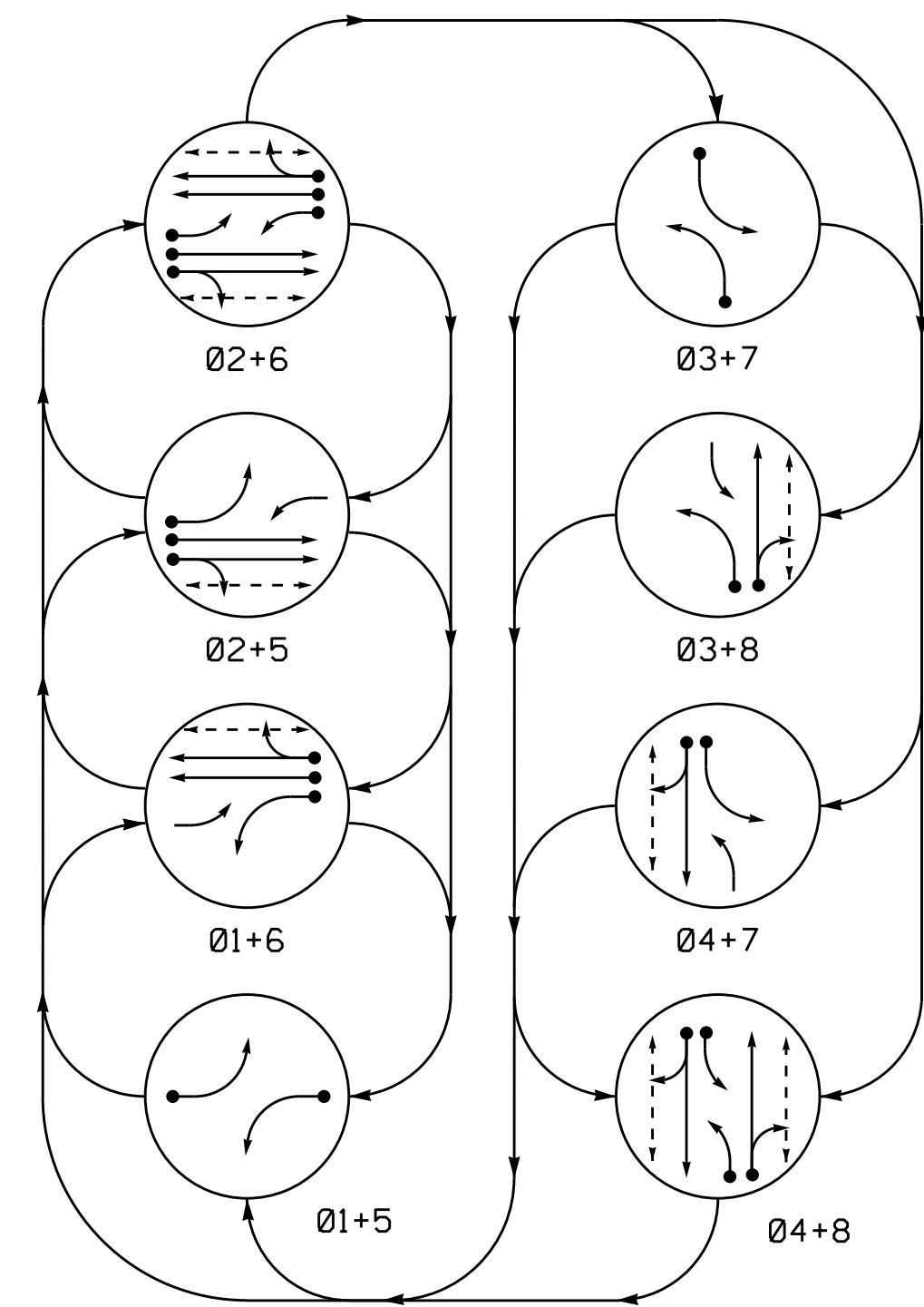


PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

EV PREEMPT PHASES

\*See Note #15

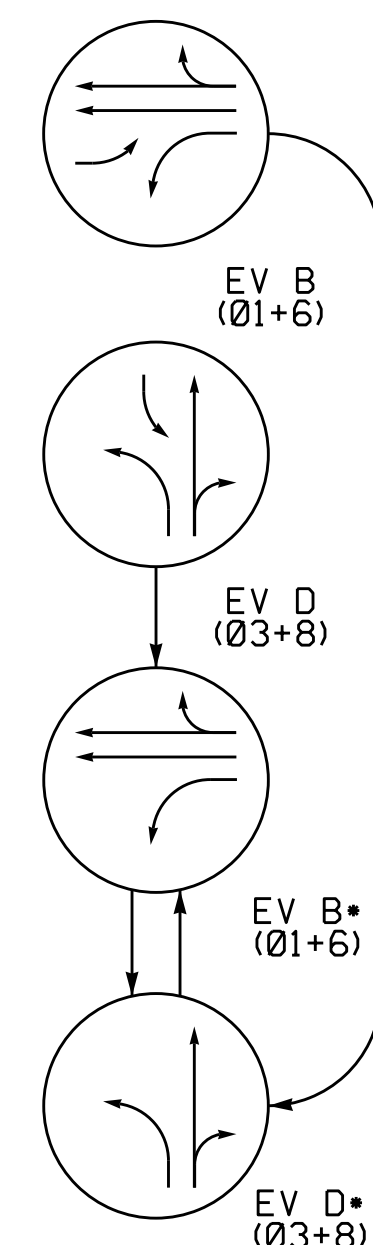


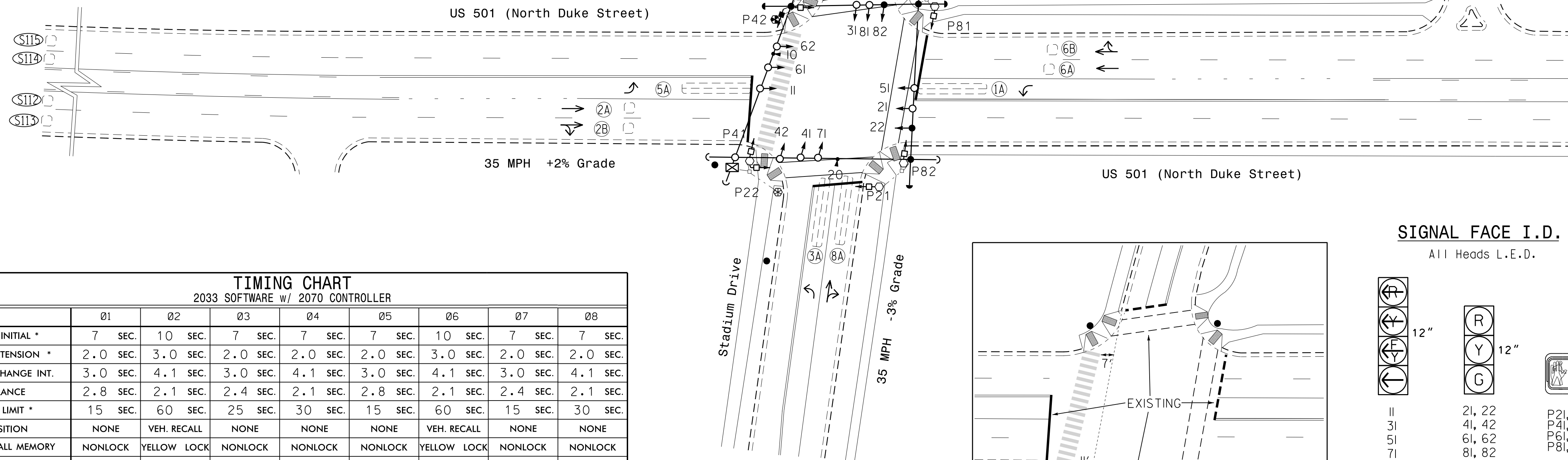
TABLE OF OPERATION

| SIGNAL FACE | PHASE |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|             | 01+5  | 02+6 | 03+7 | 04+8 | 05+9 | 06+0 | 07+1 | 08+2 | 09+3 | 10+4 | 11+5 | 12+6 | 13+7 | 14+8 | 15+9 | 16+0 |
| II          | R     | R    | G    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | Y    |
| 21, 22      | R     | R    | G    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | Y    |
| 31          | R     | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    |
| 41, 42      | R     | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    |
| 51          | R     | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | Y    |
| 61, 62      | R     | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | Y    |
| 71          | R     | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    |
| 81, 82      | R     | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    | R    |
| P21, P22    | DW    | DW   | W    | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DRK  | DRK  |
| P41, P42    | DW    | DW   | DW   | DW   | DW   | DW   | W    | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DRK  | DRK  |
| P61, P62    | DW    | W    | DW   | W    | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DRK  | DRK  |
| P81, P82    | DW    | DW   | DW   | DW   | DW   | W    | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DW   | DRK  | DRK  |

2033 SOFTWARE w/ 2070 CONTROLLER LOOP & DETECTOR UNIT INSTALLATION CHART

| LOOP NO.             | SIZE (ft) | TURNS | DIST. FROM STOPBAR (ft) | NEW EXISTING | NEMA PHASE | DELAY   | CARRY (STRETCH) | DETECTOR PROGRAMMING |   |   |   |   |   |   |   |   |    |    |    |   |
|----------------------|-----------|-------|-------------------------|--------------|------------|---------|-----------------|----------------------|---|---|---|---|---|---|---|---|----|----|----|---|
|                      |           |       |                         |              |            |         |                 | TIMING               |   |   |   |   |   |   |   |   |    |    |    |   |
|                      |           |       |                         |              |            |         |                 | ATTRIBUTES           |   |   |   |   |   |   |   |   |    |    |    |   |
|                      |           |       |                         |              |            |         |                 | 1                    | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |   |
| 1A                   | 6X40      | 2-4-2 | 0                       | X            | 1          | 10 SEC. | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 2A                   | 6X6       | 4     | 70                      | X            | 2          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 2B                   | 6X6       | 4     | 70                      | X            | 2          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 3A                   | 6X40      | 2-4-2 | +5                      | X            | 3          | 10 SEC. | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 4A                   | 6X40      | 2-4-2 | 0                       | X            | 4          | 10 SEC. | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 5A                   | 6X40      | 2-4-2 | 0                       | X            | 5          | 10 SEC. | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 6A                   | 6X6       | 4     | 70                      | X            | 6          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 6B                   | 6X6       | 4     | 70                      | X            | 6          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 7A                   | 6X40      | 2-4-2 | 0                       | X            | 7          | 10 SEC. | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| 8A                   | 6X40      | 2-4-2 | +5                      | X            | 8          | 10 SEC. | - SEC.          | -                    | - | - | - | X | - | X | - | - | X  | -  | -  | - |
| SI12                 | 6X6       | 4     | 440                     | X            | N/A        | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | X  | -  | -  | - |
| SI13                 | 6X6       | 4     | 440                     | X            | N/A        | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | X  | -  | -  | - |
| SI14                 | 6X6       | 4     | +540                    | X            | N/A        | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | X  | -  | -  | - |
| SI15                 | 6X6       | 4     | +540                    | X            | N/A        | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | X  | -  | -  | - |
| PEDESTRIAN DETECTION |           |       |                         |              |            |         |                 |                      |   |   |   |   |   |   |   |   |    |    |    |   |
| P21, P22             | N/A       | N/A   | N/A                     | X            | 2          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | -  | -  | -  | - |
| P41, P42             | N/A       | N/A   | N/A                     | X            | 4          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | -  | -  | -  | - |
| P61, P62             | N/A       | N/A   | N/A                     | X            | 6          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | -  | -  | -  | - |
| P81, P82             | N/A       | N/A   | N/A                     | X            | 8          | - SEC.  | - SEC.          | -                    | - | - | - | X | - | - | - | - | -  | -  | -  | - |

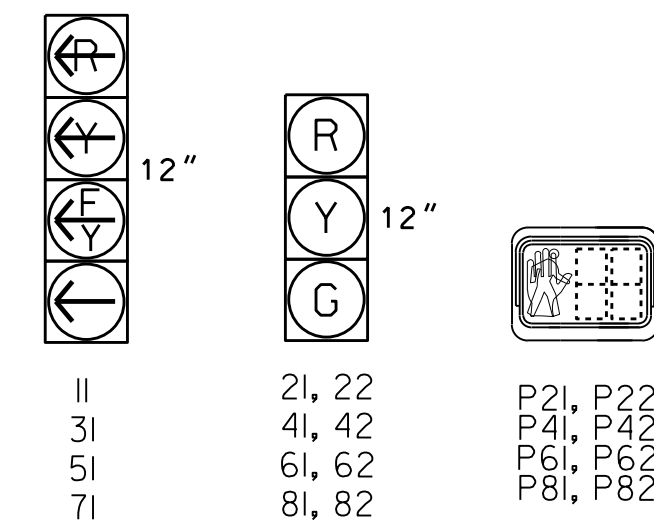
- NOTES
- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
  - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
  - Phase 1 and/or phase 5 may be lagged.
  - Phase 3 and/or phase 7 may be lagged.
  - Reposition existing signal heads numbered 22 and 82.
  - Set all detector units to presence mode.
  - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
  - Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
  - Set phase bank 3 maximum limit to 250 seconds for phases used.
  - Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
  - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
  - Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
  - This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
  - If preempt phasing resides in the barrier being serviced then the opposing 4-section FYA will flash continuously. If the preempt phase requires crossing the barrier then the opposing 4-section FYA will display a red arrow.
  - Upon completion of Emergency Vehicle Preemption, controller returns to normal operation based on vehicle demand.
  - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



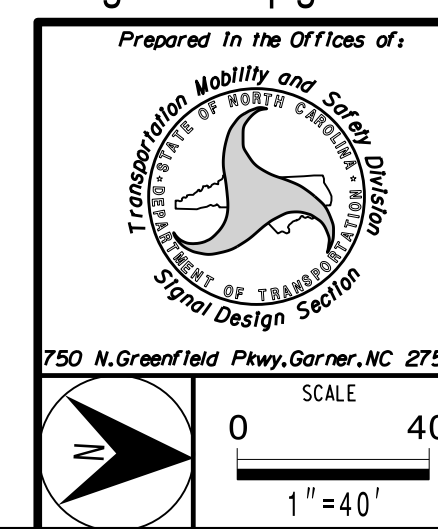
LEGEND

- | PROPOSED                                    | EXISTING |
|---|----------|
| ○ → Traffic Signal Head                     | ● → N/A  |
| ○ → Modified Signal Head                    | ○ → N/A  |
| ○ → Sign                                    | ○ → N/A  |
| ○ → Pedestrian Signal Head With Push Button | ○ → 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  |
| ○ → Optical Detector                        | ○ → N/A  |
| ○ → Type I Pushbutton Post                  | ○ → N/A  |
| ○ → Type II Signal Pedestal                 | ○ → N/A  |

SIGNAL FACE I.D.



Signal Upgrade

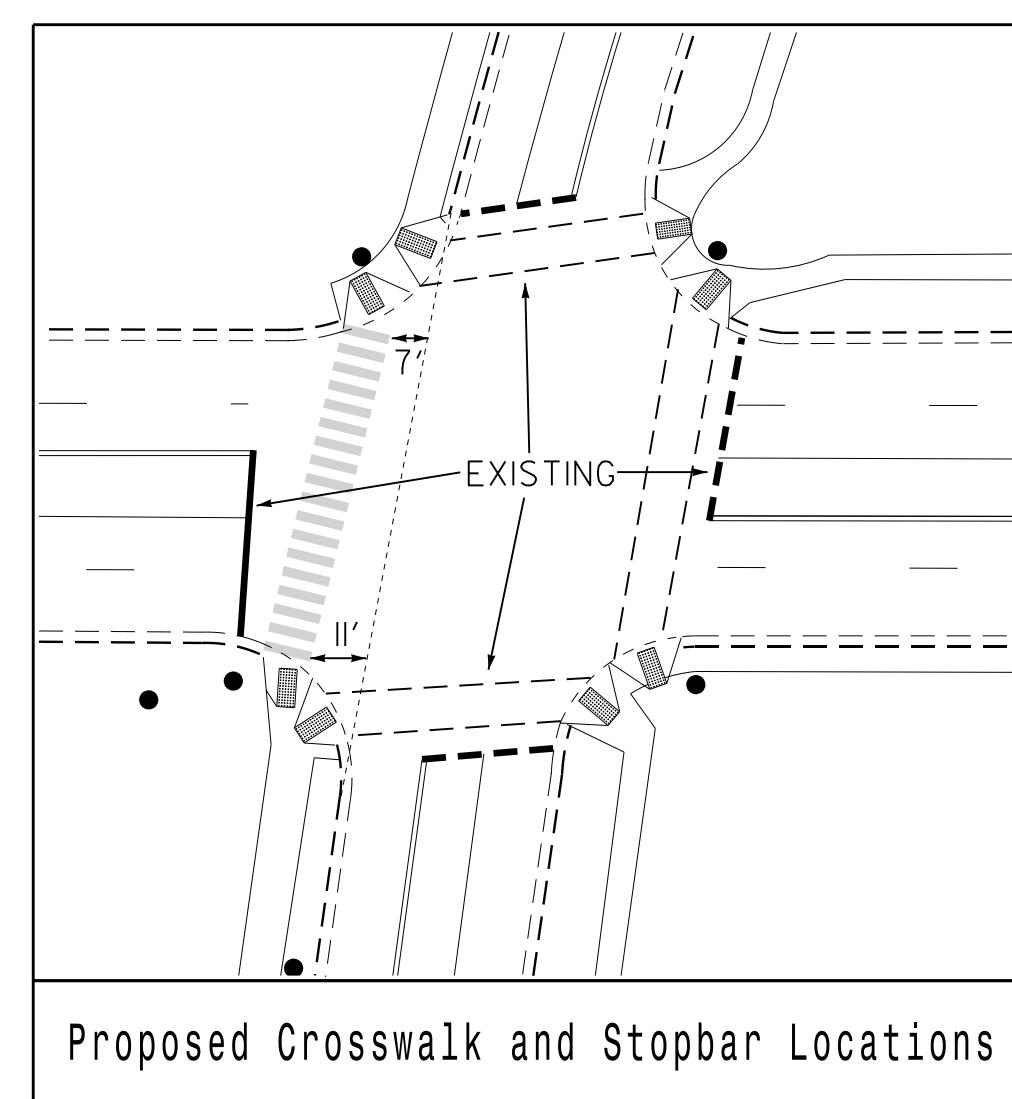


| TIMING CHART                     |          |             |          |          |          |             |          |          |
|----------------------------------|----------|-------------|----------|----------|----------|-------------|----------|----------|
| 2033 SOFTWARE w/ 2070 CONTROLLER |          |             |          |          |          |             |          |          |
| PHASE                            | 01       | 02          | 03       | 04       | 05       | 06          | 07       | 08       |
| MINIMUM INITIAL *                | 7 SEC.   | 10 SEC.     | 7 SEC.   | 7 SEC.   | 7 SEC.   | 10 SEC.     | 7 SEC.   | 7 SEC.   |
| VEHICLE EXTENSION *              | 2.0 SEC. | 3.0 SEC.    | 2.0 SEC. | 2.0 SEC. | 2.0 SEC. | 3.0 SEC.    | 2.0 SEC. | 2.0 SEC. |
| YELLOW CHANGE INT.               | 3.0 SEC. | 4.1 SEC.    | 3.0 SEC. | 4.1 SEC. | 3.0 SEC. | 4.1 SEC.    | 3.0 SEC. | 4.1 SEC. |
| RED CLEARANCE                    | 2.8 SEC. | 2.1 SEC.    | 2.4 SEC. | 2.1 SEC. | 2.8 SEC. | 2.1 SEC.    | 2.4 SEC. | 2.1 SEC. |
| MAXIMUM LIMIT *                  | 15 SEC.  | 60 SEC.     | 25 SEC.  | 30 SEC.  | 15 SEC.  | 60 SEC.     | 15 SEC.  | 30 SEC.  |
| RECALL POSITION                  | NONE     | VEH. RECALL | NONE     | NONE     | NONE     | VEH. RECALL | NONE     | NONE     |
| VEHICLE CALL MEMORY              | NONLOCK  | YELLOW LOCK | NONLOCK  | NONLOCK  | NONLOCK  | YELLOW LOCK | NONLOCK  | NONLOCK  |
| DOUBLE ENTRY                     | OFF      | OFF         | OFF      | ON       | OFF      | OFF         | OFF      | ON       |
| WALK *                           | - SEC.   | 7 SEC.      | - SEC.   | 7 SEC.   | - SEC.   | 7 SEC.      | - SEC.   | 7 SEC.   |
| FLASHING DON'T WALK              | - SEC.   | 13 SEC.     | - SEC.   | 18 SEC.  | - SEC.   | 11 SEC.     | - SEC.   | 18 SEC.  |
| Min Ped Clear*                   | - SEC.   | 7 SEC.      | - SEC.   | 9 SEC.   | - SEC.   | 6 SEC.      | - SEC.   | 9 SEC.   |
| TYPE 3 LIMIT                     | - SEC.   | - SEC.      | - SEC.   | - SEC.   | - SEC.   | - SEC.      | - SEC.   | - SEC.   |
| ALTERNATE EXTENSION              | - SEC.   | - SEC.      | - SEC.   | - SEC.   | - SEC.   | - SEC.      | - SEC.   | - SEC.   |
| ADD PER VEHICLE *                | - SEC.   | - SEC.      | - SEC.   | - SEC.   | - SEC.   | - SEC.      | - SEC.   | - SEC.   |
| MAXIMUM INITIAL *                | - SEC.   | - SEC.      | - SEC.   | - SEC.   | - SEC.   | - SEC.      | - SEC.   | - SEC.   |
| MAXIMUM GAP*                     | 2.0 SEC. | 3.0 SEC.    | 2.0 SEC. | 2.0 SEC. | 2.0 SEC. | 3.0 SEC.    | 2.0 SEC. | 2.0 SEC. |
| REDUCE 0.1 SEC EVERY *           | - SEC.   | - SEC.      | - SEC.   | - SEC.   | - SEC.   | - SEC.      | - SEC.   | - SEC.   |
| MINIMUM GAP                      | 2.0 SEC. | 3.0 SEC.    | 2.0 SEC. | 2.0 SEC. | 2.0 SEC. | 3.0 SEC.    | 2.0 SEC. | 2.0 SEC. |

\* 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.

| 2033 EMERGENCY PREEMPTION TIMING CHART |                    |                    |
|--|--------------------|--------------------|
| FUNCTION                               | EV B (1+6) SECONDS | EV D (3+8) SECONDS |
| DELAY BEFORE PREEMPT                   | 0                  | 0                  |
| PED. CLEAR BEFORE PREEMPT              | *                  | *                  |
| MIN. GREEN BEFORE PREEMPT              | 1.0                | 1.0                |
| CLEARANCE TIME                         | 2.0                | 2.0                |
| PREEMPT EXTEND**                       | 2.0                | 2.0                |

\* See Timing Chart  
\*\* Program Timing on Optical Detector Unit



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

US 501 (North Duke Street) at Stadium Drive

Division 5 Durham County Durham

PLAN DATE: December 2016 REVIEWED BY:

PREPARED BY: C.E. Carter REVIEWED BY:

REVISIONS INIT. DATE

SCALE 0 40 1"=40'

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER RYAN W. HOUGH

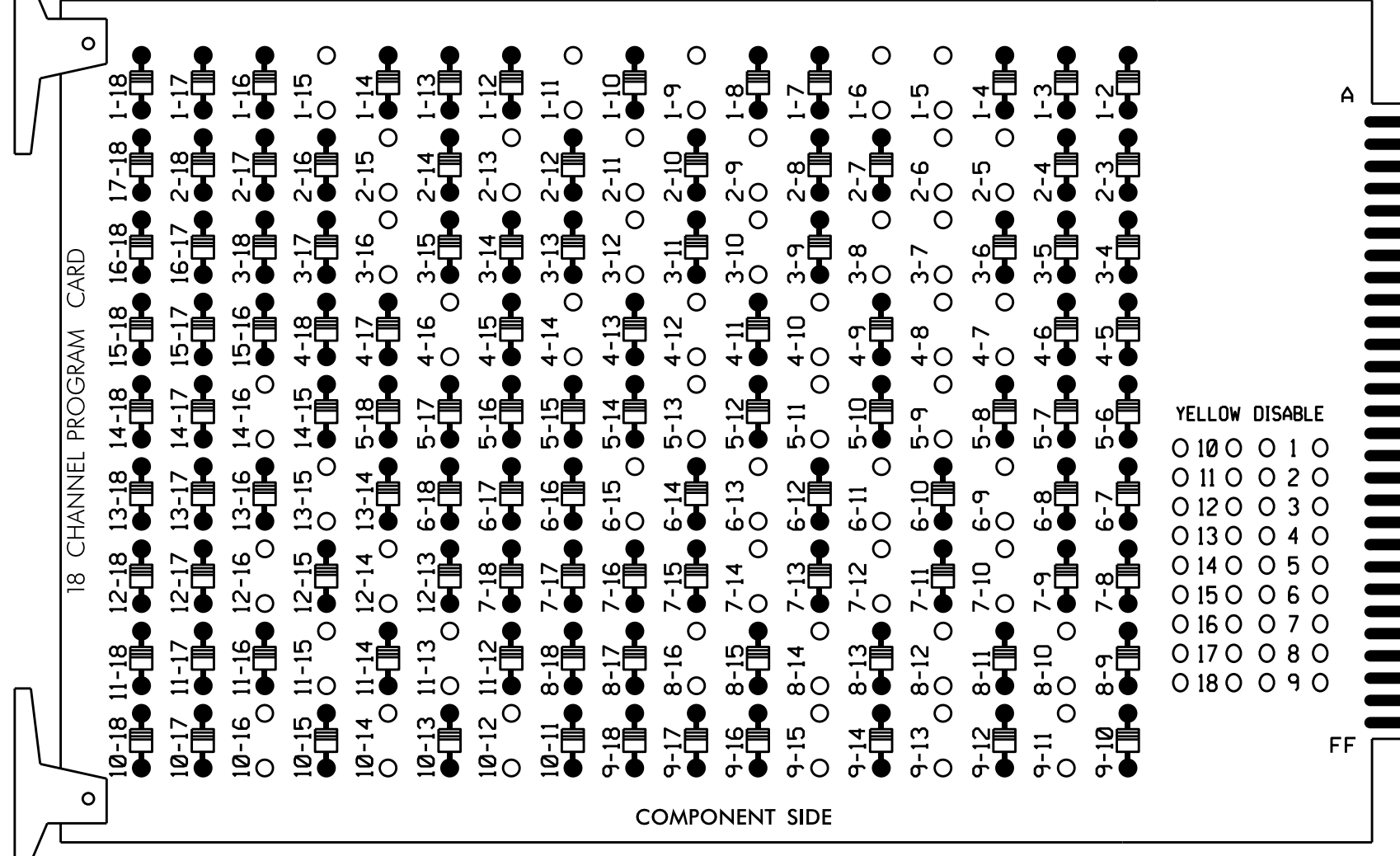
DATE 2/2/2017

SIG. INVENTORY NO. 05-0462

**EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-10, 3-12, 3-16, 4-7, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 13-15 and 14-16.



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. Verify that signal heads flash in accordance with the signal plans.
- Program controller to Start Up in phases 2 and 6 green.
- Set power-up flash time to 0 seconds within the controller programming. The conflict monitor will govern startup flash. Ensure STARTUP "RED START" is set to 0 seconds.
- Enable Simultaneous Gap-Out feature for all phases.
- Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
- Set phase bank 3 maximum limit to 250 seconds for phases used.
- Program phases 4 and 8 for Double Entry.
- Ensure start up flash phases are coordinated with flash program block assignments.
- Program Startup Ped Calls for phases 2, 4, 6, and 8.
- Set the Red Revert interval on the controller to 1 second.
- This cabinet and controller are part of the Durham Signal System.

**EQUIPMENT INFORMATION**

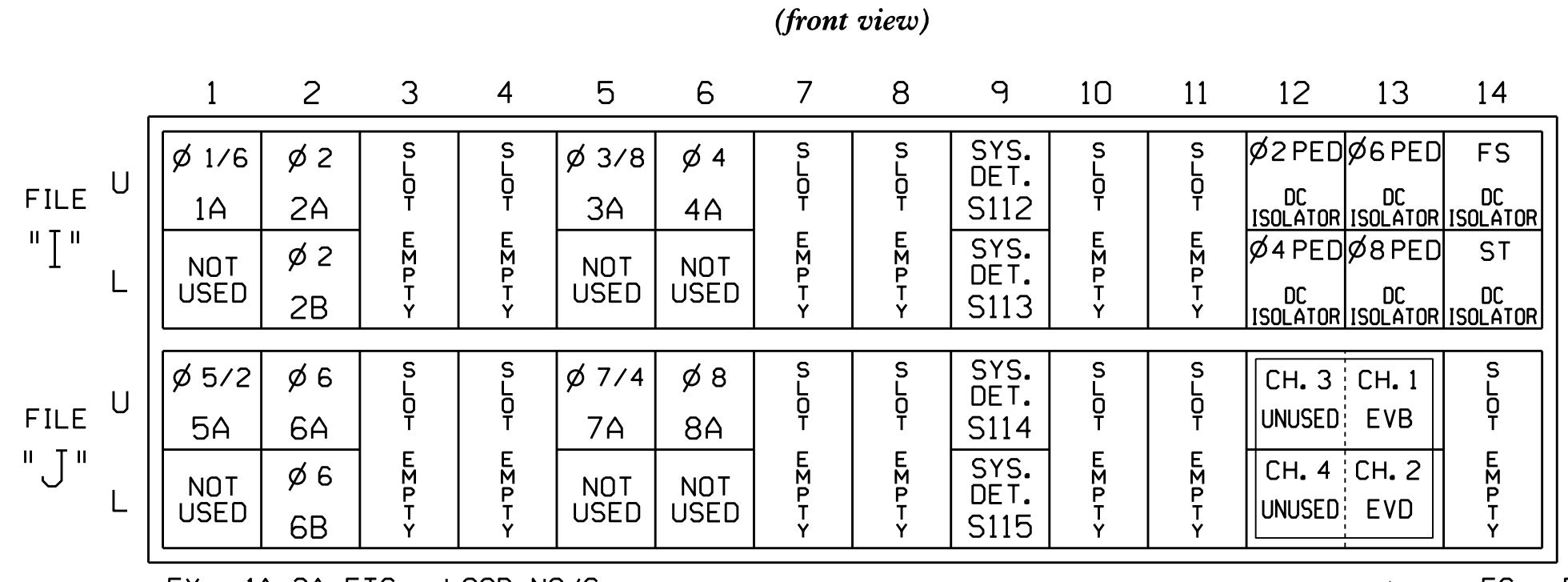
CONTROLLER.....2070E  
 CABINET.....332 W/ AUX  
 SOFTWARE.....McCain 2033  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX FILE  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S11,  
 S12,AUX S1,AUX S2,AUX S4,AUX S5  
 PHASES USED.....1,2,2 PED,3,4,4 PED,5,6,6 PED,7,  
 8,8 PED  
 OVERLAP 1.....\*  
 OVERLAP 2.....\*  
 OVERLAP 3.....\*  
 OVERLAP 4.....\*  
 \* See FYA PPLT 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     | 2 PED    | 3   | 4     | 4 PED    | 5   | 6     | 6 PED    | 7   | 8     | 8 PED    | OL1    | OL2    | SPARE  | OL3    | OL4    | SPARE  |
| SIGNAL HEAD NO.       | 11  | 21,22 | P21, P22 | 31  | 41,42 | P41, P42 | 51  | 61,62 | P61, P62 | 71  | 81,82 | P81, P82 | 11     | 31     | NU     | 51     | 71     | NU     |
| RED                   |     | 128   |          |     | 101   |          |     | 134   |          |     |       | 107      |        |        |        |        |        |        |
| YELLOW                | *   | 129   |          | *   | 102   |          | *   | 135   |          | *   | 108   |          |        |        |        |        |        |        |
| GREEN                 |     | 130   |          |     | 103   |          |     | 136   |          |     |       | 109      |        |        |        |        |        |        |
| RED ARROW             |     |       |          |     |       |          |     |       |          |     |       |          | A121   | A124   |        | A114   | A101   |        |
| YELLOW ARROW          |     |       |          |     |       |          |     |       |          |     |       |          | A122   | A125   |        | A115   | A102   |        |
| FLASHING YELLOW ARROW |     |       |          |     |       |          |     |       |          |     |       |          | A123   | A126   |        | A116   | A103   |        |
| GREEN ARROW           | 127 |       |          | 118 |       |          | 133 |       |          | 124 |       |          |        |        |        |        |        |        |
| Hand                  |     |       | 113      |     |       | 104      |     |       | 119      |     |       | 110      |        |        |        |        |        |        |
| Person                |     |       | 115      |     |       | 106      |     |       | 121      |     |       | 112      |        |        |        |        |        |        |

NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail sheet 2.  
 ★ See pictorial of head wiring in detail below.

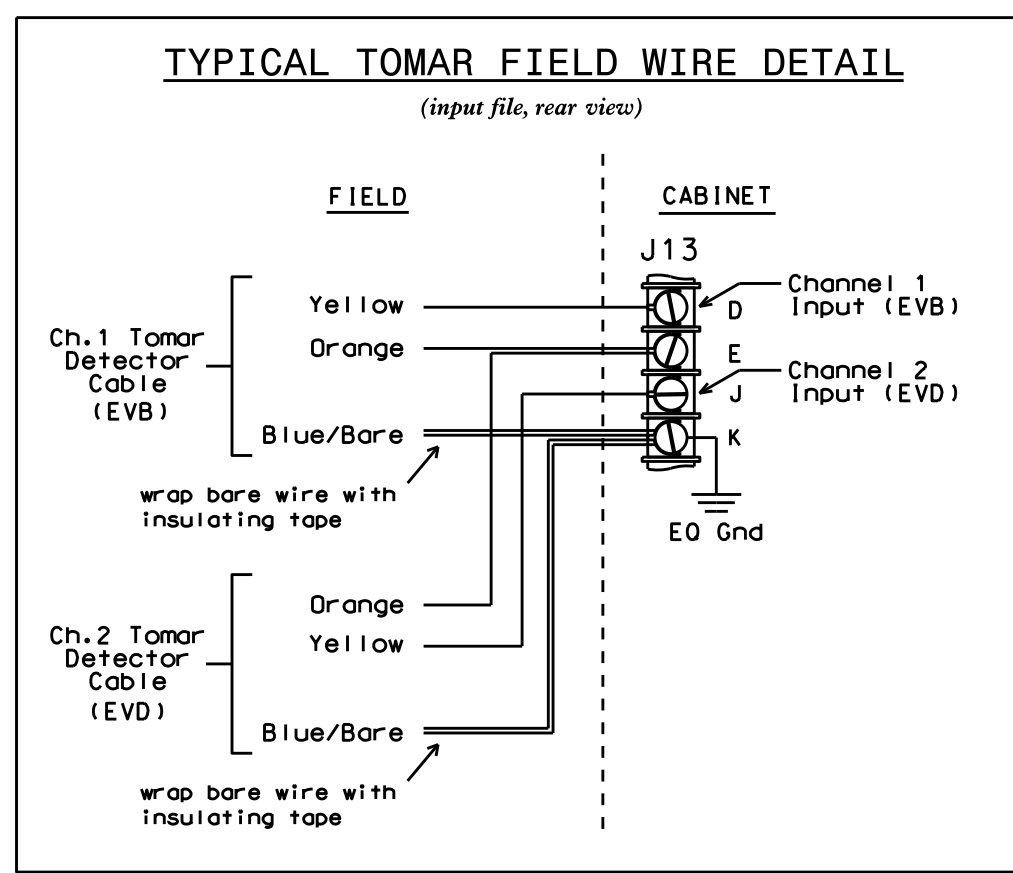
**INPUT FILE POSITION LAYOUT**



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

FS = FLASH SENSE  
 ST = STOP TIME  
 EVx = EMERGENCY VEHICLE PREEMPT

TOMAR OSP CARD  
 INSERT CARD INTO  
 SLOT J13



**INPUT FILE CONNECTION & PROGRAMMING CHART**

| LOOP NO.         | LOOP TERMINAL | INPUT FILE POS. | DETECTOR NO. | PIN NO. | ATTRIBUTES | NEMA PHASE |
|------------------|---------------|-----------------|--------------|---------|------------|------------|
| 1A               | TB2-1,2       | 11U             | 14           | 56      | 5 7        | 1          |
|                  |               |                 | 10           | 56      | 5 7        | 6          |
| 2A               | TB2-5,6       | 12U             | 1            | 39      | 5 7        | 2          |
|                  |               |                 | 5            | 43      | 5 7        | 2          |
| 3A               | TB4-5,6       | 15U             | 16           | 58      | 5 7        | 3          |
|                  |               |                 | 12           | 58      | 5 7        | 8          |
| 4A               | TB4-9,10      | 16U             | 3            | 41      | 5 7        | 4          |
|                  |               |                 | 13           | 55      | 5 7        | 5          |
| 5A               | TB3-1,2       | J1U             | 9            | 55      | 5 7        | 2          |
|                  |               |                 | 2            | 40      | 5 7        | 6          |
| 6A               | TB3-5,6       | J2U             | 6            | 44      | 5 7        | 6          |
|                  |               |                 | 15           | 57      | 5 7        | 7          |
| 7A               | TB5-5,6       | J5U             | 11           | 57      | 5 7        | 4          |
|                  |               |                 | 4            | 42      | 5 7        | 8          |
| S112             | TB6-9,10      | I9U             | 18           | 60      | 4          | SYS        |
| S113             | TB6-11,12     | I9L             | 20           | 62      | 4          | SYS        |
| S114             | TB7-9,10      | J9U             | 17           | 59      | 4          | SYS        |
| S115             | TB7-11,12     | J9L             | 19           | 61      | 4          | SYS        |
| PED PUSH BUTTONS |               |                 |              |         |            |            |
| P21,P22          | TB8-4,6       | I12U            | 25           | 67      | 2          | 2 PED      |
| P41,P42          | TB8-5,6       | I12L            | 27           | 69      | 2          | 4 PED      |
| P61,P62          | TB8-7,9       | I13U            | 26           | 68      | 2          | 6 PED      |
| P81,P82          | TB8-8,9       | I13L            | 28           | 70      | 2          | 8 PED      |

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

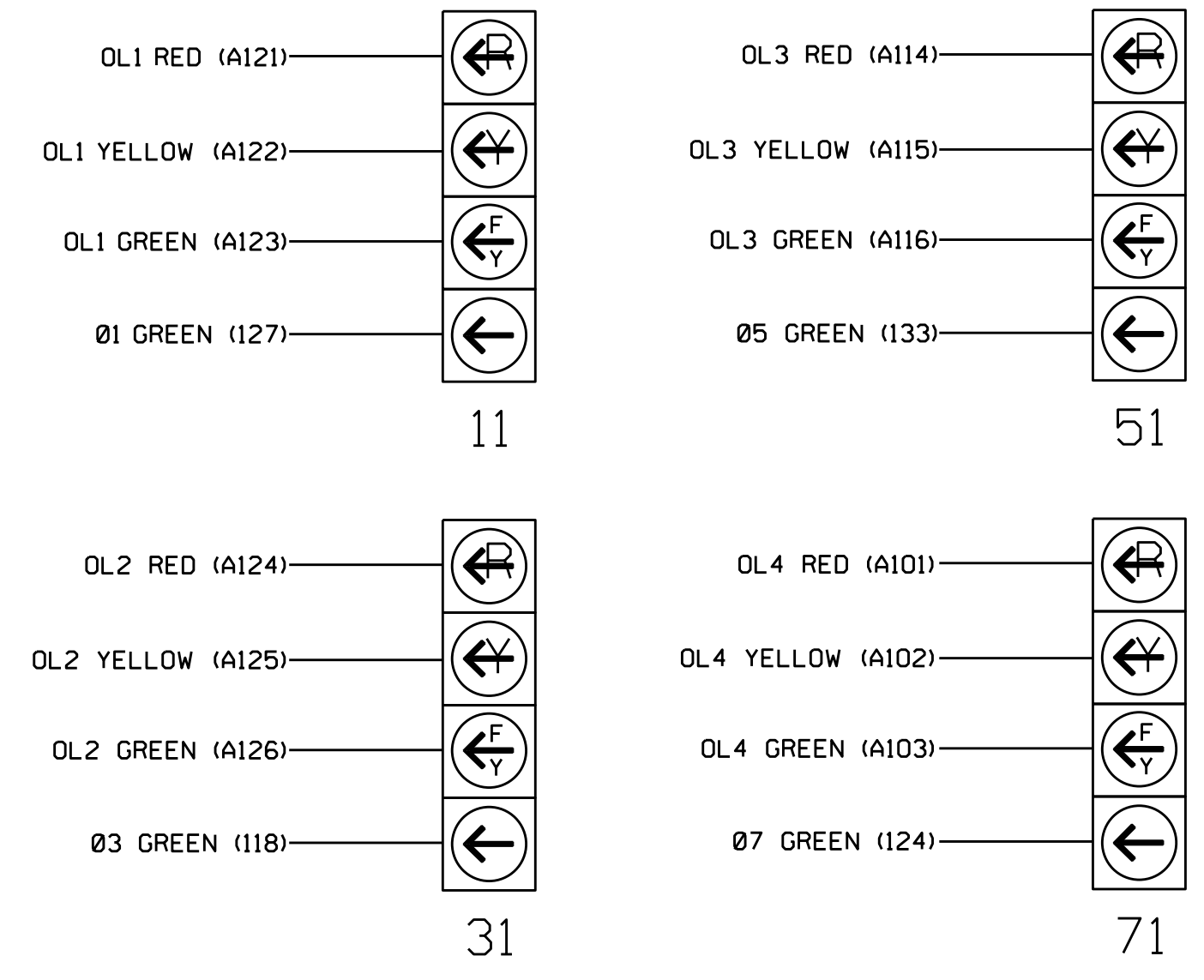
NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

INPUT FILE POSITION LEGEND: J2L DETECTOR ATTRIBUTES LEGEND:  
 FILE J  
 SLOT 2  
 LOWER  
 1-FULL TIME DELAY  
 2-PED CALL  
 3-RESERVED  
 4-COUNTING  
 5-EXTENSION  
 6-TYPE 3  
 7-CALLING  
 8-ALTERNATE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0462  
 DESIGNED: December 2016  
 SEALED: 2/2/2017  
 REVISED:

**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**

(wire signal heads as shown)



**NOTE**

1. The sequence display for these signals require special programming. See sheet 2 for programming instructions.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

US 501 (North Duke Street) at Stadium Drive

Division 5 Durham County Durham

PLAN DATE: January 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS INIT. DATE

Sealed by: Zachary M. Little, Professional Engineer, No. 030530, State of North Carolina

750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 05-0462

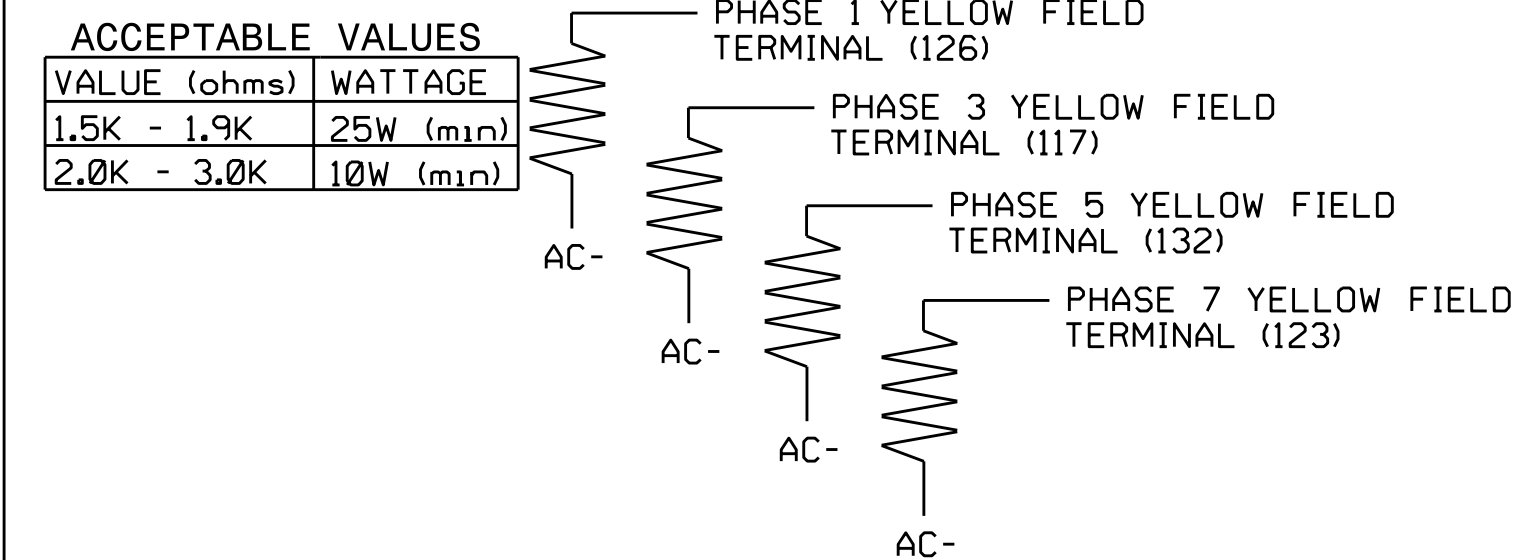
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 cbsr\ckland

### FYA PPLT PROGRAMMING

- Program Flashing Yellow Arrow phases as follows:  
Main Menu - 1) PHASE - 2) PHASE FUNCTIONS PAGE TWO  
PPLT FYA = PHASE 1,3,5,7
- Assign output pin for Flashing Yellow Arrow as follows:  
Main Menu - 6) OUTPUTS - F) FYA PPLT  
Phase 1 = 99  
Phase 3 = 96  
Phase 5 = 90  
Phase 7 = 87
- Redirect RED and YELLOW outputs for the left turn phases as follows:  
Main Menu - 6) OUTPUTS - 8) REDIRECT PHASE  
Phase 1 RED = 97, Phase 1 YELLOW = 98  
Phase 3 RED = 94, Phase 3 YELLOW = 95  
Phase 5 RED = 88, Phase 5 YELLOW = 89  
Phase 7 RED = 85, Phase 7 YELLOW = 86

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



### EMERGENCY VEHICLE PREEMPTION PROGRAMMING

- Program EVB preempt as follows:  
Main Menu - 2) PREEMPT - 4) EMERGENCY VEHICLE  
EVB Clear = 2  
EVB Clearance Phases = 1,6
- Program EVD preempt as follows:  
Main Menu - 2) PREEMPT - 4) EMERGENCY VEHICLE  
EVD Clear = 2  
EVD Clearance Phases = 3,8
- Program general preemption parameters as follows:  
Main Menu - 2) PREEMPT - 6) MISC PREEMPTION PARAMETERS  
Min Time Before PE ForceOff = 1
- Ped Clear Before Preempt is a pedestrian timing parameter, and is programmed as follows:  
Main Menu - 1) PHASE - 5) PEDESTRIAN TIMING  
PHASE 2 MIN FDW = 7  
PHASE 4 MIN FDW = 9  
PHASE 6 MIN FDW = 6  
PHASE 8 MIN FDW = 9

Program Preempt Extend time on optical detector units for 2.0 sec.

### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

### 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.

### MIN WALK DURING PREEMPTION PROGRAMMING

To disable MIN WALK pedestrian timing during preemption, program the controller as follows:  
Main Menu - 9) UTILITIES - 5) CONFIGURATION  
EXTRA TWO = 3

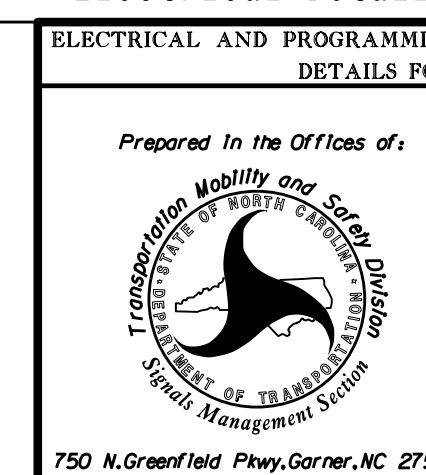
### SPECIAL NOTES EV PREEMPT PROGRAMMING

Setting 'FYA DURING PREEMPT' to 'Y' eliminates yellow trap when transitioning to preempt from adjacent through phase.  
Main Menu - 9) UTILITIES - 9) MISC  
FYA DURING PREEMPT (Y/N) = Y

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0462  
DESIGNED: December 2016  
SEALED: 2/2/2017  
REVISED:



|                             |                       |   |  |
|-----------------------------|-----------------------|---|--|
| Prepared In the Offices of: |                       | US 501 (North Duke Street) at Stadium Drive |  |
| Division 5                  | Durham County         | Durham                                      |  |
| PLAN DATE: January 2017     | REVIEWED BY: T. Joyce |   |  |
| PREPARED BY: C. Strickland  | REVIEWED BY:          |   |  |
| REVISIONS                   | INIT.                 | DATE  |  |
|                             |                       |   |  |
|                             |                       |   |  |

|  |           |
|--|-----------|
| Seal of Cary M. Little, Professional Engineer, License No. 030530. |           |
| DocuSigned by:   | 2/17/2017 |
| 0C21EFD94F5341F  | DATE      |
| SIG. INVENTORY NO. 05-0462   |           |

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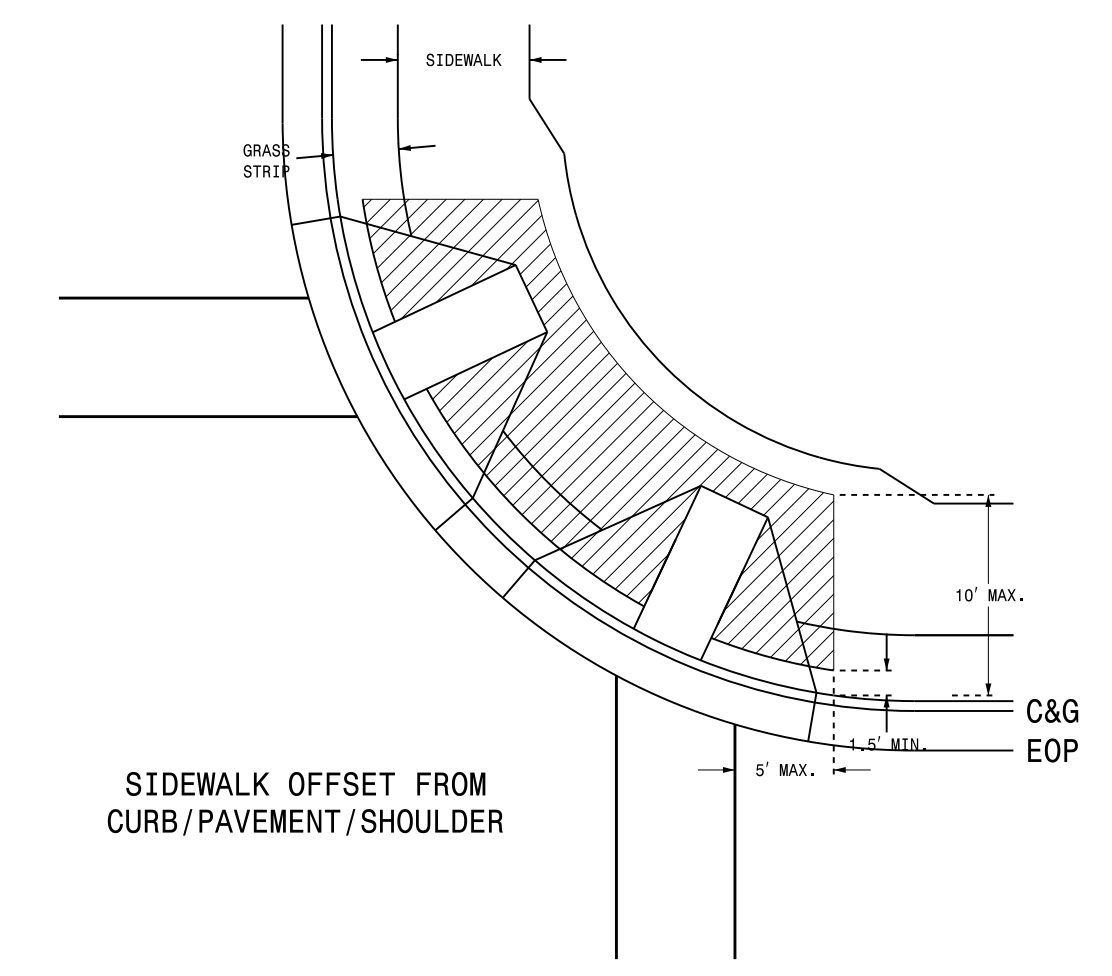
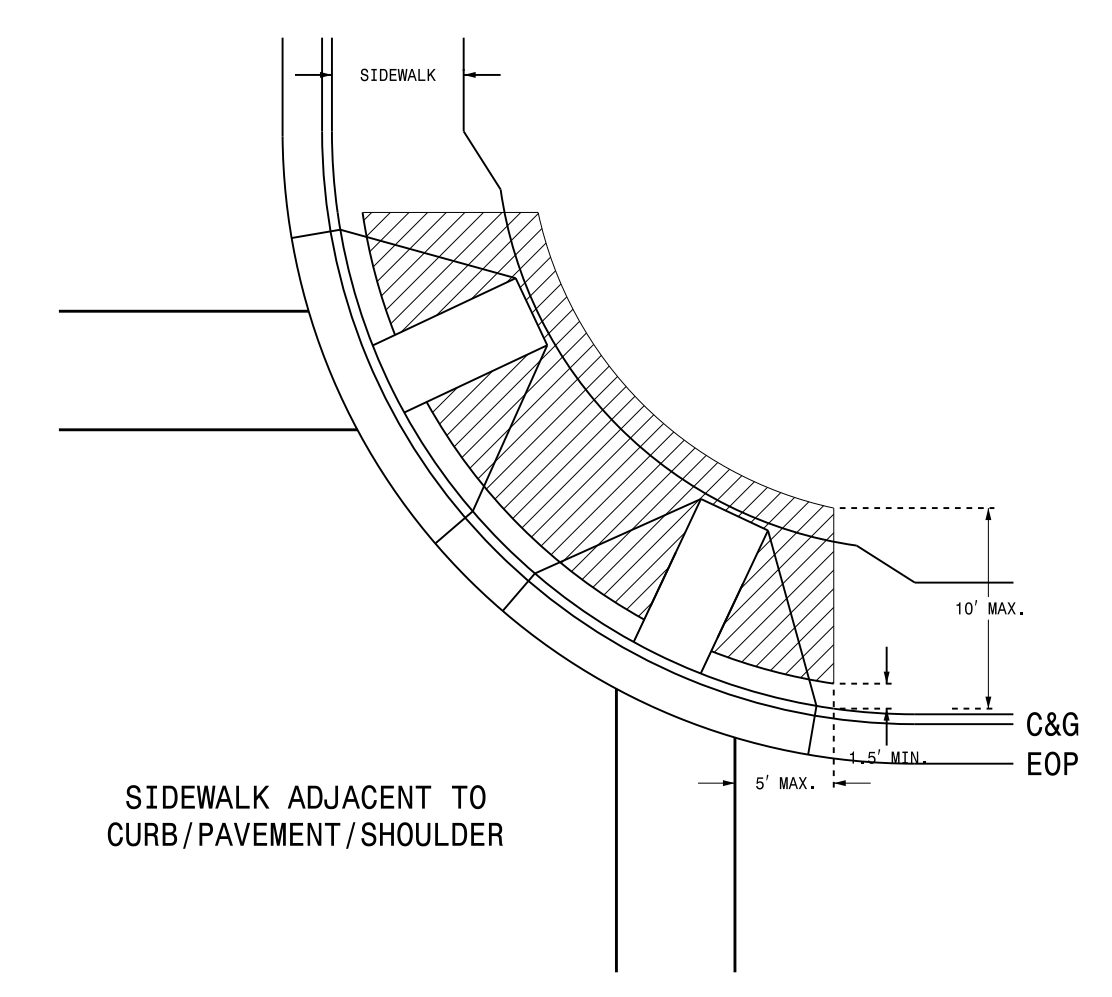
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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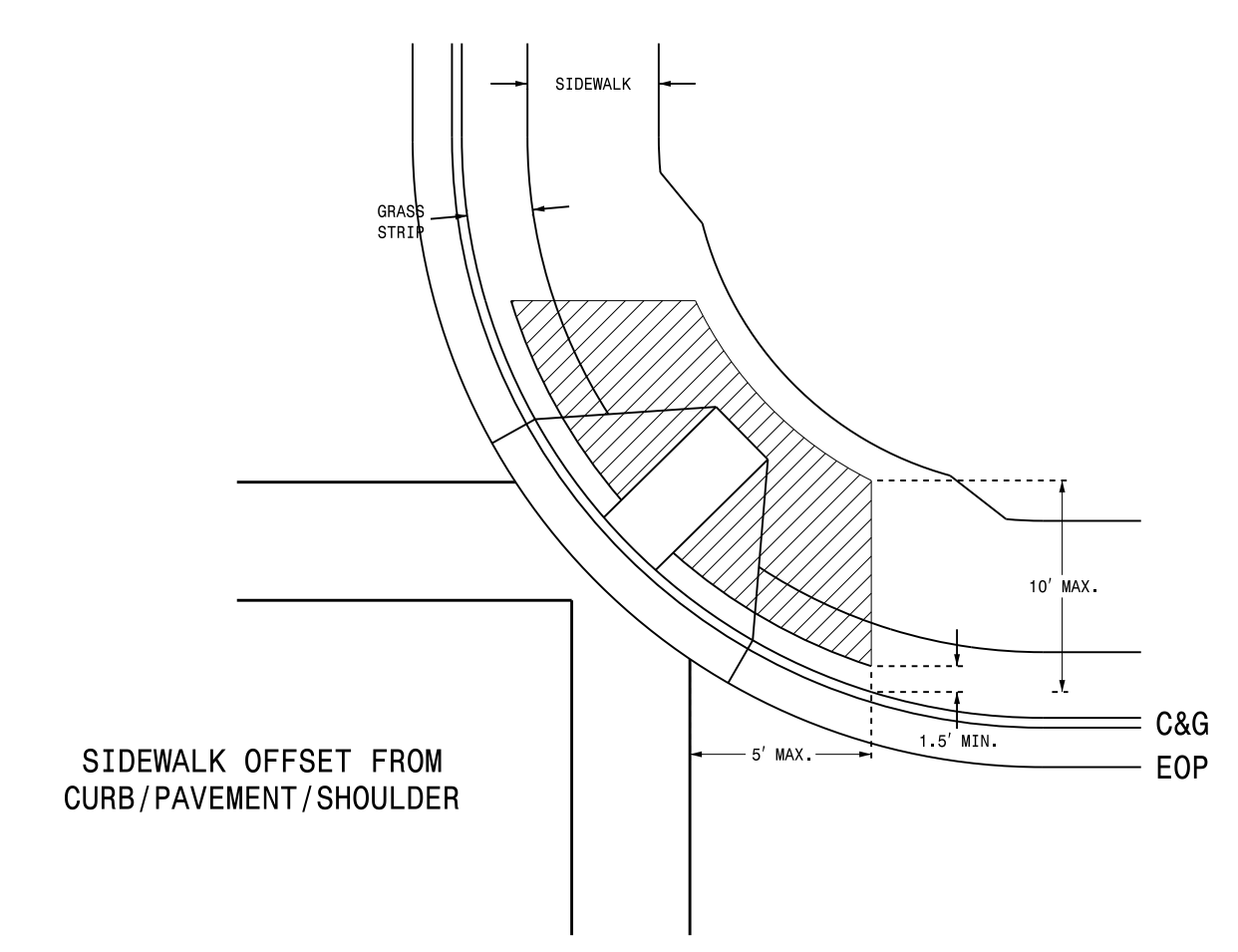
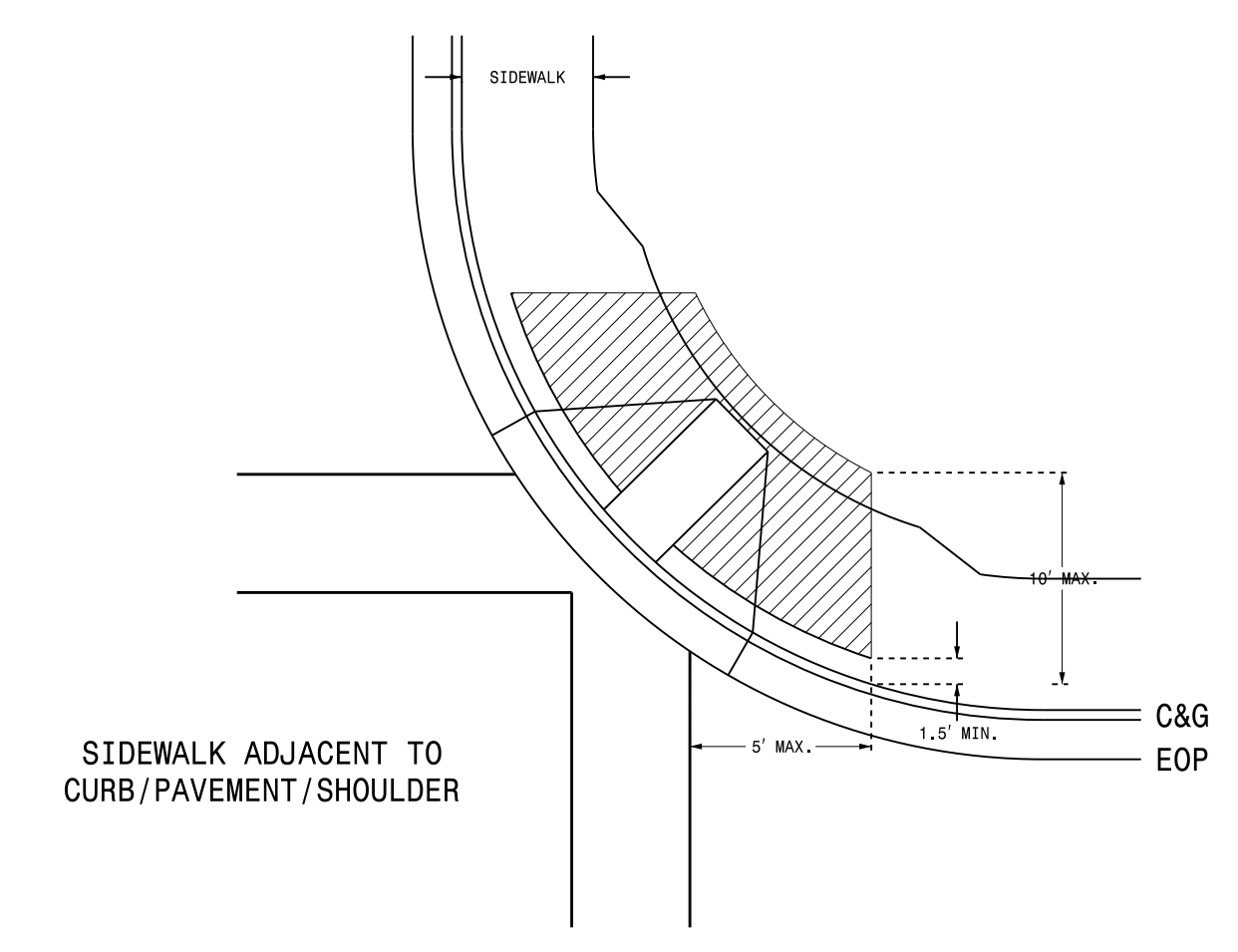
ENGLISH DETAIL DRAWING FOR  
**PEDESTRIAN PUSHBUTTON LOCATIONS**  
PLACEMENT DETAIL

SHEET 1 OF 3  
**1705D01**

**PUSHBUTTON PLACEMENT**  
SEPARATE CURB RAMPS



**PUSHBUTTON PLACEMENT**  
SHARED CURB RAMP



- NOTES**
1. Pushbutton pedestals should not be located further than 10 feet from the edge of curb, shoulder, or pavement.
  2. The face of the pushbutton should be parallel to the applicable crosswalk.
  3. Separate pushbuttons used on the same corner should be separated by a distance of at least 10 feet.
  4. Pushbuttons shall be installed adjacent to a level surface with a maximum reach distance of 10 inches.
  5. Maintain 4 feet of clearance around pedestal if located in sidewalk.
  6. Refer to section 1705 of the 2012 NCDOT Roadway Standard Drawings for Pushbutton Assembly details.
  7. Refer to section 1743 of the 2012 NCDOT Roadway Standard Drawings for Pedestal details.
  8. Contact Division Traffic Engineer for pushbutton location approval prior to installation.
  9. Curb ramps are for symbolic use only and may not reflect actual design or field conditions.

| PROPOSED | LEGEND                   |
|----------|--------------------------|
|          | Signal Pole              |
|          | Type I Pushbutton Post   |
|          | Type II Signal Pedestal  |
|          | Pushbutton & Sign        |
|          | Pedestrian Signal Head   |
|          | Curb Ramp                |
|          | Pushbutton Location Area |

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ENGLISH DETAIL DRAWING FOR  
**PEDESTRIAN PUSHBUTTON LOCATIONS**  
PLACEMENT DETAIL

SHEET 1 OF 3  
**1705D01**

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

DocuSigned by:  
*Robert J. Ziemba*  
18084828744604

SIGNATURE

6/17/2014  
DATE

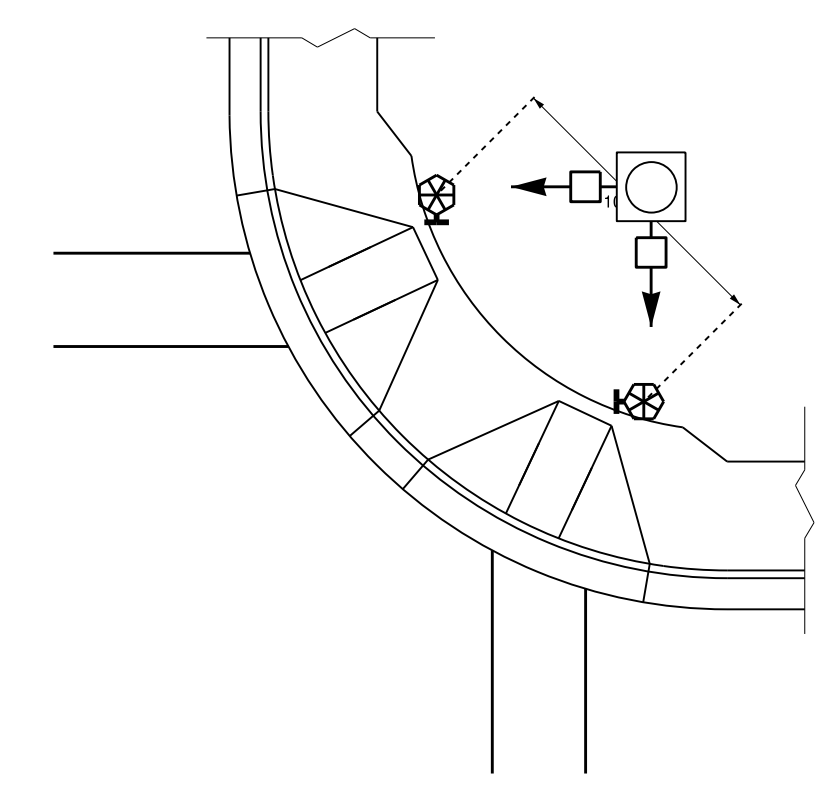
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 RALEIGH, N.C.

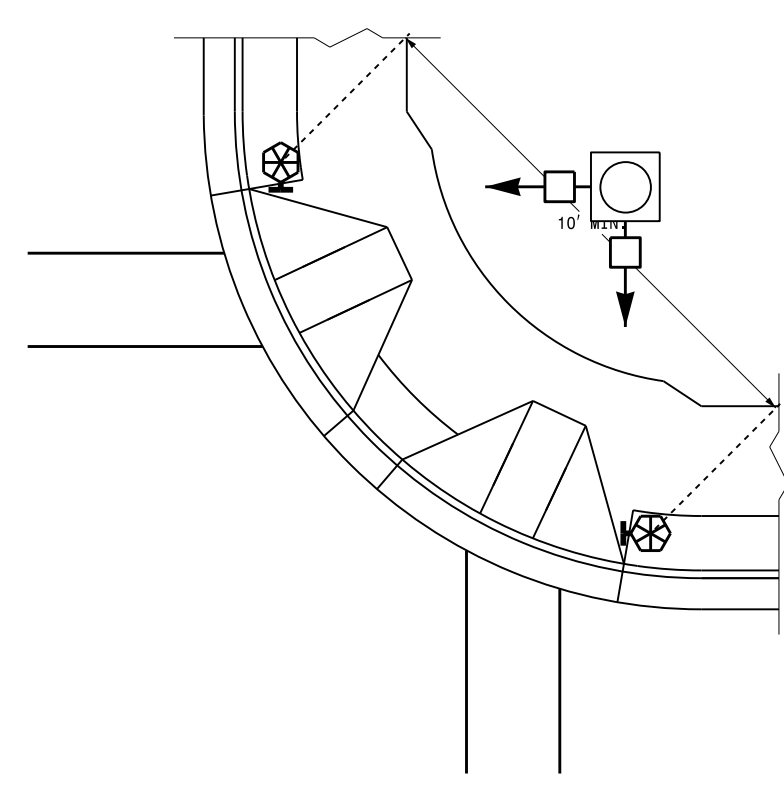
ENGLISH DETAIL DRAWING FOR  
**PEDESTRIAN PUSHBUTTON LOCATIONS**  
 PLACEMENT DETAIL

SHEET 2 OF 3  
**1705D01**

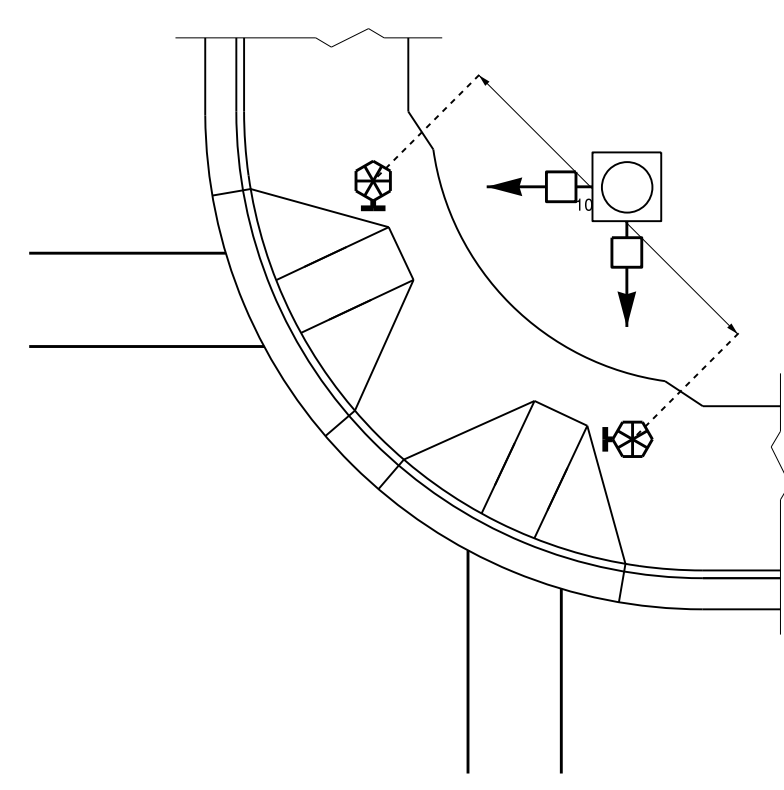
**TYPICAL PUSHBUTTON LOCATIONS (CASE I)**  
 SEPARATE CURB RAMPS W/ TYPE I PEDESTALS



BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER

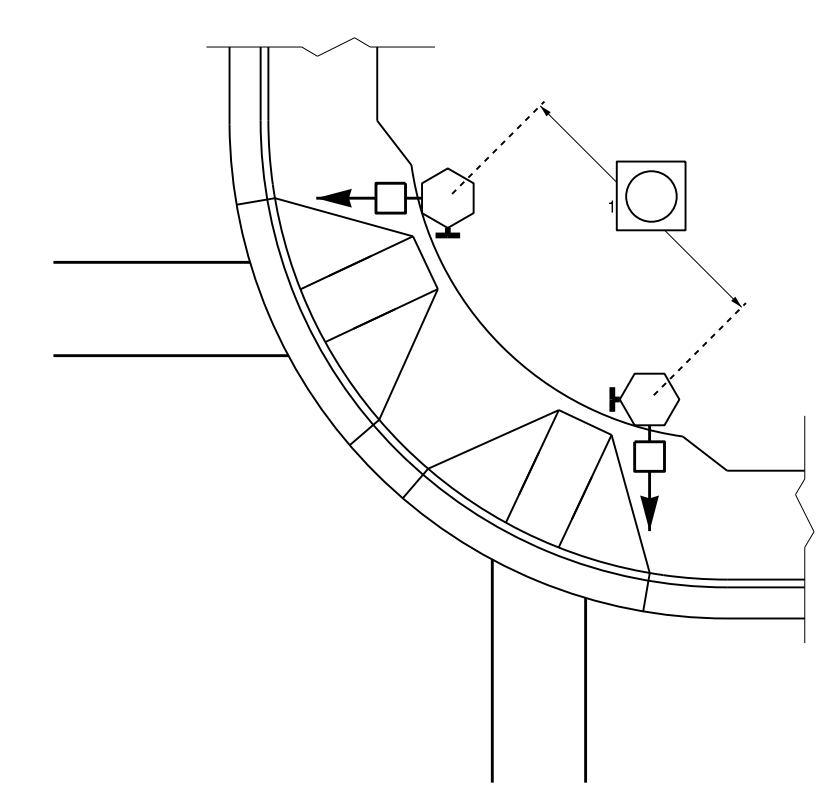


PUSHBUTTON PLACEMENT IN WIDE SIDEWALK

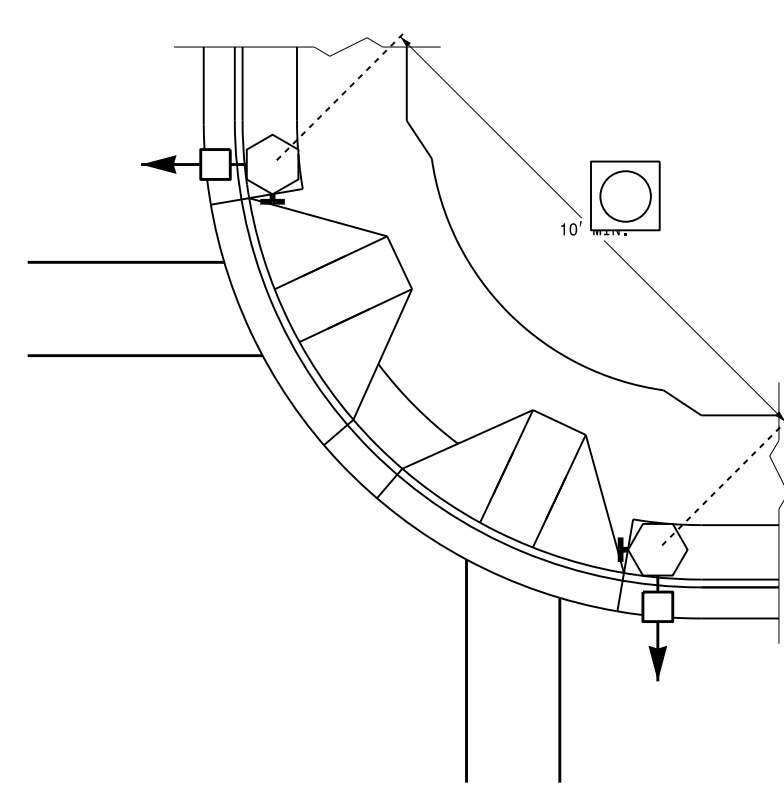
**PROPOSED**

|  |                          |
|--|--------------------------|
|  | Signal Pole              |
|  | Type I Pushbutton Post   |
|  | Type II Signal Pedestal  |
|  | Pushbutton & Sign        |
|  | Pedestrian Signal Head   |
|  | Curb Ramp                |
|  | Pushbutton Location Area |

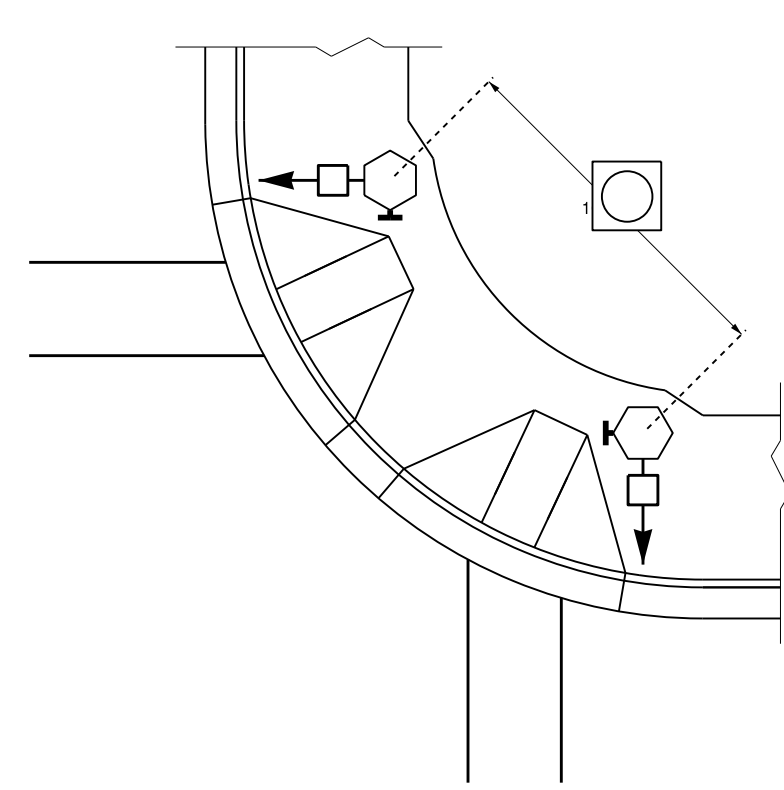
**TYPICAL PUSHBUTTON LOCATIONS (CASE II)**  
 SEPARATE CURB RAMPS W/ TYPE II PEDESTALS



BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER

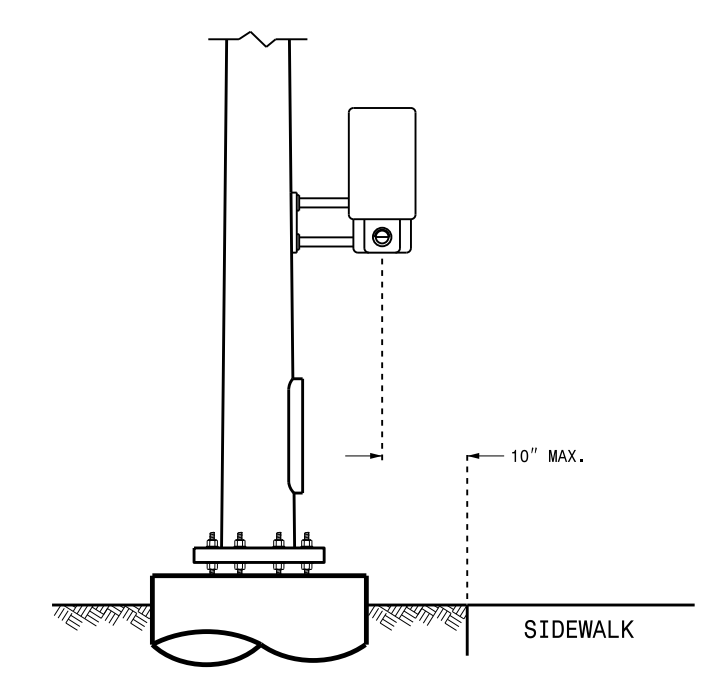


GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER



PUSHBUTTON PLACEMENT IN WIDE SIDEWALK

**OPTIONAL PUSHBUTTON EXTENSION**  
 FACE OF PUSHBUTTON PARALLEL TO APPLICABLE CROSSWALK



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ENGLISH DETAIL DRAWING FOR  
**PEDESTRIAN PUSHBUTTON LOCATIONS**  
 PLACEMENT DETAIL

SHEET 2 OF 3  
**1705D01**

See Plate for Title

Prepared in the Offices of:

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 Garner, NC 27529

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ENGLISH DETAIL DRAWING FOR  
**PEDESTRIAN PUSHBUTTON LOCATIONS**  
PLACEMENT DETAIL

SHEET 3 OF 3  
**1705D01**

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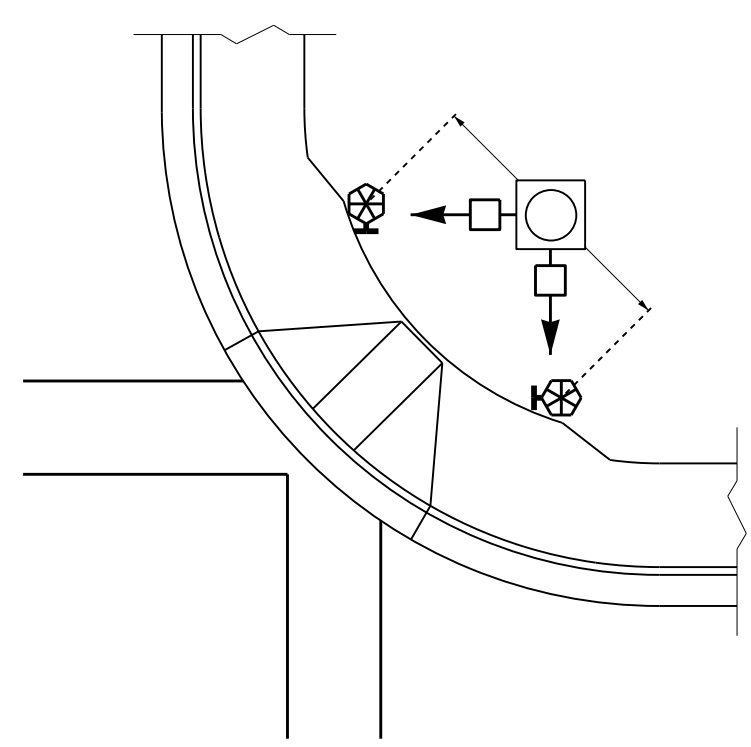
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ENGLISH DETAIL DRAWING FOR  
**PEDESTRIAN PUSHBUTTON LOCATIONS**  
PLACEMENT DETAIL

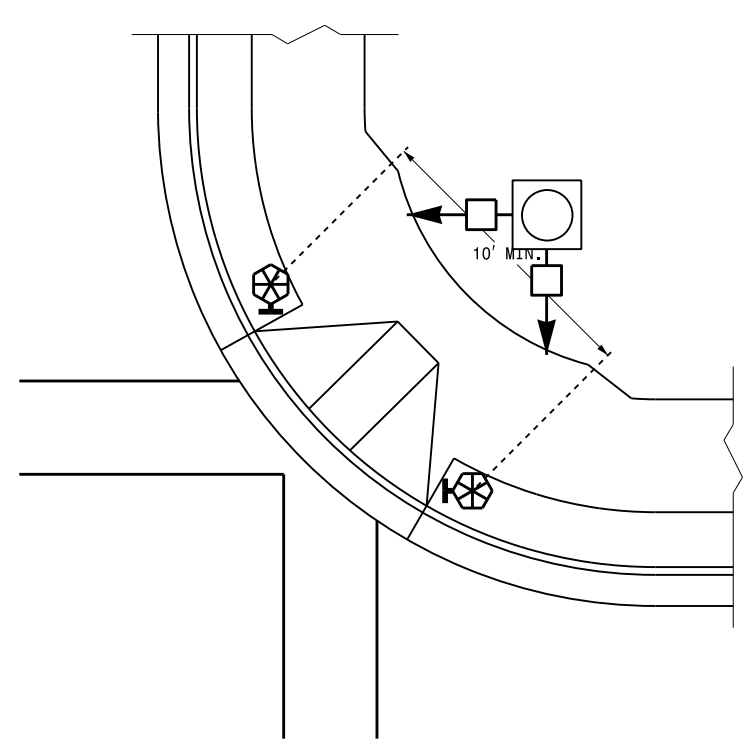
SHEET 3 OF 3  
**1705D01**

**TYPICAL PUSHBUTTON LOCATIONS (CASE III)**

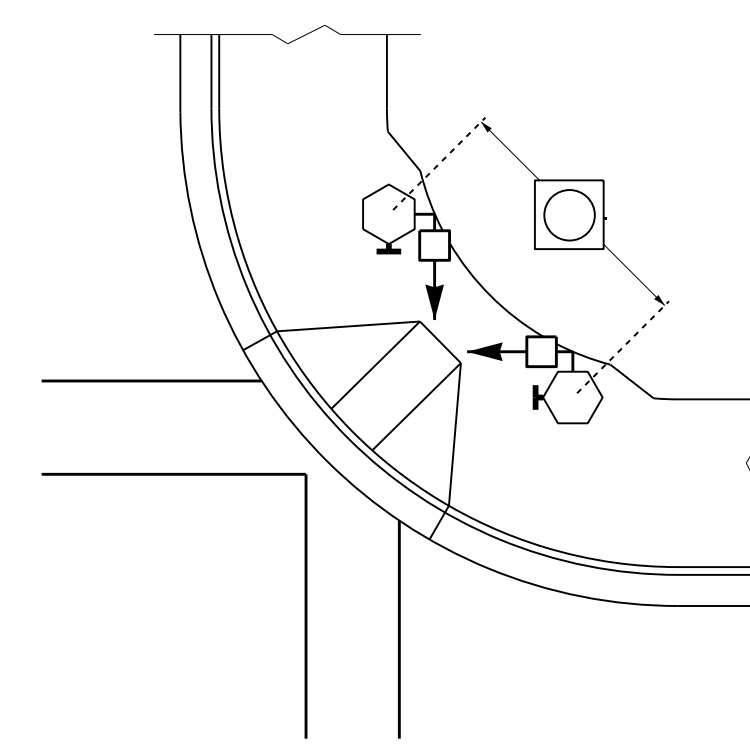
SHARED CURB RAMPS



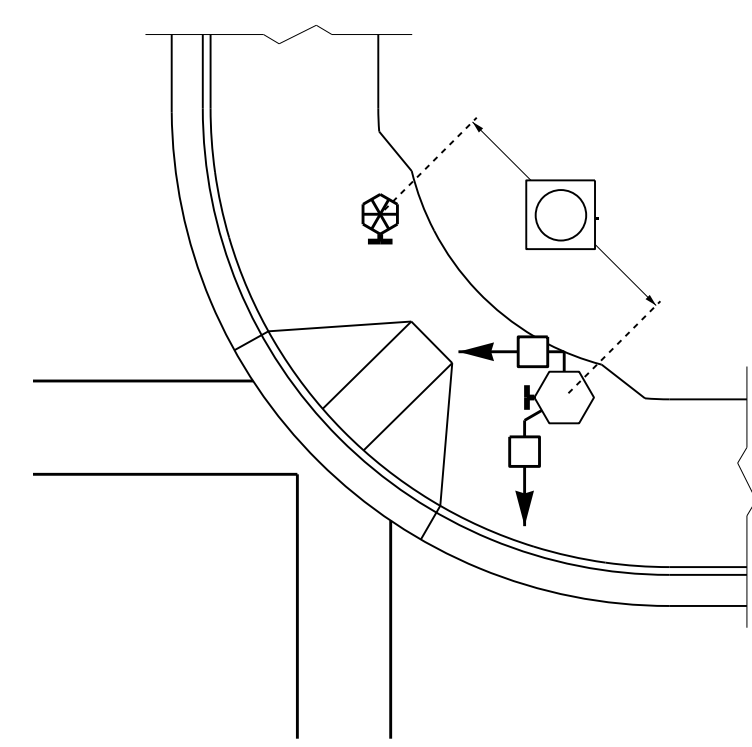
BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER

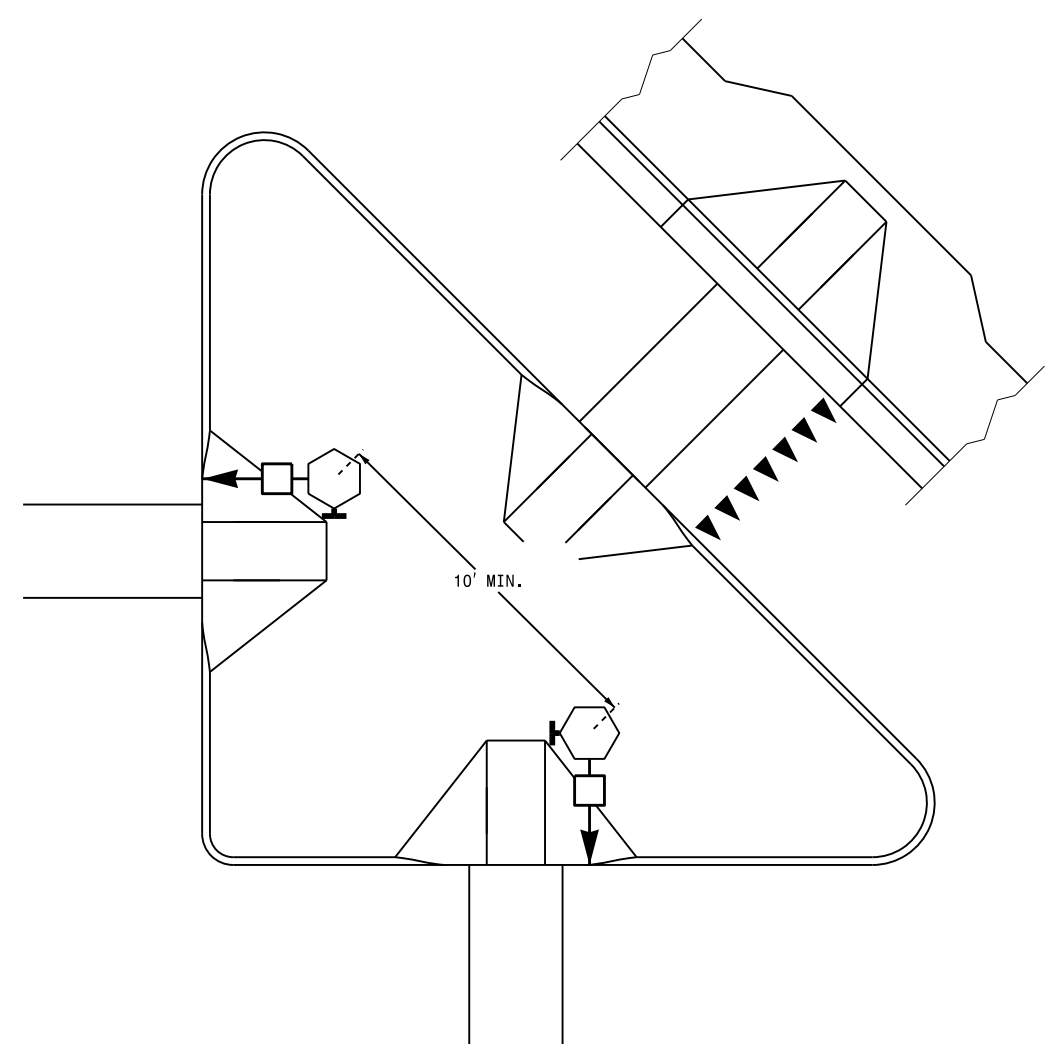


PUSHBUTTON PLACEMENT IN WIDE SIDEWALK (CORRESPONDING PUSHBUTTONS AND SIGNAL HEADS ON DIFFERENT PEDESTALS)

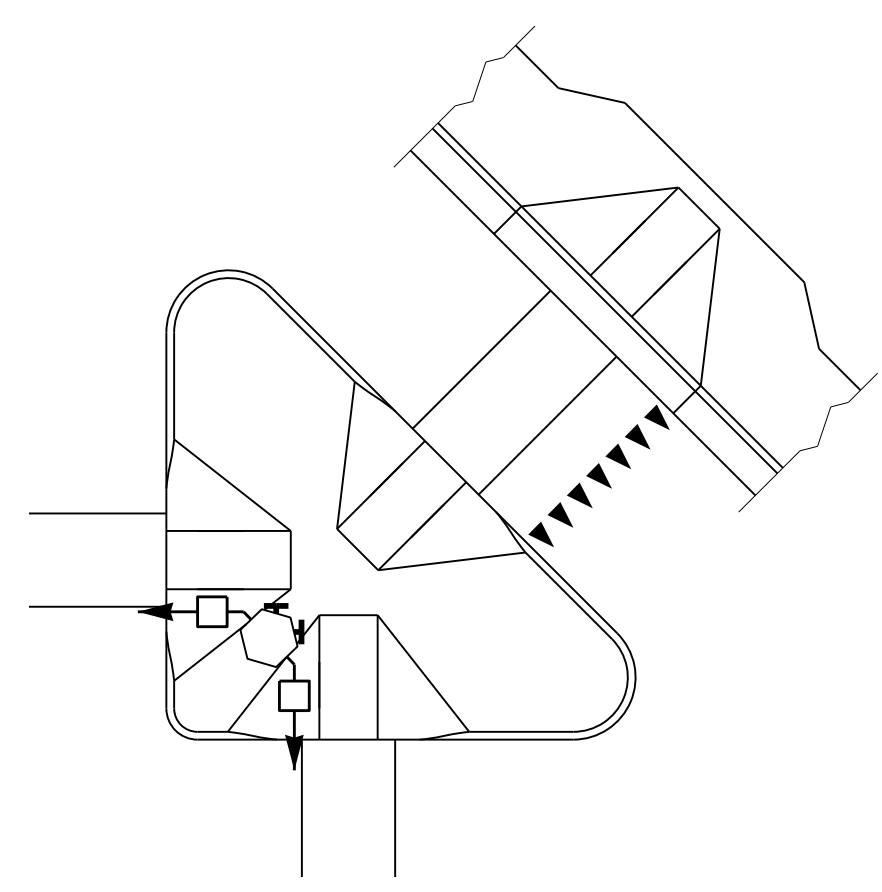


PUSHBUTTON PLACEMENT WITH SHARED TYPE II SIGNAL PEDESTAL AND TYPE I PUSHBUTTON POST

**TRAFFIC ISLAND PUSHBUTTON LOCATIONS**



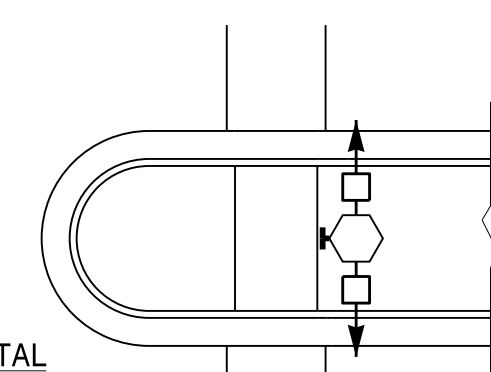
PUSHBUTTON PLACEMENT IN LARGE "PORK CHOP ISLAND" WITH SEPARATE PEDESTALS



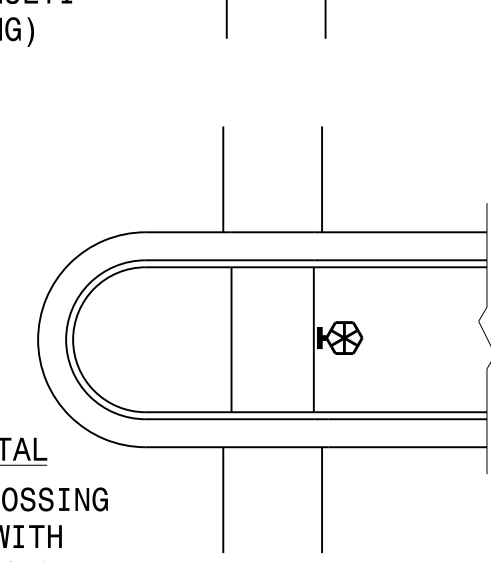
PUSHBUTTON PLACEMENT IN SMALL "PORK CHOP ISLAND" WITH SHARED PEDESTAL

**PUSHBUTTON PLACEMENT IN MEDIAN**

TYPE II PEDESTAL (FOR STAGED OR MULTI-PHASE CROSSING)



TYPE I PEDESTAL (FOR COMPLETE CROSSING CURB TO CURB WITH OPTIONAL REFUGE)



|                 |                          |
|-----------------|--------------------------|
| <b>PROPOSED</b> | <b>LEGEND</b>            |
|                 | Signal Pole              |
|                 | Type I Pushbutton Post   |
|                 | Type II Signal Pedestal  |
|                 | Pushbutton & Sign        |
|                 | Pedestrian Signal Head   |
|                 | Curb Ramp                |
|                 | Pushbutton Location Area |

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