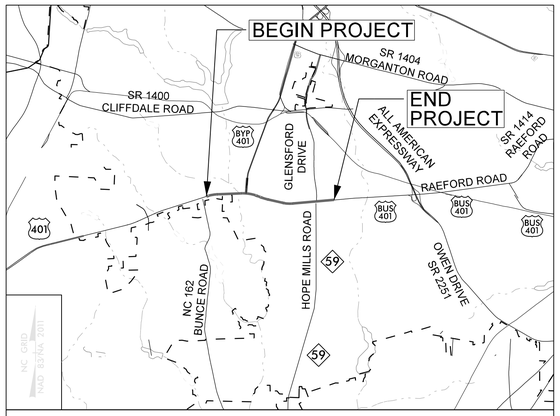
Project No.	Sheet No.
U–4405B	SIG–1.0

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

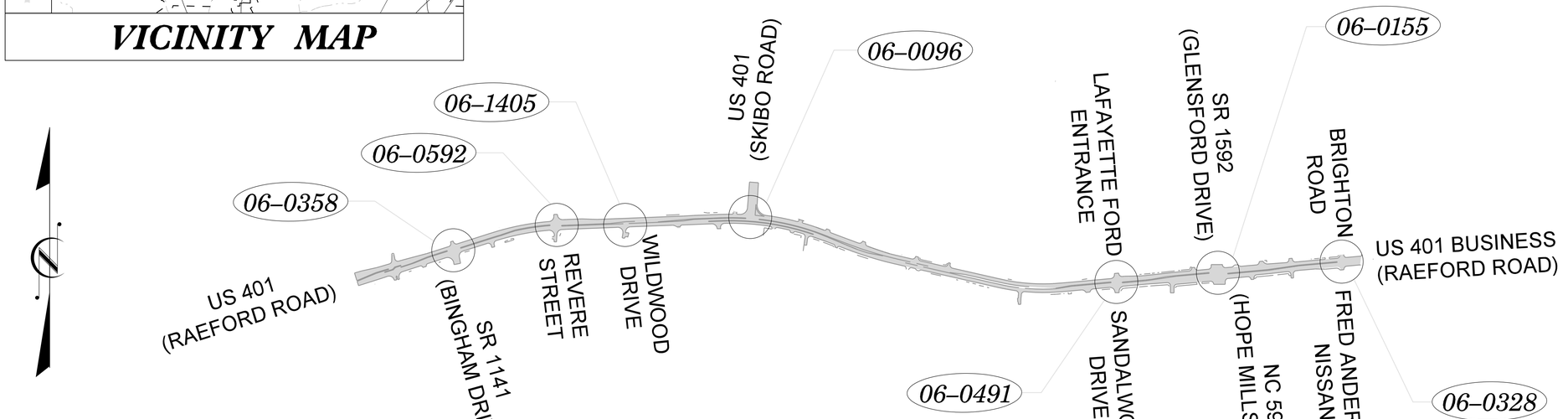
CUMBERLAND COUNTY

LOCATION: FAYETTEVILLE – US 401 (RAEFORD ROAD) FROM EAST OF NC 162 (BUNCE RD) TO EAST OF BRIGHTON RD

TYPE OF WORK: SIGNALS



VICINITY MAP



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

TIP PROJECT: U–4405B

LEGEND

(XX-XXXX) – *SIGNAL INVENTORY NUMBER*

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
Contacts:

Zachary Little, PE
Signals Engineer, Eastern Region

Ryan Hough, PE
Signal Equipment Project Engineer

Plans Prepared for:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

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License No. F-0672

Regina M. Muncey, PE
Senior Traffic Engineer

Jason Galloway, PE
Senior Traffic Engineer

James Hambright
Senior Transportation Technician

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-1.1

INDEX OF SHEETS

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Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NOT TO SCALE

Index of Sheets

Division 6 Cumberland County Fayetteville

PLAN DATE:	October 2022	REVIEWED BY:	E D Harris
PREPARED BY:	D A Waller	REVIEWED BY:	R M Muncey

REVISIONS	INIT.	DATE

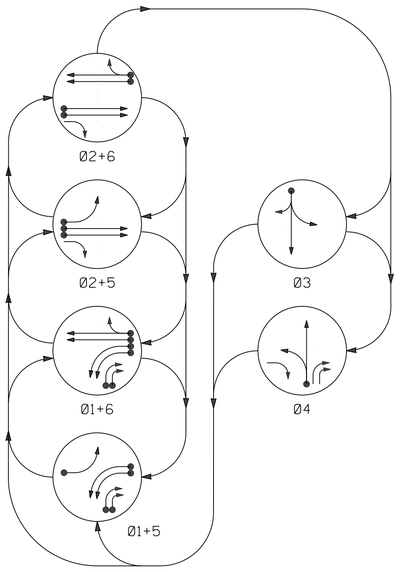
SIGNATURE DATE

SIG. INVENTORY NO.

10/8/2024
9:09:08 AM
U:\Traffic\Signals - U-4405B\Design\Titlesheet\U-4405B_SIG_Index.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

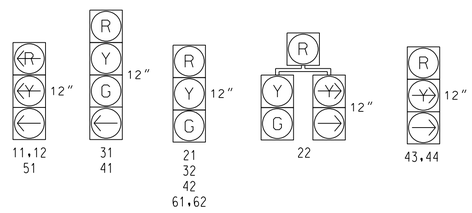
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11, 12	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R
22	R	R	G	G	R	R/→	R
31	R	R	R	R	G/←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G/←	R
42	R	R	R	R	R	G	R
43, 44	→	→	R	R	R	→	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

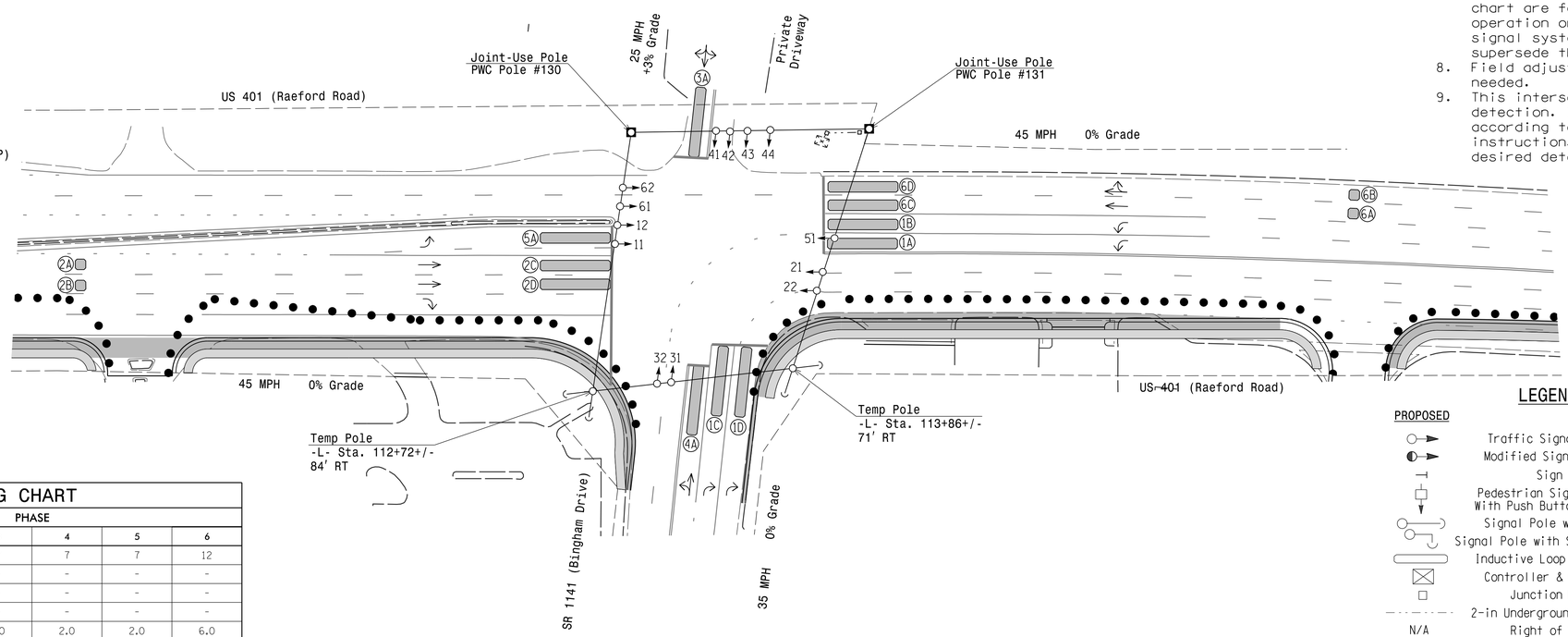
DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	*	1	Yes	-	3	-	N	-	*
1B	6X40	0	*	*	1	Yes	-	-	-	N	-	*
1C	6X40	0	*	*	1	Yes	-	15	-	N	-	*
1D	6X40	0	*	*	1	Yes	-	15	-	N	-	*
2A	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2B	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2C	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
2D	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
3A	6X40	0	*	*	3	Yes	-	5	-	N	-	*
4A	6X40	0	*	*	4	Yes	-	3	-	N	-	*
5A	6X40	0	*	*	5	Yes	-	-	-	N	-	*
6A	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6B	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6C	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
6D	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*

*Video Detection Area

6 Phase
Fully Actuated
Fayetteville Signal System

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. The order of Phase 3 and Phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet foundation so as not to obstruct sight distance of vehicles turning right on red. Relocate existing cabinet and controller onto new foundation.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Field adjust temporary poles as needed.
9. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
○►	Traffic Signal Head	●►
◑►	Modified Signal Head	N/A
⊣	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	→
◎	Metal Strain Pole	◎
▬	Video Detection Area	N/A
▭	Construction Zone	N/A
● ● ●	Drums	N/A

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	50	90	20	25	20	90
Yellow	3.0	4.5	3.1	3.8	3.0	4.5
Red Clear	3.3	1.4	2.6	2.3	2.4	1.4
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	-	-	-	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-	-
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
Temporary Signal Design 1 - TMP Phase I

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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'

US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 029904
ENGINEER
JASON P. GALLOWAY

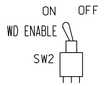
Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0358TI

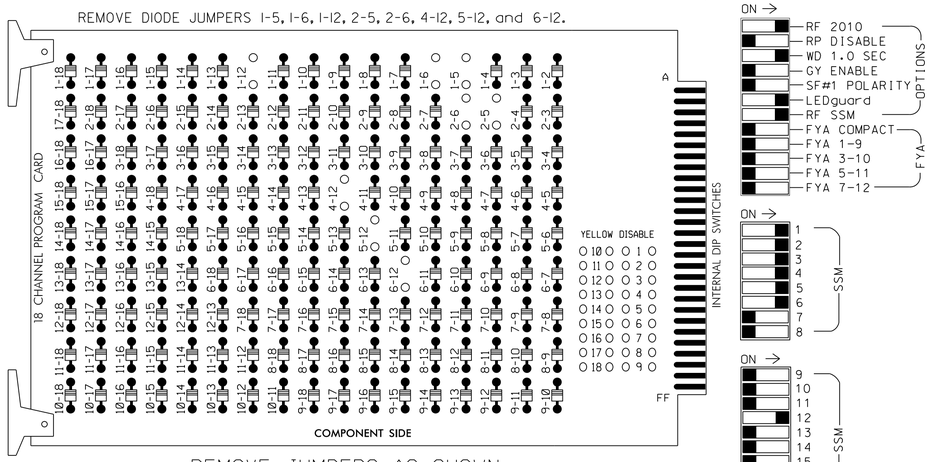
10/8/2024
01:41:56 AM
J:\Signals - U-4405B\Design\Signal Design*Temporary Designs\U-4405B_sig_dsn_06-0358TI.dgn
User:jgalloway

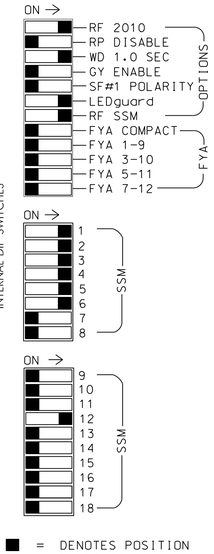
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-12, 2-5, 2-6, 4-12, 5-12, and 6-12.





REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville 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,AUX S5
PHASES USED.....1,2,3,4,5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....*

* See Overlap Programming Detail on this sheet

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-2.1

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	21,22	NU	31	32	41	42	22	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	43,44	NU
RED		128		116	116	101	101				134									A101	
YELLOW		129		117	117	102	102				135										
GREEN		130		118	118	103	103				136										
RED ARROW	125									131											
YELLOW ARROW	126							102		132										A102	
GREEN ARROW	127			118		103		103		133										A103	

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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.

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 Three 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: 06-0358T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 1 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
Signals & Signal Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DOCUSIGN ENVELOPE ID: 1BEDD05F-B021-412E-8B97-DA7023BECC56 DATE

SIG. INVENTORY NO. 06-0358T1

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-2.2

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR         1.0 SECONDS
     LP  SET CIB ON        427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP---------------------------
        1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE     G       G
        A B C D E F G H I J K L M N O P
OVERLAP X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES    Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0358T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 2 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)

Division 6 | Cumberland County | Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

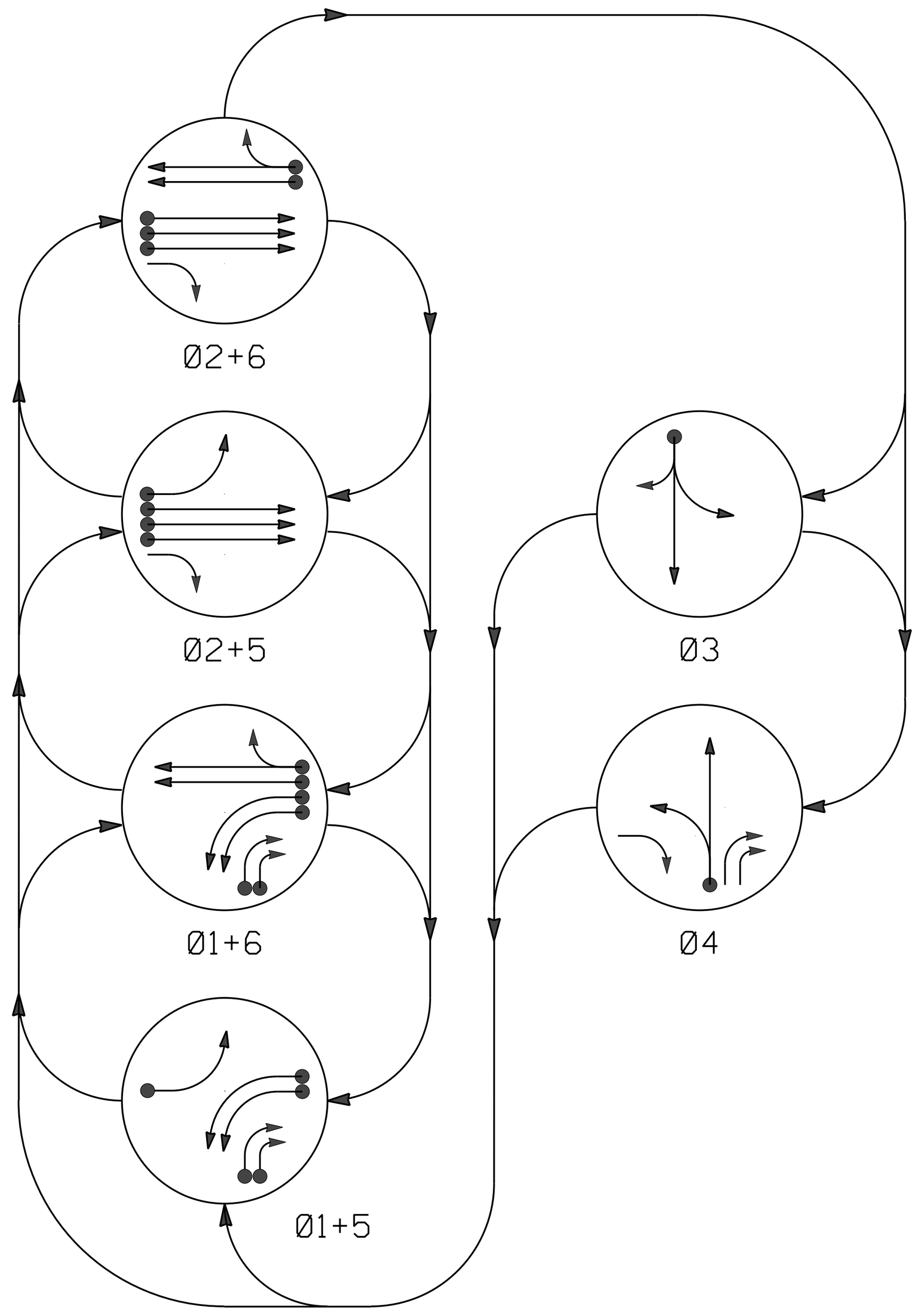
Signed by: Jason Galloway 10/8/2024
10D1E2B40D4B46E
SIGNATURE | DATE

SIG. INVENTORY NO. 06-0358TI

8:42:17 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0358T1.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-3.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

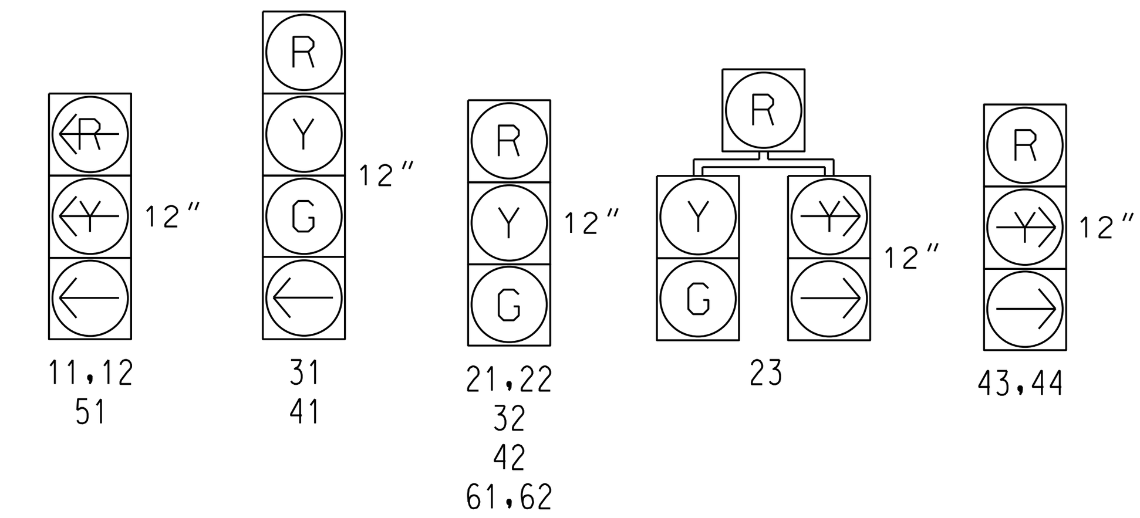
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11,12	←	←	←R	←R	←R	←R	←R
21,22	R	R	G	G	R	R	R
23	R	R	G	G	R	R / →	R
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
43,44	→	→	R	R	R	→	R
51	←	←R	←	←R	←R	←R	←R
61,62	R	G	R	G	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

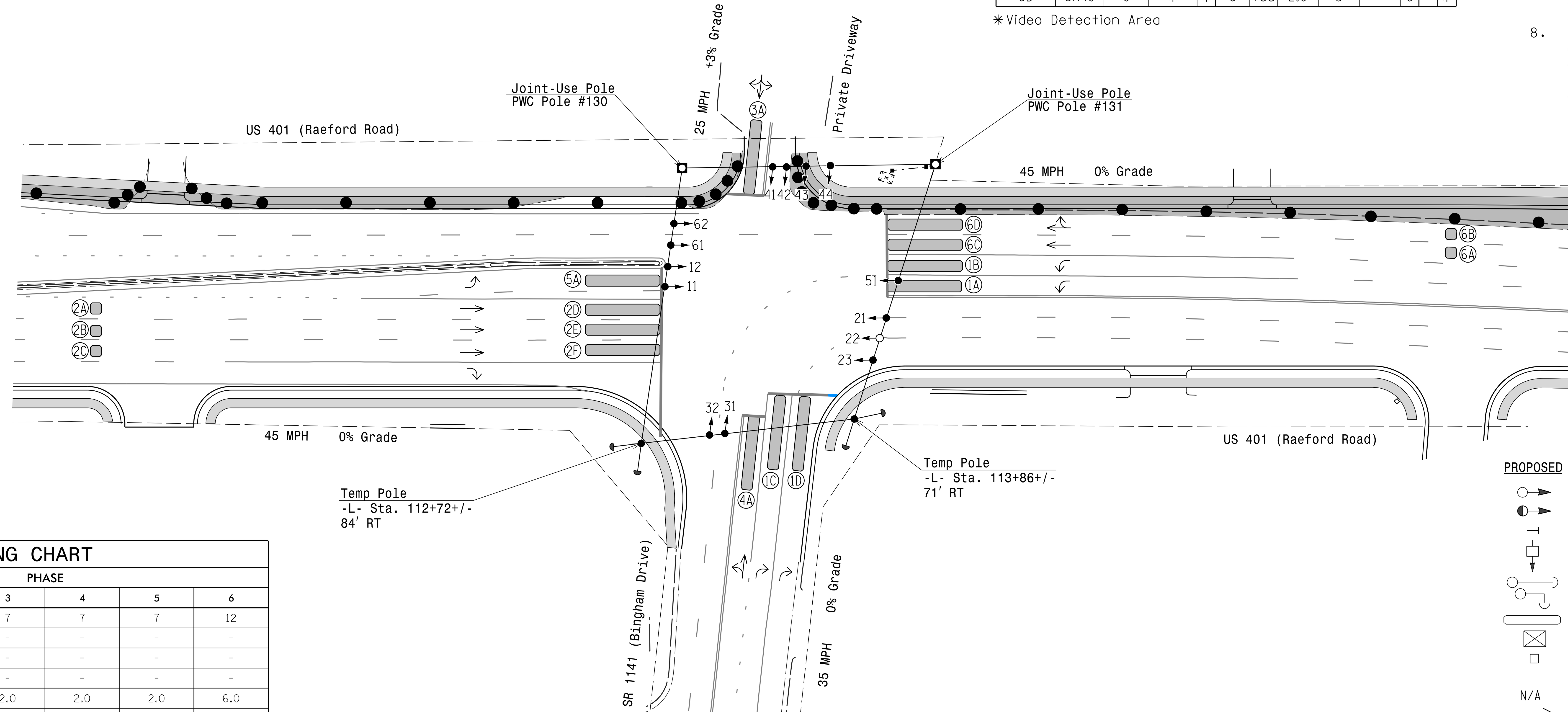
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	*	1	Yes	-	3	-	N	-	*
1B	6X40	0	*	*	1	Yes	-	-	-	N	-	*
1C	6X40	0	*	*	1	Yes	-	15	-	N	-	*
1D	6X40	0	*	*	1	Yes	-	15	-	N	-	*
2A	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2B	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2C	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2D	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
2E	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
2F	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
3A	6X40	0	*	*	3	Yes	-	5	-	N	-	*
4A	6X40	0	*	*	4	Yes	-	3	-	N	-	*
5A	6X40	0	*	*	5	Yes	-	-	-	N	-	*
6A	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6B	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6C	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
6D	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*

*Video Detection Area

6 Phase
Fully Actuated
Fayetteville Signal System

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. The order of Phase 3 and Phase 4 may be reversed.
5. Reposition existing signal head numbered 23.
6. Set all detector units to presence mode.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	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	
	Metal Strain Pole	
	Video Detection Area	N/A
	Construction Zone	N/A
	Drums	N/A

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	50	90	20	25	20	90
Yellow	3.0	4.5	3.1	3.8	3.0	4.5
Red Clear	3.5	1.4	2.9	2.3	2.4	1.4
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	-	-	-	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-	-
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
Temporary Signal Design 2 - TMP Phase II

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Prepared for the Offices of:
Transportation Mobility and Safety Division — Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)

Division 6	Cumberland County	Fayetteville
PLAN DATE: August 2024	REVIEWED BY: J. Galloway, PE	
PREPARED BY: D. Waller, PE	REVIEWED BY: R. Muncey, PE	

REVISIONS	INIT.	DATE

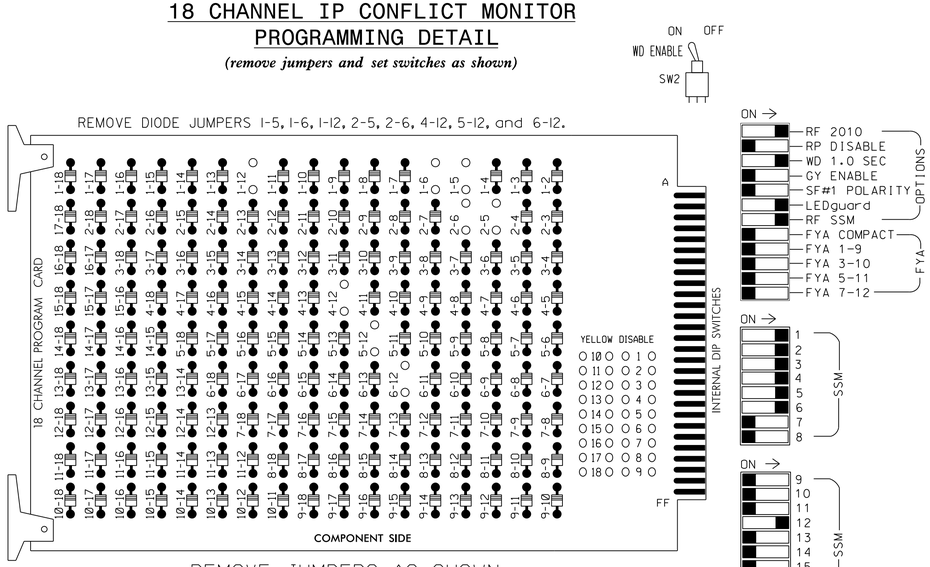
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0358T2

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 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 Fayetteville 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,AUX S5
PHASES USED.....1,2,3,4,5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....*

* See Overlap Programming Detail on this sheet

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-3.1

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	21,22, 23	NU	31	32	41	42	23	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	43,44	NU
RED		128		116	116	101	101				134									A101	
YELLOW		129		117	117	102	102				135										
GREEN		130		118	118	103	103				136										
RED ARROW	125									131											
YELLOW ARROW	126							102		132										A102	
GREEN ARROW	127			118		103		103		133										A103	

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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.

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 Three 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: 06-0358T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 1 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signal Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-0358T2

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash.
Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0358T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 2 of 2

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at
SR 1141 (Bingham Drive)

Division 6 | Cumberland County | Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

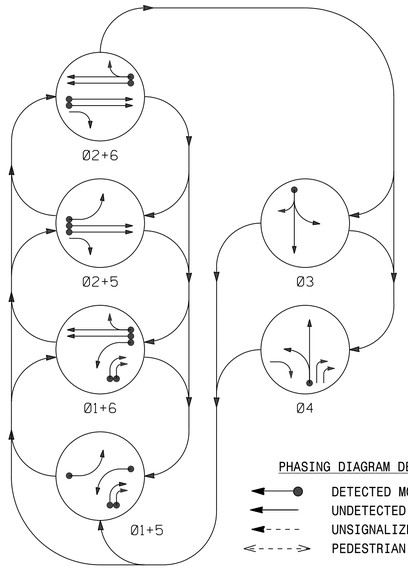
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E...
SIGNATURE | DATE

SIG. INVENTORY NO. 06-0358T2

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-4.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

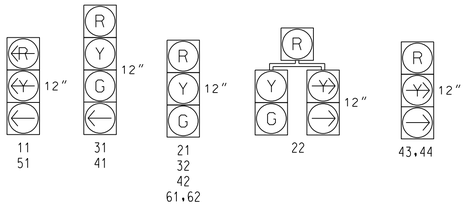
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R
22	R	R	G	G	R	R/→	R
31	R	R	R	R	G/←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G/←	R
42	R	R	R	R	R	G	R
43,44	→	→	R	R	R	→	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

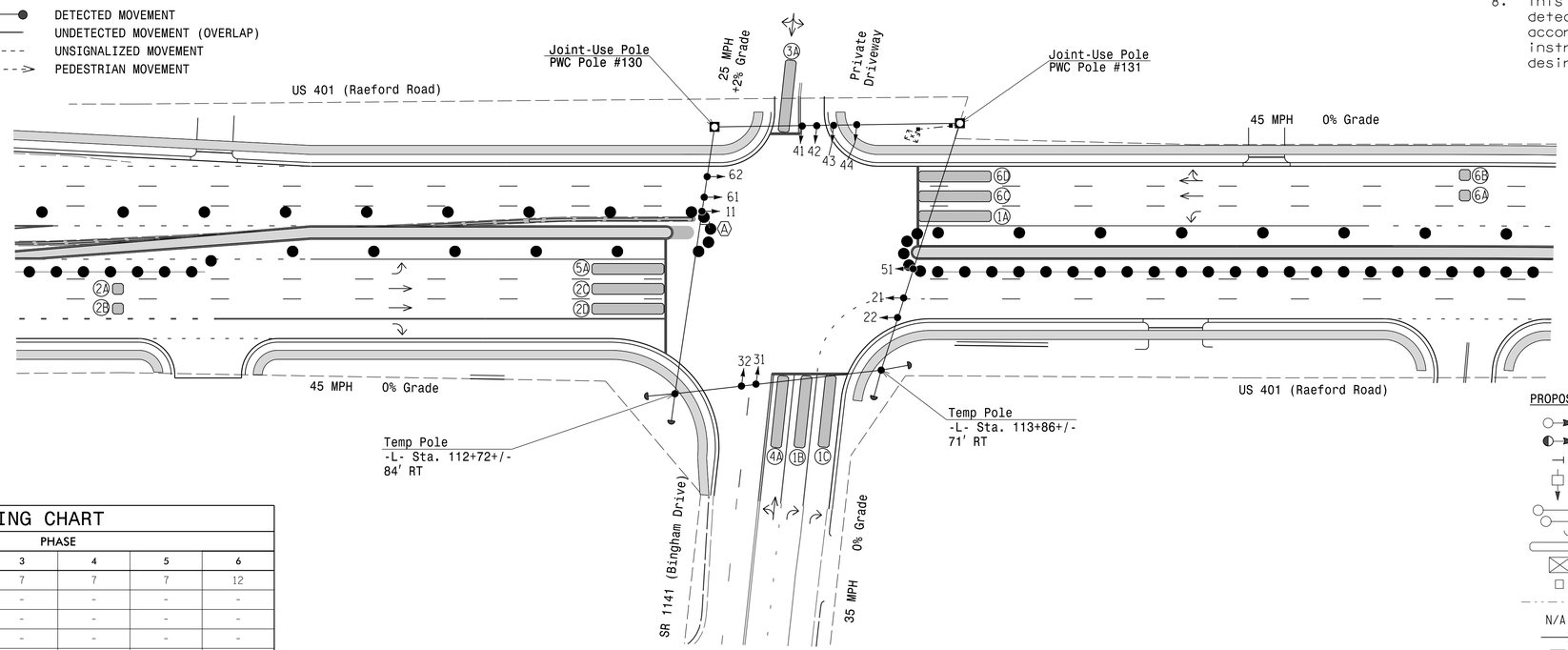
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INTIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	*	1	Yes	-	-	-	N	-	*
1B	6X40	0	*	*	1	Yes	-	15	-	N	-	*
1C	6X40	0	*	*	1	Yes	-	15	-	N	-	*
2A	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2B	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2C	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
2D	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
3A	6X40	0	*	*	3	Yes	-	5	-	N	-	*
4A	6X40	0	*	*	4	Yes	-	3	-	N	-	*
5A	6X40	0	*	*	5	Yes	-	-	-	N	-	*
6A	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6B	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6C	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
6D	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*

* Video Detection Area

6 Phase Fully Actuated Fayetteville Signal System

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. The order of Phase 3 and Phase 4 may be reversed.
5. Reposition existing signal heads numbered 11, 61, and 62.
6. Set all detector units to presence mode.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◯	Metal Strain Pole	■
▬	Video Detection Area	N/A
▭	Construction Zone	N/A
●●●	Drums	N/A
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	50	90	20	25	20	90
Yellow	3.0	4.5	3.1	3.8	3.0	4.5
Red Clear	3.4	1.6	3.1	2.3	3.4	1.6
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	-	-	-	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-	-
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
Temporary Signal Design 3 - TMP Phase III

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Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE 0 40 1"=40'

US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)
Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 029904
ENGINEER
JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
10D1E2B80B4B46E... DATE

SIG. INVENTORY NO. 06-035813

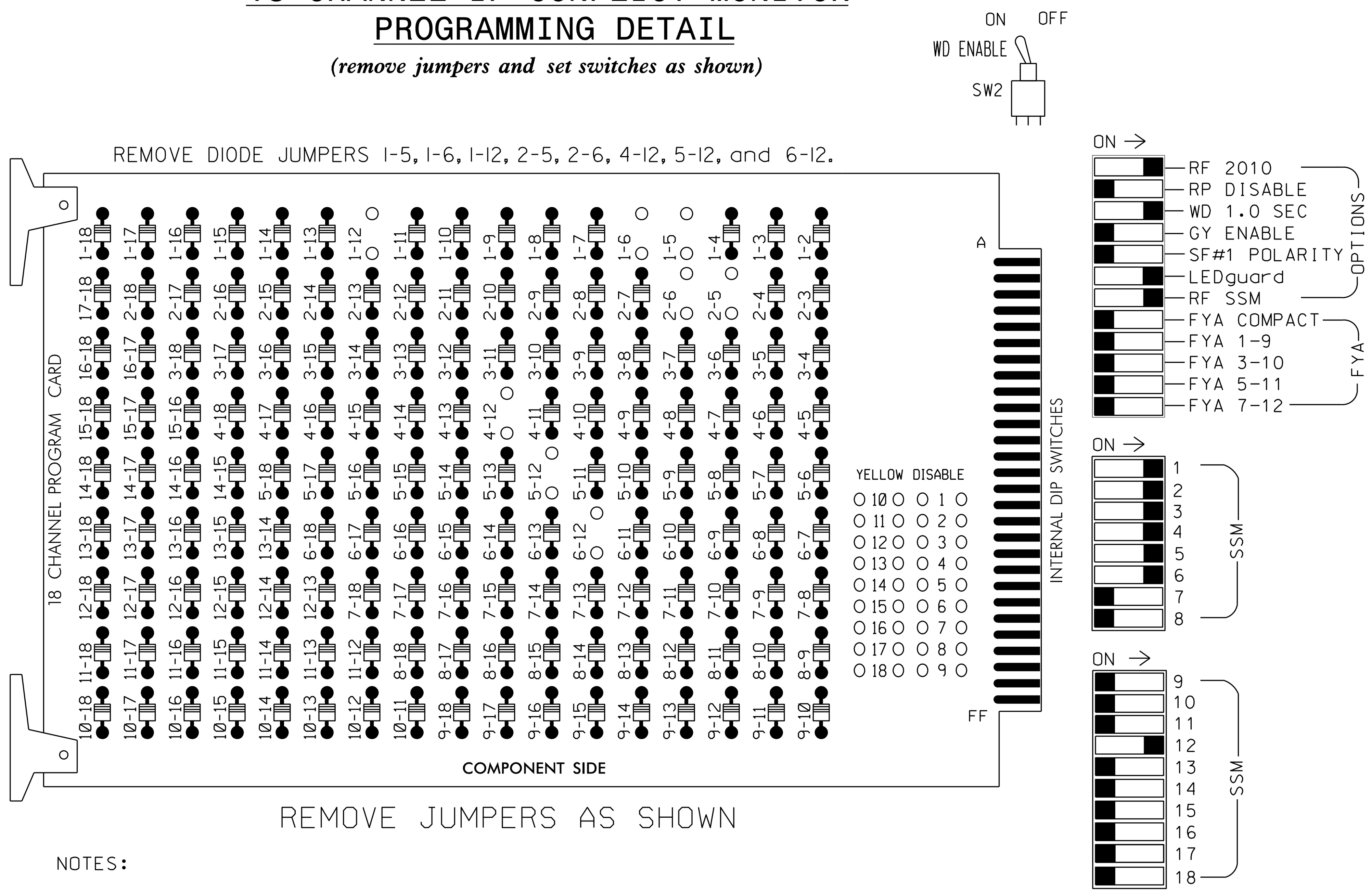
10/8/2024
8:43:09 AM
U:\Traffic\Projects\Signals - U-4405B\Design\Signal Designs\Temporary Designs\U-4405B_sig_dsn_06-035813.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-4.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-12, 2-5, 2-6, 4-12, 5-12, and 6-12.



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 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 Fayetteville 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,AUX S5
PHASES USED.............1,2,3,4,5,6
OVERLAP A...............NOT USED
OVERLAP B...............NOT USED
OVERLAP C...............NOT USED
OVERLAP D...............*

* See Overlap Programming Detail on this sheet

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	31	32	41	42	22	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	43,44	NU
RED		128		116	116	101	101				134									A101	
YELLOW		129		117	117	102	102				135										
GREEN		130		118	118	103	103				136										
RED ARROW	125									131											
YELLOW ARROW	126							102		132										A102	
GREEN ARROW	127			118		103		103		133										A103	

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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.

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 Three 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: 06-0358T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 3 - TMP Phase III
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0358T3

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-4.2

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0358T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 3 - TMP Phase III
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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License No. F-0672

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Mobility and Safety Division, ITS & Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road) at SR 1141 (Bingham Drive)

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 | REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE | REVIEWED BY: J. Galloway, PE

REVISIONS | INIT. | DATE

SEAL: North Carolina Professional Engineer SEAL 029904 Jason P. Galloway

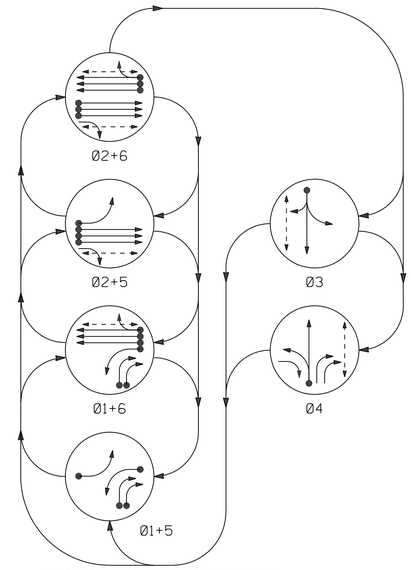
Signed by: Jason Galloway 10/8/2024 DATE

SIG. INVENTORY NO. 06-0358T3

8:43:59 AM U:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0358T3.dgn User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-5.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

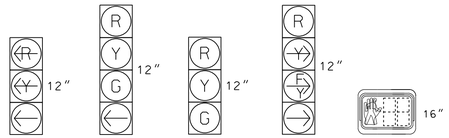
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←R	←R	←R	←R	←R
21,22,23	R	R	G	G	R	R	R
24	R	R	F→	F→	R	→	R→
31	R	R	R	R	G←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G←	R
42	R	R	R	R	R	G	R
43,44	→	→	R	R	R	F→	R
51	←	←R	←	←R	←R	←R	←R
61,62,63	R	G	R	G	R	R	R
P21,P22	DW	DW	W	W	DW	DW	DRK
P31,P32	DW	DW	DW	DW	W	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



11, 51 | 31, 41 | 21,22,23, 32, 42, 61,62,63 | 24, 43,44 | P21,P22, P31,P32, P41,P42, P61,P62

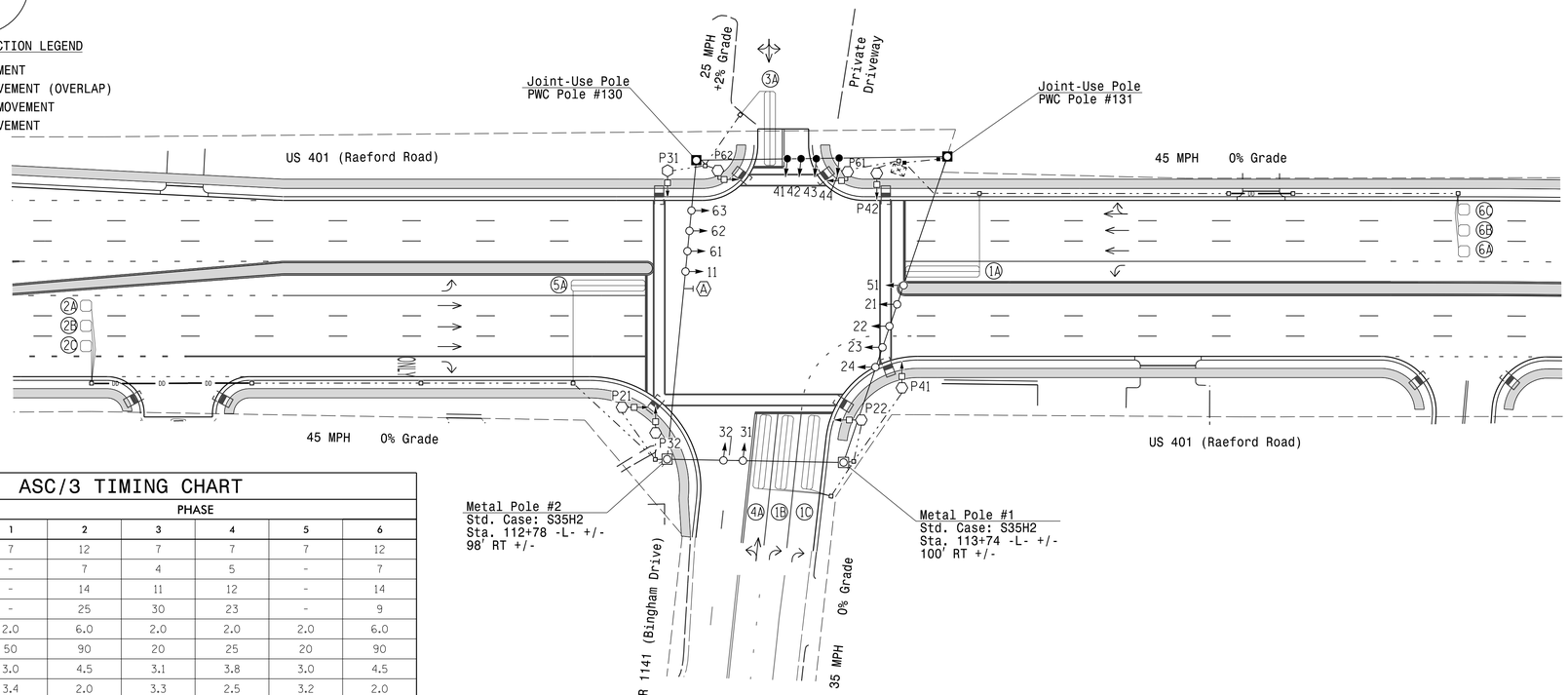
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR 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	X	1	Yes	-	-	-	N	-	X
1B	6X40	0	2-4-2	X	1	Yes	-	15	-	N	-	X
1C	6X40	0	2-4-2	X	1	Yes	-	15	-	N	-	X
2A	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2C	6X6	300	5	X	2	Yes	-	-	X	N	-	X
3A	6X40	0	2-4-2	X	3	Yes	-	5	-	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	3	-	N	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	-	-	N	-	X
6A	6X6	300	4	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	4	X	6	Yes	-	-	X	N	-	X
6C	6X6	300	4	X	6	Yes	-	-	X	N	-	X

6 Phase
Fully Actuated
Fayetteville Signal System

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. The order of Phase 3 and Phase 4 may be reversed.
5. Set all detector units to presence mode.
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. 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	3	4	5	6
Min Green *	7	12	7	7	7	12
Delayed Green	-	7	4	5	-	7
Walk *	-	14	11	12	-	14
Ped Clear	-	25	30	23	-	9
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	50	90	20	25	20	90
Yellow	3.0	4.5	3.1	3.8	3.0	4.5
Red Clear	3.4	2.0	3.3	2.5	3.2	2.0
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5
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	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	●→
◐→	Modified Signal Head	N/A
⊣	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	→
⊡	Metal Strain Pole	■
⬡	Type II Signal Pedestal	⬢
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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State Design Section
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US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

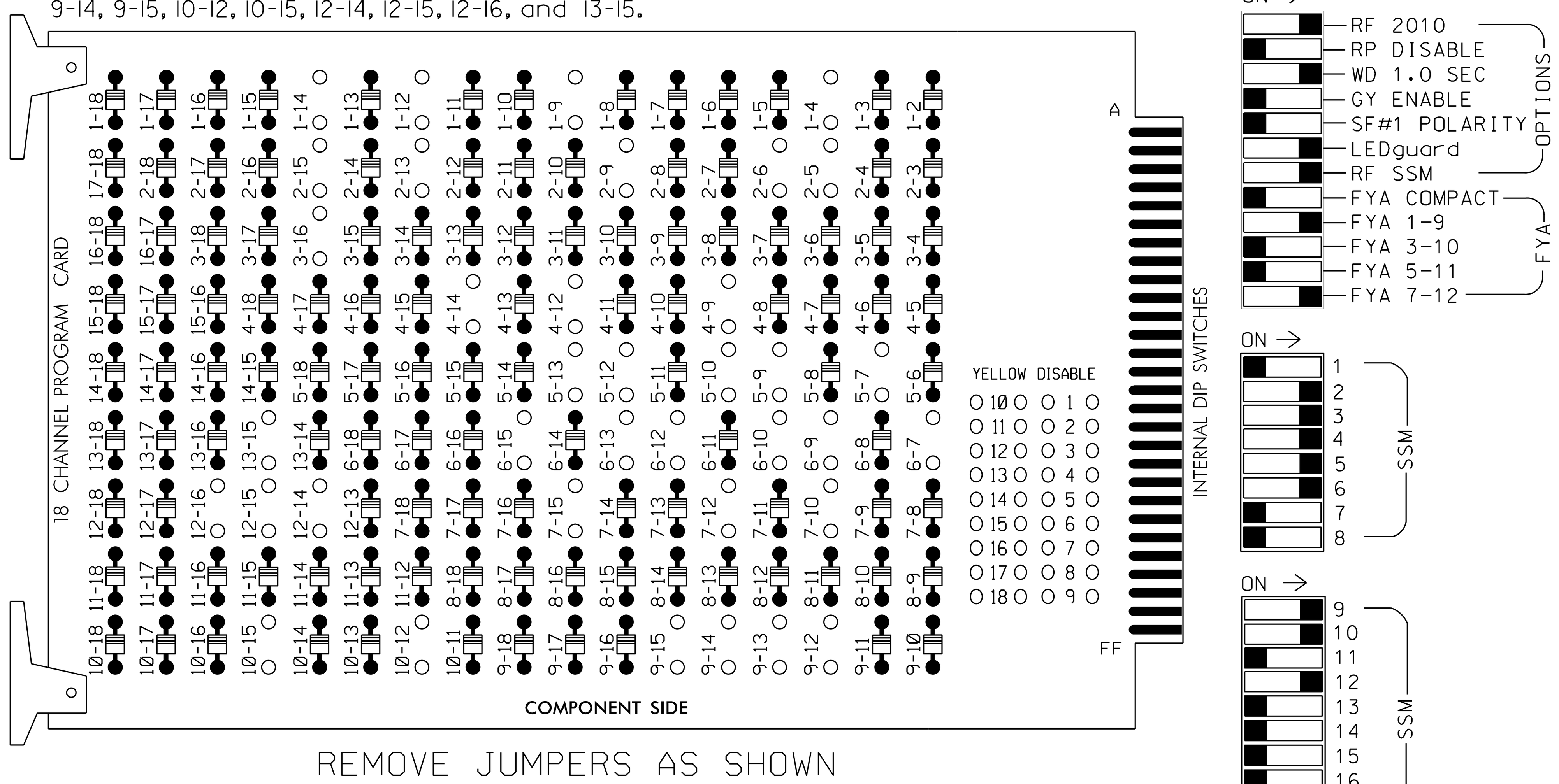
Signed by: Jason Galloway 10/8/2024
100E12B4084B46E... DATE

SIG. INVENTORY NO. 06-0358

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-4, 1-9, 1-12, 1-14, 2-5, 2-6, 2-9, 2-13, 2-15, 3-16, 4-9, 4-12, 4-14, 5-7, 5-9, 5-10, 5-12, 5-13, 6-7, 6-9, 6-10, 6-12, 6-13, 6-15, 7-10, 7-12, 7-15, 9-12, 9-13, 9-14, 9-15, 10-12, 10-15, 12-14, 12-15, 12-16, and 13-15.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville 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, S4, S5, S6, S7, S8, S9, S10, S12, AUX S1, AUX S2, AUX S5
PHASES USED.............1, 2, 2PED, 3, 3PED, 4, 4PED, 5, 6, 6PED
OVERLAP A...............*
OVERLAP B...............*
OVERLAP C...............NOT USED
OVERLAP D...............*
OVERLAP G...............*
OVERLAP H...............*

* 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	OLG	2	2 PED	3		4		4 PED	5	6	6 PED	OLH	8	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	24★	21,22, 23	P21, P22	31	32	41	42	P41, P42	51	61,62, 63	P61, P62	43,44★	NU	P31, P32	24★	11	NU	NU	43,44★	NU
RED		128		116	116	101	101			134					A121				A101	
YELLOW	*	129		117	117	102	102			135		*								
GREEN		130		118	118	103	103			136										
RED ARROW									131							A124				
YELLOW ARROW									132						A122	A125			A102	
FLASHING YELLOW ARROW															A123				A103	
GREEN ARROW	127			118		103			133			124				A126				
✋			113					104			119			110						
🚶			115					106			121			112						

NU = Not Used

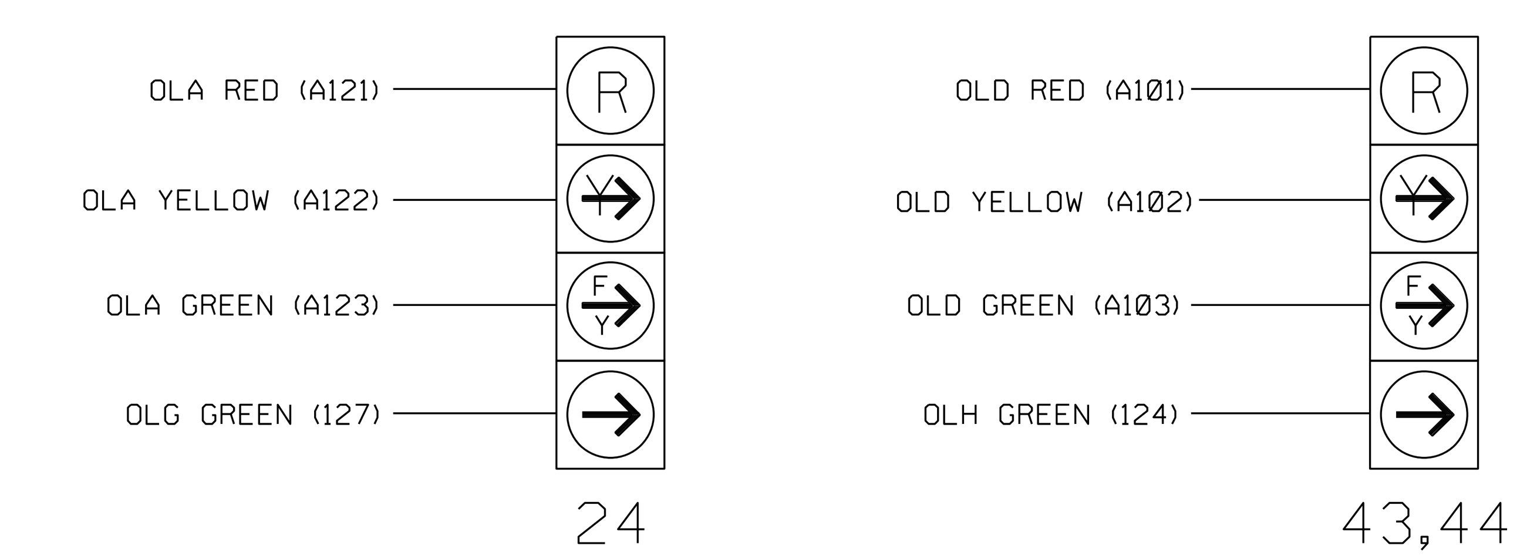
* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

NOTE: Output functions for load switch S1 and S10 have been reassigned. See sheet 2 for details.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1B	Ø 1 1A	Ø 2 2B	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	Ø 1 1C	Ø 2 2A	Ø 2 2C		NOT USED	NOT USED						Ø4 PED DC ISOLATOR	Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 6 6B	NOT USED											

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	TB2-5,6	I2U	39	2	1	YES				N
1B	TB2-1,2	I1U	56	1	1	YES		15		N
1C	TB2-3,4	I1L	56	1	1	YES		15		N
2A	TB2-7,8	I2L	43	12	2	YES			X	N
2B	TB2-9,10	I3U	63	32	2	YES			X	N
2C	TB2-11,12	I3L	76	42	2	YES			X	N
3A	TB4-5,6	I5U	58	3	3	YES		5		N
4A	TB4-9,10	I6U	41	4	4	YES		3		N
5A	TB3-1,2	J1U	55	5	5	YES				N
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
6C	TB3-9,10	J3U	64	36	6	YES			X	N
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 I12 AND I13.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

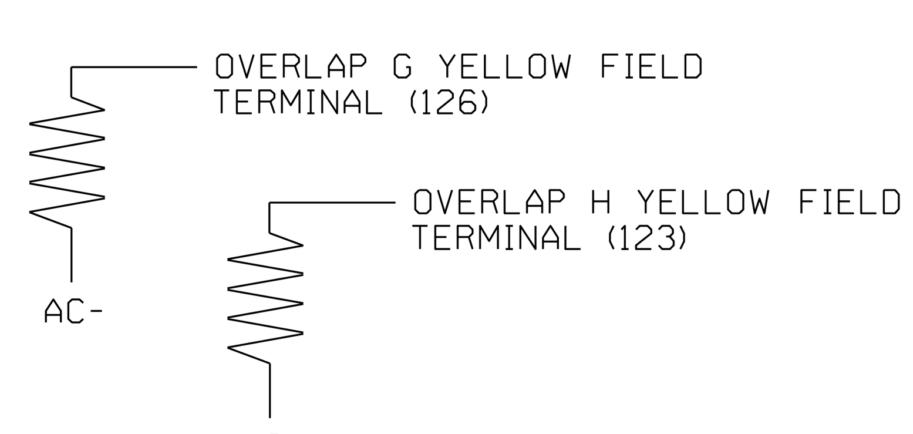
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0358
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

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)



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.

Final Design
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E...
SIGNATURE DATE

SIG. INVENTORY NO. 06-0358

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                    331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP---------------------------
        1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE     G       G
        A B C D E F G H I J K L M N O P
OVERLAP X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

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 to 'Overlap G'

OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

```
TMG VEH OVLP...[G] TYPE: .......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . X . . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

Toggle Once

OVERLAP H

Select TMG VEH OVLP [H] and 'NORMAL'

```
TMG VEH OVLP...[H] TYPE: .......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED X . . . . . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

Toggle to 'Overlap A'

OVERLAP A

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

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

PROTECTED LEFT TURN....    OVERLAP  G
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 'NORMAL'

```
TMG VEH OVLP...[B] TYPE: .......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED X . . . . . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

Toggle Twice

OVERLAP D

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

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

PROTECTED LEFT TURN....    OVERLAP  H
OPPOSING THROUGH.......    PHASE    4

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 INSURE 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.

ECONOLITE ASC/3-2070 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      7     O   . . . +  A   R   X
2      2     V   . . . +  A   R   .
3      3     V   . . . +  A   R   X
4      4     V   . . . +  A   R   .
5      5     V   . . . -  A   R   .
6      6     V   . . . -  A   R   X
7      8     O   . . . -  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 OVERLAP G ASSIGNED TO LD SWITCH 1

NOTICE OVERLAP H ASSIGNED TO LD SWITCH 7

NOTICE PHASE 3 PED ASSIGNED TO LD SWITCH 16

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0358
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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License No. F-0672

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division — ITS & Signals Management Section — State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road)
at
SR 1141 (Bingham Drive)

Division 6	Cumberland County	Fayetteville	
PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

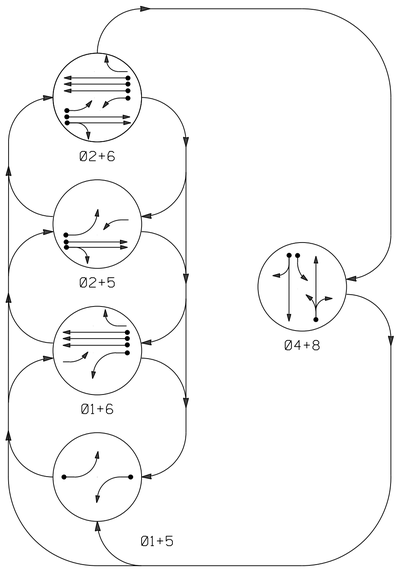
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway — 10D1E2B40B4B46E — SIGNATURE — 10/8/2024 DATE

SIG. INVENTORY NO. 06-0358

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-6.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

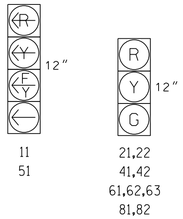
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 4 + 8	FLASH
11	←	←	F Y	F Y	R	R
21,22	R	R	G	G	R	R
41,42	R	R	R	R	G	R
51	←	F Y	←	F Y	R	R
61,62,63	R	G	R	G	R	R
81,82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

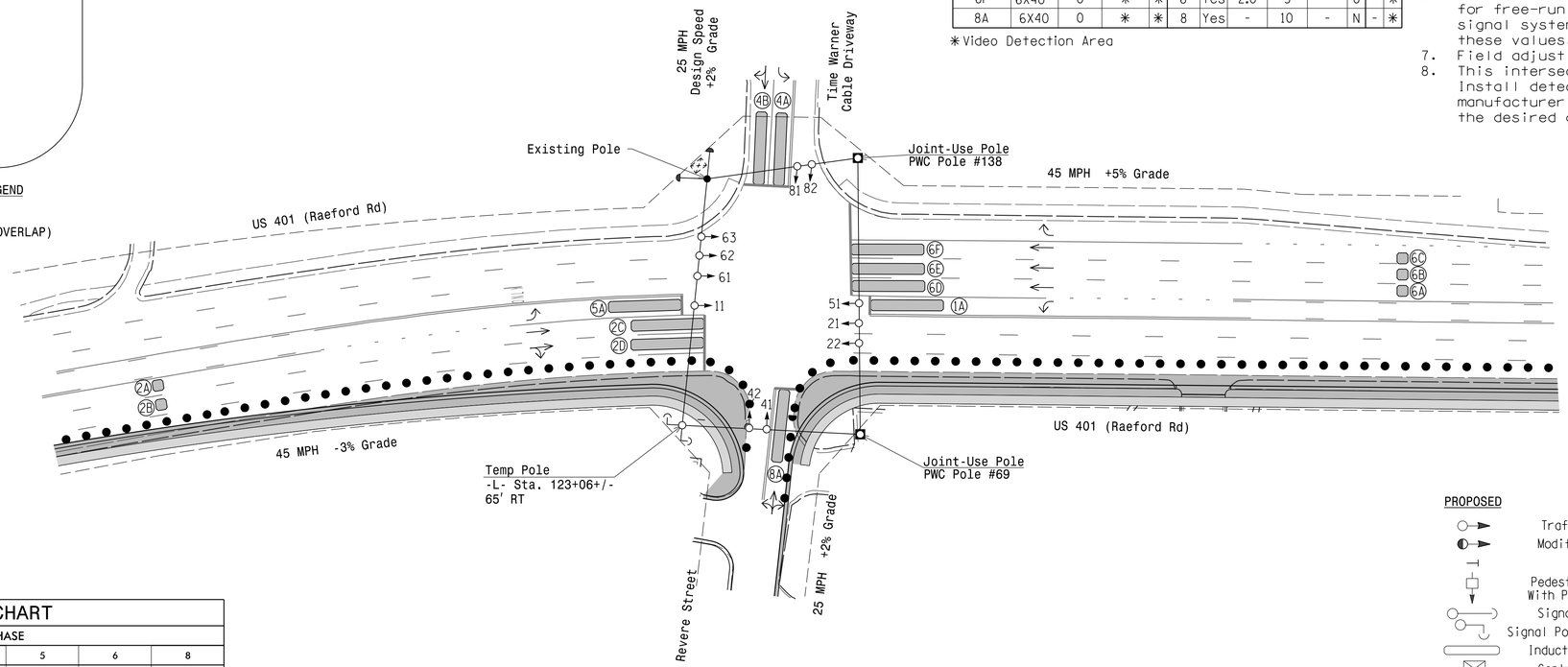
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	✳	✳	1	Yes	-	15	-	N	-	✳
					6	Yes	-	3	-	G	-	✳
2A	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2B	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2C	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
2D	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
4A	6X40	0	✳	✳	4	Yes	-	3	-	N	-	✳
4B	6X40	0	✳	✳	4	Yes	-	10	-	N	-	✳
5A	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
					2	Yes	-	3	-	G	-	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6C	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6E	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6F	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
8A	6X40	0	✳	✳	8	Yes	-	10	-	N	-	✳

✳ Video Detection Area

5 Phase
Fully Actuated
Fayetteville Signal System

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 foundation so as not to obstruct sight distance of vehicles turning right on red. Relocate existing cabinet and controller onto new foundation.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Field adjust temporary poles as needed.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◙	Metal Strain Pole	◙
▬	Construction Zone	N/A
▬	Video Detection Area	N/A
● ● ●	Drums	N/A

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow	3.0	4.8	3.1	3.0	4.8	3.1
Red Clear	2.3	1.2	2.6	2.8	1.2	2.6
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	-	-	-	-	-
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
Temporary Design 1 - TMP Phase I

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at
Revere Street/
Time Warner Cable Driveway

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

SCALE: 0 40 — 1"=40'

REVISIONS	INIT.	DATE

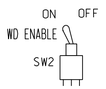
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
100E2B4D4B46E...
DATE

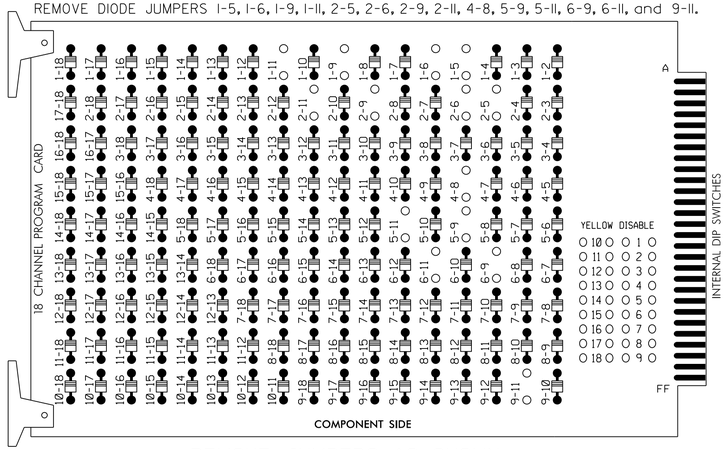
SIG. INVENTORY NO. 06-0592TI

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

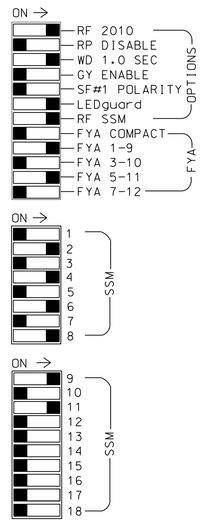
(remove jumpers and set switches as shown)



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



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville Signal System.

EQUIPMENT INFORMATION

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

* See Overlap Programming Detail on Sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-6.1

SIGNAL HEAD HOOK-UP CHART

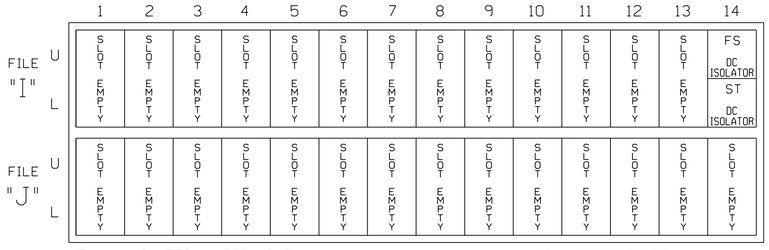
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 ★	21,22	NU	NU	41,42	NU	51 ★	61,62, 63	NU	NU	81,82	NU	11 ★	NU	NU	51 ★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)

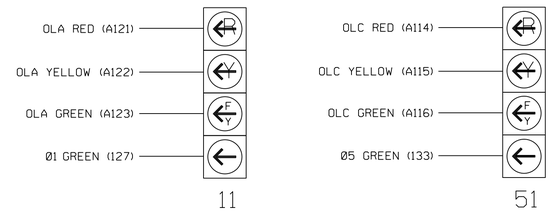


EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

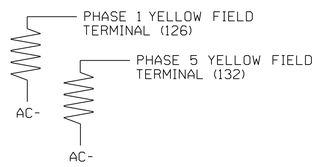


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0592T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

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)



DETECTOR NOTES

1. For all loops 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.

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 1 of 2

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NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals & Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401 (Raeford Road)
at
Revere Street/
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Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY
Signed by: Jason Galloway 10/8/2024
DOCUSIGNED BY: DATE
SIG. INVENTORY NO. 06-0592T1

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-6.2

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

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to address Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 8. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 2. LOGIC STATEMENTS

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 5. START/FLASH

```
START/FLASH DATA
------START UP---------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD→ YES    Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0592T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 2 of 2

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US 401 (Raeford Road)
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Division 6 | Cumberland County | Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

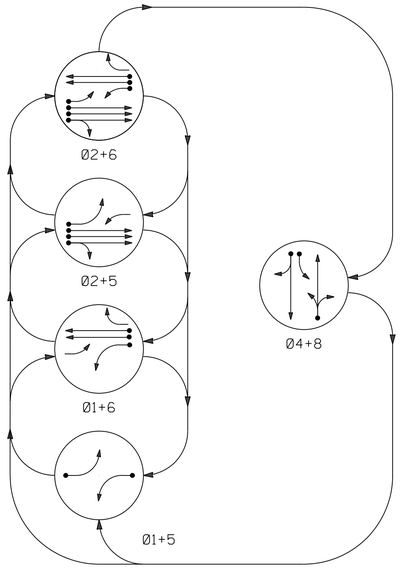
Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0592T1

8:44:45 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0592T1.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-7.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

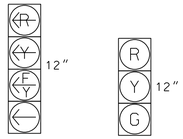
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 4 + 8	FLASH
11	←-	←-	←-	←-	←R	←R
21,22	R	R	G	G	R	R
41,42	R	R	R	R	G	R
51	←-	←-	←	←-	←R	←R
61,62	R	G	R	G	R	R
81,82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



11
51

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

ASC/3 DETECTOR INSTALLATION CHART

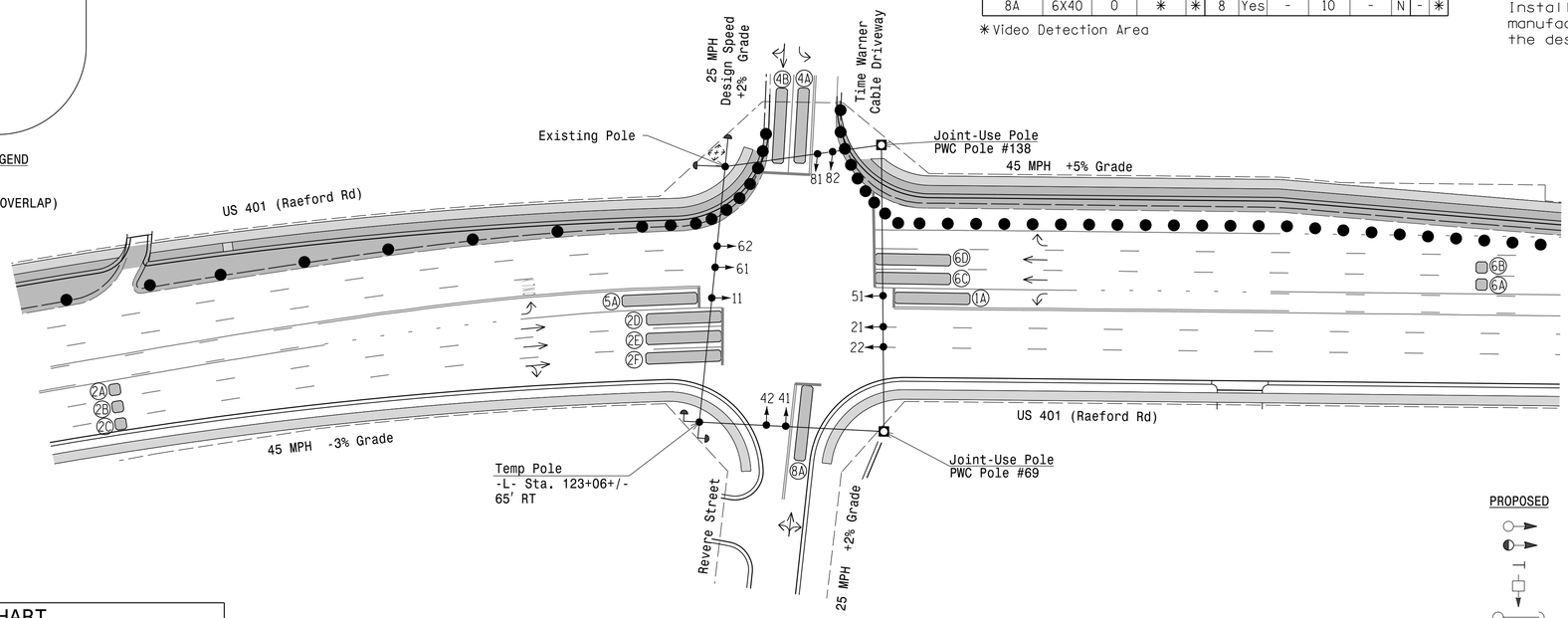
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	✳	✳	1	Yes	-	15	-	N	-	✳
					6	Yes	-	3	-	G	-	✳
2A	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2B	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2C	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2D	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
2E	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
2F	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
4A	6X40	0	✳	✳	4	Yes	-	3	-	N	-	✳
4B	6X40	0	✳	✳	4	Yes	-	10	-	N	-	✳
5A	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
					2	Yes	-	3	-	G	-	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6C	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
8A	6X40	0	✳	✳	8	Yes	-	10	-	N	-	✳

✳ Video Detection Area

5 Phase
Fully Actuated
Fayetteville Signal System

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. Reposition existing signal heads numbered 21 and 22.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	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	
	Metal Strain Pole	
	Construction Zone	N/A
	Video Detection Area	N/A
	Drums	N/A

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow	3.0	4.8	3.1	3.0	4.8	3.1
Red Clear	2.4	1.3	2.9	2.6	1.3	2.9
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	-	-	-	-	-
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
Temporary Design 2 - TMP Phase II

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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'

US 401 (Raeford Road)
at
Revere Street/
Time Warner Cable Driveway
Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 029904
ENGINEER
JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
100E2B40B4B46E...
DATE

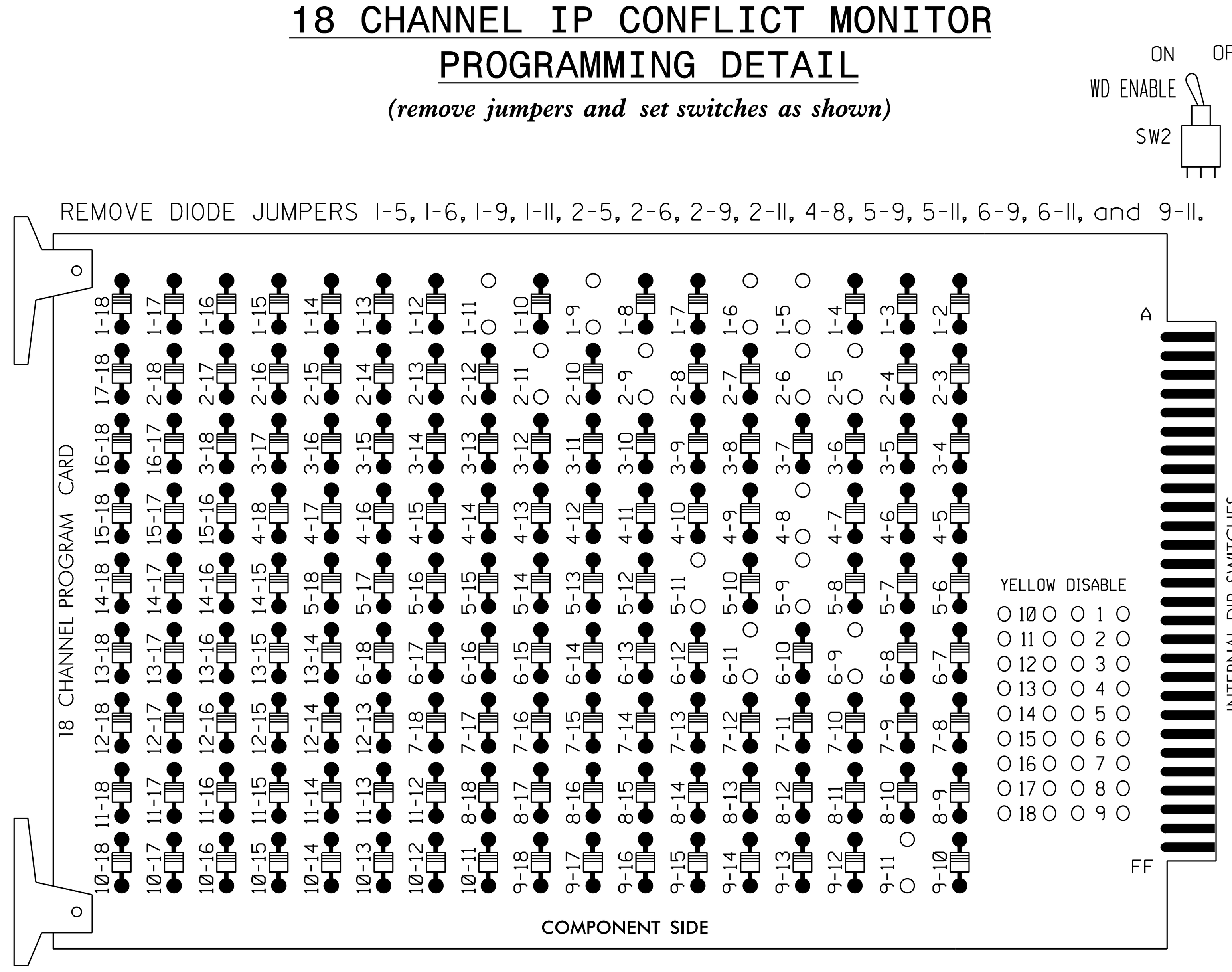
SIG. INVENTORY NO. 06-0592T2

10/8/2024
8:45:00 AM
N:\Traffic\Projects\Signals - U-4405B\Design\Signal Designs\Temporary Designs\U-4405B_sig_dsn_06-0592T2.dgn
User:jgalloway

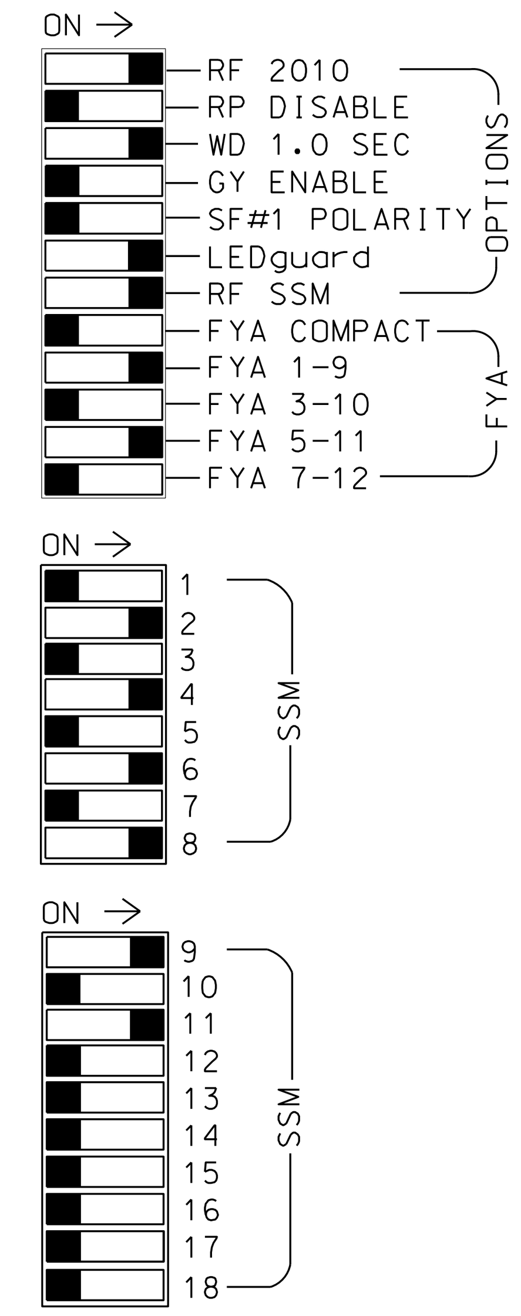
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville Signal System.

EQUIPMENT INFORMATION

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

* See Overlap Programming Detail on Sheet 2

SIGNAL HEAD HOOK-UP CHART

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

NU = Not Used

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

★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)

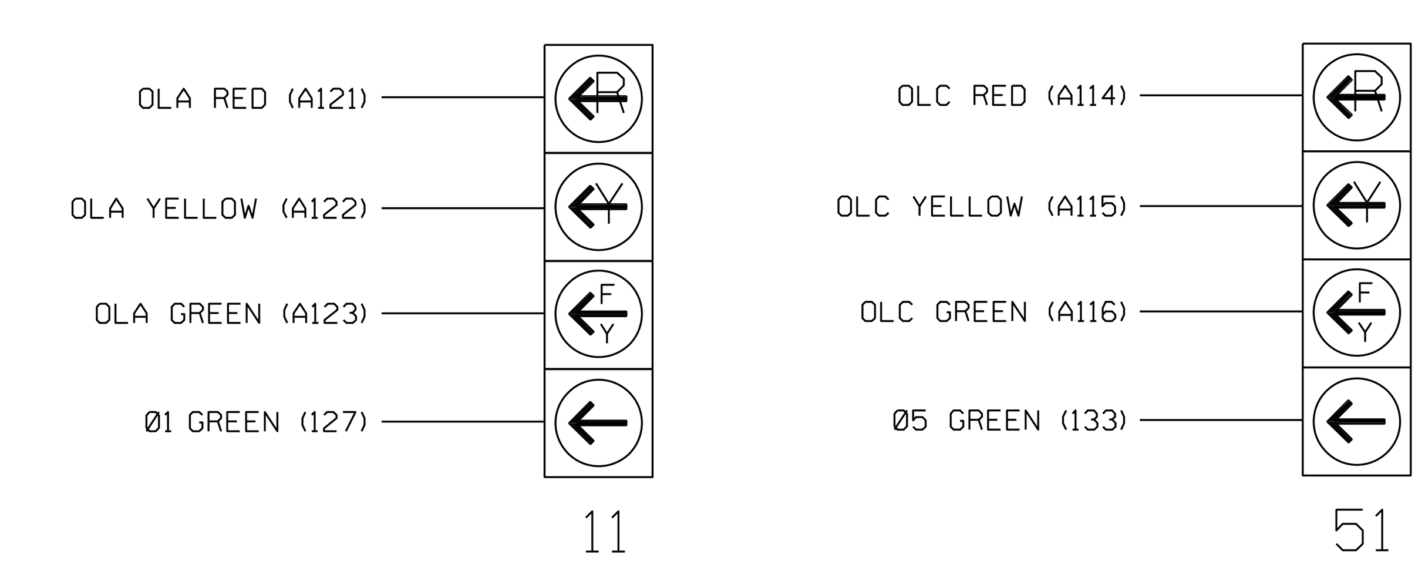
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

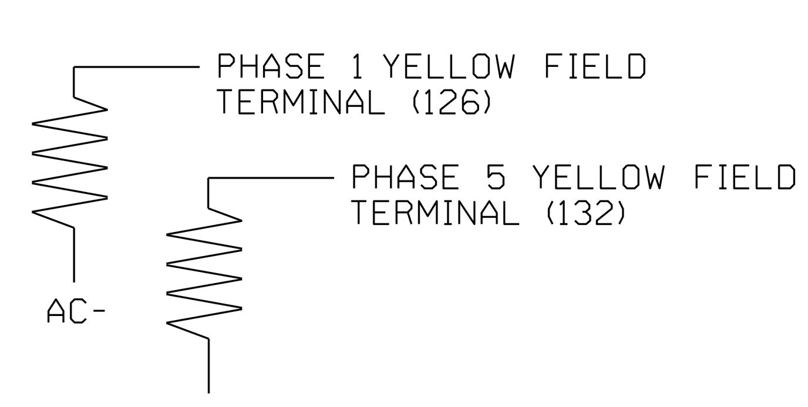


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0592T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

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)



DETECTOR NOTES

1. For all loops 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.

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 1 of 2

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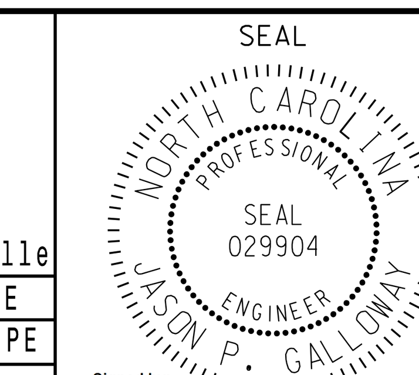
ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared for the Offices of:
Transportation Mobility and Safety Division — ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road)
at
Revere Street/
Time Warner Cable Driveway

Division 6	Cumberland County	Fayetteville
PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE	
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE	

REVISIONS	INIT.	DATE

SEAL


Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-0592T2

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

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR         1.0 SECONDS
     LP  SET CIB ON        427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP---------------------------
        1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE     G       G
        A B C D E F G H I J K L M N O P
OVERLAP X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD→ YES    Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0592T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 2 of 2

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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E
SIGNATURE DATE

SIG. INVENTORY NO. 06-0592T2

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-8.0

PHASING DIAGRAM

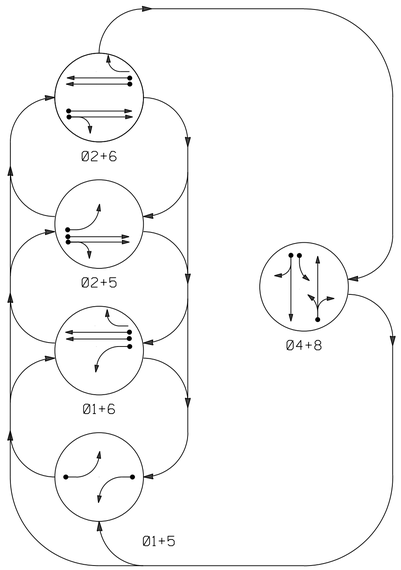
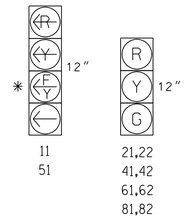


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~←~~	~~←~~	~~←~~	~~←~~
21,22	R	R	G	G	R	R
41,42	R	R	R	R	G	R
51	←	~~←~~	←	~~←~~	~~←~~	~~←~~
61,62	R	G	R	G	R	R
81,82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



✳ Disconnect FYA wiring on signalheads 11 and 51.

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	TYPE NEW CARD
1A	6X40	0	✳	✳	1	Yes	-	-	-	N -	✳
2A	6X6	300	✳	✳	2	Yes	-	-	-	N -	✳
2B	6X6	300	✳	✳	2	Yes	-	-	-	N -	✳
2C	6X40	0	✳	✳	2	Yes	2.0	5	-	G -	✳
2D	6X40	0	✳	✳	2	Yes	2.0	5	-	G -	✳
4A	6X40	0	✳	✳	4	Yes	-	3	-	N -	✳
4B	6X40	0	✳	✳	4	Yes	-	10	-	N -	✳
5A	6X40	0	✳	✳	5	Yes	-	-	-	N -	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N -	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N -	✳
6C	6X40	0	✳	✳	6	Yes	2.0	5	-	G -	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G -	✳
8A	6X40	0	✳	✳	8	Yes	-	10	-	N -	✳

✳ Video Detection Area

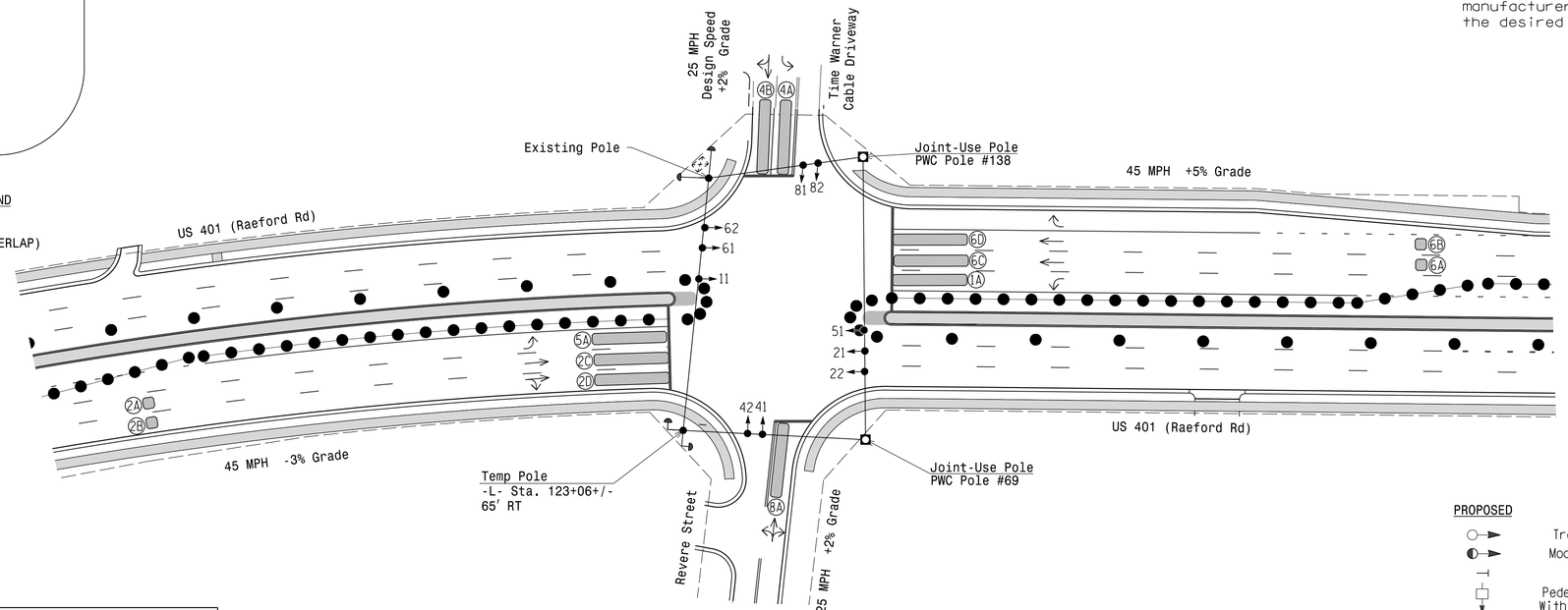
5 Phase
Fully Actuated
Fayetteville Signal System

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. Reposition existing signal heads numbered 11, 21, 22, 51, 61, and 62.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

PHASING DIAGRAM DETECTION LEGEND

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



ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	-	-	7	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow	3.0	4.8	3.1	3.0	4.8	3.1
Red Clear	2.9	1.3	3.1	3.3	1.3	3.1
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	-	-	-	-	-
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	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◎	Metal Strain Pole	◘
▬	Construction Zone	N/A
▬	Video Detection Area	N/A
● ● ●	Drums	N/A

Signal Upgrade
Temporary Design 3 - TMP Phase III

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PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
029904
ENGINEER
JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
100TE2B4084B46E DATE

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10/8/2024
8:45:38 AM
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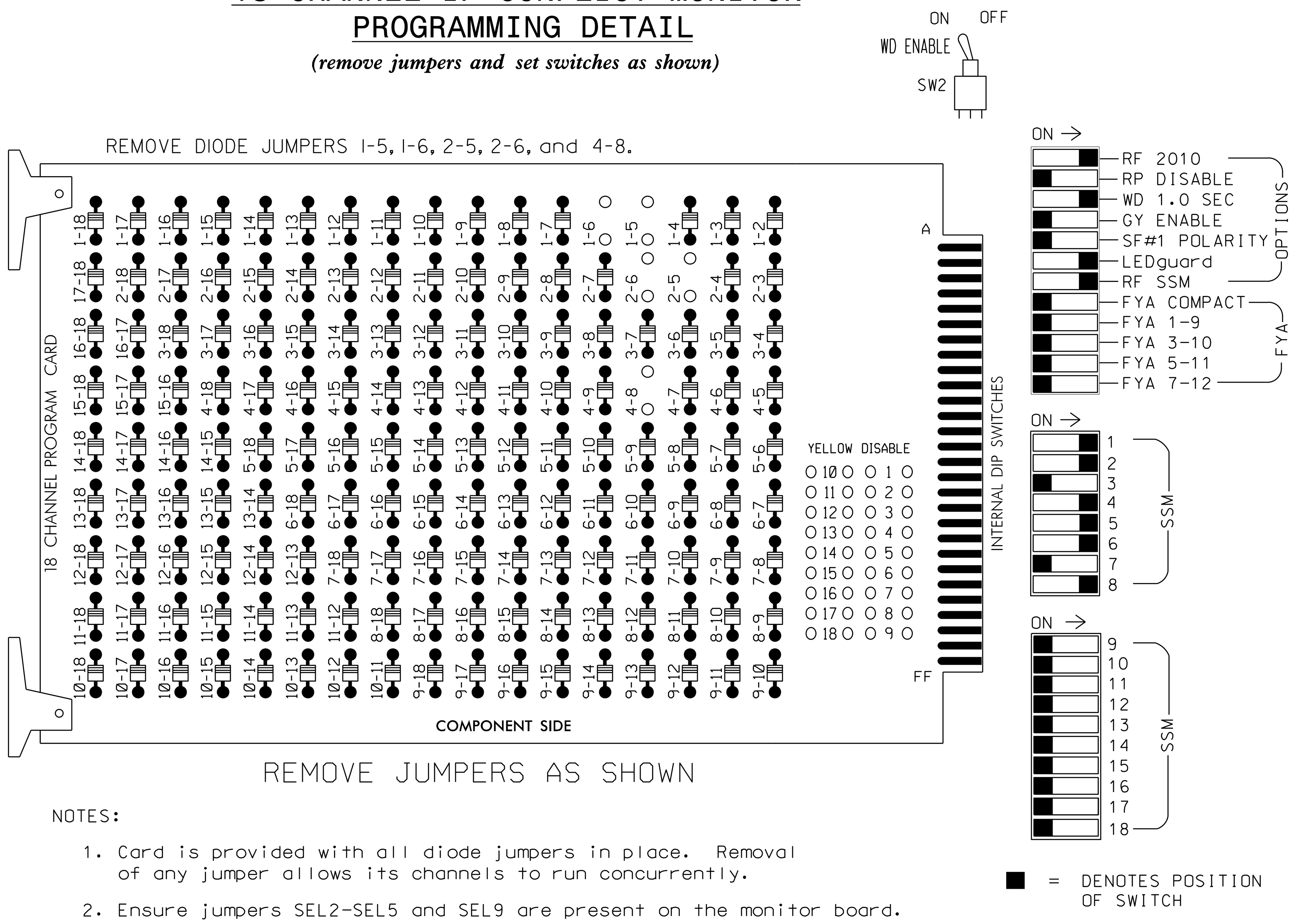
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-8.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Return controller to Factory Defaults before programming per this electrical detail.
3. Program phases 4 and 8 for Dual Entry.
4. Program controller to start up in phase 2 Green and 6 Green.
5. The cabinet and controller are part of the Fayetteville Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 ★	21,22	NU	NU	41,42	NU	51 ★	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	125						131											
YELLOW ARROW	126						132											
GREEN ARROW	127						133											

NU = Not Used

★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)

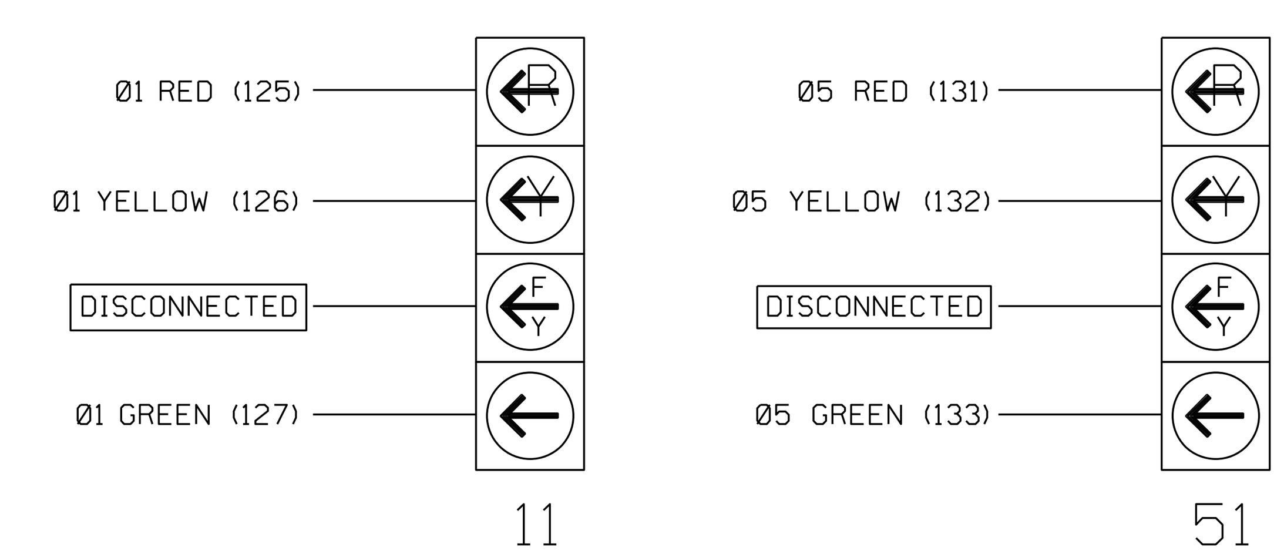
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

SIGNAL WIRING DETAIL

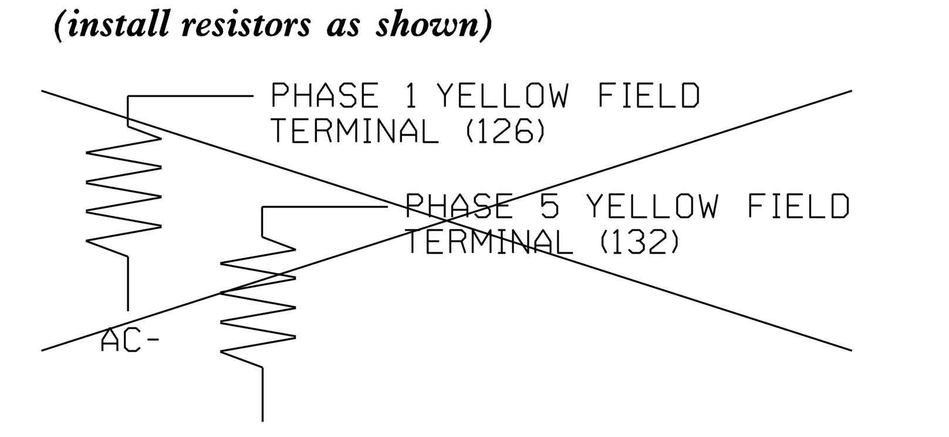
(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0592T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

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)

IMPORTANT! Remove resistors from field terminals as shown above, if present.

DETECTOR NOTES

1. For all loops 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.

Temporary Design 3 - TMP Phase III
Electrical Detail - Sheet 1 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared for the Offices of:
Transportation Mobility and Safety Division — ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road)
at
Revere Street/
Time Warner Cable Driveway

Division 6	Cumberland County	Fayetteville
PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE	
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE	
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY
Signed by: Jason Galloway 10/8/2024
DATE
SIG. INVENTORY NO. 06-0592T3

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-8.2

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key, then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR         1.0 SECONDS
     LP  SET CIB ON        427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE      G       G
         A B C D E F G H I J K L M N O P
OVERLAP  X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0592T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 3 - TMP Phase III
Electrical Detail - Sheet 2 of 2

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US 401 (Raeford Road)
at
Revere Street/
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Division 6 | Cumberland County | Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

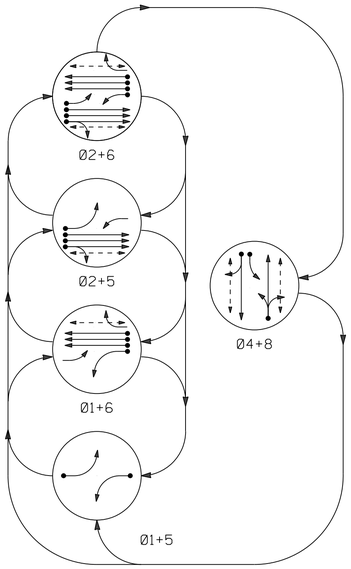
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

Signed by: Jason Galloway — 10/8/2024
10D1E2B40B4B46E
SIGNATURE | DATE

SIG. INVENTORY NO. 06-0592T3

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-9.0

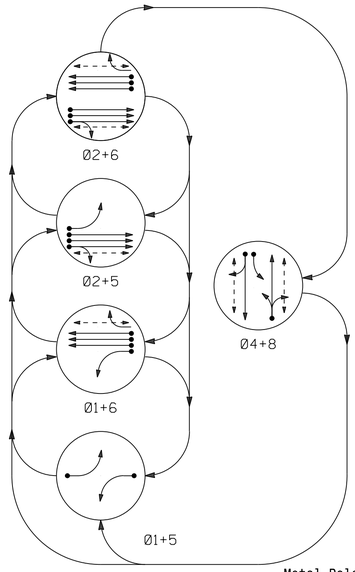
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←—	←—	FY	FY	←R	←R
21,22,23	R	R	G	G	R	R
41	←R	←R	←R	←R	FY	←R
42, 43	R	R	R	R	G	R
51	←—	FY	←—	FY	←R	←R
61,62,63	R	G	R	G	R	R
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

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←—	←—	←R	←R	←R	←R
21,22,23	R	R	G	G	R	R
41	←R	←R	←R	←R	FY	←R
42, 43	R	R	R	R	G	R
51	←—	←R	←—	←R	←R	←R
61,62,63	R	G	R	G	R	R
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

DETECTOR 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	X	1	Yes	-	15★	-	N	-	X
					6#	Yes	-	-	-	G	-	X
2A	6X6	300	6	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	6	X	2	Yes	-	-	X	N	-	X
2C	6X6	300	6	X	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
4B	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	15★	-	N	-	X
					2#	Yes	-	-	-	G	-	X
6A	6X6	300	5	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	5	X	6	Yes	-	-	X	N	-	X
6C	6X6	300	5	X	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	10	-	N	-	X

#Disable Phase call for loops during Alternate Phasing Operation.
★Disable Delay during Alternate Phasing Operation.

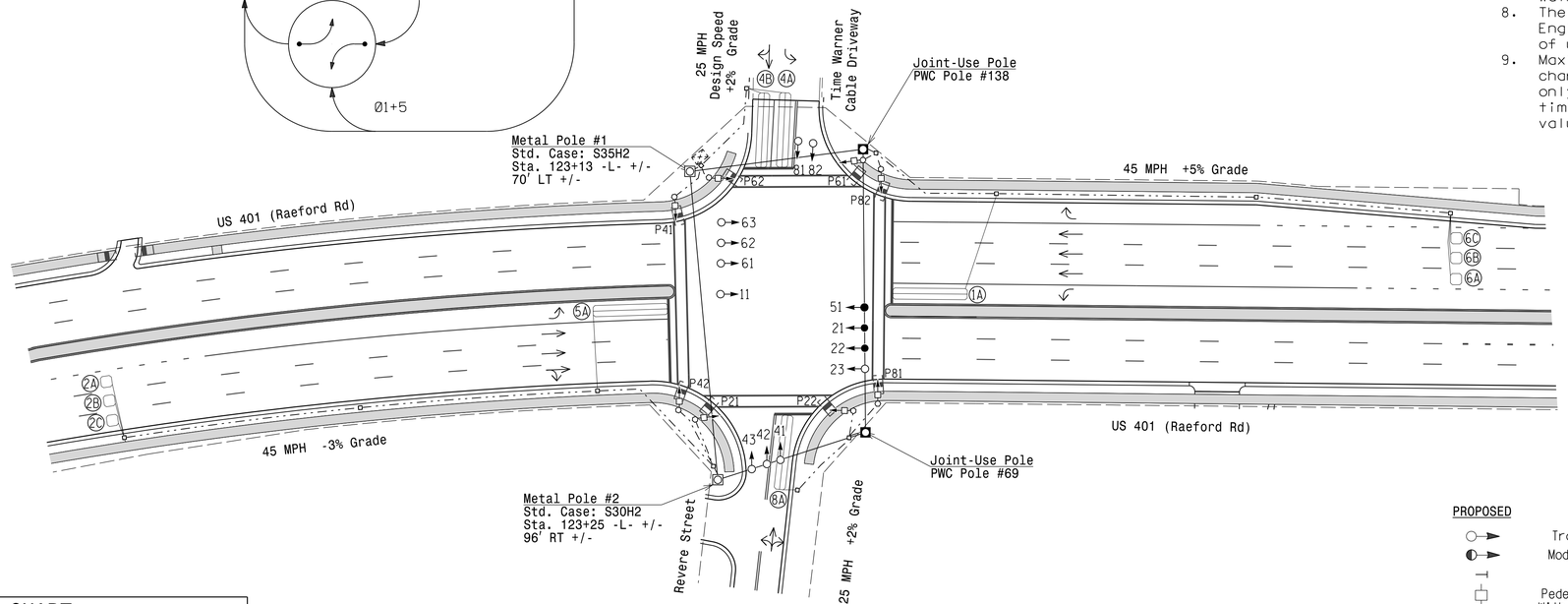
5 Phase
Fully Actuated
Fayetteville Signal System

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. Reposition existing signal heads numbered 21, 22, and 51.
5. Set all detector units to presence mode.
6. Omit "WALK" and Flahsing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◯	Metal Strain Pole	◯
⬡	Type II Signal Pedestal	⬢

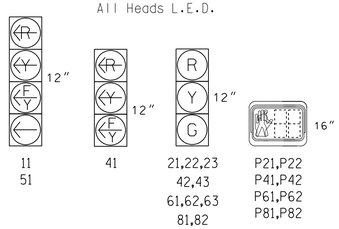
ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	7	4	-	7	4
Walk *	-	14	11	-	14	14
Ped Clear	-	15	24	-	16	27
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow	3.0	4.8	3.1	3.0	4.8	3.1
Red Clear	3.1	2.0	3.3	3.3	2.0	3.3
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	1.5	-
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	-	-	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 FACE I.D.

All Heads L.E.D.



11
51

41

21,22,23
42,43
61,62,63
81,82

P21,P22
P41,P42
P61,P62
P81,P82

Signal Upgrade - Final Design

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

US 401 (Raeford Road)
at
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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DATE

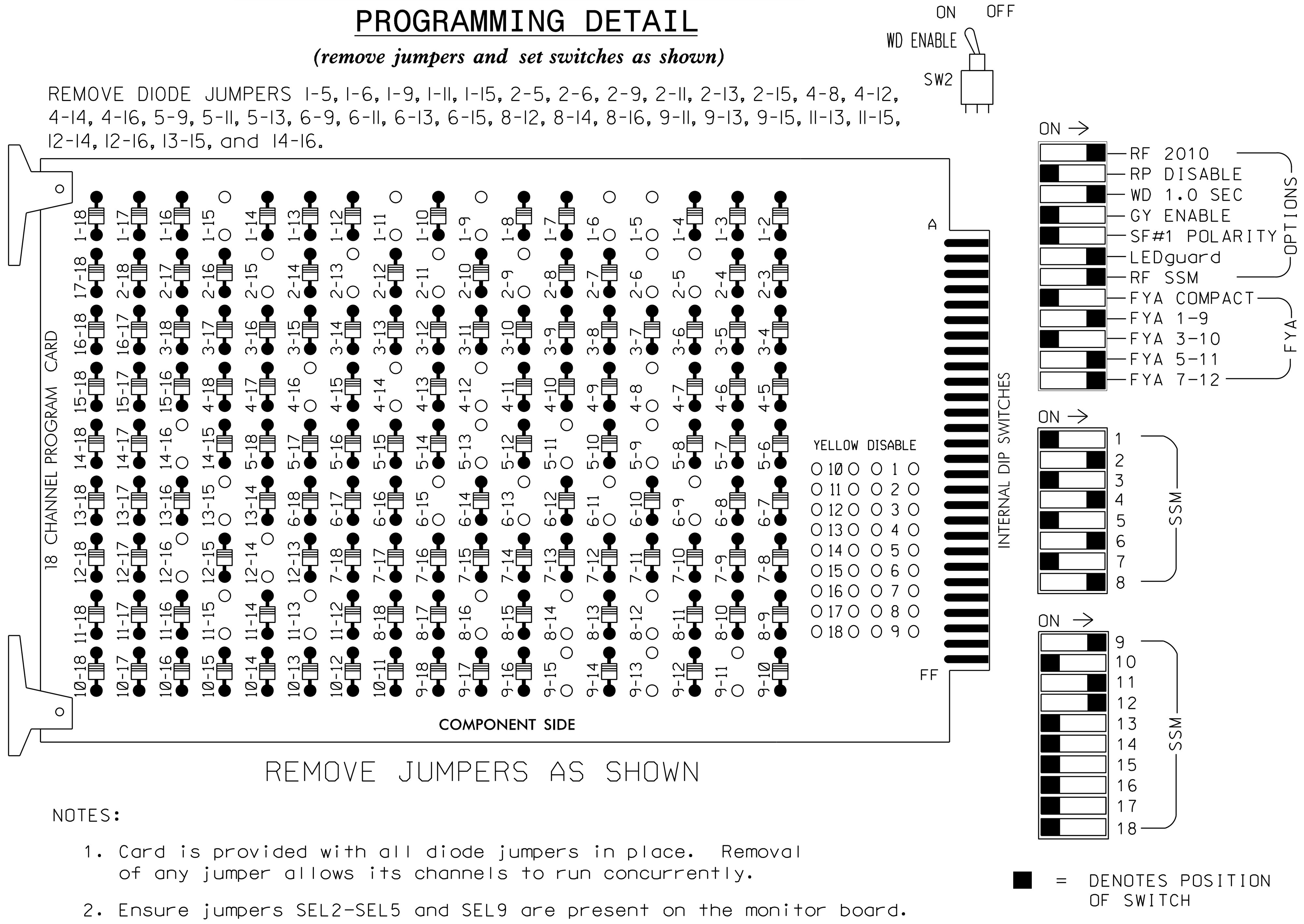
SIG. INVENTORY NO. 06-0592

10/8/2024
8:46:18 AM
U:\Traffic\Projects\Signals - U-4405B\Design\Signal Designs\Final Designs\U-4405B_sig_dsn_06-0592 Final.dgn
User:jgolloway

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 12-14, 12-16, 13-15, and 14-16.



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.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all 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 Fayetteville 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,S6,S7,S8,S9,S11, S12,AUX S1,AUX S4,AUX S5
PHASES USED.............1,2,2PED,4,4PED,5,6,6PED 8,8PED
OVERLAP A...............*
OVERLAP B...............NOT USED
OVERLAP C...............*
OVERLAP D...............*

* See Overlap Programming Detail on Sheet 2

SIGNAL HEAD HOOK-UP CHART

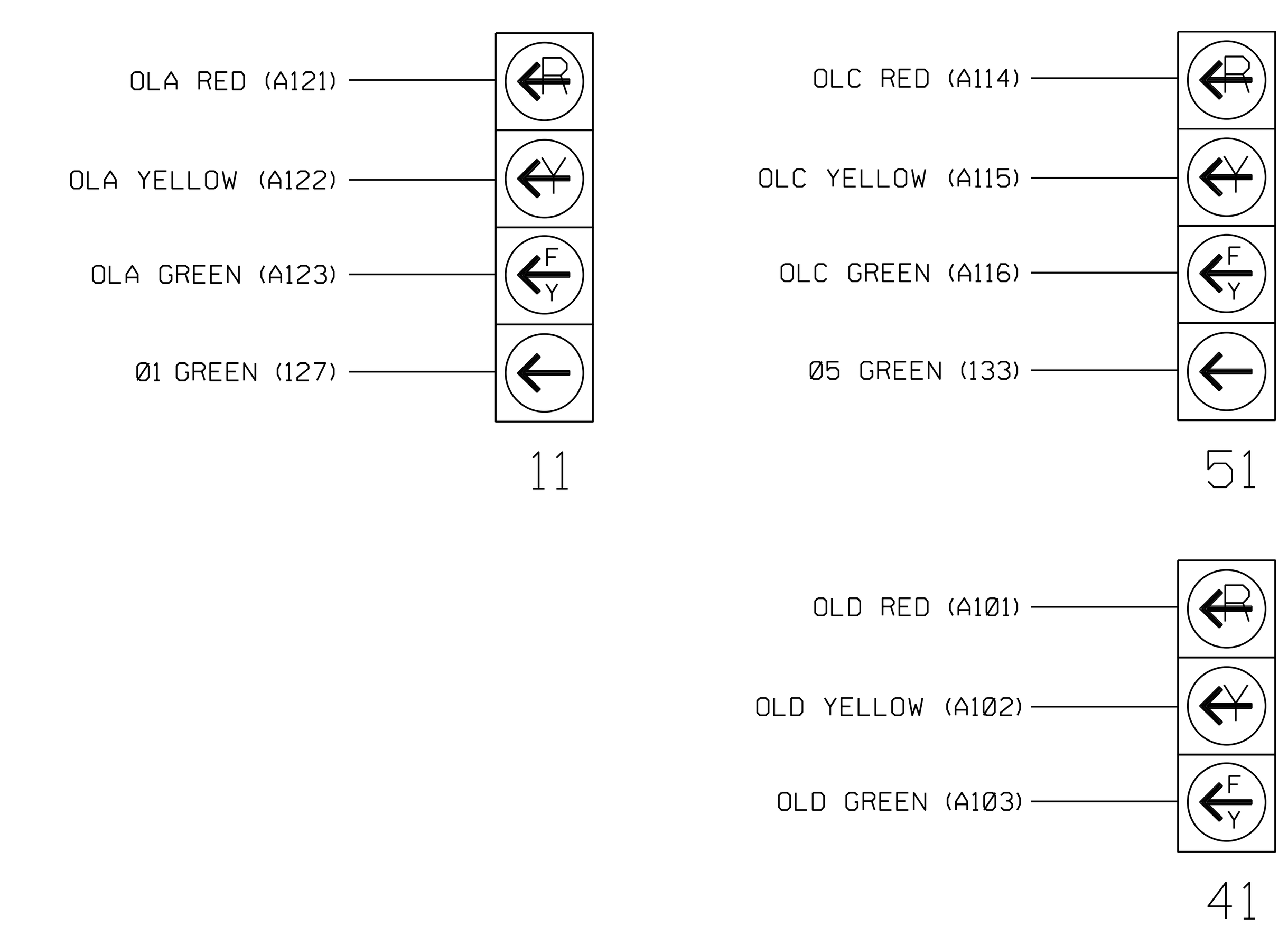
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22, 23	P21, P22	NU	42,43	P41, P42	51★	61,62, 63	P61, P62	NU	81,82	P81, P82	11★	NU	NU	51★	41★	NU
RED		128			101			134			107							
YELLOW	✳	129			102		✳	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114	A101	
YELLOW ARROW													A122			A115	A102	
FLASHING YELLOW ARROW													A123			A116	A103	
GREEN ARROW	127						133											
(Don't Walk hand)			113			104			119			110						
(Walk person)			115			106			121			112						

NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	Ø1 1A	Ø2 2A	Ø2 2C	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
"I"	L	NOT USED	Ø2 2B	NOT USED			Ø4 4B						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	Ø5 5A	Ø6 6A	Ø6 6C	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L	NOT USED	Ø6 6B	NOT USED			NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A[1]	TB2-1,2	I1U	56	1 ★	1	YES		15		N
	-	J4U	48	26 ★	6	YES				G
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
2C	TB2-9,10	I3U	63	32	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES				N
4B	TB4-11,12	I6L	45	14	4	YES				N
5A[2]	TB3-1,2	J1U	55	5 ★	5	YES		15		N
	-	I4U	47	22 ★	2	YES				G
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
6C	TB3-9,10	J3U	64	36	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES		10		N
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	PED 4	8 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 I12 AND I13.

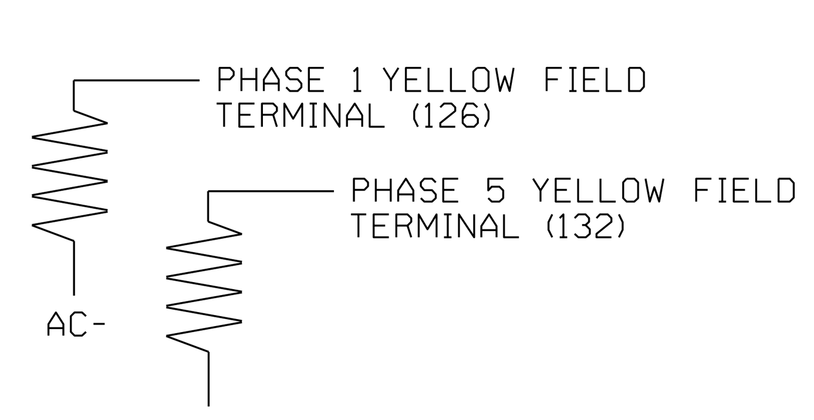
[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from J1-W to I4-W, on rear of input file.
★ See Vehicle Detector Setup Programming Detail for alternate phasing on Sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



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: 06-0592
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Prepared for the Offices of:
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750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road)
at
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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY
Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E...
SIGNATURE DATE
SIG. INVENTORY NO. 06-0592

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-9.2

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 DEFAULT PHASING	1	NONE
ACTIONS REQUIRED TO RUN ALTERNATE PHASING	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...[  *]
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 . . . . . . . . . . . . . . .
```

* The Action Plan numbers are to be determined by the Division and/or City Traffic Engineer.

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 SF BIT DISABLE 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 SF BIT DISABLE 1

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

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

(program controller as shown)

IMPORTANT!

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

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

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

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

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

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

← NOTICE VEH DET PLAN 2
← ENSURE DELAY IS SET TO '0'

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

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

← NOTICE VEH DET PLAN 2
← ENSURE DELAY IS SET TO '0'

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

```
VEH DETECTOR [22]   VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 22 0   . . . . . . . . . . . . . . .
EXTEND TIME...   0.0 DELAY TIME...   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: 06-0592
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division — ITS & Signals Management Section — State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road)
at
Revere Street/
Time Warner Cable Driveway

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

Signed by: Jason Galloway — 10D1E2B40B4B46E — SIGNATURE — DATE 10/8/2024

SIG. INVENTORY NO. 06-0592

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL FOR LEADING PED INTERVAL (DELAYED GREEN)

(program controller as shown)

The following logic processor configuration holds the FYA's on signal heads 11 and 51 red for the duration of the delayed green time (leading ped interval) when serving a ped call on the opposing through phase.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   1  COPY FROM:   1  ACTIVE:  M   (T/F)
IF    PED ON PH WALK        2     IS   ON
AND   VEH GREEN ON PH       2     IS   OFF

THEN  SIG SET OLP RED       1          ON
      SIG SET OLP YELLOW    1          OFF
      SIG SET OVLP GREEN    1          OFF

ELSE
```

HOLD SIGNAL HEAD 11 FYA RED DURING THE PHASE 2 DELAYED GREEN TIME (LEADING PED INTERVAL)

ENTER A "2" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   2  COPY FROM:   2  ACTIVE:  M   (T/F)
IF    PED ON PH WALK        6     IS   ON
AND   VEH GREEN ON PH       6     IS   OFF

THEN  SIG SET OLP RED       3          ON
      SIG SET OLP YELLOW    3          OFF
      SIG SET OVLP GREEN    3          OFF

ELSE
```

HOLD SIGNAL HEAD 51 FYA RED DURING THE PHASE 6 DELAYED GREEN TIME (LEADING PED INTERVAL)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [1. LOGIC STATEMENT CONTROL]

ENABLE LOGIC PROCESSOR STATEMENTS 1-2 BY POSITIONING THE CURSOR OVER THE FIELDS SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM .

```
LOGIC STATEMENT CONTROL
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
LP 1-15   E E . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . . .
```

END PROGRAMMING

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF    LP CIB CODE ON                 331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0592
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-9.3

ECONOLITE ASC/3-2070 PEDESTRIAN DETECTOR PHASE ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [6. DETECTORS]
2. From DETECTOR Submenu select [3. PED DETECTOR INPUT ASSIGNMENT]
3. Press the TOGGLE key to select [ECONOLITE MODE] and press ENTER.

```
PED DET PHASE ASSIGNMENT MODE:ECONOLITEv
PHASE  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
  D  1 X . . . . . . . . . . . . . . .
  E  2 . X . . . . . . . . . . . . . .
  T  3 . . X . . . . . . . . . . . . .
  E  4 . . . X . . . X . . . . . . . .
  C  5 . . . . X . . . . . . . . . . .
  T  6 . . . . . X . . . . . . . . . .
  O  7 . . . . . . X . . . . . . . . .
  R  8 . . . . . . . X . . . . . . . .
     9 . . . . . . . . X . . . . . . .
    10 . . . . . . . . . X . . . . . .
    11 . . . . . . . . . . X . . . . .
    12 . . . . . . . . . . . X . . . .
    13 . . . . . . . . . . . . X . . .
    14 . . . . . . . . . . . . . X . .
    15 . . . . . . . . . . . . . . X .
    16 . . . . . . . . . . . . . . . X
```

"." = No assignment, disabled
X = Assigns Pedestrian Push Button (PPB) to call the phase or phases
2 = Call for Ped timing 2
B = Allows for the PPB to call for Min Green 2 (BIKE GREEN)

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP----------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD→ YES   Y- G: NO
```

Scroll down on this screen and set "Exit F1" to Green "G"

Final Design
Electrical Detail - Sheet 3 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Traffic Engineering, Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Safety Systems Branch
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road)
at
Revere Street/
Time Warner Cable Driveway
Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

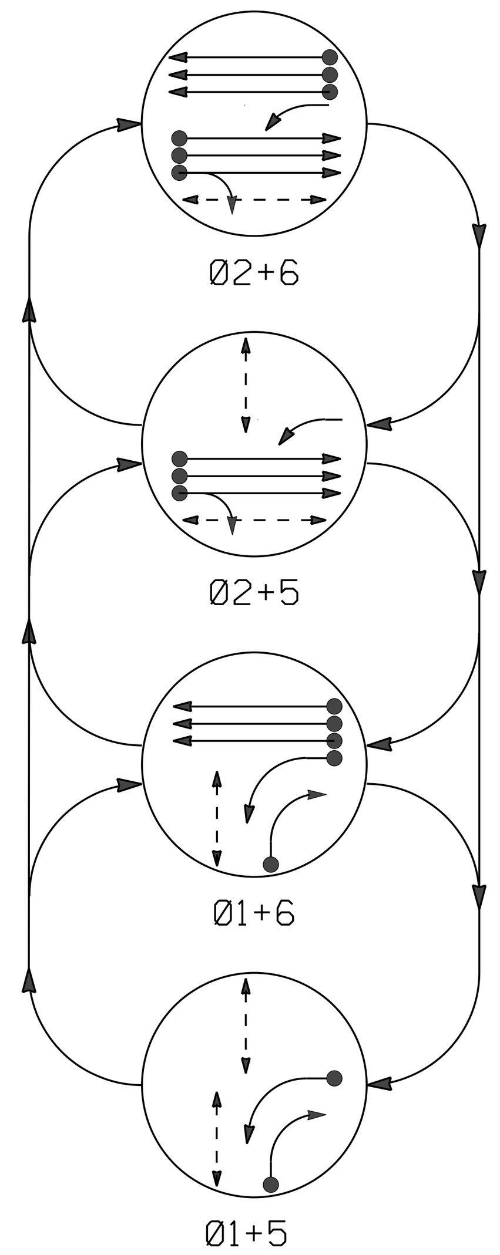
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DOCUSIGNED BY: SIGNATURE DATE

SIG. INVENTORY NO. 06-0592

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-10.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

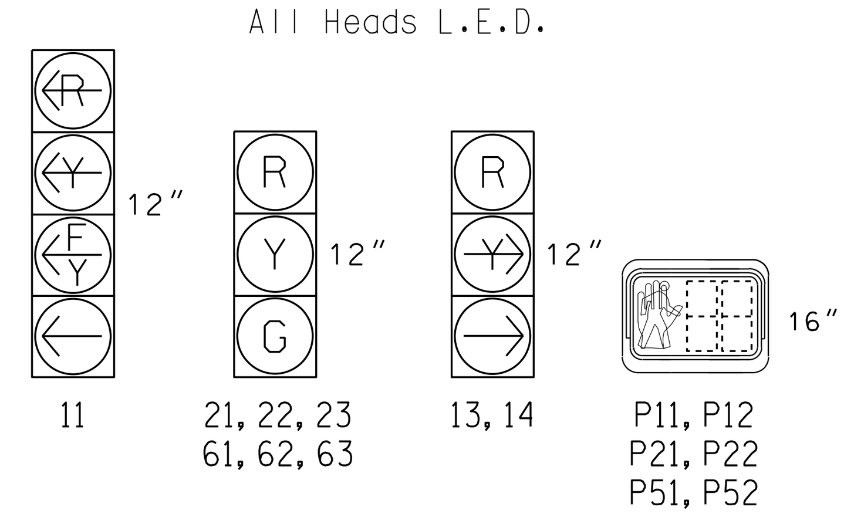
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	FLASH
11	←	←	F/Y ←	F/Y ←	← R
13,14	→	→	R	R	R
21, 22, 23	R	R	G	G	R
61, 62, 63	R	G	R	G	R
P11, P12	W	W	DW	DW	DRK
P21, P22	DW	DW	W	W	DRK
P51, P52	W	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



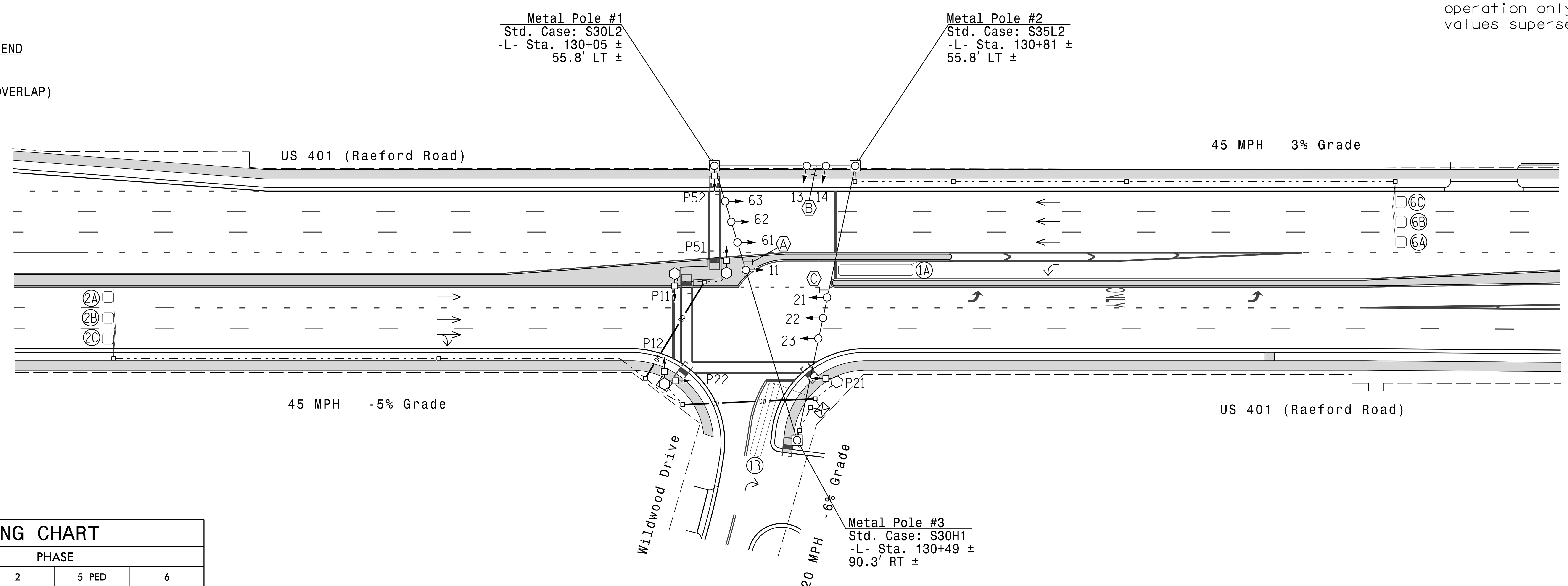
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR 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	X	1	Yes	-	15	-	N	-	X
1B	6X40	0	2-4-2	X	1	Yes	-	15	-	N	-	X
2A	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2C	6X6	300	5	X	2	Yes	-	-	X	N	-	X
6A	6X6	300	6	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	6	X	6	Yes	-	-	X	N	-	X
6C	6X6	300	6	X	6	Yes	-	-	X	N	-	X

4 Phase
Fully Actuated
Fayetteville Signal System

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. 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.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Phase 1+5 pedestrian timing is designed as a two stage crossing. The FDW time shown is only intended to get a pedestrian to/from the median during a single crossing. Install R10-3d signs as appropriate.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	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	
	Metal Strain Pole	
	Type II Signal Pedestal	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	No Left Turn Sign (R3-2)	Ⓒ

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	5 PED	6
Min Green *	7	12	1	12
Delayed Green	0	7	0	0
Walk *	7	14	7	0
Ped Clear	10	14	9	0
Veh. Extension *	2.0	6.0	0.0	6.0
Max 1 *	30	90	0	90
Yellow	3.1	5.0	3.0	5.0
Red Clear	2.9	1.0	0.0	1.0
Red Revert	-	-	-	-
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	1.5	-	1.5
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

* 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.

New Installation - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE 0 40
1"=40'

US 401 (Raeford Road)
at
Wildwood Drive

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	J. Galloway, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	R. Muncey, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-1405

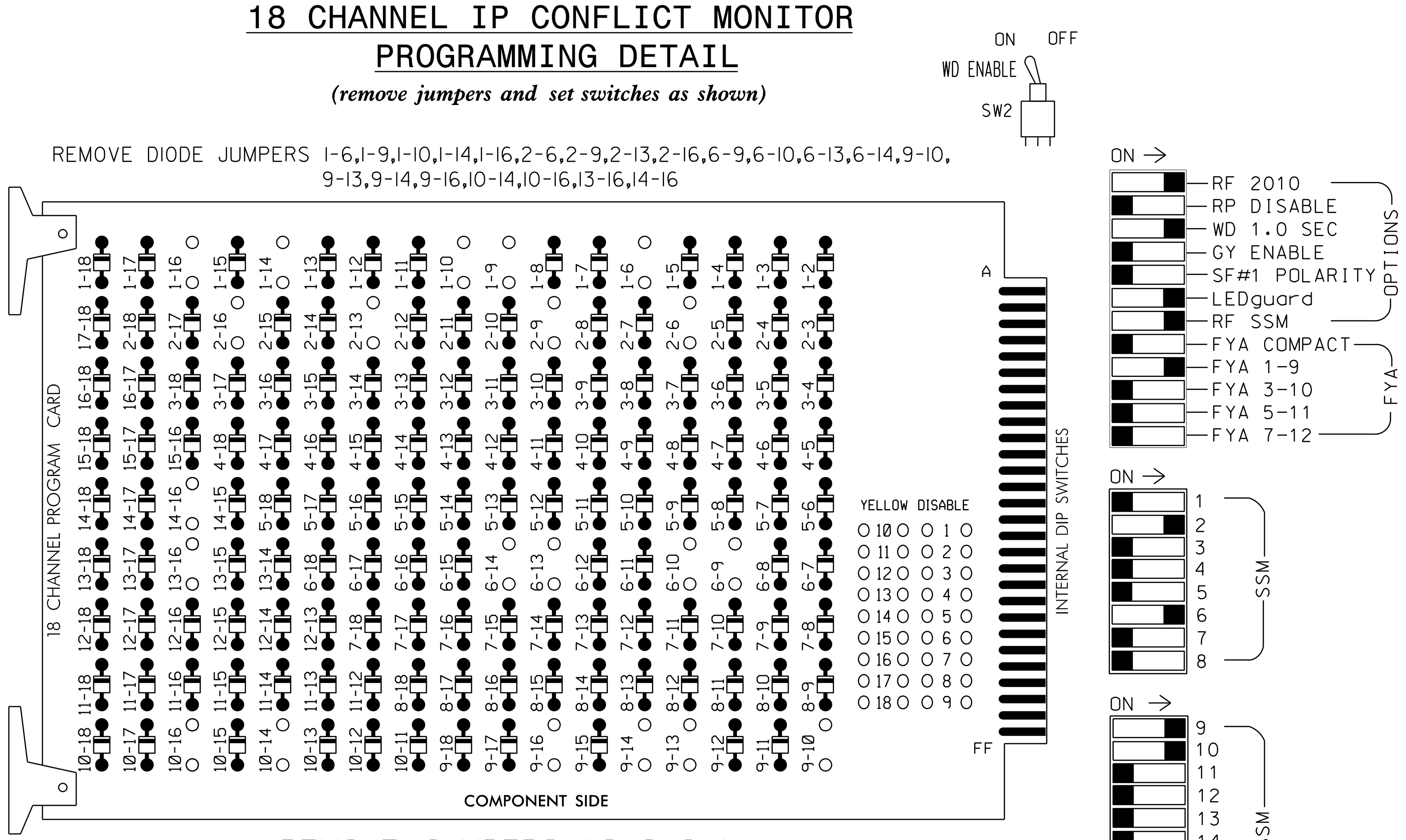
Docusign Envelope ID: 1BEDD05F-B021-412E-8B97-DA7023BECC56

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-10.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6,1-9,1-10,1-14,1-16,2-6,2-9,2-13,2-16,6-9,6-10,6-13,6-14,9-10, 9-13,9-14,9-16,10-14,10-16,13-16,14-16



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville 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,S6,S8,S12,AUXS1,AUXS2
PHASES USED.............1,1PED,2,2PED,5#,5PED,6
OVERLAP "A".............*
OVERLAP "B".............*
OVERLAP "C".............NOT USED
OVERLAP "D".............NOT USED

* See overlap programming detail on sheet 2
# Phase 5 used for timing purposes only.

SIGNAL HEAD HOOK-UP CHART

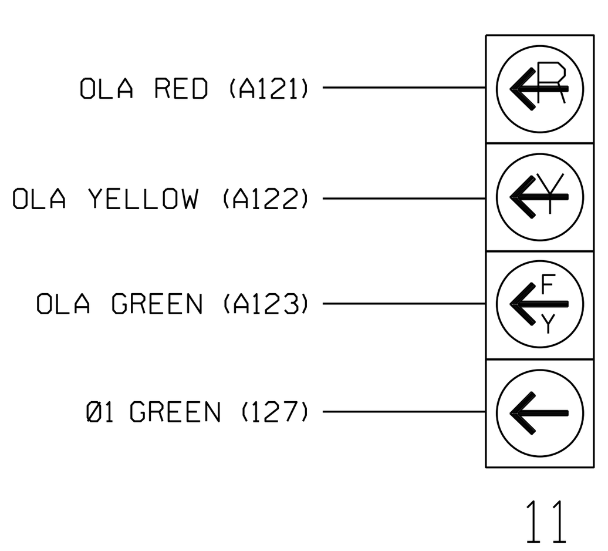
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	1 PED	5	6	6 PED	7	8	5 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 ★	21,22 23	P21, P22	NU	NU	P11, P12	NC	61,62 63	NU	NU	NU	P51, P52	11 ★	13,14	NU	NU	NU	NU
RED		128						134						A124				
YELLOW	✳	129						135										
GREEN		130						136										
RED ARROW													A121					
YELLOW ARROW													A122	A125				
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127													A126				
(hand)			113			104						110						
(walking person)			115			106						112						

NU = Not Used
NC = Not Connected

★ See pictorial of head wiring in detail this sheet.
✳ Denotes install load resistor. See load resistor installation detail this sheet.
NOTE: Output functions for load switch S6 and S12 have been reassigned. See sheet 2 for details.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	Ø2 2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B	NOT USED								Ø1 PED DC ISOLATOR	Ø5 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	Ø6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6B	NOT USED											

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	I1U	56	1	1	YES		15		N
1B	TB2-5,6	I2U	39	2	1	YES		15		N
2A	TB2-9,10	I3U	63	32	2	YES			X	N
2B	TB2-11,12	I3L	76	42	2	YES			X	N
2C	TB4-1,2	I4U	47	22	2	YES			X	N
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
6C	TB3-9,10	J3U	64	36	6	YES			X	N
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P11,P12	TB8-5,6	I12L	69	PED 4	1 PED					
P51,P52	TB8-8,9	I13L	70	PED 8	5 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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.

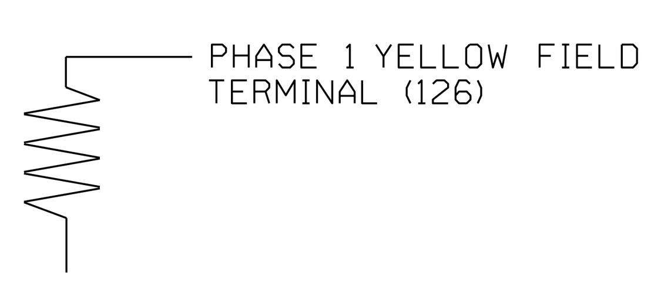
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1405
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

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)



Final Design
Electrical Detail - Sheet 1 of 3

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

US 401 (Raeford Road)
at
Wildwood Drive

Division 6 | Cumberland County | Fayetteville

PLAN DATE: August 2024 | REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE | REVIEWED BY: J. Galloway, PE

REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY
Signed by: Jason Galloway 10/8/2024
DATE
SIG. INVENTORY NO. 06-1405

8:47:20 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details\Final Design\U-4405B_sig_ele_06-1405.dgn
User:jgalloway

ECONOLITE ASC/3-2070 PED 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	4	2	0	0	8	0	0	0

PHASE	9	10	11	12	13	14	15	16
DETECTOR	0	0	0	0	0	0	0	0

NOTICE PED DETECTOR 4 ASSIGNED TO PHASE 1
NOTICE PED DETECTOR 8 ASSIGNED TO PHASE 5

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

LD SWITCH ASSIGN

	PHASE /OVLP	TYPE	DIMMING R	Y	G	D	FLASH PWR	AUT	TGR
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	R	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	-	A	R	.
6	6	V	.	.	.	-	A	R	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	1	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	5	P	.	.	.	-	A	.	.

NOTICE PHASE 1 PED ASSIGNED TO LD SWITCH 14
NOTICE PHASE 5 PED ASSIGNED TO LD SWITCH 16

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 'NORMAL'

```
TMG VEH OVLP...[B] TYPE: .......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED X . . . . . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

END PROGRAMMING

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL FOR LEADING PED INTERVAL (DELAYED GREEN)

(program controller as shown)

The following logic processor configuration holds the FYA on signal head 11 red for the duration of the delayed green time (leading ped interval) when serving a ped call on the opposing through phase.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#:   1  COPY FROM:   1  ACTIVE:  M   (T/F)
IF     PED ON PH WALK         2     IS   ON
AND    VEH GREEN ON PH        2     IS   OFF

THEN   SIG SET OLP RED        1          ON
       SIG SET OLP YELLOW     1          OFF
       SIG SET OVLP GREEN     1          OFF

ELSE
```

HOLD SIGNAL HEAD 11 FYA RED DURING THE PHASE 2 DELAYED GREEN TIME (LEADING PED INTERVAL)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [1. LOGIC STATEMENT CONTROL]

ENABLE LOGIC PROCESSOR STATEMENT 1 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

```
LOGIC STATEMENT CONTROL
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
LP 1-15   E . . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . . .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-1405
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared for the Offices of:
Transportation Mobility and Safety Division – ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 (Raeford Road) at Wildwood Drive

Division 6	Cumberland County	Fayetteville
PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE	
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE	

REVISIONS	INIT.	DATE

SEAL – NORTH CAROLINA PROFESSIONAL ENGINEER – SEAL 029904 – JASON P. GALLOWAY
Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-1405

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-10.3

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD→ YES    Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-1405
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 3 of 3

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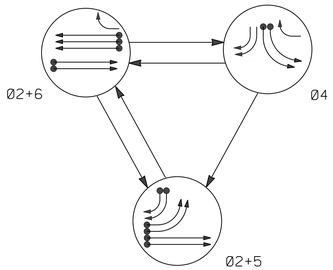
Division 6 | Cumberland County | Fayetteville
PLAN DATE: August 2024 | REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE | REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY
Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE
SIG. INVENTORY NO. 06-1405

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-11.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

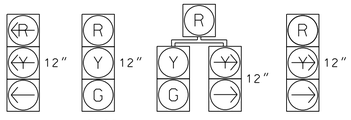
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21,22	G	G	R	R
41,42	~~R~~	~~R~~	←	~~R~~
43,44	→	R	→	R
51,52	←	~~R~~	~~R~~	~~R~~
61,62	R	G	R	R
63	R	G	R	R

SIGNAL FACE I.D.

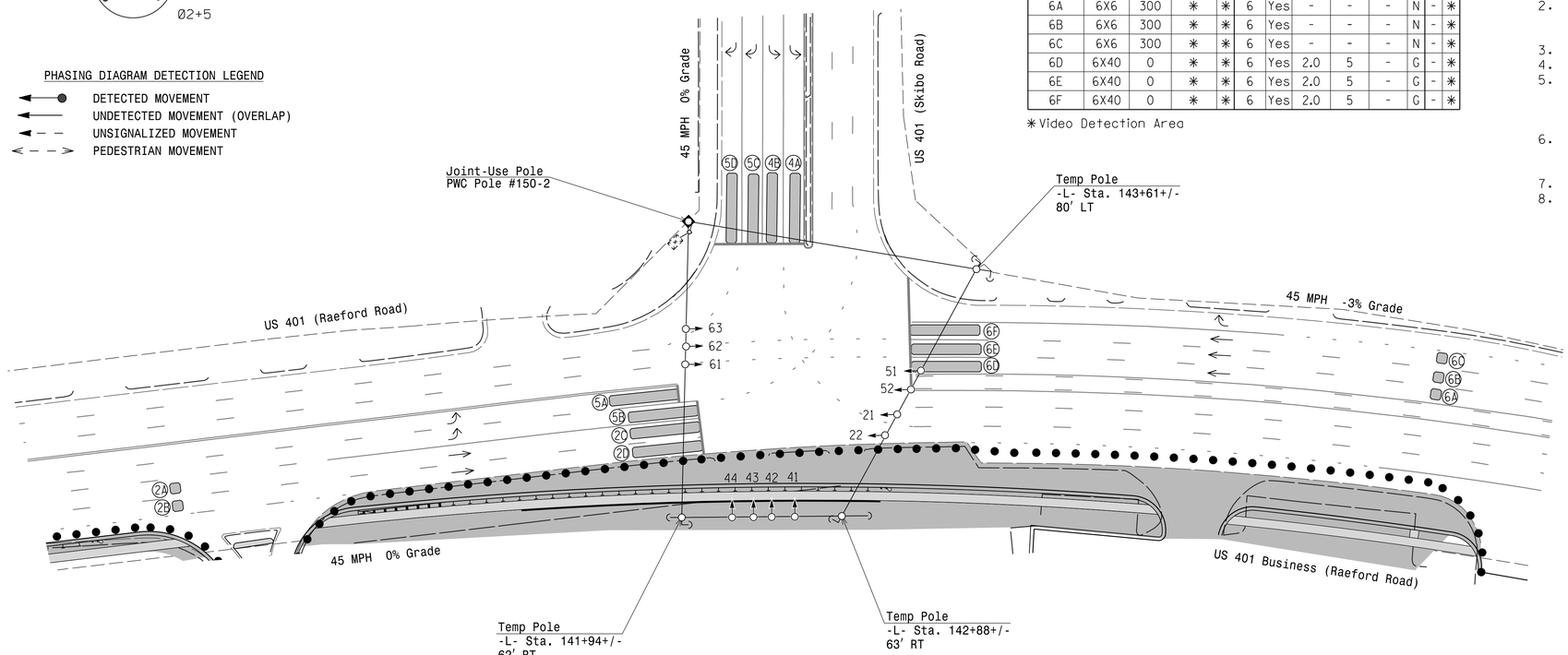
All Heads L.E.D.



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	✳	✳	2	Yes	-	-	-	N	-	✳
2B	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2C	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
2D	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
4A	6X40	0	✳	✳	4	Yes	-	-	-	N	-	✳
4B	6X40	0	✳	✳	4	Yes	-	-	-	N	-	✳
5A	6X40	0	✳	✳	5	Yes	-	-	-	N	-	✳
5B	6X40	0	✳	✳	5	Yes	-	-	-	N	-	✳
5C	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
5D	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6C	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6E	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6F	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳

✳ Video Detection Area



ASC/3 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Delayed Green	-	-	-	-
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	2.0	2.0	6.0
Max 1 *	90	30	35	90
Yellow	4.8	3.0	3.0	4.8
Red Clear	1.8	3.7	3.5	1.8
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Locking Detector	-	-	-	-
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.

3 Phase
Fully Actuated
Fayetteville Signal System

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 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet foundation so as not to obstruct sight distance of vehicles turning right on red. Relocate existing cabinet and controller onto new foundation..
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Field adjust temporary poles as needed.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◘	Metal Strain Pole	◘
▬	Video Detection Area	N/A
▬	Construction Zone	N/A
●●●	Drums	N/A

Signal Upgrade
Temporary Design 1- TMP Phase I

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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

US 401/US 401 Business
(Raeford Road)
at
US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	J. Galloway, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	R. Muncey, PE

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

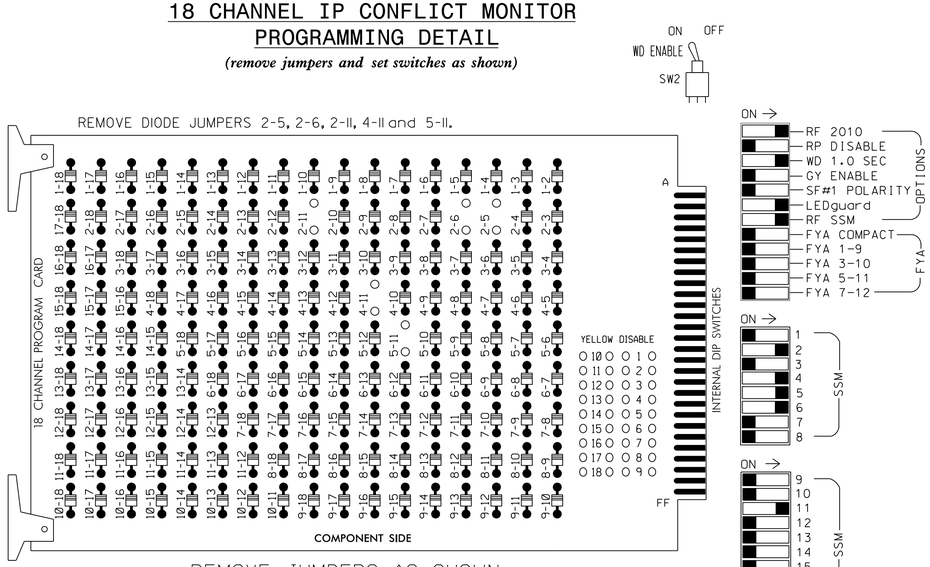
Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0096T1

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-11.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 W/ 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 this sheet.

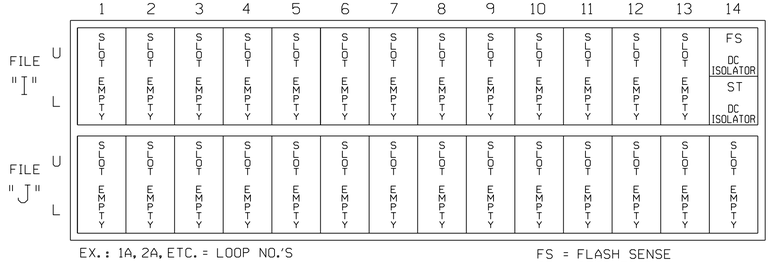
SIGNAL HEAD HOOK-UP CHART

	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	63	NU	51,52	61,62, 63	NU	NU	NU	NU	NU	NU	NU	43,44	NU	NU
RED		128							134								A114		
YELLOW		129							135										
GREEN		130							136										
RED ARROW					101			131											
YELLOW ARROW					102	102		132									A115		
GREEN ARROW					103	103		133									A116		

NU = Not Used

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.

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 'NORMAL'

```
TMG VEH OVLP...[C] 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: 06-0096T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 1 of 2

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Fax. (919) 851-7024
www.stantec.com
License No. F-0672

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Signal Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401/US 401 Business
(Raeford Road)
at
US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DOCUSIGNED BY: DATE

SIG. INVENTORY NO. 06-0096TI

8:48:06 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details*Temporary Design\U-4405B_sig_ele_06-0096T1.dgn
User:jgalloway

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash.
Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR        1.0 SECONDS
     LP  SET CIB ON       427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
        1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE     G       G
        A B C D E F G H I J K L M N O P
OVERLAP X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0096T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Transportation Mobility and Safety Division, ITS & Signals Management Section, State of North Carolina Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

US 401/US 401 Business (Raeford Road) at US 401 (Skibo Road)

Division 6 — Cumberland County — Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

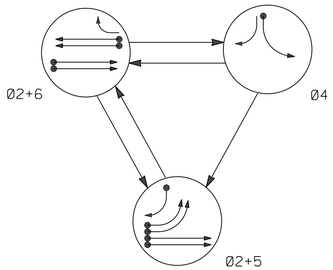
Signed by: Jason Galloway — 10/8/2024
10D1E2B40B4B46E — SIGNATURE — DATE

SIG. INVENTORY NO. 06-0096TI

8:48:14 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0096T1.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-12.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

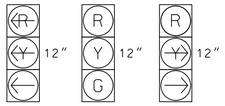
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21,22	G	G	R	R
41,42	~~R~~	~~R~~	~~R~~	~~R~~
43	→	R	→	R
51,52	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

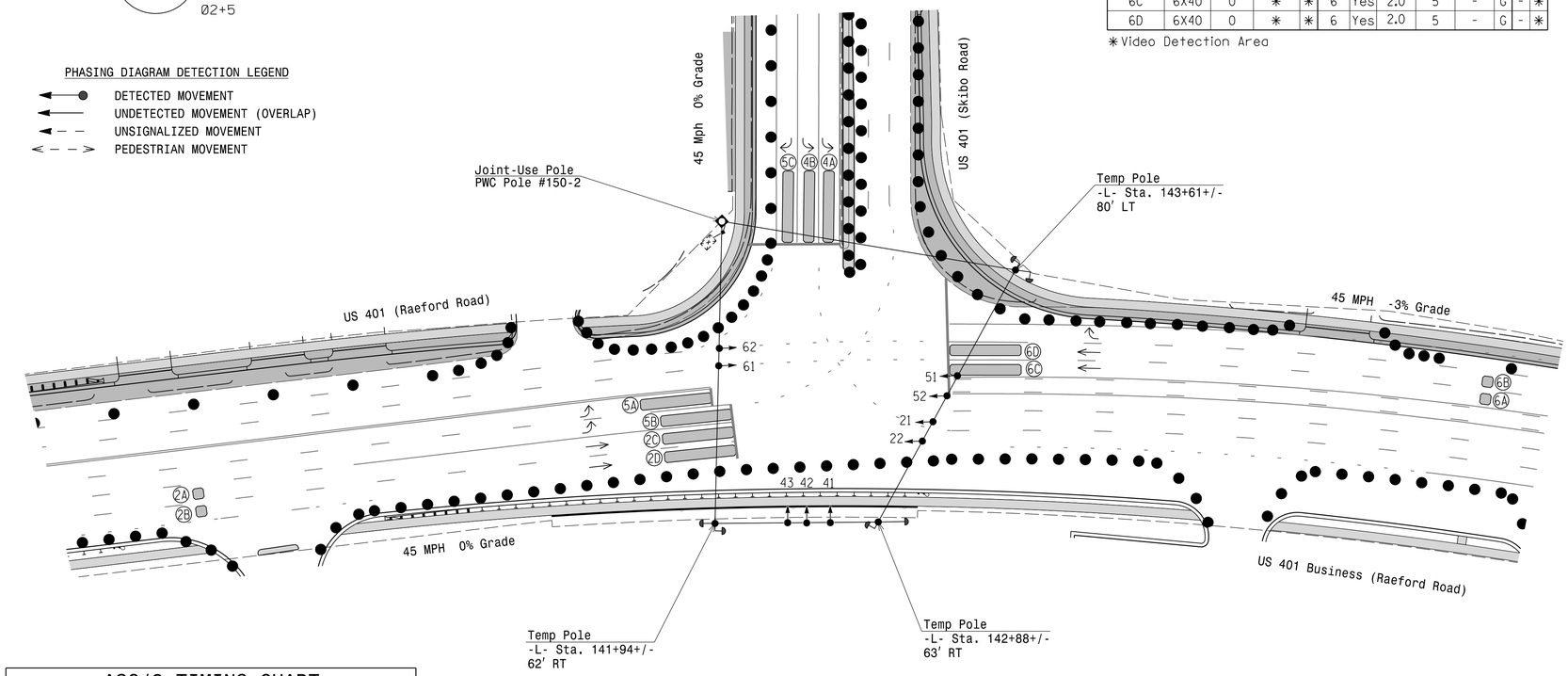


41,42 51,52 | 21,22 61,62 | 43

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	✳	✳	2	Yes	-	-	-	N	-	✳
2B	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2C	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
2D	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
4A	6X40	0	✳	✳	4	Yes	-	-	-	N	-	✳
5A	6X40	0	✳	✳	5	Yes	-	-	-	N	-	✳
5B	6X40	0	✳	✳	5	Yes	-	-	-	N	-	✳
5C	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6C	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳

✳Video Detection Area



ASC/3 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Delayed Green	-	-	-	-
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	2.0	2.0	6.0
Max 1 *	90	30	35	90
Yellow	4.8	3.0	3.0	4.8
Red Clear	1.6	3.7	3.3	1.6
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Locking Detector	-	-	-	-
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.

3 Phase
Fully Actuated
Fayetteville Signal System

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 5 may be lagged.
4. Reposition existing signal heads numbered 21 and 22.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◎	Metal Strain Pole	◙
▬	Video Detection Area	N/A
▬	Construction Zone	N/A
● ● ●	Drums	N/A

Signal Upgrade
Temporary Design 2- TMP Phase II

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NCDEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401/US 401 Business
(Raeford Road)
at
US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	J. Galloway, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	R. Muncey, PE

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 029904
ENGINEER
JASON P. GALLOWAY

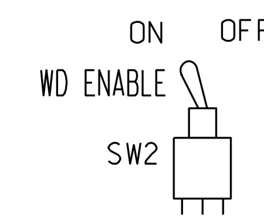
Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E... DATE

SIG. INVENTORY NO. 06-00961Z

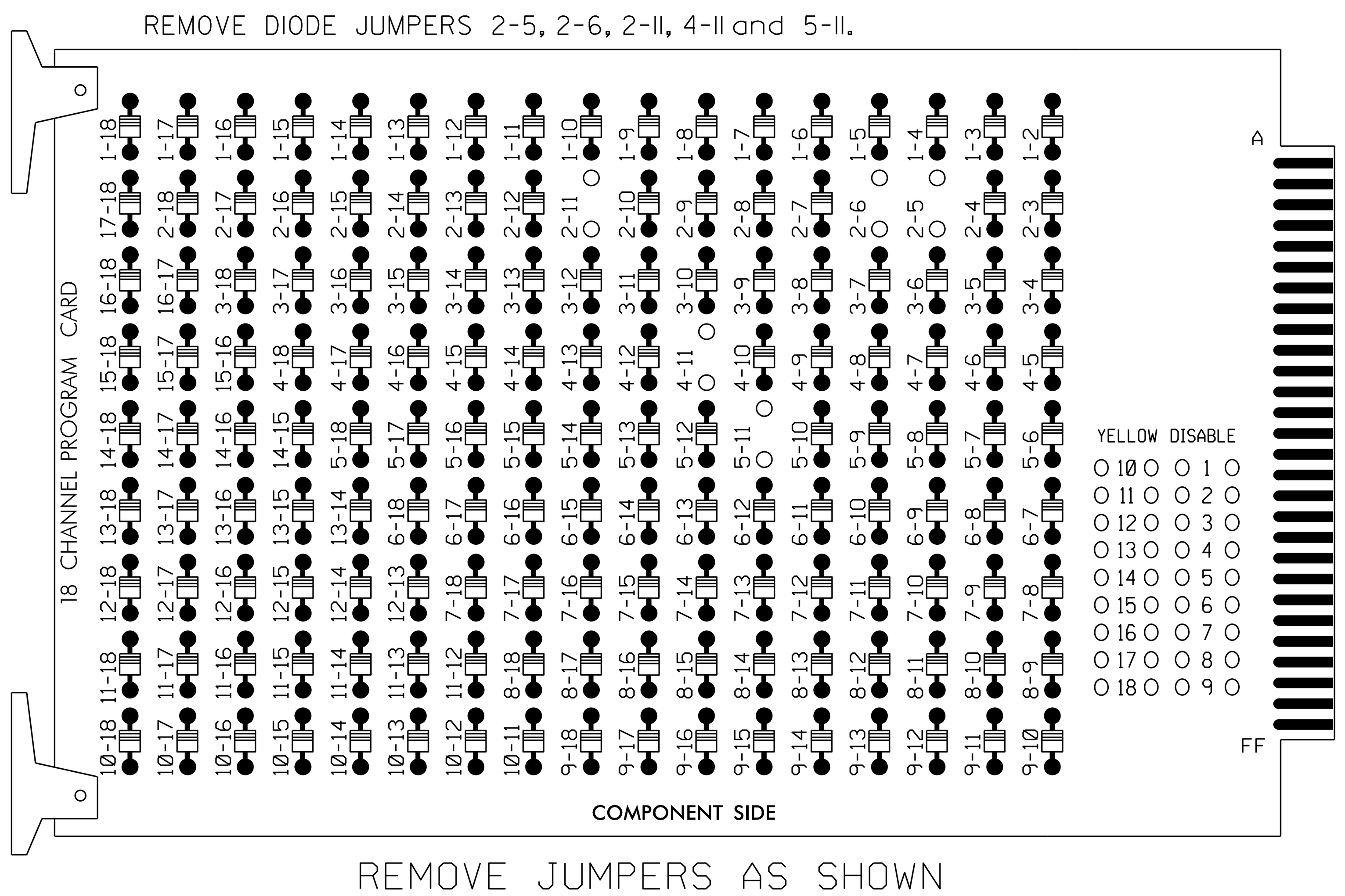
PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-12.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

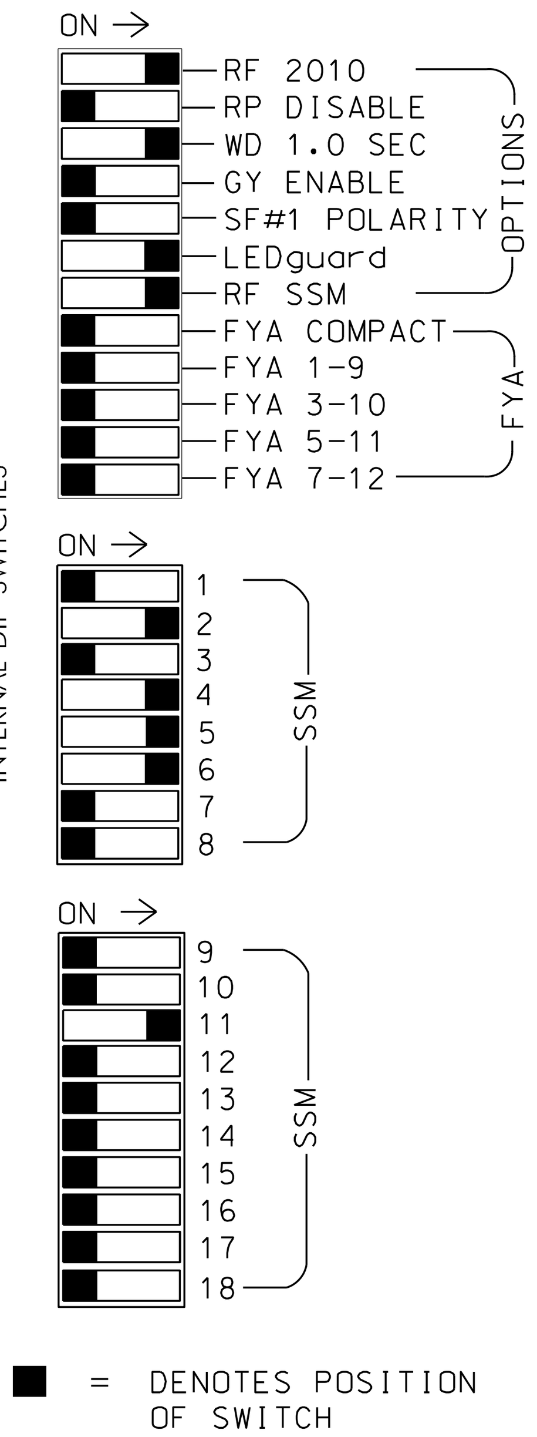
(remove jumpers and set switches as shown)



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



REMOVE JUMPERS AS SHOWN



NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

CONTROLLER..............2070LX
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 W/ 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 this sheet.

SIGNAL HEAD HOOK-UP CHART

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51,52	61,62	NU	NU	NU	NU	NU	NU	NU	43	NU	NU
RED		128						134								A114		
YELLOW		129						135										
GREEN		130						136										
RED ARROW					101		131											
YELLOW ARROW					102		132									A115		
GREEN ARROW					103		133									A116		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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.

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 'NORMAL'

```
TMG VEH OVLP...[C] 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: 06-0096T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 1 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401/US 401 Business
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at
US 401 (Skibo Road)

Division 6 | Cumberland County | Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0096T2

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to address Yellow-Red flash.
Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G         G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0096T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 2 of 2

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Transportation Mobility and Safety Division — ITS & Signals Management Section — State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

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PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

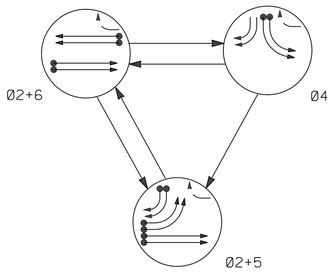
Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E...
SIGNATURE | DATE

SIG. INVENTORY NO. 06-0096T2

8:48:51 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0096T2.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-13.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

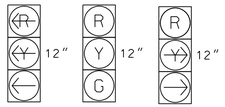
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21,22	G	G	R	R
41,42	~~R~~	~~R~~	~~R~~	~~R~~
43,44	→	R	→	R
51,52	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



41,42 51,52 — 21,22 61,62 — 43,44

ASC/3 DETECTOR INSTALLATION CHART

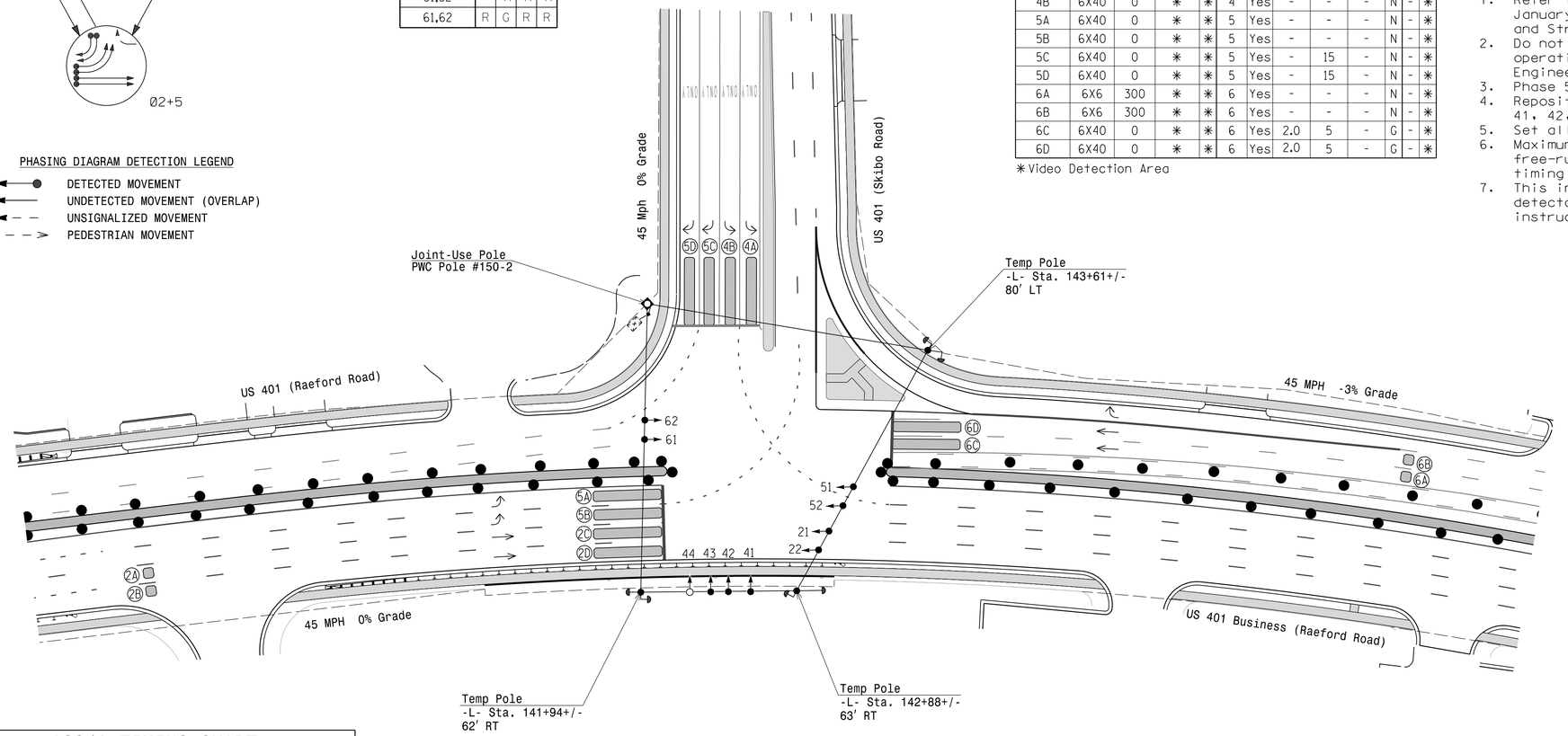
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2B	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2C	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
2D	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
4A	6X40	0	✳	✳	4	Yes	-	-	-	N	-	✳
4B	6X40	0	✳	✳	4	Yes	-	-	-	N	-	✳
5A	6X40	0	✳	✳	5	Yes	-	-	-	N	-	✳
5B	6X40	0	✳	✳	5	Yes	-	-	-	N	-	✳
5C	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
5D	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6C	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳

✳ Video Detection Area

3 Phase
Fully Actuated
Fayetteville Signal System

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 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 41, 42, 51, 52, 61, and 62.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



ASC/3 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Delayed Green	-	-	-	-
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	2.0	2.0	6.0
Max 1 *	90	30	35	90
Yellow	4.8	3.0	3.0	4.8
Red Clear	1.9	3.6	3.3	1.9
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Locking Detector	-	-	-	-
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	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◎	Metal Strain Pole	◎
▬	Video Detection Area	N/A
▭	Construction Zone	N/A
● ● ●	Drums	N/A

Signal Upgrade
Temporary Design 3 - TMP Phase III - Step 2

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Prepared for the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401/US 401 Business
(Raeford Road)
at
US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

SCALE: 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
100182B40B4B46E... DATE

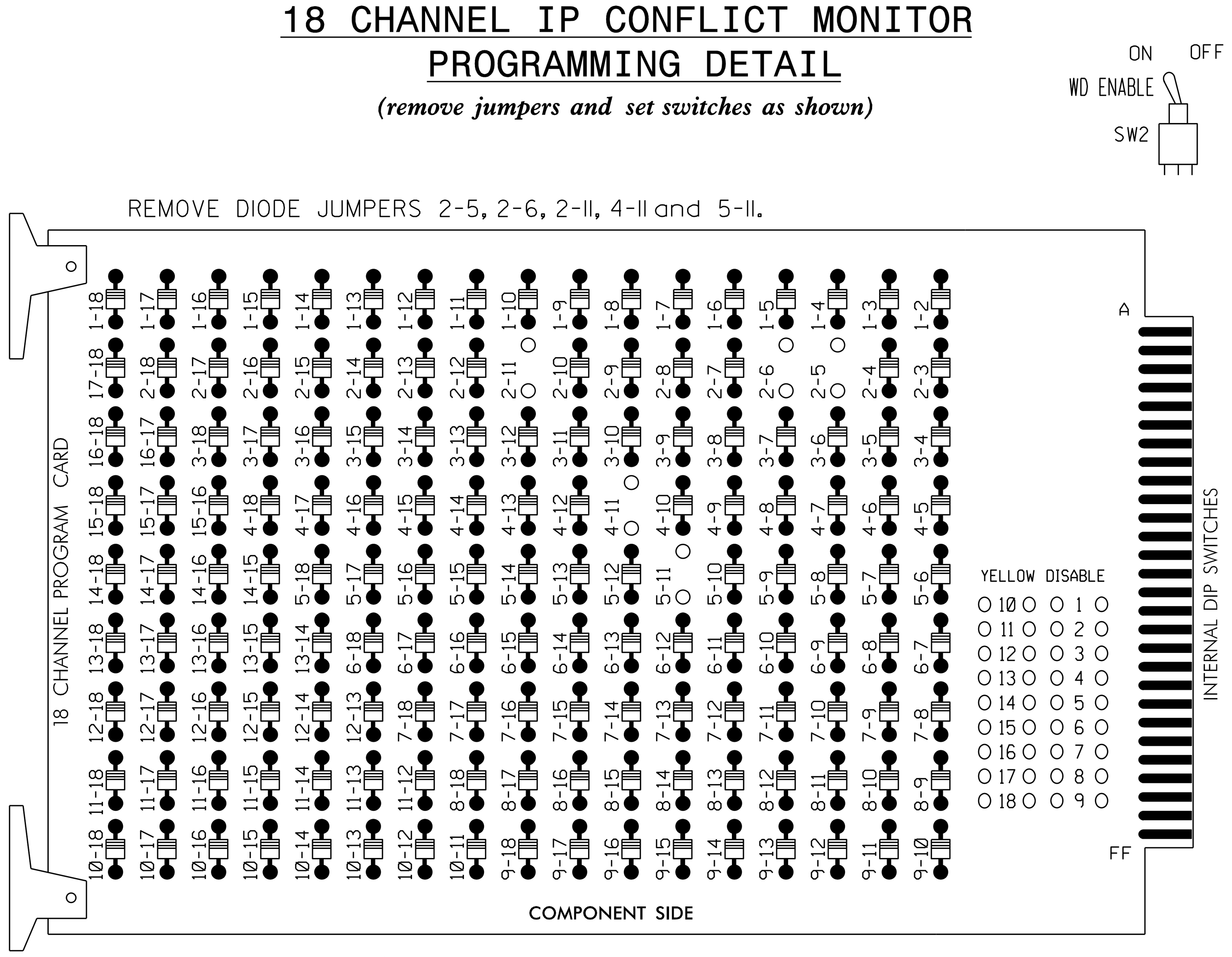
SIG. INVENTORY NO. 06-0096T3

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-13.1

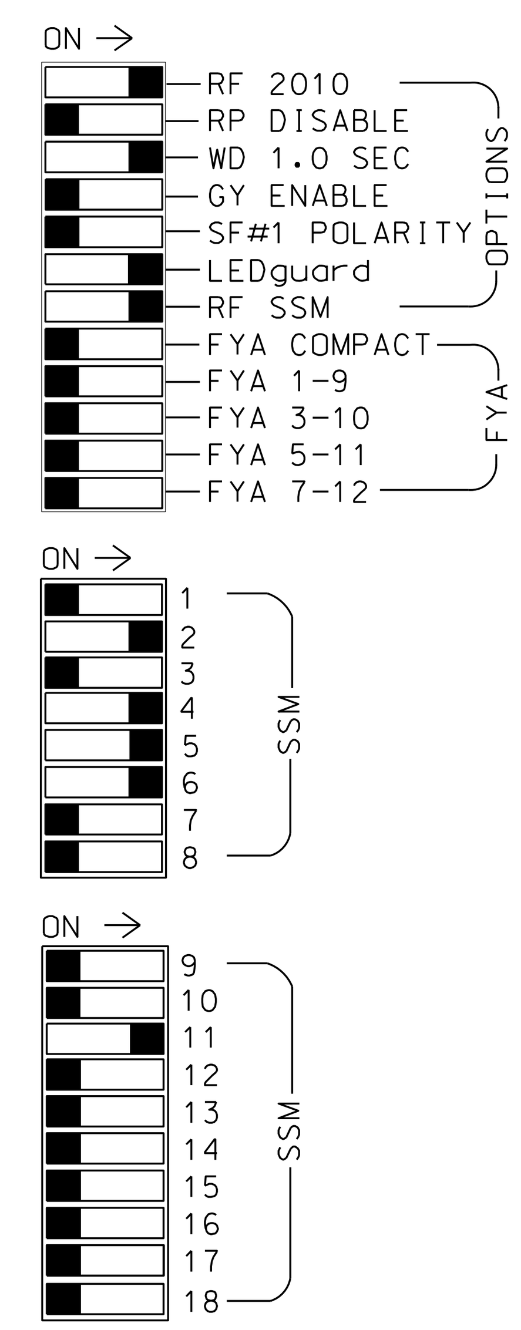
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville Signal System.

EQUIPMENT INFORMATION

CONTROLLER.............2070LX
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 W/ 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 this sheet.

SIGNAL HEAD HOOK-UP CHART

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51,52	61,62	NU	NU	NU	NU	NU	NU	NU	43,44	NU	NU
RED		128						134								A114		
YELLOW		129						135										
GREEN		130						136										
RED ARROW					101		131											
YELLOW ARROW					102		132									A115		
GREEN ARROW					103		133									A116		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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.

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 'NORMAL'

```
TMG VEH OVLP...[C] 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: 06-0096T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 3 - TMP Phase III - Step 2
Electrical Detail - Sheet 1 of 2

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License No. F-0672

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division — ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401/US 401 Business (Raeford Road) at US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0096T3

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to address Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR         1.0 SECONDS
     LP  SET CIB ON        427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE      G       G
         A B C D E F G H I J K L M N O P
OVERLAP  X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD→ YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0096T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 3 - TMP Phase III - Step 2
Electrical Detail - Sheet 2 of 2

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750 N.Greenfield Pkwy,Garner,NC 27529

US 401/US 401 Business (Raeford Road) at US 401 (Skibo Road)
Division 6 Cumberland County Fayetteville
PLAN DATE: August 2024 | REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE | REVIEWED BY: J. Galloway, PE

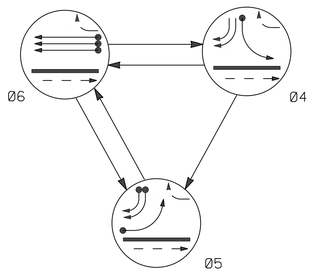
REVISIONS	INIT.	DATE

SEAL: North Carolina Professional Engineer Seal 029904 Jason P. Galloway
Signed by: Jason Galloway 10/8/2024
SIG. INVENTORY NO. 06-0096T3

8:49:28 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0096T3.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-14.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

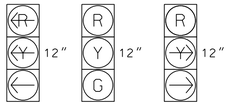
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø5	Ø6	Ø4	FLASH
21,22	G	G	G	R
41,42	~~R~~	~~R~~	~~R~~	~~R~~
43,44	→	R	→	R
51,52	~~R~~	~~R~~	~~R~~	~~R~~
61,62,63	R	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

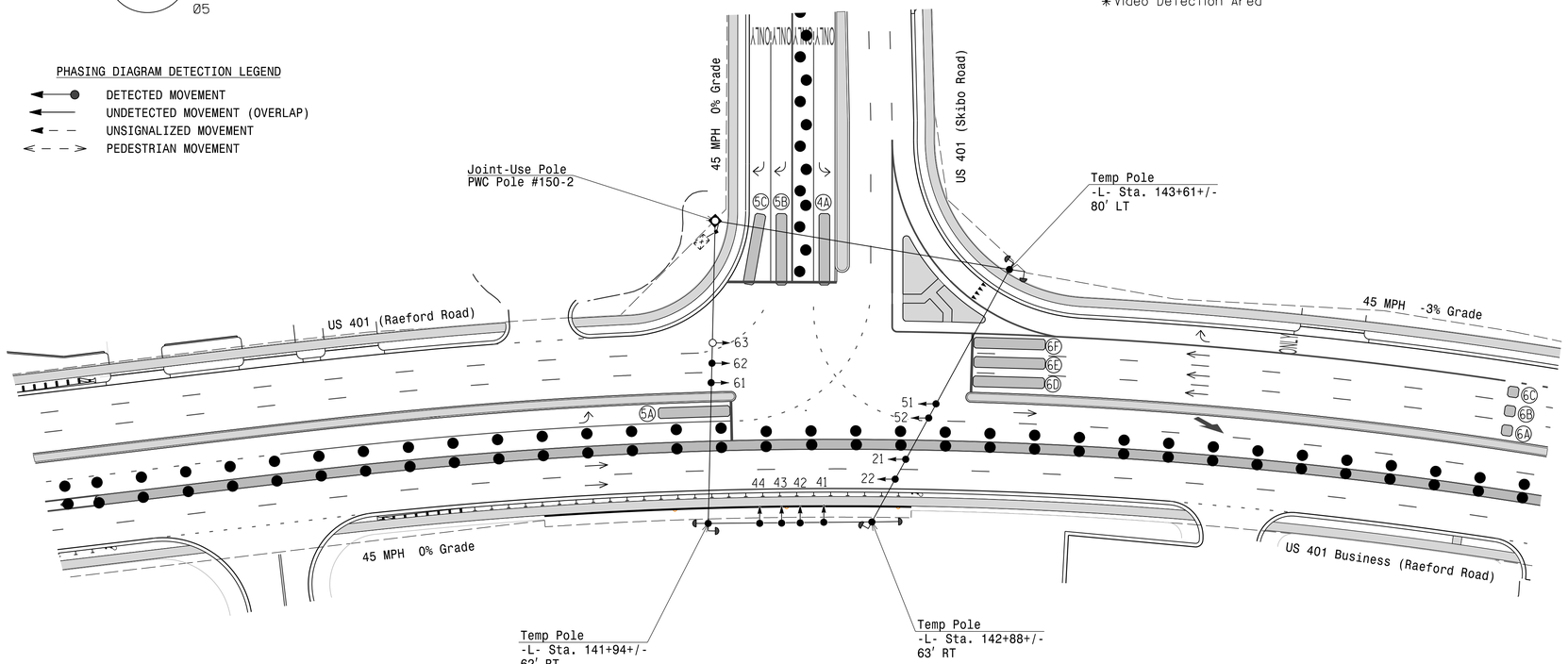


41,42 51,52 | 21,22 61,62,63 | 43,44

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
4A	6X40	0	✳	✳	4	Yes	-	-	-	N	-	✳
5A	6X40	0	✳	✳	5	Yes	-	-	-	N	-	✳
5B	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
5C	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6C	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6E	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6F	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳

✳ Video Detection Area



ASC/3 TIMING CHART

FEATURE	PHASE 4	5	6
Min Green *	7	7	12
Delayed Green	-	-	-
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	2.0	2.0	6.0
Max 1 *	30	35	90
Yellow	3.0	3.0	4.8
Red Clear	2.8	2.9	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	-	-	-
Max Initial *	-	-	-
Time Before Reduction *	-	-	15
Time To Reduce *	-	-	45
Minimum Gap	-	-	3.0
Locking Detector	-	-	-
Recall Position	-	-	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.

3 Phase
Fully Actuated
Fayetteville Signal System

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 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 51, 52, 61, and 62.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◎	Metal Strain Pole	■
▬	Video Detection Area	N/A
▭	Construction Zone	N/A
● ● ●	Drums	N/A

Signal Upgrade
Temporary Design 4 - TMP Phase III - Step 3

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401/US 401 Business
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Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	J. Galloway, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	R. Muncey, PE

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 029904
ENGINEER
JASON P. GALLOWAY

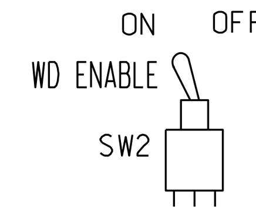
Signed by: Jason Galloway
10DTE2B40B4B46E...
10/8/2024
DATE

SIG. INVENTORY NO. 06-0096T4

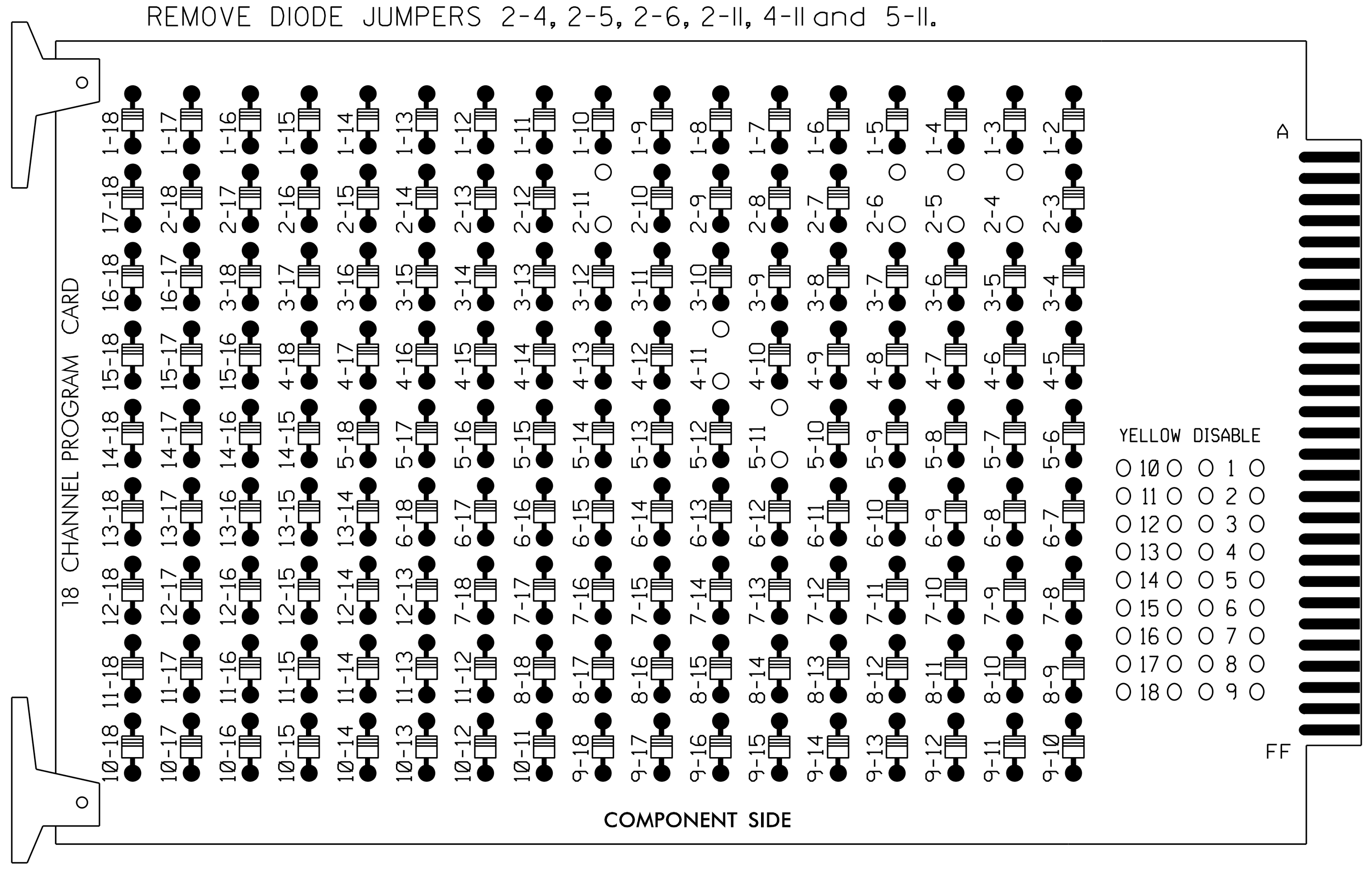
PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-14.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

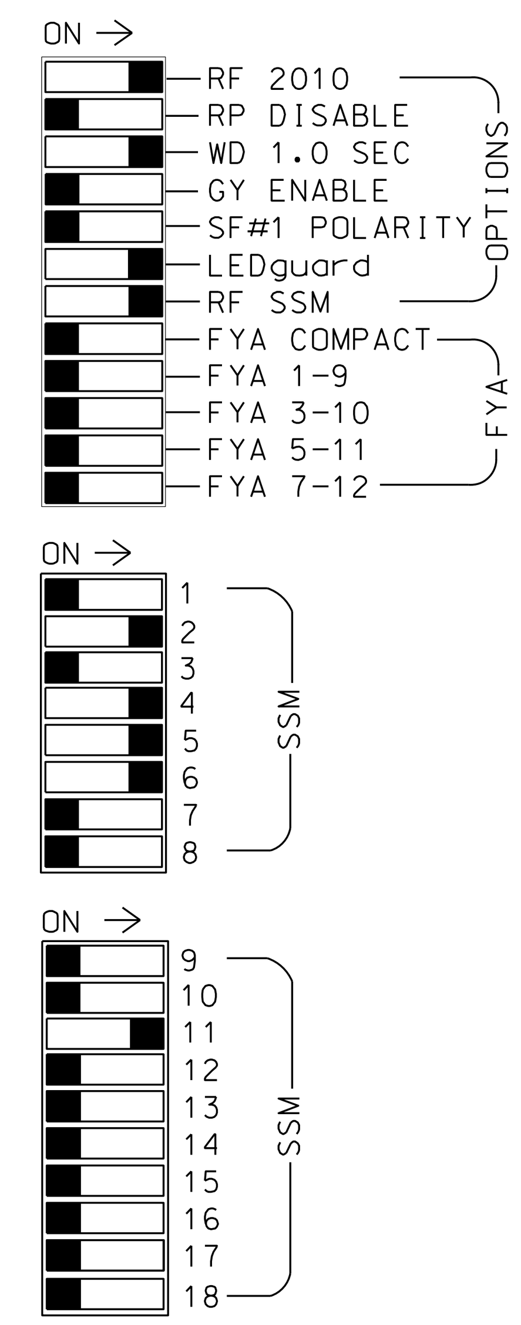
(remove jumpers and set switches as shown)



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



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

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 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 Fayetteville Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070LX
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 W/ 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
OVERLAP G...............*

* See overlap programming detail on this sheet.

SIGNAL HEAD HOOK-UP CHART

	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	OLG	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51,52	61,62, 63	NU	NU	NU	NU	NU	NU	NU	43,44	NU	NU
RED		128						134								A114		
YELLOW		129						135										
GREEN		130						136										
RED ARROW					101		131											
YELLOW ARROW					102		132									A115		
GREEN ARROW					103		133									A116		

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]

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'NORMAL'

```
TMG VEH OVLP...[C] 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 to 'Overlap G'

OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

```
TMG VEH OVLP...[G] TYPE: .......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . X X X . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

END PROGRAMMING

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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.

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switches S2 as OLG, program LD SWITCH 2 as OVLP '7' TYPE 'O' as shown below.

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

NOTICE OVERLAP G ASSIGNED TO LD SWITCH 2 →

LD SWITCH ASSIGN

	PHASE /OVLP	TYPE	DIMMING R	Y	G	D	FLASH PWR	AUT	TGR
1	1	V	.	.	.	+	A	R	X
2	7	O	.	.	.	+	A	R	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	-	A	R	.
6	6	V	.	.	.	-	A	R	X
7	7	O	.	.	.	-	A	R	.
8	8	O	.	.	.	-	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	8	P	.	.	.	-	A	.	.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0096T4
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 4 - TMP Phase III - Step 3
Electrical Detail - Sheet 1 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

Transportation Mobility and Safety Division — ITS & Signals Management Section — State of North Carolina Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

US 401/US 401 Business (Raeford Road) at US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029904 JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E
SIGNATURE DATE

SIG. INVENTORY NO. 06-0096T4

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-14.2

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash.
Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0096T4
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 4 - TMP Phase III - Step 3
Electrical Detail - Sheet 2 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Traffic Engineering Mobility and Safety Division
NC DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401/US 401 Business
(Raeford Road)
at
US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

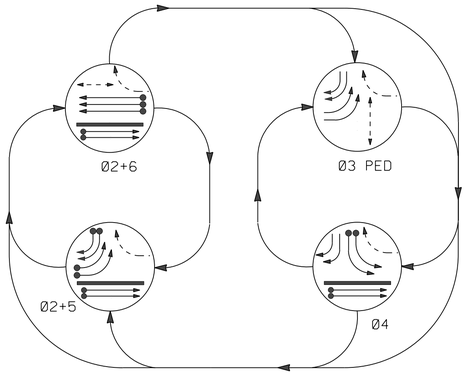
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-0096T4

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-15.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

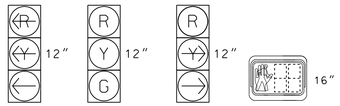
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	ØPED	Ø4	FLASH
21, 22	G	G	R	G	R
41, 42	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
43, 44	→	R	→	→	R
51, 52	←	~~R~~	←	~~R~~	~~R~~
61, 62, 63	R	G	R	R	R
P31, P32	DW	DW	W	DW	DRK
P61, P62	DW	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



41,42 51,52 — 21,22 61,62,63 — 43,44 — P31,P32 P61,P62

ASC/3 DETECTOR INSTALLATION CHART

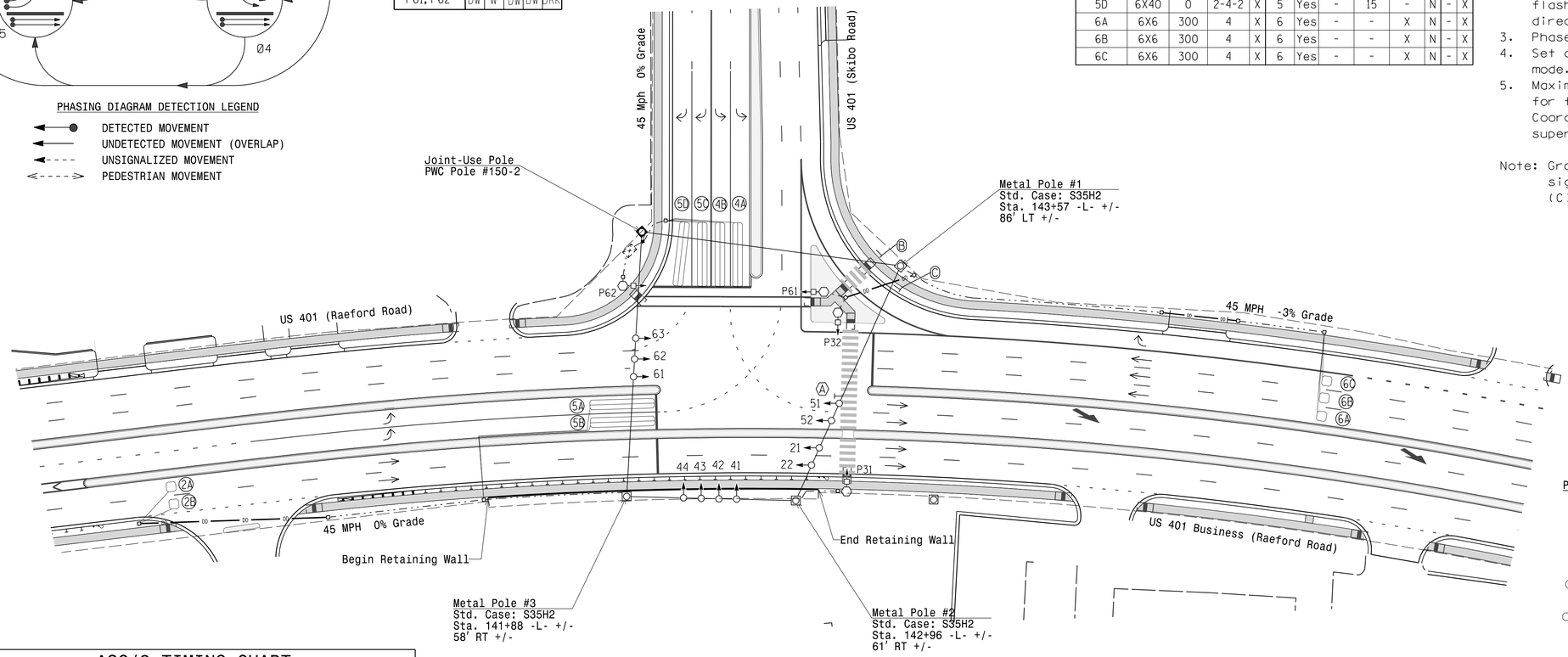
DETECTOR						PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	5	X	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
4B	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	-	-	N	-	X
5B	6X40	0	2-4-2	X	5	Yes	-	-	-	N	-	X
5C	6X40	0	2-4-2	X	5	Yes	-	15	-	N	-	X
5D	6X40	0	2-4-2	X	5	Yes	-	15	-	N	-	X
6A	6X6	300	4	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	4	X	6	Yes	-	-	X	N	-	X
6C	6X6	300	4	X	6	Yes	-	-	X	N	-	X

4 Phase
Fully Actuated
Fayetteville Signal System

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 5 may be lagged.
4. Set all detector units to presence mode.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

Note: Ground mounted pedestrian crossing sign (B) & pedestrian regulatory sign (C) are shown in the Signing Plan.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	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	
	Metal Strain Pole	
DD	Directional Drill	N/A
	Type I Pushbutton Post	
	Type II Signal Pedestal	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	Pedestrian Crossing Sign w/ Downward Diagonal Arrow Sign (W11-2 & W16-7p)	Ⓑ
Ⓒ	"YIELD HERE TO PEDESTRIANS" Sign (R1-5)	Ⓒ

ASC/3 TIMING CHART

FEATURE	PHASE 2	3 (PED)	4	5	6
Min Green *	12	1	7	7	12
Delayed Green	-	-	-	-	-
Walk *	-	7	-	-	7
Ped Clear	-	24	-	-	26
Veh. Extension *	6.0	0.0	2.0	2.0	6.0
Max 1 *	90	0	30	35	90
Yellow	4.8	3.0	3.0	3.0	4.8
Red Clear	2.0	1.0	3.2	3.4	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	1.5	-	-	-	1.5
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.

Signal Upgrade - Final Design

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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'

US 401/US 401 Business
(Raeford Road)
at
US 401 (Skibo Road)
Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

REVISIONS	INIT.	DATE

SEAL 029904 ENGINEER JASON P. GALLOWAY NORTH CAROLINA PROFESSIONAL

Signed by: Jason Galloway 10/8/2024
100TE2B40B4B46E... DATE

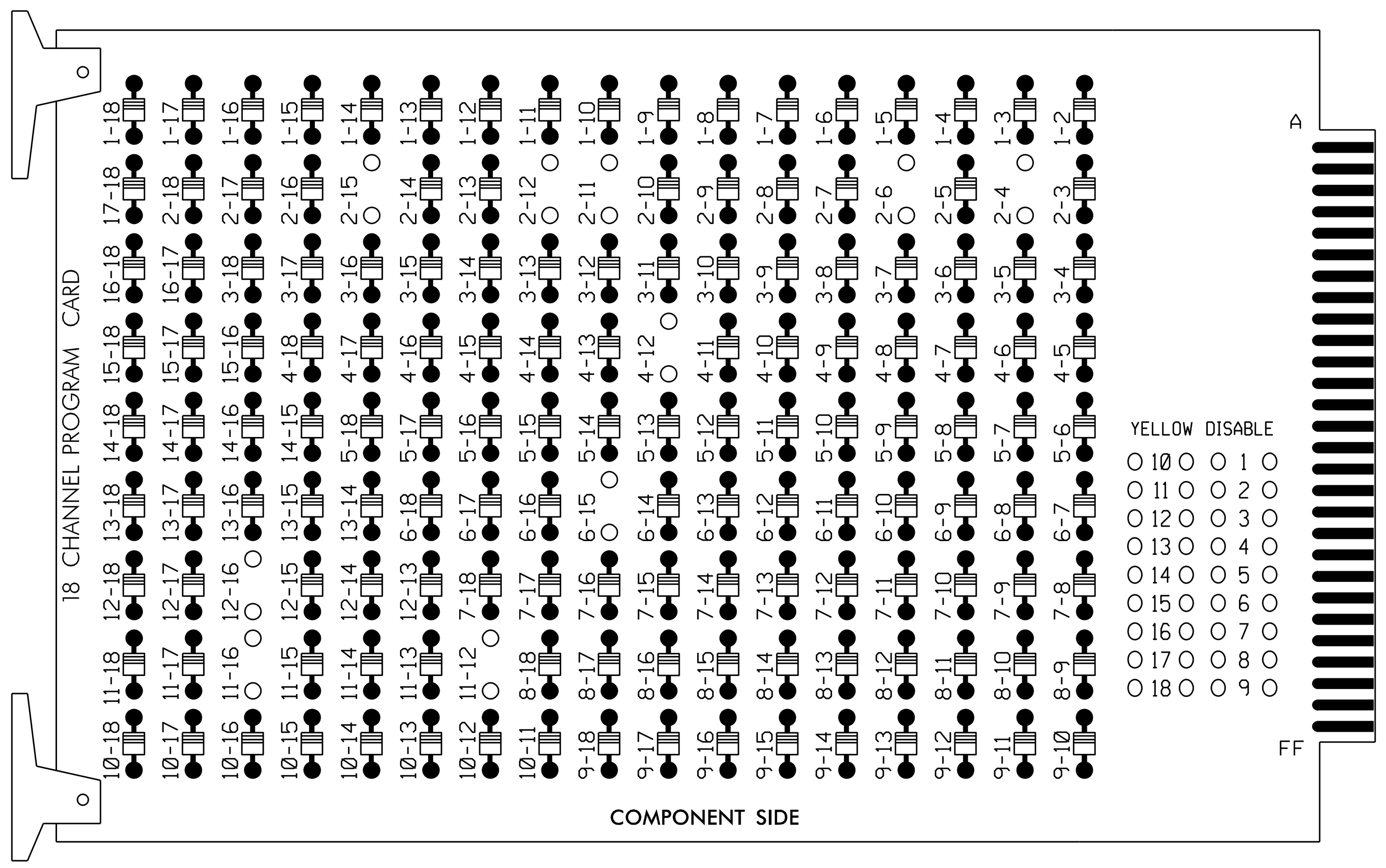
SIG. INVENTORY NO. 06-0096

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-15.1

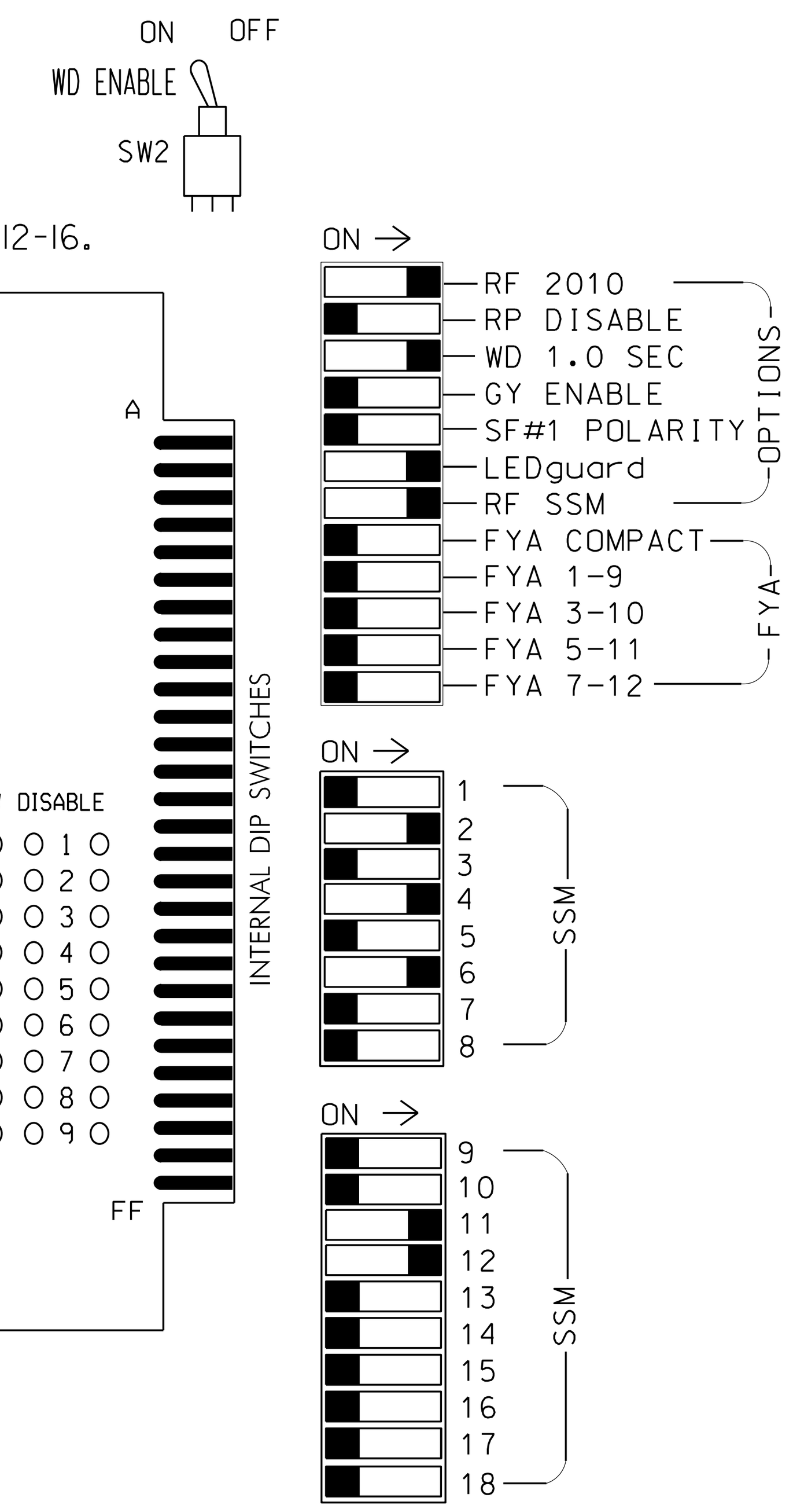
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-4, 2-6, 2-11, 2-12, 2-15, 4-12, 6-15, 11-12, 11-16, and 12-16.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

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 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 Walk.
3. The cabinet and controller are part of the Fayetteville Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070LX
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 W/ AUX. OUTPUT FILE
LOAD SWITCHES USED......S2,S5,S8,S9,S12,AUX S4,AUX S5
PHASES USED.............2,3#,3PED,4,5#,6,6PED
OVERLAP A...............NOT USED
OVERLAP B...............NOT USED
OVERLAP C...............*
OVERLAP D...............*
OVERLAP G...............*

* See overlap programming detail on sheet 2
# For timing purposes only.

SIGNAL HEAD HOOK-UP CHART

	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	OLG	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	NU	NU	41,42	NU	NU	61,62, 63	P61, P62	NU	NU	P31, P32	NU	NU	NU	51,52	43,44	NU
RED		128						134									A101	
YELLOW		129						135										
GREEN		130																
RED ARROW					101											A114		
YELLOW ARROW					102											A115	A102	
GREEN ARROW					103			136								A116	A103	
(hand)									119			110						
(walking person)									121			112						

NU = Not Used

NOTE: Output functions for load switch S2 have been reassigned. See sheet 2 for details.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6PED DC ISOLATOR	FS DC ISOLATOR
	L		Ø2 2B				Ø4 4B							Ø3PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5C	Ø6 6A	Ø6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	Ø5 5B	Ø5 5D	Ø6 6B	NOT USED										

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	12	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES				N
4B	TB4-11,12	I6L	45	14	4	YES				N
5A	TB3-1,2	J1U	55	5	5	YES				N
5B	TB3-3,4	J1L	55	5	5	YES				N
5C	TB3-5,6	J2U	40	6	5	YES		15		N
5D	TB3-7,8	J2L	44	16	5	YES		15		N
6A	TB3-9,10	J3U	64	36	6	YES			X	N
6B	TB3-11,12	J3L	77	46	6	YES			X	N
6C	TB5-1,2	J4U	48	26	6	YES			X	N
PED PUSH BUTTONS										
P31,P32	TB8-8,9	I13L	70	PED 8	3 PED					
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0096
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 1 of 3

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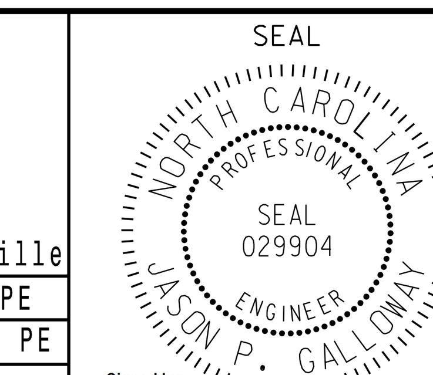
PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL



Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-0096

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-15.2

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 'NORMAL'

```
TMG VEH OVLP...[C] 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 Once

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 X . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

Toggle to 'Overlap G'

OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

```
TMG VEH OVLP...[G] 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

ECONOLITE ASC/3-2070 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]

NOTICE OVERLAP G ASSIGNED TO LD SWITCH 2 →

```
LD SWITCH ASSIGN
    PHASE      DIMMING ---FLASH---
    /OVLP TYPE R Y G D PWR AUT TGR
1     1   V    . . . +  A   R   X
2     7   O    . . . +  A   R   .
3     3   V    . . . +  A   R   X
4     4   V    . . . +  A   R   .
5     5   V    . . . -  A   R   .
6     6   V    . . . -  A   R   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: 06-0096
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 2 of 3

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PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DOCUSIGNED BY: SIGNATURE DATE

SIG. INVENTORY NO. 06-0096

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-15.3

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF    LP CIB CODE ON                 331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit FI" to Green "G"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0096
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Final Design
Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401/US 401 Business
(Raeford Road)
at
US 401 (Skibo Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

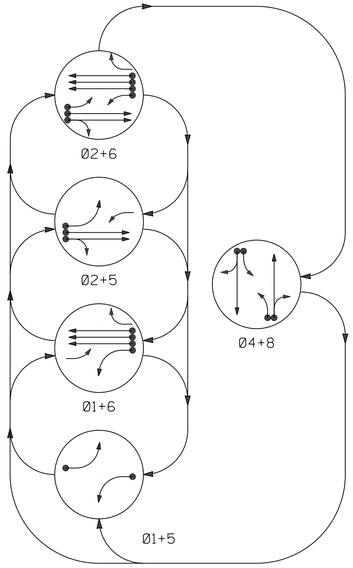
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-0096

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-16.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

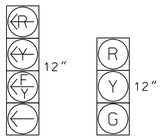
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 5	PHASE 0 1 + 6	PHASE 0 2 + 5	PHASE 0 2 + 6	PHASE 0 4 + 8	FLASH
11	←	←	←F Y	←F Y	←R	←R
21, 22	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51	←	←F	←	←F	←R	←R
61, 62, 63	R	G	R	G	R	R
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

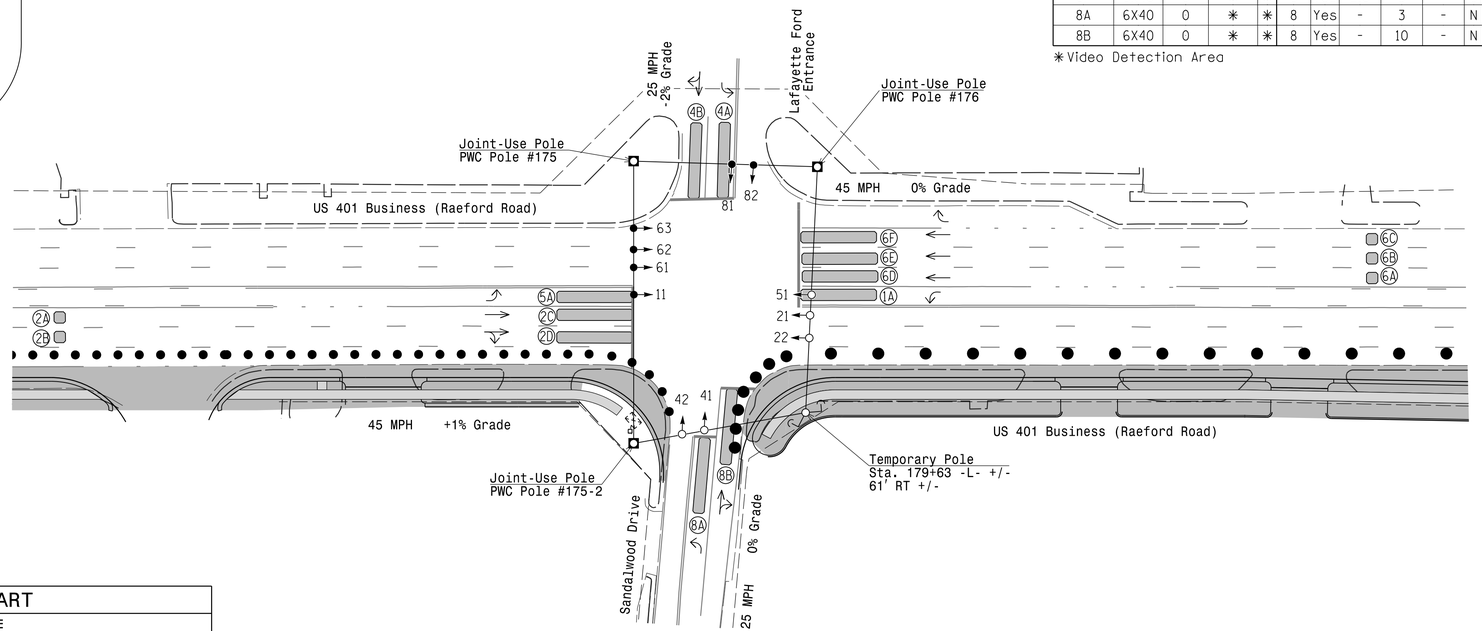
All Heads L.E.D.



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
1A	6X40	0	✳	✳	1	Yes	-	15	-	N	-	✳
					6	Yes	-	3	-	G	-	✳
2A	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2B	6X6	300	✳	✳	2	Yes	-	-	-	N	-	✳
2C	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
2D	6X40	0	✳	✳	2	Yes	2.0	5	-	G	-	✳
4A	6X40	0	✳	✳	4	Yes	-	3	-	N	-	✳
4B	6X40	0	✳	✳	4	Yes	-	10	-	N	-	✳
5A	6X40	0	✳	✳	5	Yes	-	15	-	N	-	✳
					2	Yes	-	3	-	G	-	✳
6A	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6B	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6C	6X6	300	✳	✳	6	Yes	-	-	-	N	-	✳
6D	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6E	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
6F	6X40	0	✳	✳	6	Yes	2.0	5	-	G	-	✳
8A	6X40	0	✳	✳	8	Yes	-	3	-	N	-	✳
8B	6X40	0	✳	✳	8	Yes	-	10	-	N	-	✳

✳ Video Detection Area



5 Phase Fully Actuated Fayetteville Signal System

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 foundation so as not to obstruct sight distance of vehicles turning right on red. Relocate existing cabinet and controller onto new foundation.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Field adjust temporary poles as needed.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	90	15	15	90	15
Yellow	3.0	4.5	3.3	3.0	4.5	3.3
Red Clear	2.1	1.4	2.8	2.8	1.4	2.8
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	-	-	-	-	-
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	
	Modified Signal Head	N/A
	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	
	Metal Strain Pole	
	Video Detection Area	N/A
	Construction Zone	N/A
	Drums	N/A

Signal Upgrade
Temporary Design 1 - TMP Phase I

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Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 401 Business (Raeford Road)
at
Sandalwood Drive/
Lafayette Ford Entrance
Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 | REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE | REVIEWED BY: R. Muncey, PE

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

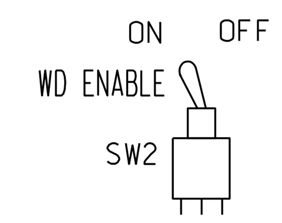
Signed by: Jason Galloway 10/8/2024
DATE

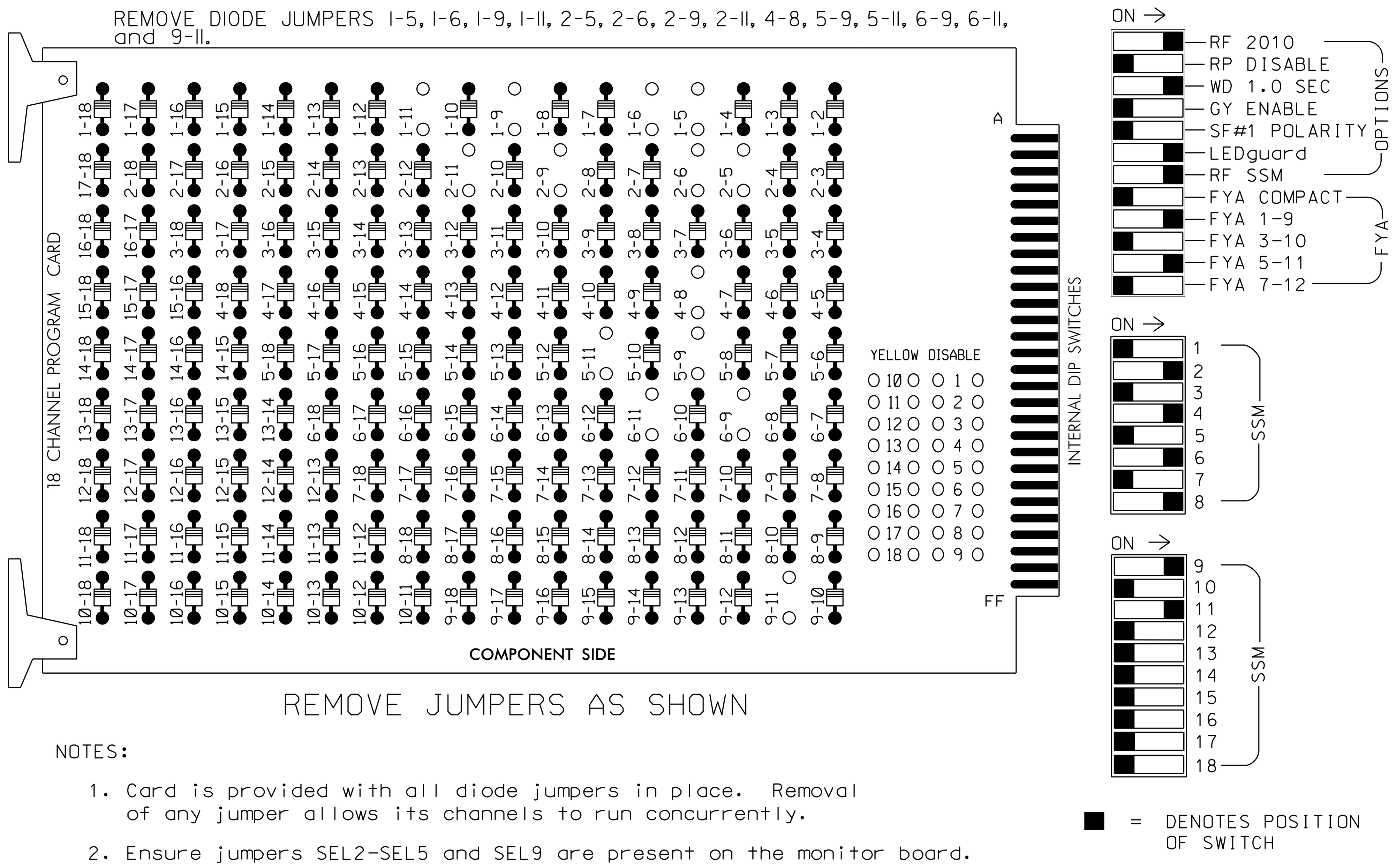
SIG. INVENTORY NO. 06-0491TI

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-16.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)





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 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 Fayetteville Signal System.

EQUIPMENT INFORMATION

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

* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	41,42	NU	51★	61,62, 63	NU	NU	81,82	NU	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											

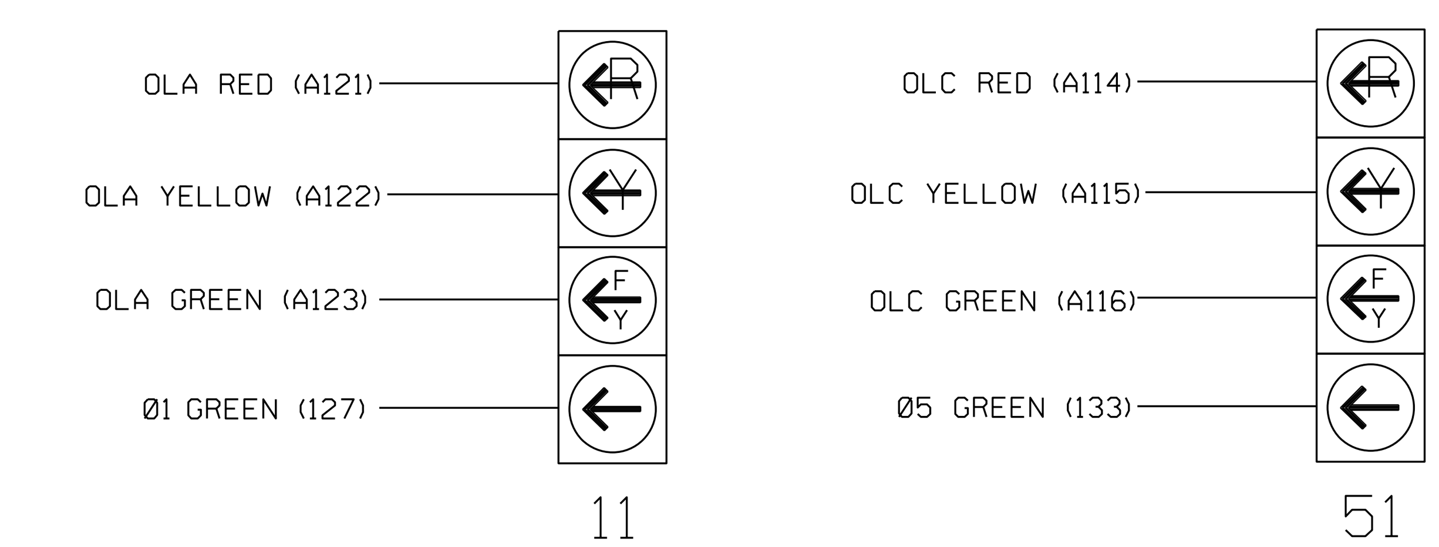
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

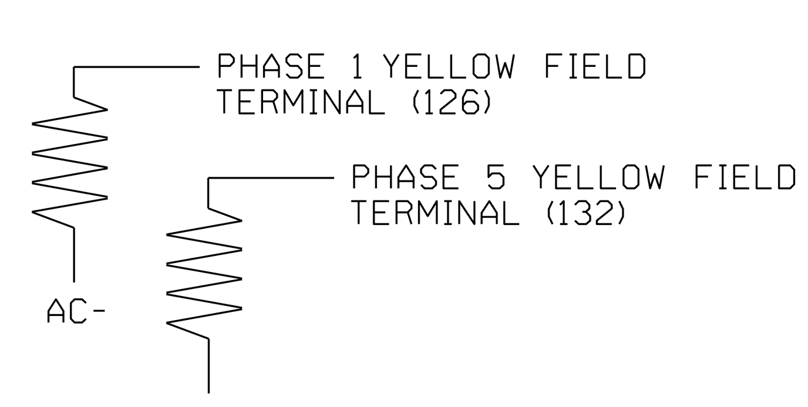
FS = FLASH SENSE
ST = STOP TIME

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0491T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

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)



DETECTOR NOTES

1. For all loops 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.

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Prepared for the Offices of:
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750 N.Greenfield Pkwy,Garner,NC 27529

US 401 Business (Raeford Road)
at
Sandalwood Drive/
Lafayette Ford Entrance

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 029904
JASON P. GALLOWAY
Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0491T1

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

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON". hit "ENT". and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP-------------------------
        1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE     G       G
        A B C D E F G H I J K L M N O P
OVERLAP X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD→ YES   Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0491T1
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

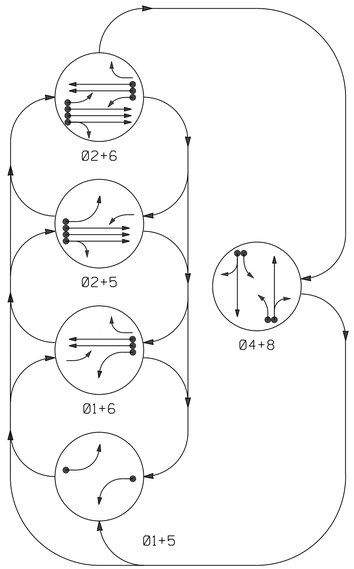
Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-0491T1

8:51:32 AM
U:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0491T1.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-17.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

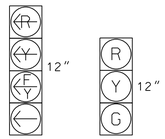
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←FY	←FY	←R	←R
21, 22, 23	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51	←	←FY	←	←FY	←R	←R
61, 62	R	G	R	G	R	R
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



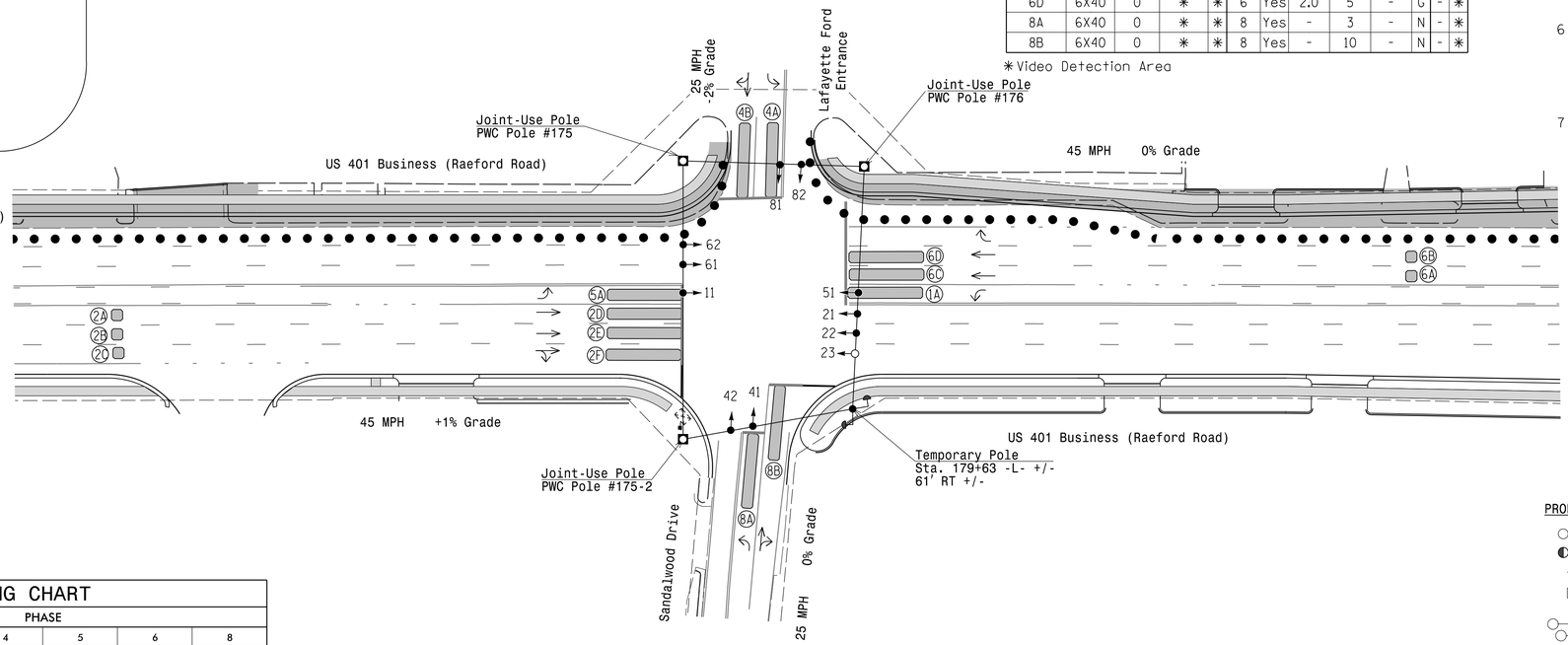
11
51

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
1A	6X40	0	*	*	1	Yes	-	15	-	N	-	*
					6	Yes	-	3	-	G	-	*
2A	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2B	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2C	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2D	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
2E	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
2F	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
4A	6X40	0	*	*	4	Yes	-	3	-	N	-	*
4B	6X40	0	*	*	4	Yes	-	10	-	N	-	*
5A	6X40	0	*	*	5	Yes	-	15	-	N	-	*
					2	Yes	-	3	-	G	-	*
6A	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6B	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6C	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
6D	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
8A	6X40	0	*	*	8	Yes	-	3	-	N	-	*
8B	6X40	0	*	*	8	Yes	-	10	-	N	-	*

*Video Detection Area



ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	90	15	15	90	15
Yellow	3.0	4.5	3.3	3.0	4.5	3.3
Red Clear	2.6	1.1	2.7	2.4	1.1	2.7
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	-	-	-	-	-
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.

5 Phase Fully Actuated Fayetteville Signal System

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. Reposition existing signal heads numbered 61, and 62.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	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	
	Metal Strain Pole	
	Video Detection Area	N/A
	Construction Zone	N/A
	Drums	N/A

Signal Upgrade
Temporary Design 2 - TMP Phase II

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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

US 401 Business (Raeford Road)
at
Sandalwood Drive/
Lafayette Ford Entrance

Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 | REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE | REVIEWED BY: R. Muncey, PE

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

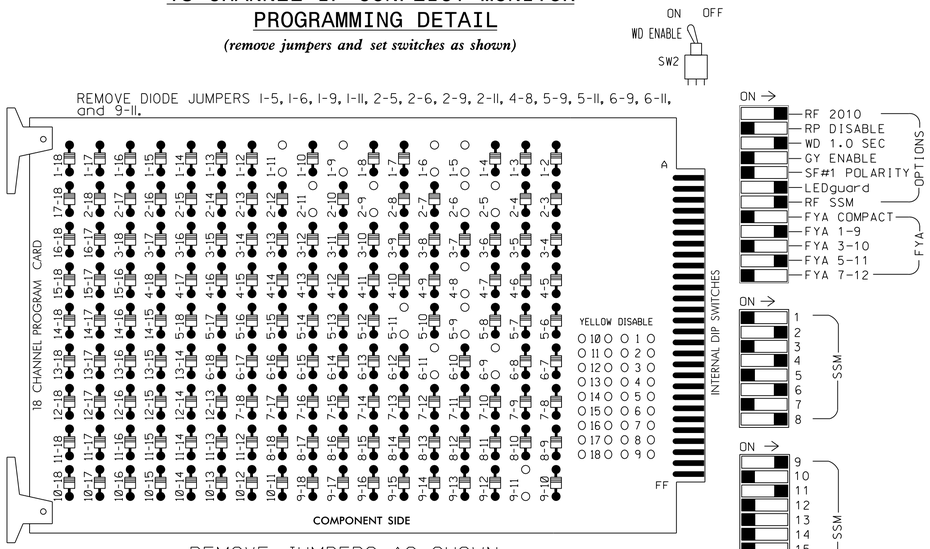
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0491T2

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 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 Fayetteville Signal System.

EQUIPMENT INFORMATION

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

* See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-17.1

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 ★	21,22, 23	NU	NU	41,42	NU	51 ★	61,62	NU	NU	81,82	NU	11 ★	NU	NU	51 ★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											

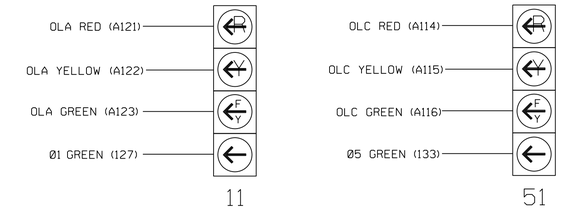
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

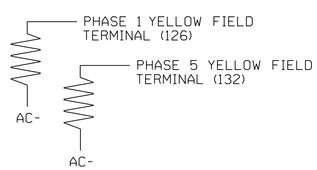
EX.: 1A, 2A, ETC. = LOOP NO.'S

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)



DETECTOR NOTES

1. For all loops 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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0491T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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www.stantec.com
License No. F-0672

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 Business (Raeford Road)
at
Sandalwood Drive/
Lafayette Ford Entrance
Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL 029904 NORTH CAROLINA PROFESSIONAL ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DOCUSIGNED BY:
DATE

SIG. INVENTORY NO. 06-0491T2

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-17.2

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

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                 331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP--------------------------
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..   0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES   Y- G: NO
```

Scroll down on this screen and set "Exit FI" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0491T2
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 2 of 2

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NC DEPARTMENT OF TRANSPORTATION
Traffic Signal Management Section
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Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DOCUSIGNED BY: DATE

SIG. INVENTORY NO. 06-0491T2

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-18.0

PHASING DIAGRAM

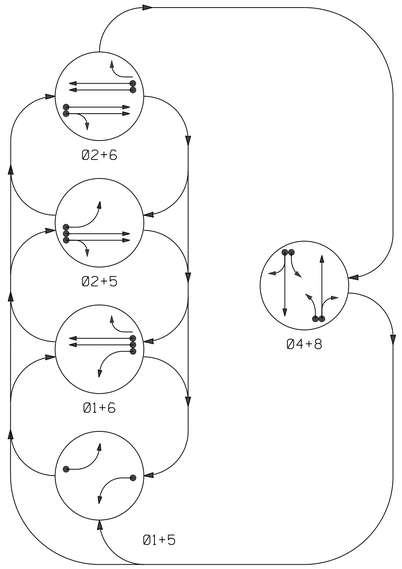
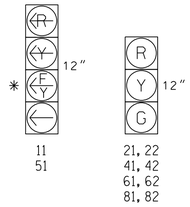


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	04+08	FLASH
11	←	←	←R	←R	←R	←R
21, 22	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51	←	←R	←	←R	←R	←R
61, 62	R	G	R	G	R	R
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



* Disconnect FYA wiring on signalheads 11 and 51.

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	*	*	1	Yes	-	-	-	N	-	*
2A	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2B	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2C	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
2D	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
4A	6X40	0	*	*	4	Yes	-	3	-	N	-	*
4B	6X40	0	*	*	4	Yes	-	10	-	N	-	*
5A	6X40	0	*	*	5	Yes	-	-	-	N	-	*
6A	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6B	6X6	300	*	*	6	Yes	-	-	-	N	-	*
6C	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
6D	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
8A	6X40	0	*	*	8	Yes	-	3	-	N	-	*
8B	6X40	0	*	*	8	Yes	-	10	-	N	-	*

* Video Detection Area

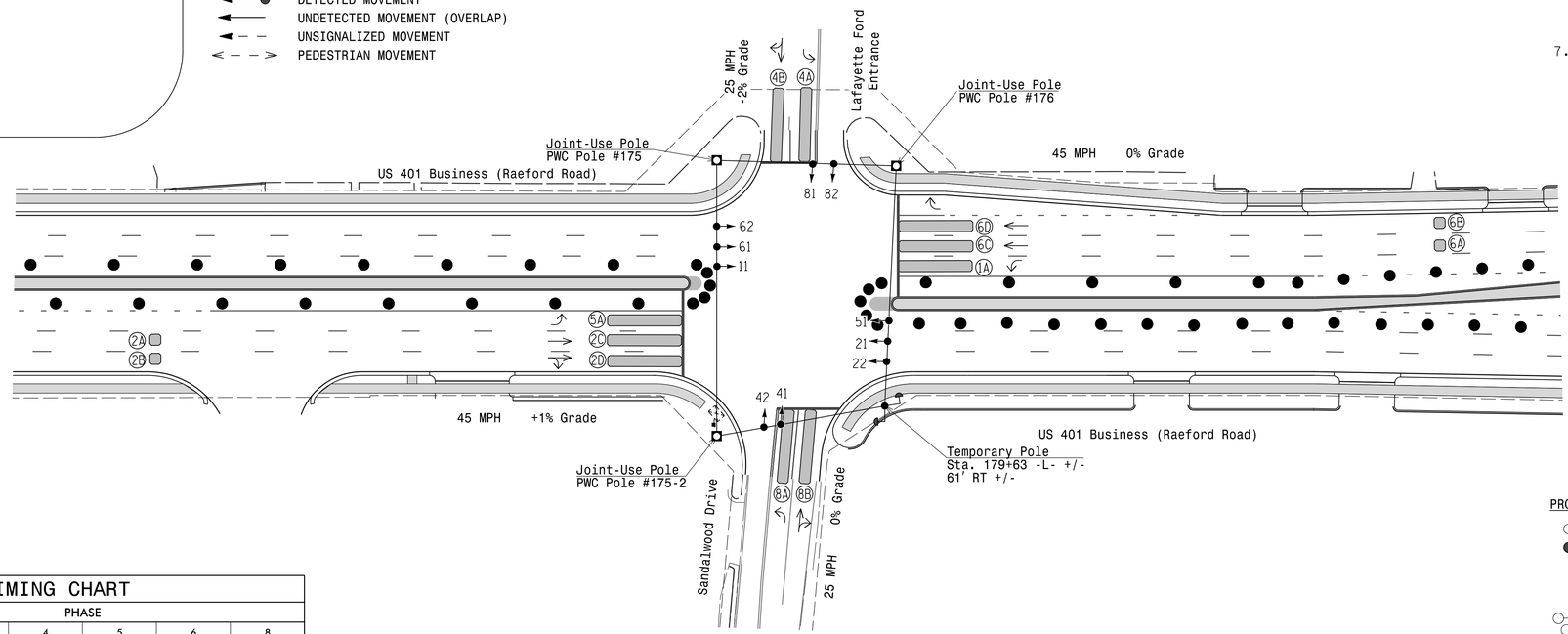
5 Phase Fully Actuated Fayetteville Signal System

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. Reposition signal heads numbered 11, 21, 22, 51, 61, and 62.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	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	
	Metal Strain Pole	
	Video Detection Area	N/A
	Construction Zone	N/A
	Drums	N/A

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	-	-	-	-	-
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	90	15	15	90	15
Yellow	3.0	4.5	3.3	3.0	4.5	3.3
Red Clear	3.2	1.3	3.2	3.3	1.3	3.2
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	-	-	-	-	-
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
Temporary Design 3 - TMP Phase III

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SCALE: 0 40 1"=40'

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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

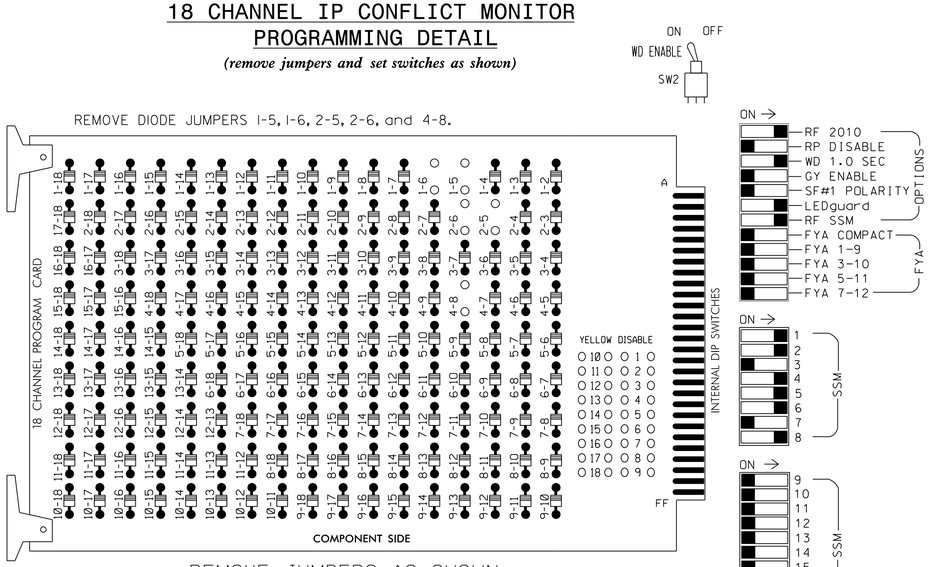
Signed by: Jason Galloway 10/8/2024
DATE

SIG. INVENTORY NO. 06-0491T3

10/8/2024
8:52:27 AM
U:\Traffic\TMS\Signals - U-4405B\Design\Signal Designs\Temporary Designs\U-4405B_sig_dsn_06-0491T3.dgn
User:jgalloway

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Return controller to Factory Defaults before programming per this electrical detail.
3. Program phases 4 and 8 for Dual Entry.
4. Program controller to start up in phase 2 Green and 6 Green.
5. The cabinet and controller are part of the Fayetteville Signal System.

EQUIPMENT INFORMATION

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

* See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-18.1

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★	21,22	NU	NU	41,42	NU	51★	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	125						131											
YELLOW ARROW	126						132											
GREEN ARROW	127						133											

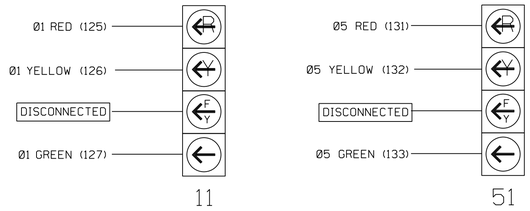
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

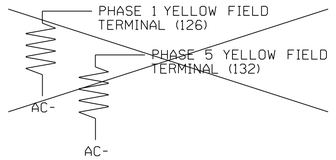
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L														ST DC ISOLATOR
FILE "J" U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" L														

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)

IMPORTANT! Remove resistors from field terminals as shown above, if present.

DETECTOR NOTES

1. For all loops 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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0491T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 3 - TMP Phase III
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Transportation Mobility and Safety Division, Traffic Engineering Branch, Traffic Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 401 Business (Raeford Road)
at
Sandalwood Drive/
Lafayette Ford Entrance
Division 6 Cumberland County Fayetteville

PLAN DATE:	August 2024	REVIEWED BY:	R. Muncey, PE
PREPARED BY:	D. Waller, PE	REVIEWED BY:	J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL 029904 NORTH CAROLINA PROFESSIONAL ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
DocuSigned by: DATE

SIG. INVENTORY NO. 06-0491T3

8:52:42 AM
U:\Traffic Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0491T3.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-18.2

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER", select "LP SET CIB ON", hit "ENT", and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF    LP CIB CODE ON                 331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC", then 1 for "LOGIC STATEMENT CONTROL", next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP-------------------------
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE       G       G
          A B C D E F G H I J K L M N O P
OVERLAP   X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES    Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0491T3
DESIGNED: AUG 2024
SEALED: 10/8/2024
REVISED: N/A

Temporary Design 3 - TMP Phase III
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024	REVIEWED BY: R. Muncey, PE
PREPARED BY: D. Waller, PE	REVIEWED BY: J. Galloway, PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

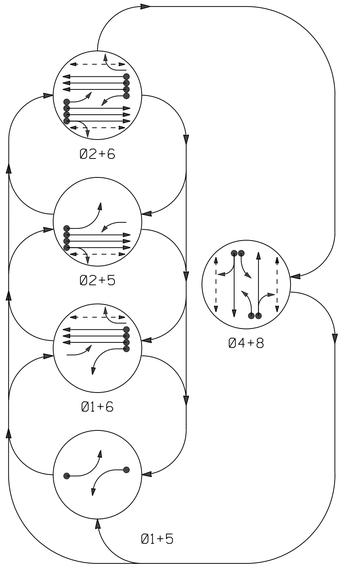
Signed by: Jason Galloway 10/8/2024
SIGNATURE DATE

SIG. INVENTORY NO. 06-0491T3

8:52:49 AM
M:\Traffic\Signals - U-4405B\Design\Electrical Details\Temporary Design\U-4405B_sig_ele_06-0491T3.dgn
User:jgalloway

PROJECT REFERENCE NO.	SHEET NO.
U-4405B	SIG-19.0

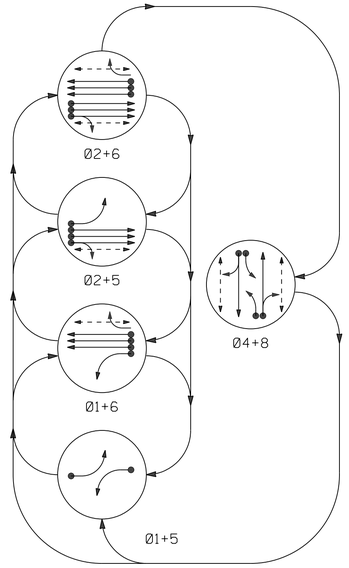
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←R	←R	←FY	←FY	←R	←R
21, 22	R	R	G	G	R	R
41	←R	←R	←R	←R	←FY	←R
42, 43	R	R	R	R	G	R
51	←R	←FY	←R	←FY	←R	←R
61, 62, 63	R	G	R	G	R	R
81	←R	←R	←R	←R	←FY	←R
82, 83	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

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←R	←R	←R	←R	←R	←R
21, 22	R	R	G	G	R	R
41	←R	←R	←R	←R	←FY	←R
42, 43	R	R	R	R	G	R
51	←R	←R	←R	←R	←R	←R
61, 62, 63	R	G	R	G	R	R
81	←R	←R	←R	←R	←FY	←R
82, 83	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

DETECTOR 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	X	1	Yes	-	15★	-	N	-	X
					6#	Yes	-	-	-	G	-	X
2A	6X6	300	4	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	4	X	2	Yes	-	-	X	N	-	X
2C	6X6	300	4	X	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	3	-	N	-	X
4B	6X40	0	2-4-2	X	4	Yes	-	10	-	N	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	15★	-	N	-	X
					2#	Yes	-	-	-	G	-	X
6A	6X6	300	6	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	6	X	6	Yes	-	-	X	N	-	X
6C	6X6	300	6	X	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	3	-	N	-	X
8B	6X40	0	2-4-2	X	8	Yes	-	10	-	N	-	X

Disable Phase call for loop during Alternate Phasing Operation.
★ Disable Delay during Alternate Phasing Operation.

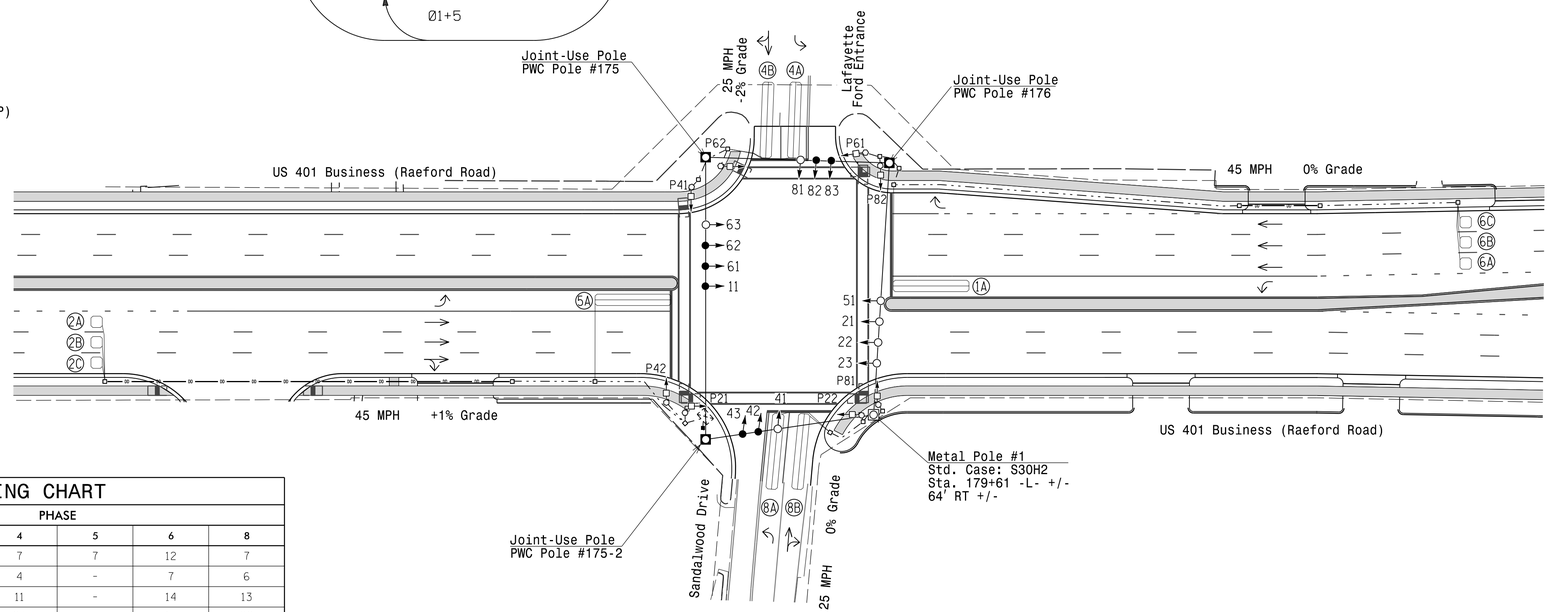
5 Phase
Fully Actuated
Fayetteville Signal System

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. Reposition signal heads numbered 11, 61, 62, and 63.
5. Set all detector units to presence mode.
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 (City) Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	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	→
◯	Metal Strain Pole	■
⬡	Type II Signal Pedestal	⬢

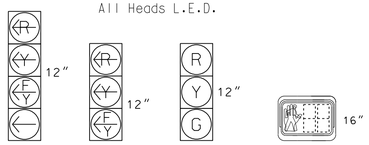
ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Delayed Green	-	7	4	-	7	6
Walk *	-	14	11	-	14	13
Ped Clear	-	19	24	-	13	29
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	90	15	15	90	15
Yellow	3.0	4.5	3.3	3.0	4.5	3.3
Red Clear	3.1	1.9	3.3	3.3	1.9	3.3
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	1.5	-
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	-	-	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 FACE I.D.

All Heads L.E.D.



Signal Upgrade - Final Design

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Division 6 Cumberland County Fayetteville

PLAN DATE: August 2024 REVIEWED BY: J. Galloway, PE
PREPARED BY: D. Waller, PE REVIEWED BY: R. Muncey, PE

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL 029904 NORTH CAROLINA PROFESSIONAL ENGINEER JASON P. GALLOWAY

Signed by: Jason Galloway 10/8/2024
10D1E2B40B4B46E DATE

SIG. INVENTORY NO. 06-0491