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Project: BL-0044

25: NOV 2024 14:18 Signals\SIGNAL Design Section\Central Region\Div 7\BL-0044\BL0044-1-sig-tsh.dgn
P: ziemba

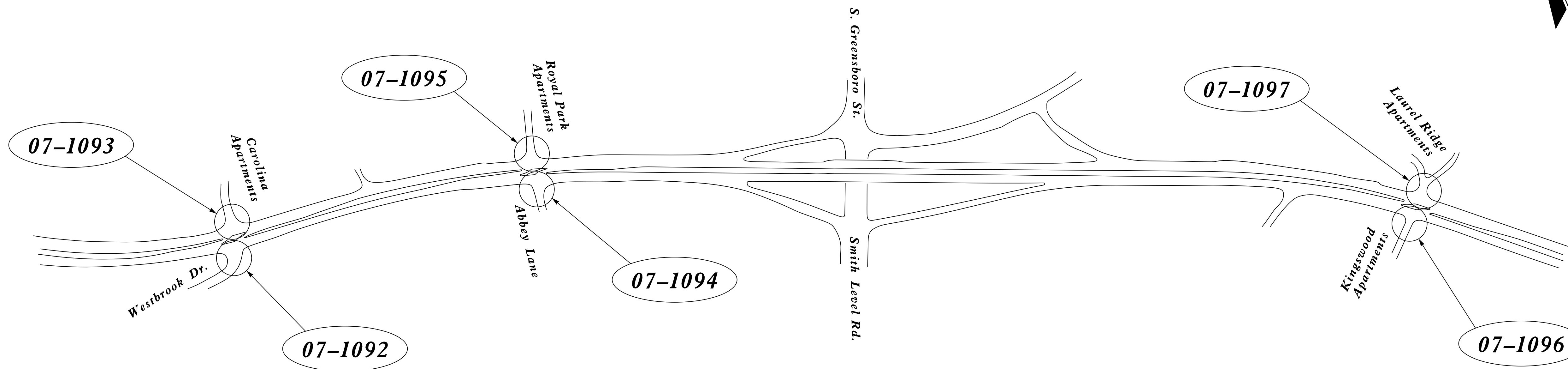
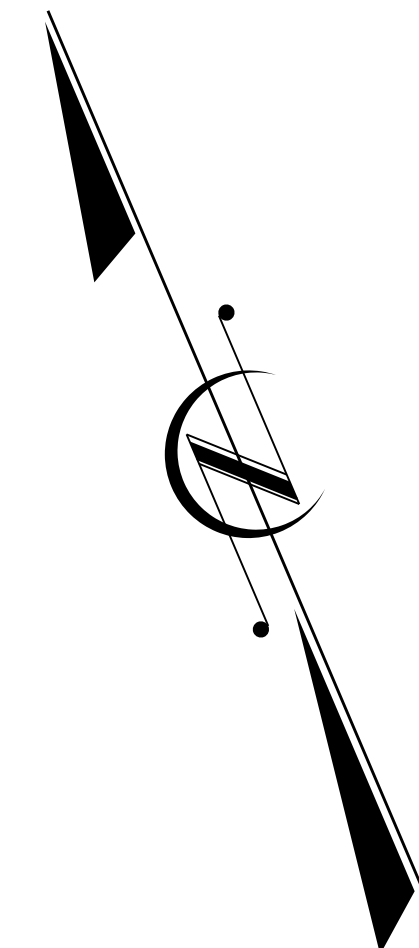
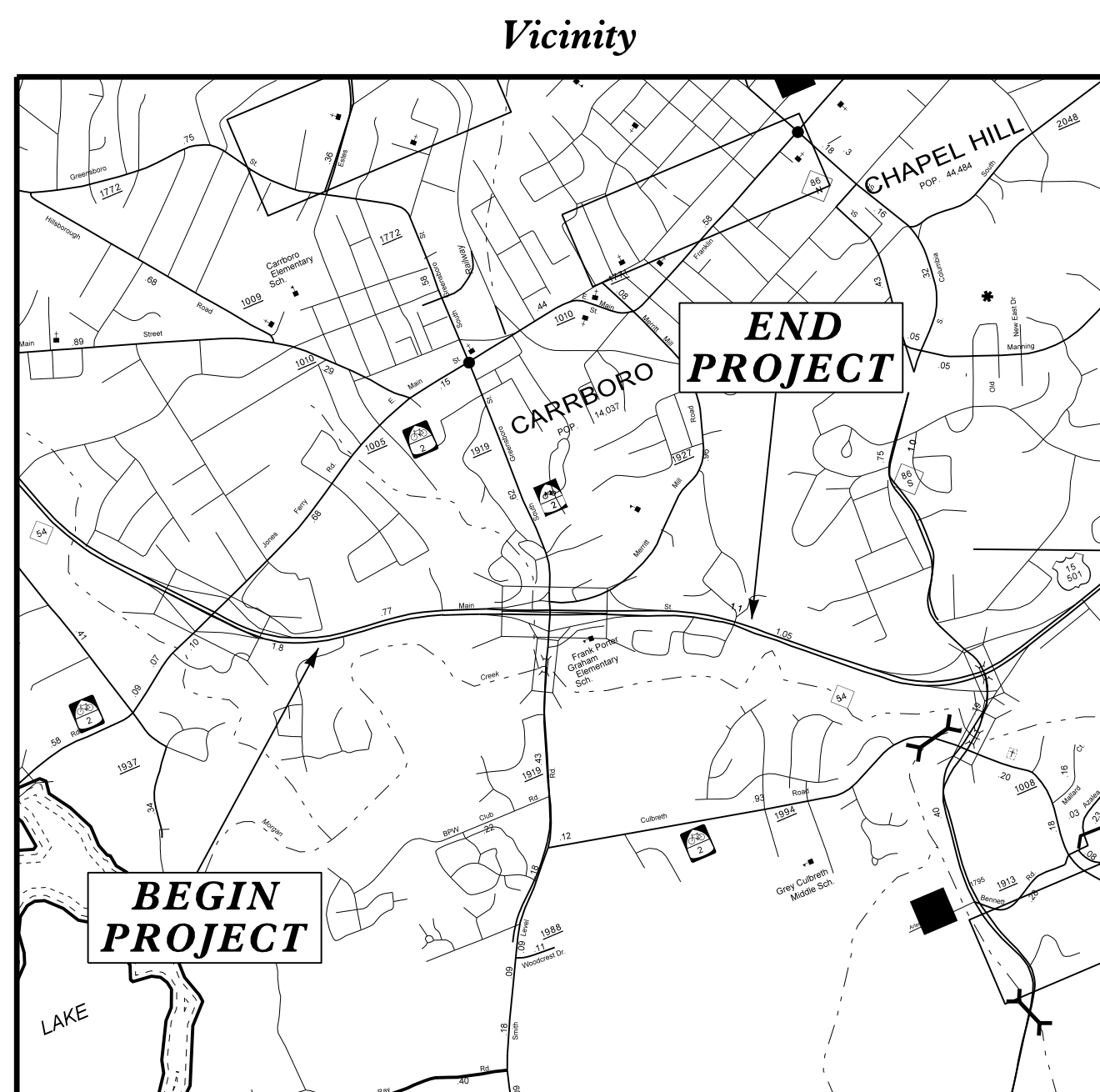
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

Project No.	Sheet No.
BL-0044	Sig. 1.0

ORANGE COUNTY

LOCATION: NC 54 FROM WESTBROOK DRIVE TO KINGSWOOD APARTMENTS

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



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

Sheet #	Reference #	Index of Plans	Location/Description
Sig. 1.0	-----	Title Sheet	
Sig. 2.0-2.5	07-1092	NC 54 EB at Westbrook Drive	
Sig. 3.0-3.5	07-1093	NC 54 WB at Carolina Apartments	
Sig. 4.0-4.5	07-1094	NC 54 EB at Abbey Lane	
Sig. 5.0-5.5	07-1095	NC 54 WB at Royal Park Apartments	
Sig. 6.0-6.5	07-1096	NC 54 EB at Kingswood Apartments	
Sig. 7.0-7.5	07-1097	NC 54 WB at Laurel Ridge Apartments	
MIA-M8	-----	Standard Metal Pole Details	
SCP 1-6	-----	Signal Communication Plans	

**TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATIONS**

Contacts:

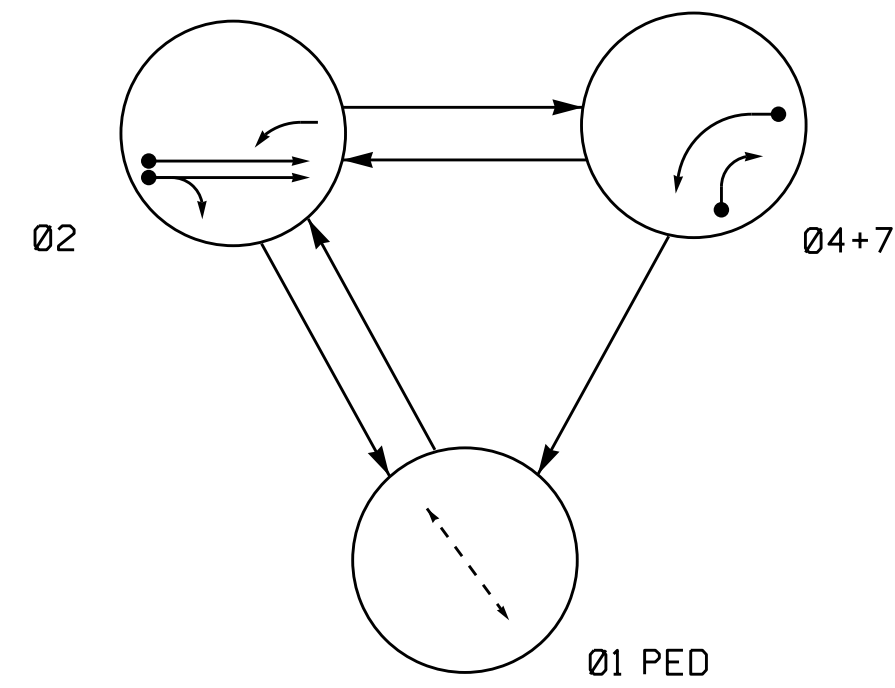
Robert J. Ziemba, PE - Central Region Signals Engineer
D. Todd Joyce, PE - Signal Equipment Design Engineer
Gregg Green - Signal Communications Project Engineer

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

TSMO UNIT

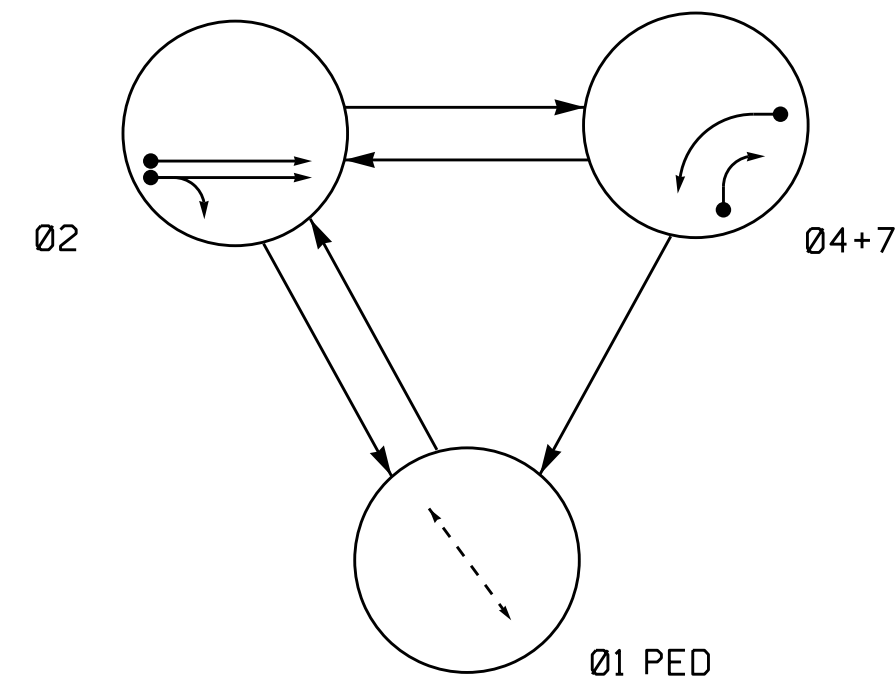
750 N. Greenfield Parkway, Garner, NC 27529

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02	04+7	01 PED	F LUSH
21	↑	R	R	Y
22	G	R	R	Y
41, 42	R	←	R	R
71	←	←	←	←
P11, P12	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02	04+7	01 PED	F LUSH
21	↑	R	R	Y
22	G	R	R	Y
41, 42	R	←	R	R
71	←	←	←	←
P11, P12	DW	DW	W	DRK

3 Phase Fully Actuated (Chapel Hill-Carrboro Signal System)

NOTES

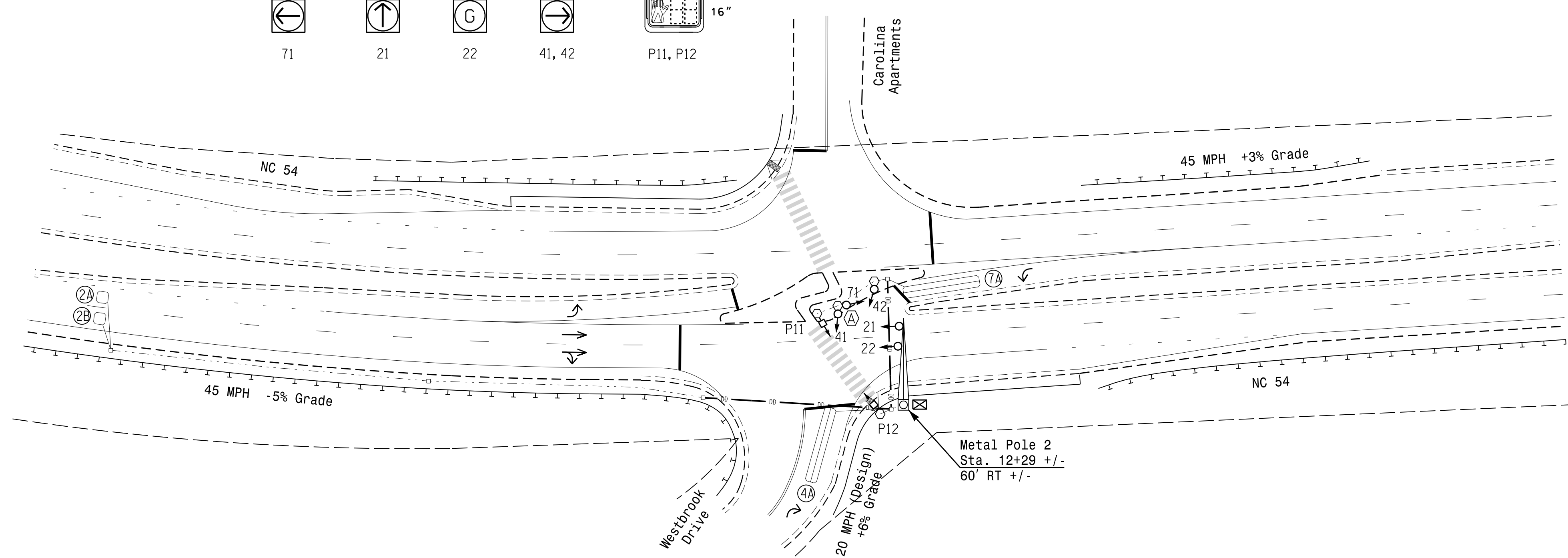
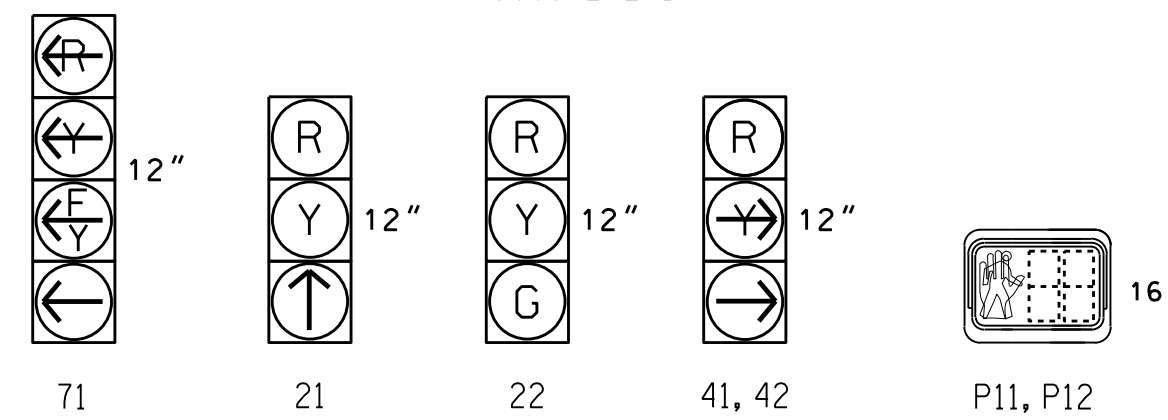
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- The order of phase 4+7 and phase 1 ped may be reversed.
- Set 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.
- The City Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.

PHASING DIAGRAM DETECTION LEGEND

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



FEATURE	PHASE			
	1 PED	2	4	7
Min Green 1 *	19	12	7	7
Extension 1 *	-	6.0	2.0	2.0
Max Green 1 *	-	75	30	30
Yellow Clearance	3.0	5.0	3.0	3.0
Red Clearance	1.0	1.9	2.3	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	7	-	-	-
Don't Walk 1	12	-	-	-
Seconds Per Actuation *	-	1.5	-	-
Max Variable Initial *	-	34	-	-
Time Before Reduction *	-	15	-	-
Time To Reduce *	-	30	-	-
Minimum Gap	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-
Dual Entry	-	-	ON	ON
Simultaneous Gap	ON	ON	ON	ON

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

INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	30	-	Y
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	30*	-	Y

* Disable Delay during alternate phasing operation.

This plan supersedes the plan signed and sealed on 10/4/22.

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	○ → N/A
□ → Sign	□ → N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → N/A
○ → Signal Pole with Guy	○ → N/A
○ → Signal Pole with Sidewalk Guy	○ → N/A
□ → Inductive Loop Detector	□ → N/A
□ → Controller & Cabinet	□ → N/A
□ → Junction Box	□ → N/A
□ → 2-in Underground Conduit	□ → N/A
--- Right of Way	--- Right of Way
→ Directional Arrow	→ Directional Arrow
N/A Curb Ramp	N/A Curb Ramp
N/A Guardrail	N/A Guardrail
○ → Metal Pole with Mastarm	○ → N/A
○ → Directional Drill	○ → N/A
○ → Type II Signal Pedestal	○ → N/A
○ → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	○ → N/A

New Installation

Prepared in the Offices of:

 TRANSPORTATION MOBILITY AND SAFETY DIVISION
 NORTH CAROLINA PROFESSIONAL ENGINEER
 ROBERT J. ZIEMBA
 03/27/2023

NC 54 EB at Westbrook Drive

Division 7 Orange County Chapel Hill

PLAN DATE: July 2022 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS: INIT. DATE

SCALE: 1" = 40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

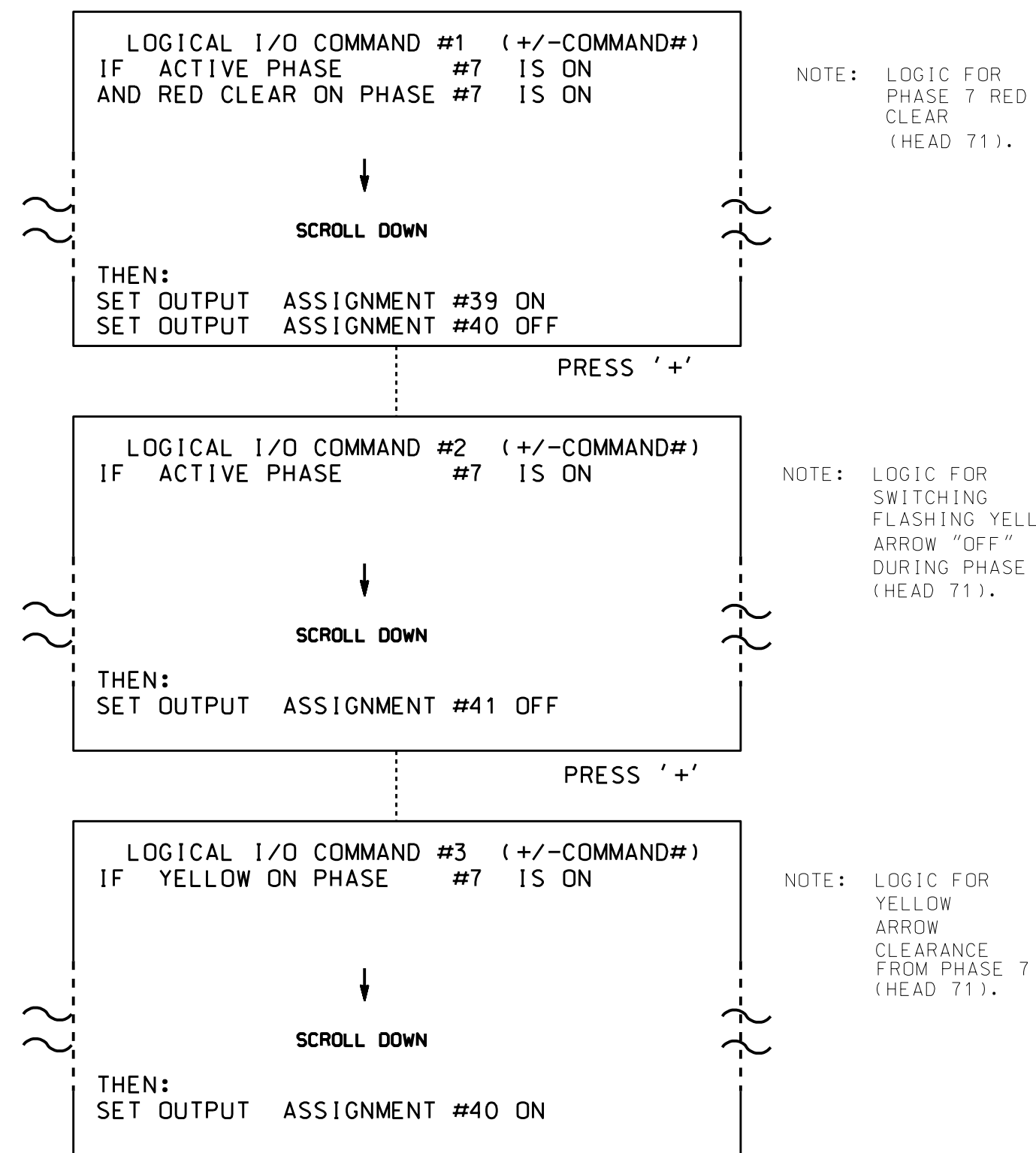
SIG. INVENTORY NO. 07-1092

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

(program controller as shown below)

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



NOTE: LOGIC FOR PHASE 7 RED CLEAR (HEAD 71).

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

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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

PED 1 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

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

CHANGING INPUT ASSIGNMENTS

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

PROGRAMMING COMPLETE

**OVERLAP PROGRAMMING DETAIL FOR
DEFAULT PHASING**

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).
PRESS '+' 3 TIMES

```

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE:           :12345678910111213141516
VEH OVL PARENTS: : X
VEH OVL NOT VEH: : X
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 (0-25.5 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.

PRESS '+' 3 TIMES

NOTICE PAGE 2

```

PAGE 2: VEHICLE OVERLAP 'D' SETTINGS
PHASE:           :12345678910111213141516
VEH OVL PARENTS: : X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR:   - RED - YELLOW - GREEN
FLASH COLORS:    - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-25.5 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

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1092
DESIGNED: July 2022
SEALED: 3/27/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Corner, NC 27529

NC 54 EB at Westbrook Drive		
Division 7	Orange County Chapel Hill	
PLAN DATE: March 2023	REVIEWED BY:	
PREPARED BY: Zarrar Zafar	REVIEWED BY:	
REVISIONS	INIT.	DATE

SEAL

DocuSigned by: *Todd Joyce* 03/30/2023

DATE

SIG. INVENTORY NO. 07-1092

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

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THIS PROGRAMMING REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 30 SECONDS TO 0 SECONDS.

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

```

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

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

(LOOP 7A - PHASE 7)

```

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

PROGRAMMING COMPLETE

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

(program controller as shown below)

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

```

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

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '7' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```

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

DETECTOR PROGRAMMING COMPLETE

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1092
 DESIGNED: July 2022
 SEALED: 3/27/2023
 REVISED: N/A

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

Electrical Detail - Sheet 3 of 4

750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 EB
at
Westbrook Drive

Division 7 Orange County Chapel Hill

PLAN DATE: March 2023 REVIEWED BY:

PREPARED BY: Zarrar Zafar REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by:
D. Todd Joyce 03/30/2023

SIG. INVENTORY NO. 07-1092

30-MAR-2023 11:33
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 zzzafar

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 71 to run protected turns only.

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

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

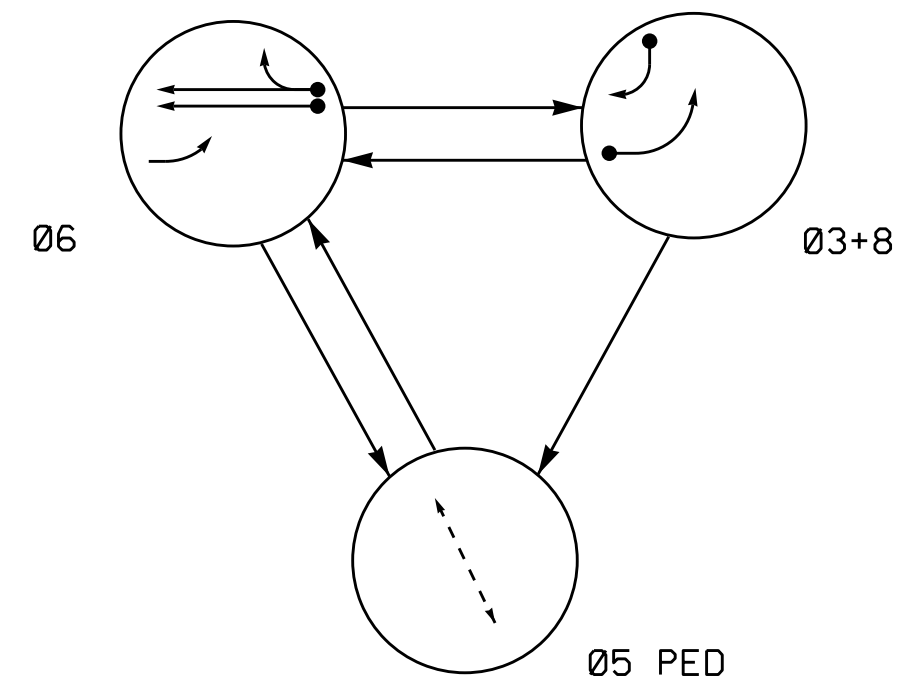
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DESIGNED: July 2022
SEALED: 3/27/2023
REVISED: N/A

Electrical Detail - Sheet 4 of 4

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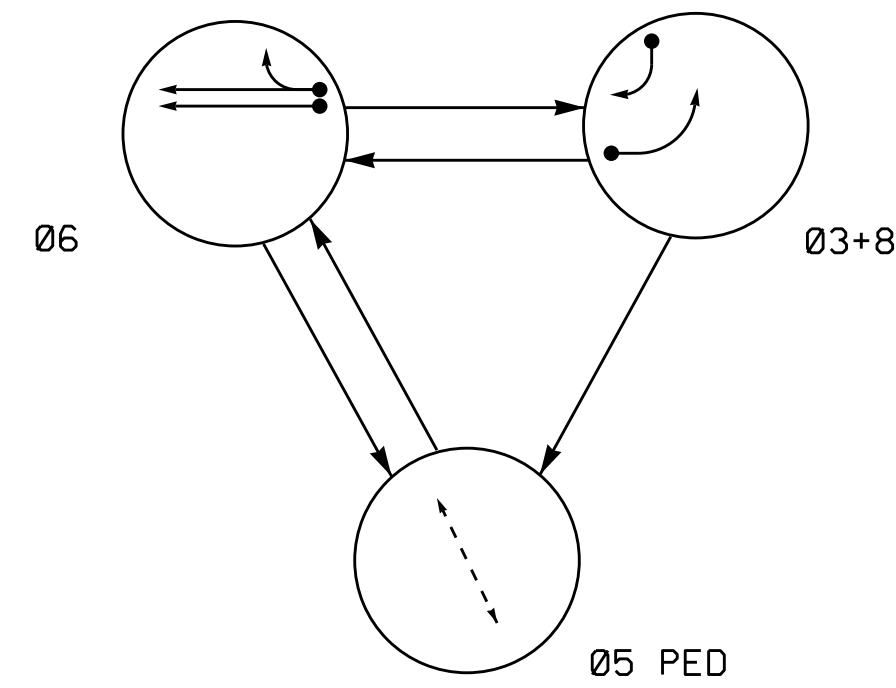
<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared in the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Coroner, NC 27529</p>	<p>NC 54 EB at Westbrook Drive</p> <p style="font-size: x-small;">Division 7 Orange County Chapel Hill</p> <p style="font-size: x-small;">PLAN DATE: March 2023 REVIEWED BY:</p> <p style="font-size: x-small;">PREPARED BY: Zarrar Zafar REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	INIT.	DATE										<p style="text-align: center; font-size: x-small;">SEAL</p> <p style="font-size: x-small;">DocuSigned by: D. Todd Joyce 03/30/2023</p> <p style="font-size: x-small;">AR0CADEFB042410 DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1092</p>
REVISIONS	INIT.	DATE												

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			
	03+8	06	05 PED	08
31	←	↑	→	↘
61	R	↑	R	Y
62	R	G	R	Y
81, 82	→	R	R	R
P51, P52	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM

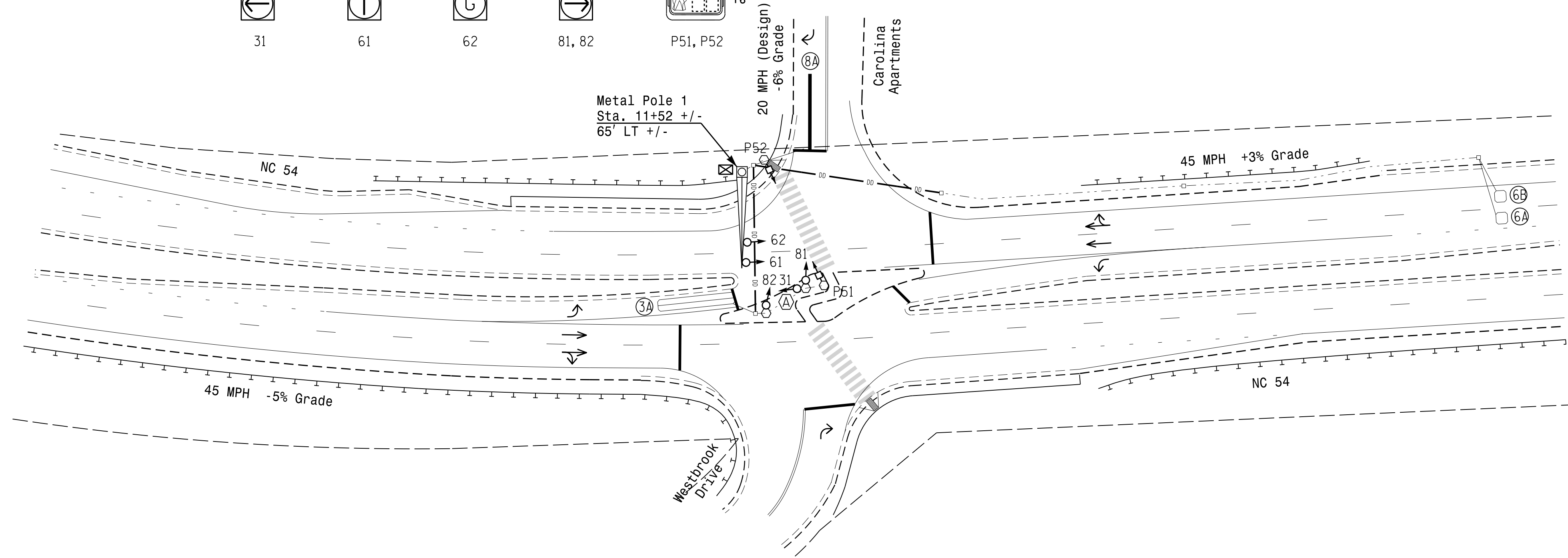
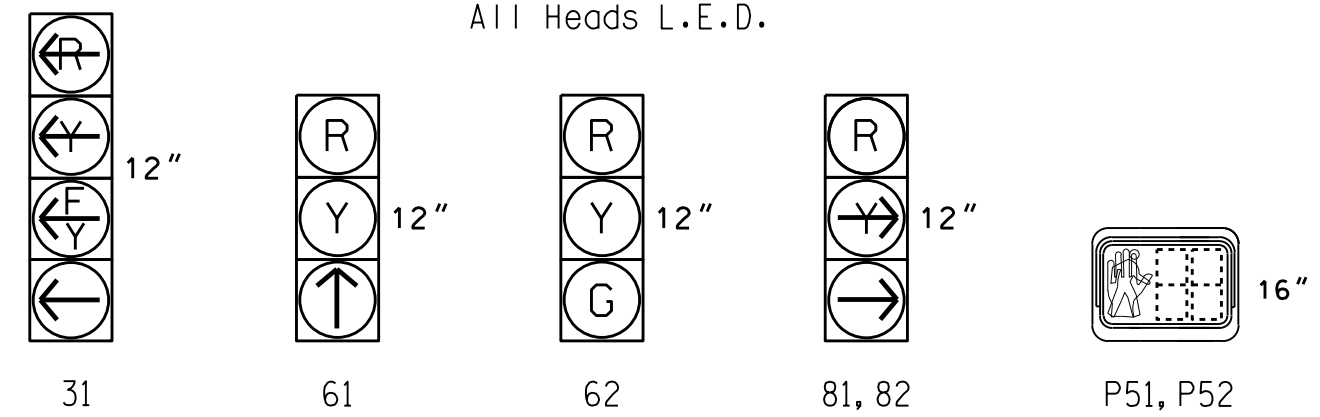


SIGNAL FACE	PHASE			
	03+8	06	05 PED	08
31	←	R	R	↘
61	R	↑	R	Y
62	R	G	R	Y
81, 82	→	R	R	R
P51, P52	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

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

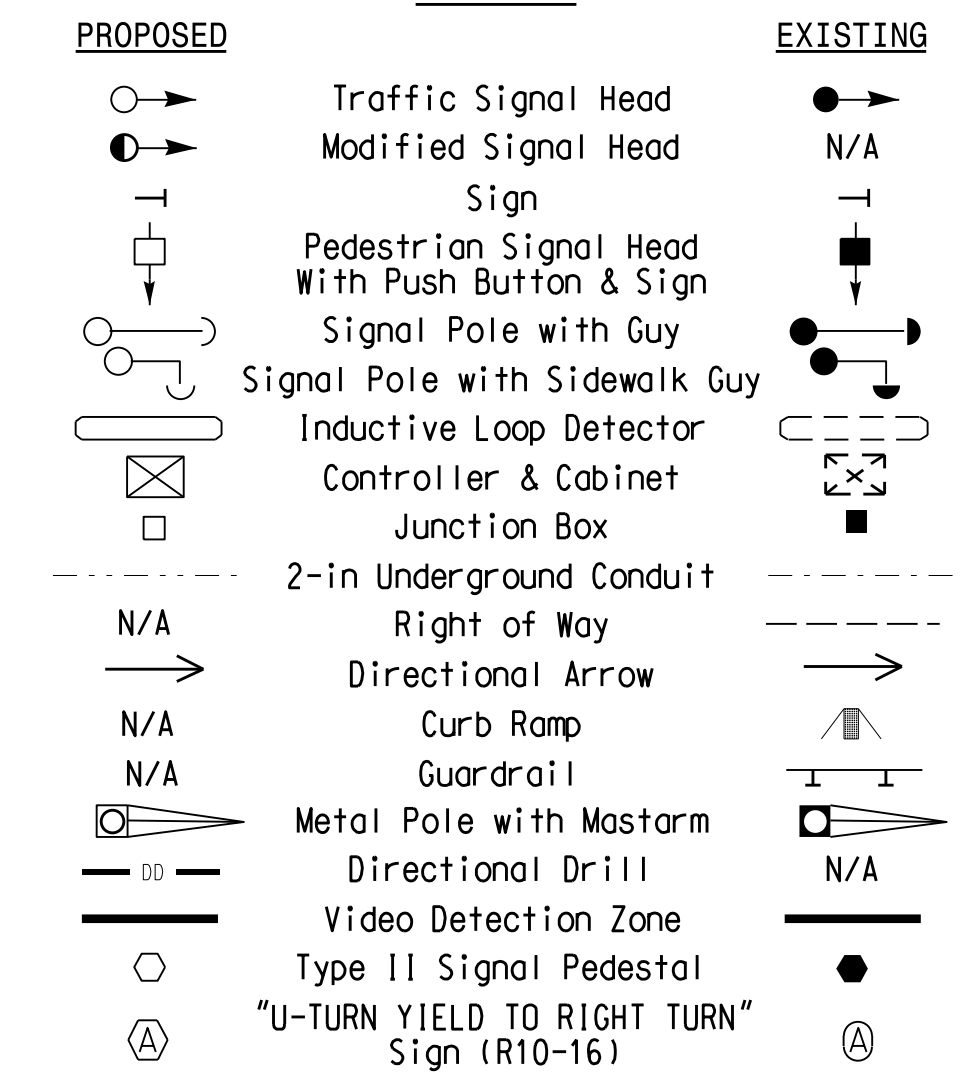


3 Phase Fully Actuated (Chapel Hill-Carrboro Signal System)

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.
- The order of phase 3+8 and phase 5 ped may be reversed.
- 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.
- The City Traffic Engineer will determine the hours of use for each phasing plan.
- This intersection uses video 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.

LEGEND



FEATURE	PHASE			
	3	5 PED	6	8
Min Green 1*	7	21	12	7
Extension 1*	2.0	-	6.0	2.0
Max Green 1*	30	-	75	30
Yellow Clearance	3.1	3.0	4.3	3.1
Red Clearance	2.3	1.0	1.6	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1*	-	7	-	-
Don't Walk 1	-	14	-	-
Seconds Per Actuation*	-	-	1.5	-
Max Variable Initial*	-	-	34	-
Time Before Reduction*	-	-	15	-
Time To Reduce*	-	-	30	-
Minimum Gap	-	-	3.0	-
Recall Mode	-	-	MIN RECALL	-
Vehicle Call Memory	-	-	YELLOW	-
Dual Entry	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
LOOP / ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	STRETCH FULL TIME DELAY	DELAY TIME	SYSTEM LOOP	NEW CARD
3A	6X40	0	2-4-2	Y	3	Y	Y	-	30*	-	Y
6A	6X6	300	5	Y	6	Y	Y	-	-	-	Y
6B	6X6	300	5	Y	6	Y	Y	-	-	-	Y
8A@	6X40	0	@	Y	8	Y	Y	-	30	-	@

* Disable Delay during alternate phasing operation.
 @ Video Detection Zone.

This plan supersedes the plan signed and sealed on 10/4/22.

New Installation

Prepared in the Offices of:
 Transportation Mobility and Safety Solutions
 NORTH CAROLINA PROFESSIONAL ENGINEERS
 STREET OF EXCELLENCE
 Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 WB at Carolina Apartments

Division 7 Orange County Chapel Hill

PLAN DATE: July 2022 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS

REVISIONS	INIT.	DATE

SCALE: 1" = 40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

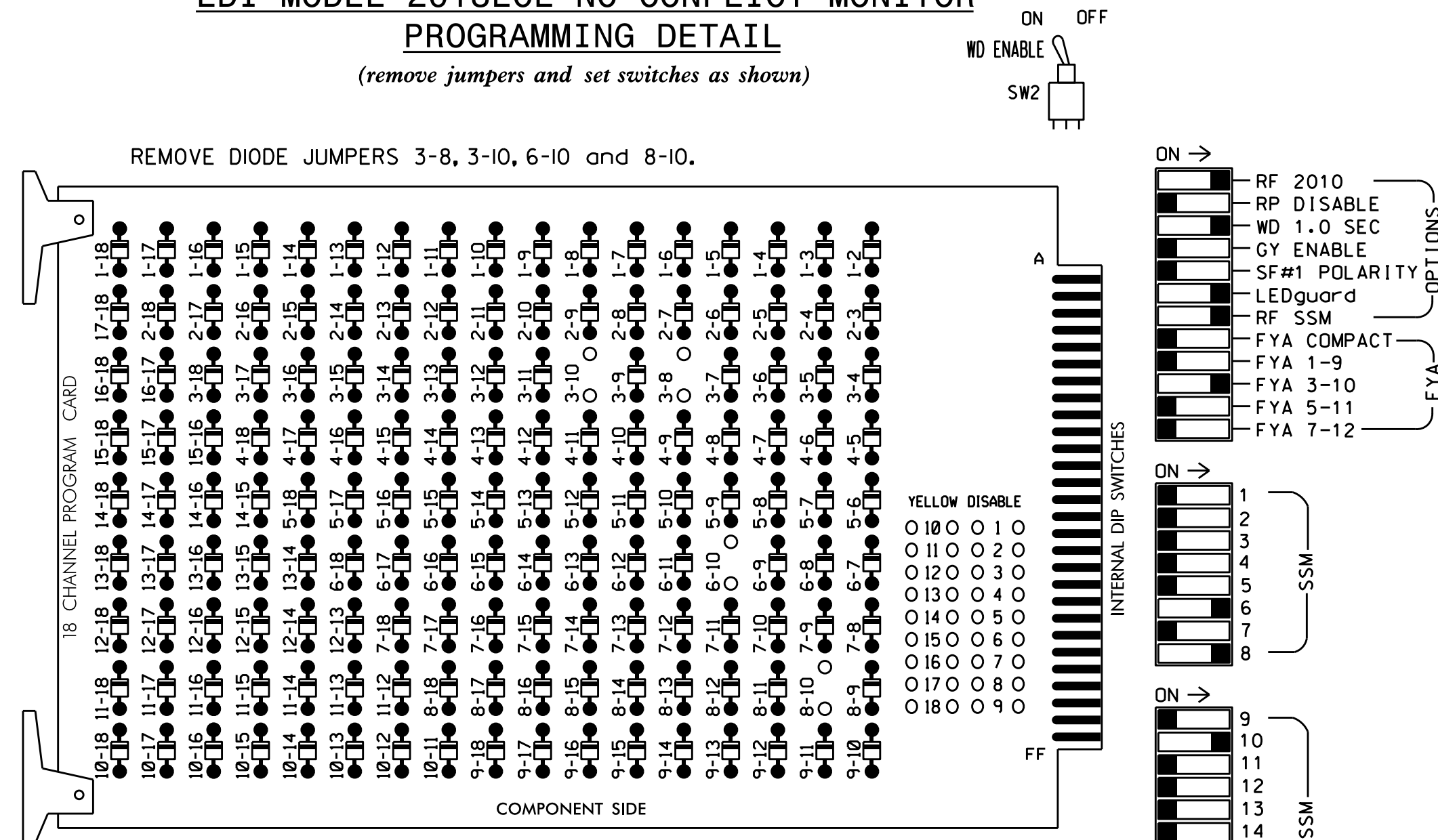
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEERS
 SEAL 026486
 ROBERT J. JENSEN
 ENGINEER

03/27/2023
 DATE

SIG. INVENTORY NO. 07-1093

27-MAY-2023 11:55
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 rz:lemo

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)



- NOTES:**
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 3 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phase 6 for Variable Initial and Gap Reduction.
- Program phase 6 for Startup In Green.
- Program phase 5 for Startup Ped Call.
- Program phase 6 for Yellow Flash.
- The cabinet and controller are part of the Chapel Hill-Carrboro 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,S6,S8,S11,AUX S2
 PHASES USED.....3,5*,5 PED,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....3+6
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

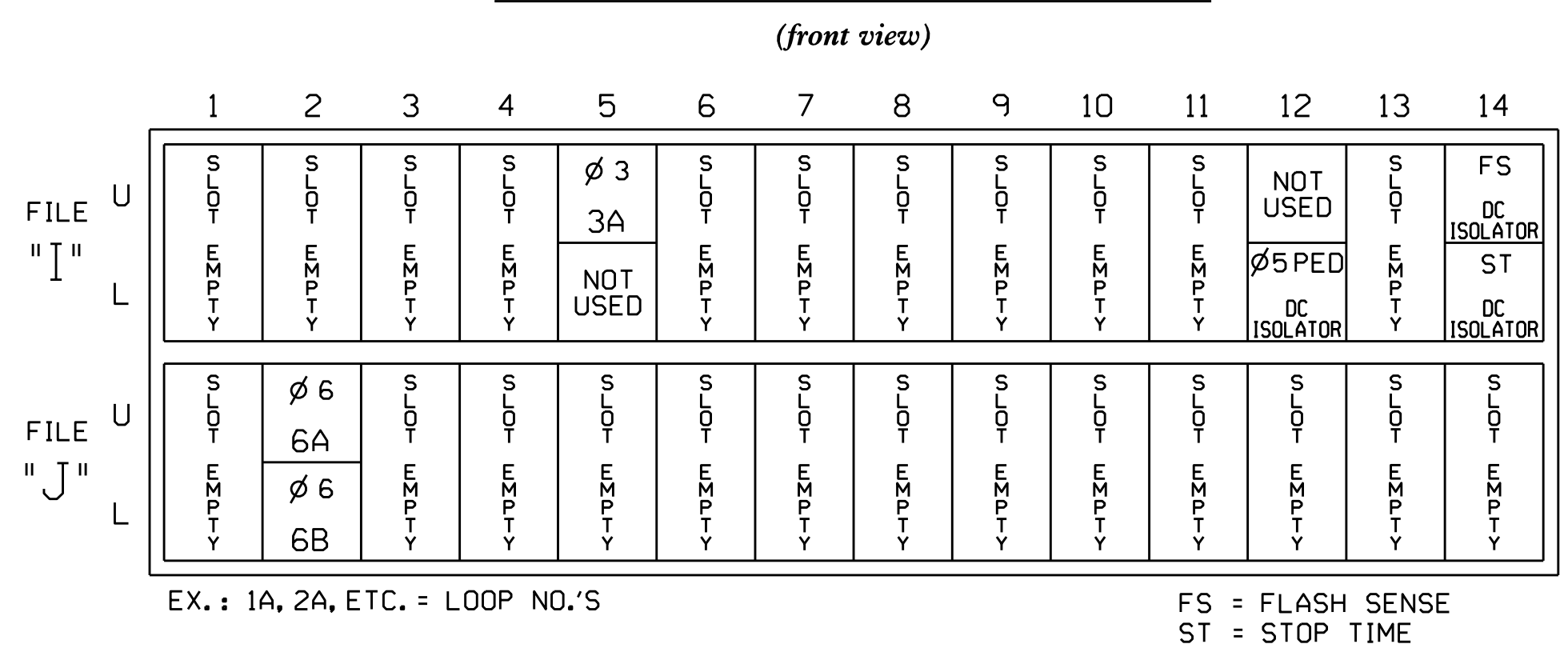
* Phase used for timing purposes only.

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	5 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31*	NU	P51, P52	NC	61	62	NU	NU	81,82	NU	NU	31*	NU	NU	NU
RED								134	134			107						
YELLOW				*				135	135									
GREEN								136										
RED ARROW																A124		
YELLOW ARROW												108				A125		
FLASHING YELLOW ARROW																A126		
GREEN ARROW				118				136				109						
Hand																		104
Person																		106

NU = Not Used
 NC = No Connection
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT



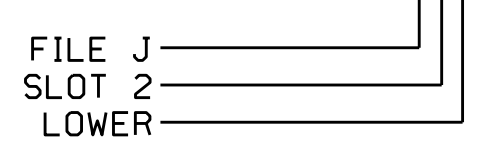
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			30
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
PED PUSH BUTTONS											
P51,P52	TB8-5,6	I12L	69	31							

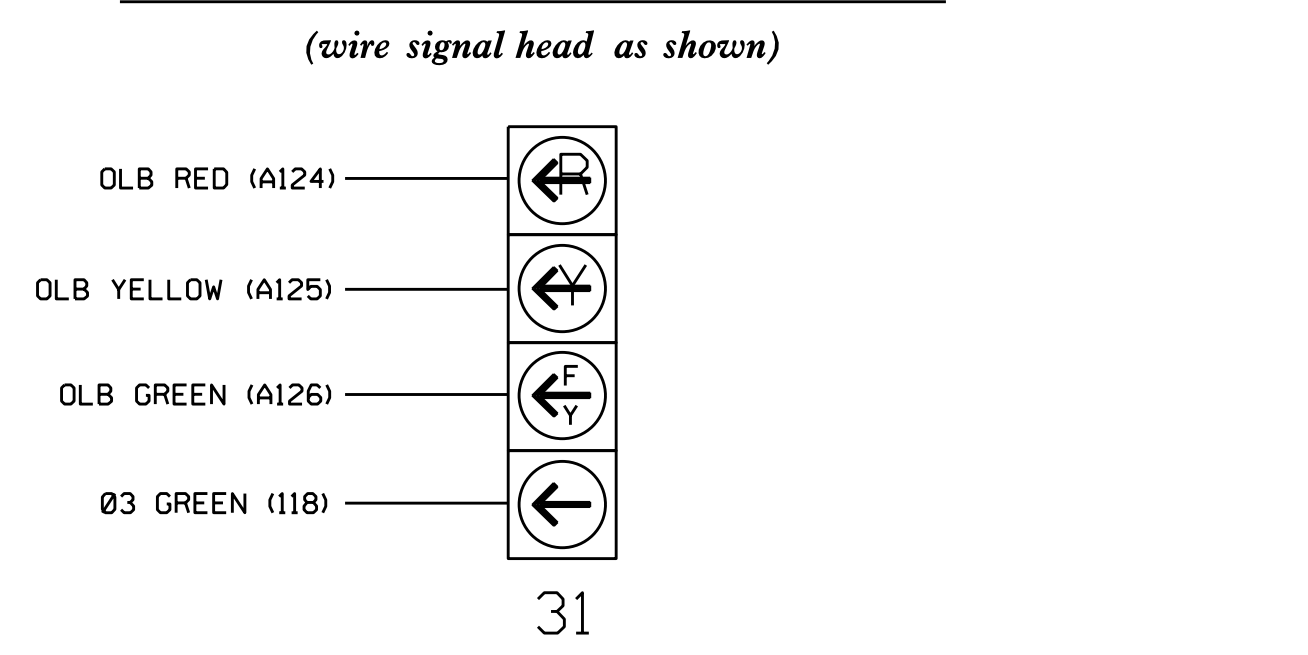
NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 112.

* See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND:



FYA SIGNAL WIRING DETAIL

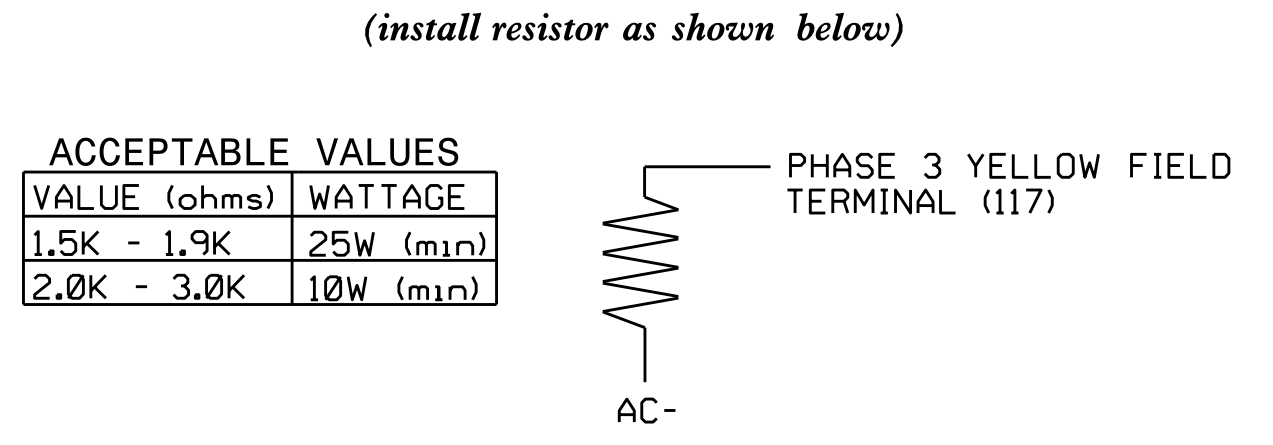


NOTE
 The sequence display for signal head 31 requires special logic programming. See sheet 2 for programming instructions.

SPECIAL DETECTOR NOTE

For zone 8A, install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

LOAD RESISTOR INSTALLATION DETAIL



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: 07-1093
 DESIGNED: July 2022
 SEALED: 3/27/2023
 REVISED: N/A

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 031001
 D. Todd Joyce
 03/30/2023

Prepared in the Offices of:
 Transportation Mobility and Safety Division
 STATE OF NORTH CAROLINA
 Department of Transportation
 Signal Management Section
 750 N. Greenfield Pkwy, Corner, NC 27529

ELECTRICAL AND PROGRAMMING DETAILS FOR:
 NC 54 WB at Carolina Apartments
 Division 7 Orange County Chapel Hill
 PLAN DATE: March 2023 REVIEWED BY:
 PREPARED BY: Zafar Zafar REVIEWED BY:
 REVISIONS INIT. DATE

SIG. INVENTORY NO. 07-1093

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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. THIS PROGRAMMING REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 30 SECONDS TO 0 SECONDS.

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

```

PAGE: 2 C1 PIN:58 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....20
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....3
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR 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 '53' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 3A - PHASE 3)

```

PAGE: 2 C1 PIN:58 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....20
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....53
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR 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 3A (ALT.)

(program controller as shown below)

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

```

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

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '3' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```

VEHICLE DETECTOR #53 SETTINGS (+,-,1-64)
SETTING: (Y/N)
ENABLE DETECTOR.....Y
ENABLE LOGGING.....N
ENABLE DIAGNOSTICS.....N
SPEED TRAP.....N
CALL DETECTOR.....Y
EXTENSION DETECTOR.....Y
MODE 2 STOP BAR.....N
SWITCHING DETECTOR.....N
DUPLICATING DETECTOR.....N
ENABLE FULL TIME DELAY.....N
IF FAILED, SET MIN RECALL?.....N
IF FAILED, SET MAX1 RECALL?.....N
IF FAILED, SET MAX2 RECALL?.....N
PHASE# :12345678910111213141516
PHASES ASSIGNED : X
SWITCH/DUPLICATE:
LOOP SIZE (0-255 FT).....6
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC).....0
STRETCH (0-25.5 SEC).....0.0
DELAY (0-255 SEC).....0.0
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
    
```

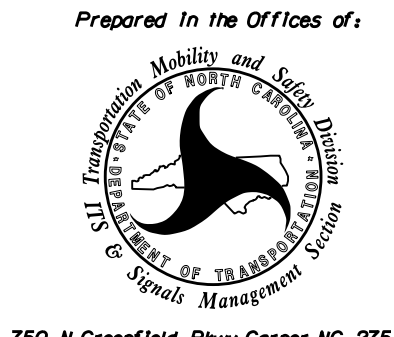
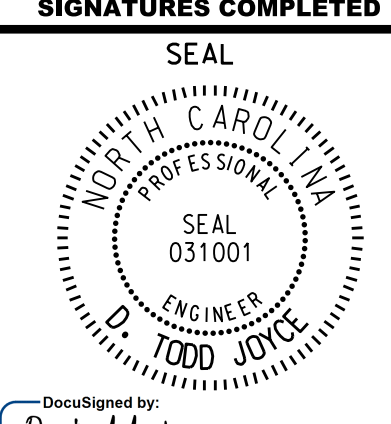
DETECTOR PROGRAMMING COMPLETE

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

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1093
DESIGNED: July 2022
SEALED: 3/27/2023
REVISED: N/A

Electrical Detail - Sheet 3 of 4

	NC 54 WB at Carolina Apartments		
	Division 7 PLAN DATE: March 2023 PREPARED BY: Zarrar Zafar	Orange County REVIEWED BY: REVIEWED BY:	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS: _____ INIT. DATE

SIG. INVENTORY NO. 07-1093

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 31 to run protected turns only.

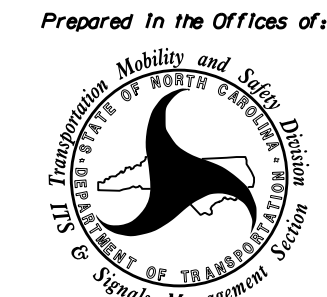
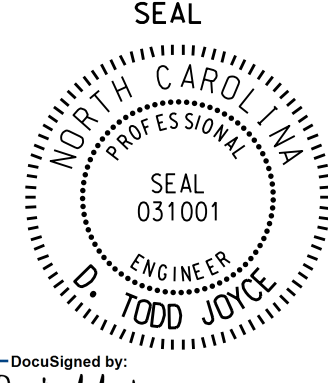
INPUTS PAGE 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

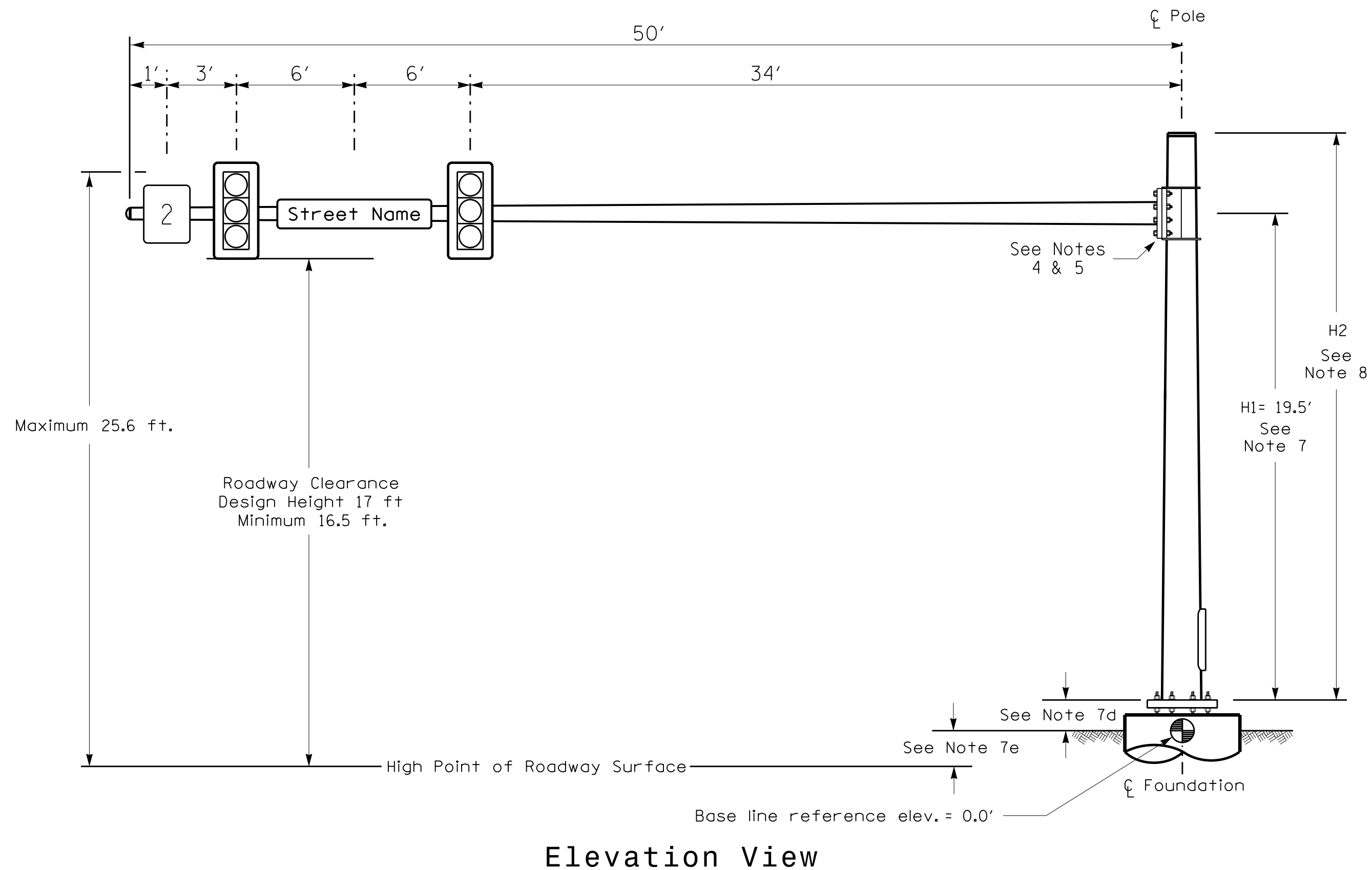
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DESIGNED: July 2022
SEALED: 3/27/2023
REVISED: N/A

Electrical Detail - Sheet 4 of 4

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<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared in the Offices of:</p>  <p style="font-size: x-small;">750 N. Greenfield Pkwy, Coroner, NC 27529</p>	<p>NC 54 WB at Carolina Apartments</p> <p style="font-size: x-small;">Division 7 Orange County Chapel Hill</p> <p style="font-size: x-small;">PLAN DATE: March 2023 REVIEWED BY:</p> <p style="font-size: x-small;">PREPARED BY: Zarrar Zafar REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	INIT.	DATE										<p style="text-align: center; font-size: x-small;">SEAL</p>  <p style="font-size: x-small;">DocuSigned by: D. Todd Joyce 03/30/2023</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1093</p>
REVISIONS	INIT.	DATE												

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 ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+1.0 ft.
Elevation difference at Edge of travelway or face of curb	0.0 ft.

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
BL-0044	Sig 3.5

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
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

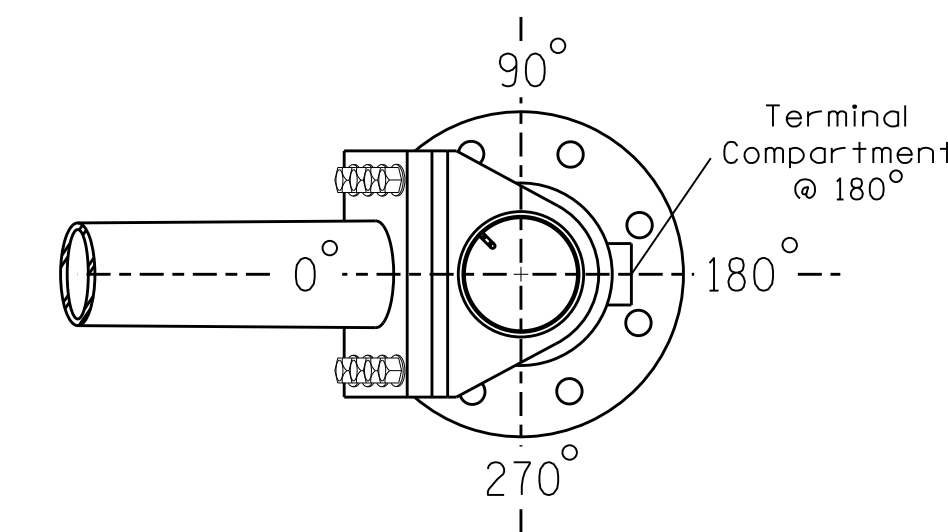
NOTES

DESIGN REFERENCE MATERIAL

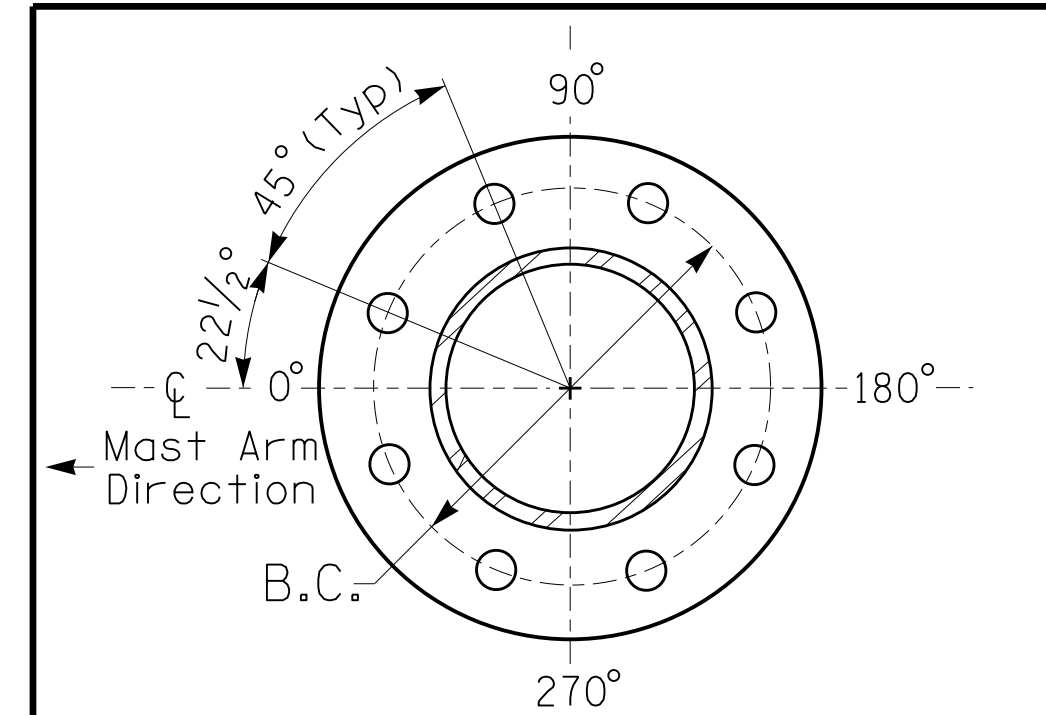
- Design the traffic signal structure and foundation in accordance with:
 - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2024 NCDOT "Standard Specifications for 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.
- 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.

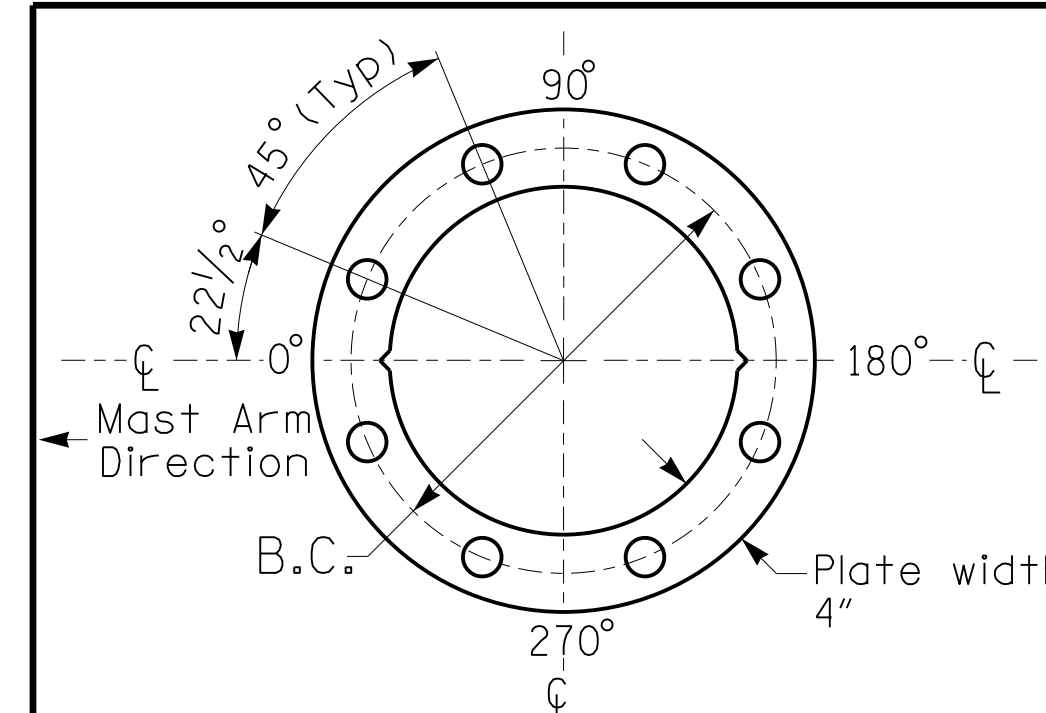


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



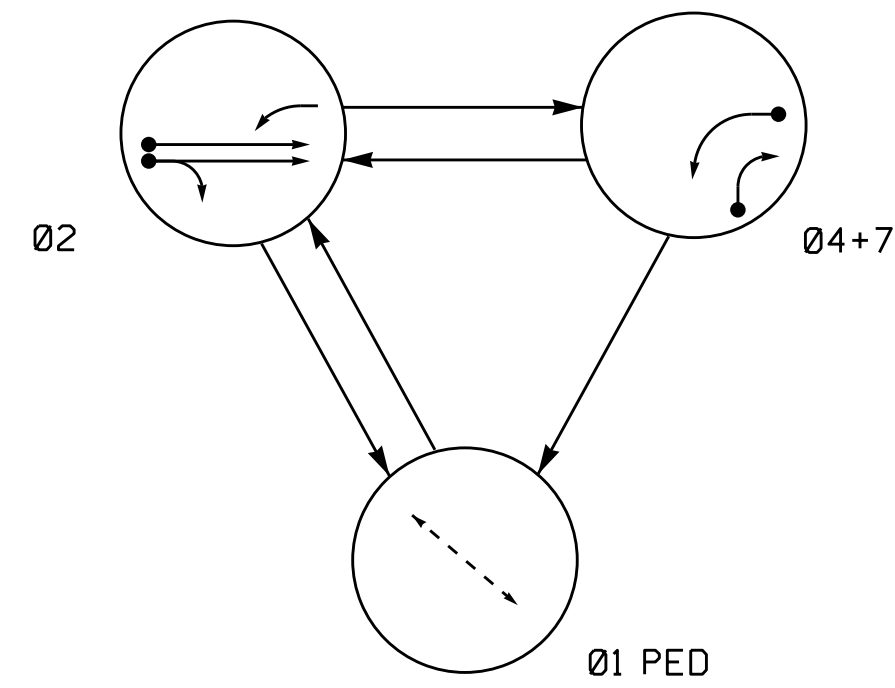
BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 4 (120 mph)

<p>Prepared in the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION DIVISION OF NORTH CAROLINA TRANSPORTATION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 54 WB at Carolina Apartments</p>		<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>
	<p>Division 7 Orange County Chapel Hill</p> <p>PLAN DATE: July 2023 REVIEWED BY:</p> <p>PREPARED BY: J.A. Lohr REVIEWED BY:</p>	<p>REVISIONS</p> <p>INIT. DATE</p>	
<p>SIG. INVENTORY NO. 07-1093</p>			<p>DATE: 11/28/2023</p>

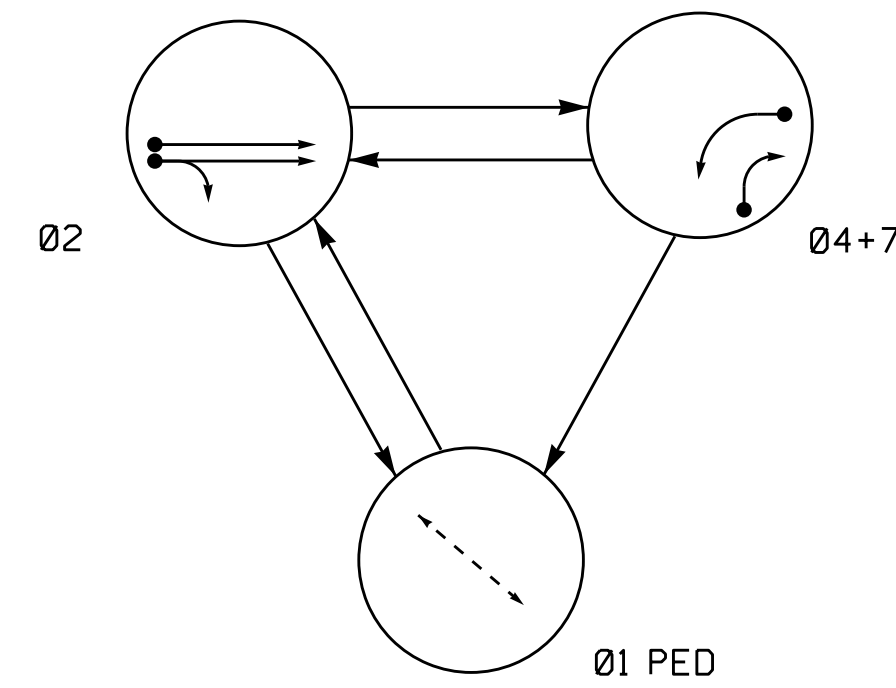
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 rz1:erba

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02	04+7	01 PED	FLASH
21	↑	R	R	Y
22	G	R	R	Y
41, 42	R	→	R	Y
71	↔	↔	↔	Y
P11, P12	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM



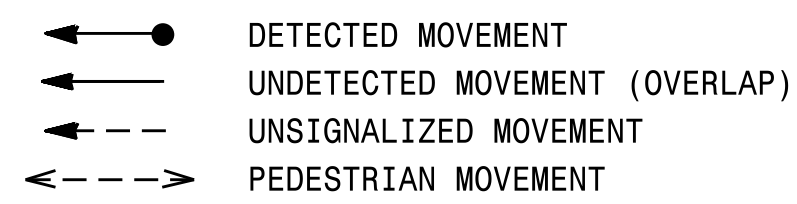
SIGNAL FACE	PHASE			
	02	04+7	01 PED	FLASH
21	↑	R	R	Y
22	G	R	R	Y
41, 42	R	→	R	Y
71	↔	↔	↔	Y
P81, P82	DW	DW	W	DRK

3 Phase Fully Actuated (Chapel Hill-Carrboro Signal System)

NOTES

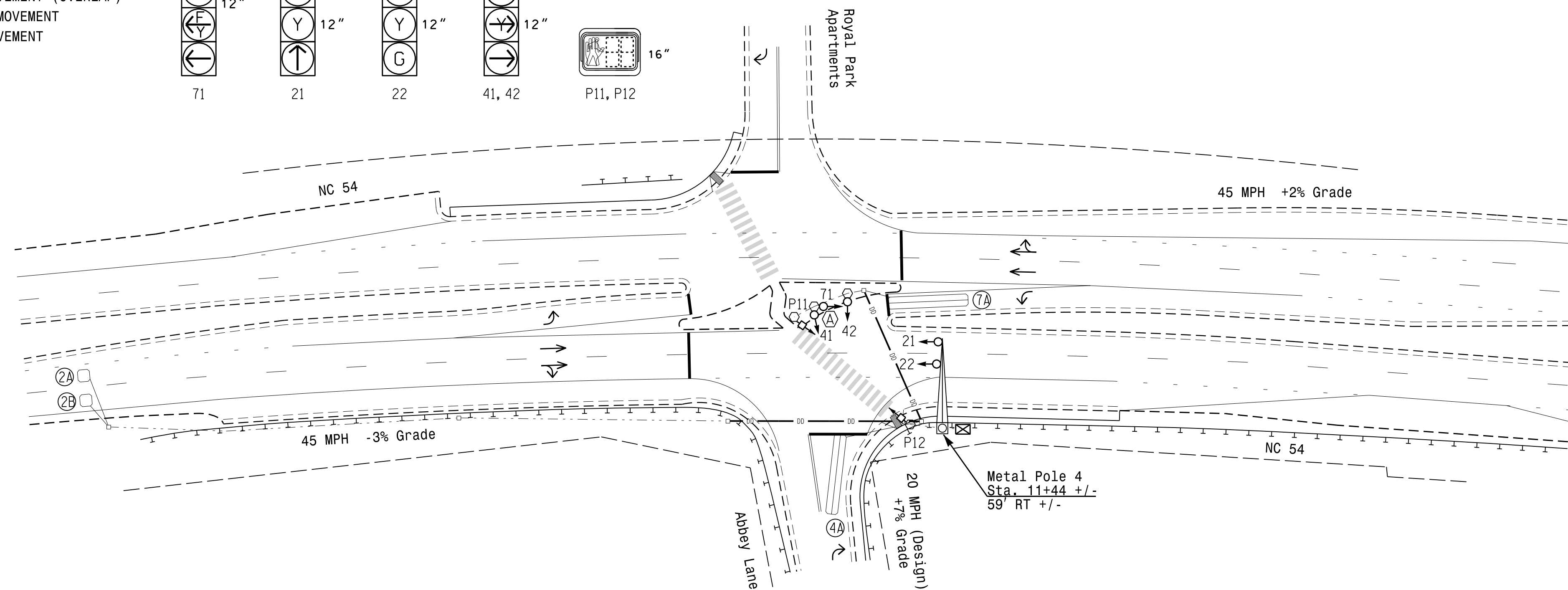
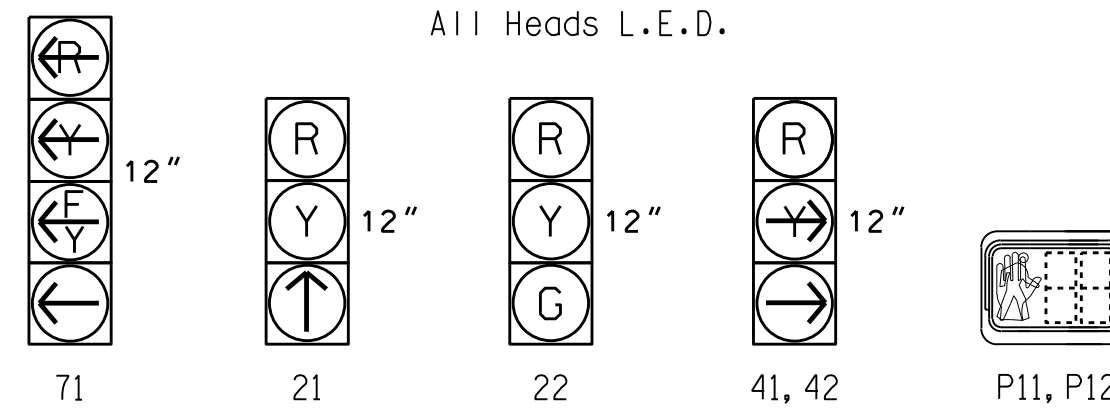
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. The order of phase 4+7 and phase 1 ped may be reversed.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. The City Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	1 PED	2	4	7
Min Green 1 *	24	12	7	7
Extension 1 *	-	6.0	2.0	2.0
Max Green 1 *	-	75	30	30
Yellow Clearance	3.0	4.8	3.0	3.0
Red Clearance	1.0	1.6	2.3	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	7	-	-	-
Don't Walk 1	17	-	-	-
Seconds Per Actuation *	-	1.5	-	-
Max Variable Initial *	-	34	-	-
Time Before Reduction *	-	15	-	-
Time To Reduce *	-	30	-	-
Minimum Gap	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-
Dual Entry	-	-	ON	ON
Simultaneous Gap	ON	ON	ON	ON

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	INDUCTIVE LOOPS			DETECTOR PROGRAMMING							
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	Y	2	Y	Y	-	-	-	Y
2B	6X6	300	5	Y	2	Y	Y	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	30	-	Y
7A	6X40	0	2-4-2	Y	7	Y	Y	-	30*	-	Y

* Disable Delay during alternate phasing operation.

This plan supersedes the plan signed and sealed on 10/4/22.

PROPOSED	LEGEND	EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
	Right of Way	
	Directional Arrow	
	Curb Ramp	
	Guardrail	
	Metal Pole with Mastarm	
	Directional Drill	N/A
	Type II Signal Pedestal	
	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	

New Installation

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 EB at Abbey Lane

Division 7 Orange County Chapel Hill

PLAN DATE: July 2022 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

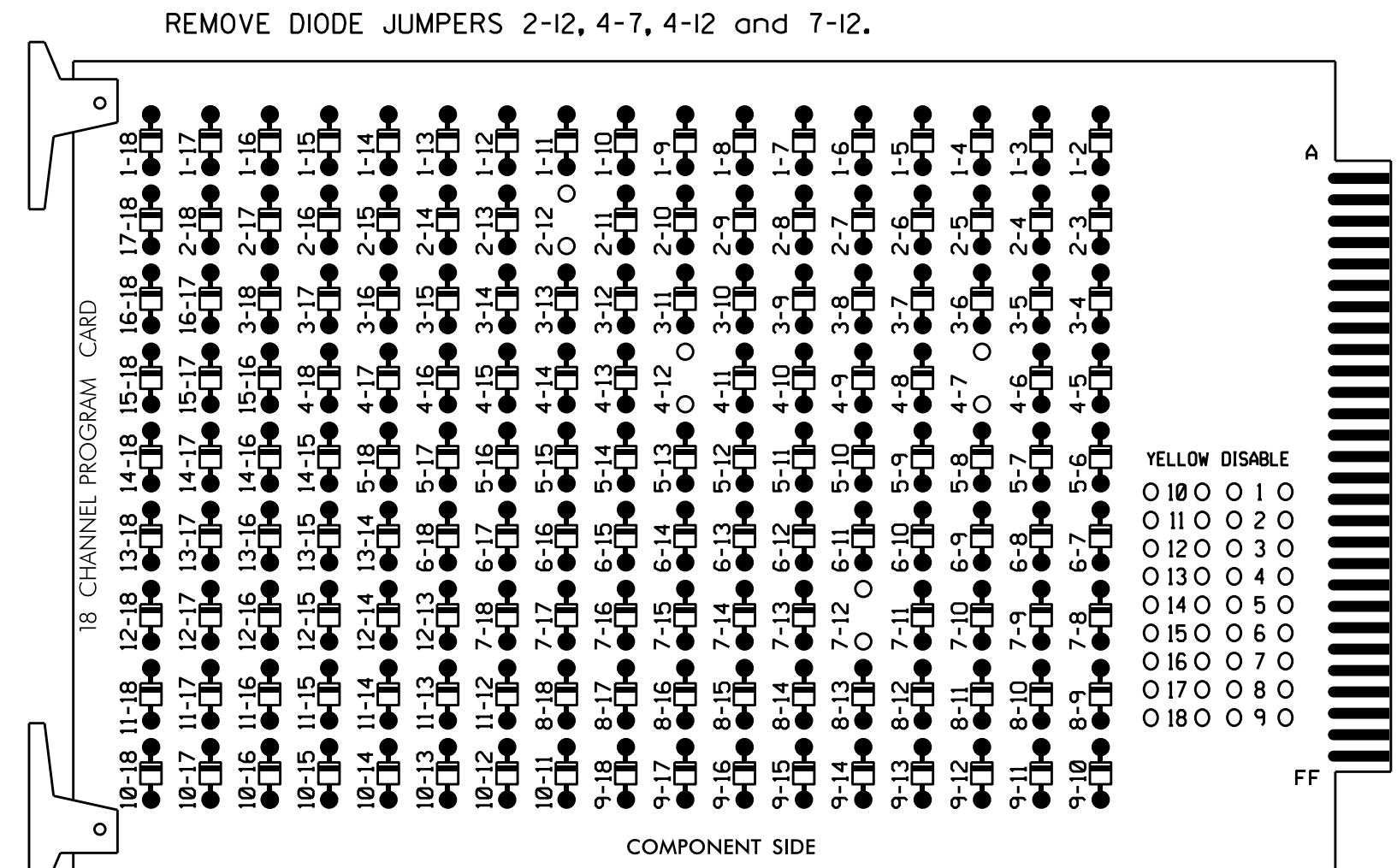
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

03/27/2023

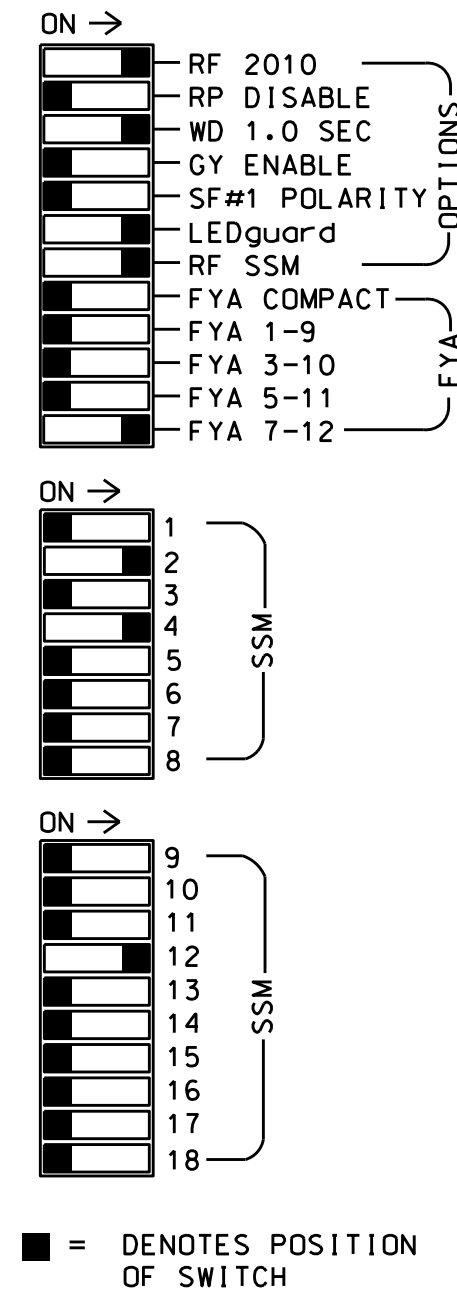
SIG. INVENTORY NO. 07-1094

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- NOTES:**
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 7 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phase 2 for Variable Initial and Gap Reduction.
- Program phase 2 for Startup In Green.
- Program phase 1 for Startup Ped Call.
- Program phase 2 for Yellow Flash.
- The cabinet and controller are part of the Chapel Hill-Carrboro 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,S10,S12,AUX S5
 PHASES USED.....1*,1 PED,2,4,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....2+7

* Phase used for timing purposes only.

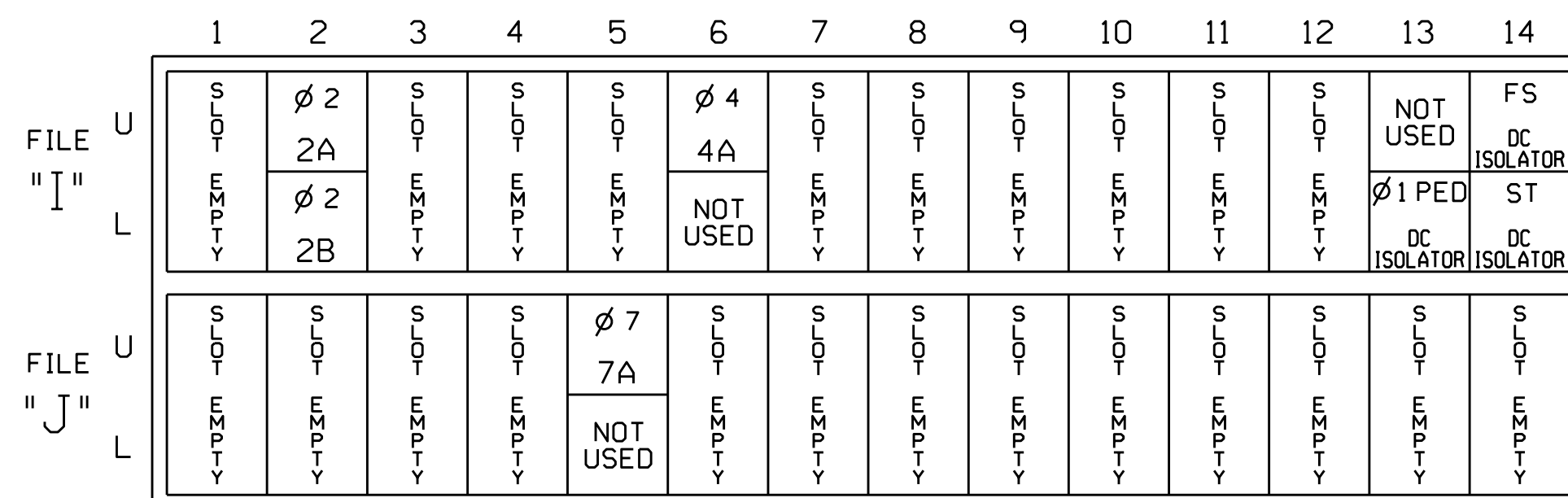
SIGNAL HEAD HOOK-UP CHART

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	1 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NC	21	22	NU	NU	41,42	NU	NU	NU	71	★	NU	P11, P12	NU	NU	NU	71	★
RED		128	128			101												
YELLOW		129	129								*							
GREEN			130															
RED ARROW																		A101
YELLOW ARROW						102												A102
FLASHING YELLOW ARROW																		A103
GREEN ARROW		130				103				124								
Hand													110					
Walking Person																		112

NU = Not Used
 NC = No Connection
 * 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

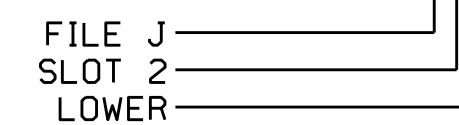
INPUT FILE CONNECTION & PROGRAMMING CHART

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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			30
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			30
PED PUSH BUTTONS											
P11,P12	TB8-8,9	I13L	70	32	PED 8	1 PED					

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

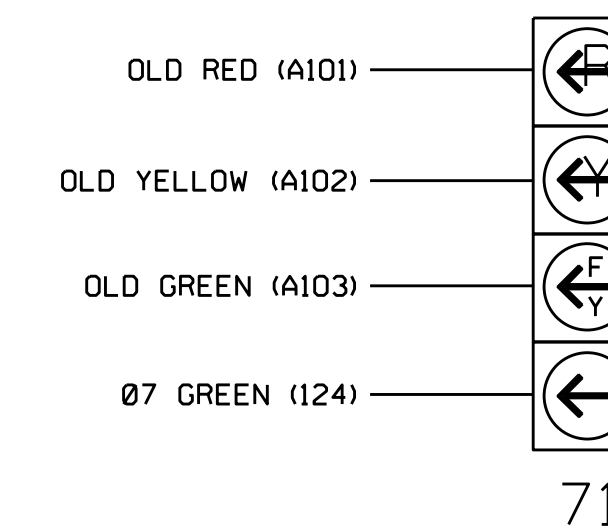
* See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

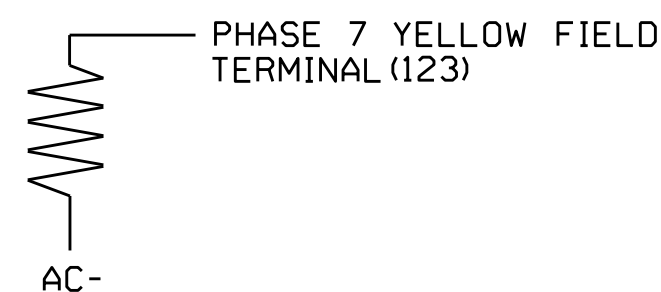
The sequence display for signal head 71 requires special logic programming. See sheet 2 for programming instructions.

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

VALUE (ohms)	WATTAGE
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: 07-1094
 DESIGNED: July 2022
 SEALED: 3/27/2023
 REVISED: N/A

Electrical Detail - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:



NC 54 EB at Abbey Lane	
Division 7	Orange County Chapel Hill
PLAN DATE: March 2023	REVIEWED BY:
PREPARED BY: Zafar Zafar	REVIEWED BY:
REVISIONS	INIT. DATE

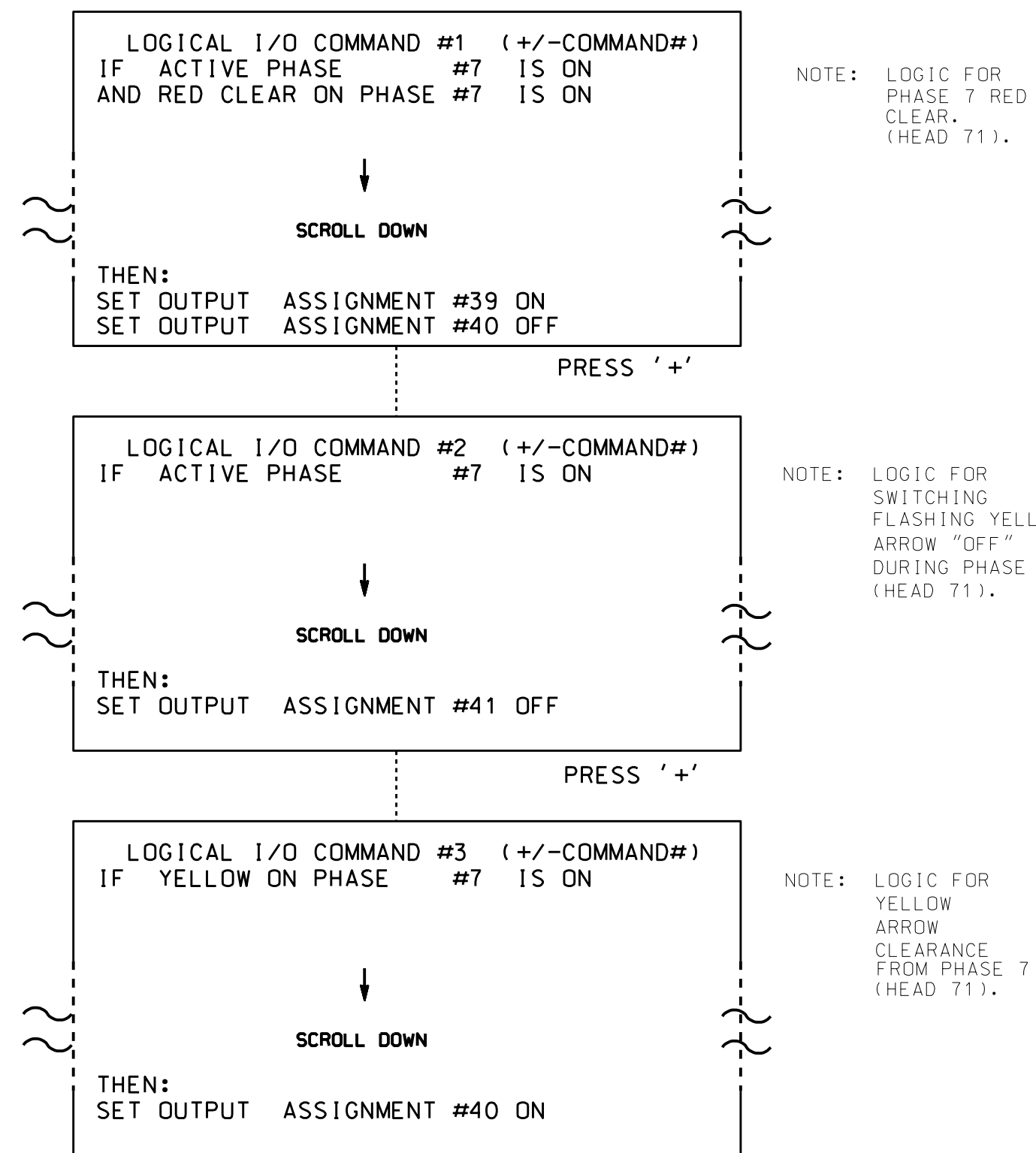
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL	03/30/2023
DATE	
SIG. INVENTORY NO.	07-1094

**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

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

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

PED 1 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

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

CHANGING INPUT ASSIGNMENTS

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

PROGRAMMING COMPLETE

**OVERLAP PROGRAMMING DETAIL FOR
DEFAULT PHASING**

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).
PRESS '+' 3 TIMES

```

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-25.5 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.

PRESS '+' 3 TIMES

NOTICE PAGE 2

```

PAGE 2: VEHICLE OVERLAP 'D' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-25.5 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
    
```

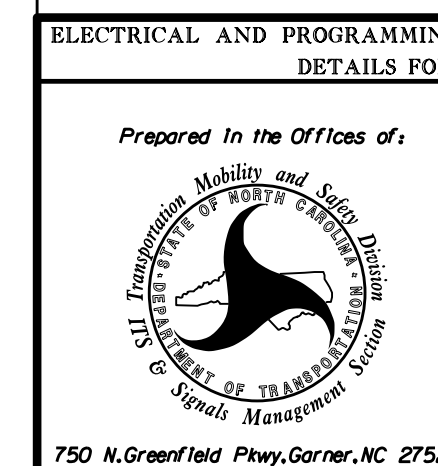
OVERLAP PROGRAMMING COMPLETE

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1094
DESIGNED: July 2022
SEALED: 3/27/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



750 N. Greenfield Pkwy, Corner, NC 27529

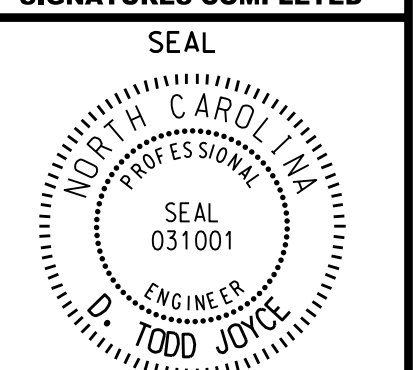
NC 54 EB
at
Abbey Lane

Division 7 Orange County Chapel Hill

PLAN DATE: March 2023 REVIEWED BY:

PREPARED BY: Zarrar Zafar REVIEWED BY:

REVISIONS INIT. DATE



DocuSigned by: D. Todd Joyce 03/30/2023

DATE

SIG. INVENTORY NO. 07-1094

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

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THIS PROGRAMMING REASSIGNS DETECTOR 57 TO INPUT #19 SO THAT THE DELAY ON LOOP 7A CAN BE REDUCED FROM 30 SECONDS TO 0 SECONDS.

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

```

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

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

(LOOP 7A - PHASE 7)

```

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

PROGRAMMING COMPLETE

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

(program controller as shown below)

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

```

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

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '7' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```

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

DETECTOR PROGRAMMING COMPLETE

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

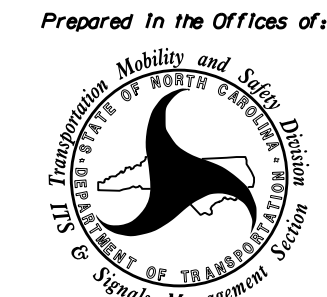
NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1094
 DESIGNED: July 2022
 SEALED: 3/27/2023
 REVISED: N/A

Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEERS
 SEAL 031001
 TODD JOYCE

Prepared in the Offices of:

 750 N. Greenfield Pkwy, Corner, NC 27529

NC 54 EB at Abbey Lane

Division 7 Orange County Chapel Hill

PLAN DATE: March 2023 REVIEWED BY:

PREPARED BY: Zarrar Zafar REVIEWED BY:

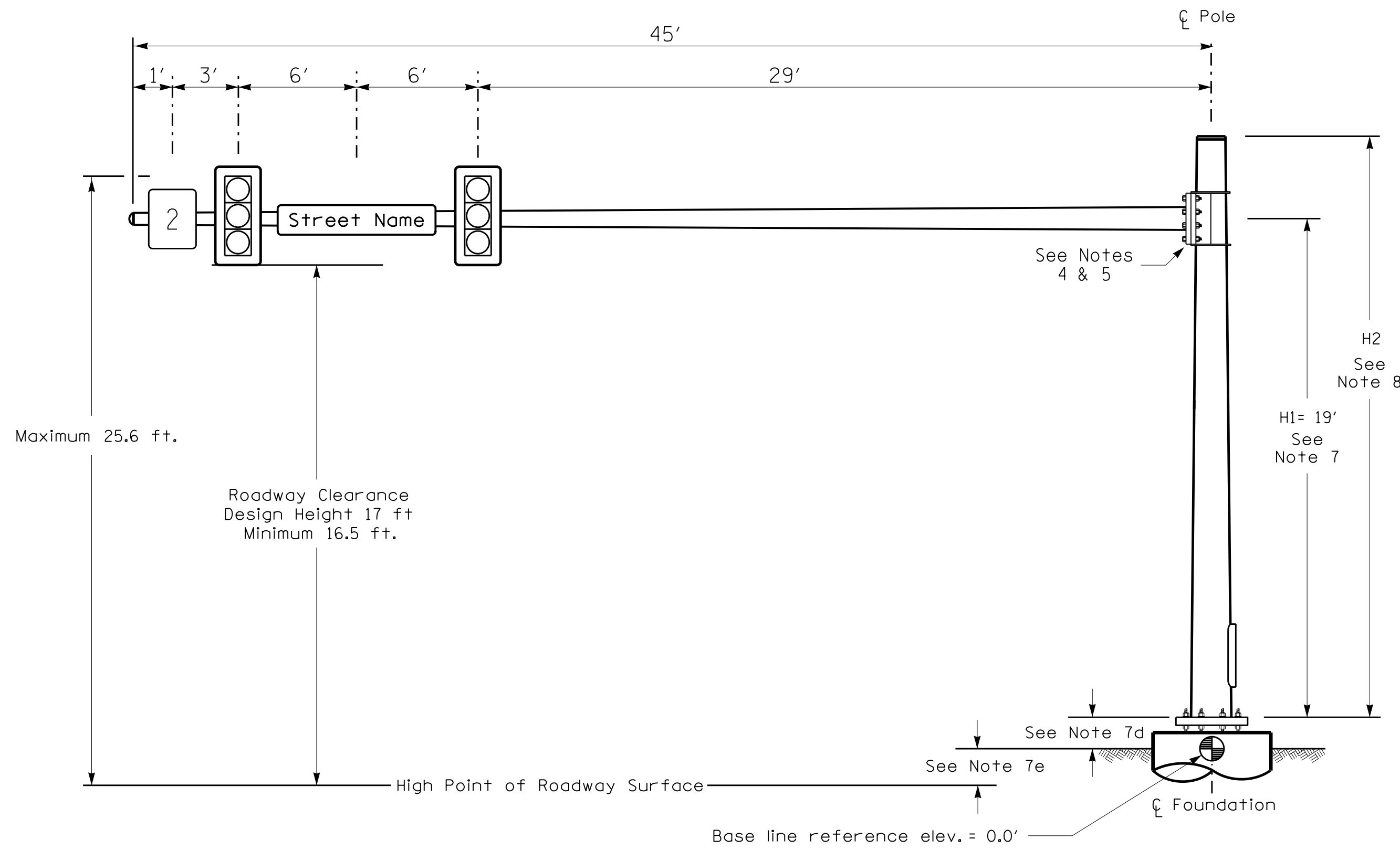
REVISIONS	INIT.	DATE

DocuSigned by:
 D. Todd Joyce 03/30/2023
 200CADEF0B2410 DATE

SIG. INVENTORY NO. 07-1094

30-MAR-2023 11:38
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 zzzafar

Design Loading for METAL POLE NO. 4

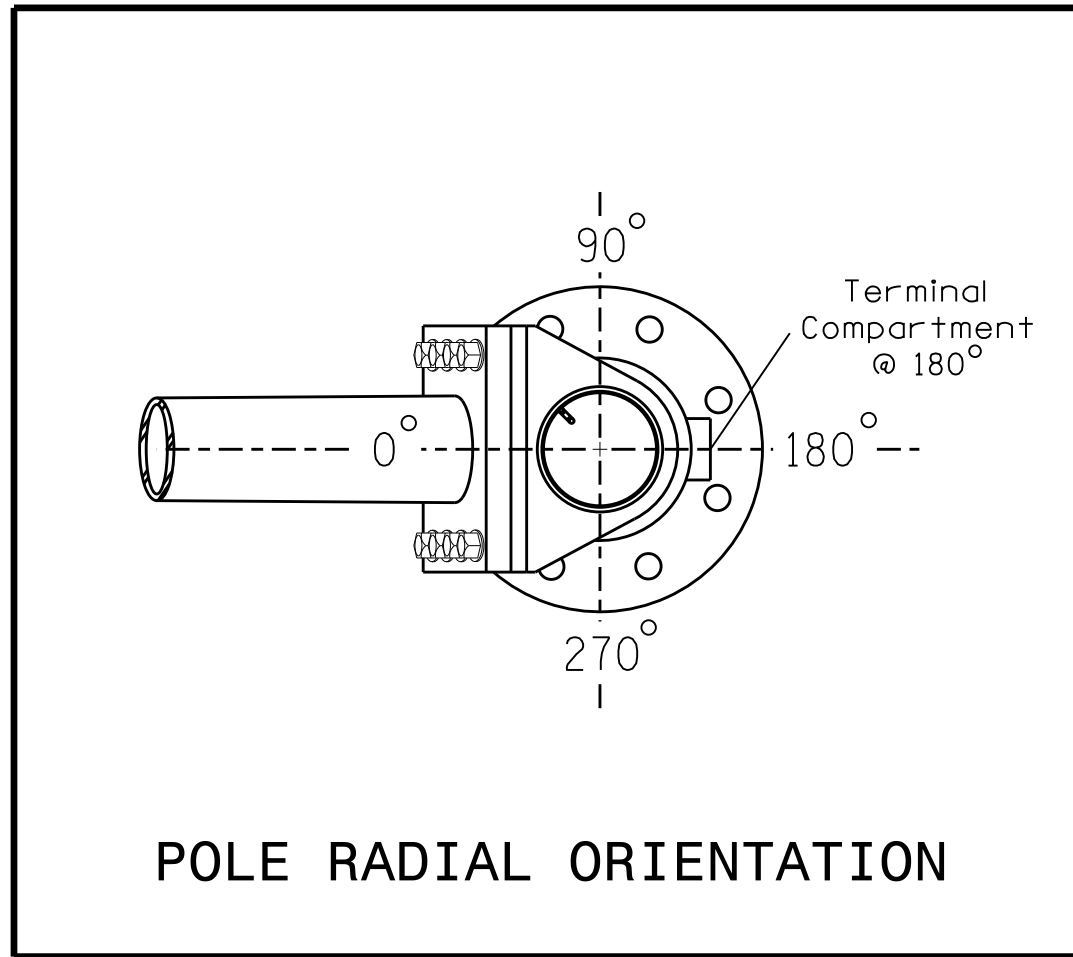


Elevation View

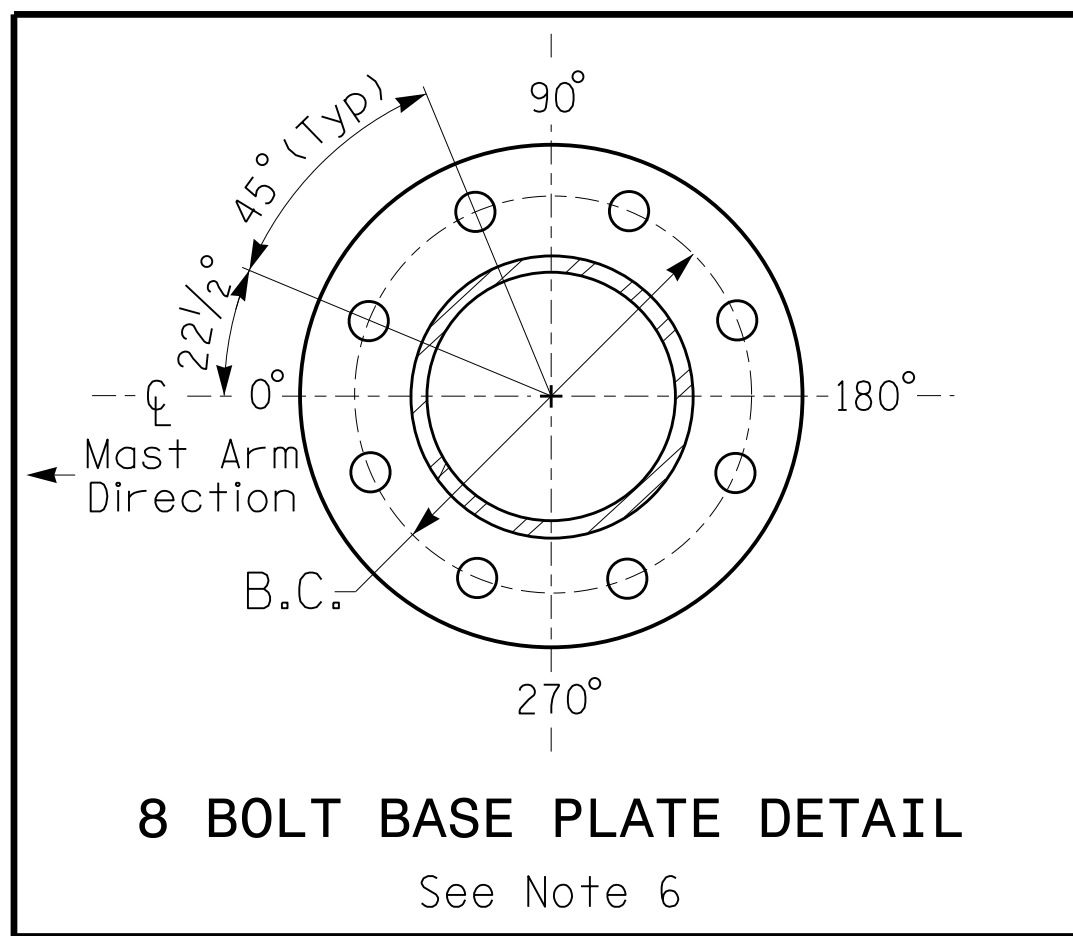
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

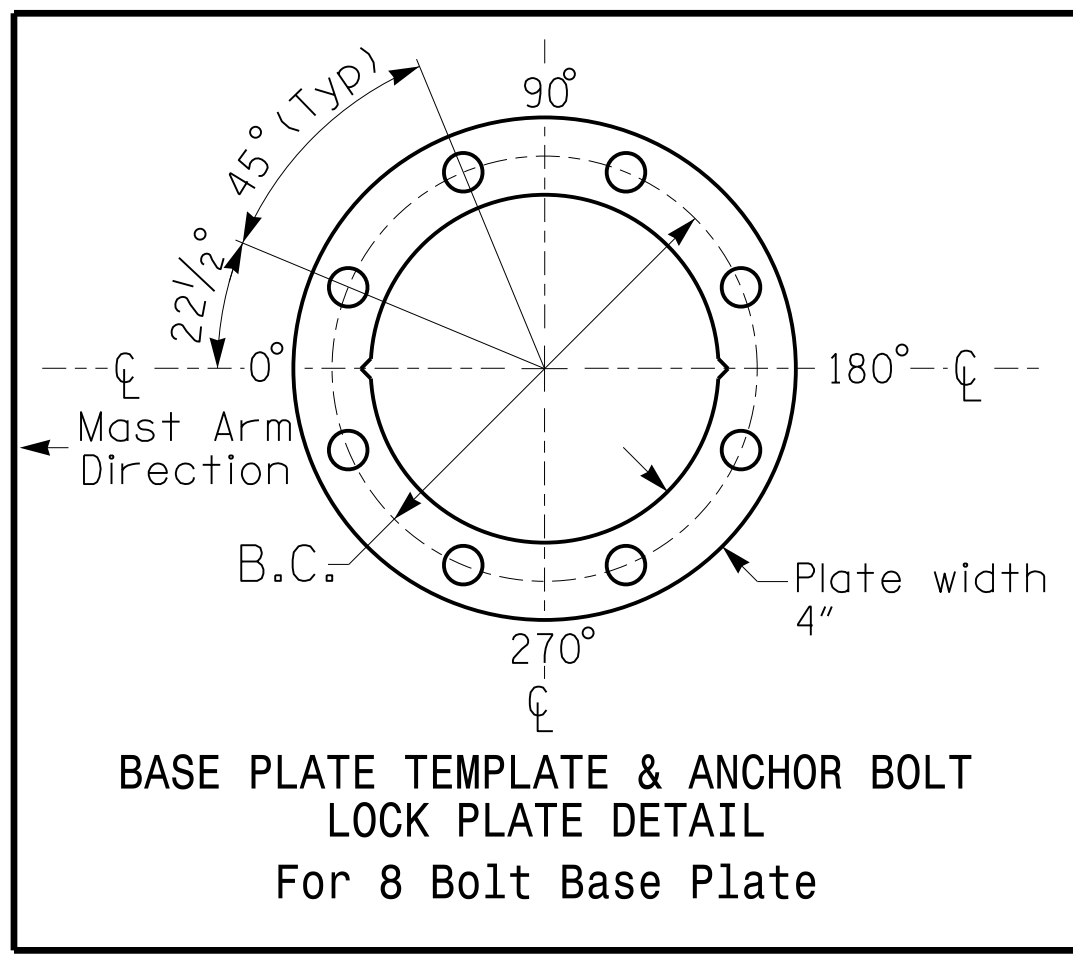
Elevation Differences for:		Pole 4
Baseline reference point at ϕ Foundation @ ground level		0.0 ft.
Elevation difference at High point of roadway surface		+0.4 ft.
Elevation difference at Edge of travelway or face of curb		-0.5 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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

METAL POLE No. 4

PROJECT REFERENCE NO.	SHEET NO.
BL-0044	Sig 4,5

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
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

DESIGN REFERENCE MATERIAL

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

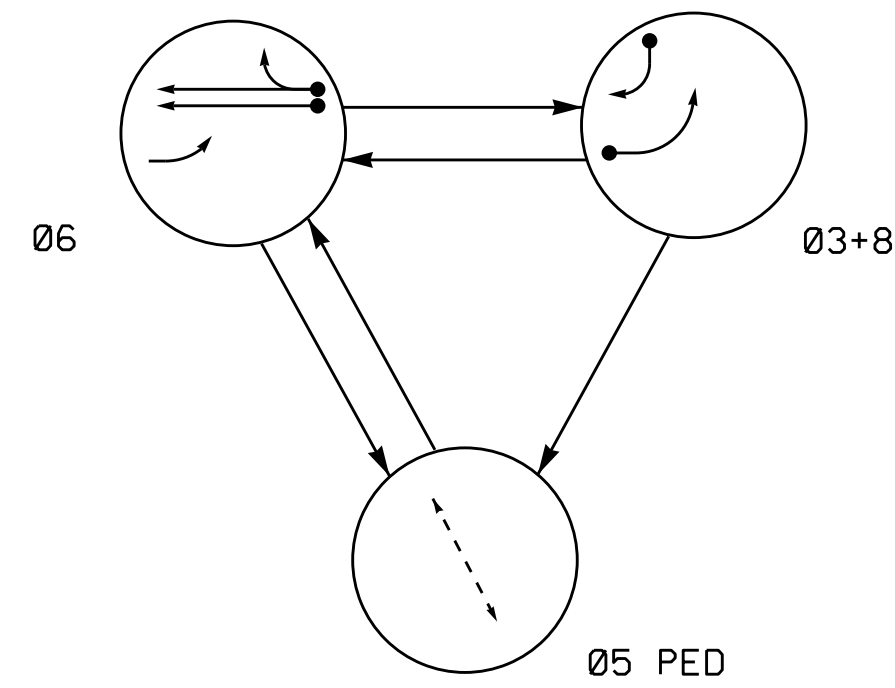
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the 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.
- 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 4 (120 mph)

<p>Prepared in the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION DIVISION OF TRANSPORTATION Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 54 EB at Abbey Lane</p> <p>Division 7 Orange County Chapel Hill</p>		<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL</p>
	<p>PLAN DATE: July 2023</p> <p>PREPARED BY: J.A. Lohr</p>	<p>REVIEWED BY:</p> <p>REVISIONS</p>	

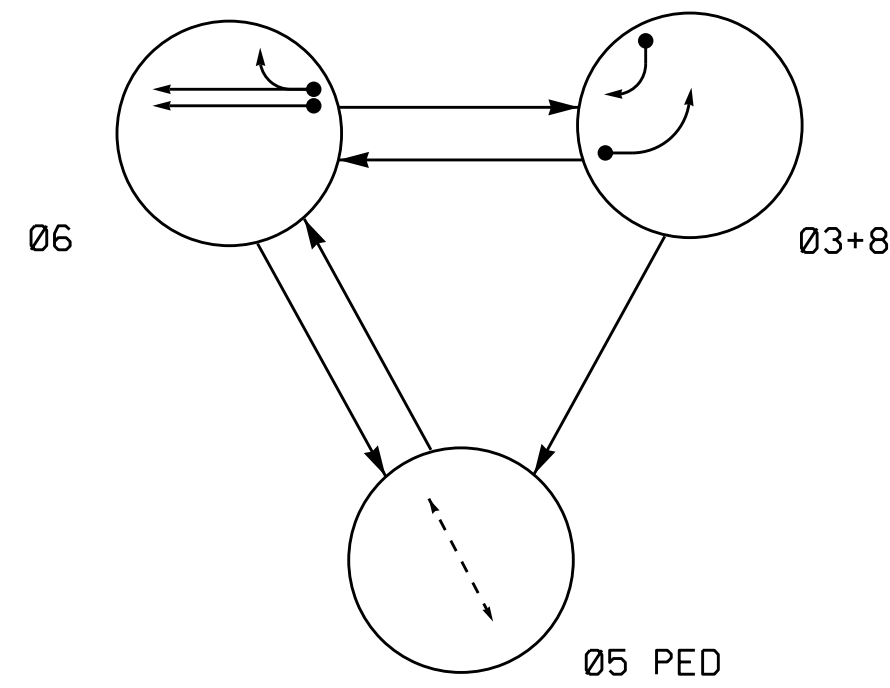
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DEFAULT PHASING DIAGRAM

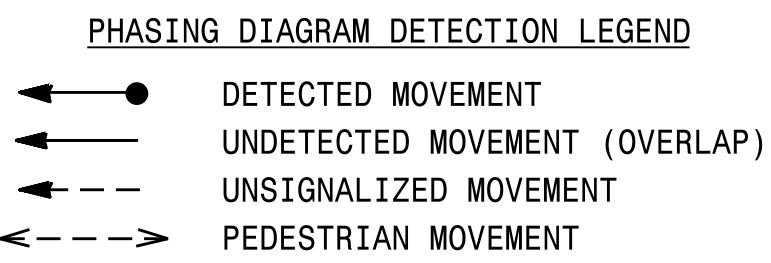


SIGNAL FACE	PHASE			
	03+8	06	05 PED	05
31	←	←	←	←
61	R	↑	R	Y
62	R	G	R	Y
81, 82	→	R	R	R
P51, P52	DW	DW	W	DRK

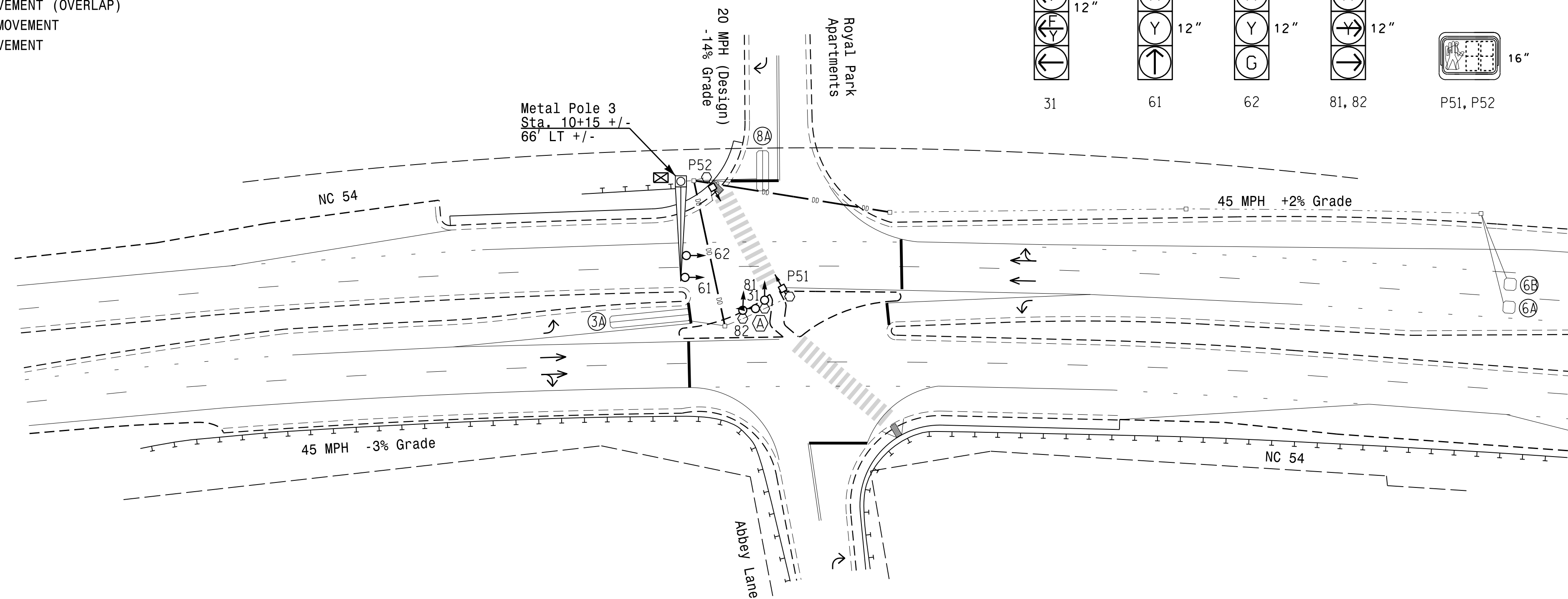
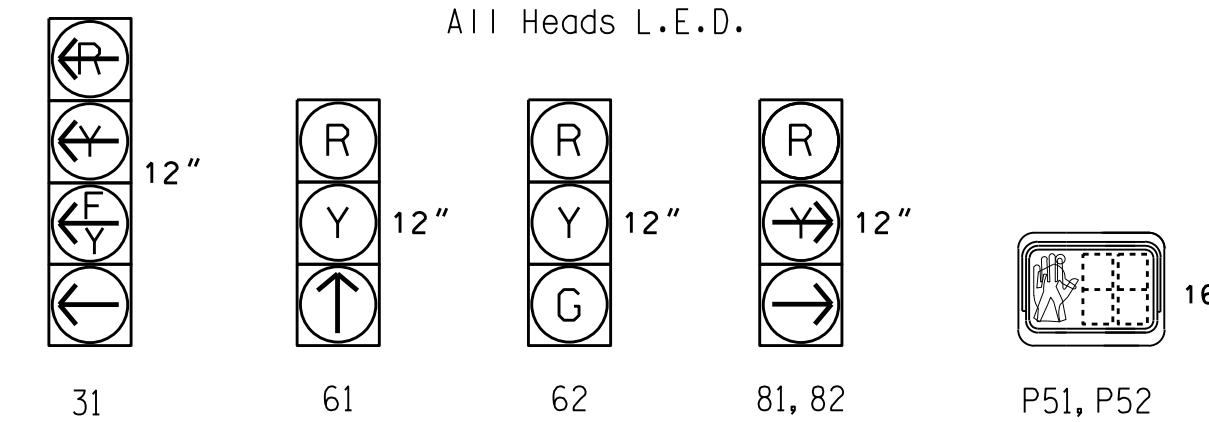
ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE			
	03+8	06	05 PED	05
31	←	←	←	←
61	R	↑	R	Y
62	R	G	R	Y
81, 82	→	R	R	R
P51, P52	DW	DW	W	DRK



SIGNAL FACE I.D.



3 Phase Fully Actuated (Chapel Hill-Carrboro 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. The order of phase 3+8 and phase 5 ped may be reversed.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. The City Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

FEATURE	PHASE			
	3	5 PED	6	8
Min Green 1 *	7	20	12	7
Extension 1 *	2.0	-	6.0	2.0
Max Green 1 *	30	-	75	30
Yellow Clearance	3.7	3.0	4.3	3.7
Red Clearance	2.3	1.0	1.6	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	-
Don't Walk 1	-	13	-	-
Seconds Per Actuation *	-	-	1.5	-
Max Variable Initial *	-	-	34	-
Time Before Reduction *	-	-	15	-
Time To Reduce *	-	-	30	-
Minimum Gap	-	-	3.0	-
Recall Mode	-	-	MIN RECALL	-
Vehicle Call Memory	-	-	YELLOW	-
Dual Entry	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON

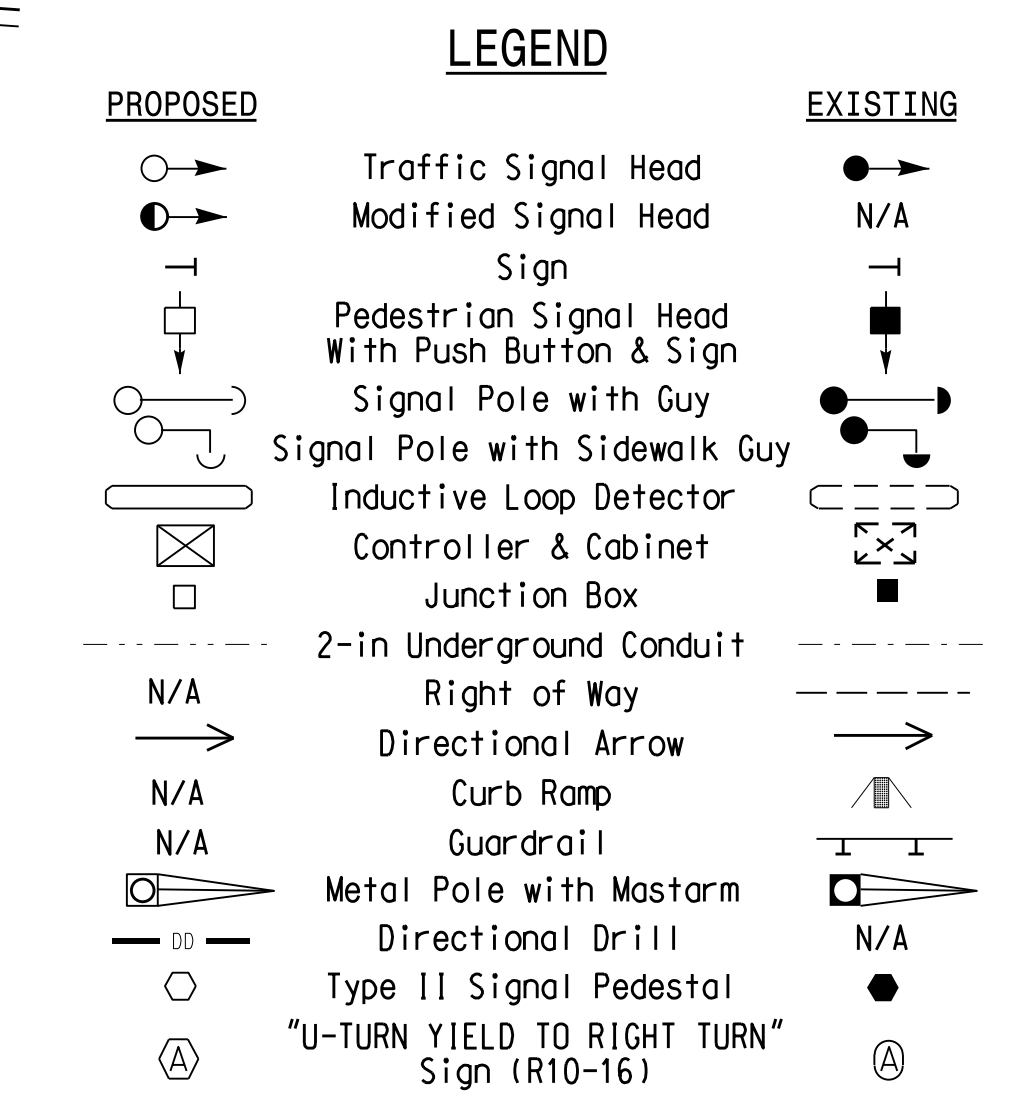
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	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
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	30*	-	Y
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	Y
8A	6X20	+5	2-4-2	Y	8	Y	Y	-	-	30	-	Y

* Disable Delay during alternate phasing operation.

This plan supersedes the plan signed and sealed on 10/4/22.



New Installation

Prepared in the Offices of:

 TRANSPORTATION MOBILITY AND SAFETY DIVISION
 STATE OF NORTH CAROLINA
 SIGNAL DESIGN SECTION

750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 WB at Royal Park Apartments

Division 7 Orange County Chapel Hill

PLAN DATE: July 2022 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS: INIT. DATE

DATE: 03/27/2023

SIG. INVENTORY NO. 07-1095

27-MAR-2023 11:59
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**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

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

```

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON
    ↓
    SCROLL DOWN
    ↓
THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF
    ↓
    PRESS '+'
    
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR (HEAD 31).

```

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
    ↓
    SCROLL DOWN
    ↓
THEN:
SET OUTPUT ASSIGNMENT #49 OFF
    ↓
    PRESS '+'
    
```

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

```

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON
    ↓
    SCROLL DOWN
    ↓
THEN:
SET OUTPUT ASSIGNMENT #48 ON
    
```

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE
USE TO INTERPRET LOGIC PROCESSOR

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

PED 5 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 '5' 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 '5' (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 5

PROGRAMMING COMPLETE

**OVERLAP PROGRAMMING DETAIL FOR
DEFAULT PHASING**

(program controller as shown below)

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

PRESS '+'

```

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-25.5 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.

PRESS '+'

NOTICE PAGE 2

```

PAGE 2: VEHICLE OVERLAP 'B' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-25.5 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

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

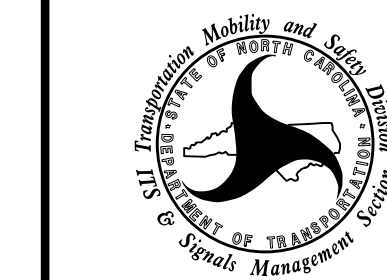
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1095
DESIGNED: July 2022
SEALED: 3/27/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529

NC 54 WB
at
Royal Park Apartments

Division 7 Orange County Chapel Hill

PLAN DATE: March 2023 REVIEWED BY:
PREPARED BY: Zarrar Zafar REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 031001
TODD JOYCE
DocuSigned by:
D. Todd Joyce 03/30/2023
200CADEF0B2410
DATE
SIG. INVENTORY NO. 07-1095

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. THIS PROGRAMMING REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 30 SECONDS TO 0 SECONDS.

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

```

PAGE: 2 C1 PIN:58 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....20
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....3
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR 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 '53' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 3A - PHASE 3)

```

PAGE: 2 C1 PIN:58 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....20
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....53
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR 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 3A (ALT.)

(program controller as shown below)

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

```

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

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '3' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```

VEHICLE DETECTOR #53 SETTINGS (+,-,1-64)
SETTING: (Y/N)
ENABLE DETECTOR.....Y
ENABLE LOGGING.....N
ENABLE DIAGNOSTICS.....N
SPEED TRAP.....N
CALL DETECTOR.....Y
EXTENSION DETECTOR.....Y
MODE 2 STOP BAR.....N
SWITCHING DETECTOR.....N
DUPLICATING DETECTOR.....N
ENABLE FULL TIME DELAY.....N
IF FAILED, SET MIN RECALL?.....N
IF FAILED, SET MAX1 RECALL?.....N
IF FAILED, SET MAX2 RECALL?.....N
PHASE# :12345678910111213141516
PHASES ASSIGNED : X
SWITCH/DUPLICATE:
LOOP SIZE (0-255 FT).....6
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC).....0
STRETCH (0-25.5 SEC).....0.0
DELAY (0-255 SEC).....0.0
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

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1095
 DESIGNED: July 2022
 SEALED: 3/27/2023
 REVISED: N/A

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

Electrical Detail - Sheet 3 of 4

	<p>NC 54 WB at Royal Park Apartments</p>		<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>					
	<p>Division 7 Orange County Chapel Hill</p> <p>PLAN DATE: March 2023 REVIEWED BY:</p> <p>PREPARED BY: Zarrar Zafar REVIEWED BY:</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		REVISIONS	INIT.	DATE		
REVISIONS	INIT.	DATE						

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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 31 to run protected turns only.

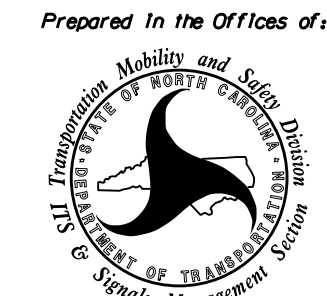
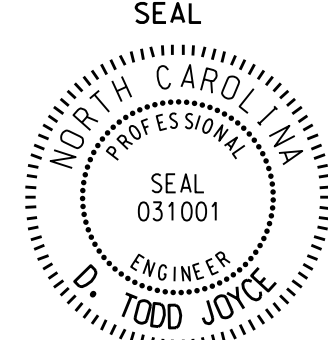
INPUTS PAGE 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

This Plan Supersedes Electrical Detail Sealed on 10/5/2022

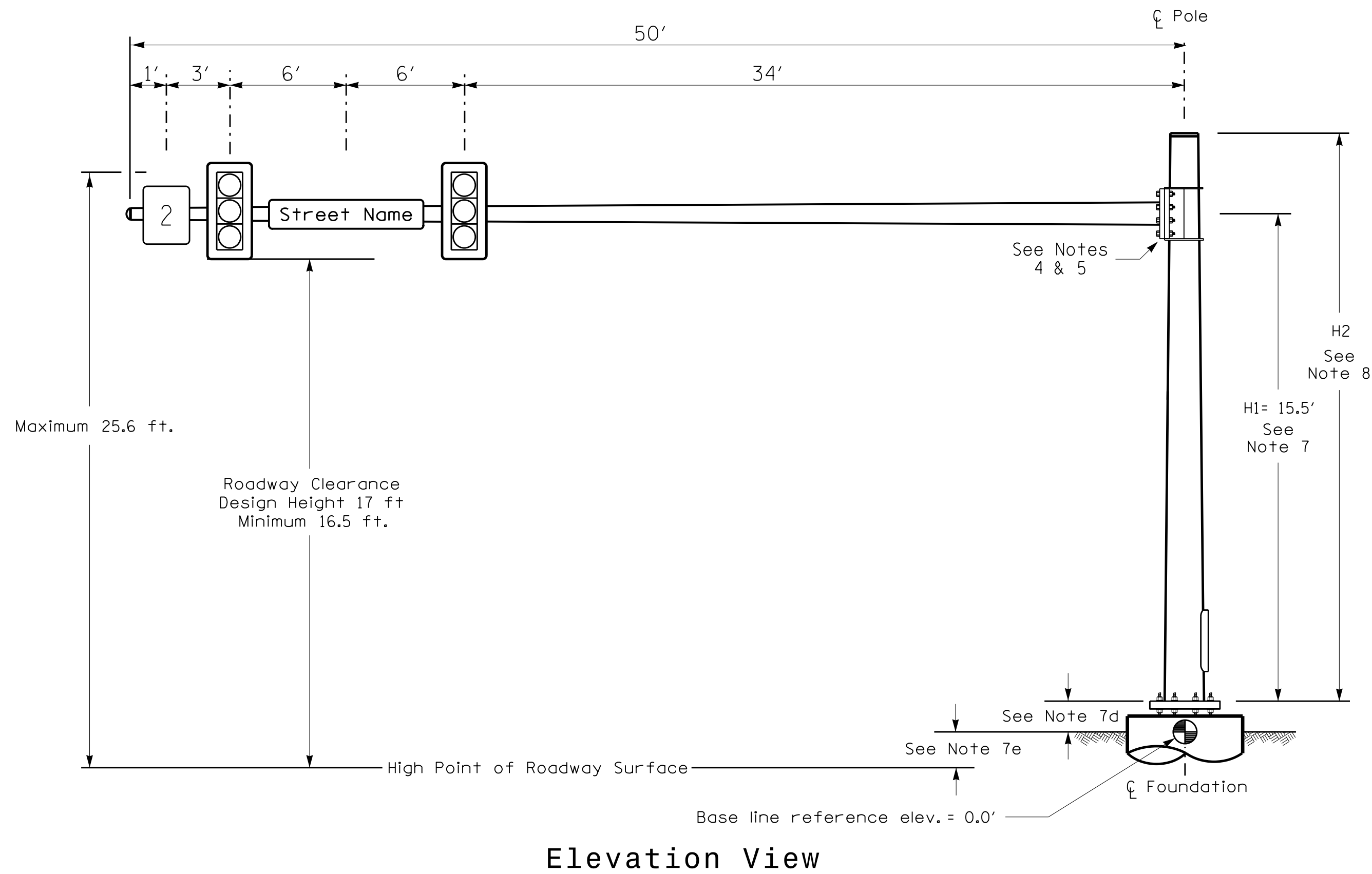
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1095
DESIGNED: July 2022
SEALED: 3/27/2023
REVISED: N/A

Electrical Detail - Sheet 4 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 <small>750 N. Greenfield Pkwy, Corner, NC 27529</small>	<p>NC 54 WB at Royal Park Apartments</p> <p>Division 7 Orange County Chapel Hill</p> <p>PLAN DATE: March 2023 REVIEWED BY:</p> <p>PREPARED BY: Zarrar Zafar REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">REVISIONS</th> <th style="width: 10%;">INIT.</th> <th style="width: 10%;">DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	INIT.	DATE										<p>SEAL</p>  <p>DocuSigned by: Todd Joyce 03/30/2023</p> <p style="font-size: x-small;">APPCADPUB042410 DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1095</p>
REVISIONS	INIT.	DATE												

Design Loading for METAL POLE NO. 3



SPECIAL NOTE

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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	-2.2 ft.
Elevation difference at Edge of travelway or face of curb	-2.2 ft.

METAL POLE No. 3

PROJECT REFERENCE NO.	SHEET NO.
BL-0044	Sig 5.5

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
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

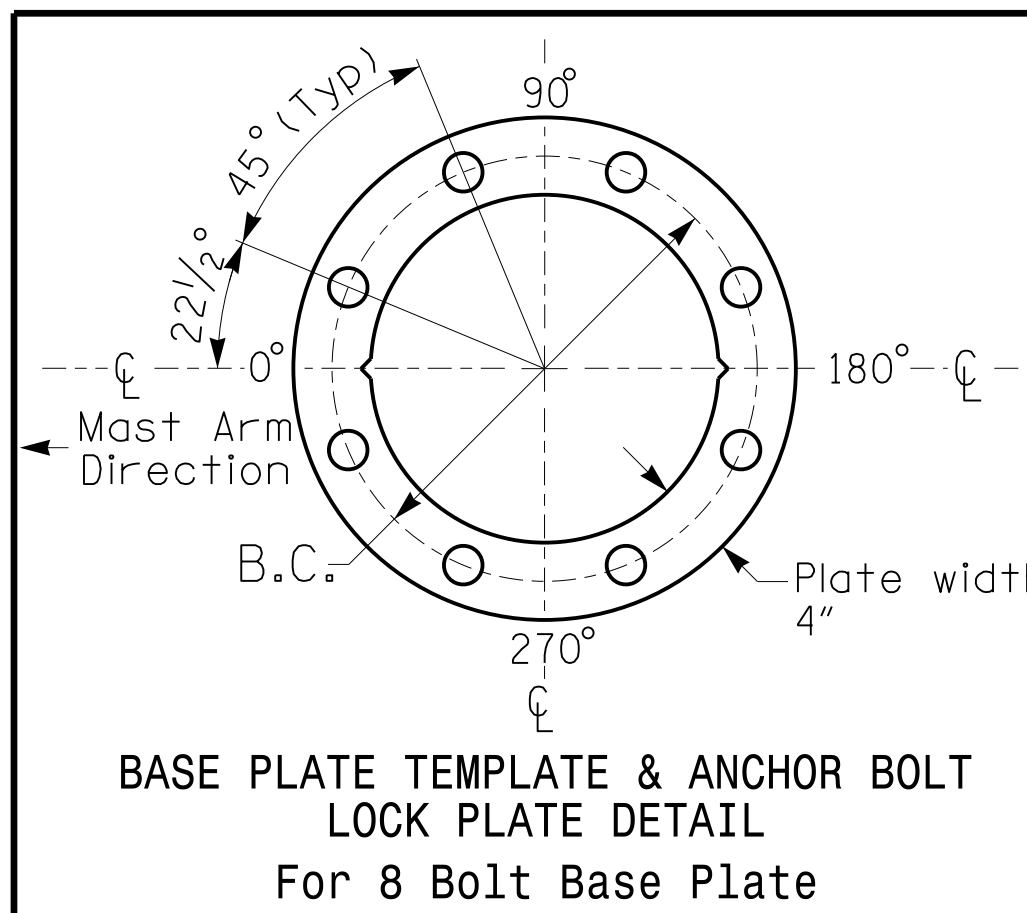
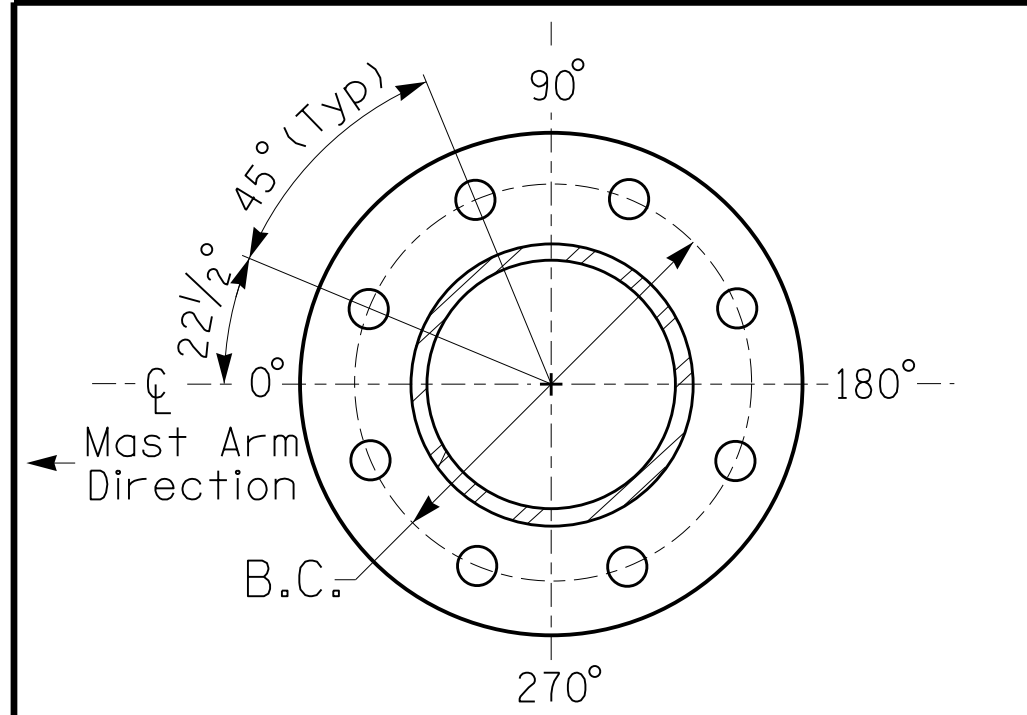
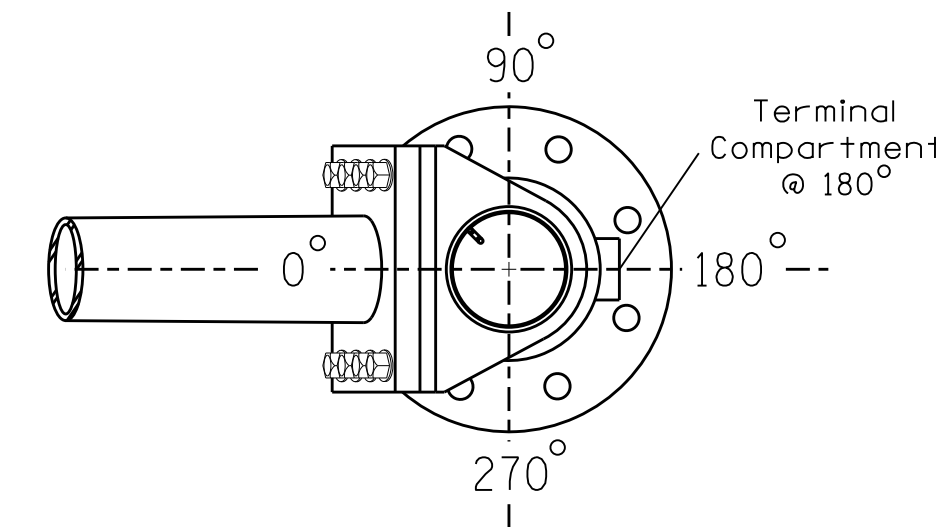
NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 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.
- 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 4 (120 mph)

<p>Prepared In the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 54 WB at Royal Park Apartments</p>		<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>
	<p>Division 7 Orange County Chapel Hill</p> <p>PLAN DATE: July 2023 REVIEWED BY:</p> <p>PREPARED BY: J.A. Lohr REVIEWED BY:</p>	<p>REVISIONS</p> <p>INIT. DATE</p>	
<p>SIG. INVENTORY NO. 07-1095</p>			<p>11/28/2023</p>

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