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Project No.	Sheet No.
W-5103A	Sig. 1.0

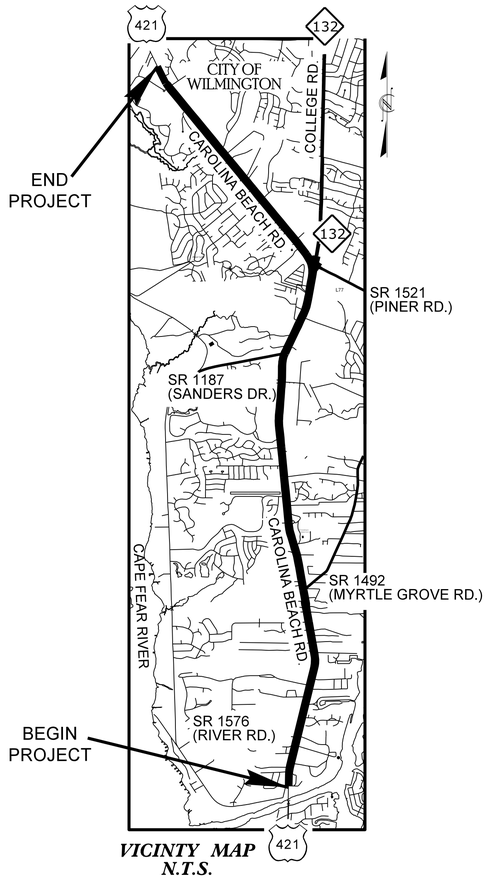
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

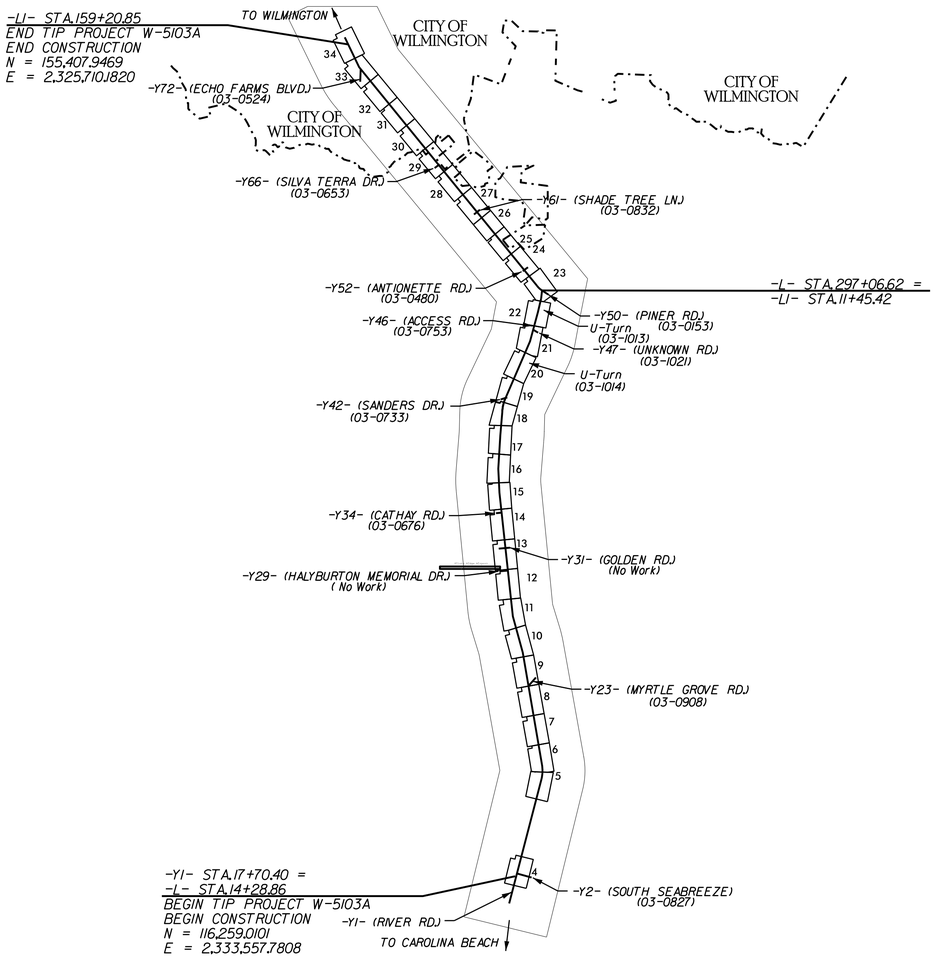
LOCATION: US 421 (CAROLINA BEACH ROAD) FROM BRIDGE NO.30 (SNOW'S CUT BRIDGE) TO 0.31 MILES NORTH OF GEORGE ANDERSON DRIVE (NON-SYSTEM).

TYPE OF WORK: TRAFFIC SIGNALS

Project: W-5103A



VICINITY MAP
N.T.S.



NC GRID
NAD 83/95

Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1.0	--------	Title Sheet
Sig. 2.0–2.2	03–0827	US 421 (Carolina Beach Rd) at SR 1576 (River Rd) /SR 1531 (S Seabreeze Rd)
Sig. 3.0–3.1	03–0908	US 421 (Carolina Beach Rd) at SR 1492 (Myrtle Grove Rd)
Sig. 4.0–4.4	03–0676	US 421 (Carolina Beach Rd) at SR 1276 (Cathay Rd)
Sig. 5.0–5.1	03–0733	US 421 (Carolina Beach Rd) at SR 1187 (Sanders Rd) /ABA Ministorage
Sig. 6.0–6.3	03–1014	US 421 (Carolina Beach Rd) at Myrtle Grove South U-Turn
Sig. 7.0–7.5	03–0753	US 421 (Carolina Beach Rd) at SR 2501 (Service Rd) /Fire Dept.
Sig. 8.0–8.5	03–1021	US 421 (Carolina Beach Rd) at The Kings Highway
Sig. 9.0–9.3	03–1013	US 421 (Carolina Beach Rd) at Myrtle Grove North U-Turn
Sig. 10.0–10.1	03–0153	US 421 (Carolina Beach Rd) /NC 132 (College Rd) at US 421 (Carolina Beach Rd) /SR 1521 (Piner Rd)
Sig. 11.0–11.2	03–0480	US 421 (Carolina Beach Rd) at SR 1247 (Antionette Drive) /Lowe's Entrance
Sig. 12.0–12.2	03–0832	US 421 (Carolina Beach Rd) at SR 1197 (Silver Lake Rd) /SR 2381 (Shade Tree Lane)
Sig. 13.0–13.1	03–0653	US 421 (Carolina Beach Rd) at SR 1237 (Silva Terra Drive) /Matteo Drive
Sig. 14.0–14.2	03–0524	US 421 (Carolina Beach Rd) at Echo Farms Blvd. /George Anderson Drive
Sig. 15.0	--------	Deep-Cut Inductive Detection Loops

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Pamela L. Alexander, PE – Eastern Region Signals Engineer

George C. Brown, PE – Signal Equipment Design Engineer

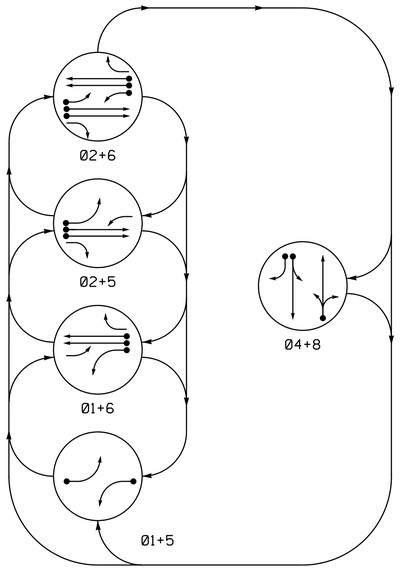
Prepared in the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 2.0

Roadway Sheet 4

PHASING DIAGRAM

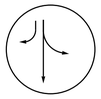


PHASING DIAGRAM DETECTION LEGEND

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

EV PREEMPT PHASES

(Medium Priority)



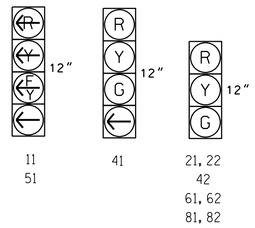
PRE 3
(Ø4+7)

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	EVP 3	FLASH
11	←	←	F Y	F Y	~~R~~	~~R~~	~~Y~~
21, 22	R	R	G	G	R	R	Y
41	R	R	R	R	G	G	R
42	R	R	R	R	G	G	R
51	←	F Y	←	F Y	~~R~~	~~R~~	~~Y~~
61, 62	R	G	R	G	R	R	Y
81, 82	R	R	R	R	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



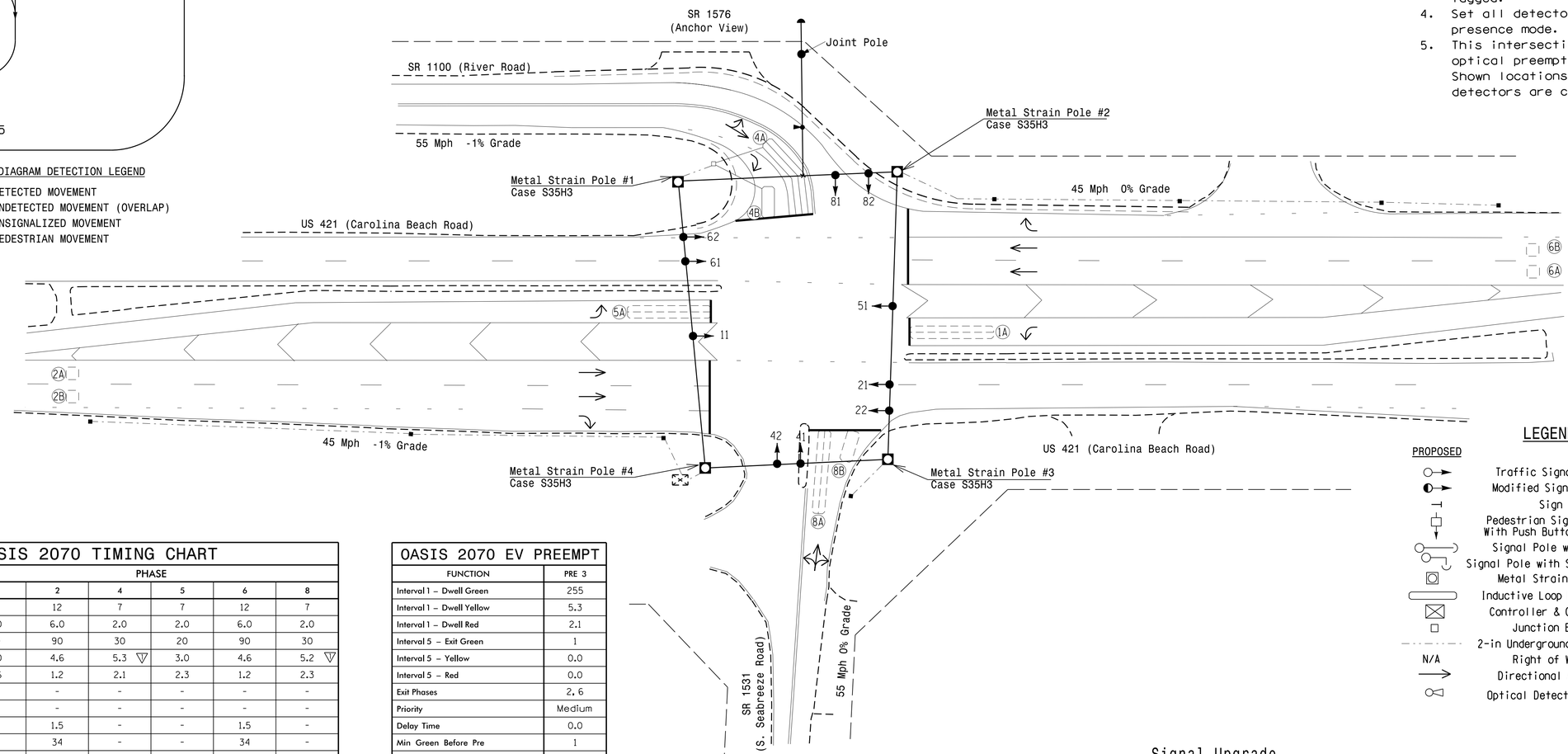
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	Y	-	3	-	-
2A	6X6	300	5	-	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	-	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	-
4B	6X15	0	4	Y	4	Y	Y	-	-	15	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	Y	-	3	-	-
6A	6X6	300	5	-	6	Y	Y	-	-	-	-	-
6B	6X6	300	5	-	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	-
8B	6X15	0	4	-	8	Y	Y	-	-	15	-	-

5 Phase
Fully Actuated
w/ Emergency Vehicle Preempt
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.



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	●
▣	Metal Strain Pole	■
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	– – –
→	Directional Arrow	→
⊂	Optical Detector Unit	◀

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	20	90	30	20	90	30
Yellow Clearance	3.0	4.6	5.3 ▽	3.0	4.6	5.2 ▽
Red Clearance	2.6	1.2	2.1	2.3	1.2	2.3
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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.

OASIS 2070 EV PREEMPT

FUNCTION	PRE 3
Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	5.3
Interval 1 – Dwell Red	2.1
Interval 5 – Exit Green	1
Interval 5 – Yellow	0.0
Interval 5 – Red	0.0
Exit Phases	2, 6
Priority	Medium
Delay Time	0.0
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	7
Enable Backup Protection	Y
Ped Clear Through Yellow	N
Omit Overlaps	-
Preempt Extend**	2

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

Signal Upgrade

Revision ▽ Seal

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E0DCE4E40D... 7/20/15 DATE

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

SCALE 0 30 1"=30'

US 421 (Carolina Beach Road) at SR 1576 (River Road)/ SR 1531 (S. Seabreeze Road)

Division 3 New Hanover County Wilmington

PLAN DATE: July 2010 REVIEWED BY:

PREPARED BY: I. O. Umozurike REVIEWED BY:

REVISIONS	INITIAL	DATE
▽Install new loops, revise clearance times. (EWM)	pa	7/20/15

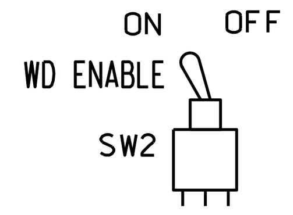
Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by Jason P.Galloway,PE no.29904 on July 7,2010 This document is only certified as to the revisions.

SIG. INVENTORY NO. 03-0827

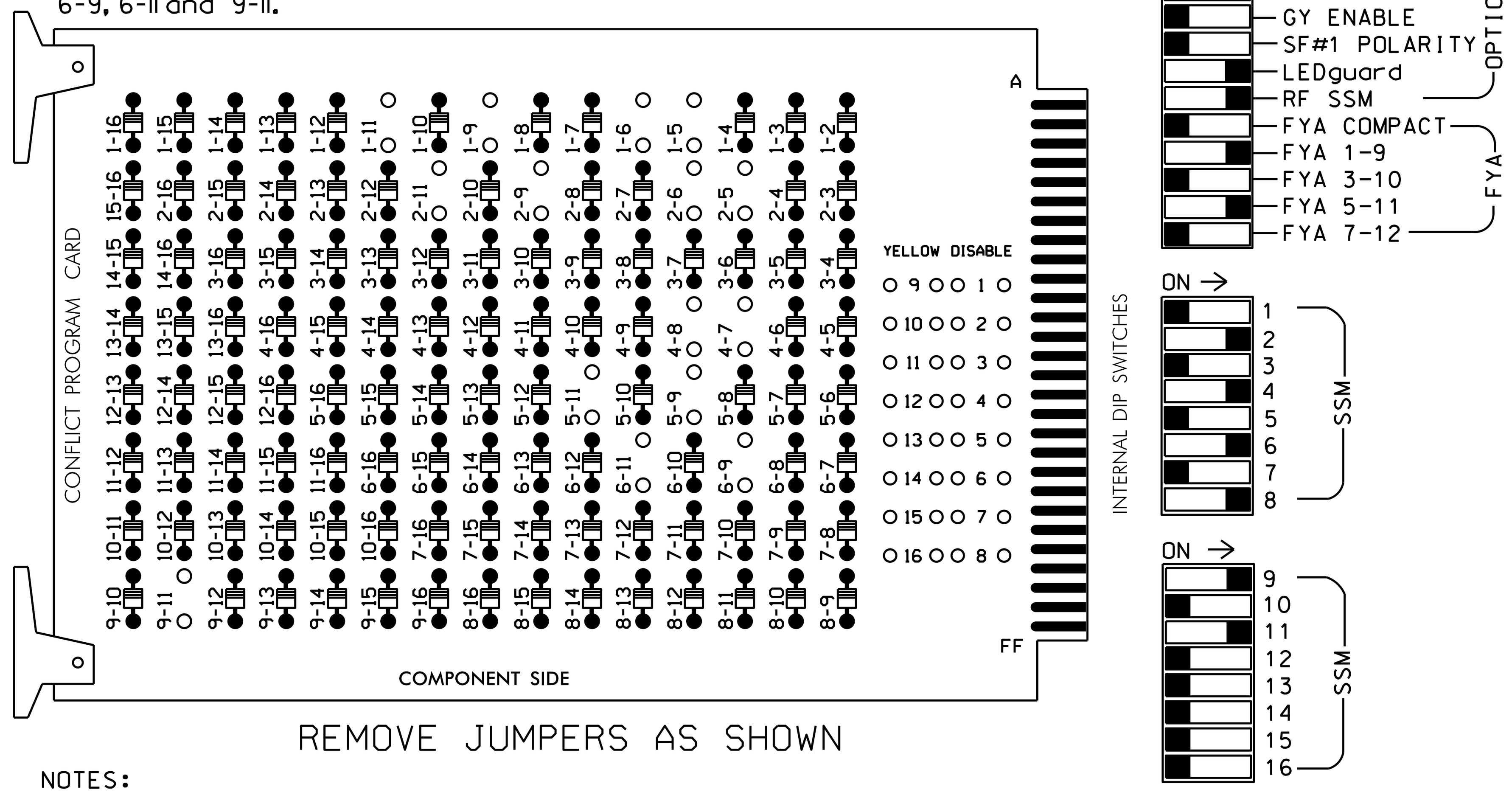
30-JUL-2015 10:02
R:\Traffic\Signals\Designs\Signals\03-0827\W030827_sig_dsn_2015mods.dgn
palexander

EDI MODEL 2010ECL-NC 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, 4-7, 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. 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 1,3, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Start Up In Green.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

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	NU	NU	41,42	NU	51★	61,62	NU	41	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			124								

NU = Not Used

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

★ See pictorial of head wiring in detail below.

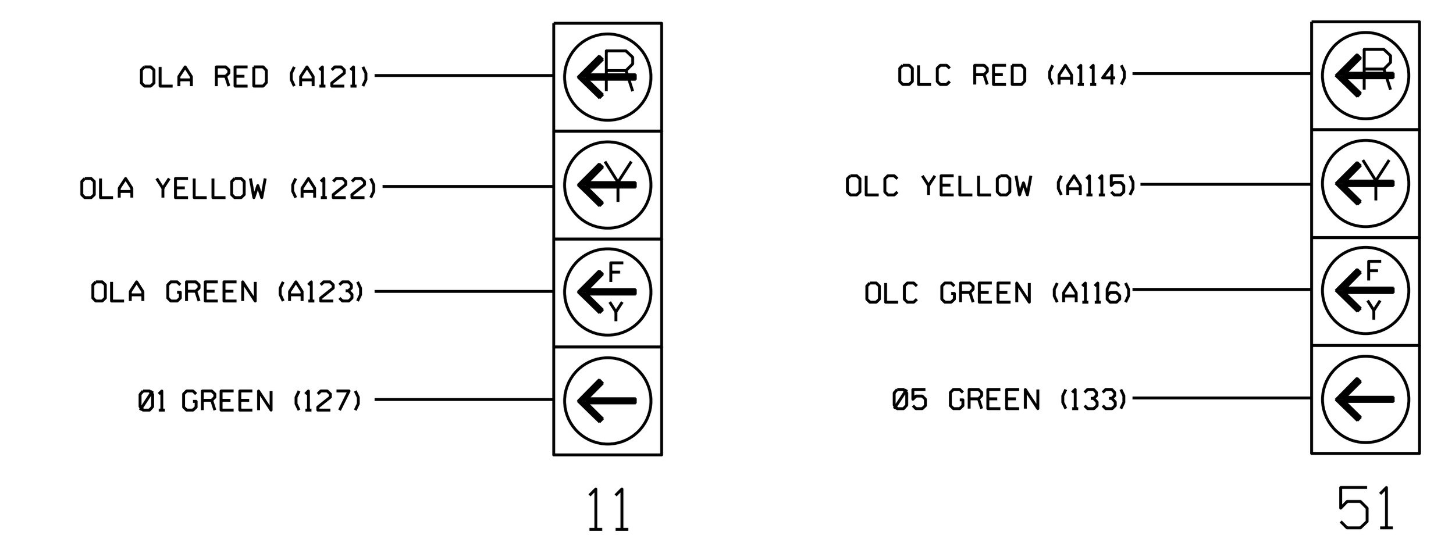
EQUIPMENT INFORMATION

CONTROLLER..............2070L
CABINET.................332 W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S6,S7,S8,S9,S12
PHASES USED.............1,2,4,5,6,✱7,8
OVERLAP "A".............1+2
OVERLAP "B".............NOT USED
OVERLAP "C".............5+6
OVERLAP "D".............NOT USED

✱ USED ONLY DURING PREEMPT

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
"I"	L	NOT USED	Ø2 2B				Ø4 4B								ST DC ISOLATOR
"J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE3 ✱ Opticom	SLOT EMPTY	SLOT EMPTY
"J"	L	NOT USED	Ø6 6B				Ø8 8B						2 Ch. Card NOT USED		

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

⊗ Wired Input - Do not populate slot with detector card

✱ See Opticom Field Wire Detail below.

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[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	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			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

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

[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

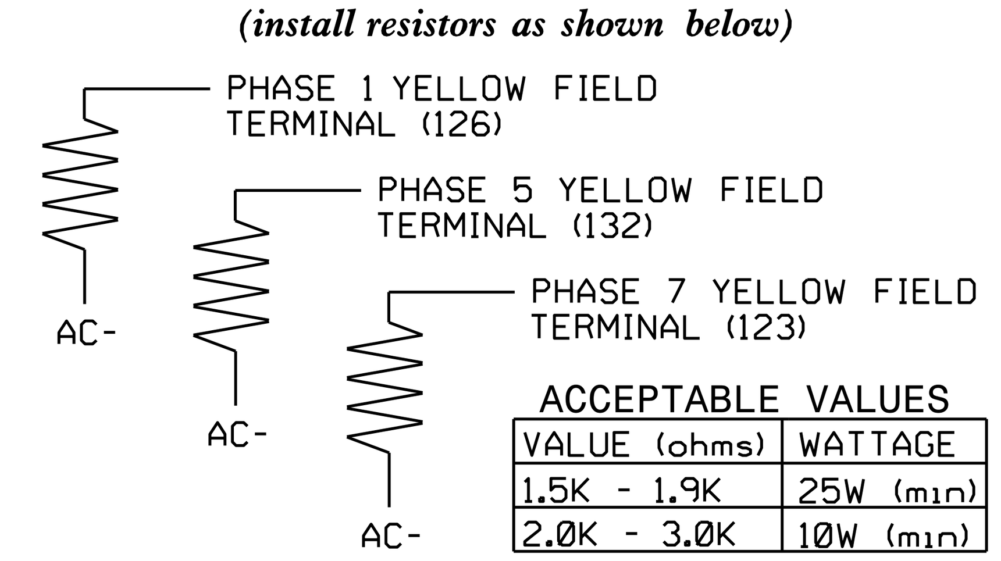
PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phase 7 for 'Omit Phase' and Phases 1, 2, 4, 5, 6 and 8 for 'Startup Calls'. This is to prevent Phase 7 from being served when not in Preempt.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

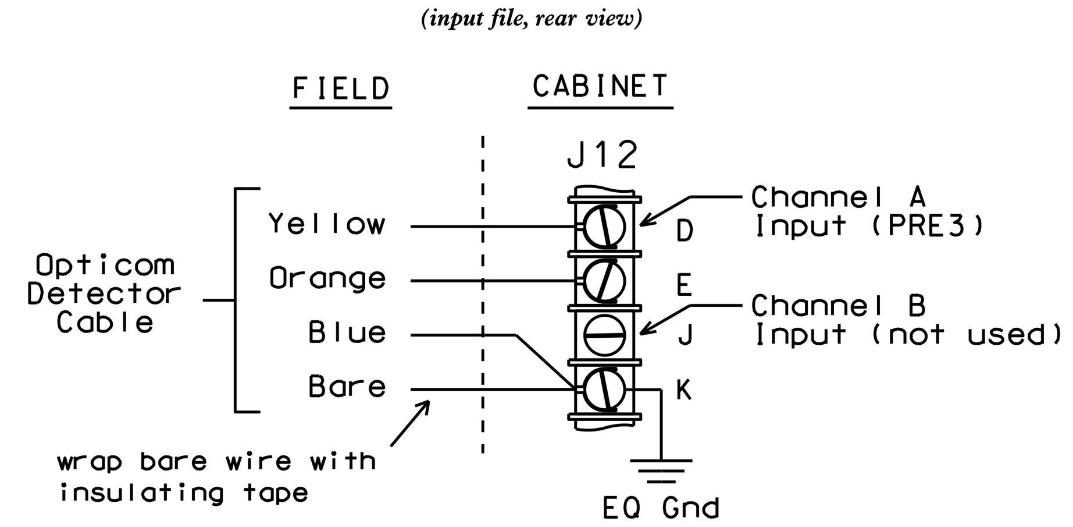


ACCEPTABLE VALUES

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

TYPICAL OPTICOM FIELD WIRE DETAIL

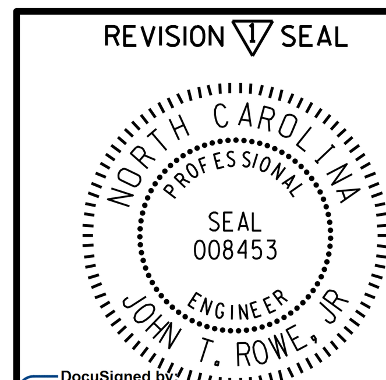
(input file, rear view)



▽1 THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0827
DESIGNED: July 2010
SEALED: 7/7/2010
REVISED: 7/20/2015

ELECTRICAL DETAIL SHEET 1 OF 2

REVISION ▽1 SEAL



DocuSigned by: John T. Rowe, Jr. 7/21/2015
641D60C145EE4F5...
DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 421 (Carolina Beach Road) at SR 1576 (River Road)/ SR 1531 (S. Seabreeze Road)

Division 3 | New Hanover County | Wilmington

PLAN DATE: July 2010	REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland	REVIEWED BY:

REVISIONS	INIT.	DATE
▽1 Revised preempt dwell yellow clear time. (WSA)	JTR	7/21/2015

SEAL

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SIGNATURE | DATE

SIG. INVENTORY NO. 03-0827

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 2.2

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

PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS: ¦    XX
VEH OVL NOT VEH: ¦
VEH OVL NOT PED: ¦
VEH OVL GRN EXT: ¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN   <- NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

▽ EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' twice to advance to Preemption #3.

```
   PREEMPTION  #3  SETTINGS (NEXT:1-10)
INTERVAL/TIMING ¦  CLEAR/DWELL PHASES
  GRN YEL  RED  ¦12345678910111213141516
1 255  5.3  2.1 ¦   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) .............0
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) .........7
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
DWELL HOLD-OVER TIMER (0-255) .......0
LATCH CALL? .........................N
LINK TO NEXT PREEMPT? ...............N
ENABLE BACKUP PROTECTION? ...........Y
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:      ¦
```

PREEMPT PROGRAMMING COMPLETE

Program extend time on optical detector unit for 2.0 sec.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
 LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

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

PRESS '+'

```
 LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

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

PRESS '+'

```
 LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

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

PRESS '+'

```
 LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

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

PRESS '+'

```
 LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

```
 LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

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

PRESS '+'

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

▽ THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0827
DESIGNED: July 2010
SEALED: 7/7/2010
REVISED: 7/20/2015

REVISION ▽ SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/21/2015 DATE
641D60C145EE4F5...

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 421 (Carolina Beach Road) at SR 1576 (River Road)/ SR 1531 (S. Seabreeze Road)

Division 3 | New Hanover County | Wilmington

PLAN DATE: July 2010	REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland	REVIEWED BY:

REVISIONS	INIT.	DATE
▽ Revised preempt dwell yellow clear time. (WSA)	JTR	7/21/2015

SEAL

Not a certified document.
This document originally issued and sealed by George C. Brown, PE. #022013 on 07/23/2010
This document shall not be considered a certified document.

SIGNATURE | DATE

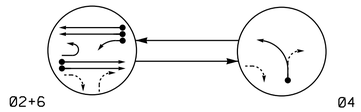
SIG. INVENTORY NO. 03-0827

20-JUL-2015 14:32
S:*ITSSIG*ITS Signals\Workgroups\Sig Mgmt\Armstrong\030827_smele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 3.0

Roadway Sheet 9

PHASING DIAGRAM



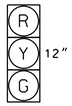
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 04	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



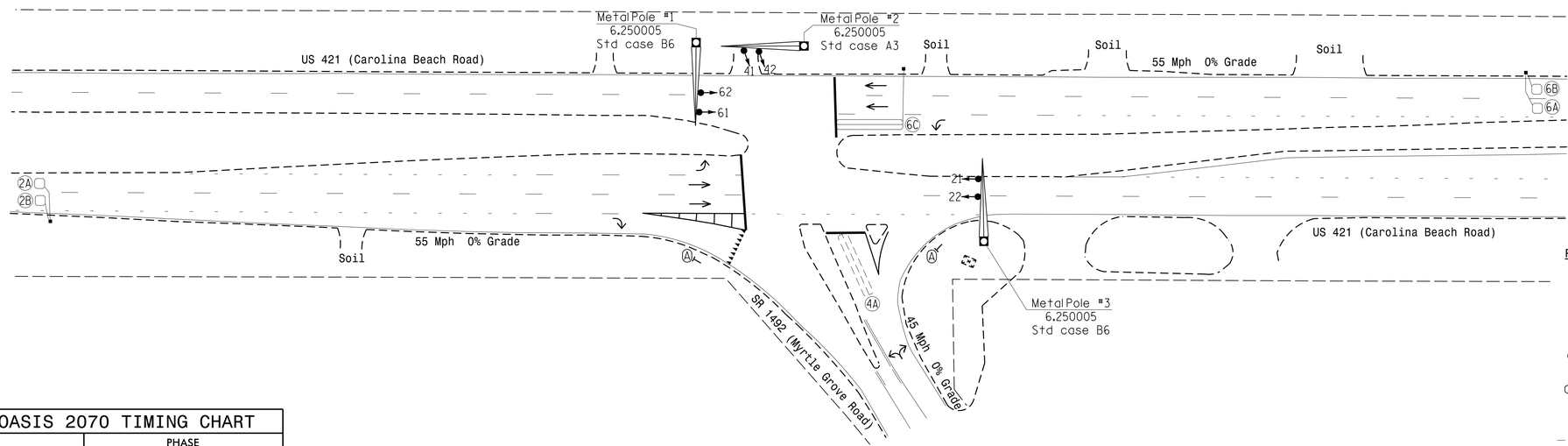
21,22
41,42
61,62

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
2A	6X6	420	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	420	5	Y	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	420	5	Y	6	Y	Y	-	-	-	-	-
6C	6X40	0	2-4-2	Y	6	Y	Y	Y	-	3	-	-

2 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.



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	
A	"YIELD" Sign (R1-2)	A

OASIS 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	14	7	14
Extension 1 *	6.0	1.0	6.0
Max Green 1 *	60	20	60
Yellow Clearance	5.2	3.0	5.2
Red Clearance	1.0	3.1	1.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	1.5	-	1.5
Max Variable Initial *	46	-	46
Time Before Reduction *	15	-	15
Time To Reduce *	30	-	30
Minimum Gap	3.0	-	3.0
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

▽

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

Signal Upgrade

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E00CE4E46D... 7/20/15 DATE

Prepared In the Offices of:

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

750 N.Greenfield Pkwy.Garner,NC 27529

SCALE 0 40 1"=40'

US 421 (Carolina Beach Road) at SR 1492 (Myrtle Grove Road)

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2000	REVIEWED BY:	M. Mahbooba
PREPARED BY:	Amy Hambright	REVIEWED BY:	D. Harris

REVISIONS	INIT.	DATE
▽ Install new loops and revise clearance times, (JRS)	pa	7/20/15

SEAL

Not a certified document as to the Original Document but Only as to the Revisions - This document originally Issued and sealed by James B.Voso,22599 on 5/31/00 This document is only certified as to the revisions.

SIGNATURE DATE

SIG. INVENTORY NO. 03-0908

27-JUL-2015 14:50
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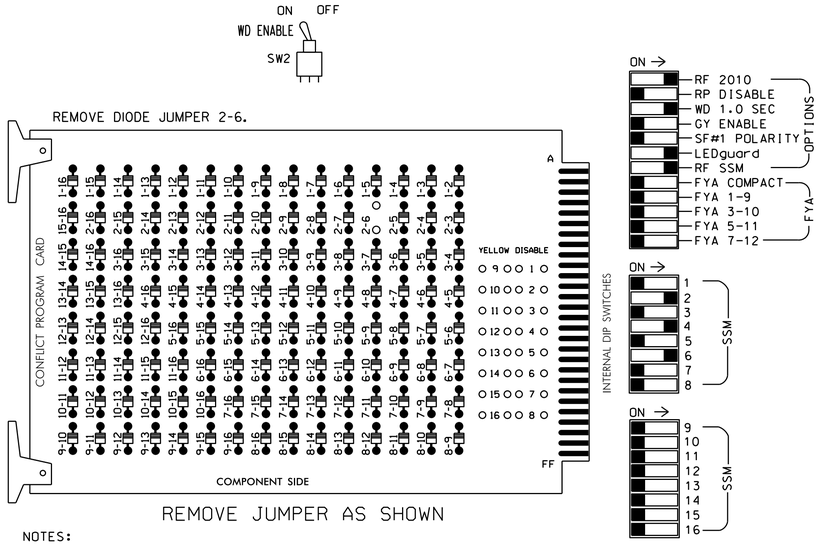
palexander

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 3.1

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		

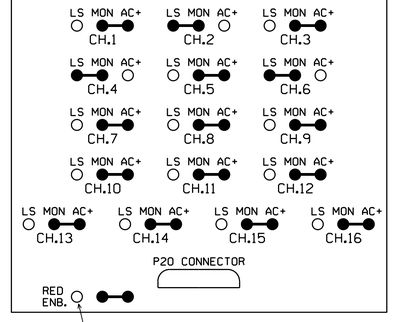
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED.....S2,S4,S6
PHASES USED.....2,4,6
OVERLAPS.....NONE

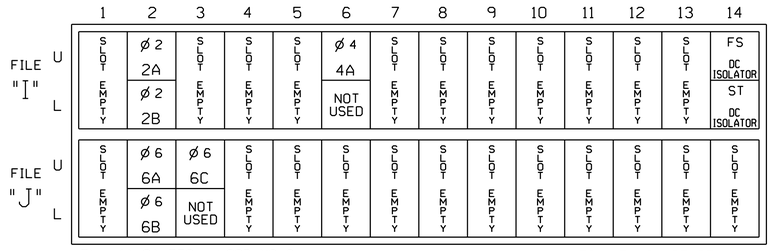
RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y	Y		3

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0908
DESIGNED: March 2000
SEALED: 5/31/2000
REVISED: 7/20/15

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 421 (Carolina Beach Road)
at
SR 1492 (Myrtle Grove Road)

Division 3 | New Hanover County | ps | Wilmington
PLAN DATE: July 2015 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

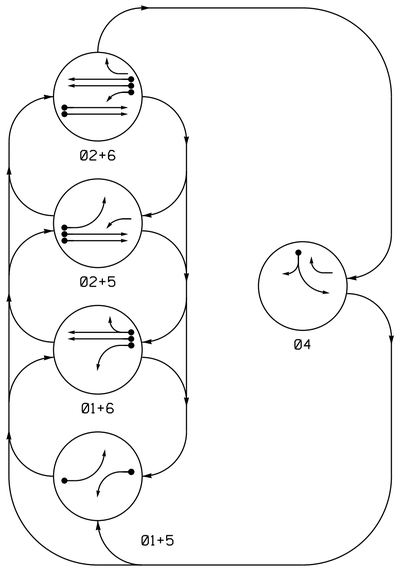
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
DocuSigned by: John T. Rowe, Jr. 7/21/2015
641D60C145EE4F5... DATE
SIG. INVENTORY NO. 03-0908

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 4.0

Roadway Sheet 14

DEFAULT PHASING DIAGRAM

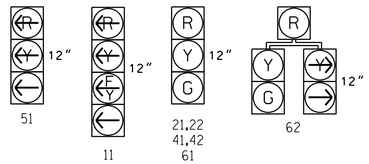


DEFAULT TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04	FLASH
11	←	←	↑ FY	↑ FY	~~R~~	~~Y~~
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R/→	Y

SIGNAL FACE I.D.

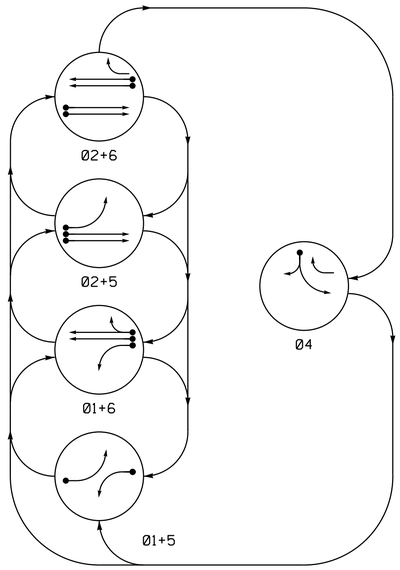
All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



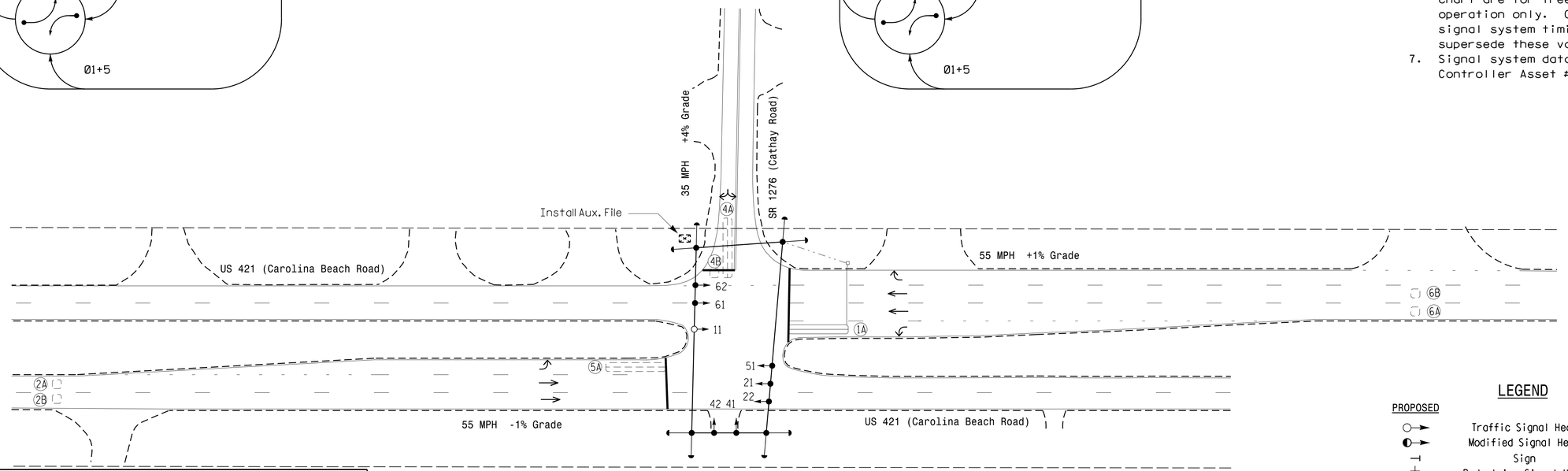
ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~Y~~
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R/→	Y

5 Phase
Fully Actuated
Wilmington Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phase 2.
4. Phase 1 and/or phase 5 may be lagged.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Signal system data: Controller Asset #0676.



OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green 1 *	7	14	7	7	14
Extension 1 *	2.0	6.0	3.0	2.0	6.0
Max Green 1 *	15	125	30	30	125
Yellow Clearance	3.0	5.3	3.0	3.0	5.3
Red Clearance	2.8	1.0	2.8	3.3	1.0
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5
Max Variable Initial *	-	46	-	-	46
Time Before Reduction *	-	30	-	-	30
Time To Reduce *	-	50	-	-	50
Minimum Gap	-	3.4	-	-	3.4
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	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.

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	Y	1	Y	Y	-	-	✳10	-	Y
					✳✳6	Y	Y	Y	-	3	-	Y
2A	6X6	420	5	-	2	Y	Y	-	-	-	-	-
2B	6X6	420	5	-	2	Y	Y	-	-	-	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	5	-	-
4B	6X6	+5	2-4-2	-	4	Y	Y	-	-	15	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-
6A	6X6	420	5	-	6	Y	Y	-	-	-	-	-
6B	6X6	420	5	-	6	Y	Y	-	-	-	-	-

✳ Disable Delay During Alternate Phasing Operation.
✳✳ Disable Phase 6 Call for Loop 1A during Alternate Phasing.

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	

Signal Upgrade

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

US 421 (Carolina Beach Road)
at
SR 1276 (Cathay Road)

Division 3 New Hanover S. of Wilmington

PLAN DATE: July 2015 REVIEWED BY: JG
PREPARED BY: PLA REVIEWED BY:

REVISIONS | INIT. | DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023489 PAMELA L ALEXANDER

DocuSigned by: P L Alexander 7/22/15
DATE

SIG. INVENTORY NO. 03-0676

31-JUL-2015 14:13
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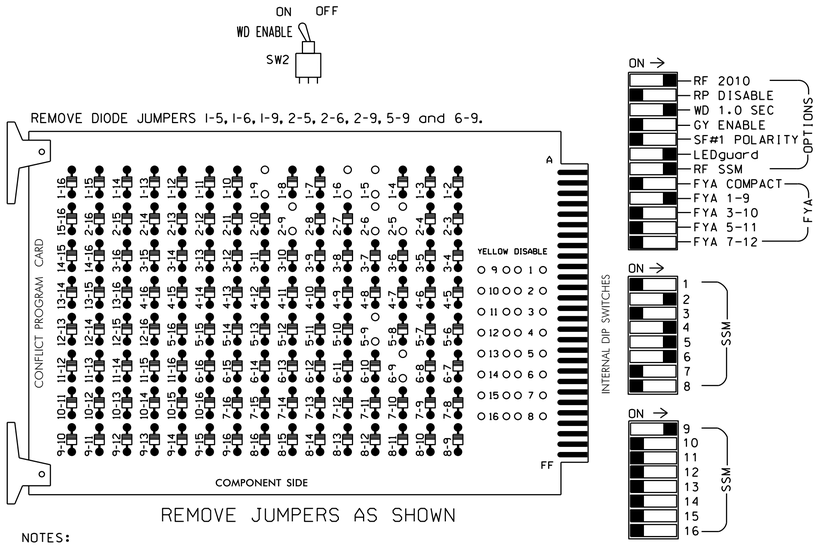
palexander

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	SIG. 4.1

EDI MODEL 2010ECL-NC 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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10 ★	26	6	Y	Y	Y		3
	-	I1U	56	18 ★	51	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

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

★ See Input Page 2 Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to *Caltrans Traffic Signal Control Equipment Specifications* (TSCES).
8. The cabinet and controller are part of the Wilmington Signal System.

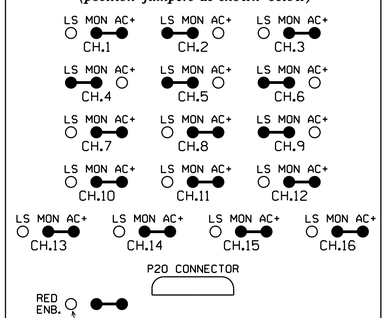
EQUIPMENT INFORMATION

CONTROLLER.....2070L
*CABINET.....McCAIN/CONTROL TECHNOLOGIES
DWG.NO.9500-332-NCDOT /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S9
PHASES USED.....1,2,4,5,6
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

*In NOTES section refer to note 7.

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



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	NU	NU	41,42	62	NU	51	61,62	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		128			101				134										
YELLOW	✳	129			102				135										
GREEN		130			103				136										
RED ARROW								131						A121					
YELLOW ARROW						102		132						A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127					103		133											

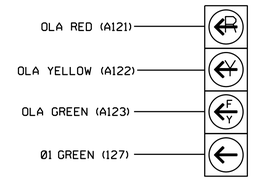
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



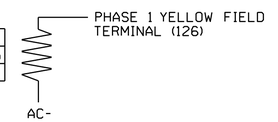
NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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: 03-0676
DESIGNED: July 2015
SEALED: 7/22/2015
REVISED: N/A

Electrical Detail - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)
at
SR 1276 (Cathay Road)

Division 3 | New Hanover County | S. of Wilmington

PLAN DATE: July 2015 | REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown F12901ED8BEB434... 7/23/2015 DATE

SIG. INVENTORY NO. 03-0676

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	SIG.4.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

            SCROLL DOWN

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

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

! IMPORTANT: If present, remove all phases from 'Backup Protect'.

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL
FOR ALTERNATE PHASING - PAGE 2

(program controller as shown below)

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

NOTICE PAGE 2 →

```
 PAGE 2: VEHICLE OVERLAP 'A' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS: ¦X
VEH OVL NOT VEH: ¦
VEH OVL NOT PED: ¦
VEH OVL GRN EXT: ¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

Electrical Detail - Sheet 2 of 4

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0676
DESIGNED: July 2015
SEALED: 7/22/2015
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

US 421 (Carolina Beach Road)
at
SR 1276 (Cathay Road)

Division 3 | New Hanover County | S. of Wilmington

PLAN DATE:	July 2015	REVIEWED BY:	T. Joyce
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/23/2015
F12601EC0BEB434...
DATE

SIG. INVENTORY NO. 03-0676

23-JUL-2015 14:20
S:\TIS\ASSIP\ITS Signals\Workgroups\Sig Mgmt\Strickland\03676_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	SIG.4.3

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

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

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

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.

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

ENTER A 'Y' FOR NOT ENABLED →

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

(LOOP 1A - PHASE 6)

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

PRESS '+' TO ADVANCE TO INPUT 18

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

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

(LOOP 1A - PHASE 1)

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

PROGRAMMING COMPLETE

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

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.

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

ENTER 'Y' FOR ENABLE DETECTOR →

ENTER '1' FOR PHASES ASSIGNED →

ENSURE DELAY IS '0' →

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

DETECTOR PROGRAMMING COMPLETE

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

Electrical Detail - Sheet 3 of 4

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0676
DESIGNED: July 2015
SEALED: 7/22/2015
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 421 (Carolina Beach Road)
at
SR 1276 (Cathay Road)

Division 3 | New Hanover County | S. of Wilmington

PLAN DATE: July 2015	REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/23/2015
DATE

SIG. INVENTORY NO. 03-0676

23-JUL-2015 14:21
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cestrickland

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	SIG.4.4

ALTERNATE PHASING ACTIVATION DETAIL

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

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

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN NORMAL PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

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

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

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

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

INPUTS PAGE 2: Disables phase 6 call on loop 1A and modifies delay time.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0676
DESIGNED: July 2015
SEALED: 7/22/2015
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

US 421 (Carolina Beach Road)
at
SR 1276 (Cathay Road)

Division 3 | New Hanover County | S. of Wilmington

PLAN DATE:	July 2015	REVIEWED BY:	T. Joyce
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/23/2015
F12601ED0BEB434... DATE

SIG. INVENTORY NO. 03-0676

23-JUL-2015 14:24
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cstrickland

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 5.0

Roadway Sheet 19

6 Phase
Fully Actuated
Wilmington Signal System

PHASING DIAGRAM

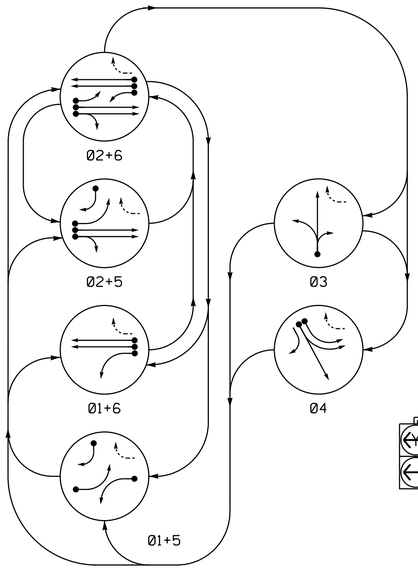
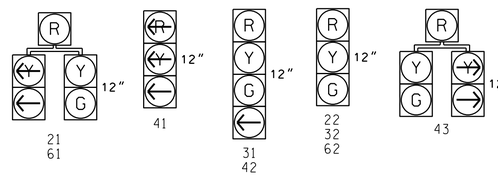


TABLE OF OPERATION

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

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	10	-	-
					6	Y	Y	Y	-	3	-	-
2A	6X6	420	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	420	5	Y	2	Y	Y	-	-	-	-	-
3A	6X20	0	2-4-2	-	3	Y	Y	-	-	10	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	10	-	-
					2	Y	Y	Y	-	3	-	-
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	420	5	Y	6	Y	Y	-	-	-	-	-
S1	6X6	145	5	Y	-	-	-	-	-	-	Y	-
S2	6X6	220	5	Y	-	-	-	-	-	-	Y	-
S3	6X6	195	5	-	-	-	-	-	-	-	Y	-
S4	6X6	195	5	-	-	-	-	-	-	-	Y	-
S5	6X6	195	5	-	-	-	-	-	-	-	Y	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through an all red display.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Existing "Left Turn Yield on Green" ball sign(s)-(R10-12) may be removed at the discretion of the Regional Traffic Engineer.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Signal system data: Controller Asset # 0733.

PHASING DIAGRAM DETECTION LEGEND

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

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⛶
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	------
→	Directional Arrow	→
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ
Ⓒ	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓒ
Ⓓ	"YIELD" Sign (R1-2)	Ⓓ

OASIS 2070 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	14	7	7	7	14
Extension 1	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	15	120	20	45	20	120
Yellow Clearance	3.0	5.3	3.2	5.0	3.0	5.3
Red Clearance	2.9	1.0	3.2	1.9	3.1	1.3
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	46	-	-	-	46
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.4	-	-	-	3.4
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	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.

Signal Upgrade

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B475E0DCE4E46D... 7/20/15 DATE

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

SCALE 0 40 1"=40'

US 421 (Carolina Beach Road) at SR 1187 (Sanders Road) / ABA Ministorage

Division 3 New Hanover County Wilmington

PLAN DATE:	February 2010	REVIEWED BY:	
PREPARED BY:	J Cross	REVIEWED BY:	S Phillips

REVISIONS	INIT.	DATE
▽Revise SB right turn to a yield movement; revise clearance times	pla	4/5/12
▽Install new loops (JRS)	pla	7/20/15

SEAL

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SIGNATURE DATE

SIG. INVENTORY NO. 03-0733

27-JUL-2015 14:51
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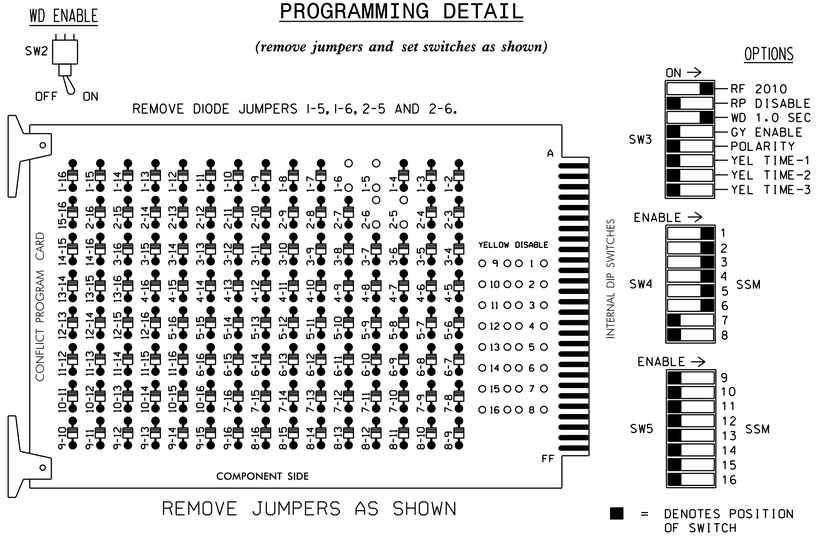
palexander

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 5.1

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 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 7,8,9, 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. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4			S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3		4			4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	31	32	41	42	43	NU	21,43	61,62	NU	NU	NU	NU
RED	✳	128		116	116		101	101		✳	134				
YELLOW		129		117	117		102	102			135				
GREEN		130		118	118		103	103			136				
RED ARROW						101									
YELLOW ARROW	126					102				132					
GREEN ARROW	127			118		103	103			133					

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 and phase 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	SLOT EMPTY	Ø2 2A	WIRED INPUT ⊗	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED		Ø2 2B		NOT USED	Ø4 4B			SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SYS. DET. S4	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6B					NOT USED	SYS. DET. S5					

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	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			
✳ S1	TB6-9,10	I9U	60	22	11	SYS					
✳ S3	TB7-5,6	J8U	50	12	28	SYS					
✳ S4	TB7-9,10	J9U	59	21	15	SYS					
✳ S5	TB7-11,12	J9L	61	23	17	SYS					
✳ S2	TB6-11,12	I9L	62	24	13	SYS					

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

[2] Add jumper from J1-W to I4-W, on rear of input file.

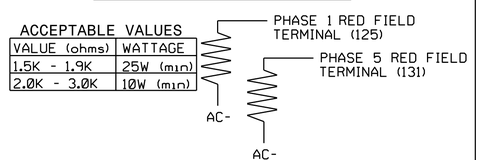
✳ SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0733
DESIGNED: February 2010
SEALED: 4-01-10
REVISED1: 4-05-12
REVISED2: 7-20-15

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn and Associates, Inc.
NC License *F-0102
P.O. Box 33068
Raleigh, NC 27636
(919) 677-2000

REVISION SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/22/2015
SIGNATURE DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 421 (Carolina Beach Road) at SR 1187 (Sanders Road)/ ABA Ministorage

Division 3 | New Hanover County | Wilmington

PLAN DATE: February 2010 | REVIEWED BY:
PREPARED BY: J. Cross | REVIEWED BY: S. Phillips

REVISIONS	INIT.	DATE
2 Revised SR right turn to a yield movement and revised clearance times. (JP)	JTR	4-9-12
1 Installed new loops, no change to electrical detail. (JP)	JTR	7/22/2015

SEAL

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SIGNATURE DATE

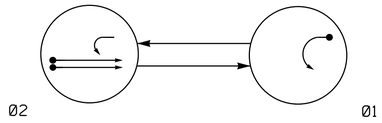
SIG. INVENTORY NO. 03-0733

$FILE$ $USER$ $TIME$ $DATE$

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 6.0

Roadway Sheet 20

DEFAULT PHASING DIAGRAM



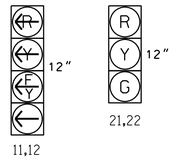
PHASING DIAGRAM DETECTION LEGEND

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

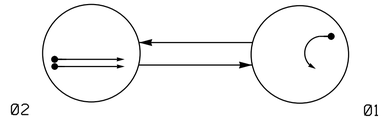
DEFAULT TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø1	PHASE Ø2	FLASH
11, 12	←	~~Y~~	~~Y~~
21, 22	R	G	Y

SIGNAL FACE I.D.

All Heads L.E.D.



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø1	PHASE Ø2	FLASH
11, 12	←	~~R~~	~~Y~~
21, 22	R	G	Y

OASIS 2070 LOOP & DETECTOR INSTALLATION

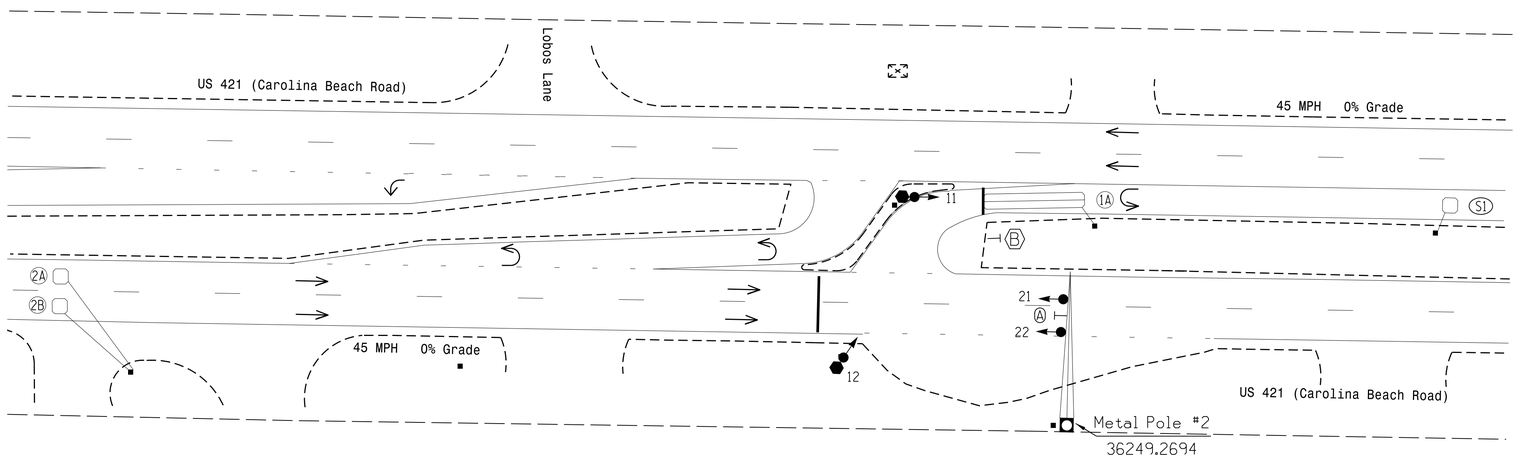
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	*15	-	-
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
S1	6X6	180	3	Y	-	-	-	-	-	-	Y	-

* Disable delay during Alternate Phasing Operation.

2 Phase
Fully Actuated
Wilmington Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. The City Traffic Engineer will determine the hours of use for each phasing plan.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Signal system data: Controller Asset #: 1014.



OASIS 2070 TIMING CHART

FEATURE	PHASE 1	PHASE 2
Min Green 1 *	7	12
Extension 1 *	2.0	6.0
Max Green 1 *	25	120
Yellow Clearance	3.0	4.5
Red Clearance	2.8	1.0
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	1.5
Max Variable Initial *	-	34
Time Before Reduction *	-	30
Time To Reduction *	-	60
Minimum Gap	-	3.0
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	ON	ON

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

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□	Pedestrian Signal Head With Push Button & Sign	■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⛶
□	Junction Box	■
- - - -	2-in Underground Conduit	- · - · -
N/A	Right of Way	— — —
→	Directional Arrow	→
⬭	Metal Pole with Mastarm	⬭
⬡	Type II Signal Pedestal	⬢
Ⓐ	Thru Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	"STOP HERE ON RED" Sign (R10-6)	Ⓑ

Signal Upgrade

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E00CE4E46D... 7/22/15 DATE

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

US 421 (Carolina Beach Road) at Myrtle Grove South U-Turn

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE: February 2008 | REVIEWED BY: R. Hinshaw

PREPARED BY: K. Moore | REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE
▽ Installloops (KGP)	pla	7/22/15

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SIG. INVENTORY NO. 03-1014

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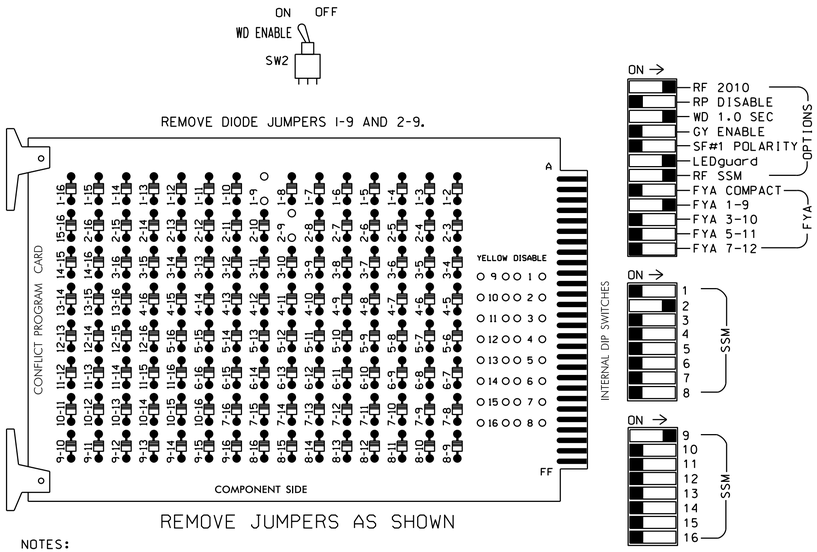
palexander

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 6.1

EDI MODEL 2010ECL-NC 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. 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 1,3,4,5,6,7,8, 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. Program phase 2 for Variable Initial and Gap Reduction.
5. Program phase 2 for Start Up In Green.
6. Program phase 2 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA ★	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,12 ★	21,22	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU	11,12 ★	NU	NU	NU	NU	NU
RED		128																
YELLOW	✳	129																
GREEN		130																
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	

NU = Not Used

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

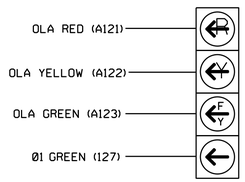
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET .....332 W/ AUX
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S9
PHASES USED.....1,2
OVERLAP A.....1+2
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE: The sequence display for these signals requires special logic programming. See sheet 2 of 3 for programming instructions.

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

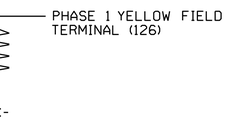
PHASE SEQUENCE: PAGE 1 NEXT: PAGES) ↘

RNG	LEAD	BARRIER 1		X-LAG	LEAD	BARRIER 2		X-LAG
1	O	2	0	0	O	1	0	0
2	O	0	0	0	O	0	0	0
3	O	0	0	0	O	0	0	0
4	O	0	0	0	O	0	0	0

NOTE: This phase sequence is utilized to enable sequence page change / TOD events as necessary.

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of this resistor is to load the channel yellow monitor input in order to prevent the Signal Sequence Monitor from detecting any possible 'phantom' (or false) conflict, as this channel has no yellow field display.

▽ THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1014
DESIGNED: February 2008
SEALED: 5/6/2008
REVISED: 7/22/2015

REVISION ▽ SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/23/2015 DATE
641D00C145EE4F5...

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
Myrtle Grove South U-Turn

Division 3 New Hanover County Myrtle Grove

PLAN DATE:	February 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	INIT.	DATE
▽ No changes to this electrical plan. (WSA)	JTR	7/23/2015

SEAL

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This document is only certified as to the revisions.

SIGNATURE DATE

SIG. INVENTORY NO. 03-1014

23-JUL-2015 09:59
S:\★ITSCSUM\ITS Signals\Workgroups\Sig Mgmt\Armstrong\03101 4_sm_ele_xxx.dgn
sarmstrong

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	ø 2 2B							NOT USED					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

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	-	-	15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	-	-
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	-	-	-
**S1	TB6-9,10	I9U	60	22	11	SYS	-	-	-	-	-

* Disable delay on this loop during Alternate Phase operation (See Sheet 3 of 3).

** 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

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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 THROUGH 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

          SCROLL DOWN

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

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEADS 11 & 12).

PRESS '+'

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

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEADS 11 & 12).

PRESS '+'

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

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEADS 11 & 12).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

(!) THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1014
DESIGNED: February 2008
SEALED: 5/6/2008
REVISED: 7/22/2015

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)
at
Myrtle Grove South U-Turn

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE: February 2008 | REVIEWED BY:
PREPARED BY: R. Hinshaw | REVIEWED BY:

REVISIONS	INIT.	DATE
(!) No changes to this electrical plan. (WSA)	JTR	7/23/2015

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 Greenfield Pkwy, Garner, NC 27529

REVISION (!) SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/23/2015
641D60C145EE4F5... DATE

SEAL

Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by F. Royal Hinshaw, #032117, on 5/6/08.
This document is only certified as to the revisions.

SIGNATURE DATE

SIG. INVENTORY NO. 03-1014

FYA-PPLT SIGNAL OUTPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR SIGNALS 11 AND 12

(program controller as shown below)

NOTE: THIS PROGRAMMING APPLIES FOR OUTPUT PAGE 2.
OUTPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS.
THIS PROGRAMMING IS NECESSARY FOR THE ALTERNATE PHASING OPERATION.

OUTPUT ASSIGNMENTS FOR SIGNAL HEADS 11 AND 12

MAKE THE FOLLOWING CHANGES ON OUTPUT PAGE 2

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS). PRESS 'NEXT' FOR PAGE 2, WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION ENTER "50"

```
PAGE:2  C1 PIN:97  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................50
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

ENTER A "Y" FOR VEHICLE PHASE.

THE OUTPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:97  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........1
SELECT COLOR(0=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'.

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

```
PAGE:2  C1 PIN:97  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................50
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................._
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

PRESS "+" KEY FOR OUTPUT 51

STEP 2

```
PAGE:2  C1 PIN:98  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................51
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

ENTER A "Y" FOR VEHICLE PHASE.

THE OUTPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:98  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........1
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

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'.

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

```
PAGE:2  C1 PIN:98  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................51
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................._
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

PRESS "+" KEY FOR OUTPUT 52

STEP 3

```
PAGE:2  C1 PIN:99  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................52
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
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.........................._
```

ENTER A "Y" FOR NOT ENABLED (THIS WILL DISABLE THE OUTPUT)

THE OUTPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'NOT ENABLED' AS SHOWN BELOW.

```
PAGE:2  C1 PIN:99  NOT ENABLED
OUTPUT ASSIGNMENT #.................52
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
VEHICLE PHASE......................._
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.........................._
```

OUTPUT PROGRAMMING COMPLETE

NOTE: THE OUTPUT ASSIGNMENT CHANGES, SHOWN ABOVE, ARE NECESSARY FOR THE TIME OF DAY OPERATION OF SIGNAL HEADS 11 AND 12. IN ALTERNATE PHASING (PROTECTED ONLY) OPERATION, THE RED ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE RED. THE SOLID YELLOW ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE YELLOW. IN ADDITION, THE FLASHING YELLOW ARROW IS SWITCHED OFF BY DISABLING THE OVERLAP GREEN OUTPUT.

THESE OUTPUT CHANGES ARE ACCOMPLISHED ON OUTPUT PAGE 2. THEREFORE IN ALTERNATE PHASING MODE THE OUTPUT PAGE IS SWITCHED TO 2.

THE OUTPUT PAGE CHANGE IS ACCOMPLISHED BY THE CONTROLLERS TOD EVENT SCHEDULER.

IN NORMAL PHASING (PPLT) MODE THE STANDARD, DEFAULT, OUTPUT ASSIGNMENTS ARE USED WHICH ARE DESIGNATED ON OUTPUT PAGE 1.

TOD EVENT SCHEDULING PROGRAMMING DETAIL TO CALL ALTERNATE PHASING OPERATION

(program controller as shown below)

THIS EVENT SCHEDULING DETAIL SHOWS THE TOD PROGRAMMING STEPS NECESSARY FOR THE CONTROLLER TO OPERATE THE "ALTERNATE PHASING" AS SHOWN ON THE SIGNAL PLANS.

FROM MAIN MENU PRESS "B" (SCHEDULING)

EVENT NO.	EVENT TYPE	DESCRIPTION OF OPERATION
1	CHANGE OUTPUT PAGE (1-4)............2	MODIFIES CONTROL CIRCUITS FOR SIGNAL HEADS 11 AND 12.
2	DISABLE DET STRETCH / DELAY (1-64)..1	DELAY IS DISABLED FOR DETECTOR 1 (LOOP 1A).

NOTE: THE EVENTS ABOVE WILL ALLOW SIGNALS 11 AND 12 TO OPERATE IN THE PROTECTED ONLY MODE.

ALL EVENTS SHOWN ABOVE SHALL BE PROGRAMMED TO START AND STOP ON THE SAME TIMES AND DATES.

1 THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1014
DESIGNED: February 2008
SEALED: 5/6/2008
REVISED: 7/22/2015

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch · State of North Carolina · Department of Transportation · Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
Myrtle Grove South U-Turn

Division 3 New Hanover County Myrtle Grove

PLAN DATE: February 2008	REVIEWED BY:
PREPARED BY: R. Hinshaw	REVIEWED BY:

REVISIONS	INIT.	DATE
1 No changes to this electrical plan. (WSA)	JTR	7/23/2015

REVISION 1 SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/23/2015
641D60C145EE4F5...
DATE

SEAL

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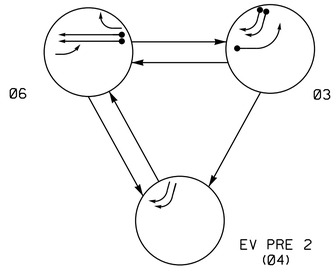
SIGNATURE DATE

SIG. INVENTORY NO. 03-1014

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 7.0

Roadway Sheet 21

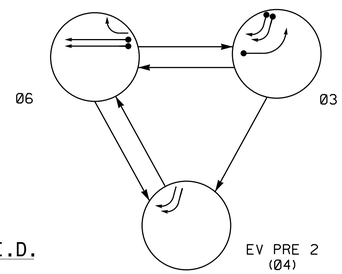
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3	PHASE EVP 2	PHASE FLASH
31	~~F Y~~	←	~~R~~	~~Y~~
32, 33	R	→	→	R
61, 62	G	R	R	Y

ALTERNATE PHASING DIAGRAM

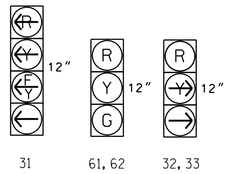


ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3	PHASE EVP 2	PHASE FLASH
31	~~R~~	←	~~R~~	~~Y~~
32, 33	R	→	→	R
61, 62	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

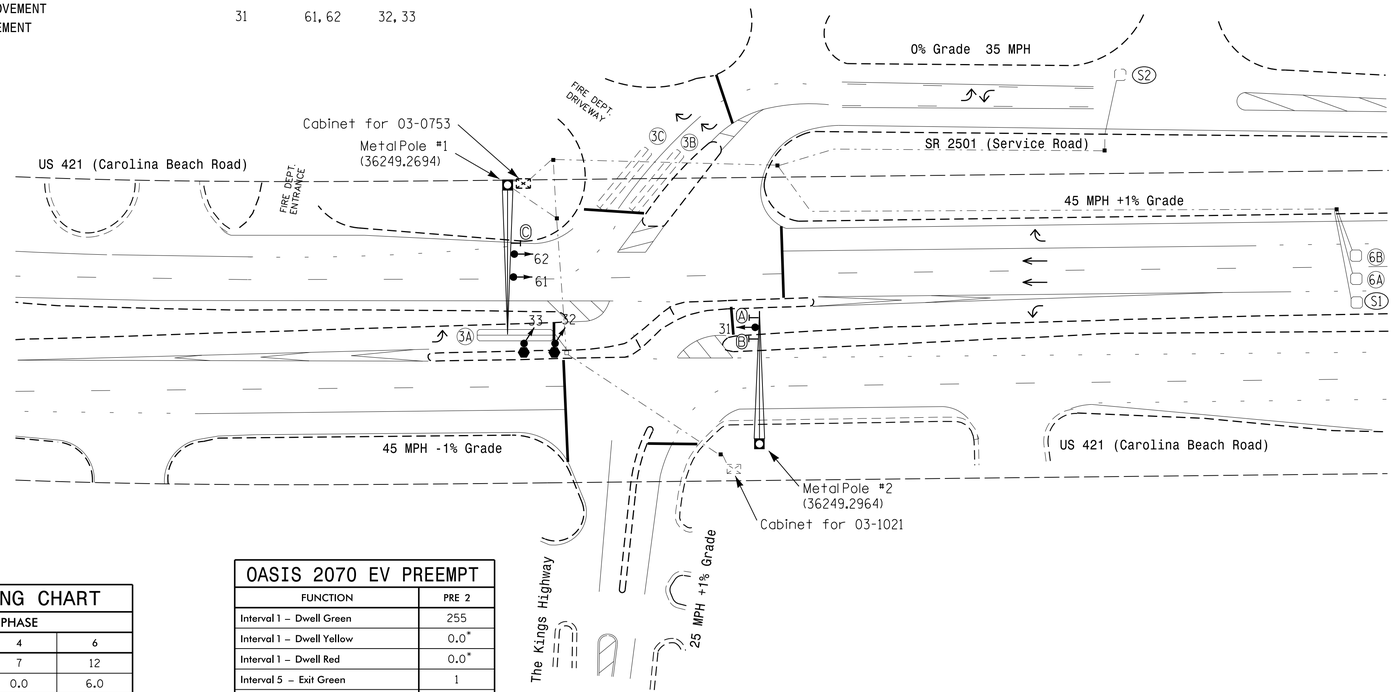
INDUCTIVE LOOPS: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING: PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
3A	6x40	0	2-4-2	Y	3	Y	Y	–	–	*10	–	–
3B	6x40	0	2-4-2	–	3	Y	Y	–	–	15	–	–
3C	6x40	0	2-4-2	–	3	Y	Y	–	–	15	–	–
6A	6x6	300	5	Y	6	Y	Y	–	–	–	–	–
6B	6x6	300	5	Y	6	Y	Y	–	–	–	–	–
S1	6x6	300	5	Y	–	–	–	–	–	–	Y	–
S2	6x6	300	3	–	–	–	–	–	–	–	Y	–

*Disable delay during Alternate Phasing Operation

2 Phase
Fully Actuated
w/ Emergency Vehicle Preempt
Wilmington Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
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. Emergency vehicle preemption switch is located in Fire Department.
5. The City Traffic Engineer will determine the Delay Time and Preempt Dwell Min Time for the emergency vehicle preemption timing.
6. The City 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. Signal system data:
   Controller Asset #: 0753.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Metal Pole with Mastarm	●
⬡	Signal Pedestal	⬢
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	– – –
→	Directional Arrow	→
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	No U-Turn Sign (R3-4)	Ⓑ
Ⓒ	Right "ONLY" Sign (R3-5R)	Ⓒ

OASIS 2070 TIMING CHART

FEATURE	PHASE 3	PHASE 4	PHASE 6
Min Green 1 *	7	7	12
Extension 1 *	2.0	0.0	6.0
Max Green 1 *	25	16	120
Yellow Clearance	3.0	3.2	4.4
Red Clearance	3.1	1.3	1.8
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	1.5
Max Variable Initial *	-	-	34
Time Before Reduction *	-	-	30
Time To Reduce *	-	-	60
Minimum Gap	-	-	3.0
Recall Mode	-	-	MIN RECALL
Vehicle Call Memory	-	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

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)	6
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
** Program Timing on Optical Detection Unit
*** See Note #5

Signal Upgrade

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E0DCE4E40D... 7/22/15 DATE

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

SCALE 0 40 1"=40'

US 421 (Carolina Beach Road)
at
SR 2501 (Service Road) / Fire Dept.

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE: March 2008 | REVIEWED BY:
PREPARED BY: R. Hinshaw | REVIEWED BY:

REVISIONS	INIT.	DATE
▽ Modify heads 32, 33; revise Head 31 flash and renumber existing phase 3 heads.	PLA	12/22/14
▽ Install loops. (kgp)	pla	7/22/15

Not a certified document as to the Original Document but Only as to the Revisions - This document originally Issued and sealed by F.Royal Hinshaw,PE-#032117 on 7/29/2008 This document is only certified as to the revisions.

SIG. INVENTORY NO. 03-0753

30-JUL-2015 14:22
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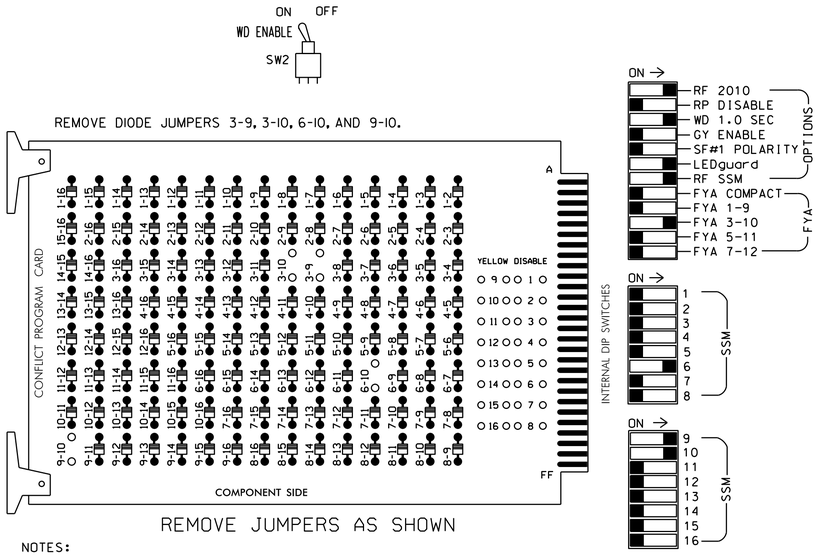
palexander

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 7.1

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

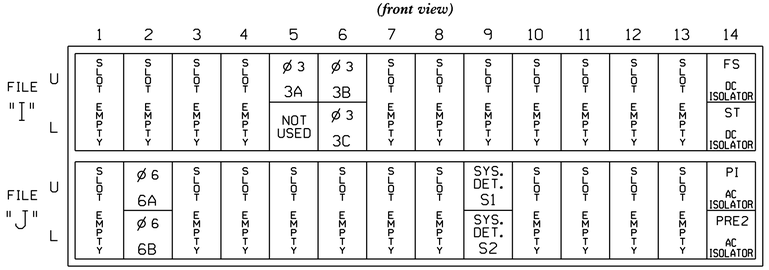
NOTES:

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

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME
PI = PREEMPT INTERFACE WITH Ø3-1021
PRE = PREEMPT

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
3A	TB4-5,6	15U	58	20	3	3	Y	Y	-	-	10
	-	15U	58	20 ★	3	3	Y	Y	-	-	
3B	TB4-9,10	16U	41	3	4	3	Y	Y	-	-	15
3C	TB4-11,12	16L	45	7	14	3	Y	Y	-	-	15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	-	-
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	-	-	-
✱S1	TB7-9,10	J9U	59	21	15	SYS	-	-	-	-	-
✱S2	TB7-11,12	J9L	61	23	17	SYS	-	-	-	-	-

★ See Input Page 2 Assignment programming details on sheet 5.

✱ 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

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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phase 6 for Variable Initial and Gap Reduction.
5. Program phase 6 for Start Up In Green.
6. Program phase 6 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

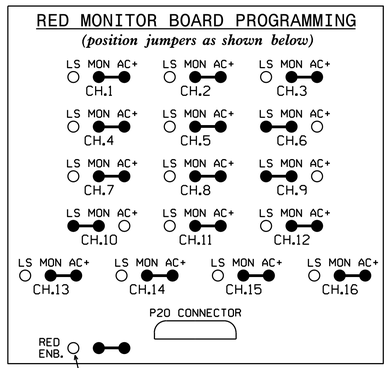
EQUIPMENT INFORMATION

CONTROLLER.....EAGLE TYPE 2070L
CABINET.....McCAIN/CONTROL TECHNOLOGIES (DWG.NO.9500-332-NCDOT)
SOFTWARE.....ECONOLITE OASIS V. 3.02.20 OR LATER
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2P✱,S3,S6,S9,S10
PHASES USED.....3,4✱✱,6
OVERLAP A.....3+4
OVERLAP B.....3+6
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED

✱ S2P used for Fire Station Pilot Lamp control.
✱✱ Phase 4 used in Preempt sequence only.

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



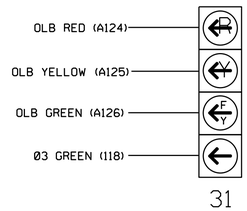
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	✱✱	31★	NC	NU	NU	61,62	NU	NU	NU	NU	32,33	31★	NU	NU	NU	NU
RED								134					A121					
YELLOW				✱				135										
GREEN								136										
RED ARROW														A124				
YELLOW ARROW													A122	A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW				118									A123					

NU = Not Used
NC = No connection: phase used for timing only.
✱ Denotes install load resistor. See load resistor installation detail this sheet.
✱✱ Denotes S2P-Y used to control firehouse preempt indicator lamp. See Sheet 2 of this electrical detail.
★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

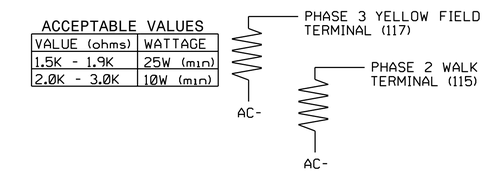
(wire signal heads as shown)



NOTE: The sequence display for these signals requires special logic programming. See sheet 4 of 5 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

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



PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phase 4 for 'Omit Phase' and Phases 3 and 6 for 'Startup Calls'. This is to prevent Phase 4 from being served when not in Preempt.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0753
DESIGNED: March 2008
SEALED: 7/29/2008
REVISED1: 12/22/14
REVISED2: 7/22/15

REVISION SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015 DATE
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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
SR 2501 (Service Road) / Fire Dept.

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE: March 2008 | REVIEWED BY:
PREPARED BY: R. Hinshaw | REVIEWED BY:

REVISIONS	INIT.	DATE
1 REVISED FIRE PREEMPTION PUSH BUTTON AND INDICATOR LAMP WIRING DETAIL. ALSO ADDED AC ISOLATOR DETAIL AND PREEMPT OMIT NOTE. 02/04/2009-MBH-	GSR	2/6/09
2 No change to Electrical detail. CES 7/14/15	YCB	7/30/2015

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SIGNATURE DATE

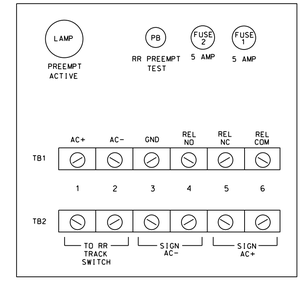
SIG. INVENTORY NO. 03-0753

Electrical Detail - Sheet 1 of 5

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 7.2

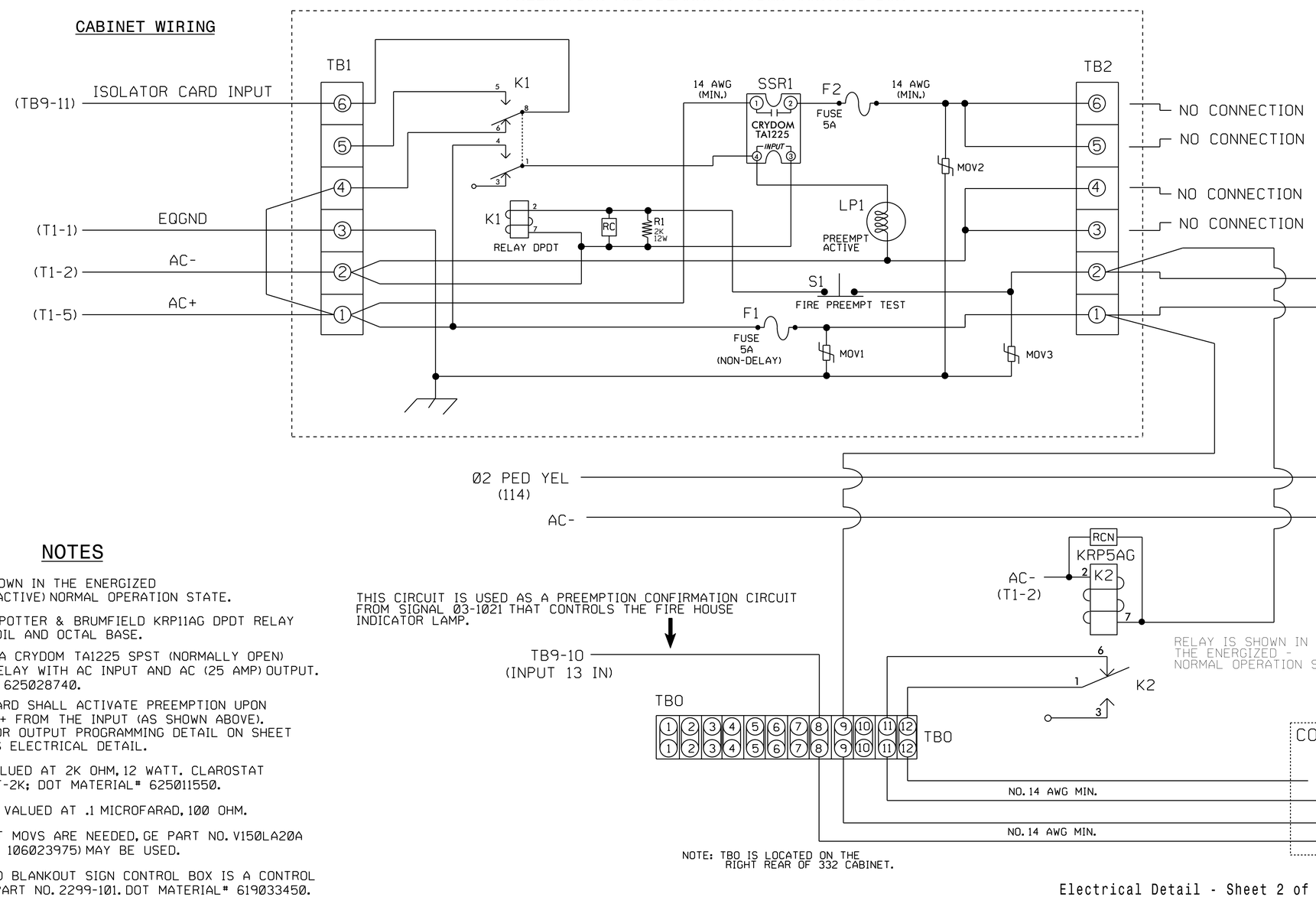
EMERGENCY VEHICLE PREEMPTION PUSHBUTTON AND INDICATOR LAMP WIRING DETAIL

FRONT VIEW OF PREEMPT BOX



PREEMPTION AND BLANKOUT SIGN CONTROL BOX

CABINET WIRING



NOTES

1. RELAY K1 IS SHOWN IN THE ENERGIZED (PREEMPT NOT ACTIVE) NORMAL OPERATION STATE.
2. RELAY K1 IS A POTTER & BRUMFIELD KRP11AG DPDT RELAY WITH 120VAC COIL AND OCTAL BASE.
3. RELAY SSR1 IS A CRYDOM TA1225 SPST (NORMALLY OPEN) SOLID STATE RELAY WITH AC INPUT AND AC (25 AMP) OUTPUT. DOT MATERIAL# 625028740.
4. AC ISOLATOR CARD SHALL ACTIVATE PREEMPTION UPON REMOVAL OF AC+ FROM THE INPUT (AS SHOWN ABOVE). SEE AC ISOLATOR OUTPUT PROGRAMMING DETAIL ON SHEET 3 OF 5 OF THIS ELECTRICAL DETAIL.
5. RESISTOR IS VALUED AT 2K OHM, 12 WATT. CLAROSTAT PART NO. VPR10F-2K; DOT MATERIAL# 625011550.
6. RC NETWORK IS VALUED AT .1 MICROFARAD, 100 OHM.
7. IF REPLACEMENT MOVS ARE NEEDED, GE PART NO. V150LA20A (DOT MATERIAL# 106023975) MAY BE USED.
8. PREEMPTION AND BLANKOUT SIGN CONTROL BOX IS A CONTROL TECHNOLOGIES PART NO. 2299-101. DOT MATERIAL# 619033450.
9. IMPORTANT!!
   TERMINAL TB9-12 (ON INPUT PANEL) SHALL BE CONNECTED TO AC NEUTRAL (JUMPER MAY HAVE TO BE ADDED).
   ALSO ADD JUMPER FROM J14-K TO J14-E ON REAR OF INPUT FILE. THIS JUMPER PROVIDES AC NEUTRAL TO CHANNEL 1 OF AC ISOLATOR CARD.
10. RELAY K2 IS A SPDT WITH A 120VAC COIL AND 10 AMP CONTACTS. (P&B PART NO. KRP5AG) (DOT MATERIAL NO. 625028600).

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NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015 DATE
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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation
Signal Management Section
750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road) at SR 2501 (Service Road) / Fire Dept.

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

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1 REVISED FIRE PREEMPTION PUSH BUTTON AND INDICATOR LAMP WIRING DETAIL. ALSO ADDED AC ISOLATOR DETAIL AND PREEMPT OMIT NOTE. 02/04/2009-MWH-	MTR	2/6/09
2 No change to Electrical detail. CES 7/14/15	GCB	7/30/2015

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SIG. INVENTORY NO. 03-0753

Electrical Detail - Sheet 2 of 5

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 7.3

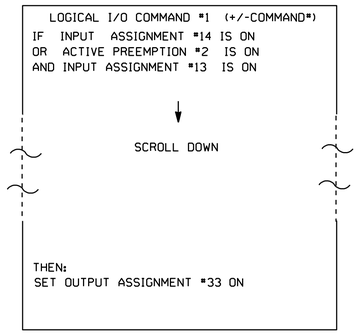
FIREHOUSE INDICATOR LAMP
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

NOTE

When preempt delay time is used, Step 1 below is necessary to ensure the pilot lamp in the fire house will activate immediately after the push button is depressed:

STEP 1

From Main Menu: Press '6' (Outputs), then select '3' (Logical I/O Processor).

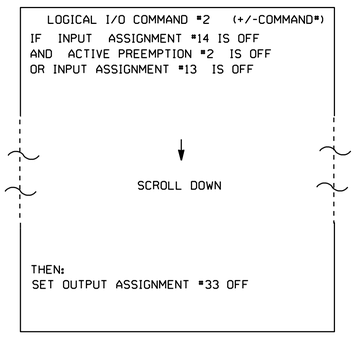


STEP 2

NOTE

In order for pilot lamp in fire house to deactivate immediately after ending preemption, program the following:

Toggle the '+' button once to access Logical I/O Command #2.



STEP 3

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable logical processor (Act Logic 1-16) by flagging #1 and #2.

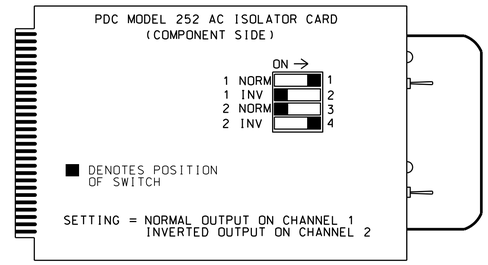
END OF PROGRAM.

IO REFERENCE SCHEDULE

INPUT 13 = SPECIAL FUNCTION 1
INPUT 14 = PREEMPT 2 IN
OUTPUT 33 = PHASE 2 PED YELLOW

FIRE PREEMPT AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

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



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

INPUT ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '5' (INPUTS), THEN '+' UNTIL PIN 51 (INPUT 13) IS REACHED.

PROGRAM INPUT 13 AS SPECIAL FUNCTION ALARM "1" AS SHOWN BELOW:

```
PAGE: 1 C1 PIN:51  SPECIAL FUNCTION
INPUT ASSIGNMENT #.................13
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................._
VEHICLE DETECTOR (1-64)............._
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................_
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)......._
SPECIAL FUNCTION ALARM (1-4).......1   <-
TOD HOUR SYCHRONIZATION (0-23)....._
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)..._
CHANGE PHASE TIMING PAGE (1-4)....._
CHANGE PHASE CONTROL PAGE (1-4)....._
CHANGE OVERLAP CONTROL PAGE (1-4)..._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

NOTE: THIS INPUT IS USED FOR PREEMPT CONFIRMATION CIRCUIT AS WELL AS LOGGING PREEMPT EVENT FOR SIGNAL AT 03-1021.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0753
DESIGNED: March 2008
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REVISED1: 12/22/14
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Electrical Detail - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)
at
SR 2501 (Service Road) / Fire Dept.

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	INIT.	DATE
1 REVISED FIRE PREEMPTION PUSH BUTTON AND INDICATOR LAMP WIRING DETAIL. ALSO ADDED AC ISOLATOR DETAIL AND PREEMPT OMIT NOTE. 02/04/2009-MWH-	DR	2/6/09
2 No change to Electrical detail. CES 7/14/15	DR GCB	7/30/2015

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NCDEPARTMENT OF TRANSPORTATION
Signal Management Section
750 Greenfield Pkwy, Garner, NC 27529

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SIG. INVENTORY NO. 03-0753

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 7.4

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

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

```
   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? .............Y
OVERLAPS:                | ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW   |
OMIT OVERLAPS:           |
```

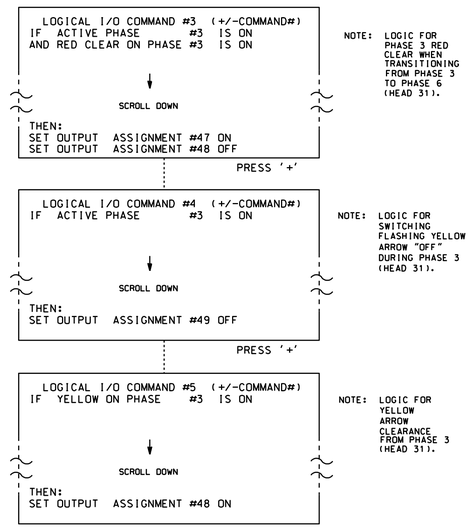
* Denotes timing to be determined in field.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

(program controller as shown below)

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE:

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 3 THROUGH 5.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

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

PRESS '+'

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0753
DESIGNED: March 2008
SEALED: 7/29/2008
REVISED1: 12/22/14
REVISED2: 7/22/15

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

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2 No change to Electrical detail. CES 7/14/15	YCB	7/30/2015

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SIG. INVENTORY NO. 03-0753

Electrical Detail - Sheet 4 of 5

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 7.5

FYA-PPLT SIGNAL OUTPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 31

(program controller as shown below)

NOTE: THIS PROGRAMMING APPLIES FOR OUTPUT PAGE 2.
OUTPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS.
THIS PROGRAMMING IS NECESSARY FOR THE ALTERNATE PHASING OPERATION.

OUTPUT ASSIGNMENTS FOR SIGNAL HEAD 31

MAKE THE FOLLOWING CHANGES ON OUTPUT PAGE 2

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS). PRESS 'NEXT' FOR PAGE 2.
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION ENTER "47"

```
PAGE:2  C1 PIN:94  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................47
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

→ ENTER A "Y" FOR VEHICLE PHASE.

→ THE OUPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:94  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........3
SELECT COLOR(0=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 INPUTING DATA,
THEN 'ESC'.

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

```
PAGE:2  C1 PIN:94  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................47
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
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..........................
```

PRESS "+" KEY FOR OUTPUT 48

STEP 2

```
PAGE:2  C1 PIN:95  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................48
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

→ ENTER A "Y" FOR VEHICLE PHASE.

→ THE OUPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:95  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........3
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

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

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

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

```
PAGE:2  C1 PIN:95  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................48
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 49

STEP 3

```
PAGE:2  C1 PIN:96  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................49
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
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..........................
```

→ ENTER A "Y" FOR NOT ENABLED (THIS WILL DISABLE THE OUTPUT)

→ THE OUPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'NOT ENABLED' AS SHOWN BELOW.

```
PAGE:2  C1 PIN:96  NOT ENABLED
OUTPUT ASSIGNMENT #.................49
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
VEHICLE PHASE.......................
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..........................
```

OUTPUT PROGRAMMING COMPLETE

NOTE: THE OUTPUT ASSIGNMENT CHANGES, SHOWN ABOVE, ARE NECESSARY FOR THE TIME OF DAY OPERATION OF SIGNAL HEAD 31.
IN ALTERNATE PHASING (PROTECTED ONLY) OPERATION, THE RED ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE RED.
THE SOLID YELLOW ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE YELLOW.
IN ADDITION, THE FLASHING YELLOW ARROW IS SWITCHED OFF BY DISABLING THE OVERLAP GREEN OUTPUT.

THESE OUTPUT CHANGES ARE ACCOMPLISHED ON OUTPUT PAGE 2. THEREFORE IN ALTERNATE PHASING MODE THE
OUTPUT PAGE IS SWITCHED TO 2.
THE OUTPUT PAGE CHANGE IS ACCOMPLISHED BY THE CONTROLLERS TOD EVENT SCHEDULER.

IN NORMAL PHASING (PPLT) MODE THE STANDARD, DEFAULT, OUPUT ASSIGNMENTS ARE USED WHICH ARE DESIGNATED ON OUTPUT PAGE 1.

TOD EVENT SCHEDULING PROGRAMMING DETAIL TO CALL ALTERNATE PHASING OPERATION

(program controller as shown below)

THIS EVENT SCHEDULING DETAIL SHOWS THE TOD
PROGRAMMING STEPS NECESSARY FOR THE CONTROLLER
TO OPERATE THE "ALTERNATE PHASING" AS SHOWN ON
THE SIGNAL PLANS.

FROM MAIN MENU PRESS "B" (SCHEDULING)

EVENT NO.	EVENT TYPE	DESCRIPTION OF OPERATION
1	CHANGE OUTPUT PAGE (1-4).....2	MODIFIES CONTROL CIRCUITS FOR SIGNAL HEAD 31.
2	DISABLE DET STRETCH / DELAY (1-64)..3	DELAY IS DISABLED FOR DETECTOR 3 (LOOP 3A).

NOTE: THE EVENTS ABOVE WILL ALLOW SIGNAL HEAD 31 TO OPERATE
IN THE PROTECTED ONLY MODE.

ALL EVENTS SHOWN ABOVE SHALL BE PROGRAMMED TO
START AND STOP ON THE SAME TIMES AND DATES.

Electrical Detail - Sheet 5 of 5

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0753
DESIGNED: March 2008
SEALED: 7/29/2008
REVISED1: 12/22/14
REVISED2: 7/22/15

REVISION SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015
F12601ED0BEB434... DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Public Transportation and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
SR 2501 (Service Road) / Fire Dept.

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	INIT.	DATE
1 REVISED FIRE PREEMPTION PUSH BUTTON AND INDICATOR LAMP WIRING DETAIL. ALSO ADDED AC ISOLATOR DETAIL AND PREEMPT OMIT NOTE. 02/04/2009-MWH-	dsTR	2/6/09
2 No change to Electrical detail. CES 7/14/15	GCB	7/30/2015

SEAL

Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by F. Royal Hinshaw. #032117, on 8-12-08.
This document is only certified as to the revisions.

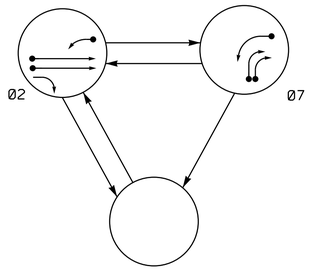
SIGNATURE DATE

SIG. INVENTORY NO. 03-0753

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 8.0

Roadway Sheet 21

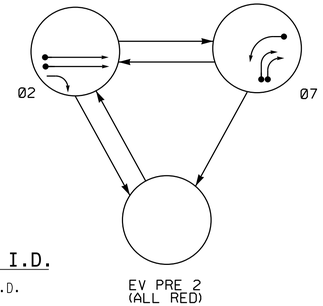
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	Ø7	EVP2	FLASH
21,22	G	R	R	Y
71	~~F~~ Y	←	~~R~~	~~Y~~
72,73	R	→	R	R

ALTERNATE PHASING DIAGRAM

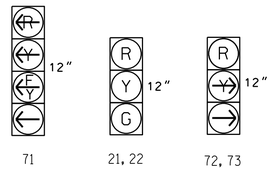


ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	Ø7	EVP2	FLASH
21,22	G	R	R	Y
71	~~R~~	←	~~R~~	~~Y~~
72,73	R	→	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

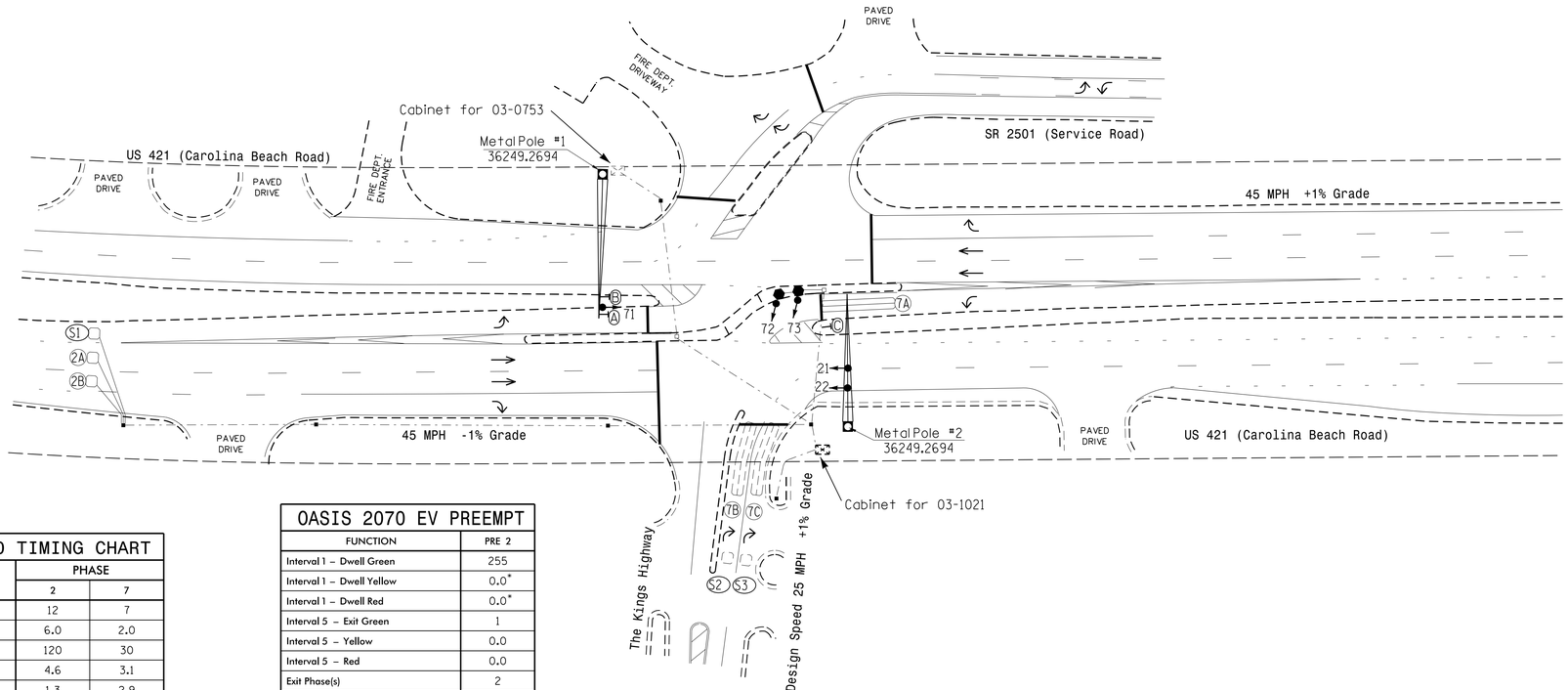
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	✳10	-	-
7B	6X40	0	2-4-2	-	7	Y	Y	-	-	15	-	-
7C	6X40	0	2-4-2	-	7	Y	Y	-	-	15	-	-
S1	6X6	300	5	Y	-	-	-	-	-	-	Y	-
S2	6X6	70	3	-	-	-	-	-	-	-	Y	-
S3	6X6	70	3	-	-	-	-	-	-	-	Y	-

✳ Disable delay during Alternate Phasing Operation.

2 Phase
Fully Actuated
w/ Emergency Vehicle Preempt
Wilmington Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
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. Existing emergency vehicle preemption switch is located in the Fire Department.
5. The City Traffic Engineer will determine the Delay Time and Dwell Min Time for the emergency vehicle preemption timing.
6. The City 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. Signal system data: Controller Asset #1021.



OASIS 2070 TIMING CHART

FEATURE	PHASE 2	7
Min Green 1 *	12	7
Extension 1 *	6.0	2.0
Max Green 1 *	120	30
Yellow Clearance	4.6	3.1
Red Clearance	1.3	2.9
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	1.5	-
Max Variable Initial *	34	-
Time Before Reduction *	30	-
Time To Reduce *	60	-
Minimum Gap	3.0	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	-
Dual Entry	-	-
Simultaneous Gap	ON	ON

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

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
** Program Timing on Optical Detection Unit
*** See Note #5

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	●
⊠	Metal Pole With Mastarm	⊠
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
-----	2-in Underground Conduit	-----
N/A	Right of Way	-----
→	Directional Arrow	→
⬡	Signal Pedestal	⬢
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	No U-Turn Sign (R3-4)	Ⓑ
Ⓒ	"Stop Here On Red" Sign (R10-6)	Ⓒ

Signal Upgrade

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P.L. Alexander 7/20/15 DATE
B4756E00CE4E46D...

Prepared In the Offices of: Transportation Mobility and Safety Division, Signal Design Section, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy.,Garner,NC 27529

SCALE 0 40 1"=40'

US 421 (Carolina Beach Road) at The Kings Highway

Division 03 New Hanover County Myrtle Grove

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	INIT.	DATE
▽ Install loops. (kgp)	pla	7/20/15

Not a certified document as to the Original Document but Only as to the Revisions - This document originally Issued and sealed by F.Royal Hinshaw,PE- #032117 on 6/19/2008 This document is only certified as to the revisions.

SIG. INVENTORY NO. 03-1021

31-JUL-2015 08:53
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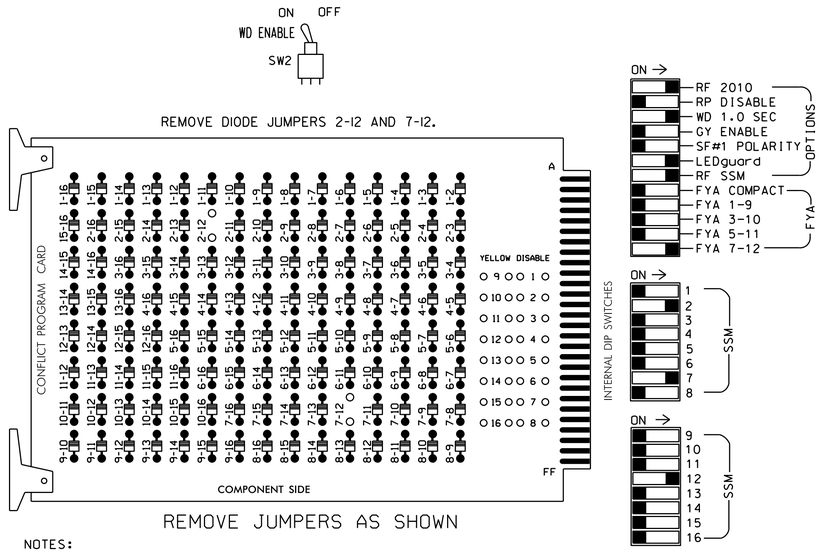
jrspence

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 8.1

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 1,3,4, 5,6,8,9,10,11,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phase 2 for Variable Initial and Gap Reduction.
5. Program phase 2 for Start Up In Green.
6. Program phase 2 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7		S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD ★	SPARE
SIGNAL HEAD NO.	NU	21,22	✳	NU	NU	NU	NU	NU	NU	71★	72,73	NU	NU	NU	NU	NU	NU	71	NU
RED		128									122								
YELLOW		129																	
GREEN		130																	
RED ARROW																		A101	
YELLOW ARROW											123							A102	
FLASHING YELLOW ARROW																		A103	
GREEN ARROW										124	124								

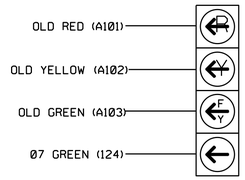
NU = Not Used

✳ Denotes S2P-Y used to control firehouse preempt indicator lamp. See Sheet 3 of this electrical detail.

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE: The sequence display for these signals requires special logic programming. See sheet 4 of 5 for programming instructions.

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	ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		ø2 2B							SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø7 7A	ø7 7B	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED
	L					NOT USED	ø7 7C			NOT USED					PRE2 AC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	-	-
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	-	-	-
✳ 7A	TB5-5,6	J5U	57	19	7	7	Y	Y	-	-	10
7B	TB5-9,10	J6U	42	4	8	7	Y	Y	-	-	15
7C	TB5-11,12	J6L	46	8	18	7	Y	Y	-	-	15
✳✳S1	TB6-9,10	I9U	60	22	11	SYS	-	-	-	-	-
✳✳S2	TB6-11,12	I9L	62	24	13	SYS	-	-	-	-	-
✳✳S3	TB7-9,10	J9U	59	21	15	SYS	-	-	-	-	-

✳ Disable delay on this loop during Alternate Phase operation (See Sheet 5 of 5).

✳✳ 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

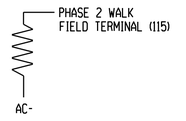
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET .....McCain 332 with Aux
SOFTWARE .....ECONOLITE OASIS 3.02.20 OR LATER
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S2P✳,S7,S13
PHASES USED.....2,7
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....2+7

✳ Denotes used for special operation. (EV Preemption Confirmation)

LOAD RESISTOR INSTALLATION DETAIL

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: 03-1021
DESIGNED: March 2008
SEALED: June 19, 2008
REVISED: 7/20/2015

REVISION SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015
F1260ED8BE8434... DATE

Electrical Detail - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road) at The Kings Hwy.

Division 3 New Hanover County Myrtle Grove

PLAN DATE:	March 2008	REVIEWED BY:
PREPARED BY:	R. Hinshaw	REVIEWED BY:

REVISIONS	INIT.	DATE
1 REVISED FIRE PREEMPTION PUSH BUTTON AND INDICATOR LAMP WIRING DETAIL. ALSO REVISED PREEMPT PROGRAMMING DETAIL AND ADDED AC ISOLATOR DETAIL. 02/04/2009 -MWH-	JTR	2/6/09
2 No change to Electrical detail. CES 6/14/15	DS GCB	7/30/2015

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

SEAL

This document originally issued and sealed by F. Royal Hinshaw, #032117, on 8-12-08. This media shall not be considered a certified document.

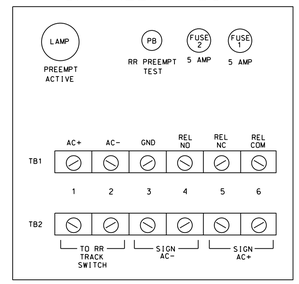
SIGNATURE DATE

SIG. INVENTORY NO. 03-1021

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 8.2

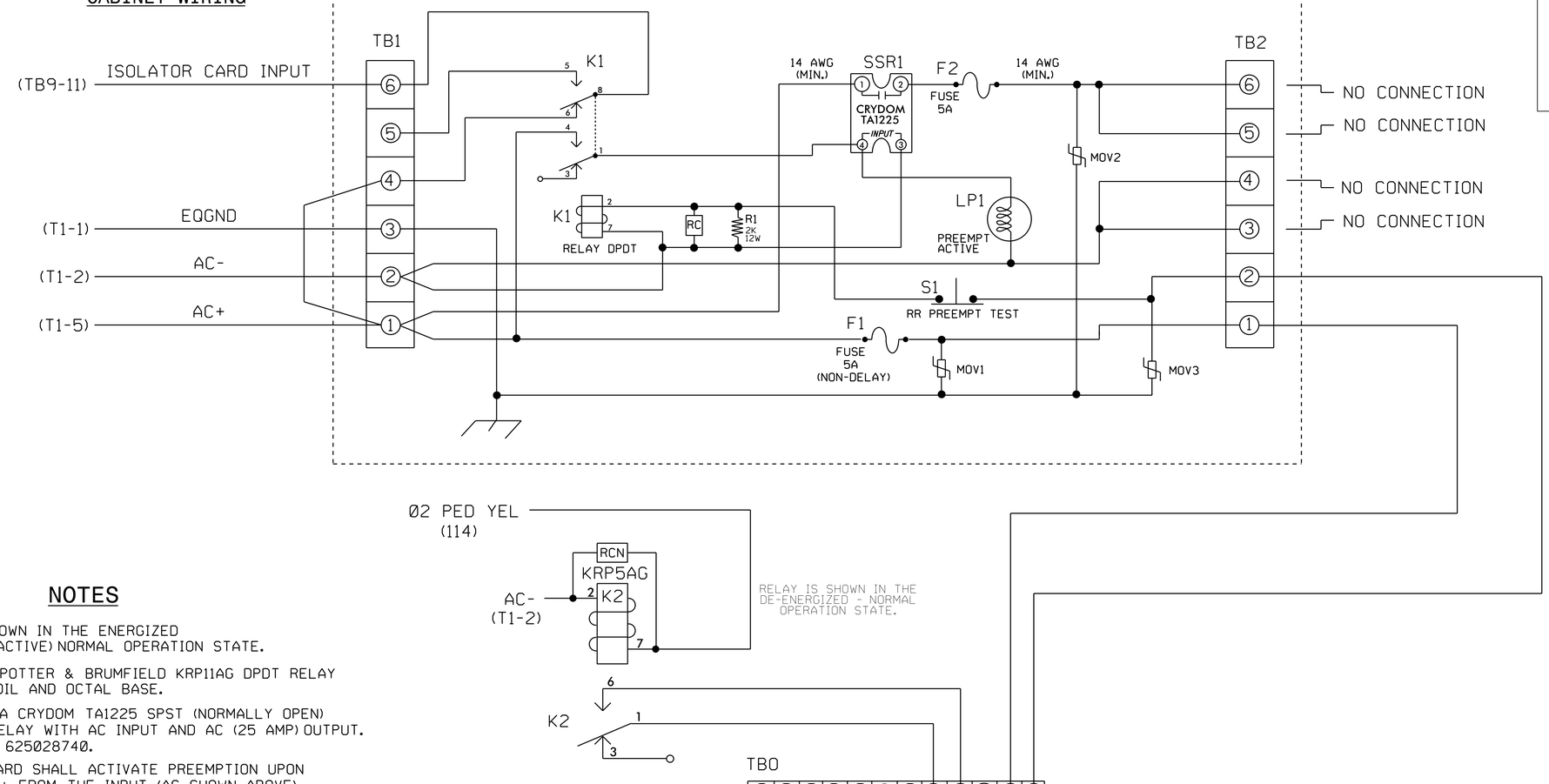
EMERGENCY VEHICLE PREEMPTION PUSHBUTTON AND INDICATOR LAMP WIRING DETAIL

FRONT VIEW OF PREEMPT BOX



PREEMPTION AND BLANKOUT SIGN CONTROL BOX

CABINET WIRING



NOTES

1. RELAY K1 IS SHOWN IN THE ENERGIZED (PREEMPT NOT ACTIVE) NORMAL OPERATION STATE.
2. RELAY K1 IS A POTTER & BRUMFIELD KRP11AG DPDT RELAY WITH 120VAC COIL AND OCTAL BASE.
3. RELAY SSR1 IS A CRYDOM TA1225 SPST (NORMALLY OPEN) SOLID STATE RELAY WITH AC INPUT AND AC (25 AMP) OUTPUT. DOT MATERIAL# 625028740.
4. AC ISOLATOR CARD SHALL ACTIVATE PREEMPTION UPON REMOVAL OF AC+ FROM THE INPUT (AS SHOWN ABOVE). SEE AC ISOLATOR OUTPUT PROGRAMMING DETAIL ON SHEET 3 OF 5 OF THIS ELECTRICAL DETAIL.
5. RESISTOR IS VALUED AT 2K OHM, 12 WATT. CLAROSTAT PART NO. VPR10F-2K; DOT MATERIAL# 625011550.
6. RC NETWORK IS VALUED AT .1 MICROFARAD, 100 OHM.
7. IF REPLACEMENT MOVS ARE NEEDED, GE PART NO. V150LA20A (DOT MATERIAL# 106023975) MAY BE USED.
8. PREEMPTION AND BLANKOUT SIGN CONTROL BOX IS A CONTROL TECHNOLOGIES PART NO. 2299-101. DOT MATERIAL# 619033450.
9. IMPORTANT!! TERMINAL TB9-12 (ON INPUT PANEL) SHALL BE CONNECTED TO AC NEUTRAL (JUMPER MAY HAVE TO BE ADDED).
10. RELAY K2 IS A SPDT WITH A 120VAC COIL AND 10 AMP CONTACTS. (P&B PART NO. KRP5AG) (DOT MATERIAL NO. 625028600).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1021
DESIGNED: March 2008
SEALED: June 19, 2008
REVISED: 7/20/2015

REVISION SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015 DATE
F12601ED0BEB434...

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
The Kings Hwy.

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	INIT.	DATE
1 REVISED FIRE PREEMPTION PUSH BUTTON AND INDICATOR LAMP WIRING DETAIL. ALSO REVISED PREEMPT PROGRAMMING DETAIL AND ADDED AC ISOLATOR DETAIL. 02/04/2009 -WH-	JTR DS	2/6/09
2 No change to Electrical Detail. CES 6/14/15	JCB	7/30/2015

SEAL

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SIGNATURE | DATE

SIG. INVENTORY NO. 03-1021

Electrical Detail - Sheet 2 of 5

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 8.3

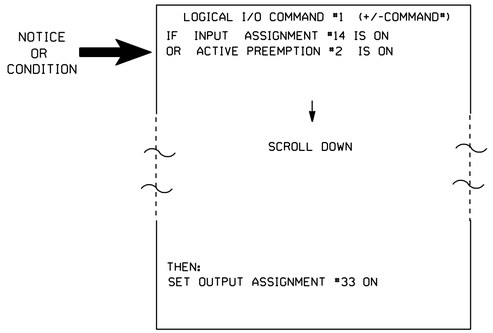
FIREHOUSE INDICATOR LAMP
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

NOTE

When preempt delay time is used, Step 1 below is necessary to ensure the pilot lamp in the fire house will activate immediately after the push button is depressed:

STEP 1

From Main Menu: Press '6' (Outputs), then select '3' (Logical I/O Processor).

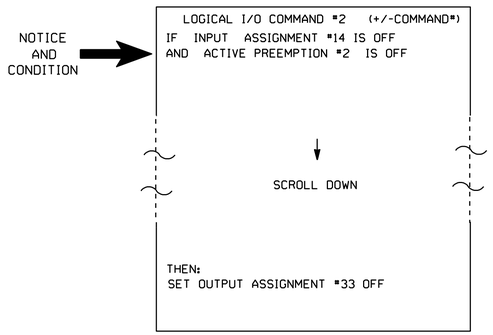


STEP 2

NOTE

In order for pilot lamp in fire house to deactivate immediately after ending preemption, program the following:

Toggle the '+' button once to access Logical I/O Command #2.



STEP 3

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable logical processor (Act Logic 1-16) by flagging #1 and #2.

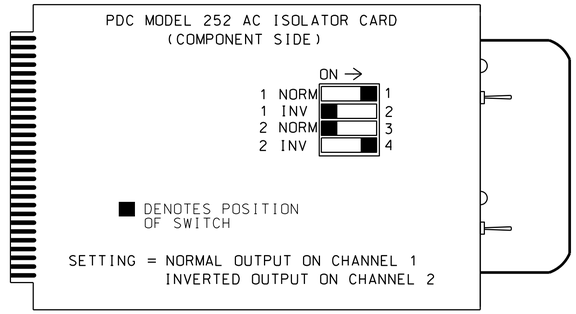
END OF PROGRAM.

I/O REFERENCE SCHEDULE

INPUT 14 = PREEMPT 2 IN
OUTPUT 33 = PHASE 2 PED YELLOW

FIRE PREEMPT AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



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

THIS ELECTRICAL DETAIL IS FOR
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NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015
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Electrical Detail - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Management Section

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
The Kings Hwy.

Division 3 | New Hanover County | Myrtle Grove

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PREPARED BY:	R. Hinshaw	REVIEWED BY:	

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2	No change to Electrical Detail. CES 6/14/15	GCB	7/30/2015

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SIG. INVENTORY NO. 03-1021

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 8.4

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

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

```
   PREEMPTION  #2  SETTINGS (NEXT:1-10)
INTERVAL/TIMING  |  CLEAR/DWELL PHASES
  GRN YEL  RED   |123456789101112131415 16
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? ..Y
FLASH DWELL INTERVAL? ...............N
ALLOW PEDS IN DWELL INTERVAL? .......N
RE-TIME DWELL INTERVAL? .............Y
OVERLAPS:                | ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW   |
OMIT OVERLAPS:           |    X
```

* Denotes timing to be determined in field.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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 3 THROUGH 5.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  ACTIVE PHASE      #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 2 (HEAD 71).

        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
                                PRESS '+'

LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE      #7  IS ON

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
                                PRESS '+'

LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  YELLOW ON PHASE   #7  IS ON

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```
 PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:          |123456789101112131415 16
VEH OVL PARENTS: | X     X
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN   <- NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1021
DESIGNED: March 2008
SEALED: June 19, 2008
REVISED: 7/20/2015

REVISION SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015
F12601ED0BEB434... DATE

Electrical Detail - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)
at
The Kings Hwy.

Division 3 | New Hanover County | Myrtle Grove

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	INIT.	DATE
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2 No change to Electrical Detail. CES 6/14/15	GCB	7/30/2015

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Traffic Signals Management Section
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA

750 Greenfield Pkwy, Garner, NC 27529

SEAL

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SIG. INVENTORY NO. 03-1021

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 8.5

FYA-PPLT SIGNAL OUTPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 71

(program controller as shown below)

NOTE: THIS PROGRAMMING APPLIES FOR OUTPUT PAGE 2.
OUTPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS.
THIS PROGRAMMING IS NECESSARY FOR THE ALTERNATE PHASING OPERATION.

OUTPUT ASSIGNMENTS FOR SIGNAL HEAD 71

MAKE THE FOLLOWING CHANGES ON OUTPUT PAGE 2

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS). PRESS 'NEXT' FOR PAGE 2. WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION ENTER "39"

```
PAGE:2  C1 PIN:85  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................39
FREQUENCY (O=DEFAULT) (O-25.5 HZ)...O.O
DUTY CYCLE (O=DEFAULT) (O - 100%)...O
MODE (O=SOLID,1=FLASH)..............O
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.........................._
```

ENTER A "Y" FOR VEHICLE PHASE.

THE OUPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:85  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........7
SELECT COLOR(O=RED,1=YEL,2=GRN).....O
```

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

PRESS THE 'ENT' KEY AFTER INPUTING DATA. THEN 'ESC'.

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

```
PAGE:2  C1 PIN:85  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................39
FREQUENCY (O=DEFAULT) (O-25.5 HZ)...O.O
DUTY CYCLE (O=DEFAULT) (O - 100%)...O
MODE (O=SOLID,1=FLASH)..............O
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.........................._
```

PRESS "+" KEY FOR OUTPUT 40

STEP 2

```
PAGE:2  C1 PIN:86  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................40
FREQUENCY (O=DEFAULT) (O-25.5 HZ)...O.O
DUTY CYCLE (O=DEFAULT) (O - 100%)...O
MODE (O=SOLID,1=FLASH)..............O
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.........................._
```

ENTER A "Y" FOR VEHICLE PHASE.

THE OUPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:86  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........7
SELECT COLOR(O=RED,1=YEL,2=GRN).....1
```

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

PRESS THE 'ENT' KEY AFTER INPUTING DATA. THEN 'ESC'.

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

```
PAGE:2  C1 PIN:86  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................40
FREQUENCY (O=DEFAULT) (O-25.5 HZ)...O.O
DUTY CYCLE (O=DEFAULT) (O - 100%)...O
MODE (O=SOLID,1=FLASH)..............O
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.........................._
```

PRESS "+" KEY FOR OUTPUT 41

STEP 3

```
PAGE:2  C1 PIN:87  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................41
FREQUENCY (O=DEFAULT) (O-25.5 HZ)...O.O
DUTY CYCLE (O=DEFAULT) (O - 100%)...O
MODE (O=SOLID,1=FLASH)..............O
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
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.........................._
```

ENTER A "Y" FOR NOT ENABLED (THIS WILL DISABLE THE OUTPUT)

THE OUPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'NOT ENABLED' AS SHOWN BELOW.

```
PAGE:2  C1 PIN:87  NOT ENABLED
OUTPUT ASSIGNMENT #.................41
FREQUENCY (O=DEFAULT) (O-25.5 HZ)...O.O
DUTY CYCLE (O=DEFAULT) (O - 100%)...O
MODE (O=SOLID,1=FLASH)..............O
SELECT ASSIGNMENT:
NOT ENABLED.........................Y
VEHICLE PHASE......................._
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.........................._
```

OUTPUT PROGRAMMING COMPLETE

NOTE: THE OUTPUT ASSIGNMENT CHANGES, SHOWN ABOVE, ARE NECESSARY FOR THE TIME OF DAY OPERATION OF SIGNAL HEAD 71.
IN ALTERNATE PHASING (PROTECTED ONLY) OPERATION, THE RED ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE RED.
THE SOLID YELLOW ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE YELLOW.
IN ADDITION, THE FLASHING YELLOW ARROW IS SWITCHED OFF BY DISABLING THE OVERLAP GREEN OUTPUT.

THESE OUTPUT CHANGES ARE ACCOMPLISHED ON OUTPUT PAGE 2. THEREFORE IN ALTERNATE PHASING MODE THE OUTPUT PAGE IS SWITCHED TO 2.
THE OUTPUT PAGE CHANGE IS ACCOMPLISHED BY THE CONTROLLERS TOD EVENT SCHEDULER.

IN NORMAL PHASING (PPLT) MODE THE STANDARD, DEFAULT, OUPUT ASSIGNMENTS ARE USED WHICH ARE DESIGNATED ON OUTPUT PAGE 1.

TOD EVENT SCHEDULING PROGRAMMING DETAIL TO CALL ALTERNATE PHASING OPERATION

(program controller as shown below)

THIS EVENT SCHEDULING DETAIL SHOWS THE TOD PROGRAMMING STEPS NECESSARY FOR THE CONTROLLER TO OPERATE THE "ALTERNATE PHASING" AS SHOWN ON THE SIGNAL PLANS.

FROM MAIN MENU PRESS "B" (SCHEDULING)

EVENT NO.	EVENT TYPE	DESCRIPTION OF OPERATION
1	CHANGE OUTPUT PAGE (1-4)............2	MODIFIES CONTROL CIRCUITS FOR SIGNAL HEAD 71.
2	DISABLE DET STRETCH / DELAY (1-64)..7	DELAY IS DISABLED FOR DETECTOR 7 (LOOP 7A).

NOTE: THE EVENTS ABOVE WILL ALLOW SIGNAL HEAD 71 TO OPERATE IN THE PROTECTED ONLY MODE.

ALL EVENTS SHOWN ABOVE SHALL BE PROGRAMMED TO START AND STOP ON THE SAME TIMES AND DATES.

REVISION 2 SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/30/2015
F12601ED0BEB434...
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Electrical Detail - Sheet 5 of 5

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REVISED: 7/20/2015 (2)

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Division 3 | New Hanover County | Myrtle Grove

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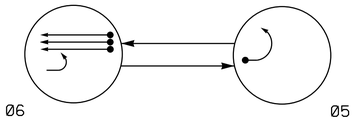
SIG. INVENTORY NO. 03-1021

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 9.0

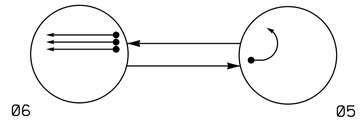
Roadway Sheet 22

DEFAULT PHASING DIAGRAM



DEFAULT TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø5	PHASE Ø6	PHASE FLASH
51, 52	←	F Y	↛Y
61, 62	R	G	Y

ALTERNATE PHASING DIAGRAM



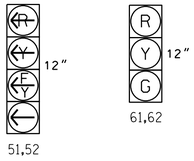
ALTERNATE TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø5	PHASE Ø6	PHASE FLASH
51, 52	←	↛R	↛Y
61, 62	R	G	Y

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



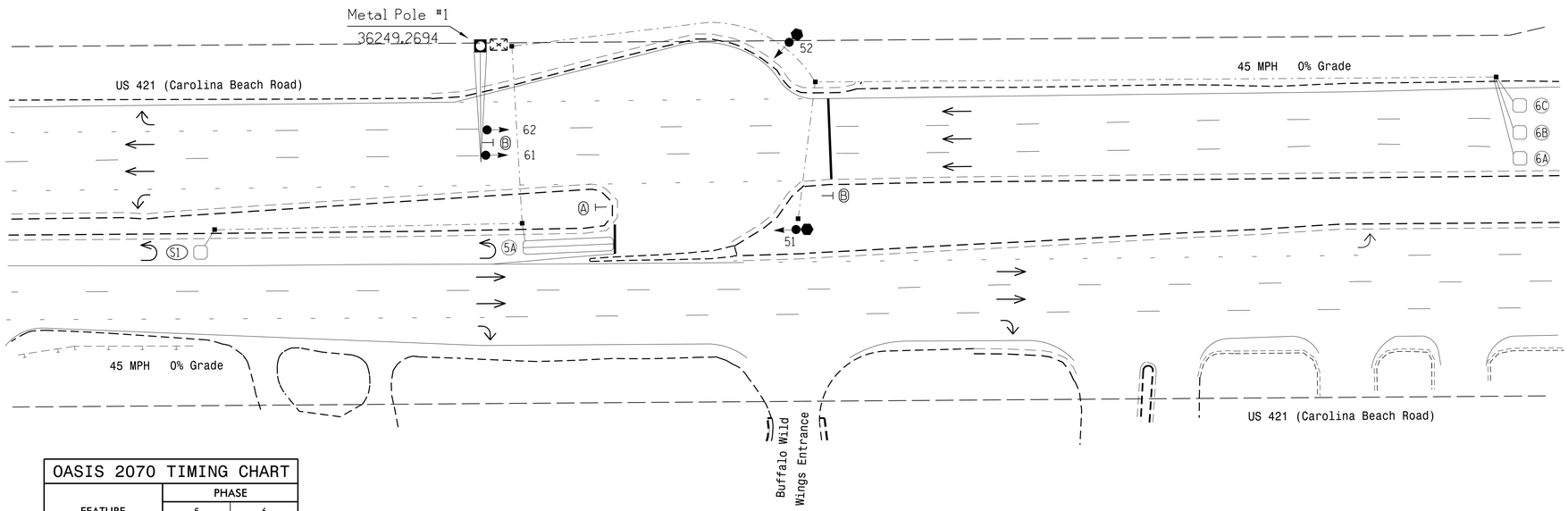
PHASING DIAGRAM DETECTION LEGEND

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

OASIS 2070 LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
5A	6X40	0	2-4-2	Y	5	Y	Y	–	–	✱15	–	–
6A	6X6	300	5	Y	6	Y	Y	–	–	–	–	–
6B	6X6	300	5	Y	6	Y	Y	–	–	–	–	–
6C	6X6	300	5	Y	6	Y	Y	–	–	–	–	–
S1	6X6	180	3	Y	–	–	–	–	–	–	Y	–

✱ Disable delay during Alternate Phasing Operation.



OASIS 2070 TIMING CHART

FEATURE	PHASE 5	PHASE 6
Min Green 1 *	7	12
Extension 1 *	2.0	6.0
Max Green 1 *	45	120
Yellow Clearance	3.0	4.5
Red Clearance	3.1	1.5
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	1.5
Max Variable Initial *	-	34
Time Before Reduction *	-	30
Time To Reduce *	-	60
Minimum Gap	-	3.0
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	ON	ON

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

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. The City Traffic Engineer will determine the hours of use for each phasing plan.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Signal system data: Controller Asset #: 1013.

2 Phase
Fully Actuated
Wilmington Signal System

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	⬢
Ⓐ	"STOP HERE ON RED" Sign (R10-6)	Ⓐ
Ⓑ	"NO TURNS" Sign (R3-3)	Ⓑ

Signal Upgrade

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E00CE4E46D... 7/22/15 DATE

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

US 421 (Carolina Beach Road) at Myrtle Grove North U-Turn

Division 3 New Hanover County Myrtle Grove

PLAN DATE: February 2008 REVIEWED BY:

PREPARED BY: R. Hinshaw REVIEWED BY:

REVISIONS	INIT.	DATE
▽ Installloops. (KGP)	pla	7/22/15

SCALE 0 30 1"=30'

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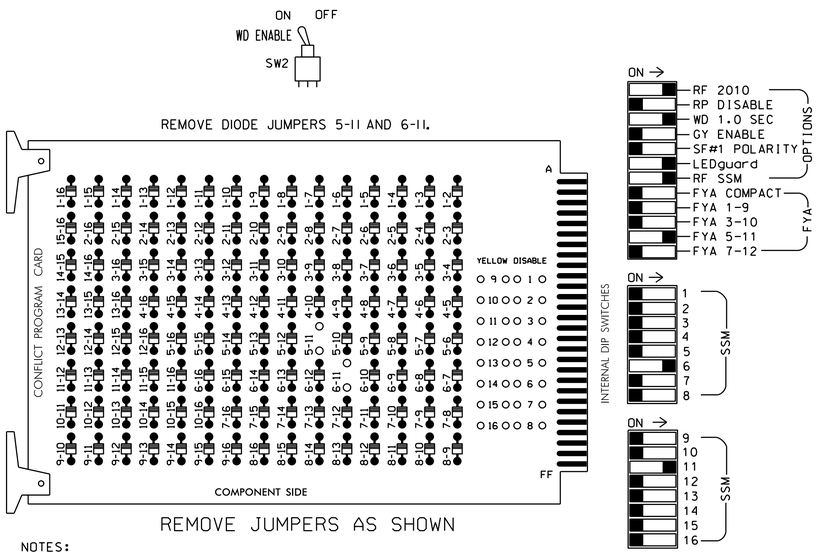
SIG. INVENTORY NO. 03-1013

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 9.1

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 1,2,3,4,5,7,8, 9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out, for all phases.
4. Program phase 6 for Variable Initial and Gap Reduction.
5. Program phase 6 for Start Up In Green.
6. Program phase 6 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	NU	NU	NU	51,52 ★	61,62	NU	NU	NU	NU	NU	NU	NU	51,52 ★	NU	NU
RED								134										
YELLOW							✱	135										
GREEN								136										
RED ARROW																A114		
YELLOW ARROW																A115		
FLASHING YELLOW ARROW																A116		
GREEN ARROW							133											

NU = Not Used

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

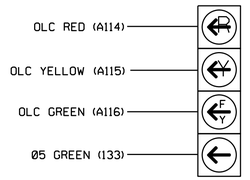
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET .....332 W/ AUX
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S5,S6,S12
PHASES USED.....5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....5+6
OVERLAP D.....NOT USED

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



51,52

NOTE: The sequence display for these signals requires special logic programming. See sheet 2 of 3 for programming instructions.

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

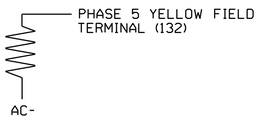
PHASE SEQUENCE: PAGE 1 NEXT: PAGES) ↘

RNG	LEAD	BARRIER 1			X-LAG	LEAD	BARRIER 2			X-LAG
1	0	0	0	0		0	0	0	0	
2	0	6	0	0		0	5	0	0	
3	0	0	0	0		0	0	0	0	
4	0	0	0	0		0	0	0	0	

NOTE: This phase sequence is utilized to enable sequence page change / TOD events as necessary.

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of this resistor is to load the channel yellow monitor input in order to prevent the Signal Sequence Monitor from detecting any possible 'phantom' (or false) conflict, as this channel has no yellow field display.

▽ THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1013
DESIGNED: February 2008
SEALED: 5/6/2008
REVISED: 7/22/2015

REVISION ▽ SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/23/2015 DATE
641D60C145EE4F5...

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
Signal Management Section
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
Myrtle Grove North U-Turn

Division 3 New Hanover County Myrtle Grove

PLAN DATE:	February 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	BY	DATE
▽ No changes to this electrical plan. (WSA)	JTR	7/23/2015

SEAL

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This document is only certified as to the revisions.

SIGNATURE DATE

SIG. INVENTORY NO. 03-1013

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	Ø5 5A	Ø6 6B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6A	Ø6 6C						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 ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
* 5A	TB3-5,6	J2U	40	2	6	5	Y	Y	-	-	15
6A	TB3-7,8	J2L	44	6	16	6	Y	Y	-	-	-
6B	TB3-9,10	J3U	64	26	36	6	Y	Y	-	-	-
6C	TB3-11,12	J3L	77	39	46	6	Y	Y	-	-	-
** S1	TB7-9,10	J9U	59	21	15	SYS	-	-	-	-	-

* Disable delay on this loop during Alternate Phase operation (See Sheet 3 of 3).

** 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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦    XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN   <-- NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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 THROUGH 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE      #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
                  SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
                  PRESS '+'
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE      #5  IS ON
                  SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
                  PRESS '+'
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE   #5  IS ON
                  SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEADS 51 & 52).

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEADS 51 & 52).

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEADS 51 & 52).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1013
DESIGNED: February 2008
SEALED: 5/6/2008
REVISED: 7/22/2015

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)
at
Myrtle Grove North U-Turn

Division 3 New Hanover County Myrtle Grove

PLAN DATE:	February 2008	REVIEWED BY:	
PREPARED BY:	R. Hinshaw	REVIEWED BY:	

REVISIONS	INIT.	DATE
▽ No changes to this electrical plan. (WSA)	JTR	7/23/2015

Prepared in the Offices of:

Public Transportation and Safety Services Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

REVISION ▽ SEAL

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

DocuSigned by:
John T. Rowe, Jr. 7/23/2015
641D60C145EE4F5... DATE

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This document is only certified as to the revisions.

SIGNATURE DATE

SIG. INVENTORY NO. 03-1013

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 9.3

FYA-PPLT SIGNAL OUTPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR SIGNALS 51 AND 52

(program controller as shown below)

NOTE: THIS PROGRAMMING APPLIES FOR OUTPUT PAGE 2.
OUTPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS.
THIS PROGRAMMING IS NECESSARY FOR THE ALTERNATE PHASING OPERATION.

OUTPUT ASSIGNMENTS FOR SIGNAL HEADS 51 AND 52

MAKE THE FOLLOWING CHANGES ON OUTPUT PAGE 2

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS). PRESS 'NEXT' FOR PAGE 2. WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION ENTER "42"

```
PAGE:2  C1 PIN:88  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #..................42
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

ENTER A "Y" FOR VEHICLE PHASE.

THE OUTPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:88  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........5
SELECT COLOR(0=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'.

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

```
PAGE:2  C1 PIN:88  VEHICLE PHASE
OUTPUT ASSIGNMENT #..................42
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................_
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" KEY FOR OUTPUT 43

STEP 2

```
PAGE:2  C1 PIN:89  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #..................43
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

ENTER A "Y" FOR VEHICLE PHASE.

THE OUTPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

```
PAGE:2  C1 PIN:89  VEHICLE OVERLAP
SELECT VEHICLE PHASE (1-16).........5
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

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'.

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

```
PAGE:2  C1 PIN:89  VEHICLE PHASE
OUTPUT ASSIGNMENT #..................43
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................_
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" KEY FOR OUTPUT 44

STEP 3

```
PAGE:2  C1 PIN:90  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #..................44
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................Y
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..........................._
```

ENTER A "Y" FOR NOT ENABLED (THIS WILL DISABLE THE OUTPUT)

THE OUTPUT IS SET AS AN OVERLAP BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'NOT ENABLED' AS SHOWN BELOW.

```
PAGE:2  C1 PIN:90  NOT ENABLED
OUTPUT ASSIGNMENT #..................44
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................Y
VEHICLE PHASE........................_
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..........................._
```

OUTPUT PROGRAMMING COMPLETE

NOTE: THE OUTPUT ASSIGNMENT CHANGES, SHOWN ABOVE, ARE NECESSARY FOR THE TIME OF DAY OPERATION OF SIGNAL HEADS 51 AND 52. IN ALTERNATE PHASING (PROTECTED ONLY) OPERATION, THE RED ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE RED. THE SOLID YELLOW ARROW CONTROL IS SWITCHED TO THE LEFT TURN PHASE YELLOW. IN ADDITION, THE FLASHING YELLOW ARROW IS SWITCHED OFF BY DISABLING THE OVERLAP GREEN OUTPUT.

THESE OUTPUT CHANGES ARE ACCOMPLISHED ON OUTPUT PAGE 2. THEREFORE IN ALTERNATE PHASING MODE THE OUTPUT PAGE IS SWITCHED TO 2.

THE OUTPUT PAGE CHANGE IS ACCOMPLISHED BY THE CONTROLLERS TOD EVENT SCHEDULER.

IN NORMAL PHASING (PPLT) MODE THE STANDARD, DEFAULT, OUTPUT ASSIGNMENTS ARE USED WHICH ARE DESIGNATED ON OUTPUT PAGE 1.

TOD EVENT SCHEDULING PROGRAMMING DETAIL TO CALL ALTERNATE PHASING OPERATION

(program controller as shown below)

THIS EVENT SCHEDULING DETAIL SHOWS THE TOD PROGRAMMING STEPS NECESSARY FOR THE CONTROLLER TO OPERATE THE "ALTERNATE PHASING" AS SHOWN ON THE SIGNAL PLANS.

FROM MAIN MENU PRESS "B" (SCHEDULING)

EVENT NO.	EVENT TYPE	DESCRIPTION OF OPERATION
1	CHANGE OUTPUT PAGE (1-4)............2	MODIFIES CONTROL CIRCUITS FOR SIGNAL HEADS 51 AND 52.
2	DISABLE DET STRETCH / DELAY (1-64)..6	DELAY IS DISABLED FOR DETECTOR 6 (LOOP 5A).

NOTE: THE EVENTS ABOVE WILL ALLOW SIGNALS 51 AND 52 TO OPERATE IN THE PROTECTED ONLY MODE.

ALL EVENTS SHOWN ABOVE SHALL BE PROGRAMMED TO START AND STOP ON THE SAME TIMES AND DATES.

1 THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1013
DESIGNED: February 2008
SEALED: 5/6/2008
REVISED: 7/22/2015

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch · State of North Carolina · Department of Transportation · Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

US 421 (Carolina Beach Road)
at
Myrtle Grove North U-Turn

Division 3 New Hanover County Myrtle Grove

PLAN DATE: February 2008	REVIEWED BY:
PREPARED BY: R. Hinshaw	REVIEWED BY:

REVISIONS	INIT.	DATE
1 No changes to this electrical plan. (WSA)	JTR	7/23/2015

REVISION 1 SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/23/2015
641D60C145EE4F5...
DATE

SEAL

Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by F. Royal Hinshaw, #032117, on 5/6/08. This document is only certified as to the revisions.

SIGNATURE DATE

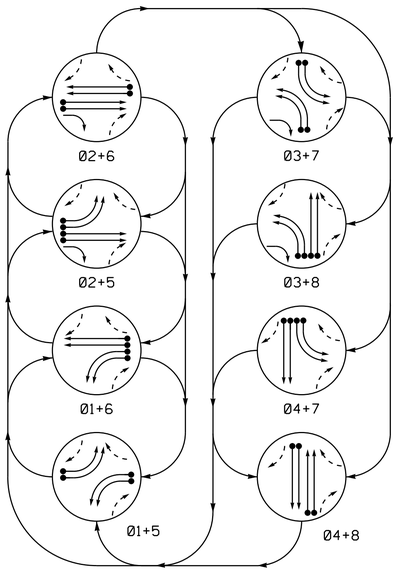
SIG. INVENTORY NO. 03-1013

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 10.0

Roadway Sheet 23

8 Phase
Fully Actuated
Wilmington Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

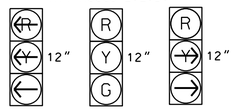
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11, 12	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
23	R	R	→	→	→	→	R	R	~~Y~~
31, 32	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51, 52	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~
81, 82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



11, 12	21, 22	23
31, 32	41, 42	
51, 52	61, 62	
71, 72	81, 82	

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	Y	1	Y	Y	-	-	-	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	-
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
4A	6X6	300	6	Y	4	-	Y	-	-	-	-	-
4B	6X6	300	6	Y	4	-	Y	-	-	-	-	-
4C	6X40	0	2-4-2	Y	4	Y	Y	Y	2.0	5	-	-
4D	6X40	0	2-4-2	Y	4	Y	Y	Y	2.0	5	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	-
7B	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	-
8A	6X6	300	4	-	8	-	Y	-	-	-	-	-
8B	6X6	300	4	-	8	-	Y	-	-	-	-	-
8C	6X40	0	2-4-2	Y	8	Y	Y	Y	2.0	5	-	-
8D	6X40	0	2-4-2	Y	8	Y	Y	Y	2.0	5	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Signal system data: Controller Asset #0153.

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	●⟋
◎	Metal Strain Pole	■
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	- - -
→	Directional Arrow	→
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	6.0	2.0	6.0	2.0	6.0
Max Green 1 *	35	90	30	40	50	90	25	30
Yellow Clearance	3.1	4.6	3.0	4.5	3.2	4.3	3.0	4.5
Red Clearance	4.1	2.0	3.3	2.2	3.4	2.1	2.9	1.6
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	30	-	0	-	30	-	0
Time To Reduce *	-	45	-	20	-	45	-	15
Minimum Gap	-	3.0	-	3.0	-	3.0	-	3.0
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.

Signal Upgrade

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

US 421 (Carolina Beach Road)/
NC 132 (College Road) at
US 421 (Carolina Beach Road)/
SR 1521 (Piner Road)

Division 3 New Hanover County Wilmington

PLAN DATE:	July 2015	REVIEWED BY:	PLA
PREPARED BY:	WEDDLE	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander 7/28/15
DATE

SIG. INVENTORY NO. 03-0153

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palexander

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 10.1

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

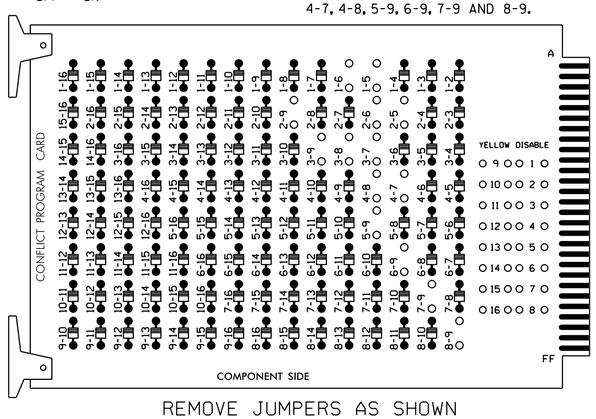
(remove jumpers and set switches as shown)

WD ENABLE

SW2

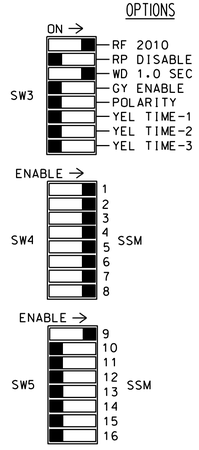
OFF ON

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 2-9, 3-7, 3-8, 3-9, 4-7, 4-8, 5-9, 6-9, 7-9 AND 8-9.



REMOVE JUMPERS AS SHOWN

OPTIONS



■ = 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. 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 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. Program phases 2 and 6 for Variable Initial and 2, 4, 6, and 8 for Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET 332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP A.....2+3
OVERLAP B.....NONE
OVERLAP C.....NONE
OVERLAP D.....NONE

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.	11,12	21,22	NU	31,32	41,42	NU	51,52	61,62	NU	71,72	81,82	NU	23	NU	NU	NU	NU	NU
RED		128			101			134			107		A121					
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125			116			131			122								
YELLOW ARROW	126			117			132			123			A122					
GREEN ARROW	127			118			133			124			A123					

NU = Not Used

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:          |123456789101112131415 16
VEH OVL PARENTS: | XX
VEH OVL NOT VEH: |X  X
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?...Y
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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "T"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	Ø4 4C	SLOT EMPTY	Ø1 1B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B			NOT USED	Ø4 4B	Ø4 4D		Ø3 3B					ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	Ø7 7A	Ø8 8A	Ø8 8C	SLOT EMPTY	Ø5 5B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B			NOT USED	Ø8 8B	Ø8 8D		Ø7 7B					

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			
1B	TB6-9,10	I9U	60	22	11	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB6-11,12	I9L	62	24	13	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4		Y			
4B	TB4-11,12	I6L	45	7	14	4		Y			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y	Y	2.0	5
4D	TB6-3,4	I7L	78	40	44	4	Y	Y	Y	2.0	5
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB7-9,10	J9U	59	21	15	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB7-11,12	J9L	61	23	17	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8		Y			
8B	TB5-11,12	J6L	46	8	18	8		Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y	Y	2.0	5
8D	TB7-3,4	J7L	79	41	48	8	Y	Y	Y	2.0	5

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0153
DESIGNED: July 2015
SEALED: 7/28/2015
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 421 (Carolina Beach Road)/
NC 132 (College Road) at
US 421 (Carolina Beach Road)/
SR 1521 (Piner Road)

Division 3 | New Hanover County | Wilmington

PLAN DATE:	July 2015	REVIEWED BY:	T. Joyce
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

DocuSigned by: George C. Brown 7/29/2015
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SIG. INVENTORY NO. 03-0153

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cestrickland

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 11.0

Roadway Sheet 24

PHASING DIAGRAM

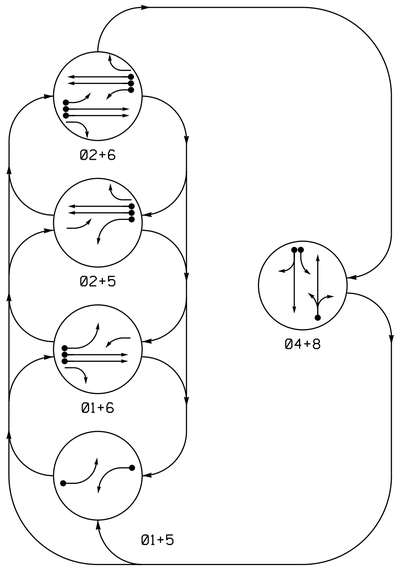
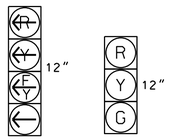


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+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

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	10	-	-
					6	Y	Y	Y	-	3	-	-
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	10	-	-
					2	Y	Y	Y	-	3	-	-
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
8A	6X40	+5	2-4-2	-	8	Y	Y	-	-	3	-	-
8B	6X40	+5	2-4-2	-	8	Y	Y	-	-	15	-	-

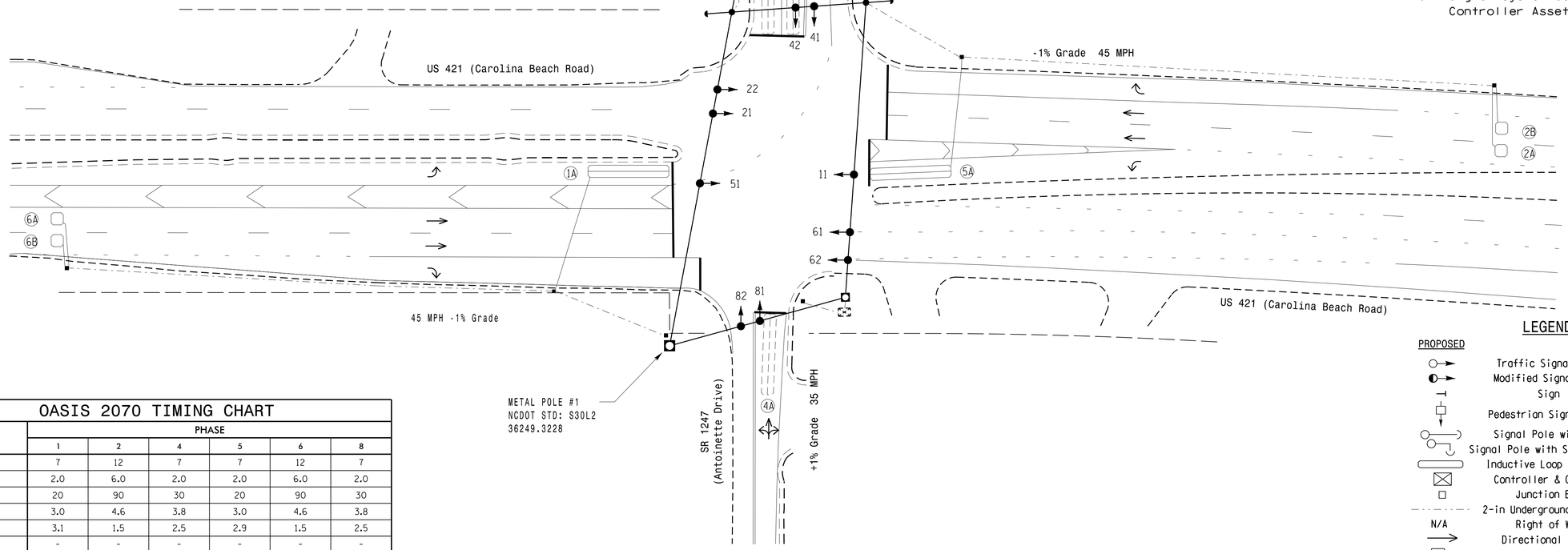
5 Phase
Fully Actuated
Wilmington Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Signal system data: Controller Asset #: 0480.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	20	90	30	20	90	30
Yellow Clearance	3.0	4.6	3.8	3.0	4.6	3.8
Red Clearance	3.1	1.5	2.5	2.9	1.5	2.5
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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.

Signal Upgrade

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E0DCE4E46D... 7/22/15 DATE

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

SCALE 0 30' 1"=30'

US 421 (Carolina Beach Road) at SR 1247 (Antoinette Drive)/ Lowe's Entrance

Division 3 New Hanover County Wilmington

PLAN DATE: JANUARY 2013 REVIEWED BY: SL PHILLIPS

PREPARED BY: SP PENNINGTON REVIEWED BY:

REVISIONS	INIT.	DATE
▽ Install loops (kgp)	SP	7/22/15

SEAL

Not a certified document as to the Original Document but Only as to the Revisions - This document originally Issued and sealed by Stacie L.Phillips,PE-032607 on 7-08-2013 This document is only certified as to the revisions.

SIGNATURE DATE

SIG. INVENTORY NO. 03-0480

31-JUL-2015 08:26
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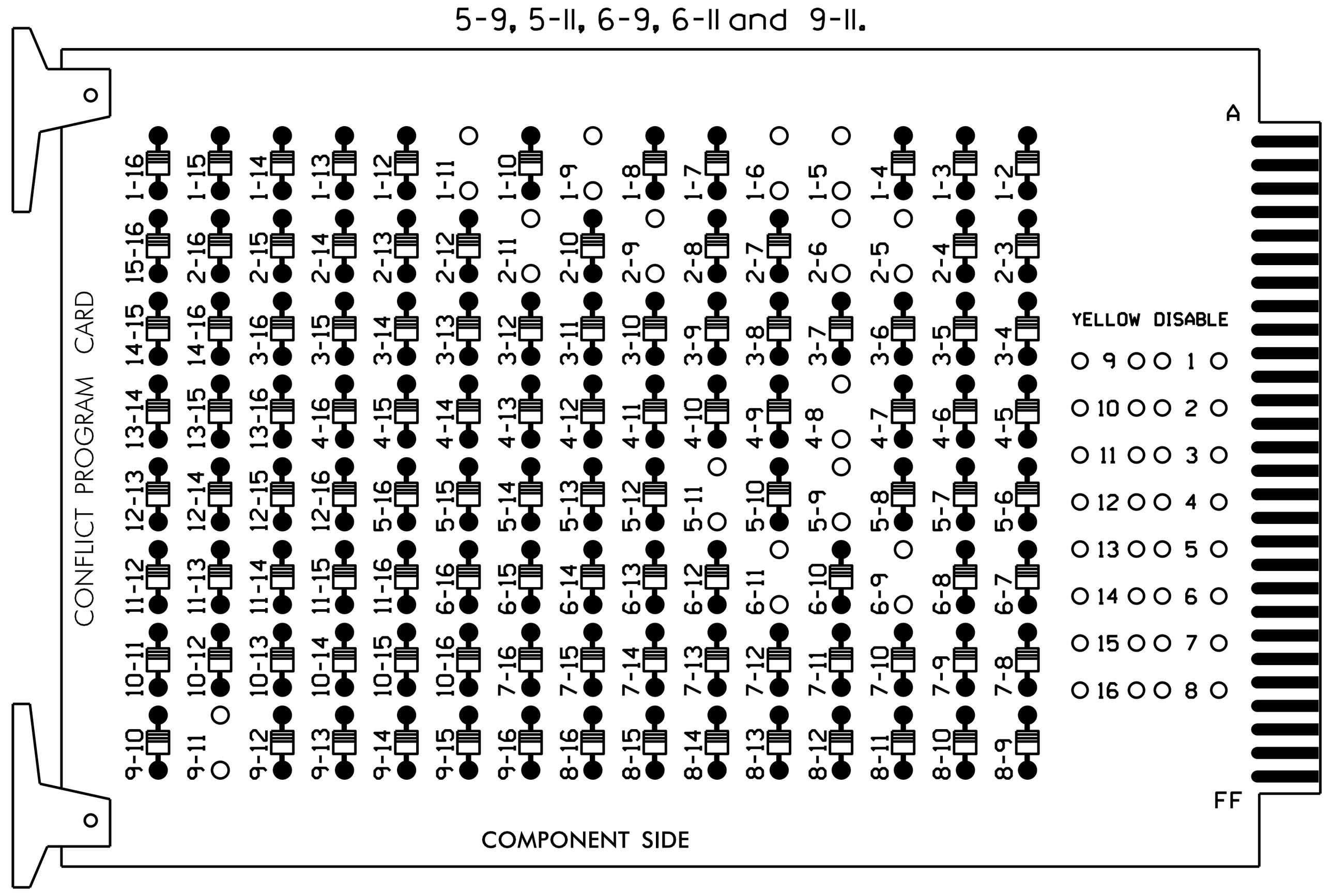
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

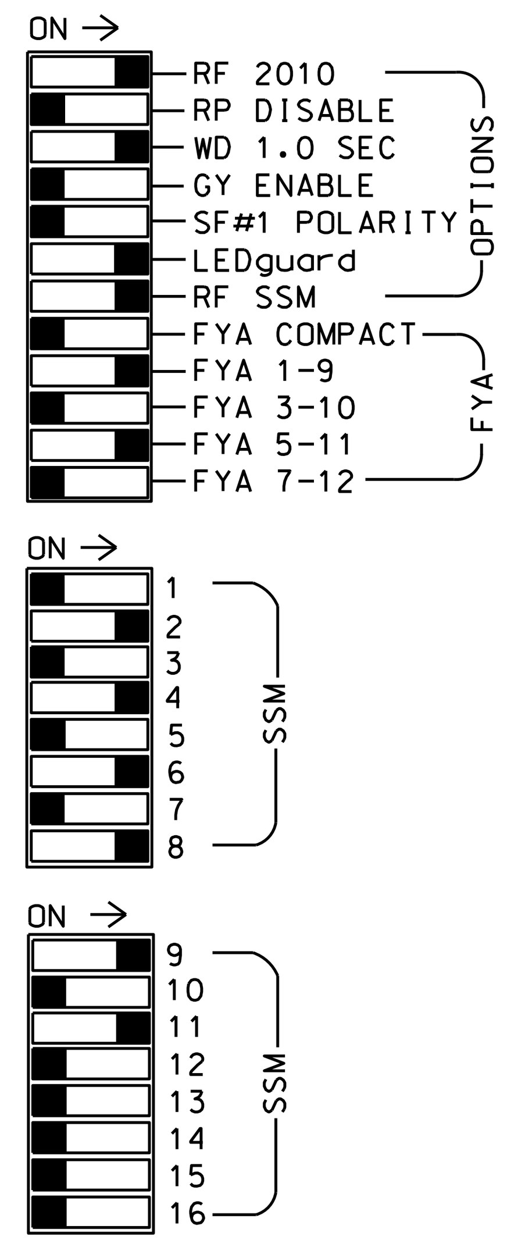
(remove jumpers and set switches as shown)

ON OFF
WD ENABLE
SW2

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



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 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 1,3, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Start Up In Green.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
8. The cabinet and controller are part of the Wilmington Signal System.

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	SIG. 11.1

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

NU = Not Used

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

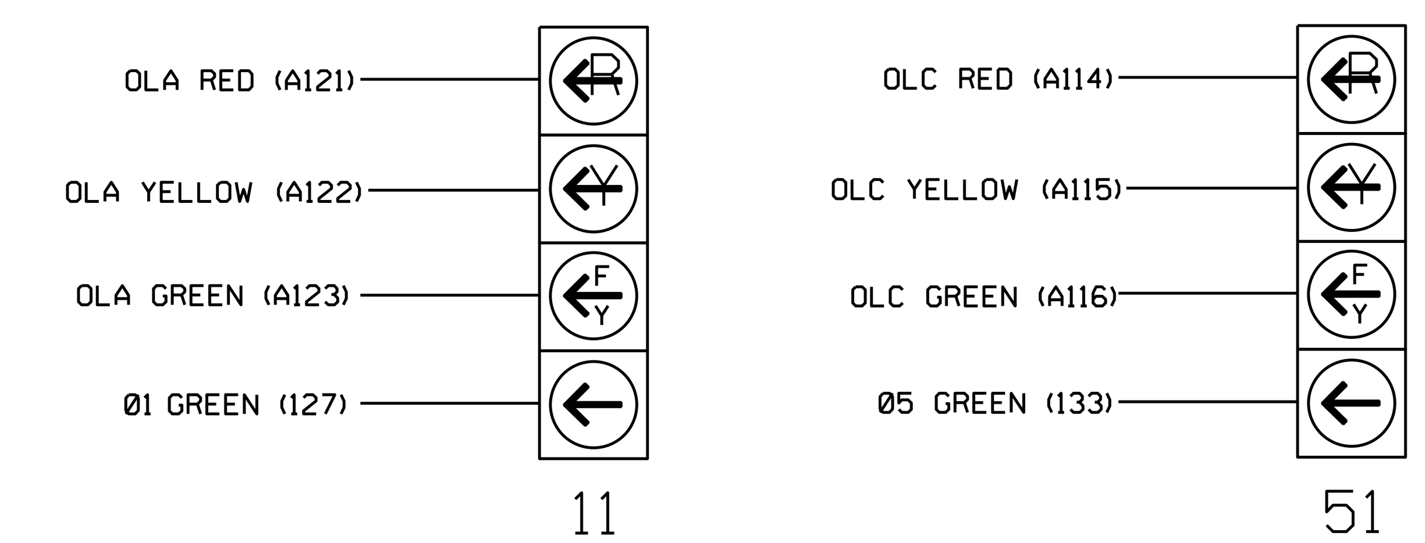
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER..............2070L
CABINET.................332 W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S6,S8,S9,S12
PHASES USED.............1,2,4,5,6,8
OVERLAP "A".............1+2
OVERLAP "B".............NOT USED
OVERLAP "C".............5+6
OVERLAP "D".............NOT USED

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

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

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[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	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			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y	Y		3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

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

[2] Add jumper from J1-W to I4-W, on rear of input file.

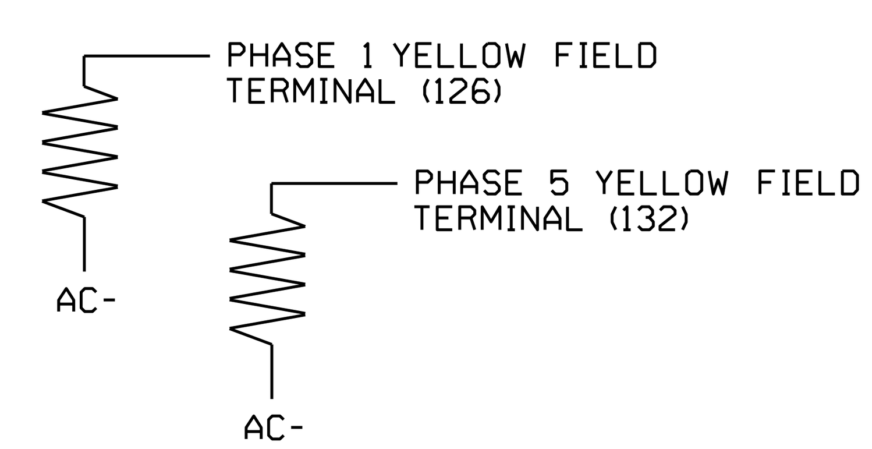
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

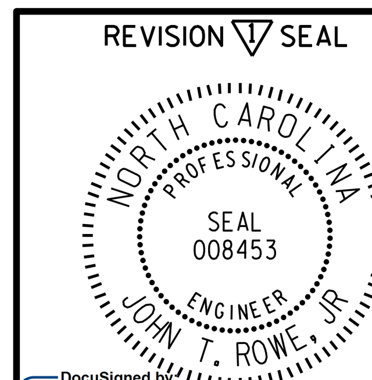
ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0480
DESIGNED: January 2013
SEALED: 7/8/2013
REVISED: 7/22/2015

REVISION 1 SEAL



DocuSigned by: John T. Rowe, Jr. 7/23/2015
641D60C145EE4F5...
DATE

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For: Transportation Mobility and Safety Division, Signals Management Section, State of North Carolina Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

US 421 (CAROLINA BEACH ROAD) AT SR 1247 (ANTOINETTE DRIVE)/ LOWE'S ENTRANCE

DIVISION 3 NEW HANOVER COUNTY WILMINGTON

PLAN DATE: JANUARY 2013 REVIEWED BY: SL PHILLIPS
PREPARED BY: SP PENNINGTON REVIEWED BY:

REVISIONS	INIT.	DATE
1 Removed stretch time from phase 2 and 6 loops. (WSA)	JTR	7/23/2015

SEAL

Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by Sracie L. Phillips, #032607, on 7/8/13. This document is only certified as to the revisions.

SIGNATURE DATE

SIG. INVENTORY NO. 03-0480

23-JUL-2015 06:26
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Armstrong*030480_sm_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	SIG. 11.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

            SCROLL DOWN

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

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

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

PRESS '+'

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

(1) THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0480
DESIGNED: January 2013
SEALED: 7/8/2013
REVISED: 7/22/2015

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 421 (CAROLINA BEACH ROAD) AT SR 1247 (ANTOINETTE DRIVE)/ LOWE'S ENTRANCE		
Prepared For: Transportation Mobility and Safety Division, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, Signals Management Section	DIVISION 3	NEW HANOVER COUNTY	WILMINGTON
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: JANUARY 2013	REVIEWED BY: SL PHILLIPS	
	PREPARED BY: SP PENNINGTON	REVIEWED BY:	
	REVISIONS	INIT.	DATE
	(1) Removed stretch time from phase 2 and 6 loops. (WSA)	JTR	7/23/2015

REVISION (1) SEAL

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

DocuSigned by: John T. Rowe, Jr. 7/23/2015 DATE
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SEAL

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This document is only certified as to the revisions.

SIGNATURE DATE

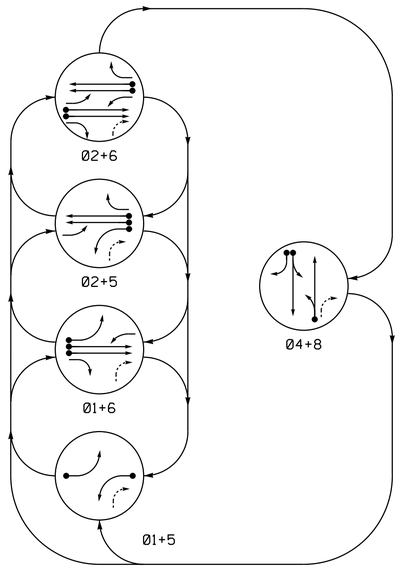
SIG. INVENTORY NO. 03-0480

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 12.0

Roadway Sheet 27

5 Phase
Fully Actuated
Wilmington Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

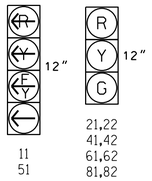
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	10	-	-
					6	Y	Y	Y	-	3	-	-
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	10	-	-
					2	Y	Y	Y	-	3	-	-
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	15	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Reposition existing signal heads numbered 11 and 51.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Signal system data: Controller Asset # 0832.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□	Pedestrian Signal Head With Push Button & Sign	■
○→	Signal Pole with Guy	●→
○↷	Signal Pole with Sidewalk Guy	●↷
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	———
→	Directional Arrow	→
◎	Metal Strain Pole	■
DD	Directional Drill	N/A
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	15	90	25	25	90	25
Yellow Clearance	3.0	4.6	3.8	3.0	4.6	3.8
Red Clearance	2.3	1.3	2.4	2.8	1.3	2.4
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.8	-	-	1.8	-
Max Variable Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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.

Signal Upgrade

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

US 421 (Carolina Beach Road)
at
SR 1197 (Silver Lake Road) /
SR 2381 (Shade Tree Lane)

Division 3 New Hanover County Wilmington

PLAN DATE: July 2015 REVIEWED BY: PLA
PREPARED BY: Jeff Spence REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

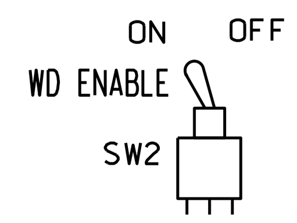
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E00CE4E46D...
7/28/15
DATE

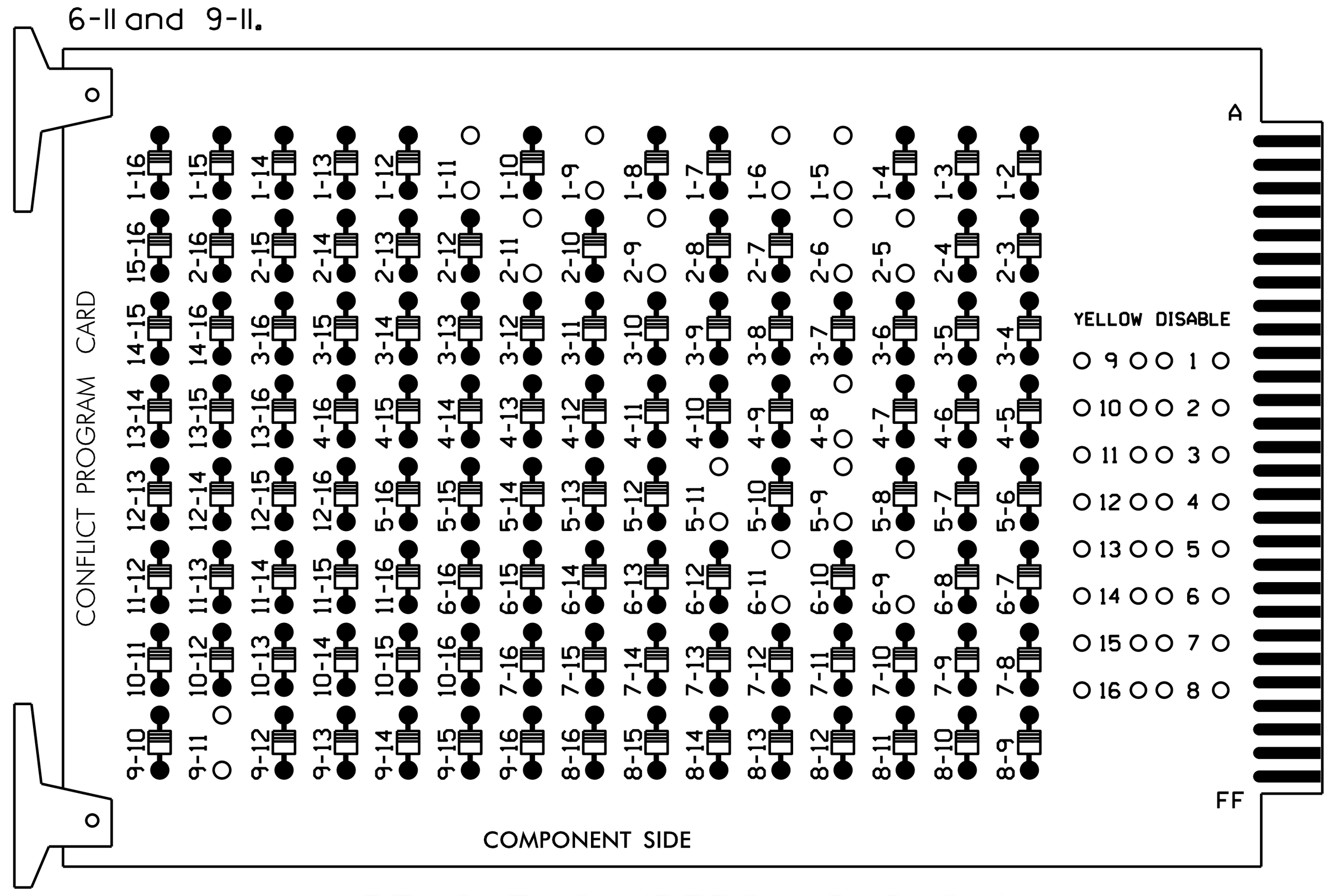
SIG. INVENTORY NO. 03-0832

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

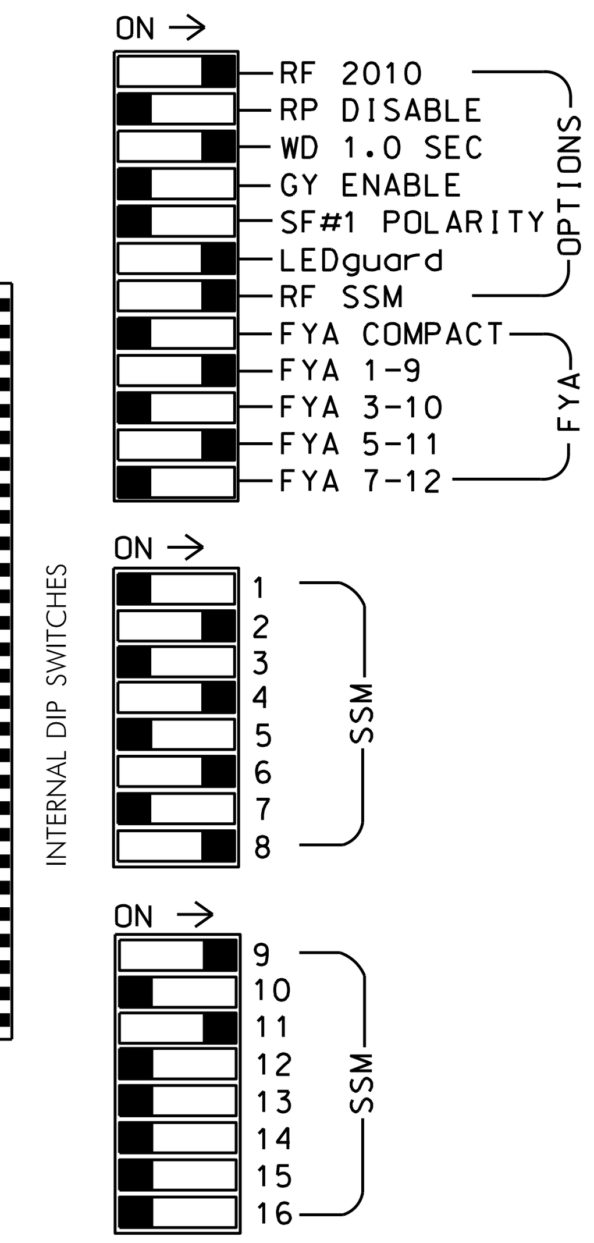
(remove jumpers and set switches as shown)



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. 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 1,3, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Start Up In Green.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
8. The cabinet and controller are part of the Wilmington City System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	41,42	NU	51★	61,62	NU	NU	81,82	NU	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	✳	129			102		✳	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											

NU = Not Used

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

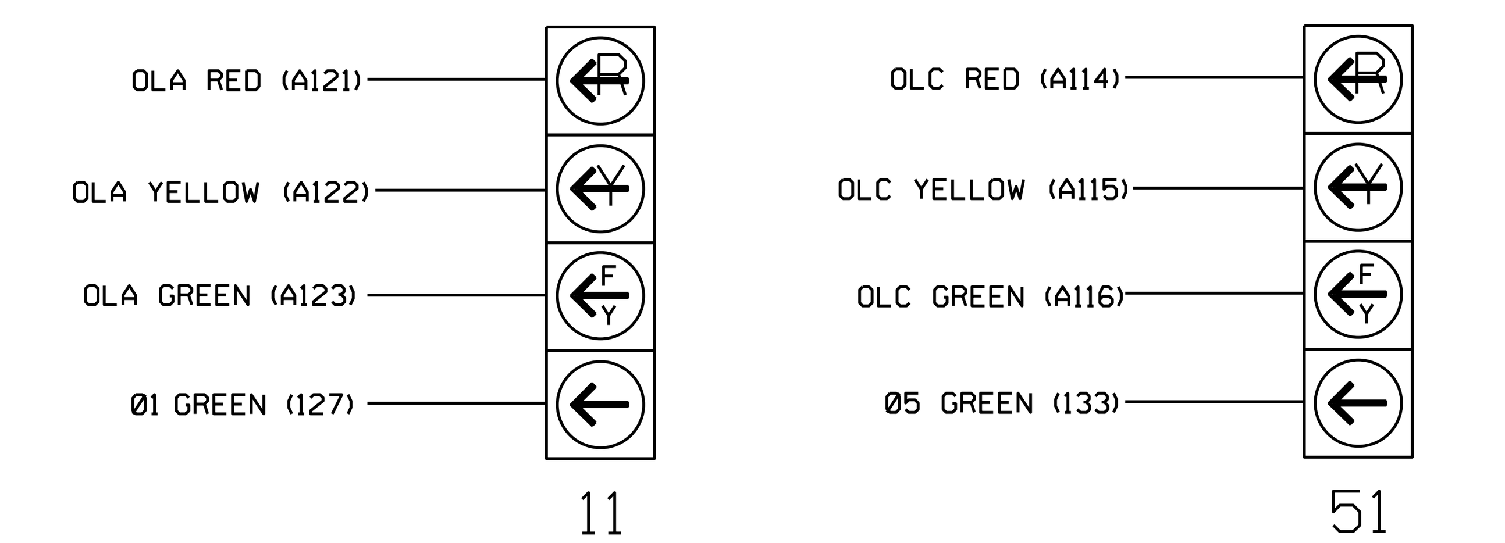
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER..............2070L
CABINET.................332 /W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S6,S8,S9,S12
PHASES USED.............1,2,4,5,6,8
OVERLAP "A".............1+2
OVERLAP "B".............NOT USED
OVERLAP "C".............5+6
OVERLAP "D".............NOT USED

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	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			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y	Y		3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

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

[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L

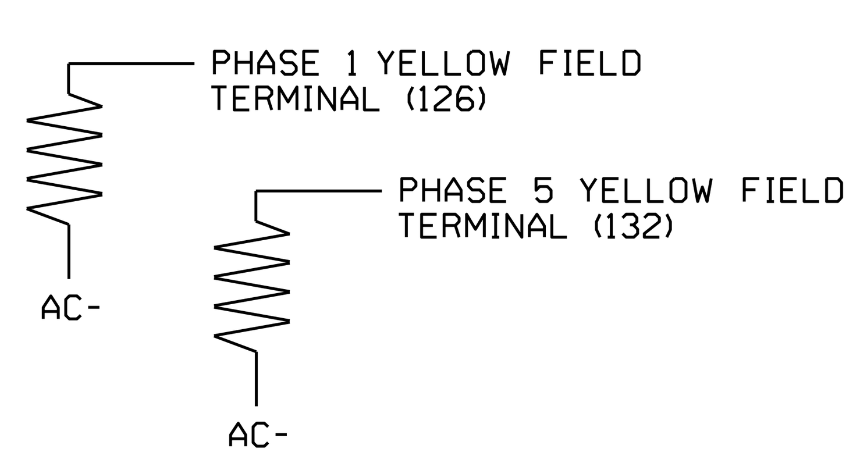
FILE J
SLOT 2
LOWER

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0832
DESIGNED: July 2015
SEALED: 7-28-15
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 7-15-14.

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Transportation Mobility and Safety Division, Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 421 (Carolina Beach Road)
at
SR 1197 (Silver Lake Road)/
SR 2381 (Shade Tree Lane)

Division 3 New Hanover County Wilmington

PLAN DATE: July 2015 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

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

DocuSigned by: John T. Rowe, Jr. 7/29/2015
SIGNATURE DATE

SIG. INVENTORY NO. 03-0832

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 12.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

          SCROLL DOWN

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

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

PRESS '+'

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

          SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #52 OFF
```

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

PRESS '+'

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

          SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #51 ON
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

          SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #42 ON
 SET OUTPUT  ASSIGNMENT #43 OFF
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

          SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

          SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #43 ON
```

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0832
DESIGNED: July 2015
SEALED: 7-28-15
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 7-15-14.

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 421 (Carolina Beach Road)
at
SR 1197 (Silver Lake Road)/
SR 2381 (Shade Tree Lane)

Division 3 | New Hanover County | Wilmington

PLAN DATE: July 2015	REVIEWED BY:	DS JTR	
PREPARED BY: James Peterson	REVIEWED BY:		

REVISIONS	INIT.	DATE

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

DocuSigned by: John T. Rowe, Jr. 7/29/2015
SIGNATURE DATE

SIG. INVENTORY NO. 03-0832

28-JUL-2015 11:12
S:\TSG\Traffic Signals\Workgroups\Sig Mon\Peterson\030832_sm.ele.20140715.dgn
jmpeterson

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 13.1

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

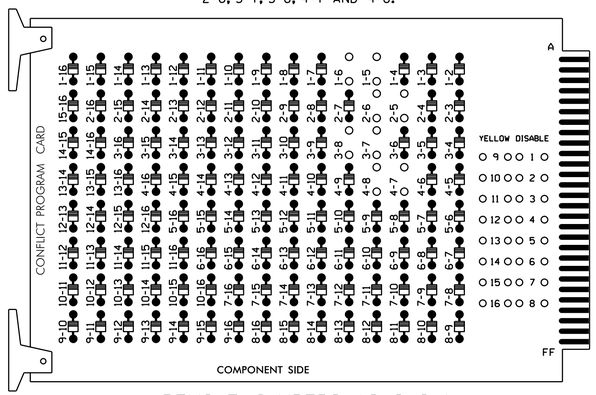
(remove jumpers and set switches as shown)

WD ENABLE

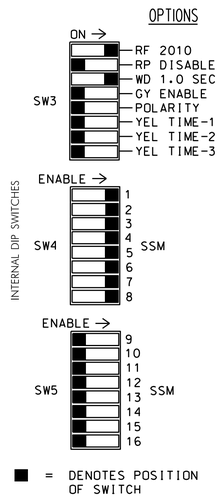
SW2

OFF ON

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 4-7 AND 4-8.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 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 9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3		S4	S4P	S5	S6	S6P	S7		S8	S8P
PHASE	1		2	2 PED	3		4	4 PED	5	6	6 PED	7		8	8 PED
SIGNAL HEAD NO.	11	82	21,22	NU	22	31,32	41,42	NU	51	61,62	NU	62	71,72	81,82	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	126			117	117			132			123	123		
GREEN ARROW	127	127			118	118			133			124	124		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	ø1 1A	ø2 2A	ø1 1B	SLOT EMPTY	ø3 3A	ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	ø2 2B	NOT USED		NOT USED	ø3 3B								ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø6 6A	SLOT EMPTY	SLOT EMPTY	ø7 7A	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	ø7 7B								

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			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
1B	TB2-9,10	I3U	63	25	32	1	Y	Y			15
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
7B	TB5-11,12	J6L	46	8	18	7	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

▽3 THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0653
DESIGNED: January 2006
SEALED: 5/23/06
REVISED1: 3/1/07
REVISED2: 7/23/2015

REVISION ▽ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR

DocuSigned by: John T. Rowe, Jr. 7/23/2015
641D60C145EE4F5... DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

Electrical Detail

US 421 (Carolina Beach Road) at SR 1237 (Silva Terra Drive)/ Matteo Drive

Division 3 New Hanover County Wilmington

PLAN DATE: January 2006	REVIEWED BY: J. Bauerlein
PREPARED BY: R. Hinshaw	REVIEWED BY:

REVISIONS	INIT.	DATE
▽1 Revised phasing. (JP)	JTR	03-19-07
▽2 Revised monitor SEL jumpers& added a note. (WSA)	JTR	3/7/13
▽3 No changes to this electrical plan. (WSA)	JTR	7/23/2015

SEAL

Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by John S. Bauerlein, PE. #5450 on 5/23/06.
This document is only certified as to the revisions.

SIGNATURE DATE

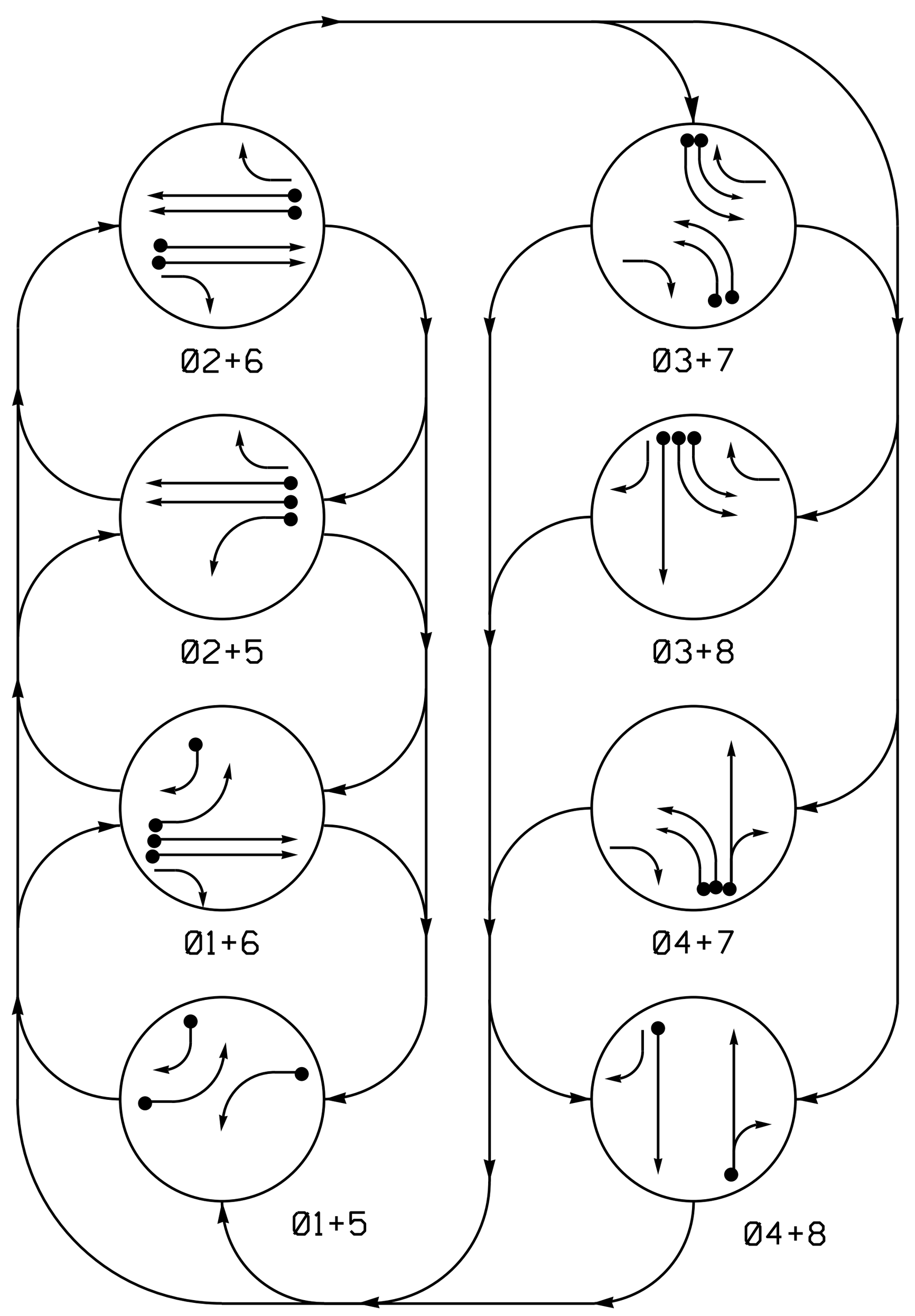
SIG. INVENTORY NO. 03-0653

23-JUL-2015 13:11
S:\TSGW\TIS\Signals\Workgroups\Sig Mgt\Armstrong\03065 3_sm_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 13.0

Roadway Sheet 29

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

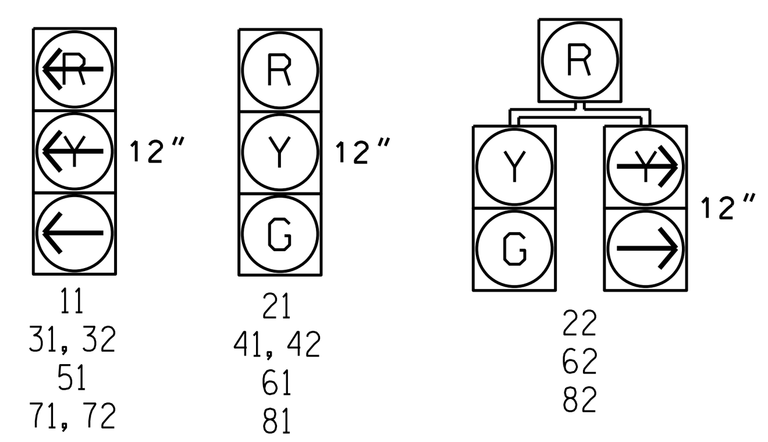
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←	←	←R	←R	←R	←R	←R	←R	←R
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/→	R/→	R	R	Y
31, 32	←R	←R	←R	←R	←	←	←R	←R	←R
41, 42	R	R	R	R	R	R	G	G	R
51	←	←R	←	←R	←R	←R	←R	←R	←R
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/→	R	R/→	R	Y
71, 72	←R	←R	←R	←R	←	←R	←	←R	←R
81	R	R	R	R	R	G	R	G	R
82	R/→	R/→	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



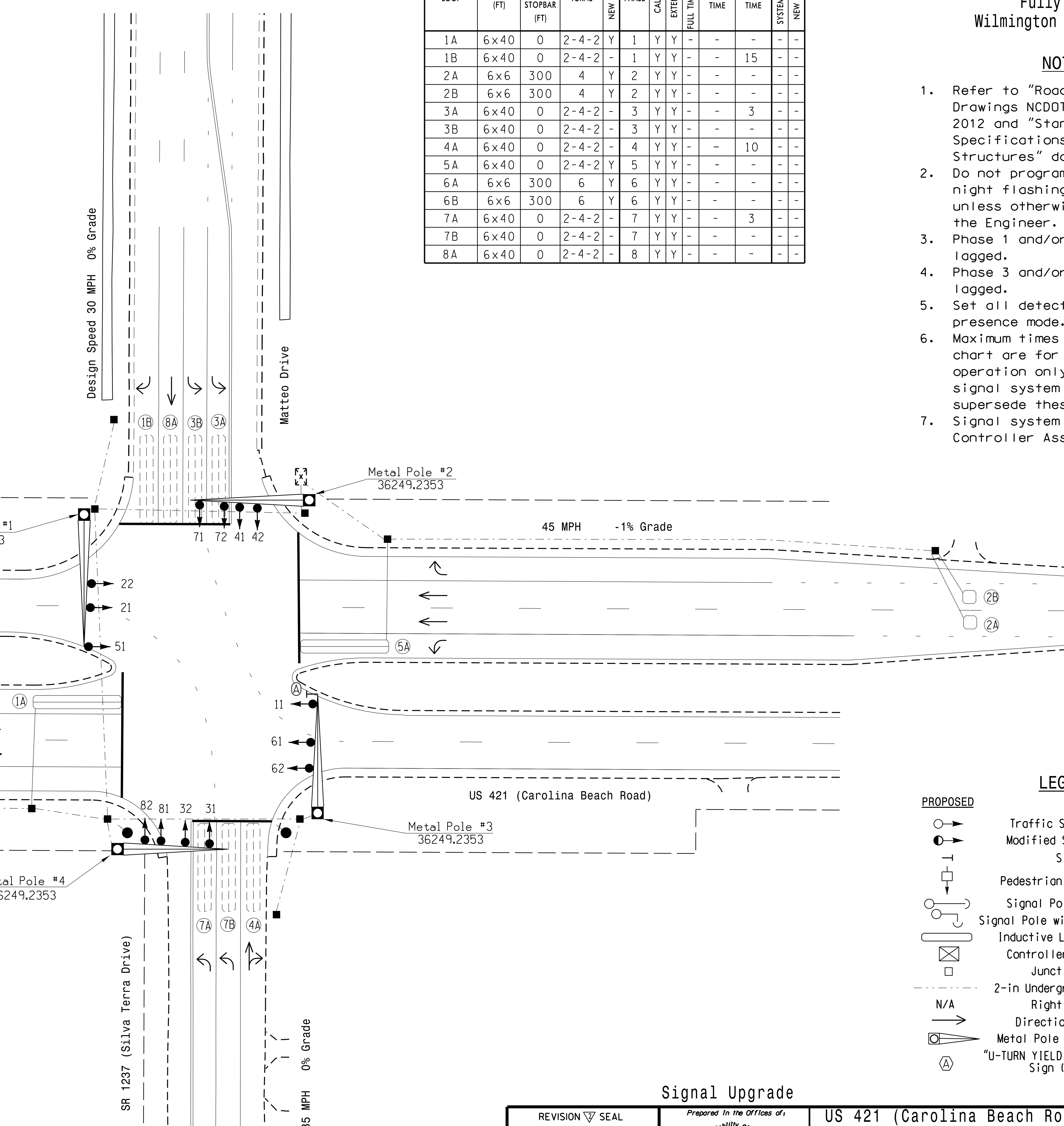
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	0	2-4-2	Y	1	Y	Y	-	-	-	-	-
1B	6x40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6x6	300	4	Y	2	Y	Y	-	-	-	-	-
2B	6x6	300	4	Y	2	Y	Y	-	-	-	-	-
3A	6x40	0	2-4-2	-	3	Y	Y	-	-	3	-	-
3B	6x40	0	2-4-2	-	3	Y	Y	-	-	-	-	-
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6x40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-
6A	6x6	300	6	Y	6	Y	Y	-	-	-	-	-
6B	6x6	300	6	Y	6	Y	Y	-	-	-	-	-
7A	6x40	0	2-4-2	-	7	Y	Y	-	-	3	-	-
7B	6x40	0	2-4-2	-	7	Y	Y	-	-	-	-	-
8A	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	-

8 Phase
Fully Actuated
Wilmington Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Signal system data: Controller Asset #0635.



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	
	Metal Pole with Mastarm	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	45	90	35	35	30	90	35	35
Yellow Clearance	3.0	4.6 (2)	3.0	3.8	3.0	4.5	3.0	3.5
Red Clearance	2.9	1.6	3.3	2.4	3.1	1.0	3.3	2.9
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	30	-	-	-	30	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	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.

30-JUL-2015 14:53
R:*Traffic*Signals*Design*Signals*03-0653*030653_sig_dsn_2015mmdd.dgn
palexander

Signal Upgrade

REVISION (2) SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E00CE4E46D... 7/23/15 DATE

Prepared in 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

SCALE 0 30 1"=30'

US 421 (Carolina Beach Road) at SR 1237 (Silva Terra Drive)/ Matteo Drive

Division 3 New Hanover County Wilmington

PLAN DATE: January 2006	REVIEWED BY: J. Bauerlein
PREPARED BY: T. Streeter	REVIEWED BY: R. Hinshaw

REVISIONS	INIT.	DATE
(1) Revise phasing orientation and set phase 2 & 6 loops for 45 MPH; Revise Clearance Times; Added Sign A.	RJBS	3-1-07
(2) Install loops and revise phase 2 yellow (kgp)	pla	7/23/15

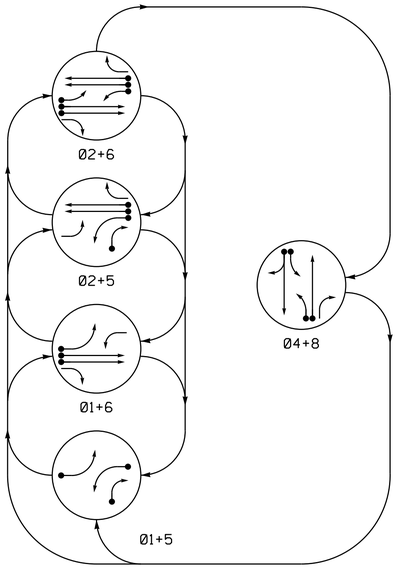
Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by J.S.Bauerlein,PE, #5450, on 5/23/06. This document is only certified as to the revisions.

SIG. INVENTORY NO. 03-0653

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 14.0

Roadway Sheet 33

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

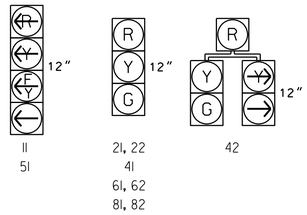
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 4 + 8	FLASH
11	←	←	F Y	F Y	R	→Y
21,22	R	R	G	G	R	Y
41	R	R	R	R	G	R
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

SIGNAL FACE I.D.

All Heads L.E.D.



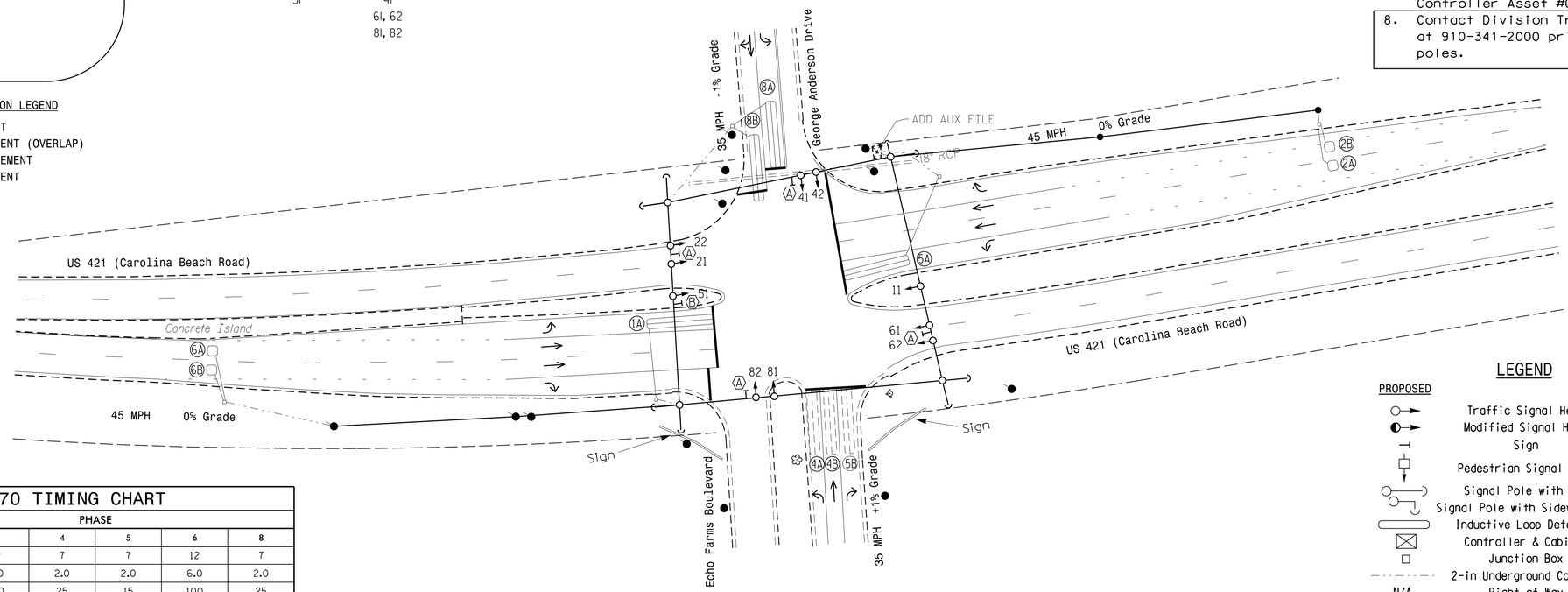
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	10	-	-
					6	Y	Y	Y	-	3	-	-
2A	6X6	300	4	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	4	Y	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	15	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	10	-	-
					2	Y	Y	Y	-	3	-	-
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	5	-	-
8B	6X40	+5	2-4-2	Y	8	Y	Y	-	-	10	-	-

5 Phase
Fully Actuated
Wilmington Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phases 2 and 6.
4. Phase 1 and/or phase 5 may be lagged.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Signal system data: Controller Asset #0524.
8. Contact Division Traffic Services at 910-341-2000 prior to installing poles.



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	
Ⓐ	Street Name Sign	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	15	100	25	15	100	25
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.9
Red Clearance	3.1	1.4	2.2	2.9	1.6	2.3
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	34	-	-	34	-
Time Before Reduction *	-	20	-	-	20	-
Time To Reduce *	-	40	-	-	40	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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.

Signal Upgrade

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

US 421 (Carolina Beach Road) at Echo Farms Boulevard/ George Anderson Drive

Division 3 New Hanover County Wilmington

PLAN DATE: July 2015 REVIEWED BY:

PREPARED BY: KGP / WEDDLE REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023489 ENGINEER PAMELA L. ALEXANDER

DocuSigned by: P L Alexander B4756E0DCE4E44D... 7/24/15

SIG. INVENTORY NO. 03-0524

30-JUL-2015 11:55
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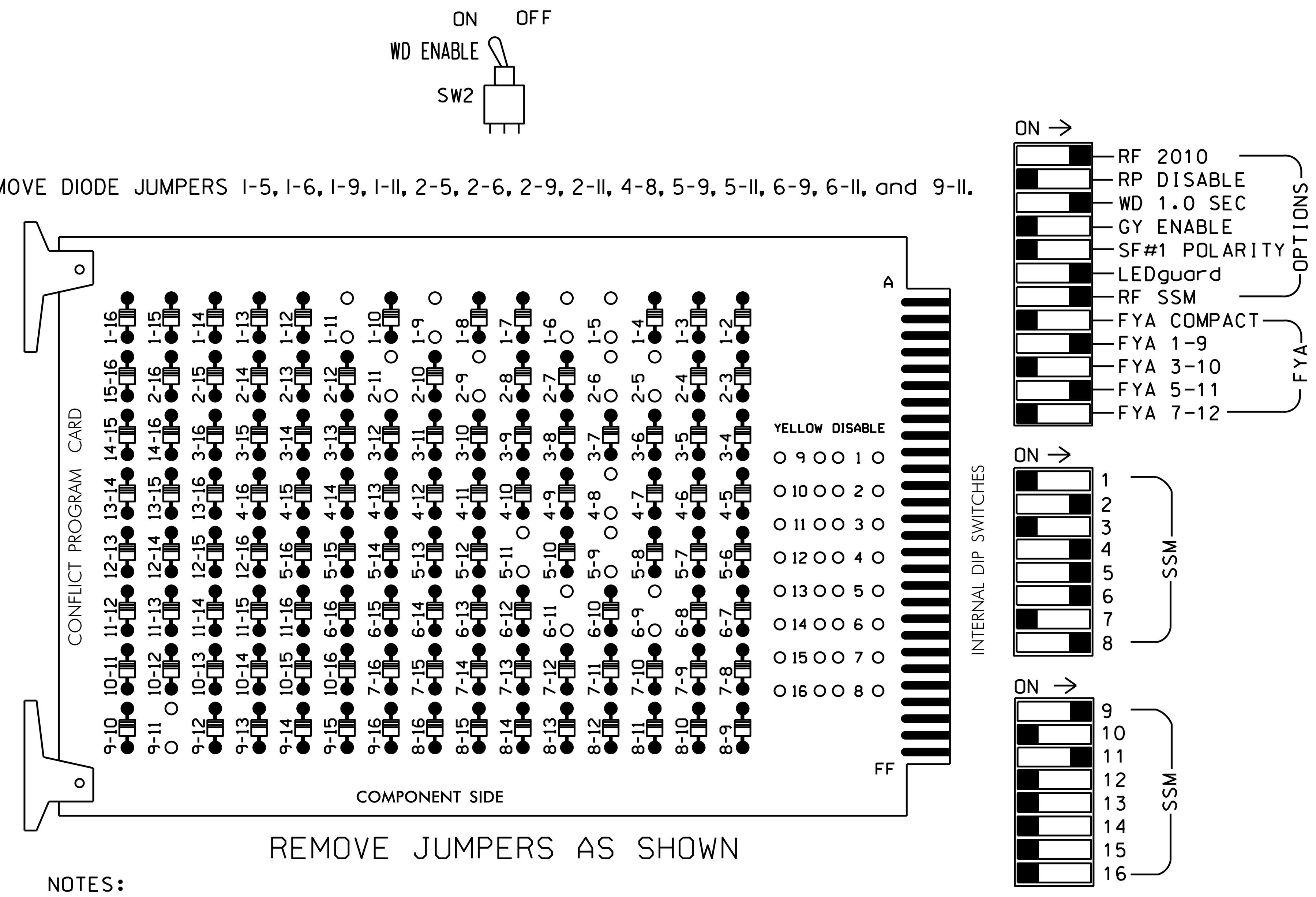
palexander

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 14.1

EDI MODEL 2010ECL-NC 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. 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 1,3, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Start Up In Green.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
8. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
9. The cabinet and controller are part of the Wilmington Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	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	NU	NU	41,42	NU	42	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							132							A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127						133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

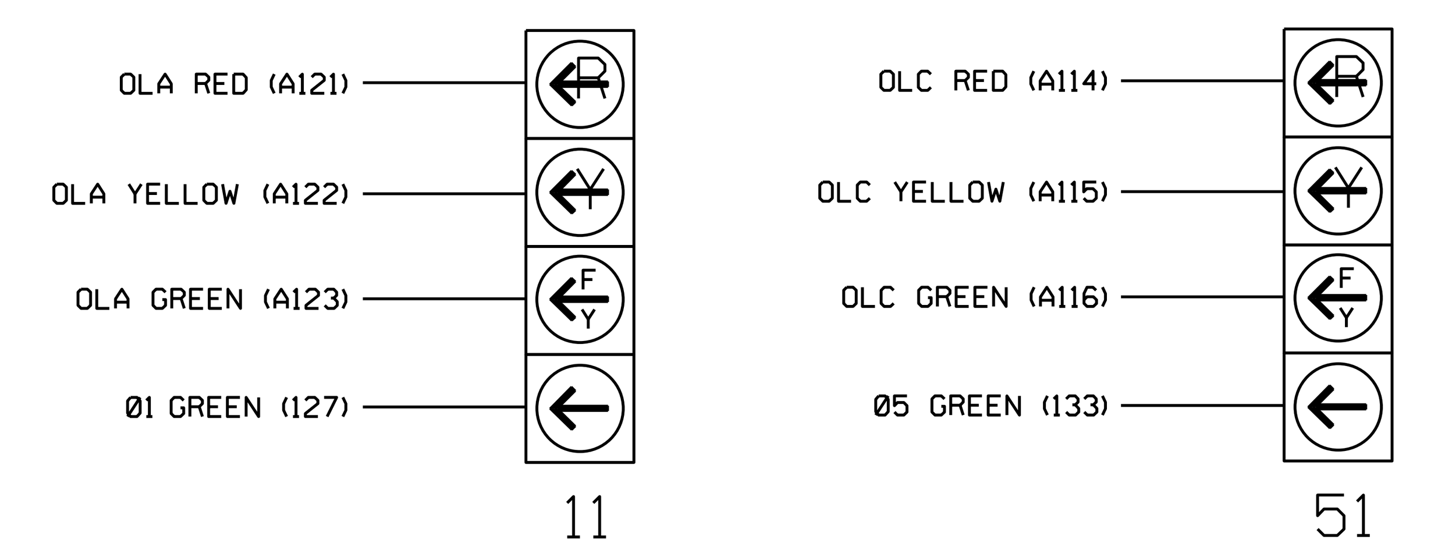
EQUIPMENT INFORMATION

CONTROLLER..............2070L
✳ CABINET.................332 W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S6,S8,S9,S12
PHASES USED.............1,2,4,5,6,8
OVERLAP "A".............1+2
OVERLAP "B".............NOT USED
OVERLAP "C".............5+6
OVERLAP "D".............NOT USED

✳ In NOTES section refer to note 8.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

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

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	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			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	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			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

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

[2] Add jumper from J1-W to I4-W, on rear of input file.

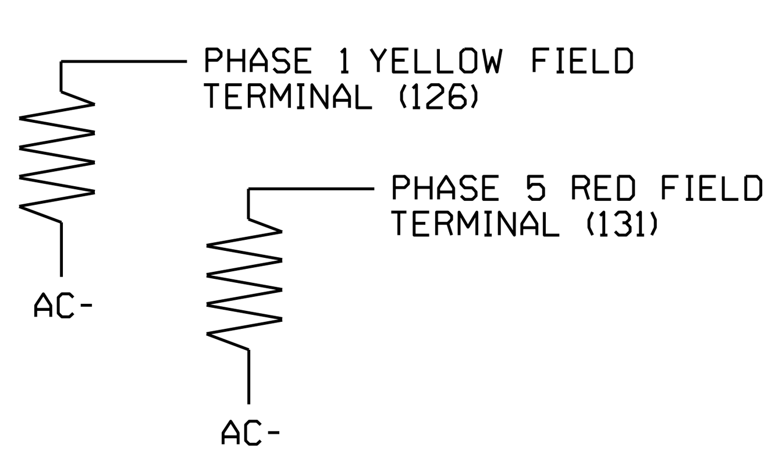
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0524
DESIGNED: 07/24
SEALED: 7/24/2015
REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy,Garner,NC 27529

US 421 (Carolina Beach Road)
at
Echo Farms Boulevard/
George Anderson Drive

Division 3 New Hanover County Wilmington

PLAN DATE: July 2015 REVIEWED BY: JTR
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS | INIT. | DATE

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

DocuSigned by: John T. Rowe, Jr. 7/27/2015
641D60C145EE4F5... DATE

SIG. INVENTORY NO. 03-0524

27-JUL-2015 08:02
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
W-5103A	Sig. 14.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
                    PRESS '+'
```

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

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

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
                    PRESS '+'
```

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

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

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
                    PRESS '+'
```

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

```
  LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
                    PRESS '+'
```

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

```
  LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
                    PRESS '+'
```

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

```
  LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

          SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
                    PRESS '+'
```

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0524
DESIGNED: 07/24
SEALED: 7/24/2015
REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 421 (Carolina Beach Road)
at
Echo Farms Boulevard/
George Anderson Drive

Division 3 | New Hanover County | DS | Wilmington

PLAN DATE:	July 2015	REVIEWED BY:	JTR
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

DocuSigned by: John T. Rowe, Jr. 7/27/2015
641D90C165EE4F5... DATE

SIG. INVENTORY NO. 03-0524

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

DEEP-CUT INDUCTIVE DETECTION LOOPS

(FOR INSTALLATION PRIOR TO MILLING)

SHEET 1 OF 1

NOTES

-OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.

-MAINTAIN 12″ SPACING BETWEEN LOOP WIRE TAIL SECTIONS.

-WIRE LOOPS CONNECTED TO THE SAME DETECTOR IN SERIES.

-LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS.

-USE A SERIES OF ONE INCH PIECES OF BACKER ROD SPACED ONE FOOT APART ALONG THE ENTIRE LENGTH OF THE FEEDER SLOT AND LOOP SAW SLOT.

-CONSULT LOOP SEALANT MANUFACTURER TO DETERMINE CURING TIME REQUIRED PRIOR TO MILLING.

-REFER TO STANDARD DRAWING 1725.01 SHEETS 2 AND 3 FOR ADDITIONAL REQUIREMENTS.

SAW SLOT DEPTH CHART

ASSUMING 2″ MILLING DEPTH

DEPTH (IN)	MAX NO. OF WIRE LAYERS				
	2	3	4	5	6
SAW SLOT DEPTH	4.0	4.5	5.0	5.0	5.0
MINIMUM TOTAL ASPHALT DEPTH REQUIRED	5.0	5.5	6.0	6.0	6.0

LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE

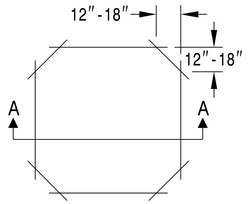
CORRECT WAY TO TWIST WIRE

CONVENTIONAL 4-SIDED LOOP

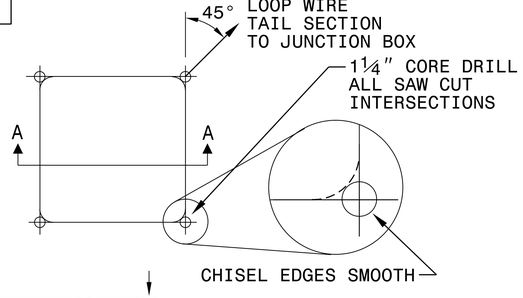
SAW CUT OPTIONS

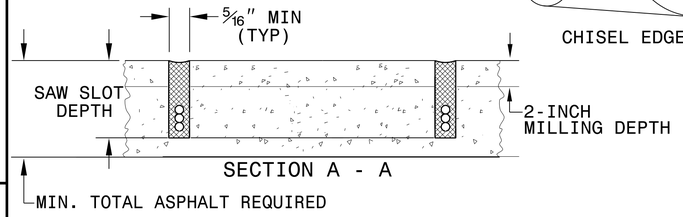
OPTION 1

INSTALL 1″ SECTIONS OF BACKER ROD ON 1 FOOT CENTERS

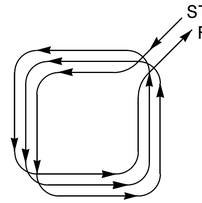


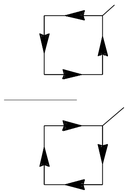
OPTION 2 (POOR PAVEMENT)





LOOP WINDING METHOD





WHEN INSTALLING 2 OR MORE LOOPS IN ADJACENT LANES, WIND LOOPS IN ALTERNATE DIRECTIONS

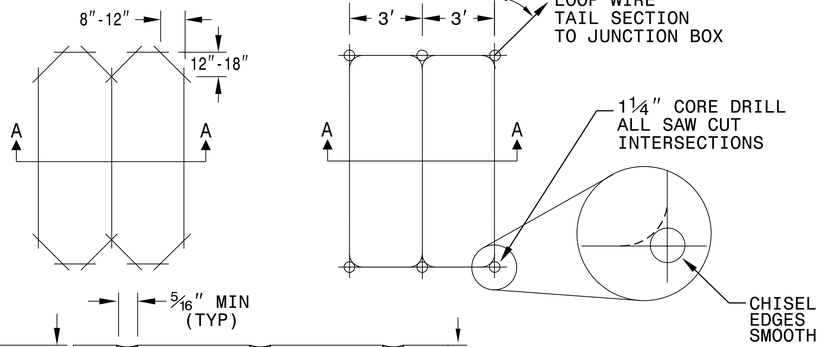
QUADRUPOLE LOOP

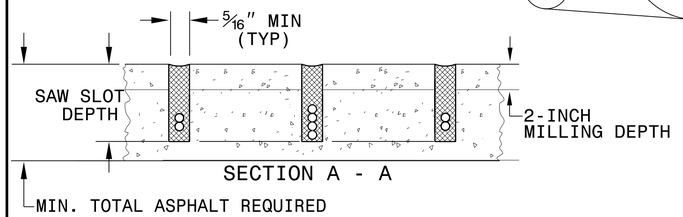
SAW CUT OPTIONS

OPTION 1

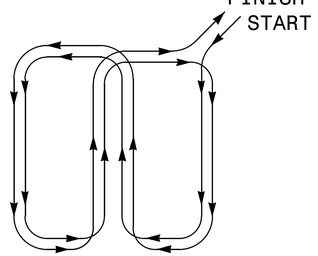
OPTION 2 (POOR PAVEMENT)

INSTALL 1″ SECTIONS OF BACKER ROD ON 1 FOOT CENTERS





LOOP WINDING METHOD



REVISIONS
1. REMOVED TWISTING NOTES FROM TAIL SECT. TO JUNCTION BOX. 2/26/08 MWH
2. REVISED SECTION A - A DETAILS. 6/29/15 JTP

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON I. DEAN

DocuSigned by: Milton I. Dean
SIGNATURE
7/1/2015
DATE

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

DEEP-CUT INDUCTIVE DETECTION LOOPS

(FOR INSTALLATION PRIOR TO MILLING)

SHEET 1 OF 1