

C:\MS&S\0115-Signals\Signal Design Section\Central Region\Div 9\I-5880\I-5880_sig_tsh.dgn
07-MAY-2025 13:28
jcalder

Contract: C204975

Project: I-5880

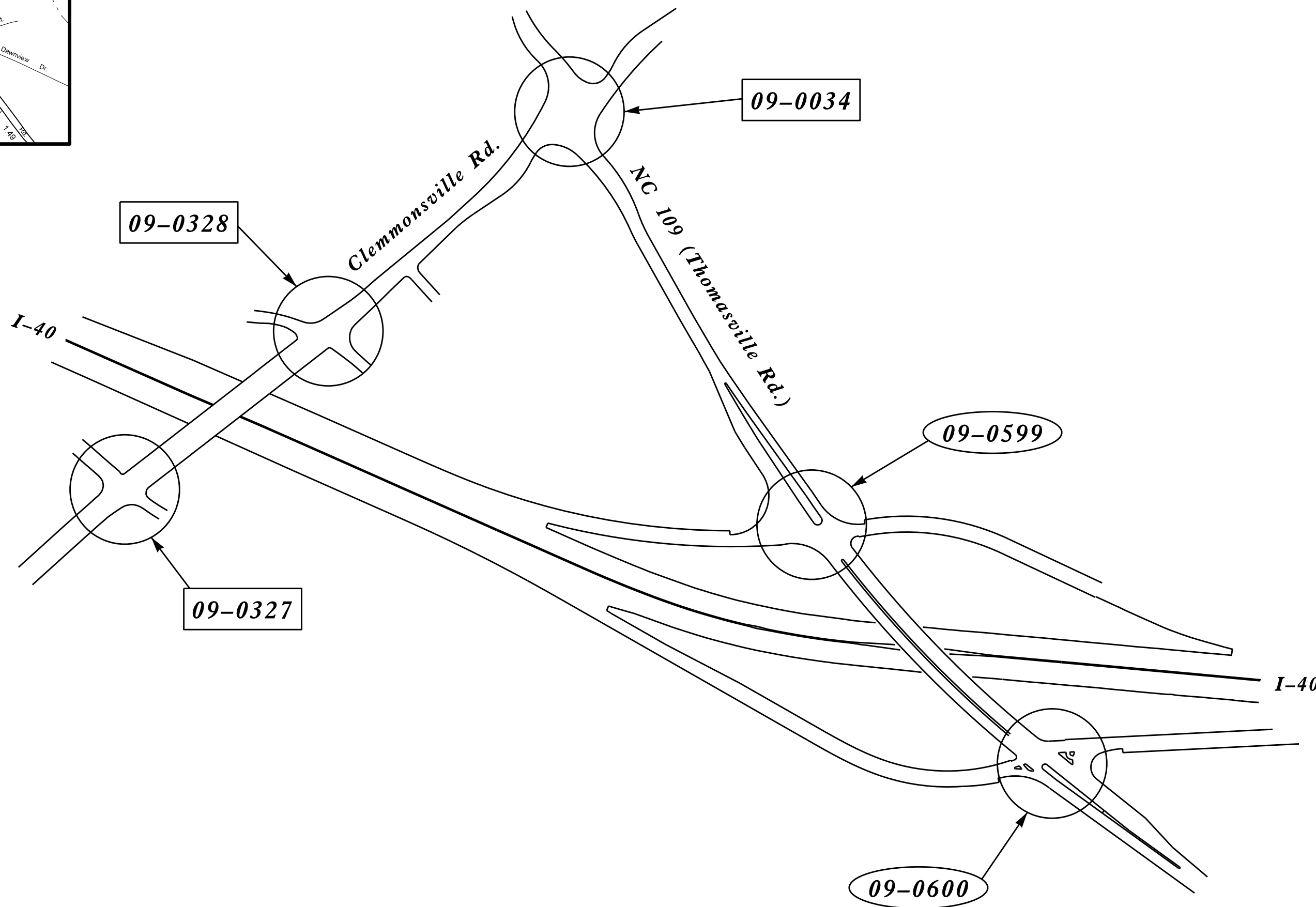
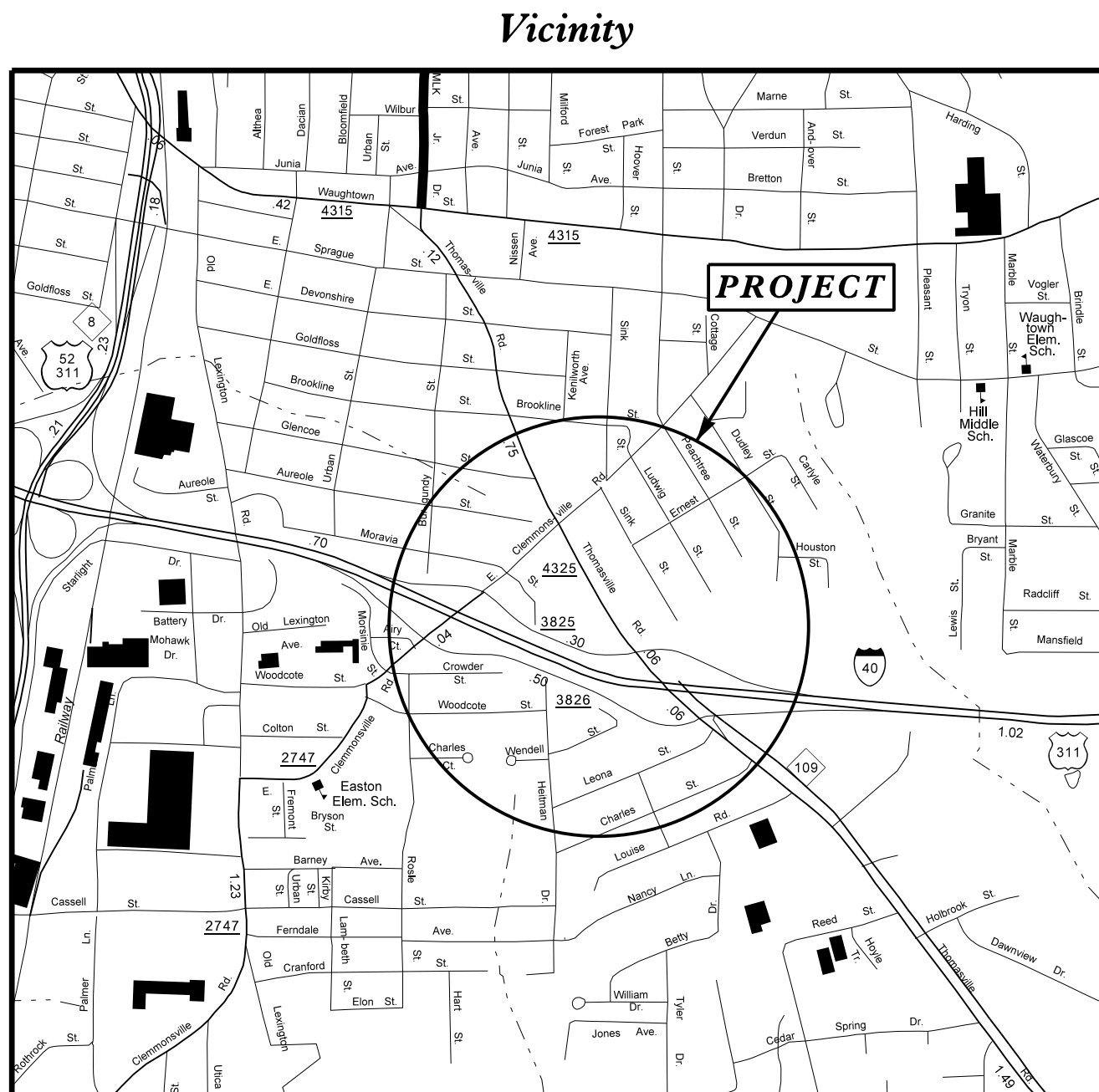
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

Project No.	Sheet No.
I-5880	Sig. 1.0

FORSYTH COUNTY

LOCATION: I-40 AT NC 109 (THOMASVILLE ROAD) INTERCHANGE

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



- - Signal to be Removed
- - Signal to be Upgraded

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

Sheet #	Reference #
Sig. 1.0	-----
Sig. 2.0-5.1	09-0034
Sig. 6.0-7.2	09-0327
Sig. 8.0-9.1	09-0328
Sig. 10.0-13.2	09-0599
Sig. 14.0-17.4	09-0600
M1A-M9	-----
SCP 1-12	-----

Index of Plans

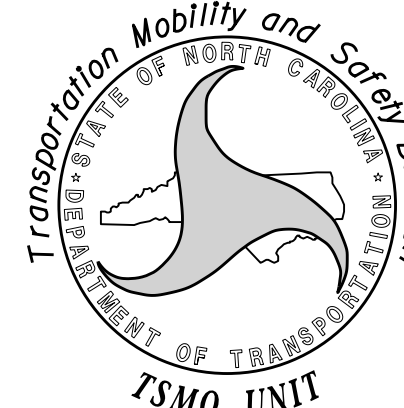
Title Sheet	Location/Description
E. Clemmonsville Road at SR 4325 (Thomasville Road)	
SR 2741 (Clemmonsville Road) at I-40 EB Ramp and SR 3826 (I-40 EB Frontage Road)	
SR 2747 (Clemmonsville Road) at I-40 WB Ramp and SR 3825 (I-40 WB Frontage Road)	
NC 109/SR 4325 (Thomasville Road) at I-40 WB Ramp and SR 3825 (I-40 WB Frontage Road)	
NC 109/SR 4325 (Thomasville Road) at I-40 EB Ramp and SR 3825 (I-40 EB Frontage Road)	
Standard Metal Pole Sheets	
Signal Communication Plans	

TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATIONS UNIT

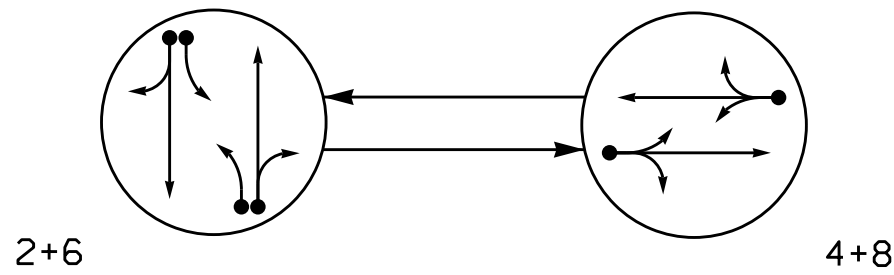
Contacts:

Robert J. Ziemba, PE - Central Region Signals Engineer
Ryan W. Hough, PE - Signal Equipment Design Engineer
Gregg Green - Signal Communications Project Engineer

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



PHASING DIAGRAM



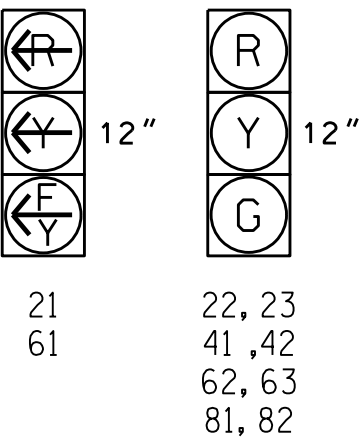
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2 + 6	4 + 8	FLASH
21	Y	R	R
22, 23	G	R	R
41, 42	R	G	R
61	Y	R	R
62, 63	G	R	R
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
2B*	6X40	0	*	Y	2	Y	Y	-	-	-	-	*
4A*	6X40	0	*	Y	4	Y	Y	-	-	5	-	*
6A*	6X6	70	*	Y	6	Y	Y	-	-	-	-	*
6B*	6X40	0	*	Y	6	Y	Y	-	-	-	-	*
8A*	6X40	0	*	Y	8	Y	Y	-	-	5	-	*

* Non-Intrusive detection zone.

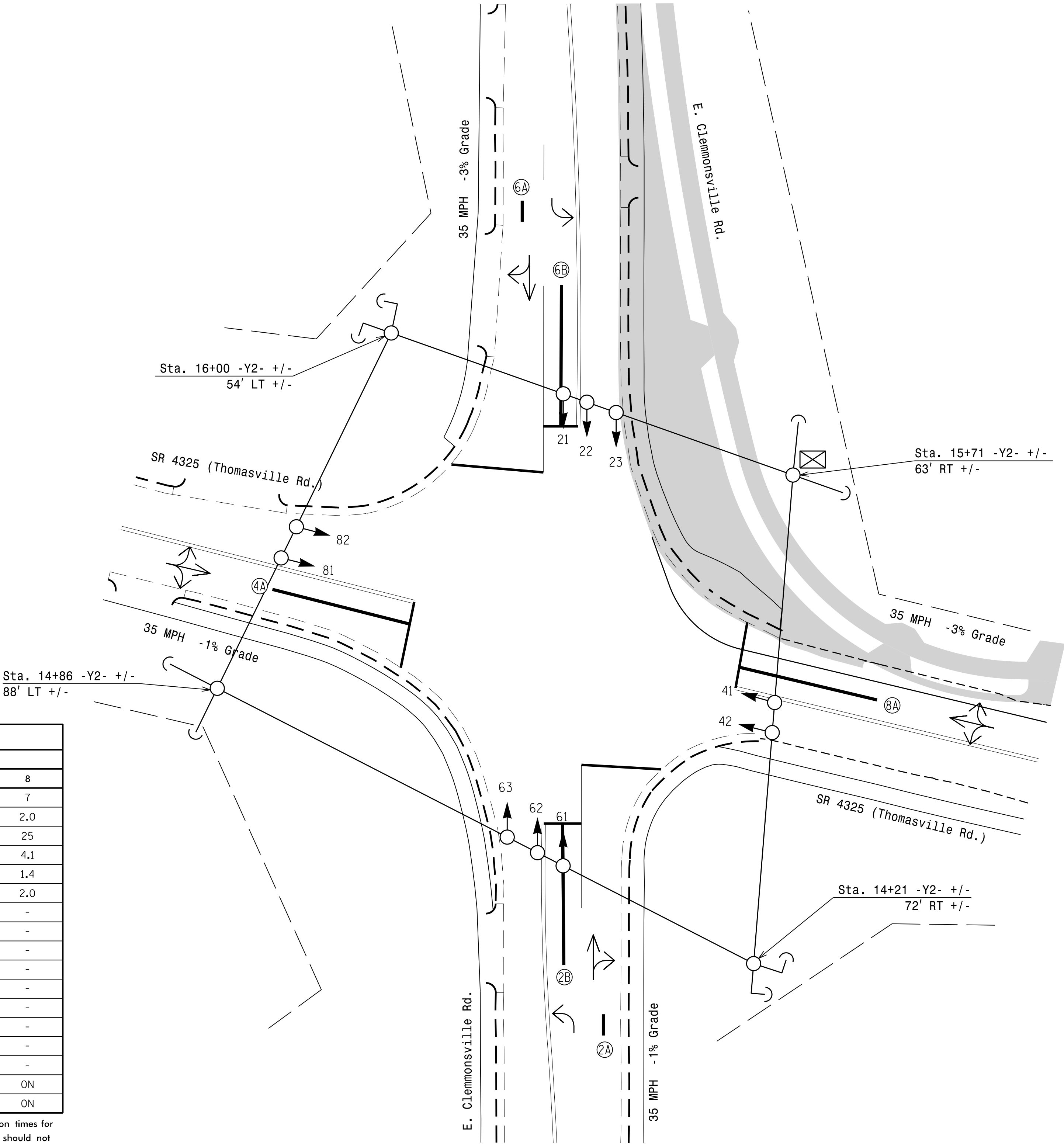
2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	45	25	45	25
Yellow Clearance	4.1	4.1	4.1	4.1
Red Clearance	1.4	1.4	1.4	1.4
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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



LEGEND

PROPOSED	EXISTING

Signal Upgrade -
Temporary Design 1 (TMP Phase I)

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

E. Clemmons Road
at
SR 4325 (Thomasville Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS	INIT.	DATE

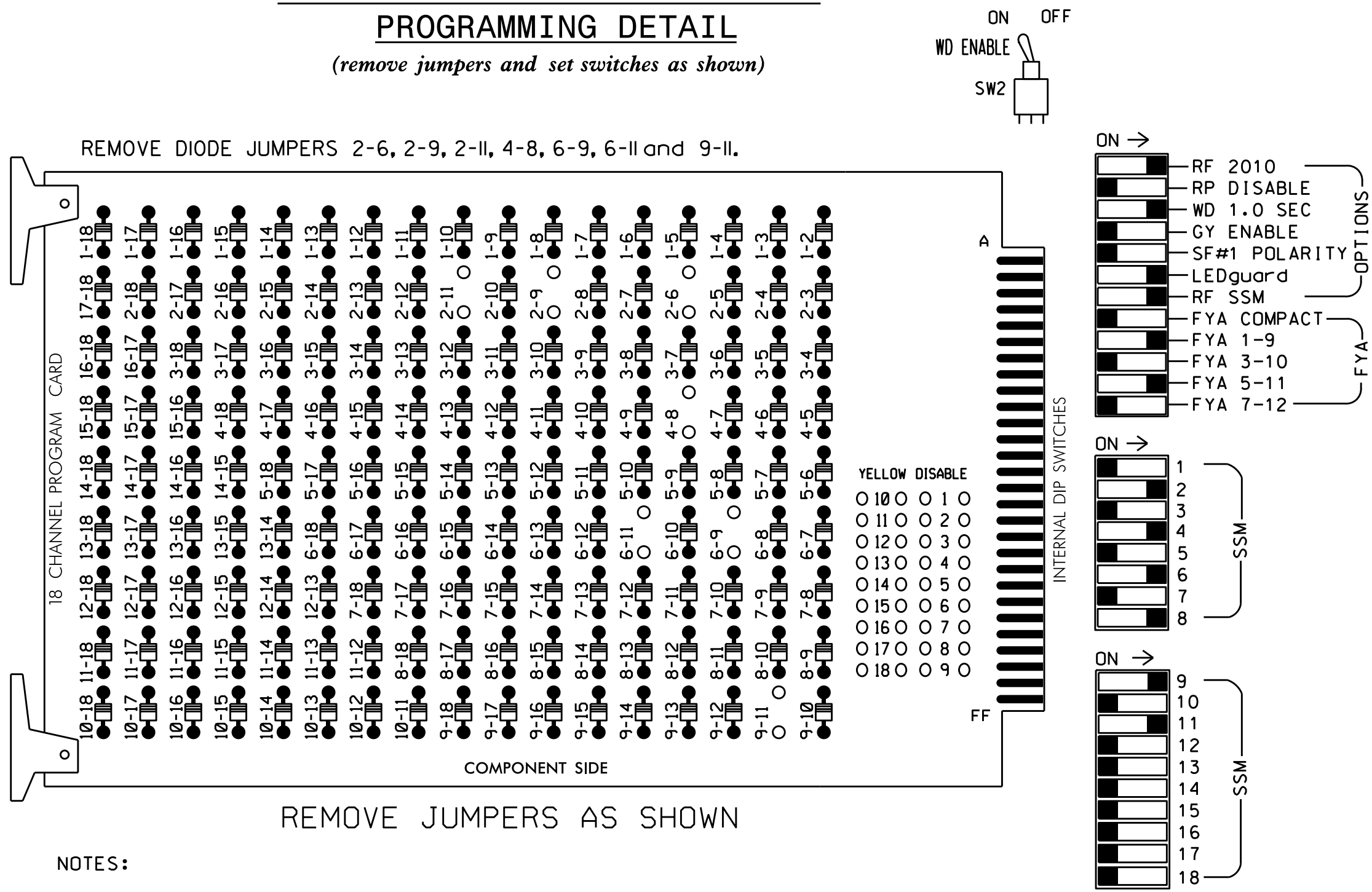
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
026486
ROBERT J. ZIMMER
DATE
01/02/2025
SIG. INVENTORY NO. 09-0034T1

09-000-2025, 13-13
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JTPeter\scm

18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Disabe all phases for Startup In Green.
- Program 2 and 6 as First Phases.
- Disable all phases for Yellow Flash.
- Program overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

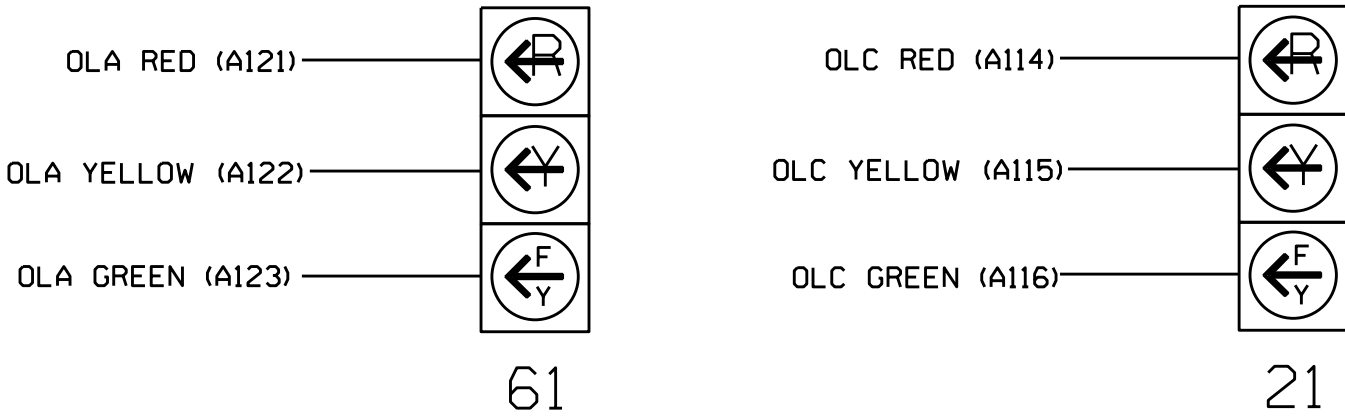
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA★	OLB	SPARE	OLC★	OLD	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81,82	NU	61	NU	NU	21	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																		

NU = Not Used

★ See pictorial of head wiring in detail below.

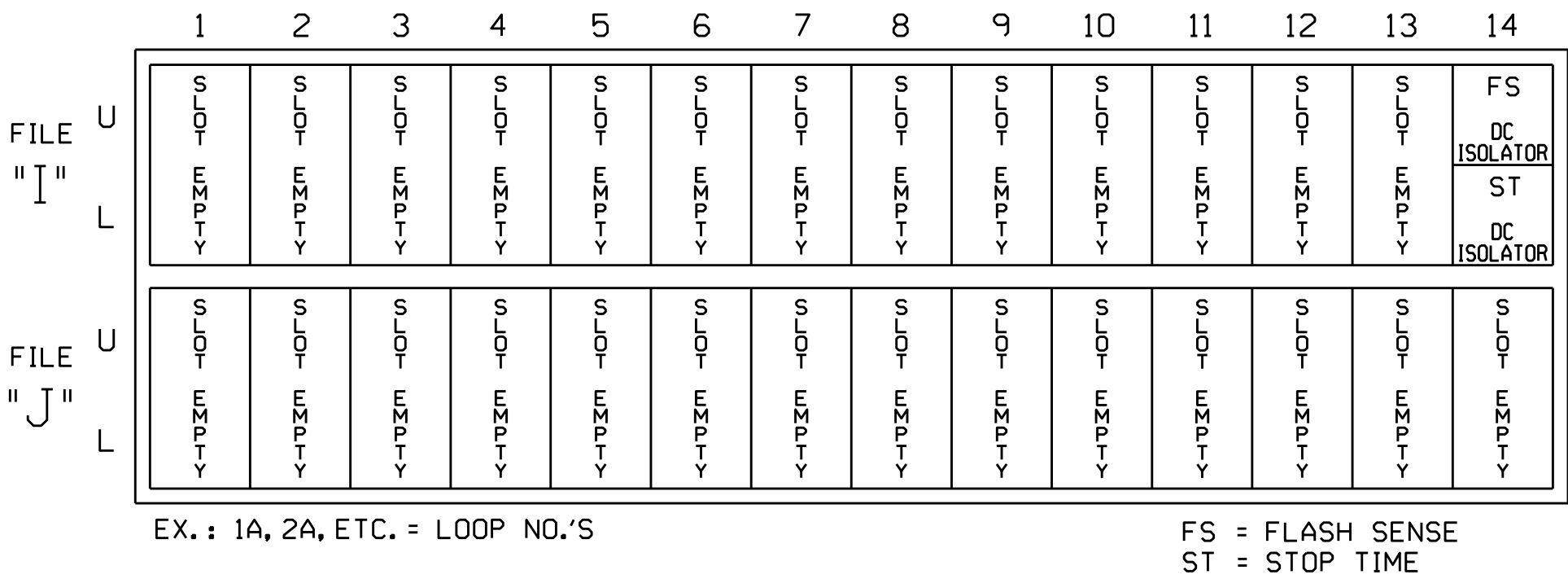
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

Install a non-intrusive 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.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

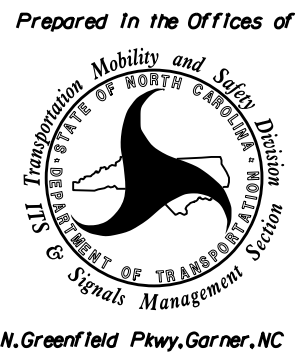
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

Electrical Detail - Temporary Design 1 (TMP Phase I)

ELECTRICAL AND PROGRAMMING
DETAILS FOR:



E. Clemmonsville Road
at
SR 4325 (Thomasville Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2024 REVIEWED BY:

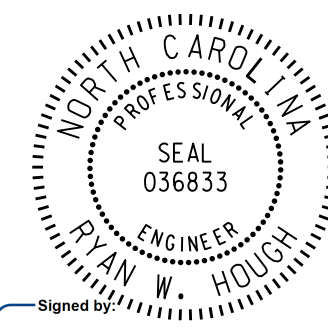
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

SIGNATURE DATE

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SIGNATURES COMPLETED

SEAL



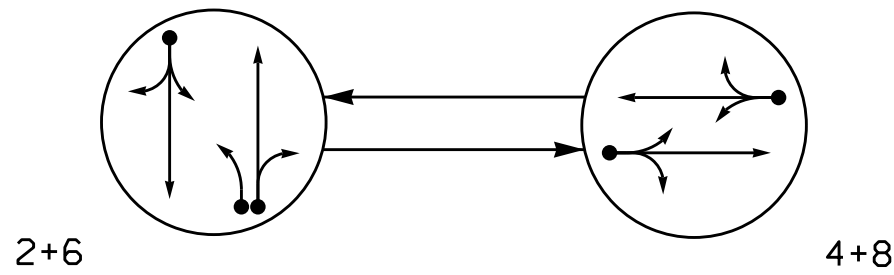
Signed by: Ryan W. Hough

430320FAA265463 01/13/2025

SIGNATURE DATE

SIG. INVENTORY NO. 09-0034T1

PHASING DIAGRAM



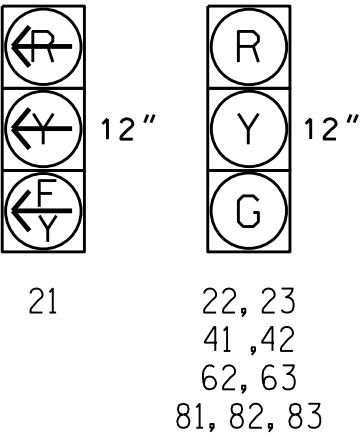
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2 + 6	4 + 8	FLASH
21	Y	R	R
22, 23	G	R	R
41, 42	R	G	R
62, 63	G	R	R
81, 82, 83	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART									
INDUCTIVE LOOPS					DETECTOR PROGRAMMING				
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME
2A*	6X6	70	*	-	2	Y	Y	-	-
2B*	6X40	0	*	-	2	Y	Y	-	-
4A*	6X40	0	*	-	4	Y	Y	-	5
6A*	6X40	0	*	Y	6	Y	Y	-	-
8A*	6X40	0	*	Y	8	Y	Y	-	-

* Non-Intrusive detection zone.

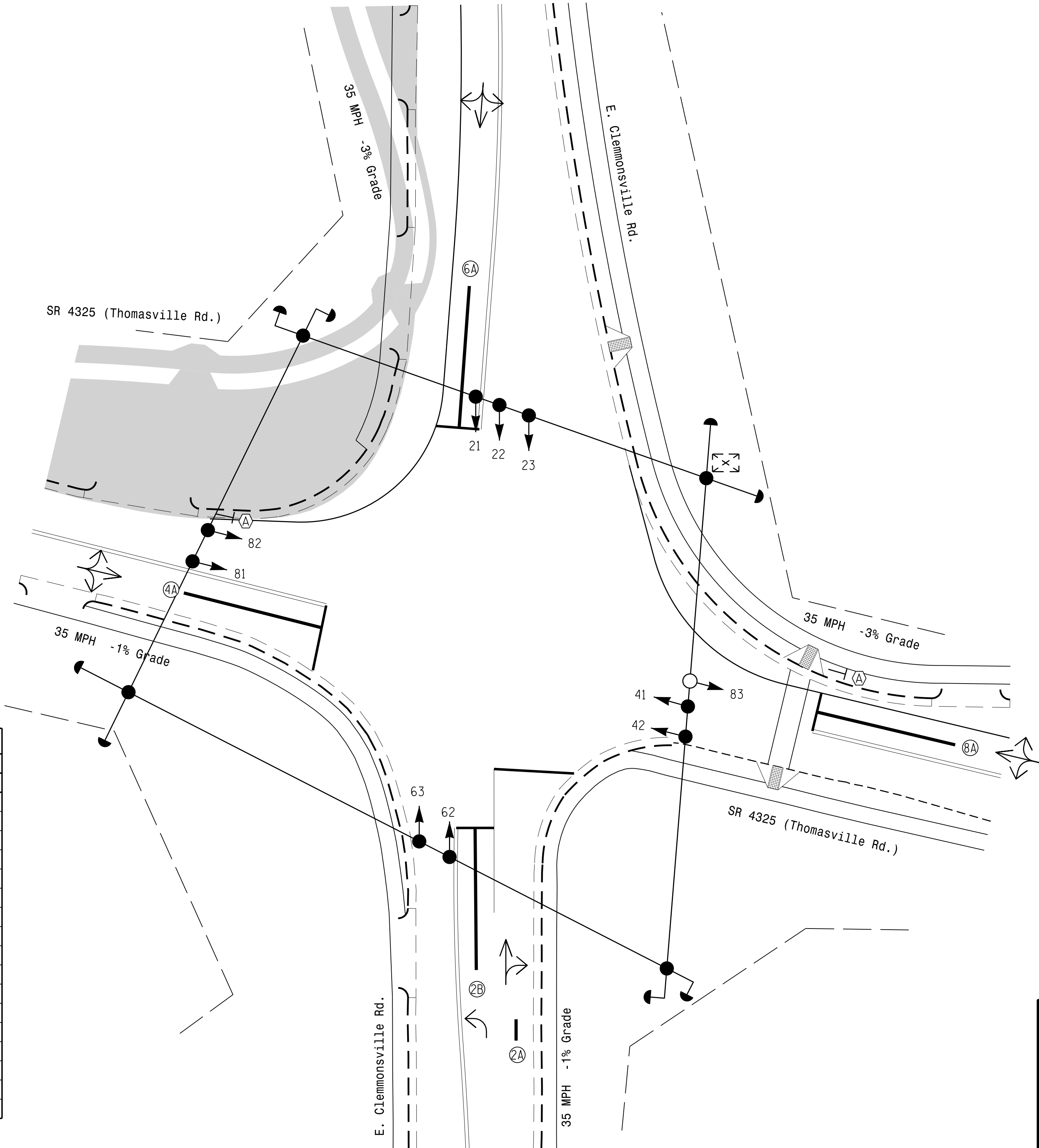
2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads 21, 22, and 23.
- Remove existing signal head 61.
- Set all detector units to presence mode.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	2.0	2.0
Max Green 1 *	45	25	45	25
Yellow Clearance	4.1	4.1	4.1	4.1
Red Clearance	2.7	2.7	2.7	2.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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



LEGEND	
PROPOSED	EXISTING

Signal Upgrade -
Temporary Design 2 (TMP Phase IA)

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

E. Clemmonsville Road
at
SR 4325 (Thomasville Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
ROBERT J. ZIMMER
026486

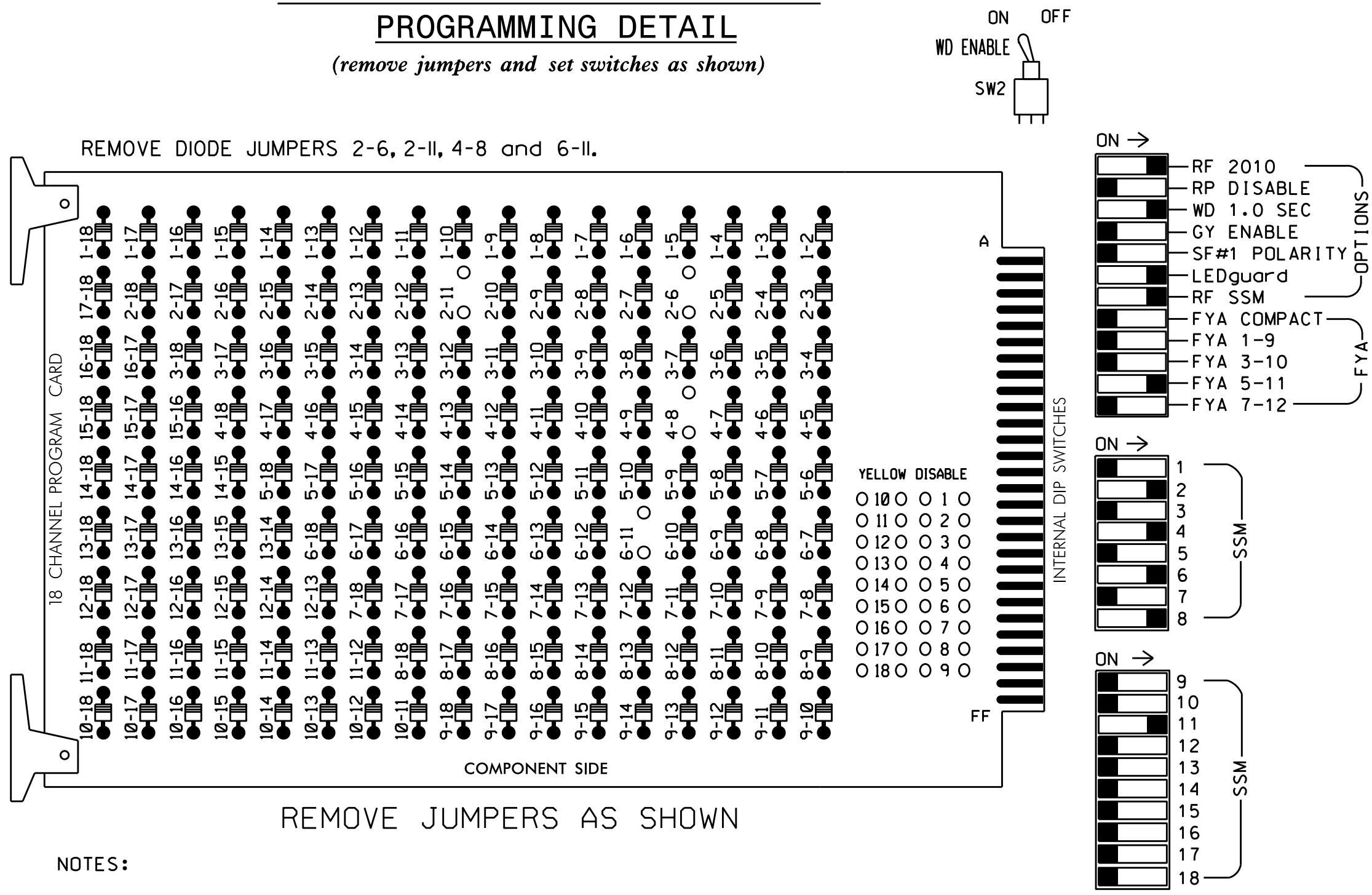
01/02/2025
DATE

SIG. INVENTORY NO. 09-0034T2

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JTPeterson

18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Disabe all phases for Startup In Green.
- Program 2 and 6 as First Phases.
- Disable all phases for Yellow Flash.
- The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S8,S11,AUX S4.
PHASES USED.....2,4,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....6
OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

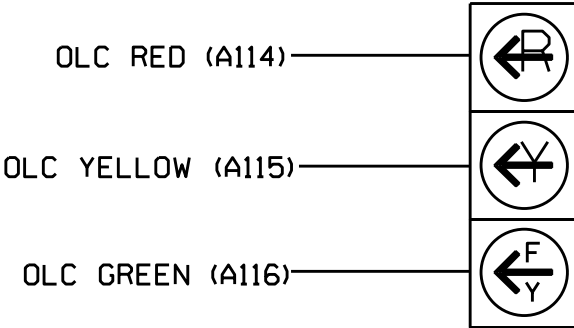
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CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81,82 83	NU	NU	NU	NU	21	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																A114		
YELLOW ARROW																A115		
FLASHING YELLOW ARROW																A116		
GREEN ARROW																		

NU = Not Used

★ See pictorial of head wiring in detail below.

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	U	U	U	U	U	U	U	U	U	U	U	U	FS
	L	L	L	L	L	L	L	L	L	L	L	L	L	DC ISOLATOR
														ST
														DC ISOLATOR
FILE "J"	U	U	U	U	U	U	U	U	U	U	U	U	U	U
	L	L	L	L	L	L	L	L	L	L	L	L	L	U

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

FS = FLASH SENSE
ST = STOP TIME

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

SPECIAL DETECTOR NOTE

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

Electrical Design - Temporary Design 2 (TMP Phase IA)

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

E. Clemmonsville Road
at
SR 4325 (Thomasville Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2024 REVIEWED BY:

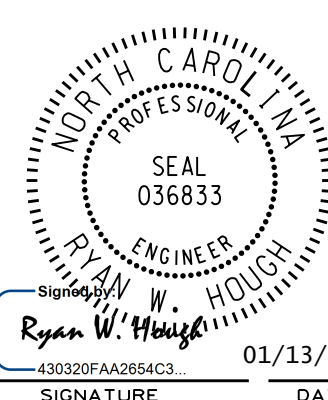
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

SIGNATURE DATE

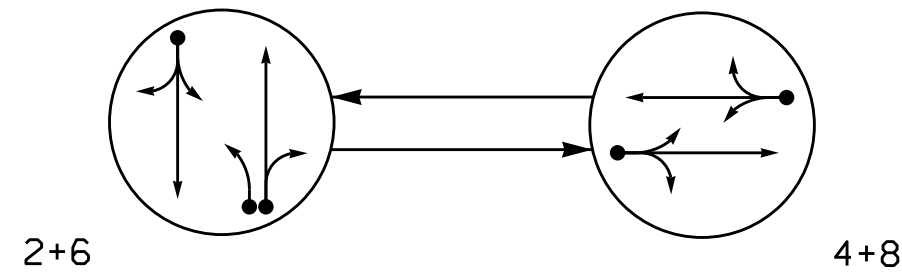
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SIGNATURES COMPLETED

SEAL



SIG. INVENTORY NO. 09-0034T2

PHASING DIAGRAM



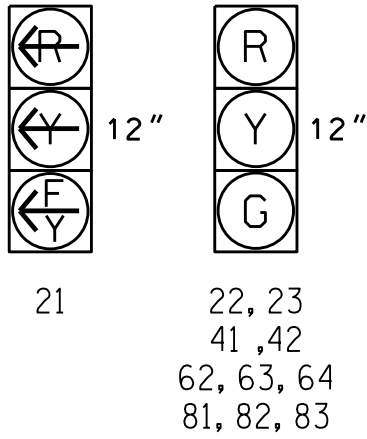
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2 + 6	4 + 8	FLASH
21	Y	R	R
22, 23	G	R	R
41, 42	R	G	R
62, 63, 64	G	R	R
81, 82, 83	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART									
INDUCTIVE LOOPS					DETECTOR PROGRAMMING				
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME
2A*	6X6	70	*	-	2	Y	Y	-	-
2B*	6X40	0	*	-	2	Y	Y	-	-
4A*	6X40	0	*	Y	4	Y	Y	-	5
6A*	6X40	0	*	-	6	Y	Y	-	-
8A*	6X40	0	*	-	8	Y	Y	-	-

* Non-Intrusive detection zone.

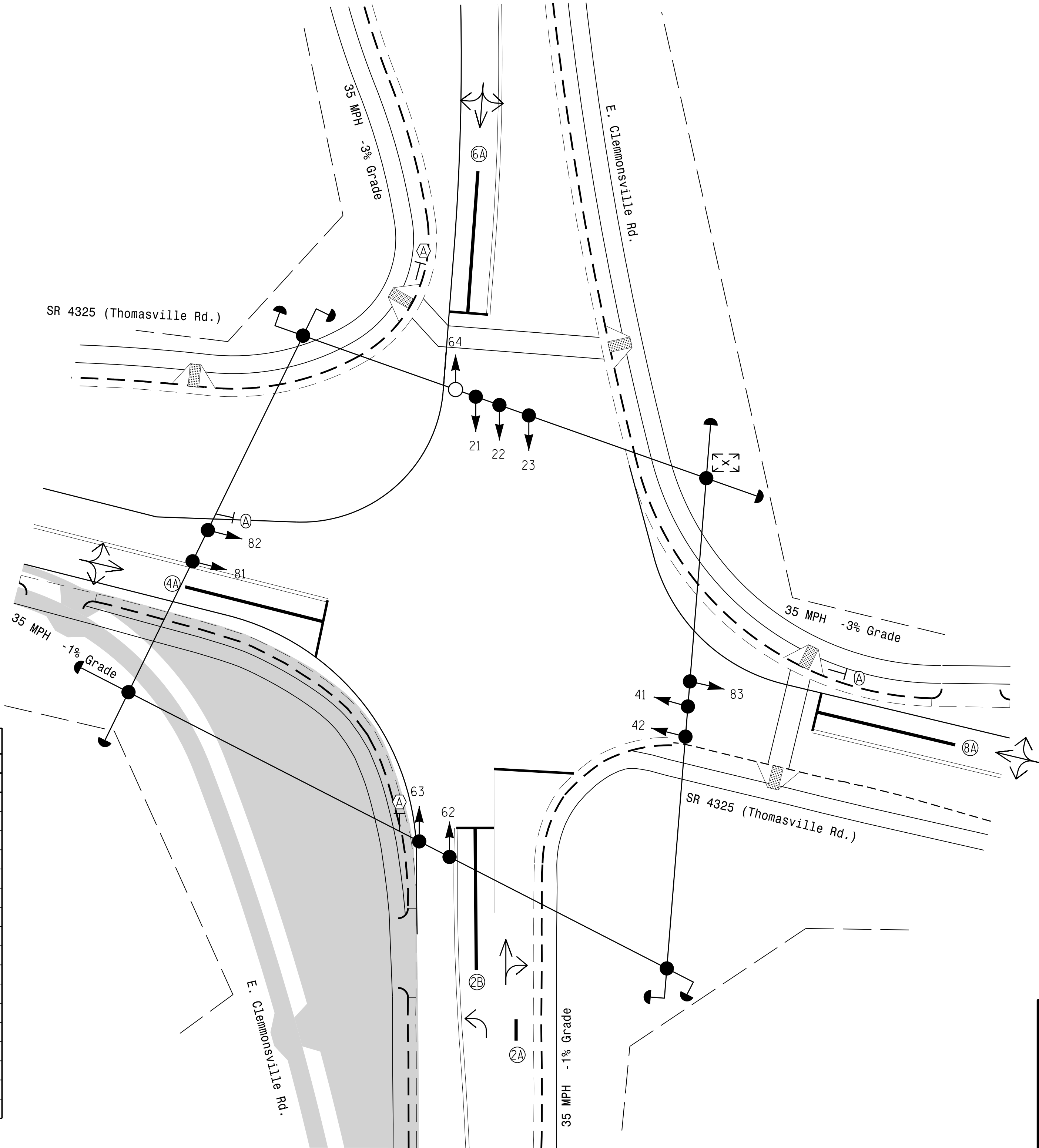
2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

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

OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	2.0	2.0
Max Green 1 *	45	25	45	25
Yellow Clearance	4.1	4.1	4.1	4.1
Red Clearance	3.0	2.7	3.0	2.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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



LEGEND	
PROPOSED	EXISTING

Signal Upgrade -
Temporary Design 3 (TMP Phase IB)

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

E. Clemmonsville Road
at
SR 4325 (Thomasville Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS

INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

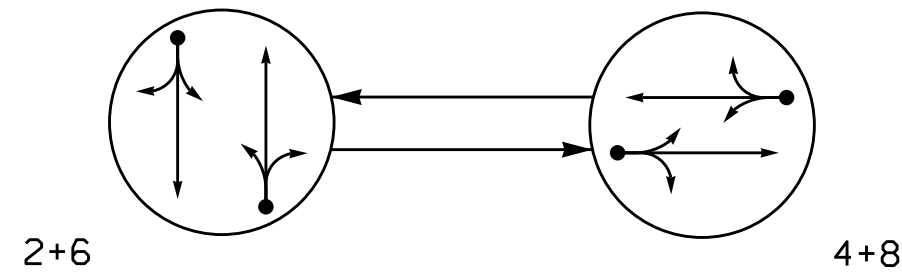
SEAL

NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
026486
ROBERT J. ZIMMER

DocuSigned by:
Robert J. Zimmer
01/02/2025

SIG. INVENTORY NO. 09-0034T3

PHASING DIAGRAM



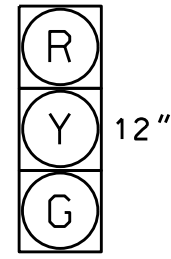
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2 + 6	4 + 8	FLASH
22, 23	G	R	R
41, 42	R	G	R
62, 63, 64	G	R	R
81, 82, 83	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



22, 23
41, 42
62, 63, 64
81, 82, 83

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART									
INDUCTIVE LOOPS					DETECTOR PROGRAMMING				
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME
2A*	6X40	0	*	Y	2	Y	Y	-	-
4A*	6X40	0	*	Y	4	Y	Y	-	5
6A*	6X40	0	*	-	6	Y	Y	-	-
8A*	6X40	0	*	-	8	Y	Y	-	-

* Non-Intrusive detection zone.

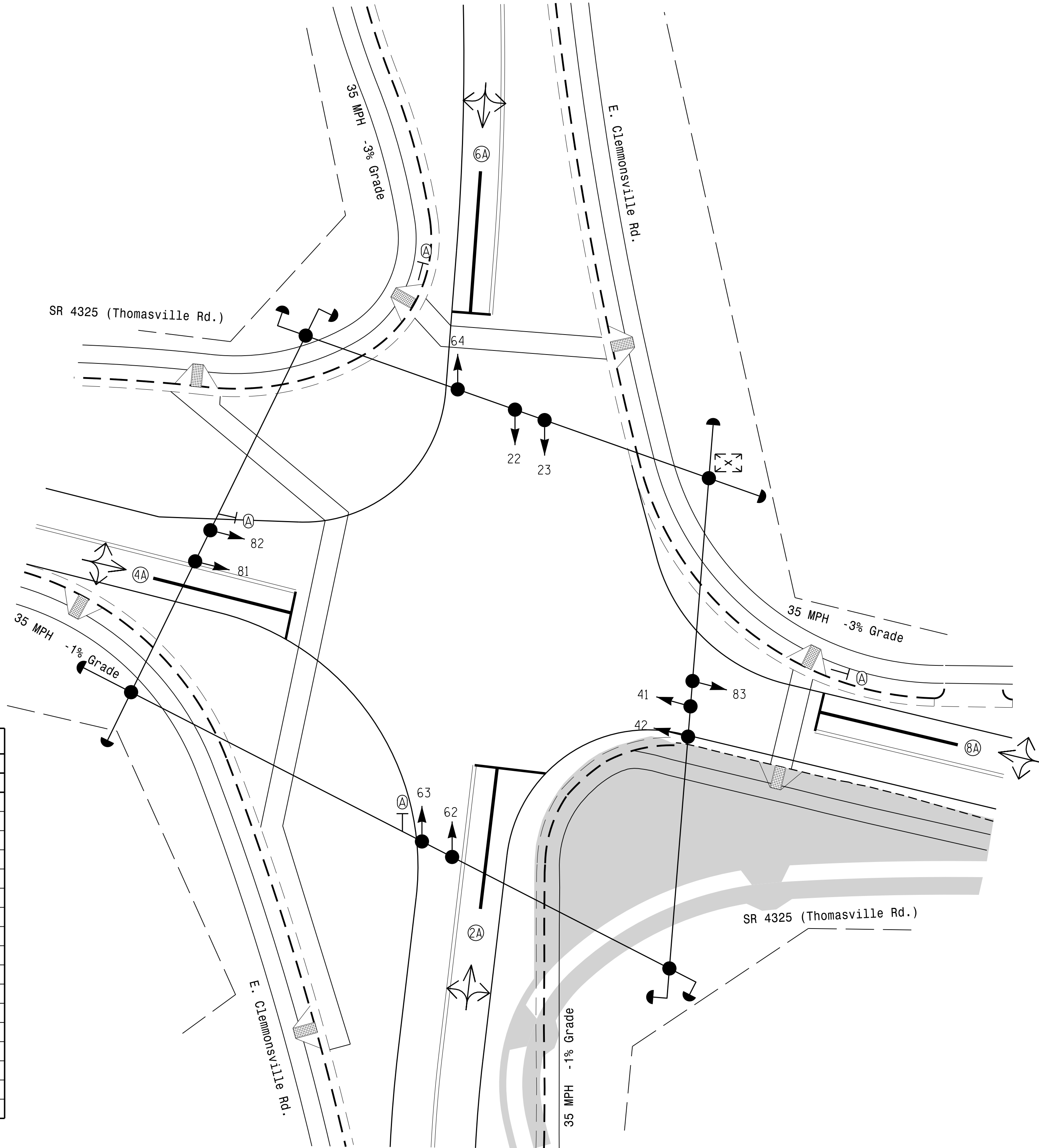
2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Remove existing signal head 21.
- Set all detector units to presence mode.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	45	25	45	25
Yellow Clearance	4.1	4.1	4.1	4.1
Red Clearance	3.0	2.9	3.0	2.9
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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



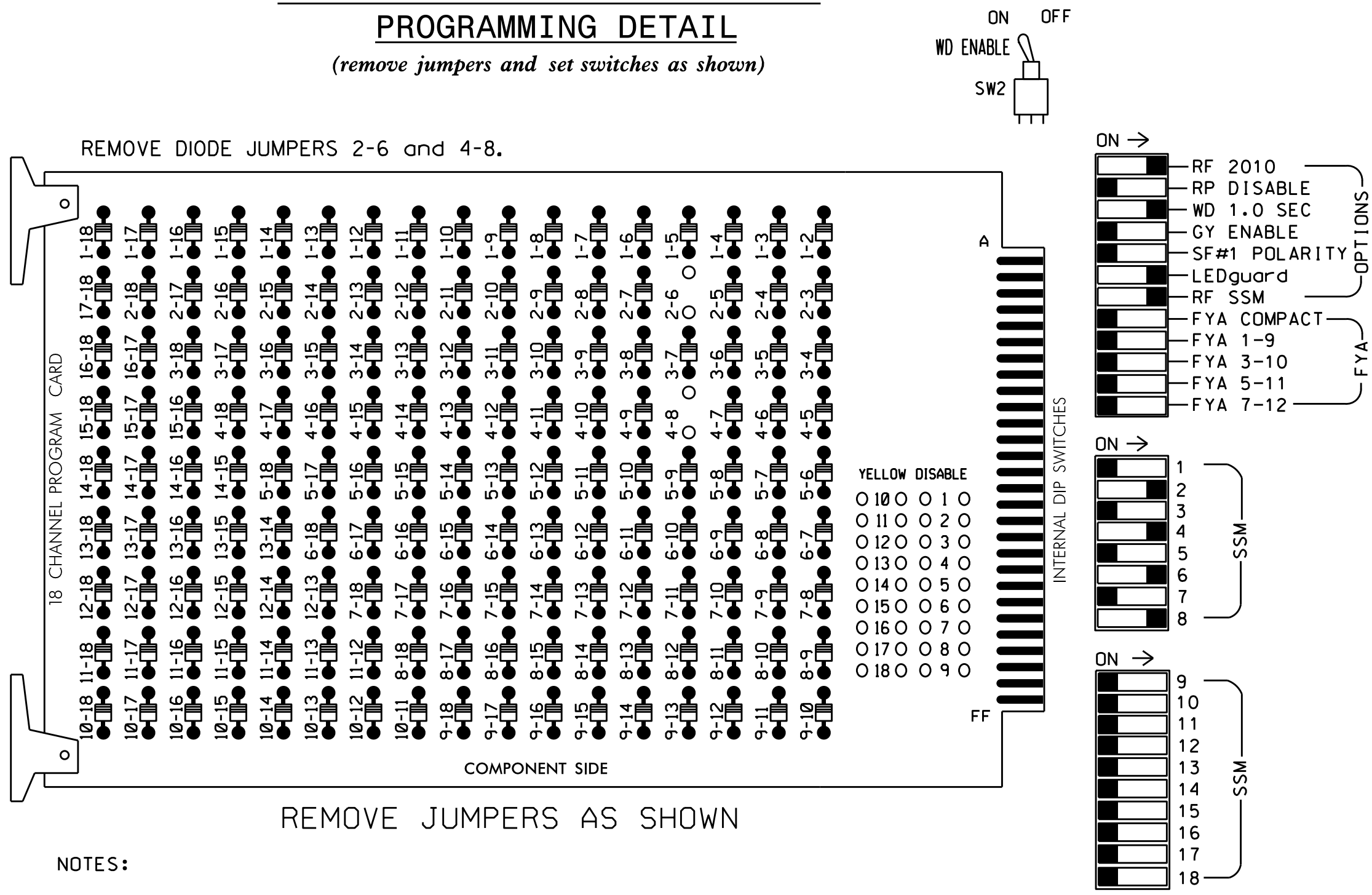
LEGEND	
PROPOSED	EXISTING

Signal Upgrade -
Temporary Design 4 (TMP Phase IC)

Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529		E. Clemmonsville Road at SR 4325 (Thomasville Road) Division 9 Forsyth County Winston-Salem PLAN DATE: September 2024 REVIEWED BY: PREPARED BY: J.A. Lohr REVIEWED BY:		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SCALE 0 20 1"=20'		REVISIONS INIT. DATE		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIMMER 01/02/2025 DATE	
				SIG. INVENTORY NO. 09-003474	

18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Disabe all phases for Startup In Green.
- Program 2 and 6 as First Phases.
- Disable all phases for Yellow Flash.
- The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

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

PROJECT REFERENCE NO.	SHEET NO.
I-5880	Sig. 5.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	NU	62,63,64	NU	NU	81,82,83	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

Install a non-intrusive 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: 09-0034T4
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Detail - Temporary Design 4 (TMP Phase 1C)

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared in the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

E. Clemmonsville Road
at
SR 4325 (Thomasville Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2024

REVIEWED BY:

PREPARED BY: James Peterson

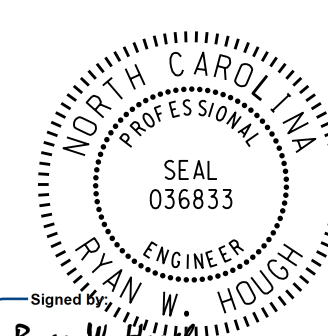
REVIEWED BY:

REVISIONS

INIT.

DATE

SEAL



SIGNATURE

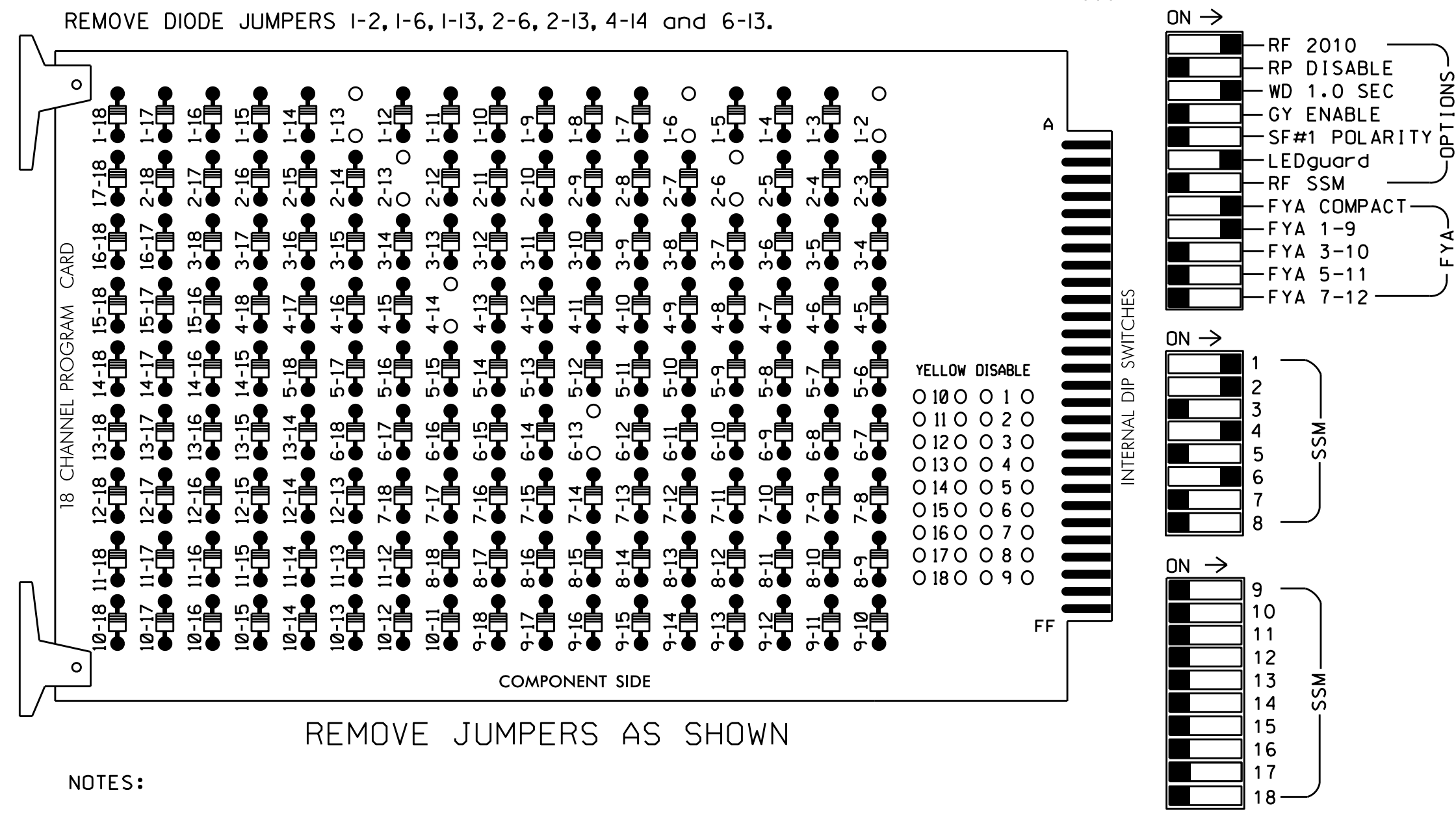
DATE

SIG. INVENTORY NO. 09-0034T4

CHANNEL 18 CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.
5. Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Disable all phases for Startup In Green.
4. Disable all phases for Startup Ped Call.
5. Program 2 and 6 as First Phases.
6. Disable all phases for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

```

CONTROLLER.....2070
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..12
LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S8
PHASES USED.....2,2 PED,4,4 PED,6
OVERLAP "A".....2
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
CMU CHANNEL NO.	1	2		13	3	4	14	5	6		15	7	8	16
PHASE	OLA	2		2 PED	3	4	4 PED	5	6		6 PED	7	8	8 PED
SIGNAL HEAD NO.	61★	21	22	P21, P22	NU	41, 42 43	P41, P42	NU	62	63	NU	NU	NU	NU
RED		128	128			101			134	134				
YELLOW		129	129			102			135	135				
GREEN			130			103			136					
RED ARROW	125													
YELLOW ARROW	126													
FLASHING YELLOW ARROW	127													
GREEN ARROW		130								136				
				113			104							
				115			106							

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)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	S O L O	Ø 2	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	Ø 2 PED	S O L O	FS
	L	2A,2B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR	EMPTY	DC ISOLATOR
FILE "J"	U	S O L O	Ø 6	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O	S O L O
	L	6A,6B	NOT USED	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

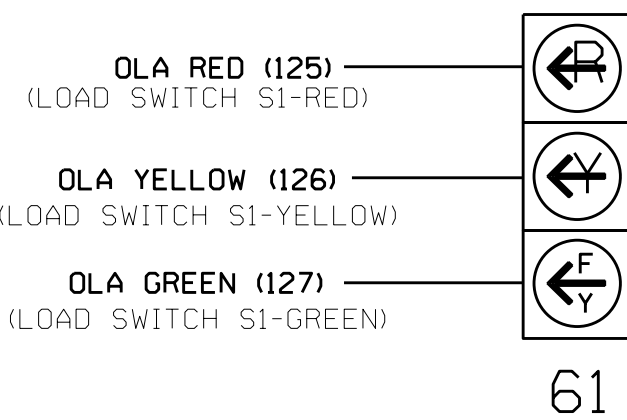
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
PED PUSH BUTTONS							NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT 112.				
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS
IN INPUT FILE SLOT 112.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



★ See pictorial of head wiring in detail below.
NOTE: Load Switch S1 require out remapping.

SPECIAL DETECTOR NOTE

For loop 4A, 4B and 4C install a non-intrusive 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.

ADVANCED WALK NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 4 for 'Advanced Walk'. Make sure the Walk Advance Time shown on the Signal Design plans is programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0327T1
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 1 of 2 - Temporary Design 1 (TMP Phase I)

SR 2741 (Clemmonsville Road)
at
I-40 EB Ramp and
SR 3826 (I-40 EB Frontage Road)

Division 9 Forsyth County Winston-Salem

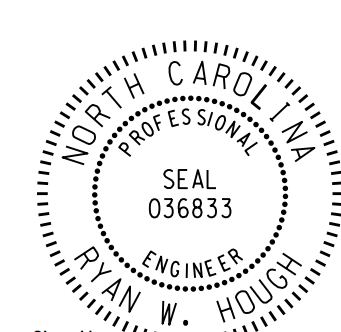
	PLAN DATE: November 2022	REVIEWED BY:
	PREPARED BY: James Peterson	REVIEWED BY:

	REVISIONS		INIT.	DATE

750 N. Greenfield Pkwy, Garner, NC 27529			
--	--	--	--

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



Signed by: _____ 01/13/2021

Ryan W. Hough 01/15/2023
430320EAA2854C2 DATE

SIG. INVENTORY NO. 09-0327T1

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL
FOR SIGNAL HEAD 61

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:16 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:16 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....0

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:16 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PRESS "+" KEY FOR OUTPUT 15

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:17 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:17 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....1

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:17 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PRESS "+" KEY FOR OUTPUT 16

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:18 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:18 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....2

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:18 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

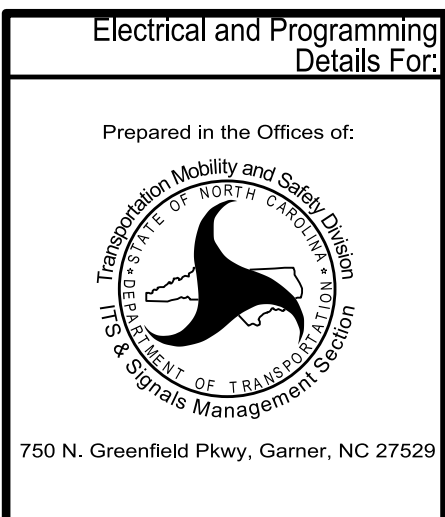
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: RED YELLOW GREEN
FLASH COLORS: RED YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255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

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0327T1
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

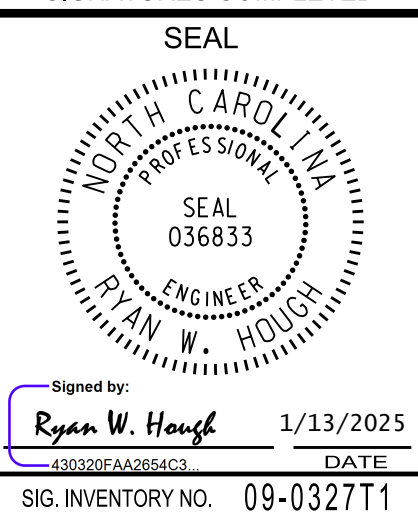
Electrical Detail - Sheet 2 of 2 - Temporary Design 1 (TMP Phase I)



SR 2741 (Clemmonsville Road)
at
I-40 EB Ramp and
SR 3826 (I-40 EB Frontage Road)

Division 9	Forsyth County	Winston-Salem
PLAN DATE: November 2022	REVIEWED BY:	
PREPARED BY: James Peterson	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



2 Phase
Fully Actuated
(Winston-Salem Signal System)

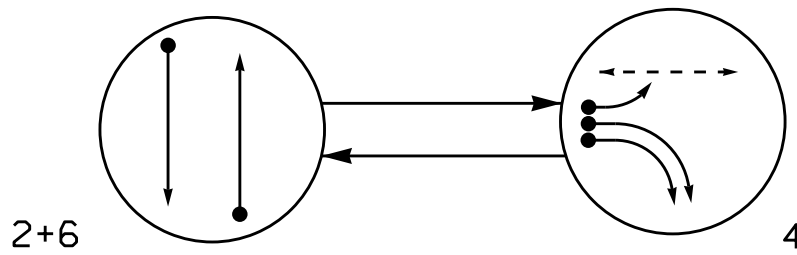
NOTES

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. Remove existing signal head 61.
4. Reposition existing signal heads 21 and 22.
6. Disconnect and abandon existing loops 2B and 6A.
6. Signal heads 21, 22, 41, 42, and 43 have backplates.
7. Set all detector units to presence mode.
8. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
9. Program controller to operate using FYA compact mode.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Remove existing lane control signs as shown.
13. This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
14. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED	EXISTING
	N/A

PHASING DIAGRAM



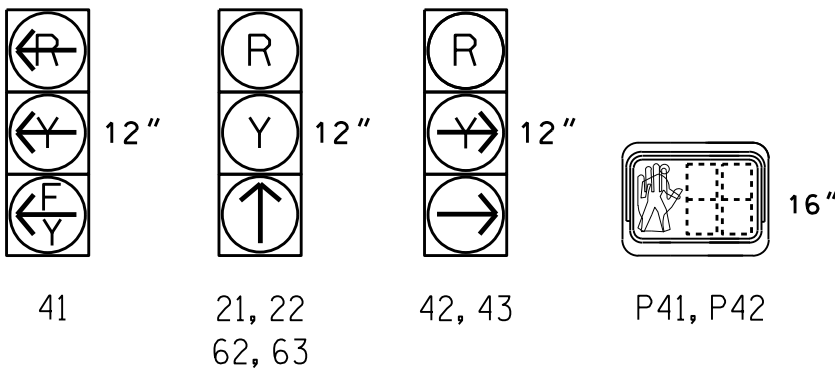
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2+6	4	FLASH
21, 22	↑	R	R
41	←R	←F	←R
42, 43	R	→	R
61, 62	↑	R	R
P41, P42	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE		
	2	4	6
Min Green 1 *	10	7	10
Extension 1 *	2.0	2.0	1.0
Max Green 1 *	50	30	50
Yellow Clearance	3.9	3.0	3.9
Red Clearance	1.4	2.3	1.4
Red Revert	2.0	2.0	2.0
Advance Walk	-	7	-
Walk 1 *	-	14	-
Don't Walk 1	-	17	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP / ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	-
4A*	6x40	0	*	-	4	Y	Y	-	-	-	-	*
4B*	6x40	0	*	-	4	Y	Y	-	-	15	-	*
4C*	6x40	0	*	-	4	Y	Y	-	-	15	-	*
6B	6X60	+5	EXIST	-	6	Y	Y	-	-	-	-	-

* Non-Intrusive detection zone.

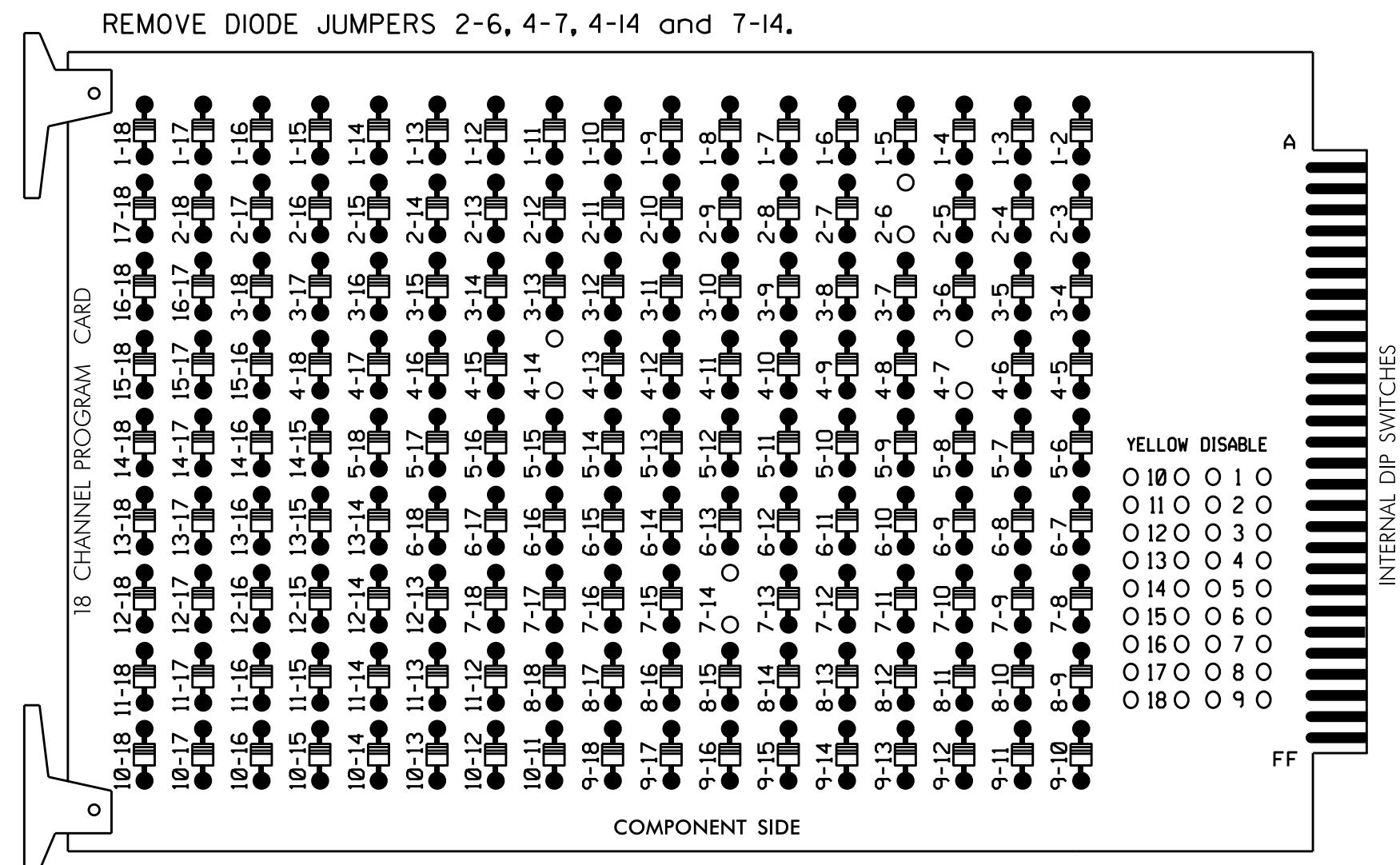
Signal Upgrade -
Temporary Design 2 (TMP Phase II)

	SR 2741 (Clemmons Road) at I-40 EB Ramp		SEAL 026486 ENGINEER ROBERT J. ZEMBA		
	Division 9 Forsyth County Winston-Salem		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
	PLAN DATE: January 2025	REVIEWED BY:	DATE: 2025/01/02		
	PREPARED BY: J.A. Lohr	REVIEWED BY:	DATE: 2025/01/02		
750 N. Greenfield Pkwy, Garner, NC 27529		REVISIONS		INIT. DATE	
0 SCALE 1"=20'					

CHANNEL 18 CONFLICT MONITOR

PROGRAMMING DETAIL

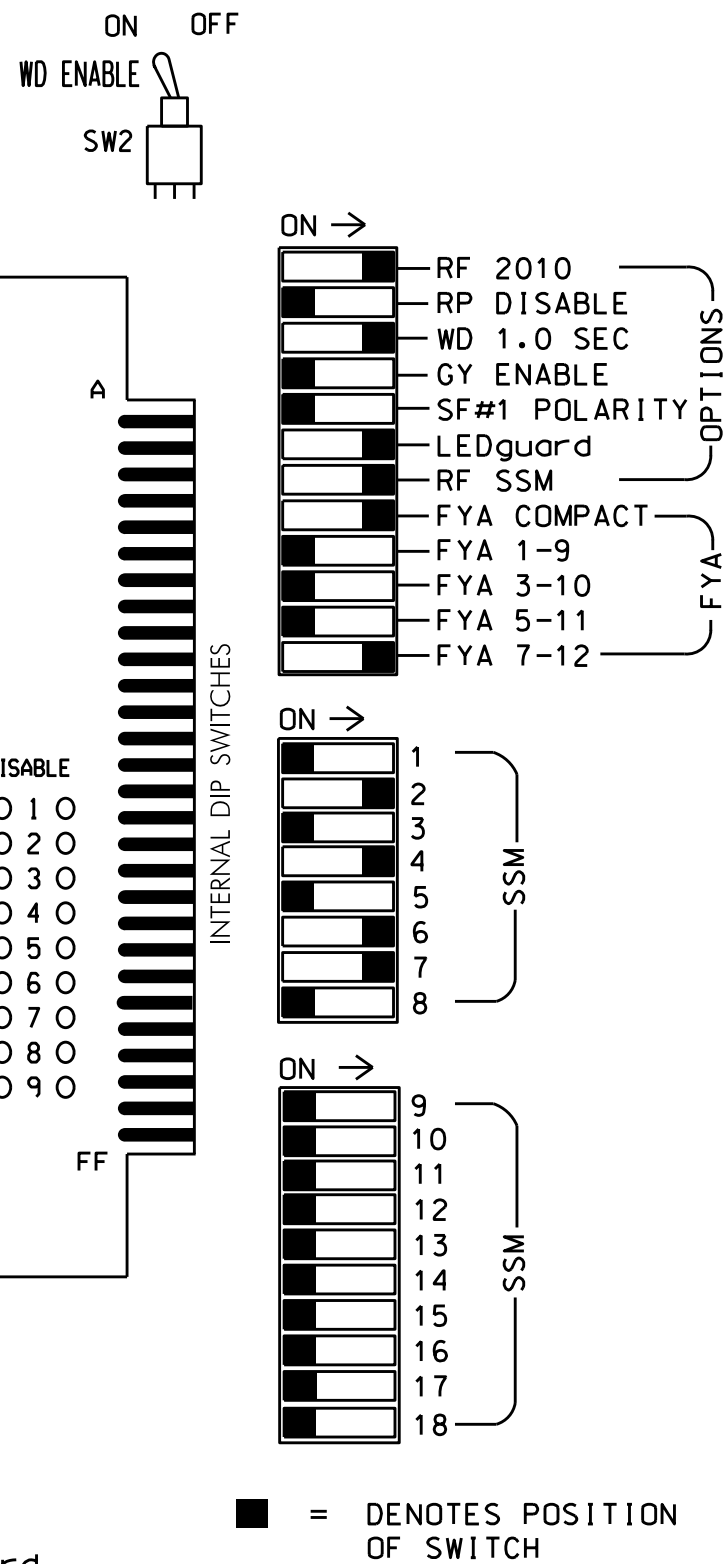
(remove jumpers and set switches as shown)



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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.
5. Special cabinet wiring is required to utilize the FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.



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. Return controller to Factory Defaults before programming per this electrical detail.
-
3. Enable Simultaneous Gap-Out for all Phases.
 4. Disable all phases for Startup In Green.
 5. Disable all phases for Startup Ped Call.
 6. Program 2 and 6 as First Phases.
 7. Disable all phases for Yellow Flash.
 8. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

```
CONTROLLER.....2070
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S6,S8,S10
PHASES USED.....2,4,4 PED,6
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
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	OLD	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	42,43	P41, P42	NU	62,63	NU	41★	NU	NU
RED		128			101			134				
YELLOW		129						135				
GREEN												
RED ARROW										122		
YELLOW ARROW					102					123		
FLASHING YELLOW ARROW										124		
GREEN ARROW		130			103			136				
						104						
						106						

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)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14			
FILE "I"	U	 	Ø 2 2A	 	 	 	 	 	 	 	 	 	 	 	 			
	L		NOT USED													NOT USED	DC ISOLATOR	FS
			DC ISOLATOR													ST	DC ISOLATOR	
FILE "J"	U	 	Ø 6 6A	 	 	 	 	 	 	 	 	 	 	 	 			
	L		NOT USED															

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

For loopS, 4A,4B and 4C install a non-intrusive 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.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
PED PUSH BUTTONS							NOTE: INSTALL DC ISOLATORS				
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS
IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L

FILE J	_____	_____
SLOT 2	_____	_____
LOWER	_____	_____

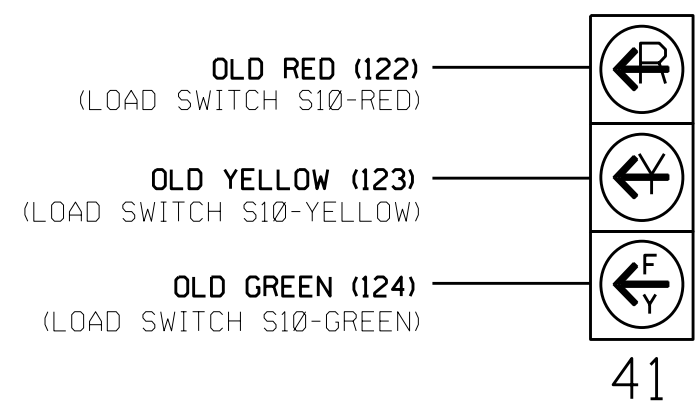
ADVANCE WALK NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 4 for 'Advanced Walk'. Make sure the Walk Advance Time shown on the Signal Design plans are programmed in the 'Phase Timing' menu.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0327T2
DESIGNED: Janaury 2025
SEALED: 01-02-25
REVISED: N/A

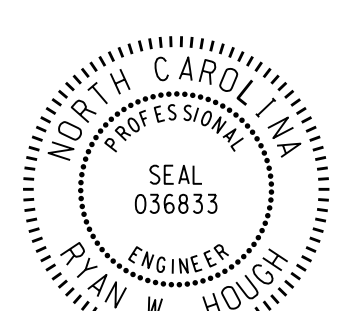
Electrical Design - Sheet 1 of 2 - Temporary Design 2 (TMP Phase II)

SR 2741 (Clemmonsville Road)
at
I-40 EB Ramp

[illegible]

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

EAL



Signed by: Ryan W. Hough 1/13/2025
430320FAA2654C3 DATE
G. INVENTORY NO. 09-0327T2

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL
FOR SIGNAL HEAD 41

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "22"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:24 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....22
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PAGE:1 C1 PIN:24 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...4
SELECT COLOR(0=RED,1=YEL,2=GRN)....0

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:24 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....22
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PRESS "+" KEY FOR OUTPUT 23

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:25 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....23
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PAGE:1 C1 PIN:25 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...4
SELECT COLOR(0=RED,1=YEL,2=GRN)....1

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:25 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....23
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PRESS "+" KEY FOR OUTPUT 24

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:26 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....24
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PAGE:1 C1 PIN:26 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...4
SELECT COLOR(0=RED,1=YEL,2=GRN)....2

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:26 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....24
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

OUTPUT PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL
(program controller as shown below)

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

PRESS '+' 3 TIMES

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

NOTICE
GREEN
FLASH

OVERLAP PROGRAMMING COMPLETE

PED YELLOW CONFLICT MONITOR WIRING DETAIL
(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode with the 2018ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 8 PY (field term. 111) to chan. 10 yellow (monitor pin U).

Follow the instructions below to make the appropriate connections:

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

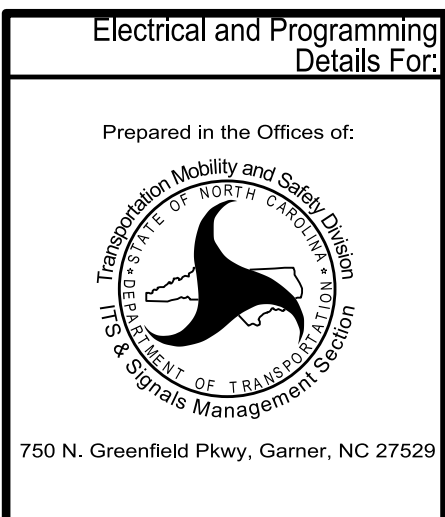
CMU-U 8PY (term. 111)

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

1-2PY 1-CMU-13
2-4PY 2-CMU-16
3-6PY 3-CMU-R
4-8PY 4-CMU-U

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0327T2
DESIGNED: January 2025
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 2 of 2 - Temporary Design 2 (TMP Phase II)



SR 2741 (Clemmonsville Road)
at
I-40 EB Ramp

Division 9 Forsyth County Winston-Salem

PLAN DATE: January 2025 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

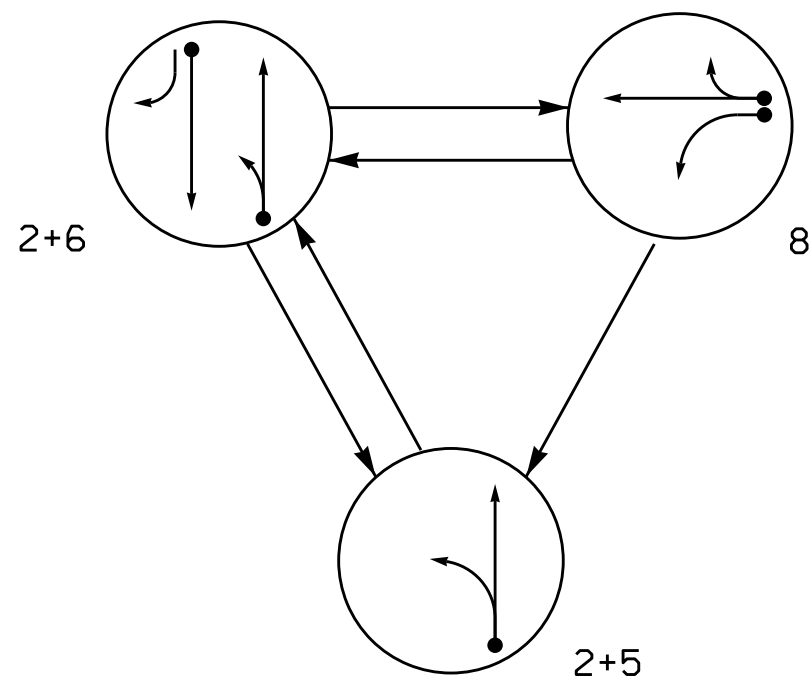
SEAL

Signed by: Ryan W. Hough 1/13/2025

DATE

SIG. INVENTORY NO. 09-0327T2

PHASING DIAGRAM



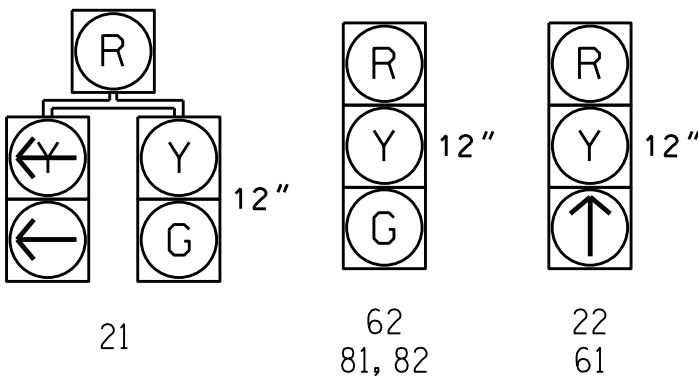
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	2+5	2+6	8	F L S H
21	G	G	R	R
22	↑	↑	R	R
61	R	↑	R	R
62	R	G	R	R
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART									
INDUCTIVE LOOPS					DETECTOR PROGRAMMING				
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME
2A	6X6	70	4	Y	2	Y	Y	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	15
6A	6X6	70	EXIST	-	6	Y	Y	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-
8B	6X40	0	2-4-2	-	8	Y	Y	-	10

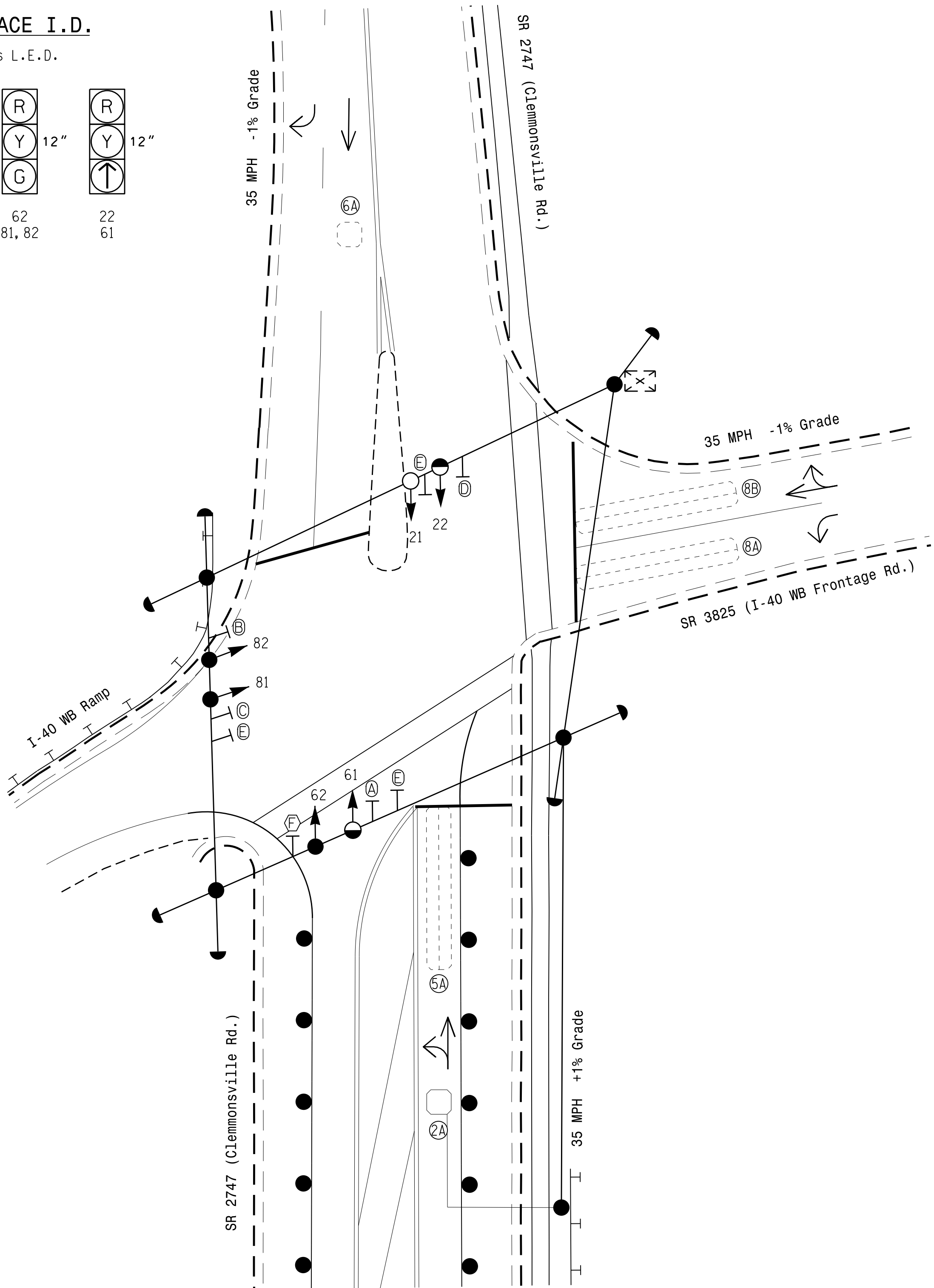
3 Phase
Fully Actuated
Winston-Salem Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal head 22.
- Existing signal heads 22, 81, and 82 have backplates
- Add backplate to signal head 21.
- Abandon existing loops 2A and 6B.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	45	15	45	30
Yellow Clearance	3.9	3.0	3.9	3.9
Red Clearance	1.4	1.8	1.4	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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



LEGEND

PROPOSED	EXISTING
Traffic Signal Head	Modified Signal Head
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	Construction Zone Drums
N/A	Guardrail
(A) No Left Turn Sign (R3-2)	(A)
(B) Combined Through and Right Arrow Sign (R3-6R)	(B)
(C) Left Arrow "ONLY" Sign (R3-5L)	(C)
(D) No Right Turn Sign (R3-1)	(D)
(E) Street Name Sign By Others (D3-1)	(E)
(F) Right Arrow "ONLY" Sign (R3-SR)	(F)

Signal Upgrade -
Temporary Design 1 (TMP Phase I)

Prepared in the Offices of:

Transportation Mobility and Safety Division
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

SR 2747 (Clemmonsville Road)
at
I-40 WB Ramp and
SR 3825 (I-40 WB Frontage Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS

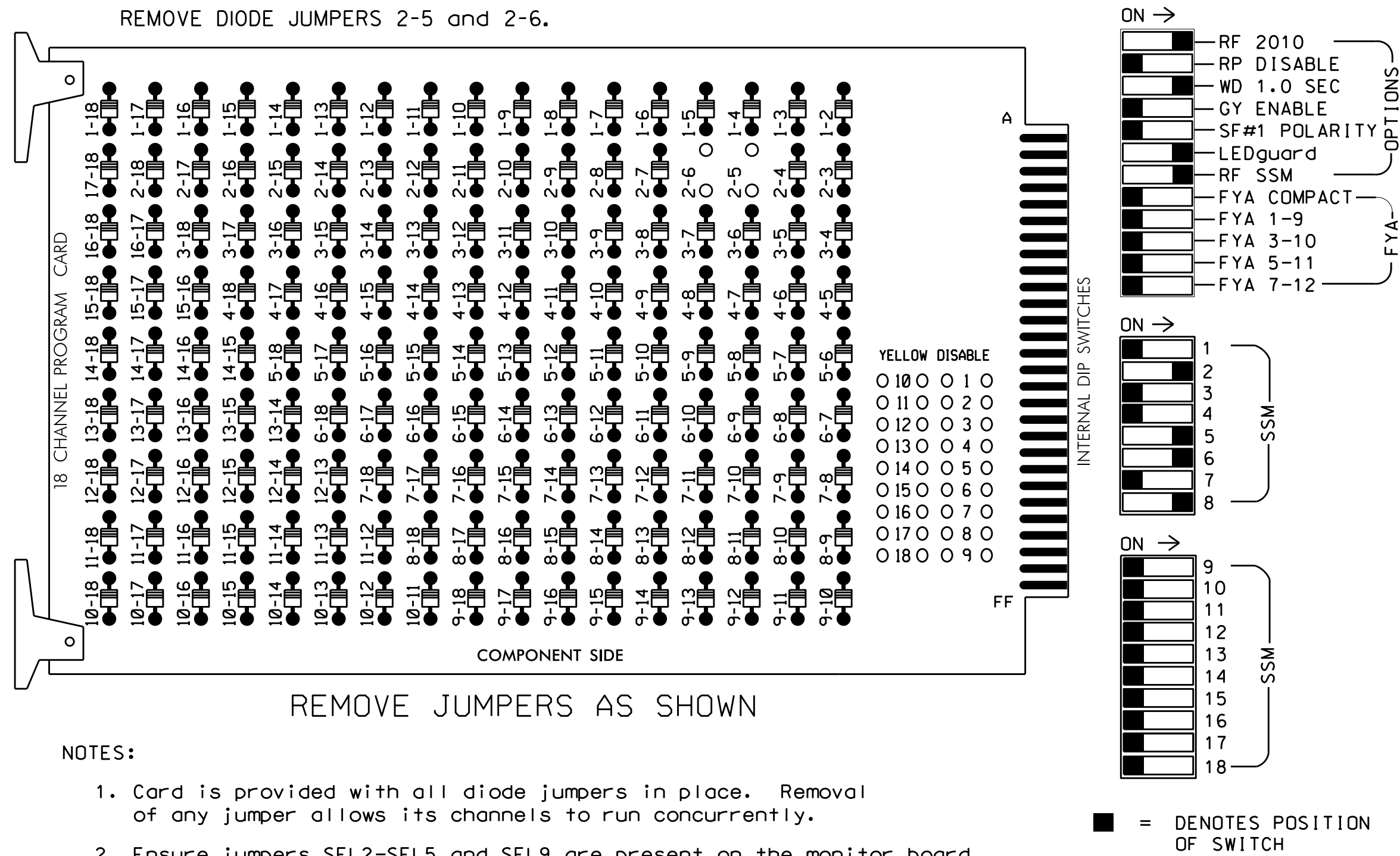
INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL
026486
ROBERT J. ZIMMERMAN
01/02/2025
DATE
18884802724484
DATE
SIG. INVENTORY NO. 09-0328T1

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all Phases.
- Disable all phases for Startup In Green.
- Program 2 and 6 as First Phases.
- Disable all phases for Yellow Flash.
- The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S7,S8,S11
PHASES USED.....2,5,6,8
OVERLAPS.....NONE

PROJECT REFERENCE NO.	SHEET NO.
I-5880	Sig. 8.1

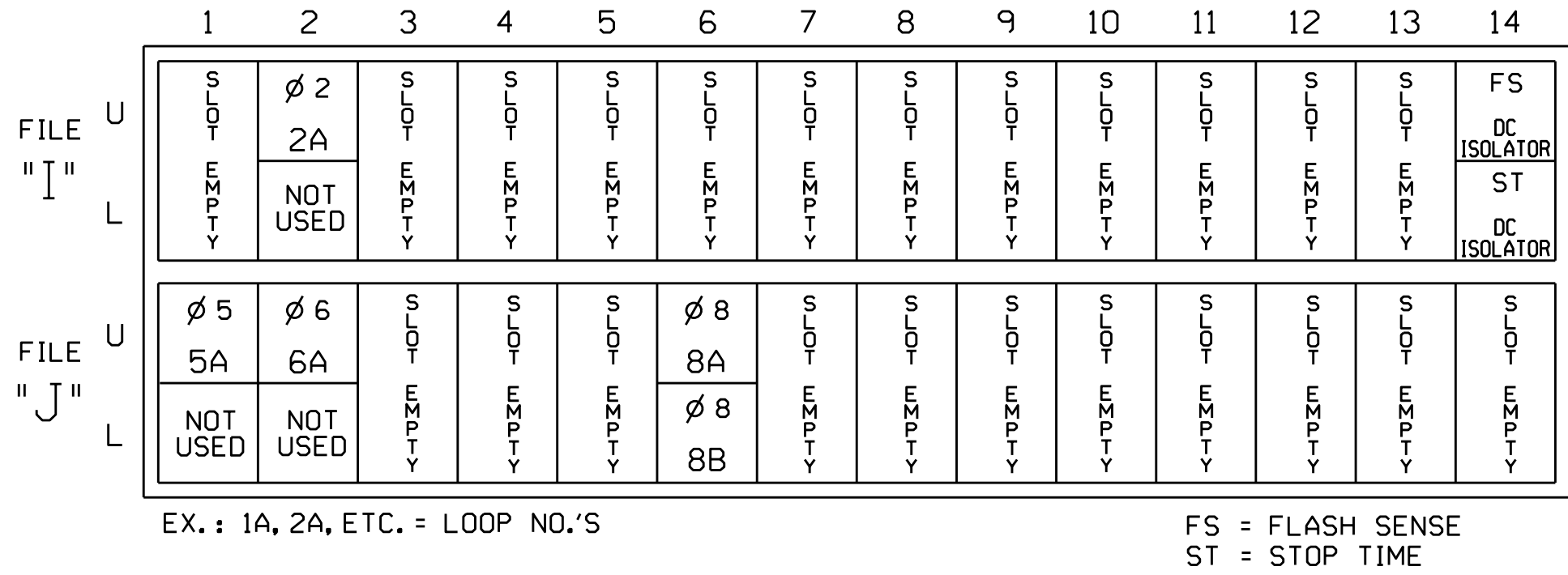
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	21	61	62	NU	NU	81,82	NU	NU	NU	NU	NU	NU
RED		128	128				*	134	134			107						
YELLOW		129	129					135	135			108						
GREEN		130							136			109						
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW			130				133	136										

NU = Not Used
* Denotes install load resistor. See load resistor installation detail below.

INPUT FILE POSITION LAYOUT

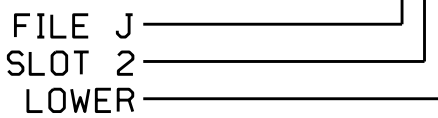
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

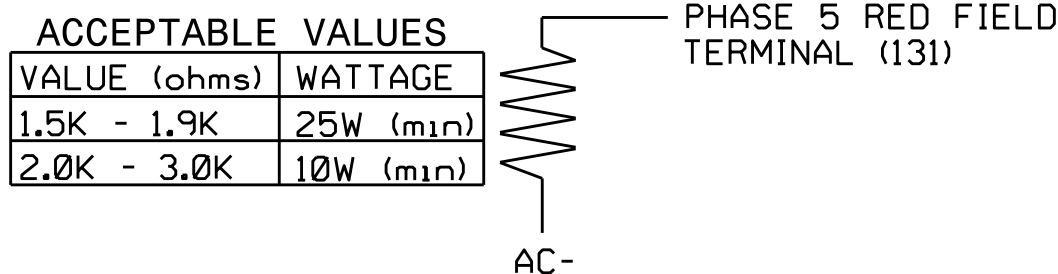
INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0328T1
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

LOAD RESISTOR
INSTALLATION DETAIL

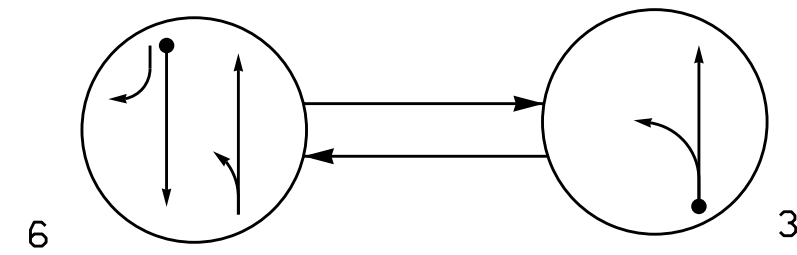
(install resistors as shown below)



Electrical Detail - Temporary Design 1 (TMP Phase 1)

ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 2747 (Clemmonsville Rd.) at I-40 WB Ramp and SR 3825 (I-40 WB Frontage Road) Division 09 Forsyth County Winston-Salem	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
Prepared In the Offices of: S&S Transportation Mobility and Safety Design a subsidiary of S&S Transportation Signal Management Services 750 N. Greenfield Pkwy, Garner, NC 27529		PLAN DATE: December 2024 PREPARED BY: James Peterson REVISIONS	REVIEWED BY: INIT. DATE DATE
750 N. Greenfield Pkwy, Garner, NC 27529		SIGNATURE	SIGNATURE

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

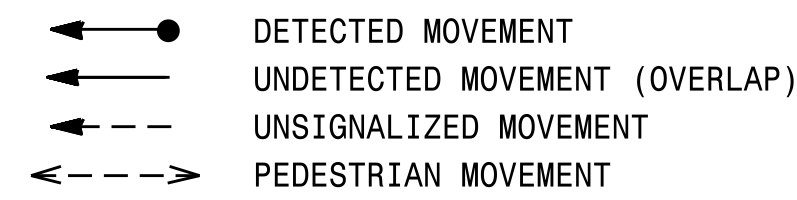
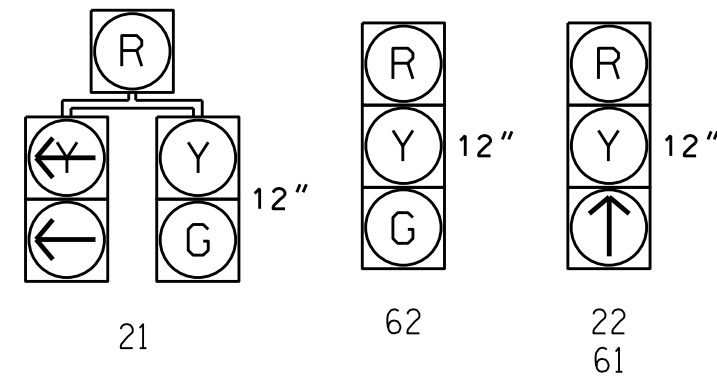


TABLE OF OPERATION	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
47	48
49	50
51	52
53	54
55	56
57	58
59	60
61	62
63	64
65	66
67	68
69	70
71	72
73	74
75	76
77	78
79	80
81	82
83	84
85	86
87	88
89	90
91	92
93	94
95	96
97	98
99	100

SIGNAL FACE	PHASE		
	3	6	FLASH
21		G	R
22	G	G	R
61	R	↑	R
62	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 TIMING CHART		
FEATURE	PHASE	
	3	6
Min Green 1 *	7	10
Extension 1 *	2.0	3.0
Max Green 1 *	15	45
Yellow Clearance	3.0	3.9
Red Clearance	1.8	1.2
Red Revert	2.0	2.0
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	ON	ON

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR		PROGRAMMING				
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
5A	6X40	0	2-4-2	-	3	Y Y	-	-	15	-	-
6A	6X6	70	EXIST	-	6	Y Y	-	-	-	-	-

2 Phase
Fully Actuated
(Winston-Salem Signal System)

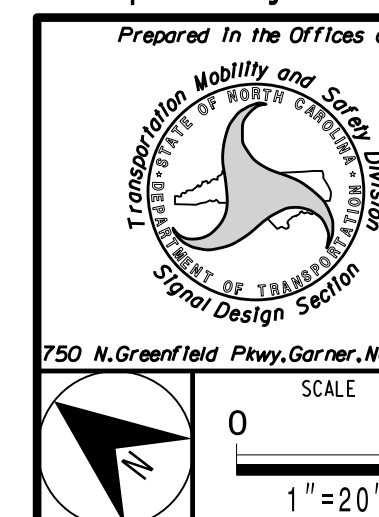
NOTES

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. Signal heads 21 and 22 have backplates.
4. Abandon existing loop 2A.
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.

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	
N/A	2-in/5-out Underground Conduit	N/A
	Right of Way	
N/A	Directional Arrow	N/A
	Guardrail	
	Construction Zone Drums	
	Construction Zone	
	No Left Turn Sign (R3-2)	
	No Right Turn Sign (R3-1)	
	Street Name Sign By Others (D3-1)	
	Right Arrow "ONLY" Sign (R3-5R)	

Signal Upgrade -
Temporary Design 2 (TMP Phase II)

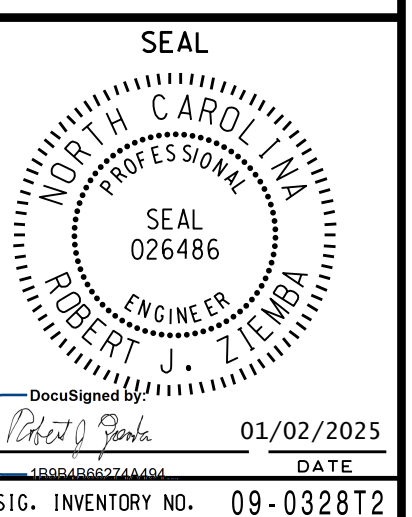


SR 2747 (Clemmonsville Road)
at
I-40 WB Ramp

Division 9	Forsyth County	Winston-Salem
PLAN DATE: September 2024	REVIEWED BY:	

PREPARED BY:	U.A. LOH	REVIEWED BY:	
REVISIONS		INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



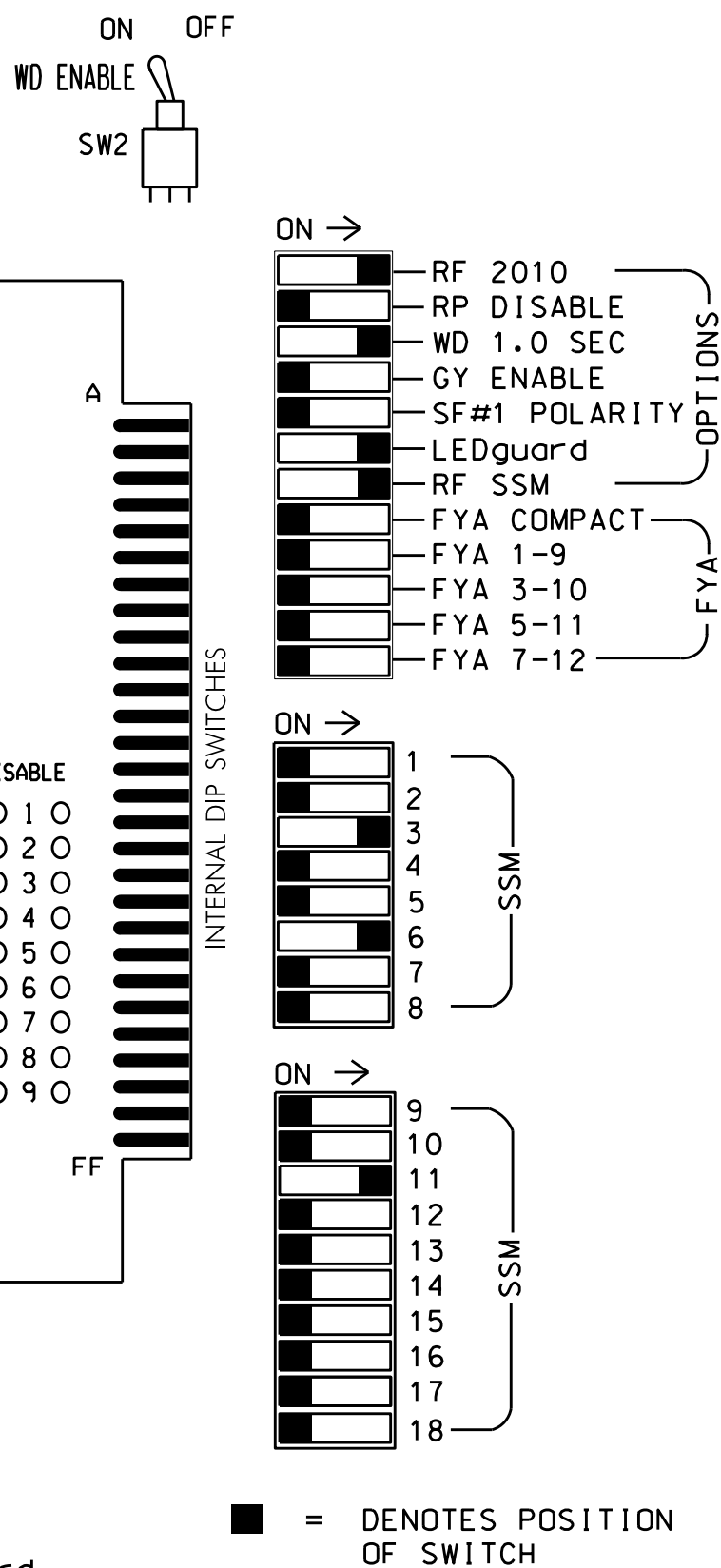
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 3-II and 6-II.



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.



1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Disable all phases for Startup In Green.
4. Program 6 as First Phases.
5. Disable all phases for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

```

CONTROLLER.....2070
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S4,S8,AUX S4
PHASES USED.....3,6
OVERLAPS.....NONE

```

[illegible]

NU = Not Used

* Denotes install load resistor. See load resistor installation detail below.

(program controller as shown below)

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

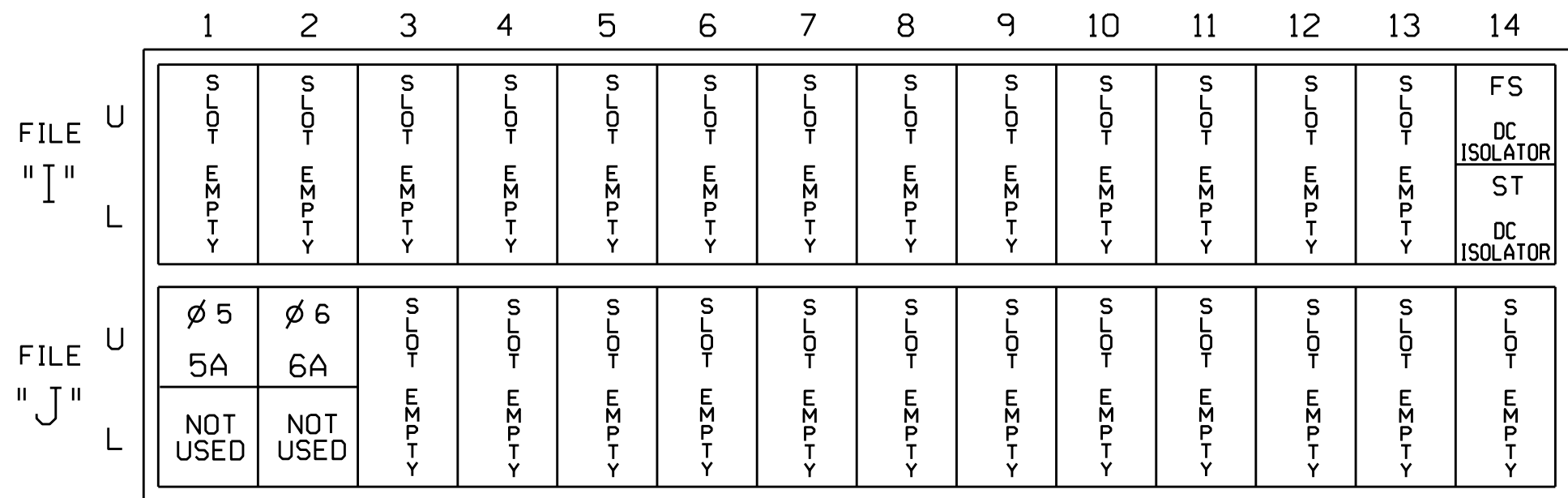
PRESS '+' TWICE

```

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

```

(front view)

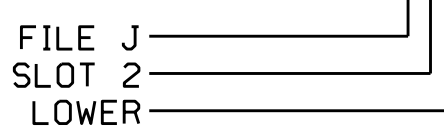


EX.: 1A, 2A, ETC. = LOOP NO.'S

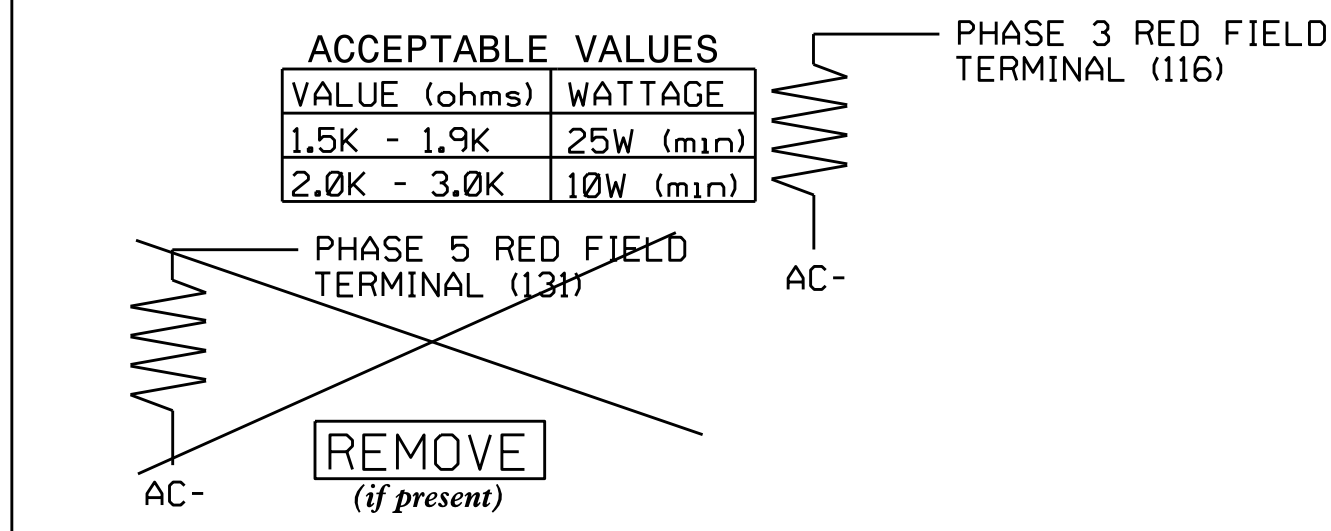
```
FS = FLASH SENSE
ST = STOP TIME
```

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L



(install resistors as shown below)



electrical Detail - Temporary Design 2 (TMP Phase II)

SR 2747 (E. Clemmons Rd.)
at
I-40 WB Ramp

Division 09 Forsyth County Winston-Salem

PLAN DATE: December 2024	REVIEWED BY:
--------------------------	--------------

PREPARED BY: James Peterson	REVIEWED BY:
-----------------------------	--------------

REVISIONS	INIT.	DATE
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[illegible]

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

SEAL

Signed by: W. H. H.

Ryan W. Hough 01/13/2025
430320EAA28E4C3

SIGNATURE _____ DATE _____

SIG. INVENTORY NO. 09-0328T2

PHASING DIAGRAM

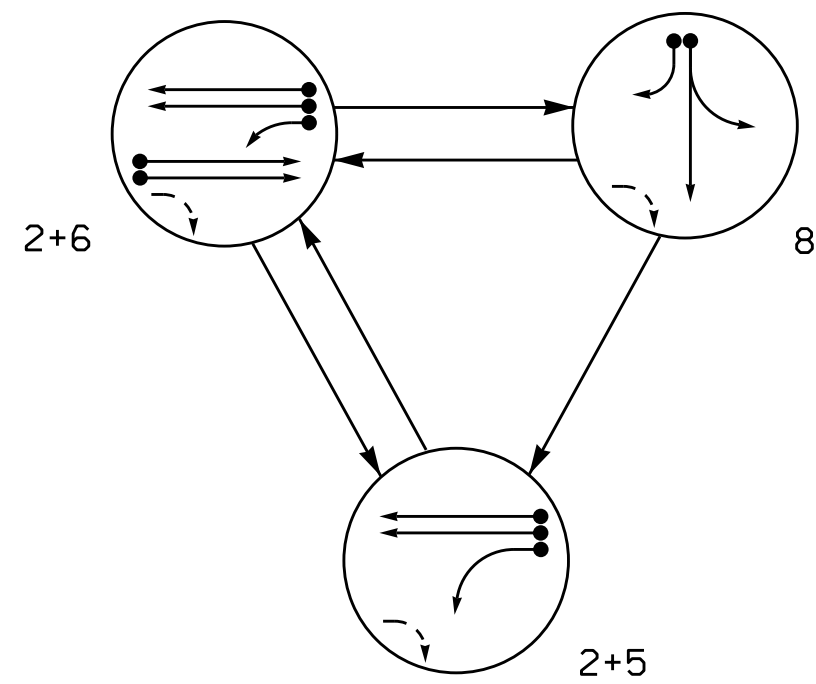
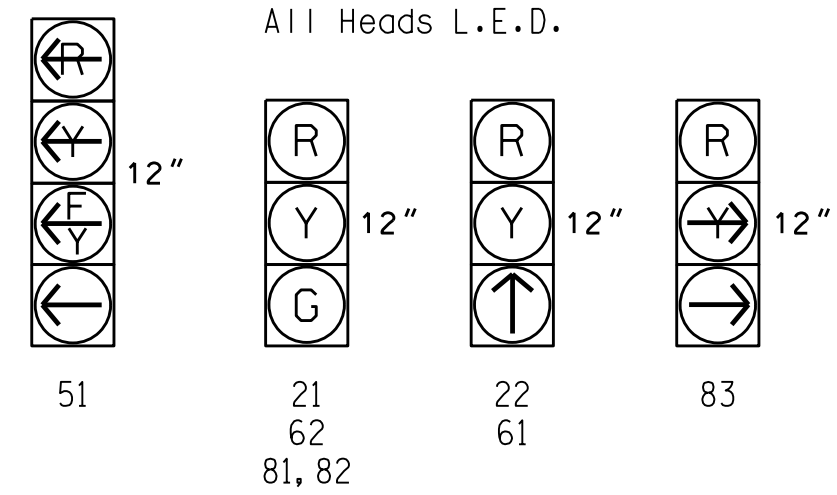


TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	2 + 5	2 + 6	8	FLASH
21	G	G	R	R
22	↑	↑	R	R
51	←	←	R	R
61	R	↑	R	R
62	R	G	R	R
81, 82	R	R	G	R
83	R	R	←	R

SIGNAL FACE I.D.

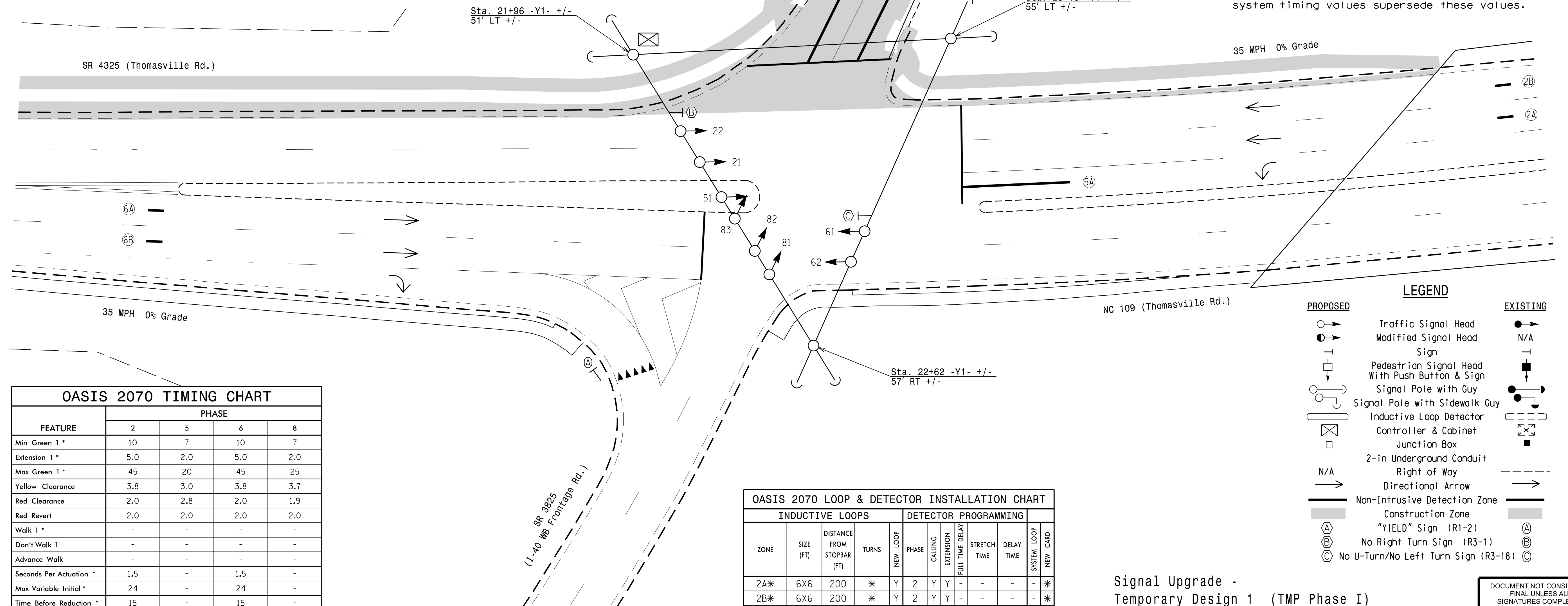
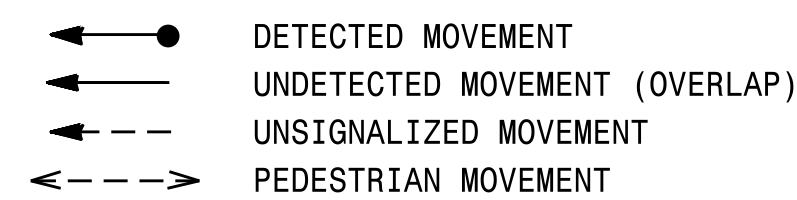


3 Phase
Fully Actuated
(Winston-Salem Signal System)

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 so as not to obstruct sight distance of vehicles turning right on red.
6. This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND



OASIS 2070 TIMING CHART

OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	5.0	2.0	5.0	2.0
Max Green 1 *	45	20	45	25
Yellow Clearance	3.8	3.0	3.8	3.7
Red Clearance	2.0	2.8	2.0	1.9
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Advance Walk	-	-	-	-
Seconds Per Actuation *	1.5	-	1.5	-
Max Variable Initial *	24	-	24	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	15	-	15	-
Minimum Gap	3.0	-	3.0	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

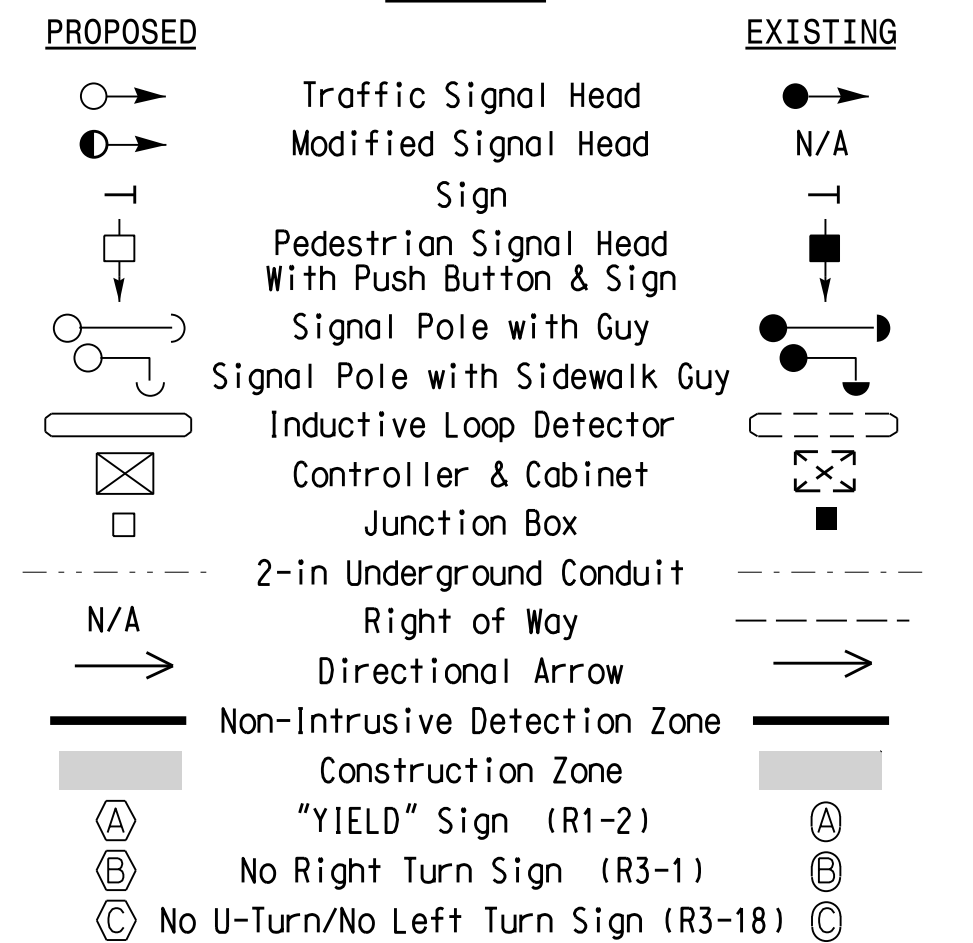
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

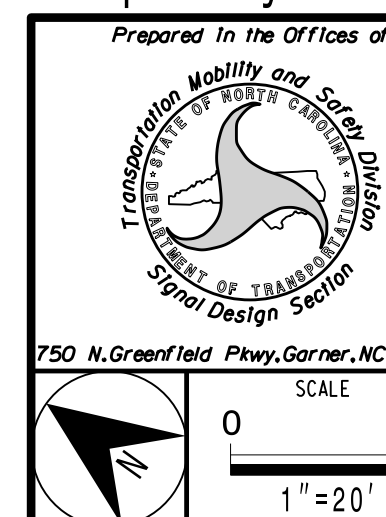
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
2A*	6X6	200	*	Y	2	Y	Y	-	-	-	-	*	
2B*	6X6	200	*	Y	2	Y	Y	-	-	-	-	*	
5A*	6X40	0	*	Y	5	Y	Y	-	-	15	-	*	
					2	Y	Y	Y	-	3	-	*	
6A*	6X6	200	*	Y	6	Y	Y	-	-	-	-	*	
6B*	6X6	200	*	Y	6	Y	Y	-	-	-	-	*	
8A*	6X40	0	*	Y	8	Y	Y	-	-	-	-	*	
8B*	6X40	0	*	Y	8	Y	Y	-	-	15	-	*	

* Non-Intrusive detection zone.

LEGEND



Signal Upgrade -
Temporary Design 1 (TMP Phase I)

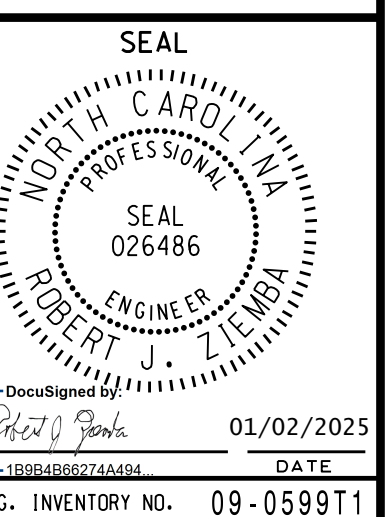


NC 109/SR 4325 (Thomasville Road) at I-40 WB Ramp and SR 3825 (I-40 WB Frontage Rd.)		
Division 9	Forsyth County	Winston-Salem

PLAN DATE:	September 2024	REVIEWED BY:
PREPARED BY:	J. A. Lohr	REVIEWED BY:

START DATE	REVIEWED BY
REVISIONS	

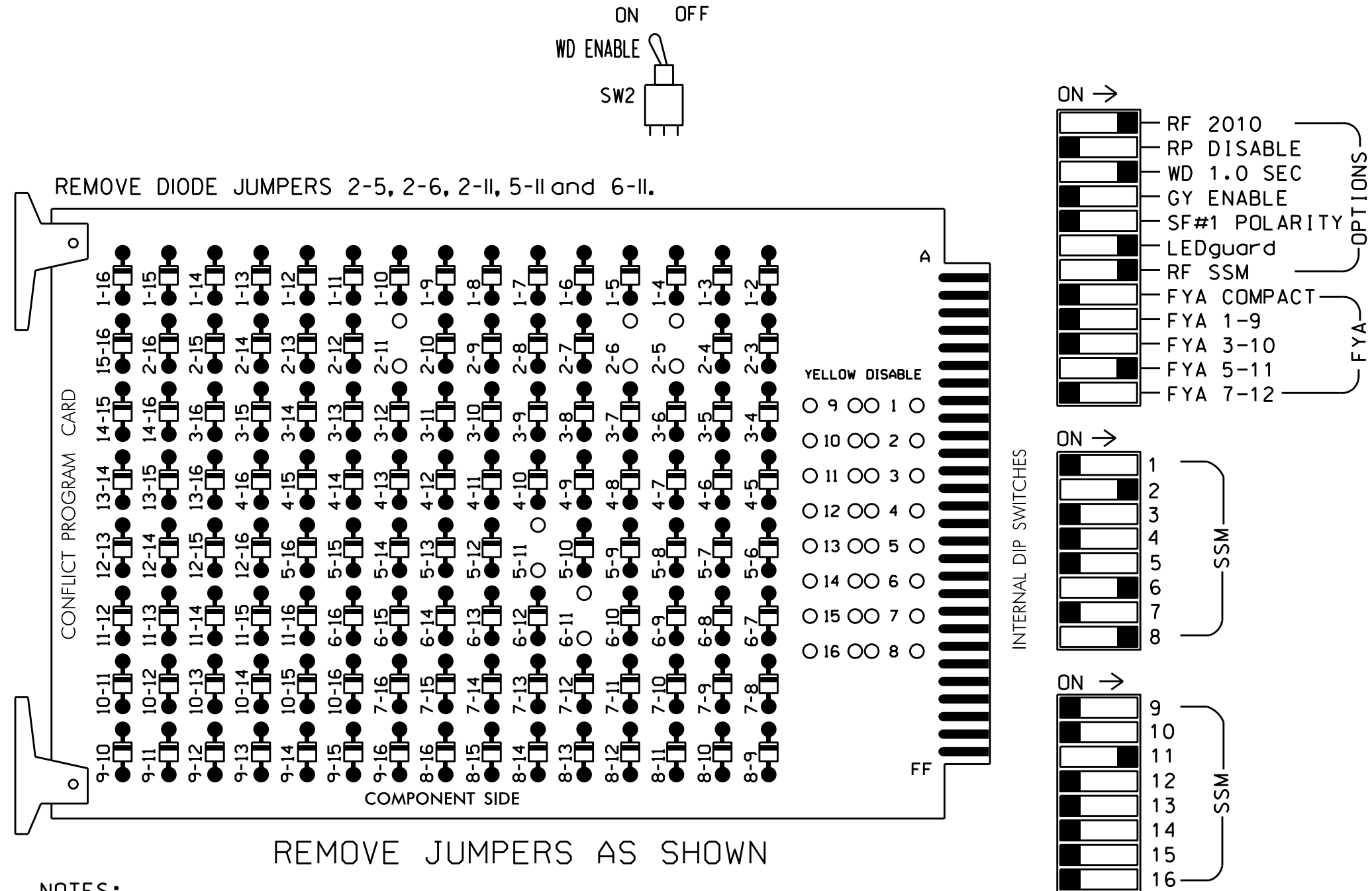
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



1B9B4B66274A494...	DATE
G. INVENTORY NO.	09-0599T1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,5,7, 9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Disable all phases for Startup In Green.
- Program 2 and 6 for First Phases.
- Disable all phases for Yellow Flash.
- The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S6,S8,S12
PHASES USED.....2,5,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	51	61	62	NU	81,82	83	NU	NU	NU	51	NU	NU
RED		128	128					134	134		107	107						
YELLOW		129	129				*	135	135		108							
GREEN		130						136			109							
RED ARROW																A114		
YELLOW ARROW											108					A115		
FLASHING YELLOW ARROW																A116		
GREEN ARROW			130				133	136			109							

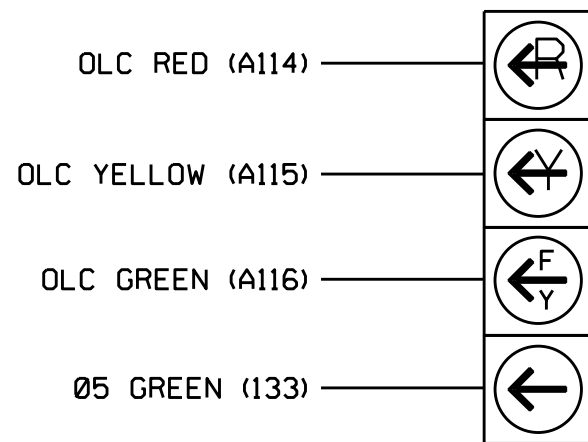
NU = Not Used

* 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)



51

NOTE

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

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FILE U	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	FS
FILE L	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	DC ISOLATOR
FILE U	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	ST
FILE L	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	←-v-0r-s	DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

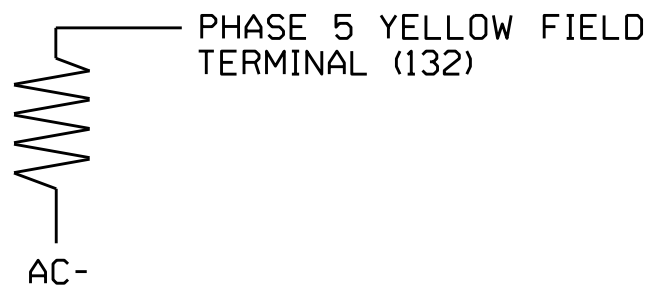
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Electrical Design - Sheet 1 of 2 - Temporary Design 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 109/SR 4325 (Thomasville Road)
Prepared In the Offices of:	at
	I-40 WB Ramp and SR 3825 (I-40 WB Frontage Rd.)
PLAN DATE: December 2024	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

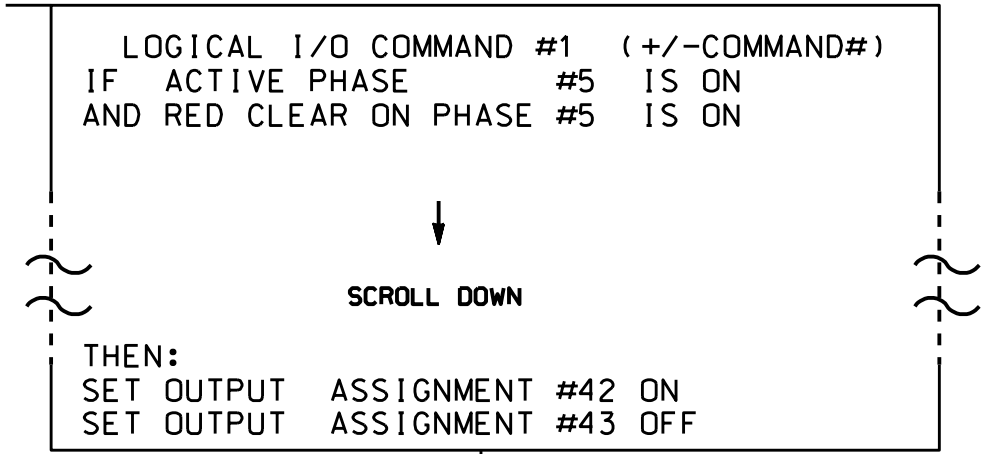
Signed by: Ryan W. Hough 1/13/2025

SIG. INVENTORY NO. 09-0599T1

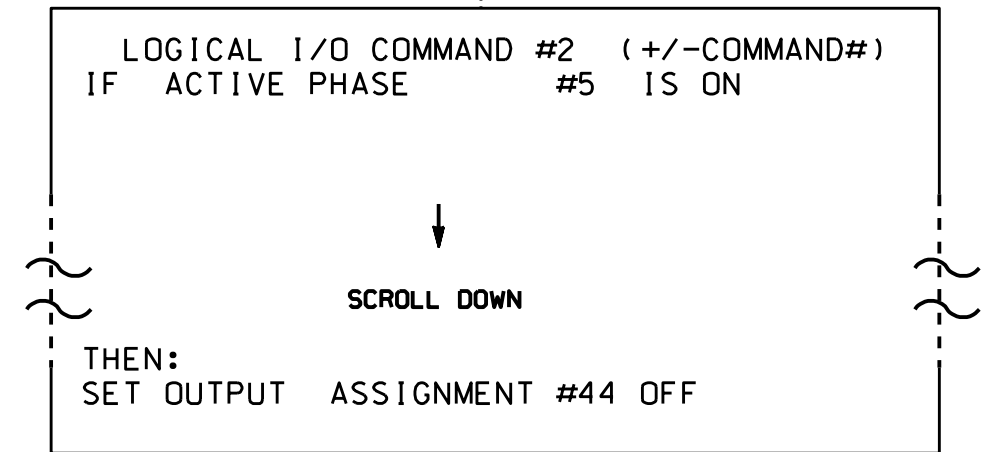
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

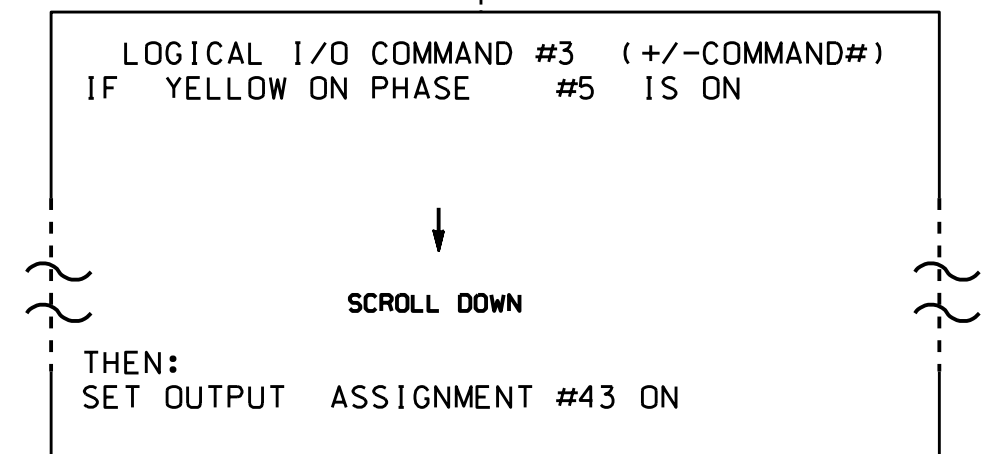
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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



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



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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

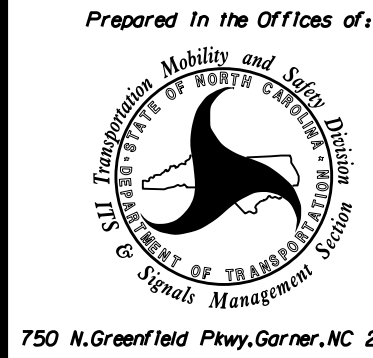
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0599T1
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 2 of 2 - Tempoary Design 1

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

NC 109/SR 4325 (Thomasville Road)
at
I-40 WB Ramp and
SR 3825 (I-40 WB Fronrage Rd.)



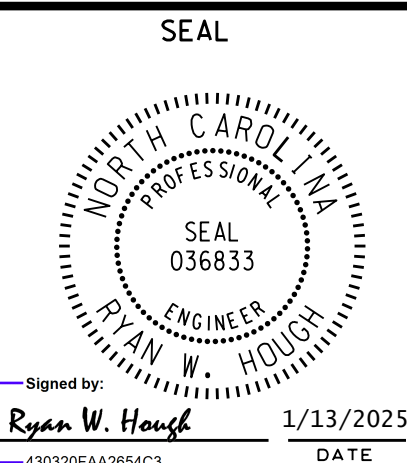
Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2024 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

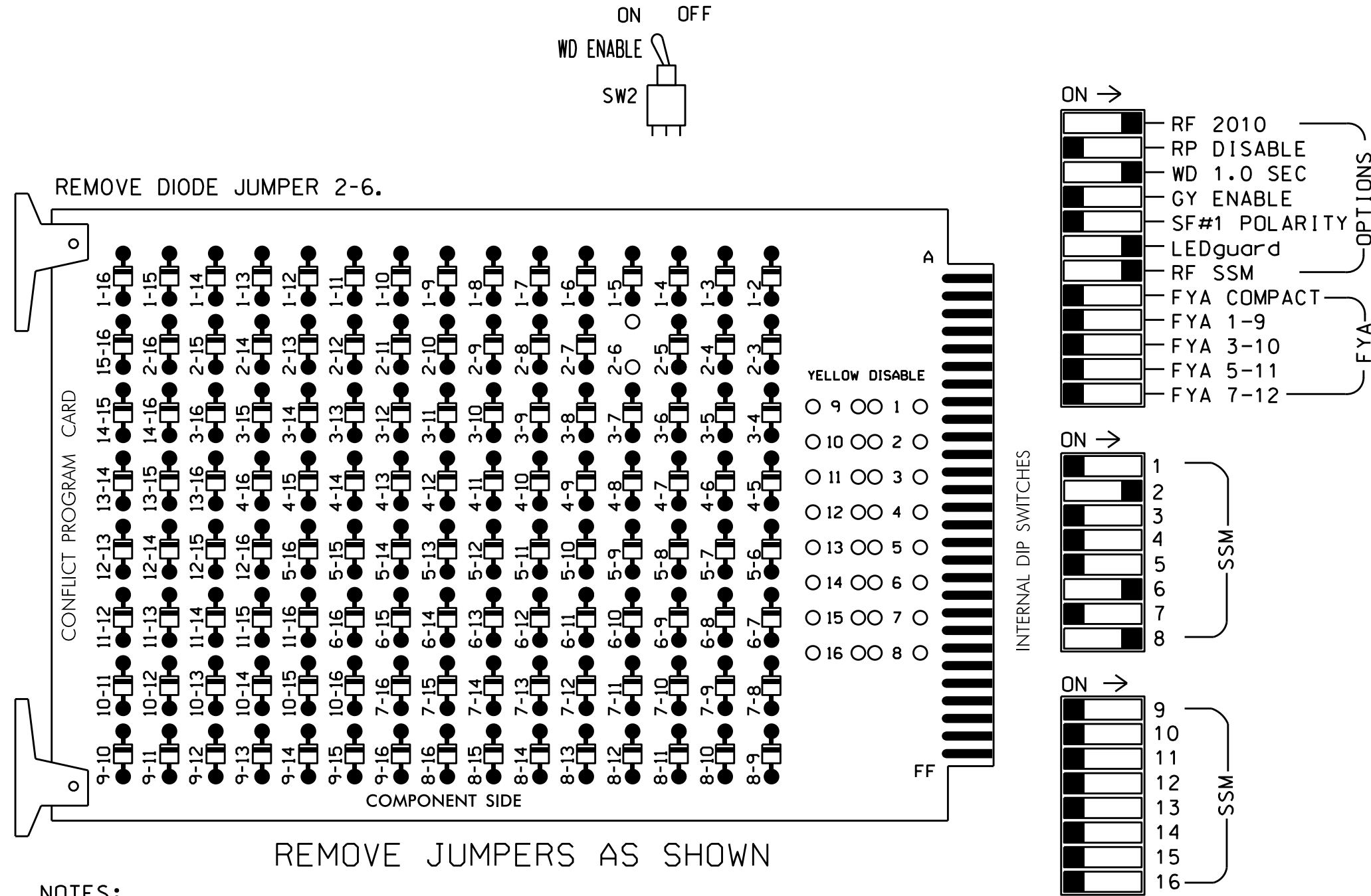
REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



16 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,5,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Disable all phases for Startup In Green.
- Program 2 and 6 for First Phases.
- Disable all phases for Yellow Flash.

Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	82,83	NU	NU	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW		129						135										
GREEN																		
RED ARROW																		
YELLOW ARROW											108							
GREEN ARROW		130						136			109							

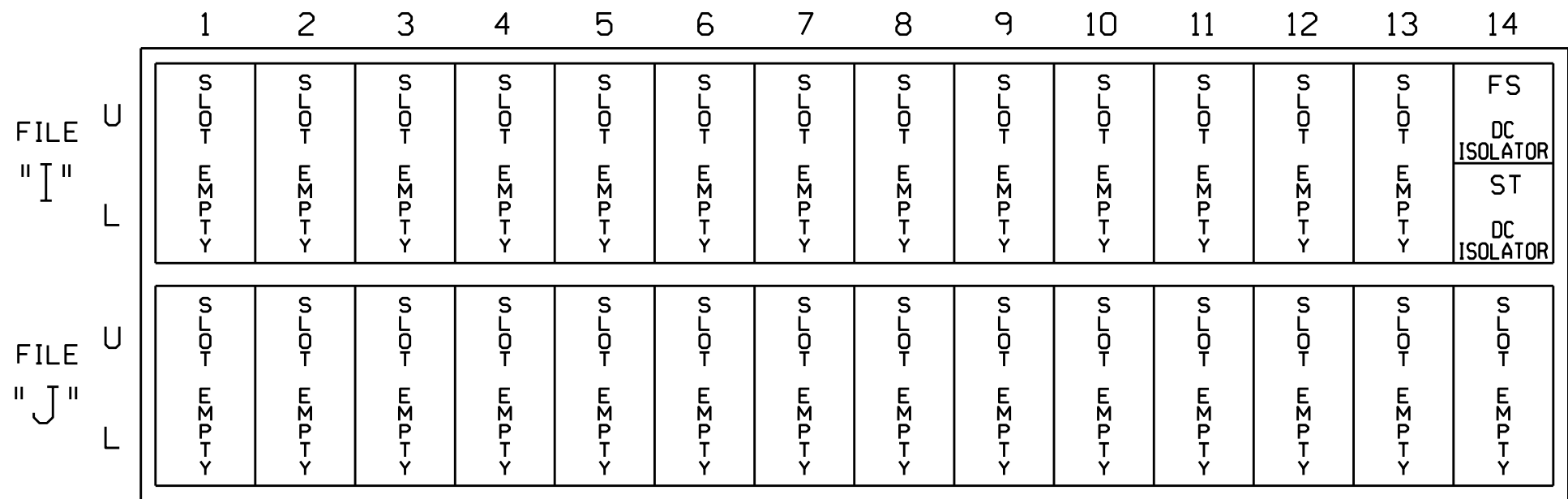
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S6,S8
PHASES USED.....2,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)

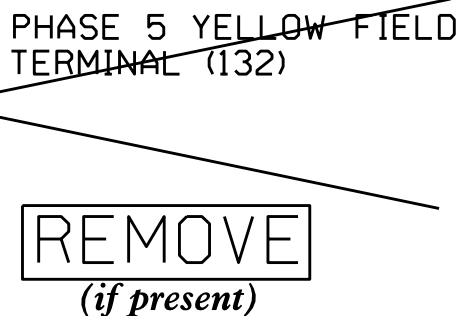


SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

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



Electrical Detail - Temporary Design 2

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road)

at
I-40 WB Ramp

Division 9 Forsyth County Winston-Salem

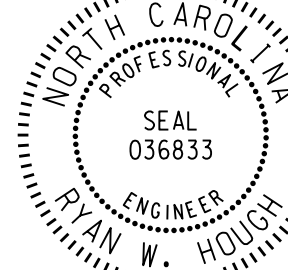
PLAN DATE: December 2024 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



Signed by: Ryan W. Hough 1/13/2025

DATE

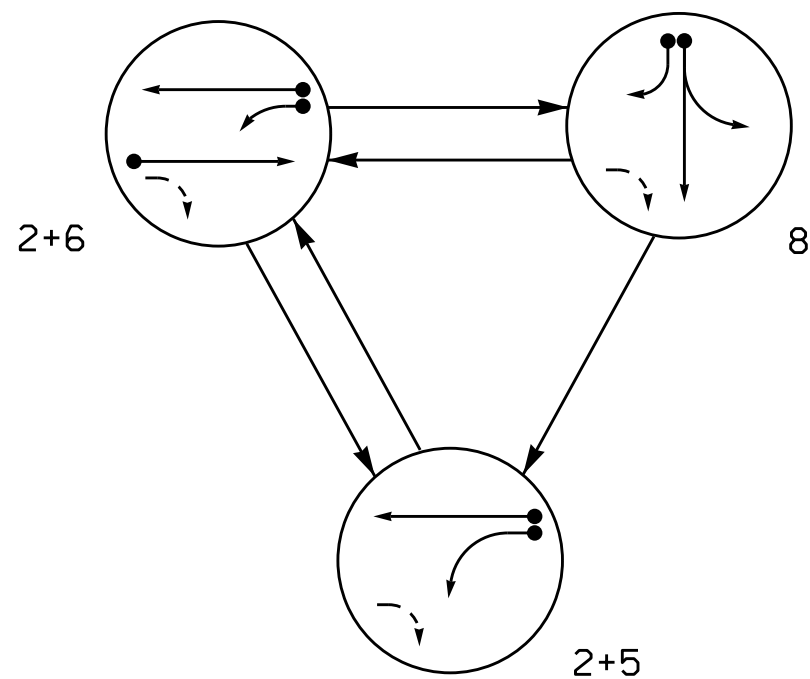
SIG. INVENTORY NO. 09-0599T2

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

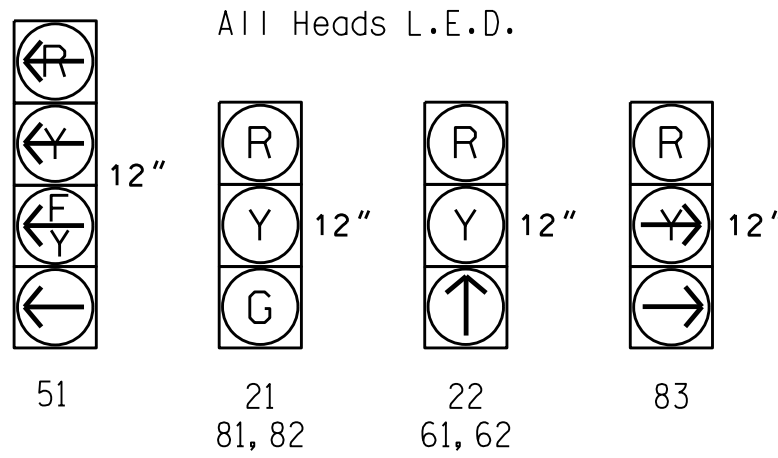
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reconnect and unbag existing signal heads 51 and 81.
4. Reposition existing signal heads 21, 22, 51, 61, and 62.
5. Phase 5 may be lagged.
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.

PHASING DIAGRAM



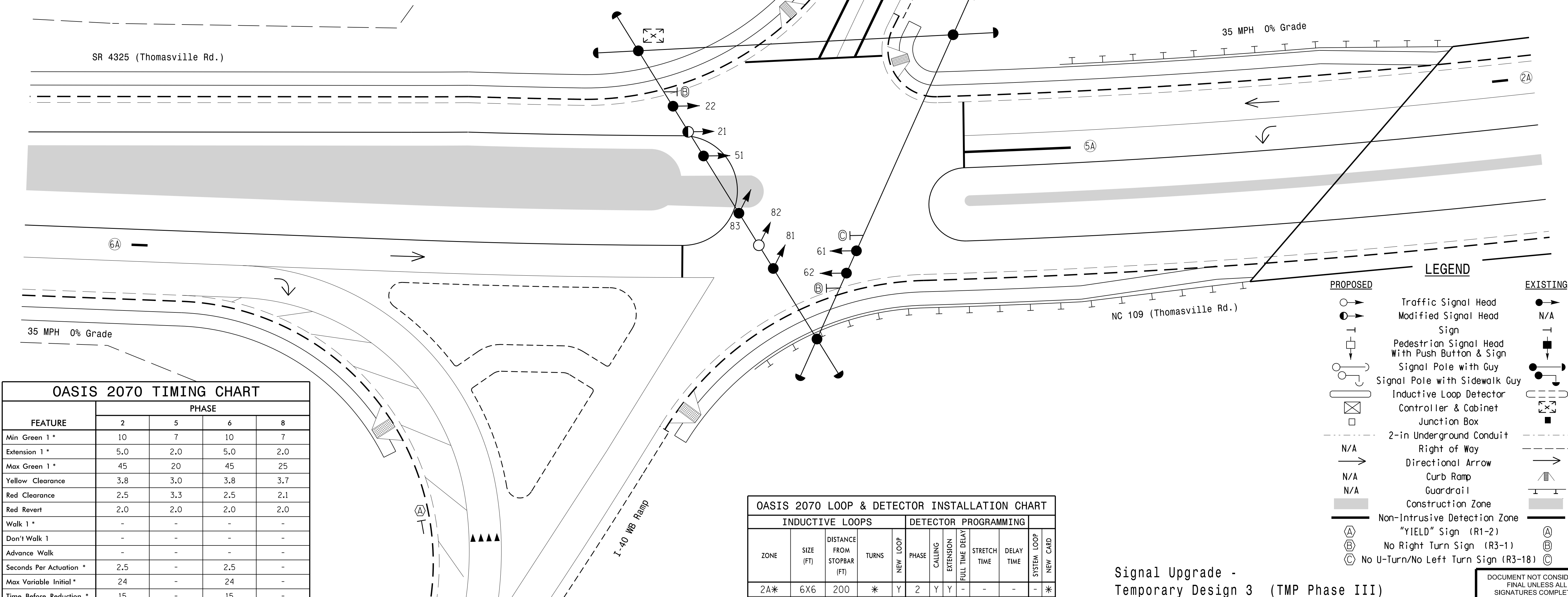
SIGNAL FACE	PHASE			
	2+5	2+6	8	FLASH
21	G	G	R	R
22	↑	↑	R	R
51	←	←	R	R
61, 62	R	↑	R	R
81, 82	R	R	G	R
83	R	R	→	R

SIGNAL FACE I.D.



PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	5.0	2.0	5.0	2.0
Max Green 1 *	45	20	45	25
Yellow Clearance	3.8	3.0	3.8	3.7
Red Clearance	2.5	3.3	2.5	2.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Advance Walk	-	-	-	-
Seconds Per Actuation *	2.5	-	2.5	-
Max Variable Initial *	24	-	24	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	15	-	15	-
Minimum Gap	3.0	-	3.0	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART									
INDUCTIVE LOOPS					DETECTOR PROGRAMMING				
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME
2A*	6X6	200	*	Y	2	Y	Y	-	-
5A*	6X40	0	*	Y	5	Y	Y	-	15
6A*	6X6	200	*	Y	2	Y	Y	-	3
8A*	6X40	0	*	-	8	Y	Y	-	-
8B*	6X40	0	*	-	8	Y	Y	-	15

* Non-Intrusive detection zone.

LEGEND

- PROPOSED
- EXISTING
- Traffic Signal Head
- Modified Signal Head
- Sign
- Pedestrian Signal Head With Push Button & Sign
- Signal Pole with Guy
- Signal Pole with Sidewalk Guy
- Inductive Loop Detector
- Controller & Cabinet
- Junction Box
- 2-in Underground Conduit
- Right of Way
- Directional Arrow
- Curb Ramp
- Guardrail
- Construction Zone
- Non-Intrusive Detection Zone
- "YIELD" Sign (R1-2)
- No Right Turn Sign (R3-1)
- No U-Turn/No Left Turn Sign (R3-18)

Signal Upgrade -
Temporary Design 3 (TMP Phase III)

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

0 SCALE 1"=20'

NC 109/SR 4325 (Thomasville Road)
at
I-40 WB Ramps

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS

INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

ROBERT J. ZIMMERMAN

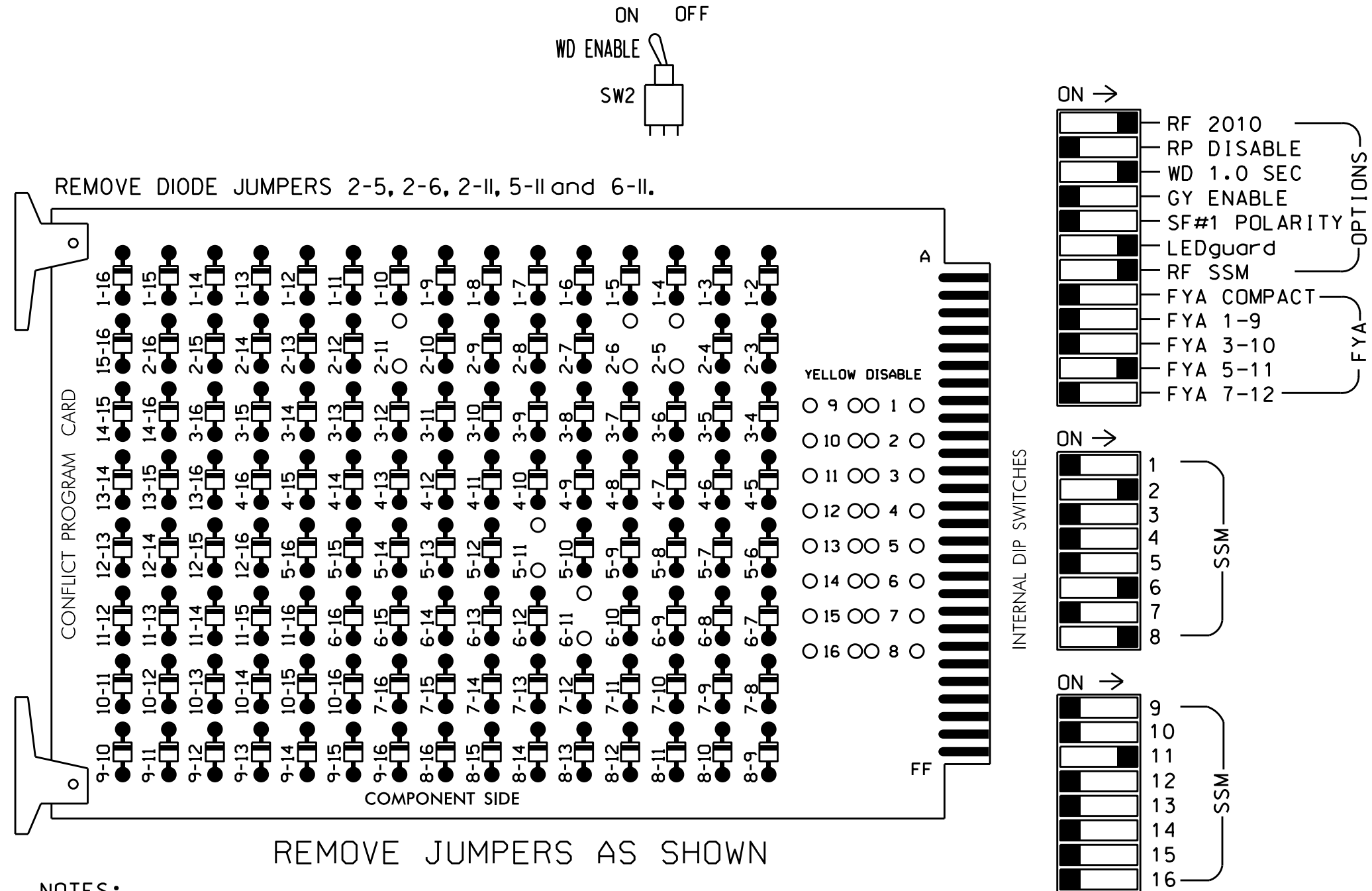
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01/02/2025

SIG. INVENTORY NO. 09-0599T3

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,5,7, 9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Disable all phases for Startup In Green.
- Program 2 and 6 for First Phases.
- Disable all phases for Yellow Flash.
- The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	51	61,62	NU	NU	81,82	83	NU	NU	NU	51	NU	NU
RED		128	128					134			107	107						
YELLOW		129	129				*	135			108							
GREEN		130									109							
RED ARROW																A114		
YELLOW ARROW											108					A115		
FLASHING YELLOW ARROW																A116		
GREEN ARROW			130				133	136			109							

NU = Not Used

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

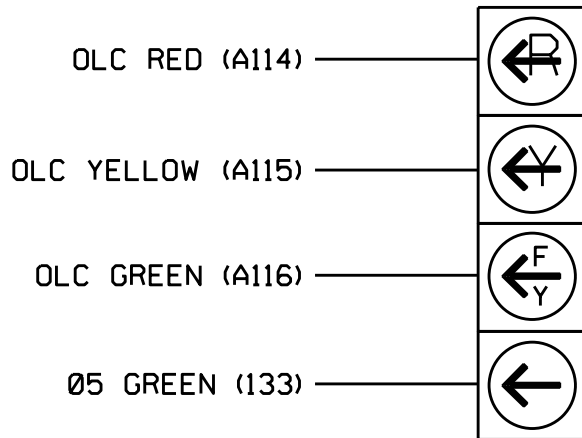
★ See pictorial of head wiring in detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S6,S8,S12
PHASES USED.....2,5,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



51

NOTE

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

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FILE U	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	FS
FILE L	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	DC ISOLATOR
FILE U	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	ST
FILE L	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	←-v-0r-S	DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

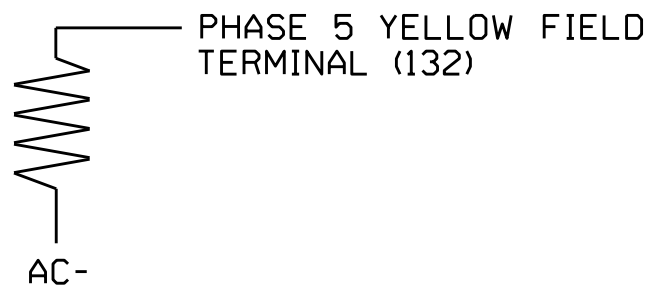
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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

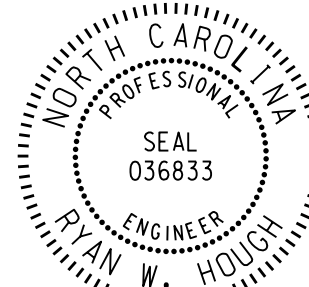


Electrical Detail - Sheet 1 of 2 - Temporary Design 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 109/SR 4325 (Thomasville Road)
Prepared In the Offices of:	at
	I-40 WB Ramps
PLAN DATE: December 2024	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



Signed by: Ryan W. Hough 1/13/2025

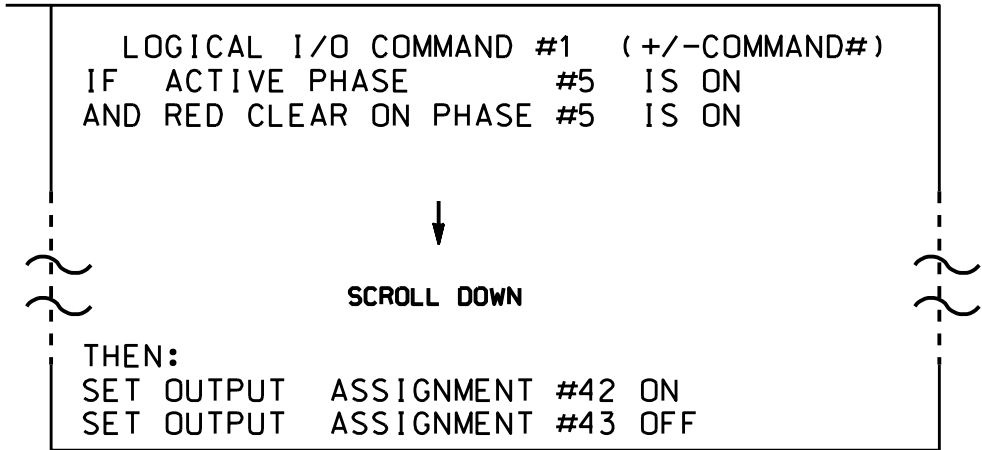
DATE

SIG. INVENTORY NO. 09-0599T3

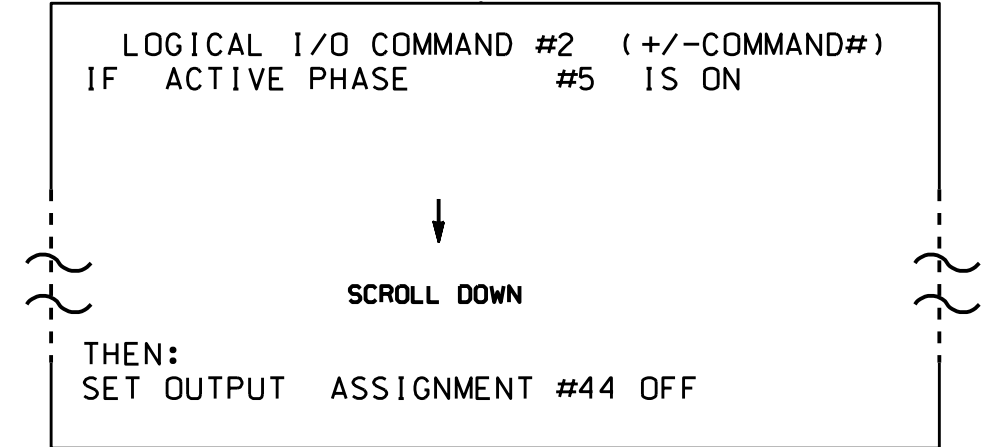
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

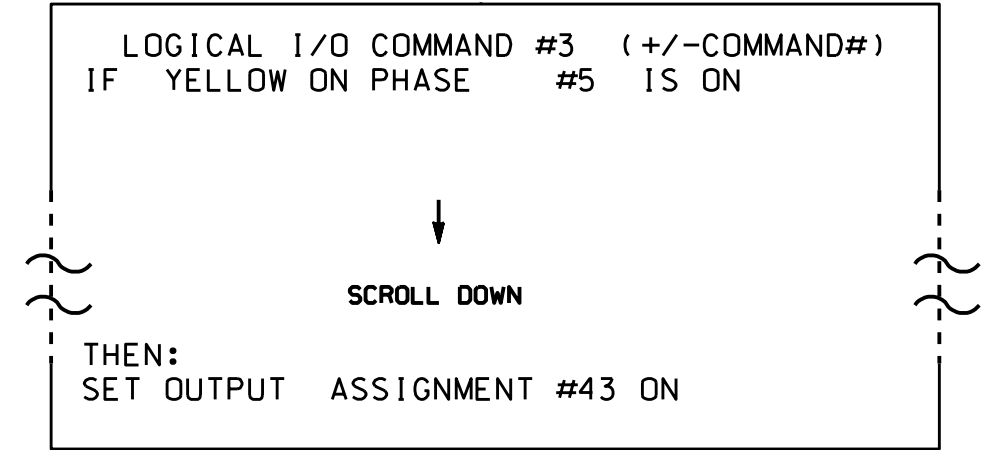
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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



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



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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0599T3
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 2 of 2 - Temporary Design 3

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road)
at
I-40 WB Ramps

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2024 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

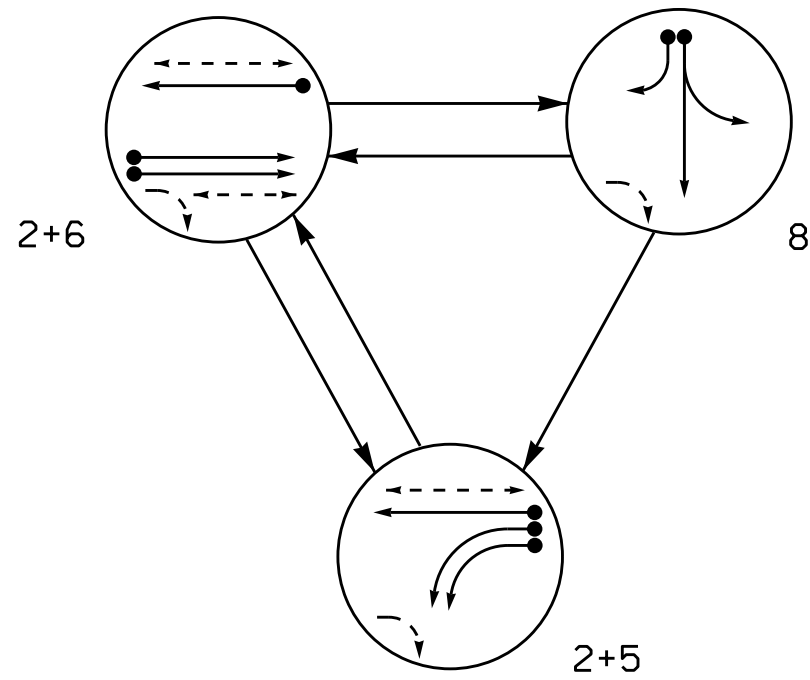


Signed by: Ryan W. Hough 1/13/2025

430320PAA264C3 DATE

SIG. INVENTORY NO. 09-0599T3

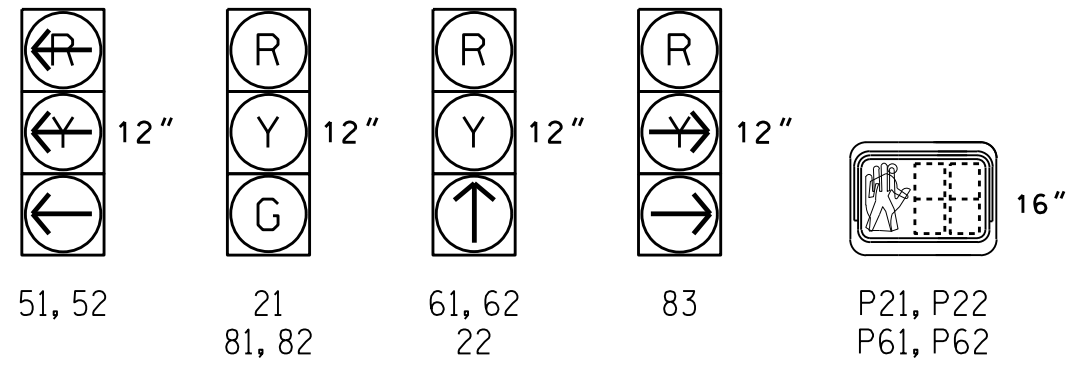
PHASING DIAGRAM



SIGNAL FACE	PHASE			
	2+5	2+6	8	FLASH
21	G	G	R	R
22	↑	↑	R	R
51, 52	←	←	RR	RR
61, 62	R	↑	R	R
81, 82	R	R	G	R
83	R	R	→	R
P21, P22	W	W	DW	DRK
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



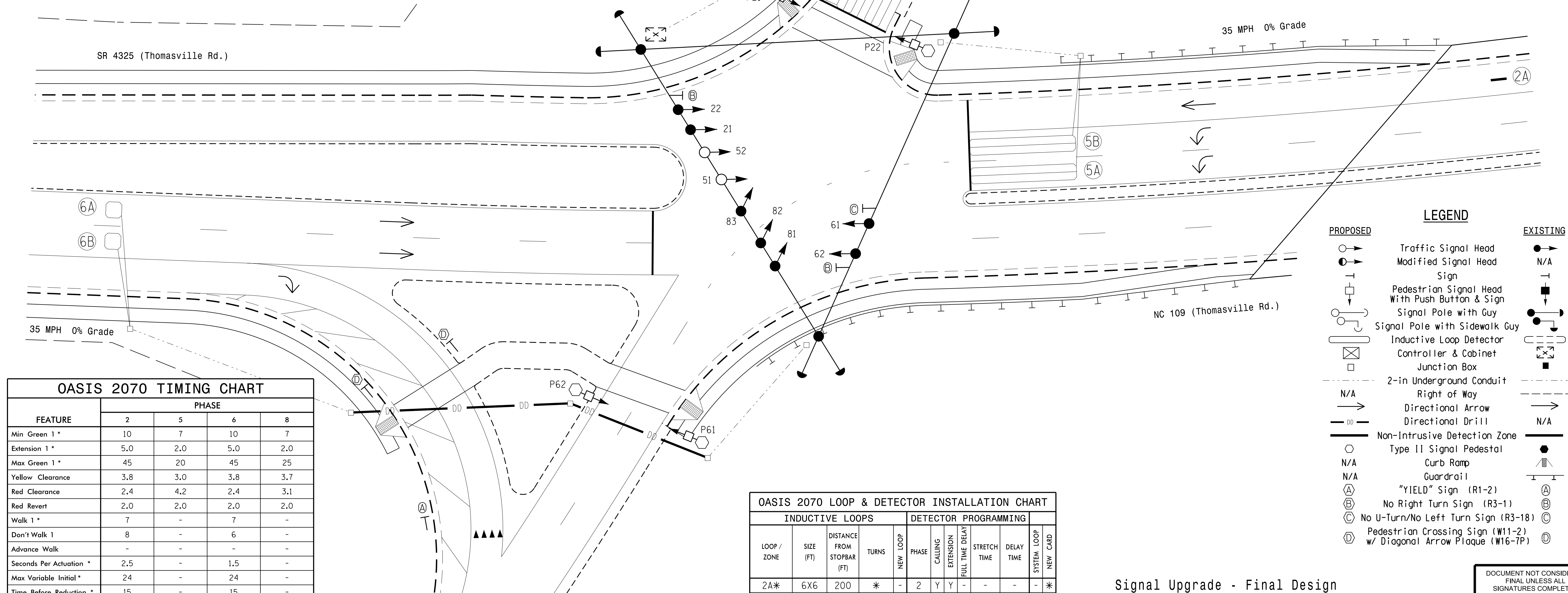
3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads 61 and 62.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	5.0	2.0	5.0	2.0
Max Green 1 *	45	20	45	25
Yellow Clearance	3.8	3.0	3.8	3.7
Red Clearance	2.4	4.2	2.4	3.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	7	-	7	-
Don't Walk 1	8	-	6	-
Advance Walk	-	-	-	-
Seconds Per Actuation *	2.5	-	1.5	-
Max Variable Initial *	24	-	24	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	15	-	15	-
Minimum Gap	3.0	-	3.0	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP / ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	200	*	-	2	Y	Y	-	-	-	-	*
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	Y
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	Y
6A	6X6	200	4	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	200	4	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	15	-	Y

* Non-Intrusive detection zone.

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 |
| --- DD --- | Directional Drill |
| --- DD --- | N/A |
| --- DD --- | Non-Intrusive Detection Zone |
| ○ | Type II Signal Pedestal |
| N/A | Curb Ramp |
| N/A | Guardrail |
| (A) | "YIELD" Sign (R1-2) |
| (B) | No Right Turn Sign (R3-1) |
| (C) | No U-Turn/No Left Turn Sign (R3-18) |
| (D) | Pedestrian Crossing Sign (W11-2) w/ Diagonal Arrow Plaque (W16-7P) |

Signal Upgrade - Final Design

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road)
at
I-40 WB Ramps

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS	INIT.	DATE

0 SCALE 20 1"=20'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
026486
ENGINEER
ROBERT J. ZIMMERMAN

DocuSign
100846892744404
01/02/2025
DATE
SIC. INVENTORY NO. 09-0599

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)



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

(front view)

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

ACCEPTABLE VALUES

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

PHASE 5 YELLOW FIELD
TERMINAL (132)

AC-

REMOVE
(if present)

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. Return controller to Factory Defaults before programming per this electrical detail.
3. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
4. Enable Simultaneous Gap-Out for all Phases.
5. Program phases 2 and 6 for Variable Initial and Gap Reduction.
6. Disable all phases for Startup In Green.
7. Program 2 and 6 for First Phases.
8. Disable all phases for Yellow Flash.
9. The cabinet and controller are part of the Winston-Salem Signal System.

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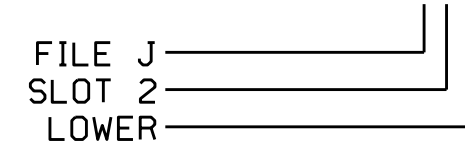
CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S2P,S5,S6,S6P,S8
PHASES USED.....2,2 PED,5,6,6 PED,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

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LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y	15		
PED PUSH BUTTONS							NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS				
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

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

INPUT FILE POSITION LEGEND: J2L



For 2A, install a non-intrusive detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	Z1	Z2	PZ1, PZ2	NU	NU	NU	5I,52	6I,62	P6I, P62	NU	8I,82	83	NU	NU	NU	NU	NU
RED		I2R	I2R						I3A			I8O	I8O					
YELLOW		I2Y	I2Y						I3S			I8S						
GREEN		I2G										I8G						
RED ARROW								I3L										
YELLOW ARROW								I3T				I8H						
FLASHING YELLOW ARROW																		
GREEN ARROW			I3O					I3X	I3V			I8V						
				I13						I19								
				I15						I21								

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

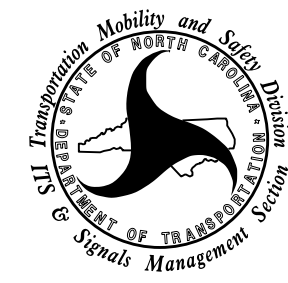
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0599
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:



750 N.Greenfield Pkwy.Garner,NC 27529

NC 109/SR 4325 (Thomasville Road)
at
I-40 WB Ramps

Division 9 Forsyth County Winston-Salem

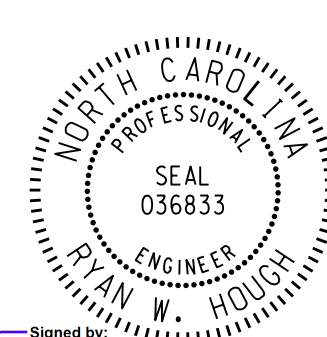
PLAN DATE: December 2024	REVIEWED BY:
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PREPARED BY: James Peterson	REVIEWED BY:
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REVISIONS	INIT.	DATE
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SIGNATURES COMPLETED**

SEAL

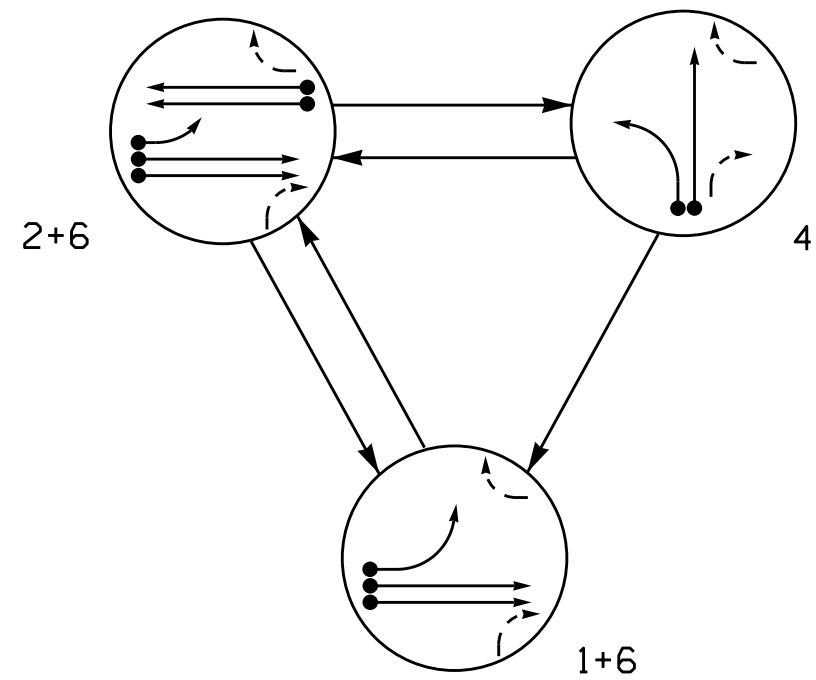


Ruan W. Hanch 1/13/2025

430320FAA2654C3... DATE

SIG. INVENTORY NO. 09-0599

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	1 + 6	2 + 6	4	FLASH
11	←	→	→	→
21	R	↑	R	R
22	R	G	R	R
41, 42	R	R	G	R
61	G	G	R	R
62	↑	↑	R	R

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART													
INDUCTIVE LOOPS							DETECTOR PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
1A*	6X40	0	*	Y	1	Y	Y	-	-	15	-	*	
					6	Y	Y	Y	-	3	-	*	
2A*	6X6	200	*	Y	2	Y	Y	-	-	-	-	*	
2B*	6X6	200	*	Y	2	Y	Y	-	-	-	-	*	
4A*	6X40	0	*	Y	4	Y	Y	-	-	-	-	*	
4B*	6X40	0	*	Y	4	Y	Y	-	-	-	-	*	
6A*	6X6	200	*	Y	6	Y	Y	-	-	-	-	*	
6B*	6X6	200	*	Y	6	Y	Y	-	-	-	-	*	

* Non-Intrusive detection zone.

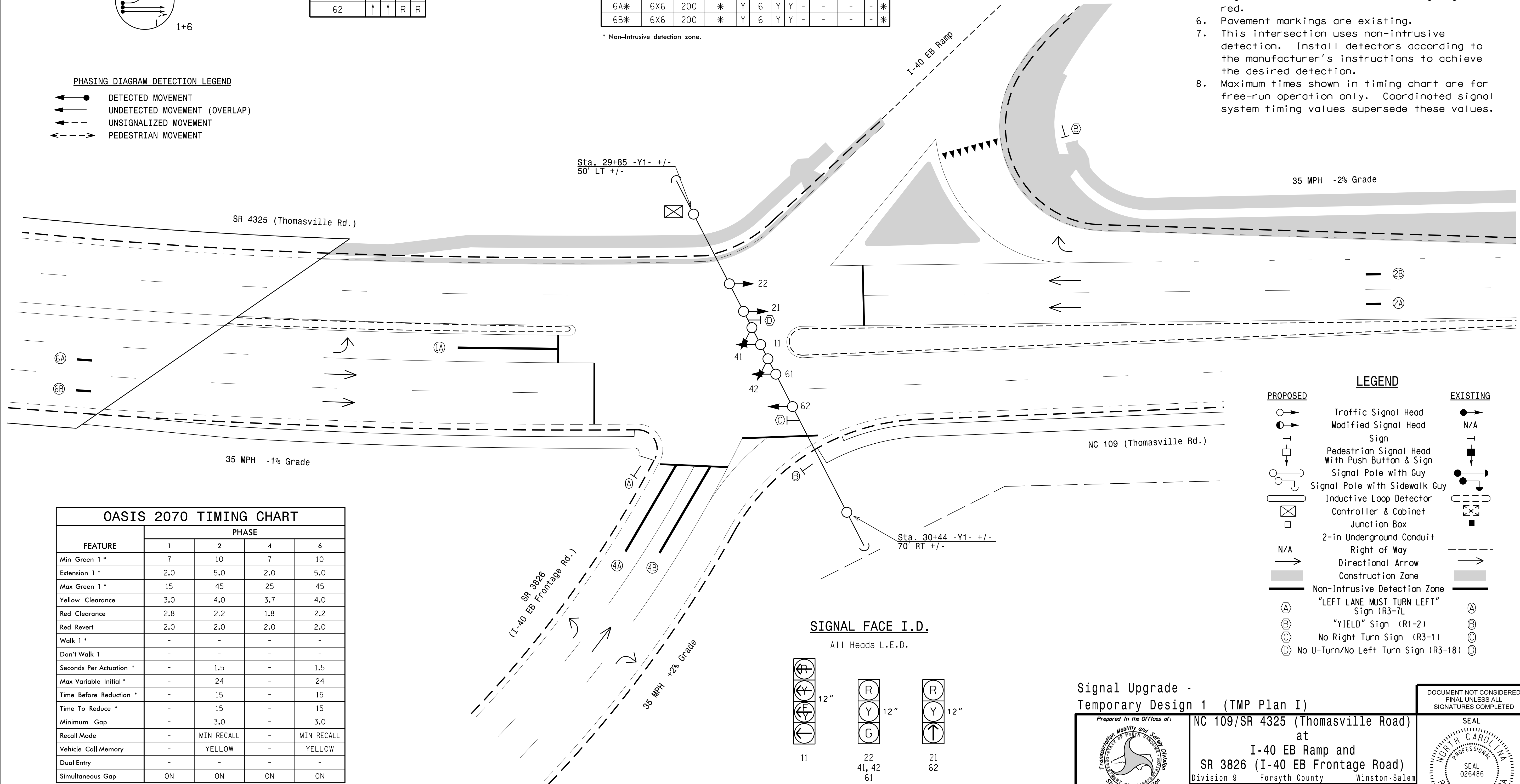
3 Phase Fully Actuated (Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	5.0	2.0	5.0
Max Green 1 *	15	45	25	45
Yellow Clearance	3.0	4.0	3.7	4.0
Red Clearance	2.8	2.2	1.8	2.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	-	1.5
Max Variable Initial *	-	24	-	24
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	15	-	15
Minimum Gap	-	3.0	-	3.0
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

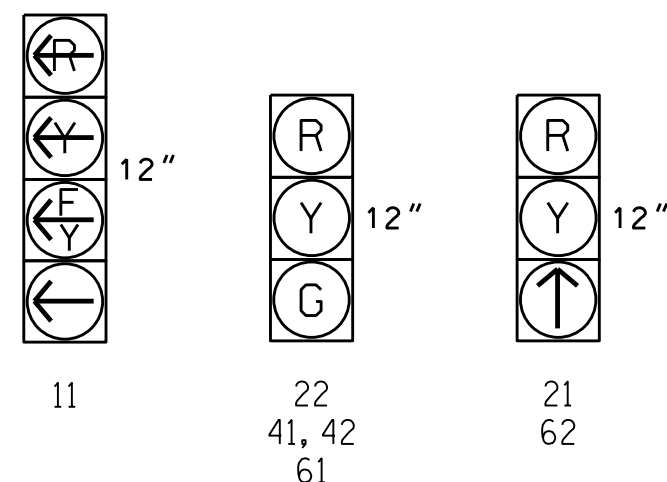
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

- | PROPOSED | EXISTING |
|--|---|
| Traffic Signal Head | Modified Signal Head |
| 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 | Right of Way |
| Directional Arrow | Construction Zone |
| Non-Intrusive Detection Zone | "LEFT LANE MUST TURN LEFT" Sign (R3-7L) |
| "YIELD" Sign (R1-2) | No Right Turn Sign (R3-1) |
| No U-Turn/No Left Turn Sign (R3-18) | |

SIGNAL FACE I.D.

All Heads L.E.D.



Signal Upgrade - Temporary Design 1 (TMP Plan I)

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

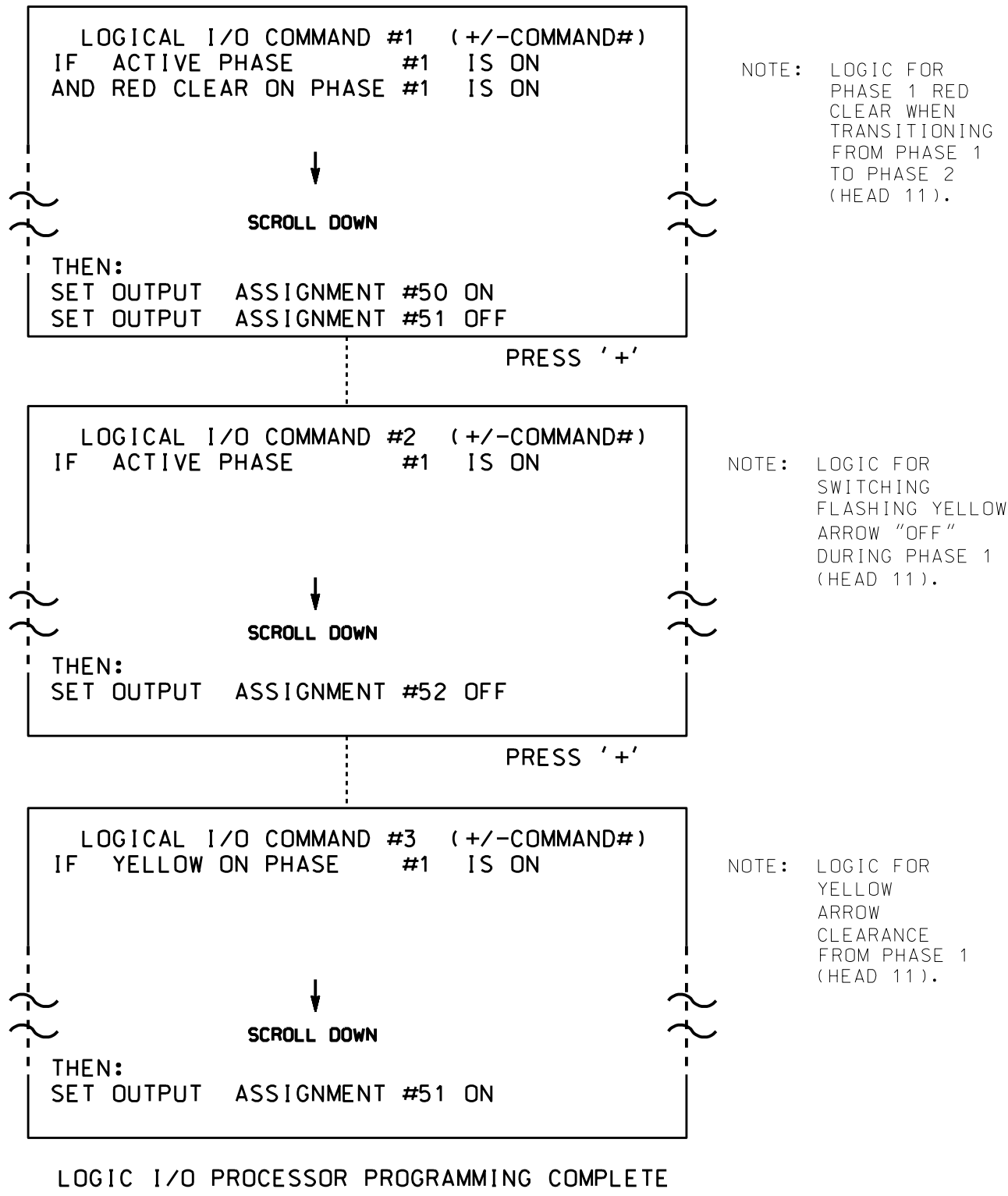
NC 109/SR 4325 (Thomasville Road) at I-40 EB Ramp and SR 3826 (I-40 EB Frontage Road)
Division 9 Forsyth County Winston-Salem
PLAN DATE: September 2024
PREPARED BY: J.A. Lohr
REVIEWED BY: J.A. Lohr
REVISIONS
INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
ROBERT J. ZIMMERMAN
026486
01/02/2025
DATE
SIC. INVENTORY NO. 09-0600T1

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

(program controller as shown below)

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



OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL
FOR DEFAULT PHASING

(program controller as shown below)

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

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

OVERLAP PROGRAMMING COMPLETE

NOTICE GREEN FLASH

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0600T1
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 2 of 2 - Temporary Design 1

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road)

at
I-40 EB Ramp and
SR 3826 (I-40 EB Frontage Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2024 REVIEWED BY:

PREPARED BY: REVIEWED BY:

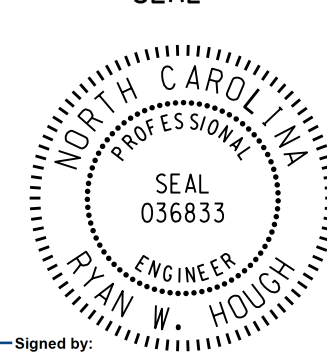
REVISIONS INIT. DATE

Signed by: Ryan W. Hough 01/13/2025

4303202F-A02654C3 DATE

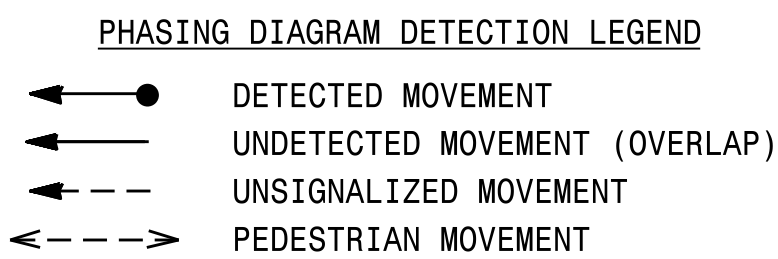
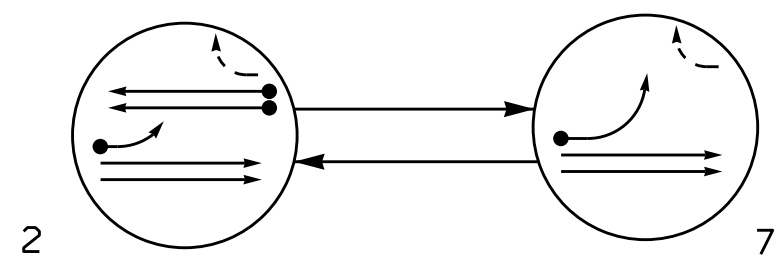
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Sig. INVENTORY NO. 09-0600T1

PHASING DIAGRAM



SIGNAL FACE	PHASE		
	2	7	FLASH
11	Y	Y	R
21	Y	R	R
22	G	R	R
61	G	G	R
62	Y	Y	R

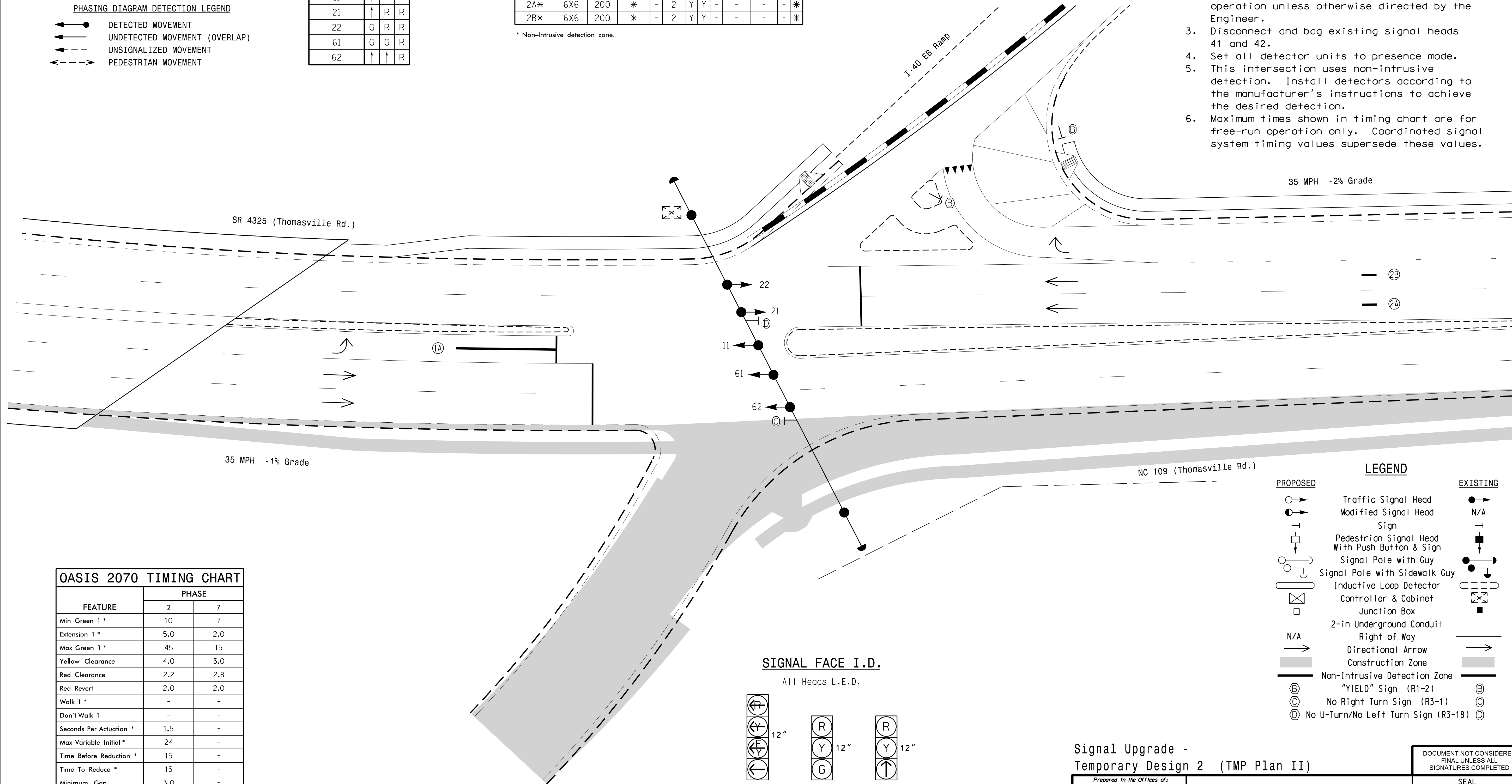
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	LOOP SYSTEM	NEW CARD
1A*	6X40	0	*	-	7	Y	Y	-	-	15	-	*
2A*	6X6	200	*	-	2	Y	Y	-	-	-	-	*
2B*	6X6	200	*	-	2	Y	Y	-	-	-	-	*

* Non-Intrusive detection zone.

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Disconnect and bag existing signal heads 41 and 42.
- Set all detector units to presence mode.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

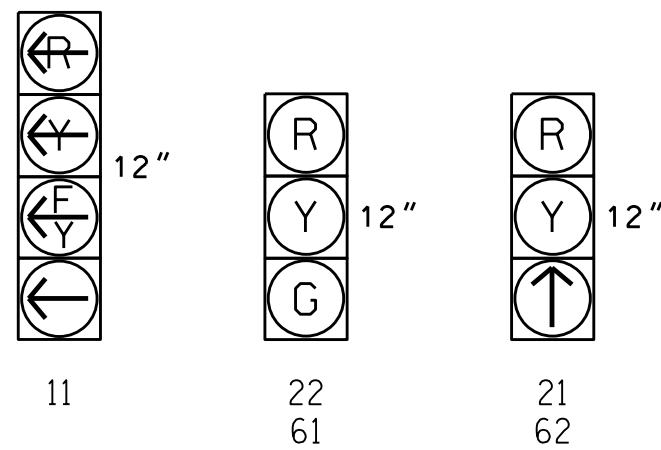


OASIS 2070 TIMING CHART		
FEATURE	PHASE	
	2	7
Min Green 1 *	10	7
Extension 1 *	5.0	2.0
Max Green 1 *	45	15
Yellow Clearance	4.0	3.0
Red Clearance	2.2	2.8
Red Revert	2.0	2.0
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	1.5	-
Max Variable Initial *	24	-
Time Before Reduction *	15	-
Time To Reduce *	15	-
Minimum Gap	3.0	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	-
Dual Entry	-	-
Simultaneous Gap	ON	ON

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

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED	EXISTING
Traffic Signal Head	Modified Signal Head
Modified Signal Head	Sign
Sign	Pedestrian Signal Head With Push Button & Sign
Pedestrian Signal Head With Push Button & Sign	Signal Pole with Guy
Signal Pole with Guy	Signal Pole with Sidewalk Guy
Signal Pole with Sidewalk Guy	Inductive Loop Detector
Inductive Loop Detector	Controller & Cabinet
Controller & Cabinet	Junction Box
Junction Box	2-in Underground Conduit
2-in Underground Conduit	Right of Way
Right of Way	Directional Arrow
Directional Arrow	Construction Zone
Construction Zone	Non-Intrusive Detection Zone
Non-Intrusive Detection Zone	"YIELD" Sign (R1-2)
"YIELD" Sign (R1-2)	No Right Turn Sign (R3-11)
No Right Turn Sign (R3-11)	No U-Turn/No Left Turn Sign (R3-18)
No U-Turn/No Left Turn Sign (R3-18)	

Signal Upgrade -
Temporary Design 2 (TMP Plan II)

Prepared in the Offices of:

Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road)
at
I-40 EB Ramp

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS

INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

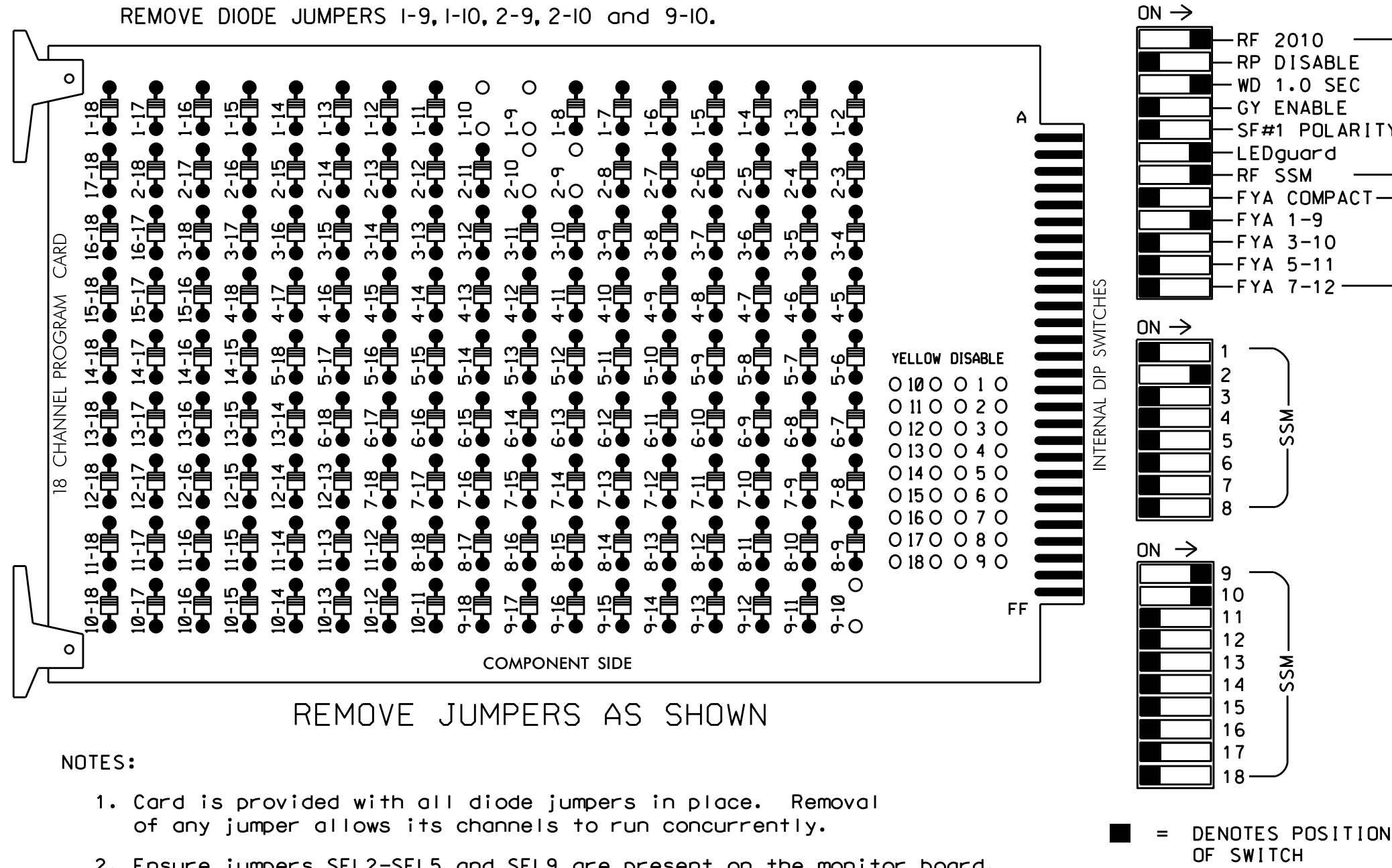
SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
026486
ROBERT J. ZIMMERMAN

01/02/2025
DATE

SIG. INVENTORY NO. 09-0600T2

18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phase 2 for Variable Initial and Gap Reduction.
- Disable all phases for Start Up In Green.
- Program phase 2 for First Phases.
- Disable all phases for Yellow Flash.
- Program overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,AUX S1,AUX S2
PHASES USED.....2,7
OVERLAP "A".....2+7
OVERLAP "B".....2+7
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
OVERLAP "G".....7

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	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21	22	NU	NU	NU	NU	NU	NU	NU	NU	NU	11★	61	62	NU	NU	NU
RED		128	128											A124	A124			
YELLOW	*	129	129											A125	A125			
GREEN			130											A126				
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127	130												A126				

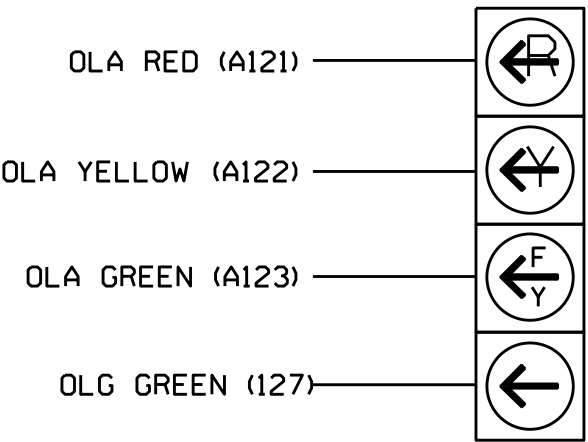
NU = Not Used

* 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 head as shown)



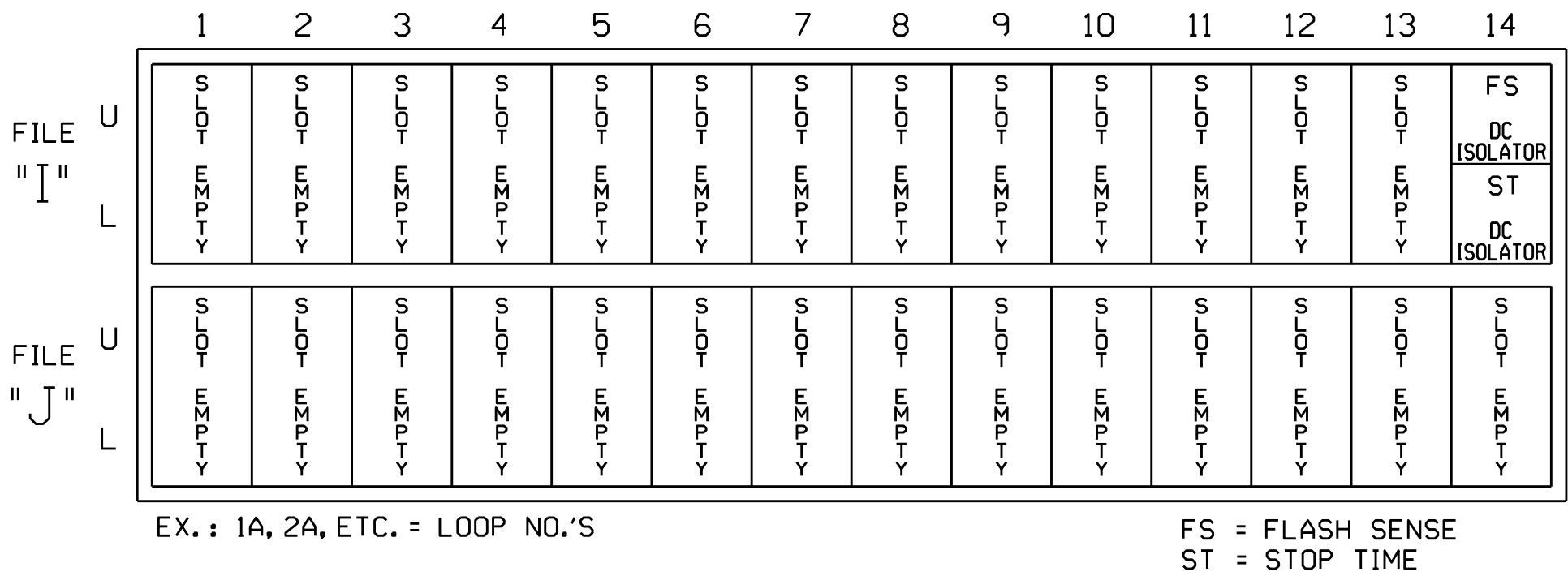
11

NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



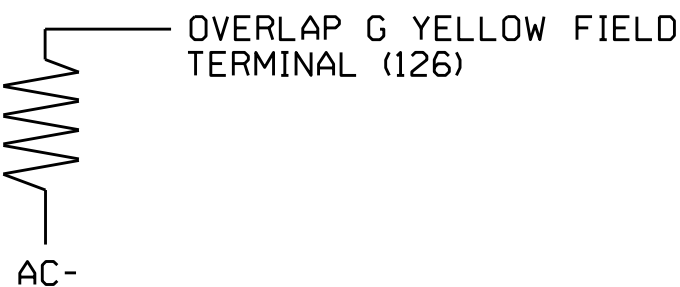
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



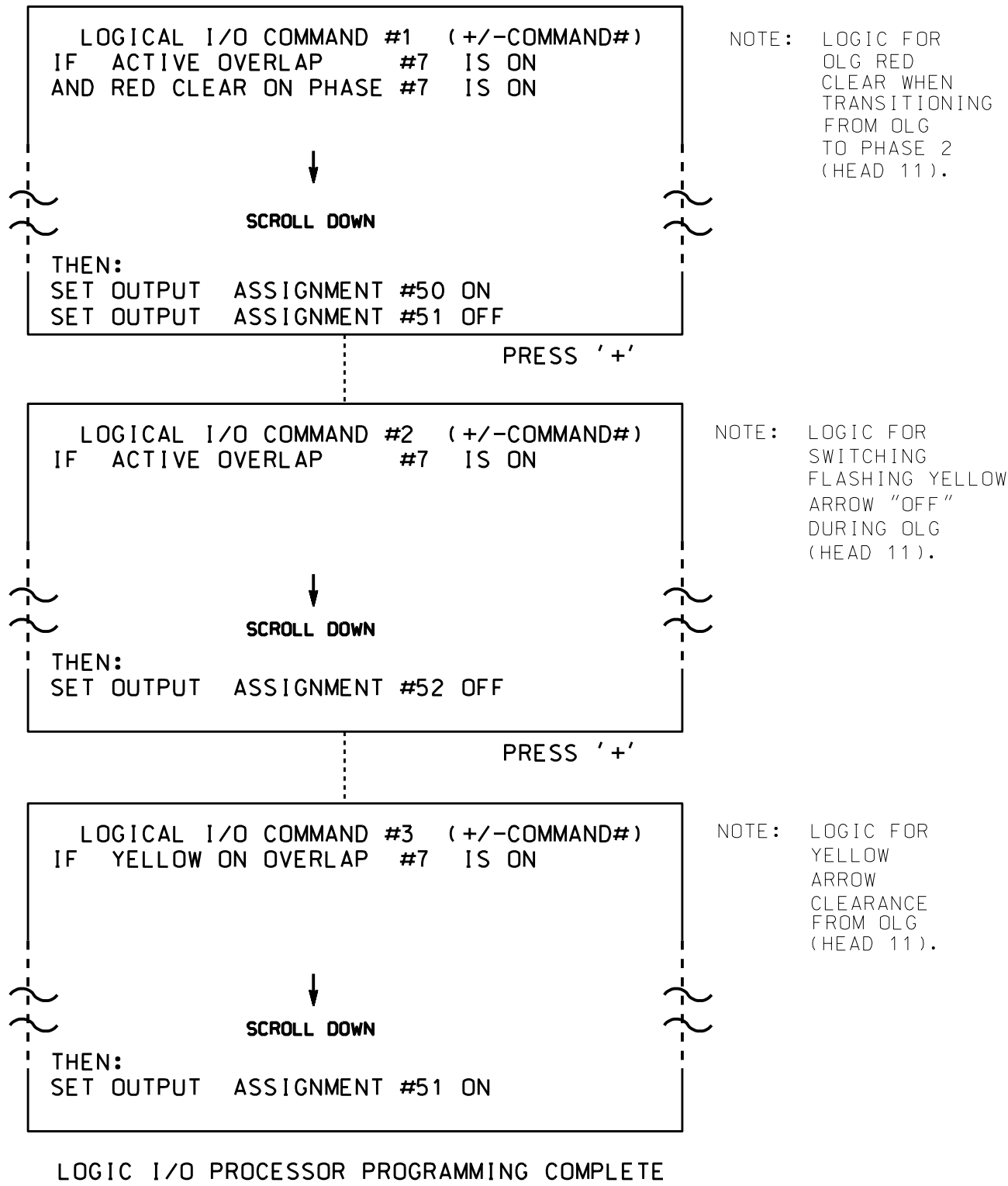
Electrical Design - Sheet 1 of 3 - Temporary Design 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 109/SR 4325 (Thomasville Road) at I-40 EB Ramp		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared In the Offices of:		Division 9 Forsyth County Winston-Salem		SEAL	
PLAN DATE: December 2024		REVIEWED BY:		SEAL 036833	
PREPARED BY: James Peterson		REVIEWED BY:		ENGINEER RYAN W. HOUGH	
REVISIONS		INIT.		DATE	
750 N. Greenfield Pkwy, Garner, NC 27529				Signed by: Ryan W. Hough 01/13/2025	
				DATE	
				SIG. INVENTORY NO. 09-0600T2	

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

(program controller as shown below)

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



OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL
FOR DEFAULT PHASING

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

PRESS '+'

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

PRESS '+' 5 TIMES

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

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0600T2
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 2 of 3 - Temporary Design 2

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road)
at
I-40 EB Ramp

Division 9 Forsyth County Winston-Salem

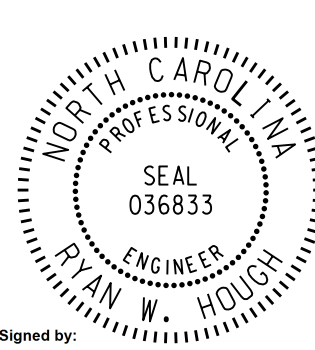
PLAN DATE: December 2024 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



Signed by: Ryan W. Hough 01/13/2025

430320EAA2054C3 DATE

SIG. INVENTORY NO. 09-0600T2

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL
FOR SIGNAL HEAD 11

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:16 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:16 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN).....0

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:16 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PRESS "+" KEY FOR OUTPUT 15

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:17 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:17 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN).....1

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:17 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

PRESS "+" KEY FOR OUTPUT 16

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

PAGE:1 C1 PIN:18 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

PAGE:1 C1 PIN:18 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...7
SELECT COLOR(0=RED,1=YEL,2=GRN).....2

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTING DATA,
THEN 'ESC'.

PAGE:1 C1 PIN:18 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

OUTPUT PROGRAMMING FOR HEAD 11 COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0600T2
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

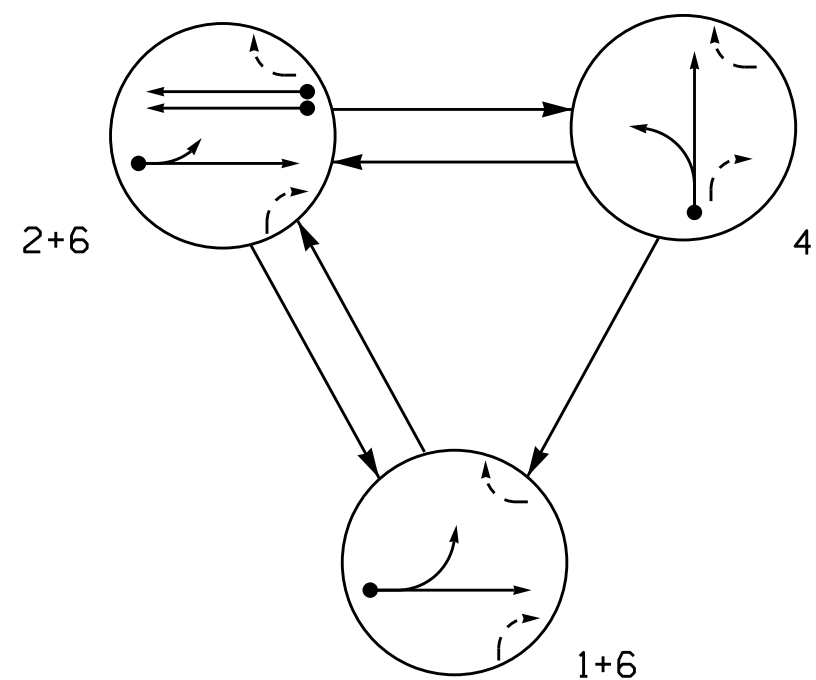
Electrical Design - Sheet 3 of 3 - Temporary Design 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 109/SR 4325 (Thomasville Road) at I-40 EB Ramp	
Division 9 Forsyth County Winston-Salem	
PLAN DATE: December 2024	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL	
NORTH CAROLINA PROFESSIONAL ENGINEER RYAN W. HOUGH 036833	
Signed by: Ryan W. Hough	01/13/2025
DATE	
SIG. INVENTORY NO. 09-0600T2	

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	1 + 6	2 + 6	4	FLASH
21	R	↑	R	R
22	R	G	R	R
41, 42	R	G	G	R
61	⬅	G	R	R
62	↑	↑	R	R

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART													
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURN	NEW LOOP	PHASE	CALLING	EXTENSION FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	LOOP NEW CARD		
1A*	6X15	50	*	Y	1	Y	Y	-	15	-	*		
2A*	6X6	200	*	-	2	Y	Y	-	-	-	*		
2B*	6X6	200	*	-	2	Y	Y	-	-	-	*		
4A*	6X40	0	*	Y	4	Y	Y	-	-	-	*		
6A*	6X6	200	*	Y	6	Y	Y	-	-	-	*		

* Non-Intrusive detection zone.

3 Phase Fully Actuated (Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Disconnect and bag existing signal head 11.
- Reconnect existing signal heads 41 and 42.
- Reposition existing signal head 62.
- Phase 1 may be lagged.
- Set all detector units to presence mode.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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

SR 4325 (Thomasville Rd.)

35 MPH -1% Grade

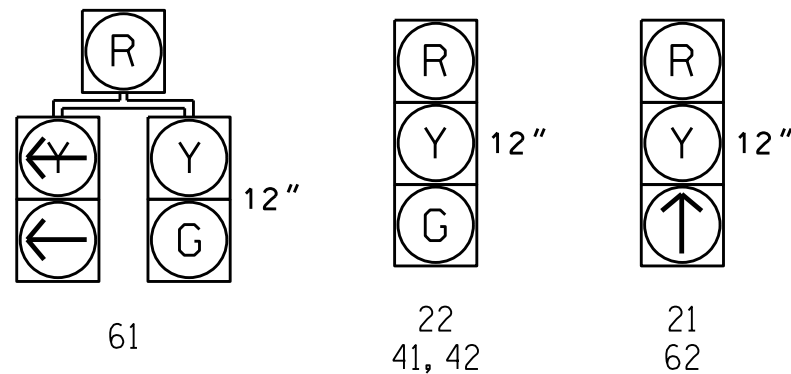
NC 109 (Thomasville Rd.)

I-40 EB Ramp

35 MPH +2% Grade

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	5.0	2.0	5.0
Max Green 1 *	15	45	25	45
Yellow Clearance	3.0	4.0	3.7	4.0
Red Clearance	2.9	2.2	1.9	2.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	-	2.5
Max Variable Initial *	-	24	-	24
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	15	-	15
Minimum Gap	-	3.0	-	3.0
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| Traffic Signal Head | N/A |
| Modified Signal Head | N/A |
| Sign | N/A |
| Pedestrian Signal Head With Push Button & Sign | N/A |
| Signal Pole with Guy | N/A |
| Signal Pole with Sidewalk Guy | N/A |
| Inductive Loop Detector | N/A |
| Controller & Cabinet | N/A |
| Junction Box | N/A |
| 2-in Underground Conduit | N/A |
| Right of Way | N/A |
| Directional Arrow | N/A |
| Guardrail | N/A |
| Construction Zone | N/A |
| Construction Zone Drums | N/A |
| Non-Intrusive Detection Zone | N/A |
| "YIELD" Sign (R1-2) | N/A |
| No Right Turn Sign (R3-1) | N/A |
| No U-Turn/No Left Turn Sign (R3-18) | N/A |

Signal Upgrade - Temporary Design 3 (TMP Plan III)

Prepared in the Offices of: Transportation Mobility and Safety Division NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27529	NC 109/SR 4325 (Thomasville Road) at I-40 EB Ramps Division 9 Forsyth County Winston-Salem PLAN DATE: September 2024 PREPARED BY: J.A. Lohr REVIEWED BY: J.A. Lohr REVISIONS INIT. DATE	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIMMERMAN 01/02/2025 DATE SIG. INVENTORY NO. 09-060073
--	---	---

(remove jumpers and set switches as shown)

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

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.

2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Disable all phases for Start Up In Green.
5. Program phases 2 and 6 for First Phases.
6. Disable all phases for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

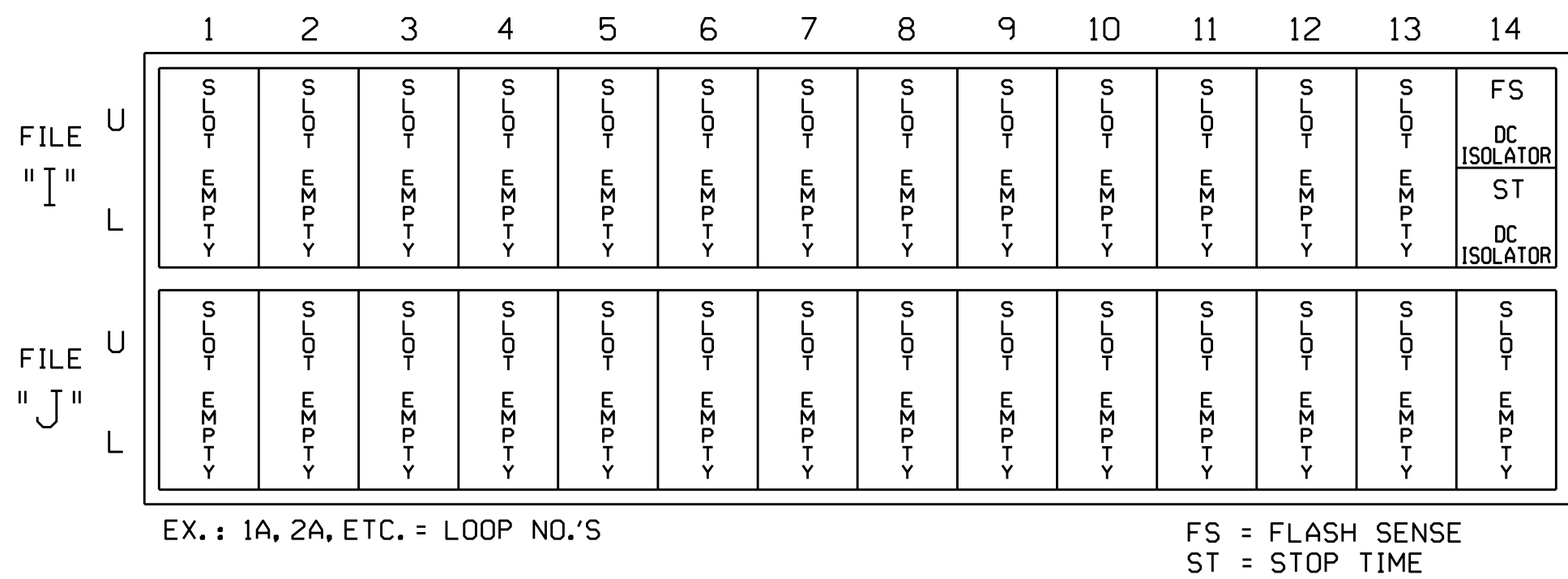
```
CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT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

[illegible]

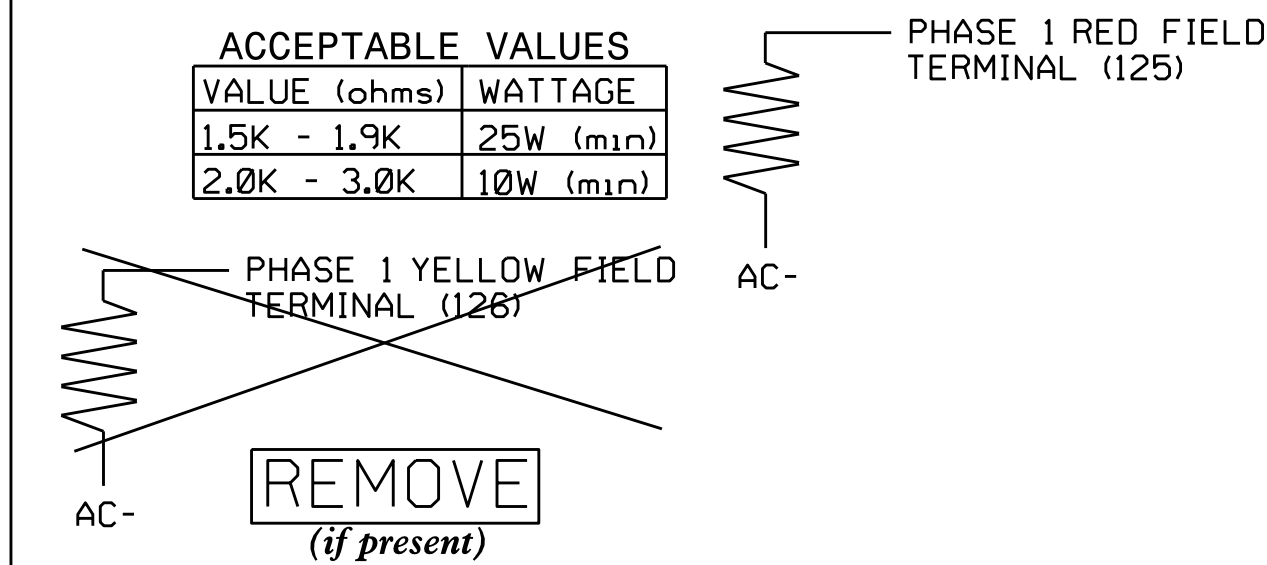
NU = Not Used

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

(front view)



(install resistor as shown below)



Install a non-intrusive 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: 09-0600T3
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 109/SR 4325 (Thomasville Road)
Prepared In the Offices of:	at
	I-40 EB Ramp

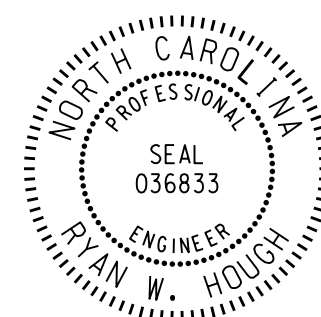
Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2024	REVIEWED BY:
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REVISIONS	INIT.	DATE
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**DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED**

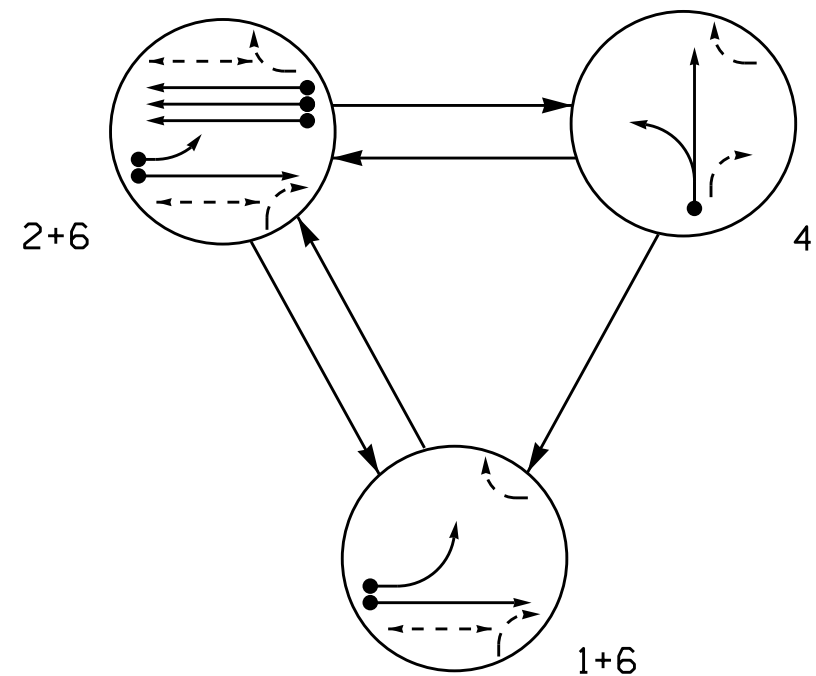
SEAL



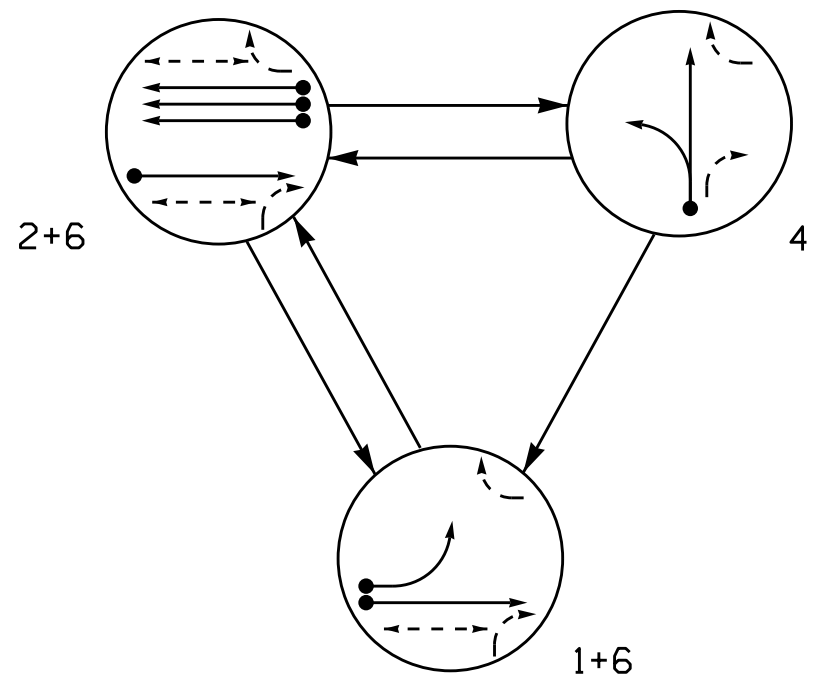
Signed by: Ryan W. Hough 01/14/2025

SIG. INVENTORY NO. 09-0600T3

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	1 + 6	2 + 6	4	FLASH
11	←	←	←	←
21	R	↑	R	R
22, 23	R	G	R	R
41, 42	R	R	G	R
61	G	G	R	R
62	↑	↑	R	R
P21, P22	DW	W	DW	DRK
P61, P62	W	W	DW	DRK

SIGNAL FACE	PHASE			
	1 + 6	2 + 6	4	FLASH
11	←	←	←	←
21	R	↑	R	R
22, 23	R	G	R	R
41, 42	R	R	G	R
61	G	G	R	R
62	↑	↑	R	R
P21, P22	DW	W	DW	DRK
P61, P62	W	W	DW	DRK

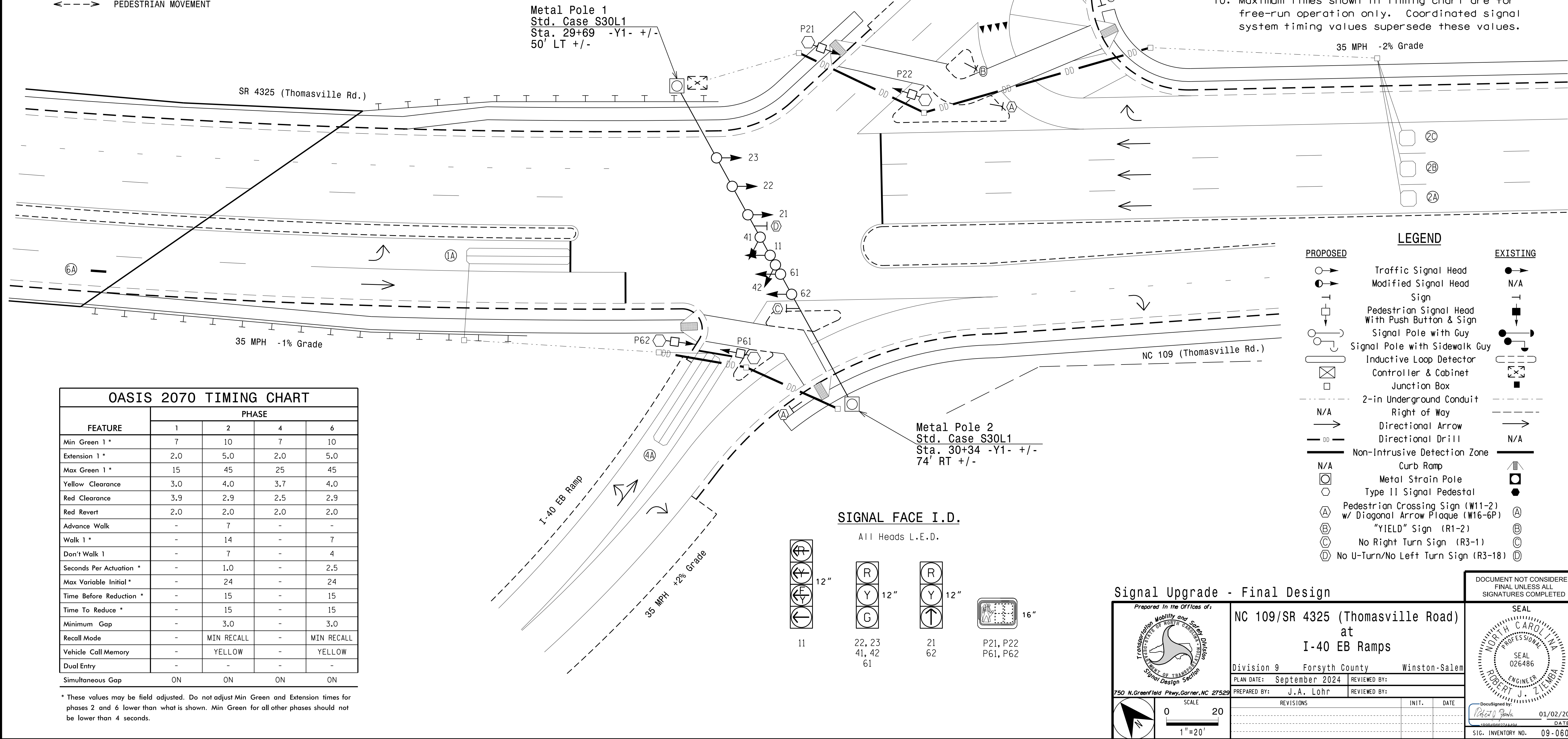
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS						DETECTOR PROGRAMMING					
LOOP / ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15*	-	Y
2A	6X6	200	4	Y	2	Y	Y	-	-	-	Y
2B	6X6	200	4	Y	2	Y	Y	-	-	-	Y
2C	6X6	200	4	Y	2	Y	Y	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	Y
6A*	6X6	200	*	Y	6	Y	Y	-	-	-	*

* Non-Intrusive detection zone.
** Disable Delay during Alternate Phasing Operation.
Disable phase call for loop during Alternate Phasing Operation.

3 Phase Fully Actuated (Winston-Salem Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Reposition existing signal heads 21 and 22.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- This intersection uses non-intrusive detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

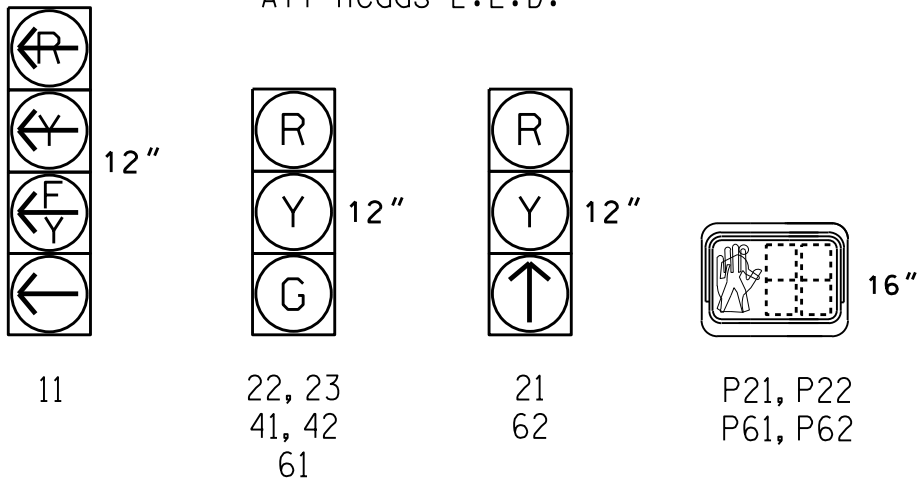


OASIS 2070 TIMING CHART					
FEATURE	PHASE				
	1	2	4	6	
Min Green 1 *	7	10	7	10	
Extension 1 *	2.0	5.0	2.0	5.0	
Max Green 1 *	15	45	25	45	
Yellow Clearance	3.0	4.0	3.7	4.0	
Red Clearance	3.9	2.9	2.5	2.9	
Red Revert	2.0	2.0	2.0	2.0	
Advance Walk	-	7	-	-	
Walk 1 *	-	14	-	7	
Don't Walk 1	-	7	-	4	
Seconds Per Actuation *	-	1.0	-	2.5	
Max Variable Initial *	-	24	-	24	
Time Before Reduction *	-	15	-	15	
Time To Reduce *	-	15	-	15	
Minimum Gap	-	3.0	-	3.0	
Recall Mode	-	MIN RECALL	-	MIN RECALL	
Vehicle Call Memory	-	YELLOW	-	YELLOW	
Dual Entry	-	-	-	-	
Simultaneous Gap	ON	ON	ON	ON	

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

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED	EXISTING
Traffic Signal Head	N/A
Modified Signal Head	N/A
Sign	N/A
Pedestrian Signal Head With Push Button & Sign	N/A
Signal Pole with Guy	N/A
Signal Pole with Sidewalk Guy	N/A
Inductive Loop Detector	N/A
Controller & Cabinet	N/A
Junction Box	N/A
2-in Underground Conduit	N/A
Right of Way	N/A
Directional Arrow	N/A
Directional Drill	N/A
Non-Intrusive Detection Zone	N/A
Curb Ramp	N/A
Metal Strain Pole	N/A
Type II Signal Pedestal	N/A
Pedestrian Crossing Sign (W11-2) w/ Diagonal Arrow Plaque (W16-6P)	N/A
"YIELD" Sign (R1-2)	N/A
No Right Turn Sign (R3-1)	N/A
No U-Turn/No Left Turn Sign (R3-18)	N/A

Signal Upgrade - Final Design

Prepared in the Offices of:

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road) at I-40 EB Ramps

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2024 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS

INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

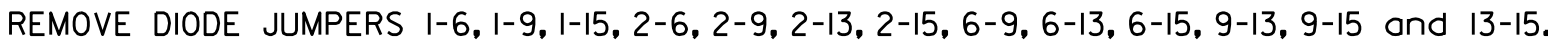
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01/02/2025

SIG. INVENTORY NO. 09-0600

(remove jumpers and set switches as shown)

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

INPUT FILE POSITION LAYOUT

(front view)

FILE
" T "

FILE
" T "

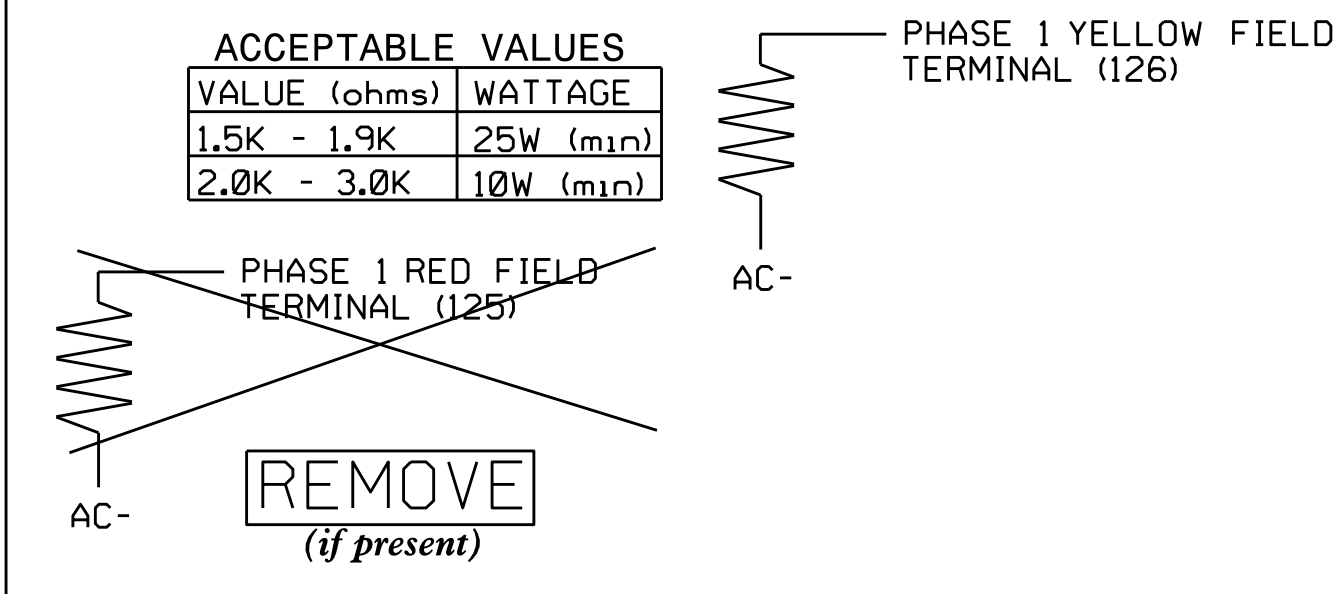
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Disable all phases for Start Up In Green.
5. Program phases 2 and 6 for First Phases.
6. Disable all phases for Yellow Flash.
7. Program overlap 1 as Wag Overlaps.
8. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

```

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S5,S8,S9,AUX S1
PHASES USED.....1,2,2 PED,4,6,6 PED
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

```

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	18 ★	26	6	Y	Y	Y		3
	-	I1U	56	18 ★	51	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
PED PUSH BUTTONS							NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS				
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

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

INPUT FILE POSITION LEGEND: J2L

FILE J _____
SLOT 2 _____
LOWER _____

SPECIAL DETECTOR NOTE

For loop 6A install a non-intrusive 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.

PROJECT REFERENCE NO.	SHEET NO.
I-5880	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	P21, P22	NU	41,42	NU	NU	61	62	P61, P62	NU	NU	NU	11★	NU	NU	NU	NU
RED		128	128			101			134	134									
YELLOW	*	129	129			102			135	135									
GREEN			130			103			136										
RED ARROW														A121					
YELLOW ARROW														A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127	130							136										
				113						119									
				115						121									

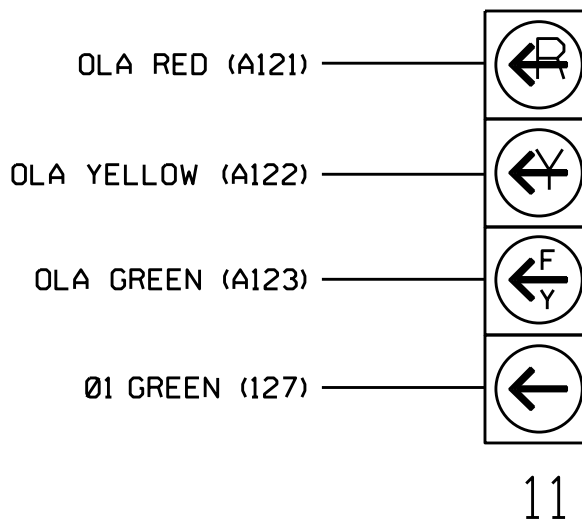
NU = Not Used

* 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 head as shown)



NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0600
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 1 of 4

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

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3 AND 4.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

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

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

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

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

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

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF OUTPUT ASSIGNMENT #10 IS ON
AND OUTPUT ASSIGNMENT #13 IS OFF

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF
SET OUTPUT ASSIGNMENT #52 OFF

NOTE: LOGIC FOR
ADVANCE WALK
WITH FYA'S.
TURN FYA HEAD
11 OFF DURING
PED 2 ADVANCE
WALK.

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 10 = Phase 2 Walk
OUTPUT 13 = Phase 2 Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL
FOR DEFAULT PHASING

(program controller as shown below)

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

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

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL
FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS),
THEN '1' (VEHICLE OVERLAP SETTINGS).
PRESS 'NEXT' TO ADVANCE TO PAGE 2.

NOTICE
PAGE 2

PAGE 2: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW _ GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

OVERLAP PROGRAMMING COMPLETE

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.

ADVANCED WALK NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control
Functions). Program phases 2 and 6 for 'Advanced Walk'. Make
sure the Walk Advance Time shown on the Signal Design plans is
programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0600
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Design - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 109/SR 4325 (Thomasville Road)
at
I-40 EB Ramps

Division 9 Forsyth County Winston-Salem

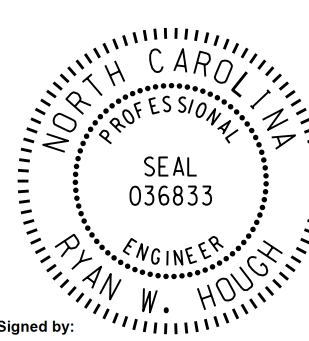
PLAN DATE: December 2024 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



Signed by: Ryan W. Hough 01/13/2025

430320FAA0054C3 DATE

SIG. INVENTORY NO. 09-0600

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD
DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION
DURING ALTERNATE PHASING OPERATION.

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

PAGE: 2	C1 PIN:48	VEHICLE DETECTOR	
INPUT ASSIGNMENT #.....	10		
DEBOUNCE TIME (0-25.5 SEC).....	0.5		
DELAY TIME (0-25.5 SEC).....	0.0		
HOLD-OVER TIME (0-25.5 SEC).....	0.0		
ASSIGNMENT SELECTION:			
NOT ENABLED (Y/N).....	Y		
VEHICLE DETECTOR (1-64).....	26		
PEDESTRIAN DETECTOR (1-16).....			
ALTERNATE PED DETECTOR (1-16).....			
PREEMPT (1-10).....			
INVERTED PREEMPT (1-10).....			
STOP TIME (Y/N).....			
FLASH SENSE (Y/N).....			
DOOR OPEN (Y/N).....			
MANUAL CONTROL ENABLE (Y/N).....			
MANUAL CONTROL ADVANCE (Y/N).....			
SPECIAL FUNCTION ALARM (1-8).....			
TOD HOUR SYNCHRONIZATION (0-23).....			
FORCE OFF RING (1-4).....			
HOLD PHASES (1-16).....			
PLAN (65=LSH,66=FREE).....	OFFSE#.....		
CHANGE PHASE SEQUENCE PAGE (1-12).....			
CHANGE PHASE TIMING PAGE (1-4).....			
CHANGE PHASE CONTROL PAGE (1-4).....			
CHANGE OVERLAP CONTROL PAGE (1-4).....			
CHANGE INPUT PAGE (1-4).....			
CHANGE OUTPUT PAGE (1-4).....			
OVERRIDE PHASE CONTROL FUNCTION (Y).....			

DEFAULT DETECTOR NUMBER WILL REMAIN
UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 1A - PHASE 6)

```

PAGE: 2 C1 PIN:48 NOT ENABLED
INPUT ASSIGNMENT #.....10
DEBOUNCE TIME (10-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....Y
-----
VEHICLE DETECTOR (1-64).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)..... OFFSET#.....
CHANGE PHASE SEQUENCE PAGE (1-12).....
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y).....

```

PRESS '+' TO ADVANCE TO INPUT 18

```

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....18
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....1
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)..... OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)....
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)....

```

ENTER '51' TO REASSIGN
THE VEHICLE DETECTOR
FOR THIS INPUT

(LOOP 1A - PHASE 1)

```

PAGE: 2 C1 PIN:56 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....18
DEBOUNCE TIME (10-25.5 SEC).....0.5
DELAY TIME (10-25.5 SEC).....0.0
HOLD-OVER TIME (10-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....51
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=F,LSH,66=FREE)..... OFFSET#.....
CHANGE PHASE SEQUENCE PAGE (1-12).....
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y).....

```

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```

VEHICLE DETECTOR #51  SETTINGS (+,-1-64)
SETTING:                (Y/N)
ENABLE DETECTOR.....Y
ENABLE LOGGING.....N
ENABLE DIAGNOSTICS.....N
SPEED TRAP.....N
CALL DETECTOR.....N
EXTENSION DETECTOR.....Y
MODE 2 STOP BAR.....N
SWITCHING DETECTOR.....N
DUPLICATING DETECTOR.....N
ENABLE FULL TIME DELAY.....N
IF FAILED, SET MIN RECALL?.....N
IF FAILED, SET MAX1 RECALL?.....N
IF FAILED, SET MAX2 RECALL?.....N
PHASE#                12345678910111213141516
PHASES ASSIGNED :X
SWITCH/DUPLICATE.....6
LOOP SIZE (0-255 FT).....0
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC).....0
STRETCH (0-25.5 SEC).....0.0
DELAY (0-255 SEC).....0.0
MAX CALLS/MIN (0-255).....255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).....0
MAX OCCUPANCY (0-100%).....100
EXTENSION DISABLE TIME (0-255 SEC).....0
QUEUE MAX OCCUPANCY TIME (0-255).....0
QUEUE GAP RESET TIME (0-25.5).....0.0
PREEMPTION INDEX FOR QUEUE (0-10).....0

```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE
INPUT FILE CONNECTION AND PROGRAMMING
CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0600
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

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JTPeterson

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11 to run protected turns only.

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0600
DESIGNED: September 2024
SEALED: 01-02-25
REVISED: N/A

Electrical Detail - Sheet 4 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: CL Transportation Mobility and Safety Division DIVISION OF NORTH CAROLINA TRANSPORTATION STATE OF NORTH CAROLINA Department of Transportation Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529	NC 109/SR 4325 (Thomasville Road) at I-40 EB Ramps		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH Signed by: <u>Ryan W. Hough</u> 01/13/2025 DATE SIG. INVENTORY NO. 09-0600
	Division 9 Forsyth County Winston-Salem		
	PLAN DATE: December 2024	REVIEWED BY:	
	PREPARED BY: James Peterson	REVIEWED BY:	
	REVISIONS	INIT. DATE	

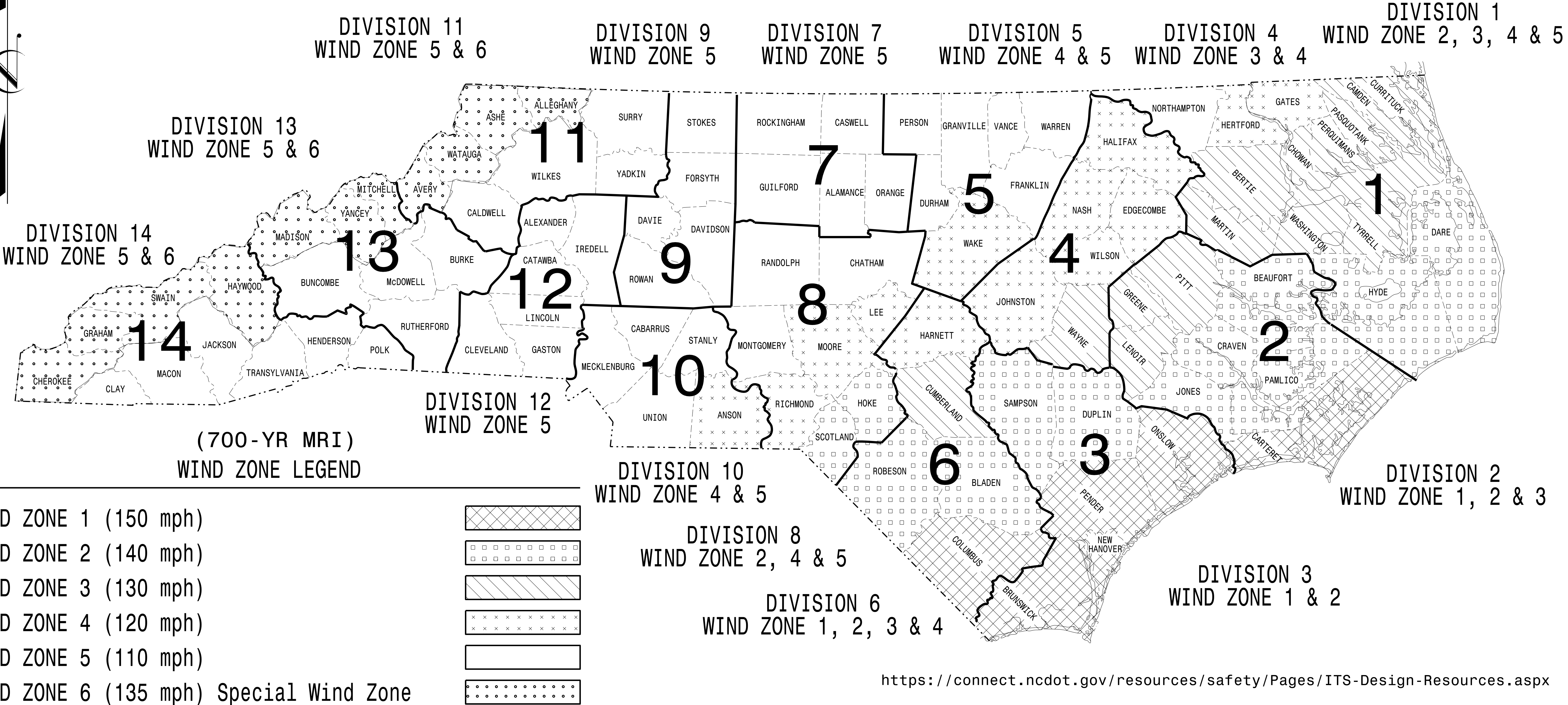
03-01-2023 12:07 S:\ITS\SSM\115\Signal\Structures\Drawings\2024 Metal Pole Standards\2024 Sig. M1A Standard 411 Metal Pole (700-yr MRI).dgn kdurigon

NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

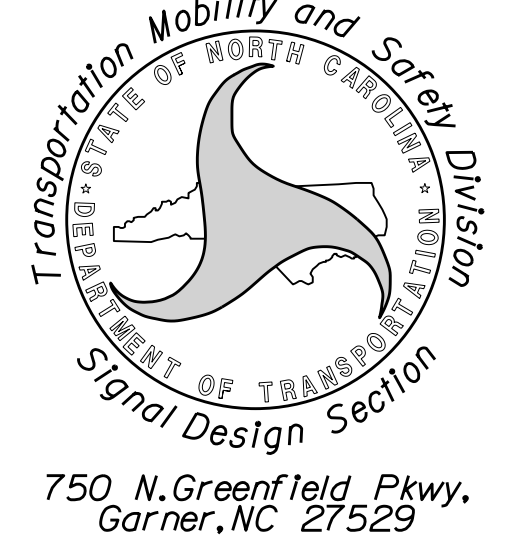
PROJECT I.D. NO.	SHEET NO.
I-5880	Sig.M1A

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)



<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

Prepared in the Offices of:



750 N. Greenfield Pkwy.
Garner, NC 27529

Designed in conformance
with the latest
2020 Interim to the
1st Edition 2015
**AASHTO
LRFD**
Standard Specifications for
Highway Signs, Luminaires,
and Traffic Signals

DRAWING NUMBER	INDEX OF PLANS DESCRIPTION
Sig. M 1A	Statewide Wind Zone Map (700-yr MRI)
Sig. M 1B	Statewide Wind Zone Map (10-yr MRI)
Sig. M 2	Typical Fabrication Details-All Metal Poles
Sig. M 3	Typical Fabrication Details-Strain Poles
Sig. M 4	Typical Fabrication Details-Mast Arm Poles
Sig. M 5	Typical Fabrication Details-Mast Arm Connection
Sig. M 6	Typical Fabrication Details-Strain Pole Attachments
Sig. M 7	Construction Details-Foundations
Sig. M 8	Standard Strain Pole Foundation-All Soil Conditions
Sig. M 9	Typical Fabrication Details-CCTV Camera Poles

MOBILITY AND SAFETY DIVISION -
TRANSPORTATION SYSTEMS MANAGEMENT
AND OPERATIONS UNIT

D.Y. ISHAK - STATE SIGNALS ENGINEER

K. DURIGON, P.E. - ITS AND SIGNALS STRUCTURAL ENGINEER

B. WALKER, P.E. - ITS AND SIGNALS STRUCTURAL ENGINEER

SEAL

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3764DA

09/21/2023
DATE