

DCN 007IDEL_P10c4

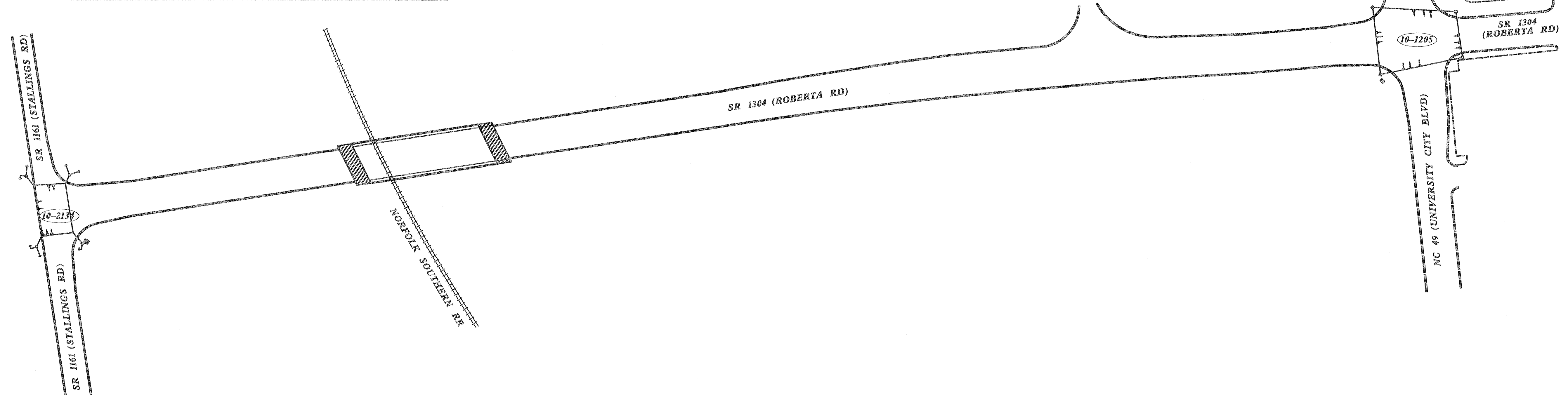
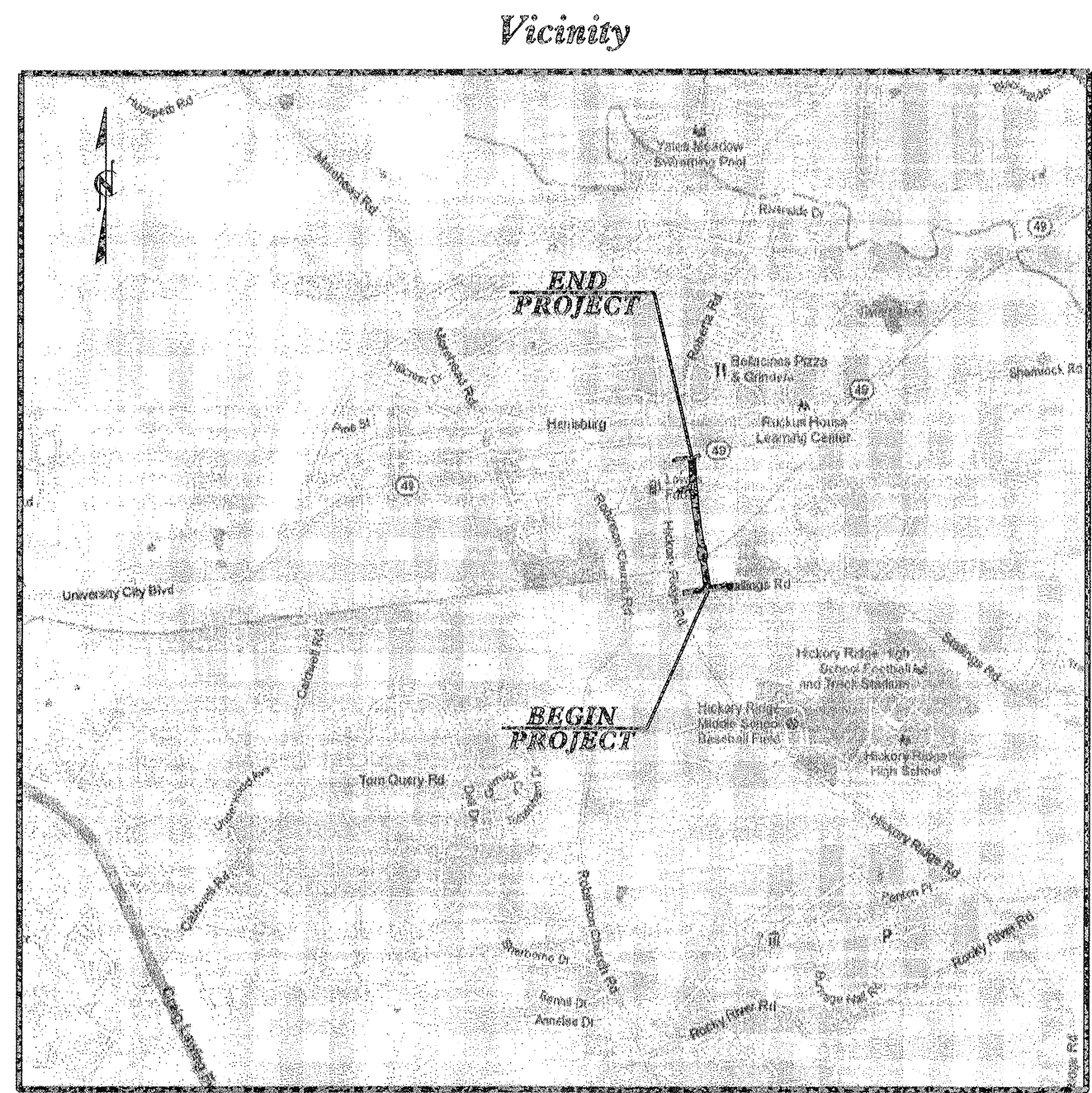
Project: P-5208D

Project No.	Sheet No.
P-5208D	SIG-01

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CABARRUS COUNTY

LOCATION: SR 1304 (ROBERTA ROAD)
FROM SR 1161 (STALLINGS RD)
TO NC 49 (UNIVERSITY CITY BLVD)
TYPE OF WORK: TRAFFIC SIGNAL INSTALLATION,
COMMUNICATIONS CABLE AND
CONDUIT ROUTING PLANS



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

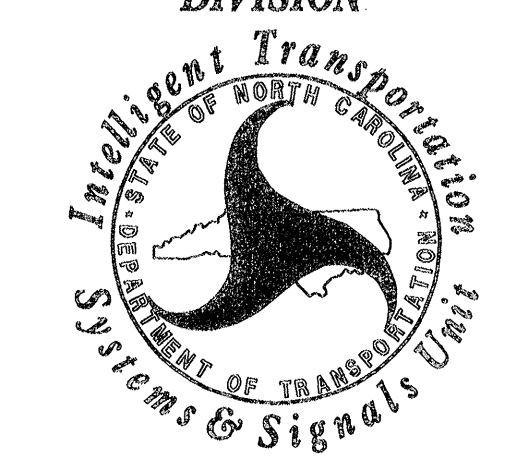
Sheet #	Reference #	Index of Plans	Location/Description
SIG 1		TITLE SHEET	
SIG 2-4	10-2134		SR 1304 (ROBERTA ROAD) AT SR 1161 (STALLINGS ROAD)
SIG 5-10	10-1205		SR 1304 (ROBERTA ROAD) AT NC 49 (UNIVERSITY CITY BLVD)
ITS 1		COMMUNICATIONS CONSTRUCTION NOTES	
ITS 2		COMMUNICATIONS ROUTING PLANS	
ITS 3-4		COMMUNICATIONS SPLICE DETAILS	

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

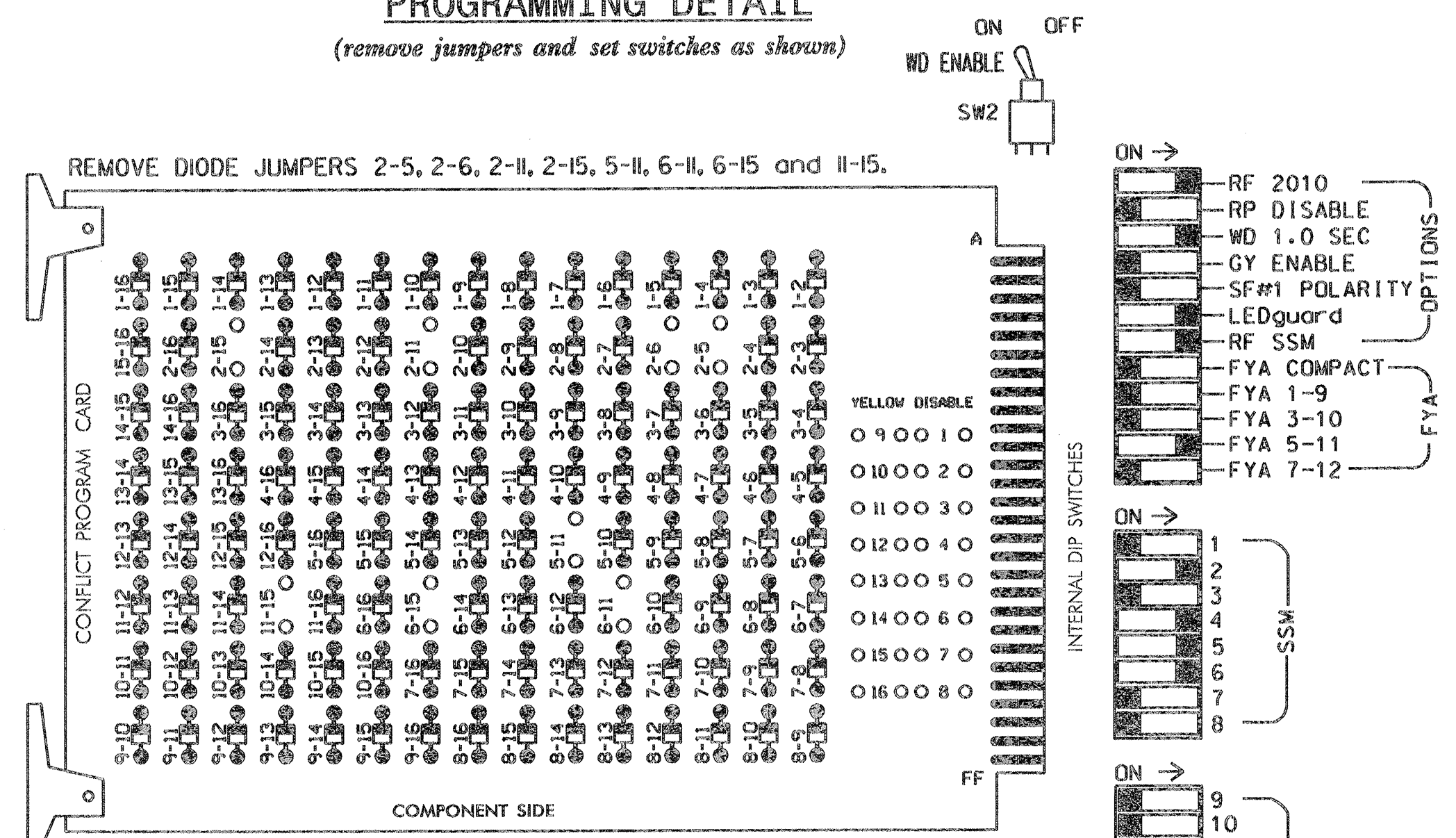
- Timothy J. Williams, PE - Western Region Signals Engineer
- George C. Brown, PE - Signal Equipment Design Engineer
- I. Neil Avery - Intelligent Transportation Systems Engineer

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



EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phase 6 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the NC 49 (University City Blvd) Closed Loop System.

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.....S2,S5,S7,S8,S9,AUX S4
 PHASES USED.....2,4,5,6,6 PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

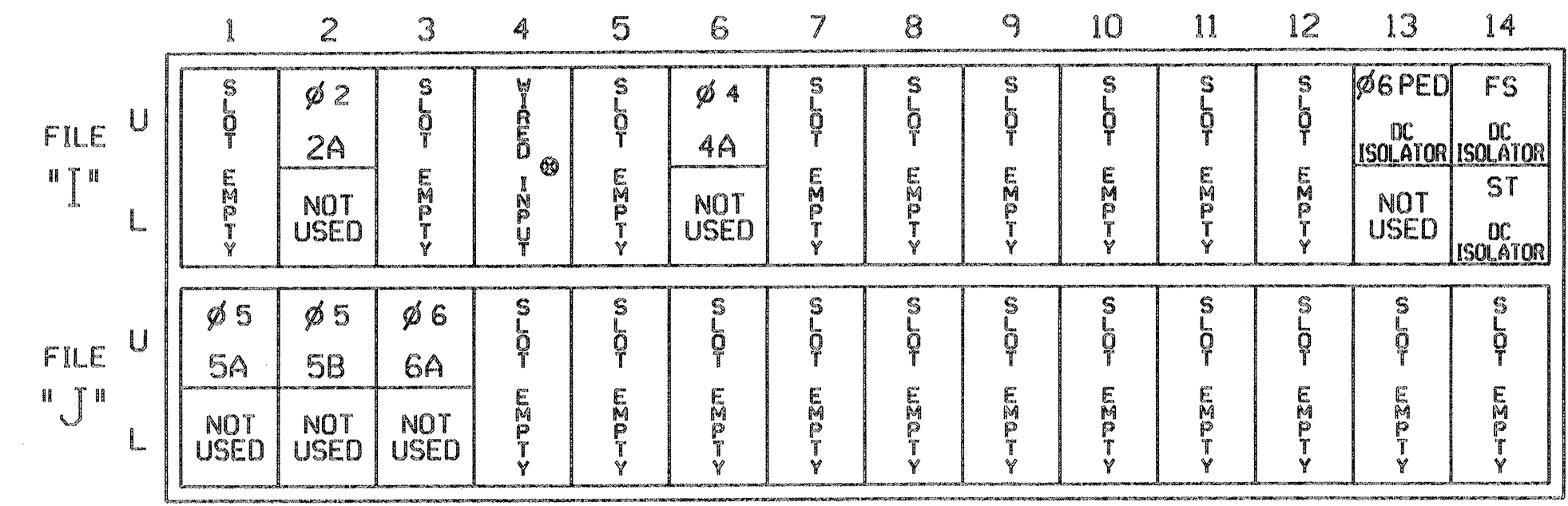
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	42	51*	61,62	P61, P62	NU	NU	NU	NU	51*	NU	NU	
RED		128			101			*		134									
YELLOW		129			102					135									
GREEN		130			103					136									
RED ARROW																		A114	
YELLOW ARROW					102			132											A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW					103		133	133											
Hand													119						
Person																			121

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

INPUT FILE POSITION LAYOUT

(front view)



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

Ⓢ Wired Input - Do not populate slot with detector card

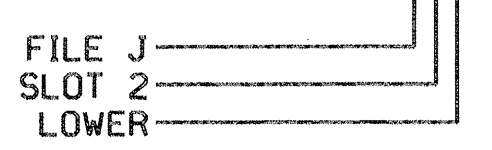
INPUT FILE CONNECTION & PROGRAMMING CHART

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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	-	-
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	-	3
5A'	TB3-1,2	J1U	55	17	5	5	Y	Y	-	-	15
5B	TB3-5,6	J2U	40	2	6	5	Y	Y	-	-	15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y	-	-	-
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT 113.

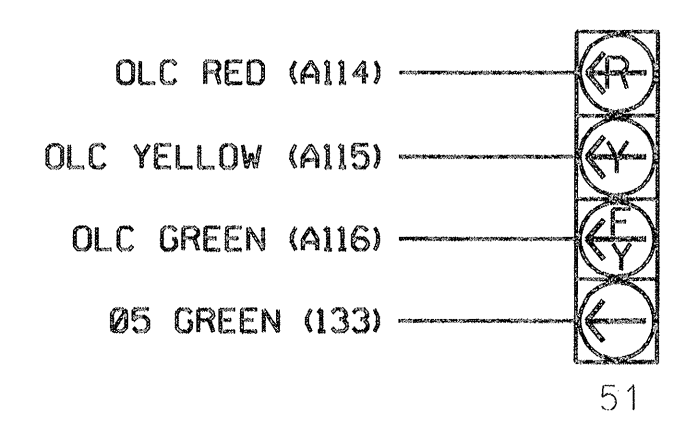
Ⓢ Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)

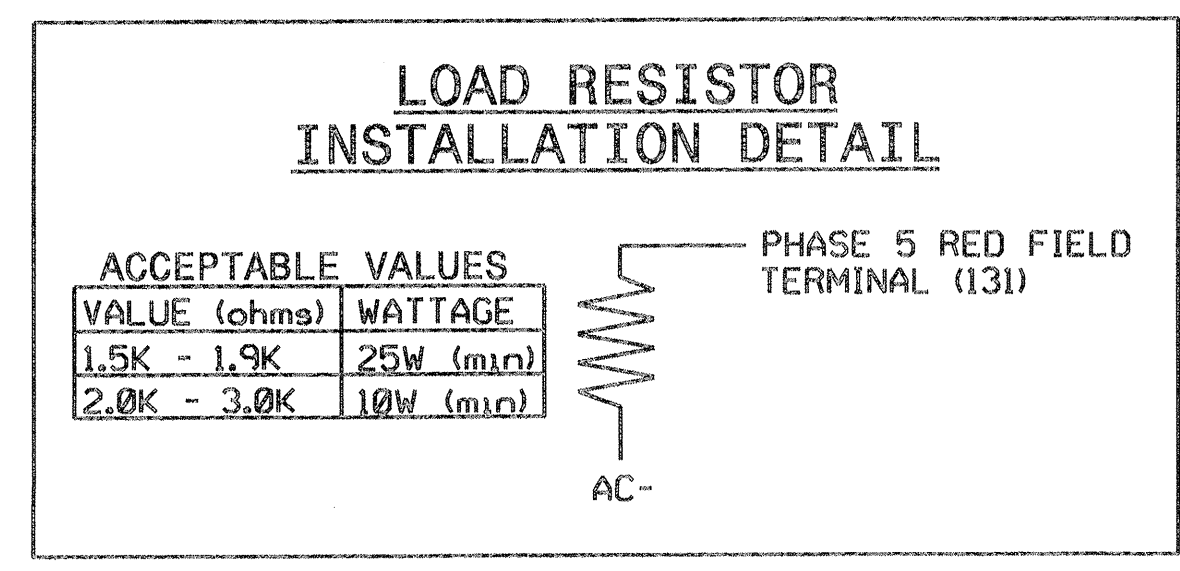


NOTE

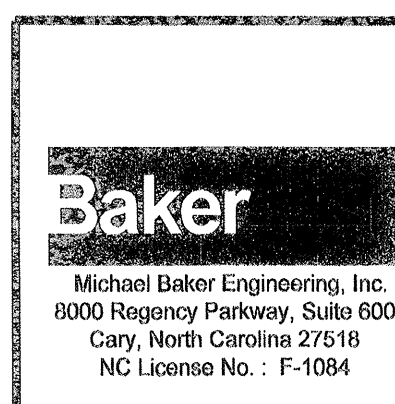
- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2134
 DESIGNED: 11-2012
 SEALED: 03-12-2013
 REVISED: _____



NEW INSTALLATION ELECTRICAL DETAIL SHEET 1 OF 2

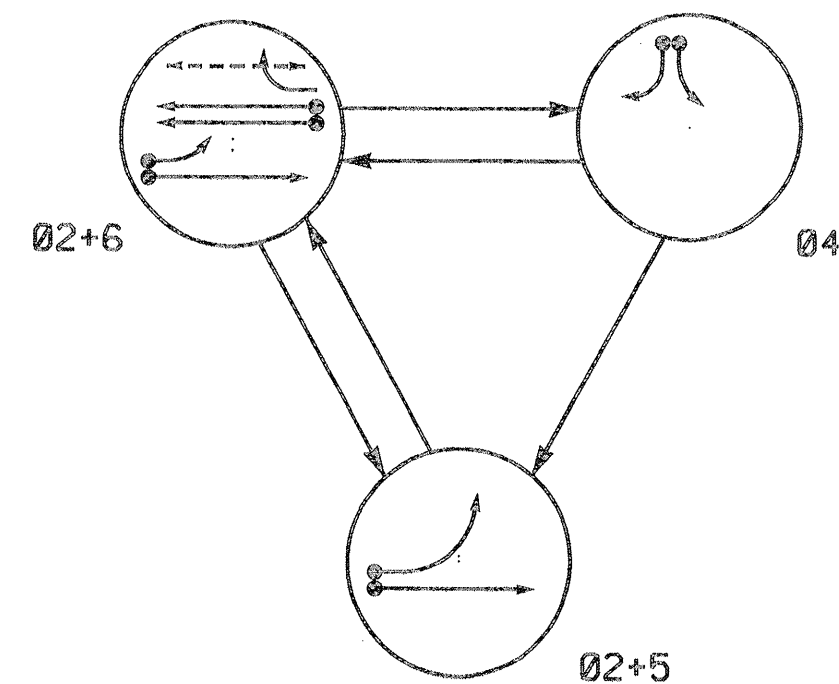
SR 1161 (STALLINGS ROAD) AT SR 1304 (ROBERTA ROAD)

DIVISION 10 CABARRUS COUNTY HARRISBURG
 PLAN DATE: NOVEMBER 2012 REVIEWED BY: R DUBNICKA
 PREPARED BY: J TRUEBLOOD REVIEWED BY: _____
 REVISIONS: _____ INIT. DATE: _____

Seal: ROBERT J. DUBNICKA, PROFESSIONAL ENGINEER, NO. 027742, STATE OF NORTH CAROLINA

SIGNATURE: Robert J. Dubnicka DATE: 3-12-13
 SIG. INVENTORY NO. 10-2134

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

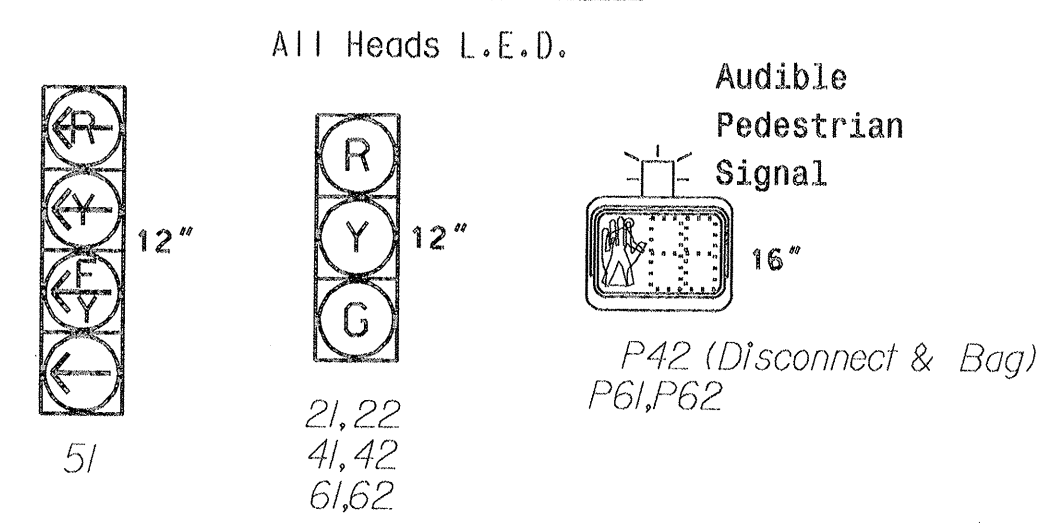
- ←●→ DETECTED MOVEMENT
- ←---→ UNDETECTED MOVEMENT (OVERLAP)
- ←--- UN SIGNALIZED MOVEMENT
- ←---→ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	---	F	R	Y
61, 62	R	G	R	Y
P61, P62	DW	W	DW	DRK

F = Flashing Yellow Arrow
 W - Walk
 DW - Don't Walk
 DRK - Dark

SIGNAL FACE I.D.



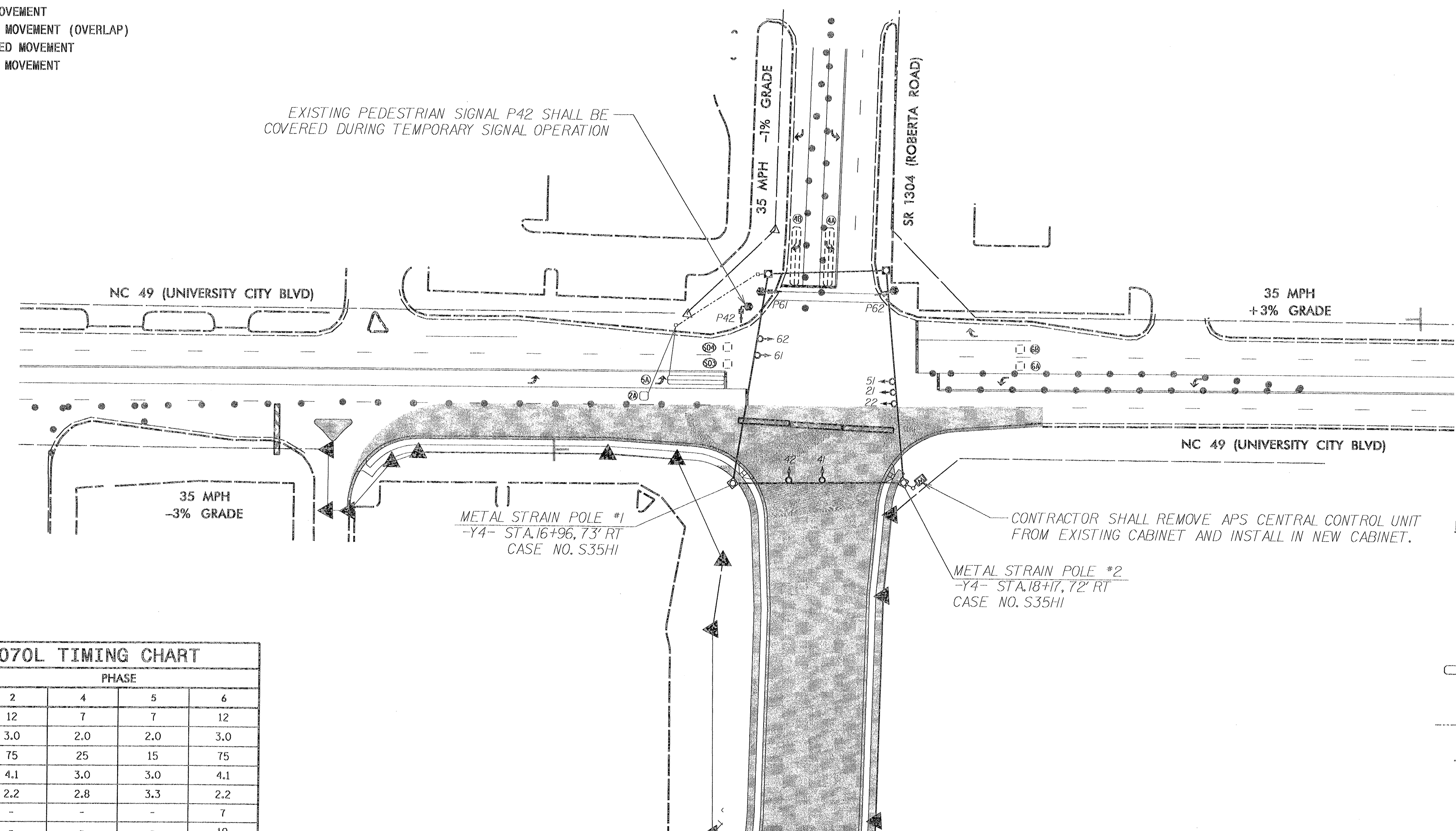
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME			DELAY TIME
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	EXIST	-	4	Y	Y	-	-	3	-	Y
4B	6X40	0	EXIST	-	4	Y	Y	-	-	15	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	70	EXIST	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	70	EXIST	Y	6	Y	Y	-	-	-	-	Y
S03	6X6	+131	EXIST	-	-	-	-	-	-	-	-	Y
S04	6X6	+131	EXIST	-	-	-	-	-	-	-	-	Y

3 PHASE FULLY ACTUATED NC 49 (University City Blvd) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do Not Program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detectors to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated Signalsystem timing values supersede these values.
- Closed loop system data:
Master Asset #: 1040
Controller Asset #: 1205
- Pedestrian pushbuttons shall be vibro-tactile.
- All Accessible Pedestrian Signals shall use the "Rapid Tick" sound.



OASIS 2070L TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	75	25	15	75
Yellow Clearance	4.1	3.0	3.0	4.1
Red Clearance	2.2	2.8	3.3	2.2
Walk 1 *	-	-	-	7
Don't Walk 1	-	-	-	19
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
⊙ → Modified Signal Head	N/A
⊥ Sign	⊥ Sign
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ Pedestrian Signal Head With Push Button & Sign
○ Signal Pedestal	○ Signal Pedestal
⊠ Metal Strain Pole	⊠ Metal Strain Pole
⊠ Inductive Loop Detector	⊠ Inductive Loop Detector
⊠ Master Controller & Cabinet	⊠ Master Controller & Cabinet
⊠ Junction Box	⊠ Junction Box
--- 2-in Underground Conduit	--- 2-in Underground Conduit
N/A Right of Way	--- Right of Way
→ Directional Arrow	→ Directional Arrow
→ Pavement Marking Arrow	→ Pavement Marking Arrow

SIGNAL MODIFICATION - TEMPORARY DESIGN

Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 49 (UNIVERSITY CITY BLVD)
AT
SR 1304 (ROBERTA RD)

DIVISION 10 CABARRUS COUNTY HARRISBURG

PLAN DATE: NOVEMBER 2012 REVIEWED BY: R DUBNICKA

PREPARED BY: K M CORY REVIEWED BY:

SEAL

SEAL 027742
ENGINEER
ROBERT J. DUBNICKA

REVISIONS

NO.	DESCRIPTION	DATE

INIT. DATE

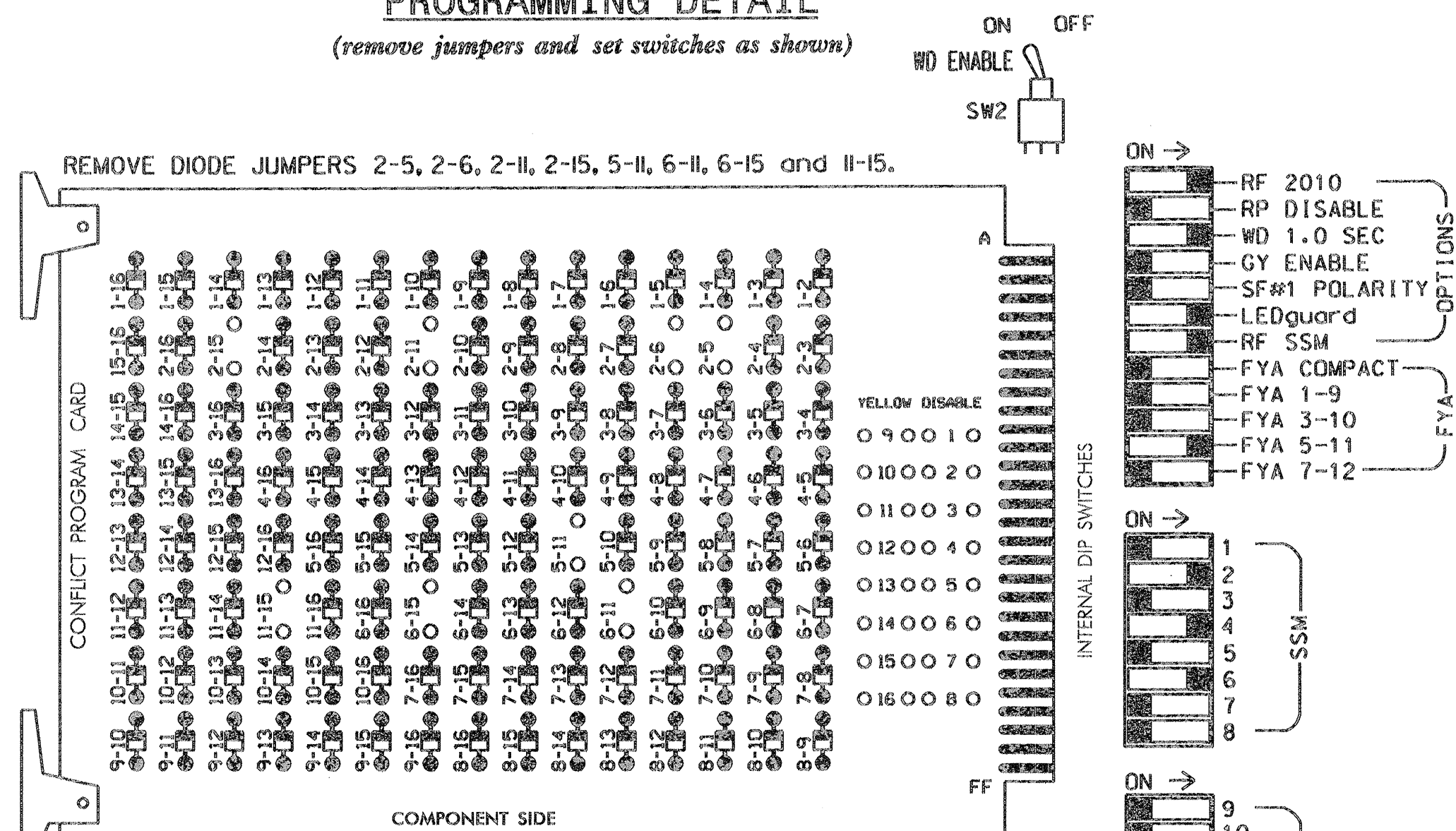
_____/_____/_____

Signature: *Robert J. Dubnicka* 3-12-13

SIG. INVENTORY NO. 10-1205T

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phase 6 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the NC 49 (University City Blvd) Closed Loop System.

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.....S2,S5,S7,S8,S9,AUX S4
 PHASES USED.....2,4,5,6,6 PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	DLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51*	61,62	P61, P62	NU	NU	NU	NU	NU	NU	51*	NU	NU	
RED		128			101			134											
YELLOW		129			102		*	135											
GREEN		130			103			136											
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW							133												
									119										
										121									

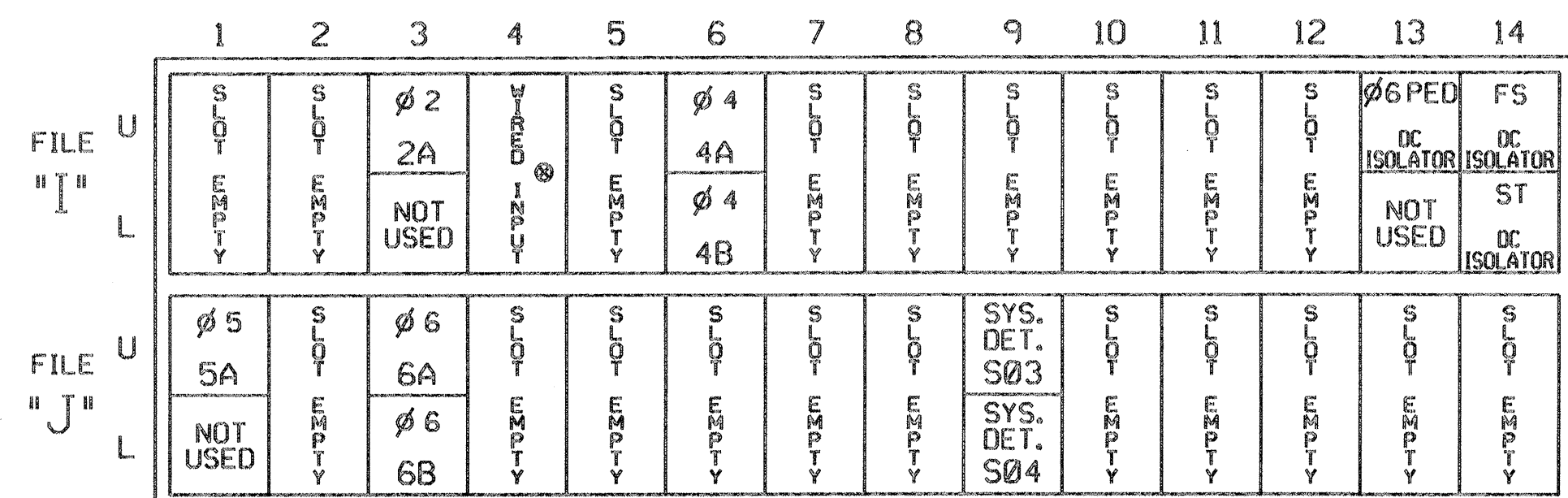
NU = Not Used

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

* See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)



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

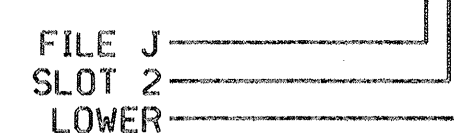
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	T82-9,10	I3U	63	25	32	2	Y	Y	-	-	-
4A	T84-9,10	I6U	41	3	4	4	Y	Y	-	-	3
4B	T84-11,12	I6L	45	7	14	4	Y	Y	-	-	15
5A ¹	T83-1,2	J1U	55	17	5	5	Y	Y	-	-	15
6A	T83-9,10	J3U	64	26	36	6	Y	Y	-	-	-
6B	T83-11,12	J3L	77	39	46	6	Y	Y	-	-	-
#S03	T87-9,10	J9U	59	21	15	SYS	-	-	-	-	-
#S04	T87-11,12	J9L	61	23	17	SYS	-	-	-	-	-
PED PUSH BUTTONS											
P61,P62	T88-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOT 113.

¹Add jumper from J1-W to I4-W, on rear of input file.

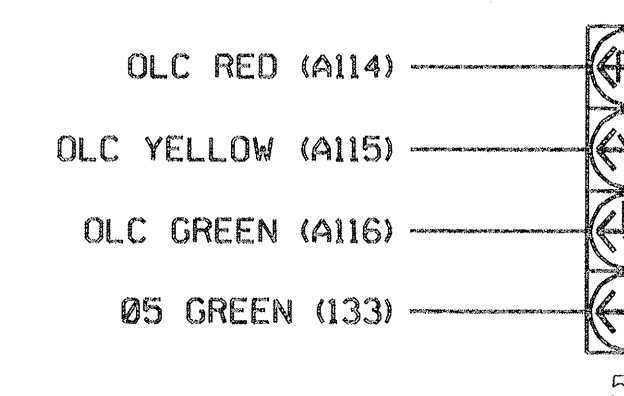
* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



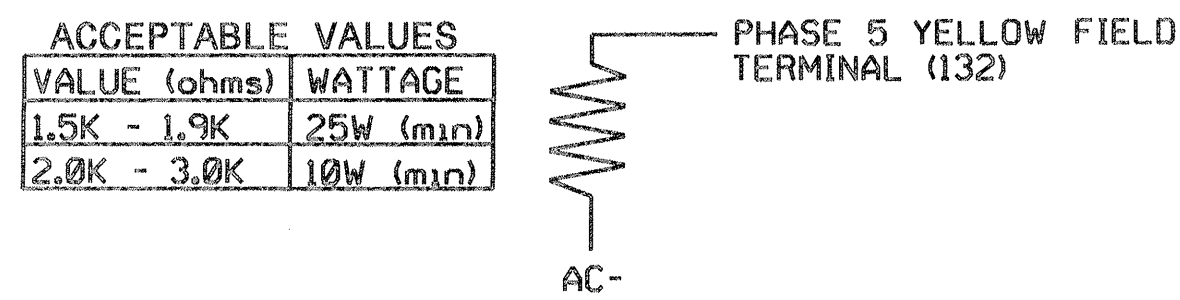
NOTE

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

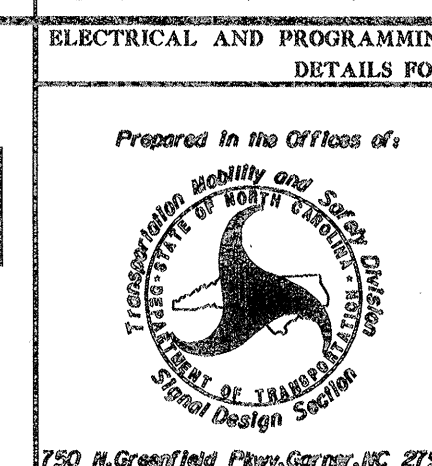
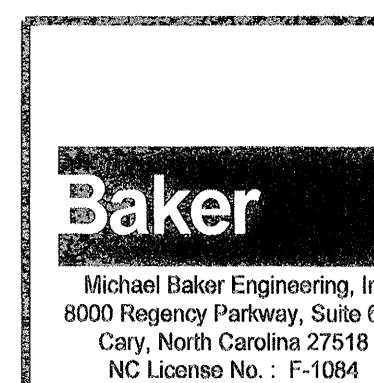
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

LOAD RESISTOR INSTALLATION DETAIL



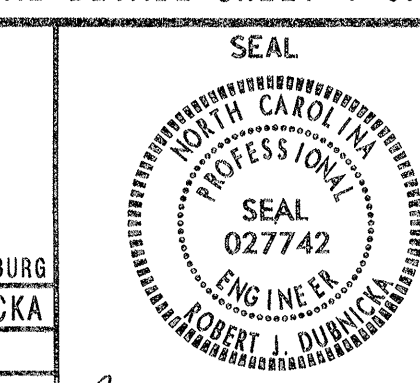
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1205T
 DESIGNED: 11-2012
 SEALED: 03-12-2013
 REVISED: _____



SIGNAL MODIFICATION - TEMPORARY DESIGN
 ELECTRICAL DETAIL SHEET 1 OF 2
 NC 49 (UNIVERSITY CITY BLVD)
 AT
 SR 1304 (ROBERTA RD)

DIVISION 10 CABARRUS COUNTY HARRISBURG
 PLAN DATE: NOVEMBER 2012 REVIEWED BY: R DUBNICKA
 PREPARED BY: J TRUEBLOOD REVIEWED BY:

REVISIONS	INIT.	DATE

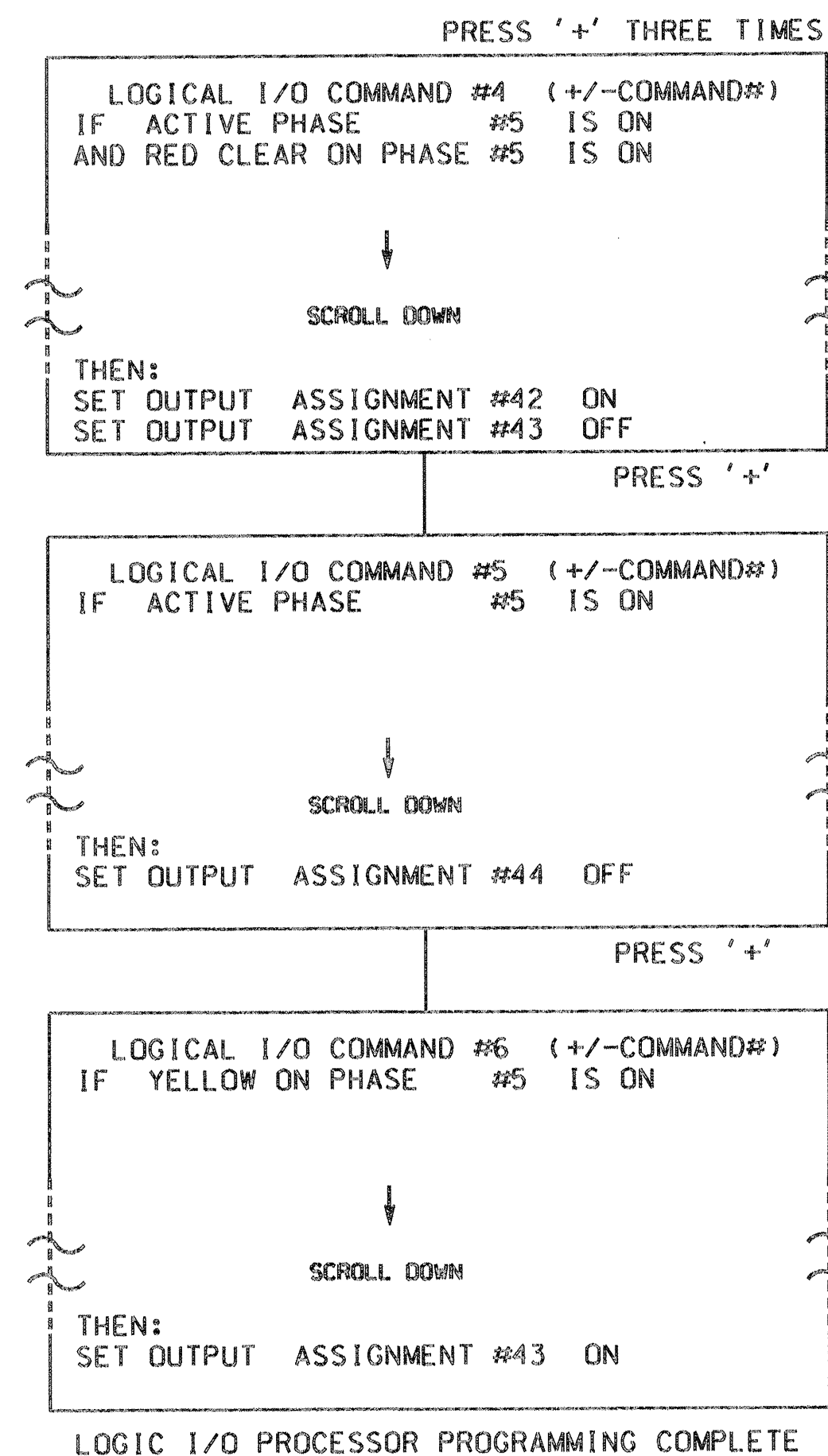


3-12-13
 DATE
 SIGNATURE
 SIG. INVENTORY NO. 10-1205T

**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 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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

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

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

OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

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

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

**ACCESSIBLE PEDESTRIAN SIGNAL (APS)
INSTALLATION NOTES**

1. Provide a dedicated pair of wires from the cabinet to each push button.
2. Mount Fail-Safe Interconnect Terminal Board on right rear side of cabinet (above service panel).
3. Wire push buttons and Central Control Unit (CCU) per Polaris Installation Manual instructions.
4. Use Controller Receptacle to power CCU. Do not use Equipment Receptacle which is a GFCI outlet.
5. Never attempt to operate a standard contact closure push button with the Polaris system unless cabinet is re-wired for standard button operation.

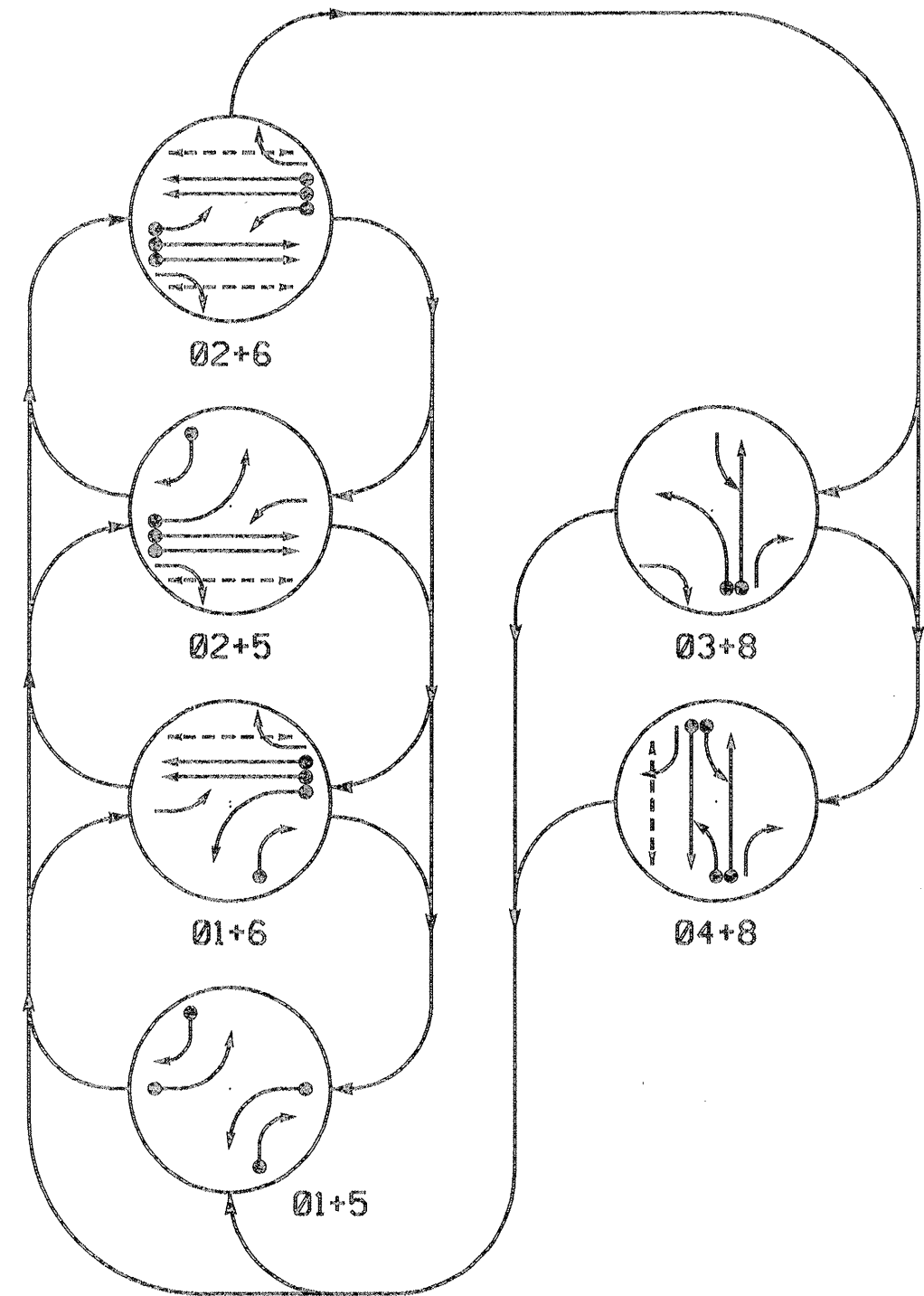
SIGNAL MODIFICATION - TEMPORARY DESIGN

ELECTRICAL DETAIL SHEET 2 OF 2

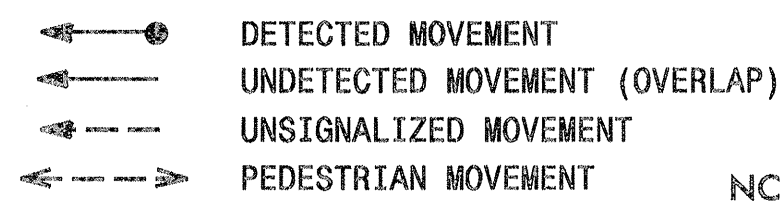
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1205T
DESIGNED: 11-2012
SEALED: 03-12-2013
REVISED:

<p>Michael Baker Engineering, Inc. 8000 Regency Parkway, Suite 600 Cary, North Carolina 27518 NC License No.: F-1084</p>		NC 49 (UNIVERSITY CITY BLVD) AT SR 1304 (ROBERTA RD)	
		DIVISION 10 CABARRUS COUNTY HARRISBURG PLAN DATE: NOVEMBER 2012 REVIEWED BY: R DUBNICKA PREPARED BY: J TRUEBLOOD REVIEWED BY:	SEAL NORTH CAROLINA PROFESSIONAL SEAL 027742 ENGINEER ROBERT J. DUBNICKA
REVISIONS INIT. DATE		SIGNATURE: <i>Robert J. Dubnicka</i> DATE: 3-12-13	
		SIG. INVENTORY NO. 10-1205T	

PHASING DIAGRAM



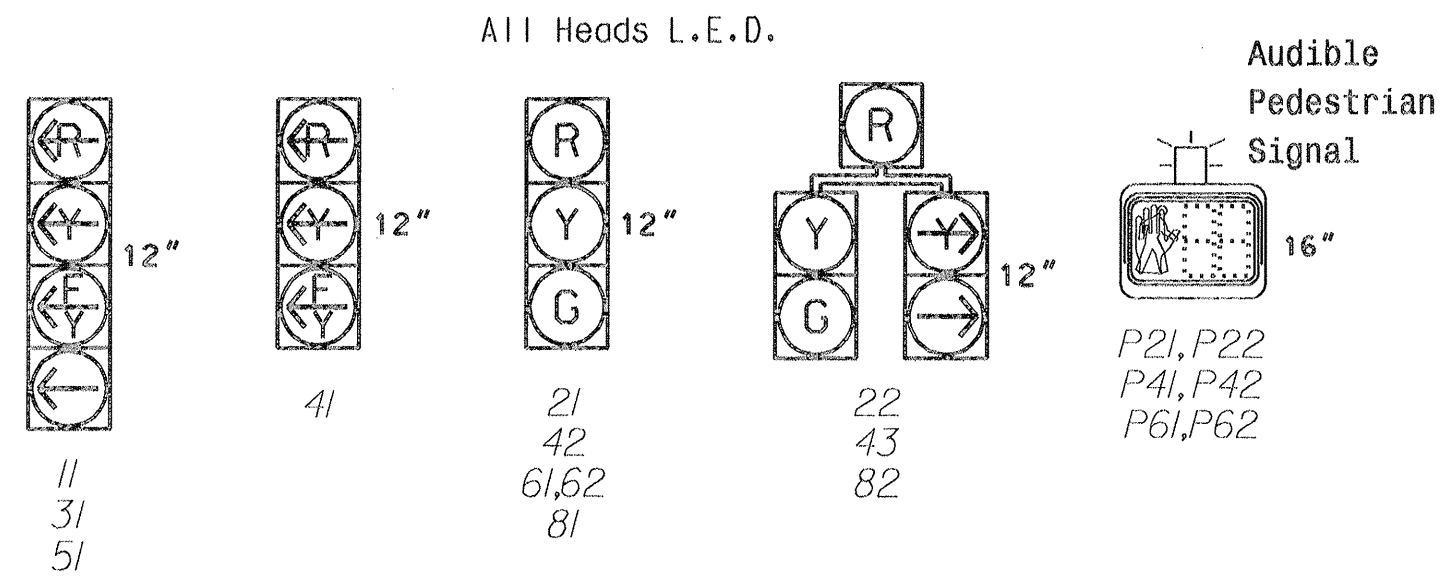
PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE	PHASE							
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3+8	Ø 4+8	FLASH	F L A S H
11			F	F	R	R	Y	
21	R	R	G	G	R	R	Y	
22	R	R	G	G	R	R	Y	
31	R	R	R	R	F	F	Y	
41	R	R	R	R	F	F	Y	
42	R	R	R	R	R	R	G	R
43	R	R	R	R	R	R	G	R
51	F	F	R	R	R	R	Y	
61,62	R	G	R	G	R	R	Y	
81	R	R	R	R	G	G	R	
82	R	R	R	R	G	G	R	
P21,P22	DW	DW	W	W	DW	DW	DRK	
P41,P42	DW	DW	DW	DW	DW	W	DRK	
P61,P62	DW	W	DW	W	DW	DRK		

F = Flashing Yellow Arrow
 W - Walk
 DW - Don't Walk
 DRK - Dark

SIGNAL FACE I.D.

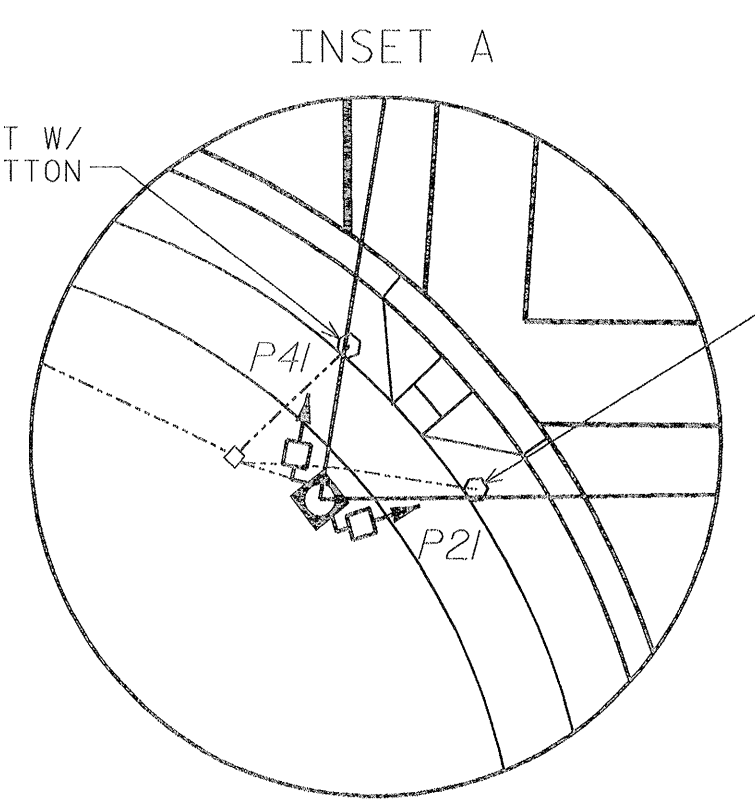
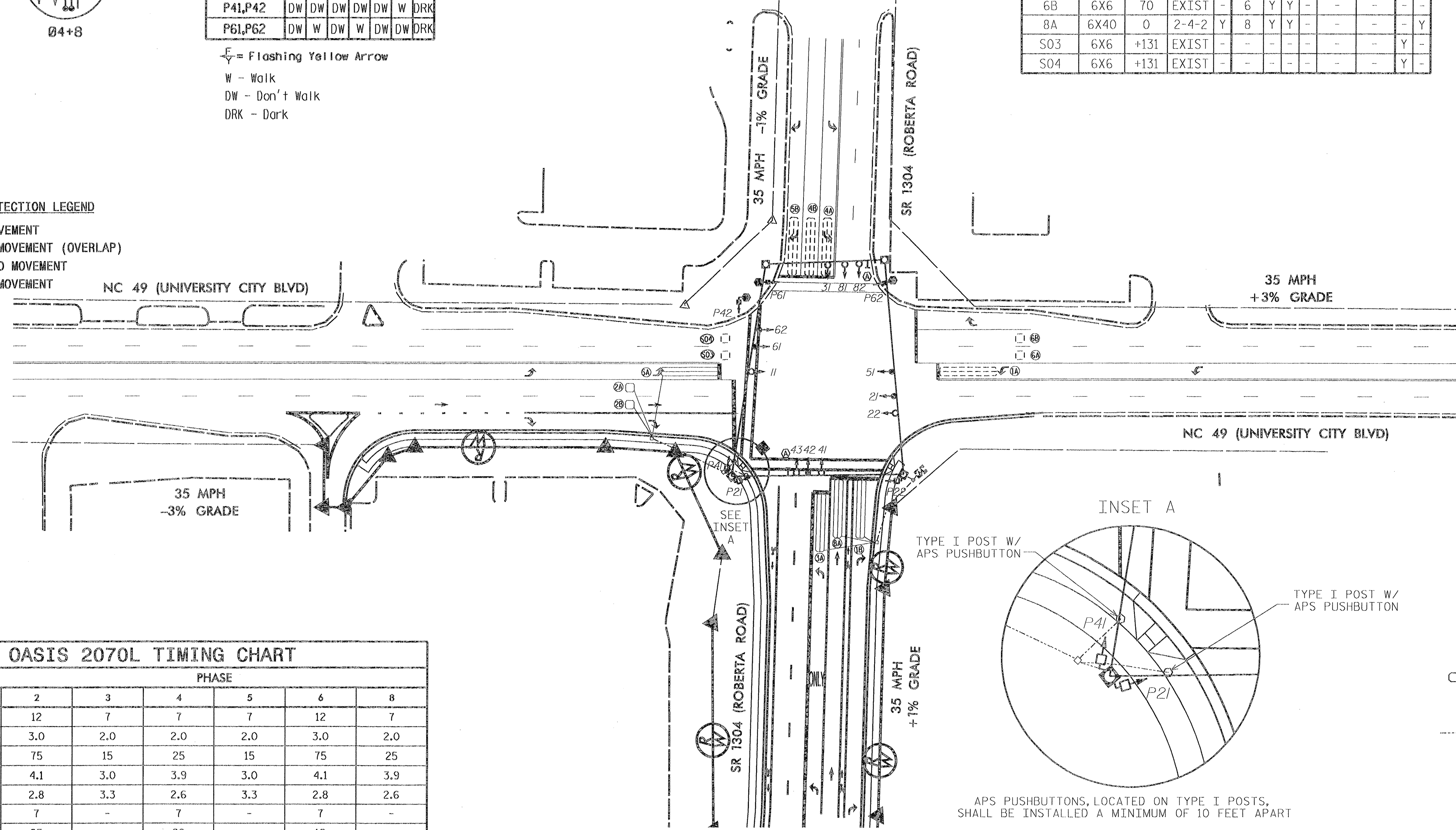


LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	STRETCH TIME		
1A	6X40	0	EXIST		1	Y	Y		15	
1B	6X40	0	2-4-2	Y	1	Y	Y		15	Y
2A	6X6	70	4	Y	2	Y	Y			
2B	6X6	70	4	Y	2	Y	Y			
3A	6X40	0	2-4-2	Y	3	Y	Y		15	Y
4A	6X40	0	EXIST		4	Y	Y		3	
4B	6X40	0	EXIST		4	Y	Y			
5A	6X40	0	2-4-2	Y	5	Y	Y		15	
5B	6X40	0	EXIST		5	Y	Y		15	
6A	6X6	70	EXIST		6	Y	Y			
6B	6X6	70	EXIST		6	Y	Y			
8A	6X40	0	2-4-2	Y	8	Y	Y			Y
S03	6X6	+131	EXIST							Y
S04	6X6	+131	EXIST							Y

6 PHASE FULLY ACTUATED NC 49 (University City Blvd) CLS

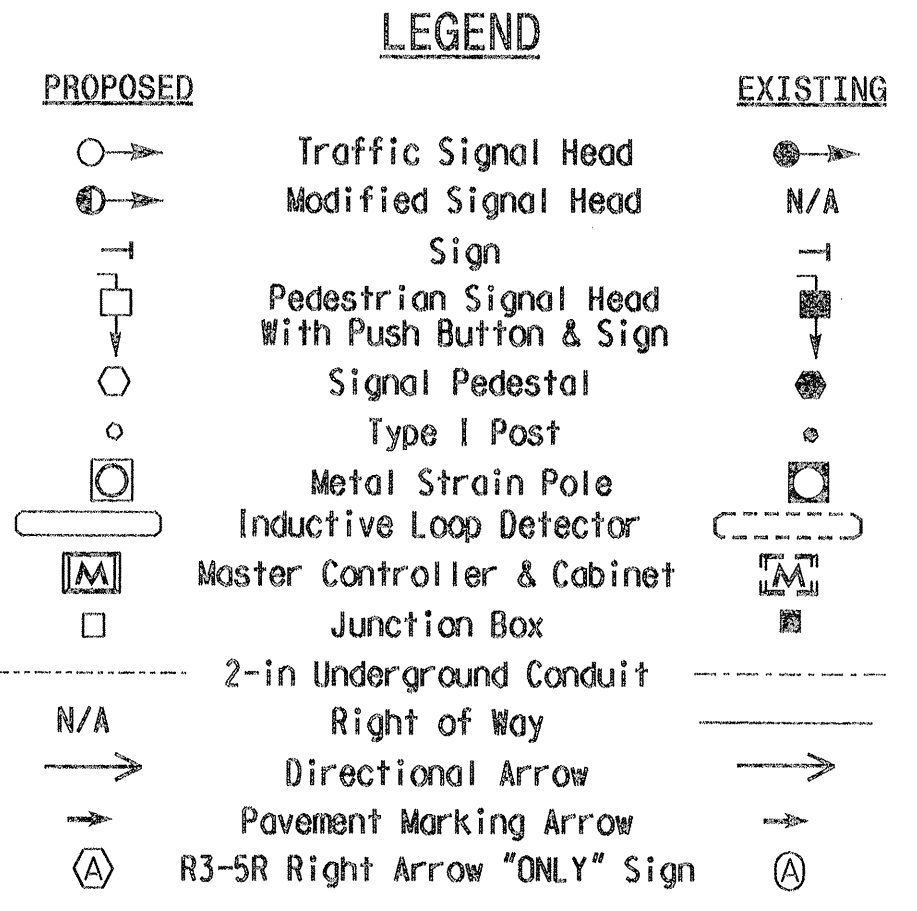
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do Not Program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 may be lagged.
- Reposition existing signalheads numbered 21 and 42.
- Set all detectors to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated Signalsystem timing values supersede these values.
- Closed loop system data:
Master Asset #: 1040
Controller Asset #: 1205
- Pedestrian pushbuttons shall be vibro-tactile.
- All Accessible Pedestrian Signals shall use the "Rapid Tick" sound.
- Pushbutton locations must be approved in the Field by the Division Traffic Engineer prior to installation.



FEATURE	OASIS 2070L TIMING CHART							
	PHASE							
	1	2	3	4	5	6	8	
Min Green 1*	7	12	7	7	7	12	7	
Extension 1*	2.0	3.0	2.0	2.0	2.0	3.0	2.0	
Max Green 1*	15	75	15	25	15	75	25	
Yellow Clearance	3.0	4.1	3.0	3.9	3.0	4.1	3.9	
Red Clearance	3.5	2.8	3.3	2.6	3.3	2.8	2.6	
Walk 1*	-	7	-	7	-	7	-	
Don't Walk 1	-	25	-	28	-	19	-	
Seconds Per Actuation*	-	-	-	-	-	-	-	
Max Variable Initial*	-	-	-	-	-	-	-	
Time Before Reduction*	-	-	-	-	-	-	-	
Time To Reduce*	-	-	-	-	-	-	-	
Minimum Gap	-	-	-	-	-	-	-	
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	
Dual Entry	-	-	-	ON	-	-	ON	
Simultaneous Gap	ON	ON	ON	ON	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 MODIFICATION - FINAL DESIGN

Michael Baker Engineering, Inc.
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NC License No.: F-1084

Prepared in the Office of:

ROBERT J. DURNICK
PROFESSIONAL ENGINEER
SEAL 027742

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AT
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DIVISION 10 CABARRUS COUNTY HARRISBURG
PLAN DATE: NOVEMBER 2012 REVIEWED BY: R DUBNICKA
PREPARED BY: K M CORY REVIEWED BY:

SEAL

ROBERT J. DURNICK
PROFESSIONAL ENGINEER
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REVISIONS

NO.	DESCRIPTION	INIT.	DATE

SCALE

0 50
1" = 50'

DATE: 3-12-13

SIGNATURE: Robert J. Durnick

SIG. INVENTORY NO. 10-1205

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

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8 AND 9.
- 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).

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

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1205
DESIGNED: 11-2012
SEALED: 03-12-2013
REVISED: _____

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)...0.0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0

PRESS '+'

NOTICE GREEN FLASH

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)...0.0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0

PRESS '+'

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

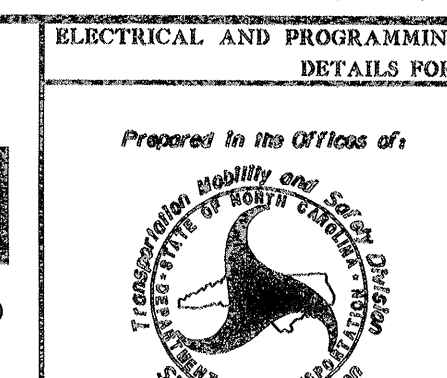
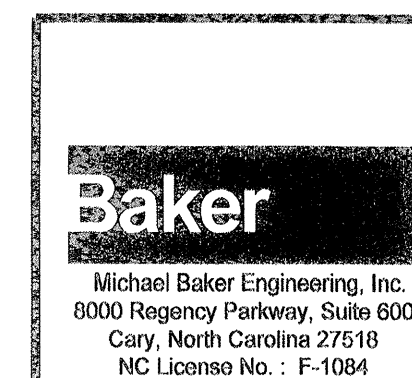
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Provide a dedicated pair of wires from the cabinet to each push button.
- Mount Fail-Safe Interconnect Terminal Board on right rear side of cabinet (above service panel).
- Wire push buttons and Central Control Unit (CCU) per Polara Installation Manual instructions.
- Use Controller Receptacle to power CCU. Do not use Equipment Receptacle which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the Polara system unless cabinet is re-wired for standard button operation.

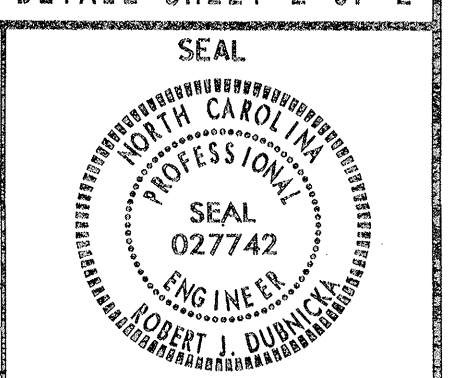
SIGNAL MODIFICATION FINAL DESIGN

ELECTRICAL DETAIL SHEET 2 OF 2



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