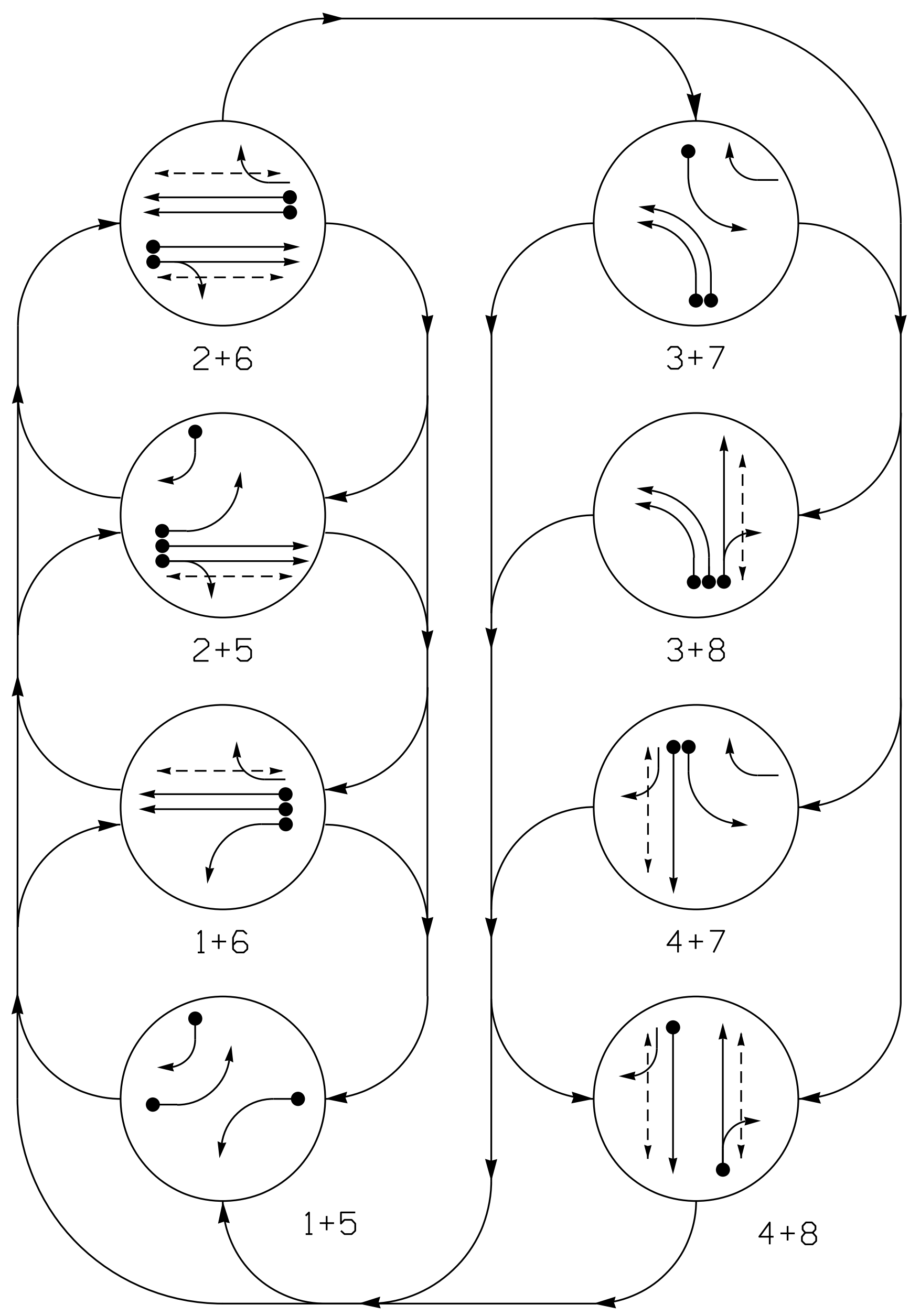
PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig. 1.0

PHASING DIAGRAM

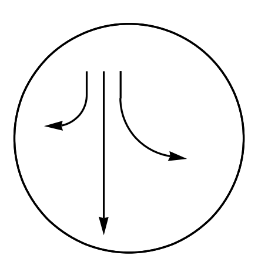


PHASING DIAGRAM DETECTION LEGEND

←●	DETECTED MOVEMENT
←—	UNDETECTED MOVEMENT (OVERLAP)
← – –	UNSIGNALIZED MOVEMENT
←– – –→	PEDESTRIAN MOVEMENT

EV PREEMPT PHASES

(Medium Priority)



PRE 2
(4+7)

SIGNAL FACE I.D.

All Heads L.E.D.

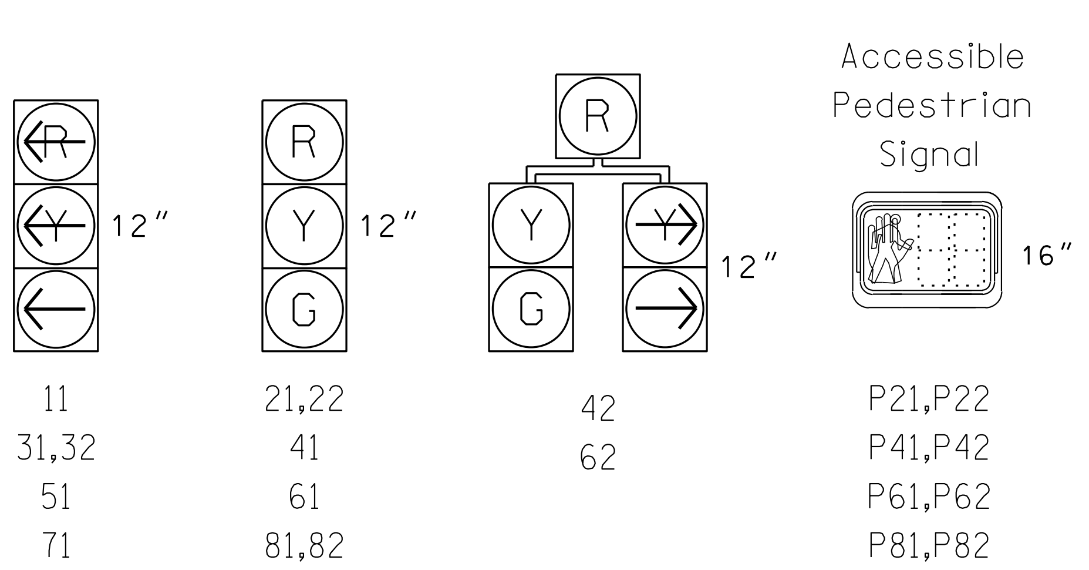


TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3+7	3+8	4+7	4+8	PRE 2	FLASH
11	←	←	←R	←R	←R	←R	←R	←R	←R	←R
21,22	R	R	G	G	R	R	R	R	R	R
31,32	←R	←R	←R	←R	←	←	←R	←R	R	←R
41	R	R	R	R	R	R	G	G	G	R
42	R/→	R	R/→	R	R	R	G	G	G	R
51	←	←R	←	←R	←R	←R	←R	←R	←R	←R
61	R	G	R	G	R	R	R	R	R	R
62	R	G	R	G	R/→	R	R/→	R	R	R
71	←R	←R	←R	←R	←	←R	←	←R	←	←R
81,82	R	R	R	R	R	G	R	G	R	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DRK	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DRK	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK	DRK

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	3	-	-
2A	6X6	65	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X6	65	EXIST	-	2	Y	Y	-	-	-	-	-
3A	6X40	+10	2-4-2	-	3	Y	Y	-	-	3	-	-
3B	6X40	+10	2-4-2	-	3	Y	Y	-	-	-	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	3	-	-
5B	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	60	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X6	60	EXIST	-	6	Y	Y	-	-	-	-	-
7A	6X40	+5	2-4-2	-	7	Y	Y	-	-	3	-	-
8A	6X40	+5	2-4-2	-	8	Y	Y	-	-	10	-	-
S3	6X6	+175	EXIST	-	-	-	-	-	-	-	-	-
S4	6X6	+175	EXIST	-	-	-	-	-	-	-	-	-
S5	6X6	+165	EXIST	-	-	-	-	-	-	-	-	-
S6	6X6	+165	EXIST	-	-	-	-	-	-	-	-	-

8 Phase
Fully Actuated
W/ EVP
NC 51 (Pineville) CLS

NOTES

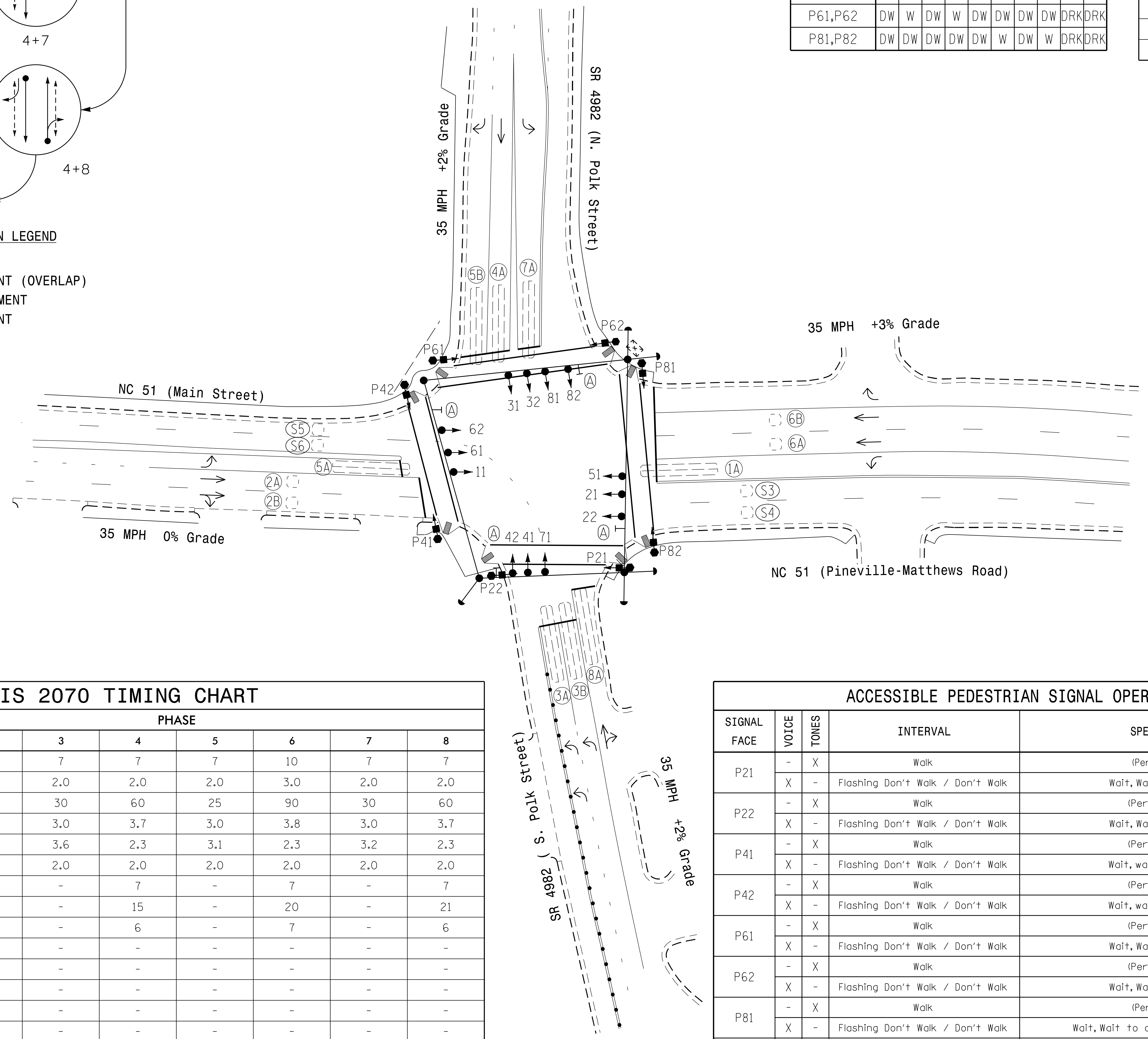
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "Standard Specifications for Roads and Structures" dated January 2024, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: https://connect.ncdot.gov/resources/safety/pages/its-and-signals.aspx
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 and/or phase 7 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. This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. The Division Traffic Engineer will determine the Delay before Preempt and Preempt Dwell Min Green time for the emergency vehicle preeemtion timing.

OASIS 2070 EV PREEMPT

FUNCTION	PRE 2
Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	0.0*
Interval 1 – Dwell Red	0.0*
Interval 5 – Exit Green	1
Interval 5 – Yellow	0.0
Interval 5 – Red	0.0
Exit Phase(s)	4, 7
Priority	Medium
Delay Time	**
Min Green Before Pre	1
Ped Clear Before Pre	0 *
Yellow Clear Before Pre	0.0*
Red Clear Before Pre	0.0*
Dwell Min Time	**
Enable Backup Protection	N
Ped Clear Through Yellow	Y
Omit Overlaps	A
Preempt Extend	-

* Time defaults to time used for phase during normal operation
** See note 10.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowhig
27DBF39C8814444...
ITS & Signals Unit



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	→
N/A	Curb Ramp	▥
⬡	Type II Signal Pedestal	⬢
Ⓐ	"TURNING VEHICLES YIELD TO" Pedestrians Sign (R10-15R)	Ⓐ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	3.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	25	90	30	60	25	90	30	60
Yellow Clearance	3.0	3.8	3.0	3.7	3.0	3.8	3.0	3.7
Red Clearance	2.9	2.3	3.6	2.3	3.1	2.3	3.2	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7	-	7	-	7
Don't Walk 1	-	15	-	15	-	20	-	21
Advanced Walk *	-	7	-	6	-	7	-	6
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Polk.
P22	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Polk.
P41	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, wait to cross Main.
P42	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, wait to cross Main.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Polk.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Polk.
P81	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Pineville-Matthews.
P82	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Pineville-Matthews.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 51 (Main Street) / NC 51 (Pineville-Matthews Road) at SR 4982 (Polk Street)

Division 10 Mecklenburg County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	N.E. Burns
PREPARED BY:	C. McDonald	IMPACT NO:	23110

REVISIONS	INIT.	DATE

IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

N

SCALE
0 40
1"=40'

SEAL
SEAL 046300
NICHOLAS E. BURNS

Signed by:
Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

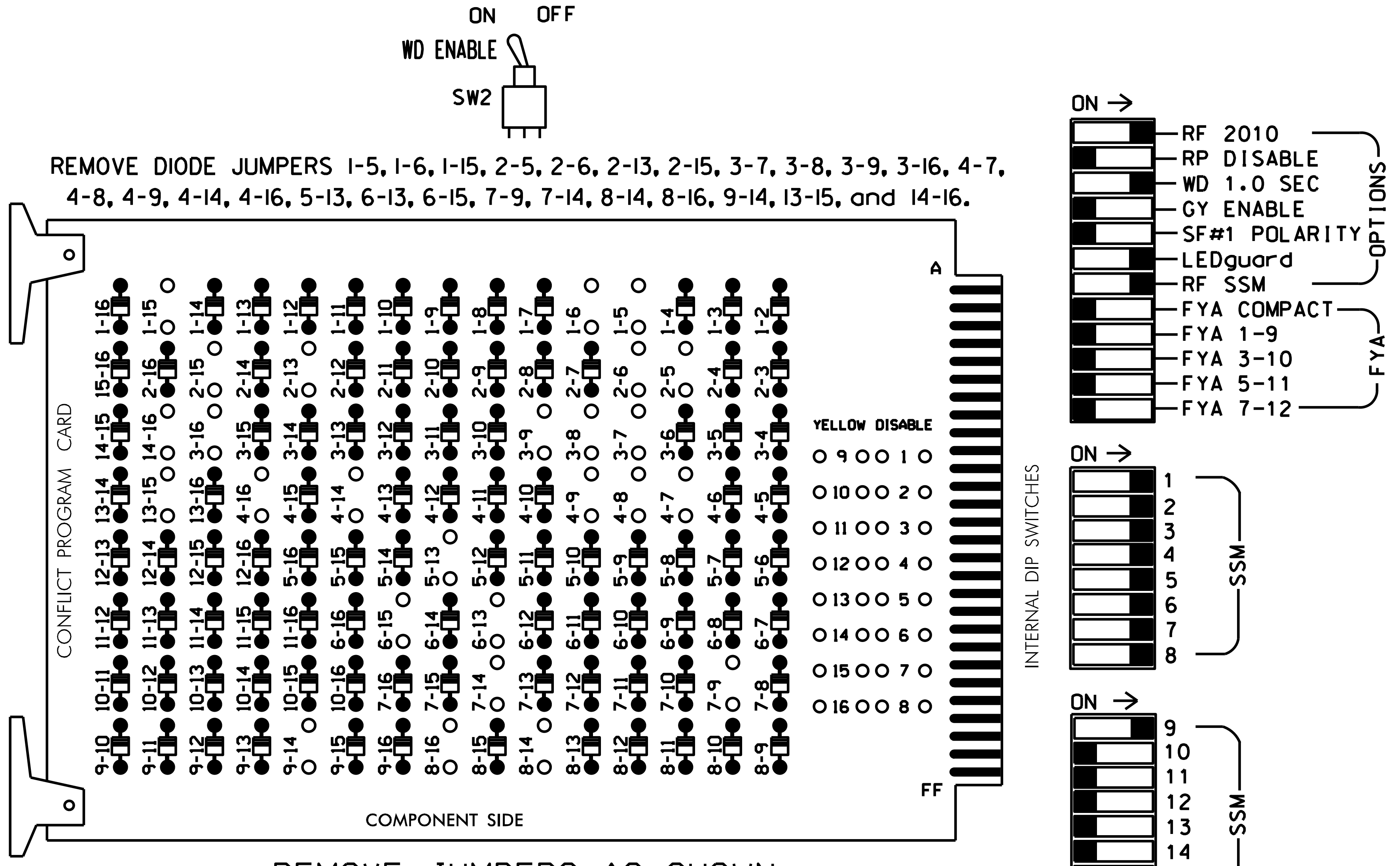
SIG. INVENTORY NO. 10-0254

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig. 1.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-7, 3-8, 3-9, 3-16, 4-7, 4-8, 4-9, 4-14, 4-16, 5-13, 6-13, 6-15, 7-9, 7-14, 8-14, 8-16, 9-14, 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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. 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 10,11, 12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Disable all phases for Start Up In Green.
5. Disable all phases for Startup Ped Call.
6. Disable all phases for Yellow Flash.
7. Program phases 2 and 6 for First Phases.
8. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
9. The cabinet and controller are part of the NC 51 (Pineville) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.............2070
CABINET ....332 w/ AUX
SOFTWARE ....ECONOLITE OASIS
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,**S2P,S3,S4,S4P,
S5,S6,S6P,S7,S8,S8P,S9
PHASES USED............1,2,2 PED,3,4,4 PED,
5,6,6 PED,7,8,8 PED
OVERLAP "A".............7
OVERLAP "B".............NOT USED
OVERLAP "C".............NOT USED
OVERLAP "D".............NOT USED

** DENOTES S2P IS ALSO USED FOR FIRE HOUSE PREEMPT PILOT LAMP CONTROL

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P		S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED		3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	FIRE PILOT LAMP	31,32	41,42	P41, P42	42	51	61,62	P61, P62	71	81,82	P81, P82	62	NU	NU	NU	NU	NU
RED		128				101				134			107		*					
YELLOW		129				102				135			108							
GREEN		130				103				136			109							
RED ARROW	125				116				131			122								
YELLOW ARROW	126				117			132	132			123			A122					
GREEN ARROW	127				118			133	133			124			A123					
🚶			113				104				119			110						
PED YELLOW				* 114																
✋			115				106				121			112						

NU = Not Used

* Denotes install load resistor. See load resistor installation detail on sheet 3.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø 2 2B	Ø 3 3B	NOT USED					SYS. DET. S4			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 5 5A	Ø 6 6A	Ø 7 7A	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S5	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED
	L		Ø 5 5B	Ø 6 6B	NOT USED		NOT USED			SYS. DET. S6					PRE2 DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB2-9,10	I3U	63	25	32	3	Y	Y			3
3B	TB2-11,12	I3L	76	38	42	3	Y	Y			
4A	TB4-1,2	I4U	47	9	22	4	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			3
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A	TB5-1,2	J4U	48	10	26	7	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
* S3	TB6-9,10	I9U	60	22	11	SYS					
* S4	TB6-11,12	I9L	62	24	13	SYS					
* S5	TB7-9,10	J9U	59	21	15	SYS					
* S6	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

ADVANCED WALK NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 4, 6, and 8 for 'Advanced Walk'. Make sure the Advance Walk times shown on the Signal Design plan are programmed in the 'Phase Timing' menu.

ACCESSIBLE PEDESTRIAN SIGNAL(APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-0254
DESIGNED: Apr 2025
SEALED: 4/30/2025
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowhig
37DBF39C881444A...
ITS & Signals Unit

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

NC 51 (Main Street)/
NC 51 (Pineville-Matthews Road)
at
SR 4982 (Polk Street)

Division 10 Mecklenburg County Pineville

PLAN DATE: April 2025	REVIEWED BY: N.E. Burns
PREPARED BY: C. McDonald	IMPACT NO: 23110

REVISIONS	INIT.	DATE

SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by:
Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

SIG. INVENTORY NO. 10-0254

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL FOR INDICATOR LAMP CONTROL

(program controller as shown below)

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

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF   INPUT    ASSIGNMENT #14 IS ON
OR   ACTIVE PREEPTION    #2   IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #33 ON
```

NOTE: FIRE HOUSE PILOT LAMP LOGIC.

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF   INPUT    ASSIGNMENT #14 IS OFF
AND ACTIVE PREEMPTION   #2   IS OFF

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
```

NOTE: FIRE HOUSE PILOT LAMP LOGIC.

END OF PROGRAMMING

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

INPUT 14 = Preempt 2
OUTPUT 33 = Phase 2 PED Yellow

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

OVERLAP PROGRAMMING COMPLETE

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig. 1.2

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempt 2.

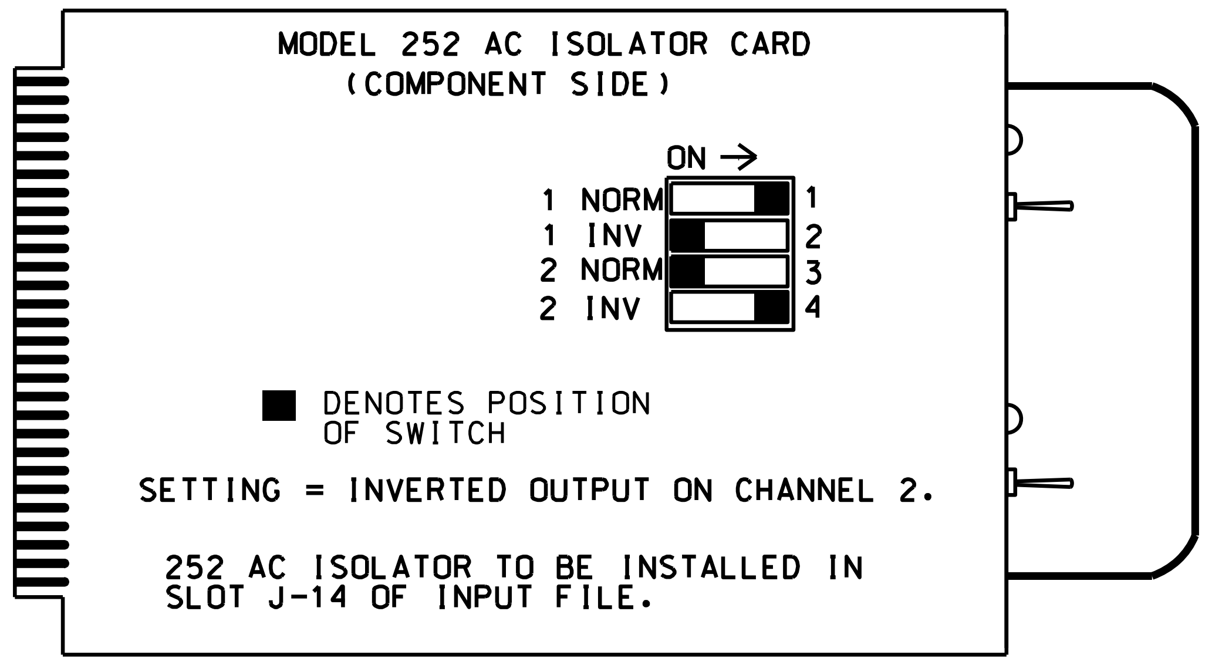
```
   PREEMPTION  #2  SETTINGS (NEXT:1-10)
 INTERVAL/TIMING ¦  CLEAR/DWELL PHASES
   GRN YEL  RED  ¦12345678910111213141516
1 255  0.0  0.0 ¦   X  X
2   0  0.0  0.0 ¦
3   0  0.0  0.0 ¦
4   0  0.0  0.0 ¦
5   1  0.0  0.0 ¦   X  X
-----------------------------------------
EXIT CALLS      ¦
                OPTIONS
PRIORITY (Y/N TO SELECT) ............MED
DELAY TIMER (0-255 SEC) .............*
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0
DWELL MIN TIMER (0-255 SEC) .........*
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
DWELL HOLD-OVER TIMER (0-255) .......0
LATCH CALL? .........................Y
LINK TO NEXT PREEMPT? ...............N
ENABLE BACKUP PROTECTION? ...........N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES? ......N
PED CLEARANCE THROUGH YELLOW? .......Y
INHIBIT OVERLAP GREEN EXTENSION? ....N
SERVICE DURING SOFTWARE FLASH? ......N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL? ...............N
ALLOW PEDS IN DWELL INTERVAL? .......N
RE-TIME DWELL INTERVAL? .............Y
OVERLAPS:                  ¦ ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW     ¦
OMIT OVERLAPS:             ¦ X
```

PROGRAMMING COMPLETE

* Denotes timing to be determined in field.

PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

*(set **DIP** switches as shown below)*



SETTING = INVERTED OUTPUT ON CHANNEL 2.

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-0254
DESIGNED: Apr 2025
SEALED: 4/30/2025
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by: Matthew Cowhig
37DBF39C881444A...
ITS & Signals Unit

Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 51 (Main Street)/
NC 51 (Pineville-Matthews Road)
at
SR 4982 (Polk Street)

Division 10 Mecklenburg County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	N.E. Burns
PREPARED BY:	C. McDonald	IMPACT NO:	23110

REVISIONS	INIT.	DATE

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

IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

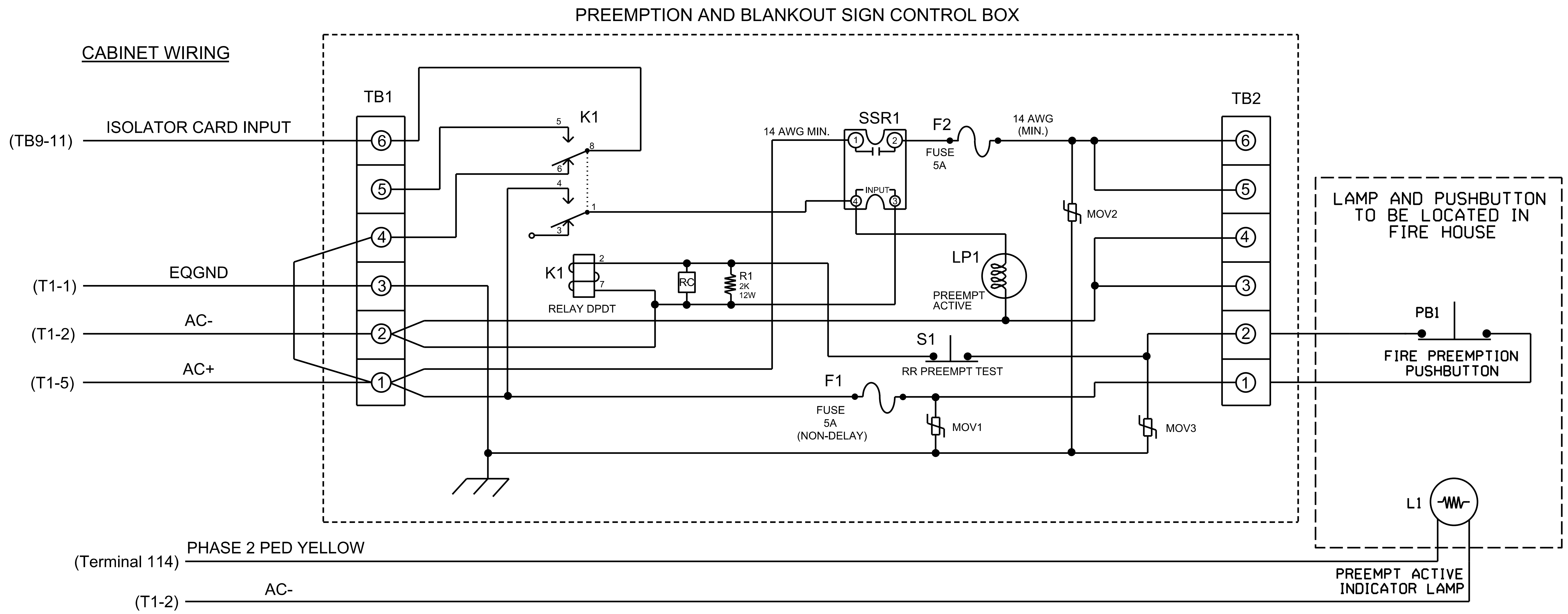
SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by: Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

SIG. INVENTORY NO. 10-0254

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig. 1.3

EV Preemption Control Box Wiring Detail

(wire as shown below)



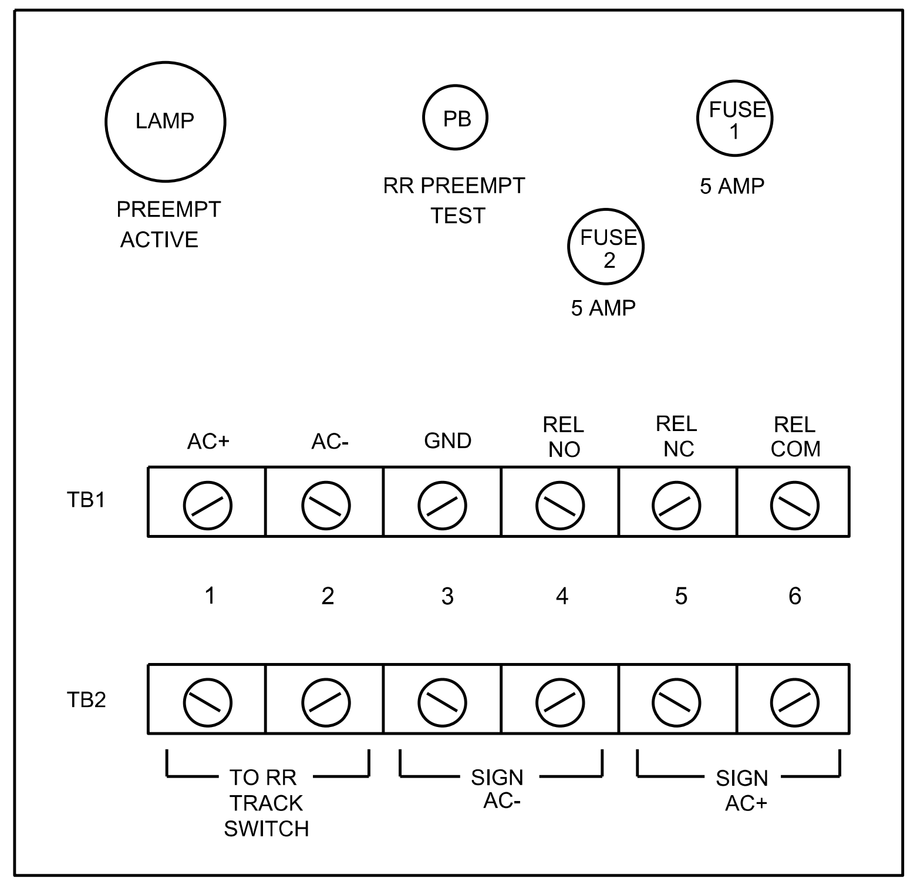
LAMP NOTES

1. Make sure load resistor is in place as shown in the Load Resistor Installation Detail on this sheet.
2. Install a loadswitch in Output File Slot S2P.
3. If field terminal 114 has a conflict monitor wire attached, remove, tape and label wire.

NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a DPDT with 120VAC coil with octal base.
3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

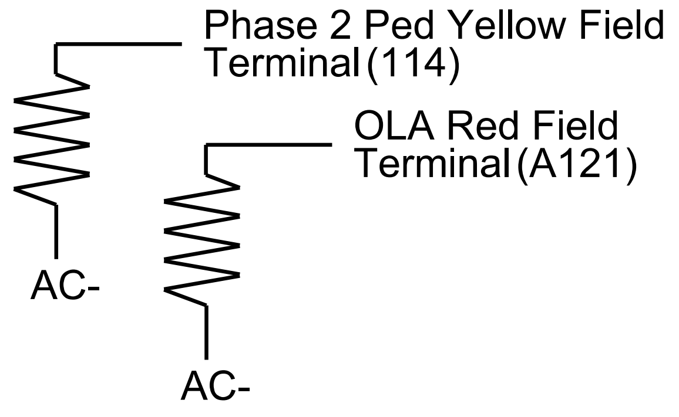
FRONT VIEW



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: 10-0254
DESIGNED: Apr 2025
SEALED: 4/30/2025
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowhig
37DB539C8814414A...
ITS & Signals Unit

Electrical Detail - Sheet 3 of 3

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FINAL UNLESS ALL
SIGNATURES COMPLETED

IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

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

NC 51 (Main Street)/
NC 51 (Pineville-Matthews Road)
at
SR 4982 (Polk Street)

Division 10 Mecklenburg County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	N.E. Burns
PREPARED BY:	C. McDonald	IMPACT NO:	23110

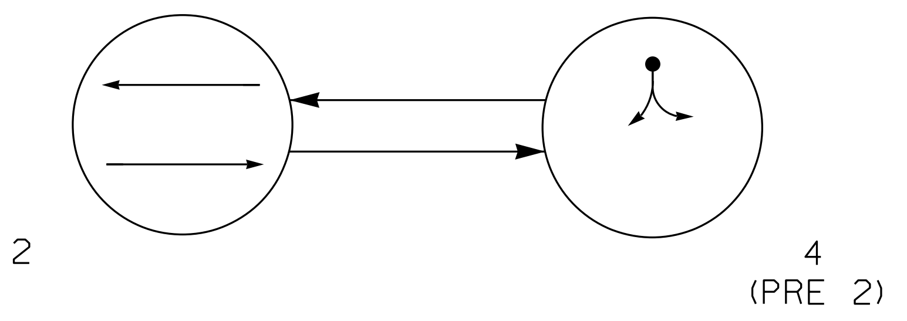
REVISIONS	INIT.	DATE

SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by:
Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

SIG. INVENTORY NO. 10-0254

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig-2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

←—●	DETECTED MOVEMENT
←——	UNDETECTED MOVEMENT (OVERLAP)
←– –	UNSIGNALIZED MOVEMENT
←– – →	PEDESTRIAN MOVEMENT

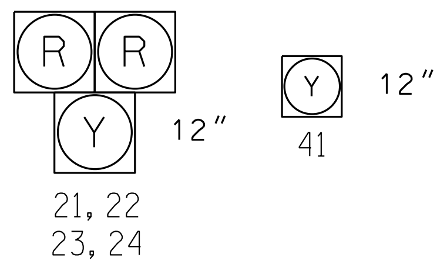
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2 DARK	ACTIVATION	STEADY YELLOW	STEADY RED	Ø4 PRE 2	FLASH
21, 22	DRK	FY	Y	R	FR*	Y
23, 24	DRK	FY	Y	R	FR*	Y
41	DRK	DRK	DRK	DRK	FY	DRK

* - Alternating Flash
Y - Steady Yellow
FY - Flashing Yellow
R - Steady Red
FR - Flashing Red
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 EV PREEMPT

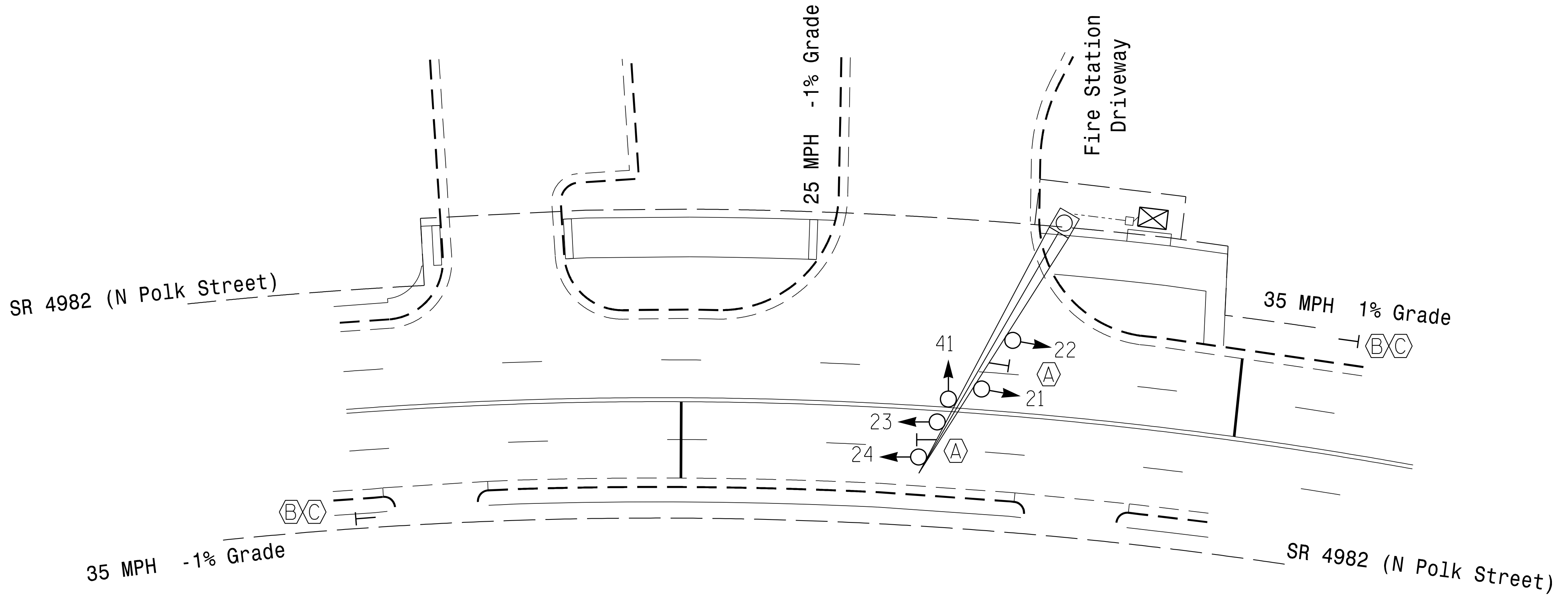
FUNCTION	PRE 2
Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	0.0*
Interval 1 – Dwell Red	0.0*
Interval 5 – Exit Green	1
Interval 5 – Yellow	0.0
Interval 5 – Red	0.0
Exit Phase(s)	2
Priority	MEDIUM
Delay Time	**
Min Green Before Pre	1
Ped Clear Before Pre	0
Yellow Clear Before Pre	0.0*
Red Clear Before Pre	0.0*
Dwell Min Time	**
Enable Backup Protection	N
Ped Clear Through Yellow	N
Omit Overlaps	-
Preempt Extend	-

* Time defaults to time used for phase during normal operation
** See Note #5

2 Phase
Semi Actuated
Emergency Hybrid Beacon
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "Standard Specifications for Roads and Structures" dated January 2024 and all applicable sections of the latest verson of the generic Project Special Provisions. The PSP can be accessed at the following website: https://connect.ncdot.gov/resources/safety/pages/its-and-signals.aspx
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Locate emergency vehicle preemption switch in Pineville Fire Station and use wired interconnect.
5. The Division Traffic Engineer will determine the Delay Time and Dwell Min Time for the emergency vehicle preemption timing.
6. The Division Traffic Engineer shall locate signs B and C in conformance with section 2C of the 2009 MUTCD.
7. Signal Head 41 shall remain dark except during the phase 4 green interval (flashing yellow display).



NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowhig
37DBF39C8814444...
ITS & Signals Unit

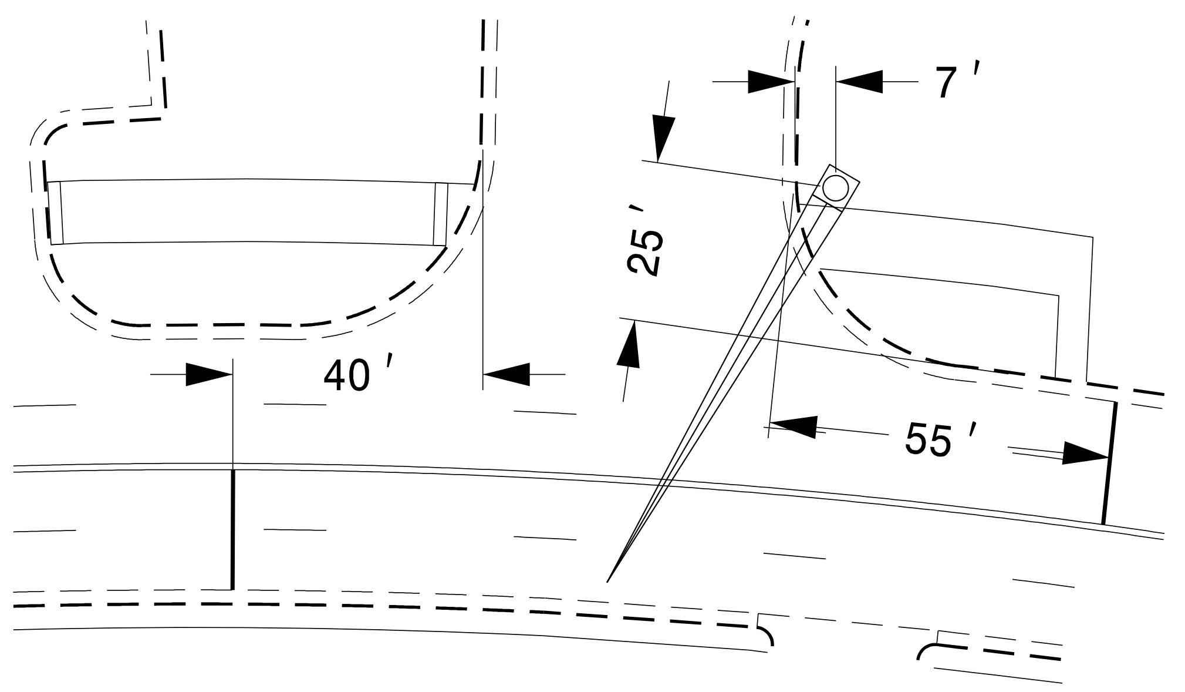
OASIS 2070 TIMING CHART

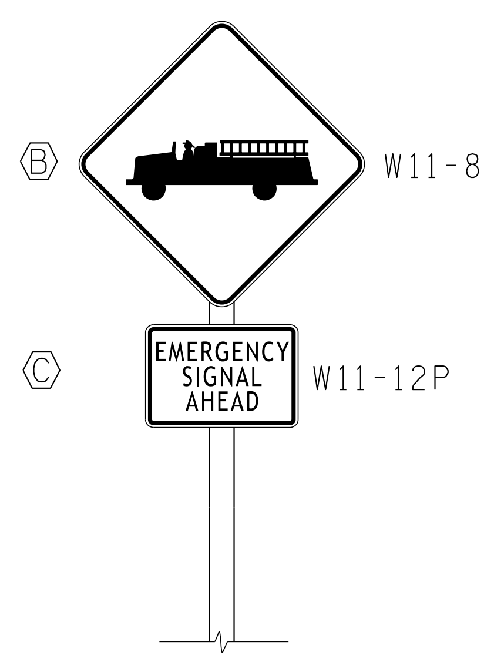
FEATURE	PHASE 2	OLA	4 (PRE 2)
Min Green 1 *	10	5	7
Extension 1 *	0.0	▨	0.0
Max Green 1 *	30	▨	30
Yellow Clearance	5.0	3.9	3.0
Red Clearance	2.0	5.0	0.0
Walk 1 *	-	▨	-
Don't Walk 1	-	▨	-
Seconds Per Actuation *	-	▨	-
Max Variable Initial *	-	▨	-
Time Before Reduction *	-	▨	-
Time To Reduce *	-	▨	-
Minimum Gap	-	▨	-
Recall Mode	MIN RECALL	▨	-
Vehicle Call Memory	-	▨	-
Dual Entry	-	▨	-
Simultaneous Gap	ON	▨	ON

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

Serves as Steady Yellow Clearance Time
Serves as Steady Red Clearance Time
Serves as Flashing Yellow Time

Pavement Marking and Pole Locations





Advance Warning
Sign Assembly

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□	Pedestrian Signal Head	■
○—)	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	→
Ⓐ	"EMERGENCY SIGNAL STOP ON FLASHING RED" Sign (R10-14a)	Ⓐ
Ⓑ	Emergency Vehicle Sign (W11-8)	Ⓑ
Ⓒ	"EMERGENCY SIGNAL AHEAD" Sign (W11-12P)	Ⓒ

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 4982 (N Polk Street)
at
Fire Station Driveway

Division 10 Union County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	NE Burns
PREPARED BY:	C McDonald	IMPACT NO:	23110

REVISIONS	INIT.	DATE

IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

SCALE
0 30
1"=30'

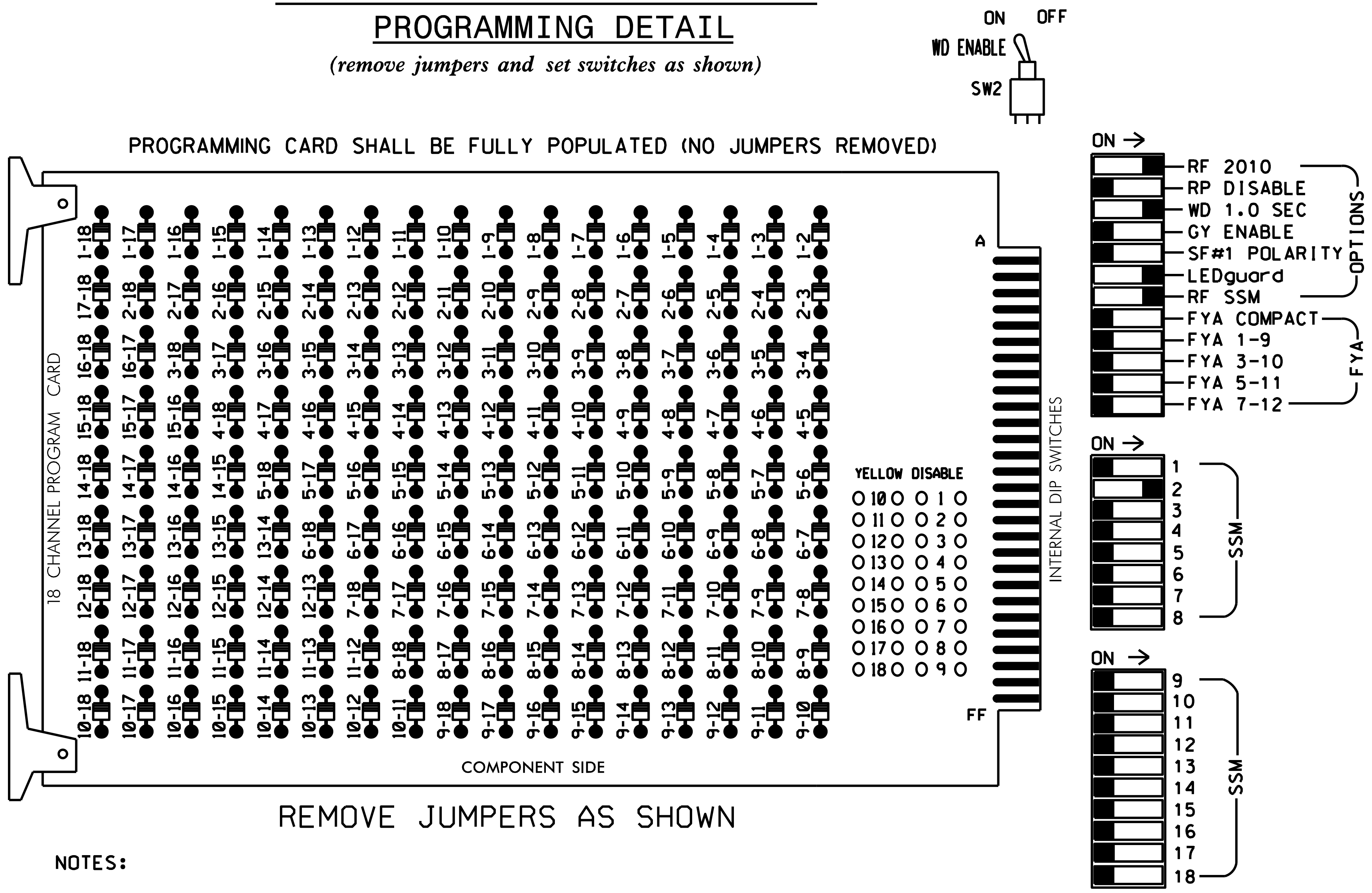
SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by:
Nicholas E. Burns
1524B9F1FC84442...
4/30/2025
DATE

SIG. INVENTORY NO. 10-2567

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig-2.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED
	L														PRE2 DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

TIMING INTERVAL SCHEDULE

PHASE 2 YELLOW CLEAR TIME = FLASHING YELLOW CLEARANCE INTERVAL
OVERLAP "A" YELLOW CLEAR TIME = STEADY YELLOW CLEARANCE INTERVAL
OVERLAP "A" RED CLEAR TIME = ALL RED CLEARANCE INTERVAL

NOTE: Phase 2 YELLOW CLEARANCE and OLA GREEN EXTENSION times <u>must</u> be equal.

NOTES

1. Insert <u>yellow flash program blocks for phases 1 and 2.</u> Insert red flash program blocks for all remaining unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 2 for START UP IN GREEN.
3. Program phase 2 for YELLOW FLASH.
4. Program phase 2 for STARTUP CALLS.

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S1,S2,S5,**S6
PHASES USED.............2,4
OVERLAP "A".............2*
OVERLAP "B".............NOT USED
OVERLAP "C".............NOT USED
OVERLAP "D".............NOT USED

* DENOTES PHASE USED TO CONTROL CLEARANCE INTERVALS.

** Denotes S6 is also used for Fire House Preempt Pilot Lamp control

OPERATIONAL NOTES

1. In order for controller to perform the "Emergency Veh. Hybrid Beacon" (aka. HAWK signal) sequence, special logic and output programming is necessary. See programming details on sheets 2 and 3 of this electrical detail.
2. This sequence uses PHASE 2 YELLOW to produce "flashing yellow clearance" and also uses overlap "A" assigned as phase 2 to provide "steady yellow" clearance interval. Time for this interval shall be implemented in "OL A YELLOW CLEAR" timing. See signal plan for timing.
3. Phase 2 YELLOW CLEARANCE and OLA GREEN EXTENSION times <u>must</u> be equal. This is necessary so that when flashing yellow clear ends, the steady yellow clear begins.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

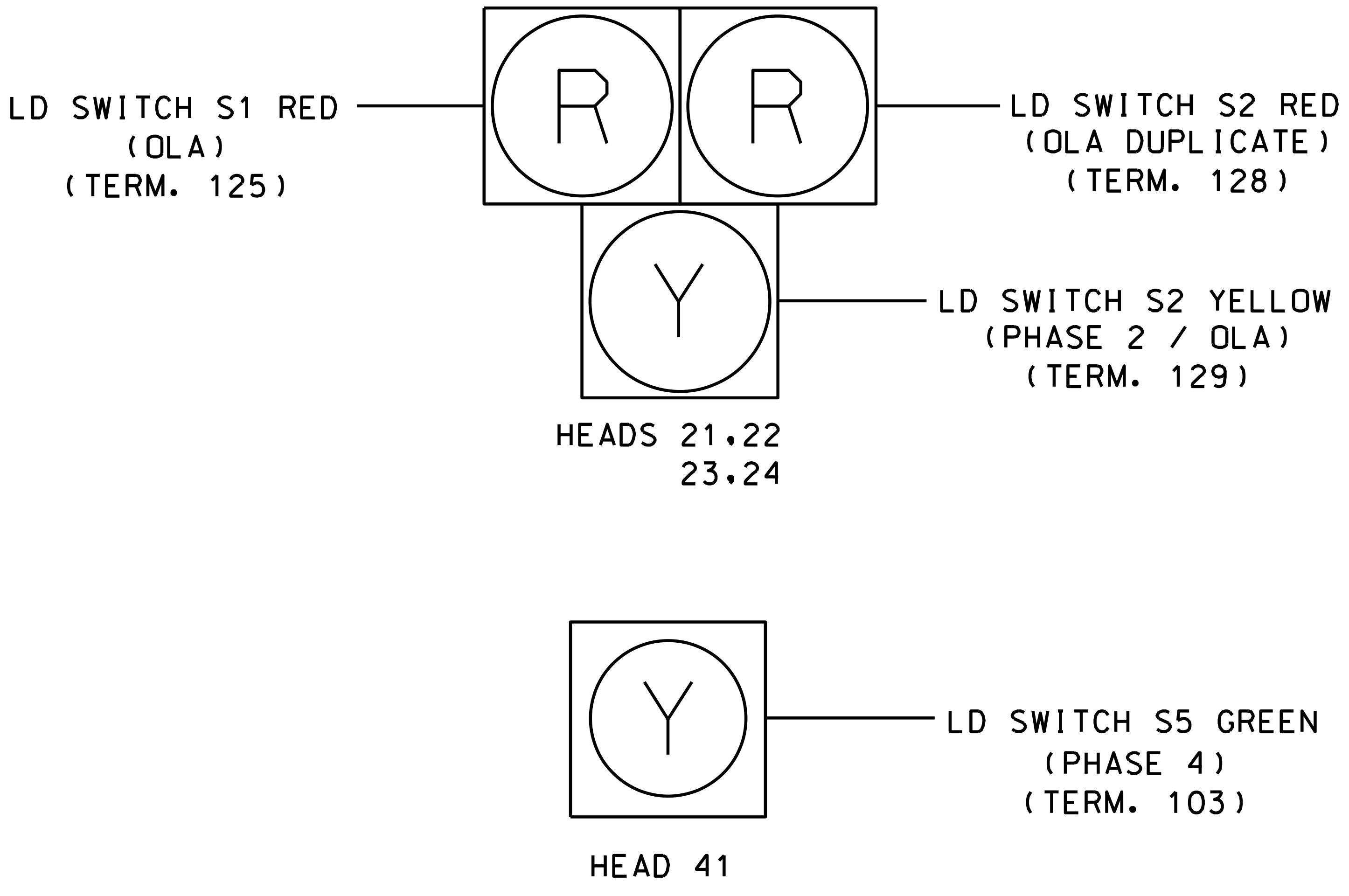
```
 PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE:           ¦12345678910111213141516
VEH OVL PARENTS:¦ X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦ X
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........5
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..3.9
RED CLEAR (0=PARENT,0.1-25.5 SEC)...5.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE TIMING INTERVALS

OVERLAP PROGRAMMING COMPLETE

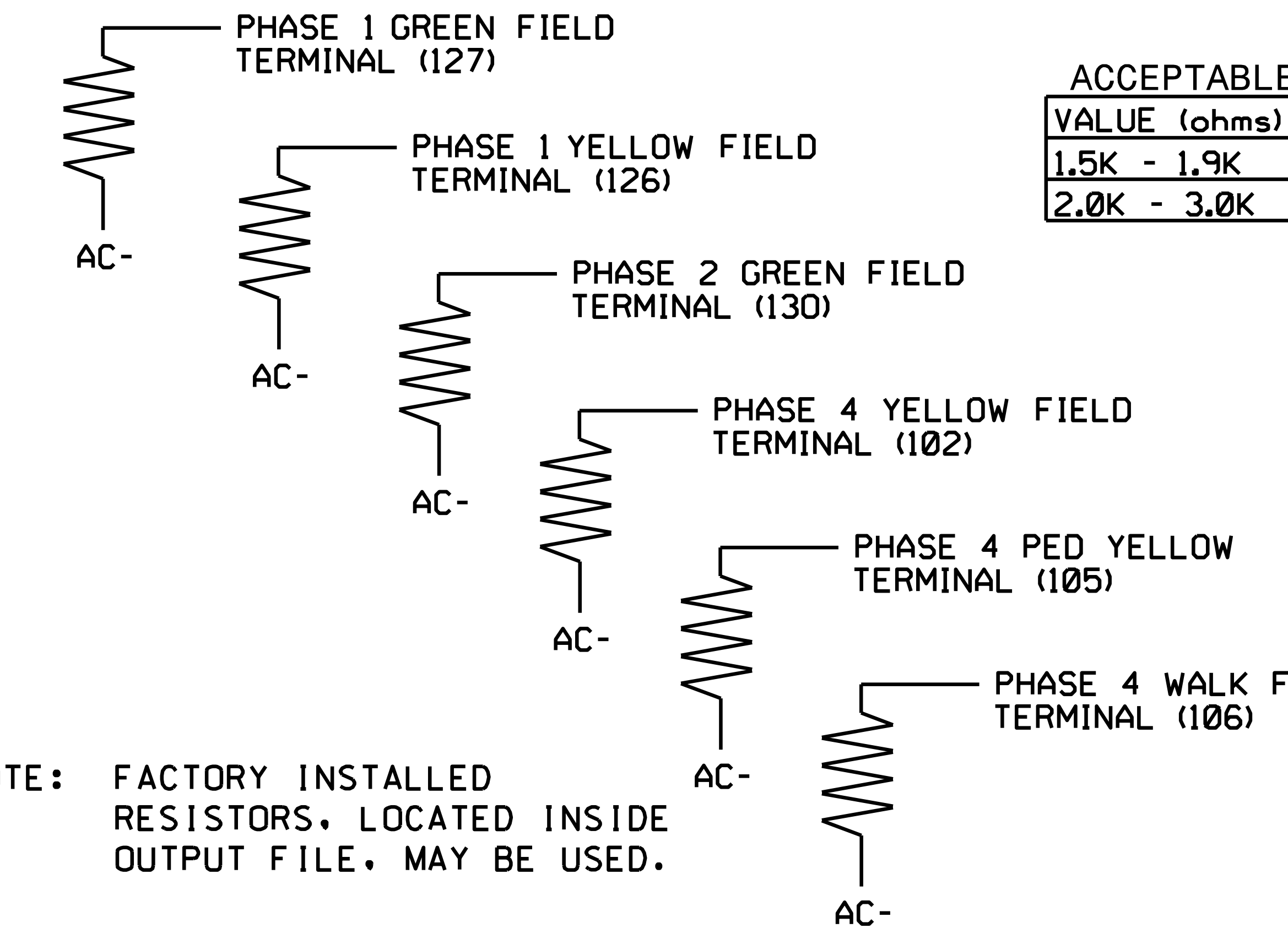
SIGNAL HEAD WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



ACCEPTABLE VALUES

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

NOTE: FACTORY INSTALLED RESISTORS, LOCATED INSIDE OUTPUT FILE, MAY BE USED.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2567
DESIGNED: Apr 2025
SEALED: 4/30/2025
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by: Matthew Cowhig
37DBF39C981444A...
ITS & Signals Unit

Electrical Detail
Sheet 1 of 4

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IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 4982 (N Polk Street)
at
Fire Station Driveway

Division 10 Union County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	NE Burns
PREPARED BY:	C McDonald	IMPACT NO:	23110

REVISIONS	INIT.	DATE

SEAL
NICHOLAS E. BURNS
SEAL 046300
Signed by: Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

SIG. INVENTORY NO. 10-2567

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig-2.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL EMERGENCY VEH. HYBRID BEACON SEQUENCE

(program controller as shown below)

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

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
 IF   ACTIVE PHASE        #4  IS ON
 AND OUTPUT  ASSIGNMENT #33 IS ON

                  ↓
             SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #11 OFF
```

NOTE: LOGIC TO WIG-WAG THE RED INDICATIONS ON HEADS 21, 22, 23 & 24 DURING PHASE 4.

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
 IF   ACTIVE PHASE        #4  IS ON
 AND OUTPUT  ASSIGNMENT #33 IS OFF

                  ↓
             SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #14 OFF
```

NOTE: LOGIC TO WIG-WAG THE RED INDICATIONS ON HEADS 21, 22, 23 & 24 DURING PHASE 4.

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
 IF   GREEN ON OVERLAP    #1  IS ON
 OR   GRN EXT ON OVERLAP #1  IS ON
 OR   YELLOW ON OVERLAP   #1  IS ON

                  ↓
             SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT  #11 OFF
 SET OUTPUT  ASSIGNMENT  #14 OFF
```

NOTE: LOGIC TO ENSURE THAT RED INDICATIONS OF HEADS 21,22,23,24 REMAIN DARK UNTIL YELLOW CLEARANCE INTERVALS ARE FINISHED TIMING.

PRESS '+'

```
  LOGICAL I/O COMMAND #4  (+/-COMMAND#)
 IF   INPUT ASSIGNMENT    #14  IS ON
 OR   ACTIVE PREEMPTION   #2   IS ON

                  ↓
             SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT  #35 ON
```

NOTE: FIREHOUSE PILOT LAMP LOGIC.

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

I/O REFERENCE SCHEDULE

OUTPUT 11 = OLA RED
OUTPUT 14 = OLA RED (DUPLICATE)
OUTPUT 33 = OUT OF PHASE FLASHER
OUTPUT 34 = ADVANCE BEACON 1
OUTPUT 35 = PED 4 YEL (PILOT LAMP)
INPUT 14 = PREEMPT 2 IN

Note: Outputs 11, 14, 33 & 34 have been remapped. See detail on sheet 3.

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press the 'Next' key to advance to Preempt 2:

PRE2:

```
   PREEMPTION  #2  SETTINGS (NEXT:1-10)
 INTERVAL/TIMING ¦  CLEAR/DWELL PHASES
   GRN  YEL  RED ¦12345678910111213141516
 1 255  0.0  0.0 ¦    X
 2   0  0.0  0.0 ¦
 3   0  0.0  0.0 ¦
 4   0  0.0  0.0 ¦
 5   1  0.0  0.0 ¦ X
 ________________________________________
 EXIT CALLS      ¦
               OPTIONS
 PRIORITY (Y/N TO SELECT) ............MED
 DELAY TIMER (0-255 SEC) .............✱
 MIN GREEN BEFORE PRE (0= DEFAULT)....1
 PED CLEAR BEFORE PRE (0= DEFAULT)....0
 YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0
 RED CLEAR BEFORE PRE (0= DEFAULT)....0.0
 DWELL MIN TIMER (0-255 SEC) .........✱
 DWELL MAX TIMER (0=OFF,1-255MIN) ....0
 DWELL HOLD-OVER TIMER (0-255) .......0
 LATCH CALL? .........................Y
 LINK TO NEXT PREEMPT? ...............N
 ENABLE BACKUP PROTECTION? ...........N
 HOLD CLEAR 1 PHASES DURING DELAY? ...N
 FAST GREEN FLASH DWELL PHASES? ......N
 PED CLEARANCE THROUGH YELLOW? .......N
 INHIBIT OVERLAP GREEN EXTENSION? ....N
 SERVICE DURING SOFTWARE FLASH? ......N
 REST IN RED DURING DWELL INTERVAL? ..N
 FLASH DWELL INTERVAL? ...............N
 ALLOW PEDS IN DWELL INTERVAL? .......N
 RE-TIME DWELL INTERVAL? .............N
 OVERLAPS:                 ¦ ABCDEFGHIJKLMNOP
 DWELL INT FLASH YELLOW    ¦
 OMIT OVERLAPS:            ¦
```

PROGRAMMING COMPLETE

✱ DENOTES TIMING TO BE DETERMINED IN FIELD

ADVANCE BEACON PROGRAMMING DETAIL

(program controller as shown below)

1. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '2' (OUTPUT BEACON SETTINGS).

```
           OUTPUT BEACON SETTINGS
 TRIGGER PHASES:  ¦12345678910111213141516
 BEACON #1  OFF   ¦ X
 BEACON #2  OFF   ¦
 BEACON #3  OFF   ¦
 BEACON #4  OFF   ¦
                BEACON ¦   1   2   3   4
 OFF DELAY TIME (0-255)¦   0   0   0   0
 ON DELAY TIME  (0-255)¦   0   0   0   0
 STOP-TIME HOLD (0-255)¦   0   0   0   0
```

NOTE: ADVANCE BEACON IS USED TO CONTROL THE WIG-WAG RED INDICATION OF HEADS 21, 22, 23 AND 24. OUTPUTS HAVE TO BE ASSIGNED APPROPRIATELY. SEE SHEET 3 OF THIS ELECTRICAL DETAIL.

GREEN INTERVAL FLASH PROGRAMMING DETAIL

IN ORDER TO MAKE SIGNAL HEAD 41 FLASH DURING PREEMPTION DWELL, PHASE 4 WILL HAVE TO BE PROGRAMMED FOR "GREEN INTERVAL FLASH."

FROM THE OASIS MAIN MENU PRESS 2 (PHASE CONTROL) THEN "1" (PHASE CONTROL FUNCTIONS). SCROLL DOWN 15 ROWS TO ARRIVE AT THE "GREEN INT FLASH" FUNCTION - ENABLE PHASE 4.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2567
DESIGNED: Apr 2025
SEALED: 4/30/2025
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowling
37DBF39C881444A...
ITS & Signals Unit

Electrical Detail
Sheet 2 of 4

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Prepared for:
Transportation Mobility and Safety Division
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750 N. Greenfield Pkwy, Garner, NC 27529

SR 4982 (N Polk Street)
at
Fire Station Driveway

Division 10 Union County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	NE Burns
PREPARED BY:	C McDonald	IMPACT NO:	23110

REVISIONS	INIT.	DATE

SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by:
Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

SIG. INVENTORY NO. 10-2567

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig-2.3

OUTPUT REMAPPING DETAIL FOR SPECIAL EMERGENCY VEHICLE HYBRID BEACON SEQUENCE

(program controller as shown)

START HERE

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "11"

```
PAGE:1  C1 PIN:12  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................11
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THIS OUTPUT IS DEFAULTED AS A VEHICLE PHASE.
THIS SETTING WILL REMAIN UNTIL CHANGE IS MADE.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:12  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(O=RED,1=YEL,2=GRN).....0
```

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

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

NOTE: THIS CHANGE REMAPS OVERLAP "A" RED TO DRIVE LOAD SWITCH S2 RED.

PRESS "+" KEY TO ADVANCE TO OUTPUT 12

```
PAGE:1  C1 PIN:13  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................12
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...1.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...50
MODE (O=SOLID,1=FLASH).............1
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

MODIFY DATA AS SHOWN TO MAKE OUTPUT 12 A FLASHING OUTPUT

NOTE: THIS MODIFIES THE PHASE 2 YELLOW LOAD SWITCH DRIVER TO FLASH, WHICH WILL PROVIDE THE FLASHING YELLOW CLEARANCE INTERVAL.

PRESS "+" KEY TWICE TO ADVANCE TO OUTPUT 14

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

THIS OUTPUT IS DEFAULTED AS A VEHICLE PHASE.
THIS SETTING WILL REMAIN UNTIL CHANGE IS MADE.

ENTER A "Y" FOR VEHICLE OVERLAP.

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

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

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

NOTE: THIS CHANGE REMAPS OVERLAP "A" RED TO DRIVE LOAD SWITCH S1 RED.

PRESS "+" KEY TO MULTIPLE TIMES TO ADVANCE TO OUTPUT 51

CHANGE C1 PIN NUMBER FROM 98 TO 13 AS SHOWN

```
PAGE:1  C1 PIN:13  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................51
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

NOTE: THIS CHANGE REMAPS THE OVERLAP "A" YELLOW DRIVER TO THE SAME PIN AS PHASE 2 YELLOW, WHICH WILL PROVIDE THE OUTPUT FOR THE STEADY YELLOW CLEARANCE.

PRESS "-" MULTIPLE TIMES TO ADVANCE TO OUTPUT 33

```
PAGE:1  C1 PIN:35  NOT ENABLED
OUTPUT ASSIGNMENT #.................33
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................Y
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THIS OUTPUT IS DEFAULTED AS "NOT ENABLED."
THIS SETTING WILL REMAIN UNTIL CHANGE IS MADE.

ENTER A "Y" FOR OUT OF PHASE FLASHER.

```
PAGE:1  C1 PIN:35  NOT ENABLED
SELECT OUTPUT ASSIGNMENT (1-64).....34
```

WHEN A 'Y' IS ENTERED FOR 'OUT OF PHASE FLASHER'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

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

NOTE: THIS CHANGE ALLOWS THE OUT OF PHASE FLASHER TO DRIVE LOAD SWITCH S1 RED (THROUGH LOGIC PROGRAMMING), WHICH WILL PROVIDE THE WIG-WAG RED.

PRESS "+" KEY ONCE TO ADVANCE TO OUTPUT 34

```
PAGE:1  C1 PIN:36  NOT ENABLED
OUTPUT ASSIGNMENT #.................34
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...1.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...50
MODE (O=SOLID,1=FLASH).............1
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................Y
OUT OF PHASE FLASHER................
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

MODIFY DATA AS SHOWN
TO MAKE OUTPUT 34 A FLASHING OUTPUT

THIS OUTPUT IS DEFAULTED AS "NOT ENABLED."
THIS SETTING WILL REMAIN UNTIL CHANGE IS MADE.

ENTER A "Y" FOR ADVANCE BEACON.

```
PAGE:1  C1 PIN:36  NOT ENABLED
SELECT BEACON INDEX (1-4).............1
```

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

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

NOTE: THIS CHANGE ALLOWS THE ADVANCE BEACON TO DRIVE LOAD SWITCH S2 RED (THROUGH LOGIC PROGRAMING), WHICH WILL PROVIDE THE WIG-WAG RED.

OUTPUT PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2567
DESIGNED: Apr 2025
SEALED: 4/30/2025
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowhig
37DBF39C8814444...
ITS & Signals Unit

Electrical Detail
Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 4982 (N Polk Street)
at
Fire Station Driveway

Division 10 Union County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	NE Burns
PREPARED BY:	C McDonald	IMPACT NO:	23110

REVISIONS	INIT.	DATE

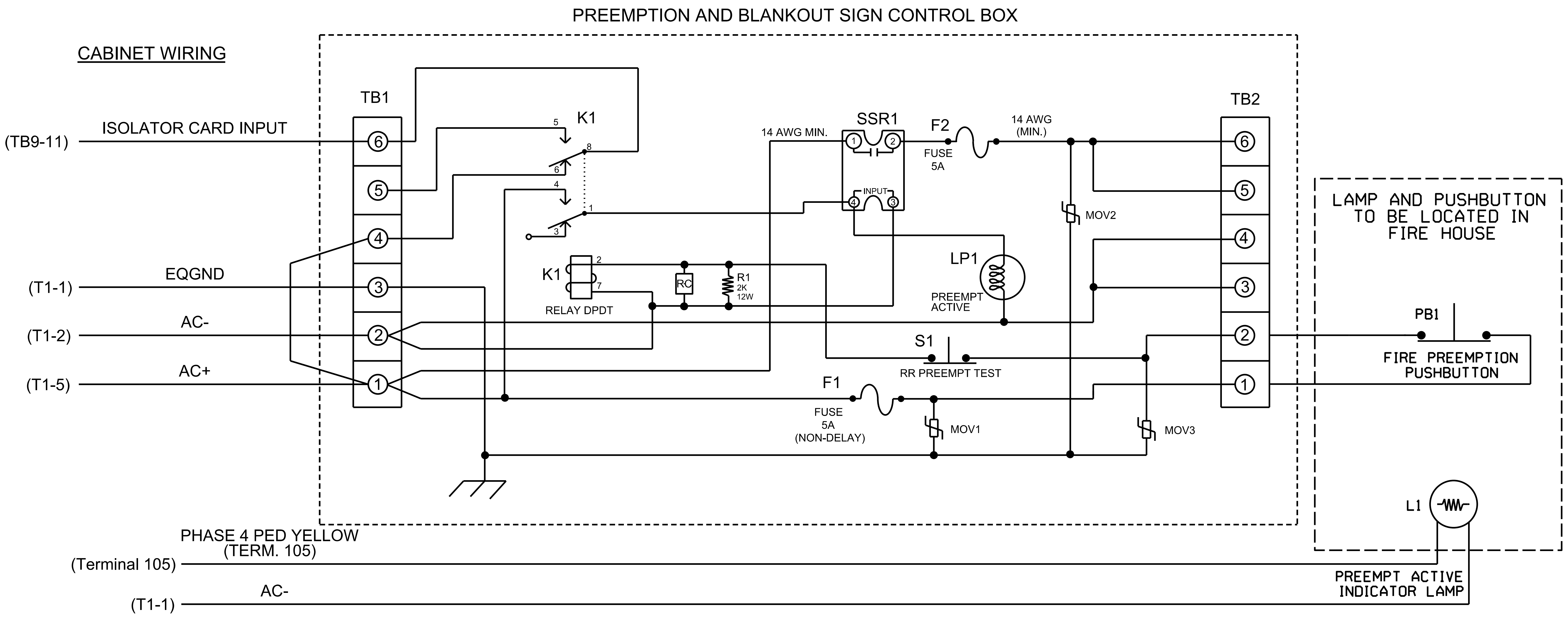
SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by:
Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

SIG. INVENTORY NO. 10-2567

PROJECT REFERENCE NO.	SHEET NO.
36249.4892	Sig-2.4

EV Preemption Control Box Wiring Detail

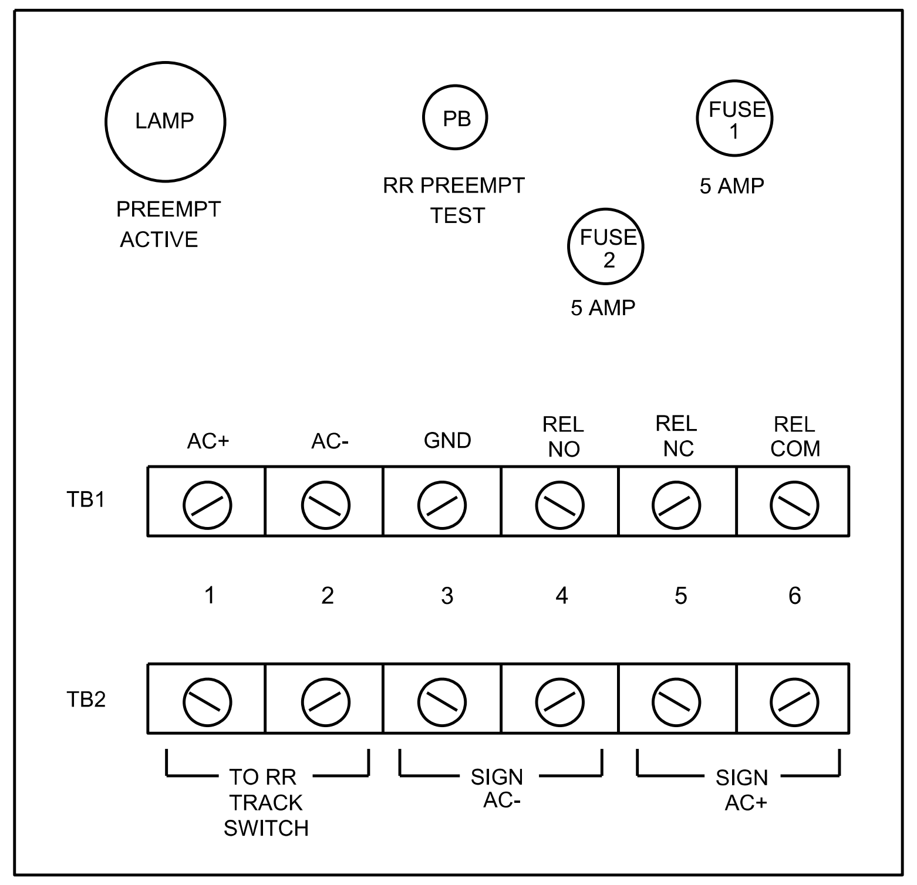
(wire as shown below)



NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a DPDT with 120VAC coil with octal base.
3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW

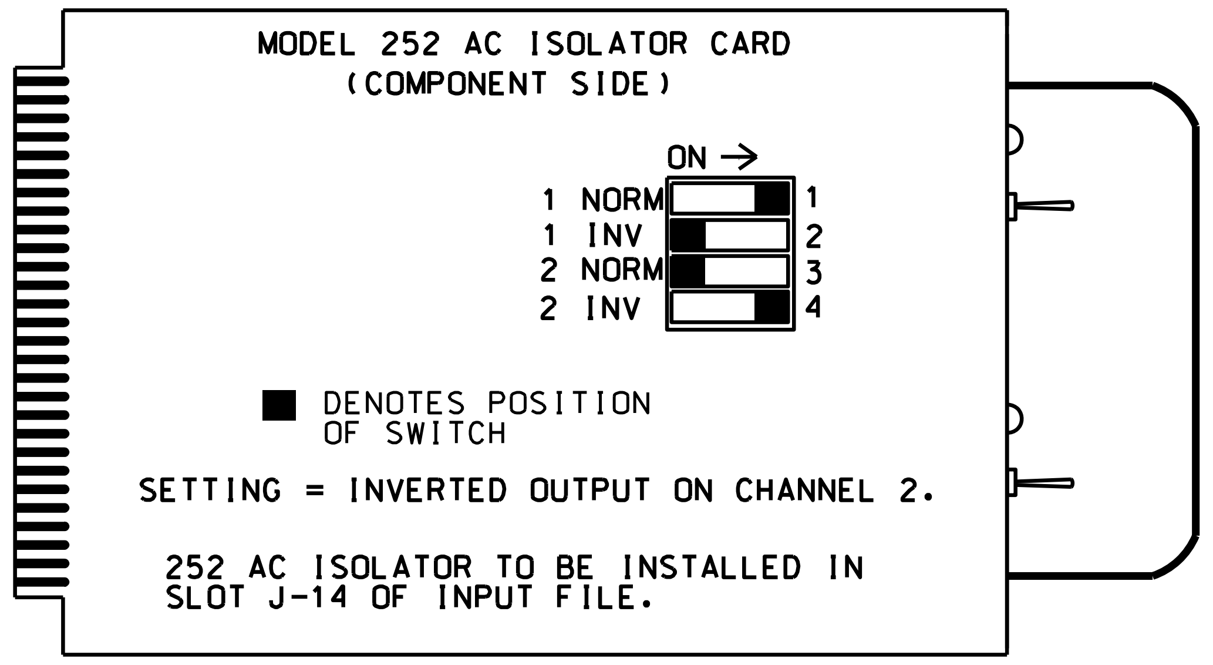


LAMP NOTES

1. Make sure load resistor is in place as shown in the Load Resistor Installation Detail on sheet 1.
2. Install a loadswitch in Output File Slot S6.
3. If field terminal 105 has a conflict monitor wire attached, remove, tape and label wire.

PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



■ DENOTES POSITION OF SWITCH

SETTING = INVERTED OUTPUT ON CHANNEL 2.

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED. OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2567
DESIGNED: Apr 2025
SEALED: 4/30/2025
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowhig
37DBF39C8814444...
ITS & Signals Unit

Electrical Detail
Sheet 4 of 4

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

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at
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Division 10 Union County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	NE Burns
PREPARED BY:	C McDonald	IMPACT NO:	23110

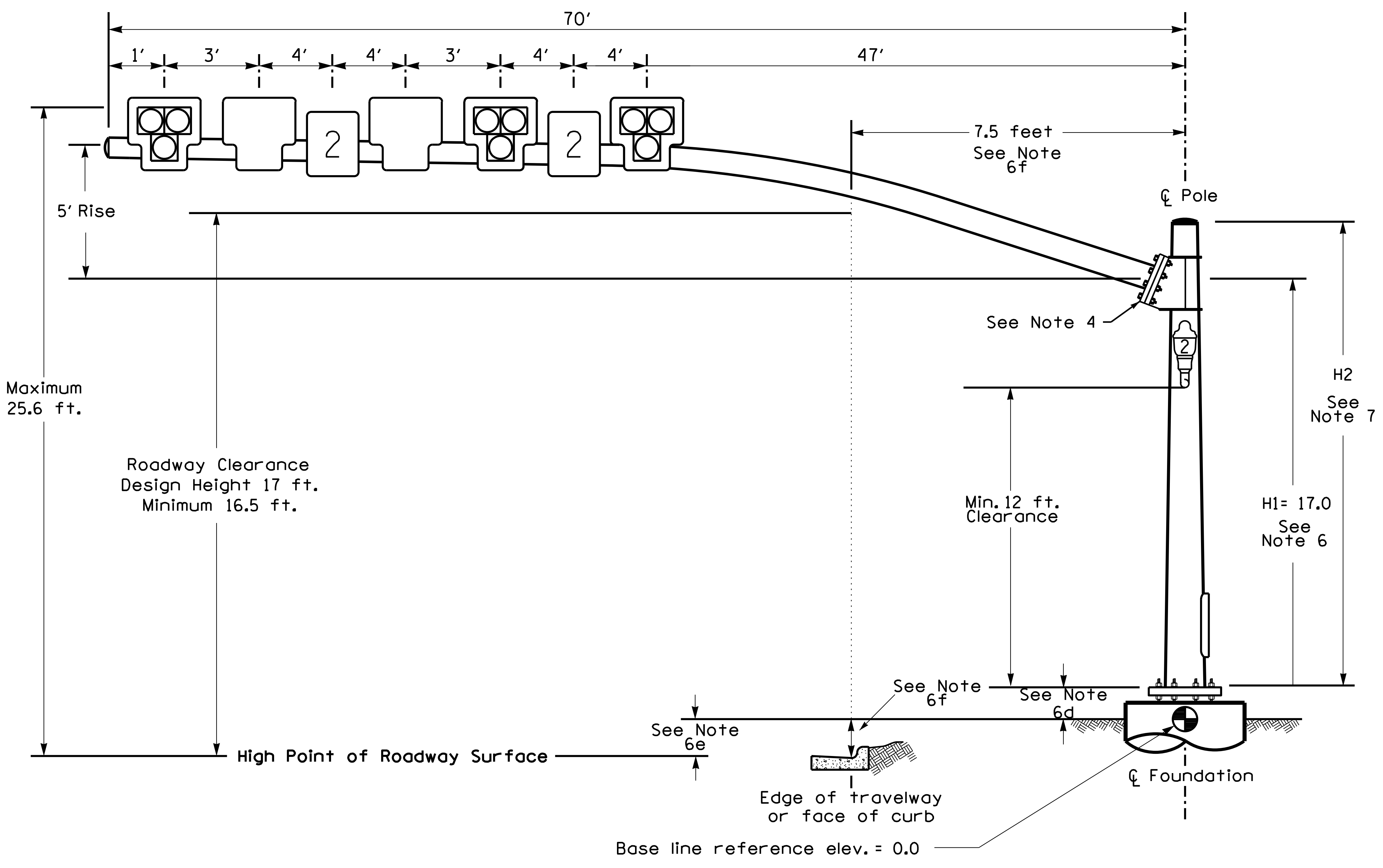
REVISIONS	INIT.	DATE

IMPACT
PO BOX 3728
MOORESVILLE,NC 28117
C-4720

SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by:
Nicholas E. Burns 4/30/2025
1524B9F1FC84442...
DATE

SIG. INVENTORY NO. 10-2567

Design Loading for METAL POLE NO. 1



Elevation View

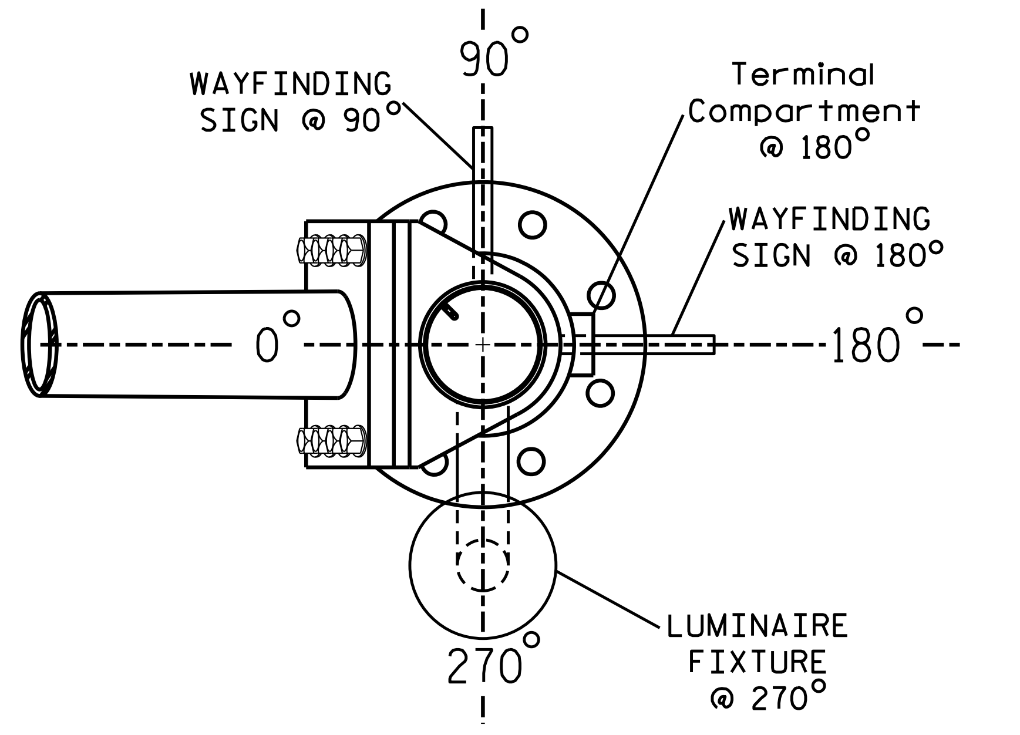
METAL POLE No. 1	PROJECT REFERENCE NO.	SHEET NO.
	36249.4892	Sig-2.5

SPECIAL NOTE

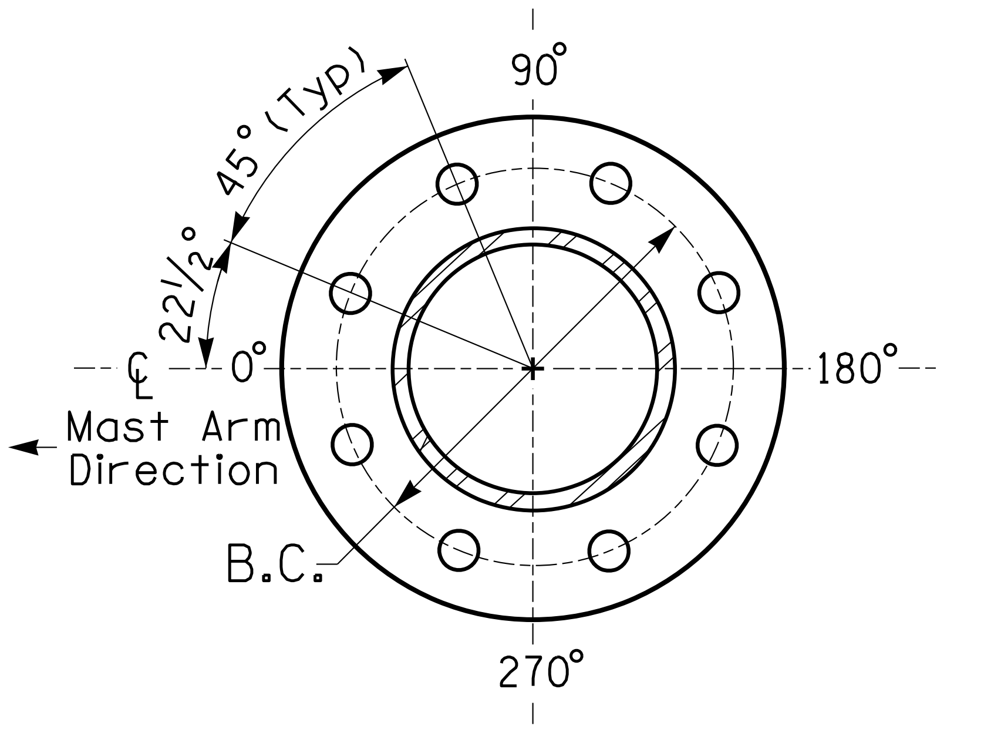
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	POLE 1	
Baseline reference point at ℄ Foundation @ ground level ⊕	0.0 ft.	
Elevation difference at High point of roadway surface	+/-1.0 ft.	
Elevation difference at Edge of travelway or face of curb	+/-1.0 ft.	

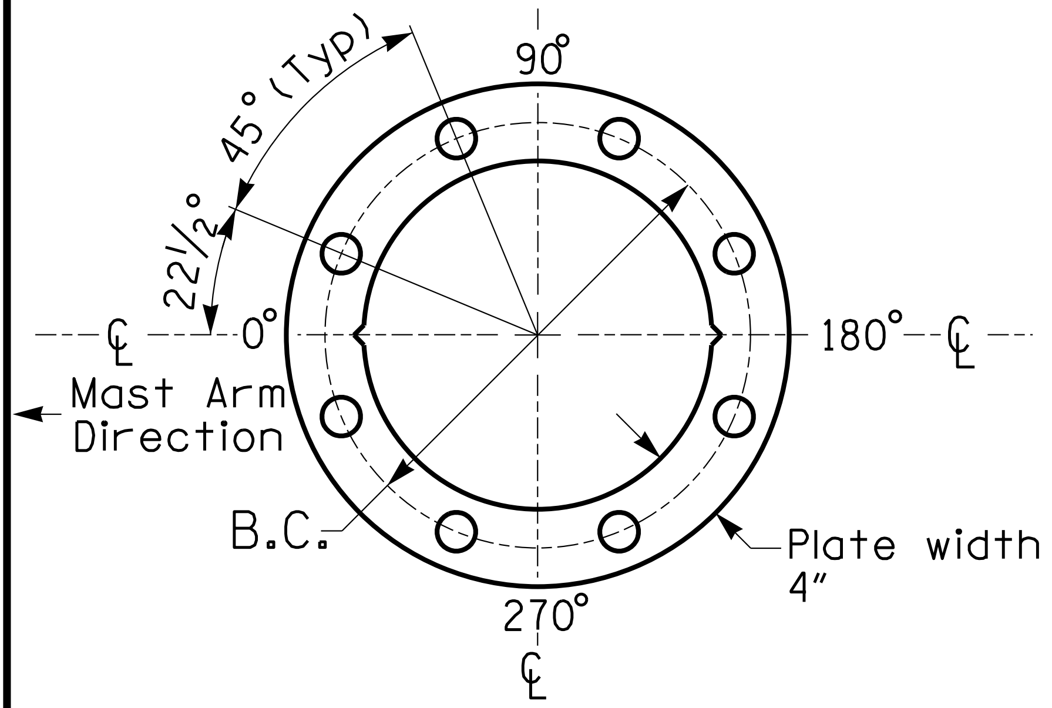


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



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"-3 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 42.0" L	90 LBS
2	DECORATIVE OUTDOOR POLE-MOUNTED LUMINAIRE	1.4 S.F.	31.0" W X 13.0" L	47 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 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. 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.
5. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
6. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
   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.
   f. Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
7. 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.
8. 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.
9. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
10. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

-A black protective coating shall be used on all metal poles and arms as specified in the project special provisions.
-All metal poles are required to be fluted as specified in the project special provisions.
-See the intersection of NC 51 (Main Street) and Johnston Drive for reference.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 5/13/2025
DocuSigned by:
Matthew Cowhig
37DBF39C881444A...
ITS & Signals Unit

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PO BOX 3728
MOORESVILLE,NC 28117
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PH: 704-776-2036

NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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

SR 4982 (N Polk Street)
at
Fire Station Driveway

Division 10 Union County Pineville

PLAN DATE:	April 2025	REVIEWED BY:	N.E. Burns
PREPARED BY:	C. McDonald	IMPACT NO:	23110

SCALE
0 N/A
N/A

REVISIONS	INIT.	DATE

SEAL
SEAL 046300
NICHOLAS E. BURNS
Signed by:
Nicholas E. Burns
1524B9E1FC84442...
SIGNATURE 4/30/2025 DATE

SIG. INVENTORY NO. 10-2567