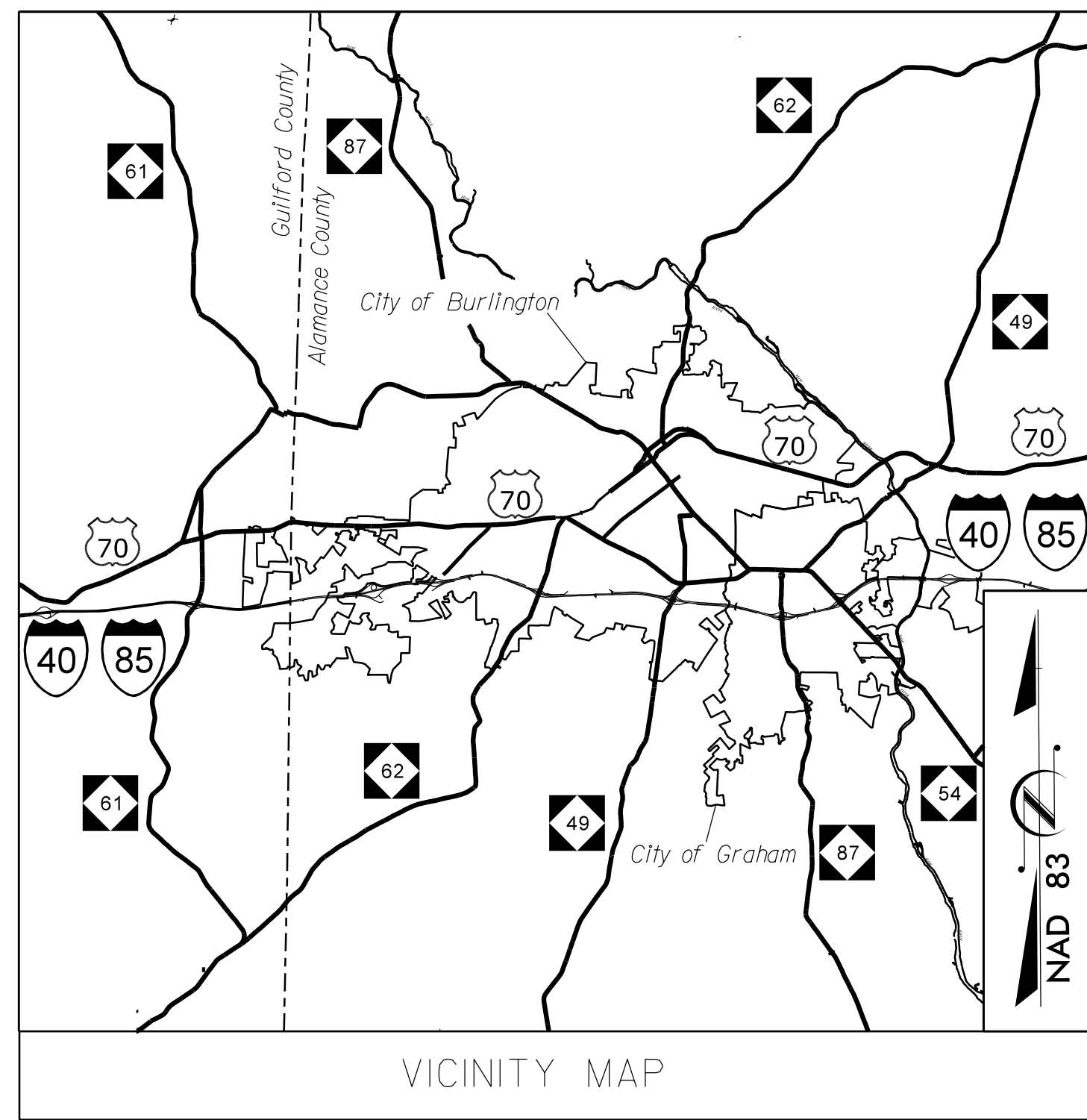


**TIP PROJECT: U-6015**

**CONTRACT: C204111**



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

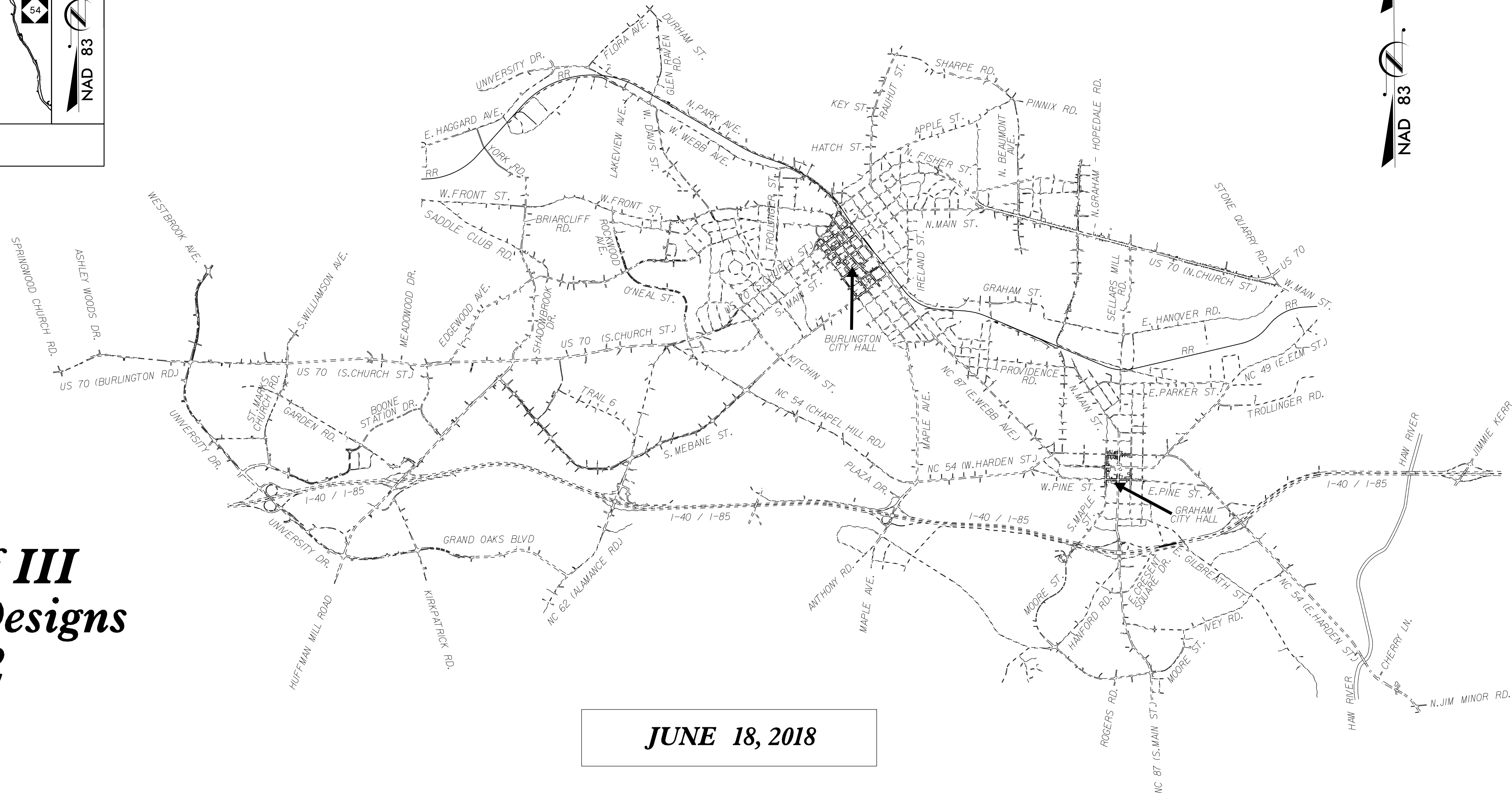
PLANS FOR PROPOSED IMPROVEMENTS  
**CITIES OF BURLINGTON & GRAHAM**  
COMPUTERIZED TRAFFIC SIGNAL SYSTEM

REPLACEMENT OF EXISTING SIGNAL SYSTEM WITH A NEW COMPUTERIZED TRAFFIC SIGNAL SYSTEM.  
RELATED WORK INCLUDES:  
UPGRADING LOCAL INTERSECTION CONTROLLERS, CABINETS, AND SYSTEM DETECTORS WITH LIMITED SIGNAL WIRING AND SIGNAL HEAD UPGRADES WHEN NECESSARY; UPGRADE AND EXPANSION OF CCTV MONITORING NETWORK; INSTALLING CENTRAL EQUIPMENT AND CENTRAL SOFTWARE; AND INSTALLATION OF AN ETHERNET COMMUNICATIONS NETWORK COMPRISED OF FIBER-OPTIC CABLE AND WIRELESS TECHNOLOGY WITH ALL RELATED EQUIPMENT.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6015	Sig. 101.A	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
47160.1.1		PE	
47160.3.1	STBG-0701 (036)	CONST	

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**Volume III of III  
Traffic Signal Designs  
Part 2 of 2**



**JUNE 18, 2018**

2018 STANDARD SPECIFICATIONS  
LETTING DATE: SEPTEMBER 18, 2018  
PROJECT LENGTH = 55 MILES



750 Greenfield Parkway, Garner, NC 27529  
NCDOT CONTACTS:  
TRANSPORTATION MOBILITY & SAFETY DIVISION  
INTELLIGENT TRANSPORTATION SYSTEMS SECTION  
SHERRY YOW - METRO SYSTEMS PROJECT ENGINEER  
WILLIAM B. HAIRSTON, III - PROJECT DESIGN ENGINEER  
CYNTHIA MULDROW - DESIGN ENGINEER

**ATKINS**

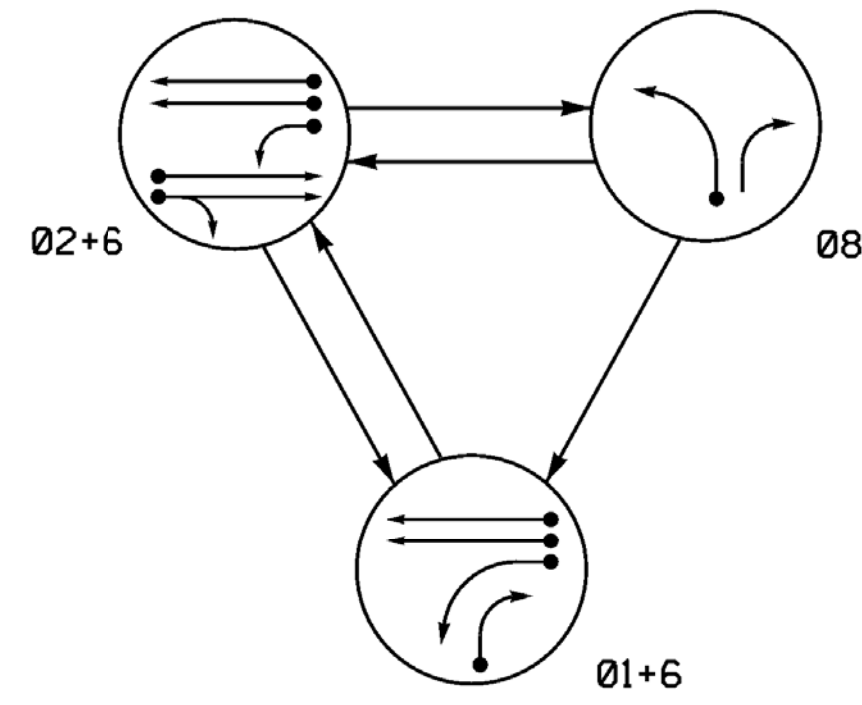
1616 EAST MILLBROOK ROAD, SUITE 160  
RALEIGH, NORTH CAROLINA 27609  
(919) 876-6888 NCBEES #F-0326

MELISSA B. TOTH, PE - ATKINS PROJECT MANAGER  
PAMELA L. ALEXANDER, PE - ATKINS SENIOR PROJECT ENGINEER  
ANTHONY M. ENCARNACION, PE - ATKINS PROJECT ENGINEER



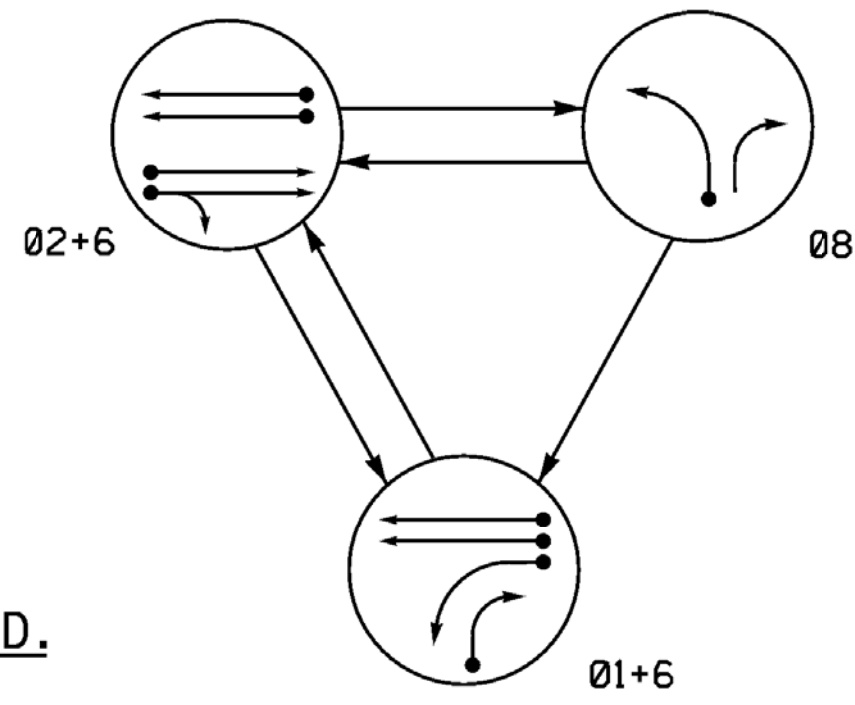
DocuSigned by:  
**Melissa B. Toth** 6/18/2018  
SIGNATURE DATE

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			FLASH
	01+6	02+6	08	
11	Y	R	R	Y
21, 22	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE			FLASH
	01+6	02+6	08	
11	Y	R	R	Y
21, 22	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

ASC/3 DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6x60	0	2-4-2	-	1	Yes	-	15*	-	S	-	X
1B	6x60	0	2-4-2	-	1	Yes	-	15	-	S	-	X
2A,2B	6x6	90	4	-	2	Yes	-	-	-	S	-	X
6A,6B	6x6	90	4	-	6	Yes	-	-	-	S	-	X
8A	6x60	0	2-4-2	-	8	Yes	-	3	-	S	-	X

3 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

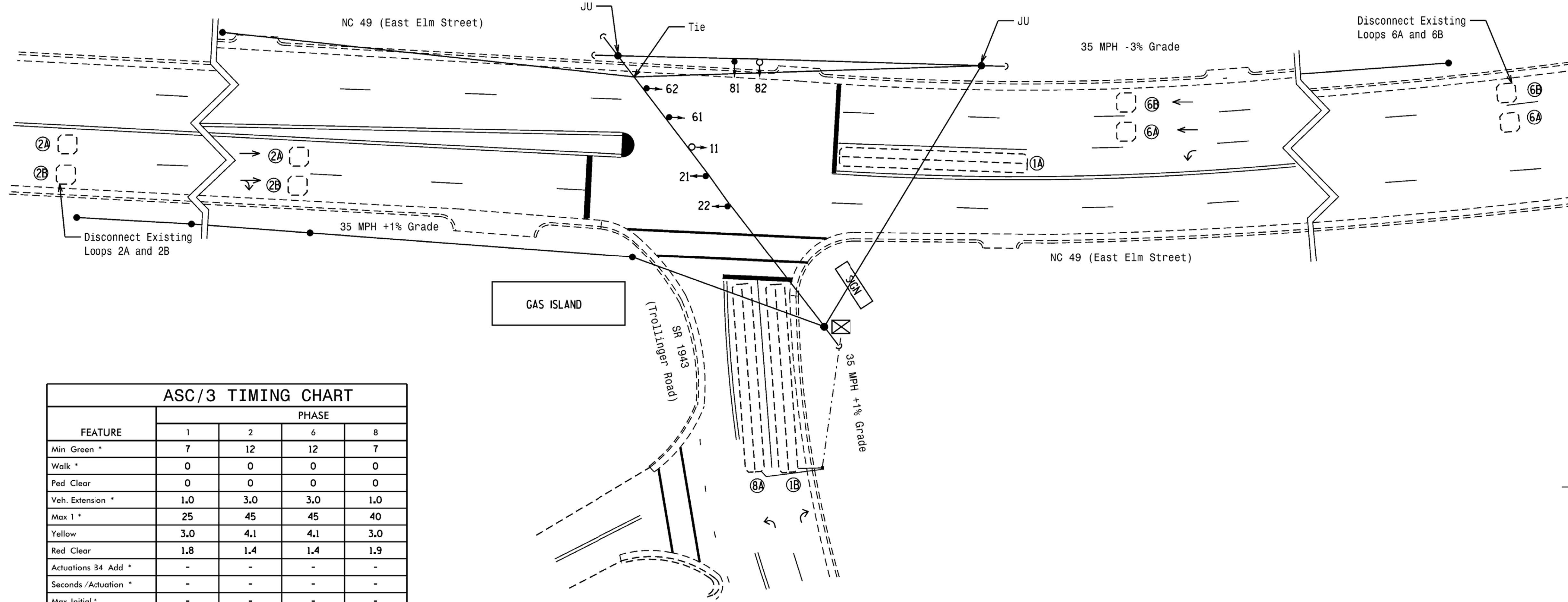
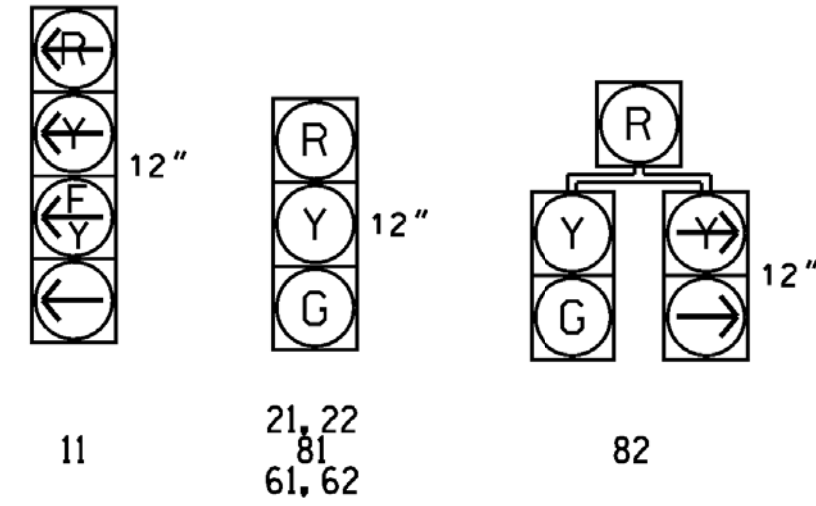
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal heads numbered 41, 61, and 62.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. The City Traffic Engineer will determine the hours of use for each phasing plan.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

- ←● DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- UN SIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Min Green *	7	12	12	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	1.0	3.0	3.0	1.0
Max 1 *	25	45	45	40
Yellow	3.0	4.1	4.1	3.0
Red Clear	1.8	1.4	1.4	1.9
Actuations 34 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	X	X	-
Recall Position	-	VEH. RECALL	VEH. RECALL	-
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

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

LEGEND

- | PROPOSED   | EXISTING |
|--|----------|
| ○ → Traffic Signal Head                          | ● → N/A  |
| ○ → Modified Signal Head                         | ○ → N/A  |
| ⊥ Sign   | ⊥ N/A    |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ N/A    |
| ⊥ Metal Strain Pole                              | ⊥ N/A    |
| ⊥ Signal Pole with Guy                           | ⊥ N/A    |
| ⊥ Signal Pole with Sidewalk Guy                  | ⊥ N/A    |
| ▭ Inductive Loop Detector                        | ▭ N/A    |
| ⊠ Controller & Cabinet                           | ⊠ N/A    |
| □ Junction Box                                   | □ N/A    |
| --- 2-in Underground Conduit                     | --- N/A  |
| N/A Right of Way                                 | N/A      |
| → Directional Arrow                              | →        |

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*USER\*\*\*\*\*  
 \*\*\*\*\*DATE\*\*\*\*\*



12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

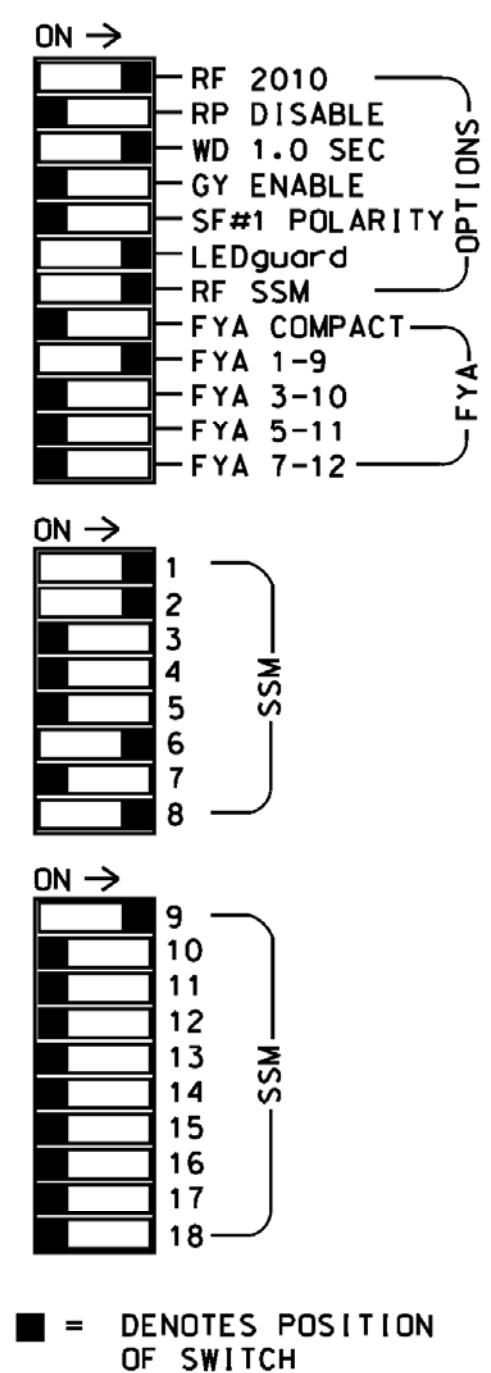
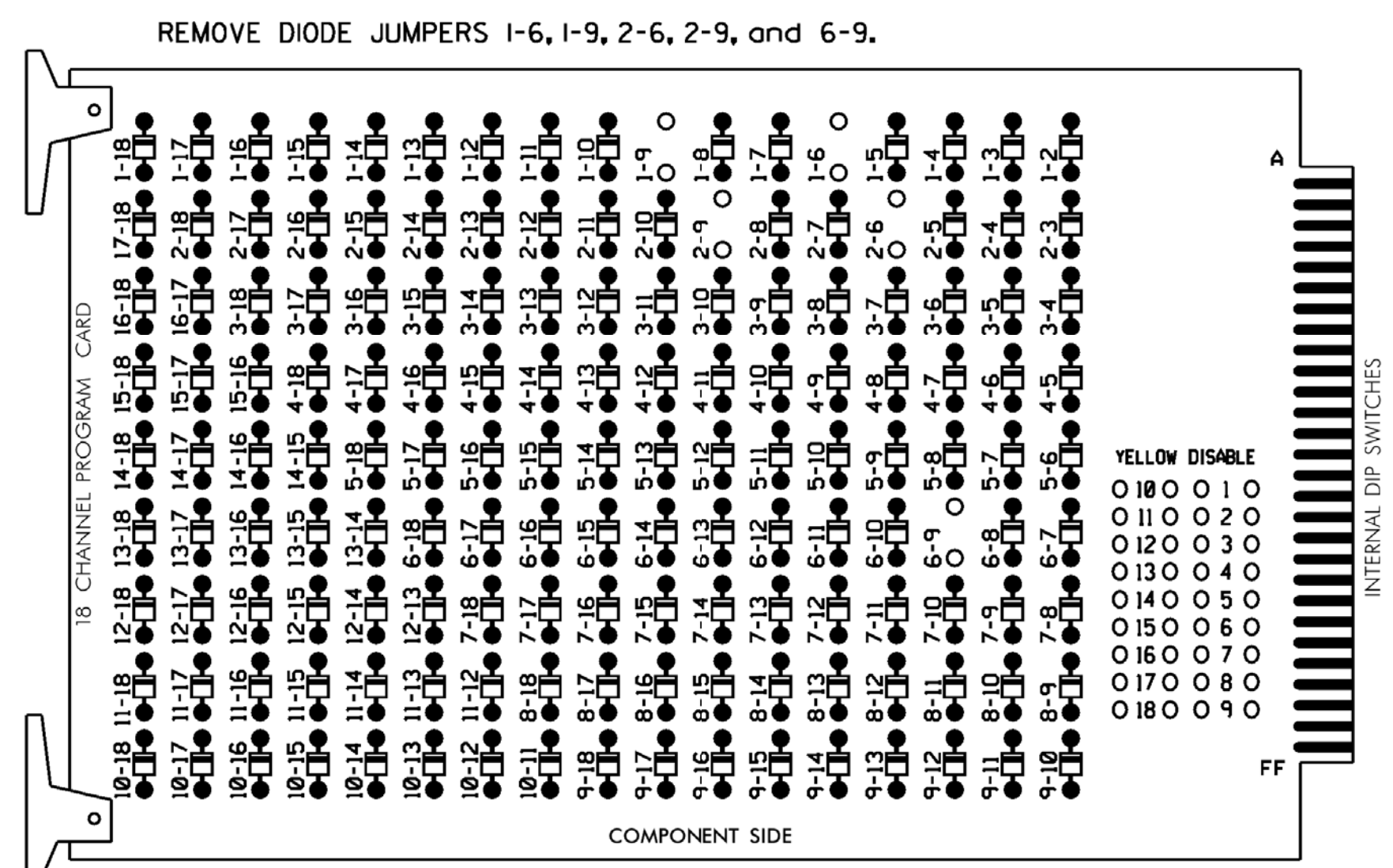
Signal Upgrade

	NC 49 (East Elm Street) at SR 1943 (Trollinger Road)		SEAL JAMES B. VOSO ENGINEER 022599 6/13/2018
	Division 7 Alamance County Graham	PLAN DATE: March 2018 PREPARED BY: SE Greene	REVIEWED BY: JB Voso REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EDI MODEL 2018ECLip-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.
  - Integrate monitor with Ethernet network in cabinet.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S8,S11,AUX S1  
 PHASES USED.....1,2,6,8  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED

\* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CNU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11	NU	NU	NU	NU
RED	*	128							134			107						
YELLOW		129							135			108						
GREEN		130							136			109						
RED ARROW													A121					
YELLOW ARROW		126											A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127	127																

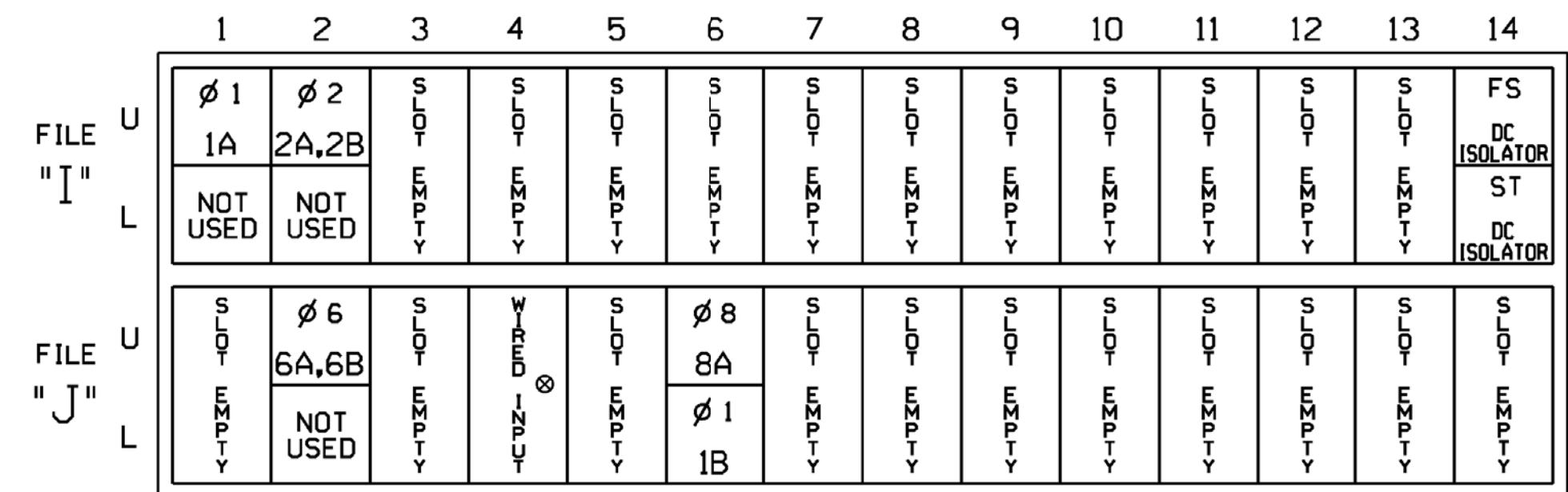
NU = Not Used

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

\* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

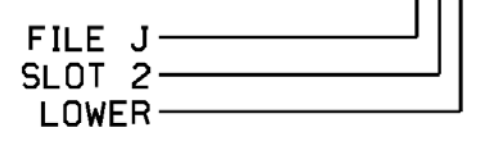
⊗ Wired Input - Do not populate slot with detector cord

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	I1U	56	1 *	1	YES		15		S
		J4U	48	26 *	6	YES				S
2A,2B	TB2-5,6	I2U	39	2	2	YES				S
6A,6B	TB3-5,6	J2U	40	6	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		3		S
1B	TB5-11,12	J6L	46	18	1	YES		15		S

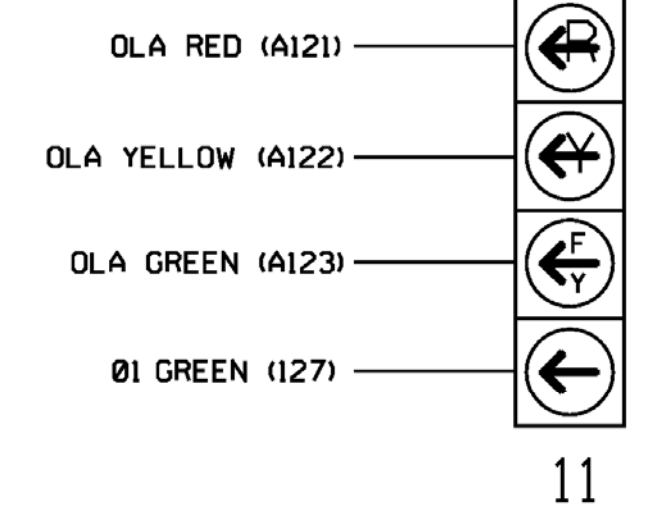
- <sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
 \* For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 3.

INPUT FILE POSITION LEGEND:



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

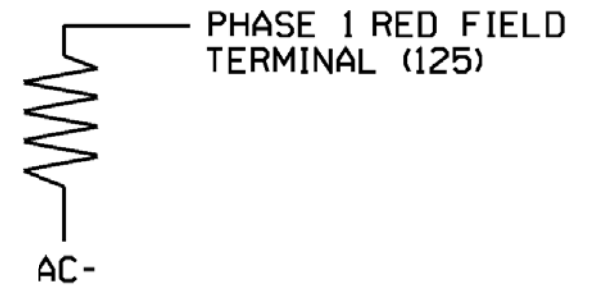


LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

ACCEPTABLE VALUES

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



Electrical Detail - Sheet 1 of 4

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1056  
 DESIGNED: March 2018  
 SEALED: 6/13/2018  
 REVISED: NA

**Mattern & Craig**  
 ENGINEERS • SURVEYORS  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

ELECTRICAL AND PROGRAMMING DETAILS FOR:  
 Prepared for the Offices of:  
  
 150 N. Greenfield Pkwy, Garner, NC 27529

NC 49 (East Elm Street) at SR 1943 (Trollinger Road)  
 Division 7 Alamance County Graham  
 PLAN DATE: March 2018 REVIEWED BY: JB Voso  
 PREPARED BY: SE Greene REVIEWED BY:  
 REVISIONS: INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
  
 James Voso  
 6/13/2018  
 DATE  
 SIG. INVENTORY NO. 07-1056

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*D\*\*\*\*\*  
 \*\*\*\*\*USER\*\*\*\*\*

**ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL**  
*(program controller as shown)*

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

*OVERLAP A*

Select TMG VEH OVLP [A] and 'PPLT FYA'

```

TMG VEH OVLP...[A] TYPE: ....PPLT FYA
PROTECTED LEFT TURN... PHASE 1
OPPOSING THROUGH..... PHASE 2


FLASHING ARROW OUTPUT.....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 1
    
```

← NOTICE ACTION  
PLAN SF BIT "1"

END PROGRAMMING


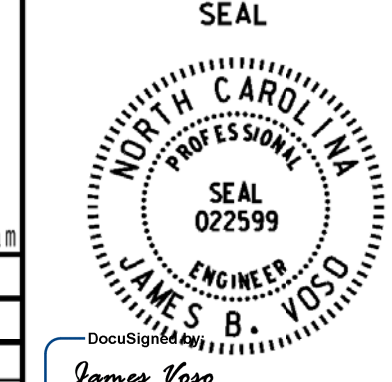
THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1056  
 DESIGNED: March 2018  
 SEALED: 6/13/2018  
 REVISED: NA

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*USER\*\*\*\*\*



**Mattern & Craig**  
 ENGINEERS • SURVEYORS  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

Electrical Detail - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	NC 49 (East Elm Street) at SR 1943 (Trollinger Road)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Division 7 Alamance County Graham	SEAL  JAMES B. VOSO ENGINEER SEAL 022599 6/13/2018	
PLAN DATE: March 2018 PREPARED BY: SE Greene	REVIEWED BY: JB Voso	REVISIONS INIT. DATE	SIG. INVENTORY NO. 07-1056



## ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

### ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 1.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 1.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	1

**IMPORTANT:** IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BIT 1 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BIT 1:                      Modifies overlap parent phase for head 11 to run protected turns only.

VEH DET PLAN 2:            Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

ACTION PLAN...[ 1]

PATTERN.....AUTO    SYS OVERRIDE.... NO

TIMING PLAN..... 0    SEQUENCE..... 0

VEH DETECTOR PLAN.. 2    DET LOG.....NONE

FLASH..... --    RED REST..... NO

VEH DET DIAG PLN... 0    PED DET DIAG PLN..0

DIMMING ENABLE.. NO    PRIORITY RETURN. NO

PED PR RETURN.. NO    QUEUE DELAY..... NO

PMT COND DELAY    NO

PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
PED RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
WALK 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
VEX 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
VEH RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MAX RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MAX 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
MAX 3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CS INH	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
OMIT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SPC FCT	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AUX FCT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.




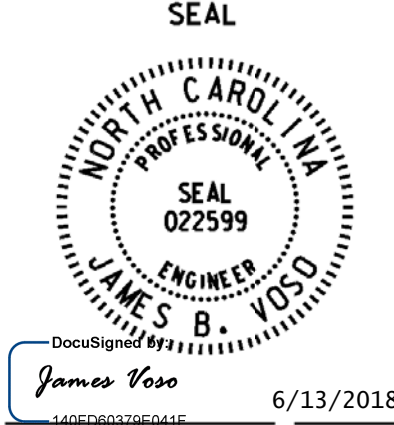
**Mattern & Craig**  
ENGINEERS • SURVEYORS

12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201  
FAX (828) 254-4562  
NC LIC. NO. C-1154

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-1056  
DESIGNED: March 2018  
SEALED: 6/13/2018  
REVISED: NA

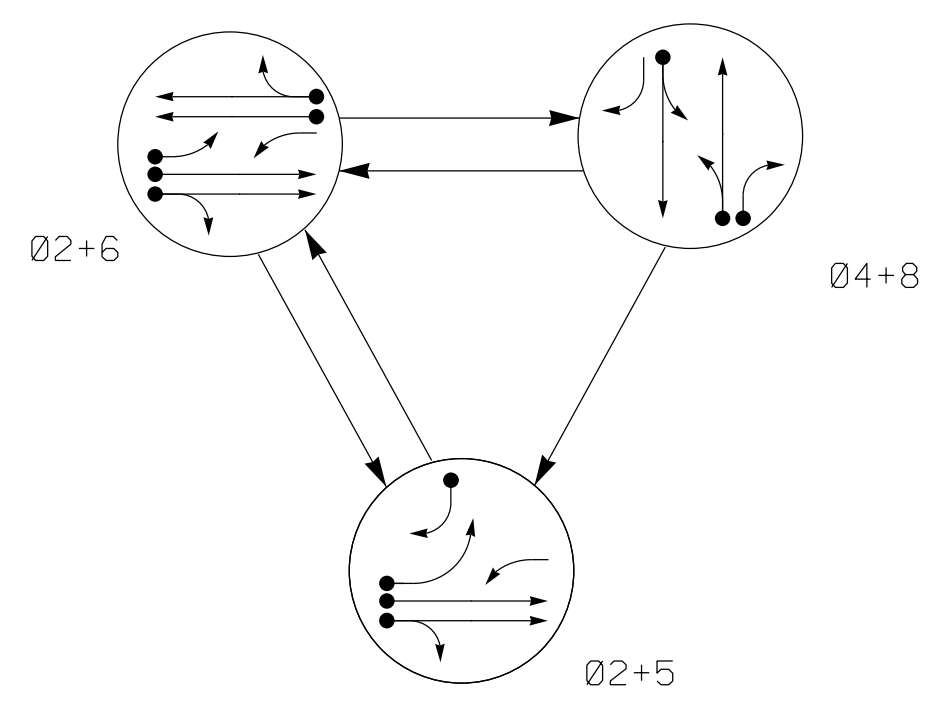
Electrical Detail - Sheet 4 of 4

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of:</p>  <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 49 (East Elm Street) at SR 1943 (Trollinger Road)</p> <p style="font-size: x-small;">Division 7      Alamance County      Graham</p> <p style="font-size: x-small;">PLAN DATE: March 2018      REVIEWED BY: JB Voso</p> <p style="font-size: x-small;">PREPARED BY: SE Greene      REVIEWED BY:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> <tr> <td style="height: 20px;"> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE				<p style="font-size: x-small;">SEAL</p>  <p style="font-size: x-small;">James Voso      6/13/2018</p> <p style="font-size: x-small;">DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1056</p>
REVISIONS	INIT.	DATE						

\*\*\*\*\*SYSTEMS\*\*\*\*\*  
\*\*\*\*\*USER\*\*\*\*\*

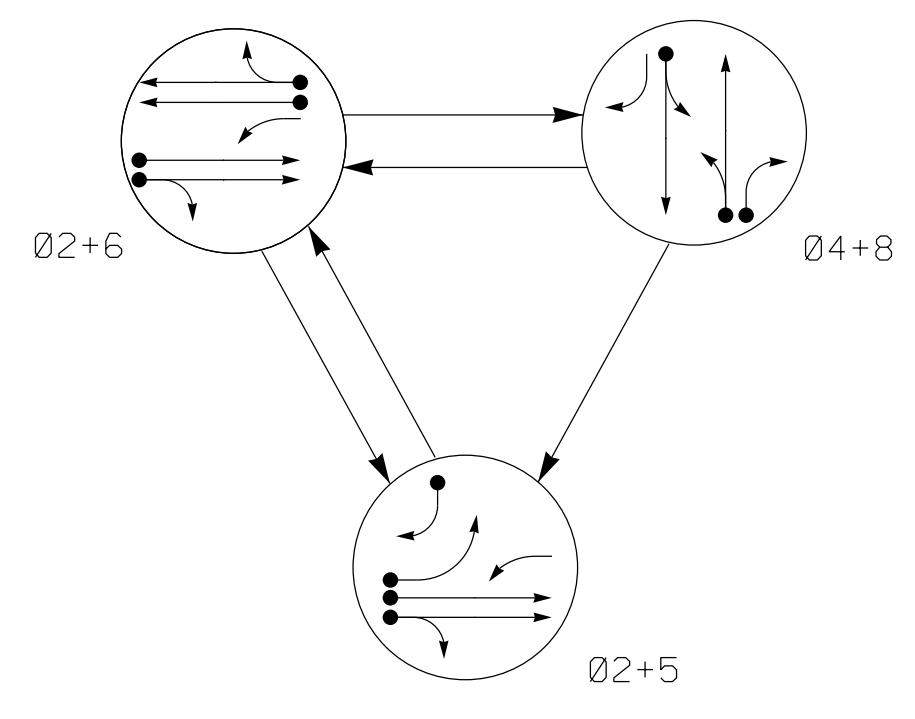
**DEFAULT PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	02+5
21,22	G	G	R	Y
41,42	R	R	G	R
51	←	←	←	←
61	←	←	←	←
62,63	R	G	R	Y
81,82	R	R	G	R

**ALTERNATE PHASING DIAGRAM**



**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	02+5
21,22	G	G	R	Y
41,42	R	R	G	R
51	←	←	←	←
61	←	←	←	←
62,63	R	G	R	Y
81,82	R	R	G	R

**ASC/3 DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A,2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X40	+5	2-4-2	-	4	Yes	-	-	-	S	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	*15	-	G	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
6A,6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	3	-	S	-	X
8B	6X40	+5	2-4-2	-	8	Yes	-	15	-	S	-	X

**3 Phase Fully Actuated (Burlington-Graham Signal System)**

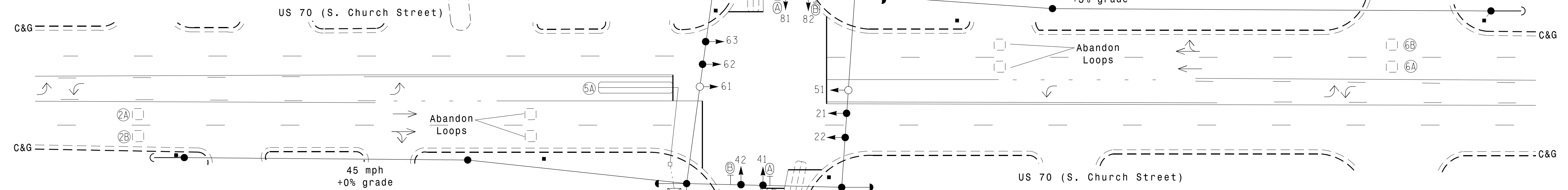
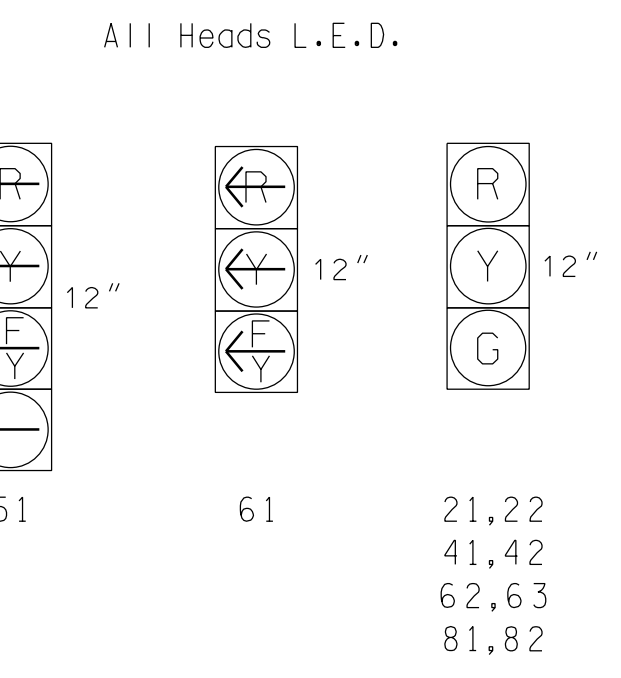
**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 62 and 63.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. The City Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

**PHASING DIAGRAM DETECTION LEGEND**

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

**SIGNAL FACE I.D.**



**ASC/3 TIMING CHART**

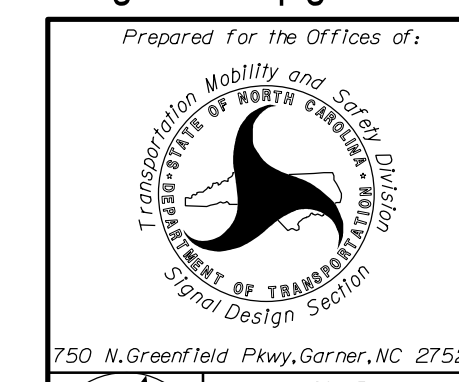
FEATURE	PHASE				
	2	4	5	6	8
Min Green *	12	7	7	12	7
Walk *	0	0	0	0	0
Ped Clear	0	0	0	0	0
Veh. Extension *	6.0	2.0	2.0	6.0	2.0
Max I *	90	20	20	90	20
Yellow	4.5	4.0	3.0	4.5	4.2
Red Clear	1.0	1.5	2.4	1.0	1.5
Actuations B4 Add *	0	-	-	0	-
Seconds / Actuation *	2.0	-	-	2.0	-
Max Initial *	34	-	-	34	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.0	-	-	3.0	-
Locking Detector	X	-	-	X	-
Recall Position	VEH. RECALL	-	-	VEH. RECALL	-
Dual Entry	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X

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

**LEGEND**

- | PROPOSED   | EXISTING   |
|--|--|
| ○ → Traffic Signal Head                              | ● → Traffic Signal Head                              |
| ○ → Modified Signal Head                             | N/A  |
| ⊥ Sign   | ⊥ Sign   |
| ⊥ Pedestrian Signal Head 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                               | ⊥ Controller & Cabinet                               |
| ⊥ Junction Box                                       | ⊥ Junction Box                                       |
| ⊥ 2-in Underground Conduit                           | ⊥ 2-in Underground Conduit                           |
| N/A Right of Way                                     | --- Right of Way                                     |
| → Directional Arrow                                  | → Directional Arrow                                  |
| (A) Combination Through and Left Arrows Sign (R3-6L) | (A) Combination Through and Left Arrows Sign (R3-6L) |
| (B) Right Arrow "ONLY" Sign (R3-5R)                  | (B) Right Arrow "ONLY" Sign (R3-5R)                  |

**Signal Upgrade**



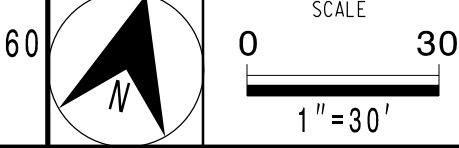
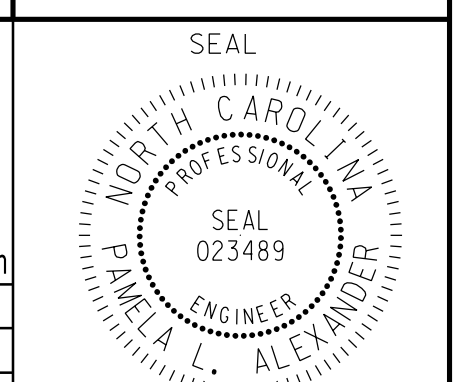
**US 70 (S. Church Street) at Gurney Street**

Division 7 Alamance County Burlington

PLAN DATE: January 2018 REVIEWED BY: AM Encarnacion

PREPARED BY: VJ Paul REVIEWED BY: PL Alexander

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

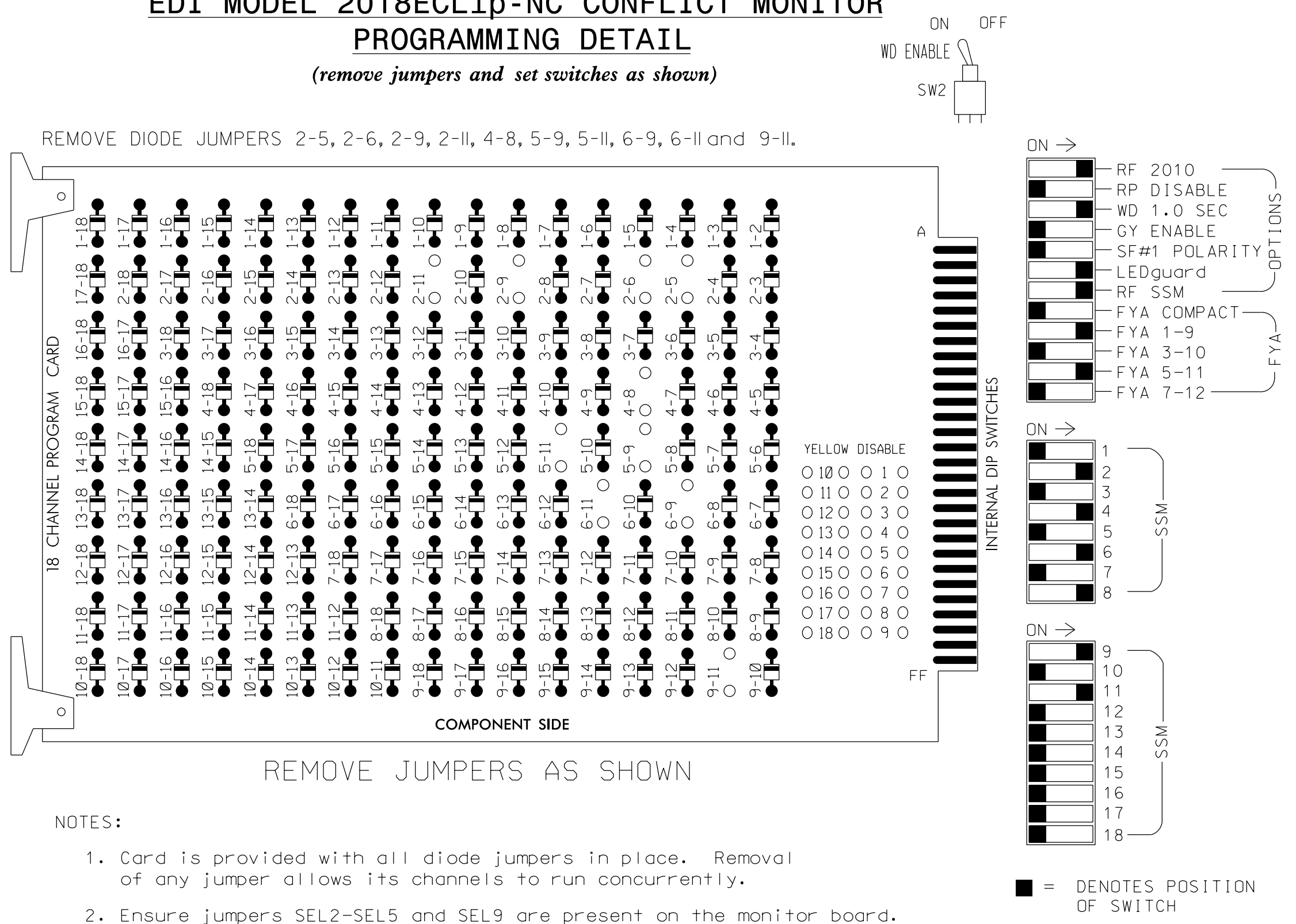


**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

07-JUN-2018 11:15 D:\Projects\2018\11115\11115\Task\Traffic\Signal\00056469 U-6015 B-G S19 SystemTask 05\_11\_Signal\Des\gpm07-1062.dgn ALEX3361 AT LUS510649

### EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 and 9-11.
- 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.
  - Integrate monitor with Ethernet network in cabinet.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

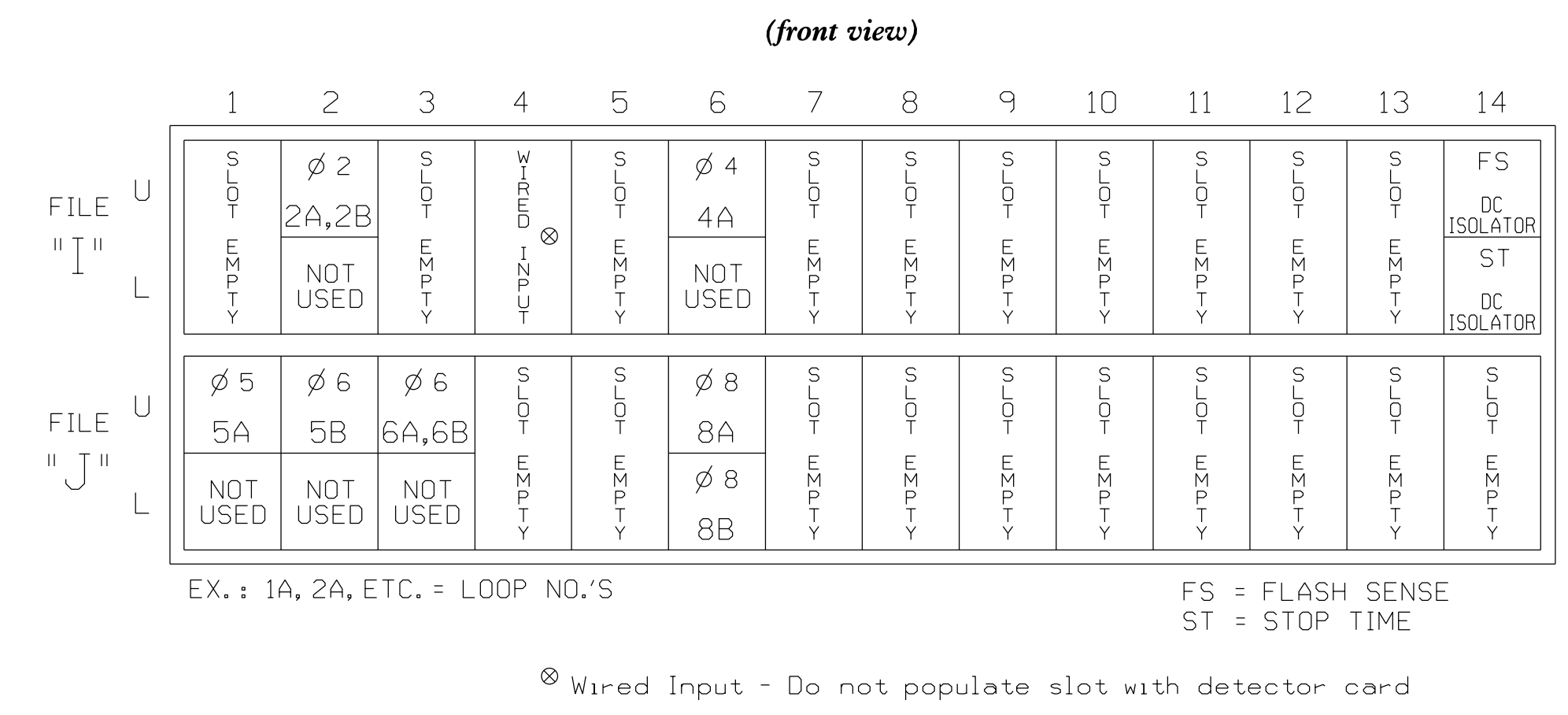
CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S5,S7,S8,S11,AUX S1  
 AUX S4  
 PHASES USED.....2,4,5,6,8  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED  
 \* See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51*	62,63	NU	NU	81,82	NU	61*	NU	NU	51*	NU	NU
RED		128			101			134			107							
YELLOW		129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW							133											

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

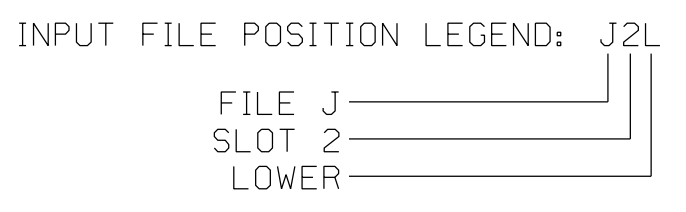
### INPUT FILE POSITION LAYOUT



### INPUT FILE CONNECTION & PROGRAMMING CHART

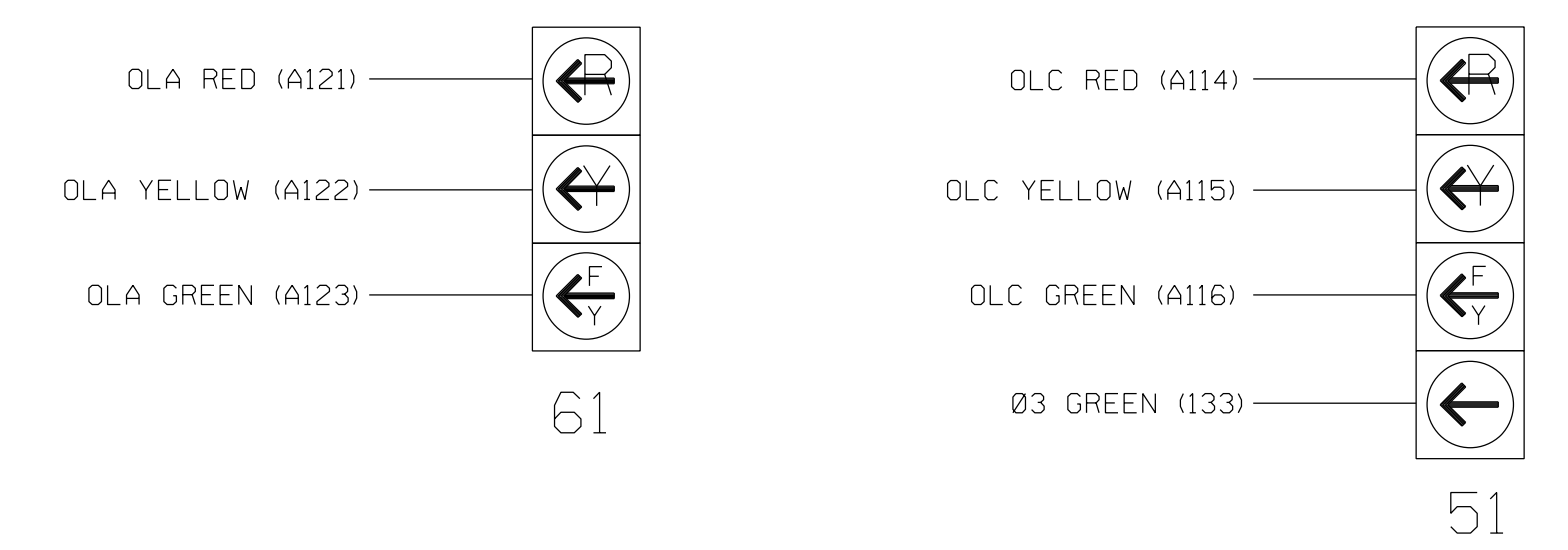
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	DETECTOR TYPE
2A,2B	TB2-5,6	I2U	39	2	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		3		S
5A <sup>1</sup>	TB3-1,2	J1U	55	5 ★	5	YES		15		S
	-	I4U	47	22 ★	2	YES		3		G
5B	TB3-5,6	J2U	40	6	5	YES		15		S
6A,6B	TB3-9,10	J3U	64	36	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES		3		S
8B	TB5-11,12	J6L	46	18	8	YES		15		S

★ See the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.  
<sup>1</sup> Add jumper from J1-W to I4-W, on rear of input file.



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

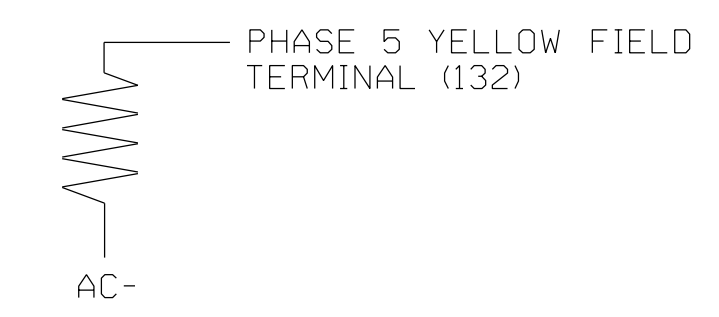


### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1062  
 DESIGNED: January 2018  
 SEALED: 6/7/2018  
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared for the Offices of:

US 70 (S. Church Street) at Gurney Street

Division 7 Alamance County Burlington

PLAN DATE: January 2018 REVIEWED BY: AM Encarnacion

PREPARED BY: VJ Paul REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

Seal of Pamela L. Alexander, Professional Engineer, North Carolina, License No. 023489

DATE: 6/9/2018

SIG. INVENTORY NO. 07-1062



### ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL (program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**

OVERLAP A  
Select TMG VEH OVLP [A] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP...[A] TYPE: OTHER/ECONOLITE
 PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 INCLUDED . X . . . . .
 PROTECT . . . . .
 PED PRTC . . . . .
 NOT OVLP . . . . .
 FLSH GRN . 1 . . . . .
 LAG X PH . . . . .
 LAG 2 PH . . . . .

 LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

```

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```

TMG VEH OVLP...[C] TYPE: . . . . . PPLT FYA
 PROTECTED LEFT TURN... PHASE 5
 OPPOSING THROUGH..... PHASE 6

 FLASHING ARROW OUTPUT.....CH11 ISOLATE
 DELAY START OF: FYA..0.0 CLEARANCE..0.0
 ACTION PLAN SF BIT DISABLE..... 5

```

NOTICE ACTION PLAN SF BIT "5"

END PROGRAMMING

### ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A (program controller as shown)

## IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

- From Main Menu select **8. UTILITIES**
- From UTILITIES Submenu select **1. COPY/CLEAR**
- Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```

COPY / CLEAR UTILITY
 FROM TO
 PHASE TIMING.... > PHASE TIMING....
 TIMING PLAN..... > TIMING PLAN....
 PH DET OPT PLAN. > PH DET OPT PLAN.
 DETECTOR PLAN... 1 > DETECTOR PLAN... 2
 TOGGLE TO SELECT A "FROM" AND A "TO"
 THEN PRESS ENTER

```

- From Main Menu select **6. DETECTORS**
- From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
- Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "5".
- Set delay time to "0".

```

VEH DETECTOR [ 5] VEH DET PLAN [ 2]
 TYPE: S-STANDARD
 TS2 DETECTOR..... ECPI LOG..... NO
 DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 5 5 . . . . .
 EXTEND TIME... 0.0 DELAY TIME... 0.0
 USE ADDED INITIAL . CROSS SWITCH PH.. 0
 LOCK IN..... NONE NTCIP VOL . OR OCC .
 PMT QUEUE DELAY. NO

```

NOTICE VEH DET PLAN 2

ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [ ] position and enter "22".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0"

```

VEH DETECTOR [22] VEH DET PLAN [ 2]
 TYPE: G-GREEN EXTENSION/DELAY
 TS2 DETECTOR..... ECPI LOG..... NO
 DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 22 0 . . . . .
 EXTEND TIME... 0.0 DELAY TIME... 3.0
 USE ADDED INITIAL . CROSS SWITCH PH.. 0
 LOCK IN..... NONE NTCIP VOL . OR OCC .
 PMT QUEUE DELAY. NO

```

NOTICE VEH DET PLAN 2

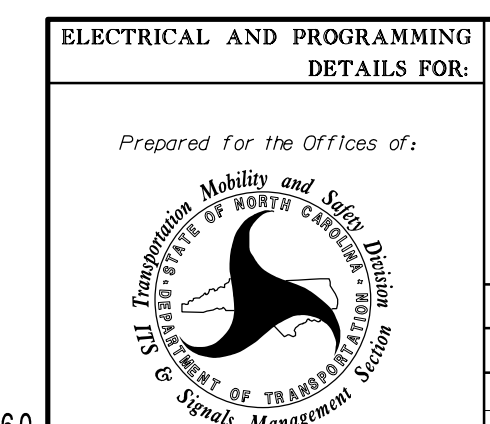
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1062  
DESIGNED: January 2018  
SEALED: 6/7/2018  
REVISED: N/A

END PROGRAMMING

09-JUN-2018 14:14 D:\T\consort\at\work\office\curr\100056469 U-6015 B-G S1g Sys\Task 05\_11\_Signal\Des\gr\mtr\ing\07-1062E.dgn ALEX3361 AT LUS310649

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Prepared for the Offices of:  
**US 70 (S. Church Street) at Gurney Street**  
Division 7 Alamance County Burlington  
PLAN DATE: January 2018 REVIEWED BY: AM Encarnacion  
PREPARED BY: VJ Paul REVIEWED BY: PL Alexander



REVISIONS INIT. DATE  
DATE

6/9/2018  
Pamela Alexander  
DATE  
SIG. INVENTORY NO. 07-1062

**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
RALEIGH, NORTH CAROLINA 27609  
(919) 876-6888 NCBES #F-0326

750 N. Greenfield Pkwy, Garner, NC 27529

### ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 5.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	5

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

**ALTERNATE PHASING CHANGE SUMMARY**

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BIT 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 5:               Modifies overlap parent phases for heads 51 to run protected turns only.

VEH DET PLAN 2:       Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

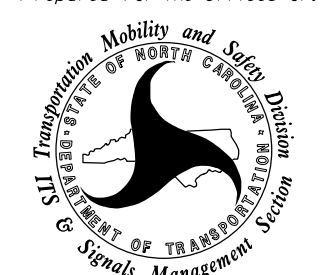
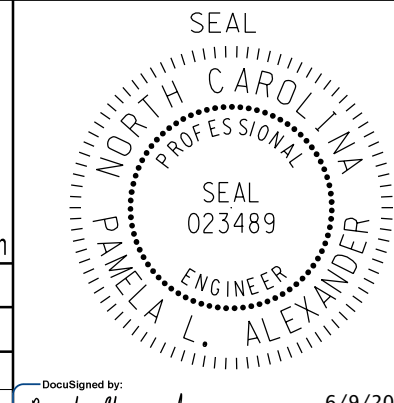
### ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

- From Main Menu select 5. TIME BASE
- From TIME BASE Submenu select 2. ACTION PLAN

```

ACTION PLAN...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2  DET LOG.....NONE
FLASH..... --   RED REST..... NO
VEH DET DIAG PLN... 0  PED DET DIAG PLN..0
DIMMING ENABLE.. NO  PRIORITY RETURN. NO
PED PR RETURN.. NO  QUEUE DELAY..... NO
PMT COND DELAY   NO
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT      .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT   .  .  .  .  X  .  .  .  .  .  .  .  .  .  .  .
AUX FCT   .  .  .  .  (1-3)
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
    
```

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1062  
 DESIGNED: January 2018  
 SEALED: 6/7/2018  
 REVISED: N/A

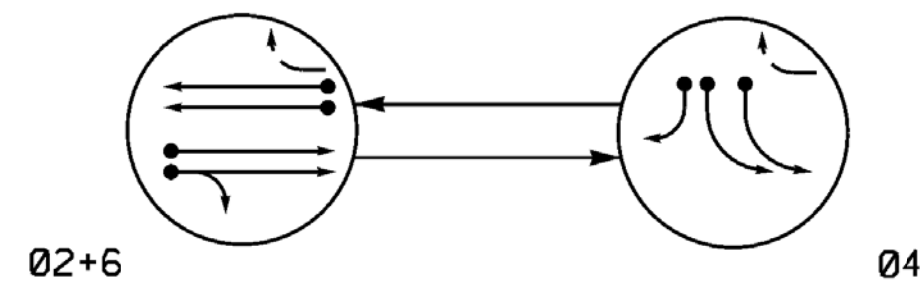
Electrical Detail - Sheet 3 of 3		<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>
ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared for the Offices of: 	<b>US 70 (S. Church Street) at Gurney Street</b> Division 7      Alamance County      Burlington PLAN DATE: January 2018      REVIEWED BY: AM Encarnacion PREPARED BY: VJ Paul      REVIEWED BY: PL Alexander	SEAL 
REVISIONS      DATE      INIT.      DATE	6/9/2018 Pamela Alexander	DATE SIG. INVENTORY NO. 07-1062

09-JUN-2018 14:14  
 D:\Fonsor\at\at\off\c\curr\100056469 U-6015 B-G S1g Sys\Task 05\_11\_Signal\Des\gn\mtr\ing\07-1062E.dgn  
 ALEX3361 AT LUS310649





PHASING DIAGRAM

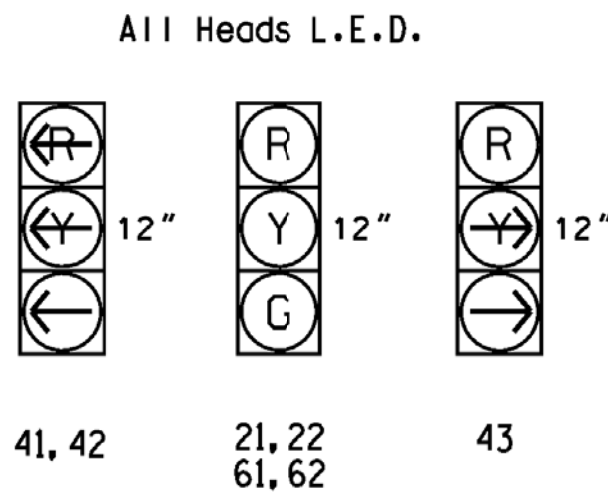


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	Ø 2+6	Ø 4	FLASH
21, 22	G	R	Y
41, 42	R	-	R
43	R	-	R
61, 62	G	R	Y

SIGNAL FACE I.D.

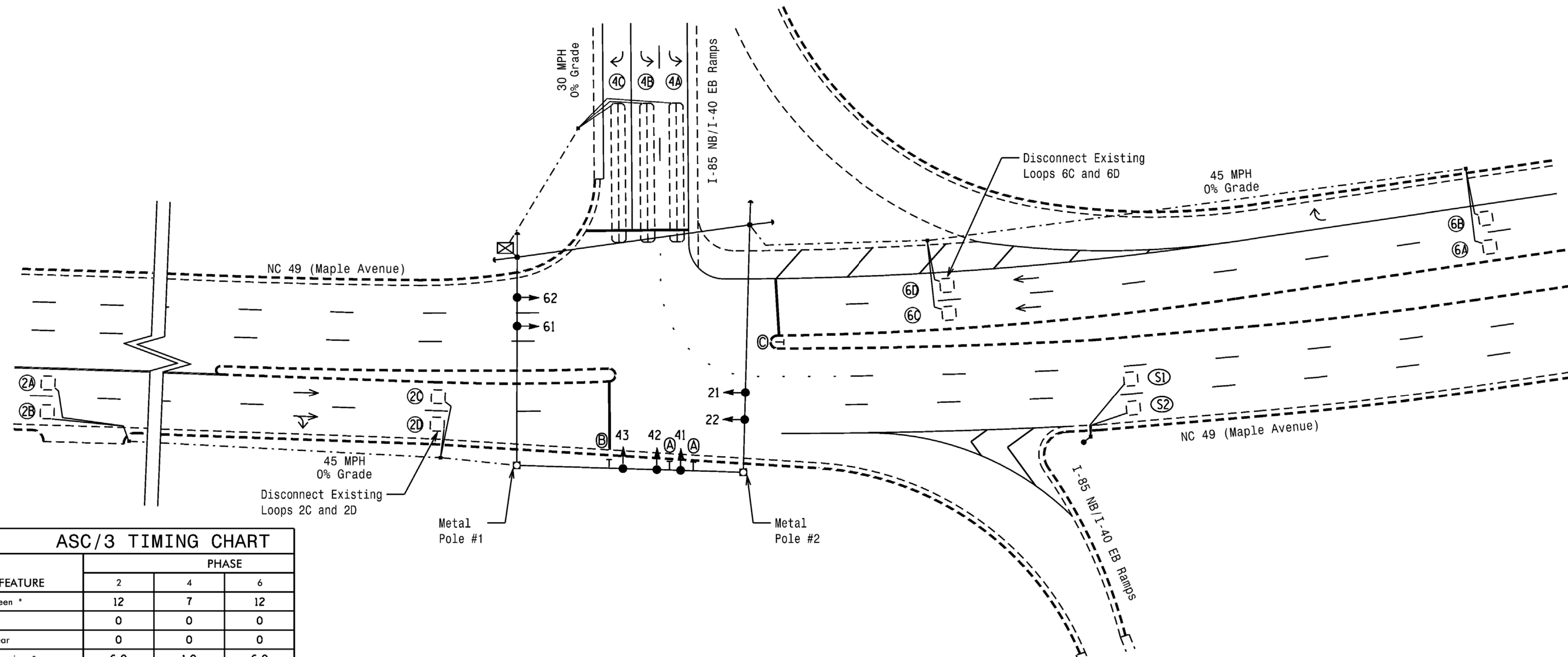


ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	NEW CARD
2A, 2B	6x6	300	EXIST.	-	2	Yes	-	-	X	N	- X
4A, 4B	6x60	+5	2-4-2	-	4	Yes	-	-	-	S	- X
4C	6x60	+5	2-4-2	-	4	Yes	-	15	-	S	- X
6A, 6B	6x6	300	EXIST.	-	6	Yes	-	-	X	N	- X
S1	6x6	+220	EXIST.	-	-	No	-	-	-	N	X X
S2	6x6	+220	EXIST.	-	-	No	-	-	-	N	X X

2 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



ASC/3 TIMING CHART

FEATURE	PHASE		
	2	4	6
Min Green *	12	7	12
Walk *	0	0	0
Ped Clear	0	0	0
Veh. Extension *	6.0	1.0	6.0
Max I *	45	30	45
Yellow	4.5	3.0	4.5
Red Clear	1.0	2.4	1.2
Actuations B4 Add *	0	-	0
Seconds / Actuation *	1.5	-	1.5
Max Initial *	34	-	34
Time Before Reduction *	15	-	15
Time To Reduce *	15	-	15
Minimum Gap	3.0	-	3.0
Locking Detector	X	-	X
Recall Position	VEH. RECALL	-	VEH. RECALL
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

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

LEGEND

- | PROPOSED                              | EXISTING                              |
|---------------------------------------|---------------------------------------|
| ○ → Traffic Signal Head               | ● → N/A                               |
| ● → Modified Signal Head              | — Sign                                |
| ⊥ Pedestrian Signal Head              | ⊥ Signal Pole with Guy                |
| ⊥ With Push Button & Sign             | ⊥ Signal Pole with Sidewalk Guy       |
| ⊥ Signal Pole with Guy                | ⊥ Inductive Loop Detector             |
| ⊥ Signal Pole with Sidewalk Guy       | ⊥ Controller & Cabinet                |
| ⊥ Inductive Loop Detector             | ⊥ Junction Box                        |
| ⊥ Controller & Cabinet                | ⊥ 2-in Underground Conduit            |
| ⊥ Junction Box                        | ⊥ Right of Way                        |
| ⊥ 2-in Underground Conduit            | → Directional Arrow                   |
| ⊥ Right of Way                        | ⊥ Metal Strain Pole                   |
| → Directional Arrow                   | ⊙ (A) Left Arrow "ONLY" Sign (R3-5L)  |
| ⊥ Metal Strain Pole                   | ⊙ (B) Right Arrow "ONLY" Sign (R3-5R) |
| ⊙ (A) Left Arrow "ONLY" Sign (R3-5L)  | ⊙ (C) No Left Turn Sign (R3-2)        |
| ⊙ (B) Right Arrow "ONLY" Sign (R3-5R) |                                       |
| ⊙ (C) No Left Turn Sign (R3-2)        |                                       |

**Mattern & Craig**  
ENGINEERS • SURVEYORS

12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201  
FAX (828) 254-4562  
NC LIC. NO. C-1154

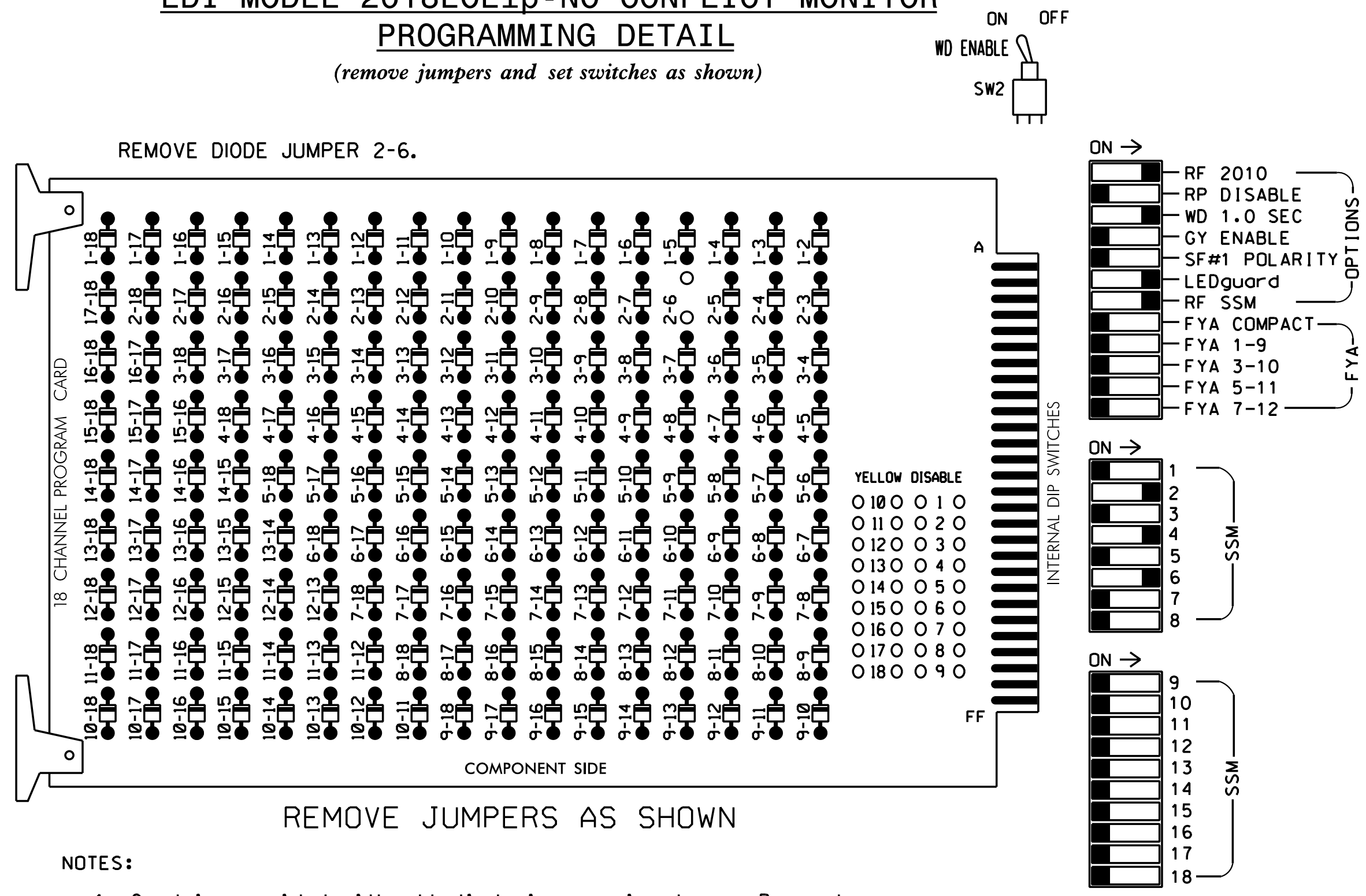
Signal Upgrade

	NC 49 (Maple Avenue) at I-85 NB/I-40 EB Ramps	
	Division 7 Alamance County Burlington PLAN DATE: April 2018 REVIEWED BY: JB Voso PREPARED BY: SE Greene REVIEWED BY:	SCALE 0 30 1"=30'

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*BUSINESS\*\*\*\*\*

**EDI MODEL 2018ECLip-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. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. The cabinet and controller are part of the Burlington-Graham Signal System.

**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	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42,43	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129						135				
GREEN		130						136				
RED ARROW												
YELLOW ARROW					102							
GREEN ARROW					103							

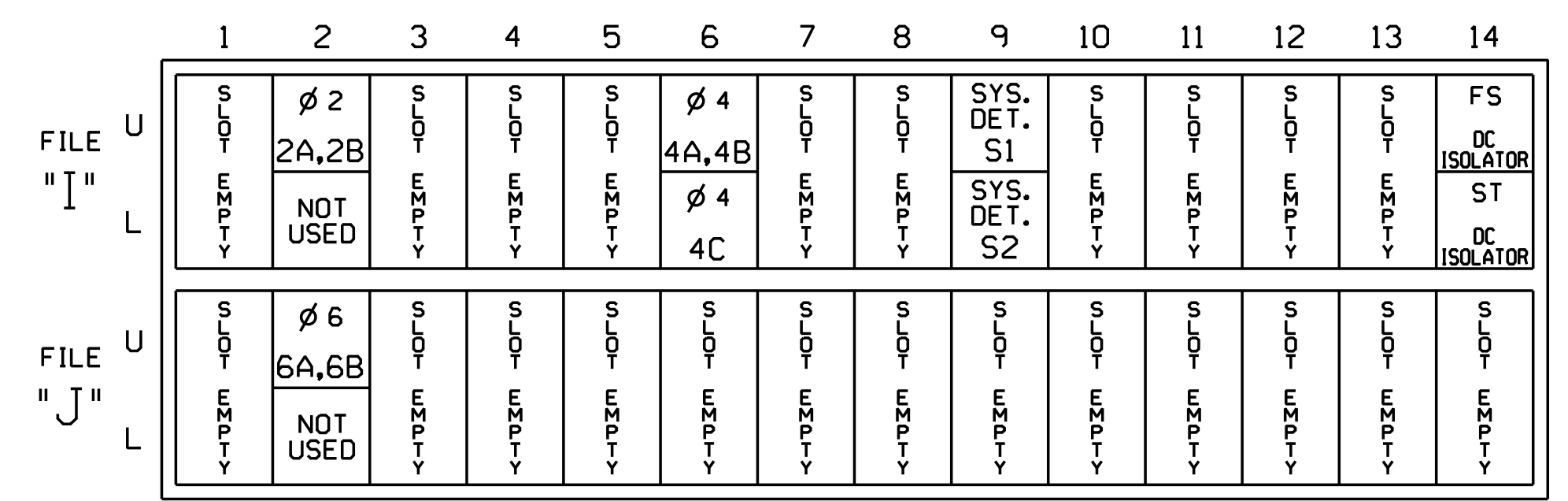
NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....2070LX  
 CABINET.....332  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S5,S8  
 PHASES USED.....2,4,6  
 OVERLAPS.....NONE

**INPUT FILE POSITION LAYOUT**

(front view)



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

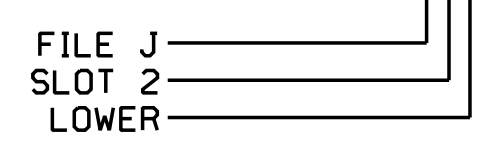
FS = FLASH SENSE  
 ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A, 2B	TB2-5,6	I2U	39	2	2	YES			X	N
4A, 4B	TB4-9,10	I6U	41	4	4	YES				S
4C	TB4-11,12	I6L	45	14	4	YES		15		S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
6A, 6B	TB3-5,6	J2U	40	6	6	YES			X	N

\* System detector only. Remove any assigned vehicle phase.

**INPUT FILE POSITION LEGEND: J2L**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1066  
 DESIGNED: April 2018  
 SEALED: 6/13/2018  
 REVISED: NA

2:52:37 PM 11/13/2018 - Burlington-Graham Signal System06 Working Folders (Replace Sub-folders with NCDOT File Structure if Working on NCDOT Project)Ming or DgnW07-1066-071066.ele.dsn.dgn jbvoso

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Division 7 Alamance County Burlington

NC 49 (Maple Avenue) at I-85 NB/I-40 EB Ramps

PLAN DATE: April 2018 REVIEWED BY: JB Voso

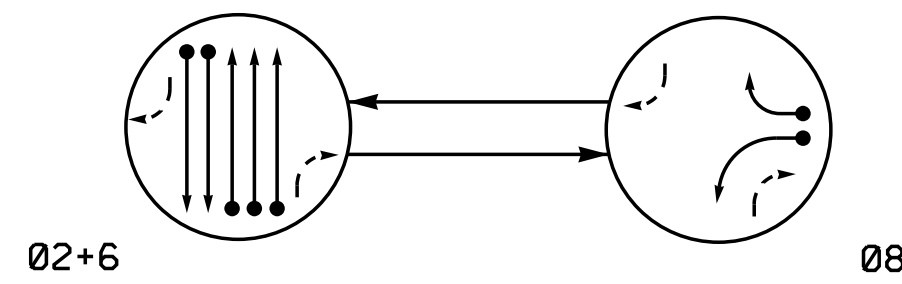
PREPARED BY: SE Greene REVIEWED BY:

REVISIONS INIT. DATE

James Voso 6/13/2018

SIG. INVENTORY NO. 07-1066

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

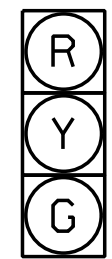
- ←●→ DETECTED MOVEMENT
- ←---→ UNDETECTED MOVEMENT (OVERLAP)
- ←- - -→ UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	08	FLASH
21, 22	G	R	Y
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21, 22  
61, 62  
81, 82

ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6x22	70	EXIST.	-	2	Yes	-	-	-	S	-	X
6A	6x32	70	EXIST.	-	6	Yes	-	-	-	S	-	X
S1	6x6	+125	EXIST.	-	-	No	-	-	-	N	X	X
S2	6x6	+125	EXIST.	-	-	No	-	-	-	N	X	X
8A	6x40	0	2-4-2	-	8	Yes	-	-	-	S	-	X
8B	6x40	0	2-4-2	-	8	Yes	-	15	-	S	-	X

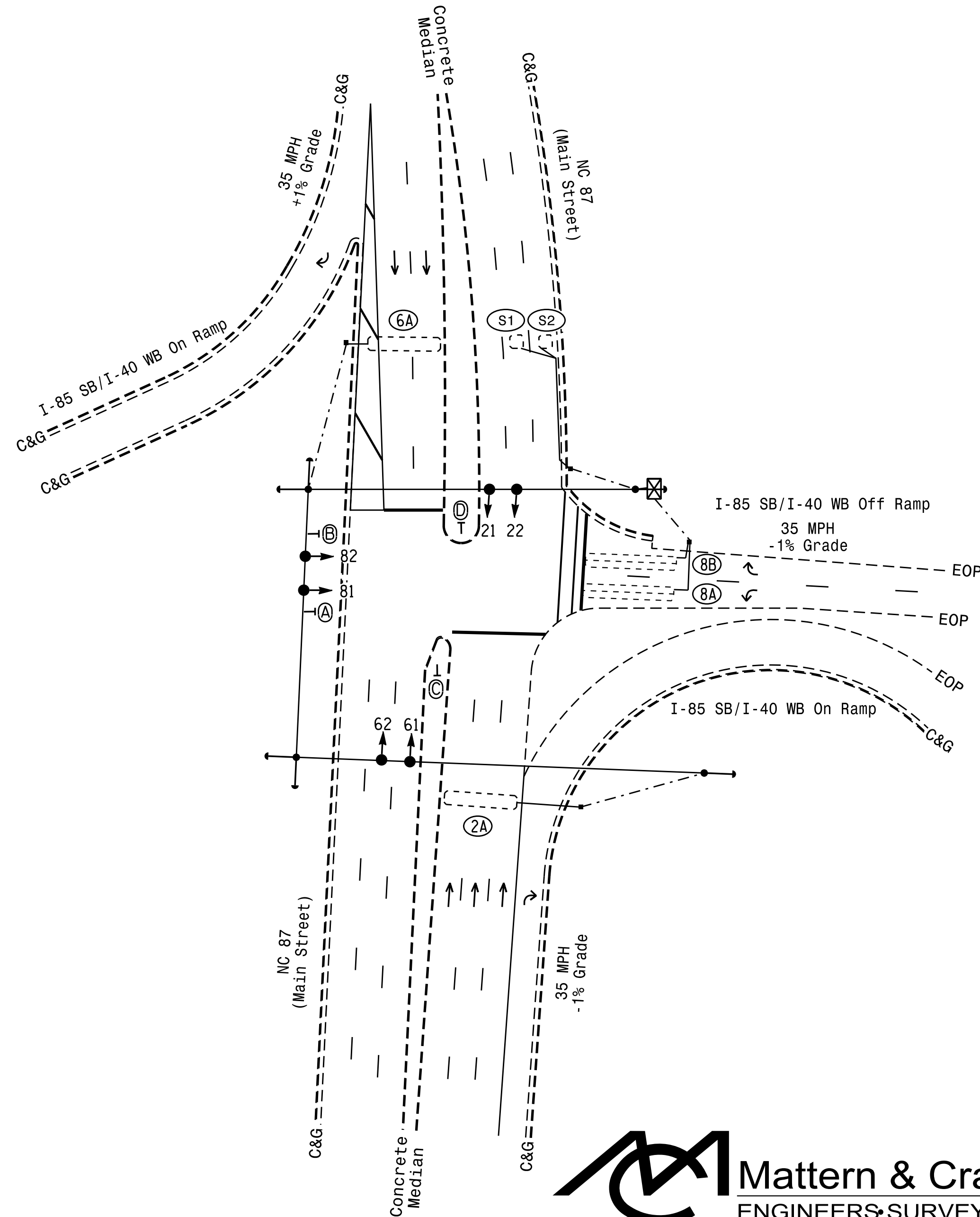
2 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output file for future use.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

FEATURE	PHASE		
	2	6	8
Min Green *	10	10	7
Walk *	0	0	0
Ped Clear	0	0	0
Veh. Extension *	3.0	3.0	1.0
Max 1 *	45	45	25
Yellow	3.9	3.8	3.0
Red Clear	1.0	1.2	2.6
Actuations B4 Add *	-	-	-
Seconds /Actuation *	-	-	-
Max Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Locking Detector	X	X	-
Recall Position	VEH. RECALL	VEH. RECALL	-
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

\* 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.



PROPOSED	EXISTING
	N/A
N/A	
(A)	(A) Left Arrow "ONLY" Sign (R3-5L)
(B)	(B) Right Arrow "ONLY" Sign (R3-5R)
(C)	(C) No U-Turn Sign (R3-4)
(D)	(D) No Left Turn Sign (R3-2)

Signal Upgrade



12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201  
FAX (828) 254-4562  
NC LIC. NO. C-1154

Prepared for the Offices of:  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
SIGNAL DESIGN SECTION  
750 N. Greenfield Place, Corner, NC 27529

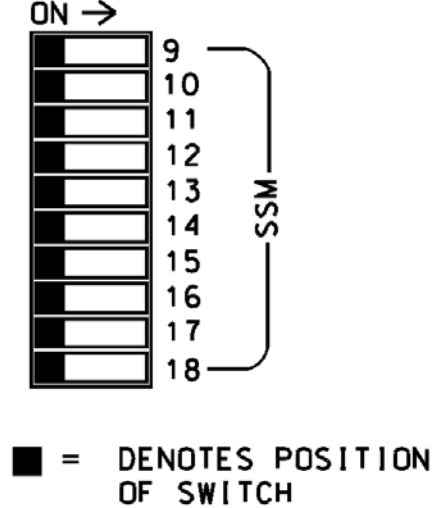
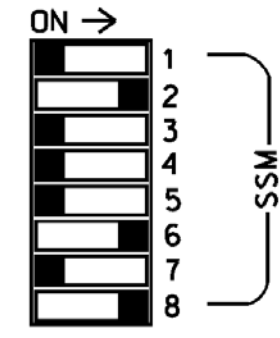
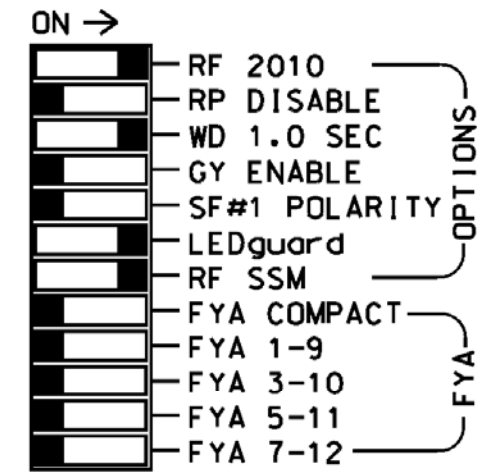
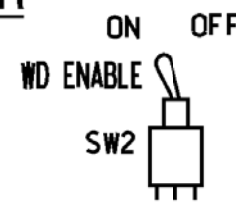
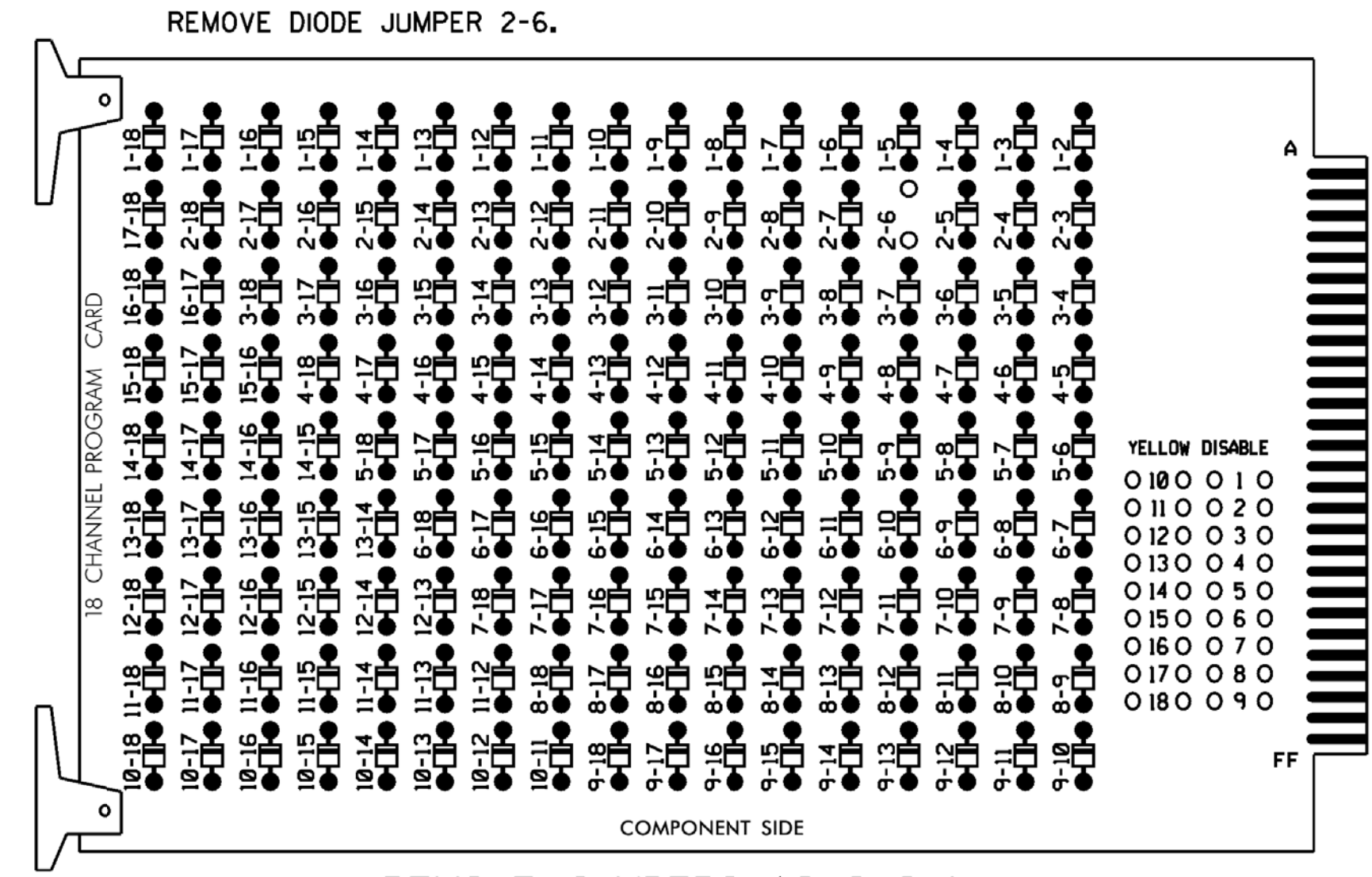
NC 87 (Main Street) at I-85 SB/I-40 WB Off-Ramp	
Division 7 Alamance County	Graham
PLAN DATE: March 2018	REVIEWED BY: JB Voso
PREPARED BY: SE Greene	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
JAMES VOSO  
022599  
6/13/2018  
SIGNATURE DATE  
SIG. INVENTORY NO. 07-1067

EDI MODEL 2018ECLIP-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. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. The cabinet and controller are part of the Burlington-Graham Signal System.

SIGNAL HEAD HOOK-UP CHART

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

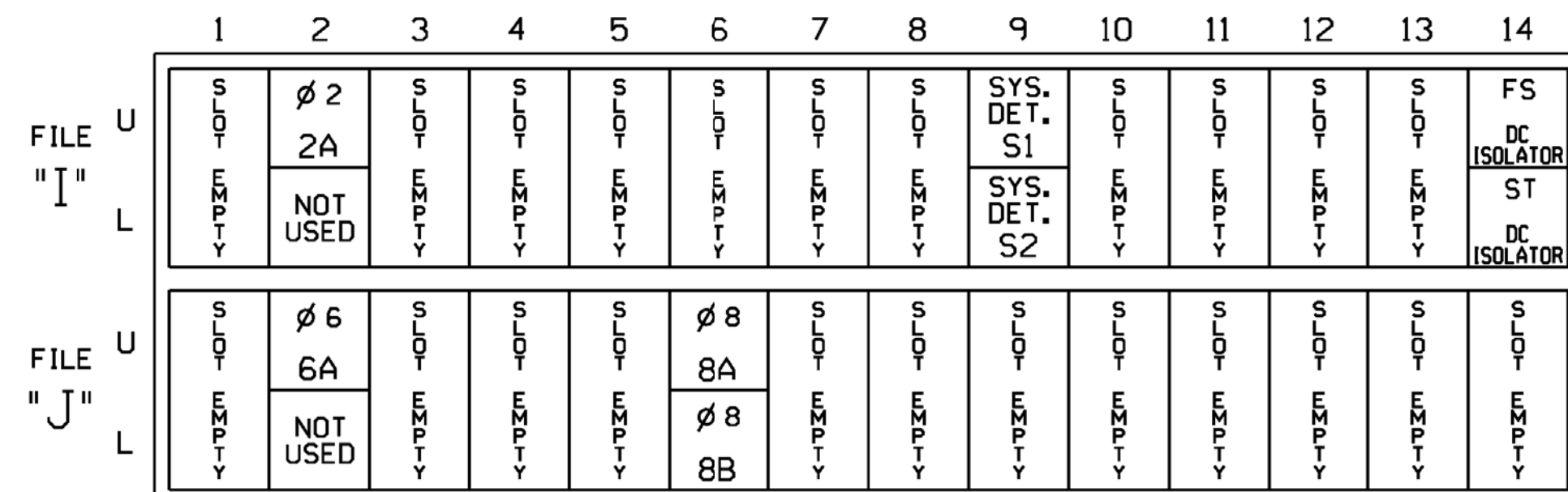
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S8,S11  
 PHASES USED.....2,6,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)



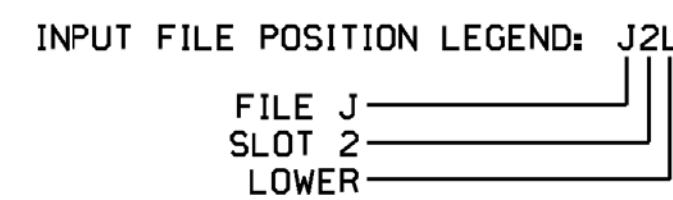
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES				S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
6A	TB3-5,6	J2U	40	6	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES		15		S

\* System detector only. Remove any assigned vehicle phase.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1067  
 DESIGNED: March 2018  
 SEALED: 6/13/2018  
 REVISED: NA

Electrical Detail



12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

Prepared for the Offices of:  
  
 150 N. Greenfield Pkwy, Corner, NC 27529

NC 87 (Main Street) at I-85 SB/I-40 WB Ramps	
Division 7	Alamance County
PLAN DATE: March 2018	REVIEWED BY: JB Voso
PREPARED BY: SE Greene	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

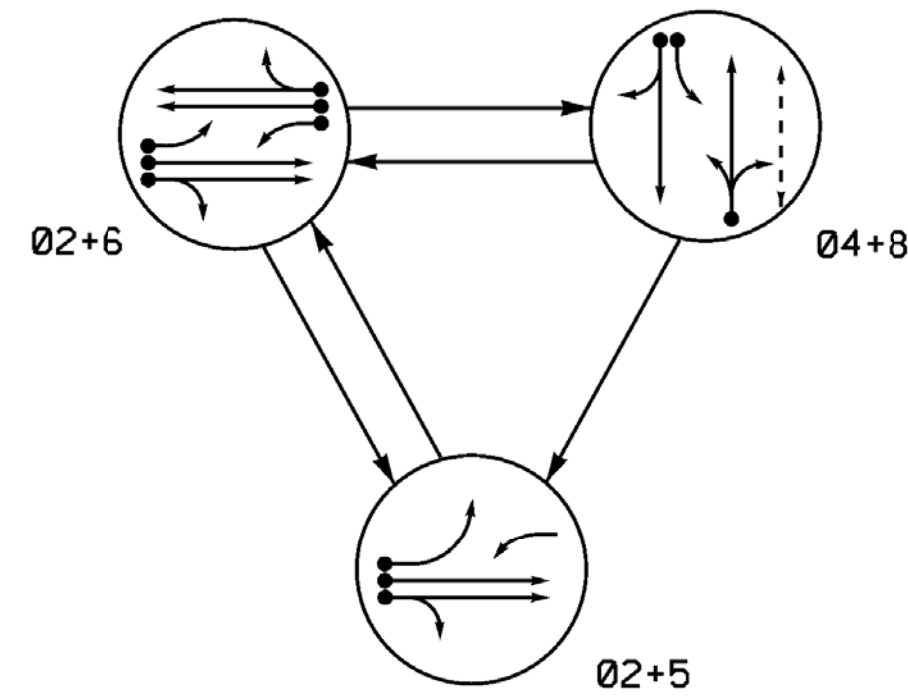
SEAL  
  
 James Voso  
 6/13/2018  
 DATE

SIG. INVENTORY NO. 07-1067

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*D\*\*\*\*\*  
 \*\*\*\*\*USER\*\*\*\*\*



PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	-	F	R	-
61	F	F	R	-
62, 63	R	G	R	Y
81, 82	R	R	G	R
P81, P82	DW	DW	W	DRK

ASC/3 DETECTOR INSTALLATION CHART												
LOOP	DETECTOR				PROGRAMMING							
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6x22	300	EXIST.	-	2	Yes	-	-	X	N	-	X
4A	6x60	+5	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6x60	+5	2-4-2	-	4	Yes	-	10	-	S	-	X
5A	6x60	+5	EXIST.	-	5	Yes	-	15	-	S	-	X
6A	6x22	300	EXIST.	-	6	Yes	-	3	-	G	-	X
8A	6x60	+10	2-4-2	-	8	Yes	-	5	-	S	-	X
S1	6x6	1184	EXIST.	-	-	No	-	-	-	N	X	X
S2	6x6	1184	EXIST.	-	-	No	-	-	-	N	X	X

3 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

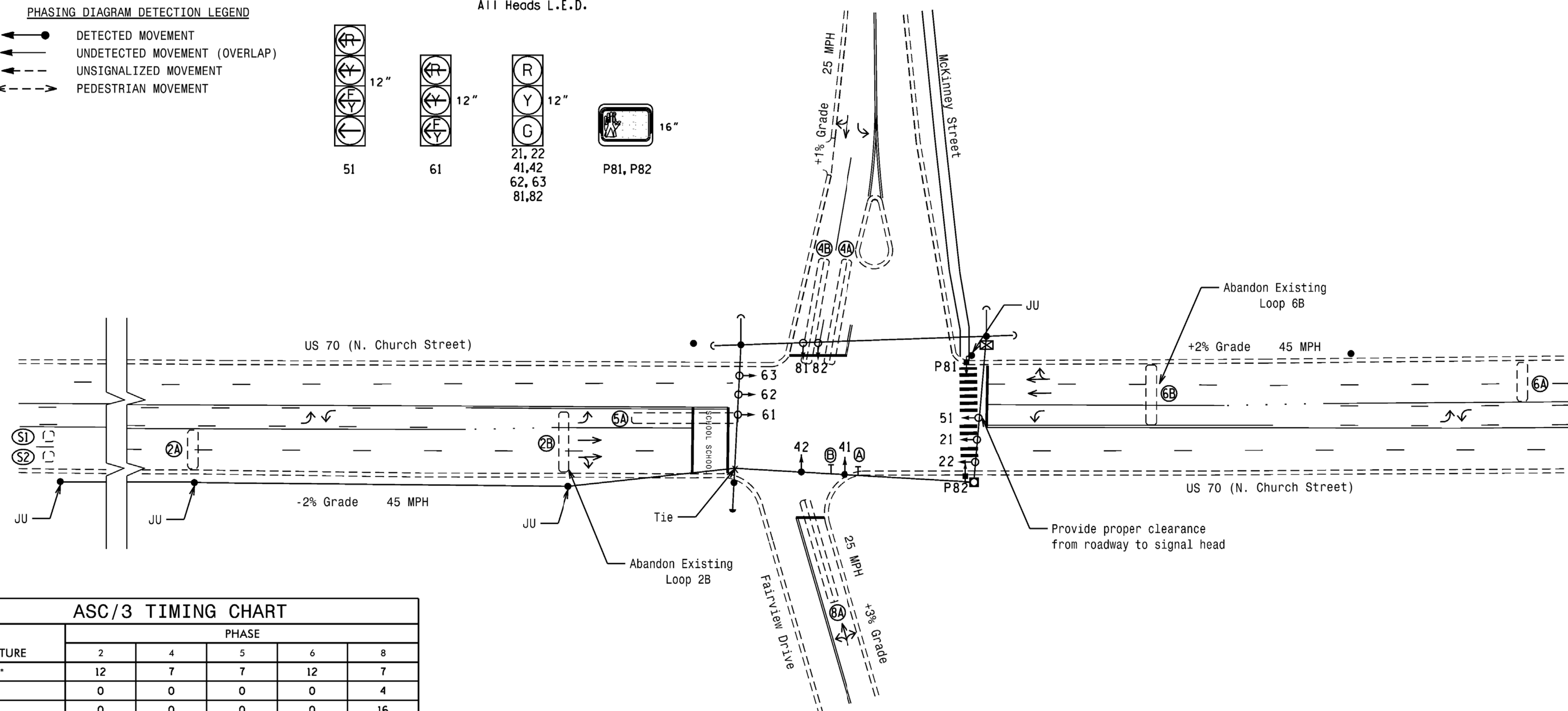
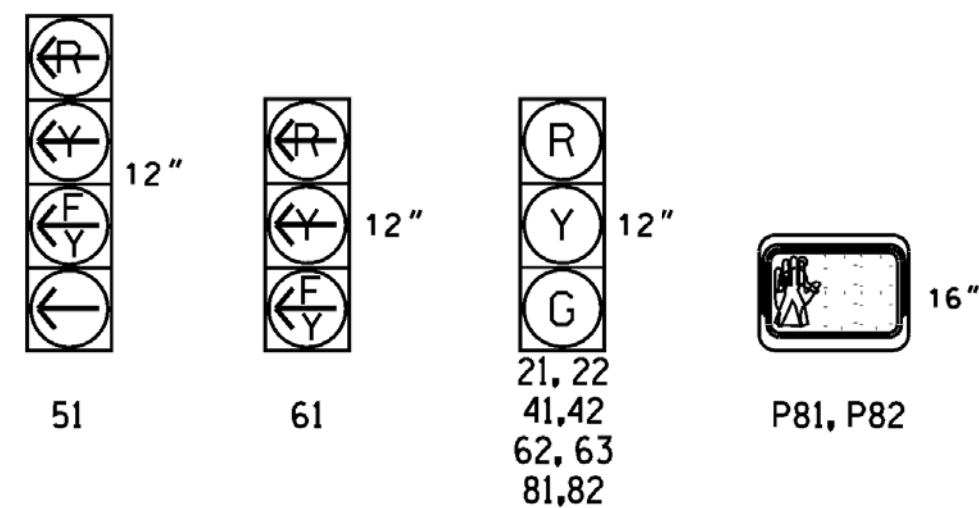
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads numbered 22, 62, and 63.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- 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.
- Existing Left Arrow "ONLY" (R3-5L) and "LEFT TURN YIELD ON GREEN" ball (R10-12) signs may be removed at the discretion of the Regional Traffic Engineer.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.

PHASING DIAGRAM DETECTION LEGEND

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



ASC/3 TIMING CHART

FEATURE	PHASE				
	2	4	5	6	8
Min Green *	12	7	7	12	7
Walk *	0	0	0	0	4
Ped Clear	0	0	0	0	16
Veh. Extension *	6.0	1.0	1.0	6.0	1.0
Max I *	90	25	15	90	25
Yellow	4.7	3.1	3.0	4.7	3.1
Red Clear	2.4	3.1	2.8	2.4	2.8
Actuations 34 Add *	0	-	-	0	-
Seconds /Actuation *	1.5	-	-	1.5	-
Max Initial *	34	-	-	34	-
Time Before Reduction *	30	-	-	30	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.0	-	-	3.0	-
Locking Detector	X	-	-	X	-
Recall Position	VEH. RECALL	-	-	VEH. RECALL	-
Dual Entry	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X

\* 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.

PROPOSED	EXISTING
	N/A
N/A	

**Mattern & Craig**  
ENGINEERS • SURVEYORS

12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201  
FAX (828) 254-4562  
NC LIC. NO. C-1154

Signal Upgrade

Prepared for the Offices of:  
TRANSPORTATION MOBILITY AND SAFETY DIVISION  
DEPARTMENT OF TRANSPORTATION  
Signal Design Section

US 70 (N. Church Street) at McKinney Street/Fairview Drive

Division 7 Alamance County Burlington

PLAN DATE: March 2018 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS

SCALE 0 40 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

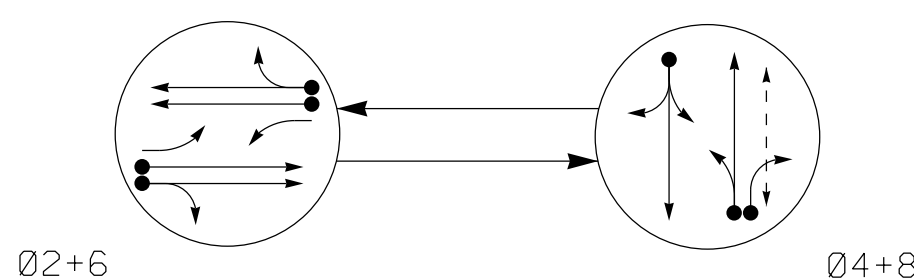
SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
JAMES B. VOSS  
022599  
6/13/2018  
SIG. INVENTORY NO. 07-1150

\*\*\*\*\*SYSTEM \*\*\*\*\*  
\*\*\*\*\*BUSINESS \*\*\*\*\*





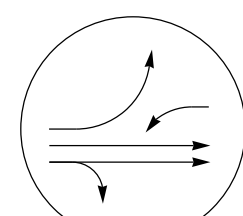
**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

**EV PREEMPT PHASE**  
(Medium Priority)



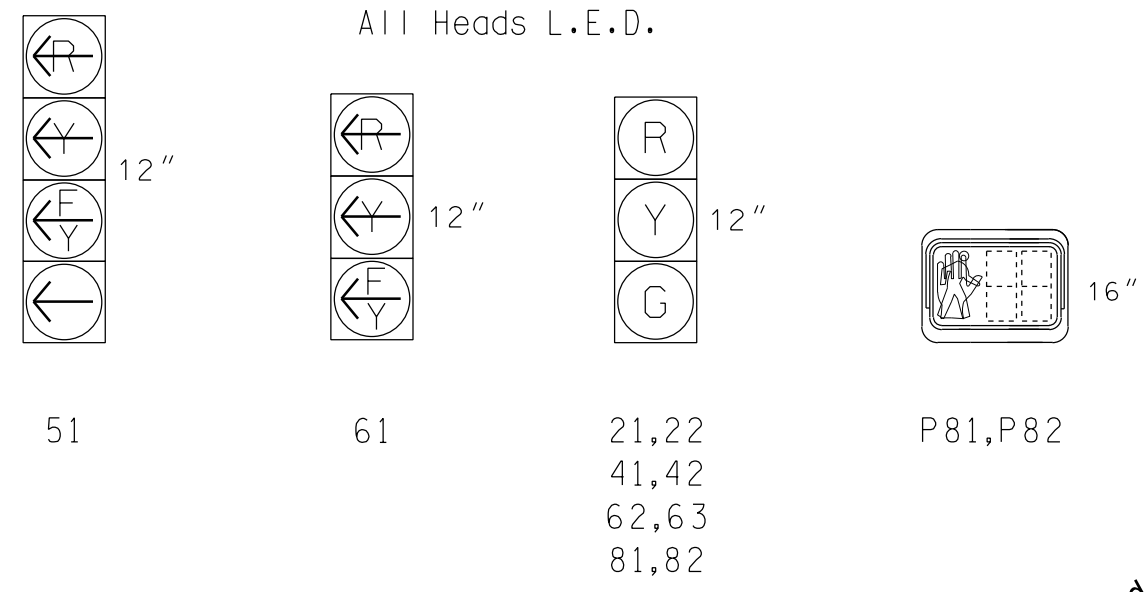
PREEMPT 2 (02+5)

**TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+6	04+8	05+2	05+5
21,22	G	R	G	Y
41,42	R	G	R	R
51	F	R	←	→
61	F	R	←	→
62,63	G	R	R	Y
81,82	R	G	R	R
P81,P82	DW	W	DW	DRK

**SIGNAL FACE I.D.**

All Heads L.E.D.



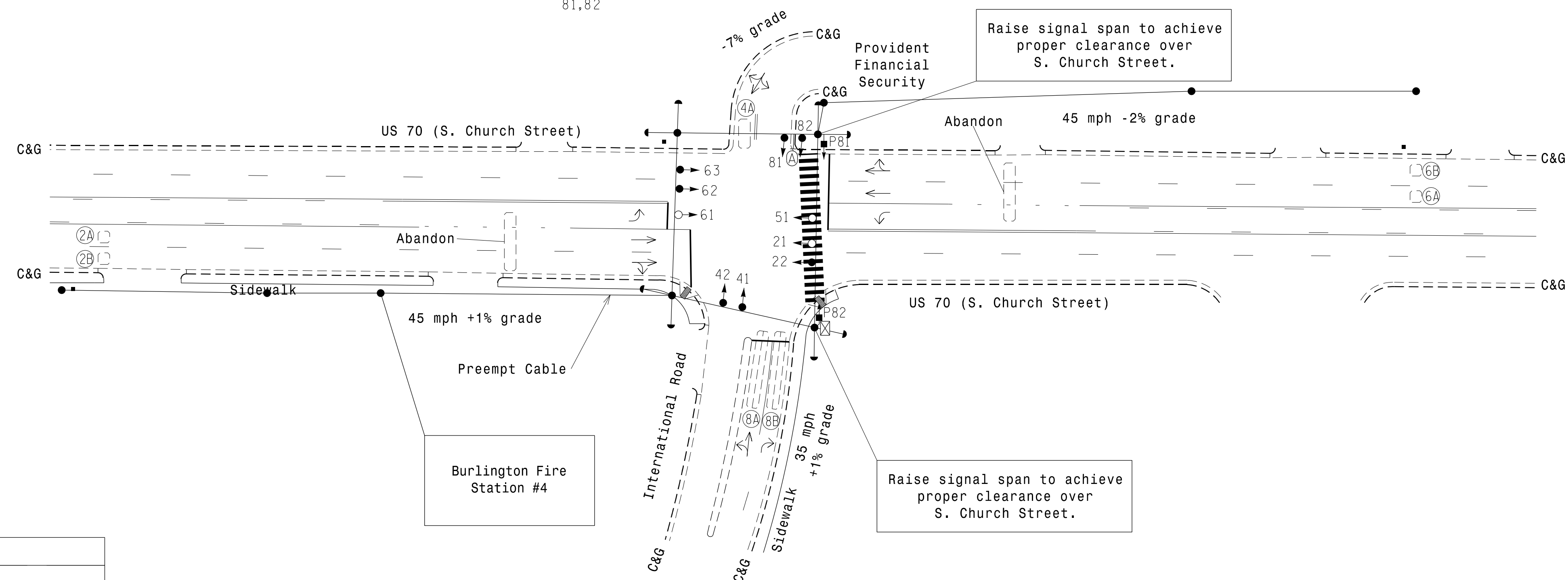
**ASC/3 DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	PROGRAMMING						
						CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP	NEW CARD
2A,2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X15	0	EXIST	-	4	Yes	-	5	-	S	-	X
6A,6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X40	+5	2-4-2	-	8	Yes	-	-	-	S	-	X
8B	6X40	+5	2-4-2	-	8	Yes	-	15	-	S	-	X

**2 Phase Fully Actuated w/ EV Preemption (Burlington-Graham Signal System)**

**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by Engineer.
3. Reposition existing signal heads numbered 22, 62, and 63.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
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. Remove existing Left Arrow "ONLY" Sign (R3-5L).
10. Pavement markings are existing.
11. Emergency vehicle preemption switch is located in Burlington Fire Station #4.
12. The Division Traffic Engineer will determine the Delay Time and Minimum Dwell Time for the emergency vehicle preemption timing.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**LEGEND**

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	→ Sign
⊞ Pedestrian Signal Head With Push Button & Sign	⊞
○ Signal Pole with Guy	● Signal Pole with Sidewalk Guy
⊞ Inductive Loop Detector	⊞ Controller & Cabinet
⊞ Junction Box	⊞
⊞ 2-in Underground Conduit	⊞
N/A → Right of Way	→ Directional Arrow
N/A → Curb Ramp	⊞
(A) Right Arrow "ONLY" Sign (R3-5R)	(A)

**ASC/3 TIMING CHART**

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	0	0	0	4
Ped Clear	0	0	0	19
Veh. Extension *	6.0	2.0	6.0	2.0
Max 1 *	90	25	90	25
Yellow	4.7	3.6	4.7	3.8
Red Clear	1.0	2.0	1.0	2.0
Actuations B4 Add *	0	-	0	-
Seconds / Actuation *	2.0	-	2.0	-
Max Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Locking Detector	X	-	X	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

**ASC/3 EV PREEMPT**

FUNCTION	PRE 2
Exit Phase(s)	4,8
Preempt Override	OFF
Delay Time	0 **
Ped Clear Through Yellow	Y
Terminate Phases	N
Entrance Walk	1
Entrance Ped Clear	255*
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	25 **
Preempt Input Extension Time	0
Preempt Max Time	0
Exit Yellow Change	4.7
Exit Red Clear	1.0

\* 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.

\* Allows normal phase times to be used.  
\*\* See note 12.

**Signal Upgrade**

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

Prepared For the Offices of:  
**US 70 (S. Church Street) at International Road/ Provident Financial Security**

Division 7 Alamance County Burlington  
 PLAN DATE: March 2018 REVIEWED BY: PL Alexander  
 PREPARED BY: NA Ptak REVIEWED BY: AM Encarnacion

750 N. Greenfield Pkwy, Garner, NC 27529  
 SCALE: 0 40  
 1"=40'

Seal of Pamela L. Alexander, Professional Engineer, License No. 023489, State of North Carolina.

DATE: 6/7/2018  
 SIG. INVENTORY NO. 07-1215

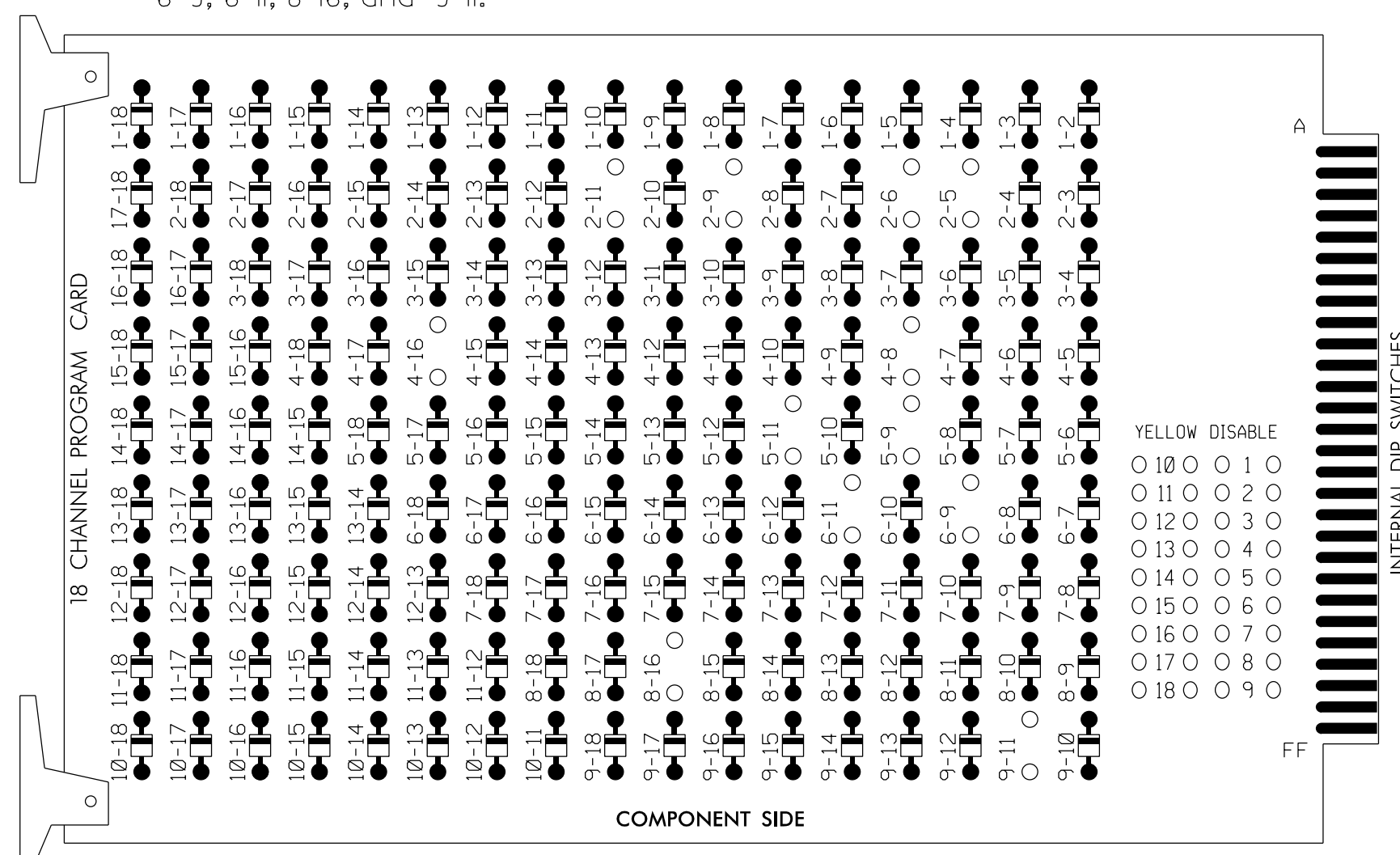
**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888 NCBES #F-0326

07-JUN-2018 11:15 U:\Projects\Traffic\05-11-Signals\Design\Task 05-11-Signals\Design\Task 05-11-Signals\Task 05-11-Signals.dgn ALEX3361 AL LUS340649

### EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

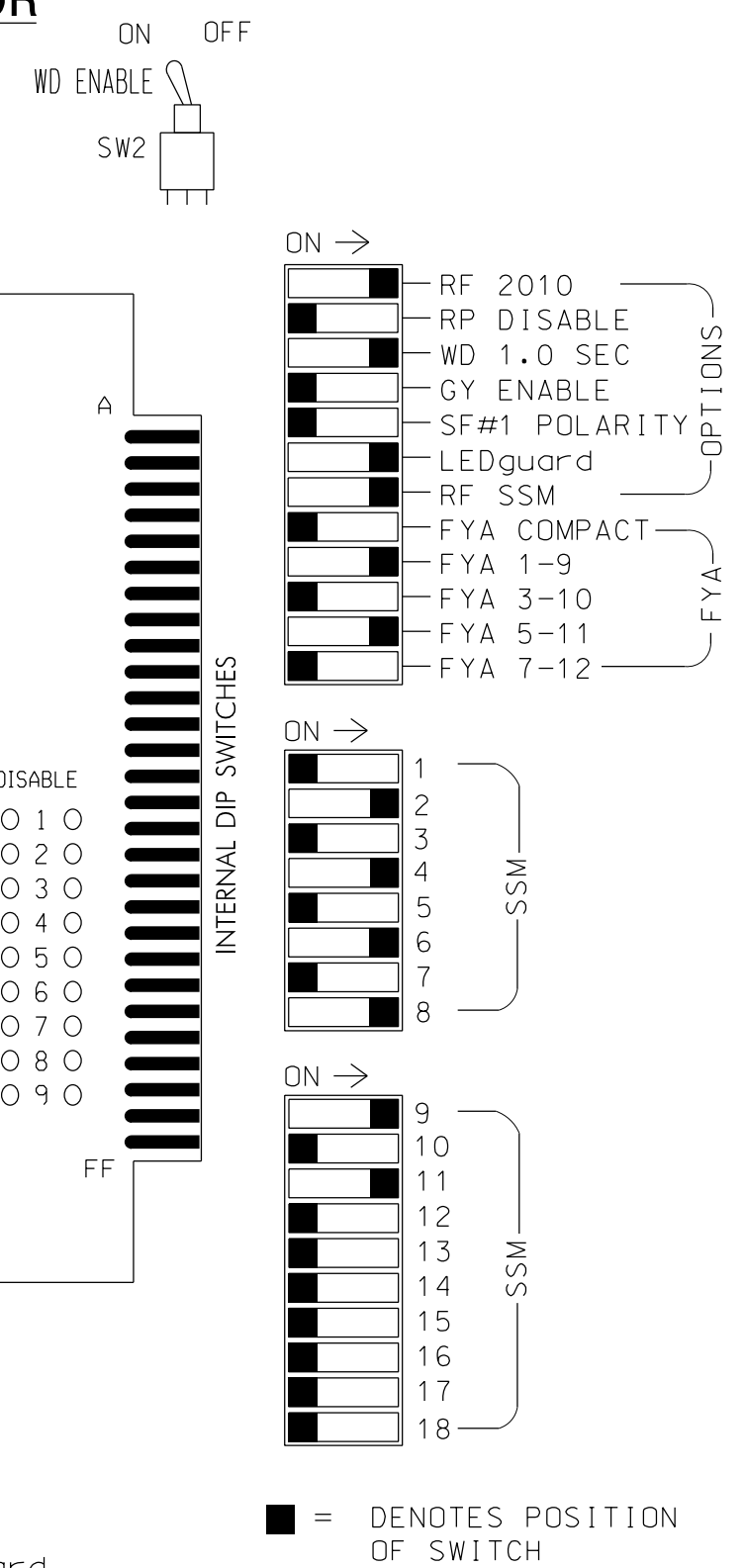
REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 4-8, 4-16, 5-9, 5-11, 6-9, 6-11, 8-16, and 9-11.



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.
- Integrate monitor with Ethernet network in cabinet.



■ = DENOTES POSITION OF SWITCH

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONDLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S5,S7,S8,S11,S12,  
 AUX S1,AUX S4  
 PHASES USED.....2,4,5\*,6,8,8PED  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED  
 \* See overlap programming detail on sheet 2  
 ★ Used only during preempt

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51	62,63	NU	NU	81,82	P81, P82	61	NU	NU	51	NU	NU	
RED		128			101			134			107								
YELLOW		129			102		*	135			108								
GREEN		130			103			136			109								
RED ARROW														A121				A114	
YELLOW ARROW														A122				A115	
FLASHING YELLOW ARROW														A123				A116	
GREEN ARROW																			
Hand icon																		110	
Walking person icon																			112

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

### INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 2	2A,2B	∅ 3	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4
L	NOT USED		NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
U	∅ 6	6A,6B	∅ 7	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8
L	NOT USED		NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

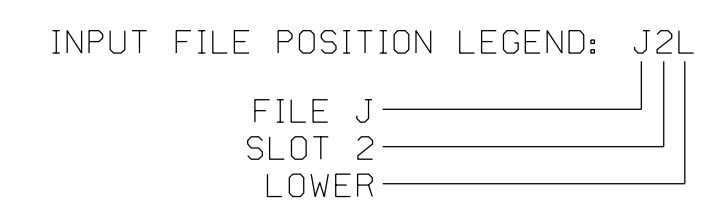
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME  
 PRE = PREEMPT

### INPUT FILE CONNECTION & PROGRAMMING CHART

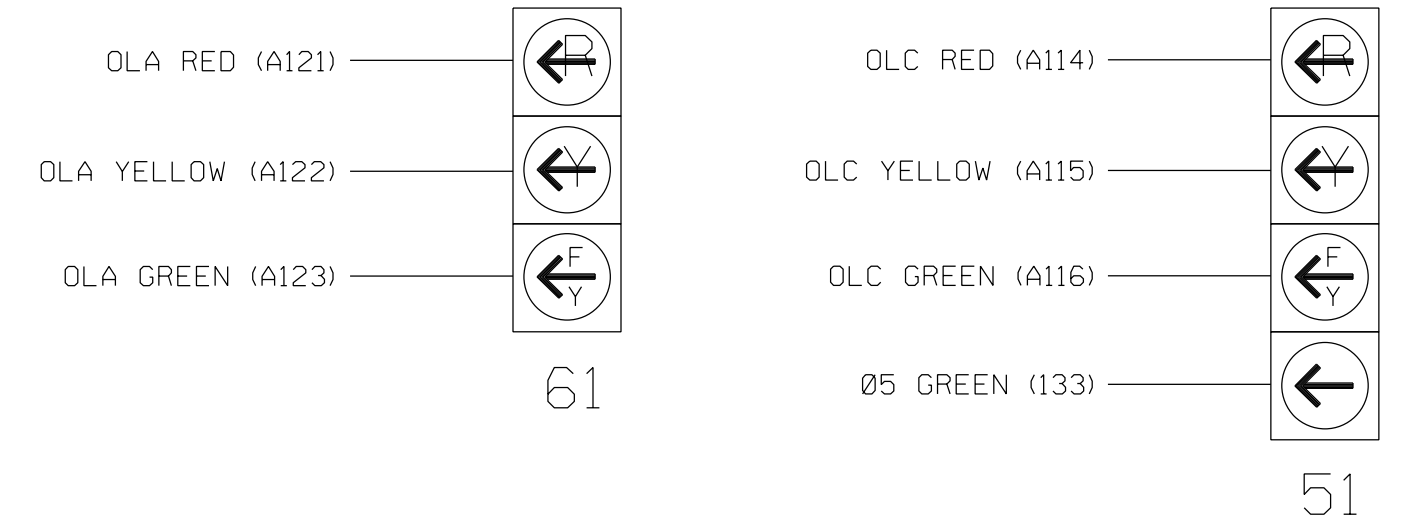
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A,2B	TB2-5,6	I2U	39	2	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		5		S
6A,6B	TB3-5,6	J2U	40	6	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES		15		S
PED PUSH BUTTONS										
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT 113.



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



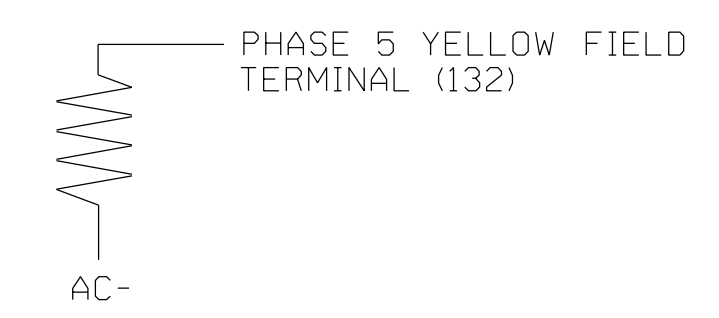
### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



Electrical Details - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:  
**US 70 (S. Church Street) at International Road/Provident Financial Security**  
 Division 7 Alamance County Burlington  
 PLAN DATE: March 2018 REVIEWED BY: PL Alexander  
 PREPARED BY: NA Ptak REVIEWED BY: AM Encarnacion

REVISIONS	INIT.	DATE

Seal: PAMELA L. ALEXANDER, PROFESSIONAL ENGINEER, SEAL 023489  
 Date: 6/9/2018  
 Signature: Pamela Alexander  
 Date: 6/9/2018  
 SIG. INVENTORY NO. 07-1215

**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888 NCBEES #F-0326

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

```

OVERLAP A
Select TMG VEH OVLP [A] and 'OTHER/ECONOLITE'
TMG VEH OVLP...[A] TYPE: OTHER/ECONOLITE
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
  
```

↓ Toggle Twice

```

OVERLAP C
Select TMG VEH OVLP [C] and 'PPLT FYA'
TMG VEH OVLP...[C] TYPE: PPLT FYA
PROTECTED LEFT TURN.... PHASE 5
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT....CH11 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
  
```


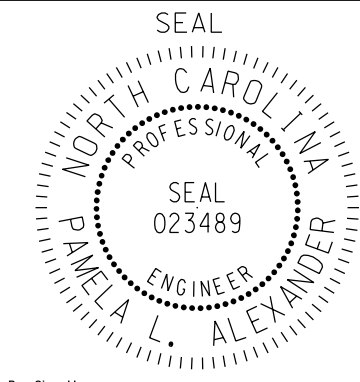
END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1215  
 DESIGNED: March 2018  
 SEALED: 6/7/2018  
 REVISED: N/A

09-JUN-2018 14:14  
 D:\Consolidation\Projects\00056469 U-6015 B-G S19 System\Task 05\_11\_Signal\Des\gn\mtr\ing\07-1215E.dgn  
 ALEX3361 AT LUS210649

Electrical Details - Sheet 2 of 3

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of:</p> 	<p><b>US 70 (S. Church Street)</b>  <b>at</b>  <b>International Road/          Provident Financial Security</b></p> <p style="font-size: x-small;">Division 7      Alamance County      Burlington</p> <p style="font-size: x-small;">PLAN DATE: March 2018      REVIEWED BY: AM Encarnacion</p> <p style="font-size: x-small;">PREPARED BY: NA Ptak      REVIEWED BY: PL Alexander</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE							<div style="text-align: center;">  <p style="font-size: x-small;">Sealed by: Pamela Alexander      6/9/2018</p> <p style="font-size: x-small;">DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1215</p> </div>
REVISIONS	INIT.	DATE									

ATKINS

1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888      NCBEES #F-0326

# ECONOLITE ASC/3-2070 EMERGENCY VEHICLE

## PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select 4. PREEMPTOR/TSP
- From PREEMPTOR/TSP/SCP Submenu select 1. PREEMPT PLAN 1-10

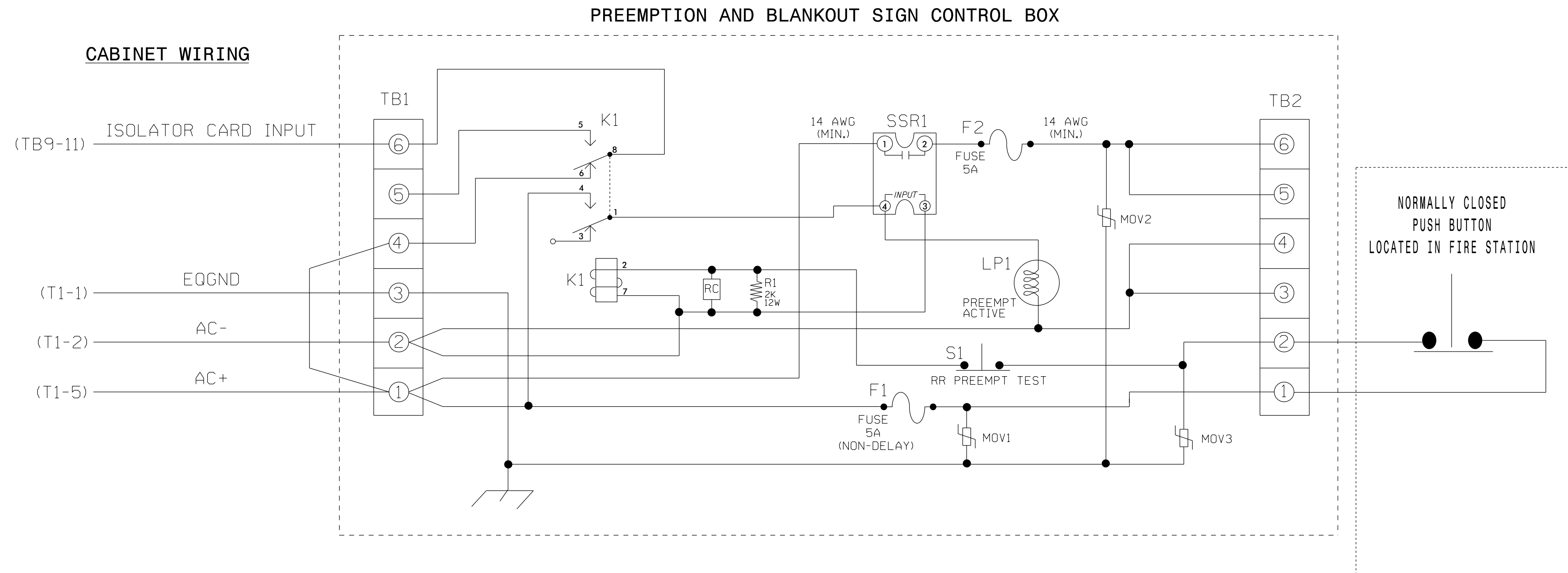
Place cursor in [ ] next to Preempt Plan and press 2. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #2.

PREEMPT PLAN [ 2 ]	ENABLE....YES
VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
OVERLAP A B C D E F G H I J K L M N O P	
TRKCLR V . . . . .	
TRKCLR 0 . . . . .	
ENA TRL . . . . .	
DWEL VEH . X . . X . . . . .	
DWEL PED . . . . .	
DWEL OLP F1 . F1 . . . . .	
CYC VEH . . . . .	
CYC PED . . . . .	
CYC OLP . . . . .	
EXIT PH . . . X . . . X . . . . .	
EXIT CAL . . . . .	
SP FUNC . . . . .	

ENABLE... YES	IPMT	OVRIDE..	INTERLOCK.	NO
DET LOCK... X	IDELAY..	OINHIBIT...	0	
OVERIDE FL. .	IDURATION	OICLR-GRN...	NO	
TERM OLP. NO	IPC>YEL	YESITERM PH	NO	
PED DARK.. NO	ITC RESRV	YESIDWELL FL	OFF	
LINK PMT....O	IX FLCOLR	REDIEXIT OPT.	OFF	
X TMG PLN...O	IRE-SERV..	OIFLT TYPE.HARD		
FREE DUR PMT	R1 NOIR2	NOIR3 NOIR4	NO	
--TIMING----	WALKIPED	CLIMN GRI YELI	RED	
ENTRANCE TM.	11 2551	1125.5125.5		
-----MIN	GRIEXT	GRIMX GRI YELI	RED	
TRACK CLEAR	01 01	0125.5125.5		
-----MIN	DLIPMTEXTIMX	TMI YELI	RED	
DWL/CYC-EXIT	01 0.01	01 4.71 1.0		
PMT ACTIVE OUT..	ON	PMT ACT DWELL...	NO	
OTHER - PRI	PMT.OFF	NON-PRI PMT....	OFF	
INH EXT TIME...	0.0	PED PR RETURN...	OFF	
PRIORITY RETURN..	OFF	QUEUE DELAY....	OFF	
COND DELAY.....	OFF			
PHASES	1 2 3 4 5 6 7 8			
PR RTN%	0 0 0 0 0 0 0 0			
PHASES	9 10 11 12 13 14 15 16			
PR RTN%	0 0 0 0 0 0 0 0			

## EV Preemption Control Box Wiring Detail

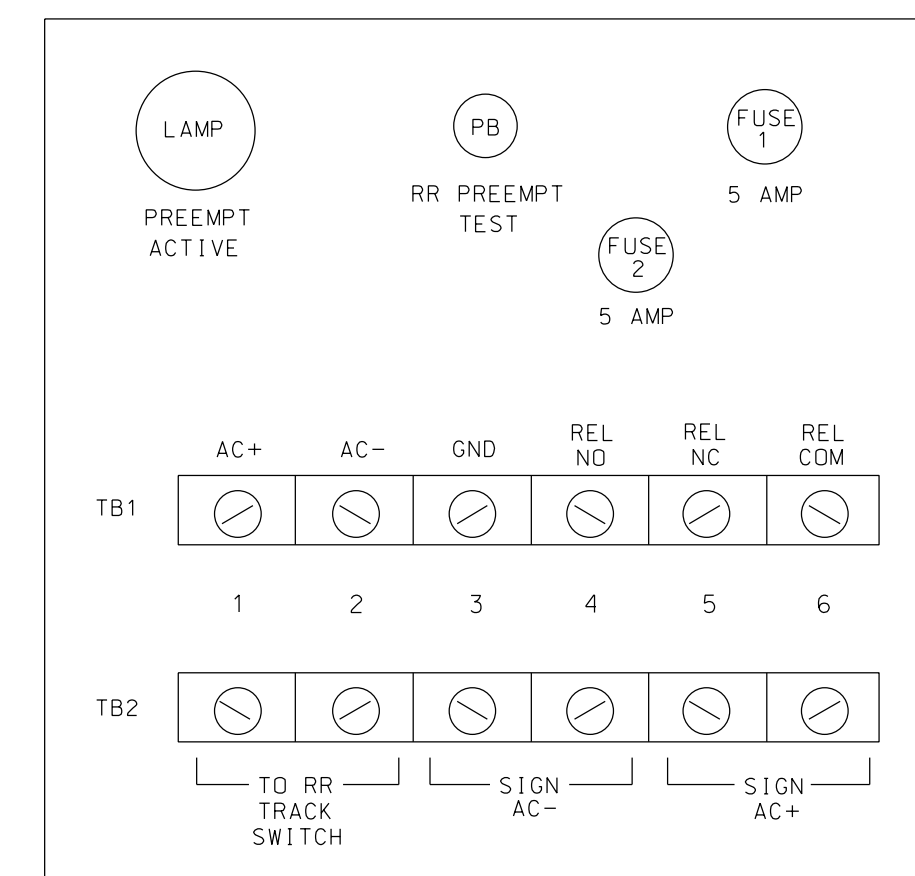
(wire as shown below)



### NOTES

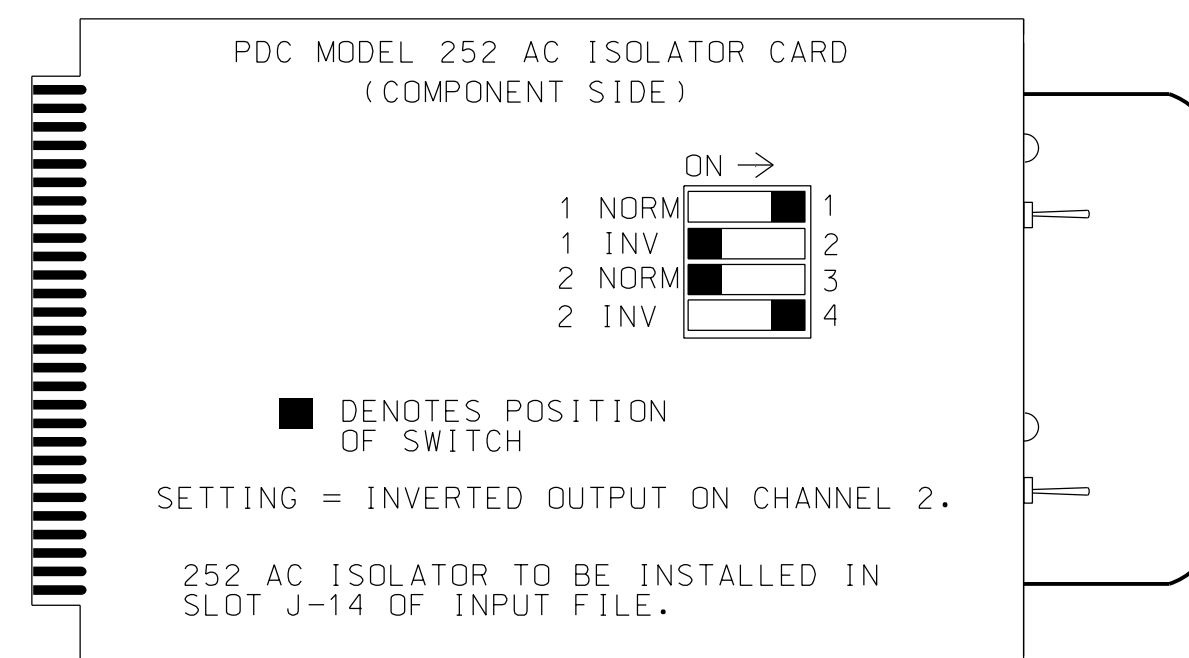
- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay 'K1' is an enclosed DPDT general purpose relay with a 120VAC coil, 10A contacts, and octal-style plug.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this, set invert dip switch on AC Isolator Card.
- IMPORTANT!! Terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

### FRONT VIEW



### PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

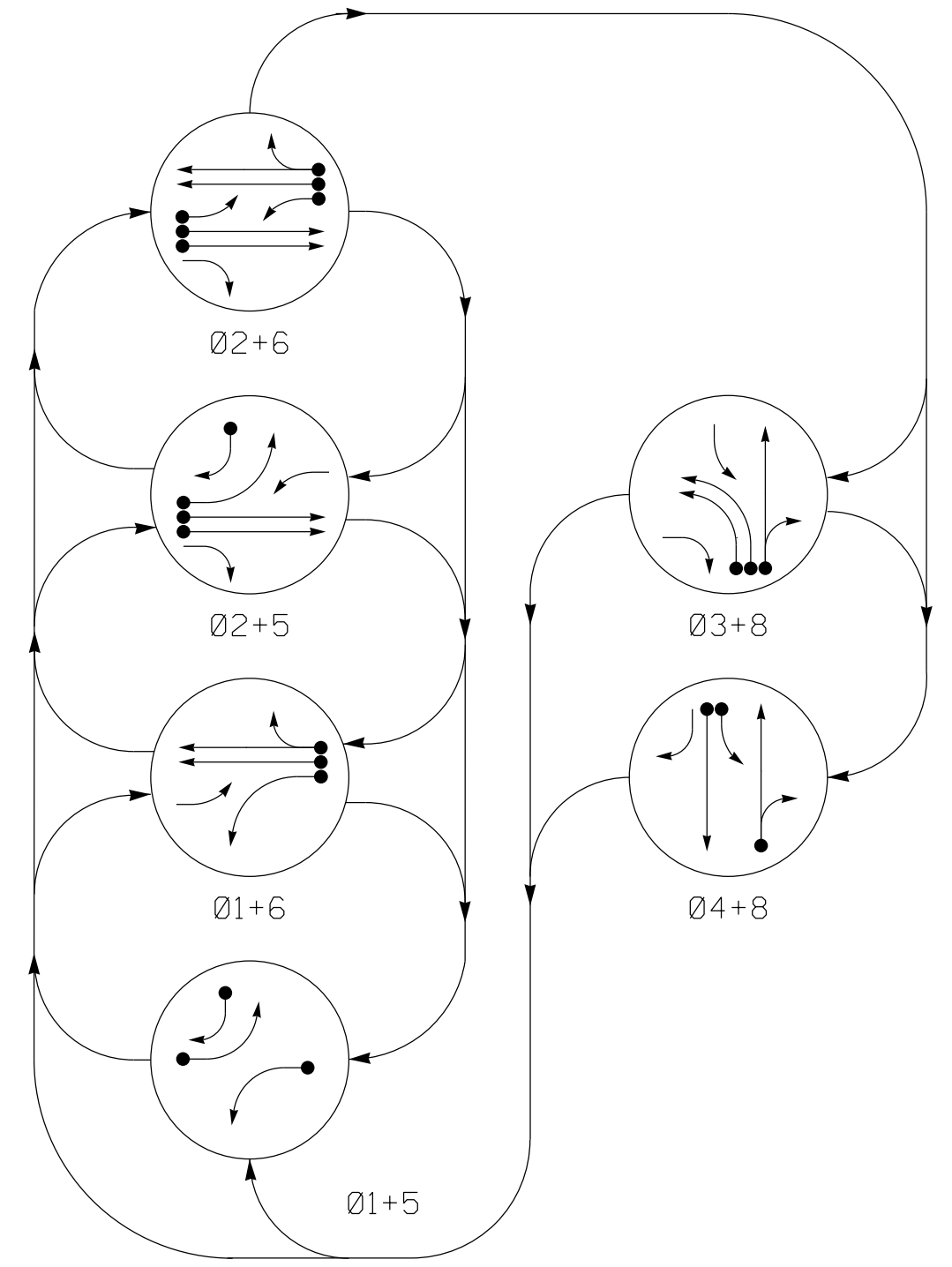


NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

Electrical Details - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	US 70 (S. Church Street) at International Road/ Provident Financial Security		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED 
	Division 7 PLAN DATE: March 2018 PREPARED BY: NA Ptak	Alamance County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	

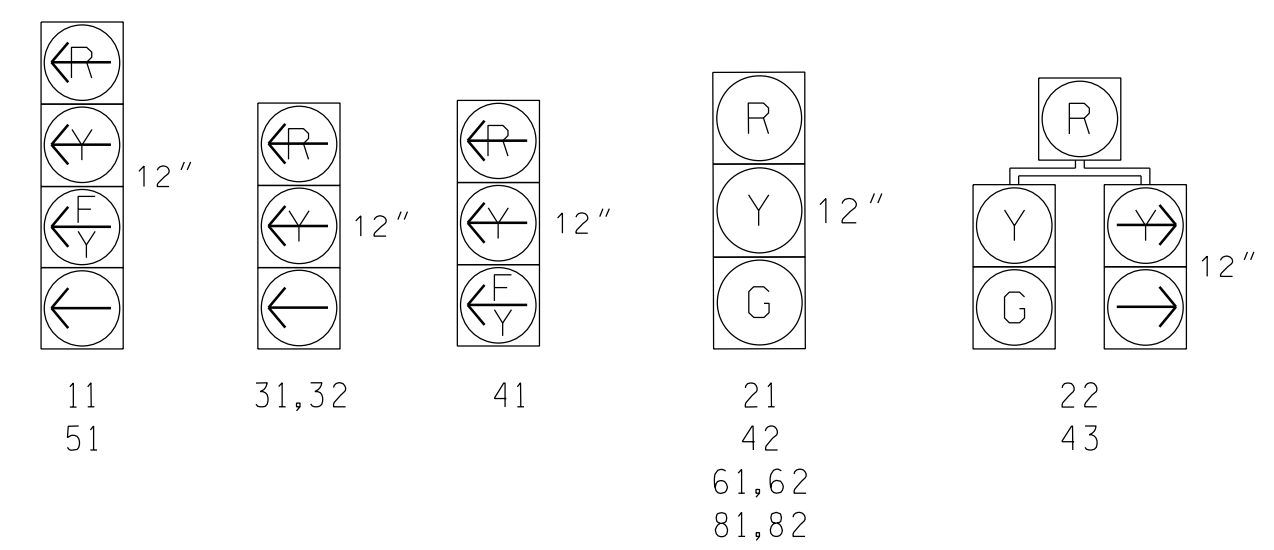
**PHASING DIAGRAM**



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

**SIGNAL FACE I.D.**

All Heads L.E.D.



**TABLE OF OPERATION**

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+8	04+8	04+8	04+8
11	←	←	←	←	←	←	←	←
21	R	R	G	G	R	R	Y	
22	R	R	G	G	R	R	Y	
31,32	←	←	←	←	←	←	←	←
41	←	←	←	←	←	←	←	←
42	R	R	R	R	G	R		
43	R	R	R	R	R	G	R	
51	←	←	←	←	←	←	←	←
61,62	R	G	R	G	R	R	Y	
81,82	R	R	R	G	G	R		

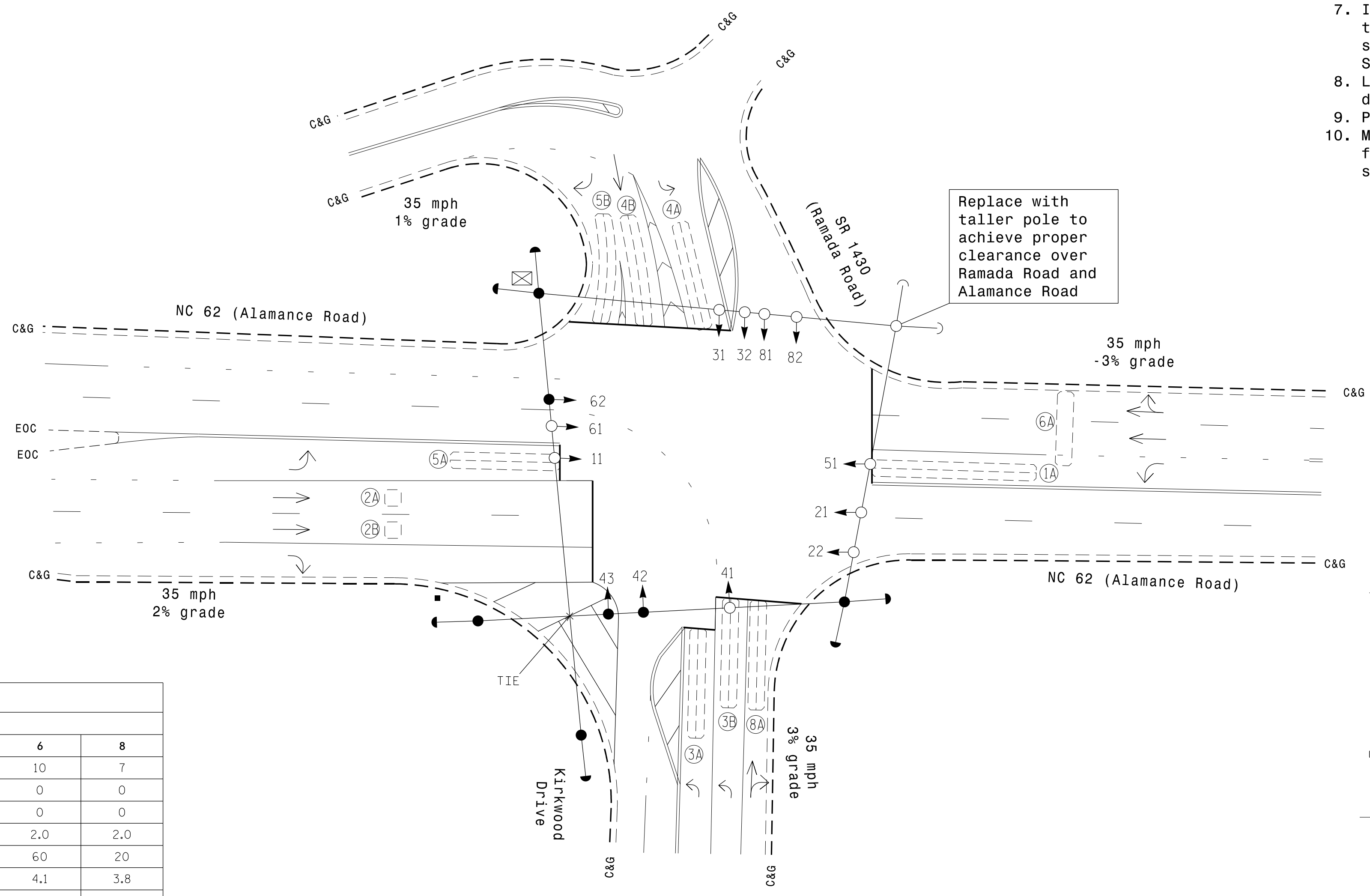
**ASC/3 DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Yes	-	15	-	S	-	X
					6	Yes	-	-	-	S	-	X
2A,2B	6X6	70	EXIST	-	2	Yes	-	-	-	S	-	X
3A	6X40	0	2-4-2	-	3	Yes	-	-	-	S	-	X
3B	6X40	0	2-4-2	-	3	Yes	-	-	-	S	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
					2	Yes	-	-	-	S	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
6A	6X27	70	EXIST	-	6	Yes	-	-	-	S	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	10	-	S	-	X

**6 Phase Fully Actuated (Burlington-Graham Signal System)**

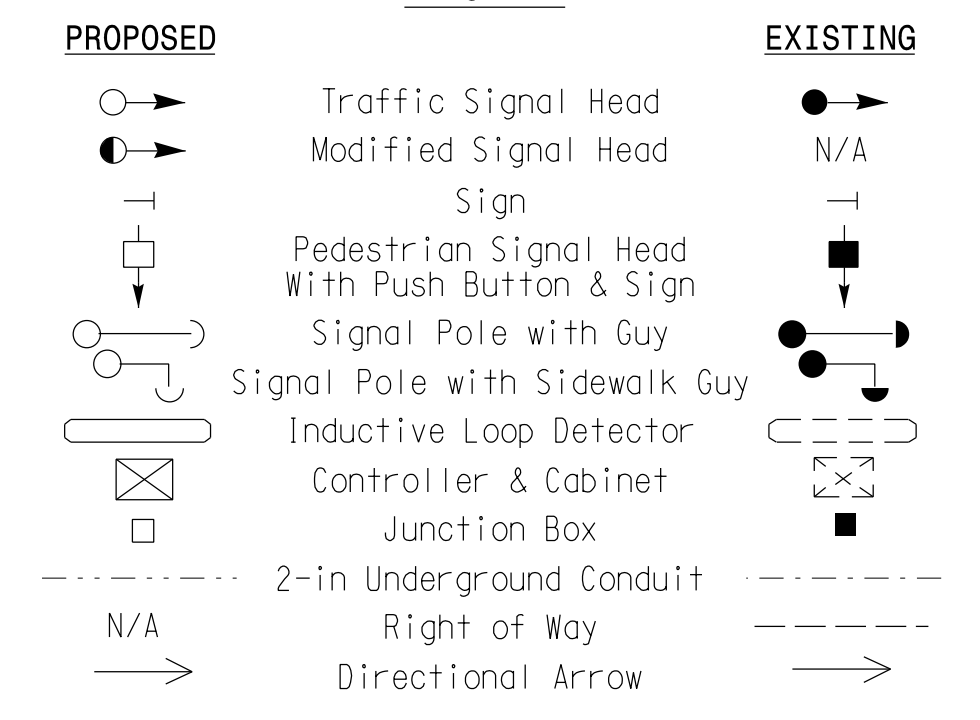
**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 may be lagged.
5. Reposition existing signal heads numbered 42, 43, and 62.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



Replace with taller pole to achieve proper clearance over Ramada Road and Alamance Road

**LEGEND**



**ASC/3 TIMING CHART**

FEATURE	PHASE							
	1	2	3	4	5	6	8	
Min Green *	7	10	7	7	7	10	7	
Walk *	0	0	0	0	0	0	0	
Ped Clear	0	0	0	0	0	0	0	
Veh. Extension *	2.0	3.0	2.0	2.0	3.0	2.0	2.0	
Max 1 *	15	60	20	15	20	60	20	
Yellow	3.0	4.1	3.0	3.8	3.0	4.1	3.8	
Red Clear	3.2	2.1	3.1	1.9	2.8	2.1	1.9	
Actuations B4 Add *	-	-	-	-	-	-	-	
Seconds / Actuation *	-	-	-	-	-	-	-	
Max Initial *	-	-	-	-	-	-	-	
Time Before Reduction *	-	-	-	-	-	-	-	
Time To Reduce *	-	-	-	-	-	-	-	
Minimum Gap	-	-	-	-	-	-	-	
Locking Detector	-	X	-	-	-	X	-	
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	
Dual Entry	-	-	-	-	-	-	X	
Simultaneous Gap	X	X	X	X	X	X	X	

\* 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 for the Offices of:  
 Transportation Mobility and Safety Division  
 STATE OF NORTH CAROLINA  
 Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 30  
1"=30'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NC 62 (Alamance Road) at SR 1430 (Ramada Road)/ Kirkwood Drive

Division 7 Alamance County Burlington

PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion

PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

REVISIONS: INIT. DATE

SEAL: PAMELA L. ALEXANDER, PROFESSIONAL ENGINEER, NO. 023489

DATE: 6/7/2018

SIG. INVENTORY NO. 07-1230

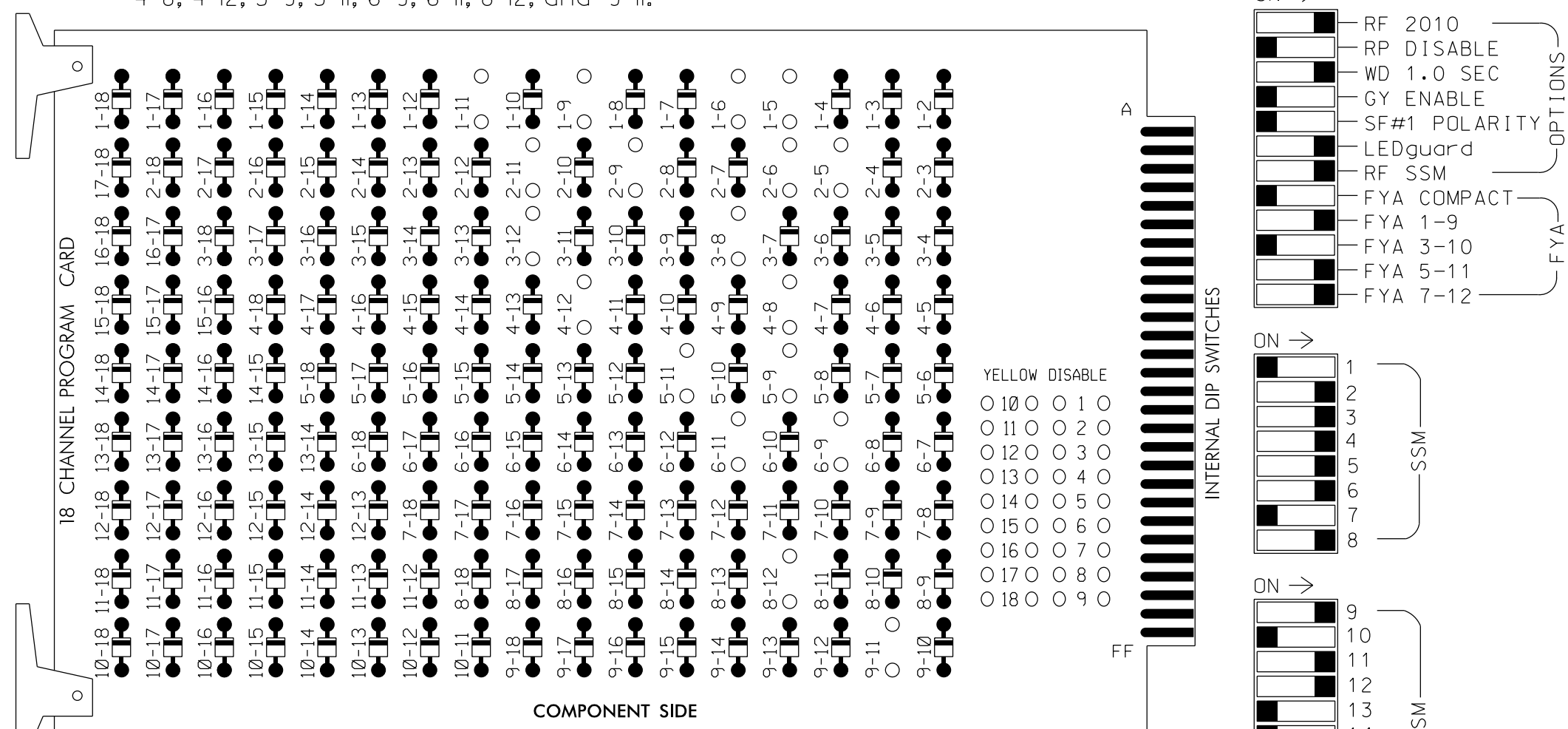
07-JUN-2018 11:15 0: \*Transportation and Safety Division - U-6015 B-C 51a Sys\*ask\_05-11-Signal Design Section - 1230.dgn ALX2361 AT LUS40649



### EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-II, 2-5, 2-6, 2-9, 2-II, 3-8, 3-12, 4-8, 4-12, 5-9, 5-II, 6-9, 6-II, 8-12, and 9-II.



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.
- Integrate monitor with Ethernet network in cabinet.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phase 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S11,AUX S1,  
 AUX S4,AUX S5  
 PHASES USED.....1,2,3,4,5,6,8  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....\*  
 \* See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11	21,22	NU	22	31,32	42,43	NU	43	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	41
RED		128			101		*	134		107									
YELLOW	*	129			102			135		108									
GREEN		130			103			136		109									
RED ARROW				116									A121			A114	A101		
YELLOW ARROW				117	117			132					A122			A115	A102		
FLASHING YELLOW ARROW													A123			A116	A103		
GREEN ARROW	127			118	118			133	133										

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

### INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 2 2A,2B	∅ 3 3A	∅ 3 3B	∅ 4 4A	∅ 4 4B	∅ 5 5A	∅ 5 5B	∅ 6 6A	∅ 7 7A	∅ 7 7B	∅ 8 8A	∅ 8 8B	∅ 9 9A
L	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
U	∅ 5 5A	∅ 5 5B	∅ 6 6A	∅ 7 7A	∅ 7 7B	∅ 8 8A	∅ 8 8B	∅ 9 9A	∅ 9 9B	∅ 10 10A	∅ 10 10B	∅ 11 11A	∅ 11 11B	∅ 12 12A
L	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

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

FS = FLASH SENSE  
 ST = STOP TIME

\* Wired Input - Do not populate slot with detector card

### INPUT FILE CONNECTION & PROGRAMMING CHART

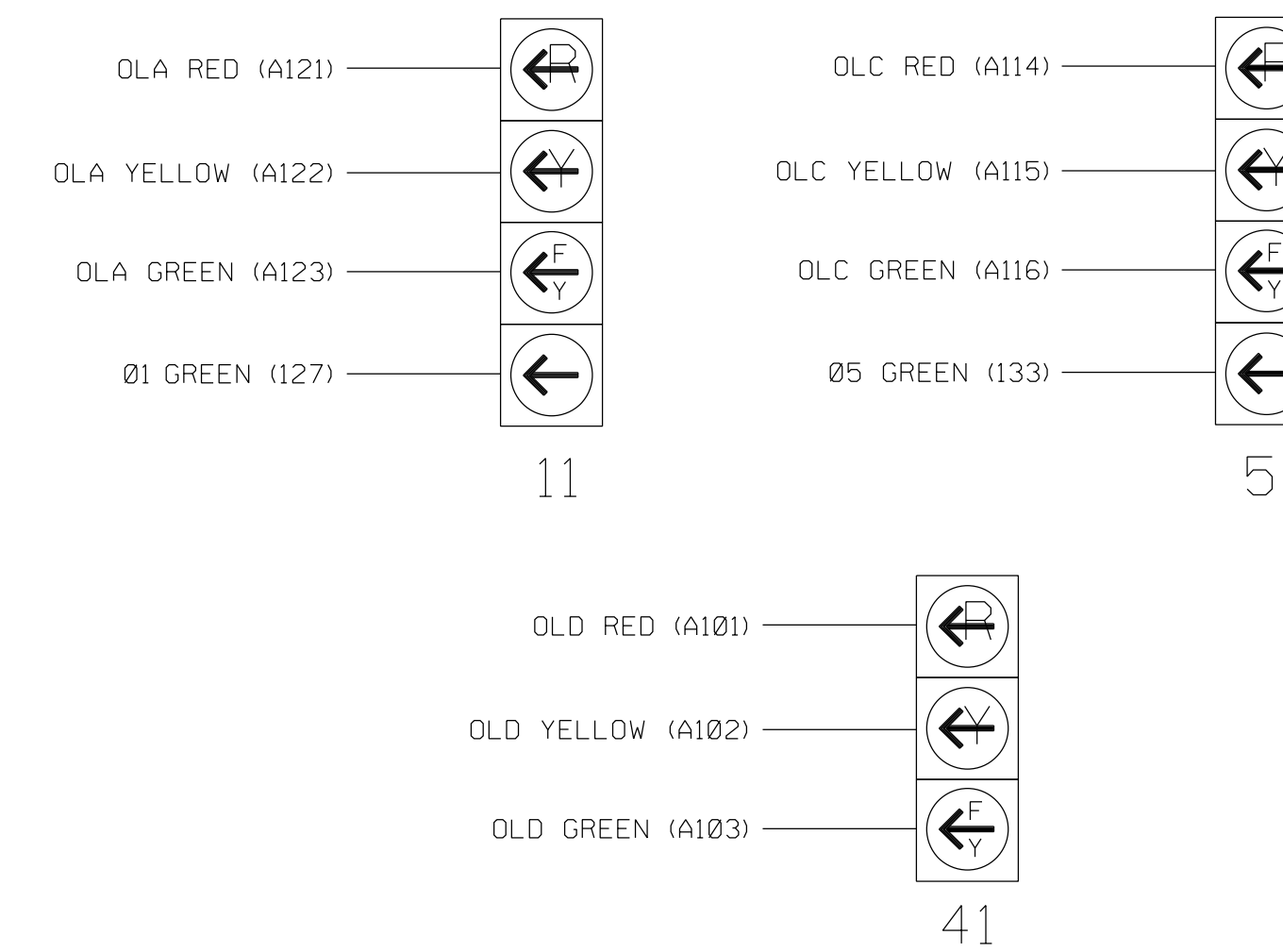
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	I1U	56	1	1	YES		15		S
	-	J4U	48	26	6	YES				S
	2A,2B	TB2-5,6	I2U	39	2	YES				S
3A	TB4-5,6	I5U	58	3	YES					S
3B	TB4-9,10	I6U	41	4	YES					S
4A	TB6-1,2	I7U	65	34	4	YES		3		S
4B	TB6-3,4	I7L	78	44	4	YES				S
5A <sup>2</sup>	TB3-1,2	J1U	55	5	5	YES		15		S
	-	I4U	47	22	2	YES				S
5B	TB3-5,6	J2U	40	6	5	YES		15		S
6A	TB3-9,10	J3U	64	36	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		10		S

<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.

<sup>2</sup>Add jumper from J1-W to I4-W, on rear of input file.

### FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)

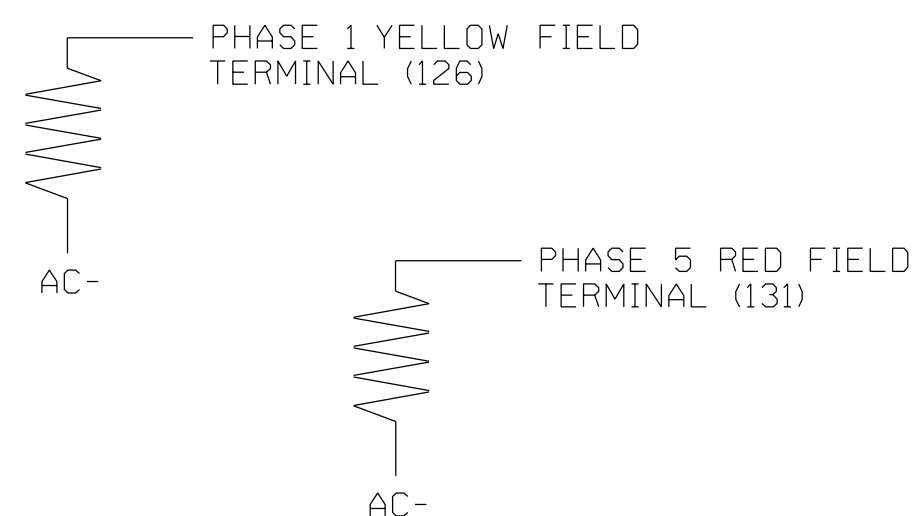


### LOAD RESISTOR INSTALLATION DETAIL

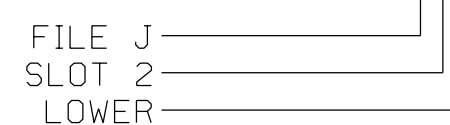
(install resistors as shown)

**ACCEPTABLE VALUES**

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



INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1230  
 DESIGNED: November 2017  
 SEALED: 6/7/2018  
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:  

 NC 62 (Alamance Road) at SR 1430 (Ramada Road)/Kirkwood Drive  
 Division 7 Alamance County Burlington  
 PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion  
 PREPARED BY: NA Ptak REVIEWED BY: PL Alexander  
 REVISIONS INIT. DATE  
 6/9/2018  
 Pamela Alexander  
 SEAL 023489  
 SIG. INVENTORY NO. 07-1230

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

*(program controller as shown)*

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

*OVERLAP A*

Select TMG VEH OVLP [A] and 'PPLT FYA'

TMG VEH OVLP...[A] TYPE: ....PPLT FYA

PROTECTED LEFT TURN.... PHASE 1  
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT.....CH9 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0  
ACTION PLAN SF BIT DISABLE..... 0

Toggle Twice

*OVERLAP C*

Select TMG VEH OVLP [C] and 'PPLT FYA'

TMG VEH OVLP...[C] TYPE: ....PPLT FYA

PROTECTED LEFT TURN.... PHASE 5  
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0  
ACTION PLAN SF BIT DISABLE..... 0

Toggle Once

*OVERLAP D*

Select TMG VEH OVLP [D] and 'OTHER/ECONOLITE'

TMG VEH OVLP...[D] TYPE:OTHER/ECONOLITE

PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6

INCLUDED . . . . . X . . . . .

PROTECT . . . . .

PED PRTC . . . . .

NOT OVLP . . . . .

FLSH GRN . . . . . 1 . . . . .

LAG X PH . . . . .

LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

END PROGRAMMING

## FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-1230  
DESIGNED: November 2017  
SEALED: 6/7/2018  
REVISED: N/A

09-JUN-2018 14:14  
D:\Consolidation\Projects\00056469 U-6015 B-G Sig System\Task 05\_11\_Signals\Des\gn\wlr\ing\07-1230E.dgn  
ALEX3361 AT LUS33069

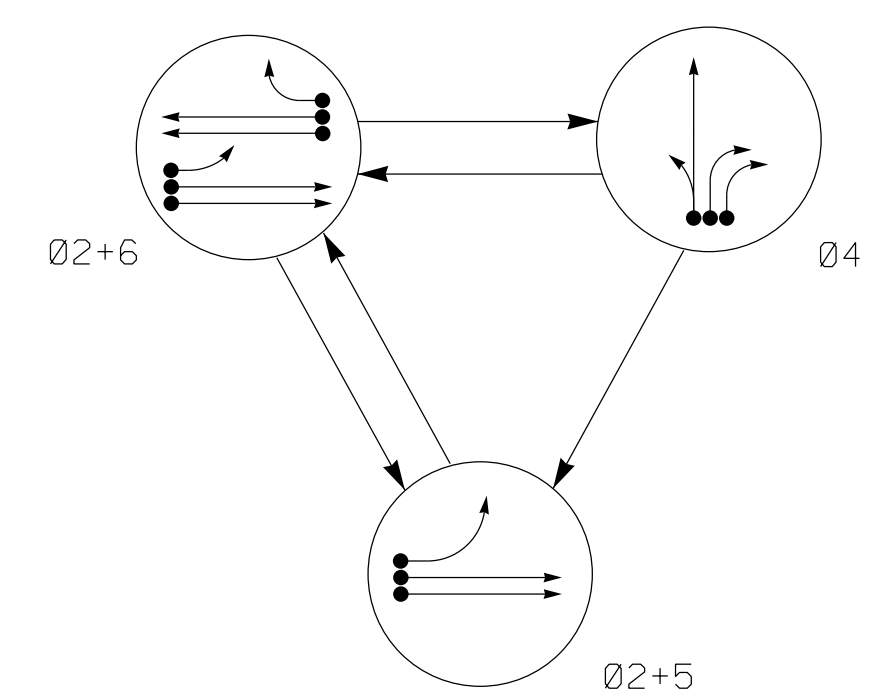
Electrical Detail - Sheet 2 of 2

<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small; text-align: center;">Prepared for the Offices of:</p> <p style="font-size: x-small; text-align: center;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p><b>NC 62 (Alamance Road)</b> at <b>SR 1430 (Ramada Road)/</b> <b>Kirkwood Drive</b></p> <p style="font-size: x-small;">Division 7 Alamance County Burlington</p> <p>PLAN DATE: <b>November 2017</b> REVIEWED BY: <b>AM Encarnacion</b></p> <p>PREPARED BY: <b>NA Ptak</b> REVIEWED BY: <b>PL Alexander</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p style="text-align: center; font-weight: bold; font-size: small;">DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <div style="text-align: center;"> <p style="font-size: x-small;">Sealed by: <b>Pamela Alexander</b> 6/9/2018</p> <p style="font-size: x-small;">DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. <b>07-1230</b></p> </div>
REVISIONS	INIT.	DATE						

ATKINS

1616 EAST MILLBROOK ROAD, SUITE 160  
RALEIGH, NORTH CAROLINA 27609  
(919) 876-6888 NCBEES #F-0326

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

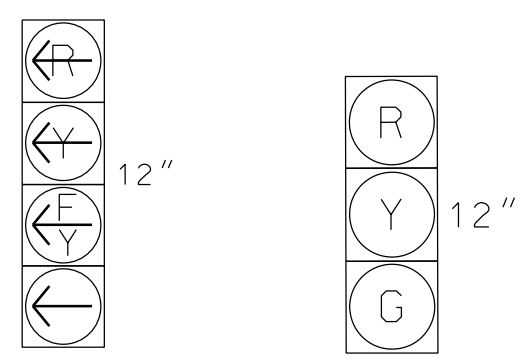
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←○→ UNSIGNALIZED MOVEMENT
- ←○→ PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	Ø 2+6	Ø 4	Ø 2+5	FLASH
21,22	G	G	R	Y
41,42,43	R	R	G	R
51	←	←	←	←
61,62	R	G	R	Y

**SIGNAL FACE I.D.**

All Heads L.E.D.



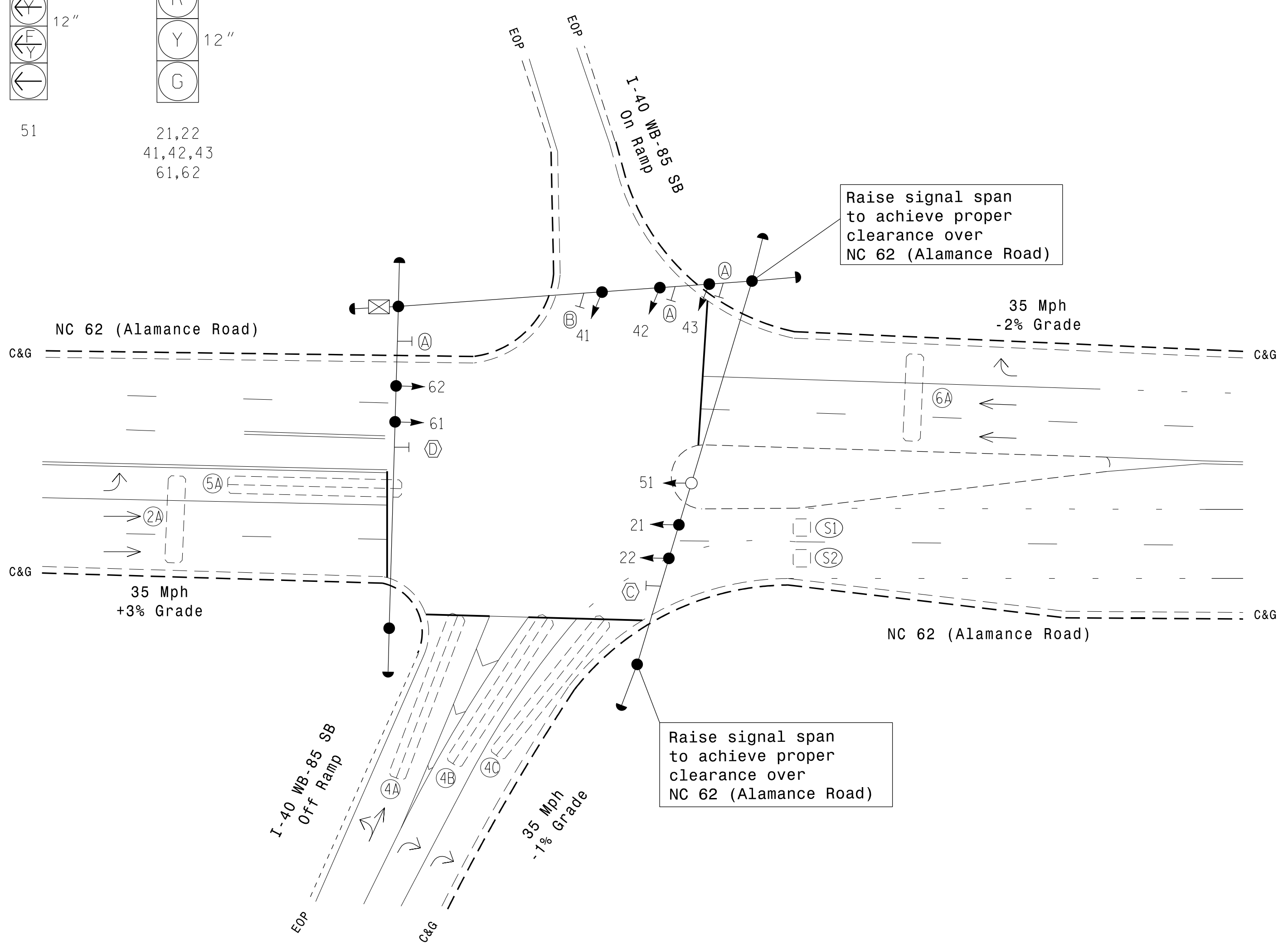
**ASC/3 DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X30	70	EXIST	-	2	Yes	-	-	-	S	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	-	-	S	-	X
4B	6X60	0	2-4-2	-	4	Yes	-	15	-	S	-	X
4C	6X60	0	2-4-2	-	4	Yes	-	15	-	S	-	X
5A	6X60	+5	2-4-2	-	5	Yes	-	15	-	S	-	X
6A	6X30	70	EXIST	-	6	Yes	-	-	-	S	-	X
S1	6X6	+140	EXIST	-	-	NO	-	-	-	N	X	X
S2	6X6	+140	EXIST	-	-	NO	-	-	-	N	X	X

**3 Phase Fully Actuated (Burlington-Graham Signal System)**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**ASC/3 TIMING CHART**

FEATURE	PHASE			
	2	4	5	6
Min Green *	10	7	7	10
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	3.0	2.0	2.0	3.0
Max 1 *	45	30	20	45
Yellow	4.0	3.9	3.0	4.0
Red Clear	2.2	2.2	2.9	2.2
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

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

**LEGEND**

- | PROPOSED                                       | EXISTING  |
|--|-----------|
| ○→ Traffic Signal Head                         | ●→ N/A    |
| ●→ Modified Signal Head                        | ○→ N/A    |
| □→ Pedestrian Signal Head                      | □→ N/A    |
| □→ Signal Pole with Guy                        | □→ N/A    |
| □→ Signal Pole with Sidewalk Guy               | □→ N/A    |
| □→ Inductive Loop Detector                     | □→ N/A    |
| □→ Controller & Cabinet                        | □→ N/A    |
| □→ Junction Box                                | □→ N/A    |
| □→ 2-in Underground Conduit                    | □→ N/A    |
| N/A → Right of Way                             | N/A → N/A |
| → Directional Arrow                            | → N/A     |
| Ⓐ Right Arrow "ONLY" Sign (R-5R)               | Ⓐ N/A     |
| Ⓑ Combined Through and Left Arrow Sign (R3-6L) | Ⓑ N/A     |
| Ⓒ No Right Turn Sign (R3-1)                    | Ⓒ N/A     |
| Ⓓ No U-Turn/No Left Turn Sign (R3-18)          | Ⓓ N/A     |

**Signal Upgrade**

**NC 62 (Alamance Road) at I-40 WB-85 SB Ramps**

Division 7 Alamance County Burlington

PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion

PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

SCALE: 1"=30'

SEAL

PROFESSIONAL ENGINEER

PAUL A. L. ALEXANDER

6/7/2018

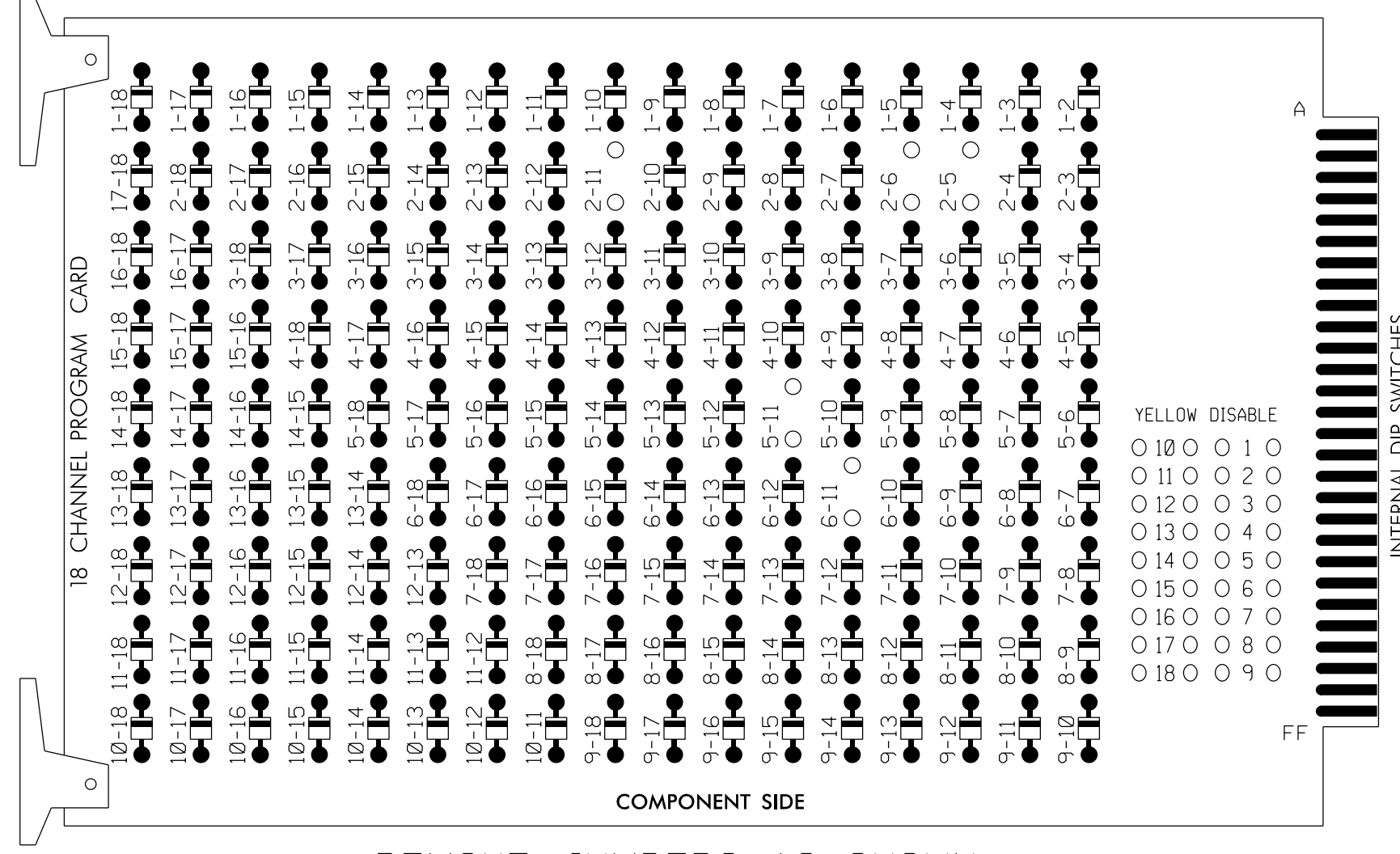
SIG. INVENTORY NO. 07-1231

07-JUN-2018 11:15 D:\Projects\2018\100056469 U-6015 B-G S1g Sys\Task 05\_11\_Signal\Des\gn\07-1231.dgn ALEX3361 AT LUS33649

### EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

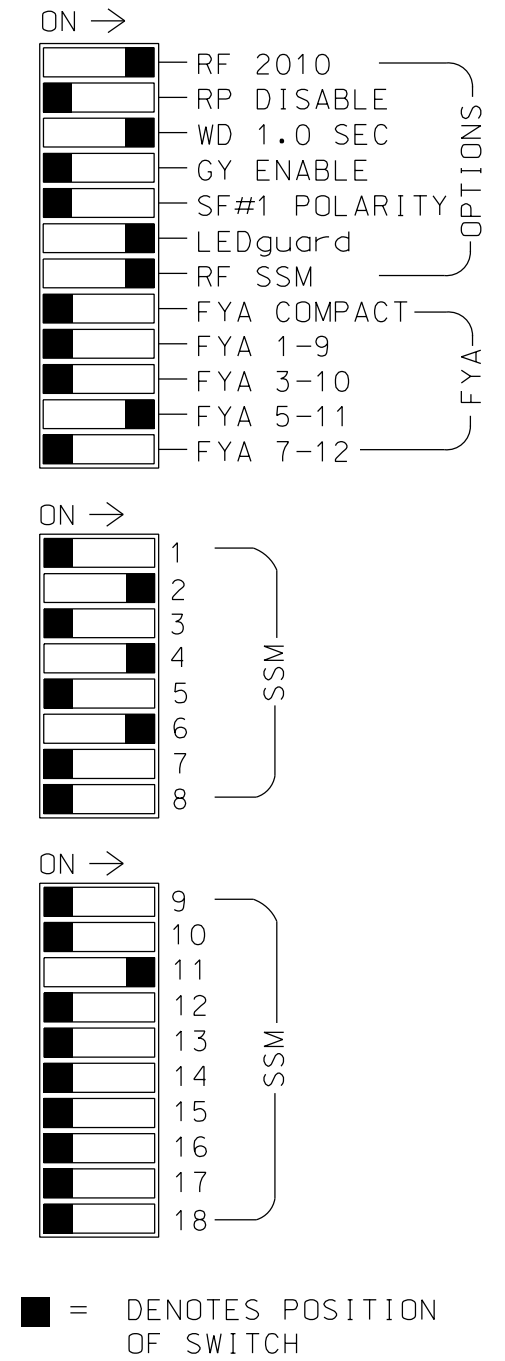
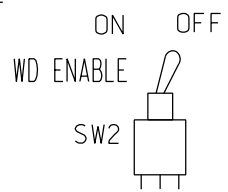
REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 5-11, and 6-11.



REMOVE JUMPERS AS SHOWN

**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.



### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONDLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S5,S7,S8,AUX S4  
 PHASES USED.....2,4,5,6  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED

\* See sheet 2 for overlap programming.

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Sig. 109.1

### SIGNAL HEAD HOOK-UP CHART

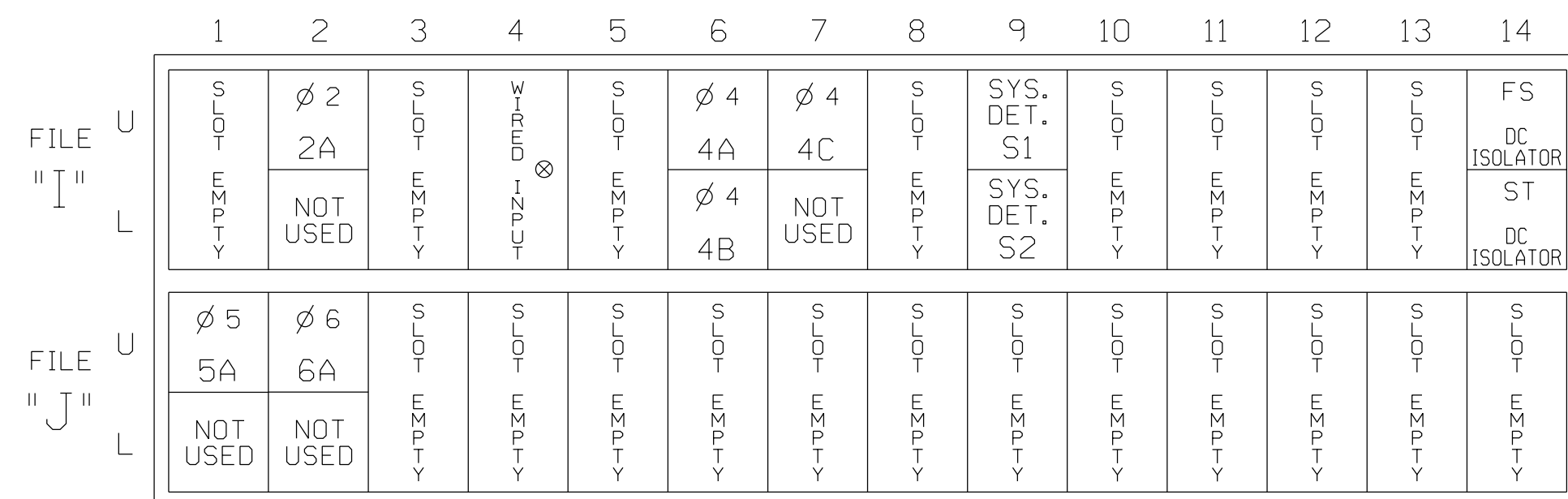
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42,43	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	51	NU	NU	
RED		128			101			134											
YELLOW		129			102		*	135											
GREEN		130			103			136											
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW								133											

NU = Not Used

- \* See pictorial of head wiring in detail this sheet.
- \* Denotes install load resistor. See load resistor installation detail this sheet.

### INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE  
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

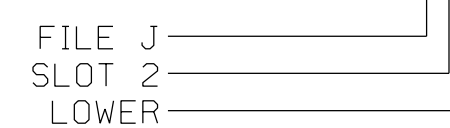
### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXT TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	YES		15		S
4C	TB6-1,2	I7U	65	34	4	YES		15		S
5A <sup>1</sup>	TB3-1,2	J1U	55	5	5	YES		15		S
	-	I4U	47	22	2	YES				S
6A	TB3-5,6	J2U	40	6	6	YES				S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N

<sup>1</sup>Add jumper from J1-W to I4-W, on rear of input file.

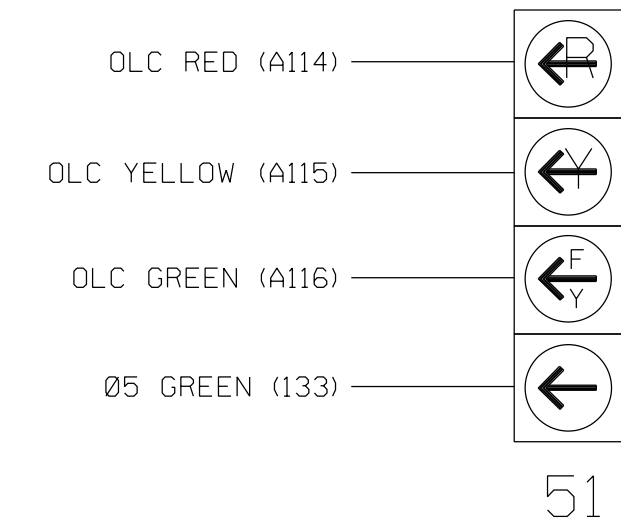
\* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

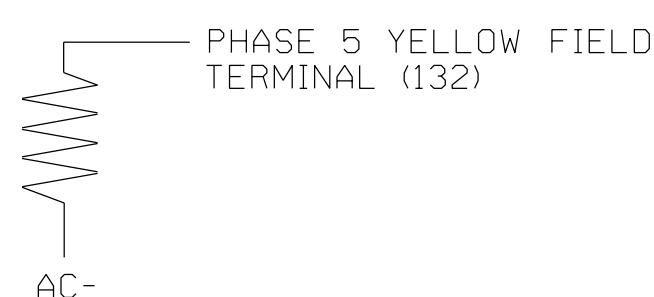


### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

**ACCEPTABLE VALUES**

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



Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of: 	<b>NC 62 (Alamance Road)                  at                  I-40 WB-85 SB Ramps</b>		SEAL 
	Division 7 Alamance County Burlington		
PLAN DATE: November 2017	REVIEWED BY: AM Encarnacion		
PREPARED BY: NA Ptak	REVIEWED BY: PL Alexander		
REVISIONS	INIT.	DATE	
Prepared by: Pamela Alexander			DATE: 6/9/2018
SIG. INVENTORY NO. 07-1231			

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

*(program controller as shown)*

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```

TMG VEH OVLP...[C] TYPE: .....PPLT FYA
PROTECTED LEFT TURN.... PHASE 5
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT.....CH11 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
    
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1231  
 DESIGNED: November 2017  
 SEALED: 6/7/2018  
 REVISED: N/A

09-JUN-2018 14:14  
 D:\Transpor\at\at\off\c\cur\100056469 U-6015 B-G S1g Sys\Task 05\_11\_Signal\Des\gn\wlr\ing\07-1231E.dgn  
 ALEX3361 AT LUS210649

Electrical Detail - Sheet 2 of 2

**DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED**

<p style="text-align: center; font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="text-align: center; font-size: x-small;">Prepared for the Offices of:</p> <p style="text-align: center; font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p><b>NC 62 (Alamance Road) at I-40 WB-85 SB Ramps</b></p> <p style="font-size: small;">Division 7 Alamance County Burlington</p> <p style="font-size: x-small;">PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion                  PREPARED BY: NA Ptak REVIEWED BY: PL Alexander</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE							<p style="font-size: x-small;">SEAL</p> <p style="font-size: x-small;">Sealed by: Pamela Alexander DATE: 6/9/2018</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1231</p>
REVISIONS	INIT.	DATE									

ATKINS

1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888 NCBEES #F-0326

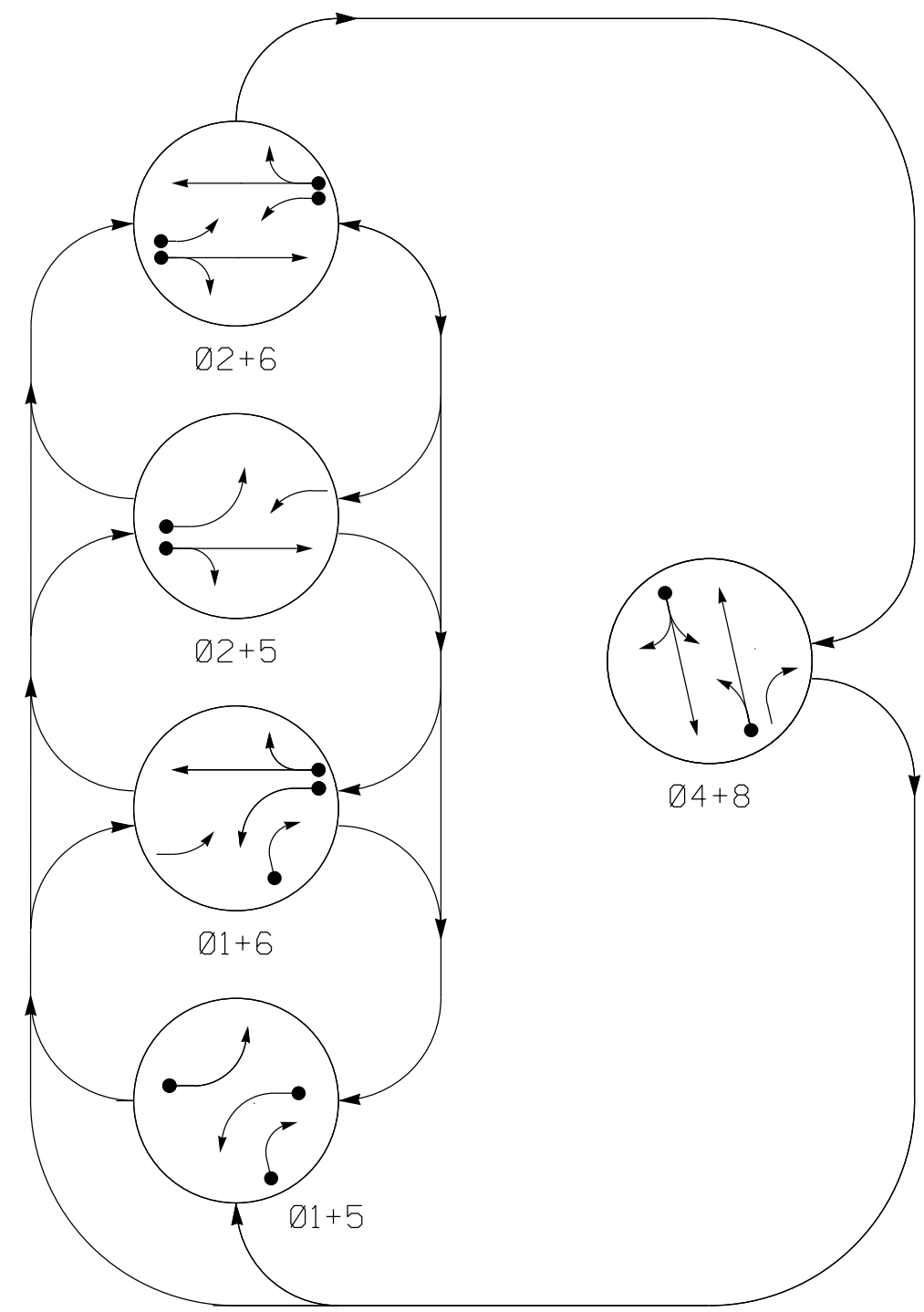








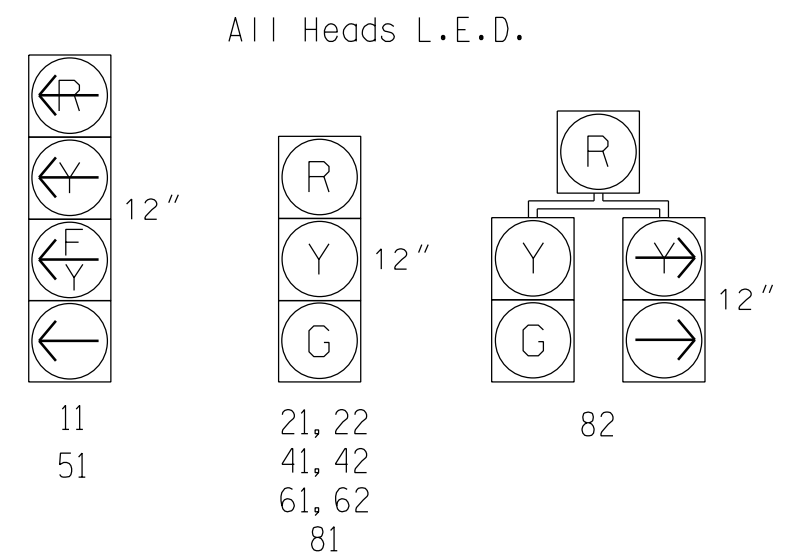
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION table with columns for SIGNAL FACE and PHASE (0, 1, 2, 4, FLASH).

ALTERNATE PHASING TABLE OF OPERATION table with columns for SIGNAL FACE and PHASE (0, 1, 2, 4, FLASH).

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART table with columns for LOOP, SIZE, DISTANCE, TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD.

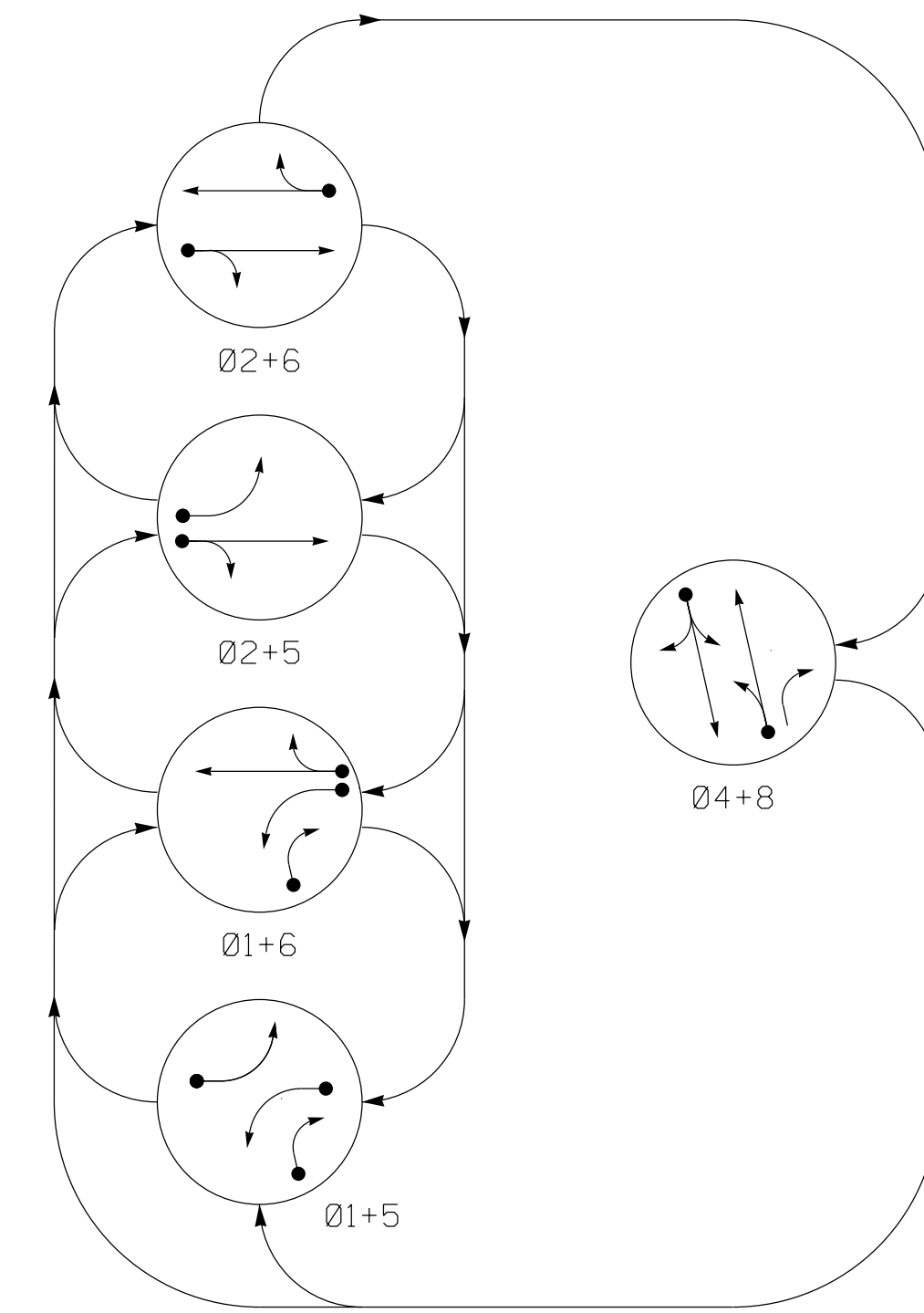
\* Disable delay during alternate phasing operation.
\*\* Disable phase 2 & 6 call during alternate phasing operation.

5 Phase Fully Actuated (Burlington-Graham Signal System)

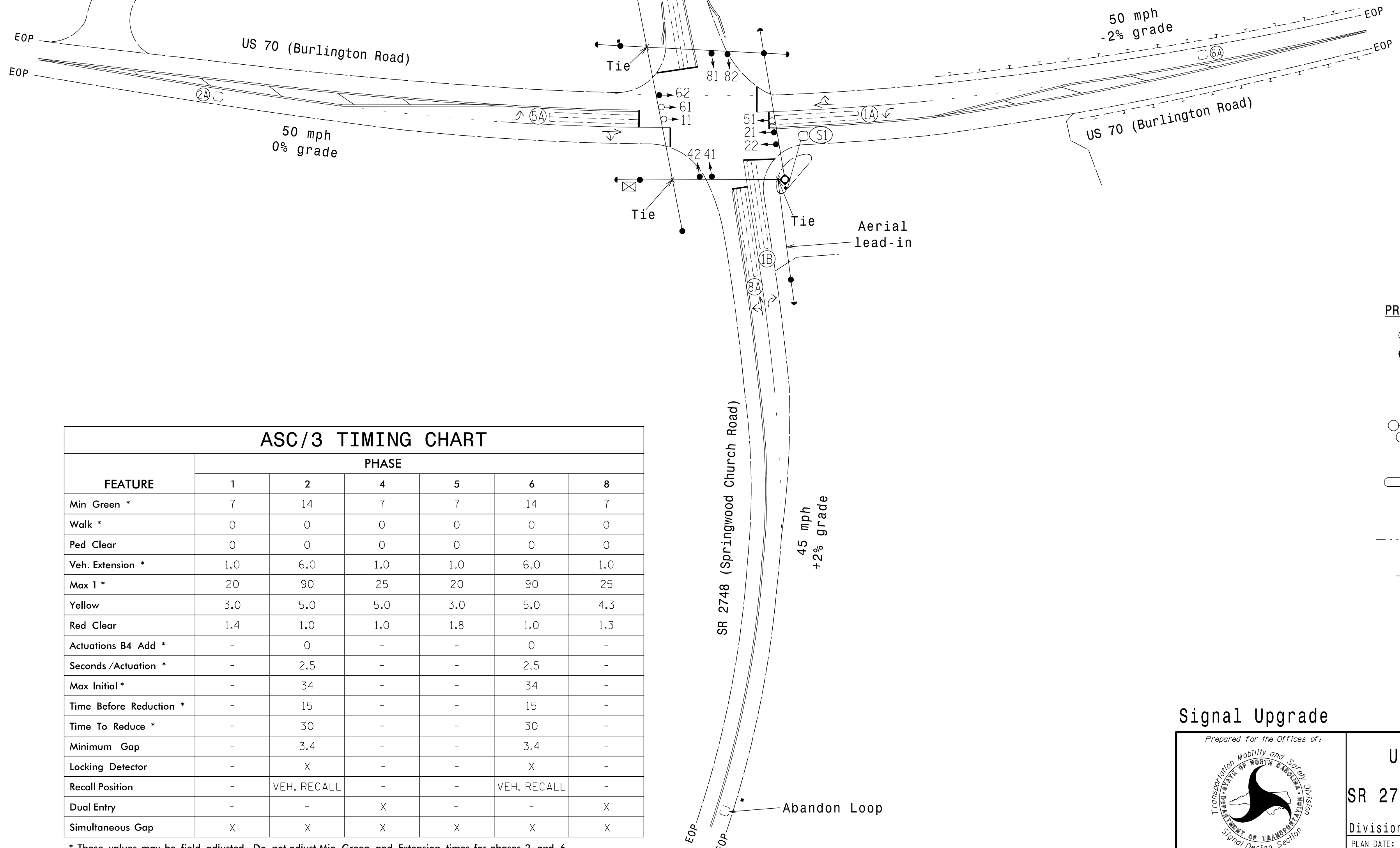
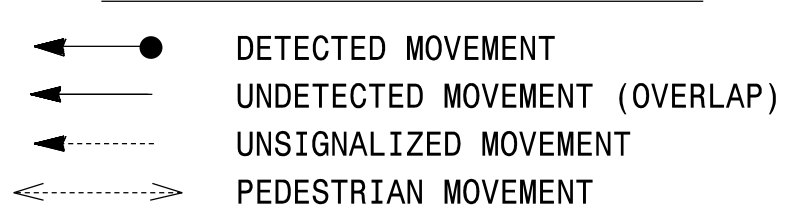
NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018...
2. Do not program signal for late night flashing operation...
3. Phase 1 and/or phase 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22 and 62.
5. Install backplates for signal heads numbered 11, 51 and 61.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual...
8. Locate new cabinet so as not to obstruct sight distance...
9. Pavement markings are existing. The City Traffic Engineer will determine the hours of use...
10. The City Traffic Engineer will determine the hours of use for each phasing plan.
11. Maximum times shown in timing chart are for free-run operation only.

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

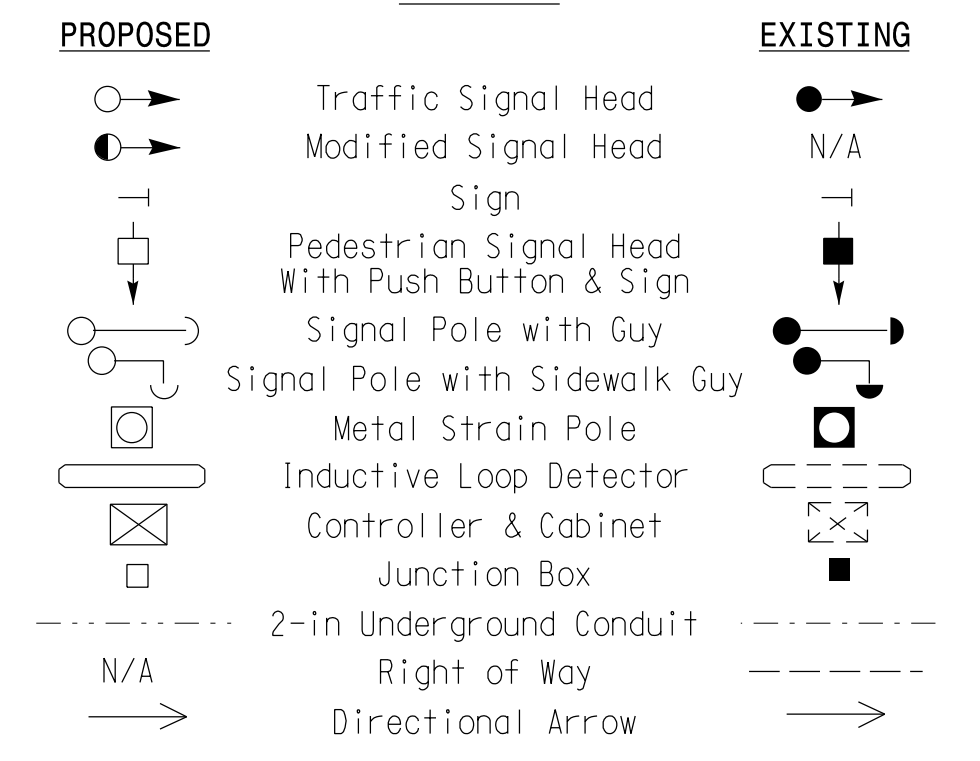


ASC/3 TIMING CHART

ASC/3 TIMING CHART table with columns for FEATURE and PHASE (1, 2, 4, 5, 6, 8).

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

LEGEND



Signal Upgrade

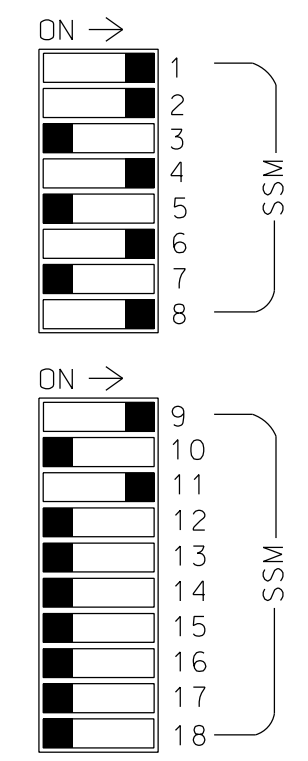
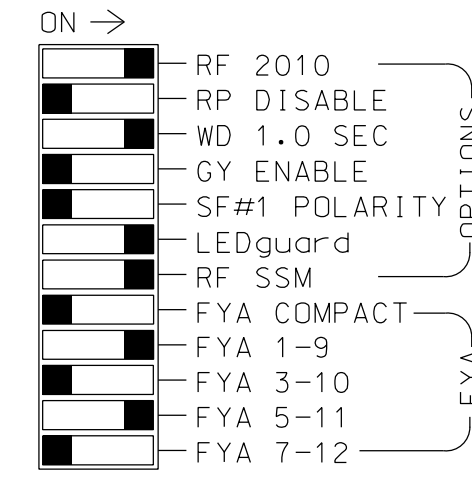
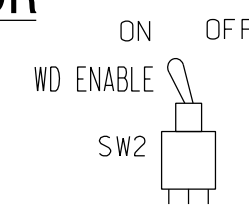
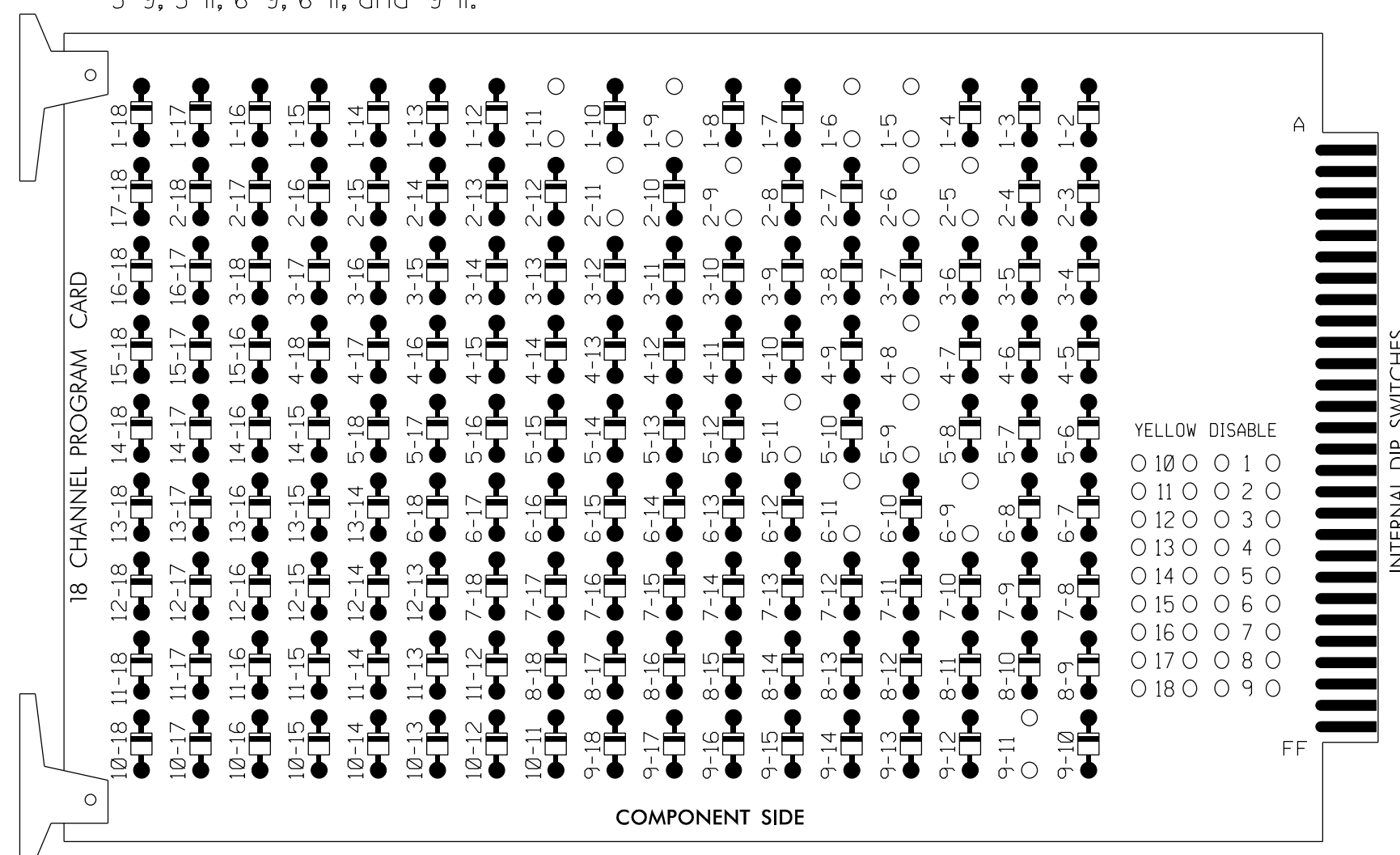
Project information block including logos for Guilford County and Atkins, project name 'US 70 (Burlington Road) at SR 2748 (Springwood Church Road)', dates, and signatures.

07-JUN-2018 11:15 D:\transport\10\work\trc\trc\100056469 U-6015 B-G Sig System\Task 05\_11\_Signals\Des\gm07-1251.dgn

## EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11, and 9-11.



■ = DENOTES POSITION OF SWITCH

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.
- Integrate monitor with Ethernet network in cabinet.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1,AUX S4  
 PHASES USED.....1,2,4,5,6,8  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED

\* See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Sig.111.1

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	21,22	NU	NU	41,42	NU	51★	61,62	NU	NU	81,82	NU	11★	NU	NU	51★	NU
RED	*	128			101			134		107								
YELLOW		129			102		*	135		108								
GREEN		130			103			136		109								
RED ARROW														A121			A114	
YELLOW ARROW	126													A122			A115	
FLASHING YELLOW ARROW														A123			A116	
GREEN ARROW	127	127						133										

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

### INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 1 1B	∅ 2 2A	∅ 4 4A	∅ 5 5A	∅ 6 6A	∅ 8 8A	SYS. DET. S1						FS DC ISOLATOR
L	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED						DC ISOLATOR
U	∅ 5 5A	∅ 6 6A												S
L	NOT USED	NOT USED												ST

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

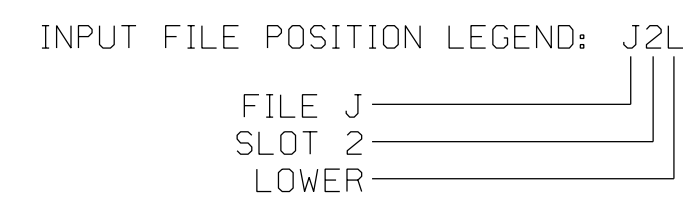
FS = FLASH SENSE  
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	I1U	56	1★	1	YES		15		S
	-	J4U	48	26★	6	YES		3		G
1B	TB2-5,6	I2U	39	2	1	YES		15		S
2A	TB2-9,10	I3U	63	32	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		5		S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
5A <sup>2</sup>	TB3-1,2	J1U	55	5★	5	YES		15		S
	-	I4U	47	22★	2	YES		3		G
6A	TB3-5,6	J2U	40	6	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES		3		S

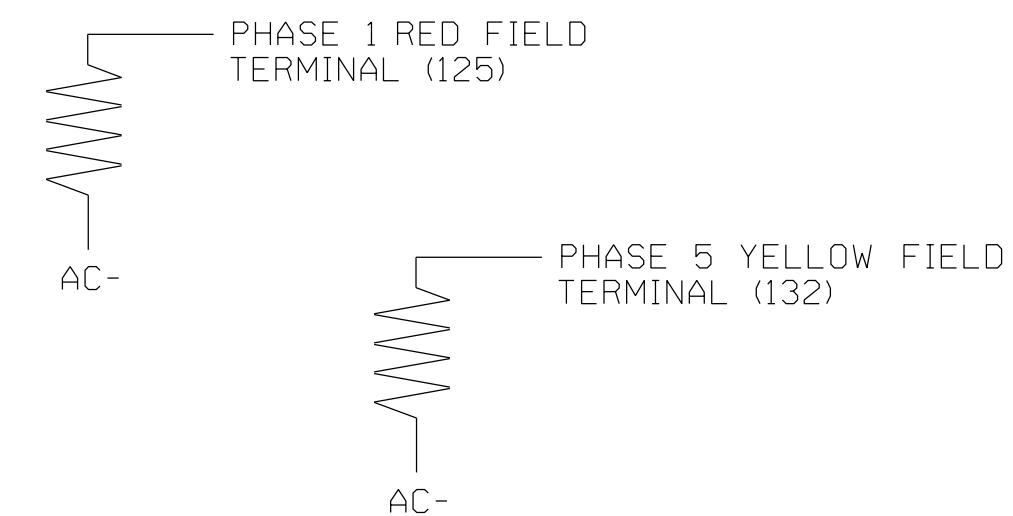
- Add jumper from I1-W to J4-W, on rear of input file.
  - Add jumper from J1-W to I4-W, on rear of input file.
- \* System detector only. Remove any assigned vehicle phase.
- ★ See vehicle detector setup programming detail for alternate phasing on sheet 2.



### LOAD RESISTOR INSTALLATION DETAIL

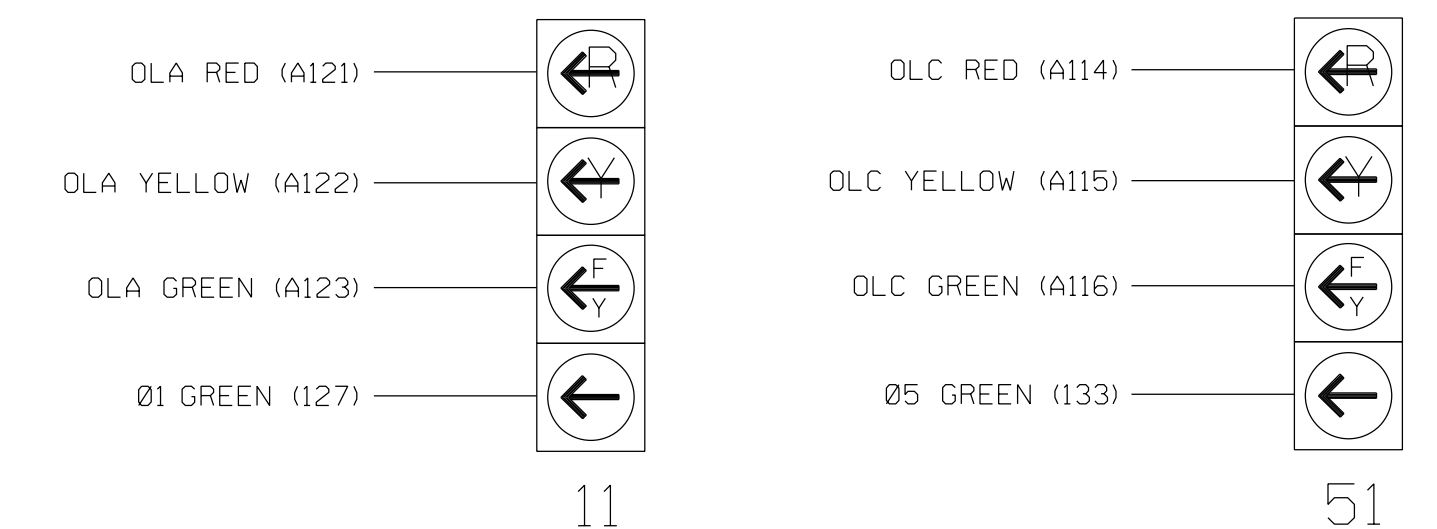
(install resistors as shown)

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



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1251  
 DESIGNED: December 2017  
 SEALED: 6/7/2018  
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

Prepared for the Offices of:

**US 70 (Burlington Road)  
at  
SR 2748 (Springwood Church Road)**

Division 7    Guilford County    Burlington

PLAN DATE: December 2017    REVIEWED BY: AM Encarnacion  
 PREPARED BY: JA Wiles    REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

**DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED**

SEAL  
NORTH CAROLINA  
PROFESSIONAL  
ENGINEER  
PAMELA L. ALEXANDER  
023489

Reviewed by:  
PAMELA ALEXANDER  
DATE: 6/9/2018

SIG. INVENTORY NO. 07-1251

09-JUN-2018 14:14  
 D:\Transportation\tr-office\curr\*100056469 U-6015 B-6 Sig Sys\*task 05-11-15\signal\sig05as\gn\wfr\ing07-1251E.dgn  
 ALEX3361 AT LUS340619

## ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A

(program controller as shown)

# IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select 8. UTILITIES
2. From UTILITIES Submenu select 1. COPY/CLEAR
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```

COPY / CLEAR UTILITY
FROM          TO
PHASE TIMING... > PHASE TIMING...
TIMING PLAN... > TIMING PLAN...
PH DET OPT PLAN... > PH DET OPT PLAN...
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
TOGGLE TO SELECT A "FROM" AND A "TO"
THEN PRESS ENTER
    
```

4. From Main Menu select 6. DETECTORS
5. From DETECTOR Submenu select 2. VEHICLE DETECTOR SETUP
6. Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "1".  
- Set delay time to "0".

```

VEH DETECTOR [ 1]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
1 1
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [ ] position and enter "26".  
- Set assigned phase to "0".

```

VEH DETECTOR [26]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
26 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

← NOTICE VEH DET PLAN 2

← ENSURE PHASE IS SET TO "0"

- Place cursor in VEH DETECTOR [ ] position and enter "5".  
- Set delay time to "0".

```

VEH DETECTOR [ 5]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
5 5
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [ ] position and enter "22".  
- Set assigned phase to "0".

```

VEH DETECTOR [22]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
22 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

← NOTICE VEH DET PLAN 2

← ENSURE PHASE IS SET TO "0"

END PROGRAMMING

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL (program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

### OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```

TMG VEH OVLP...[A] TYPE: ....PPLT FYA
PROTECTED LEFT TURN... PHASE 1
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT.....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 1
    
```

← NOTICE ACTION PLAN SF BIT "1"

Toggle Twice

### OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```

TMG VEH OVLP...[C] TYPE: ....PPLT FYA
PROTECTED LEFT TURN... PHASE 5
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT.....CH11 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 5
    
```

← NOTICE ACTION PLAN SF BIT "5"

END PROGRAMMING

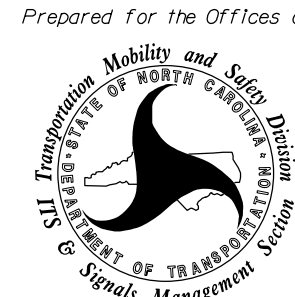
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-1251  
DESIGNED: December 2017  
SEALED: 6/7/2018  
REVISED: N/A

Electrical Detail - Sheet 2 of 3

**DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED**

**ELECTRICAL AND PROGRAMMING  
DETAILS FOR:**

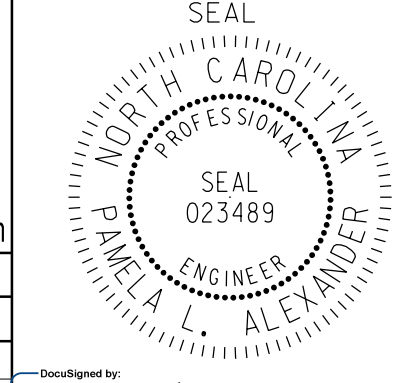
Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

<b>US 70 (Burlington Road) at SR 2748 (Springwood Church Road)</b>	
Division 7    Guilford County    Burlington	
PLAN DATE: December 2017	REVIEWED BY: AM Encarnacion
PREPARED BY: JA Wiles	REVIEWED BY: PL Alexander
REVISIONS	INIT.    DATE

SEAL



SEAL  
023489  
PAMELA L. ALEXANDER  
ENGINEER

6/9/2018  
DATE  
DATE  
DATE

9/9/2018  
DATE  
DATE

SIG. INVENTORY NO. 07-1251

## ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

### ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	1, 5

**IMPORTANT:** IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

#### ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1 AND 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

- SF BITS 1,5:** Modifies overlap parent phases for heads 11 and 51 to run protected turns only.
- VEH DET PLAN 2:** Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.
- Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

```

ACTION PLAN... [ 1 ]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  X  .  .  .  X  .  .  .  (1-8)
AUX FCT  .  .  .  (1-3)
          1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
    
```

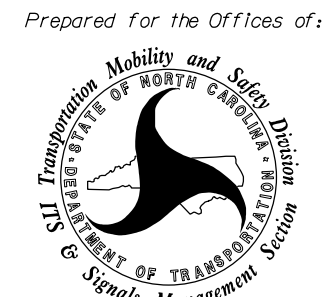
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-1251  
DESIGNED: December 2017  
SEALED: 6/7/2018  
REVISED: N/A

Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529


**US 70 (Burlington Road)  
at  
SR 2748 (Springwood Church Road)**

Division 7    Guilford County    Burlington

PLAN DATE: December 2017	REVIEWED BY: AM Encarnacion
PREPARED BY: JA Wiles	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

SEAL



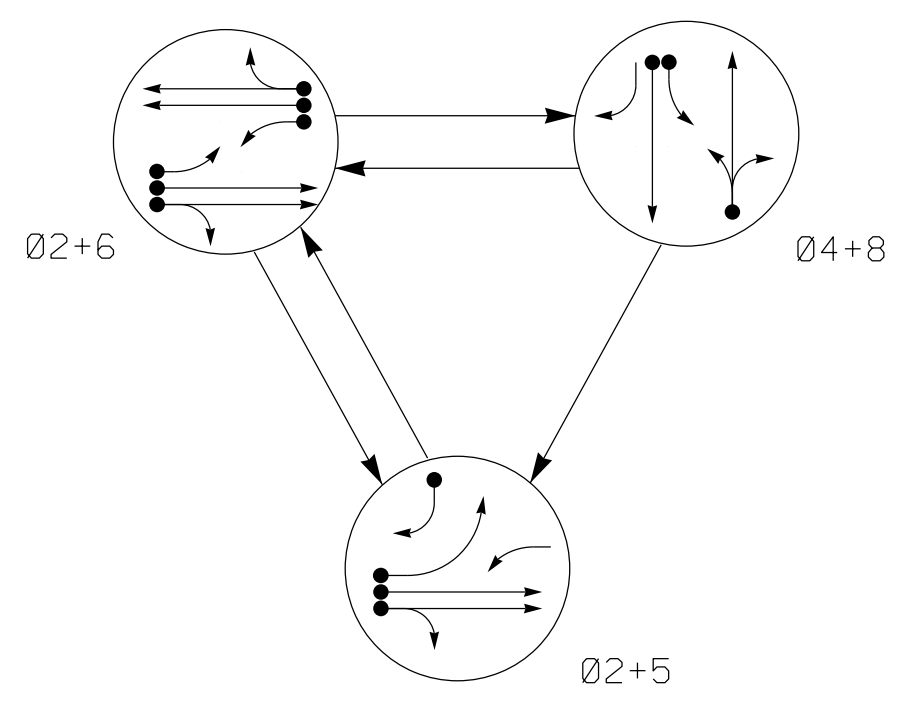
Seal No. 023489  
PAMELA L. ALEXANDER  
ENGINEER

6/9/2018  
DATE

SIG. INVENTORY NO. 07-1251

**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
RALEIGH, NORTH CAROLINA 27609  
(919) 876-6888    NCBEES #F-0326

**PHASING DIAGRAM**



**TABLE OF OPERATION**

SIGNAL FACE	PHASE				
	02+5	02+6	04+8	F	H
21, 22	G	G	R	Y	
41	←	←	←	←	
42	R	R	G	R	
43	←	←	←	←	
51	←	←	←	←	
61	←	←	←	←	
62, 63	R	G	R	Y	
81, 82	R	R	G	R	

**ASC/3 DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X30	90	EXIST	-	2	Yes	-	-	-	S	-	X
4A	6X60	+5	EXIST	-	4	Yes	-	3	-	S	-	X
4B	6X60	+5	EXIST	-	4	Yes	-	-	-	S	-	X
5A	6X60	+5	EXIST	-	5	Yes	-	15	-	S	-	X
5B	6X60	0	2-4-2	-	5	Yes	-	15	-	S	-	X
6A	6X30	90	EXIST	-	6	Yes	-	-	-	S	-	X
8A	6X40	+5	EXIST	-	8	Yes	-	10	-	S	-	X
S1	6X6	+335	EXIST	-	-	No	-	-	-	N	X	X
S2	6X6	+335	EXIST	-	-	No	-	-	-	N	X	X

**3 Phase Fully Actuated (Burlington-Graham Signal System)**

**NOTES**

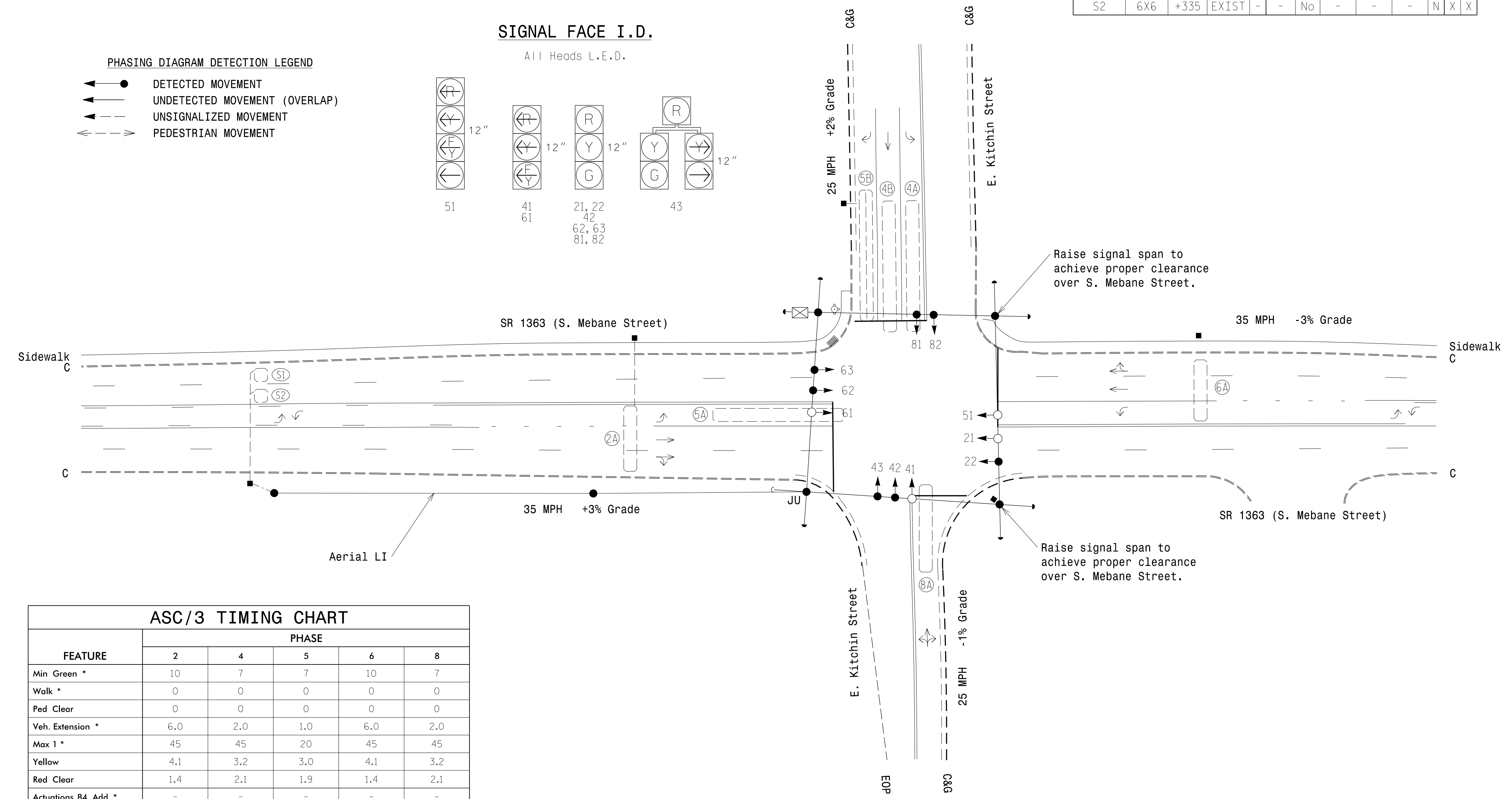
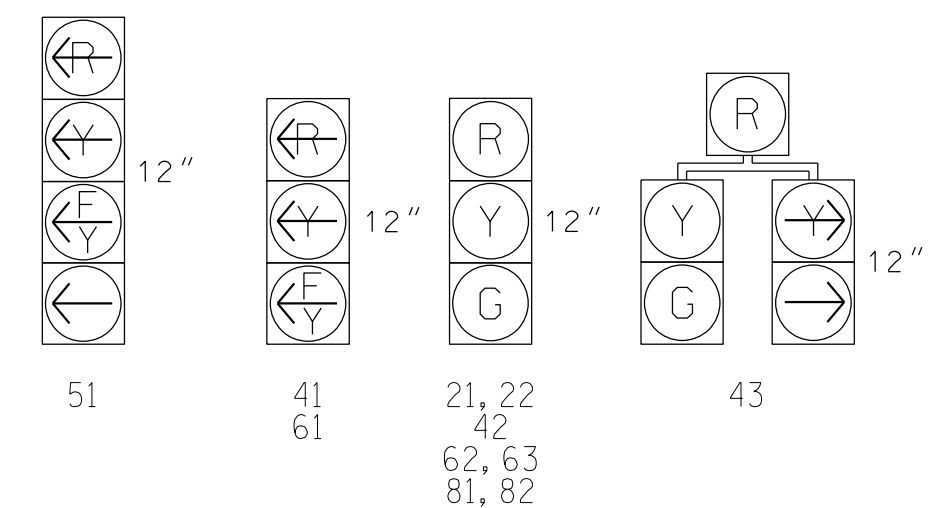
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads numbered 22, 62, and 63.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Remove existing Left Arrow "ONLY" (R3-5L) signs.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

**PHASING DIAGRAM DETECTION LEGEND**

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

**SIGNAL FACE I.D.**

All Heads L.E.D.



**ASC/3 TIMING CHART**

FEATURE	PHASE				
	2	4	5	6	8
Min Green *	10	7	7	10	7
Walk *	0	0	0	0	0
Ped Clear	0	0	0	0	0
Veh. Extension *	6.0	2.0	1.0	6.0	2.0
Max I *	45	45	20	45	45
Yellow	4.1	3.2	3.0	4.1	3.2
Red Clear	1.4	2.1	1.9	1.4	2.1
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-
Max Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Locking Detector	X	-	-	X	-
Recall Position	VEH RECALL	-	-	VEH RECALL	-
Dual Entry	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X

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

**LEGEND**

- | PROPOSED   | EXISTING |
|--|----------|
| ○ → Traffic Signal Head                            | ● → N/A  |
| ○ → Modified Signal Head                           | ○ → N/A  |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → N/A  |
| ○ → Signal Pole with Guy                           | ○ → N/A  |
| ○ → Signal Pole with Sidewalk Guy                  | ○ → N/A  |
| □ → Inductive Loop Detector                        | □ → N/A  |
| □ → Controller & Cabinet                           | □ → N/A  |
| □ → Junction Box                                   | □ → N/A  |
| ○ → 2-in Underground Conduit                       | ○ → N/A  |
| → → Right of Way                                   | → → N/A  |
| → → Directional Arrow                              | → → N/A  |
| ○ → Truncated Dome                                 | ○ → N/A  |
| ○ → Fire Hydrant                                   | ○ → N/A  |

**Signal Upgrade**

Prepared For the Offices of:

**DRMP**  
DRMP, Inc.  
8000 Regency Parkway, Suite 175  
Cary, NC 27518  
NC License No. C-2213 (919) 650-1038

**SR 1363 (S. Mebane Street) at E. Kitchin Street**

Division 7 Alamance County Burlington

PLAN DATE: December 2017 REVIEWED BY: AJ Davis

PREPARED BY: DJ White REVIEWED BY: LM Moon

REVISIONS: INIT. DATE

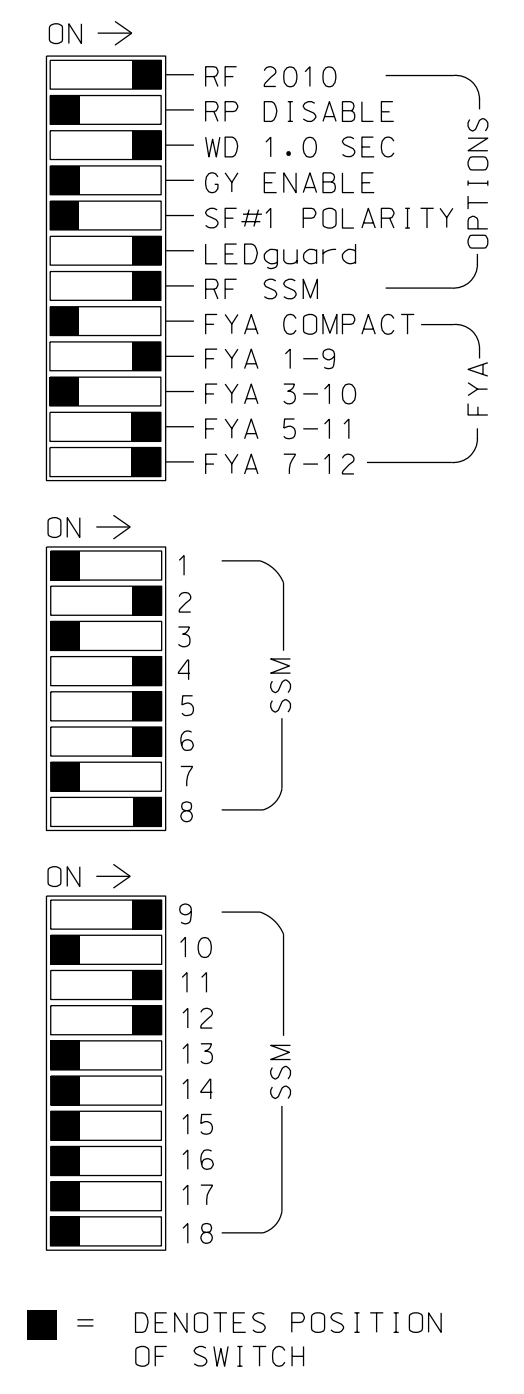
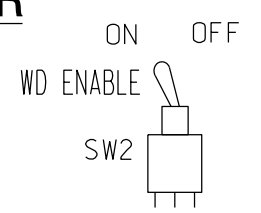
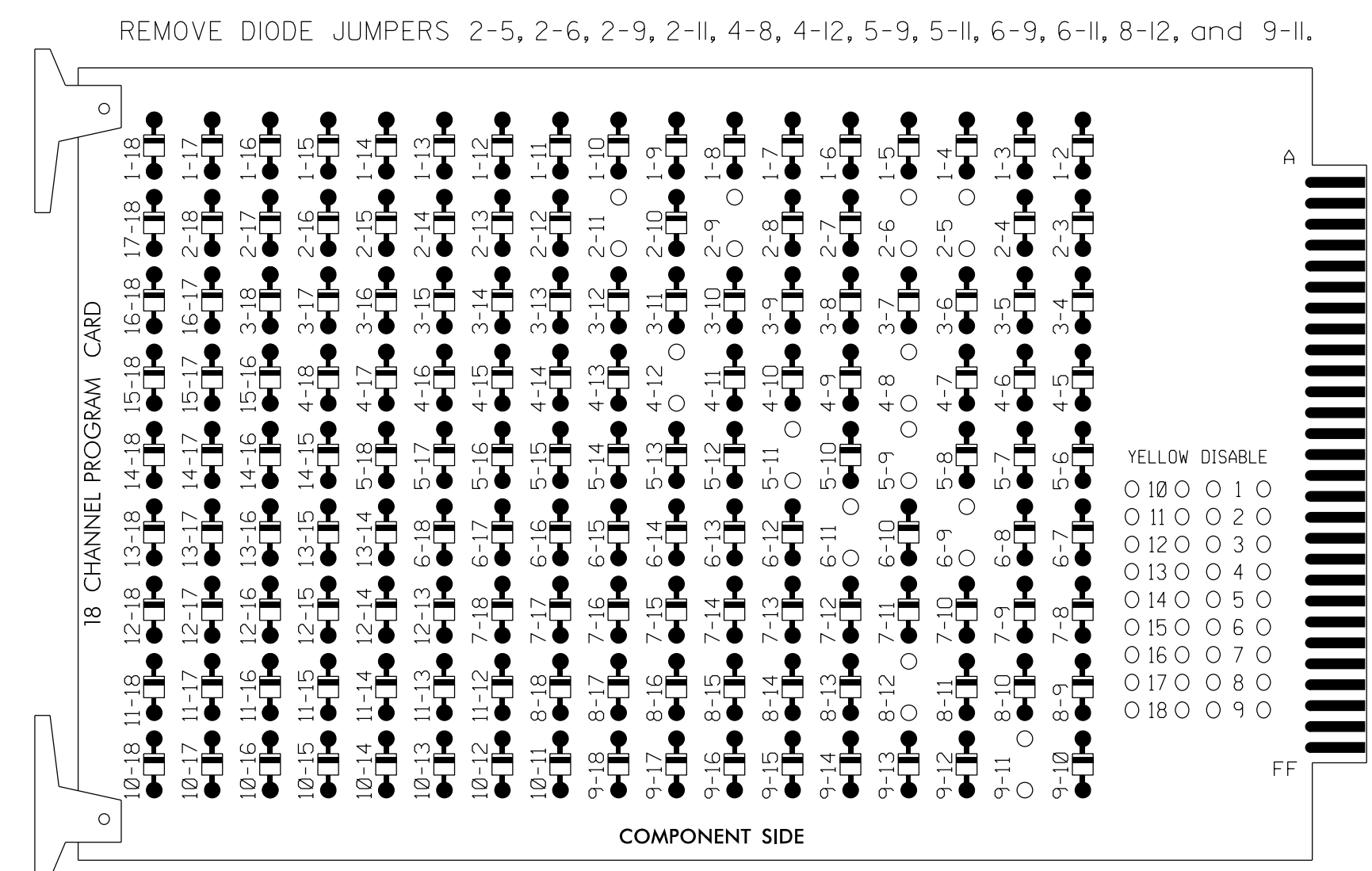
SCALE: 1"=30'

SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 022516  
LISA M. MOON  
6/13/2018  
SIG. INVENTORY NO. 07-1257

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

### EDI MODEL 2018ECLIP-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.
- Integrate monitor with Ethernet network in cabinet.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S5,S7,S8,S11,  
 AUX S1,AUX S4,AUX S5  
 PHASES USED.....2,4,5,6,8  
 OVERLAP "A".....\*  
 OVERLAP "B".....NONE  
 OVERLAP "C".....\*  
 OVERLAP "D".....\*  
 \* See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	42,43	NU	43	51	62,63	NU	NU	81,82	NU	61	NU	51	41	NU
RED		128			101		*		134			107						
YELLOW		129			102				135			108						
GREEN		130			103				136			109						
RED ARROW													A121			A114	A101	
YELLOW ARROW								132					A122			A115	A102	
FLASHING YELLOW ARROW													A123			A116	A103	
GREEN ARROW							133	133										

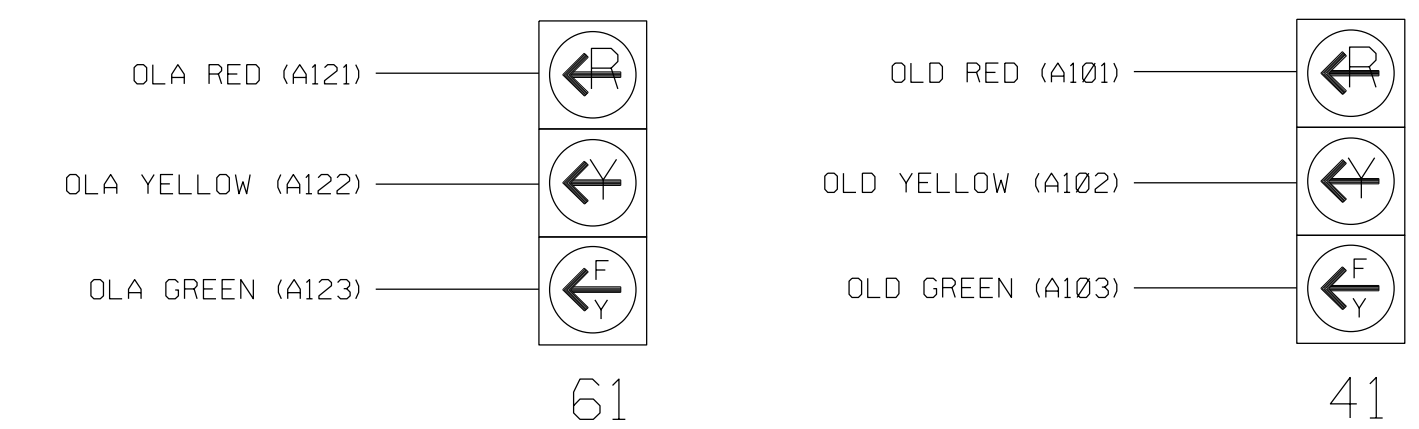
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

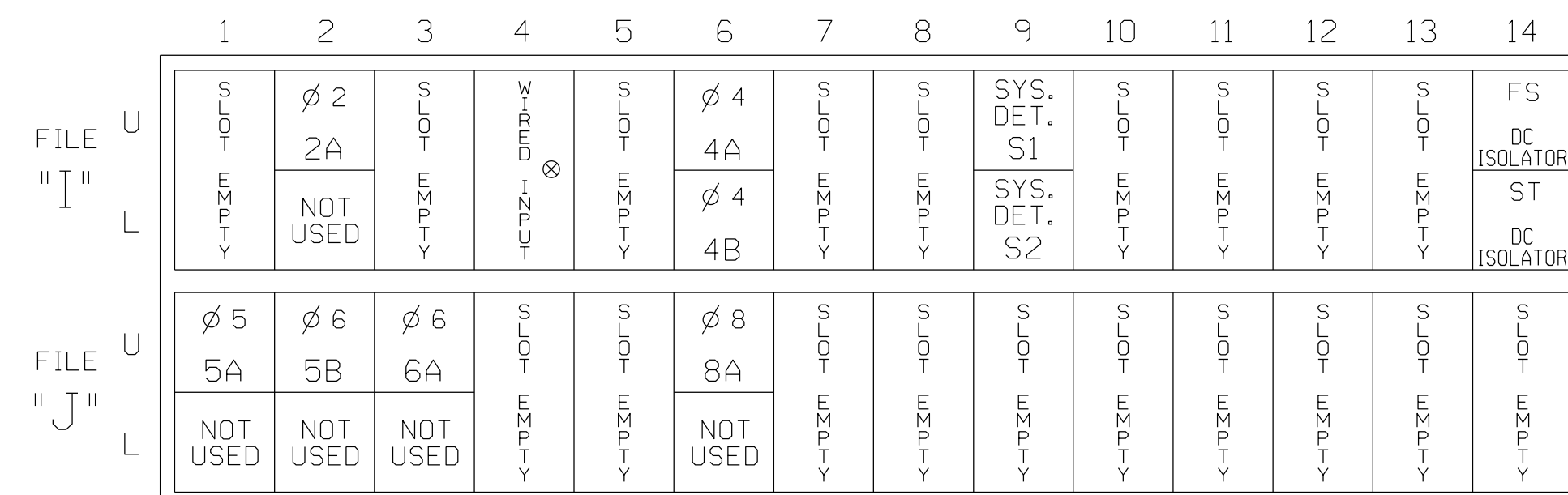
### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### INPUT FILE POSITION LAYOUT

(front view)



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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES		3		S
4B	TB4-11,12	I6L	45	14	4	YES				S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
5A <sup>1</sup>	TB3-1,2	J1U	55	5	5	YES		15		S
		I4U	47	22	2	YES				S
5B	TB3-5,6	J2U	40	6	5	YES		15		S
6A	TB3-9,10	J3U	64	36	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		10		S

\* System detector only. Remove any assigned vehicle phase.

<sup>1</sup>Add jumper from J1-W to I4-W, on rear of input file.

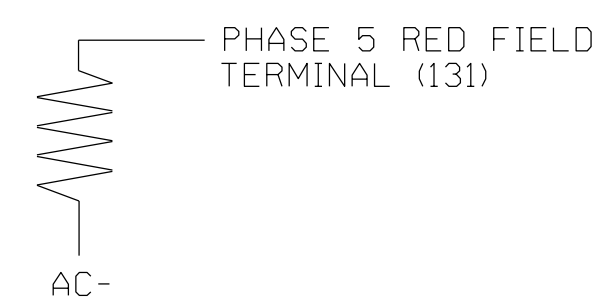
INPUT FILE POSITION LEGEND: J2L



### LOAD RESISTOR INSTALLATION DETAIL

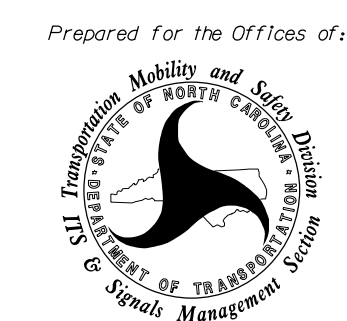
(install resistor as shown)

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



Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 1363 (S. Mebane Street) at E. Kitchin Street

Division 7 Alamance County Burlington

PLAN DATE: December 2017 REVIEWED BY: AJ Davis

PREPARED BY: DJ White REVIEWED BY: LM Moon

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DocuSigned by: Lisa M. Moon 6/13/2018

SIG. INVENTORY NO. 07-1257

# ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**

OVERLAP A

Select TMG VEH OVLP [A] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP...[A] TYPE: OTHER/ECONOLITE
 PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 INCLUDED . X . . . . .
 PROTECT . . . . .
 PED PRTC . . . . .
 NOT OVLP . . . . .
 FLSH GRN . 1 . . . . .
 LAG X PH . . . . .
 LAG 2 PH . . . . .

 LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

```

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```

TMG VEH OVLP...[D] TYPE: PPLT FYA
 PROTECTED LEFT TURN... PHASE 5
 OPPOSING THROUGH..... PHASE 6

 FLASHING ARROW OUTPUT.....CH11 ISOLATE
 DELAY START OF: FYA..0.0 CLEARANCE..0.0
 ACTION PLAN SF BIT DISABLE..... 0

```

Toggle Once

OVERLAP D

Select TMG VEH OVLP [D] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP...[D] TYPE: OTHER/ECONOLITE
 PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 INCLUDED . . . . . X . . . . .
 PROTECT . . . . .
 PED PRTC . . . . .
 NOT OVLP . . . . .
 FLSH GRN . . . . . 1 . . . . .
 LAG X PH . . . . .
 LAG 2 PH . . . . .

 LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

```

END PROGRAMMING

## FLASHER CIRCUIT MODIFICATION DETAIL

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

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

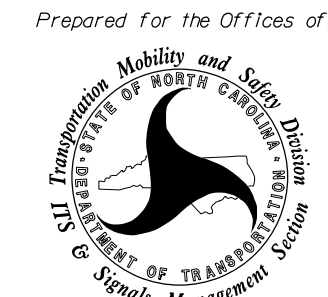
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1257  
 DESIGNED: DECEMBER 2017  
 SEALED: 06-13-2018  
 REVISED: N/A


Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:



Plans Prepared By:



DRMP, Inc.  
 8000 Regency Parkway, Suite 175  
 Cary, NC 27519  
 NC License No. C-2213 (019) 650-1038

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1363 (S. Mebane Street) at E. Kitchin Street	
Division 7 Alamance County Burlington	
PLAN DATE: December 2017	REVIEWED BY: AJ Davis
PREPARED BY: DJ White	REVIEWED BY: LM Moon
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL



DocuSigned by:  
 Lisa M. Moon  
 6/13/2018

SIG. INVENTORY NO. 07-1257

13-JUN-2018 17:45 R:\66015\17\off\c\k\gnols\des\gnw\ir\mg\07-1257e.dgn KANDERSON AT CHA-Y.ANDERSON

# THIS SHEET LEFT INTENTIONALLY BLANK

18-JUN-2018 15:11  
 \*\*\*work files.com\projects\USRL\Transportation\Traffic\Cur\100056489 U-6015 B-C S1a Sys\*Task 05-11\_Signals\Design\07-125B (FUTURE).dgn  
 P183836 AT US40478

Signal Upgrade



Prepared for the Offices of:  
**US 70 (S. Church Street)  
 at  
 Wade Cable Drive (Future)**  
 Division 7 Alamance County Burlington  
 PLAN DATE: June 2018 REVIEWED BY: MBT  
 PREPARED BY: NAP REVIEWED BY: AME

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

SEAL

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

SIG. INVENTORY NO. 07-1258

**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888 NCBEEES #F-0326

REVISIONS	INIT.	DATE

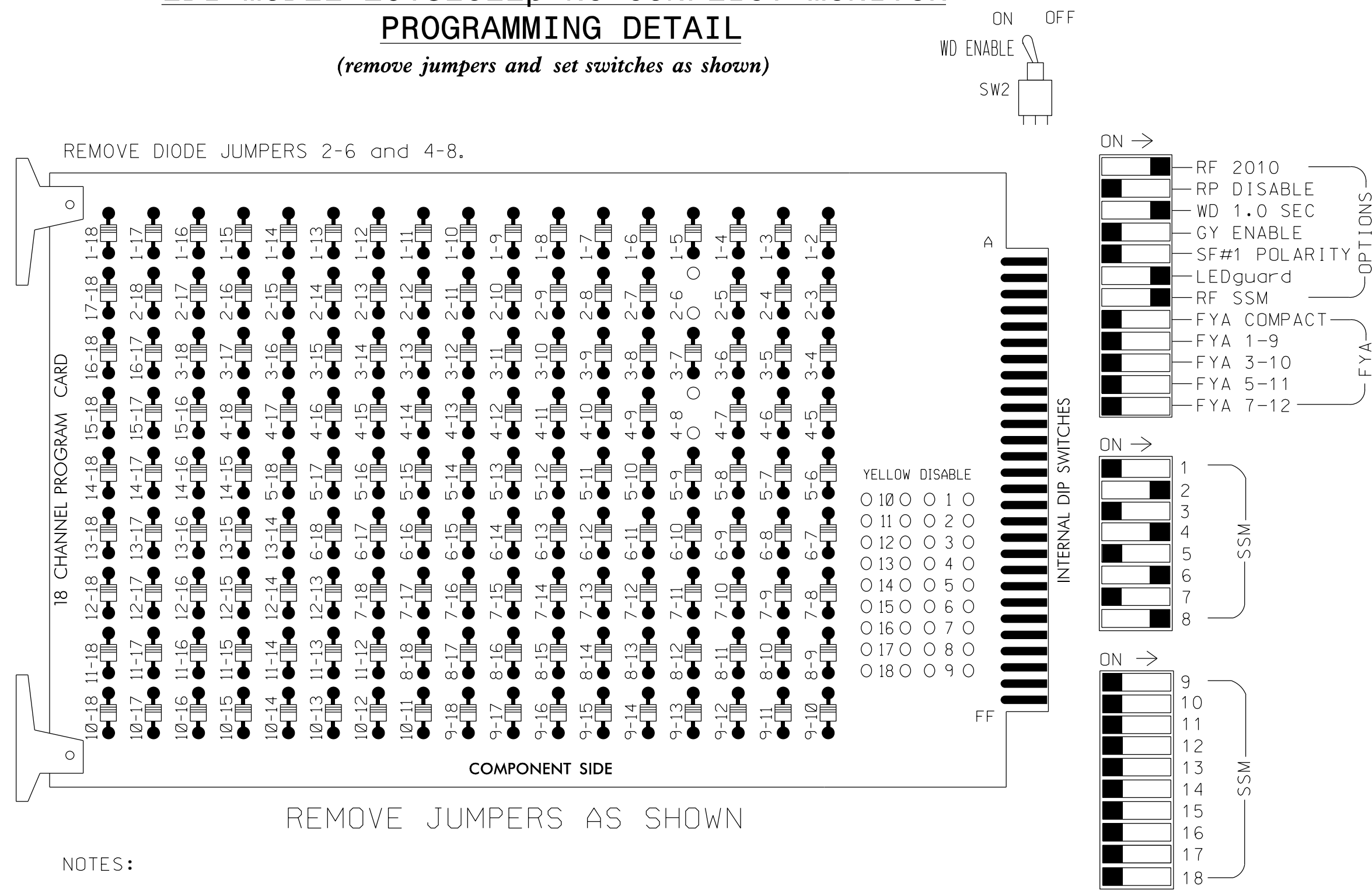
NTS





### EDI MODEL 2018EClip-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.
  - Ensure Conflict Monitor Ethernet port is connected to a Switch port located within the cabinet.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S5,S8,S11  
 PHASES USED.....2,4,6,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED

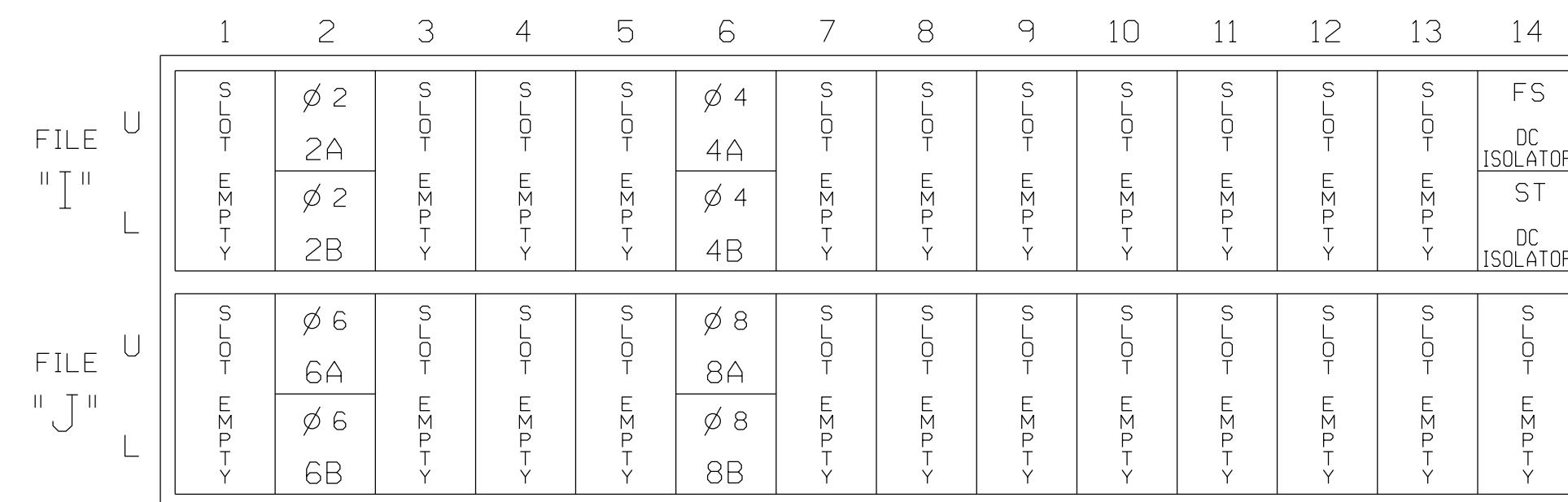
### SIGNAL HEAD HOOK-UP CHART

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

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)



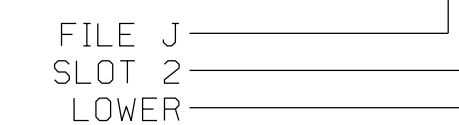
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES		3		S
2B	TB2-7,8	I2L	43	12	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES		3		S
4B	TB4-11,12	I6L	45	14	4	YES		10		S
6A	TB3-5,6	J2U	40	6	6	YES		3		S
6B	TB3-7,8	J2L	44	16	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		3		S
8B	TB5-11,12	J6L	46	18	8	YES		10		S

INPUT FILE POSITION LEGEND: J2L

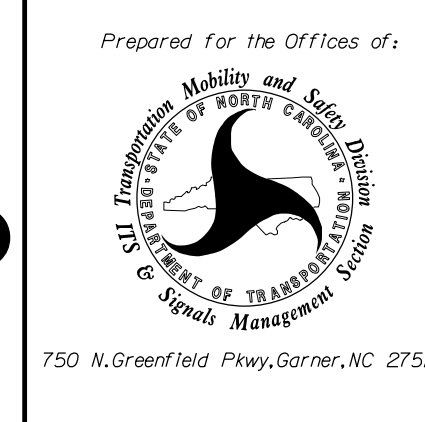


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1294  
 DESIGNED: NOVEMBER 2017  
 SEALED: 06-13-2018  
 REVISED: N/A

13-UNA-2018.17-46  
 R:\66015\17\off\ek\signo\des\gn\w\ir\ing\07-1294e.dgn  
 KANDERSON AT CHA-KANDERSON

### Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 1323 (W. Front Street) at Briarcliff Road

Division 7 Alamance County Burlington

PLAN DATE: November 2017 REVIEWED BY: AJ Davis

PREPARED BY: RD Lawton REVIEWED BY: LM Moon

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

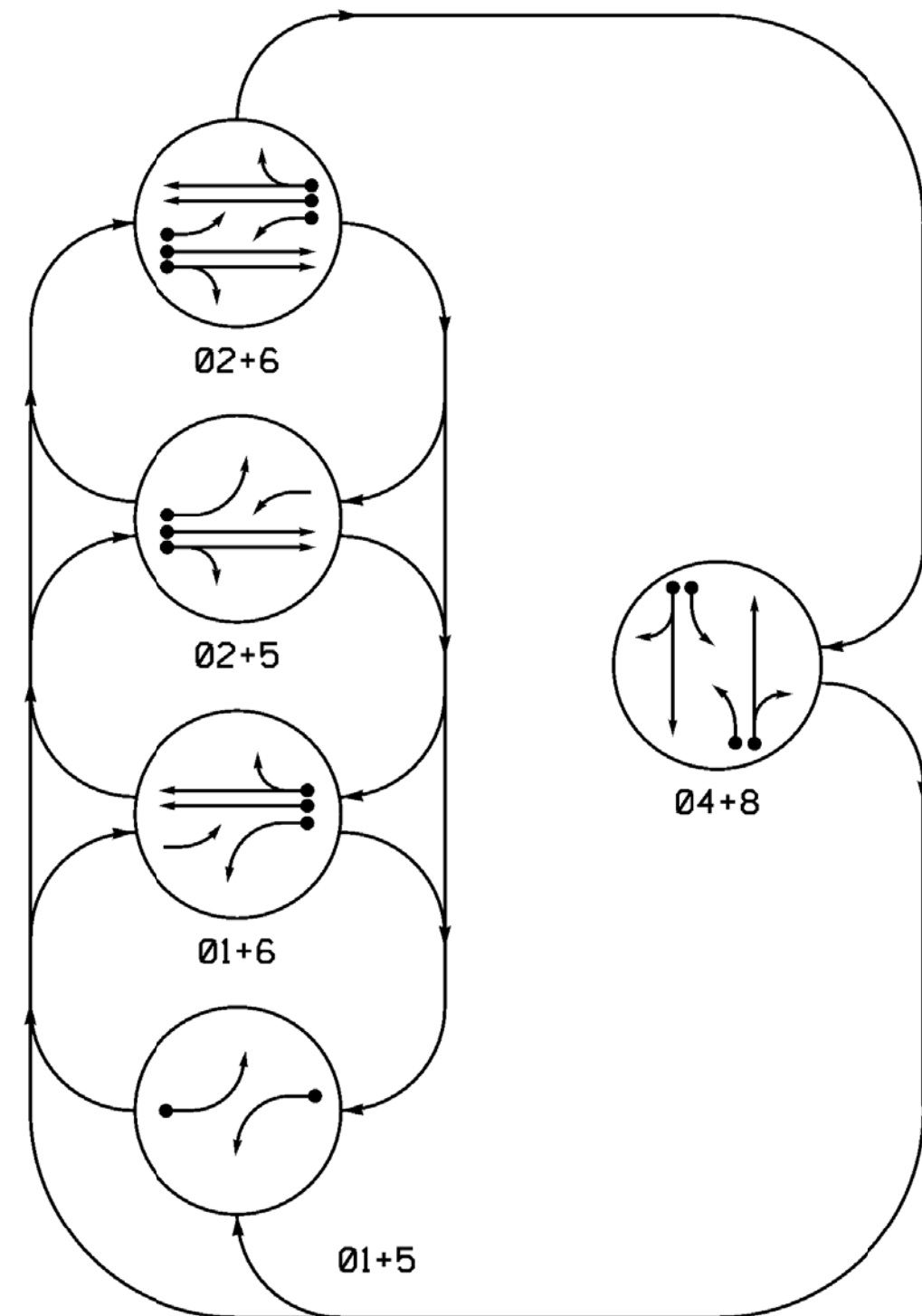
SEAL 022516

JISA M. MOON

DocuSigned by: Lisa M. Moon 6/13/2018

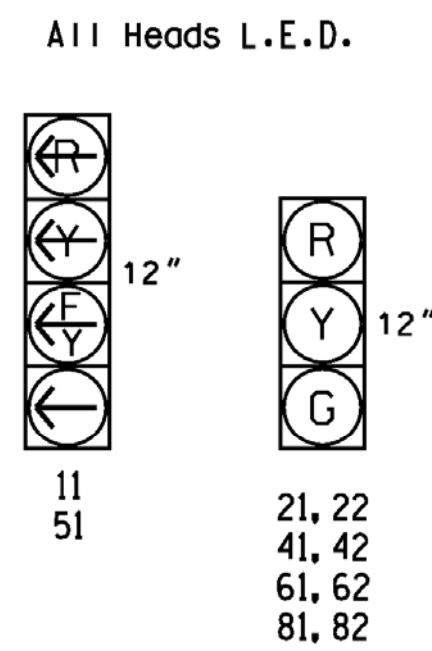
SIG. INVENTORY NO. 07-1294

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	FLASH
11	—	—	F	F	R	Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	—	F	—	F	R	Y
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

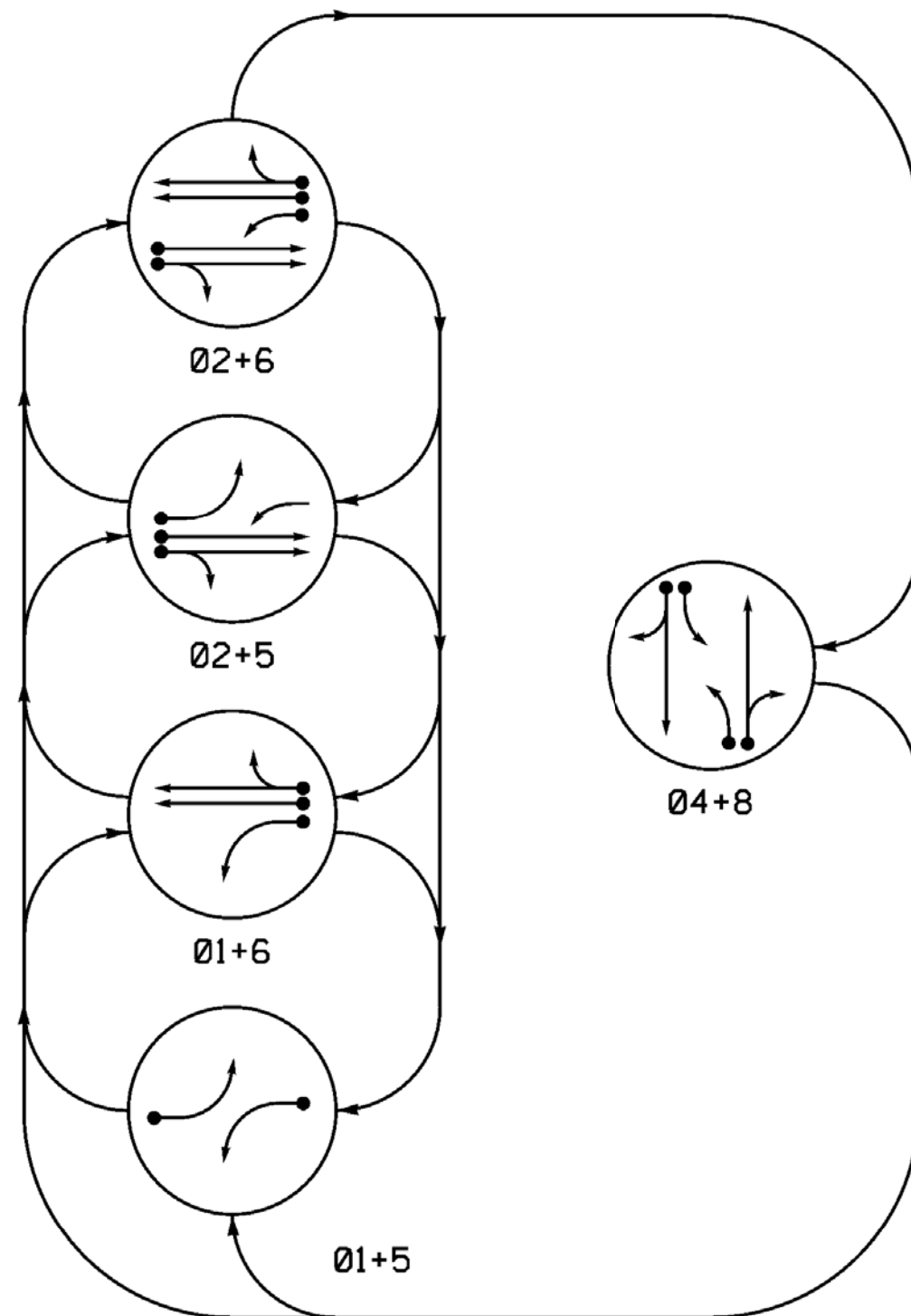
SIGNAL FACE I.D.



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	FLASH
11	—	—	F	F	R	Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	—	R	—	R	R	Y
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	FLASH
11	—	—	F	F	R	Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	—	R	—	R	R	Y
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

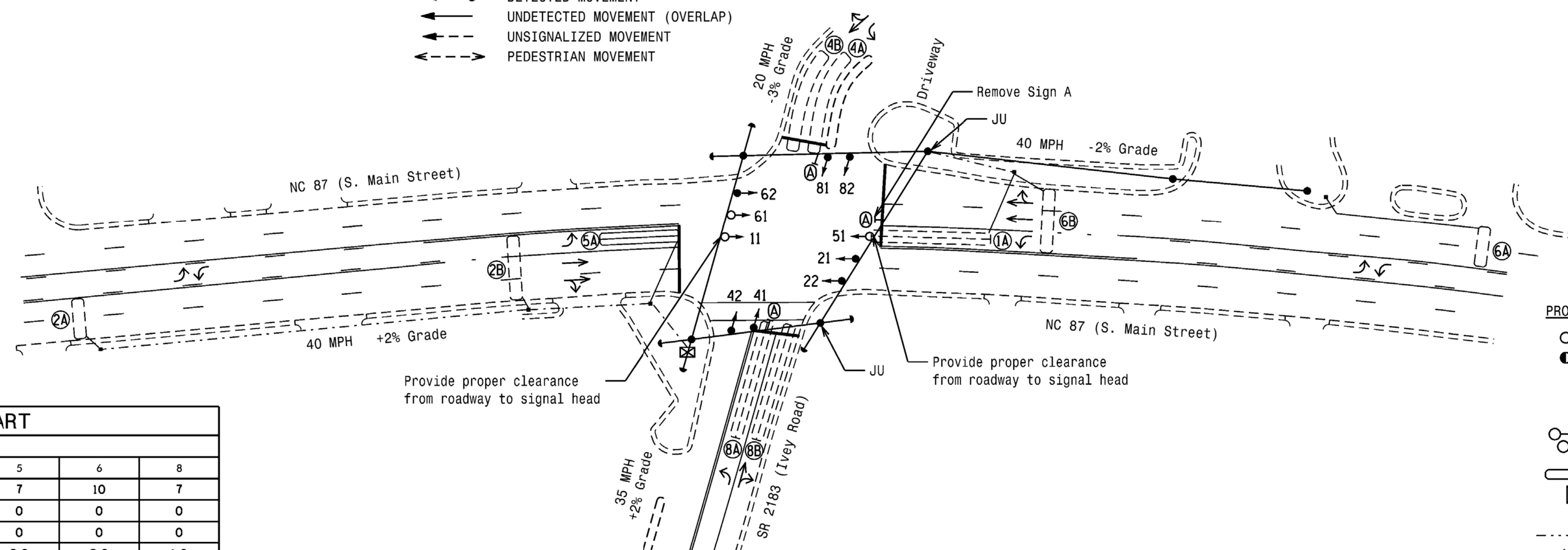
ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR				PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6x60	+5	EXIST.	1	Yes	-	15	-	S	-	X
2A	6x20	300	EXIST.	2	Yes	-	-	-	S	-	X
2B	6x32	80	EXIST.	2	Yes	1.7	-	-	S	-	X
4A	6x50	+5	EXIST.	4	Yes	-	3	-	S	-	X
4B	6x50	+5	EXIST.	4	Yes	-	10	-	S	-	X
5A	6x40	0	2-4-2	X	5	Yes	15*	-	S	-	X
6A	6x20	300	EXIST.	6	Yes	1.7	-	-	S	-	X
6B	6x32	80	EXIST.	6	Yes	-	-	-	S	-	X
8A	6x60	+5	2-4-2	-	8	Yes	3	-	S	-	X
8B	6x60	+5	2-4-2	-	8	Yes	10	-	S	-	X

\* Disable Delay During Alternate Phasing Operation.  
 \*\* Disable Phase 2 Call for Loop 5A during Alternate Phasing Operation.

5 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Reposition existing signal heads numbered 21, 22, and 61.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- The City Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

- | PROPOSED  | EXISTING                          |
|---|-----------------------------------|
| ○→ Traffic Signal Head                            | ●→ Traffic Signal Head            |
| ○→ Modified Signal Head                           | ○→ N/A                            |
| ○→ Sign   | ○→ Sign                           |
| ○→ Pedestrian Signal Head With Push Button & Sign | ○→ Pedestrian Signal Head         |
| ○→ Signal Pole with Guy                           | ○→ Signal Pole with Guy           |
| ○→ Signal Pole with Sidewalk Guy                  | ○→ Signal Pole with Sidewalk Guy  |
| ○→ Inductive Loop Detector                        | ○→ Inductive Loop Detector        |
| ○→ Controller & Cabinet                           | ○→ Controller & Cabinet           |
| ○→ Junction Box                                   | ○→ Junction Box                   |
| ○→ 2-in Underground Conduit                       | ○→ 2-in Underground Conduit       |
| ○→ Right of Way                                   | ○→ Right of Way                   |
| ○→ Directional Arrow                              | ○→ Directional Arrow              |
| ○→ Left Arrow "ONLY" Sign (R3-5L)                 | ○→ Left Arrow "ONLY" Sign (R3-5L) |

FEATURE	ASC/3 TIMING CHART						
	1	2	4	5	6	8	
Min Green *	7	10	7	7	10	7	
Walk *	0	0	0	0	0	0	
Ped Clear	0	0	0	0	0	0	
Veh. Extension *	1.0	2.0	1.0	2.0	2.0	1.0	
Max 1 *	15	45	30	15	45	30	
Yellow	3.0	4.3	3.0	3.0	4.3	3.7	
Red Clear	2.6	1.8	3.1	2.8	1.8	1.7	
Actuations B4 Add *	-	-	-	-	-	-	
Seconds / Actuation *	-	-	-	-	-	-	
Max Initial *	-	-	-	-	-	-	
Time Before Reduction *	-	-	-	-	-	-	
Time To Reduce *	-	-	-	-	-	-	
Minimum Gap	-	-	-	-	-	-	
Locking Detector	-	X	-	-	X	-	
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-	
Dual Entry	-	-	X	-	-	X	
Simultaneous Gap	X	X	X	X	X	X	

\* 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.



12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

Signal Upgrade

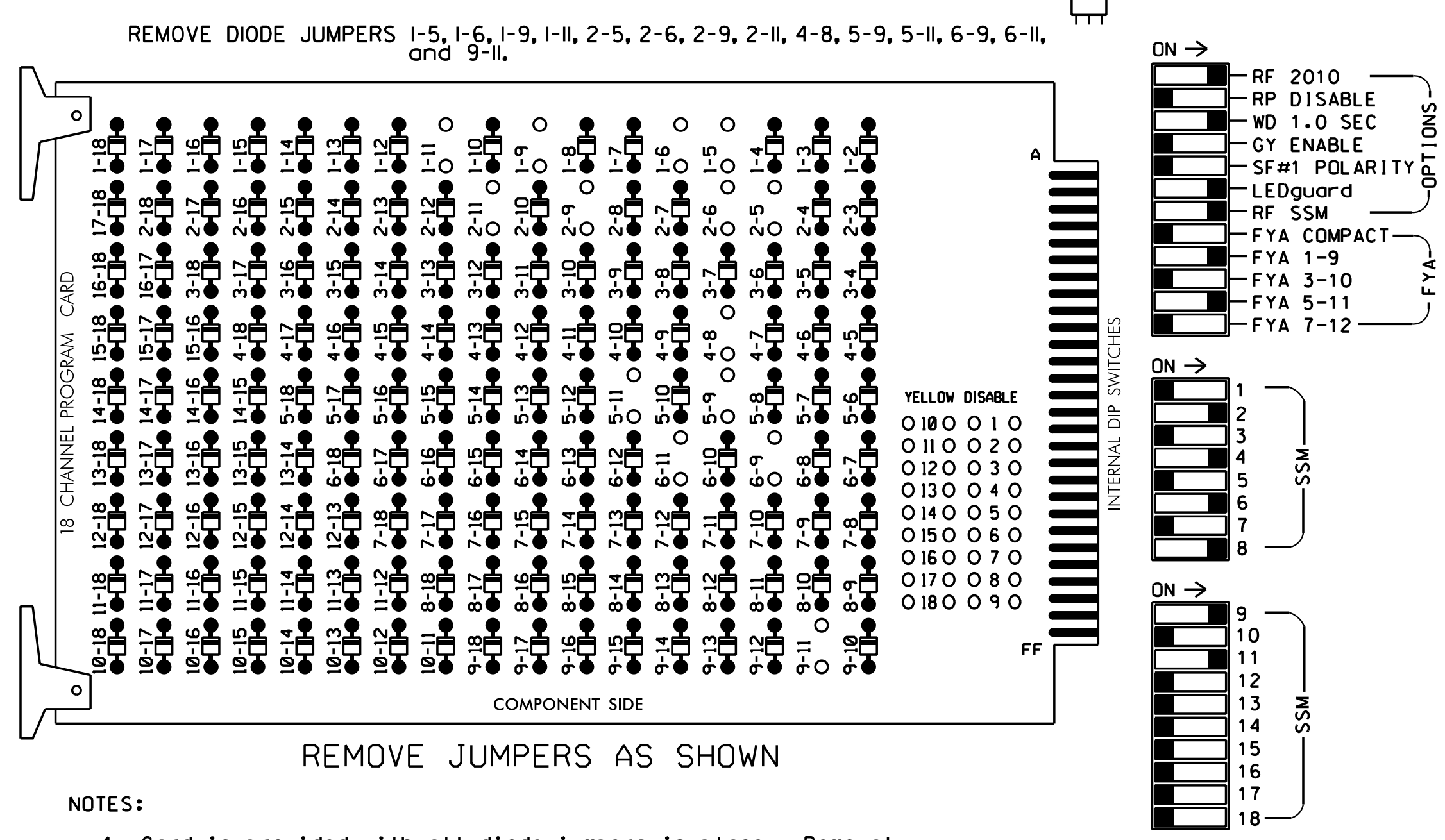
	Prepared for the Offices of: NC 87 (S. Main Street) at SR 2183 (Ivey Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO License No. 022599 Date: 6/13/2018
	Division 7 Alamance County PLAN DATE: March 2018 PREPARED BY: SE Greene	Graham REVIEWED BY: JB Voso REVIEWED BY:	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

\*\*\*\*\*SYSTEMS\*\*\*\*\*  
 \*\*\*\*\*BUSINESS\*\*\*\*\*

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

(remove jumpers and set switches as shown)



- REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11, and 9-11.
- 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.
  - Integrate monitor with Ethernet network in cabinet.

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1  
 AUX S4  
 PHASES USED.....1,2,4,5,6,8  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED

\* See overlap programming detail on sheet 2

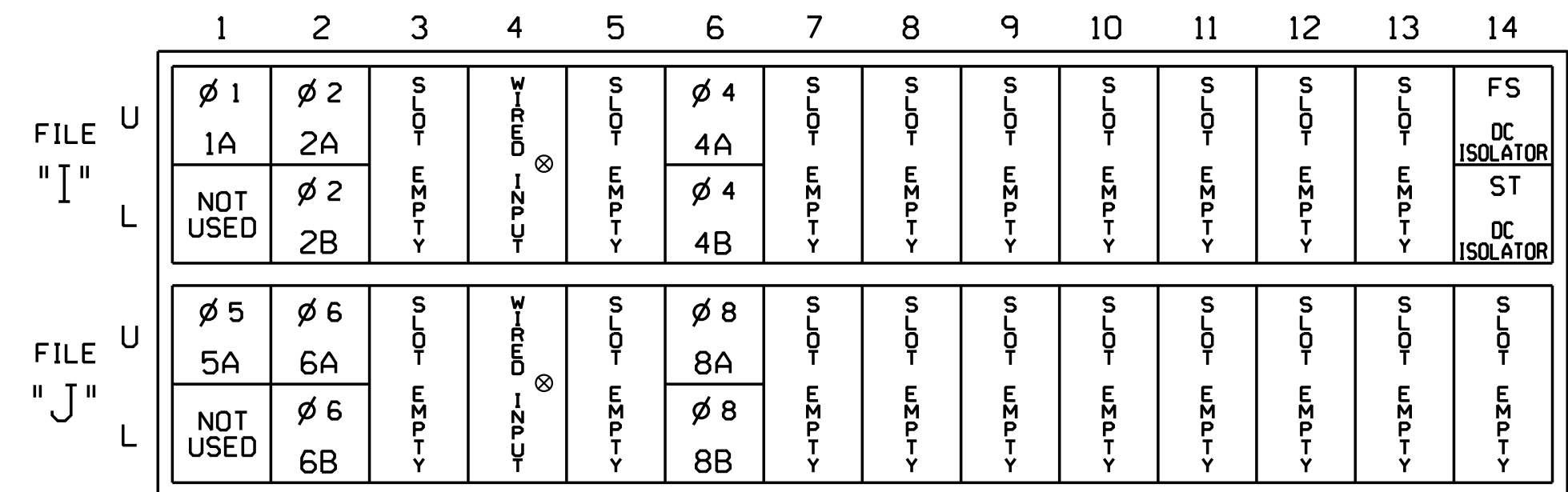
**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127							133										

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

**INPUT FILE POSITION LAYOUT**

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

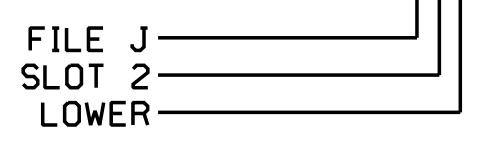
⊗ Wired Input - Do not populate slot with detector card

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	I1U	56	1	1	YES		15		S
	-	J4U	48	26	6	YES				S
2A	TB2-5,6	I2U	39	2	2	YES	1.7			S
	TB2-7,8	I2L	43	12	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES		3		S
	TB4-11,12	I6L	45	14	4	YES		10		S
5A <sup>2</sup>	TB3-1,2	J1U	55	5 ★	5	YES		15		S
	-	I4U	47	22 ★	2	YES				S
6A	TB3-5,6	J2U	40	6	6	YES	1.7			S
	TB3-7,8	J2L	44	16	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		3		S
	TB5-11,12	J6L	46	18	8	YES		10		S

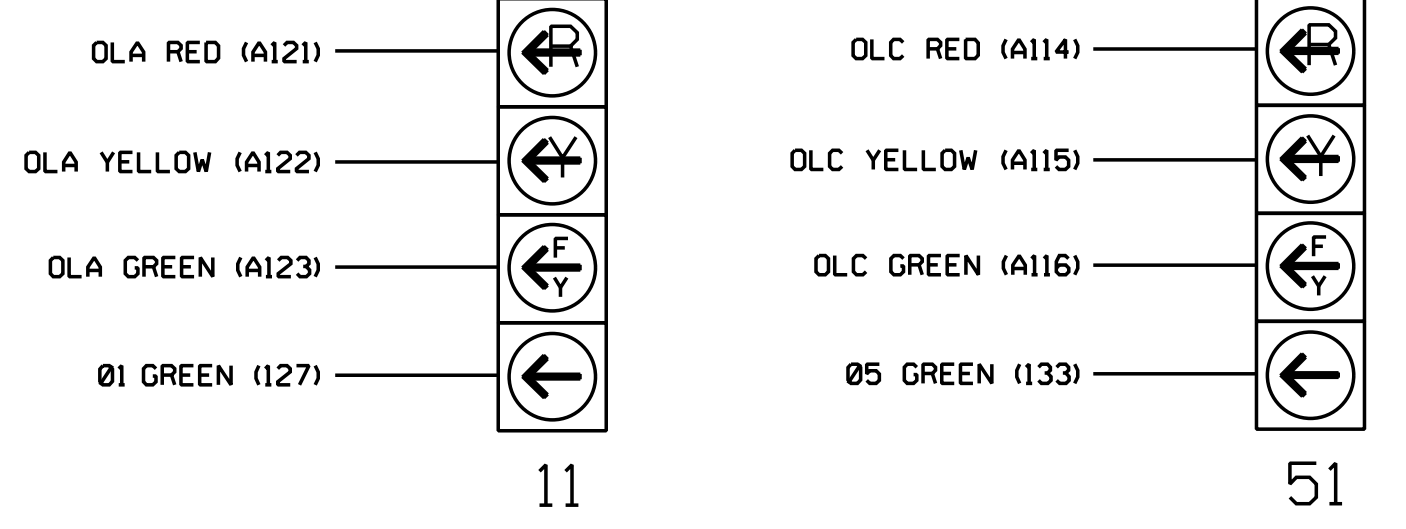
- <sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
<sup>2</sup>Add jumper from J1-W to I4-W, on rear of input file.  
 ★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 3.

**INPUT FILE POSITION LEGEND: J2L**



**FYA SIGNAL WIRING DETAIL**

(wire signal heads as shown)

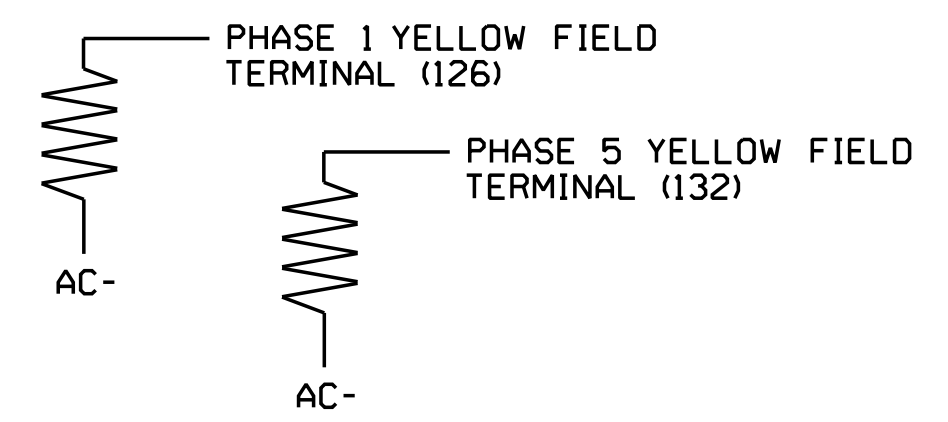


**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1310  
 DESIGNED: March 2018  
 SEALED: 6/13/2018  
 REVISED: NA

Electrical Detail - Sheet 1 of 4

**Mattern & Craig**  
 ENGINEERS • SURVEYORS

12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 JAMES B. VOSS  
 022599

Division 7 Alamance County Graham  
 PLAN DATE: March 2018 REVIEWED BY: JB Vosso  
 PREPARED BY: SE Greene REVIEWED BY:  
 REVISIONS INIT. DATE

6/13/2018  
 DATE  
 SIG. INVENTORY NO. 07-1310

11:06:28 AM 11-13-18 - Burlington-Graham Signal System06 Working Folders (Replace Sub-folders with NCDOT File Structure if Working on NCDOT Project)Mdw or DgnW07-1310-071310-sm.ele-20131106.dgn

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

*OVERLAP A*

Select TMG VEH OVLP [A] and 'PPLT FYA'

TMG VEH OVLP...[A] TYPE: ....PPLT FYA

PROTECTED LEFT TURN.... PHASE 1

OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT.....CH9 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE..... 0

Toggle Twice

*OVERLAP C*

Select TMG VEH OVLP [C] and 'PPLT FYA'

TMG VEH OVLP...[C] TYPE: ....PPLT FYA

PROTECTED LEFT TURN.... PHASE 5

OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

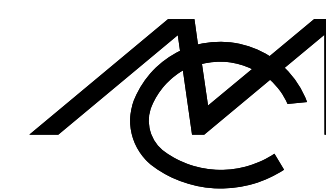
ACTION PLAN SF BIT DISABLE..... 5

← NOTICE ACTION  
PLAN SF BIT "5"

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-1310  
DESIGNED: March 2018  
SEALED: 6/13/2018  
REVISED: NA

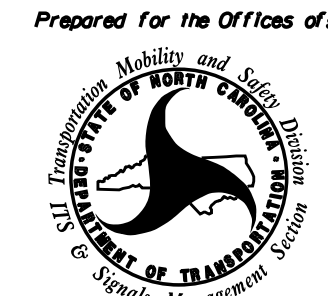
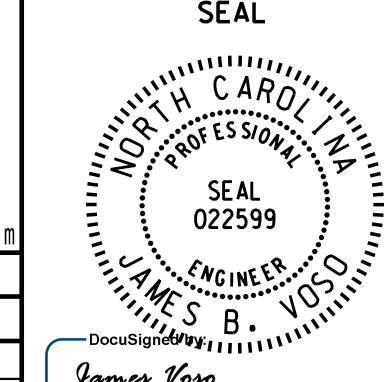
11:07:10 AM I:\31789 - Burlington Graham Signal Systems\06 Working Folders with NCDOT File Structure if Working on NCDOT Project\HWg or Dgn\07-1310\071310\_sm.ele\_20131106.dgn



**Mattern & Craig**  
ENGINEERS • SURVEYORS

12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201  
FAX (828) 254-4562  
NC LIC. NO. C-1154

Electrical Detail - Sheet 2 of 4

<p><b>ELECTRICAL AND PROGRAMMING</b> DETAILS FOR:</p> <p style="font-size: small;">Prepared for the Offices of:</p>  <p style="font-size: x-small;">750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p>NC 87 (S. Main Street) at SR 2183 (Ivey Road)</p> <p>Division 7 Alamance County Graham</p> <p>PLAN DATE: March 2018    REVIEWED BY: JB Voso</p> <p>PREPARED BY: SE Greene    REVIEWED BY:</p>	<p>SEAL</p>  <p>SEAL 022599 ENGINEER JAMES B. VOSO</p> <p>DocuSign James Voso    6/13/2018 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							<p style="font-size: x-small;">DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1310</p>	
REVISIONS	INIT.	DATE									

# ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING

## LOOP 5A

(program controller as shown)

# IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select **8. UTILITIES**
2. From UTILITIES Submenu select **1. COPY/CLEAR**
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```

COPY / CLEAR UTILITY
FROM          TO
PHASE TIMING... > PHASE TIMING...
TIMING PLAN... > TIMING PLAN...
PH DET OPT PLAN. > PH DET OPT PLAN.
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
TOGGLE TO SELECT A "FROM" AND A "TO"
THEN PRESS ENTER
    
```

4. From Main Menu select **6. DETECTORS**
  5. From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
  6. Place cursor in VEH DET PLAN [ ] position and enter "2".
- Place cursor in VEH DETECTOR [ ] position and enter "5".  
 - Set delay time to "0".

```

VEH DETECTOR [ 5]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
5 5 . . . . .
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [ ] position and enter "22".  
 - Set assigned phase to "0".

```

VEH DETECTOR [22]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
22 0 . . . . .
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

← NOTICE VEH DET PLAN 2

ENSURE PHASE IS SET TO "0" →

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1310  
 DESIGNED: March 2018  
 SEALED: 6/13/2018  
 REVISED: NA

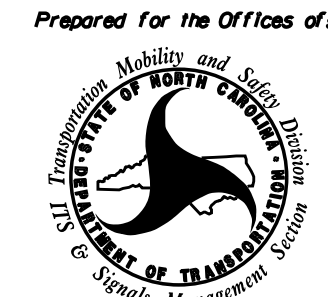
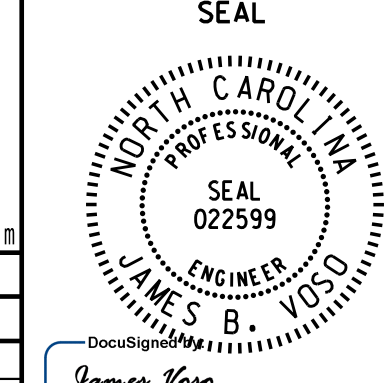
11:07:48 AM  
 I:\31789 - Burlington Graham Signal System\06 Working Folders with NCDOT File Structure if Working on NCDOT Project\Wkg or Dgn\07-1310\071310\_sm.ele\_20131106.dgn  
 jlkun



**Mattern & Craig**  
 ENGINEERS • SURVEYORS

12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

Electrical Detail - Sheet 3 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared for the Offices of:  750 N. Greenfield Pkwy, Corner, NC 27529	NC 87 (S. Main Street) at SR 2183 (Ivey Road)	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
Division 7 Alamance County Graham		
PLAN DATE: March 2018      REVIEWED BY: JB Voso		
PREPARED BY: SE Greene      REVIEWED BY:		
REVISIONS	INIT.      DATE	SEAL JAMES B. VOSO 6/13/2018 DATE
		SIG. INVENTORY NO. 07-1310

## ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

### ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 5.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	5

**IMPORTANT:** IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BIT 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BIT 5:                      Modifies overlap parent phases for head 51 to run protected turns only.

VEH DET PLAN 2:            Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

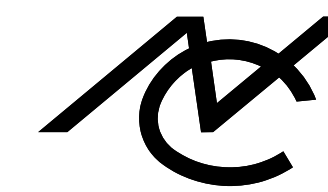
```

ACTION PLAN...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --      RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  .  .  X  .  .  .  .  .  .  .  .  .  .  .
AUX FCT  .  .  .  .  (1-3)

  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .

```



**Mattern & Craig**  
ENGINEERS • SURVEYORS

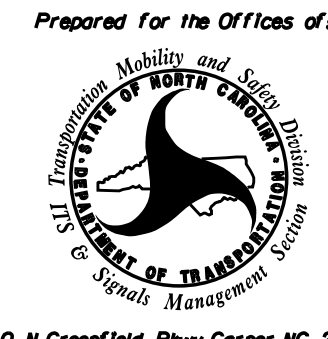
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201  
FAX (828) 254-4562  
NC LIC. NO. C-1154

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 07-1310  
DESIGNED: March 2018  
SEALED: 6/13/2018  
REVISED: NA

Electrical Detail - Sheet 4 of 4

ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

Prepared for the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529

NC 87 (S. Main Street)  
at  
SR 2183 (Ivey Road)

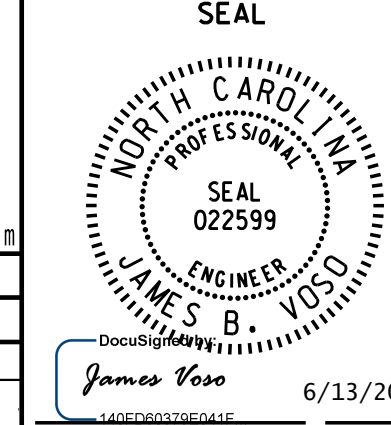
Division 7      Alamance County      Graham

PLAN DATE: March 2018	REVIEWED BY: JB Voso
PREPARED BY: SE Greene	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

SEAL



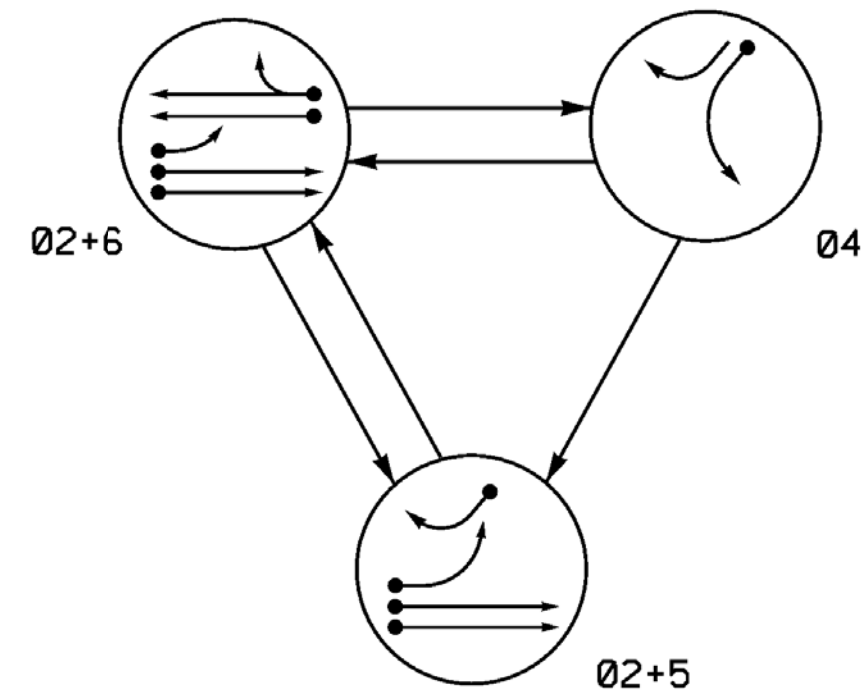
James Voso      6/13/2018

DATE

SIG. INVENTORY NO. 07-1310

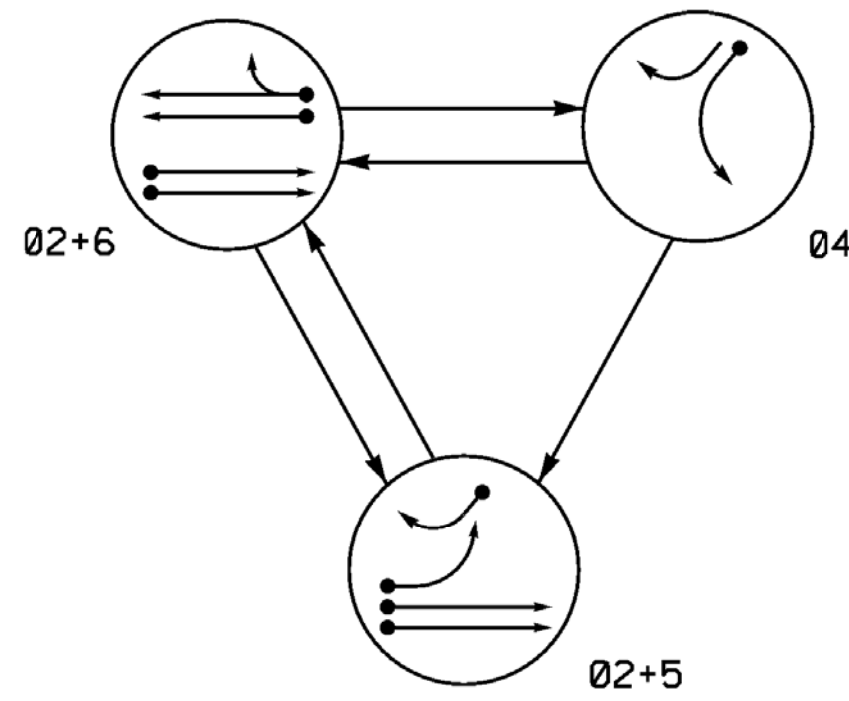
11:08:34 AM I:\3789 - Burlington Graham Signal System\06 Working Folders with NCDOT File Structure - If Working on NCDOT Project\dwg or Dgn\07-1310\071310-sm.ele-20131106.dgn

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	-	F	R	-
61, 62	R	G	R	Y

ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	-	R	R	-
61, 62	R	G	R	Y

ASC/3 DETECTOR INSTALLATION CHART												
DETECTOR						PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP	NEW CARD
2A	6x6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6x6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6x60	0	2-4-2	-	4	Yes	-	3	-	S	-	X
5A	6x60	0	2-4-2	-	5	Yes	-	15*	-	S	-	X
5B	6x60	0	2-4-2	-	5	Yes	-	15	-	S	-	X
6A	6x6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6x6	300	EXIST	-	6	Yes	-	-	X	N	-	X

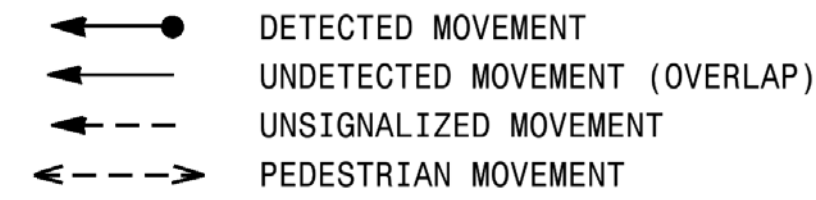
\* Disable Delay During Alternate Phasing Operation.  
 \*\* Disable Phase 2 Call for Loop 5A during Alternate Phasing Operation.

3 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

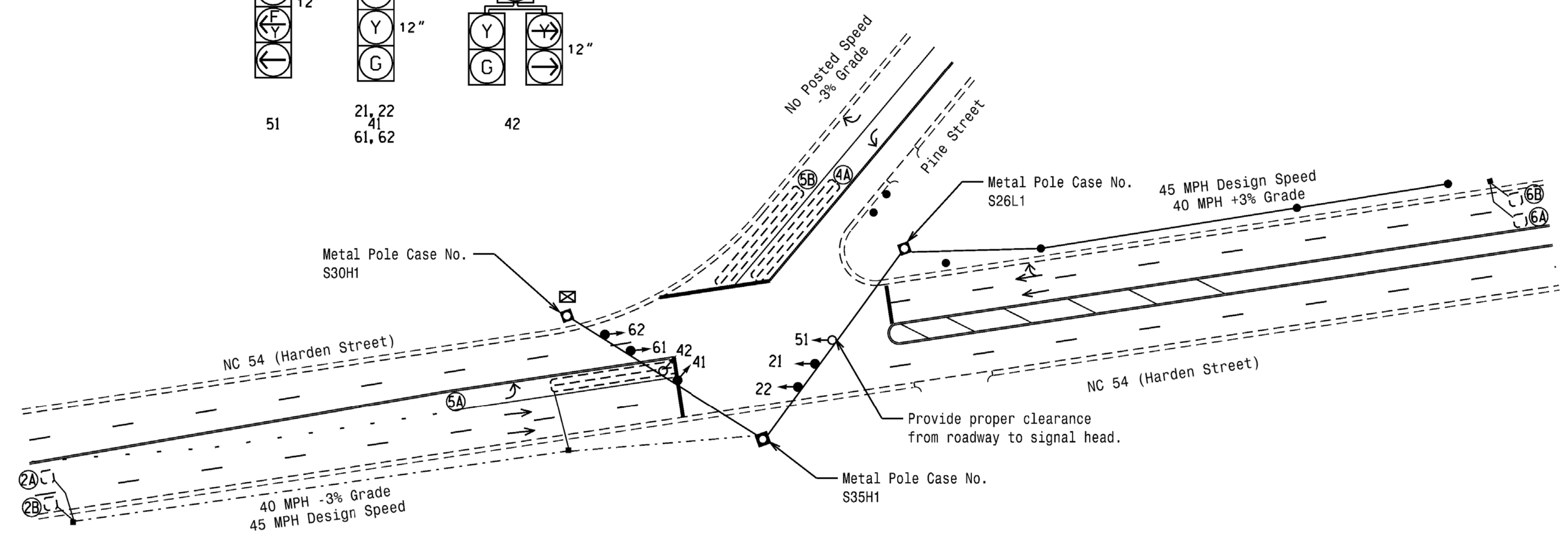
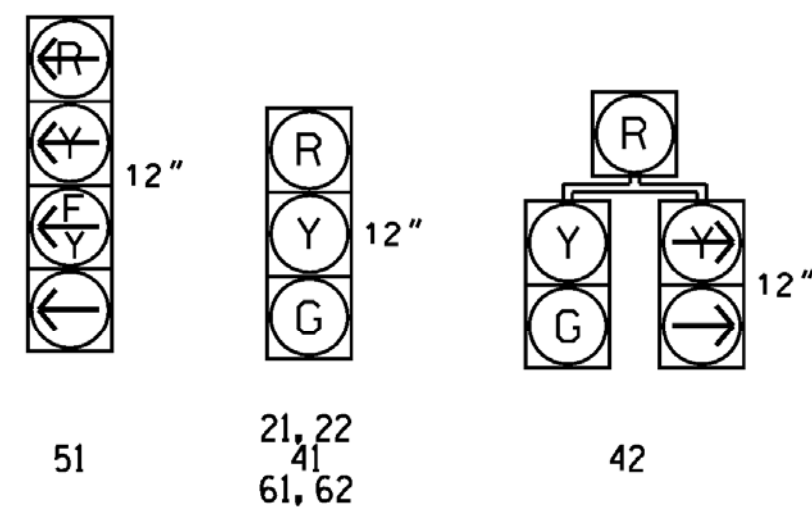
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads numbered 21, 22, and 41.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- The City Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

All Heads L.E.D.

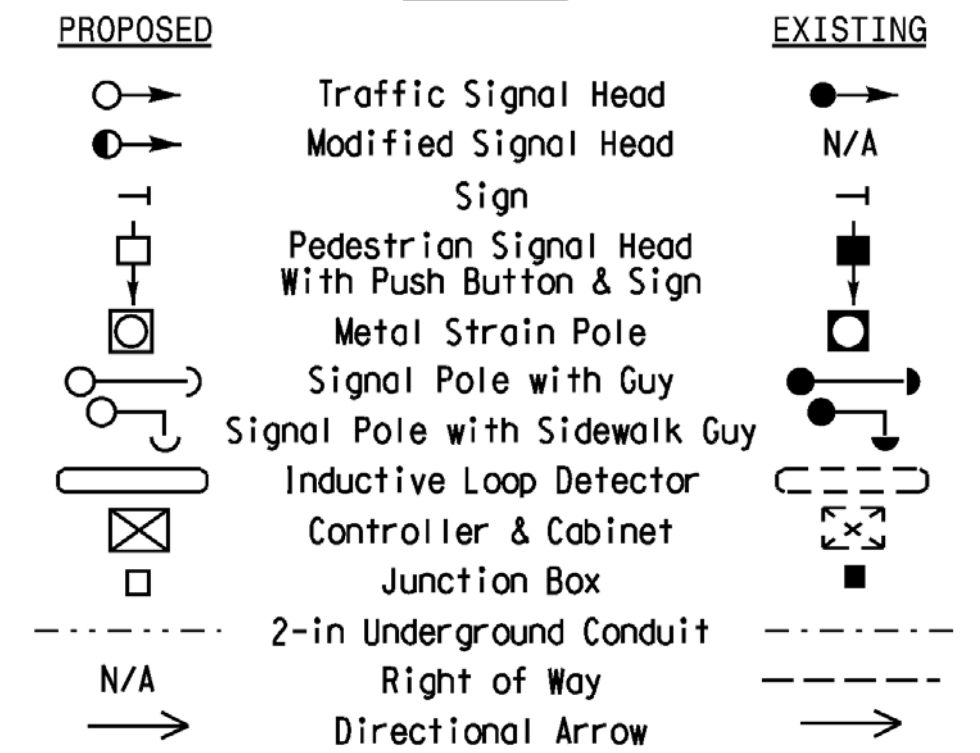


ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green *	12	7	7	12
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	6.0	1.0	1.0	6.0
Max I *	60	28	15	60
Yellow	4.8	3.0	3.0	4.8
Red Clear	1.5	2.3	1.8	1.5
Actuations 34 Add *	0	-	-	0
Seconds /Actuation *	1.5	-	-	1.5
Max Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	15	-	-	15
Minimum Gap	3.0	-	-	3.0
Locking Detector	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

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

LEGEND



\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DESIGN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*



12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

Signal Upgrade

Prepared for the Offices of:  
 TRANSPORTATION MOBILITY AND SAFETY DIVISION  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 Signal Design Section  
 750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (Harden Street) at East Pine Street

Division 7 Alamance County Graham

PLAN DATE: March 2018 REVIEWED BY: JB Voso  
 PREPARED BY: SE Greene REVIEWED BY:

REVISIONS

SCALE 0 40  
 1"=40'

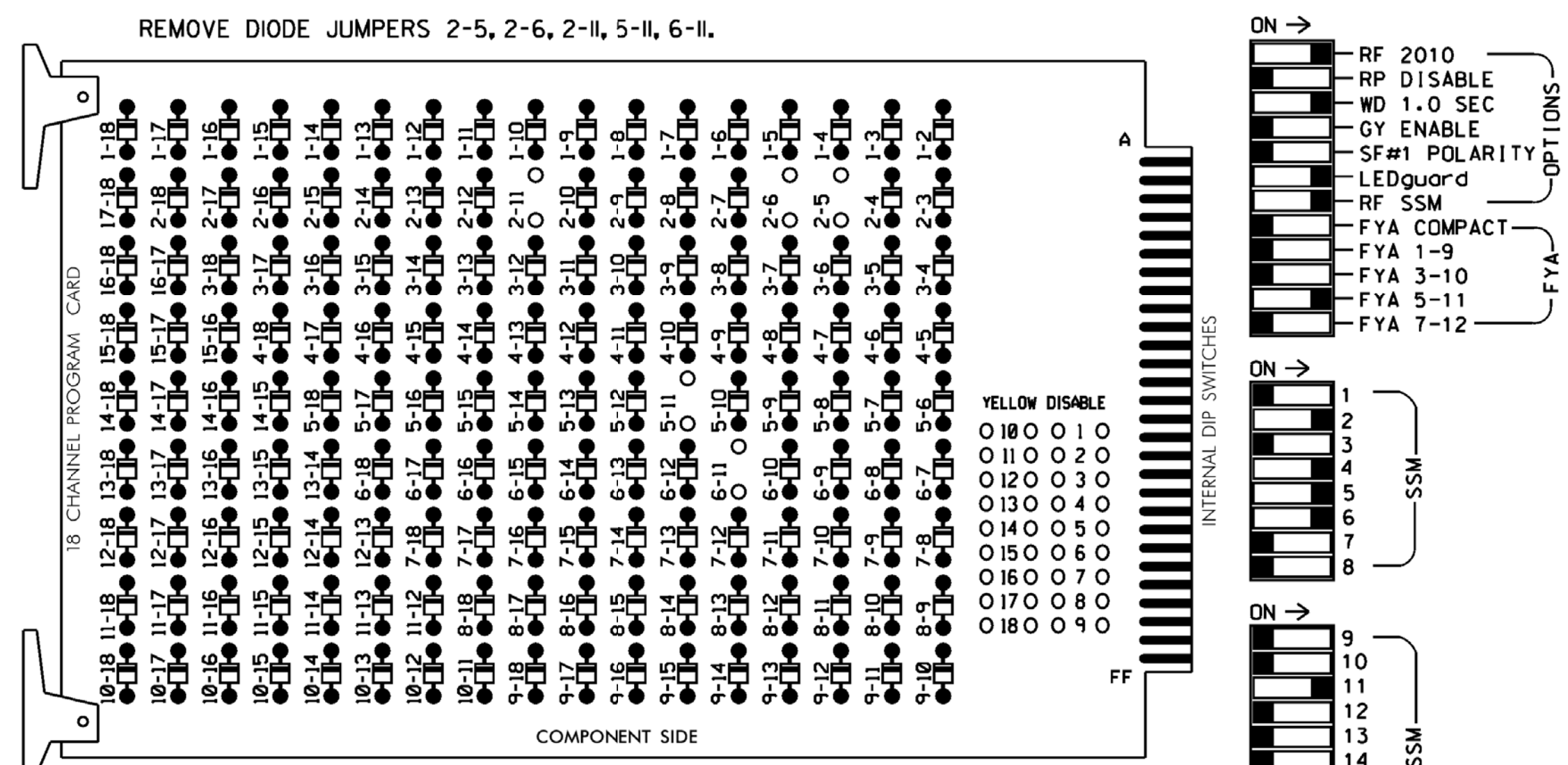
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 JAMES B. VOSO  
 SEAL 022599  
 6/13/2018  
 DATE  
 SIG. INVENTORY NO. 07-1364



EDI MODEL 2018ECLip-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.
  - Integrate monitor with Ethernet network in cabinet.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

SIGNAL HEAD HOOK-UP CHART

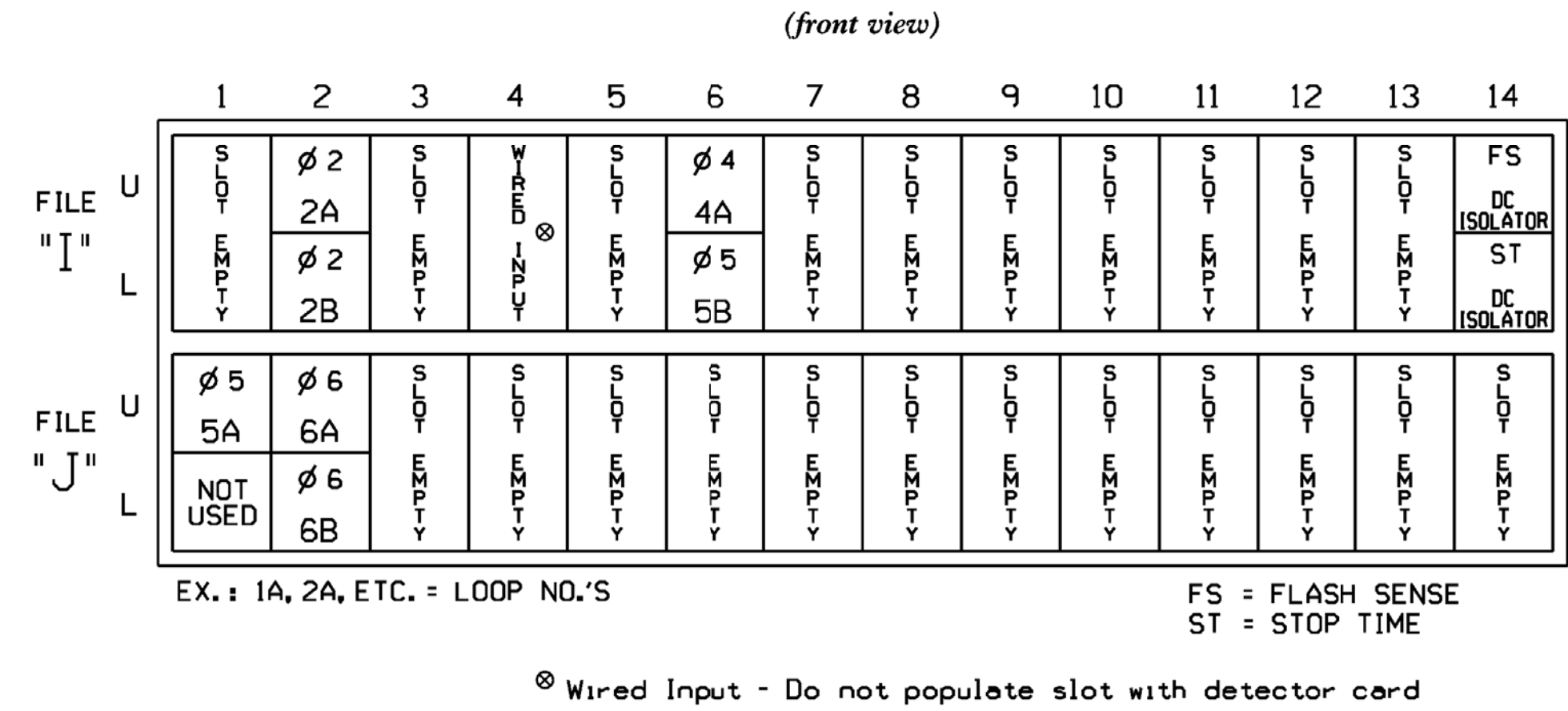
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CNU CHANNEL NC.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51★	42	61,62	NU	NU	NU	NU	NU	NU	51★	NU	NU	
RED		128			101				134										
YELLOW		129			102		*		135										
GREEN		130			103				136										
RED ARROW																		A114	
YELLOW ARROW									132										A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW								133	133										

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

EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S5,S7,S8,AUX S4  
 PHASES USED.....2,4,5,6  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED  
 \* See overlap programming detail on sheet 2

INPUT FILE POSITION LAYOUT

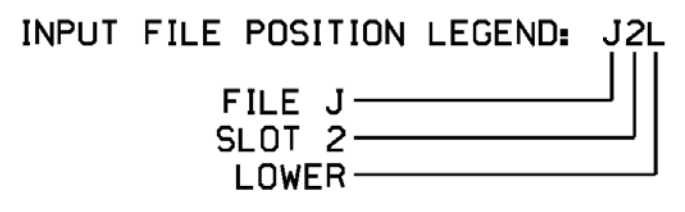


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 ⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

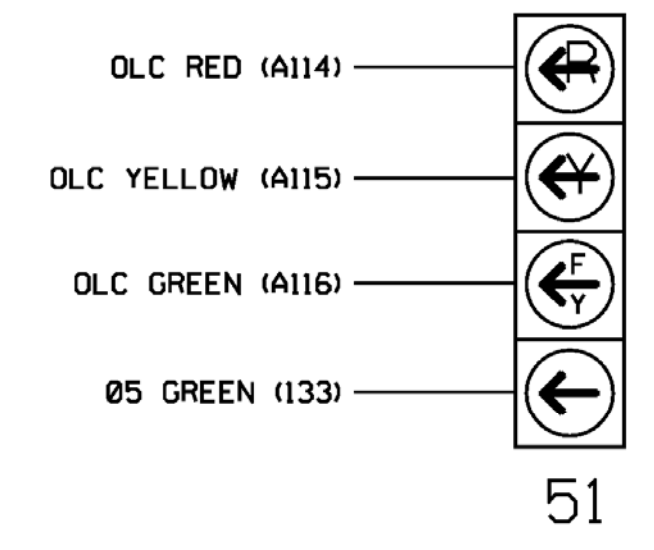
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	J2U	39	2	2	YES			X	N
2B	TB2-7,8	J2L	43	12	2	YES			X	N
4A	TB4-9,10	J6U	41	4	4	YES		3		S
5B	TB4-11,12	J6L	45	14	4	YES		15		S
5A <sup>1</sup>	TB3-1,2	J1U	55	5★	5	YES		15		S
		J4U	47	22★	2	YES		3		G
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N

<sup>1</sup>Add jumper from J1-W to J4-W, on rear of input file.  
 ★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 3.



FYA SIGNAL WIRING DETAIL

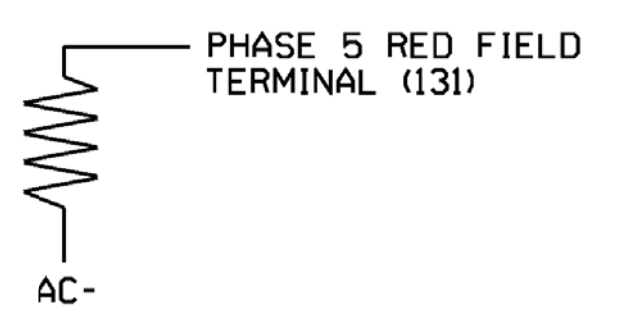
(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



**Mattern & Craig**  
 ENGINEERS • SURVEYORS  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

Electrical Detail - Sheet 1 of 4

Electrical AND PROGRAMMING DETAILS FOR:  
 Prepared for the Offices of:  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 Signal Management

NC 54 (Harden Street) at East Pine Street

Division 7 Alamance County Graham

PLAN DATE: March 2018 REVIEWED BY: JB Voso  
 PREPARED BY: SE Greene REVIEWED BY:

REVISIONS: INIT. DATE

James Voso  
 6/13/2018  
 DATE

Document NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 JAMES B. VOSO  
 SEAL 022599  
 1402900750041E  
 6/13/2018  
 DATE

SIG. INVENTORY NO. 07-1364

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*D\*\*\*\*\*  
 \*\*\*\*\*USER\*\*\*\*\*

**ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL**  
*(program controller as shown)*

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS  
     Toggle Twice

*OVERLAP C*

Select TMG VEH OVLP [C] and 'PPLT FYA'

```

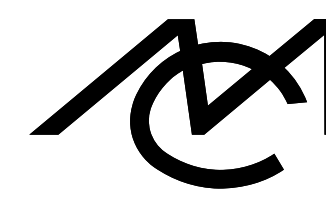
TMG VEH OVLP...[C] TYPE: ....PPLT FYA
PROTECTED LEFT TURN... PHASE 5
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT.....CH11 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 5
END PROGRAMMING
    
```

← NOTICE ACTION  
PLAN SF BIT "5"

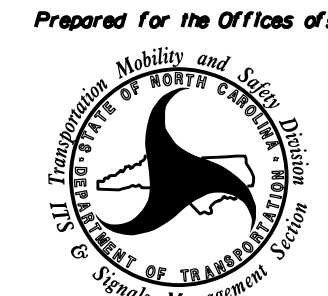
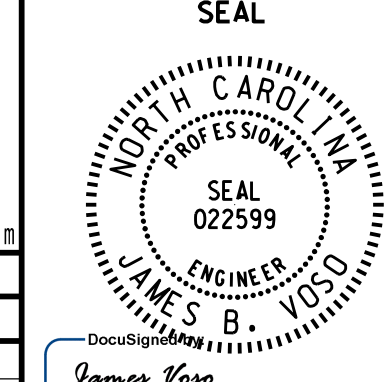
THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 07-1364  
 DESIGNED: March 2018  
 SEALED: 6/13/2018  
 REVISED: NA

\$\$\$SYTIME\$\$\$\$  
 \$\$\$DOCS\$\$\$\$  
 \$\$\$SERIAL\$\$\$\$



**Mattern & Craig**  
 ENGINEERS • SURVEYORS  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154

Electrical Detail - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared for the Offices of:  750 N. Greenfield Hwy, Corner, NC 27529	NC 54 (Harden Street) at East Pine Street		SEAL  SEAL 022599 JAMES B. VOSO ENGINEER
	Division 7      Alamance County      Graham	PLAN DATE: March 2018      REVIEWED BY: JB Voso	PREPARED BY: SE Greene      REVIEWED BY:
REVISIONS	INIT.      DATE	DocuSign James Voso      6/13/2018 DATE	
SIG. INVENTORY NO. 07-1364			

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

(program controller as shown)

IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

- 1. From Main Menu select 8. UTILITIES
2. From UTILITIES Submenu select 1. COPY/CLEAR
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

COPY / CLEAR UTILITY FROM TO PHASE TIMING... > PHASE TIMING... TIMING PLAN... > TIMING PLAN... PH DET OPT PLAN. > PH DET OPT PLAN. DETECTOR PLAN... 1 > DETECTOR PLAN... 2 TOGGLE TO SELECT A "FROM" AND A "TO" THEN PRESS ENTER

- 4. From Main Menu select 6. DETECTORS
5. From DETECTOR Submenu select 2. VEHICLE DETECTOR SETUP
6. Place cursor in VEH DET PLAN [ ] position and enter "2".
- Place cursor in VEH DETECTOR [ ] position and enter "5".
- Set delay time to "0".

VEH DETECTOR [ 5] VEH DET PLAN [ 2] TYPE: S-STANDARD TS2 DETECTOR... ECPI LOG... NO DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 5 5 EXTEND TIME... 0.0 DELAY TIME... 0.0 USE ADDED INITIAL . CROSS SWITCH PH.. 0 LOCK IN..... NONE NTCIP VOL . OR OCC . PMT QUEUE DELAY. NO

NOTICE VEH DET PLAN 2

ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [ ] position and enter "22".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0"

VEH DETECTOR [22] VEH DET PLAN [ 2] TYPE: S-STANDARD TS2 DETECTOR... ECPI LOG... NO DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 22 0 EXTEND TIME... 0.0 DELAY TIME... 3.0 USE ADDED INITIAL . CROSS SWITCH PH.. 0 LOCK IN..... NONE NTCIP VOL . OR OCC . PMT QUEUE DELAY. NO

NOTICE VEH DET PLAN 2

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1364 DESIGNED: March 2018 SEALED: 6/13/2018 REVISED: NA

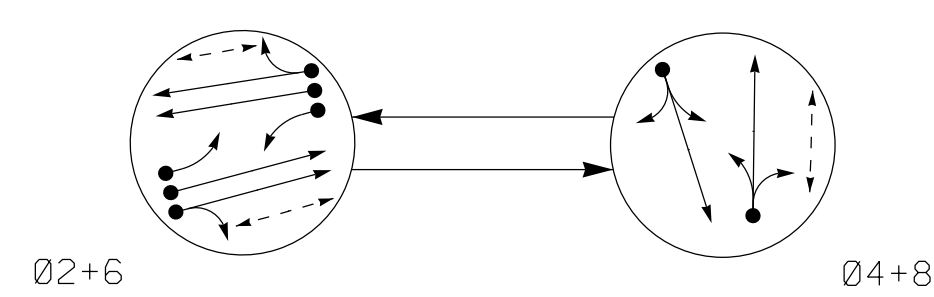
\*\*\*\*\*SYTIME\*\*\*\*\* \*\*\*\*\*DORIS\*\*\*\*\* \*\*\*\*\*USERAME\*\*\*\*\*

Mattern & Craig ENGINEERS • SURVEYORS 12 BROAD STREET ASHEVILLE, NORTH CAROLINA 28801 (828) 254-2201 FAX (828) 254-4562 NC LIC. NO. C-1154

Electrical Detail - Sheet 3 of 4 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED NC 54 (Harden Street) at East Pine Street Division 7 Alamance County Graham PLAN DATE: March 2018 REVIEWED BY: JB Voso PREPARED BY: SE Greene REVIEWED BY: James Voso SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO 022599 6/13/2018 SIG. INVENTORY NO. 07-1364



**PHASING DIAGRAM**



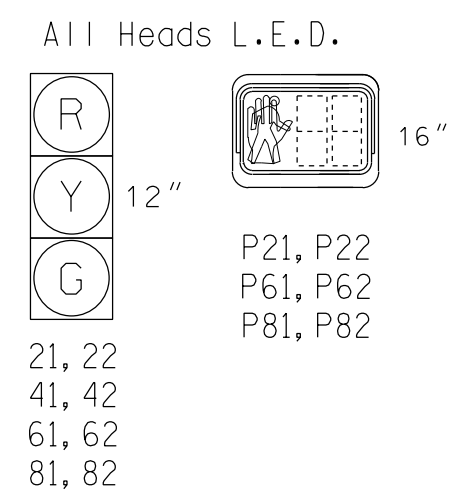
**PHASING DIAGRAM DETECTION LEGEND**

- → DETECTED MOVEMENT
- → UNDETECTED MOVEMENT (OVERLAP)
- ⋯ → UNSIGNALIZED MOVEMENT
- ↔ → PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	Ø 2+6	Ø 4+8	F L S H
21, 22	G R Y		
41, 42	R G R		
61, 62	G R Y		
81, 82	R G R		
P21, P22	W DW DRK		
P61, P62	W DW DRK		
P81, P82	DW W DRK		

**SIGNAL FACE I.D.**



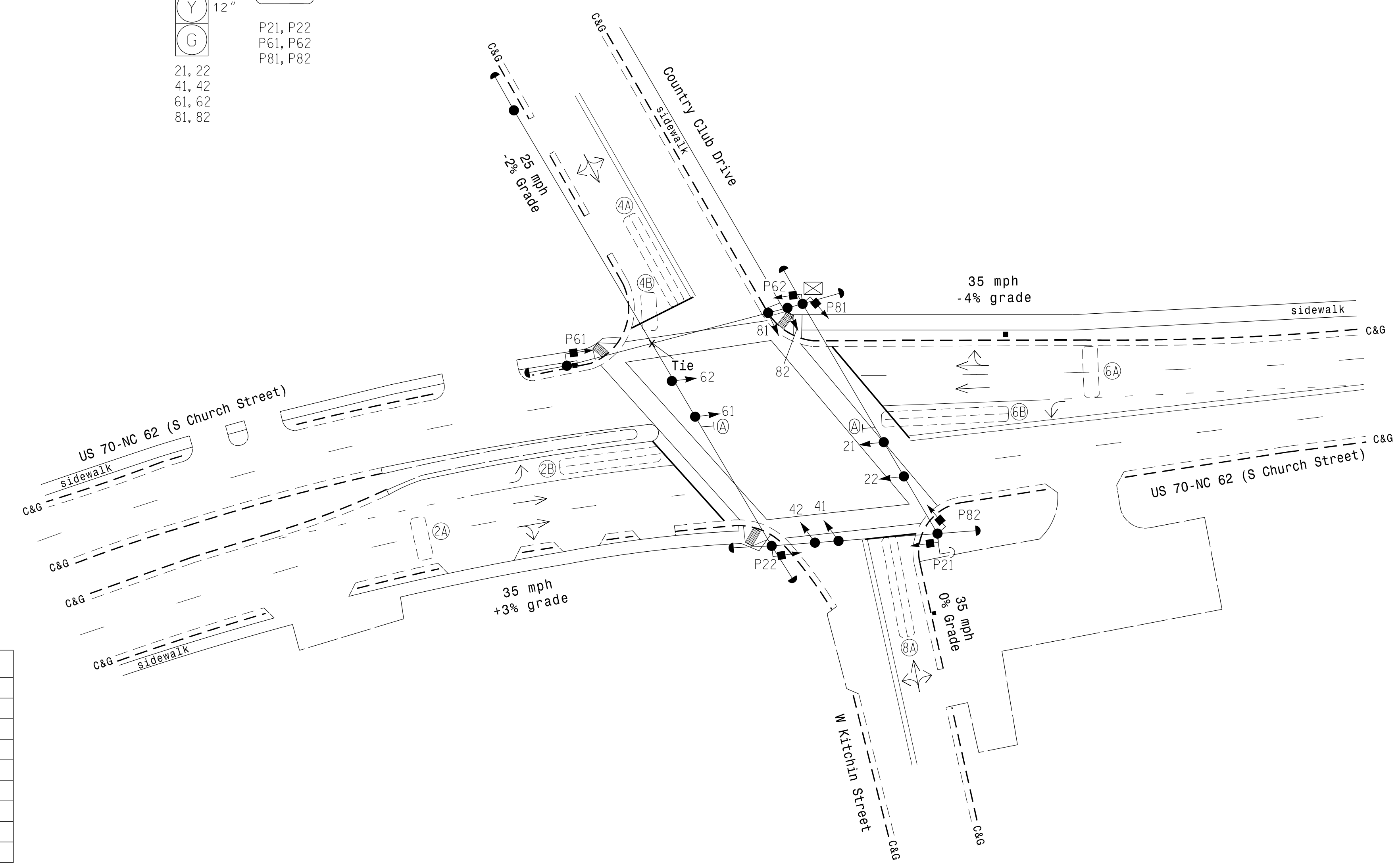
**ASC/3 DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X17	90	EXIST	-	2	Yes	-	-	-	S	-	X
2B	6X40	0	2-4-2	-	2	Yes	-	-	-	S	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	X
4B	6X15	+5	EXIST	-	4	Yes	-	15	-	S	-	X
6A	6X20	70	EXIST	-	6	Yes	-	-	-	S	-	X
6B	6X50	+5	2-4-2	-	6	Yes	-	-	-	S	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	10	-	S	-	X

**2 Phase Fully Actuated (Burlington-Graham Signal System)**

**NOTES**

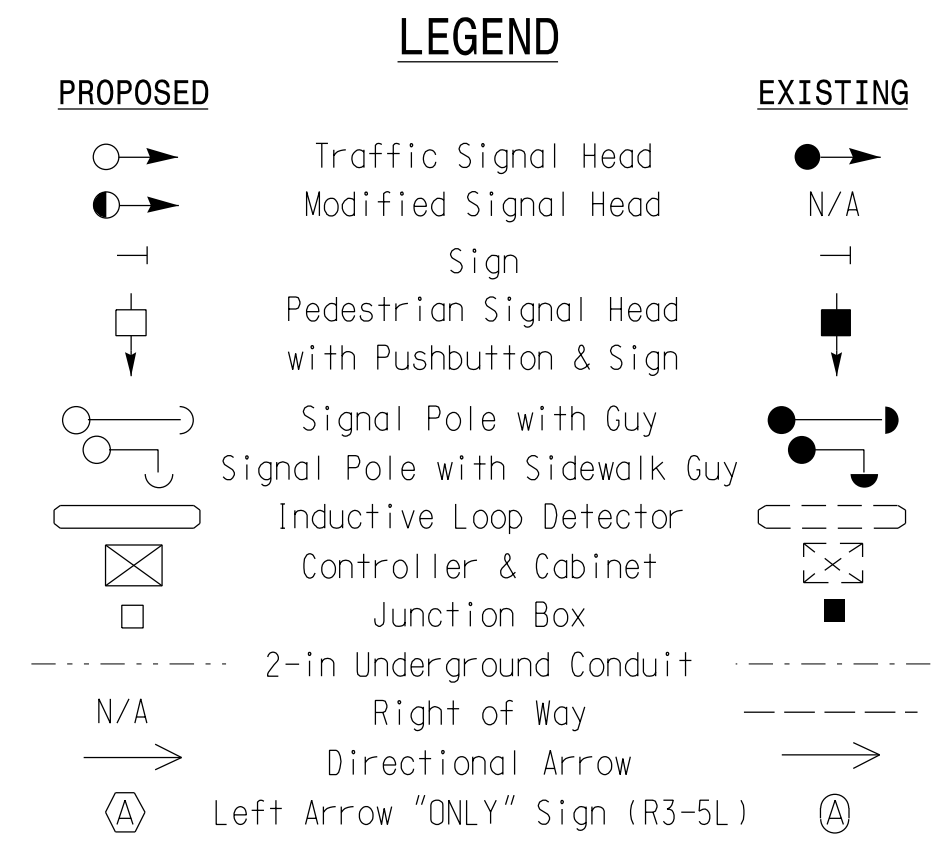
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output File for future use.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**ASC/3 TIMING CHART**

FEATURE	PHASE			
	2	4	6	8
Min Green *	10	7	10	7
Walk *	4	0	4	4
Ped Clear	16	0	15	24
Veh. Extension *	3.0	2.0	3.0	2.0
Max 1 *	65	25	65	25
Yellow	3.7	3.3	4.1	3.8
Red Clear	1.5	3.0	1.6	2.5
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	X	-
Recall Position	VEH, RECALL	-	VEH, RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

\* 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 for the Offices of:

**US 70-NC 62 (S. Church Street) at W. Kitchin Street/ Country Club Drive**

Division 7 Alamance County Burlington

PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion

PREPARED BY: JA Wiles REVIEWED BY: PL Alexander

SCALE: 1"=30'

6/7/2018

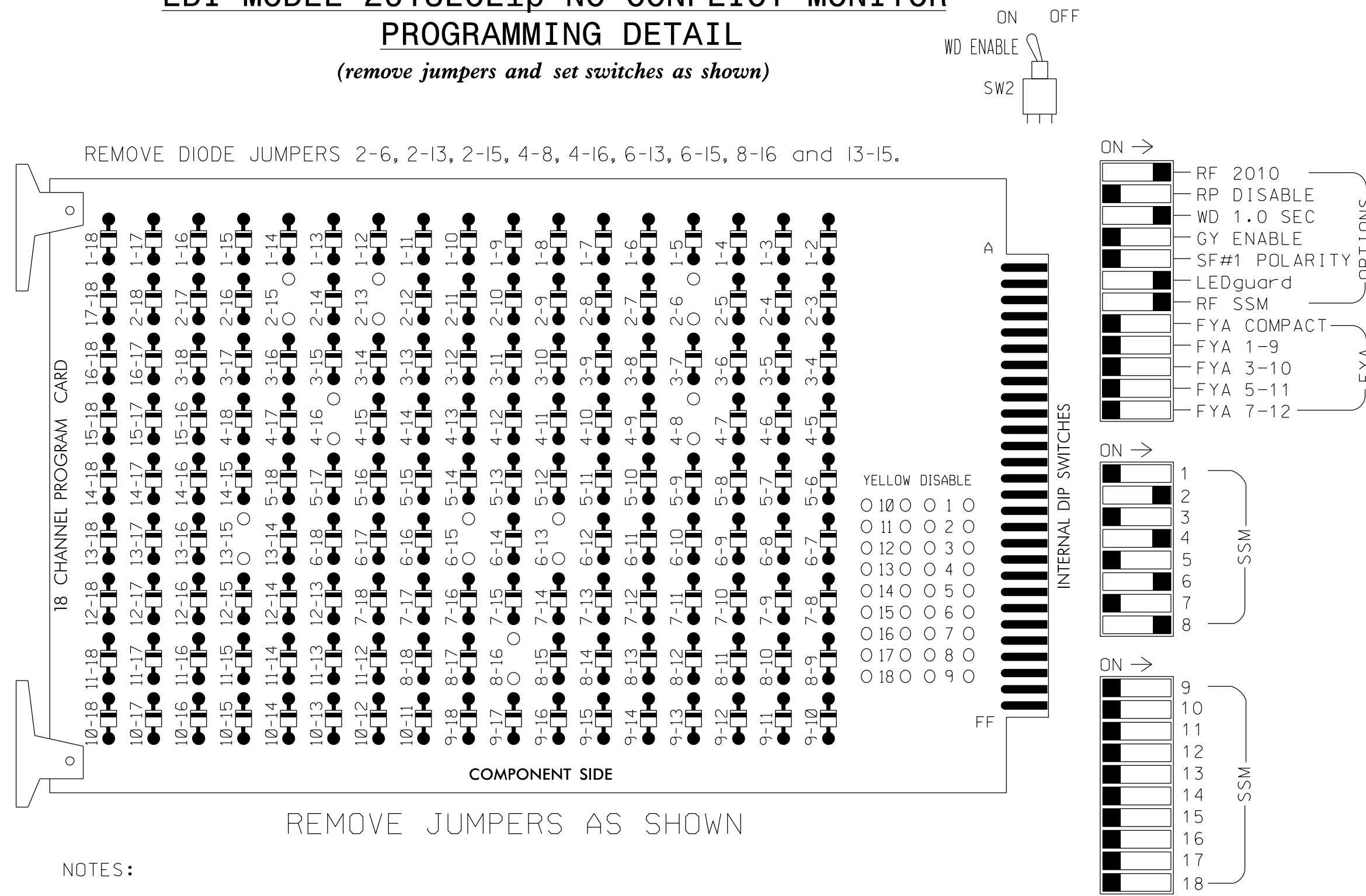
SIG. INVENTORY NO. 07-1380

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

07-JUN-2018 11:15 D:\Transpor\at\work\Traffic\c\ur\00056469 U-6015 B-G S19 System\Task 05\_11\_Signal\Drawings\07-1380.dgn ALEX3361 AT LUS210649

### EDI MODEL 2018ECLip-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.
- Integrate monitor with Ethernet network in cabinet.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for dual entry.
- Program controller to start up in phase 2 Walk and 6 Walk.
- The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S3,S5,S8,S9,S11,S12  
 PHASES USED.....2,2PED,4,6,6PED,8,8PED  
 OVERLAPS.....NONE

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Sig.117.1

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	NU	NU	61,62	P61, P62	NU	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		
Hand				113						119		110						
Walking				115						121		112						

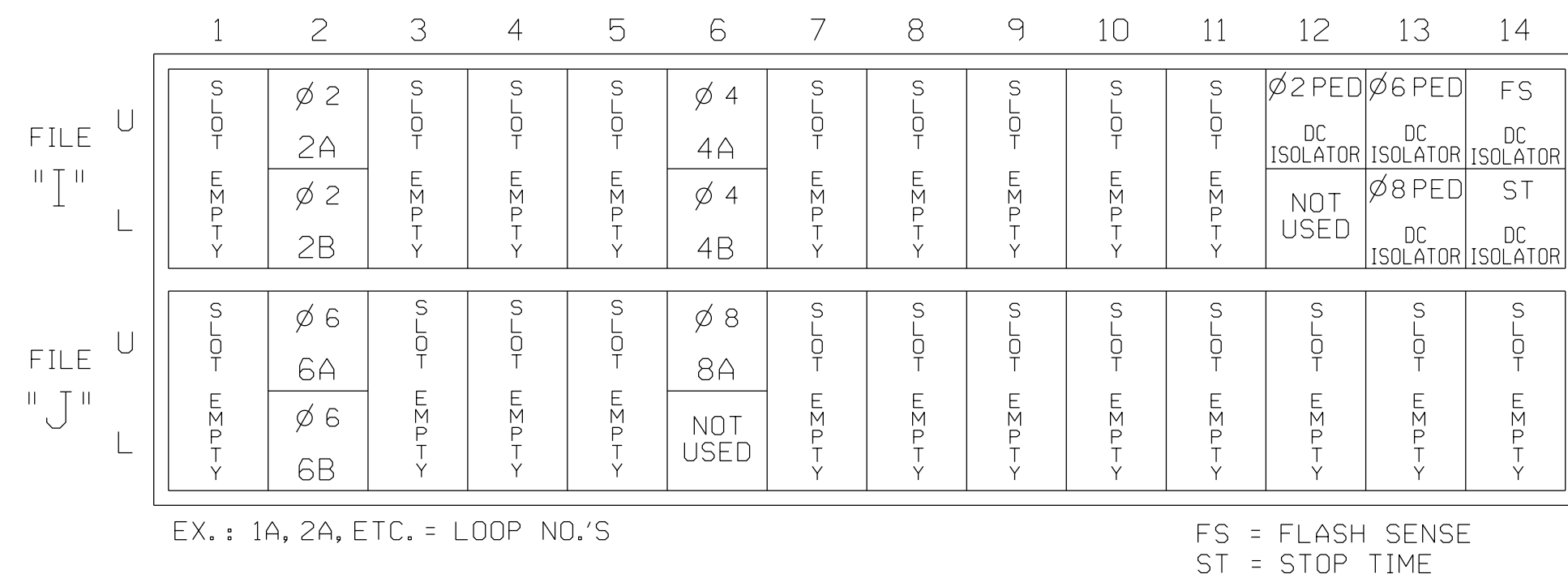
NU = Not Used

### 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)

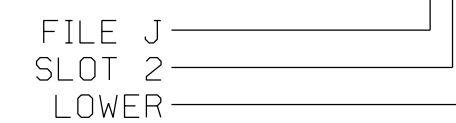


### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES				S
2B	TB2-7,8	I2L	43	12	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	YES		15		S
6A	TB3-5,6	J2U	40	6	6	YES				S
6B	TB3-7,8	J2L	44	16	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		10		S
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2	PED				
P61,P62	TB8-7,9	I13U	68	PED 6	6	PED				
P81,P82	TB8-8,9	I13L	70	PED 8	8	PED				

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

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1380  
 DESIGNED: NOVEMBER 2017  
 SEALED: 6/7/2018  
 REVISED: N/A

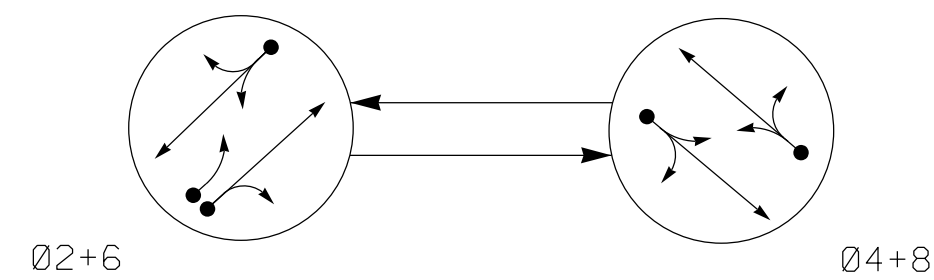
### Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	US 70-NC 62 (S. Church Street) at W. Kitchin Street/ Country Club Drive		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER PAMELA L. ALEXANDER SEAL 023489
	Division 7 PLAN DATE: November 2017 PREPARED BY: JA Wiles	Alamance County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	
REVISIONS		INIT. DATE	DATE
1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBES #F-0326			750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 07-1380

**PHASING DIAGRAM**



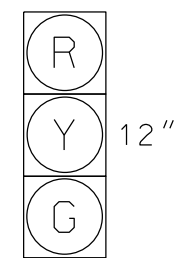
**PHASING DIAGRAM DETECTION LEGEND**

- ◄●► DETECTED MOVEMENT
- ◄◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄---► UNSIGNALIZED MOVEMENT
- ◄---◄ PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

**SIGNAL FACE I.D.**

All Heads L.E.D.



21, 22  
41, 42  
61, 62  
81, 82

ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR				PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM NEW CARD
2A	6X15	80	EXIST	-	2	Yes	-	-	-	S	- X
4A	6X40	+5	EXIST	-	4	Yes	-	3	-	S	- X
6A	6X6	295	EXIST	-	6	Yes	1.7	-	-	S	- X
6B	6X6	80	EXIST	-	6	Yes	-	-	-	S	- X
8A	6X40	+5	EXIST	-	8	Yes	-	3	-	S	- X
S1	6X6	+115	4	X	-	NO	-	-	-	N	X X

**2 Phase Fully Actuated (Burlington-Graham Signal System)**

**NOTES**

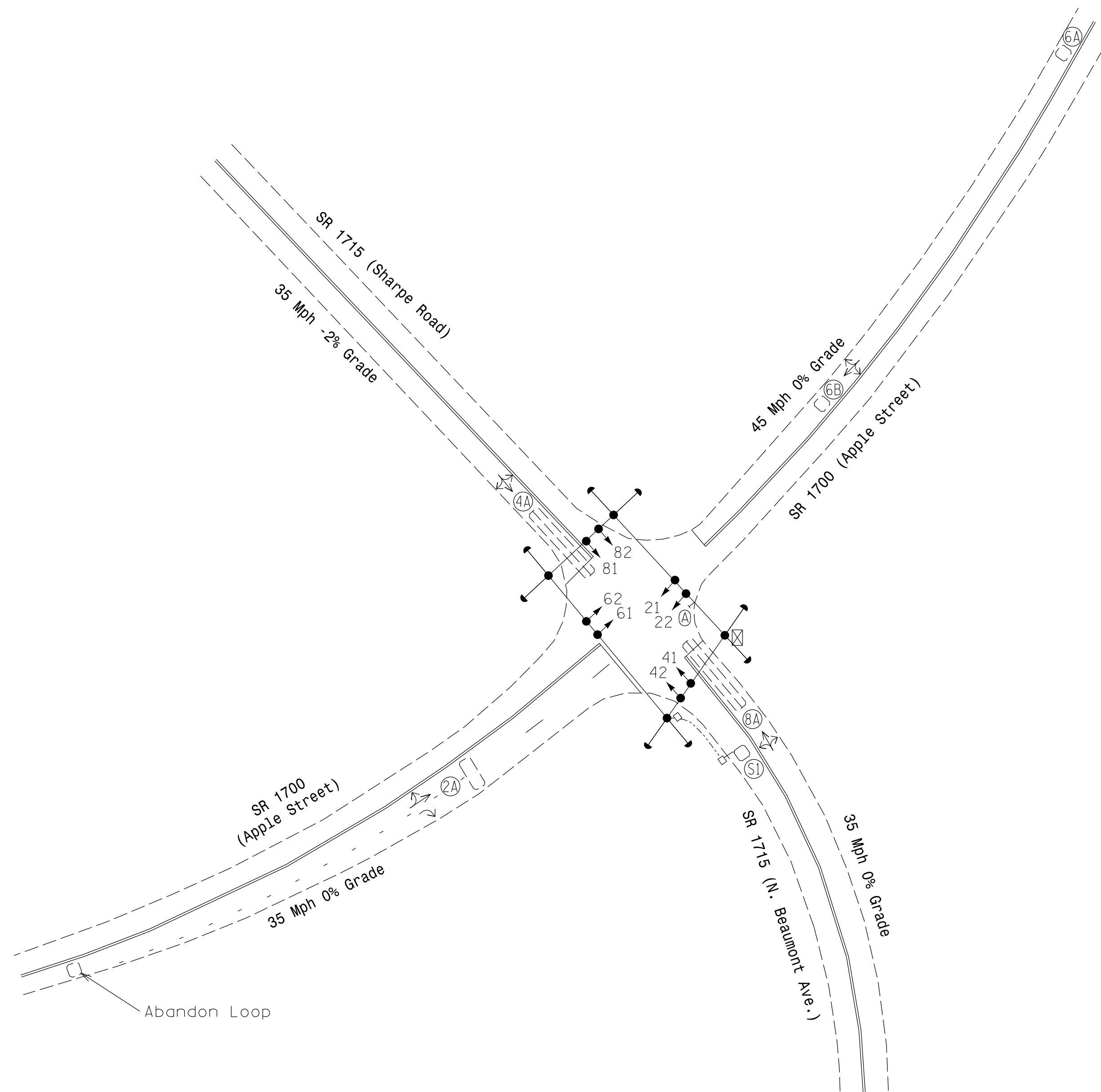
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output file for future use.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

**LEGEND**

- | PROPOSED   | EXISTING   |
|--|--|
| ○→ Traffic Signal Head                           | ●→ N/A   |
| ◐→ Modified Signal Head                          | ◐→ N/A   |
| ⊥ Sign   | ⊥ 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                           | ⊠ Controller & Cabinet                           |
| ⊠ Junction Box                                   | ⊠ Junction Box                                   |
| --- 2-in Underground Conduit                     | --- 2-in Underground Conduit                     |
| N/A Right of Way                                 | → Right of Way                                   |
| → Directional Arrow                              | → Directional Arrow                              |
| ⊠ Right Arrow "ONLY" Sign (R3-5R)                | ⊠ Right Arrow "ONLY" Sign (R3-5R)                |

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	2.0	2.0	2.0	2.0
Max 1 *	45	25	45	25
Yellow	3.8	4.0	4.5	3.8
Red Clear	1.0	1.1	1.0	1.0
Actions B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	X	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

\* 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**

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:  
  
 NC FIRM LICENSE No: P-0339  
 504 Meadowlands Drive  
 Hillsborough, NC 27278  
 (919) 732-3883  
 (919) 732-6676 (FAX)

Prepared For:  
  
 750 N. Greenfield Pkwy, Garner, NC 27529  
 SCALE: 1" = 40'

SR 1700 (Apple Street)  
 At  
 SR 1715 (Sharpe Road / N. Beaumont Avenue)  
 Division 7 Alamance County Burlington  
 PLAN DATE: October 2017 REVIEWED BY: E. W. Sirgany  
 PREPARED BY: M. Parker REVIEWED BY:  
 REVISIONS: INIT. DATE

SEAL  
  
 SEAL  
 018174  
 EDWARD W. SIRGANY  
 DocuSigned by:  
 Edward W. Sirgany 5/31/2018  
 DATE  
 SIG. INVENTORY NO. 07-1386



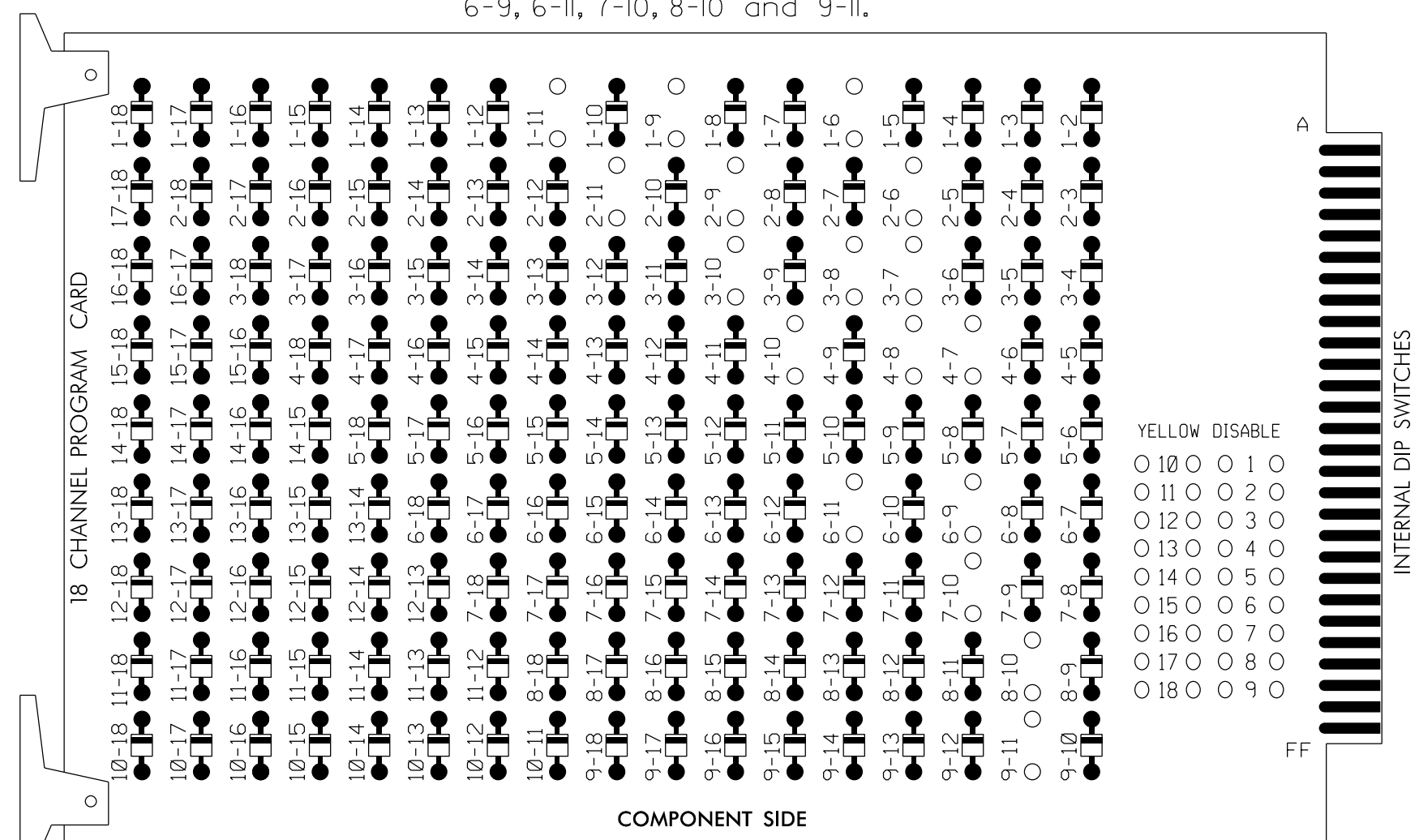




### EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

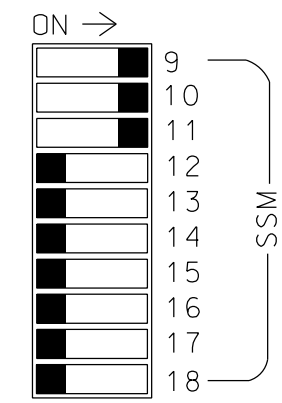
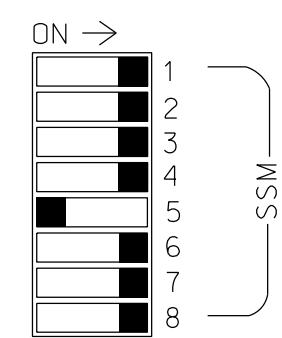
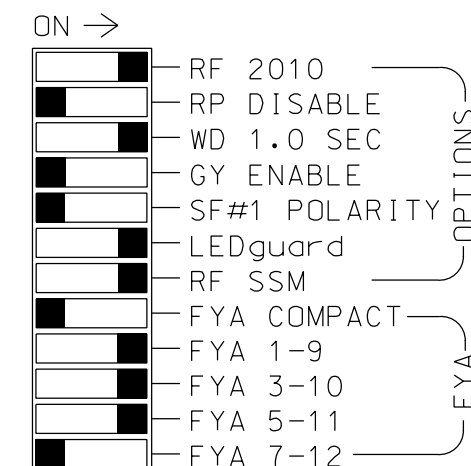
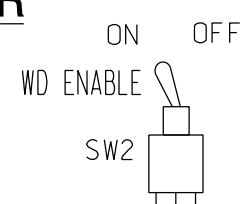
REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 4-7, 4-8, 4-10, 6-9, 6-11, 7-10, 8-10 and 9-11.



REMOVE JUMPERS AS SHOWN

**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.



■ = DENOTES POSITION OF SWITCH

### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. The cabinet and controller are part of the Burlington-Graham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S8,S10,S11,  
 AUX S1,AUX S2,AUX S4  
 PHASES USED.....1,2,3,4,6,7,8

OVERLAP "A".....\*  
 OVERLAP "B".....\*  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED

\* See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	22,23	23	31	41,42	NU	NU	61,62	62	71,72	81,82	11	31	NU	21	NU	NU
RED	*	128		*	101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW										122			A121	A124			A114	
YELLOW ARROW	126			117						123	123		A122	A125			A115	
FLASHING YELLOW ARROW													A123	A126			A116	
GREEN ARROW	127	127		118	118					124	124							

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

### INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE  
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

### INPUT FILE CONNECTION & PROGRAMMING CHART

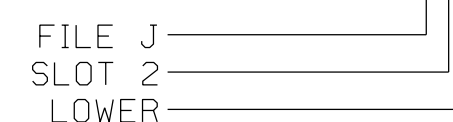
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	I1U	56	1	1	YES		15		S
1B	TB2-5,6	I2U	48	26	6	YES				S
2A, 2B	TB2-9,10	I3U	39	2	1	YES		15		S
2C	TB2-11,12	I3L	63	32	2	YES				S
3A <sup>2</sup>	TB4-5,6	I5U	76	42	2	YES				S
	-	J8U	58	3	★	YES		15		S
	-	J8U	50	28	★	8	YES	3		S
4A	TB4-9,10	I6U	58	8	YES			10		S
6A	TB3-5,6	J2U	41	4	4	YES				S
7A	TB5-5,6	J5U	40	6	6	YES				S
7B	TB5-9,10	J6U	57	7	7	YES				S
8A	TB7-1,2	J7U	42	8	7	YES				S
			66	38	8	YES				S

<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.

<sup>2</sup>Add jumper from I5-W to J8-W, on rear of input file.

★ See the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

### INPUT FILE POSITION LEGEND: J2L

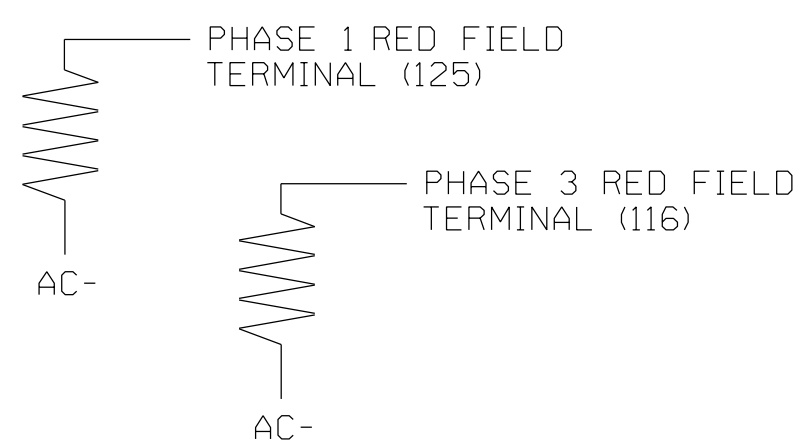


### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

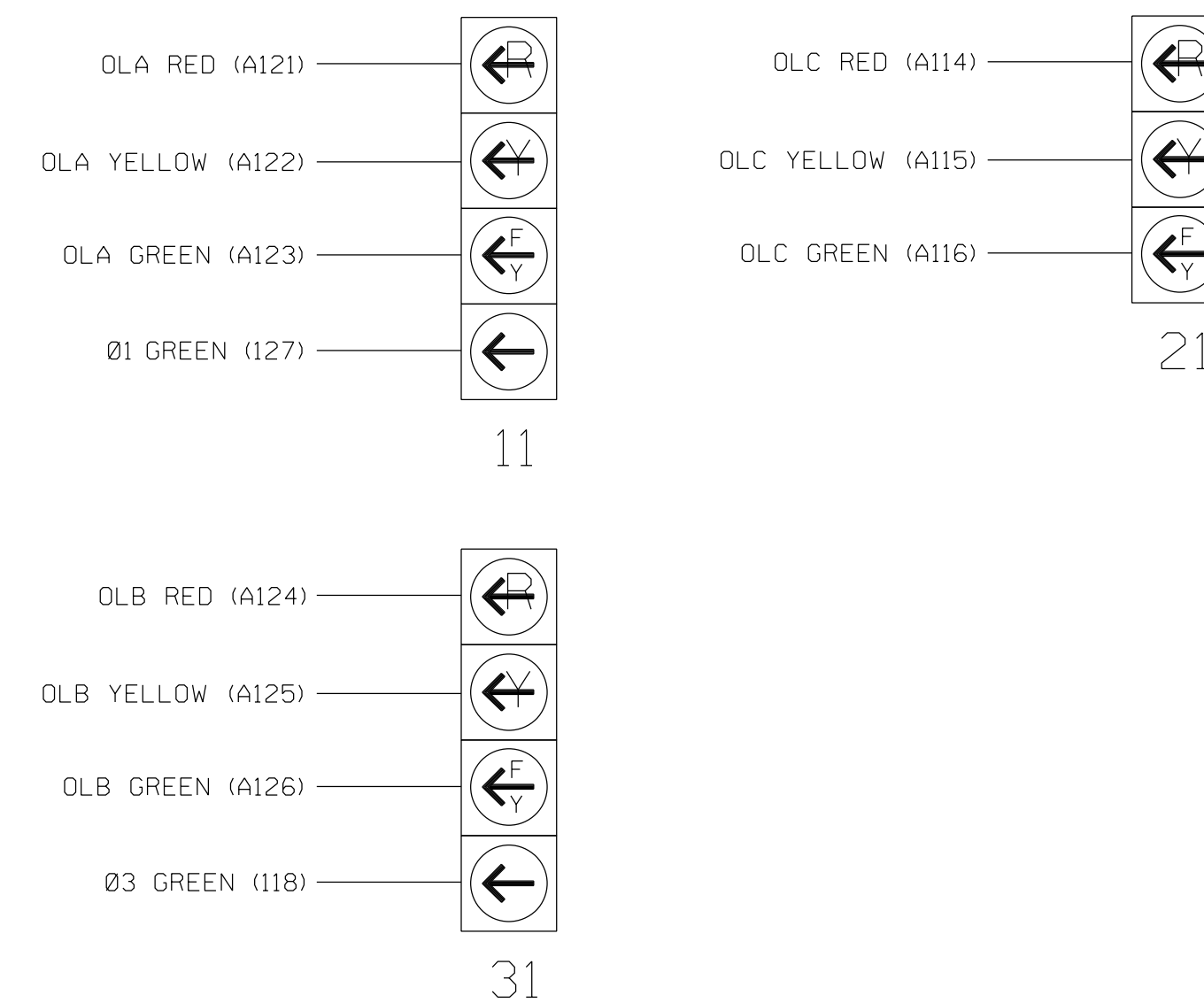
#### ACCEPTABLE VALUES

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



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1422  
 DESIGNED: March 2018  
 SEALED: 6/7/2018  
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared for the Offices of: Department of Transportation and Safety State of North Carolina	SR 1308 (Garden Road) at Huffman Mill Plaza/ Chick-Fil-A		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER PAMELA L. ALEXANDER SEAL 023489
	Division 7 PLAN DATE: March 2018 PREPARED BY: PL Alexander	Alamance County REVIEWED BY: MB Toth REVIEWED BY:	
REVISIONS INIT. DATE			SIG. INVENTORY NO. 07-1422

**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888 NCBEEES #F-0326

750 N. Greenfield Pkwy, Garner, NC 27529

### ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A *(program controller as shown)*

## IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

- From Main Menu select **8. UTILITIES**
- From UTILITIES Submenu select **1. COPY/CLEAR**
- Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```

COPY / CLEAR UTILITY
FROM          TO
PHASE TIMING... > PHASE TIMING...
TIMING PLAN... > TIMING PLAN...
PH DET OPT PLAN. > PH DET OPT PLAN.
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
TOGGLE TO SELECT A "FROM" AND A "TO"
THEN PRESS ENTER
  
```

- From Main Menu select **6. DETECTORS**
- From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
- Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "3".
- Set delay time to "0".

```

VEH DETECTOR [ 3]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
3 3
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
  
```

- Place cursor in VEH DETECTOR [ ] position and enter "28".
- Set assigned phase to "0".

```

VEH DETECTOR [28]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
28 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
  
```

ENSURE PHASE IS SET TO "0"

END PROGRAMMING

### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1422  
DESIGNED: March 2018  
SEALED: 6/7/2018  
REVISED: N/A

### ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL *(program controller as shown)*

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**

#### OVERLAP A

```

Select TMG VEH OVLP [A] and 'PPLT FYA'
TMG VEH OVLP...[A] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... PHASE 1
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
  
```

Toggle Once

#### OVERLAP B

```

Select TMG VEH OVLP [B] and 'PPLT FYA'
TMG VEH OVLP...[B] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... PHASE 3
OPPOSING THROUGH..... PHASE 4

FLASHING ARROW OUTPUT....CH10 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 3
  
```

NOTICE ACTION PLAN SF BIT "3"

Toggle Once

#### OVERLAP C

```

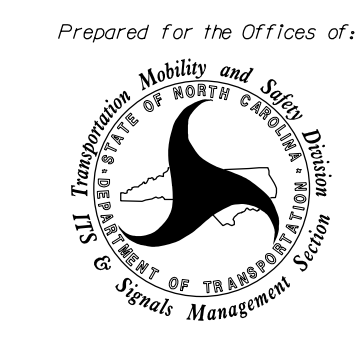
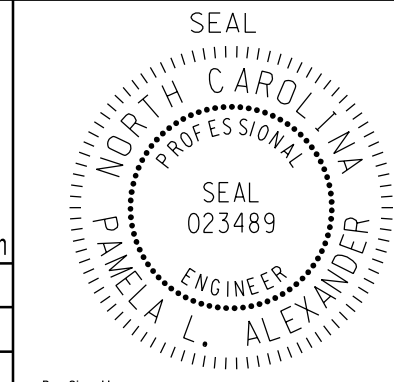
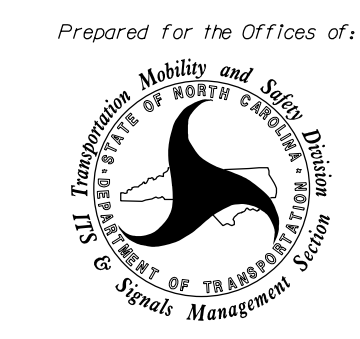
Select TMG VEH OVLP [C] and 'OTHER/ECONOLITE'
TMG VEH OVLP...[C] TYPE: OTHER/ECONOLITE
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . . . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . . . . . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
  
```

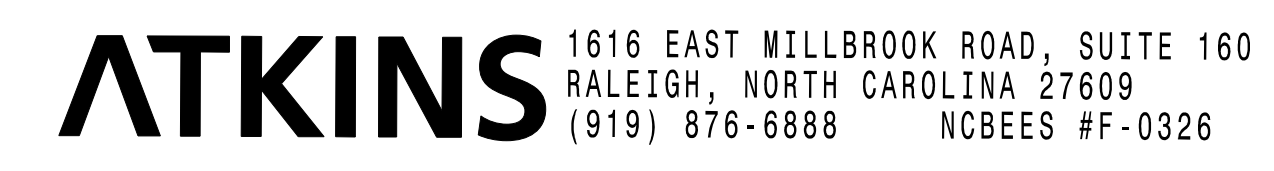
END PROGRAMMING

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	<b>SR 1308 (Garden Road)</b> <b>at</b> <b>Huffman Mill Plaza/</b> <b>Chick-Fil-A</b>		
	Division 7 PLAN DATE: March 2018 PREPARED BY: PL Alexander	Alamance County REVIEWED BY: MB Toth REVIEWED BY:	
Prepared for the Offices of: 		REVISIONS INIT. DATE	Date by: Pamela Alexander DATE: 6/9/2018 DATE:
1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEEES #F-0326			SIG. INVENTORY NO. 07-1422

09-JUN-2018 14:15 \*\*\*SIGNALING AND TRAFFIC CONTROL SYSTEMS GROUP\*\*\* U-6015 B-6 Sig Sys\*Task 05-11-15 Signal is 40as:gn:WIF:ing:07-1422E.dgn ALEX3361 AT LUS510649



### ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 3.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 3.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	3

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

**ALTERNATE PHASING CHANGE SUMMARY**

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BIT 3 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BIT 3: Modifies overlap parent phases for head 31 to run protected turns only.

VEH DET PLAN 2: Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 0 seconds.

### ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

- From Main Menu select 5. TIME BASE
- From TIME BASE Submenu select 2. ACTION PLAN

```


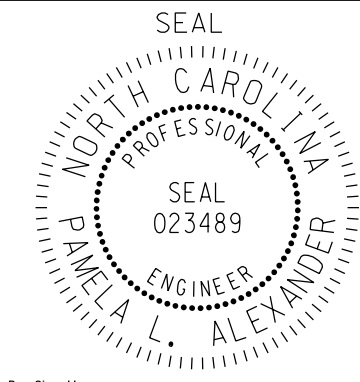
ACTION PLAN...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  X  .  .  .  .  .  .  .  .  .  .  .  .  .
AUX FCT  .  .  .  (1-3)
                1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100.  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
    
```

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1422  
 DESIGNED: March 2018  
 SEALED: 6/7/2018  
 REVISED: N/A

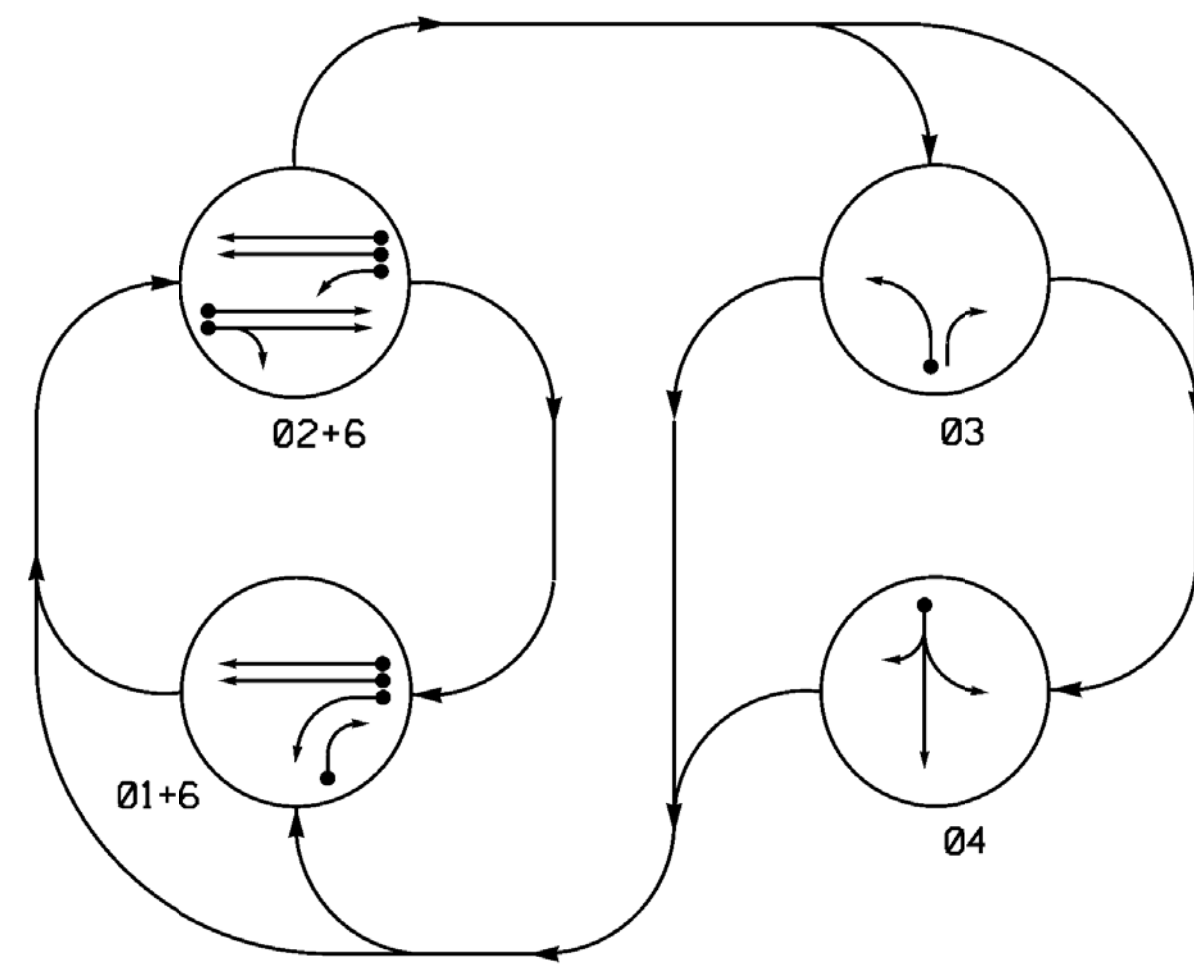
Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared for the Offices of: 	<b>SR 1308 (Garden Road) at Huffman Mill Plaza/ Chick-Fil-A</b> Division 7      Alamance County      Burlington PLAN DATE: March 2018      REVIEWED BY: MB Toth PREPARED BY: PL Alexander      REVIEWED BY:	SEAL  SEAL 023489 PAMELA L. ALEXANDER ENGINEER
REVISIONS      INIT.      DATE		Date: 6/9/2018 Signature: Pamela Alexander Date:
		SIG. INVENTORY NO. 07-1422

09-JUN-2018 14:14  
 \*\*\*SIGNALS.COM\PROJECTS\SR1308\Transportation\Traffic\Curr\*00056469 U-6015 B-6 Sig Sys\*Task 05-11-SIGNALS\08as\gn\WIF.rng\07-1422E.dgn  
 ALEX3361 AT LUS510849

PHASING DIAGRAM



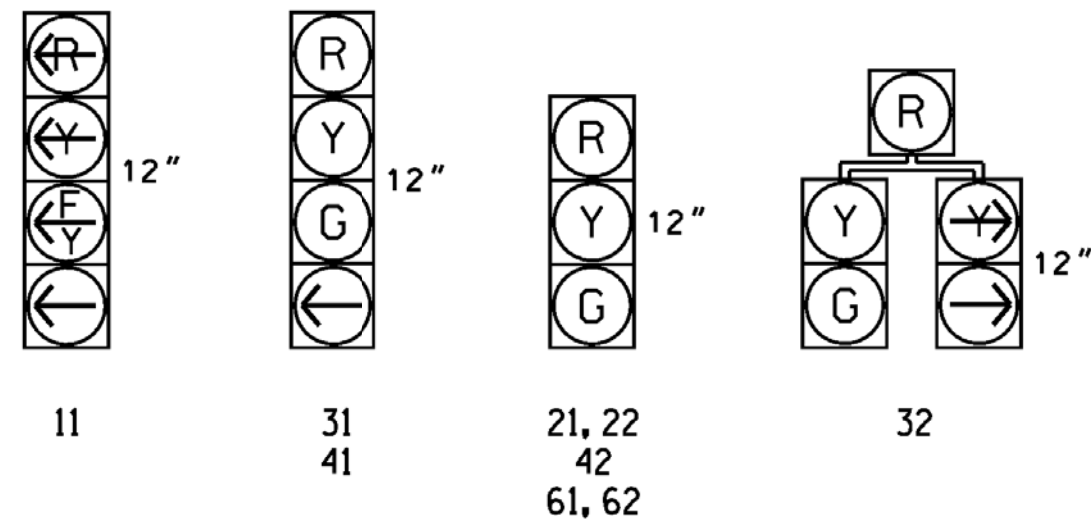
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	01+6	02+6	03	04	FLASH
11	-	F	R	R	Y
21, 22	R	G	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

SIGNAL FACE I.D.

All Heads L.E.D.

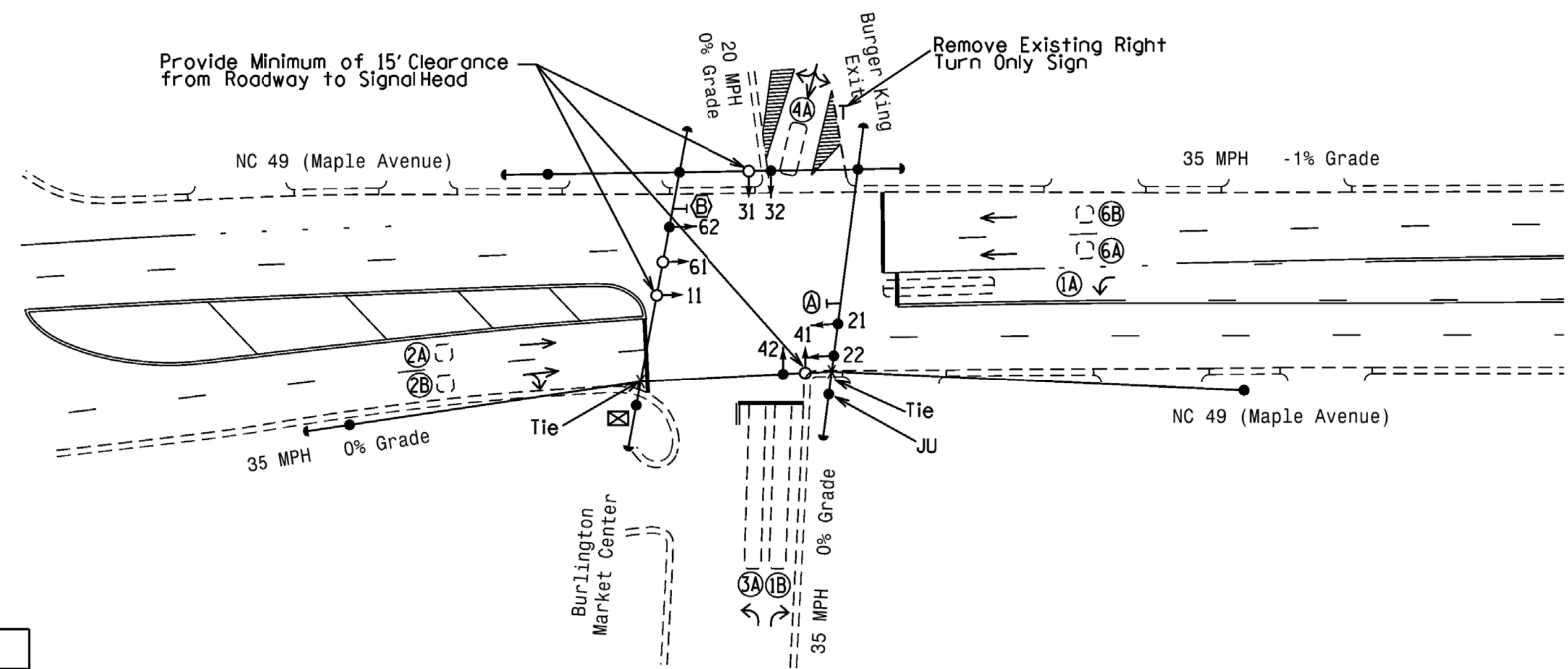


ASC/3 DETECTOR INSTALLATION CHART												
DETECTOR				PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	NEW LOOP	
1A	6X40	+5	2-4-2	-	1	Yes	-	15	-	S	-	X
					6	Yes	-	-	-	S	-	X
1B	6X60	0	EXIST	-	1	Yes	-	15	-	S	-	X
2A, 2B	6X6	70	EXIST	-	2	Yes	-	-	-	S	-	X
3A	6X60	0	EXIST	-	3	Yes	-	3	-	S	-	X
4A	6X19	0	EXIST	-	4	Yes	-	10	-	S	-	X
6A, 6B	6X60	70	EXIST	-	6	Yes	-	-	-	S	-	X

4 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- The order of phases 3 and 4 may be reversed.
- Reposition existing signal head number 62.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing unless otherwise noted on plans.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



FEATURE	ASC/3 TIMING CHART				
	1	2	3	4	6
Min Green *	7	10	7	7	10
Walk *	0	0	0	0	0
Ped Clear	0	0	0	0	0
Veh. Extension *	2.0	3.0	2.0	3.5	3.0
Max I *	15	35	15	15	35
Yellow	3.0	3.9	3.0	3.0	3.9
Red Clear	2.3	1.4	1.9	2.6	1.4
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-
Max Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Locking Detector	-	X	-	-	X
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X

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

LEGEND

- |  |  |  |  |
|--|--|--|--|
|  | PROPOSED Traffic Signal Head           |  | EXISTING Traffic Signal Head           |
|  | PROPOSED Modified Signal Head          |  | EXISTING N/A                           |
|  | PROPOSED Pedestrian Signal Head        |  | EXISTING N/A                           |
|  | PROPOSED Signal Pole with Guy          |  | EXISTING Signal Pole with Guy          |
|  | PROPOSED Signal Pole with Sidewalk Guy |  | EXISTING Signal Pole with Sidewalk Guy |
|  | PROPOSED Inductive Loop Detector       |  | EXISTING Inductive Loop Detector       |
|  | PROPOSED Controller & Cabinet          |  | EXISTING Junction Box                  |
|  | PROPOSED Junction Box                  |  | EXISTING Junction Box                  |
|  | PROPOSED 2-in Underground Conduit      |  | EXISTING 2-in Underground Conduit      |
|  | PROPOSED Right of Way                  |  | EXISTING Right of Way                  |
|  | PROPOSED Directional Arrow             |  | EXISTING Directional Arrow             |
|  | PROPOSED No Left Turn Sign (R3-2)      |  | EXISTING No Left Turn Sign (R3-2)      |
|  | PROPOSED No Right Turn Sign (R3-1)     |  | EXISTING No Right Turn Sign (R3-1)     |

\*\*\*\*\*SYSTEM \*\*\*\*\*  
 \*\*\*\*\*USER \*\*\*\*\*  
 \*\*\*\*\*SERIAL \*\*\*\*\*

**Mattern & Craig**  
ENGINEERS • SURVEYORS

12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201  
FAX (828) 254-4562  
NC LIC. NO. C-1154

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:  
  
 NC 49 (Maple Avenue) at Burger King Exit/ Burlington Market Center  
 Division 7 Alamance County Burlington  
 PLAN DATE: November 2017 REVIEWED BY: J. Voso  
 PREPARED BY: S. Homewood REVIEWED BY: J. Voso

SCALE 1"=40'

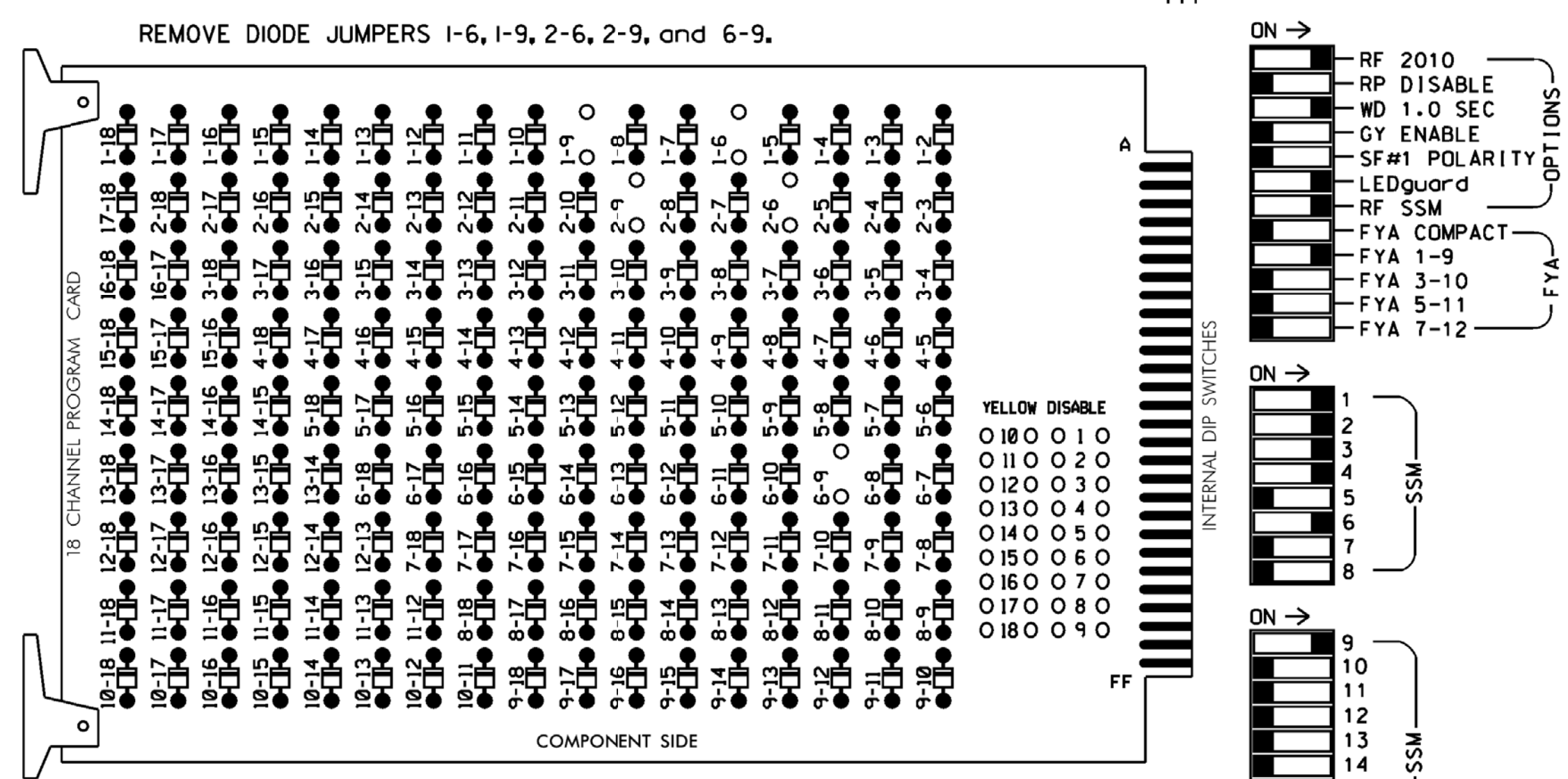
REVISIONS

NO.	DESCRIPTION	INIT.	DATE

James Voso  
  
 6/13/2018  
 SIG. INVENTORY NO. 07-1423

**EDI MODEL 2018EClip-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.
  - Integrate monitor with Ethernet network in cabinet.

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S8,AUX S1  
 PHASES USED.....1,2,3,4,6  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED

\* See overlap programming detail on sheet 2

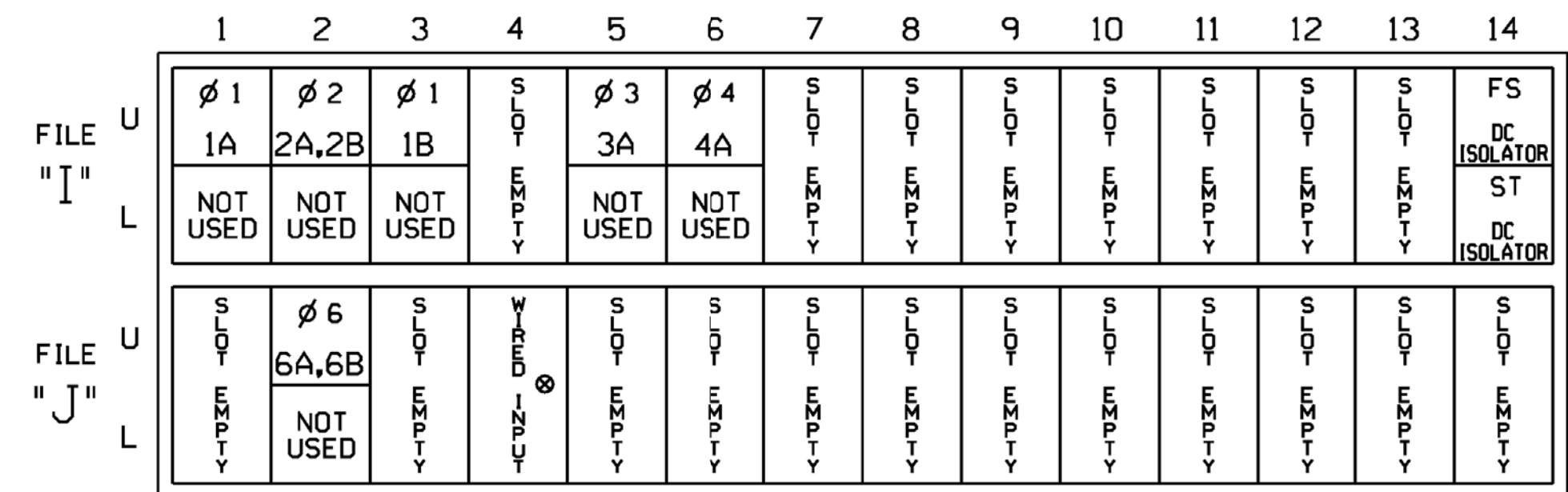
**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
GMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11*	32	21,22	NU	31	32	41	42	NU	NU	61,62	NU	NU	NU	NU	11*	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																		A121	
YELLOW ARROW		126																	A122
FLASHING YELLOW ARROW																			A123
GREEN ARROW	127	127		118	103														

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

**INPUT FILE POSITION LAYOUT**

(front view)



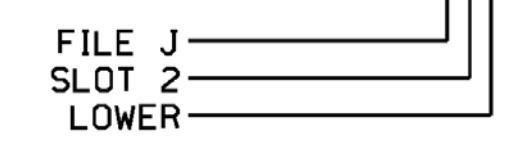
EX: 1A, 2A, ETC. = LOOP NO.'S  
 \* Wired Input - Do not populate slot with detector card

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	11U	56	1	1	YES		15		S
		J4U	48	26	6	YES				S
1B	TB2-9,10	13U	63	32	1	YES		15		S
2A,2B	TB2-5,6	12U	39	2	2	YES				S
3A	TB4-5,6	15U	58	3	3	YES		3		S
4A	TB4-9,10	16U	41	4	4	YES		10		S
6A	TB3-5,6	J2U	40	6	6	YES				S

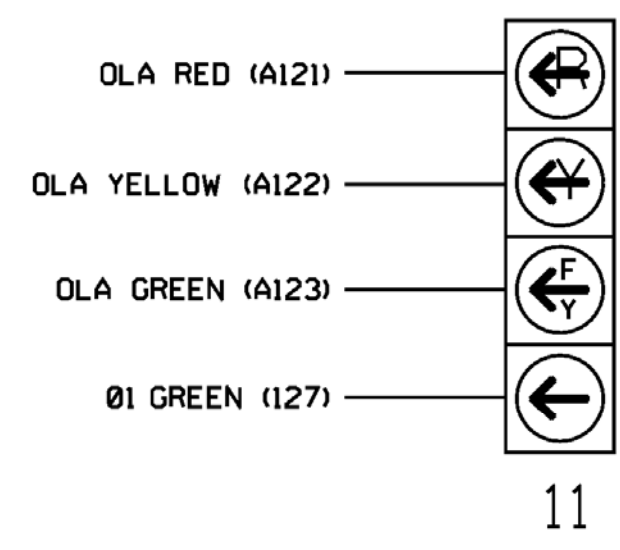
<sup>1</sup>Add jumper from 11-W to J4-W, on rear of input file.

**INPUT FILE POSITION LEGEND: J2L**



**FYA SIGNAL WIRING DETAIL**

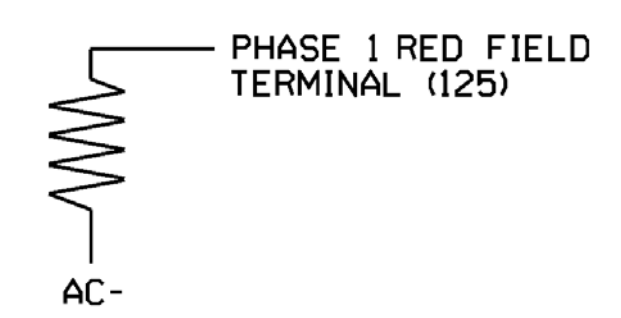
(wire signal head as shown)



**LOAD RESISTOR INSTALLATION DETAIL**

(install resistor as shown below)

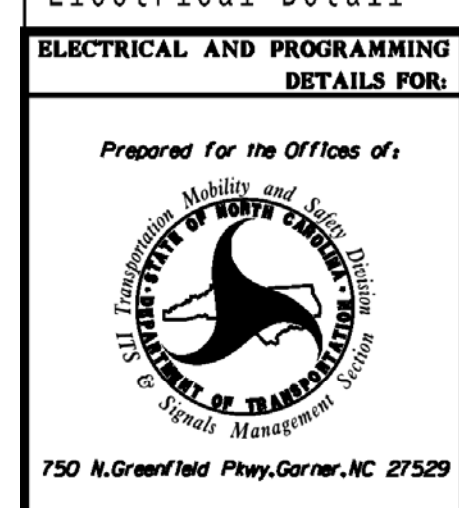
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



Electrical Detail - Sheet 1 of 2



12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562  
 NC LIC. NO. C-1154



NC 49 (Maple Avenue) at Burger King Exit/ Burlington Market Center	
Division 7	Alamance County
Prepared By: S. Homewood	Reviewed By: J. Voso
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL	DATE
James Voso	6/13/2018
SIG. INVENTORY NO. 07-1423	

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*D\*\*\*\*\*  
 \*\*\*\*\*USER\*\*\*\*\*



