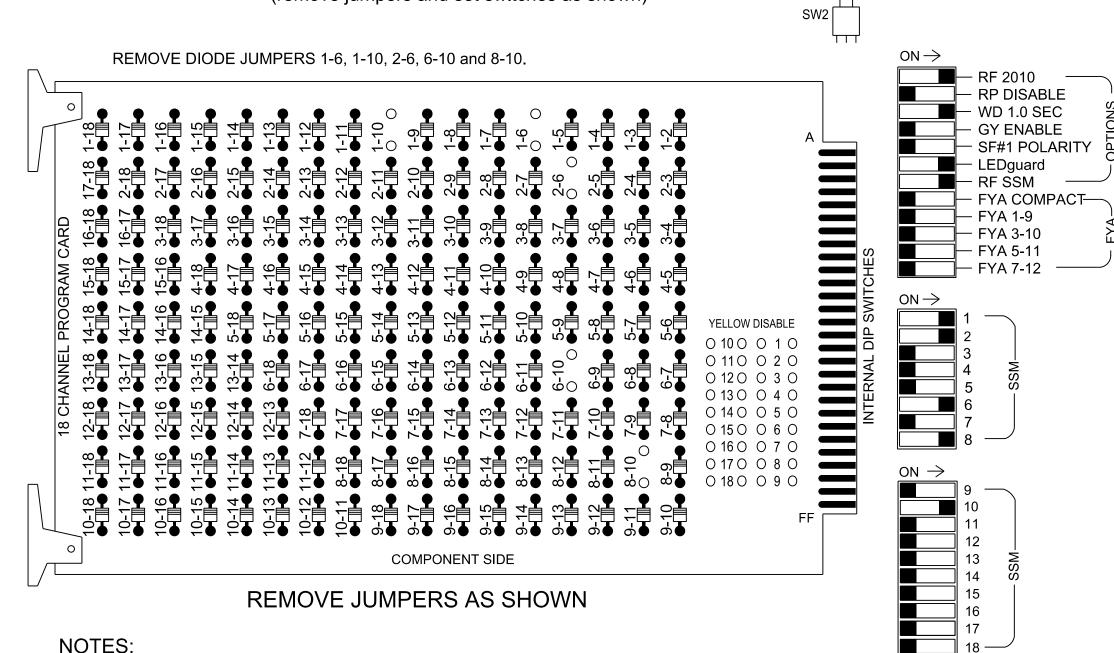


18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S8, S11, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	NOT USED
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

*See overlap programming detail this sheet.

ROJECT REFERENCE NO. SHEET NO Sig. 12.1

				S	SIGN	IAL	ΗE	AD	НО	OK-	-UP	СН	AR ⁻	Γ					
LOAD SWITCH NO.	S1	S	2	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	2	13	3	4	14	5	6	15	7	8	16	9	10	1:7	11	12	18
PHASE	1	2	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PÉD	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21	22	NU	NU	NU	NU	NU	61,62	NU	NU	82	NU	NU	13	NU	NU	NU	NU
RED		128	128		·				134	·		107			A124		·		·
YELLOW		129	129						135										
GREEN			130					,	136										
RED ARROW	125						-										·		
YELLOW ARROW	126											108			A125				
GREEN ARROW	127	130			·							109			A126	·			·

NU = Not Used

INPUT FILE POSITION LAYOUT

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 the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

(front view)

	,	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Ø 1	Ø 1	S L	S L	S	S L	S L	S L	S	S	S	S L	S L	FS
FILE	U	1C	1A	O T	Ö	O T	O T	O T	O T	OT	OT	O T	O T	Ō T	DC ISOLATOR
" "		NOT	Ø 1	E M P	E M P	E M P	E M P	E M P	E M P	E M P	E M P	E M	E M P	E M P	ST
		USED	1B	- +	T Y	T Y	T Y	T Y	T Y	T Y	T Y	- T Y	T Y	T Y	DC ISOLATOR
		S	S	S	S	S		S	S	S	S	S	S	s	s
FILE	U	L O T	L O T	L O T	L O T	SLOT	NOT USED	L O T	S L O T	L O T	L O T	L O T	L O T	L O T	
"J"		E M P	E M P	E M	E M	E M	Ø 8	E M	E M P	E M	E M	E M	E M P	E M	E
•	L	P T Y	P T Y	P T Y	P T Y	E M P T Y	8B	P T Y							
	l	EX.: 1A, 2A, ETC. = LOOP NO.'S										FS = F	FLASH S	ENSE	

FS = FLASH SENSE ST = STOP TIME

ON OFF

■ = DENOTES POSITION OF SWITCH

WD ENABLE '

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-5,6	I2U	39	1	2	1			Х		Х	
1B	TB2-7,8	I2L	43	5	3	1			Χ		Х	
1C	TB2-1,2	I1U	56	18	1	1	15		Х		Х	
8B	TB5-11,12	J6L	46	8	23	8			Χ		Х	

INPUT FILE CONNECTION & PROGRAMMING CHART

FILE J SLOT 2 LOWER

OVERLAP PROGRAMMING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	2
Туре	Normal
Included Phases	1,8
Modifier Phases	4
Modifier Overlaps	4
Trail Green	0
Trail Yellow	0:0
Trail Red	0:0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0510T2 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 2 (TMP Phase I Step 3) Electrical Detail

50 N. Greenfield Pkwy, Garner, NC 27529

Electrical and Programming
Details For:

US 158 (Reidsville Rd.)

at

NC 74 Eastbound Ramps

NC /4 Eastbound Ramps

Division 9 Forsyth County

PLAN DATE: February 2024 REVIEWED BY:

PREPARED BY: WP Erickson-Jones REVIEWED BY:

REVISIONS

Winston-Salem

DT Sears

INIT. DATE

Docusigned by:

Docusigned by:

Docusigned by:

DocuSigned by: 2/12/2020

| Portur Johns | 2/12/2020
| DATE |
| SIG. INVENTORY NO. 09-0510T2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

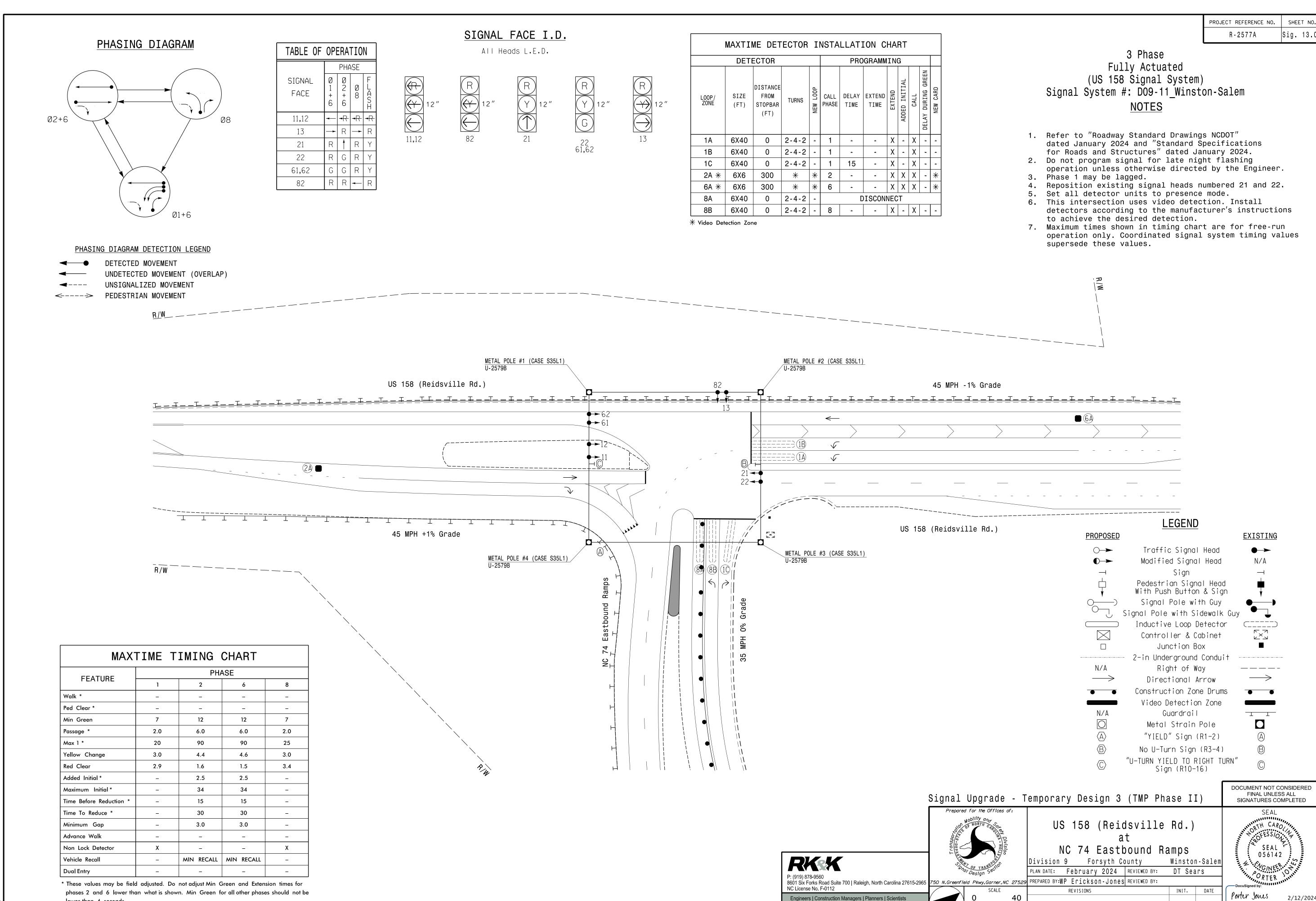
SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 2A, 2B and 6A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

P: (919) 878-9560 8601 Six Forks Road Suite 700 | Raleigh, North Carolina 27615-296 NC License No. F-0112

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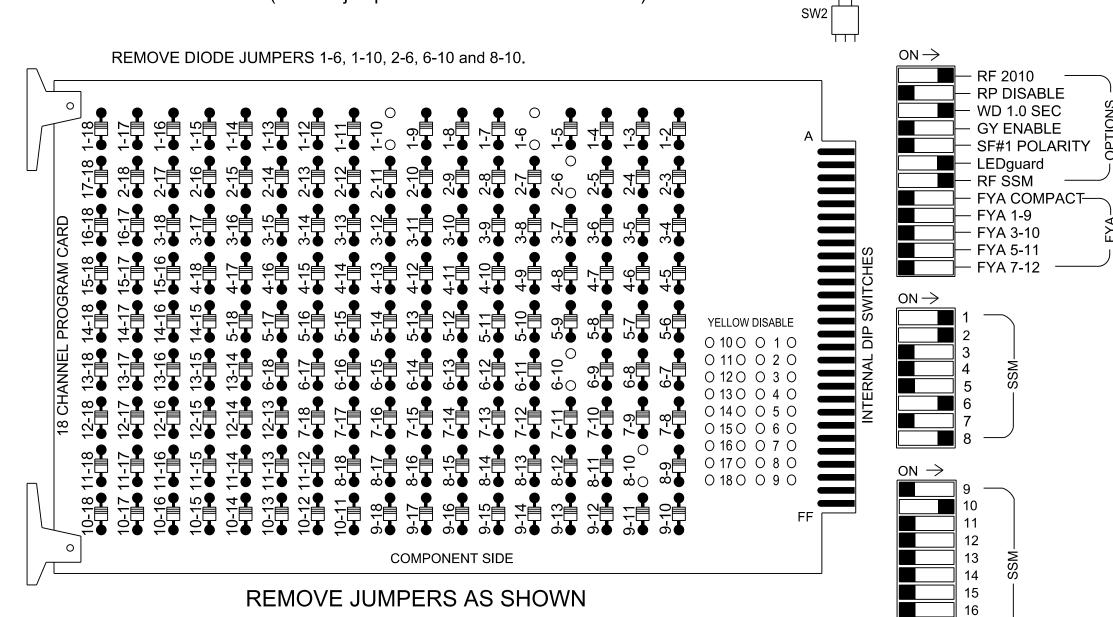
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S8, S11, AUX S2
Phases Used	• • •
Overlap "1"	NOT USED
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

ROJECT REFERENCE NO. R-2577A Sig. 13.1

				S	ig _N	IAL	ΗE	AD	НО	OK-	·UP	СН	AR	Γ					
LOAD SWITCH NO.	S1	S	2	S3	S4	S 5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	Ž	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21	22	NU	NU	NU	NU	NU	61,62	NU	NU	82	NU	NU	13	ΝU	NU	NU	NU
RED	·	128	128		•	٠	٠		134		•	107			A124				
YELLOW		129	129		·				135	÷		٠							
GREEN			130		-				136					·					
RED ARROW	125	·			·		·				·	·							
YELLOW ARROW	126		•							·		108			A125				
GREEN ARROW	127	130			·		·				·	109			A126				
NU = Not	Used																		

NU = Not Used

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
_oad Switches Used	S1, S2, S8, S11, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	NOT USED
O I 11011	.

*See overlap programming detail this sheet

INPUT FILE CONNECTION & PROGRAMMING CHART

INPUT FILE POSITION LAYOUT

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 the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

(front view)

	_	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Ø 1	ø 1	S L	S L	S L	S L	S L	S L	S L	S L	S L	S L	S L	FS
FILE	U	1C	1A	O T	P T	O T	OT	Ö	O T	O T	OT	O T	Ŏ T	Ō T	DC ISOLATOR
" "		NOT	Ø 1	E M P	E M P	E M P T	E M P	E M P	E M P T	E M P	E M P	E M P	E M P	E M P T	ST
		USED	1B	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	DC ISOLATOR
		S	S	S	S	S	NOT	S I	S	S	S	S I	S	S	S
FILE	U	OT	L O T	Ö	Ö T	O T	USED	Ö T	O T	Ö	Ö	Ö T	O T	Ö T	Š
"J"		E M P	E M P	E M	E M	E M P T Y	Ø 8	E M P	E M P	E M	E M P	E M P	E M P	E M P	E M P
	L	T	T Y	T Y	T Y	T Y	8B	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y
	L	EX.: 1 <i>A</i>	A, 2A, ET	C. = LOC	P NO.'S							FS = F	FLASH S	ENSE	

FS = FLASH SENSE ST = STOP TIME

ON OFF

18 —

■ = DENOTES POSITION OF SWITCH

WD ENABLE '

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-5,6	I2U	39	1	2	1			Х		Х	
1B	TB2-7,8	I2L	43	5	3	1			Х		Х	
1C	TB2-1,2	I1U	56	18	1	1	15		Х		Х	
8B	TB5-11,12	J6L	46	8	23	8			Х		Х	

INPUT FILE POSITION LEGEND: J2L SLOT 2 -LOWER

OVERLAP PROGRAMMING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	2
Type	Normal
Included Phases	1;8
Modifier Phases	÷
Modifier Overlaps	4
Trail Green	0
Trail Yellow	0:0
Trail Red	0:0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0510T3 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 3 (TMP Phase II) Electrical Detail

Electrical and Programming Details For: US 158 (Reidsville Rd.) Prepared for the Offices of: NC 74 Eastbound Ramps

Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY:

056142

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 2A and 6A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans

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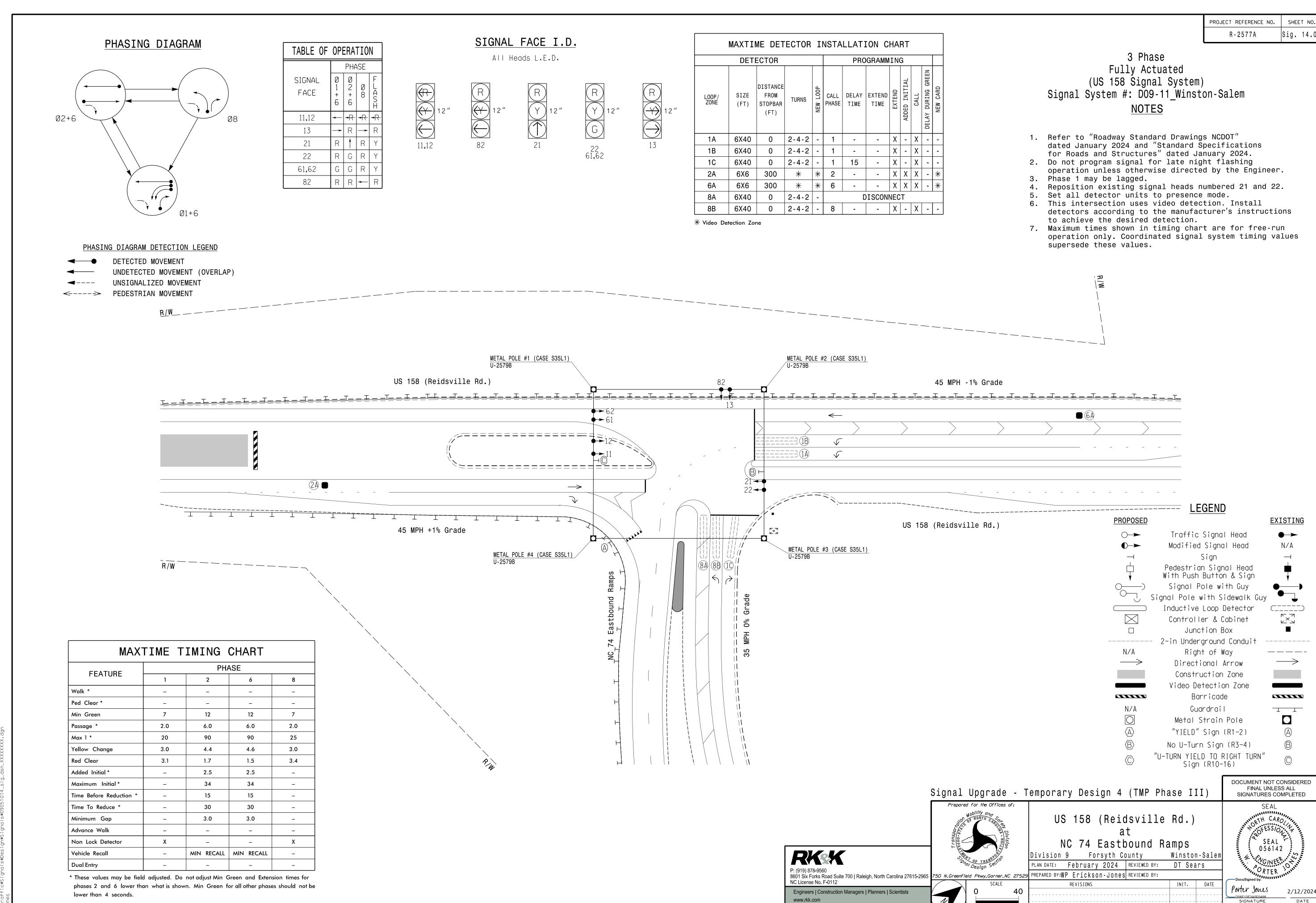
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REVISIONS

SIG. INVENTORY NO. 09-0510T3

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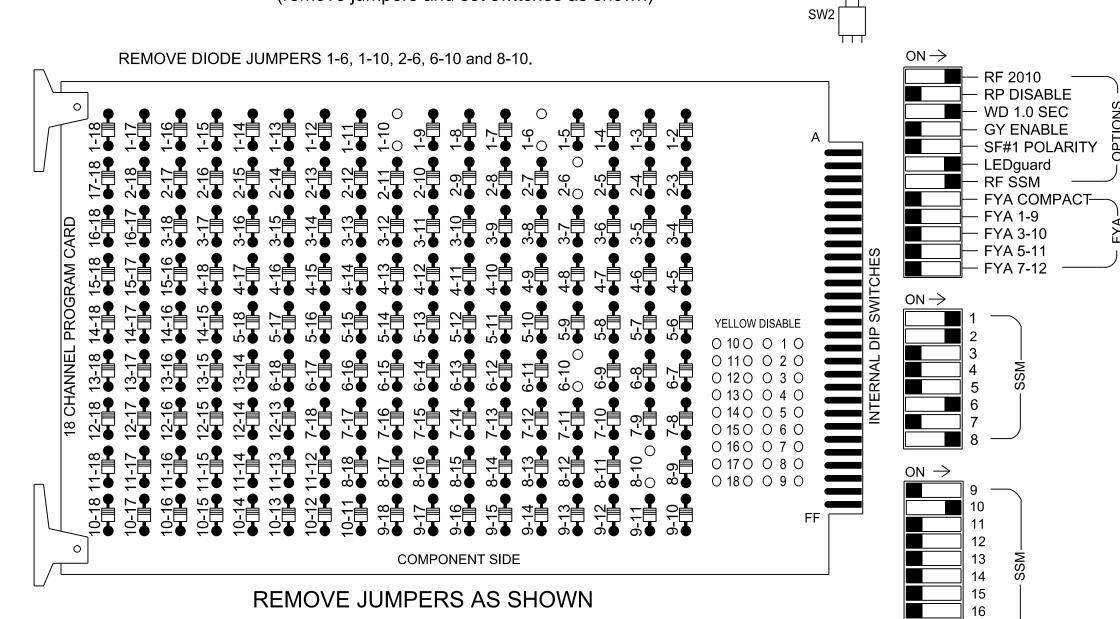


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SIG. INVENTORY NO. 09-05/074

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
_oad Switches Used	S1, S2, S8, S11, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	NOT USED
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

*See overlap programming detail this sheet

R-2577A Sig. 14.

SIGNAL HEAD HOOK-UP CHART																			
LOAD SWITCH NO.	S1	S	2	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	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21	22	NU	NU	NU	NU	NU	61,62	NU	NU	82	NU	NU	13	NU	NU	NU	NU
RED		128	128		٠	•			134	٠		107			A124				
YELLOW		129	129			٠	·		135										
GREEN			130						136										
RED ARROW	125	٠	٠		·					·									
YELLOW ARROW	126					·	·					108			A125				
GREEN ARROW	127	130		·	·		·			·		109			A126				·

NU = Not Used

INPUT FILE POSITION LAYOUT

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 the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Ø 1	Ø 1	S L	S L	S L	S	S L	FS						
FILE	U	1C	1A	Ō T	OT	ģ	O T	Ö T	O T	O T	Ö T	O T	O T	O T	DC ISOLATOR
" "		NOT	Ø 1	E M P	ST										
	L	USED	1B	T Y	DC ISOLATOR										
		S	S	S	S	s		S	s	s	s	s	s	s	ş
FILE	U	L O T	L O T	L O T	L O T	L O T	NOT USED	L O T							
"J"		E M	E M P	E M P	E M P	E M P	Ø 8	E M P	E M	E M P	E M P	E M	E M P	E M	E M
	L	P T Y	P T Y	P T Y	P T Y	P T Y	8B	P T Y	E M P T Y						
	l	EX.: 1A	A, 2A, ET					FS = 1	FLASH S	ENSE					

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE

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

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

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

SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

FS = FLASH SENSE
ST = STOP TIME

ON OFF

18 —

■ = DENOTES POSITION OF SWITCH

WD ENABLE '

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-5,6	I2U	39	1	2	1			Х		Х	
1B	TB2-7,8	I2L	43	5	3	1			Х		Х	
1C	TB2-1,2	I1U	56	18	1	1	15		Х		Х	
8B	TB5-11,12	J6L	46	8	23	8			Х		Х	
	_		•									

INPUT FILE POSITION LEGEND: J2L SLOT 2 -LOWER

OVERLAP PROGRAMMING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	2
Туре	Normal
Included Phases	1;8
Modifier Phases	-
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0:0
Trail Red	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0510T4 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 4 (TMP Phase III) Electrical Detail

750 N. Greenfield Pkwy, Garner, NC 27529

Electrical and Programming Details For: US 158 (Reidsville Rd.) Prepared for the Offices of: NC 74 Eastbound Ramps

Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 09-0510T4

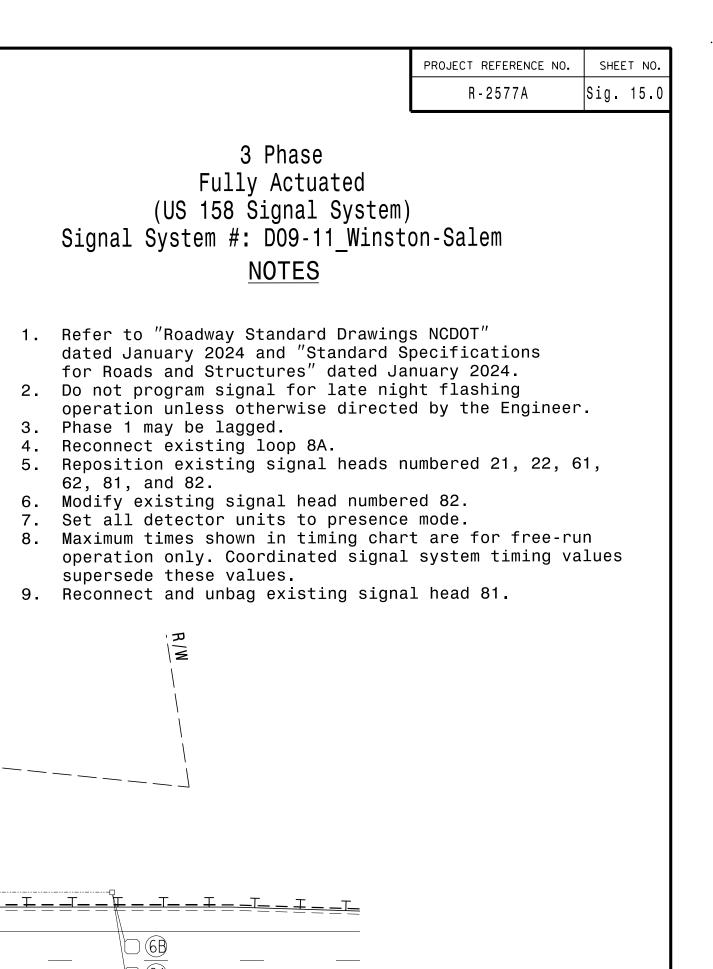
SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 2A and 6A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

3. REMOVE FLASHER UNIT 2.

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PHASE

	17.000
	SIGNAL FACE
2+6 Ø8	11,12
	13
	21
	22
	61,62
	81,82
Ø1+6	

PHASING DIAGRAM DETECTION LEGEND

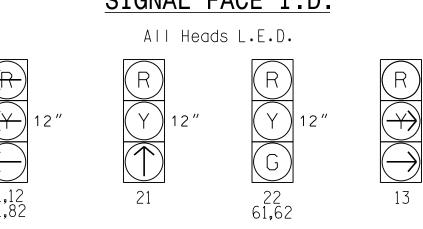
UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

<u>R/W</u>________

■ DETECTED MOVEMENT

←---> PEDESTRIAN MOVEMENT



	DET	ECTOR		PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1:A	6X40	0	2-4-2	_	1	÷	<u> </u>	Χ	-	Χ	-	4
1B	6X40	0	2-4-2	_	1	_	-	Χ	_	Χ	_	_
1·C	6X40	0	2-4-2	_	1	15	-	Χ	_	Χ	_	-
2A	6X6	300	5	Χ	2	<u>.</u>	<u>-</u>	Χ	Χ	Χ	_	Х
2B	6X6	300	5	Χ	2	<u>.</u>	<u>-</u>	Χ	Χ	Χ	_	Х
6A	6X6	300	5	Χ	6	<u>.</u>	<u>-</u>	Χ	Χ	Χ	-	Х
6B	6X6	300	5	Χ	6	<u>.</u>	<u>-</u>	Χ	Χ	Χ	-	Х
8 _A	6X40	0	2-4-2	_	8	_	-	Χ	_	Χ	-	-
8B	6X40	0	2-4-2	_	8	<u>.</u>	_	Х	-	Х	-	_

3 Phase Fully Actuated (US 158 Signal System)
Signal System #: D09-11_Winston-Salem **NOTES**

- 1. Refer to "Roadway Standard Drawings NCDOT"
- 3. Phase 1 may be lagged. 4. Reconnect existing loop 8A.
- 5. Reposition existing signal heads numbered 21, 22, 61, 62, 81, and 82.
- 6. Modify existing signal head numbered 82. 7. Set all detector units to presence mode.
- 8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

Sign

Pedestrian Signal Head With Push Button & Sign

Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector

<u>EXISTING</u>

-

N/A

 \dashv

9. Reconnect and unbag existing signal head 81.

METAL POL	LE #1 (CASE S35L1)	METAL POLI	E #2 (CASE S35L1)		
US 158 (Reidsville Rd.)		81 82 • • • • • •	45 MPH -1% Grade		
▗▗▋▗▗▗▗▗▗▗▗▗▗▗ ▗▗▗▗▗ ▗▗ ▗ ▗▗▗▗▗▗▗▗▗▗▗▗		╘═╧══┺ ╡ ┋ ┋ ═╧═╘┺═┵══	<u> </u>	<u>= + = - - - - - - - - - -</u>	<u>= = T=</u>
	→ 62	15	←	(A)	
	— — 61		<u>−</u> − − − −	- $ -$	
	=======================================	[=======] (1B)	<u>√</u>		
	11		▼		
	=======================================	21 •			
	$ \rightarrow$ $-$	22			
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			`		
			US 158 (Reidsville Rd.)		
45 MPH +1% Grade	O LALANA		(		
		METAL POL	E #3 (CASE S35L1)		<u>LEGEND</u>
	OLE #4 (CASE S35L1)	U-2579B		PROPOSED	
	s H			$\bigcirc$	Traffic Signal
	am L			0->	Modified Signal

MAX	TIME	TIMING	CHART	
FEATURE		PH	ASE	
FEATURE	1	2	6	8
Walk *	_	_	_	_
Ped Clear *	_	_	_	_
Min Green	7	12	12	7
Passage *	2.0	6.0	6.0	2.0
Max 1 *	20	90	90	25
Yellow Change	3.0	4.4	4.6	3.0
Red Clear	3.1	1.6	1.5	3.4
Added Initial *	_	1.5	1.5	_
Maximum Initial *	_	34	34	_
Time Before Reduction *	_	15	15	_
Time To Reduce *	_	30	30	_
Minimum Gap	_	3.0	3.0	_
Advance Walk	_	_	_	_
Non Lock Detector	Х	_	_	х
Vehicle Recall	-	MIN RECALL	MIN RECALL	_
Dual Entry	-	_	_	_

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

			Controller & C	Box	<b>■</b>
		N/A	2-in Underground Right of W	lay —	
		—> N/A [○]	Directional Guardrai Metal Strain	[ ·	
		$\overline{\langle \! \Delta \! \rangle}$	"YIELD" Sign	(R1-2)	A
		(B) (C)	No U-Turn Sign "U-TURN YIELD TO F Sign (R10-	RIGHT TURN"	(B) (C)
Signal Upgrade - Fi	inal Design			DOCUMENT NO FINAL UNI SIGNATURES	LESS ALL
Prepared for the Offices of:  Nobility and  Offices of:	110 150	(Poidevil	10 Pd \	SEA	

RKK 8601 Six Forks Road Suite 700 | Raleigh, North Carolina 27615-2965 750 N.Greenfield Pkwy.Garner.NC 27529 PREPARED BY: WP Erickson-Jones REVIEWED BY: NC License No. F-0112

US 158 (Reidsville Rd.)

NC 74 Eastbound Ramps Division 9 Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears

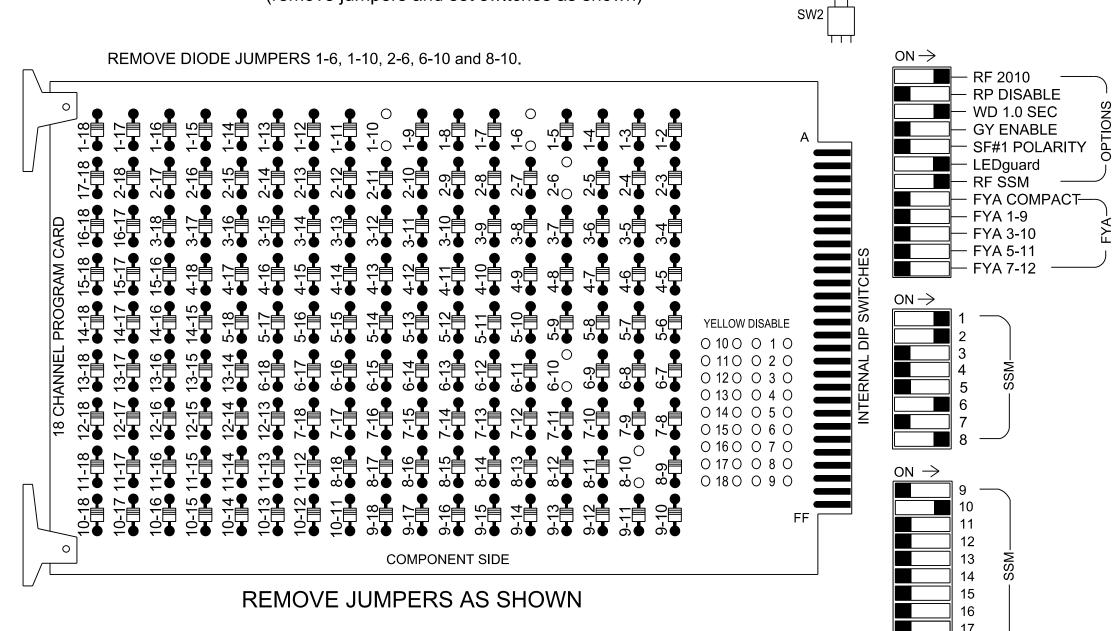
SIG. INVENTORY NO. 09-0510

056142

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#### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



# **NOTES**

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

#### **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S8, S11, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	NOT USED
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

 
 S3
 S4
 S5
 S6
 S7
 S8
 S9
 S10
 S11
 S12
 AUX S1
 AUX S2
 AUX S3
 AUX S4
 AUX S5
 S6
 LOAD SWITCH NO S2 CMU CHANNEL NO. 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 2 8 PED OL1 OL2 SPARE OL3 OL4 SPARE PHASE SIGNAL HEAD NO .12 | 21 | 22 | NU | NU | NU | NU | NU |61,62 | NU | NU |81,82 | NU | NU | 13 | NU | NU | NU | NU 128 | 128 | 134 RED 129 | 129 | YELLOW 135 130 136 **GREEN** RED 107 ARROW

108

109

A125

SIGNAL HEAD HOOK-UP CHART

ROJECT REFERENCE NO.

Sig. 15.1

NU = Not Used

127 | 130

YELLOW ARROW

GREEN

ARROW

*See overlap programming detail this sheet

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S8, S11, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	NOT USED
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

# INPUT FILE POSITION LAYOUT

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 the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

(front view)

	_	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	U	Ø 1	Ø 1	ø 2	S L	S L C	8 L C	S L	S L O	SLO	SL	S L O	S L	S L	FS
FILE		1C	1A	2A	O T	ŎŢ	OT	O T	Ť	O T	O T	¥	O T	O T	DC ISOLATOR
" "		NOT	Ø 1	Ø 2	E M P	ST									
		USED	1B	2B	T Y	DC ISOLATOR									
					_	_				_	1 _		I _		
	U	S L	Ø 6	S L	S L	SL	Ø 8	S L	S L						
FILE		OT	6A	O T	Ŏ T	OT	8A	O T	O T	O T	O T	P T	O T	O T	O T
"J"		E M P	Ø 6	E M P	E M P	E M P	Ø 8	E M P	E M	E M P	E M P	E M	E M P	E M P	E M P
	L	TY	6B	T Y	T Y	T Y	8B	T Y							
		EX.: 1A	A, 2A, ET	C. = LOO	P NO.'S					FS = I	FLASH S	ENSE			

FS = FLASH SENSE ST = STOP TIME

ON OFF

18 —

■ = DENOTES POSITION OF SWITCH

WD ENABLE '

# INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-5,6	I2U	39	1	2	1			Х		Х	
1B	TB2-7,8	I2L	43	5	3	1			Х		Х	
1C	TB2-1,2	I1·U	56	18	1	1	15		Х		Х	
2A	TB2-9,10	I3U	63	29	4	2			Х	Χ	Х	
2B	TB2-11,12	I3L	76	42	5	2			Χ	Χ	Χ	
6A	TB3-5,6	J2U	40	2	16	6			Χ	Χ	Χ	
6B	TB3-7,8	J2L	44	6	17	6			Χ	Χ	Χ	
8A	TB5-9,10	J6U	42	4	22	8			Х		Х	
8B	TB5-11,12	J6L	46	8	23	8			Х		Х	

SLOT 2 -**LOWER** 

INPUT FILE POSITION LEGEND: J2L

#### **OVERLAP PROGRAMMING**

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	2
Туре	Normal
Included Phases	1;8
Modifier Phases	-1
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0510 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Final Design - Electrical Detail

Electrical and Programming Details For: US 158 (Reidsville Rd.) NC 74 Eastbound Ramps

PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY:

056142

SIG. INVENTORY NO.

09-0510

DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL SIGNATURES COMPLETED

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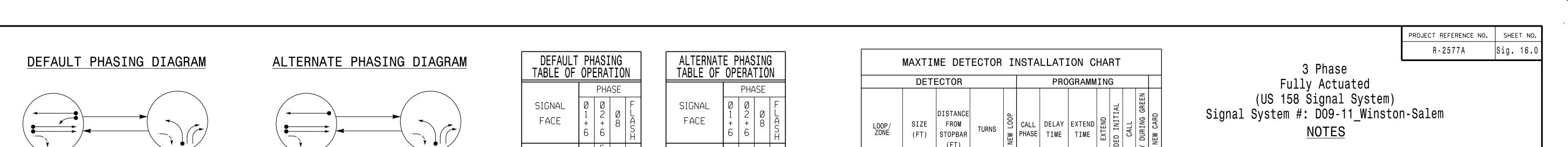
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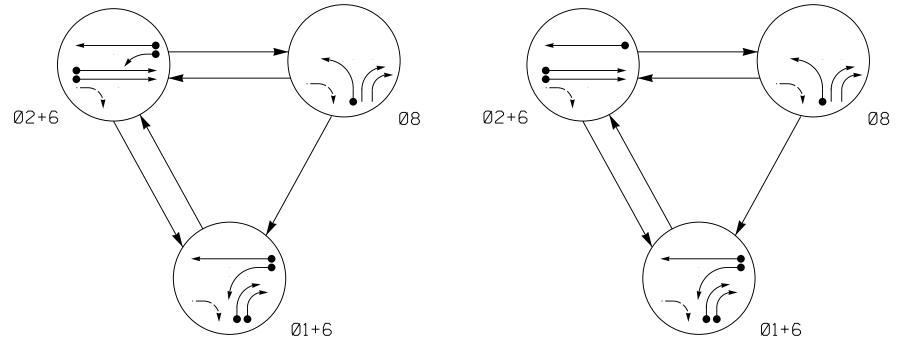
# FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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





Χ

MIN RECALL | MIN RECALL

* 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

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT PEDESTRIAN MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

■ DETECTED MOVEMENT

FACE	1 + 6	2 + 6	Ø 8	LASH	FACE	1 + 6	N+6	Ø &	JŒWI
1·1	-	<del>F</del> Y	<del></del>	<del>-</del> Y	1·1	-	#	₩	<del>-</del> Y
12,13	-	R	-	R	12,13	-	R		R
21	R	1	R	Υ	21	R	<b>†</b>	R	Υ
22	R	G	R	Υ	22	R	G	R	Y
61,62	G	G	R	Υ	61,62	G	G	R	Y
81	<del></del>	<del></del>	•	<del>-R</del>	81	<del></del>	#	•	#

SIGNAL FACE I.D.

All Heads L.E.D.

	DET	ECTOR		PROGRAMMING								
LOOP/ ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2		1	15#	<u>-</u>	Χ	÷	Χ	_	-
TA.	6840		2-4-2	-	6##	3	-	Χ	-	Χ	Χ	-
1B	6X40	0	2-4-2	-	1	15	-	Χ	-	Χ	-	-
1C	6X40	0	2-4-2	-	1	15	-	Χ	-	Χ	-	-
1D	6X15	0	4	-	1	15	-	Χ	-	Χ	_	-
2A *	6X6	300	*	*	2	<u> </u>	<u>-</u>	Χ	Χ	Χ	-	*
2B *	6X6	300	*	*	2	<u> </u>	<u>-</u>	Χ	Χ	Χ	_	*
6A *	6X6	300	*	*	6	4	-	Χ	Χ	Χ	_	*
Q.R	67/10	0	2 4 2		Q			V		V		

8B | 6X40 | 0 | 2-4-2 | - | 8 | - | - | X | - | X | - | - | # Disable Delay During Alternate Phasing Operation.

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## Disable Phase Call For Loop(s) During Alternate Phasing Operation. * Video Detection Zone

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

2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.

3. Phase 1 may be lagged. 4. Reposition existing signal heads numbered 61 and 62.

5. Modify existing signal head numbered 21. 6. Set all detector units to presence mode.

NC 74 Westbound Ramps

Winston-Salem

INIT. DATE

DT Sears

Division 9 Forsyth County

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: WP Erickson-Jones REVIEWED BY:

PLAN DATE: February 2024 REVIEWED BY:

056142

SIG. INVENTORY NO. 09-05||T

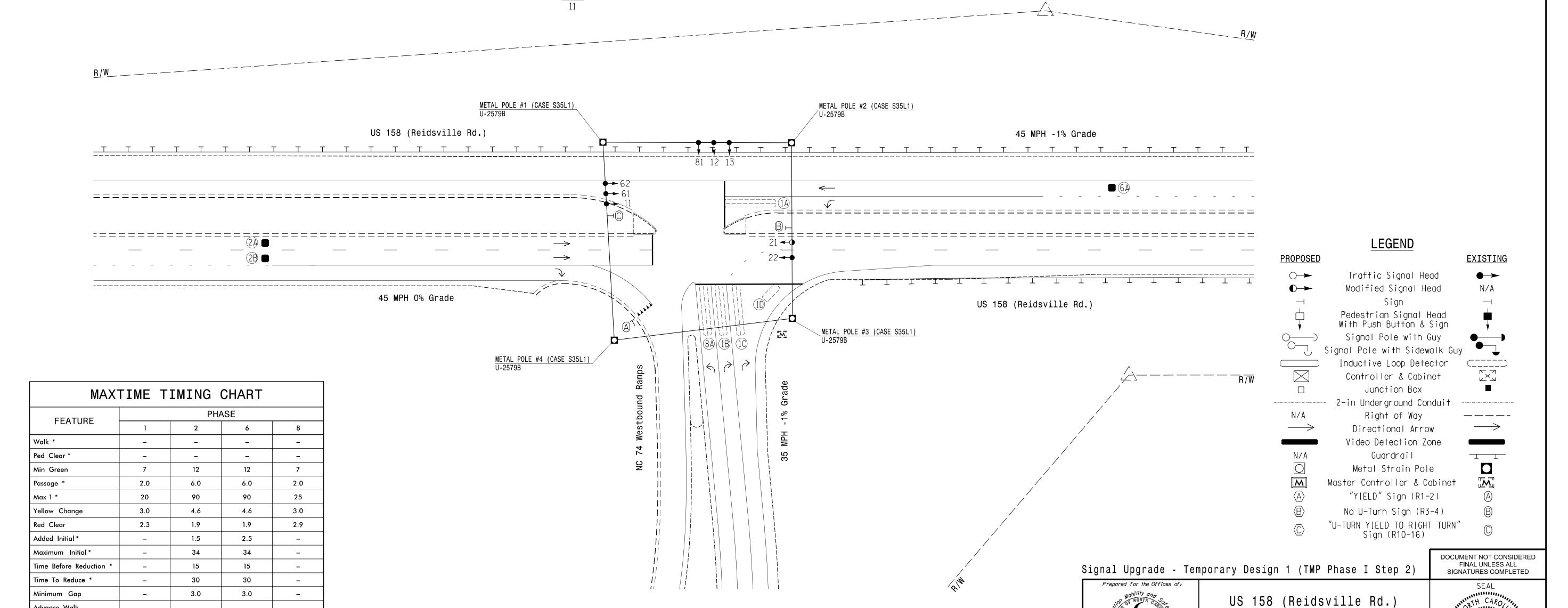
Porter Jones

7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

8. Install new 2070LX Controller and conflict monitor in existing signal cabinet.

9. The Division Traffic Engineer will determine the hours of use for each phasing plan.

10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



Advance Walk

Vehicle Recall

Dual Entry

Non Lock Detector

lower than 4 seconds.

# 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 plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal Sytem, Signal System: D09-11_Winston-Salem System.

#### **EQUIPMENT INFORMATION**

*See overlap programming detail on sheet 2.

Controller	.2070LX
Cabinet	.332 w/ Aux
Software	.Q-Free MAXTIME
Cabinet Mount	.Base
Output File Positions	.18 With Aux. Output File
_oad Switches Used	S1, S2, S8, S11, AUX S1, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	*
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

ROJECT REFERENCE NO. R-2577A Sig. 16.1

	SIGNAL HEAD HOOK-UP CHART																		
LOAD SWITCH NO.	S1	S	62	S3	S4	S5	S6	S7	S8	<b>S</b> 9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	4	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO	<b>★</b> 11	21	22	NU	NU	NU	NU	NU	61,62	NU	NU	81	NU	<b>★</b> 11	12,13	NU	NU	NU	NU
RED		128	128						134						A124				
YELLOW	*	129	129						135	-									
GREEN			130						136										
RED ARROW	·											107		A121					
YELLOW ARROW										·		108		A122	A125				
FLASHING YELLOW ARROW					•									A123					
GREEN ARROW	127	130			·					·		109			A126	·			

NU = Not Used

# INPUT FILE CONNECTION & PROGRAMMING CHART

								(front	view)						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE	U	Ø 1 1A	Ø 1  1B Ø 1	SLOT ESP	SLOT EM	SLOT EM	SLOT EMP	SLOT EM	S L O T E M P	Ø 1 1D Ø 8	SLOT ESP	S L O T E M	SLOT EMP	S L O T E M	FS DC ISOLATOR ST
•	L	NOT USED	1C	P T Y	P T Y	P T Y	P T Y	P T Y	P T Y	8A	P T Y	P T Y	P T Y	P T Y	DC ISOLATOR
FILE	U	SLOT	SLOT	S L OT	SLOT	S L OT	S L O T	S L O T	S L O T	S L O T	S L OT	S L O T	S L O T	S L O T	S L O T
"J"	L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y									
	'	EX.: 1A, 2A, ETC. = LOOP NO.'S  FS = FLASH SENSE ST = STOP TIME													

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Phase 1 Yellow Field

Terminal (126)

INPUT FILE POSITION LAYOUT

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1 /	TD0 1 0	1411	56	18	1	1	15		Х		Х	
1A	TB2-1,2	l I1U	30	-	29	6	3		Х		Х	Х
1B	TB2-5,6	I2U	39	1	2	1	15		Х		Х	
1C	TB2-7,8	I2L	43	5	3	1	15		Х		Х	
1D	TB6-9,10	I9U	60	22	13	1	15		Х		Х	
8A	TB6-11,12	I9L	62	24	14	8			Х		Х	
REMOVE	, jumper fron	n 1-W to J4	-W, c	n rear of	input file, if p	oresent.						

INPUT FILE POSITION LEGEND: J2L SLOT 2 — **LOWER** 

OL1 RED (A121) ————	
OL1 YELLOW (A122)	4
OL1 GREEN (A123)	<del>F</del> Y
01 GREEN (127) ————	<b>(</b>
	11

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511T1 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

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

Electrical and Programming Details For: Prepared for the Offices of:

US 158 (Reidsville Rd.) NC 74 Westbound Ramps

Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones | REVIEWED BY: REVISIONS

SIG. INVENTORY NO. 09-0511T1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Design Plans.

# SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones. 2A, 2B and 6A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal

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ACCEPTABLE VALUES Value (ohms) | Wattage 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (min)

= DENOTES POSITION OF SWITCH

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

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2
Туре	FYA 4 - Section	Normal
Included Phases	2	1,8
Modifier Phases	1	4
Modifier Overlaps	4	<u>-</u>
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

#### Overlap Plan 2

Overlap	1	2	
Туре	FYA 4 - Section	Normal	
Included Phases	<u> </u>	1;8	NOTICE INCLUDED PHAS
Modifier Phases	1	<u>-</u>	
Modifier Overlaps	÷	÷	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

#### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

# MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

OVERLAP PLAN	VEH DET PLAN
1	1
2	2
	OVERLAP PLAN  1 2

#### ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for head 11 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A

and reduces delay time for phase 1 call on loop 1A to 0 seconds.

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Plan 2

Home >Controller >Detector Configuration >Vehicle Detectors

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

1A

Detector	Call Phase	Delay
1	1	0
29	0	3

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu > Controller > Coordination > Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511T1 DESIGNED: February 2024 SEALED: February 12, 2024 **REVISED:** 

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

Electrical and Programming Details For:

US 158 (Reidsville Rd.) NC 74 Westbound Ramps

Forsyth County PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

Winston-Salem

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

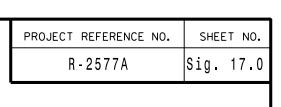
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ROJECT REFERENCE NO.

| Sig. 16.2

SIG. INVENTORY NO. 09-0511T1

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## DEFAULT PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

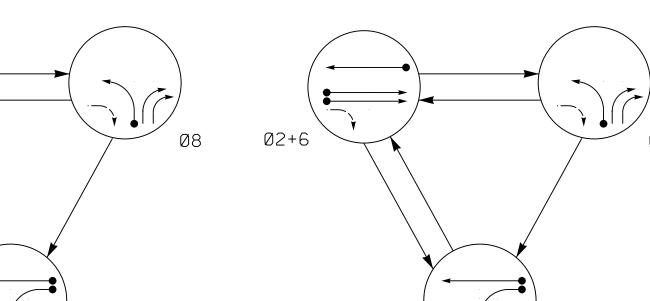
UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

■ DETECTED MOVEMENT

←−−−→ PEDESTRIAN MOVEMENT

Ø2+6



Χ

MIN RECALL | MIN RECALL

* 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

ALTERNATE	PHASING	DIAGRAM

6 08
Ø1+6

DEFAULT PHASING TABLE OF OPERATION												
		PHA	ASE									
SIGNAL FACE	Ø 1 + 6	Ø2+6	Ø 8	TUDL								
11	<b>↓</b>	╙╬╾	<del></del>	<del>-</del>								
12,13	<b>†</b>	R	-	R								
21	R	<b></b>	R	Y								
22	R	G	R	Y								

ALTERNAT TABLE OF				
		PHA	4SE	
SIGNAL FACE	Ø 1 + 6	Ø2+6	Ø 8	エハロハエ
11	<b>—</b>	*	₩	<del>*</del>
12,13	<b>—</b>	R	<b>→</b>	R
21	R	1	R	Υ
22	R	G	R	Υ
~ ~	1 1			
61,62	G	G	R	Υ

#### SIGNAL FACE I.D.

All Heads L.E.D.

	DETI	ECTOR			PROGRAMMING							
LOOP/ ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	_	1	15#	<u> </u>	Χ	-	Χ	-	-
1/1	0,40			_	6##	3	_	Χ	_	Χ	X	_
1B	6X40	0	2-4-2	_	1	15	_	Χ	_	Χ	-	_
1C	6X40	0	2-4-2	-	1	15	-	Χ	_	Χ	-	_
1D	6X15	0	4	<u> </u>	1	15	-	Χ	_	Χ	ı	_
2A *	6X6	300	*	*	2	<u> </u>	<u>-</u>	Χ	Χ	Χ		*
2B *	6X6	300	*	*	2	<u> </u>	<u>-</u>	Χ	Χ	Χ	ı	*
6A *	6X6	300	*	*	6	-	-	Χ	Χ	Χ	-	*
8B	6X40	0	2-4-2	_	8	_	_	Χ	_	Х	_	_

# Disable Delay During Alternate Phasing Operation.

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## Disable Phase Call For Loop(s) During Alternate Phasing Operation. * Video Detection Zone

3 Phase Fully Actuated (US 158 Signal System) Signal System #: DO9-11_Winston-Salem <u>NOTES</u>

1. 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. 3. Phase 1 may be lagged.

4. Reposition existing signal heads numbered 61 and 62. 5. Set all detector units to presence mode.

6. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

7. The Division Traffic Engineer will determine the hours of use for each phasing plan.

8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values

supersede these values.

NC 74 Westbound Ramps

Winston-Salem

INIT. DATE

DT Sears

Division 9 Forsyth County

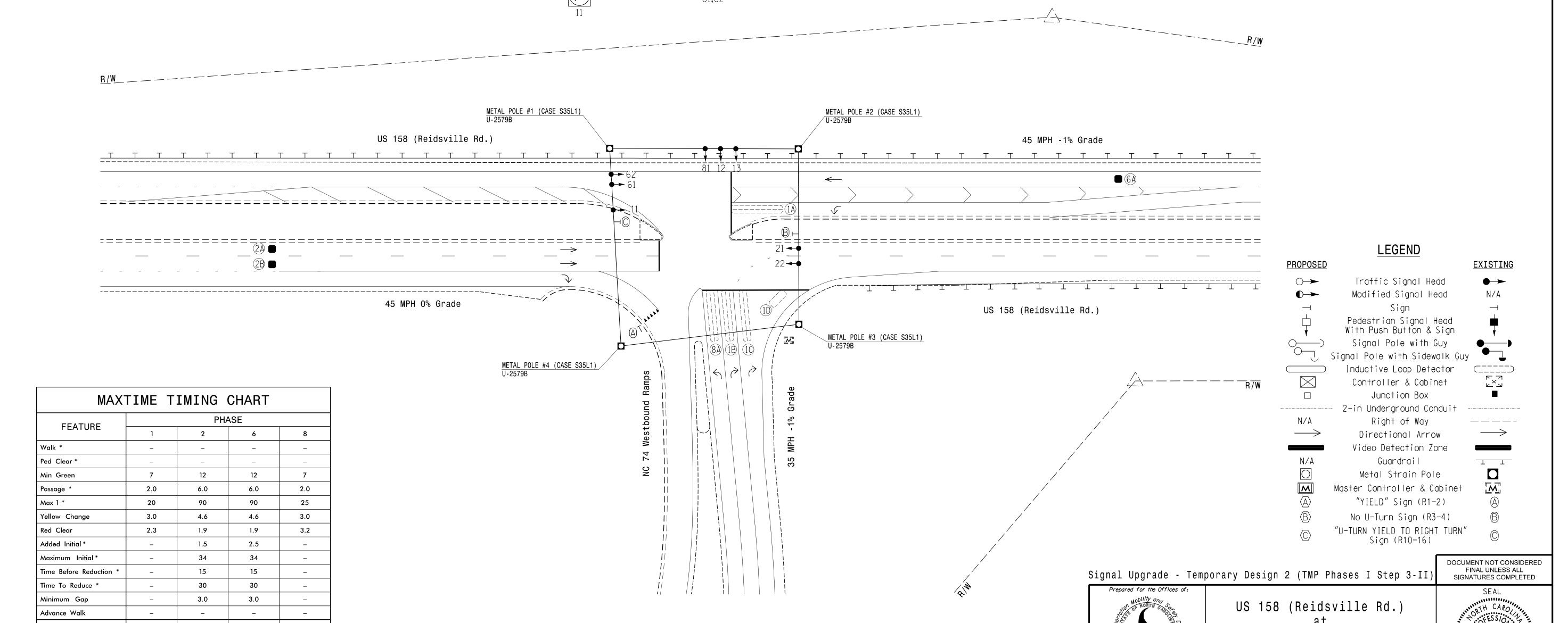
750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: WP Erickson-Jones REVIEWED BY:

PLAN DATE: February 2024 REVIEWED BY:

056142

SIG. INVENTORY NO. 09-05||T2

Porter Jones



Non Lock Detector

lower than 4 seconds.

Vehicle Recall

Dual Entry

# 18 CHANNEL IP CONFLICT MONITOR ON OFF PROGRAMMING DETAIL WD ENABLE ' (remove jumpers and set switches as shown) REMOVE DIODE JUMPERS 1-6, 1-9, 1-10, 2-6, 2-9, 6-9, 6-10, 8-10 and 9-10. – RF 2010 – – RP DISABLE - WD 1.0 SEC GY ENABLE ー SF#1 POLARITY 📮 — LEDguard — RF SSM └─ FYA COMPACT── FYA 1-9 FYA 3-10 - FYA 5-11 COMPONENT SIDE ____ 13 ] 14 REMOVE JUMPERS AS SHOWN 15 18 — 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently. = DENOTES POSITION OF SWITCH

# NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

#### **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	
Load Switches Used	S1, S2, S8, S11, AUX S1, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	*
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED
*See overlap programming detail or	sheet 2.

R-2577A Sig. 17.1

				S	SIGN	NAL	HE	AD	НО	OK-	-UP	СН	IAR	Т					
LOAD SWITCH NO.	S1	S	2	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	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	1:1	21	22	NU	NU	NU	NU	NU	61,62	NU	NU	81	NU	<b>★</b> 11	12,13	NU	NU	NU	NU
RED		128	128						134		-				A124	·			
YELLOW	*	129	129						135										
GREEN			130						136										
RED ARROW			·									107		A121					
YELLOW ARROW				-		-						108		A122	A125				
FLASHING YELLOW ARROW														A123	·				
GREEN ARROW	127	130										109			A126				
NU = Not U	Jsed													•					•

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

# INPUT FILE CONNECTION & PROGRAMMING CHART

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	U	Ø 1	Ø 1	SLOT	S L O	S L O	S L O T	S L O	S L O T	Ø 1	S L O	S L O T	S L O T	S L O	FS
		1A	1B				·			1D	•	·	'	ı	DC ISOLATOR
" "		NOT	Ø 1	E M P	E M P	E M P	E M P	E M P	E M P	Ø 8	E M P	E M P	E M P	E M P	ST
L		USED	1C	T Y	T Y	T Y	T Y	T Y	T Y	8A	T Y	T Y	T Y	T Y	DC ISOLATOR
FILE	U	S L O T	S L O T	SLOT	S L O T	S L O T	S L O T	S L O T	S L O T	S L OT	S L O T	S L O T	S L O T	S L O T	S L O T
"J"	L	E M P T Y													
	l	EX.: 1A	A, 2A, ET	C. = LOC	P NO.'S						FS = 1	FLASH S	ENSE		

ST = STOP TIME

INPUT FILE POSITION LAYOUT

(front view)

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1·U	56	18	1	1	15		Х		Х	
IA.		Tro	50		29	6	3		Х		Χ	Х
1B	TB2-5,6	I2U	39	1	2	1	15		Х		Х	
1C	TB2-7,8	I2L	43	5	3	1	15		Х		Х	
1D	TB6-9,10	I9U	60	22	13	1	15		Х		Χ	
8A	TB6-11,12	I9L	62	24	14	8			Х		Х	

INPUT FILE POSITION LEGEND: J2L SLOT 2 -

REMOVE, jumper from I1-W to J4-W, on rear of input file, if present.

**LOWER** 

OL1 RED (A121)	
OL1 YELLOW (A122)	*
OL1 GREEN (A123)	$\langle F \rangle$
01 GREEN (127) —————	
	11

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511T2 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 2 (TMP Phase I Step 3-II) Electrical Detail- Sheet 1 of 2

Electrical and Programming Details For: Prepared for the Offices of:

US 158 (Reidsville Rd.) NC 74 Westbound Ramps

Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

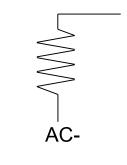
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SIG. INVENTORY NO. 09-0511T2

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES Value (ohms) | Wattage 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (min)



Phase 1 Yellow Field Terminal (126)

# SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones. 2A, 2B and 6A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

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# MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2
Туре	FYA 4 - Section	Normal
Included Phases	2	1;8
Modifier Phases	1	÷
Modifier Overlaps	4	<u>.</u>
Trail Green	0	0
Trail Yellow	0.0	0:0
Trail Red	0:0	0:0

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

## Overlap Plan 2

Overlap	1	2	
Туре	FYA 4 - Section	Normal	
Included Phases	÷	1;8	NOTICE INCLUDED PHAS
Modifier Phases	1	-	
Modifier Overlaps	÷	<u> </u>	
Trail Green	0	0	
Trail Yellow	0:0	0.0	
Trail Red	0.0	0.0	

#### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

# MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

#### ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for head 11 to run protected turns only.

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

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0
29	0	3

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu > Controller > Coordination > Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511T2 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 2 (TMP Phase I Step 3-II) Electrical Detail- Sheet 2 of 2

Electrical and Programming Details For:

US 158 (Reidsville Rd.) NC 74 Westbound Ramps

Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

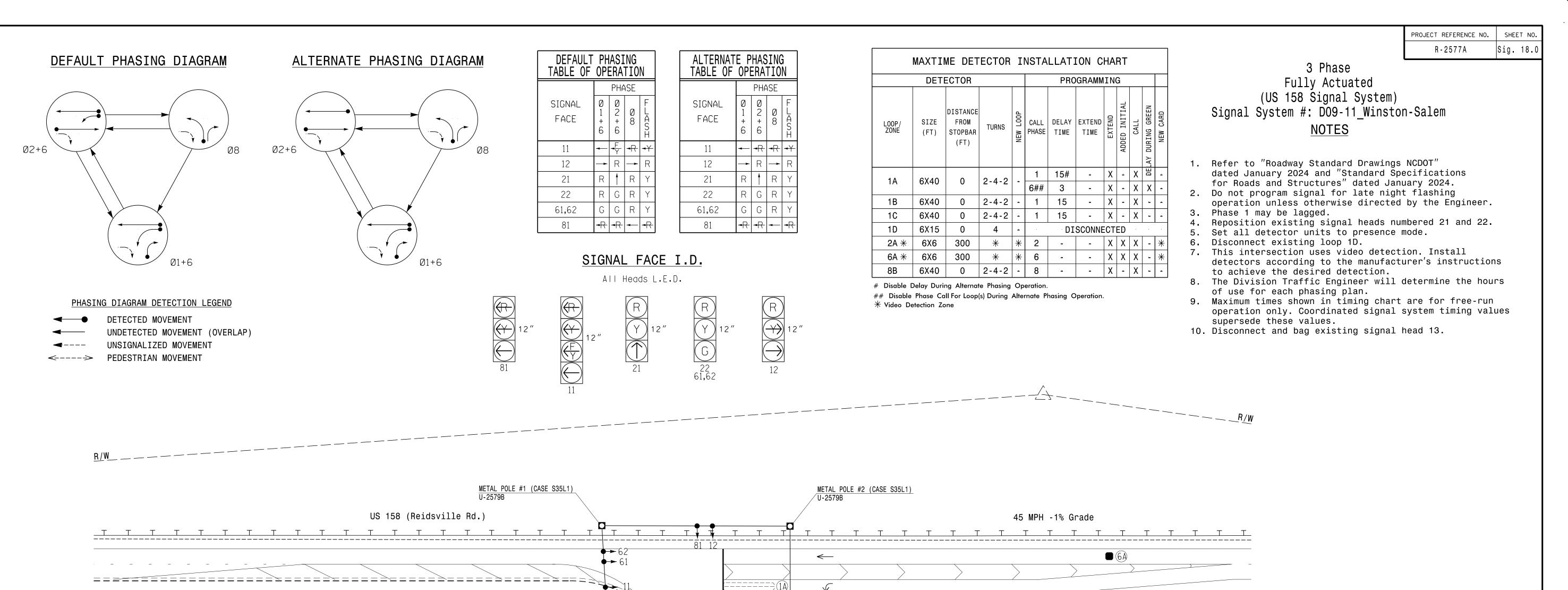
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ROJECT REFERENCE NO.

SIG. INVENTORY NO. 09-0511T2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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LEGEND  $\longrightarrow$ Traffic Signal Head _____ Modified Signal Head N/A 45 MPH 0% Grade Sign US 158 (Reidsville Rd.) Pedestrian Signal Head With Push Button & Sign METAL POLE #3 (CASE S35L1) Signal Pole with Guy Signal Pole with Sidewalk Guy METAL POLE #4 (CASE S35L1) U-2579B Inductive Loop Detector Controller & Cabinet Junction Box MAXTIME TIMING CHART 2-in Underground Conduit -----PHASE N/A Right of Way 8 Directional Arrow Video Detection Zone Guardrail Metal Strain Pole 12 12 7 Master Controller & Cabinet 2.0 2.0 6.0 6.0 "YIELD" Sign (R1-2) 20 90 25 3.0 No U-Turn Sign (R3-4) 3.0 4.6 4.6 "U-TURN YIELD TO RIGHT TURN" 2.3 1.4 1.4 3.2 Sign (R10-16) 2.5 2.5 DOCUMENT NOT CONSIDERED

FEATURE Ped Clear | Min Green Passage ' Yellow Change Red Clear Added Initial * 34 34 Maximum Initial ' Time Before Reduction 15 15 Time To Reduce 30 30 Minimum Gap 3.0 3.0 Advance Walk Non Lock Detector Χ Vehicle Recall MIN RECALL | MIN RECALL Dual Entry

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

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US 158 (Reidsville Rd.)

Signal Upgrade - Temporary Design 3 (TMP Phase III)

NC 74 Westbound Ramps Division 9 Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears 750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: WP Erickson-Jones REVIEWED BY:

INIT. DATE Porter Jones

2/12/2024 SIG. INVENTORY NO. 09-05||T|

FINAL UNLESS ALL

SIGNATURES COMPLETED

FESSION.

056142

# **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 plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

#### **EQUIPMENT INFORMATION**

*See overlap programming detail on sheet 2.

Controller	2070LX
Cabinet	332 w/ Aux
Software	.Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	.18 With Aux. Output File
Load Switches Used	S1, S2, S8, S11, AUX S1, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

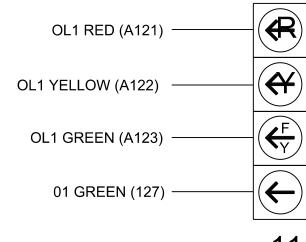
Sig. 18.

				S	SIGN	<b>NAL</b>	. HE	AD	НО	OK-	-UP	CH	IAR [®]	Т					
LOAD SWITCH NO.	S1	S	62	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 PÉD	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	<b>★</b> 11	21	22	NU	NU	NU	NU	NU	61,62	NU	NU	81	NU	<b>★</b> 11	12	NU	NU	NU	NU
RED	٠	128	128						134	٠					A124				
YELLOW	*	129	129		-				135	٠			-				·		
GREEN			130					,	136									,	
RED ARROW												107		A121					
YELLOW ARROW	·											108		A122	A125				
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127	130										109			A126				
NU = Not I	Used		•			•	•				•		•	•	•				

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

## FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



# INPUT FILE CONNECTION & PROGRAMMING CHART

# (front view) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 DC ISOLATOR FILE NOT USED FILE

INPUT FILE POSITION LAYOUT

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1	15		Х		Х	
1/	102-1,2	110	30	-	29	6	3		X		Χ	X
1B	TB2-5,6	I2U	39	1	2	1	15		Х		Χ	
1C	TB2-7,8	I2L	43	5	3	1	15		Х		Χ	
1D	TB6-9,10	I9U	60	22	13	1	15		Х		Χ	
8A	TB6-11,12	I9L	62	24	14	8			Х		Х	

INPUT FILE POSITION LEGEND: J2L SLOT 2 **LOWER** 

REMOVE, jumper from I1-W to J4-W, on rear of input file, if present.

#### THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511T3 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 3 (TMP Phase III) Electrical Detail- Sheet 1 of 2

Electrical and Programming Details For: US 158 (Reidsville Rd.) Prepared for the Offices of: NC 74 Westbound Ramps

Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

SIG. INVENTORY NO. 09-0511T3

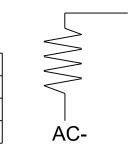
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

# LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (min)

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



Phase 1 Yellow Field Terminal (126)

### SPECIAL DETECTOR NOTE

■ = DENOTES POSITION OF SWITCH

FS = FLASH SENSE ST = STOP TIME

Install a video detection system for vehicle detection for zones. 2A and 6A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

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# MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2
Туре	FYA 4 - Section	Normal
Included Phases	2	1,8
Modifier Phases	1	4
Modifier Overlaps	4	4
Trail Green	0	0
Trail Yellow	0.0	0:0
Trail Red	0.0	0:0

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

## Overlap Plan 2

Overlap	1	2	
Туре	FYA 4 - Section	Normal	
Included Phases	<u> </u>	1,8	NOTICE INCLUDED PHA
Modifier Phases	1	<u>-</u>	
Modifier Overlaps	<u> </u>	<u> </u>	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	
			•

### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

# MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

OVERLAP PLAN	VEH DET PLAN
1	1
2	2
	OVERLAP PLAN  1 2

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for head 11 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A

and reduces delay time for phase 1 call on loop 1A to 0 seconds.

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

#### Plan 2

Detector	Call Phase	Delay			
1	1	0			
29	0	3			

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan								
*	2	2								

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511T3 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 3 (TMP Phase III) Electrical Detail- Sheet 2 of 2

Electrical and Programming Details For: Prepared for the Offices of:

US 158 (Reidsville Rd.) NC 74 Westbound Ramps

Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

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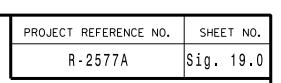
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| Sig. 18.2

Porter Jones SIG. INVENTORY NO. 09-0511T3

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## DEFAULT PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

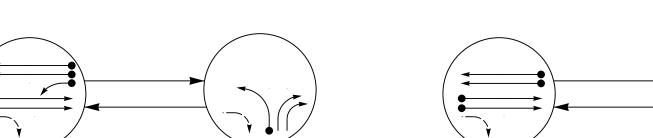
* These values may be field adjusted. Do not adjust Min Green and Extension times for

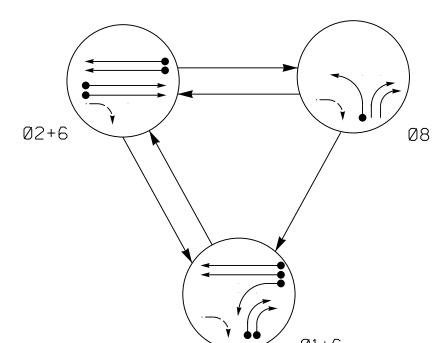
phases 2 and 6 lower than what is shown. Min Green for all other phases should not be

■ DETECTED MOVEMENT

←----> PEDESTRIAN MOVEMENT

Ø2+6





ALTERNATE PHASING DIAGRAM

DEFAULT PHASING TABLE OF OPERATION										
		PHA	SE							
SIGNAL FACE	Ø 1 + 6	ØN+6	$ abla \infty$	LUANI						
11	<b>—</b>	나	#	<del>-</del> Y						
12,13	<b>†</b>	R	1	R						
21	R	1	R	Υ						
21	R	G	R	Υ						
61,62	G	G	R	Υ						
81	<del>-</del> R	<del></del>	•	<del>-R</del>						

ALTERNATE PHASING TABLE OF OPERATION										
		PHA	SE							
SIGNAL FACE	Ø 1 + 6	Ø2+6	Ø 80	11日のエ						
11	<b>\</b>	<del></del>	<del> </del>	<b>→</b>						
12,13	<b>→</b>	R	<b>→</b>	R						
21	R	1	R	Υ						
2.2	R	G	R	Υ						
61,62	G	G	R	Y						
81	<del>-R</del>	<del>-R</del>	<b>←</b>	<del>-</del> R						

# SIGNAL FACE I.D.

All Heads L.E.D.

8B	6X40	0	2-4-2	-	8	<u> </u>
★ Disable [	Delav Durin	a Alternat	e Phasina	On	eration	

300

6X6 300

	MAXTIME DETECTOR INSTALLATION CHART												
	DETE	CTOR				PRO	GRAMM	IN	G				
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD	
1A	6X40	0	2-4-2	_	1	15 <del>*</del>	÷	Χ	-	Χ		_	
<u> </u>	0,40	U	2-4-2	_	6#	3	-	Χ	-	Χ	Χ	-	
1B	6X40	0	2-4-2	_	1	15	<b>-</b>	Χ	4	Χ	1	4	
10	6X40	0	2-4-2	-	1	15	-	X	4	X	1	4	
1D	6X15	0	4	-	1	15	-	Χ	-	Χ		4	
2Δ	6X6	300	5	χ	0	<u>.</u>		Χ	Х	Χ		χ	

5 | X | 2 | - | - | X | X | X | - | X

- | X | X | X | - | X

- | X | X | X | - | X

- | X | - | X | - | -

*	Disable	Delay	During	Alternate	Phasina	Operation.	
<b>∕</b>  \`	Disabic	Doidy	Donnig	, aiciliaic	inasing	Operanon.	

[#] Disable Phase Call For Loop(s) During Alternate Phasing Operation.

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6X6 300 5 X 6

3 Phase Fully Actuated (US 158 Signal System)
Signal System #: D09-11_Winston-Salem NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications

for Roads and Structures" dated January 2024.

2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer. 3. Phase 1 may be lagged.

4. Reposition existing signal heads numbered 21, 22, 61, and 62

5. Reconnect existing loop 1D. 6. Set all detector units to presence mode.

7. The Division Traffic Engineer will determine the hours of use for each phasing plan.

8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

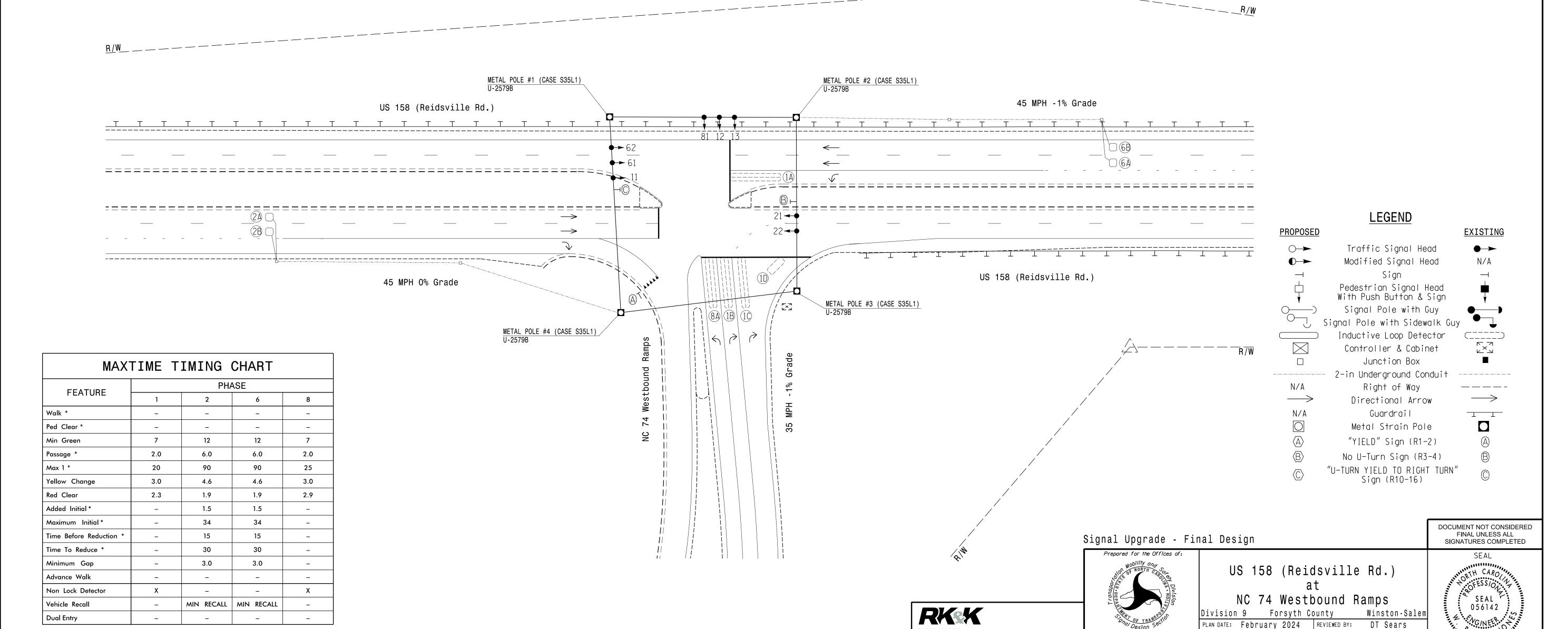
9. Reconnect and unbag existing signal head 13.

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: WP Erickson-Jones REVIEWED BY:

INIT. DATE

Porter Jones

SIG. INVENTORY NO. 09-05||



lower than 4 seconds.

# 18 CHANNEL IP CONFLICT MONITOR ON OFF PROGRAMMING DETAIL WD ENABLE ' (remove jumpers and set switches as shown) SW2 REMOVE DIODE JUMPERS 1-6, 1-9, 1-10, 2-6, 2-9, 6-9, 6-10, 8-10 and 9-10. – RF 2010 – – RP DISABLE — WD 1.0 SEC GY ENABLE – SF#1 POLARITY 📮 — LEDguard — RF SSM └─ FYA COMPACT── FYA 1-9 FYA 3-10 - FYA 5-11 – FYA 7-12 ——— COMPONENT SIDE ____ 13 ] 14 15 REMOVE JUMPERS AS SHOWN 18 — 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

# 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 plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

#### **EQUIPMENT INFORMATION**

*See overlap programming detail on sheet 2.

Controller	2070LX
Cabinet	332 w/ Aux
Software	.Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	.18 With Aux. Output File
Load Switches Used	S1, S2, S8, S11, AUX S1, AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

R-2577A Sig. 19.1

	SIGNAL HEAD HOOK-UP CHART																		
LOAD SWITCH NO.	S1	S	2	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	Ź	2	13	3	4	14	5	6	15	7	8	16	9	10	1.7	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PÉD	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21	22	NU	NU	NU	NU	NU	61,62	NU	NU	81	NU	<b>★</b> 11	12,13	NU	NU	NU	NU
RED	·	128	128		٠	·			134						A124				
YELLOW	*	129	129						135										
GREEN	•		130						136										
RED ARROW												107		A121					
YELLOW ARROW												108		A122	A125			·	
FLASHING YELLOW ARROW	·	·												A123	·				
GREEN ARROW	127	130										109			A126				

#### NU = Not Used

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

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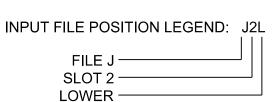
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#### LOOP NO. LOOP INPUT PIN INPUT DETECTOR CALL DELAY EXTEND ADDED INITIAL **GREEN** TB2-1,2 Χ 1B TB2-5,6 I2U 39 Χ 1C TB2-7,8 43 Χ Χ 1D TB6-9,10 I9U | 60 | 22 13 15 Χ Χ TB2<del>-</del>9,10 63 29 Χ TB2-11,12 42 2B 76 X | Χ 6A 40 Χ 44 6 6 Χ Χ I9L | 62 | 24

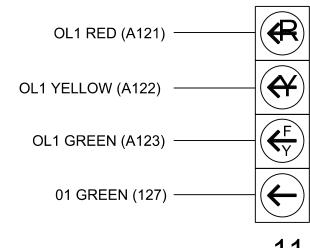
INPUT FILE CONNECTION & PROGRAMMING CHART

REMOVE, jumper from I1-W to J4-W, on rear of input file, if present.



# FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511 DESIGNED: February 2024 SEALED: February 12, 2024 **REVISED:** 

#### Signal Upgrade - Final Design - Electrical Detail- Sheet 1 of 2

Electrical and Programming Details For: Prepared for the Offices of:

US 158 (Reidsville Rd.) NC 74 Westbound Ramps

Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones | REVIEWED BY: REVISIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DATE 09-0511 SIG. INVENTORY NO.

# INPUT FILE POSITION LAYOUT

(front view)

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

	_	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Ø 1	Ø 1	Ø 2	S L	S L	S L	S L	S L	Ø 1	S L	S L	S L	S L	FS
FILE	U	1A	1B	2A	OT	O T	O T	O T	O T	1D	ÖT	O T	Ö	þ T	DC ISOLATOR
" "		NOT	Ø 1	Ø 2	E M P	E M P	E M P	E M P	E M P	Ø 8	E M P	E M P	E M P	E M P	ST
	-	USED	1C	2B	Y	T	T Y	T Y	T Y	8A	T Y	T Y	Y	T	DC ISOLATOR
		S L	Ø 6	S L	S										
FILE	U	O T	6A	Ō T	Ō T	O T	Ō T	P							
"J"		E M P	Ø 6	E M P											
	<b>-</b>	T Y	6B	T Y											
	ι		24 ET	C - L O C										ENIOE	

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

FS = FLASH SENSE ST = STOP TIME

= DENOTES POSITION OF SWITCH

#### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min)

2.0K - 3.0K | 10W (min)

Phase 1 Yellow Field Terminal (126)

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2		
Туре	FYA 4 - Section	Normal		
Included Phases	2	1;8		
Modifier Phases	1	•		
Modifier Overlaps	4	i		
Trail Green	0	0		
Trail Yellow	0.0	0:0		
Trail Red	0.0	0:0		

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

## Overlap Plan 2

Overlap	1	2	
Туре	FYA 4 - Section	Normal	
Included Phases	<u> </u>	1;8	NOTICE INCLUDED PHASE
Modifier Phases	1	÷	
Modifier Overlaps	4	4	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

#### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

# MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

OVERLAP PLAN	VEH DET PLAN
1	1
2	2
	OVERLAP PLAN  1 2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE

TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases

for head 11 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A

and reduces delay time for phase 1 call on loop 1A to 0 seconds.

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

#### Plan 2

	Detector	r Call Phase Delay	
Д	1	1	0
	29	0	3

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu > Controller > Coordination > Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0511 DESIGNED: February 2024 SEALED: February 12, 2024 **REVISED:** 

Signal Upgrade - Final Design - Electrical Detail- Sheet 2 of 2

Electrical and Programming Details For: Prepared for the Offices of:

US 158 (Reidsville Rd.)

NC 74 Westbound Ramps

Forsyth County Winston-Salem PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

ROJECT REFERENCE NO.

SIG. INVENTORY NO. 09-0511

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PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

✓ DETECTED MOVEMENT

←---> PEDESTRIAN MOVEMENT

## ALTERNATE PHASING DIAGRAM

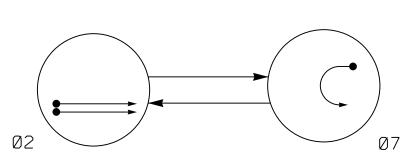


TABLE OF O	PER			TABLE OF O			
	PHASE				Р	HAS	E
SIGNAL FACE	Ø 2	Ø 7	FLASH	SIGNAL FACE	Ø 2	Ø 7	FLAST
21,22	1	R	Υ	21,22	1	R	Υ
71	<b>(</b> FY)		ψŶ	71	₽R		<b>∀</b> Y
72	<del>F</del> Y	-	<del>-</del> Y	72	<del>-R</del>	-	<b>→</b>

21,22

SIGNAL FACE I.D.

All Heads L.E.D.

DEFAULT DUACTNO

MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR						PRO	GRAMM	IN	G			
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A *	6X6	300	*	*	2	<b>-</b>	-	Χ	Χ	Χ	1	*
7A *	6X40	0	*	*	7	15#	_	Χ	1	Χ		*

# Disable Delay During Alternate Phasing Operation.

**★** Video Detection Zone

2 Phase Fully Actuated (Isolated)

PROJECT REFERENCE NO.

R-2577A

Sig. 20.

#### 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. Set all detector units to presence mode.
- 4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
- 5. This intersection uses video detection. Install
- detectors according to the manufacturer's instructions to achieve the desired detection.

**LEGEND** 

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

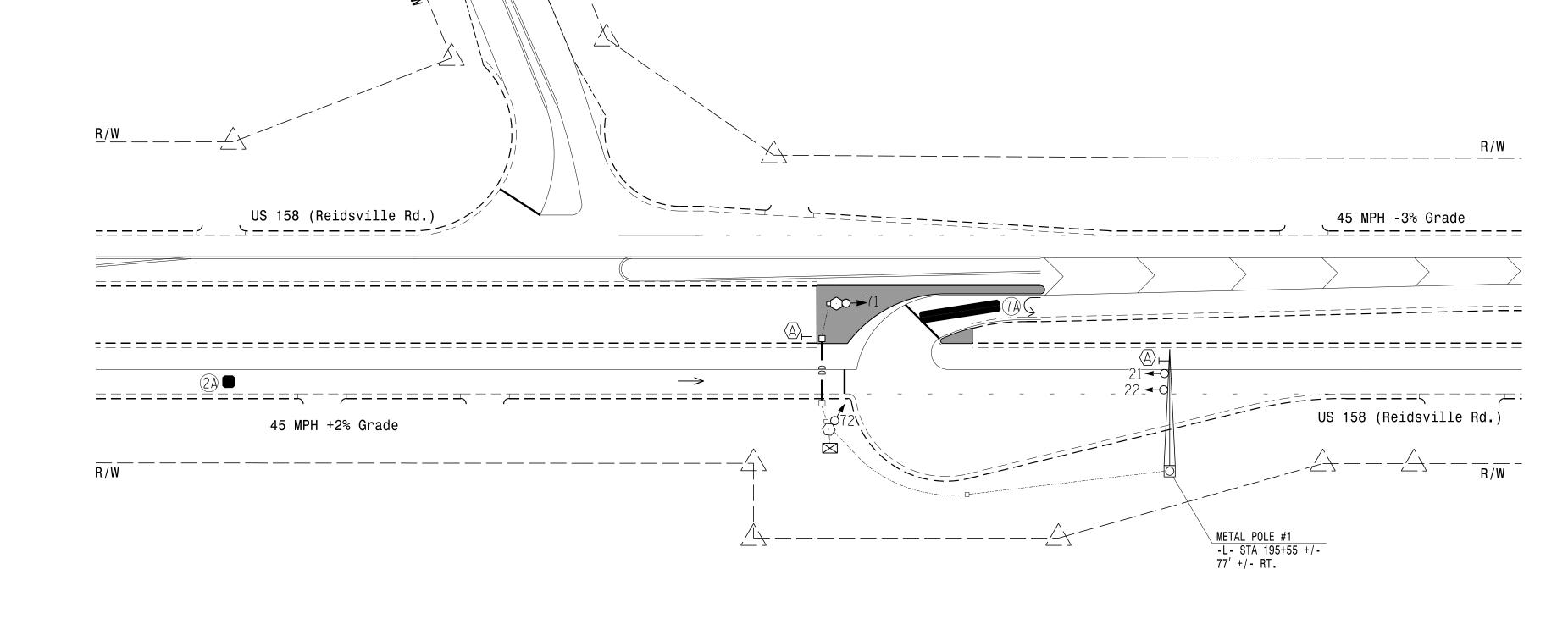
Directional Drill

No Left Turn Sign (R3-2)

Type II Signal Pedestal

Metal Pole with Mastarm

Right of Way Directional Arrow



MAXTIME T	IMING	CHART				
EEATUDE	PHASE					
FEATURE	2	7				
Walk *	_	_				
Ped Clear *	_	_				
Min Green	12	7				
Passage *	6.0	2.0				
Max 1 *	90	30				
Yellow Change	4.3	3.0				
Red Clear	1.0	3.9				
Added Initial *	2.5	_				
Maximum Initial *	34	-				
Time Before Reduction *	15	_				
Time To Reduce *	30	_				
Minimum Gap	3.0	_				
Advance Walk	_	_				
Non Lock Detector	_	Х				
Vehicle Recall	MIN RECALL	_				
Dual Entry	_	_				

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

New Installation (TMP Phase III Step 3)

US 158 EB (Reidsville Rd.) U-Turn West of Division 9 Forsyth County

**PROPOSED** 

N/A

SR 2385 (Darrow Road) Walkertown PLAN DATE: February 2024 REVIEWED BY: WP Erickson-Jones

**EXISTING** 

**-**

N/A

N/A

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OFESSION.

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SIG. INVENTORY NO. 09-09837

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(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-II, 2-I2, 5-7, 5-II, 5-I2, 7-II, 7-I2, AND II-I2

COMPONENT SIDE 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.

# **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 plan.
- 2. Program controller to start up in phase 2 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

# **EQUIPMENT INFORMATION**

.2070LX
.332 w/ Aux
.Q-Free MAXTIME
.Base
.18 With Aux. Output File
S2, S7, S10, AUX S4, AUX S5
2,7
NOT USED
NOT USED
*
<b>.</b> *
*

*See overlap programming detail on sheet 2

#### SIGNAL HEAD HOOK-UP CHART S8 S9 S10 S11 S12 AUX S1 AUX AUX AUX S5 AUX S5 S6 LOAD SWITCH NO. CMU CHANNEL PHASE ★ NU NU NU NU HEAD NO. 128 RED YELLOW GREEN A114 A101 ARROW YELLOW A115 A102 ARROW FLASHING YELLOW ARROW

ROJECT REFERENCE NO.

A116 A103

Sig. 20.

NU = Not Used

ARROW

130

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

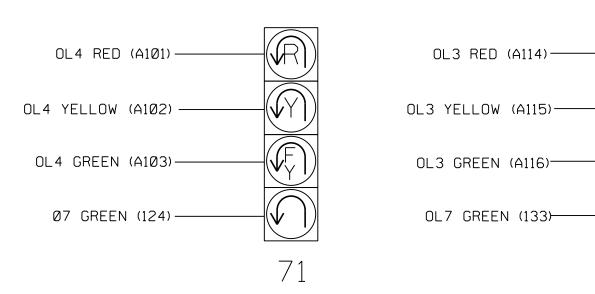
133

★ See pictorial of head wiring in detail below.

#### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

124



THIS ELECTRICAL DETAIL IS FOR

THE SIGNAL DESIGN: 09-0983T

DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

New Installation - Temporary Design (TMP Phase III Step 3) Electrical Detail- Sheet 1 of 2 Electrical and Programming Details For: US 158 EB (Reidsville Rd.)

Prepared for the Offices of:

50 N. Greenfield Pkwy, Garner, NC 27529

U-Turn West of SR 2385 (Darrow Road)

Walkertown PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

DATE 09-0983T SIG. INVENTORY NO.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL
SIGNATURES COMPLETED

# INPUT FILE POSITION LAYOUT

(front view)

	_	1	2	3	4	5	6	/	8	9	10	11	12	13	14
FILE	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
file "J"	U	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y	Ø 7 7A NOT USED	SLOT EMPTY	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y				
	EX.: 1A, 2A, ETC. = LOOP NO.'S											FS = I	FLASH S	ENSE	

FS = FLASH SENSE ST = STOP TIME

ON OFF

—RF 2010 — RP DISABLE

─ WD 1.0 SEC ⊢GY ENABLE

**■**—LEDguard

—RF SSM

—FYA 3-10 FYA 5-11

FYA 7-12

]—SF#1 POLARITY

FYA COMPACT— ]— FYA 1−9

DENOTES POSITION

WD ENABLE \

SW2

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
7A	TB5-5,6	J5U	57	19	21 ★	7	15		Х		Χ	

For the detector to work as shown on the signal design plan, see the vehicle detector setup programming detail for alternate phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L SLOT 2 LOWER

# LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown) Phase 7 Yellow Field

Terminal(123) Overlap 7 Yellow Field ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min) AC-2.0K - 3.0K | 10W (min)

# SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 2A and 7A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For Detection Zone 7A, the equipment placement and slots are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

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# MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	3	4	7
Туре	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	2	2	7
Modifier Phases	-	7	-
Modifier Overlaps	7	4	-
Trail Green	0	0	0
Trail Yellow	0.0	0.0	0.0
Trail Red	0:0	0.0	0:0

#### **OUTPUT CHANNEL CONFIGURATION**

Front Panel

Main Menu >Controller >More>Channels>Channels Config

Web Interface

Home >Controller >Advanced IO>Channels>Channels Configuration

#### **Channel Configuration**

_								
	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel	
	1	Phase Vehicle	1	·	Х	X	1	
	2	Phase Vehicle	2	Х	·		2	
	3	Phase Vehicle	3		Х	Х	3	
OTICE OVERLAP 7	4	Phase Vehicle	4		Х		4	
ASSIGNED -	5	Overlap	7	Х	·		5	NOTICE CHANNEL 5
TO CHANNEL 5.	6	Phase Vehicle	6	Х	·	Х	6	YELLOW FLASH
	7	Phase Vehicle	7	X			7	NOTICE CHANNEL 7
	8	Phase Vehicle	8		Χ	Х	8	YELLOW FLASH
	9	Overlap	1	X		Х	9	
	10	Overlap	2		Χ	Х	10	
	11	Overlap	3	X		Х	11	
	12	Overlap	4	Х		Х	12	NOTICE CHANNEL 12
	13	Phase Ped	2				13	YELLOW FLASH
	14	Phase Ped	4				14	
	15	Phase Ped	6				15	
	16	Phase Ped	8				16	
	17	Overlap	5		Χ	Х	17	
	18	Overlap	6		Х		18	

# MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

ROJECT REFERENCE NO.

| Sig. 20.2

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

PHASINGOVERLAP PLANVEH DET PLANACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING11ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING22

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for heads 71 and 72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

#### Overlap Plan 2

Overlap	3	4	7	
Туре	FYA 4 - Section	FYA 4 - Section	Normal	
Included Phases	-	-	7	NOTICE INCLUDED PHASE
Modifier Phases	<u>-</u>	7	-	
Modifier Overlaps	7	÷	÷	
Trail Green	0	0	0	
Trail Yellow	0.0	0.0	0.0	
Trail Red	0:0	0.0	0.0	

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
4	21	7	0

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern Veh Det Plan Overlap Plan

* 2 2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0983T
DESIGNED: February 2024
SEALED: February 12, 2024
REVISED:

New Installation - Temporary Design (TMP Phase III Step 3) Electrical Detail - Sheet 2 of 2

Prepared for the Offices of:

Division 9

PLAN DATE:

750 N. Greenfield Pkwy, Garner, NC 27529

US 158 EB (Reidsville Rd.) at U-Turn West of

SR 2385 (Darrow Road)

Division 9 Forsyth County Walkertown

PLAN DATE: February 2024 REVIEWED BY: DT Sears

PLAN DATE: February 2024 REVIEWED BY: DT Sears
PREPARED BY: WP Erickson-Jones REVIEWED BY:
REVISIONS INIT. DATE

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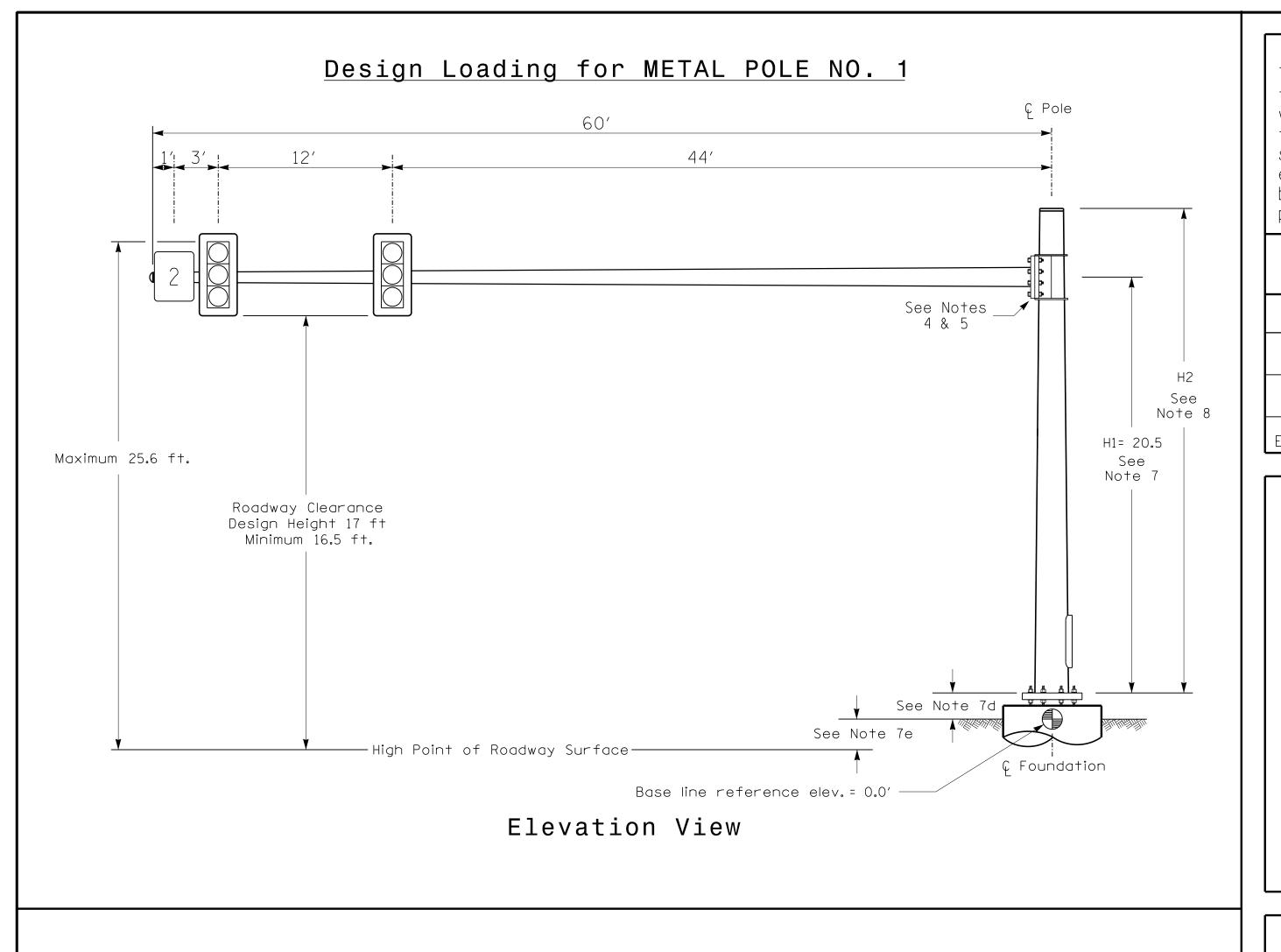
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Porter Jones 2/1

DATE
SIG. INVENTORY NO. 09-0983T

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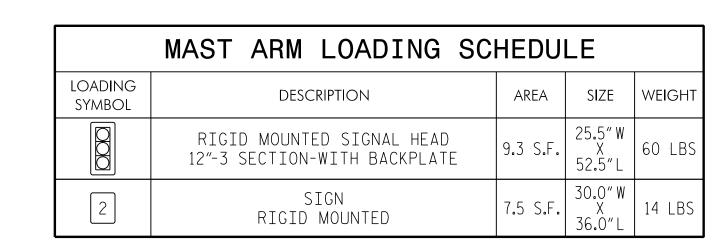


#### SPECIAL NOTE

The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

#### Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at © Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+1.7 ft.	
Elevation difference at Edge of travelway or face of curb	+1.7 ft.	



PROJECT REFERENCE NO.

R-2577A

Sig. 20.3

SIG. INVENTORY NO. 09-09837

#### **NOTES**

#### DESIGN REFERENCE MATERIAL

l. Design the traffic signalstructure and foundation in accordance with:

METAL POLE No. 1

- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signalproject specialprovisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signalproject plans and specialprovisions.
- The NCDOT "MetalPole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

#### DESIGN REQUIREMENTS

Terminal Compartment

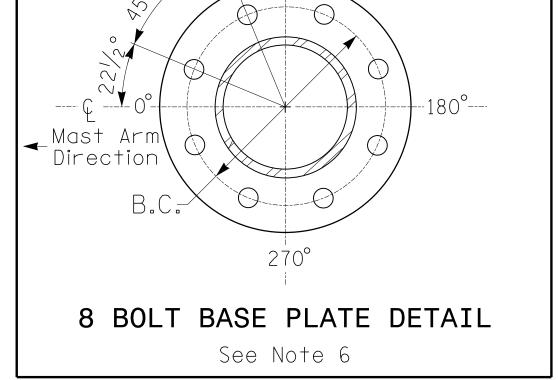
@ 180°

180 ----

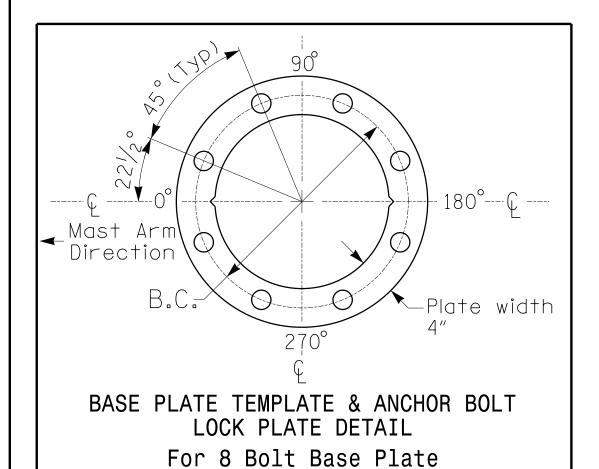
- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signalplans for the actualloads that will be applied at the time of the installation.
- 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- 6. Design base plate with 8 anchor bolt holes.Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
- b. Signalheads are rigidly mounted and vertically centered on the mast arm.
- c. The roadway clearance height for design is as shown in the elevation views.
- d. The top of the pole base plate is 0.75 feet above the ground elevation.
- e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground leveland the high point of the roadway.
- 8. The pole manufacturer willdetermine the totalheight (H2) of each pole using the greater of the following:
- Mast arm attachment height (H1) plus 2 feet, or

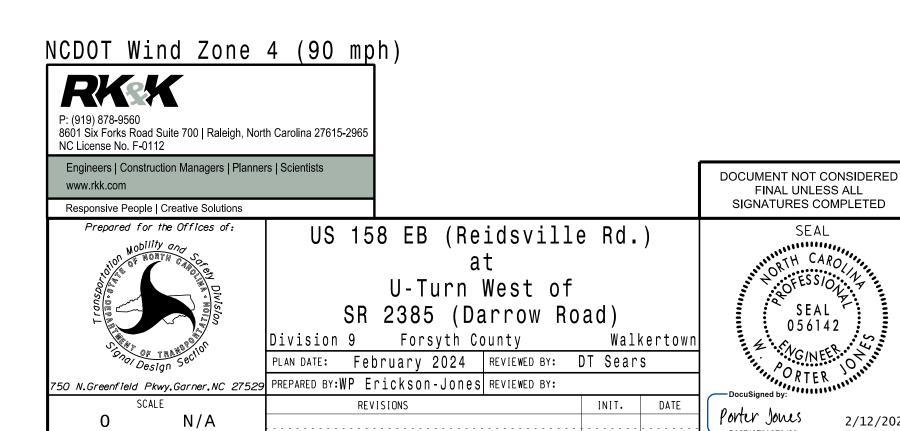
N/A

- H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signalheads over the roadway.
- 11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

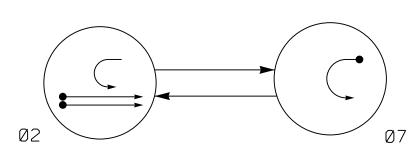


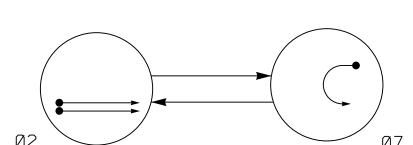
POLE RADIAL ORIENTATION





#### DEFAULT PHASING DIAGRAM





ALTERNATE PHASING DIAGRAM

DEFAULT F TABLE OF O				ALTERNATE PHASING TABLE OF OPERATION					
	Р	HAS	E		Р	HAS	E		
SIGNAL FACE	Ø 2	Ø 7	T L L G O T	SIGNAL FACE	Ø 2	Ø 7	トーセのエ		
21,22	1	R	Υ	21,22	1	R	Υ		
71	F _Y		$\langle \hat{Y} \rangle$	71	<b>(</b> R)		$\overline{\langle \gamma \rangle}$		
72	<del>F</del>	-	¥	72	<del>-R</del>	<b>—</b>	*		

	MAXTIME DETECTOR INSTALLATION CHART											
	DETE	PROGRAMMING										
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	4	Χ	2	<u>.</u>	-	Χ	Χ	Χ	ı	Х
2B	6X6	300	4	Χ	2	<u>.</u>	-	Χ	Χ	Χ	ı	Х
7A	6X40	0	2-4-2	Χ	7	15#	<u> </u>	Χ	÷	Χ	_	Χ

# Disable Delay During Alternate Phasing Operation.

IAGRAM DETECTION LEGEND
-------------------------

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

# SIGNAL FACE I.D.

All Heads L.E.D.

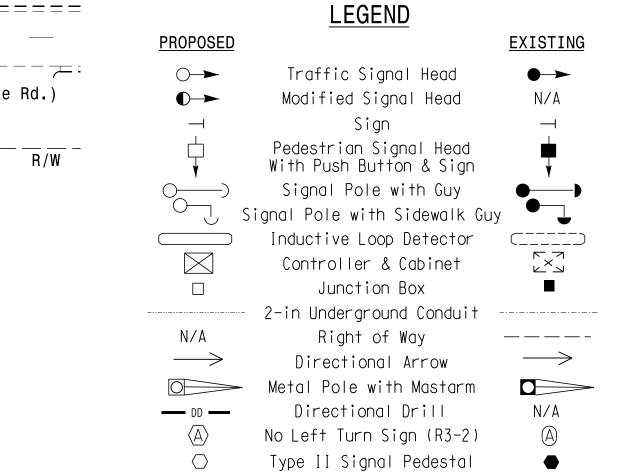
12" (F) (7) (7) (7) (7) (7) (7) (7)	12" Y 12" 21,22
R/W US 158 (Reidsville Rd.)	R/W
US 158 (RELOSVIIIE Rd.)  ———————————————————————————————————	45 MPH - 3% Grade  21

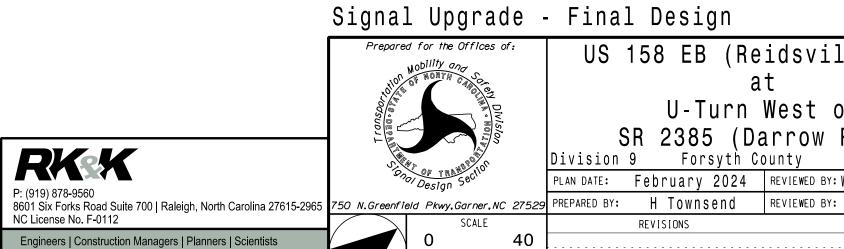
# 2 Phase Fully Actuated (US 158 Signal System) Signal System #: DO9-11_Winston-Salem NOTES

- 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. Reposition existing signal heads numbered 61 and 62.
- Set all detector units to presence mode.
   The Division Traffic Engineer will determine the hours
- of use for each phasing plan. 6. Maximum times shown in timing chart are for free-run
  - operation only. Coordinated signal system timing values supersede these values.

MAXTIME T	IMING	CHART	
FEATURE	PH	ASE	
FEATURE	2	7	
Walk *	_	_	
Ped Clear *	_	_	
Min Green	12	7	
Passage *	6.0	2.0	
Max 1 *	90	30	
Yellow Change	4.3	3.0	
Red Clear	1.0	3.9	
Added Initial *	1.5	_	
Maximum Initial *	34	_	
Time Before Reduction *	15	_	
Time To Reduce *	30	_	
Minimum Gap	3.0	_	
Advance Walk	_	_	
Non Lock Detector	_	Х	
Vehicle Recall	MIN RECALL	_	
Dual Entry	_	_	

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





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77′ +/- RT.

US 158 EB (Reidsville Rd.) U-Turn West of

SR 2385 (Darrow Road) Division 9 Forsyth County

PLAN DATE: February 2024 | REVIEWED BY: WP Erickson-Jones |

056142

DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL SIGNATURES COMPLETED

Porter Jones SIG. INVENTORY NO. 09-0983

# 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 plan.
- 2. Program controller to start up in phase 2 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158, Signal System: D09-11_Winston-Salem System.

### **EQUIPMENT INFORMATION**

Controller	.2070LX
Cabinet	.332 w/ Aux
Software	.Q-Free MAXTIME
Cabinet Mount	.Base
Output File Positions	.18 With Aux. Output File
Load Switches Used	.S2, S7, S10, AUX S4, AUX S5
Phases Used	2,7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	*
Overlap "7"	*

*See overlap programming detail on sheet 2

DENOTES POSITION

	SIGNAL HEAD HOOK-UP CHART																	
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S1Ø	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	OL7	6	6 PED	7	8	8 PED	OL1	0L2	SPARE	0L3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	<b>★</b> 72	NU	NU	<b>★</b> 71	NU	NU	NU	NU	NU	<b>★</b> 72	<b>71</b>	NU
RED		128																
YELLOW		129					*			*								
GREEN																		
RED ARROW																A114	A1Ø1	
YELLOW ARROW																A115	A1Ø2	
FLASHING YELLOW ARROW																A116	A1Ø3	
GREEN ARROW		130					133			124								

PROJECT REFERENCE NO.

R-2577A

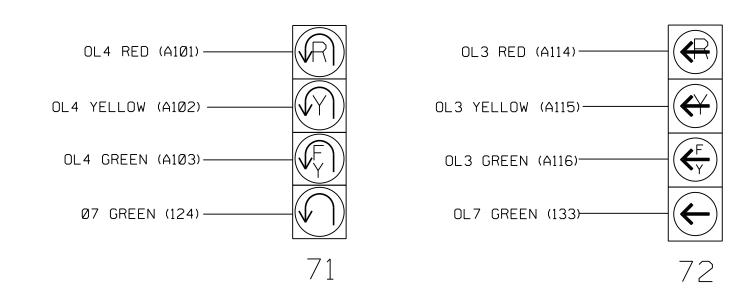
Sig. 21.

NU = Not Used

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

#### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



#### THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0983 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

#### Signal Upgrade - Final Desing - Electrical Detail- Sheet 1 of 2

# Electrical and Programming Details For Prepared for the Offices of:

# US 158 EB (Reidsville Rd.) U-Turn West of SR 2385 (Darrow Road)

Walkertown PLAN DATE: February 2024 REVIEWED BY: DT Sears

PREPARED BY: WP Erickson-Jones | REVIEWED BY: REVISIONS

056142 DATE

SIG. INVENTORY NO.

09-0983

DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL
SIGNATURES COMPLETED

INPUT FILE CONNECTION & PROGRAMMING CHART

								•	ŕ						
	_	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	J	S L O T	Ø 2 <b>2A</b>	S L O T	FS DC ISOLATOR										
" <b> </b> "	-	E M P T Y	Ø 2 2B	E M P T Y	ST DC ISOLATOR										
FILE U	J	S L O T	S L O T	S L O T	S L O T	Ø 7 <b>7A</b>	S L O T								
"J" └	-	E M P T Y	E M P T Y	E M P T Y	E M P T Y	NOT USED	E M P T Y								

INPUT FILE POSITION LAYOUT

(front view)

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

4. Integrate monitor with Ethernet network in cabinet.

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.

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

LOOP NO. LOOP INPUT PIN INPUT DETECTOR CALL DELAY EXTEND ADDED NO. PHASE TIME TIME EXTEND INITIAL I2U | 39 | 43 J5U | 57 | 19 | 21★ |

🛪 For the detector to work as shown on the signal design plan, see the vehicle detector setup programming detail for alternate phasing on sheet 2.

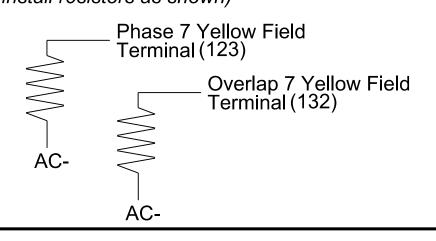
INPUT FILE POSITION LEGEND: J2L SLOT 2 -

**LOWER** 

# LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (min)



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# MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

#### Front Panel

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

#### Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	3	4	7
Туре	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	2	2	7
Modifier Phases	4	7	÷
Modifier Overlaps	7	4	<b>±</b>
Trail Green	0	0	0
Trail Yellow	0:0	0.0	0:0
Trail Red	0:0	0.0	0:0

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

#### Front Panel

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

#### Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

#### Overlap Plan 2

•				
Overlap	3	4	7	
Туре	FYA 4 - Section	FYA 4 - Section	Normal	
Included Phases	<u> </u>	<u> </u>	7	NOTICE INCLUDED PHAS
Modifier Phases	-	7	-	
Modifier Overlaps	7	<u>-</u>	-	
Trail Green	0	0	0	
Trail Yellow	0.0	0.0	0.0	
Trail Red	0:0	0:0	0.0	

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

#### Front Panel

Main Menu >Controller >Coordination >Patterns

#### Web Interface

Home >Controller >Coordination >Patterns

#### Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan								
*	2	2								

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

## **OUTPUT CHANNEL CONFIGURATION**

#### Front Panel

Main Menu >Controller >More>Channels>Channels Config

#### Web Interface

**NOTICE OVERLAP 7** 

ASSIGNED TO ■ CHANNEL 5

Home >Controller >Advanced IO>Channels>Channels Configuration

#### Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel	
1	Phase Vehicle	1	·	Χ	Х	1	
2	Phase Vehicle	2	Х			2	
3	Phase Vehicle	3	·	Х	Х	3	
4	Phase Vehicle	4	·	Х		4	
5	Overlap	7	Х	·		5	NOTICE CHAN
6	Phase Vehicle	6	Х	·	X	6	YELLOW FLAS
7	Phase Vehicle	7	Х	·	·	7	NOTICE CHAI
8	Phase Vehicle	8	·	Х	Х	8	YELLOW FLA
9	Overlap	1	Х	·	Х	9	
10	Overlap	2	·	Х	Х	10	
11	Overlap	3	Х		Х	11	
12	Overlap	4	Х	·	Х	12	NOTICE CHAI
13	Phase Ped	2	·	·	·	13	YELLOW FLA
14	Phase Ped	4	·			14	
15	Phase Ped	6				15	
16	Phase Ped	8				16	
17	Overlap	5		Χ	Х	17	
18	Overlap	6		Х	,	18	

# MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

ROJECT REFERENCE NO.

R-2577A

Sig. 21.2

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

OVERLAP PLAN	VEH DET PLAN
1	1
2	2
	OVERLAP PLAN  1 2

#### ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for heads 71 and 72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7

call on loop 7A to 0 seconds.

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 7A

#### Front Panel

Main Menu >Controller >Detector >Veh Det Plans

#### Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Call Phase Delay Detector 21

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0983 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Final Design - Electrical Detail- Sheet 2 of 2

Prepared for the Offices of:

US 158 EB (Reidsville Rd.) U-Turn West of

SR 2385 (Darrow Road)

PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142 Walkertown

DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL SIGNATURES COMPLETED

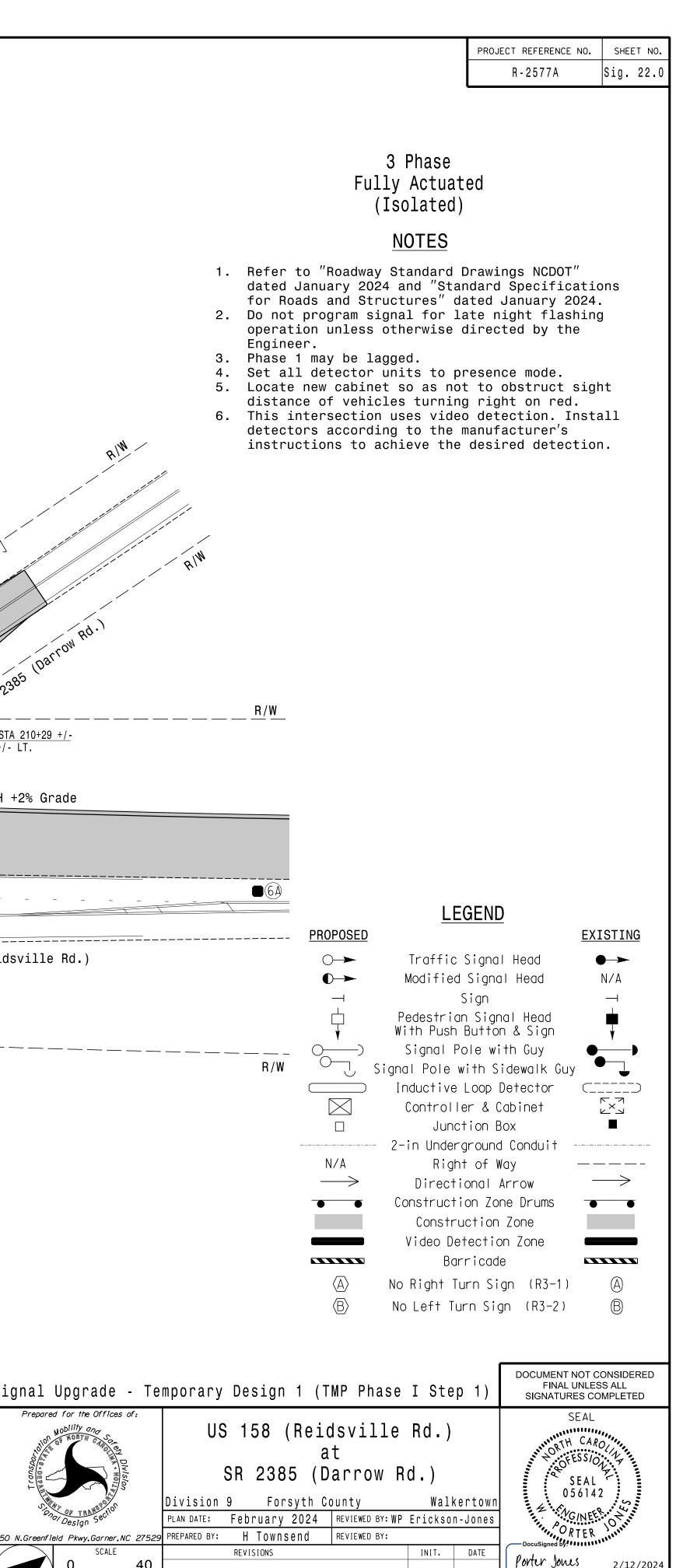
09-0983 SIG. INVENTORY NO.

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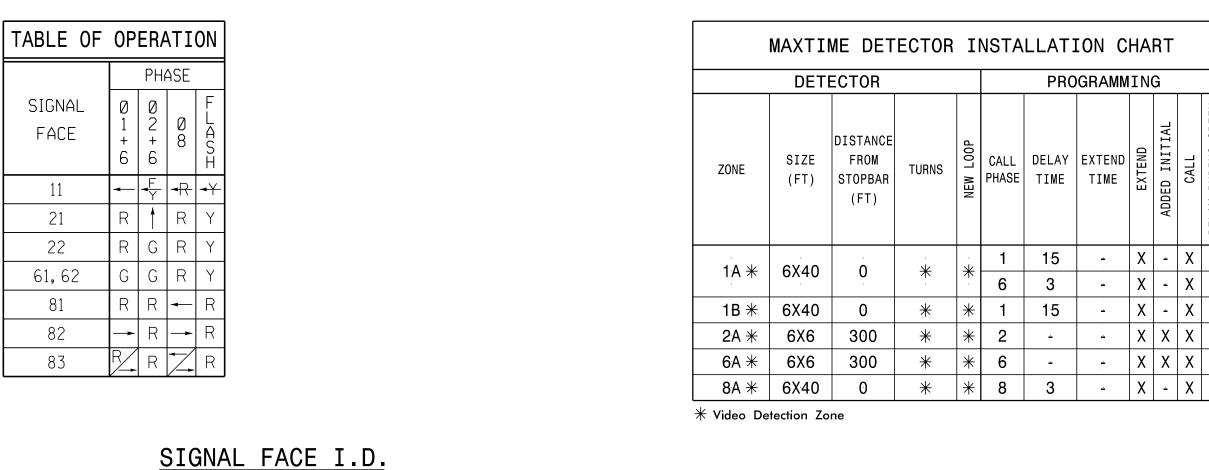
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SIG. INVENTORY NO. 09-0996T



All Heads L.E.D.

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer
- 3. Phase 1 may be lagged.

R/W

- 4. Set all detector units to presence mode.
- distance of vehicles turning right on red.
- instructions to achieve the desired detection.

	-L- STA 208+50 +/- 50' +/- LT.  US 158 (Reidsville Rd.)	-L- STA 210+29 +/- 71' +/- LT.  81 82 45 MPH +2% Grade	
2A•	45 MPH -2% Grade	US 158 (Reidsville Rd.)	
	-L2- STA 206+92 +/- 73' +/- RT.  8A  83  R/M  R/M  R/M  R/M  R/M  R/M  R/M  R/	-L- STA 208+53 +/- 60' +/- RT.	- — — — — — — — — — — — — — — — — — — —
8 - - 7 2.0	RIW		
35 3.0 1.9 - -		Signal Upgrade  Prepared for the Offices	- Temporary Design 1

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- | X | X | X | - | <del>></del>

- XXXX

Division 9 Forsyth County PLAN DATE: February 2024 REVIEWED BY: WP Erickson-Jones REVISIONS

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: H TOWNSEND REVIEWED BY:

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

MAXTIME TIMING CHART

2.0

15

3.0

3.5

12

6.0

100

2.2

2.5

15

3.0

MIN RECALL | MIN RECALL

**FEATURE** 

Ped Clear *

Min Green

Passage *

Red Clear

Yellow Change

Added Initial *

Maximum Initial *

Time To Reduce *

Minimum Gap

Advance Walk

Vehicle Recall

Dual Entry

Non Lock Detector

Time Before Reduction

PHASE

6.0

100 4.7

2.2

2.5

15

3.0

Χ

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

←−−−→ PEDESTRIAN MOVEMENT

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

R/W

ON OFF

RP DISABLE

- WD 1.0 SEC

GY ENABLE

RF SSM

FYA 3-10

- FYA 5-11

FYA 1-9

] 12

ີ 14

16

= DENOTES POSITION OF SWITCH

____ 13

15

18 —

- SF#1 POLARITY 💆

- FYA COMPACT-

– FYA 7-12 ———

WD ENABLE

SW2

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-10, 2-6, 2-9, 6-9, 6-10, 8-10 and 9-10.

REMOVE JUMPERS AS SHOWN

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

COMPONENT SIDE

- 2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- 3. Ensure that the 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)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	S L C T E M P T Y	S L O T E M P T Y	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR										
FILE U	S L O T E M P T Y	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y

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

- 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 plan.
- 2. Program controller to start up in phase 2 Green No Walk and phase 6
- 3. If this signal will be managed by an ATMS software, enable controller and

# **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S8, S11, AUX S1,
	AUX S2
Phases Used	1, 2, 6, 8
Overlap "1"	*
Overlap "2"	<b></b> *
Overlap "3"	NOT USED
Overlap "4"	NOT USED

*See overlap programming detail on this sheet.

# **OVERLAP PROGRAMMING**

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2
Туре	FYA 4 - Section	Normal
Included Phases	2	1,8
Modifier Phases	1	÷
Modifier Overlaps	4	ŀ
Trail Green	0	0
Trail Yellow	0:0	0:0
Trail Red	0.0	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T1 DESIGNED: February 2024

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SEALED: February 12, 2024

**REVISED:** 

Install a video detection system for vehicle detection for zones. 1A, 1B, 2A, 6A, and 8A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

# NOTES

LOAD SWITCH NO.

CMU CHANNEL NO.

PHASE

HEAD NO.

RED

YELLOW

**GREEN** 

RED ARROW

YELLOW

ARROW FLASHING YELLOW ARROW

GREEN

ARROW

NU = Not Used

S3 | S4 |

13

2

128 | 128 |

130

★See pictorial of head wiring in detail this sheet.

***** | 129 | 129 |

127 | 130

- Green No Walk.
- detector logging for all detectors used at this location

Controller	.2070LX					
Cabinet	.332 w/ Aux					
Software	.Q-Free MAXTIME					
Cabinet Mount	.Base					
Output File Positions	.18 With Aux. Output File					
Load Switches Used	S1, S2, S8, S11, AUX S1,					
	AUX S2					
Phases Used	1, 2, 6, 8					
Overlap "1"	*					
Overlap "2"	*					
Overlap "3"	NOT USED					
Overlap "4"	NOT USED					

# FLASHER CIRCUIT MODIFICATION DETAIL

SIGNAL HEAD HOOK-UP CHART

S8

134 | 134 |

135 | 135 |

136

136

21 | 22 | NU | NU | NU | NU | 61 | 62 | NU | NU |81,83 | NU |

S9 S10 S11 S12 AUX S1

108

109

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

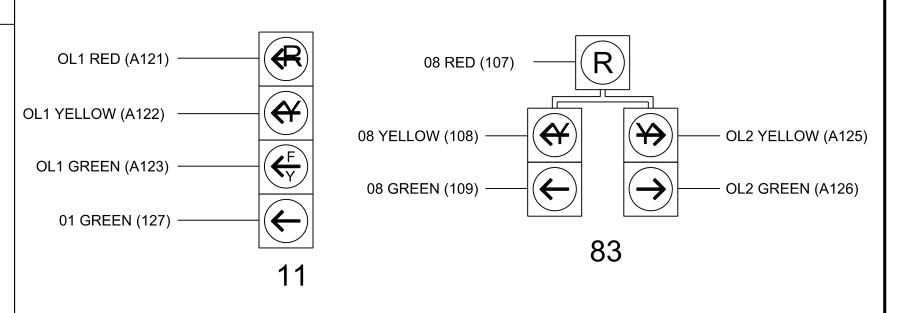
- 1. ON REAR OF PDA REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- 2. ON REAR OF PDA REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- 3. REMOVE FLASHER UNIT 2.

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

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

#### FYA/SPECIAL SIGNAL WIRING DETAIL

(wire signal heads as shown)



Signal Upgrade - Temporary Design 1 (TMP Phase I Step 1) Electrical Detail

Electrical and Programming Details For: US 158 (Reidsville Rd.) Prepared for the Offices of: SR 2385 (Darrow Road)

Walkertown**l** PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 09-0996T1

ROJECT REFERENCE NO.

11 82 83 NU NU NU NU NU

OL2

A122 A125 A125

A126 A126

Sig. 22.

AUX AUX AUX AUX S3 S4 S5 S6

17 | 11 | 12 | 18

SPARE OL3 OL4 SPARE

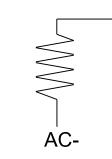
# LOAD RESISTOR INSTALLATION DETAIL

Phase 7 Yellow Field

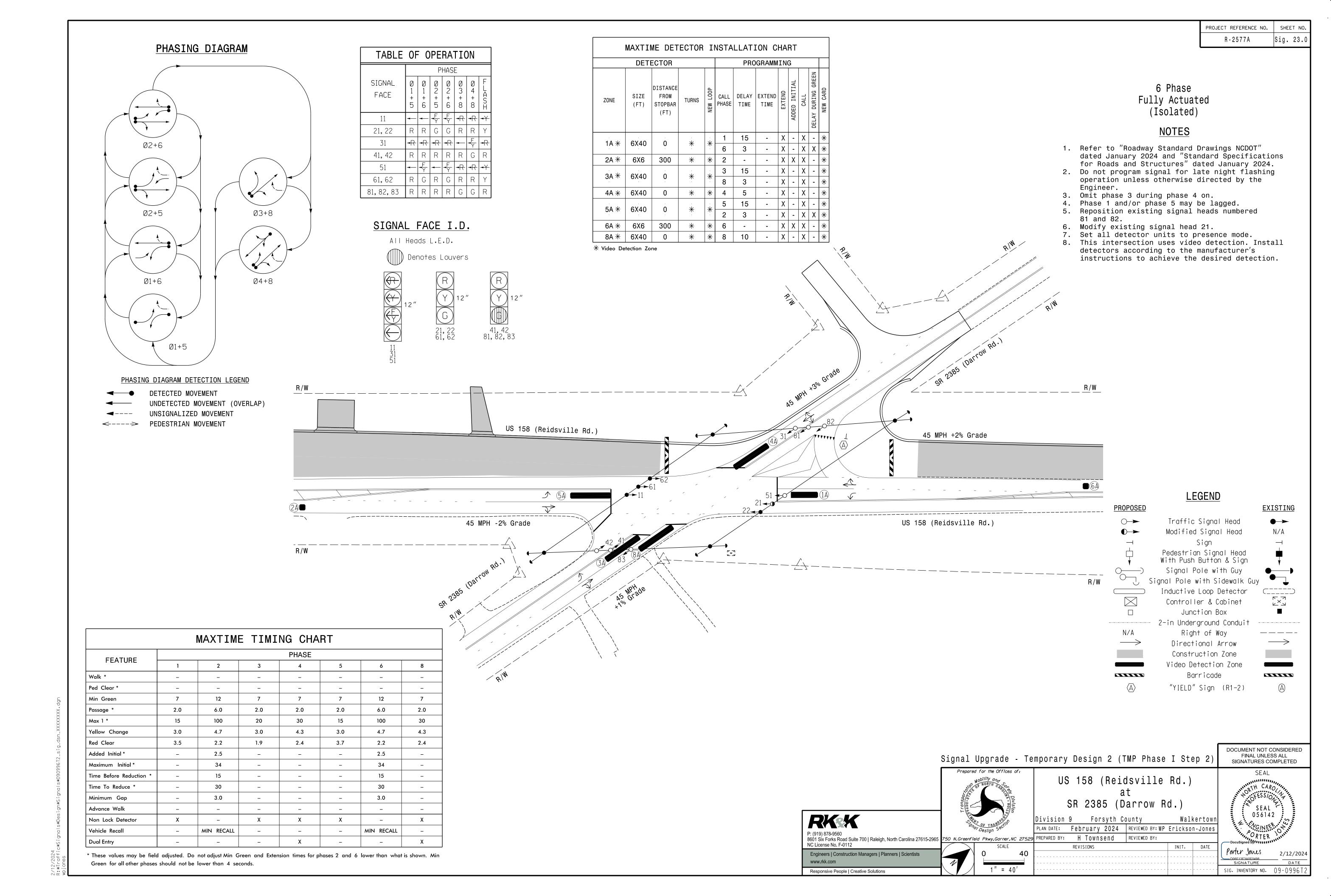
Terminal (126)

(install resistors as shown)

ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (min)



# SPECIAL DETECTOR NOTE



# 18 CHANNEL IP CONFLICT MONITOR ON OFF PROGRAMMING DETAIL WD ENABLE (remove jumpers and set switches as shown) SW2 REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-8, 3-10, 4-8, 4-10, 5-9, 5-11, 6-9, 6-11, 8-10 and 9-11. - RP DISABLE WD 1.0 SEC GY ENABLE – SF#1 POLARITY 📮 — FYA COMPACT—— FYA 1-9 FYA 3-10 ── FYA 5-11 – FYA 7-12 ——— COMPONENT SIDE 15 REMOVE JUMPERS AS SHOWN 16 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently. 18 — = DENOTES POSITION OF SWITCH 2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

# 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 plan.
- 2. Return controller to Factory Defaults before programming per this electrical detail.
- 3. Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

#### **EQUIPMENT INFORMATION**

Controller	2070LX						
Cabinet	332 w/ Aux						
Software	Q-Free MAXTIME						
Cabinet Mount	Base						
Output File Positions	18 With Aux. Output File						
Load Switches Used	S1, S2, S4, S5, S7, S8, S11,						
	AUX S1, AUX S2, AUX S4						
Phases Used	1, 2, 3, 4, 5, 6, 8						
Overlap "1"	*						
Overlap "2"	*						
Overlap "3"	* ····						
Overlap "4"	NOT USED						
*See overlap programming detail on sheet 2.							

ROJECT REFERENCE NO.

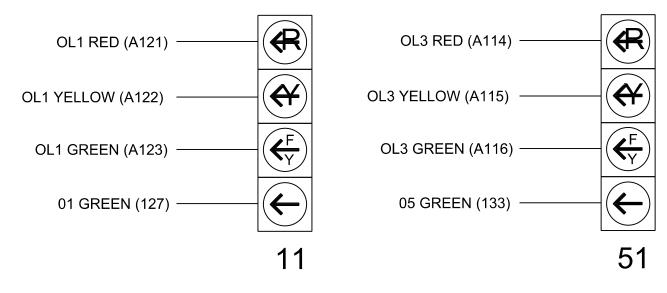
SIGNAL HEAD HOOK-UP CHART																		
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1		SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	<b>★</b> 1:1	21;22	NU	<b>3</b> 1 ★	41,42	NU	<b>★</b> 51	61,62	NU	NU	81 <u>,</u> 82, 83	NU	11	<b>3</b> 1	NU	<b>5</b> 1	NU	NU
RED		128			101			134			107		·					
YELLOW	*	129		*	102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114		
YELLOW ARROW												·	A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126	·	A116		
GREEN ARROW	127			118			133								·		·	

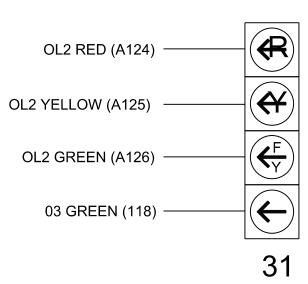
NU = Not Used

★See pictorial of head wiring in detail this sheet.

# (wire signal heads as shown)

FYA SIGNAL WIRING DETAIL





THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T2 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For: Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 158 (Reidsville Rd.) SR 2385 (Darrow Road)

Walkertown**l** PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

SIG. INVENTORY NO. 09-0996T2

## INPUT FILE POSITION LAYOUT

3. Ensure that the 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.

(front view) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 DC ISOLATOR ST FILE

> FS = FLASH SENSE ST = STOP TIME

# LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown) Phase 1 Yellow Field Terminal (126) Phase 3 Yellow Field Terminal (117) ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min) Phase 5 Yellow Field 2.0K - 3.0K | 10W (min) Terminal (132)

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

## SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones. 1A, 2A, 3A, 4A, 5A, 6A, and 8A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

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^{*}Denotes install load resistor. See load resistor installation detail this sheet.

## OVERLAP PROGRAMMING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6
Modifier Phases	1	3	5
Modifier Overlaps	4	<u> </u>	4
Trail Green	0	0	0
Trail Yellow	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0

# FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

# **BACKUP PREVENTION PROGRAMMING**

Front Panel

Main Menu >Controller >Sequence & Phs Config > Backup Prevention >Backup Protection Plan

Web Interface

Home >Controller> Backup Prevention > Backup Protection Plan

#### Sequence 1

1								
No Backup Phase	1	2	3	4	5	6	7	8
Serve Phase 1	÷	÷	÷	÷	÷	÷	÷	-
Serve Phase 2	÷	÷	÷	÷	4	÷	÷	-
Serve Phase 3	÷	÷	÷	÷	÷	÷	÷	-
Serve Phase 4	<u> -</u>	÷	Х	<u> -</u>	÷	<u> -</u>	÷	-
Serve Phase 5	<u> -</u>	÷	<u> -</u>	<u> -</u>	÷	<u> -</u>	÷	-
Serve Phase 6	<u> -</u>	÷	<u> -</u>	<u> -</u>	÷	<u> -</u>	÷	-
Serve Phase 7	<u> -</u>	÷	<u> -</u>	<u> -</u>	÷	<u> -</u>	÷	-
Serve Phase 8	-	-	-	-	-	-	-	_

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T2 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 2 (TMP Phase I Step 2) Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For: Prepared for the Offices of:

US 158 (Reidsville Rd.) SR 2385 (Darrow Road)

Walkertown DT Sears PLAN DATE: February 2024 REVIEWED BY: PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

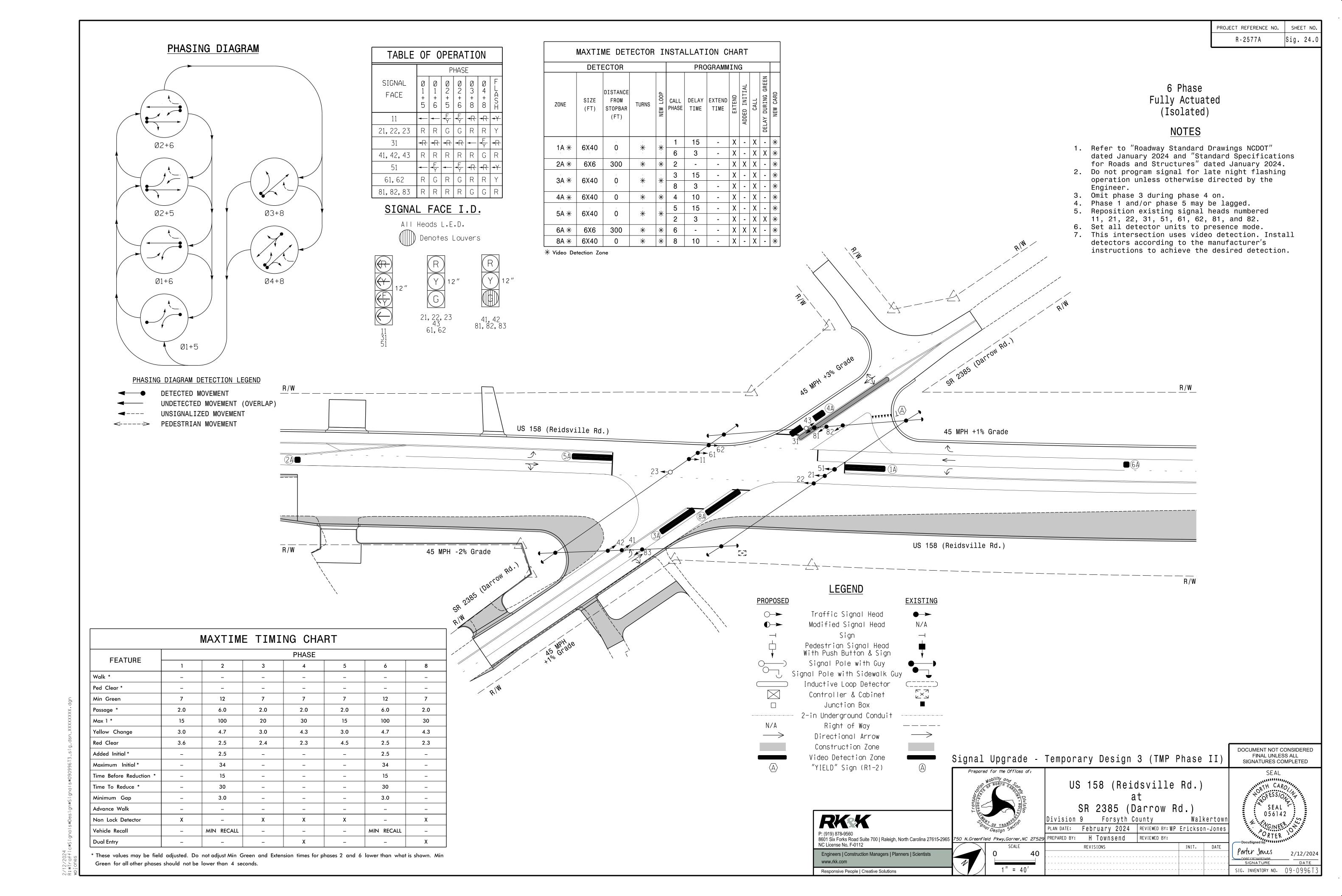
056142

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SIG. INVENTORY NO. 09-0996T2

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# 18 CHANNEL IP CONFLICT MONITOR ON OFF PROGRAMMING DETAIL WD ENABLE (remove jumpers and set switches as shown) SW2 REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-8, 3-10, 4-8, 4-10, 5-9, 5-11, 6-9, 6-11, 8-10 and 9-11. RP DISABLE - WD 1.0 SEC GY ENABLE ー SF#1 POLARITY 📮 — LEDguard — RF SSM ─ FYA COMPACT— FYA 1-9 FYA 3-10 FYA 5-11 – FYA 7-12 ——— COMPONENT SIDE ] 13 ] 14 15 REMOVE JUMPERS AS SHOWN 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently. 18 — = DENOTES POSITION OF SWITCH 2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board. 3. Ensure that the Red Enable is active at all times during normal operation.

# 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 plan.
- 2. Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

#### **EQUIPMENT INFORMATION**

*See overlap programming detail on sheet 2.

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S4, S5, S7, S8, S11,
	AUX S1, AUX S2, AUX S4
Phases Used	1, 2, 3, 4, 5, 6, 8
Overlap "1"	*
Overlap "2"	
Overlap "3"	
Overlap "4"	
•	

SIGNAL HEAD HOOK-UP CHART 
 S4
 S5
 S6
 S7
 S8
 S9
 S10
 S11
 S12
 AUX S1
 AUX S2
 AUX S3
 AUX S4
 AUX S5
 S6
 LOAD SWITCH NO. CMU CHANNEL NO. 16 | 9 | 10 | 17 | 11 | 12 | 18 8 PED OL1 OL2 SPARE OL3 OL4 SPARE PHASE  $31^{+41,42}$  NU  $51^{+61,62}$  NU NU 81,82 NU  $11^{+1}$   $31^{+1}$  NU  $51^{+1}$  NU NU SIGNAL HEAD NO. 128 RED 101 134 ***** | 135 | ***** | 102 | 108 129 YELLOW 130 103 136 109 GREEN. RED A121 A124 A114 ARROW YELLOW A122 A125 A115 ARROW

NU = Not Used

127

FLASHING YELLOW ARROW

GREEN

ARROW

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

133

118

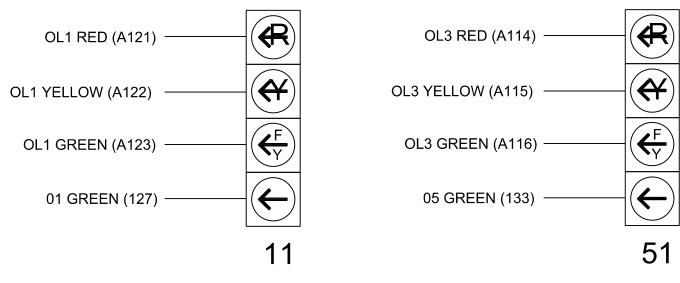
★ See pictorial of head wiring in detail this sheet

## INPUT FILE POSITION LAYOUT

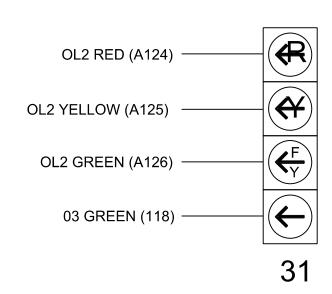
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

								(front	view)						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE	U	S L O T	S L O T	S L O T	S L O T	S L O T	FS DC ISOLATOR								
" "	L	E M P T Y	ST DC ISOLATOR												
FILE	U	S L O T	S L O T	S L O T											
"J"	L	E M P T Y													
	l	EX.: 1/	A, 2A, ET	C. = LOC	P NO.'S							FS = I	FLASH S	ENSE	

#### (wire signal heads as shown) OL3 RED (A114) -OL1 RED (A121)



FYA SIGNAL WIRING DETAIL



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T3 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 3 (TMP Phase II) Electrical Detail - Sheet 1 of 2

50 N. Greenfield Pkwy, Garner, NC 27529

Electrical and Programming Details For: US 158 (Reidsville Rd.) Prepared for the Offices of: SR 2385 (Darrow Road)

Walkertown**l** PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones | REVIEWED BY: REVISIONS

FINAL UNLESS ALL SIGNATURES COMPLETED 056142

ROJECT REFERENCE NO.

R-2577A

A123 A126

A116

Sig. 24.

SIG. INVENTORY NO. 09-0996T3

DOCUMENT NOT CONSIDERED

# SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones. 1A, 2A, 3A, 4A, 5A, 6A, and 8A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown

#### LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown) Phase 1 Yellow Field Terminal (126) Phase 3 Yellow Field ACCEPTABLE VALUES Terminal (117) Value (ohms) | Wattage 1.5K - 1.9K | 25W (min) Phase 5 Yellow Field 2.0K - 3.0K | 10W (min) Terminal (132)

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on the Signal Design Plans.

ST = STOP TIME

# **OVERLAP PROGRAMMING**

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2	3
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6
Modifier Phases	1	3	5
Modifier Overlaps	4	4	4
Trail Green	0	0	0
Trail Yellow	0.0	0.0	0.0
Trail Red	0.0	0:0	0:0

# FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

# BACKUP PREVENTION PROGRAMMING

Front Panel

Main Menu >Controller >Sequence & Phs Config > Backup Prevention >Backup Protection Plan

Web Interface

Home >Controller> Backup Prevention > Backup Protection Plan

#### Sequence 1

No Backup Phase	1	2	3	4	5	6	7	8
Serve Phase 1	÷	÷	÷	÷	÷	÷	<u> </u>	_
Serve Phase 2	÷	÷	÷	÷	÷	÷	<u> </u>	_
Serve Phase 3	÷	÷	÷	÷	÷	÷	<u> </u>	_
Serve Phase 4	<u> </u>	<u> </u>	Х	<u> </u>	<u> </u>	<u> -</u>	÷	-
Serve Phase 5	<u> </u>	<u> -</u>	÷	-				
Serve Phase 6	<u> -</u>	-	÷	-				
Serve Phase 7	<u> -</u>	-	÷	-				
Serve Phase 8	_	_	_	_	_	_	_	_

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T3 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 3 (TMP Phase II) Electrical Detail - Sheet 2 of 2

Prepared for the Offices of:

NORTH CAROLINIA SOLUTION OF THE CAROLINI

750 N. Greenfield Pkwy, Garner, NC 27529

US 158 (Reidsville Rd.) at SR 2385 (Darrow Road)

Division 9 Forsyth County Walkertown
PLAN DATE: February 2024 REVIEWED BY: DT Sears
PREPARED BY: WP Erickson-Jones REVIEWED BY:
REVISIONS INIT. DATE

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DATE Porter Jones 2/12/2024

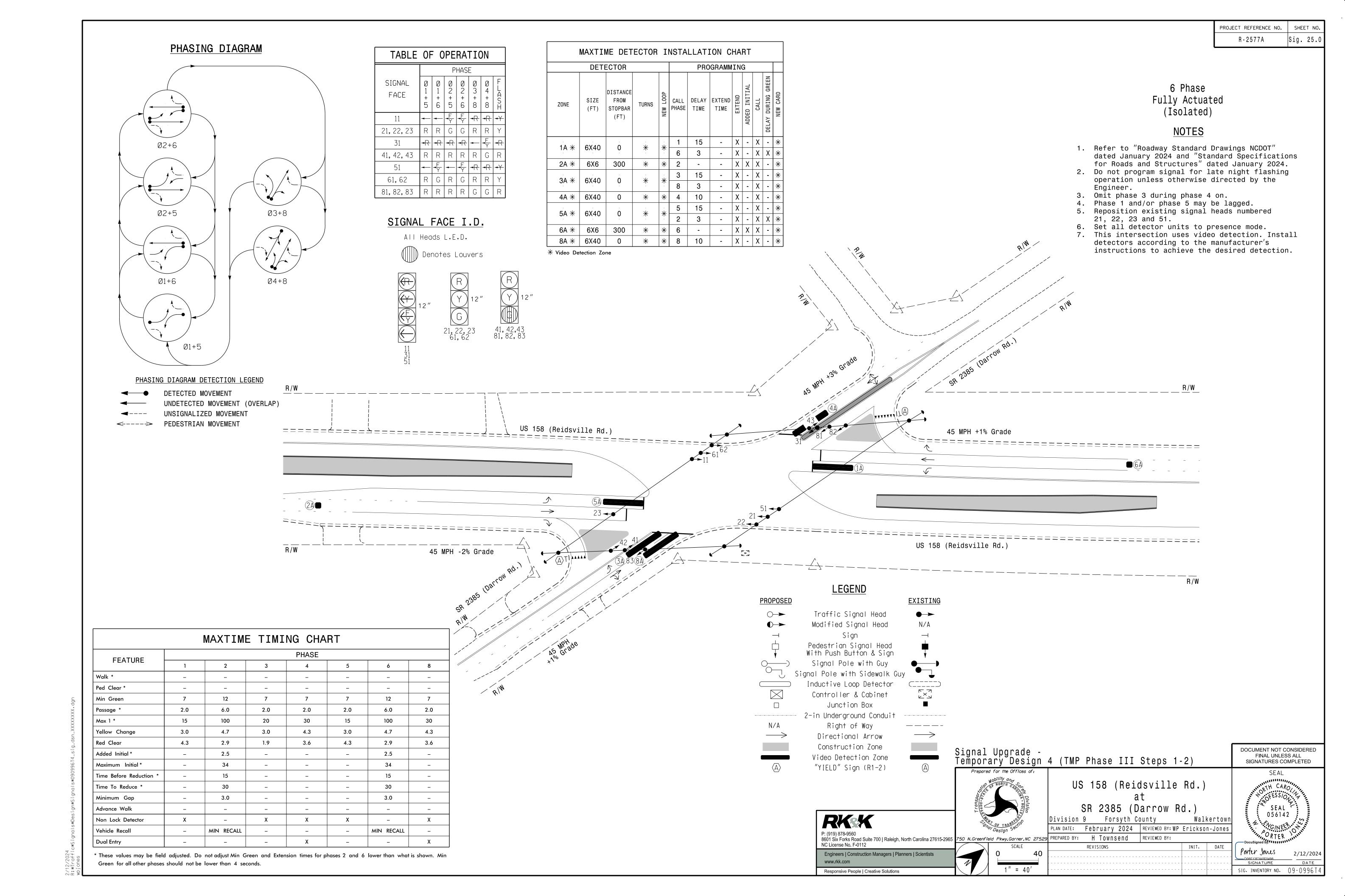
SIG. INVENTORY NO. 09-0996T3

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R:*Traffic*Signals*Design*Signals*090996eT wpjones



# 18 CHANNEL IP CONFLICT MONITOR ON OFF PROGRAMMING DETAIL WD ENABLE (remove jumpers and set switches as shown) SW2 REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-8, 3-10, 4-8, 4-10, 5-9, 5-11, 6-9, 6-11, 8-10 and 9-11. RP DISABLE WD 1.0 SEC GY ENABLE - SF#1 POLARITY 📮 LEDguard RF SSM — FYA COMPACT— FYA 1-9 FYA 3-10 — FYA 5-11 – FYA 7-12 COMPONENT SIDE ] 14 15 REMOVE JUMPERS AS SHOWN 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently. 18 — = DENOTES POSITION OF SWITCH 2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board. 3. Ensure that the Red Enable is active at all times during normal operation.

# 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 plan.
- 2. Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

#### **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S4, S5, S7, S8, S11,
	AUX S1, AUX S2, AUX S4
Phases Used	1, 2, 3, 4, 5, 6, 8
Overlap "1"	*
Overlap "2"	
Overlap "3"	*
Overlap "4"	NOT USED
*See overlap programming detail	on sheet 2.

ROJECT REFERENCE NO. R-2577A Sig. 25.1

	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	OL1			OL3	OL4	SPARE
SIGNAL HEAD NO.	<b>★</b> 11	21,22 23	NU	<b>★</b> 31	41,42, 43	NU	<b>★</b> 51	61,62	NU	NU	81,82, 83	NU	<b>★</b>	<b>★</b> 31	NU	<b>★</b> 51	NU	NU
RED		128			101			134			107							
YELLOW	*	129		*	102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114		
YELLOW ARROW													A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		A116		
GREEN ARROW	127			118			133											

NU = Not Used

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

# INPUT FILE POSITION LAYOUT

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

(front view) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 DC ISOLATOR ST FILE

> FS = FLASH SENSE ST = STOP TIME

# FYA SIGNAL WIRING DETAIL (wire signal heads as shown) OL1 RED (A121) OL3 RED (A114) -OL3 YELLOW (A115) -OL1 YELLOW (A122) OL1 GREEN (A123) OL3 GREEN (A116) -05 GREEN (133) -01 GREEN (127) -

OL2 RED (A124) OL2 YELLOW (A125) OL2 GREEN (A126) 03 GREEN (118) 31

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T4 DESIGNED: February 2024 SEALED: February 12, 2024 **REVISED:**

**(4**)

(FY)

Signal Upgrade - Temporary Design 4 (TMP Phase III Steps 1-2) Electrical Detail - Sheet 1 of 2

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED Electrical and Programming Details For: US 158 (Reidsville Rd.) SR 2385 (Darrow Road)

Walkertown**l** PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

SIG. INVENTORY NO. 09-0996T4

#### (install resistors as shown) Phase 1 Yellow Field Terminal (126) Phase 3 Yellow Field Terminal (117) ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min) Phase 5 Yellow Field 2.0K - 3.0K | 10W (min) Terminal (132)

LOAD RESISTOR INSTALLATION DETAIL

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

## SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones. 1A, 2A, 3A, 4A, 5A, 6A, and 8A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

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# **OVERLAP PROGRAMMING**

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

Overlap	1	2	3
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6
Modifier Phases	1	3	5
Modifier Overlaps	-	-	-
Trail Green	0	0	0
Trail Yellow	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0

# FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

# **BACKUP PREVENTION PROGRAMMING**

Front Panel

Main Menu >Controller >Sequence & Phs Config > Backup Prevention >Backup Protection Plan

Web Interface

Home >Controller> Backup Prevention > Backup Protection Plan

#### Sequence 1

No Backup Phase	1	2	3	4	5	6	7	8
Serve Phase 1	-	-	-	-	-	-	_	-
Serve Phase 2	-	-	-	-	-	-	_	-
Serve Phase 3	-	-	-	-	-	-	_	-
Serve Phase 4	-	-	Х	-	-	-	_	-
Serve Phase 5	-	-	-	-	-	-	_	-
Serve Phase 6	-	-	-	-	-	-	_	-
Serve Phase 7	_	_	_	-	-	-	-	-
Serve Phase 8	_	_	_	-	-	_	_	-

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T4 DESIGNED: February 2024 SEALED: February 12, 2024 REVISED:

Signal Upgrade - Temporary Design 4 (TMP Phase III Steps 1-2) Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For: Prepared for the Offices of:

US 158 (Reidsville Rd.) SR 2385 (Darrow Road)

Walkertown DT Sears PLAN DATE: February 2024 REVIEWED BY: PREPARED BY: WP Erickson-Jones REVIEWED BY: REVISIONS

056142

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 09-0996T4

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PHASING DIAGRAM DETECTION LEGEND

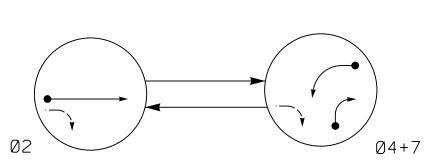
UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

←−−−→ PEDESTRIAN MOVEMENT

## ALTERNATE PHASING DIAGRAM



DEFAULT F TABLE OF O				
	Р	HAS	E	
SIGNAL FACE	Ø۷	Ø 4 + 7	止」位のエ	
21, 22	1	R	Υ	
41, 42	R	<b>*</b>	R	
71	<del>F</del>	<b>—</b>	<del>-</del>	

SIGNAL FACE I.D.

All Heads L.E.D.

ALTERNATE PHASING TABLE OF OPERATION							
	Р	HAS	E				
SIGNAL FACE	Ø۷	Ø 4 + 7	11日のエ				
21, 22	<b>†</b>	R	Υ				
41, 42	R		R				
71	#	<b>\</b>	<b>→</b>				

4A	6X40	0	*
7A	6X40	0	*

# Disable Delay During Alternate Phasing Operation.

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* Video Detection Zone

ZONE

DETECTOR

DISTANCE

FROM

MAXTIME DETECTOR INSTALLATION CHART

6X6 | 300 | * |*| 2 | - | - | X | X | X | - |

PROGRAMMING

- | X | - | X | -

15

7 | 15# |

PROJECT REFERENCE NO. R-2577A Sig. 26.

2 Phase Fully Actuated (Isolated)

#### 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. Set all detector units to presence mode.

R/W

- 4. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- 5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

Traffic Signal Head

Modified Signal Head

Sign

Pedestrian Signal Head With Push Button & Sign

Signal Pole with Guy Signal Pole with Sidewalk Guy

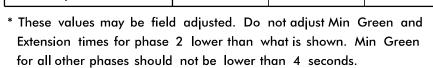
Inductive Loop Detector Controller & Cabinet Junction Box 2-in Underground Conduit

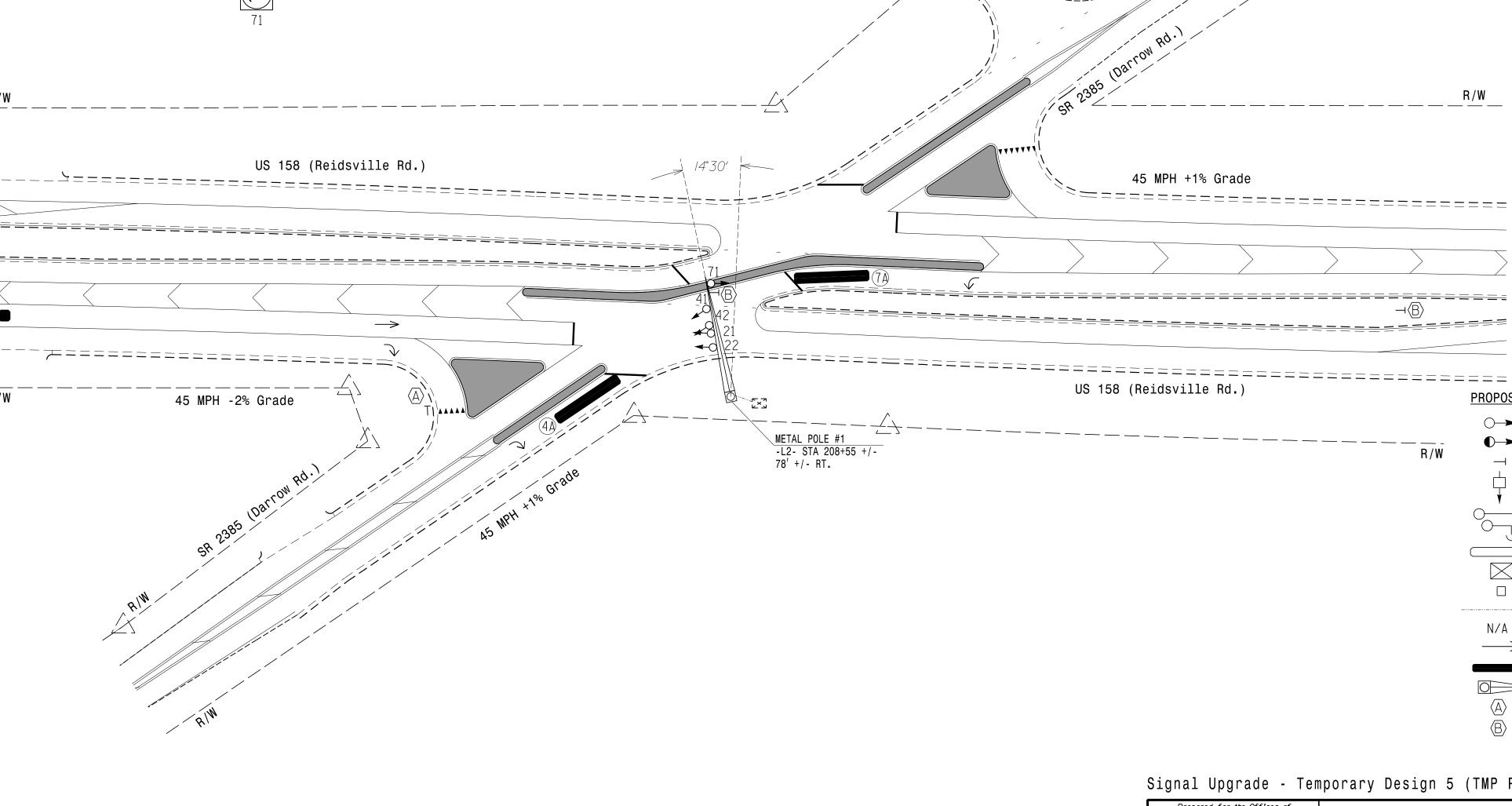
Right of Way

Directional Arrow Video Detection Zone Metal Pole with Mastarm "YIELD" Sign (R1-2)

No U-Turn Sign (R3-4)

MAXTIM	E TIMI	NG CHA	RT
FEATURE		PHASE	
FEATURE	2	4	7
Walk *	_	_	_
Ped Clear *	_	_	_
Min Green	12	7	7
Passage *	6.0	2.0	2.0
Max 1 *	90	30	30
Yellow Change	4.7	3.0	3.0
Red Clear	1.3	3.2	3.2
Added Initial *	2.5	_	_
Maximum Initial *	34	-	_
Time Before Reduction *	15	_	_
Time To Reduce *	30	-	_
Minimum Gap	3.0	_	_
Advance Walk	_	_	_
Non Lock Detector	_	Х	Х
Vehicle Recall	MIN RECALL	1	_
Dual Entry	_	Х	х





Signal Upgrade - Temporary Design 5 (TMP Phase III Step 5) US 158 EB (Reidsville Rd.) SR 2385 (Darrow Rd.)

Division 9 Forsyth County Walkertown PLAN DATE: February 2024 REVIEWED BY: WP Erickson-Jones 750 N.Greenfield Pkwy.Garner.NC 27529 PREPARED BY: H TOWNSEND REVIEWED BY:

REVISIONS

N/A

FINAL UNLESS ALL SIGNATURES COMPLETED OTH CARO FESSION 056142

DOCUMENT NOT CONSIDERED

<u>EXISTING</u>

**-**

N/A

 $\longrightarrow$ 

 $^{\otimes}$ 

Porter Jones SIG. INVENTORY NO. 09-0996TS

# 18 CHANNEL IP CONFLICT MONITOR ON OFF PROGRAMMING DETAIL WD ENABLE ' (remove jumpers and set switches as shown) SW2 REMOVE DIODE JUMPERS 2-12, 4-7, 4-12 and 7-12. - RP DISABLE — WD 1.0 SEC GY ENABLE ー SF#1 POLARITY 📮 — LEDguard — RF SSM - FYA COMPACT-- FYA 1-9 - FYA 3-10 - FYA 5-11 – FYA 7-12 ——— COMPONENT SIDE 15 REMOVE JUMPERS AS SHOWN 16

## 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 plan.
- 2. Return controller to Factory Defaults before programming per this electrical detail.
- 3. Program controller to start up in phase 2 Green No Walk.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

# **EQUIPMENT INFORMATION**

Controller	332 w/ Aux Q-Free MAXTIME Base 18 With Aux. Output File S2, S5, S10, AUX S5 2, 4, 7 NOT USED NOT USED
Overlap "2"	NOT USED
Overlap "3" Overlap "4"	

*See overlap programming detail on sheet 2.

ROJECT REFERENCE NO.

				SI	GNA	\L H	łΕΑ	DH	100	K-U	P C	CHA	RT					
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	NU	NU	<b>★</b> 71	NU	NU	NU	NU	NU	NU	<b>71</b>	NU
RED		128			101													
YELLOW		129								*								
GREEN																		
RED ARROW																	A101	
YELLOW ARROW					102												A102	
FLASHING YELLOW ARROW																	A103	
GREEN ARROW		130			103					124								

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

# INPUT FILE POSITION LAYOUT

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 the 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.

(front view) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 DC ISOLATOR ST FILE

> FS = FLASH SENSE ST = STOP TIME

18 —

= DENOTES POSITION OF SWITCH

#### INPUT FILE CONNECTION & PROGRAMMING CHART

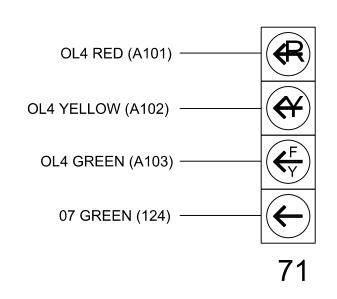
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.		DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
7A	TB5-5,6	J5U	57	19	21 ★	7	15		Х		Χ	

For the detector to work as shown on the signal design plan, see the vehicle detector setup programming detail for alternate phasing on sheet 2.

## INPUT FILE POSITION LEGEND: J2L SLOT 2 LOWER -

### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T5 DESIGNED: February 2024 SEALED: February 12, 2024 **REVISED:** 

Signal Upgrade - Temporary Design 5 (TMP Phase III Step 5) Electrical Detail - Sheet 1 of 2

#### LOAD RESISTOR INSTALLATION DETAIL

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

(install resistors as shown) ACCEPTABLE VALUES Phase 1/Yellow Field Value (ohms) | Wattage Terminal (126) 1.5K - 1.9K 25W (min) Phase 3 Yellow Field 2.0K - 3.0K | 10W (min) Terminal (127) Phase 7 Yellow Field Terminal (123) Remove Phase 1 Yellow Field Terminal (126) and Phase 3 Yellow Field Terminal (117) if present.

#### SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones. 2A, 4A and 7A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For Detection Zone 7A, the equipment placement and slots are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

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Electrical and Programming Details For:

US 158 EB (Reidsville Rd.)

SR 2385 (Darrow Road)

Walkertown**l** PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones | REVIEWED BY: REVISIONS

FINAL UNLESS ALL SIGNATURES COMPLETED 056142

DOCUMENT NOT CONSIDERED

DATE SIG. INVENTORY NO. 09-0996T5

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

#### Overlap Plan 1

4
FYA 4 - Section
2
7
-
0
0.0
0.0

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

#### Overlap Plan 2

Overlap	4	
Туре	FYA 4 - Section	
Included Phases	-	NOTICE INCLUDED PR
Modifier Phases	7	
Modifier Overlaps	1	
Trail Green	0	
Trail Yellow	0.0	
Trail Red	0.0	

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

ROJECT REFERENCE NO. Sig. 26.2

# MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

OVERLAP PLAN	VEH DET PLAN
1	1
2	2
	OVERLAP PLAN  1 2

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for head 71 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7

call on loop 7A to 0 seconds.

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector | Call Phase | Delay 21 7

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966T5 DESIGNED: February 2024 SEALED: February 12, 2024 **REVISED:** 

Signal Upgrade - Temporary Design 5 (TMP Phase III Step 5) Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

US 158 EB (Reidsville Rd.) SR 2385 (Darrow Road)

PLAN DATE: February 2024 REVIEWED BY: DT Sears PREPARED BY: WP Erickson-Jones REVIEWED BY:

Walkertown REVISIONS

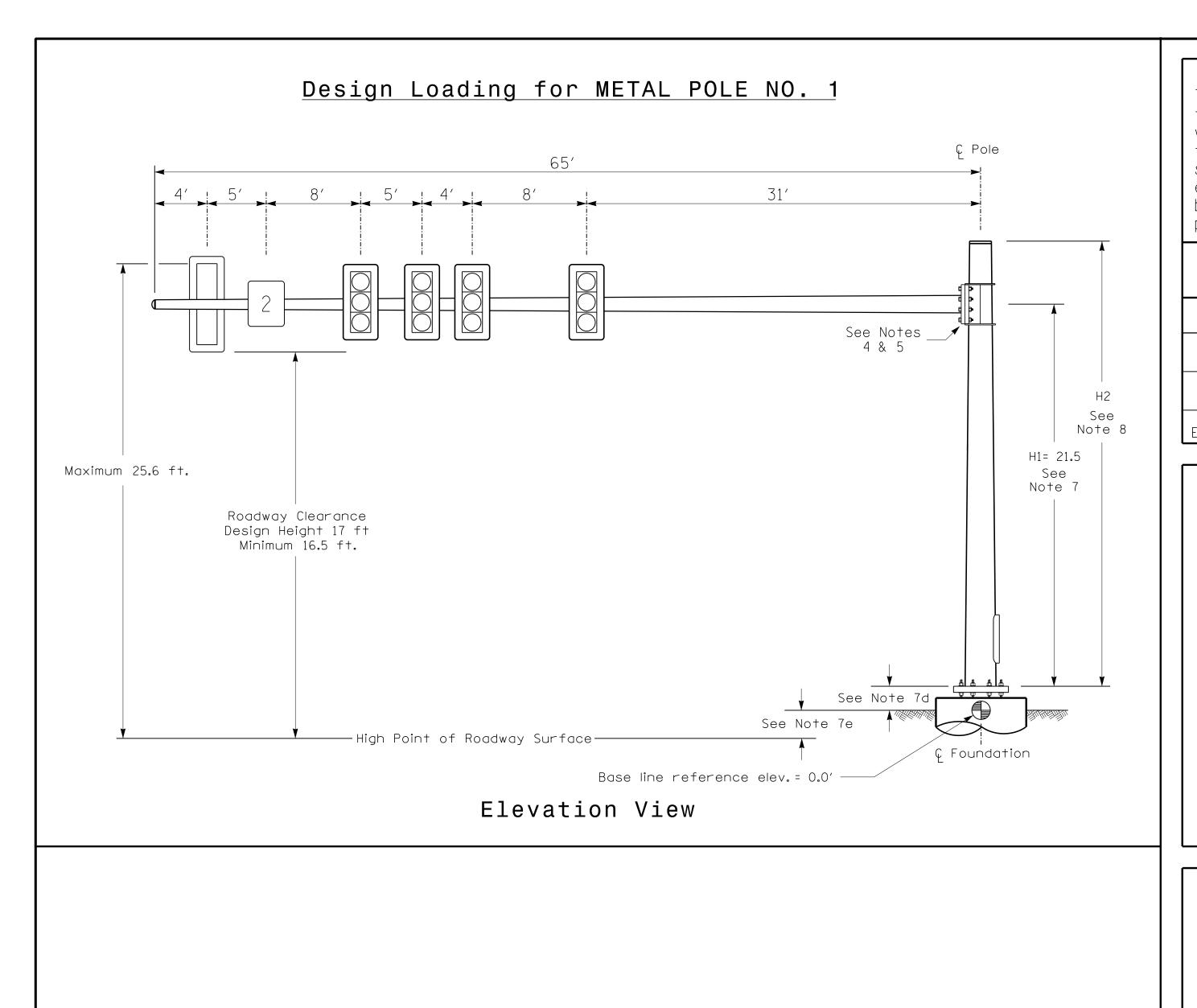
056142 Porter Jones

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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RKK

SIG. INVENTORY NO. 09-0996T5



#### SPECIAL NOTE

The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

#### Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at © Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+2.5 ft.	
Elevation difference at Edge of travelway or face of curb	+1.5 ft.	

POLE RADIAL ORIENTATION

Mast Arm

_ Direction

#### MAST ARM LOADING SCHEDULE LOADING DESCRIPTION AREA SIZE WEIGHT SYMBOL 25.5″ W RIGID MOUNTED SIGNAL HEAD 9.3 S.F. X 52.5"L 60 LBS 12"-3 SECTION-WITH BACKPLATE 25.5" W 11.5 S.F. X 66.0" L RIGID MOUNTED SIGNAL HEAD 74 LBS 12"-4 SECTION-WITH BACKPLATE 7.5 S.F. 30.0" W X 36.0" L SIGN RIGID MOUNTED 2 14 LBS

PROJECT REFERENCE NO.

R-2577A

Sig. 26.3

#### DESIGN REFERENCE MATERIAL

l. Design the traffic signalstructure and foundation in accordance with:

METAL POLE No. 1

- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signalproject specialprovisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "MetalPole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

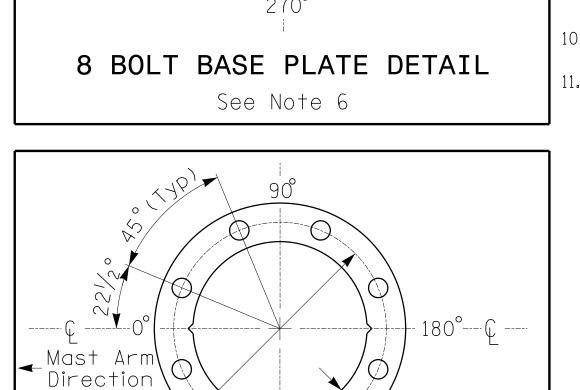
#### DESIGN REQUIREMENTS

Terminal Compartment

@ 180°

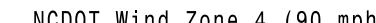
180 ----

- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signalplans for the actualloads that will be applied at the time of the installation.
- 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions:
- a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
- b. Signalheads are rigidly mounted and vertically centered on the mast arm.
- c. The roadway clearance height for design is as shown in the elevation views.
- d. The top of the pole base plate is 0.75 feet above the ground elevation.
- e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground leveland the high point of the roadway.
- 8. The pole manufacturer willdetermine the totalheight (H2) of each pole using the greater of the following:
- Mast arm attachment height (H1) plus 2 feet, or
- H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signalheads over the roadway.
- 11. The contractor is responsible for providing soilpenetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

-Plate width





US 158 EB (Reidsville Rd.)

Division 9 Forsyth County Walkertown PLAN DATE: February 2024 REVIEWED BY: DT Sears 50 N.Greenfield Pkwy.Garner.NC 27529 PREPARED BY:WP Erickson-Jones REVIEWED BY: REVISIONS

SIGNATURES COMPLETED 056142

DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

Porter Jones SIG. INVENTORY NO. 09-0996TS

NCDOT Wind Zone 4 (90 mph)

SR 2385 (Darrow Road)

N/A

PHASING DIAGRAM DETECTION LEGEND

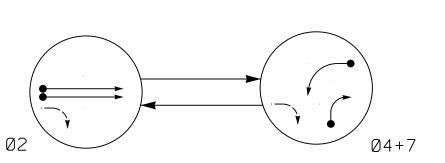
UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

←−−−→ PEDESTRIAN MOVEMENT

# ALTERNATE PHASING DIAGRAM



DEFAULT I				
	Р	HAS	Ε	
SIGNAL FACE	Ø 2	Ø 4 + 7	11日のエ	
21,22	1	R	Υ	
41, 42	R		R	
71	<del>-</del> F	-	+	

SIGNAL FACE I.D.

All Heads L.E.D.

ALTERNATE TABLE OF 0			
	Р	HAS	E
SIGNAL FACE	Ø۷	Ø 4 + 7	止し母のエ
21,22	<b>†</b>	R	Y
41, 42	R		R
71	₩	•	<del></del>

	7:A	6X40	0	2-4-2	Χ	7	15#	<u>.</u>	Χ	÷	Χ	1	Х
Ì	# Disable [	Delay Durir	na Alternat	te Phasina	On	eration							

DETECTOR

L00P

FROM

MAXTIME DETECTOR INSTALLATION CHART

6X6 | 300 | 5 | X | 2 | - | - | X | X | X | - |

0 | 2-4-2 | X | 4 |

PROGRAMMING

- | X | X | X | -

- | X | - | X | - |

OO CALL DELAY EXTEND NI INI Q

15

PROJECT REFERENCE NO. R-2577A Sig. 27.

2 Phase Fully Actuated (US 158 Signal System)
Signal System #: D09-11_Winston-Salem 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.

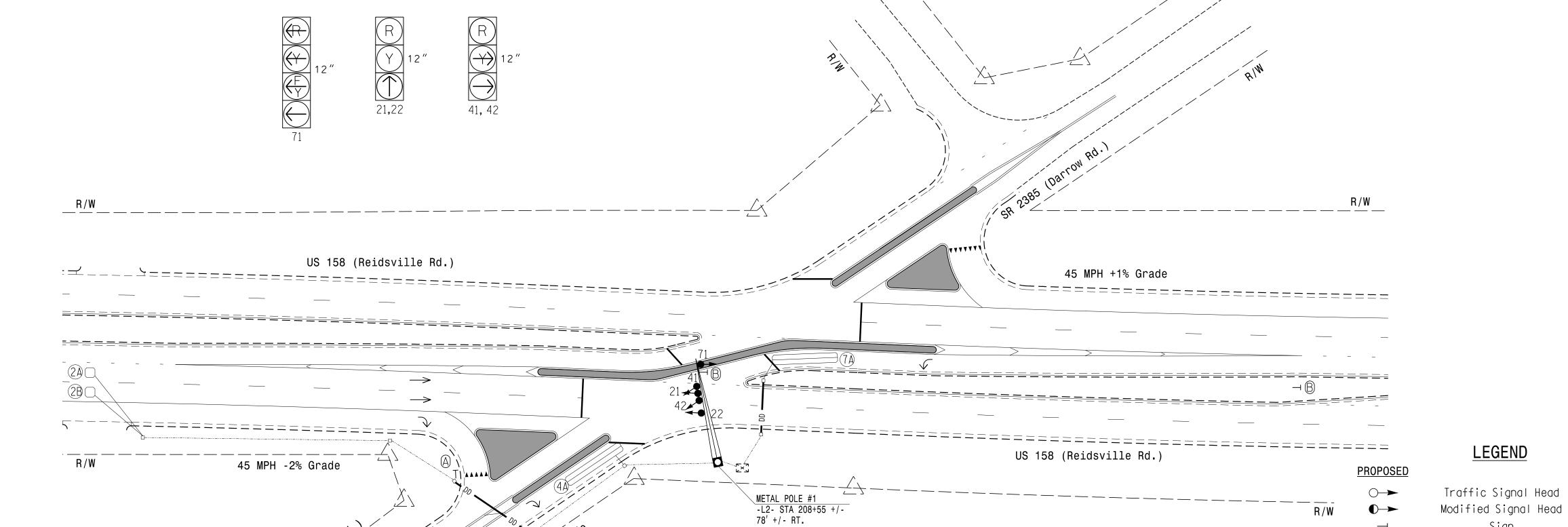
  3. Reposition existing signal heads numbered 21 and 22.

  4. Set all detector units to presence mode.

  5. The Division Traffic Engineer will determine the hours

- of use for each phasing plan.
- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

MAXTIM	E TIMI	NG CHA	RT
FEATURE		PHASE	
FEATURE	2	4	7
Walk *	-	_	_
Ped Clear *	-	_	_
Min Green	12	7	7
Passage *	6.0	2.0	2.0
Max 1 *	90	30	30
Yellow Change	4.7	3.0	3.0
Red Clear	1.3	3.2	3.2
Added Initial *	1.5	_	_
Maximum Initial *	34	_	_
Time Before Reduction *	15	_	_
Time To Reduce *	30	_	_
Minimum Gap	3.0	_	_
Advance Walk	_	_	_
Non Lock Detector	_	Х	х
Vehicle Recall	MIN RECALL	_	_
Dual Entry	_	Х	Х



	Signal Upgrade -	Final Design
	Prepared for the Offices of:	US 158 EB (F
	Transpo,	SR 2385 (
RKSK		Division 9 Forsyth
	Onal Design Section	PLAN DATE: February 2024
P: (919) 878-9560 8601 Six Forks Road Suite 700   Raleigh, North Carolina 27615-2965		PREPARED BY: H Townsend
NC License No. F-0112	SCALE	REVISIONS
Engineers   Construction Managers   Planners   Scientists	0 40	

Responsive People | Creative Solutions

US 158 EB (Reidsville Rd.) SR 2385 (Darrow Rd.)

Division 9 Forsyth County Walkertown PLAN DATE: February 2024 REVIEWED BY: WP Erickson-Jones v. Garner. NC 27529 PREPARED BY: H TOWNS end REVIEWED BY:

SCALE

DEVISIONS INIT. DATE

056142

LEGEND

Pedestrian Signal Head With Push Button & Sign

Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box

> Right of Way Directional Arrow

Metal Pole with Mastarm "YIELD" Sign (R1-2)

No U-Turn Sign (R3-4)

2-in Underground Conduit

<u>EXISTING</u>

N/A

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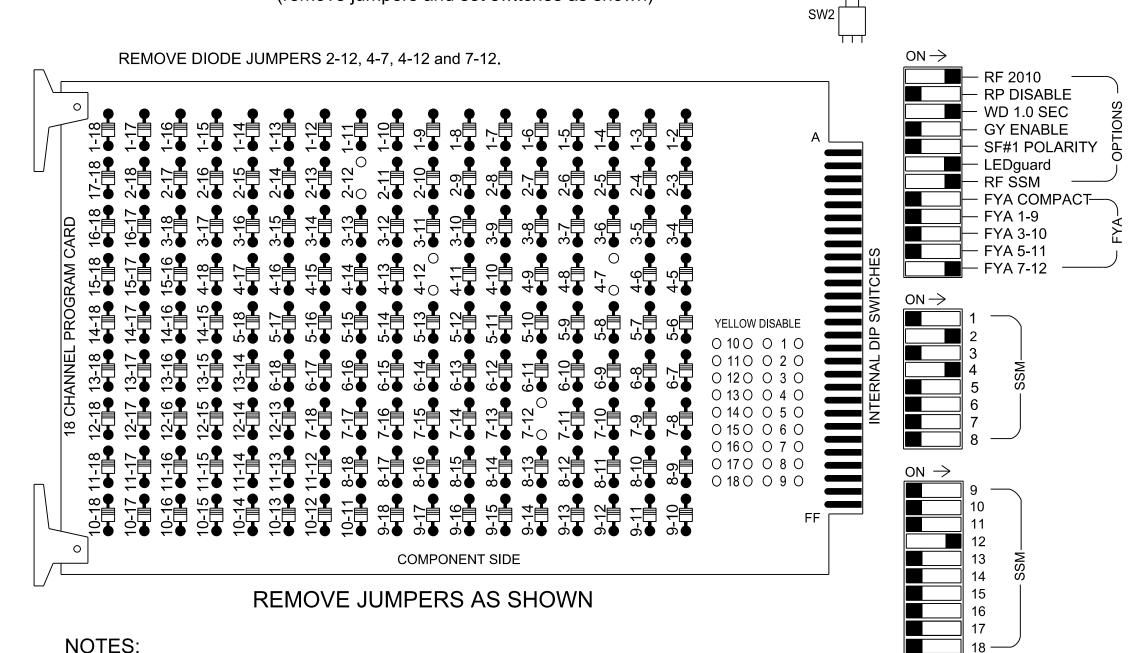
 $^{\otimes}$ 

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 09-0996

for all other phases should not be lower than 4 seconds

(remove jumpers and set switches as shown)



ON OFF

■ = DENOTES POSITION OF SWITCH

WD ENABLE '

# 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 plan.
- 2. Program controller to start up in phase 2 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the US 158 Signal System, Signal System: D09-11_Winston-Salem System.

#### **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S2, S5, S10, AUX S5
Phases Used	2, 4, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	*

*See overlap programming detail on sheet 2

# ROJECT REFERENCE NO. R-2577A

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	1.7	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	NU	NU	<b>★</b> 71	ΝŪ	NU	NU	NU	NU	ΝŪ	<b>★</b> 71	ŊŪ
RED		128			101													
YELLOW		129				٠				*								
GREEN																		
RED ARROW			·														A101	
YELLOW ARROW					102												A102	
FLASHING YELLOW ARROW		·	·						·								A103	
GREEN ARROW		130			103	·			·	124		·					·	

NU = Not Used

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

# INPUT FILE POSITION LAYOUT

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 the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

(front view)

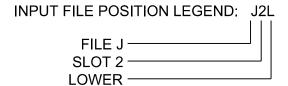
	_	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE	U	S L O T	Ø 2 <b>2A</b>	S L O T	S L O T	SLOT	Ø 4 <b>4A</b>	S L O T	S L O T	S L O T	SLOT	S L OT	S L O T	S L O T	FS DC ISOLATOR
" "	L	E M P T Y	ø 2 <b>2B</b>	E M P T Y	E M P T Y	E M P T Y	NOT USED	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	ST DC ISOLATOR
FILE	U	S L O T	S L O T	S L O T	S L O T	Ø 7 <b>7A</b>	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T
"J"	L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	NOT USED	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y
	L	EX.: 1/	A, 2A, ET	C. = LOC	P NO.'S				FS = F	FLASH S	ENSE				

FS = FLASH SENSE ST = STOP TIME

#### INPUT FILE CONNECTION & PROGRAMMING CHART

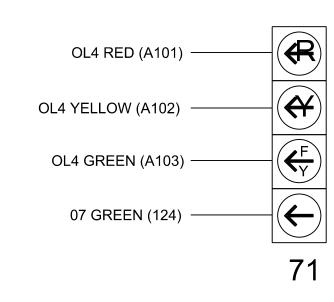
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			Х	Х	Х	
2B	TB2-7,8	I2L	43	5	3	2			Х	Х	Х	
4A	TB4-9,10	I6U	41	3	8	4	15		Х		Х	
7A	TB5-5,6	J5U	57	19	21 ★	7	15		Χ		Х	

right For the detector to work as shown on the signal design plan, see the vehicle detector setup programming detail for alternate phasing on sheet 2.



# FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0966 DESIGNED: February 2024 SEALED: February 12, 2024 **REVISED:** 

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (min)

Phase 7 Yellow Field Terminal (123)

Signal Upgrade - Final Design - Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: US 158 EB (Reidsville Rd.) Prepared for the Offices of: SR 2385 (Darrow Road)

PLAN DATE: February 2024 REVIEWED BY: PREPARED BY: WP Erickson-Jones REVIEWED BY:

Walkertown**l** DT Sears REVISIONS

FINAL UNLESS ALL
SIGNATURES COMPLETED 056142

DOCUMENT NOT CONSIDERED

DATE SIG. INVENTORY NO.

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