

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

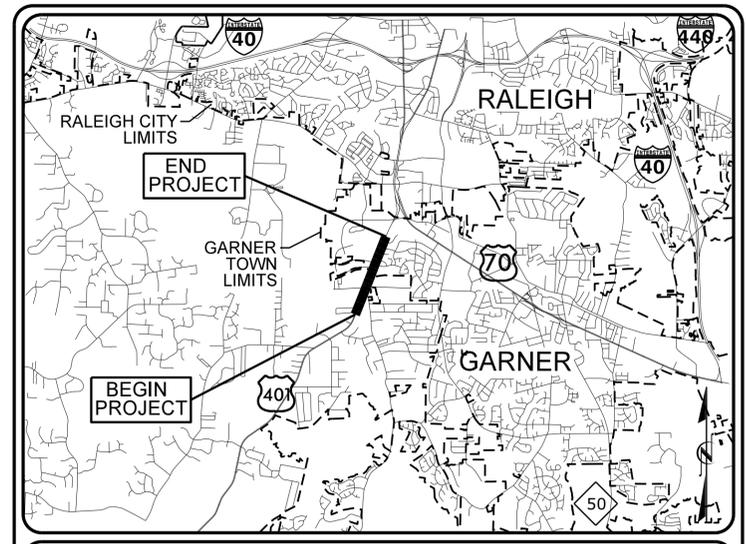
WAKE COUNTY

LOCATION: US 401 (FAYETTEVILLE ROAD) SOUTH OF SR 1006 (OLD STAGE ROAD) TO SOUTH OF SR 2538 (MECHANICAL BOULEVARD)

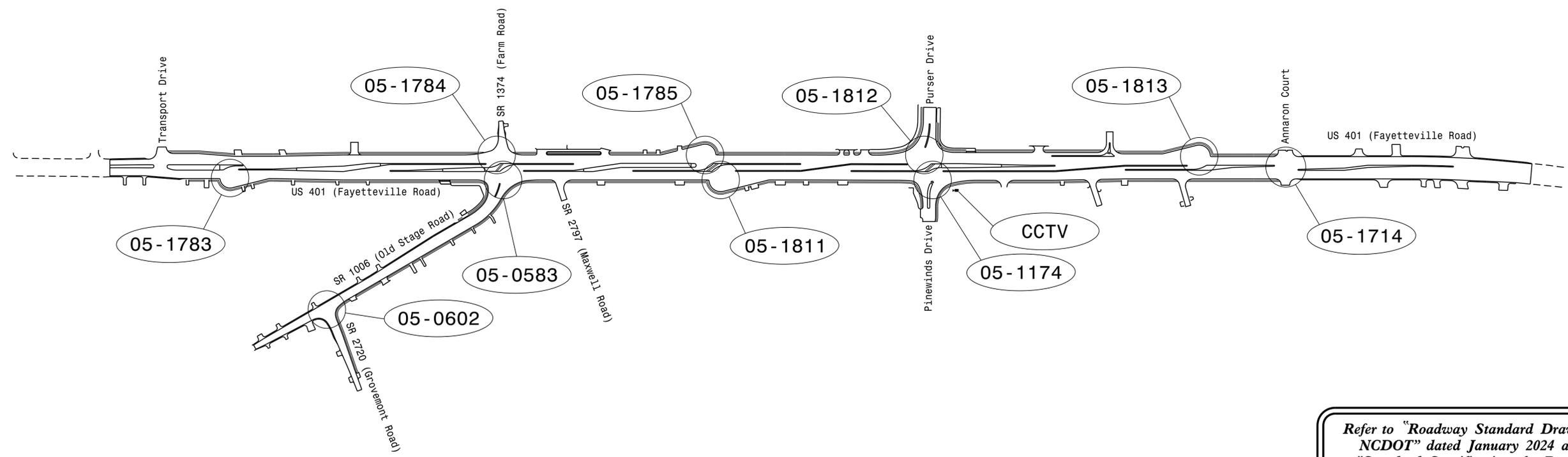
TYPE OF WORK: TRAFFIC SIGNALS, SIGNAL COMMUNICATIONS, AND CCTV PLANS



Project: U-5302



VICINITY MAP
NOT TO SCALE



Contract: C204512

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. 2.0-2.3 | 05-1783 | US 401 NB (Fayetteville Road) at U-Turn South of SR 1006 (Old Stage Road) | |
| Sig. 3.0-6.3 | 05-0583 | US 401 NB (Fayetteville Road) at SR 1006 (Old Stage Road) | |
| Sig. 7.0-8.3 | 05-1784 | US 401 SB (Fayetteville Road) at SR 1374 (Farm Road) | |
| Sig. 9.0-9.3 | 05-1785 | US 401 SB (Fayetteville Road) at U-Turn North of SR 1374 (Farm Road) | |
| Sig. 10.0-10.3 | 05-1811 | US 401 NB (Fayetteville Road) at U-Turn South of Pinewinds Drive | |
| Sig. 11.0-14.4 | 05-1174 | US 401 NB (Fayetteville Road) at Pinewinds Drive | |
| Sig. 15.0-16.2 | 05-1812 | US 401 SB (Fayetteville Road) at Purser Drive | |
| Sig. 17.0-17.3 | 05-1813 | US 401 SB (Fayetteville Road) at U-Turn North of Purser Drive | |
| Sig. 18.0-20.5 | 05-1714 | US 401 (Fayetteville Road) at Annaron Court | |
| Sig. 21.0-21.5 | 05-0602 | SR 1006 (Old Stage Road) at SR 2720 (Grovemont Road) | |
| Sig. M1A-M9 | N/A | Metal Pole Standard Drawings | |
| SCP 1-7 | N/A | Communications Cable and Conduit Routing Plans | |
| SCP 8-13 | N/A | Splice Details | |
| SCP 14 | N/A | CCTV Camera Installation for Wood Poles | |

**TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATIONS UNIT**

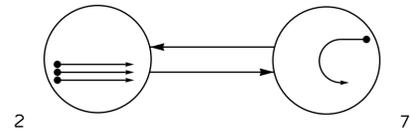
Robert J. Ziembra, PE - Central Region Signals Engineer
Ryan W. Hough, PE - Signal Equipment Design Engineer
Gregg Green - Signal Communications Project Engineer

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

750 N. Greenfield Parkway, Garner, NC 27529

S:\AFS\2025\165\15-Signals\Signal_Design\Section\Central_Region\Div_5\U-5302\2025_Updates\U5302_sig_tsh.dgn

PHASING DIAGRAM

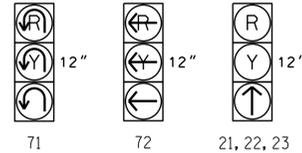


PHASING DIAGRAM DETECTION LEGEND
 ←●→ DETECTED MOVEMENT
 ←→ UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 ←- - - PEDESTRIAN MOVEMENT

| SIGNAL FACE | PHASE | | |
|-------------|-------|---|-------|
| | 2 | 7 | FLASH |
| 21, 22, 23 | ↑ | R | R |
| 71 | ↑R | ↑ | ↑R |
| 72 | ↑R | ↑ | ↑R |

SIGNAL FACE I.D.

All Heads L.E.D.

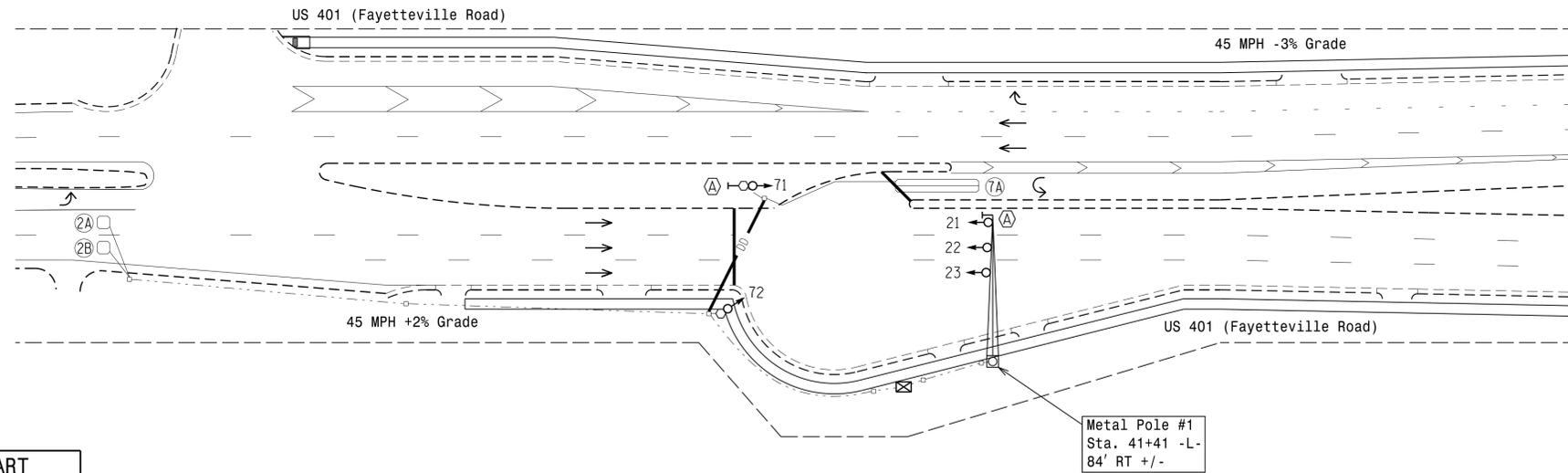


| INDUCTIVE LOOPS | | | | | | | | | | DETECTOR PROGRAMMING | | | | | | | | | |
|-----------------|-----------|-------|-------------------------|-----|----------|----------------|--------|------------------|----------------|----------------------|--------|--------|--------|----------------|-----------------------|--------|--------------|-----|----------|
| LOOP NO. | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW | EXISTING | ASSIGNED PHASE | TIMING | | OPERATION MODE | | | | | | | STATUS | | | |
| | | | | | | | DELAY | EXTEND (STRETCH) | VEHICLE | PEDESTRIAN | T CALL | STOP A | STOP B | PROTECTOR LEFT | PROTECTOR THROUGH AND | SWITCH | SYSTEM LOOPS | NEW | EXISTING |
| 2A | 6X6 | 5 | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | X | - |
| 2B | 6X6 | 5 | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | X | - |
| 7A | 6X40 | 2-4-2 | 0 | X | - | 7 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | X | - |

2 Phase Fully Actuated (Raleigh 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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Program phase 3 as a dummy phase for Ring 1.



| FEATURE | PHASE | | |
|-------------------------|------------|-----|----------|
| | 2 | 3 | 7 |
| Min Green * | 12 | 7 | 7 |
| Passage Gap * | 6.0 | - | 2.0 |
| Maximum Green * | 90 | 30 | 30 |
| Yellow Change | 4.3 | 3.0 | 3.0 |
| Red Clear | 1.3 | 2.1 | 2.1 |
| Walk * | - | - | - |
| Pedestrian Clear | - | - | - |
| Added Initial * | 1.5 | - | - |
| Maximum Initial * | 34 | - | - |
| Time Before Reduction * | 15 | - | - |
| Time To Reduce * | 30 | - | - |
| Minimum Gap | 3.0 | - | - |
| Recall Mode | MIN RECALL | - | - |
| Vehicle Call Memory | LOCK | - | NON-LOCK |
| Dual Entry | - | - | - |
| Simultaneous Gap | ON | ON | ON |

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

| PROPOSED | EXISTING |
|----------------------------------|-----------|
| ○→ Traffic Signal Head | ●→ N/A |
| ○→ Modified Signal Head | ○→ N/A |
| ↑ Sign | ↑ N/A |
| □ Pedestrian Signal Head | □ N/A |
| ○→ Signal Pole with Guy | ○→ N/A |
| ○→ Signal Pole with Sidewalk Guy | ○→ N/A |
| ⊗ Inductive Loop Detector | ⊗ N/A |
| ⊠ Controller & Cabinet | ⊠ N/A |
| □ Junction Box | □ N/A |
| - - - 2-in Underground Conduit | - - - N/A |
| - - - Right of Way | - - - N/A |
| → Directional Arrow | → N/A |
| ○→ Metal Pole with Mastarm | ○→ N/A |
| ○ Type II Signal Pedestal | ○ N/A |
| - - - Directional Drill | - - - N/A |
| ⊗ No Left Turn Sign (R3-2) | ⊗ N/A |

New Installation

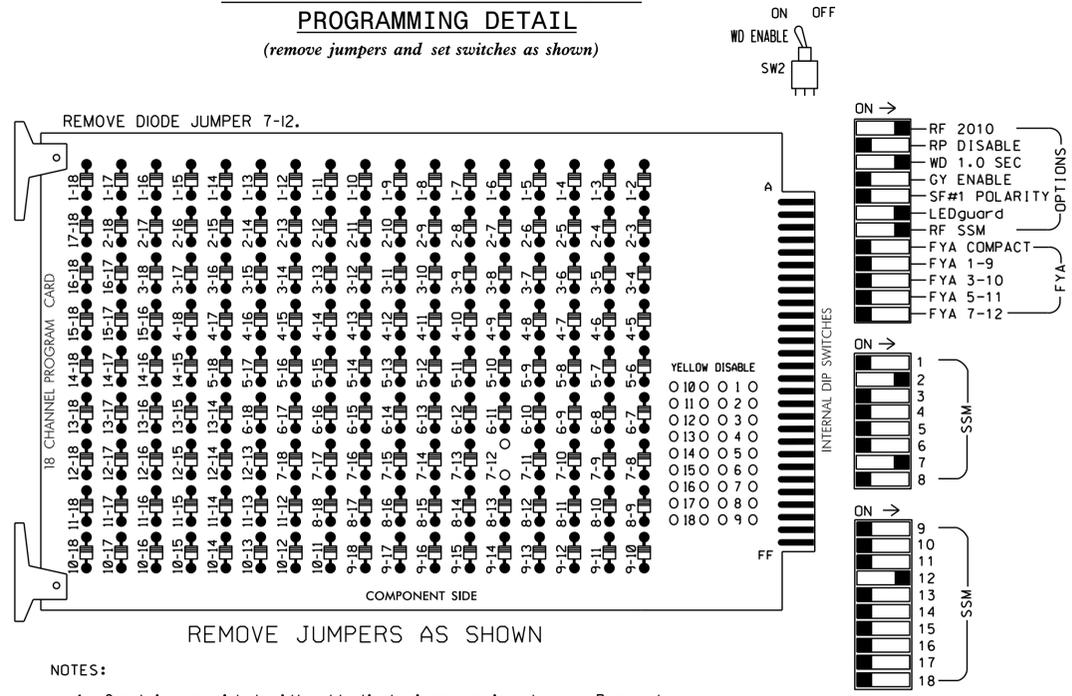
| | | | |
|------------------------|---|--------------------------|-------|
| | US 401 NB (Fayetteville Road) at U-Turn South of SR 1006 (Old Stage Road) | | |
| | Division 5 Wake County Raleigh | PLAN DATE: February 2025 | |
| PREPARED BY: J.A. Lohr | REVIEWED BY: | DATE: 03/27/2025 | DATE: |
| SCALE: 1" = 40' | REVISIONS: | INIT. DATE: | DATE: |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 ROBERT J. TIMMEN
 No. 026486
 DATE: 03/27/2025
 SIG. INVENTORY NO. 05-1783

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

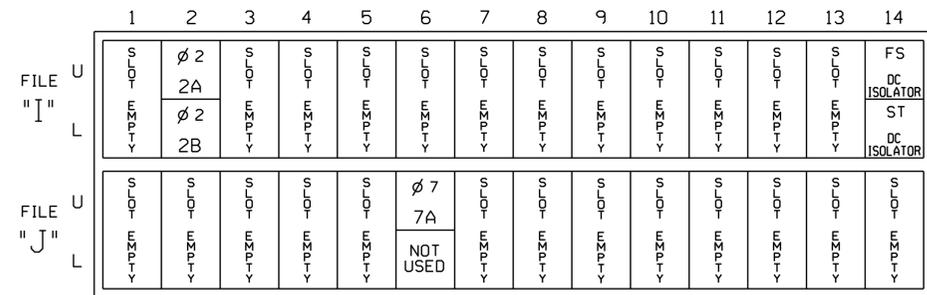


NOTES:

- 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.

INPUT FILE POSITION LAYOUT

(front view)



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 controller to start up in phase 2 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phase 2 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

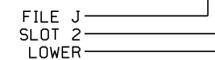
CONTROLLER.....2070LX
CABINET.....332 W/ AUX
SOFTWARE.....SE-PAC2070 ver 5.5 or later
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S10,AUX S5
PHASES USED.....2,*3,7
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....**

** See overlap programming detail on sheet 2.
* Phase used for timing purposes only

INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | DELAY TIME | EXTEND (STRETCH) TIME |
|----------|---------------|-----------------|---------|--------------|------------|------------|-----------------------|
| 2A | TB2-5,6 | I2U | 39 | 3 | 2 | | |
| 2B | TB2-7,8 | I2L | 43 | 4 | 2 | | |
| 7A | TB5-9,10 | J6U | 42 | 3I | 7 | | |

INPUT FILE POSITION LEGEND: J2L



ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
RED REV/10...: 40 (TSEC) 1-RED
AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
STOP T RESET.: 0 (0-NO 1-YES)
SEQUENCE.....: 1 (1-19)
SPECIAL SEQ : 0 (SEE HELP)
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO UNIT DATA

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1783
DESIGNED: February 2025
SEALED: 03/27/2025
REVISED: N/A

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 | 21,22,23 | NU | NC | NU | NU | NU | NU | NU | 71 | NU | NU | NU | NU | NU | NU | 72 | NU | |
| RED | | 128 | | | | | | | | | | | | | | | | | |
| YELLOW | | 129 | | | | | | | | | | | | | | | | | |
| GREEN | | | | | | | | | | | | | | | | | | | |
| RED ARROW | | | | | | | | | | 122 | | | | | | | | A101 | |
| YELLOW ARROW | | | | | | | | | | 123 | | | | | | | | | A102 |
| GREEN ARROW | | 130 | | | | | | | | 124 | | | | | | | | | A103 |

NU = Not Used
NC = Not Connected

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0
LDSW: 123456789 0123456789 0123456789 012
FLSH: 010000000 1000000100 0000000000 000
ALT: 000000000 1000000100 0000000000 000
0-DARK 1-RED 2-YELLOW 3-STeady YELLOW
A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES
PHASES: 12345678 90123456
ENTRY: 01000000 00000000
EXIT: 01000000 00000000
0-DARK 1-RED 2-YELLOW 3-STeady YELLOW
A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

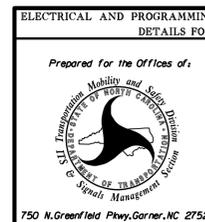
- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 4, 5, 6 and 8 NOT used!

PHASE.....1...2...3...4...5...6...7...8
INITIAL 0 6 1 0 0 0 1 0
NA RESP 0 1 0 2 0 1 0 2
UPDT GRN 0 0 0 0 0 0 0 0
CODES.....0...1...2...3...4...5...6
INITL NONE INACT RED YEL GRN DRK G/DW
NA RSP NONE NA1 NA2 1&2 --- ---

INIT & N.A. RESP PROGRAMMING COMPLETE

Electrical Detail - Sheet 1 of 2



US 401 NB (Fayetteville Road)
at U-Turn South of
SR 1006 (Old Stage Road)

Division 5 Wake County Raleigh
PLAN DATE: March 2025 REVIEWED BY:
PREPARED BY: S.Kirkpatrick REVIEWED BY:

| REVISIONS | INIT. | DATE |
|-----------|-------|------|
| | | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
RYAN W. HOUFF
03/28/2025
43002FA26543
SIGNATURE DATE

SIG. INVENTORY NO. 05-1783

OVERLAP PROGRAMMING DETAIL

1. From Main Menu select 4 - UNIT DATA
2. From UNIT DATA Submenu select 3 - OVERLAP DATA

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA

A: --- E: --- I: --- M: ---
B: --- F: --- J: --- N: ---
C: --- G: --- K: --- O: ---
D: STD H: --- L: --- P: ---

PREV/NEXT TO CYCLE
    
```

↓

OVERLAP D

Use Up/Dn/Left/Right keys to position cursor on Overlap 'D', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - D      12345678 90123456
PARENTS: 00000010 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD: 0 YEL/10: 40
TRAIL GREEN PREEMPT: 0 RED/10: 20
    
```

END OVERLAP PROGRAMMING

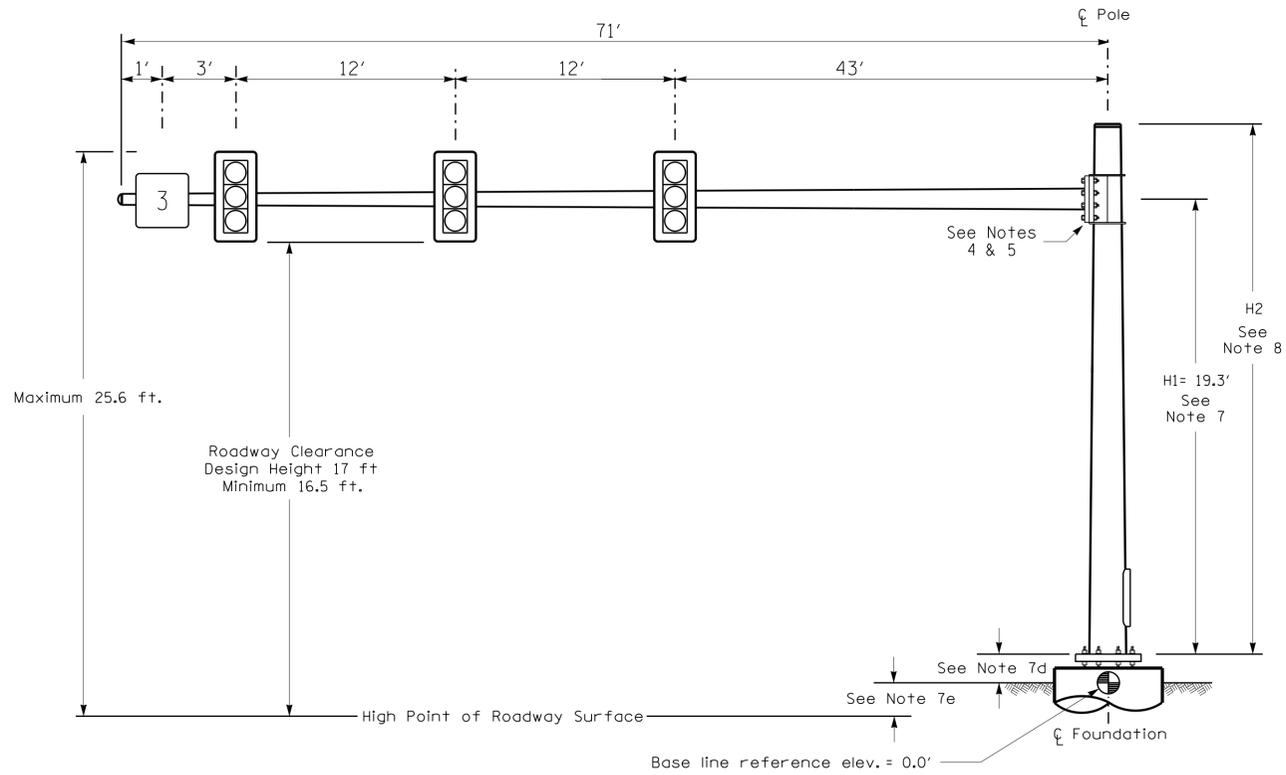
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1783
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Electrical Detail - Sheet 2 of 2

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FINAL UNLESS ALL
SIGNATURES COMPLETED

| <p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p> | <p>US 401 NB (Fayetteville Road) at U-Turn South of SR 1006 (Old Stage Road)</p> <p style="font-size: x-small;">Division 5 Wake County Raleigh</p> <p style="font-size: x-small;">PLAN DATE: March 2025 REVIEWED BY:</p> <p style="font-size: x-small;">PREPARED BY: S. Kirkpatrick 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> </tbody> </table> | REVISIONS | INIT. | DATE | | | | | | | <p style="text-align: center; font-size: x-small;">SEAL</p> <p style="font-size: x-small;">Signed by: Ryan W. Hough 03/28/2025</p> <p style="font-size: x-small;">SIGNATURE DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 05-1783</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 | 0.81 ft. |
| Elevation difference at Edge of travelway or face of curb | -0.61 ft. |

METAL POLE No. 1

| PROJECT REFERENCE NO. | SHEET NO. |
|-----------------------|-----------|
| U-5302 | Sig 2.3 |

MAST ARM LOADING SCHEDULE

| LOADING SYMBOL | DESCRIPTION | AREA | SIZE | WEIGHT |
|----------------|---|----------|-------------------------|--------|
| | RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE | 9.3 S.F. | 25.5" W X 52.5" L | 60 LBS |
| | SIGN RIGID MOUNTED | 9.0 S.F. | 36.0" W X 36.0" L | 17 LBS |

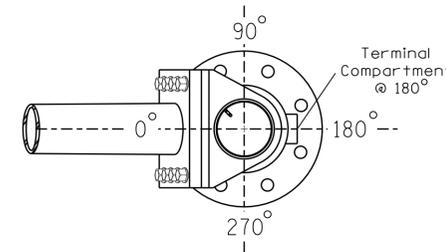
NOTES

DESIGN REFERENCE MATERIAL

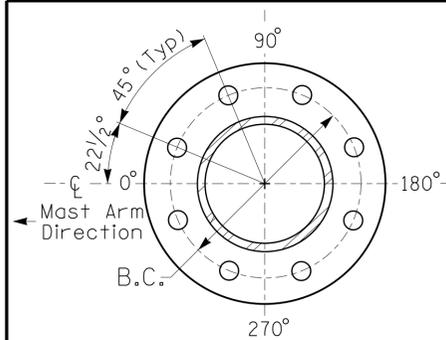
- Design the traffic signal structure and foundation in accordance with:
 - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2024 NCDOT "Standard Specifications for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

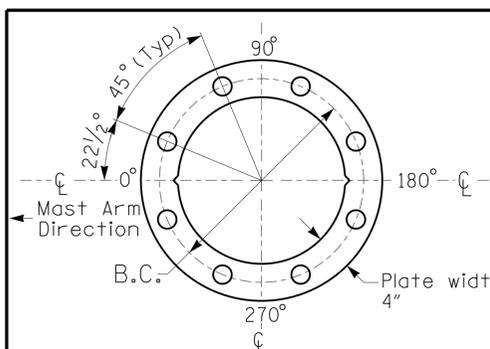


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



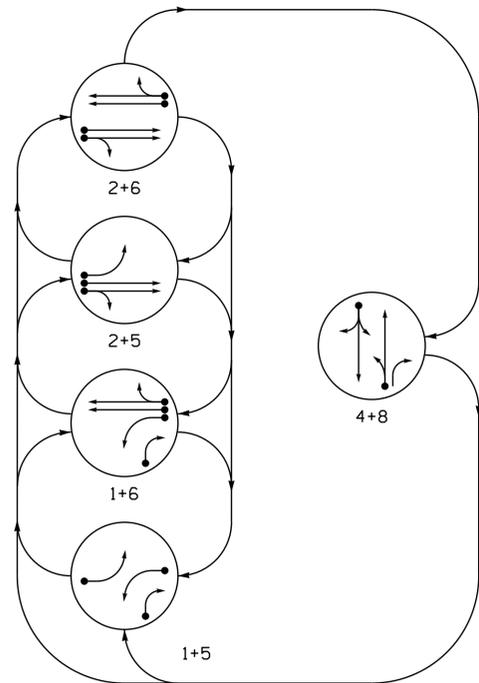
BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 4 (120 mph)

| | | | |
|---|---|------------------------------------|--|
| <p>Prepared in the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529</p> | <p>US 401 NB (Fayetteville Road) at U-Turn South of SR 1006 (Old Stage Road)</p> | | <p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> |
| | <p>Division 5 Wake County Raleigh</p> <p>PLAN DATE: February 2025 REVIEWED BY:</p> <p>PREPARED BY: J.A. Lohr REVIEWED BY:</p> | <p>REVISIONS</p> <p>INIT. DATE</p> | |

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 JAL:07

PHASING DIAGRAM



| SIGNAL FACE | PHASE | | | | | |
|-------------|-------|-----|-----|-----|-----|---------|
| | 1+5 | 1+6 | 2+5 | 2+6 | 4+8 | F L S H |
| 11 | ← | ← | ← | ← | ← | ← |
| 21, 22 | R | R | G | G | R | R |
| 41, 42 | R | R | R | R | G | R |
| 51 | ← | ← | ← | ← | ← | ← |
| 61, 62 | R | G | R | G | R | R |
| 81, 83 | R | R | R | R | G | R |
| 82 | R | R | R | R | G | R |

| SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART | | | | | | | | | | | | | | | | | | | | |
|---|-----------|-------|-------------------------|--------------|----------------------|--------|------------------|----------------|------------|--------|--------|--------|-------------------|-------------------|-----|--------|--------------|--------|---|---|
| INDUCTIVE LOOPS | | | | | DETECTOR PROGRAMMING | | | | | | | | | | | | | | | |
| ZONE | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW EXISTING | ASSIGNED PHASE | TIMING | | OPERATION MODE | | | | | | | | | | | | |
| | | | | | | DELAY | EXTEND (STRETCH) | VEHICLE | PEDESTRIAN | 1 CALL | STOP A | STOP B | PROTECTOR THROUGH | PROTECTOR THROUGH | AND | SWITCH | SYSTEM LOOPS | STATUS | | |
| 1A | 6X40 | * | 0 | X | - | 1 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 1B | 6X40 | * | 0 | X | - | 1 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 2A | 6X6 | * | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 2B | 6X6 | * | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 4A | 6X40 | * | 0 | X | - | 4 | 5.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 5A | 6X40 | * | 0 | X | - | 5 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 6A | 6X6 | * | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 6B | 6X6 | * | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 8A | 6X40 | * | 0 | X | - | 8 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |

* Non-intrusive detection zone.

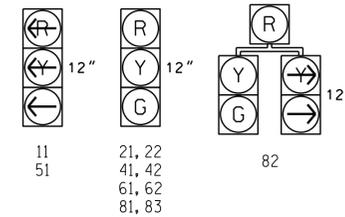
5 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- This intersection uses non-intrusive 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.

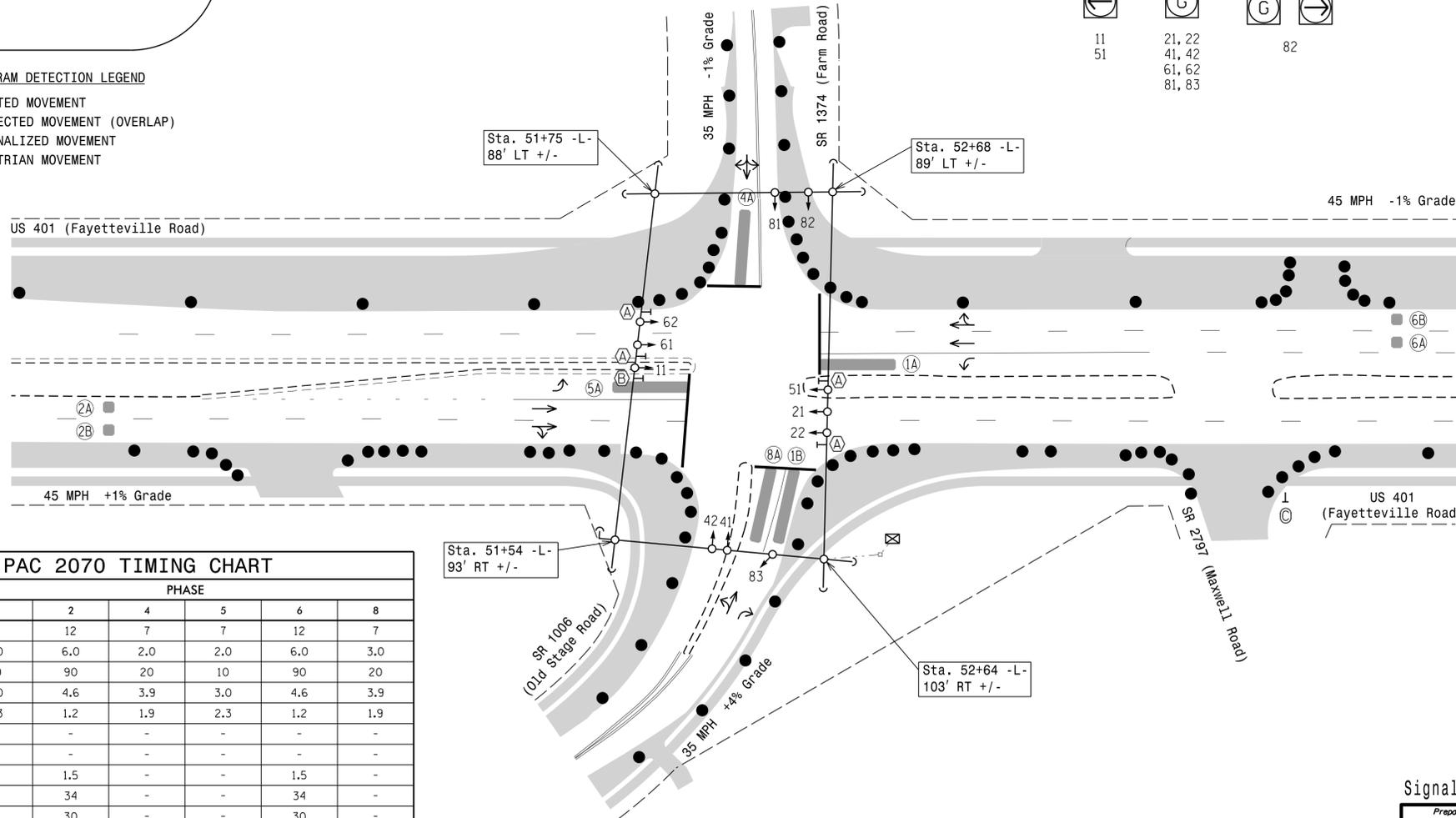
SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

- ← ● DETECTED MOVEMENT
- ← ○ UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- ← - - - PEDESTRIAN MOVEMENT



| FEATURE | SE-PAC 2070 TIMING CHART | | | | | |
|-------------------------|--------------------------|------------|----------|----------|------------|----------|
| | PHASE | | | | | |
| | 1 | 2 | 4 | 5 | 6 | 8 |
| Min Green * | 7 | 12 | 7 | 7 | 12 | 7 |
| Passage Gap * | 3.0 | 6.0 | 2.0 | 2.0 | 6.0 | 3.0 |
| Maximum Green * | 60 | 90 | 20 | 10 | 90 | 20 |
| Yellow Change | 3.0 | 4.6 | 3.9 | 3.0 | 4.6 | 3.9 |
| Red Clear | 2.3 | 1.2 | 1.9 | 2.3 | 1.2 | 1.9 |
| Walk * | - | - | - | - | - | - |
| Pedestrian Clear | - | - | - | - | - | - |
| Added Initial * | - | 1.5 | - | - | 1.5 | - |
| Maximum Initial * | - | 34 | - | - | 34 | - |
| Time Before Reduction * | - | 30 | - | - | 30 | - |
| Time To Reduce * | - | 30 | - | - | 30 | - |
| Minimum Gap | - | 3.0 | - | - | 3.0 | - |
| Recall Mode | - | MIN RECALL | - | - | MIN RECALL | - |
| Vehicle Call Memory | NON-LOCK | LOCK | NON-LOCK | NON-LOCK | LOCK | NON-LOCK |
| Dual Entry | - | - | ON | - | - | ON |
| Simultaneous Gap | ON | ON | ON | ON | ON | ON |

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

LEGEND

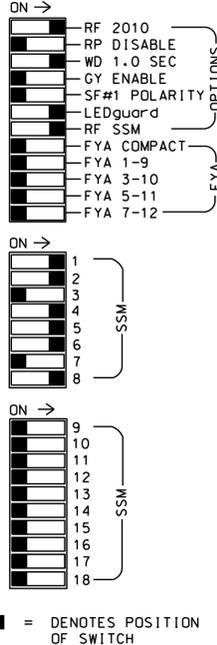
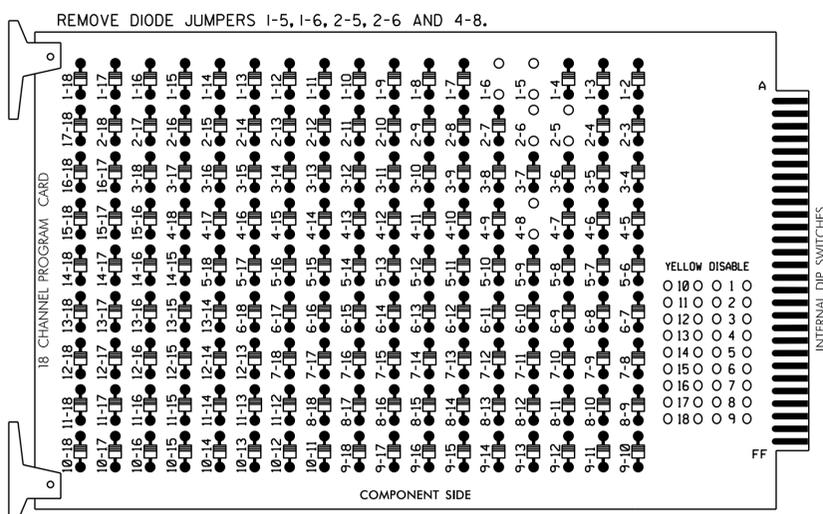
- | PROPOSED | EXISTING |
|-----------------------------------|--|
| ○ → Traffic Signal Head | ● → Traffic Signal Head |
| ○ → Modified Signal Head | N/A |
| ○ → Sign | ○ → Sign |
| ○ → Pedestrian Signal Head | ○ → Pedestrian Signal Head |
| ○ → Signal Pole with Guy | ○ → Signal Pole with Guy |
| ○ → Signal Pole with Sidewalk Guy | ○ → Signal Pole with Sidewalk Guy |
| ○ → Inductive Loop Detector | ○ → Inductive Loop Detector |
| ○ → Controller & Cabinet | ○ → Controller & Cabinet |
| ○ → Junction Box | ○ → Junction Box |
| ○ → 2-in Underground Conduit | ○ → 2-in Underground Conduit |
| N/A | ○ → Right of Way |
| → | → Directional Arrow |
| ■ | ■ Non-Intrusive Detection Zone |
| ■ | ■ Construction Zone |
| ● | ● Construction Zone Drums |
| (A) | (A) Street Name Sign By Others (D3-1) |
| (B) | (B) "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) |
| (C) | (C) "STOP" Sign (R1-1) |

Signal Upgrade - Temporary Design 1 (TMP Phases I & II)

| | | | |
|---------------------------|---|--------------------------|--|
| | US 401 (Fayetteville Road) at SR 1006 (Old Stage Road) and SR 1374 (Farm Road) | | SEAL NORTH CAROLINA PROFESSIONAL ENGINEER ROBERT J. JAMES 026486 |
| | Division 5 Wake County Raleigh | PLAN DATE: February 2025 | |
| PREPARED BY: J.A. Lohr | REVIEWED BY: | REVISIONS | INIT. DATE |
| SCALE 0 40 1" = 40' | DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | DATE 03/27/2025 | SIG. INVENTORY NO. 05-058311 |

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 controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phases 2 and 6 for volume density operation.
- Program phases 4 and 8 for dual entry.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|-----|-----|-------|----|----|-------|----|----|-------|-----|-----|----------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | 11 | 82 | 21,22 | NU | NU | 41,42 | NU | 51 | 61,62 | NU | NU | 81,82,83 | NU | NU | NU | NU | NU | NU |
| RED | | | 128 | | | 101 | | | 134 | | | 107 | | | | | | |
| YELLOW | | | 129 | | | 102 | | | 135 | | | 108 | | | | | | |
| GREEN | | | 130 | | | 103 | | | 136 | | | 109 | | | | | | |
| RED ARROW | 125 | | | | | | | | 131 | | | | | | | | | |
| YELLOW ARROW | 126 | 126 | | | | | | | 132 | | | | | | | | | |
| GREEN ARROW | 127 | 127 | | | | | | | 133 | | | | | | | | | |

NU = Not Used

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

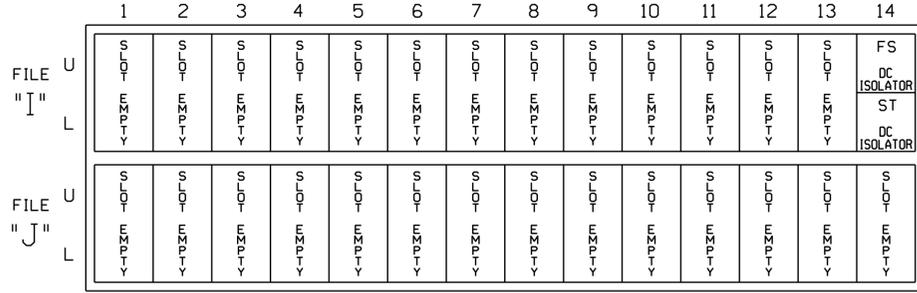
- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL 1-RED)
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

INPUT FILE POSITION LAYOUT

(front view)



REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0
 LDSW: 123456789 0123456789 0123456789 012
 FLSH: 110010110 0100000000 0000000000 000
 ALT: 100000010 0100000000 0000000000 000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES
 PHASES: 12345678 90123456
 ENTRY: 01000100 00000000
 EXIT: 01000100 00000000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 3 and 7 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 1 | 6 | 0 | 1 | 1 | 6 | 0 | 1 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

SPECIAL DETECTOR NOTE

Install a non-intrusive 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0583T1
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Temporary Design 1 (TMP Phase I & II)
 Electrical Detail

US 401 (Fayetteville Road) at SR 1006 (Old Stage Road) and SR 1374 (Farm Road)

Division 5 Wake County Raleigh

PLAN DATE: March 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

SEAL

RYAN W. HOUGH

Professional Engineer

03/28/2025

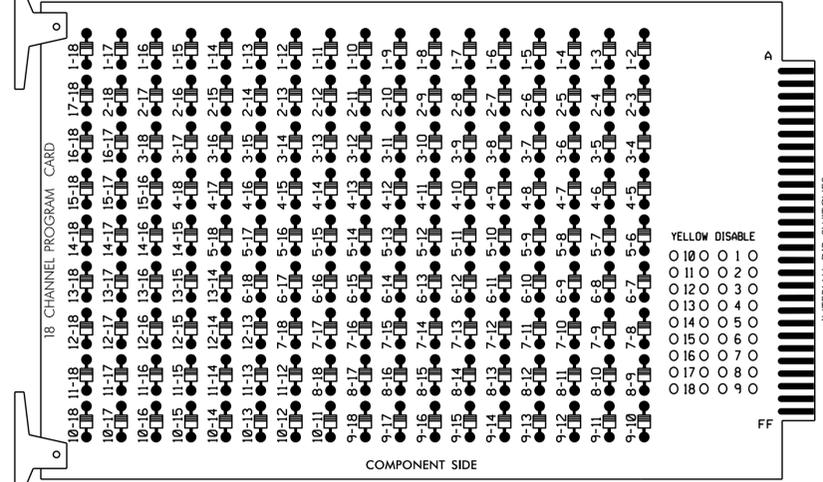
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

27-MAR-2025 15:51 D:\nodot-pw\ben\ey.com\nodot-pw-01\Documents\NCDOT_TSMO\SIGNAL Design\an014\signal_05-0583T1\signal_05-0583T1_sml.eie_20250327.dgn

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

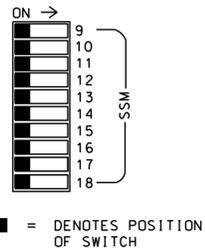
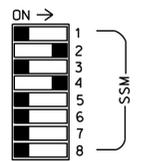
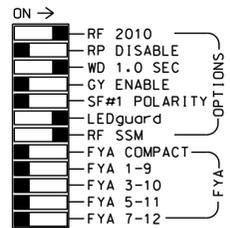
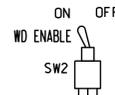
DO NOT REMOVE ANY DIODE JUMPERS.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = 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 controller to start up in phase 2 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phase 2 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5
 PHASES USED.....2,4
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|----|-----|-------|----|----|----------|----|----|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | 21 | 22 | NU | NU | 41,42,43 | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU |
| RED | | 128 | 128 | | | 101 | | | | | | | | | | | | |
| YELLOW | | 129 | 129 | | | | | | | | | | | | | | | |
| GREEN | | | 130 | | | | | | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | | | | | | | | |
| YELLOW ARROW | | | | | | 102 | | | | | | | | | | | | |
| GREEN ARROW | | 130 | | | | 103 | | | | | | | | | | | | |

NU = Not Used

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL 1-RED)
 RED REV/10...: 40 (TSEC) 2-RAF)
 AUTO PED CLR.: 0 (0-NO 1-YES)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

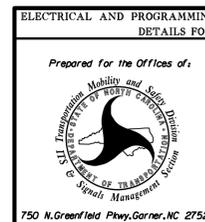
STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

SPECIAL DETECTOR NOTE

Install a non-intrusive 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.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-0583T3
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Temporary Design 3 (TMP Phase IV)
 Electrical Detail



US 401 (Fayetteville Road)
 at
 SR 1006 (Old Stage Road)

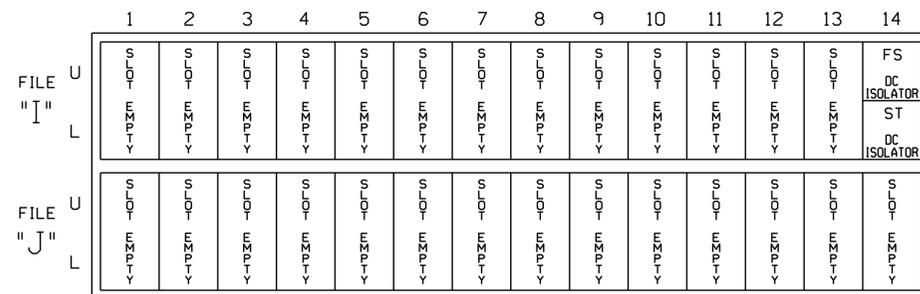
| | | |
|----------------------------|--------------|---------|
| Division 5 | Wake County | Raleigh |
| PLAN DATE: March 2025 | REVIEWED BY: | |
| PREPARED BY: S.Kirkpatrick | REVIEWED BY: | |
| REVISIONS | INIT. | DATE |
| | | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 RYAN W. HOUGH
 03/28/2025
 430320FAA2054C3
 SIGNATURE DATE
 SIG. INVENTORY NO. 05-0583T3

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0
 LDSW: 123456789 0123456789 0123456789 012
 FLSH: 010010000 0000000000 0000000000 000
 ALT: 000010000 0000000000 0000000000 000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES
 PHASES: 12345678 90123456
 ENTRY: 01000000 00000000
 EXIT: 01000000 00000000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

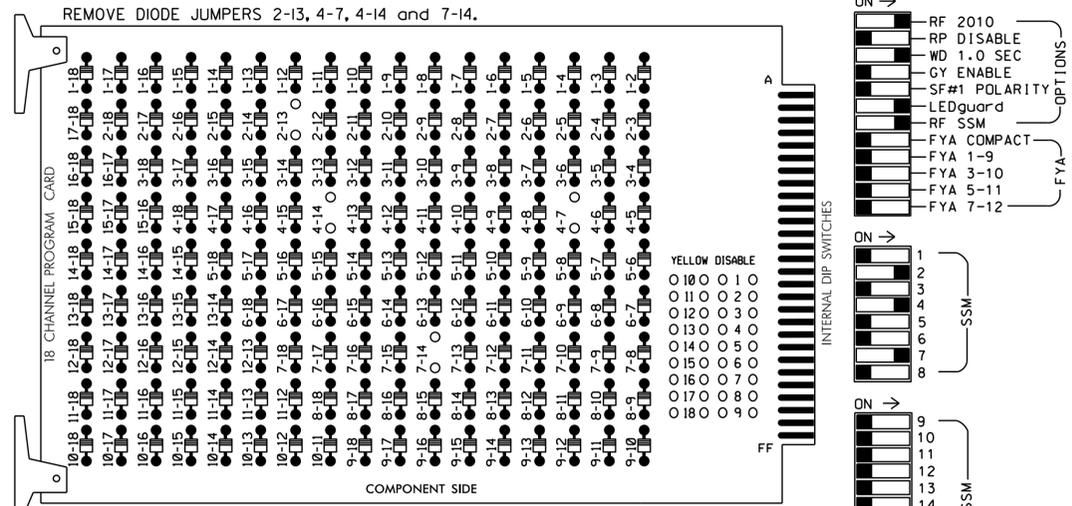
Note Phases 1, 3, 5, 6, 7, and 8 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

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 controller to start up in phase 2 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phases 4 and 7 for dual entry.
- Program phase 2 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S3,S5,S6,S10
 PHASES USED.....2,2PED,4,4PED,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|-----|-----|-------|----------|----|-----------|----------|-----|-------|-----|-------|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | 21 | 22,23 | P21, P22 | NU | 41,42, 43 | P41, P42 | NU | NU | NU | 71,72 | NU | NU | NU | NU | NU | NU | NU |
| RED | | 128 | 128 | | | 101 | | | | | | | | | | | | |
| YELLOW | | 129 | 129 | | | | | | | | | | | | | | | |
| GREEN | | | 130 | | | | | | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | | 122 | | | | | | |
| YELLOW ARROW | | | | | | 102 | | | | 123 | | | | | | | | |
| GREEN ARROW | 130 | | | | | 103 | | | | 124 | | | | | | | | |
| Hand icon | | | | | | | | 113 | | | | | | | | | | |
| Person icon | | | | | | | | | | | | | | | | | | 106 |

NU = Not Used

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

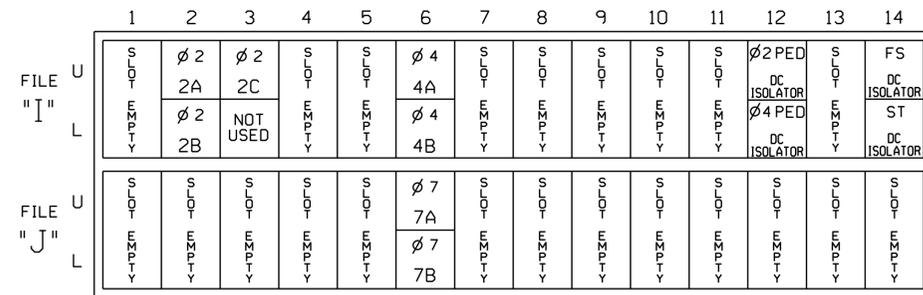
- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEO : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

INPUT FILE POSITION LAYOUT

(front view)



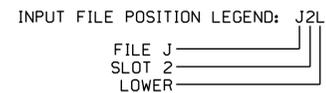
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | DELAY TIME | EXTEND (STRETCH) TIME |
|------------------|---------------|-----------------|---------|--------------|------------|------------|-----------------------|
| 2A | TB2-5,6 | I2U | 39 | 3 | 2 | | |
| 2B | TB2-7,8 | I2L | 43 | 4 | 2 | | |
| 2C | TB2-9,10 | I3U | 63 | 5 | 2 | | |
| 4A | TB4-9,10 | I6U | 41 | 11 | 4 | 15 | |
| 4B | TB4-11,12 | I6L | 45 | 12 | 4 | 15 | |
| 7A | TB5-9,10 | J6U | 42 | 31 | 7 | | |
| 7B | TB5-11,12 | J6L | 46 | 32 | 7 | | |
| PED PUSH BUTTONS | | | | | | | |
| P21,P22 | TB8-4,6 | I12U | 67 | PED 2 | 2 PED | | |
| P41,P42 | TB8-5,6 | I12L | 69 | PED 4 | 4 PED | | |

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.



INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 3, 5, 6 and 8 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 0 | 1 | 0 | 0 | 1 | 0 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

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: 05-0583
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

| | | | |
|--|--|--------------|------------|
| | US 401 (Fayetteville Road) at SR 1006 (Old Stage Road) | | |
| | Division 5 | Wake County | |
| Prepared for the Offices of: | PLAN DATE: March 2025 | REVIEWED BY: | |
| | PREPARED BY: S. Kirkpatrick | REVIEWED BY: | |
| REVISIONS | INIT. | DATE | |
| | | | |
| 750 N. Greenfield Pkwy, Garner, NC 27529 | | | 03/28/2025 |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 05-0583

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **3 - PHASE DATA**
2. From PHASE DATA Submenu select **3 - PEDESTRIAN DATA**
3. From DETECTOR DATA Submenu select **3 - PED OFFSET +**

```

PHASE.....1...2...3...4...5...6...7...8
WOFF/10   0  70  0  0  0  0  0  0
MODE*     0  0  0  0  0  0  0  0
    
```

CODES:* 0=ADVANCE 1=DELAY

Advance Walk PED programming complete.

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **4 - UNIT DATA**
2. From UNIT DATA Submenu select **2 - REMOTE FLASH**
3. From FLASH Submenu select **1 - FLASH SETTINGS**

```

FLASH SETTINGS          TEST-A AS FLASH: 0
LDSW: 123456789 0123456789 0123456789 012
FLSH: 010010000 1000000000 0000000000 000
ALT: 000010000 0000000000 0000000000 000

O-DARK  1-RED  2-YELLOW  3-STEADY YELLOW
A-UP    B-DN   C-LT    D-RT      F-PRIOR MENU
    
```

PRESS 'F' TO RETURN TO FLASH

4. From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

```

FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456
ENTRY:  01000000 00000000
EXIT:   01000000 00000000

O-DARK  1-RED  2-YELLOW  3-STEADY YELLOW
A-UP    B-DN   C-LT    D-RT      F-PRIOR MENU
    
```

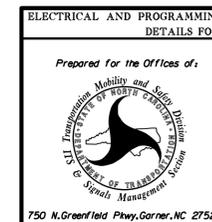
REMOTE FLASH PROGRAMMING COMPLETE

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-0583
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Electrical Detail - Sheet 2 of 2



US 401 (Fayetteville Road)
 at
 SR 1006 (Old Stage Road)

Division 5 Wake County Raleigh
 PLAN DATE: March 2025 REVIEWED BY:
 PREPARED BY: S. Kirkpatrick REVIEWED BY:

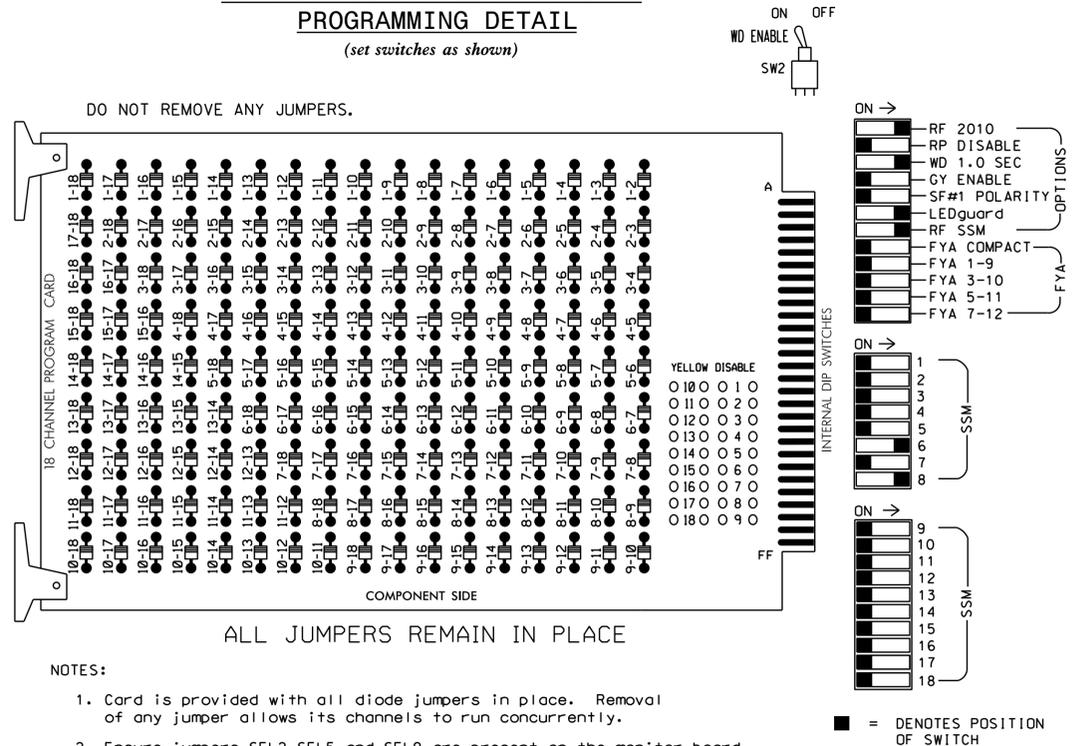
| REVISIONS | INIT. | DATE |
|-----------|-------|------|
| | | |

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

SEAL
 STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 RYAN W. HOUGH
 SEAL 036833
 Signed by: Ryan W. Hough 03/28/2025
 SIGNATURE DATE
 SIG. INVENTORY NO. 05-0583

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(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 controller to start up in phases 2 and 6 Green/Don't Walk.
 - Enable simultaneous gap-out feature for all phases.
 - Program phase 6 for volume density operation.
 - The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S8,S11
 PHASES USED.....*2,*3,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 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 | NC | NU | NC | NU | NU | NU | 61 | 62 | NU | NU | 81,82,83 | NU | NU | NU | NU | NU | NU |
| RED | | | | | | | | 134 | 134 | | | 107 | | | | | | |
| YELLOW | | | | | | | | 135 | 135 | | | | | | | | | |
| GREEN | | | | | | | | 136 | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | | | | | | | | |
| YELLOW ARROW | | | | | | | | | | | | | 108 | | | | | |
| GREEN ARROW | | | | | | | | 136 | | | | | 109 | | | | | |

NU = Not Used
 NC = Not Connected

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL 1-RED)
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

SPECIAL DETECTOR NOTE

Install a non-intrusive 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.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1784T
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Temporary Design (TMP Phase IV)
 Electrical Detail

US 401 SB (Fayetteville Road)
 at
 SR 1374 (Farm Road)

Division 5 Wake County Raleigh

Prepared by: S. Kirkpatrick
 Reviewed by: Ryan W. Hough

3/28/2025

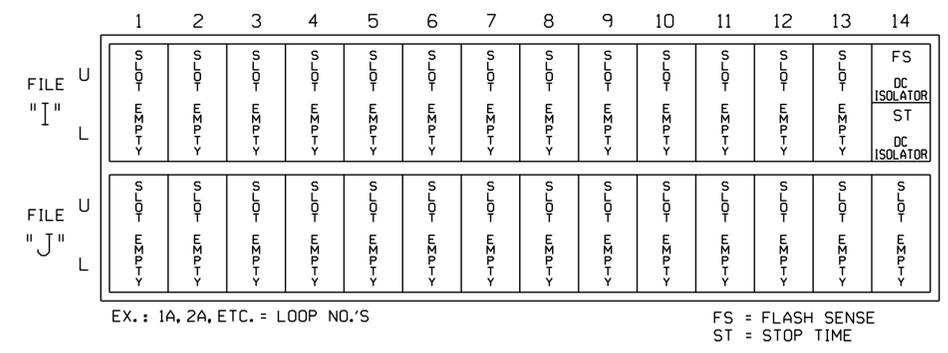
750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 RYAN W. HOUGH
 430220FA2854C3
 SIGNATURE DATE
 SIG. INVENTORY NO. 05-1784T

INPUT FILE POSITION LAYOUT

(front view)



REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0

LDSW: 123456789 0123456789 0123456789 012
 FLSH: 000000010 0100000000 0000000000 000
 ALT: 000000010 0000000000 0000000000 000

0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456
 ENTRY: 01000100 00000000
 EXIT: 01000100 00000000

0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 4, 5, and 7 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 1 | 0 | 0 | 6 | 0 | 1 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

28-MAR-2025 07:59
 D:\p\ncdot-pw\ben\ey.com\ncdot-pw\01\Documents\ACDOT_TSMO\SIGNAL Design_Sect1\an\01\vision_05\05-1784\Signal Management\051784T_sm.eia_20250328.dgn
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PHASING DIAGRAM

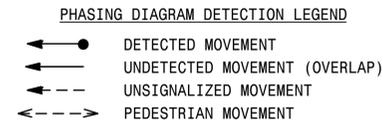
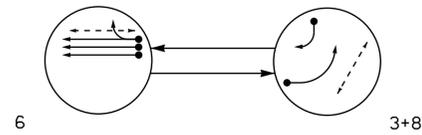
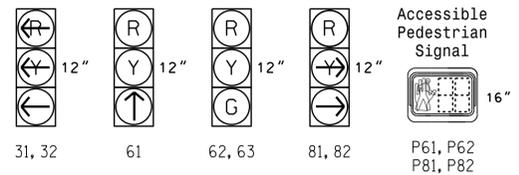


TABLE OF OPERATION

| SIGNAL FACE | PHASE | |
|-------------|-------|-----|
| | 6 | 3+8 |
| 31, 32 | ← | ← |
| 61 | ↑ | ↑ |
| 62, 63 | G | R |
| 81, 82 | R | ← |
| P61, P62 | W | DRK |
| P81, P82 | DW | DRK |

SIGNAL FACE I.D.

All Heads L.E.D.



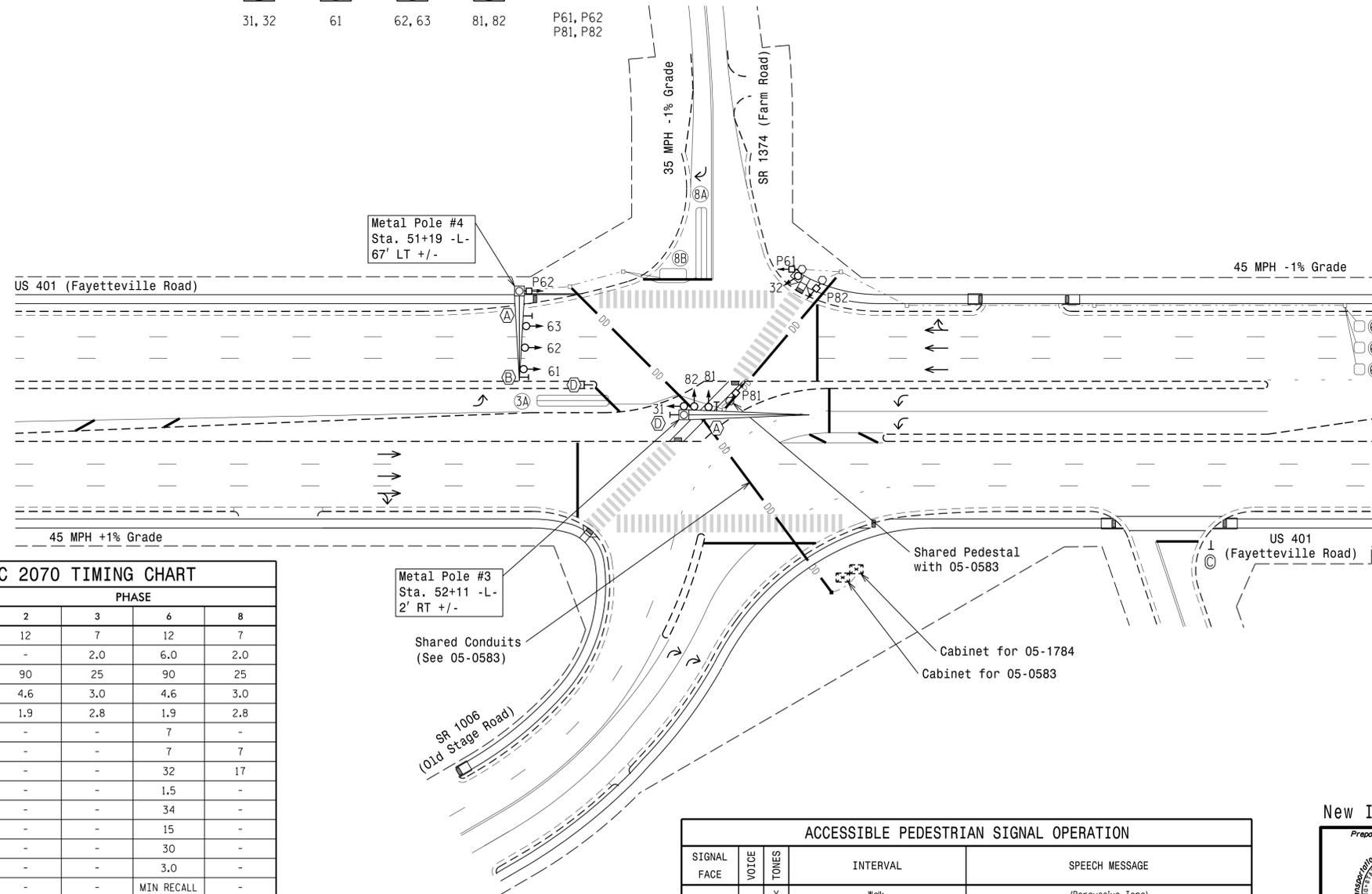
SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| LOOP NO. | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW | EXISTING | ASSIGNED PHASE | DETECTOR PROGRAMMING | | | | | | | | | | | | | |
|----------|-----------|-------|-------------------------|-----|----------|----------------|----------------------|------------------|----------------|--------|---|---|---|---|---|--------|--------|--------|---|---|
| | | | | | | | DELAY | EXTEND (STRETCH) | OPERATION MODE | | | | | | | SWITCH | SYSTEM | STATUS | | |
| | | | | | | | | | VEHICLE | 1 CALL | 2 | 3 | 4 | 5 | 6 | | | | 7 | |
| 3A | 6X40 | 2-4-2 | 0 | X | - | 3 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 6A | 6X6 | 6 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 6B | 6X6 | 6 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 6C | 6X6 | 6 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 8A | 6X40 | 2-4-2 | 0 | X | - | 8 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 8B | 15x6 | 3 | 0 | X | - | 8 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |

2 Phase Fully Actuated (Raleigh 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.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 2 as a dummy phase for ring 1.



LEGEND

| PROPOSED | EXISTING |
|--|--|
| ○ → Traffic Signal Head | ● → Modified Signal Head |
| ○ → Pedestrian Signal Head | ○ → Sign |
| ○ → Signal Pole with Guy | ○ → Signal Pole with Sidewalk Guy |
| □ → Inductive Loop Detector | □ → Controller & Cabinet |
| □ → Junction Box | □ → Junction Box |
| --- → 2-in Underground Conduit | --- → Right of Way |
| → → Directional Arrow | → → Metal Pole with Mastarm |
| ○ → Type II Signal Pedestal | ○ → Directional Drill |
| --- → Curbed Ramp | --- → Curbed Ramp |
| A → Street Name Sign (D3-1) | A → Street Name Sign (D3-1) |
| B → No Left Turn Sign (R3-2) | B → No Left Turn Sign (R3-2) |
| C → "STOP" Sign (R1-1) | C → "STOP" Sign (R1-1) |
| D → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) | D → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) |

SE-PAC 2070 TIMING CHART

| FEATURE | PHASE | | | |
|-------------------------|-------|----------|------------|----------|
| | 2 | 3 | 6 | 8 |
| Min Green * | 12 | 7 | 12 | 7 |
| Passage Gap * | - | 2.0 | 6.0 | 2.0 |
| Maximum Green * | 90 | 25 | 90 | 25 |
| Yellow Change | 4.6 | 3.0 | 4.6 | 3.0 |
| Red Clear | 1.9 | 2.8 | 1.9 | 2.8 |
| Advance Walk | - | - | 7 | - |
| Walk * | - | - | 7 | 7 |
| Pedestrian Clear | - | - | 32 | 17 |
| Added Initial * | - | - | 1.5 | - |
| Maximum Initial * | - | - | 34 | - |
| Time Before Reduction * | - | - | 15 | - |
| Time To Reduce * | - | - | 30 | - |
| Minimum Gap | - | - | 3.0 | - |
| Recall Mode | - | - | MIN RECALL | - |
| Vehicle Call Memory | - | NON-LOCK | LOCK | NON-LOCK |
| 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 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

| SIGNAL FACE | VOICE | TONES | INTERVAL | SPEECH MESSAGE |
|-------------|-------|-------|----------------------------------|-----------------------------------|
| P61, P62 | - | X | Walk | (Percussive Tone) |
| P61, P62 | X | - | Flashing Don't Walk / Don't Walk | Wait, wait to cross Farm. |
| P81, P82 | - | X | Walk | (Percussive Tone) |
| P81, P82 | X | - | Flashing Don't Walk / Don't Walk | Wait, wait to cross Fayetteville. |

New Installation - Final Design

US 401 SB (Fayetteville Road) at SR 1374 (Farm Road)

Division 5 Wake County Raleigh

PLAN DATE: February 2025 REVIEWED BY: J.A. Lohr

PREPARED BY: J.A. Lohr

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 1" = 40'

REVISIONS: [Table with columns for REVISIONS, INIT., DATE]

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

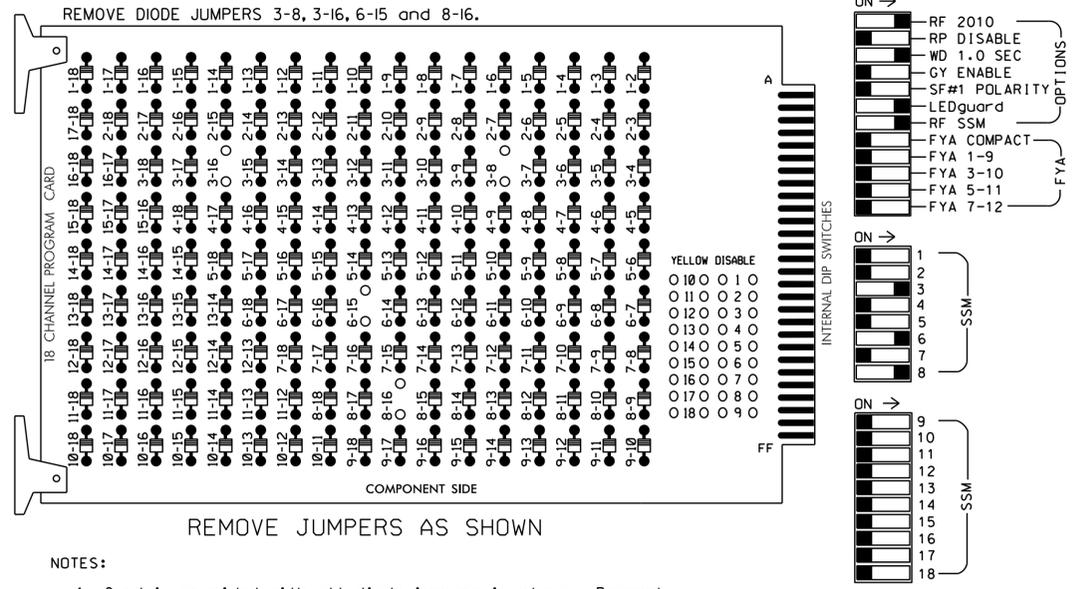
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER, ROBERT J. ZIMMERMAN, No. 026486

DATE: 03/27/2025

SIG. INVENTORY NO. 05-1784

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 controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phases 3 and 8 for dual entry.
- Program phase 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S4,S8,S9,S11,S12
 PHASES USED.....*2,3,6,6PED,8,8PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 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 | NC | NU | 31,32 | NU | NU | NU | 61 | 62,63 | P61, P62 | NU | 81,82 | P81, P82 | NU | NU | NU | NU | NU |
| RED | | | | | | | | 134 | 134 | | 107 | | | | | | | |
| YELLOW | | | | | | | | 135 | 135 | | | | | | | | | |
| GREEN | | | | | | | | 136 | | | | | | | | | | |
| RED ARROW | | | | 116 | | | | | | | | | | | | | | |
| YELLOW ARROW | | | | 117 | | | | | | | 108 | | | | | | | |
| GREEN ARROW | | | | 118 | | | | 136 | | | 109 | | | | | | | |
| Hand icon | | | | | | | | | | 119 | | 110 | | | | | | |
| Walking person icon | | | | | | | | | | 121 | | | 112 | | | | | |

NU = Not Used
 NC = Not Connected

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

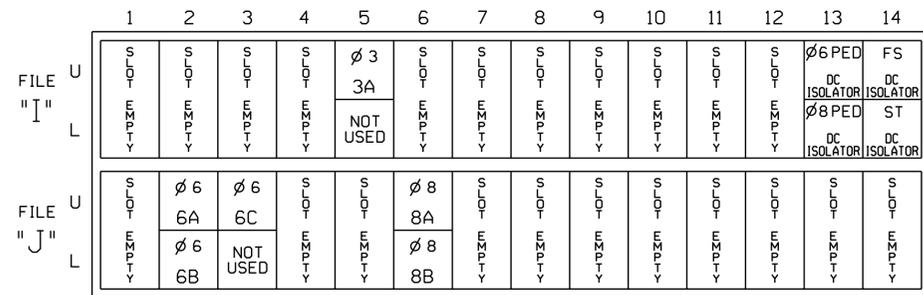
- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

INPUT FILE POSITION LAYOUT

(front view)



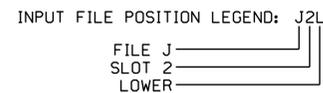
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | DELAY TIME | EXTEND (STRETCH) TIME |
|------------------|---------------|-----------------|---------|--------------|------------|------------|-----------------------|
| 3A | TB4-5,6 | I5U | 58 | 9 | 3 | | |
| 6A | TB3-5,6 | J2U | 40 | 21 | 6 | | |
| 6B | TB3-7,8 | J2L | 44 | 22 | 6 | | |
| 6C | TB3-9,10 | J3U | 64 | 23 | 6 | | |
| 8A | TB5-9,10 | J6U | 42 | 31 | 8 | 15 | |
| 8B | TB5-11,12 | J6L | 46 | 32 | 8 | 15 | |
| PED PUSH BUTTONS | | | | | | | |
| P61,P62 | TB8-7,9 | I13U | 68 | PED 6 | 6 PED | | |
| P81,P82 | TB8-8,9 | I13L | 70 | PED 8 | 8 PED | | |

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOT 113.



INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 4, 5 and 7 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 1 | 0 | 0 | 6 | 0 | 1 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

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: 05-1784
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

US 401 SB (Fayetteville Road) at SR 1374 (Farm Road)

Division 5 Wake County Raleigh

PLAN DATE: March 2025 REVIEWED BY:

PREPARED BY: S. Kirkpatrick REVIEWED BY:

REVISIONS

INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

MORTH CAROLINA PROFESSIONAL ENGINEER

RYAN W. HOUGH

Signed by: Ryan W. Hough 03/28/2025

SIGNATURE DATE

SIG. INVENTORY NO. 05-1784

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **3 - PHASE DATA**
2. From PHASE DATA Submenu select **3 - PEDESTRIAN DATA**
3. From DETECTOR DATA Submenu select **3 - PED OFFSET +**

```

PHASE.....1...2...3...4...5...6...7...8
WOFF/10   0   0   0   0   0   70  0   0
MODE*     0   0   0   0   0   0   0   0
  
```

CODES:* 0=ADVANCE 1=DELAY

Advance Walk PED programming complete.

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **4 - UNIT DATA**
2. From UNIT DATA Submenu select **2 - REMOTE FLASH**
3. From FLASH Submenu select **1 - FLASH SETTINGS**

```

FLASH SETTINGS          TEST-A AS FLASH: 0
LDSW: 123456789 0123456789 0123456789 012
FLSH: 000100010 0100000000 0000000000 000
ALT: 000100010 0000000000 0000000000 000

O-DARK  1-RED  2-YELLOW  3-STEADY YELLOW
A-UP    B-DN   C-LT    D-RT      F-PRIOR MENU
  
```

PRESS 'F' TO RETURN TO FLASH

4. From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

```

FLASH ENTRY/EXIT PHASES
PHASES: 12345678 90123456
ENTRY: 01000100 00000000
EXIT: 01000100 00000000

O-DARK  1-RED  2-YELLOW  3-STEADY YELLOW
A-UP    B-DN   C-LT    D-RT      F-PRIOR MENU
  
```

REMOTE FLASH PROGRAMMING COMPLETE

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Contoller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

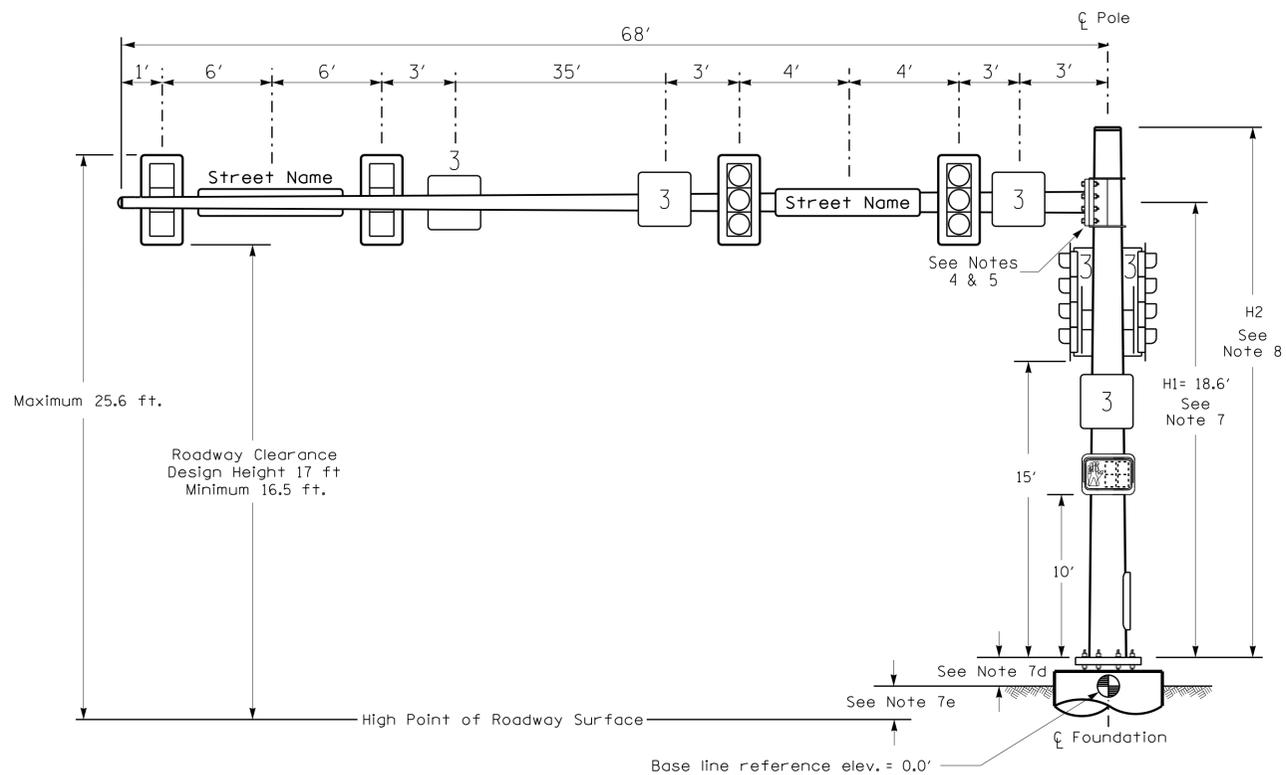
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1784
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Electrical Detail - Sheet 2 of 2

| | | | |
|--|---|------------------------------------|-------------------------------|
| | Prepared for the Offices of: US 401 SB (Fayetteville Road) at SR 1374 (Farm Road) | | |
| | Division 5 Wake County Raleigh | PLAN DATE: March 2025 REVIEWED BY: | |
| 750 N. Greenfield Pkwy, Garner, NC 27529 | REVISIONS _____ INIT. DATE | SIGNATURE _____ DATE | 03/28/2025 430320FAA2054C3 |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Design Loading for METAL POLE NO. 3



Elevation View

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

Elevation Data for Mast Arm Attachment (H1)

| Elevation Differences for: | Pole 3 | Pole 4 |
|--|---------|----------|
| Baseline reference point at ϕ Foundation @ ground level | 0.0 ft. | 0.0 ft. |
| Elevation difference at High point of roadway surface | 1.9 ft. | 0.6 ft. |
| Elevation difference at Edge of travelway or face of curb | 0.7 ft. | -0.7 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 |
| | PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE | 2.2 S.F. | 18.5" W X 17.0" L | 21 LBS |
| | STREET NAME SIGN RIGID MOUNTED | 16.0 S.F. | 24.0" W X 96.0" L | 36 LBS |
| | SIGN RIGID MOUNTED | 9.0 S.F. | 36.0" W X 36.0" L | 17 LBS |

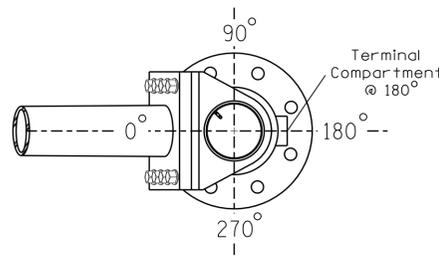
NOTES

DESIGN REFERENCE MATERIAL

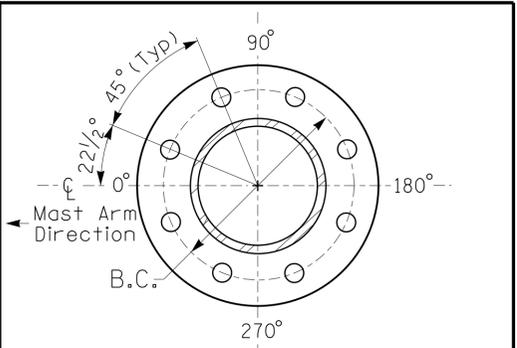
- Design the traffic signal structure and foundation in accordance with:
 - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2024 NCDOT "Standard Specifications for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

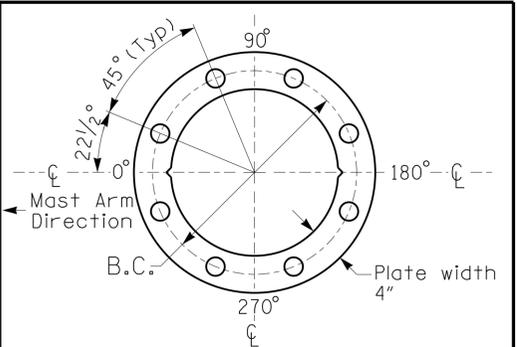
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

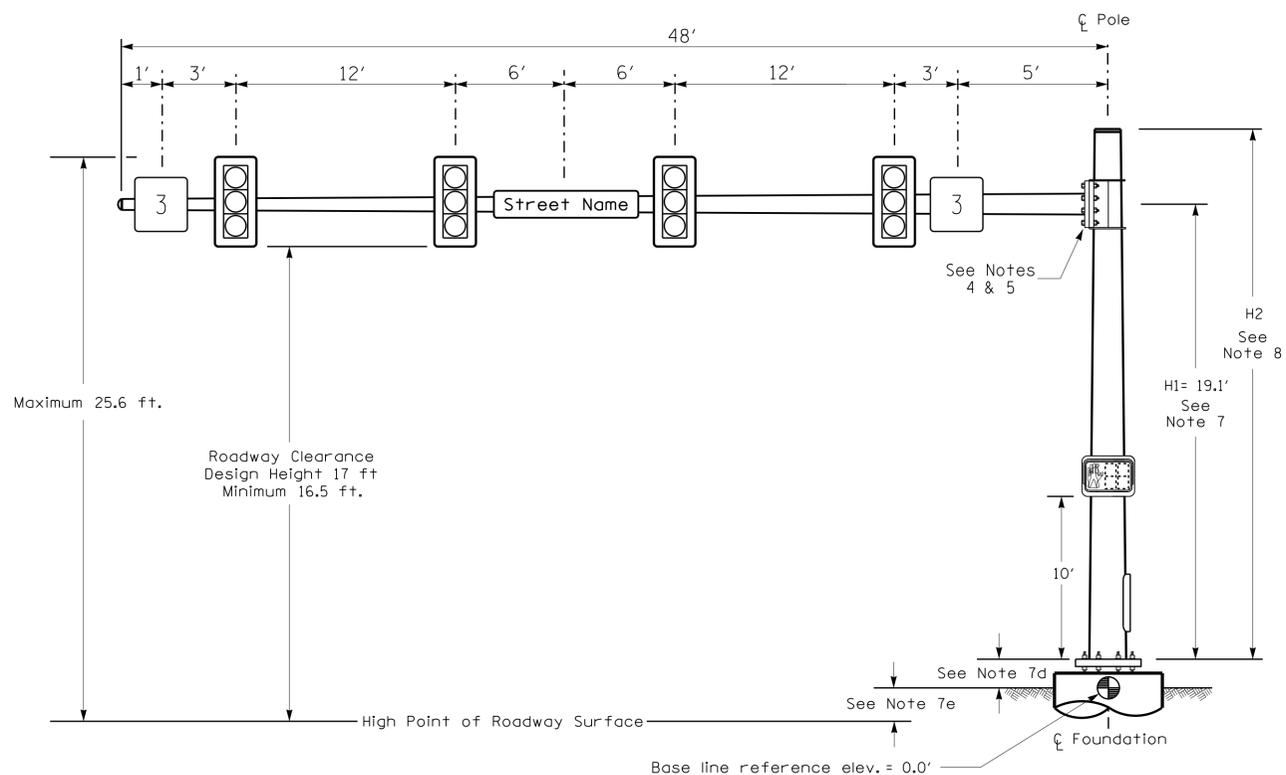


8 BOLT BASE PLATE DETAIL



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

Design Loading for METAL POLE NO. 4



Elevation View

NCDOT Wind Zone 4 (120 mph)

Prepared In the Offices of:

 TRANSPORTATION MOBILITY AND SAFETY DIVISION
 DIVISION OF TRANSPORTATION SIGNAL DESIGN SECTION
 750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (Fayetteville Road) at SR 1006 (Old Stage Road) and SR 1374 (Farm Road)
 Division 5 Wake County Raleigh
 PLAN DATE: February 2025 REVIEWED BY:
 PREPARED BY: J.A. Lohr REVIEWED BY:

SCALE: 0 N/A

REVISIONS: INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

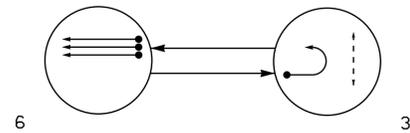
SEAL

 ROBERT J. TIPTON
 PROFESSIONAL ENGINEER
 03/27/2025

SIG. INVENTORY NO. 05-0583 & 05-1784

27-MAR-2025 08:54
 #PROJECT# 202501016R-0405-TEC-CM-ITS-SIGNAL-SECTION-CENTRAL-Region-01iv-541-5302-2025-Update-051784-sig-mp-2025mids.dgn
 JAL:07

PHASING DIAGRAM

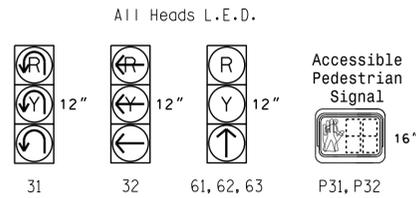


PHASING DIAGRAM DETECTION LEGEND
 ● ← DETECTED MOVEMENT
 ← UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 ← - - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

| SIGNAL FACE | PHASE | | |
|-------------|-------|-----|-------|
| | 6 | 3 | FLASH |
| 31 | (R) | (R) | (R) |
| 32 | (R) | (R) | (R) |
| 61, 62, 63 | (R) | (R) | (R) |
| P31, P32 | DW | W | DRK |

SIGNAL FACE I.D.



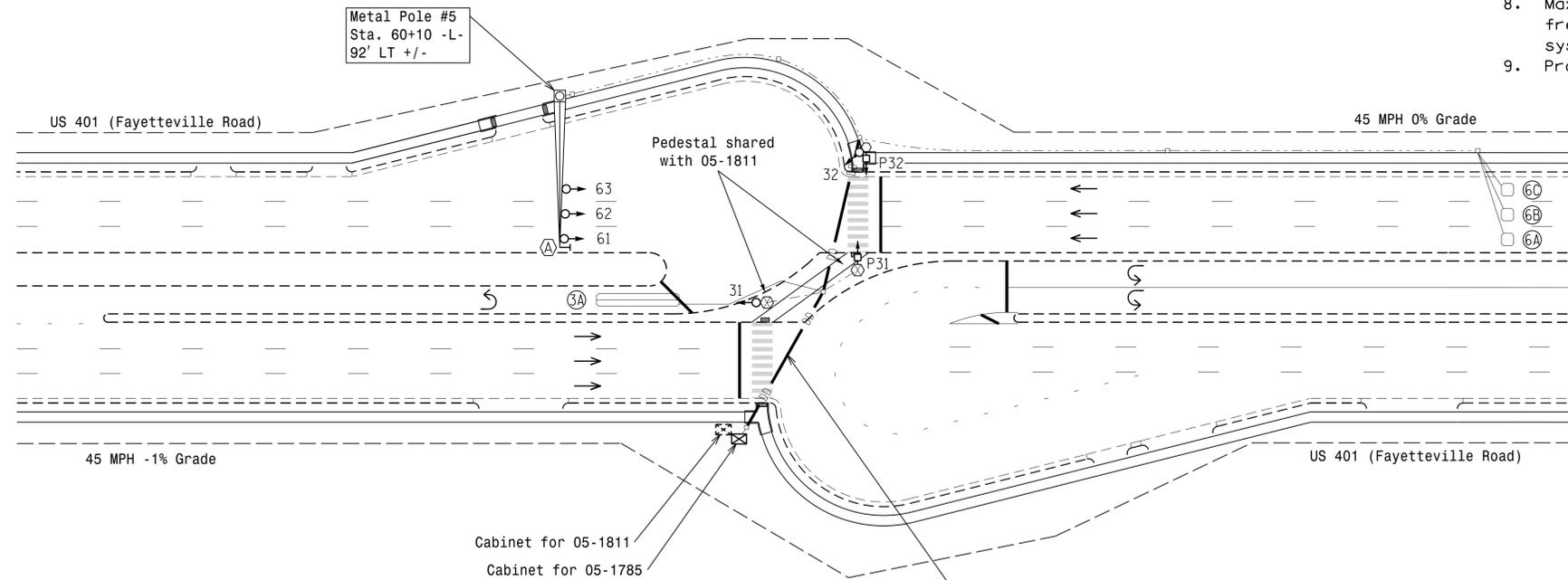
SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| LOOP NO. | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW | EXISTING | ASSIGNED PHASE | DETECTOR PROGRAMMING | | | | | | | | | | | | | | |
|----------|-----------|-------|-------------------------|-----|----------|----------------|----------------------|------------------|----------------|--------|---|---|--------|--------|----------------|--------|--------|-------|--------|-------------------|-----|
| | | | | | | | TIMING | | OPERATION MODE | | | | | | | SWITCH | SYSTEM | LOOPS | STATUS | | |
| | | | | | | | DELAY | EXTEND (STRETCH) | VEHICLE | 1 CALL | 2 | 3 | STOP A | STOP B | PROTECTOR LEFT | | | | | PROTECTOR THROUGH | AND |
| 3A | 6X40 | 2-4-2 | 0 | X | - | 3 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | X | - |
| 6A | 6X6 | 5 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | X | - |
| 6B | 6X6 | 5 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | X | - |
| 6C | 6X6 | 5 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | X | - |

2 Phase Fully Actuated (Raleigh 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.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 2 as a dummy phase for Ring 1.



SE-PAC 2070 TIMING CHART

| FEATURE | PHASE | | |
|-------------------------|-------|----------|------------|
| | 2 | 3 | 6 |
| Min Green * | 12 | 7 | 12 |
| Passage Gap * | - | 2.0 | 6.0 |
| Maximum Green * | 90 | 30 | 90 |
| Yellow Change | 4.5 | 3.0 | 4.5 |
| Red Clear | 1.6 | 2.8 | 1.6 |
| Walk * | - | 7 | - |
| Pedestrian Clear | - | 9 | - |
| Added Initial * | - | - | 1.5 |
| Maximum Initial * | - | - | 34 |
| Time Before Reduction * | - | - | 15 |
| Time To Reduce * | - | - | 30 |
| Minimum Gap | - | - | 3.0 |
| Recall Mode | - | - | MIN RECALL |
| Vehicle Call Memory | - | NON-LOCK | LOCK |
| Dual Entry | - | - | - |
| Simultaneous Gap | ON | ON | ON |

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

| SIGNAL FACE | VOICE | TONES | INTERVAL | SPEECH MESSAGE |
|-------------|-------|-------|----------------------------------|-----------------------------------|
| P31, P32 | - | X | Walk | (Percussive Tone) |
| | X | - | Flashing Don't Walk / Don't Walk | Wait. Wait to cross Fayetteville. |

LEGEND

| PROPOSED | EXISTING |
|-----------------------------------|-----------------------------------|
| ○ → Traffic Signal Head | ● → N/A |
| ● → 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 |
| ⊞ Inductive Loop Detector | ⊞ Inductive Loop Detector |
| ⊞ Controller & Cabinet | ⊞ Controller & Cabinet |
| □ Junction Box | □ Junction Box |
| - - - 2-in Underground Conduit | - - - 2-in Underground Conduit |
| - - - Right of Way | - - - Right of Way |
| → Directional Arrow | → Directional Arrow |
| ○ Metal Pole with Mastarm | ○ Metal Pole with Mastarm |
| ○ Type II Signal Pedestal | ○ Type II Signal Pedestal |
| ○ Type III Signal Pedestal | ○ Type III Signal Pedestal |
| ⊞ Directional Drill | ⊞ Directional Drill |
| - - - Curb Ramp | - - - Curb Ramp |
| ⊞ No Left Turn Sign (R3-2) | ⊞ No Left Turn Sign (R3-2) |

New Installation

Prepared in the Offices of:
 Transportation Mobility and Safety Solutions
 NORTH CAROLINA PROFESSIONAL ENGINEERS
 J.A. LOHR ENGINEERS, P.C.
 750 N. Greenfield Pkwy, Garner, NC 27529

US 401 SB (Fayetteville Road) at U-Turn North of SR 1374 (Farm Road)

Division 5 Wake County Raleigh

PLAN DATE: February 2025 REVIEWED BY: J.A. Lohr

REVISIONS: [Table with columns for REVISIONS, INIT., DATE]

DATE: 03/27/2025

SCALE: 1" = 40'

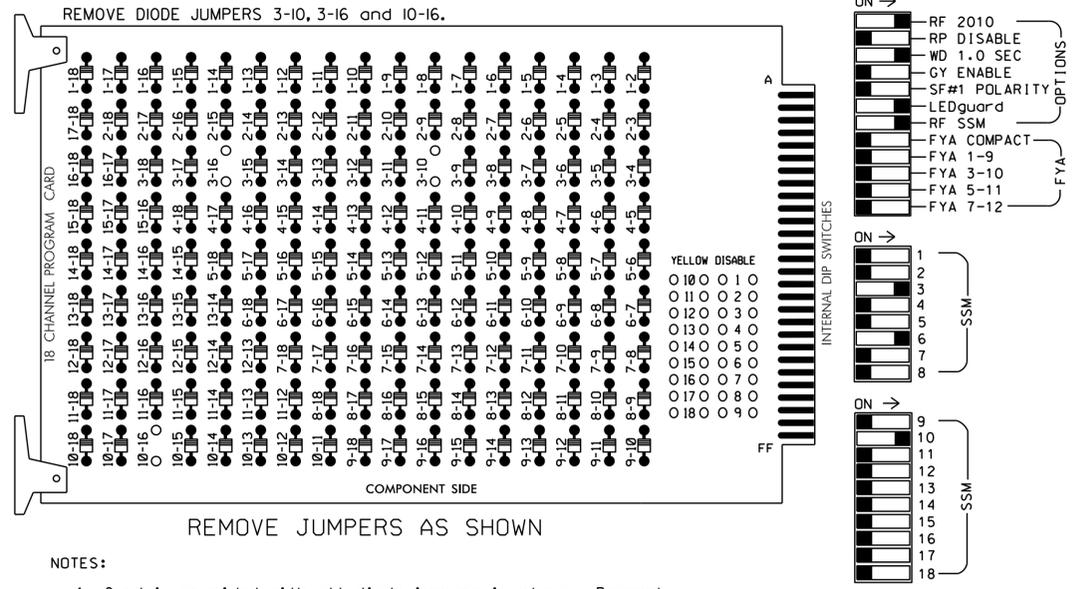
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 05-1785

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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 controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phase 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S4,S8,S12,AUX S2
 PHASES USED.....*2,3,3PED,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....**
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

* Phase used for timing purposes only.
 ** See overlap programming detail on sheet 2.

| 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 | 3 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | NC | NU | 31 | NU | NU | NU | 61,62,63 | NU | NU | NU | P31, P32 | NU | 32 | NU | NU | NU | NU |
| RED | | | | | | | | 134 | | | | | | | | | | |
| YELLOW | | | | | | | | 135 | | | | | | | | | | |
| GREEN | | | | | | | | | | | | | | | | | | |
| RED ARROW | | | | 116 | | | | | | | | | A124 | | | | | |
| YELLOW ARROW | | | | 117 | | | | | | | | | A125 | | | | | |
| GREEN ARROW | | | | 118 | | | | 136 | | | | | A126 | | | | | |
| Hand icon | | | | | | | | | | | | 110 | | | | | | |
| Walking person icon | | | | | | | | | | | | 112 | | | | | | |

NU = Not Used
 NC = Not Connected

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

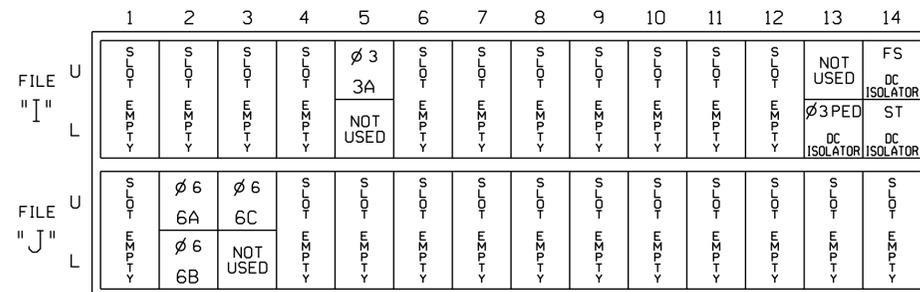
- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

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. | DETECTOR NO. | NEMA PHASE | DELAY TIME | EXTEND (STRETCH) TIME |
|------------------|---------------|-----------------|---------|--------------|------------|------------|-----------------------|
| 3A | TB4-5,6 | I5U | 58 | 9 | 3 | | |
| 6A | TB3-5,6 | J2U | 40 | 21 | 6 | | |
| 6B | TB3-7,8 | J2L | 44 | 22 | 6 | | |
| 6C | TB3-9,10 | J3U | 64 | 23 | 6 | | |
| PED PUSH BUTTONS | | | | | | | |
| P31,P32 | TB8-8,9 | I13L | 70 | PED 8 | 3 PED | | |

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L



INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 4, 5, 7 and 8 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 1 | 0 | 0 | 6 | 0 | 0 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

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: 05-1785
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

| | | | |
|--|---|------------------------------|---|
| | US 401 SB (Fayetteville Road) at U-Turn North of SR 1374 (Farm Road) | | SEAL NORTH CAROLINA PROFESSIONAL ENGINEER RYAN W. HOUDE 03/28/2025 |
| | Division 5 Wake County Raleigh PLAN DATE: March 2025 PREPARED BY: S.Kirkpatrick | REVIEWED BY: REVIEWED BY: | |

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 05-1785

PED DETECTOR PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **7 - DETECTOR DATA**
- From DETECTOR DATA Submenu select **9-PED 1-8**
- From DETECTOR CONFIG DATA Submenu select **8-PEDESTRIAN DET 8+**

ASSIGN PHASE 3
TO DETECTOR 8

```

PED DET 8   PHASE 12345678 90123456
ASSIGNED PHASES....00100000 00000000
SWITCH PHASES.....00000000 00000000
MODE 1     CALL 1     EXT/10 0
VOLUME 0   PASS 0     DLY/10 0
OCCUPY 0   ADDED 0    FAIL 255
LOCK 0     QUEUE 0    QLIMIT 0
    
```

PED DETECTOR PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **3 - OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA
A: --- E: --- I: --- M: ---
B: STD F: --- J: --- N: ---
C: --- G: --- K: --- O: ---
D: --- H: --- L: --- P: ---
PREV/NEXT TO CYCLE
    
```

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - B      12345678 90123456
PARENTS: 00100000 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD: 0 YEL/10: 40
TRAIL GREEN PREEMPT: 0 RED/10: 20
    
```

END OVERLAP PROGRAMMING

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

```

FLASH SETTINGS      TEST-A AS FLASH: 0
LDSW: 123456789 0123456789 0123456789 012
FLSH: 000100010 0000100000 0000000000 000
ALT: 000100000 0000100000 0000000000 000
O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
A-UP B-DN C-LT D-RT F-PRIOR MENU
    
```

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

```

FLASH ENTRY/EXIT PHASES
PHASES: 12345678 90123456
ENTRY: 01000100 00000000
EXIT: 01000100 00000000
O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
A-UP B-DN C-LT D-RT F-PRIOR MENU
    
```

REMOTE FLASH PROGRAMMING COMPLETE

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
- An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
- A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

LOAD SWITCH MAPPING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **9 - OUTPUT MAPPING**

```

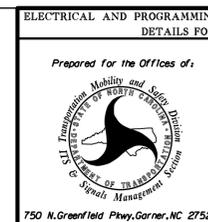
OUTPUT MAPPING      EDIT MODE: LDSW
                    E-TOGGLE MODE
LDSW ..7.. ..8.. ..9.. ..10.. ..11.. ..12..
RED PH5 PH6 PD6 PH7 PH8 [PD3]
YEL - - - - -
GRN - - - - -
FIO 7 8 9 10 11 12
PREV/NEXT TO CYCLE D-DISPLAY COMPAT
    
```

USE ENTER AND NEXT KEYS TO
MAP 'LDSW 12', AS 'PD3'.

LOAD SWITCH MAPPING COMPLETE

Electrical Detail - Sheet 2 of 2

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1785
DESIGNED: February 2025
SEALED: 03/27/2025
REVISED: N/A



US 401 SB (Fayetteville Road)
at U-Turn North of
SR 1374 (Farm Road)

Division 5 Wake County Raleigh
PLAN DATE: March 2025 REVIEWED BY:
PREPARED BY: S. Kirkpatrick REVIEWED BY:
REVISIONS INIT. DATE

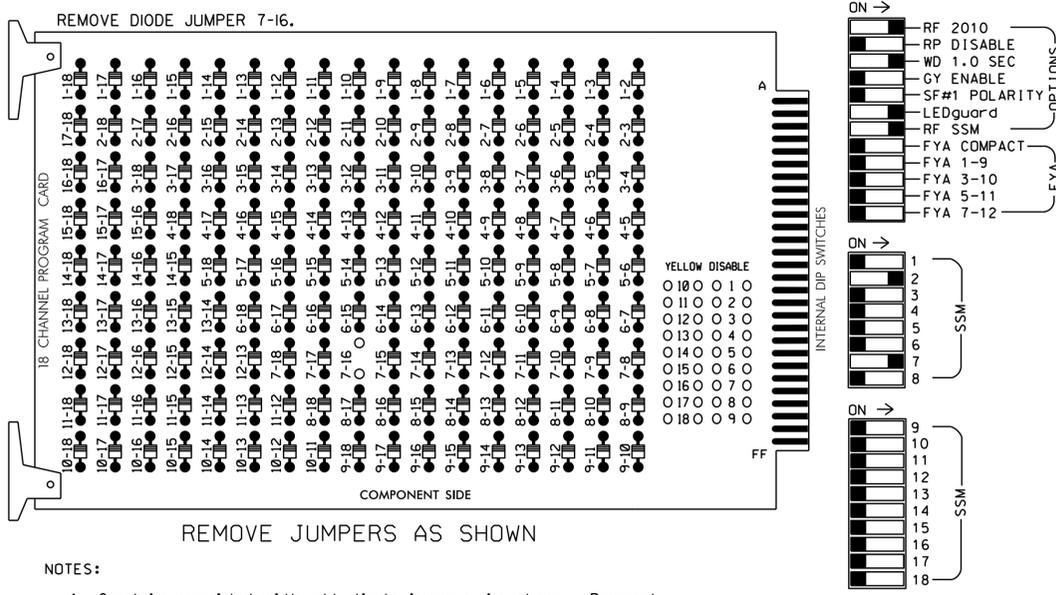
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Signed: Ryan W. Hough 03/28/2025
SIGNATURE DATE
SIG. INVENTORY NO. 05-1785

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 controller to start up in phase 2 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phase 2 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S10,S12
 PHASES USED.....2,*3,7,7PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 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 | 7 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | 21,22,23 | NU | NC | NU | NU | NU | NU | NU | 71,72 | NU | P71, P72 | NU | NU | NU | NU | NU | NU |
| RED | | 128 | | | | | | | | | | | | | | | | |
| YELLOW | | 129 | | | | | | | | | | | | | | | | |
| GREEN | | | | | | | | | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | | 122 | | | | | | |
| YELLOW ARROW | | | | | | | | | | | | 123 | | | | | | |
| GREEN ARROW | | 130 | | | | | | | | | | 124 | | | | | | |
| Hand icon | | | | | | | | | | | | | 110 | | | | | |
| Walking person icon | | | | | | | | | | | | | | 112 | | | | |

NU = Not Used
 NC = Not Connected

ALL RED FLASH STARTUP PROGRAMMING DETAIL

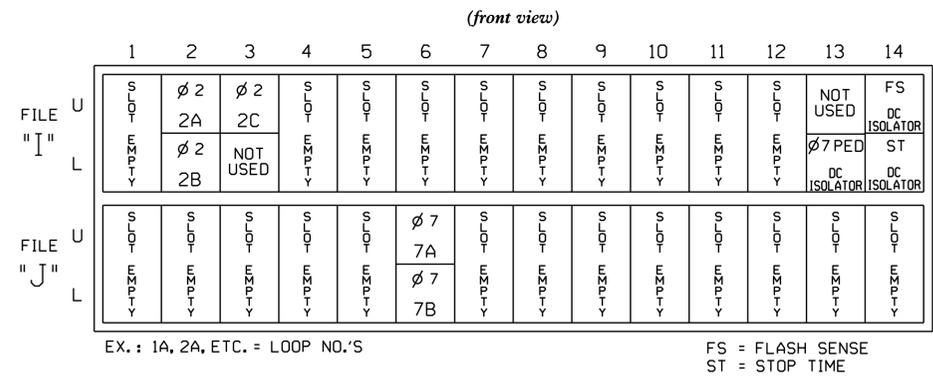
(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL 1-RED)
 RED REV/10...: 40 (TSEC) 1-RED 2-RAF)
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

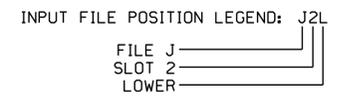
INPUT FILE POSITION LAYOUT



INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | DELAY TIME | EXTEND (STRETCH) TIME |
|------------------|---------------|-----------------|---------|--------------|------------|------------|-----------------------|
| 2A | TB2-5,6 | I2U | 39 | 3 | 2 | | |
| 2B | TB2-7,8 | I2L | 43 | 4 | 2 | | |
| 2C | TB2-9,10 | I3U | 63 | 5 | 2 | | |
| 7A | TB5-9,10 | J6U | 42 | 31 | 7 | | |
| 7B | TB5-11,12 | J6L | 46 | 32 | 7 | | |
| PED PUSH BUTTONS | | | | | | | |
| P71,P72 | TB8-8,9 | I13L | 70 | PED 8 | 7 PED | | |

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 113.



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.

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 4, 5, 6 and 8 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 0 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1811 DESIGNED: February 2025 SEALED: 03/27/2025 REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

US 401 SB (Fayetteville Road) at U-Turn South of Pinewinds Drive

Division 5 Wake County Raleigh

PLAN DATE: March 2025 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS

INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

3/28/2025

SIGNATURE DATE

SIG. INVENTORY NO. 05-1811

28-MAR-2025 09:39 p:\nodot-pw\bartley.com\ncdot\signal\design\signal\TSMO\Signal Design\Signal Management\051811_sm_ele_20250328.dgn

PED DETECTOR PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **7 - DETECTOR DATA**
- From DETECTOR DATA Submenu select **9-PED 1-8**
- From DETECTOR CONFIG DATA Submenu select **8-PEDESTRIAN DET 8+**

ASSIGN PHASE 7
TO DETECTOR 8

```

PED DET 8   PHASE 12345678 90123456
ASSIGNED PHASES....00000010 00000000
SWITCH PHASES.....00000000 00000000
MODE 1     CALL 1     EXT/10 0
VOLUME 0   PASS 0     DLY/10 0
OCCUPY 0   ADDED 0    FAIL 255
LOCK 0     QUEUE 0    QLIMIT 0
    
```

[1]

PED DETECTOR PROGRAMMING COMPLETE

LOAD SWITCH MAPPING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **9 - OUTPUT MAPPING**

```

OUTPUT MAPPING          EDIT MODE: LDSW
                        E-TOGGLE MODE
LDSW ..7.. ..8.. ..9.. .10.. .11.. .12..
RED PH5  PH6  PD6  PH7  PH8  [PD7]
YEL -    -    -    -    -    -
GRN -    -    -    -    -    -
FIO 7    8    9    10   11   12
PREV/NEXT TO CYCLE     D-DISPLAY COMPAT
    
```

USE ENTER AND NEXT KEYS TO
MAP 'LDSW 12', AS 'PD7'.

LOAD SWITCH MAPPING COMPLETE

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

```

FLASH SETTINGS          TEST-A AS FLASH: 0
LDSW: 123456789 0123456789 0123456789 012
FLSH: 010000000 1000000000 0000000000 000
ALT: 000000000 1000000000 0000000000 000
O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
A-UP B-DN C-LT D-RT F-PRIOR MENU
    
```

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

```

FLASH ENTRY/EXIT PHASES
PHASES: 12345678 90123456
ENTRY: 01000000 00000000
EXIT: 01000000 00000000
O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
A-UP B-DN C-LT D-RT F-PRIOR MENU
    
```

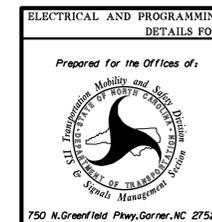
REMOTE FLASH PROGRAMMING COMPLETE

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
- An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
- A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1811
DESIGNED: February 2025
SEALED: 03/27/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2



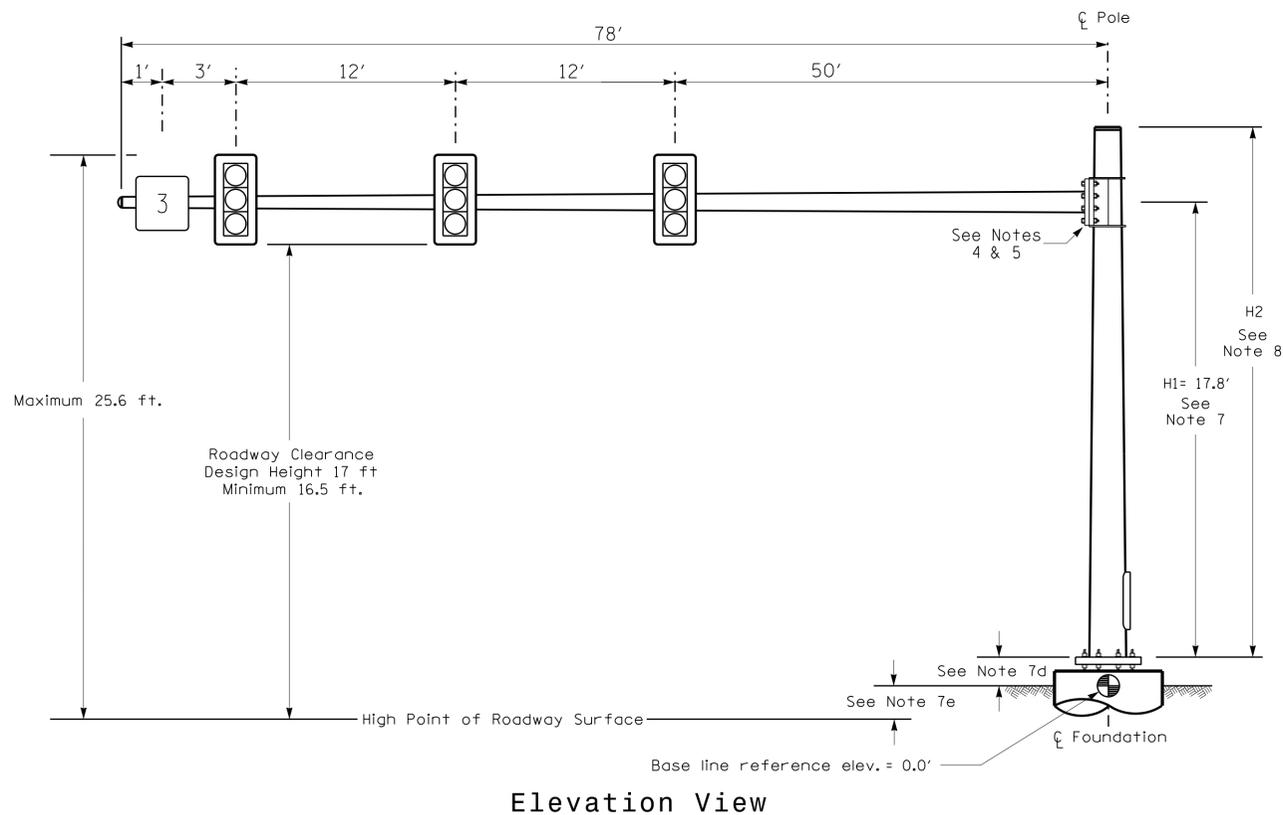
| | |
|---|---------------------|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: | |
| Prepared for the Offices of: US 401 SB (Fayetteville Road) at U-Turn South of Pinewinds Drive | |
| Division 5 | Wake County Raleigh |
| PLAN DATE: March 2025 | REVIEWED BY: |
| PREPARED BY: S. Kirkpatrick | REVIEWED BY: |
| REVISIONS | INIT. DATE |
| | |
| | |
| | |

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



SIGNATURE DATE
Ryan W. Hough 03/28/2025
SIG. INVENTORY NO. 05-1811

Design Loading for METAL POLE NO. 6

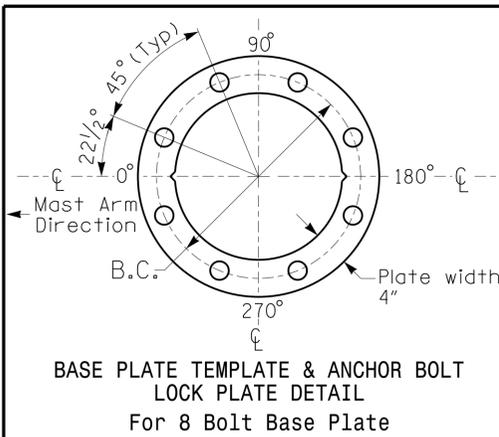
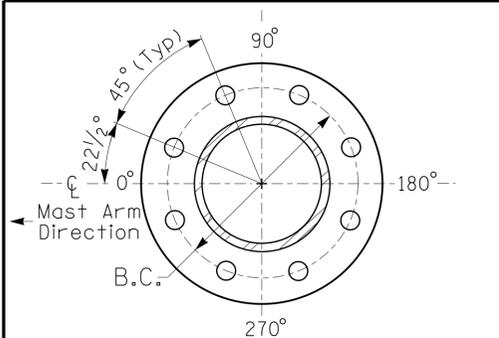
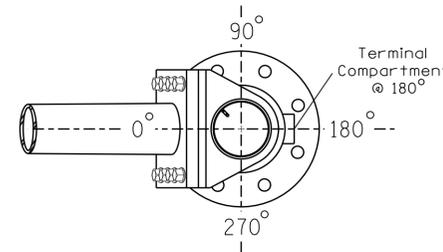


SPECIAL NOTE

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 6 |
|---|----------|
| Baseline reference point at ☐ Foundation @ ground level | 0.0 ft. |
| Elevation difference at High point of roadway surface | 0.2 ft. |
| Elevation difference at Edge of travelway or face of curb | -1.0 ft. |



METAL POLE No. 6

| PROJECT REFERENCE NO. | SHEET NO. |
|-----------------------|-----------|
| U-5302 | Sig. 10.3 |

MAST ARM LOADING SCHEDULE

| LOADING SYMBOL | DESCRIPTION | AREA | SIZE | WEIGHT |
|----------------|---|----------|-------------------------|--------|
| ☐ | RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE | 9.3 S.F. | 25.5" W X 52.5" L | 60 LBS |
| ☐ 3 | SIGN RIGID MOUNTED | 9.0 S.F. | 36.0" W X 36.0" L | 17 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)

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: N/A

US 401 NB (Fayetteville Road)
at
U-Turn South of Pinewinds Drive

Division 5 Wake County Raleigh

PLAN DATE: February 2025 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

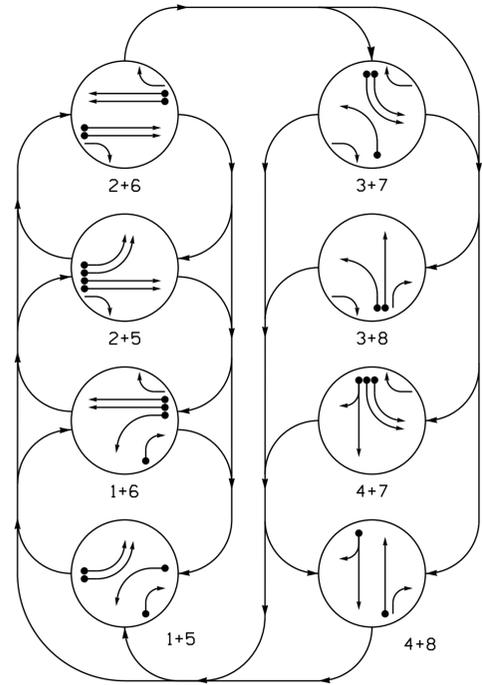
SEAL

03/27/2025

SIG. INVENTORY NO. 05-1811

27-MAR-2025 1:41:41
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 #ProjectName: 101*Gr\Roads-TECC\113630\113630.dwg
 #ProjectTitle: Signal Design Section Central Region 401v 541-5302*2025 Update*051811...sig.mp_2025mids.dwg
 #User: JAL

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

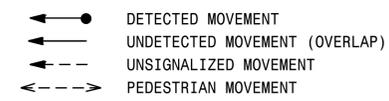
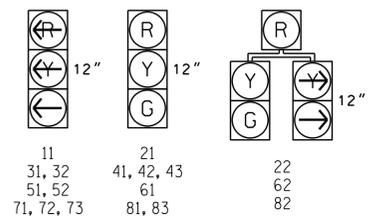


TABLE OF OPERATION

| SIGNAL FACE | PHASE | | | | | | | |
|-------------|-------|-----|-----|-----|-----|-----|-----|-----|
| | 1+5 | 1+6 | 2+5 | 2+6 | 3+7 | 3+8 | 4+7 | 4+8 |
| 11 | ← | ← | ← | ← | ← | ← | ← | ← |
| 21 | R | R | G | G | R | R | R | Y |
| 22 | R | R | G | G | R | R | R | Y |
| 31, 32 | ← | ← | ← | ← | ← | ← | ← | ← |
| 41, 42, 43 | R | R | R | R | R | R | G | G |
| 51, 52 | ← | ← | ← | ← | ← | ← | ← | ← |
| 61 | R | G | R | G | R | R | R | Y |
| 62 | R | G | R | G | R | R | R | Y |
| 71, 72, 73 | ← | ← | ← | ← | ← | ← | ← | ← |
| 81, 83 | R | R | R | R | R | G | R | G |
| 82 | R | R | R | R | R | G | R | G |

SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

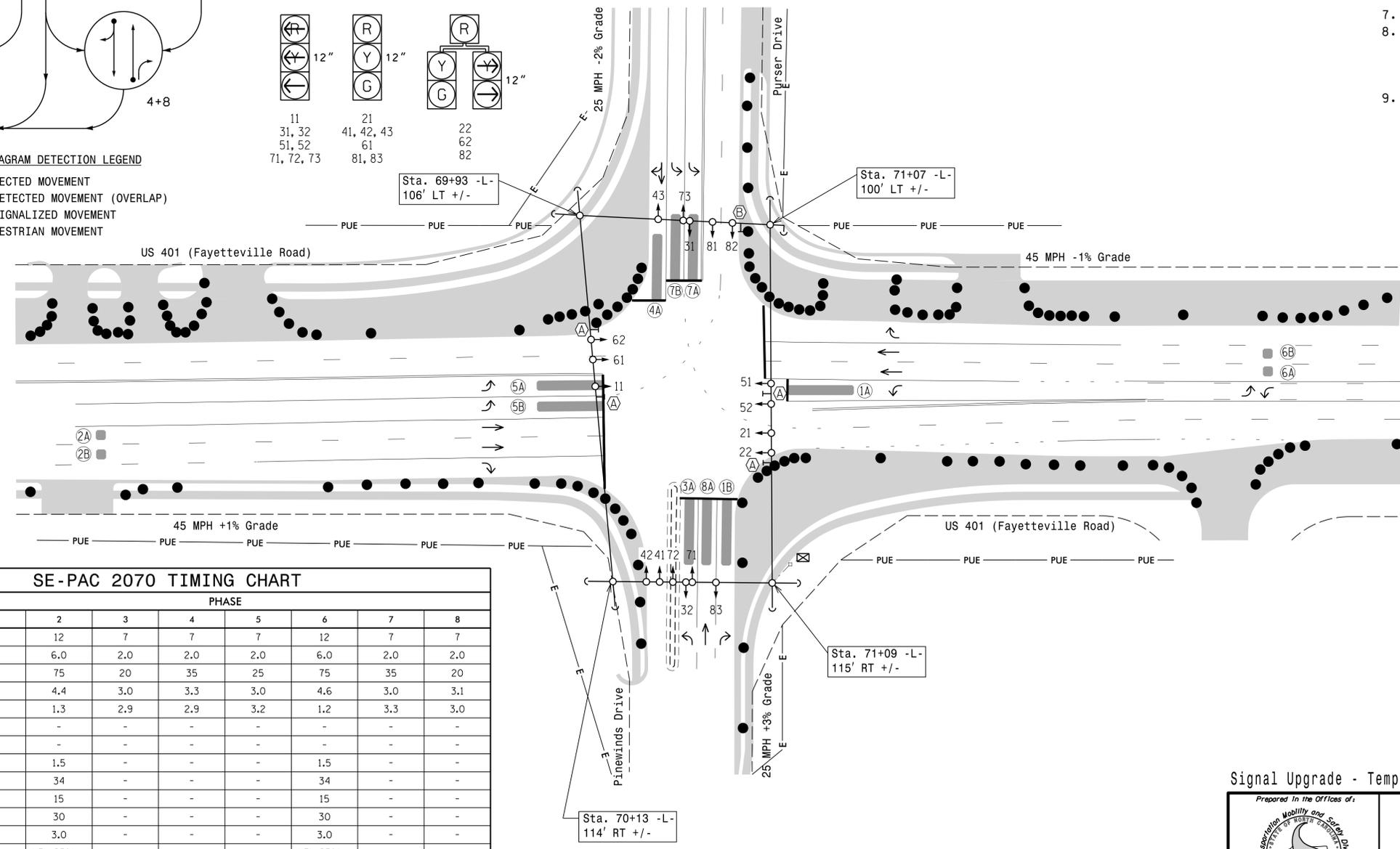
| ZONE | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW | EXISTING | ASSIGNED PHASE | DETECTOR PROGRAMMING | | | | | | | | | | | | | |
|------|-----------|-------|-------------------------|-----|----------|----------------|----------------------|------------------|----------------|------------|--------|--------|--------|-----------|-------------------|-----|--------|--------------|--------|----------|
| | | | | | | | TIMING | | OPERATION MODE | | | | | | | | | | STATUS | |
| | | | | | | | DELAY | EXTEND (STRETCH) | VEHICLE | PEDESTRIAN | 1 CALL | STOP A | STOP B | PROTECTOR | PROTECTOR THROUGH | AND | SWITCH | SYSTEM LOOPS | NEW | EXISTING |
| 1A | 6X40 | * | 0 | X | - | 1 | 3.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 1B | 6X40 | * | 0 | X | - | 1 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 2A | 6X6 | * | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 2B | 6X6 | * | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 3A | 6X40 | * | 0 | X | - | 3 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 4A | 6X40 | * | 0 | X | - | 4 | 10.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 5A | 6X40 | * | 0 | X | - | 5 | 3.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 5B | 6X40 | * | 0 | X | - | 5 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 6A | 6X6 | * | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 6B | 6X6 | * | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 7A | 6X40 | * | 0 | X | - | 7 | 3.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 7B | 6X40 | * | 0 | X | - | 7 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |
| 8A | 6X40 | * | 0 | X | - | 8 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | * | - |

* Non-intrusive detection zone.

8 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- This intersection uses non-intrusive 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.

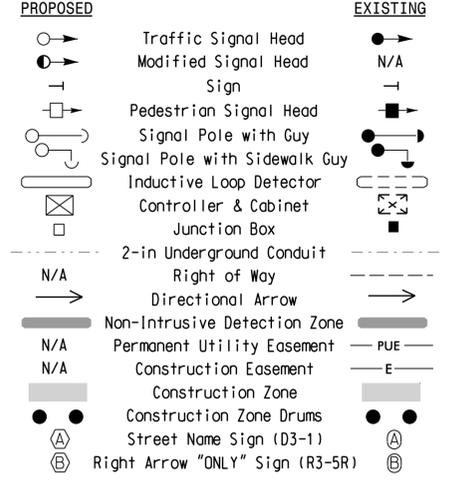


SE-PAC 2070 TIMING CHART

| FEATURE | PHASE | | | | | | | |
|-------------------------|----------|------------|----------|----------|----------|------------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Min Green * | 7 | 12 | 7 | 7 | 7 | 12 | 7 | 7 |
| Passage Gap * | 2.0 | 6.0 | 2.0 | 2.0 | 2.0 | 6.0 | 2.0 | 2.0 |
| Maximum Green * | 25 | 75 | 20 | 35 | 25 | 75 | 35 | 20 |
| Yellow Change | 3.0 | 4.4 | 3.0 | 3.3 | 3.0 | 4.6 | 3.0 | 3.1 |
| Red Clear | 3.2 | 1.3 | 2.9 | 2.9 | 3.2 | 1.2 | 3.3 | 3.0 |
| Walk * | - | - | - | - | - | - | - | - |
| Pedestrian Clear | - | - | - | - | - | - | - | - |
| Added Initial * | - | 1.5 | - | - | - | 1.5 | - | - |
| Maximum Initial * | - | 34 | - | - | - | 34 | - | - |
| Time Before Reduction * | - | 15 | - | - | - | 15 | - | - |
| Time To Reduce * | - | 30 | - | - | - | 30 | - | - |
| Minimum Gap | - | 3.0 | - | - | - | 3.0 | - | - |
| Recall Mode | - | MIN RECALL | - | - | - | MIN RECALL | - | - |
| Vehicle Call Memory | NON-LOCK | LOCK | NON-LOCK | NON-LOCK | NON-LOCK | LOCK | NON-LOCK | NON-LOCK |
| Dual Entry | - | - | - | - | - | - | - | - |
| Simultaneous Gap | ON | ON | ON | ON | ON | ON | ON | ON |

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

LEGEND



Signal Upgrade - Temporary Design 1 (TMP Phases I & II)

Prepared in the Offices of:

US 401 (Fayetteville Road)
at
Purser Drive and Pinewinds Drive

Division 5 Wake County Raleigh

PLAN DATE: February 2025 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

03/27/2025

SIG. INVENTORY NO. 05-11741

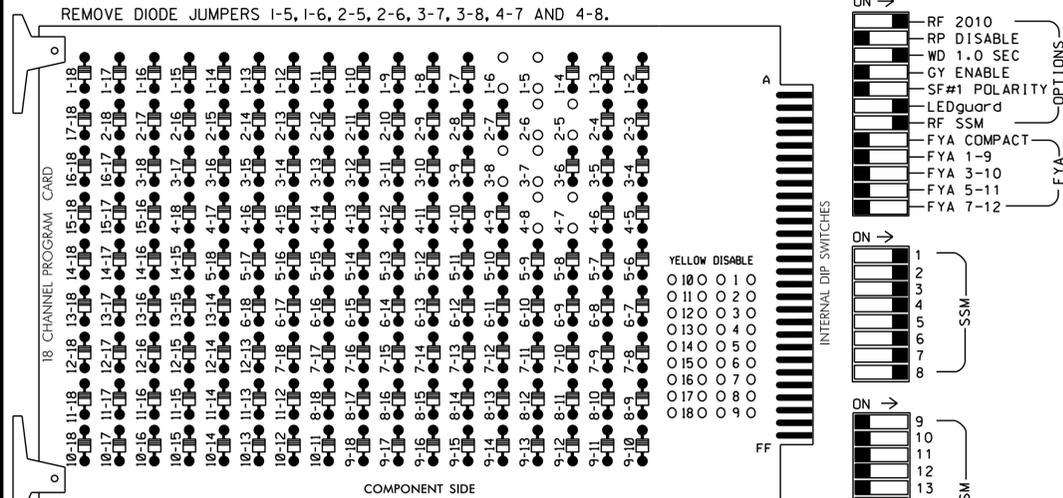
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 40
1" = 40'

27-MAR-2025 07:38 #4021refsig001#groups-TECC#ITS&SU#ITS Signal#Signal Design_Section#Central Region#01#U-5302#2025 Update#05117411...s1g.dsn_2025mdd.dgn JAL:grf

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 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.

■ = 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 controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phases 2 and 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|-----|-----|-------|-----|-------|-----|----------|-----|-------|-------|-----|----------|--------|----------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | PED | 3 | 4 | PED | 5 | 6 | PED | 7 | 8 | PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | 11 | 82 | 21,22 | NU | 31,32 | 22 | 41,42,43 | NU | 51,52 | 61,62 | NU | 71,72,73 | 62 | 81,82,83 | NU | NU | NU | NU |
| RED | | 128 | | | 101 | | | 134 | | | 107 | | | | | | | |
| YELLOW | | 129 | | | 102 | | | 135 | | | 108 | | | | | | | |
| GREEN | | 130 | | | 103 | | | 136 | | | 109 | | | | | | | |
| RED ARROW | 125 | | | 116 | | | 131 | | | 122 | | | | | | | | |
| YELLOW ARROW | 126 | 126 | | 117 | 117 | | 132 | | | 123 | 123 | | | | | | | |
| GREEN ARROW | 127 | 127 | | 118 | 118 | | 133 | | | 124 | 124 | | | | | | | |

NU = Not Used

YELLOW-RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 0 (SEC) STATE: 0 (0-FL
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

SPECIAL DETECTOR NOTE

Install a non-intrusive 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.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1174T1
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Temporary Design 1 (TMP Phase I & II)
 Electrical Detail

US 401 (Fayetteville Road)
 at
 Purser Drive and
 Pinewinds Drive

Division 5 Wake County Raleigh

PLAN DATE: March 2025 REVIEWED BY:
 PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS

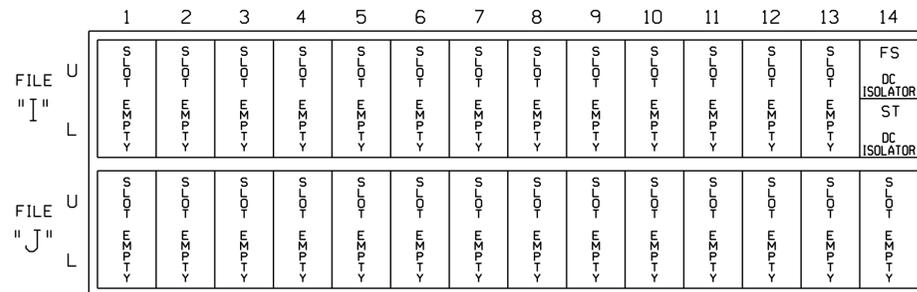
750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 RYAN W. HOUGH
 03/27/2025
 SIGNATURE DATE
 SIG. INVENTORY NO. 05-1174T1

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0
 LDSW: 123456789 0123456789 0123456789 012
 FLSH: 120110120 1100000000 0000000000 000
 ALT: 100100010 0100000000 0000000000 000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES
 PHASES: 12345678 90123456
 ENTRY: 01000100 00000000
 EXIT: 01000100 00000000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

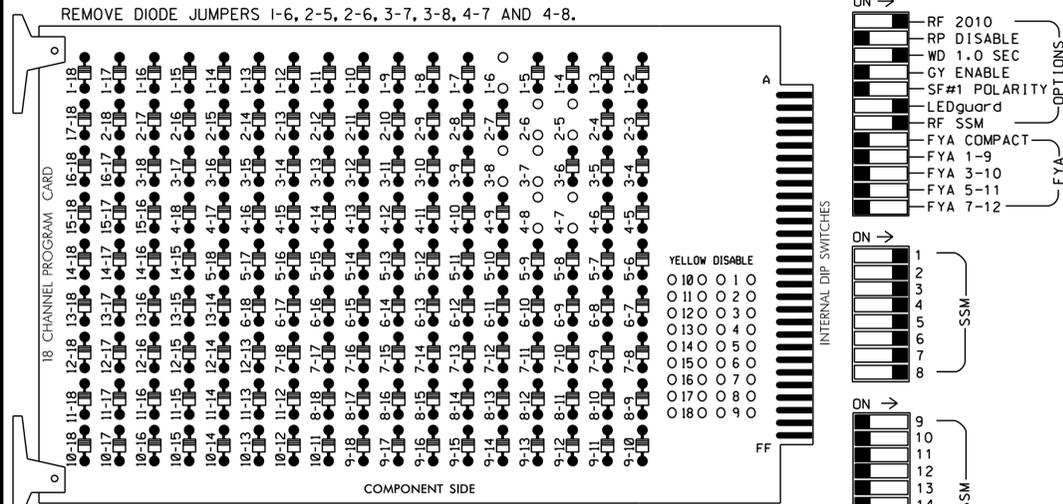
- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 1 | 6 | 1 | 1 | 1 | 6 | 1 | 1 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

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 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 controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phases 2 and 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|-----|-----|-------|-----|-------|----------|-----|-------|-------|-----|----------|-------|----------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | 11 | 82 | 21,22 | NU | 31,32 | 41,42,43 | NU | 51,52 | 61,62 | NU | 71,72,73 | 62 | 81,82,83 | NU | NU | NU | NU | NU |
| RED | | 128 | | | 101 | | | | 134 | | | | | 107 | | | | |
| YELLOW | | | 129 | | | 102 | | | 135 | | | | | 108 | | | | |
| GREEN | | | | 130 | | | 103 | | | 136 | | | | 109 | | | | |
| RED ARROW | 125 | | | | 116 | | | 131 | | | 122 | | | | | | | |
| YELLOW ARROW | 126 | 126 | | | 117 | | | 132 | | | 123 | 123 | | | | | | |
| GREEN ARROW | 127 | 127 | | | 118 | | | 133 | | | 124 | 124 | | | | | | |

NU = Not Used

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

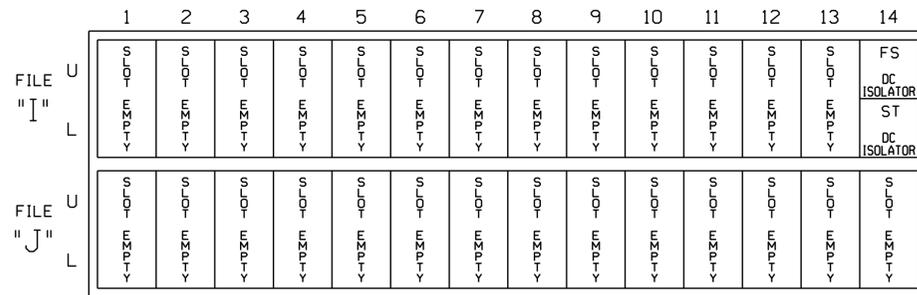
- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0
 LDSW: 123456789 0123456789 0123456789 012
 FLSH: 110110110 1100000000 0000000000 000
 ALT: 100100010 0100000000 0000000000 000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES
 PHASES: 12345678 90123456
 ENTRY: 01000100 00000000
 EXIT: 01000100 00000000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 1 | 6 | 1 | 1 | 1 | 6 | 1 | 1 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

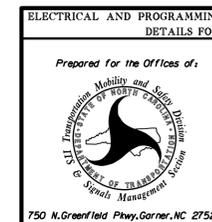
INIT & N.A. RESP PROGRAMMING COMPLETE

SPECIAL DETECTOR NOTE

Install a non-intrusive 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.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1174T2
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Temporary Design 2 (TMP Phase III)
 Electrical Detail - Sheet 1 of 2

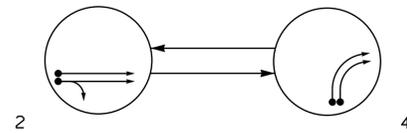


US 401 (Fayetteville Road)
 at
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 PLAN DATE: March 2025 REVIEWED BY:
 PREPARED BY: S.Kirkpatrick REVIEWED BY:
 REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 RYAN W. HOUGH
 03/27/2025
 SIGNATURE DATE
 SIG. INVENTORY NO. 05-1174T2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

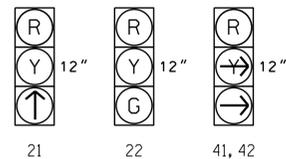
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←---→ UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

| SIGNAL FACE | PHASE | | FLASH |
|-------------|-------|---|-------|
| | 2 | 4 | |
| 21 | ↑ | R | R |
| 22 | G | R | R |
| 41, 42 | R | → | R |

SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

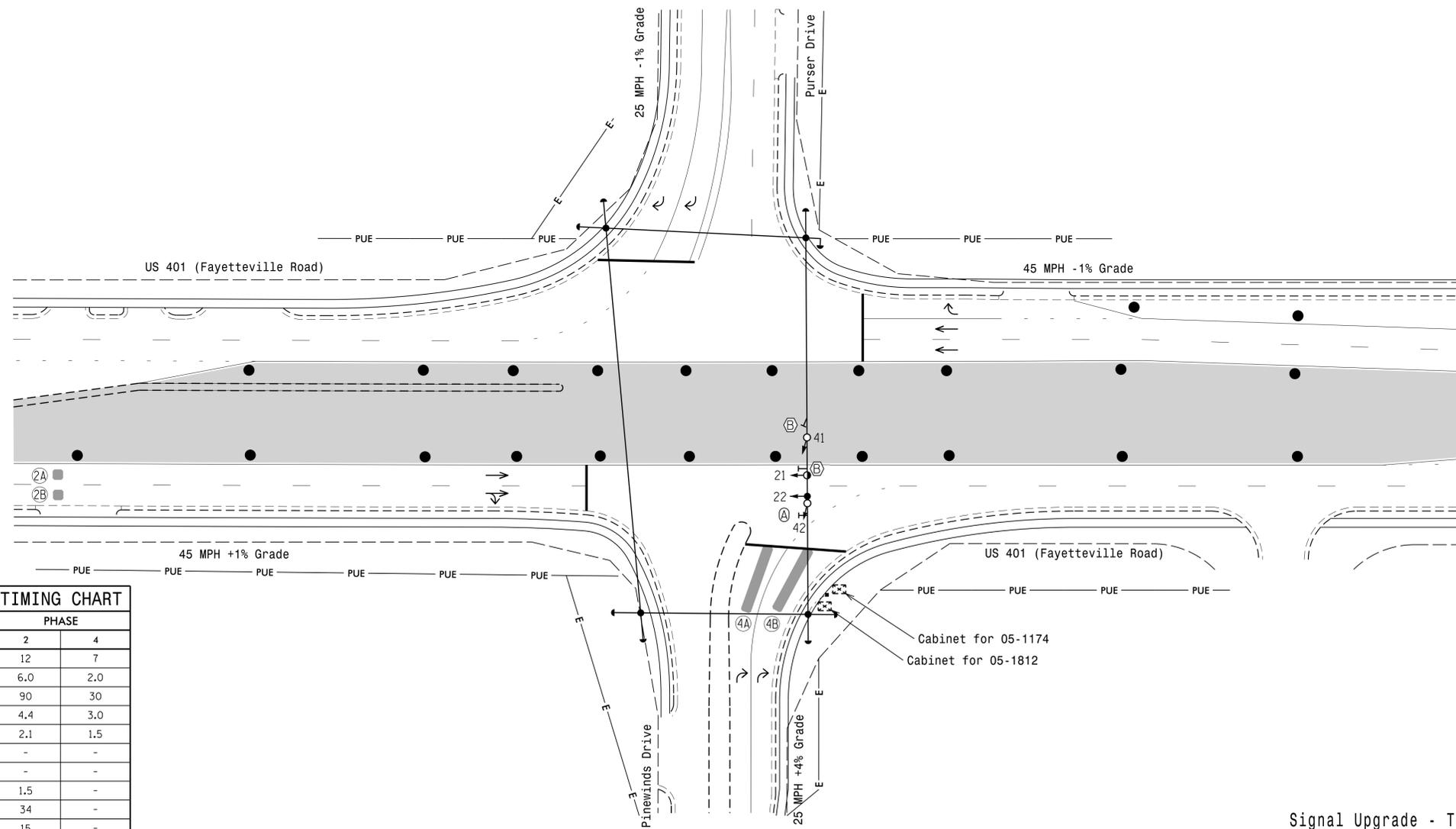
| INDUCTIVE LOOPS | | | | | DETECTOR PROGRAMMING | | | | | | | | | | | | | | | |
|-----------------|-----------|-------|-------------------------|--------------|----------------------|--------|------------------|----------------|------------|--------|--------|--------|----------------|-------------------|--------|--------|--------------|-----|----------|---|
| ZONE | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW EXISTING | ASSIGNED PHASE | TIMING | | OPERATION MODE | | | | | | | STATUS | | | | | |
| | | | | | | DELAY | EXTEND (STRETCH) | VEHICLE | PEDESTRIAN | T CALL | STOP A | STOP B | PROTECTOR LEFT | PROTECTOR THROUGH | AND | SWITCH | SYSTEM LOOPS | NEW | EXISTING | |
| 2A | 6X6 | * | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | * |
| 2B | 6X6 | * | 300 | X | - | 2 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | * |
| 4A | 6X40 | * | 0 | X | - | 4 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | * |
| 4B | 6X40 | * | 0 | X | - | 4 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | - | * |

* Non-intrusive detection zone.

2 Phase Fully Actuated (Raleigh 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. Set all detector units to presence mode.
4. This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



SE-PAC 2070 TIMING CHART

| FEATURE | PHASE | |
|-------------------------|------------|----------|
| | 2 | 4 |
| Min Green * | 12 | 7 |
| Passage Gap * | 6.0 | 2.0 |
| Maximum Green * | 90 | 30 |
| Yellow Change | 4.4 | 3.0 |
| Red Clear | 2.1 | 1.5 |
| Walk * | - | - |
| Pedestrian Clear | - | - |
| Added Initial * | 1.5 | - |
| Maximum Initial * | 34 | - |
| Time Before Reduction * | 15 | - |
| Time To Reduce * | 30 | - |
| Minimum Gap | 3.0 | - |
| Recall Mode | MIN RECALL | - |
| Vehicle Call Memory | LOCK | NON-LOCK |
| 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.

LEGEND

- | | |
|----------------------------------|----------------------------------|
| PROPOSED | EXISTING |
| ○→ Traffic Signal Head | ●→ N/A |
| ●→ Modified Signal Head | ○→ N/A |
| → Sign | → N/A |
| □→ Pedestrian Signal Head | □→ 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 |
| N/A Right of Way | N/A Right of Way |
| → Directional Arrow | → Directional Arrow |
| --- Non-Intrusive Detection Zone | --- Non-Intrusive Detection Zone |
| N/A Permanent Utility Easement | N/A Permanent Utility Easement |
| N/A Construction Easement | N/A Construction Easement |
| Construction Zone | Construction Zone |
| ● Construction Zone Drums | ● Construction Zone Drums |
| Ⓐ Street Name Sign (D3-1) | Ⓐ Street Name Sign (D3-1) |
| Ⓑ No Left Turn Sign (R3-2) | Ⓑ No Left Turn Sign (R3-2) |

Signal Upgrade - Temporary Design 3 (TMP Phase IV)

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 401 NB (Fayetteville Road) at Pinewinds Drive

Division 5 Wake County Raleigh

PLAN DATE: February 2025 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

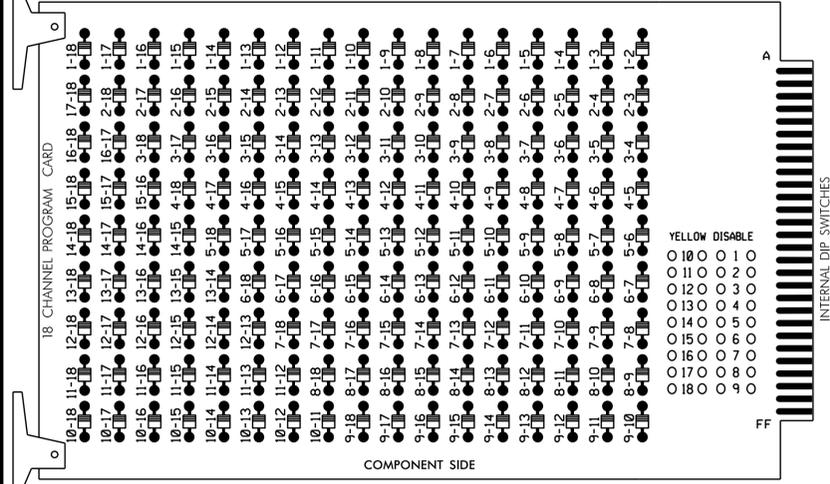
03/27/2025

SIG. INVENTORY NO. 05-117473

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

DO NOT REMOVE ANY DIODE JUMPERS.



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = 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 controller to start up in phase 2 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phase 2 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5
 PHASES USED.....2,4
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SPECIAL DETECTOR NOTE

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

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 |
|-----------------|-----|-----|-------|----|-------|-------|----|----|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|
| DMU 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 | 41,42 | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU |
| RED | | 128 | 128 | | 101 | | | | | | | | | | | | | |
| YELLOW | | 129 | 129 | | | | | | | | | | | | | | | |
| GREEN | | | 130 | | | | | | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | | | | | | | | |
| YELLOW ARROW | | | | | | 102 | | | | | | | | | | | | |
| GREEN ARROW | 130 | | | | 103 | | | | | | | | | | | | | |

NU = Not Used

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

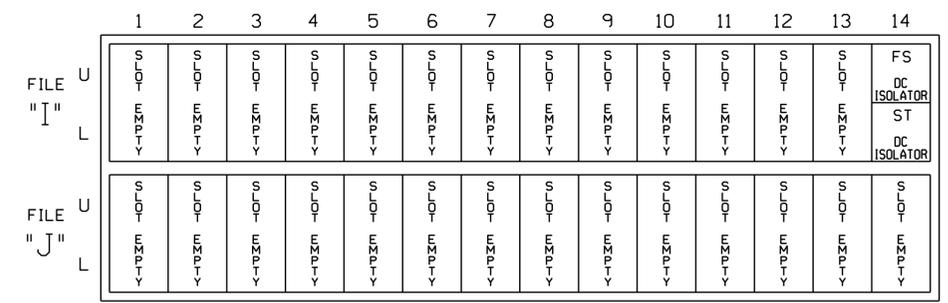
- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0
 LDSW: 123456789 0123456789 0123456789 012
 FLSH: 010010000 0000000000 0000000000 000
 ALT: 000010000 0000000000 0000000000 000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES
 PHASES: 12345678 90123456
 ENTRY: 01000000 00000000
 EXIT: 01000000 00000000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

PHASE.....1...2...3...4...5...6...7...8
 INITIAL 0 6 0 1 0 0 0 0
 NA RESP 0 1 0 2 0 1 0 2
 UPDT GRN 0 0 0 0 0 0 0 0
 CODES.....0...1...2...3...4...5...6
 INITL NONE INACT RED YEL GRN DRK G/DW
 NA RSP NONE NA1 NA2 1&2 --- ---

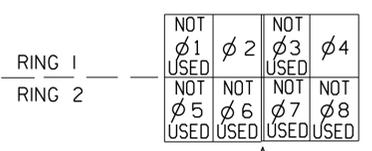
INIT & N.A. RESP PROGRAMMING COMPLETE

Note Phases 1, 3, 5, 6, 7, and 8 NOT used!

SE-PAC2070 CONTROLLER RING CONFIGURATION NOTE

Restore the ring structure to default.

RING STRUCTURE PICTORIAL



Temporary Design 3 (TMP Phase IV)
 Electrical Detail

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1174T3
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A



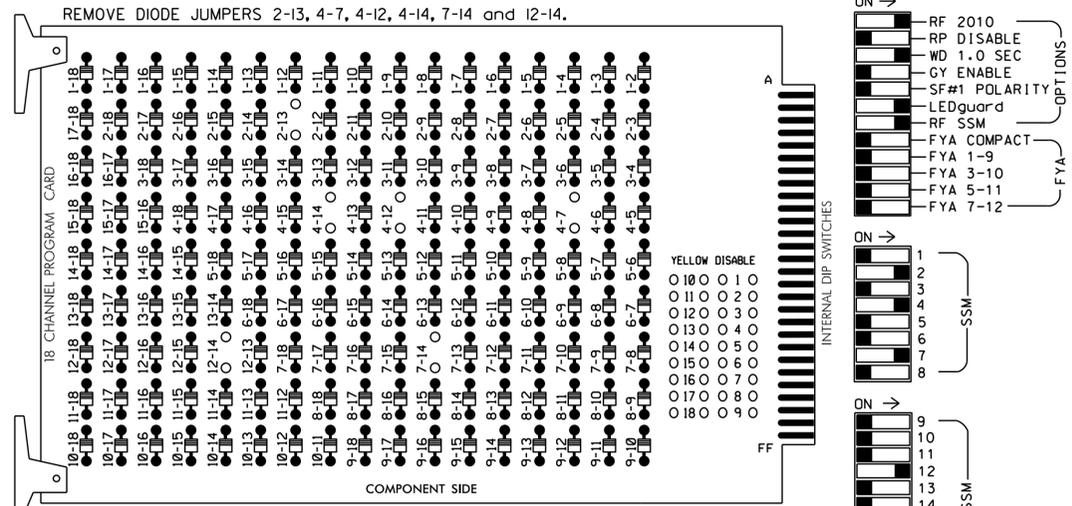
US 401 (Fayetteville Road)
 at
 Pinewinds Drive
 Division 5 Wake County Raleigh
 PLAN DATE: March 2025 REVIEWED BY:
 PREPARED BY: S.Kirkpatrick REVIEWED BY:
 REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 RYAN W. HOUGH
 03/27/2025
 SIGNATURE DATE

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 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.

■ = 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 controller to start up in phase 2 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phases 4 and 7 for dual entry.
- Program phase 2 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE LOAD SWITCHES USED.....S2,S3,S5,S6,S10,AUX S5
 PHASES USED.....2,2PED,4,4PED,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....*

* See sheet 2 for Overlap Programming Detail

| 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 | 22,23 | P21, P22 | NU | 41,42 | P41, P42 | NU | NU | NU | 71 | NU | NU | NU | NU | NU | 72 | NU | |
| RED | | 128 | 128 | | | 101 | | | | | | | | | | | | | |
| YELLOW | | 129 | 129 | | | | | | | | | | | | | | | | |
| GREEN | | | 130 | | | | | | | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | 122 | | | | | | | A101 | |
| YELLOW ARROW | | | | | | | 102 | | | 123 | | | | | | | | | A102 |
| GREEN ARROW | 130 | | | | | | 103 | | | 124 | | | | | | | | | A103 |
| Hand | | | | | | | | | | | | | | | | | | | |
| Person | | | | | | | | | | | | | | | | | | | |

NU = Not Used

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
 RED REV/10....: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

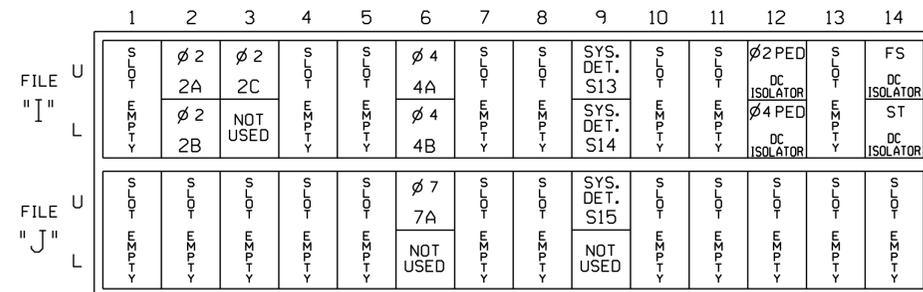
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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: 05-1174
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

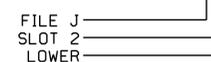
INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | DELAY TIME | EXTEND (STRETCH) TIME |
|------------------|---------------|-----------------|---------|--------------|------------|------------|-----------------------|
| 2A | TB2-5,6 | I2U | 39 | 3 | 2 | | |
| 2B | TB2-7,8 | I2L | 43 | 4 | 2 | | |
| 2C | TB2-9,10 | I3U | 63 | 5 | 2 | | |
| 4A | TB4-9,10 | I6U | 41 | 11 | 4 | 15 | |
| 4B | TB4-11,12 | I6L | 45 | 12 | 4 | 15 | |
| 7A | TB5-9,10 | J6U | 42 | 31 | 7 | | |
| * S13 | TB6-9,10 | I9U | 60 | 17 | SYS | | |
| * S14 | TB6-11,12 | I9L | 62 | 18 | SYS | | |
| * S15 | TB7-9,10 | J9U | 59 | 37 | SYS | | |
| PED PUSH BUTTONS | | | | | | | |
| P21,P22 | TB8-4,6 | I12U | 67 | PED 2 | 2 PED | | |
| P41,P42 | TB8-5,6 | I12L | 69 | PED 4 | 4 PED | | |

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

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

INPUT FILE POSITION LEGEND: J2L



INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 3, 5, 6 and 8 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 0 | 1 | 0 | 0 | 1 | 0 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 401 NB (Fayetteville Road) at Pinewinds Drive

Division 5 Wake County Raleigh

PLAN DATE: March 2025 REVIEWED BY:

PREPARED BY: S. Kirkpatrick REVIEWED BY:

| REVISIONS | INIT. | DATE |
|-----------|-------|------|
| | | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Signed by: Ryan W. Houff
 03/27/2025
 SIGNATURE DATE

SIG. INVENTORY NO. 05-1174

27-MAR-2025 15:54
 D:\nodot-pw-bent\ey.com\ncdot-pw-01\Documents\ACDOT_TSMO\SIGNAL Design\Signal Management\051174.sm.ele_20250327.dgn
 sgc:rspr:ck

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **3 - PHASE DATA**
2. From PHASE DATA Submenu select **3 - PEDESTRIAN DATA**
3. From DETECTOR DATA Submenu select **3 - PED OFFSET +**

| | | | | | | | | |
|------------|------|------|------|------|------|------|------|---|
| PHASE..... | 1... | 2... | 3... | 4... | 5... | 6... | 7... | 8 |
| WOFF/10 | 0 | 70 | 0 | 0 | 0 | 0 | 0 | 0 |
| MODE* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CODES:* 0=ADVANCE 1=DELAY

Advance Walk PED programming complete.

OVERLAP PROGRAMMING DETAIL

1. From Main Menu select **4 - UNIT DATA**
2. From UNIT DATA Submenu select **3 - OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

| | | | |
|--------------------|--------|--------|--------|
| OVERLAP DATA | | | |
| A: --- | E: --- | I: --- | M: --- |
| B: --- | F: --- | J: --- | N: --- |
| C: --- | G: --- | K: --- | O: --- |
| D: STD | H: --- | L: --- | P: --- |
| PREV/NEXT TO CYCLE | | | |

OVERLAP D

Use Up/Dn/Left/Right keys to position cursor on Overlap 'D'. use the NEXT key to select 'STD'. then press ENT

| | | |
|-----------------------|----------|------------|
| OVERLAP - D | 12345678 | 90123456 |
| PARENTS: | 00000010 | 00000000 |
| +GRN PHASES: | 00000000 | 00000000 |
| -G/Y PHASES: | 00000000 | 00000000 |
| -PED PHASES: | 00000000 | 00000000 |
| TRAIL GREEN STANDARD: | 0 | YEL/10: 40 |
| TRAIL GREEN PREEMPT: | 0 | RED/10: 20 |

END OVERLAP PROGRAMMING

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **4 - UNIT DATA**
2. From UNIT DATA Submenu select **2 - REMOTE FLASH**
3. From FLASH Submenu select **1 - FLASH SETTINGS**

| | |
|----------------|-------------------------------------|
| FLASH SETTINGS | TEST-A AS FLASH: 0 |
| LDSW: | 123456789 0123456789 0123456789 012 |
| FLSH: | 010010000 1000000100 0000000000 000 |
| ALT: | 000010000 0000000000 0000000000 000 |
| 0-DARK | 1-RED 2-YELLOW 3-STEADY YELLOW |
| A-UP | B-DN C-LT D-RT F-PRIOR MENU |

PRESS 'F' TO RETURN TO FLASH

4. From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

| | |
|-------------------------|--------------------------------|
| FLASH ENTRY/EXIT PHASES | |
| PHASES: | 12345678 90123456 |
| ENTRY: | 01000000 00000000 |
| EXIT: | 01000000 00000000 |
| 0-DARK | 1-RED 2-YELLOW 3-STEADY YELLOW |
| A-UP | B-DN C-LT D-RT F-PRIOR MENU |

REMOTE FLASH PROGRAMMING COMPLETE

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Contoller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1174
DESIGNED: February 2025
SEALED: 03/27/2025
REVISED: N/A

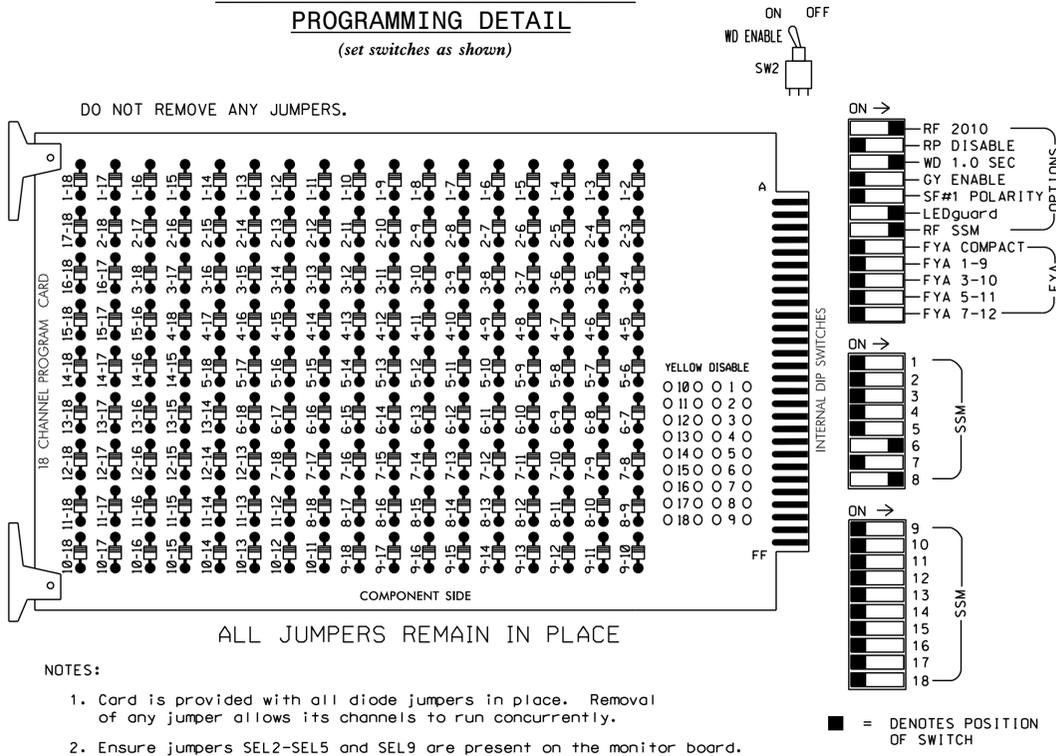
Electrical Detail - Sheet 2 of 2

| | | | |
|---|---|---|---|
|  | US 401 NB (Fayetteville Road) at Pinewinds Drive | |  |
| | Division 5 Wake County Raleigh | PREPARED BY: S. Kirkpatrick REVIEWED BY: | |
| PLAN DATE: March 2025 | REVISIONS | INIT. | DATE |
| 750 N. Greenfield Pkwy, Garner, NC 27529 | SIGNATURE: Ryan W. Hough | DATE: 03/27/2025 | SIG. INVENTORY NO. 05-1174 |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(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 controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phase 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|----|----|-------|----|----|-------|----|-----|-------|-----|-----|----------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | NC | NU | NU | NC | NU | NU | 61 | 62 | NU | NU | 81,82,83 | 62 | NU | NU | NU | NU | NU |
| RED | | | | | | | | 134 | 134 | | | 107 | | | | | | |
| YELLOW | | | | | | | | 135 | 135 | | | | | | | | | |
| GREEN | | | | | | | | 136 | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | | | | | | | | |
| YELLOW ARROW | | | | | | | | | | | | 108 | 108 | | | | | |
| GREEN ARROW | | | | | | | | 136 | | | | 109 | 109 | | | | | |

NU = Not Used
NC = Not Connected

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S8,S11
 PHASES USED.....*2,*4,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

* Phase used for timing purposes only.

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC
 STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL 1-RED)
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

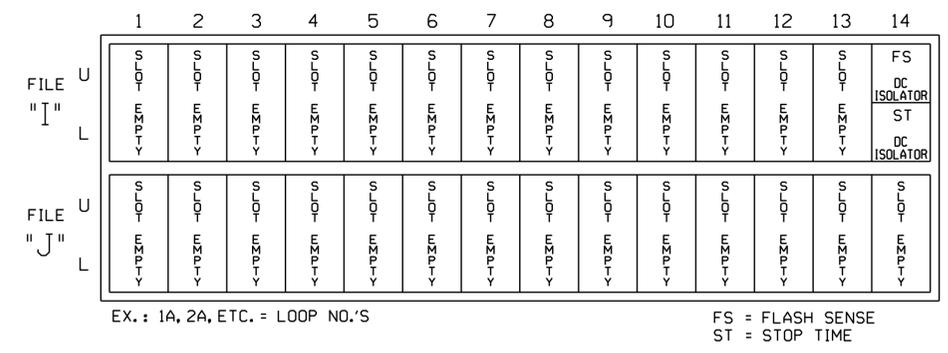
SPECIAL DETECTOR NOTE

Install a non-intrusive 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.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1812T
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

INPUT FILE POSITION LAYOUT

(front view)



REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **2 - REMOTE FLASH**
- From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0
 LDSW: 123456789 0123456789 0123456789 012
 FLSH: 000000010 0100000000 0000000000 000
 ALT: 000000010 0000000000 0000000000 000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

- From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES
 PHASES: 12345678 90123456
 ENTRY: 01000100 00000000
 EXIT: 01000100 00000000
 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phases 1, 3, 5, and 7 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 0 | 1 | 0 | 6 | 0 | 1 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

Temporary Design (TMP Phase II)
 Electrical Detail

US 401 SB (Fayetteville Road) at Purser Drive

Division 5 Wake County Raleigh

Prepared for the Offices of:

Prepared by: S. Kirkpatrick
 Reviewed by: _____

REVISIONS: _____

Signature: Ryan W. Hough
 Date: 03/28/2025

Seal: SEAL 036833
 ENGINEER RYAN W. HOUGH
 STATE OF NORTH CAROLINA

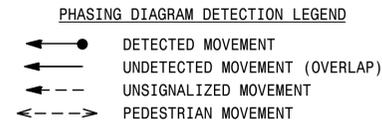
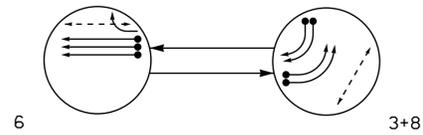
750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 05-1812T

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PHASING DIAGRAM



| SIGNAL FACE | PHASE | | |
|-------------|-------|-----|------|
| | 6 | 3+8 | FLHS |
| 31, 32 | ← | ← | ← |
| 61 | ↑ | R | R |
| 62, 63 | G | R | R |
| 64 | ← | R | R |
| 81, 82 | R | ← | R |
| P61, P62 | W | DW | DRK |
| P81, P82 | DW | W | DRK |

| SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART | | | | | | | | | | | | | | | | | | | | |
|---|-----------|-------|-------------------------|--------------|----------------------|--------|------------------|----------------|--------|---|---|--------|--------|----------------|-----------------------|--------|--------|-------|--------------|---|
| INDUCTIVE LOOPS | | | | | DETECTOR PROGRAMMING | | | | | | | | | | | | | | | |
| LOOP NO. | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW EXISTING | ASSIGNED PHASE | TIMING | | OPERATION MODE | | | | | | | STATUS | | | | | |
| | | | | | | DELAY | EXTEND (STRETCH) | VEHICLE | 1 CALL | 2 | 3 | STOP A | STOP B | PROTECTOR LEFT | PROTECTOR THROUGH AND | SWITCH | SYSTEM | LOOPS | NEW EXISTING | |
| 3A | 6X40 | 2-4-2 | 0 | X | - | 3 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 3B | 6X40 | 2-4-2 | 0 | X | - | 3 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 6A | 6X6 | 6 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 6B | 6X6 | 6 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 6C | 6X6 | 6 | 300 | X | - | 6 | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 8A | 6X40 | 2-4-2 | 0 | X | - | 8 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| 8B | 6X40 | 2-4-2 | 0 | X | - | 8 | 15.0 SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | - |
| S17 | 6X6 | 4 | +250 | X | - | - | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | X |
| S18 | 6X6 | 4 | +250 | X | - | - | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | X |
| S19 | 6X6 | 4 | +250 | X | - | - | - SEC. | - SEC. | X | - | - | - | - | - | - | - | - | - | X | X |

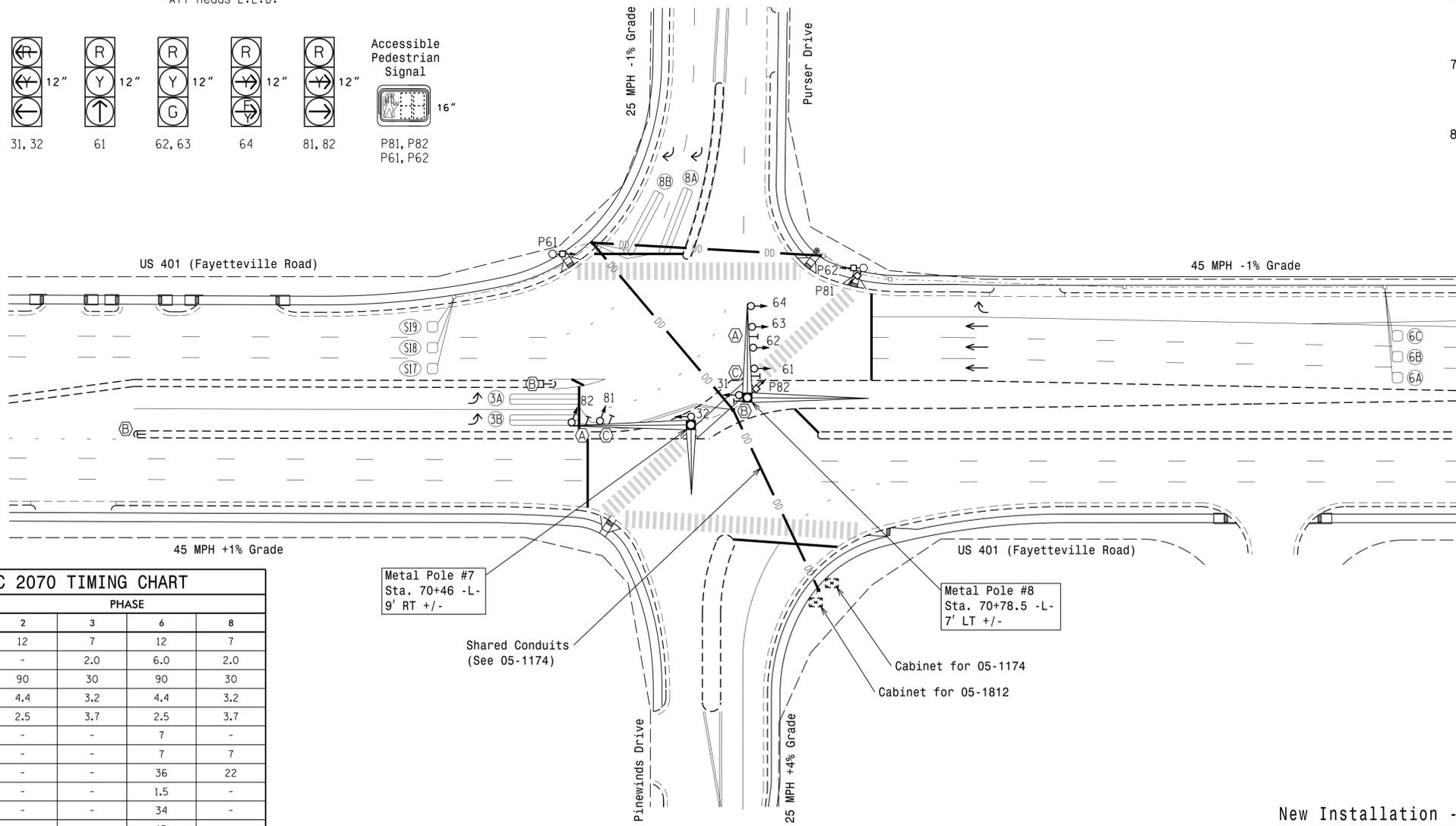
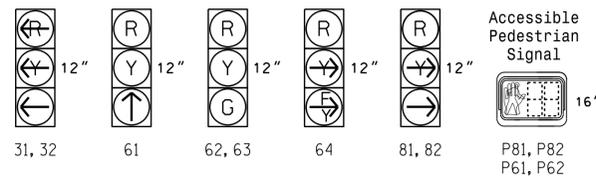
2 Phase Fully Actuated (Raleigh Signal System)

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.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 2 as a dummy phase for Ring 1.

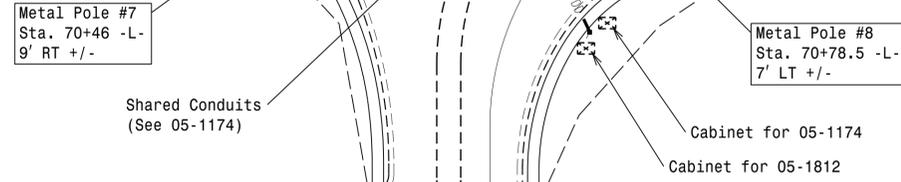
SIGNAL FACE I.D.

All Heads L.E.D.



| FEATURE | PHASE | | | |
|-------------------------|-------|----------|------------|----------|
| | 2 | 3 | 6 | 8 |
| Min Green * | 12 | 7 | 12 | 7 |
| Passage Gap * | - | 2.0 | 6.0 | 2.0 |
| Maximum Green * | 90 | 30 | 90 | 30 |
| Yellow Change | 4.4 | 3.2 | 4.4 | 3.2 |
| Red Clear | 2.5 | 3.7 | 2.5 | 3.7 |
| Advance Walk | - | - | 7 | - |
| Walk * | - | - | 7 | 7 |
| Pedestrian Clear | - | - | 36 | 22 |
| Added Initial * | - | - | 1.5 | - |
| Maximum Initial * | - | - | 34 | - |
| Time Before Reduction * | - | - | 15 | - |
| Time To Reduce * | - | - | 30 | - |
| Minimum Gap | - | - | 3.0 | - |
| Recall Mode | - | - | MIN RECALL | - |
| Vehicle Call Memory | - | NON-LOCK | LOCK | NON-LOCK |
| 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 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



| ACCESSIBLE PEDESTRIAN SIGNAL OPERATION | | | | |
|--|-------|-------|----------------------------------|-----------------------------------|
| SIGNAL FACE | VOICE | TONES | INTERVAL | SPEECH MESSAGE |
| P81, P82 | - | X | Walk | (Percussive Tone) |
| | X | - | Flashing Don't Walk / Don't Walk | Wait. Wait to cross Fayetteville. |
| P61, P62 | - | X | Walk | (Percussive Tone) |
| | X | - | Flashing Don't Walk / Don't Walk | Wait. Wait to cross Purser. |

| PROPOSED | EXISTING |
|-----------------------------------|-----------------------------|
| ○ → Traffic Signal Head | ● → N/A |
| ○ → Modified Signal Head | ○ → Sign |
| ○ → Pedestrian Signal Head | ○ → 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 | → → Metal Pole with Mastarm |
| ⊗ → Type I Pushbutton Post | ⊗ → Type II Signal Pedestal |
| ○ → Directional Drill | ○ → Curbed Ramp |
| ○ → Street Name Sign (D3-1) | ○ → No U-Turn Sign (R3-4) |
| ○ → No Left Turn Sign (R3-2) | ○ → N/A |

New Installation - Final Design

US 401 SB (Fayetteville Road) at Purser Drive

Division 5 Wake County Raleigh

PLAN DATE: February 2025 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS

SCALE 0 40 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER ROBERT J. ZIEMBA

03/27/2025

SIG. INVENTORY NO. 05-1812

27-MAR-2025 06:52
 S:\IT\GIS\UM\15-Signal\ak5\SIGNAL Design_Sect\Central_Reg\on401v_5\U-5302\2025_Update\051812_sig_dsn_2025mdd.dgn
 J.Lohr

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select 4 - UNIT DATA
2. From UNIT DATA Submenu select 2 - REMOTE FLASH
3. From FLASH Submenu select 1 - FLASH SETTINGS

```
FLASH SETTINGS          TEST-A AS FLASH: 0
LDSW: 123456789 0123456789 0123456789 012
FLSH: 000100010 0101000000 0000000000 000
ALT: 000100010 0001000000 0000000000 000
O-DARK  1-RED  2-YELLOW 3-STEADY YELLOW
A-UP    B-DN   C-LT   D-RT       F-PRIOR MENU
```

PRESS 'F' TO RETURN TO FLASH

4. From REMOTE FLASH Submenu select 2 - ENTRY/EXIT PHASES

```
FLASH ENTRY/EXIT PHASES
PHASES: 12345678 90123456
ENTRY:  01000100 00000000
EXIT:   01000100 00000000
O-DARK  1-RED  2-YELLOW 3-STEADY YELLOW
A-UP    B-DN   C-LT   D-RT       F-PRIOR MENU
```

REMOTE FLASH PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

1. From Main Menu select 4 - UNIT DATA
2. From UNIT DATA Submenu select 3 - OVERLAP DATA

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```
OVERLAP DATA
A: FYA  E: ---  I: ---  M: ---
B: ---  F: ---  J: ---  N: ---
C: ---  G: ---  K: ---  O: ---
D: ---  H: ---  L: ---  P: ---
PREV/NEXT TO CYCLE
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```
FYA OVERLAP - A          MIN PERM: 1
PHASES..12345678 90123456
PROT PHASES: 00000010 00000000  DELAY/10
PERM PHASES: 00000100 00000000  FYA: 0
-PED PHASES: 00000000 00000000  -PED: 30
OVERLAPS..ABCDEFGHIJ KLMNOP
PROT O-LAPS: x0000000 00000000
PERM O-LAPS: x0000000 00000000
```

← NOTICE

END OVERLAP PROGRAMMING

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select 3 - PHASE DATA
2. From PHASE DATA Submenu select 3 - PEDESTRIAN DATA
3. From DETECTOR DATA Submenu select 3 - PED OFFSET +

```
PHASE.....1...2...3...4...5...6...7...8
WOFF/10    0  0  0  0  0  70  0  0
MODE*      0  0  0  0  0  0  0  0
```

CODES:* 0=ADVANCE 1=DELAY

Advance Walk PED programming complete.

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Contoller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select 4 - UNIT DATA
2. From UNIT DATA Submenu select 1 - STARTUP & MISC

```
EPAC STARTUP & MISC
STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
RED REV/10...: 40 (TSEC)          1-RED
AUTO PED CLR.: 0 (0-NO 1-YES)    2-RAF)
STOP T RESET.: 0 (0-NO 1-YES)
SEQUENCE.....: 1 (1-19)
SPECIAL SEO  : 0 (SEE HELP)
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

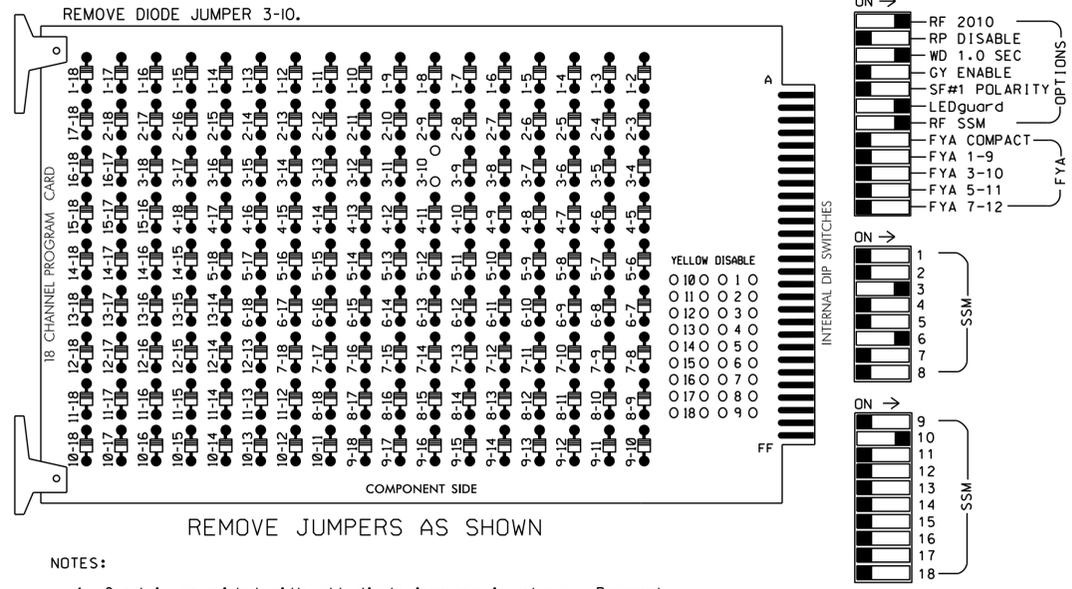
STARTUP PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO UNIT DATA

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1812
DESIGNED: February 2025
SEALED: 03/27/2025
REVISED: N/A

| Electrical Detail - Sheet 2 of 2 | | DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | | | | | | | |
|--|---|--|---|-----|-------|------|--|--|--|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529 | US 401 SB (Fayetteville Road) at Purser Drive Division 5 Wake County Raleigh PLAN DATE: March 2025 REVIEWED BY: PREPARED BY: S. Kirkpatrick REVIEWED BY: | SEAL  SEAL 036833 ENGINEER Ryan W. Hough 03/28/2025 | REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NO.</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table> | NO. | INIT. | DATE | | | |
| NO. | INIT. | DATE | | | | | | | |
| | | | | | | | | | |
| | | SIGNATURE DATE _____ _____ | SIGNATURE DATE _____ _____ | | | | | | |
| | | SIG. INVENTORY NO. 05-1812 | | | | | | | |

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phases 2 and 6 Green/Don't Walk.
3. Enable simultaneous gap-out feature for all phases.
4. Program phase 6 for volume density operation.
5. The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070 ver 5.5 or later
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S4,S8,AUX S2
 PHASES USED.....*2,3,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....**
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

- * Phase used for timing purposes only.
- ** See overlap programming detail on sheet 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 | PED | 3 | 4 | PED | 5 | 6 | PED | 7 | 8 | PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | NC | NU | 31 | NU | NU | NU | 61,62,63 | NU | NU | NU | NU | NU | 32 | NU | NU | NU | NU |
| RED | | | | | | | | 134 | | | | | | | | | | |
| YELLOW | | | | | | | | 135 | | | | | | | | | | |
| GREEN | | | | | | | | | | | | | | | | | | |
| RED ARROW | | | | 116 | | | | | | | | | | A124 | | | | |
| YELLOW ARROW | | | | 117 | | | | | | | | | | A125 | | | | |
| GREEN ARROW | | | | 118 | | | | 136 | | | | | | A126 | | | | |

NU = Not Used
 NC = Not Connected

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **4 - UNIT DATA**
2. From UNIT DATA Submenu select **2 - REMOTE FLASH**
3. From FLASH Submenu select **1 - FLASH SETTINGS**

FLASH SETTINGS TEST-A AS FLASH: 0

LDSW: 123456789 0123456789 0123456789 012
 FLSH: 000100010 0000100000 0000000000 000
 ALT: 000100000 0000100000 0000000000 000

O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

PRESS 'F' TO RETURN TO FLASH

4. From REMOTE FLASH Submenu select **2 - ENTRY/EXIT PHASES**

FLASH ENTRY/EXIT PHASES

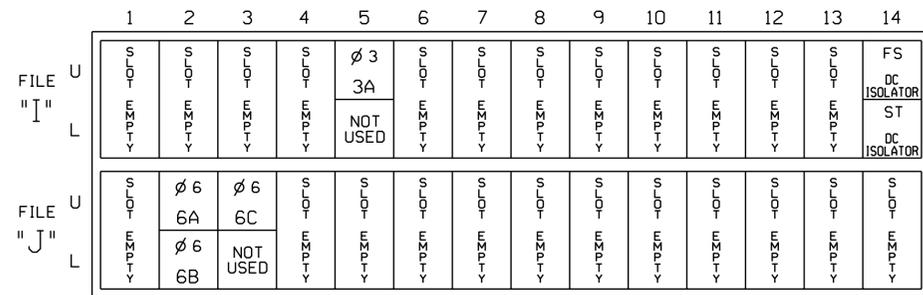
PHASES: 12345678 90123456
 ENTRY: 01000100 00000000
 EXIT: 01000100 00000000

O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW
 A-UP B-DN C-LT D-RT F-PRIOR MENU

REMOTE FLASH PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)



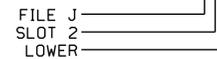
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | DELAY TIME | EXTEND (STRETCH) TIME |
|----------|---------------|-----------------|---------|--------------|------------|------------|-----------------------|
| 3A | TB4-5,6 | I5U | 58 | 9 | 3 | | |
| 6A | TB3-5,6 | J2U | 40 | 21 | 6 | | |
| 6B | TB3-7,8 | J2L | 44 | 22 | 6 | | |
| 6C | TB3-9,10 | J3U | 64 | 23 | 6 | | |

INPUT FILE POSITION LEGEND: J2L



ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu select **4 - UNIT DATA**
2. From UNIT DATA Submenu select **1 - STARTUP & MISC**

EPAC STARTUP & MISC

STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
 RED REV/10...: 40 (TSEC) 1-RED
 AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
 STOP T RESET.: 0 (0-NO 1-YES)
 SEQUENCE.....: 1 (1-19)
 SPECIAL SEQ : 0 (SEE HELP)
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

STARTUP PROGRAMMING COMPLETE
 PRESS 'F' TO RETURN TO UNIT DATA

INIT & N.A. RESP PROGRAMMING DETAIL

1. From Main Menu select **3 - PHASE DATA**
2. From PHASE DATA Submenu select **4 - INIT & N.A RESP**

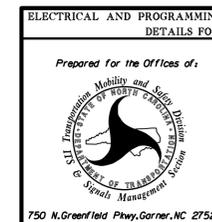
Note Phases 1, 4, 5, 7 and 8 NOT used!

| | | | | | | | | |
|------------|------|-------|-----|-----|-----|-----|------|---|
| PHASE..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| INITIAL | 0 | 6 | 1 | 0 | 0 | 6 | 0 | 0 |
| NA RESP | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| UPDT GRN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CODES..... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| INITL | NONE | INACT | RED | YEL | GRN | DRK | G/DW | |
| NA RSP | NONE | NA1 | NA2 | 1&2 | --- | --- | --- | |

INIT & N.A. RESP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1813
 DESIGNED: February 2025
 SEALED: 03/27/2025
 REVISED: N/A

Electrical Detail - Sheet 1 of 2



US 401 SB (Fayetteville Road) at U-Turn North of Purser Drive

| | | |
|----------------------------|--------------|---------|
| Division 5 | Wake County | Raleigh |
| PLAN DATE: March 2025 | REVIEWED BY: | |
| PREPARED BY: S.Kirkpatrick | REVIEWED BY: | |
| REVISIONS | INIT. | DATE |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SIGNATURE DATE 03/28/2025
 SIG. INVENTORY NO. 05-1813