

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# GRANVILLE COUNTY

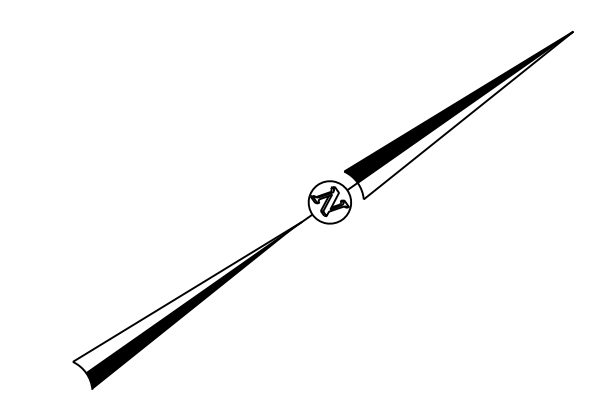
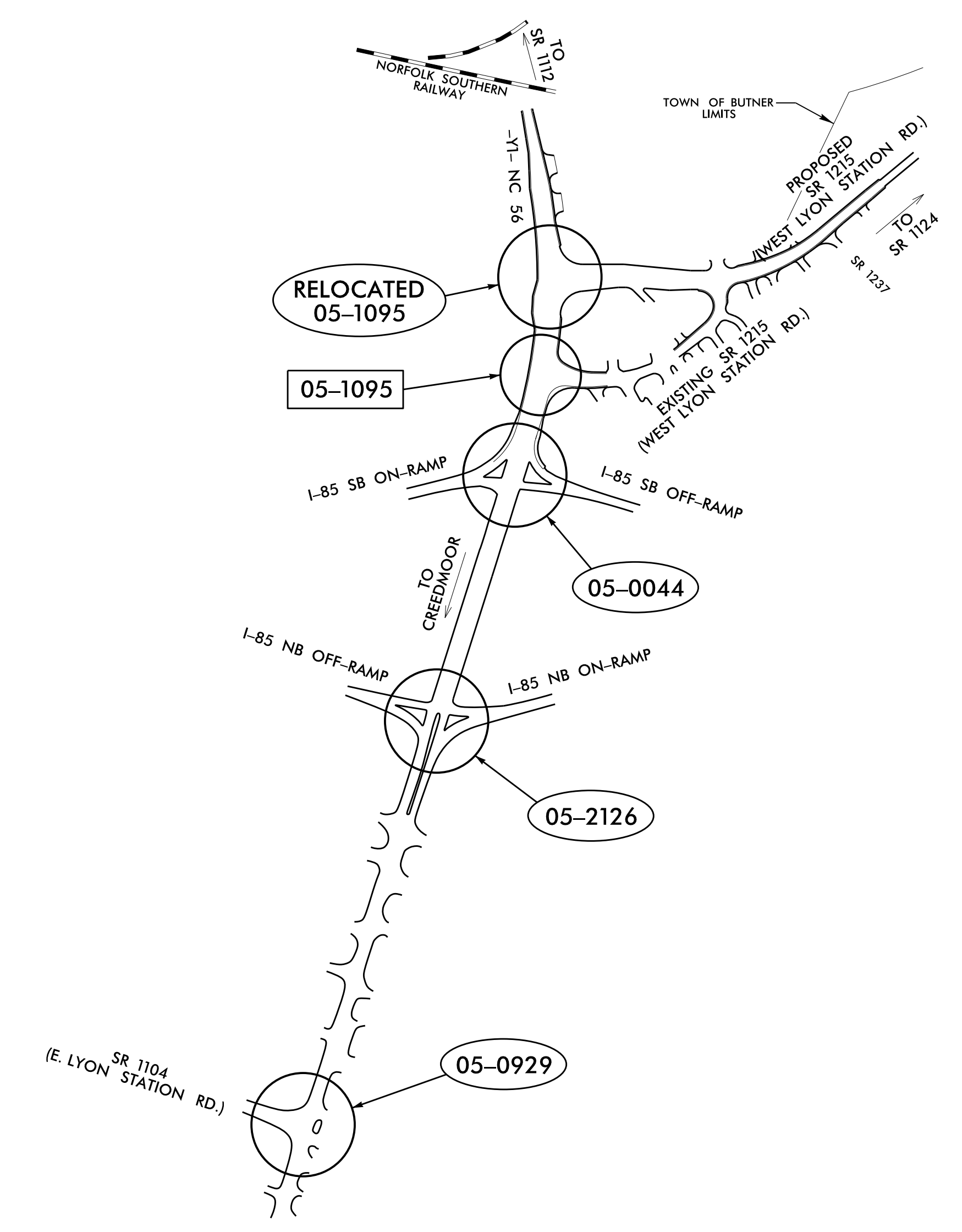
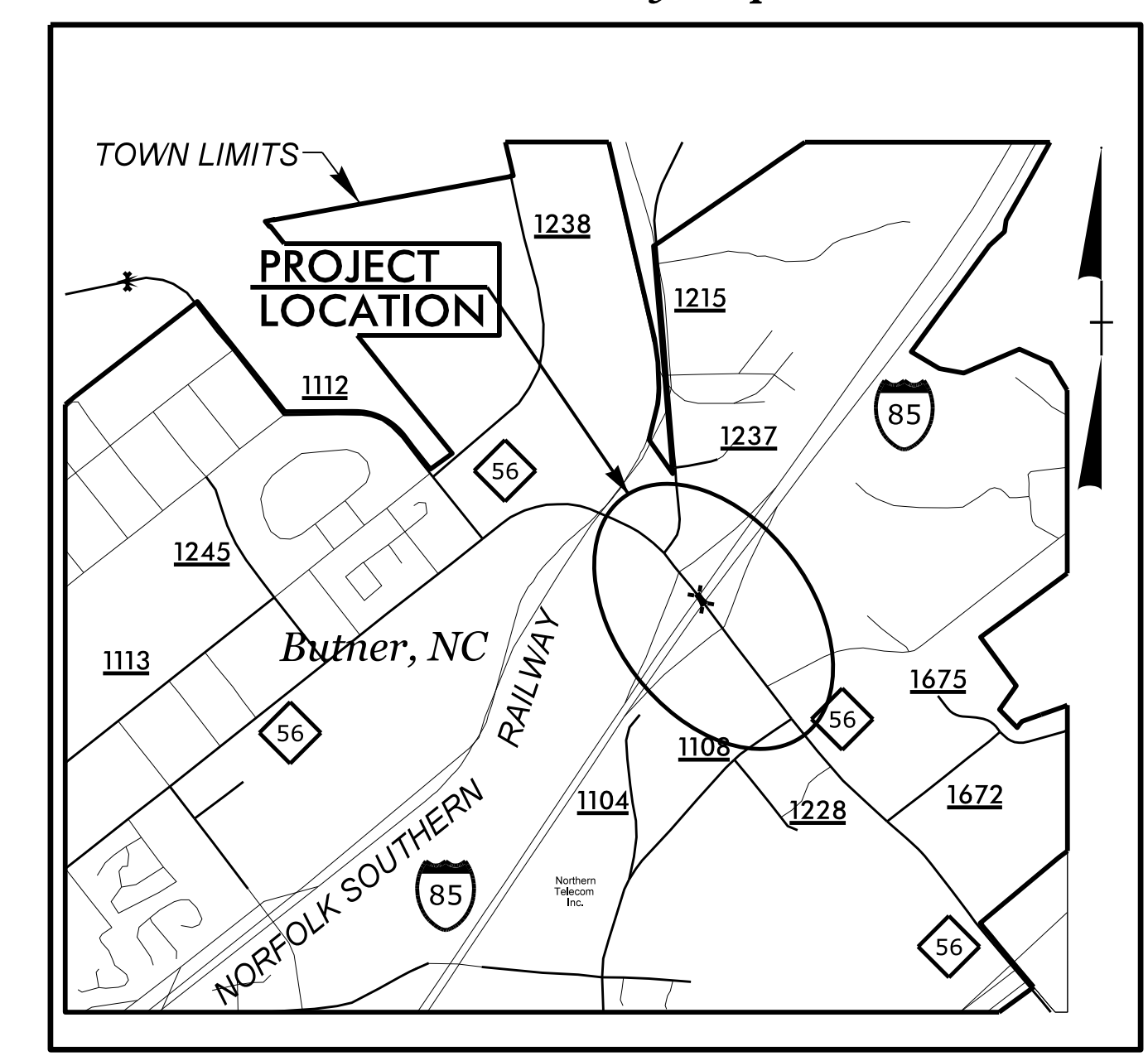
**LOCATION: REALIGNMENT OF SR 1215 (WEST LYON STATION ROAD) AT NC 56 (EAST C STREET) IN BUTNER**

**TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATION**

**Project: U-6020**

**Contract: C204944**

Vicinity Map



- 05-XXXX New or Existing Signal
- 05-XXXX Existing Signal to be Removed

Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.

Sheet #	Reference #	Index of Plans	Location/Description
Sig. 1.0		Title Sheet	
Sig. 2.0-3.2	05-1095	NC 56 at SR 1215 (West Lyon Station Road)	
Sig. 4.0-6.2	05-0044	NC 56 at I-85 SB Ramps	
Sig. 7.0-7.2	05-2126	NC 56 at I-85 NB Ramps	
Sig. 8.0-8.1	05-0929	NC 56 at SR 1104 (East Lyon Station Road)	
SCP 1		Signal Communication Plans	

**TRANSPORTATION SYSTEMS  
MANAGEMENT & OPERATIONS UNIT**

Contacts:

**Robert J. Ziemba, PE** - Central Region Signals Engineer  
**Ryan W. Hough, PE** - Signal Equipment Project Engineer  
**Gregory A. Green** - Signal Communications Project Engineer

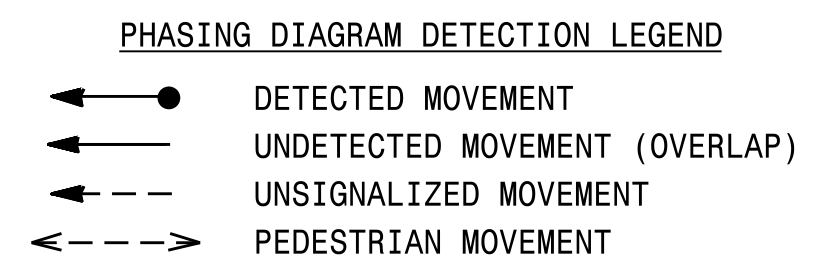
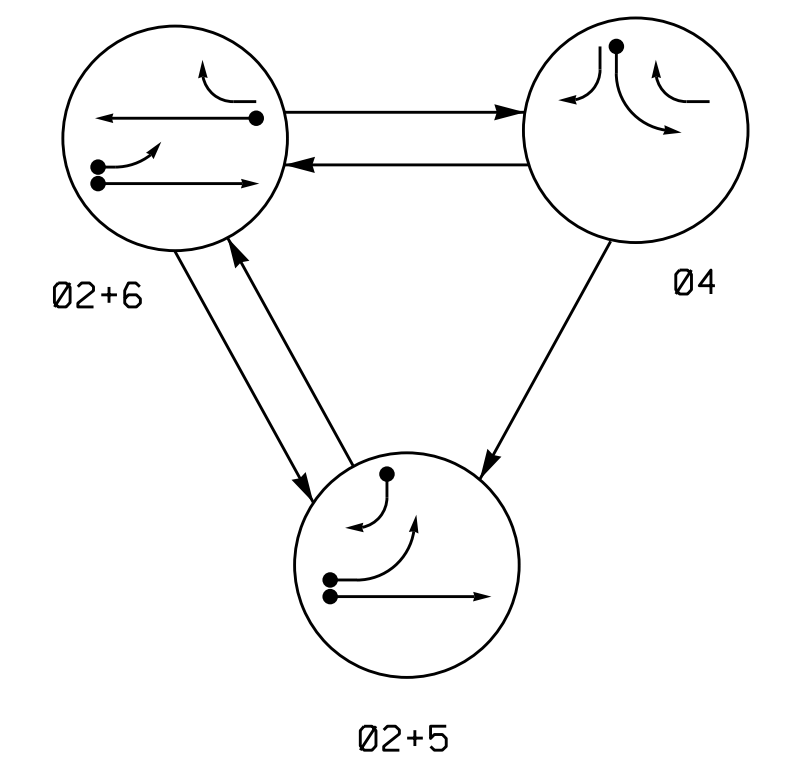
Prepared in the Office of:  
DIVISION OF HIGHWAYS  
TRANSPORTATION MOBILITY & SAFETY DIVISION

TSMO UNIT

750 N. Greenfield Parkway, Garner, NC 27529

27-Apr-2024 11:30 C:\Users\rsz\OneDrive\Documents\Signal Design\Central Region\Div 5\U-6020\MAXTIME\U-6020-sig-tsh-2024mmd.dgn

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	04	FLASH
21, 22	G	G	R	Y
41, 43	R	R	←	R
42	R	R	→	R
51	←	→	←	→
61	R	G	R	Y
62	R	G	←	Y

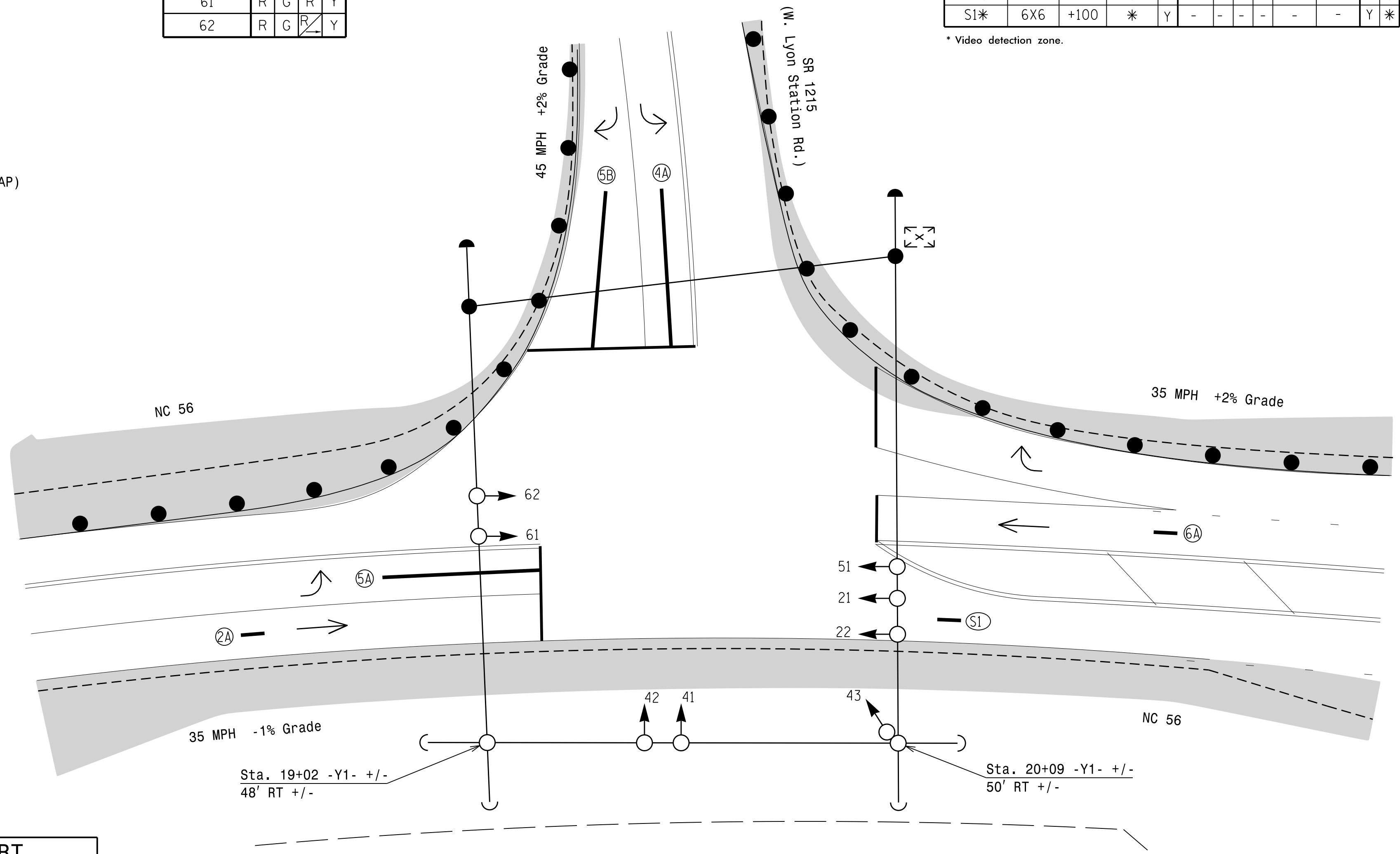
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	STRETCH TIME		
2A*	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
4A*	6X40	0	*	Y	4	Y	Y	-	-	3	-	*
5A*	6X60	0	*	Y	5	Y	Y	-	-	15	-	*
5B*	6X40	0	*	Y	5	Y	Y	-	-	15	-	*
6A*	6X6	70	*	Y	6	Y	Y	-	-	-	-	*
S1*	6X6	+100	*	Y	-	-	-	-	-	-	Y	*

\* Video detection zone.

3 Phase Fully Actuated (NC 56 (Butner) CLS) Signal System #: D05-56\_Butner

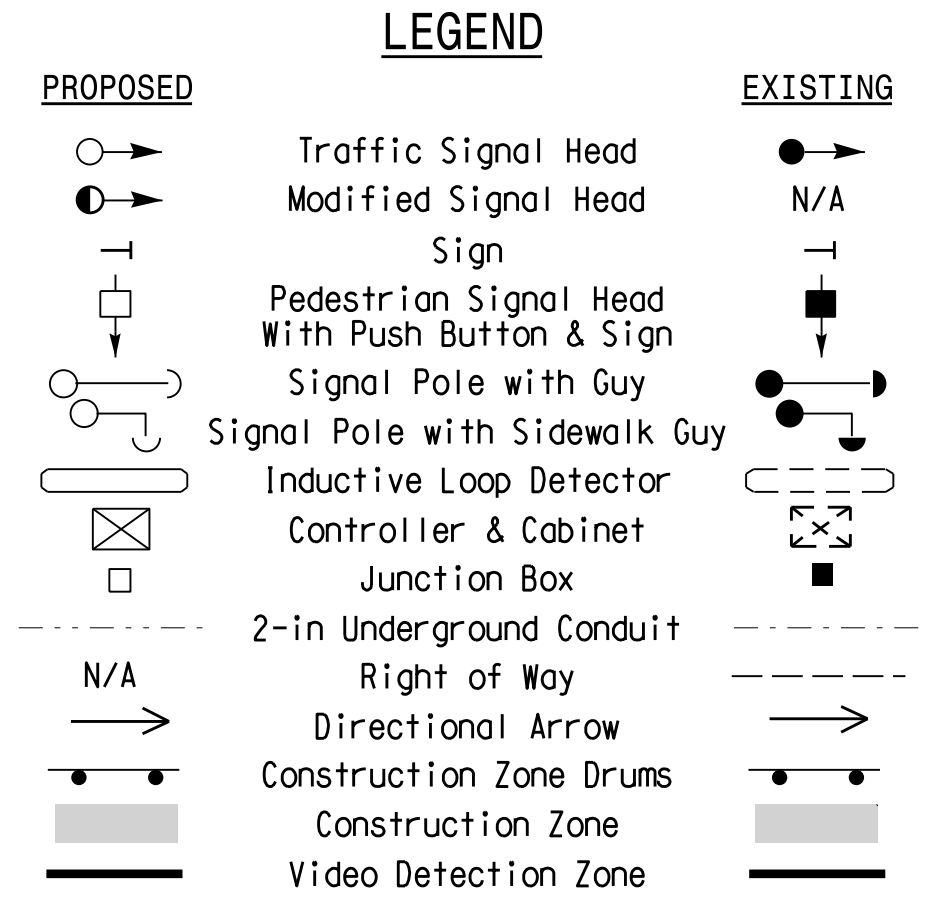
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

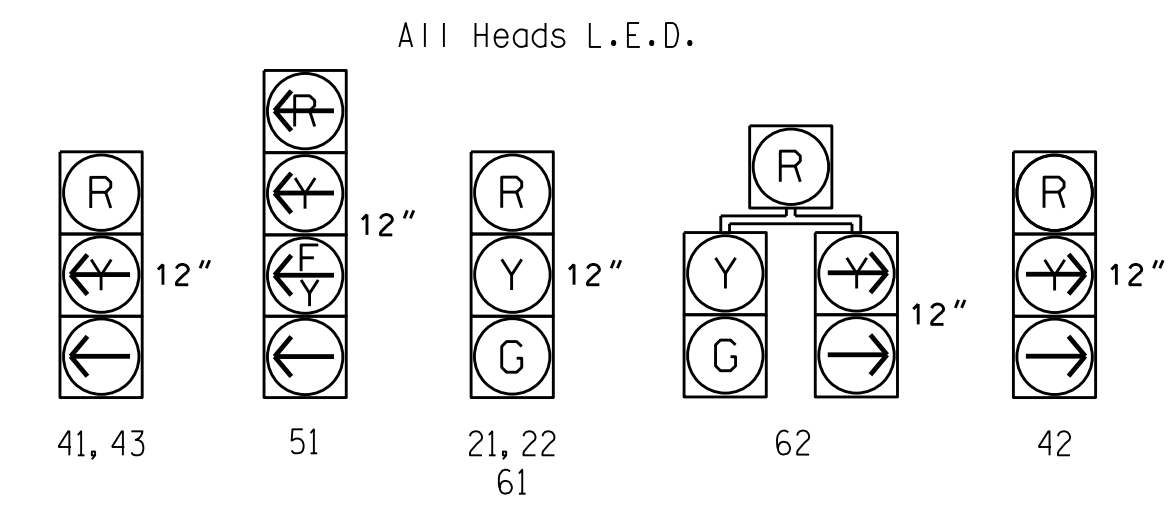


FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	45	15	20	45
Yellow Clearance	4.0	3.0	3.0	4.0
Red Clearance	1.6	2.4	2.1	1.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

\* 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 FACE I.D.



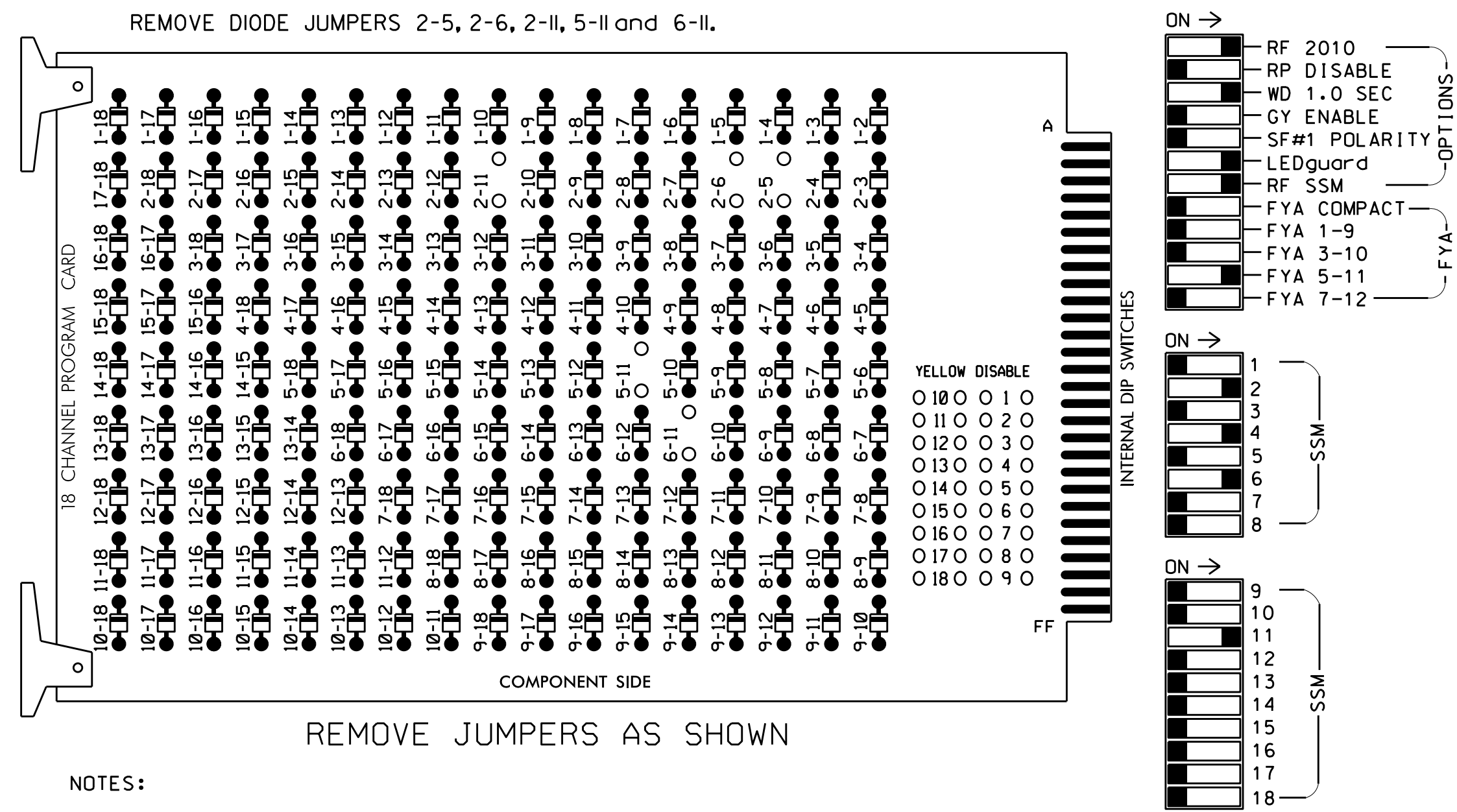
Signal Upgrade - Temporary Design (TMP Phases I and II)

	NC 56 at SR 1215 (W. Lyon Station Road)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Decision 5 Granville County Butner		
Prepared in the Offices of: 	PLAN DATE: February 2024 PREPARED BY: J.A. Lohr	REVIEWED BY: REVIEWED BY:	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIEMBA DATE 03/14/2024
SCALE 0 20 1"=20'	REVISIONS INIT. DATE	DATE	SIG. INVENTORY NO. 05-1095T

14-MAR-2024 07:55 S:\PROJECTS\UMTS\SIGNAL\Signal\Central\_Reg\on401v\_5kl-6020\MAXTIME\051095T.sig.dgn-2024mmoda.dgn JAL:ort

### 18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = 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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Startup In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the NC 56 (Butner) CLS. Signal System #: D05-56\_Butner

### SIGNAL HEAD HOOK-UP CHART

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

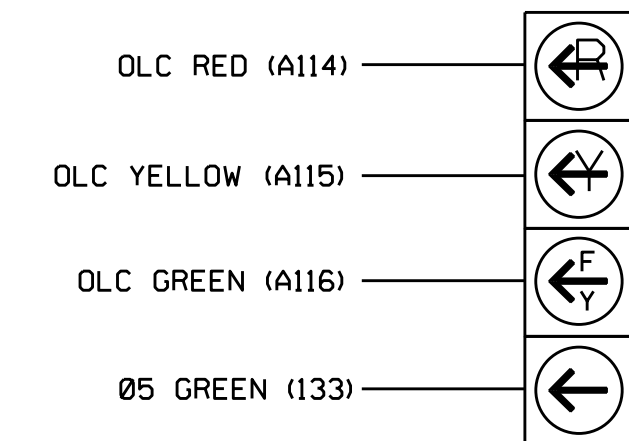
NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail this sheet.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 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".....5+6  
 OVERLAP "D".....NOT USED

### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



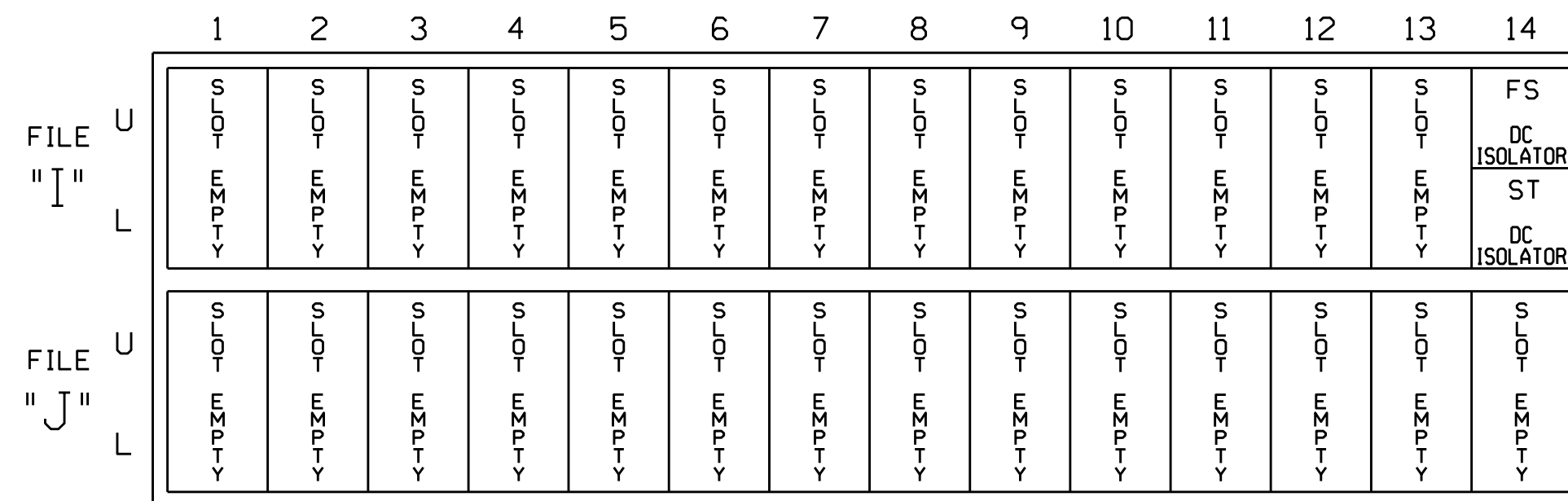
51

**NOTE**

The sequence display for signal head 51 requires special logic programming. See sheet 2 for programming instructions.

### INPUT FILE POSITION LAYOUT

(front view)



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

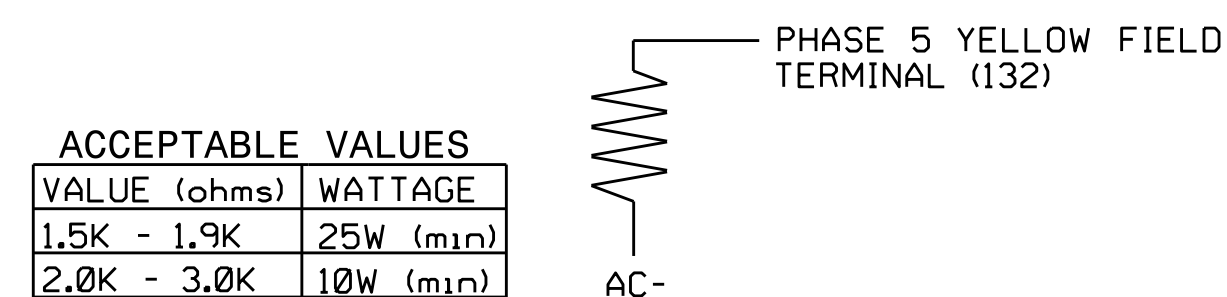
FS = FLASH SENSE  
 ST = STOP TIME

### SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1095T  
 DESIGNED: February 2024  
 SEALED: 03/14/2024  
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

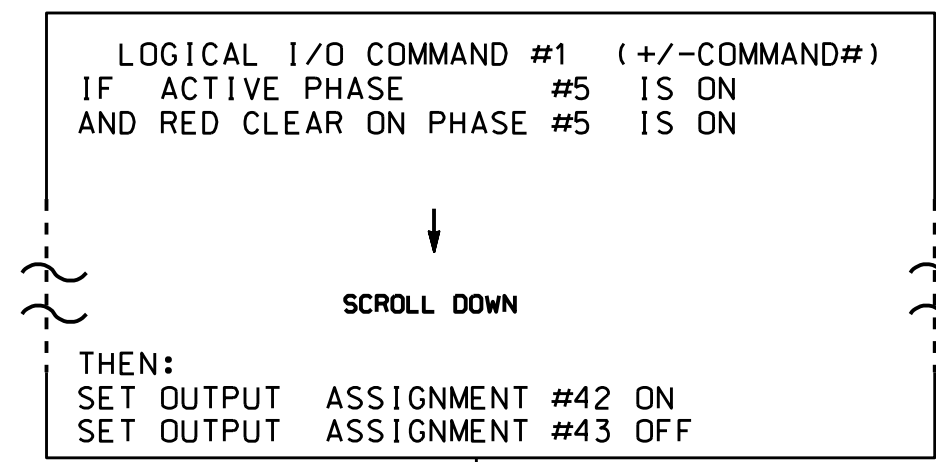
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared in the Offices of:  750 N. Greenfield Pkwy, Corner, NC 27529	<b>NC 56</b> at <b>SR 1215 (W. Lyon Station Road)</b>		SEAL  RYAN W. HOUGH ENGINEER
	Division 5 Granville County Butner PLAN DATE: March 2024 REVIEWED BY: PREPARED BY: S.Kirkpatrick REVIEWED BY:		
REVISIONS _____ INIT. DATE		DocuSigned by: Ryan W. Hough 03/15/2024 DATE SIG. INVENTORY NO. 05-1095T	

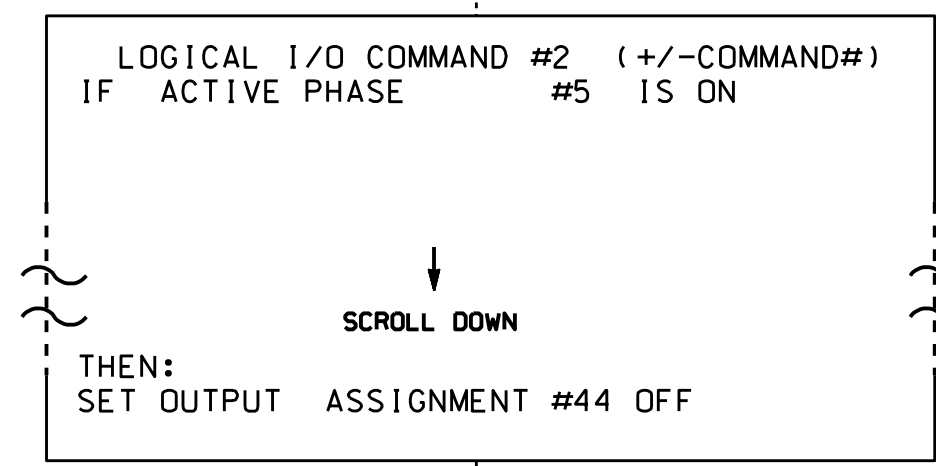
## LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

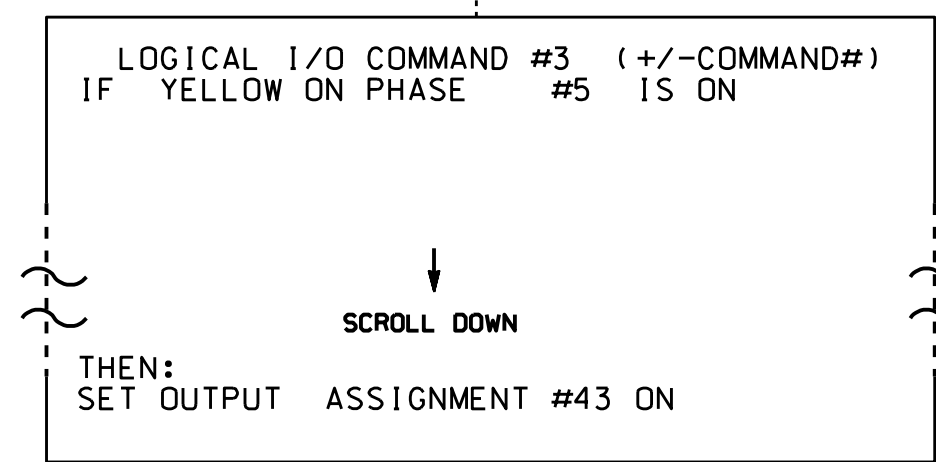
1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 5 (HEAD 51).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

### OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 42 = Overlap C Red  
OUTPUT 43 = Overlap C Yellow  
OUTPUT 44 = Overlap C Green

## OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

```

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

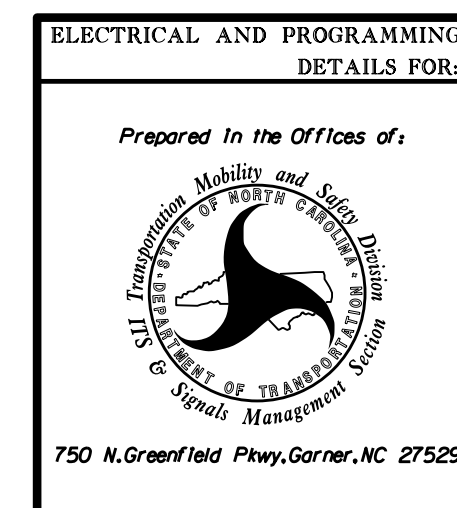
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

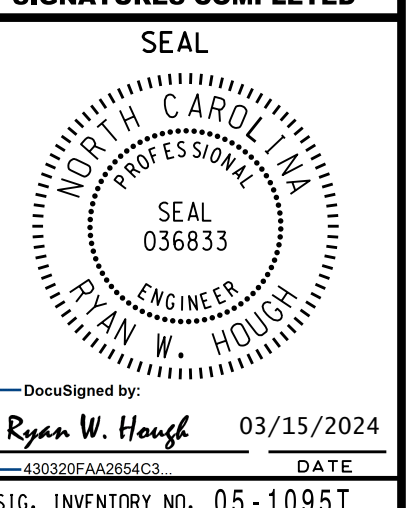
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 05-1095T  
DESIGNED: February 2024  
SEALED: 03/14/2024  
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

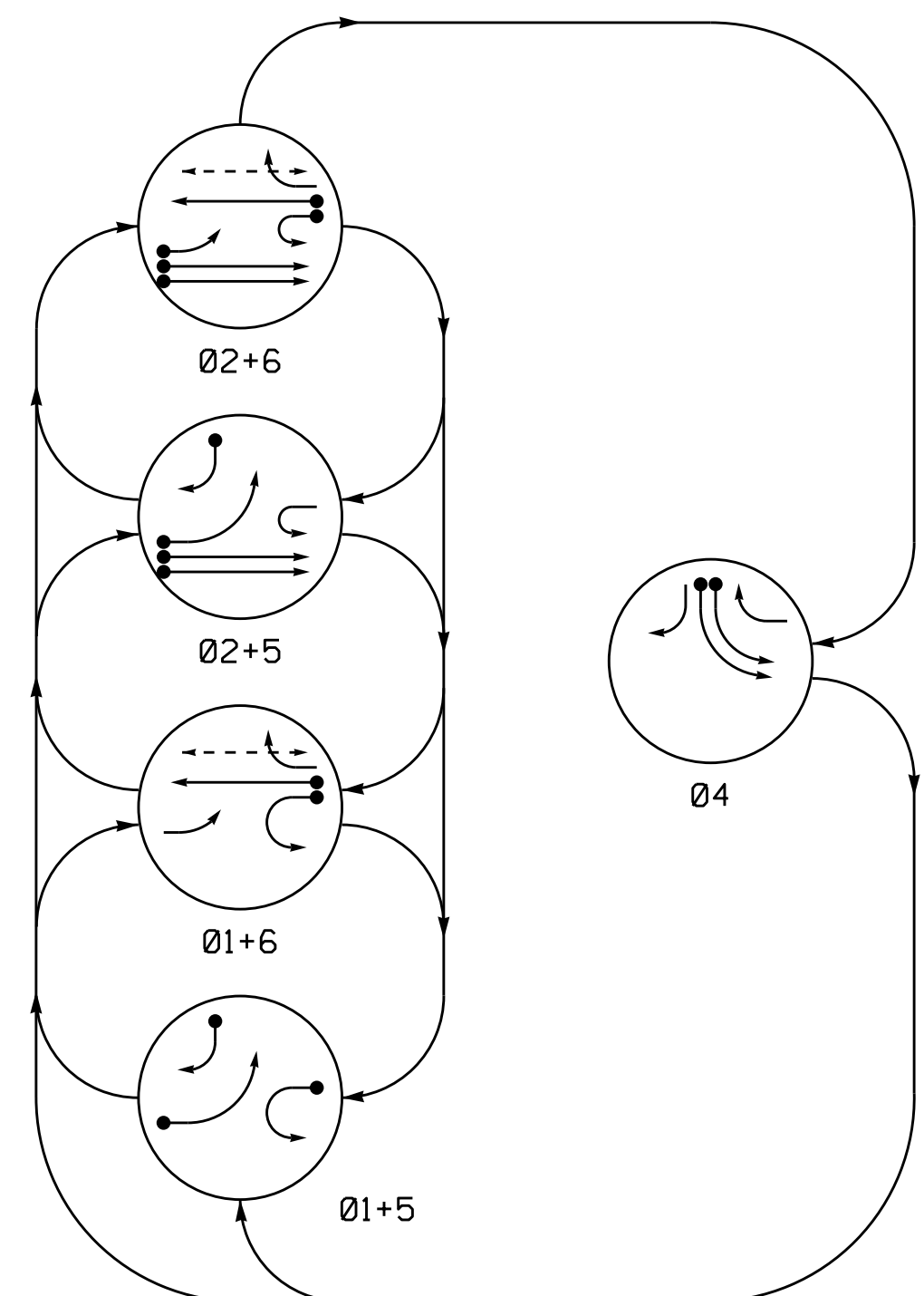


NC 56 at SR 1215 (W. Lyon Station Road)	
Division 5	Granville County
Prepared by: S. Kirkpatrick	Reviewed by:
Plan Date: March 2024	Date:
REVISIONS	INIT. DATE



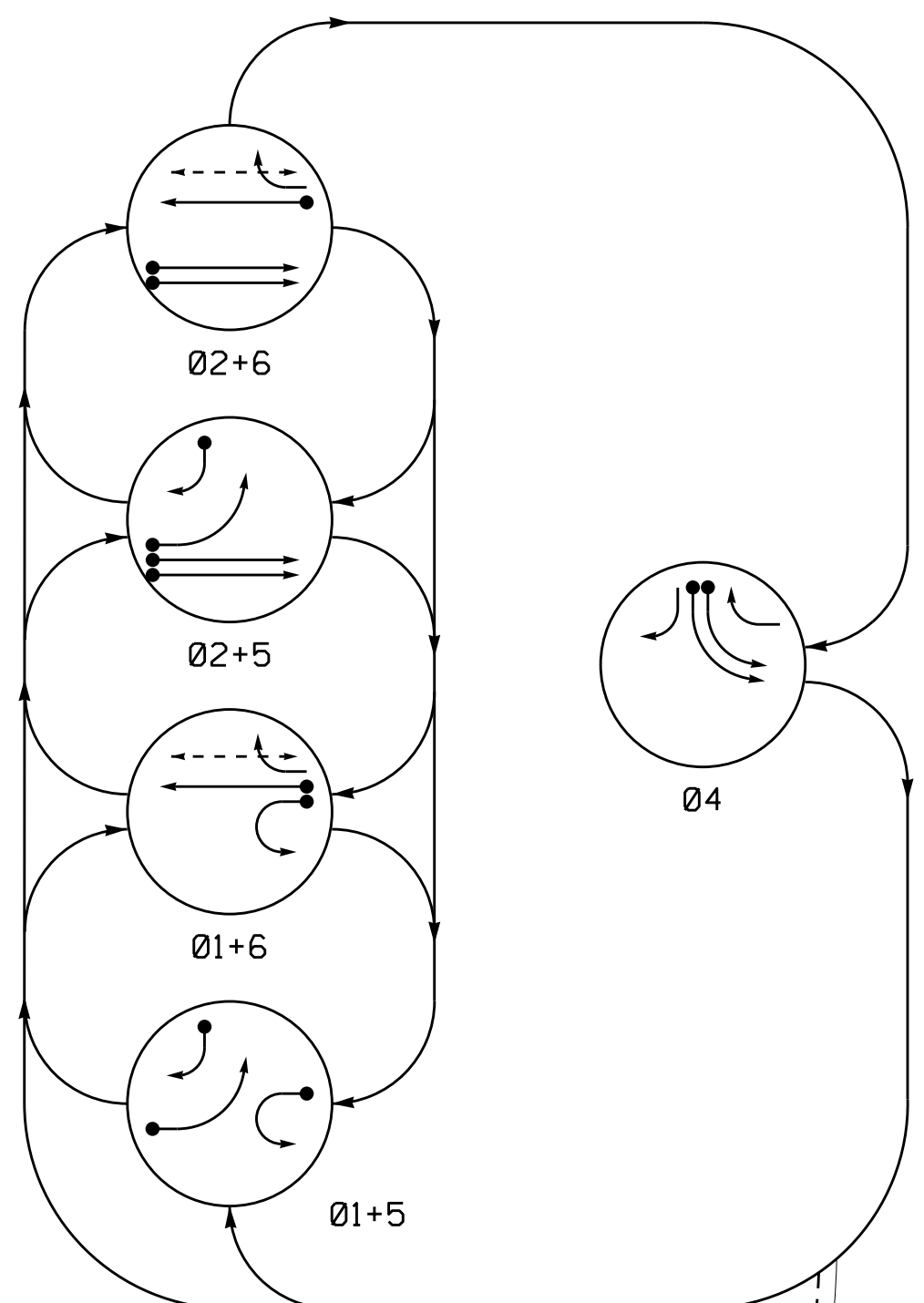
DocuSigned by:  
**Ryan W. Hough** 03/15/2024  
430320FAA2664C3 DATE  
SIG. INVENTORY NO. 05-1095T

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE				
	01+5	01+6	02+5	02+6	FLASH
11	⤴	⤵	⤴	⤵	⚡
21, 22	R	R	G	G	R
41, 42	←	←	←	←	←
43	→	→	→	→	→
51	←	←	←	←	←
61, 62	R	G	R	G	R
63	R	←	R	←	←
P61, P62	DW	W	DW	W	DRK

ALTERNATE PHASING DIAGRAM



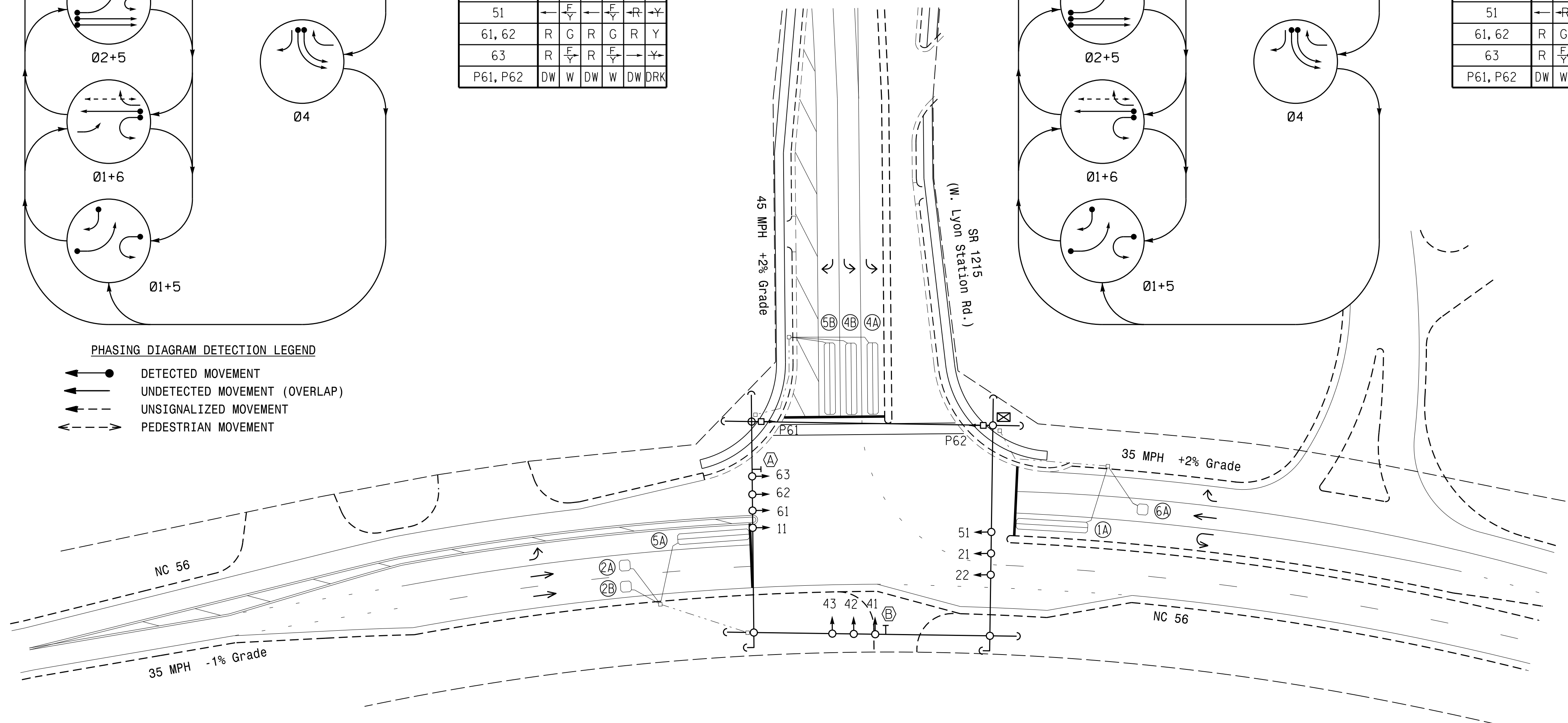
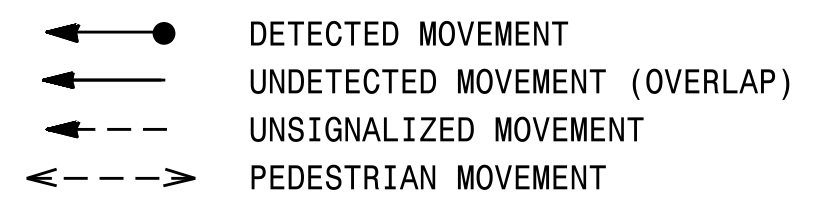
SIGNAL FACE	PHASE				
	01+5	01+6	02+5	02+6	FLASH
11	⤴	⤵	⤴	⤵	⚡
21, 22	R	R	G	G	R
41, 42	←	←	←	←	←
43	→	→	→	→	→
51	←	←	←	←	←
61, 62	R	G	R	G	R
63	R	←	R	←	←
P61, P62	DW	W	DW	W	DRK

5 Phase Fully Actuated (NC 56 (Butner) CLS) Signal System #: D05-56\_Butner

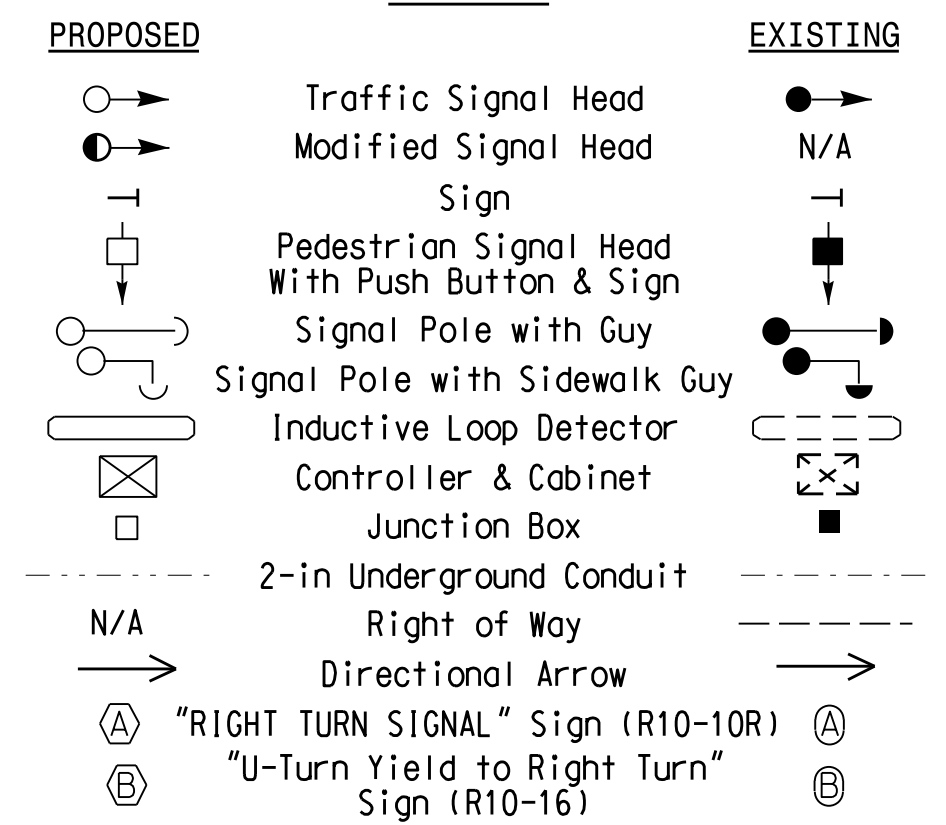
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. To provide a leading pedestrian interval on phase 6, program FYA heads 51 and 63 to delay for 6 seconds after the start of the phase 6 walk interval. See electrical details.

PHASING DIAGRAM DETECTION LEGEND



LEGEND



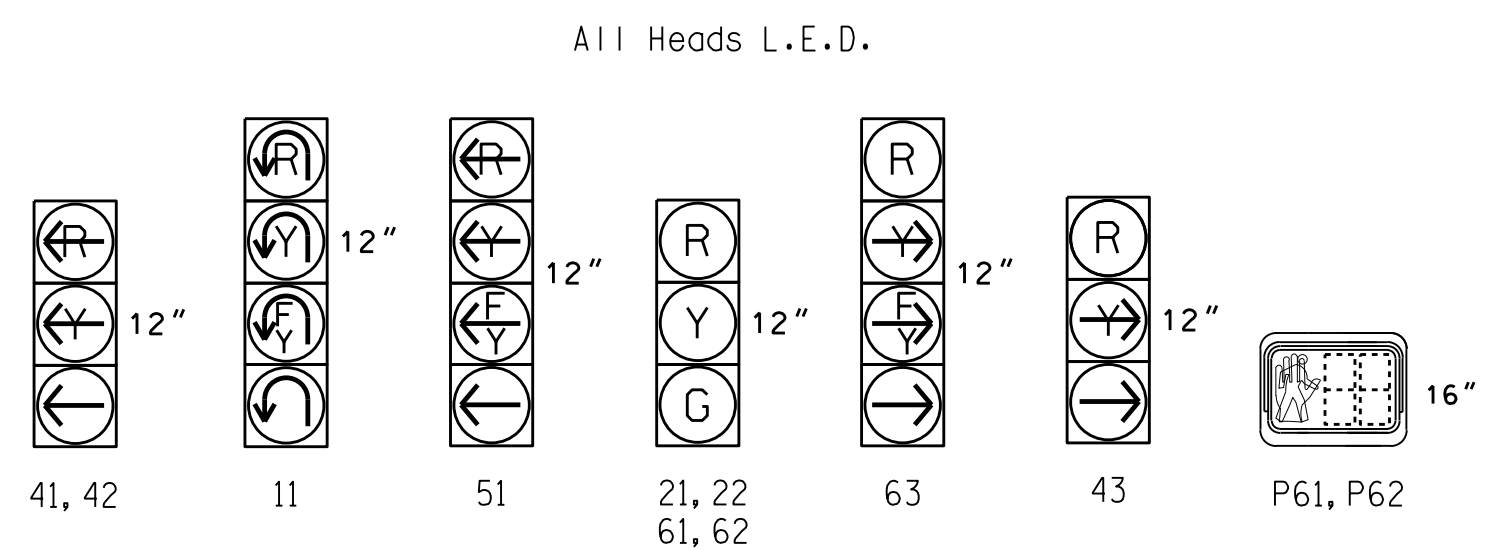
FEATURE	PHASE					
	1	2	4	5	6	
Walk *	-	-	-	-	-	13
Ped Clear	-	-	-	-	-	26
Min Green *	7	10	7	7	10	
Passage *	2.0	3.0	2.0	2.0	3.0	
Max 1 *	20	45	15	20	45	
Yellow Change	3.0	3.9	3.0	3.0	3.9	
Red Clear	3.1	2.4	3.3	3.2	2.4	
Added Initial *	-	-	-	-	-	
Maximum Initial *	-	-	-	-	-	
Time Before Reduction *	-	-	-	-	-	
Time To Reduce *	-	-	-	-	-	
Minimum Gap	-	-	-	-	-	
Advance Walk	-	-	-	-	-	**
Non Lock Detector	X	-	X	X	-	
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	
Dual Entry	-	-	-	-	-	

\* 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.  
\*\* See note 10.

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND INITIAL	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD	
1A	6X40	0	2-4-2	X	1	15.0*	-	X	-	X	-	X
2A	6X6	70	4	X	2	-	-	X	-	X	-	X
2B	6X6	70	4	X	2	-	-	X	-	X	-	X
4A	6X40	0	2-4-2	X	4	-	-	X	-	X	-	X
4B	6X40	0	2-4-2	X	4	-	-	X	-	X	-	X
5A	6X40	0	2-4-2	X	5	15.0*	-	X	-	X	-	X
5B	6X40	0	2-4-2	X	5	15.0	-	X	-	X	-	X
6A	6X6	70	4	X	6	-	-	X	-	X	-	X

\* Disable Delay during Alternate Phasing Operation.  
# Disable phase call for loop during Alternate Phasing Operation.

SIGNAL FACE I.D.



This plan supersedes the plan signed and sealed on 11/16/18.

New Location - Final Design

Prepared in the Offices of:  
TRANSPORTATION MOBILITY AND SAFETY GROUP  
STATE OF NORTH CAROLINA  
SIGNAL DESIGN SECTION

750 N. Greenfield Pkwy, Garner, NC 27529

NC 56 at SR 1215 (W. Lyon Station Road)

Division 5 Granville County Butner

PLAN DATE: February 2024 REVIEWED BY: J.A. Lohr

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS: INIT. DATE

03/14/2024

SCALE: 1" = 40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZITEMA

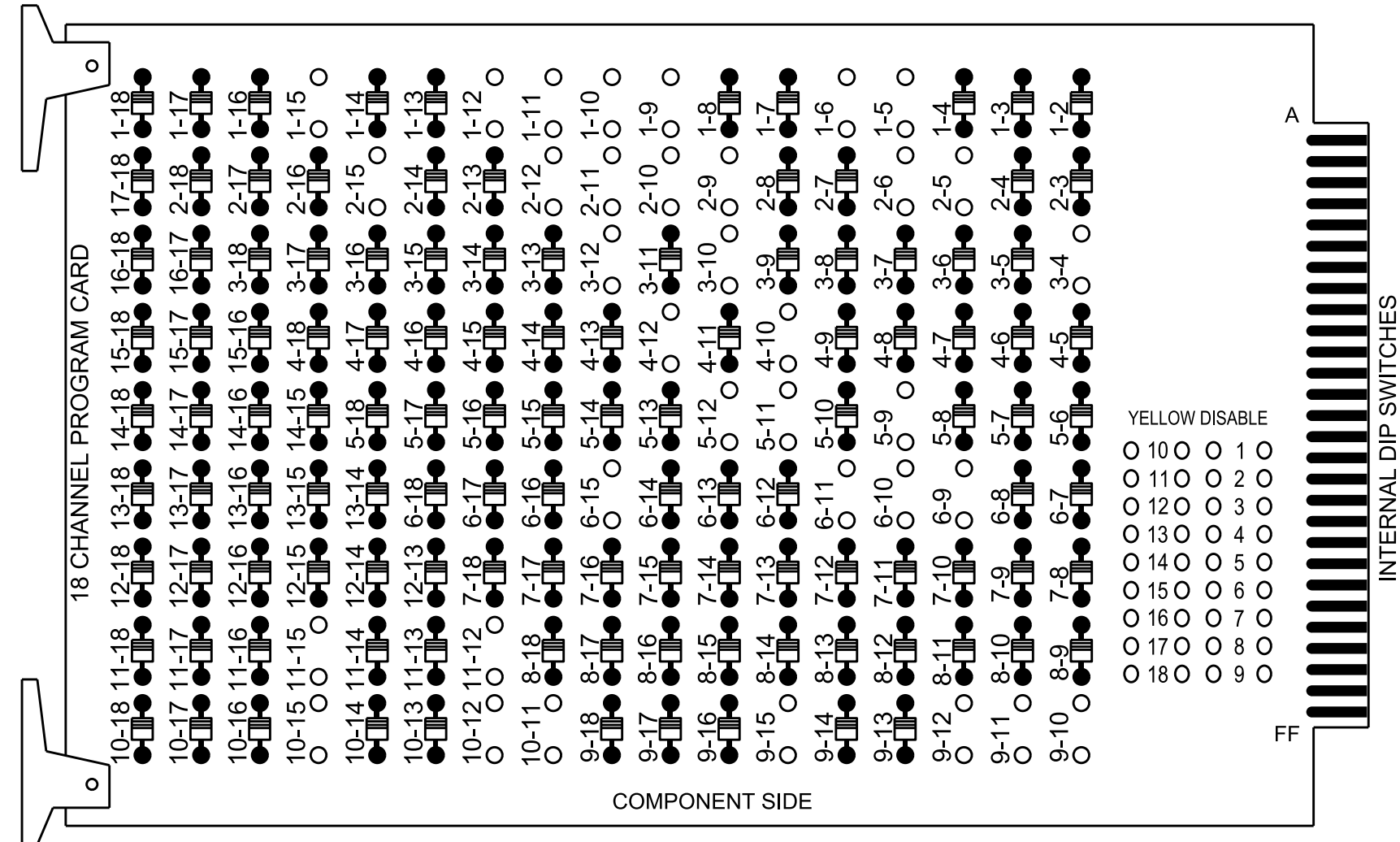
SIG. INVENTORY NO. 05-1095

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### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 1-12, 1-15, 2-5, 2-6, 2-9, 2-10, 2-11, 2-12, 2-15, 3-4, 3-10, 3-12, 4-10, 4-12, 5-9, 5-11, 5-12, 6-9, 6-10, 6-11, 6-15, 9-10, 9-11, 9-12, 9-15, 10-11, 10-12, 10-15, 11-12 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 the 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 plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 56 (Butner) CLS. Signal System #: D05-56\_Butner

### EQUIPMENT INFORMATION

Controller.....2070LX  
 Cabinet.....332 w/ Aux  
 Software.....Q-Free MAXTIME  
 Cabinet Mount.....Base  
 Output File Positions.....18 With Aux. Output File  
 Load Switches Used.....S1, S2, S4, S5, S7, S8, S9, AUX S1, AUX S2, AUX S4  
 Phases Used.....1, 2, 4, 5, 6, 6PED  
 Overlap "1".....\*  
 Overlap "2".....\*  
 Overlap "3".....\*  
 Overlap "4".....\*

\*See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

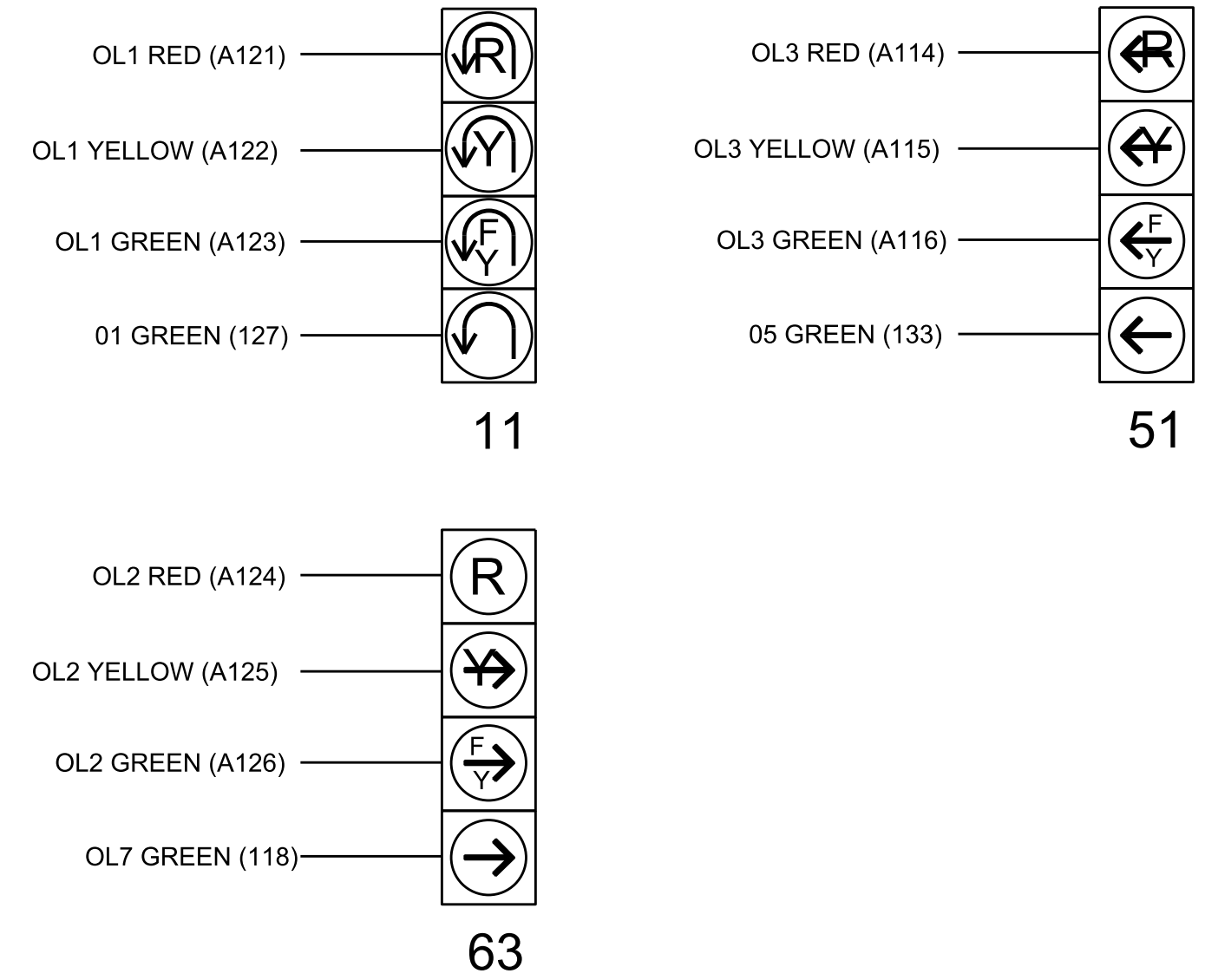
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	OL7	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	11*	21,22	NU	63*	41,42	NU	51*	61,62	P61, P62	NU	NU	NU	11*	63*	NU	51*	43	NU	
RED	128							134							A124			A101	
YELLOW	*	129		*			*	135											
GREEN		130						136											
RED ARROW					101										A121			A114	
YELLOW ARROW					102										A122	A125		A115	A102
FLASHING YELLOW ARROW															A123	A126		A116	
GREEN ARROW	127			118	103		133												A103
Hand icon														119					
Person icon														121					

NU = Not Used

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

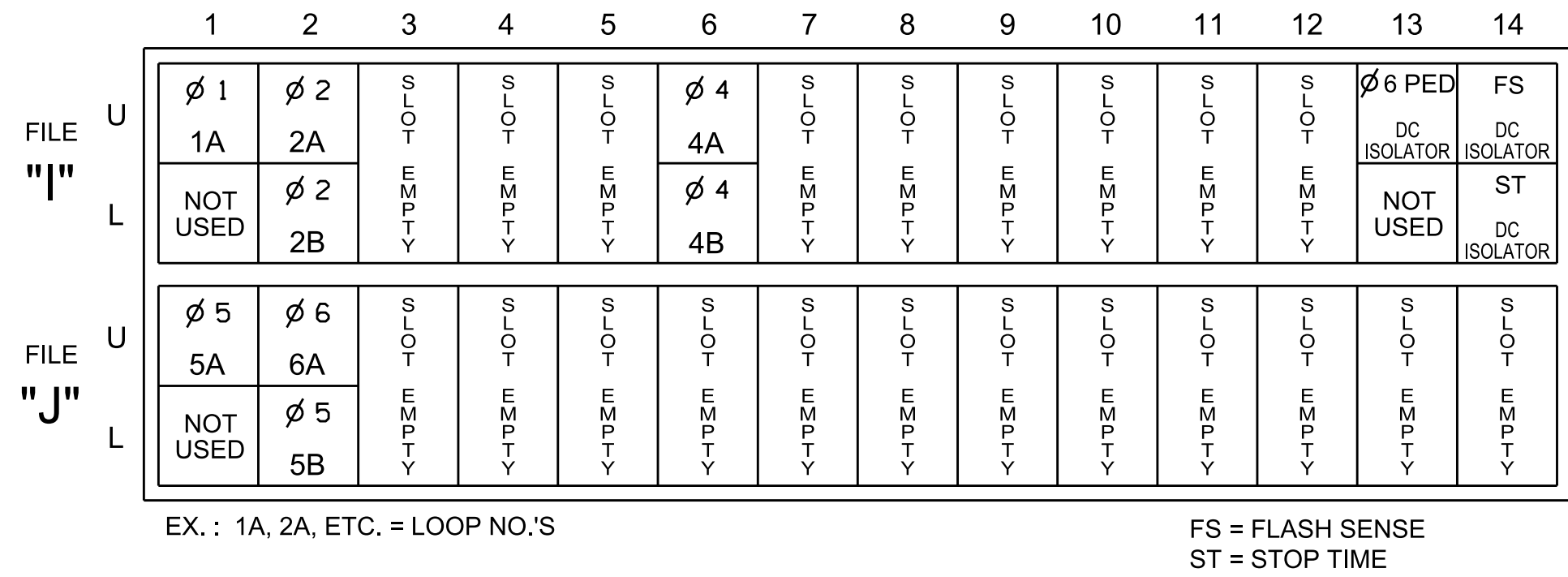
### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### INPUT FILE POSITION LAYOUT

(front view)

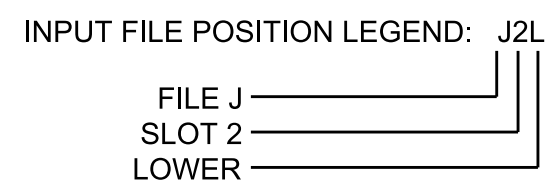


### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 *	1	15.0		X		X	
2A	TB2-5,6	I2U	39	1	29 *	6			X		X	
2B	TB2-7,8	I2L	43	5	3	2			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4			X		X	
5A	TB3-1,2	J1U	55	17	15 *	5	15.0		X		X	
5B	TB3-7,8	J2L	44	6	17	5	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
PED PUSH BUTTONS												
P61 P62	TB8-7,9	I13U	68	34	6	PED 6						

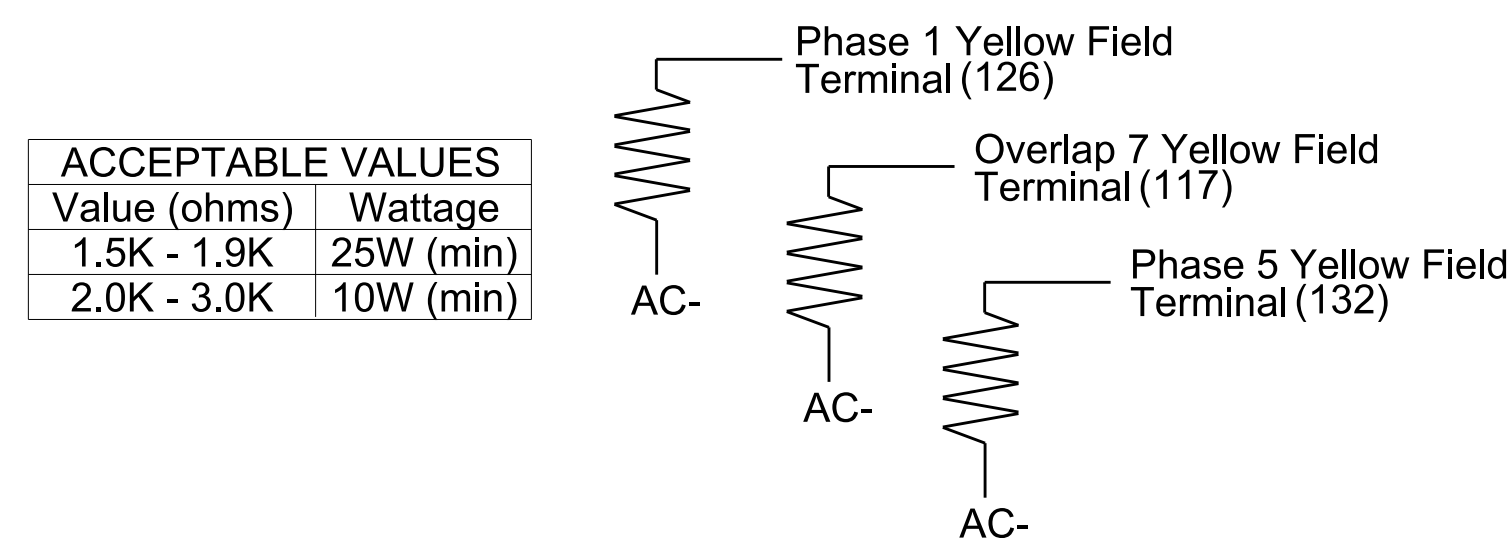
NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

\* For the detectors to work as shown on the signal plan see the Detector Programming Detail for Alternate Phasing on Sheet 2 of this plan.



### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

This plan supersedes the plan signed and sealed on 11/16/2018.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1095  
 DESIGNED: February 2024  
 SEALED: 03/14/2024  
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

Prepared in the Offices of:

NC 56 at SR 1215 (W. Lyon Station Road)

Division 5 Granville County Butner

PLAN DATE: March 2024 REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: RYAN W. HOUGH, ENGINEER, 036833

DocuSigned by: Ryan W. Hough 03/15/2024

SIG. INVENTORY NO. 05-1095

15-MAR-2024 13:45 S:\IT\55\15\Sig\05-1095\Signal\Projects\15-MAR-2024\05-1095-sm.ele.20240315.dgn sgm:irp:ck

### MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel  
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface  
Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2	3	4	7
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal	Normal
Included Phases	2	6	6	4,5	4
Modifier Phases	1	-	5	-	-
Modifier Overlaps	-	7	-	-	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	6.0	6.0	0.0	0.0

### MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

#### ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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.

### MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel  
Main Menu >Controller >Detector >Veh Det Plans

Web Interface  
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2		
Detector	Call Phase	Delay
1A	1	0.0
	29	0
5A	15	0.0
	31	0

### MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel  
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface  
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

#### Overlap Plan 2

Overlap	1	2	3	4	7
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal	Normal
Included Phases	-	6	-	4,5	4
Modifier Phases	1	-	5	-	-
Modifier Overlaps	-	7	-	-	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	6.0	6.0	0.0	0.0

← NOTICE INCLUDED PHASE

### OUTPUT CHANNEL CONFIGURATION

Front Panel  
Main Menu >Controller >More>Channels>Channels Config

Web Interface  
Home >Controller >Advanced IO>Channels>Channels Configuration

#### Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2	X			2
3	Overlap	7		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6	X		X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2	X		X	10
11	Overlap	3	X			11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

NOTE  
OVERLAP 7 →

NOTE  
YELLOW FLASH →

### MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel  
Main Menu >Controller >Coordination >Patterns

Web Interface  
Home >Controller >Coordination >Patterns

#### Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

\* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

This plan supersedes the plan signed and sealed on 11/16/2018.

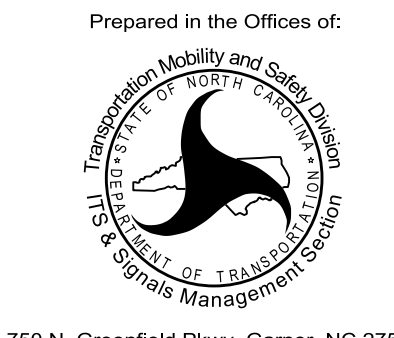
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1095  
DESIGNED: February 2024  
SEALED: 03/14/2024  
REVISED: N/A

### 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.

Electrical Detail - Sheet 2 of 2

Prepared in the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 56  
at  
SR 1215 (W. Lyon Station Road)

Division 5 Granville County Butner

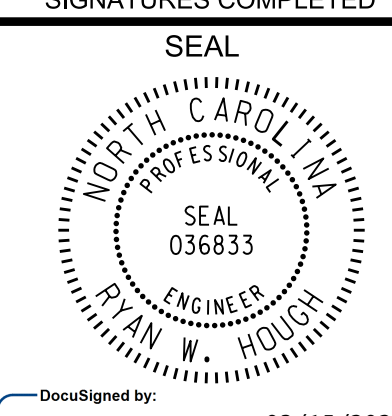
PLAN DATE: March 2024 REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

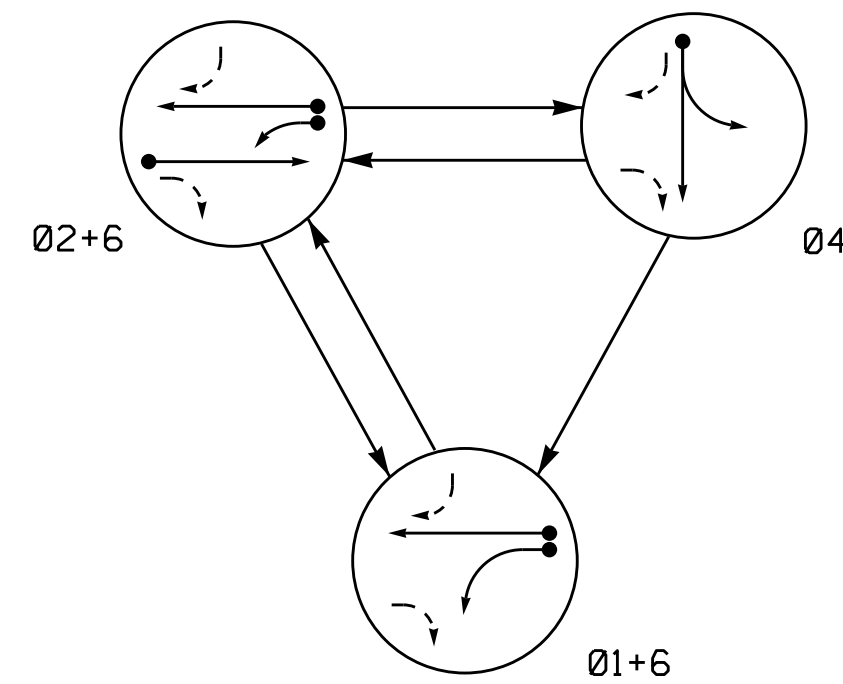
SEAL



DocuSigned by:  
**Ryan W. Hough** 03/15/2024

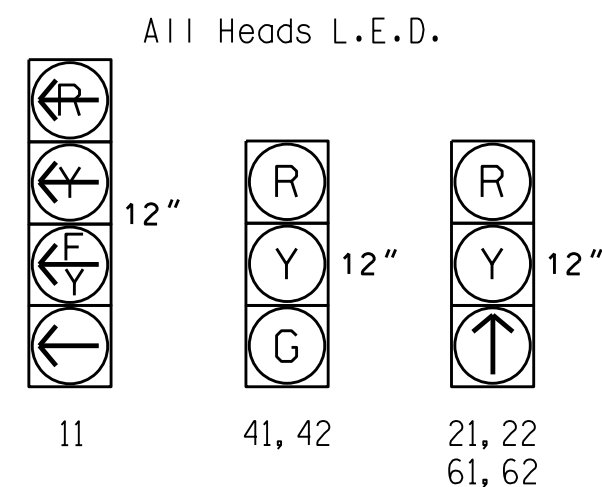
SIG. INVENTORY NO. 05-1095

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	01+6	02+6	04	FLIGHTS
11	←	←	←	←
21, 22	R	↑	R	Y
41, 42	R	R	G	R
61, 62	↑	↑	R	Y

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A*	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
6A	6X6	70	EXIST	-	6	Y	Y	-	-	-	-	-
S2*	6X6	+130	*	Y	-	-	-	-	-	-	-	Y*
S3	6X6	+70	EXIST	-	-	-	-	-	-	-	-	Y

\* Video detection zone.

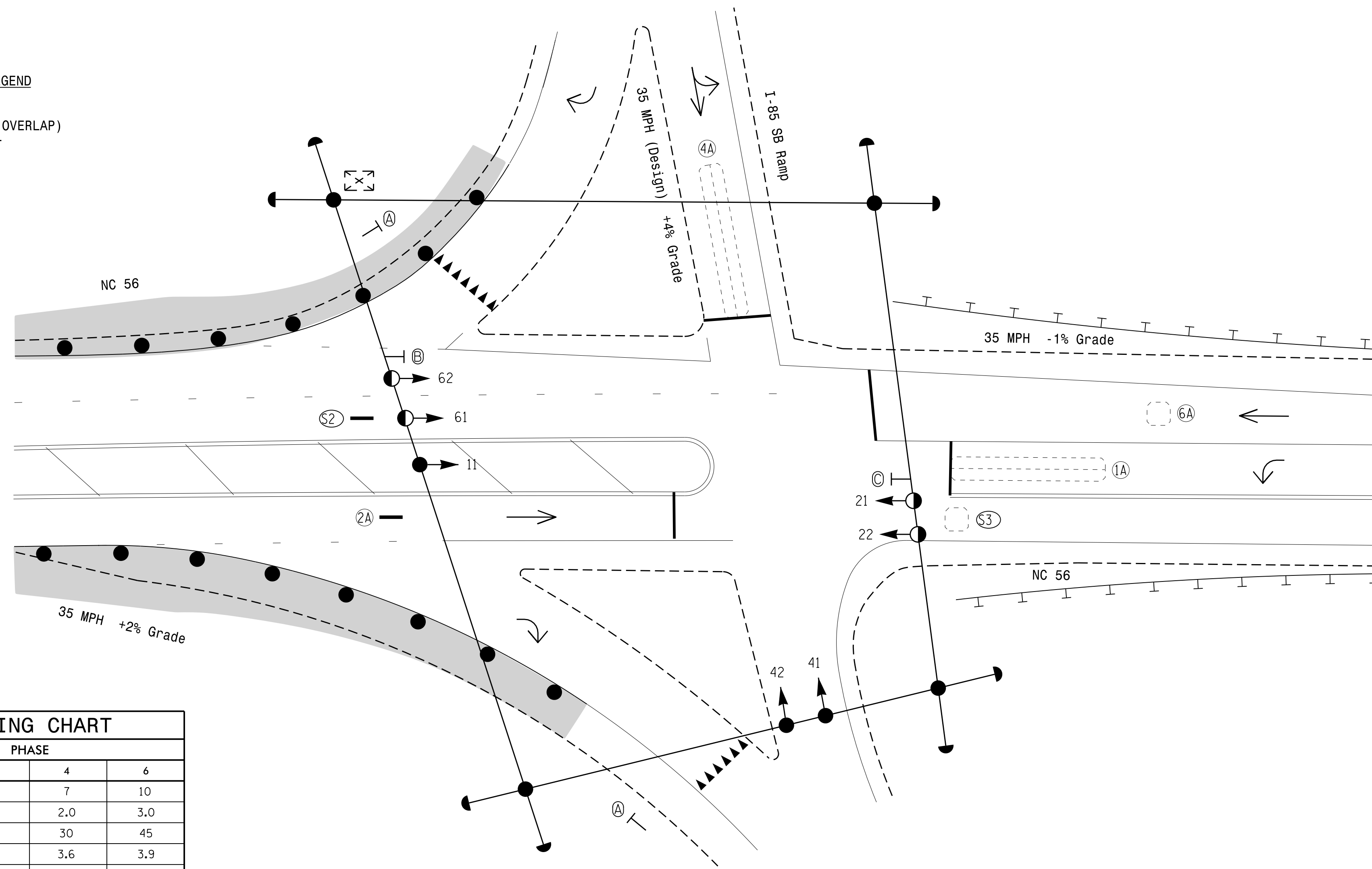
3 Phase Fully Actuated (NC 56 (Butner) CLS) Signal System #: D05-56\_Butner

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing.
6. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	45	30	45
Yellow Clearance	3.0	3.9	3.6	3.9
Red Clearance	1.8	1.0	1.8	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

- |  |   |  |  |
|--|---|--|--|
|  | PROPOSED Traffic Signal Head                            |  | EXISTING Traffic Signal Head           |
|  | PROPOSED Modified Signal Head                           |  | EXISTING N/A                           |
|  | PROPOSED Pedestrian Signal Head With Push Button & Sign |  | EXISTING N/A                           |
|  | PROPOSED Signal Pole with Guy                           |  | EXISTING Signal Pole with Sidewalk Guy |
|  | PROPOSED Signal Pole with Sidewalk Guy                  |  | EXISTING Signal Pole with Sidewalk Guy |
|  | PROPOSED Inductive Loop Detector                        |  | EXISTING Inductive Loop Detector       |
|  | PROPOSED Controller & Cabinet                           |  | EXISTING Controller & Cabinet          |
|  | PROPOSED Junction Box                                   |  | EXISTING Junction Box                  |
|  | PROPOSED 2-in Underground Conduit                       |  | EXISTING 2-in Underground Conduit      |
|  | PROPOSED Right of Way                                   |  | EXISTING Right of Way                  |
|  | PROPOSED Directional Arrow                              |  | EXISTING Directional Arrow             |
|  | PROPOSED Guardrail                                      |  | EXISTING Guardrail                     |
|  | PROPOSED Construction Zone Drums                        |  | EXISTING Construction Zone Drums       |
|  | PROPOSED Construction Zone                              |  | EXISTING Construction Zone             |
|  | PROPOSED Video Detection Zone                           |  | EXISTING Video Detection Zone          |
|  | PROPOSED "YIELD" Sign (R1-2)                            |  | EXISTING "YIELD" Sign (R1-2)           |
|  | PROPOSED No Right Turn Sign (R3-1)                      |  | EXISTING No Right Turn Sign (R3-1)     |
|  | PROPOSED No Left Turn Sign (R3-2)                       |  | EXISTING No Left Turn Sign (R3-2)      |

Signal Upgrade - Temporary Design 1 (TMP Phases I and II)

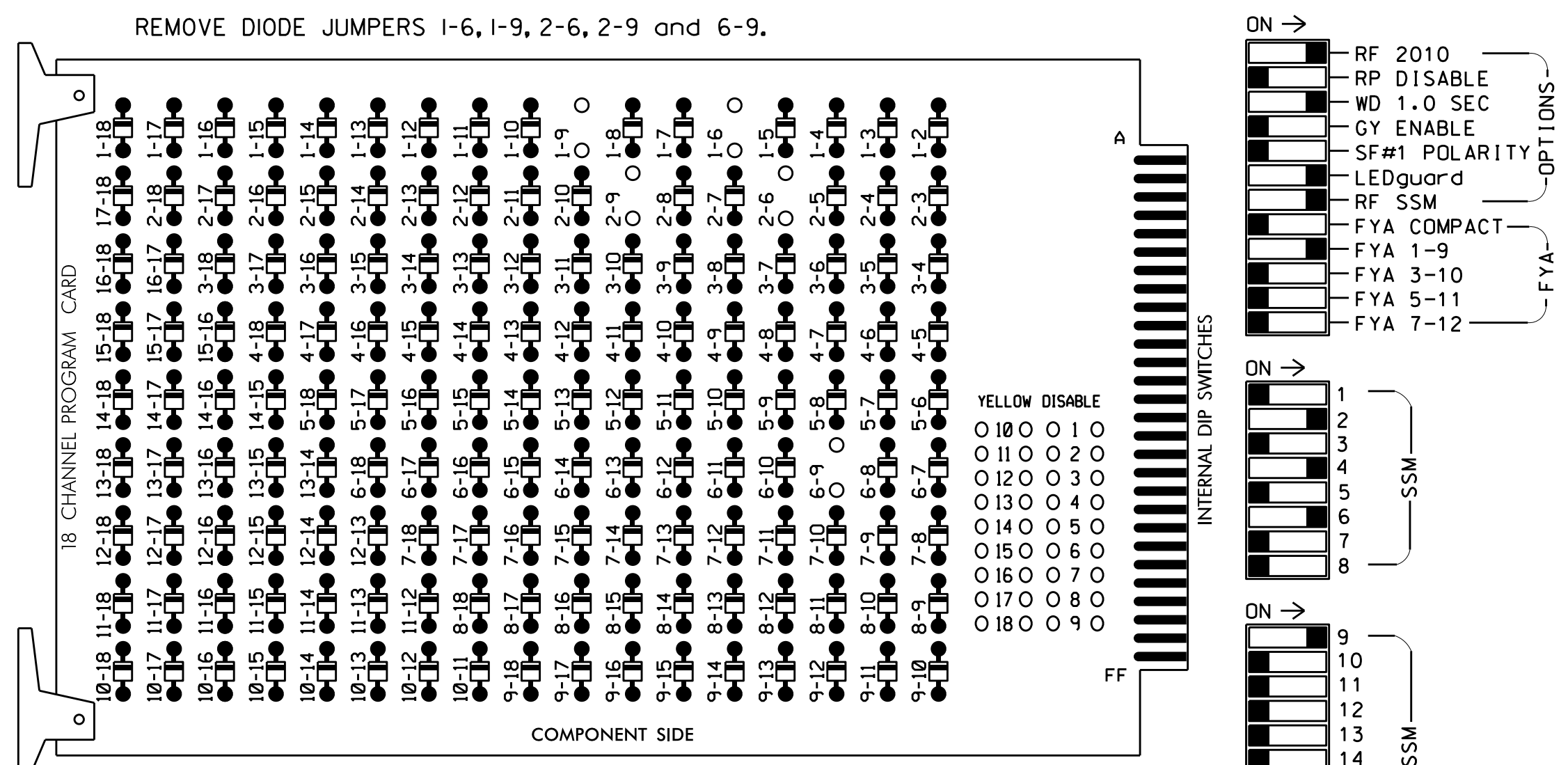
	<p>NC 56 at I-85 SB Ramps</p>	
	<p>Division 5 Granville County Butner</p>	<p>PLAN DATE: February 2024 REVIEWED BY:</p>
<p>PREPARED BY: J.A. Lohr REVIEWED BY:</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SCALE 0 20 1"=20'</p>	<p>03/14/2024</p>

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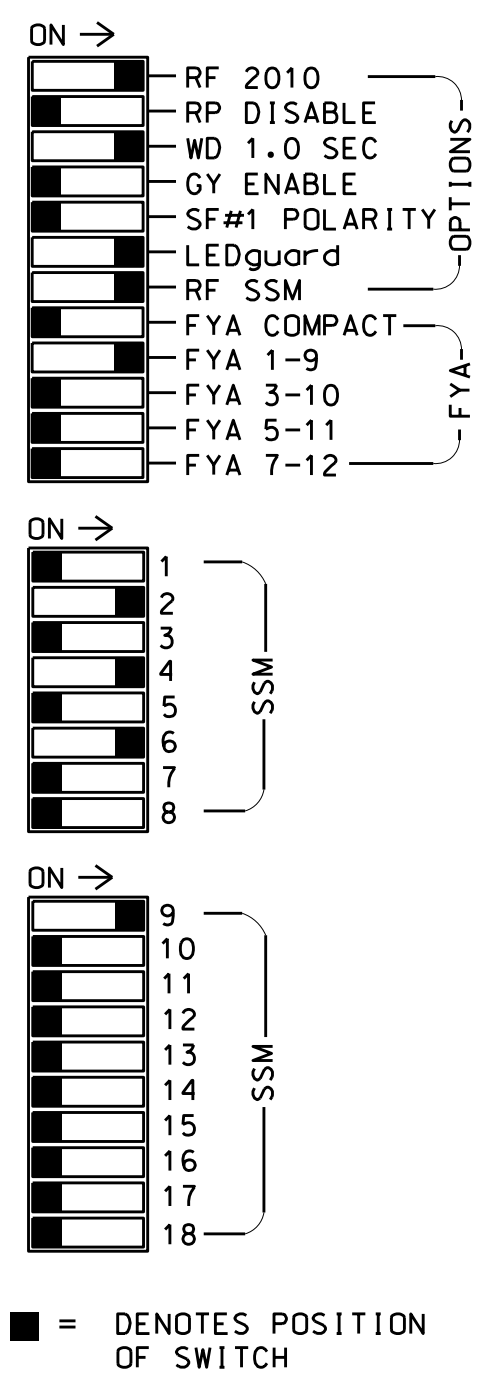
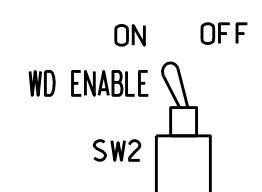
### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



**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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Startup In Green.
4. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the NC 56 (Butner) CLS. Signal System #: D05-56\_Butner

**SIGNAL HEAD HOOK-UP CHART**

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

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

**EQUIPMENT INFORMATION**

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

**INPUT FILE POSITION LAYOUT**

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	S	S	S	S	∅ 4	S	S	NOT USED	S	S	S	S	FS
L	1A	NOT USED	NOT USED	NOT USED	NOT USED	4A	NOT USED	NOT USED	SYS. DET. S3	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
U	∅ 6	S	S	S	S	S	S	S	S	S	S	S	S	ST
L	6A	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR

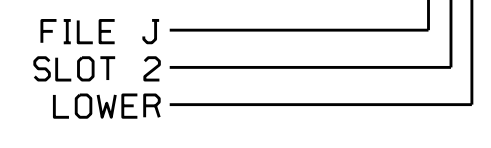
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 ⊗ Wired Input - Do not populate slot with detector card

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
* S3	TB6-11,12	I9L	62	24	13	SYS					

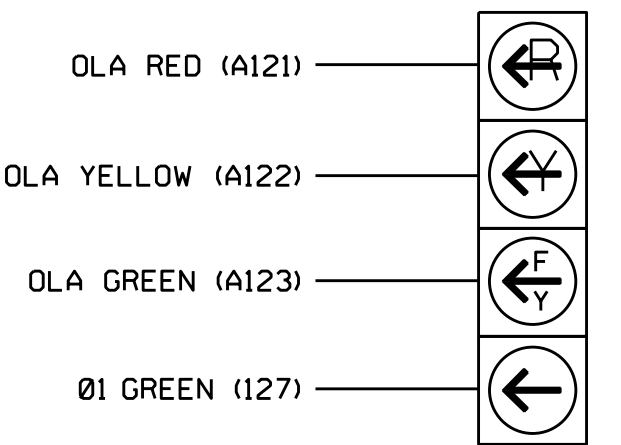
- <sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
 \* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

**INPUT FILE POSITION LEGEND: J2L**



**FYA SIGNAL WIRING DETAIL**

(wire signal heads as shown)



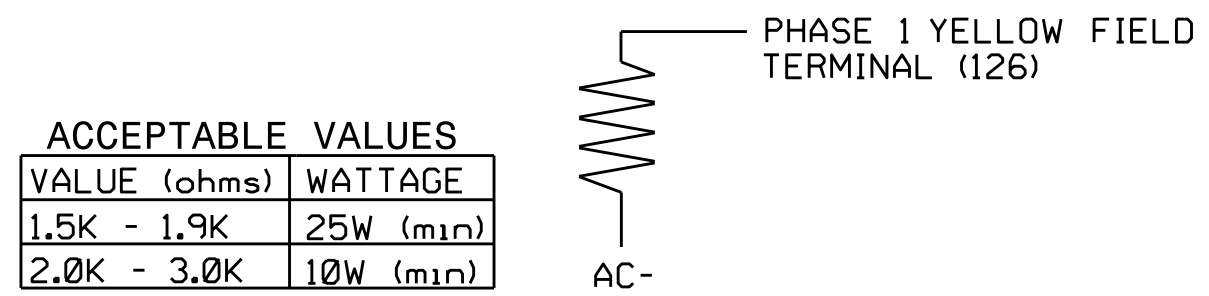
11

**NOTE**

The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown below)

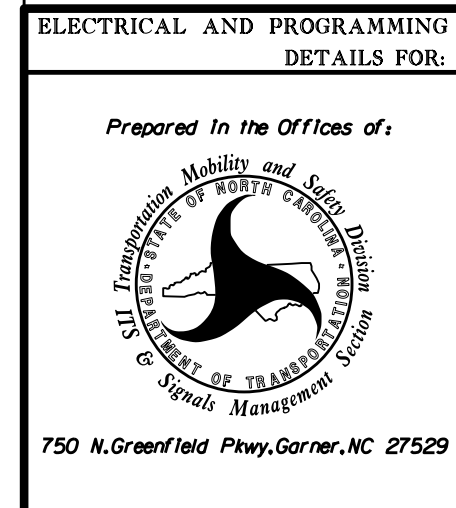


VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Electrical Detail - Sheet 1 of 2



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0044T1  
 DESIGNED: February 2024  
 SEALED: 03/14/2024  
 REVISED: N/A

REVISIONS	INIT.	DATE

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

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 RYAN W. HOUGH  
 SEAL 036833

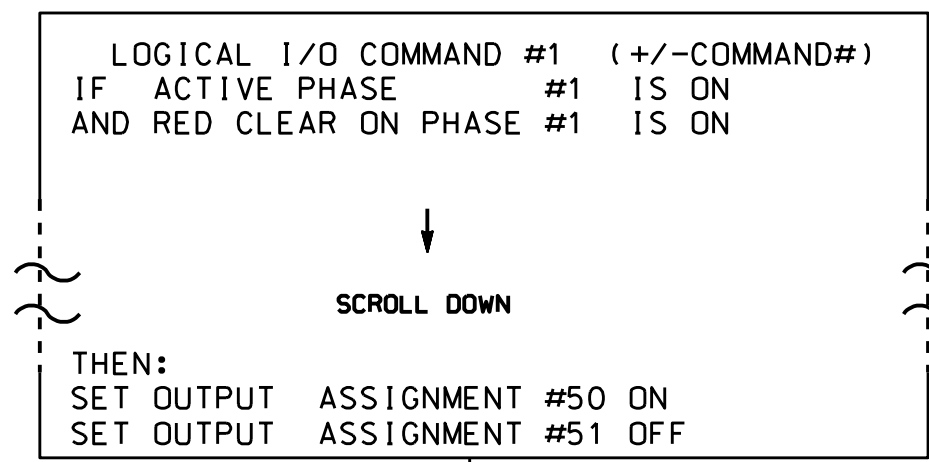
Division 5 Granville County Butner  
 PLAN DATE: March 2024 REVIEWED BY:  
 PREPARED BY: S.Kirkpatrick REVIEWED BY:  
 DocuSigned by: Ryan W. Hough 03/15/2024  
 630302EA82056C3 DATE  
 SIG. INVENTORY NO. 05-0044T1

15-MAR-2024 07:53  
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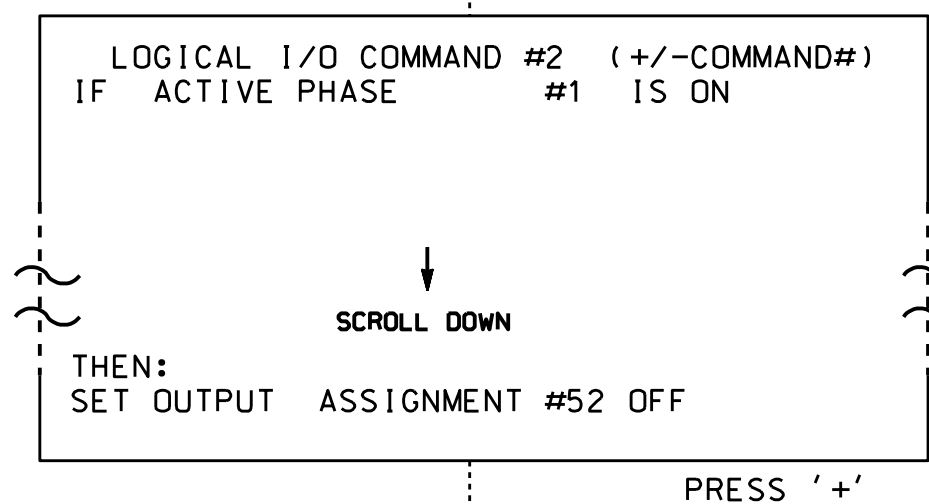
## LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

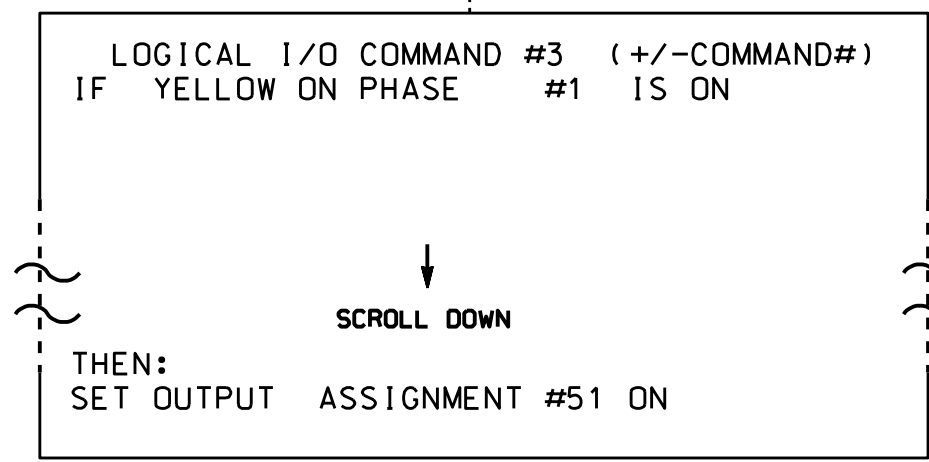
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 1 (HEAD 11).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

<b>OUTPUT REFERENCE SCHEDULE</b>	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 50 = Overlap A Red	
OUTPUT 51 = Overlap A Yellow	
OUTPUT 52 = Overlap A Green	

## OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

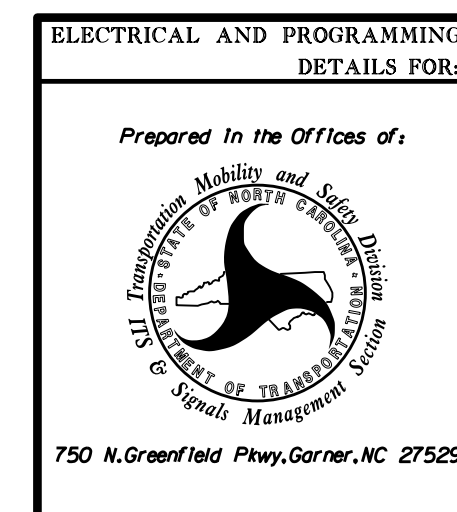
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:           ;12345678910111213141516
VEH OVL PARENTS:;XX
VEH OVL NOT VEH:;
VEH OVL NOT PED:;
VEH OVL GRN EXT:;
STARTUP COLOR:  _ RED _ YELLOW _ GREEN
FLASH COLORS:   _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 05-0044T1  
DESIGNED: February 2024  
SEALED: 03/14/2024  
REVISED: N/A

Electrical Detail - Sheet 2 of 2

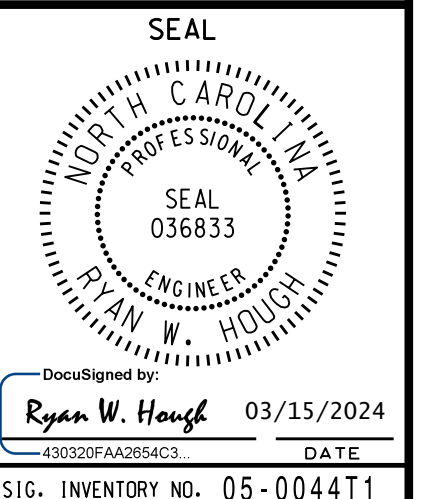


750 N. Greenfield Pkwy, Garner, NC 27529

**NC 56**  
at  
**I-85 SB Ramps**

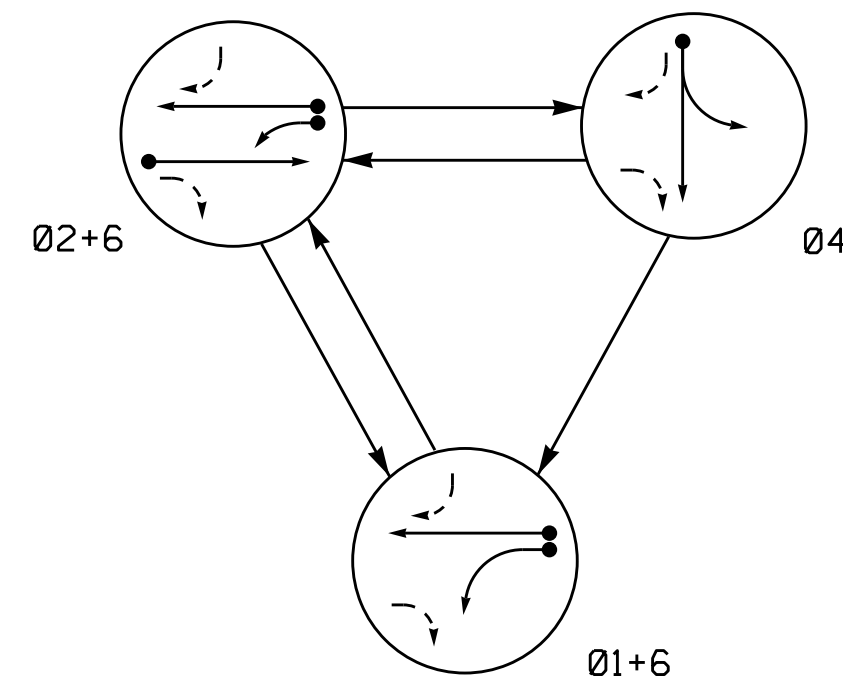
Division 5 Granville County Butner	
PLAN DATE: March 2024	REVIEWED BY:
PREPARED BY: S. Kirkpatrick	REVIEWED BY:
REVISIONS	INIT. DATE

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



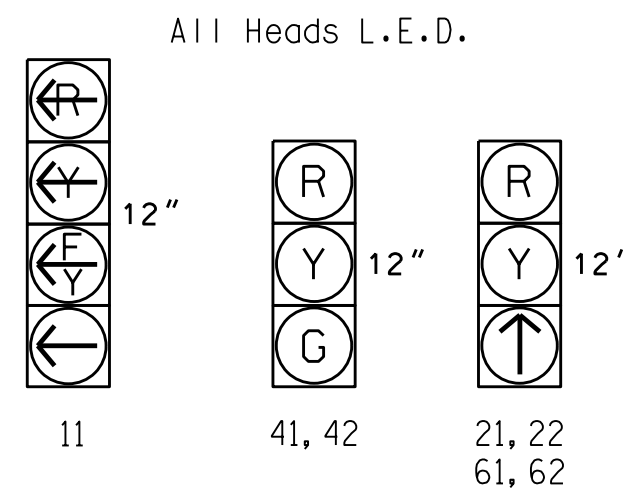
DocuSigned by:  
**Ryan W. Hough** 03/15/2024  
430320FAA2854C3 DATE  
SIG. INVENTORY NO. 05-0044T1

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	01+6	02+6	04	FLASH
11	←	→	←	→
21, 22	R	↑	R	Y
41, 42	R	R	G	R
61, 62	↑	↑	R	Y

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A*	6X6	70	*	-	2	Y	Y	-	-	-	-	*
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
6A	6X6	70	EXIST	-	6	Y	Y	-	-	-	-	-
S2*	6X6	+130	*	-	-	-	-	-	-	-	-	Y*
S3	6X6	+70	EXIST	-	-	-	-	-	-	-	-	Y

\* Video detection zone.

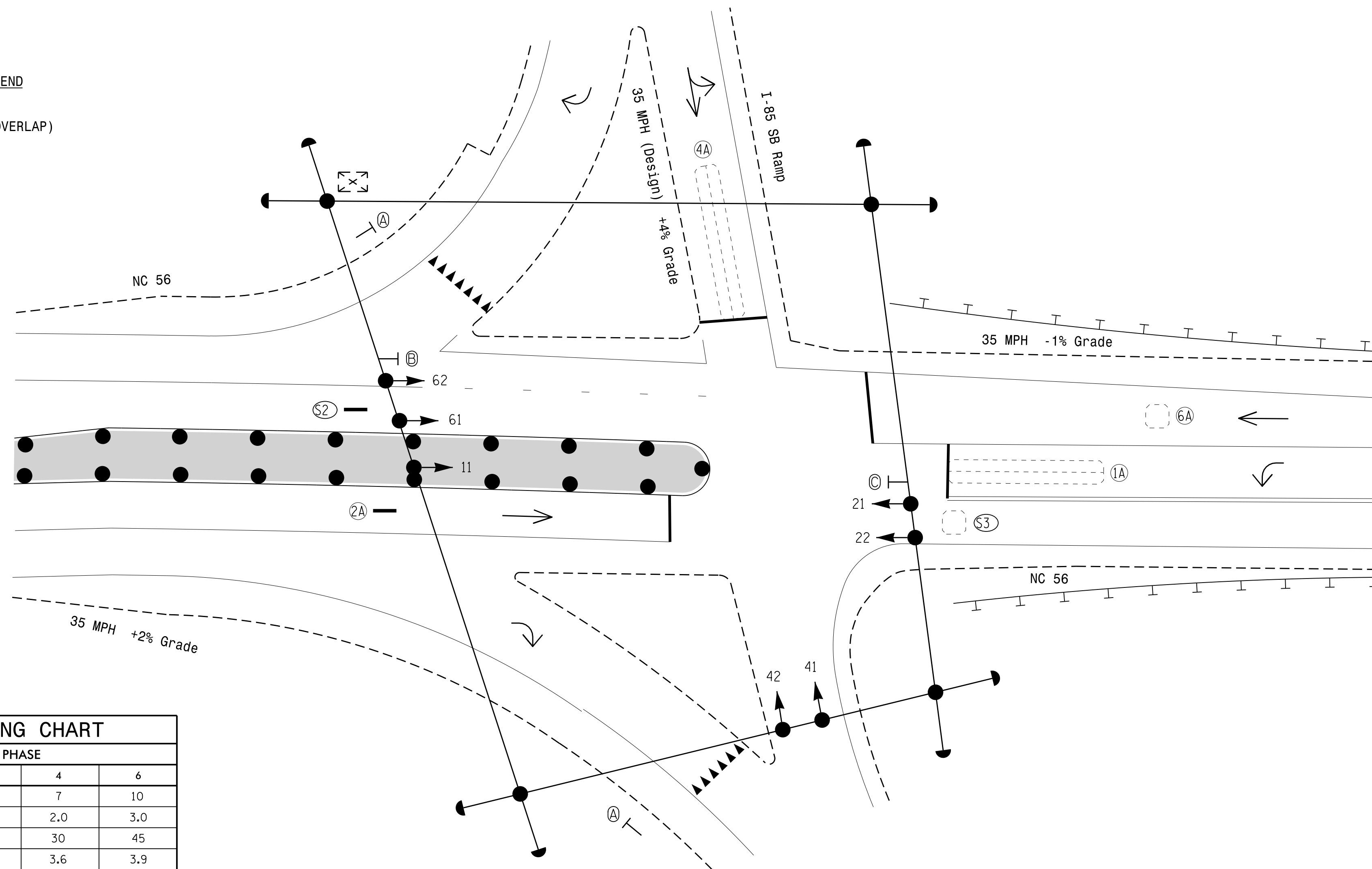
3 Phase Fully Actuated (NC 56 (Butner) CLS) Signal System #: D05-56\_Butner

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing.
6. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	45	30	45
Yellow Clearance	3.0	3.9	3.6	3.9
Red Clearance	1.8	1.0	1.8	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

\* 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	○	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
○	Directional Arrow	○	N/A
N/A	Guardrail	○	N/A
○	Construction Zone Drums	○	N/A
○	Construction Zone	○	N/A
○	Video Detection Zone	○	N/A
○	"YIELD" Sign (R1-2)	○	N/A
○	No Right Turn Sign (R3-1)	○	N/A
○	No Left Turn Sign (R3-2)	○	N/A

Signal Upgrade - Temporary Design 2 (TMP Phases III and IV)

	<p>NC 56 at I-85 SB Ramps</p> <p>Division 5 Granville County Butner</p> <p>PLAN DATE: February 2024 REVIEWED BY:</p> <p>PREPARED BY: J.A. Lohr REVIEWED BY:</p>	<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL</p> <p>ROBERT J. ZIMERA</p> <p>ENGINEER</p> <p>03/14/2024</p>
	<p>750 N. Greenfield Pkwy, Garner, NC 27529</p> <p>SCALE: 0 20 1"=20'</p> <p>REVISIONS: _____</p> <p>INIT. DATE</p>	<p>SIG. INVENTORY NO. 05-004472</p>

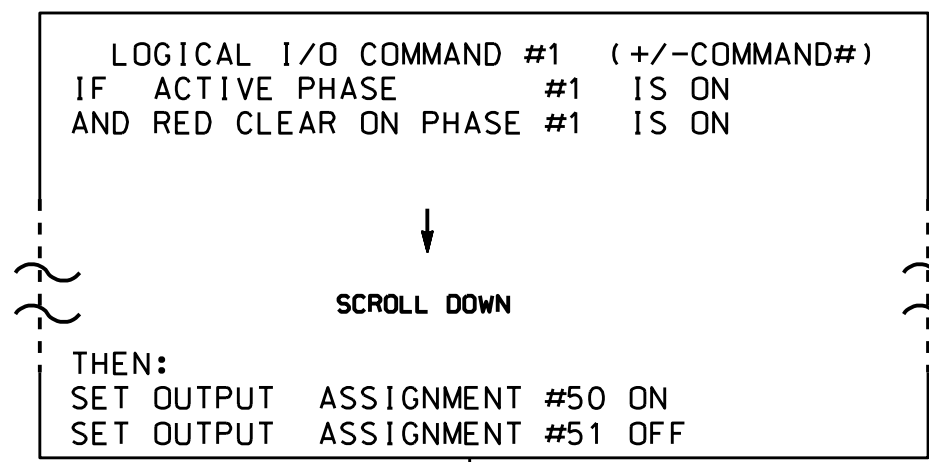
14-MAR-2024 07:44 S:\IT\GIS\UM\15\_Signal\485\SIGNAL Design\Central\_Reg\0401iv\_5MI-6020MAXTIME\05004472...sig\_dsn\_2024madd.dgn JAL:grf



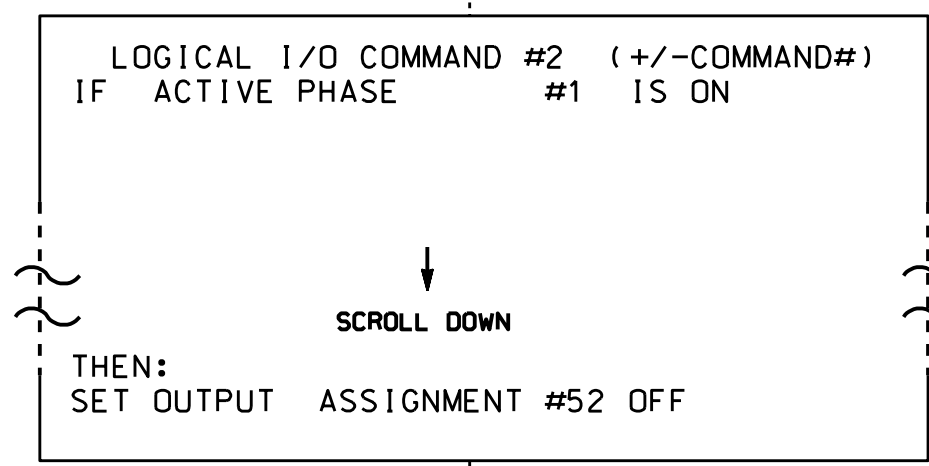
## LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

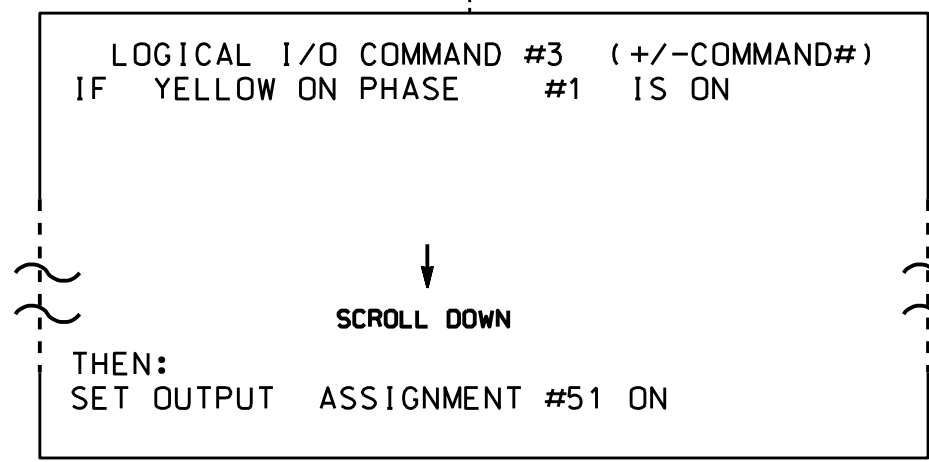
1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 1 (HEAD 11).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

### OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 50 = Overlap A Red  
OUTPUT 51 = Overlap A Yellow  
OUTPUT 52 = Overlap A Green

## OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

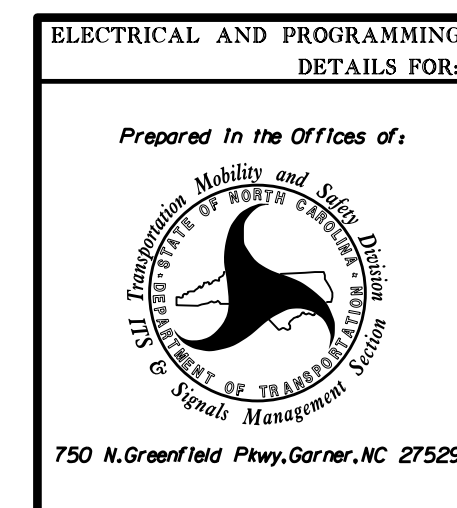
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:           ;12345678910111213141516
VEH OVL PARENTS:;XX
VEH OVL NOT VEH:;
VEH OVL NOT PED:;
VEH OVL GRN EXT:;
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:   _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 05-0044T2  
DESIGNED: February 2024  
SEALED: 03/14/2024  
REVISED: N/A

Electrical Detail - Sheet 2 of 2



750 N. Greenfield Pkwy, Garner, NC 27529

**NC 56**  
at  
**I-85 SB Ramps**

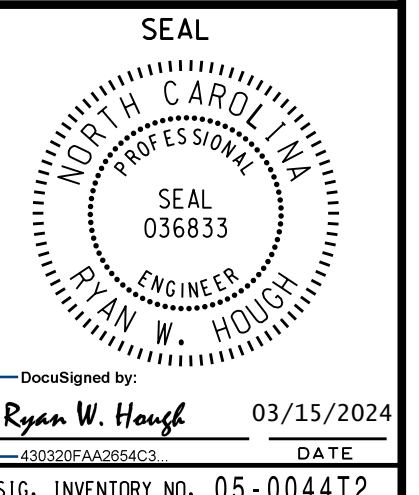
Division 5 Granville County Butner

PLAN DATE: March 2024 REVIEWED BY:

PREPARED BY: S. Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

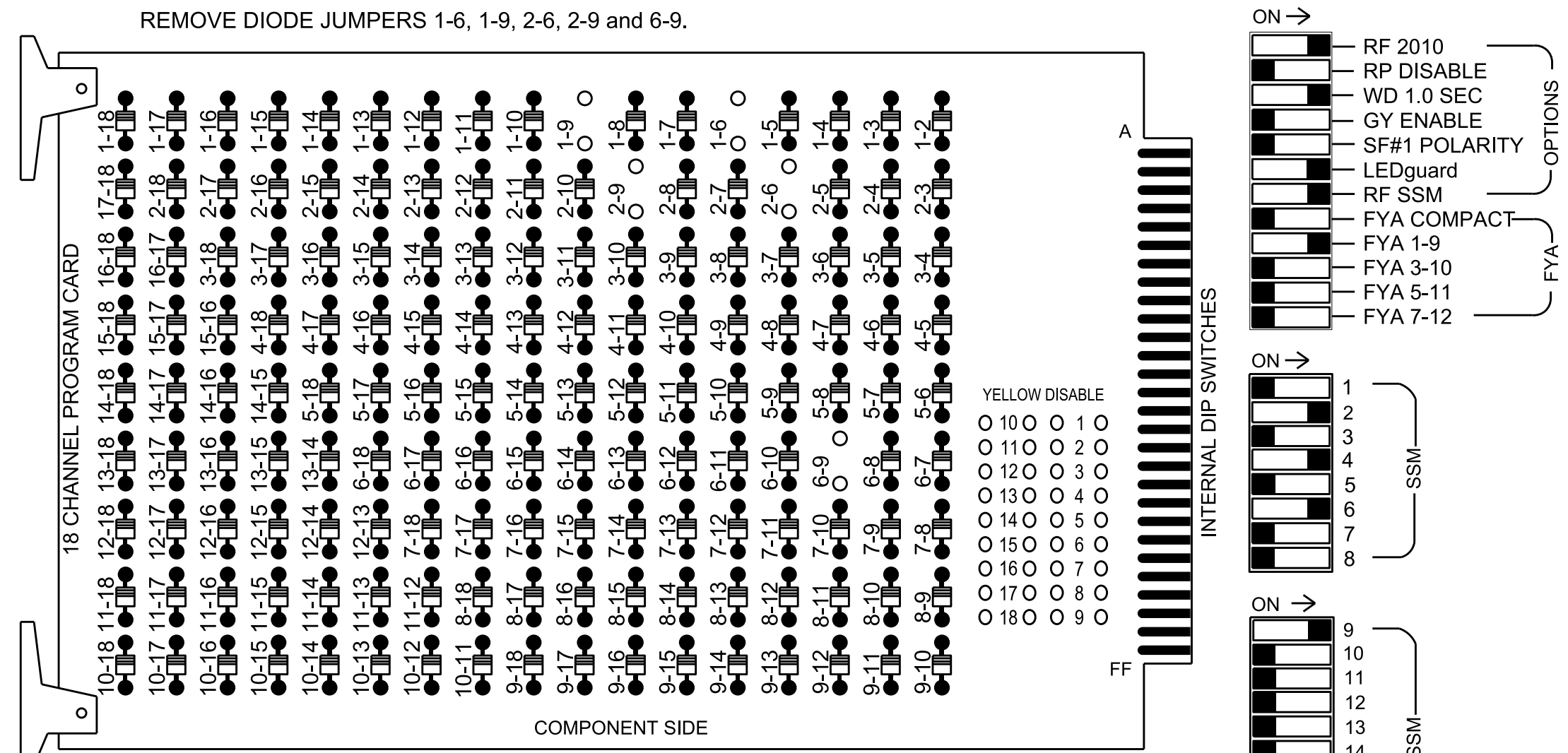


DocuSigned by:  
**Ryan W. Hough** 03/15/2024  
430320FAA0864C3 DATE  
SIG. INVENTORY NO. 05-0044T2



### 18 CHANNEL 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 the Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 56 (Butner) CLS. Signal System #: D05-56\_Butner

### EQUIPMENT INFORMATION

Controller.....2070LX  
 Cabinet.....332 w/ Aux  
 Software.....Q-Free MAXTIME  
 Cabinet Mount.....Base  
 Output File Positions.....18 With Aux. Output File  
 Load Switches Used.....S1, S2, S5,S8, AUX S1  
 Phases Used.....1, 2, 4, 6  
 Overlap "1".....\*  
 Overlap "2".....Not Used  
 Overlap "3".....Not Used  
 Overlap "4".....Not Used

\*See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

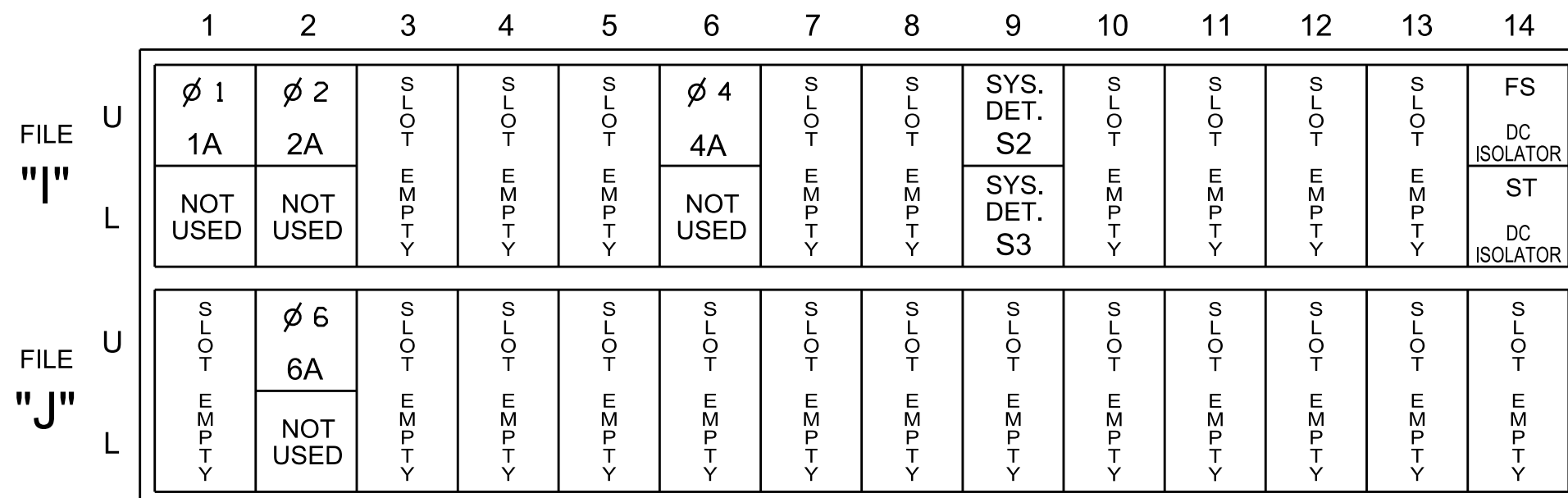
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	11*	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW	*	129			102			135										
GREEN					103													
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127	130						136										

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

! If present, remove jumper from I1-W to J4-W on rear of input file.

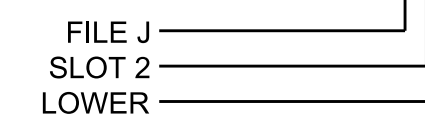
### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 *	1	15.0		X		X	
2A	TB2-5,6	I2U	39	1	29 *	6			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
*S2	TB6-9,10	I9U	60	22	13	SYS						
*S3	TB6-11,12	I9L	62	24	14	SYS						

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

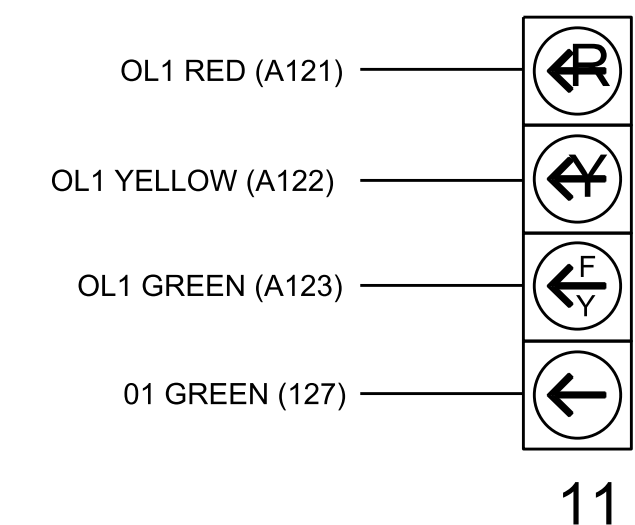
\* For the detectors to work as shown on the signal plan see the Detector Programming Detail for Alternate Phasing on Sheet 2 of this plan.

INPUT FILE POSITION LEGEND: J2L



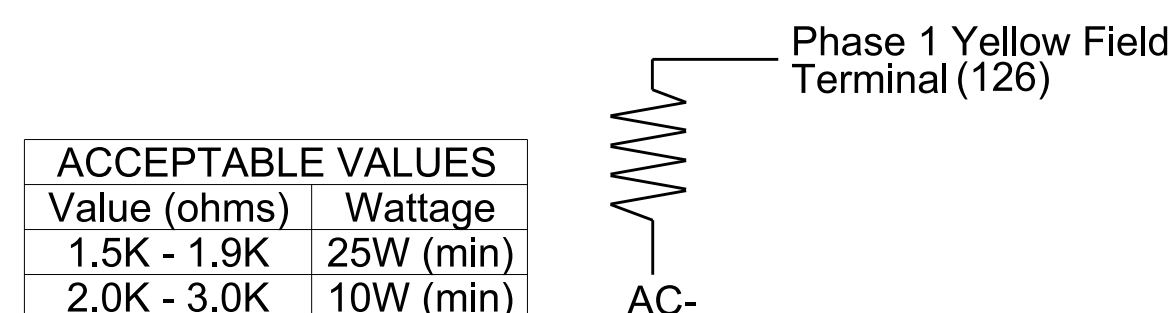
### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0044  
 DESIGNED: February 2024  
 SEALED: 03/14/2024  
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

Prepared in the Offices of:

Transportation Mobility and Safety Division  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 STATE OF NORTH CAROLINA  
 TRANSPORTATION MANAGEMENT DIVISION

750 N. Greenfield Pkwy, Garner, NC 27529

NC 56 at I-85 SB Ramps

Division 5 Granville County Butner

PLAN DATE: March 2024 REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: Ryan W. Houff 03/25/2024

SEAL 036833 ENGINEER RYAN W. HOUFF

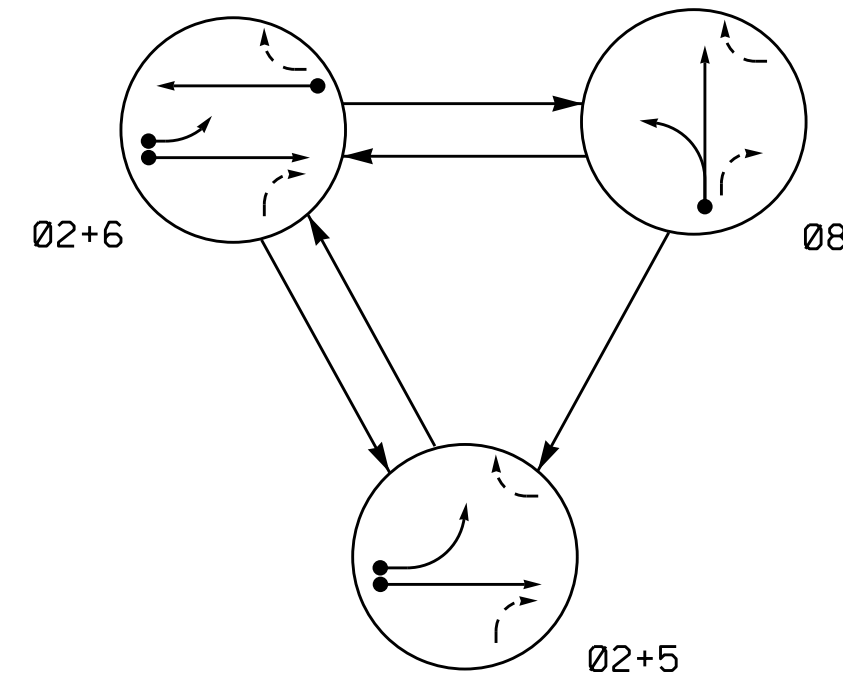
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 05-0044



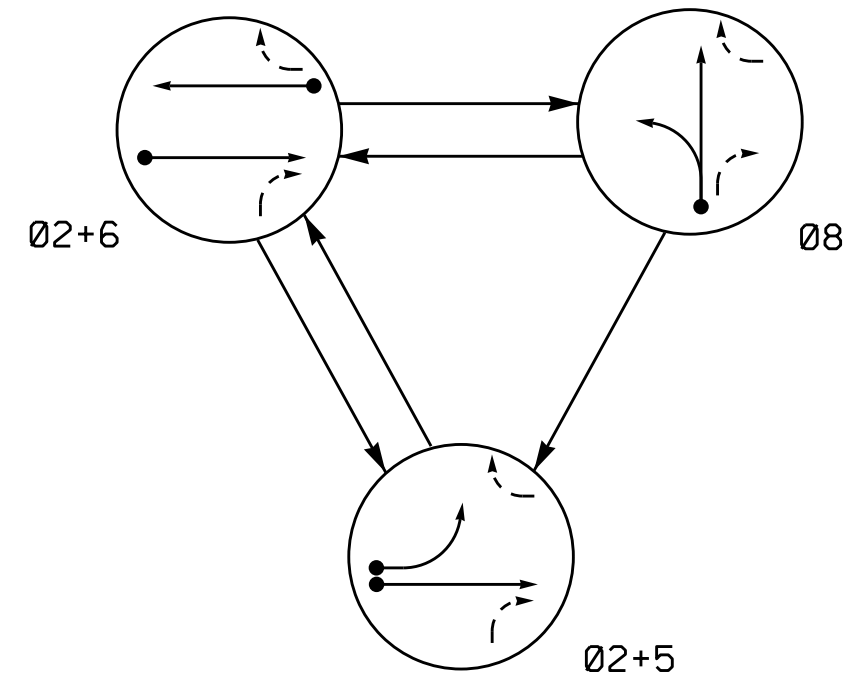


DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21, 22	↑	↑	R	Y
51	←	←	←	←
61, 62	R	↑	R	Y
81, 82	R	R	G	R

ALTERNATE PHASING DIAGRAM



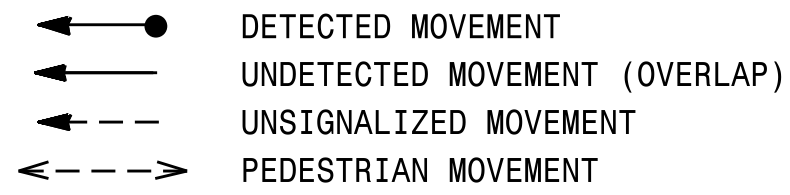
SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21, 22	↑	↑	R	R
51	←	←	←	←
61, 62	R	↑	R	R
81, 82	R	R	G	R

3 Phase Fully Actuated (NC 56 (Butner) CLS)  
Signal System #: D05-56\_Butner

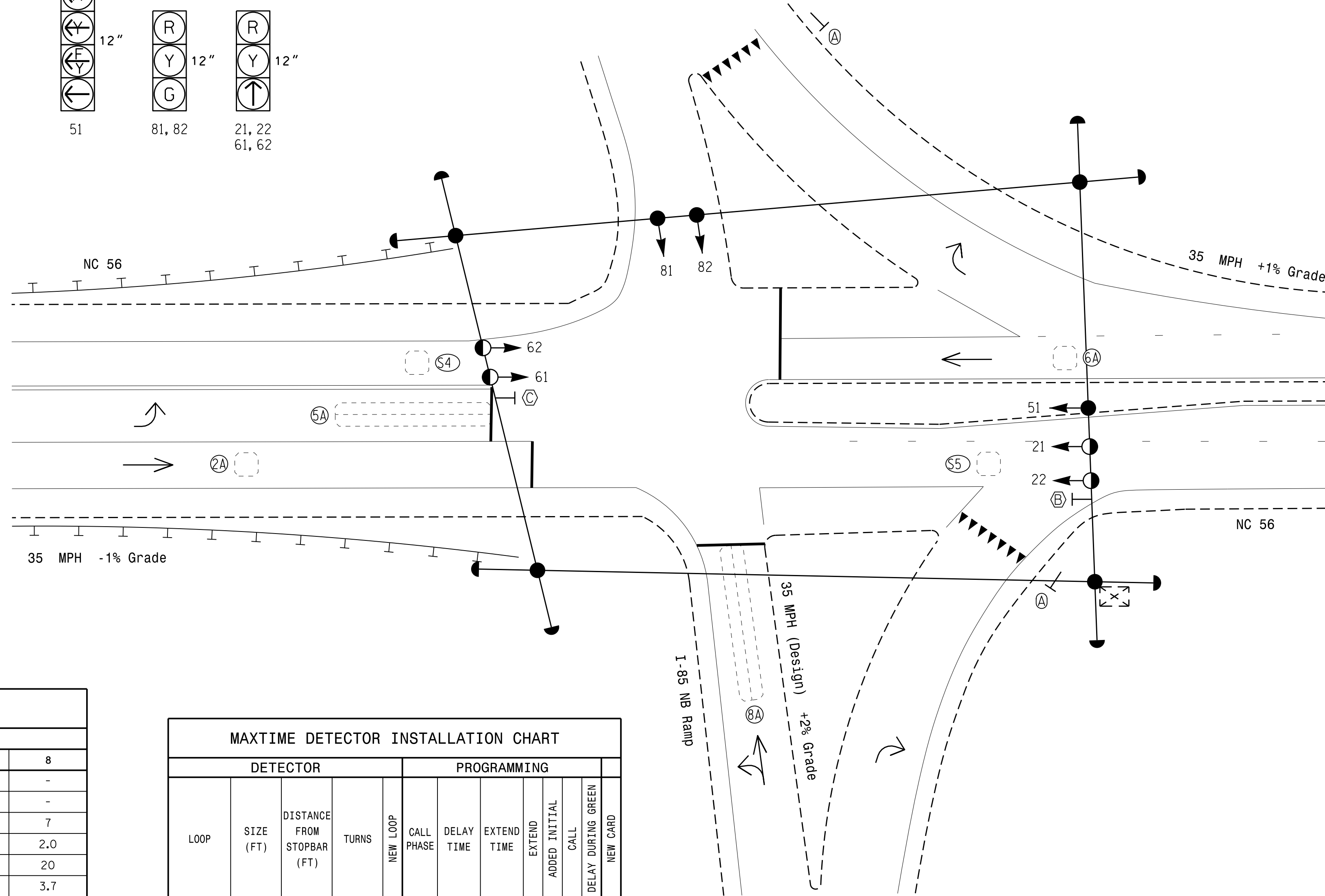
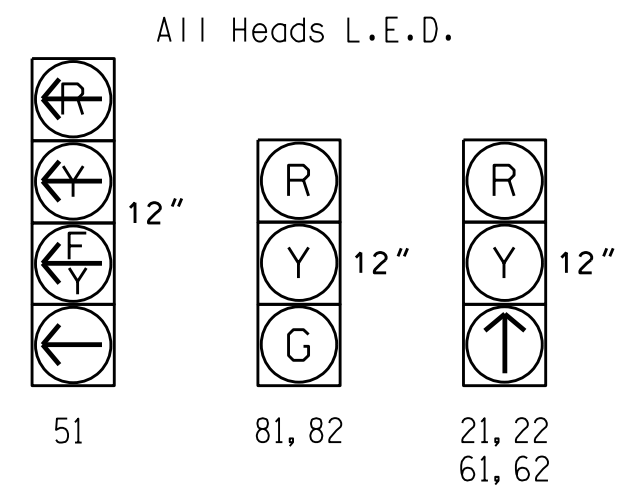
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Pavement markings are existing.
- Install new controller in existing cabinet.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.



FEATURE	PHASE			
	2	5	6	8
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Min Green *	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max 1 *	45	15	45	20
Yellow Change	3.9	3.0	3.9	3.7
Red Clear	1.2	1.9	1.2	1.2
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	-
Non Lock Detector	-	X	-	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	-	-	-

\* 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.

MAXTIME DETECTOR INSTALLATION CHART										
DETECTOR				PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND INITIAL	ADDED INITIAL CALL	DELAY DURING GREEN
2A	6X6	70	EXIST	-	2	-	-	X	-	X
5A	6X40	0	2-4-2	-	5	15.0*	-	X	-	X
6A	6X6	70	EXIST	-	6	-	-	X	-	X
8A	6X40	0	2-4-2	-	8	-	-	X	-	X
S4	6X6	+90	EXIST	-	-	-	-	-	-	-
S5	6X6	+120	EXIST	-	-	-	-	-	-	-

\* Reduce Delay to 3 seconds during Alternate Phasing Operation.  
# Disable phase call for loop during Alternate Phasing Operation.

LEGEND	
PROPOSED	EXISTING
	N/A
N/A	
N/A	

Signal Upgrade

**NC 56 at I-85 NB Ramps**

Division 5 Granville County Butner

PLAN DATE: February REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 20 1"=20'

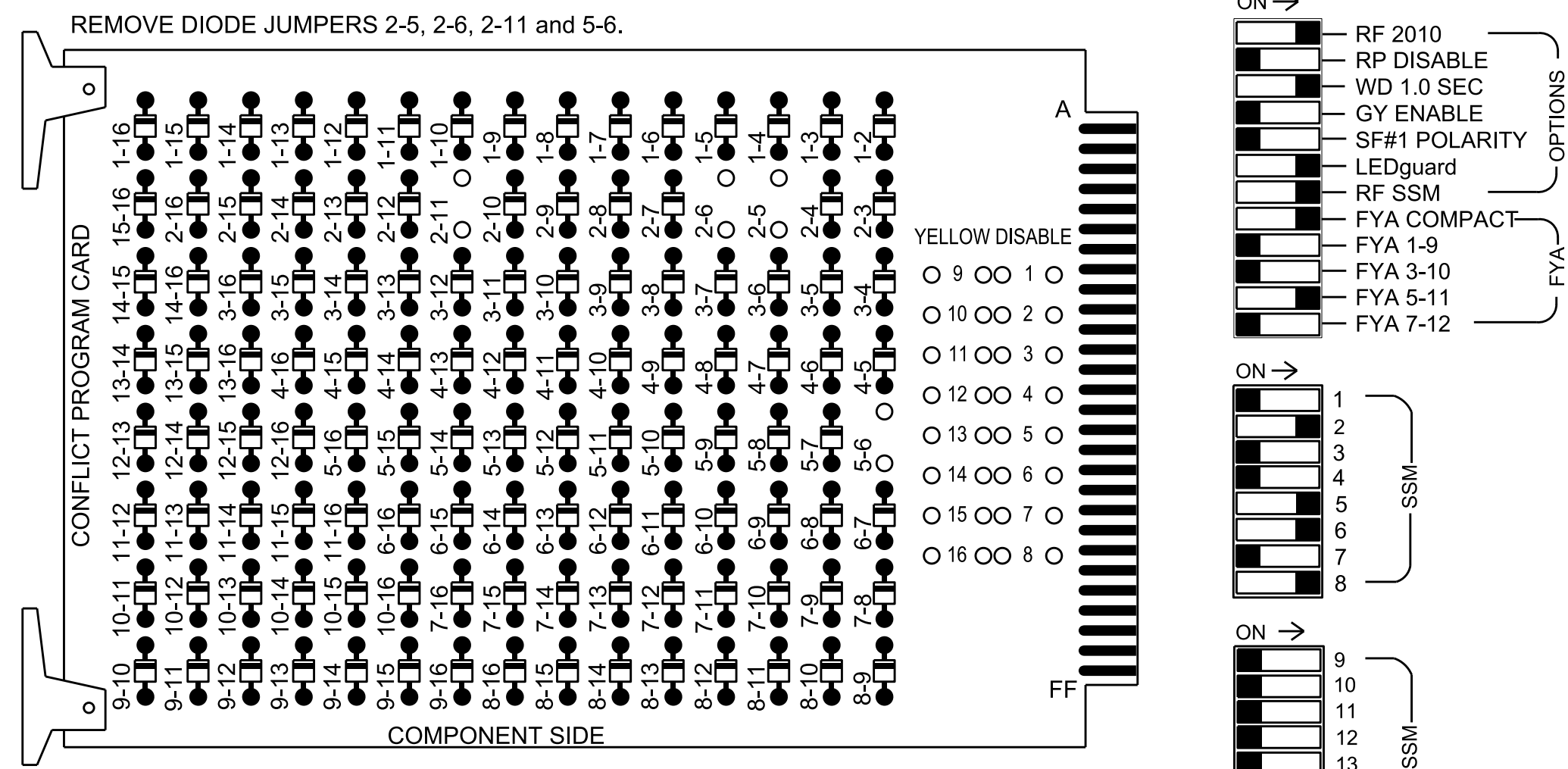
REVISIONS: \_\_\_\_\_ INIT. DATE

DATE: 03/14/2024

SIG. INVENTORY NO. 05-2126

### 16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.
- Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

### 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 plan.
- Ensure that Red Enable is active at all times during normal operation. To prevent red failures on unused monitor channels, tie unused red monitor inputs 1,3,4,7,9,10,11, 12,13,14,15 & 16 to AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 56 (Butner) CLS. Signal System #: D05-56\_Butner

### EQUIPMENT INFORMATION

Controller.....2070LX  
 Cabinet.....332 w/ Aux  
 Software.....Q-Free MAXTIME  
 Cabinet Mount.....Base  
 Output File Positions.....18 With Aux. Output File  
 Load Switches Used.....S2, S5, S6, S6P, S8  
 Phases Used.....2, 5, 6, 8  
 Overlap "1".....Not Used  
 Overlap "2".....Not Used  
 Overlap "3".....\*  
 Overlap "4".....Not Used

\*See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

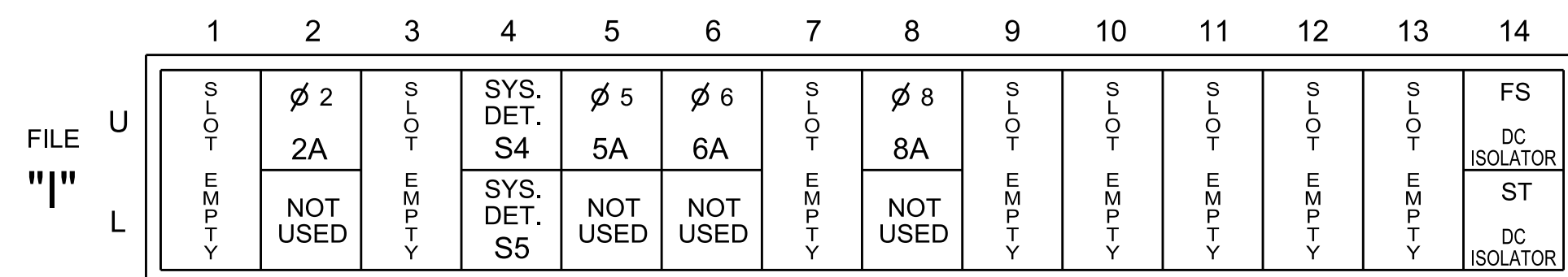
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	11	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	OL3	6	5 GRN	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51*	61,62	51*	NU	NU	81,82	NU
RED		128						134				107	
YELLOW		129						135				108	
GREEN												109	
RED ARROW								131					
YELLOW ARROW								132					
FLASHING YELLOW ARROW								133					
GREEN ARROW		130						136	120				*

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

! If present, remove jumper from I5-F to I5-W on rear of input file.

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB21-3,4	I2U	39	1	2	2			X		X	
*S4	TB21-7,8	I4U	41	3	8	SYS						
*S5	TB23-7,8	I4L	45	7	9	SYS						
5A	TB21-9,10	I5U	55	17	15 *	5	15.0		X		X	
6A	TB21-11,12	I6U	40	2	16	6			X		X	
8A	TB22-1,2	I8U	42	4	22	8			X		X	

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

\* For the detectors to work as shown on the signal plan see the Detector Programming Detail for Alternate Phasing on Sheet 2 of this plan.

INPUT FILE POSITION LEGEND: J2L  
 FILE J  
 SLOT 2  
 LOWER

### PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

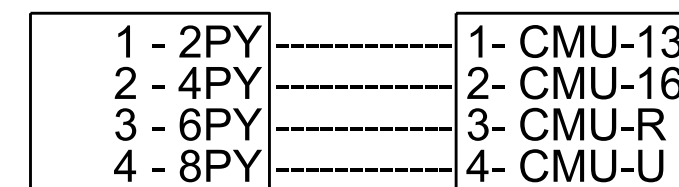
In order to use FYA COMPACT mode with the 16 or 18 Channel Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 6 PY (field term. 120) to chan. 10 green (monitor pin R).

Follow the instructions below to make appropriate connections:

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

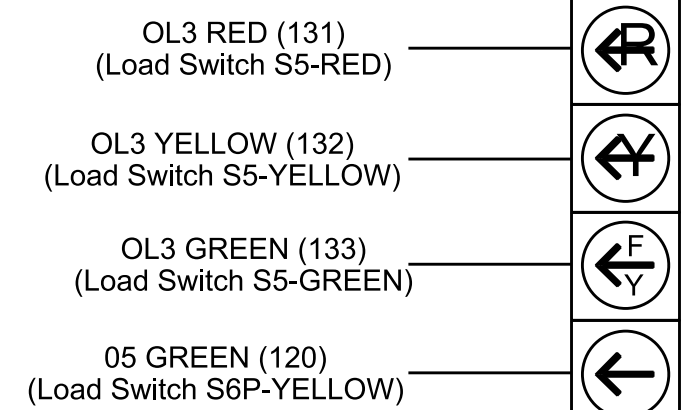
CMU-R -----6PY (term. 120)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:



### FYA SIGNAL WIRING DETAIL

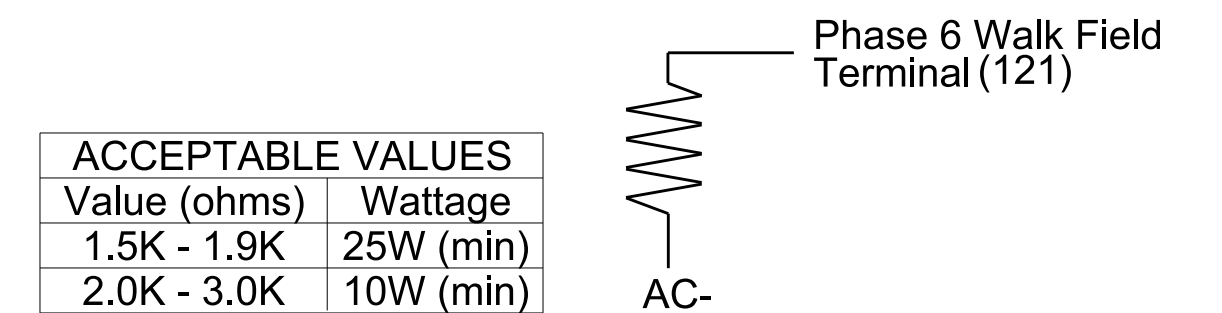
(wire signal heads as shown)



51

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2126  
 DESIGNED: February 2024  
 SEALED: 03/14/2024  
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Prepared in the Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NC 56 at I-85 NB Ramps

Division 5 Granville County Butner

PLAN DATE: March 2024 REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL 036833

SEAL 036833

DESIGNED BY: Ryan W. Hough 03/15/2024

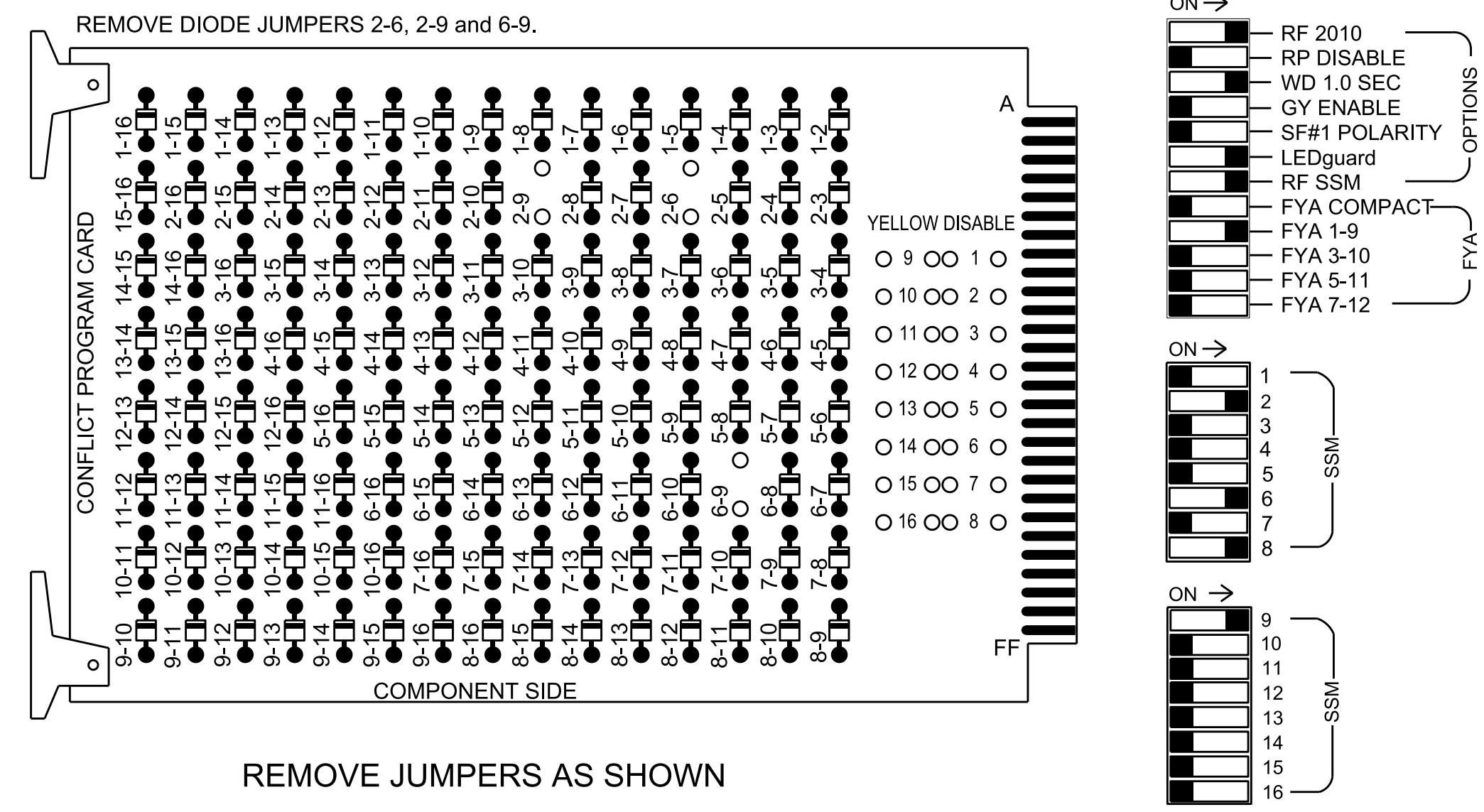
SIG. INVENTORY NO. 05-2126





### 16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Ensure that Red Enable is active at all times during normal operation. To prevent red failures on unused monitor channels, tie unused red monitor inputs 1,3,4,5,7,10,11, 12,13,14,15 & 16 to AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the NC 56 (Butner) CLS. Signal System #: D05-56\_Butner

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82,83	NU	63	NU	NU	NU	NU	NU
RED		128							134		107							
YELLOW		129							135									
GREEN		130							136									
RED ARROW																		A121
YELLOW ARROW													108					A122
FLASHING YELLOW ARROW																		A123
GREEN ARROW											109							

NU = Not Used  
 ★See pictorial of head wiring in detail this sheet.

### EQUIPMENT INFORMATION

Controller.....2070LX  
 Cabinet.....332 w/ Aux  
 Software.....Q-Free MAXTIME  
 Cabinet Mount.....Base  
 Output File Positions.....18 With Aux. Output File  
 Load Switches Used.....S2, S6, S8, S9  
 Phases Used.....2, 6, 8  
 Overlap "1".....\*  
 Overlap "2".....Not Used  
 Overlap "3".....Not Used  
 Overlap "4".....Not Used

\*See overlap programming detail on this sheet

### INPUT FILE POSITION LAYOUT

(front view)

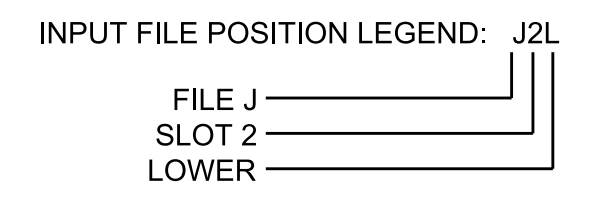
FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	FS	∅ 2	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
L	NOT USED	2A	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
U	FS	∅ 6	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
L	NOT USED	6A	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
U	FS	∅ 6	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
L	NOT USED	6B	FS	FS	FS	FS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

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

### INPUT FILE CONNECTION & PROGRAMMING CHART

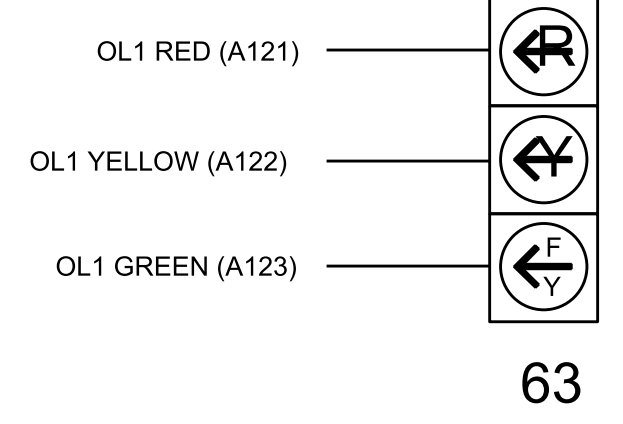
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	J2U	39	1	2	2			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
6B	TB3-7,8	J2L	44	6	17	6			X		X	
8A	TB5-9,10	J6U	42	4	22	8	3.0		X		X	
8B	TB5-11,12	J6L	46	8	23	8	10.0		X		X	
*S6	TB7-9,10	J9U	59	21	27	SYS						

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



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### OVERLAP PROGRAMMING

Front Panel  
 Main Menu > Controller > Overlap > Overlap Parameters/Overlap Timings

Web Interface  
 Home > Controller > Overlap Configuration > Overlaps

Overlap Plan 1

Overlap	1
Type	FYA 4 - Section
Included Phases	2
Modifier Phases	-
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0929  
 DESIGNED: February 2024  
 SEALED: 03/14/2024  
 REVISED: N/A

Electrical Detail

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 56 at SR 1104 (E. Lyon Station Rd.)

Division 5 Granville County Butner

PLAN DATE: March 2024 REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS

REVISIONS	INIT.	DATE

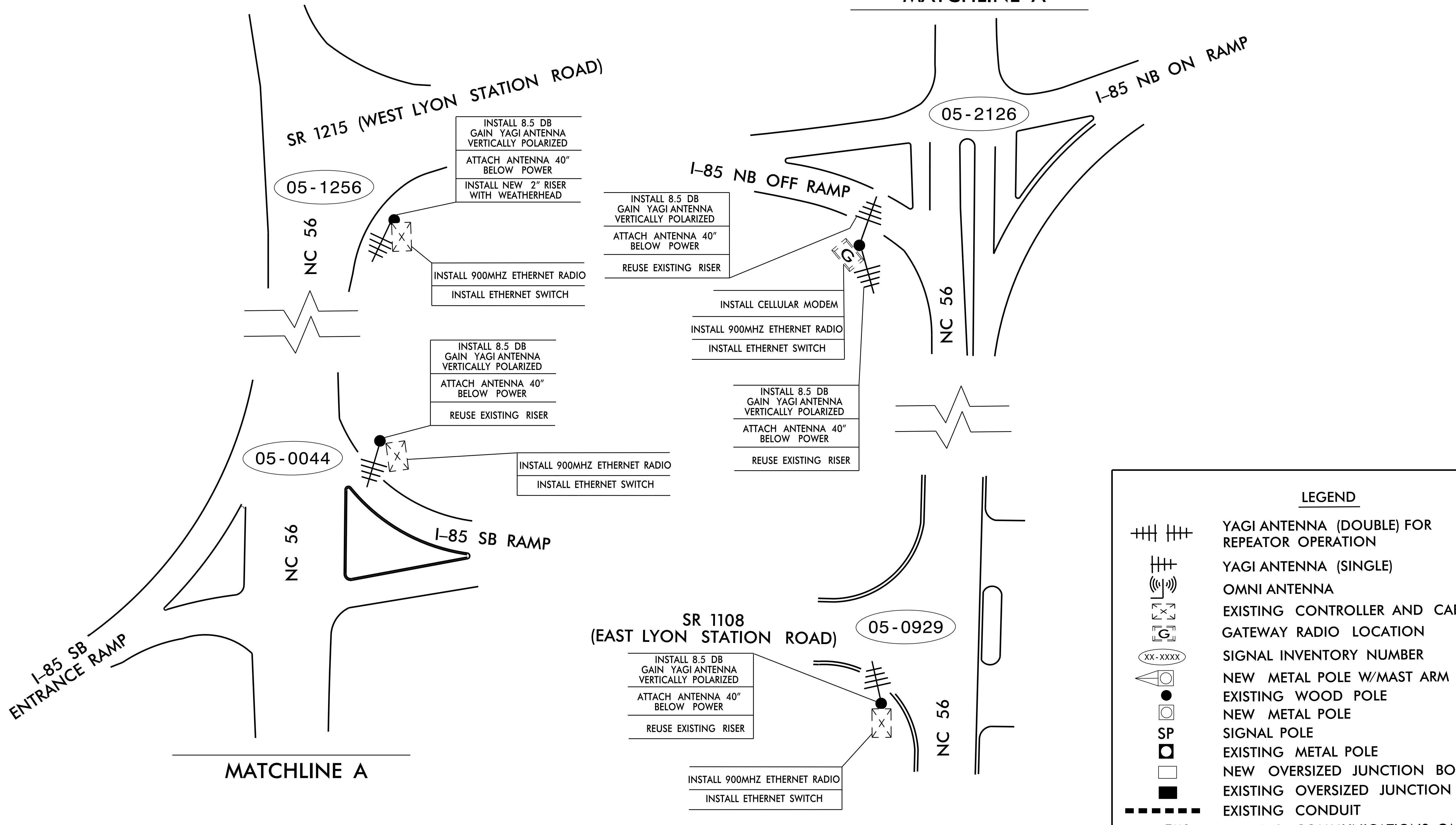
DocuSigned by: Ryan W. Hough

03/15/2024

SIG. INVENTORY NO. 05-0929

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MATCHLINE A



**LEGEND**

- ⚡ YAGI ANTENNA (DOUBLE) FOR REPEATOR OPERATION
- ⚡ YAGI ANTENNA (SINGLE)
- 📶 OMNI ANTENNA
- ⊗ EXISTING CONTROLLER AND CABINET
- Ⓜ GATEWAY RADIO LOCATION
- Ⓜ XX-XXXX SIGNAL INVENTORY NUMBER
- 📍 NEW METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- Ⓜ NEW METAL POLE
- SP SIGNAL POLE
- Ⓜ EXISTING METAL POLE
- NEW OVERSIZED JUNCTION BOX
- EXISTING OVERSIZED JUNCTION BOX
- EXISTING CONDUIT
- EXI — EXISTING COMMUNICATIONS CABLE

**NOTES FOR WIRELESS COMMUNICATIONS:**

- INSTALL COAXIAL CABLE:
  - ON WOOD POLES, REQUIRING A NEW RIGID GALVANIZED STEEL RISER, INSTALL A 2" RISER WITH WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
  - ON METAL POLES WITH MAST ARMS, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL A 1/2" HOLE UP THROUGH THE BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
  - ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
  - BETWEEN THE POINT OF EXITING THE RISER, METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
- IF AN EXISTING 2" SPARE RIGID GALVANIZED STEEL RISER IS AVAILABLE, INSTALL THE COAXIAL CABLE IN THE SPARE RISER.
- INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN.  
(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
- MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
- INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.  
(NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
- REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

Prepared in the Offices of:

**D05-56 BUTNER WIRELESS PLAN**

DIVISION 05 GRANVILLE CO. BUTNER

PLAN DATE: DECEMBER 2023 REVIEWED BY: G.A. GREEN

PREPARED BY: J.C. WALDEN REVIEWED BY: A.D. STEWART, PE

REVISIONS	INIT.	DATE

SCALE: 0

Downloaded by: Alex D. Stewart 02/08/2024

CADD File name: