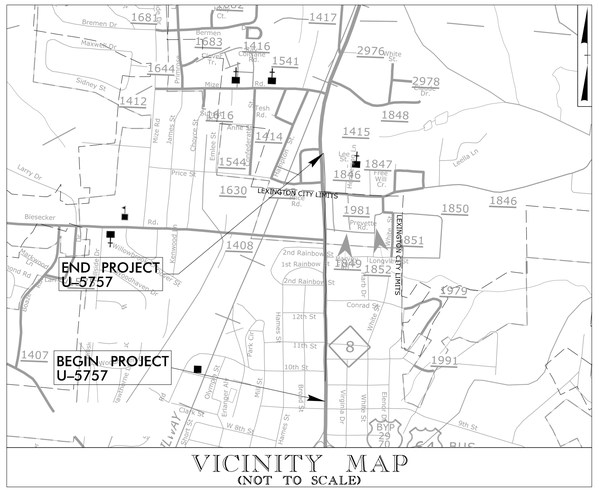
09/08/99

TIP PROJECT: U–5757

CONTRACT: C204941



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

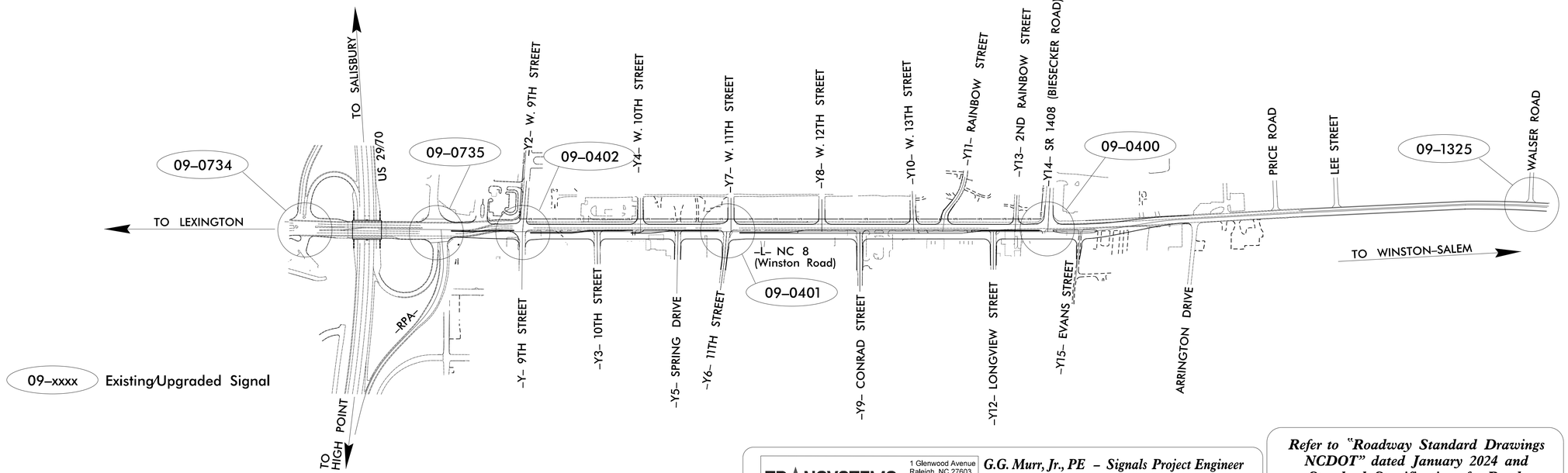
DAVIDSON COUNTY

Project No.	*Sheet No.*
U–5757	*Sig. 1.0*

LOCATION: NC 8 (WINSTON ROAD) FROM US 29/US 70 TO SR 1846 (ARRINGTON DRIVE) IN LEXINGTON

TYPE OF WORK: TRAFFIC SIGNALS

NAD 83/NA 2011



INDEX OF PLANS

SHEET NUMBER	*SIGNAL INV. NUMBER*	*LOCATION /DESCRIPTION*
Sig. 1.0	–	*Title Sheet*
Sig. 2.0 – Sig. 2.1	*09–0734*	*NC 8 (Winston Rd) at US 29 NB/US 64–70 EB Ramp*
Sig. 3.0 – Sig. 5.2	*09–0735*	*NC 8 (Winston Rd) at US 29 SB/US 64–70 WB Ramp*
Sig. 6.0 – Sig. 8.4	*09–0402*	*NC 8 (Winston Rd) at 9th Street*
Sig. 9.0 – Sig. 11.4	*09–0401*	*NC 8 (Winston Rd) at 11th Street*
Sig. 12.0 – Sig. 14.5	*09–0400*	*NC 8 (Winston Rd) at SR 1408 (Biesecker Rd)*
Sig. 15.0 – Sig. 15.2	*09–1325*	*NC 8 (Winston Rd) at SR 1412 (Walser Rd)*
M1A – M9	–	*NCDOT 2024 Metal Pole Standard Drawing Sheets*
SCP1 – SCP4	–	*Signal Communications Plans*

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

G.G. Murr, Jr., PE – Signals Project Engineer
J.T. Rowe, Jr. PE – Electrical Engineer
B.E. Wynn, PE – Signals Design Engineer

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

TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS UNIT

Contacts:

Robert J. Ziemba, P.E. – Central Region Signals Engineer
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Gregg Green – Signal Communications Project Engineer
Heidi Berggren, EI – Signal Communications Design Engineer

Prepared for the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION
Transportation Systems Management & Operations Unit

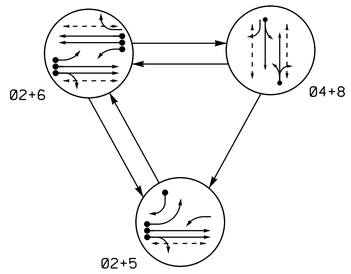
750 N. Greenfield Parkway, Garner, NC 27529

5/10/2024
::\U-5757_Signals_tsh.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 2.0

3 Phase
Fully Actuated
(Lexington NC 8 CLS)
Signal System #: D09-19_Lexington

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

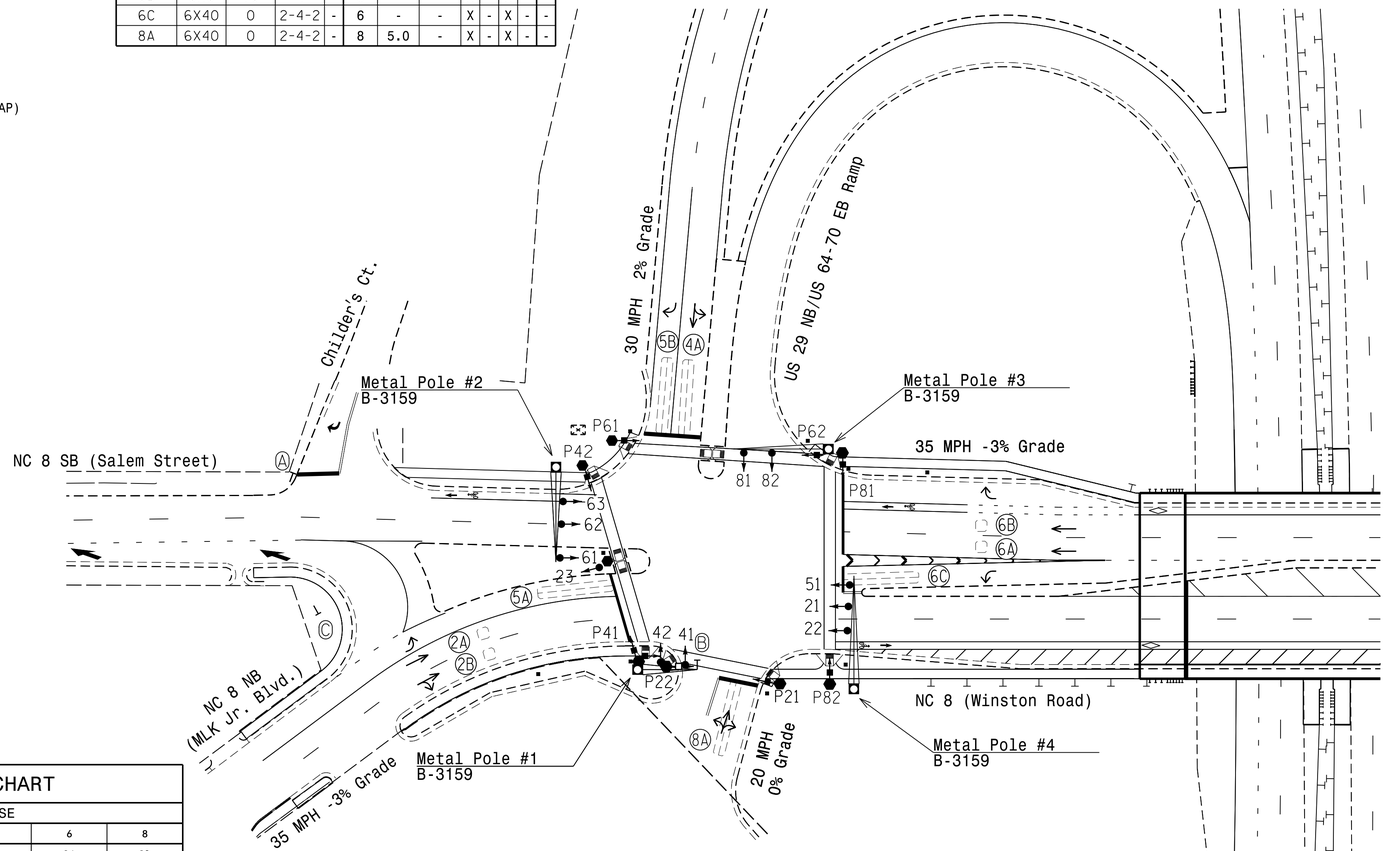
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					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	70	4	-	2	-	-	X	-	X	-	-
2B	6X6	70	4	-	2	-	-	X	-	X	-	-
4A	6X40	0	2-4-2	-	4	-	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15.0	-	X	-	X	-	-
5B	6X40	0	2-4-2	-	5	15.0	-	X	-	X	-	-
6A	6X6	70	4	-	6	-	-	X	-	X	-	-
6B	6X6	70	4	-	6	-	-	X	-	X	-	-
6C	6X40	0	2-4-2	-	6	-	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	5.0	-	X	-	X	-	-

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø2+5	Ø2+6	Ø4+8	FLASH
21, 22, 23	G	G	R	Y
41	R	R	G	R
42	R/←	R	G	R
51	←	F/Y	-R-	-Y-
61	F/Y	F/Y	-R-	-Y-
62, 63	R	G	R	Y
81, 82	R	R	G	R
P21, P22	W	W	DW	DRK
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK



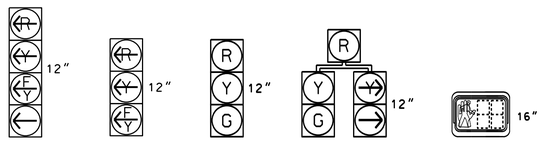
MAXTIME TIMING CHART

FEATURE	PHASE				
	2	4	5	6	8
Walk *	11	12	–	14	13
Ped Clear *	8	18	–	20	20
Min Green	12	7	7	12	7
Passage *	3.0	2.0	2.0	3.0	2.0
Max 1 *	120	25	15	120	25
Yellow Change	4.7	4.5	3.0	4.7	3.7
Red Clear	1.0	1.0	1.4	1.0	1.7
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	4	5	–	7	6
Non Lock Detector	–	X	X	–	X
Vehicle Recall	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	X	–	–	X

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

SIGNAL FACE I.D.

All Heads L.E.D.



51 | 61 | 21, 22, 23, 41, 62, 63, 81, 82 | 42 | P21, P22, P41, P42, P61, P62, P81, P82

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Install new controller in existing cabinet.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Existing "Left Turn Yield on Green" ball sign (R10-12) may be removed at the discretion of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
○~	Signal Pole with Guy	●~
○~	Signal Pole with Sidewalk Guy	●~
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	———
→	Directional Arrow	→
▭	Metal Pole with Mastarm	▭
N/A	Guardrail	⊥⊥
N/A	Directional Drill	—DD—
⊛	Type I Pushbutton Post	⊛
⬡	Type II Signal Pedestal	⬢
N/A	Curb Ramp	◪
Ⓐ	"STOP" Sign (R1-1)	Ⓐ
Ⓑ	"LEFT TURN YIELD ON GREEN" Ball Sign (R10-12)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Rd./MLK Blvd.)
at
US 29 NB/US 64-70 EB Ramp

Division 9 Davidson County Lexington

PLAN DATE: January 2024 REVIEWED BY:

PREPARED BY: I.O. Umozurike REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by: Robert J Ziemba 02/29/2024
SIGNATURE DATE

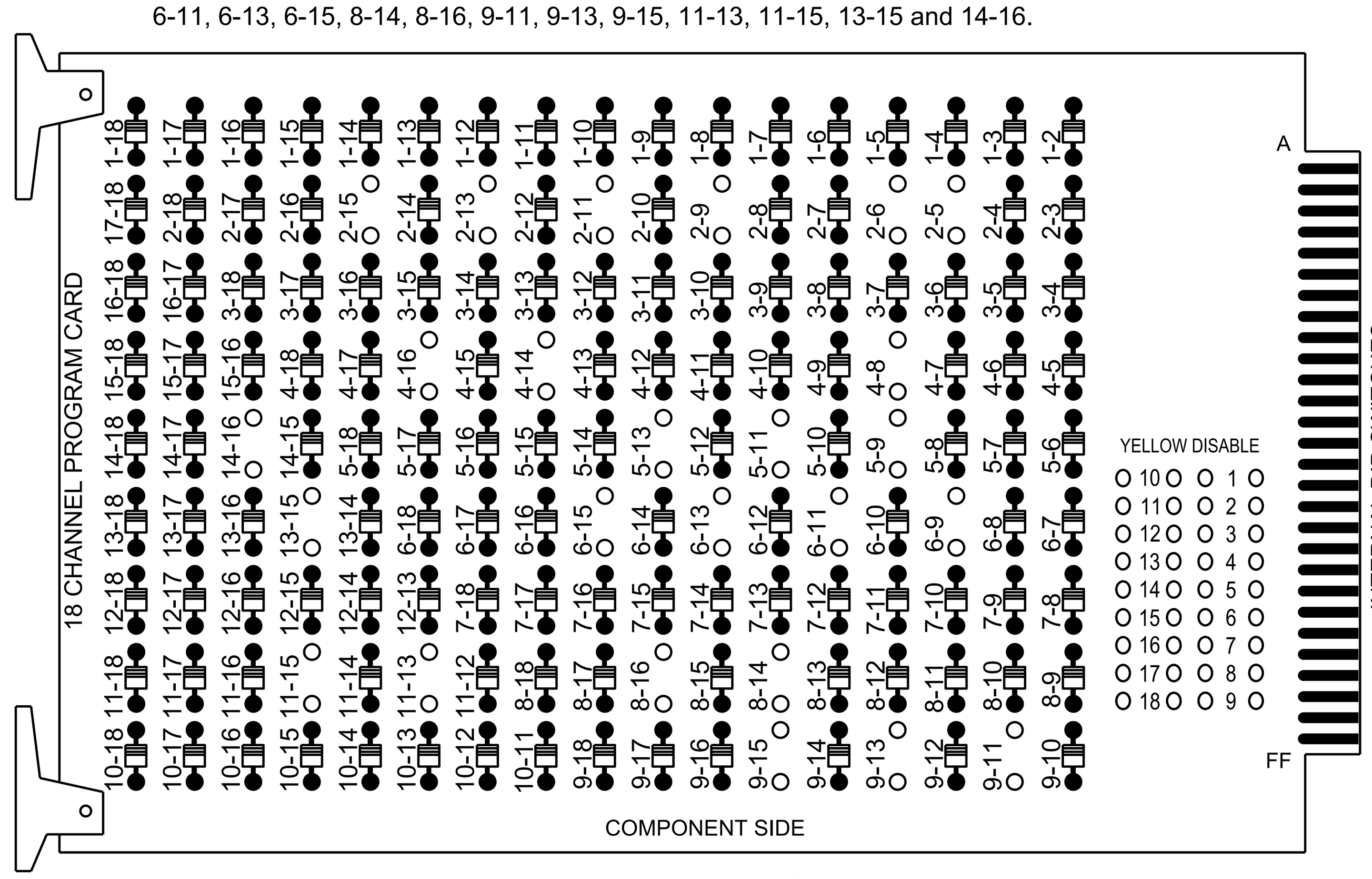
SIG. INVENTORY NO. 09-0734

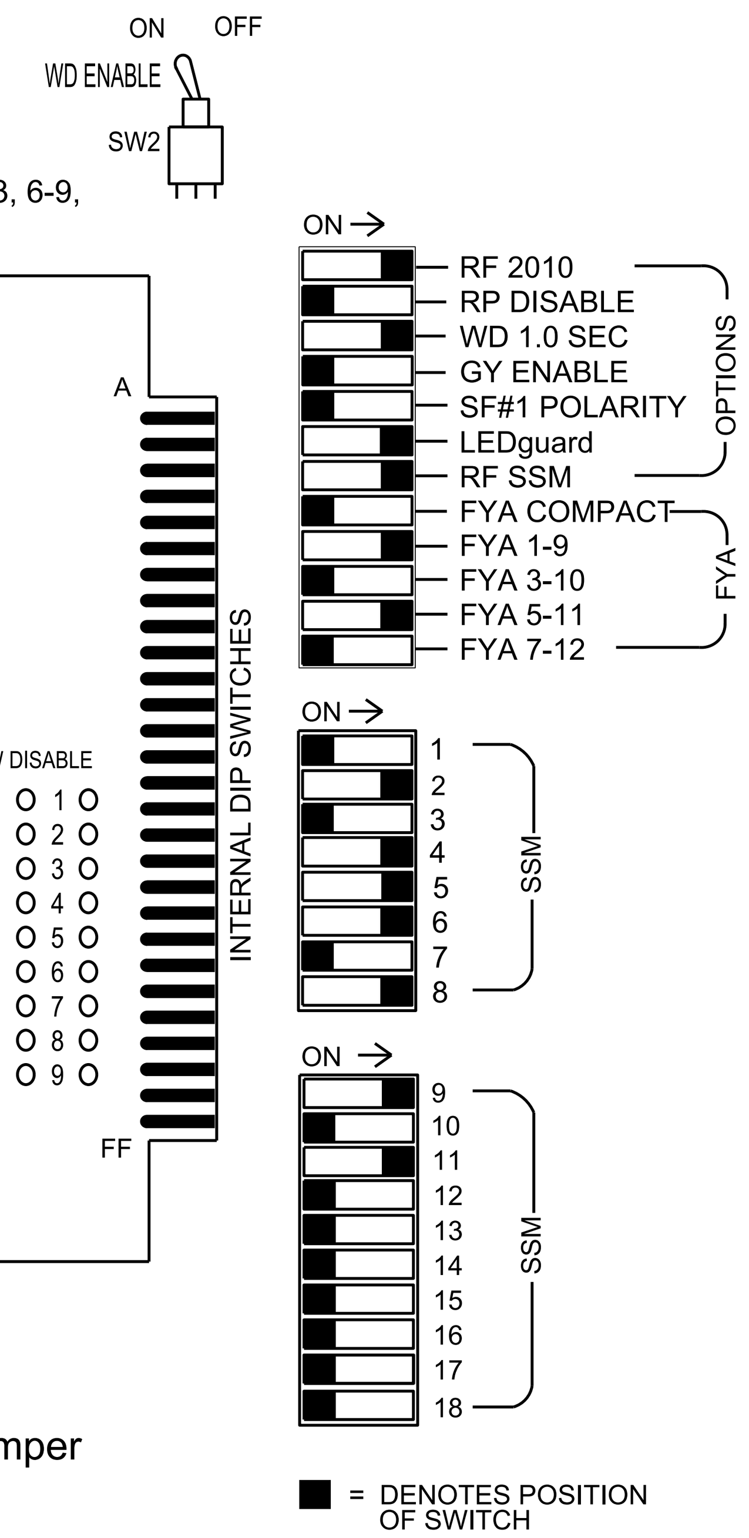
01 MAR-2024 14:44
S:\TTSSIGMATS Signals\Signal Design Section\Central Region\Div 9\U-5757\090734_sig_dsn_2024mmdd.dgn
rziemba

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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





REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that 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.

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 phases 4 and 8 for Dual Entry.
3. Program phases 4 and 8 for Simultaneous Start.
4. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the Lexington NC 8 CLS. Signal System #: D09-19_Lexington

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, S3, S5, S6, S7, S8, S9, S11, S12, AUX S1, AUX S4
Phases Used.......................................2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	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, 23	P21, P22	NU	41,42	P41, P42	51★	42	62,63	P61, P62	NU	81,82	P81, P82	61★	NU	NU	51★	NU	NU
RED		128			101		*		134			107							
YELLOW		129			102				135			108							
GREEN		130			103				136			109							
RED ARROW														A121			A114		
YELLOW ARROW								132						A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW							133	133											
(Don't Walk)			113			104				119			110						
(Walk)			115			106				121			112						

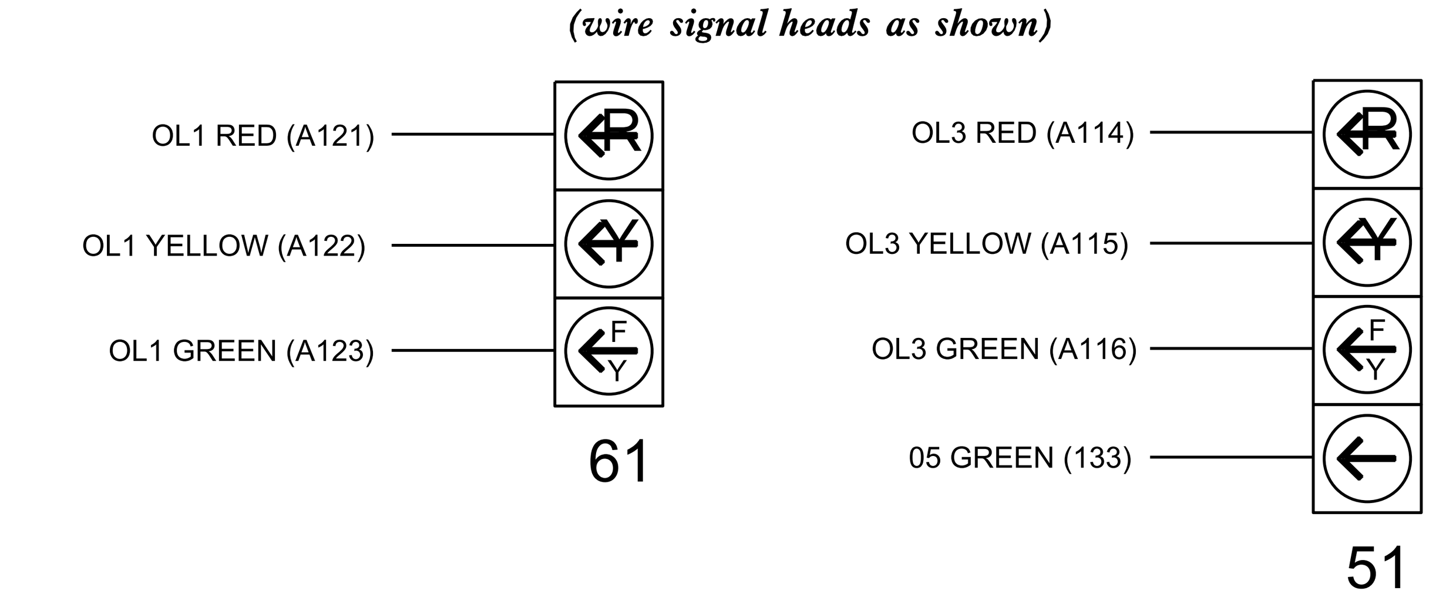
NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

! If present, remove jumper from J1W to I4-W on rear of input file.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X		X	
2B	TB2-7,8	I2L	43	5	3	2			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
5A	TB3-1,2	J1U	55	17	15	5	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
6B	TB3-7,8	J2L	44	6	17	6			X		X	
6C	TB3-9,10	J3U	64	30	18	6			X		X	
8A	TB5-9,10	J6U	42	4	22	8	5.0		X		X	
5B	TB7-9,10	J9U	59	21	27	5	15.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

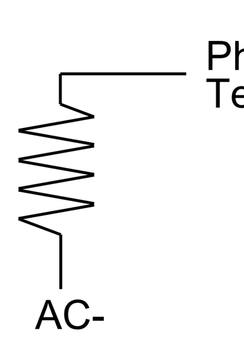
Overlap Plan 1

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0734
DESIGNED: January 2024
SEALED: 02/29/2024
REVISED: N/A

Electrical Detail

Electrical and Programming Details For:

NC 8 (Winston Rd./MLK Blvd.)
at
US 29 NB/US 64-70 EB Ramp

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

Division 9 Davidson County Lexington

PLAN DATE: February 2024 REVIEWED BY:
PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 03/01/2024
430320FAA2654C3...
DATE

SIG. INVENTORY NO. 09-0734

29-FEB-2024 14:47
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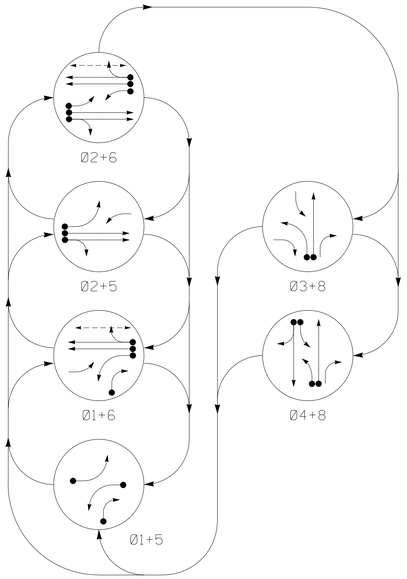
sgkirkpatrick

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 3.0

6 Phase Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19_Lexington

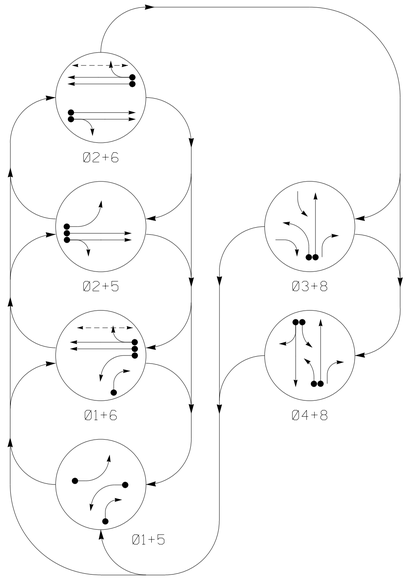
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
11	←	←	F Y	F Y	~~R~~	~~R~~	~~Y~~
21	R	R	G	G	R	R	Y
22	R	R	G	G	R / →	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	F Y	~~R~~
41	~~R~~	~~R~~	~~R~~	~~R~~	F Y	F Y	~~R~~
42,43	R	R	R	R	R	G	R
51	←	F Y	←	F Y	~~R~~	~~R~~	~~Y~~
61,62	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82	R / →	R / →	R	R	G	G	R
P61,P62	DW	W	DW	W	DW	DW	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
21	R	R	G	G	R	R	Y
22	R	R	G	G	R / →	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	F Y	~~R~~
41	~~R~~	~~R~~	~~R~~	~~R~~	F Y	F Y	~~R~~
42,43	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~Y~~
61,62	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82	R / →	R / →	R	R	G	G	R
P61,P62	DW	W	DW	W	DW	DW	DRK

PHASING DIAGRAM DETECTION LEGEND

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

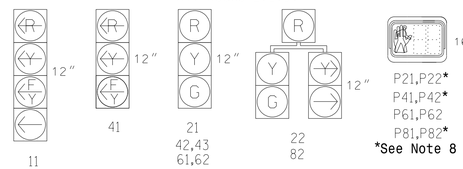
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					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
1A	6X40	0	2-4-2	-	1	15.0**	-	X	-	X	-	-
					6#	-	-	X	-	X	-	-
1B	6X40	0	2-4-2	-	1	15.0	-	X	-	X	-	-
2A,2B	6X6	70	4	-	2	-	-	X	-	X	-	-
3A	6X40	0	2-4-2	-	3	15.0	-	X	-	X	-	-
					8	-	-	X	-	X	-	-
4A	6X40	0	2-4-2	-	4	3.0	-	X	-	X	-	-
4B	6X40	0	2-4-2	-	4	10.0	-	X	-	X	-	-
4C	6X6	0	4	-	4	15.0	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15.0**	-	X	-	X	-	-
					2#	-	-	X	-	X	-	-
6A,6B	6X6	70	4	-	6	-	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	-	-	X	-	X	-	-

**Disable delay during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	8
Walk *	–	–	–	–	–	13	–
Ped Clear *	–	–	–	–	–	31	–
Min Green *	7	10	7	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	2.0	3.0	2.0
Max 1 *	20	50	20	25	15	50	25
Yellow Change	3.0	4.1	3.0	3.5	3.0	4.1	3.5
Red Clear	3.3	3.0	3.7	3.9	2.9	3.0	3.9
Added Initial *	–	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	6	–
Non Lock Detector	X	–	X	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–
Dual Entry	–	–	–	X	–	–	X

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

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or Phase 5 may be lagged.
4. Phase 3 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Due to sidewalk closures during TMP I, disconnect and bag Pedestrian Heads P21, P22, P41, P42, P81 & P82 during this phase of construction.
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.
11. Reposition signal head number 31.
12. Pavement markings are existing.
13. Install new controller in existing cabinet.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Metal Pole with Mastarm	
	Directional Arrow	
	Construction Zone	N/A
	Type I Pushbutton Post	
	Type II Signal Pedestal	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

Signal Upgrade - Temporary Design 1(TMP Phase I)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Road)
at
US 29 SB/US 64-70 WB Ramp

Division 9 Davidson County Lexington

PLAN DATE:	May 2024	REVIEWED BY:	G.G. Murr, Jr.
PREPARED BY:	B.E. Wynn	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER
EUGENE G. MURR, JR.

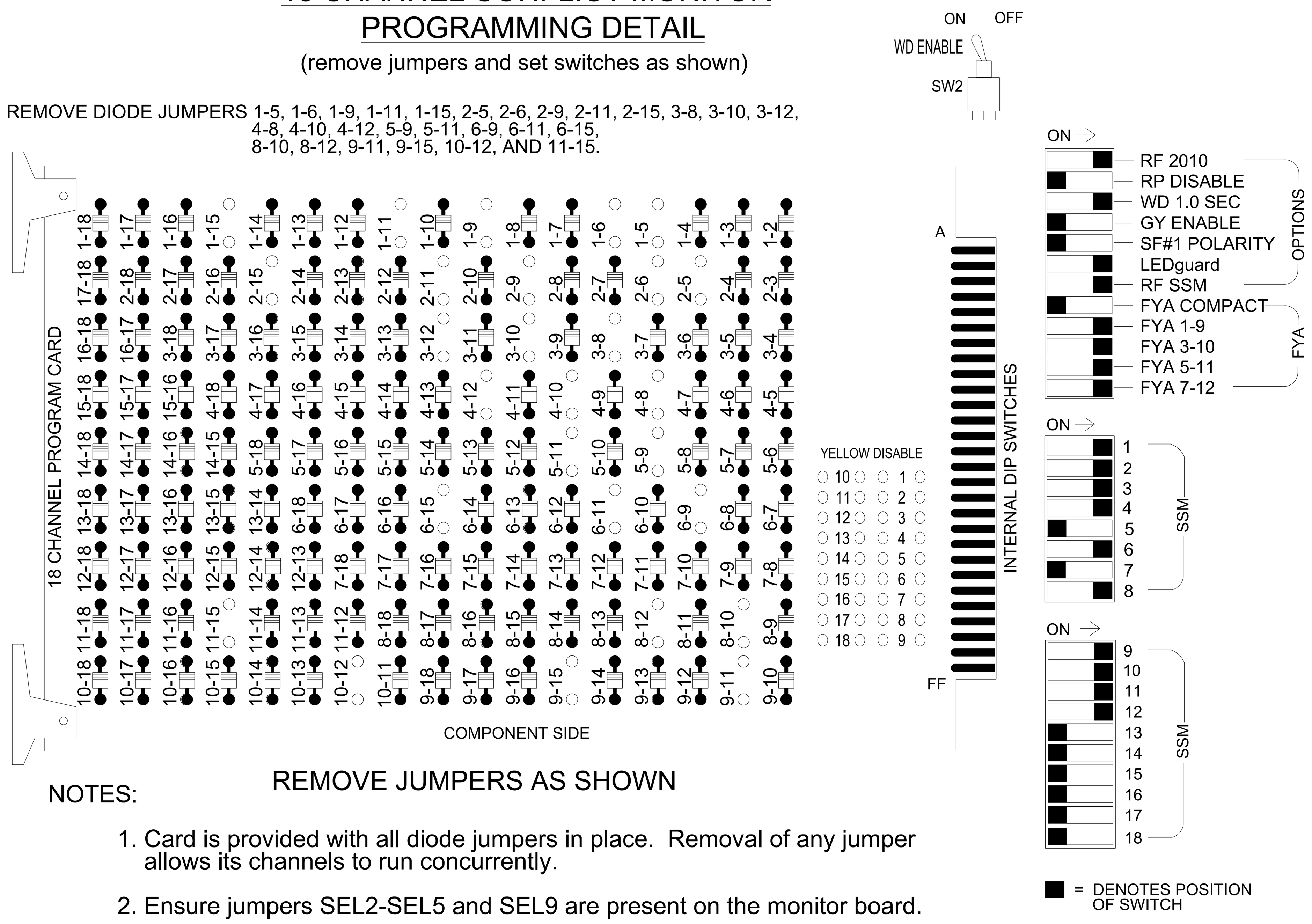
SIG. INVENTORY NO. 09-07351

5/9/2024
...\09-07351_sig_dsn_2022xxxx.dgn
USER:default

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-15, 3-8, 3-10, 3-12, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 6-15, 8-10, 8-12, 9-11, 9-15, 10-12, AND 11-15.



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 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.

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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S4, S5, S7, S8, S9, S11, AUX S1, AUX S2, AUX S4, AUX S5
Phases Used.......................................1, 2, 3, 4, 5, 6, 6 PED, 8
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..*

*See overlap programming detail on sheet 2

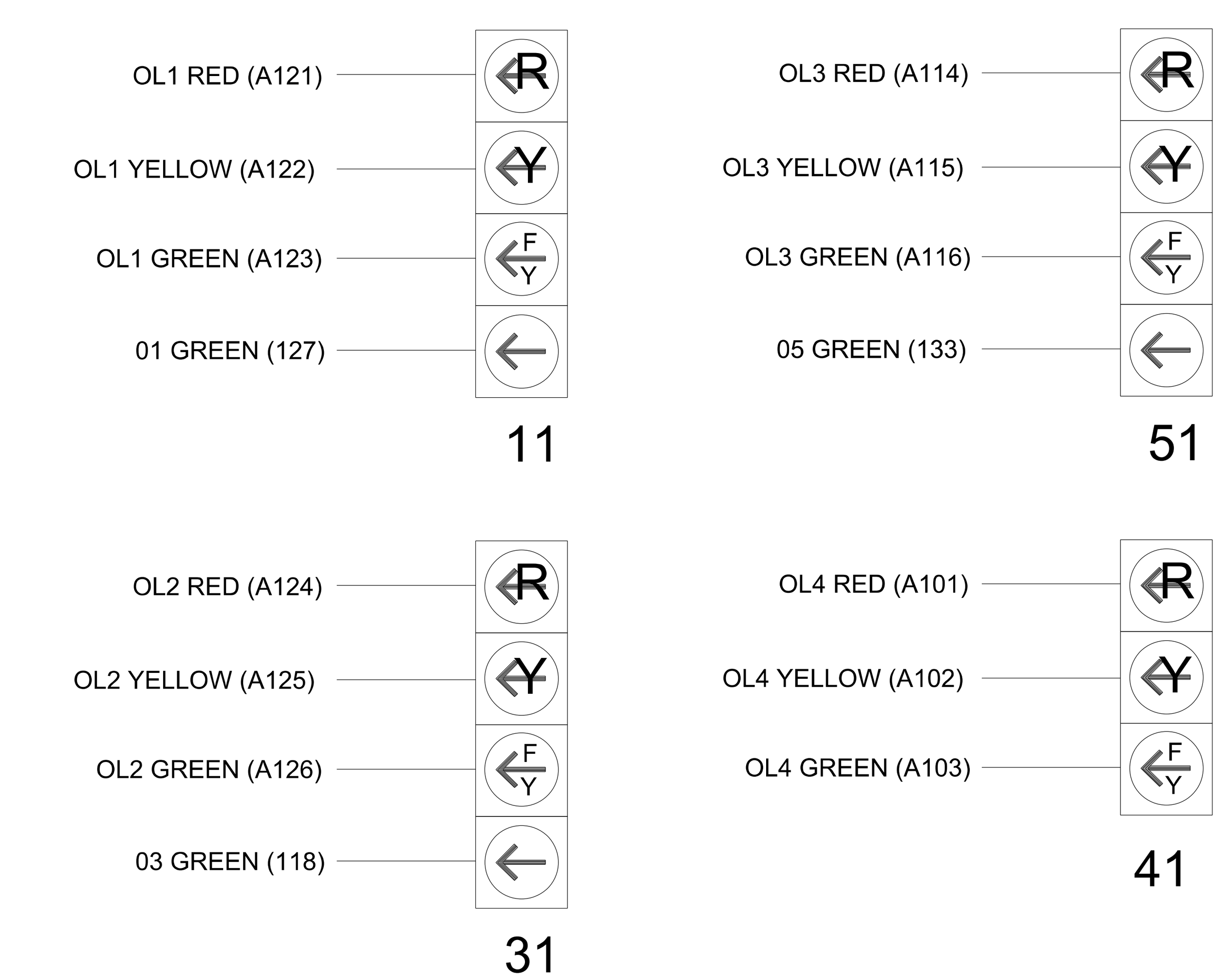
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	82	11★	21,22	NU	22	31★	42,43	NU	51★	61,62	P61, P62	NU	81,82	NU	11★	31★	NU	51★	41★	NU
RED		*	128			*	101			134			107							
YELLOW			129				102		*	135			108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW	126				117										A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133											
(hand)											119									
(walk)											121									

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	ø1 1A	ø1 1B	SLOT EMPTY	SLOT EMPTY	ø3 3A	ø4 4A	ø4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø6 PED DC ISOLATOR	FS DC ISOLATOR
"I"	L	NOT USED	ø2 2A,2B			NOT USED	ø4 4B	NOT USED						NOT USED	ST DC ISOLATOR
"J"	U	ø5 5A	ø6 6A,6B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L	NOT USED	NOT USED				NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

Note:
If present, remove jumpers from I1-W to J4-W, I5-W to J8-W, and J1-W to I4-W on rear of Input File.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0	---	X	_	X	_
				-	29 ★	6	---	---	X	_	X	_
1B	TB2-5,6	I2U	39	1	2	1	15.0	---	X	_	X	_
2A,2B	TB2-7,8	I2L	43	5	3	2	---	---	X	_	X	_
3A	TB4-5,6	I5U	58	20	7	3	15.0	---	X	_	X	_
				-	30	8	---	---	X	_	X	_
4A	TB4-9,10	I6U	41	3	8	4	3.0	---	X	_	X	_
4B	TB4-11,12	I6L	45	7	9	4	10.0	---	X	_	X	_
4C	TB6-1,2	I7U	65	31	10	4	15.0	---	X	_	X	_
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0	---	X	_	X	_
				-	31 ★	2	---	---	X	_	X	_
6A,6B	TB3-5,6	J2U	40	2	16	6	---	---	X	_	X	_
8A	TB5-9,10	J6U	42	4	22	8	---	---	X	_	X	_
PED PUSH BUTTONS												
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

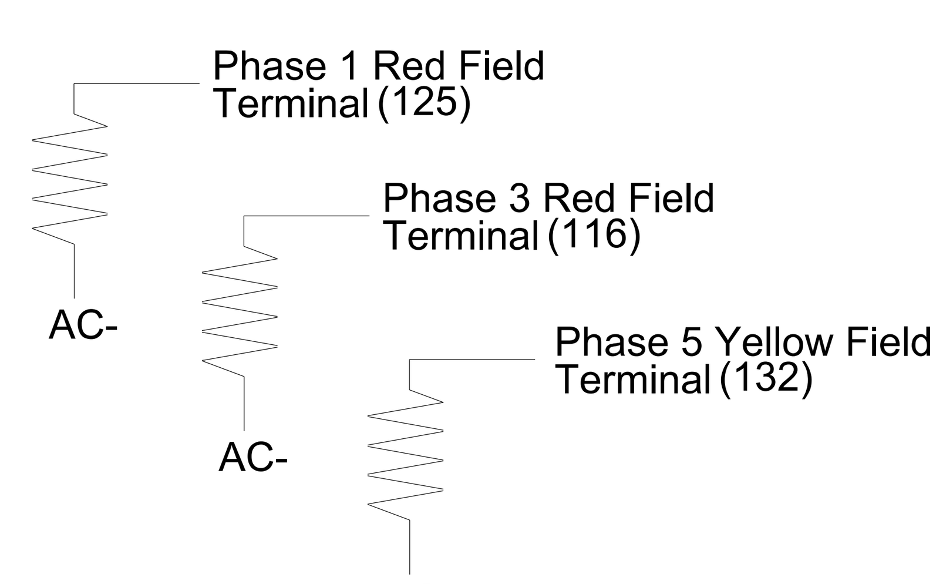
INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0735T1
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

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Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

NC 8 (Winston Road)
at
US 29 SB / US 64-70 WB Ramp

Division 9 Davidson County Lexington

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

PLAN DATE:	May 2024	REVIEWED BY:	
PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR.

DATE

SIG. INVENTORY NO. 09-0735T1

5/9/2024
...*090735T1_sm_ele_2024xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.3.2

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	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	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	4	-	8
Modifier Phases	1	3	5	
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE REMOVED INCLUDED PHASES

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.

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0735T1
DESIGNED: March 2024
SEALED: 05-09-2024
REVISED: N/A

Electrical and Programming Details For:

NC 8 (Winston Road)
at
US 29 SB / US 64-70 WB Ramp

Division 9 | Davidson County | Lexington

PLAN DATE: May 2024 | REVIEWED BY:
PREPARED BY: J.T. Rowe | REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

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

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SEAL
NORTH CAROLINA PROFESSIONAL
SEAL 008453
ENGINEER
JOHN T. ROWE IV

DATE

SIG. INVENTORY NO. 09-0735T1

5/9/2024
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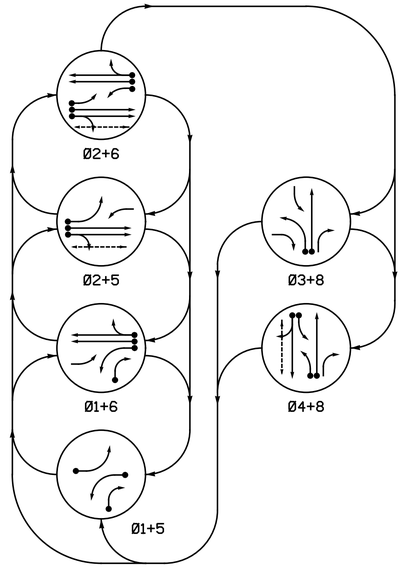
USER:default

DELAULT PHASING DIAGRAM



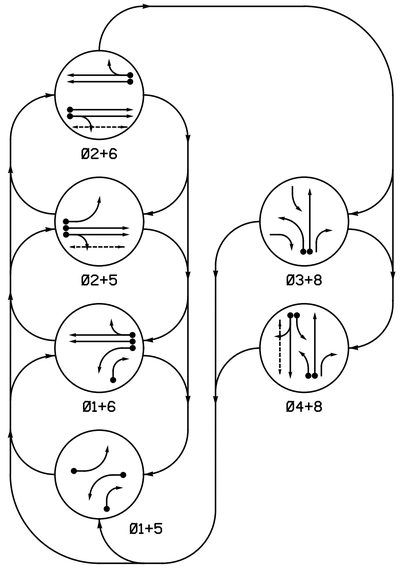
PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+8	04+8	FLASH
11	~~←~~	~~←~~	~~F Y~~	~~F Y~~	~~R~~	~~R~~	~~Y~~
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/~~R~~	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~F Y~~	~~R~~
41	~~R~~	~~R~~	~~R~~	~~R~~	~~F Y~~	~~F Y~~	~~R~~
42,43	R	R	R	R	R	G	R
51	~~←~~	~~F Y~~	~~←~~	~~F Y~~	~~R~~	~~R~~	~~Y~~
61,62	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82	R/~~R~~	R/~~R~~	R	R	G	G	R
P21,P22	DW	DW	W	W	DW	DW	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+8	04+8	FLASH
11	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/~~R~~	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~F Y~~	~~R~~
41	~~R~~	~~R~~	~~R~~	~~R~~	~~F Y~~	~~F Y~~	~~R~~
42,43	R	R	R	R	R	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~Y~~
61,62	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82	R/~~R~~	R/~~R~~	R	R	G	G	R
P21,P22	DW	DW	W	W	DW	DW	DRK

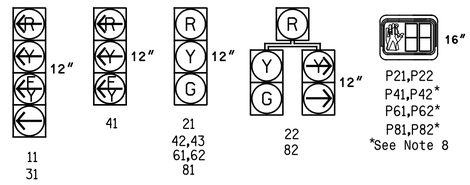
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR: LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP/ZONE	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A*	6X40	0	*	*	1	15.0**	-	X	-	X	-	-
					6#	-	-	X	-	X	-	-
1B	6X40	0	2-4-2	-	1	15.0	-	X	-	X	-	-
2A,2B	6X6	70	4	-	2	-	-	X	-	X	-	-
3A	6X40	0	2-4-2	-	3	15.0	-	X	-	X	-	-
					8	-	-	X	-	X	-	-
4A	6X40	0	2-4-2	-	4	3.0	-	X	-	X	-	-
4B	6X40	0	2-4-2	-	4	10.0	-	X	-	X	-	-
4C	6X6	0	4	-	4	15.0	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15.0**	-	X	-	X	-	-
					2#	-	-	X	-	X	-	-
6A*	6X6	70	*	*	6	-	-	X	-	X	-	-
6B*	6X6	70	*	*	6	-	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	-	-	X	-	X	-	-

*Video Detection Zone
**Disable delay during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	8
Walk *	–	13	–	–	–	–	–
Ped Clear *	–	25	–	–	–	–	–
Min Green *	7	10	7	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	2.0	3.0	2.0
Max 1 *	20	50	20	25	15	50	25
Yellow Change	3.0	4.1	3.0	3.6	3.0	4.1	3.6
Red Clear	3.3	3.0	2.0	3.9	2.9	3.0	3.9
Added Initial *	–	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–	–
Advance Walk	–	6	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–
Dual Entry	–	–	–	X	–	–	X

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

6 Phase
Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19_Lexington

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 4.0

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or Phase 5 may be lagged.
4. Phase 3 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Due to sidewalk closures during TMP II, disconnect and bag Pedestrian Heads P41, P42, P61, P62, P81 & P82 during this phase of construction.
9. The Division Traffic Engineer will determine the hours of use for each phasing plan.
10. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Video Detection Zone	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
	Metal Pole with Mastarm	
N/A	Right of Way	
	Directional Arrow	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

Signal Upgrade - Temporary Design 2(TMP Phase II)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

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

NC 8 (Winston Road)
at
US 29 SB/US 64-70 WB Ramp

Division 9 Davidson County Lexington

PLAN DATE:	May 2024	REVIEWED BY:	G.G. Murr, Jr.
PREPARED BY:	B.E. Wynn	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. 9/10/2024
SIGNATURE DATE

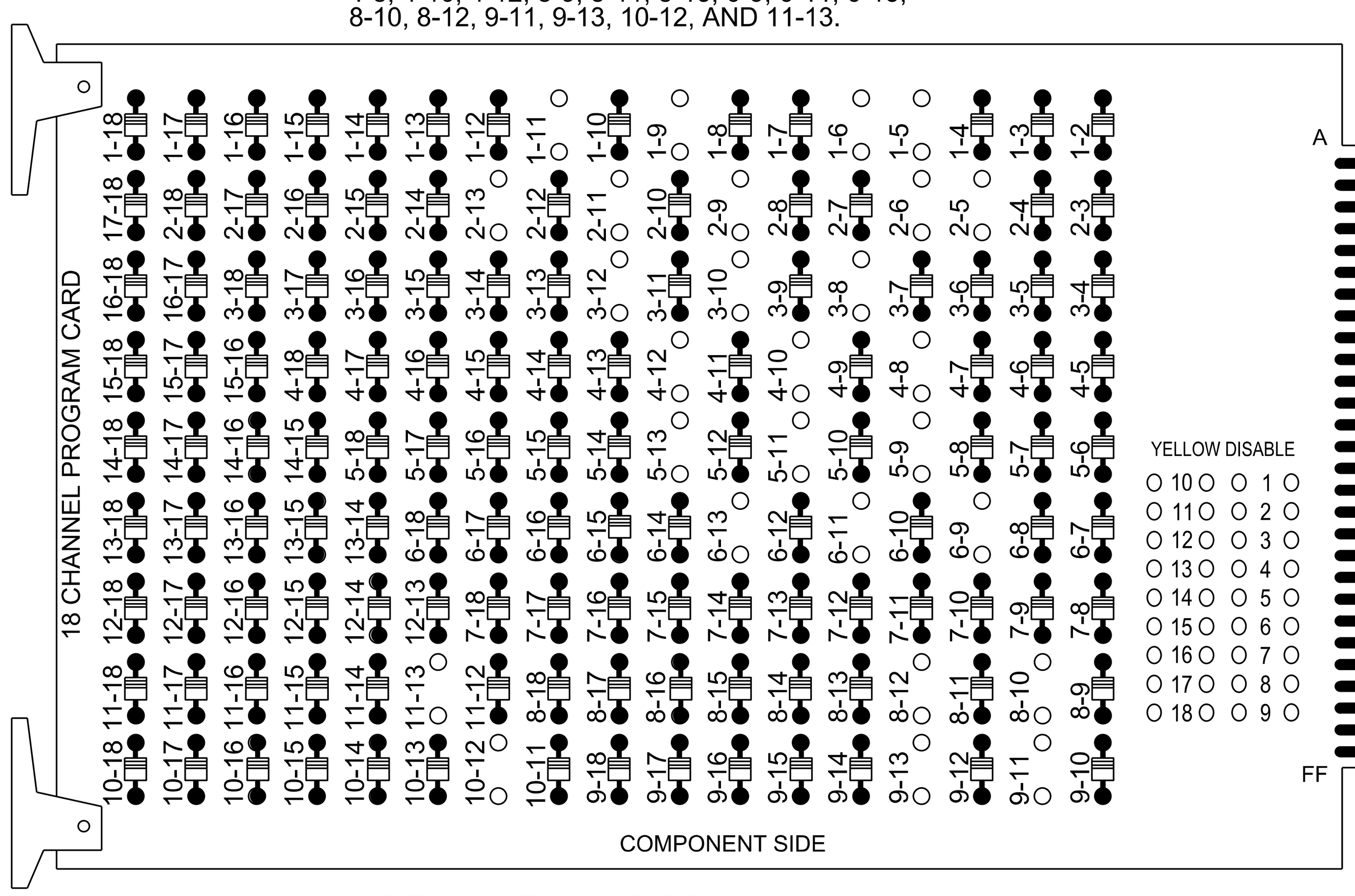
SIG. INVENTORY NO. 09-0735T2

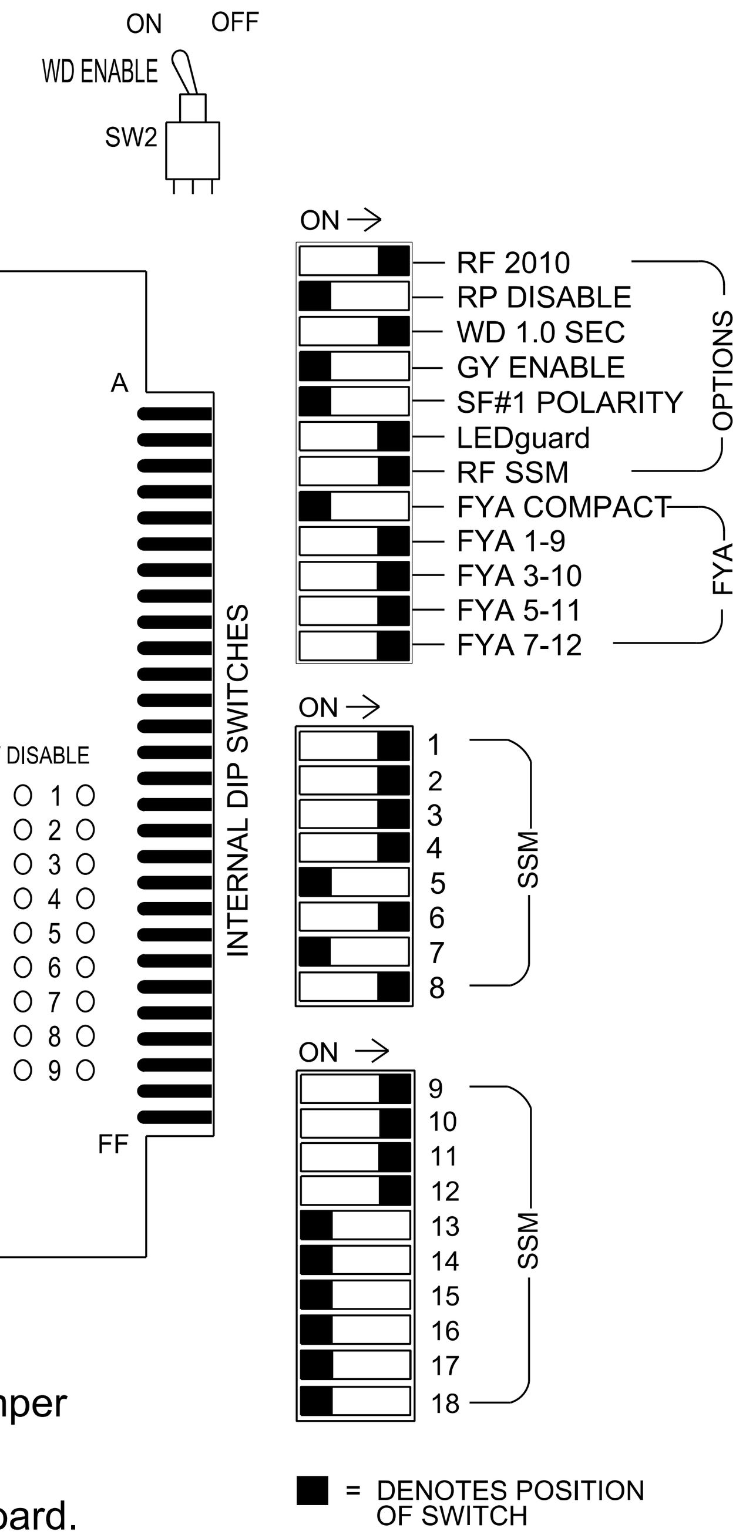
PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.4.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 3-8, 3-10, 3-12, 4-8, 4-10, 4-12, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 8-10, 8-12, 9-11, 9-13, 10-12, AND 11-13.





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 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.

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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S3, S4, S5, S7, S8, S11, AUX S1, AUX S2, AUX S4, AUX S5
Phases Used..1, 2, 2 PED, 3, 4, 5, 6, 8
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..*

*See overlap programming detail on sheet 2

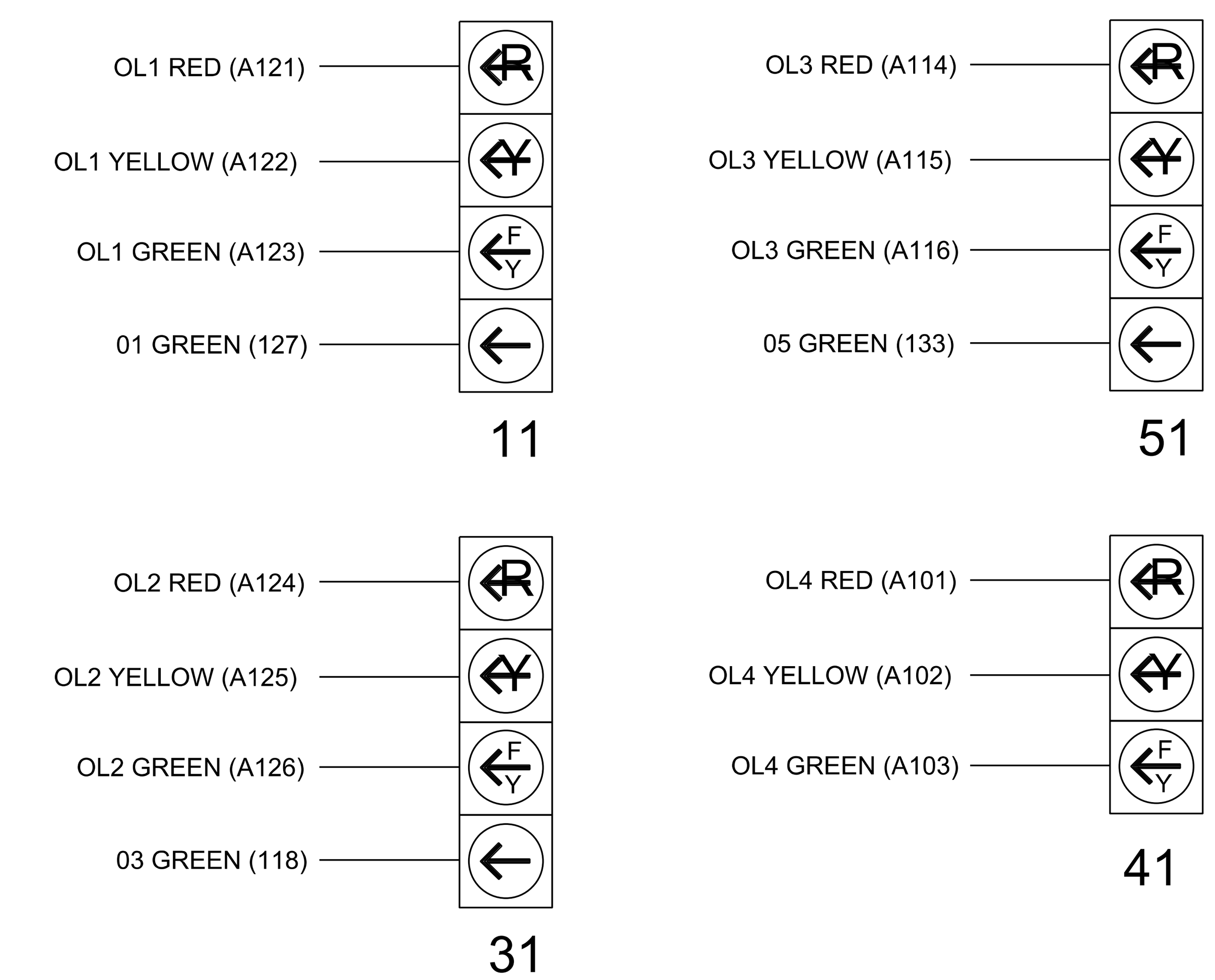
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	82	11★	21,22	P21, P22	22	31★	42,43	NU	51★	61,62	NU	NU	81,82	NU	11★	31★	NU	51★	41★	NU
RED		*	128			*	101			134			107							
YELLOW			129				102		*	135			108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW	126				117										A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133											
(hand)				113																
(walking person)				115																

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1B	TB2-5,6	I2U	39	1	2	1	15.0	---	X	-	X	-
2A,2B	TB2-7,8	I2L	43	5	3	2	---	---	X	-	X	-
3A	TB4-5,6	I5U	58	20	7	3	15.0	---	X	-	X	-
				-	30	8	---	---	X	-	X	-
4A	TB4-9,10	I6U	41	3	8	4	3.0	---	X	-	X	-
4B	TB4-11,12	I6L	45	7	9	4	10.0	---	X	-	X	-
4C	TB6-1,2	I7U	65	31	10	4	15.0	---	X	-	X	-
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0	---	X	-	X	-
				-	31 ★	2	---	---	X	-	X	-
8A	TB5-9,10	J6U	42	4	22	8	---	---	X	-	X	-
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

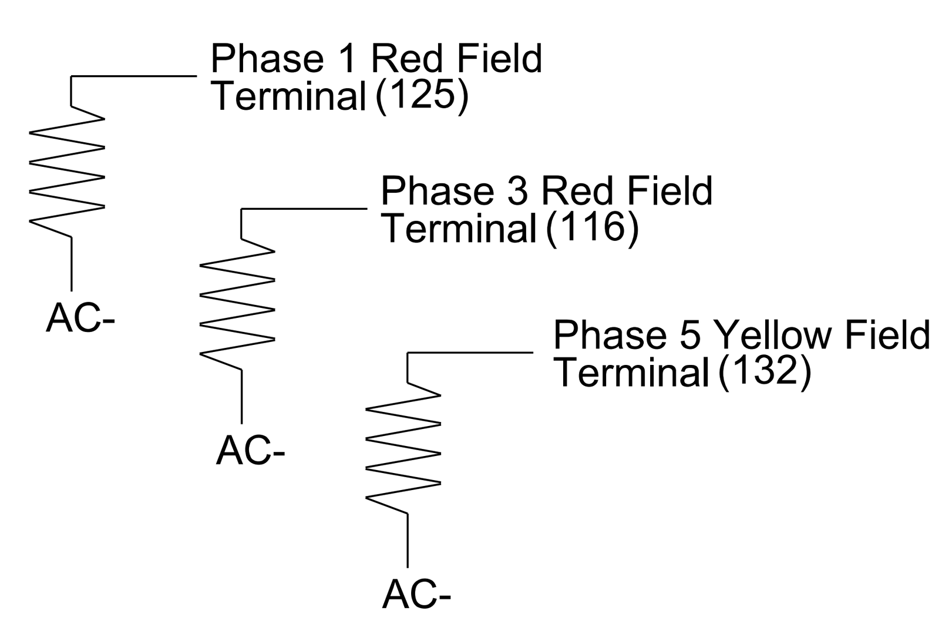
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection in zones 1A, 6A, and 6B. 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 zone 1A, inputs associated with the typical NCDOT installation slots are compatible with time of day instructions located on sheet 2.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0735T2
DESIGNED: May 2024
SEALED: 09-10-2024
REVISED: N/A

Electrical Detail - Sheet 1 of 2

TRANSYSTEMS
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License: F-0453

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

NC 8 (Winston Road)
at
US 29 SB / US 64-70 WB Ramp

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY:
PREPARED BY: J.T. Rowe REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr.
24D2C3BC04724A5...
09/10/2024
DATE

SIG. INVENTORY NO. 09-0735T2

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	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	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	4	-	8
Modifier Phases	1	3	5	
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE REMOVED INCLUDED PHASES

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.

Note: If Loop 1A is detected using the Vehicle Detectors shown in the charts below, use the steps shown below. If different Vehicle Detectors are used, substitute the appropriate Vehicle Detector numbers for the ones shown below.

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0735T2
DESIGNED: May 2024
SEALED: 09-10-2024
REVISED: N/A

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

Electrical Detail Sheet 2 of 2

Electrical and Programming Details For:

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

NC 8 (Winston Road)
at
US 29 SB / US 64-70 WB Ramp

Division 9 | Davidson County | Lexington

PLAN DATE: May 2024 | REVIEWED BY:
PREPARED BY: J.T. Rowe | REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR.

Signed by: John T. Rowe, Jr.
24D2C3BC04724A5...
09/10/2024
DATE

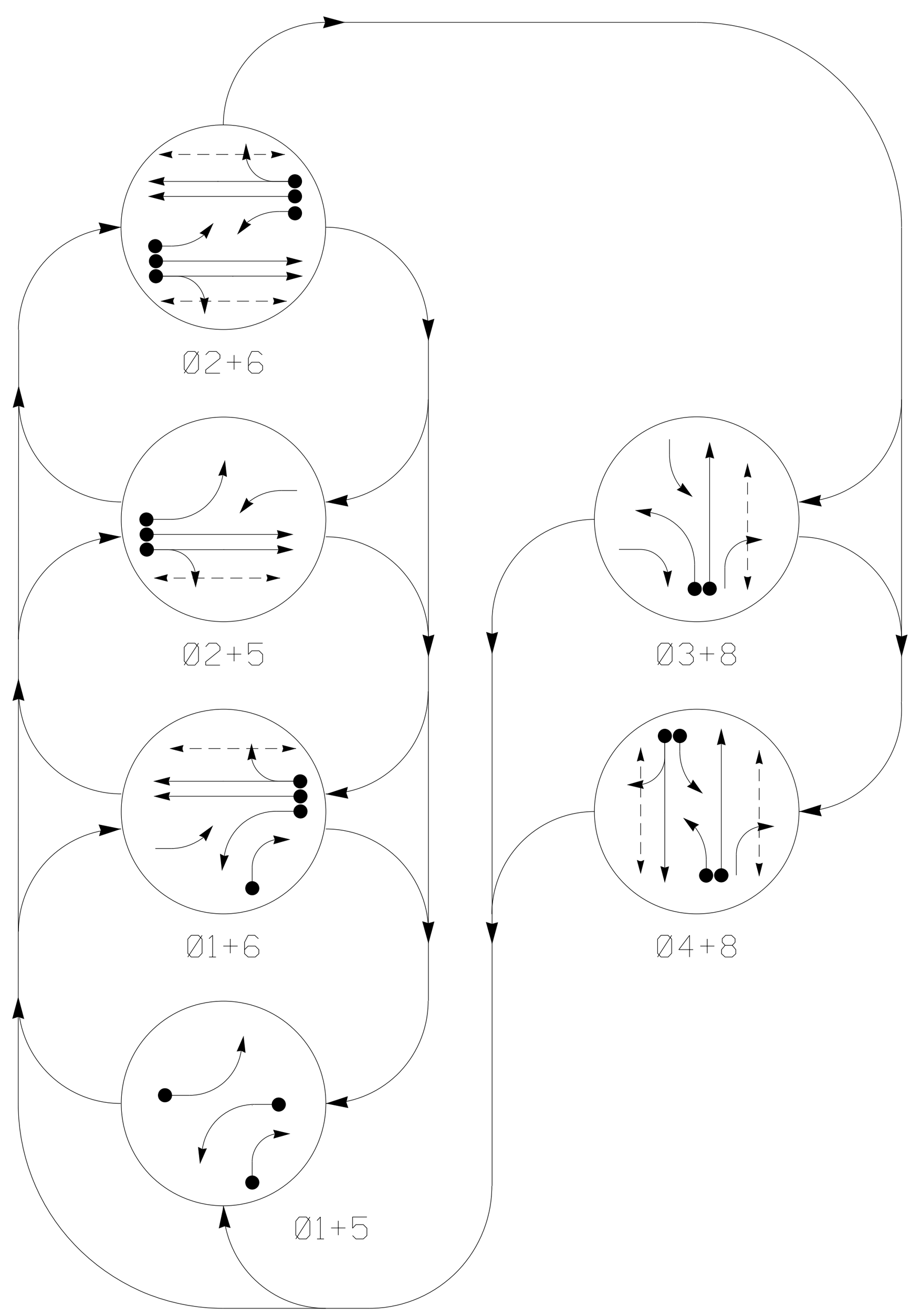
SIG. INVENTORY NO. 09-0735T2

9/10/2024
...*090735T2_sm_ele_2024xxyy.dgn
USER:default

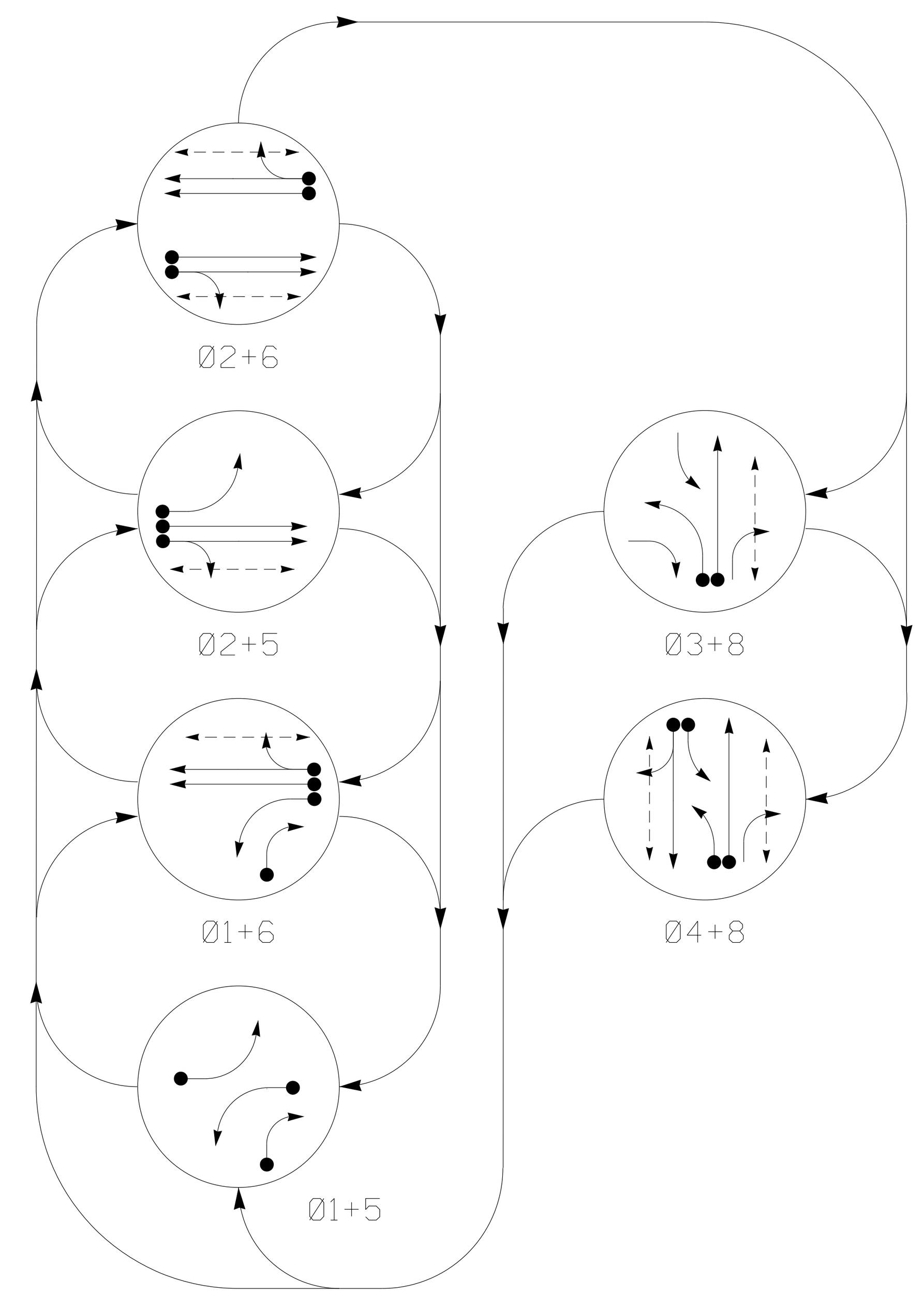
PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 5.0

6 Phase
Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19 Lexington

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
11	←	←	←F/Y	←F/Y	←R	←R	←Y
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/→	R	Y
31	←R	←R	←R	←R	←	←F/Y	←R
41	←R	←R	←R	←R	←F/Y	←F/Y	←R
42,43	R	R	R	R	R	G	R
51	←	←F/Y	←	←F/Y	←R	←R	←Y
61,62	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82	R/→	R/→	R	R	G	G	R
P21,P22	DW	DW	W	W	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK
P81,P82	DW	DW	DW	DW	W	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
11	←	←	←R	←R	←R	←R	←Y
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/→	R	Y
31	←R	←R	←R	←R	←	←F/Y	←R
41	←R	←R	←R	←R	←F/Y	←F/Y	←R
42,43	R	R	R	R	R	G	R
51	←	←R	←	←R	←R	←R	←Y
61,62	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82	R/→	R/→	R	R	G	G	R
P21,P22	DW	DW	W	W	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK
P81,P82	DW	DW	DW	DW	W	W	DRK

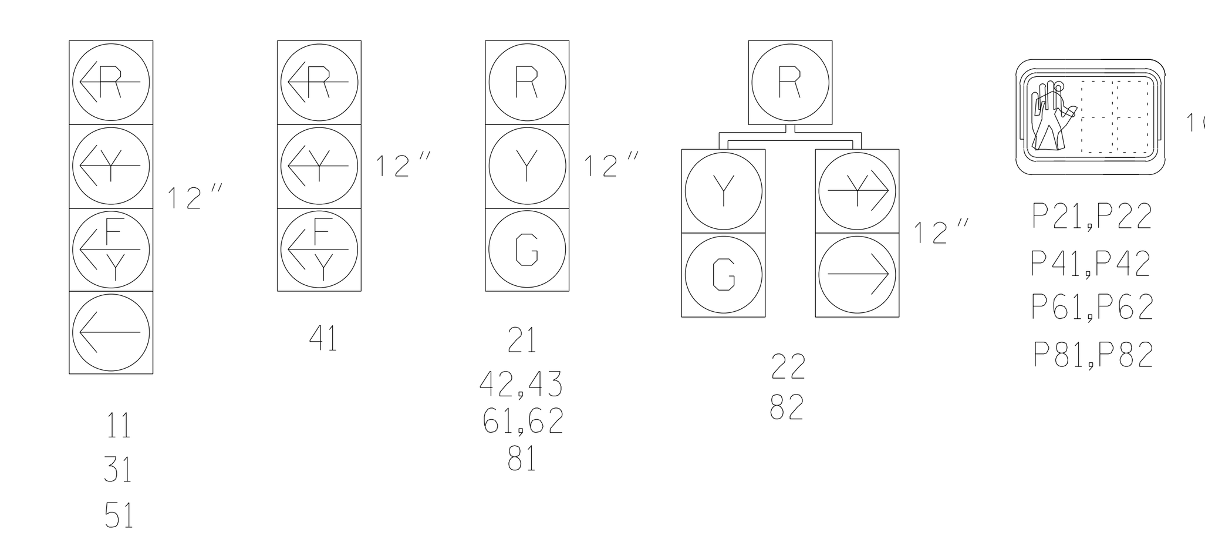
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP/ZONE	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1	15.0**	-	X	-	X	-	-
					6#	3.0	-	X	-	X	X	-
1B	6X40	0	2-4-2	-	1	15.0	-	X	-	X	-	-
2A	6X6	200	*	*	2	-	-	X	X	X	-	-
2B	6X6	200	*	*	2	-	-	X	X	X	-	-
3A	6X40	0	2-4-2	-	3	15.0	-	X	-	X	-	-
					8	-	-	X	-	X	-	-
4A	6X40	0	2-4-2	-	4	3.0	-	X	-	X	-	-
4B	6X40	0	2-4-2	-	4	10.0	-	X	-	X	-	-
4C	6X6	0	4	-	4	15.0	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15.0**	-	X	-	X	-	-
					2#	3.0	-	X	-	X	X	-
6A	6X6	200	4	X	6	-	-	X	X	X	-	-
6B	6X6	200	4	X	6	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	-	8	-	-	X	-	X	-	-

*Video Detection Zone
**Disable delay during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

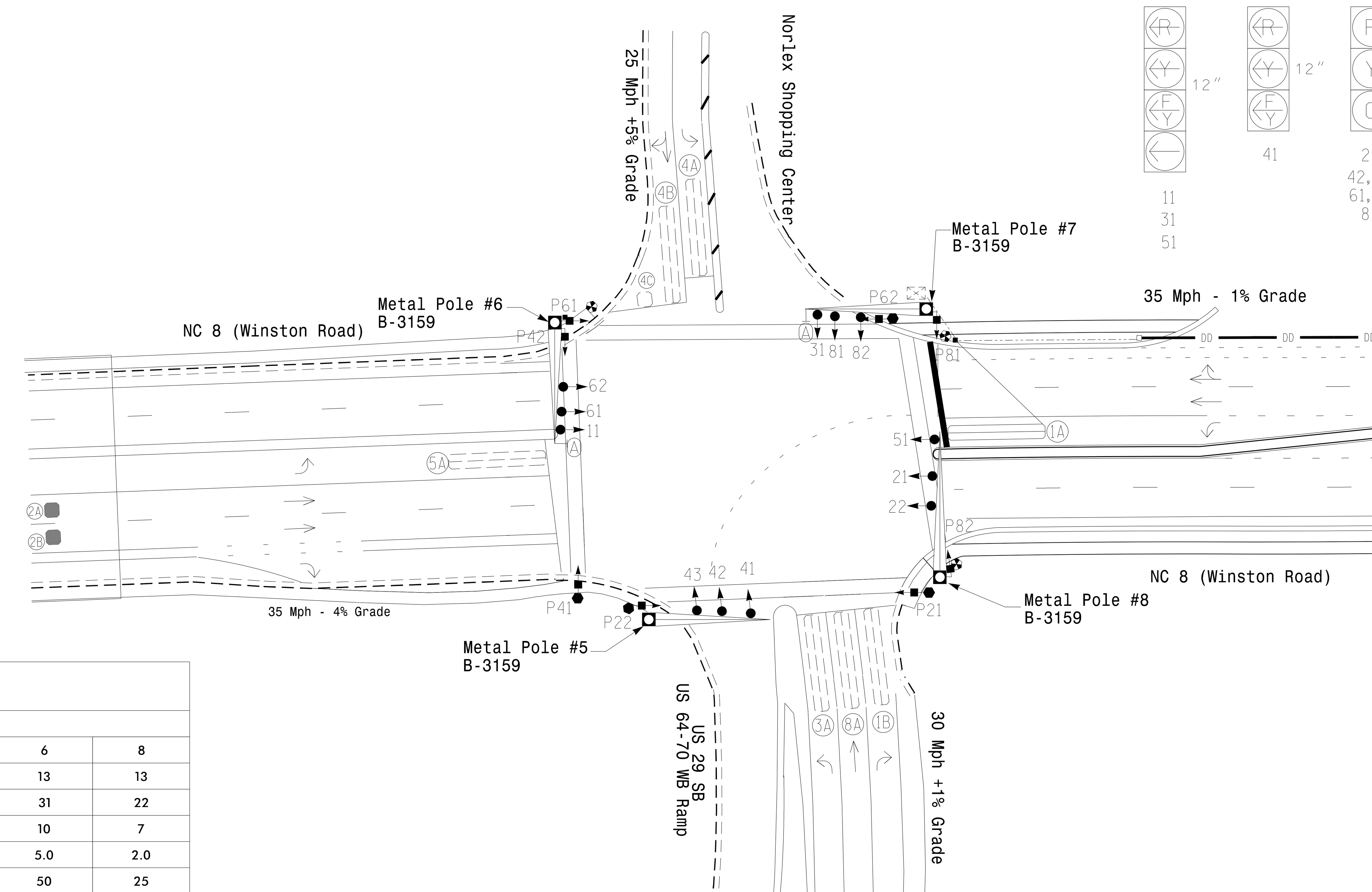
SIGNAL FACE I.D.

All Heads L.E.D.



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or Phase 5 may be lagged.
4. Phase 3 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Reconnect and unbag Pedestrian Heads P41, P42, P61, P62, P81 & P82.
9. Remove "LEFT LANE ENDS 300 FEET" sign from Metal Pole #8.
10. The Division Traffic Engineer will determine the hours of use for each phasing plan.
11. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Metal Pole with Mastarm	
	Directional Arrow	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	8
Walk *	–	13	–	13	–	13	13
Ped Clear *	–	25	–	25	–	31	22
Min Green *	7	10	7	7	7	10	7
Passage *	2.0	5.0	2.0	2.0	2.0	5.0	2.0
Max 1 *	20	50	20	25	15	50	25
Yellow Change	3.0	4.1	3.0	3.5	3.0	4.1	3.5
Red Clear	3.4	3.1	3.8	3.8	3.2	3.1	3.8
Added Initial *	–	1.5	–	–	–	1.5	–
Maximum Initial *	–	24	–	–	–	24	–
Time Before Reduction *	–	15	–	–	–	15	–
Time To Reduce *	–	30	–	–	–	30	–
Minimum Gap	–	3.0	–	–	–	3.0	–
Advance Walk	–	6	–	6	–	6	6
Non Lock Detector	X	–	X	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–
Dual Entry	–	–	–	X	–	–	X

* These values may be field adjusted. Do not adjust Min Green and Passage 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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Tel:919.789.9977
Fax:919.789.9591
License: F-0453

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

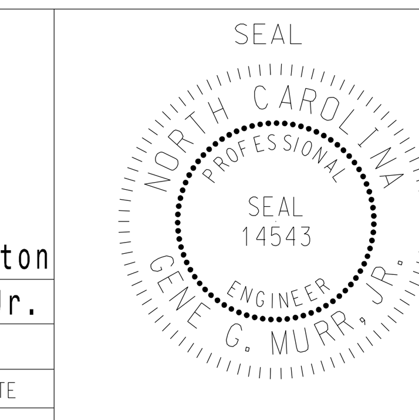
NC 8 (Winston Road)
at
US 29 SB/US 64-70 WB Ramp

Division 9	Davidson County	Lexington
PLAN DATE: May 2024	REVIEWED BY: G.G. Murr, Jr.	
PREPARED BY: B.E. Wynn	REVIEWED BY:	

SCALE 0 40
1"=40'

REVISIONS	INIT.	DATE

SEAL



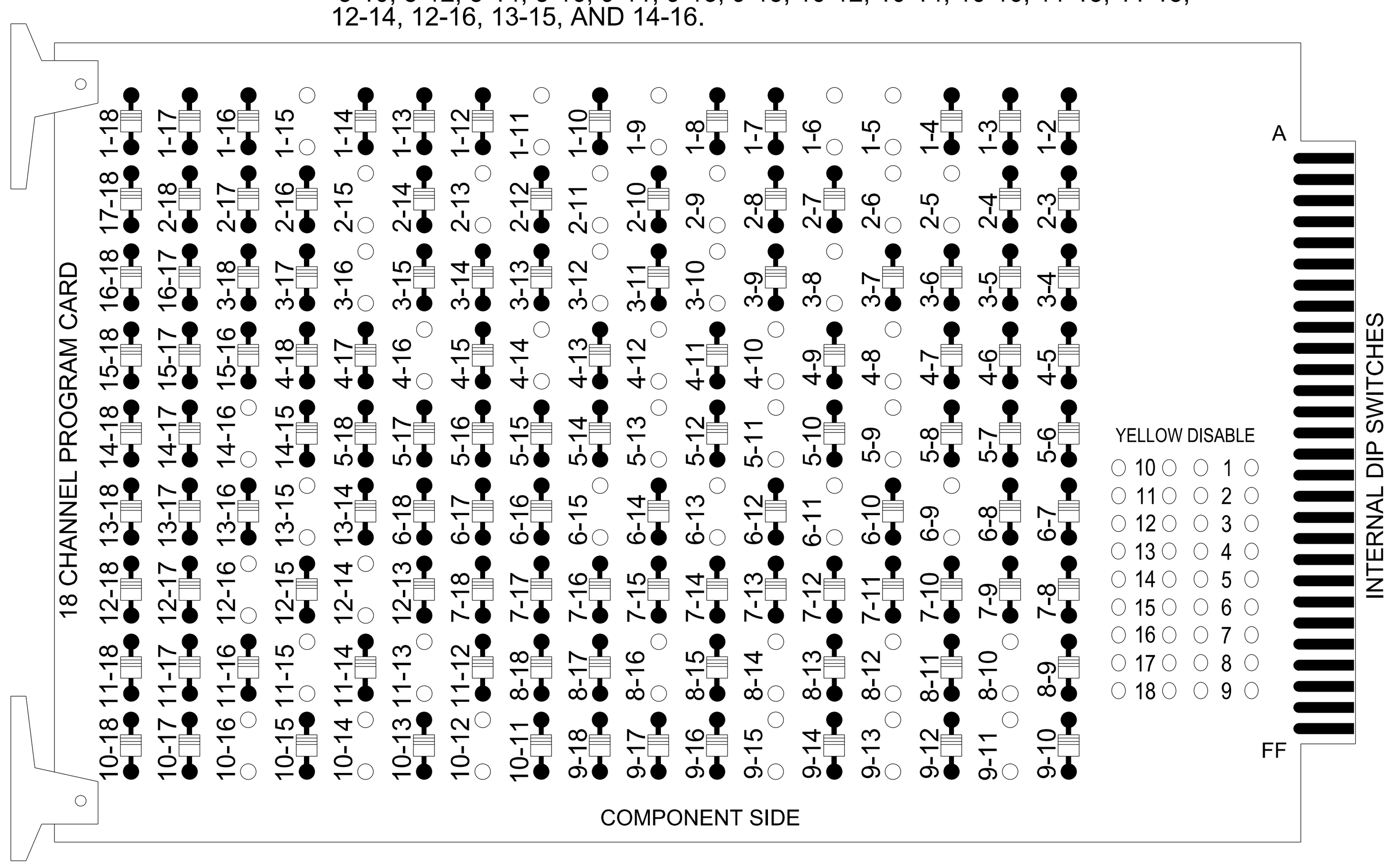
SIGNATURE	DATE
SIG. INVENTORY NO.	09-0735

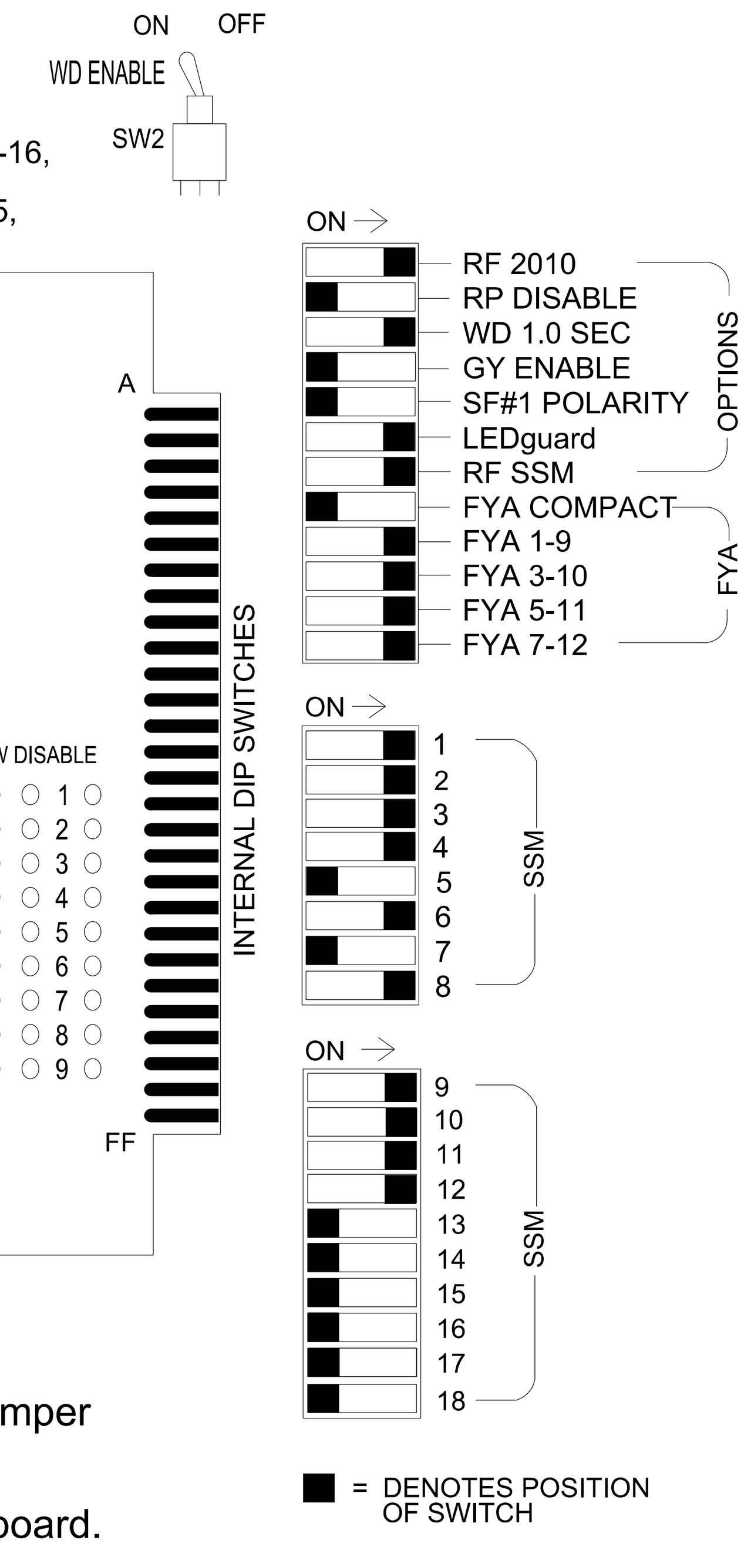
5/9/2024
...*090735_sig_dsn_2022xxxx.dgn
USER:default

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-8, 3-10, 3-12, 3-16, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 13-15, AND 14-16.





REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that 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.

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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S3, S4, S5, S6, S7, S8, S9, S11, S12, AUX S1, AUX S2, AUX S4, AUX S5
Phases Used.......................................1, 2, 2PED, 3, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..*

*See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.5.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	82	11★	21,22	P21, P22	22	31★	42,43	P41, P42	51★	61,62	P61, P62	NU	81,82	P81, P82	11★	31★	NU	51★	41★	NU
RED		*	128			*	101			134			107							
YELLOW			129				102		*	135			108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW	126				117										A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133											
(hand symbol)				113				104			119			110						
(pedestrian symbol)				115				106			121			112						

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

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	Ø4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	Ø4 4B	NOT USED					Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0		X		X	
				-	29 ★	6	3.0		X		X	X
1B	TB2-5,6	I2U	39	1	2	1	15.0		X		X	
3A	TB4-5,6	I5U	58	20	7	3	15.0		X		X	
				-	30	8			X		X	
4A	TB4-9,10	I6U	41	3	8	4	3.0		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10.0		X		X	
4C	TB6-1,2	I7U	65	31	10	4	15.0		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2	3.0		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

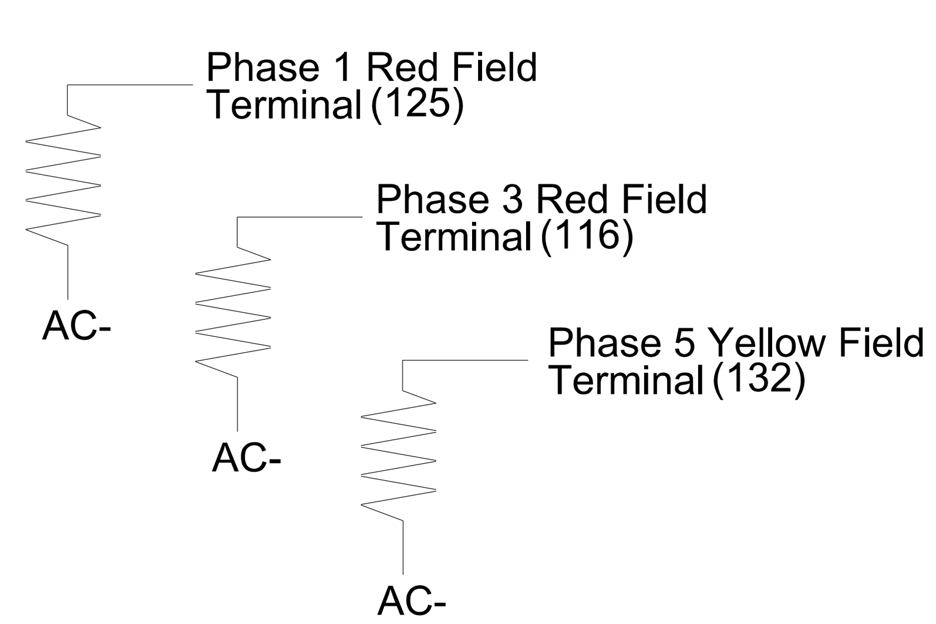
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

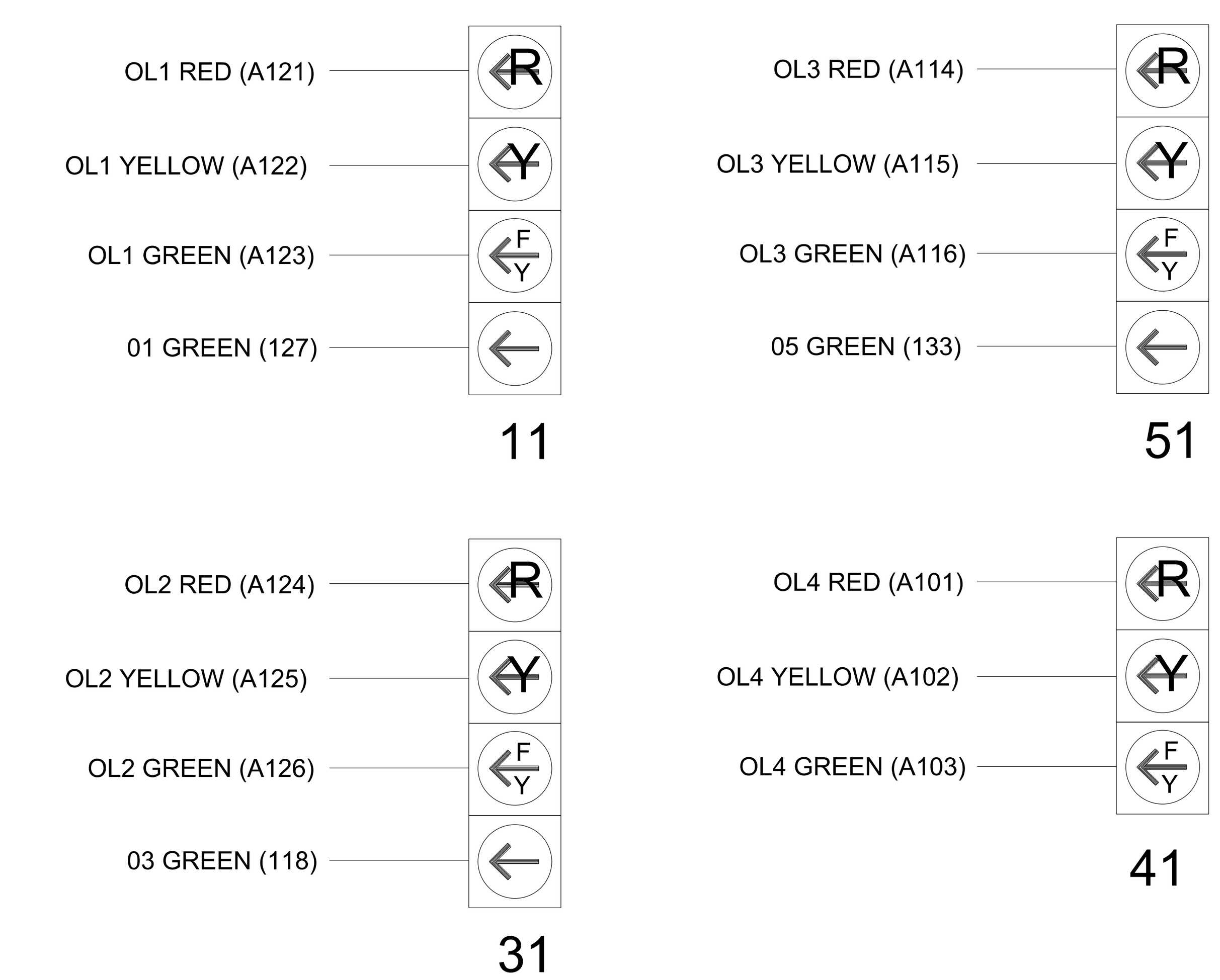
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

SPECIAL DETECTOR NOTE

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0735
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

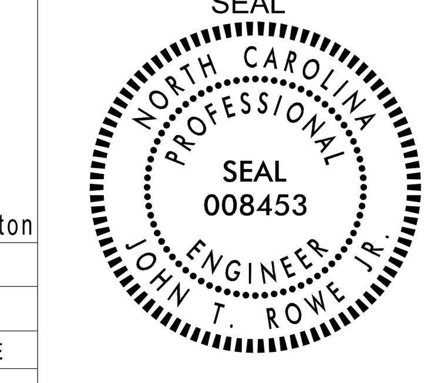
NC 8 (Winston Road)
at
US 29 SB / US 64-70 WB Ramp

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

Division 9	Davidson County	Lexington	
PLAN DATE: May 2024		REVIEWED BY:	
PREPARED BY: J.T. Rowe		REVIEWED BY: G.G. Murr, Jr.	
REVISIONS		INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL



DATE

SIG. INVENTORY NO. 09-0735

5/9/2024
...*090735_sm_ele_2024xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.5.2

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	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	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	4	-	8
Modifier Phases	1	3	5	
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE REMOVED INCLUDED PHASES

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.

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

Electrical Detail - Sheet 2 of 2

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0735
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

Electrical and Programming Details For:

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

NC 8 (Winston Road)
at
US 29 SB / US 64-70 WB Ramp

Division 9 | Davidson County | Lexington

PLAN DATE:	May 2024	REVIEWED BY:	
PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR.

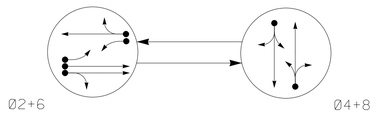
DATE

SIG. INVENTORY NO. 09-0735

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 6.0

2 Phase
Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19_Lexington

PHASING DIAGRAM



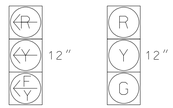
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	~~FY~~	~~R~~	~~Y~~
22,23	G	R	Y
41,42	R	G	R
61	~~FY~~	~~R~~	~~Y~~
62,63	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21
61

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

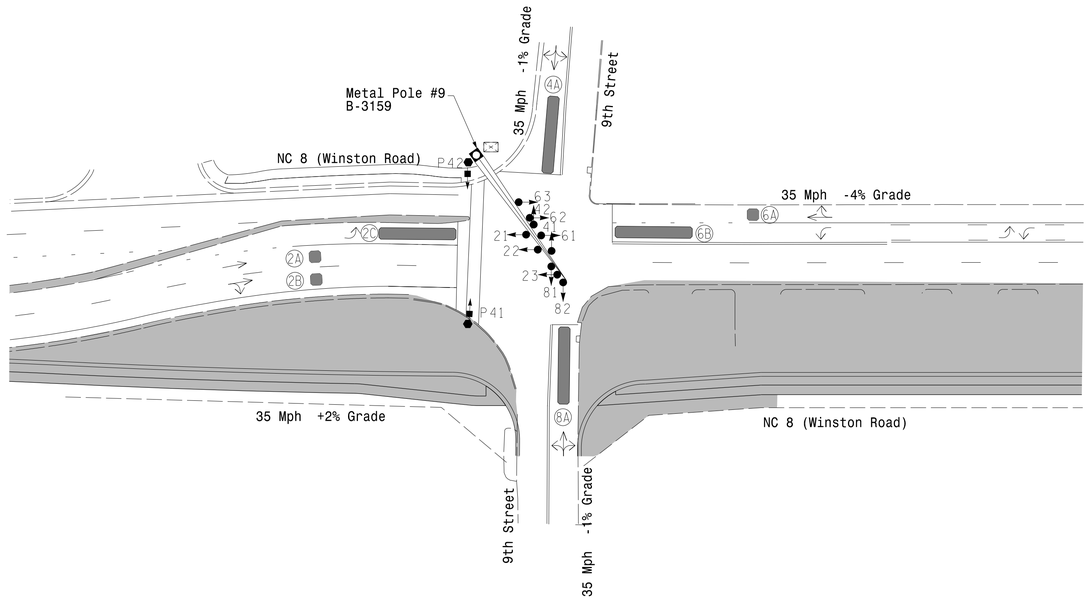
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A*	6X6	70	*	*	2	-	-	X	-	X	-	-
2B*	6X6	70	*	*	2	-	-	X	-	X	-	-
2C*	6X40	0	*	*	2	-	-	X	-	X	-	-
4A*	6X40	0	*	*	4	5.0	-	X	-	X	-	-
6A*	6X6	70	*	*	6	-	-	X	-	X	-	-
6B*	6X40	0	*	*	6	-	-	X	-	X	-	-
8A*	6X40	0	*	*	8	5.0	-	X	-	X	-	-

*Video Detection Zone

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. 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.
6. Pavement markings are existing.
7. Due to sidewalk closures during TMP I, disconnect and remove Pedestrian Heads P41 and P42.
8. Install new controller in existing cabinet.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
	Type II Signal Pedestal	
	Construction Zone	N/A
	Video Detection Zone	

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green *	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max 1 *	50	25	50	25
Yellow Change	4.1	3.9	4.1	3.9
Red Clear	1.4	2.4	1.4	2.4
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	–	–	–
Non Lock Detector	–	X	–	X
Vehicle Recall	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	X	–	X

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

Signal Upgrade - Temporary Design 1 (TMP Phase I)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Road) at 9th Street

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: B.E. Wynn REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

SIGNATURE DATE

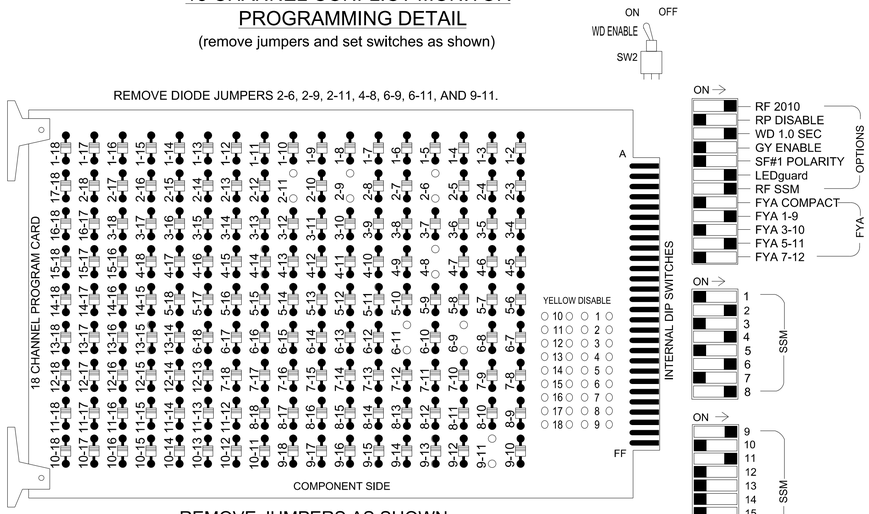
SIG. INVENTORY NO. 09-0402 TI

5/9/2024
09-0402TI_sig_dsn_2022xxxx.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.6.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



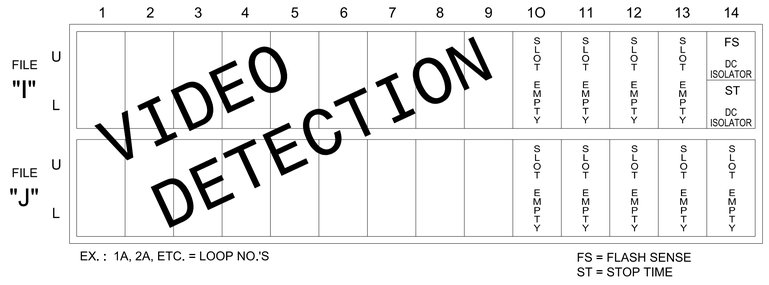
REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that 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)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S8, S11, AUX S1, AUX S4
Phases Used.....2, 4, 6, 8
Overlap "1".....*
Overlap "2".....Not Used
Overlap "3".....*
Overlap "4".....Not Used

*See overlap programming 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	4
Type	FYA 4 - Section	Off	FYA 4 - Section	Off
Included Phases	2		6	
Modifier Phases				
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

SIGNAL HEAD HOOK-UP CHART

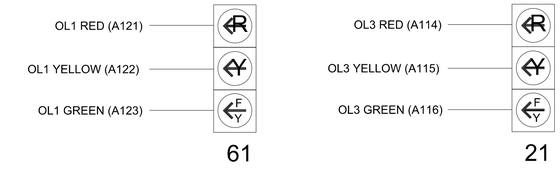
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81,82	NU	61★	NU	NU	21★	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW																		

NU = Not Used

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0402T1
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

NC 8 (Winston Road)
at
9th Street

Division 9 | Davidson County | Lexington

PLAN DATE: May 2024 | REVIEWED BY:
PREPARED BY: J.T. Rowe | REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER JOHN T. ROWE IV
SEAL 008453

DATE

SIG. INVENTORY NO. 09-0402T1

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

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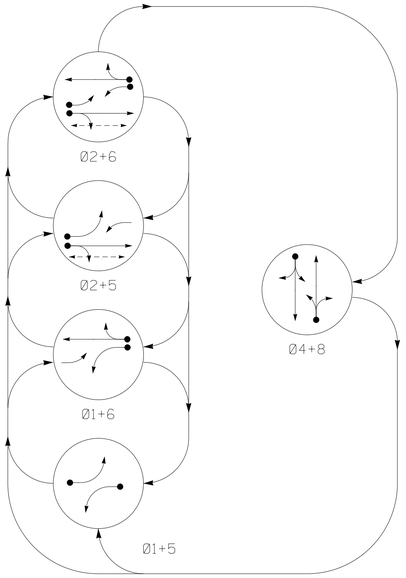
License: F-0453

5/9/2024
09-0402T1_sm.e!a.2024xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 7.0

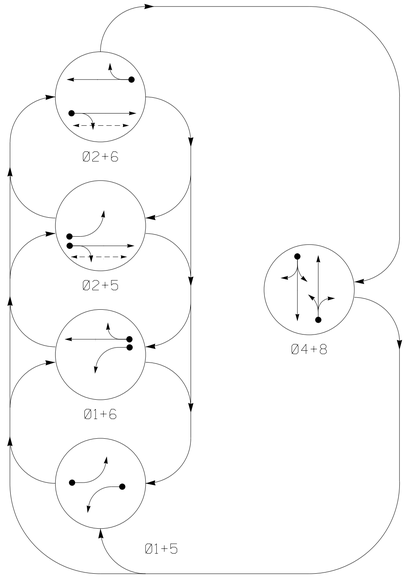
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←F Y	←F Y	←R	←Y
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←●	←F Y	←●	←F Y	←R	←Y
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←R	←R	←R	←Y
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←●	←R	←●	←R	←R	←Y
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK

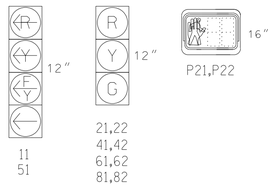
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A✳	6X40	0	✳	✳	1	15.0**	-	X	-	X	-	
					6#	-	-	X	-	X	-	-
2A✳	6X6	70	✳	✳	2	-	-	X	-	X	-	-
4A✳	6X40	0	✳	✳	4	3.0	-	X	-	X	-	-
5A✳	6X40	0	✳	✳	5	15.0**	-	X	-	X	-	-
					2#	-	-	X	-	X	-	-
6A✳	6X6	70	✳	✳	6	-	-	X	-	X	-	-
8A✳	6X40	0	✳	✳	8	5.0	-	X	-	X	-	-

✳Video Detection Zone
**Disable delay during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

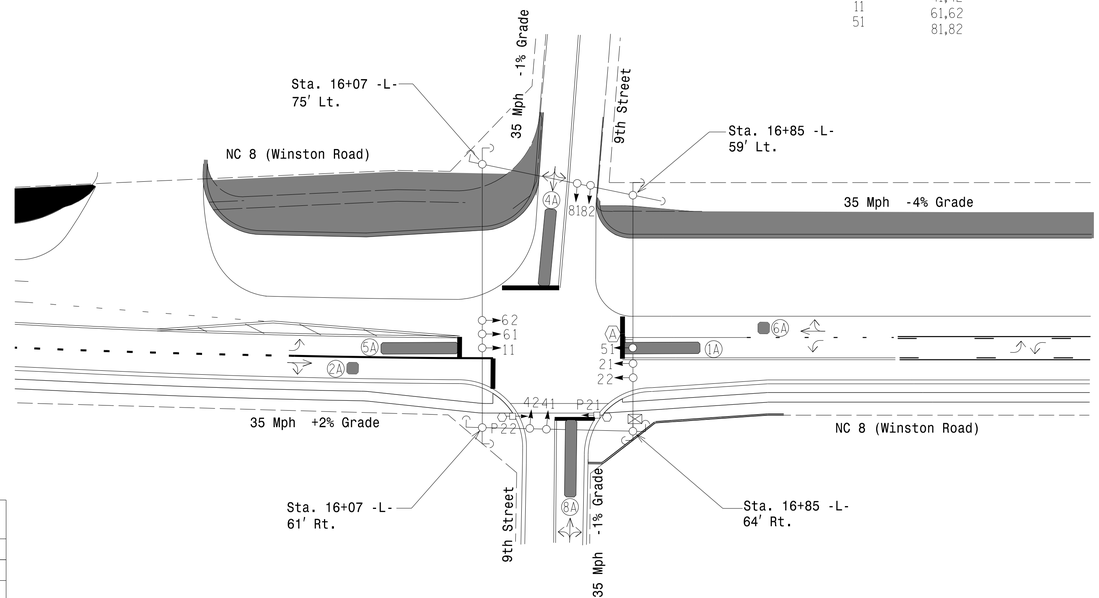
SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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



MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	13	–	–	–	–
Ped Clear *	–	10	–	–	–	–
Min Green *	7	10	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	3.0	2.0
Max 1 *	15	40	15	15	40	15
Yellow Change	3.0	4.1	3.9	3.0	4.1	3.9
Red Clear	1.6	1.4	1.2	2.1	1.4	1.2
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	6	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

5 Phase
Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19_Lexington

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
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.
11. Relocate 2070LX controller installed in Temporary Design 1.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○—	Signal Pole with Guy	●—
○~	Signal Pole with Sidewalk Guy	●~
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	———
→	Directional Arrow	→
▬	Construction Zone	N/A
▬	Video Detection Zone	▬
⬡	Type II Signal Pedestal	⬢
Ⓐ	Left Turn Only Sign (R3-5)	Ⓐ

Signal Upgrade - Temporary Design 2 (TMP Phase II)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Road) at 9th Street

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: B.E. Wynn REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

SIGNATURE DATE

SIG. INVENTORY NO. 09-0402 T2

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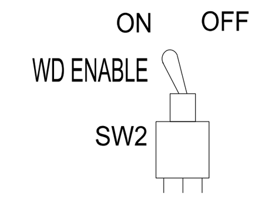
5/9/2024
USER:default
09-0402T2_sig_dsn_2022xwx.dgn

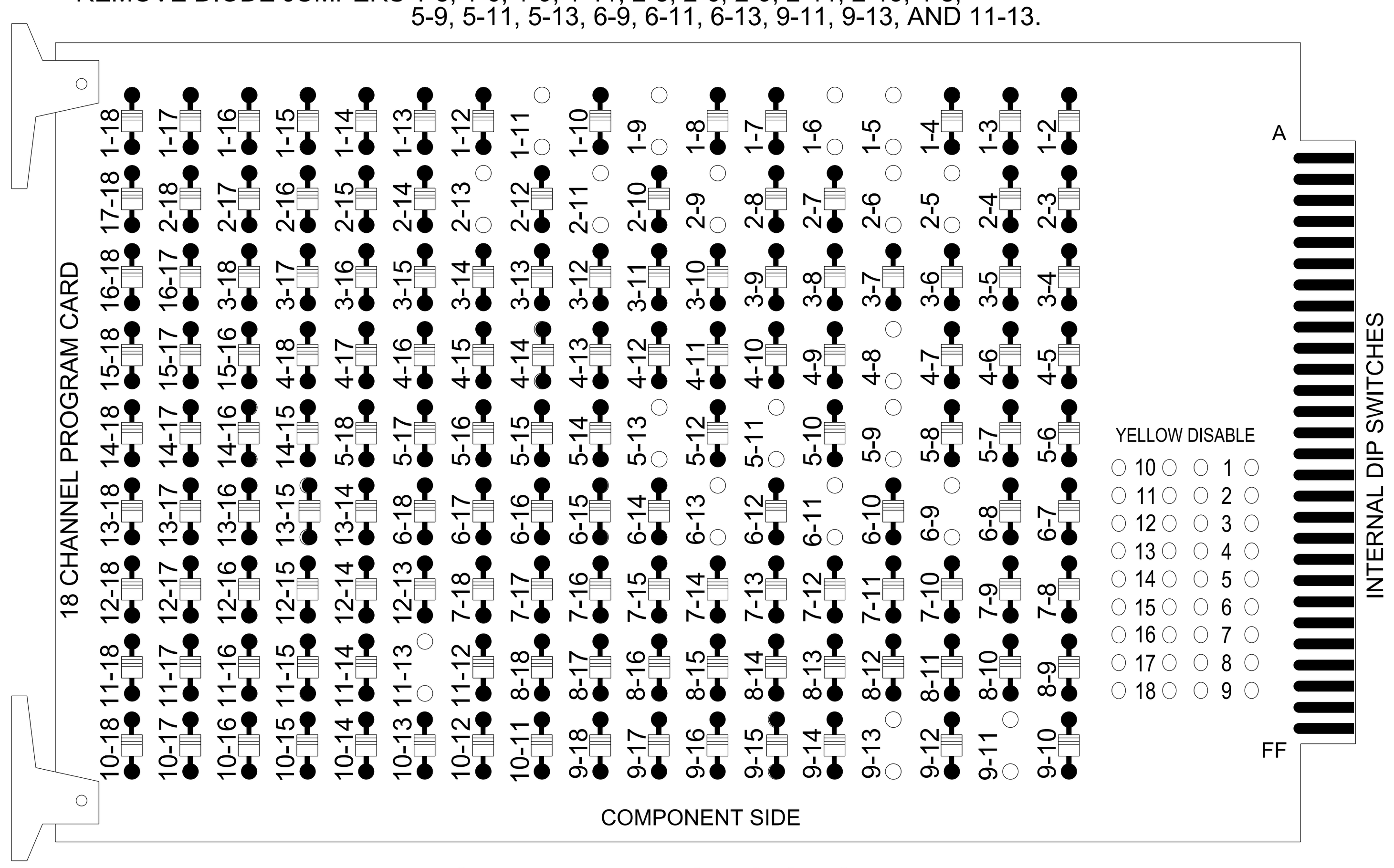
PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.7.1

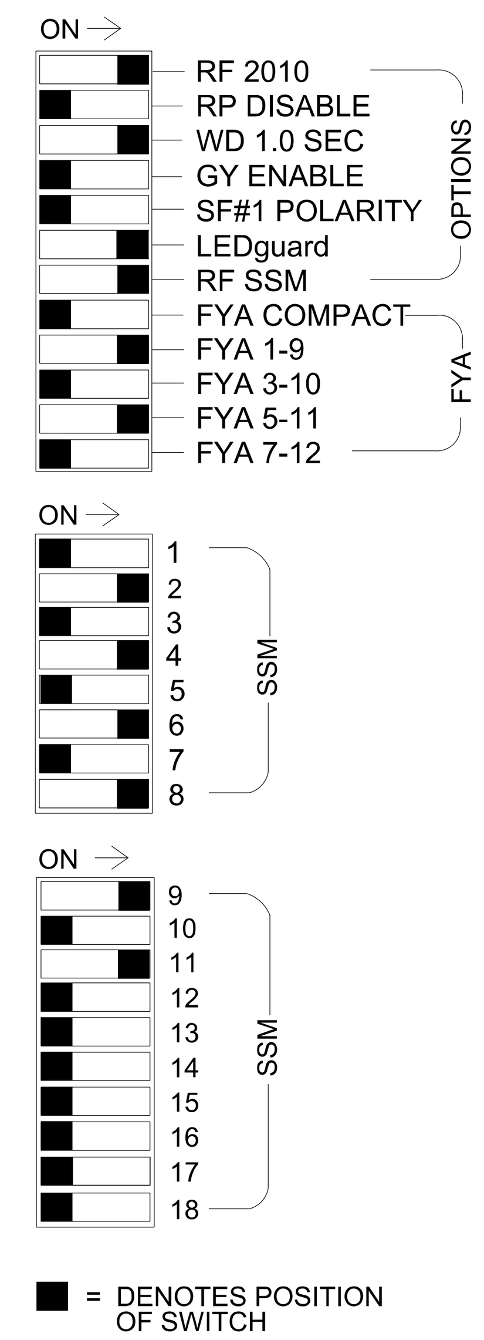
18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 4-8, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 9-11, 9-13, AND 11-13.





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 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.

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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S3, S5, S7, S8, S11, AUX S1, AUX S4
Phases Used..1, 2, 2PED, 4, 5, 6, 8
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	NU	41,42	NU	51★	61,62	NU	NU	81,82	NU	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											
(hand)			113															
(pedestrian)			115															

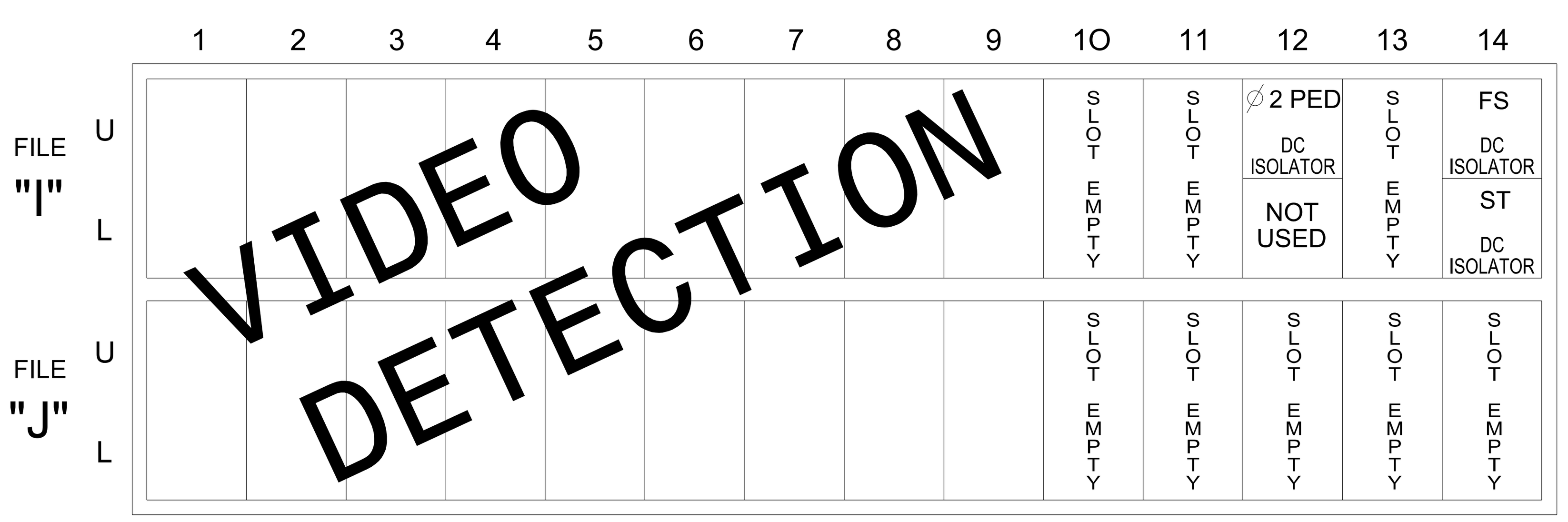
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

PED PUSH BUTTONS	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
P21,P22	TB8-4,6	I12U	67	33	2	PED 2

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

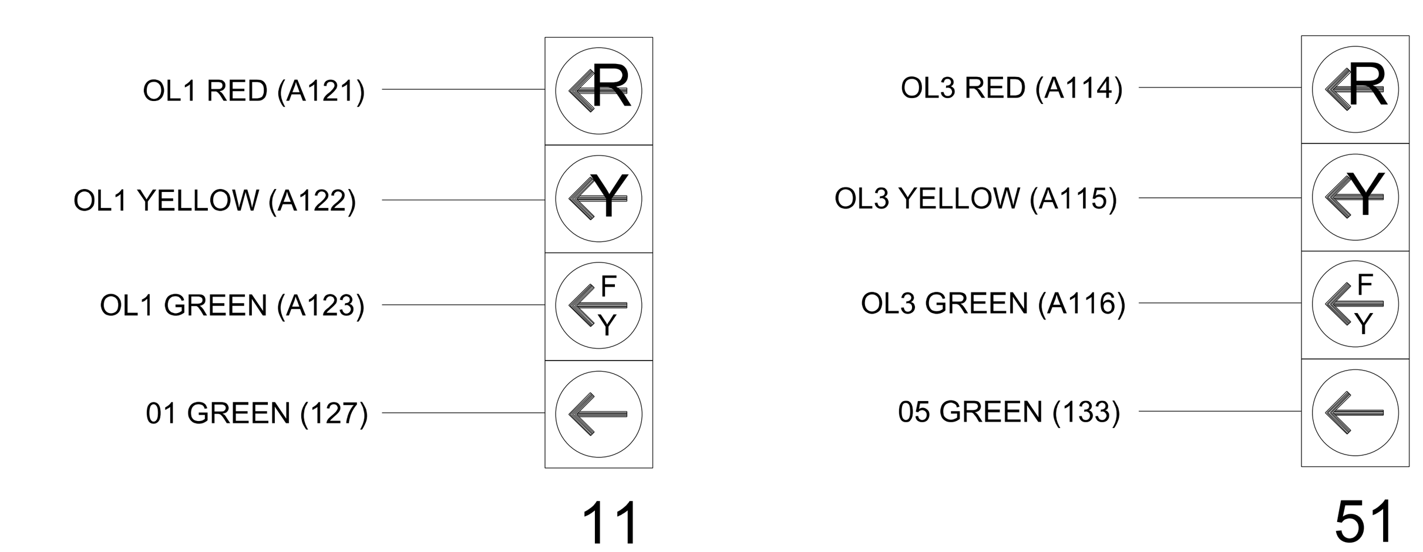
Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zones 1A and 5A, inputs associated with the typical NCDOT installation slots are compatible with time of day instructions located on sheet 2.

Note: For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

FYA SIGNAL WIRING DETAIL

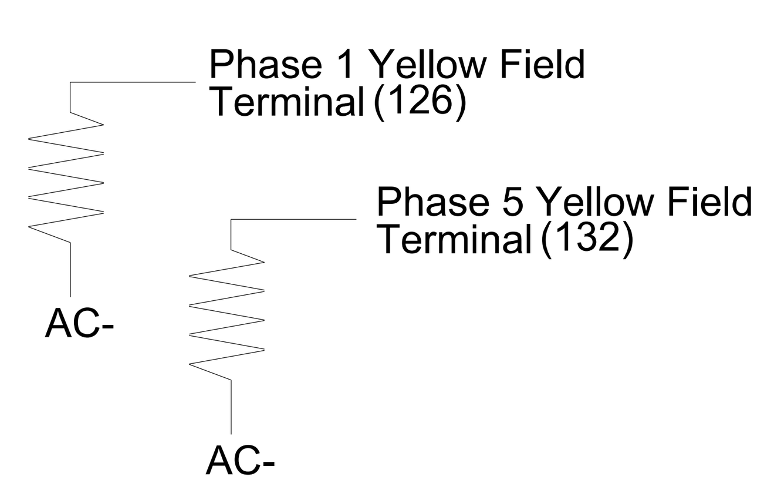
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0402T2
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

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Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

NC 8 (Winston Road)
at
9th Street

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

750 N. Greenfield Pkwy, Garner, NC 27529

Division 9 — Davidson County — Lexington

PLAN DATE: May 2024	REVIEWED BY:
PREPARED BY: J.T. Rowe	REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 008453
JOHN T. ROWE JR.

DATE

SIG. INVENTORY NO. 09-0402T2

5/9/2024
...*090402T2_sm_ele_2024xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.T.2

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

← NOTICE INCLUDED PHASE

Note: If Loops 1A and 5A are detected using the Vehicle Detectors shown in the charts below, use the steps shown below. If different Vehicle Detectors are used, substitute the appropriate Vehicle Detector numbers for the ones shown below.

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0402T2
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

Electrical and Programming Details For:

NC 8 (Winston Road) at 9th Street

Division 9 | Davidson County | Lexington

PLAN DATE: May 2024 | REVIEWED BY:
PREPARED BY: J.T. Rowe | REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signals Management Section
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License: F-0453

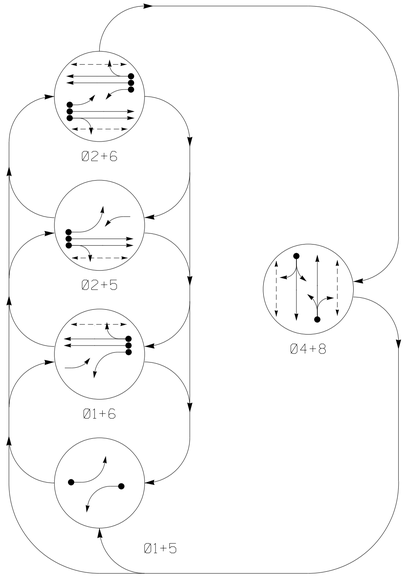
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE IV
DATE

SIG. INVENTORY NO. 09-0402T2

5/9/2024
#0402T2_sm_die_2024xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 8.0

DEFAULT PHASING DIAGRAM



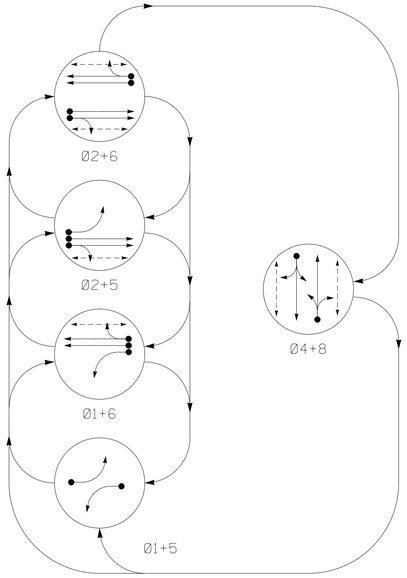
PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←—	←—	←R	←R	←R	←Y
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←—	←Y	←—	←Y	←R	←Y
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM

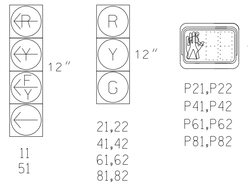


ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←—	←—	←R	←R	←R	←Y
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←—	←R	←—	←R	←R	←Y
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

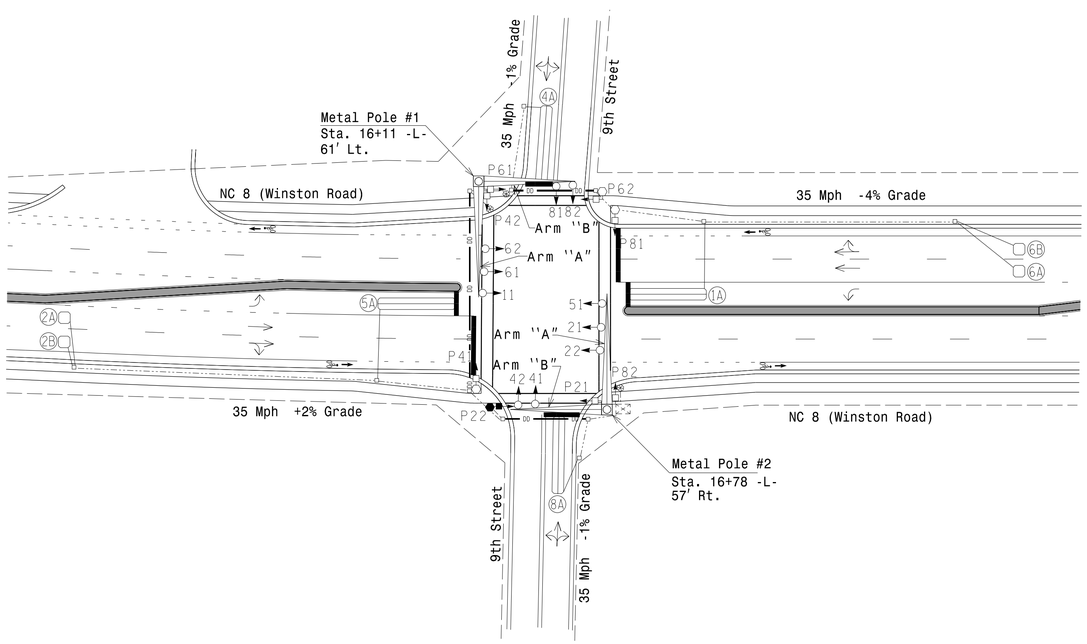
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1	15.0**	-	X	-	X	-	X
					6#	3.0	-	X	-	X	X	X
2A	6X6	200	5	X	2	-	-	X	X	X	-	X
2B	6X6	200	5	X	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	X	4	15.0	-	X	-	X	-	X
5A	6X40	0	2-4-2	X	5	15.0**	-	X	-	X	-	X
					2#	3.0	-	X	-	X	X	X
5B	6X40	0	2-4-2	X	5	-	-	X	-	X	-	X
6A	6X6	200	5	X	6	-	-	X	X	X	-	X
6B	6X6	200	5	X	6	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	X	8	15.0	-	X	-	X	-	X

** Disable delay during alternate phasing operation
# Disable phase call for loop(s) during alternate phasing operation

5 Phase Fully Actuated NC 8 (Winston Road) CLS Signal System #:D09-19_Lexington

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or 5 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
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. Traffic Signal Heads and Pedestal Posts will be black color treated. The selected shade of black must be verified and approved by the Engineer and City of Lexington prior to ordering.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▯↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○ ◡	Signal Pole with Sidewalk Guy	● ◡
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
—DD—	Directional Drill	N/A
N/A	Right of Way	— — —
⊙▱	Metal Pole with Mastarm	■▱
→	Directional Arrow	→
⊛	Type I Pushbutton Post	☢
⬡	Type II Signal Pedestal	⬢

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	13	13	–	11	13
Ped Clear *	–	10	21	–	7	21
Min Green *	7	10	7	7	10	7
Passage *	2.0	5.0	2.0	2.0	5.0	2.0
Max 1 *	15	50	25	15	50	25
Yellow Change	3.0	4.1	3.9	3.0	4.1	3.9
Red Clear	2.6	2.1	2.2	2.8	2.1	2.2
Added Initial *	–	1.5	–	–	1.5	–
Maximum Initial *	–	24	–	–	24	–
Time Before Reduction *	–	15	–	–	15	–
Time To Reduce *	–	30	–	–	30	–
Minimum Gap	–	3.0	–	–	3.0	–
Advance Walk	–	6	6	–	4	6
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

5/9/2024
09-0402_sig_dsn_2022xxxx.dgn
USER:default

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

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Fax:919.789.9591
License: F-0453

SCALE 0 40 1"=40'

NC 8 (Winston Road) at 9th Street

Division 9 Davidson County Lexington

PLAN DATE:	May 2024	REVIEWED BY:	G.G. Murr, Jr.
PREPARED BY:	B.E. Wynn	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GREGORY G. MURR, JR.

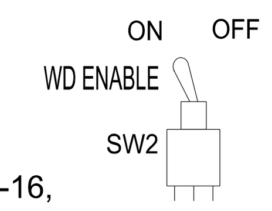
SIGNATURE DATE

SIG. INVENTORY NO. 09-0402

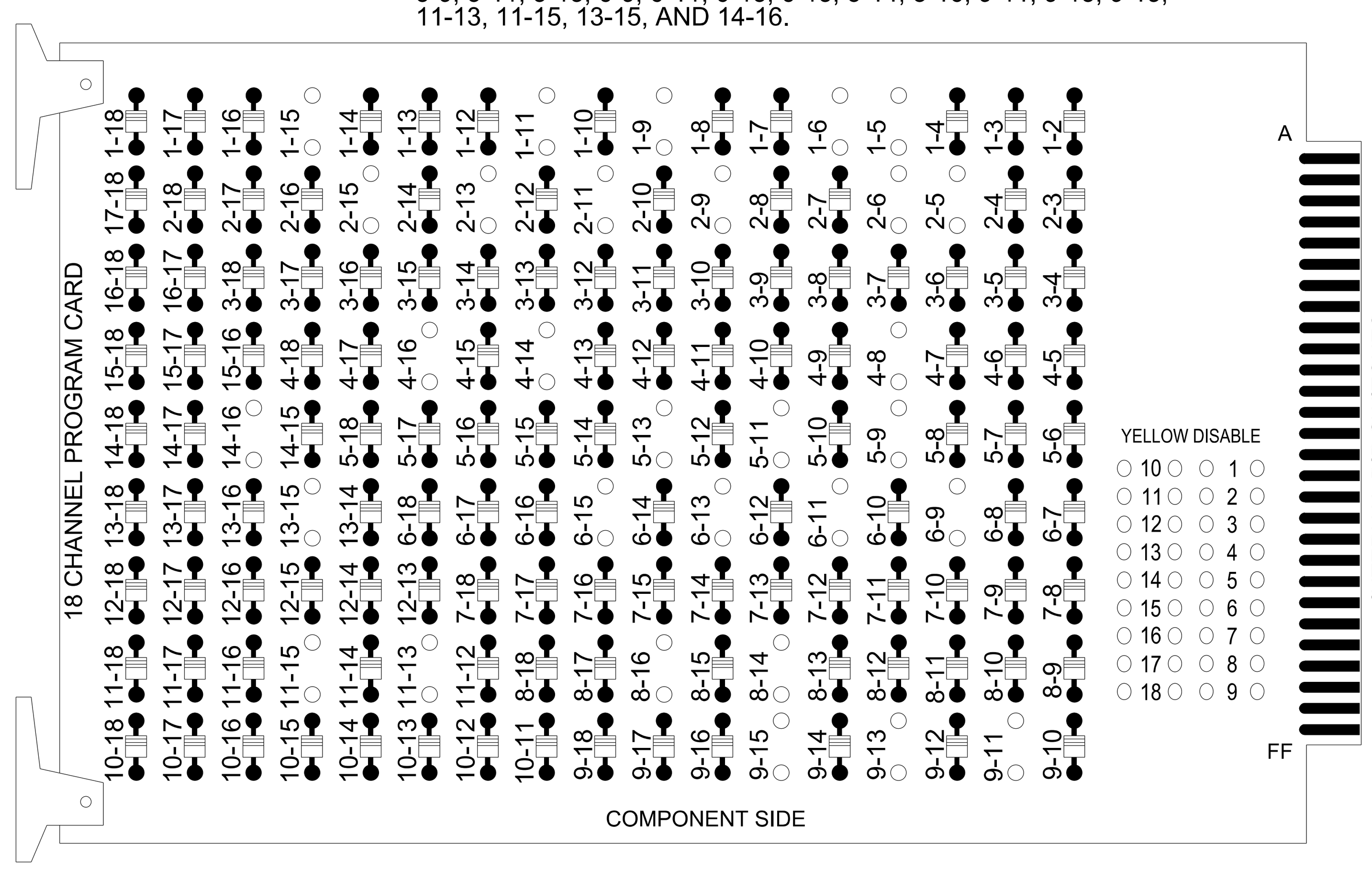
PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.8.1

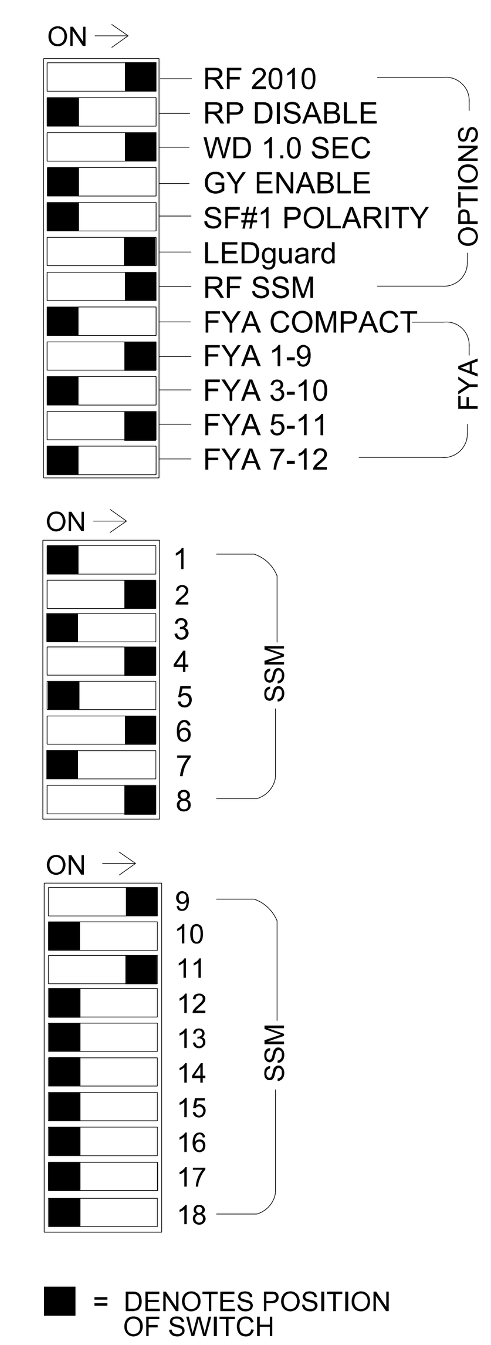
18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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





REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that 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.

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 phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Start for phases 4 and 8.
4. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S3, S5, S6, S7, S8, S9 S11, S12, AUX S1, AUX S4
Phases Used.......................................1, 2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	NU	41,42	P41, P42	51★	61,62	P61, P62	NU	81,82	P81, P82	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											
(Don't Walk hand)			113			104			119			110						
(Walk pedestrian)			115			106			121			112						

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0	---	X	-	X	-
				-	29 ★	6	3.0	---	X	-	X	X
2A	TB2-5,6	I2U	39	1	2	2	---	---	X	X	X	-
2B	TB2-7,8	I2L	43	5	3	2	---	---	X	X	X	-
4A	TB4-9,10	I6U	41	3	8	4	15.0	---	X	-	X	-
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0	---	X	-	X	-
				-	31 ★	2	3.0	---	X	-	X	X
5B	TB3-5,6	J2U	40	2	16	5	---	---	X	-	X	-
6A	TB3-9,10	J3U	64	30	18	6	---	---	X	X	X	-
6B	TB3-11,12	J3L	77	43	19	6	---	---	X	X	X	-
8A	TB5-9,10	J6U	42	4	22	8	15.0	---	X	-	X	-
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

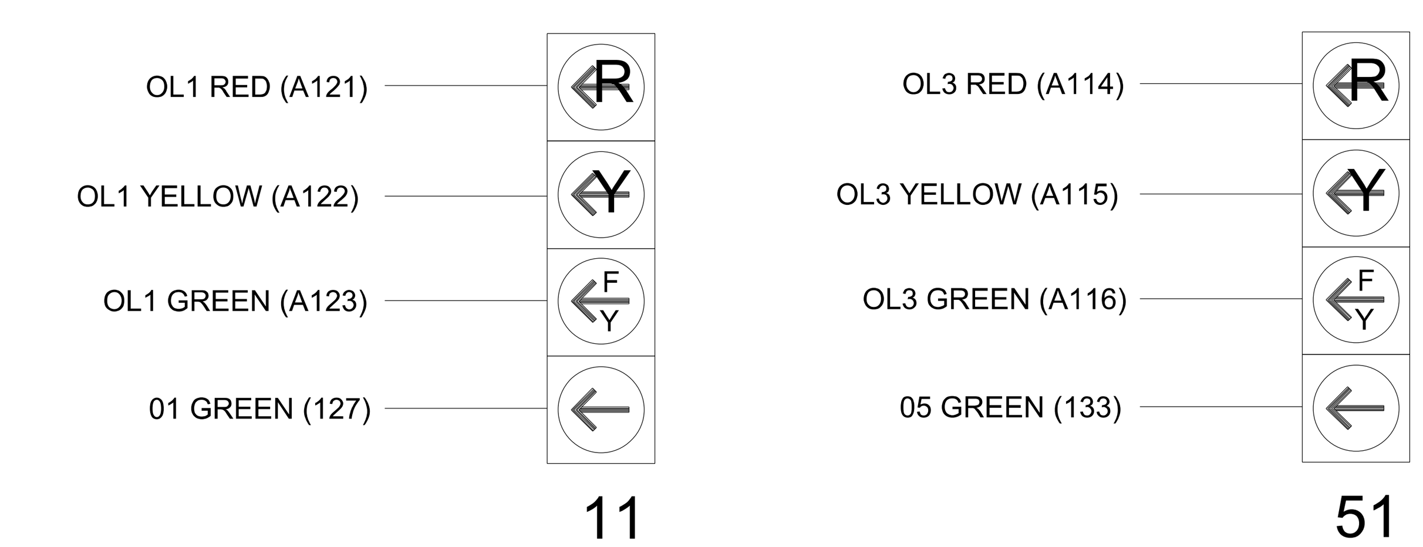
NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

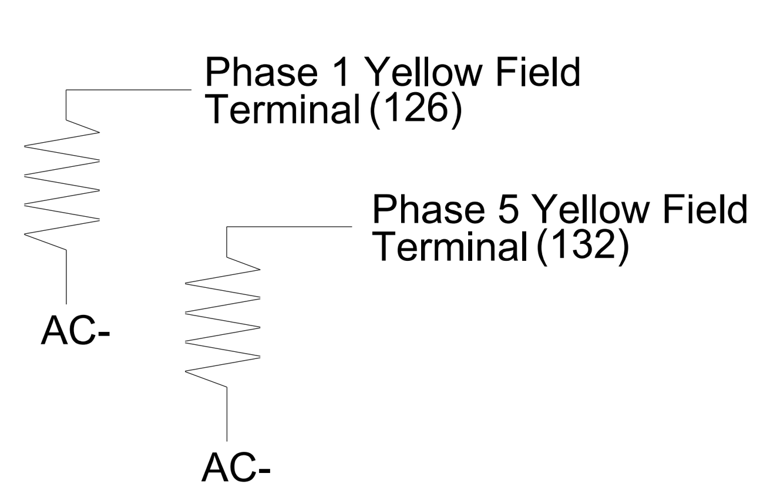
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0402
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
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License: F-0453

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

NC 8 (Winston Road)
at
9th Street

Division 9 Davidson County Lexington

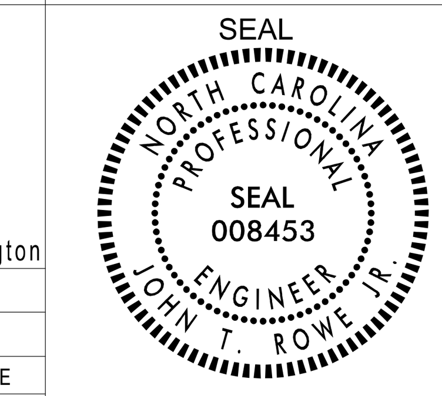
Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

PLAN DATE:	May 2024	REVIEWED BY:	
PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL



DATE

SIG. INVENTORY NO. 09-0402

5/9/2024
...*090402_sm_ele_2024xxyy.dgn
USER:default

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

← NOTICE INCLUDED PHASE

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

Electrical Detail - Sheet 2 of 2

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0402
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
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License: F-0453

Electrical and Programming Details For:

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

NC 8 (Winston Road)
at
9th Street

Division 9 | Davidson County | Lexington

PLAN DATE: May 2024 | REVIEWED BY:
PREPARED BY: J.T. Rowe | REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

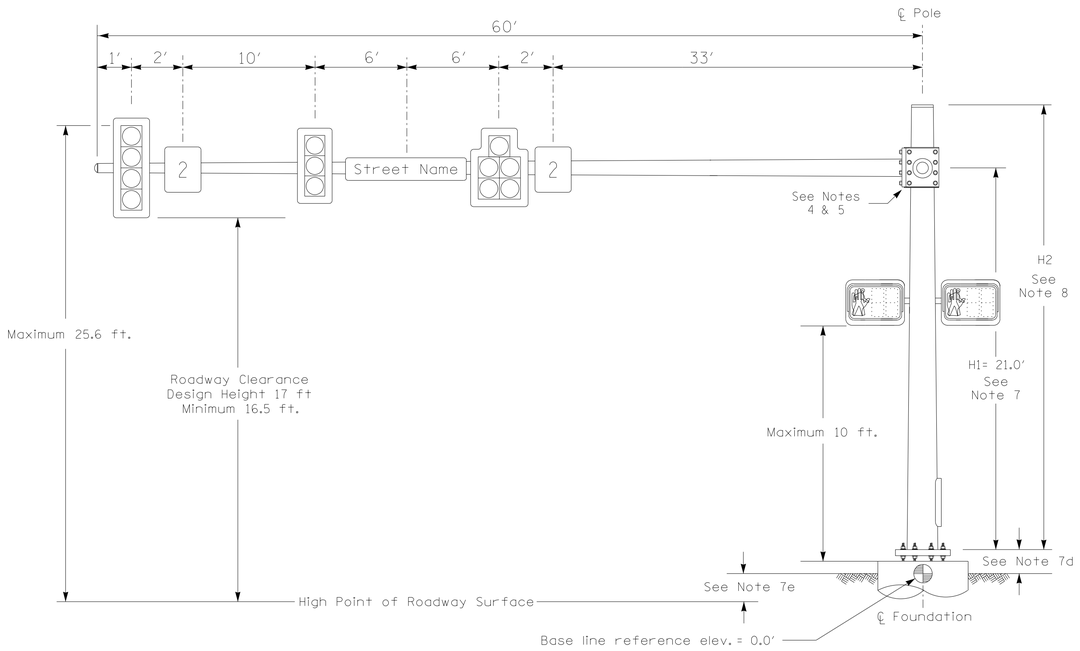
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 008453
JOHN T. ROWE JR.

DATE

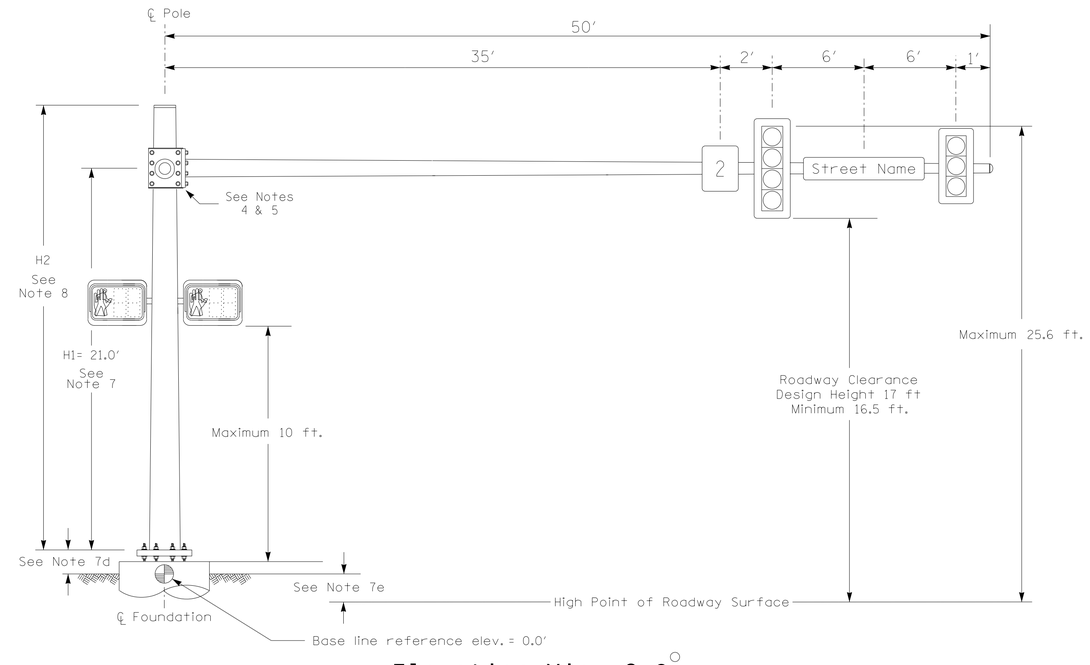
SIG. INVENTORY NO. 09-0402

Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 1, MAST ARM B



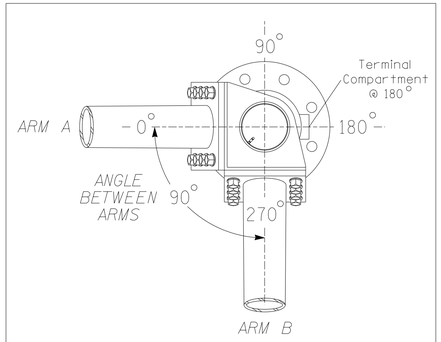
Elevation View @ 0°

SPECIAL NOTE

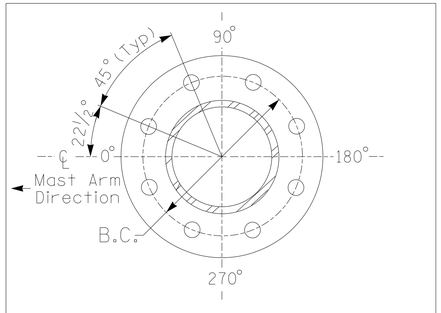
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	MP#1 Arm A	MP#1 Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.62 ft.	+1.82 ft.
Elevation difference at Edge of travelway or face of curb	+0.70 ft.	+1.37 ft.

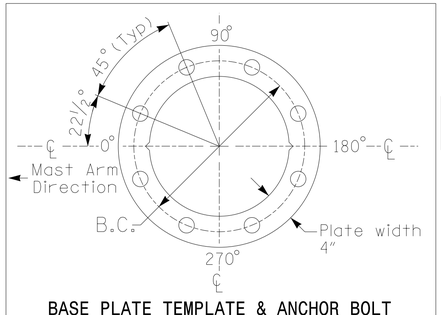


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0″ W X 56.0″ L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″ W X 66.0″ L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″ W X 52.5″ L	60 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″ W X 17.0″ L	21 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0″ W X 36.0″ L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″ W X 96.0″ L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - 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 signal project special provisions.
   - The 2024 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

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 signal plans for the actual loads 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
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. Signal heads 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 level and the high point of the roadway.
8. The pole manufacturer will determine the total height (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 signal heads 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.

NOTE: Metal poles and mast arms are to have black protective coating as specified in the Project Special Provisions. The selected shade, RAL® 9017 Traffic Black, must be verified and approved by the Engineer and City of Lexington before shop drawings will be reviewed by NCDOT.

NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Road)
at
9th Street

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: B.E. Wynn REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

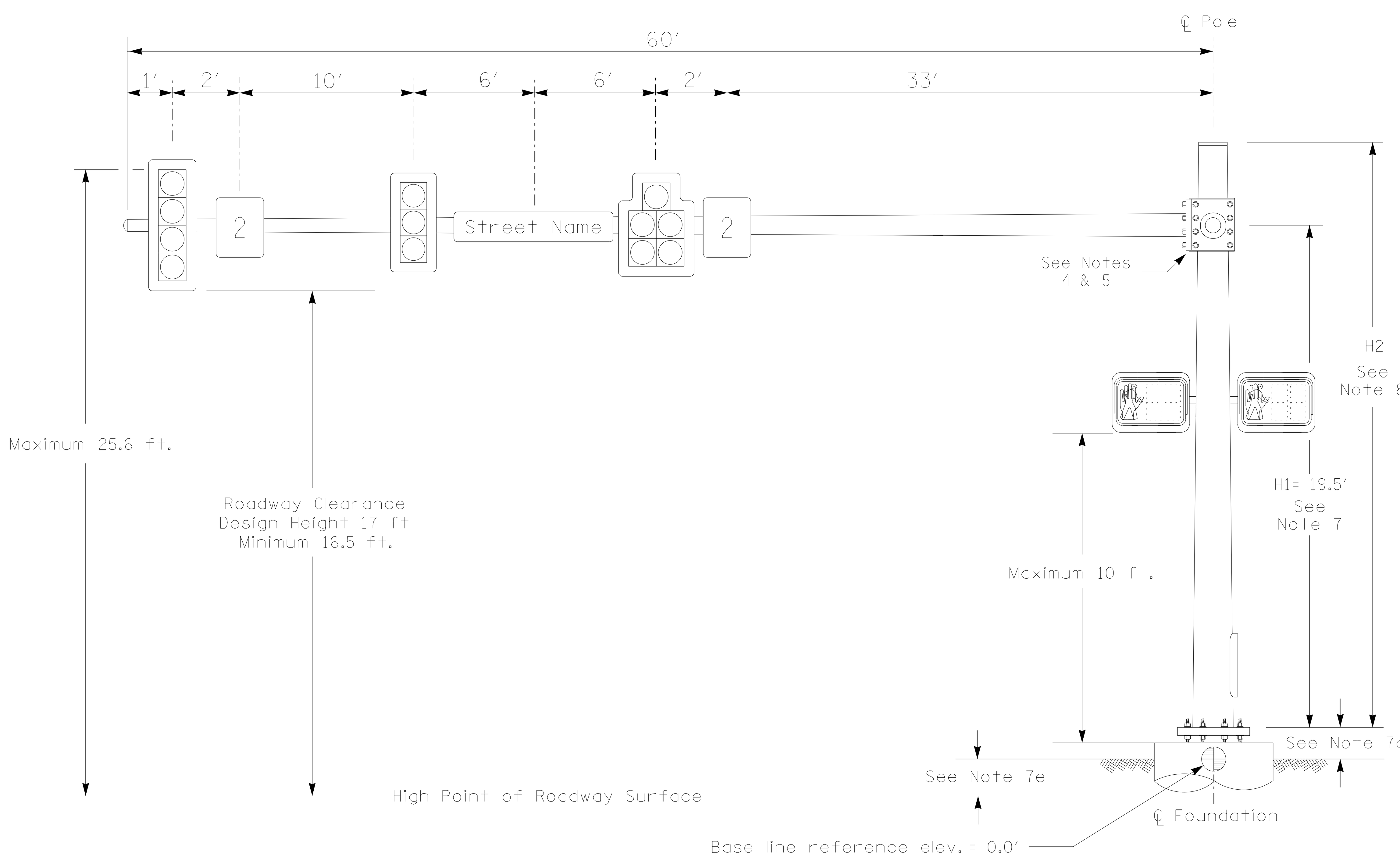
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

DATE

SIG. INVENTORY NO. 09-0402

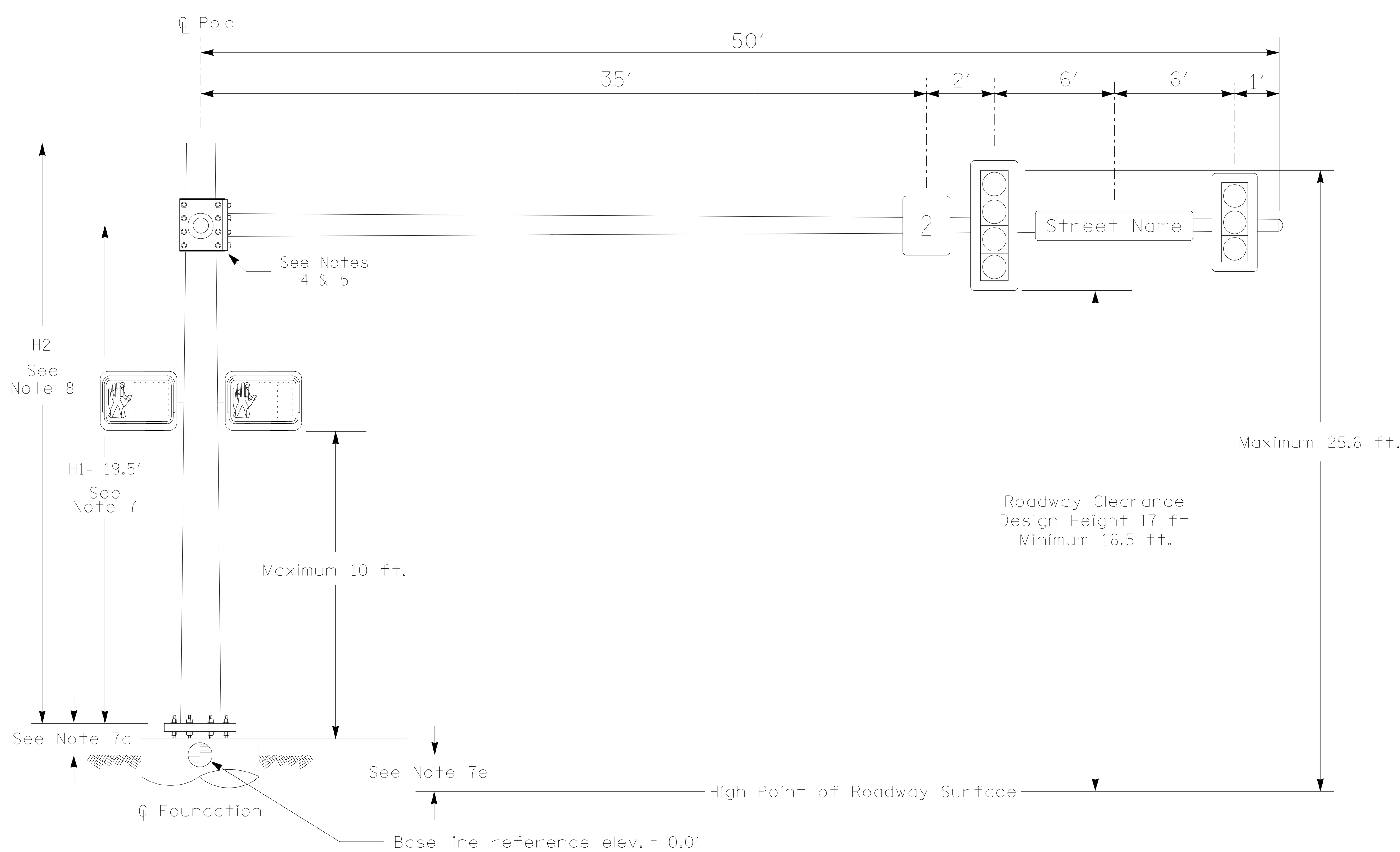
5/9/2024
M:\0402_sig_mp_2024xxx.dgn
USER:default

Design Loading for METAL POLE NO. 2, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 2, MAST ARM B



Elevation View @ 0°

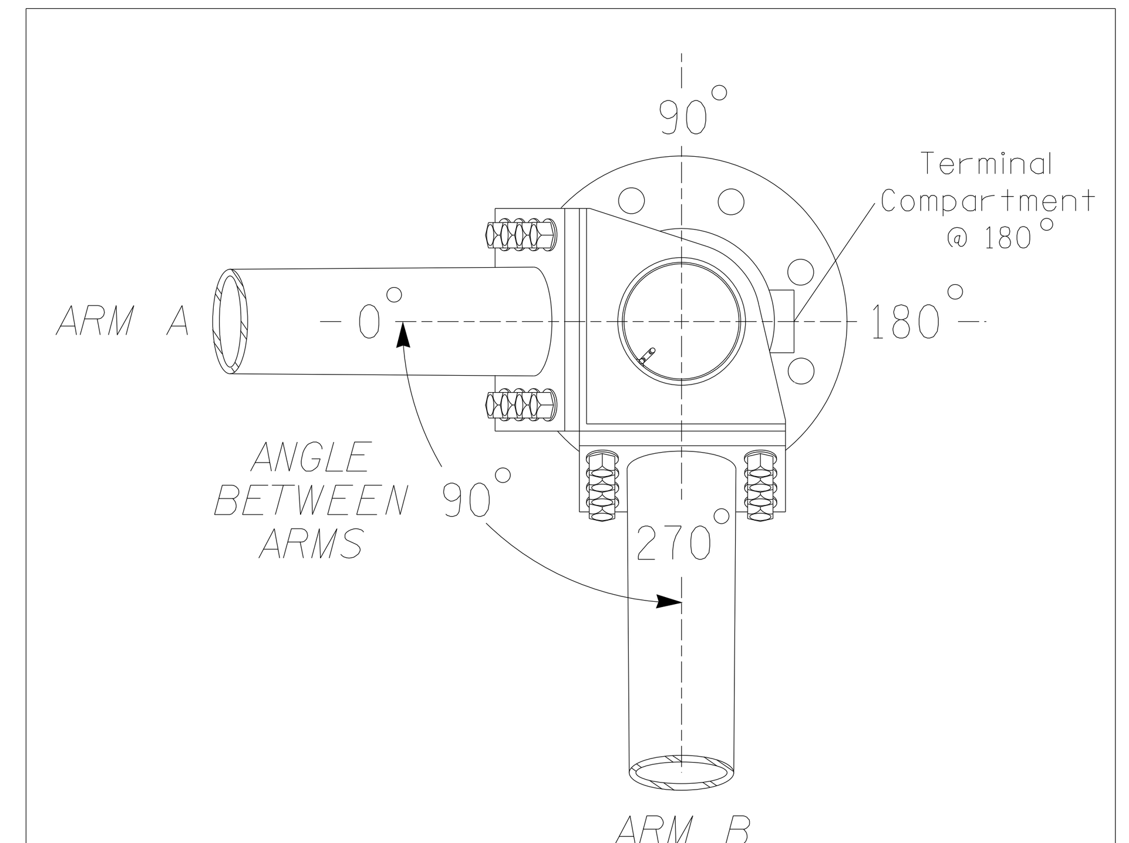
5/9/2024
...*090402_sig_mp_2024xxxx.dgn
USER:default

SPECIAL NOTE

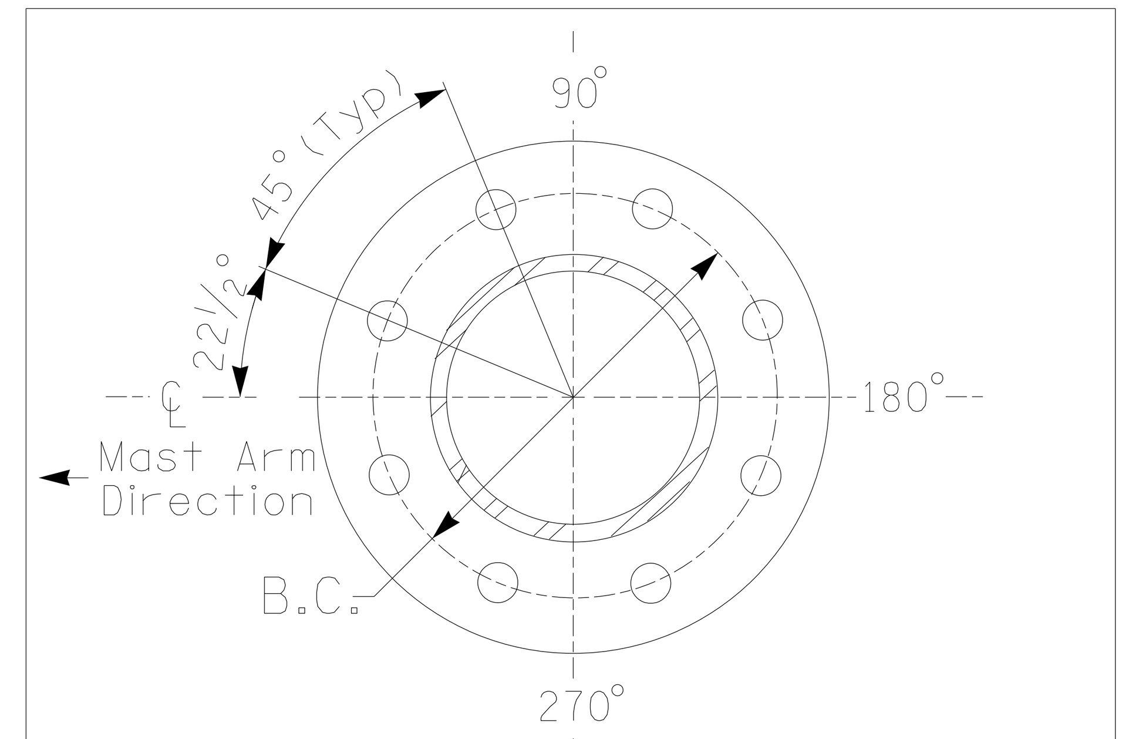
The contractor is responsible for verifying that the mast arm attachment height (H1) willprovide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	MP#2 Arm A	MP#2 Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.36 ft.	-0.61 ft.
Elevation difference at Edge of travelway or face of curb	-0.68 ft.	-0.70 ft.

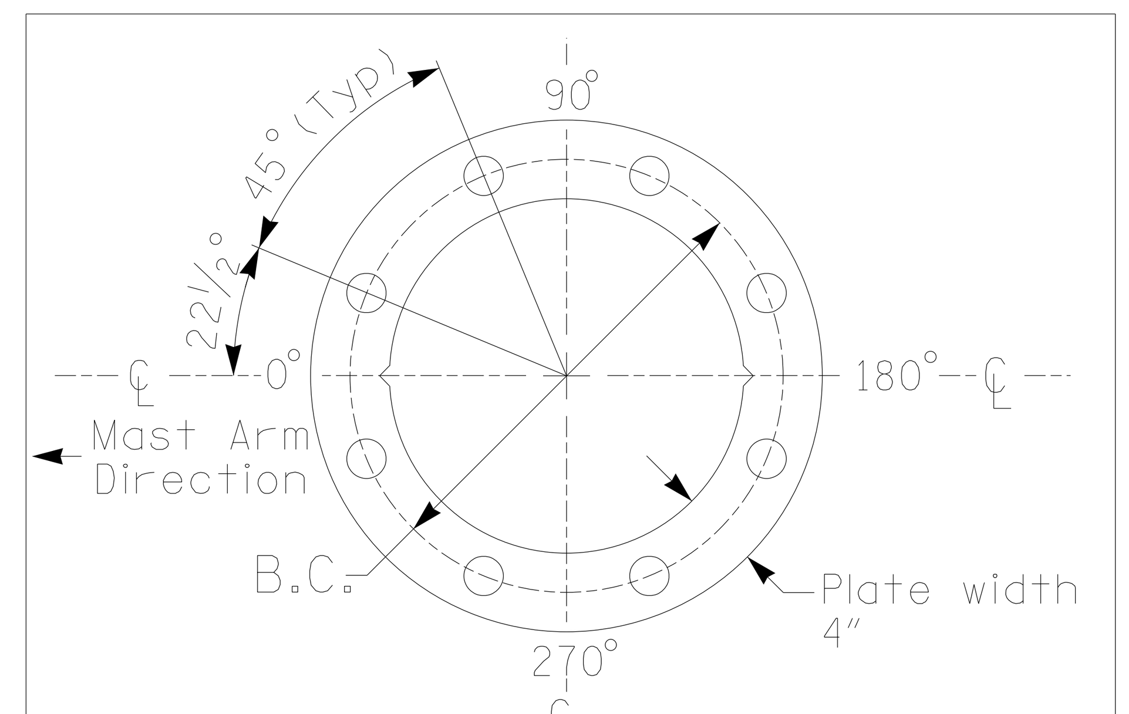


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 8.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0″W X 56.0″L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″W X 17.0″L	21 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0″W X 36.0″L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - 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 signal project special provisions.
   - The 2024 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

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 signal plans for the actual loads 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
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. Signal heads 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 level and the high point of the roadway.
8. The pole manufacturer will determine the total height (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 signal heads 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.

NOTE: Metal poles and mast arms are to have black protective coating as specified in the Project Special Provisions. The selected shade, RAL# 9017 Traffic Black, must be verified and approved by the Engineer and City of Lexington before shop drawings will be reviewed by NCDOT.

NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of: Transportation Mobility and Safety Division, Signal Design Section, State of North Carolina Department of Transportation

750 N.Greenfield Pkwy, Garner, NC 27529

NC 8 (Winston Road)
at
9th Street

Division 9 | Davidson County | Lexington

PLAN DATE:	May 2024	REVIEWED BY:	G.G. Murr, Jr.
PREPARED BY:	B.E. Wynn	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE
0 N/A
N/A

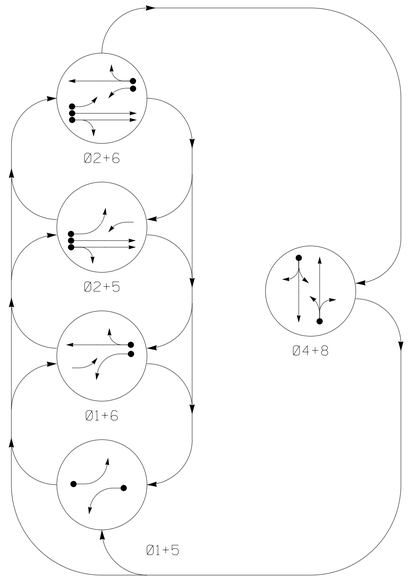
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

DATE

SIG. INVENTORY NO. 09-0402

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 9.0

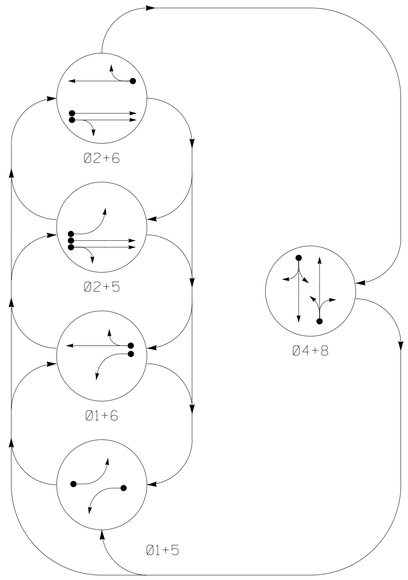
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←FY	←FY	←R	←Y
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
51	←●	←FY	←●	←FY	←R	←Y
61,62	R	G	R	G	R	Y
81,82,83	R	R	R	R	G	R

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←R	←R	←R	←Y
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
51	←●	←R	←●	←R	←R	←Y
61,62	R	G	R	G	R	Y
81,82,83	R	R	R	R	G	R

PHASING DIAGRAM DETECTION LEGEND

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

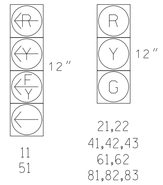
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A✳	6X40	0	✳	✳	1	15.0**	-	X	-	X	-	
					6#	3.0	-	X	-	X	-	-
2A✳	6X6	70	✳	✳	2	-	-	X	-	X	-	-
2B✳	6X6	70	✳	✳	2	-	-	X	-	X	-	-
4A✳	6X40	0	✳	✳	4	5.0	-	X	-	X	-	-
5A✳	6X40	0	✳	✳	5	15.0**	-	X	-	X	-	-
					2#	3.0	-	X	-	X	-	-
5B✳	6X40	0	✳	✳	5	-	-	X	-	X	-	-
6A✳	6X6	70	✳	✳	6	-	-	X	-	X	-	-
8A✳	6X40	0	✳	✳	6	5.0	-	X	-	X	-	-

✳Video Detection Zone
**Disable delay during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

SIGNAL FACE I.D.

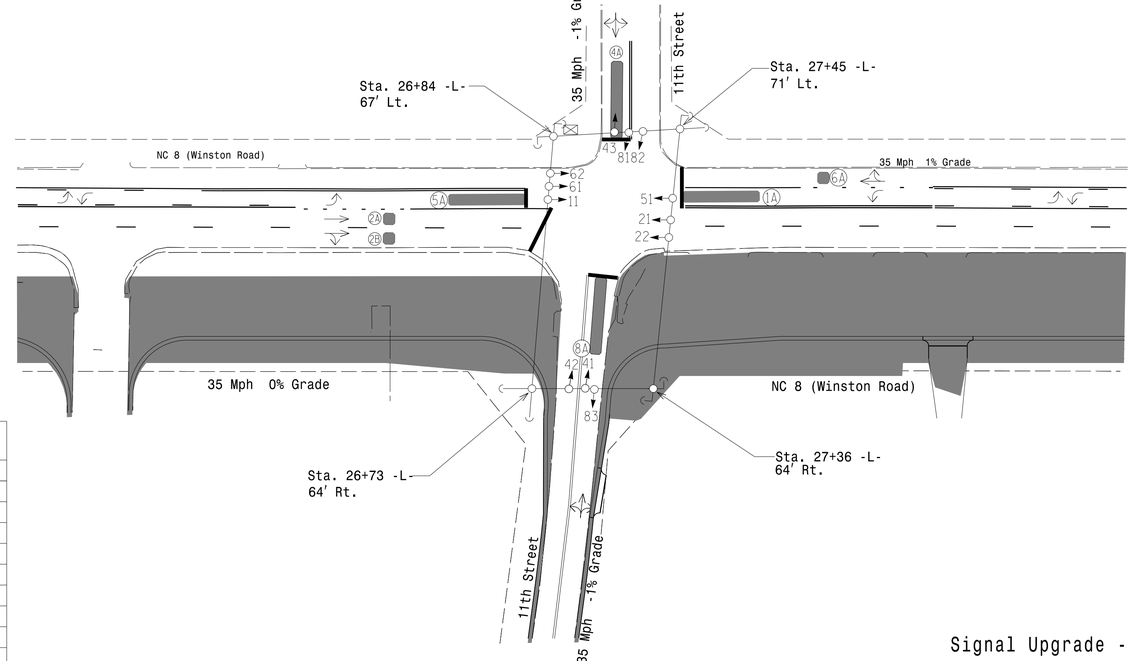
All Heads L.E.D.



5 Phase
Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19_Lexington

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. This intersection uses 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.
9. Pavement markings are existing.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▯↓	Pedestrian Signal Head With Push Button & Sign	■↓
○→	Signal Pole with Guy	●→
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	- - - -
→	Directional Arrow	→
▬	Construction Zone	N/A
▬	Video Detection Zone	▬

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–
Min Green *	7	10	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	3.0	2.0
Max 1 *	15	40	15	15	40	15
Yellow Change	3.0	3.8	3.9	3.0	3.8	3.9
Red Clear	2.1	1.3	1.2	2.1	1.3	1.2
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

Signal Upgrade - Temporary Design 1 (TMP Phase I)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Road) at 11th Street

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: B.E. Wynn REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

SIGNATURE DATE

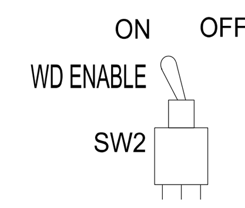
SIG. INVENTORY NO. 09-0401TI

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

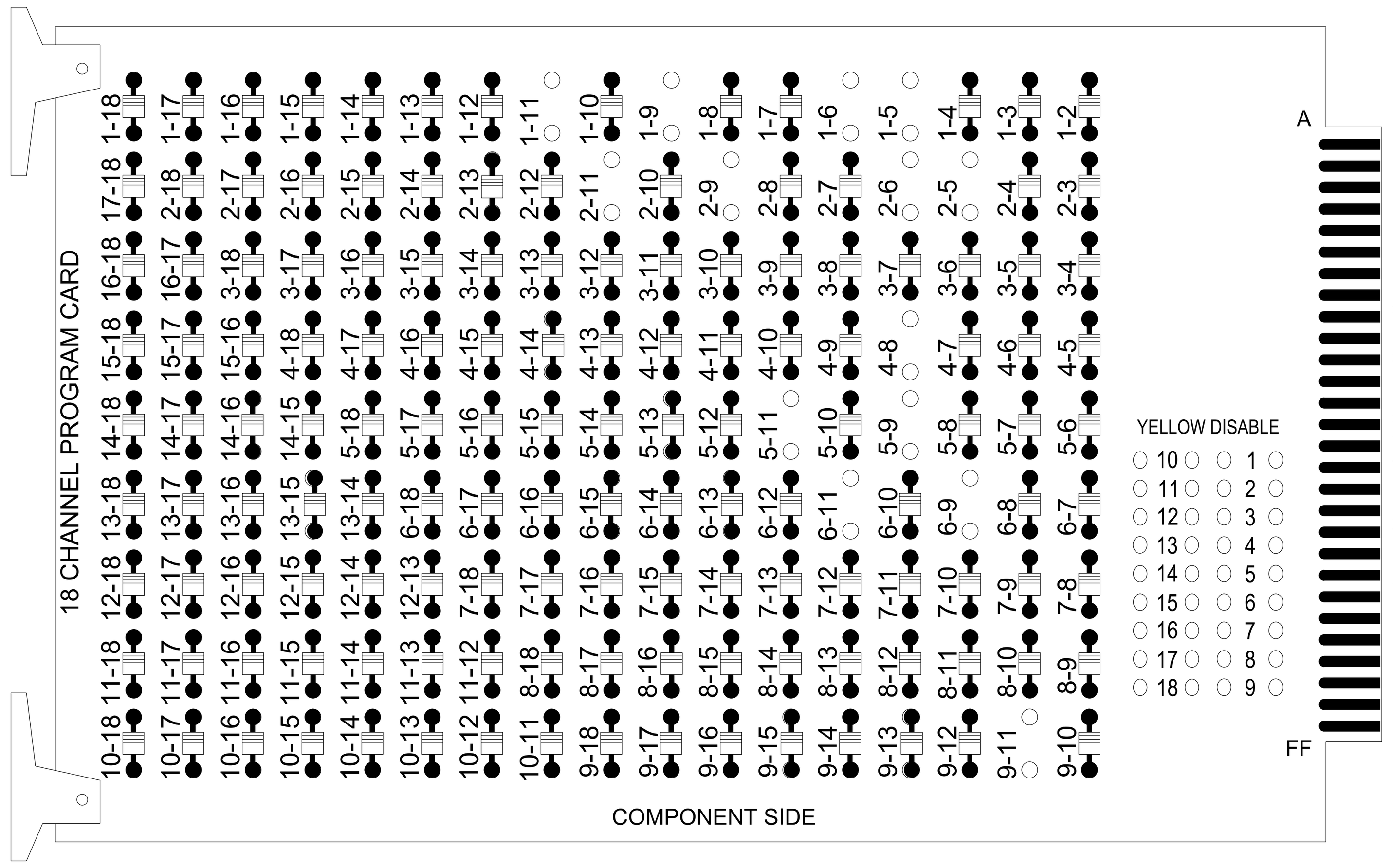
5/9/2024
09-0401TI_sig_dsn_2022xxxx.dgn
USER:default

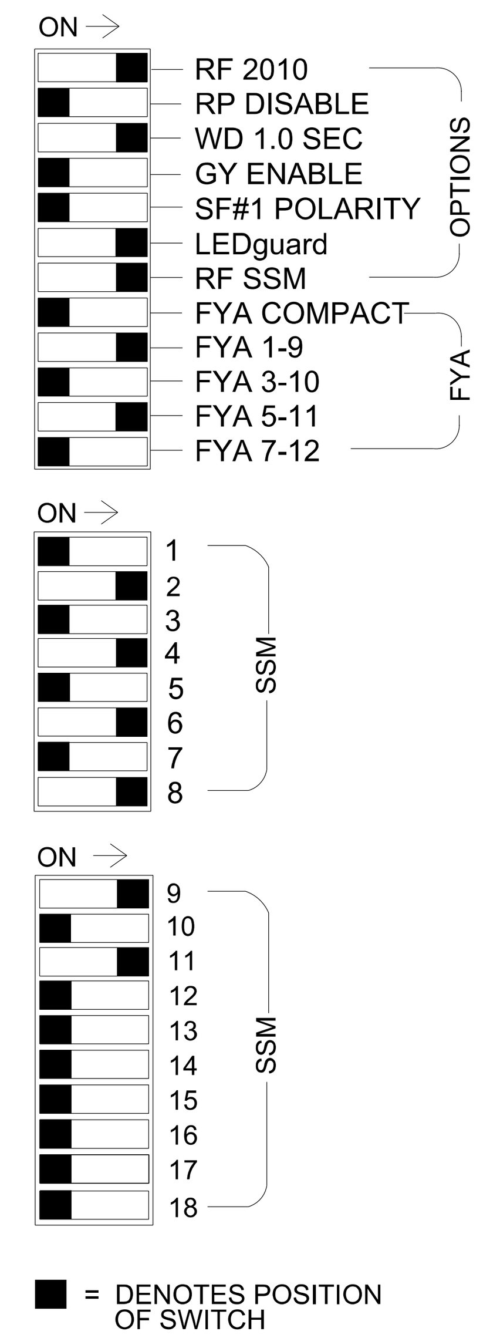
18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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





REMOVE JUMPERS AS SHOWN

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 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.

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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.9.1

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	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	41,42, 43	NU	51★	61,62	NU	NU	81,82, 83	NU	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											

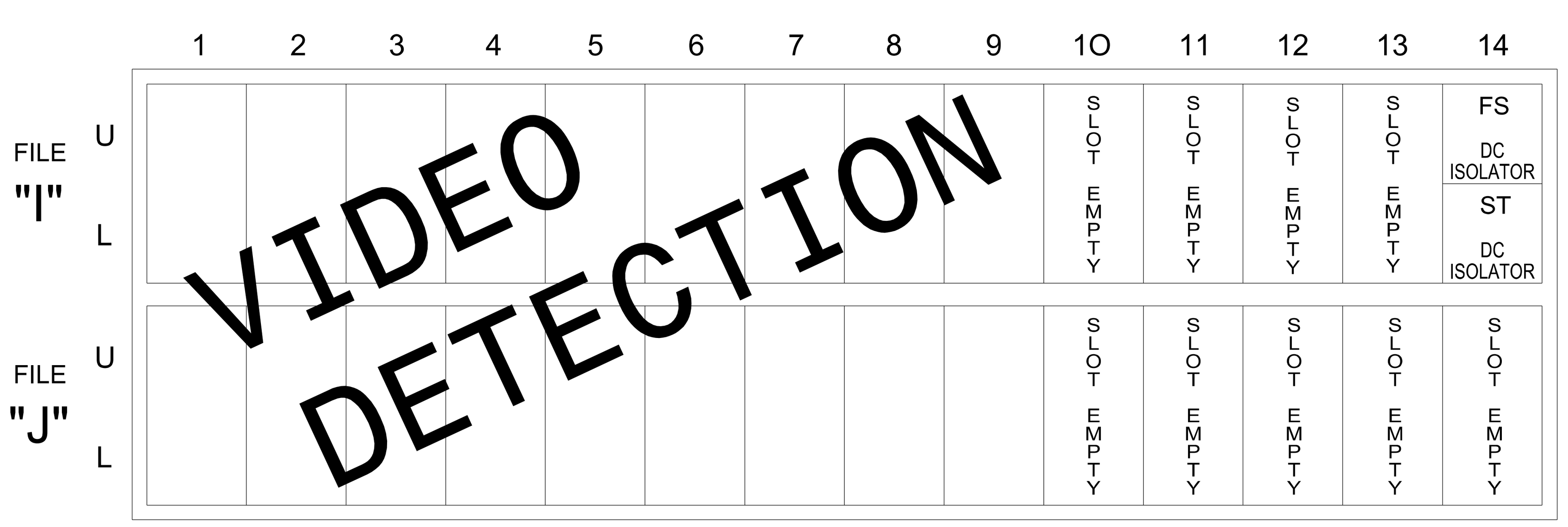
NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

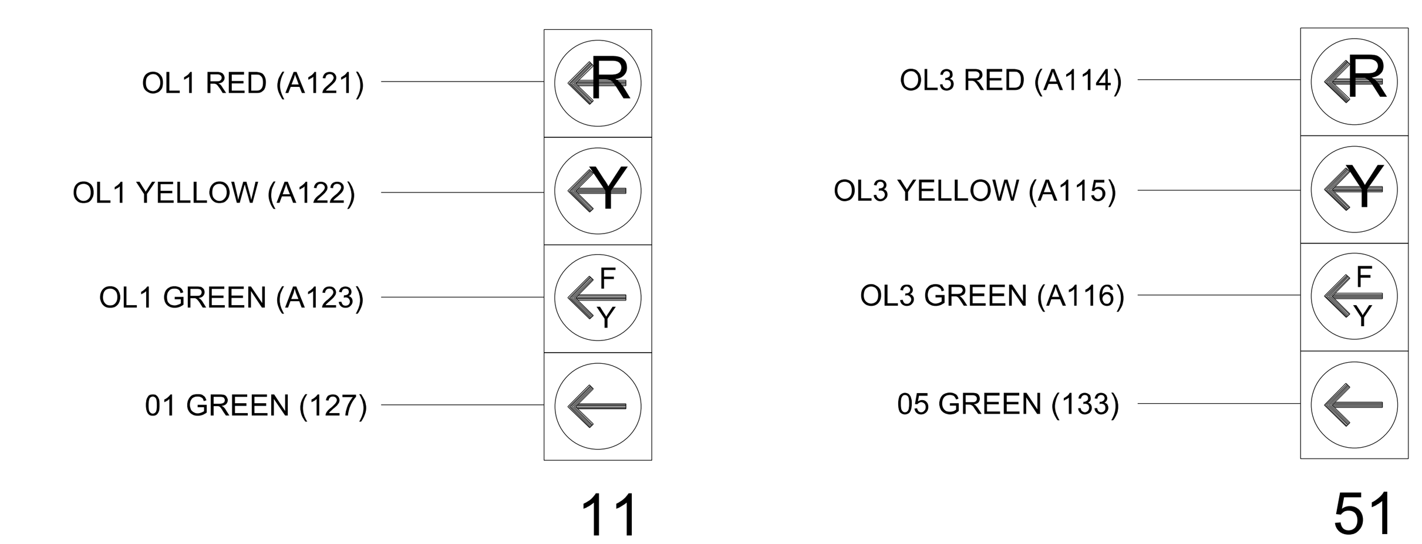
Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zones 1A and 5A, inputs associated with the typical NCDOT installation slots are compatible with time of day instructions located on sheet 2.

Note: For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

FYA SIGNAL WIRING DETAIL

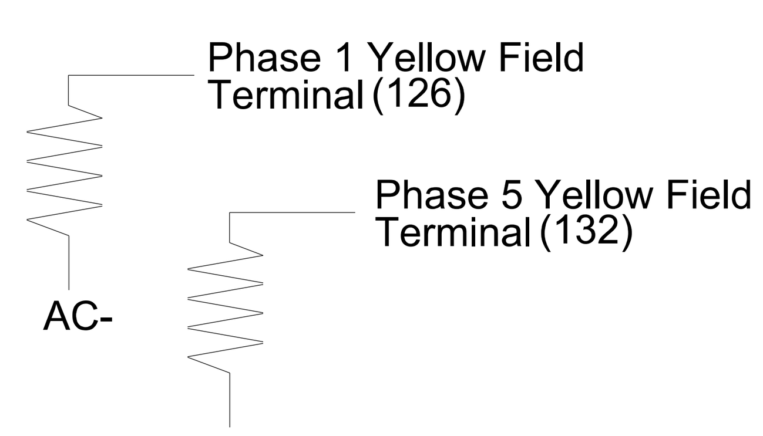
(wire signal heads as shown)



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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0401T1
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

Electrical Detail - Sheet 1 of 2

TRANSYSTEMS
1 Glenwood Avenue
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Fax:919.789.9591
License: F-0453

Electrical and Programming Details For:

Prepared for the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

NC 8 (Winston Road)
at
11th Street

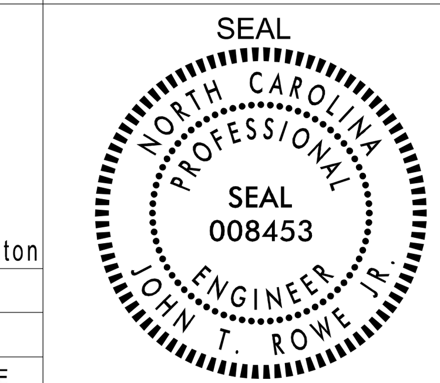
Division 9 | Davidson County | Lexington

PLAN DATE:	May 2024	REVIEWED BY:	
PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL



DATE

SIG. INVENTORY NO. 09-0401T1

5/9/2024
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USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.9.2

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

← NOTICE INCLUDED PHASE

Note: If Loops 1A and 5A are detected using the Vehicle Detectors shown in the charts below, use the steps shown below. If different Vehicle Detectors are used, substitute the appropriate Vehicle Detector numbers for the ones shown below.

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0401T1
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

Electrical and Programming Details For:

NC 8 (Winston Road) at 11th Street

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

Division 9 | Davidson County | Lexington

PLAN DATE:	May 2024	REVIEWED BY:	
PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, IV
DATE

SIG. INVENTORY NO. 09-0401T1

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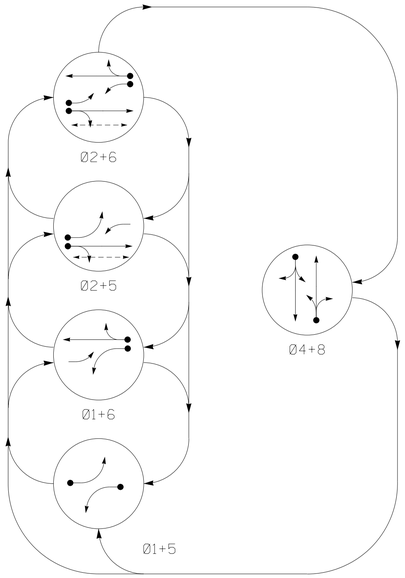
License: F-0453

5/9/2024
09-0401T1_sheet_2024xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 10.0

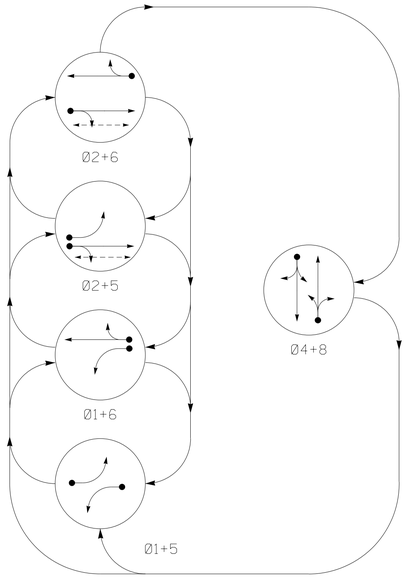
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←●	←●	←̶F̶Y̶	←̶F̶Y̶	←̶R̶	←̶Y̶
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
51	←●	←̶F̶Y̶	←●	←̶F̶Y̶	←̶R̶	←̶Y̶
61,62	R	G	R	G	R	Y
81,82,83	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK

ALTERNATE PHASING DIAGRAM

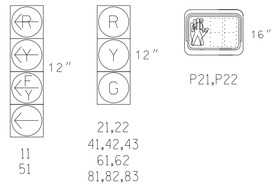


ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←●	←●	←̶R̶	←̶R̶	←̶R̶	←̶Y̶
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
51	←●	←̶R̶	←●	←̶R̶	←̶R̶	←̶Y̶
61,62	R	G	R	G	R	Y
81,82,83	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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

MAXTIME DETECTOR INSTALLATION CHART

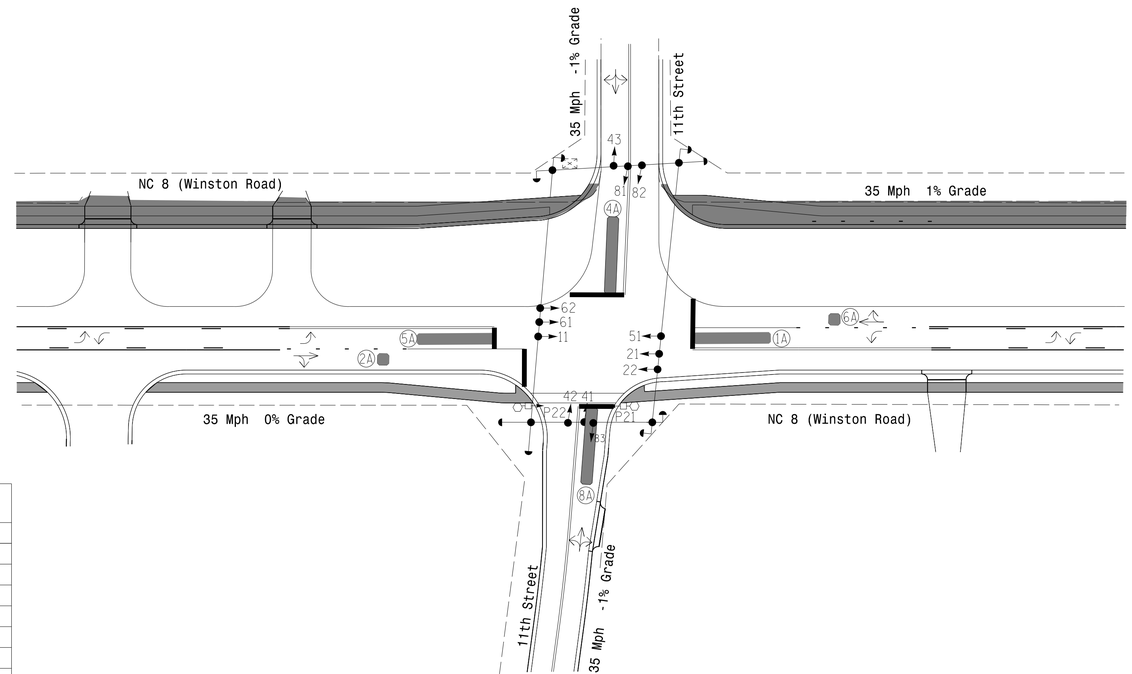
DETECTOR ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A✳	6X40	0	✳	-	1	15.0✳✳	-	X	-	X	-	
					6#	-	-	X	-	X	-	-
2A✳	6X6	70	✳	-	2	-	-	X	-	X	-	-
4A✳	6X40	0	✳	-	4	5.0	-	X	-	X	-	-
5A✳	6X40	0	✳	-	5	15.0✳✳	-	X	-	X	-	-
					2#	-	-	X	-	X	-	-
6A✳	6X6	70	✳	-	6	-	-	X	-	X	-	-
8A✳	6X40	0	✳	-	6	5.0	-	X	-	X	-	-

✳Video Detection Zone
✳✳Disable delay during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

5 Phase
Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19_Lexington

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or 5 may be lagged.
4. Reposition existing signal heads 11, 21, 22, 51, 61 & 62.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
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.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
○→	Signal Pole with Guy	●→
○↘	Signal Pole with Sidewalk Guy	●↘
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
┈┈	2-in Underground Conduit	┈┈
N/A	Right of Way	┈┈
→	Directional Arrow	→
⬡	Type II Signal Pedestal	⬢
▬	Construction Zone	N/A
▬	Video Detection Zone	▬

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	13	–	–	–	–
Ped Clear *	–	9	–	–	–	–
Min Green *	7	10	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	3.0	2.0
Max 1 *	15	40	15	15	40	15
Yellow Change	3.0	3.8	3.9	3.0	3.8	3.9
Red Clear	2.3	1.3	1.1	2.6	1.3	1.1
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	6	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

Signal Upgrade - Temporary Design 2 (TMP Phase II)

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

NC 8 (Winston Road)
at
11th Street

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY: G.G. Murr, Jr.
PREPARED BY: B.E. Wynn REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
14543
ENGINEER
GENE G. MURR JR.

SIGNATURE DATE

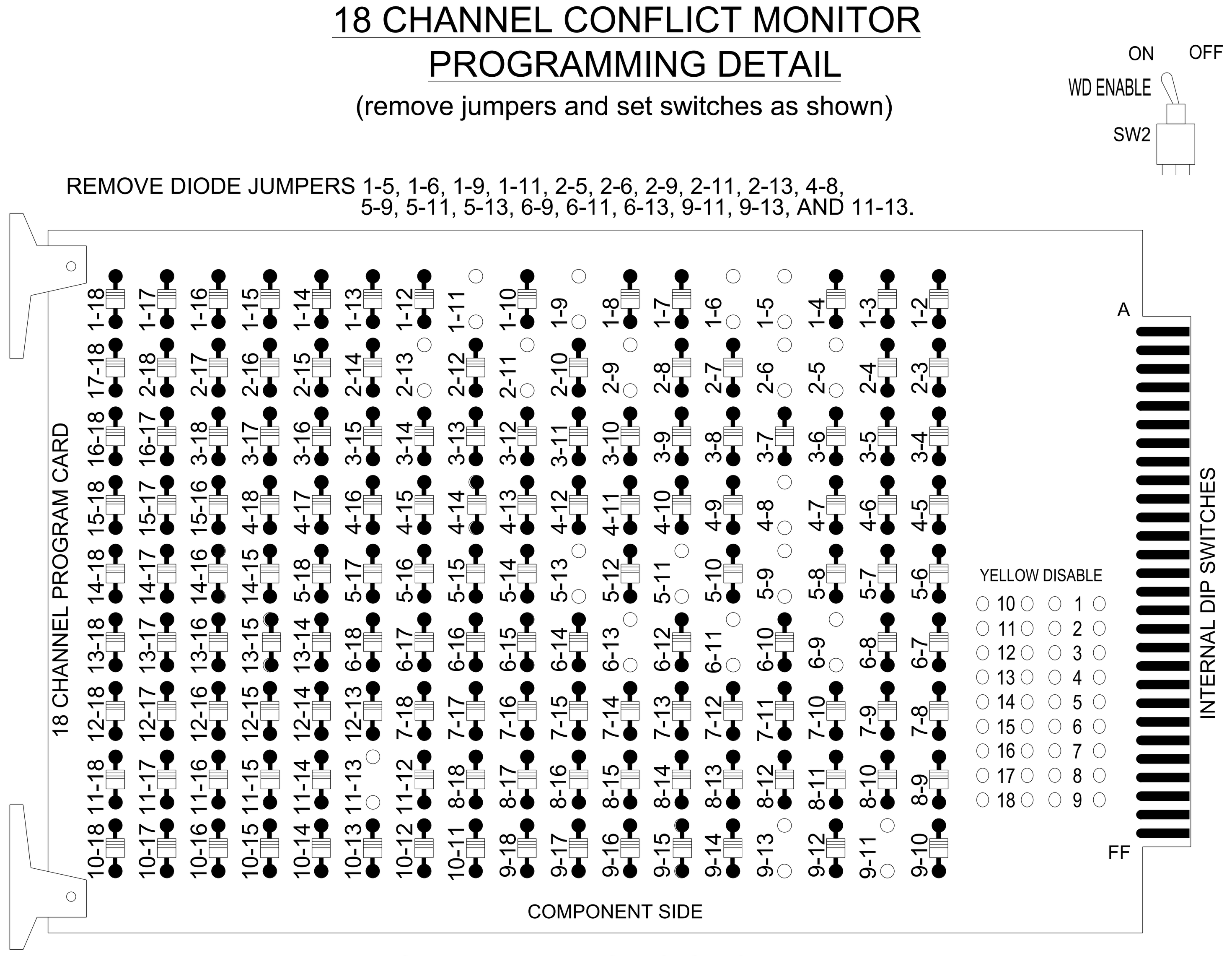
SIG. INVENTORY NO. 09-0401T2

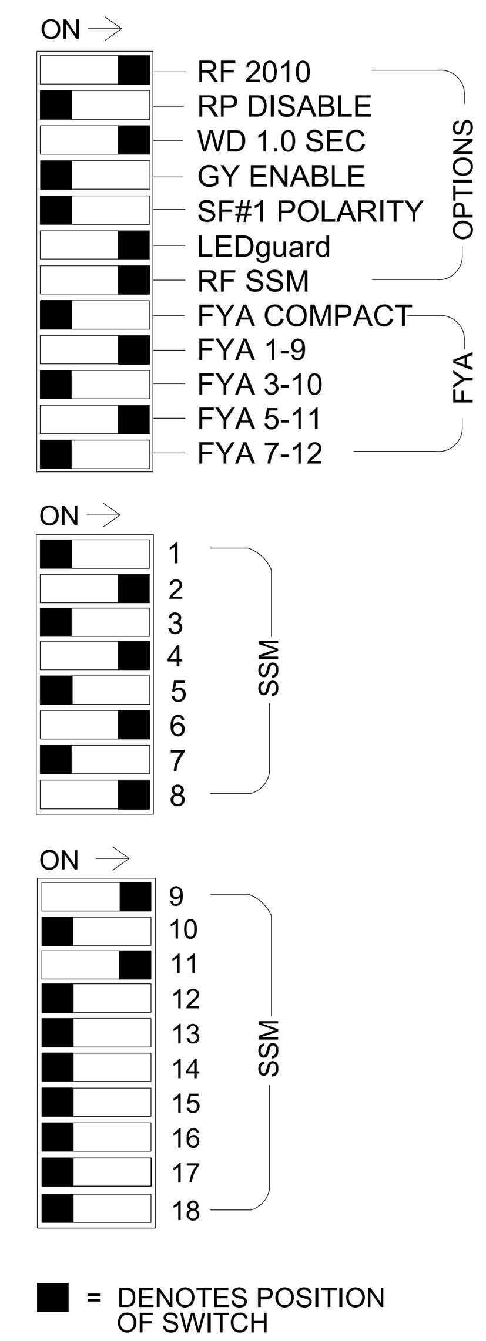
5/9/2024
09-0401T2_sig_dsn_2022xxxx.dgn
USER:default

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 4-8, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 9-11, 9-13, AND 11-13.





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 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.

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 phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S3, S5, S7, S8, S11, AUX S1, AUX S4
Phases Used..1, 2, 2PED, 4, 5, 6, 8
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	NU	41,42, 43	NU	51★	61,62	NU	NU	81,82, 83	NU	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											
(Don't Walk hand)			113															
(Walk person)			115															

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

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	VIDEO DETECTION									SLOT EMPTY	SLOT EMPTY	∅2 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
"I"	L												NOT USED		ST DC ISOLATOR
"J"	U										SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

PED PUSH BUTTONS	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
P21,P22	TB8-4,6	I12U	67	33	2	PED 2

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

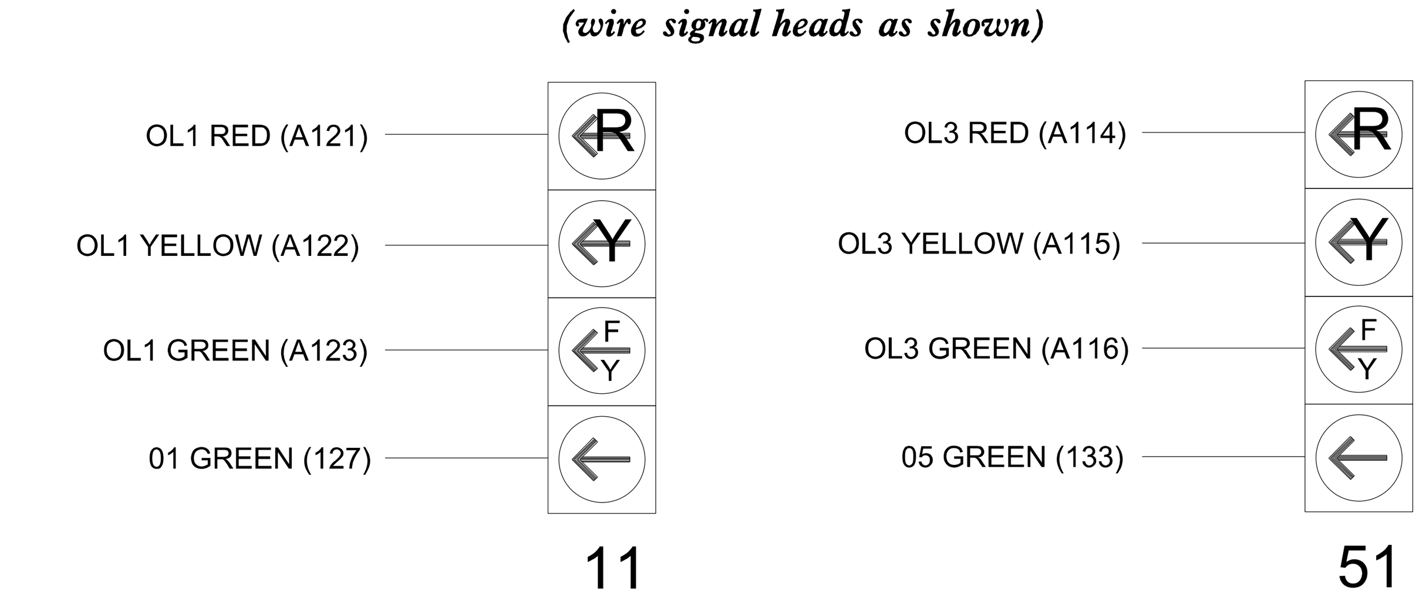
Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zones 1A and 5A, inputs associated with the typical NCDOT installation slots are compatible with time of day instructions located on sheet 2.

Note: For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

FYA SIGNAL WIRING DETAIL

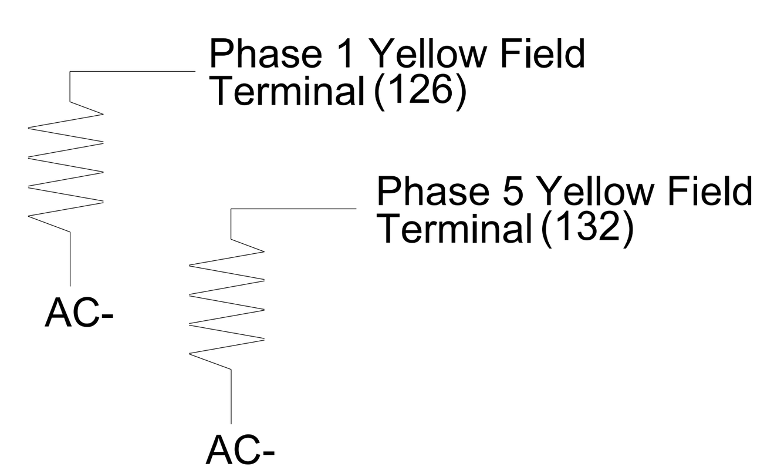
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0401T2
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

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License: F-0453

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

NC 8 (Winston Road) at 11th Street

Division 9 Davidson County Lexington

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

PLAN DATE: May 2024 REVIEWED BY:
PREPARED BY: J.T. Rowe REVIEWED BY: G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR.

DATE

SIG. INVENTORY NO. 09-0401T2

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.10.2.

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

← NOTICE INCLUDED PHASE

Note: If Loops 1A and 5A are detected using the Vehicle Detectors shown in the charts below, use the steps shown below. If different Vehicle Detectors are used, substitute the appropriate Vehicle Detector numbers for the ones shown below.

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0401T2
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

Electrical and Programming Details For:

NC 8 (Winston Road) at 11th Street

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Division 9 | Davidson County | Lexington

PLAN DATE:	May 2024	REVIEWED BY:	
PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

DATE

SIG. INVENTORY NO. 09-0401T2

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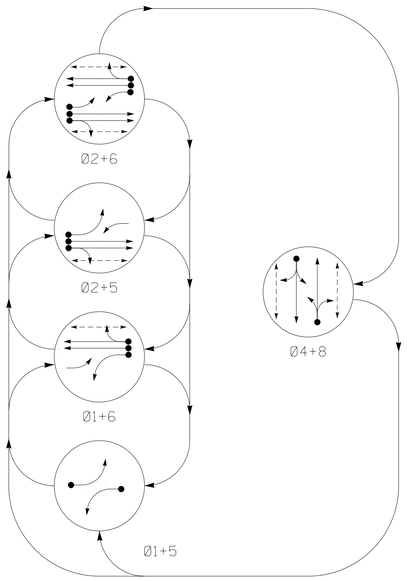
5/9/2024
09-0401T2_sht_ele_2024xxyy.dgn
USER:jtrowe

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 11.0

DEFAULT PHASING DIAGRAM



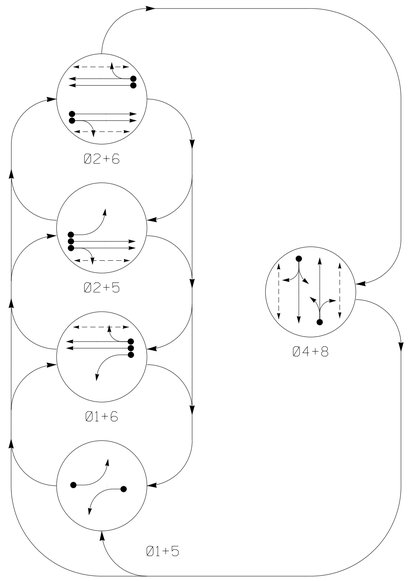
PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	~~R~~	~~R~~	~~F Y~~	~~F Y~~	~~R~~	~~Y~~
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
51	~~R~~	~~F Y~~	~~R~~	~~F Y~~	~~R~~	~~Y~~
61,62	R	G	R	G	R	Y
81,82,83	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM

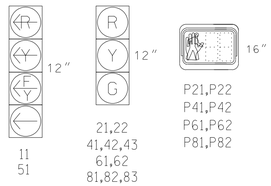


ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
51	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
61,62	R	G	R	G	R	Y
81,82,83	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

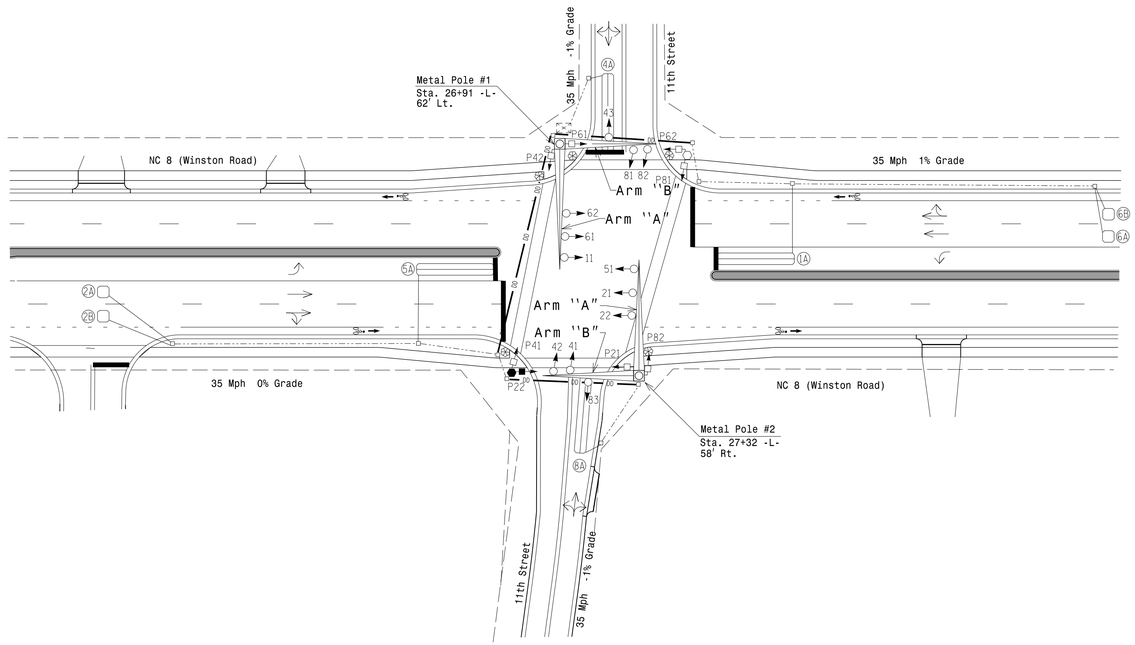
DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1	15.0**	-	X	-	X	-	X
					6#	3.0	-	X	-	X	X	X
2A	6X6	200	5	X	2	-	-	X	X	X	-	X
2B	6X6	200	5	X	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	X	4	5.0	-	X	-	X	-	X
5A	6X40	0	2-4-2	X	5	15.0**	-	X	-	X	-	X
					2#	3.0	-	X	-	X	X	X
5B	6X40	0	2-4-2	X	5	-	-	X	-	X	-	X
6A	6X6	200	5	X	6	-	-	X	X	X	-	X
6B	6X6	200	5	X	6	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	X	8	5.0	-	X	-	X	-	X

** Disable delay during alternate phasing operation
# Disable phase call for loop(s) during alternate phasing operation

5 Phase Fully Actuated NC 8 (Winston Road) CLS Signal System #:D09-19 Lexington

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or 5 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
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. Traffic Signal Heads and Pedestal Posts will be black color treated. The selected shade of black must be verified and approved by the Engineer and City of Lexington prior to ordering.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
DD	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
	Type I Pushbutton Post	
	Type II Signal Pedestal	

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	13	13	–	13	13
Ped Clear *	–	9	22	–	10	22
Min Green *	7	10	7	7	10	7
Passage *	2.0	5.0	2.0	2.0	5.0	2.0
Max 1 *	15	40	15	15	40	15
Yellow Change	3.0	3.8	3.9	3.0	3.8	3.9
Red Clear	3.2	2.4	2.2	3.2	2.4	2.2
Added Initial *	–	1.5	–	–	1.5	–
Maximum Initial *	–	24	–	–	24	–
Time Before Reduction *	–	15	–	–	15	–
Time To Reduce *	–	30	–	–	30	–
Minimum Gap	–	3.0	–	–	3.0	–
Advance Walk	–	6	6	–	6	6
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

5/9/2024
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USER:default

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Road) at 11th Street

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY: G.G. Murr, Jr.
PREPARED BY: B.E. Wynn REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GEORGE G. MURR, JR.

SIGNATURE DATE

SIG. INVENTORY NO. 09-0401

TRANSYSTEMS
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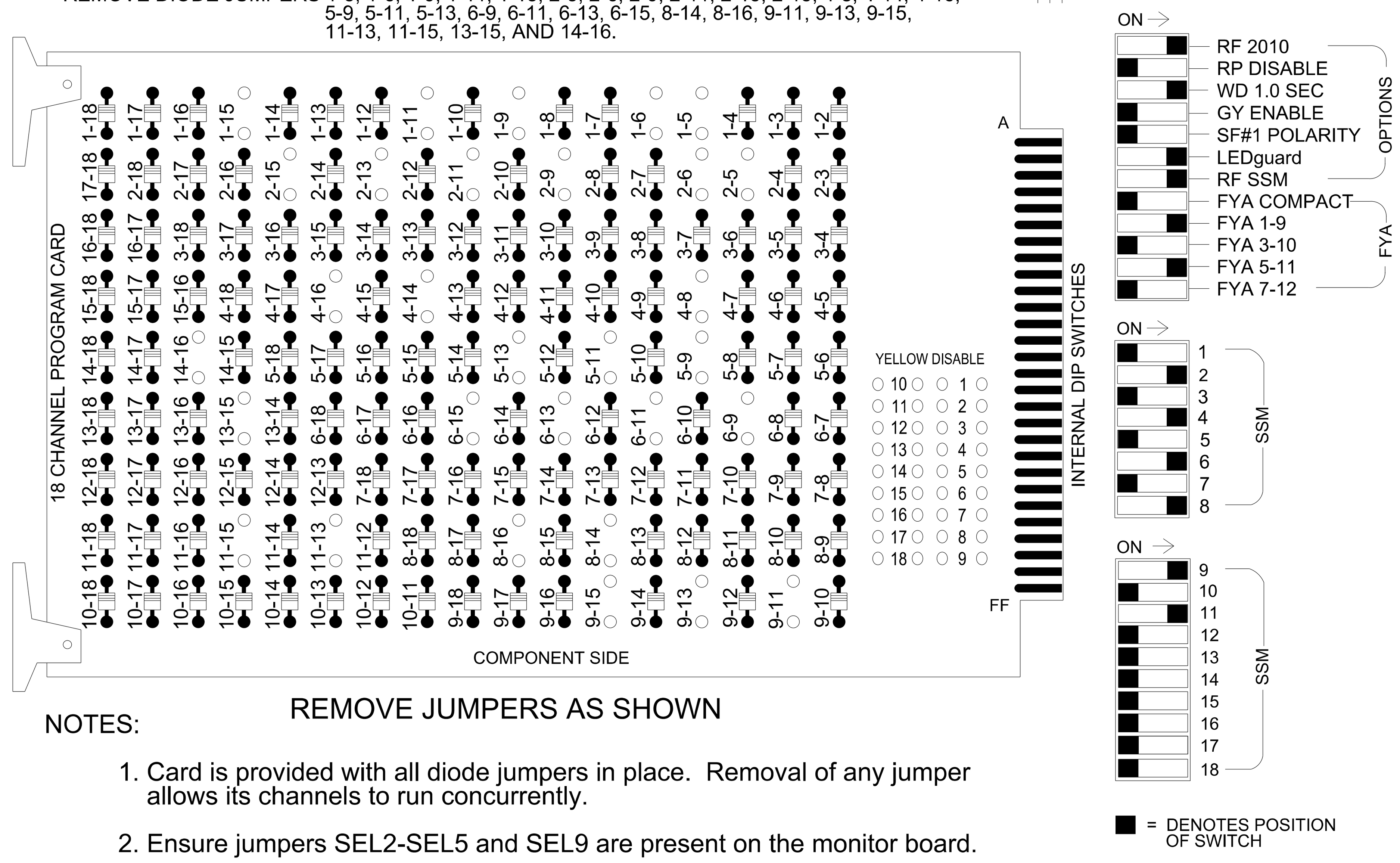
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that 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.

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 phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Start for phases 4 and 8.
4. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S3, S5, S6, S7, S8, S9, S11, S12, AUX S1, AUX S4
Phases Used.......................................1, 2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig.11.1

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	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	NU	41,42, 43	P41, P42	51★	61,62	P61, P62	NU	81,82, 83	P81, P82	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											
(hand)			113			104			119			110						
(pedestrian)			115			106			121			112						

NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0	---	X	_	X	_
				-	29 ★	6	3.0	---	X	_	X	X
2A	TB2-5,6	I2U	39	1	2	2	---	---	X	X	X	_
2B	TB2-7,8	I2L	43	5	3	2	---	---	X	X	X	_
4A	TB4-9,10	I6U	41	3	8	4	5.0	---	X	_	X	_
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0	---	X	_	X	_
				-	31 ★	2	3.0	---	X	_	X	X
5B	TB3-5,6	J2U	40	2	16	5	---	---	X	_	X	_
6A	TB3-9,10	J3U	64	30	18	6	---	---	X	X	X	_
6B	TB3-11,12	J3L	77	43	19	6	---	---	X	X	X	_
8A	TB5-9,10	J6U	42	4	22	8	5.0	---	X	_	X	_
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

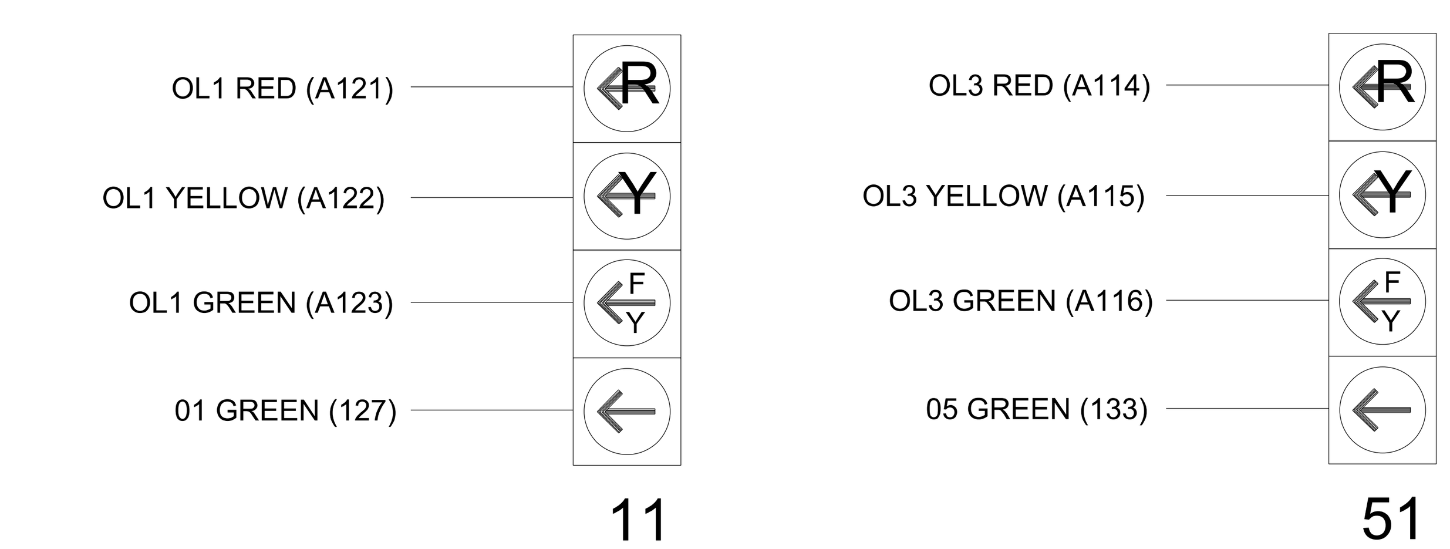
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loops 1A & 5A on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

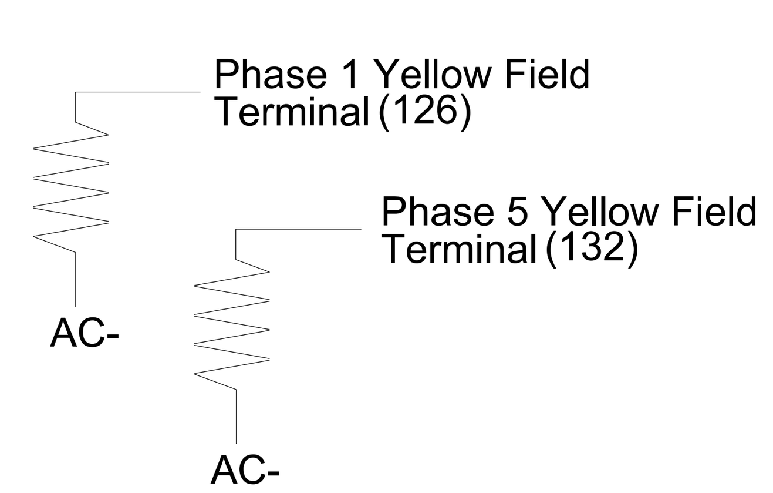
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0401
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

TRANSYSTEMS
1 Glenwood Avenue
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Fax:919.789.9591
License: F-0453

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

NC 8 (Winston Road)
at
11th Street

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

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY:
PREPARED BY: J.T. Rowe REVIEWED BY: G.G. Murr, Jr.

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR

DATE

SIG. INVENTORY NO. 09-0401

5/9/2024
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USER:default

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

← NOTICE INCLUDED PHASE

VEHICLE DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	0.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

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

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0401
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

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Fax:919.789.9591
License: F-0453

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

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

NC 8 (Winston Road)
at
11th Street

Division 9 | Davidson County | Lexington

PLAN DATE:	May 2024	REVIEWED BY:	
PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.

DATE

SIG. INVENTORY NO. 09-0401

5/10/2024
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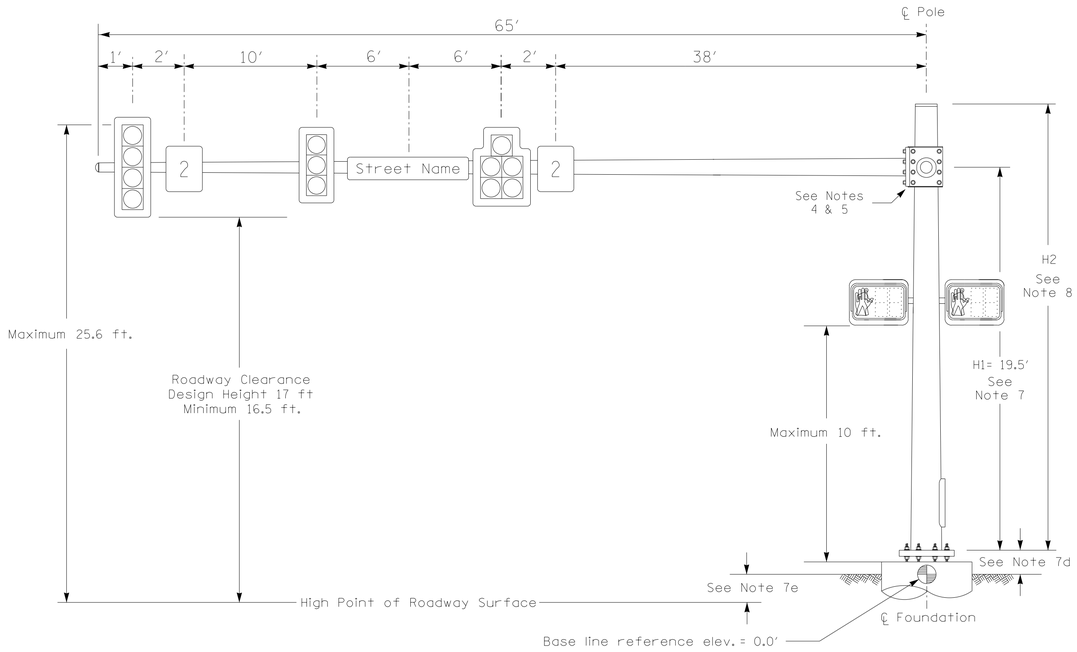
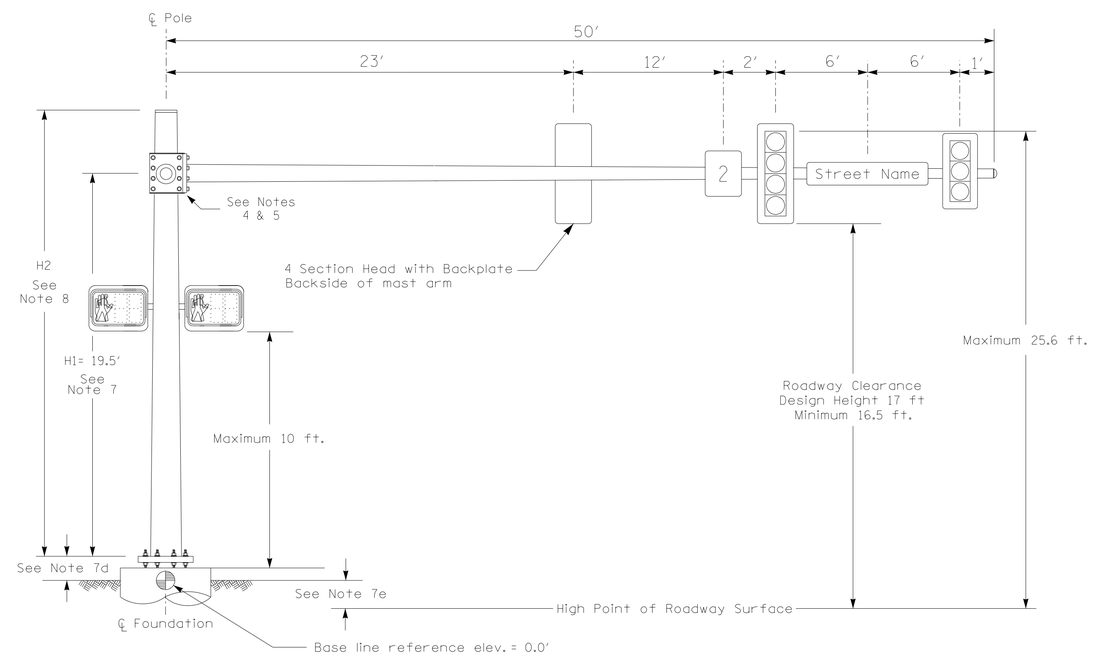
USER:default

Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 1, MAST ARM B



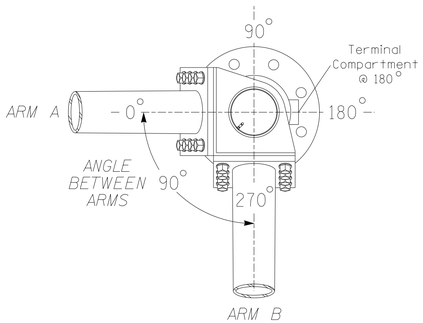
Elevation View @ 0°

SPECIAL NOTE

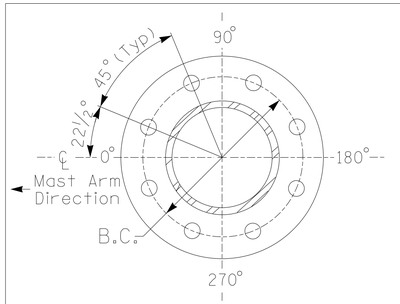
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	MP#1 Arm A	MP#1 Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.27 ft.	-0.56 ft.
Elevation difference at Edge of travelway or face of curb	-0.76 ft.	-0.63 ft.

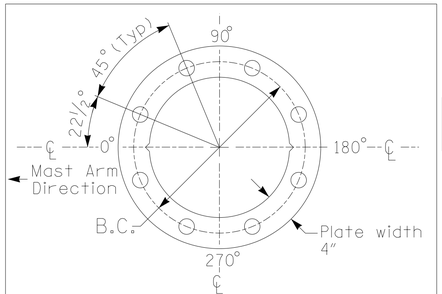


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 11.3

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0″W X 56.0″L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″W X 17.0″L	21 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0″W X 36.0″L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - 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 signal project special provisions.
   - The 2024 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

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 signal plans for the actual loads 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
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. Signal heads 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 level and the high point of the roadway.
8. The pole manufacturer will determine the total height (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 signal heads 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.

NOTE: Metal poles and mast arms are to have black protective coating as specified in the Project Special Provisions. The selected shade, RAL= 9017 Traffic Black, must be verified and approved by the Engineer and City of Lexington before shop drawings will be reviewed by NCDOT.

NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 8 (Winston Road)
at
11th Street

Division 9 | Davidson County | Lexington

PLAN DATE: May 2024 | REVIEWED BY: G.G. Murr, Jr.
PREPARED BY: B.E. Wynn | REVIEWED BY:

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

DATE

SIG. INVENTORY NO. 09-0401

5/9/2024
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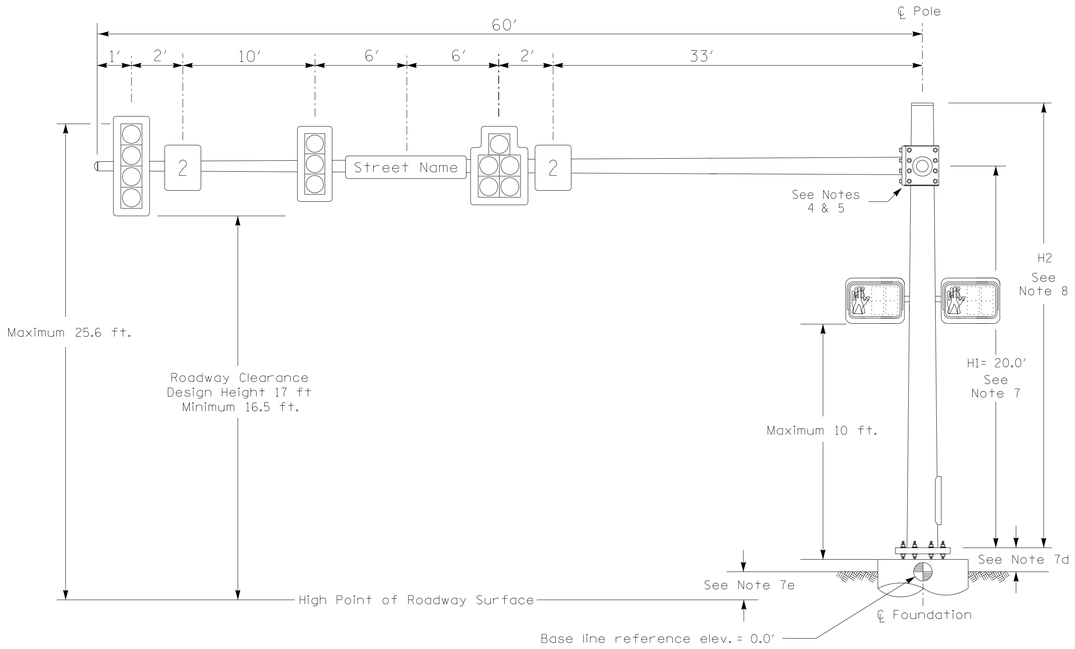
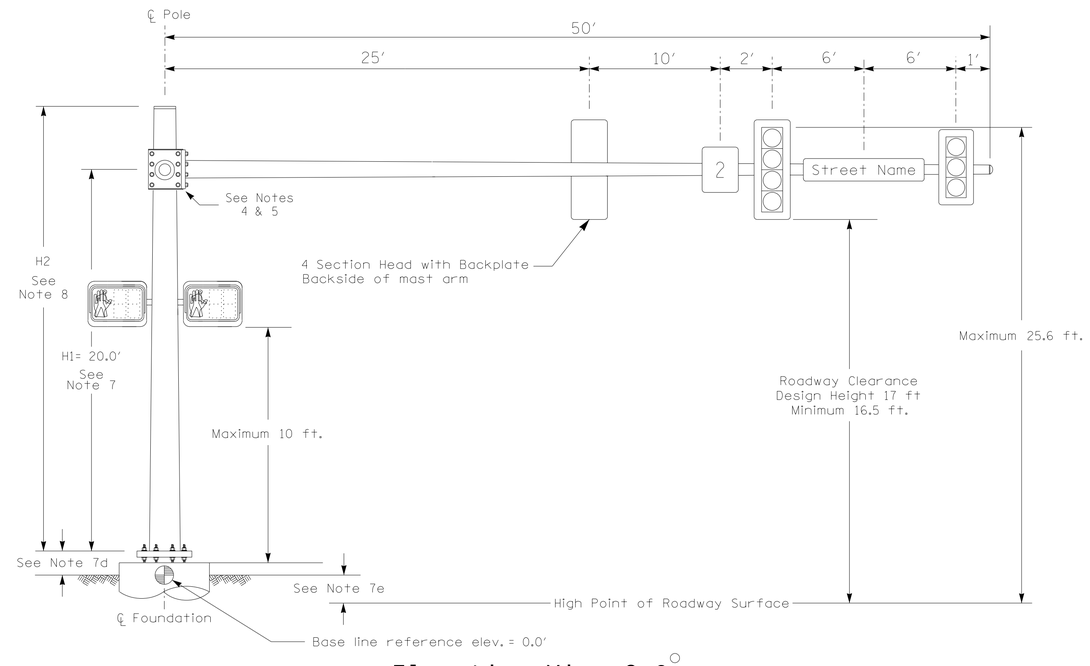
Design Loading for METAL POLE NO. 2, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 2, MAST ARM B



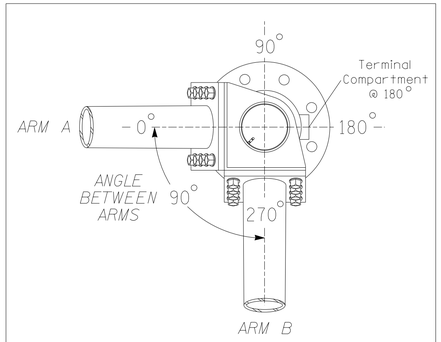
Elevation View @ 0°

SPECIAL NOTE

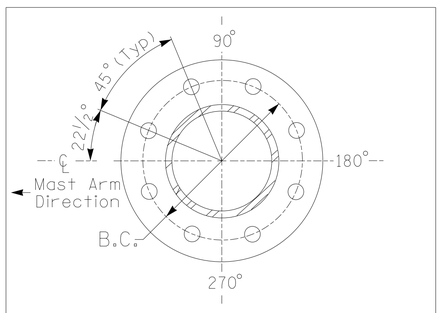
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	MP#2 Arm A	MP#2 Arm B
Baseline reference point at ⊕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.96 ft.	+0.97 ft.
Elevation difference at Edge of travelway or face of curb	+0.03 ft.	+0.49 ft.

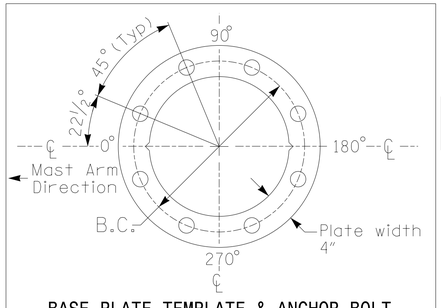


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12″-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0″W X 56.0″L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″W X 17.0″L	21 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0″W X 36.0″L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - 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 signal project special provisions.
   - The 2024 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

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 signal plans for the actual loads 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
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. Signal heads 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 level and the high point of the roadway.
8. The pole manufacturer will determine the total height (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 signal heads 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.

NOTE: Metal poles and mast arms are to have black protective coating as specified in the Project Special Provisions. The selected shade, RAL® 9017 Traffic Black, must be verified and approved by the Engineer and City of Lexington before shop drawings will be reviewed by NCDOT.

NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SCALE
0 N/A
N/A

NC 8 (Winston Road) at 11th Street

Division 9 Davidson County Lexington

PLAN DATE: May 2024 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: B.E. Wynn REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

DATE

SIG. INVENTORY NO. 09-0401

5/9/2024
09-0401_sig_mp_2024wxx.dgn
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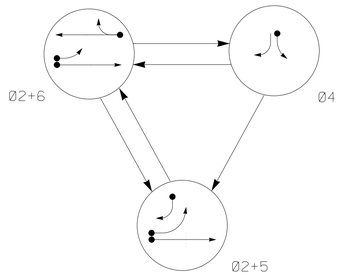
PROJECT REFERENCE NO.	SHEET NO.
U-5757	Sig. 12.0

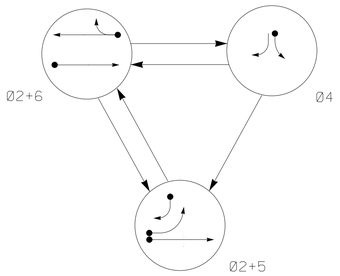
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

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

ALTERNATE PHASING DIAGRAM



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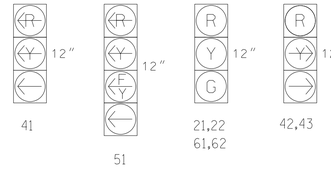
21,22	G	G	R	Y
41	~~R~~	~~R~~	~~R~~	~~R~~
42,43	→	R	→	R
51	←	~~R~~	~~R~~	~~Y~~
61,62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR ZONE	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW ZONE	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A✳	6X6	300	✳	X	2	-	-	X	X	X	-	-
4A✳	6X40	0	✳	X	4	3.0	-	X	-	X	-	-
5A✳	6X40	0	✳	X	5	15.0✳✳	-	X	-	X	-	-
					2#	3.0	-	X	-	X	X	-
5B✳	6X40	0	✳	X	5	15.0	-	X	-	X	-	-
6A✳	6X6	300	✳	X	6	-	-	X	X	X	-	-

✳ Video Detection Zone
✳✳ Reduce delay to 3 sec during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

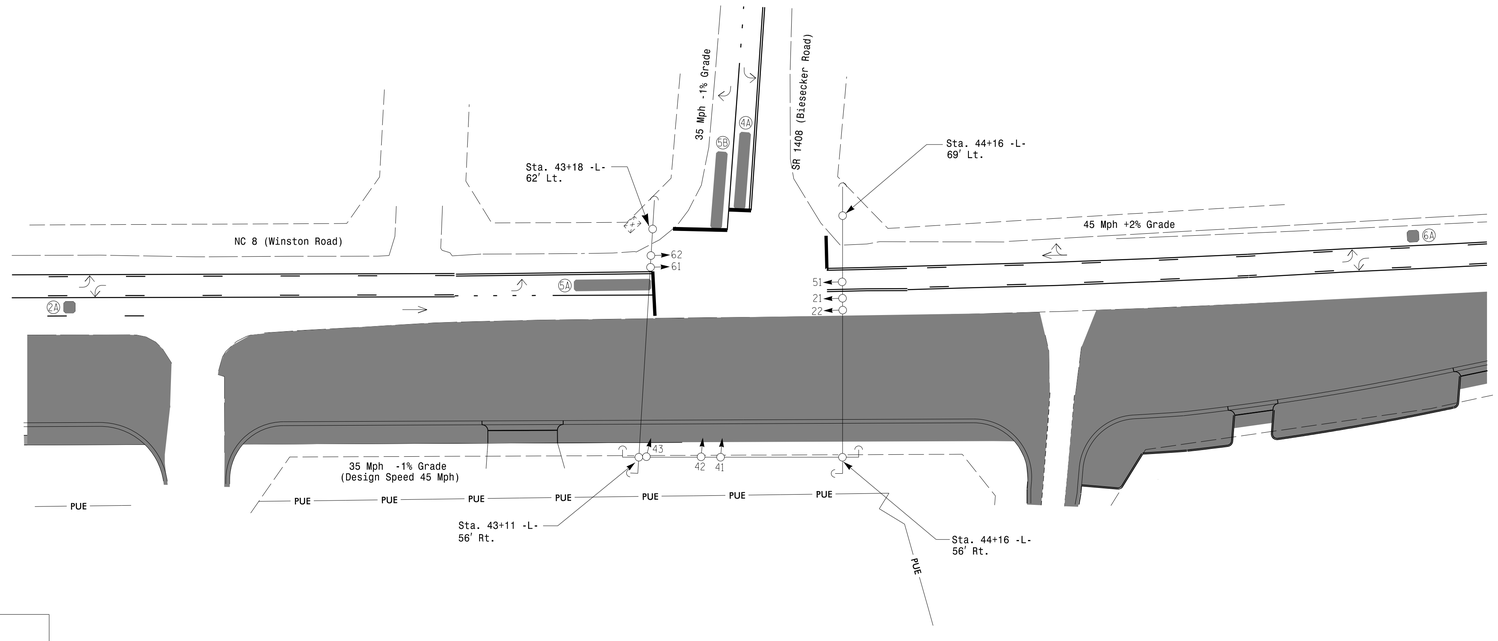
3 Phase
Fully Actuated
NC 8 (Winston Road) CLS
Signal System #:D09-19_Lexington

NOTES

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

PHASING DIAGRAM DETECTION LEGEND

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



MAXTIME TIMING CHART

FEATURE	PHASE 2	4	5	6
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green *	12	7	7	12
Passage *	6.0	2.0	2.0	6.0
Max 1 *	35	25	15	35
Yellow Change	4.6	3.0	3.0	4.6
Red Clear	1.2	1.9	1.9	1.2
Added Initial *	2.5	–	–	2.5
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	–	X	X	–
Vehicle Recall	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–

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

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○→	Signal Pole with Guy	●→
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·-·	2-in Underground Conduit	·-·-·-·
N/A	Right of Way	- - - - -
→	Directional Arrow	→
▬	Construction Zone	N/A
▬	Video Detection Zone	▬

Signal Upgrade - Temporary Design 1 (TMP Phase I)

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

NC 8 (Winston Road) at SR 1406 (Biesecker Road)

Division 9 Davidson County Lexington

PLAN DATE:	May 2024	REVIEWED BY:	G.G. Murr, Jr.
PREPARED BY:	B.E. Wynn	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

SIGNATURE DATE

SIG. INVENTORY NO. 09-0400 TI

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License: F-0453

5/9/2024
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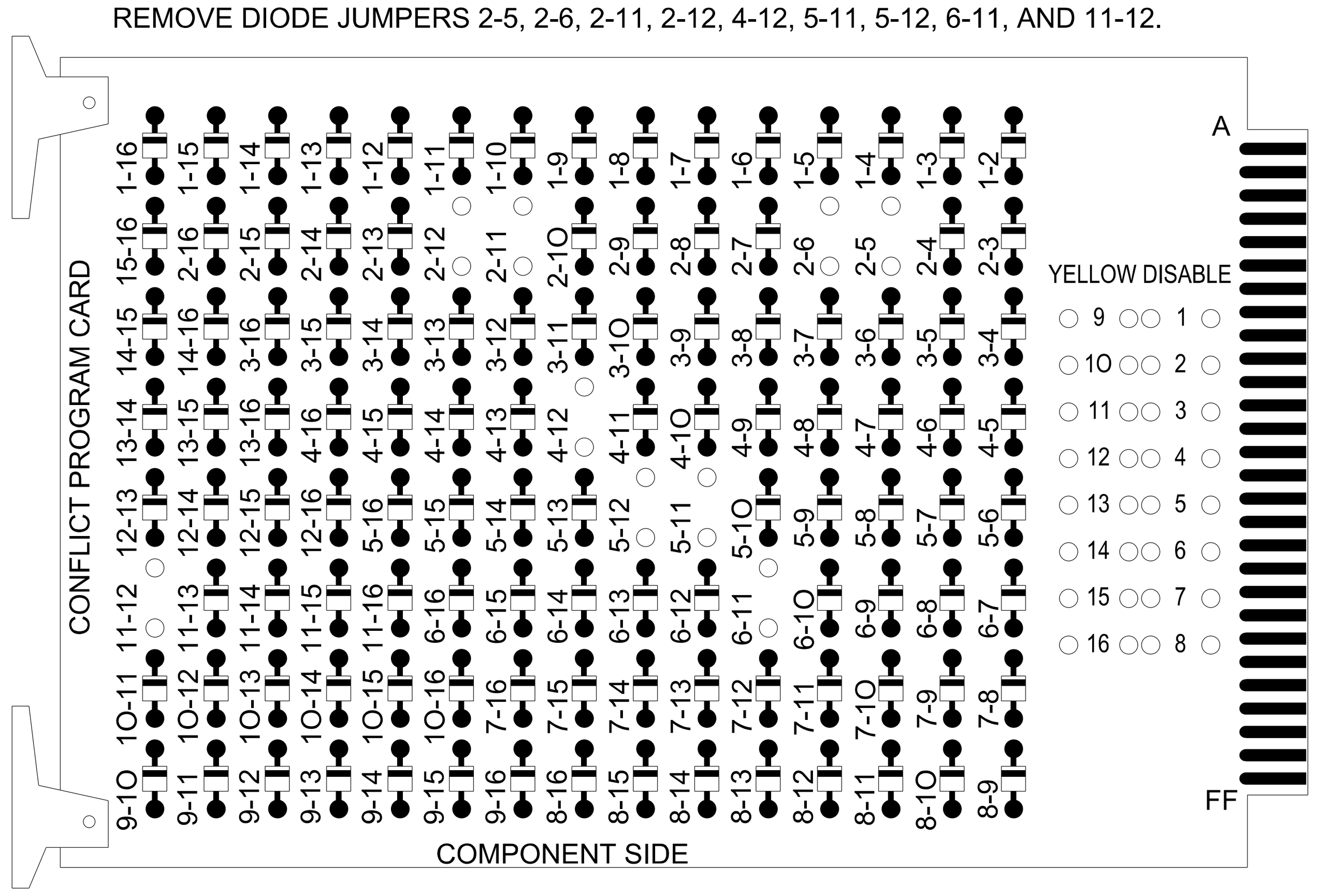
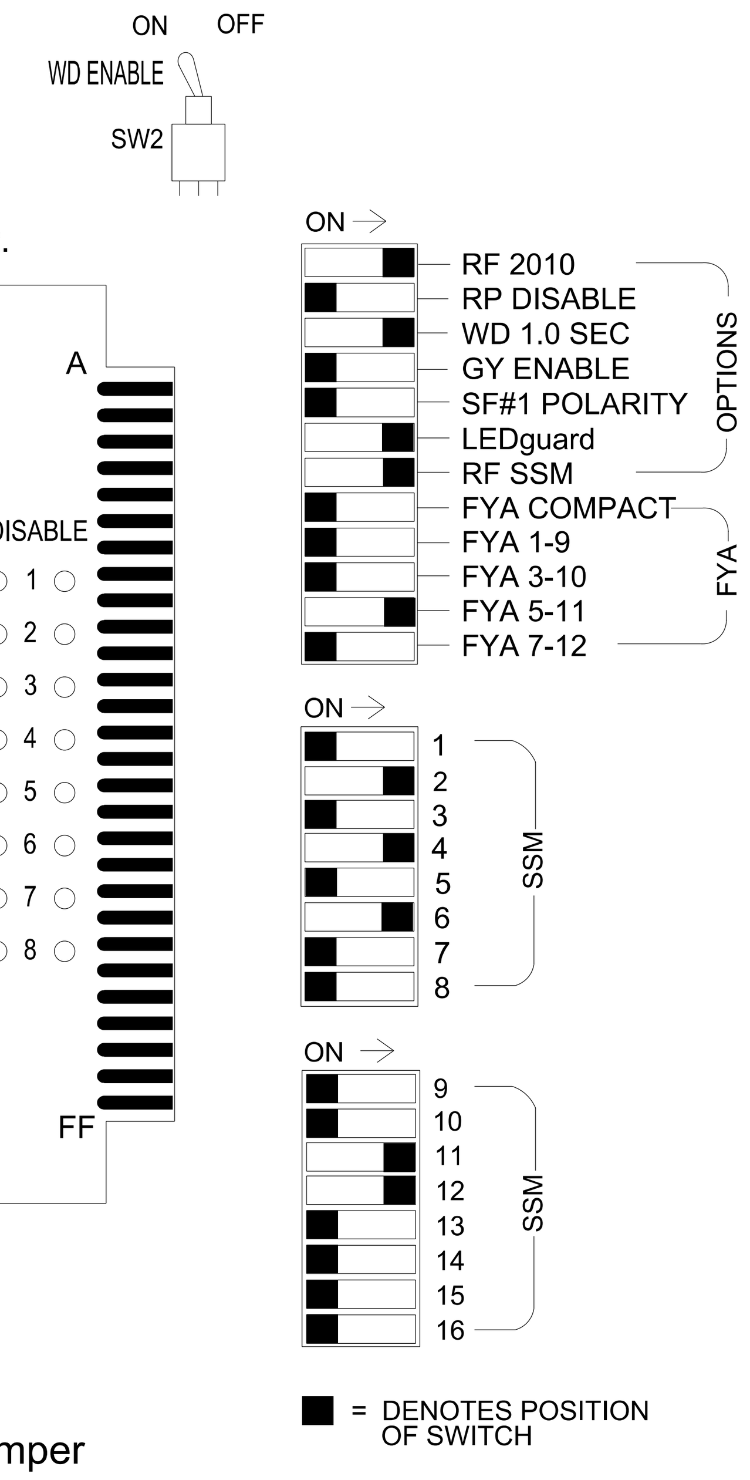
USER:default

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 2-12, 4-12, 5-11, 5-12, 6-11, AND 11-12.





REMOVE JUMPERS AS SHOWN

NOTES:
1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 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. Ensure that Red Enable is active at all times during normal operation. To prevent red failures on unused monitor channels, tie unused red monitor inputs 1,3,5,7,8,9, 10,13,14,15 and 16 to AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phase 2 Green No Walk and 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.
5. The cabinet and controller are part of the NC 8 (Winston Road) Closed Loop System (Signal System D09-19 Lexington).

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, S4, S5, S6, S12, S13
Phases Used.......................................2, 4, 5, 6
Overlap "1"..Not Used
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21.22	NU	NU	41	NU	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	42,43	NU
RED		128						134									A101	
YELLOW		129					*	135										
GREEN		130						136										
RED ARROW					101											A114		
YELLOW ARROW					102											A115	A102	
FLASHING YELLOW ARROW																A116		
GREEN ARROW					103		133										A103	

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

INPUT FILE POSITION LAYOUT

(front view)

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

VIDEO DETECTION

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

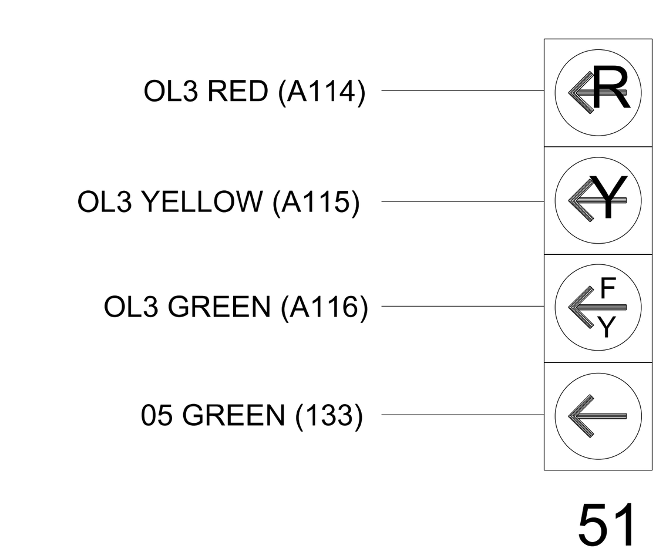
Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zone 5A, inputs associated with the typical NCDOT installation slots are compatible with time of day instructions located on sheet 2.

Note: For the detectors to work as shown on the signal design plan, see the Vehicle Detector Programming Detail for Alternate Phasing Loop 5A on sheet 2.

FYA SIGNAL WIRING DETAIL

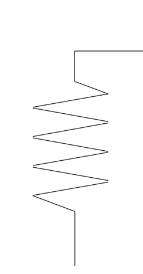
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



IMPORTANT ! Move resistor from Red Field Terminal to Yellow Field Terminal for Phase 5.

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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0400T1
DESIGNED: May 2024
SEALED: 05-09-2024
REVISED: N/A

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License: F-0453

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

NC 8 (Winston Road) at SR 1406 (Biesecker Road)

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

Division 9 Davidson County Lexington

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PREPARED BY:	J.T. Rowe	REVIEWED BY:	G.G. Murr, Jr.

REVISIONS	INIT.	DATE

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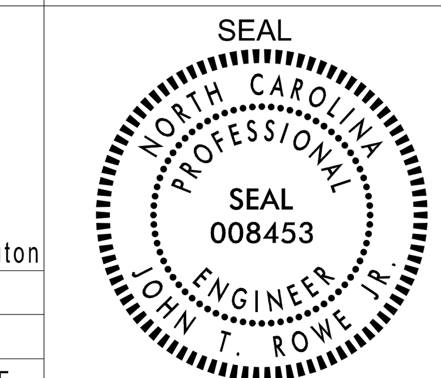
SEAL



DATE

SIG. INVENTORY NO. 09-0400T1