

Project: U-0624

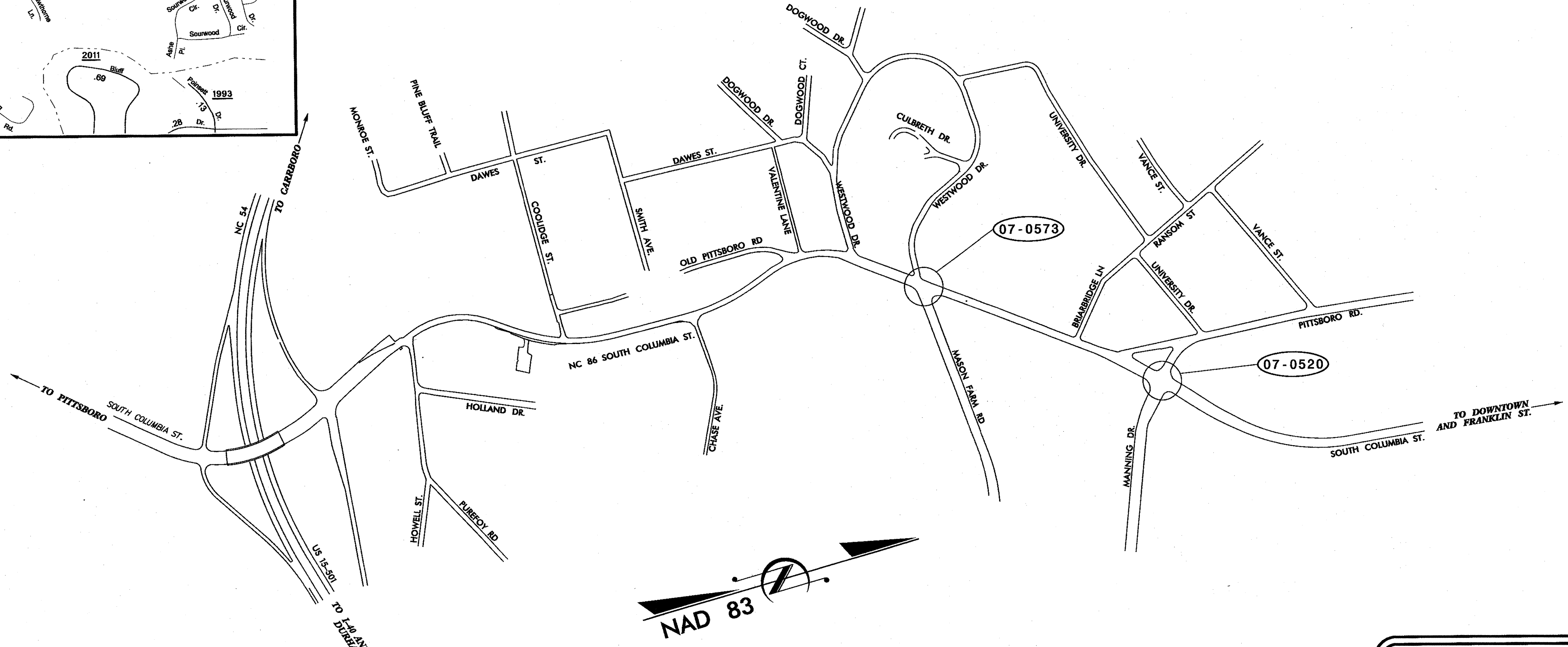
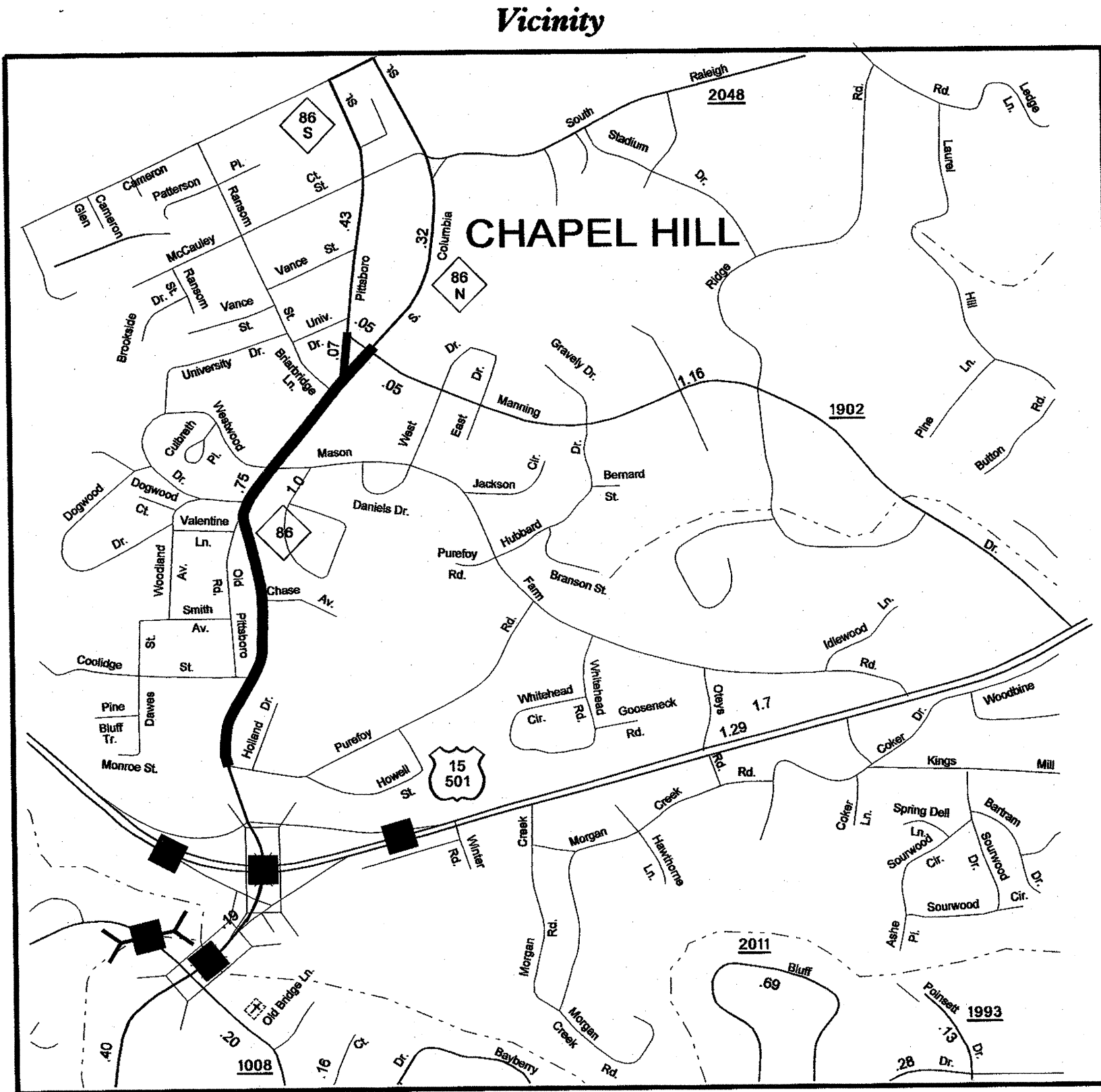
Project: 34762.1.1

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# ORANGE COUNTY

**LOCATION: NC 86 (SOUTH COLUMBIA STREET) FROM  
SR 1906 (PUREFOY ROAD) TO SR 1902 (MANNING DRIVE)  
IN CHAPEL HILL**

**TYPE OF WORK: TRAFFIC SIGNALS AND FIBER OPTIC COMMUNICATIONS SYSTEM**



09-11-2012 17:17 D:\Projects\U0624\Traffic\Signals\Design\Titlesheet\U-0624-sig-tsh.dgn

Refer to "Roadway Standard Drawings NCDOT" dated January, 2012 and "Standard Specifications for Roads and Structures" dated January, 2012.

**Index of Plan Sheets**

Sheet #	SIN	Location/Description
Sig. 1	-	Title Sheet
Sig. 2-15	07-0573	NC 86 (South Columbia St.) @ Mason Farm Rd./Westwood Dr.
Sig. 16-22	07-0520	NC 86 (South Columbia St.) @ NC 86 (S. Pittsboro St.) /SR 1902 (Manning Dr.)
Sig. 23-25	-	Communications Cable & Conduit Routing Plans

**INTELLIGENT TRANSPORTATION SYSTEMS AND SIGNALS UNIT**

Contacts:

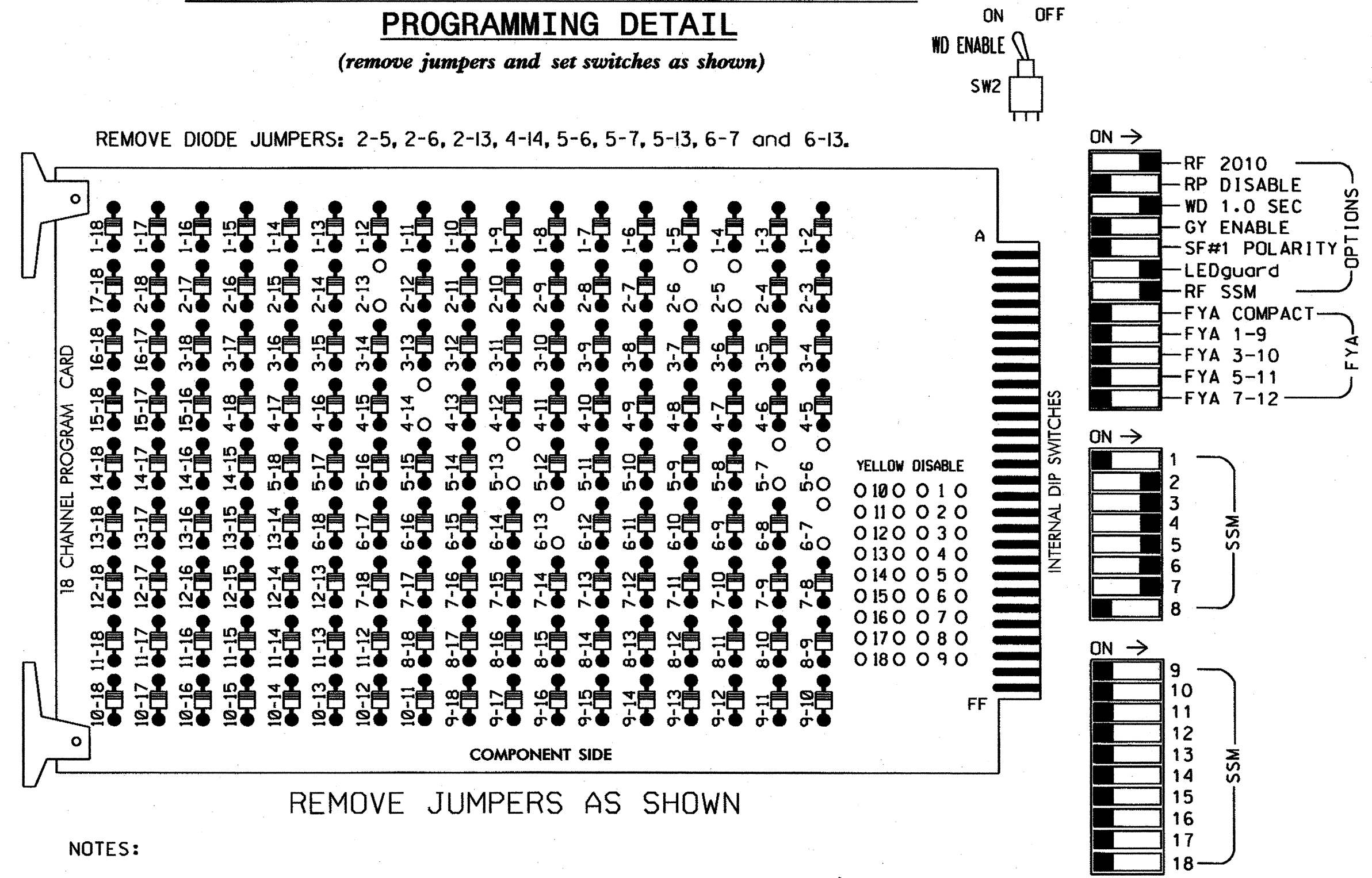
**Robert J. Ziemba, PE - Central Region Signals Project Engineer**  
**John T. Rowe, Jr., PE - Signal Equipment Design Engineer**  
**I. Neil Avery - Signal Communications Project Engineer**

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

750 N. Greenfield Parkway, Garner, NC 27529



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



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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 4 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....POLE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S3,S4,S5,S6,S7,S8,S10.  
 PHASES USED.....1,2,3,4,6,2 PED,4 PED.  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....6  
 OVERLAP "D".....NOT USED  
 OVERLAP "E".....1

**SIGNAL HEAD HOOK-UP CHART**

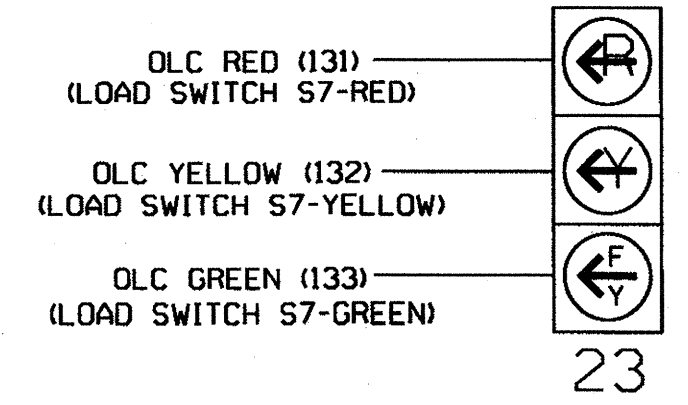
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	OLC	6	6 PED	OLE	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	22	31,32	41	42	P41, P42	23	61,62	NU	32,61
RED		128		116	101	101				134	*	
YELLOW		129		117	102	102				135		
GREEN		130		118	103	103				136		
RED ARROW										131		
YELLOW ARROW				117						132		123
FLASHING YELLOW ARROW										133		
GREEN ARROW			113					104				
				118	103							124
								106				

NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \*See pictorial of head wiring in detail below.  
 NOTE: Load Switch S7 requires output remapping. See sheets 2 of this electrical detail for instructions.

**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

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

**3 SECTION FYA PPLT SIGNAL WIRING DETAIL**  
(wire signal heads as shown)



**INPUT FILE POSITION LAYOUT**  
(front view)

FILE U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1A	∅ 1	∅ 2	∅ 3	∅ 4	S	-O-S	-O-S	-O-S	-O-S	-O-S	-O-S	∅ 2 PED DC ISOLATOR	S	FS DC ISOLATOR
WIRED INPUT	2A	∅ 1	∅ 1B	NOT USED	-O-S	-O-S	-O-S	-O-S	-O-S	-O-S	-O-S	∅ 4 PED DC ISOLATOR	-O-S	DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 \* Wired Input - turn off Channel 2.

**INPUT FILE CONNECTION & PROGRAMMING CHART**

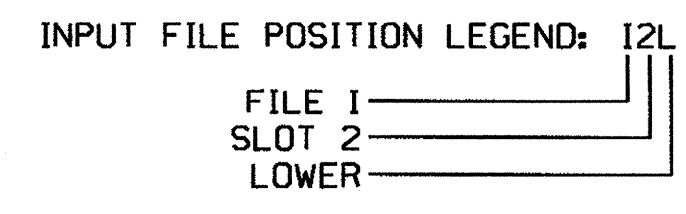
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB21-1,2	11U	56	18	1	1	Y	Y			15
2A	TB21-3,4	12U	39	9	22	6	Y	Y			
2B	TB23-3,4	12L	43	5	12	2	Y	Y			
3A	TB21-5,6	13U	58	20	3	3	Y	Y			3
1B	TB23-5,6	13L	49	11	24	1	Y	Y			15
4A	TB21-7,8	14U	41	3	4	4	Y	Y			3
PED PUSH BUTTONS											
P21,P22	TB22-9,10	112U	67	29	PED 2	2 PED					
P41,P42	TB24-9,10	112L	69	31	PED 4	4 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT 112.  
<sup>1</sup>Add jumper from 11-F to 11-W, on rear of input file.

**LOAD RESISTOR INSTALLATION DETAIL**

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

NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.



**BACKUP PROTECTION NOTE**  
(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Remove phase 6 for 'Backup Protect'.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0573T1  
 DESIGNED: June 2012  
 SEALED: 6-21-12  
 REVISED: N/A

This Electrical Detail supersedes the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 1 OF 2

Electrical and Programming Details For: **NC 86 (S. Columbia Street) at Mason Farm Road/Westwood Drive**

Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 REVIEWED BY: JTR

PREPARED BY: James Peterson REVIEWED BY:

750 N. Greenfield Pkwy, Garner, NC 27529

Seal: JOHN T. ROWE, ENGINEER, SEAL 008453

Signature: John Thow 7-3-12

SIG. INVENTORY NO. 07-0573T1

03-JUL-2012 08:53 SSATTSKUMTCS Signal@workgroups61p ManuPeterson\070973.sm.dwg 20110803.dgn J Peterson

**FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 23**

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS), WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

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

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...0
    
```

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

```

PAGE:1 C1 PIN:32 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 31

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

STEP 2

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...1
    
```

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

```

PAGE:1 C1 PIN:33 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 32

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

STEP 3

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...2
    
```

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

```

PAGE:1 C1 PIN:34 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

**OVERLAP PROGRAMMING DETAIL**

(program controller as shown below)

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

PRESS '+' TWICE

```

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'E' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...7
    
```

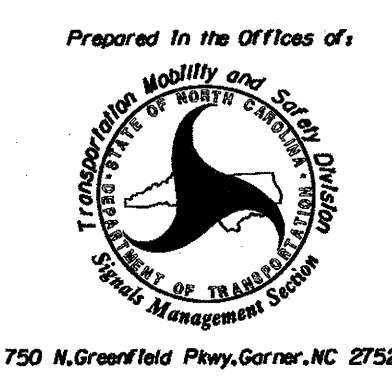
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0573T1  
DESIGNED: June 2012  
SEALED: 6-21-12  
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 2 OF 2

Prepared in the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 86 (S. Columbia Street) at Mason Farm Road/Westwood Drive

Division 7 Orange County Chapel Hill

PLAN DATE: June 2011 REVIEWED BY: JTR

PREPARED BY: James Peterson REVIEWED BY:

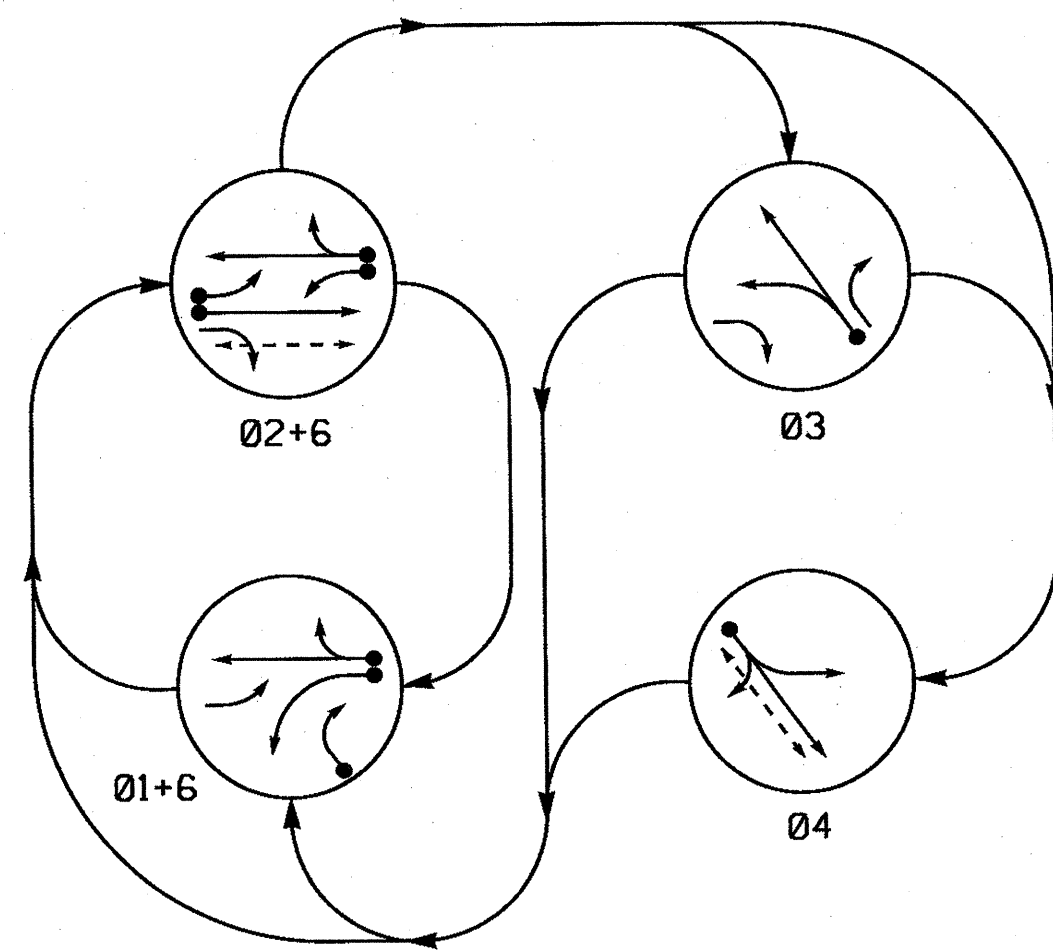
REVISIONS	INIT.	DATE

SEAL  
JOHN T. ROWE, JR.  
ENGINEER  
SEAL 008453

Signature: John T. Rowe, Jr. 7-3-12  
DATE: 7-3-12  
SIG. INVENTORY NO. 07-0573T1

03-JUL-2012 08:34 S:\4175650\115 51\paul\workgroups\sig\mon\jpeterson\070573\_tsm\_ele\_20110803.dgn jpeterson

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 1 + 6	Ø 2 + 6	Ø 3	Ø 4	EWDR
11	—	Y	—	—	—
21	R	G	R	R	Y
22	R	G	R	R	Y
23	Y	Y	—	—	—
31	R	R	G	R	R
32	R	R	G	R	R
41	R	R	R	G	R
42	R	R	R	G	R
61, 62	G	G	R	R	Y
P21, P22	DW	W	DW	DW	DRK
P41, P42	DW	DW	DW	W	DRK

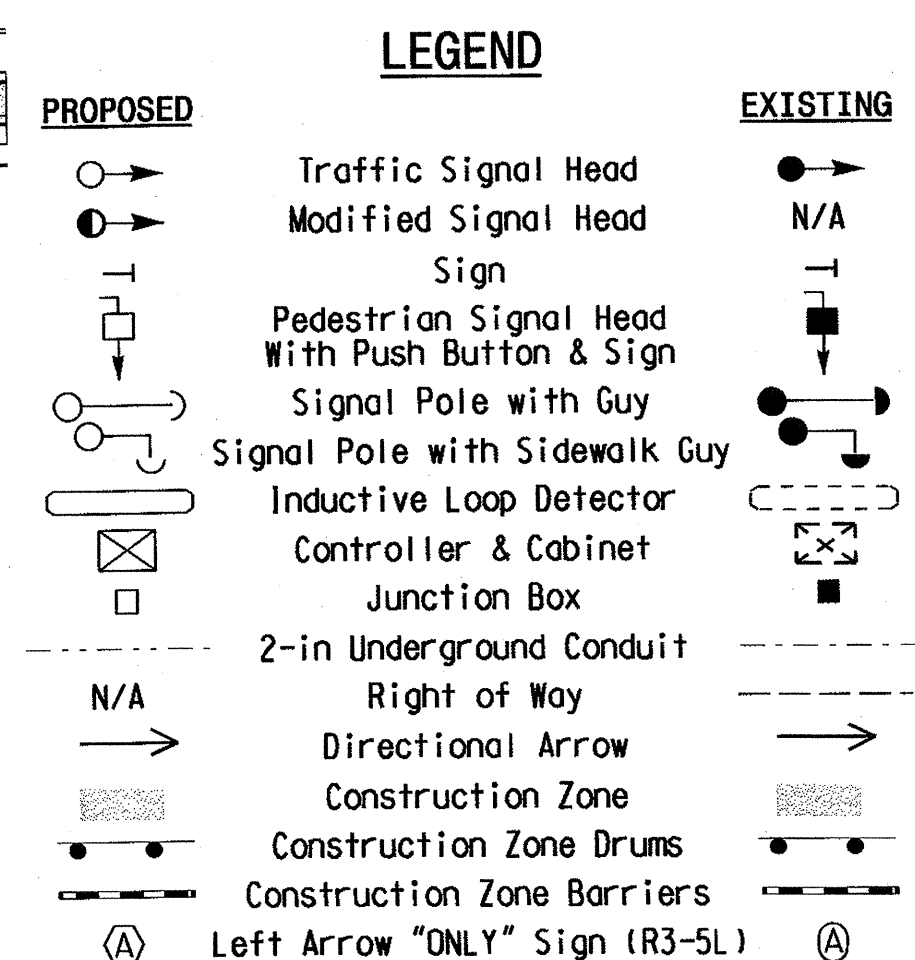
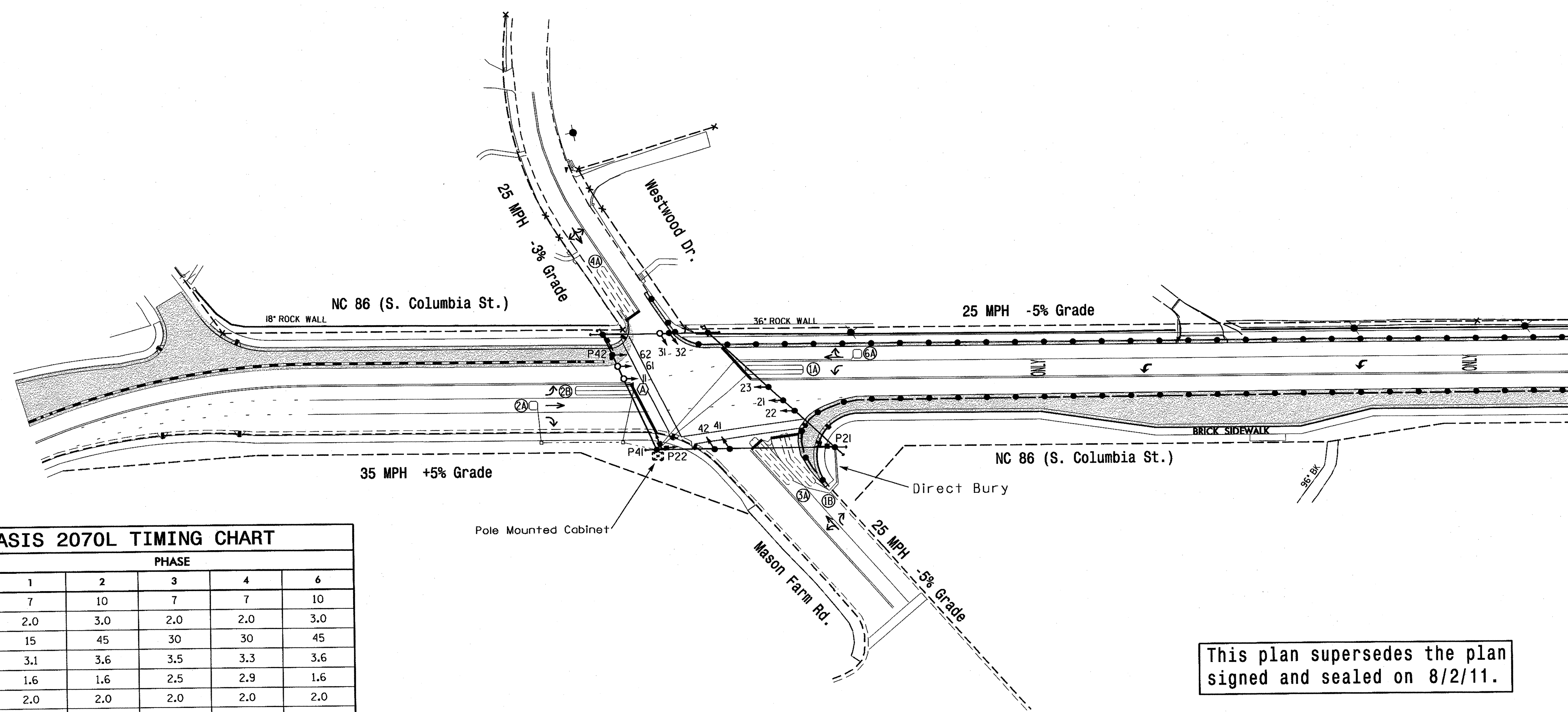
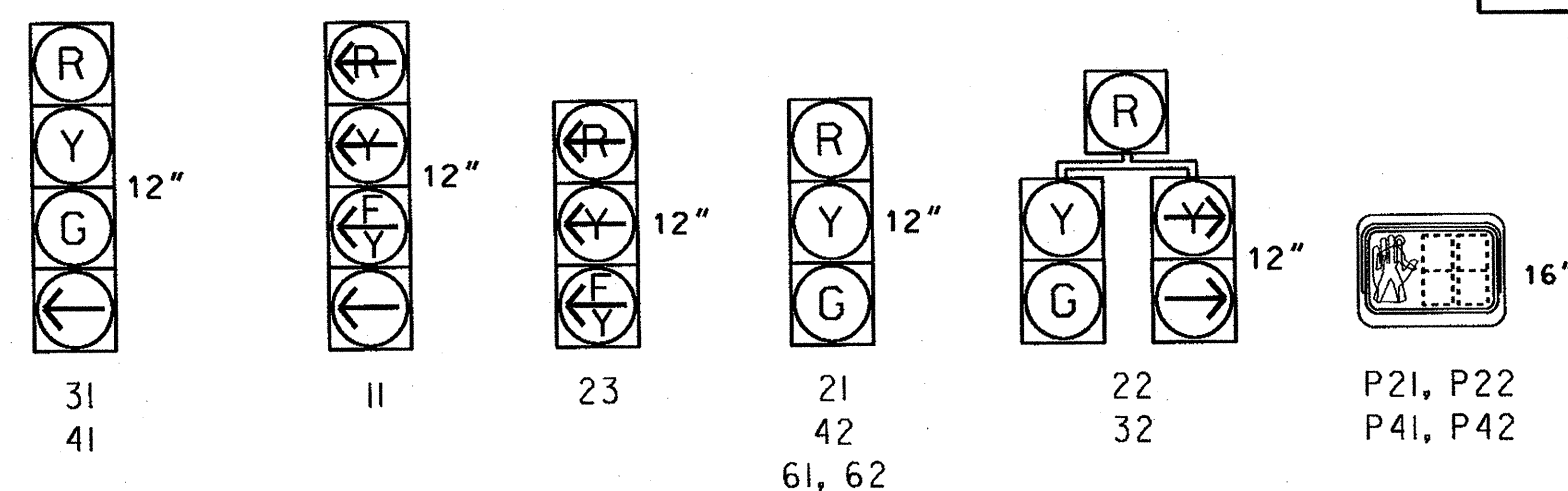
Y = Flashing Yellow Arrow

2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	—	15	—	—
1B	6X40	+3	2-4-2	—	1	Y	Y	—	15	—	—
2A	6X6	70	3	Y	2	Y	Y	—	—	—	—
2B	6X40	0	2-4-2	Y	2	Y	Y	—	—	—	—
3A	6X40	+5	2-4-2	—	3	Y	Y	—	3	—	—
4A	6X40	0	2-4-2	—	4	Y	Y	—	10	—	—
6A	6X6	70	4	Y	6	Y	Y	—	—	—	Y

SIGNAL FACE I.D.

All Heads L.E.D.



This plan supersedes the plan signed and sealed on 8/2/11.

OASIS 2070L TIMING CHART

FEATURE	PHASE				
	1	2	3	4	6
Min Green 1 *	7	10	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	3.0
Max Green 1 *	15	45	30	30	45
Yellow Clearance	3.1	3.6	3.5	3.3	3.6
Red Clearance	1.6	1.6	2.5	2.9	1.6
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	—	4	—	4	—
Don't Walk 1	—	23	—	18	—
Seconds Per Actuation *	—	—	—	—	—
Max Variable Initial *	—	—	—	—	—
Time Before Reduction *	—	—	—	—	—
Time To Reduce *	—	—	—	—	—
Minimum Gap	—	—	—	—	—
Recall Mode	—	MIN RECALL	—	—	MIN RECALL
Vehicle Call Memory	—	YELLOW	—	—	YELLOW
Dual Entry	—	—	—	—	—
Simultaneous Gap	ON	ON	ON	ON	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.

- 4 Phase Fully Actuated (Chapel Hill - Carrboro Signal System)
- 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 may be lagged.
  - The order of phase 3 and phase 4 may be reversed.
  - Reposition existing signal heads as shown.
  - Remove existing No Left Turn (R3-2) and No Right Turn (R3-1) signs.
  - 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.
  - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

Signal Upgrade - Temporary Design 2 (TMP Phase II)

Prepared in the Offices of: **TRANSPORTATION MOBILITY AND SAFETY DIVISION**  
**ORANGE COUNTY**  
**CHapel Hill**

NC 86 (S. Columbia Street) at Mason Farm Road/ Westwood Drive

Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 REVIEWED BY: R. Hough

PREPARED BY: R. Hough REVIEWED BY:

SCALE: 1"=50'

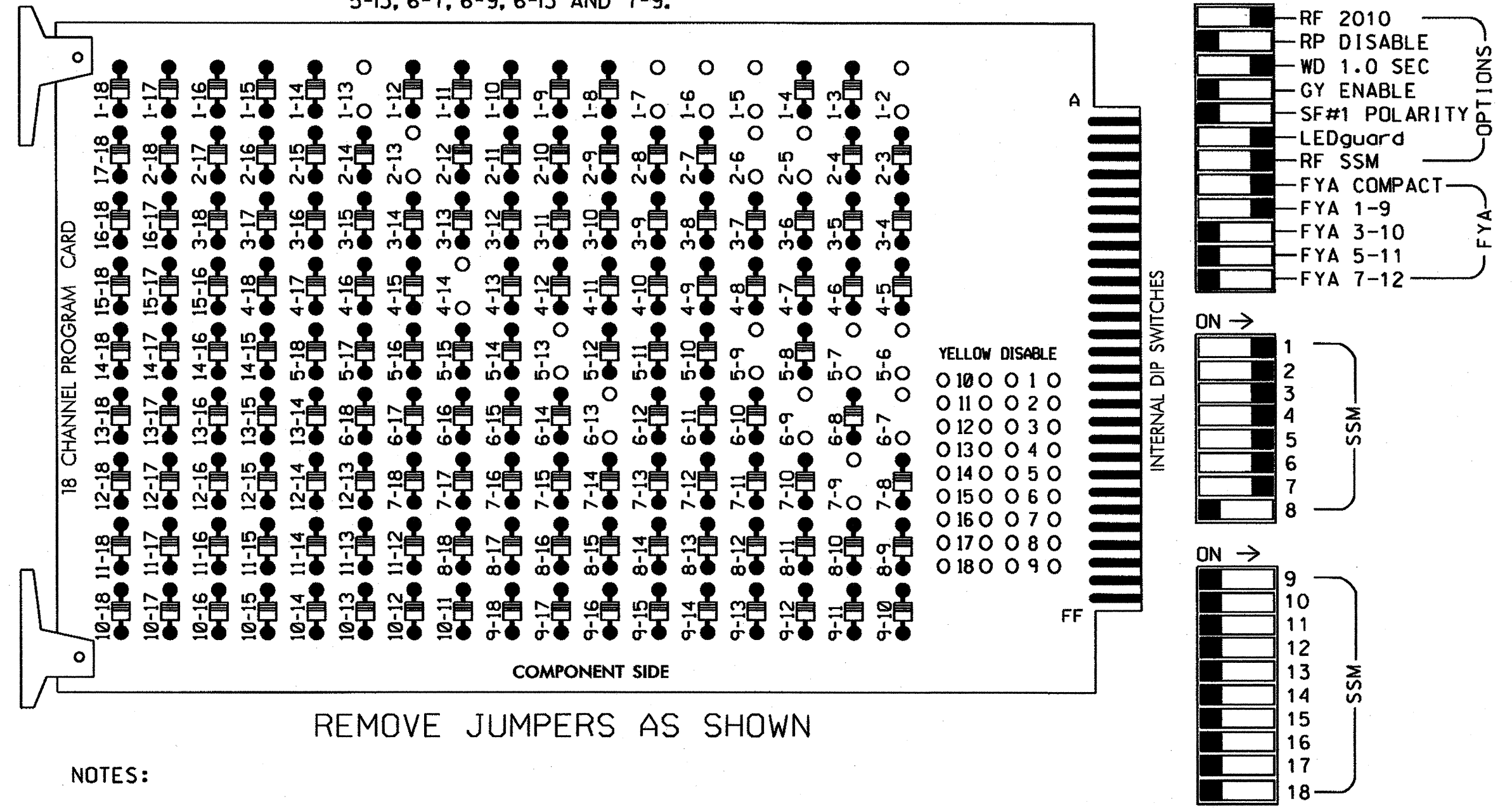
SIGNATURE: [Signature] DATE: [Date]

SIG. INVENTORY NO. 07-0573

09-JUL-2012 18:03 0:MT:PP:Projects:U0024:MT:off:11:045:1:04:05:13:07:03:312:as:1:0:den:20:20621:00

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

REMOVE DIODE JUMPERS: 1-2, 1-5, 1-6, 1-7, 1-13, 2-5, 2-6, 2-13, 4-14, 5-6, 5-7, 5-9, 5-13, 6-7, 6-9, 6-13 AND 7-9.



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.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 4 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....POLE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S10.  
 PHASES USED.....1,2,3,4,6,2 PED,4 PED.  
 OVERLAP "A".....1+2+6  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....6  
 OVERLAP "D".....NOT USED  
 OVERLAP "E".....1

**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

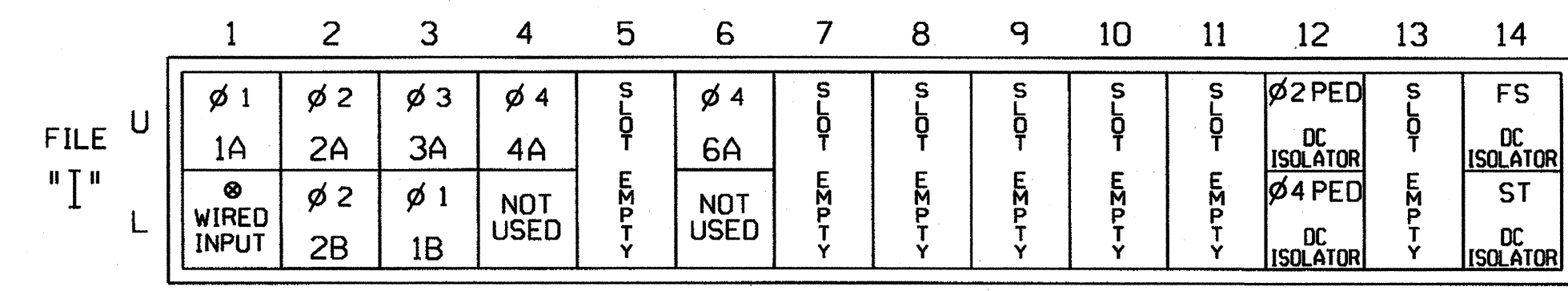
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12				
CMU CHANNEL NO.	1	2	9	13	3	4	14	5	6	15	7	8	16			
PHASE	OLA	2	1 GRN	2 PED	3	4	4 PED	6	6 PED	OLE	8	8 PED				
SIGNAL HEAD NO.	11	21,22	11	P21, P22	22	31	32	41	42	P41, P42	23	61,62	NU	32	NU	NU
RED		128			116	116	101	101				134	*			
YELLOW		129			117	117	102	102				135				
GREEN		130			118	118	103	103				136				
RED ARROW	125											131				
YELLOW ARROW	126				117							132			123	
FLASHING YELLOW ARROW	127											133				
GREEN ARROW					113				104							
					114			118	118	103						124
												106				

NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail below.  
 NOTE: Load Switches S1, S3, S7 require output remapping. See sheets 3 and 4 of this electrical detail for instructions.

**INPUT FILE POSITION LAYOUT**  
(front view)

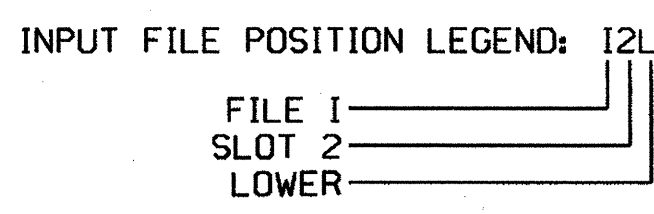


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 \* Wired Input - turn off Channel 2.

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB21-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB21-3,4	I2U	39	9	22	6	Y	Y			
2B	TB23-3,4	I2L	43	5	2	2	Y	Y			
3A	TB21-5,6	I3U	58	20	3	3	Y	Y			3
1B	TB23-5,6	I3L	49	11	24	1	Y	Y			15
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2 PED					
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					

<sup>1</sup>Add jumper from I1-F to I1-W. on rear of input file.



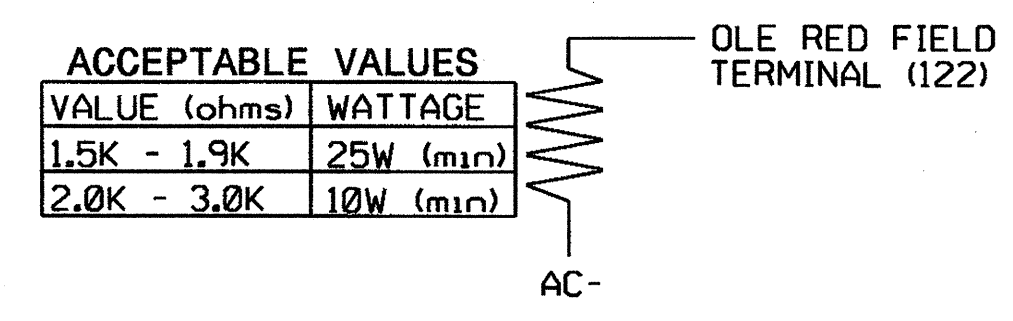
**PED YELLOW CONFLICT MONITOR WIRING DETAIL**  
(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode on the 2018ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to chan. 9 green (monitor pin 13).

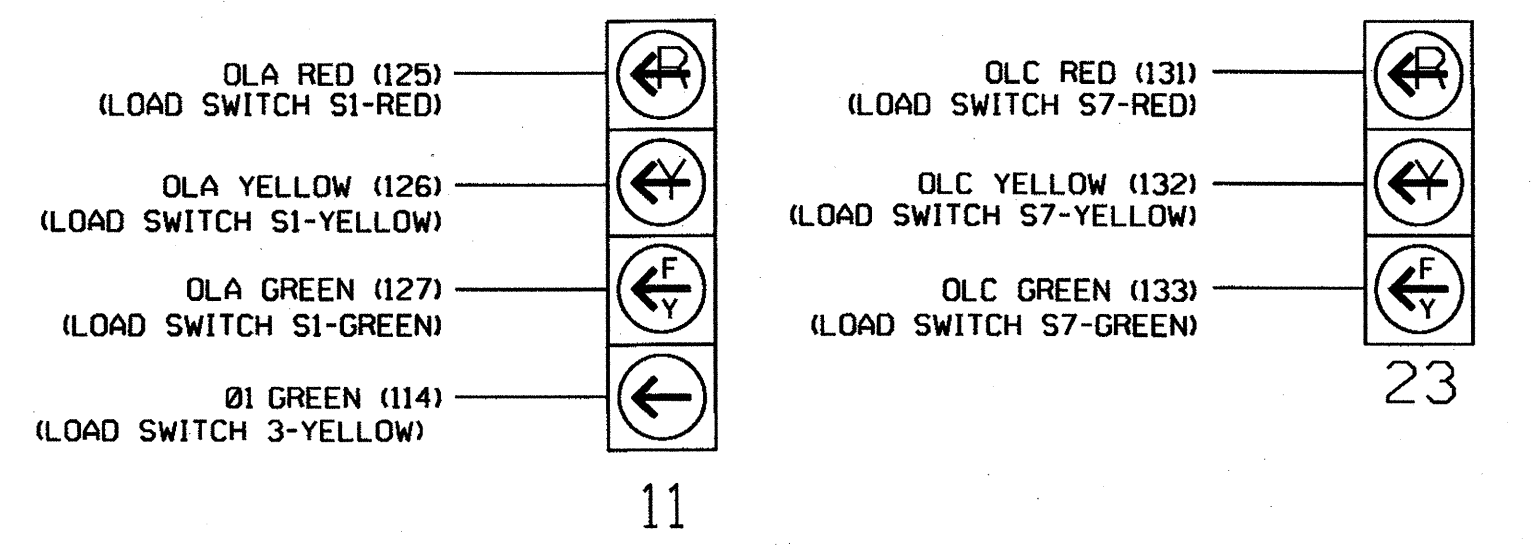
- Follow the instructions below to make the appropriate connections:
- STEP 1: Fold down rear panel of output file.
  - STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).
  - STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:  
 CMU-13 \_\_\_\_\_ 2PY (term. 114)

NOTE: Some cabinet manufacturers use a molex plug to accomplish this wiring configuration. If connectors are used, simply plug the two connectors together that are labeled with the pin-out as shown above.

**LOAD RESISTOR INSTALLATION DETAIL**



**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**  
(wire signal heads as shown)



NOTE  
 1. The sequence display for this signal requires special logic. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0573T2  
 DESIGNED: June 2012  
 SEALED: 6-21-12  
 REVISED: N/A

This Electrical Detail supersedes the detail sealed on 8/03/11.

**ELECTRICAL DETAIL SHEET 1 OF 4**

Electrical and Programming Details For: **NC 86 (S. Columbia Street) at Mason Farm Road/Westwood Drive**

Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 REVIEWED BY: JTK

PREPARED BY: James Peterson REVIEWED BY:

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, P.E.

750 N. Greenfield Pkwy, Corner, NC 27529

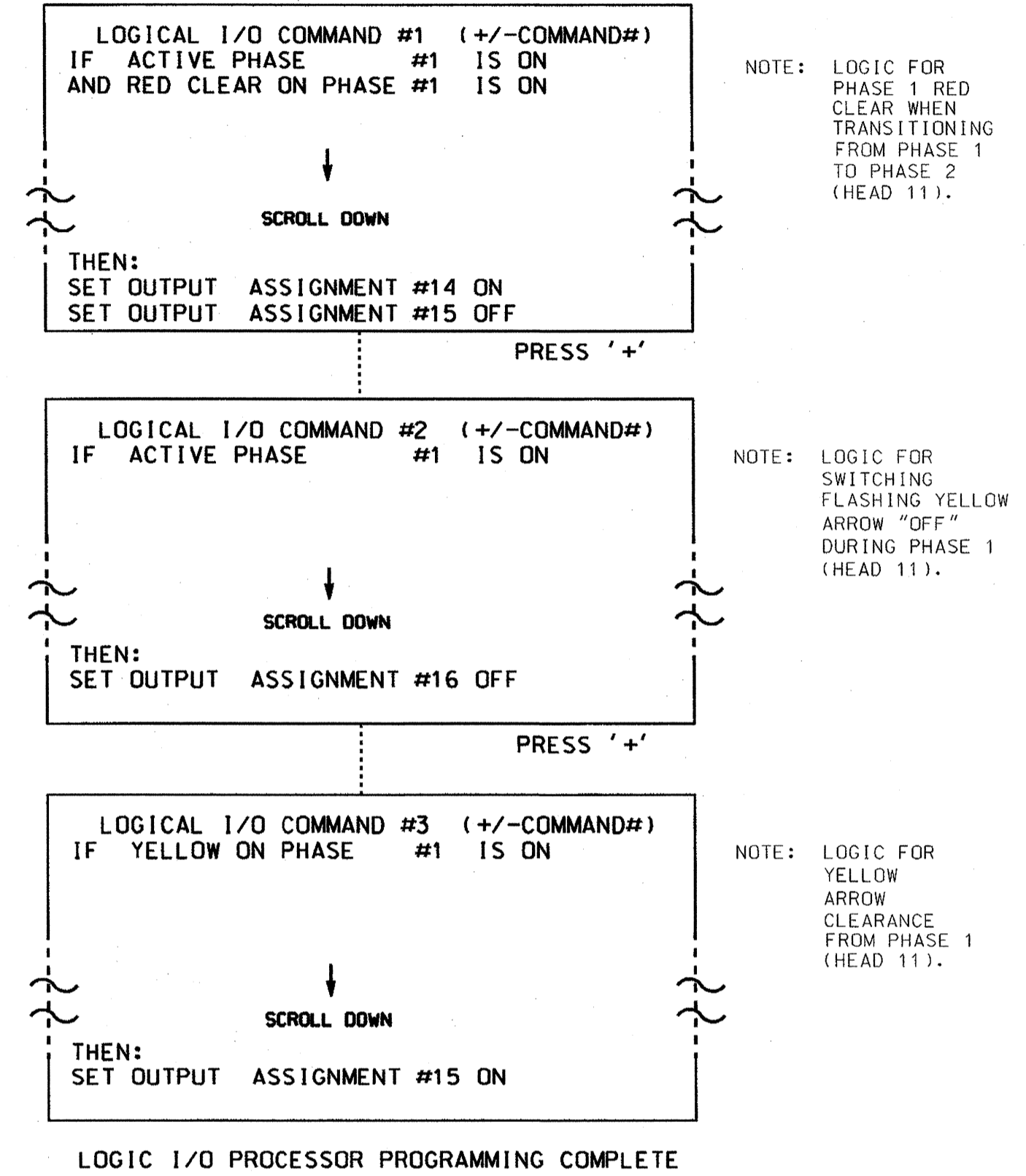
Signature: John T. Rowe 7-3-12 DATE

SIG. INVENTORY NO. 07-0573T2

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

(program controller as shown below)

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



**OUTPUT REFERENCE SCHEDULE**

OUTPUT 14 = Overlap A Red
OUTPUT 15 = Overlap A Yellow
OUTPUT 16 = Overlap A Green
OUTPUT 33 = 2 Ped Yellow

**OVERLAP PROGRAMMING DETAIL**  
(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: XX X  
VEH OVL NOT VEH: :  
VEH OVL NOT PED: :  
VEH OVL GRN EXT: :  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: X  
VEH OVL NOT VEH: :  
VEH OVL NOT PED: :  
VEH OVL GRN EXT: :  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'E' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: X  
VEH OVL NOT VEH: :  
VEH OVL NOT PED: :  
VEH OVL GRN EXT: :  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW - GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...N  
GREEN EXTENSION (0-255 SEC)...0.0  
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0  
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)...7

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-0573T2  
DESIGNED: June 2012  
SEALED: 6-21-12  
REVISED: N/A

This Electrical Detail supersedes  
the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 2 OF 4

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 86 (S. Columbia Street) at Mason Farm Road/ Westwood Drive Chapel Hill		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR. DATE 2-3-12
	Prepared in the Offices of:		Division 7 Orange County		
	PLAN DATE: June 2012	REVIEWED BY: JTR	PREPARED BY: James Peterson		
	REVISIONS	INIT.	DATE	SIGNATURE	

750 N. Greenfield Pkwy, Coroner, NC 27529

SIG. INVENTORY NO. 07-0573T2

05-JUL-2012 08:51  
C:\Users\jpeterson\Documents\0573\_sml.ele\_20110803.cgm  
J.PETERSON

# FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 11

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN  
'1' (OUTPUT ASSIGNMENTS),  
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

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

STEP 1

```

PAGE:1 C1 PIN:16 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

ENTER A "Y" FOR VEHICLE OVERLAP.

```

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

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

```

PAGE:1 C1 PIN:16 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 15

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

STEP 2

```

PAGE:1 C1 PIN:17 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:17 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN)...1
    
```

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

```

PAGE:1 C1 PIN:17 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 16

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

STEP 3

```

PAGE:1 C1 PIN:18 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:18 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN)...2
    
```

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

```

PAGE:1 C1 PIN:18 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" UNTIL OUTPUT 33  
IS REACHED.

STEP 4

```

PAGE:1 C1 PIN:35 NOT ENABLED
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT. THIS  
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE PHASE.

```

PAGE:1 C1 PIN:35 NOT ENABLED
SELECT VEHICLE PHASE (1-16).....1
SELECT COLOR(0=RED,1=YEL,2=GRN)...2
    
```

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

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

```

PAGE:1 C1 PIN:35 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

OUTPUT PROGRAMMING FOR HEAD 11 COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-0573T2  
DESIGNED: June 2012  
SEALED: 6-21-12  
REVISED: N/A

This Electrical Detail supersedes  
the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 3 OF 4

Prepared In the Office of:  
**TRANSPORTATION MOBILITY AND SAFETY DIVISION**  
STATE OF NORTH CAROLINA  
Signal Management Section  
750 N. Greenfield Pkwy, Garner, NC 27529

NC 86 (S. Columbia Street)  
at  
Mason Farm Road/  
Westwood Drive

Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 REVIEWED BY: JTR

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL  
NORTH CAROLINA  
PROFESSIONAL  
ENGINEER  
SEAL  
008453  
JOHN T. ROWE, JR.  
SIGNATURE DATE 7-3-12  
SIG. INVENTORY NO. 07-0573T2

03-JUL-2012 08:31  
115 SIG.Mgr\jtr\peterson\0573\_sml.ele\_20110803.dgn



## FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 23

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN  
'1' (OUTPUT ASSIGNMENTS),  
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

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

STEP 1

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN)....0
    
```

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

```

PAGE:1 C1 PIN:32 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 31

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

STEP 2

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN)....1
    
```

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

```

PAGE:1 C1 PIN:33 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 32

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

STEP 3

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN)....2
    
```

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

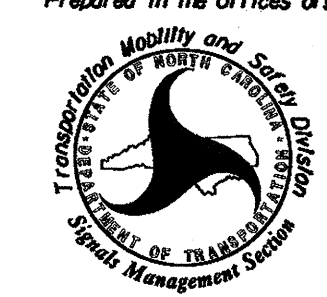
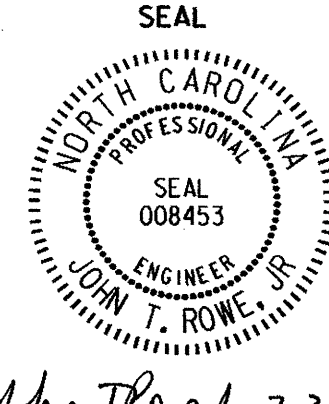
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PAGE:1 C1 PIN:34 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-0573T2  
DESIGNED: June 2012  
SEALED: 6-21-12  
REVISED: N/A

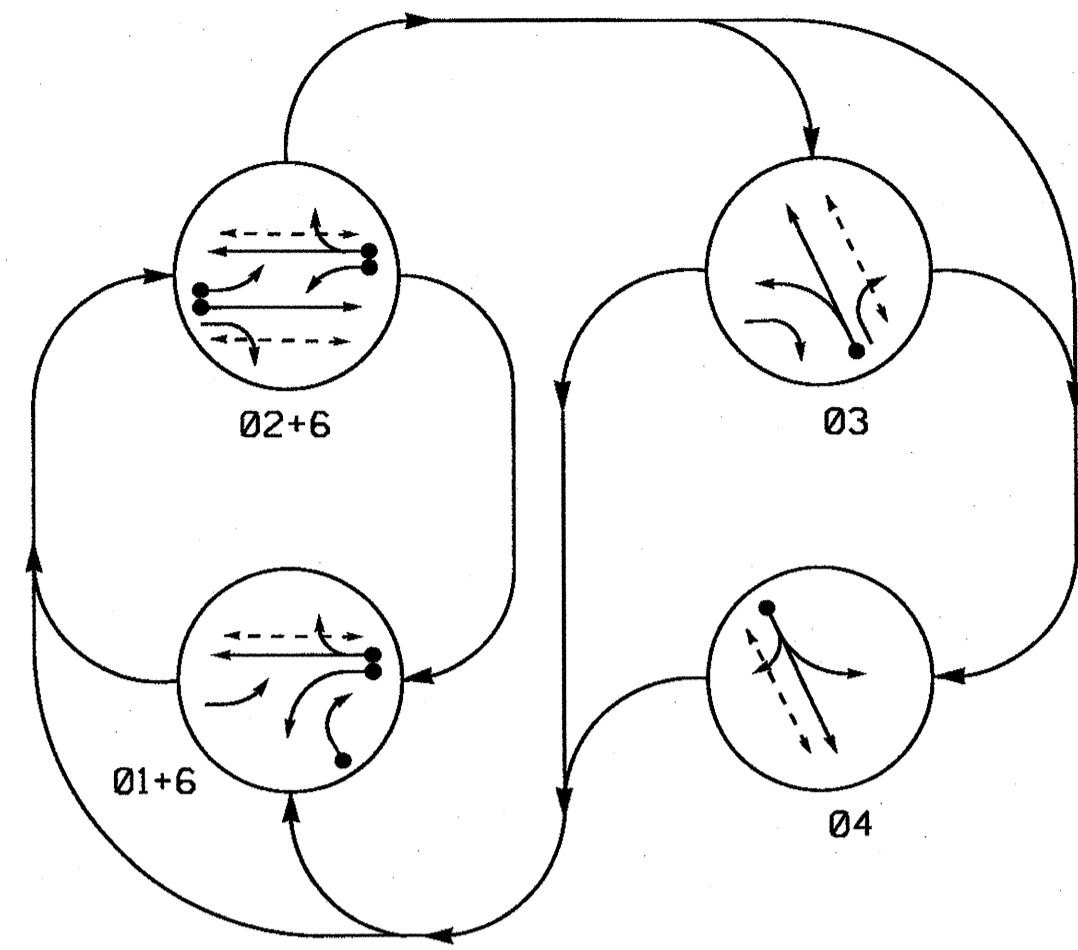
This Electrical Detail supersedes  
the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 4 OF 4

 <p style="font-size: 8px;">750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p><b>NC 86 (S. Columbia Street)</b> at <b>Mason Farm Road/ Westwood Drive</b></p>	<p>SEAL</p> 									
	<p>Division 7 Orange County Chapel Hill</p> <p>PLAN DATE: June 2012 REVIEWED BY: JTR</p> <p>PREPARED BY: James Peterson REVIEWED BY:</p>		<p>7-3-12</p> <p>SIGNATURE DATE</p>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">REVISIONS</th> <th style="width: 10%;">INIT.</th> <th style="width: 10%;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			REVISIONS	INIT.	DATE						
REVISIONS	INIT.	DATE									
<p>SIG. INVENTORY NO. 07-0573T2</p>											

05-111-2012, 08:32  
S:\111\2012\111\SIGNAL\aworking\pous4519\_mon@peterson070573\_tsmc.ele\_20110803.dgn  
Peterson

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

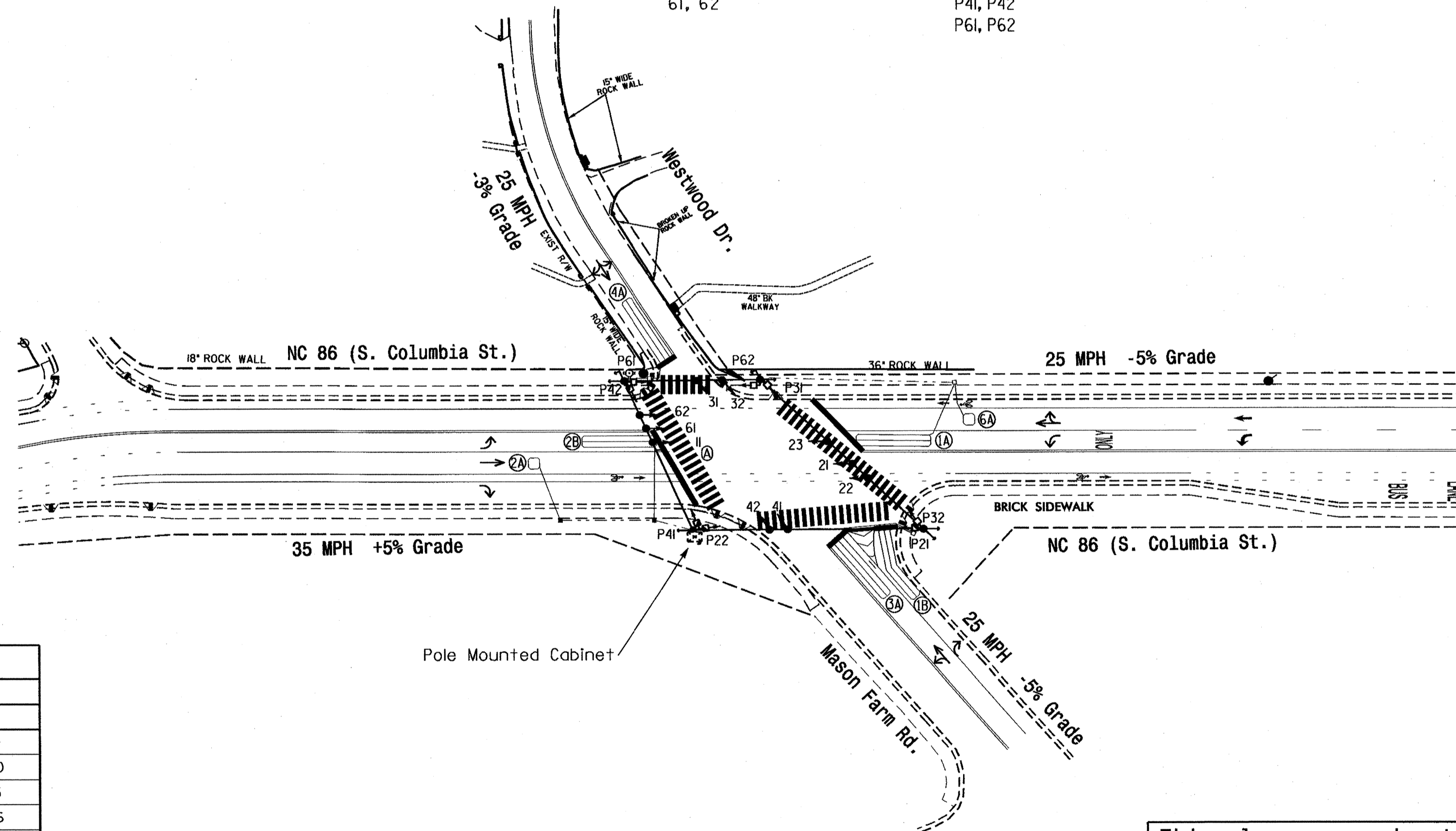
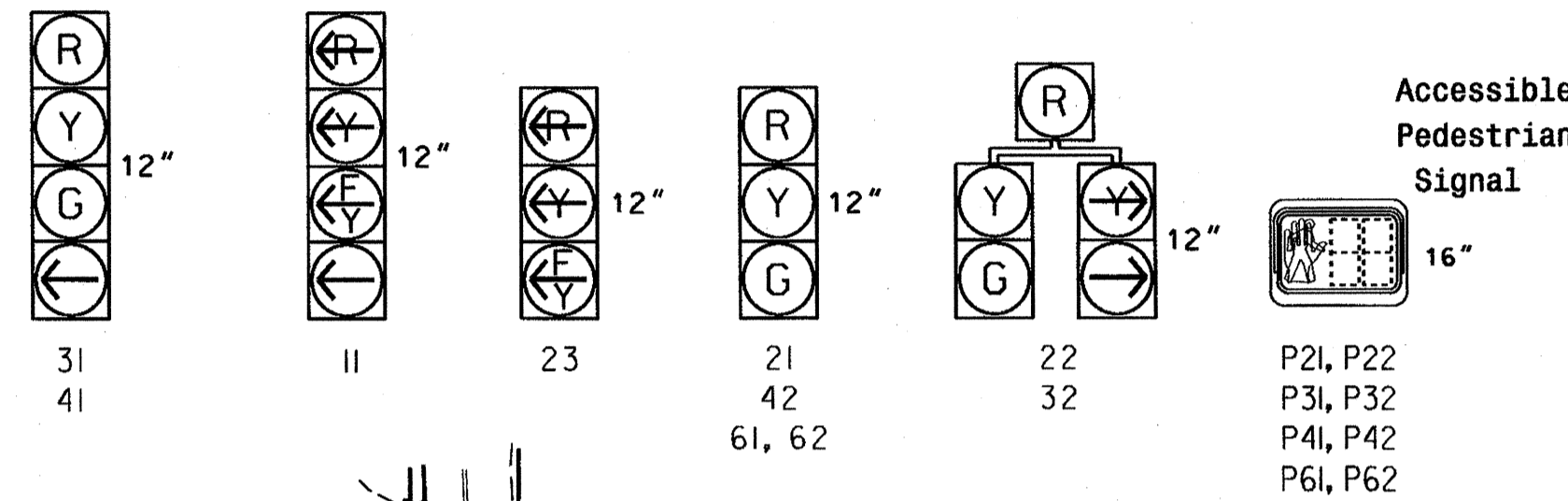
SIGNAL FACE	PHASE				FLASH
	01+6	02+6	03	04	
11		F	R	R	Y
21	R	G	R	R	Y
22	R	G	R	R	Y
23	F	F	R	R	Y
31	R	R	G	R	R
32	R	R	G	R	R
41	R	R	R	G	R
42	R	R	R	G	R
61, 62	G	G	R	R	Y
P21, P22	DW	W	DW	DRK	DRK
P31, P32	DW	DW	W	DRK	DRK
P41, P42	DW	DW	DW	W	DRK
P61, P62	W	W	DW	DW	DRK

F = Flashing Yellow Arrow

2070L LOOP & DETECTOR INSTALLATION												
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
2A	6X6	70	3	Y	2	Y	Y	-	-	-	-	-
2B	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	3	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	10	-	-
6A	6X6	70	3	Y	6	Y	Y	-	-	-	-	-

**SIGNAL FACE I.D.**

All Heads L.E.D.



PROPOSED	EXISTING
○ Traffic Signal Head	● N/A
○ Modified Signal Head	○ N/A
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ N/A
⊥ Modified Pedestrian 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	--- Right of Way
→ Directional Arrow	→ Directional Arrow
⊙ Left Arrow "ONLY" Sign (R3-5L)	⊙ Left Arrow "ONLY" Sign (R3-5L)

OASIS 2070L TIMING CHART					
FEATURE	PHASE				
	1	2	3	4	6
Min Green 1 *	7	10	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	3.0
Max Green 1 *	15	45	30	30	45
Yellow Clearance	3.1	3.6	3.5	3.3	3.6
Red Clearance	1.8	23	2.9	3.0	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	4	4	4	4
Don't Walk 1	-	21	23	18	7
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	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.

This plan supersedes the plan signed and sealed on 8/2/11.

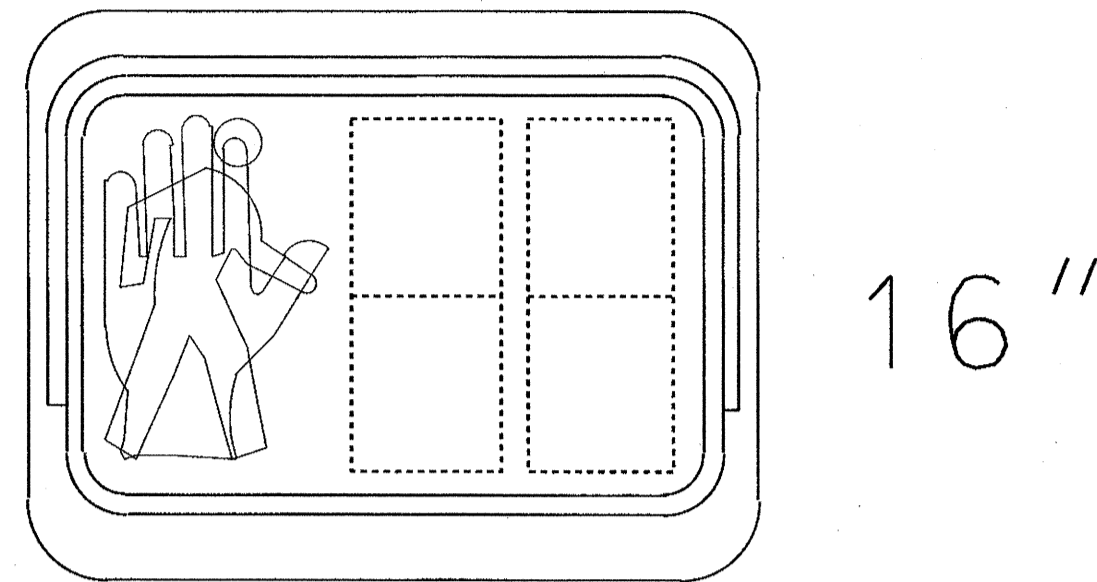
Signal Upgrade - Final Design (Sheet 1 of 2)

	<p>NC 86 (S. Columbia Street) at Mason Farm Road/ Westwood Drive</p>		<p>Division 7 Orange County Chapel Hill</p>
	<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>PREPARED BY: R. Hough</p>	
<p>SCALE: 1" = 50'</p>	<p>REVISIONS:</p>	<p>INIT. DATE:</p>	<p>DATE:</p>

21-JUN-2012 18:19  
 D:\IT\Projects\U-0624\Traffic\061\061.dwg  
 21-JUN-2012 18:19  
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 21-JUN-2012 18:19  
 D:\IT\Projects\U-0624\Traffic\061\061.dwg

# Accessible Pedestrian Signal

\*Volume should be set to 5 dB over the ambient noise level

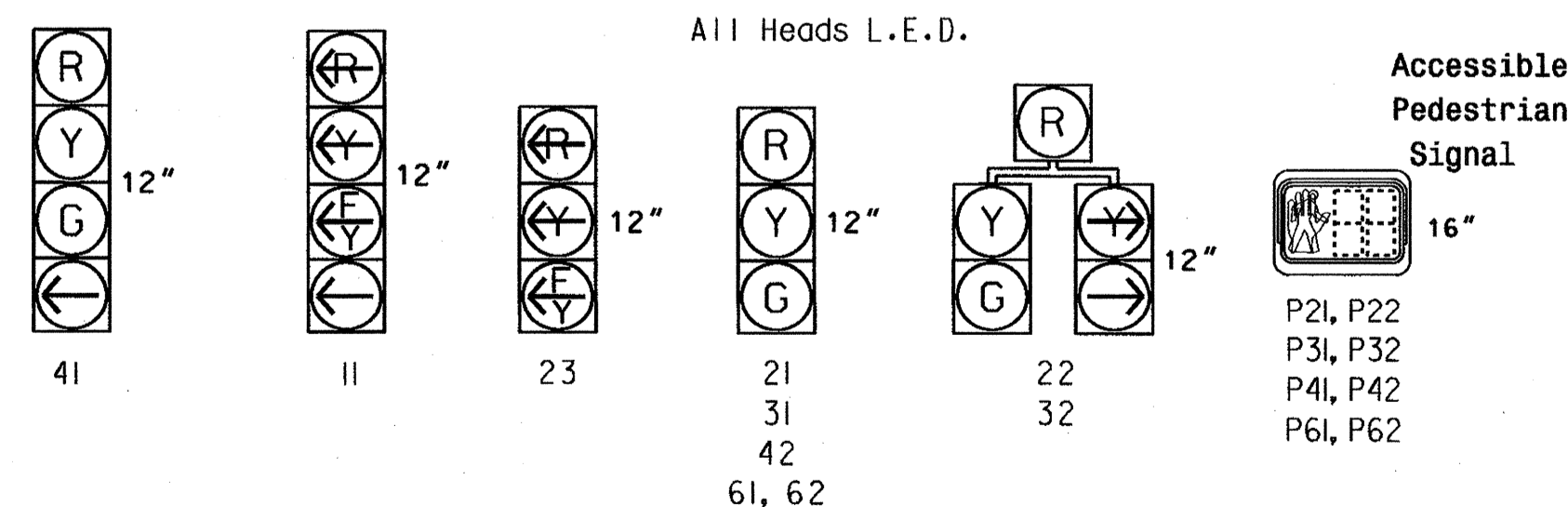


## NOTES

1. Refer to "Roadway Standard Drawings NCDDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Signal P21, P22, P31, P32, P41, P42, P61 and P62 are accessible pedestrian signal heads.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION		
SIGNAL FACE	INTERVAL	SPEECH MESSAGE
P21, P22	Walk	Mason Farm. Walk sign is on to cross Mason Farm.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Mason Farm.
P31, P32	Walk	Columbia. Walk sign is on to cross Columbia.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Columbia.
P41, P42	Walk	Columbia. Walk sign is on to cross Columbia.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Columbia.
P61, P62	Walk	Westwood. Walk sign is on to cross Westwood.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Westwood.

### SIGNAL FACE I.D.



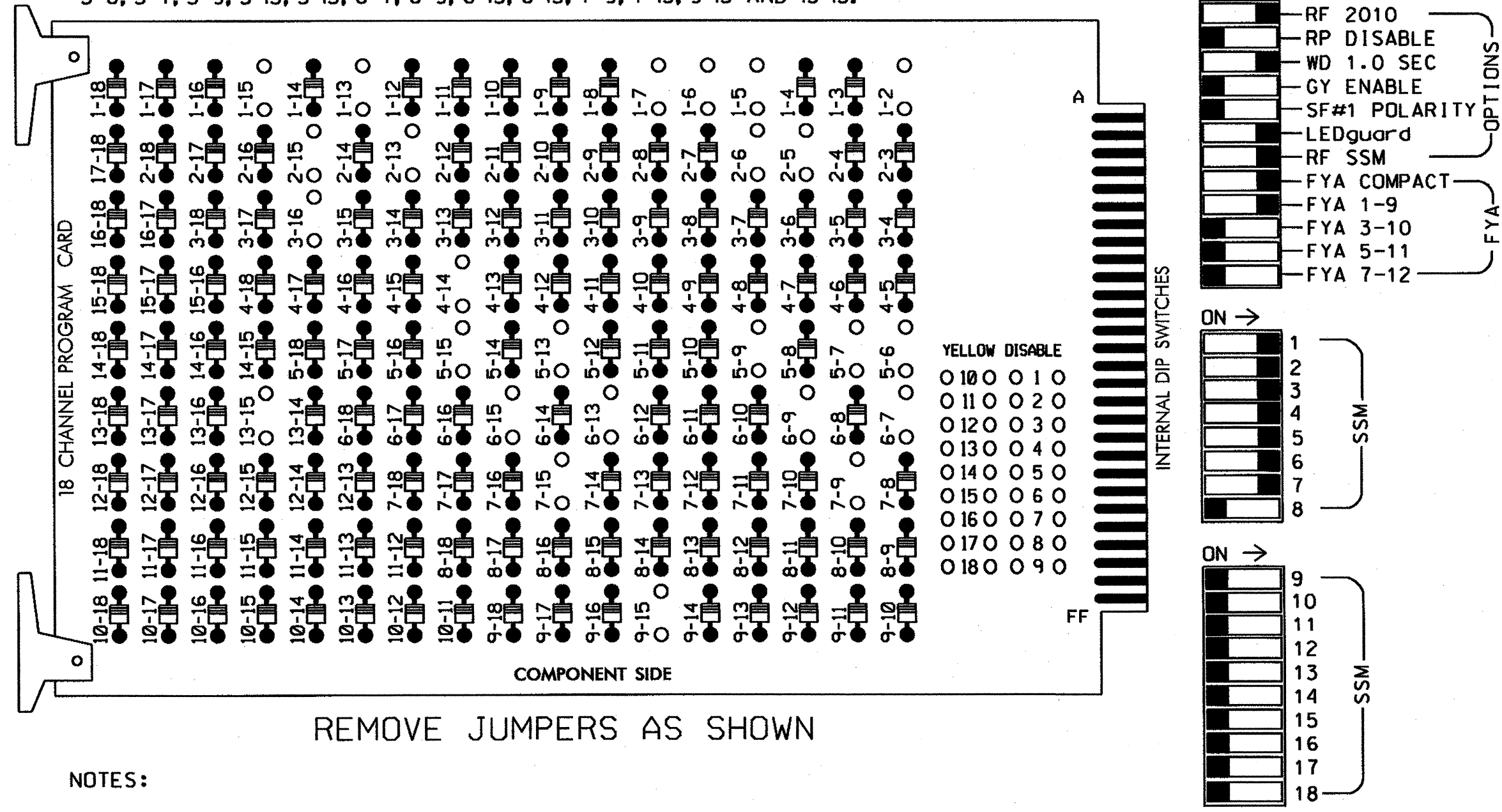
This plan supersedes the plan signed and sealed on 8/2/11.

Signal Upgrade - Final Design (Sheet 2 of 2)

	NC 86 (S. Columbia Street) at Mason Farm Road/ Westwood Drive		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIEGLER 8/2/12
	Division 7 Orange County Chapel Hill PLAN DATE: June 2012 REVIEWED BY: PREPARED BY: R. Hough REVIEWED BY:	REVISIONS INIT. DATE	
SCALE 0 NA NA	SIG. INVENTORY NO. 07-0573		

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

REMOVE DIODE JUMPERS: 1-2, 1-5, 1-6, 1-7, 1-13, 1-15, 2-5, 2-6, 2-13, 2-15, 3-16, 4-14, 5-6, 5-7, 5-9, 5-13, 5-15, 6-7, 6-9, 6-13, 6-15, 7-9, 7-15, 9-15 AND 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 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.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2, 4, 6 and 3 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....POLE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S12.  
 PHASES USED.....1,2,3,4,6,2 PED,4 PED,6 PED,3 PED.  
 OVERLAP "A".....1+2+6  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....6  
 OVERLAP "D".....NOT USED  
 OVERLAP "E".....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.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12				
CMU CHANNEL NO.	1	2	9	13	3	4	14	5	6	15	7	8	16			
PHASE	OLA	2	1 GRN	2 PED	3	4	4 PED	OLC	6	6 PED	OLE	8	3 PED			
SIGNAL HEAD NO.	11	21,22	11	P21, P22	22	31	32	41	42	P41, P42	23	61,62	P61, P62	32	NU	P31, P32
RED		128			116	116	101	101				134	*			
YELLOW		129			117	117	102	102				135				
GREEN		130			118	118	103	103				136				
RED ARROW	125											131				
YELLOW ARROW	126				117							132		123		
FLASHING YELLOW ARROW	127											133				
GREEN ARROW					114	118	118	103				124				
					115							106		124		112

NU = Not Used

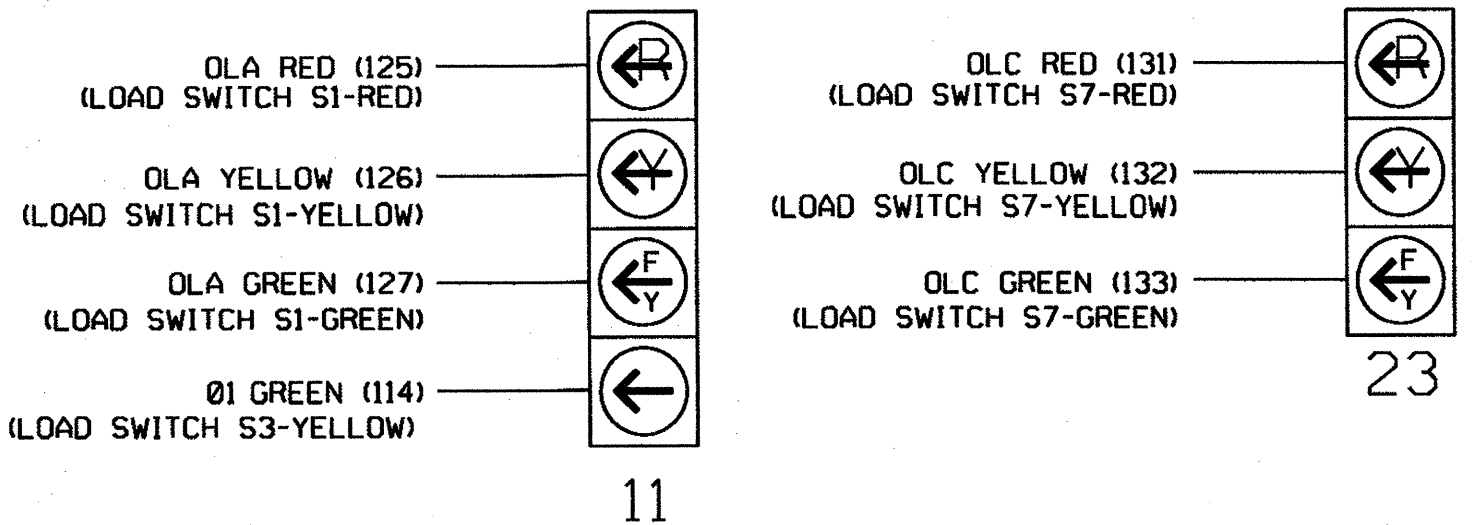
\* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

NOTE: Load Switches S1, S3, S7 require output remapping. See sheets 3 and 4 of this electrical detail for instructions.

**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**

(wire signal heads as shown)

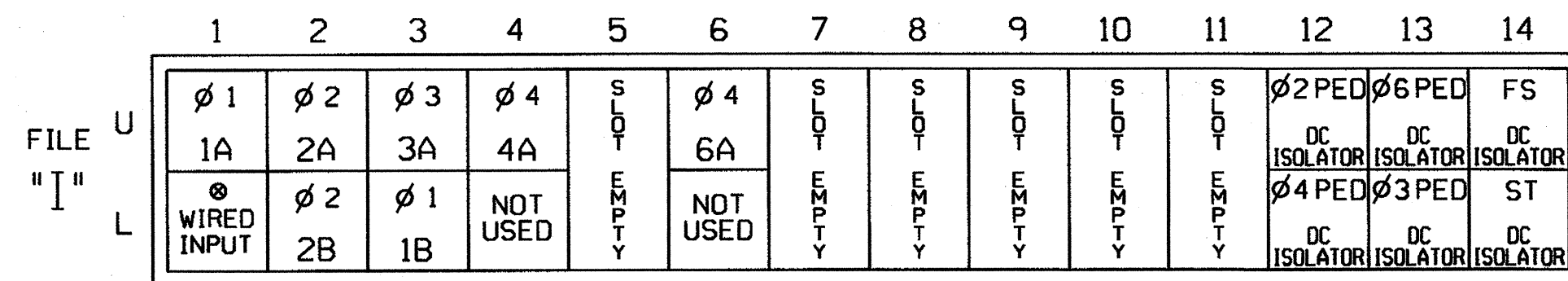


NOTE

- The sequence display for this signal requires special logic. See sheet 2 for programming instructions.

**INPUT FILE POSITION LAYOUT**

(front view)



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

FS = FLASH SENSE  
ST = STOP TIME

⊗ Wired Input - turn off Channel 2.

**INPUT FILE CONNECTION & PROGRAMMING CHART**

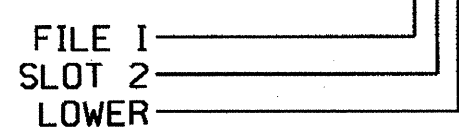
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB21-1,2	I1U	56	18	1	1	Y	Y			15
		I1L	47	9	22	6	Y	Y			
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
3A	TB21-5,6	I3U	58	20	3	3	Y	Y			3
		I3L	49	11	24	1	Y	Y			15
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2					
P41,P42	TB24-9,10	I12L	69	31	PED 4	4					
P61,P62	TB22-11,12	I13U	68	30	PED 6	6					
P31,P32	TB24-11,12	I13L	70	32	PED 8	3					

<sup>1</sup> Add jumper from I1-F to I1-W. on rear of input file.

NOTE:

INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

INPUT FILE POSITION LEGEND: I2L



**PED YELLOW CONFLICT MONITOR WIRING DETAIL**

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode on the 2018ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to chan. 9 green (monitor pin 13).

Follow the instructions below to make the appropriate connections:

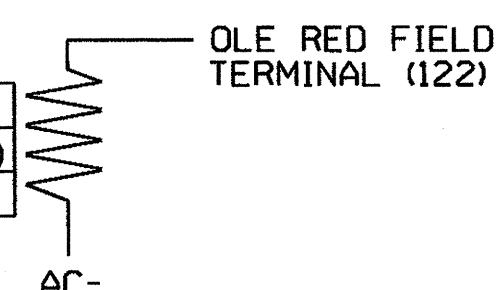
- STEP 1: Fold down rear panel of output file.
- STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).
- STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-13 \_\_\_\_\_ 2PY (term. 114)

NOTE: Some cabinet manufacturers use a molex plug to accomplish this wiring configuration. If connectors are used, simply plug the two connectors together that are labeled with the pin-out as shown above.

**LOAD RESISTOR INSTALLATION DETAIL**

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



ELECTRICAL DETAIL SHEET 1 OF 4

Electrical and Programming Details For: **NC 86 (S. Columbia Street)** at **Mason Farm Road/Westwood Drive**

Division 7 Orange County Chapel Hill

Prepared In the Offices of: **TRANSPORTATION MOBILITY AND SAFETY DIVISION**

PLAN DATE: June 2012 REVIEWED BY: JTR

PREPARED BY: James Peterson REVIEWED BY:

750 N. Greatfield Pkwy, Garner, NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, ESQ.

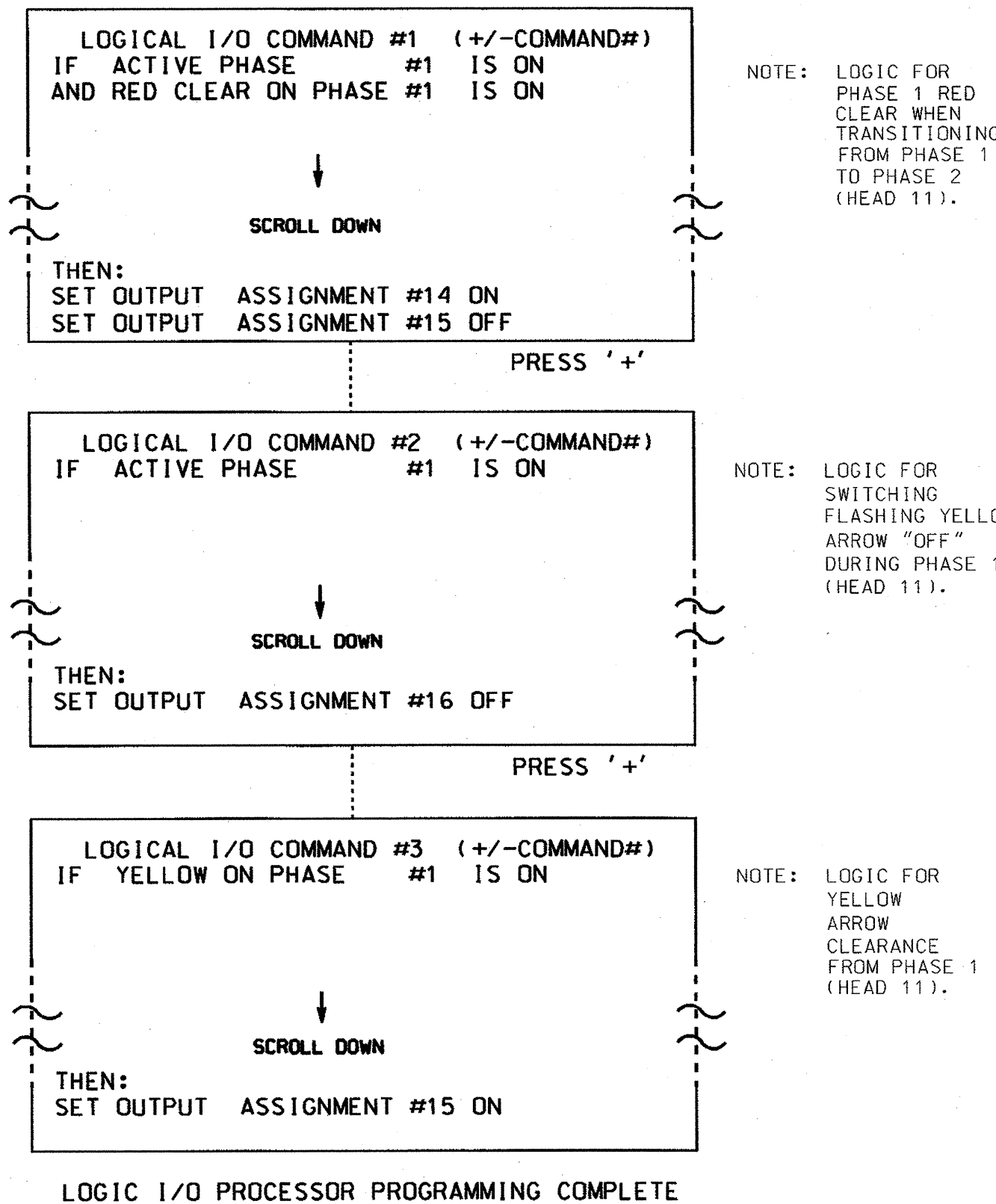
SIGNATURE: John T. Rowe DATE: 7-3-12

SIG. INVENTORY NO. 07-0573

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

(program controller as shown below)

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



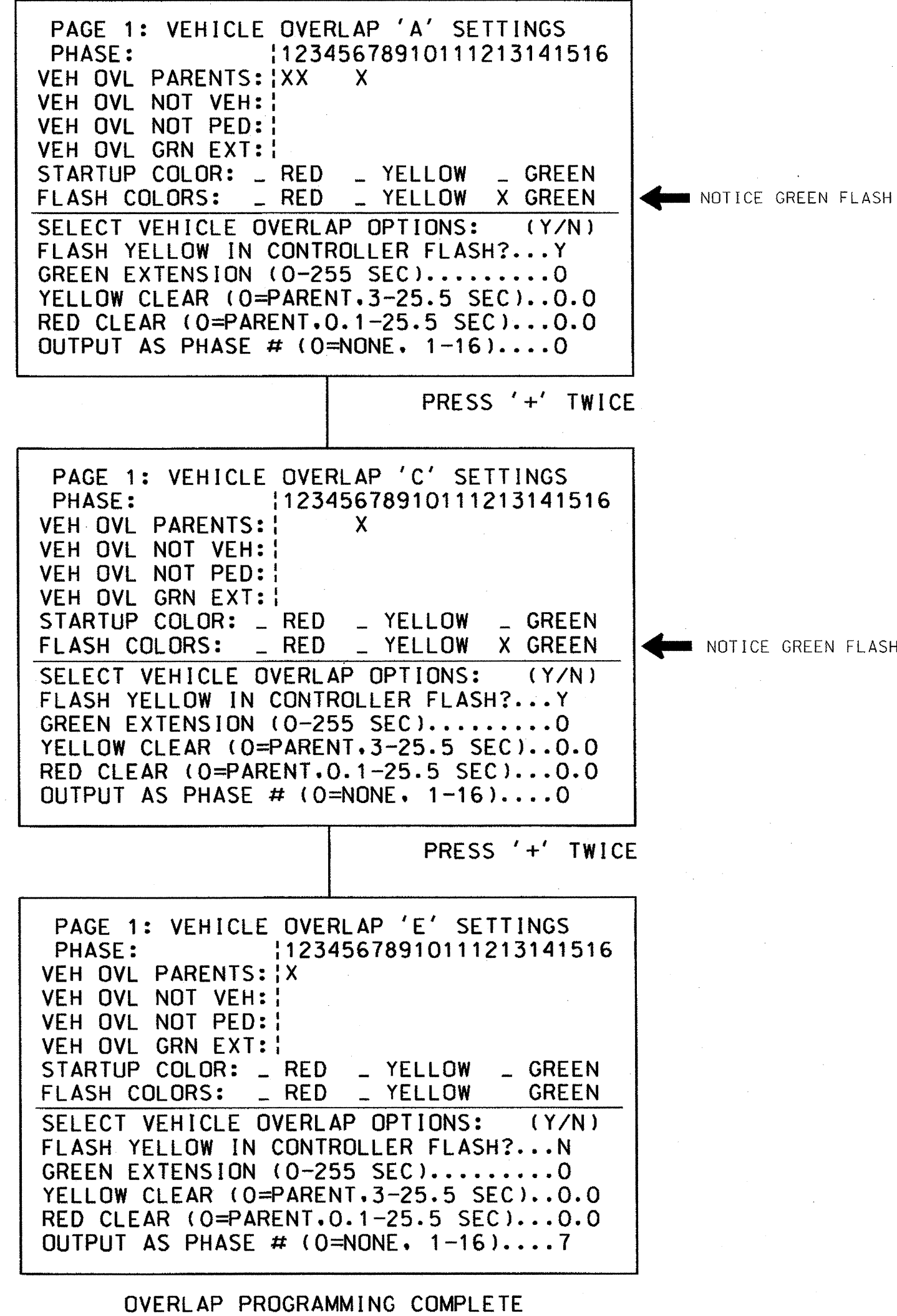
#### OUTPUT REFERENCE SCHEDULE

OUTPUT 14 = Overlap A Red  
OUTPUT 15 = Overlap A Yellow  
OUTPUT 16 = Overlap A Green  
OUTPUT 33 = 2 Ped Yellow

### OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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



OVERLAP PROGRAMMING COMPLETE

### PED 3 PROGRAMMING DETAIL

(program controller as shown below)

#### CHANGING OUTPUT ASSIGNMENTS

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

#### CHANGING INPUT ASSIGNMENTS

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

PROGRAMMING COMPLETE

### ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Provide a dedicated pair of wires from the cabinet to each push button.
- Mount Fail-Safe Interconnect Terminal Board on right rear side of cabinet (above service panel).
- Wire push buttons and Central Control Unit (CCU) per Polara Installation Manual instructions.
- Use Controller Receptacle to power CCU. Do not use Equipment Receptacle which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the Polara system unless cabinet is re-wired for standard button operation.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-0573  
DESIGNED: June 2012  
SEALED: 6-21-12  
REVISED: N/A

This Electrical Detail supersedes  
the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 2 OF 4

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 86 (S. Columbia Street)	
	at Mason Farm Road/ Westwood Drive		SEAL 008453 ENGINEER JOHN T. ROWE, JR.	
Division 7 Orange County Chapel Hill		PLAN DATE: June 2012	REVIEWED BY: JTR	
PREPARED BY: James Peterson		REVIEWED BY:		
REVISIONS		INIT.	DATE	
750 N. Greenfield Pkwy, Garner, NC 27529		SIGNATURE: <i>John T. Rowe, Jr.</i> 7/3/12 DATE:		
		SIG. INVENTORY NO. 07-0573		

# FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 11

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN  
'1' (OUTPUT ASSIGNMENTS).  
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

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

STEP 1

```

PAGE:1 C1 PIN:16 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

ENTER A "Y" FOR VEHICLE OVERLAP.

```

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

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

```

PAGE:1 C1 PIN:16 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 15

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

STEP 2

```

PAGE:1 C1 PIN:17 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:17 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN)....1
    
```

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

```

PAGE:1 C1 PIN:17 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 16

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

STEP 3

```

PAGE:1 C1 PIN:18 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:18 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN)....2
    
```

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

```

PAGE:1 C1 PIN:18 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" UNTIL OUTPUT 33  
IS REACHED.

STEP 4

```

PAGE:1 C1 PIN:35 NOT ENABLED
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT. THIS  
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE PHASE.

```

PAGE:1 C1 PIN:35 NOT ENABLED
SELECT VEHICLE PHASE (1-16).....1
SELECT COLOR(0=RED,1=YEL,2=GRN)....2
    
```

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

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

```

PAGE:1 C1 PIN:35 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

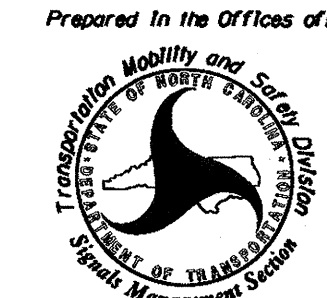
OUTPUT PROGRAMMING FOR HEAD 11 COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-0573  
DESIGNED: June 2012  
SEALED: 6-21-12  
REVISED: N/A

This Electrical Detail supersedes  
the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 3 OF 4

ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 86 (S. Columbia Street) at Mason Farm Road/ Westwood Drive

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

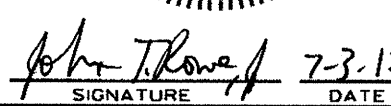
Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 REVIEWED BY: JTK

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS: INIT. DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR. ENGINEER

SIGNATURE:  7-3-12 DATE

SIG. INVENTORY NO. 07-0573

05-Jul-2012 09:43 S:\Projects\0415\Sig\0415\work\hpc\cupss61\g\_Mem#Enteron070573\_sml.e\_20110803.dgn J Peterson

### FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 23

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN  
'1' (OUTPUT ASSIGNMENTS).  
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN)....0
    
```

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

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

```

PAGE:1 C1 PIN:32 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 31

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

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN)....1
    
```

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

```

PAGE:1 C1 PIN:33 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

PRESS "+" KEY FOR OUTPUT 32

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

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

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

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN)....2
    
```

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

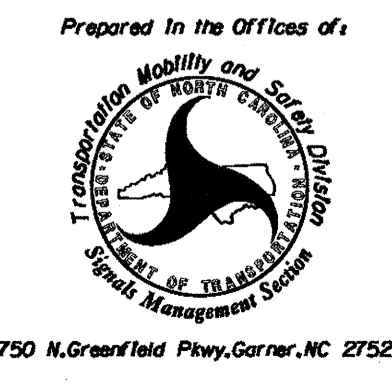
```

PAGE:1 C1 PIN:34 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-0573  
DESIGNED: June 2012  
SEALED: 6-21-12  
REVISED: N/A

This Electrical Detail supersedes  
the detail sealed on 8/03/11.

ELECTRICAL DETAIL SHEET 4 OF 4

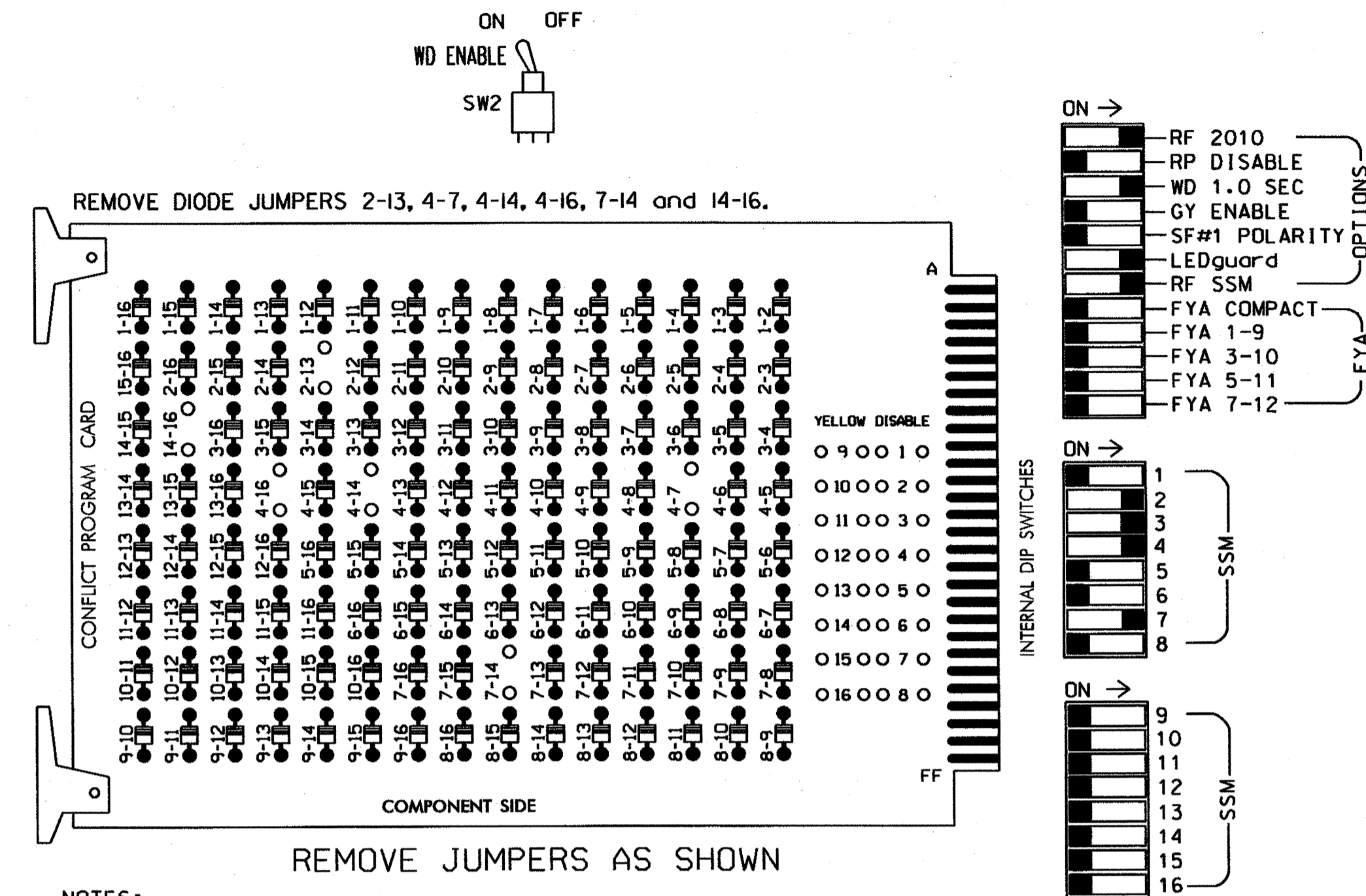
 <p>Prepared In the Offices of: TRANSPORTATION MOBILITY AND SAFETY SOLUTIONS, INC. 750 N. Greenfield Pkwy, Garner, NC 27529</p>	ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 86 (S. Columbia Street) at Mason Farm Road/ Westwood Drive	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JOHN T. ROWE, JR. 008453
	Division 7      Orange County      Chapel Hill	PLAN DATE: June 2011      REVIEWED BY: JTR	PREPARED BY: James Peterson      REVIEWED BY:
REVISIONS      INIT.      DATE		SIG. INVENTORY NO. 07-0573	





### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.

### 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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5,6, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phase 2, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2, 4 and 8 for 'STARTUP PED CALL'.
- Program phase 2 for Yellow Flash.
- Program phase 4 for Dual Entry.
- The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S3,S4,S4P,S7,S8P  
 PHASES USED.....2,3,4,7,2 PED,4 PED,8 PED  
 OVERLAPS.....NONE

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	
SIGNAL HEAD NO.	NU	21,22	P21,P22 P23,P24	22	31	32,33	41,42	P41, P42	NU	NU	71	NU	P81, P82
RED		128			116	101							
YELLOW		129				102							
GREEN		130				103							
RED ARROW					116						122		
YELLOW ARROW					117	117	117				123		
GREEN ARROW					118	118	118				124		
Hand								104				110	
Person								106				112	

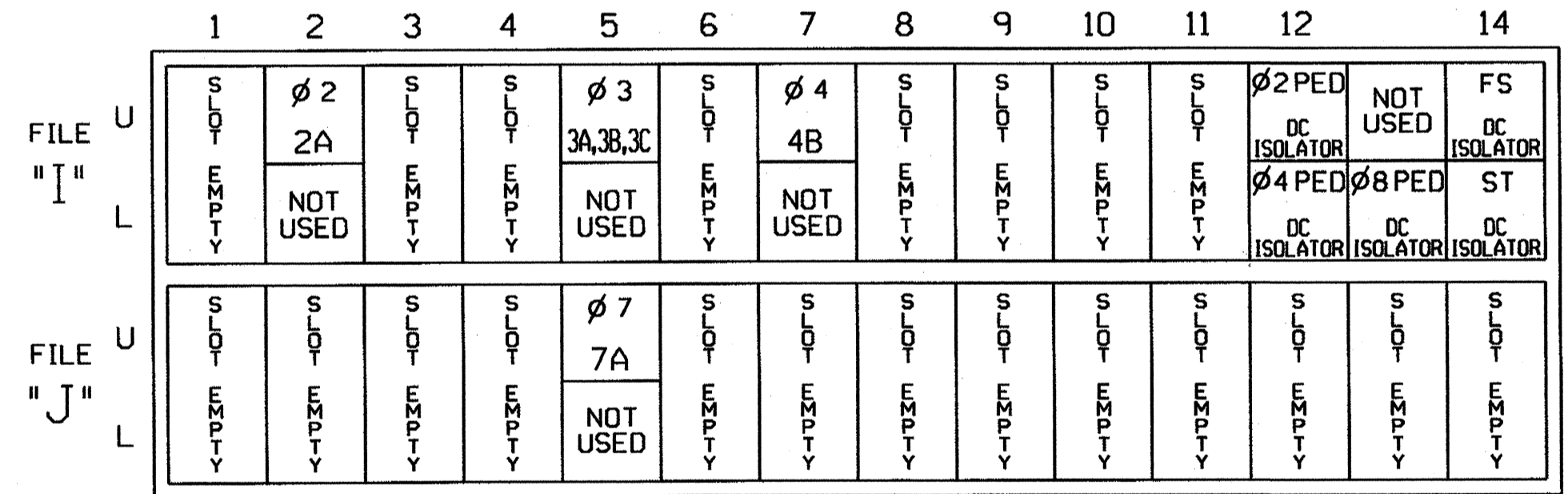
NU = Not Used

### 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.

### INPUT FILE POSITION LAYOUT

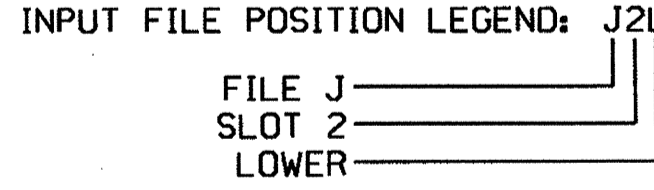
(front view)



### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A,3B,3C	TB4-5,6	I5U	58	20	3	3	Y	Y			
4B	TB6-1,2	I7U	65	27	34	4	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
PED PUSH BUTTONS											
P21,P22,P23,P24	TB8-4,6	I12U	67	29		2 PED					
P41,P42	TB8-5,6	I12L	69	31		4 PED					
P81,P82	TB8-8,9	I13L	70	32		8 PED					

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0520T1  
 DESIGNED: June 2012  
 SEALED: 6-21-12  
 REVISED: N/A

This Electrical Detail supersedes the detail sealed on 8/02/11.

### PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU  
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES)					
RNG:LEAD	BARRIER 1	X-LAG:LEAD	BARRIER 2	X-LAG:LEAD	BARRIER 3	X-LAG
1 :0	2 0	0 0	3 0	0 0	4 0	0 0
2 :0	0 0	0 0	0 0	0 0	8 7	0 0
3 :0	0 0	0 0	0 0	0 0	0 0	0 0
4 :0	0 0	0 0	0 0	0 0	0 0	0 0

Signal Upgrade - Temporary Design 1

ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 86 (S. Columbia Street) at S. Pittsboro Street/ SR 1902 (Manning Drive)

Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 REVIEWED BY: JTR

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS

INIT. DATE

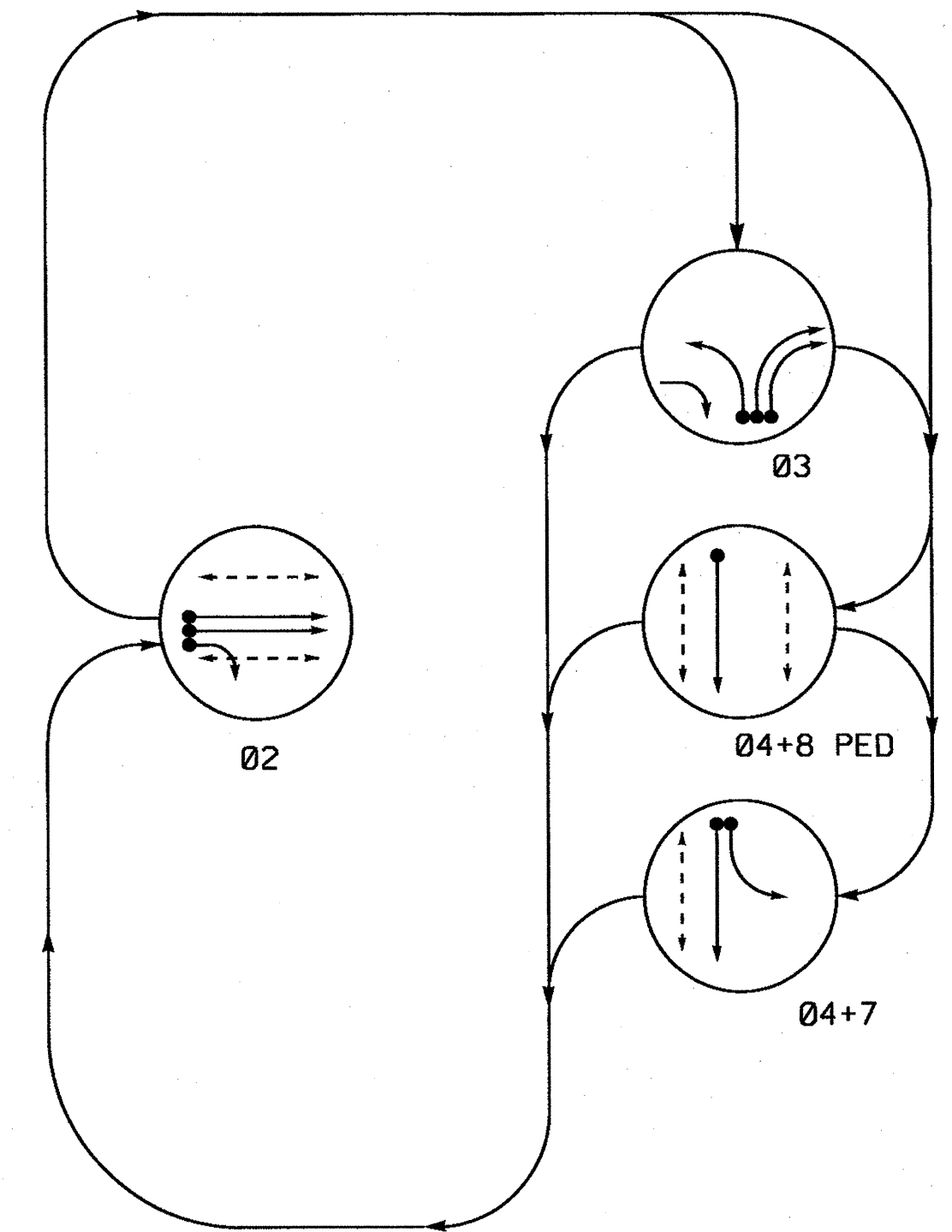
750 N. Greenfield Pkwy., Garner, NC 27529

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 008453  
 JOHN T. ROWE, JR.  
 ENGINEER

Signature: [Signature] 7-5-12  
 DATE

SIG. INVENTORY NO. 07-0520T1

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

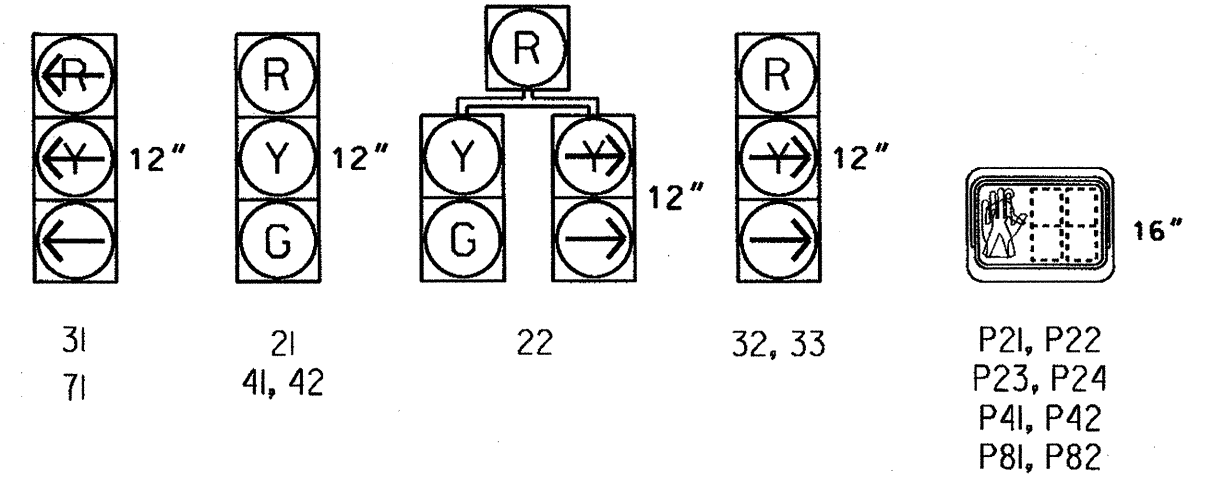
**TABLE OF OPERATION**

SIGNAL FACE	PHASE					FLASH
	02	03	04+7	04+8	PED	
21	G	R	R	R	Y	
22	G	R	R	R	Y	
31	R	R	R	R		
32, 33	R	R	R	R		
41, 42	R	R	G	G	R	
71	R	R	R	R		
P21, P22	W	DW	DW	DW	DRK	
P23, P24	W	DW	DW	DW	DRK	
P41, P42	DW	DW	W	W	DRK	
P81, P82	DW	DW	W	DW	DRK	

W - Walk  
DW - Don't Walk  
DRK - Dark

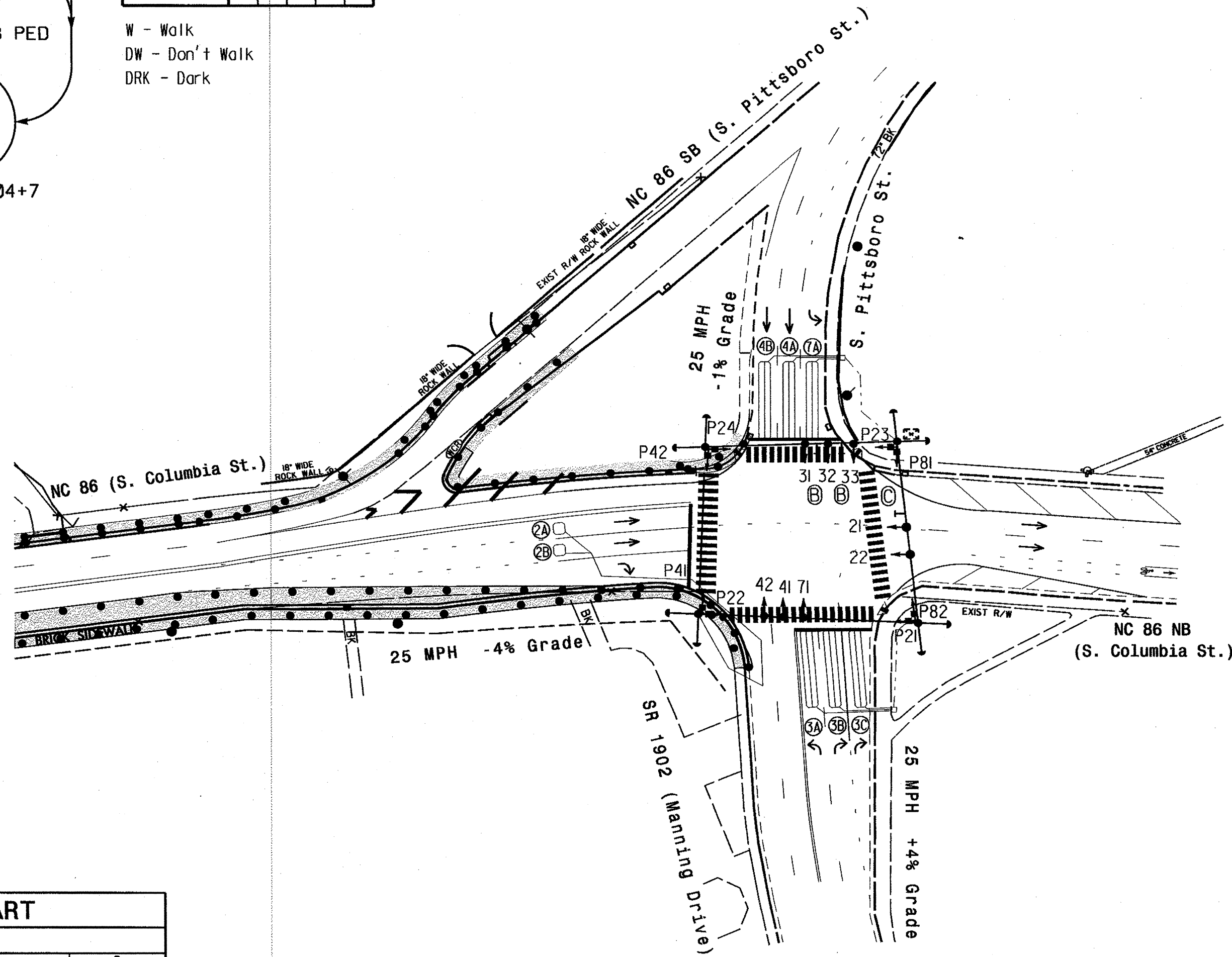
**SIGNAL FACE I.D.**

All Heads L.E.D.



**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
2A, 2B	6X6	70	4	Y	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	-	-
3C	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	-



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

**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 7 may lead phase 4+8 PED.
- The order of phase 3 and phases (4+7 and 4+8 PED) may be reversed.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

**OASIS 2070L TIMING CHART**

FEATURE	PHASE				
	2	3	7	8	PED
Min Green 1*	10	7	7	7	1
Extension 1*	3.0	1.0	1.0	1.0	-
Max Green 1*	30	15	30	15	1
Yellow Clearance	3.4	3.0	3.2	3.0	3.0
Red Clearance	2.6	2.9	2.5	1.8	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1*	4	-	4	-	4
Don't Walk 1	19	-	16	-	19
Seconds Per Actuation*	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-
Time To Reduce*	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	-
Vehicle Call Memory	YELLOW	-	-	-	-
Dual Entry	-	-	ON	-	-
Simultaneous Gap	ON	ON	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.

This plan supersedes the plan signed and sealed on 8/1/11.

**LEGEND**

PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	N/A
T Sign	T Sign
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ Pedestrian Signal Head With Push Button & Sign
○ 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 Junction Box	□ Controller & Cabinet Junction Box
- - - 2-in Underground Conduit	- - - 2-in Underground Conduit
N/A Right of Way	N/A Right of Way
→ Directional Arrow	→ Directional Arrow
● Construction Zone Drums	● Construction Zone Drums
■ Construction Zone	■ Construction Zone
Ⓟ Right Arrow "ONLY" Sign (R3-5R)	Ⓟ Right Arrow "ONLY" Sign (R3-5R)
Ⓞ No Left Turn Sign (R3-2)	Ⓞ No Left Turn Sign (R3-2)

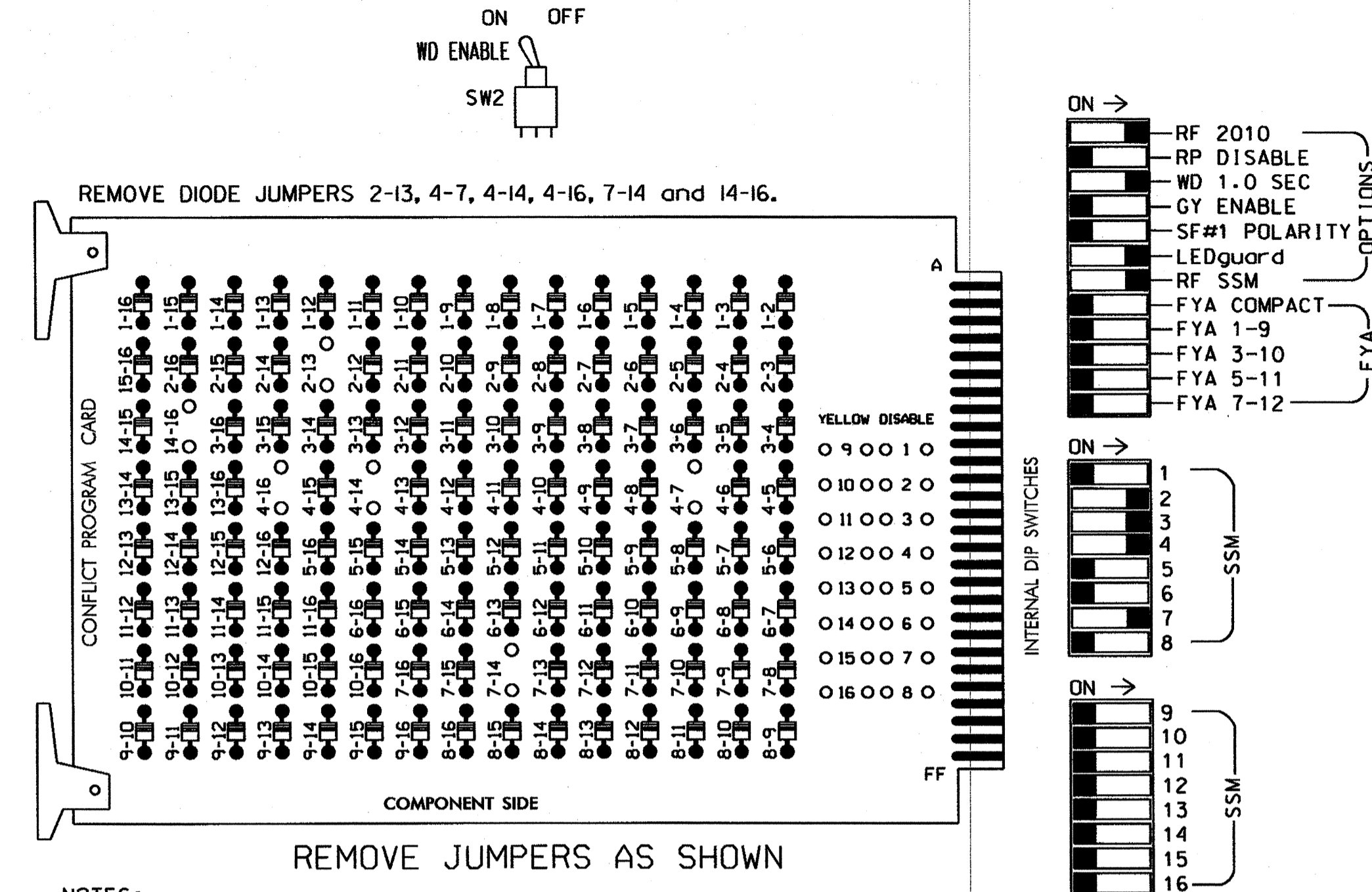
**Signal Upgrade - Temporary Design 2 (TMP Phase II)**

	<p>NC 86 (S. Columbia Street) at S. Pittsboro Street/ SR 1902 (Manning Drive)</p>		<p>SEAL ROBERT J. ZIEMBA ENGINEER 026486</p>
	<p>Division 7 Orange County Chapel Hill</p>	<p>PLANNED BY: R. Hough</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SCALE: 1"=50'</p>	<p>REVISIONS:</p>	<p>INIT. DATE</p>

21-JUN-2012 18:05 C:\TIP\Projects\U0624\Traffic\Oasis\gnis\gnis.dwg -0520407052012.dwg -0520407052012.dwg

**EDI MODEL 2010ECL-NC 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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

**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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5,6, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2, 4 and 8 for 'STARTUP PED CALL'.
6. Program phase 2 for Yellow Flash.
7. Program phase 4 for Dual Entry.
8. The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	
SIGNAL HEAD NO.	NU	21,22	P21,P22 P23,P24	22	31	32,33	41,42	P41, P42	NU	NU	71	NU	P81, P82
RED		128			116	101							
YELLOW		129				102							
GREEN		130				103							
RED ARROW				116							122		
YELLOW ARROW				117	117	117					123		
GREEN ARROW				118	118	118					124		
			113				104					110	
			115				106					112	

NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S3,S4,S4P,S7,S8P  
 PHASES USED.....2,3,4,7,2 PED,4 PED,8 PED  
 OVERLAPS.....NONE

**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.

**INPUT FILE POSITION LAYOUT**

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	∅ 2	S	S	∅ 3	∅ 3	∅ 4	S	S	S	S	∅ 2 PED	NOT USED	FS
L	←	2A,2B	←	←	3A	3B	4A	←	←	←	←	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
L	←	NOT USED	←	←	NOT USED	∅ 3	∅ 4	←	←	←	←	∅ 4 PED	∅ 8 PED	ST
L	←	←	←	←	←	3C	4B	←	←	←	←	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
U	S	S	S	S	∅ 7	S	S	S	S	S	S	S	S	S
L	←	←	←	←	7A	←	←	←	←	←	←	←	←	←

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

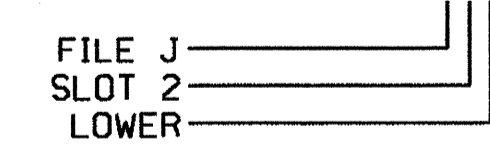
FS = FLASH SENSE  
ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			15
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			15
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			
7A	TB5-5,6	I5U	57	19	7	7	Y	Y			
PED PUSH BUTTONS											
P21,P22,P23,P24	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

**INPUT FILE POSITION LEGEND: J2L**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0520T2  
 DESIGNED: June 2012  
 SEALED: 6-21-12  
 REVISED: N/A

This Electrical Detail supersedes the detail sealed on 8/02/11.

**PHASE SEQUENCE PROGRAMMING DETAIL**

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU  
SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES)					
RNG:LEAD	BARRIER 1	X-LAG:LEAD	BARRIER 2	X-LAG:LEAD	BARRIER 3	X-LAG
1 :0	2 0	0 0	3 0	0 0	4 0	0 0
2 :0	0 0	0 0	0 0	0 0	8 7	0 0
3 :0	0 0	0 0	0 0	0 0	0 0	0 0
4 :0	0 0	0 0	0 0	0 0	0 0	0 0

Signal Upgrade - Temporary Design 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Office of:

**NC 86 (S. Columbia Street) at S. Pittsboro Street/ SR 1902 (Manning Drive)**

Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 REVIEWED BY: JTR

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

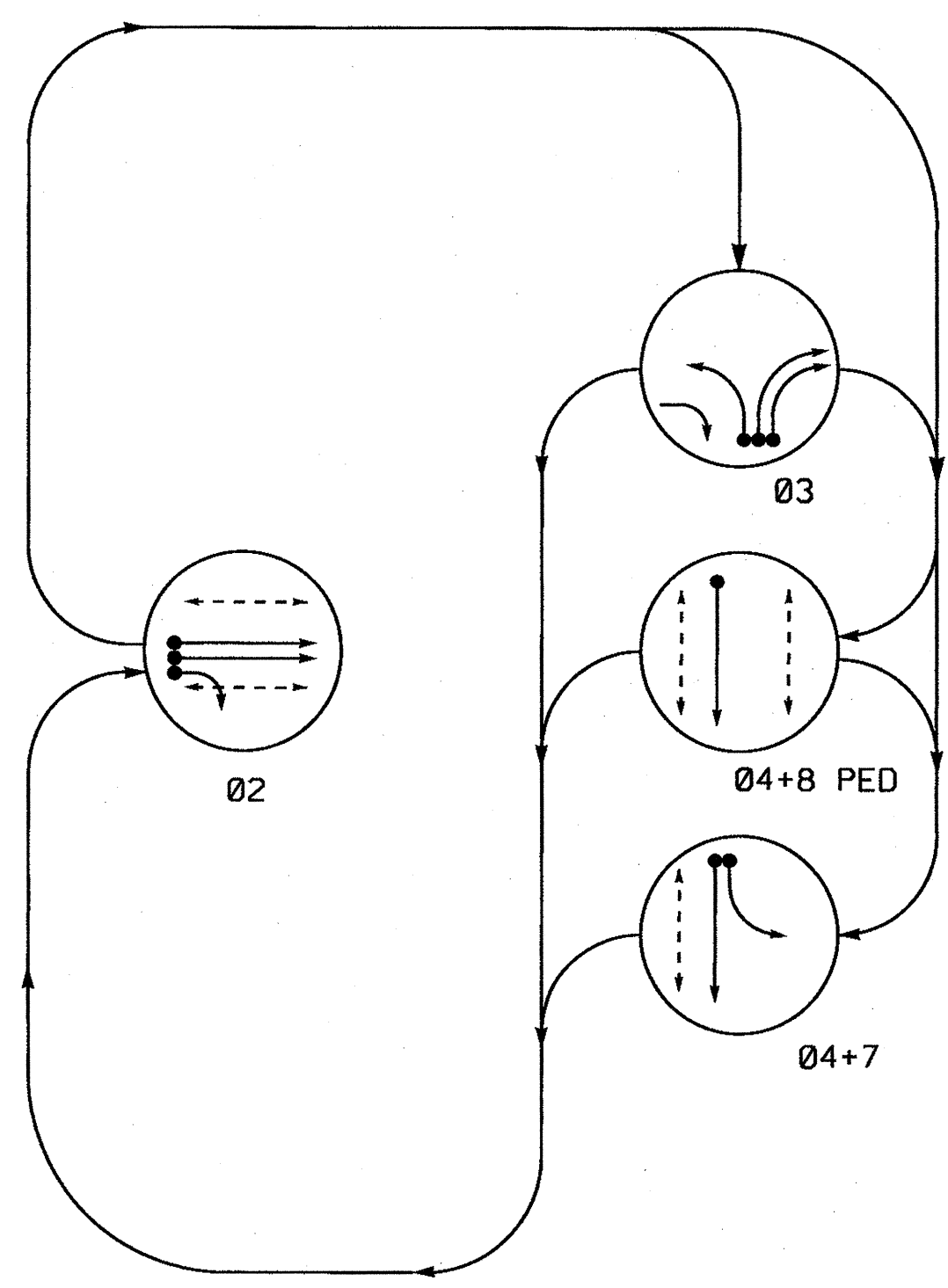
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, ESQ.

SIGNATURE: DATE: 7-5-12

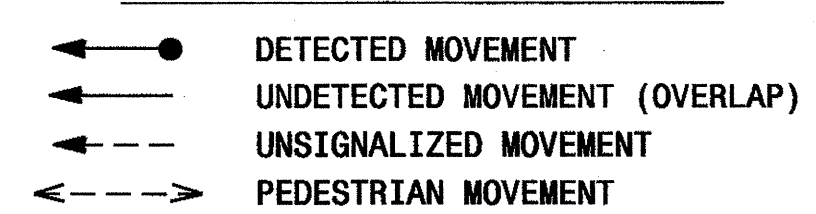
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**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**



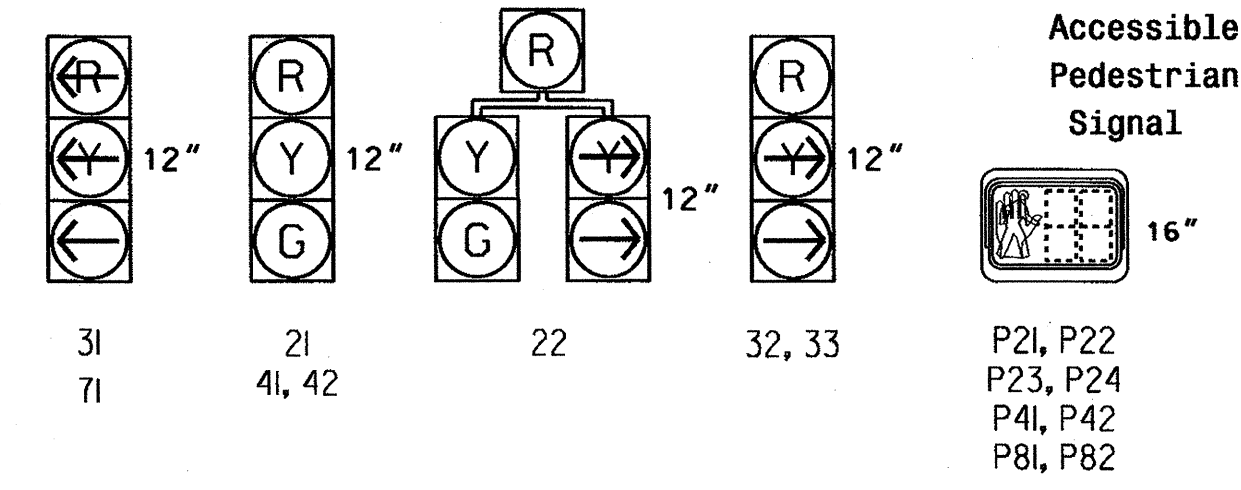
**TABLE OF OPERATION**

SIGNAL FACE	PHASE				
	Ø 2	Ø 3	Ø 4+8 PED	Ø 4+7	F L H S A B
21	G	R	R	R	Y
22	G	R	R	R	Y
31	R	R	R	R	Y
32, 33	R	R	R	R	Y
41, 42	R	R	G	G	R
71	R	R	R	R	Y
P21, P22	W	DW	DW	DW	DRK
P23, P24	W	DW	DW	DW	DRK
P41, P42	DW	DW	W	W	DRK
P81, P82	DW	DW	W	DW	DRK

W - Walk  
DW - Don't Walk  
DRK - Dark

**SIGNAL FACE I.D.**

All Heads L.E.D.



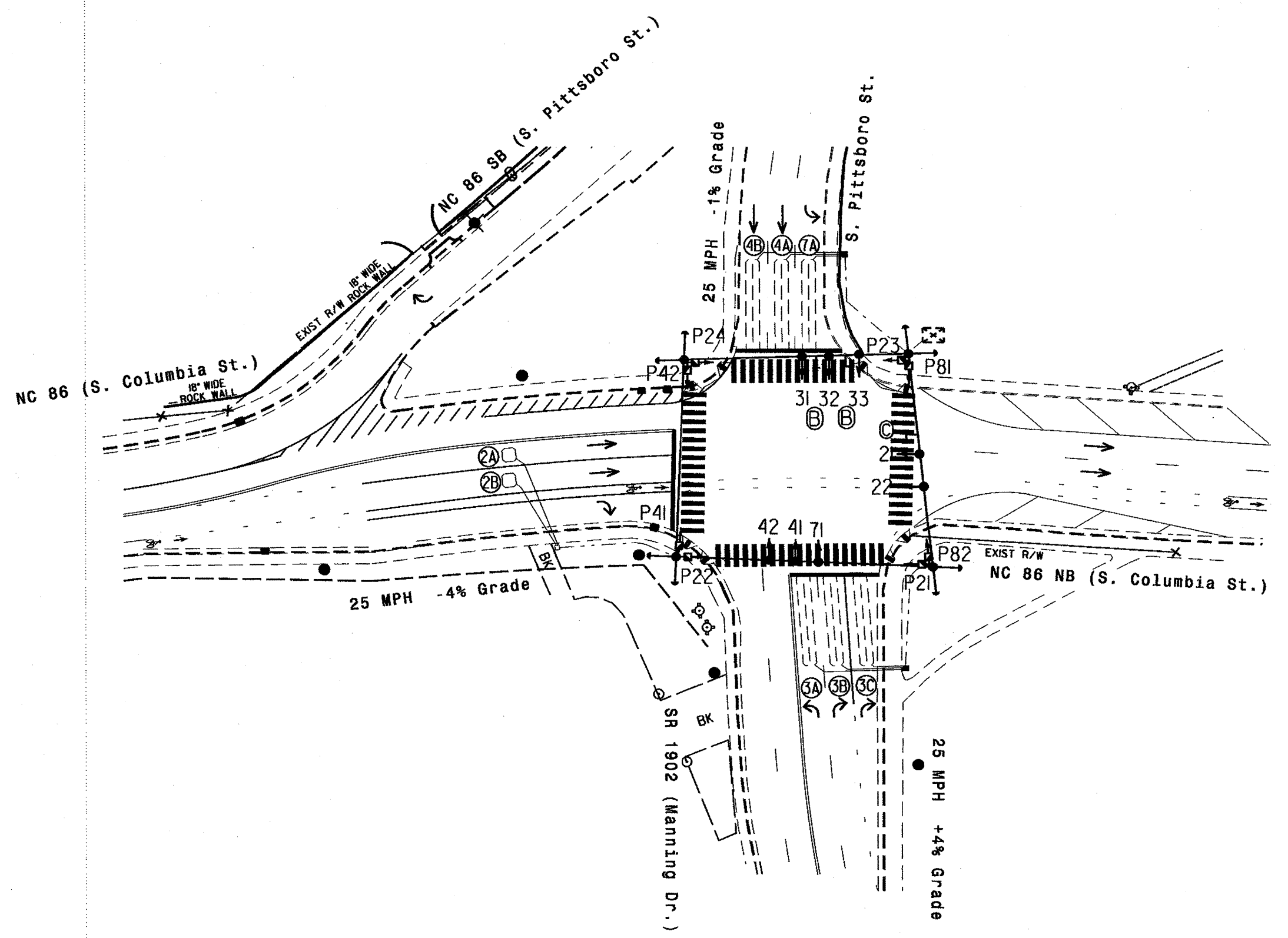
**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	INDUCTIVE LOOPS		DETECTOR PROGRAMMING								
		DISTANCE FROM STOPBAR (FT)	TURNS	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
2A, 2B	6X6	70	3	Y	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	-
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	15	-	-
3C	6X40	0	2-4-2	-	3	Y	Y	-	-	15	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-

**4 Phase Fully Actuated (Chapel Hill - Carrboro Signal System)**

**NOTES**

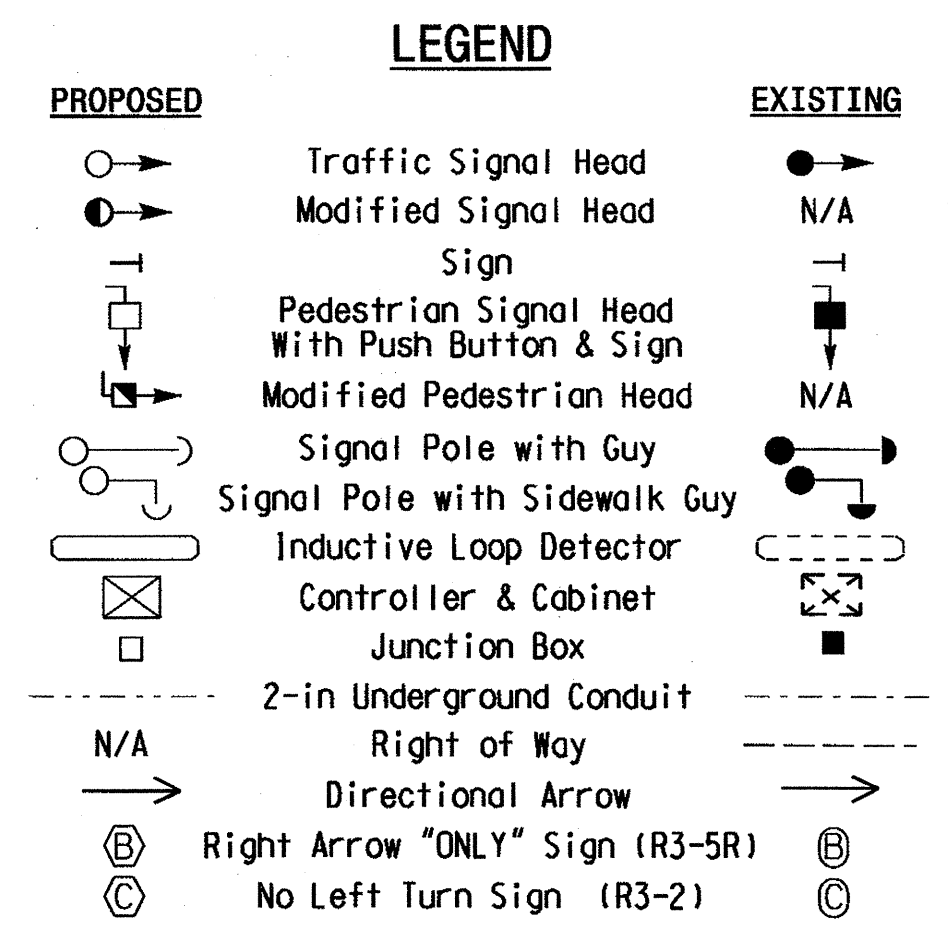
- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 7 may lead phase 4+8 PED.
- The order of phase 3 and phases (4+7 and 4+8 PED) may be reversed.
- Set all detector units to presence mode.
- Signal heads P21, P22, P23, P24, P41, P42, P81, and P82 are accessible pedestrian signal heads. See sheet #2 for speech messages.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**OASIS 2070L TIMING CHART**

FEATURE	PHASE				
	2	3	4	7	8 PED
Min Green 1*	10	7	7	7	1
Extension 1*	3.0	1.0	1.0	1.0	-
Max Green 1*	30	15	30	15	1
Yellow Clearance	3.4	3.0	3.2	3.0	3.0
Red Clearance	2.6	2.9	2.4	1.9	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1*	4	-	4	-	4
Don't Walk 1	20	-	16	-	15
Seconds Per Actuation*	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-
Time To Reduce*	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	-
Vehicle Call Memory	YELLOW	-	-	-	-
Dual Entry	-	-	ON	-	-
Simultaneous Gap	ON	ON	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.



This plan supersedes the plan signed and sealed on 8/1/11.

Signal Upgrade - Final Design (Sheet 1 of 2)

**NC 86 (S. Columbia Street) at S. Pittsboro Street/ SR 1902 (Manning Drive)**

Division 7 Orange County Chapel Hill

PLAN DATE: June 2012 PREPARED BY: R. Hough

REVIEWED BY: \_\_\_\_\_

SCALE: 1" = 50'

REVISIONS: \_\_\_\_\_

INIT. DATE

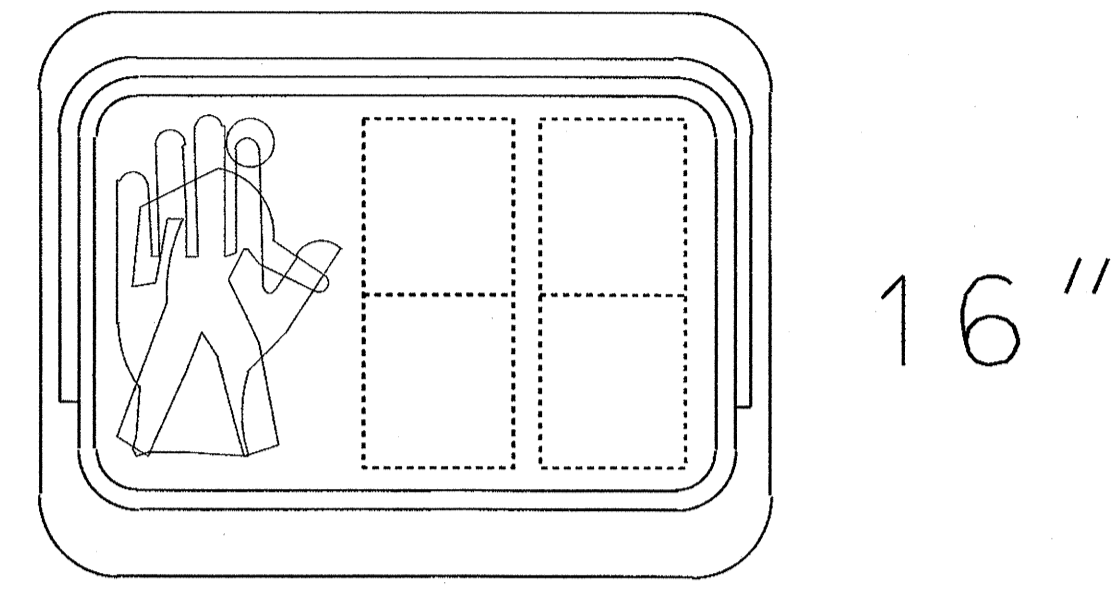
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# Accessible Pedestrian Signal

\*Volume should be set to 5 dB over the ambient noise level

## NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 7 may lead phase 4+8 PED.
4. The order of phase 3 and phases (4+7 and 4+8 PED) may be reversed.
5. Set all detector units to presence mode.
6. Signal heads P21, P22, P23, P24, P41, P42, P81, and P82 are accessible pedestrian signal heads.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

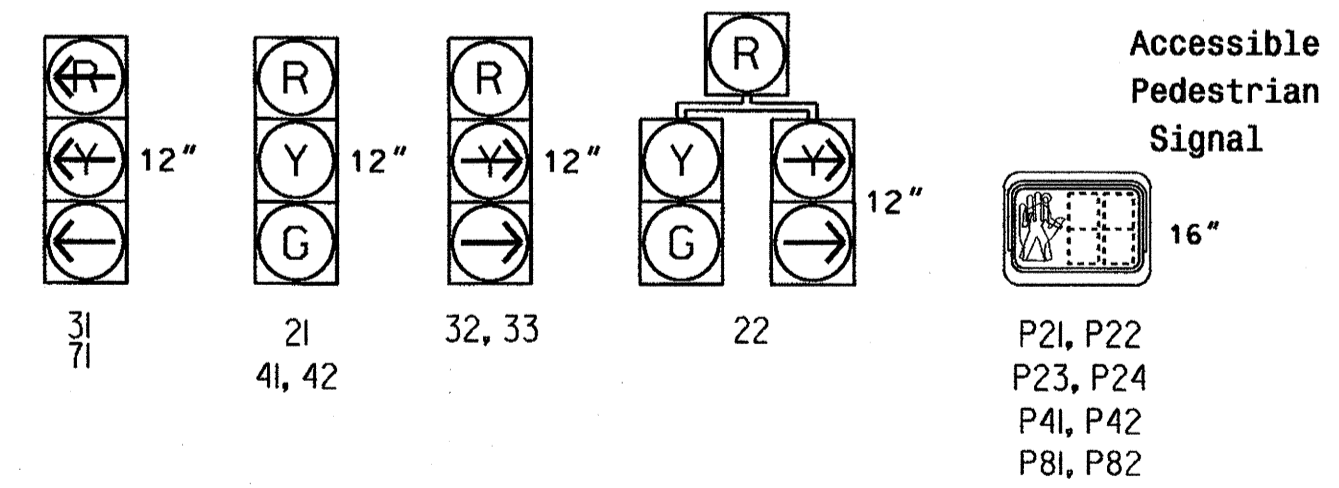


## ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	INTERVAL	SPEECH MESSAGE
P21, P22	Walk	Manning. Walk sign is on to cross Manning.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Manning.
P23, P24	Walk	Pittsboro. Walk sign is on to cross Pittsboro.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Pittsboro.
P41, P42	Walk	Columbia. Walk sign is on to cross Columbia.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Columbia.
P81, P82	Walk	Columbia. Walk sign is on to cross Columbia.
	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Columbia.

### SIGNAL FACE I.D.

All Heads L.E.D.



This plan supersedes the plan signed and sealed on 8/1/11.

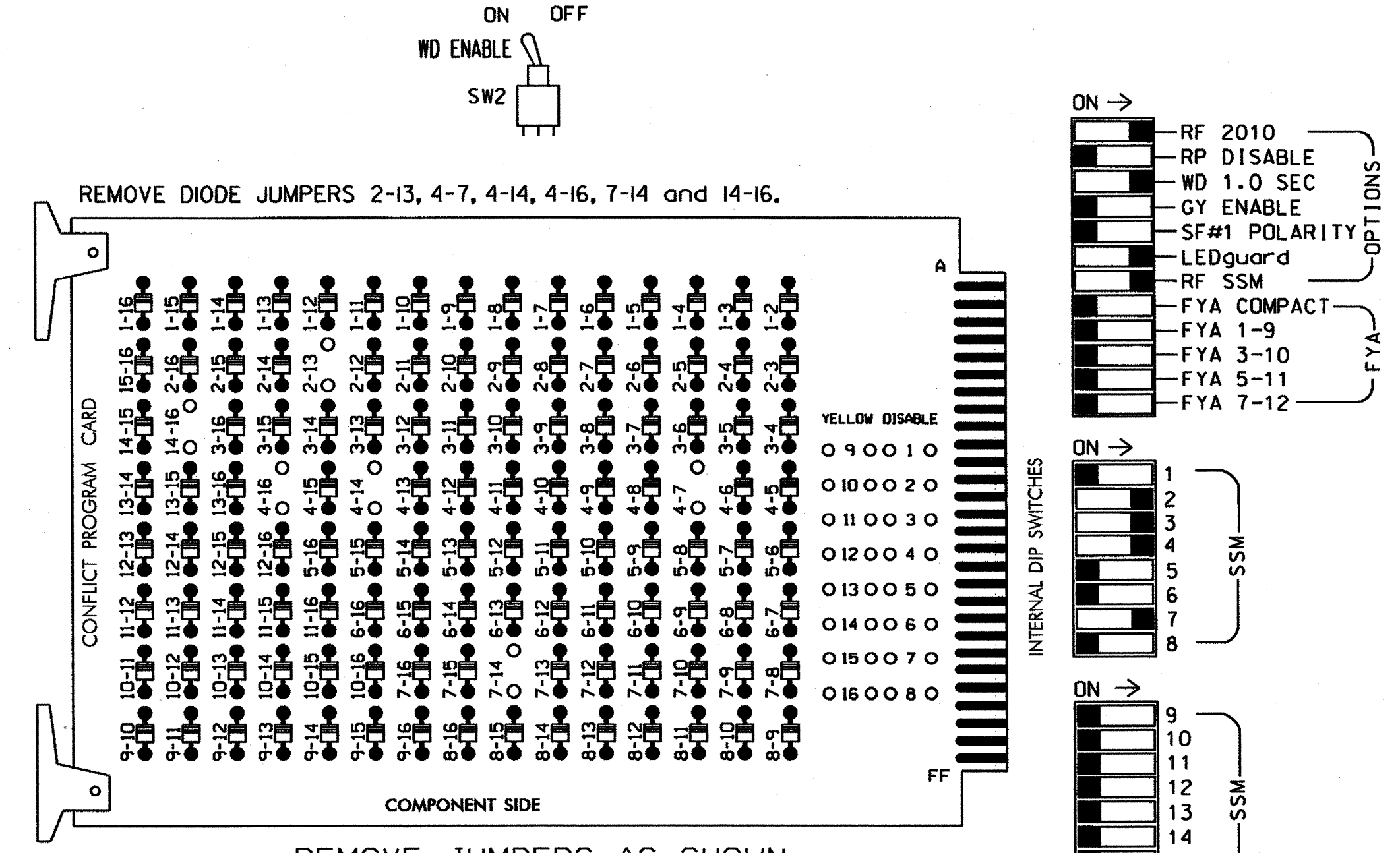
Signal Upgrade - Final Design (Sheet 2 of 2)

	NC 86 (S. Columbia Street) at S. Pittsboro Street/ SR 1902 (Manning Drive)		
	Division 7 Orange County Chapel Hill	PLAN DATE: June 2012 REVIEWED BY:	
SCALE: NA	REVISIONS	INIT. DATE	SIGNATURE: R. Hough DATE: 6/2/12
SIG. INVENTORY NO. 07-0520			SEAL

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 21-0520

### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.

### 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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5,6, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phase 2, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2, 4 and 8 for 'STARTUP PED CALL'.
- Program phase 2 for Yellow Flash.
- Program phase 4 for Dual Entry.
- The cabinet and controller are part of the Chapel Hill -

### EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S3,S4,S4P,S7,S8P  
 PHASES USED.....2,3,4,7,2 PED,4 PED,8 PED  
 OVERLAPS.....NONE

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	
SIGNAL HEAD NO.	NU	21,22	P21,P22 P23,P24	22	31	32,33	41,42	P41, P42	NU	NU	71	NU	P81, P82
RED		128			116	101							
YELLOW		129				102							
GREEN		130				103							
RED ARROW				116							122		
YELLOW ARROW				117	117	117					123		
GREEN ARROW				118	118	118					124		
			113				104					110	
			115				106					112	

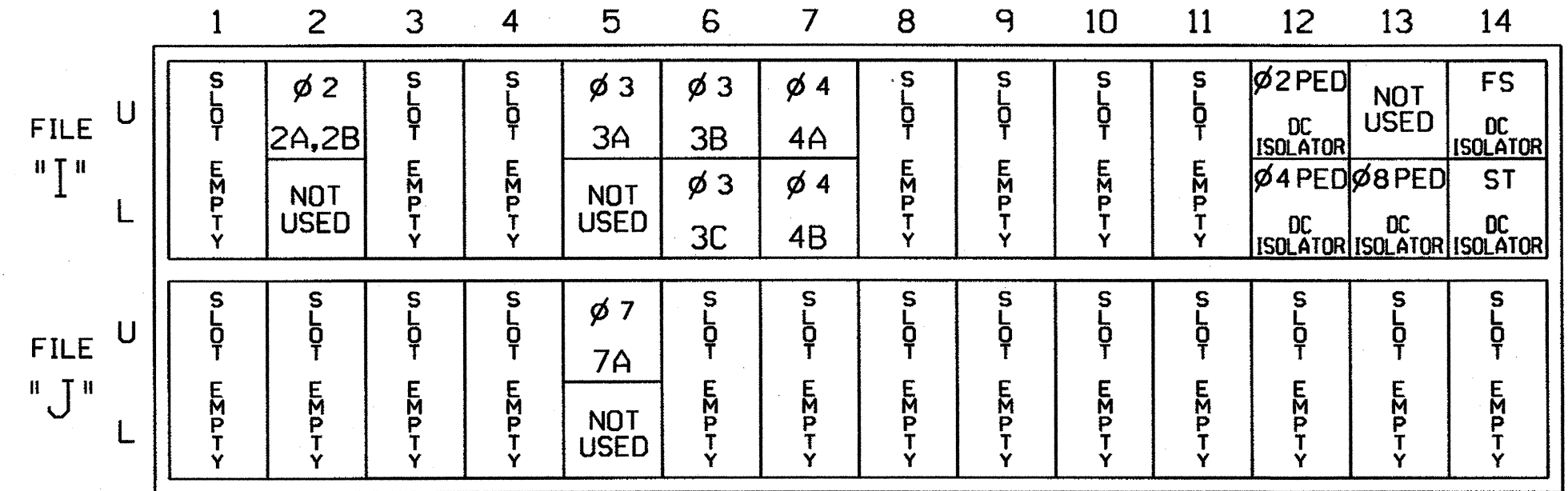
NU = Not Used

### 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.

### INPUT FILE POSITION LAYOUT

(front view)



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

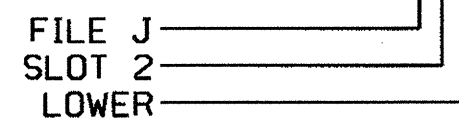
FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			15
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			15
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
PED PUSH BUTTONS											
P21,P22,P23,P24	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

### INPUT FILE POSITION LEGEND: J2L



### ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Provide a dedicated pair of wires from the cabinet to each push button.
- Mount Fail-Safe Interconnect Terminal Board on right rear side of cabinet (above service panel).
- Wire push buttons and Central Control Unit (CCU) per Polara Installation Manual instructions.
- Use Controller Receptacle to power CCU. Do not use Equipment Receptacle which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the Polara system unless cabinet is re-wired for standard button operation.

### PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU  
 SELECT: 4 PHASE SEQUENCE

PHASE	RNG:LEAD	BARRIER 1	X-LAG:LEAD	BARRIER 2	X-LAG:LEAD	BARRIER 3	X-LAG
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0520  
 DESIGNED: June 2012  
 SEALED: 6-21-12  
 REVISED: N/A

This Electrical Detail supersedes the detail sealed on 8/02/11.

Signal Upgrade - Final

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 86 (S. Columbia Street)	
	at		S. Pittsboro Street/ SR 1902 (Manning Drive)	
	Division 7		Orange County	
	Chapel Hill			
PLAN DATE:	June 2012	REVIEWED BY:	JKR	
PREPARED BY:	James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE	
750 N. Greenfield Pkwy, Carrboro, NC 27529				Signature: <i>John T. Rowe</i> Date: 7-5-12

05-JUL-2012 08:34 S:\ITS\SSM\ITS\_Signal\work\p060520.sm.ele\_20110802.dgn J Peterson

- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE - 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE - 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPlice CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPlice ENCLOSURE
- 30 INSTALL AERIAL SPlice ENCLOSURE
- 31 INSTALL POLE MOUNTED SPlice CABINET
- 32 INSTALL BASE MOUNTED SPlice CABINET
- 33 REMOVE EXISTING SPlice CABINET

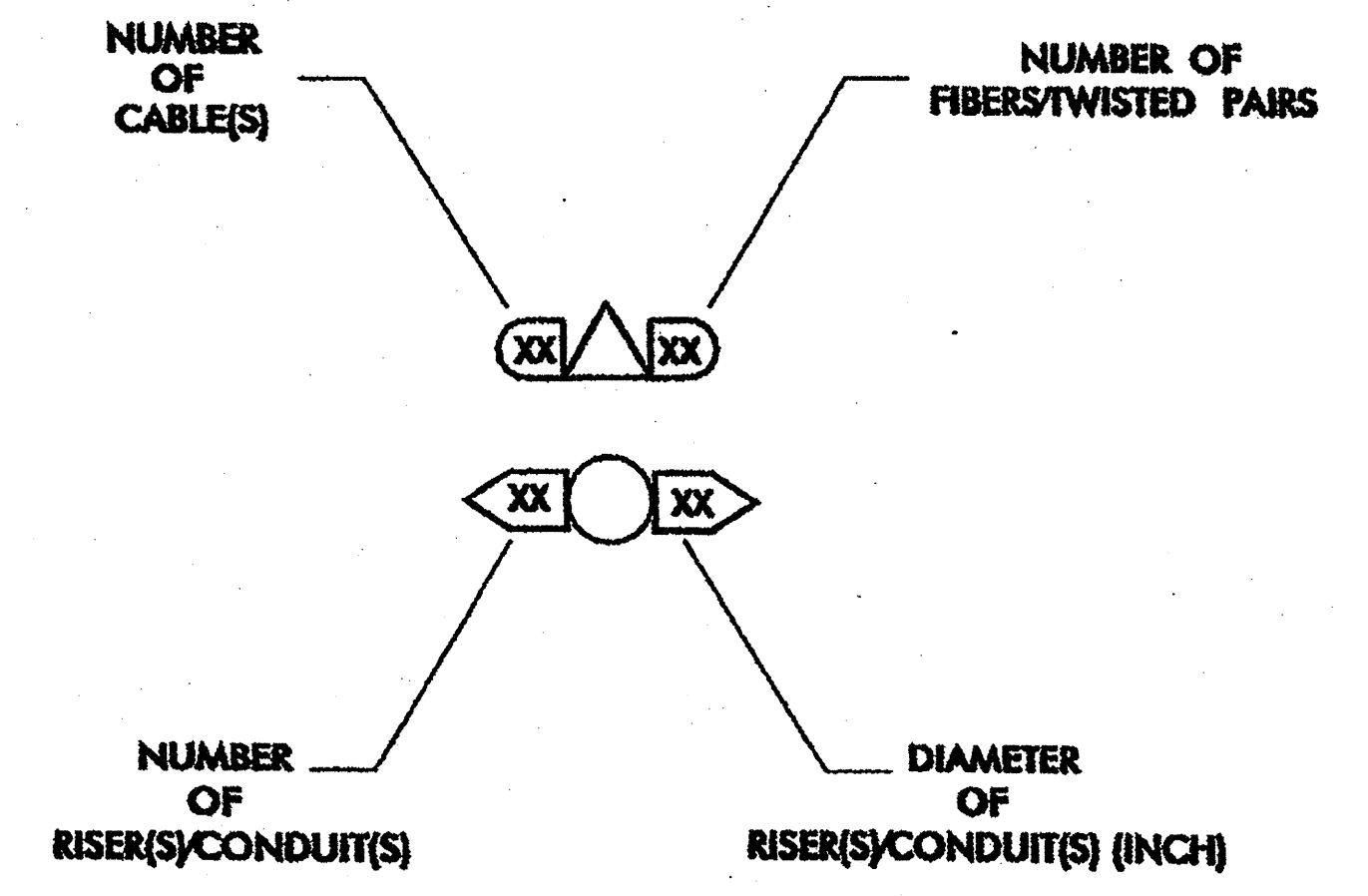
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49 REMOVE EXISTING MESSENGER CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE

**LEGEND**

- FO NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI EXISTING COMMUNICATIONS CABLE
- REM EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD NEW DIRECTIONAL DRILLED CONDUIT
- B&J NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- AERIAL SPlice ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- EXISTING SPlice CABINET
- NEW SPlice CABINET
- SP SIGNAL POLE
- XX-XXXX SIGNAL INVENTORY NUMBER

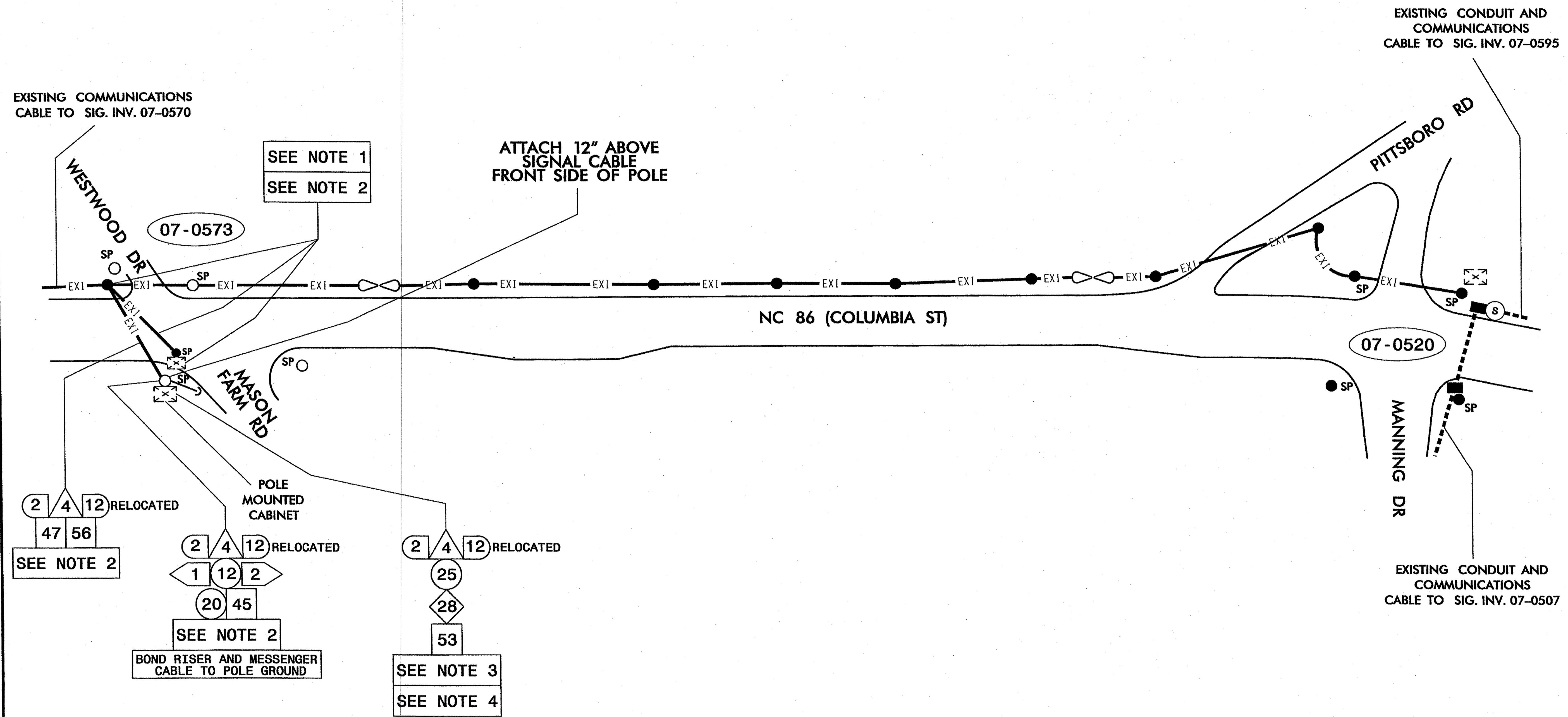
**CONSTRUCTION NOTE SYMBOLOGY KEY**

- XX INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



	<b>CONSTRUCTION NOTES</b>		
	PLAN DATE: _____ PREPARED BY: _____ SCALE: 0 _____	REVIEWED BY: <b>G. A. FULLER</b> REVISIONS: _____ DATE: _____	

CONTACT KUMAR NEPPALI, PROJECT MANAGER – TOWN OF CHAPEL HILL TRAFFIC ENGINEERING (919-969-5093), PRIOR TO REMOVING ANY CABLE. PROVIDE 5 DAYS ADVANCE NOTICE PRIOR TO BEGINNING WORK.



**NOTES:**

1. PRIOR TO REMOVING FIBER OPTIC CABLE FROM CABINET, RECORD EXISTING SPLICES AND COMPARE TO PROVIDED SPLICE PLAN FOR 07-0573. IF DIFFERENCES BETWEEN THE RECORDED INFORMATION & THE PROVIDED INFORMATION EXIST, SPLICE BACK TO RECORDED INFORMATION. PROVIDE AS-BUILT PLANS TO THE ENGINEER.
2. REMOVE EXISTING FIBER OPTIC CABLES FROM EXISTING SIGNAL CABINET AND BACK PULL TO NEAREST DUKE POWER POLE.
3. RELOCATE EXISTING CABLES TO NEW SIGNAL POLE AND NEW POLE MOUNTED SIGNAL CABINET AS SHOWN. TERMINATE RELOCATED CABLES IN NEW INTERCONNECT CENTER. REUSE EXISTING TRANSCEIVER IN NEW CABINET.
4. ENSURE THAT FIBER OPTIC CABLE IS RETERMINATED AND OPERATIONAL WITHIN 48 HOURS OF RELOCATING CABLE.

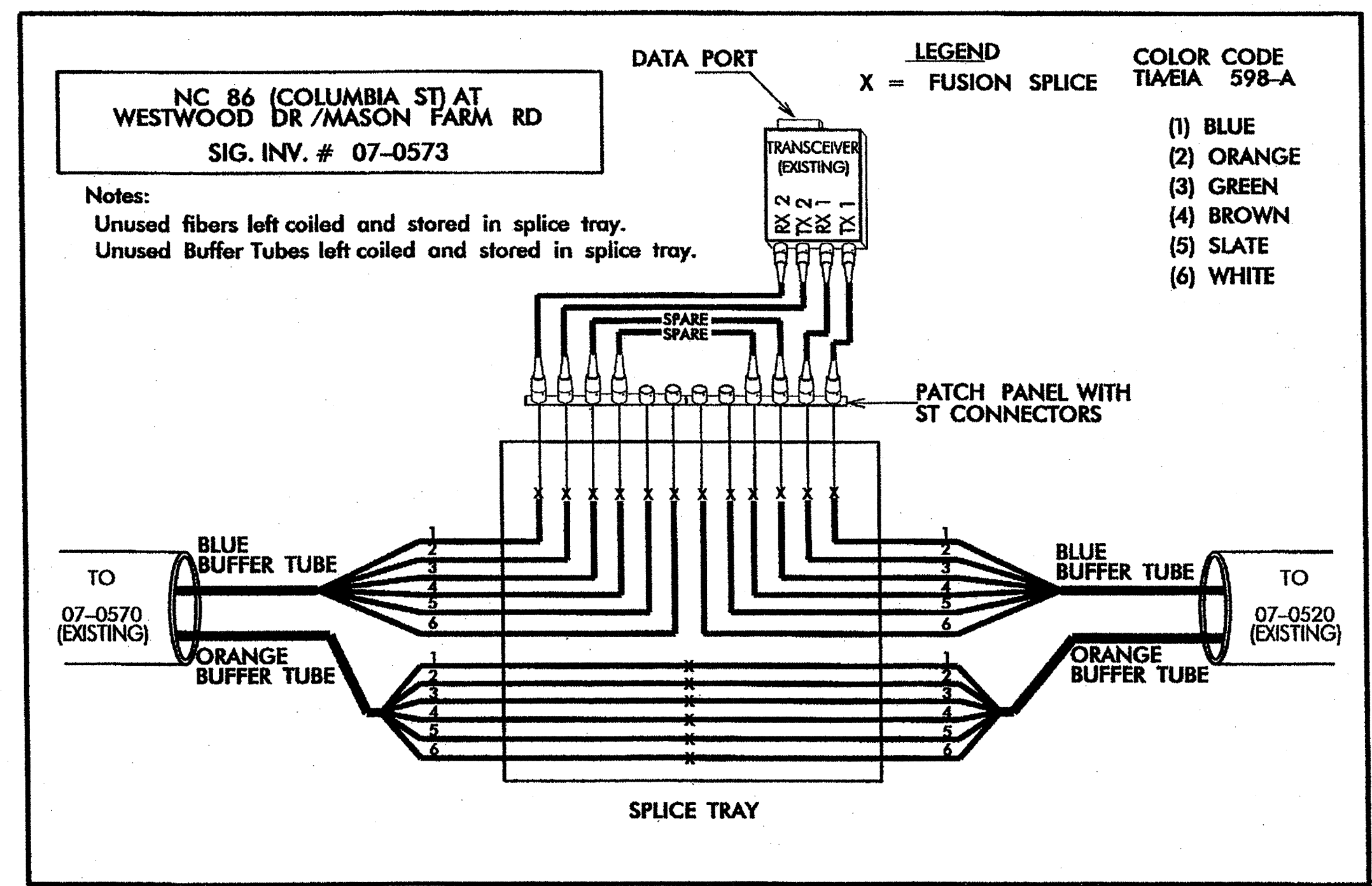
ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

**CONSTRUCTION PHASE I**

	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG NC 86 (COLUMBIA STREET)		
	DIVISION 07 ORANGE COUNTY CHAPEL HILL PLAN DATE: JULY 2011 PREPARED BY: S.C. WARDLE	REVIEWED BY: I.N. AVERY REVIEWED BY: G.A. FULLER	
750 N. Greenfield Pkwy., Garner, NC 27529 SCALE: 0	REVISIONS: _____ INIT. DATE _____ _____ INIT. DATE _____	SIGNATURE: _____ DATE: 7/29/11 CADD File name:	SEAL



# FIBER OPTIC CABLE



**CONTACT KUMAR NEPPALI, PROJECT MANAGER – TOWN OF CHAPEL HILL TRAFFIC ENGINEERING (919-969-5093), PRIOR TO REMOVING ANY CABLE. PROVIDE 5 DAYS ADVANCE NOTICE PRIOR TO BEGINNING WORK.**

**NOTES:**

1. REUSE EXISTING TRANSCEIVER AND INSTALL WITH NEW INTERCONNECT CENTER.
2. PRIOR TO REMOVING FIBER OPTIC CABLE FROM CABINET, RECORD EXISTING SPLICES AND COMPARE TO PROVIDED SPLICE PLAN FOR 07-0573. IF DIFFERENCES BETWEEN THE RECORDED INFORMATION & THE PROVIDED INFORMATION EXIST, SPLICE BACK TO RECORDED INFORMATION. PROVIDE AS-BUILT PLANS TO THE ENGINEER.
4. ENSURE THAT FIBER OPTIC CABLE IS RETERMINATED AND OPERATIONAL WITHIN 48 HOURS OF RELOCATING CABLE.

**TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS**

**CONSTRUCTION PHASE I**

	<b>SLICE PLAN</b> <b>ALONG NC 86 (COLUMBIA STREET)</b>		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER GREGORY A. FULLER 023919
	DIVISION 07 ORANGE COUNTY CHAPEL HILL		PLAN DATE: JULY 2011 REVIEWED BY: I.N. AVERY
	PREPARED BY: S.C. WARDLE	REVIEWED BY: G.A. FULLER	REVISIONS INIT. DATE

SCALE: 0

CADD File Name: 7/29/11