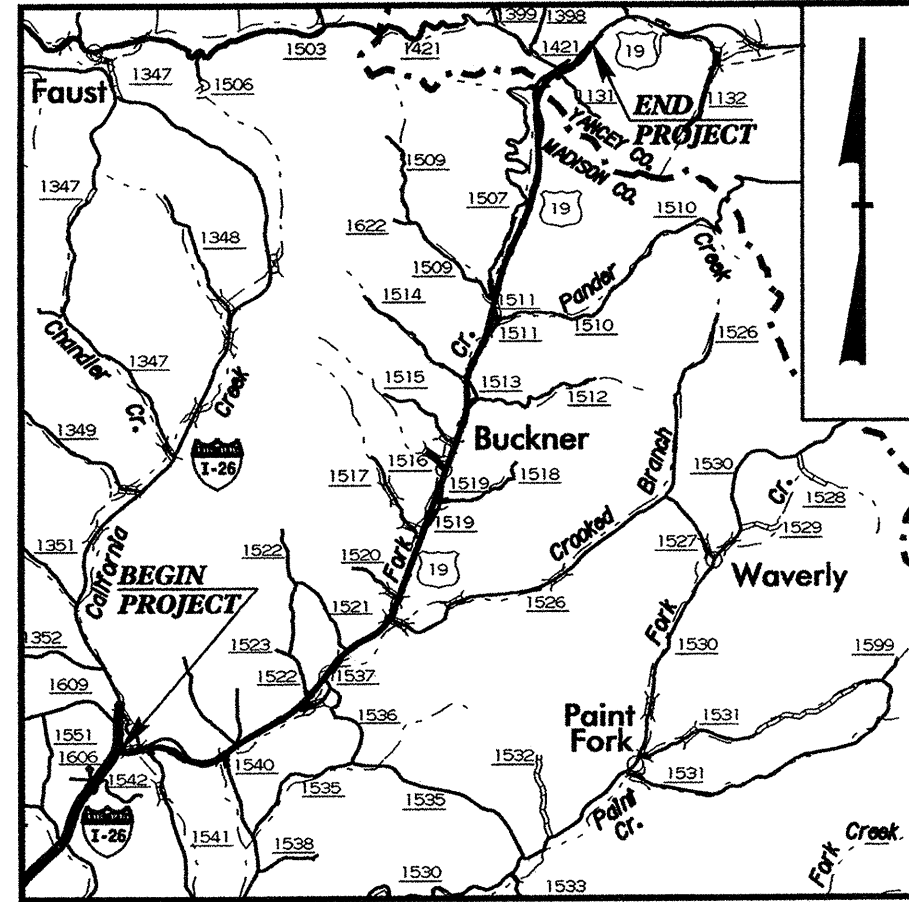


**PROJECT: R-2518A**

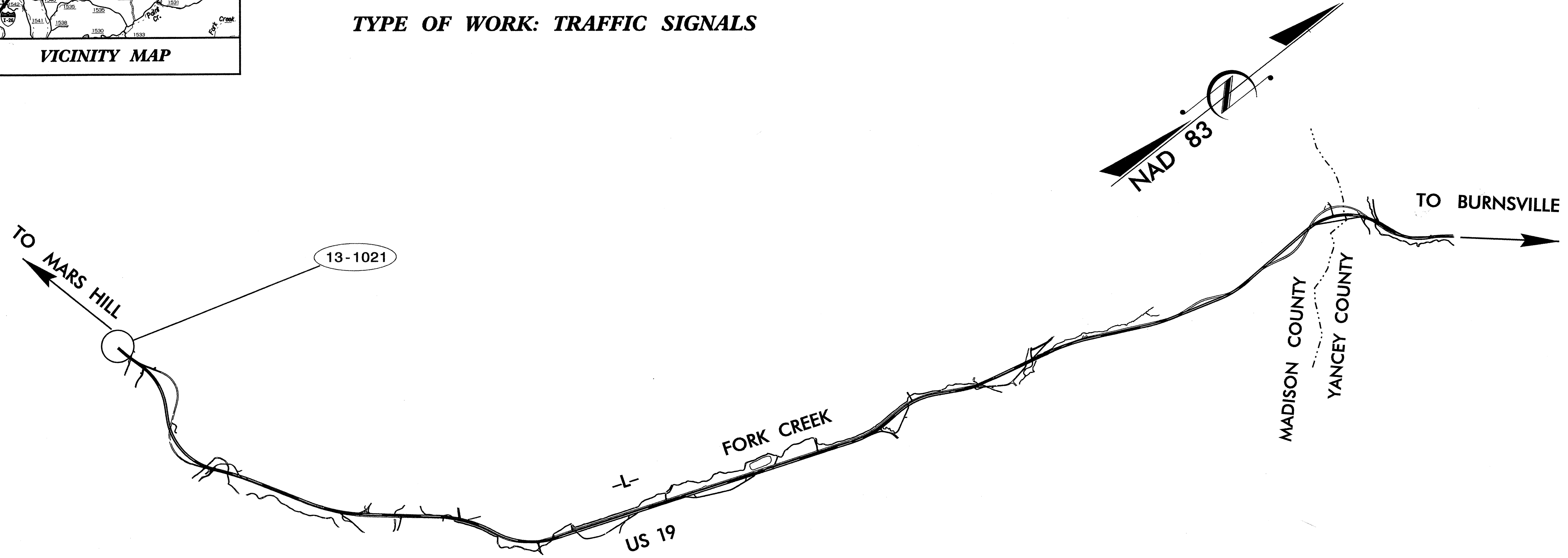
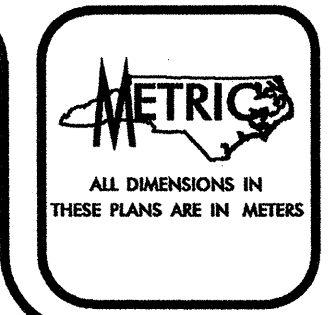


VICINITY MAP

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  
**MADISON COUNTY**

LOCATION: US 19 FROM I-26 TO 0.8 KM EAST OF THE YANCEY CO. LINE  
 TYPE OF WORK: TRAFFIC SIGNALS

STATE N.C.	PROJECT NO. R-2518A	SHEET NO. Sig. 1
	F.A. PROJ. NO. PROJECT ID. NO.	



INDEX OF PLANS

SHEET NO.	SIGNAL INVENTORY NO.	LOCATION /DESCRIPTION
SIG. 1	NA	Title Sheet
SIG. 2-3	13-1021	US 19 at US 23A/Crossroads Parkway

2006 STANDARD SPECIFICATIONS

LEGEND

##-#### SIGNAL INVENTORY NUMBER

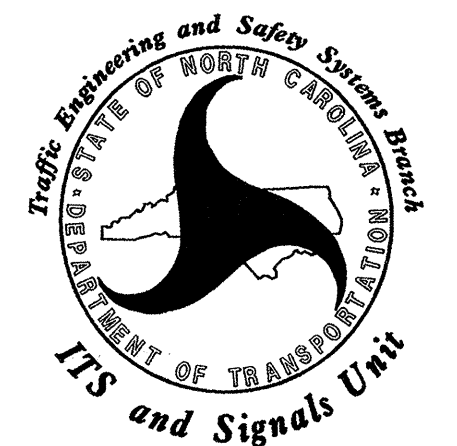
NCDOT CONTACTS:

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

Timothy J. Williams, PE - S&G Contracts & PEF Support Engineer

George C. Brown, PE - Signal Equipment Design Engineer

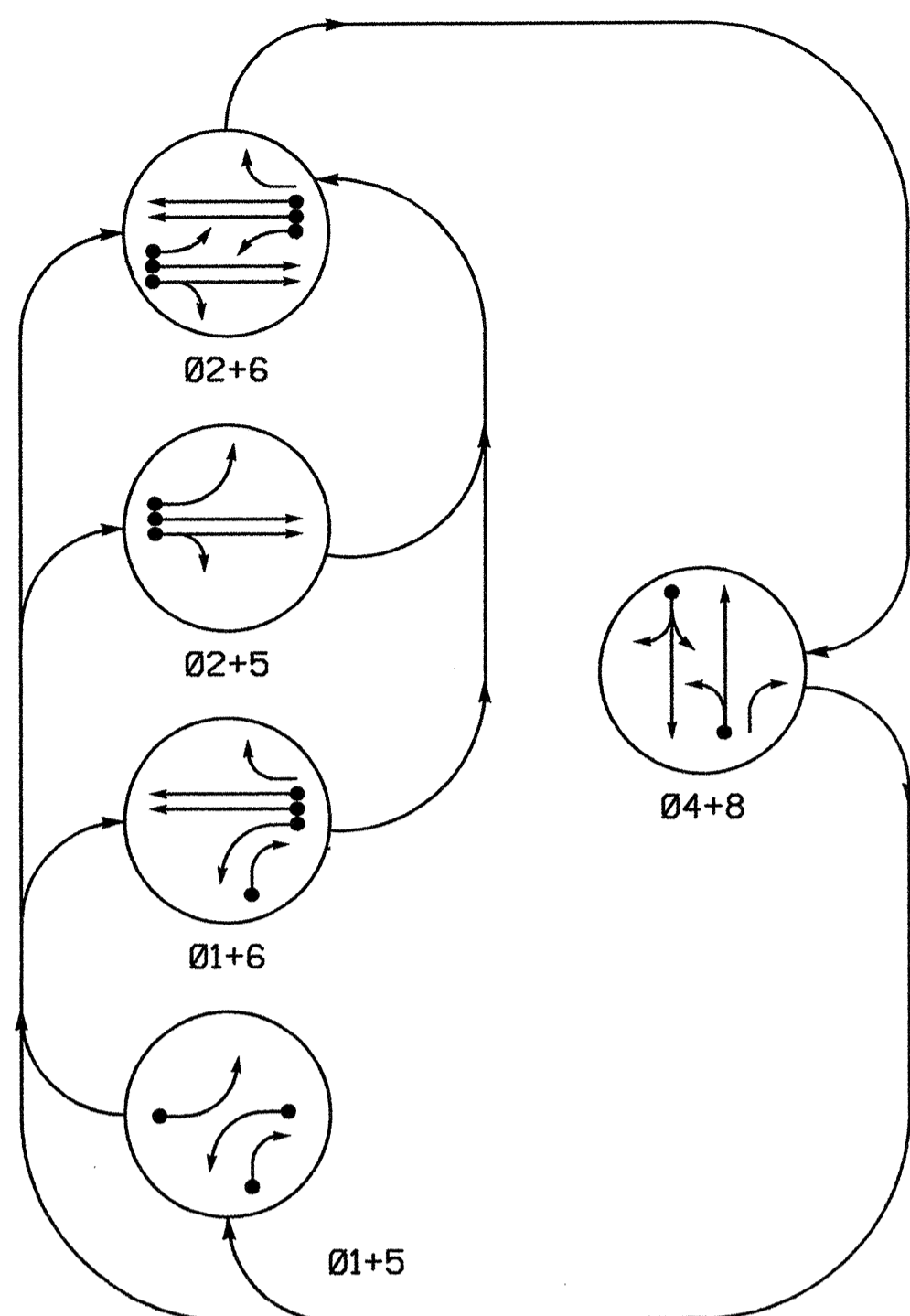
Prepared in the Office of:



750 N. Greenfield Parkway, Garner, NC 27529

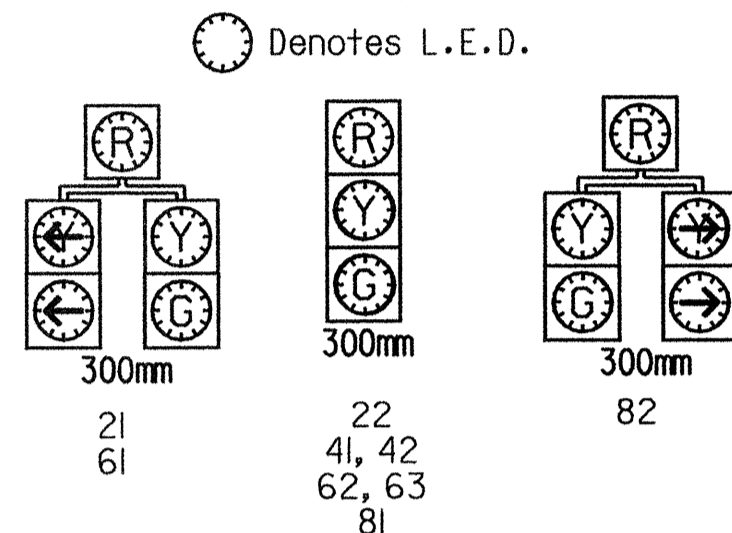


**PHASING DIAGRAM**



SIGNAL FACE	PHASE				
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8
21	R	R	G	G	Y
22	R	R	G	G	Y
41, 42	R	R	R	R	G
61	R	G	R	G	Y
62, 63	R	G	R	G	Y
81	R	R	R	R	G
82	R	R	R	R	G

**SIGNAL FACE I.D.**



**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (M)	DISTANCE FROM STOPBAR (M)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	LOOP SYSTEM	NEW CARD
1A	1.8X12.0	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
1B	1.8X18.0	0	2-4-2	-	6	Y	Y	Y	-	3	-	Y
2A	1.8X1.8	104	5	-	2	Y	Y	-	-	-	-	Y
2B	1.8X1.8	104	5	-	2	Y	Y	-	-	-	-	Y
4A	1.8X18.0	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
4B	1.8X1.8	0	4	-	4	Y	Y	-	-	15	-	Y
5A	1.8X18.0	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	1.8X1.8	130	5	Y	6	Y	Y	-	-	-	-	Y
6B	1.8X1.8	130	5	Y	6	Y	Y	-	-	-	-	Y
8A	1.8X18.0	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

**5 Phase Fully Actuated (Isolated)**

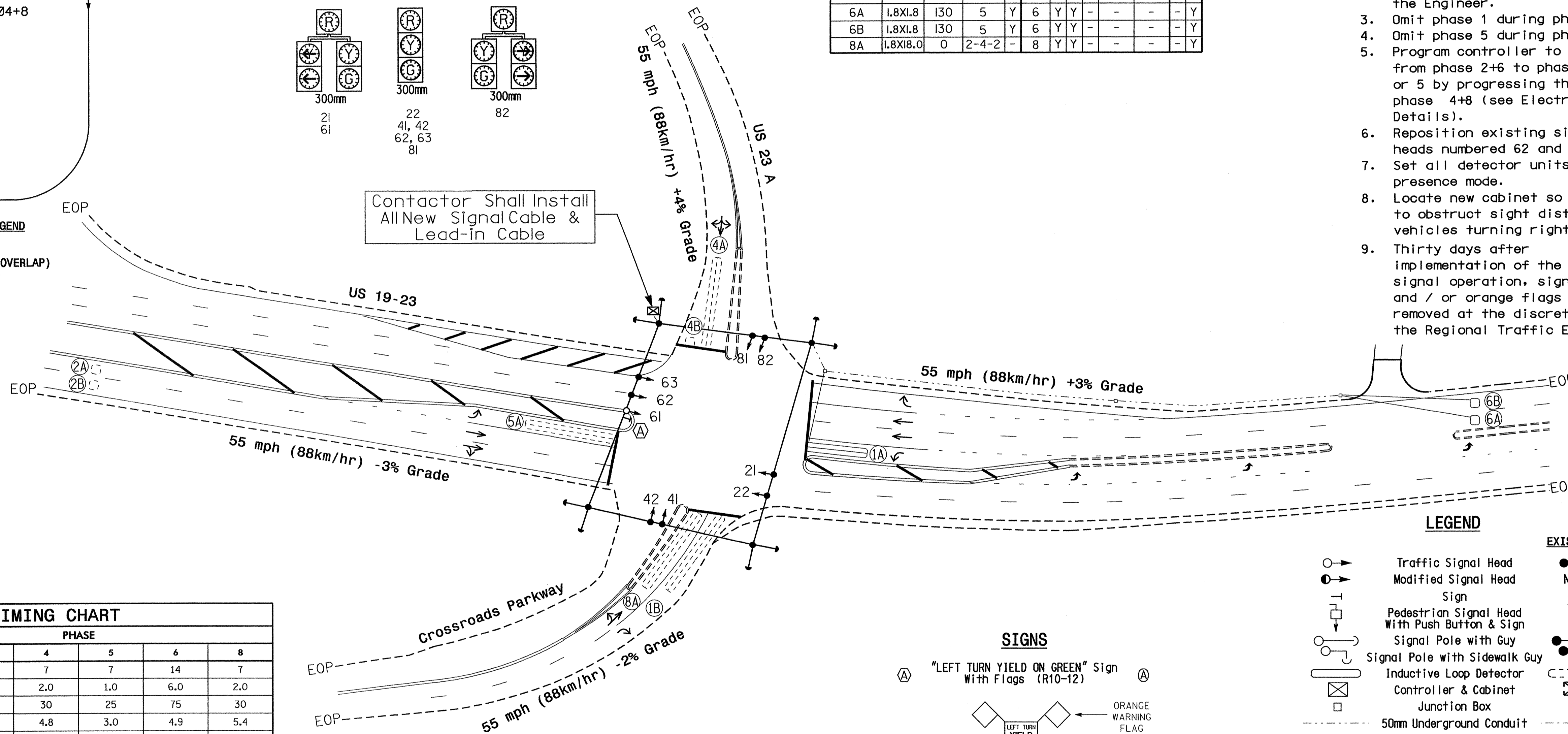
**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Omit phase 1 during phase 2 on.
- Omit phase 5 during phase 6 on.
- Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).
- Reposition existing signal heads numbered 62 and 63.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Thirty days after implementation of the revised signal operation, sign (A) and / or orange flags may be removed at the discretion of the Regional Traffic Engineer.

**PHASING DIAGRAM DETECTION LEGEND**

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

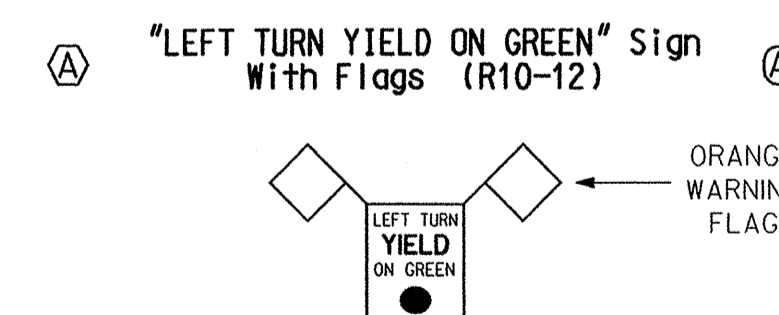
Contactor Shall Install All New Signal Cable & Lead-in Cable



**LEGEND**

- |     |  |     |          |
|-----|--|-----|----------|
| ○→  | Traffic Signal Head                            | ●→  | EXISTING |
| ○→  | Modified Signal Head                           | N/A |          |
| ○   | Sign   | T   |          |
| ○   | Pedestrian Signal Head With Push Button & Sign | ○   |          |
| ○   | Signal Pole with Guy                           | ○   |          |
| ○   | Signal Pole with Sidewalk Guy                  | ○   |          |
| □   | Inductive Loop Detector                        | □   |          |
| □   | Controller & Cabinet                           | □   |          |
| □   | Junction Box                                   | □   |          |
| ○   | 50mm Underground Conduit                       | ○   |          |
| N/A | Right of Way with Marker                       | --- |          |
| →   | Directional Arrow                              | →   |          |
| →   | Pavement Marking Arrow                         | →   |          |

**SIGNS**



FEATURE	PHASE						
	1	2	4	5	6	8	
Min Green 1 *	7	14	7	7	14	7	
Extension 1 *	2.0	6.0	2.0	1.0	6.0	2.0	
Max Green 1 *	15	75	30	25	75	30	
Yellow Clearance	3.0	5.5	4.8	3.0	4.9	5.4	
Red Clearance	3.1	1.2	1.4	3.2	1.4	1.3	
Walk 1 *	-	-	-	-	-	-	
Don't Walk 1	-	-	-	-	-	-	
Seconds Per Actuation *	-	1.5	-	-	1.5	-	
Max Variable Initial *	-	38	-	-	46	-	
Time Before Reduction *	-	15	-	-	15	-	
Time To Reduce *	-	30	-	-	30	-	
Minimum Gap	-	2.3	-	-	3.4	-	
Recall Mode	-	MIN. RECALL	-	-	MIN. RECALL	-	
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-	
Dual Entry	-	-	ON	-	-	ON	
Simultaneous Gap	ON	ON	ON	ON	ON	ON	

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

**Signal Upgrade**

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

**US 19**  
at  
**US 23 A / Crossroads Parkway**  
Madison County Mars Hill

PLAN DATE: July 2007 REVIEWED BY: I.O. Umozurike

PREPARED BY: Luhr REVIEWED BY:

SEAL

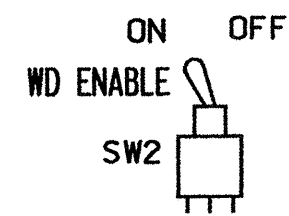
8/2/07

SIGNATURE DATE

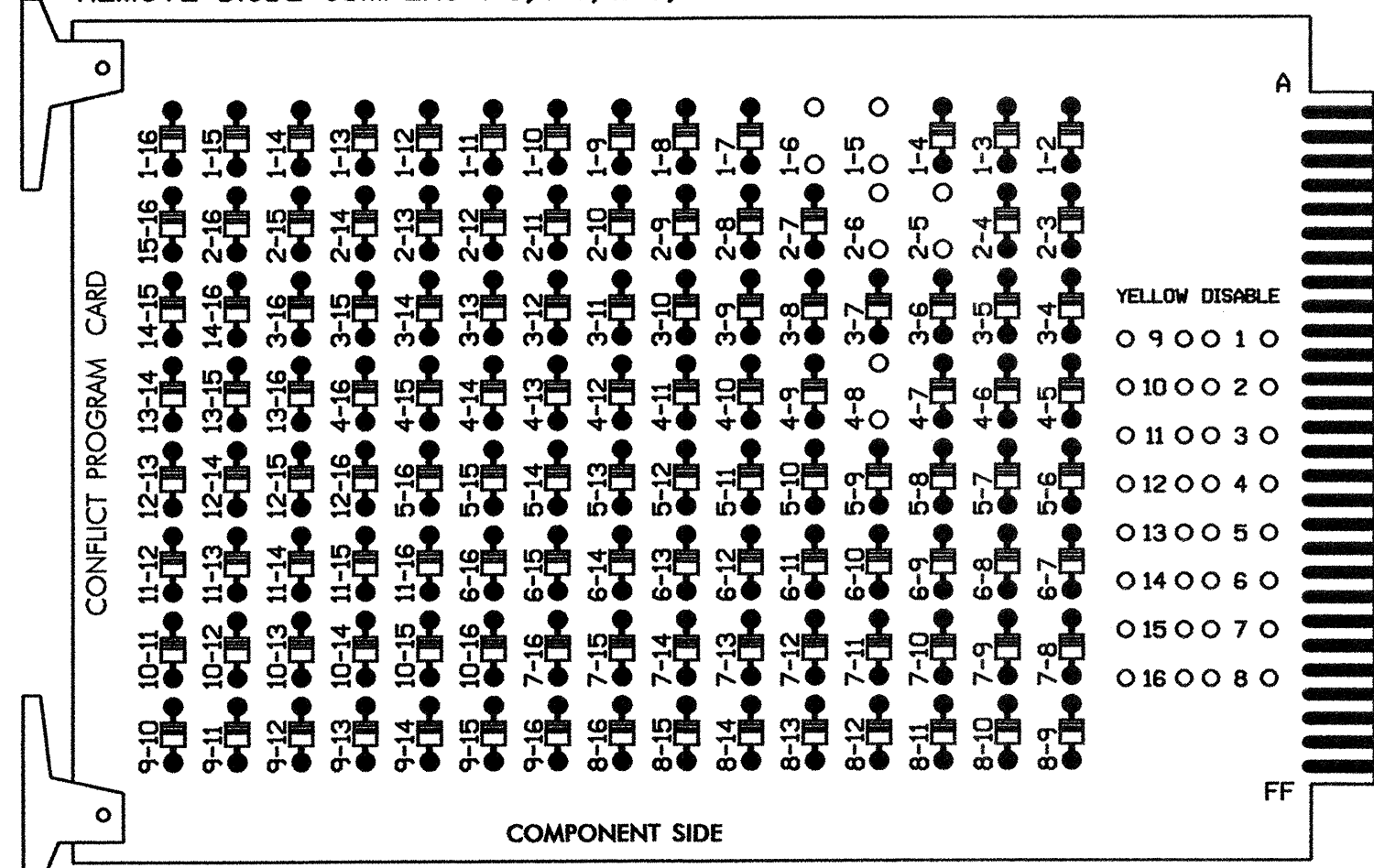
SIG. INVENTORY NO. 13-1021

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

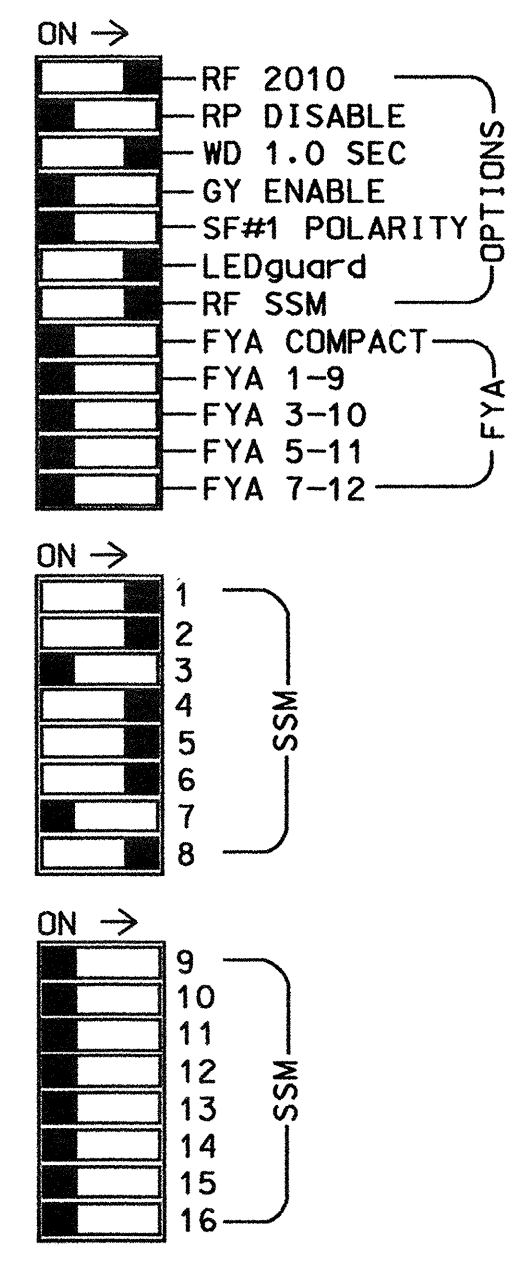
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6 and 4-8.



REMOVE JUMPERS 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.

■ = 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.
- 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 3,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.

### EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8  
 PHASES USED.....1,2,4,5,6,8  
 OVERLAPS.....NONE

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.	61,82	21,22	NU	NU	41,42	NU	21	61, 62,63	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126							132				
GREEN ARROW	127							133				

NU = Not Used

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

### INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE  
 ST = STOP TIME

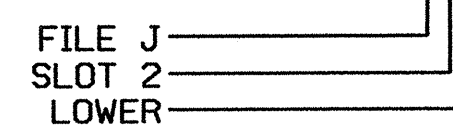
### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y	Y		3
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A <sup>2</sup>	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y	Y		3
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

<sup>1</sup>Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

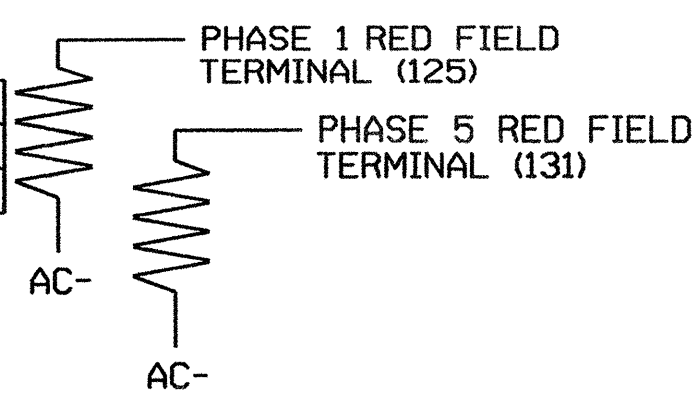
<sup>2</sup>Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

INPUT FILE POSITION LEGEND: J2L



### LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

### DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Functions 1 and 2.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01  
 OVERLAPS:;ABCDEFGHIJKLMNPO  
 IF OVERLAPS ARE ACTIVE ;  
 OR PHASES:;12345678910111213141516  
 IF PHASES ARE ON; X  
 OMIT PHASES ; X  
 CALL PHASES ; X

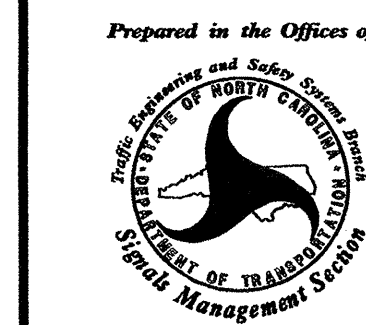
PRESS 'NEXT'

DYNAMIC/BACKUP CONTROL FUNCTION #02  
 OVERLAPS:;ABCDEFGHIJKLMNPO  
 IF OVERLAPS ARE ACTIVE ;  
 OR PHASES:;12345678910111213141516  
 IF PHASES ARE ON; X  
 OMIT PHASES ; X  
 CALL PHASES ; X

BACKUP PROTECTION PROGRAMMING COMPLETE

### Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:



US 19  
 at  
 US 23 A/Crossroads Parkway  
 Division 13 Madison County Mars Hill  
 PLAN DATE: July 2007 REVIEWED BY: T. J. J. J.  
 PREPARED BY: C. Strickland REVIEWED BY:  
 REVISIONS INIT. DATE

SEAL  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 022013  
 GEORGE C. BROWN

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-1021  
 DESIGNED: July 2007  
 SEALED: 08/02/07  
 REVISED: N/A