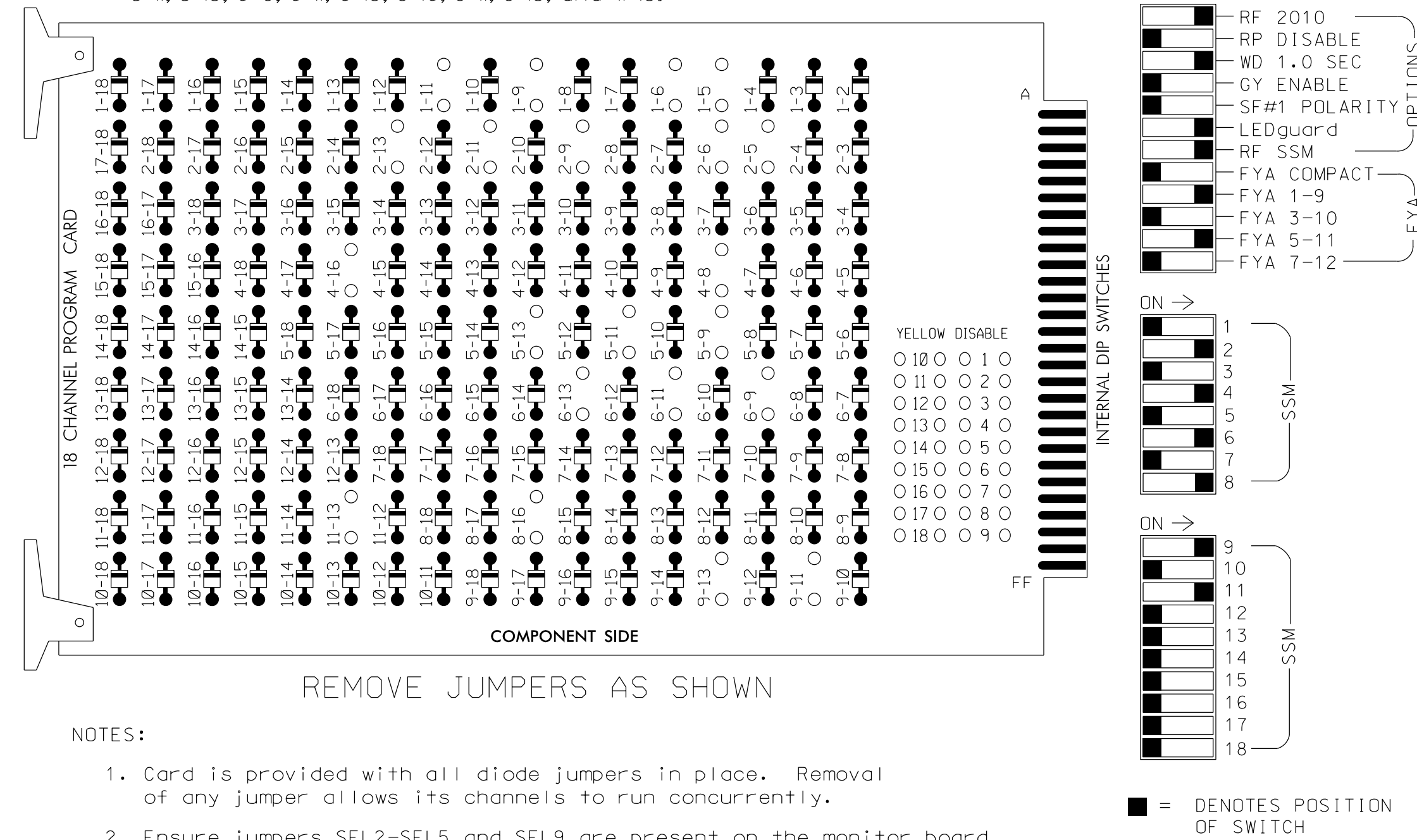


EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, 2-5, 2-6, 2-9, 2-11, 2-13, 4-8, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 8-16, 9-11, 9-13, and 11-13.



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 phase 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,S3,S5,S7,S8,S11,S12,
 AUX S1,AUX S4
 PHASES USED.....1,2,2PED,4,5,6,8,8PED
 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	P21, P22	NU	41,42	NU	51	61,62	NU	NU	81,82	P81, P82	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											
Hand icon				113								110						
Person icon				115								112						

NU = Not Used

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

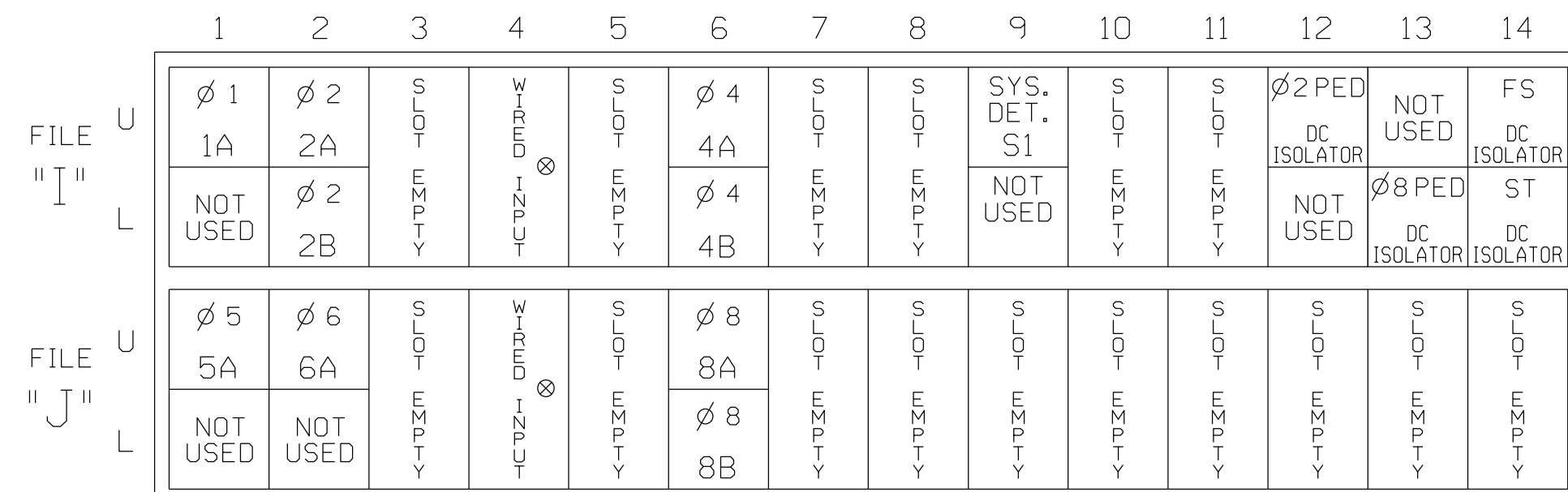
★ See pictorial of head wiring in detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

⊗ 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 ¹	TB2-1,2	I1U	56	1★	1	YES		15		S
2A	TB2-5,6	J4U	48	26★	6	YES				S
2B	TB2-7,8	I2L	39	2	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	YES		10		S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
5A ²	TB3-1,2	J1U	55	5★	5	YES		15		S
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		10		S
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

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

- * System detector only. Remove any assigned vehicle phase.
- ¹Add jumper from I1-W to J4-W, on rear of input file.
- ²Add jumper from J1-W to I4-W, on rear of input file.
- ★ See vehicle detector setup programming detail for alternate phasing on sheet 3.

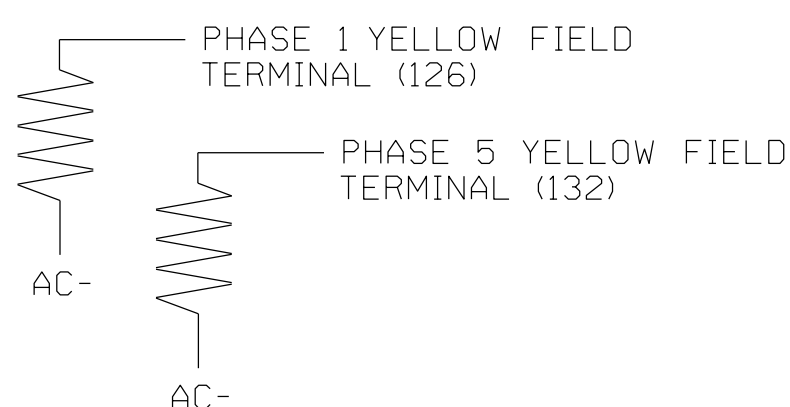
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

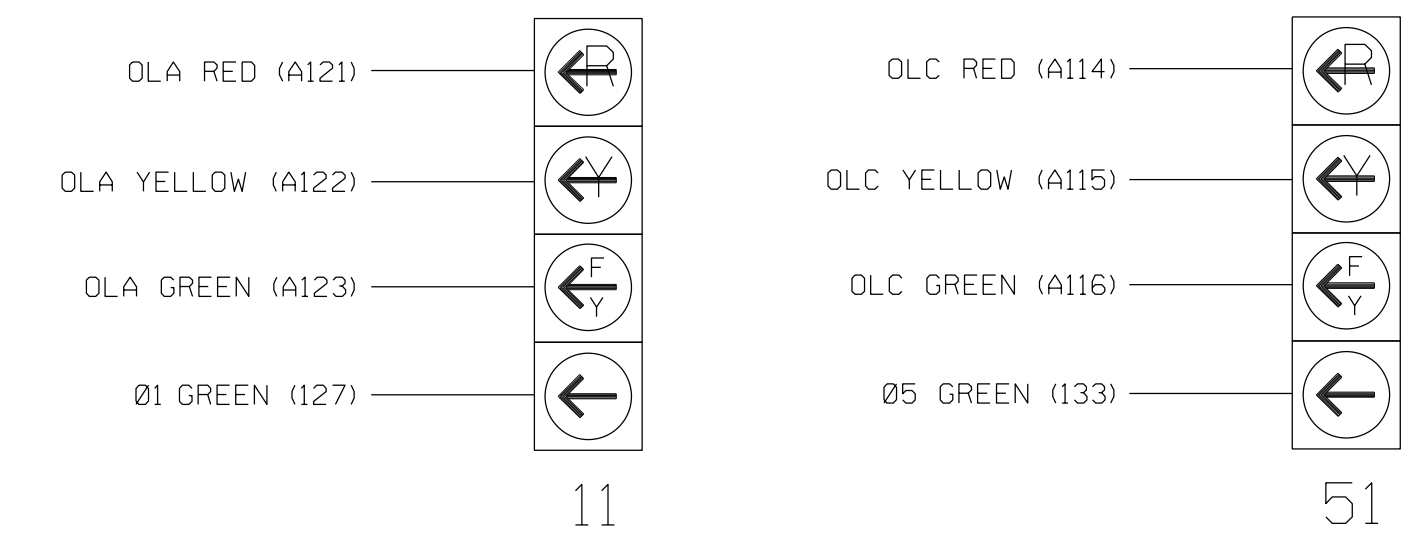
(install resistors as shown)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



11

51

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1718
 DESIGNED: DECEMBER 2017
 SEALED: 06-13-2018
 REVISED: N/A

Electrical Detail Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
LISA M. MOON
022516

Edgewood Avenue at SR 1452 (Rockwood Avenue/N. O'Neal Street)
 Division 7 Alamance County Burlington

Prepared for the Offices of:
 DRMP, Inc. 8000 Regency Parkway, Suite 175 Cary, NC 27519 NC License No. C-2215 (919) 650-1038

Plan Date: December 2017
 Prepared by: DJ White
 Revisions: _____

Reviewed by: AJ Davis
 Reviewed by: LM Moon
 Date: _____

DocuSigned by: Lisa M. Moon 6/13/2018
 SEC5888030021
 SIG. INVENTORY NO. 07-1718

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
```

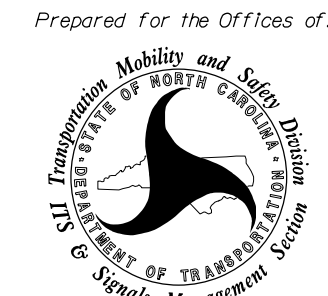
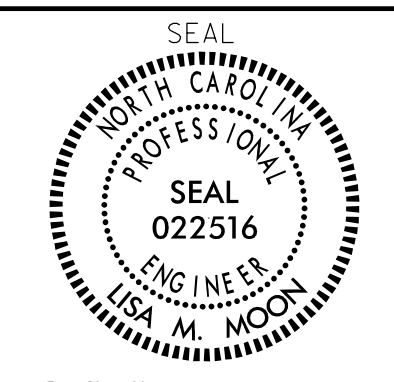
← NOTICE ACTION PLAN SF BIT "5"

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1718
DESIGNED: DECEMBER 2017
SEALED: 06-13-2018
REVISED: N/A

Electrical Detail Sheet 2 of 4

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

<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> <div style="text-align: center;">  </div> <p style="font-size: x-small; text-align: center;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Edgewood Avenue at SR 1452 (Rockwood Avenue/N. O'Neal Street) Division 7 Alamance County Burlington</p> <table style="width: 100%; font-size: x-small;"> <tr> <td>PLAN DATE: December 2017</td> <td>REVIEWED BY: AJ Davis</td> </tr> <tr> <td>PREPARED BY: DJ White</td> <td>REVIEWED BY: LM Moon</td> </tr> </table> <table border="1" style="width: 100%; font-size: x-small; border-collapse: collapse;"> <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> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	PLAN DATE: December 2017	REVIEWED BY: AJ Davis	PREPARED BY: DJ White	REVIEWED BY: LM Moon	REVISIONS	INIT.	DATE										<div style="text-align: center;">  </div> <p style="font-size: x-small;">DocuSigned by: <i>Lisa M. Moon</i> 6/13/2018 SICCE88D83D0421 DATE SIG. INVENTORY NO. 07-1718</p>
PLAN DATE: December 2017	REVIEWED BY: AJ Davis																	
PREPARED BY: DJ White	REVIEWED BY: LM Moon																	
REVISIONS	INIT.	DATE																

Plans Prepared By:



DRMP

DRMP, Inc.
8000 Regency Parkway, Suite 175
Cary, NC 27519
NC License No. C-2213 (919) 650-1038

13-JUN-2018 17:57 R:\66015\1707\1\c\esignols\design\1707-1718e.dgn
r:\lowton AT CAR-RLANTON-W7

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING (FOR LOOPS 1A AND 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..... ECP1 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: S-STANDARD
TS2 DETECTOR..... ECP1 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... 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"

- 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..... ECP1 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..... ECP1 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
    
```

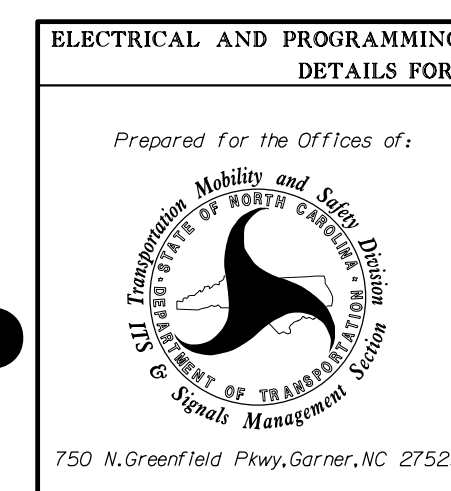
← NOTICE VEH DET PLAN 2

→ ENSURE PHASE IS SET TO "0"

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1718
DESIGNED: DECEMBER 2017
SEALED: 06-13-2018
REVISED: N/A

Electrical Detail Sheet 3 of 4



Edgewood Avenue at SR 1452 (Rockwood Avenue/N. O'Neal Street)	
Division 7	Alameda County
Prepared By: DJ White	Reviewed By: AJ Davis
Prepared By: DJ White	Reviewed By: LM Moon
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
LISA M. MOON
022516

DocuSigned by:
Lisa M. Moon 6/13/2018
SIG. INVENTORY NO. 07-1718

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.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

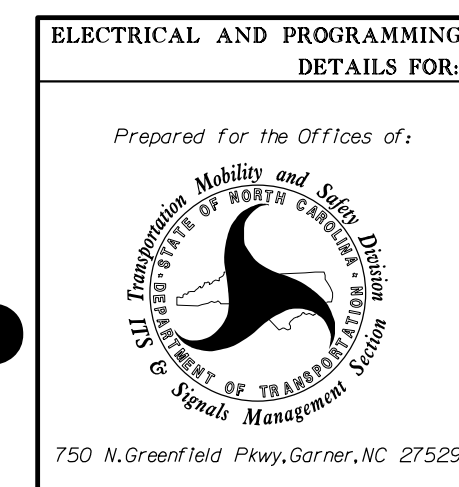
1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

```

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: 07-1718
DESIGNED: DECEMBER 2017
SEALED: 06-13-2018
REVISED: N/A

Electrical Detail Sheet 4 of 4



**Edgewood Avenue
at
SR 1452
(Rockwood Avenue/N. O'Neal Street)**

Division 7 Alamance County Burlington

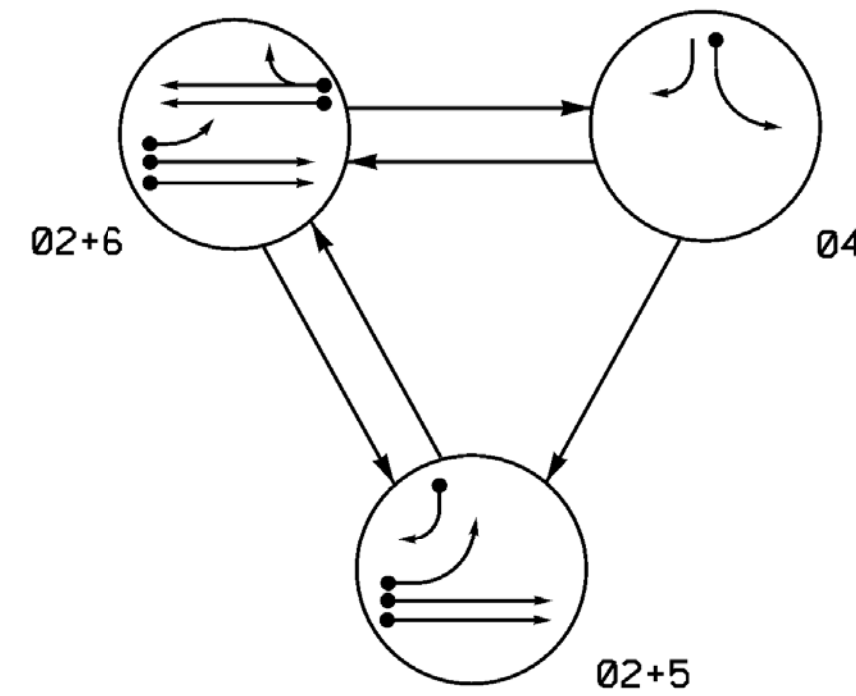
PLAN DATE: December 2017	REVIEWED BY: AJ Davis
PREPARED BY: DJ White	REVIEWED BY: LM Moon
REVISIONS	INIT. DATE

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

SIG. INVENTORY NO. 07-1718

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	0 2 + 5	0 2 + 6	0 4	FLASH
21,22,23	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	-	-	-	-
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	SYSTEM LOOP	NEW CARD
2A,2B	6x6	360	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,6B	6x6	360	EXIST.	-	6	Yes	-	-	X	N	-	X

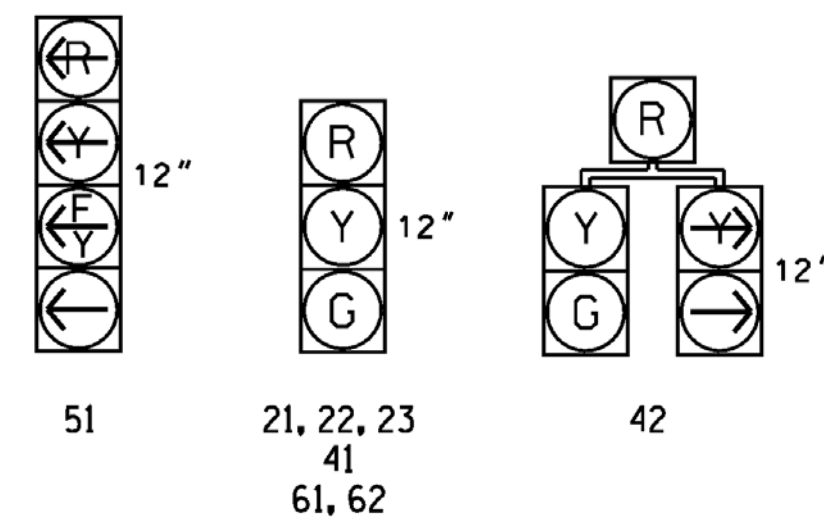
3 Phase Fully Actuated (Burlington-Graham Signal System)

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 logged.
- Reposition existing signal head numbered 22.
- 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.

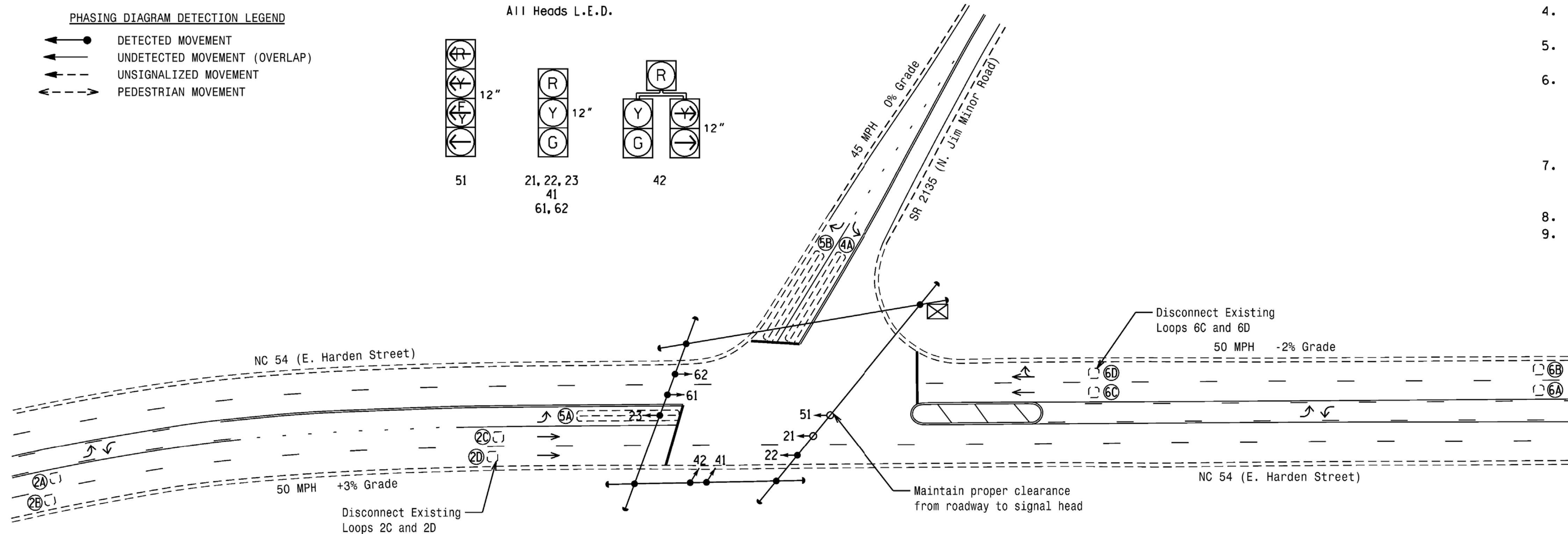
SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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



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 |
| ⊥ 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 |

FEATURE	PHASE			
	2	4	5	6
Min Green *	14	7	7	14
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	6.0	2.0	2.0	6.0
Max I *	90	25	15	90
Yellow	5.0	3.0	3.0	5.0
Red Clear	1.6	1.9	2.6	1.6
Actuations B4 Add *	0	-	-	0
Seconds / Actuation *	1.5	-	-	1.5
Max Initial *	40	-	-	40
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	-	-	-	-
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.

Mattern & Craig
ENGINEERS • SURVEYORS

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

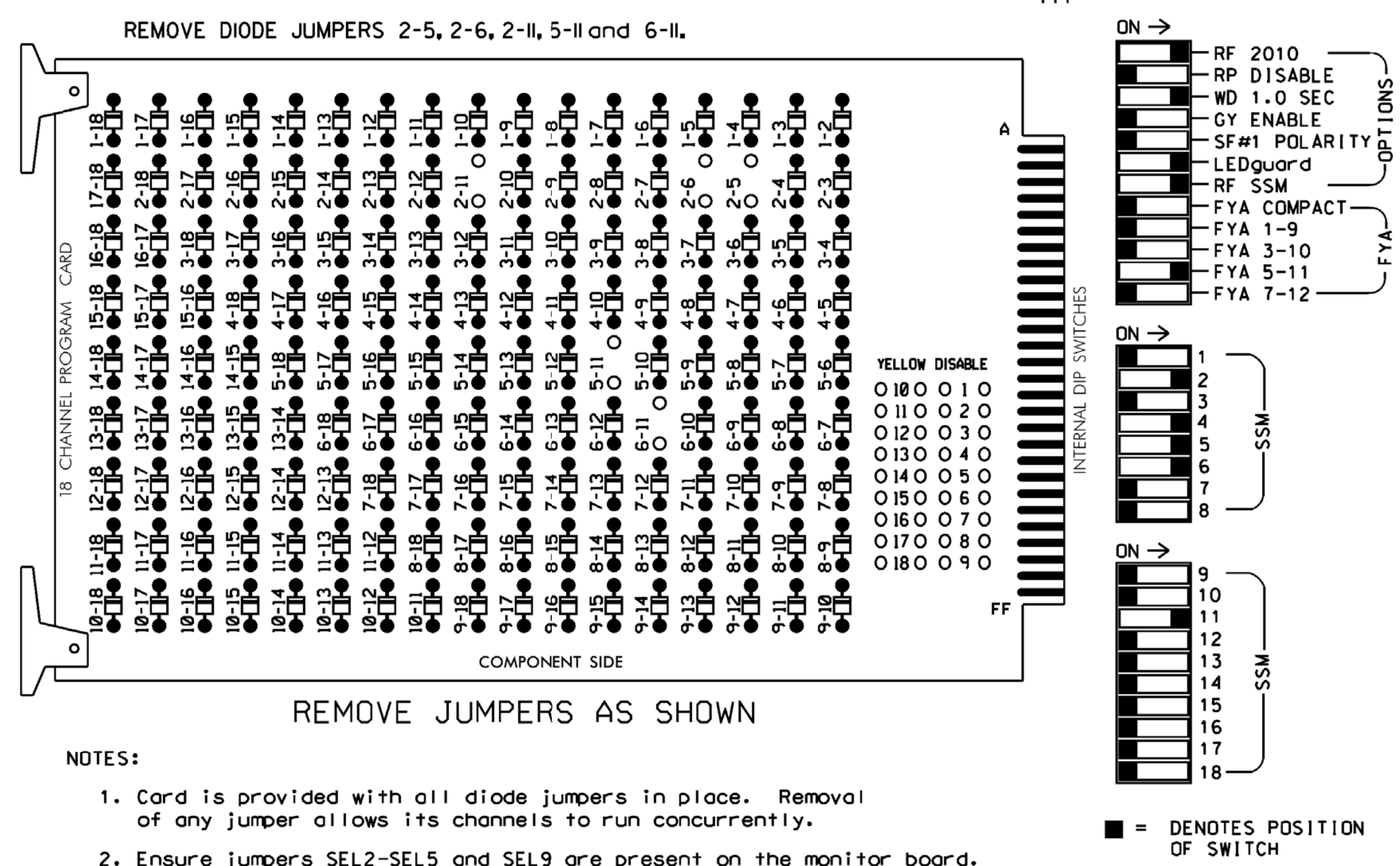
Signal Upgrade

	Prepared for the Offices of: NC 54 (E. Harden Street) at SR 2135 (N. Jim Minor Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO License No. 022599 Date: 6/13/2018
	Division 7 Alamance County PLAN DATE: November 2017 PREPARED BY: SE Wilson REVIEWED BY: JB Voso	Division 7 Alamance County PLAN DATE: November 2017 PREPARED BY: SE Wilson REVIEWED BY: JB Voso	Division 7 Alamance County PLAN DATE: November 2017 PREPARED BY: SE Wilson REVIEWED BY: JB Voso

*****SYSTEMS*****
*****BUSINESS*****

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.....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

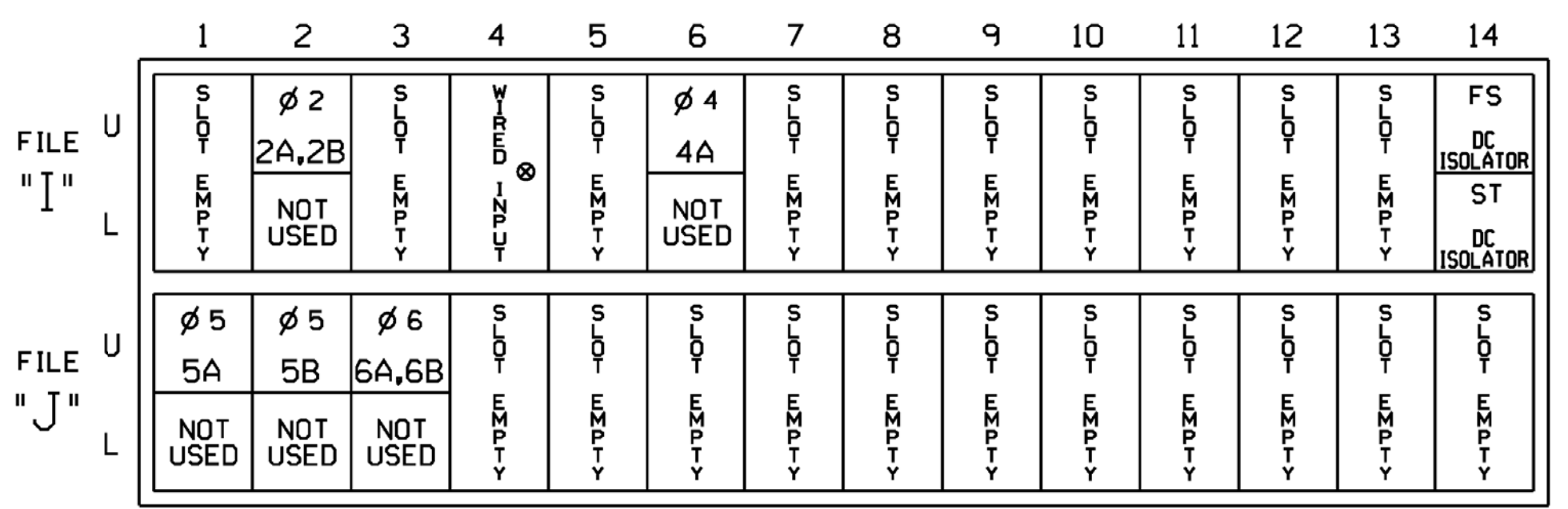
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22,23	NU	NU	41,42	NU	42	51*	61,62	NU	NU	NU	NU	NU	NU	51*	NU	NU	
RED		128			101		*		134										
YELLOW					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.

INPUT FILE POSITION LAYOUT

(front view)

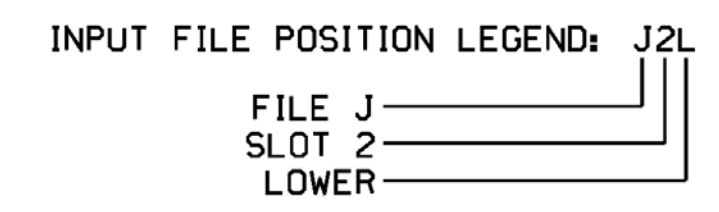


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

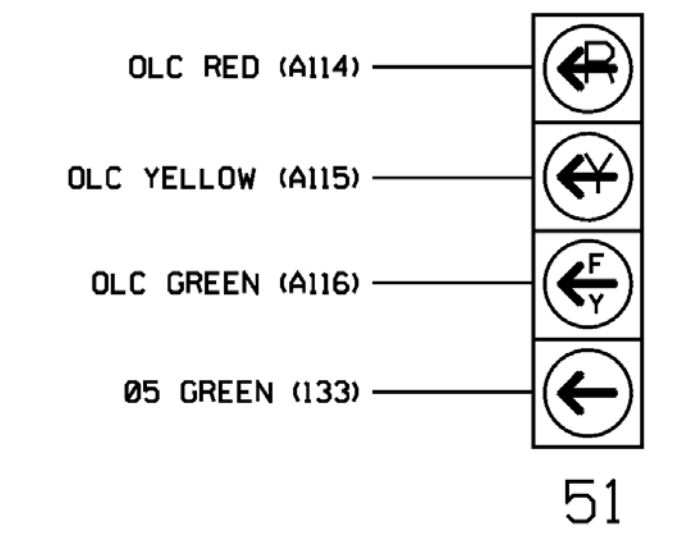
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A,2B	TB2-5,6	I2U	39	2	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		3		S
5A ¹	TB3-1,2	J1U	55	5	5	YES		15		S
		I4U	47	22	2	YES		3		G
5B	TB3-5,6	J2U	40	6	5	YES		15		S
6A,6B	TB3-9,10	J3U	64	36	6	YES			X	N

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



FYA SIGNAL WIRING DETAIL

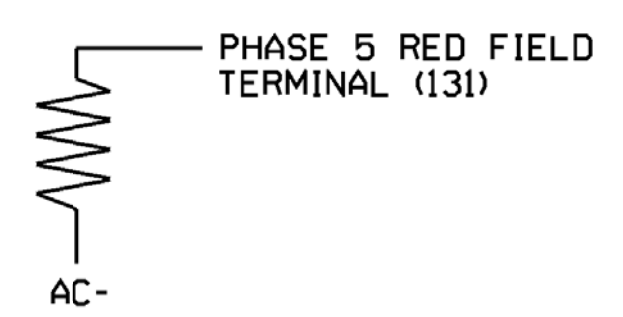
(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



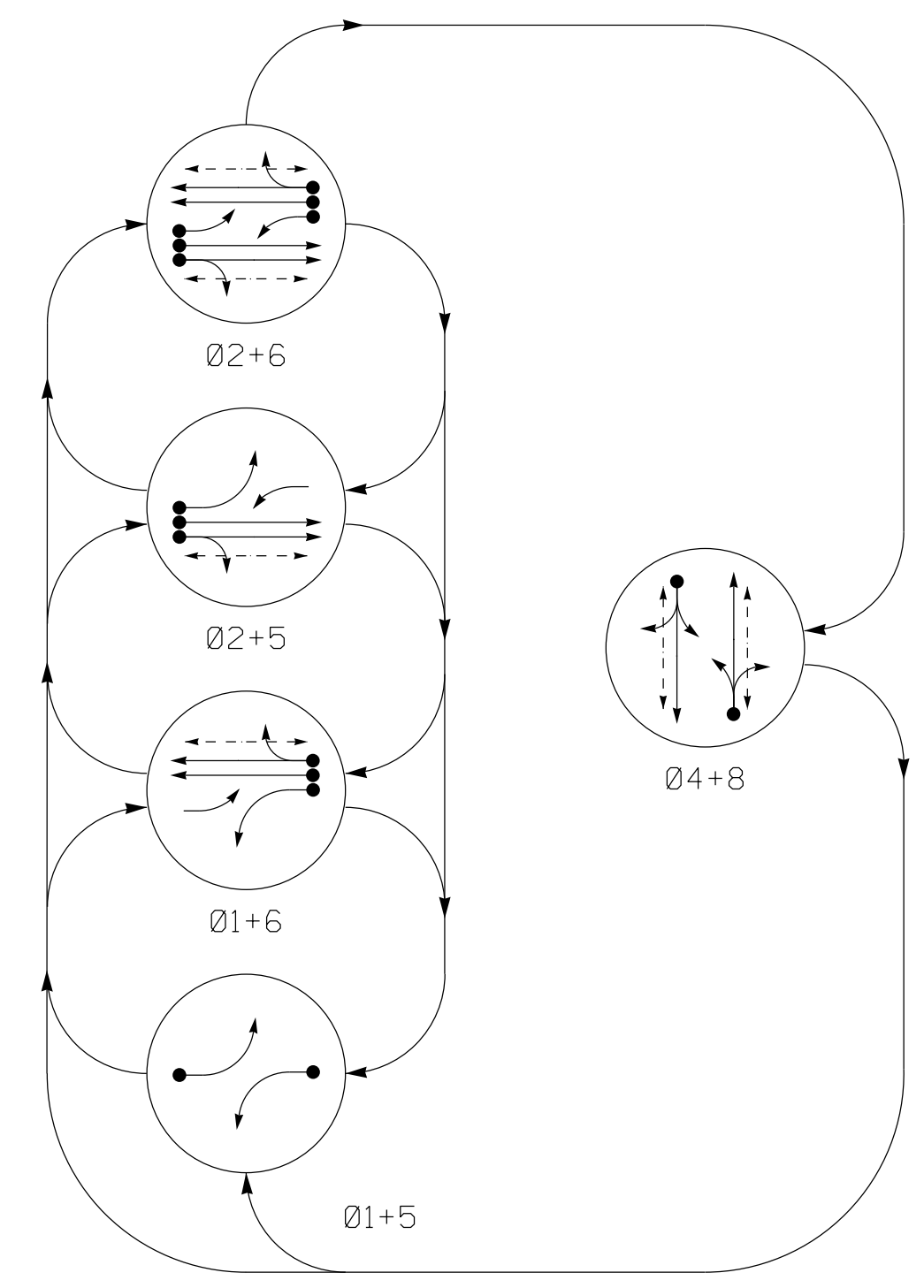
12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Corner, NC 27529	NC 54 (E. Harden Street) at SR 2135 (N. Jim Minor Road)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022599 JAMES B. VOSO DocuSigned by: James Voso 6/13/2018 SIGNATURE DATE SIG. INVENTORY NO. 07-1719
	Division 7 PLAN DATE: November 2017 PREPARED BY: SE Wilson	Alamance County REVIEWED BY: JB Voso REVIEWED BY:	
	REVISIONS	INIT. DATE	
	750 N. Greenfield Pkwy, Corner, NC 27529		

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

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	PEDEST
11	←	←	←	←	←	⤴
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	←	←	←	←	⤴
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

ASC/3 DETECTOR INSTALLATION CHART

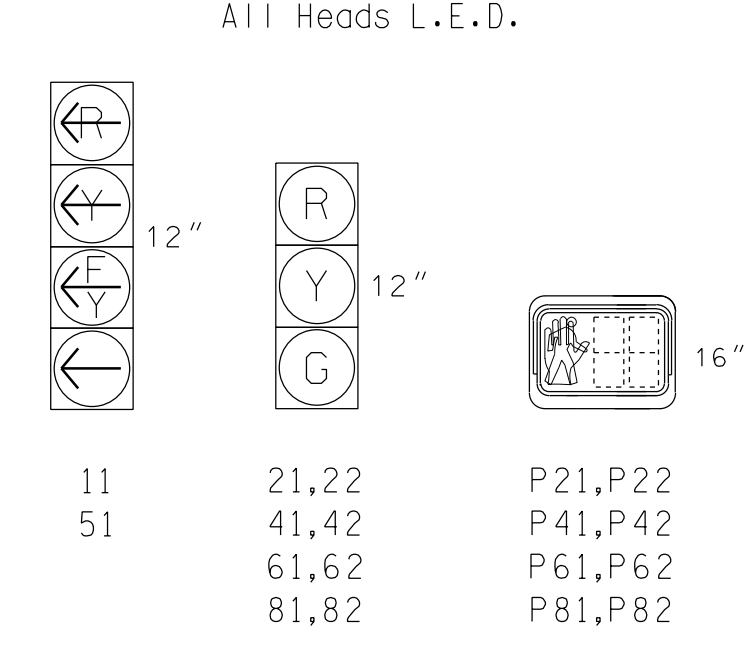
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	+10	2-4-2	-	1	Yes	-	15	-	S	-	X
2A	6X6	70	EXIST	-	2	Yes	-	-	-	S	-	X
2B	6X6	70	EXIST	-	2	Yes	-	-	-	S	-	X
4A	6X50	+10	2-4-2	-	4	Yes	-	5	-	S	-	X
5A	6X40	+10	2-4-2	-	5	Yes	-	15	-	S	-	X
6A	6X6	70	EXIST	-	6	Yes	-	-	-	S	-	X
6B	6X6	70	EXIST	-	6	Yes	-	-	-	S	-	X
8A	6X50	+10	2-4-2	-	8	Yes	-	5	-	S	-	X
S1	6X6	+95	3	X	-	No	-	-	-	N	X	X
S2	6X6	+95	3	X	-	No	-	-	-	N	X	X
S3	6X6	+95	3	X	-	No	-	-	-	N	X	X

5 Phase Fully Actuated (Burlington-Graham Signal System)

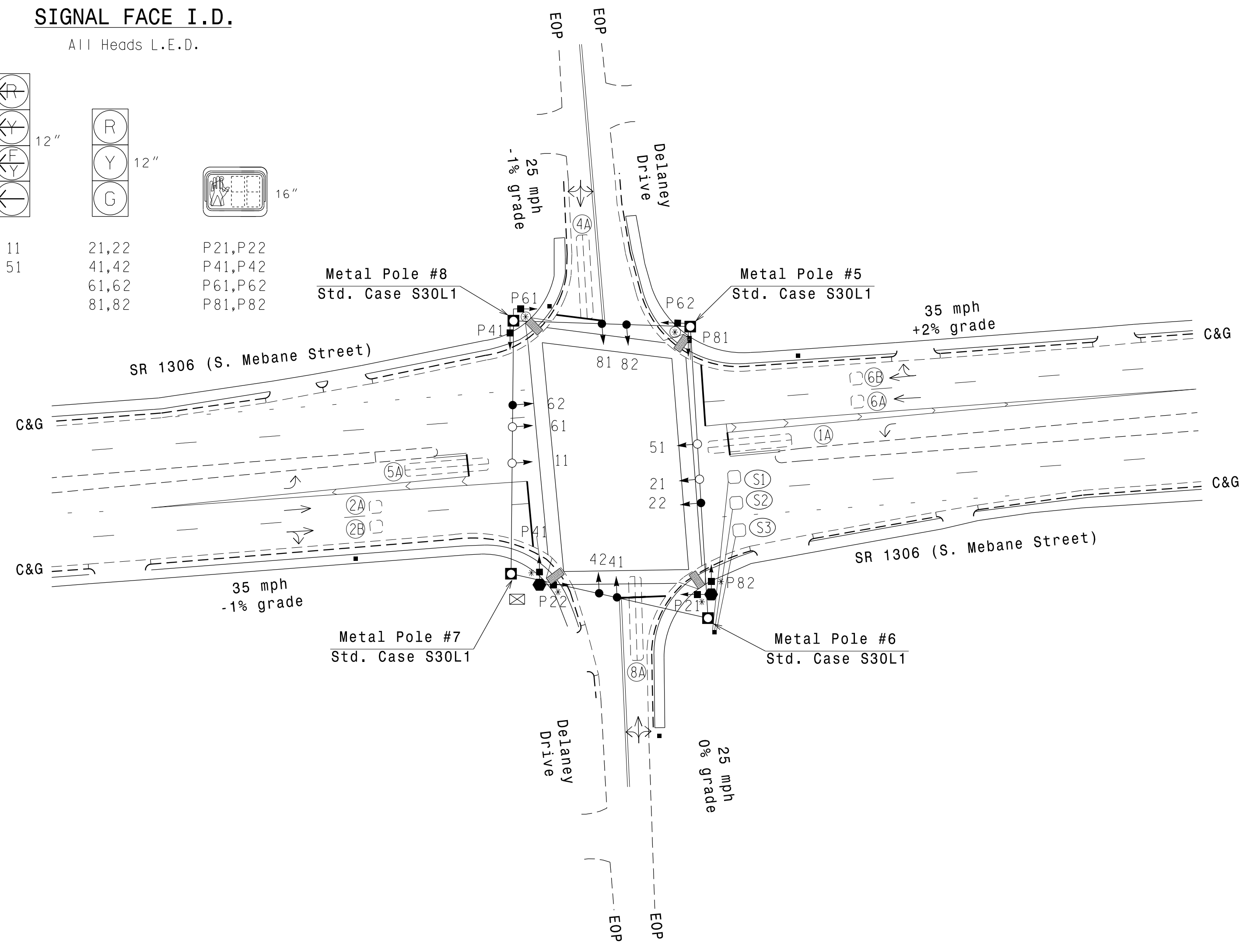
NOTES

- 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 Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Reposition existing signal heads numbered 22 and 62.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 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.



11 21,22 P21,P22
51 41,42 P41,P42
61,62 P61,P62
81,82 P81,P82

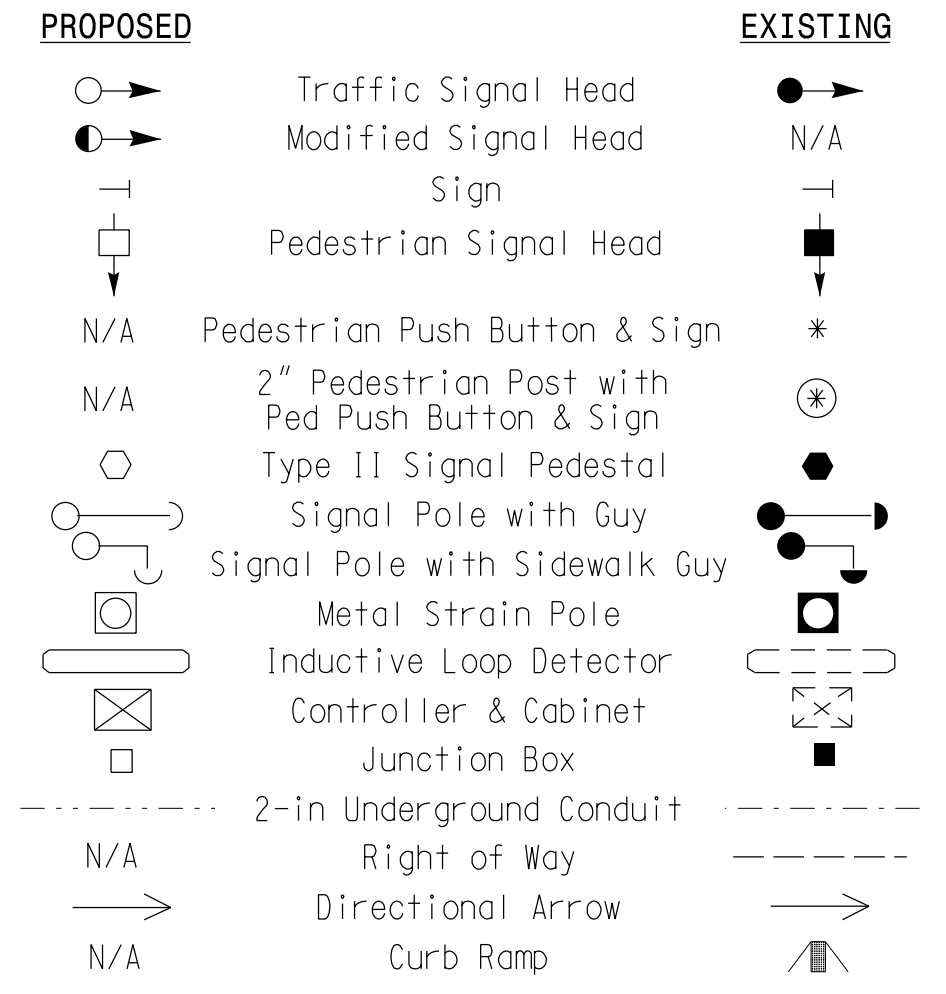


ASC/3 TIMING CHART

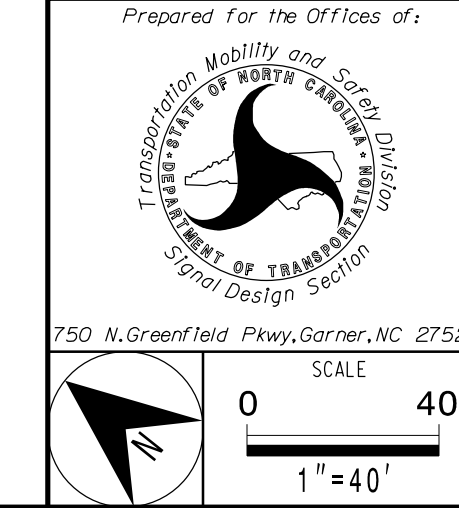
FEATURE	PHASE					
	1	2	4	5	6	8
Min Green *	7	10	7	7	10	7
Walk *	0	4	4	0	4	4
Ped Clear	0	14	29	0	17	28
Veh. Extension *	2.0	5.0	3.0	2.0	5.0	3.0
Max 1 *	20	45	30	20	45	30
Yellow	3.0	3.9	3.2	3.0	3.9	3.2
Red Clear	2.9	2.2	3.2	3.1	2.2	3.2
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-
Dual Entry	-	-	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.

LEGEND



Signal Upgrade



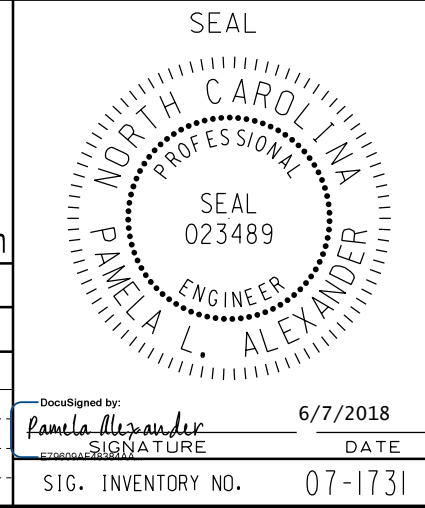
SR 1306 (S. Mebane Street) at Delaney Drive

Division 7 Alamance County Burlington

PLAN DATE: February 2018 REVIEWED BY: AM Encarnacion

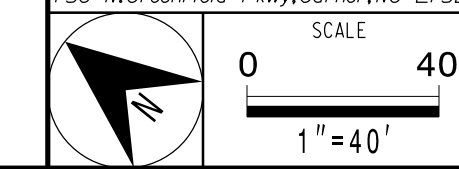
PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

REVISIONS INIT. DATE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

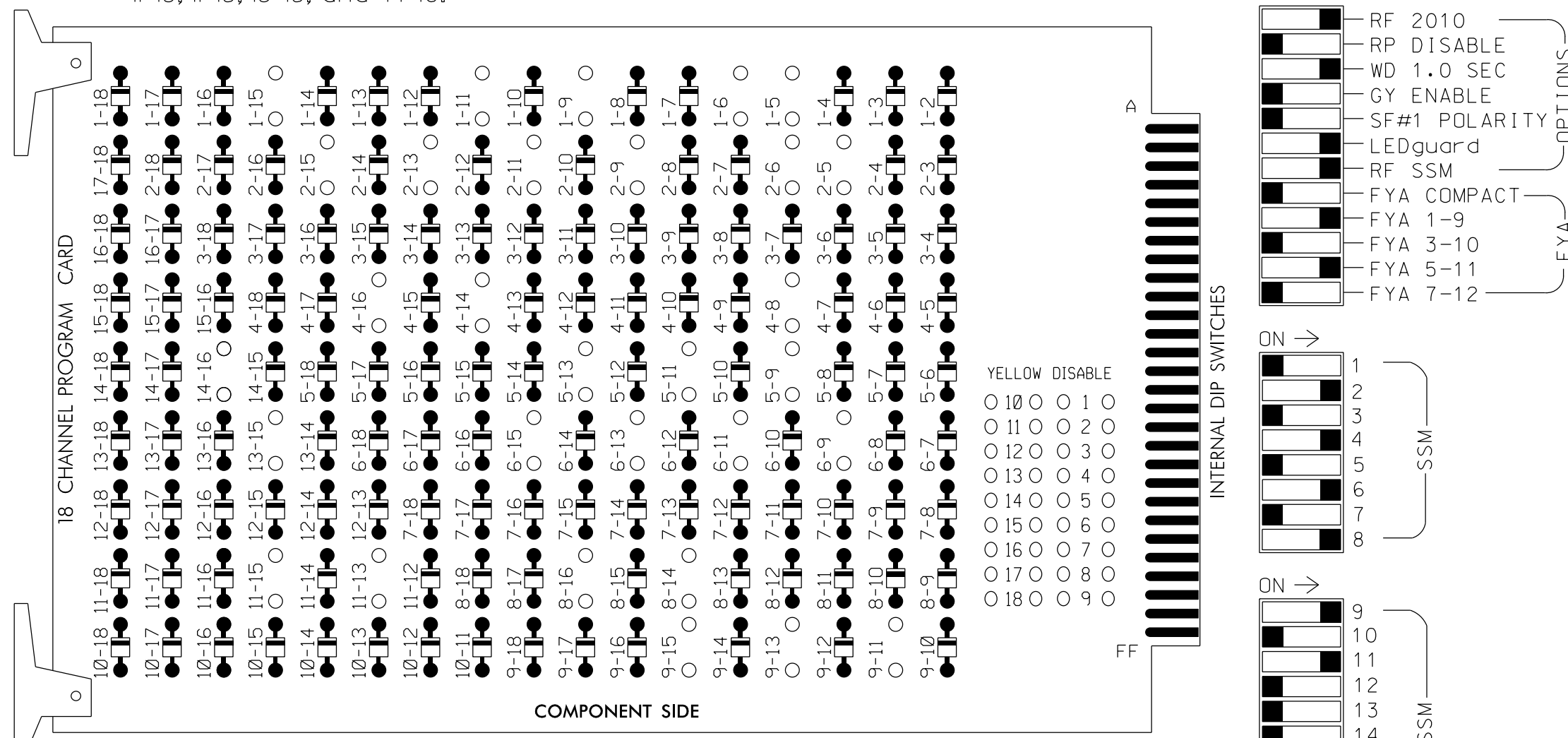


07-JUN-2018 11:15 U:\Projects\Traffic\05-11-Signals\Des\Task 05-11-Signals\Task 05-11-Signals.dgn ALEX3361 AT LUS340649

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS J-5, J-6, J-9, J-11, J-15, J-2-5, J-2-6, J-2-9, J-2-11, J-2-13, J-2-15, J-4-8, J-4-14, J-4-16, J-5-9, J-5-11, J-5-13, J-6-9, J-6-11, J-6-13, J-6-15, J-8-14, J-8-16, J-9-11, J-9-13, J-9-15, J-11-13, J-11-15, J-13-15, and J-14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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
 LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S7,S8,S9,
 S11,S12,AUX S1,AUX S4
 PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,
 8,8PED
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See sheet 2 for overlap programming.

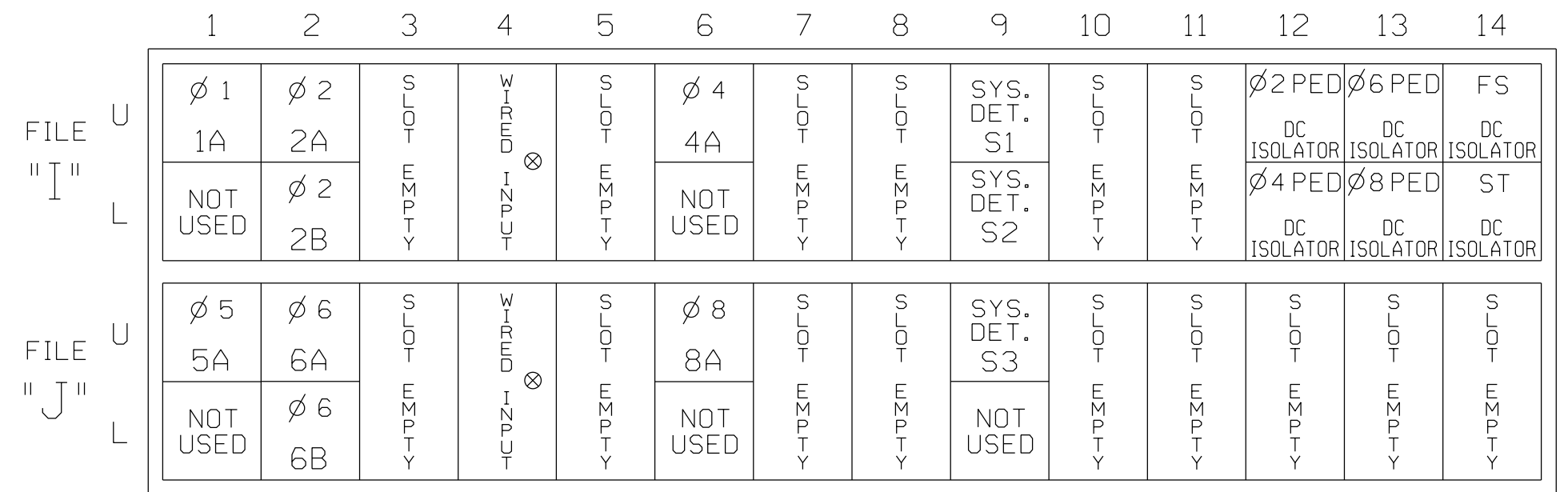
SIGNAL HEAD HOOK-UP CHART

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	DLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82	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										
Hand				113			104		119				110					
Person				115			106		121				112					

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

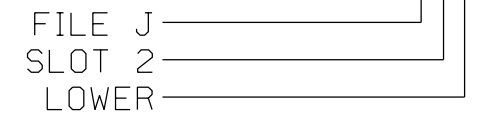
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	1	TB2-1,2	I1U	56	1	YES		15		S
	2	-	J4U	48	26	6	YES			S
2A	1	TB2-5,6	I2U	39	2	YES				S
	2	TB2-7,8	I2L	43	12	2	YES			S
4A	1	TB4-9,10	I6U	41	4	YES		5		S
	2	TB6-9,10	I9U	60	11	SYS	NO			N
5A ²	1	TB3-1,2	J1U	55	5	YES		15		S
	2	-	I4U	47	22	2	YES			S
6A	1	TB3-5,6	J2U	40	6	YES				S
	2	TB3-7,8	J2L	44	16	6	YES			S
8A	1	TB5-9,10	J6U	42	8	YES		5		S
	2	TB7-9,10	J9U	59	15	SYS	NO			N
PED PUSH BUTTONS										
	P21,P22	TB8-4,6	I12U	67	PED 2	2 PED				
	P41,P42	TB8-5,6	I12L	69	PED 4	4 PED				
	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.

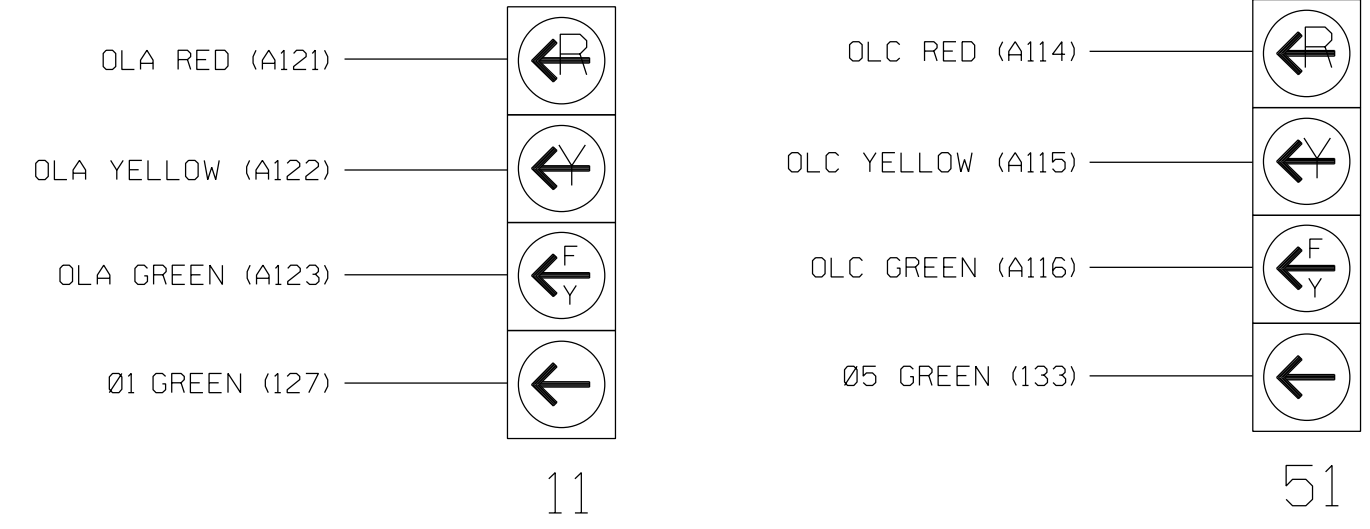
- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from J1-W to I4-W, on rear of input file.
- * System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

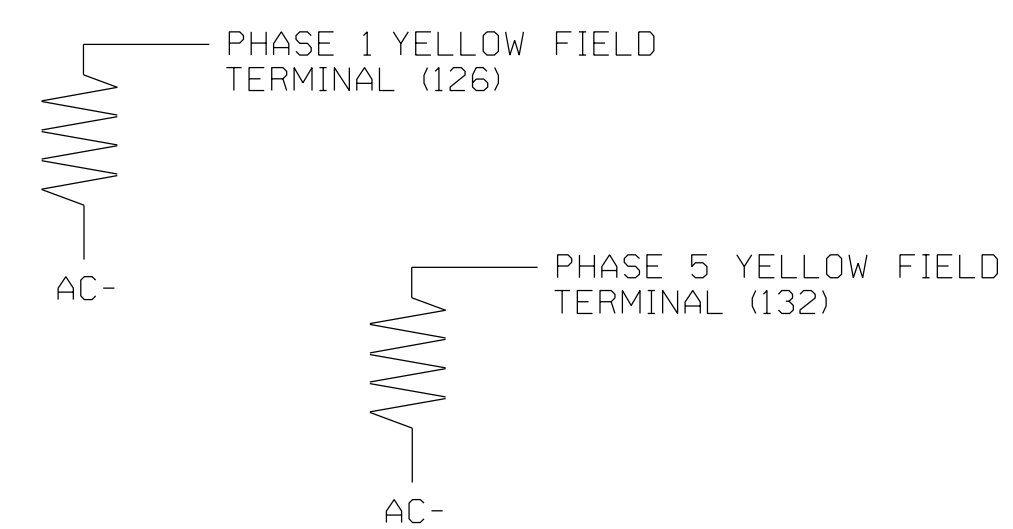
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



Electrical Detail - Sheet 1 of 2

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

SR 1306 (S. Mebane Street) at Delaney Drive
 Division 7 Alamance County Burlington
 PLAN DATE: February 2018 REVIEWED BY: AM Encarnacion
 PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
 SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 PAMELA L. ALEXANDER
 SEAL 023489
 6/27/2018
 SIG. INVENTORY NO. 07-1731

27-JUN-2018 17:28 \\work\ms.com\proj\elect\MSL\krt\transportation\tr\off\cur**00056469 U-6015 B-C S1a Sys*task 05-11-Signal*Design\wir\mgw07-1731E.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..... 0

END PROGRAMMING

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

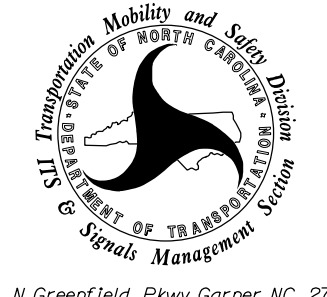
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-1731
 DESIGNED: February 2018
 SEALED: 6/7/2018
 REVISED: N/A

09-JUN-2018 14:15
 D:\P\consort\at\off\c\cur\100056469 U-6015 B-G S1g Sys\Task 05_11_Signal\Des\gn\mtr\ing\07-1731E.dgn
 ALEX3361 AT LUS210649

Electrical Detail - Sheet 2 of 2

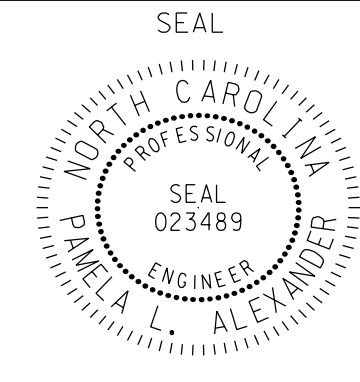
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

SR 1306 (S. Mebane Street) at Delaney Drive	
Division 7	Alamance County Burlington
PLAN DATE: February 2018	REVIEWED BY: AM Encarnacion
PREPARED BY: NA Ptak	REVIEWED BY: PL Alexander
REVISIONS	INIT. DATE

SEAL



SEAL
023489
PAMELA L. ALEXANDER
ENGINEER

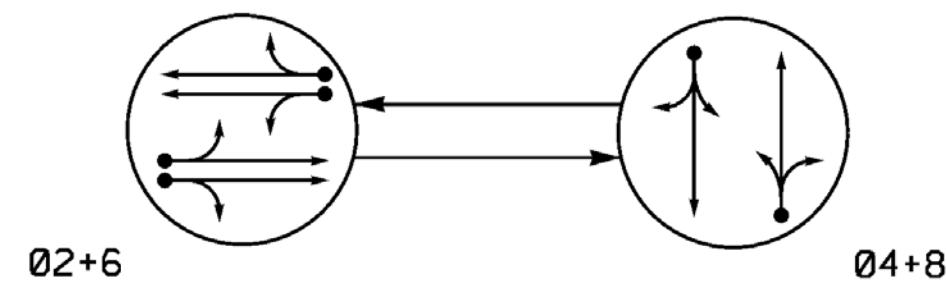
6/9/2018
 Date
 Signature: Pamela Alexander
 Date
 Signature: _____
 Date
 Signature: _____

SIG. INVENTORY NO. 07-1731

ATKINS

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

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

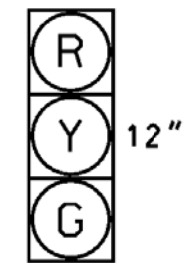
- ← DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ← UNSIGNALIZED MOVEMENT
- ← PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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.



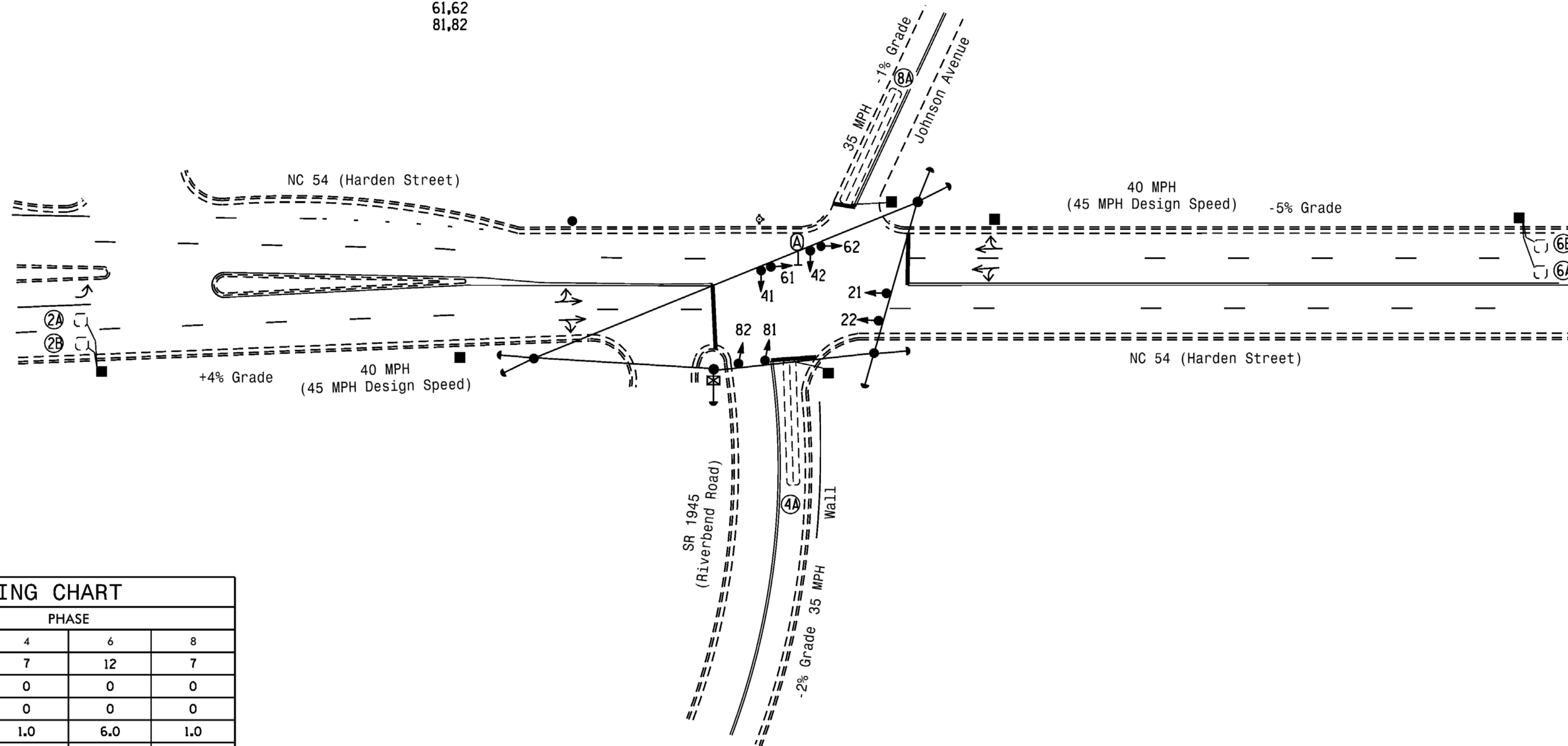
21,22
41,42
61,62
81,82

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	NEW CARD
2A	6x6	300	5	-	2	Yes	-	-	X	N	X
2B	6x6	300	5	-	2	Yes	-	-	X	N	X
4A	6x60	0	2-4-2	-	4	Yes	-	10	-	S	X
6A	6x6	300	5	-	6	Yes	-	-	X	N	X
6B	6x6	300	5	-	6	Yes	-	-	X	N	X
8A	6x60	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.



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	6.0	1.0	6.0	1.0
Max I *	90	35	90	35
Yellow	4.2	4.0	5.0	3.9
Red Clear	1.4	1.4	1.0	1.5
Actuations B4 Add *	0	-	0	-
Seconds / Actuation *	1.5	-	1.5	-
Max Initial *	34	-	34	-
Time Before Reduction *	20	-	20	-
Time To Reduce *	40	-	40	-
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

* 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 | ⊥ 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 | N/A Right of Way |
| → Directional Arrow | → Directional Arrow |
| N/A "LEFT TURN YIELD ON GREEN" Sign (R10-12) | ⓐ "LEFT TURN YIELD ON GREEN" Sign (R10-12) |

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NC 54 (Harden Street) at SR 1945 (Riverbend Road) / Johnson Avenue
Alamance County Graham

PLAN DATE: November 2017 REVIEWED BY: JB Voso
PREPARED BY: SE Wilson REVIEWED BY:

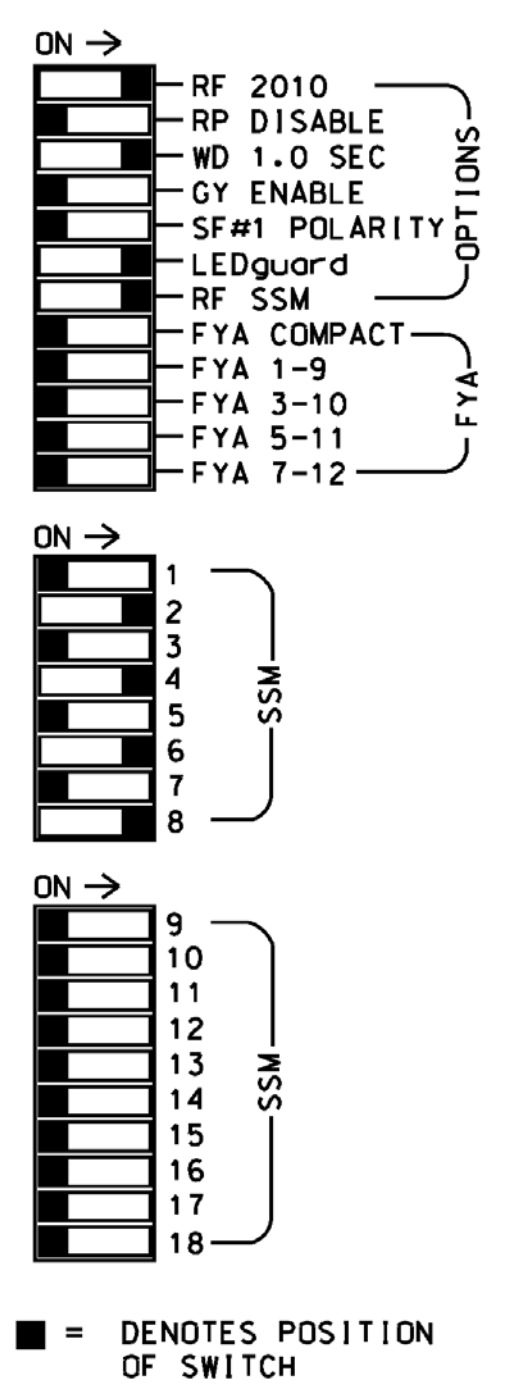
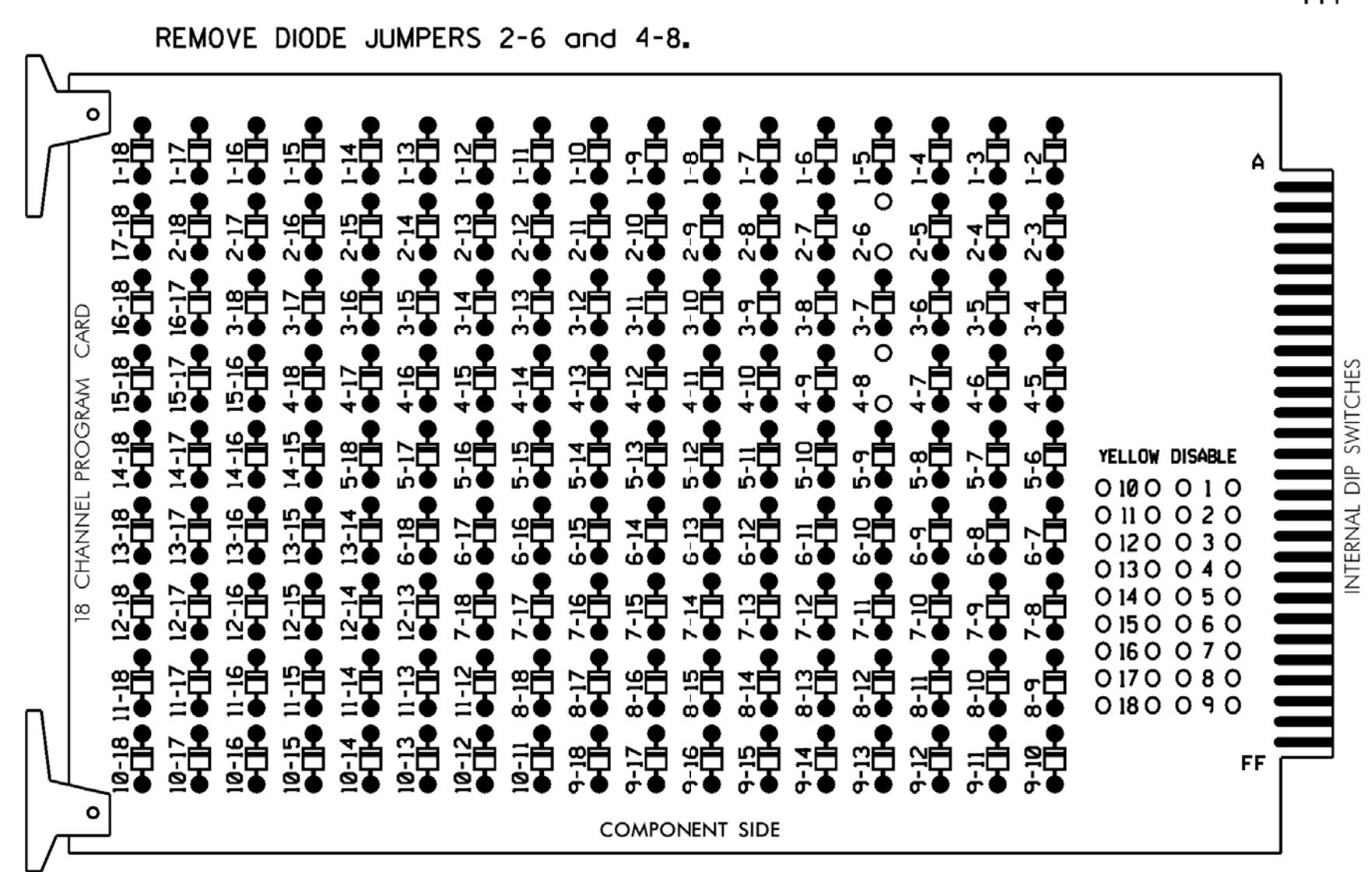
REVISIONS: INIT. DATE

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO 022599
6/13/2018
SIG. INVENTORY NO. 07-1771

*****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 phases 4 and 8 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.....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

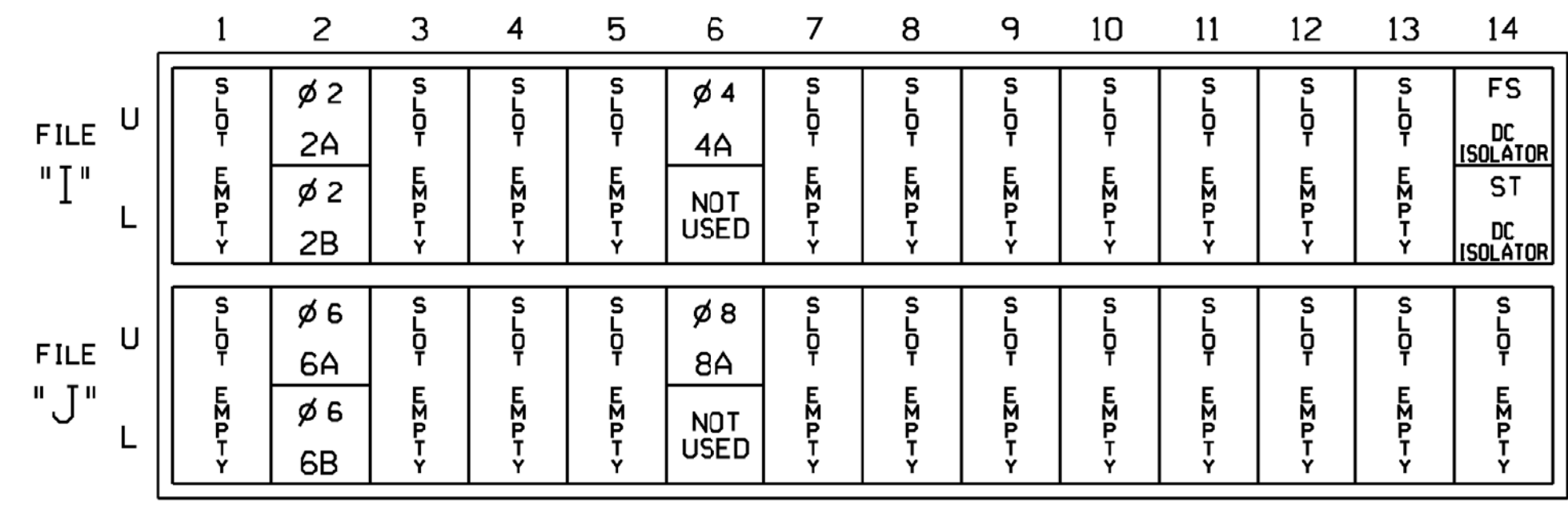
SIGNAL HEAD HOOK-UP CHART

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	PED	3	4	PED	5	6	PED	7	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)



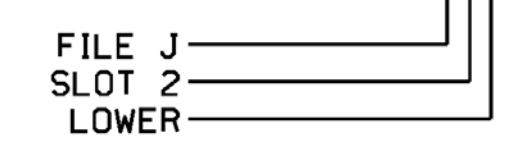
EX. : 1A, 2A, ETC. = LOOP NO.'S

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			X	N
2B	TB2-7,8	I2L	43	2	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		10		S
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	6	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES		15		S

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1771
 DESIGNED: November 2017
 SEALED: 6/13/2018
 REVISED: NA

*****SYTIME*****



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

Electrical Detail

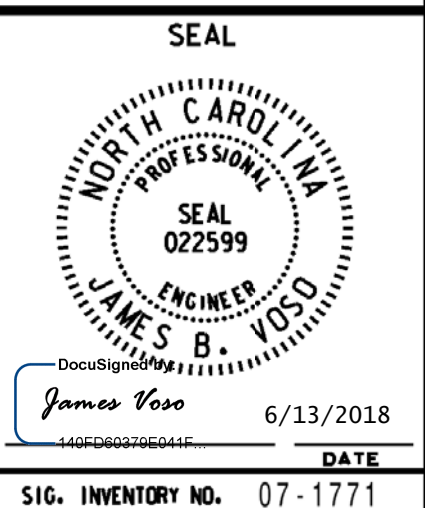
ELECTRICAL AND PROGRAMMING DETAILS FOR:



NC 54 (Harden Street)
 at
 SR 1945 (Riverbend Road)
 /Johnson Avenue

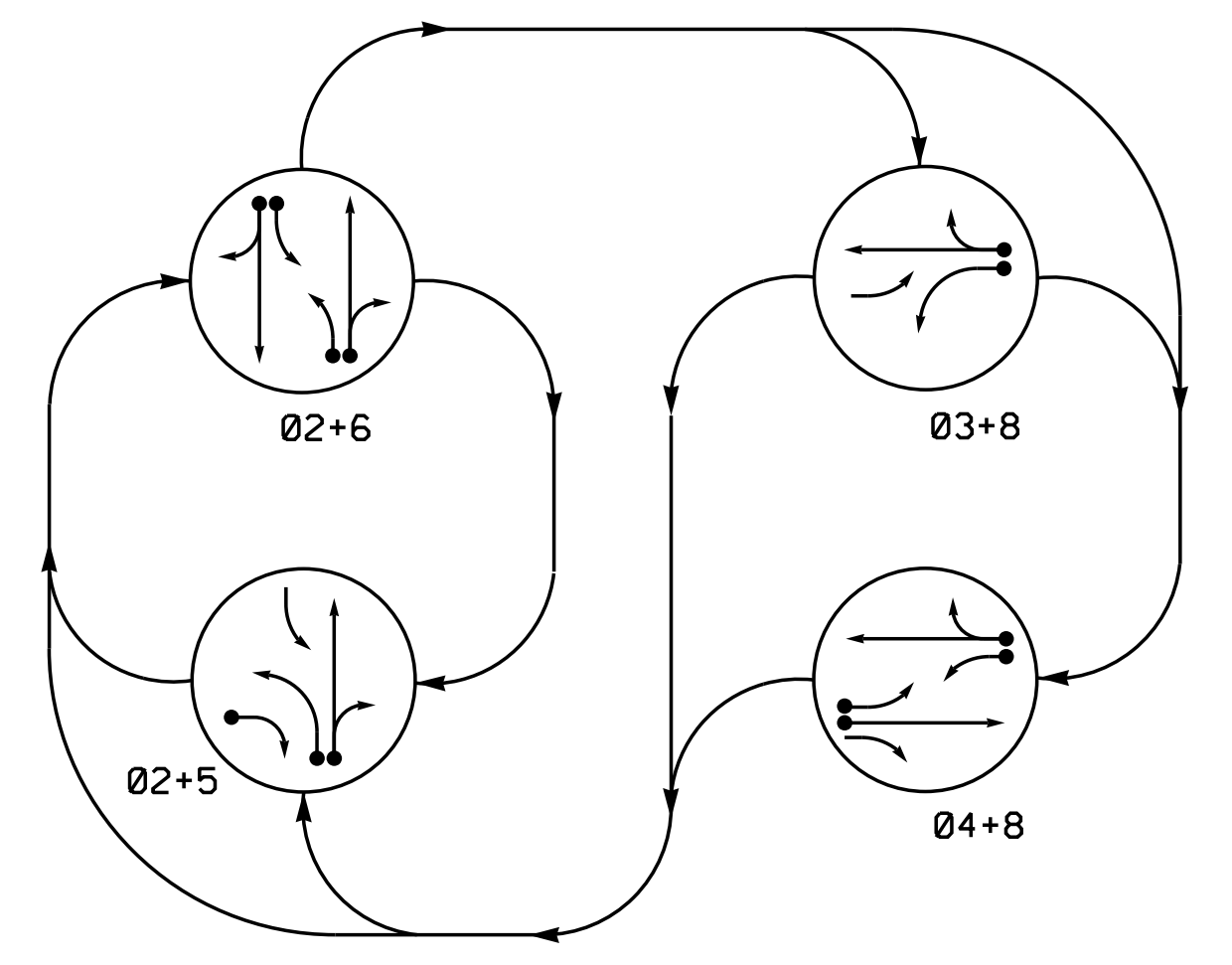
Division 7	Alamance County	Graham
PLAN DATE: November 2017	REVIEWED BY: JB Voso	
PREPARED BY: SE Wilson	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SIG. INVENTORY NO. 07-1771

PHASING DIAGRAM

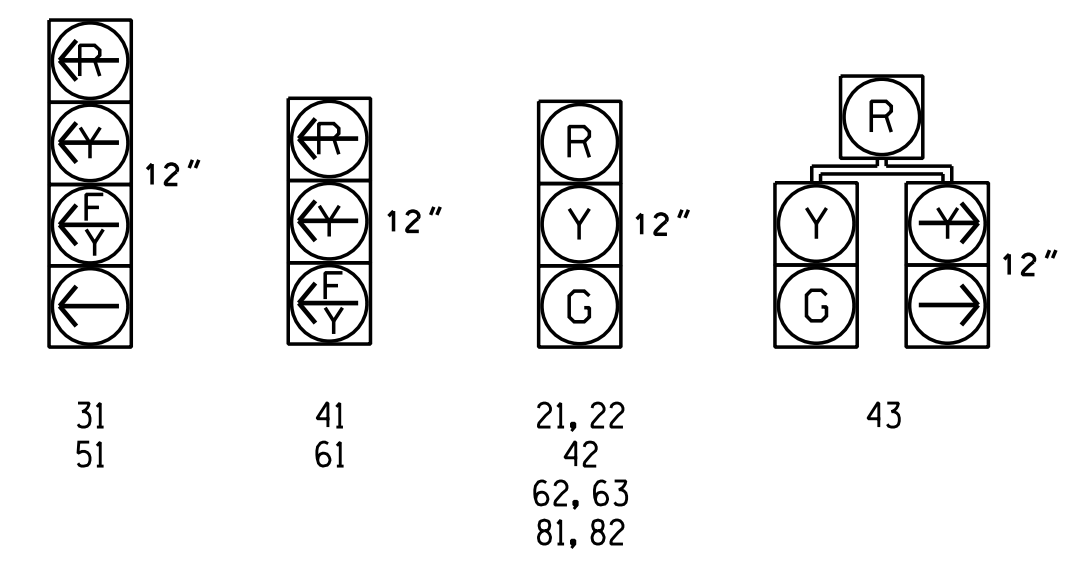


PHASING DIAGRAM DETECTION LEGEND
 ● ← DETECTED MOVEMENT
 ○ ← UNDETECTED MOVEMENT (OVERLAP)
 - - ← UNSIGNALIZED MOVEMENT
 - - - - ← PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	02+5	02+6	03+8	04+8	F
21,22	G	G	R	R	Y
31	R	R	F	F	R
41	R	R	F	F	R
42	R	R	R	G	R
43	R	R	R	G	R
51	F	F	R	R	Y
61	F	F	R	R	Y
62,63	R	G	R	R	Y
81,82	R	R	G	G	R

SIGNAL FACE I.D.
All Heads L.E.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	6x6	250	EXIST.	-	2	Yes	-	-	X	N	-	X
2B	6x60	0	2-4-2	-	2	Yes	2.0	5	-	G	-	X
3A	6x60	+5	2-4-2	-	3	Yes	-	15	-	S	-	X
4A	6x6	300	EXIST.	-	4	No	2.4	-	-	S	-	X
4B	6x60	+5	2-4-2	-	4	Yes	-	3	-	S	-	X
4C	6x40	+5	2-4-2	-	4	Yes	-	-	-	S	-	X
5A	6x60	0	2-4-2	-	2	Yes	-	3	-	G	-	X
5B	6x40	+5	2-4-2	-	5	Yes	-	15	-	S	-	X
6A	6x6	250	EXIST.	-	6	Yes	-	-	X	N	-	X
6B	6x60	0	2-4-2	-	6	Yes	2.0	5	-	G	-	X
6C	6x60	0	2-4-2	-	6	Yes	2.0	5	-	G	-	X
8A	6x6	300	EXIST.	-	8	No	2.4	-	-	S	-	X
8B	6x40	+5	2-4-2	-	8	Yes	-	10	-	S	-	X
8C	6x15	+5	EXIST.	-	8	Yes	-	15	-	S	-	X

4 Phase Fully Actuated (Burlington-Graham Signal System)

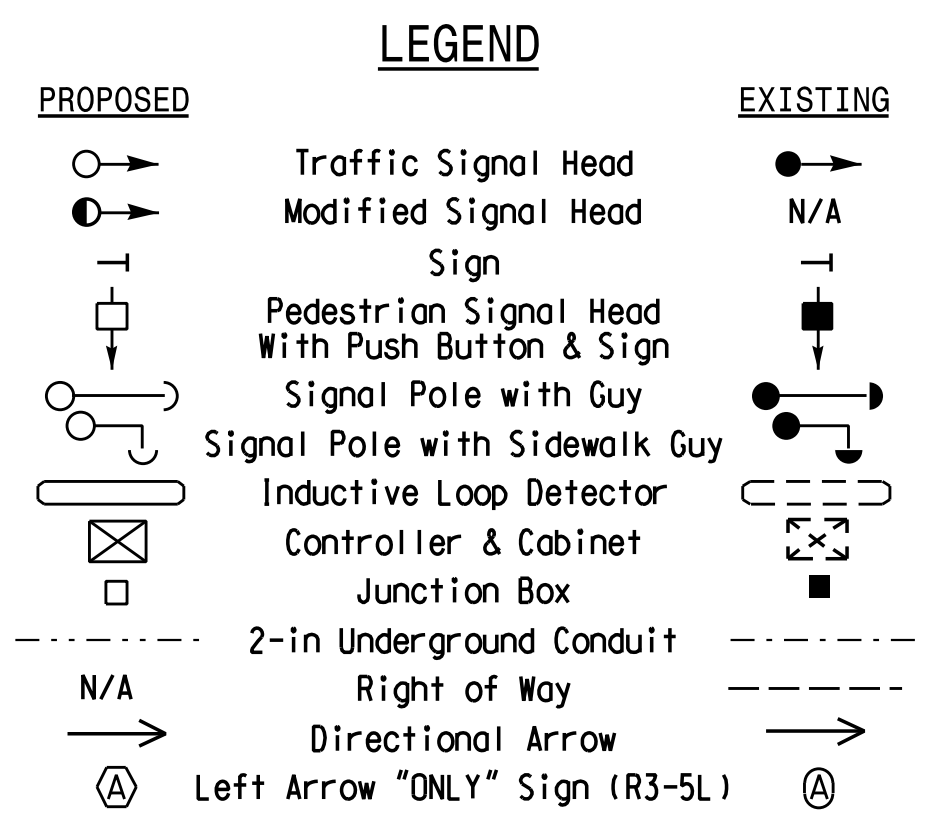
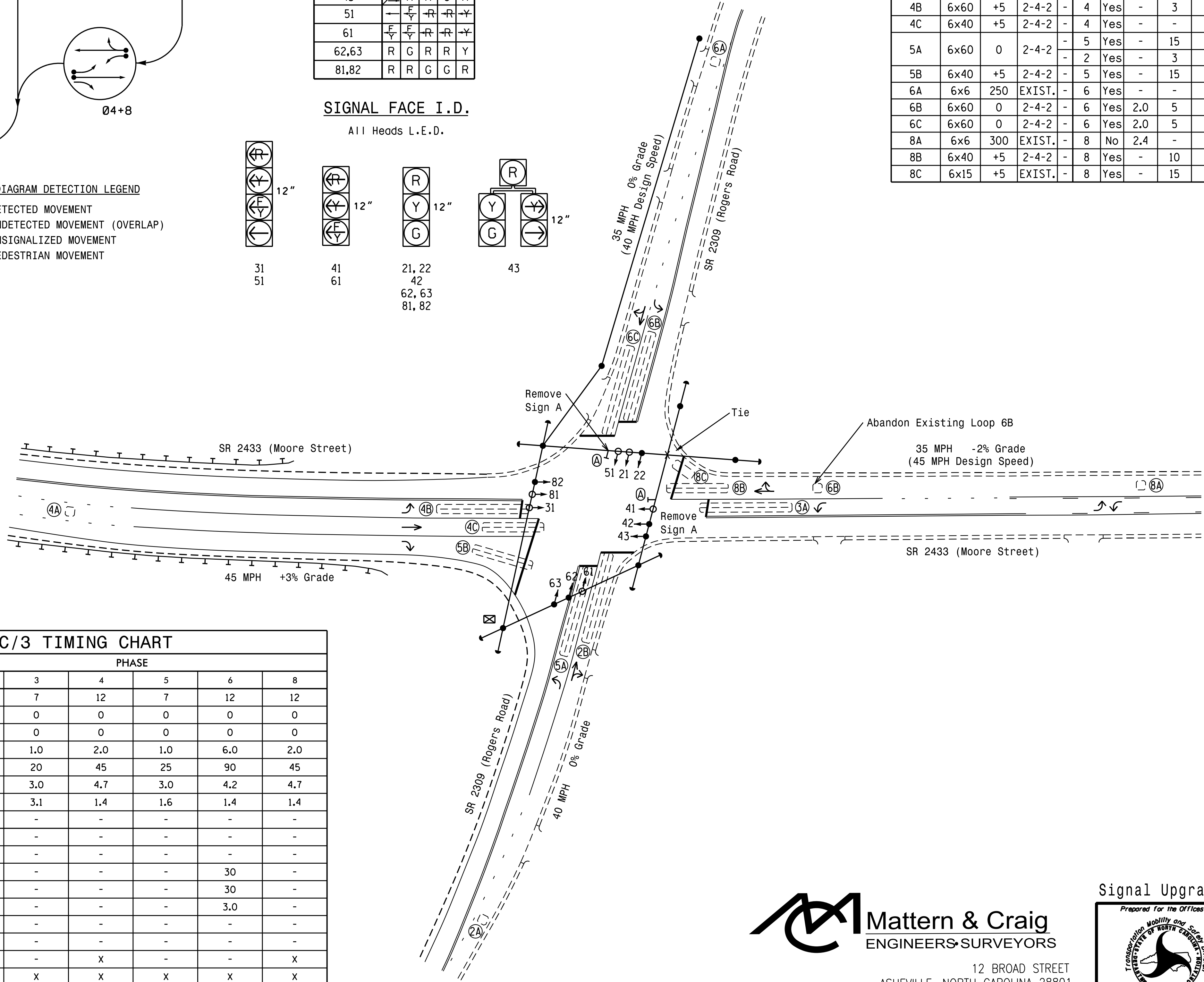
NOTES

- 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 3 may be lagged.
- Phase 5 may be lagged.
- Reposition all existing signal heads as shown.
- 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.
- Existing Left Arrow "ONLY" sign(s)-(R3-5L) 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.

ASC/3 TIMING CHART

FEATURE	PHASE						
	2	3	4	5	6	8	
Min Green *	12	7	12	7	12	12	
Walk *	0	0	0	0	0	0	
Ped Clear	0	0	0	0	0	0	
Veh. Extension *	6.0	1.0	2.0	1.0	6.0	2.0	
Max 1 *	90	20	45	25	90	45	
Yellow	4.2	3.0	4.7	3.0	4.2	4.7	
Red Clear	1.4	3.1	1.4	1.6	1.4	1.4	
Actuations B4 Add *	-	-	-	-	-	-	
Seconds / Actuation *	-	-	-	-	-	-	
Max Initial *	-	-	-	-	-	-	
Time Before Reduction *	30	-	-	-	30	-	
Time To Reduce *	30	-	-	-	30	-	
Minimum Gap	3.0	-	-	-	3.0	-	
Locking Detector	-	-	-	-	-	-	
Recall Position	-	-	-	-	-	-	
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.



4:14:51 PM C:\Burlington-Graham Signal System\06 Working Folders\Replace Sub-folders with NCDOT File Structure If Working on NCDOT Project\DWG or Dgn\07-1804-071804.sig.dgn, 20170316.dgn

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

Division 7 Alamance County Graham

SR 2433 (Moore Street) at SR 2309 (Rogers Road)

PLAN DATE: November 2017 REVIEWED BY: JB Voso

PREPARED BY: SE Wilson REVIEWED BY:

REVISIONS

INIT. DATE

6/13/2018

SIGNATURE DATE

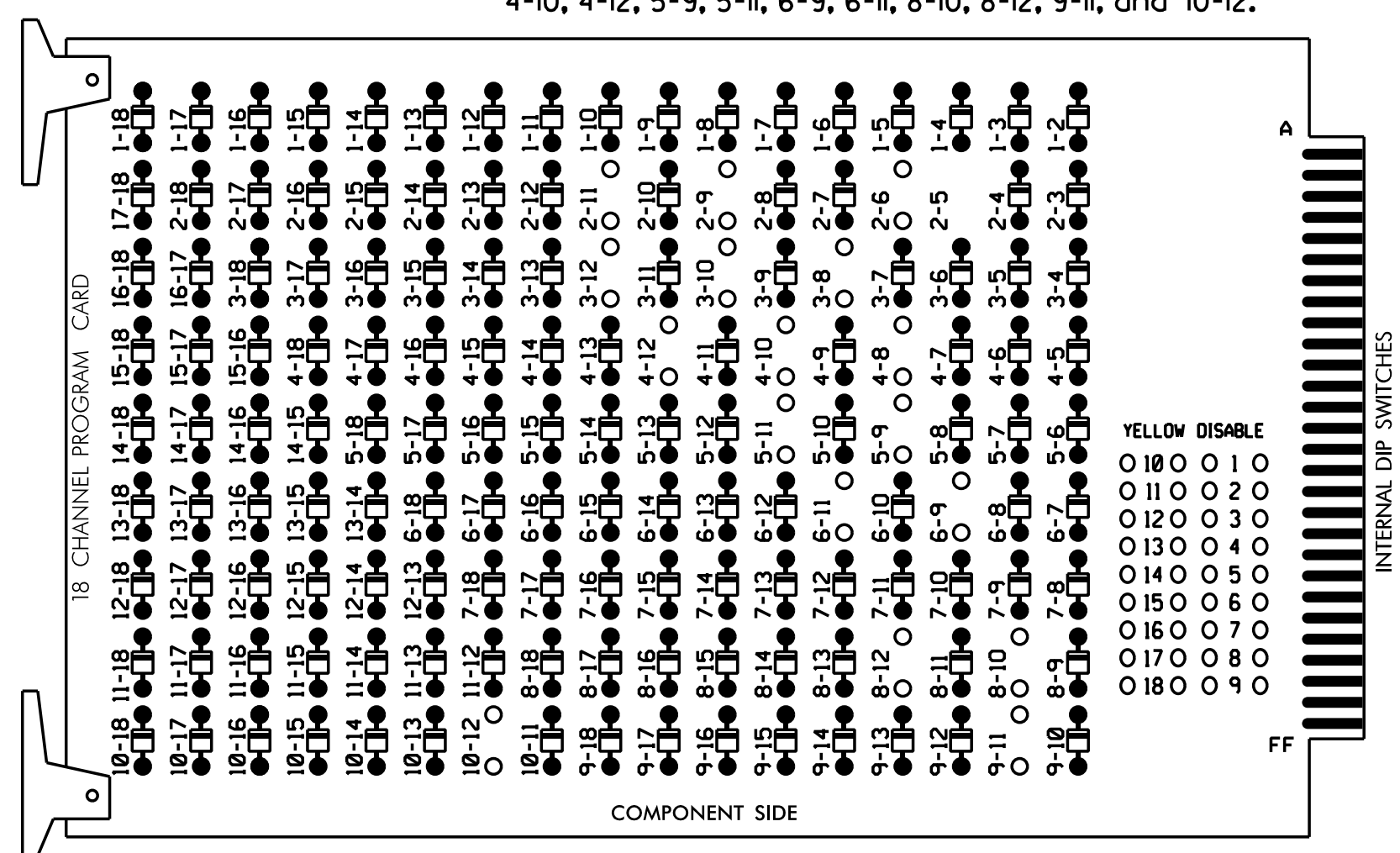
SIG. INVENTORY NO. 07-1804

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

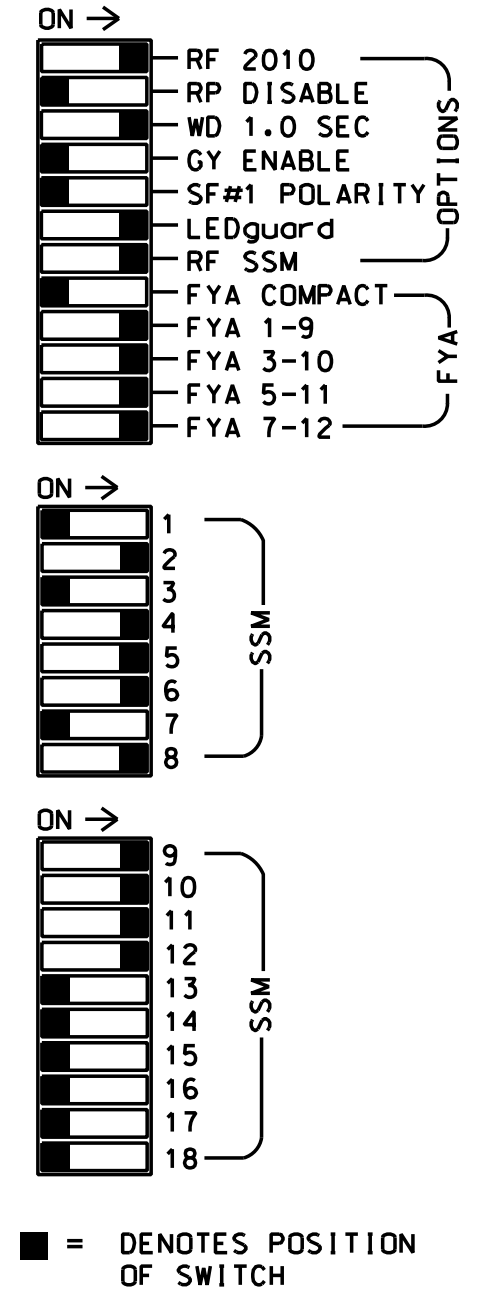
REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 3-8, 3-10, 3-12, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 8-10, 8-12, 9-11, and 10-12.



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,S4,S5,S7,S8,S11,AUX S1, AUX S2,AUX S4,AUX S5
 PHASES USED.....2,3,4,5,6,8
 OVERLAP A.....*
 OVERLAP B.....*
 OVERLAP C.....*
 OVERLAP D.....*
 * See overlap programming detail on sheet 2

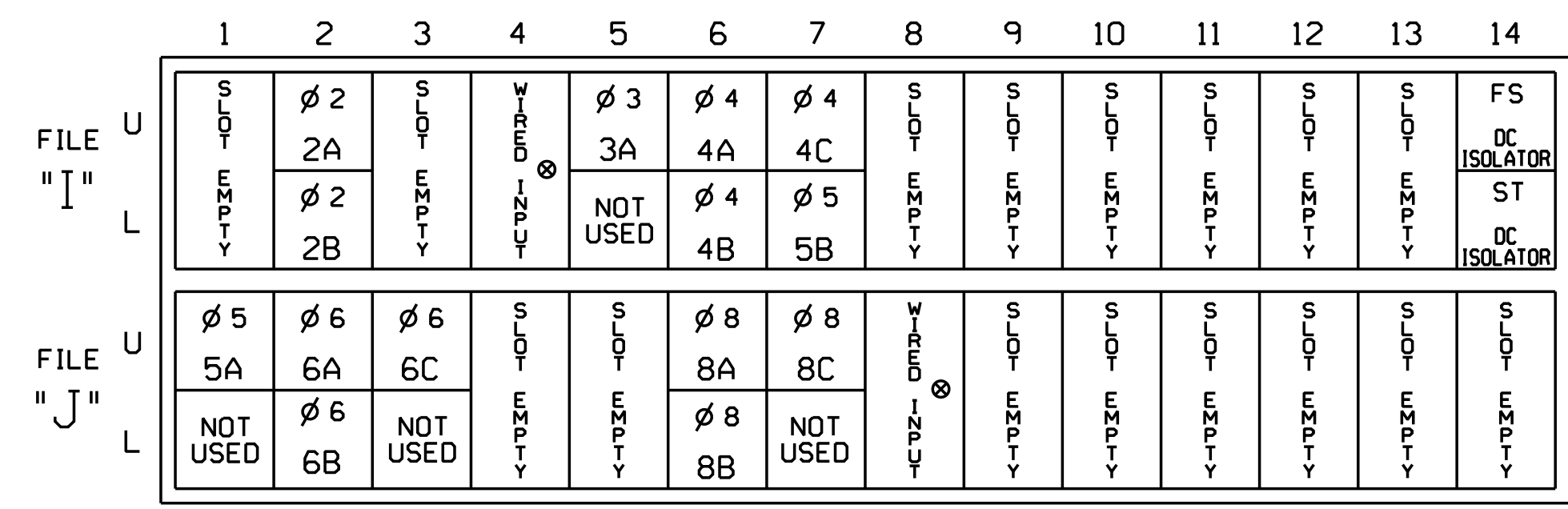
SIGNAL HEAD HOOK-UP CHART

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	31	42,43	NU	43	51	62,63	NU	NU	81,82	NU	61	31	NU	51	41	NU
RED		128			101		*		134			107							
YELLOW		129		*	102				135			108							
GREEN		130			103				136			109							
RED ARROW															A121	A124		A114	A101
YELLOW ARROW																			
FLASHING YELLOW ARROW																			
GREEN ARROW																			

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)



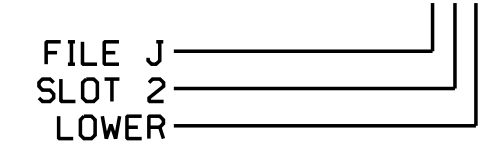
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card.

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
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES	2.0	5		G
3A ¹	TB4-5,6	I5U	58	3	3	YES		15		S
		J8U	50	28	8	YES				S
4A	TB4-9,10	I6U	41	4	4	NO	2.4			S
4B	TB4-11,12	I6L	45	14	4	YES		3		S
4C	TB6-1,2	I7U	65	34	4	YES				S
5A ²	TB3-1,2	J1U	55	5	5	YES		15		S
		I4U	47	22	2	YES		3		G
5B	TB6-3,4	I7L	78	44	5	YES		15		S
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES	2.0	5		G
6C	TB3-9,10	J3U	64	36	6	YES	2.0	5		G
8A	TB5-9,10	J6U	42	8	8	NO	2.4			S
8B	TB5-11,12	J6L	46	18	8	YES		10		S
8C	TB7-1,2	J7U	66	38	8	YES		15		S

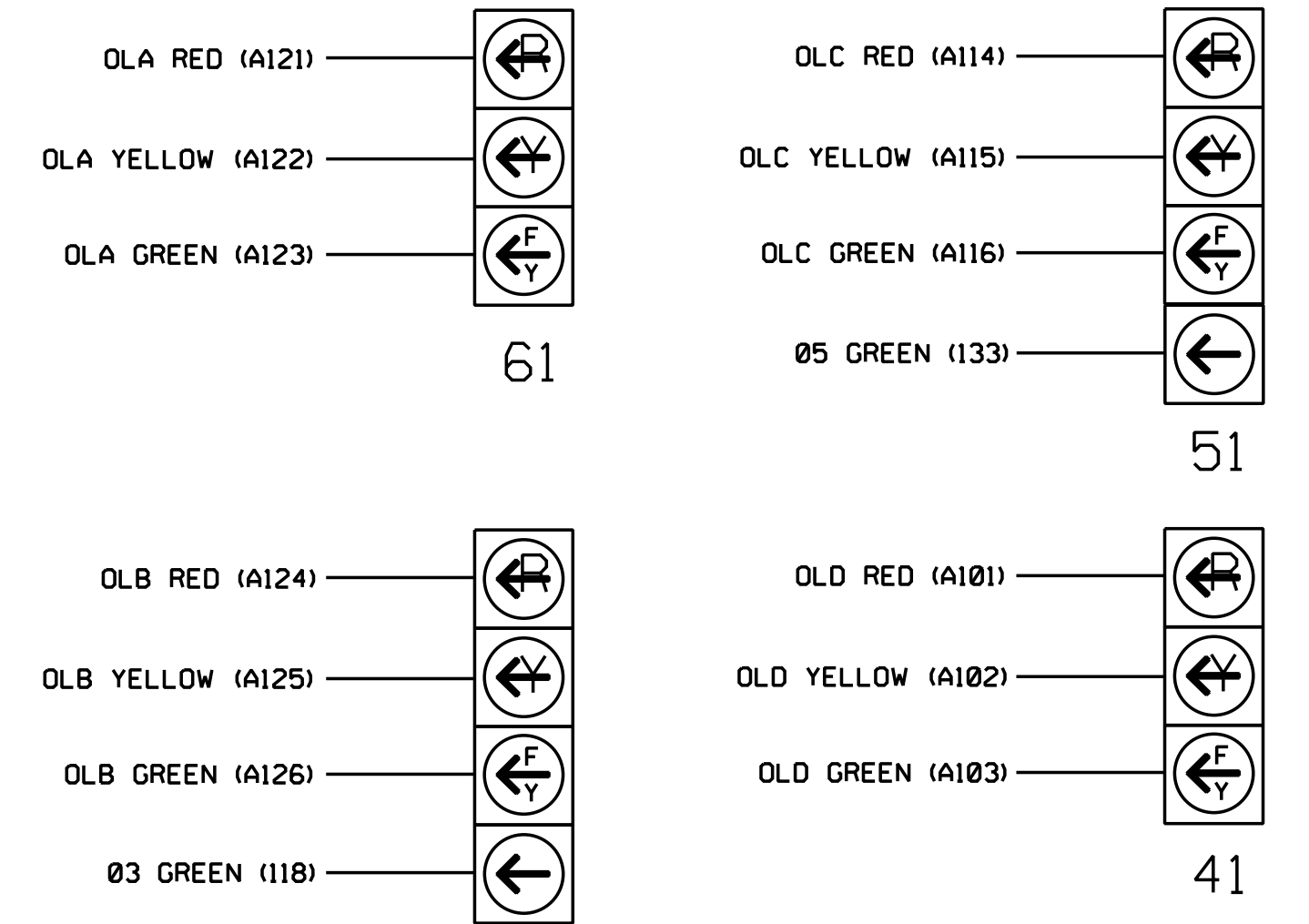
¹Add jumper from I5-W to J8-W, on rear of input file.
²Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

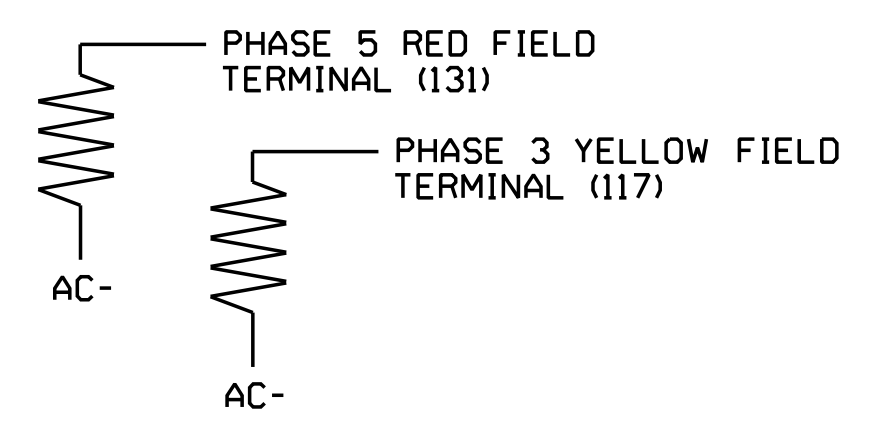
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors 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 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N. Greenfield Pkwy, Corner, NC 27529	SR 2433 (Moore Street) at SR 2309 (Rogers Road)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL SEAL JAMES B. VOSO ENGINEER 6/13/2018 DATE
	Division 7 Alamance County Graham PLAN DATE: November 2017 REVIEWED BY: JB Voso PREPARED BY: SE Wilson REVIEWED BY:	REVISIONS INIT. DATE	

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 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..... 0
  
```

Toggle Once

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.



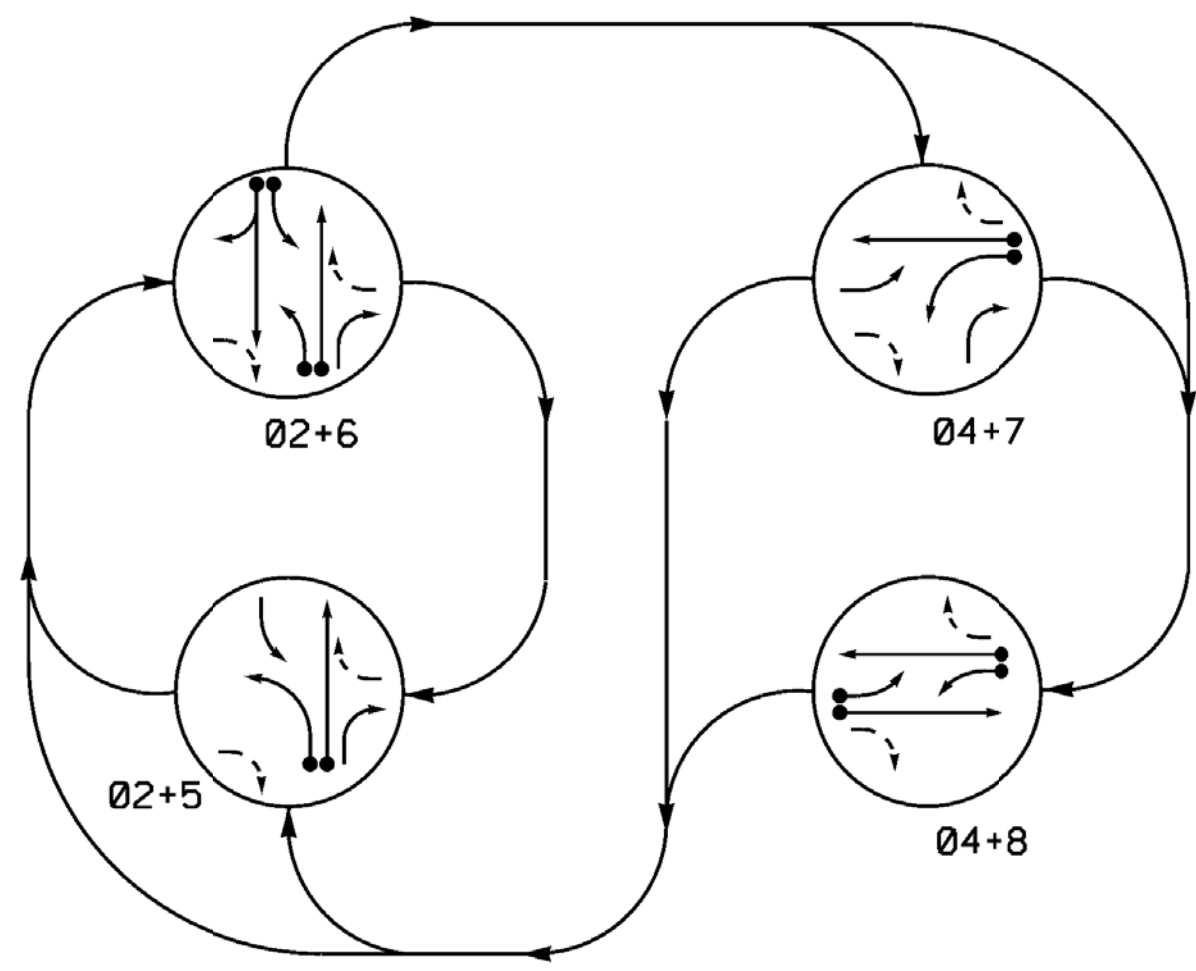
12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-1804
 DESIGNED: November 2017
 SEALED: 6/13/2018
 REVISED: NA

Electrical Detail - Sheet 2 of 2

<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>Prepared for the Offices of:</p> <p>750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p>SR 2433 (Moore Street) at SR 2309 (Rogers Road)</p> <p>Division 7 Alamance County Graham</p> <p>PLAN DATE: November 2017 REVIEWED BY: JB Voso</p> <p>PREPARED BY: SE Wilson REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p style="text-align: center;">SEAL</p> <p style="text-align: center;">James Voso 6/13/2018 DATE</p> <p style="text-align: center;">SIG. INVENTORY NO. 07-1804</p>
REVISIONS	INIT.	DATE						

PHASING DIAGRAM



SIGNAL FACE	PHASE				
	0 2 + 5	0 2 + 6	0 4 + 7	0 4 + 8	F L S A H
21, 23	G	G	R	R	Y
22	G	G	R	R	Y
41, 42	R	R	G	G	R
51	-	F	R	R	Y
61, 62	R	G	R	R	Y
63	F	F	R	R	Y
71	R	R	-	F	R
81, 82	R	R	R	G	R
83	R	R	F	F	R

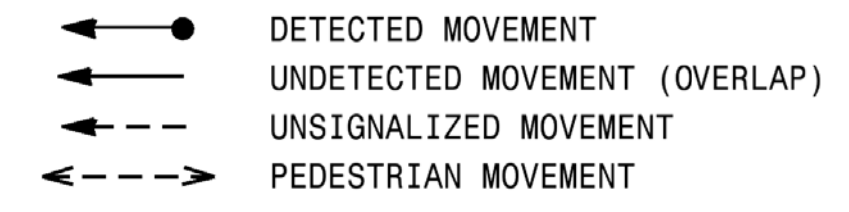
ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP
2A	6x6	300	EXIST.	-	2	Yes	-	-	X	N	-
4A	6x40	0	2-4-2	-	4	Yes	-	-	-	S	-
5A	6x60	0	2-4-2	-	5	Yes	-	15	-	S	-
6A	6x6	300	EXIST.	-	6	Yes	-	-	X	N	-
6B	6x60	0	2-4-2	-	6	Yes	-	3	-	G	-
7A	6x40	0	2-4-2	-	7	Yes	-	15	-	S	-
8A	6x60	+5	2-4-2	-	8	Yes	-	3	-	S	-
8B	6x40	0	2-4-2	-	8	Yes	-	-	-	S	-

4 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

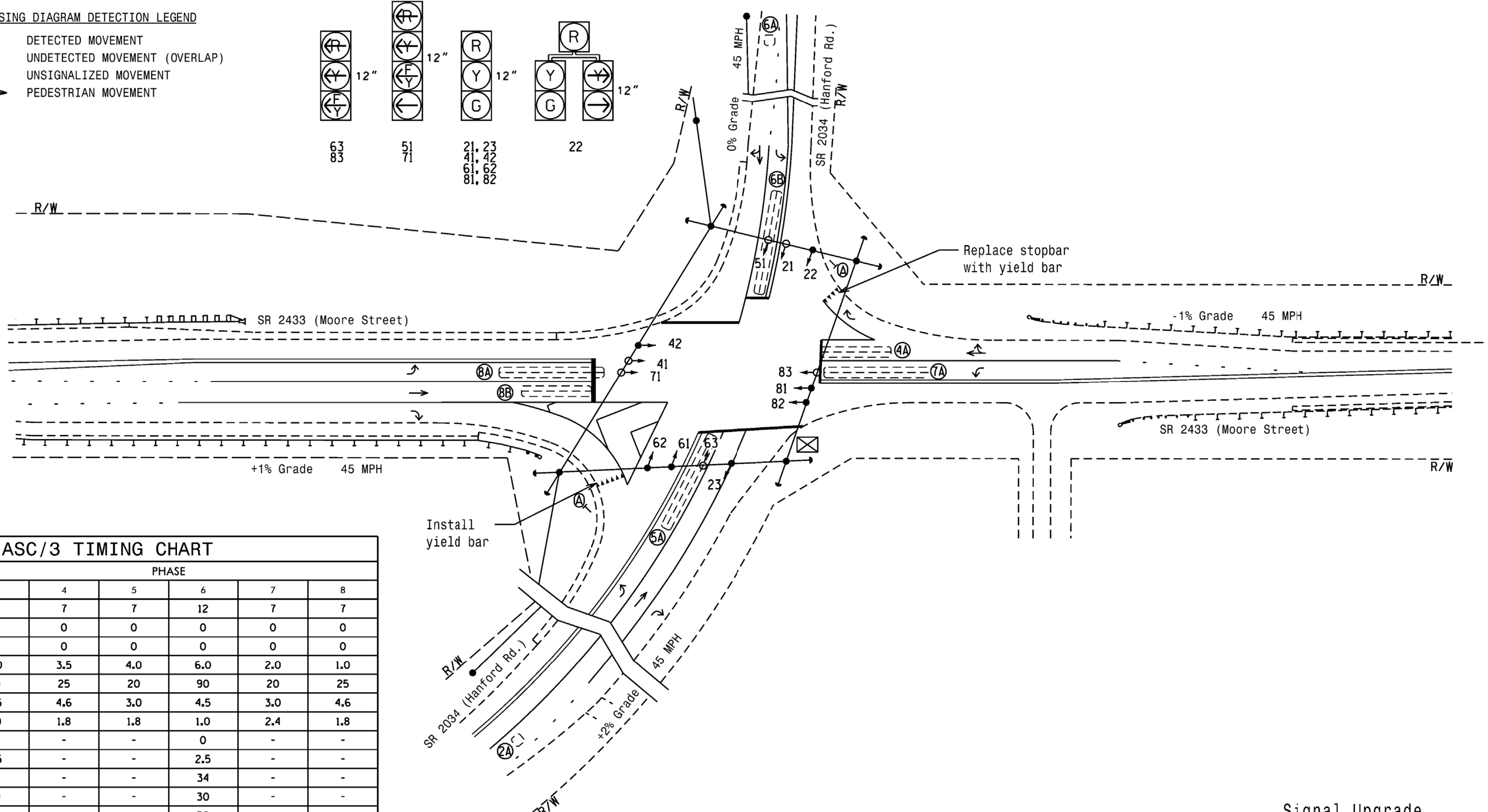
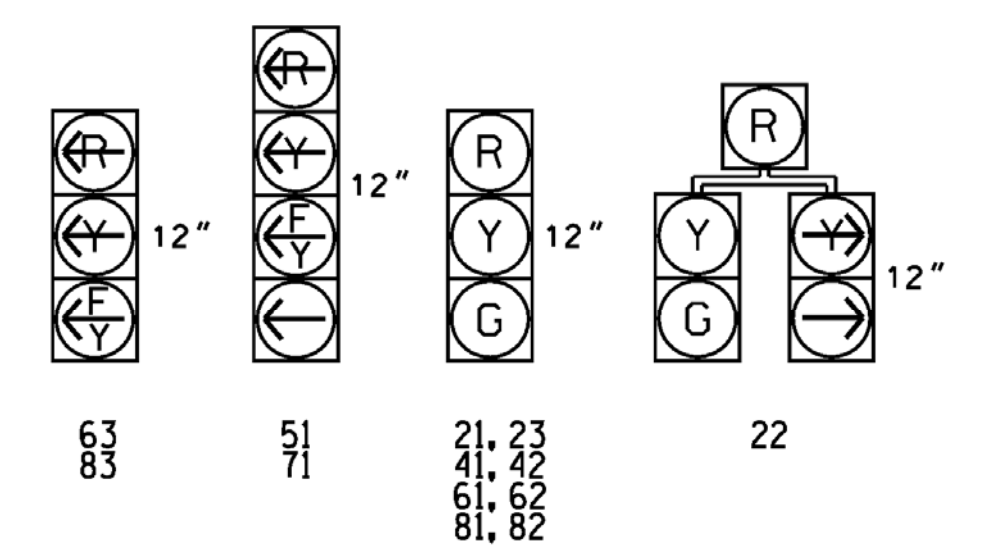
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Phase 7 may be lagged.
5. Reposition existing signal heads numbered 42, 81, and 82.
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.
11. Provide minimum of 15' clearance from high point in roadway to bottom of proposed signal heads.

PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

All Heads L.E.D.

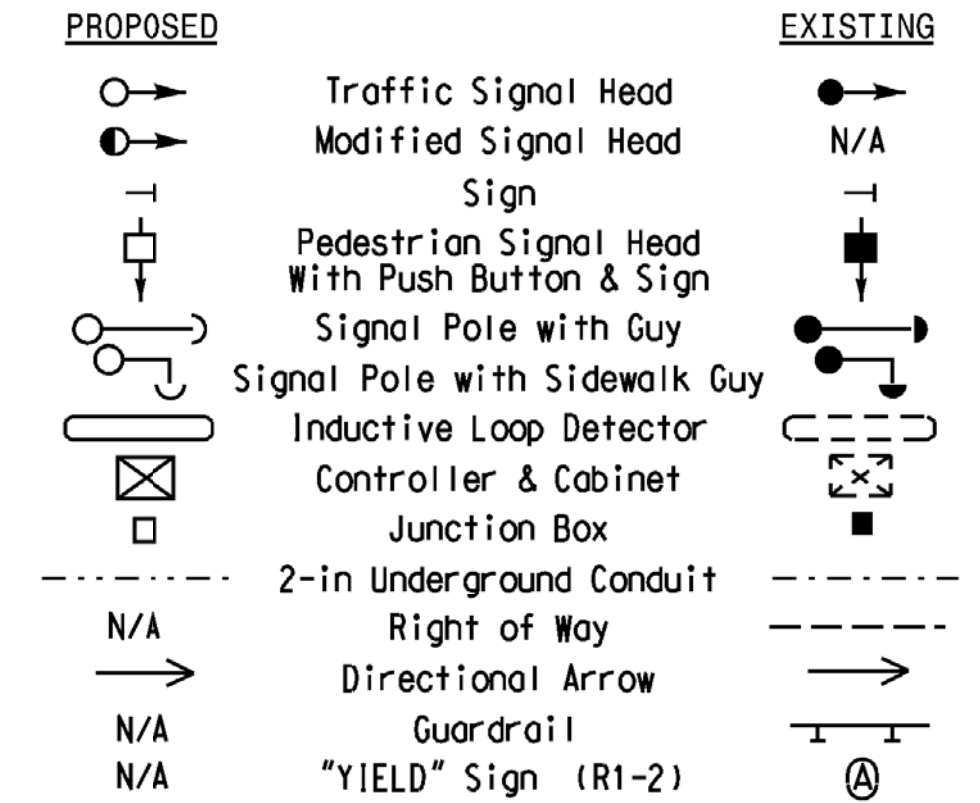


ASC/3 TIMING CHART

FEATURE	PHASE					
	2	4	5	6	7	8
Min Green *	12	7	7	12	7	7
Walk *	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0
Veh. Extension *	6.0	3.5	4.0	6.0	2.0	1.0
Max I *	90	25	20	90	20	25
Yellow	4.5	4.6	3.0	4.5	3.0	4.6
Red Clear	1.0	1.8	1.8	1.0	2.4	1.8
Actuations B4 Add *	0	-	-	0	-	-
Seconds / Actuation *	2.5	-	-	2.5	-	-
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	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



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:

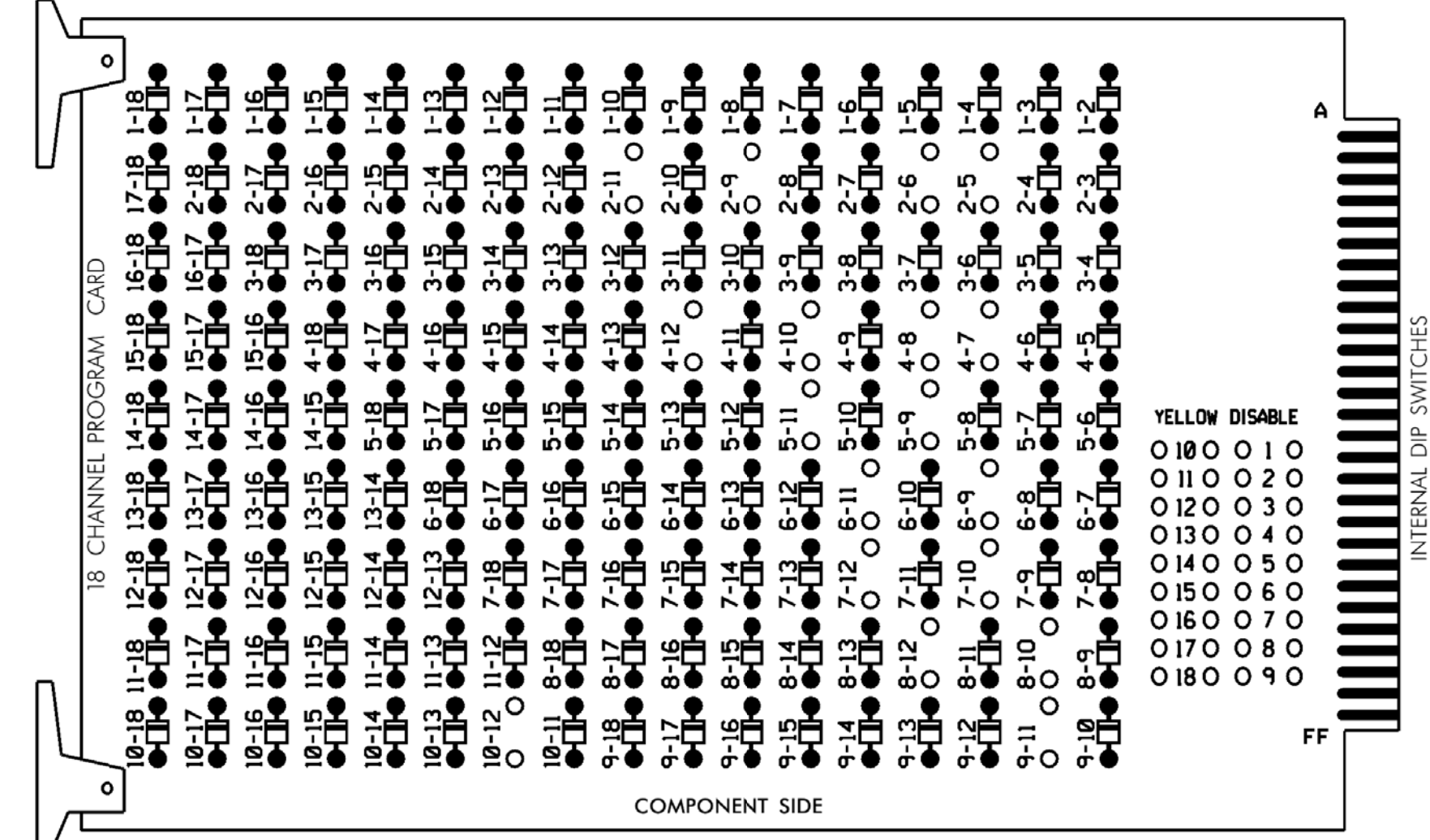
 SR 2304 (Hanford Road) at SR 2433 (Moore Street)
 Division 7 Alamance County Graham
 PLAN DATE: November 2017 REVIEWED BY: JB Voso
 PREPARED BY: SE Wilson REVIEWED BY:
 SCALE 0 40 1"=40'
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
 SEAL

 6/13/2018
 SIG. INVENTORY NO. 07-1805

*****SYSTEM*****
 *****USER*****

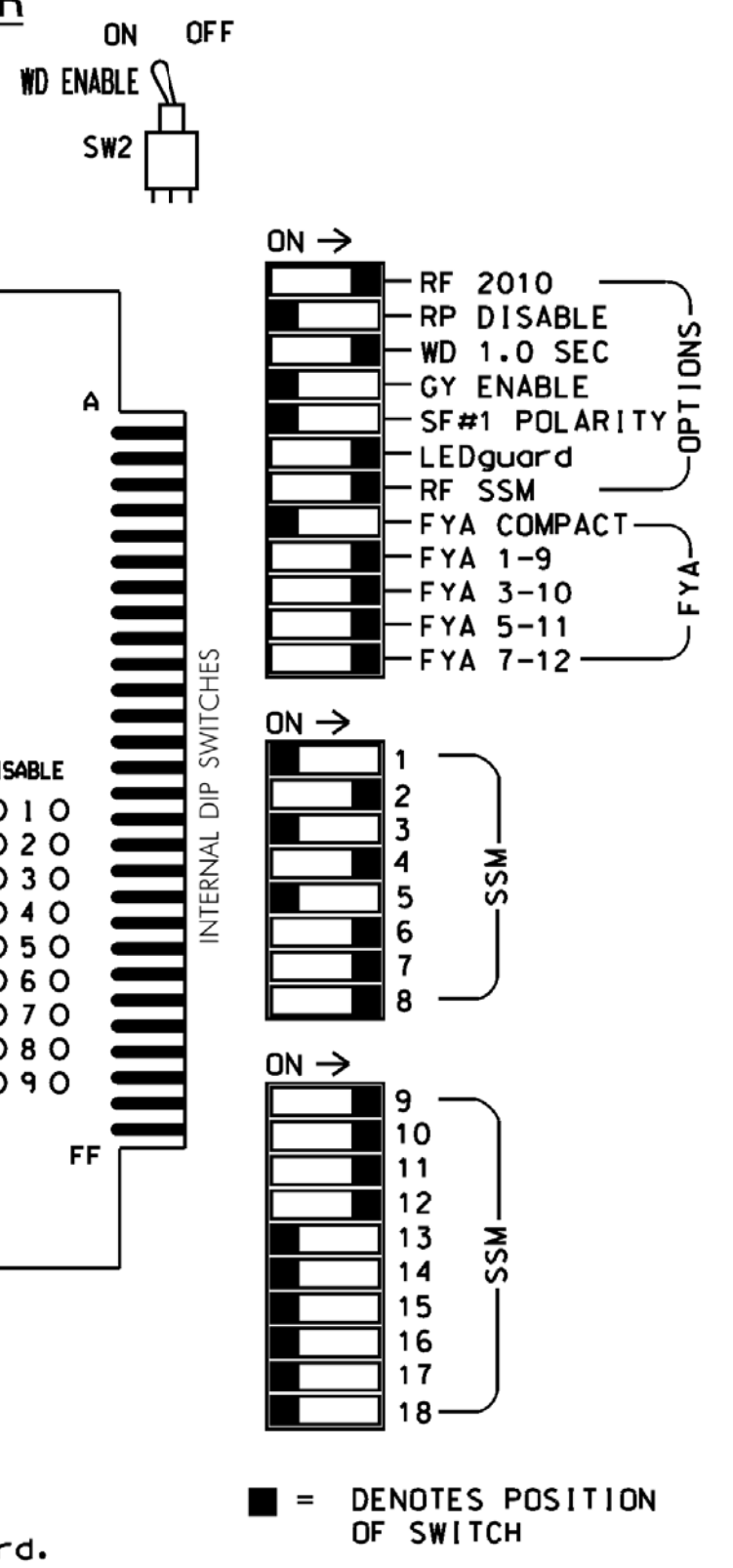
EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9
6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



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 FILE
 LOAD SWITCHES USED.....S2,S5,S7,S8,S10,S11,
 AUX S1,AUX S2,AUX S4,AUX S5
 PHASES USED.....2,4,5,6,7,8
 OVERLAP A.....*
 OVERLAP B.....*
 OVERLAP D.....*
 OVERLAP A.....*

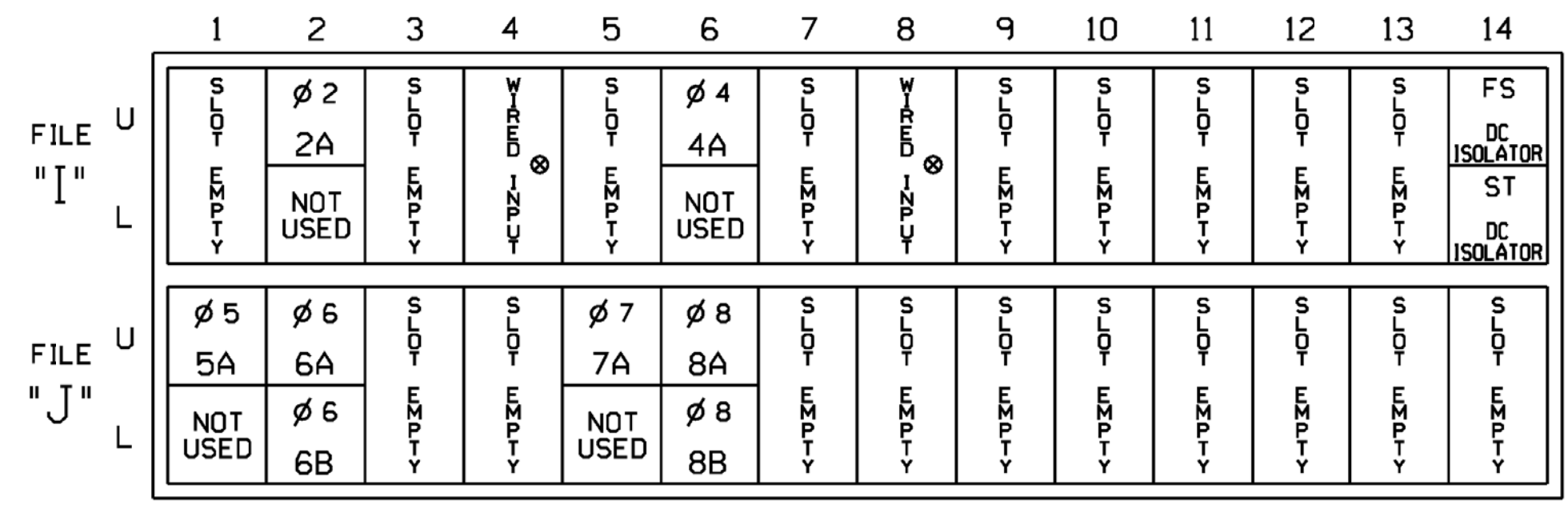
* See overlap programming detail on sheet 2

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	
CHU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22,23	NU	NU	41,42	NU	51	61,62	NU	71	22	81,82	NU	63	83	NU	51	71	NU
RED		128			101			134		*		107							
YELLOW		129			102		*	135				108							
GREEN		130			103			136				109							
RED ARROW																A121	A124	A114	A101
YELLOW ARROW											123					A122	A125	A115	A102
FLASHING YELLOW ARROW																A123	A126	A116	A103
GREEN ARROW								133		124	124								

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

INPUT FILE POSITION LAYOUT
(front view)

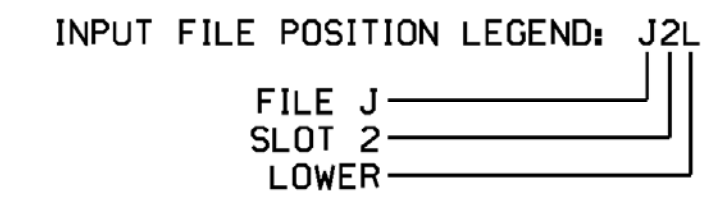


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card

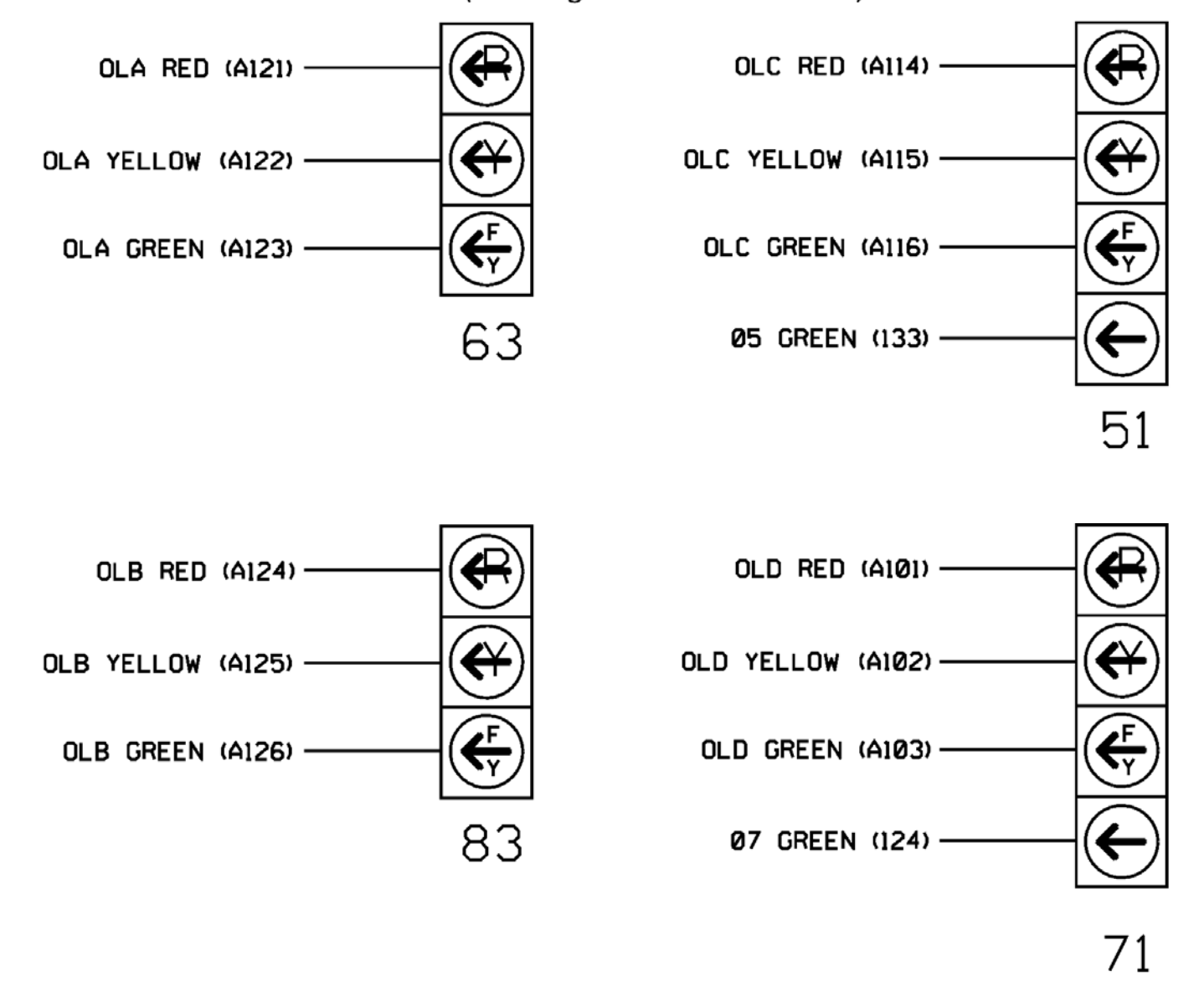
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES				S
5A ¹	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
6B	TB3-7,8	J2L	44	16	6	YES		3		G
7A ²	TB5-5,6	J5U	57	7	7	YES		15		S
	-	I8U	49	24	4	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		3		S
8B	TB5-11,12	J6L	46	18	8	YES				S

¹Add jumper from J1-W to I4-W, on rear of input file.
²Add jumper from J5-W to I8-W, on rear of input file.

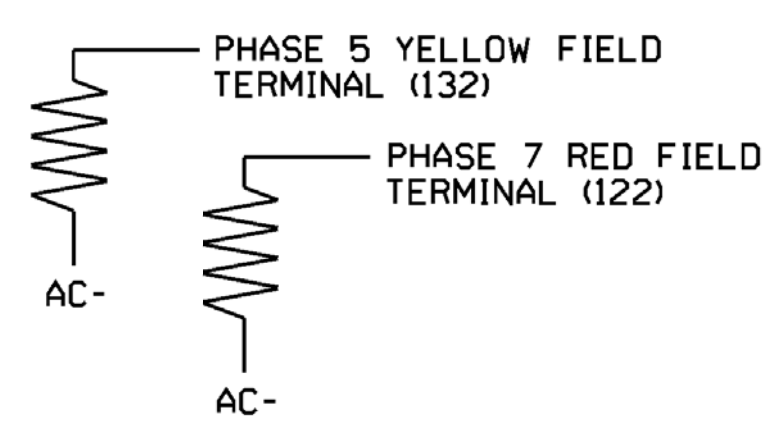


FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

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

Electrical and Programming Details For: SR 2304 (Hanford Road) at SR 2433 (Moore Street)

Prepared for the Offices of: **Mattern & Craig ENGINEERS • SURVEYORS**

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

Division 7 Alamance County Graham
 PLAN DATE: November 2017 REVIEWED BY: JB Voso
 PREPARED BY: SE Wilson REVIEWED BY:

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO 022599

James Voso 6/13/2018

SIG. INVENTORY NO. 07-1805

*****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 '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 Once

OVERLAP B

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

TMG VEH OVLP... [B] 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 Once

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 'PPLT FYA'

TMG VEH OVLP... [D] TYPE: PPLT FYA
PROTECTED LEFT TURN... PHASE 7
OPPOSING THROUGH..... PHASE 8
FLASHING ARROW OUTPUT.....CH12 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 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.

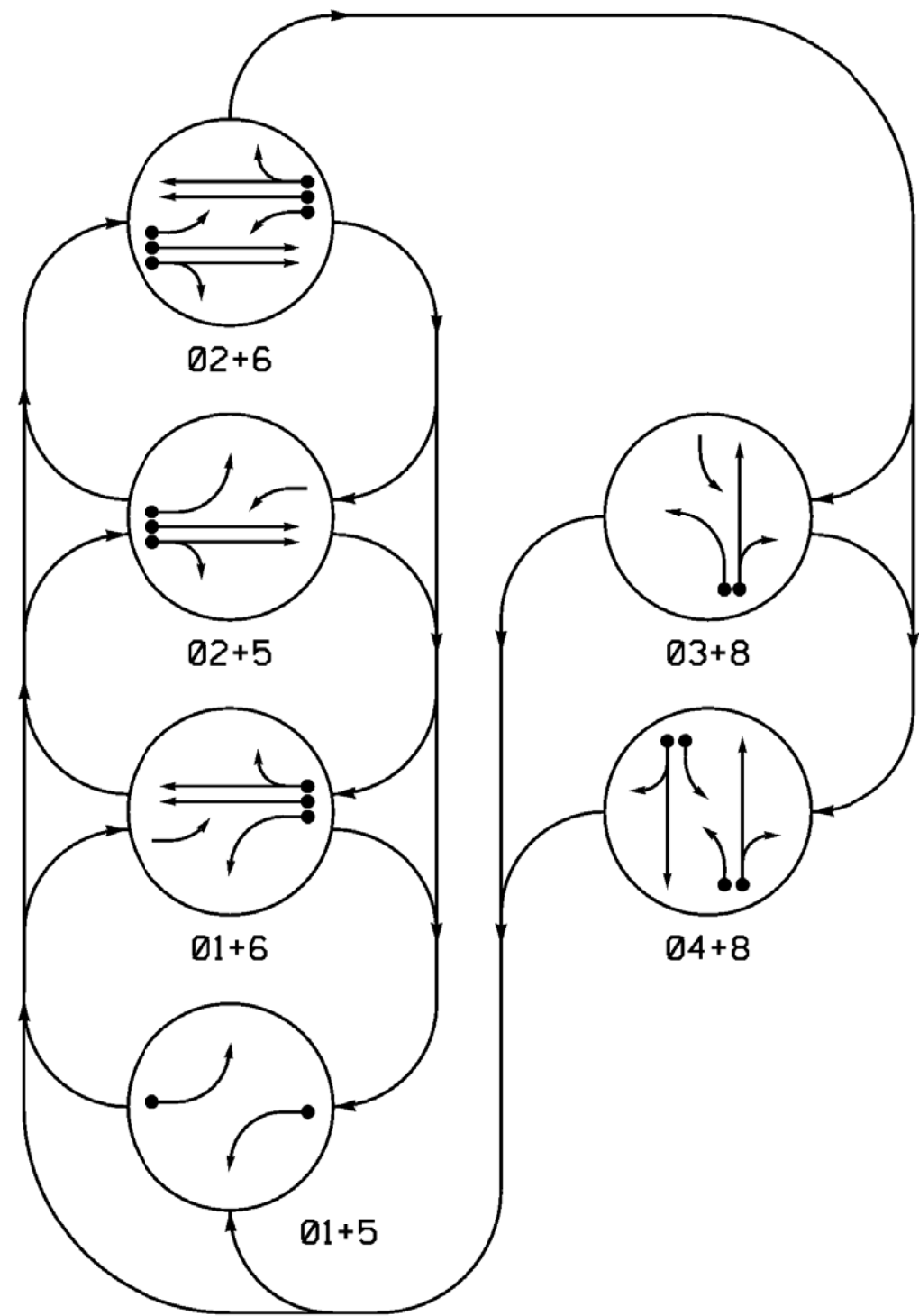


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1805 DESIGNED: November 2017 SEALED: 6/13/2018 REVISED: NA

ELLECTRICAL AND PROGRAMMING DETAILS FOR: SR 2304 (Hanford Road) at SR 2433 (Moore Street) Includes a table for REVISIONS and a seal for James B. Voso, Professional Engineer, Seal 022599.

***** SYSTEM TIME ***** ***** USER NAME *****

DEFAULT PHASING DIAGRAM

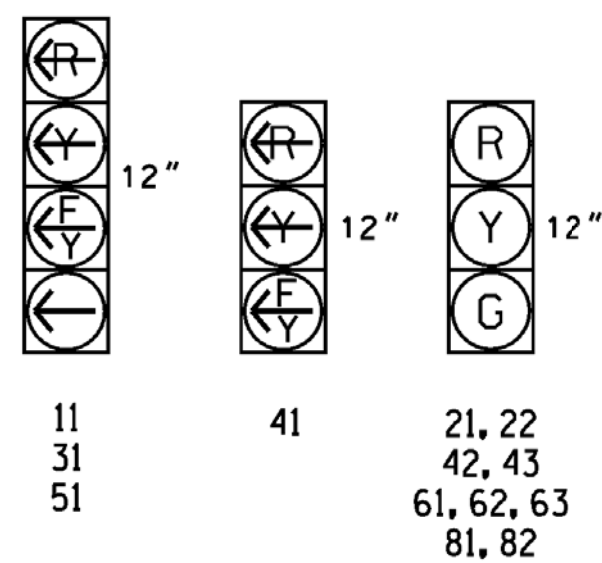


DEFAULT TABLE OF OPERATION

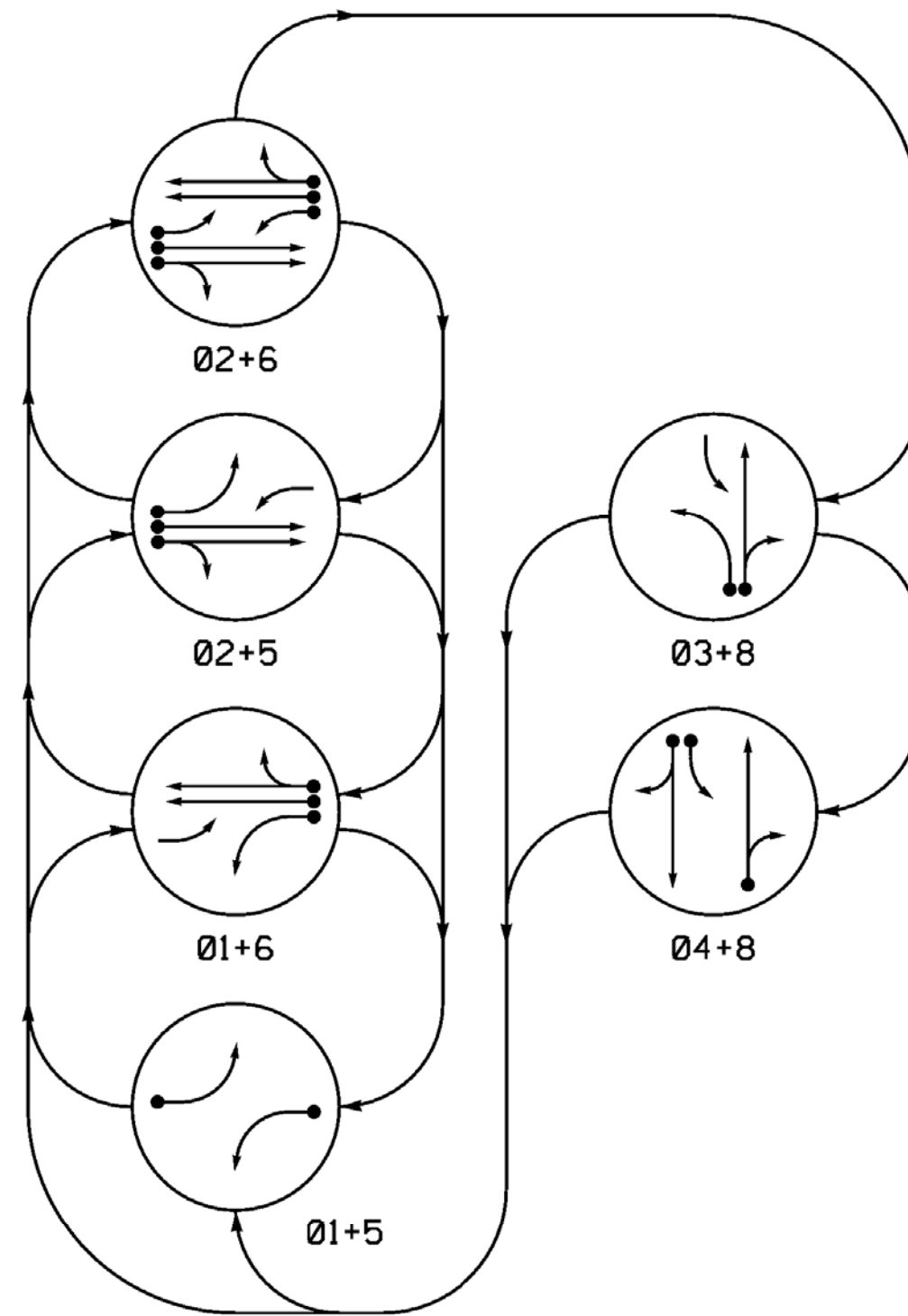
SIGNAL FACE	PHASE						
	01+5	02+5	02+6	03+8	04+8	FLASH	
11	-	-	F	F	R	R	Y
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	-	F	R
41	R	R	R	R	F	F	R
42, 43	R	R	R	R	R	G	R
51	-	F	-	F	R	R	Y
61, 62, 63	R	G	R	G	R	R	Y
81, 82	R	R	R	R	G	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



ALTERNATE PHASING DIAGRAM



ALTERNATE TABLE OF OPERATION

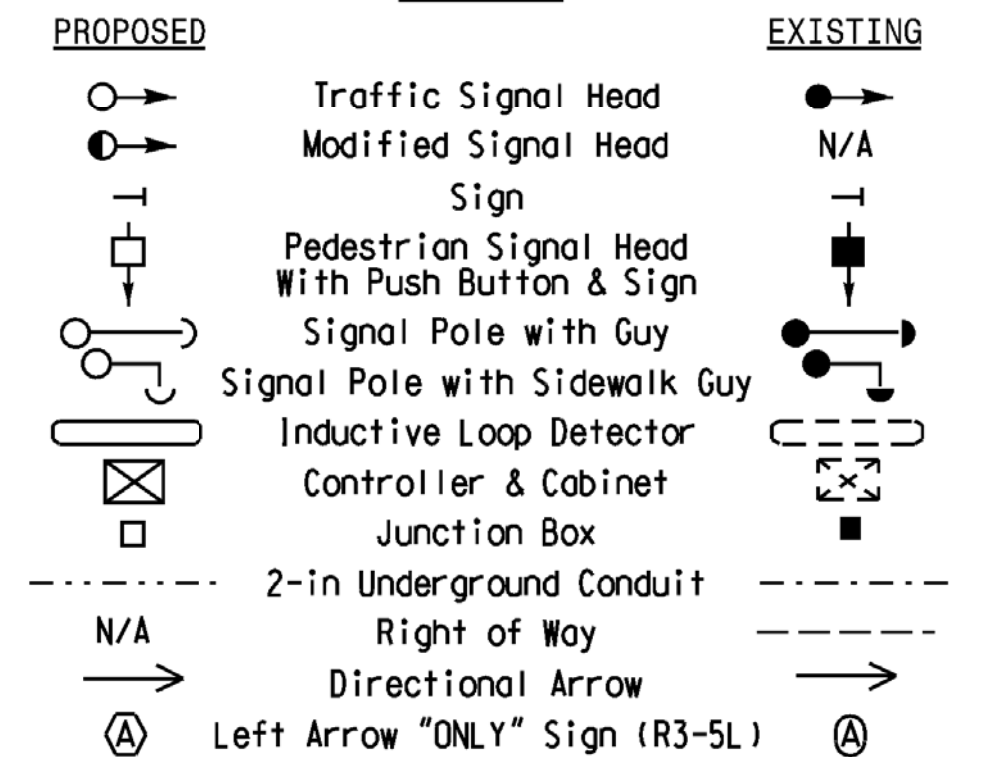
SIGNAL FACE	PHASE						
	01+5	02+5	02+6	03+8	04+8	FLASH	
11	-	-	F	F	R	R	Y
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	-	R	R
41	R	R	R	R	F	F	R
42, 43	R	R	R	R	R	G	R
51	-	F	-	F	R	R	Y
61, 62, 63	R	G	R	G	R	R	Y
81, 82	R	R	R	R	G	G	R

6 Phase Fully Actuated (Burlington-Graham Signal System)

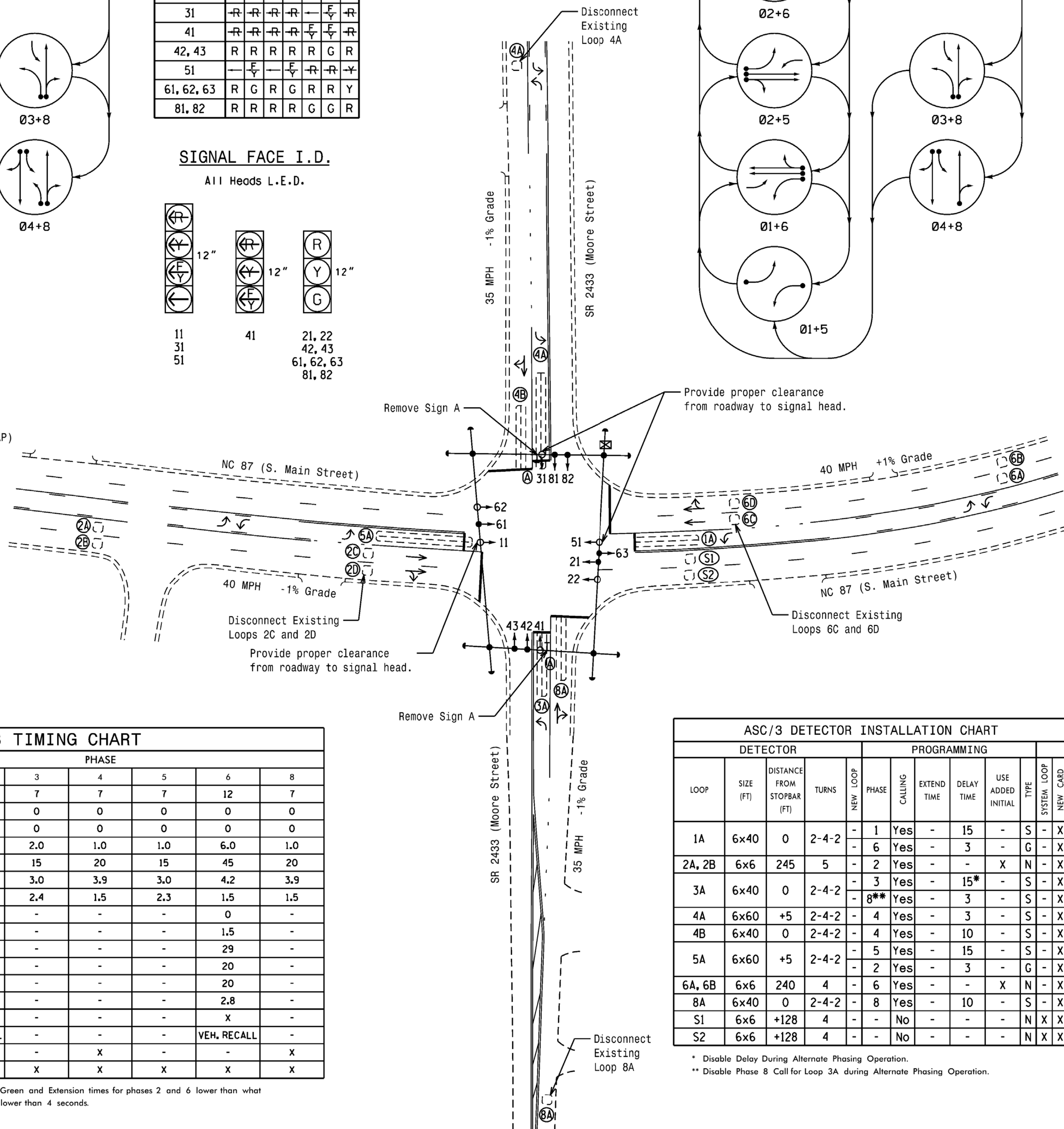
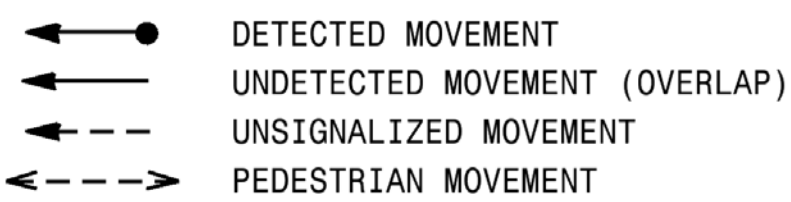
NOTES

- 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.
- Phase 3 may be lagged.
- Reposition existing signal heads numbered 21, 42, 43, 61, 81, and 82.
- 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



PHASING DIAGRAM DETECTION LEGEND



ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0
Veh. Extension *	2.0	6.0	2.0	1.0	1.0	6.0	1.0	1.0
Max 1 *	15	45	15	20	15	45	20	20
Yellow	3.0	4.2	3.0	3.9	3.0	4.2	3.9	3.9
Red Clear	2.6	1.5	2.4	1.5	2.3	1.5	1.5	1.5
Actuations B4 Add *	-	0	-	-	-	0	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	29	-	-	-	29	-	-
Time Before Reduction *	-	20	-	-	-	20	-	-
Time To Reduce *	-	20	-	-	-	20	-	-
Minimum Gap	-	2.8	-	-	-	2.8	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	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.

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	6x40	0	2-4-2	-	1	Yes	-	15	-	S	-	X
2A, 2B	6x6	245	5	-	6	Yes	-	3	-	G	-	X
3A	6x40	0	2-4-2	-	3	Yes	-	15*	-	S	-	X
4A	6x60	+5	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6x40	0	2-4-2	-	4	Yes	-	10	-	S	-	X
5A	6x60	+5	2-4-2	-	5	Yes	-	15	-	S	-	X
6A, 6B	6x6	240	4	-	6	Yes	-	3	-	G	-	X
8A	6x40	0	2-4-2	-	8	Yes	-	10	-	S	-	X
S1	6x6	+128	4	-	-	No	-	-	-	N	X	X
S2	6x6	+128	4	-	-	No	-	-	-	N	X	X

* Disable Delay During Alternate Phasing Operation.
** Disable Phase 8 Call for Loop 3A during Alternate Phasing Operation.



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

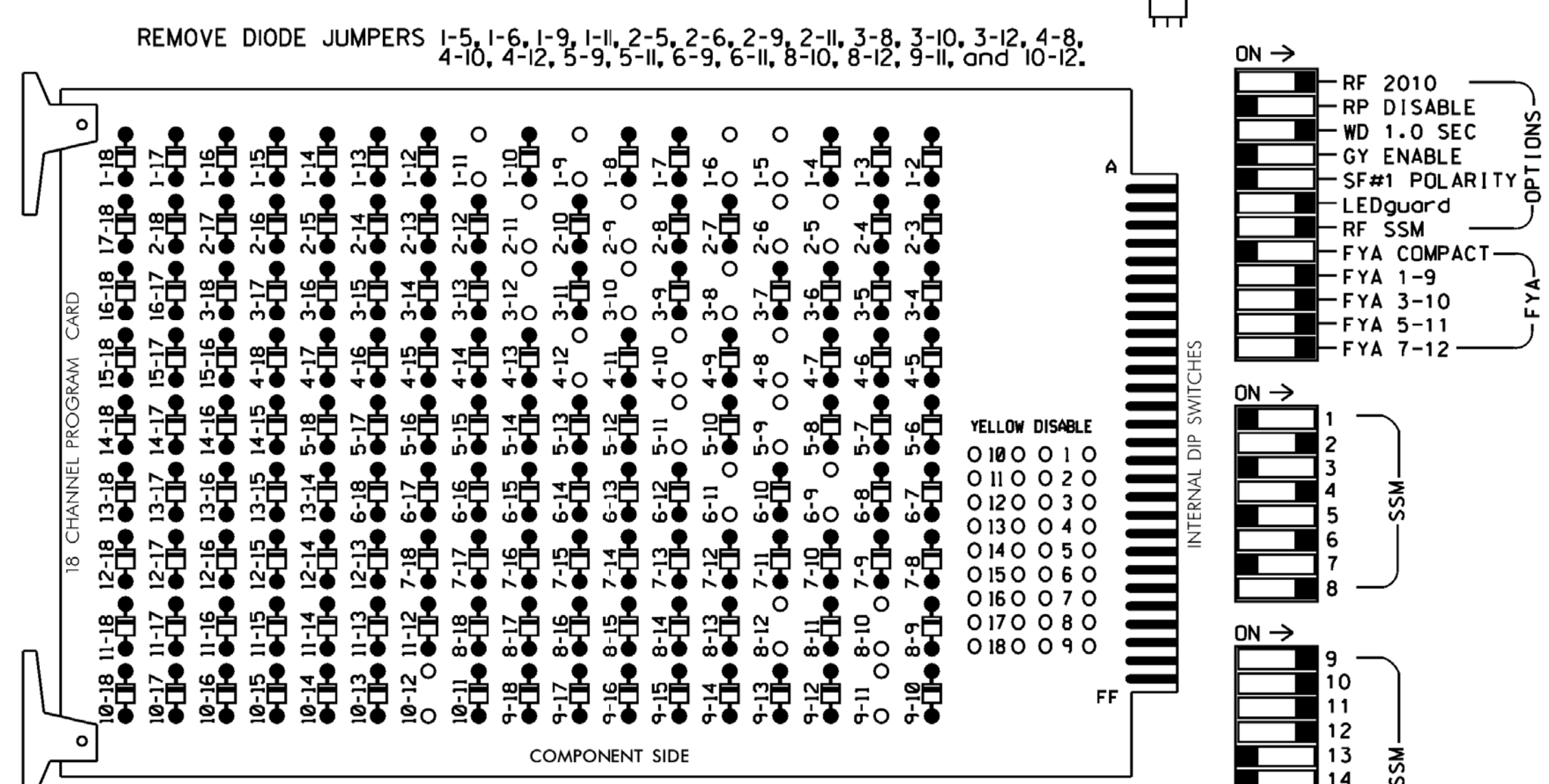
Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	Prepared for the Offices of: NC 87 (S. Main Street) at SR 2433 (Moore Street)		SEAL
	Division 7 Alamance County Graham	Division 7 Alamance County Graham	
PLAN DATE: April 2018	REVIEWED BY: JB Voso	PREPARED BY: SE Greene	REVIEWED BY:
SCALE: 1"=40' 	REVISIONS:	INIT.	DATE
750 N. Greenfield Pkwy, Garner, NC 27529	James Voso	6/13/2018	SIG. INVENTORY NO. 07-1806

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, 3-8, 3-10, 3-12, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 8-10, 8-12, 9-11, and 10-12.

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.....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 S2,AUX S4,AUX S5
 PHASES USED.....1,2,3,4,5,6,8
 OVERLAP "A".....*
 OVERLAP "B".....*
 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
P-HASE	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	31	42,43	NU	51	61,62,63	NU	NU	81,82	NU	11	31	NU	51	41	NU
RED		128			101			134			107							
YELLOW	*	129		*	102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW														A122	A125		A115	A102
FLASHING YELLOW ARROW														A123	A126		A116	A103
GREEN ARROW	127				118			133										

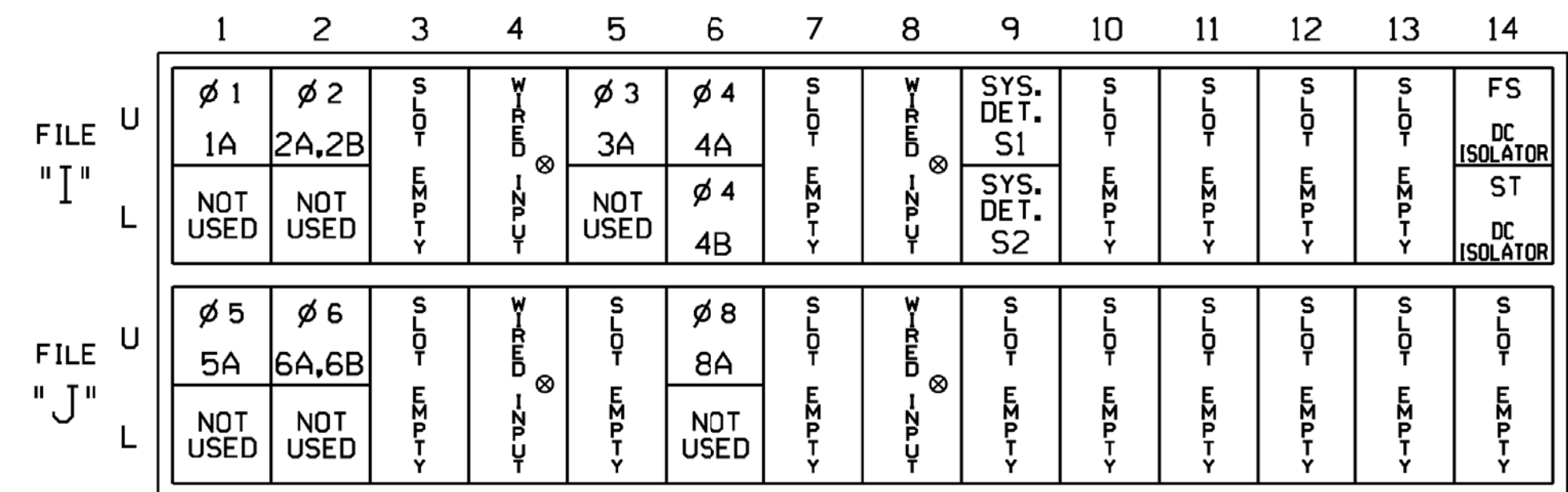
NU = Not Used

* 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

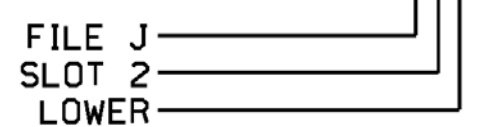
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	I1U	56	1	1	YES		15		S
		J4U	48	26	6	YES		3		G
2A, 2B	TB2-5,6	I2U	39	2	2	YES			X	N
3A ²	TB4-5,6	I5U	58	3	3	YES		15		S
		J8U	50	28	8	YES		3		S
4A	TB4-9,10	I6U	41	4	4	YES		3		S
4B	TB4-11,12	I6L	45	4	4	YES		10		S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
5A ³	TB3-1,2	J1U	55	5	5	YES		15		S
		I4U	47	22	2	YES		3		G
6A, 6B	TB3-5,6	J2U	40	6	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES		10		S

* System detector only. Remove any assigned vehicle phase.

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from I5-W to J8-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.

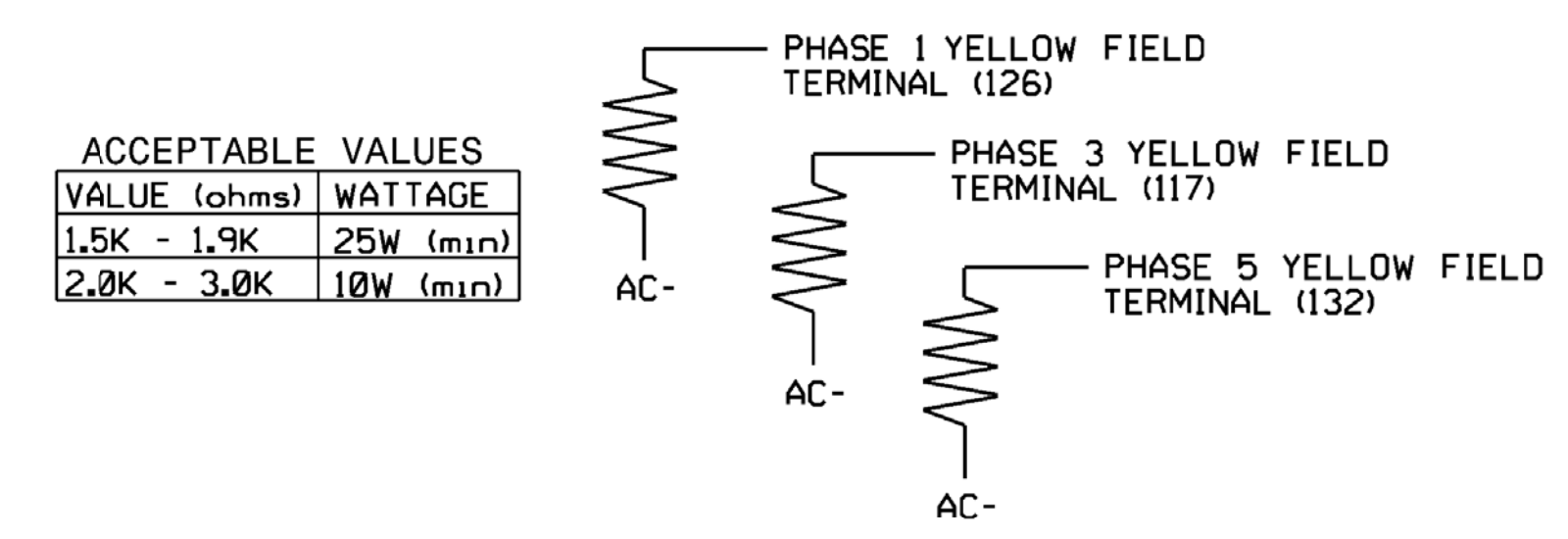
* For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 3

INPUT FILE POSITION LEGEND: J2L



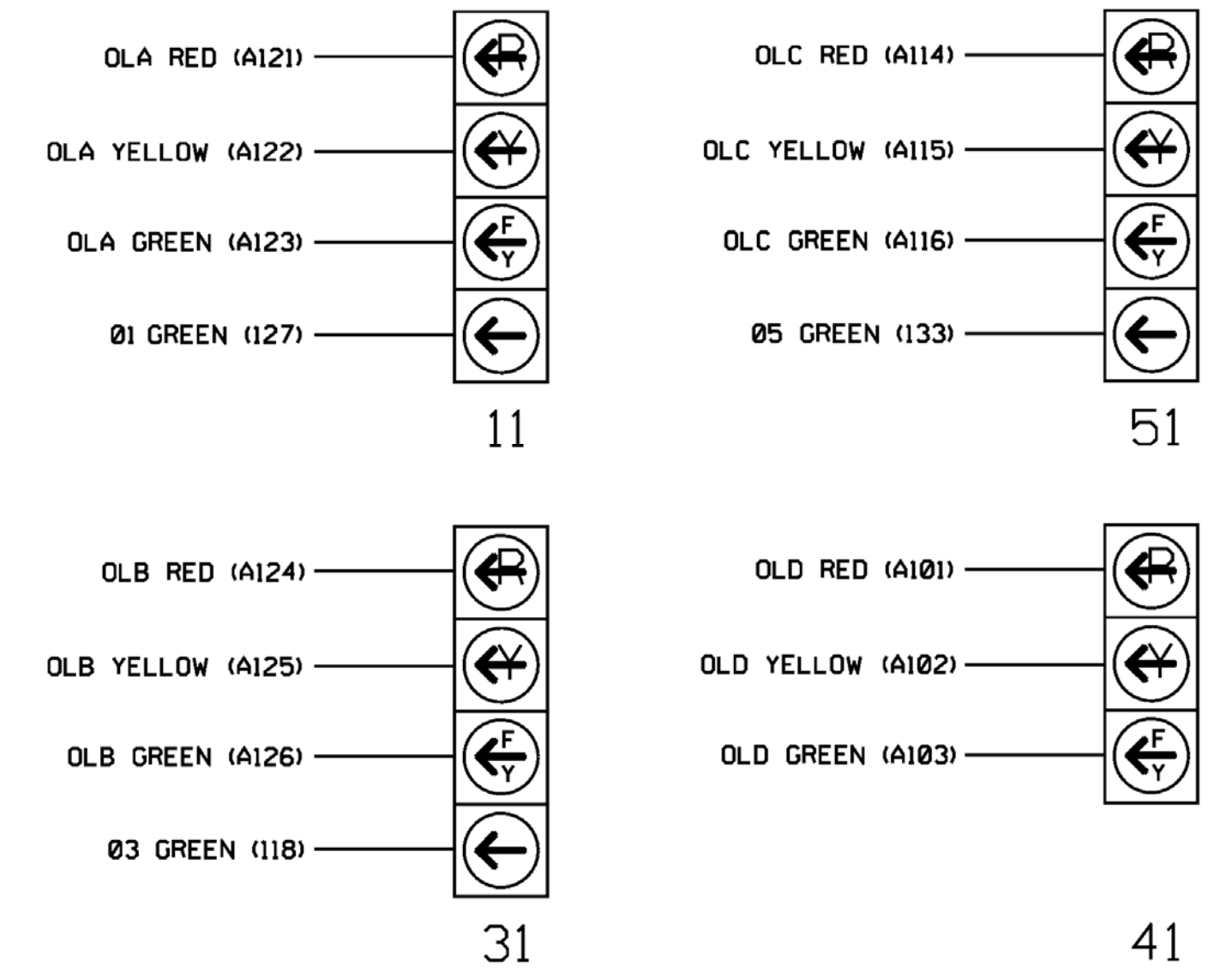
LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1806
 DESIGNED: April 2018
 SEALED: 6/13/2018
 REVISED: NA

Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For: NC 87 (S. Main Street) at SR 2433 (Moore Street)

Prepared for the Offices of: James B. Voso, Professional Engineer, License No. 022599

Division 7 Alamance County Graham

PLAN DATE: April 2018 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS: _____

INIT. DATE

James Voso 6/13/2018

750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 07-1806

Mattern & Craig
ENGINEERS • SURVEYORS

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

*****SYSTEM*****
 *****DIALOG*****
 *****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..... 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

Toggle Once

← NOTICE ACTION PLAN SF BIT "3"

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

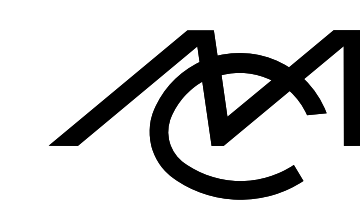
END PROGRAMMING

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.



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12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
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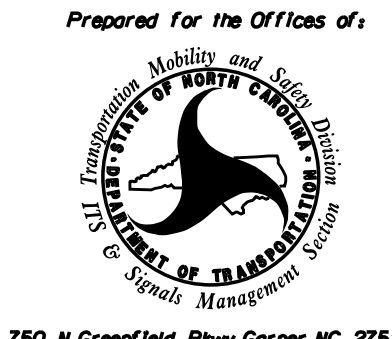
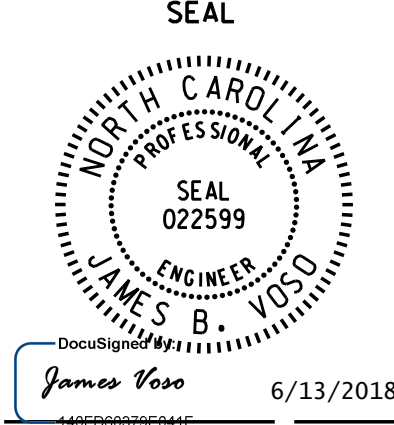
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1806

DESIGNED: April 2018

SEALED: 6/13/2018

REVISED: NA

Electrical Detail - Sheet 2 of 4

 <small>750 N. Greenfield Pkwy, Corner, NC 27529</small>	<p>NC 87 (S. Main Street) at SR 2433 (Moore Street)</p>	<p>SEAL</p>  <small>SEAL 022599</small>				
	<p>Division 7 Alamance County Graham</p> <p>PLAN DATE: April 2018 REVIEWED BY: JB Voso</p> <p>PREPARED BY: SE Greene REVIEWED BY:</p>	<p>REVISIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	INIT.	DATE		
INIT.	DATE					

3:07:11 PM
 J:\3789 - Burlington Graham Signal System\06 Working Folders\Replace Sub-folders with NCDOT File Structure if Working on NCDOT Project\dwg or Dgn\07-1806-071806-sm.ele_20170404.dgn
 jbvoso

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.

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 "3".
 - Set delay time to "0".

```

VEH DETECTOR [ 3]  VEH DET PLAN [ 2] ← NOTICE VEH
TYPE: S-STANDARD  DET PLAN 2
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 ← ENSURE DELAY
USE ADDED INITIAL . CROSS SWITCH PH.. 0  IS SET TO '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] ← NOTICE VEH
TYPE: S-STANDARD  DET PLAN 2
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 ..... ← ENSURE PHASE
EXTEND TIME... 0.0 DELAY TIME... 3.0  IS SET TO "0"
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

END PROGRAMMING


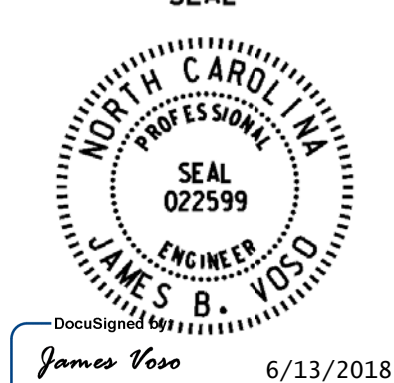
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN# 07-1806
DESIGNED: April 2018
SEALED: 6/13/2018
REVISED: NA

*****SYTIME*****
*****D*****
*****USERNAME*****



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

<p><small>ELECTRICAL AND PROGRAMMING</small> DETAILS FOR:</p> <p style="text-align: center;"><small>Prepared for the Offices of:</small></p>  <p style="font-size: 8px;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 87 (S. Main Street) at SR 2433 (Moore Street)</p> <p style="font-size: 8px;">Division 7 Alamance County Graham</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: 8px;">PLAN DATE: April 2018</td> <td style="font-size: 8px;">REVIEWED BY: JB Voso</td> </tr> <tr> <td style="font-size: 8px;">PREPARED BY: SE Greene</td> <td style="font-size: 8px;">REVIEWED BY:</td> </tr> </table>	PLAN DATE: April 2018	REVIEWED BY: JB Voso	PREPARED BY: SE Greene	REVIEWED BY:	<p style="text-align: center;">SEAL</p>  <p style="font-size: 8px;">James Voso 6/13/2018</p> <p style="font-size: 8px;">DATE</p> <p style="font-size: 8px;">SIG. INVENTORY NO. 07-1806</p>
PLAN DATE: April 2018	REVIEWED BY: JB Voso					
PREPARED BY: SE Greene	REVIEWED BY:					

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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 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.

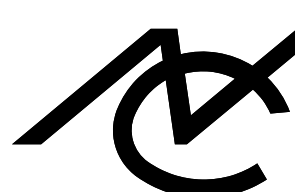
1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

```

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 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  
```

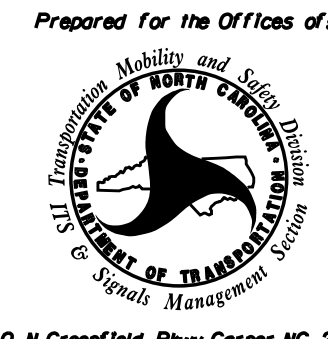
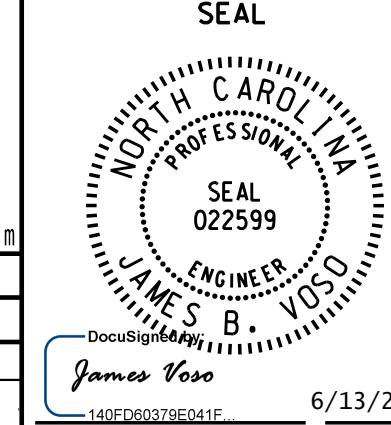


Mattern & Craig
ENGINEERS & SURVEYORS

12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
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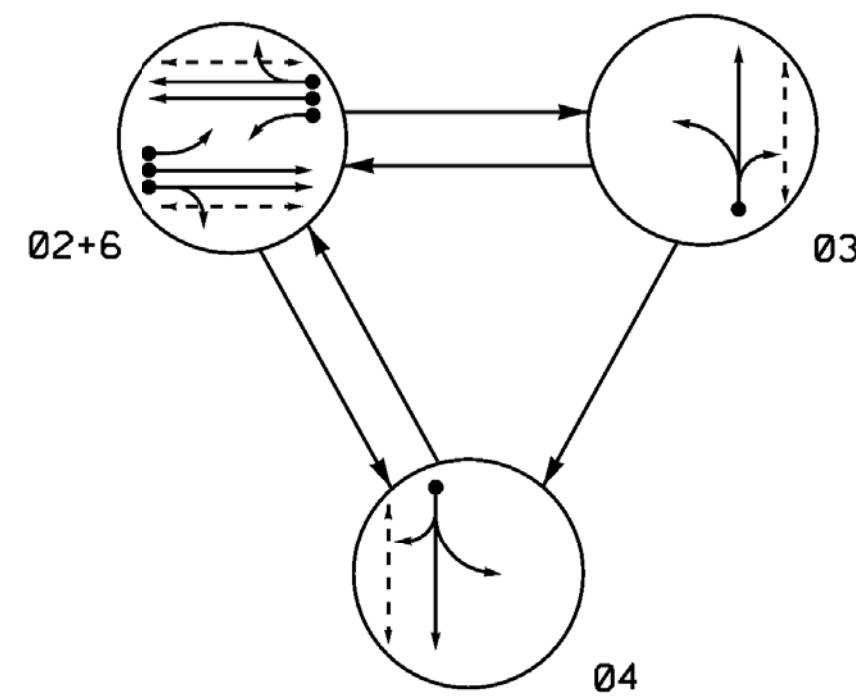
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1806
DESIGNED: April 2018
SEALED: 6/13/2018
REVISED: NA

Electrical Detail - Sheet 4 of 4

<p style="font-size: 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, Corner, NC 27529</p>	<p>NC 87 (S. Main Street) at SR 2433 (Moore Street)</p> <p style="font-size: x-small;">Division 7 Alamance County Graham</p> <p style="font-size: x-small;">PLAN DATE: April 2018 REVIEWED BY: JB Voso</p> <p style="font-size: x-small;">PREPARED BY: SE Greene REVIEWED BY:</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 style="height: 20px;"> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p style="text-align: center; font-size: small;">SEAL</p>  <p style="font-size: x-small;">James Voso 14020003780410 6/13/2018 DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1806</p>
REVISIONS	INIT.	DATE						

3:08:14 PM 11/13/18 - Burlington Graham Signal System06 Working Folders with NCDOT File Structure if Working on NCDOT Project\Wing or Dgn\07-1806-071806-sm.ele-20170404.dgn jvoso

PHASING DIAGRAM

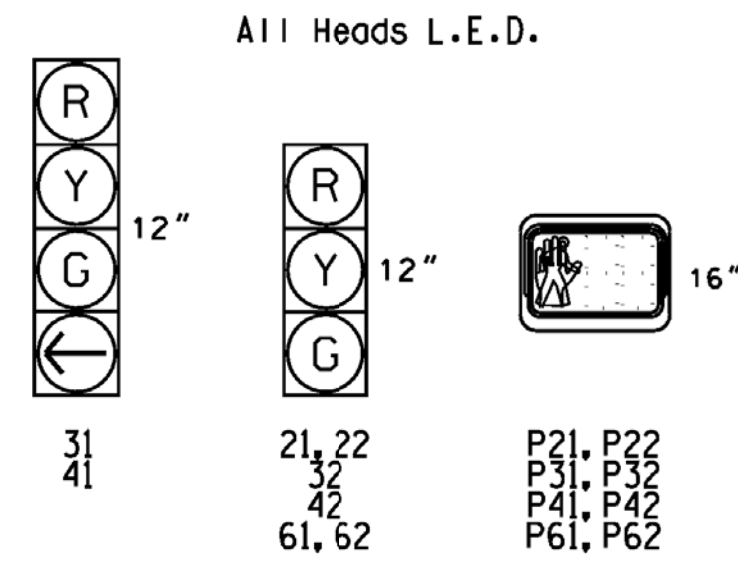


PHASING DIAGRAM DETECTION LEGEND

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

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

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	LOOP
2A	6x6	80	EXIST.	-	2	Yes	-	-	-	S	X
2B	6x6	80	EXIST.	-	2	Yes	-	-	-	S	X
2C	6x40	0	2-4-2	-	2	Yes	-	-	-	S	X
3A	6x40	+10	2-4-2	-	3	Yes	-	5	-	S	X
4A	6x40	+10	2-4-2	-	4	Yes	-	5	-	S	X
6A	6x6	70	EXIST.	-	6	Yes	-	-	-	S	X
6B	6x6	70	EXIST.	-	6	Yes	-	-	-	S	X
6C	6x40	0	2-4-2	-	6	Yes	-	-	-	S	X
S1	6x6	+175	4	X	-	No	-	-	-	N	X
S2	6x6	+175	4	X	-	No	-	-	-	N	X

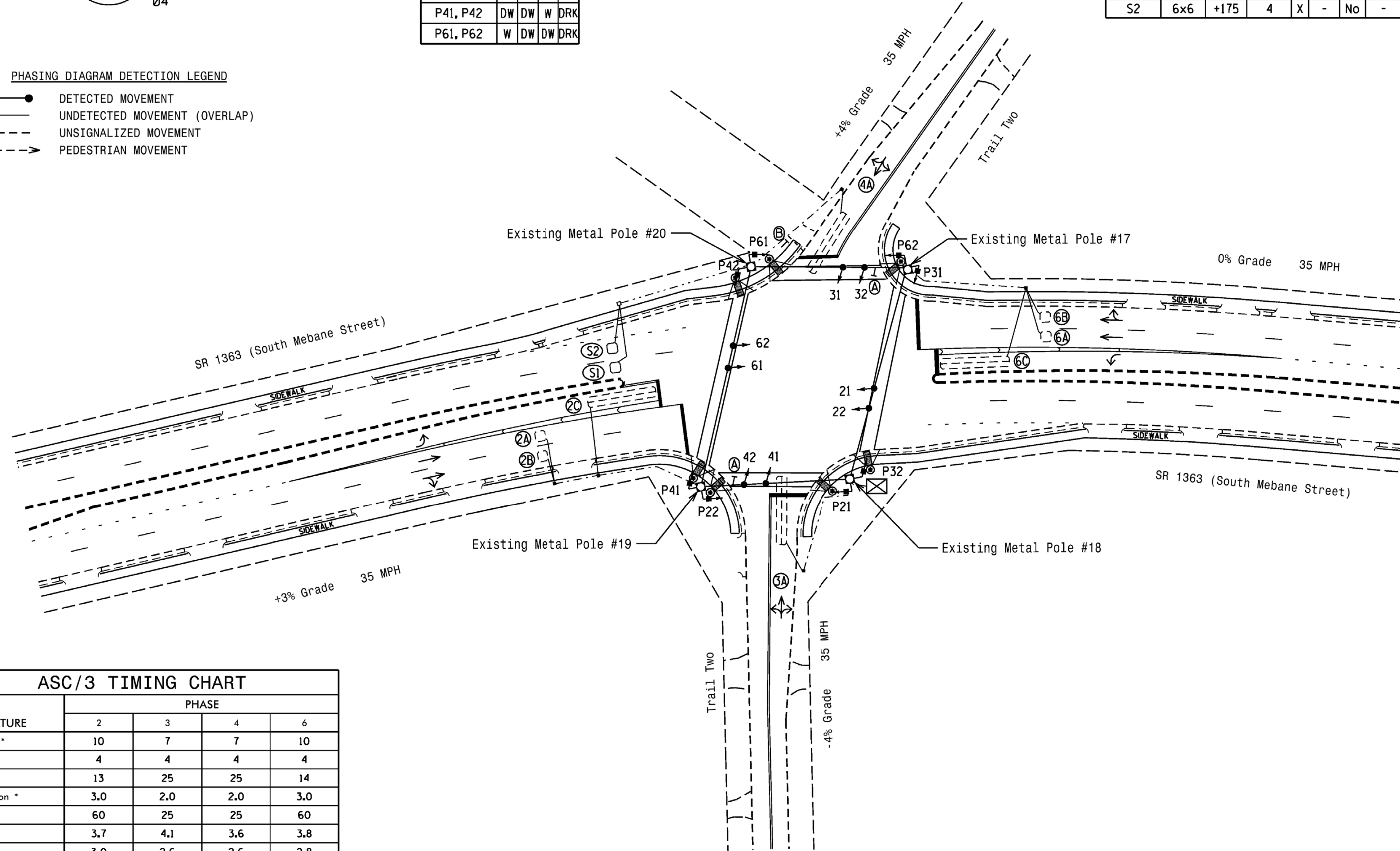
3 Phase Fully Actuated (Burlington-Graham Signal System)

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.
- 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.
- The order of phase 3 and phase 4 may be reversed.

ASC/3 TIMING CHART				
FEATURE	PHASE			
	2	3	4	6
Min Green *	10	7	7	10
Walk *	4	4	4	4
Ped Clear	13	25	25	14
Veh. Extension *	3.0	2.0	2.0	3.0
Max I *	60	25	25	60
Yellow	3.7	4.1	3.6	3.8
Red Clear	3.0	2.6	2.6	2.8
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 |
|----------|----------|
| ○→ | ●→ |
| ○→ | N/A |
| ⊥ | ⊥ |
| ⊥ | ⊥ |
| ○→ | ●→ |
| ○→ | ●→ |
| ⊠ | ⊠ |
| □ | □ |
| N/A | ⊠ |
| - - - | - - - |
| N/A | - - - |
| → | → |
| N/A | ⊙ |
| ⊠ | ⊠ |
| ⊠ | ⊠ |

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



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
 SCALE 0 40
 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 1363 (South Mebane Street) at Trail Two

Division 7 Alamance County Burlington

PLAN DATE: September 2017 REVIEWED BY: JB Voso

PREPARED BY: SE Wilson REVIEWED BY:

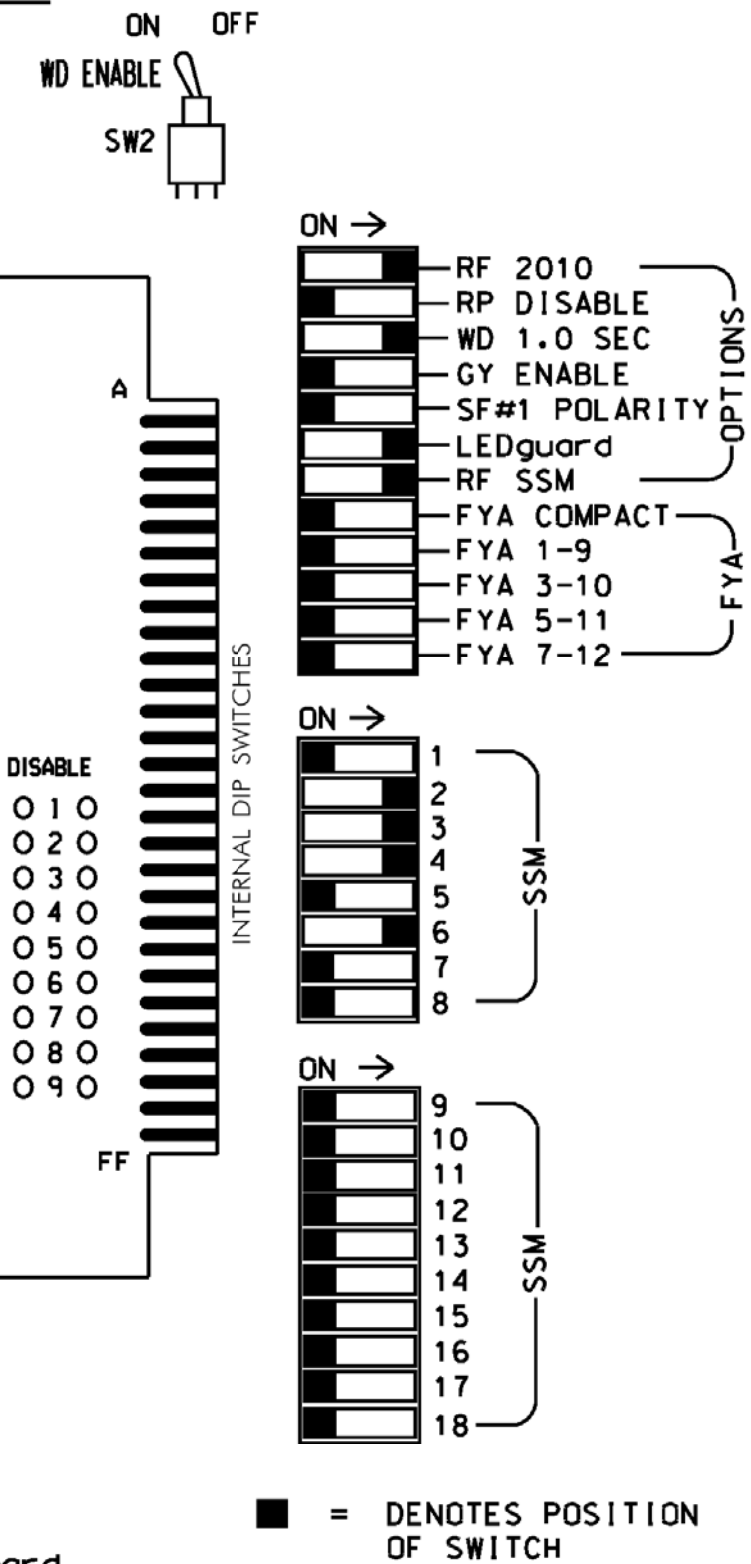
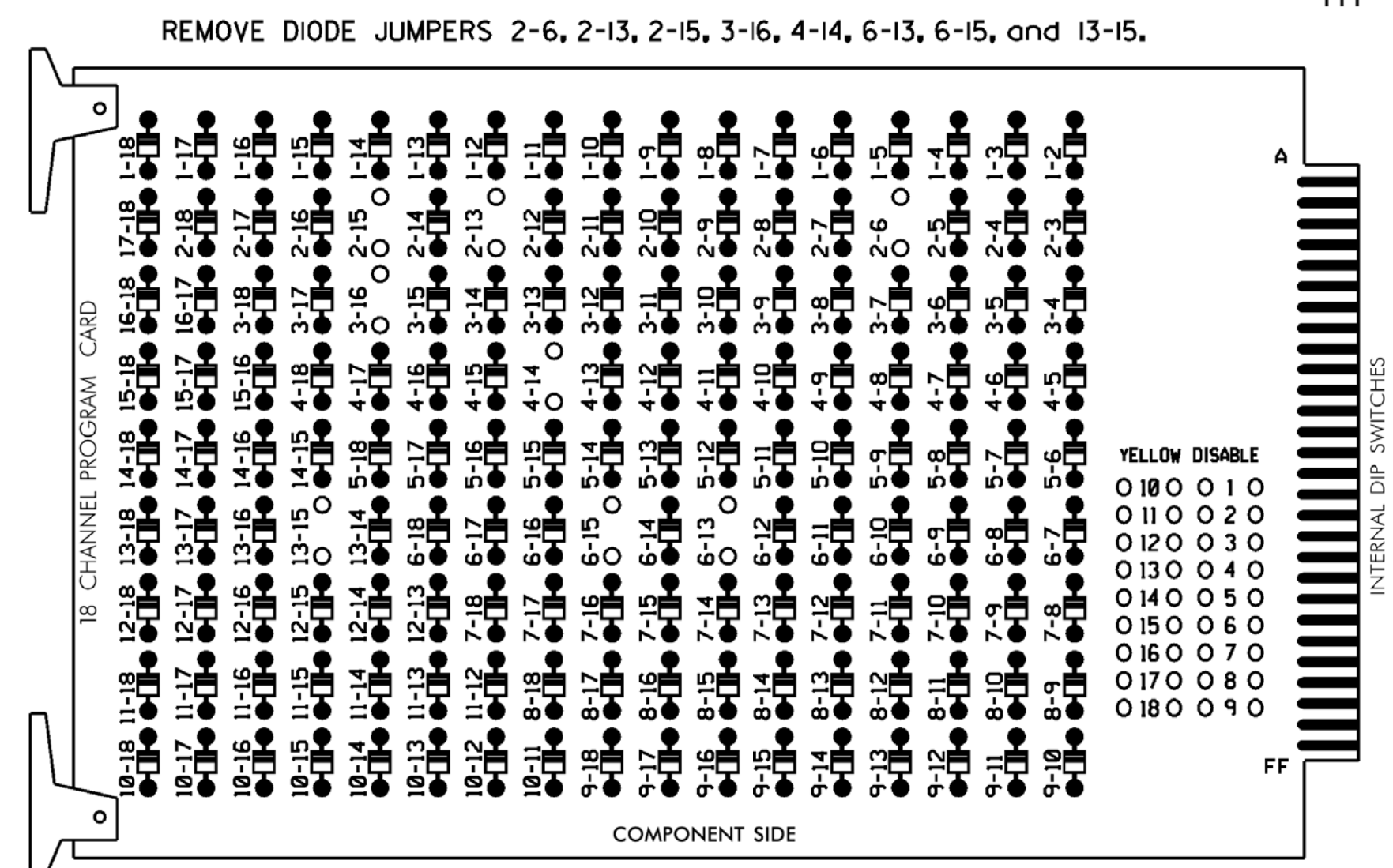
REVISIONS

INIT. DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022599
 JAMES B. VOSO
 James B. Voso
 6/13/2018
 DATE
 SIG. INVENTORY NO. 07-1852

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 Walk and 6 Walk.
3. 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,S4,S5,S6,S8,S9,S12
 PHASES USED.....2,2PED,3,3PED,4,4PED,6,6PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

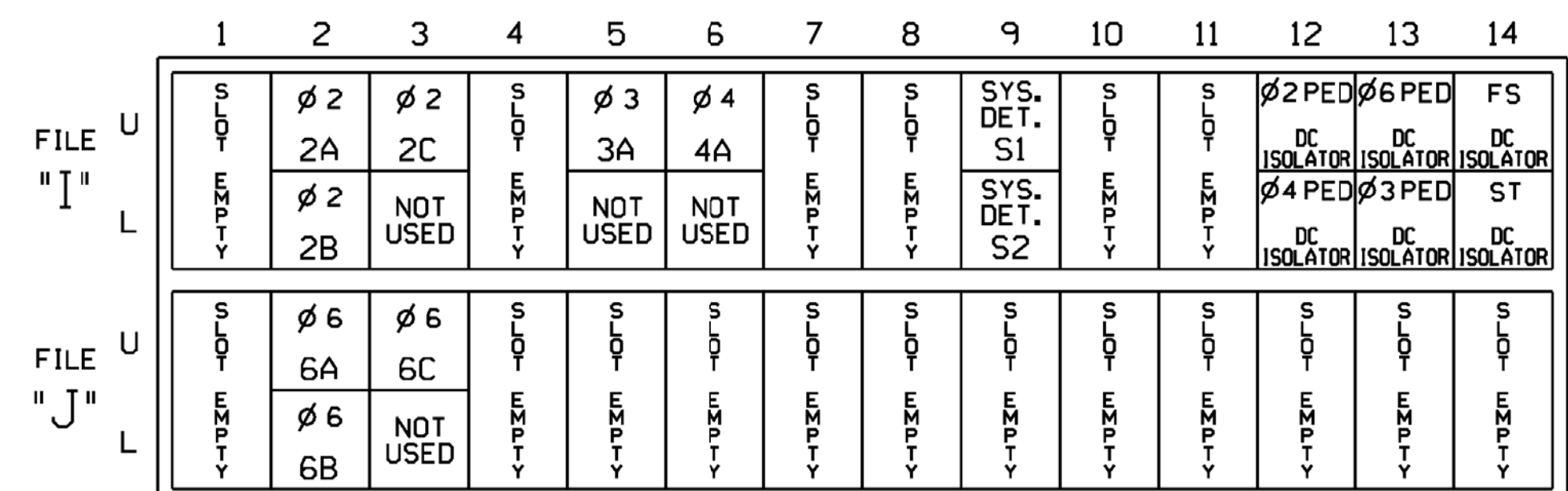
SIGNAL HEAD HOOK-UP CHART

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	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	P21 P22	31	32	41	42	P41 P42	NU	61,62	P61 P62	NU	NU	P31 P32	NU	NU	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																		
YELLOW ARROW																		
GREEN ARROW																		
Hand				113				104		119		110						
Person				115				106		121		112						

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



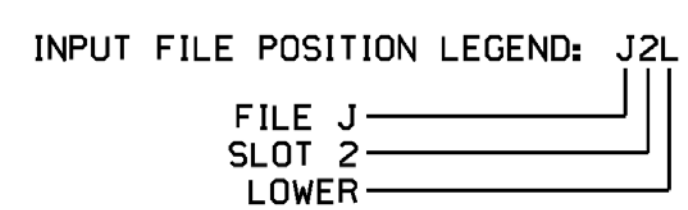
EX. 1 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

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
2B	TB2-7,8	I2L	43	12	2	YES				S
2C	TB2-9,10	I3U	63	32	2	YES				S
3A	TB4-5,6	I5U	58	3	3	YES		5		S
4A	TB4-9,10	I6U	41	4	4	YES		5		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
6B	TB3-7,8	J2L	44	16	6	YES				S
6C	TB3-9,10	J3U	64	36	6	YES				S
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P31,P32	TB8-8,9	I13L	70	PED 8	3 PED					
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED					

NOTE:
 Install DC isolators in input file slots 112 and 113.

* System Detector only. Remove any assigned vehicle phase.



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1852
 DESIGNED: September 2017
 SEALED: 6/13/2018
 REVISED: NA

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELLECTRICAL AND PROGRAMMING DETAILS FOR: SR 1363 (South Mebane Street) at Trail Two

Prepared for the Offices of: STATE OF NORTH CAROLINA

Division 7 Alamance County Burlington

PLAN DATE: September 2017 REVIEWED BY: JB Voso

PREPARED BY: SE Wilson REVIEWED BY:

REVISIONS: _____ INIT. DATE

James Voso 6/13/2018

SIG. INVENTORY NO. 07-1852



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

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

ECONOLITE ASC/3-2070 PED 3 PROGRAMMING ASSIGNMENT DETAIL

(program controller as shown)

1. From Main Menu select 6. DETECTORS
2. From DETECTOR Submenu select 3. PED DETECTOR INPUT ASSIGNMENT

PED DET PHASE ASSIGNMENT MODE: NTCIP																
PHASE	1	2	3	4	5	6	7	8								
DETECTOR	0	2	8	4	0	6	0	0								
PHASE	9	10	11	12	13	14	15	16								
DETECTOR	0	0	0	0	0	0	0	0								

← NOTICE PED DETECTOR 8
ASSIGNED TO PHASE 3

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 3. LOAD SW ASSIGN

LD SWITCH ASSIGN									
PHASE	DIMMING	---	FLASH---						
/OVLP	TYPE	R	Y	G	D	PWR	AUT	TGR	
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	Y	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	-	A	R	.
6	6	V	.	.	.	-	A	Y	X
7	7	V	.	.	.	-	A	R	.
8	8	V	.	.	.	-	A	R	X
9	1	O	.	.	.	+	A	R	X
10	2	O	.	.	.	+	A	R	X
11	3	O	.	.	.	-	A	R	.
12	4	O	.	.	.	-	A	R	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	3	P	.	.	.	-	A	.	.

NOTICE PHASE 3 PED
ASSIGNED TO LD SWITCH 16 →

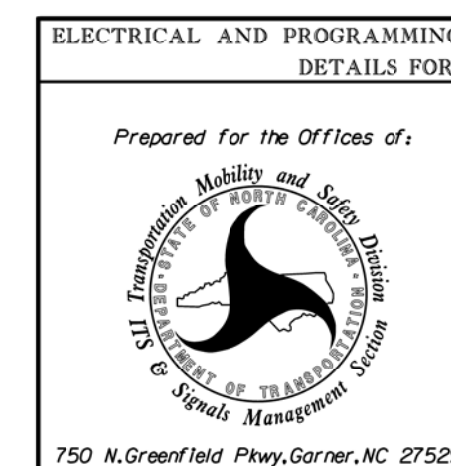
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1852
DESIGNED: September 2017
SEALED: 6/13/2018
REVISED: NA

\$\$\$\$\$\$SYTIME\$\$\$\$\$\$
 \$\$\$\$\$\$DATE\$\$\$\$\$\$
 \$\$\$\$\$\$DRAWING\$\$\$\$\$\$
 \$\$\$\$\$\$NAME\$\$\$\$\$\$



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

Electrical Detail - Sheet 2 of 2

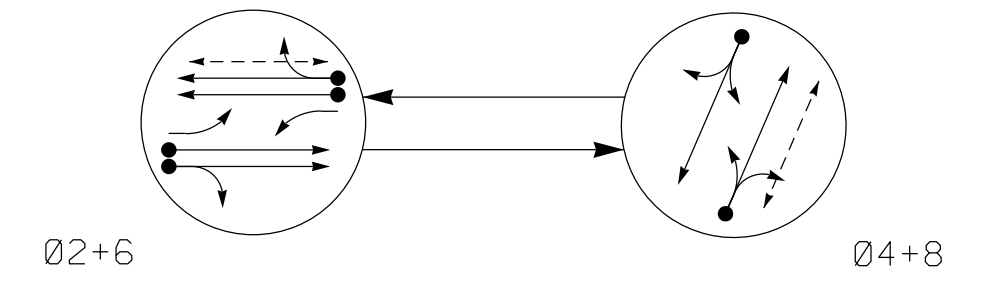


ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 1363 (South Mebane Street)	
Prepared for the Offices of:		at Trail Two	
Division 7		Alamance County	
Burlington			
PLAN DATE: September 2017	REVIEWED BY: JB Vosso		
PREPARED BY: SE Wilson	REVIEWED BY:		
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
James Vosso SIGNATURE 6/13/2018 DATE
SIG. INVENTORY NO. 07-1852

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

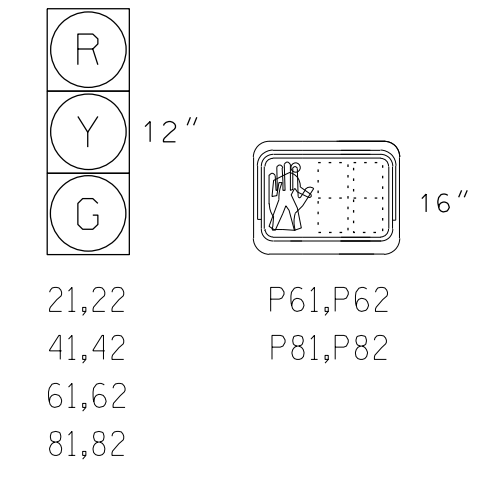
- ← DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ← UNSIGNALIZED MOVEMENT
- - - ← PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

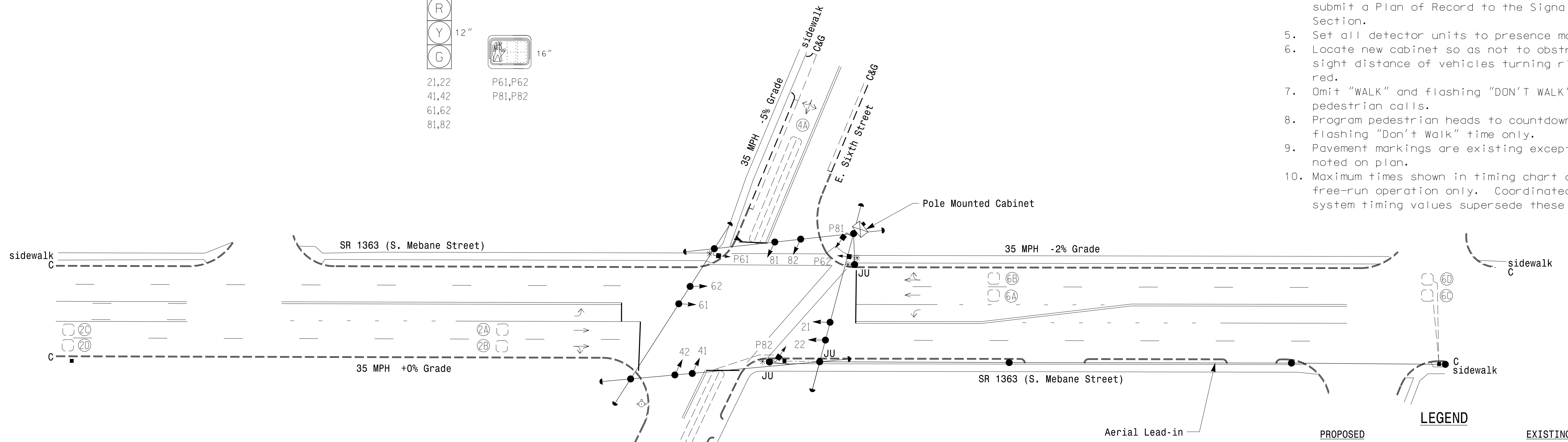
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	Exist	-	2	Yes	-	-	-	S	-	X
2B	6X6	70	Exist	-	2	Yes	-	-	-	S	-	X
2C*	6X6	300	Exist	-	2	-	-	-	-	S	-	-
2D*	6X6	300	Exist	-	2	-	-	-	-	S	-	-
4A	6X60	0	2-4-2	-	4	Yes	10	-	-	S	-	X
6A	6X6	70	Exist	-	6	Yes	-	-	-	S	-	X
6B	6X6	70	Exist	-	6	Yes	-	-	-	S	-	X
6C*	6X6	300	Exist	-	6	-	-	-	-	S	-	-
6D*	6X6	300	Exist	-	6	-	-	-	-	S	-	-
8A	6X60	0	2-4-2	-	8	Yes	10	-	-	S	-	X

* DISCONNECT LOOP

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.
- Loop data based on previous plan and field observations.
- 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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing except where noted on plan.
- 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 *	0	0	4	4
Ped Clear	0	0	13	16
Veh. Extension *	3.0	1.0	3.0	1.0
Max 1 *	45	30	45	30
Yellow	3.8	4.2	4.0	3.5
Red Clear	2.0	1.4	1.9	1.3
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.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
— Sign	— Sign
□ Pedestrian Signal Head	□ Pedestrian Signal Head
* Pedestrian Push Button & Sign	* Pedestrian 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	N/A Right of Way
→ Directional Arrow	→ Directional Arrow
N/A Fire Hydrant	⊕ Fire Hydrant

13-UNA-2018-17-47
R:\66015\1707\off\caks\gnals\gnals\07-1886.dgn
KANDERSON AT CHA-Y. ANDERSON

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Plans Prepared By:

DRMP, Inc.
8000 Regency Parkway, Suite 175
Cary, NC 27519
NC License No. C-2213 (919) 650-1038

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

Division 7 Alamance County Burlington

PLAN DATE: November 2017 REVIEWED BY: AJ Davis

PREPARED BY: RD Lawton REVIEWED BY: LM Moon

REVISIONS	INIT.	DATE

SEAL

STATE OF NORTH CAROLINA

PROFESSIONAL ENGINEER

LISA M. MOON

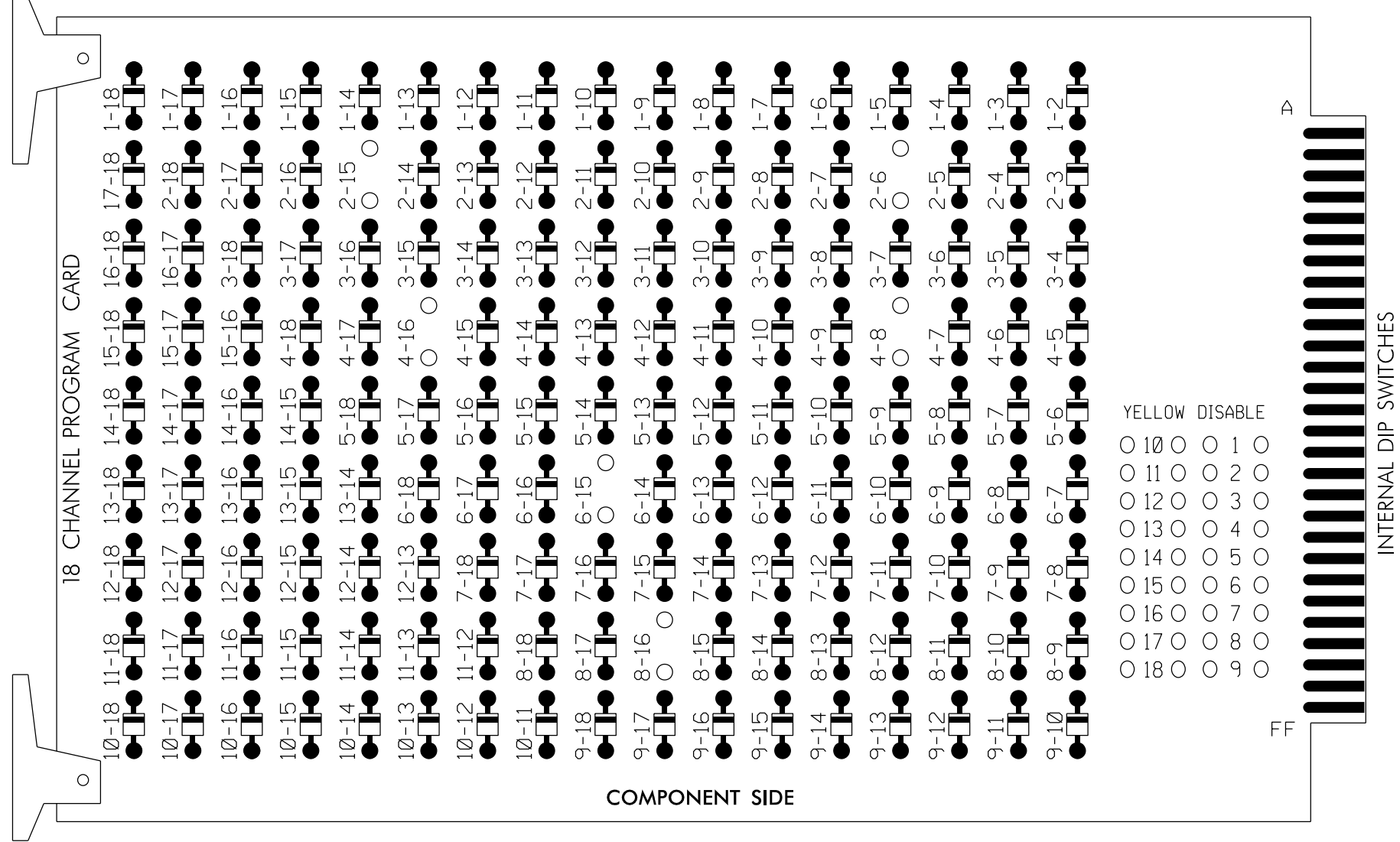
DocuSigned by:
Lisa M. Moon 6/13/2018

SIG. INVENTORY NO. 07-1886

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

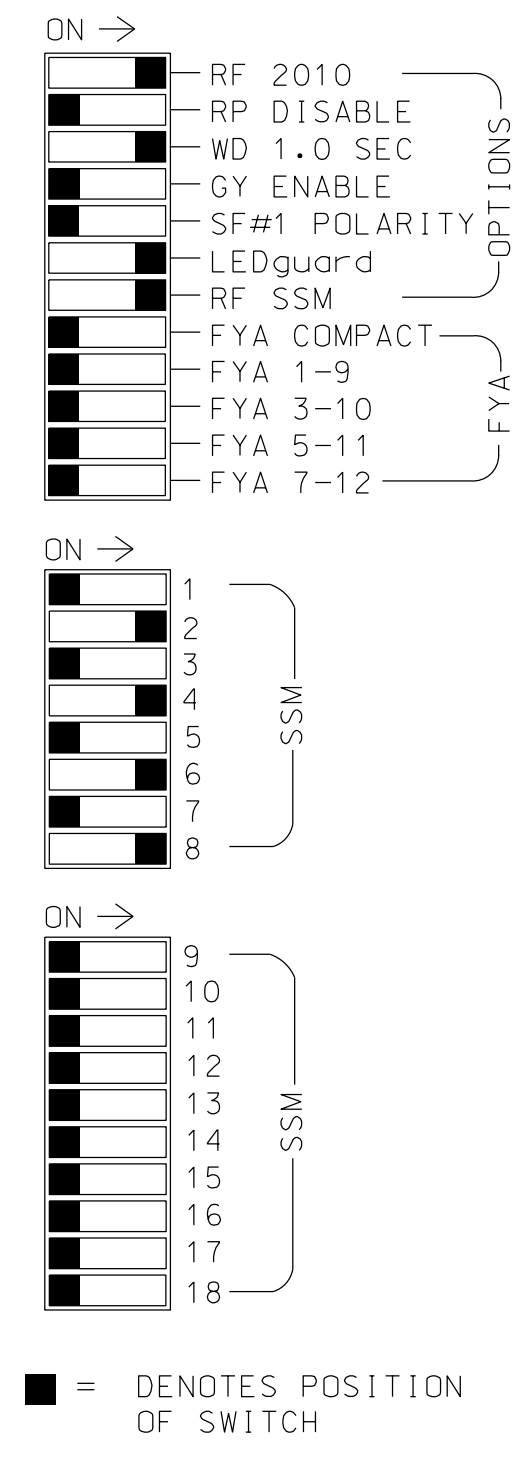
REMOVE DIODE JUMPERS 2-6, 2-15, 4-8, 4-16, 6-15, and 8-16.



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.

REMOVE JUMPERS AS SHOWN



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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 walk.
4. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONDLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S9,S11,S12
 PHASES USED.....2,4,6,6PED,8,8PED
 OVERLAPS.....NONE

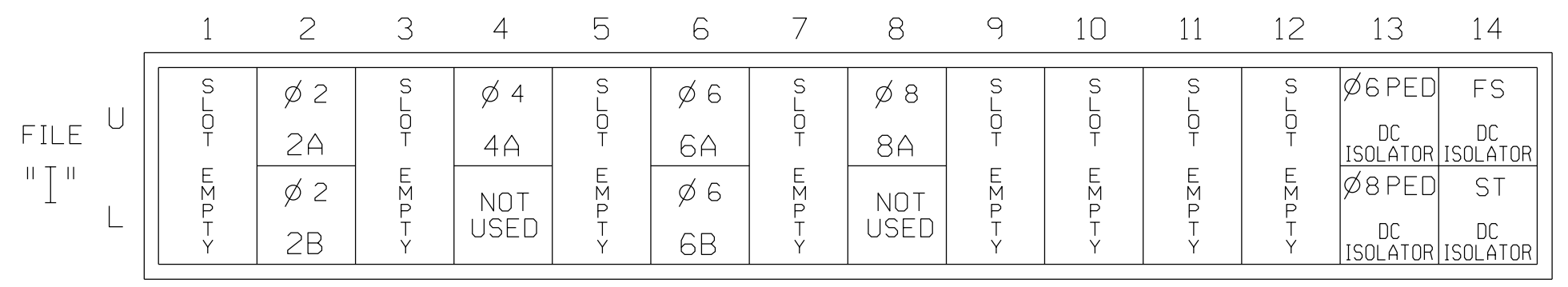
SIGNAL HEAD HOOK-UP CHART

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	NU	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon									119			110
Walking person icon									121			112

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

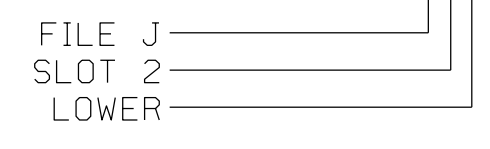
FS = FLASH SENSE
 ST = STOP TIME

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	TB21-3,4	I2U	39	2	2	YES				S
2B	TB23-3,4	I2L	43	12	2	YES				S
4A	TB21-7,8	I4U	41	4	4	YES		10		S
6A	TB21-11,12	I6U	40	6	6	YES				S
6B	TB23-11,12	I6L	44	16	6	YES				S
8A	TB22-1,2	I8U	42	8	8	YES		10		S
PED PUSH BUTTONS										
P61,P62	TB22-11,12	I13U	68	PED 6	6 PED					
P81,P82	TB24-11,12	I13L	70	PED 8	8 PED					

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 113.

INPUT FILE POSITION LEGEND: J2L



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1886
 DESIGNED: NOVEMBER 2017
 SEALED: 06-13-2018
 REVISED: N/A

Electrical Detail

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 (819) 650-1038

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

Division 7 Alamance County Burlington

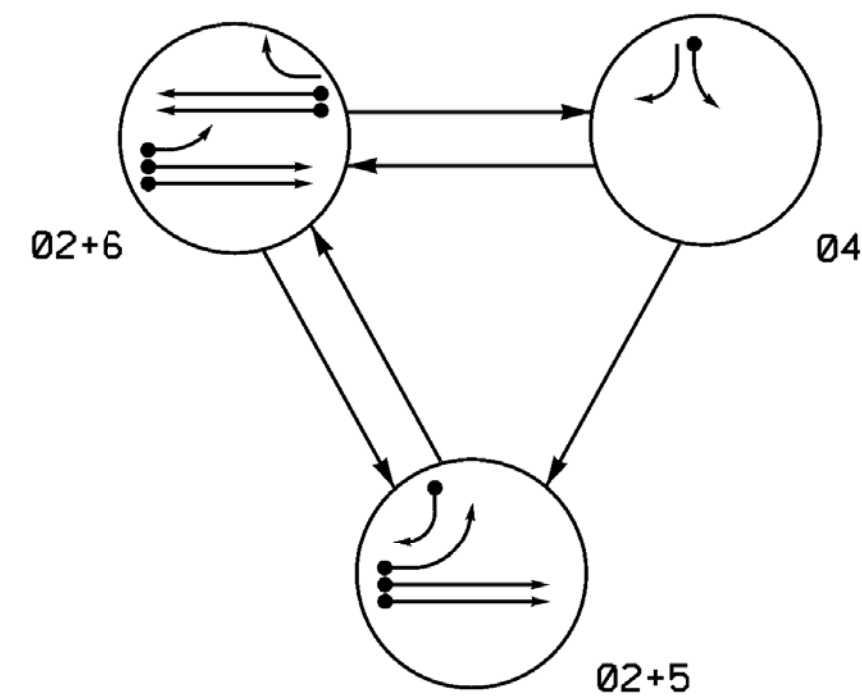
PLAN DATE: November 2017	REVIEWED BY: AJ Davis
PREPARED BY: RD Lawton	REVIEWED BY: LM Moon
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DocuSigned by:
 Lisa M. Moon 6/13/2018
 DATE: 6/13/2018
 SIG. INVENTORY NO. 07-1886

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	G	R	Y
61, 62	R	G	R	Y

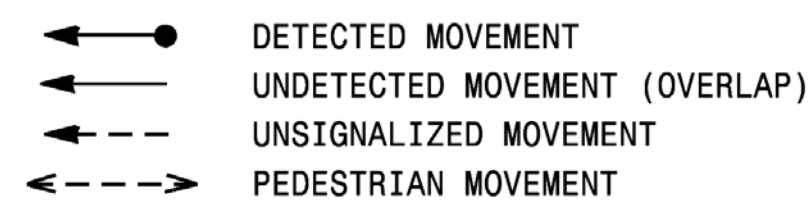
ASC/3 DETECTOR INSTALLATION CHART											
LOOP	DETECTOR				PROGRAMMING						
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP
2A,2B	6x6	360	EXIST.	-	2	Yes	-	-	X	N	X
4A	6x60	0	2-4-2	-	4	Yes	-	3	-	S	X
5A	6x60	0	2-4-2	-	5	Yes	-	15	-	S	X
5B	6x60	0	2-4-2	-	2	Yes	-	3	-	G	X
6A,6B	6x6	360	EXIST.	-	6	Yes	-	-	X	N	X

3 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

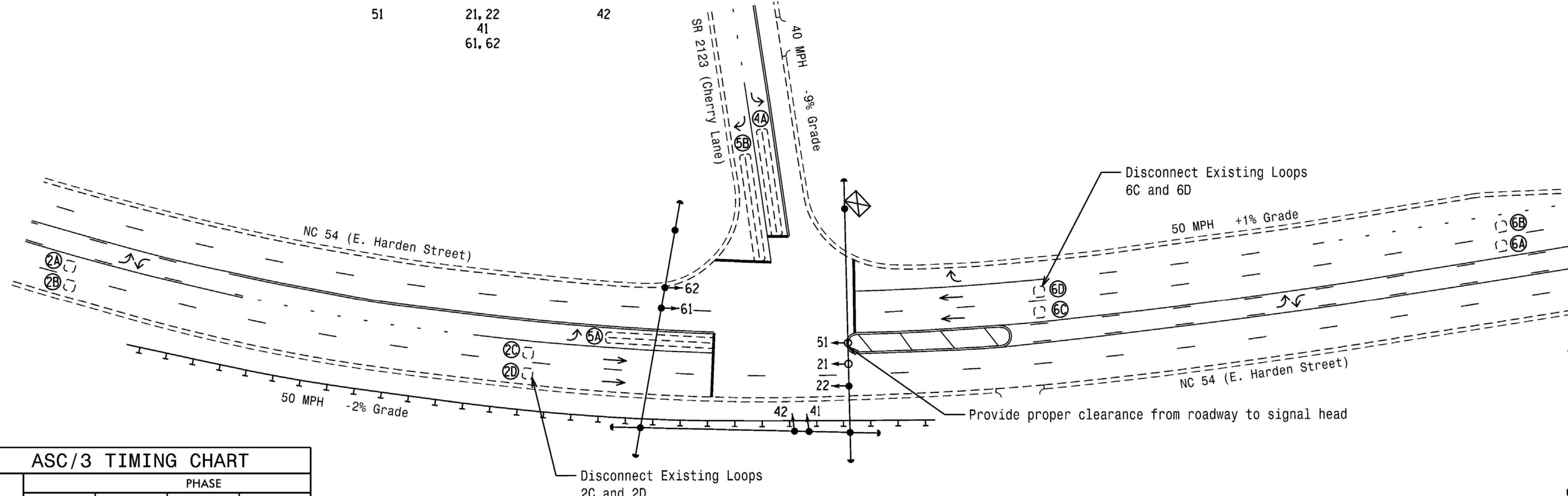
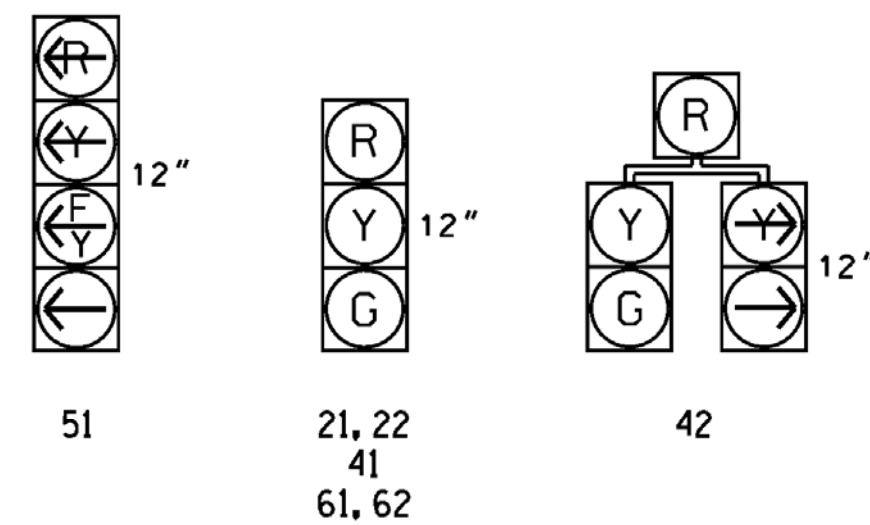
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal head numbered 22.
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

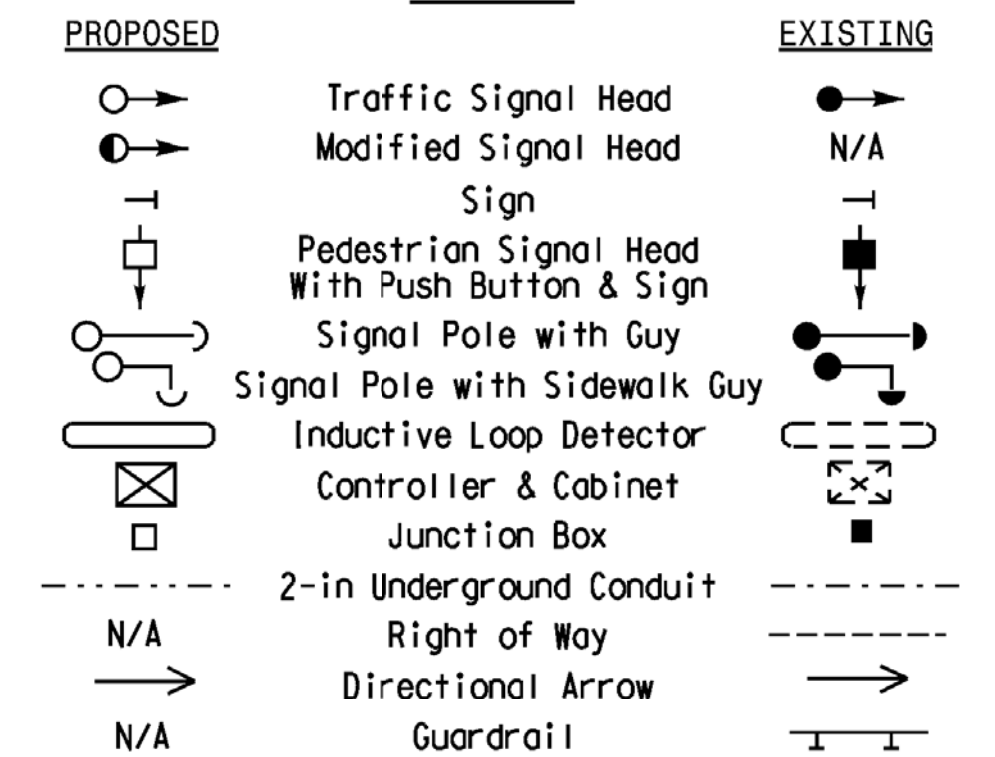


SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND



FEATURE	PHASE			
	2	4	5	6
Min Green *	14	7	7	14
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	6.0	1.0	1.0	6.0
Max 1 *	60	25	15	60
Yellow	5.0	3.3	3.0	5.0
Red Clear	1.0	2.6	2.3	1.0
Actuations 34 Add *	0	-	-	0
Seconds /Actuation *	1.5	-	-	1.5
Max Initial *	40	-	-	40
Time Before Reduction *	20	-	-	20
Time To Reduce *	20	-	-	20
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.



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

Signal Upgrade

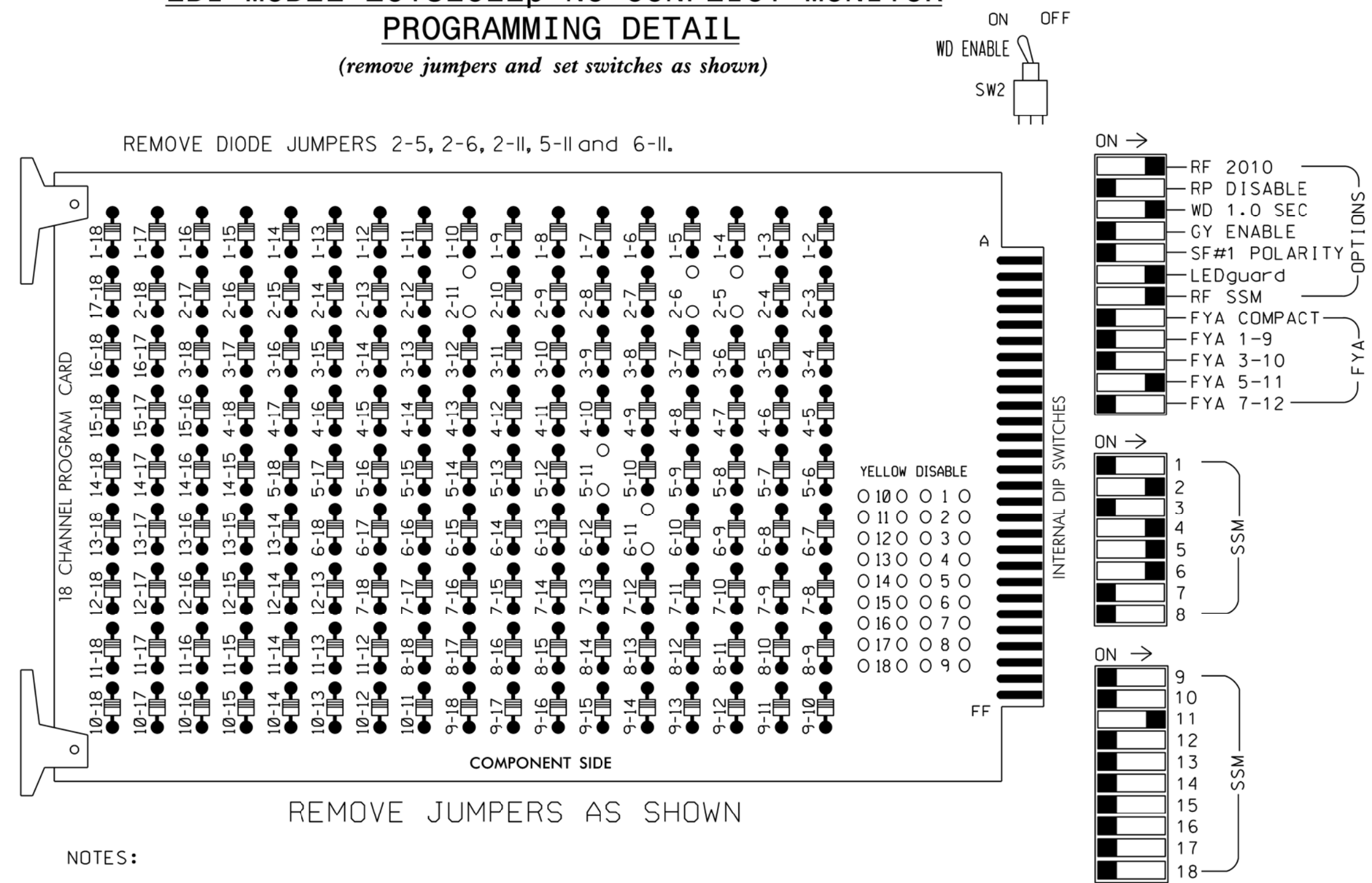
	NC 54 (E. Harden Street) at SR 2123 (Cherry Lane)		SEAL JAMES B. VOSO ENGINEER No. 022599 6/13/2018
	Division 7 Alamance County PLAN DATE: September 2017 PREPARED BY: SE Wilson	Burlington REVIEWED BY: JB Voso REVIEWED BY:	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

*****SYTIME*****
*****BUSINESS*****

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in 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	
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	42	51	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 GREEN																			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 below.

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,AUXS4
 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

(front view)

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

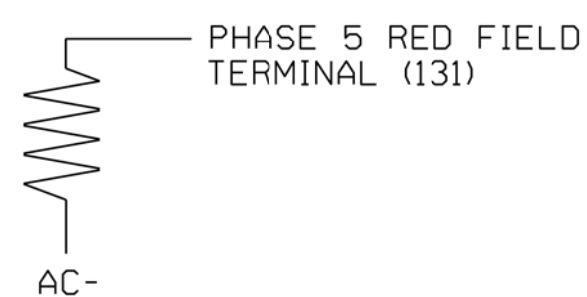
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

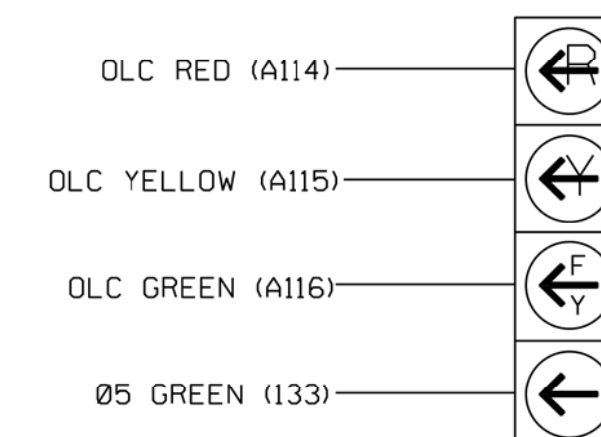
ACCEPTABLE VALUES

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



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



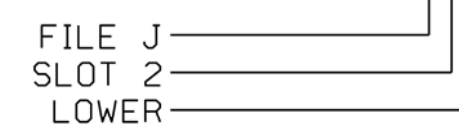
51

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		3		S
5A ¹	TB3-1,2	J1U	55	5	5	YES		15		S
		I4U	47	22	2	YES		3		G
6A,6B	TB3-5,6	J2U	40	6	6	YES			X	N
5B	TB3-9,10	J3U	64	36	5	YES		15		S

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

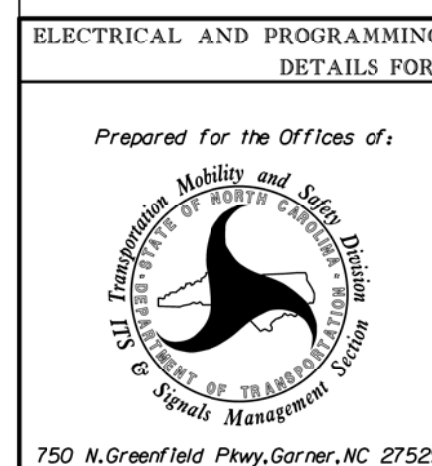
INPUT FILE POSITION LEGEND: J2L



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



Electrical and Programming Details For:

NC 54 (E. Harden Street) at SR 2123 (Cherry Lane)

Division 7 Alamance County Burlington

PLAN DATE: September 2017 REVIEWED BY: JB Vosso

PREPARED BY: SE Wilson REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

James Vosso
 PROFESSIONAL ENGINEER
 STATE OF NORTH CAROLINA
 License No. 14090

6/13/2018

SIGNATURE DATE

SIG. INVENTORY NO. 07-1938

*****SYTIME*****
 *****SYTIME*****
 *****SYTIME*****
 *****SYTIME*****
 *****SYTIME*****

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

- 1. From Main Menu select 2. CONTROLLER
 - 1. 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: 07-1938
 DESIGNED: September 2017
 SEALED: 6/13/2018
 REVISED: NA


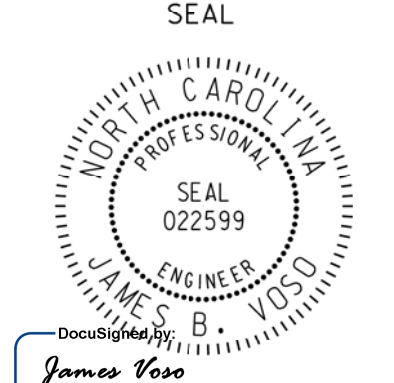
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 \$\$\$\$\$\$DOCS\$\$\$\$\$\$
 \$\$\$\$\$\$SERIAL\$\$\$\$\$\$



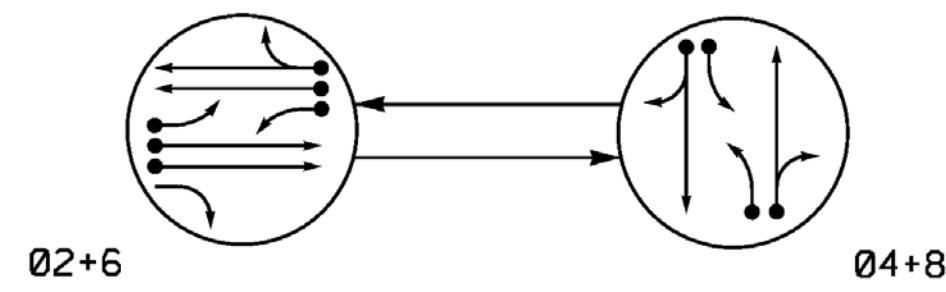
Mattern & Craig
 ENGINEERS • SURVEYORS

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

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 54 (E. Harden Street) at SR 2123 (Cherry Lane)	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED						
Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Division 7 Alamance County Burlington PLAN DATE: September 2017 REVIEWED BY: JB Voso PREPARED BY: SE Wilson REVIEWED BY:	SEAL  James B. Voso 140FD00379E041F SIGNATURE DATE						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				6/13/2018 DATE	SIG. INVENTORY NO. 07-1938
REVISIONS	INIT.	DATE						

PHASING DIAGRAM



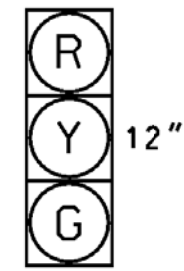
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21, 22, 23	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.



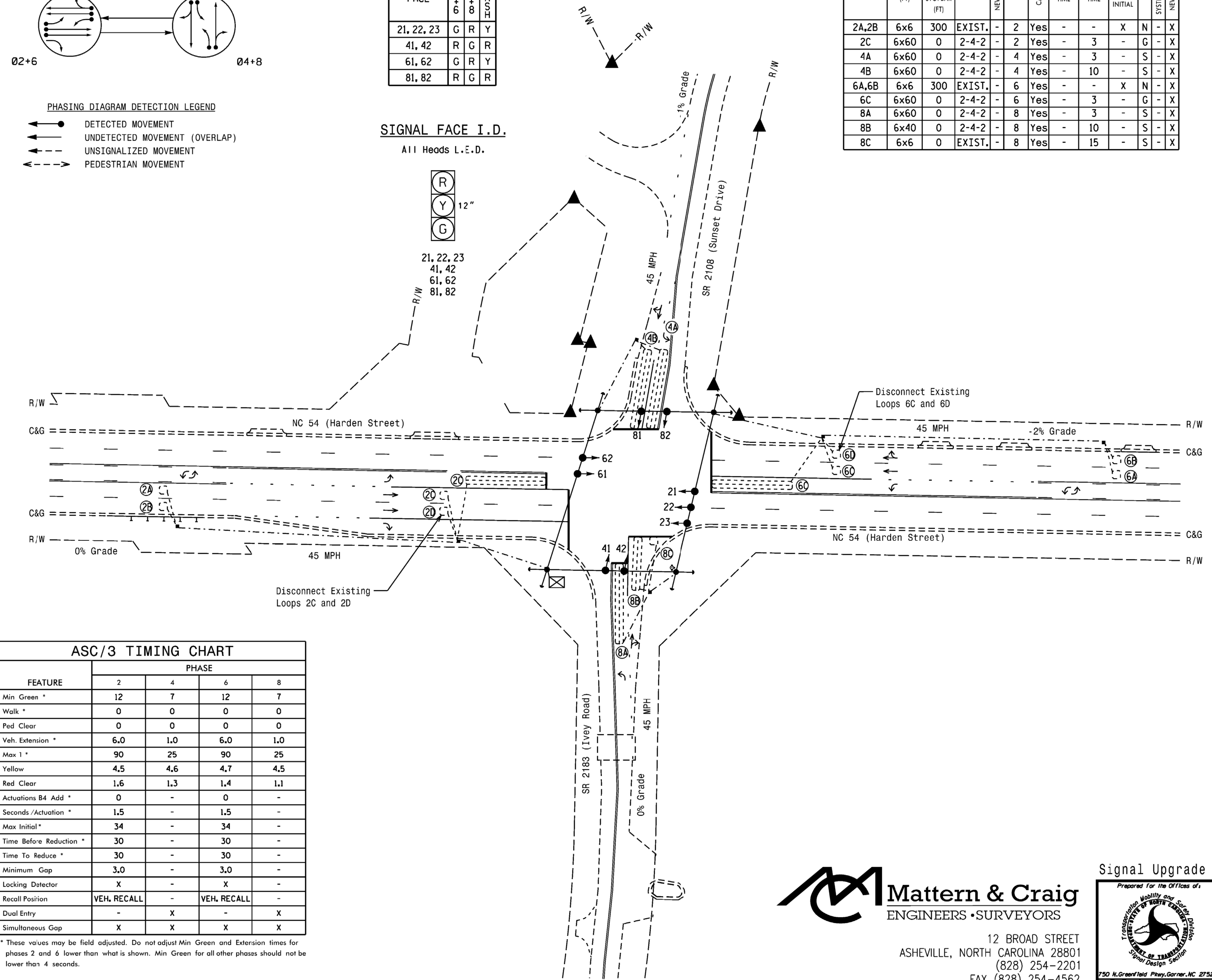
21, 22, 23
41, 42
61, 62
81, 82

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	SYSTEM LOOP	NEW CARD
2A,2B	6x6	300	EXIST.	-	2	Yes	-	-	X	N	-	X
2C	6x60	0	2-4-2	-	2	Yes	-	3	-	G	-	X
4A	6x60	0	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6x60	0	2-4-2	-	4	Yes	-	10	-	S	-	X
6A,6B	6x6	300	EXIST.	-	6	Yes	-	-	X	N	-	X
6C	6x60	0	2-4-2	-	6	Yes	-	3	-	G	-	X
8A	6x60	0	2-4-2	-	8	Yes	-	3	-	S	-	X
8B	6x40	0	2-4-2	-	8	Yes	-	10	-	S	-	X
8C	6x6	0	EXIST.	-	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.



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	6.0	1.0	6.0	1.0
Max I *	90	25	90	25
Yellow	4.5	4.6	4.7	4.5
Red Clear	1.6	1.3	1.4	1.1
Actuations B4 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

* 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 phasess should not be lower than 4 seconds.

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	→	



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
750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NC 54 (Harden Street)
at
SR 2108 (Sunset Drive)
/ SR 2183 (Ivey Road)
Graham

Division 7 Alamance County

PLAN DATE: September 2017 REVIEWED BY: JB Voso

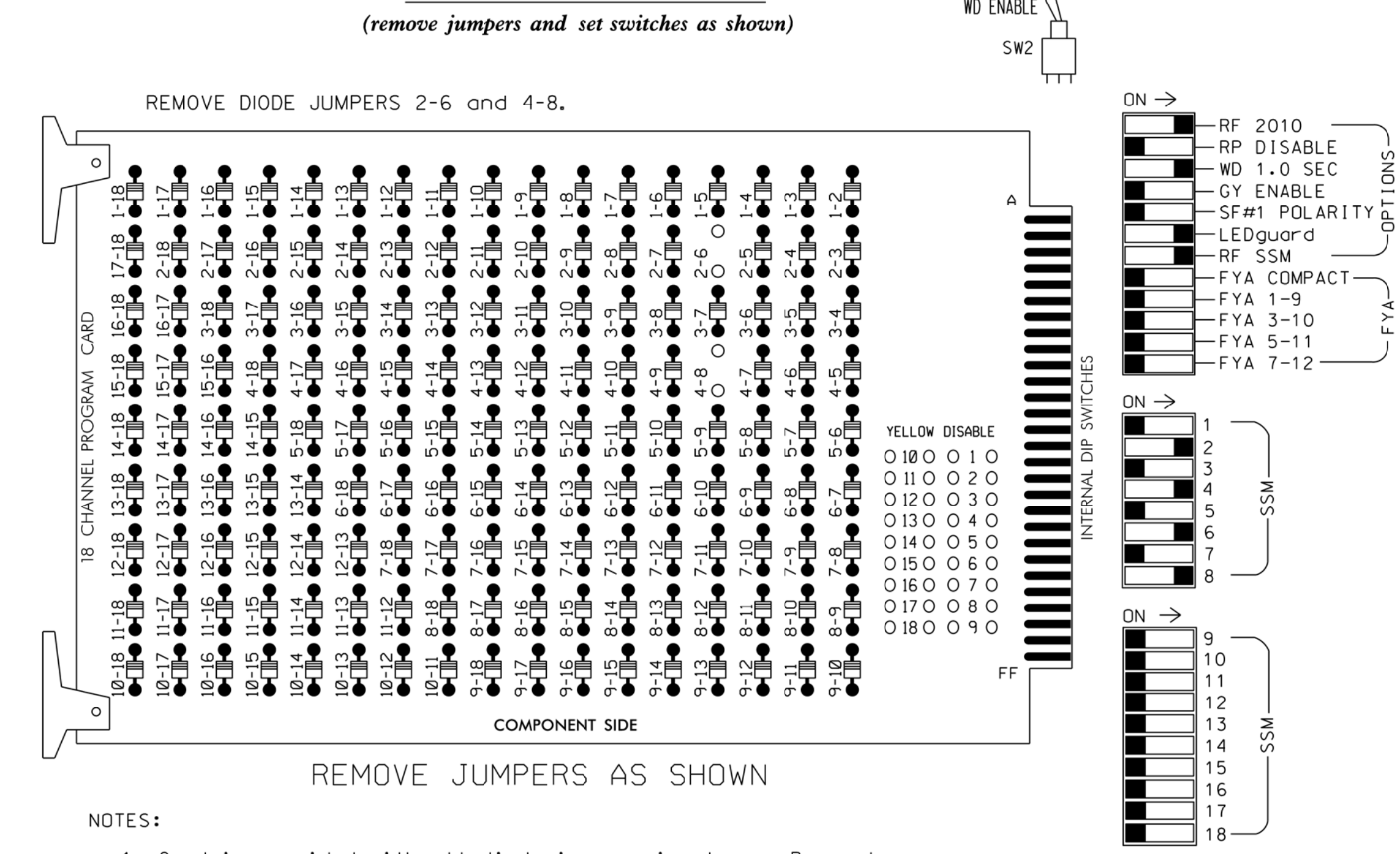
PREPARED BY: SE Wilson REVIEWED BY:

REVISIONS	INIT.	DATE

SIG. INVENTORY NO. 07-1939

*****SYSTEM *****
*****USER *****

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 phases 4 and 8 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.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22 23	NU	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

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

INPUT FILE POSITION LAYOUT
(front view)

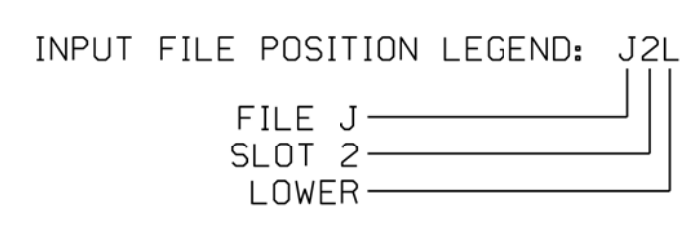
FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	∅ 2	S	∅ 2	S	∅ 4	S	S	S	S	S	S	S	FS
I	T	2A,2B	T	2C	T	4A	T	T	T	T	T	T	T	DC ISOLATOR
L	Y	NOT USED	Y	NOT USED	Y	4B	Y	Y	Y	Y	Y	Y	Y	DC ISOLATOR
U	S	∅ 6	S	∅ 6	S	∅ 8	∅ 8	S	S	S	S	S	S	S
I	T	6A,6B	T	6C	T	8A	8C	T	T	T	T	T	T	T
L	Y	NOT USED	Y	NOT USED	Y	8B	NOT USED	Y	Y	Y	Y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

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
2C	TB4-1,2	I4U	47	22	2	YES		3		G
4A	TB4-9,10	I6U	41	4	4	YES		3		S
4B	TB4-11,12	I6L	45	14	4	YES		10		S
6A,6B	TB3-5,6	J2U	40	6	6	YES			X	N
6C	TB5-1,2	J4U	48	26	6	YES		3		G
8A	TB5-9,10	J6U	42	8	8	YES		3		S
8B	TB5-11,12	J6L	46	18	8	YES		10		S
8C	TB7-1,2	J7U	66	38	8	YES		15		S



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1939
 DESIGNED: September 2017
 SEALED: 6/13/2018
 REVISED: NA

*****SYTIME*****
 *****DOWNS*****
 *****JOB*****
 *****JOB*****



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

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



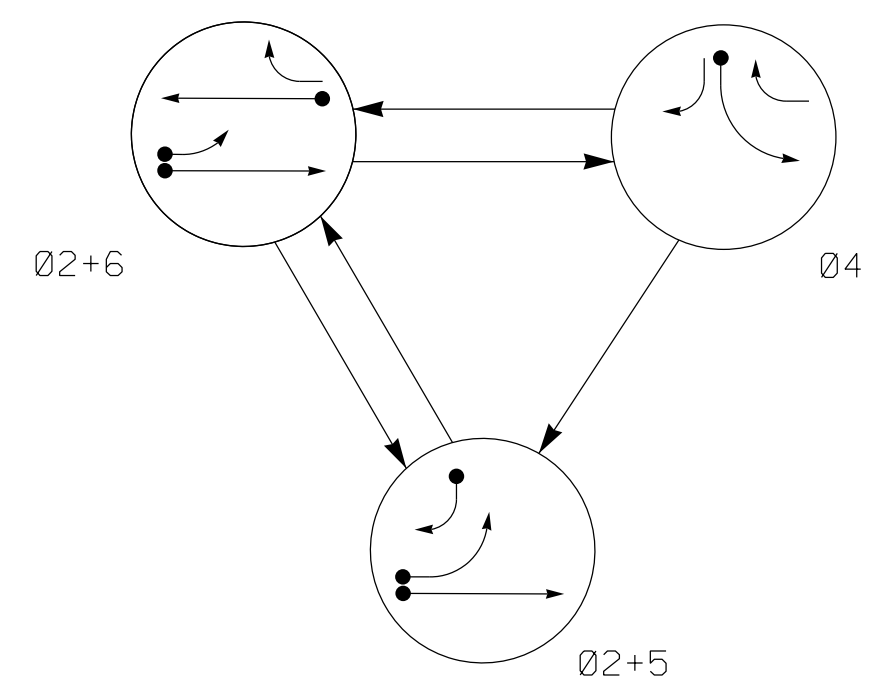
NC 54 (Harden Street)
 at
 SR 2108 (Sunset Drive)
 / SR 2183 (Ivey Road)

Division 7	Alamance County	Graham
PLAN DATE: September 2017	REVIEWED BY: JB Voso	
PREPARED BY: SE Wilson	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 JAMES B. VOSO
 SEAL 022599
 James Voso
 6/13/2018
 SIGNATURE DATE
 SIG. INVENTORY NO. 07-1939

PHASING DIAGRAM



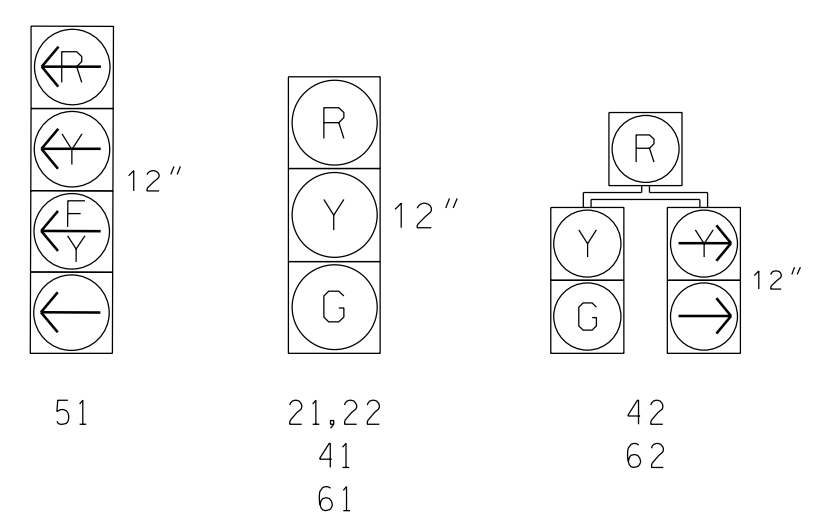
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	2	4	5	6
21,22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	—	—	—	—
61	R	G	R	Y
62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

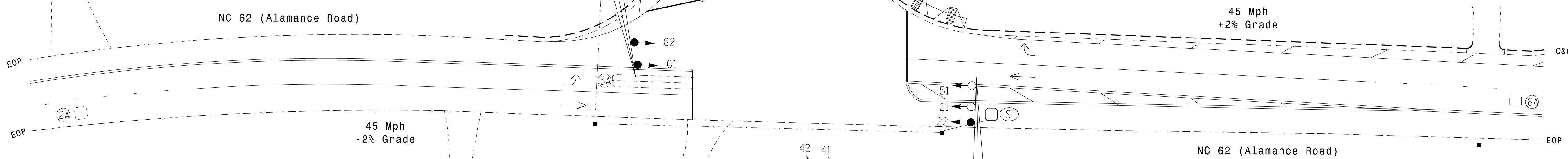


ASC/3 DETECTOR INSTALLATION CHART												
DETECTOR				PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	3	-	S	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	10	-	S	-	X
5C	6X15	0	EXIST	-	5	Yes	-	15	-	S	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
S1	6X6	+140	4	X	-	No	-	-	-	N	X	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 head numbered 22.
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 to obstruct sight distances of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



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	2.0	2.0	6.0
Max 1 *	90	30	45	90
Yellow	4.7	3.0	3.0	4.7
Red Clear	1.6	3.2	2.4	1.6
Actuations B4 Add *	0	-	-	0
Seconds / Actuation *	2.5	-	-	2.5
Max Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
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	
PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
◐ → Modified Signal Head	— N/A
— Sign	—
⊥ Pedestrian Signal Head	⊥
⊥ With Push Button & Sign	⊥
○ Signal Pole with Guy	●
○ Signal Pole with Sidewalk Guy	●
⊥ Metal Pole with Mastarm	⊥
⊥ Inductive Loop Detector	⊥
⊥ Controller & Cabinet	⊥
□ Junction Box	■
--- 2-in Underground Conduit	---
N/A Right of Way	---
→ Directional Arrow	→
N/A Curb Ramp	▲

Signal Upgrade

Prepared for the Offices of:

NC 62 (Alamance Road) at SR 1213 (Grand Oaks Boulevard)

Division 7 Alamance County Burlington

PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion

PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

SCALE: 1"=30'

DATE: 6/7/2018

SIGNATURE: Pamela Alexander

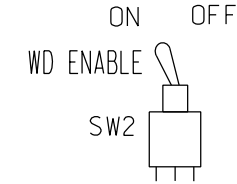
SIG. INVENTORY NO. 07-1990

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

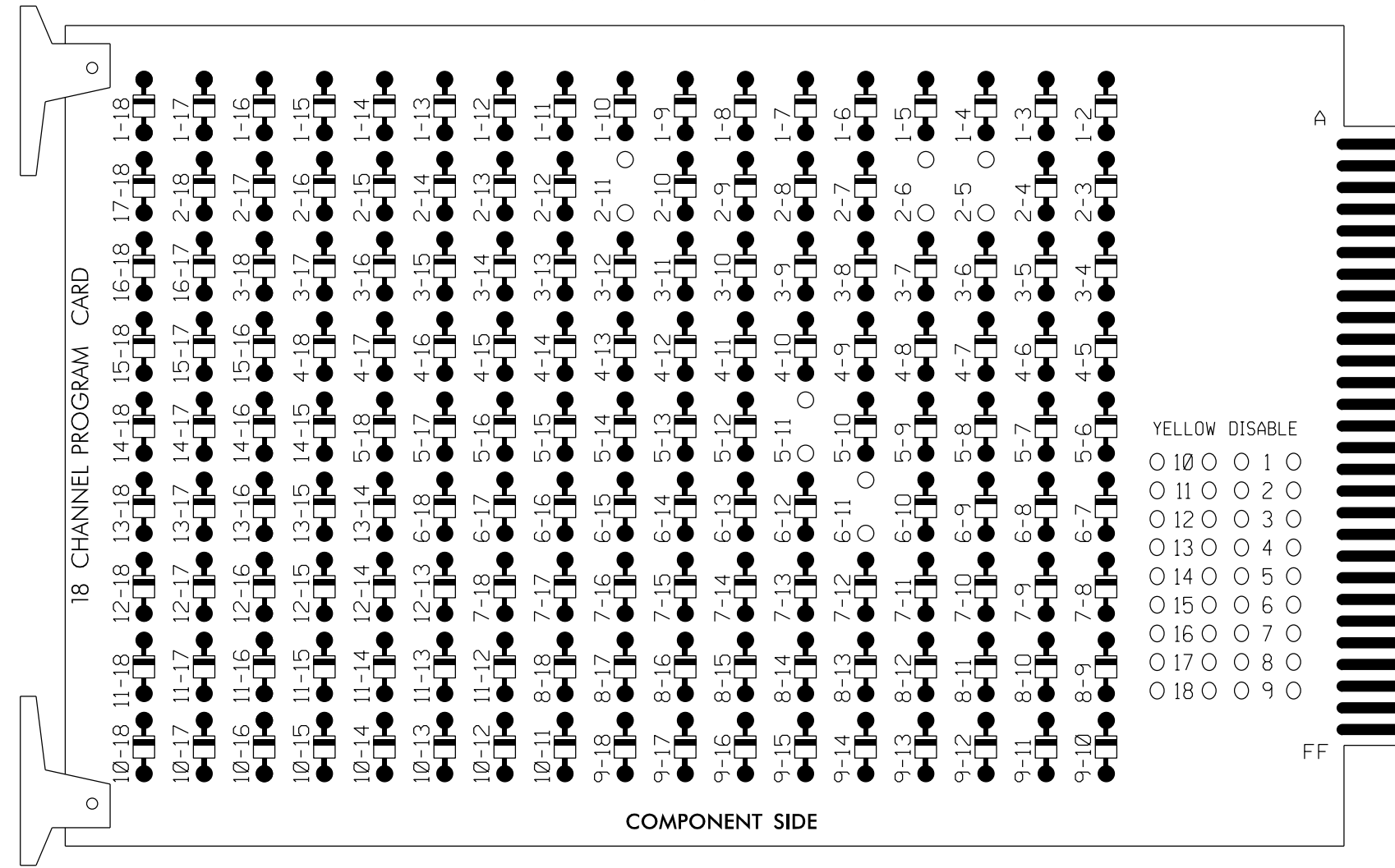
07-JUN-2018 11:15 D:\Transpor\at\work\proj\c\cur\00056469 U-6015 B-G S19 Sys\Task 05_11_Signal\Des\gsm07-1990.dgn ALEX3361 AT LUS210649

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



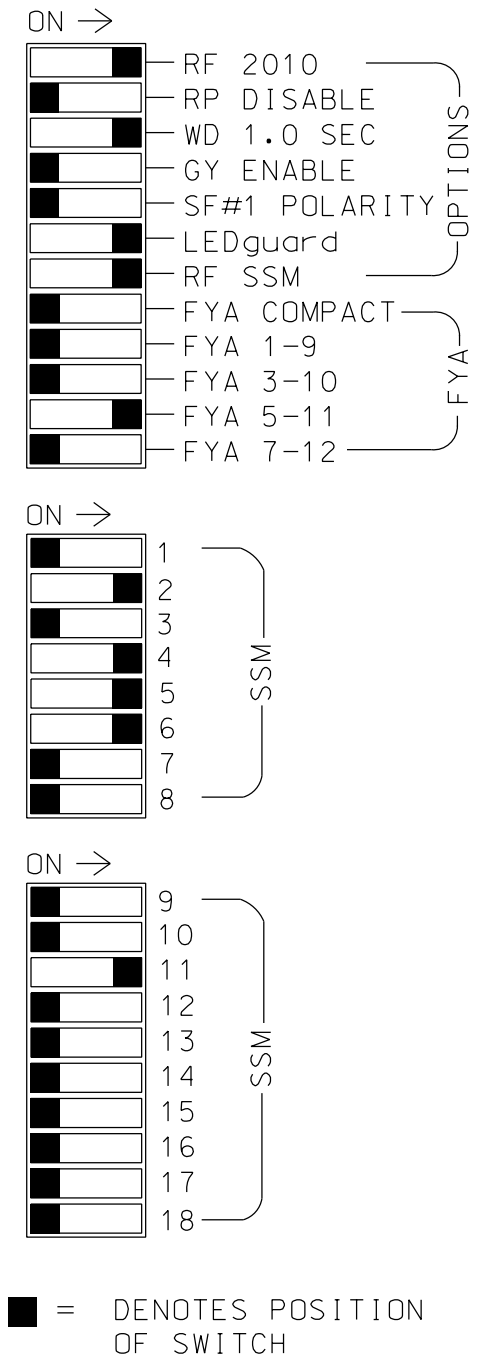
REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 5-11, and 6-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- 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.....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.

SIGNAL HEAD HOOK-UP CHART

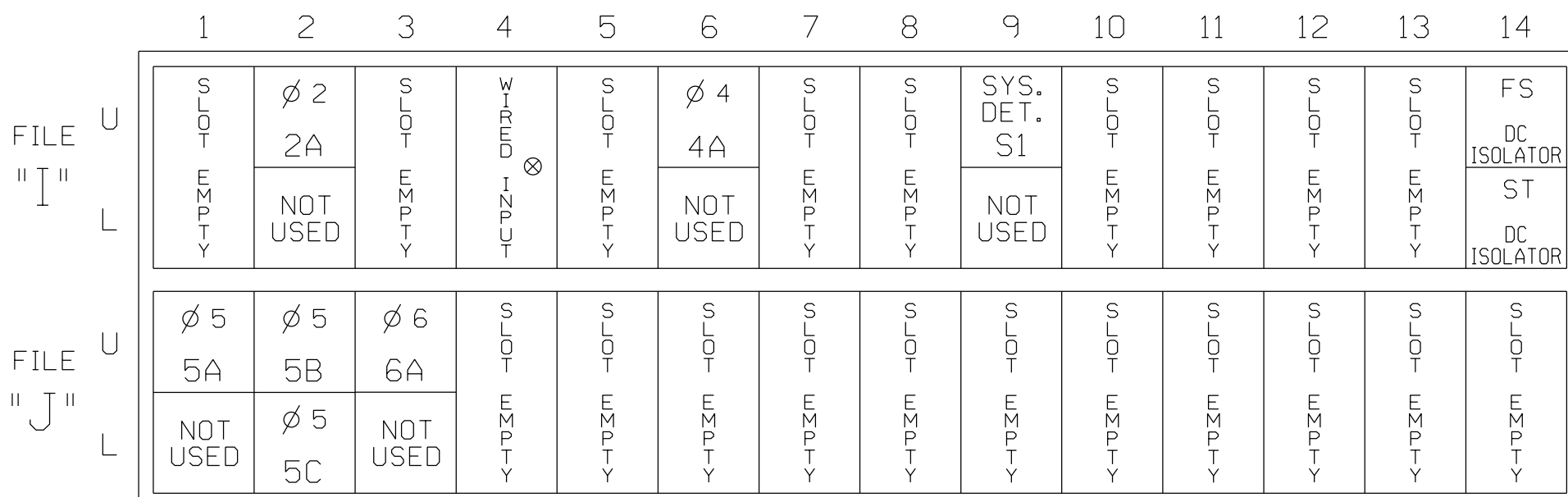
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	42	51*	61,62	NU	NU	NU	NU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

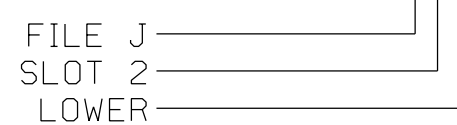
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		3		S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
5A ¹	TB3-1,2	J1U	55	5★	5	YES		15		S
5B	TB3-5,6	J2U	40	6	6	YES		10		S
5C	TB3-7,8	J2L	44	16	6	YES		15		S
6A	TB3-9,10	J3U	64	36	6	YES			X	N

* System detector only. Remove any assigned vehicle phase.

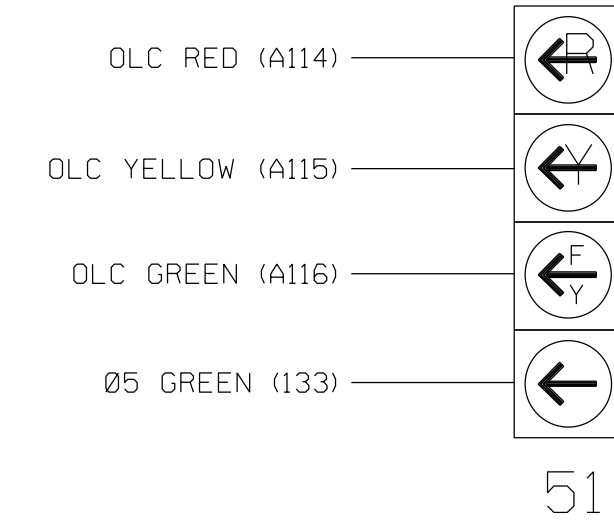
¹Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

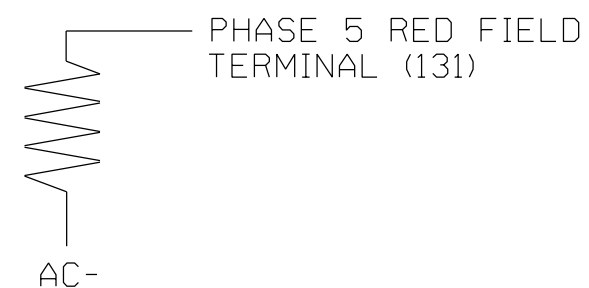


LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

ACCEPTABLE VALUES

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

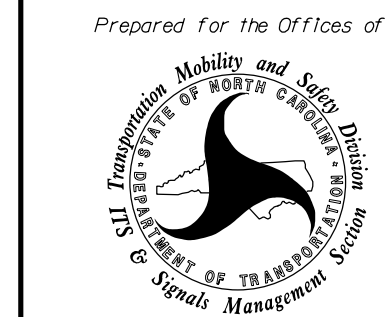


Electrical Detail - Sheet 1 of 2

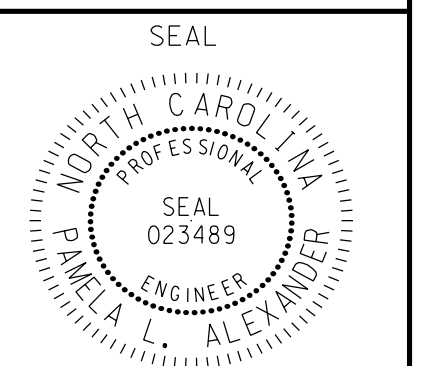
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 62 (Alamance Road)
 at
 SR 1213 (Grand Oaks Boulevard)



Division 7	Alamance County	Burlington
PLANNED BY: NA Ptk	REVIEWED BY: AM Encarnacion	
PREPARED BY: NA Ptk	REVIEWED BY: PL Alexander	
REVISIONS	INIT.	DATE



DATE: 6/9/2018

SIG. INVENTORY NO. 07-1990

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

750 N. Greenfield Pkwy, Garner, NC 27529

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: 07-1990
 DESIGNED: November 2017
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail - Sheet 2 of 2

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

<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>NC 62 (Alamance Road) at SR 1213 (Grand Oaks Boulevard)</p> <p style="font-size: x-small;">Division 7 Alamance County Burlington</p> <p style="font-size: x-small;">PLAN DATE: November 2017 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;"> <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-size: x-small;">SEAL</p> <p style="font-size: x-small; text-align: center;">Sealed by: Pamela Alexander DATE: 6/9/2018</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1990</p>
REVISIONS	INIT.	DATE						

ATKINS

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

09-JUN-2018 14:15
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 ALEX3361 AT LUS30669

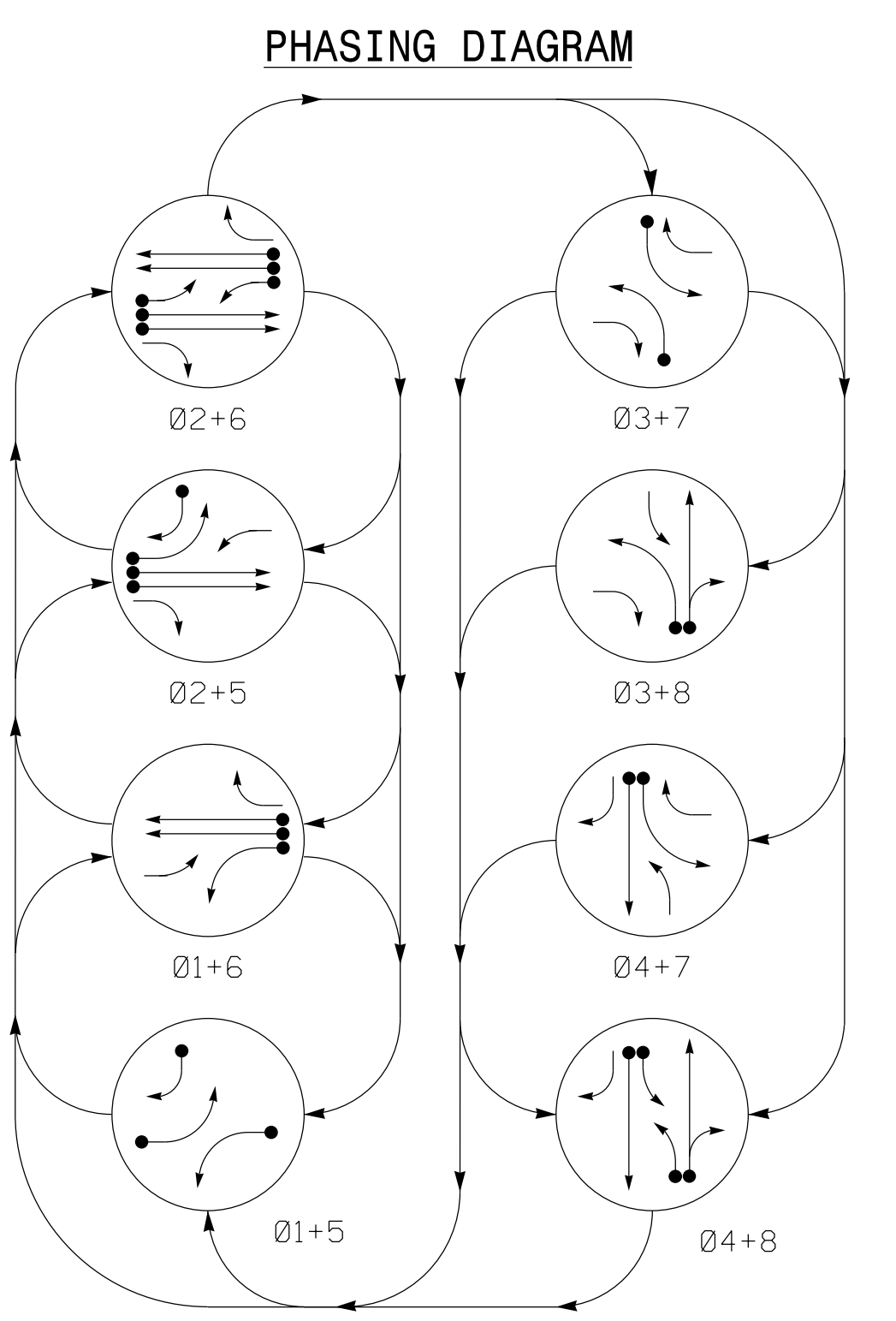
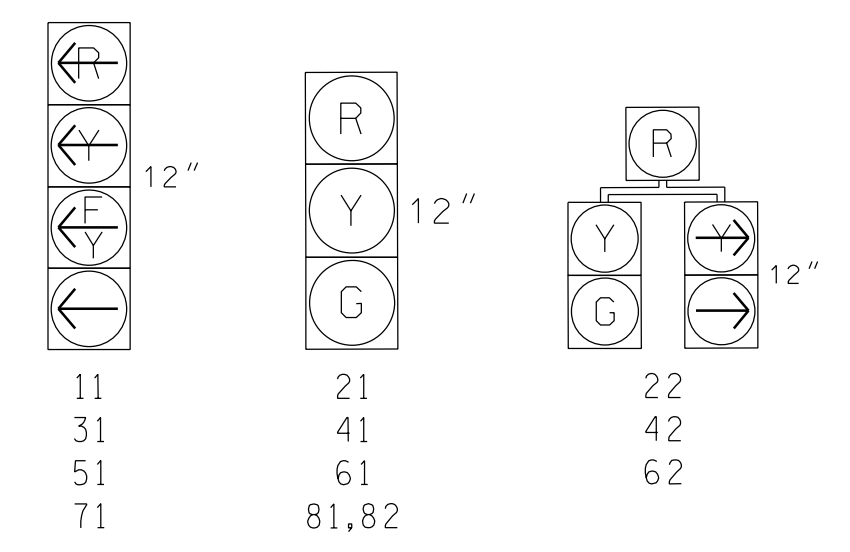


TABLE OF OPERATION table with columns for SIGNAL FACE and PHASE (1-8) showing traffic signal settings (R, G, Y, F).

SIGNAL FACE I.D. All Heads L.E.D.



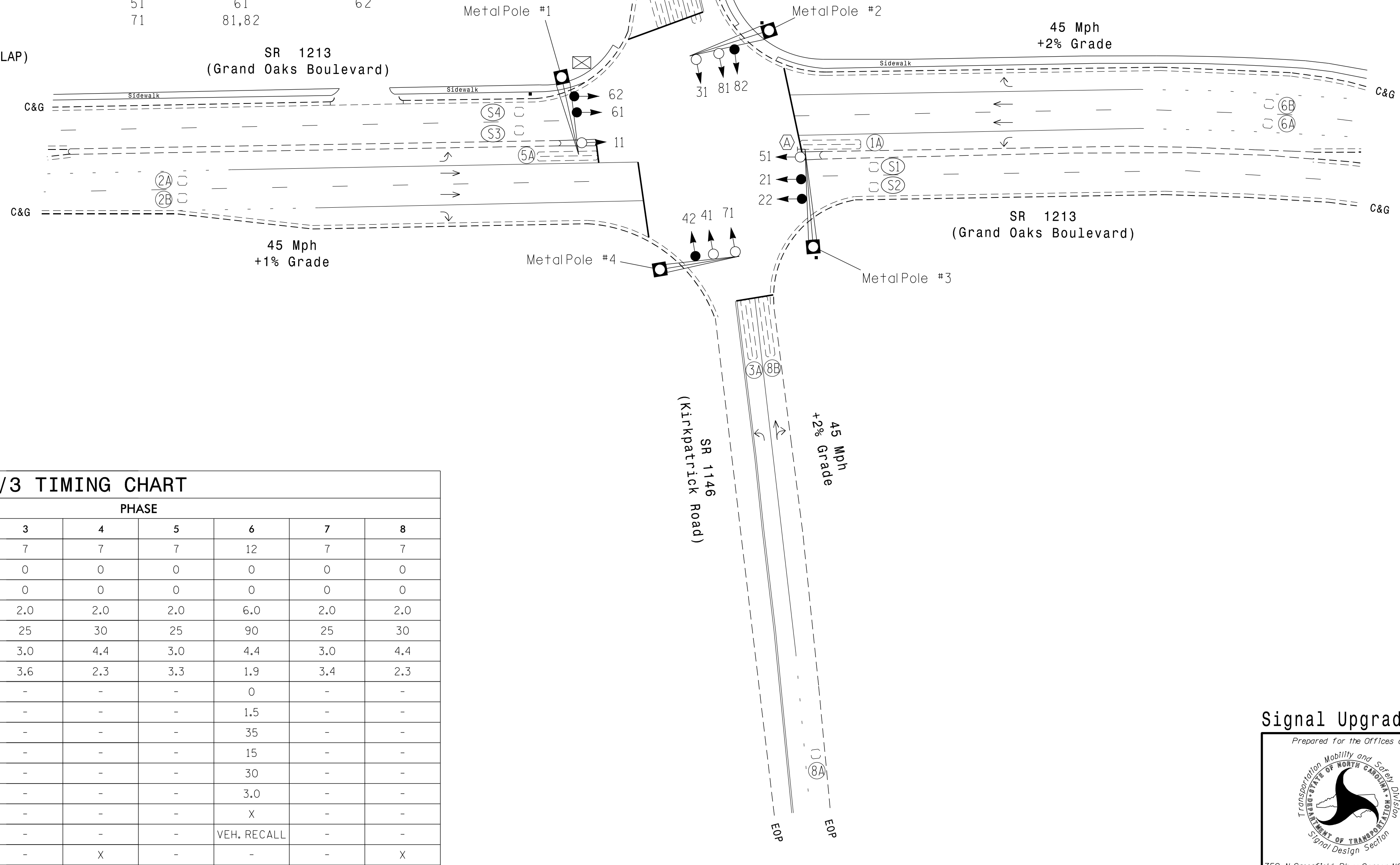
PHASING DIAGRAM DETECTION LEGEND: DETECTED MOVEMENT, UNDETECTED MOVEMENT (OVERLAP), UNSIGNALIZED MOVEMENT, PEDESTRIAN MOVEMENT.

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

8 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. Phase 3 and/or phase 7 may be lagged... 5. Reposition existing signal head numbered 82... 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 to obstruct sight distances of vehicles turning right on red... 9. Pavement markings are existing... 10. Maximum times shown in timing chart are for free-run operation only.



LEGEND table defining symbols for PROPOSED and EXISTING features: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Signal Pole with Sidewalk Guy, Metal Pole with Mastarm, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Curb Ramp, "U-TURN YIELD TO RIGHT TURN" Sign (R10-16).

ASC/3 TIMING CHART table with columns for FEATURE and PHASE (1-8) showing timing values for Min Green, Walk, Ped Clear, Veh. Extension, Max I, Yellow, Red Clear, Actuations B4 Add, Seconds/Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, and Simultaneous Gap.

* 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.

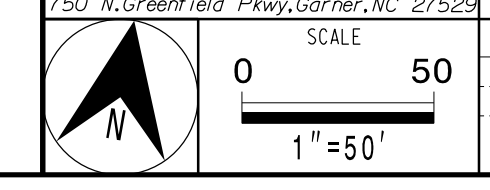
Signal Upgrade

Professional Engineer seal for Pamela Alexander, State of North Carolina, License No. 023489.

SR 1213 (Grand Oaks Boulevard) at SR 1146 (Kirkpatrick Road) Division 7 Alamance County Burlington PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

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

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-8888 NCBEES #F-0326



07-JUN-2018 11:15 C:\projects\signal\148\148.dwg AT:US540649

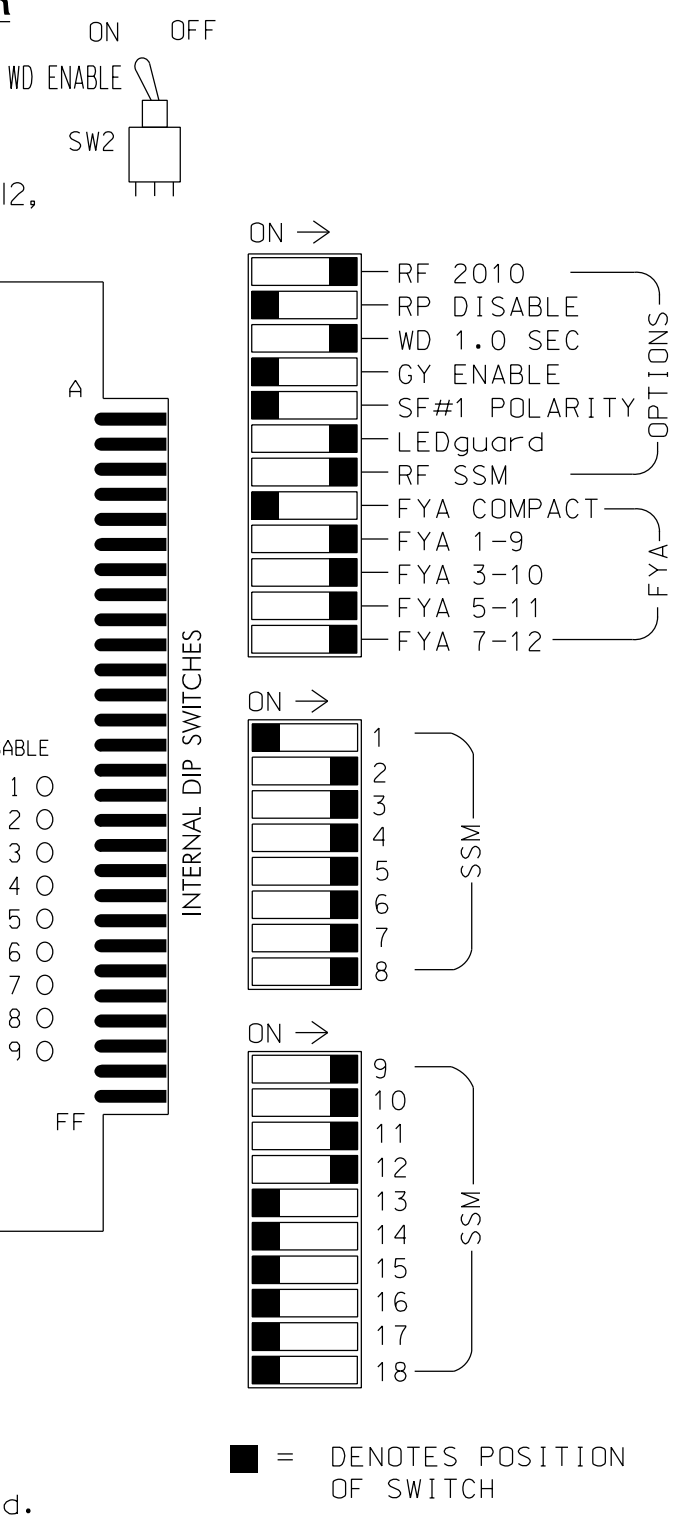
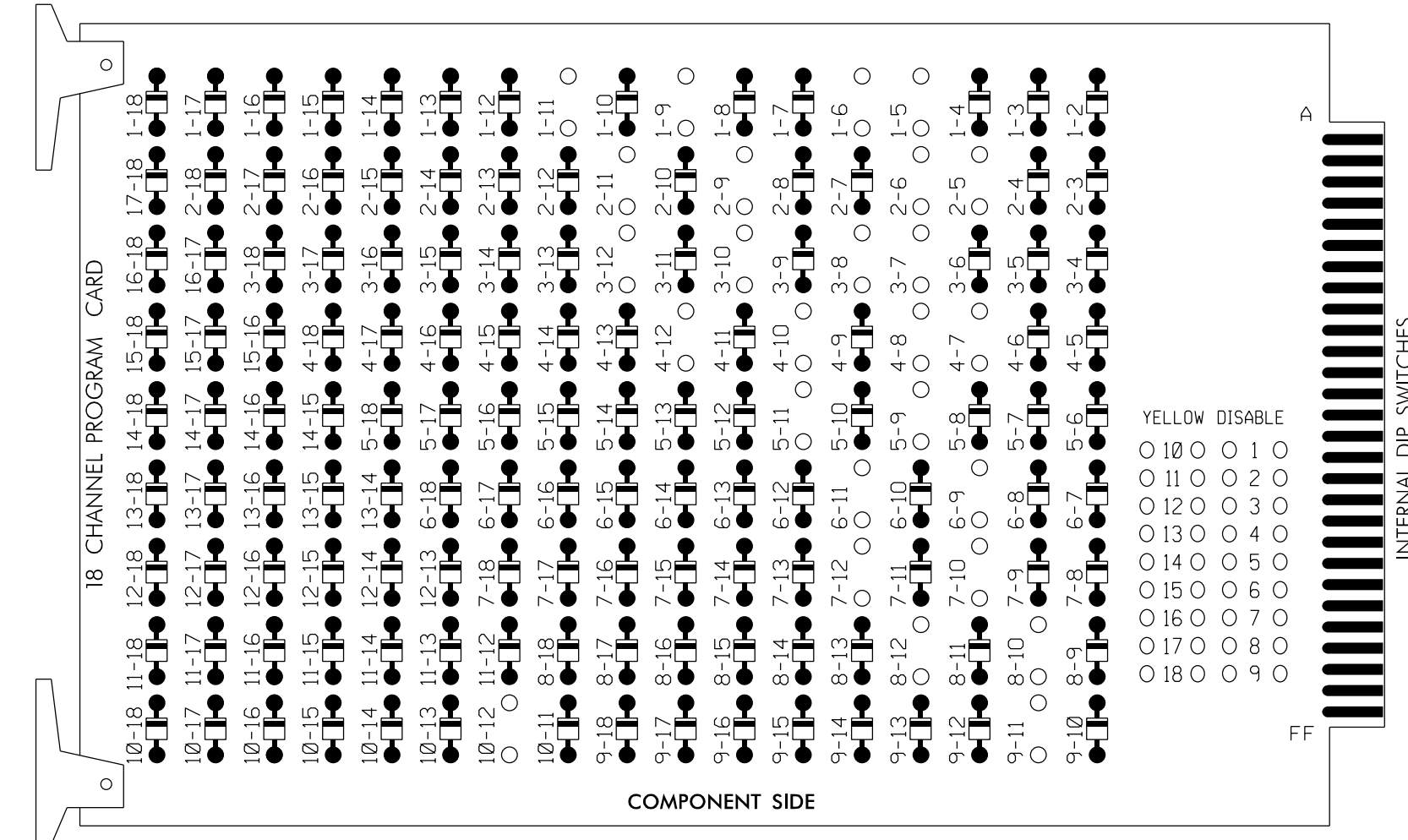
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 07-1991

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, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



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 phases 4 & 8 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,S7,S8,S10,S11,
AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP "A".....*
OVERLAP "B".....*
OVERLAP "C".....*
OVERLAP "D".....*
* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

Table with columns for LOAD SWITCH NO., S1-S11, S12-S18, AUX S1-S6, and PHASE. Rows include CMU CHANNEL NO., PHASE, SIGNAL HEAD NO., RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, FLASHING YELLOW ARROW, and GREEN ARROW.

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)

Table showing input file positions for FILE 'I' and FILE 'J' across 14 slots, including loop numbers, detector types, and stop times.

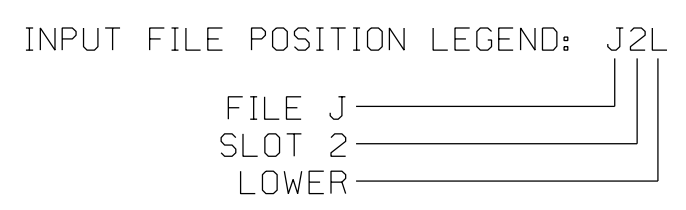
EX. : 1A, 2A, ETC. = LOOP NO.* FS = FLASH SENSE ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., DETECTOR NO., NEMA PHASE, CALL, EXTEND TIME, DELAY TIME, ADDED INITIAL, DETECTOR TYPE.

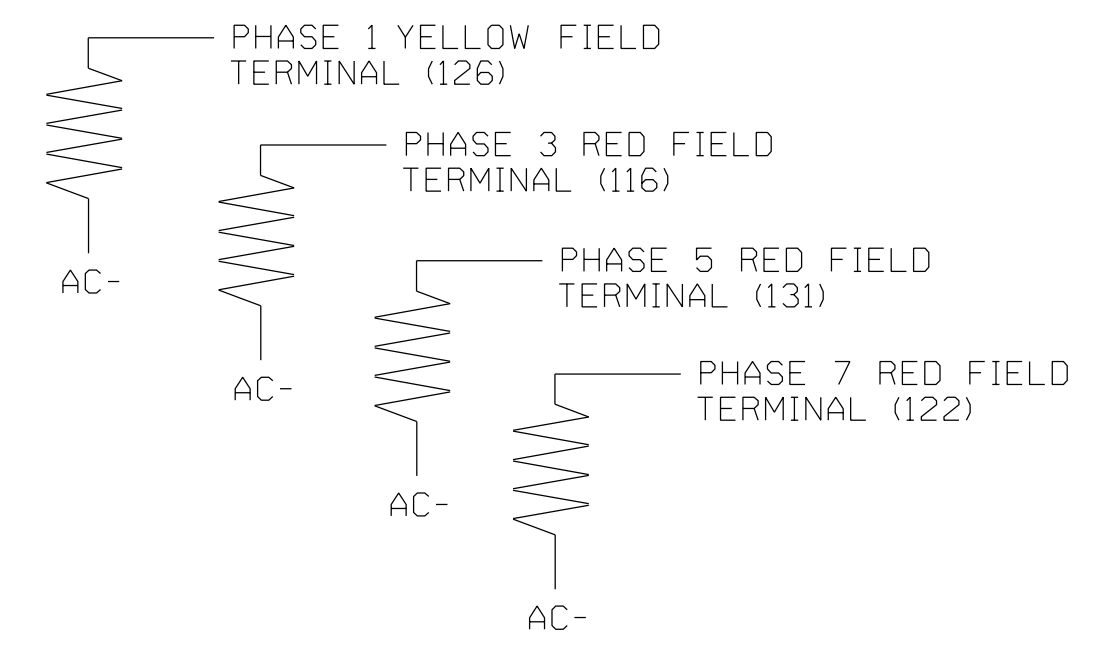
- 1 Add jumper from I1-W to J4-W, on rear of input file.
 - 2 Add jumper from I5-W to J8-W, on rear of input file.
 - 3 Add jumper from J1-W to I4-W, on rear of input file.
 - 4 Add jumper from J5-W to I8-W, on rear of input file.
- * System detector only. Remove any assigned vehicle phase.



LOAD RESISTOR INSTALLATION DETAIL

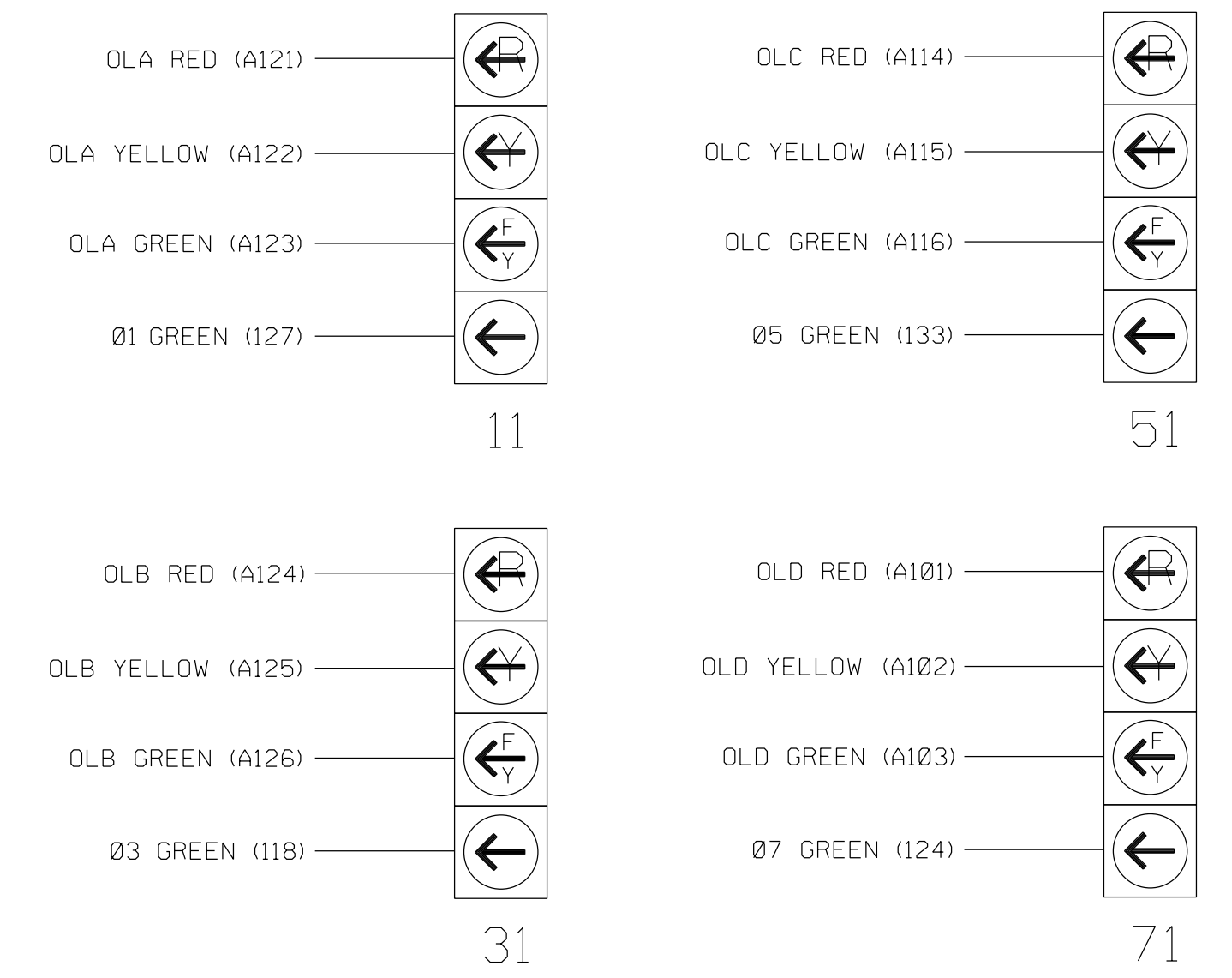
(install resistors as shown)

ACCEPTABLE VALUES table with columns VALUE (ohms) and WATTAGE.



FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1991
DESIGNED: November 2017
SEALED: 6/7/2018
REVISED: N/A

Electrical Detail - Sheet 1 of 2

Professional Engineer Seal for Pamela L. Alexander, State of North Carolina, License No. 023489. Includes project details for SR 1213 and SR 1146 at Grand Oaks Boulevard and Kirkpatrick Road.

09-JUN-2018 14:15
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ALEX3361 AT LUS510649

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 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..... 0

Toggle Once

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 'PPLT FYA'

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

PROTECTED LEFT TURN.... PHASE 7

OPPOSING THROUGH..... PHASE 8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

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

ACTION PLAN SF BIT DISABLE..... 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.

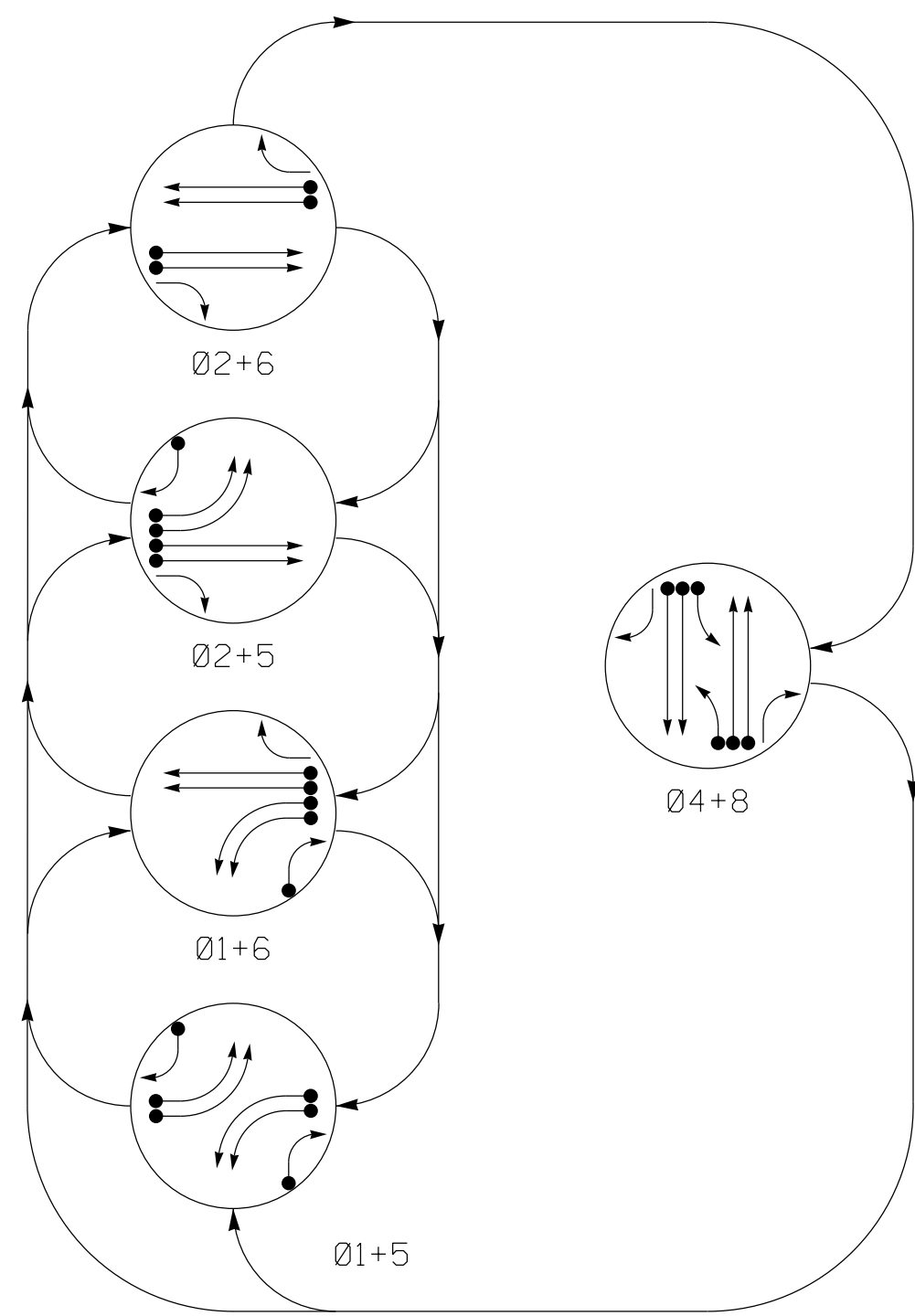
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1991
 DESIGNED: November 2017
 SEALED: 6/7/2018
 REVISED: N/A

09-JUN-2018 14:15 D:\T\consort\at\work\office\cur\100056469 U-6015 B-G S1g Sys\Task 05_11_Signal\Des\gn\mtr\ing\07-1991E.dgn ALEX3361 AT LUS210649

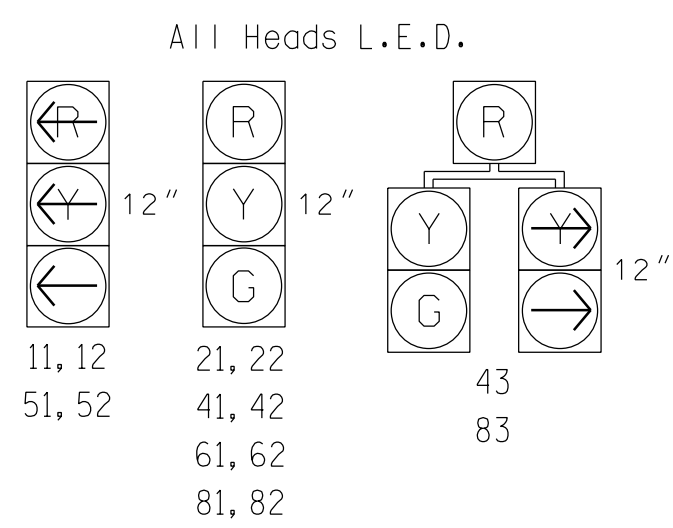
Electrical Detail - Sheet 2 of 2		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED						
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	SR 1213 (Grand Oaks Boulevard) at SR 1146 (Kirkpatrick Road) Division 7 Alamance County Burlington PLAN DATE: November 2017 REVIEWED BY: AM Encarnacion PREPARED BY: NA Ptak REVIEWED BY: PL Alexander							
	1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p style="font-size: x-small;"> Checked by: <u>Pamela Alexander</u> 6/9/2018 Date: _____ Sig. Inventory No. 07-1991 </p>	REVISIONS	INIT.	DATE			
REVISIONS	INIT.	DATE						

PHASING DIAGRAM



SIGNAL FACE	PHASE					FLASH
	Ø 1 + 5	Ø 2 + 6	Ø 4 + 8	Ø 1 + 6	Ø 1 + 5	
11, 12	←	←	←	←	←	
21, 22	R	R	G	R	Y	
41, 42	R	R	R	R	R	
43	R	R	R	R	R	
51, 52	←	←	←	←	←	
61, 62	R	G	R	R	R	
81, 82	R	R	R	R	R	
83	R	R	R	R	R	

SIGNAL FACE I.D.



PHASING DIAGRAM DETECTION LEGEND

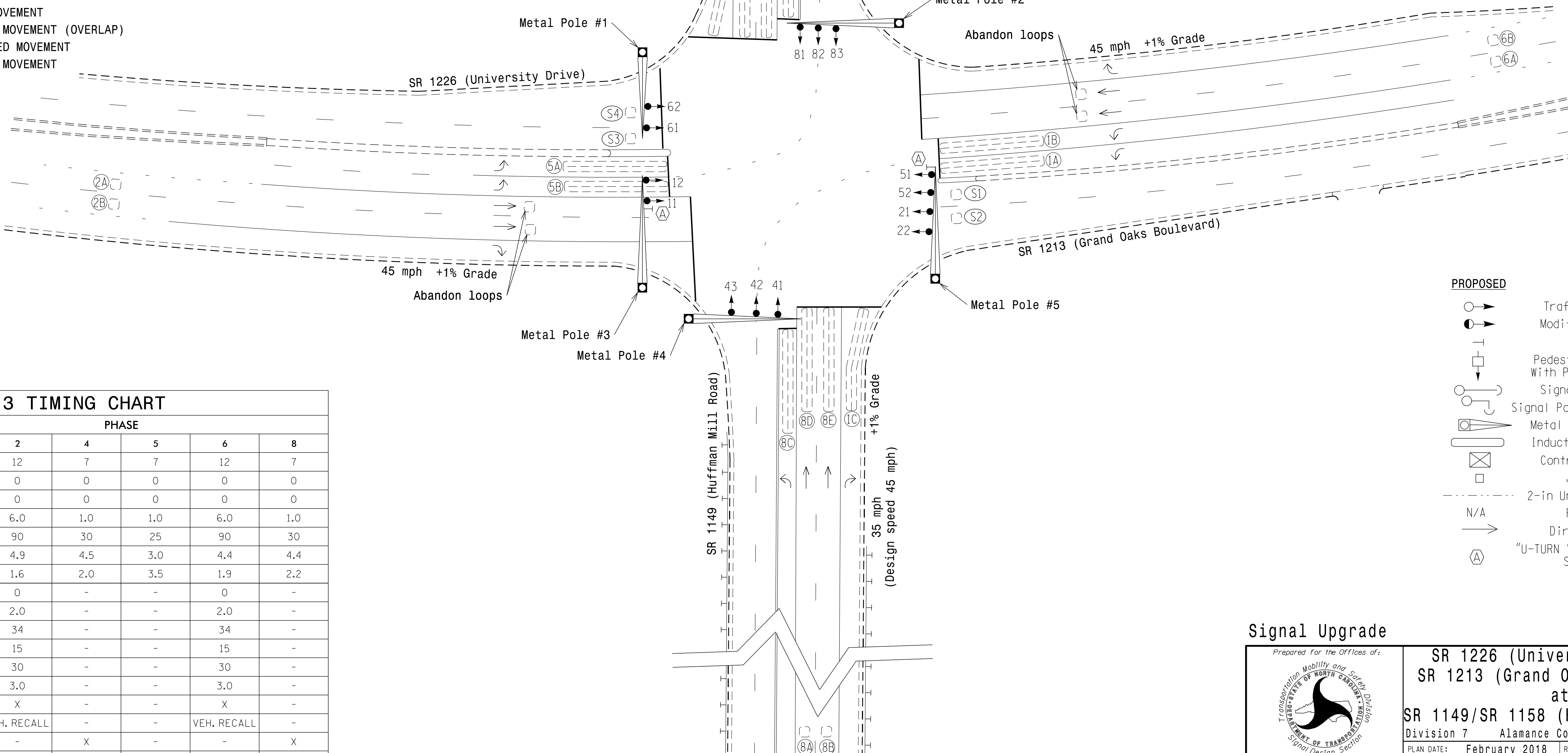
- DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ⋯ UNSIGNALIZED MOVEMENT
- ⇄ PEDESTRIAN MOVEMENT

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
1A	6X60	0	2-4-2	-	1	Yes	-	-	-	S	-	X	
1B	6X60	0	2-4-2	-	1	Yes	-	-	-	S	-	X	
1C	6X60	0	2-4-2	-	1	Yes	-	15	-	S	-	X	
2A, 2B	6X6	330	EXIST	-	2	Yes	0.5	-	X	N	-	X	
4A, 4B	6X6	300	EXIST	-	4	No	3.7	-	-	S	-	X	
4C	6X60	0	2-4-2	-	4	Yes	-	3	-	S	-	X	
4D	6X60	0	2-4-2	-	4	Yes	-	-	-	S	-	X	
4E	6X60	0	2-4-2	-	4	Yes	-	-	-	S	-	X	
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	S	-	X	
5B	6X60	0	2-4-2	-	5	Yes	-	-	-	S	-	X	
5C	6X60	0	2-4-2	-	5	Yes	-	15	-	S	-	X	
6A, 6B	6X6	330	EXIST	-	6	Yes	0.5	-	X	N	-	X	
8A, 8B	6X6	300	EXIST	-	8	No	3.7	-	-	S	-	X	
8C	6X60	0	2-4-2	-	8	Yes	-	3	-	S	-	X	
8D	6X60	0	2-4-2	-	8	Yes	-	-	-	S	-	X	
8E	6X60	0	2-4-2	-	8	Yes	-	-	-	S	-	X	
S1	6X6	+150	EXIST	-	-	No	-	-	-	N	X	X	
S2	6X6	+150	EXIST	-	-	No	-	-	-	N	X	X	
S3	6X6	+150	EXIST	-	-	No	-	-	-	N	X	X	
S4	6X6	+150	EXIST	-	-	No	-	-	-	N	X	X	

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.
- 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 |
|----------|----------|
| ○ | ● |
| ○→ | N/A |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |
| ○→ | ○→ |

FEATURE	ASC/3 TIMING CHART							
	PHASE							
	1	2	4	5	6	8		
Min Green *	7	12	7	7	12	7		
Walk *	0	0	0	0	0	0		
Ped Clear	0	0	0	0	0	0		
Veh. Extension *	1.0	6.0	1.0	1.0	6.0	1.0		
Max 1 *	25	90	30	25	90	30		
Yellow	3.0	4.9	4.5	3.0	4.4	4.4		
Red Clear	3.7	1.6	2.0	3.5	1.9	2.2		
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	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

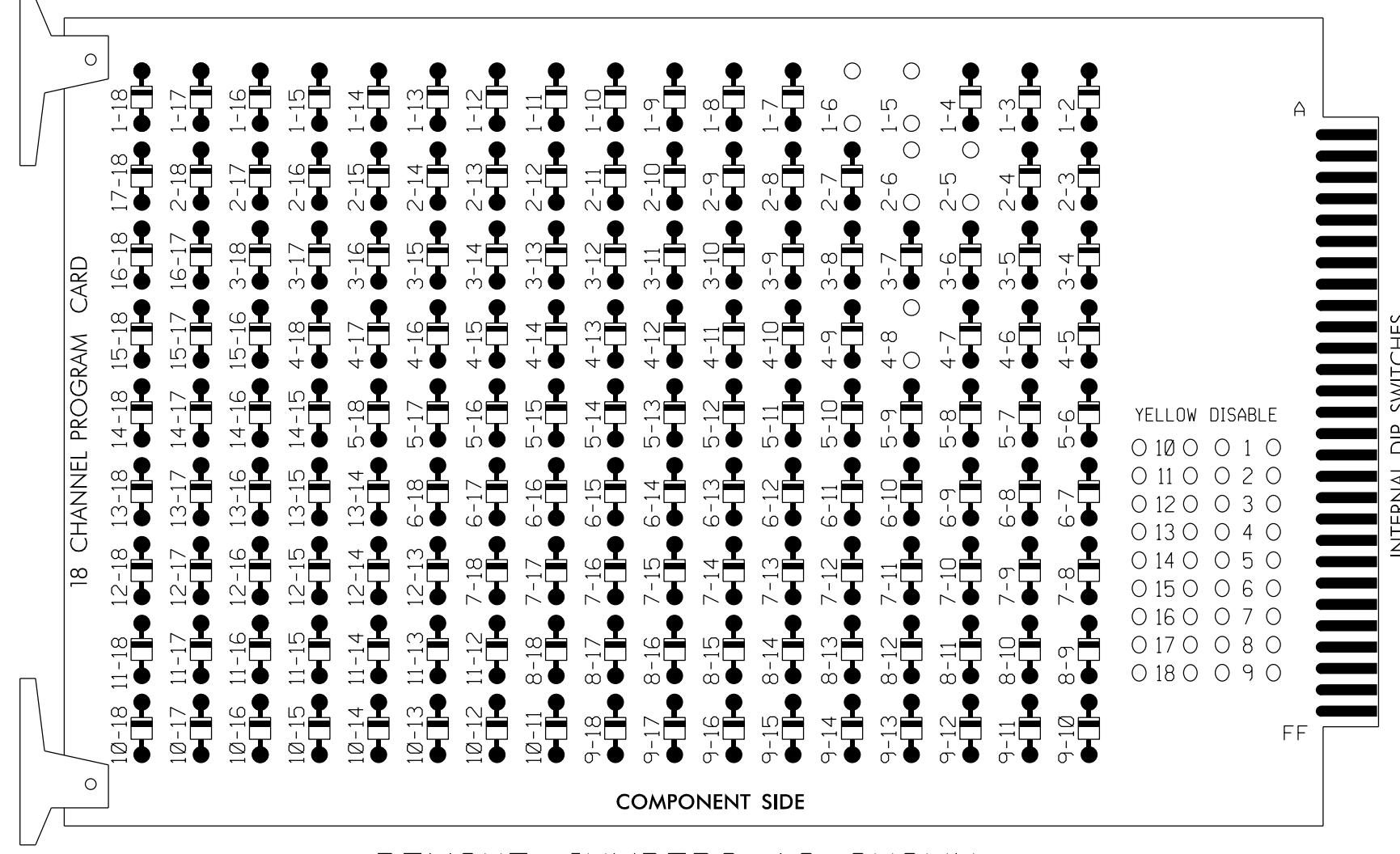
 Prepared for the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF TRANSPORTATION STATE OF NORTH CAROLINA Signal Design Section	SR 1226 (University Drive) / SR 1213 (Grand Oaks Boulevard) at SR 1149/SR 1158 (Huffman Mill Rd) Division 7 Alamance County Burlington PLAN DATE: February 2018 REVIEWED BY: MB Toth PREPARED BY: PL Alexander REVIEWED BY:	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL PAMELA L. ALEXANDER ENGINEER No. 023489 6/7/2018 SIGNATURE DATE SIG. INVENTORY NO. 07-1992						
750 N. Greenfield Pkwy, Garner, NC 27529 SCALE 0 40 1"=40' ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326	<table border="1"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>		REVISIONS	INIT.	DATE			
REVISIONS	INIT.	DATE						

07-JUN-2018 11:11:53
 SHEET RISK CONTROL
 U-6015-B-Sig-Sys*Task_05_11_15_Signal%04as%gn%07-1992.dgn
 ALEX3361 AT LUS3361

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

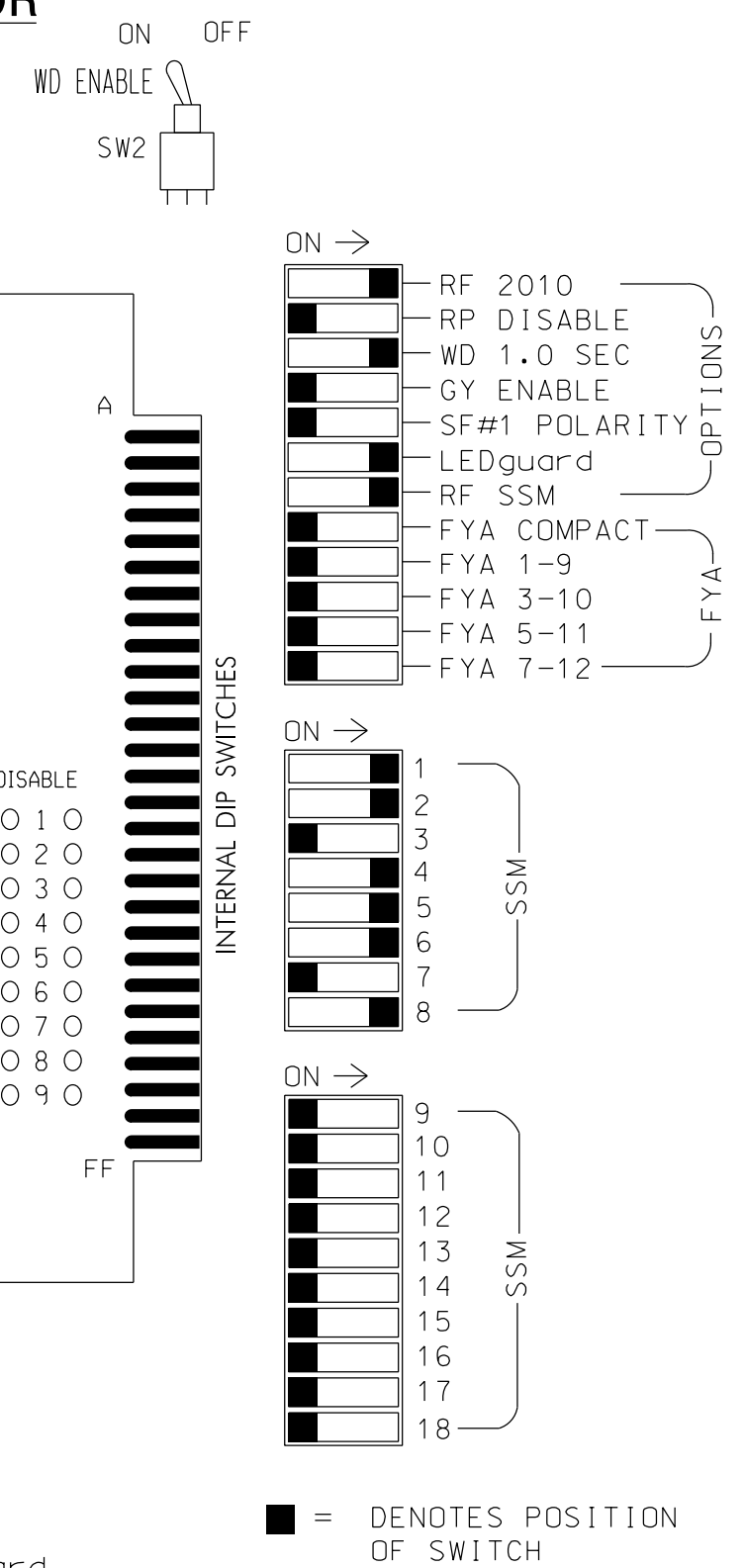
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6 and 4-8.



REMOVE JUMPERS AS SHOWN

NOTES:

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 phases 4 and 8 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.....ECONDLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Fig.149.1

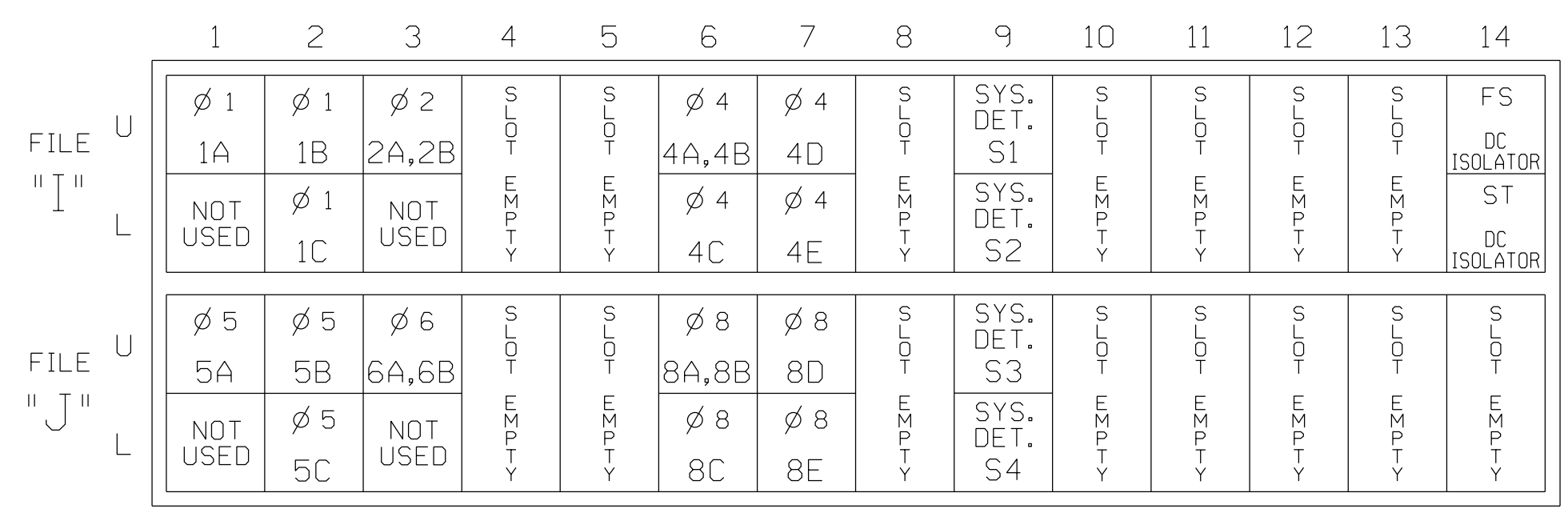
SIGNAL HEAD HOOK-UP CHART

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.	11,12	83	21,22	NU	NU	41,42 43	NU	43	51,52	61,62	NU	NU	81,82 83	NU	NU	NU	NU	NU
RED		128			101				134				107					
YELLOW			129		102				135				108					
GREEN			130		103				136				109					
RED ARROW	125								131									
YELLOW ARROW	126	126						132	132									
GREEN ARROW	127	127						133	133									

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

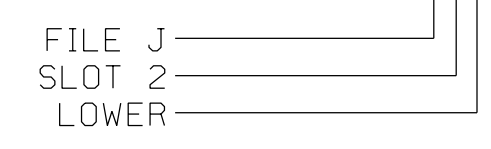
FS = FLASH SENSE
 ST = STOP TIME

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
1A	TB2-1,2	11U	56	1	1	YES				S
1B	TB2-5,6	12U	39	2	1	YES				S
1C	TB2-7,8	12L	43	12	1	YES		15		S
2A, 2B	TB2-9,10	13U	63	32	2	YES			X	N
4A, 4B	TB4-9,10	16U	41	4	4	NO	3.7			S
4C	TB4-11,12	16L	45	14	4	YES		3		S
4D	TB6-1,2	17U	65	34	4	YES				S
4E	TB6-3,4	17L	78	44	4	YES				S
* S1	TB6-9,10	19U	60	11	SYS	NO				N
* S2	TB6-11,12	19L	62	13	SYS	NO				N
5A	TB3-1,2	11U	55	5	5	YES				S
5B	TB3-5,6	12U	40	6	5	YES				S
5C	TB3-7,8	12L	44	16	5	YES		15		S
6A, 6B	TB3-9,10	13U	64	36	6	YES			X	N
8A, 8B	TB5-9,10	16U	42	8	8	NO	3.7			S
8C	TB5-11,12	16L	46	18	8	YES		3		S
8D	TB7-1,2	17U	66	38	8	YES				S
8E	TB7-3,4	17L	79	48	8	YES				S
* S3	TB7-9,10	19U	59	15	SYS	NO				N
* S4	TB7-11,12	19L	61	17	SYS	NO				N

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1992
 DESIGNED: February 2018
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1226 (University Drive)/ SR 1213 (Grand Oaks Boulevard) at SR 1149/SR 1158 (Huffman Mill Road)	
Division 7	Alamance County
PLAN DATE: February 2018	REVIEWED BY: MB Toth
PREPARED BY: PL Alexander	REVIEWED BY:
REVISIONS	INIT. DATE

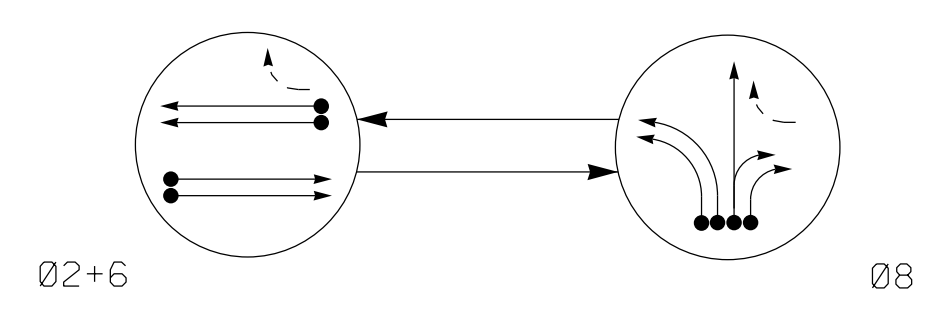
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

6/9/2018

SIG. INVENTORY NO. 07-1992

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

PHASING DIAGRAM



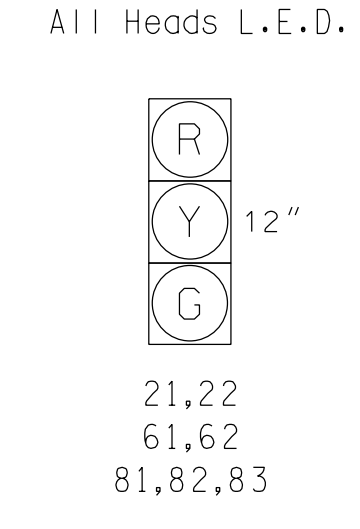
PHASING DIAGRAM DETECTION LEGEND

- 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
81,82,83	R	G	R

SIGNAL FACE I.D.



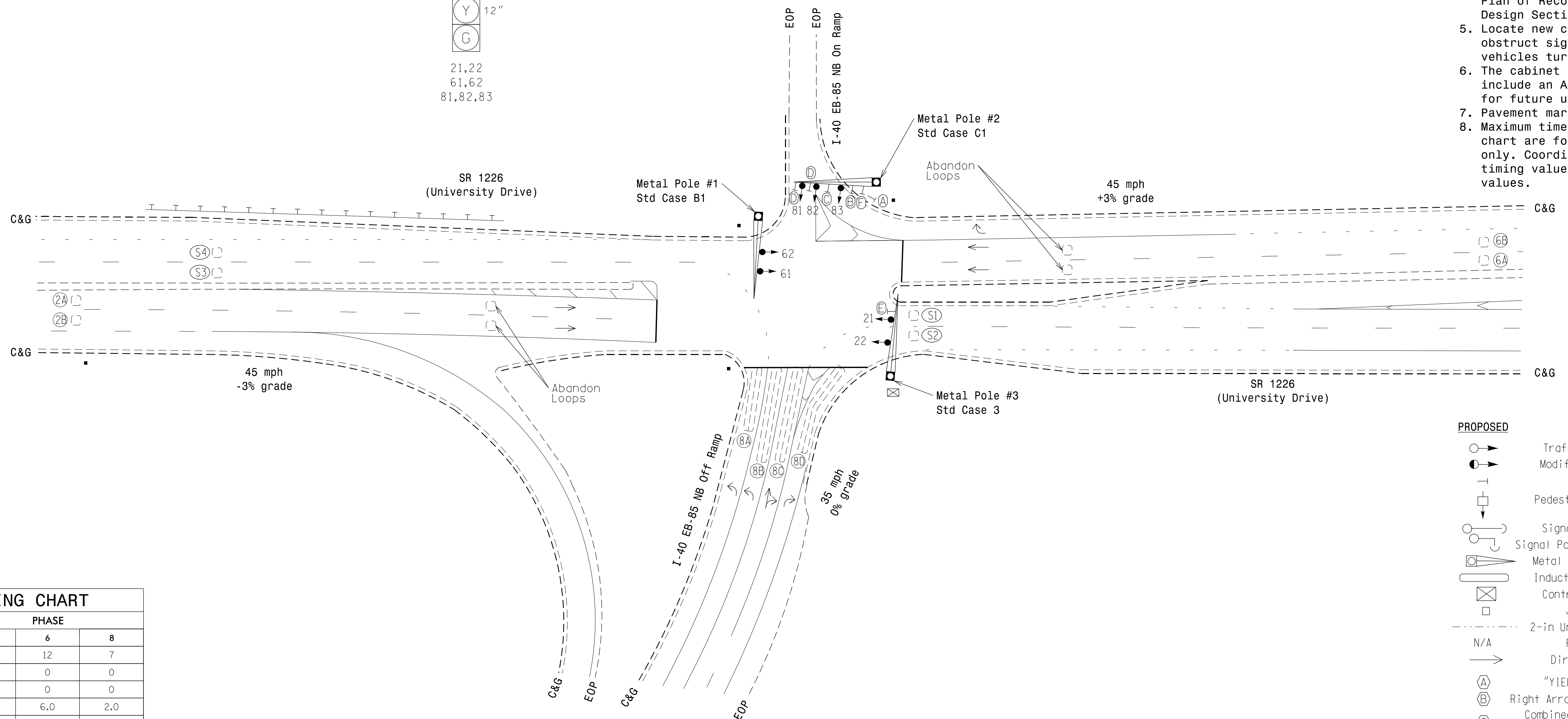
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	PROGRAMMING						
						CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD	
2A,2B	6X6	360	EXIST	-	2	Yes	1.0	-	X	N	-	X
6A,6B	6X6	360	EXIST	-	6	Yes	1.0	-	X	N	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	X
8B	6X60	0	2-4-2	-	8	Yes	-	-	-	S	-	X
8C	6X60	0	2-4-2	-	8	Yes	-	10	-	S	-	X
8D	6X60	0	2-4-2	-	8	Yes	-	15	-	S	-	X
S1	6X6	+150	EXIST	-	-	NO	-	-	-	N	X	X
S2	6X6	+150	EXIST	-	-	NO	-	-	-	N	X	X
S3	6X6	+425	EXIST	-	-	NO	-	-	-	N	X	X
S4	6X6	+425	EXIST	-	-	NO	-	-	-	N	X	X

2 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 Engineer.
3. Set all detector units to presence mode.
4. 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.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. The cabinet should be designed to include an Auxiliary Output File for future use.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



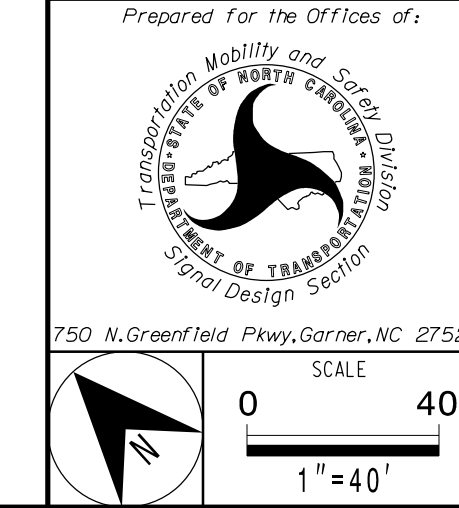
ASC/3 TIMING CHART

FEATURE	PHASE		
	2	6	8
Min Green *	12	12	7
Walk *	0	0	0
Ped Clear	0	0	0
Veh. Extension *	6.0	6.0	2.0
Max 1 *	90	90	30
Yellow	4.8	4.3	3.8
Red Clear	2.2	1.4	1.6
Actuations B4 Add *	0	0	-
Seconds / Actuation *	2.0	2.0	-
Max Initial *	40	40	-
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	-	-	-
Simultaneous Gap	X	X	X

LEGEND

PROPOSED	EXISTING
	N/A
N/A	
(A)	(A) "YIELD" Sign (R1-2)
(B)	(B) Right Arrow "ONLY" Sign (R3-5R)
(C)	(C) Combined Through and Right Arrow Sign (R3-6R)
(D)	(D) Left Arrow "ONLY" Sign (R3-5L)
(E)	(E) "NO LEFT TURN" Sign (R3-2)
(F)	(F) Street Name Sign

Signal Upgrade



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 1226 (University Drive) at I-40 EB-85 NB Ramps

Division 7 Alamance County Burlington

PLAN DATE: March 2018 REVIEWED BY: PL Alexander

PREPARED BY: NA Ptak REVIEWED BY: AM Encarnacion

SCALE: 1"=40'

SIGNATURE: Pamela Alexander DATE: 6/7/2018

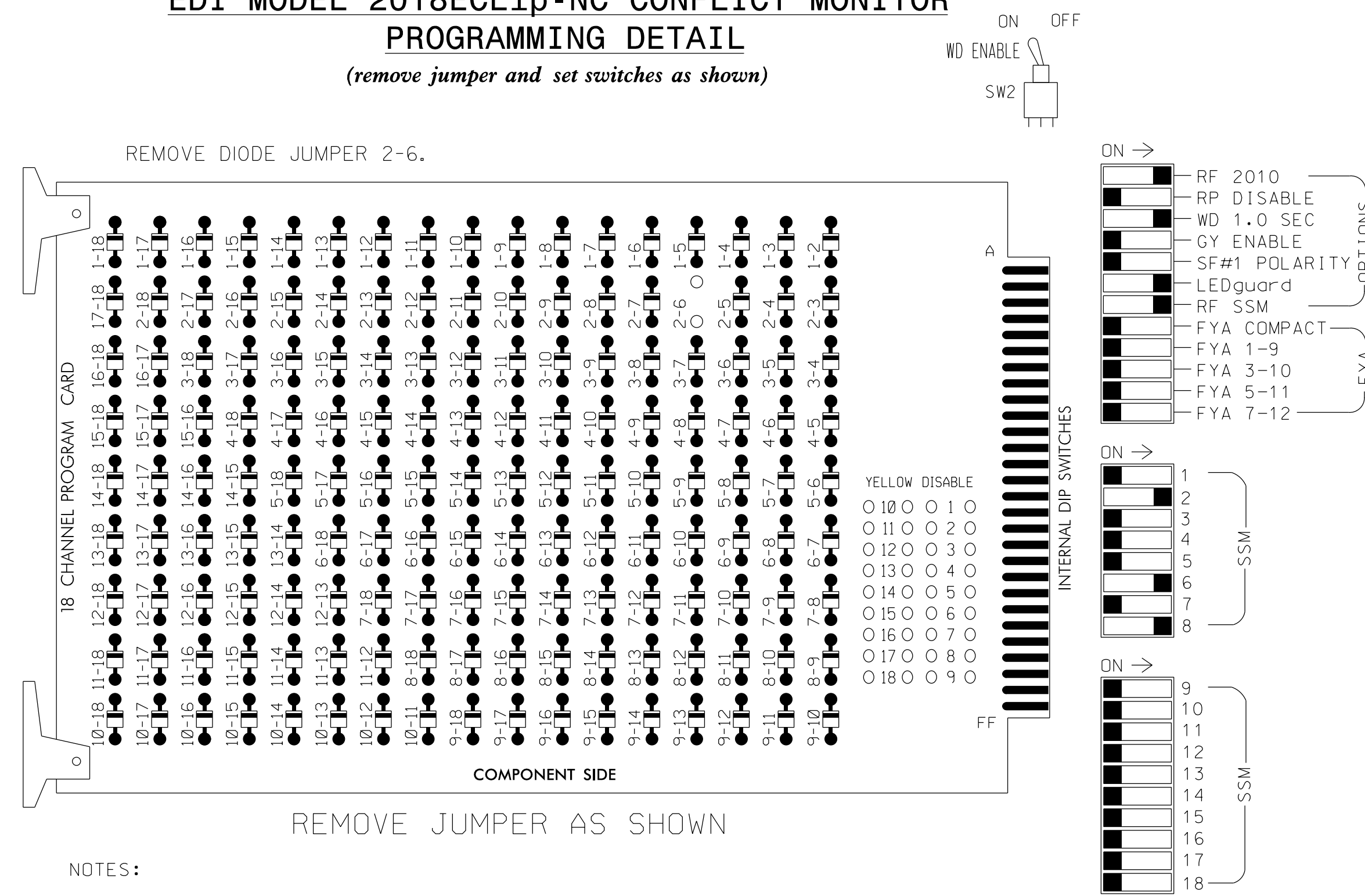
SIG. INVENTORY NO. 07-1993

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

07-JUN-2018 11:15 ***wstark\ins-comp\project\SR1226\I-40 EB-85 NB Ramps\Task 05-11_Signal Design\07-1993.dgn AT LUS340649

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper 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.

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
 OVERLAPS.....NONE

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Sig. 150.1

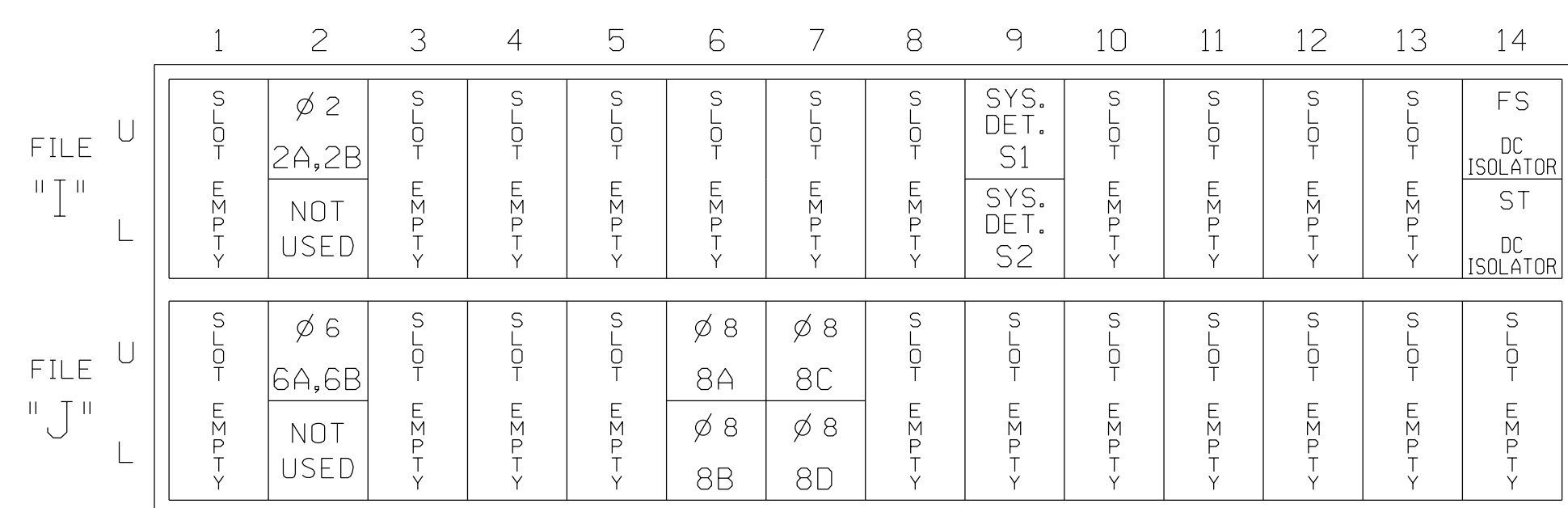
SIGNAL HEAD HOOK-UP CHART

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	NU	NU	NU	61,62	NU	NU	81,82,83	NU	NU	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW		129						135			108							
GREEN		130						136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

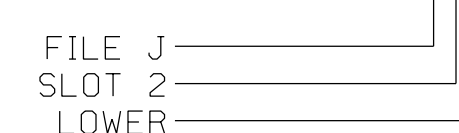
FS = FLASH SENSE
 ST = STOP TIME

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,2B	TB2-5,6	I2U	39	2	2	YES	1.0		X	N
* 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	1.0		X	N
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES				S
8C	TB7-1,2	J7U	66	38	8	YES		10		S
8D	TB7-3,4	J7L	79	48	8	YES		15		S

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND:



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1993
 DESIGNED: March 2018
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

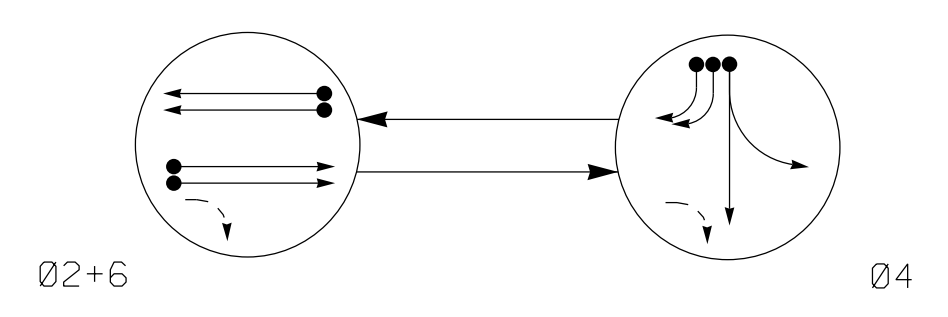
Electrical and Programming Details for:
 SR 1226 (University Drive) at I-40 EB-85 NB Ramps

Prepared for the Offices of:

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

Sealed by: 6/9/2018
 SEAL 023489
 SIG. INVENTORY NO. 07-1993

PHASING DIAGRAM



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

TABLE OF OPERATION

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

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	360	EXIST	-	2	Yes	0.5	-	X	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	15	-	S	-	X
4C	6X40	0	2-4-2	-	4	Yes	-	15	-	S	-	X
6A,6B	6X6	360	EXIST	-	6	Yes	0.5	-	X	N	-	X
S1	6X6	+90	3	X	-	No	-	-	-	N	X	X
S2	6X6	+90	3	X	-	No	-	-	-	N	X	X

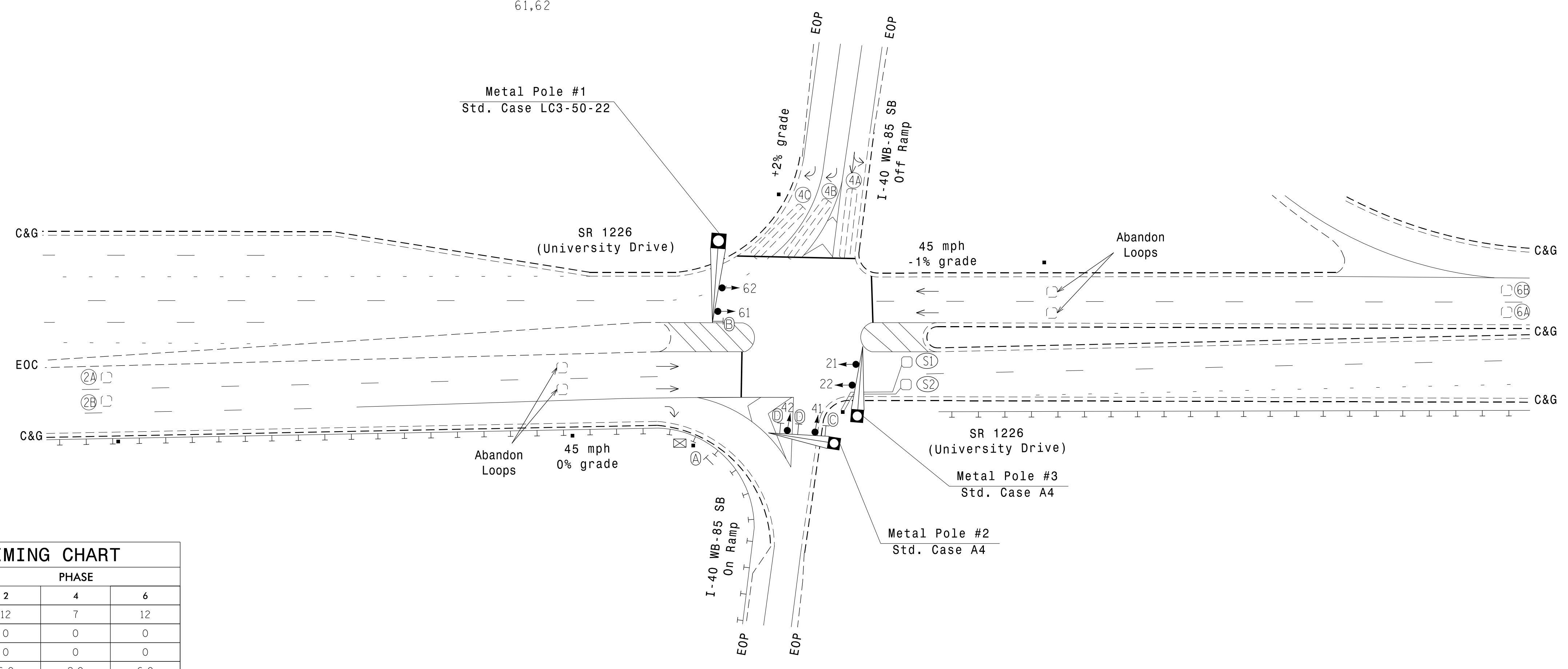
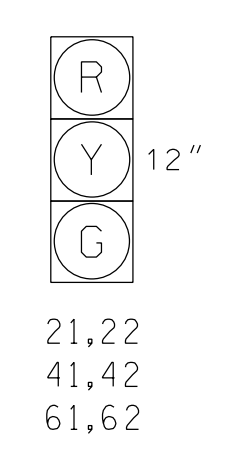
2 Phase Fully Actuated (Burlington-Graham Signal System)

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 Engineer.
3. Set all detector units to presence mode.
4. 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.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. The cabinet should be designed to include an Auxiliary Output File for future use.
7. Pavement markings are existing.
8. 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.



LEGEND

PROPOSED	EXISTING
○▶ Traffic Signal Head	○▶ N/A
◐▶ Modified Signal Head	◐▶ N/A
⊥ Sign	⊥
⊥ Pedestrian Signal Head	⊥
○ Signal Pole with Guy	○ Signal Pole with Sidewalk Guy
○ Metal Pole with Mastarm	○ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Junction Box
□ 2-in Underground Conduit	□ Right of Way
→ Directional Arrow	→ "YIELD" Sign (R1-2)
Ⓐ	"NO LEFT TURN" Sign (R3-2)
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)

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	2.0	6.0
Max 1 *	90	30	90
Yellow	4.5	3.7	4.6
Red Clear	1.0	1.7	1.3
Actuations B4 Add *	0	-	0
Seconds / Actuation *	2.0	-	2.0
Max Initial *	40	-	40
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	-	-	-
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.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 1226 (University Drive) at I-40 WB-85 SB Ramps

Division 7 Alamance County Burlington

PLAN DATE: February 2018 REVIEWED BY: PL Alexander

PREPARED BY: NA Ptak REVIEWED BY: AM Encarnacion

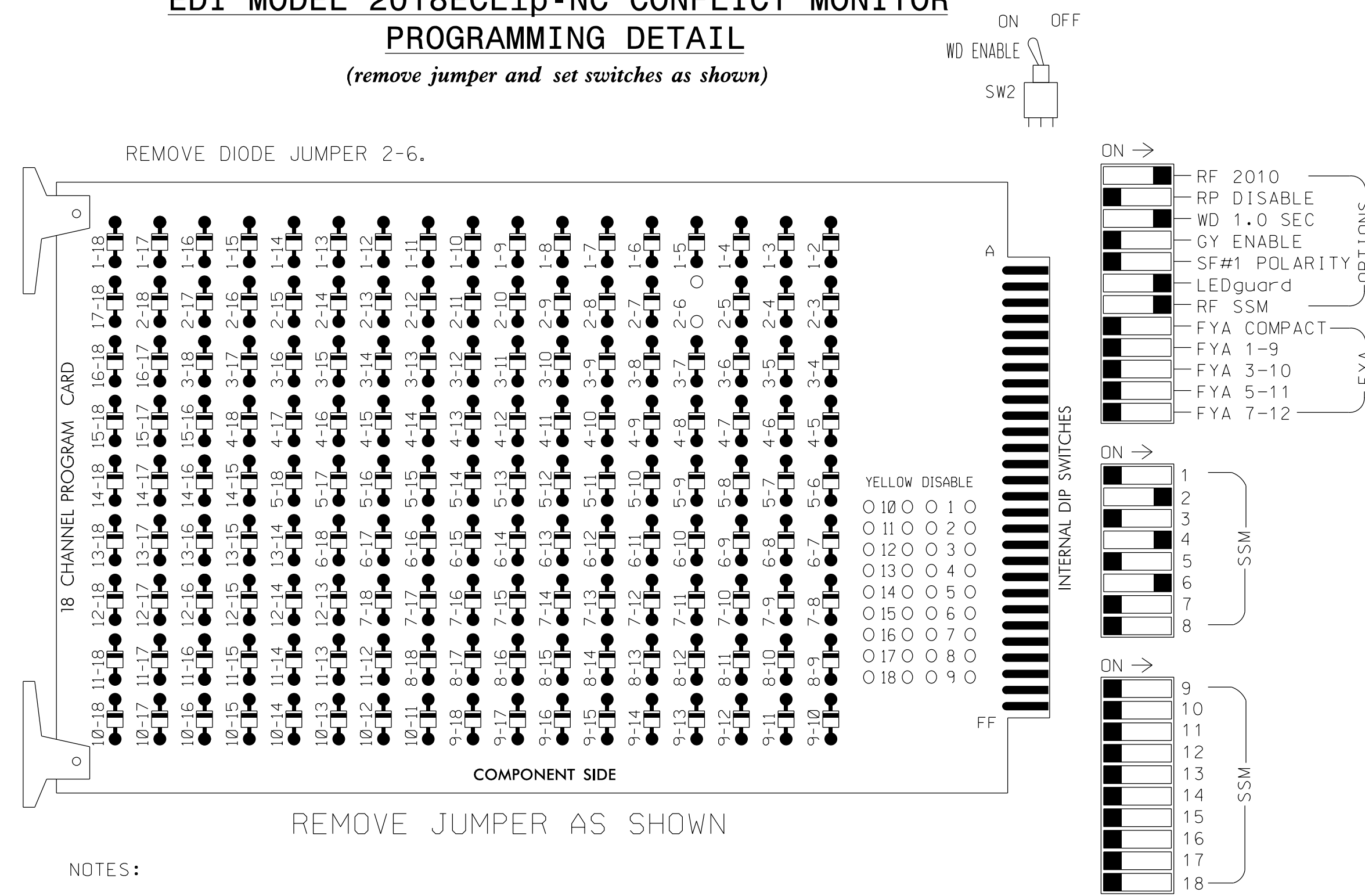
SCALE: 1"=40'

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

07-JUN-2018 11:15
 U:\Projects\2018\06\SR1226\Traffic\Task 05_11_Signal\Design\Task 07-1994.dgn
 ALEX3361 AT LUS340649

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper 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.

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Fig. 151.1

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	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		

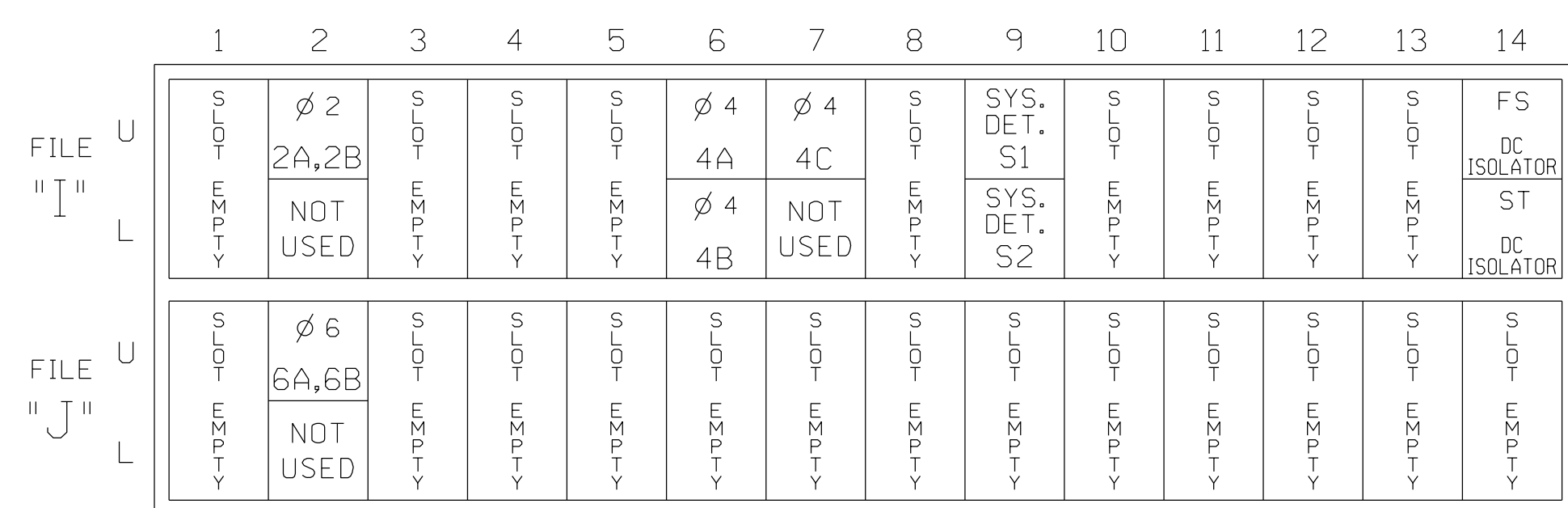
NU = Not Used

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,S5,S8
 PHASES USED.....2,4,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



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

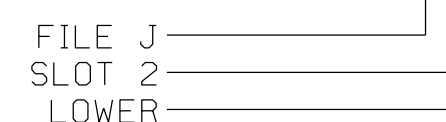
FS = FLASH SENSE
 ST = STOP TIME

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	0.5		X	N
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
* 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	0.5		X	N

* System detector only. Remove any assigned vehicle phase.

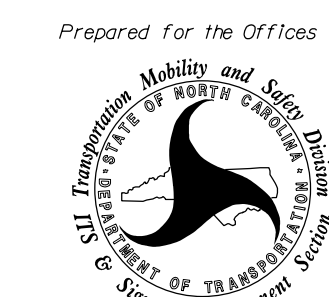
INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1994
 DESIGNED: February 2018
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 1226 (University Drive)
 at
 I-40 WB-85 SB Ramps

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

REVISIONS	INIT.	DATE

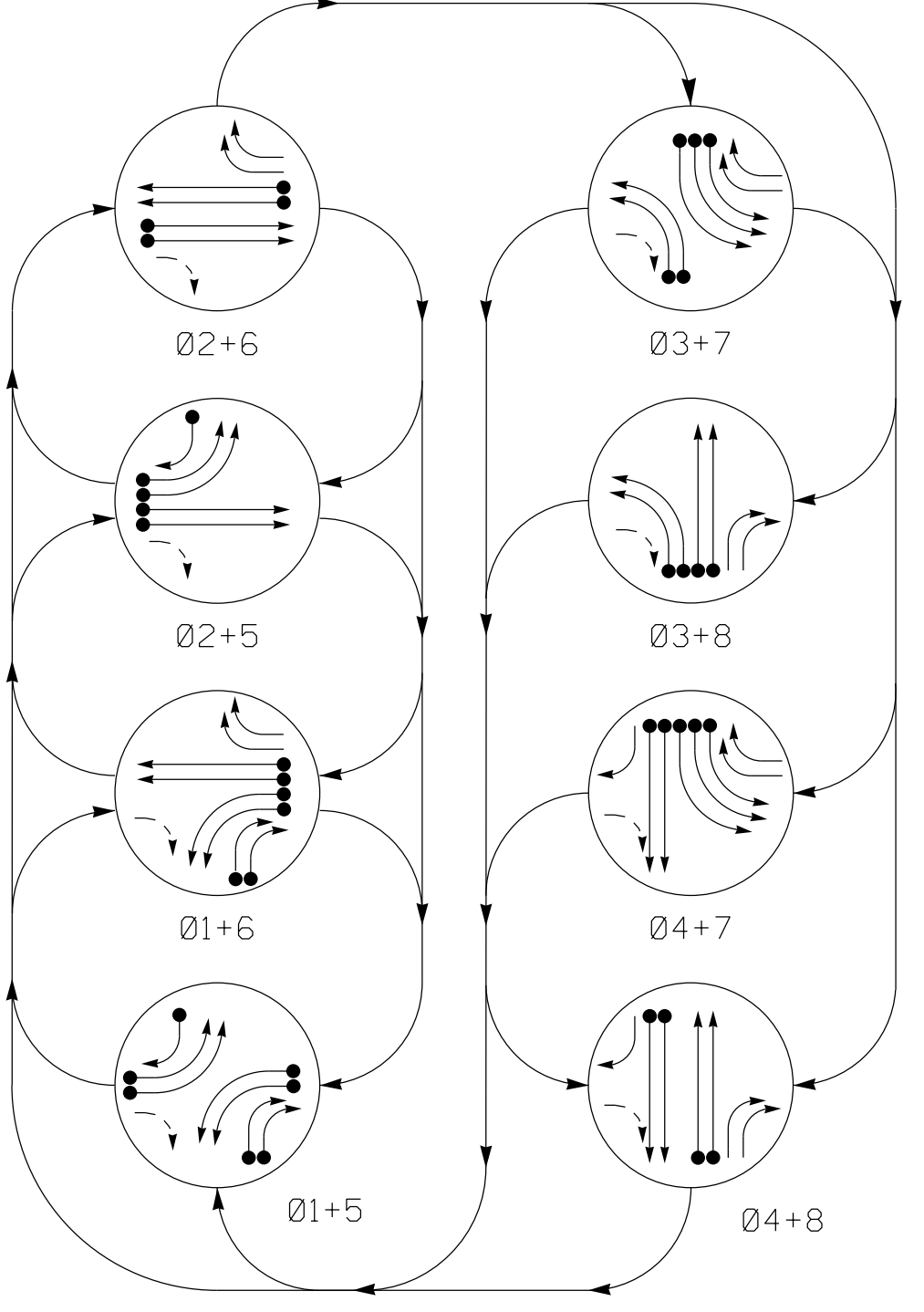
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 PAMELA L. ALEXANDER
 SEAL 023489
 6/9/2018
 DATE

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

09-JUN-2018 14:15
 D:*Transmittal*Traffic*00056469 U-6015 B-G S1g Sys*Task 05_11_Signal*Des*gmr*r-Ing*07-1994E.dgn
 ALEX3361 AT LUS2\0649

PHASING DIAGRAM



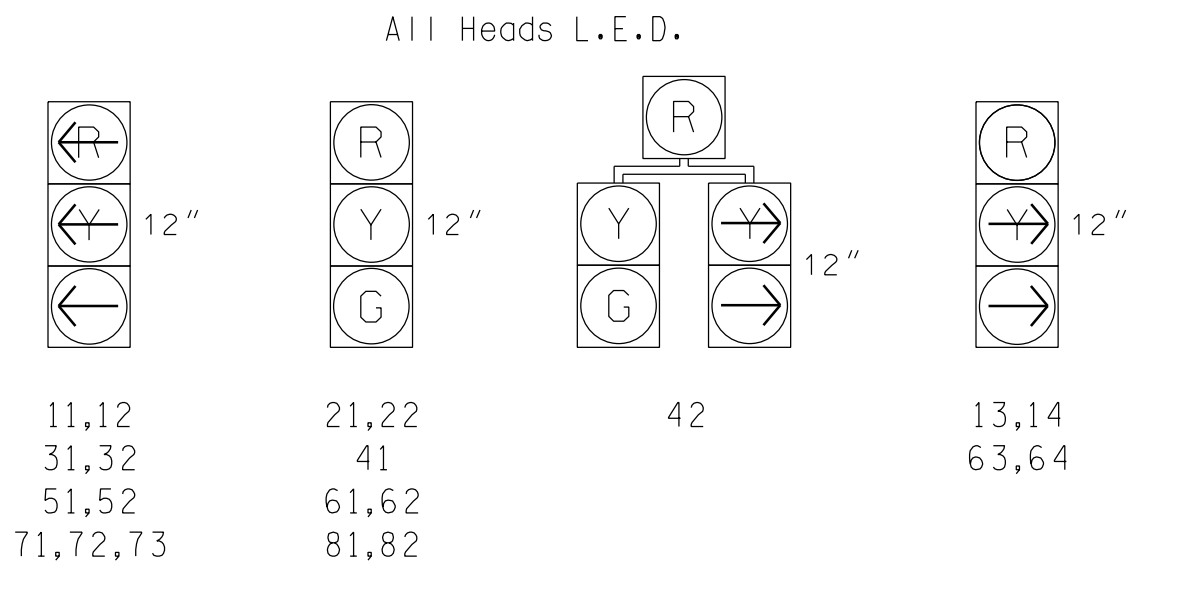
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

Table with columns for SIGNAL FACE, PHASE (01+5 to 04+8), and detection status (R, G, Y, or blank).

SIGNAL FACE I.D.



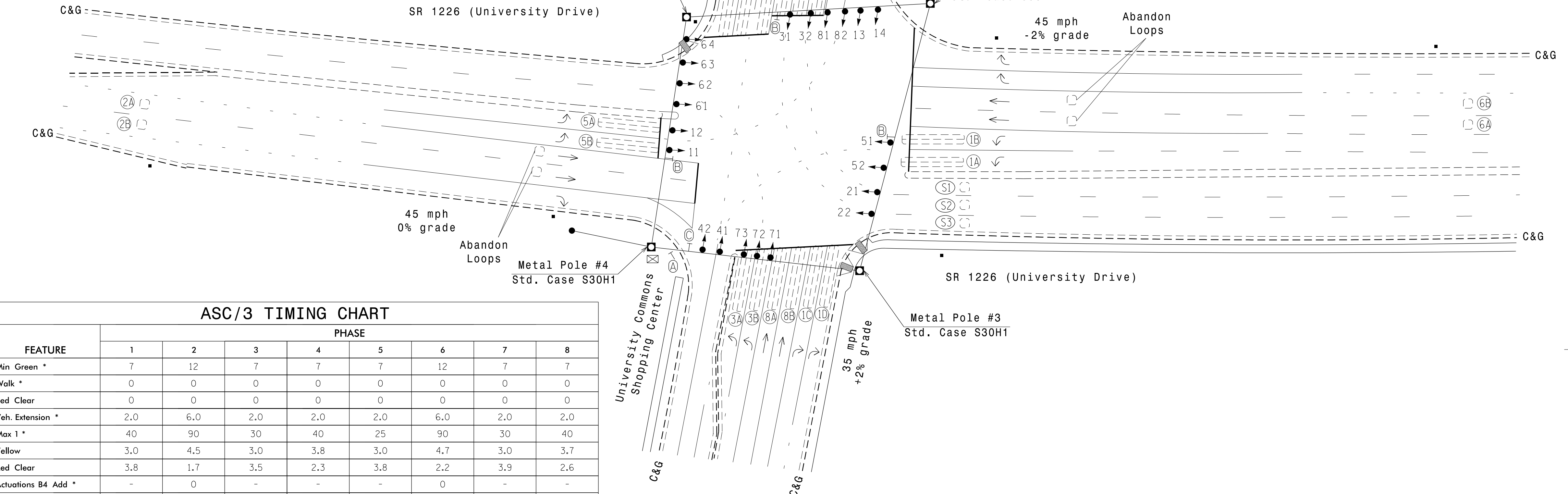
ASC/3 DETECTOR INSTALLATION CHART

Table with columns for LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, and NEW CARD.

8 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 unless otherwise directed by Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual...
7. Locate new cabinet so as not to obstruct sight distance...
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only.

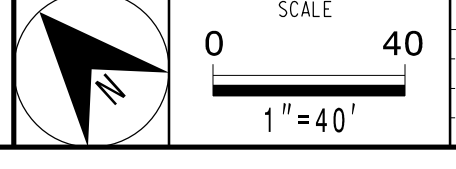
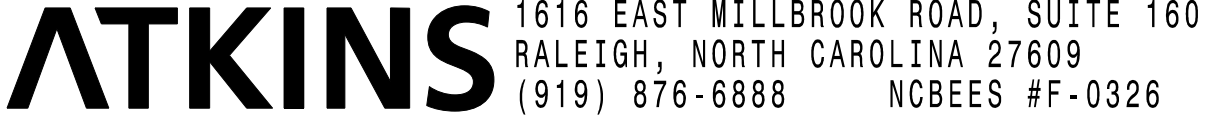


ASC/3 TIMING CHART

Timing chart table with columns for FEATURE and PHASE (1-8), listing values for Min Green, Walk, Ped Clear, Veh. Extension, Max 1, Yellow, Red Clear, Actuations B4 Add, Seconds/Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, and Simultaneous Gap.

LEGEND showing symbols for PROPOSED and EXISTING traffic signal heads, pedestrian heads, poles, detectors, cabinets, junction boxes, conduits, and various signs.

Project information block including 'Signal Upgrade' title, project location (SR 1226 at SR 1301), division (Alamance County), dates, and signatures of PL Alexander and AM Encarnacion.



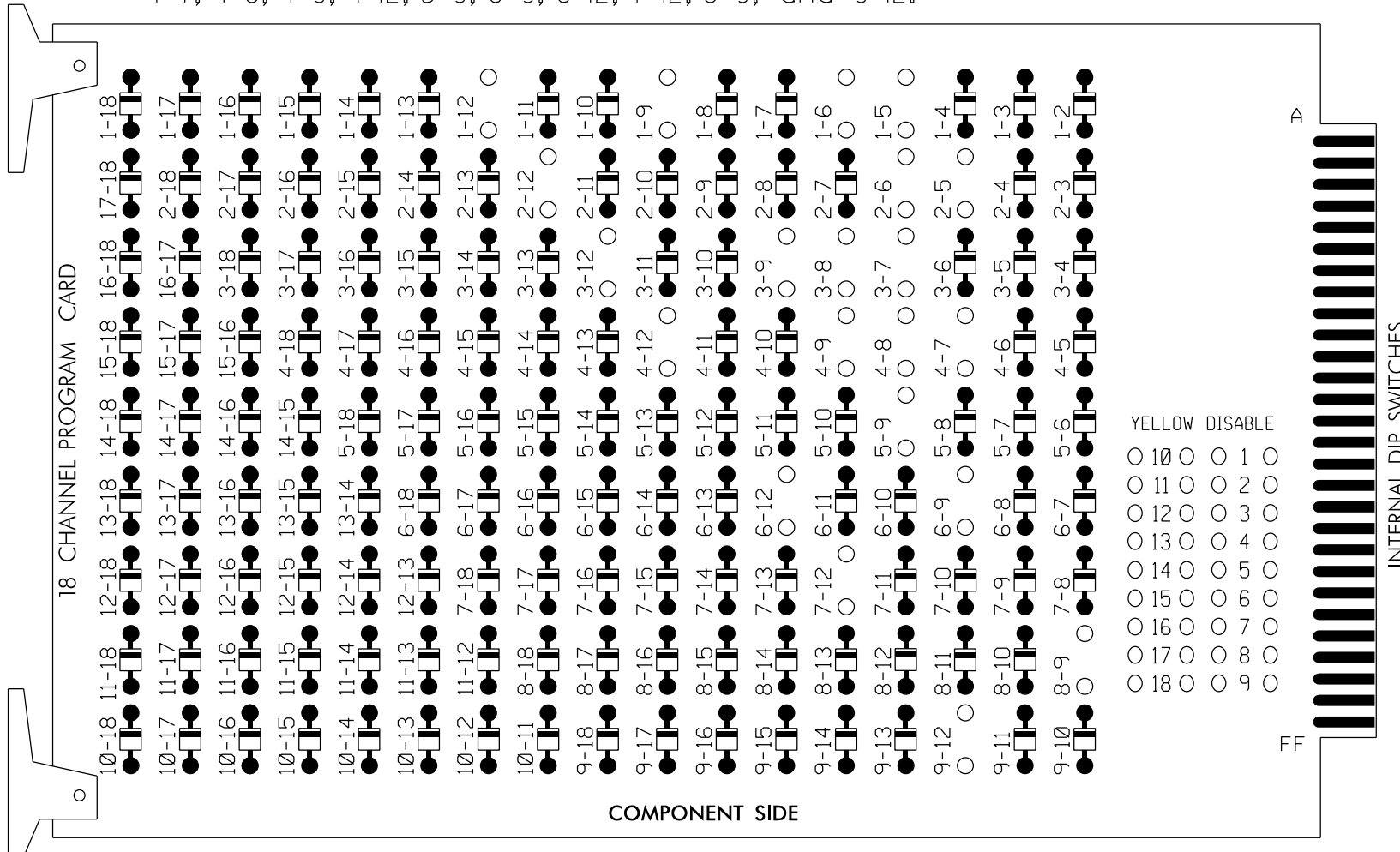
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

07-JUN-2018 11:15 D:\Transpor\Traffic\Task\00056469 U-6015 B-G Sig Sys\Task 05_11_Signals\Des\gn\07-1995.dgn ALEX3361 AT LUS340649

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

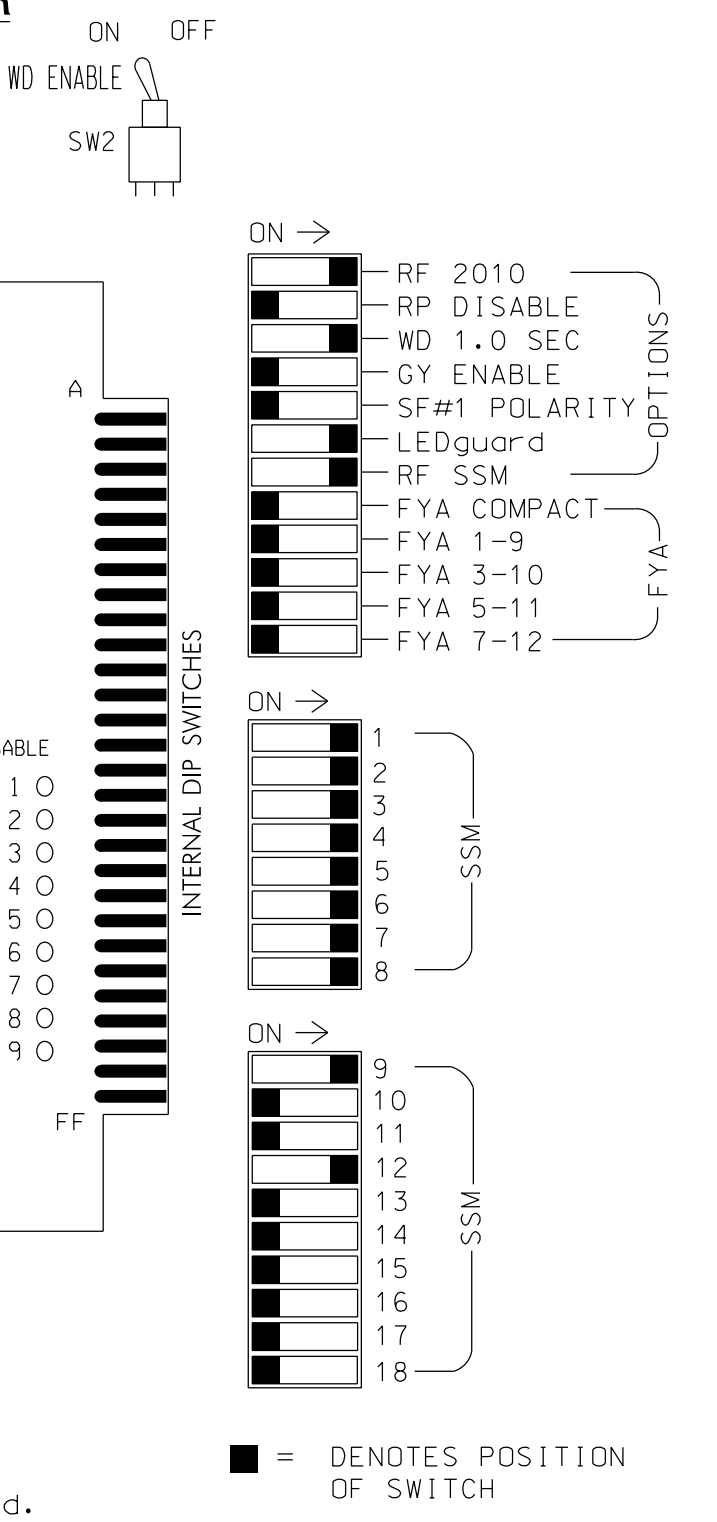
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-12, 2-5, 2-6, 2-12, 3-7, 3-8, 3-9, 3-12, 4-7, 4-8, 4-9, 4-12, 5-9, 6-9, 6-12, 7-12, 8-9, and 9-12.



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.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE.
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11,
AUX S1,AUX S5.
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP "A".....1+8
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....6+7

SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., CMU Channel No., Phase, Signal Head No., and various signal colors (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, GREEN ARROW) with corresponding switch numbers.

NU = Not Used

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 'NORMAL'
TMG VEH OVLP...[A] TYPE:[NORMAL]
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED X X
LAG GRN 0.0 YEL 0.0 RED 0.0

Toggle 3 Times

OVERLAP D

Select TMG VEH OVLP [D] and 'NORMAL'
TMG VEH OVLP...[D] TYPE:[NORMAL]
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED X X
LAG GRN 0.0 YEL 0.0 RED 0.0

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1995
DESIGNED: March 2018
SEALED: 6/7/2018
REVISED: N/A

INPUT FILE POSITION LAYOUT

(front view)

Table showing input file positions 1-14 with columns for FILE U, FILE J, and various detector/terminal settings.

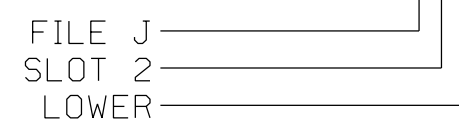
EX.: 1A, 2A, ETC. = LOOP NO.'S
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., DETECTOR NO., NEMA PHASE, CALL, EXTEND TIME, DELAY TIME, ADDED INITIAL, DETECTOR TYPE.

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



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.

Electrical Detail

Complex block containing electrical programming details, a seal for Pamela L. Alexander, and document completion status.

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RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PHASING DIAGRAM

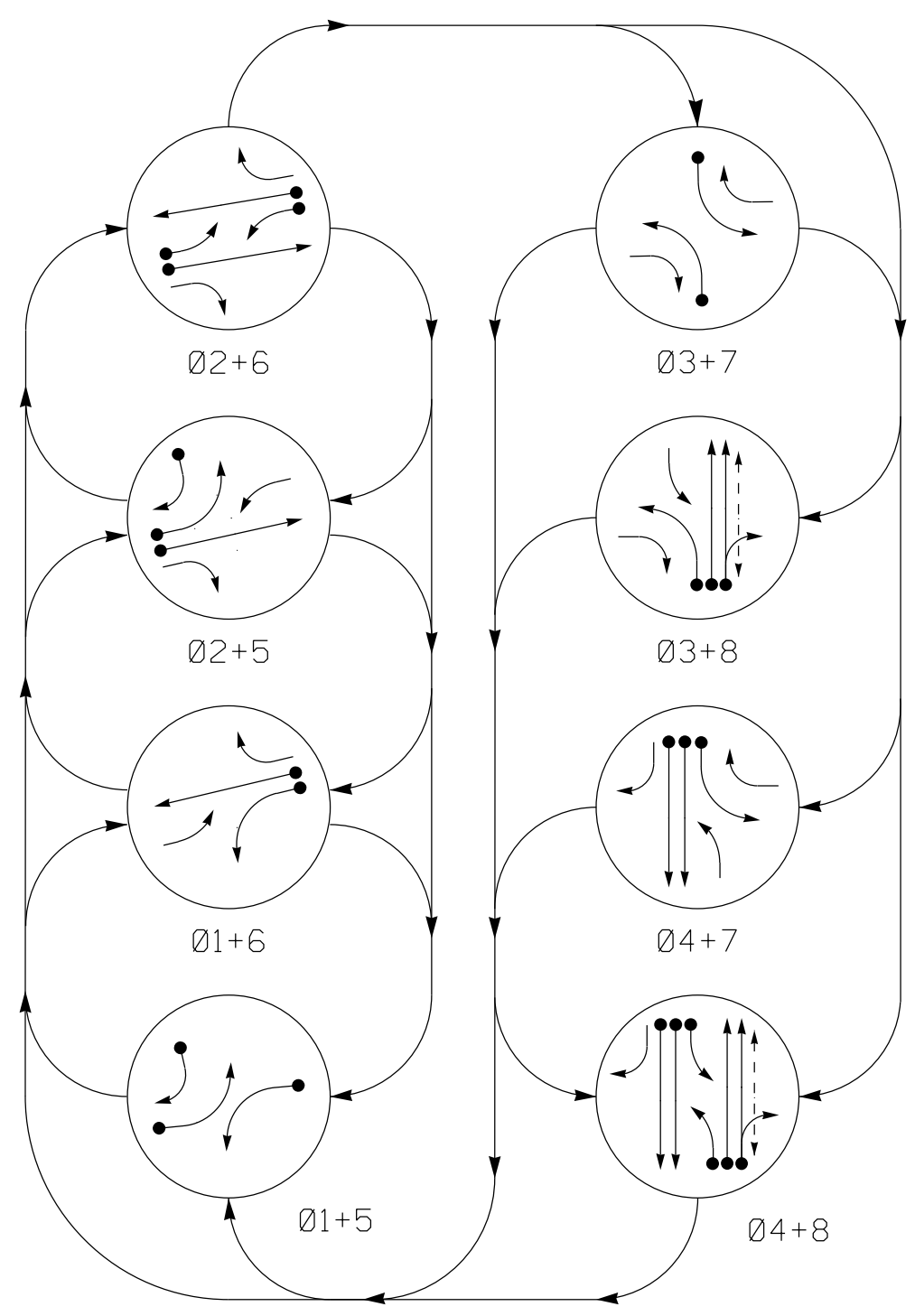
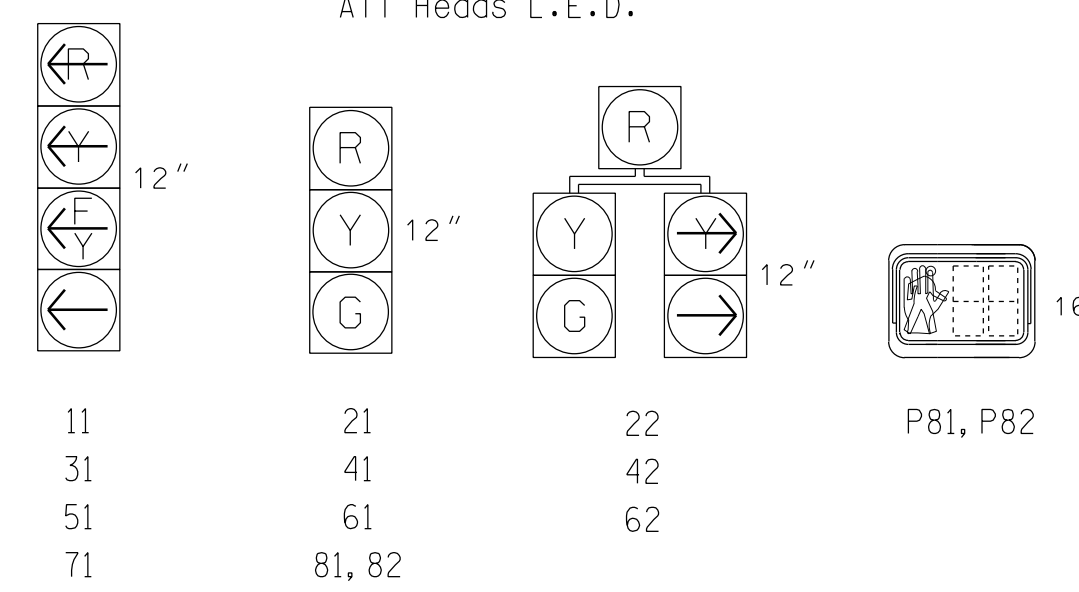
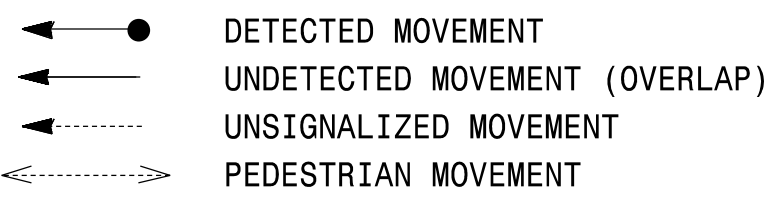


TABLE OF OPERATION table with columns for SIGNAL FACE and PHASE (Ø1+6 to Ø8+8). Rows list signal faces 11, 21, 22, 31, 41, 42, 51, 61, 62, 71, 81, 82, and P81, P82.

SIGNAL FACE I.D.



PHASING DIAGRAM DETECTION LEGEND



ASC/3 DETECTOR INSTALLATION CHART table with columns for LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, and NEW CARD. Lists loops 1A through 8D and SI.

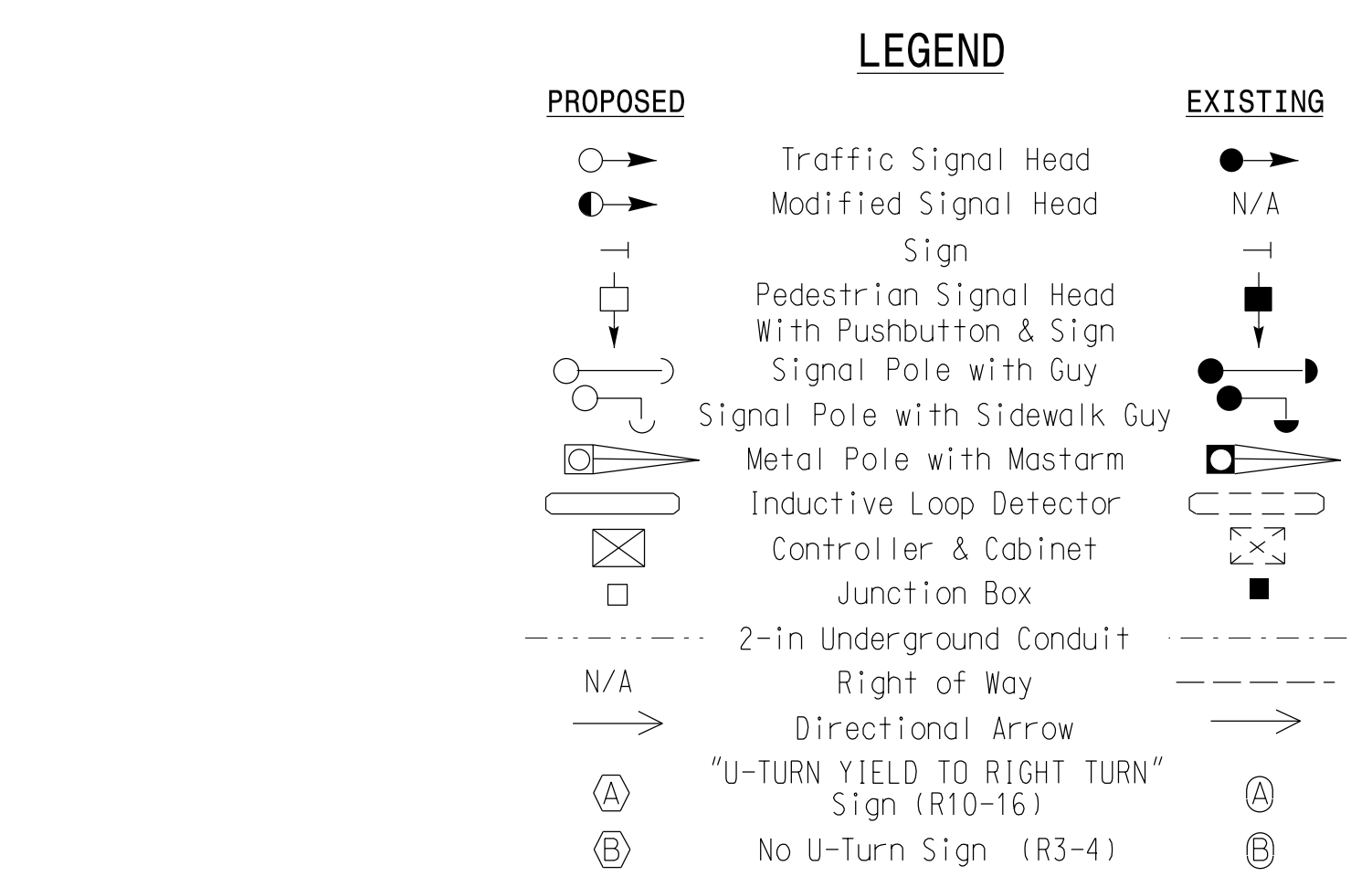
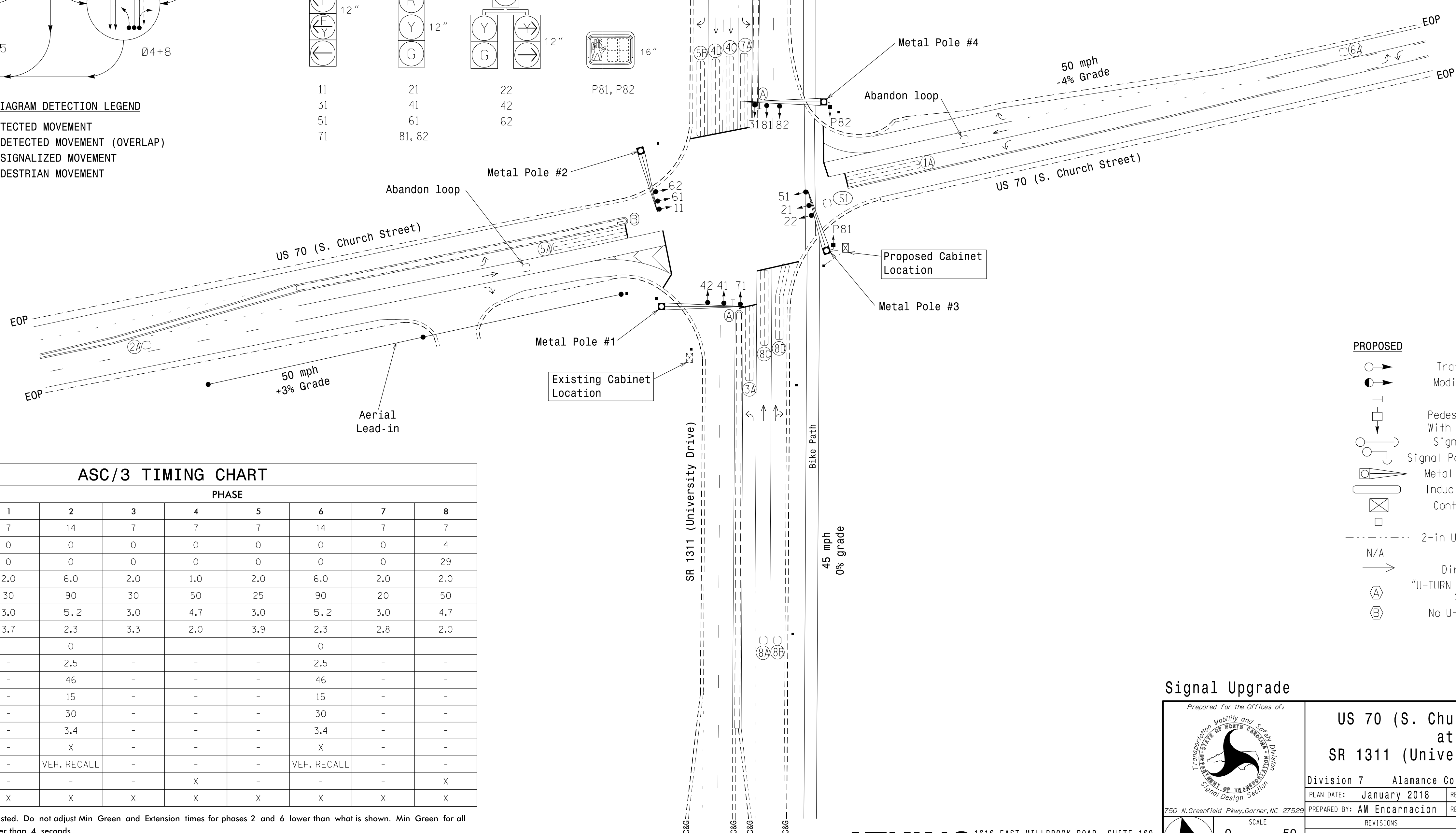
8 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- List of 11 notes providing technical instructions and references for the signal system, including references to NCDOT standards and signal timing.

ASC/3 TIMING CHART table with columns for FEATURE and PHASE (1-8). Rows list timing parameters such as Min Green, Walk, Ped Clear, Veh. Extension, Max I, Yellow, Red Clear, Actuations B4 Add, Seconds / Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, and Simultaneous Gap.

* 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

Professional seal for Pamela L. Alexander, Engineer, and project information for US 70 (S. Church Street) at SR 1311 (University Drive). Includes dates, signatures, and a 'DOCUMENT NOT CONSIDERED FINAL' stamp.

ATKINS logo and contact information: 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

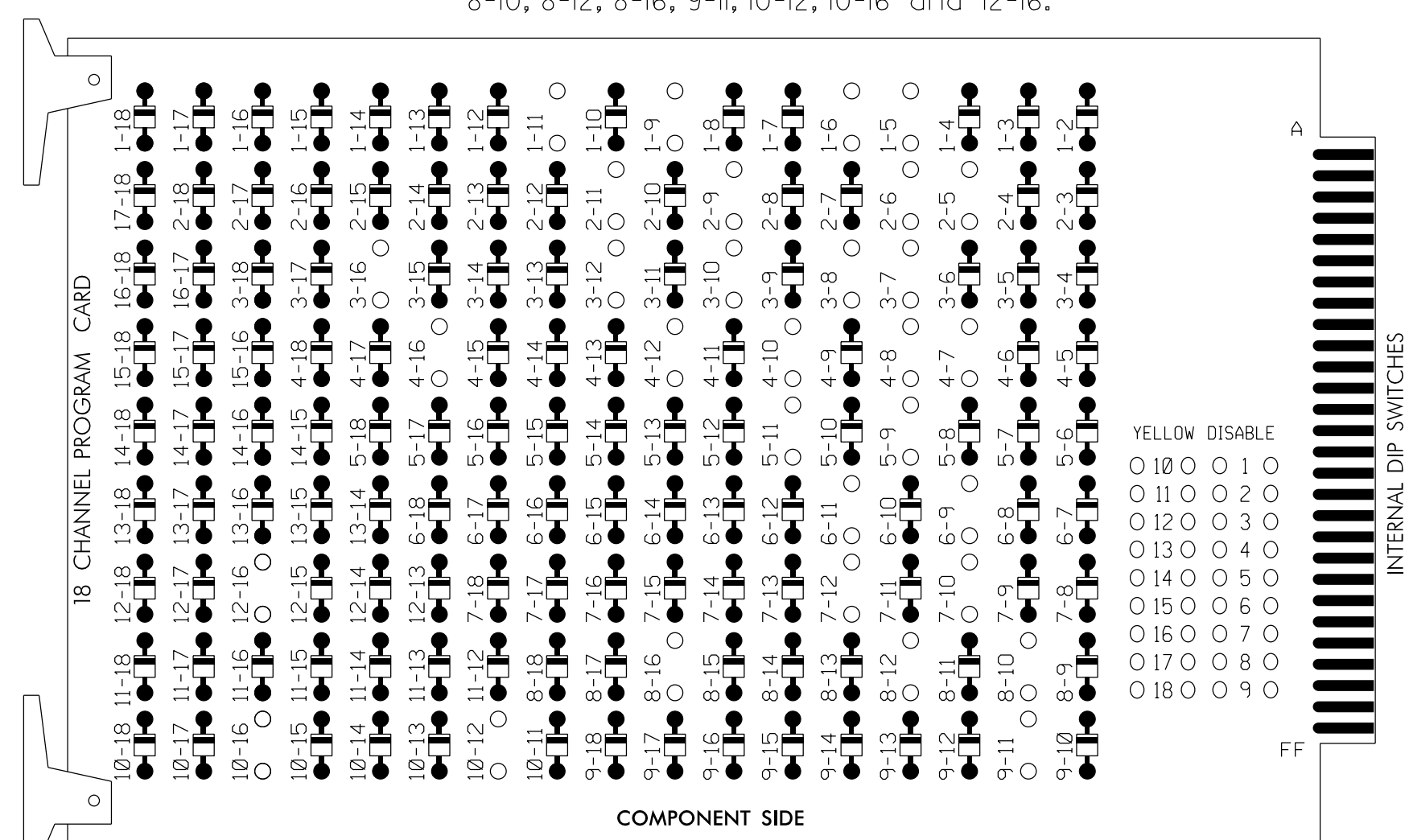
07-JUN-2018 11:15 D:\Forsyth\Task\Task\Facility\0056469 U-6015 B-C S19 SysTask 05_11_Signal\Des\gmm07-1916.dgn ALEX3361 AT LUS30699

EDI MODEL 2018EClip-NC CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

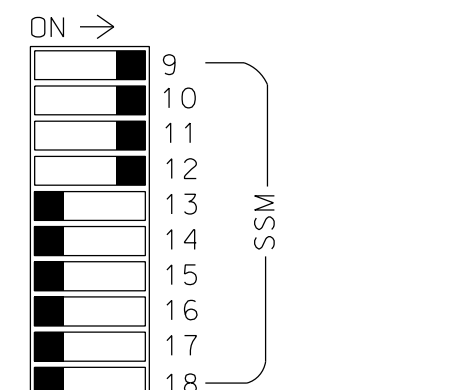
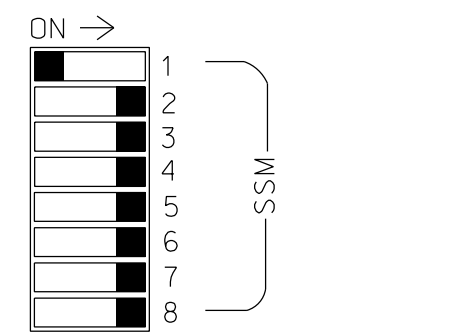
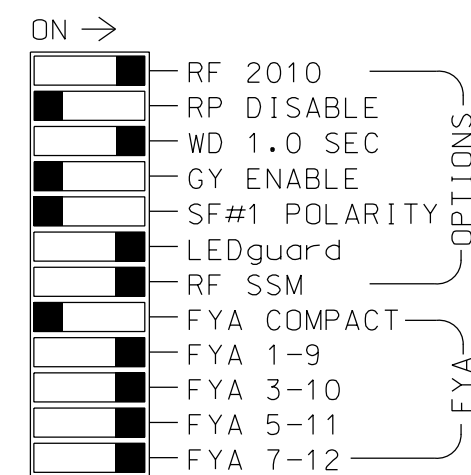
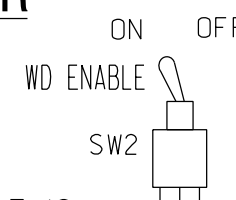
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 3-16, 4-7, 4-8, 4-10, 4-12, 4-16, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 8-16, 9-11, 10-12, 10-16 and 12-16.



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 phases 4 and 8 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,S7,S8,S10,S11,S12
 AUX S1,AUX S2,AUX S4,AUX S5
 PHASES USED.....1,2,3,4,5,6,7,8,8PED
 OVERLAP "A".....*
 OVERLAP "B".....*
 OVERLAP "C".....*
 OVERLAP "D".....*
 * See overlap programming detail on sheet 2

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 CONNECTION & PROGRAMMING CHART

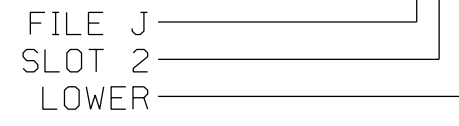
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	I1U	56	1	1	YES		15		S
	-	J4U	48	26	6	YES		3		G
2A	TB2-5,6	I2U	39	2	2	YES			X	N
	-	J8U	50	28	8	YES		15		S
3A ²	TB4-5,6	I5U	58	3	3	YES				S
	-	J8U	50	28	8	YES				S
4A,4B	TB4-9,10	I6U	41	4	4	YES	3.1			S
	-	J6U	45	14	4	YES				S
4D	TB6-1,2	I7U	65	34	4	YES				S
	*S1	TB6-9,10	I9U	60	11	SYS NO				N
5A ³	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	TB3-9,10	J3U	64	36	6	YES		X	N
7A ⁴	TB5-5,6	J5U	57	7	7	YES		15		S
	-	I8U	49	24	4	YES				S
8A,8B	TB5-9,10	J6U	42	8	8	YES	3.1			S
	8C	TB5-11,12	J6L	46	18	8	YES			S
8D	TB7-1,2	J7U	66	38	8	YES		10		S
PED PUSH BUTTONS										
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

* System detector only. Remove any assigned vehicle phase.

- ¹Add jumper from I1-W to J4-W, on rear of input file.
- ²Add jumper from I5-W to J8-W, on rear of input file.
- ³Add jumper from J1-W to I4-W, on rear of input file.
- ⁴Add jumper from J5-W to I8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



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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	41,42	NU	42	51	61,62	NU	62	71	81,82	P81, P82	11	31	51	71
RED		128		*	101		*	134		*	107								
YELLOW	*	129			102			135			108								
GREEN		130			103			136			109								
RED ARROW																A121	A124	A114	A101
YELLOW ARROW				117			132			123						A122	A125	A115	A102
FLASHING YELLOW ARROW																A123	A126	A116	A103
GREEN ARROW	127		118	118			133	133		124	124								
Hand													110						
Walking																			112

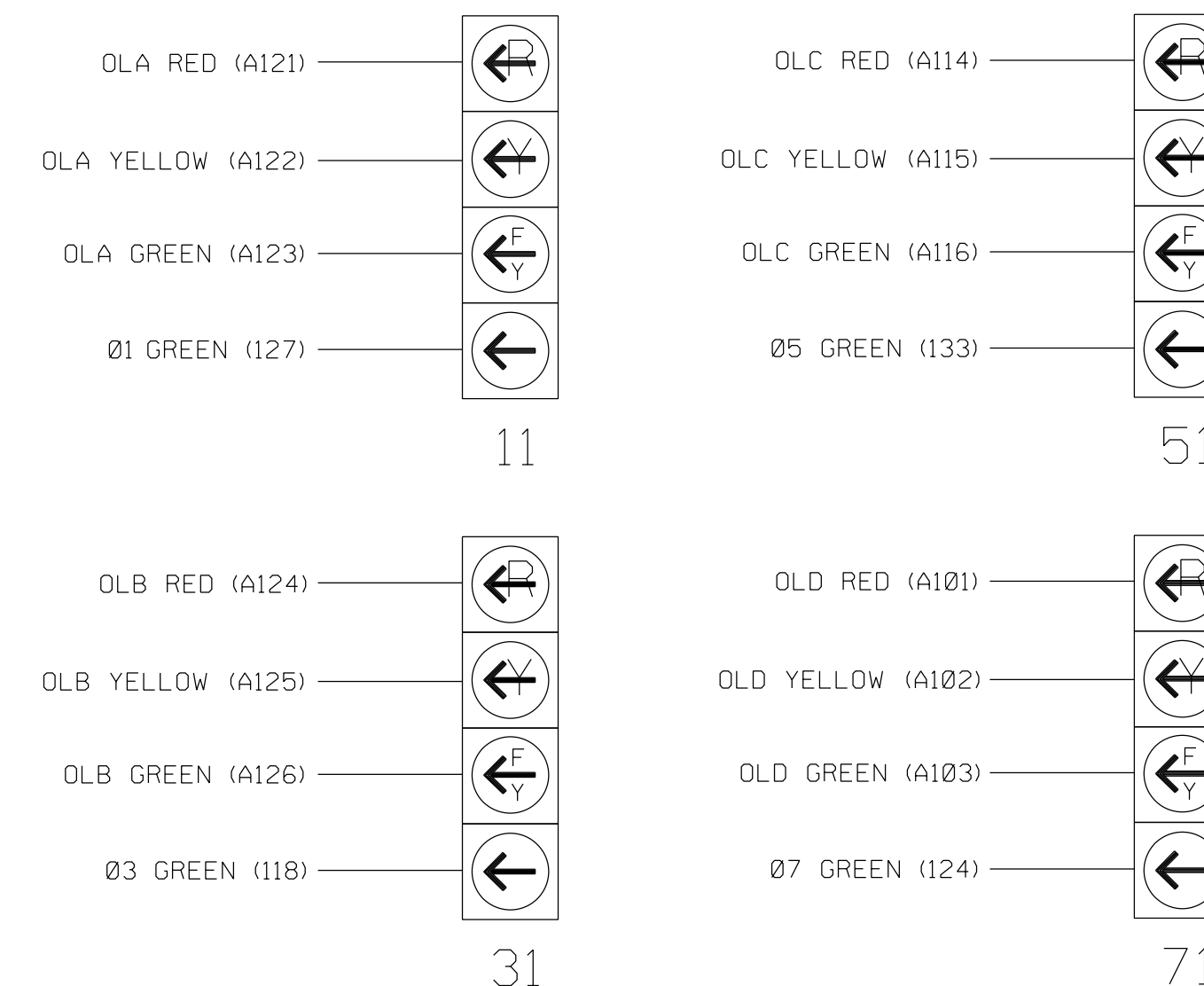
NU = Not Used

* 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)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1996
 DESIGNED: January 2018
 SEALED: 6/7/2018
 REVISED: N/A

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	∅ 3 3A	∅ 4 4A,4B	∅ 4 4D	∅ 5 5A	∅ 6 6A	∅ 7 7A	∅ 8 8A,8B	∅ 8 8D	SYS. DET. S1	NOT USED	NOT USED	FS
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	∅ 8 8A,8B	∅ 8 8D	∅ 8 8C	∅ 8 8C	∅ 8 8C	∅ 8 8C	∅ 8 8C	∅ 8 8C	∅ 8 8C	∅ 8 8C
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

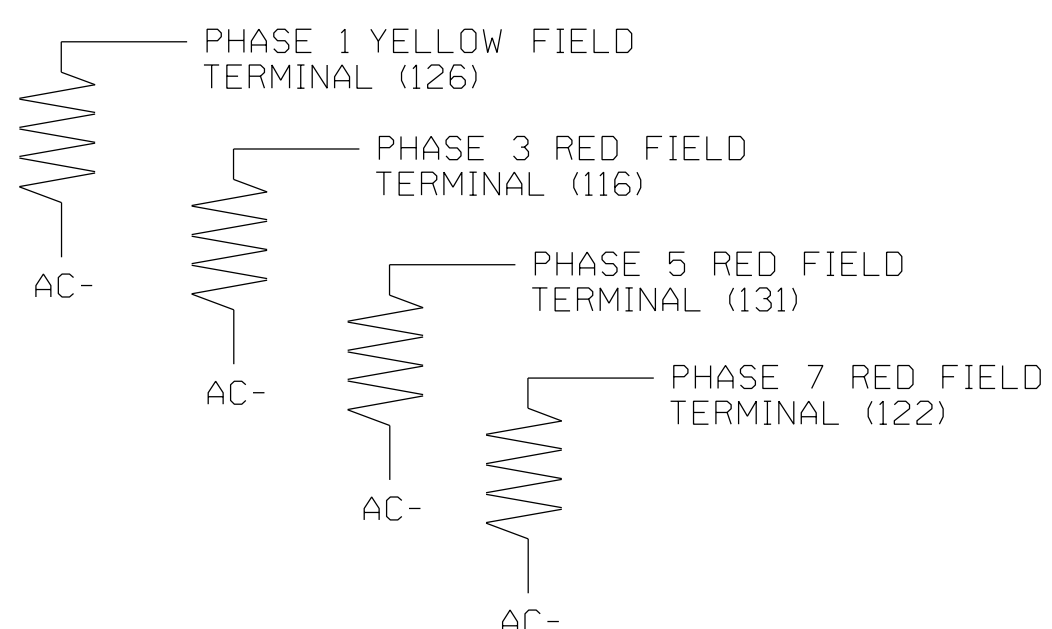
FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL

(install resistors 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:

Prepared for the Offices of:

US 70 (S. Church Street) at SR 1311 (University Drive)

Division 7 Alamance County Burlington

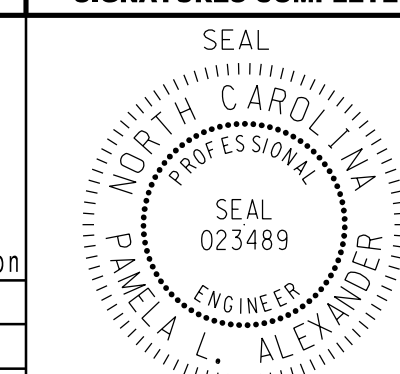
PLAN DATE: January 2018 REVIEWED BY: PL Alexander

PREPARED BY: AM Encarnacion REVIEWED BY:

REVISIONS	INIT.	DATE

Signature: Pamela L. Alexander
 Date: 6/9/2018
 SIG. INVENTORY NO. 07-1996

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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 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..... 0

Toggle Once

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 'PPLT FYA'

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

PROTECTED LEFT TURN.... PHASE 7

OPPOSING THROUGH..... PHASE 8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

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

ACTION PLAN SF BIT DISABLE..... 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.

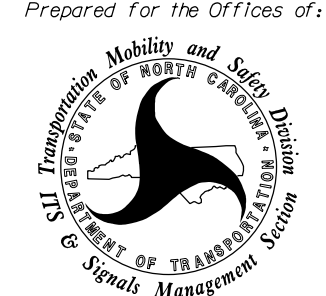
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1996
 DESIGNED: January 2018
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

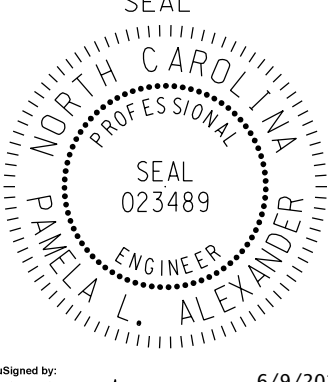
Prepared for the Offices of:



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

US 70 (S. Church Street) at SR 1311 (University Drive)	
Division 7	Alamance County Burlington
PLAN DATE: January 2018	REVIEWED BY: PL Alexander
PREPARED BY: AM Encarnacion	REVIEWED BY:
REVISIONS	INIT. DATE

SEAL



SEAL
023489
PAMELA L. ALEXANDER
ENGINEER

6/9/2018

DATE

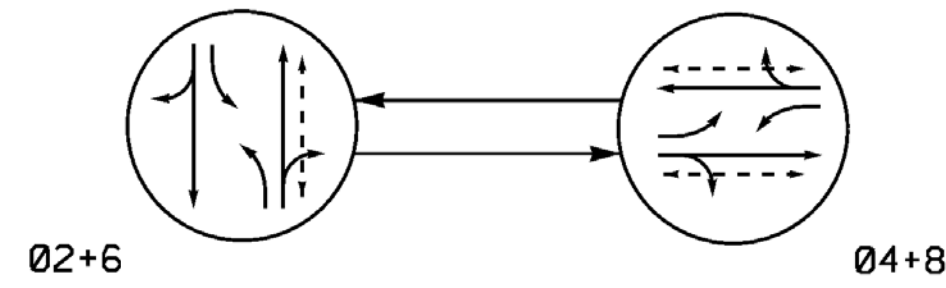
SIGNED BY: Pamela Alexander

DATE

SIG. INVENTORY NO. 07-1996

09-JUN-2018 14:15
 D:\Consolidation\Projects\00056469 U-6015 B-G Sig System\Task 05_11_Signal\Des\gym\tr-Ing\07-1996E.dgn
 ALEX3361 AT LUS33069

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

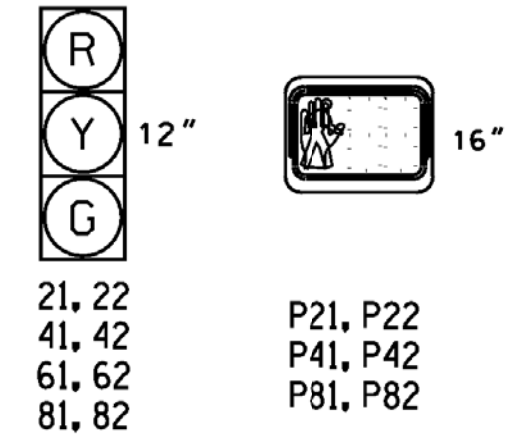
- ←● DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ←- - UNSIGNALIZED MOVEMENT
- ←- - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

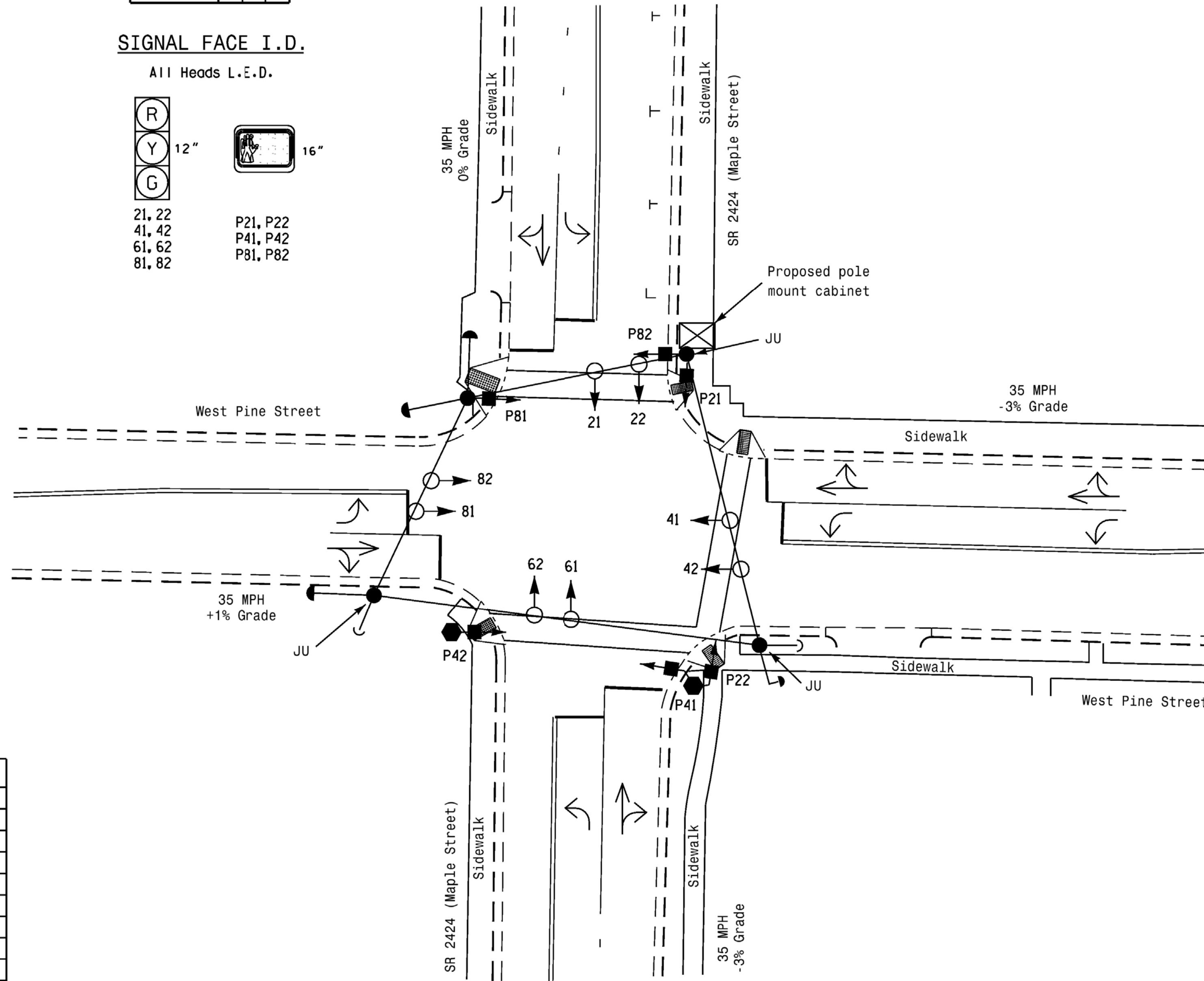
All Heads L.E.D.



2 Phase
Pre-Timed
(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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Provide minimum of 15' clearance from high point in roadway to bottom of proposed signal heads.



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	10	7	10	7
Walk *	4	4	0	4
Ped Clear	11	12	0	9
Veh. Extension *	0.0	0.0	0.0	0.0
Max I *	43	25	43	25
Yellow	4.1	3.8	3.8	4.1
Red Clear	1.5	1.4	1.6	1.3
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	MAX/PED	MAX/PED	MAX	MAX/PED
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.

PROPOSED	EXISTING
○→ Traffic Signal Head	●→ N/A
●→ Modified Signal Head	— Sign
⊥ Pedestrian Signal Head	⊥ With 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
○ Type II Signal Pedestal	● Wheelchair Ramp

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

Signal Upgrade

SR 2424 (Maple Street)
at
West Pine Street

Division 7 Alamance County Graham

PLAN DATE: September 2017 REVIEWED BY: JB Voso

PREPARED BY: SE Wilson REVIEWED BY:

REVISIONS	INIT.	DATE

6/13/2018

SIG. INVENTORY NO. 07-2063

*****SYSTEM*****
 *****USER*****

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

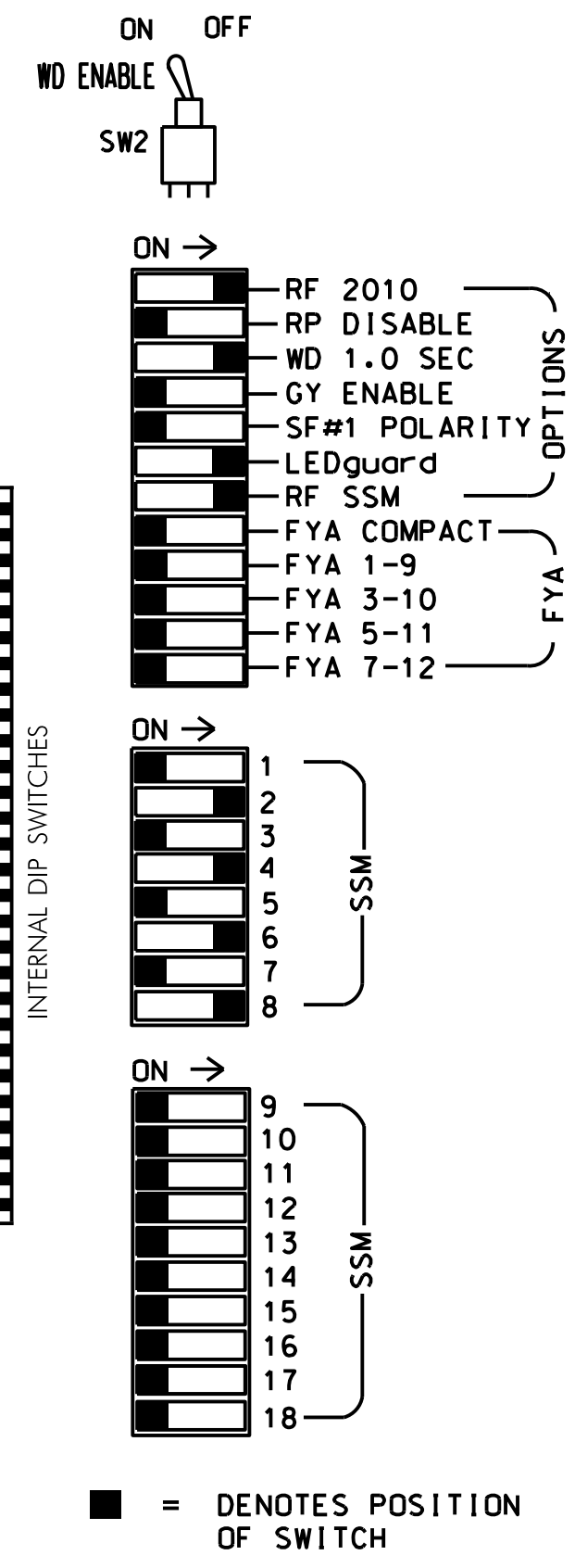
REMOVE DIODE JUMPERS 2-6, 2-13, 4-8, 4-14, 4-16, 6-13, 8-14, 8-16, and 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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 controller to start up in phase 2 Walk and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S3,S5,S6,S8,S11,S12
 PHASES USED.....2,2PED,4,4PED,6,8,8PED
 OVERLAPS.....NONE

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	P21, P22	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon			113			104						110
Walking person icon			115			106						112

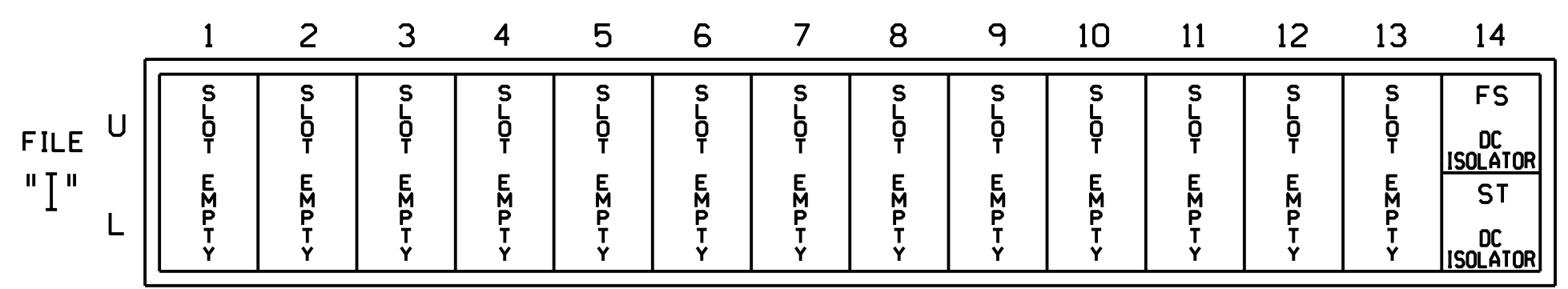
NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2063
 DESIGNED: September 2017
 SEALED: 6/13/2018
 REVISED: NA

*****SYTIME*****
 *****DOCS*****
 *****USER*****



12 BROAD STREET
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 NC LIC. NO. C-1154

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
 City of Asheville, North Carolina
 Department of Public Works
 Signal Management Section

SR 2424 (Maple Street) at West Pine Street

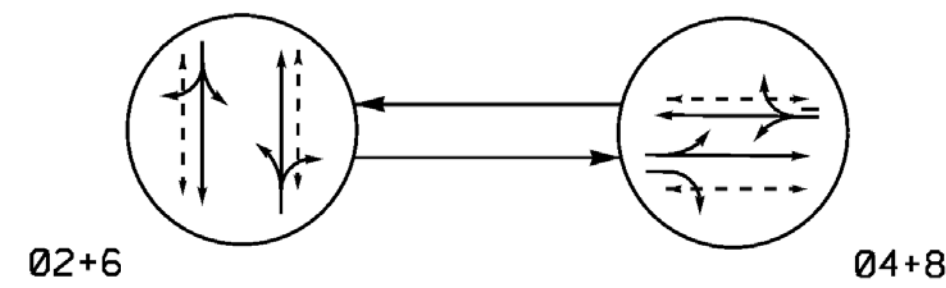
Division 7 Alamance County Graham

PLAN DATE: September 2017 REVIEWED BY: JB Voso
 PREPARED BY: SE Wilson REVIEWED BY:

REVISIONS INIT. DATE

James Voso 6/13/2018
 SEAL 022599
 NORTH CAROLINA PROFESSIONAL ENGINEER
 JAMES B. VOSO
 DATE 6/13/2018
 SIG. INVENTORY NO. 07-2063

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

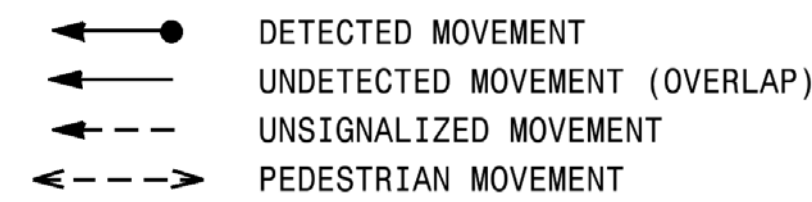
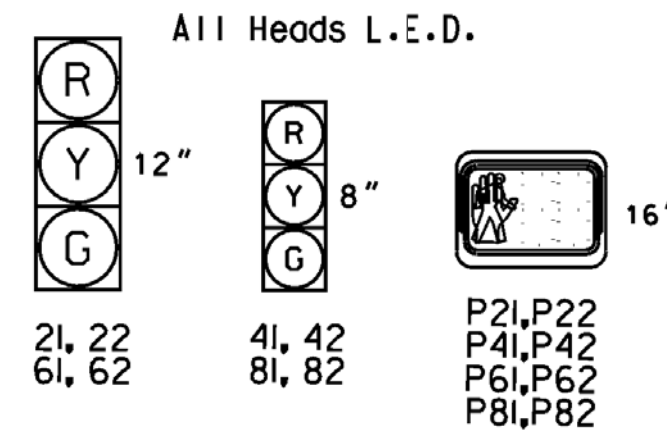


TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
2L, 22	G	R	Y
4L, 42	R	G	R
6L, 62	G	R	Y
8L, 82	R	G	R
P2L, P22	W	DW	DRK
P4L, P42	DW	W	DRK
P6L, P62	W	DW	DRK
P8L, P82	DW	W	DRK

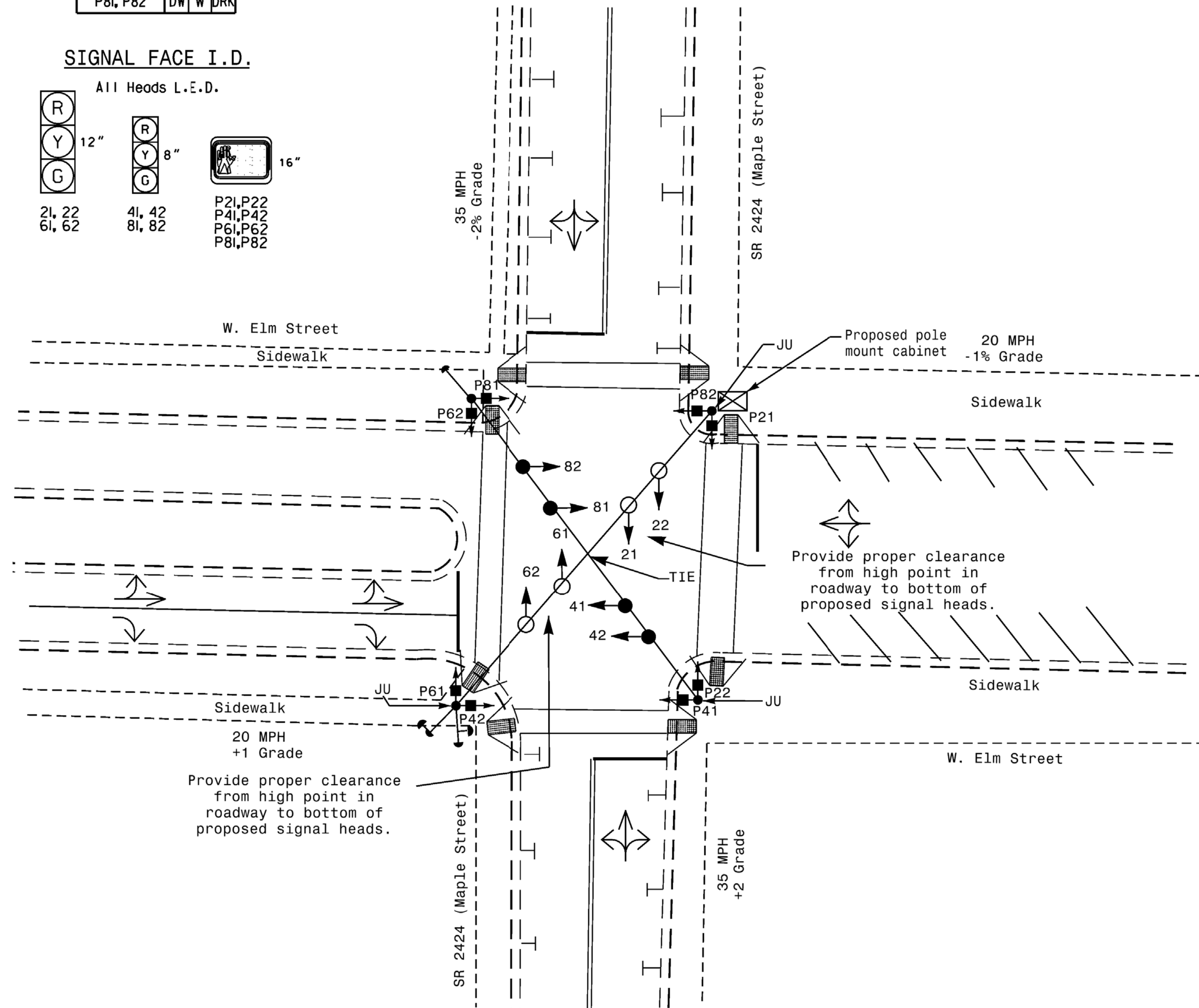
SIGNAL FACE I.D.



2 Phase
Pre-Timed
(Burlington-Graham Signal System)

NOTES

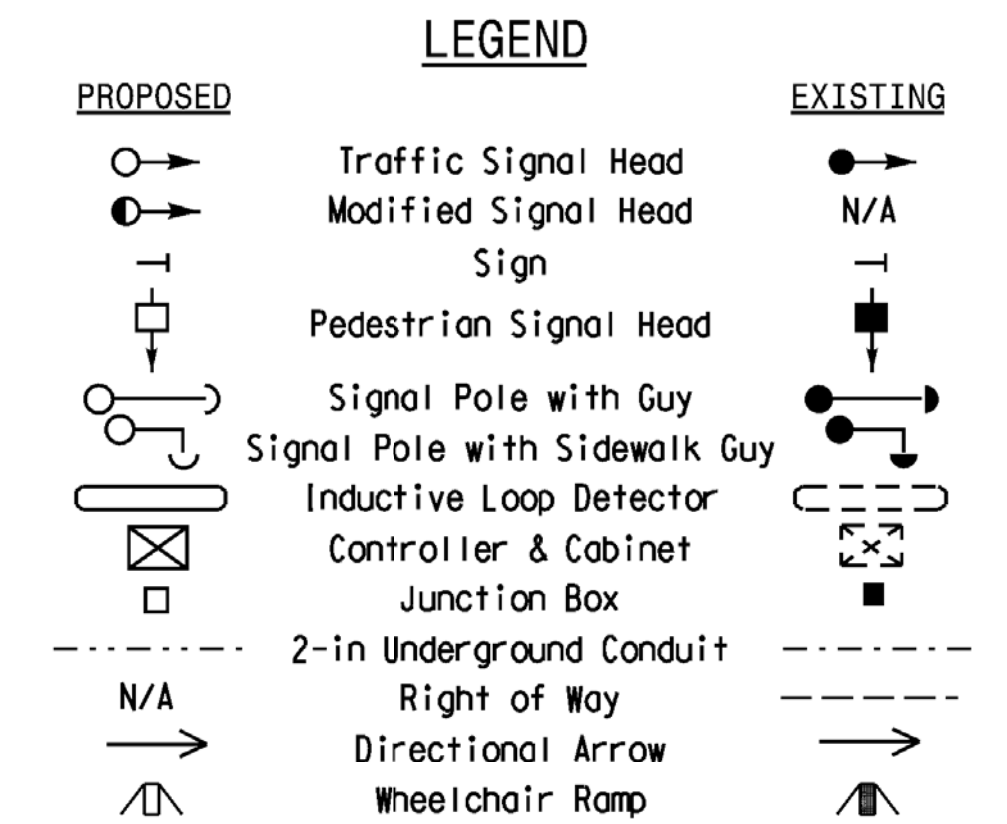
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
5. Pavement markings are existing.
6. 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	4	4	4
Ped Clear	13	9	15	9
Veh. Extension *	0.0	0.0	0.0	0.0
Max I *	31	37	31	37
Yellow	3.7	3.0	4.0	3.0
Red Clear	1.9	2.4	1.9	2.6
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	MAX/PED	MAX/PED	MAX/PED	MAX/PED
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.



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NC LIC. NO. C-1154

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2424 (Maple Street)
at
W. Elm Street

Division 7 Alamance County Graham

PLAN DATE: September 2017 REVIEWED BY: JB Voso

PREPARED BY: SE Wilson REVIEWED BY:

REVISIONS	INIT.	DATE

SIGNATURE: James B. Vosso DATE: 6/13/2018

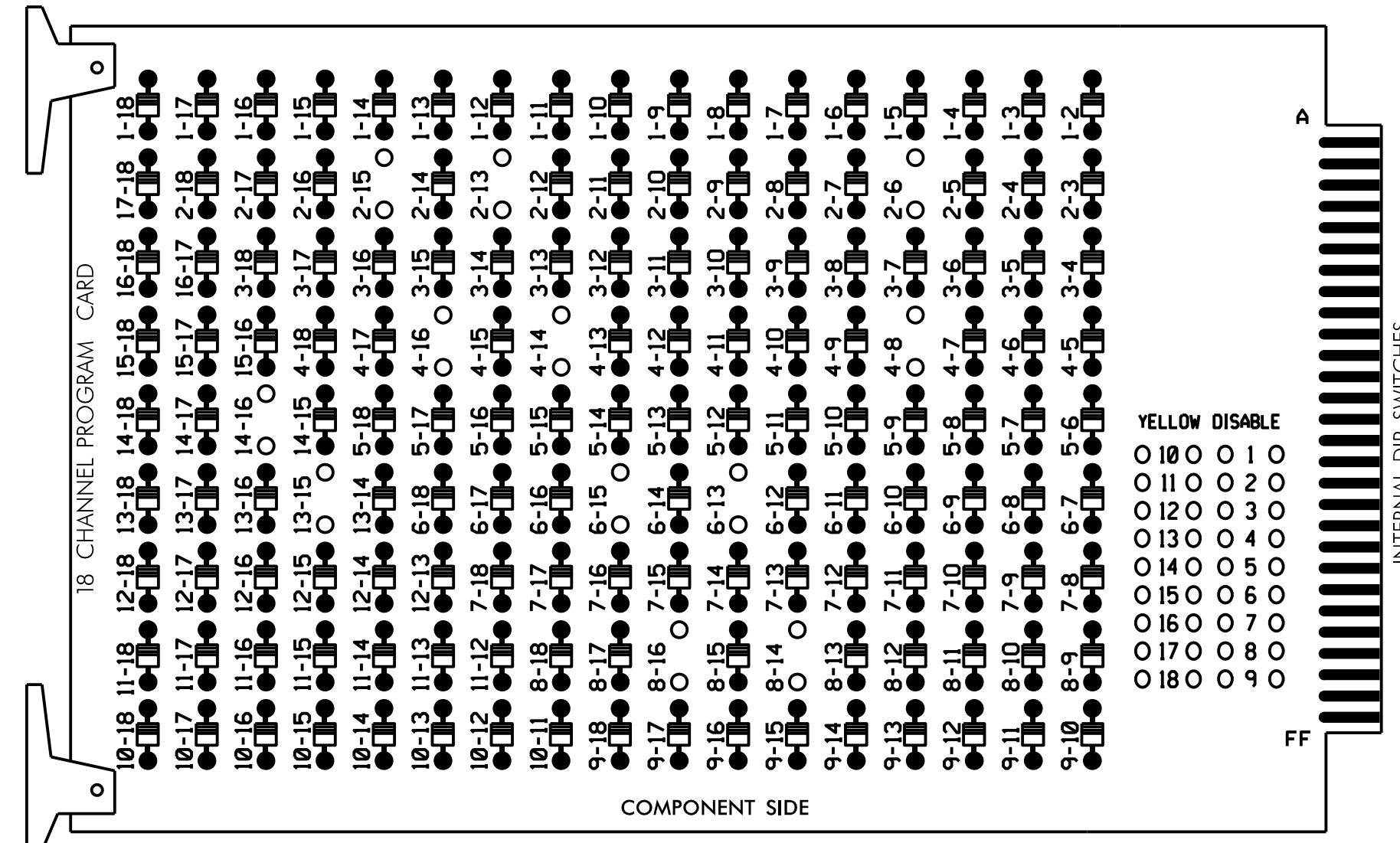
SIG. INVENTORY NO. 07-2064

*****SYSTEMS*****
*****BUSINESS*****

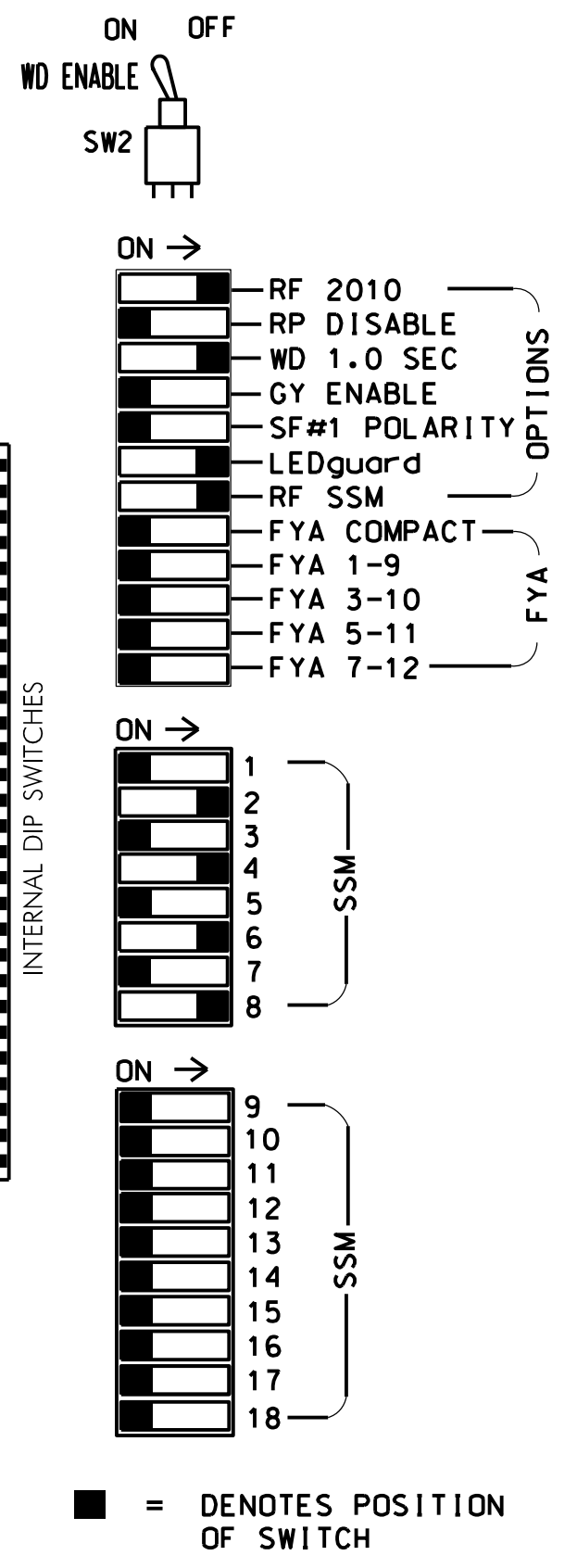
EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-13, 2-15, 4-8, 4-14, 4-16, 6-13, 6-15, 8-14, 8-16, 13-15, and 14-16.



REMOVE JUMPERS AS SHOWN



NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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 Walk and 6 Walk.
- The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S3,S5,S6,S8,S9,S11,S12
 PHASES USED.....2,2PED,4,4PED,6,6PED,8,8PED
 OVERLAPS.....NONE

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	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134				107
YELLOW		129			102			135				108
GREEN		130			103			136				109
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand			113			104			119			110
Walker			115			106			121			112

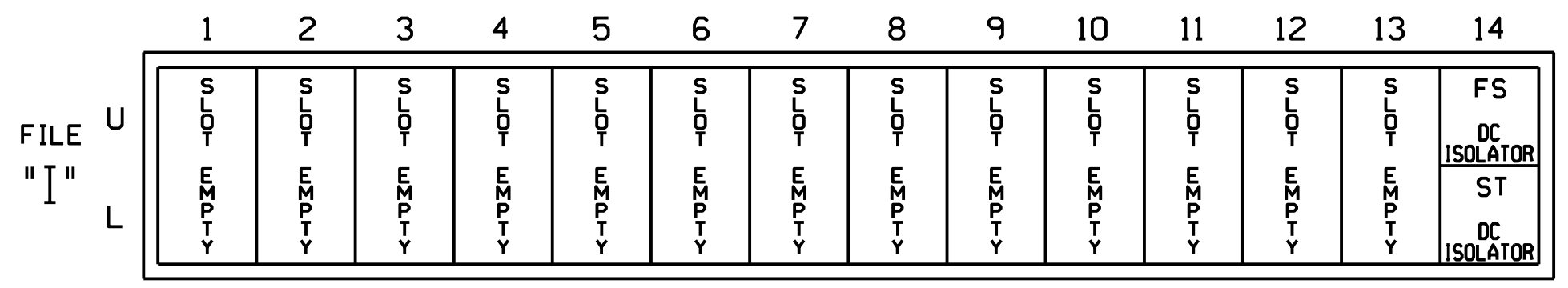
NU = Not Used

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)



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

FS = FLASH SENSE
 ST = STOP TIME

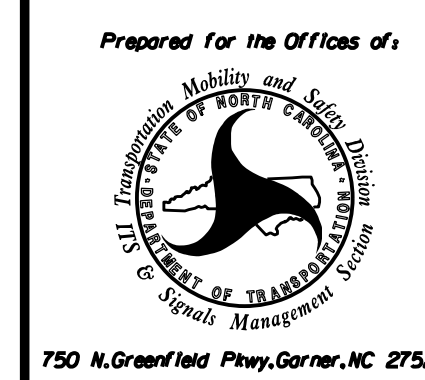
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12 BROAD STREET
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 (828) 254-2201
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 NC LIC. NO. C-1154

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



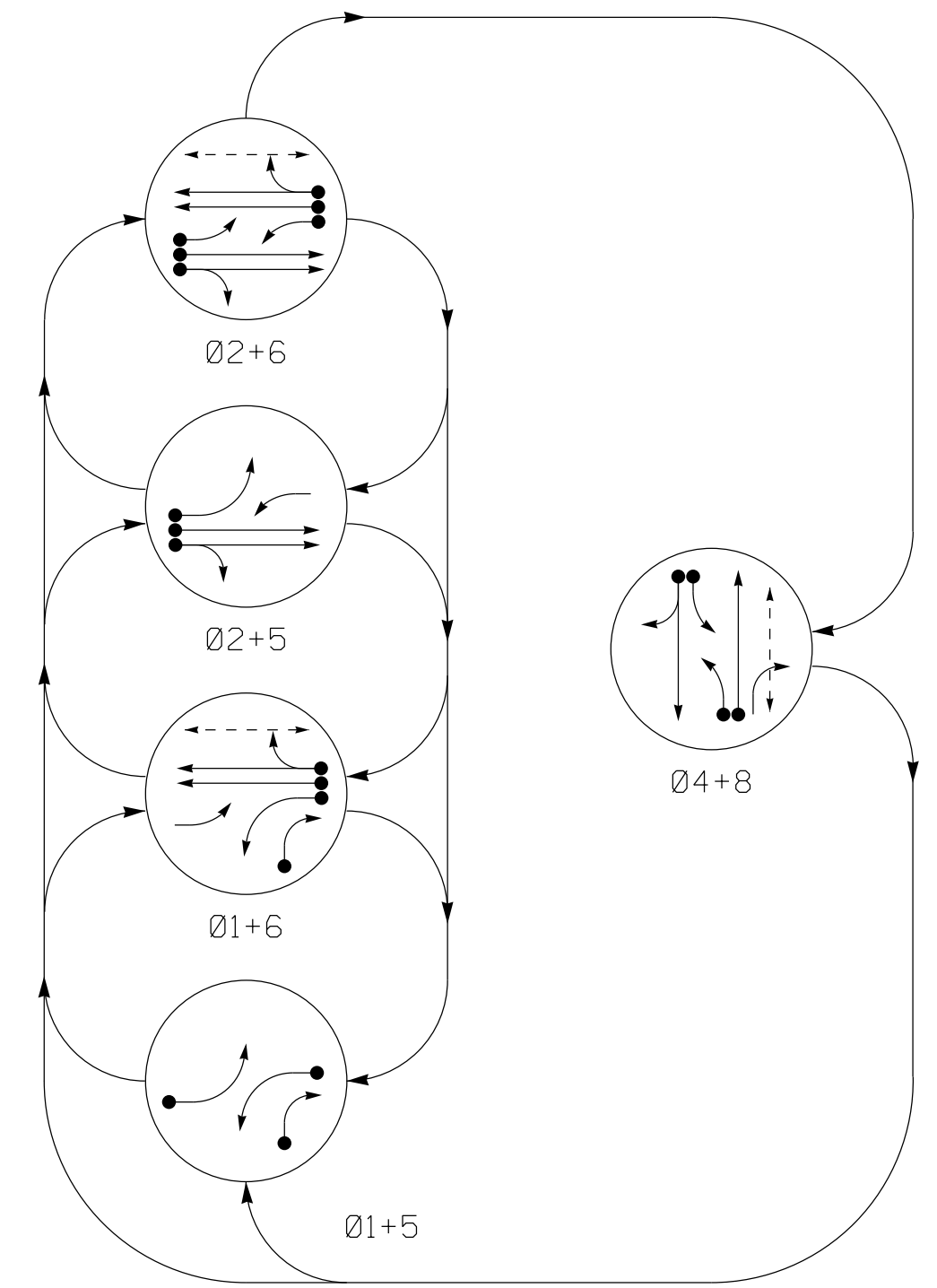
SR 2424 (Maple Street)
 at
 W. Elm Street

Division 7	Alamance County	Graham
PLAN DATE: September 2017	REVIEWED BY: JB Voso	
PREPARED BY: SE Wilson	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022599
 JAMES B. VOSO
 James Voso 6/13/2018
 SIGNATURE DATE
 SIG. INVENTORY NO. 07-2064

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

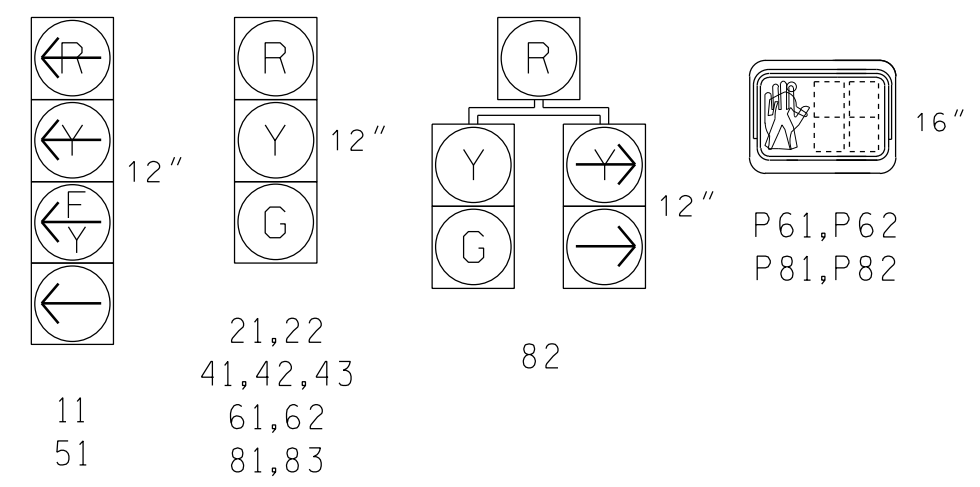
- DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ⋯ UNSIGNALIZED MOVEMENT
- ⋯ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	←	←	←	←
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
51	←	←	←	←	←	←
61,62	R	G	R	G	R	Y
81,83	R	R	R	R	G	R
82	R	R	R	R	G	R
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



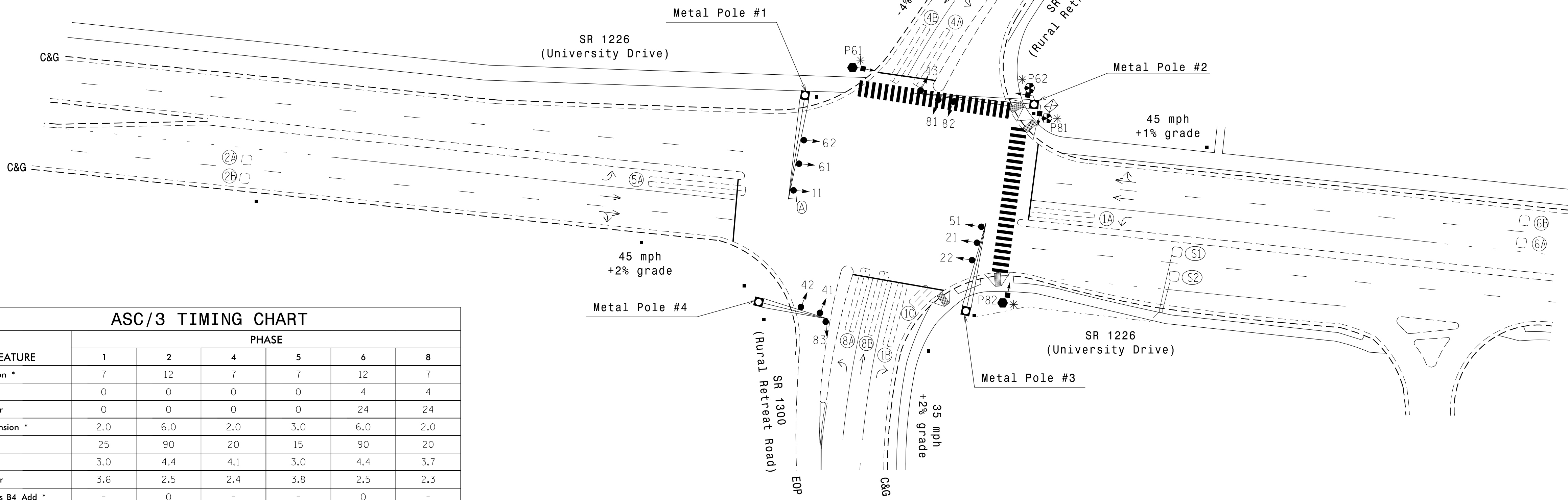
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	15	-	S	-	X
1B	6X40	0	2-4-2	-	6	Yes	-	3	-	G	-	X
1C	6X15	0	2-4-2	-	1	Yes	-	15	-	S	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X40	+5	2-4-2	-	4	Yes	-	-	-	S	-	X
4B	6X40	+5	2-4-2	-	4	Yes	-	10	-	S	-	X
5A	6X60	+5	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
8A	6X40	+5	2-4-2	-	8	Yes	-	-	-	S	-	X
8B	6X40	+5	2-4-2	-	8	Yes	-	-	-	S	-	X
S1	6X6	+270	4	X	-	No	-	-	-	N	X	X
S2	6X6	+270	4	X	-	No	-	-	-	N	X	X

5 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 Engineer.
3. Phase 1 and/or phase 5 may be lagged.
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. 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						
	1	2	4	5	6	8	
Min Green *	7	12	7	7	12	7	
Walk *	0	0	0	0	4	4	
Ped Clear	0	0	0	0	24	24	
Veh. Extension *	2.0	6.0	2.0	3.0	6.0	2.0	
Max 1 *	25	90	20	15	90	20	
Yellow	3.0	4.4	4.1	3.0	4.4	3.7	
Red Clear	3.6	2.5	2.4	3.8	2.5	2.3	
Activations B4 Add *	-	0	-	-	0	-	
Seconds / Actuation *	-	1.5	-	-	1.5	-	
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	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 |
| * Pedestrian Push Button & Sign | * → N/A |
| ⊕ Type I Pushbutton Post | ⊕ → N/A |
| ⊙ Type II Signal Pedestal | ⊙ → N/A |
| ○ Signal Pole with Guy | ○ → N/A |
| ○ Signal Pole with Sidewalk Guy | ○ → N/A |
| ○ Metal Pole with Mastarm | ○ → 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 |
| N/A Curb Ramp | ▴ → N/A |
| ⊕ "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) | ⊕ → N/A |

Signal Upgrade

SR 1226 (University Drive) at SR 1300 (Rural Retreat Road)

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

NORTH CAROLINA PROFESSIONAL ENGINEER

SEAL 023489

PAMELA L. ALEXANDER

DATE 6/7/2018

SIG. INVENTORY NO. 07-2070

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

SCALE 0 40 1"=40'

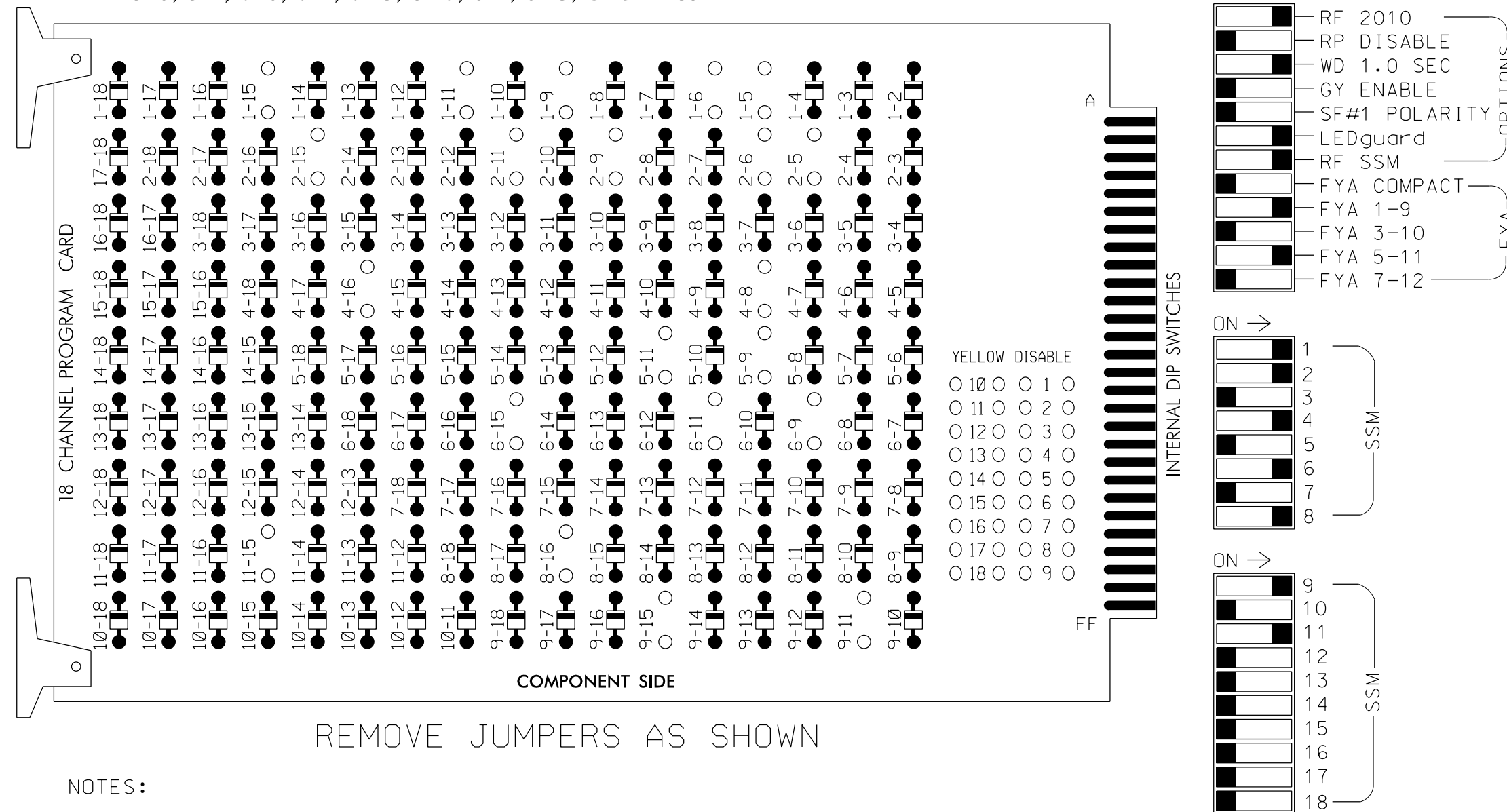
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

07-JUN-2018 11:15 U:\Projects\2018\06\05\6469 U-6015 B-G Sig Sys\Task 05_11_Signals\Desi\gn07-2070.dgn ALEX3361 AT LUS340649

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, I-15, 2-5, 2-6, 2-9, 2-11, 2-15, 4-8, 4-16, 5-9, 5-11, 6-9, 6-11, 6-15, 8-16, 9-11, 9-15, and 11-15.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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 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.....S1,S2,S5,S7,S8,S9,S11,S12, AUX S1,AUX S4
 PHASES USED.....1,2,4,5,6,6PED,8,8PED
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on sheet 2

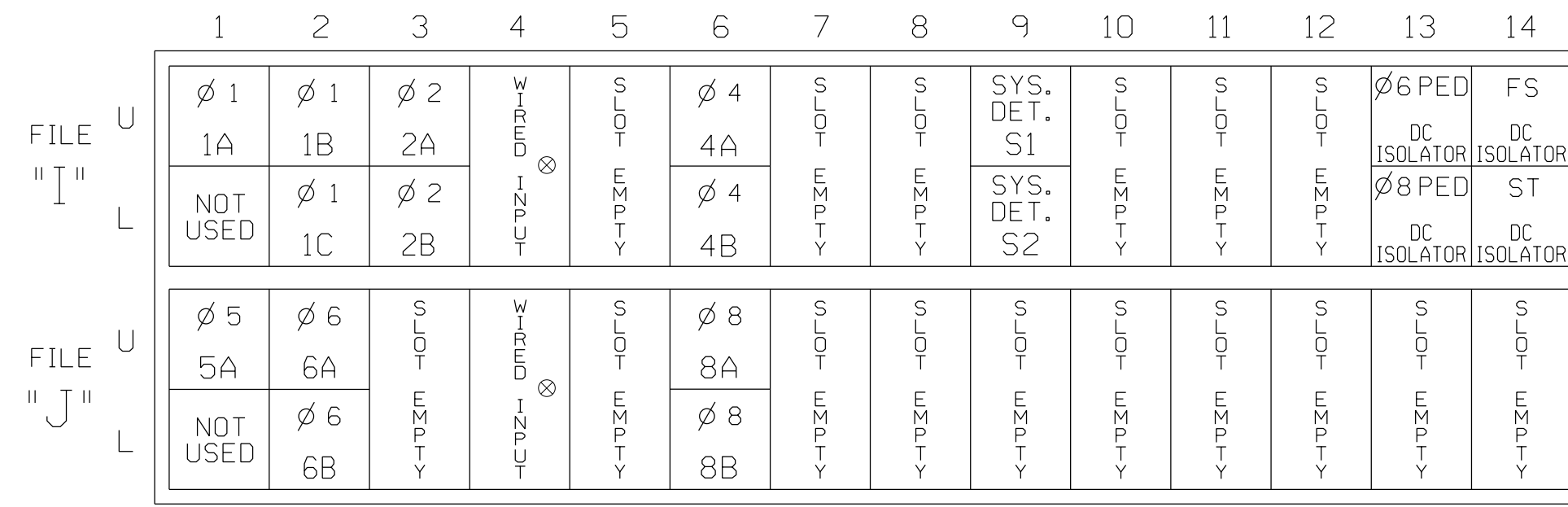
SIGNAL HEAD HOOK-UP CHART

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	82	21,22	NU	NU	41,42, 43	NU	51	61,62	P61, P62	NU	81,82, 83	P81, P82	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												
Hand icon													119						110	
Walking person icon													121						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)



INPUT FILE CONNECTION & PROGRAMMING CHART

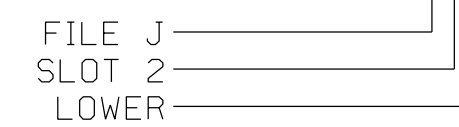
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	I1U	56	1	1	YES		15		S
		J4U	48	26	6	YES		3		G
1B	TB2-5,6	I2U	39	2	1	YES		15		S
1C	TB2-7,8	I2L	43	12	1	YES		15		S
2A	TB2-9,10	I3U	63	32	2	YES			X	N
2B	TB2-11,12	I3L	76	42	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	YES		10		S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
5A ²	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
6B	TB3-7,8	J2L	44	16	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES				S

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT 113.

* System detector only. Remove any assigned vehicle phase.

- 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.

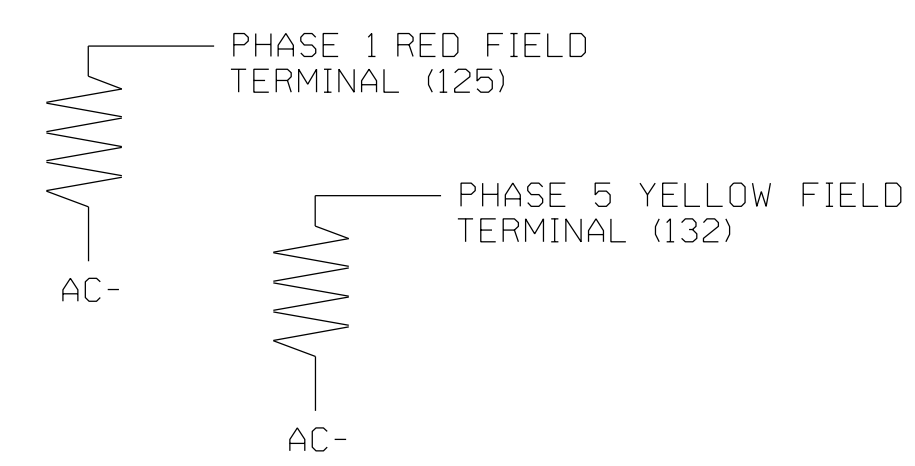
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

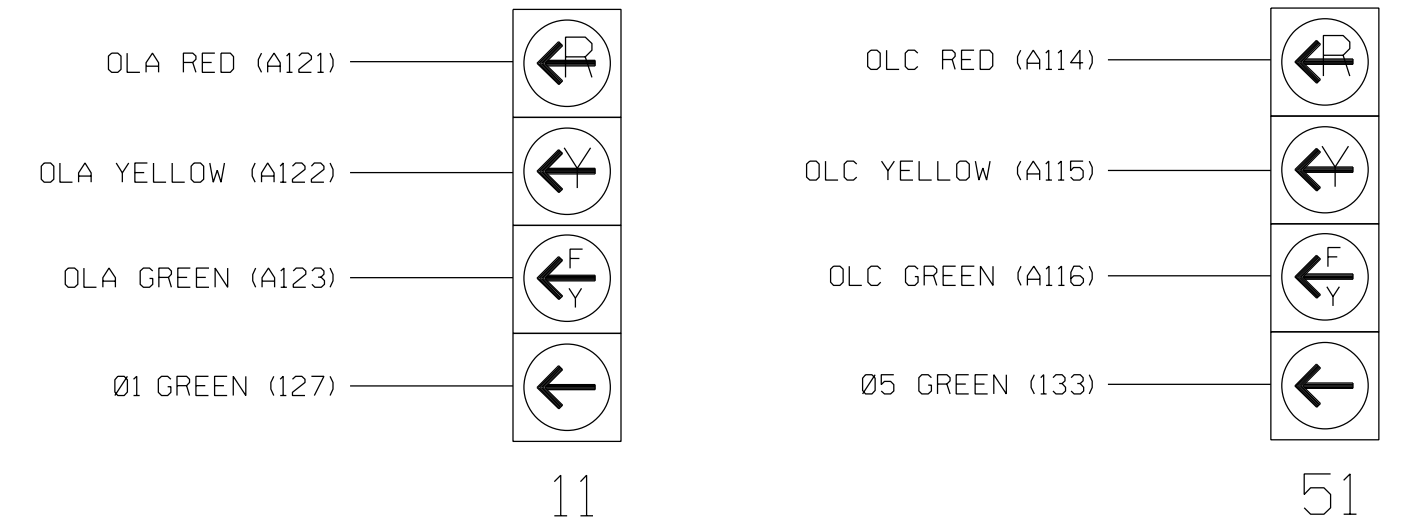
(install resistors as shown)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2070
 DESIGNED: March 2018
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Details - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION & TRAFFIC MANAGEMENT SYSTEMS	SR 1226 (University Drive) at SR 1300 (Rural Retreat Road)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER PAMELA L. ALEXANDER SEAL 023489 DATE
	Division 7 Alamance County Burlington PLAN DATE: March 2018 REVIEWED BY: PL Alexander PREPARED BY: NA Ptak REVIEWED BY: AM Encarnacion	REVISIONS INIT. DATE

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

09-JUN-2018 14:15
 01:Transmittal:0056469 U:0019 B-G S19 Sys:Task 05_11_Signal:Des:gn:wr:ing:07-2070E.dgn
 ALEX3361 AT LUS510649