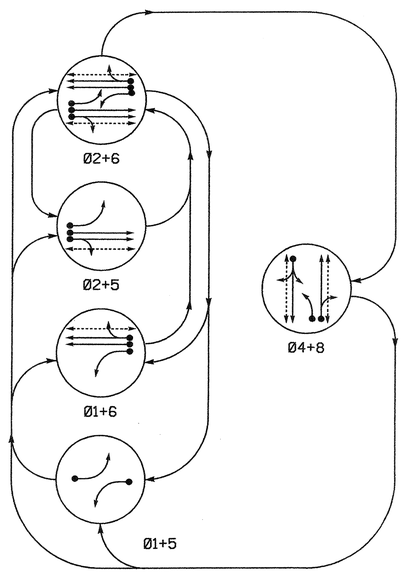
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

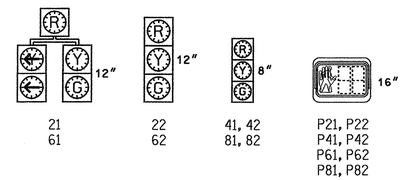
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	PHASE 01+6	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
61	R	R	G	R	G	R	Y
62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

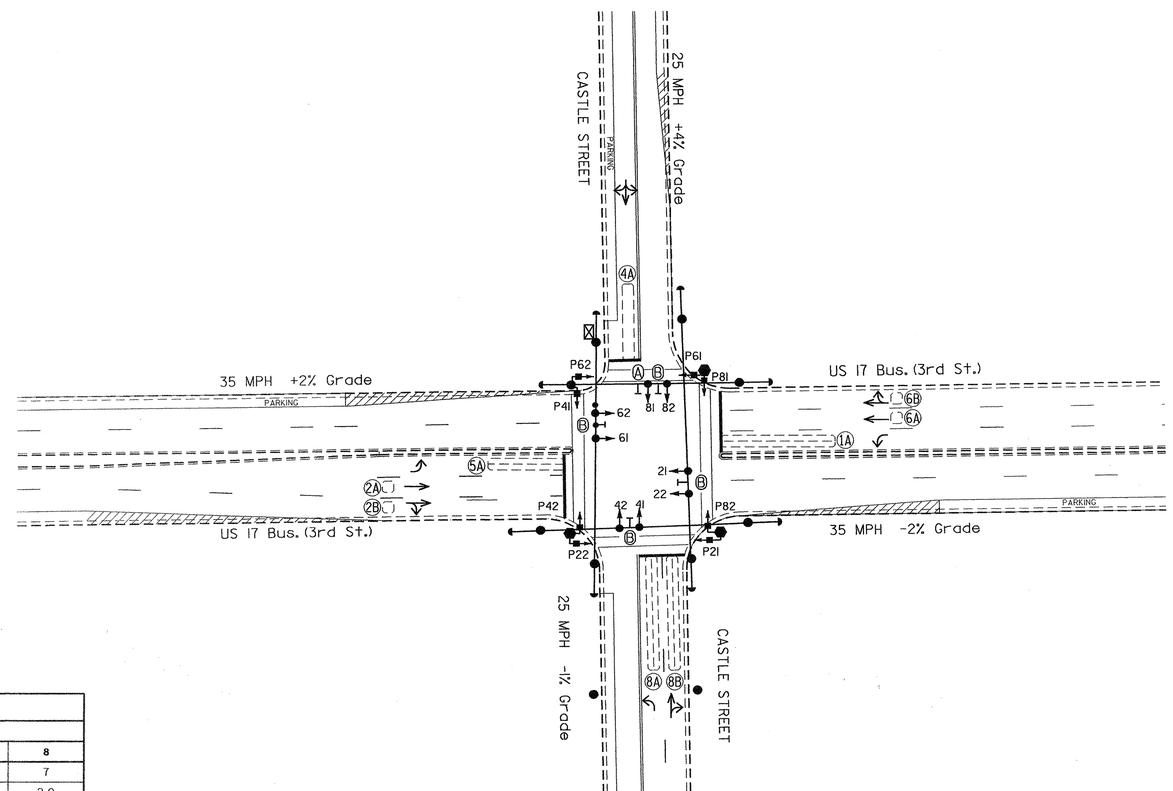
SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	-	—	—	-	Y
2A, 2B	6X6	90	Existing	-	2	Y	Y	-	—	—	-	Y
4A	6X40	0	Existing	-	4	Y	Y	-	—	5	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	—	15	-	Y
					2	Y	Y	-	—	—	-	Y
6A, 6B	6X6	90	Existing	-	6	Y	Y	-	—	—	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	—	3	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	—	10	-	Y



5 Phase
Fuly Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Existing Left Arrow "ONLY" Sign (R3-5L) may be removed.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0011.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Pedestrian Signal Pedestal	
	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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Street Sign	B

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	3.0	2.0	2.0	3.0	2.0
Max Green 1 *	20	40	20	20	40	20
Yellow Clearance	3.0	3.7	3.0	3.0	4.0	3.2
Red Clearance	2.6	1.6	2.6	2.3	1.6	2.6
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	4	4	-	4	4
Don't Walk 1	-	10	16	-	8	16
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40

US 17 Bus. (3rd Street)
at
Castle Street

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2007	PREPARED BY:	Sterling
PREPARED BY:	J Navarrete	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/24/08 DATE
SIG. INVENTORY NO. 03-0011

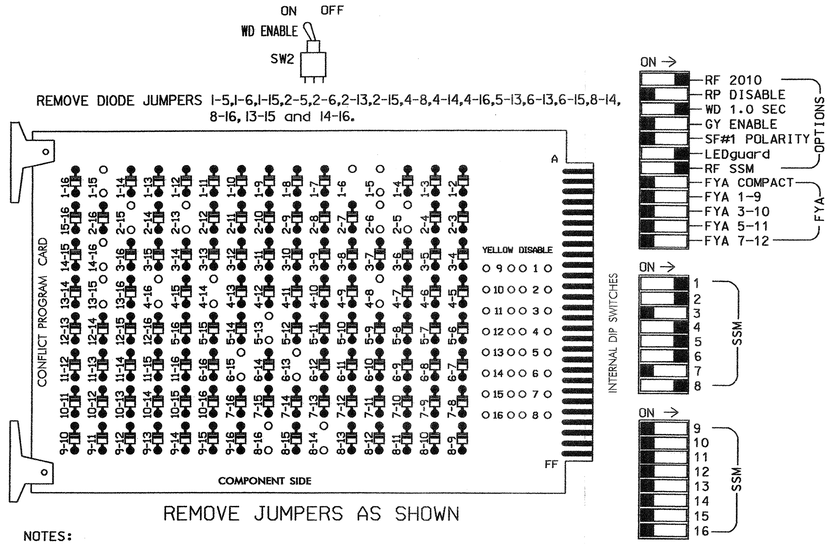
24-APR-2008 08:54
s:\its signals\workgroups\alexander\u-5017 (wilmington city system)\03-0011\03011_sig_dsn.20080424.dgn
rziemba

PROJECT REFERENCE
U-5017B

S16. 2

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 3,7,9,10, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
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	P21, P22	NU	41,42	P41, P42	21	61,62	P61, P62	NU	81,82	P81, P82
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
✋			113			104			119			110
🚶			115			106			121			112

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S5,S6,S6P,S8,S8P
PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,8,8PED
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+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	SLOT	Ø1 1A	Ø2 2A,2B	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	EMPTY	Ø6 1A	NOT USED	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø5 5A	Ø6 6A,6B	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø2 5A	NOT USED	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A,6B	TB3-9,10	J3U	64	26	36	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			10
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

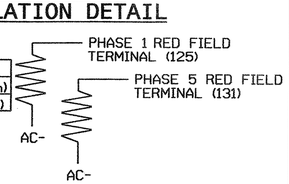
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

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: 03-0011
DESIGNED: May 2007
SEALED: 4-24-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17 Bus. (3rd Street) at Castle Street

Division 03 New Hanover County Wilmington

PLAN DATE: 4-22-08 REVIEWED BY: D.T. Joyce DTJ
PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 4/29/08 DATE
SIG. INVENTORY NO. 03-0011

29-APR-2008 09:14
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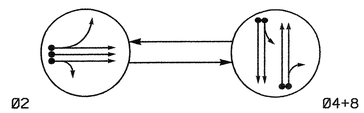
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5B.3

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

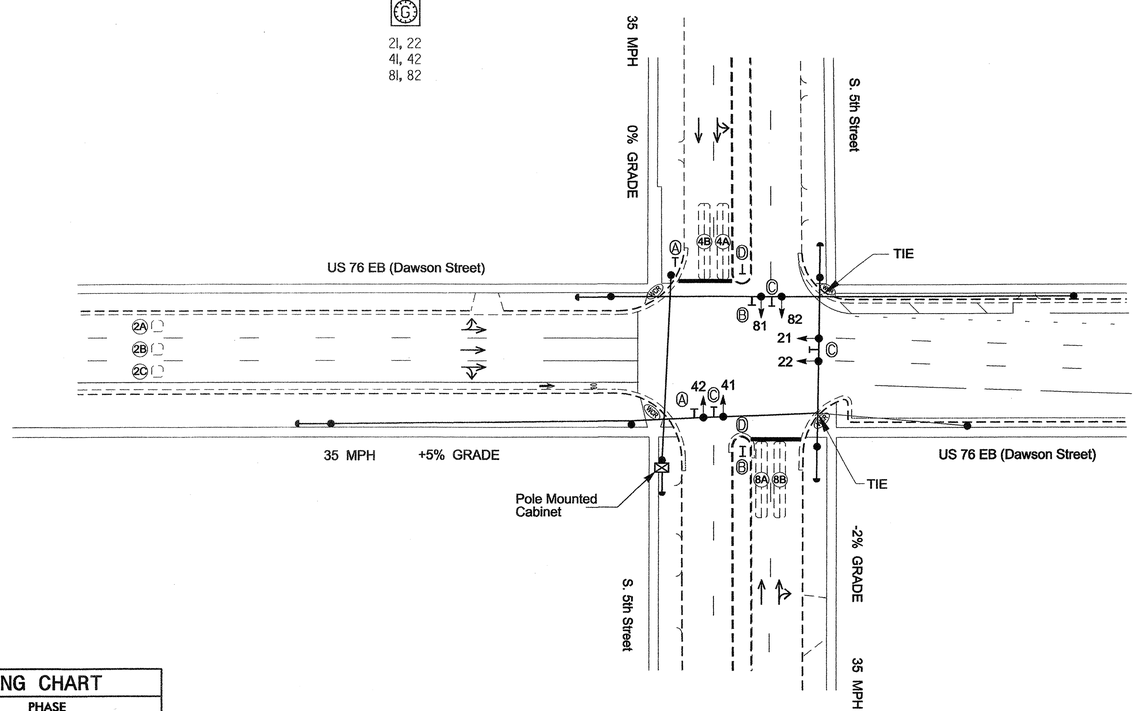
SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

12"

21, 22
41, 42
81, 82



2070L 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
2A,2B,2C	6X6	250	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	——	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	——	10	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0025.

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	10	4	4
Extension 1 *	6.0	2.0	2.0
Max Green 1 *	30	15	15
Yellow Clearance	3.6	3.8	4.0
Red Clearance	1.7	1.2	1.3
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	1.3	-	-
Max Variable Initial *	24	-	-
Time Before Reduction *	10	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.0	-	-
Recall Mode	MIN RECALL	-	-
Vehicle Call Memory	YELLOW	-	-
Dual Entry	-	ON	ON
Simultaneous Gap	ON	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	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Street Sign	C
D	Keep Right Sign (R4-7)	D

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
UNIVERSITY OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40
1"=40'

US 76 EB (Dawson Street)
at
S. 5th Street

Division 3 New Hanover County Wilmington

PLAN DATE:	December 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/24/08 DATE
SIG. INVENTORY NO. 03-0025

24-APR-2008 17:22
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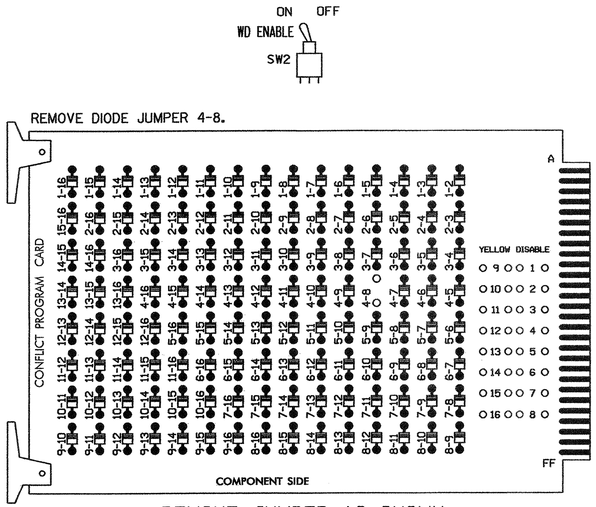
rziemba

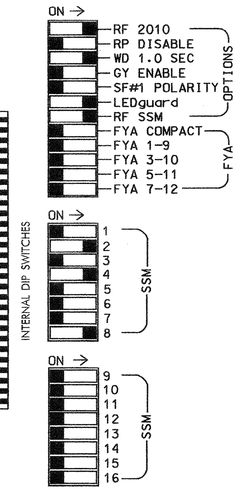
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16. 4

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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 1,3,5,6,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 2, on the controller unit, for Variable Initial and Gap Reduction.
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.	NU	21,22	NU	NU	41,42	NU	NU	NU	NU	NU	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S8
PHASES USED.....2,4,8
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0025
DESIGNED: December 2007
SEALED: 4-24-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

US 76 EB (Dawson Street)
at
S. 5th Street

Division 03 New Hanover County Wilmington

PLAN DATE:	4-21-08	REVIEWED BY:	T. Vogel
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

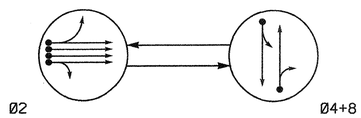
John T. Rowe Jr. 4-30-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0025

25-APR-2008 14:17
s:\ets\signal&workgroups\sig mgmt\klooz\03025_sm.ele.2008mod.dgn
aklooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.5

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	PHASE FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R
81, 82	R	G	R

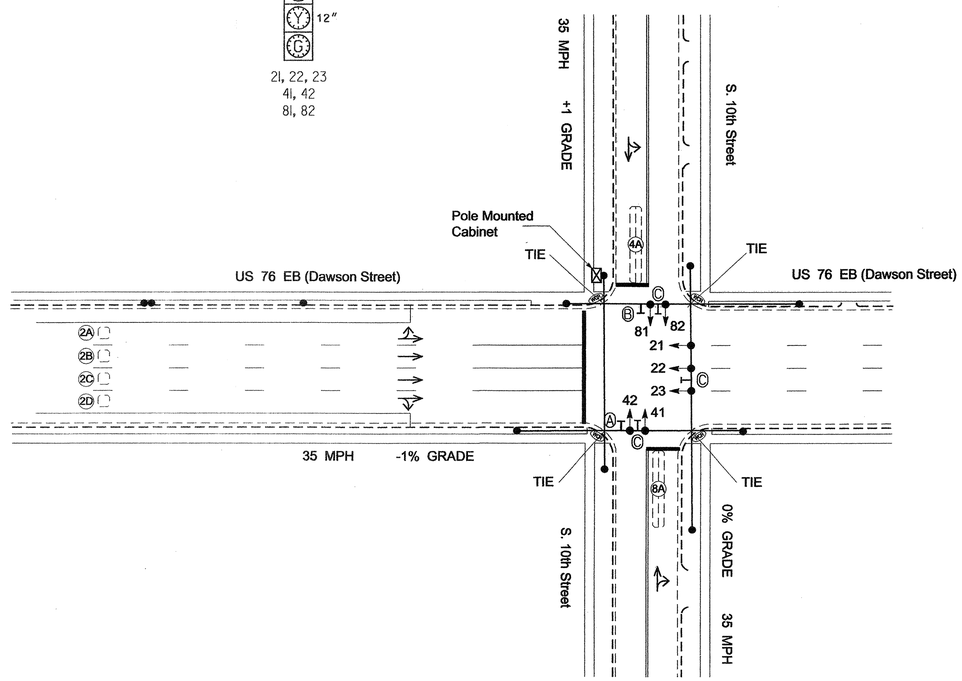
2070L LOOP & DETECTOR INSTALLATION

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
2A, 2B	6X6	255	Existing	-	2	Y	Y	-	——	——	-	Y
2C, 2D	6X6	255	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	10	-	Y

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22, 23
41, 42
81, 82



2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0026.

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	
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
Ⓒ	Street Sign	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	10	7	7
Extension 1 *	2.0	2.0	2.0
Max Green 1 *	30	15	15
Yellow Clearance	3.9	3.8	3.8
Red Clearance	1.0	1.5	1.5
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	1.3	-	-
Max Variable Initial *	24	-	-
Time Before Reduction *	10	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.0	-	-
Recall Mode	MIN RECALL	-	-
Vehicle Call Memory	YELLOW	-	-
Dual Entry	-	ON	ON
Simultaneous Gap	ON	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.

Signal Upgrade

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

SCALE 0 40 1"=40'

US 76 EB (Dawson Street)
at
S. 10th Street

Division 3 New Hanover County Wilmington

PLAN DATE: December 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

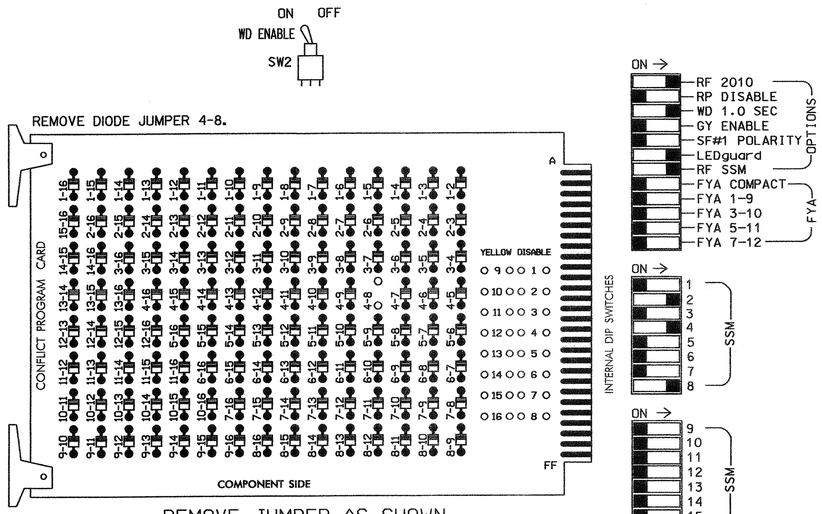
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIENDA
SIGNATURE DATE 4/24/08
SIG. INVENTORY NO. 03-0026

30-APR-2008 17:44
s:\its signals\workgroups\alexander\u-5017 (wilmington city system)\03-0026\03026_sig_dsn_20080424.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.6

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.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB21-3,4	I2U	39	1	2	2	Y	Y			
2C,2D	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			10

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,3,5,6,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 2, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S8
PHASES USED.....2,4,8
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.	NU	21 22,23	NU	NU	41,42	NU	NU	NU	NU	NU	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0026
DESIGNED: December 2007
SEALED: 4-24-08
REVISED: N.A.

Signal Upgrade

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

122 N. McDowell St., Raleigh, NC 27603

US 76 EB (Dawson Street)
at
S. 10th Street

Division 03 New Hanover County Wilmington

PLAN DATE:	4-22-08	REVIEWED BY:	T. Vaga
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

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

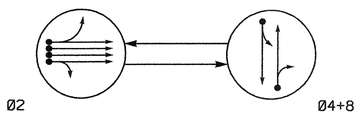
SIGNATURE DATE 4-30-08

SIG. INVENTORY NO. 03-0026

25-APR-2008 14:18
s:\traffic\signals\workgroups\sig mgmt\0026\03026_sm.ele.2008mod.dgn
$$$$USER

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.7

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22, 23
41, 42
81, 82

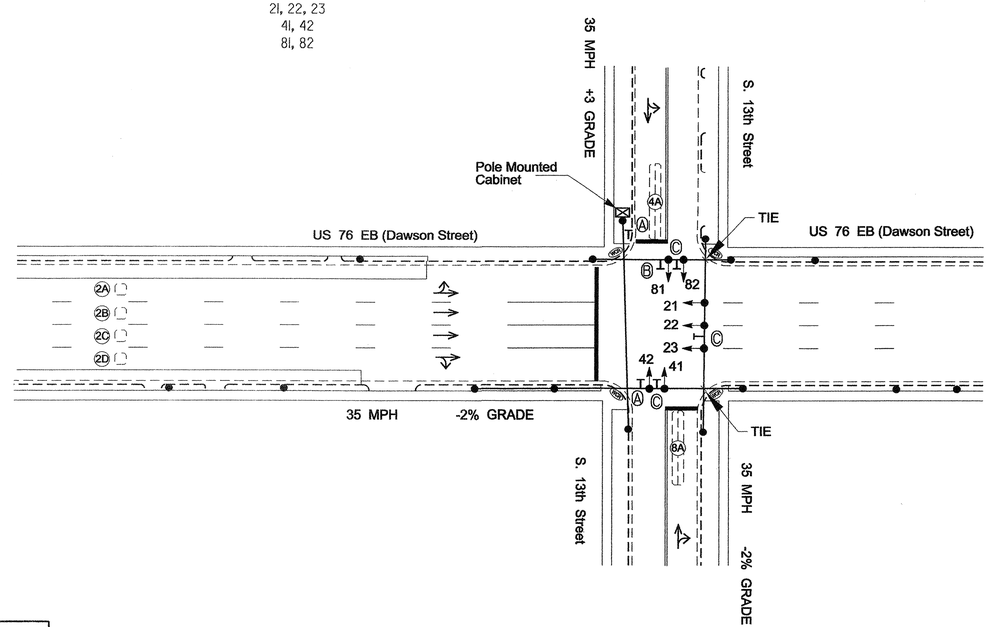
2070L LOOP & DETECTOR INSTALLATION

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
2A, 2B	6X6	250	Existing	-	2	Y	Y	-	——	——	-	Y
2C, 2D	6X6	250	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	3	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	10	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0027.



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	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Street Sign	C

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	10	7	7
Extension 1 *	6.0	2.0	2.0
Max Green 1 *	30	15	15
Yellow Clearance	4.0	3.7	4.0
Red Clearance	1.1	1.5	1.5
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	1.3	-	-
Max Variable Initial *	24	-	-
Time Before Reduction *	10	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.0	-	-
Recall Mode	MIN RECALL	-	-
Vehicle Call Memory	YELLOW	-	-
Dual Entry	-	ON	ON
Simultaneous Gap	ON	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.

Signal Upgrade

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

SCALE 0 40 1"=40'

US 76 EB (Dawson Street)
at
S. 13th Street

Division 3 New Hanover County Wilmington

PLAN DATE:	December 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

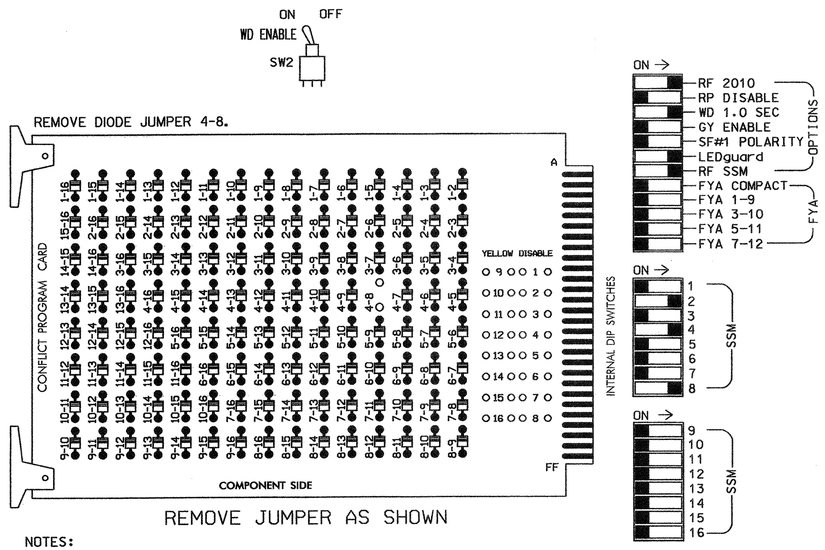
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/24/08 DATE
SIG. INVENTORY NO. 03-0027

24-APR-2008 17:31
s:\traffic\signals\wbd\kgroupsw\alexanderau-5017 (wilmington city system\W03-0027\W03027_sig_dsn_20080424.dgn
Sterling

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	516.8

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB21-3,4	I2U	39	1	2	2	Y	Y			
2C,2D	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			3
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			10

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,3,5,6,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 2, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S8
PHASES USED.....2,4,8
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.	NU	21 22,23	NU	NU	41,42	NU	NU	NU	NU	NU	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0027
DESIGNED: December 2007
SEALED: 4-24-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 76 EB (Dawson Street)
at
S. 13th Street

Division 03 New Hanover County Wilmington

PLAN DATE: 4-22-08 REVIEWED BY: T. Jyu
PREPARED BY: A.A. Klooz REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe Jr. 4-30-08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0027

25-APR-2008 14:20
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PROJECT REFERENCE NO.	SHEET NO.
U-5017B	516.9

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø2	Ø4	FLASH
21, 22, 23, 24	G	R	Y
41, 42	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

R
Y 12"
G

21, 22
23, 24
41, 42

2070L LOOP & DETECTOR INSTALLATION

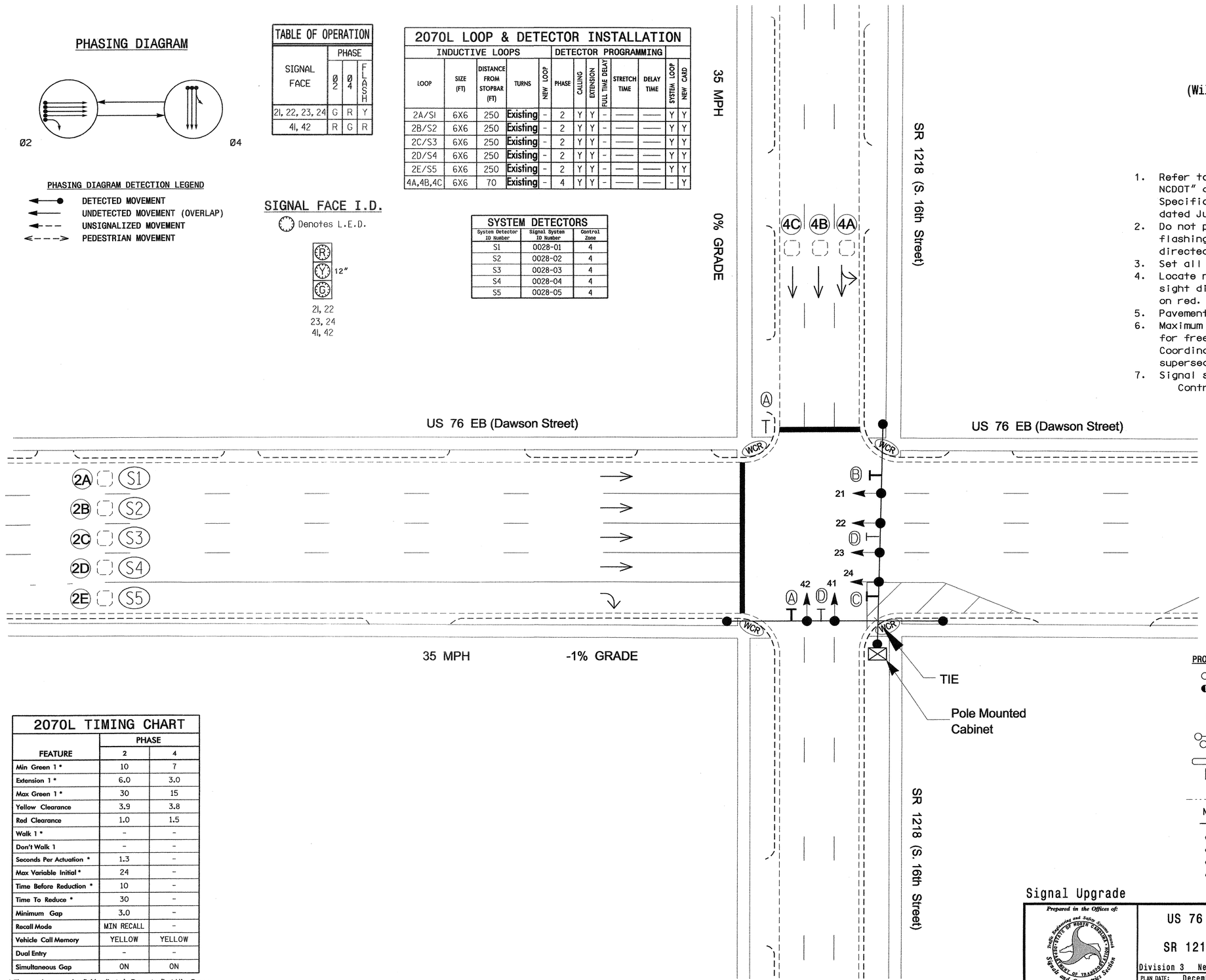
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY*	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S1	6X6	250	Existing	-	2	Y	Y	-	——	——	Y	Y
2B/S2	6X6	250	Existing	-	2	Y	Y	-	——	——	Y	Y
2C/S3	6X6	250	Existing	-	2	Y	Y	-	——	——	Y	Y
2D/S4	6X6	250	Existing	-	2	Y	Y	-	——	——	Y	Y
2E/S5	6X6	250	Existing	-	2	Y	Y	-	——	——	Y	Y
4A,4B,4C	6X6	70	Existing	-	4	Y	Y	-	——	——	-	Y

SYSTEM DETECTORS		
System Detector ID Number	Signal System ID Number	Control Zone
S1	0028-01	4
S2	0028-02	4
S3	0028-03	4
S4	0028-04	4
S5	0028-05	4

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
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 #: 0028.



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	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	Street Sign	D

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4
Min Green 1 *	10	7
Extension 1 *	6.0	3.0
Max Green 1 *	30	15
Yellow Clearance	3.9	3.8
Red Clearance	1.0	1.5
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	1.3	-
Max Variable Initial *	24	-
Time Before Reduction *	10	-
Time To Reduce *	30	-
Minimum Gap	3.0	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	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.

Signal Upgrade

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

SCALE 0 20 1"=20'

US 76 EB (Dawson Street)
at
SR 1218 (S. 16th Street)

Division 3 New Hanover County Wilmington

PLAN DATE:	December 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE
DATE 5/1/08
SIG. INVENTORY NO. 03-0028

01-MAY-2008 17:35
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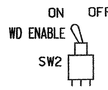
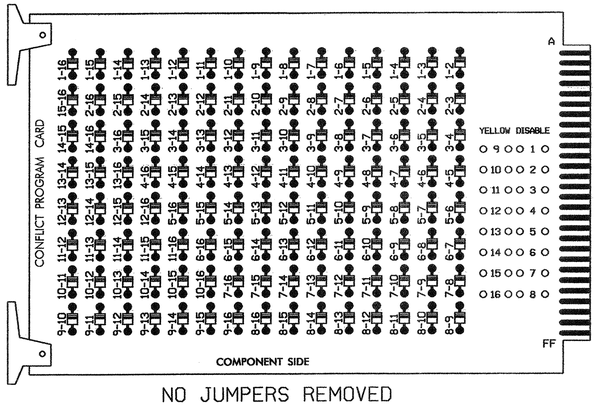
rziemba2

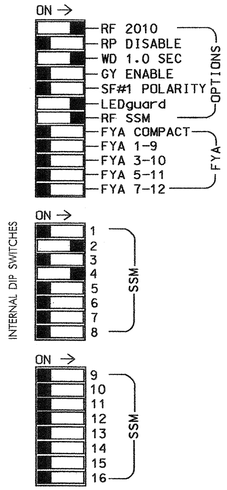
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.10

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

set switches as shown







NO JUMPERS REMOVED

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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	NOT USED	Ø 2/SYS 2A/S1	NOT USED	Ø 4 4A,4B,4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L	Ø 2/SYS 2C/S3	Ø 2/SYS 2B/S2	Ø 2/SYS 2D/S4	Ø 2/SYS 2E/S5										ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2C/S3	TB23-1,2	I1L	47	9	22	2/SYS	Y	Y			
2A/S1	TB21-3,4	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB23-3,4	I2L	43	5	12	2/SYS	Y	Y			
2D/S4	TB23-5,6	I3L	49	11	24	2/SYS	Y	Y			
4A,4B,4C	TB21-7,8	I4U	41	3	4	4	Y	Y			
2E/S5	TB23-7,8	I4L	45	7	14	2/SYS	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,3,5,6,7,8, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phase 2, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4
PHASES USED.....2,4
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.	NU	21,22 23,24	NU	NU	41,42	NU	NU	NU	NU	NU	NU	NU
RED		128			101							
YELLOW		129			102							
GREEN		130			103							
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0028
DESIGNED: December 2007
SEALED: 5-1-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 76 EB (Dawson Street)
at
SR 1218 (S. 16th Street)

Division 03 New Hanover County Wilmington

PLAN DATE: 9-28-07 REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
Department of Transportation State of North Carolina
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

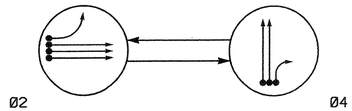
SIGNATURE DATE 5/1/08

SIG. INVENTORY NO. 03-0028

06-MAY-2008 09:42
s:\ts signals\workgroups\sig management\spaulding\in-progress\03028_sm.ele.2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A.11

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

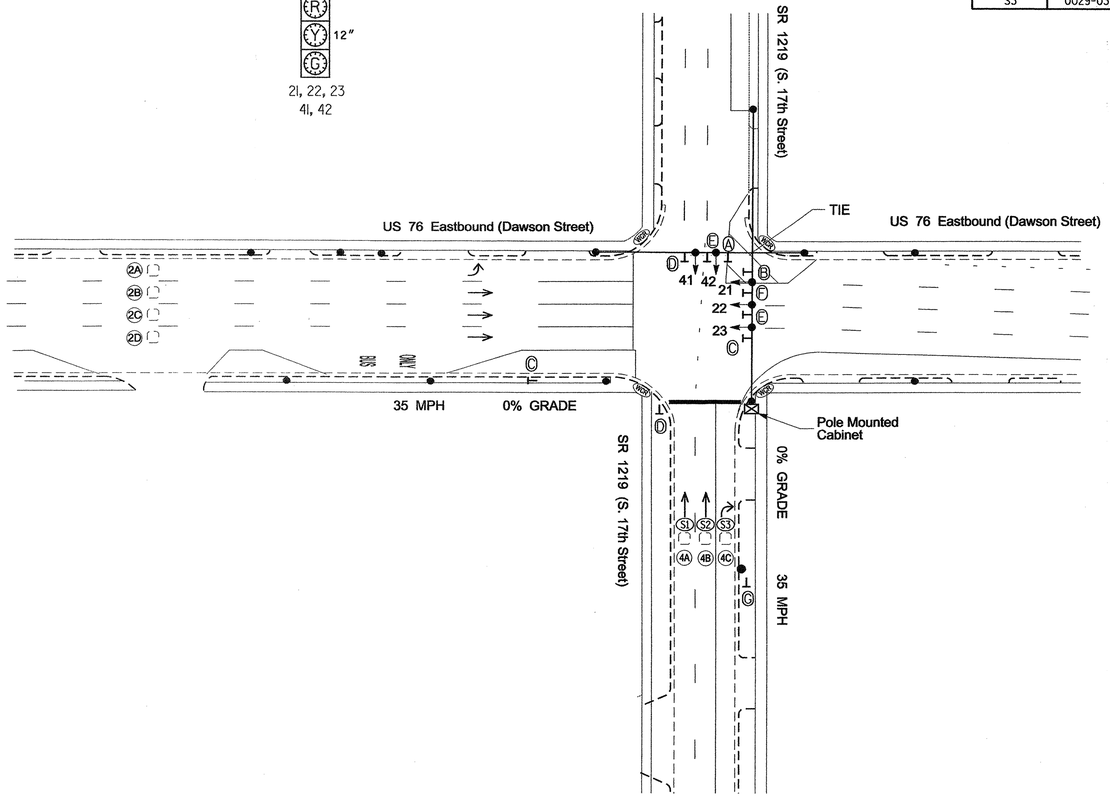
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4	FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22, 23
41, 42



2070L 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
2A, 2B	6X6	250	Existing	-	2	Y	Y	-	——	——	-	Y
2C, 2D	6X6	250	Existing	-	2	Y	Y	-	——	——	-	Y
4A/S1	6X6	70	Existing	-	4	Y	Y	-	——	——	Y	Y
4B/S2	6X6	70	Existing	-	4	Y	Y	-	——	——	Y	Y
4C/S3	6X6	70	Existing	-	4	Y	Y	-	——	——	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0029-01	4
S2	0029-02	4
S3	0029-03	4

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
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 #: 0029.

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4
Min Green 1 *	10	7
Extension 1 *	6.0	3.0
Max Green 1 *	30	15
Yellow Clearance	3.8	3.8
Red Clearance	1.2	1.6
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	1.3	-
Max Variable Initial *	24	-
Time Before Reduction *	10	-
Time To Reduce *	30	-
Minimum Gap	3.0	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	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	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	Left Arrow "ONLY" Sign (R3-5L)	B
C	No Right Turn Sign (R3-1)	C
D	No Left Turn Sign (R3-2)	D
E	Street Sign	E
F	Thru Arrow "ONLY" Sign (R3-5A)	F
G	"Right Lane MUST Turn Right" Sign (R3-7R)	G

Signal Upgrade

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

SCALE 0 40
1"=40'

US 76 EB (Dawson Street)
at
SR 1219 (S. 17th Street)

Division 3 New Hanover County Wilmington

PLAN DATE: December 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

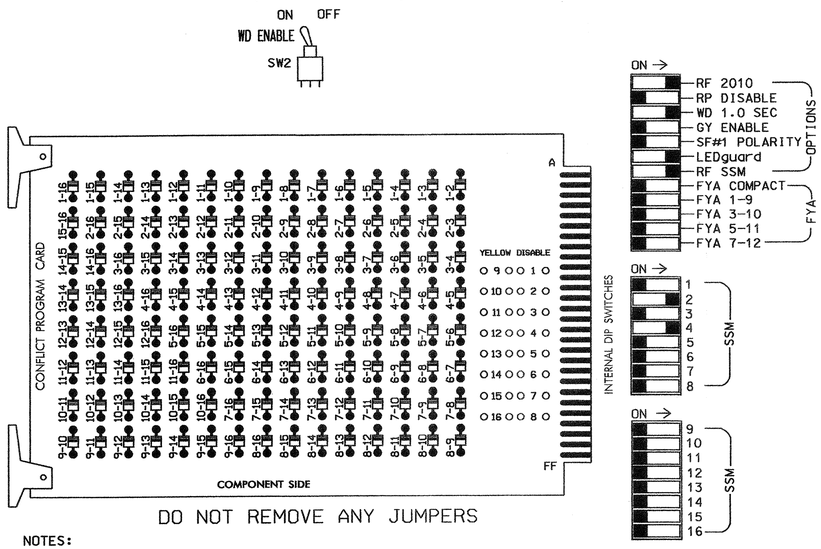
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/1/08 DATE
SIG. INVENTORY NO. 03-0029

01-MAY-2008 17:50
s:\its signals\workgroups\wilexander\u-5017 (wilmington city system)\03-0029\030029_sig_dsn_20080501.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.12

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



DO NOT REMOVE ANY JUMPERS

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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	ø 2 2A,2B	NOT USED	ø 4/SYS 4A/S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		ø 2 2C,2D	ø 4/SYS 4C/S3	ø 4/SYS 4B/S2										ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB21-3,4	I2U	39	1	2	2	Y	Y			
2C,2D	TB23-3,4	I2L	43	5	12	2	Y	Y			
4C/S3	TB23-5,6	I3L	49	11	24	4/SYS	Y	Y			
4A/S1	TB21-7,8	I4U	41	3	4	4/SYS	Y	Y			
4B/S2	TB23-7,8	I4L	45	7	14	4/SYS	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,3,5,6,7,8, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phase 2, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4
PHASES USED.....2,4
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.	NU	21 22,23	NU	NU	41,42	NU	NU	NU	NU	NU	NU	NU
RED		128			101							
YELLOW		129			102							
GREEN		130			103							
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0029
DESIGNED: December 2007
SEALED: 5/01/08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 76 EB (Dawson Street)
at
SR 1219 (S. 17th Street)

Division 03 New Hanover County Wilmington

PLAN DATE:	4-29-08	REVIEWED BY:	T. Vaga
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

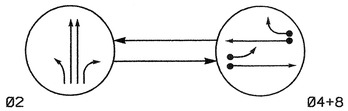
Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe, Jr. 5-12-08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0029

07-MAY-2008 10:30
S:\ITS signals\workgroups\sig mon\klooz\030029_sn_ele_2008mod.dgn
dk:\02

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	6.13

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R
81, 82	R	G	R

2070L LOOP & DETECTOR INSTALLATION

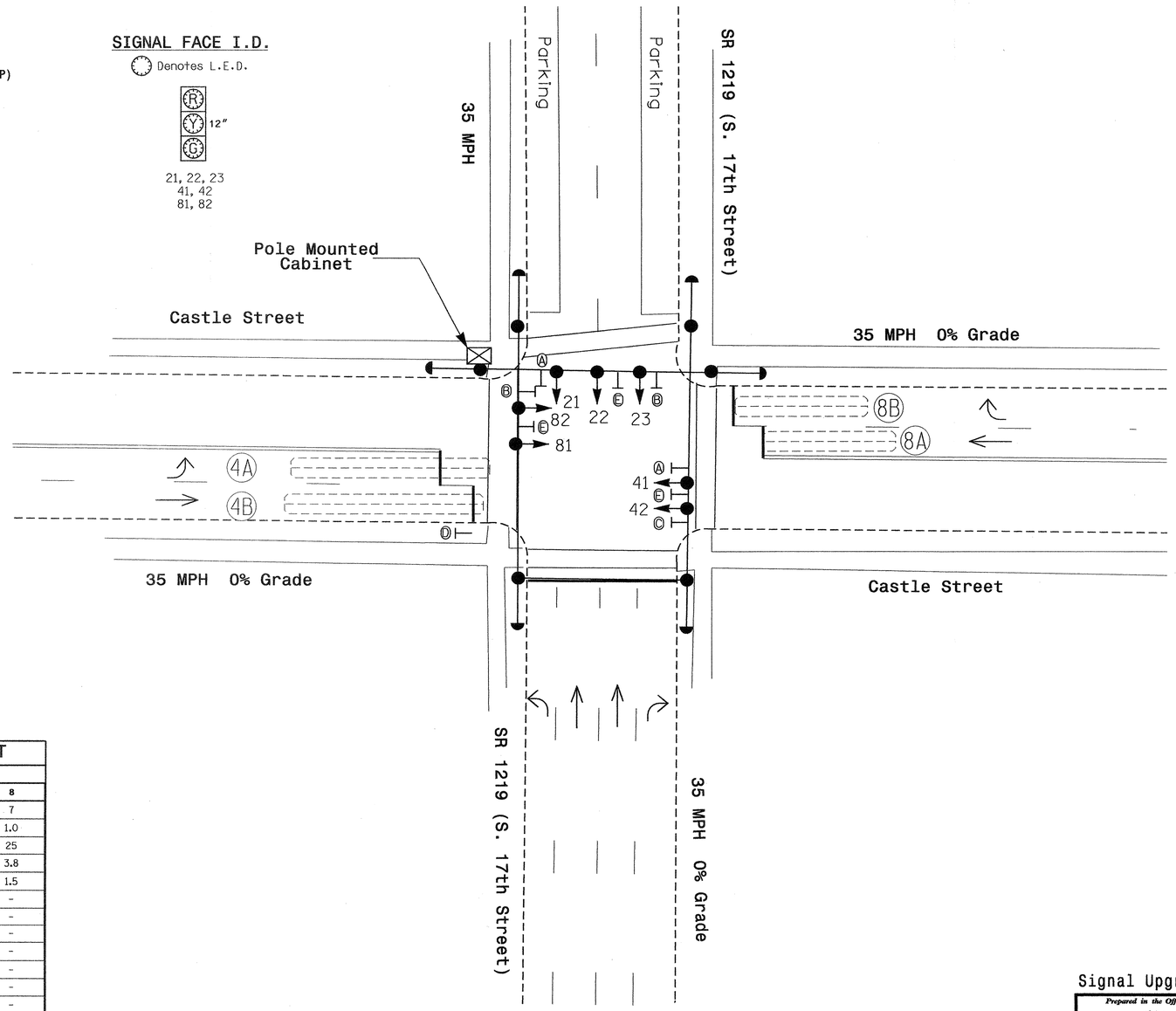
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6X60	+15	2-4-2	–	4	Y	Y	–	–	3	–	Y
4B	6X60	+3	2-4-2	–	4	Y	Y	–	–	–	–	Y
8A	6X40	0	2-4-2	–	8	Y	Y	–	–	–	–	Y
8B	6X40	0	2-4-2	–	8	Y	Y	–	–	15	–	Y

2 Phase
Semi-Actuated
(Wilmington Signal System)

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22, 23
41, 42
81, 82



NOTES

1. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
2. Set all detector units to presence mode.
3. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Lane control signs may be removed.
6. Pavement markings are existing.
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: # 0030.

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	10	7	7
Extension 1 *	0.0	1.0	1.0
Max Green 1 *	45	25	25
Yellow Clearance	3.8	3.8	3.8
Red Clearance	1.4	1.5	1.5
Walk 1 *	–	–	–
Don't Walk 1	–	–	–
Seconds Per Actuation *	–	–	–
Max Variable Initial *	–	–	–
Time Before Reduction *	–	–	–
Time To Reduce *	–	–	–
Minimum Gap	–	–	–
Recall Mode	MAX RECALL	–	–
Vehicle Call Memory	–	–	–
Dual Entry	–	ON	ON
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.

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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	No Right Turn Sign (R3-1)	C
D	"LEFT LANE MUST TURN LEFT" Sign (R3-7L)	D
E	Street Sign	E

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

SR 1219 (S. 17th Street) at Castle Street

Division 3 New Hanover County Wilmington

PLAN DATE: December 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

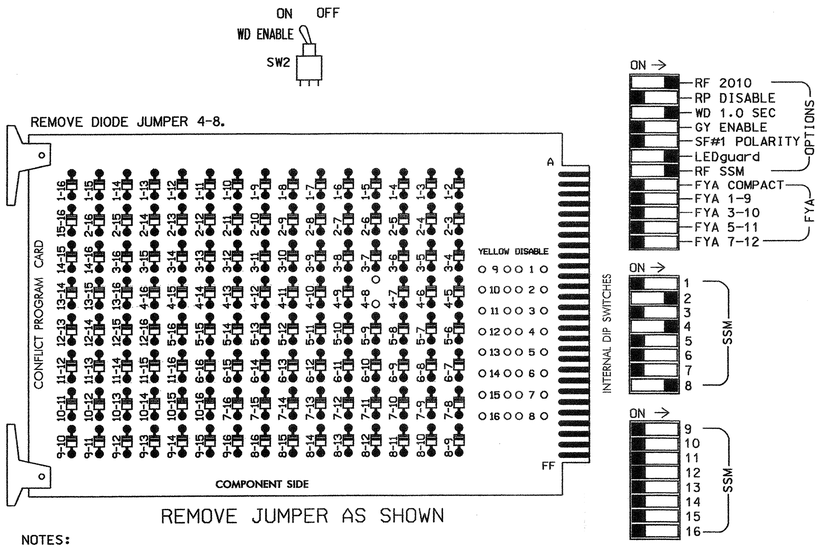
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 2/25/08 DATE
SIG. INVENTORY NO. 03-0030

25-FEB-2008 17:19
s:\traffic\signals\workgroups\alexander\u-5017 (wilmington city system)\03-0030\03-0030_sig_dsn_20080226.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5G.14

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L				ø4 4B				ø8 8B						ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			3
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			15

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,3,5,6,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S8
PHASES USED.....2,4,8
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.	NU	21 22,23	NU	NU	41,42	NU	NU	NU	NU	NU	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0030
DESIGNED: December 2007
SEALED: 2-26-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1219 (S. 17th Street)
at
Castle Street

Division 03 New Hanover County Wilmington

PLAN DATE: 02-22-08 REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 2/28/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0030

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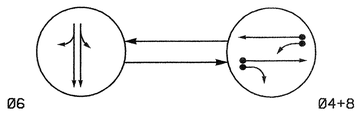
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.15

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	FLASH
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

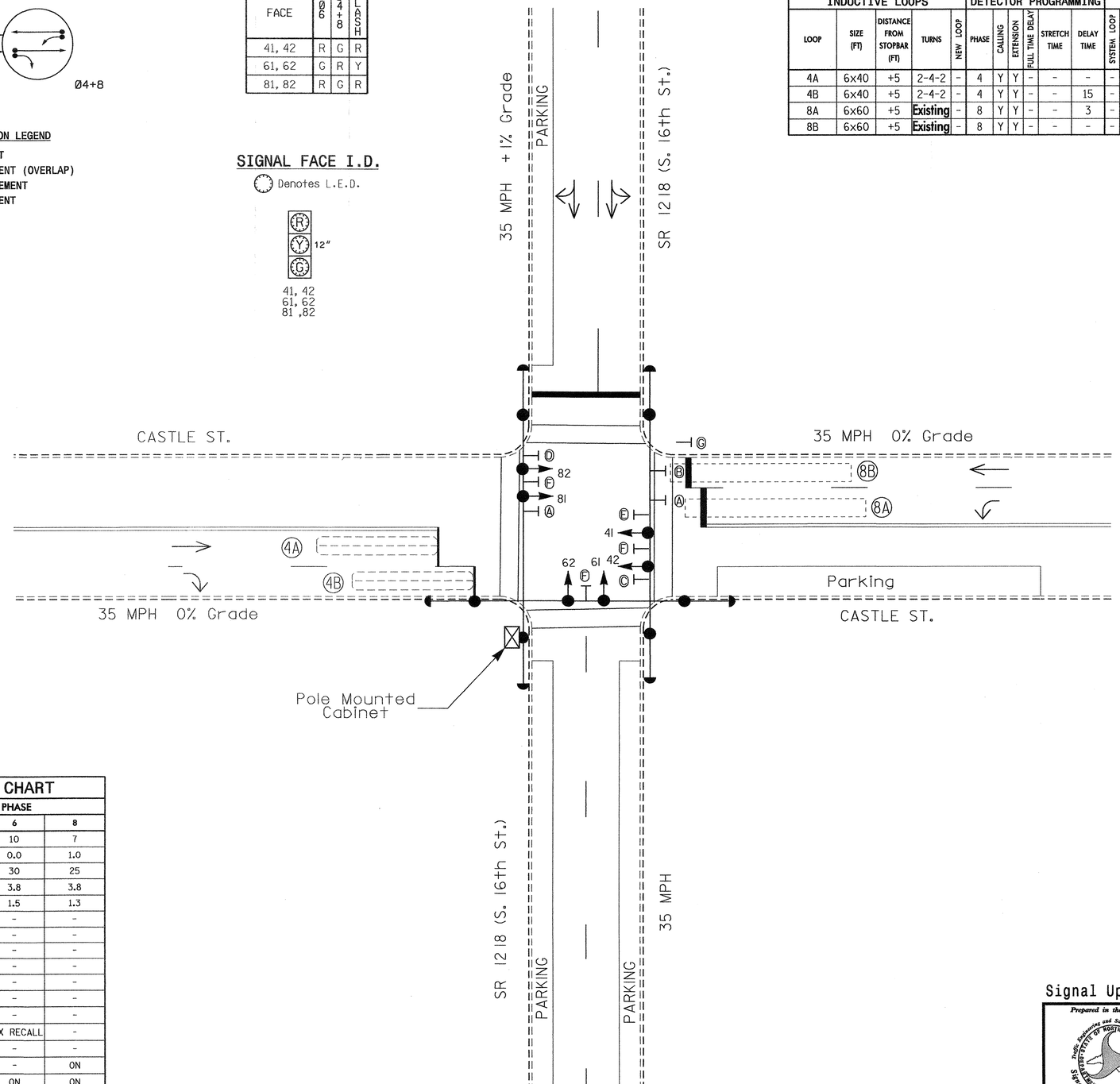
SIGNAL FACE I.D.

Denotes L.E.D.

41, 42
61, 62
81 ,82

2070L 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
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	+5	2-4-2	-	4	Y	Y	-	-	15	-	Y
8A	6x60	+5	Existing	-	8	Y	Y	-	-	3	-	Y
8B	6x60	+5	Existing	-	8	Y	Y	-	-	-	-	Y



2 Phase Semi-Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Existing signal heads 81 and 82 have backplates.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Existing lane control signs may be removed.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0031.

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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Through Arrow "ONLY" Sign (R3-5A)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	No Right Turn Sign (R3-1)	D
E	No Left Turn Sign (R3-2)	E
F	Street Sign	F
G	"LEFT LANE MUST TURN LEFT" Sign (R3-7L)	G

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7
Extension 1 *	1.0	0.0	1.0
Max Green 1 *	25	30	25
Yellow Clearance	3.8	3.8	3.8
Red Clearance	1.2	1.5	1.3
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	MAX RECALL	-
Vehicle Call Memory	-	-	-
Dual Entry	ON	-	ON
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.

Signal Upgrade

Prepared in the Offices of:
State Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20

SR 1218 (S. 16th Street) at Castle Street

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2007	PREPARED BY:	Sterling
PREPARED BY:	J Navarrete	REVIEWED BY:	

REVISIONS	INIT.	DATE

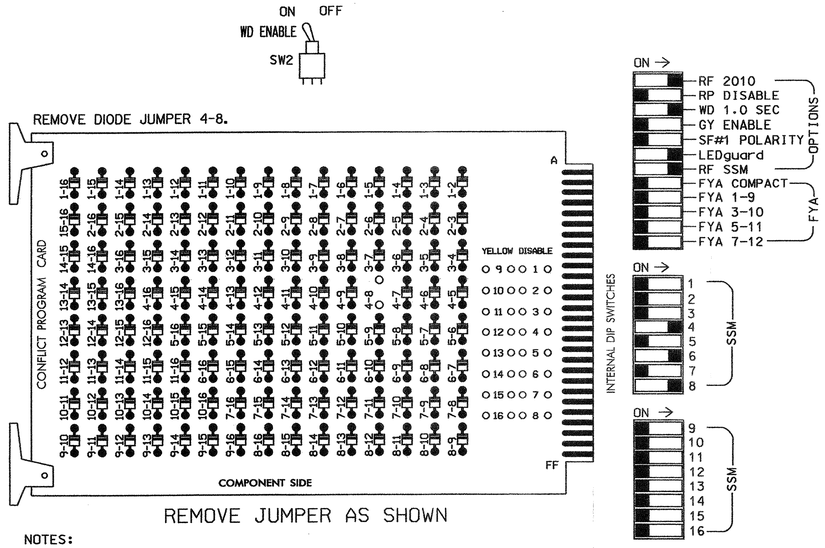
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. TIEMEYER
SIGNATURE DATE 4/2/08
SIG. INVENTORY NO. 03-0031

02-APR-2008 17:17
s:\traffic\signals\work\groups\wilmington\alexander\u-5017 (wilmington city system)\03-0031\03031_sig_dsn_20080402.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.16

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 1,2,3,5,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. 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.	NU	NU	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
L	EMPTY	EMPTY	EMPTY	Ø4 4B	EMPTY	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			15
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			

INPUT FILE POSITION LEGEND: I2L

FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0031
DESIGNED: May 2007
SEALED: 4-2-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1218 (S. 16th Street) at Castle Street

Division 03 New Hanover County Wilmington

PLAN DATE: 4-1-08 REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 4/9/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0031

04-APR-2008 11:40
s:\ts\signals\workgroups\ss\g nomespaulding\in-progress\03031_sm_ele.2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	9b.17

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø8	FLASH
21, 22	G	R	Y
61, 62	G	R	Y
81, 82, 83	R	G	R
P21, P22	W	DW	DRK
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK
P83, P84	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22
61, 62
81, 82, 83

P21, P22
P61, P62
P81, P82
P83, P84

2070L 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
8A	6X40	0	2-4-2	Y	8	Y	Y	–	–	–	–	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	–	–	–	–	Y
8C	6X40	0	2-4-2	Y	8	Y	Y	–	–	–	–	Y
8D	6X40	0	2-4-2	Y	8	Y	Y	–	–	15	–	Y
S1	6X6	+280	EXISTING	–	–	–	–	–	–	–	Y	Y
S2	6X6	+280	EXISTING	–	–	–	–	–	–	–	Y	Y

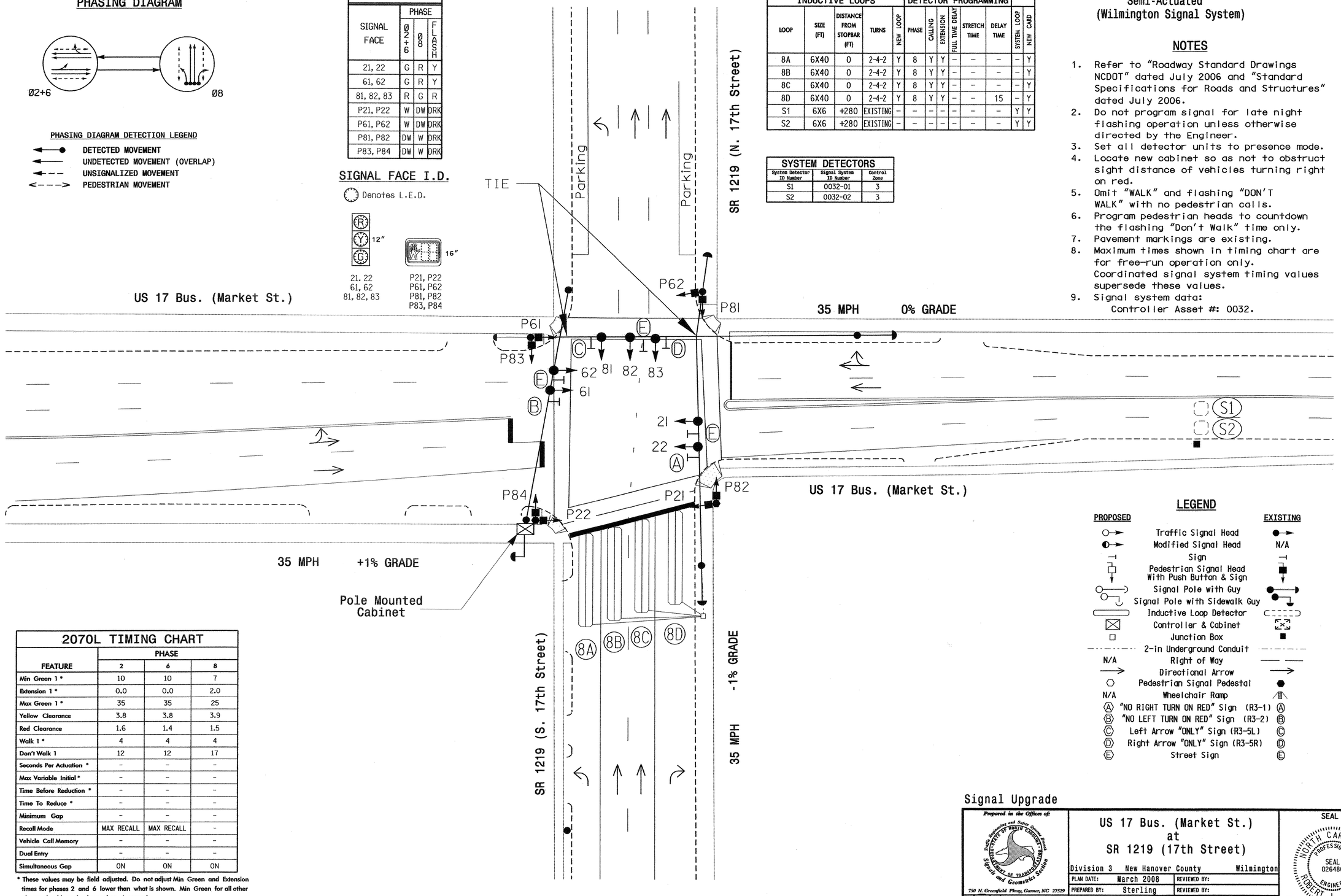
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0032-01	3
S2	0032-02	3

2 Phase Semi-Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0032.



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	
	Pedestrian Signal Pedestal	
N/A	Wheelchair Ramp	
Ⓐ	"NO RIGHT TURN ON RED" Sign (R3-1)	Ⓐ
Ⓑ	"NO LEFT TURN ON RED" Sign (R3-2)	Ⓑ
Ⓒ	Left Arrow "ONLY" Sign (R3-5L)	Ⓒ
Ⓓ	Right Arrow "ONLY" Sign (R3-5R)	Ⓓ
Ⓔ	Street Sign	Ⓔ

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	10	10	7
Extension 1 *	0.0	0.0	2.0
Max Green 1 *	35	35	25
Yellow Clearance	3.8	3.8	3.9
Red Clearance	1.6	1.4	1.5
Walk 1 *	4	4	4
Don't Walk 1	12	12	17
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MAX RECALL	MAX RECALL	-
Vehicle Call Memory	-	-	-
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

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

SCALE 0 20 1"=20'

US 17 Bus. (Market St.)
at
SR 1219 (17th Street)

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

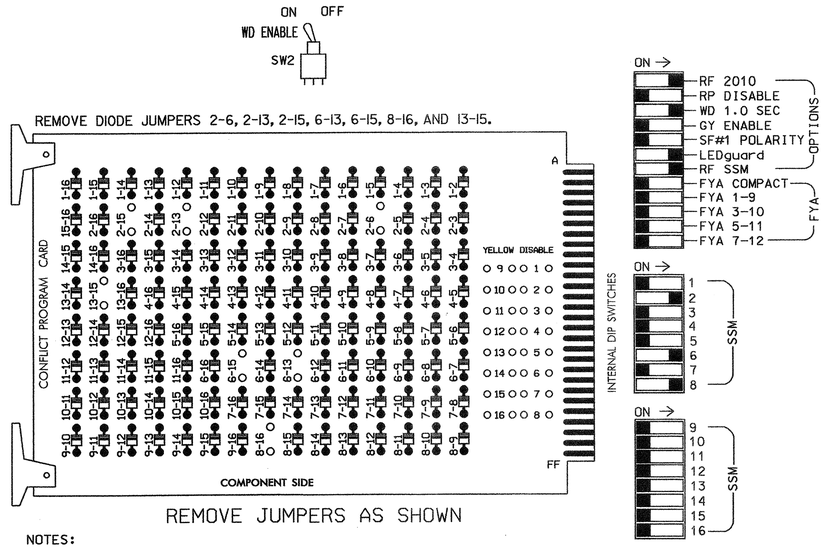
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/24/08
SIG. INVENTORY NO. 03-0032

24-JUN-2008 17:47
s:\its signalsworkgroups\walexander\wu-5017 (wilmington city system)\03-0032\03032_sig.dgn_20080623.dgn
FZ:BTBQ

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 18

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 1,3,4,5,7,9, 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, 6 and 8 for 'STARTUP PED CALL'.
6. 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.	NU	21,22	P21, P22	NU	NU	NU	NU	61,62	P61, P62	NU	81 82,83	P81,P82 P83,P84
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋			113						119			110
🚶			115						121			112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S2P,S6,S6P,S8,S8P
PHASES USED.....2,2PED,6,6PED,8,8PED
OVERLAPS.....NONE

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.

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	Ø8 8A	Ø8 8C	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
FILE "I" L						Ø8 8B	Ø8 8D	SYS. DET. S2				NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
8A	TB21-11,12	I6U	40	2	6	8	Y	Y			
8B	TB23-11,12	I6L	44	6	16	8	Y	Y			
8C	TB21-13,14	I7U	57	19	7	8	Y	Y			
8D	TB23-13,14	I7L	50	12	28	8	Y	Y			15
✱ S1	TB22-1,2	I8U	42	4	8	SYS					
✱ S2	TB24-1,2	I8L	46	8	18	SYS					
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2 PED					
P61,P62	TB22-11,12	I13U	68	30	PED 6	6 PED					
P81,P82 P83,P84	TB24-11,12	I13L	70	32	PED 8	8 PED					

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

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

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0032
DESIGNED: March 2008
SEALED: 6/24/08
REVISED: N/A

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 17 Bus. (Market St.)
at
SR 1219 (17th Street)

Division 3 New Hanover County Wilmington

PLAN DATE:	June 2008	REVIEWED BY:	T. Igle
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

SIGNATURE DATE 6-26-08

SIG. INVENTORY NO. 03-0032

25-JUN-2008 13:08
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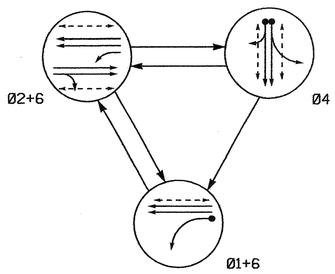
klooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.19

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

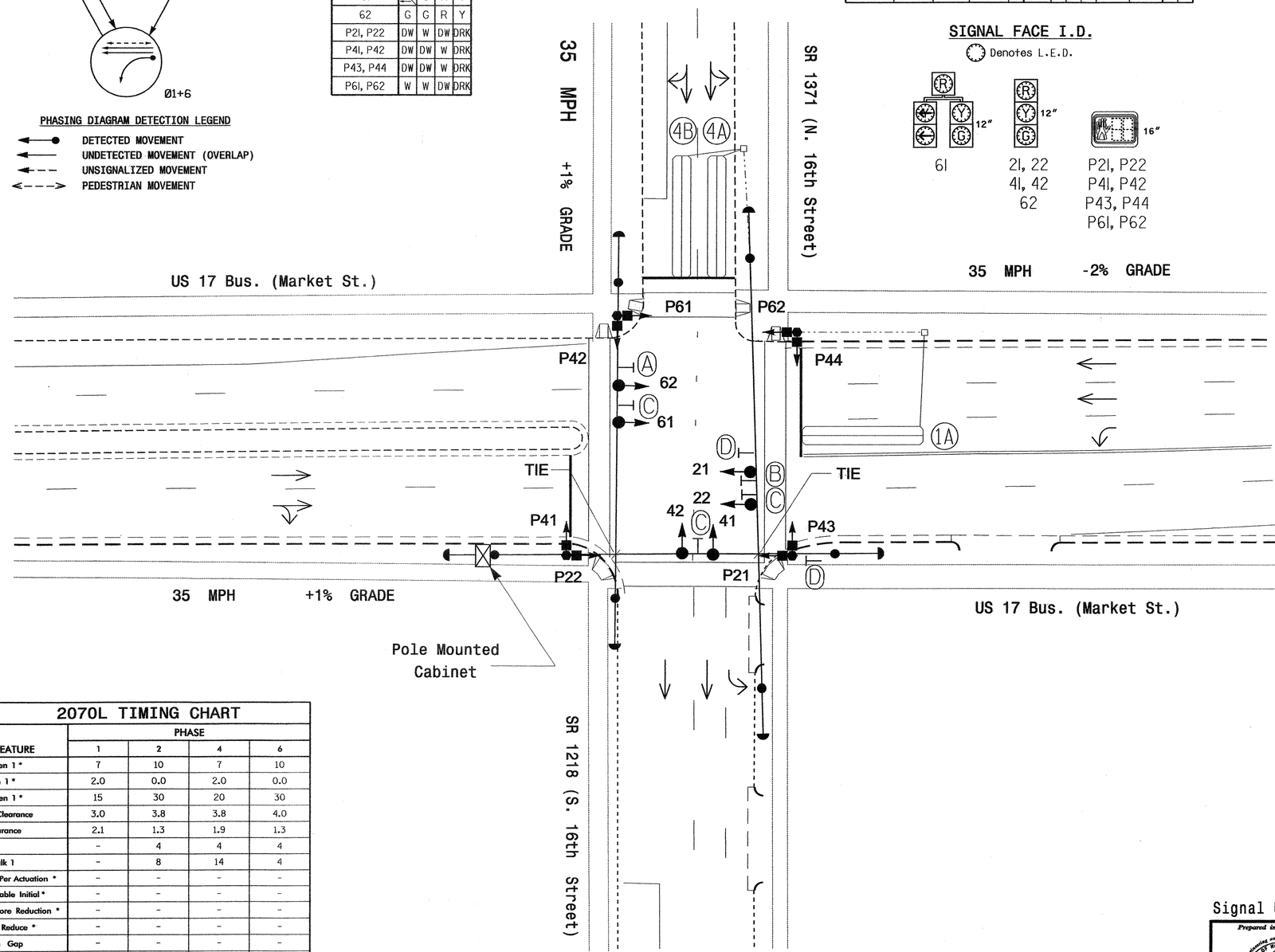
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y
P21, P22	DW	W	DW	DRK
P41, P42	DW	DW	W	DRK
P43, P44	DW	DW	W	DRK
P61, P62	W	W	DW	DRK

2070L 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	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	10	-	Y

3 Phase
Semi-Actuated
(Wilmington Signal System)



SIGNAL FACE I.D.

Denotes L.E.D.

61 | 21, 22, 41, 42, 62 | P21, P22, P41, P42, P43, P44, P61, P62

35 MPH -2% GRADE

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0033.

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	
A	No Right Turn Sign (R3-1)	A
B	No U-Turn Sign (R3-4)	B
C	Street Sign	C
D	No Left Turn Sign (R3-2)	D

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	0.0	2.0	0.0
Max Green 1 *	15	30	20	30
Yellow Clearance	3.0	3.8	3.8	4.0
Red Clearance	2.1	1.3	1.9	1.3
Walk 1 *	-	4	4	4
Don't Walk 1	-	8	14	4
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MAX RECALL	-	MAX RECALL
Vehicle Call Memory	-	-	-	-
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.

Signal Upgrade

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

SCALE 0 20 1"=20'

US 17 Bus. (Market Street)
at
SR 1218/SR 1371 (16th Street)

Division 3 New Hanover County Wilmington

PLAN DATE: March 2008 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

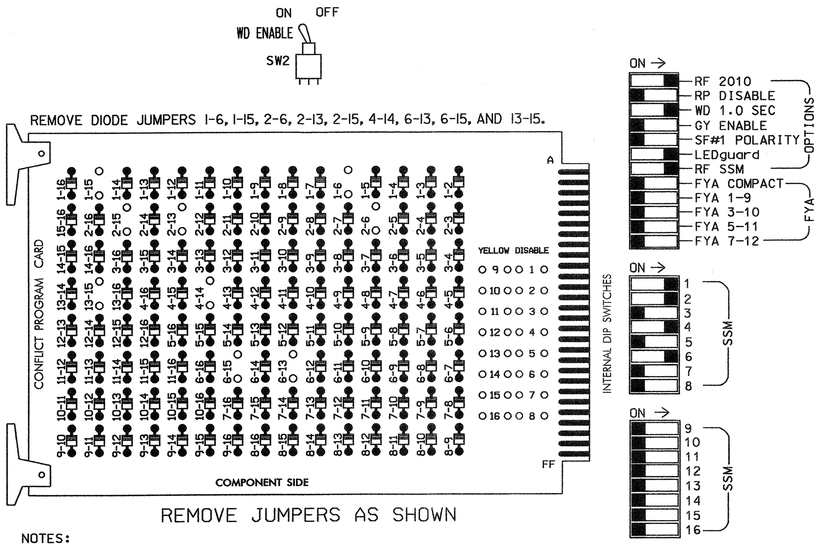
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 6/23/08 DATE
SIG. INVENTORY NO. 03-0033

23-JUN-2008 10:36
s:##16 signals#workgroups#alexander#wu-5017 (wilmington city system)#03-0033#03033_sig_dsn_20080623.dgn
rzziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 20

EDI MODEL 2010ECL-NC 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.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB21-1,2	I1U	56	18	1	1	Y	Y			15
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			10
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2 PED					
P41,P42 P43,P44	TB24-9,10	I12L	69	31	PED 4	4 PED					
P61,P62	TB22-11,12	I13U	68	30	PED 6	6 PED					

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

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 3,5,7,8,9, 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, 4, and 6 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Wilmington Signal System.

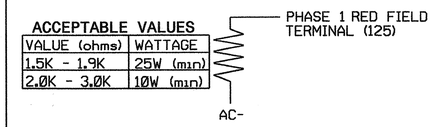
EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET .....CONTRACTOR SUPPLIED 336
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S6,S6P
PHASES USED.....1,2,2PED,4,4PED,6,6PED
OVERLAPS.....NONE

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 red monitor input 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.

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	P21, P22	NU	41,42	P41,P42 P43,P44	NU	61,62	P61, P62	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋			113			104			119			
🚶			115			106			121			

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.

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: 03-0033
DESIGNED: March 2008
SEALED: 6/23/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17 Bus. (Market Street) at SR 1218/SR 1371 (16th Street)

Division 3 | New Hanover County | Wilmington

PLAN DATE: June 2008 | REVIEWED BY: T. Joyce
PREPARED BY: A.A. Klooz | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Department of Transportation
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe, Jr. 6-27-08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0033

24-JUN-2008 12:11
c:\pw\sigpro1\$ework\groups\sig mgmt\klooz\03033_sm.ela.2008rmds.dgn
ch1002

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.21

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
81, 82, 83	R	G	R

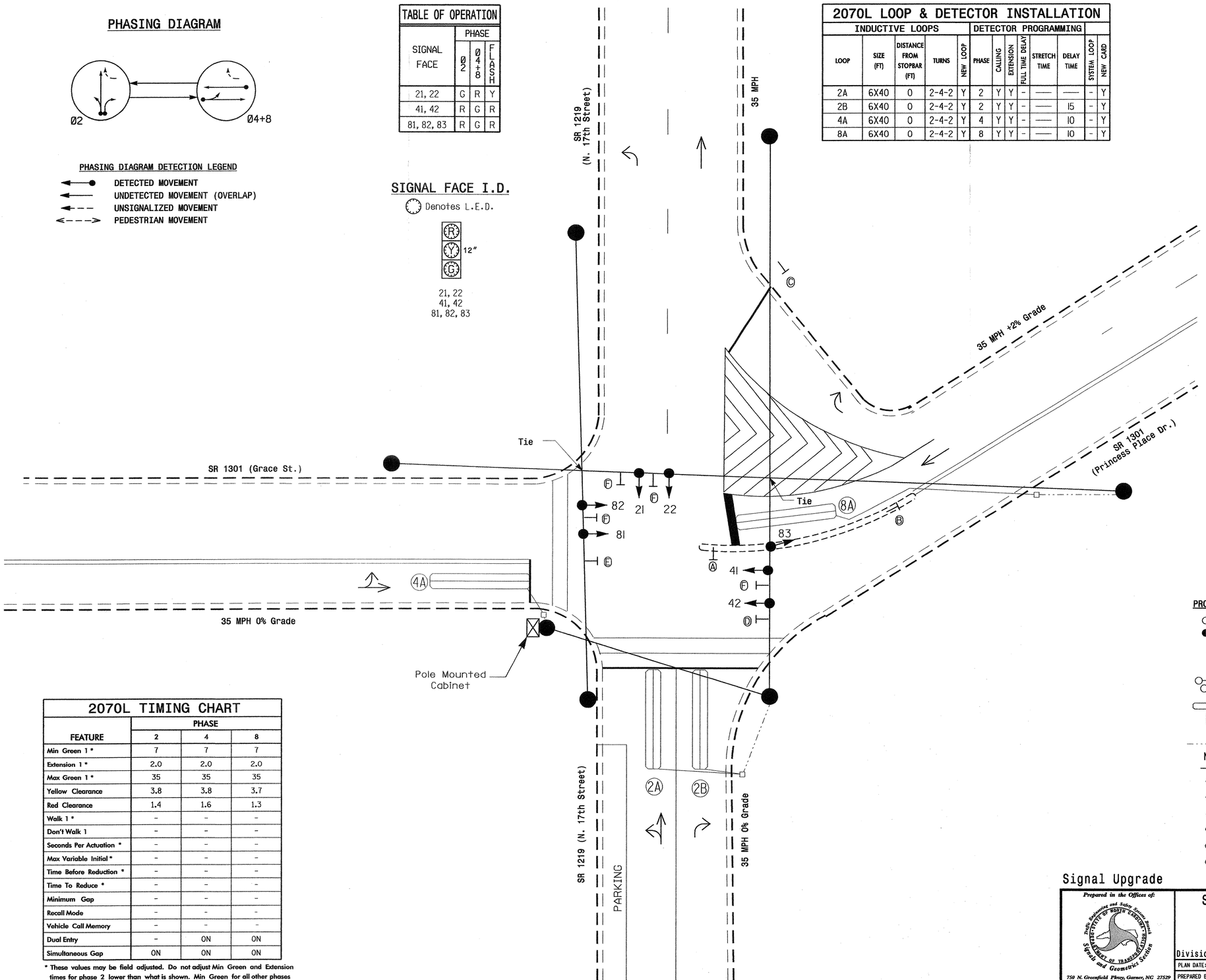
SIGNAL FACE I.D.

Denotes L.E.D.

21, 22
41, 42
81, 82, 83

2070L 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
2A	6X40	0	2-4-2	Y	2	Y	Y	-	—	—	-	Y
2B	6X40	0	2-4-2	Y	2	Y	Y	-	—	15	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	—	10	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	—	10	-	Y



2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Pavement markings are existing.
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 #: 0034.

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	7	7	7
Extension 1 *	2.0	2.0	2.0
Max Green 1 *	35	35	35
Yellow Clearance	3.8	3.8	3.7
Red Clearance	1.4	1.6	1.3
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	-	-
Vehicle Call Memory	-	-	-
Dual Entry	-	ON	ON
Simultaneous Gap	ON	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	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Keep Right Sign (R4-7)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	No Right Turn Sign (R3-1)	Ⓓ
Ⓔ	No Left Turn Sign (R3-2)	Ⓔ
Ⓕ	Street Sign	Ⓕ

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1219 (N. 17th Street)
at
SR 1301 (Grace Street/
Princess Place Dr.)
Division 3 New Hanover County Wilmington

PLAN DATE:	March 2007	REVIEWED BY:
PREPARED BY:	Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

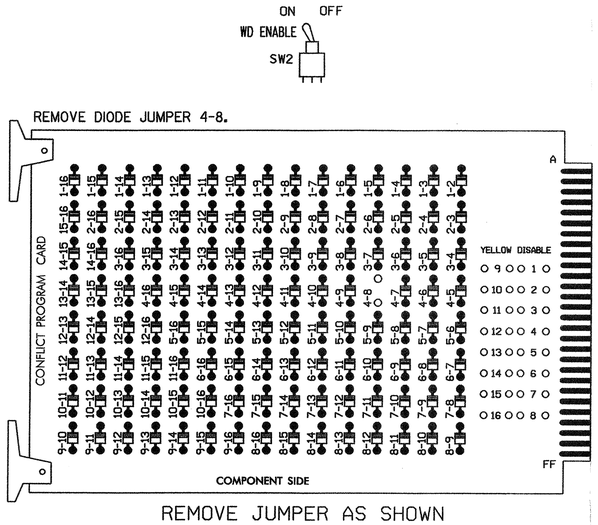
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/9/08
SIG. INVENTORY NO. 03-0034

09-JUN-2008 12:12
c:\pw_work\pwworking\ps\alexander\mu5017 (wilmington city system)\03-0034\03-0034_sig_dsn_20080609.dgn
Ziemba

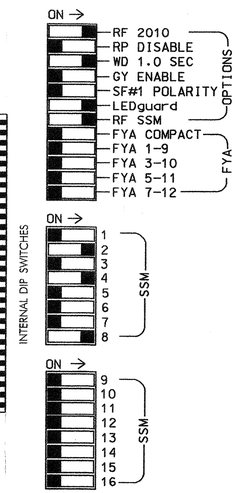
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	51622

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			15
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			10

INPUT FILE POSITION LEGEND: I2L

FILE I
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. 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 1,3,5,6,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S8
PHASES USED.....2,4,8
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.	NU	21,22	NU	NU	41,42	NU	NU	NU	NU	NU	81 82,83	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0034
DESIGNED: March 2007
SEALED: 6/09/08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1219 (N. 17th Street) at SR 1301 (Grace Street/ Princess Place Dr.)

Division 03 New Hanover County Wilmington

PLAN DATE: June 2007 REVIEWED BY: T. Jyle
PREPARED BY: A.A. Klooz REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals Management Section, Division of Highways, State of North Carolina, Department of Transportation
122 N. McDowell St., Raleigh, NC 27603

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

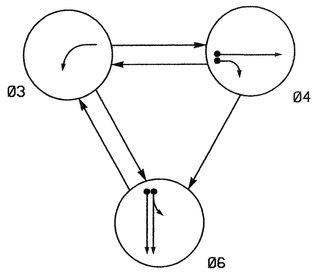
SIGNATURE John T. Rowe Jr. DATE 6-10-08

SIG. INVENTORY NO. 03-0034

09-JUN-2008 17:20
s:\traffic\signals\workgroups\esig mcnwk1ooz#030034_sm.ele.2008mod.dgn
ok1ooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	56.23

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

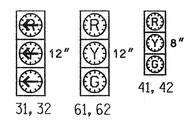
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

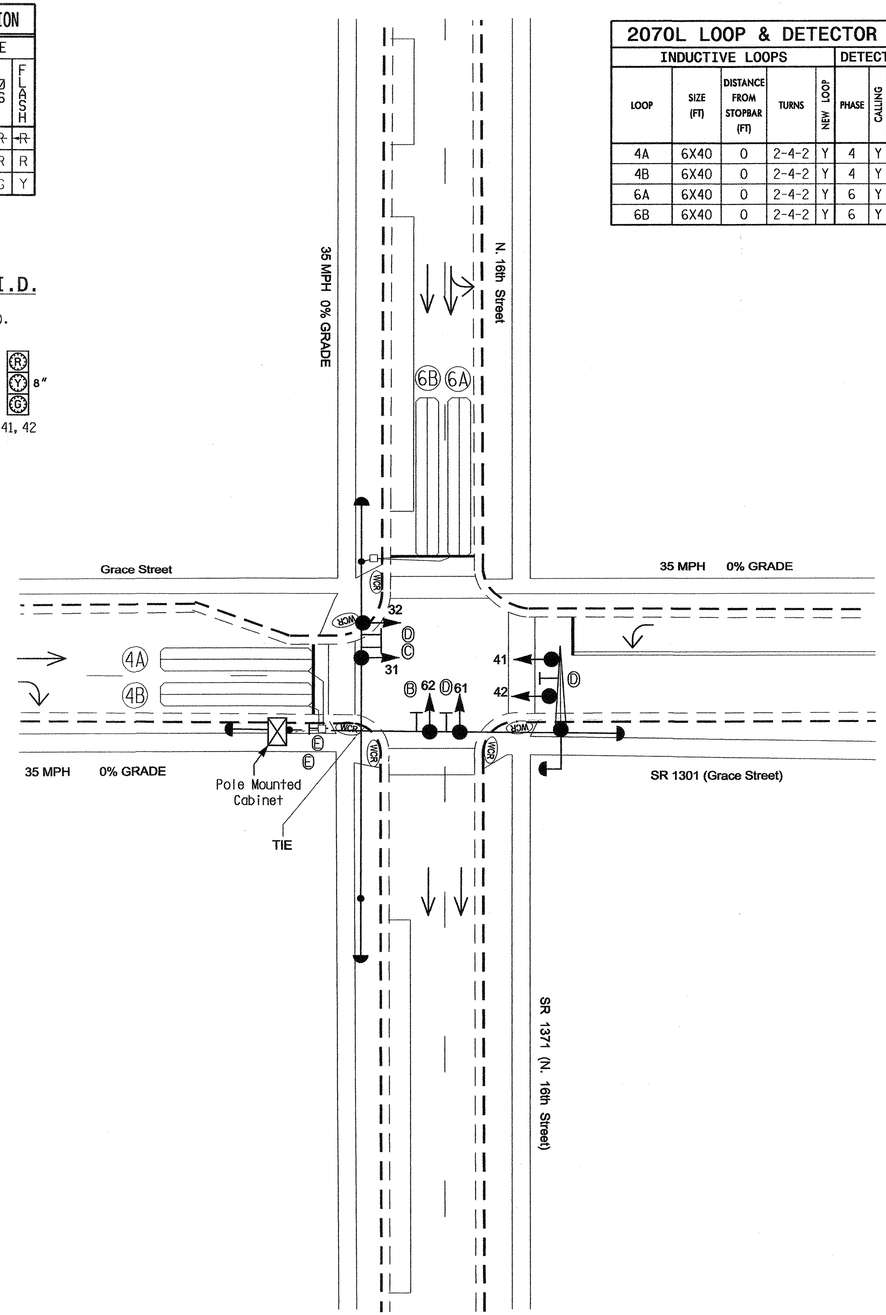
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø4	PHASE Ø6	PHASE FLASH
31, 32	—	~~R~~	~~R~~	~~R~~
41, 42	R	G	R	R
61, 62	R	R	G	Y

SIGNAL FACE I.D.

Denotes L.E.D.





2070L 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
4A	6X40	0	2-4-2	Y	4	Y	Y	-	——	——	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	——	15	-	Y
6A	6X40	0	2-4-2	Y	6	Y	Y	-	——	——	-	Y
6B	6X40	0	2-4-2	Y	6	Y	Y	-	——	——	-	Y

3 Phase
Semi-Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. The order of phase 3 and 4 may be reversed.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
6. Repaint existing crosswalks.
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 #: 0035.

2070L TIMING CHART

FEATURE	PHASE 3	PHASE 4	PHASE 6
Min Green 1 *	7	7	7
Extension 1 *	0.0	2.0	2.0
Max Green 1 *	35	15	15
Yellow Clearance	3.0	3.8	3.8
Red Clearance	1.8	1.0	1.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MAX RECALL	-	-
Vehicle Call Memory	-	-	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 3 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 with Marker	
	Directional Arrow	
	Wood Pole with Mastarm	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	No Right Turn Sign (R3-1)	B
C	"LEFT TURN ONLY" Sign	C
D	Street Sign	D
E	"RIGHT LANE MUST TURN RIGHT" Sign (R3-7R)	E

Signal Upgrade

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

SCALE 0 20 1"=20'

SR 1371 (N. 16th Street) at SR 1301 (Grace Street)

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2008	REVIEWED BY:
PREPARED BY:	Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

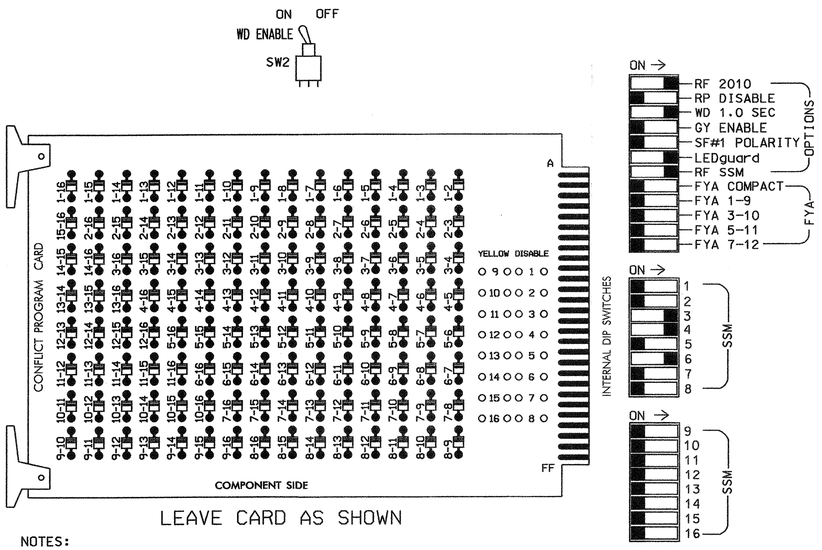
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/9/08
SIG. INVENTORY NO. 03-0035

09-JUN-2008 12:21
s:\traffic\signals\workgroups\alexander\wu-5017 (wilmington city system)\03-0035\030035_sig_dsn_20080609.dgn
T2 tembo

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.24

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



LEAVE CARD 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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L				Ø 4 4B		Ø 6 6B								ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			15
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,2,5,7,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S3,S4,S6
PHASES USED.....3,4,6
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.	NU	NU	NU	31,32	41,42	NU	NU	61,62	NU	NU	NU	NU
RED					1Ø1			134				
YELLOW					1Ø2			135				
GREEN					1Ø3			136				
RED ARROW				116								
YELLOW ARROW				117								
GREEN ARROW				118								

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0035
DESIGNED: March 2008
SEALED: 6/09/08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1371 (N. 16th Street)
at
SR 1301 (Grace Street)

Division 03 New Hanover County Wilmington

PLAN DATE:	June 2007	REVIEWED BY:	T.J.R.
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

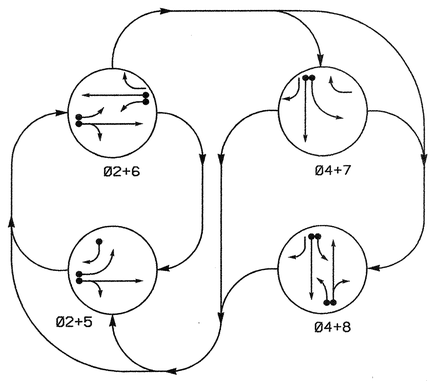
Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 6-11-08 DATE
SIG. INVENTORY NO. 03-0035

09-JUN-2008 17:21
S:\traffic\signal\workgroups\sig mgmt\klooz\03035_sm.01k.2008mmdd.dgn
klooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.25

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04+7	PHASE 04+8	FLASH
21	G	G	R	R	Y
22	G	G	R	R	Y
41	R	R	G	G	R
42	R	R	G	G	R
61	R	G	R	R	Y
62	R	G	R	R	Y
81, 82	R	R	R	G	R

SIGNAL FACE I.D.

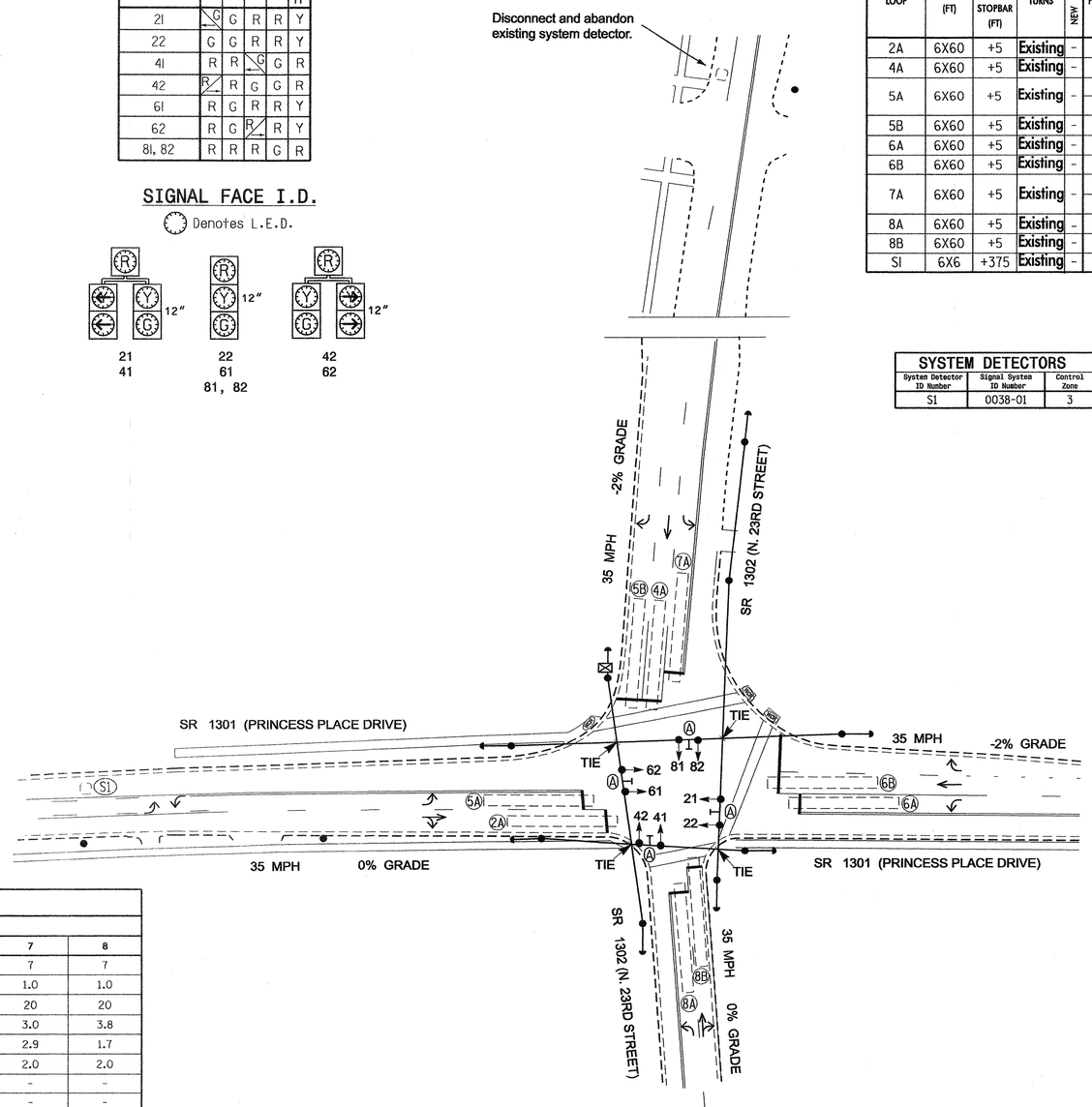
Denotes L.E.D.

2070L 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
2A	6X60	+5	Existing	-	2	Y	Y	-	—	—	-	Y
4A	6X60	+5	Existing	-	4	Y	Y	-	—	—	-	Y
5A	6X60	+5	Existing	-	5	Y	Y	-	—	10	-	Y
					2	Y	Y	-	—	—	-	Y
5B	6X60	+5	Existing	-	5	Y	Y	-	—	10	-	Y
6A	6X60	+5	Existing	-	6	Y	Y	-	—	—	-	Y
6B	6X60	+5	Existing	-	6	Y	Y	-	—	—	-	Y
7A	6X60	+5	Existing	-	7	Y	Y	-	—	15	-	Y
					4	Y	Y	-	—	3	-	Y
8A	6X60	+5	Existing	-	8	Y	Y	-	—	—	-	Y
8B	6X60	+5	Existing	-	8	Y	Y	-	—	—	-	Y
S1	6X6	+375	Existing	-	-	-	-	-	—	—	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0038-01	3



4 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 7 during phase 8 on.
4. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
5. Disconnect existing Southbound system detector.
6. Renumber existing signal heads and loops as shown.
7. Set all detector units to presence mode.
8. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Pavement markings are existing.
11. Repaint existing crosswalks.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Signal system data:
    Controller Asset #: 0038.

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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 7	PHASE 8
Min Green 1 *	10	7	7	10	7	7
Extension 1 *	3.0	1.0	2.0	3.0	1.0	1.0
Max Green 1 *	30	20	30	30	20	20
Yellow Clearance	3.8	4.0	3.0	4.0	3.0	3.8
Red Clearance	1.8	1.9	2.6	1.9	2.9	1.7
Red Revert	5.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	-	-	-	-	-
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: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Division of Highways, Department of Transportation, State of North Carolina
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1301 (Princess Place Drive) at SR 1302 (N. 23rd Street)

Division 3 New Hanover County Wilmington

PLAN DATE: April 2007 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 5/13/08

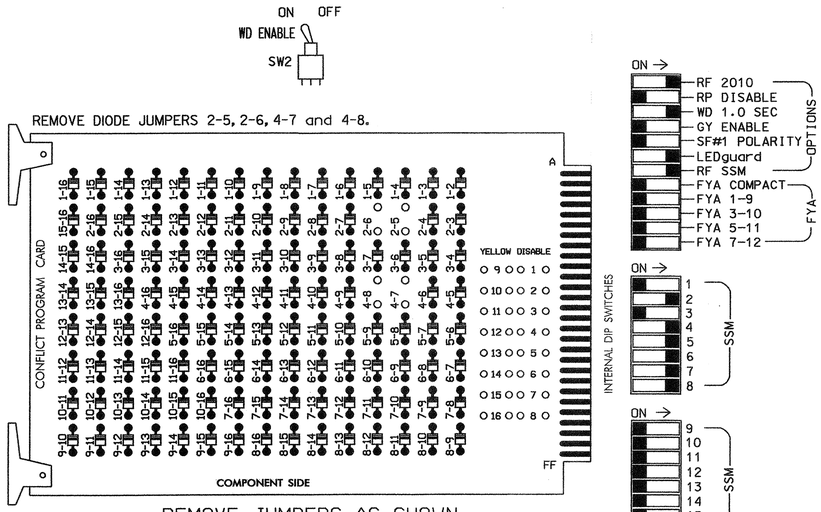
SIG. INVENTORY NO. 03-0038

13-MAY-2008 10:53
s:##ts signals##workgroups##alexander##u-5017 (wilmington city system)##03-0038##030038_sig_dsn_20080513.dgn
rziemba

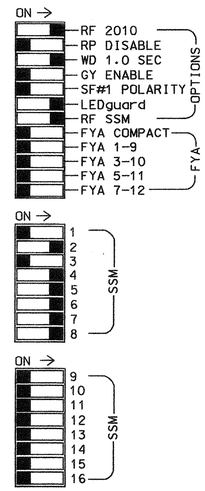
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	516.26

EDI MODEL 2010ECL-NC 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 1,3,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. 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.	NU	21,22	NU	NU	41,42	NU	21,42	61,62	NU	41,62	81,82	NU
RED		128			101		*	134		*	107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW							132			123		
GREEN ARROW							133			124		

NU = Not Used

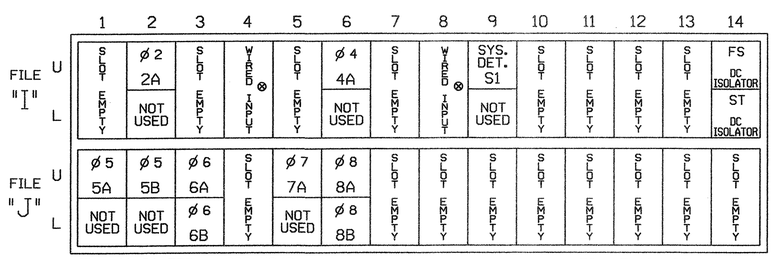
* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

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

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			
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			10
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A[2]	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					

[1] Add jumper from J1W to I4W, on rear of input file.

[2] Add jumper from J5W to I8W, 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0038
DESIGNED: April 2007
SEALED: 5/13/08
REVISED:

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.

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Function 1.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

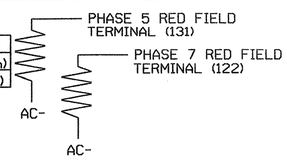
```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦        X
OMIT PHASES     ¦       X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

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.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1301 (Princess Place Drive) at SR 1302 (N. 23rd Street)

Division 3 | New Hanover County | Wilmington

PLAN DATE: May 2008 | REVIEWED BY:
PREPARED BY: G. C. Brown | REVIEWED BY: T. Vaughn

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

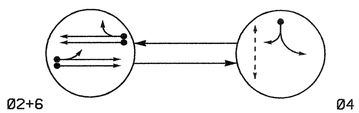
George C. Brown 5/15/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0038

14-MAY-2008 10:34
S:\traffic\signals\workgroups\ess\g monitor\ownM030038.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.27

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

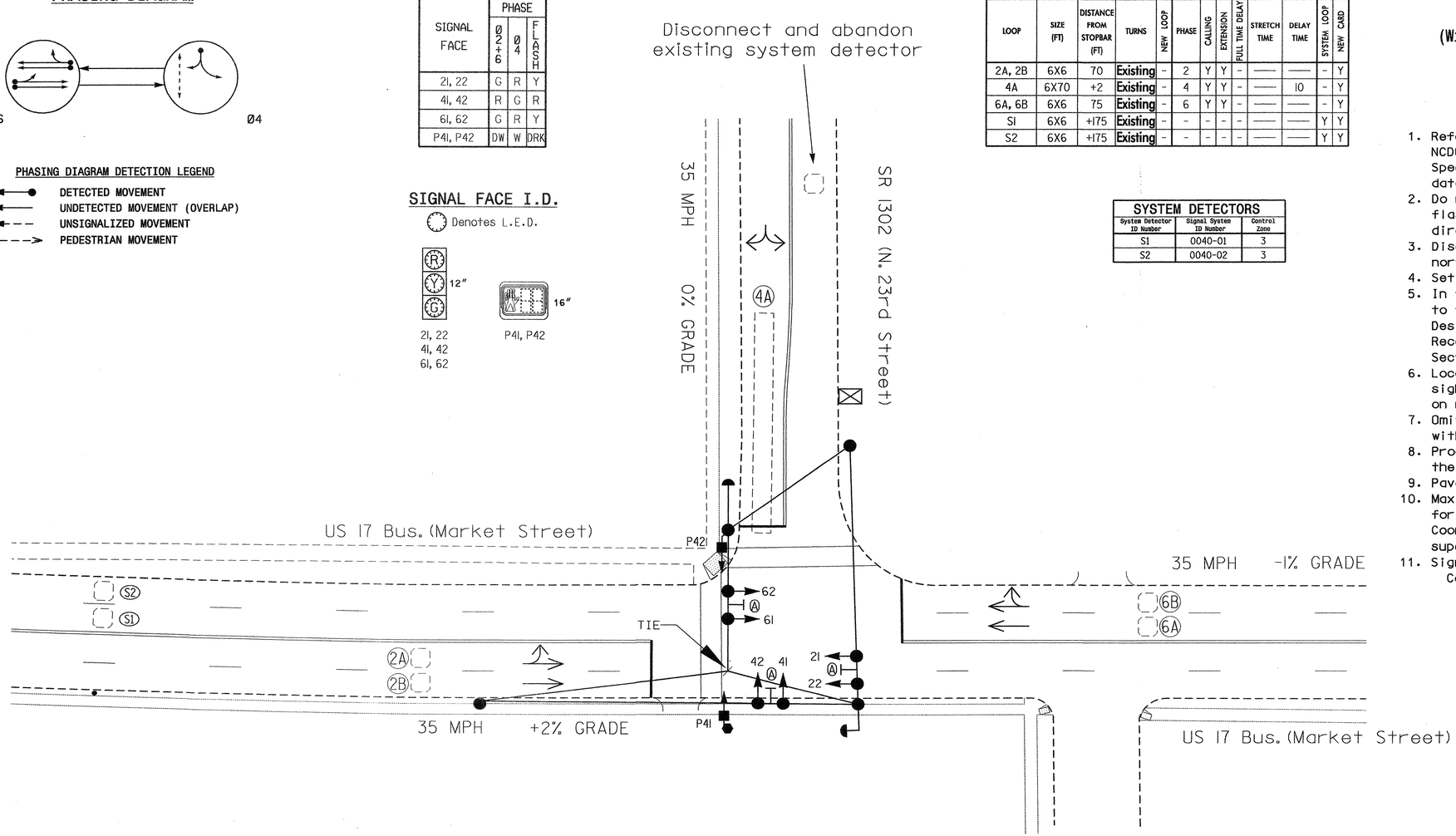
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	FLASH
2I, 22	G	R	Y
4I, 42	R	G	R
6I, 62	G	R	Y
P4I, P42	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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
2A, 2B	6X6	70	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X70	+2	Existing	-	4	Y	Y	-	——	10	-	Y
6A, 6B	6X6	75	Existing	-	6	Y	Y	-	——	——	-	Y
SI	6X6	+175	Existing	-	-	-	-	-	——	——	Y	Y
S2	6X6	+175	Existing	-	-	-	-	-	——	——	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0040-01	3
S2	0040-02	3

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disconnect and abandon existing northbound system detector.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0040.

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	7	10
Extension 1 *	3.0	2.0	3.0
Max Green 1 *	25	15	25
Yellow Clearance	3.7	3.0	3.9
Red Clearance	1.2	1.8	1.2
Walk 1 *	-	4	-
Don't Walk 1	-	7	-
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

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

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Pedestrian Signal Pedestal	
	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 Sign	

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

US 17 Bus. (Market Street)
at
SR 1302 (N. 23rd Street)

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

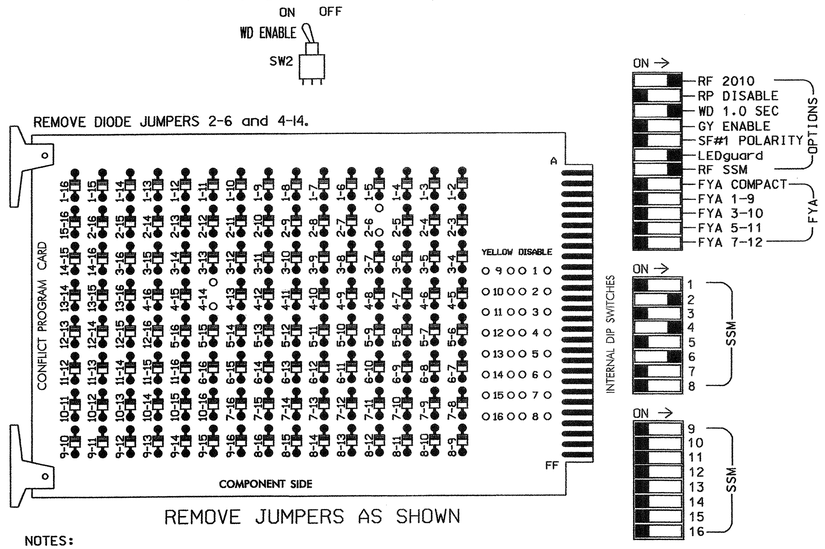
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/2/08 DATE
SIG. INVENTORY NO. 03-0040

02-APR-2008 17:35
s:\traffic\signals\workgroups\alexander\u-5017 (wilmington city system)\03-0040\030040_sig_dsn_20080402.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	56-28

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.

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 1,3,5,7,8,9, 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 phase 4 for 'STARTUP PED CALL'.
6. 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.	NU	21,22	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						
🚶						106						

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S4P,S6
PHASES USED.....2,4,4PED,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A,2B	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	NOT USED	SLOT	FS DC ISOLATOR
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A,6B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0040
DESIGNED: March 2007
SEALED: 4-2-08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17 Bus. (Market Street)
at
SR 1302 (N. 23rd Street)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

Division 03 New Hanover County Wilmington
PLAN DATE: 4-3-08 REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding REVIEWED BY:

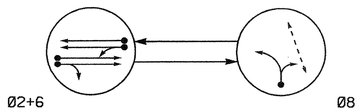
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 4/9/08 DATE
SIG. INVENTORY NO. 03-0040

08-APR-2008 17:01
st#ts signals#workgroups#sig mgmt#spaulding#in-progress#03040_sm_ele_2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	96.29

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

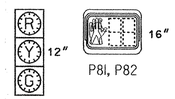
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø8	FLASH
21, 22	G	R	Y
61, 62	G	R	Y
81, 82	R	G	R
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.



P81, P82

21, 22
61, 62
81, 82

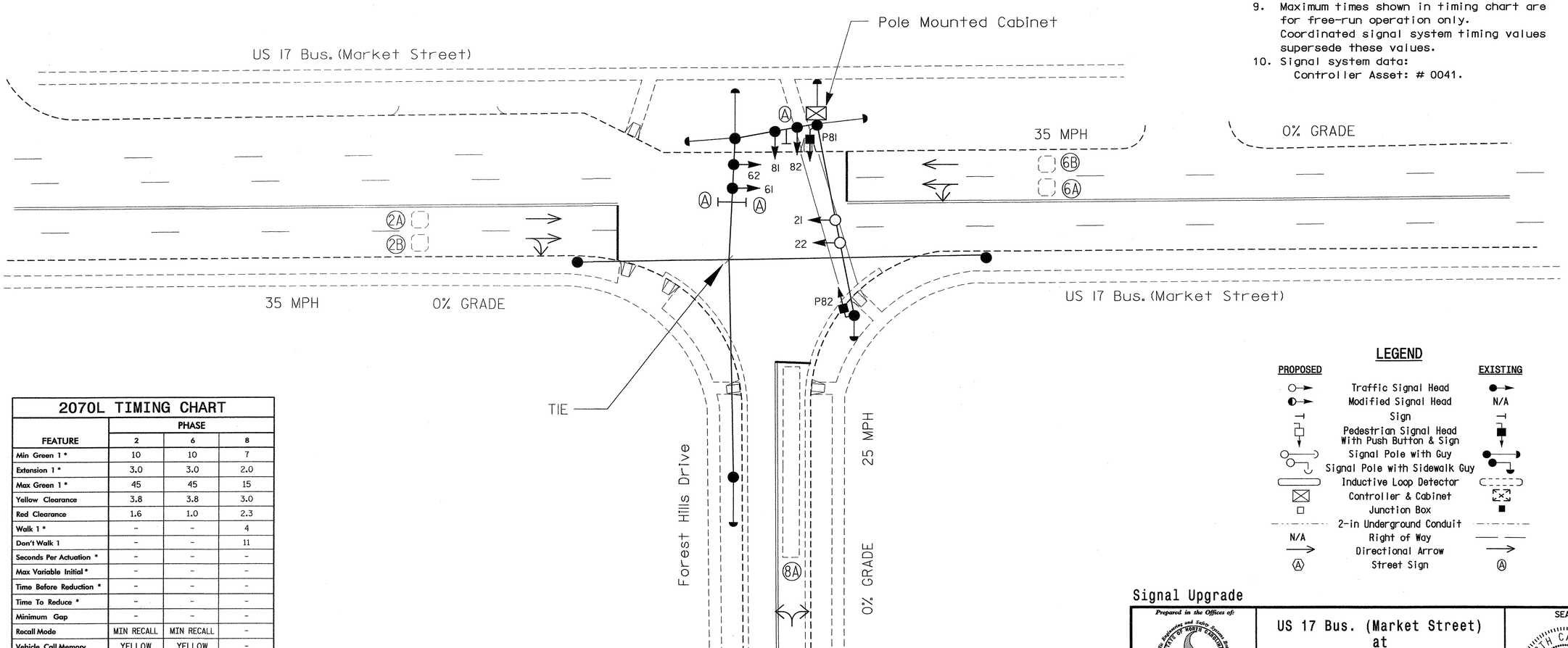
2070L LOOP & DETECTOR INSTALLATION

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
2A, 2B	6X6	70	Existing	-	2	Y	Y	-	——	——	-	Y
6A, 6B	6X6	70	Existing	-	6	Y	Y	-	——	——	-	Y
8A	6X70	0	Existing	-	8	Y	Y	-	——	——	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset: # 0041.



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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	10	10	7
Extension 1 *	3.0	3.0	2.0
Max Green 1 *	45	45	15
Yellow Clearance	3.8	3.8	3.0
Red Clearance	1.6	1.0	2.3
Walk 1 *	-	-	4
Don't Walk 1	-	-	11
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20
1"=20'

US 17 Bus. (Market Street) at Forest Hills Drive

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

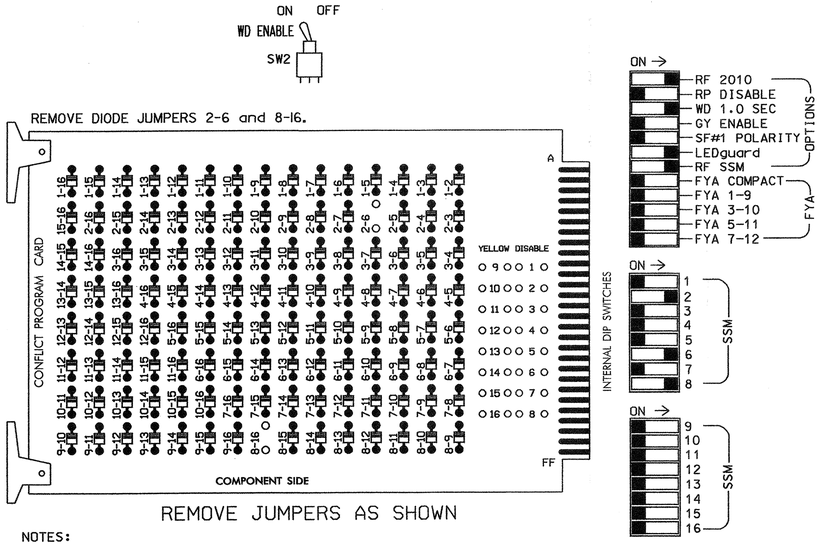
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/13/08 DATE
SIG. INVENTORY NO. 03-0041

13-MAY-2008 11:21
s:\traffic signals\workgroups\alexander\u-5017 (wilmington city system)\03-0041\03041.dgn
r2.embo

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.30

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.

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, 7,9,10,11,12,13,14,15 & 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 phase 8 for 'STARTUP PED CALL'.
6. 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.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	P81, P82
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												110
🚶												112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S6,S8,S8P
PHASES USED.....2,6,8,8 PED
OVERLAPS.....NONE

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.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB21-3,4	I2U	39	1	2	2	Y	Y			
6A,6B	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P81,P82	TB24-11,12	I13L	70	32	PED 8	8 PED					

NOTE:

INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0041
DESIGNED: March 2007
SEALED: 5/13/08
REVISED:

Signal Upgrade

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 N. Greenfield Pkwy, Garner, NC 27529

US 17 Bus. (Market Street)
at
Forest Hills Drive

Division 3 New Hanover County Wilmington

PLAN DATE: May 2008	REVIEWED BY: T. Jga		
PREPARED BY: G. C. Brown	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

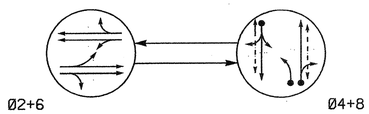
George C Brown 5/14/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0041

14-MAY-2008 09:41
S:\Traffic Signal\Work\groups\sig mon\brown\030041.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 31

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42, 43	R	G	R
61, 62	G	R	Y
81, 82, 83	R	G	R
P41, P42	DW	W	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22
41, 42, 43
61, 62
81, 82, 83

P41, P42
P81, P82

2070L 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
4A	6x60	0	2-4-2	-	4	Y	Y	-	—	10	-	Y
8A	6x60	0	2-4-2	-	8	Y	Y	-	—	3	-	Y
8B	6x28	33	2-4-2	-	8	Y	Y	-	—	—	-	Y
8C	6x26	0	2-4-2	-	8	Y	Y	-	—	10	-	Y
S1	6x6	+365	Existing	-	-	-	-	-	—	—	Y	Y
S2	6x6	+365	Existing	-	-	-	-	-	—	—	Y	Y

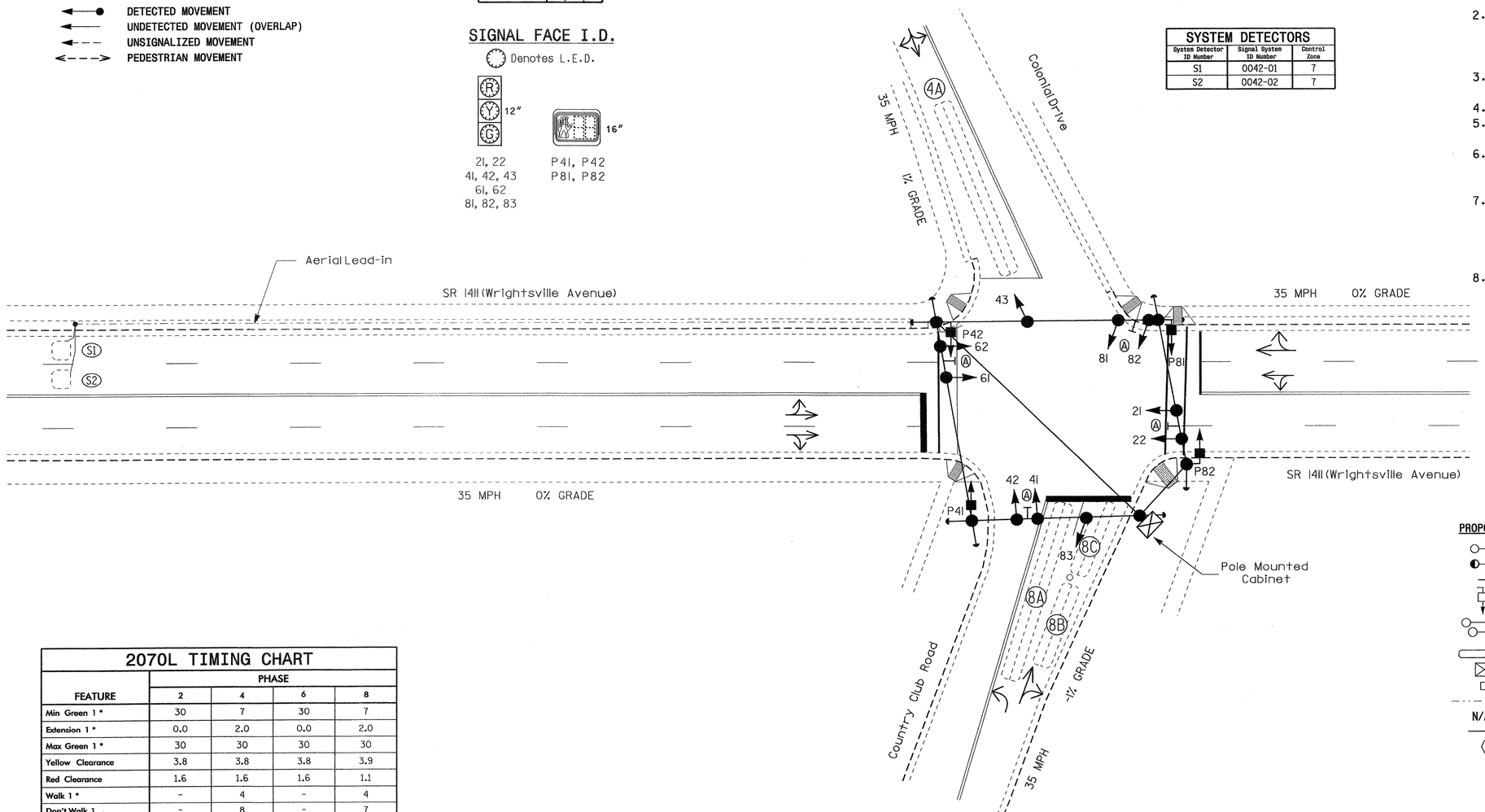
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0042-01	7
S2	0042-02	7

2 Phase Semi-Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Pavement markings are existing.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. 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 #: 0042.



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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	30	7	30	7
Extension 1 *	0.0	2.0	0.0	2.0
Max Green 1 *	30	30	30	30
Yellow Clearance	3.8	3.8	3.8	3.9
Red Clearance	1.6	1.6	1.6	1.1
Walk 1 *	-	4	-	4
Don't Walk 1	-	8	-	7
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	-	MAX RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
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.

Signal Upgrade

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

SCALE 0 20 1"=20

SR 1411 (Wrightsville Avenue) at Country Club Drive/ Colonial Drive

Division 3 New Hanover County Wilmington

PLAN DATE: May 2007	PREPARED BY: Sterling
PREPARED BY: J Navarrete	REVIEWED BY:

REVISIONS	INIT.	DATE

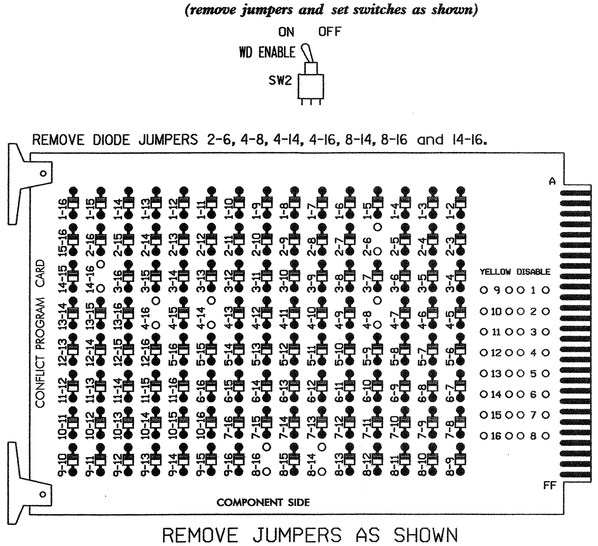
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 2/14/08 DATE
SIG. INVENTORY NO. 03-0042

30-JUL-2008 17:57
s:\ts_signals\working\groups\alexander\u-5017 (wilmington city system)\03-0042\030042_sig_dsn_20080214.dgn
r2tenb

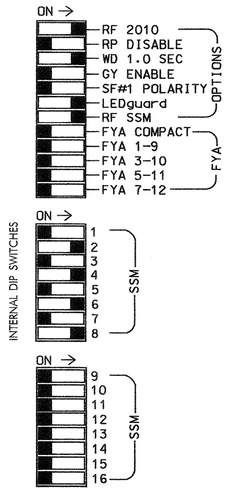
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S1632

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 1,3,5, 7,9,10,11,12,13,14,15 & 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 4 and 8 for 'STARTUP PED CALL'.
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.	NU	21,22	NU	NU	41 42,43	P41, P42	NU	61,62	NU	NU	81 82,83	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						110
🚶						106						112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S4P,S6,S8,S8P
PHASES USED.....2,4,4 PED,6,8,8 PED
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT	SLOT	SYS. DET. S1	ø 4 4A	SLOT	SLOT	SLOT	ø 8 8A	SLOT	SLOT	SLOT	NOT USED	NOT USED	FS DC ISOLATOR
FILE "I" L	ENTRY	ENTRY	SYS. DET. S2	ø 8 8C	ENTRY	ENTRY	ENTRY	ø 8 8B	ENTRY	ENTRY	ENTRY	ø4 PED DC ISOLATOR	ø8 PED DC ISOLATOR	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			
8C	TB23-7,8	I4L	45	7	14	8	Y	Y			10
* S1	TB21-5,6	I3U	58	20	3	SYS					
* S2	TB23-5,6	I3L	49	11	24	SYS					
PED PUSH BUTTONS											
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P81,P82	TB24-11,12	I13L	70	32	PED 8	8 PED					

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

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

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0042
DESIGNED: May 2007
SEALED: 2/14/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

SR 1411 (Wrightsville Avenue) at Country Club Drive/ Colonial Drive

Division 3 New Hanover County Wilmington

PLAN DATE: February 2008 REVIEWED BY: T. Vaga
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

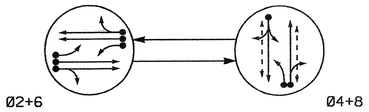
George C. Brown 2/25/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0042

25-FEB-2008 13:12
S:\Traffic\Signals\Working\Groups\Sig Mgmt\Brown\03-0042.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 33

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
2I, 22	G	R	Y
4I, 42	R	G	R
6I, 62	G	R	Y
8I, 82	R	G	R
P4I, P42	DW	W	DRK
P8I, P82	DW	W	DRK

2070L 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
2A, 2B	6X6	250	5	-	2	Y	Y	-	——	——	-	Y
2C	6X40	0	2-4-2	-	2	Y	Y	Y	——	3	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	——	10	-	Y
6A, 6B	6X6	250	5	-	6	Y	Y	-	——	——	-	Y
6C	6X40	0	2-4-2	-	6	Y	Y	Y	——	3	-	Y
8A	6X60	+10	2-4-2	-	8	Y	Y	-	——	3	-	Y
8B	6X60	+5	2-4-2	-	8	Y	Y	-	——	10	-	Y

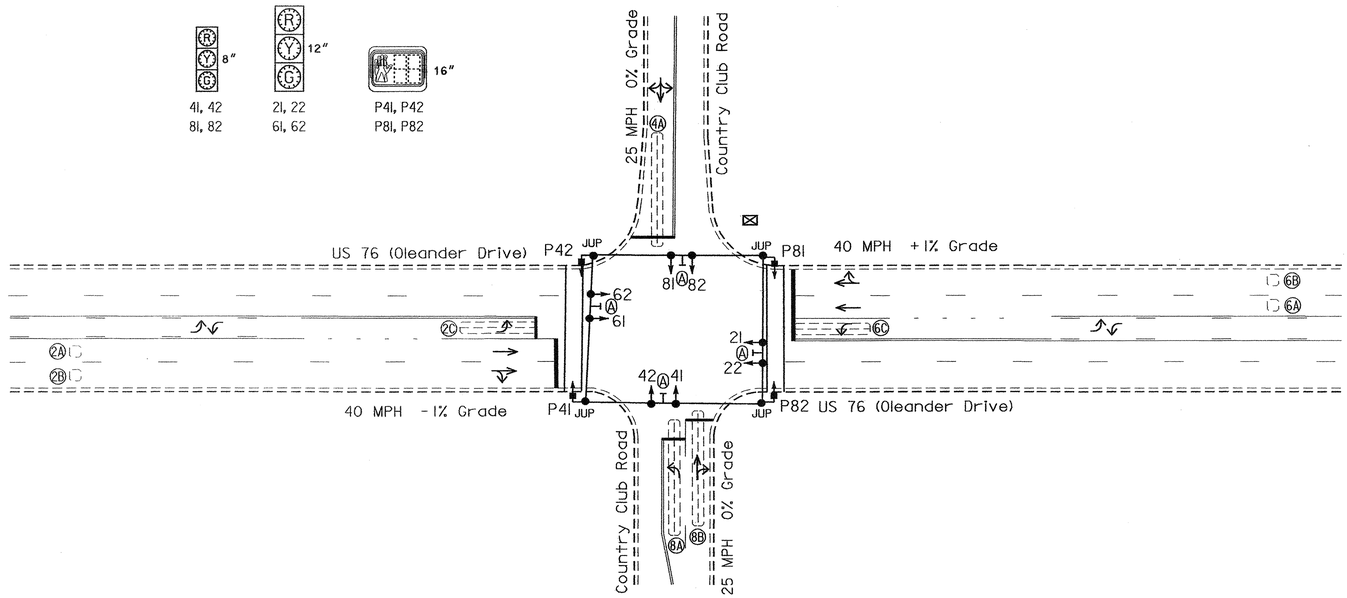
2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0043.

SIGNAL FACE I.D.

Denotes L.E.D.



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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	12	7	12	7
Extension 1 *	6.0	2.0	6.0	2.0
Max Green 1 *	40	35	40	35
Yellow Clearance	4.2	3.2	4.1	3.2
Red Clearance	2.0	2.9	2.0	2.7
Walk 1 *	-	7	-	7
Don't Walk 1	-	14	-	14
Seconds Per Actuation *	1.5	-	1.5	-
Max Variable Initial *	29	-	29	-
Time Before Reduction *	10	-	10	-
Time To Reduce *	20	-	20	-
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 76 (Oleander Drive) at Country Club Road

Division 3 New Hanover County Wilmington

PLAN DATE:	June 2008	PREPARED BY:	Sterling
PREPARED BY:	J Navarrete	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

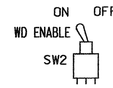
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/27/08
SIG. INVENTORY NO. 03-0043

27-JUN-2008 13:47
s:\traffic\signal\workgroups\wilmington city system\WD3-0043\03043_sig.dgn_20080627.dgn
rziemba

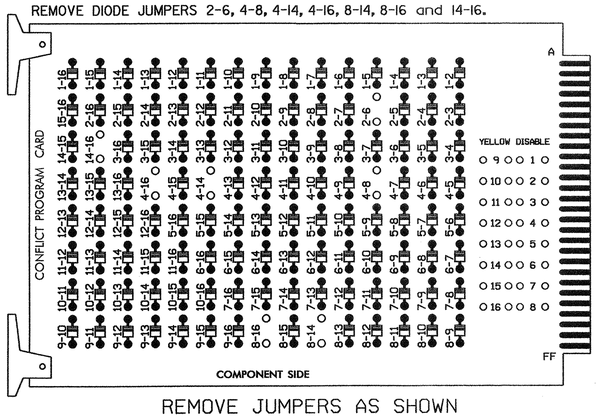
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.34

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

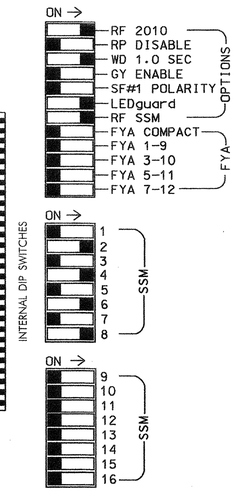
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-6, 4-8, 4-14, 4-16, 8-14, 8-16 and 14-16.



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, 7,9,10,11,12,13,14,15 & 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
7. Program phases 4 and 8 for 'STARTUP PED CALL'.
8. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S4P,S6,S8,S8P
PHASES USED.....2,4,4 PED,6,8,8 PED
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.	NU	21,22	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						110
🚶						106						112

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	SLOT	Ø2 2A,2B	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	NOT USED	NOT USED	FS DC ISOLATOR
	L	EMPTY	Ø2 2C	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A,6B	SLOT	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø6 6C	EMPTY	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
2C	TB2-7,8	I2L	43	5	12	2	Y	Y	Y		3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
6C	TB3-7,8	J2L	44	6	16	6	Y	Y	Y		3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0043
DESIGNED: June 2008
SEALED: 6/27/08
REVISED:

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 76 (Oleander Drive)
at
Country Club Road

Division 3 | New Hanover County | Wilmington

PLAN DATE: January 2008	REVIEWED BY: T. Iyer		
PREPARED BY: G. C. Brown	REVIEWED BY:		
REVISIONS		INIT.	DATE

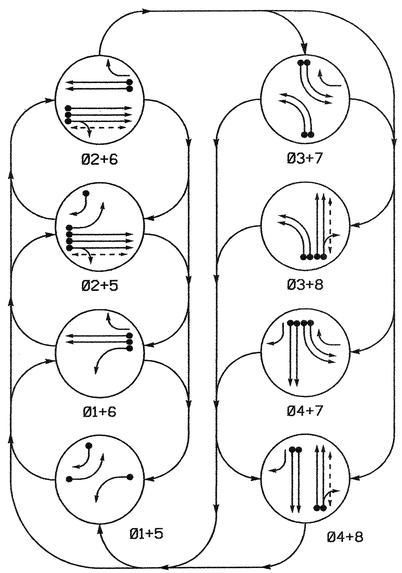
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 6/30/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0043

30-JUN-2008 10:38
s:\ts signals\workgroups\sig management\03043_sm_ela.20080222.dgn
(gbrown)

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 35

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	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
31, 32	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~
41	R	R	R	R	R	R	G	G	R
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, 82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

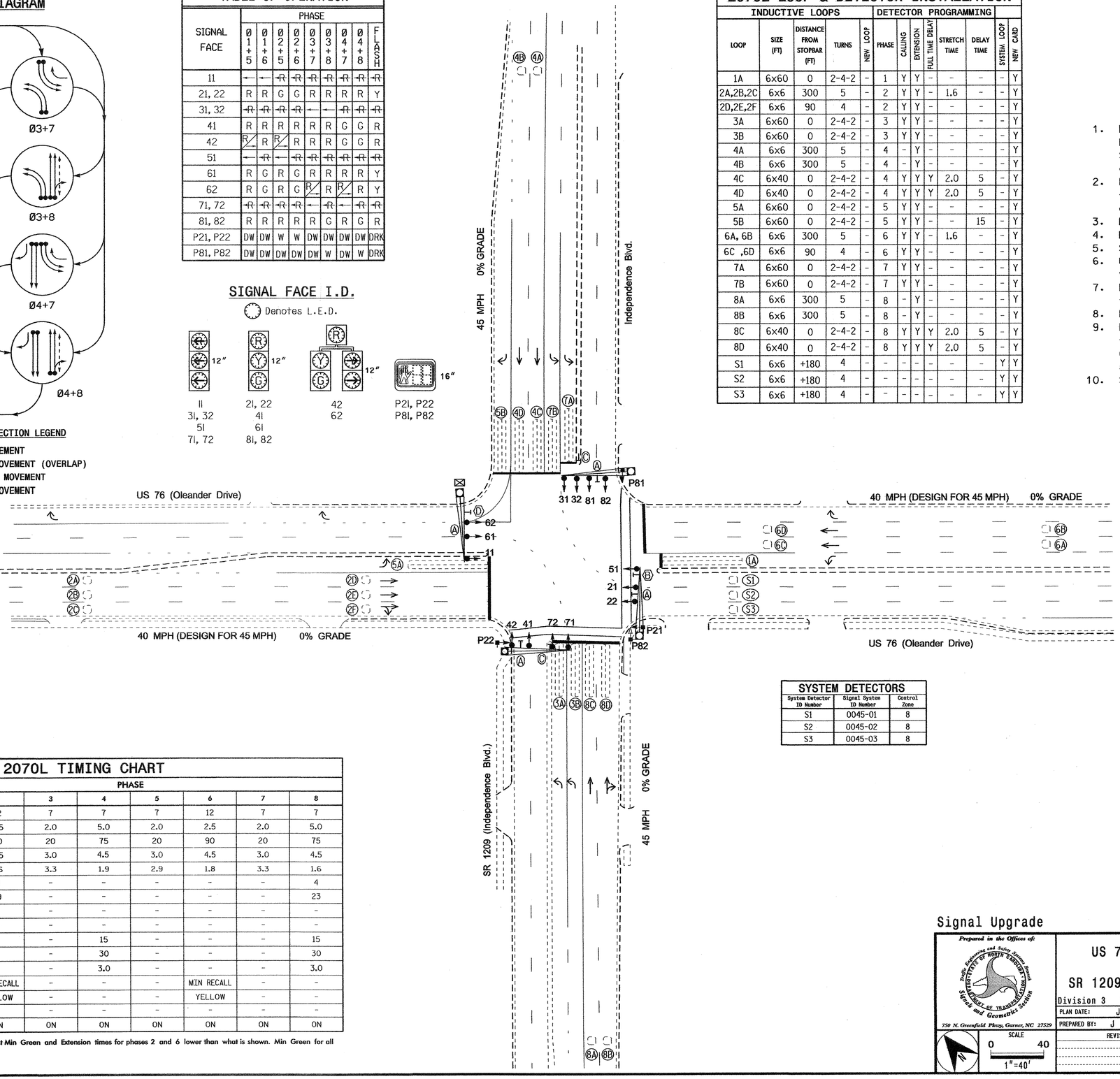
SIGNAL FACE I.D.

Denotes L.E.D.

11, 31, 32, 51, 71, 72 — 21, 22, 41, 61, 81, 82 — 42, 62 — P21, P22, P81, P82

2070L 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	6x60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A,2B,2C	6x6	300	5	-	2	Y	Y	-	1.6	-	-	Y
2D,2E,2F	6x6	90	4	-	2	Y	Y	-	-	-	-	Y
3A	6x60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
3B	6x60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6x6	300	5	-	4	-	Y	-	-	-	-	Y
4B	6x6	300	5	-	4	-	Y	-	-	-	-	Y
4C	6x40	0	2-4-2	-	4	Y	Y	Y	2.0	5	-	Y
4D	6x40	0	2-4-2	-	4	Y	Y	Y	2.0	5	-	Y
5A	6x60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6x60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A, 6B	6x6	300	5	-	6	Y	Y	-	1.6	-	-	Y
6C ,6D	6x6	90	4	-	6	Y	Y	-	-	-	-	Y
7A	6x60	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
7B	6x60	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A	6x6	300	5	-	8	-	Y	-	-	-	-	Y
8B	6x6	300	5	-	8	-	Y	-	-	-	-	Y
8C	6x40	0	2-4-2	-	8	Y	Y	Y	2.0	5	-	Y
8D	6x40	0	2-4-2	-	8	Y	Y	Y	2.0	5	-	Y
S1	6x6	+180	4	-	-	-	-	-	-	-	Y	Y
S2	6x6	+180	4	-	-	-	-	-	-	-	Y	Y
S3	6x6	+180	4	-	-	-	-	-	-	-	Y	Y



SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0045-01	8
S2	0045-02	8
S3	0045-03	8

2070L 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	2.5	2.0	5.0	2.0	2.5	2.0	5.0
Max Green 1 *	20	90	20	75	20	90	20	75
Yellow Clearance	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5
Red Clearance	3.3	1.6	3.3	1.9	2.9	1.8	3.3	1.6
Walk 1 *	-	4	-	-	-	-	-	4
Don't Walk 1	-	19	-	-	-	-	-	23
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
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	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.

8 Phase Fully Actuated (Wilmington City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0045.

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	
Ⓐ	Street Sign	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ
Ⓒ	Keep Right Sign (R4-7)	Ⓒ
Ⓓ	Right Arrow "ONLY" Sign (R3-5R)	Ⓓ

Signal Upgrade

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

SCALE 0 40 1"=40'

US 76 (Oleander Drive) at SR 1209 (Independence Blvd.)

Division 3	New Hanover County	Wilmington
PLAN DATE: June 2008	PREPARED BY: Sterling	
PREPARED BY: J Navarrete	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/27/08
SIG. INVENTORY NO. 03-0045

30-JUN-2008 12:09
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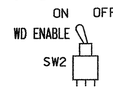
rziemba

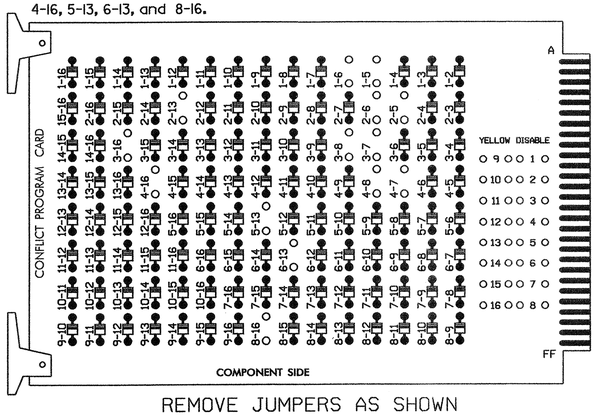
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.36

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

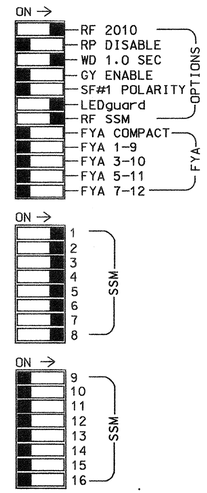
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS I-5, I-6, 2-5, 2-6, 2-13, 3-7, 3-8, 3-16, 4-7, 4-8, 4-16, 5-13, 6-13, and 8-16.



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 4 and 8, on the controller unit, for Gap Reduction.
6. Program phases 2 and 8 for 'STARTUP PED CALL'.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S5,S6,S7,S8,S8P
PHASES USED.....1,2,2 PED,3,4,5,6,7,8,8 PED
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	21,22	P21, P22	31,32	41,42	NU	42	51	61,62	NU	62	71,72	81,82	P81, P82
RED		128			101				134				107	
YELLOW		129			102				135				108	
GREEN		130			103				136				109	
RED ARROW	125			116				131				122		
YELLOW ARROW	126			117			132	132			123	123		
GREEN ARROW	127			118			133	133			124	124		
✋			113											110
🚶			115											112

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,2B,2C	Ø3 3A	SLOT EMPTY	SLOT EMPTY	Ø4 4A	Ø4 4C	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L	NOT USED	Ø2 2D,2E,2F	Ø3 3B			Ø4 4B	Ø4 4D		SYS. DET. S2			NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A,6B	SLOT EMPTY	Ø7 7A	Ø8 8A	Ø8 8C	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø5 5B	Ø6 6C,6D		Ø7 7B	Ø8 8B	Ø8 8D		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
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2D,2E,2F	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB2-9,10	I3U	63	25	32	3	Y	Y			
3B	TB2-11,12	I3L	76	38	42	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	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6C,6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-7,8	J5L	57	19	7	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
* 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					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0045
DESIGNED: June 2008
SEALED: 6/27/08
REVISED:

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 76 (Oleander Drive)
at
SR 1209 (Independence Blvd.)

Division 3 | New Hanover County | Wilmington

PLAN DATE: | REVIEWED BY: T. Jon
PREPARED BY: G. C. Brown | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/2/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0045

02-JUL-2008 07:56
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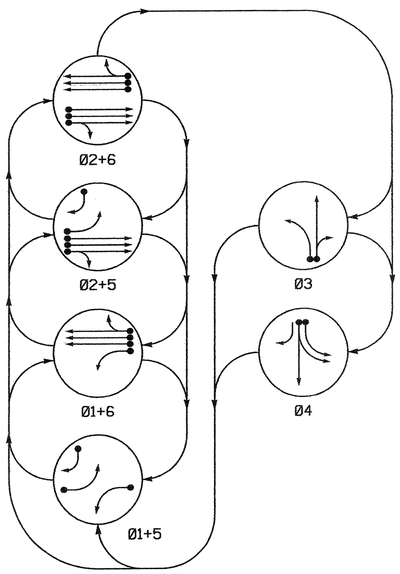
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 37

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	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 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	G ←	R
42	R/←	R	R/←	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

2070L 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	-	1	Y	Y	-	——	——	-	Y
2A,2B,2C	6X6	250	5	-	2	Y	Y	-	——	——	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	——	3	-	Y
3B	6X40	0	2-4-2	-	3	Y	Y	-	——	10	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	3	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	——	——	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	——	——	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	——	15	-	Y
6A,6B,6C	6X6	250	5	-	6	Y	Y	-	——	——	-	Y
S1	6X6	220	6	-	-	-	-	-	——	——	Y	Y
S2	6X6	+270	5	-	-	-	-	-	——	——	Y	Y
S3	6X6	+270	5	-	-	-	-	-	——	——	Y	Y
S4	6X6	+270	5	-	-	-	-	-	——	——	Y	Y

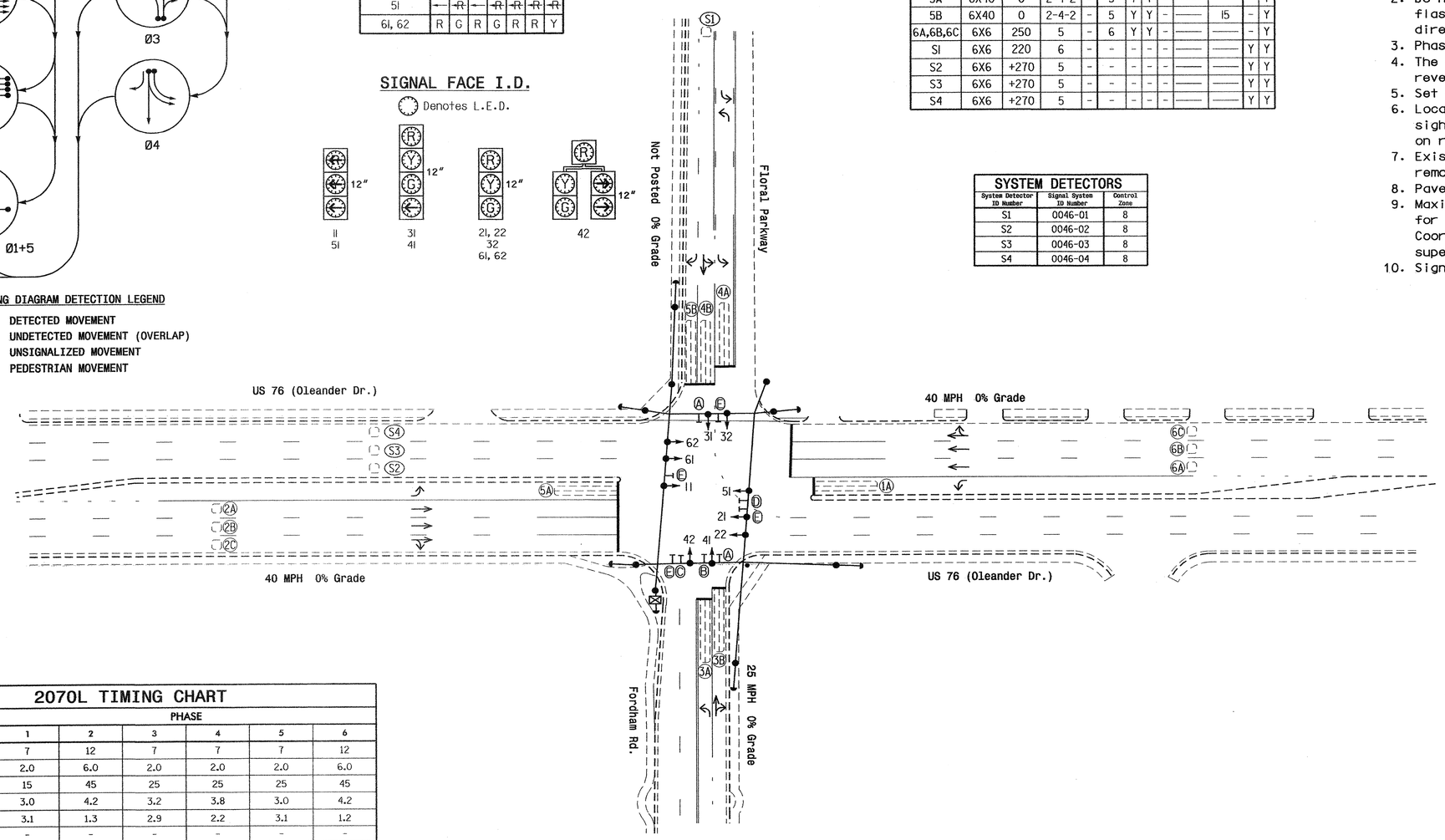
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0046-01	8
S2	0046-02	8
S3	0046-03	8
S4	0046-04	8

6 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Existing lane control signs may be removed.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0046.



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)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓓ
Ⓔ	Street Sign	Ⓔ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	15	45	25	25	25	45
Yellow Clearance	3.0	4.2	3.2	3.8	3.0	4.2
Red Clearance	3.1	1.3	2.9	2.2	3.1	1.2
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.4	-	-	-	1.4
Max Variable Initial *	-	28	-	-	-	28
Time Before Reduction *	-	10	-	-	-	10
Time To Reduce *	-	20	-	-	-	20
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

* 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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40
1"=40'

US 76 (Oleander Drive) at Fordham Road and Floral Parkway

Division 3 New Hanover County Wilmington

PLAN DATE: June 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

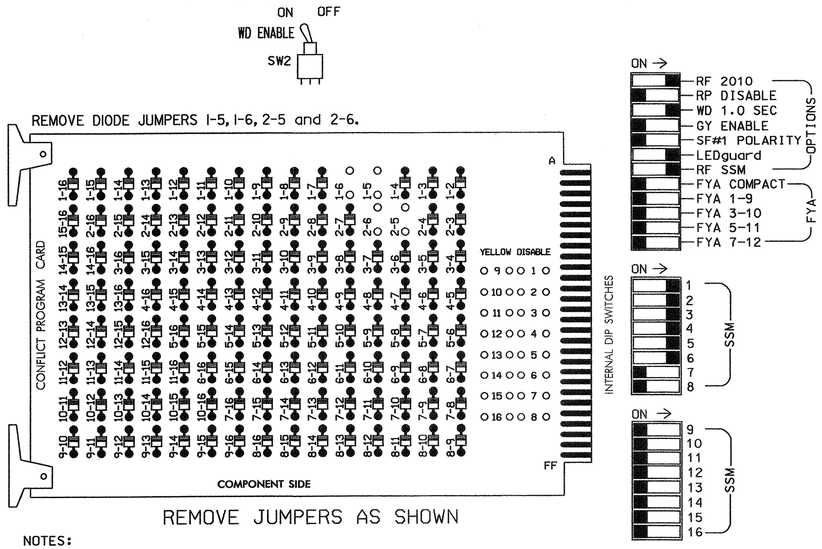
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 6/26/08 DATE
SIG. INVENTORY NO. 03-0046

27-JUN-2008 15:08
s:\ts signals\workgroups\wilexander\u-5017 (wilmington city system)\03-0046\030046_sig_dsn_20080626.dgn
2160602

PROJECT REFERENCE NO.	SHEET NO.
U-5017	Sig. 30

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.

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. 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 controller unit, for volume density operation.
6. 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.	11	21,22	NU	31	32	41	42	NU	42	51	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	125									131					
YELLOW ARROW	126								132	132					
GREEN ARROW	127			118		103			133	133					

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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, 2B,2C	SLOT	SLOT	ø 3 3B	ø 4 4A	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	ø 3 3A	EMPTY	EMPTY	NOT USED	ø 4 4B	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	ø 5 5A	ø 6 6A, 6B,6C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SYS. DET. S3	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	ø 5 5B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	SYS. DET. S4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB2-7,8	I2L	43	5	12	3	Y	Y			3
3B	TB4-5,6	I5U	58	20	3	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
* 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					
* S4	TB7-11,12	J9L	61	23	17	SYS					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0046
DESIGNED: June 2008
SEALED: 06/26/08
REVISED: N/A

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 76 (Oleander Drive)
at
Fordham Road and
Floral Parkway

Division 3 New Hanover County Wilmington

PLAN DATE: June 2008	REVIEWED BY:		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C Brown 7/8/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0046

03-JUL-2008 13:26
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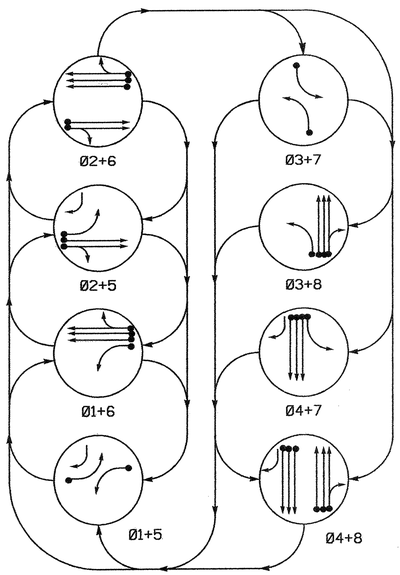
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16. 39

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	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
43	R/	R	R/	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R

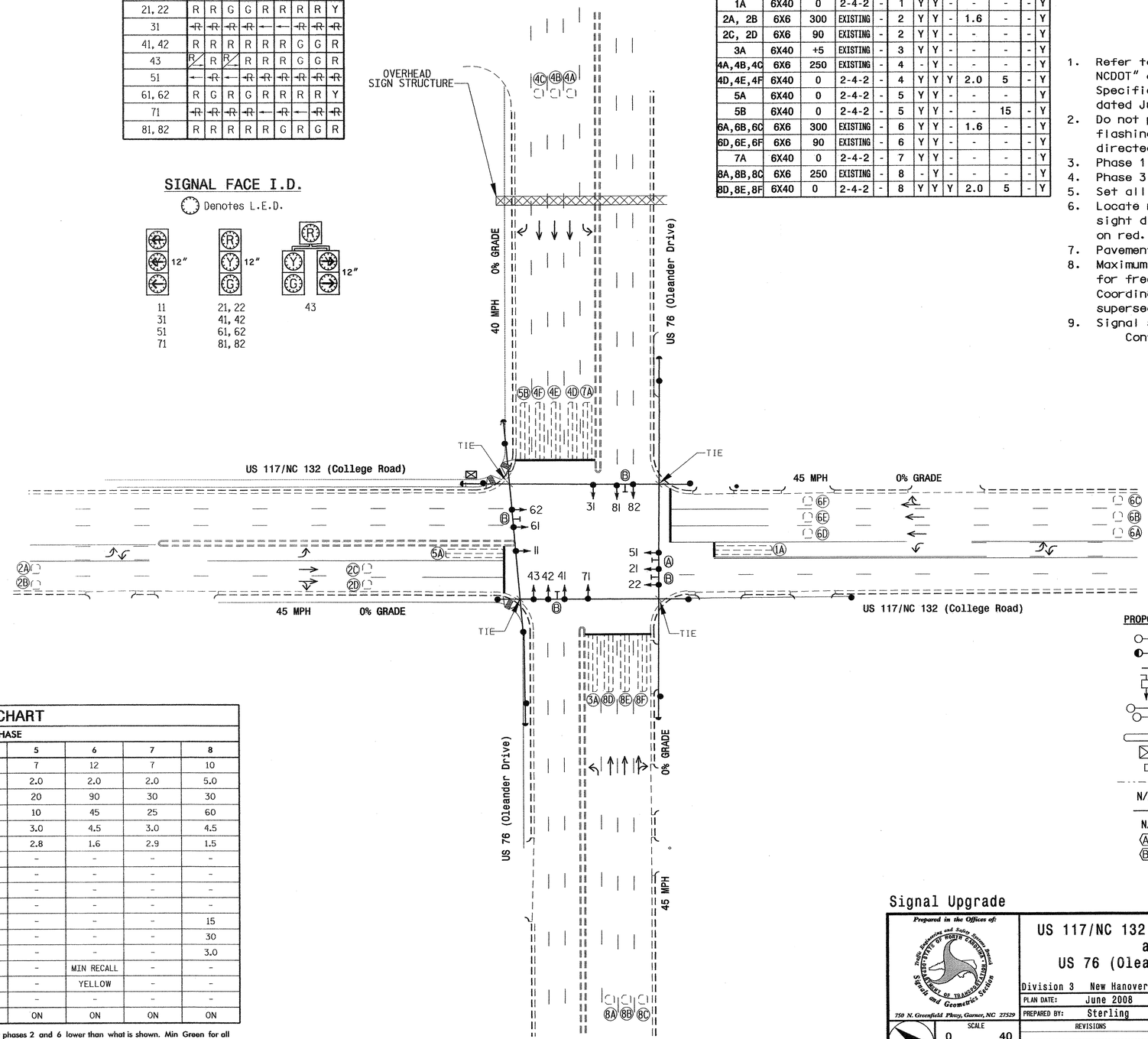
SIGNAL FACE I.D.

Denotes L.E.D.

11, 31, 51, 71 — 21, 22, 41, 42, 61, 62, 81, 82 — 43

2070L 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	-	1	Y	Y	-	-	-	-	Y
2A, 2B	6X6	300	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2C, 2D	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
3A	6X40	+5	EXISTING	-	3	Y	Y	-	-	-	-	Y
4A,4B,4C	6X6	250	EXISTING	-	4	-	Y	-	-	-	-	Y
4D,4E,4F	6X40	0	2-4-2	-	4	Y	Y	Y	2.0	5	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-		Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B,6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
7A	6X40	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A,8B,8C	6X6	250	EXISTING	-	8	-	Y	-	-	-	-	Y
8D,8E,8F	6X40	0	2-4-2	-	8	Y	Y	Y	2.0	5	-	Y



8 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0047.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
Ⓐ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓐ
Ⓑ	Street Sign	Ⓑ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	10	7	12	7	10
Extension 1 *	2.0	2.0	2.0	5.0	2.0	2.0	2.0	5.0
Max Green 1 *	20	90	30	30	20	90	30	30
Max Green 2 *	10	45	25	90	10	45	25	60
Yellow Clearance	3.0	4.5	3.0	4.2	3.0	4.5	3.0	4.5
Red Clearance	3.3	1.6	3.1	1.6	2.8	1.6	2.9	1.5
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
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	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: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Division of Highways, Department of Transportation, State of North Carolina
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 — 1"=40'

US 117/NC 132 (College Road) at US 76 (Oleander Drive)

Division 3 New Hanover County Wilmington

PLAN DATE:	June 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 6/26/08

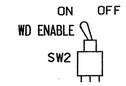
SIG. INVENTORY NO. 03-0047

07-JUL-2008 16:25
c:\pw_working\groups\alexander\wu-5017 (wilmington city system)\03-0047\03-0047_sig_dsn_20080626.dgn
rziemba

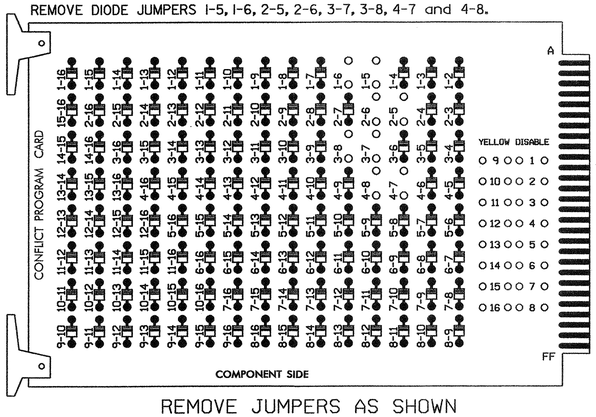
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	SIG. 40

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

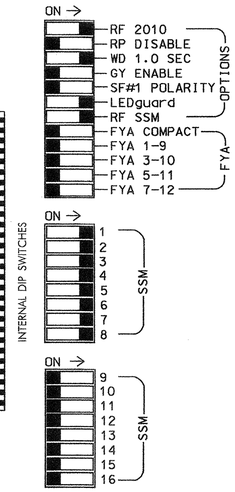
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS I-5, I-6, 2-5, 2-6, 3-7, 3-8, 4-7 and 4-8.



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 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 4 and 8, on the controller unit, for Gap Reduction.
6. 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.	11	21,22	NU	31	41 42,43	NU	43	51	61,62	NU	71	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			117			132	132			123		
GREEN ARROW	127			118			133	133			124		

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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,2B	ø3 3A	SLOT EMPTY	SLOT EMPTY	ø4 4A,4B,4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	ø2 2C,2D	NOT USED			ø4 4D,4E,4F								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø5 5A	ø6 6A,6B,6C	SLOT EMPTY	ø7 7A	ø8 8A,8B,8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		ø5 5B	ø6 6D,6E,6F		NOT USED	ø8 8D,8E,8F								

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,2B	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2C,2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB2-9,10	I3U	63	25	32	3	Y	Y			
4A,4B,4C	TB4-9,10	I6U	41	3	4	4	-	Y			
4D,4E,4F	TB4-11,12	I6L	45	7	14	4	Y	Y	Y	2.0	5
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A,8B,8C	TB5-9,10	J6U	42	4	8	8	-	Y			
8D,8E,8F	TB5-11,12	J6L	46	8	18	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: 03-0047
DESIGNED: June 2008
SEALED: 6/26/08
REVISED:

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (College Road)
at
US 76 (Oleander Drive)

Division 3 | New Hanover County | Wilmington

PLAN DATE: September 2007 | REVIEWED BY: T. Joyce
PREPARED BY: G. C. Brown | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/2/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0047

02-JUL-2008 07:42
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GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16 41

PHASING DIAGRAM

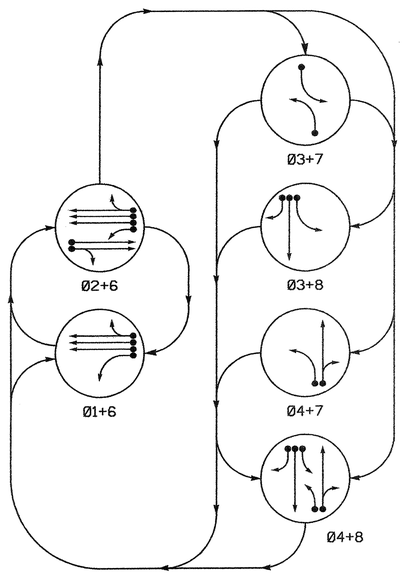


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	03+7	03+8	04+7	04+8	FLASH
21, 22	R	G	R	R	R	R	Y
41	R	R	R	R	G	G	R
42	R	R	R	R	G	G	R
61	G	G	R	R	R	R	Y
62, 63	G	G	R	R	R	R	Y
81	R	R	R	G	R	G	R
82	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

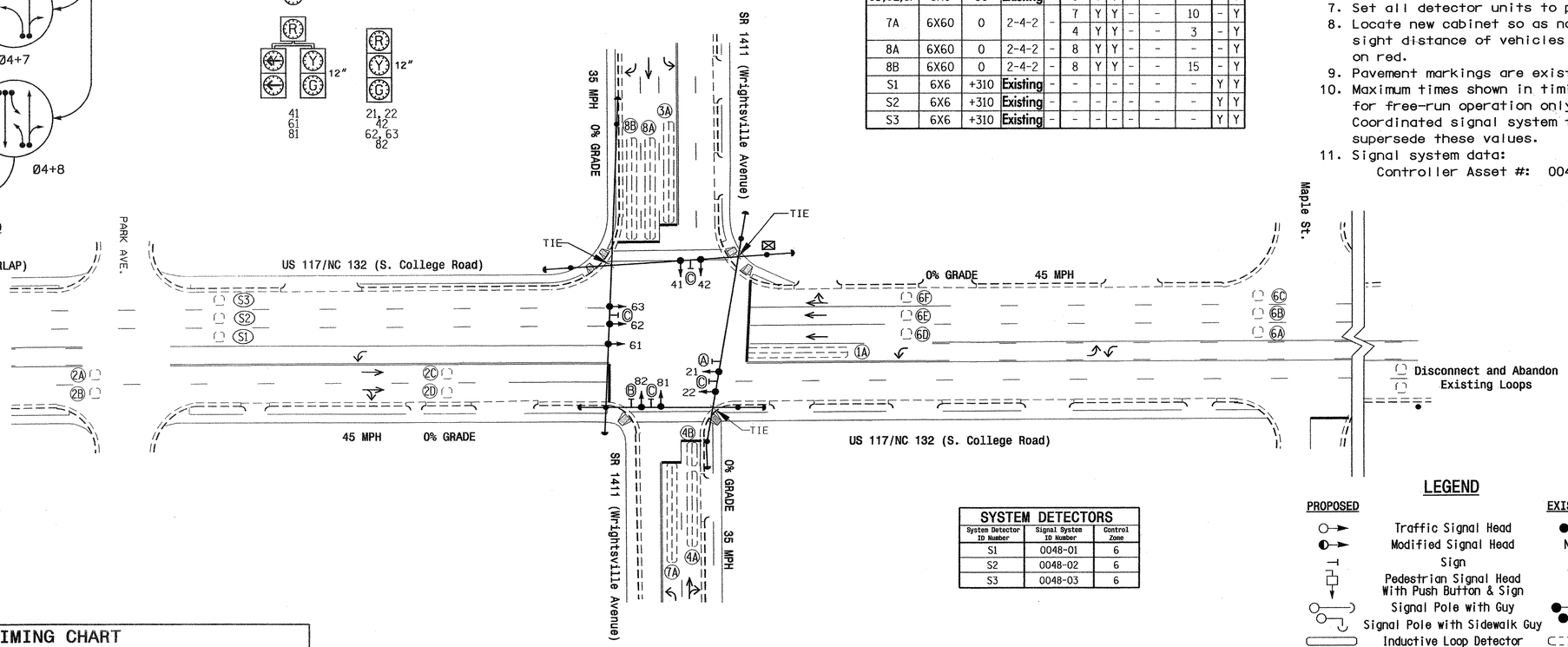
2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SISTEM LOOP	NEW CARD
1 A	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A, 2B	6X6	300	Existing	-	2	Y	Y	-	1.6	-	-	Y
2C, 2D	6X6	90	Existing	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	15	-	Y
					8	Y	Y	-	-	-	-	Y
4A	6X45	20	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X15	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A,6B,6C	6X6	300	Existing	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	Existing	-	6	Y	Y	-	-	-	-	Y
7A	6X60	0	2-4-2	-	7	Y	Y	-	-	10	-	Y
					4	Y	Y	-	-	3	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	15	-	Y
S1	6X6	+310	Existing	-	-	-	-	-	-	-	Y	Y
S2	6X6	+310	Existing	-	-	-	-	-	-	-	Y	Y
S3	6X6	+310	Existing	-	-	-	-	-	-	-	Y	Y

6 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Phase 1 may be lagged.
6. Disconnect and abandon existing Northbound system detectors.
7. Set all detector units to presence mode.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0048.



SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0048-01	6
S2	0048-02	6
S3	0048-03	6

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
A	No Left Turn Sign (R3-2)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	Street Sign	C

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	6	7	8
Min Green 1 *	4	12	7	7	12	7	7
Extension 1 *	1.0	3.0	1.0	1.5	3.0	1.0	1.5
Max Green 1 *	17	120	25	25	120	17	25
Yellow Clearance	3.0	4.5	3.0	3.8	4.5	3.0	3.8
Red Clearance	2.4	1.0	3.1	2.2	1.2	2.8	2.2
Walk 1 *	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-
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 Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geomatics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40
1"=40'

US 117/NC 132 (S. College Rd.) at SR 1411 (Wrightsville Ave.)

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 2/14/08
SIG. INVENTORY NO. 03-0048

30-JUN-2008 09:57
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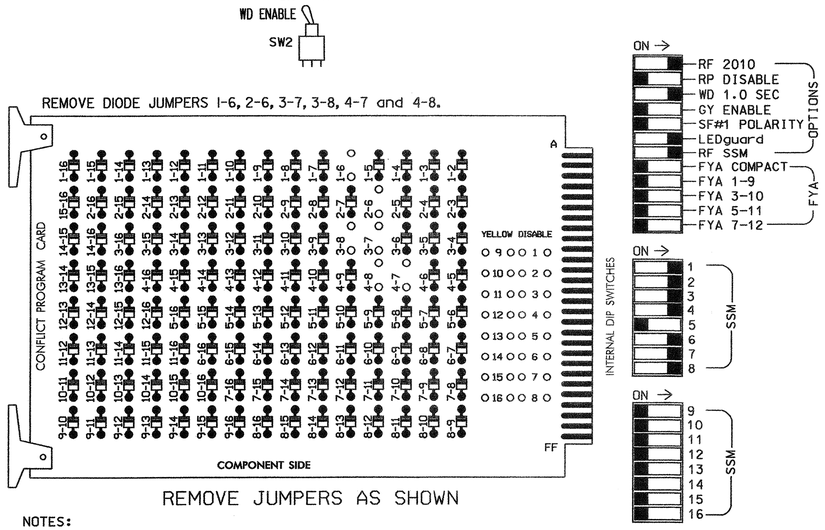
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A.42

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø1 1A	Ø2 2A,2B	SLOT	SLOT	Ø3 3A	Ø4 4A	SLOT	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø6 1A	Ø2 2C,2D	EMPTY	EMPTY	Ø8 3A	Ø4 4B	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A,6B, 6C	SLOT	SLOT	SLOT	Ø7 7A	Ø8 8A	SLOT	SYS. DET. S3	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø6 6D,6E, 6F	EMPTY	EMPTY	EMPTY	Ø4 7A	Ø8 8B	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

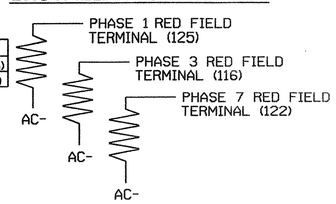
FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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

(TYPICAL)



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.

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 5,9,10, 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2C,2D	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A [2]	TB4-9,10	I6U	41	3	4	3	Y	Y			15
	TB4-11,12	I6L	45	7	14	8	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y		1.6	
6D,6E,6F	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A [3]	TB5-9,10	J6U	42	4	8	7	Y	Y			10
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			
8B	TB7-3,4	J7L	79	41	48	8	Y	Y			15
* S3	TB7-9,10	J9U	59	21	15	SYS					

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

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

[2] Add jumpers from TB4-9 to TB4-11, and from TB4-10 to TB4-12.

[3] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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	81	41,42	NU	NU	61,62 63	NU	41	81,82	NU
RED	*	128		*	101			134		*	107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126			117						123		
GREEN ARROW	127			118						124		
✋												
🚶												

NU = Not Used

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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
                 OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦   X
OMIT PHASES     ¦   X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
                 OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦       X
OMIT PHASES     ¦      X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0048
DESIGNED: March 2007
SEALED: 2/14/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117/NC 132 (S. College Road) at SR 1411 (Wrightsville Ave.)

Division 03 New Hanover County Wilmington

PLAN DATE: 9-28-07	REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding	REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 2/28/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0048

28-FEB-2008 09:28
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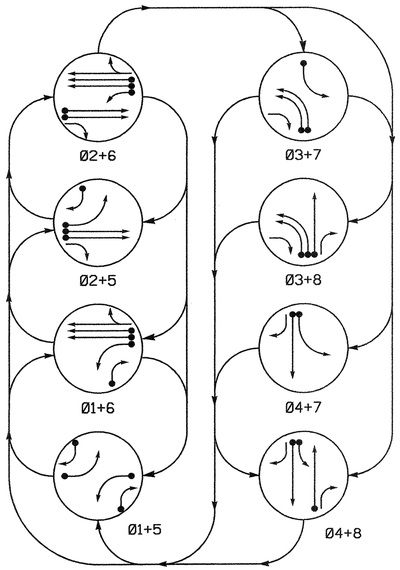
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 43

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

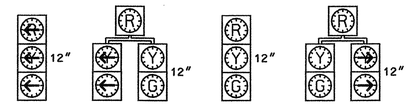
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
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	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61	R	G	G	R	G	R	R	R	R	Y
62, 63	R	G	R	G	R	R	R	R	Y
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	6X60	+10	Existing	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	Y	—	3	-	Y
1B	6X60	+5	2-4-2	-	1	Y	Y	-	—	15	-	Y
2A	6X6	250	Existing	-	2	Y	Y	-	—	—	-	Y
2B	6X6	250	Existing	-	2	Y	Y	-	—	—	-	Y
3A	6X60	+5	2-4-2	-	3	Y	Y	-	—	3	-	Y
3B	6X60	+5	2-4-2	-	3	Y	Y	-	—	—	-	Y
4A	6X60	+5	Existing	-	4	Y	Y	-	—	—	-	Y
5A	6X70	+10	Existing	-	5	Y	Y	-	—	—	-	Y
5B	6X40	0	Existing	-	5	Y	Y	-	—	15	-	Y
6A	6X6	250	Existing	-	6	Y	Y	-	—	—	-	Y
6B	6X6	250	Existing	-	6	Y	Y	-	—	—	-	Y
6C	6X6	250	Existing	-	6	Y	Y	-	—	—	-	Y
7A	6X40	+5	2-4-2	-	7	Y	Y	-	—	10	-	Y
					4	Y	Y	-	—	3	-	Y
8A	6X60	+5	2-4-2	-	8	Y	Y	-	—	—	-	Y
S1	6X6	390	Existing	-	-	-	-	-	—	—	Y	Y
S2	6X6	390	Existing	-	-	-	-	-	—	—	Y	Y
S3	6X6	390	Existing	-	-	-	-	-	—	—	Y	Y
S4	6X6	+150	4	Y	-	-	-	-	—	—	Y	Y
S5	6X6	+150	4	Y	-	-	-	-	—	—	Y	Y

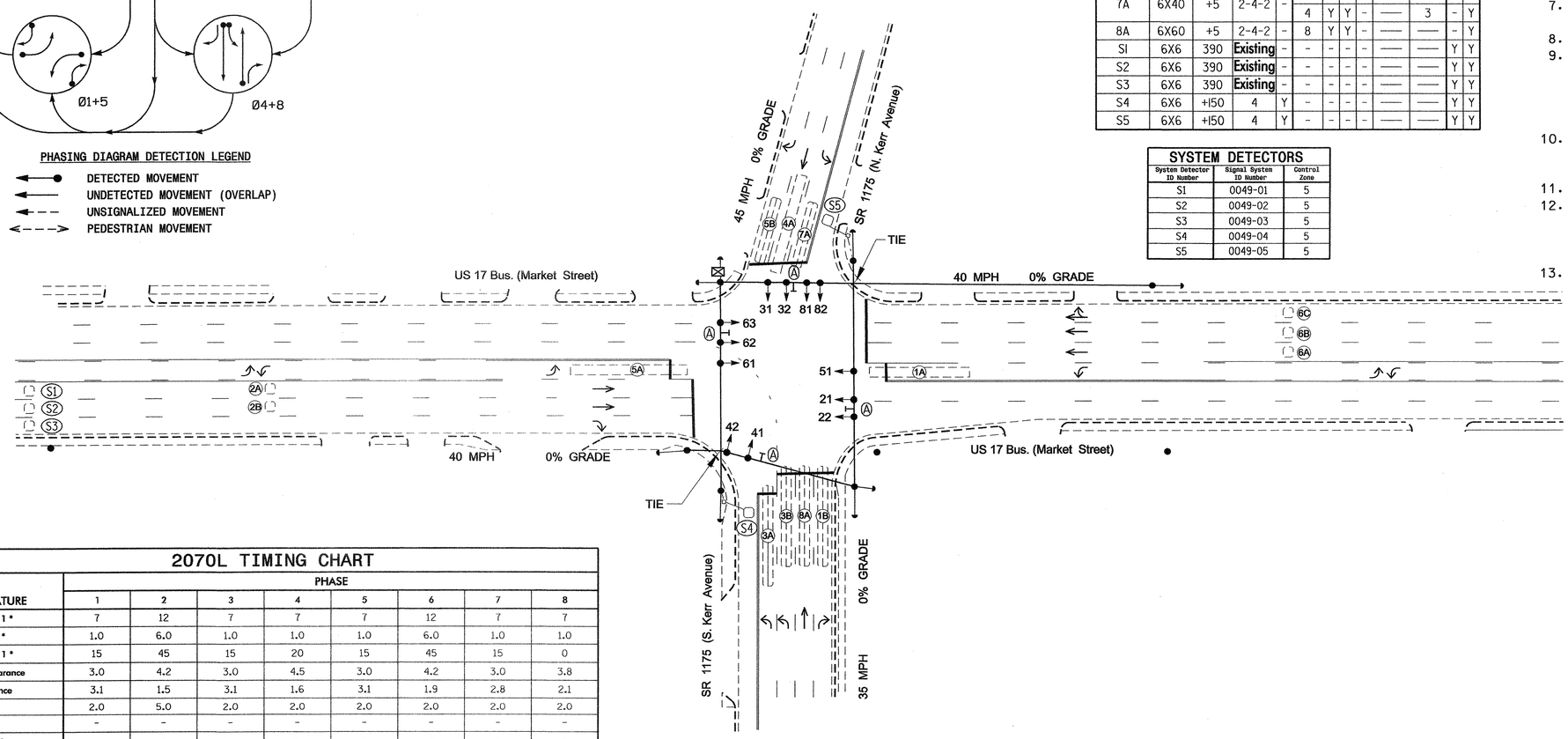
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0049-01	5
S2	0049-02	5
S3	0049-03	5
S4	0049-04	5
S5	0049-05	5

8 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer
3. Omit phase 3 during phase 4 on.
4. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2 to phase 2+5 by progressing through an all red display.
5. Phase 1 may be lagged.
6. Phase 7 may be lagged.
7. Renumber existing signal heads and loops as shown.
8. Set all detector units to presence mode.
9. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
10. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
11. Pavement markings are existing.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Signal system data:
    Controller Asset #: 0049.



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	
	Street Sign	

2070L 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 *	1.0	6.0	1.0	1.0	1.0	6.0	1.0	1.0
Max Green 1 *	15	45	15	20	15	45	15	0
Yellow Clearance	3.0	4.2	3.0	4.5	3.0	4.2	3.0	3.8
Red Clearance	3.1	1.5	3.1	1.6	3.1	1.9	2.8	2.1
Red Revert	2.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.4	-	-	-	1.4	-	-
Max Variable Initial *	-	24	-	-	-	24	-	-
Time Before Reduction *	-	10	-	-	-	10	-	-
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
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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 17 Bus. (Market Street)
at
SR 1175 (Kerr Avenue)

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2007	REVIEWED BY:
PREPARED BY:	Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

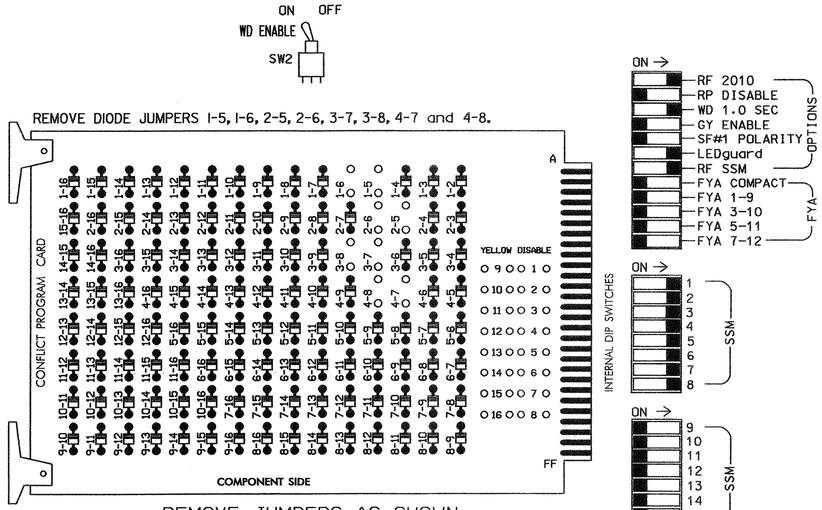
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZEMBA
SIGNATURE 4/21/08 DATE
SIG. INVENTORY NO. 03-0049

31-JUL-2008 11:48
s:\ite signals\workgroups\alexander\u-5017 (wilmington city system)\03-0049\030049_sig_dsn_20080421.dgn
czemba3

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 44

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 phase 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
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.	61,82	21,22	NU	22	31,32	41,42	NU	42	51	61, 62,63	NU	41	81,82	NU
RED	*	128				101				134		*	107	
YELLOW		129				102				135			108	
GREEN		130				103				136			109	
RED ARROW					116				131					
YELLOW ARROW	126			117	117			132	132			123		
GREEN ARROW	127			118	118			133	133			124		

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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.

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 1B	Ø 1 1A	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 6 1A	Ø 2 2B			Ø 3 3B	NOT USED		SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 5 5A	Ø 6 6A	Ø 6 6C	SLOT EMPTY	Ø 7 7A	Ø 8 8A	SYS. DET. S3	SYS. DET. S4	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 5 5B	Ø 6 6B	NOT USED		Ø 4 7A	NOT USED	NOT USED	SYS. DET. S5					

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
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	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	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
6C	TB5-1,2	J4U	48	10	26	6	Y	Y			
7A[2]	TB5-9,10	J6U	42	4	8	7	Y	Y			10
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			
* 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					

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

[2] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.

* 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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Function 1.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

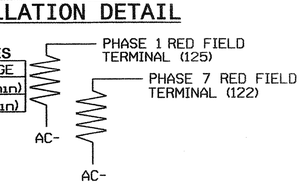
```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦   X
OMIT PHASES     ¦  X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

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: 03-0049
DESIGNED: March 2007
SEALED: 04-21-08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Traffic Control Branch
Signals Management Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pwky, Garner, NC 27529

US 17 Bus. (Market Street)
at
SR 1175 (Kerr Avenue)

Division 3 New Hanover County Wilmington
PLAN DATE: April 2008 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

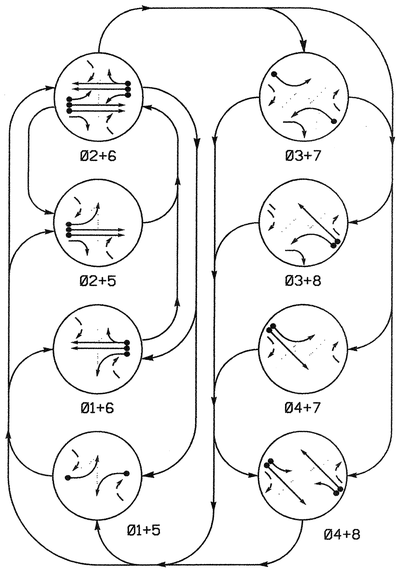
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 4-24-08
SIG. INVENTORY NO. 03-0049

24-APR-2008 13:13
s:\traffic\Signal\Workgroups\sig mpm\petersonM030049_smu_ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 45

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

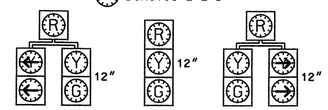
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
23	R	R	G	G	R	R	R	R	Y
41	R	R	R	R	R	R	G	G	R
42, 43	R	R	R	R	R	R	G	G	R
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R	R	R	R	Y
81	R	R	R	R	R	G	R	G	R
82, 83	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



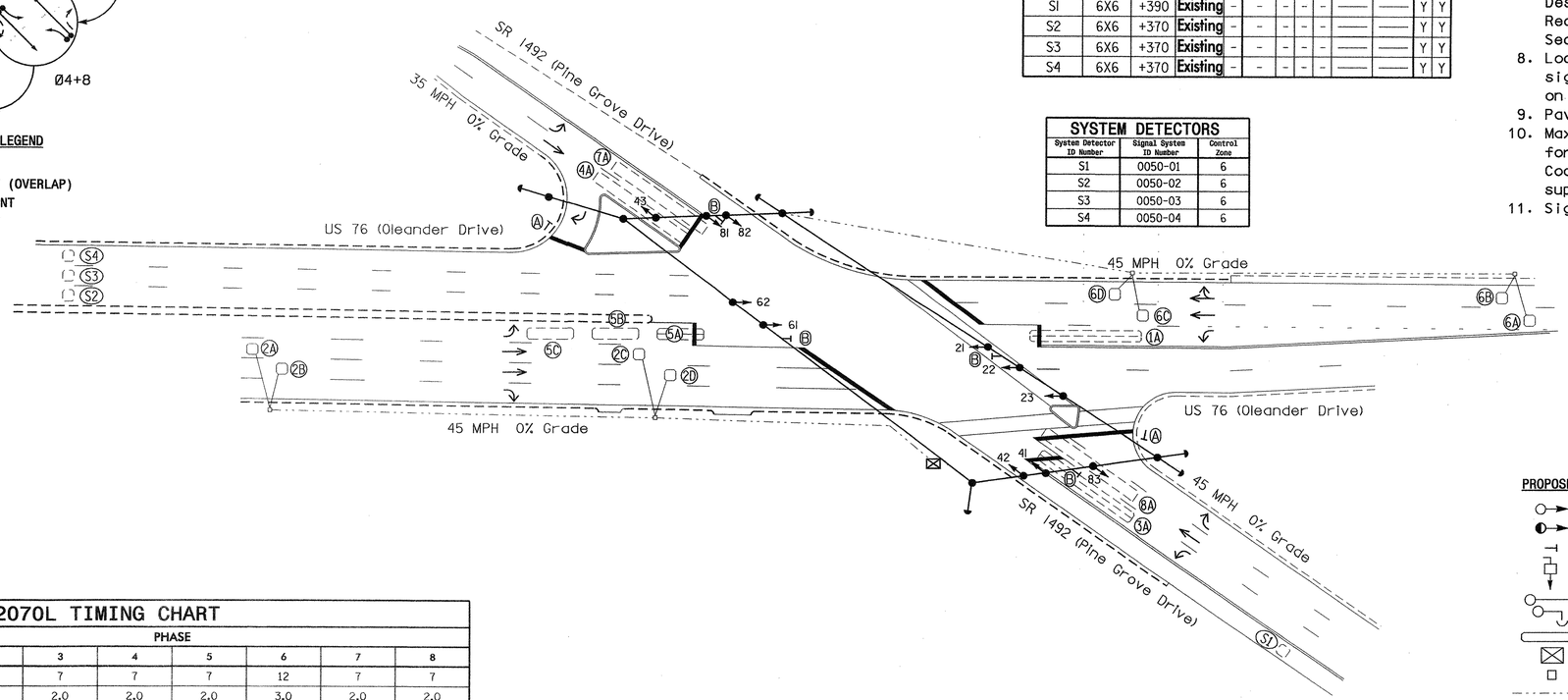
21, 41, 61, 81 — 22, 42, 43, 62, 82, 83 — 23

2070L 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	6X60	+5	2-4-2	-	1	Y	Y	-	——	15	-	Y
					6	Y	Y	-	——	-	-	Y
2A, 2B	6X6	300	5	Y	2	Y	Y	-	1.6	——	-	Y
2C, 2D	6X6	90	4	Y	2	Y	Y	-	——	——	-	Y
3A	6X60	+5	2-4-2	-	3	Y	Y	-	——	15	-	Y
					8	Y	Y	-	——	3	-	Y
4A	6X60	0	Existing	-	4	Y	Y	-	——	——	-	Y
5A	6X25	+5	2-4-2	-	5	Y	Y	-	——	15	-	Y
					2	Y	Y	-	——	-	-	Y
5B, 5C	6X25	30, 65	Existing	-	5	Y	Y	-	——	——	-	Y
6A, 6B	6X6	300	6	Y	6	Y	Y	-	1.6	——	-	Y
6C, 6D	6X6	90	5	Y	6	Y	Y	-	——	——	-	Y
7A	6X60	+5	Existing	-	7	Y	Y	-	——	15	-	Y
					4	Y	Y	-	——	3	-	Y
8A	6X60	0	Existing	-	8	Y	Y	-	——	——	-	Y
S1	6X6	+390	Existing	-	-	-	-	-	——	——	Y	Y
S2	6X6	+370	Existing	-	-	-	-	-	——	——	Y	Y
S3	6X6	+370	Existing	-	-	-	-	-	——	——	Y	Y
S4	6X6	+370	Existing	-	-	-	-	-	——	——	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0050-01	6
S2	0050-02	6
S3	0050-03	6
S4	0050-04	6



6 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Enable Backup Protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1+6 or 2+5 by progressing through an all red display.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0050.

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	
	"YIELD" Sign (R1-2)	
	Street Sign	

2070L 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	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	15	60	20	35	15	60	20	35
Yellow Clearance	3.0	4.5	3.2	3.8	3.0	4.5	3.2	4.5
Red Clearance	2.3	1.4	3.9	3.3	1.9	1.7	3.8	2.6
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 76 (Oleander Drive) at SR 1492 (Pine Grove Drive)

Division 3 New Hanover County Wilmington

PLAN DATE:	November 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

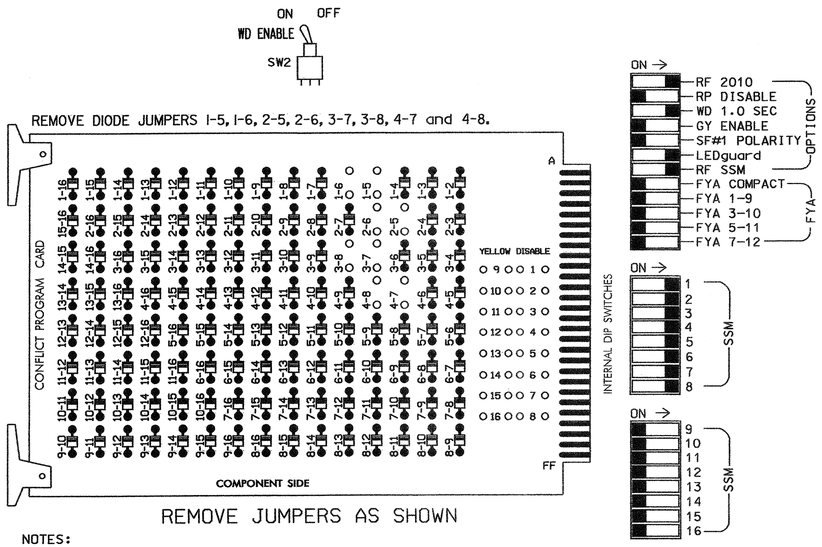
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELINSKI
SIGNATURE 4/14/08 DATE
SIG. INVENTORY NO. 03-0050

30-JUL-2008 17:26
s:*its signals\workgroups\alexander\u-5017 (wilmington city system)\03-0050\03050_sig_dsn_20080414.dgn
rzlemco

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A.A6

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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.	61	21 22,23	NU	23,81	41 42,43	NU	21	61,62	NU	41	81 82,83	NU
RED	*	128		*	101		*	134		*	107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		

NU = Not Used

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

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 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

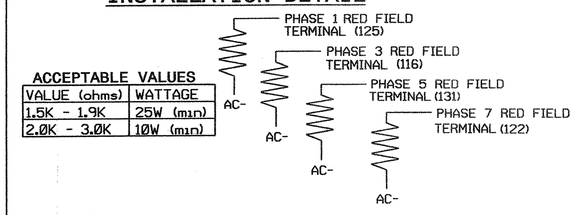
(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø1	Ø2	SLOT	SLOT	Ø3	Ø4	SLOT	SYS. DET.	SLOT	SLOT	SLOT	SLOT	FS
			1A	2A,2B			3A	4A		S1					DC ISOLATOR
	L	EMPTY	Ø6	Ø2	EMPTY	EMPTY	Ø8	NOT USED	EMPTY	SYS. DET.	EMPTY	EMPTY	EMPTY	EMPTY	ST
			1A	2C,2D			3A			S2					DC ISOLATOR
FILE "J"	U	Ø5	Ø5	Ø6	SLOT	SLOT	Ø7	Ø8	SLOT	SYS. DET.	SLOT	SLOT	SLOT	SLOT	SLOT
		5B,5C	5A	6A,6B			7A	8A		S3					
	L	NOT USED	Ø2	Ø6	EMPTY	EMPTY	Ø4	NOT USED	EMPTY	SYS. DET.	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
			5A	6C,6D			7A			S4					

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

FS = FLASH SENSE
ST = STOP TIME

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.

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2C,2D	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A [2]	TB4-9,10	I6U	41	3	4	3	Y	Y			15
	TB4-11,12	I6L	45	7	14	8	Y	Y			3
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
5A [3]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
5B,5C	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6C,6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A [4]	TB5-9,10	J6U	42	4	8	7	Y	Y			15
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			
* 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					
* S4	TB7-11,12	J9L	61	23	17	SYS					

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.
[2] Add jumpers from TB4-9 to TB4-11, and from TB4-10 to TB4-12.
[3] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.
[4] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0050
DESIGNED: November 2007
SEALED: 4/14/08
REVISED:

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦   X
OMIT PHASES     ¦  X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦       X
OMIT PHASES     ¦      X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 76 (Oleander Drive)
at
SR 1492 (Pine Grove Drive)

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008		REVIEWED BY: T. Jaja	
PREPARED BY: G. C. Brown		REVIEWED BY:	
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 4/24/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0050

23-APR-2008 13:39
s:\its\sig\workgroups\sig management\03050_smele_2008xxxx.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.47

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	FLASH
41, 42	R	G	R
6A, 6B, 6C	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

41, 42
61, 62, 63
81, 82

2070L 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
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
6A/S1	6X6	250	Existing	-	6	Y	Y	-	-	-	Y	Y
6B/S2	6X6	250	Existing	-	6	Y	Y	-	-	-	Y	Y
6C/S3	6X6	250	Existing	-	6	Y	Y	-	-	-	Y	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	3	-	Y

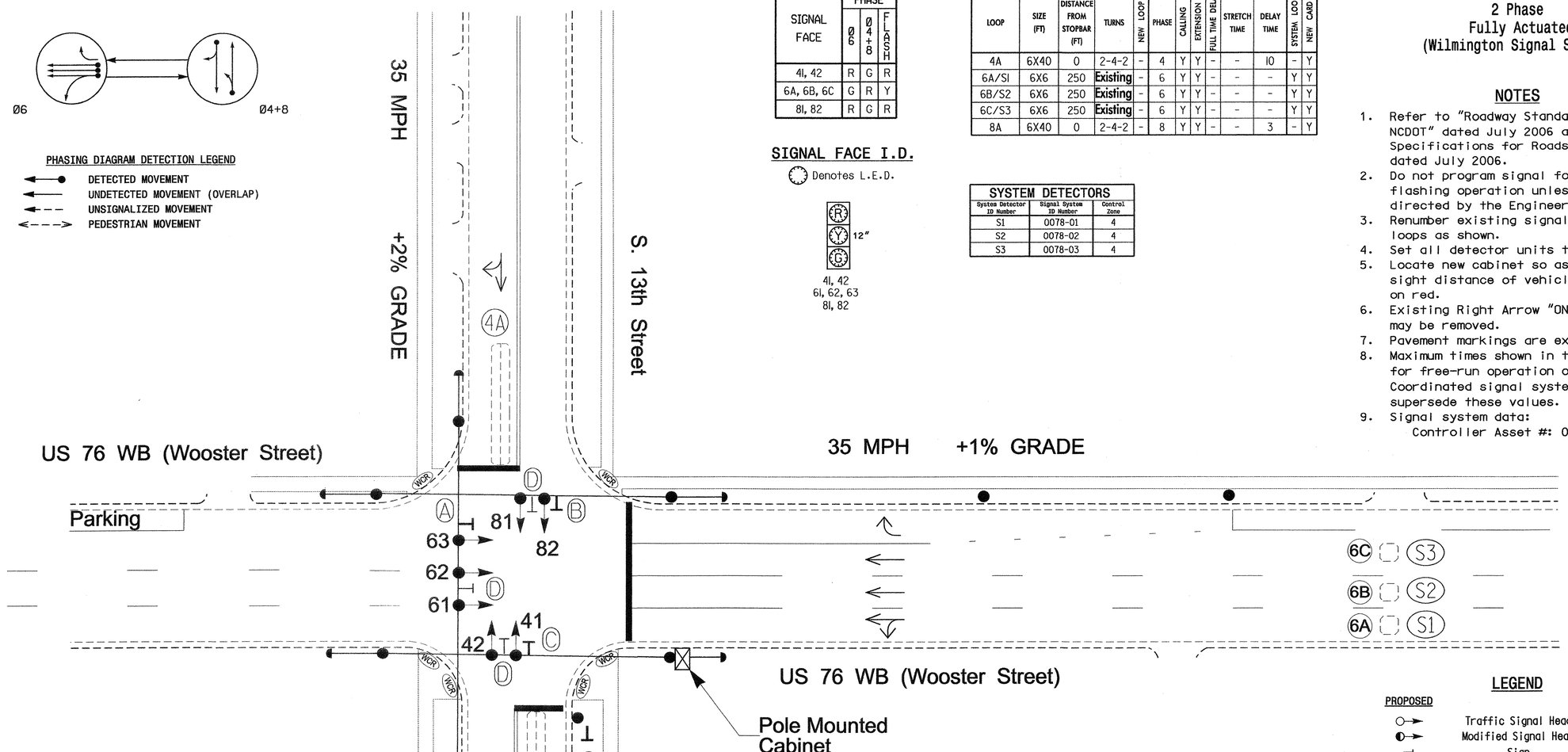
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0078-01	4
S2	0078-02	4
S3	0078-03	4

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Existing Right Arrow "ONLY" sign (R3-5R) may be removed.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0078.



2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7
Extension 1 *	2.0	6.0	2.0
Max Green 1 *	15	30	15
Yellow Clearance	3.7	3.8	4.0
Red Clearance	1.2	1.1	1.4
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	1.3	-
Max Variable Initial *	-	24	-
Time Before Reduction *	-	10	-
Time To Reduce *	-	30	-
Minimum Gap	-	3.0	-
Recall Mode	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-
Dual Entry	ON	-	ON
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.

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	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	No Right Turn Sign (R3-1)	B
C	No Left Turn Sign (R3-2)	C
D	Street Sign	D

Signal Upgrade

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

SCALE 0 20 1"=20'

US 76 WB (Wooster Street)
at
S. 13th Street

Division 3 New Hanover County Wilmington

PLAN DATE: December 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

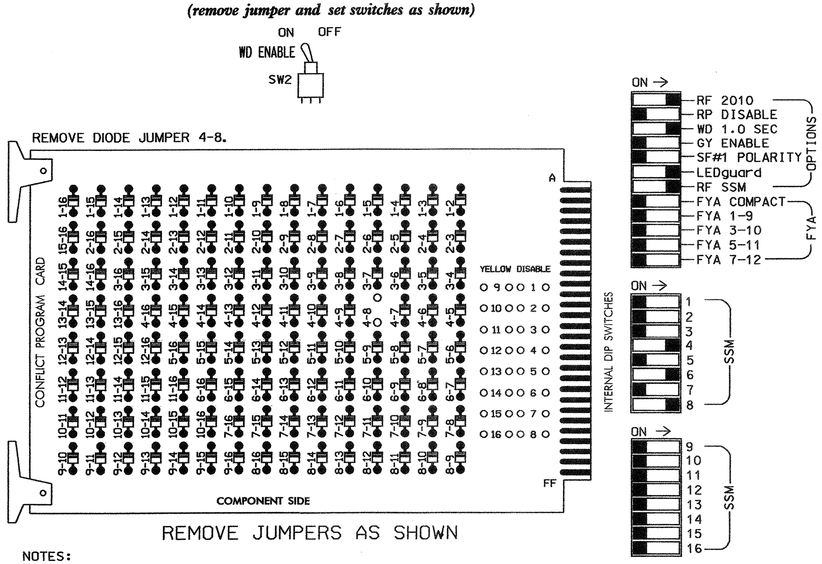
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/21/08 DATE
SIG. INVENTORY NO. 03-0078

21-APR-2008 14:17
s:\ts signals\workgroups\alexander\u-5017 (wilmington city system)\03-0078\03078_sig_dsn_20080421.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 48

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper 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 1,2,3, 5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
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.	NU	NU	NU	NU	41,42	NU	NU	61, 62,63	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 / 4A	NOT USED	Ø6/SYS / 6A/S1	SLOT EMPTY	Ø 8 / 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS / DC ISOLATOR
L				NOT USED	Ø6/SYS / 6C/S3	Ø6/SYS / 6B/S2		NOT USED						ST / DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6C/S3	TB23-9,10	I5L	48	10	26	6/SYS	Y	Y			
6A/S1	TB21-11,12	I6U	40	2	6	6/SYS	Y	Y			
6B/S2	TB23-11,12	I6L	44	6	16	6/SYS	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0078
DESIGNED: December 2007
SEALED: 04-21-08
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 76 WB (Wooster Street)
at
S. 13th Street

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

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

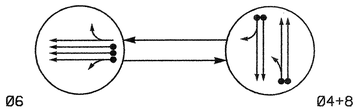
SIGNATURE DATE 4-23-08

SIG. INVENTORY NO. 03-0078

22-APR-2008 09:01
s:\ts\signals\working\groups\sig mon\petersonw\03078_sm_ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5649

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	FLASH
41, 42	R	G	R
61, 62, 63	G	R	Y
81, 82	R	G	R

2070L LOOP & DETECTOR INSTALLATION

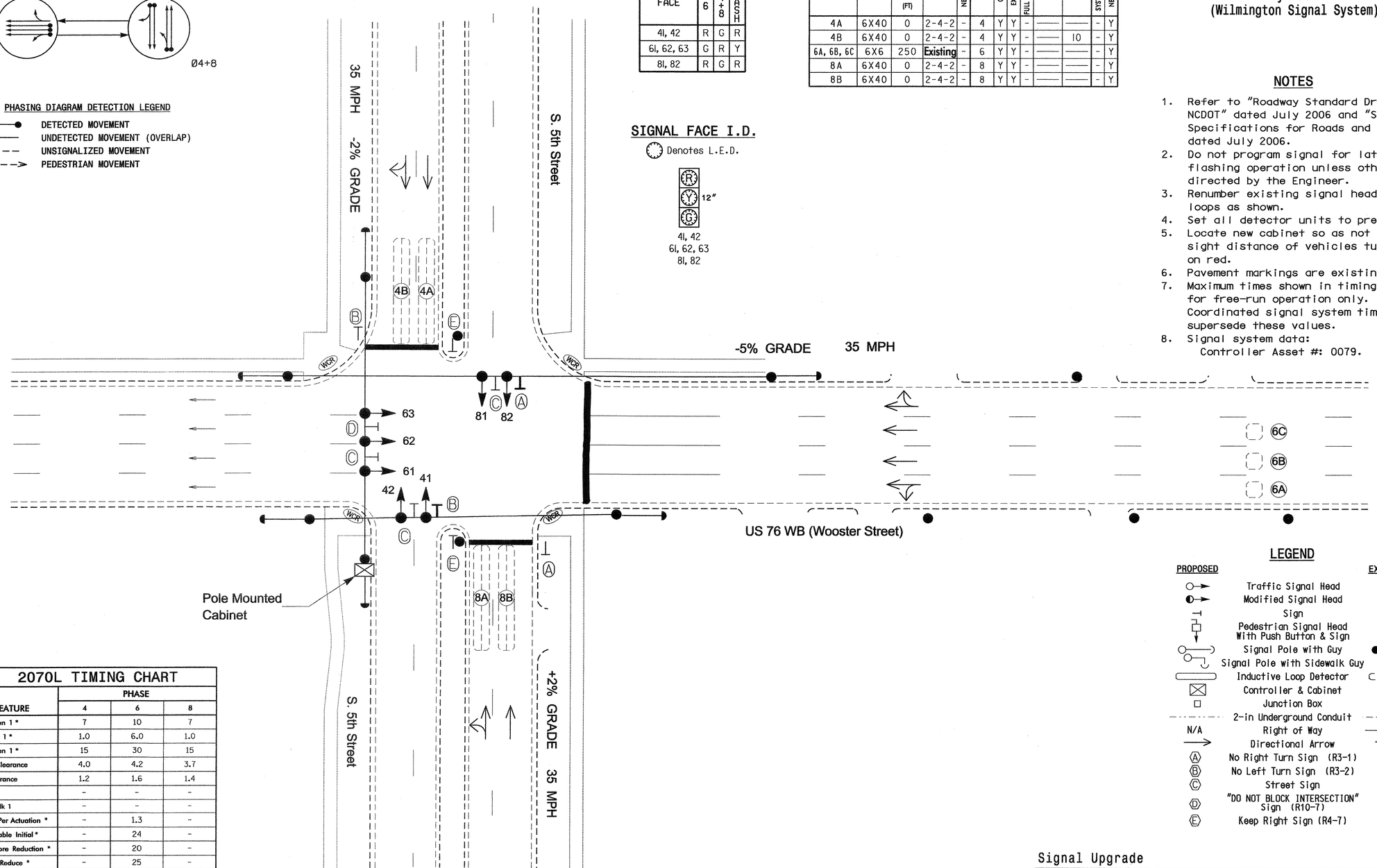
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	——	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	——	10	-	Y
6A, 6B, 6C	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	——	——	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

SIGNAL FACE I.D.

Denotes L.E.D.

41, 42
61, 62, 63
81, 82



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0079.

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	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Street Sign	C
D	"DO NOT BLOCK INTERSECTION" Sign (R10-7)	D
E	Keep Right Sign (R4-7)	E

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7
Extension 1 *	1.0	6.0	1.0
Max Green 1 *	15	30	15
Yellow Clearance	4.0	4.2	3.7
Red Clearance	1.2	1.6	1.4
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	1.3	-
Max Variable Initial *	-	24	-
Time Before Reduction *	-	20	-
Time To Reduce *	-	25	-
Minimum Gap	-	3.0	-
Recall Mode	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-
Dual Entry	ON	-	ON
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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20
1"=20'

US 76 WB (Wooster Street) at S. 5th Street

Division 3 New Hanover County Wilmington

PLAN DATE: January 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

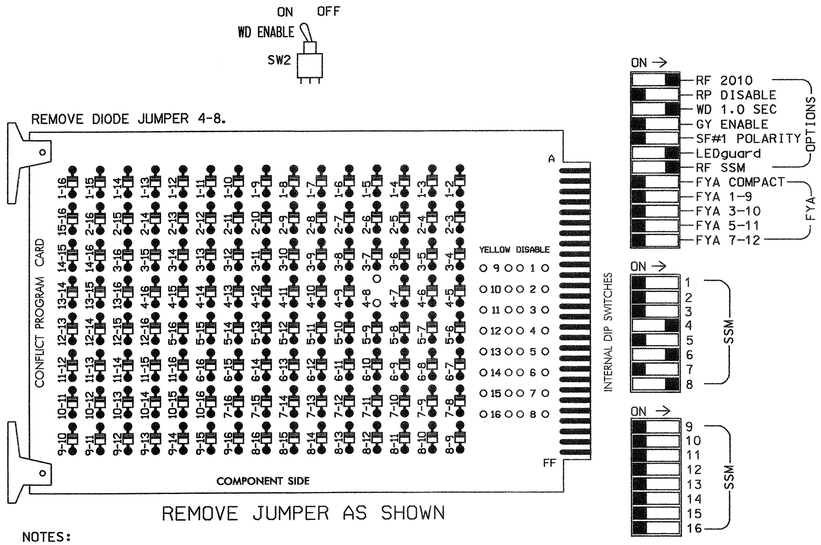
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/15/08 DATE
SIG. INVENTORY NO. 03-0079

15-MAY-2008 11:41
U:\ATS\signals\groups\alexander\u-5017 (wilmington city system)\03-0079\03079_sig_dsn_20080515.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig.5D

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPER 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 1,2,3,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are a part of the Wilmington Signal system.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
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.	NU	NU	NU	NU	41,42	NU	NU	61, 62,63	NU	NU	81,82	NU
RED					1Ø1			134			1Ø7	
YELLOW					1Ø2			135			1Ø8	
GREEN					1Ø3			136			1Ø9	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			1Ø
6A,6B,6C	TB21-11,12	I6U	4Ø	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0079
DESIGNED: January 2008
SEALED: 05-15-08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 76 WB (Wooster Street)
at
S. 5th Street

Division 3 New Hanover County Wilmington

PLAN DATE: May 2008 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

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

John T. Rowe Jr. 5-19-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0079

15-MAY-2008 14:12
s:\traffic\signals\workgroups\sig mandpeterson\2070gen336.dgn
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.51

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

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

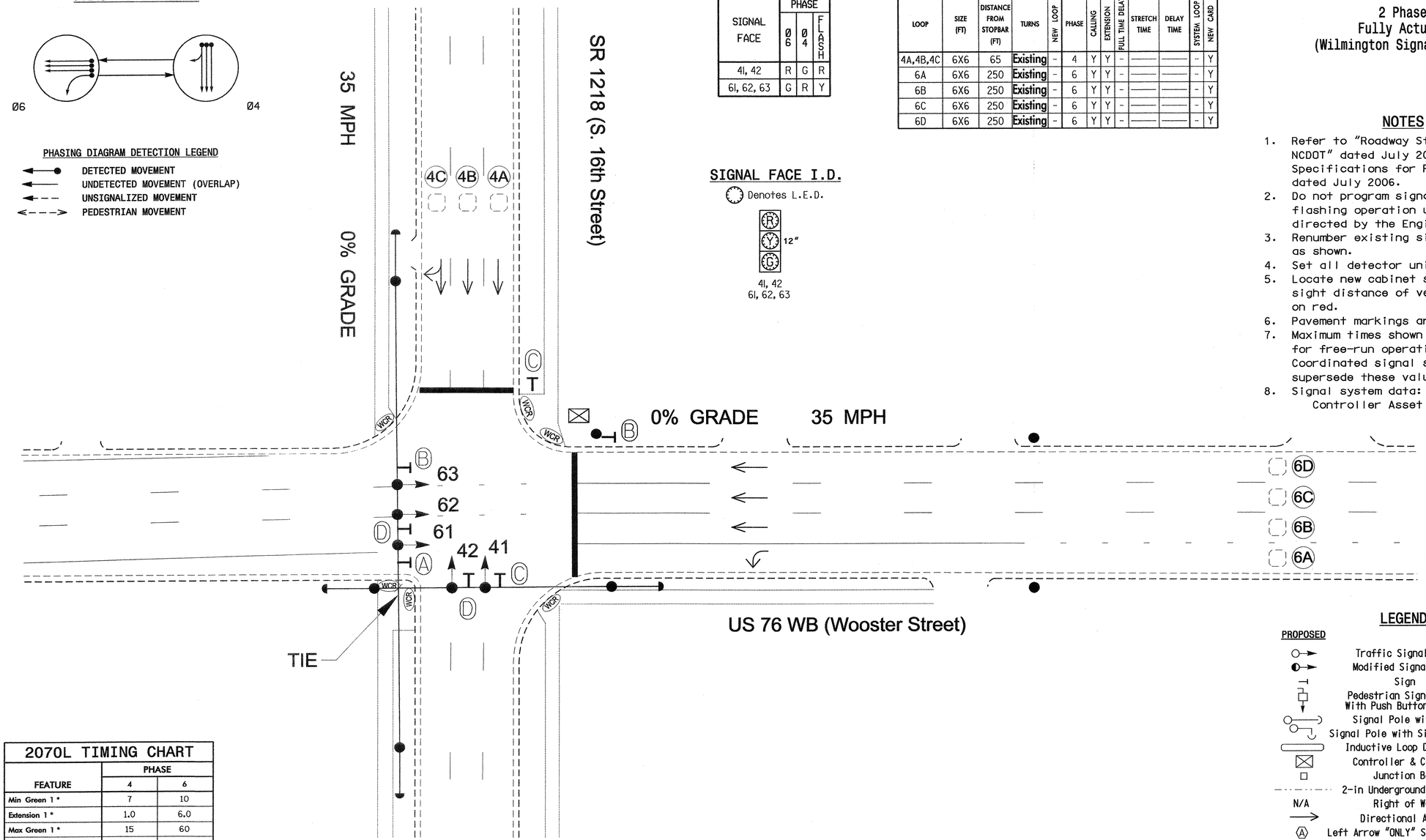


TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø6	PHASE Ø4	FLASH
41, 42	R	G	R
61, 62, 63	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

41, 42
61, 62, 63

2070L 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
4A,4B,4C	6X6	65	Existing	-	4	Y	Y	-	——	——	-	Y
6A	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
6B	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
6C	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
6D	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0080.

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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	No Right Turn Sign (R3-1)	B
C	No Left Turn Sign (R3-2)	C
D	Street Sign	D

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6
Min Green 1 *	7	10
Extension 1 *	1.0	6.0
Max Green 1 *	15	60
Yellow Clearance	3.8	3.8
Red Clearance	1.4	1.1
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	1.3
Max Variable Initial *	-	24
Time Before Reduction *	-	10
Time To Reduce *	-	20
Minimum Gap	-	3.0
Recall Mode	-	MIN RECALL
Vehicle Call Memory	YELLOW	YELLOW
Dual Entry	-	-
Simultaneous Gap	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.

Signal Upgrade

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

SCALE 0 20 1"=20'

US 76 WB (Wooster Street)
at
SR 1218 (S. 16th Street)

Division 3 New Hanover County Wilmington

PLAN DATE: January 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

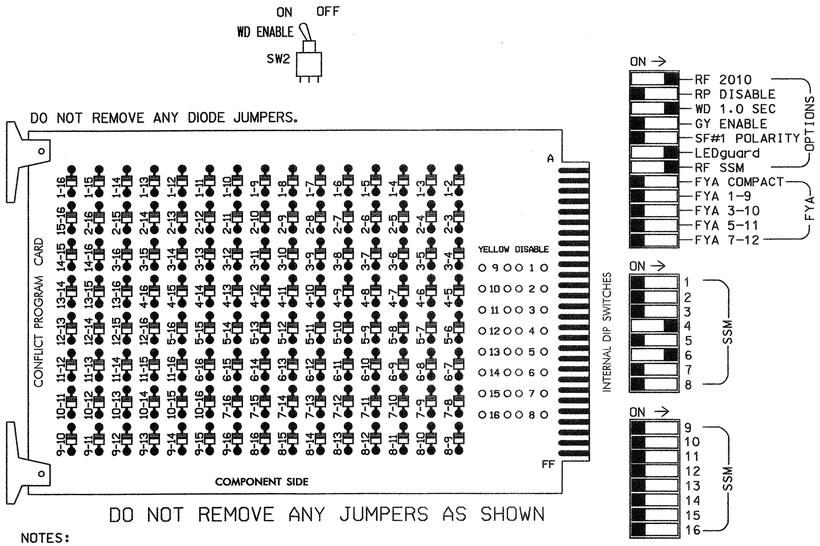
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE
DATE 5/13/08
SIG. INVENTORY NO. 03-0080

13-MAY-2008 17:32
s:\its signals\workgroups\wilexander\u-5017 (wilmington city system)\03-0080\03080_sig_dsn_20080513.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 52

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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, 5,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phase 6, on the controller unit, for Variable Initial Gap Reduction.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6
PHASES USED.....4,6
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.	NU	NU	NU	NU	41,42	NU	NU	61, 62,63	NU	NU	NU	NU
RED					101			134				
YELLOW					102			135				
GREEN					103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A,4B,4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L						NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 6 6B	Ø 6 6D											

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
4A,4B,4C	TB4-9,10	I6U	41	3	4	4	Y	Y			
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			
6D	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0080
DESIGNED: January 2008
SEALED: 05-13-08
REVISED: N/A

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 76 WB (Wooster Street)
at
SR 1218 (S. 16th Street)

Division 3 | New Hanover County | Wilmington

PLAN DATE: May 2008 | REVIEWED BY: JTR
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

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

John T. Rowe 5-21-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0080

20-MAY-2008 14:41
s:\its signals\workgroups\sig mgmt\petersonj\03080_smlele.xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.53

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø8	FLASH
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

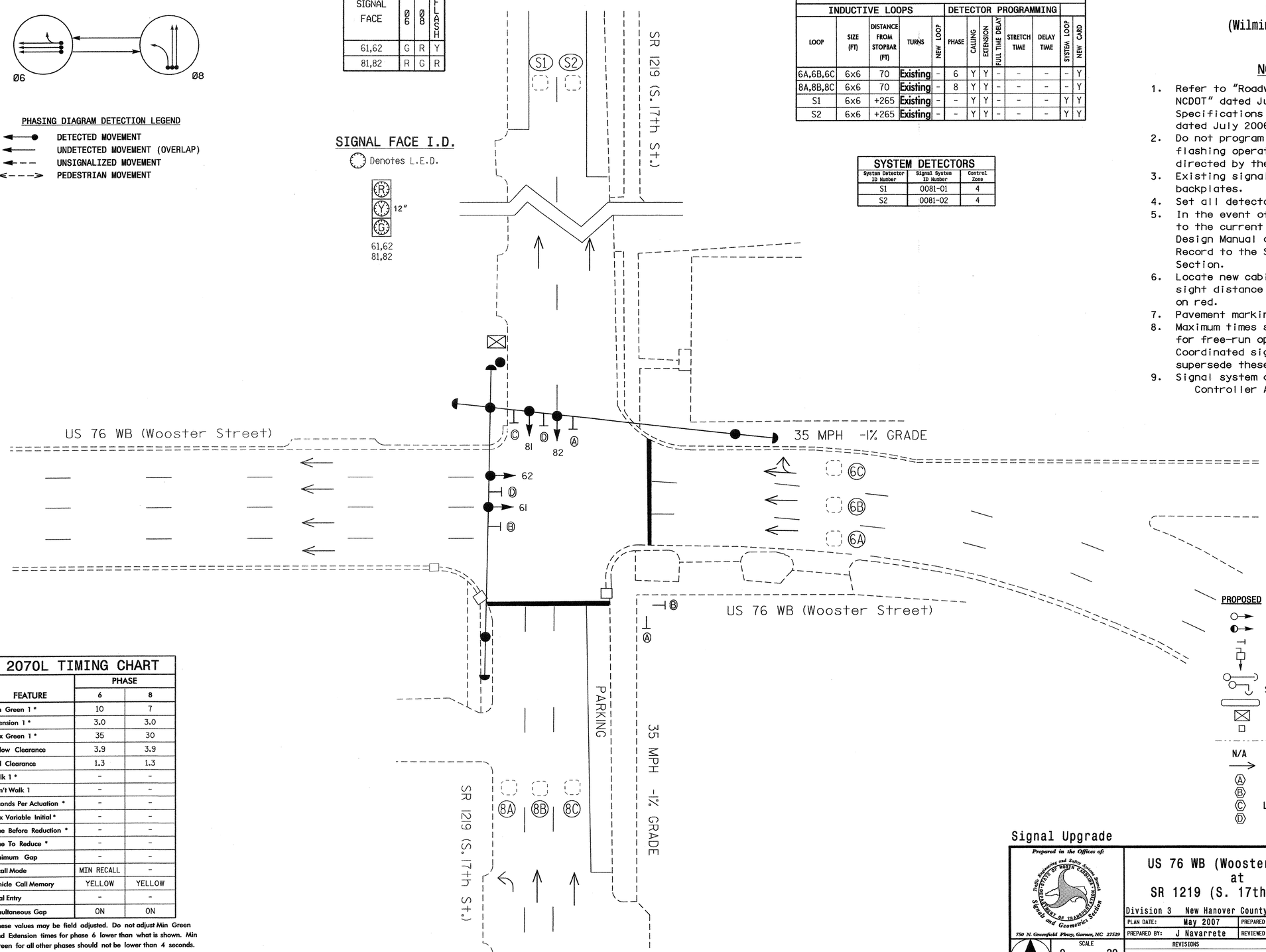
61,62
81,82

2070L 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
6A,6B,6C	6x6	70	Existing	-	6	Y	Y	-	-	-	-	Y
8A,8B,8C	6x6	70	Existing	-	8	Y	Y	-	-	-	-	Y
S1	6x6	+265	Existing	-	-	Y	Y	-	-	-	Y	Y
S2	6x6	+265	Existing	-	-	Y	Y	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0081-01	4
S2	0081-02	4



2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Existing signal heads 61 and 62 have backplates.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0081.

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	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Left Arrow "ONLY" Sign (R3-5L)	C
D	Street Sign	D

2070L TIMING CHART

FEATURE	PHASE 6	PHASE 8
Min Green 1 *	10	7
Extension 1 *	3.0	3.0
Max Green 1 *	35	30
Yellow Clearance	3.9	3.9
Red Clearance	1.3	1.3
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	YELLOW
Dual Entry	-	-
Simultaneous Gap	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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometric Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

US 76 WB (Wooster Street) at SR 1219 (S. 17th Street)

Division 3 New Hanover County Wilmington

PLAN DATE: May 2007 PREPARED BY: Sterling
PREPARED BY: J Navarrete REVIEWED BY:

REVISIONS	INIT.	DATE

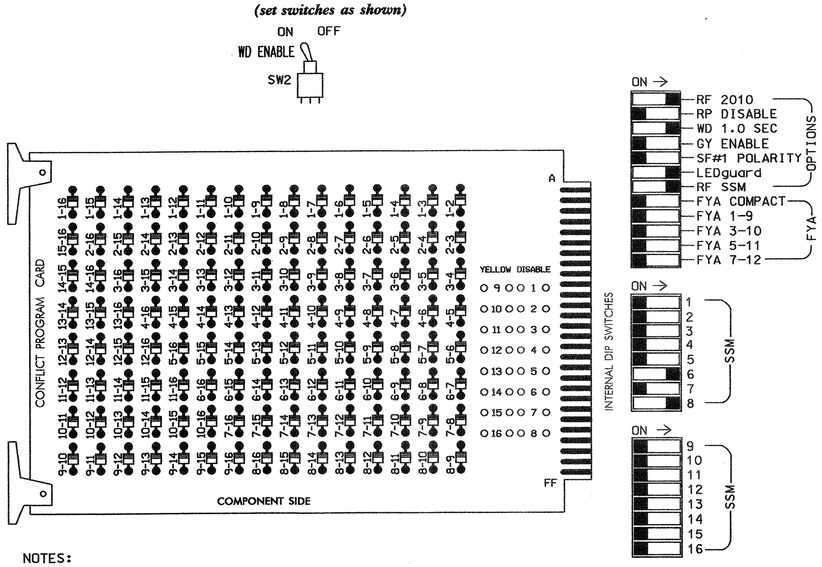
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELINSKI
SIGNATURE DATE
SIG. INVENTORY NO. 03-0081

09-APR-2008 09:29
s:\ts\signals\workgroups\alexander\u-5017 (wilmington city system)\03-0081\03081_sig_dsn_20080402.dgn
rzielinski

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	56.54

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS / DC ISOLATOR
	L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	EMPTY	ST / DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A,6B 6C	SLOT	SLOT	SLOT	Ø8 8A,8B 8C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

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, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S6,S8
PHASES USED.....6,8
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.	NU	NU	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU
RED								134			107	
YELLOW								135			108	
GREEN								136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

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
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A,8B,8C	TB5-9,10	J6U	42	4	8	8	Y	Y			

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0081
DESIGNED: May 2007
SEALED: 4-2-08
REVISED: N/A

Signal Upgrade

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

122 N. McDowell St., Raleigh, NC 27603

US 76 WB (Wooster Street)
at
SR 1219 (S. 17th Street)

Division 03 | New Hanover County | Wilmington

PLAN DATE: 4-4-08 | REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

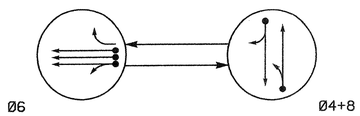
SIGNATURE | DATE 4/9/08

SIG. INVENTORY NO. 03-0081

04-APR-2008 17:24
S:\Traffic Signal\Workgroups\sig mgmt\spaulding\in-progress\030081.sm.elt.2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.55

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	PHASE FLASH
41, 42	R	G	R
61, 62, 63	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

41, 42
61, 62, 63
81, 82

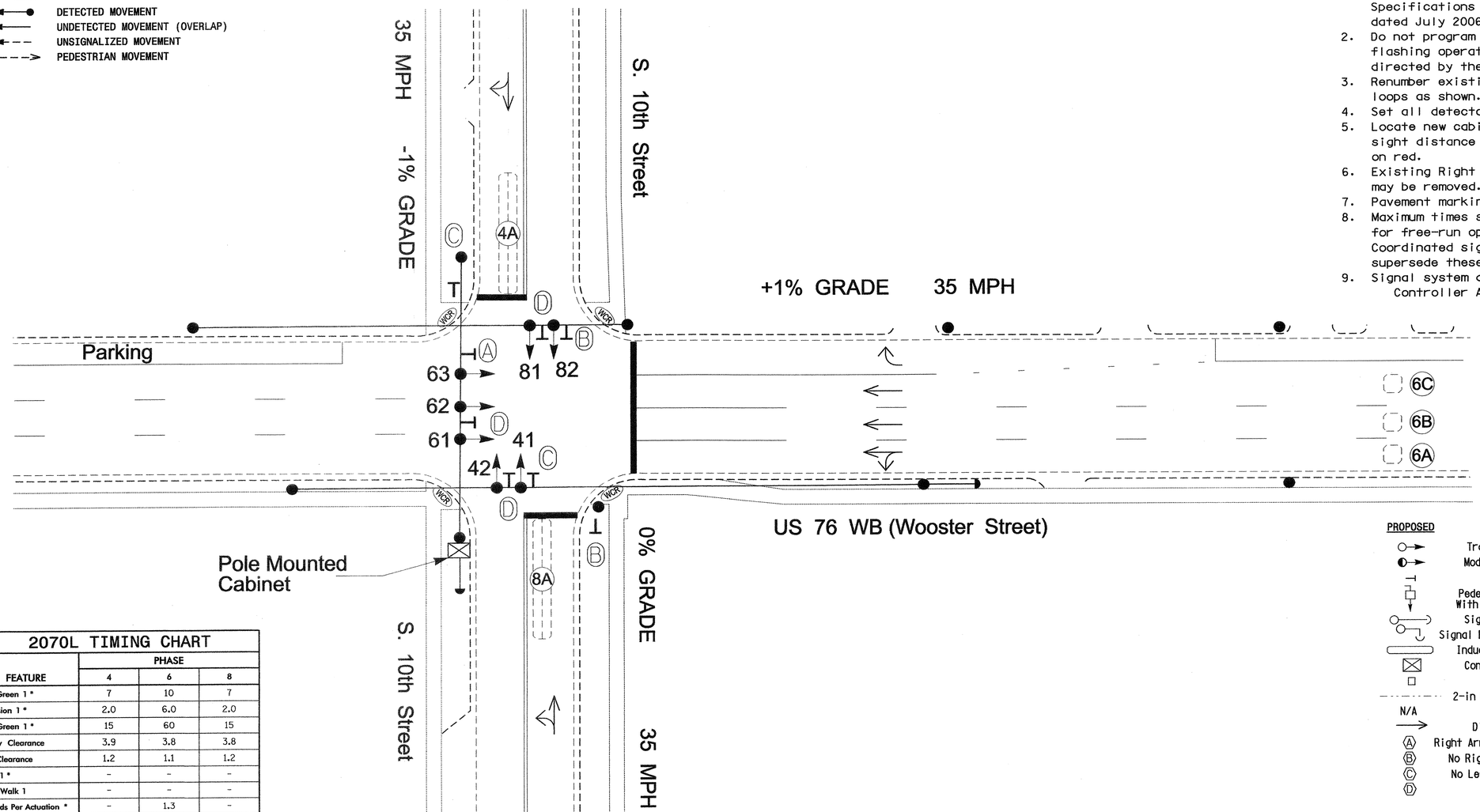
2070L LOOP & DETECTOR INSTALLATION

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
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	10	-	Y
6A,6B,6C	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	3	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Existing Right Arrow "ONLY" sign (R3-5R) may be removed.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0088.



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	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	No Right Turn Sign (R3-1)	B
C	No Left Turn Sign (R3-2)	C
D	Street Sign	D

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7
Extension 1 *	2.0	6.0	2.0
Max Green 1 *	15	60	15
Yellow Clearance	3.9	3.8	3.8
Red Clearance	1.2	1.1	1.2
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	1.3	-
Max Variable Initial *	-	24	-
Time Before Reduction *	-	10	-
Time To Reduce *	-	30	-
Minimum Gap	-	3.0	-
Recall Mode	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-
Dual Entry	ON	-	ON
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.

Signal Upgrade

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

SCALE 0 20 1"=20'

US 76 WB (Wooster Street)
at
S. 10th Street

Division 3 New Hanover County Wilmington

PLAN DATE: January 2008 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

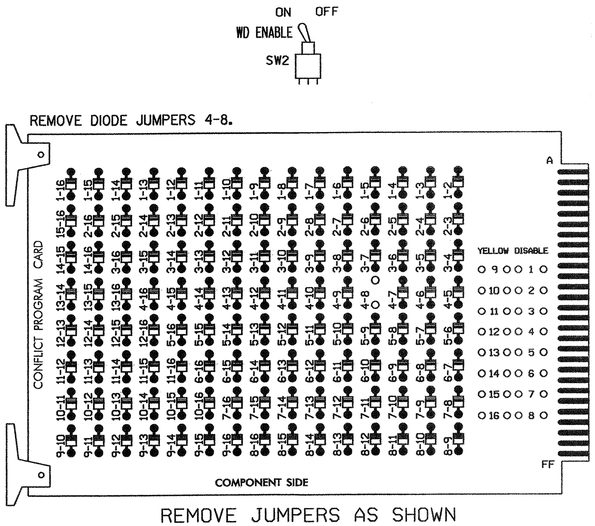
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIENDA
SIGNATURE DATE 4/21/08
SIG. INVENTORY NO. 03-0088

21-APR-2008 14:11
s:\ts signals\workgroups\ncdot\alexander\u-5017 (wilmington city system)\03-0088\03088_sig_dsn_20080421.dgn
rziendo

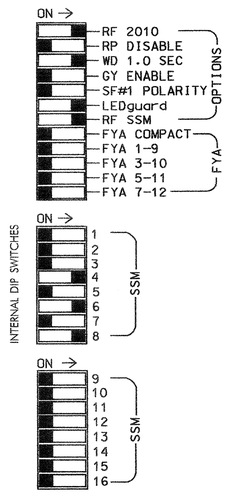
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig.5G

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 1,2,3,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
OVERLAPS.....NONE

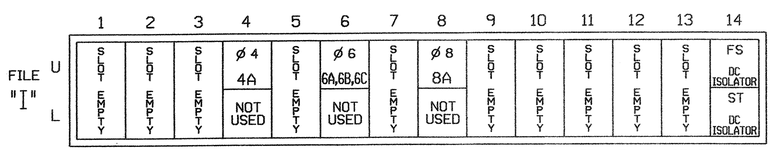
SIGNAL HEAD HOOK-UP CHART

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.	NU	NU	NU	NU	41,42	NU	NU	61, 62,63	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

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
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6A,6B,6C	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0088
DESIGNED: January 2008
SEALED: 04-21-08
REVISED: N/A

Signal Upgrade

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

122 N. McDowell St., Raleigh, NC 27603

US 76 WB (Wooster Street)
at
S. 10th Street

Dividion 3 New Hanover County Wilmington

PLAN DATE: January 2008	REVIEWED BY: JTR		
PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE

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

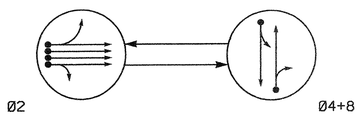
John T. Rowe Jr. 4-24-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0088

24-APR-2008 08:26
s:\mts signals\workgroups\sig mon\peterson\m030088_smu_ale_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.57

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22, 23
41, 42
81, 82

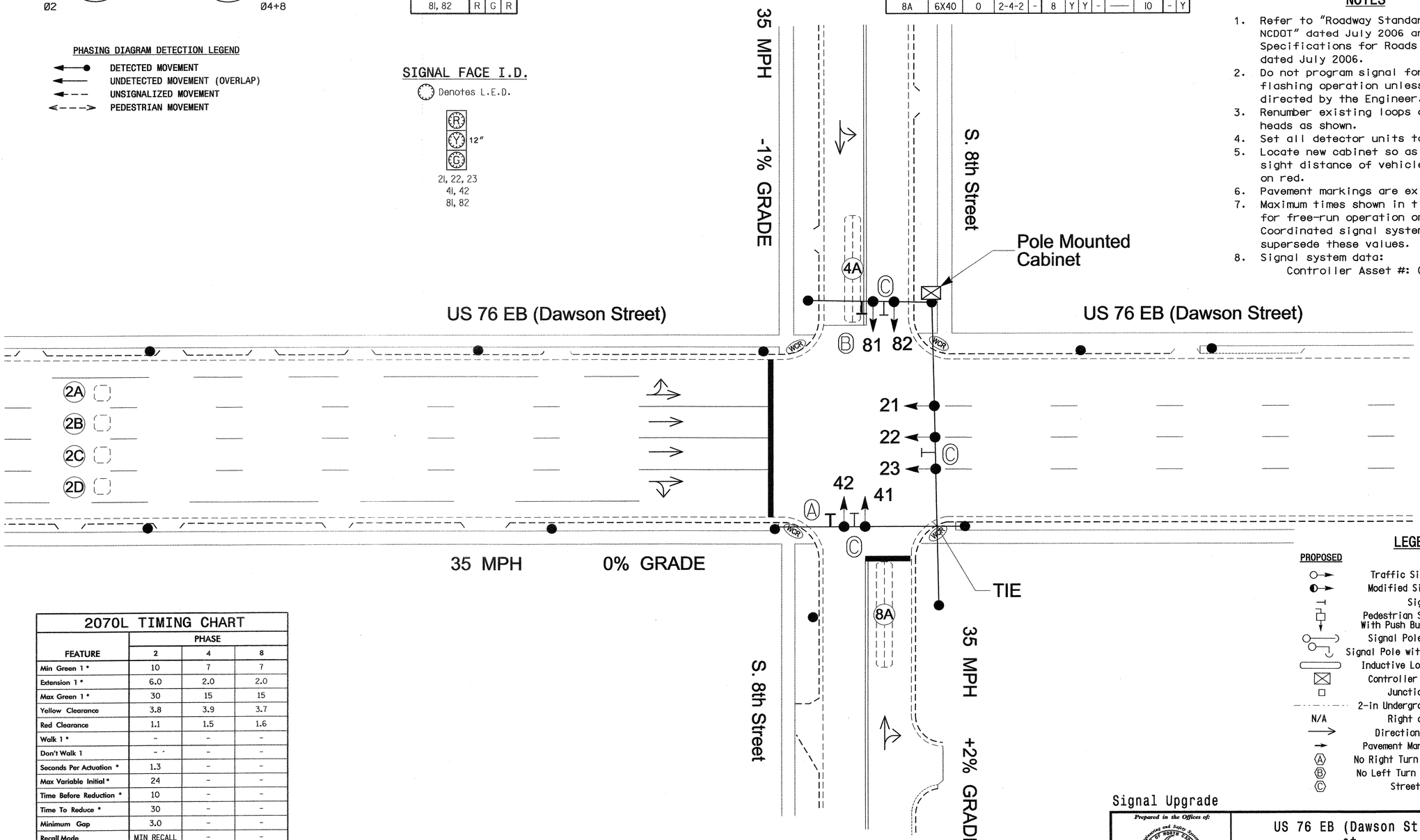
2070L LOOP & DETECTOR INSTALLATION

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
2A, 2B	6X6	250	Existing	-	2	Y	Y	-	——	——	-	Y
2C, 2D	6X6	250	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	3	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	10	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing loops and signal heads as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0089.



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	
	Pavement Marking Arrow	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Street Sign	C

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	10	7	7
Extension 1 *	6.0	2.0	2.0
Max Green 1 *	30	15	15
Yellow Clearance	3.8	3.9	3.7
Red Clearance	1.1	1.5	1.6
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	1.3	-	-
Max Variable Initial *	24	-	-
Time Before Reduction *	10	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.0	-	-
Recall Mode	MIN RECALL	-	-
Vehicle Call Memory	YELLOW	-	-
Dual Entry	-	ON	ON
Simultaneous Gap	ON	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.

Signal Upgrade

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

SCALE 0 20 1"=20'

US 76 EB (Dawson St.)
at
S. 8th Street

Division 3 New Hanover County Wilmington

PLAN DATE: December 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

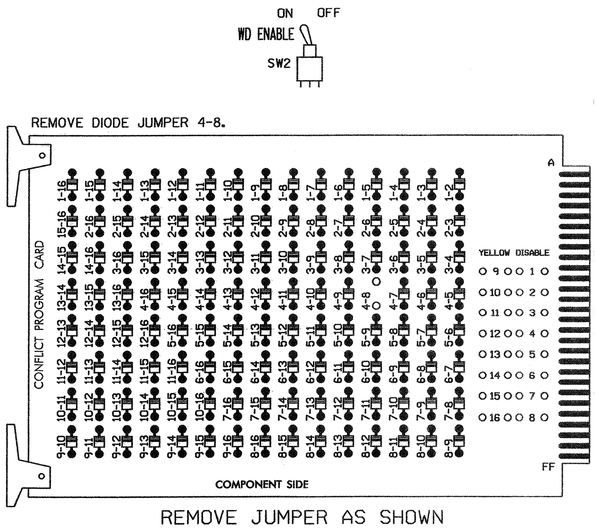
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. TIEMEYER
SIGNATURE 4/21/08 DATE
SIG. INVENTORY NO. 03-0089

21-APR-2008 14:25
s:\traffic\signal\workgroups\wilmington city system\W03-0089\W030089_sig_dsn_20080421.dgn
rziembo

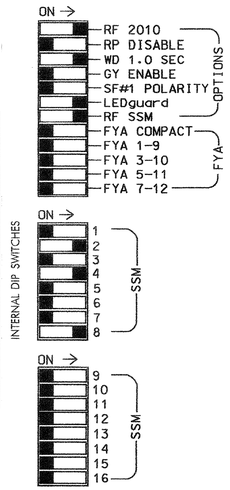
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 58

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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, 6,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 2, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S8
PHASES USED.....2,4,8
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.	NU	21, 22,23	NU	NU	41,42	NU	NU	NU	NU	NU	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB21-3,4	I2U	39	1	2	2	Y	Y			
2C,2D	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			3
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			10

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0089
DESIGNED: December 2007
SEALED: 04-21-08
REVISED: N/A

Signal Upgrade

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 N. Greenfield Pkwy, Garner, NC 27529

US 76 EB (Dawson St.)
at
S. 8th Street

Division 3 | New Hanover Street | Wilmington

PLAN DATE: April 2008 | REVIEWED BY: JTR
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 4-23-08
SIG. INVENTORY NO. 03-0089

22-APR-2008 09:06
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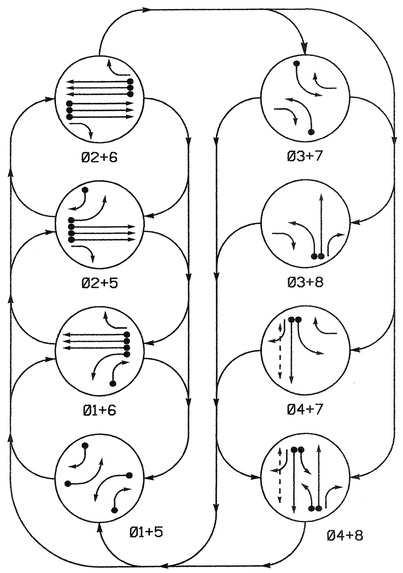
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.59

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

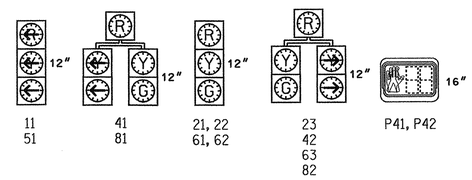
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
23	R	R	G	G	R/←	R/←	R	R	Y
41	R	R	R	R	←R	R	\G	G	R
42	R/←	R	R/←	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
63	R	G	R	G	R/←	R	R/←	R	Y
81	R	R	R	R	←R	\G	R	G	R
82	R/←	R/←	R	R	R	G	R	G	R
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.



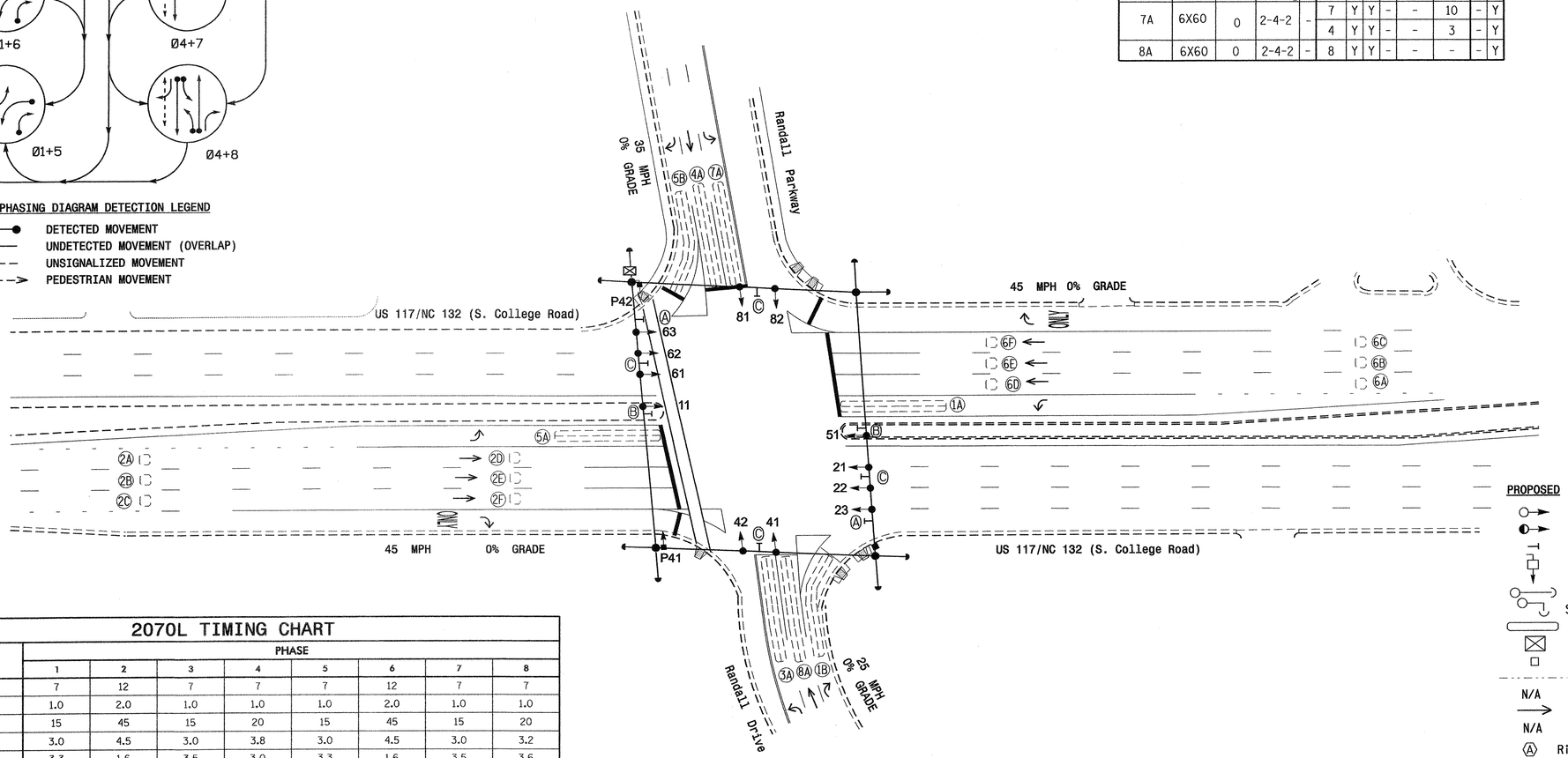
2070L LOOP & DETECTOR INSTALLATION

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	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A,2B,2C	6X6	300	Existing	-	2	Y	Y	-	1.6	-	-	Y
2D,2E,2F	6X6	90	Existing	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	10	-	Y
					8	Y	Y	-	-	3	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B,6C	6X6	300	Existing	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	Existing	-	6	Y	Y	-	-	-	-	Y
7A	6X60	0	2-4-2	-	7	Y	Y	-	-	10	-	Y
					4	Y	Y	-	-	3	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

8 Phase
Fully Actuated
(Wilmington City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Phase 1 or phase 5 may be lagged.
6. Signal heads 81 and 82 have backplates.
7. Set all detector units to presence mode.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Omit "WALK" and flashing "DON'T WALK with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
11. Pavement markings are existing.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Signal system data:
    Controller Asset #: 0128.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓑ
Ⓒ	Street Sign	Ⓒ

2070L 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 *	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
Max Green 1 *	15	45	15	20	15	45	15	20
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.2
Red Clearance	3.3	1.6	3.5	3.0	3.3	1.6	3.5	3.6
Walk 1 *	-	-	-	4	-	-	-	-
Don't Walk 1	-	-	-	35	-	-	-	-
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	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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
Department of Transportation State of North Carolina
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Rd.) at Randall Pkwy./Randall Drive

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

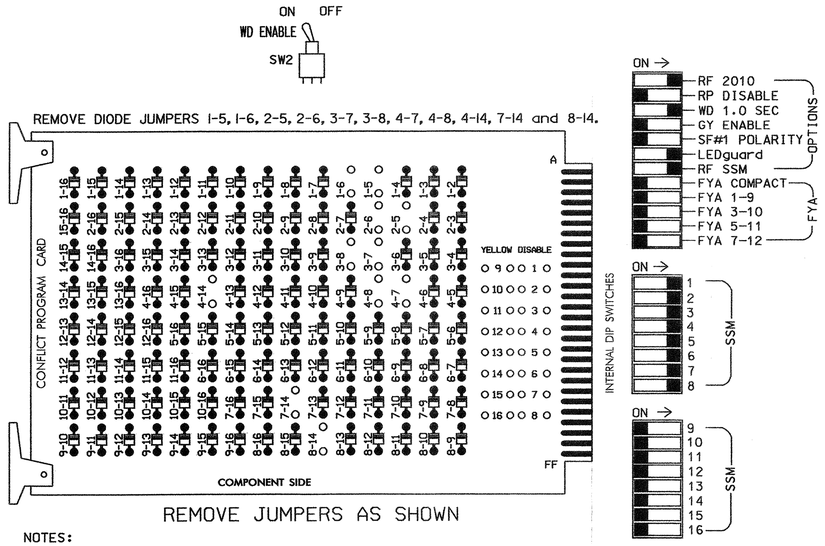
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT ZIEMBA
SIGNATURE DATE 2/29/08
SIG. INVENTORY NO. 03-0128

29-FEB-2008 10:48
S:\TEB signal&workgroups\mel\alexander\wu-5017 (wilmington city system)\03-0128\03128_sig_dsn_20080229.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 20

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 4 for 'STARTUP PED CALL'.
7. 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
PHASE	1		2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	82	21, 22,23	NU	23,81	41,42	P41, P42	51	42	61, 62,63	NU	41,63	81,82	NU
RED			128		*	101				134		*	107	
YELLOW			129			102				135			108	
GREEN			130			103				136			109	
RED ARROW	125							131						
YELLOW ARROW	126	126			117			132	132			123		
GREEN ARROW	127	127			118			133	133			124		
✋							104							
🚶							106							

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S4P,S5,S6,S7,S8
PHASES USED.....1,2,3,4,4 PED,5,6,7,8
OVERLAPS.....NONE

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
          OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR      PHASES:¦1234567891011121314 1516
IF PHASES ARE ON¦   X
OMIT PHASES     ¦  X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
          OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR      PHASES:¦1234567891011121314 1516
IF PHASES ARE ON¦       X
OMIT PHASES     ¦      X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	ø1 1A	ø2 2A 2B,2C	SLOT	SLOT	ø3 3A	ø4 4A	SLOT	SLOT	SLOT	SLOT	NOT USED	SLOT	FS DC ISOLATOR
	L	EMPTY	ø1 1B	ø2 2D 2E,2F	EMPTY	EMPTY	ø8 3A	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	ø4 PED DC ISOLATOR	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	ø5 5A	ø6 6A 6B,6C	SLOT	SLOT	ø7 7A	ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	ø5 5B	ø6 6D 6E,6F	EMPTY	EMPTY	ø4 7A	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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	TB2-5,6	I2U	39	1	2	1	Y	Y			
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A,2B,2C	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2D,2E,2F	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A[1]	TB4-9,10	I6U	41	3	4	3	Y	Y			10
	TB4-11,12	I6L	45	7	14	8	Y	Y			3
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A[2]	TB5-9,10	J6U	42	4	8	7	Y	Y			10
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

[1] Add jumpers from TB4-9 to TB4-11, and from TB4-10 to TB4-12.

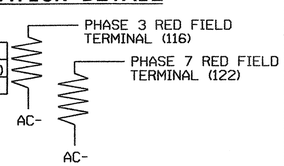
[2] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.

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.

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: 03-0128
DESIGNED: March 2007
SEALED: 02/29/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117/NC 132 (S. College Rd.) at Randall Pkwy./Randall Drive

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY: T. Jyll
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Traffic Management Section, Division of Highways, State of North Carolina, Department of Transportation
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

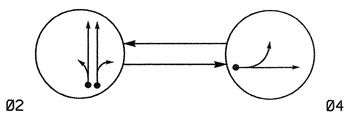
George C. Brown 3/6/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0128

04-MAR-2008 12:24
s:\its signals\workgroups\sig manns\trickland\03128.sml.ele.xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 61

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

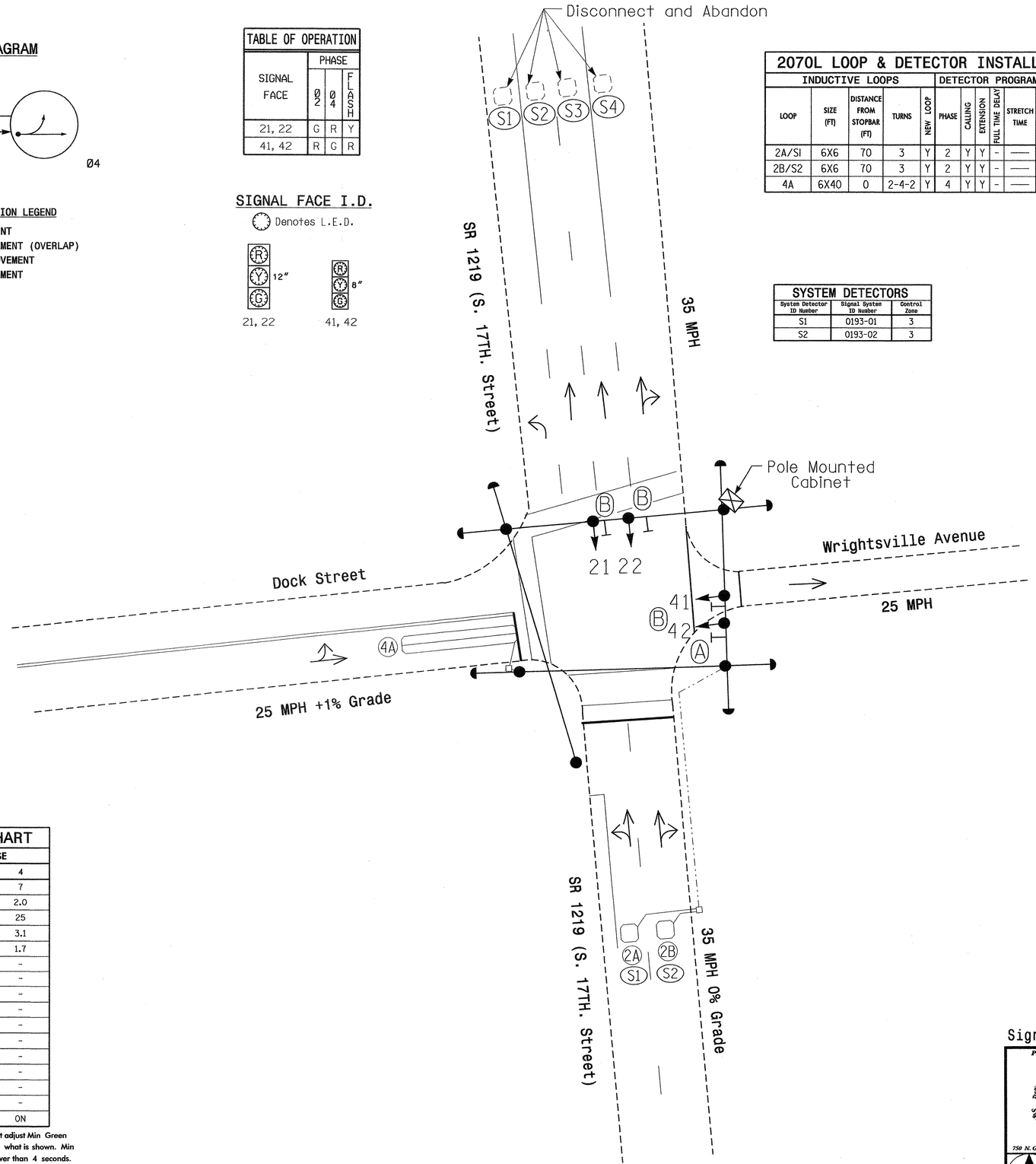
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4	FLASH
21, 22	G	R	Y
41, 42	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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
2A/S1	6X6	70	3	Y	2	Y	Y	-	—	—	Y	Y
2B/S2	6X6	70	3	Y	2	Y	Y	-	—	—	Y	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	—	3	-	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0193-01	3
S2	0193-02	3

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Remove existing signal heads 43 and 44.
4. Disconnect and abandon existing system detectors.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing unless otherwise noted.
8. Restripe existing Eastbound approach for one lane as shown.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0193.

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	
A	No Right Turn Sign (R3-1)	A
B	Street Sign	B

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4
Min Green 1 *	10	7
Extension 1 *	3.0	2.0
Max Green 1 *	45	25
Yellow Clearance	3.8	3.1
Red Clearance	1.5	1.7
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	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.

Signal Upgrade

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

SCALE 0 20 1"=20'

SR 1219 (S. 17th Street) at Dock Street / Wrightsville Avenue

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

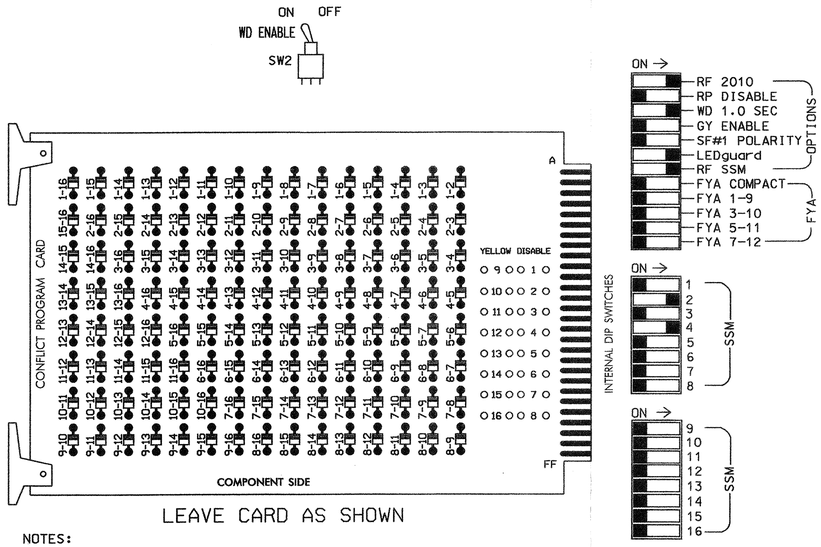
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/9/08
SIG. INVENTORY NO. 03-0193

31-JUL-2008 11:15
s:\traffic-signals\workgroups\wilmington city system\W03-0193\W03-0193_sig_dsn_20080609.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.62

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



LEAVE CARD 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.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø2/SYS 2A/S1	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		Ø2/SYS 2B/S2		NOT USED										ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S1	TB21-3,4	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB23-3,4	I2L	43	5	12	2/SYS	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			3

INPUT FILE POSITION LEGEND: I2L

FILE I
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. 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 1,3,5,6,7,8, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4
PHASES USED.....2,4
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.	NU	21,22	NU	NU	41,42	NU	NU	NU	NU	NU	NU	NU
RED		128			101							
YELLOW		129			102							
GREEN		130			103							
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0193
DESIGNED: March 2008
SEALED: 6/09/08
REVISED: N.A.

Signal Upgrade

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

122 N. McDowell St., Raleigh, NC 27603

SR 1219 (S. 17th Street)
at
Dock Street /
Wrightsville Avenue

Division 03 New Hanover County Wilmington

PLAN DATE: June 2007 REVIEWED BY: T. Jga
PREPARED BY: A.A. Klooz REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

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

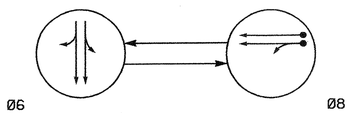
John T Rowe 6-10-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0193

10-JUN-2008 09:17
s:\its signals\workgroups\sig mgmt\klooz\03193_sm_ele_2008mdd.dgn
GK\OCZ

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S1663

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

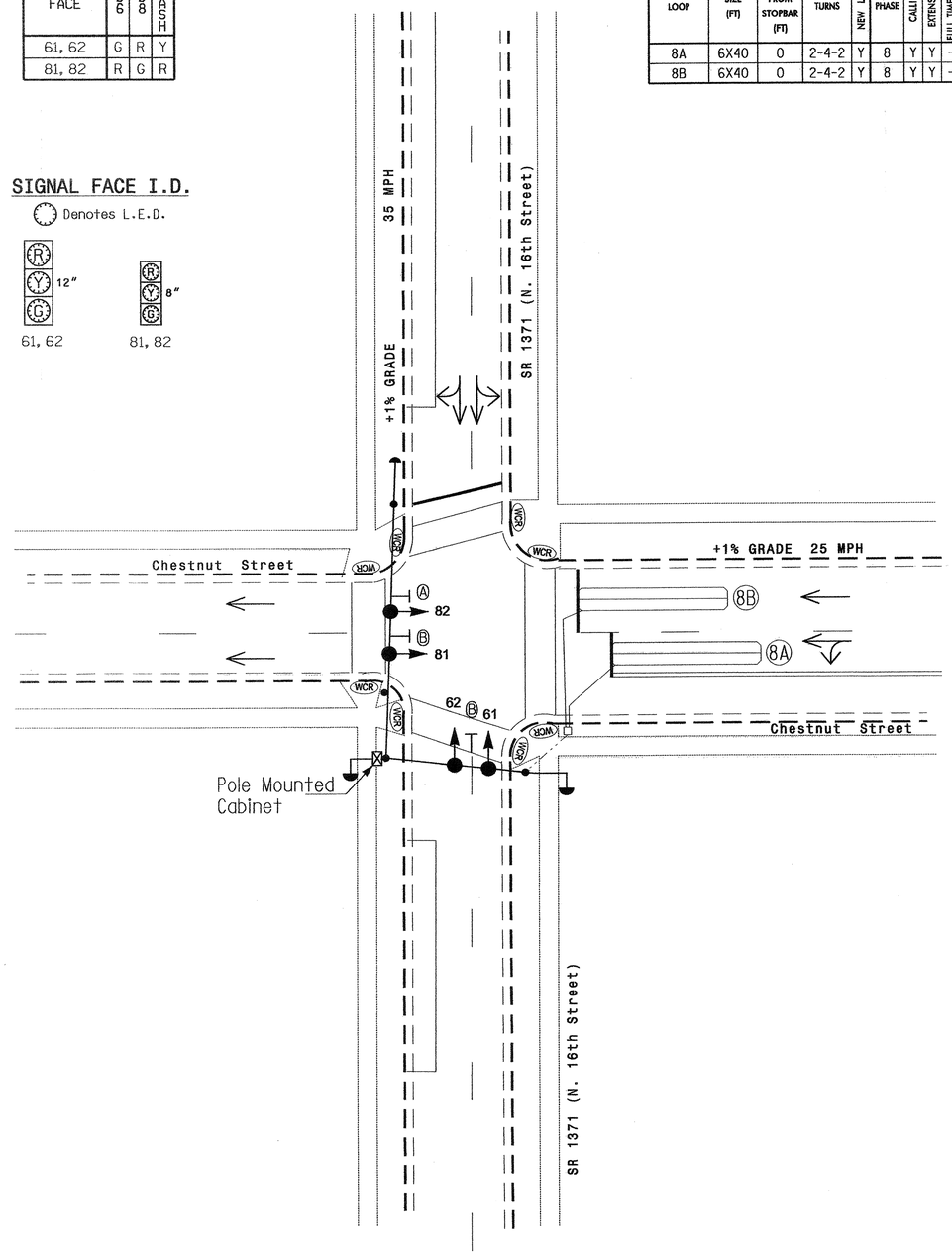
SIGNAL FACE	PHASE Ø6	PHASE Ø8	FLASH
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

2070L 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
8A	6X40	0	2-4-2	Y	8	Y	Y	-	——	3	- / Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	——	10	- / Y



2 Phase Semi-Actuated (Wilmington City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. In the event of loop placement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0198.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	WCR
A	No Right Turn Sign (R3-1)	A
B	Street Sign	B

2070L TIMING CHART

FEATURE	PHASE 6	PHASE 8
Min Green 1 *	10	7
Extension 1 *	0.0	2.0
Max Green 1 *	58	12
Yellow Clearance	3.8	3.1
Red Clearance	1.3	1.5
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	MAX RECALL	-
Vehicle Call Memory	-	-
Dual Entry	-	-
Simultaneous Gap	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

SR 1371 (N. 16th Street) at Chestnut Street

Division 3 New Hanover County Wilmington

PLAN DATE: March 2008 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

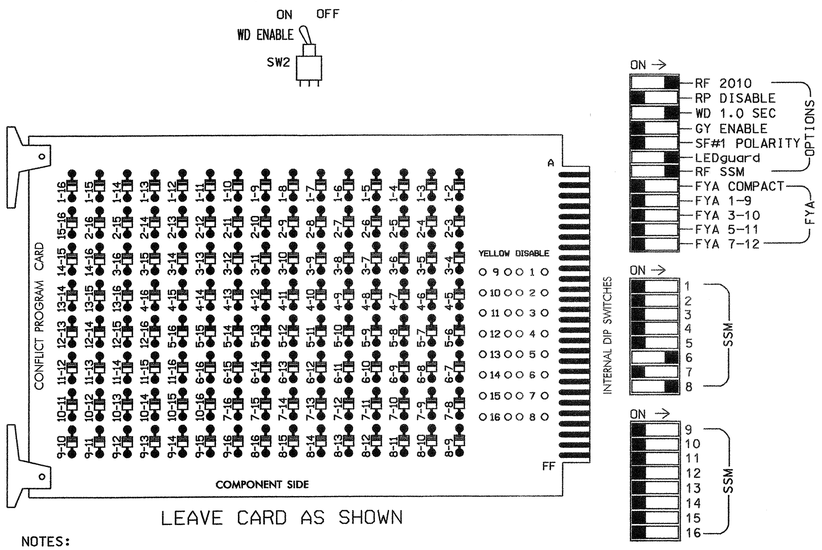
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELINSKI
SIGNATURE DATE 6/19/08
SIG. INVENTORY NO. 03-0198

19-JUN-2008 17:08
c:\wits signalsworkgroup\alexander\u-5017 (wilmington city system)\03-0198\030198_sig_dsn_20080619.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.6A

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



LEAVE CARD 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 1,2,3,4,5,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S6,S8
PHASES USED.....6,8
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.	NU	NU	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU
RED								134			107	
YELLOW								135			108	
GREEN								136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L								Ø 8 8B						ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0198
DESIGNED: March 2008
SEALED: 6/19/08
REVISED: N.A.

Signal Upgrade

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
122 N. McDowell St., Raleigh, NC 27603

SR 1371 (N. 16th Street) at Chestnut Street

Division 03 New Hanover County Wilmington

PLAN DATE:	June 2008	REVIEWED BY:	T. Joyce
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

John T. Rowe Jr. 6-24-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0198

20-JUN-2008 17:03
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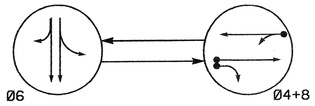
aklooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A,65

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

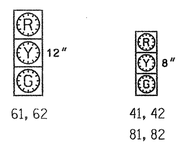
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

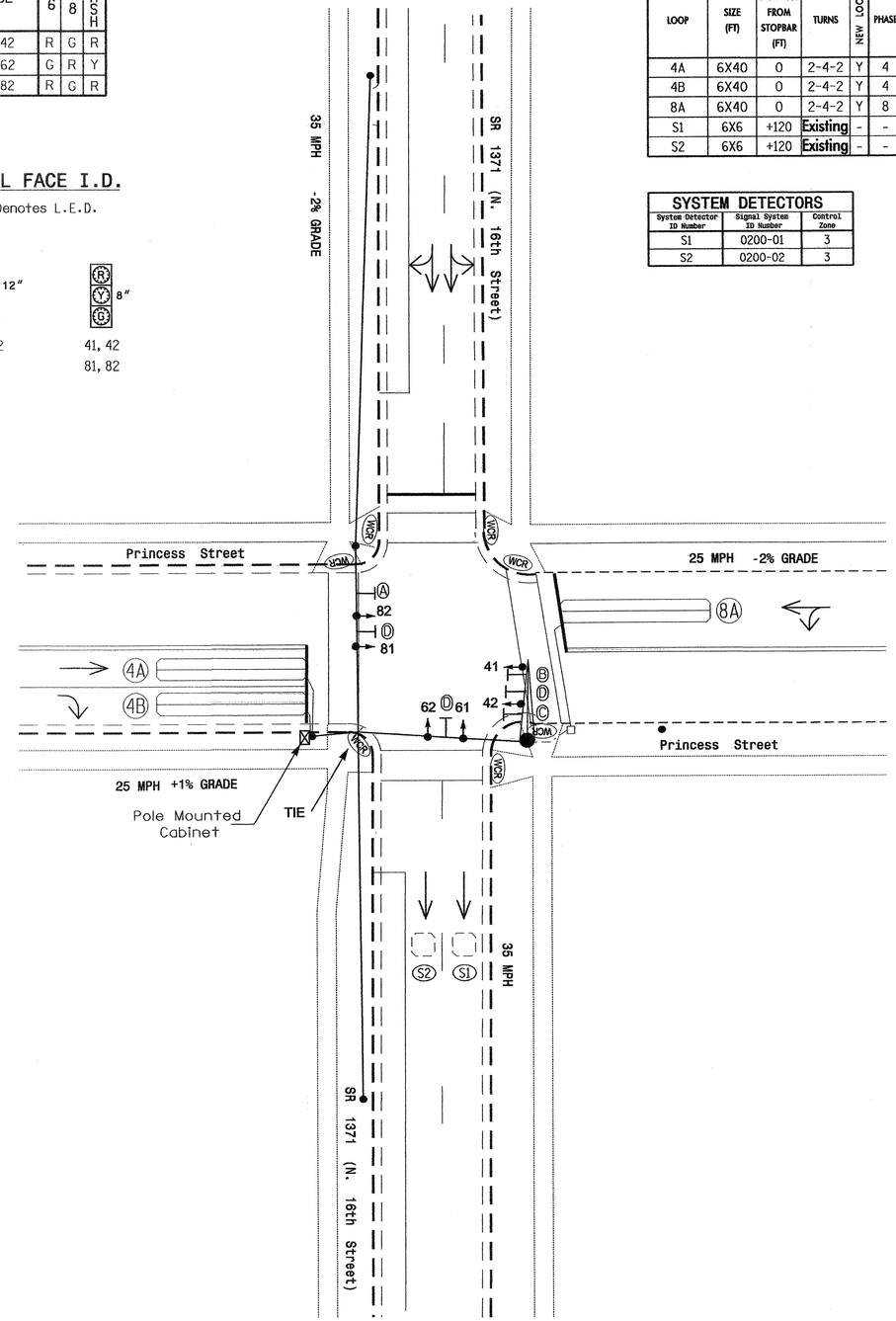
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	FLASH
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.





2070L 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
4A	6X40	0	2-4-2	Y	4	Y	Y	-	——	-	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	——	15	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	——	-	-	Y
S1	6X6	+120	Existing	-	-	-	-	-	-	-	Y	Y
S2	6X6	+120	Existing	-	-	-	-	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0200-01	3
S2	0200-02	3

2 Phase Semi-Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. In the event of loop placement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Existing lane control signs may be removed.
7. Pavement markings are existing.
8. Repaint stopbars and/or crosswalks.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0200.

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7
Extension 1 *	2.0	0.0	2.0
Max Green 1 *	20	50	20
Yellow Clearance	3.1	4.0	3.3
Red Clearance	1.7	1.4	1.6
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	MAX RECALL	-
Vehicle Call Memory	-	-	-
Dual Entry	ON	-	ON
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.

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	
	Wood Pole with Mast arm	
N/A	Wheelchair Ramp	WCR
A	No Right Turn Sign (R3-1)	A
B	Through Arrow "ONLY" Sign (R3-5A)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	Street Sign	D

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

SR 1371 (N. 16th Street) at Princess Street

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

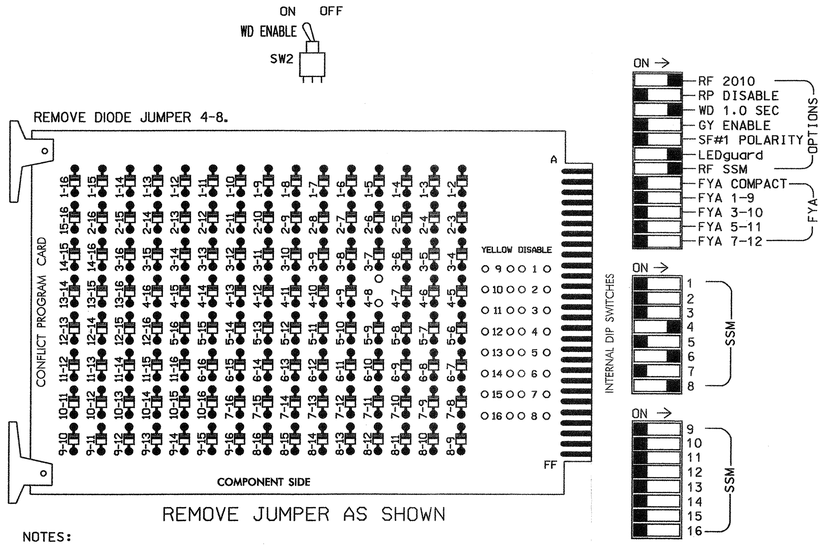
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 6/19/08 DATE
SIG. INVENTORY NO. 03-0200

19-JUN-2008 17:10
S:\TEB\Signals\Workgroups\wilmington city system\W03-0200\W030200_sig_dsn_20080619.dgn
Zemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	96.66

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø 4 4A	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L				ø 4 4B		SYS. DET. S2		NOT USED						ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			15
*S1	TB21-11,12	I6U	40	2	6	SYS					
*S2	TB23-11,12	I6L	44	6	16	SYS					
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			

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

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,2,3,5,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
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.	NU	NU	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0200
DESIGNED: March 2008
SEALED: 6/19/08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1371 (N. 16th Street) at Princess Street

Division 03 New Hanover County Wilmington

PLAN DATE:	June 2008	REVIEWED BY:	T. Joyce
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

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

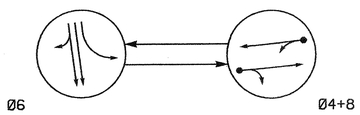
SIGNATURE John T. Rowe Jr. DATE 6-24-08

SIG. INVENTORY NO. 03-0200

20-JUN-2008 17:01
s:\its\signals\workgroups\sig management\klooz\03020_smalle.2008mmdd.dgn
dk klooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.67

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

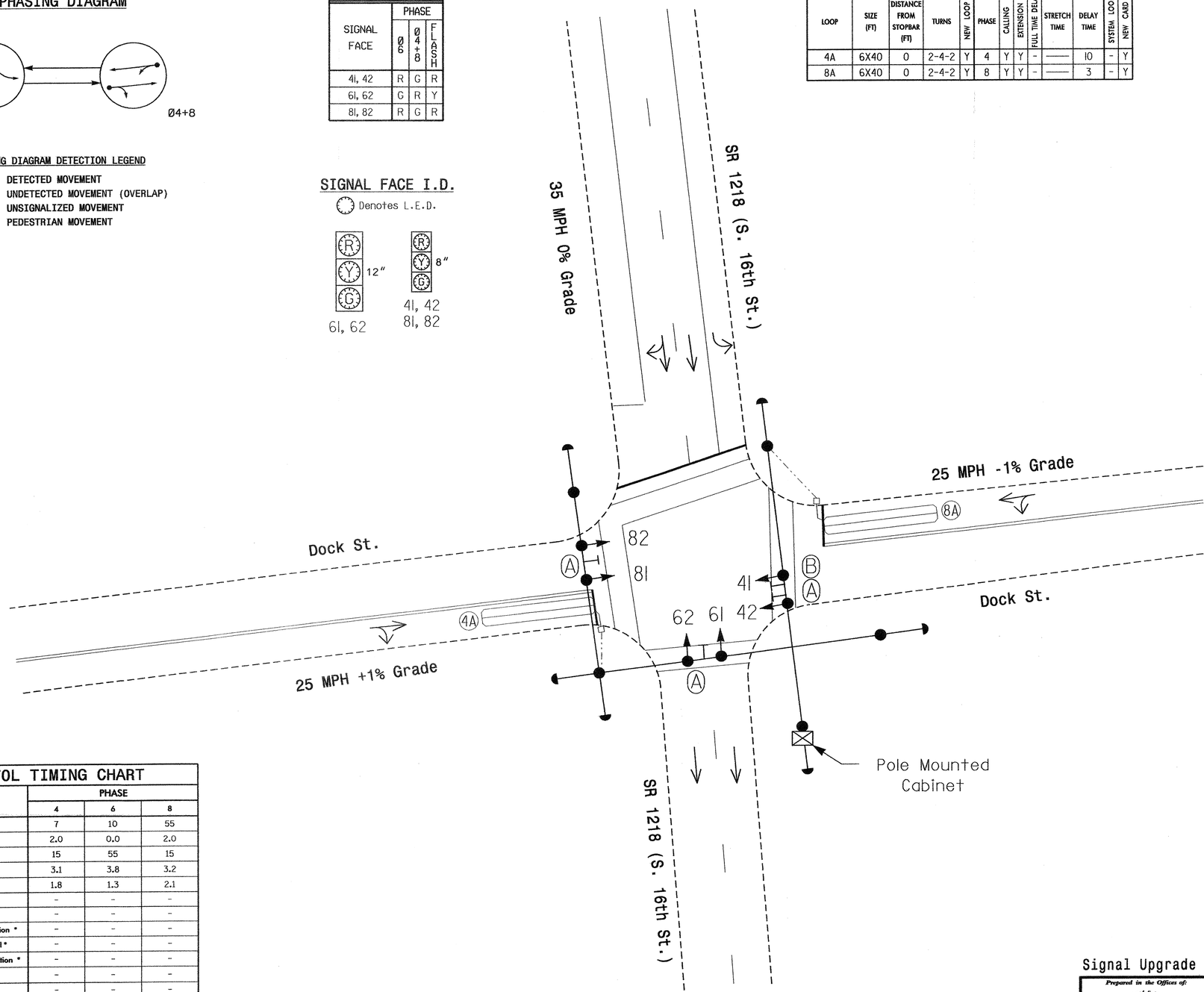
SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	PHASE FLASH
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

2070L 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
4A	6X40	0	2-4-2	Y	4	Y	Y	-	——	10	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	——	3	-	Y



2 Phase Semi-Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. In the event of loop placement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Repaint stopbars and/or crosswalks.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0203.

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	
A	"YIELD" Sign (R1-2)	A
B	"DO NOT BLOCK INTERSECTION" Sign (R10-7)	B

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	55
Extension 1 *	2.0	0.0	2.0
Max Green 1 *	15	55	15
Yellow Clearance	3.1	3.8	3.2
Red Clearance	1.8	1.3	2.1
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	MAX RECALL	-
Vehicle Call Memory	-	-	-
Dual Entry	ON	-	ON
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.

Signal Upgrade

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

SCALE 0 20 1"=20'

N

SR 1218 (S. 16th Street) at Dock Street

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

6/19/08

SIGNATURE DATE

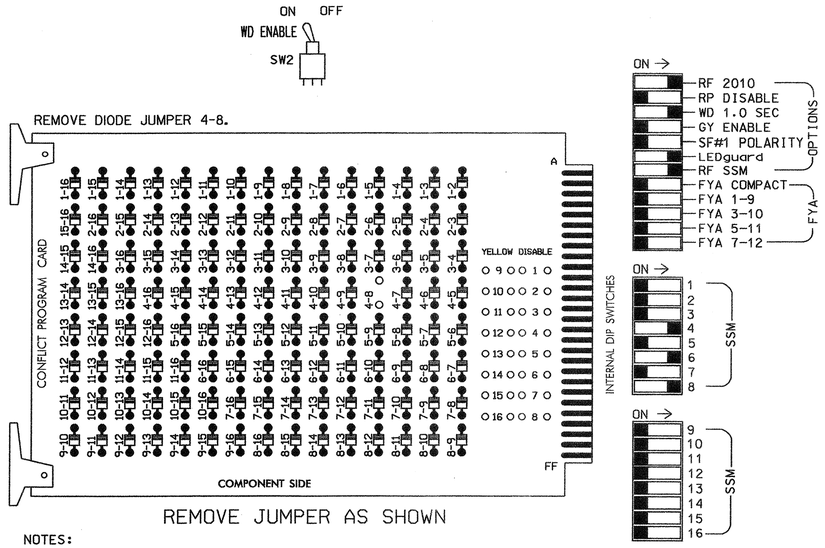
SIG. INVENTORY NO. 03-0203

23-JUN-2008 11:03
s:\wits signals\workgroups\alexander\u-5017 (wilmington city system)\03-0203\030203_sig_dsn_20080619.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.68

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

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT	SLOT	SLOT	ø4 4A	SLOT	SLOT	SLOT	ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
L	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,2,3,5,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
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.	NU	NU	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0203
DESIGNED: March 2008
SEALED: 6/19/08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1218 (S. 16th Street)
at
Dock Street

Division 03 New Hanover County Wilmington

PLAN DATE: June 2008 REVIEWED BY: T. Jogi
PREPARED BY: A.A. Klooz REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

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

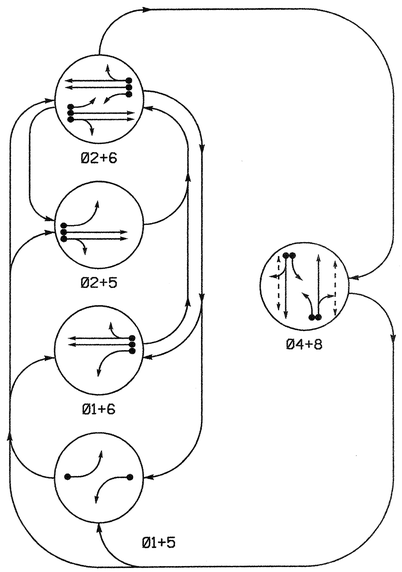
SIGNATURE John T. Rowe, Jr. DATE 6-25-08

SIG. INVENTORY NO. 03-0203

23-JUN-2008 12:27
s:\its signals\workgroups\sig mon\klooz\03203_smelle.2008mmdd.dgn
dklooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.29

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

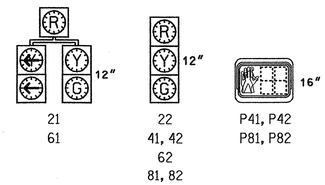
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
21	R	R	G	G	R	Y
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
81, 82	R	R	R	R	G	R
P41, P42	DW	DW	DW	DW	W	DRK
P81, P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	6x60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A/S1	6x6	300	Existing	-	2	Y	Y	-	1.6	-	Y	Y
2B/S2	6x6	300	Existing	-	2	Y	Y	-	1.6	-	Y	Y
2C, 2D	6x6	90	Existing	-	2	Y	Y	-	-	-	-	Y
4A	6x60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6x60	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6x60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A, 6B	6x6	300	Existing	-	6	Y	Y	-	1.6	-	-	Y
6C, 6D, 6E	6x6	90	Existing	-	6	Y	Y	-	-	-	-	Y
8A	6x60	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6x85	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

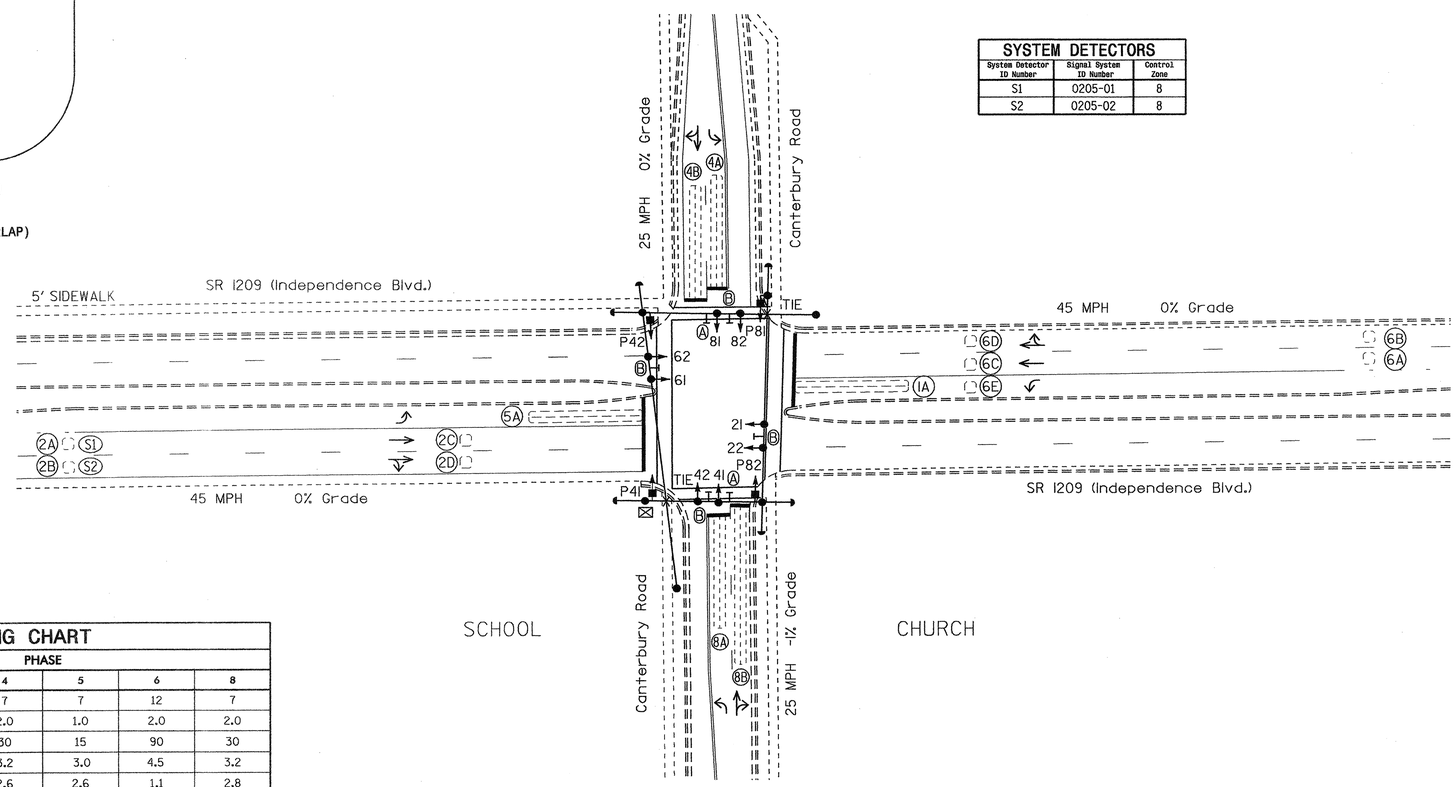
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0205-01	8
S2	0205-02	8

5 Phase
Fully Actuated
(Wilmington Siganl System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Existing Left Arrow "ONLY" signs (R3-5L) may be removed.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0205.



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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Street Sign	B

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	1.0	2.0	2.0	1.0	2.0	2.0
Max Green 1 *	15	90	30	15	90	30
Yellow Clearance	3.0	4.5	3.2	3.0	4.5	3.2
Red Clearance	2.6	1.1	2.6	2.6	1.1	2.8
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	4	-	-	4
Don't Walk 1	-	-	21	-	-	18
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	LOCK	-	-	LOCK	-
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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40

SR 1209 (Independence Blvd.) at Canterbury Road

Division 3 New Hanover County Wilmington

PLAN DATE: May 2007	PREPARED BY: Sterling
PREPARED BY: J Navarrete	REVIEWED BY:

REVISIONS	INIT.	DATE

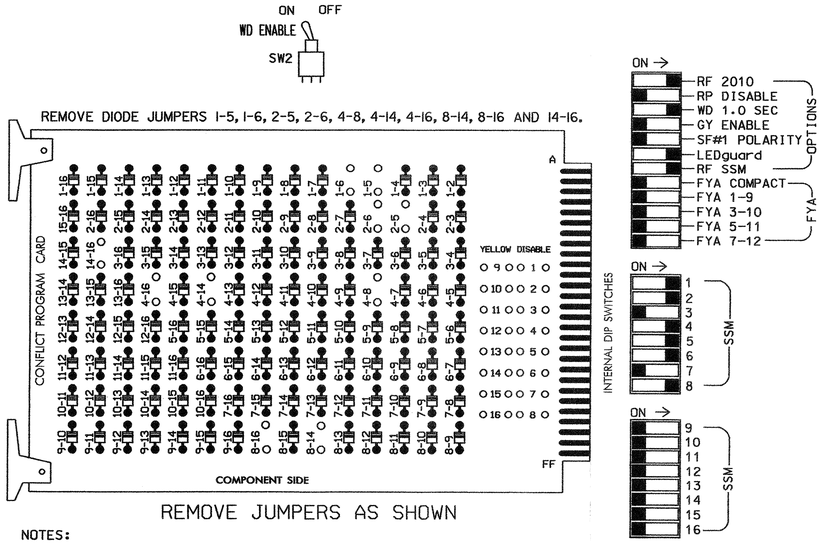
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 4/4/08
SIG. INVENTORY NO. 03-0205

07-APR-2008 10:09
s:*ts signals\workgroups\ralexander\u-5017 (wilmington city system)\03-0205\03-0205_sig_dsn_20080404.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.70

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

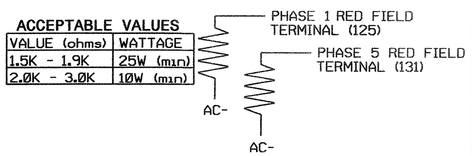
(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø 1 / 1A	Ø2/SYS / 2A/S1	Ø 2 / 2C,2D	SLOT EMPTY	Ø 4 / 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	NOT USED	FS / DC ISOLATOR
	L		Ø 6 / 1A	Ø 2/SYS / 2B/S2	NOT USED		Ø 4 / 4B						Ø4 PED / DC ISOLATOR	Ø8 PED / DC ISOLATOR	ST / DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 5 / 5A	Ø 6 / 6A,6B	SLOT EMPTY	SLOT EMPTY	Ø 8 / 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 2 / 5A	Ø 6 / 6C,6D,6E			Ø 8 / 8B								

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL



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.

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 3,7, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 4 and 8 for 'STARTUP PED CALL'.
7. The cabinet and ontroller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S4P,S5,S6,S8,S8P
PHASES USED.....1,2,4,4PED,5,6,8,8PED
OVERLAPS.....NONE

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A/S1	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y		1.6	
2B/S2	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y		1.6	
2C,2D	TB4-1,2	I4U	47	9	22	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			10
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6C,6D,6E	TB3-11,12	J3L	77	39	46	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			10
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.
[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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	NU	41,42	P41, P42	21	61,62	NU	NU	81,82	P81, P82
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
✋						104						110
🚶						106						112

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.

BACKUP PROTECTION NOTE

(program controller as shown below)

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

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: 03-0205
DESIGNED: May 2007
SEALED: 4/4/08
REVISED: NA

SIGNAL UPGRADE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1209 (Independence Blvd.) at Canterbury Road

Division 3 | New Hanover County | Wilmington

PLAN DATE: Dec. 2007 | REVIEWED BY: T. Vgh
PREPARED BY: A. Waslewicz | REVIEWED BY:

REVISIONS	INIT.	DATE

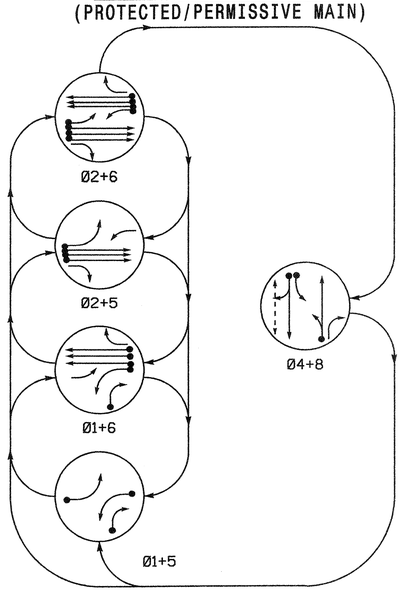
Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
1122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 4/10/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0205

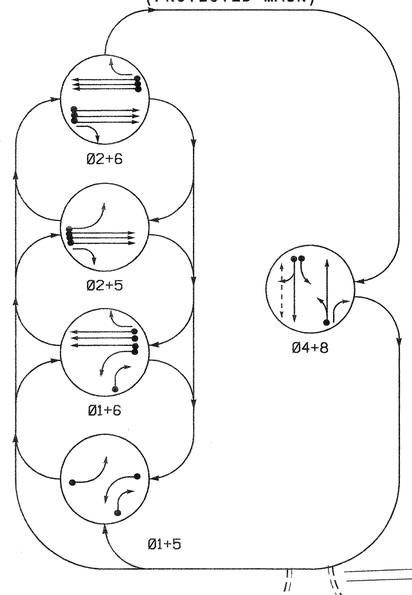
08-APR-2008 13:44
s:\its signals\workgroups\sig man\brown\03020_smlele_XXXXXXX.dgn
(BRown)

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.71

NORMAL PHASING DIAGRAM (PROTECTED/PERMISSIVE MAIN)



ALTERNATE PHASING DIAGRAM (PROTECTED MAIN)



NORMAL PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~FY~~	~~FY~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	~~FY~~	←	~~FY~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/↘	R/↘	R	R	G	R
P41, P42	DW	DW	DW	DW	W	DRK

~~FY~~ = Flashing Yellow Arrow

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/↘	R/↘	R	R	G	R
P41, P42	DW	DW	DW	DW	W	DRK

STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

FROM	TO ← 1	← 2	~~FY~~ 1	~~FY~~ 2	~~R~~ 1	~~R~~ 2
←	←	←	~~Y~~	~~R~~	~~Y~~	~~R~~
~~FY~~	~~FY~~	~~FY~~	~~FY~~	~~FY~~	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

~~FY~~ = FLASHING YELLOW ARROW

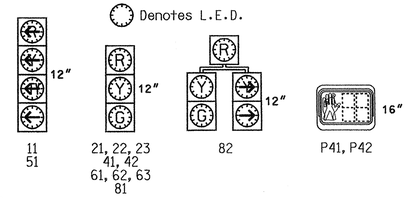
5 Phase Fully Actuated (Wilmington Signal System)

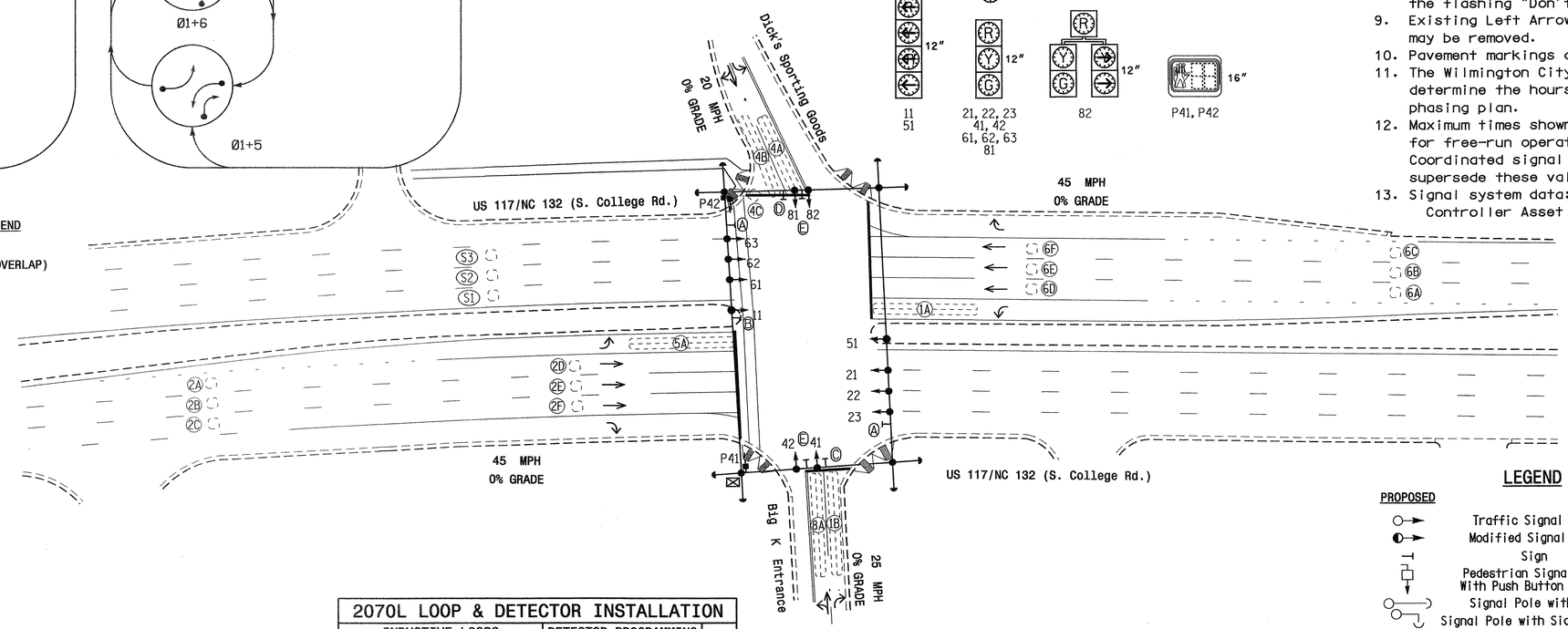
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Renumber existing signal heads and loops as shown.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Existing Left Arrow "ONLY" sign (R3-5L) may be removed.
10. Pavement markings are existing.
11. The Wilmington City Traffic Engineer will determine the hours of use for each phasing plan.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Signal system data: Controller Asset #: 0212.

SIGNAL FACE I.D.

Denotes L.E.D.





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	
N/A	Wheelchair Ramp	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓑ
Ⓒ	Left Arrow "ONLY" Sign (R3-5L)	Ⓒ
Ⓓ	Combined Through and Left Arrow Sign (R3-6L)	Ⓓ
Ⓔ	Street Sign	Ⓔ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	1.0	2.0	2.0	1.0	2.0	2.0
Max Green 1 *	15	45	20	15	45	20
Yellow Clearance	3.0	4.5	3.0	3.0	4.5	4.0
Red Clearance	3.2	1.7	3.9	3.2	1.7	3.0
Walk 1 *	-	-	4	-	-	-
Don't Walk 1	-	-	34	-	-	-
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

* 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.

2070L LOOP & DETECTOR INSTALLATION

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
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	** 10	-	Y
					* 6	Y	Y	-	-	-	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A,2B,2C	6X6	300	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2D,2E,2F	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	EXISTING	-	4	Y	Y	-	-	3	-	Y
4B	6X50	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
4C	6X6	+3	EXISTING	-	4	Y	Y	-	-	15	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	** 10	-	Y
					* 2	Y	Y	-	-	-	-	Y
6A,6B,6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
8A	6X50	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
S1	6X6	+220	EXISTING	-	-	-	-	-	-	-	Y	Y
S2	6X6	+220	EXISTING	-	-	-	-	-	-	-	Y	Y
S3	6X6	+220	EXISTING	-	-	-	-	-	-	-	Y	Y

* Disable Phase 2 or 6 CallFor Loops 1A and 5A During Alternate Phasing Operation.
** Disable Delay During Alternate Phasing Operation.

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0212-01	6
S2	0212-02	6
S3	0212-03	6

Signal Upgrade

Prepared in the Offices of:
Pedestrian Engineering and Safety Systems Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Rd.) at Big K/Dick's Sporting Goods

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 4/29/08

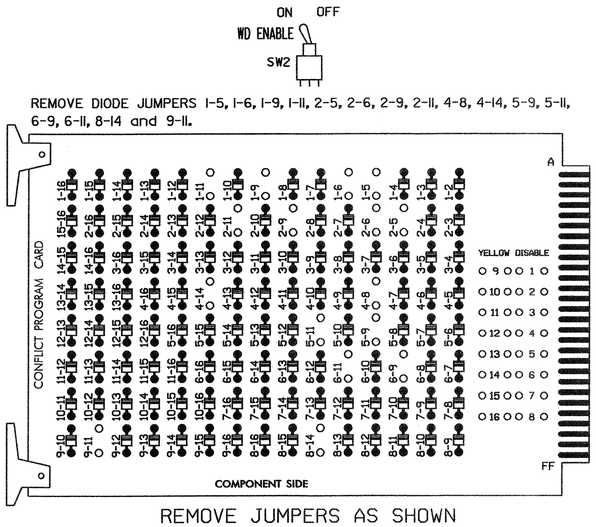
SIG. INVENTORY NO. 03-0212

29-FEB-2008 13:23
s:\wbs\signals\workgroups\wilexander\u-5017 (wilmington city system)\03-0212\m030212_sig_dsn_20080229.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 72

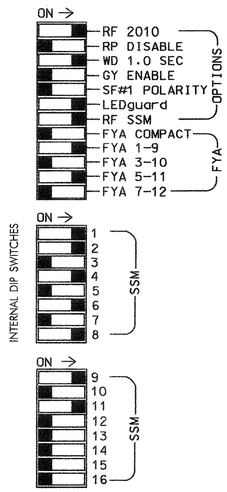
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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, 4-14, 5-9, 5-11, 6-9, 6-11, 8-14 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 3,5,7, 10,12,13,14,15 & 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 4 for 'STARTUP PED CALL'.
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★	82	21, 22,23	NU	NU	41,42	P41, P42	51★	51, 62,63	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		126												A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127						133											
✋							104												
🚶							106												

NU = Not Used

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

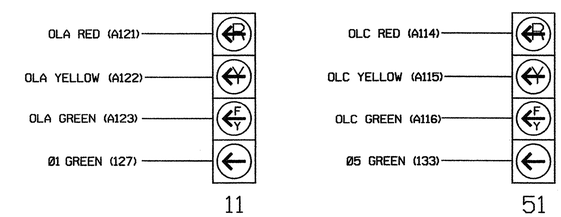
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S4P,S5,S6,S8,S9,S12.
PHASES USED.....1,2,4,4 PED,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 4 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	Ø1 1B	Ø1 1A	Ø2 2A, 2B,2C	SLOT EMPTY	SLOT EMPTY	Ø4 4A	Ø4 4C	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø6 1A	Ø2 2D, 2E,2F			Ø4 4B	NOT USED		SYS. DET. S2			Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A 6B,6C	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø2 5A	Ø6 6D, 6E,6F			NOT USED			NOT USED					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			10##
	TB2-7,8	I2L	43	5	12	6#	Y	Y			
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A,2B,2C	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2D,2E,2F	TB2-11,12	I3L	76	38	42	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			10
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			10##
	TB3-7,8	J2L	44	6	16	2#	Y	Y			
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
✳ 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					
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

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

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

Disable phase 2 or 6 call for loops 1A and 5A during alternate phasing operation.

Disable delay during alternate phasing operation.

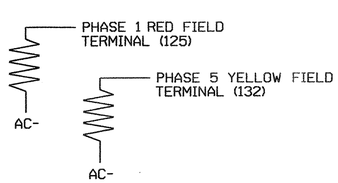
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0212
DESIGNED: March 2007
SEALED: 02/29/08
REVISED: N/A

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)



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.

ELECTRICAL DETAIL SHEET 1 OF 4

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 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (S. College Rd.) at Big K/Dick's Sporting Goods

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY: T. Lyons
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 3/31/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0212

05-MAR-2008 09:25
s:\its signals\workgroups\sig management\strickland\030212_smlele_xxx.dgn
cstrickland

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:          ¦123456789101112131415 16
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
```

NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          ¦123456789101112131415 16
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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0212
DESIGNED: March 2007
SEALED: 02/29/08
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (S. College Rd.)
at
Big K/Dick's Sporting Goods

Division 3 | New Hanover County | Wilmington

PLAN DATE: September 2007 | REVIEWED BY: T. Jyg
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 3/31/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0212

04-MAR-2008 14:36
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$WORK(DMS)

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 74

PPLT SIGNAL OUTPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

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

OUTPUT ASSIGNMENTS FOR SIGNAL HEAD 51

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 OUPUT 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 INPUTING 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 OUPUT 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 INPUTING 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 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: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 ASSIGNMENTS FOR SIGNAL HEAD 11

STEP 4

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 OUPUT 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 INPUTING 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 5

```
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 OUPUT 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 INPUTING 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 6

```
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 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: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

ELECTRICAL DETAIL SHEET 3 OF 4

NOTE: THE OUTPUT ASSIGNMENT CHANGES, SHOWN ABOVE, ARE NECESSARY FOR THE TIME OF DAY OPERATION OF SIGNAL HEADS 11 AND 51. 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.

ALL OF THESE OUTPUT CHANGES ARE ACCOMPLISHED ON OUTPUT PAGE 2. THEREFORE IN ALTERNATE PHASING (PROTECTED ONLY) MODE, THE PAGE IS SWITCHED TO "2" BY THE CONTROLLER TOD EVENT SCHEDULING.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0212
DESIGNED: March 2007
SEALED: 02/29/08
REVISED: N/A

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 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (S. College Rd.)
at
Big K/Dick's Sporting Goods

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY: T. Jones		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 3/31/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0212

04-MAR-2008 14:41
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cstrickland

TOD EVENT SCHEDULING PROGRAMMING DETAIL

TO CALL ALTERNATE PHASING OPERATION

(program controller as shown below)

* DENOTES TO BE DETERMINED BY THE DIVISION TRAFFIC ENGINEER.

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

FROM MAIN MENU PRESS 'B' (SCHEDULING).

NOTE THAT THE TOP LINE WILL CHANGE FROM "NOT ASSIGNED" TO SPECIFIED FUNCTION WHEN EVENT IS ASSIGNED AS SHOWN.

```
SCHEDULED EVENT #1  OUTPUT PAGE CHANGE
START DATE (MM/DD)............**/**
END DATE (MM/DD)..............**/**
START TIME (HH:MM)............**:**
STOP TIME (HH:MM)............**:**
DOW     !SUN MON TUE WED THR FRI SAT
ENABLED ! *   *   *   *   *   *   *
EVENT GROUPS    !1234567891011121314151 6
ASSIGNED        !

DELETE EVENT WHEN COMPLETED?........N
CONTINUOUS EVENT?...................N
INVERT EVENT?.......................N
SELECT 1 EVENT TYPE:
EVENT GROUP (1-16)..................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
PLAN PRIORTY:  LOW.._ MED.._  HIGH.._
CAHNGE 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)............2
SET OUTPUT ON  (1-64)..............._
SET OUTPUT OFF (1-64)..............._
SET INPUT ON   (1-64)..............._
SET INPUT OFF  (1-64)..............._
ENABLE FAILURES LOG?................._
ENABLE EVENTS LOG?..................._
ENABLE DATA ENTRIES LOG?............._
ENABLE COORDINATION PLANS LOG?......._
ENABLE SPECIAL FUNCTIONS LOG?......._
ENABLE SLIT MONITOR LOG?............._
ENABLE DETECTOR DATA LOG?............_
ENABLE DETECTOR (1-64)..............._
ENABLE DETECTOR DIAGNOSTICS (1-64)..._
DISABLE DET STRETCH / DELAY (1-64)..._
DISABLE DET STOP BAR MODE (1-64)....._
SET LOGIC FLAG ON (1-16)............._
SET LOGIC FLAG OFF (1-64)............_
OVERIDE PHASE CONTROL FUNCTIONS?....._
```

PRESS "+" FOR NEXT EVENT

```
SCHEDULED EVENT #2  INPUT OVERRIDE
START DATE (MM/DD)............**/**
END DATE (MM/DD)..............**/**
START TIME (HH:MM)............**:**
STOP TIME (HH:MM)............**:**
DOW     !SUN MON TUE WED THR FRI SAT
ENABLED ! *   *   *   *   *   *   *
EVENT GROUPS    !1234567891011121314151 6
ASSIGNED        !

DELETE EVENT WHEN COMPLETED?........N
CONTINUOUS EVENT?...................N
INVERT EVENT?.......................N
SELECT 1 EVENT TYPE:
EVENT GROUP (1-16)..................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
PLAN PRIORTY:  LOW.._ MED.._  HIGH.._
CAHNGE 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)............._
SET OUTPUT ON  (1-64)..............._
SET OUTPUT OFF (1-64)..............._
SET INPUT ON   (1-64)..............._
SET INPUT OFF  (1-64)..............5
ENABLE FAILURES LOG?................._
ENABLE EVENTS LOG?..................._
ENABLE DATA ENTRIES LOG?............._
ENABLE COORDINATION PLANS LOG?......._
ENABLE SPECIAL FUNCTIONS LOG?......._
ENABLE SLIT MONITOR LOG?............._
ENABLE DETECTOR DATA LOG?............_
ENABLE DETECTOR (1-64)..............._
ENABLE DETECTOR DIAGNOSTICS (1-64)..._
DISABLE DET STRETCH / DELAY (1-64)..._
DISABLE DET STOP BAR MODE (1-64)....._
SET LOGIC FLAG ON (1-16)............._
SET LOGIC FLAG OFF (1-64)............_
OVERIDE PHASE CONTROL FUNCTIONS?....._
```

PRESS "+" FOR NEXT EVENT

```
SCHEDULED EVENT #3  INPUT OVERRIDE
START DATE (MM/DD)............**/**
END DATE (MM/DD)..............**/**
START TIME (HH:MM)............**:**
STOP TIME (HH:MM)............**:**
DOW     !SUN MON TUE WED THR FRI SAT
ENABLED ! *   *   *   *   *   *   *
EVENT GROUPS    !1234567891011121314151 6
ASSIGNED        !

DELETE EVENT WHEN COMPLETED?........N
CONTINUOUS EVENT?...................N
INVERT EVENT?.......................N
SELECT 1 EVENT TYPE:
EVENT GROUP (1-16)..................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
PLAN PRIORTY:  LOW.._ MED.._  HIGH.._
CAHNGE 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)............._
SET OUTPUT ON  (1-64)..............._
SET OUTPUT OFF (1-64)..............._
SET INPUT ON   (1-64)..............._
SET INPUT OFF  (1-64)..............6
ENABLE FAILURES LOG?................._
ENABLE EVENTS LOG?..................._
ENABLE DATA ENTRIES LOG?............._
ENABLE COORDINATION PLANS LOG?......._
ENABLE SPECIAL FUNCTIONS LOG?......._
ENABLE SLIT MONITOR LOG?............._
ENABLE DETECTOR DATA LOG?............_
ENABLE DETECTOR (1-64)..............._
ENABLE DETECTOR DIAGNOSTICS (1-64)..._
DISABLE DET STRETCH / DELAY (1-64)..._
DISABLE DET STOP BAR MODE (1-64)....._
SET LOGIC FLAG ON (1-16)............._
SET LOGIC FLAG OFF (1-64)............_
OVERIDE PHASE CONTROL FUNCTIONS?....._
```

PRESS "+" FOR NEXT EVENT

```
SCHEDULED EVENT #4  DETECTOR CONTROL
START DATE (MM/DD)............**/**
END DATE (MM/DD)..............**/**
START TIME (HH:MM)............**:**
STOP TIME (HH:MM)............**:**
DOW     !SUN MON TUE WED THR FRI SAT
ENABLED ! *   *   *   *   *   *   *
EVENT GROUPS    !1234567891011121314151 6
ASSIGNED        !

DELETE EVENT WHEN COMPLETED?........N
CONTINUOUS EVENT?...................N
INVERT EVENT?.......................N
SELECT 1 EVENT TYPE:
EVENT GROUP (1-16)..................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
PLAN PRIORTY:  LOW.._ MED.._  HIGH.._
CAHNGE 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)............._
SET OUTPUT ON  (1-64)..............._
SET OUTPUT OFF (1-64)..............._
SET INPUT ON   (1-64)..............._
SET INPUT OFF  (1-64)..............._
ENABLE FAILURES LOG?................._
ENABLE EVENTS LOG?..................._
ENABLE DATA ENTRIES LOG?............._
ENABLE COORDINATION PLANS LOG?......._
ENABLE SPECIAL FUNCTIONS LOG?......._
ENABLE SLIT MONITOR LOG?............._
ENABLE DETECTOR DATA LOG?............_
ENABLE DETECTOR (1-64)..............._
ENABLE DETECTOR DIAGNOSTICS (1-64)..._
DISABLE DET STRETCH / DELAY (1-64)..2
DISABLE DET STOP BAR MODE (1-64)....._
SET LOGIC FLAG ON (1-16)............._
SET LOGIC FLAG OFF (1-64)............_
OVERIDE PHASE CONTROL FUNCTIONS?....._
```

PRESS "+" FOR NEXT EVENT

```
SCHEDULED EVENT #5  DETECTOR CONTROL
START DATE (MM/DD)............**/**
END DATE (MM/DD)..............**/**
START TIME (HH:MM)............**:**
STOP TIME (HH:MM)............**:**
DOW     !SUN MON TUE WED THR FRI SAT
ENABLED ! *   *   *   *   *   *   *
EVENT GROUPS    !1234567891011121314151 6
ASSIGNED        !

DELETE EVENT WHEN COMPLETED?........N
CONTINUOUS EVENT?...................N
INVERT EVENT?.......................N
SELECT 1 EVENT TYPE:
EVENT GROUP (1-16)..................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
PLAN PRIORTY:  LOW.._ MED.._  HIGH.._
CAHNGE 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)............._
SET OUTPUT ON  (1-64)..............._
SET OUTPUT OFF (1-64)..............._
SET INPUT ON   (1-64)..............._
SET INPUT OFF  (1-64)..............._
ENABLE FAILURES LOG?................._
ENABLE EVENTS LOG?..................._
ENABLE DATA ENTRIES LOG?............._
ENABLE COORDINATION PLANS LOG?......._
ENABLE SPECIAL FUNCTIONS LOG?......._
ENABLE SLIT MONITOR LOG?............._
ENABLE DETECTOR DATA LOG?............_
ENABLE DETECTOR (1-64)..............._
ENABLE DETECTOR DIAGNOSTICS (1-64)..._
DISABLE DET STRETCH / DELAY (1-64)..6
DISABLE DET STOP BAR MODE (1-64)....._
SET LOGIC FLAG ON (1-16)............._
SET LOGIC FLAG OFF (1-64)............_
OVERIDE PHASE CONTROL FUNCTIONS?....._
```

TOD PROGRAMMING COMPLETE

ALTERNATE PHASING NOTES

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

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE TOD EVENTS ACTIVATE TO CALL THE "ALTERNATE PHASING":

EVENT NO.

1. OUTPUT PAGE 2 IS CALLED: Modifies control circuits for signal heads 11 and 51.
2. INPUT 5 IS SWITCHED OFF: Disables phase 6 call on loop 1A.
3. INPUT 6 IS SWITCHED OFF: Disables phase 2 call on loop 5A.
4. DELAY IS DISABLED FOR DETECTOR 2 (Phase 1, Loop 1A).
5. DELAY IS DISABLED FOR DETECTOR 6 (Phase 5, Loop 5A).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0212
DESIGNED: March 2007
SEALED: 02/29/08
REVISED: N/A

ELECTRICAL DETAIL SHEET 4 OF 4

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 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (S. College Rd.)
at
Big K/Dick's Sporting Goods

Division 3 | New Hanover County | Wilmington

PLAN DATE: September 2007 | REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

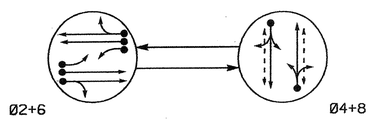
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE | DATE 3/31/08
SIG. INVENTORY NO. 03-0212

04-MAR-2008 14:46
s:\traffic\Signals\Workgroups\sig management\ncl\ond\03021 2_sm_816_xxx.dgn
ncstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.76

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

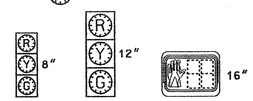
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R
P41, P42	DW	W	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.



41, 42
81, 82

21, 22
61, 62

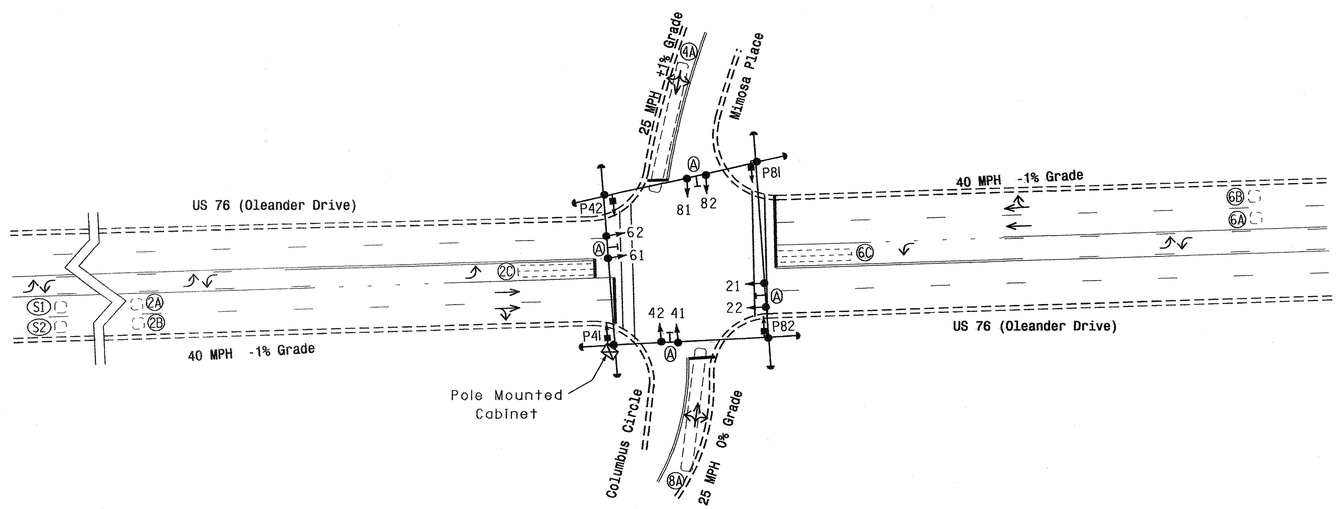
P41, P42
P81, P82

2070L 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
2A, 2B	6X6	250	4	-	2	Y	Y	-	-	-	-	Y
2C	6X40	0	2-4-2	-	2	Y	Y	Y	-	3	-	Y
4A	6X70	+5	EXISTING	-	4	Y	Y	-	-	10	-	Y
6A, 6B	6X6	250	5	-	6	Y	Y	-	-	-	-	Y
6C	6X40	0	2-4-2	-	6	Y	Y	Y	-	3	-	Y
8A	6X65	+5	EXISTING	-	8	Y	Y	-	-	10	-	Y
S1	6X6	477	5	-	-	-	-	-	-	-	Y	Y
S2	6X6	477	5	-	-	-	-	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0214-01	8
S2	0214-02	8



2 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0214.

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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	6.0	1.0	6.0	1.0
Max Green 1 *	45	25	45	25
Yellow Clearance	4.2	3.1	4.2	3.2
Red Clearance	1.2	2.5	1.3	2.4
Walk 1 *	-	4	-	4
Don't Walk 1	-	15	-	15
Seconds Per Actuation *	1.5	-	1.5	-
Max Variable Initial *	29	-	29	-
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 76 (Oleander Drive) at Mimosa Place / Columbus Circle

Division 3 New Hanover County Wilmington

PLAN DATE: June 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

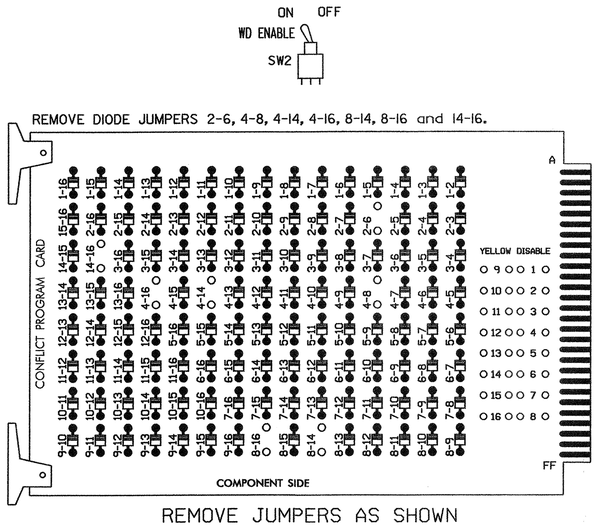
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELINSKA
SIGNATURE DATE 6/26/08
SIG. INVENTORY NO. 03-0214

27-JUN-2008 13:57
s:\its signals\wpkgroups\alexander\u-5017 (wilmington city system)\03-0214\03021 4_sig_dsn.20080626.dgn
rzielinsk

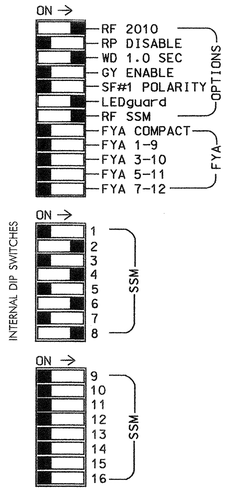
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.77

EDI MODEL 2010ECL-NC 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 1,3,5, 7,9,10,11,12,13,14,15 & 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
7. Program phases 4 and 8 for 'STARTUP PED CALL'.
8. 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.	NU	21,22	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						110
🚶						106						112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S4P,S6,S8,S8P
PHASES USED.....2,4,4 PED,6,8,8 PED
OVERLAPS.....NONE

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.

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT	Ø2 2A,2B	SLOT	Ø4 4A	SLOT	Ø6 6A,6B	SLOT	Ø8 8A	SLOT	SLOT	SLOT	NOT USED	NOT USED	FS DC ISOLATOR
FILE "I" L	EMPTY	Ø2 2C	EMPTY	SYS. DET. S1	EMPTY	Ø6 6C	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB21-3,4	I2U	39	1	2	2	Y	Y			
2C	TB23-3,4	I2L	43	5	12	2	Y	Y	Y		3
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6A,6B	TB21-11,12	I6U	40	2	6	6	Y	Y			
6C	TB23-11,12	I6L	44	6	16	6	Y	Y	Y		3
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			10
* S1	TB23-7,8	I4L	45	7	14	SYS					
* S2	TB24-1,2	I8L	46	8	18	SYS					
PED PUSH BUTTONS											
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P81,P82	TB24-11,12	I13L	70	32	PED 8	8 PED					

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

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

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0214
DESIGNED: June 2008
SEALED: 6/26/08
REVISED:

Signal Upgrade

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
122 N. McDowell St., Raleigh, NC 27603

US 76 (Oleander Drive)
at
Mimosa Place /
Columbus Circle

Division 3 New Hanover County Wilmington
PLAN DATE: January 2008 REVIEWED BY: T. Jiffo
PREPARED BY: G. C. Brown REVIEWED BY:

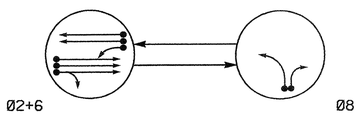
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 6/30/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0214

30-JUN-2008 10:41
s:\its signals\workgroups\sig management\03021 4_smu\e1e.20080303.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.78

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø2+6	Ø8	FLASH
21, 22	G	R	Y
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22
61, 62
81, 82

2070L LOOP & DETECTOR INSTALLATION

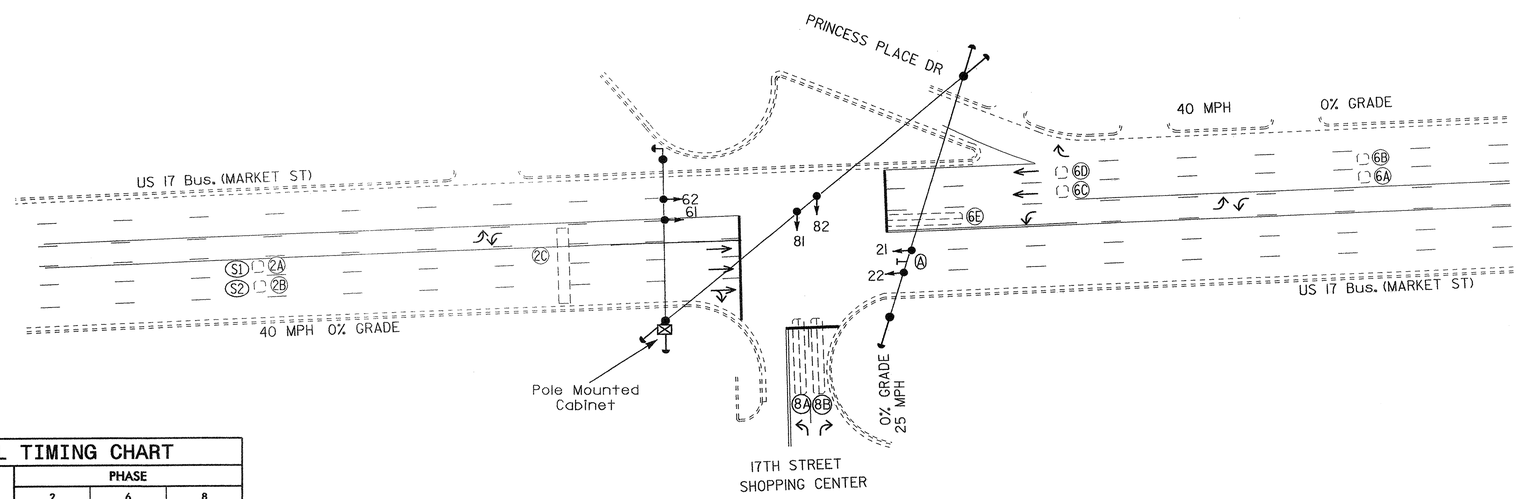
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S1	6X6	250	Existing	-	2	Y	Y	-	—	—	Y	Y
2B/S2	6X6	250	Existing	-	2	Y	Y	-	—	—	Y	Y
2C	6X40	90	Existing	-	2	Y	Y	-	—	—	-	Y
6A, 6B	6X6	250	Existing	-	6	Y	Y	-	—	—	-	Y
6C, 6D	6X6	90	Existing	-	6	Y	Y	-	—	—	-	Y
6E	6X40	0	2-4-2	-	6	Y	Y	-	—	—	-	Y
8A	6X40	+5	2-4-2	-	8	Y	Y	-	—	3	-	Y
8B	6X40	+5	2-4-2	-	8	Y	Y	-	—	10	-	Y

SYSTEM DETECTORS		
System Detector ID Number	Signal System ID Number	Control Zone
S1	0224-01	5
S2	0224-02	5

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0224.



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	
A	"DO NOT BLOCK INTERSECTION" Sign (R10-7)	A

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	12	12	7
Extension 1 *	2.0	2.0	2.0
Max Green 1 *	35	35	15
Yellow Clearance	4.2	4.2	3.0
Red Clearance	1.0	1.2	2.3
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
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

* 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 Uprade

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

SCALE 0 40 1"=40'

US 17 Bus. (Market Street) at 17th Street Shopping Center

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/30/08 DATE
SIG. INVENTORY NO. 03-0224

30-APR-2008 18:10
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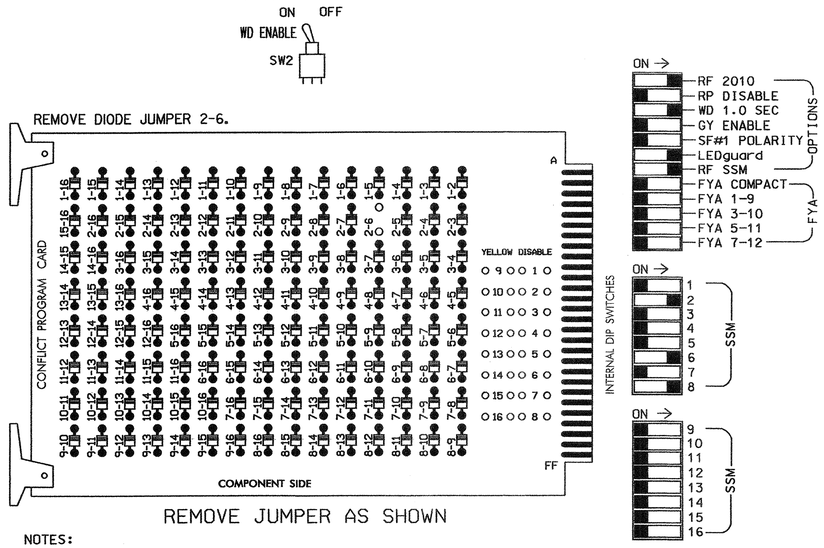
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.79

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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, 5,7,9,10,11,12,13,14,15 & 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. 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.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S6,S8
PHASES USED.....2,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	NOT USED	ø 2/SYS 2A/S1	SLOT EMPTY	SLOT EMPTY	NOT USED	ø 6 6A,6B	SLOT EMPTY	ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L	ø 2 2C	ø 2/SYS 2B/S2			ø 6 6E	ø 6 6C,6D		ø 8 8B						ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S1	TB21-3,4	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB23-3,4	I2L	43	5	12	2/SYS	Y	Y			
2C	TB23-1,2	I1L	47	9	22	2	Y	Y			
6A,6B	TB21-11,12	I6U	40	2	6	6	Y	Y			
6C,6D	TB23-11,12	I6L	44	6	16	6	Y	Y			
6E	TB23-9,10	I5L	48	10	26	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0224
DESIGNED: March 2007
SEALED: 4/30/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
122 N. McDowell St., Raleigh, NC 27603

US 17 Bus. (Market Street)
at
17th Street Shopping Center

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008 REVIEWED BY: T. Ugle
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

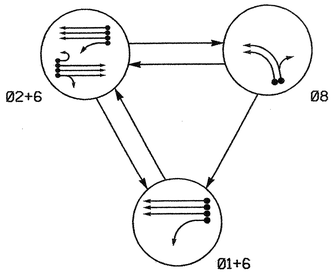
George C. Brown 5/1/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0224

01-MAY-2008 08:32
s:\traffic\signals\workgroups\sig mainbrown\m030224.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 80

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

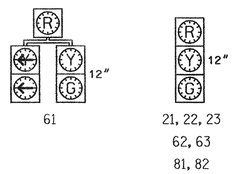
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	FLASH
21, 22, 23	R	G	R	Y
61	G	G	R	Y
62, 63	G	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



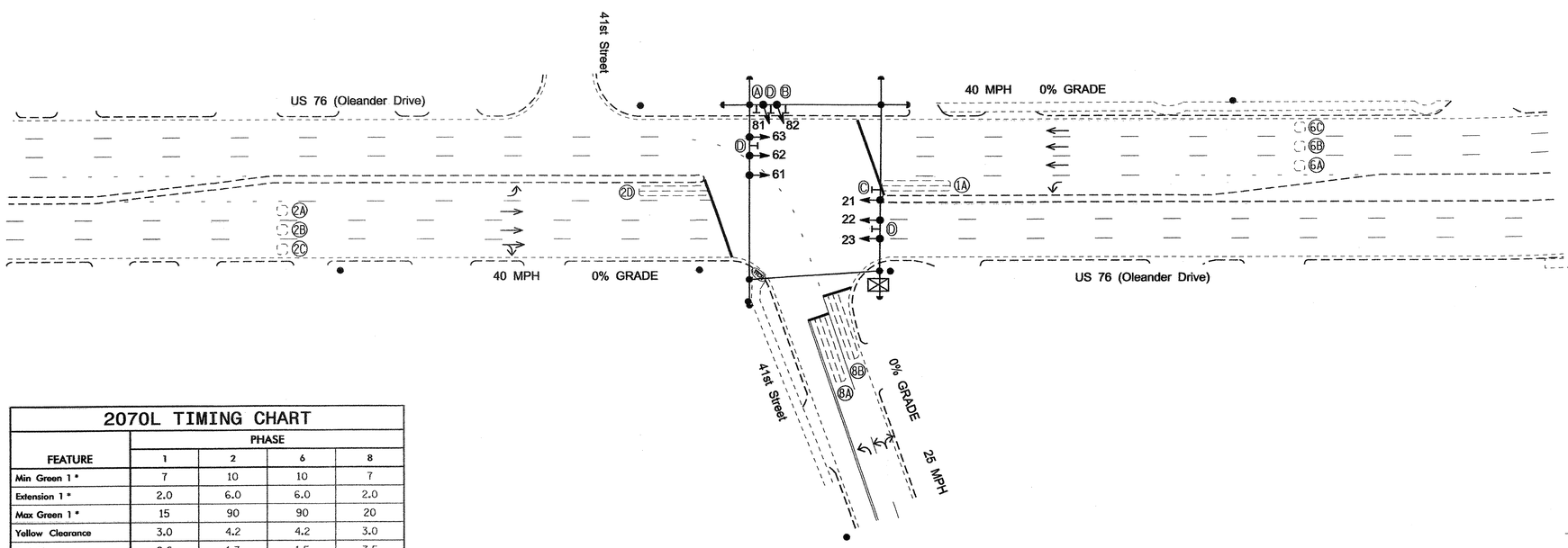
2070L LOOP & DETECTOR INSTALLATION

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	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
2A,2B,2C	6x6	250	5	-	2	Y	Y	-	-	-	-	Y
2D	6x40	0	2-4-2	-	2	Y	Y	Y	-	3	-	Y
6A,6B,6C	6x6	250	5	-	6	Y	Y	-	-	-	-	Y
8A	6x40	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6x40	0	2-4-2	-	8	Y	Y	-	-	5	-	Y

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0227.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	WCR
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Dual Turn Arrows Sign	B
C	U-Turn "MUST YIELD" Sign (R3-27)	C
D	Street Sign	D

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	10	10	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	15	90	90	20
Yellow Clearance	3.0	4.2	4.2	3.0
Red Clearance	2.6	1.3	1.5	3.5
Red Revert	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	1.5	-
Max Variable Initial *	-	29	29	-
Time Before Reduction *	-	10	10	-
Time To Reduce *	-	20	20	-
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 76 (Oleander Drive) at 41st Street

Division 3 New Hanover County Wilmington

PLAN DATE:	June 2008	PREPARED BY:	Sterling
PREPARED BY:	J Navarrete	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE
DATE 6/27/08

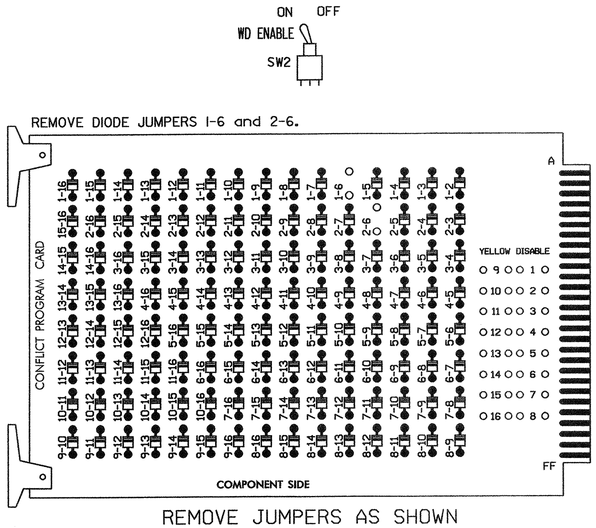
SIG. INVENTORY NO. 03-0227

27-JUN-2008 14:38
s:\traffic\Signals\Workgroups\wilmington city system\R03-0227\R030227_sig_dsn_20080627.dgn
jzieman

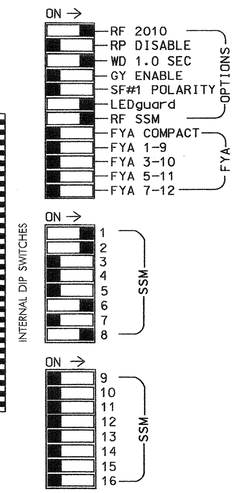
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 81

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 3,4,5, 7,9,10,11,12,13,14,15 & 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. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S6,S8
PHASES USED.....1,2,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

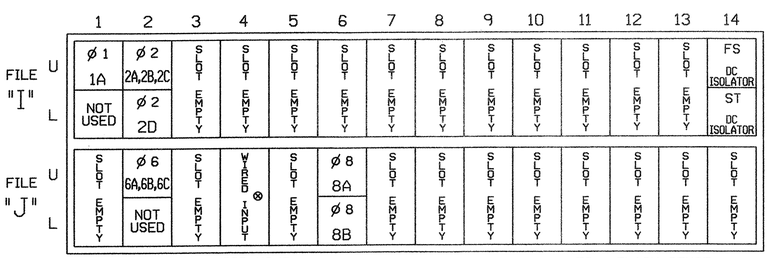
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21 22,23	NU	NU	NU	NU	NU	61 62,63	NU	NU	81,82	NU
RED	✳	128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

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

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
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
2D	TB2-7,8	I2L	43	5	12	2	Y	Y	Y		3
6A,6B,6C	TB3-5,6	J2U	40	2	6	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			5

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

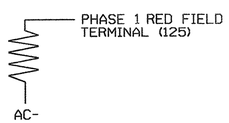
(program controller as shown below)

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

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 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: 03-0227
DESIGNED: June 2008
SEALED: 6-27-08
REVISED: N/A

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 76 (Oleander Drive) at 41st Street

Division 3 | New Hanover County | Wilmington

PLAN DATE:	7-11-08	REVIEWED BY:	D.T. Joyce DTJ
PREPARED BY:	D.H. Spaulding	REVIEWED BY:	

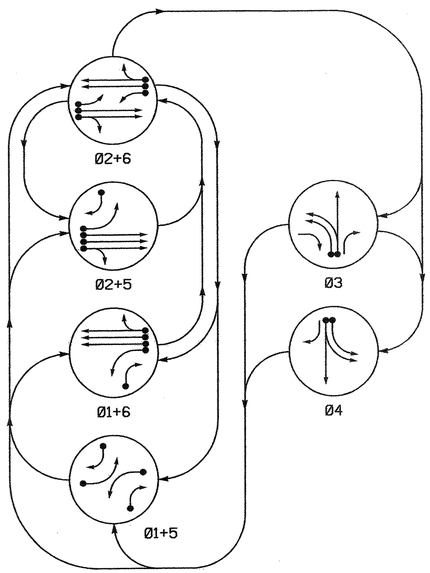
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 7/14/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0227

15-JUL-2008 13:14
s:\tfs signals\workgroups\sig management\spaulding\in-progress\03027_sm_ele_2008xx.dgn
dbspalding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 82

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

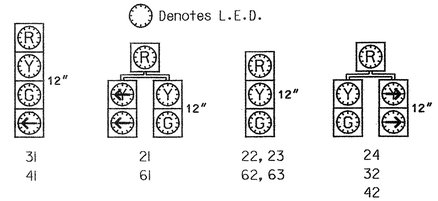
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
21	R	R	G	G	R	R	Y
22, 23	R	R	G	G	R	R	Y
24	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	G	R	R
42	R	R	R	R	R	G	R
61	R	R	G	R	G	R	Y
62, 63	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
1B	6x40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A,2B,2C	6x6	250	5	-	2	Y	Y	-	-	-	-	Y
3A	6x40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
3B	6x40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	0	5	-	4	Y	Y	-	-	-	-	Y
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
5B	6x40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B,6C	6x6	250	5	-	6	Y	Y	-	-	-	-	Y
S1	6x6	+345	5	-	-	-	-	-	-	-	Y	Y
S2	6x6	+345	5	-	-	-	-	-	-	-	Y	Y
S3	6x6	+345	5	-	-	-	-	-	-	-	Y	Y

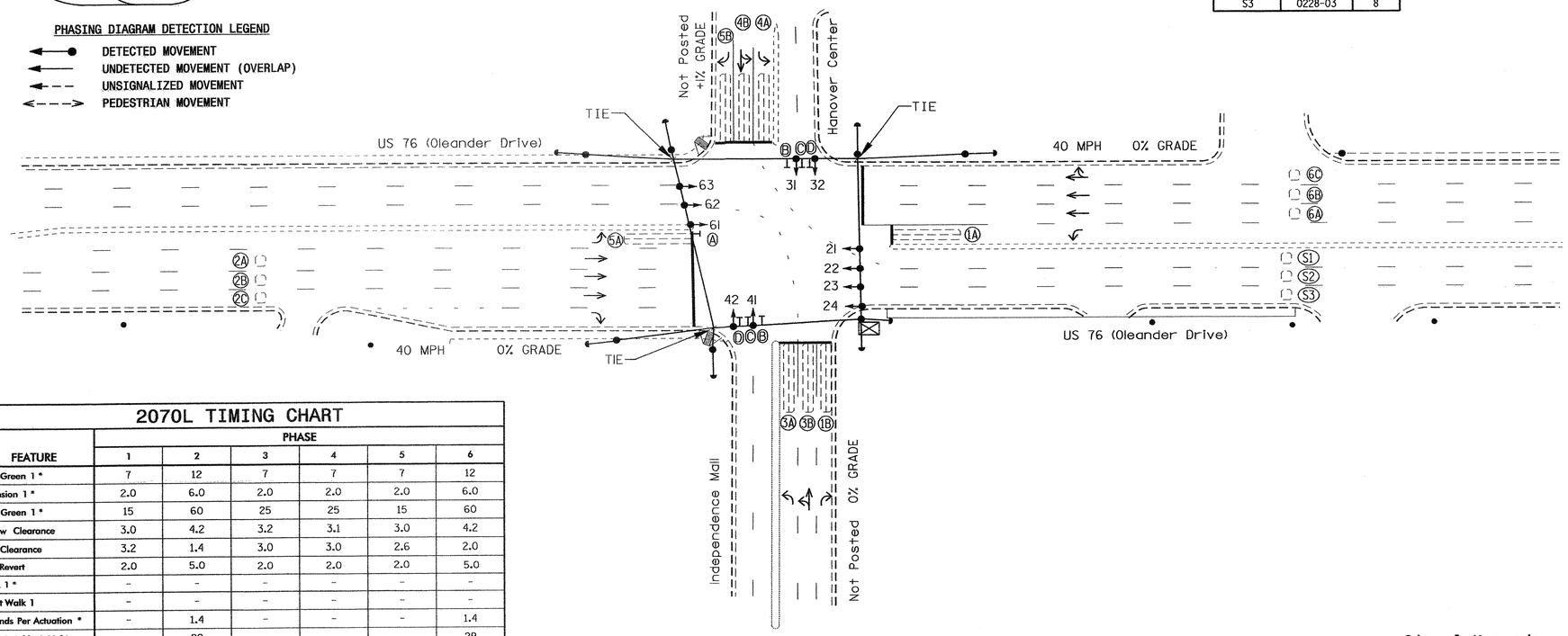
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0228-01	8
S2	0228-02	8
S3	0228-03	8

6 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0228.



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	
Ⓐ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Combined Through and Left Arrow Sign (R3-6L)	Ⓒ
Ⓓ	Street Sign	Ⓓ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	15	60	25	25	15	60
Yellow Clearance	3.0	4.2	3.2	3.1	3.0	4.2
Red Clearance	3.2	1.4	3.0	3.0	2.6	2.0
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.4	-	-	-	1.4
Max Variable Initial *	-	29	-	-	-	29
Time Before Reduction *	-	10	-	-	-	10
Time To Reduce *	-	20	-	-	-	20
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 76 (Oleander Drive) at Hanover Center and Independence Mall

Division 3 New Hanover County Wilmington

PLAN DATE:	June 2008	PREPARED BY:	Sterling
PREPARED BY:	J Navarrete	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

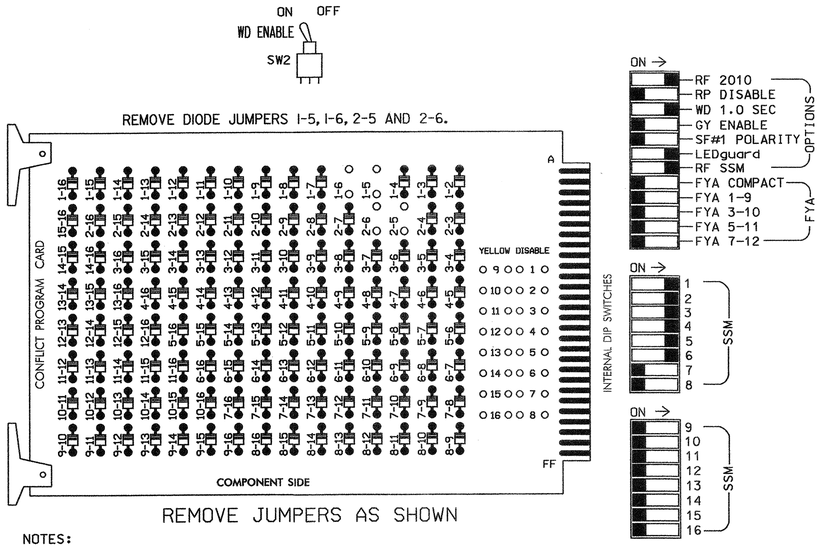
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELINSKI
SIGNATURE DATE 6/26/08
SIG. INVENTORY NO. 03-0228

27-JUN-2008 13:53
S:##ts signals$workgroups$wilexander$wu-5017 (wilmington city system)$03-0228$03028_sig_dsn_20080626.dgn
zielinski

PROJECT REFERENCE NO.	SHEET NO.
U-5017	Sig. 83

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 7,8,9,10, 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. 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.	32,61	21,22 23,24	NU	24	31	32	41	42	NU	21,42	61,62 63	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															
YELLOW ARROW	126			117						132					
GREEN ARROW	127			118	118		103			133					

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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, 2B,2C	SLOT EMPTY	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	Ø1 1B			Ø3 3B	Ø4 4B			SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A, 6B,6C	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø5 5B							NOT USED					

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			15
	-	J4U	48	10	26	6	Y	Y	Y		3
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
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			15
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
* 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					

[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

BACKUP PROTECTION NOTE

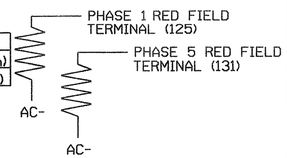
(program controller as shown below)

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

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: 03-0228
DESIGNED: June 2008
SEALED: 06/26/08
REVISED: N/A

SIGNAL UPGRADE

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
122 N. McDowell St., Raleigh, NC 27603

US 76 (Oleander Drive) at Hanover Center and Independence Mall

Division 3 | New Hanover County | Wilmington

PLAN DATE: June 2008 | REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland | REVIEWED BY:

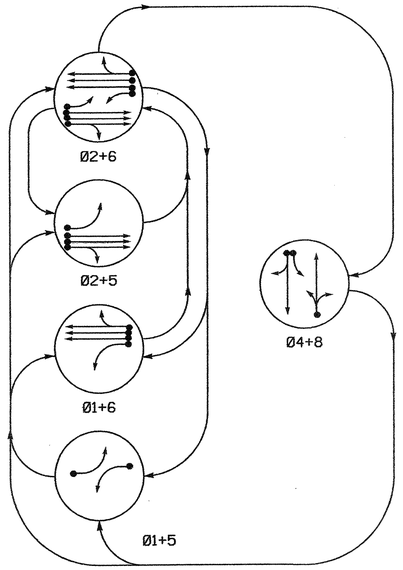
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 7/3/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0228

02-JUL-2008 14:12
s:\traffic\signalsworkgroups\sig manestrickland\03228_sheets_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 84

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

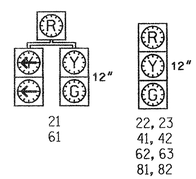
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
21	R	R	G	G	R	Y
22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62, 63	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
2A,2B,2C	6X6	250	5	-	2	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
6A,6B,6C	6X6	250	5	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y
S1	6X6	+830	6	-	-	-	-	-	-	-	Y	Y
S2	6X6	+830	6	-	-	-	-	-	-	-	Y	Y
S3	6X6	+830	6	-	-	-	-	-	-	-	Y	Y
S4	6X6	760	6	-	-	-	-	-	-	-	Y	Y
S5	6X6	760	6	-	-	-	-	-	-	-	Y	Y
S6	6X6	760	6	-	-	-	-	-	-	-	Y	Y

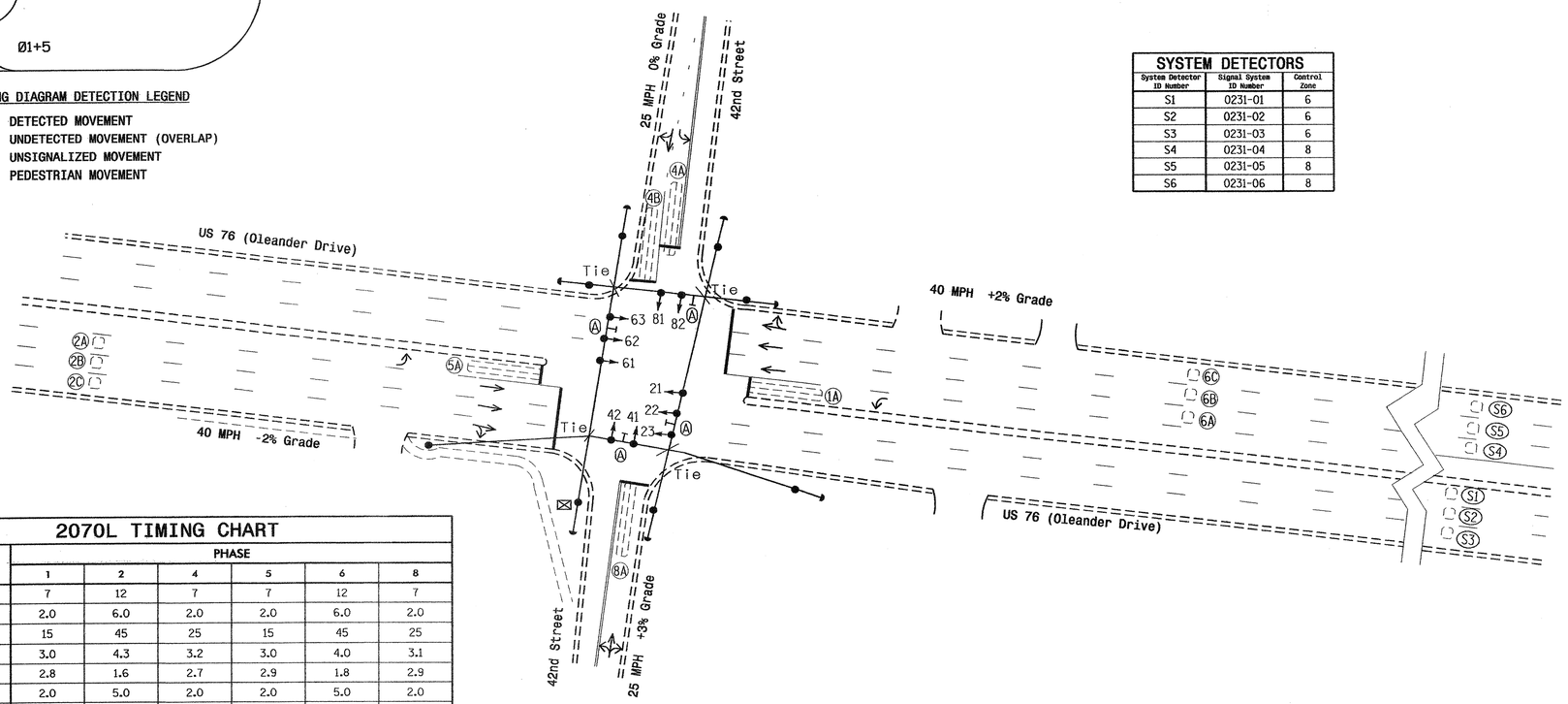
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0231-01	6
S2	0231-02	6
S3	0231-03	6
S4	0231-04	8
S5	0231-05	8
S6	0231-06	8

5 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0231.



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	
	Street Sign	

2070L 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	45	25	15	45	25
Yellow Clearance	3.0	4.3	3.2	3.0	4.0	3.1
Red Clearance	2.8	1.6	2.7	2.9	1.8	2.9
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	29	-	-	29	-
Time Before Reduction *	-	10	-	-	10	-
Time To Reduce *	-	20	-	-	20	-
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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 76 (Oleander Drive) at 42nd Street

Division 3 New Hanover County Wilmington

PLAN DATE: June 2008 REVIEWED BY:

PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/26/08
SIG. INVENTORY NO. 03-0231

27-JUN-2008 13:54
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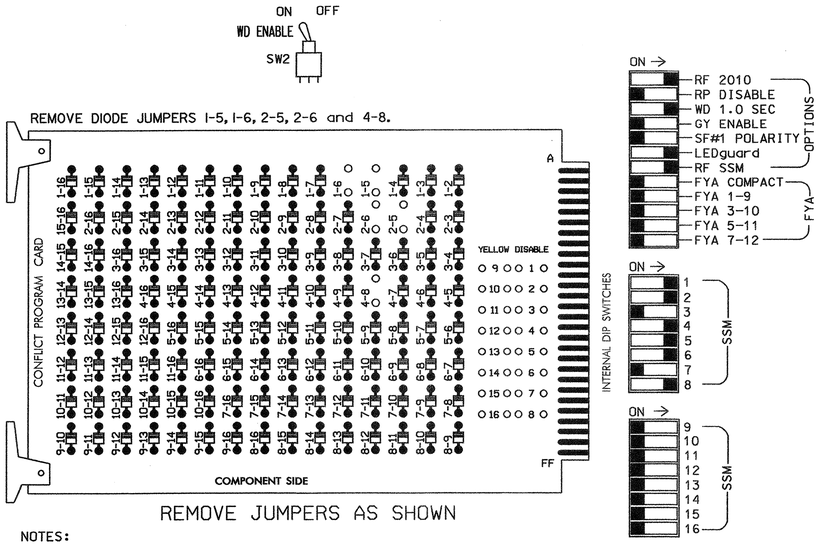
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017	Sig. 85

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 3,7, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
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, 22,23	NU	NU	41,42	NU	21	61, 62,63	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					

NU = Not Used

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

EQUIPMENT INFORMATION

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

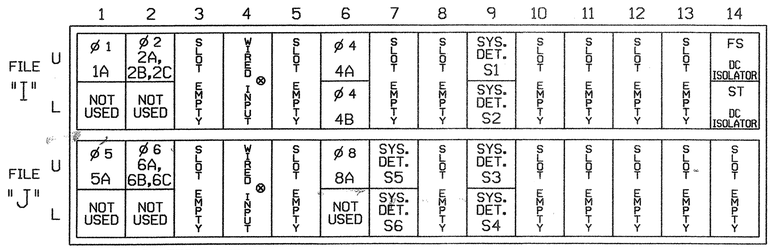
BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 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)



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			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A,2B,2C	TB2-5,6	I2U	39	1	2	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			10
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
* 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					
* S4	TB7-11,12	J9L	61	23	17	SYS					
* S5	TB7-1,2	J7U	66	28	38	SYS					
* S6	TB7-3,4	J7L	79	41	48	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.

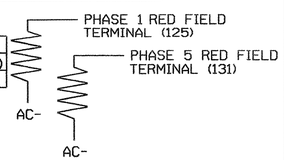
* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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: 03-0231
DESIGNED: June 2008
SEALED: 06/26/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety System Branch
Signals Management Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pwky, Garner, NC 27529

US 76 (Oleander Drive) at 42nd Street

Division 3 | New Hanover County | Wilmington

PLAN DATE: June 2008 | REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/3/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0231

01-JUL-2008 11:11
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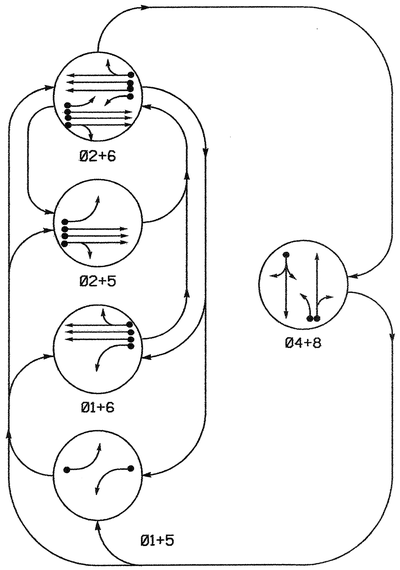
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig 86

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

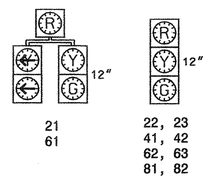
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
21	R	R	G	G	R	Y
22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62, 63	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



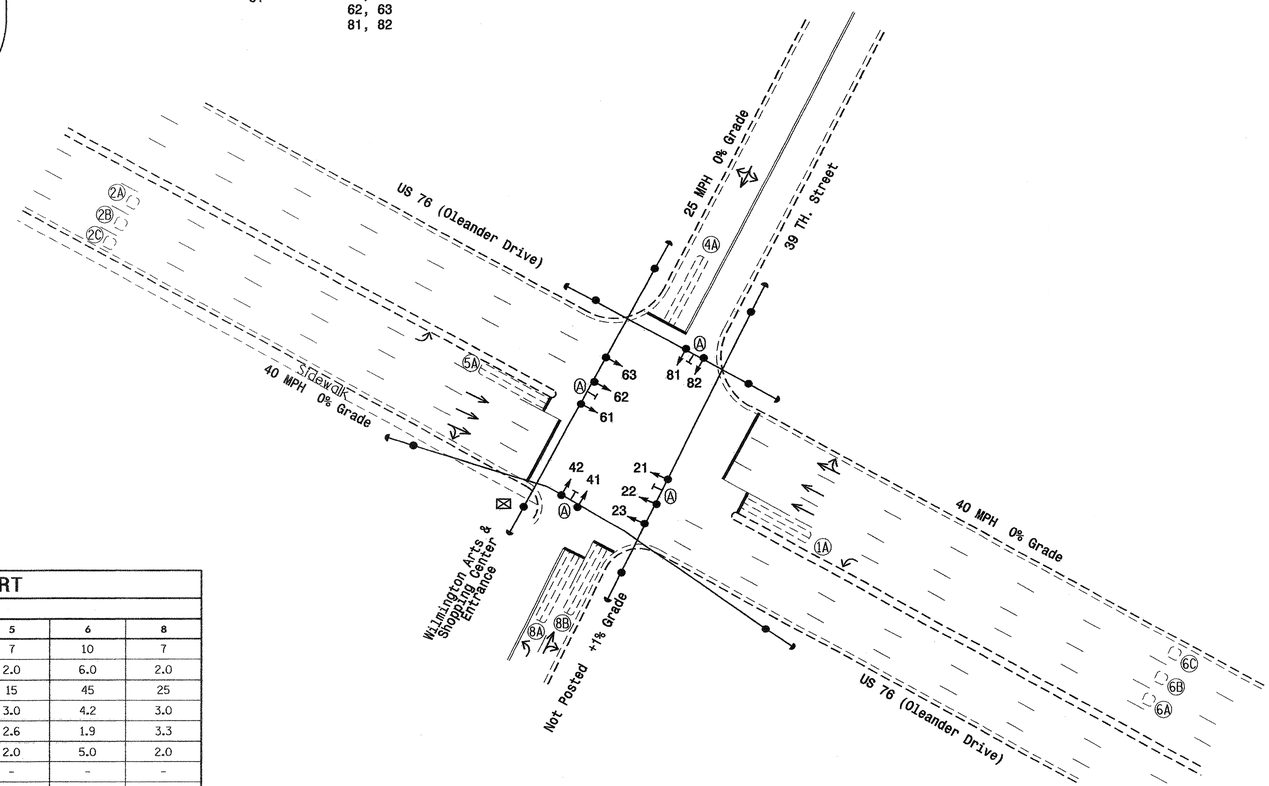
2070L LOOP & DETECTOR INSTALLATION

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	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
2A,2B,2C	6X6	250	5	-	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
6A,6B,6C	6X6	250	5	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

5 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0232.



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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	15	45	25	15	45	25
Yellow Clearance	3.0	4.2	3.2	3.0	4.2	3.0
Red Clearance	3.1	1.4	3.0	2.6	1.9	3.3
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.4	-	-	1.4	-
Max Variable Initial *	-	28	-	-	28	-
Time Before Reduction *	-	10	-	-	10	-
Time To Reduce *	-	20	-	-	20	-
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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 76 (Oleander Drive) at 39th Street/Wilmington Arts & Shopping Center Entrance

Division 3 New Hanover County Wilmington

PLAN DATE:	June 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

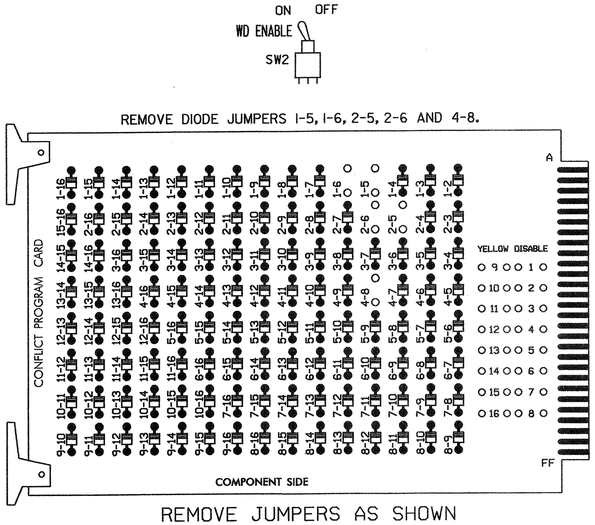
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 6/26/08 DATE
SIG. INVENTORY NO. 03-0232

21-JUN-2008 13:55
s:\traffic\signals\workgroups\wilmington\u-5017 (wilmington city system)\03-0232\03-0232_sig_dsn_20080626.dgn

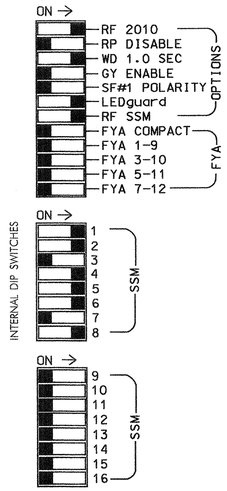
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 87

EDI MODEL 2010ECL-NC 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 3,7,9,10, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8
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.	61	21, 22,23	NU	NU	41,42	NU	21	61, 62,63	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					

NU = Not Used

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

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,2B,2C	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	NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A,6B,6C	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	NOT USED				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			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A,2B,2C	TB2-5,6	I2U	39	1	2	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			15
	-	I4U	47	9	22	2	Y	Y	Y		3
6A,6B,6C	TB3-5,6	J2U	40	2	6	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			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

BACKUP PROTECTION NOTE

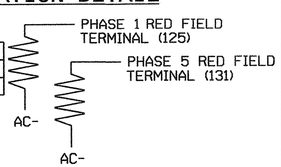
(program controller as shown below)

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

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: 03-0232
DESIGNED: June 2008
SEALED: 6-26-08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

US 76 (Oleander Drive)
at
39th Street/Wilmington Arts & Shopping Center Entrance

Division 3 | New Hanover County | Wilmington
PLAN DATE: 7-10-08 | REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding | REVIEWED BY:

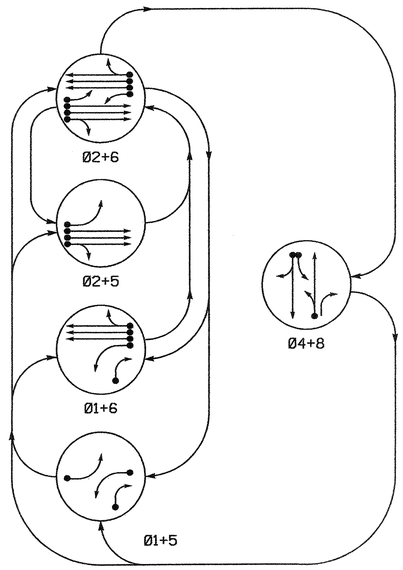
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 7/16/08 DATE
SIG. INVENTORY NO. 03-0232

15-JUL-2008 13:57
s:\traffic\signals\working\groups\sig namespaulding\in-progress\03023z_sm.ele_2008xx.dgn
D.H. Spaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 88

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

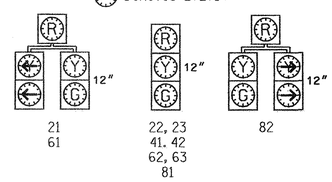
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
21	R/G	R	R/G	G	R	Y
22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
61	R/G	G	R	G	R	Y
62, 63	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/R	R/G	R	R	G	R

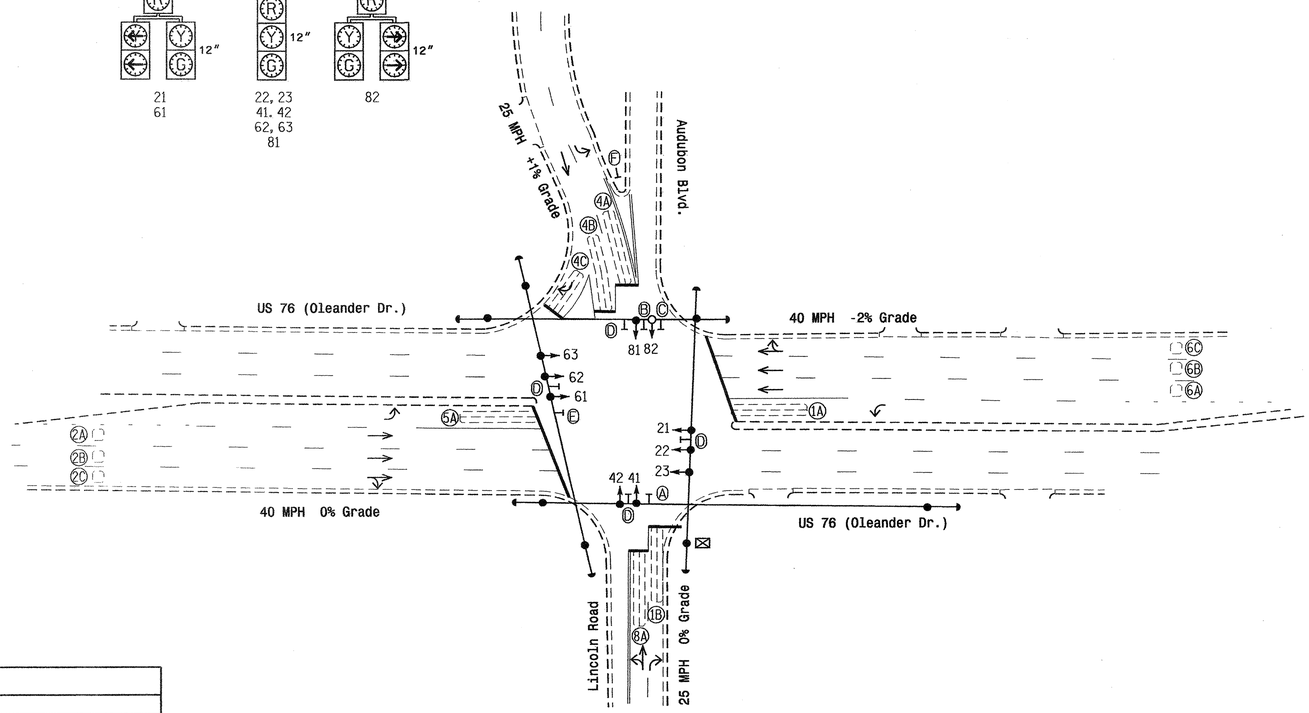
SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A,2B,2C	6X6	250	5	-	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	5	-	Y
4C	6X25	0	2-4-2	-	4	Y	Y	-	-	15	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
6A,6B,6C	6X6	250	5	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y



5 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Exisitng lane control signs may be removed.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset: # 0233.

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)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	Street Sign	Ⓓ
Ⓔ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓔ
Ⓕ	Keep Right Sign (R4-7)	Ⓕ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	15	40	20	15	40	0
Yellow Clearance	3.0	4.2	3.1	3.0	4.3	3.2
Red Clearance	2.6	1.4	2.7	2.6	1.5	3.1
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	29	-	-	29	-
Time Before Reduction *	-	10	-	-	10	-
Time To Reduce *	-	20	-	-	20	-
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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1=40'

US 76 (Oleander Dr.)
at
Audubon Blvd./
Lincoln Road

Division 3 New Hanover County Wilmington

PLAN DATE:	June 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/27/08
SIG. INVENTORY NO. 03-0233

15-JUL-2008 13:02
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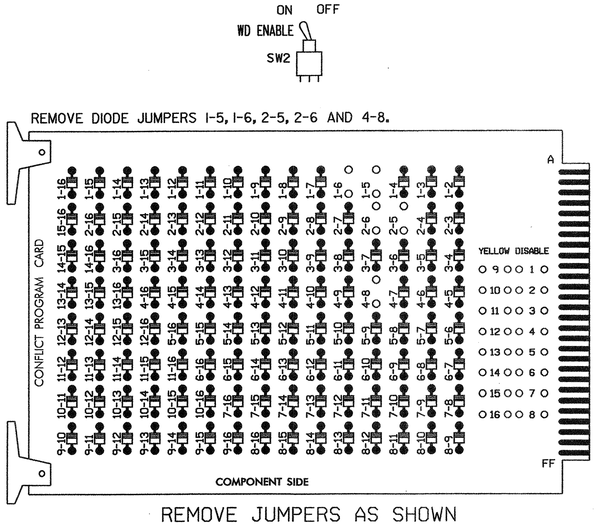
rziemba

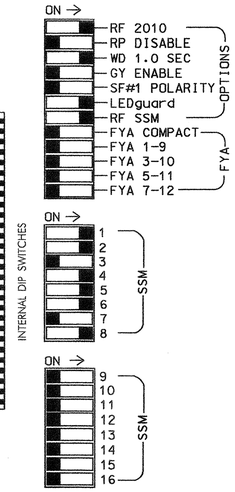
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 89

EDI MODEL 2010ECL-NC 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 3,7,9,10, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8
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.	61,82	21,22, 23	NU	NU	41,42	NU	21	61,62 63	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
✋												
🚶												

NU = Not Used

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

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,2B,2C	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø 4 4A	Ø 4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 1 1B				Ø 4 4B	NOT USED							ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A,6B,6C	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	NOT USED				NOT USED								

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			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			5
4C	TB6-1,2	I7U	65	27	34	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,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

[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

BACKUP PROTECTION NOTE

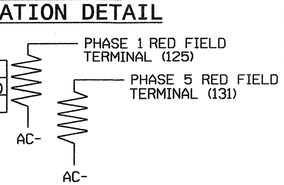
(program controller as shown below)

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

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: 03-0233
DESIGNED: June 2008
SEALED: 6-27-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering Branch, State of North Carolina Department of Transportation, Signal Management Section

750 N. Greenfield Pwky, Garner, NC 27529

US 76 (Oleander Dr.) at Audubon Blvd./ Lincoln Road

Division 03 New Hanover County Wilmington

PLAN DATE: 07-11-08	REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

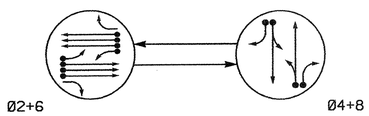
George C. Brown 7/16/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0233

16-JUL-2008 07:53
S:\MTS Signal\Work Groups\sig mon\spoulding\in-progress\030233_sm_ele_2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	SIG. 90

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22, 23, 24	G	R	Y
41, 42	R	G	R
61, 62, 63, 64	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22, 23, 24
41, 42
61, 62, 63, 64
81, 82

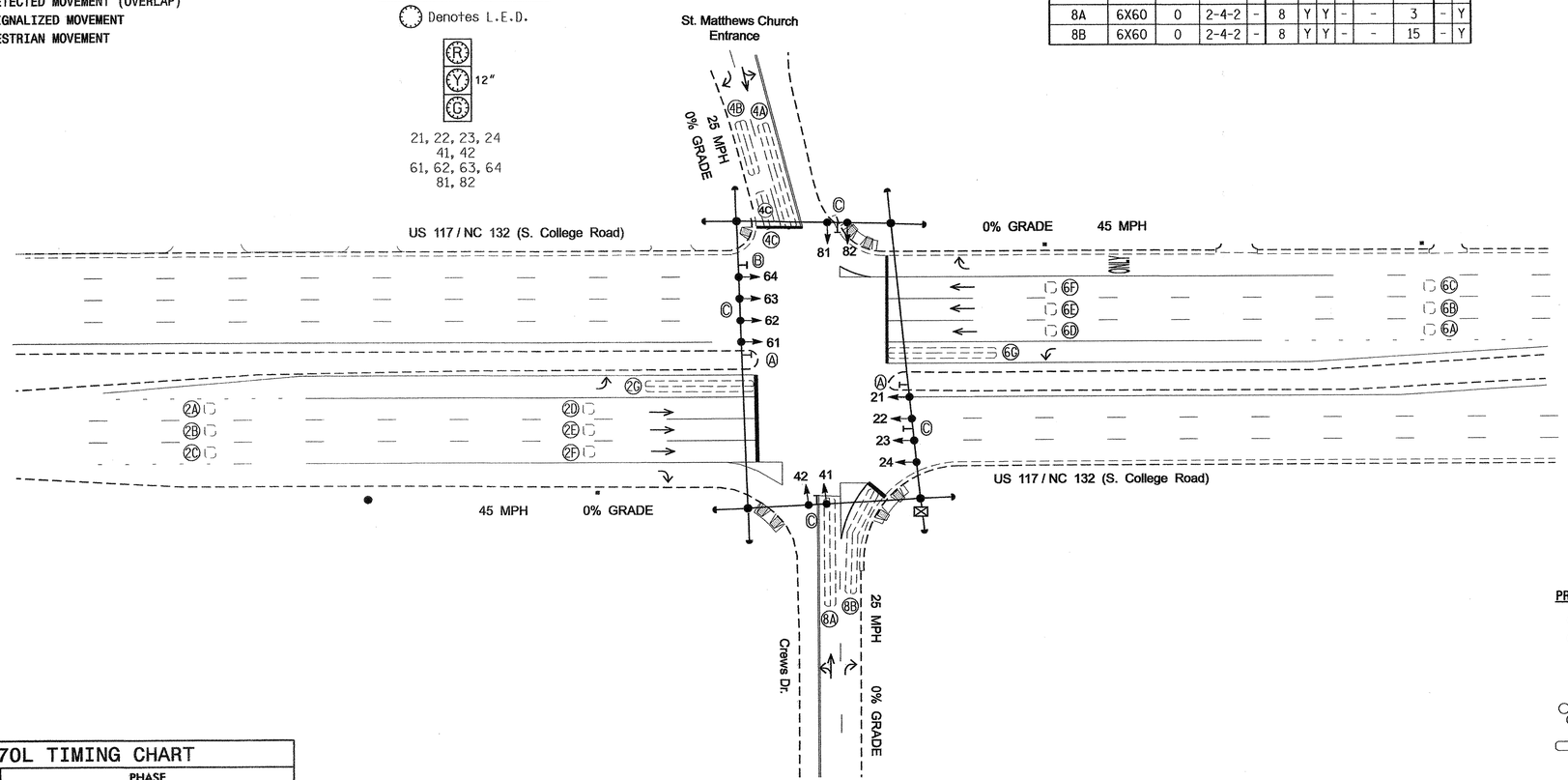
2070L LOOP & DETECTOR INSTALLATION

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
2A,2B,2C	6X6	300	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2D,2E,2F	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
2G	6X60	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X30	30	2-4-2	-	4	Y	Y	-	-	15	-	Y
4C	6X20	0	2-4-2	-	4	Y	Y	-	-	15	-	Y
6A,6B,6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
6G	6X60	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	15	-	Y

2 Phase
Fully Actuatead
(Wilmington City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
5. Pavement markings are existing.
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 #: 0234.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
Ⓐ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Street Sign	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	12	7	12	7
Extension 1 *	2.0	1.0	2.0	1.0
Max Green 1 *	45	15	45	15
Yellow Clearance	4.5	3.2	4.5	3.2
Red Clearance	1.4	3.5	1.6	3.4
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
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

* 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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40
1"=40'

US 117/NC 132 (S. College Rd.)
at
Crews Drive and
St. Matthews Church Entrance

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 2/29/08 DATE
SIG. INVENTORY NO. 03-0234

30-JUN-2008 16:49
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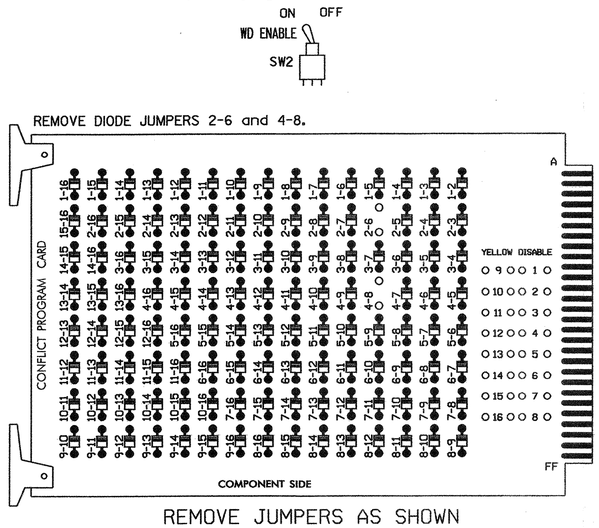
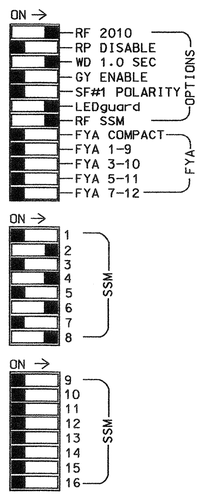
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 91

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 1,3,5,7, 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 4 and 8, on the controller unit, for Dual Entry.
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
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22 23,24	NU	NU	41,42	NU	NU	61,62 63,64	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S6,S8
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

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

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,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2D,2E,2F	TB2-7,8	I2L	43	5	12	2	Y	Y			
2G	TB2-9,10	I3U	63	25	32	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
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y		1.6	
6D,6E,6F	TB3-7,8	J2L	44	6	16	6	Y	Y			
6G	TB3-9,10	J3U	64	26	36	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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0234
DESIGNED: March 2007
SEALED: 2/29/08
REVISED:

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 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (S. College Rd.)
at
Crews Drive and
St. Matthews Church Entrance

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY: T. J.
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 3/4/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0234

03-MAR-2008 11:26
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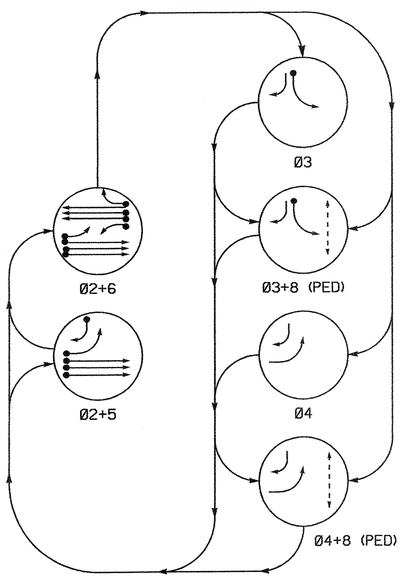
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 92

6 Phase
Fully Actuated
(Wilmington City System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

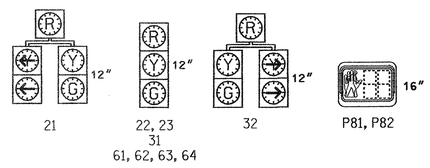
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	02+6	03	03+8	04	04+8	FLASH
21	G	G	R	R	R	R	Y
22, 23	G	G	R	R	R	R	Y
31	R	R	G	G	R	R	R
32	R	R	G	G	R	R	R
61,62,63,64	R	G	R	R	R	R	Y
P81, P82	DW	DW	DW	W	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.

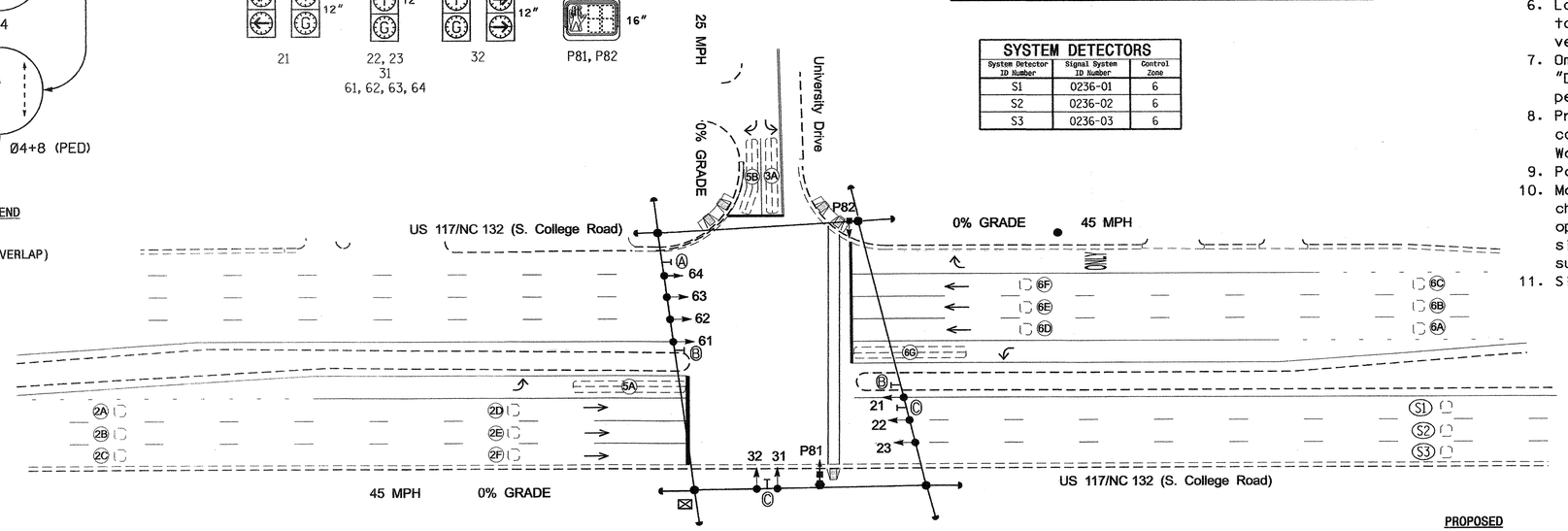


2070L LOOP & DETECTOR INSTALLATION

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
2A,2B,2C	6X6	300	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2D,2E,2F	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	2	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
5B	6X40	0	EXISTING	-	5	Y	Y	-	-	15	-	Y
6A,6B,6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
6G	6X60	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
S1	6X6	+402	EXISTING	-	-	-	-	-	-	-	Y	Y
S2	6X6	+402	EXISTING	-	-	-	-	-	-	-	Y	Y
S3	6X6	+402	EXISTING	-	-	-	-	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0236-01	6
S2	0236-02	6
S3	0236-03	6



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 5 during phase 6 on.
4. Program controller to clear from phase 2+6 to phase 2+5 by progressing through phase 4 (see Electrical Details).
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0236.

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 Pedestal	
N/A	Wheelchair Ramp	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	U-Turn "MUST YIELD" Sign (R3-27)	B
C	Street Sign	C

2070L TIMING CHART

FEATURE	PHASE 2	3	4	5	6	8
Min Green 1 *	12	7	4	7	12	7
Extension 1 *	3.0	1.0	0.0	1.0	3.0	0.0
Max Green 1 *	50	15	4	15	50	30
Yellow Clearance	4.5	3.0	3.0	3.0	4.5	3.0
Red Clearance	1.8	3.3	3.3	3.3	1.1	0.0
Walk 1 *	-	-	-	-	-	4
Don't Walk 1	-	-	-	-	-	30
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	-	YELLOW	-
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Rd.)
at
University Drive

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 7/21/08 DATE
SIG. INVENTORY NO. 03-0236

21-JUL-2008 12:38
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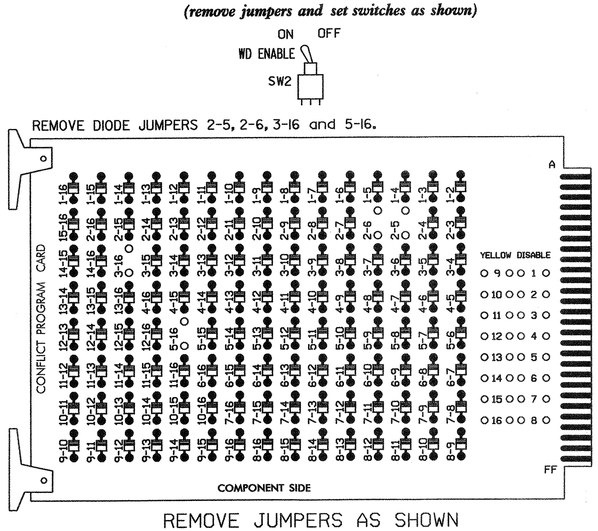
rziemba

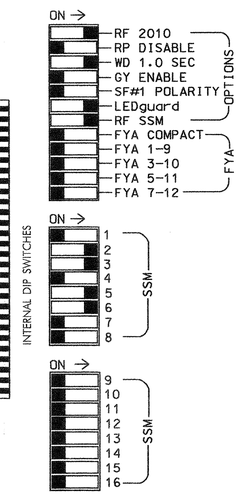
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 93

EDI MODEL 2010ECL-NC 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 1,4,7, 8,9,10,11,12,13,14,15 & 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 8 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Wilmington City System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S3,S5,S6,S8P
PHASES USED.....2,3,4,5,6,8,8 PED
OVERLAP A.....4+5

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	OLA	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21, 22,23	NU	31,32	NC	NU	21,32	61,62, 63,64	NU	NU	NC	P81, P82
RED		128		116			✱	134				
YELLOW		129		117				135				
GREEN		130		118				136				
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
✋												110
🚶												112

NU = Not Used
NC = No Connection, phase used for timing purposes only.
✱ Denotes install load resistor. See load resistor installation detail this sheet.

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, 2B,2C	SLOT EMPTY	WIRED INPUT ⊗	Ø3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	FS DC ISOLATOR
	L		Ø2 2D, 2E,2F			NOT USED				SYS. DET. S2				Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A, 6B,6C	Ø6 6G	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6D, 6E,6F	NOT USED					NOT USED					

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,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2D,2E,2F	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			2
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	6	Y	Y			
6G	TB5-1,2	J4U	48	10	26	6	Y	Y			
✱ 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					
PED PUSH BUTTONS											
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

[1] 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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Function 1.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
                 OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦     X
OMIT PHASES     ¦    X
CALL PHASES     ¦   X
```

BACKUP PROTECTION PROGRAMMING COMPLETE

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

(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 Command 1.
2. From Main Menu press '6' (Outputs), then '3' (Logical I/O Processor).
3. The programming shown below is necessary for signals to operate as shown on the signal design plans.

```
LOGICAL I/O COMMAND #1   (+/-COMMAND#)
IF  ACTIVE PHASE        #8    IS ON
AND VEH CALL ON PHASE   #5    IS ON

                 SCROLL DOWN

THEN:
SET  INPUT ASSIGNMENT   #3    ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

NOTE: INPUT 3 IS THE DEFAULT CALL/EXTEND DETECTOR (4) FOR PHASE 4.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

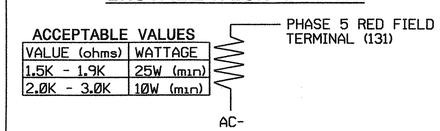
```
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          ¦123456789101112131415 16
VEH OVL PARENTS:¦   XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER 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)....5
```

OVERLAP PROGRAMMING COMPLETE

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



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 red monitor input 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: 03-0236
DESIGNED: March 2007
SEALED: 07/21/08
REVISED: N/A

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (S. College Rd.) at University Drive

Division 3 | New Hanover County | Wilmington

PLAN DATE: September 2007 | REVIEWED BY: T. Vaden
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

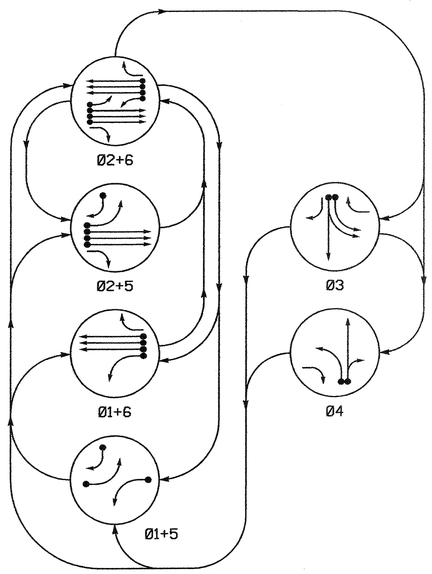
George C. Brown 7/22/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0236

22-JUL-2008 10:54
cstrickland
c:\pw_working\dms\wdkgroupsesig mcmestrickland#030236_smlele_xxx.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5B. 94

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	04	FLASH
21	R	R	G	G	R	R	Y
22, 23	R	R	G	G	R	R	Y
24	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	G	R
42	R	R	R	R	R	G	R
61	R	G	R	G	R	R	Y
62, 63	R	G	R	G	R	R	Y
64	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	-	10	-	Y
					6	Y	Y	-	-	-	-	Y
2A, 2B	6X6	296	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2C,2D,2E	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	3	-	Y
3B	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	10	-	Y
					2	Y	Y	-	-	-	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B,6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
S1	6X6	+315	EXISTING	-	-	-	-	-	-	-	Y	Y
S2	6X6	+315	EXISTING	-	-	-	-	-	-	-	Y	Y
S3	6X6	+315	EXISTING	-	-	-	-	-	-	-	Y	Y

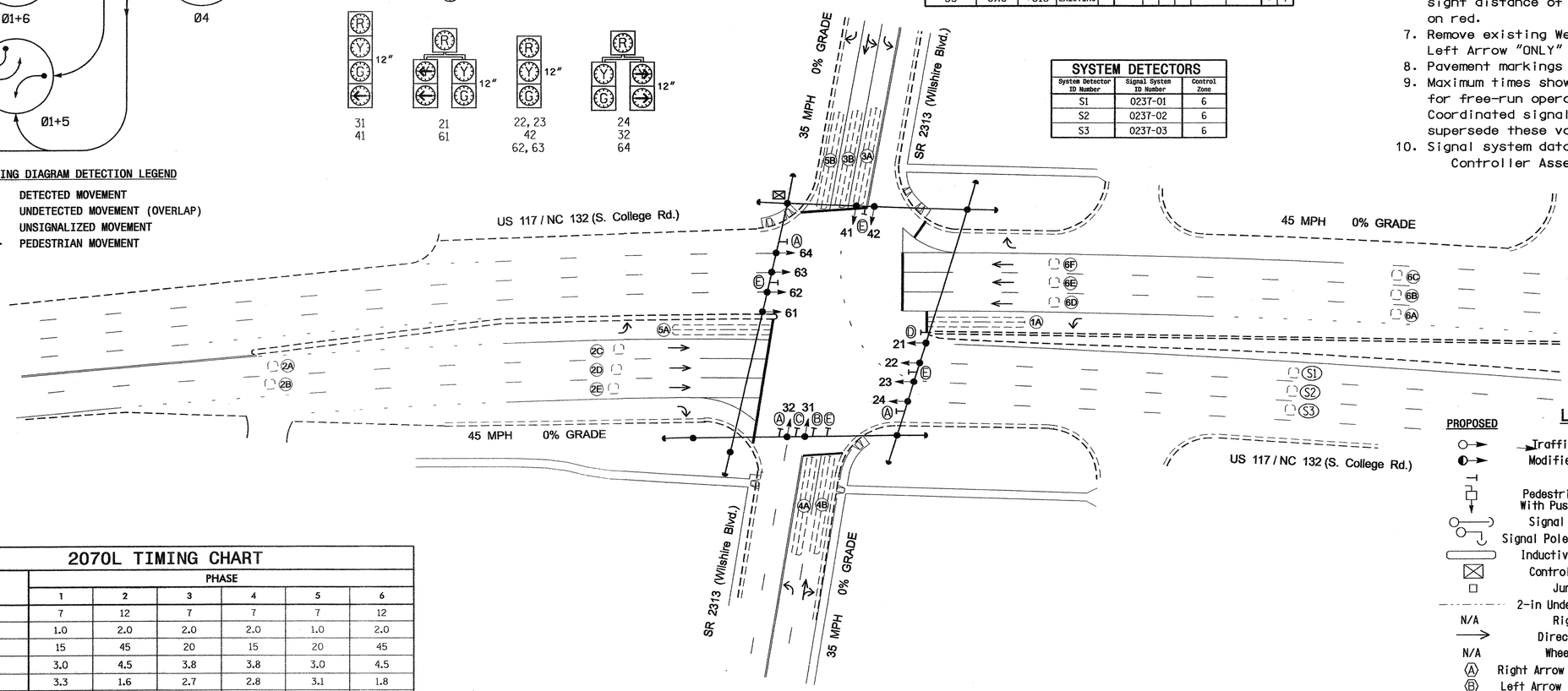
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0237-01	6
S2	0237-02	6
S3	0237-03	6

6 Phase
Fully Actuated
(Wilmington City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable backup protect for phase 2 and 6 to allow the controller to clear from phase 2+6 to phase 1+6 or 2+5 by progressing through all red phase.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Remove existing Westbound Left Arrow "ONLY" sign (R3-5L).
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0237.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Combined Through and Left Arrow Sign (R3-6L)	Ⓒ
Ⓓ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓓ
Ⓔ	Street Sign	Ⓔ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	1.0	2.0	2.0	2.0	1.0	2.0
Max Green 1 *	15	45	20	15	20	45
Yellow Clearance	3.0	4.5	3.8	3.8	3.0	4.5
Red Clearance	3.3	1.6	2.7	2.8	3.1	1.8
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	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

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

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Rd.) at SR 2313 (Wilshire Blvd.)

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

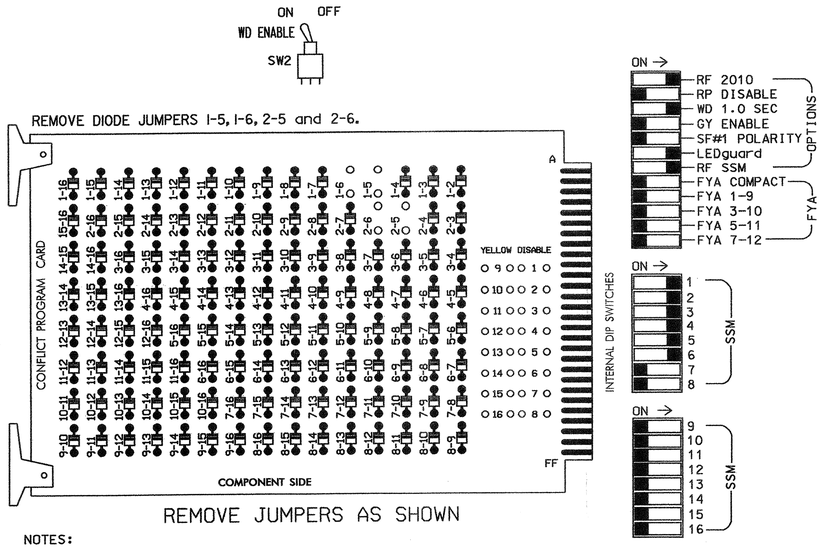
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 2/29/08 DATE
SIG. INVENTORY NO. 03-0237

30-JUN-2008 16:52
s:\traffic\signal\workgroups\alexander\wu-5017 (wilmington city system)\03-0237\03237_sig_dsn_20080229.dgn
rzziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	51695

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 7,8,9, 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. 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
PHASE	1	2	2 PED	3			4			4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22 23,24	NU	31	32	64	41	42	24	NU	21,32	61,62 63,64	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																
YELLOW ARROW	126					117			102		132					
GREEN ARROW	127			118		118	103		103		133					

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

INPUT FILE POSITION LAYOUT

(front view)

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

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			10
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2C,2D,2E	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			3
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			10
	TB3-7,8	J2L	44	6	16	2	Y	Y			
5B	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	6	Y	Y			
* 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					

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

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.
[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

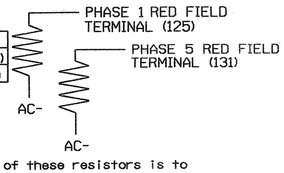
(program controller as shown below)

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

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: 03-0237
DESIGNED: March 2007
SEALED: 2/29/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117/NC 132 (S. College Rd.)
at
SR 2313 (Wilshire Blvd.)

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY: T. Igo
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

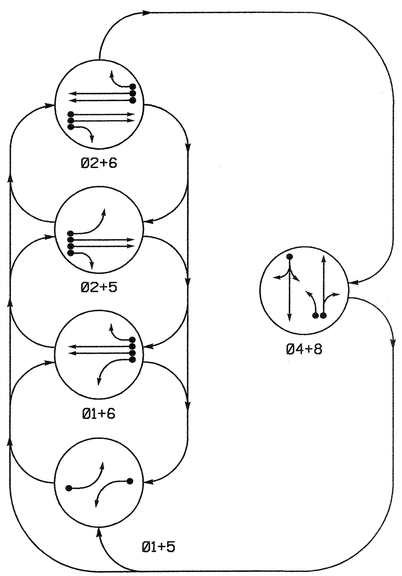
George C. Brown 3/10/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0237

03-MAR-2008 10:58
s:**s signals\workgroups\sig mon\brown\M030237.dgn
GBROWN

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 96

5 Phase Fully Actuated (Wilmington Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

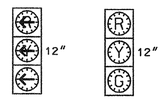
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

SIGNAL FACE I.D.

Denotes L.E.D.



11
51

21, 22
41, 42
61, 62
81, 82

2070L LOOP & DETECTOR INSTALLATION

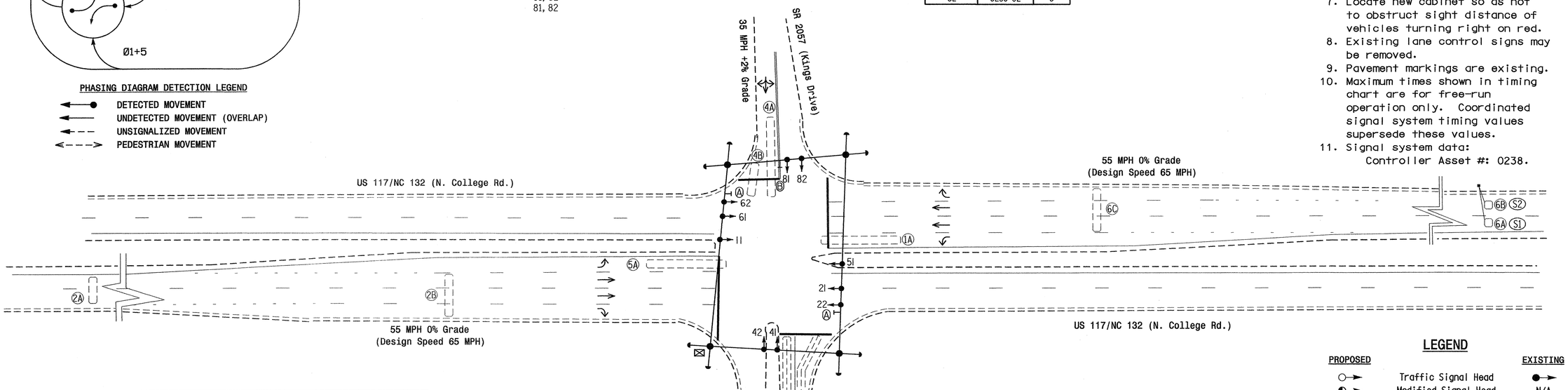
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	+5	EXISTING	-	1	Y	Y	-	-	-	-	Y
2A	6X20	600	EXISTING	-	2	Y	Y	-	2.5	-		Y
2B	6X32	200	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X60	+10	EXISTING	-	4	Y	Y	-	-	3	-	Y
4B	6X25	+10	EXISTING	-	4	Y	Y	-	-	15	-	Y
5A	6X60	+5	EXISTING	-	5	Y	Y	-	-	-	-	Y
6A/S1	6X6	600	6	Y	6	Y	Y	-	2.5	-	Y	Y
6B/S2	6X6	600	6	Y	6	Y	Y	-	2.5	-	Y	Y
6C	6X32	200	EXISTING	-	6	Y	Y	-	-	-	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0238-01	6
S2	0238-02	6

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Renumber existing loop 6B as 6C.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Existing lane control signs may be removed.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0238.



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	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	14	7	7	14	7
Extension 1 *	1.0	2.5	2.0	1.0.	2.5	2.0
Max Green 1 *	15	140	35	15	140	35
Max Green 2 *	15	240	25	15	240	25
Yellow Clearance	3.0	5.8	3.7	3.0	5.8	3.9
Red Clearance	2.8	1.0	2.2	2.8	1.0	2.3
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (N. College Rd.) at SR 2004 / SR 2057 (Kings Dr.)

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

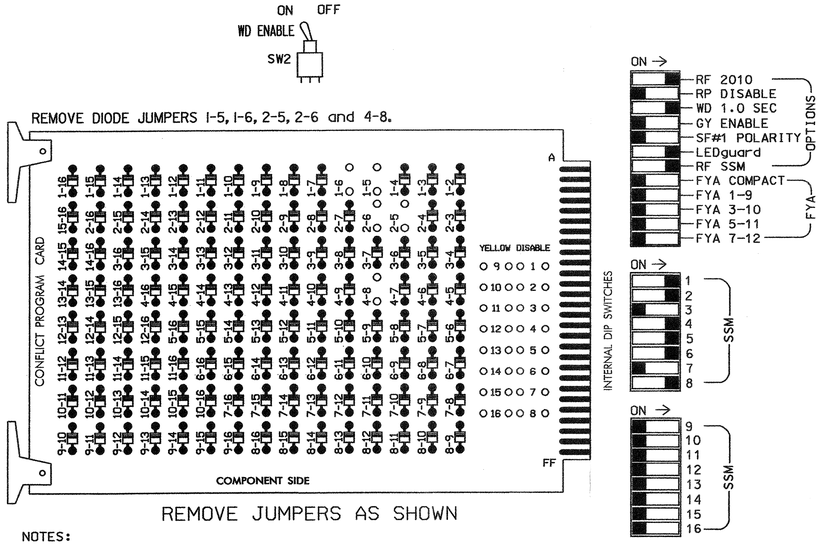
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 3/20/08 DATE
SIG. INVENTORY NO. 03-0238

31-JUL-2008 12:20
s:\traffic\signals\workgroups\wilmington city system\W03-0238\W030238_sig_dsn_20080320.dgn
Robert Ziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 97

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 3,7, 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8
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	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125						131					
YELLOW ARROW	126						132					
GREEN ARROW	127						133					

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	Ø 1 / 1A	Ø 2 / 2A	SLOT	SLOT	SLOT	Ø 4 / 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS / DC ISOLATOR
	L	NOT USED	Ø 2 / 2B	EMPTY	EMPTY	EMPTY	Ø 4 / 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST / DC ISOLATOR
FILE "J"	U	Ø 5 / 5A	Ø6/SYS / 6A/S1	Ø 6 / 6C	SLOT	SLOT	Ø 8 / 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6/SYS / 6B/S2	NOT USED	EMPTY	EMPTY	Ø 8 / 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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		2.5	
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	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A/S1	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y		2.5	
6B/S2	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y		2.5	
6C	TB3-9,10	J3U	64	26	36	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			10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0238
DESIGNED: March 2007
SEALED: 03-20-08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
750 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (N. College Rd.)
at
SR 2004 / SR 2057 (Kings Dr.)

Division 3 New Hanover County Wilmington

PLAN DATE: October 2007 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

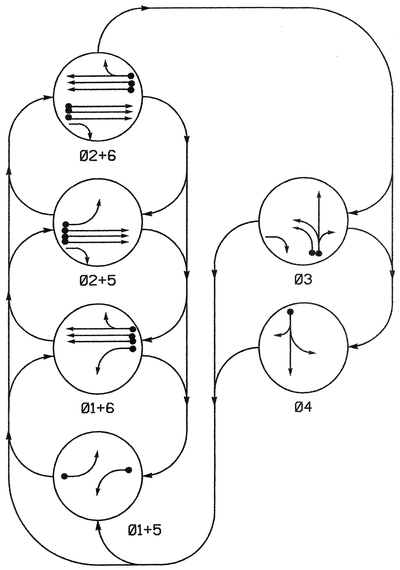
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 4-3-08
SIG. INVENTORY NO. 03-0238

03-APR-2008 10:46
s:\its signal\workgroups\sig mon\petersonM03023B_sml_ele.xxx.dgn
jjpetersen

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5G.98

6 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	04	FLASH
11	↚	↚	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	Y
23	R	R	G	G	R/	R	R
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
51	↚	~~R~~	↚	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

2070L LOOP & DETECTOR INSTALLATION

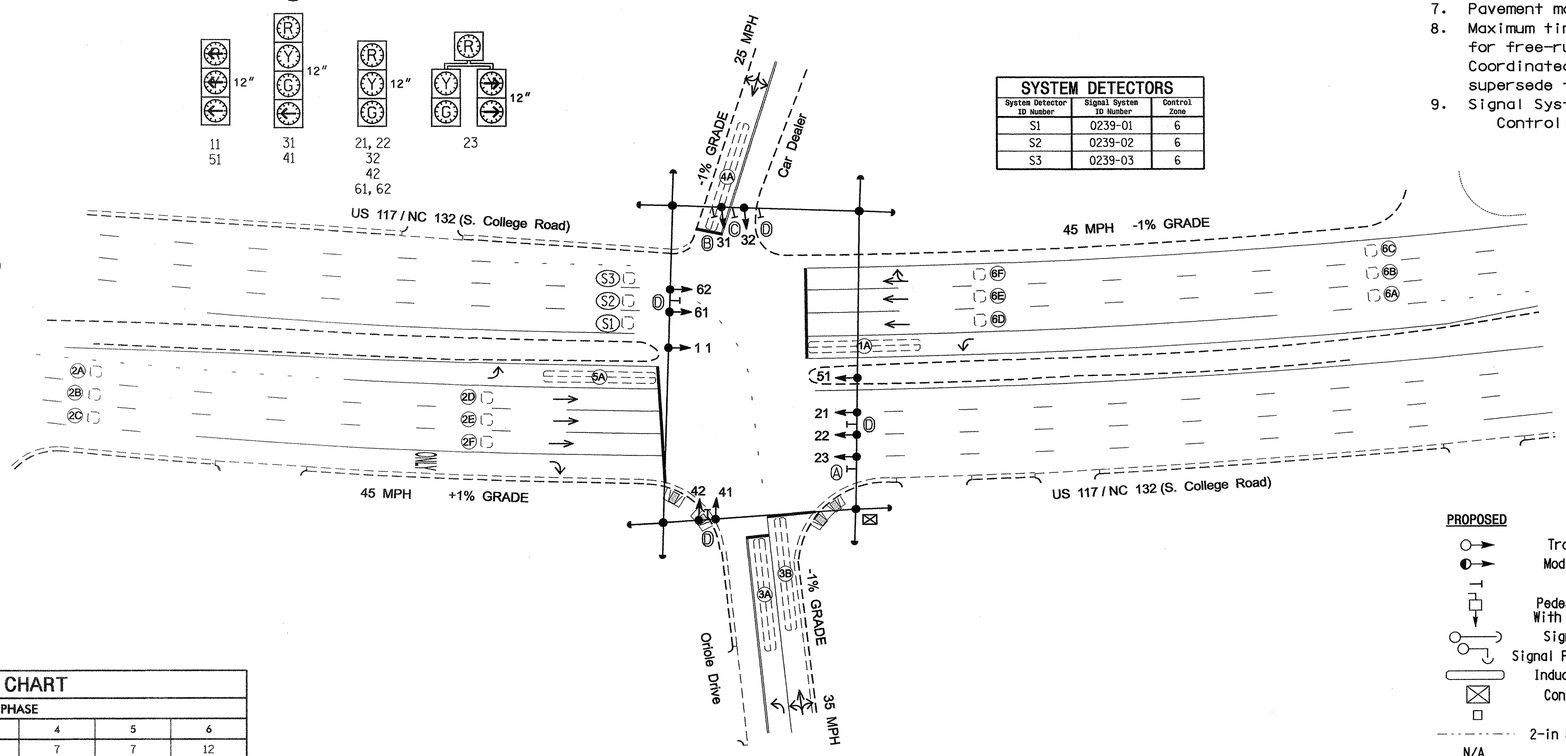
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A,2B,2C	6X6	300	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2D,2E,2F	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	3	-	Y
3B	6X60	0	2-4-2	-	3	Y	Y	-	-	10	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-		-	-	Y
6A,6B,6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
S1	6X6	+92	EXISTING	-	-	-	-	-	-	-	Y	Y
S2	6X6	+92	EXISTING	-	-	-	-	-	-	-	Y	Y
S3	6X6	+92	EXISTING	-	-	-	-	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0239-01	6
S2	0239-02	6
S3	0239-03	6

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal System data:
   Controller Asset #: 0239.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Dual Turn and Through Arrows Sign (R3-19)	Ⓒ
Ⓓ	Street Sign	Ⓓ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	1.0	2.0	2.0	2.0	1.0	2.0
Max Green 1 *	15	45	25	15	15	45
Yellow Clearance	3.0	4.4	3.9	3.2	3.0	4.6
Red Clearance	2.9	1.3	3.0	3.3	2.6	1.2
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Rd.)
at
Oriole Drive

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

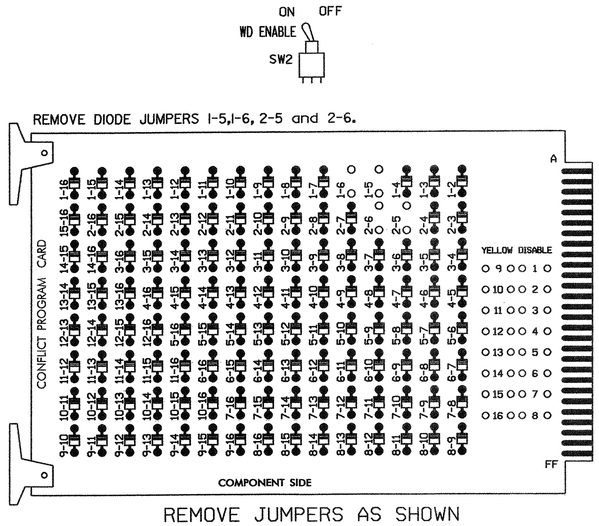
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIENDA
SIGNATURE DATE 2/29/08
SIG. INVENTORY NO. 03-0239

03-MAR-2008 15:03
S:\traffic\Signals\Workgroups\alexander\u-5017 (wilmington city system)\03-0239\03-0239_sig_dsn_20080239.dgn
rziemba

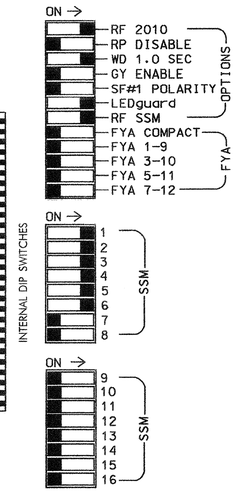
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.99

EDI MODEL 2010ECL-NC 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. 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. 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.	11	21 22,23	NU	31	32	23	41	42	NU	51	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	125									131					
YELLOW ARROW	126					117				132					
GREEN ARROW	127			118		118	103			133					

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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,2B,2C	Ø 3 3A	SLOT	SLOT	Ø 4 4A	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	Ø 2 2D,2E,2F	Ø 3 3B	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A,6B,6C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SYS. DET. S3	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø 6 6D,6E,6F	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2D,2E,2F	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB2-9,10	I3U	63	25	32	3	Y	Y			3
3B	TB2-11,12	I3L	76	38	42	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y		1.6	
6D,6E,6F	TB3-7,8	J2L	44	6	16	6	Y	Y			
* 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					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0239
DESIGNED: March 2007
SEALED: 2/29/08
REVISED:

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
Signal Management Section
750 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (S. College Rd.)
at
Oriole Drive

Division 3 | New Hanover County | Wilmington

PLAN DATE: | REVIEWED BY: T. Vigil
PREPARED BY: George C. Brown | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

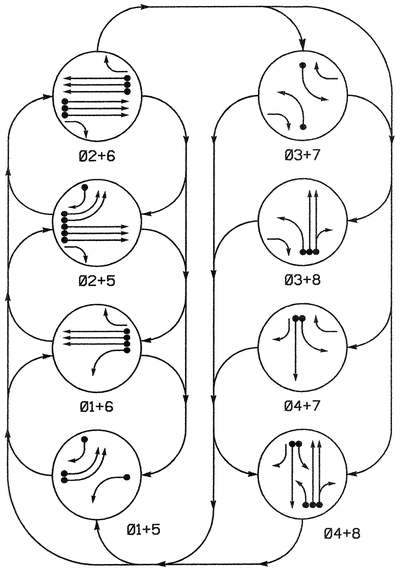
George C. Brown 3/3/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0239

03-MAR-2008 11:58
s:\traffic signals\workgroups\sig management\03-0239.dgn
gbrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.100

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	←̶	←̶	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
23	R	R	G	G	R/←	R/←	R	R	Y
41	R	R	R	R	←̶R	R	←̶G	G	R
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
63	R	G	R	G	R/←	R	R/←	R	Y
81	R	R	R	R	←̶R	←̶G	R	G	R
82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

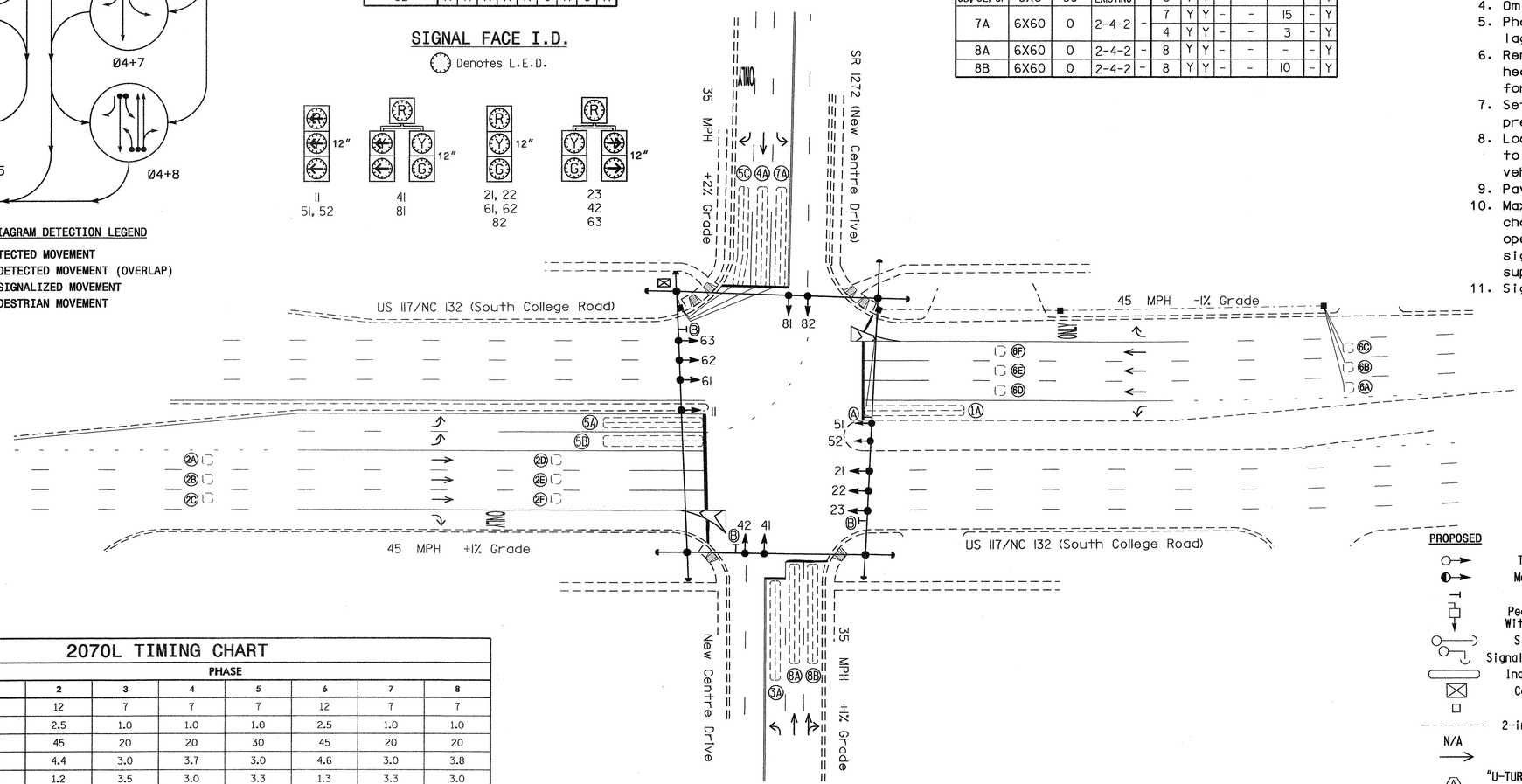
2070L LOOP & DETECTOR INSTALLATION

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	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A, 2B, 2C	6X6	300	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2D, 2E, 2F	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	15	-	Y
					8	Y	Y	-	-	3	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5C	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A, 6B, 6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D, 6E, 6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
7A	6X60	0	2-4-2	-	7	Y	Y	-	-	15	-	Y
					4	Y	Y	-	-	3	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

8 Phase
Fully Actuated
(Wilmington City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Phase 1 and/or phase 5 may be lagged.
6. Renumber existing signal heads and loops as shown for revised phasing.
7. Set all detector units to presence mode.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0240.



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	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ

2070L 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 *	1.0	2.5	1.0	1.0	1.0	2.5	1.0	1.0
Max Green 1 *	20	45	20	20	30	45	20	20
Yellow Clearance	3.0	4.4	3.0	3.7	3.0	4.6	3.0	3.8
Red Clearance	3.3	1.2	3.5	3.0	3.3	1.3	3.3	3.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Rd.)
at
SR 1272 (New Centre Drive)

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2007	REVIEWED BY:
PREPARED BY:	Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

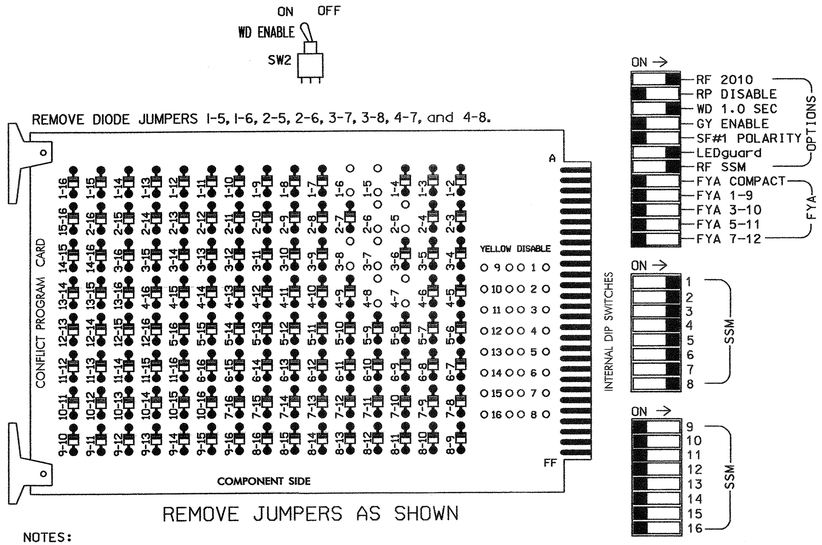
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 3/10/08 DATE
SIG. INVENTORY NO. 03-0240

13-MAR-2008 11:46
s:\traffic\signals\workgroups\alexander\u-5017 (wilmington city system)\03-0240\03240_sig_dsn_20080311.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A101

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

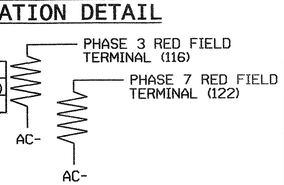
(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

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.

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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington City Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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			
2A2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2D,2E,2F	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A[1]	TB2-9,10	I3U	63	25	32	3	Y	Y			15
	TB2-11,12	I3L	76	38	42	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			
5C	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A[2]	TB5-9,10	J6U	42	4	8	7	Y	Y			15
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			
8B	TB7-3,4	J7L	79	41	48	8	Y	Y			10

[1] Add jumpers from TB2-9 to TB2-11, and from TB2-10 to TB2-12.
[2] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0240
DESIGNED: March 2007
SEALED: 03/11/08
REVISED: N/A

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	21, 22,23	NU	23,81	41,42	NU	42	51,52	61, 62,63	NU	41,63	81,82	NU
RED		128		*	101			131	134		*	107	
YELLOW		129			102			132	135			108	
GREEN		130			103			133	136			109	
RED ARROW	125												
YELLOW ARROW	126			117			132				123		
GREEN ARROW	127			118			133				124		

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR         PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦   X
OMIT PHASES     ¦   X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR         PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦       X
OMIT PHASES     ¦      X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117/NC 132 (S. College Rd.) at SR 1272 (New Centre Drive)

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY:
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signal Management Section, Division of Highways, Department of Transportation, State of North Carolina
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 3/26/08
SIG. INVENTORY NO. 03-0240

13-MAR-2008 11:52
s:\ts\signals\workgroups\sig management\carolina\and\03240_sm_ele_xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.102

PHASING DIAGRAM

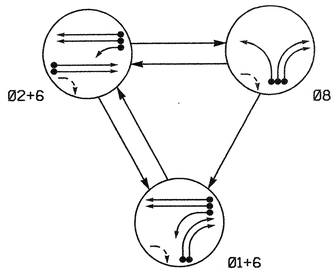


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	FLASH
12, 13	→	~~R~~	→	~~R~~
21, 22	R	G	R	Y
61	↖G	G	R	Y
62	G	G	R	Y
81	~~R~~	~~R~~	←	~~R~~

2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
					6	Y	Y	-	——	——	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
1C	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
2A, 2B	6X6	250	Existing	-	2	Y	Y	-	1.3	——	-	Y
2C, 2D	6X6	80	Existing	-	2	Y	Y	-	——	——	-	Y
6A, 6B	6X6	250	Existing	-	6	Y	Y	-	1.3	——	-	Y
6C, 6D	6X6	80	Existing	-	6	Y	Y	-	——	——	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	——	——	-	Y

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

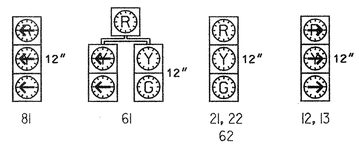
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Renumber existing signal heads as shown.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0242.

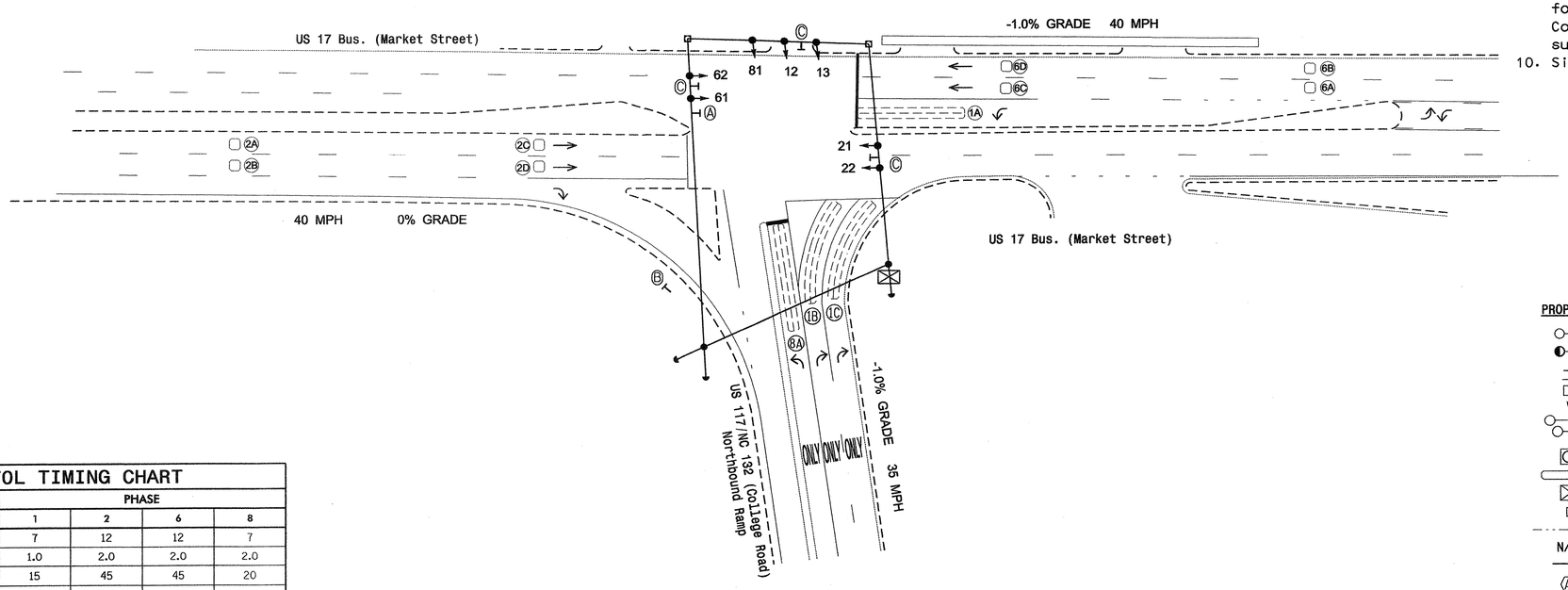
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

Denotes L.E.D.





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	
Ⓐ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	Street Sign	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	12	12	7
Extension 1 *	1.0	2.0	2.0	2.0
Max Green 1 *	15	45	45	20
Yellow Clearance	3.0	4.2	4.2	3.0
Red Clearance	2.8	2.1	1.7	3.1
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
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.

Signal Upgrade

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

SCALE 0 40 1"=40'

US 17 Bus. (Market Street) at US 117/NC 132 (College Road) Northbound Ramp

Division 3 New Hanover County Wilmington

PLAN DATE:	April 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 2/29/08

SIG. INVENTORY NO. 03-0242

29-FEB-2008 12:16
s:\traffic\signals\workgroups\alexander\u-5017 (wilmington city system)\03-0242\03242_sig_dsn_20080229.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 102

PHASING DIAGRAM

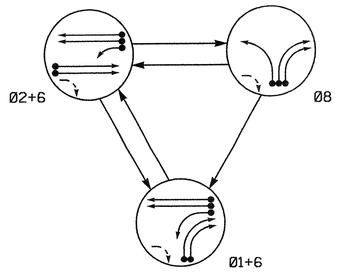


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	FLASH
12, 13	~~→~~	~~R~~	~~→~~	~~R~~
21, 22	R	G	R	Y
61	G	G	R	Y
62	G	G	R	Y
81	~~R~~	~~R~~	~~←~~	~~R~~

2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
					6	Y	Y	-	——	——	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
1C	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
2A, 2B	6X6	250	Existing	-	2	Y	Y	-	1.3	——	-	Y
2C, 2D	6X6	80	Existing	-	2	Y	Y	-	——	——	-	Y
6A, 6B	6X6	250	Existing	-	6	Y	Y	-	1.3	——	-	Y
6C, 6D	6X6	80	Existing	-	6	Y	Y	-	——	——	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	——	——	-	Y

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

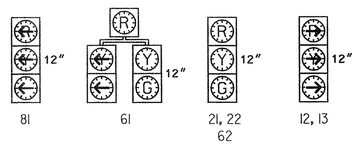
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Renumber existing signal heads as shown.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0242.

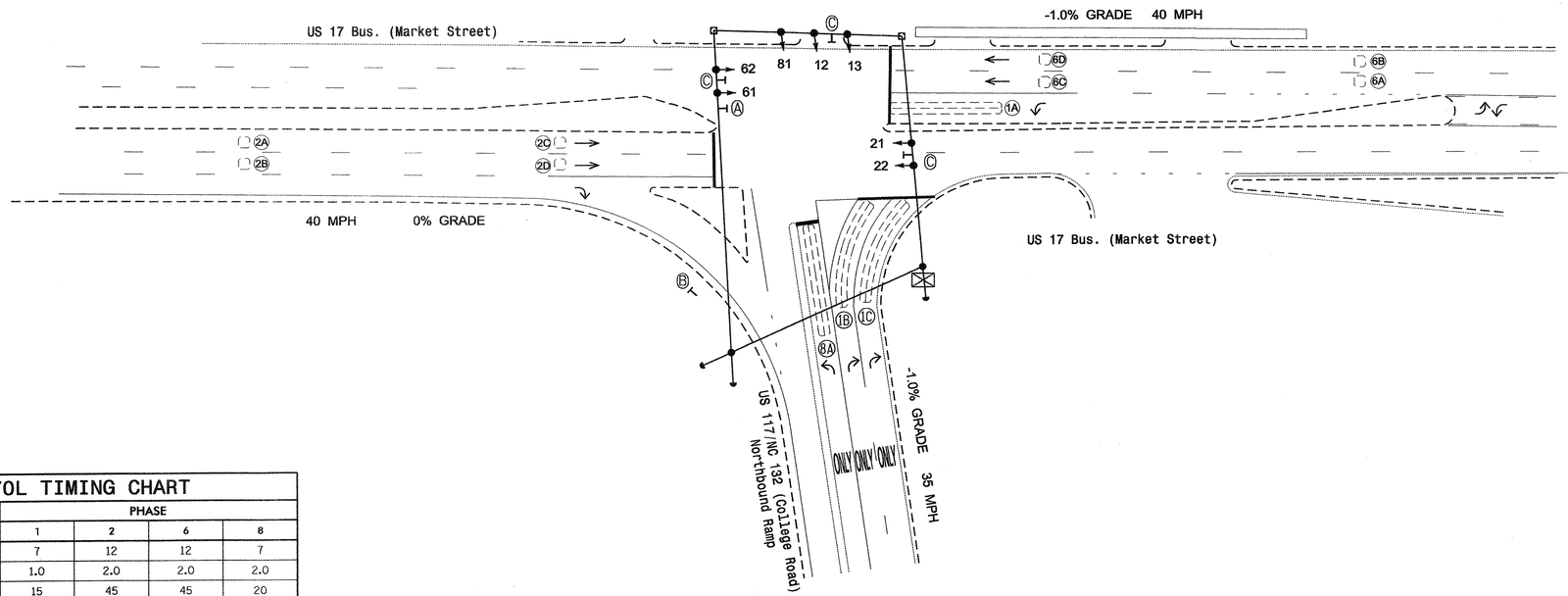
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

Denotes L.E.D.





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	
Ⓐ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	Street Sign	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	12	12	7
Extension 1 *	1.0	2.0	2.0	2.0
Max Green 1 *	15	45	45	20
Yellow Clearance	3.0	4.2	4.2	3.0
Red Clearance	2.8	2.1	1.7	3.1
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

US 17 Bus. (Market Street) at US 117/NC 132 (College Road) Northbound Ramp

Division 3 New Hanover County Wilmington

PLAN DATE:	April 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

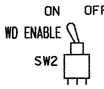
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE Robert J. Ziemba DATE 2/29/08
SIG. INVENTORY NO. 03-0242

31-JUL-2008 12:36
s:\traffic\Signals\Working\ugusta\alexander#u-5017 (wilmington city system)\03-0242\03024z_sig.dgn 20080229.dgn
rziemba

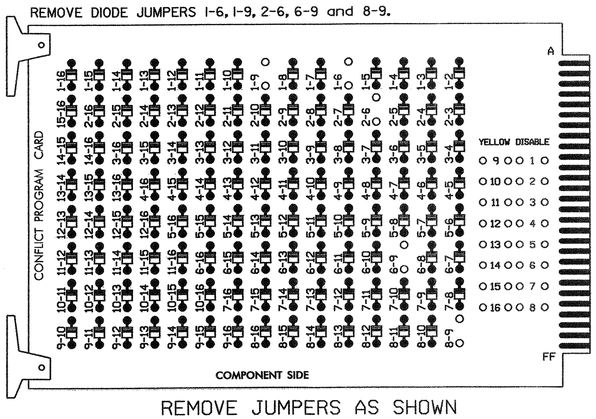
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.103

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



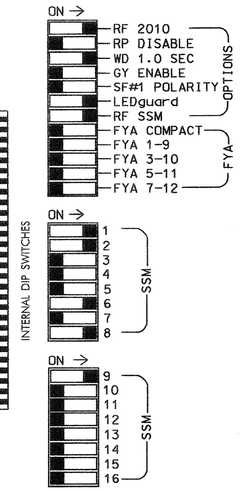
REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 6-9 and 8-9.



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 3,4,5, 7,10,11,12,13,14,15 & 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. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6 AUX)
LOAD SWITCHES USED.....S1,S2,S6,S8,S9
PHASES USED.....1,2,6,8
OVERLAP A.....1+8

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.	61	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81	NU	12,13	NU	NU	NU	NU	NU
RED	*	128						134										
YELLOW		129						135										
GREEN		130						136										
RED ARROW											107		A121					
YELLOW ARROW	126										108		A122					
GREEN ARROW	127										109		A123					

NU = NOT USED

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

** Rewire OLA to flash on flash unit #2 circuit #1

INPUT FILE POSITION LAYOUT

(front view)

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

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
1B	TB2-9,10	I3U	63	25	32	1	Y	Y			15
1C	TB2-11,12	I3L	76	38	42	1	Y	Y			15
2A,2B	TB4-9,10	I6U	41	3	4	2	Y	Y		1.3	
2C,2D	TB4-11,12	I6L	45	7	14	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		1.3	
6C,6D	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

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).

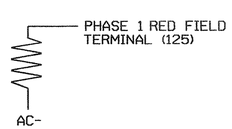
```
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          ¦123456789101112131415 16
VEH OVL PARENTS:¦X       X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER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

OVERLAP PROGRAMMING COMPLETE

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 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: 03-0242
DESIGNED: April 2007
SEALED: 2/29/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

US 17 Bus. (Market Street) at US 117/NC 132 (College Road) Northbound Ramp

Division 3 New Hanover County Wilmington

PLAN DATE: February 2008	REVIEWED BY: T. Jack		
PREPARED BY: G. C. Brown	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

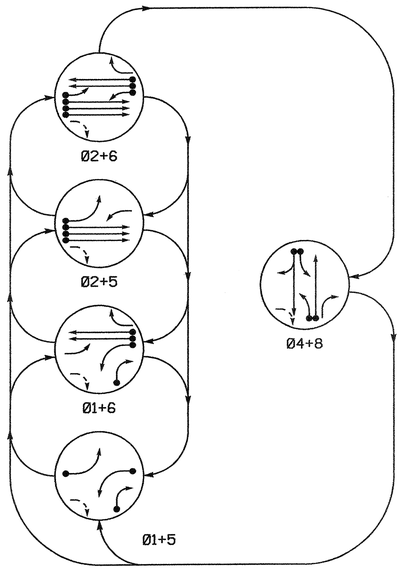
George C. Brown 3/11/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0242

03-MAR-2008 08:32
s:\traffic\signals\workgroups\sig monitor\dwn\03-0242.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5B.104

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	04+8	FLASH
11	←	←	↛	↛	↛	↛
22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	↛	←	↛	↛	↛
62, 63	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/↗	R/↗	R	R	G	R

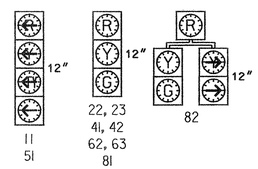
STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

FROM \ TO	← 1	← 2	↛ 1	↛ 2	↛ 1	↛ 2
←	←	←	↛	↛	↛	↛
↛	↛	↛	↛	↛	↛	↛
↛	↛	↛	↛	↛	↛	↛

↛ = FLASHING YELLOW ARROW

SIGNAL FACE I.D.

Denotes L.E.D.



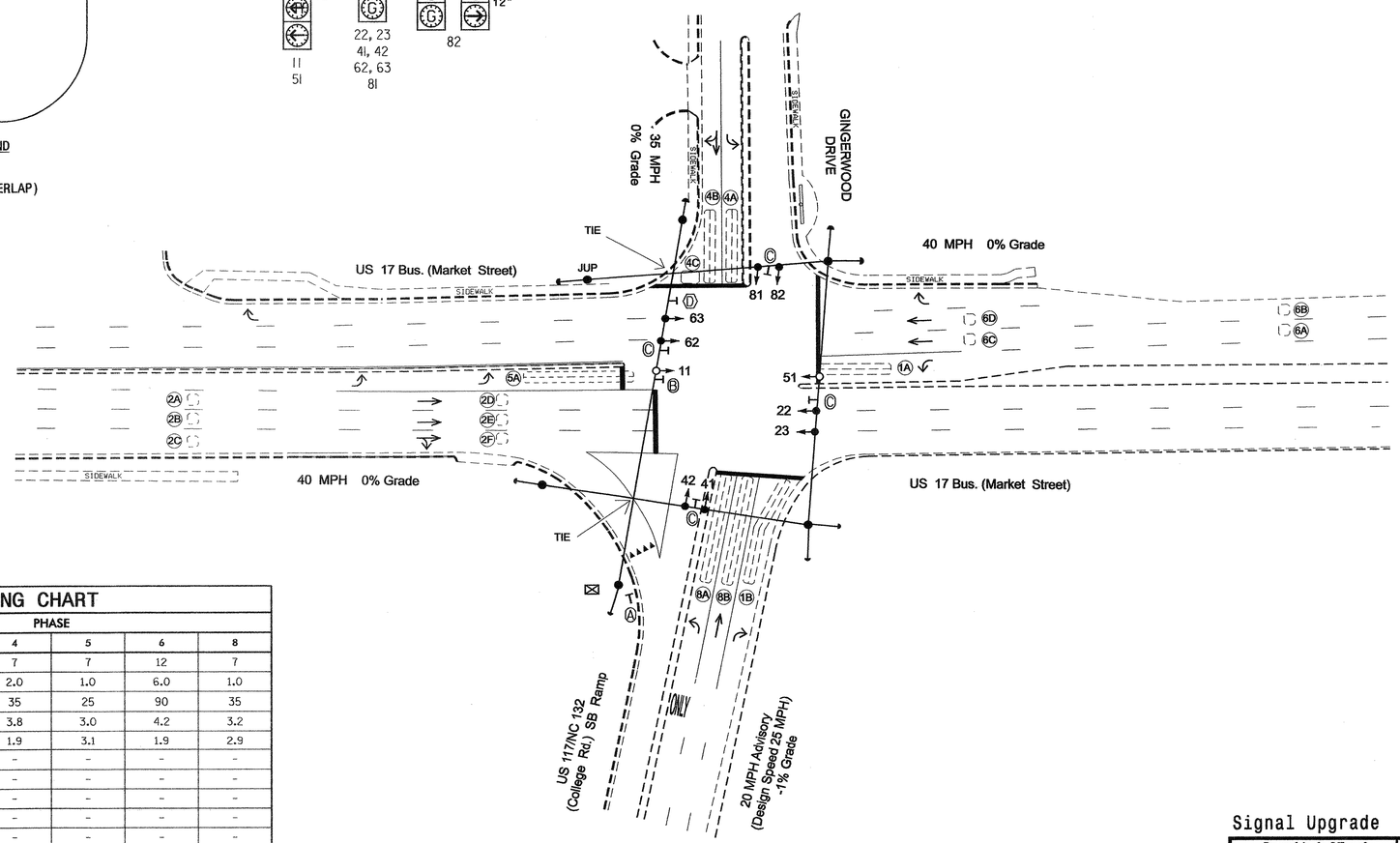
2070L LOOP & DETECTOR INSTALLATION

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	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	-	—	—	-	Y
1B	6X60	0	Existing	-	1	Y	Y	-	—	15	-	Y
2A,2B,2C	6X6	250	Existing	-	2	Y	Y	-	1.3	—	-	Y
2D,2E,2F	6X6	80	Existing	-	2	Y	Y	-	—	—	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	—	—	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	—	10	-	Y
4C	6X10	0	Existing	-	4	Y	Y	-	—	15	-	Y
5A	6X60	+5	2-4-2	-	5	Y	Y	-	—	15	-	Y
					2	Y	Y	-	—	—	-	Y
6A, 6B	6X6	250	Existing	-	6	Y	Y	-	1.3	—	-	Y
6C, 6D	6X6	80	Existing	-	6	Y	Y	-	—	—	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	—	—	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	—	—	-	Y

6 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0243.



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	
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓑ
Ⓒ	Street Sign	Ⓒ
Ⓓ	Right Arrow "ONLY" Sign (R3-5R)	Ⓓ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	1.0	6.0	2.0	1.0	6.0	1.0
Max Green 1 *	25	90	35	25	90	35
Yellow Clearance	3.0	4.2	3.8	3.0	4.2	3.2
Red Clearance	2.8	1.9	1.9	3.1	1.9	2.9
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 17 Bus. (Market Street)
at
US 117/NC 132 (College Rd.) SB Ramp
and Gingerwood Dr.

Division 3 New Hanover County Wilmington

PLAN DATE: March 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

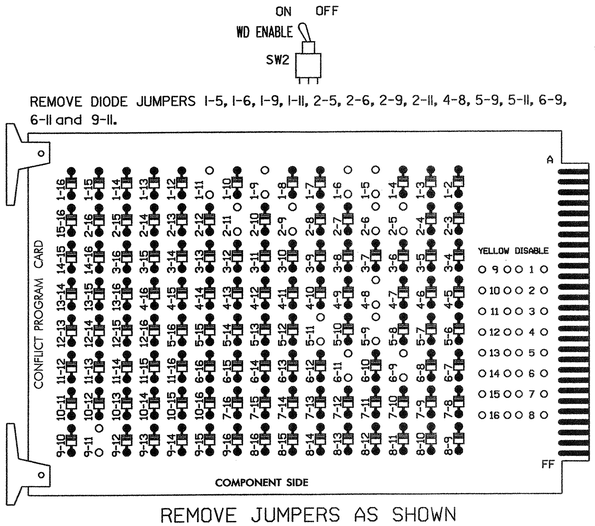
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZELMER
SIGNATURE 5/30/08 DATE
SIG. INVENTORY NO. 03-0243

30-MAY-2008 12:00
s:\its signal\workgroups\wilexander\u-5017 (wilmington city system)\03-0243\030243_sig_dsn_20080530.dgn
rzelmer

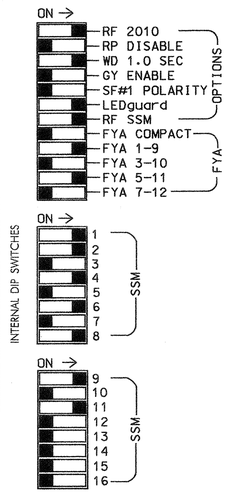
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 105

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 3,5,7, 10,12,13,14,15 & 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 4 and 8, on the controller unit, for Dual Entry.
6. 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★	82	22,23	NU	NU	41,42	NU	51★	62,63	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		126											A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127	127					133											

NU = Not Used

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

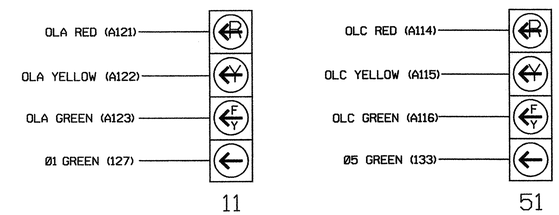
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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)

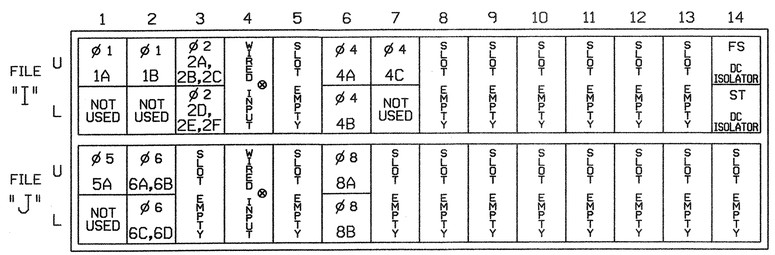


NOTE

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)



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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

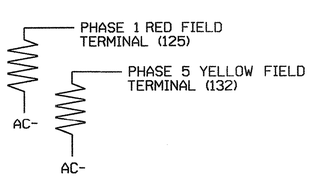
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A,2B,2C	TB2-9,10	I3U	63	25	32	2	Y	Y		1.3	
2D,2E,2F	TB2-11,12	I3L	76	38	42	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			10
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		1.3	
6C,6D	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			

[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.

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: 03-0243
DESIGNED: March 2008
SEALED: 05/30/08
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17 Bus. (Market Street) at US 117/NC 132 (College Rd.) SB Ramp and Gingerwood Dr.

Division 3 New Hanover County Wilmington

PLAN DATE: May 2008 REVIEWED BY: T. Jyg

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS | INIT. | DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 6/3/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0243

30-MAY-2008 13:47
S:\ITS & SIGNAL\Workgroups\sig mgmt\strickland\ms30243_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig.106

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:          |123456789101112131415 16
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
```

NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |123456789101112131415 16
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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0243
DESIGNED: March 2008
SEALED: 05/30/08
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

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 N. Greenfield Pwky, Garner, NC 27529

US 17 Bus. (Market Street)
at
US 117/NC 132 (College Rd.) SB Ramp
and Gingerwood Dr.

Division 3 | New Hanover County | Wilmington

PLAN DATE:	May 2008	REVIEWED BY:	T. Joyce
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

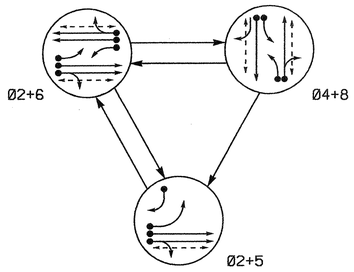
George C. Brown 6/3/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0243

30-MAY-2008 13:49
s:\its\signals\workgroups\sig management\cstrickland\d03243.smlele.xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 107

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

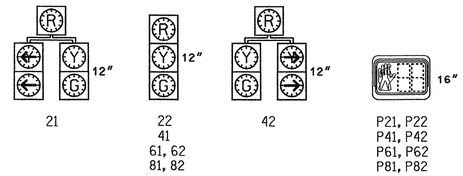
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21	G	G	R	Y
22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
61, 62	R	G	R	Y
81, 82	R	R	G	R
P21, P22	W	W	DW	DRK
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.

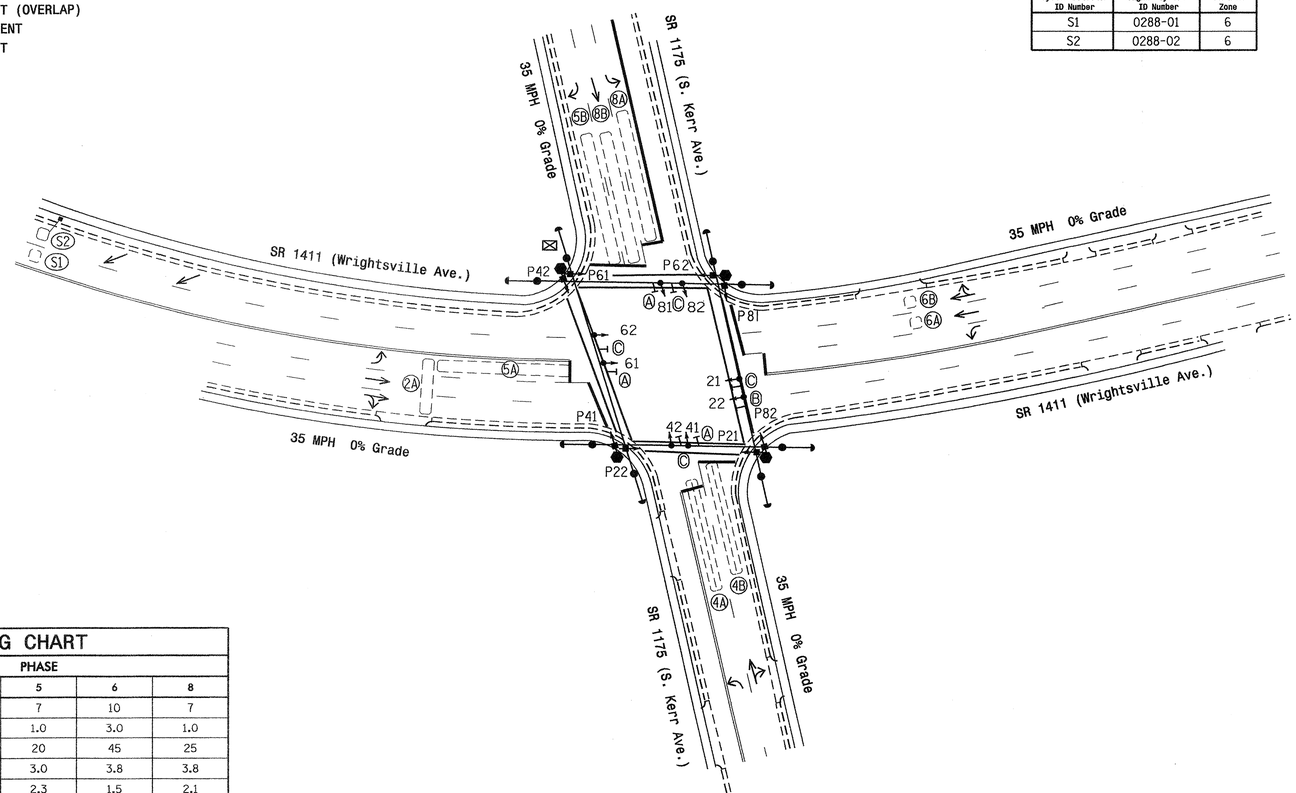


2070L LOOP & DETECTOR INSTALLATION

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
2A	6x29	90	Existing	-	2	Y	Y	-	-	-	-	Y
4A	6X70	0	Existing	-	4	Y	Y	-	-	3	-	Y
4B	6X70	0	Existing	-	4	Y	Y	-	-	10	-	Y
5A	6X70	0	Existing	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
5B	6X70	0	Existing	-	5	Y	Y	-	-	20	-	Y
6A, 6B	6X6	90	Existing	-	6	Y	Y	-	-	-	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
S1	6X6	+375	Existing	-	-	-	-	-	-	-	Y	Y
S2	6X6	+375	4	Y	-	-	-	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0288-01	6
S2	0288-02	6



2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	1.0	1.0	3.0	1.0
Max Green 1 *	45	25	20	45	25
Yellow Clearance	3.8	3.8	3.0	3.8	3.8
Red Clearance	1.5	2.1	2.3	1.5	2.1
Red Revert	5.0	2.0	2.0	2.0	2.0
Walk 1 *	4	4	-	4	4
Don't Walk 1	10	16	-	12	16
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

* 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.

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Existing Left Arrow "ONLY" signs (R3-5L) may be removed.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Signal system data:
    Controller Asset #: 0288.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Pedestrian Signal Pedestal	
	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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	"Do Not Block Intersection" Sign (R10-7)	B
C	Street Sign	C

Signal Upgrade

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

SCALE 0 40
1"=40'

SR 1411 (Wrightsville Ave.)
at
SR 1175 (S. Kerr Ave.)

Division 3 New Hanover County Wilmington

PLAN DATE: November 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

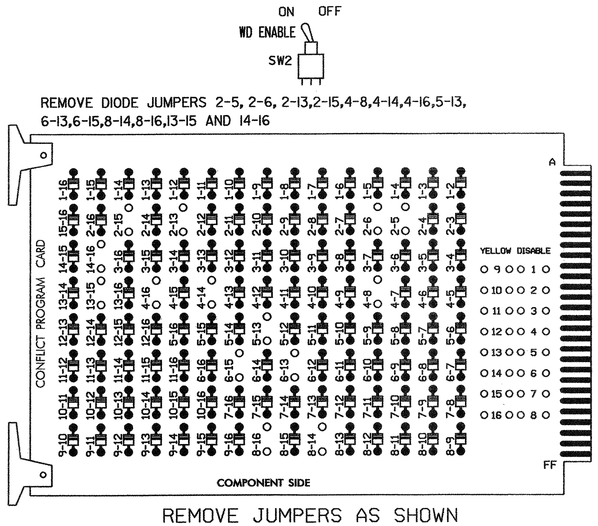
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 3/12/08 DATE
SIG. INVENTORY NO. 03-0288

31-JUL-2008 12:51
s:\its\signals\workgroups\alexander\u-5017 (wilmington city system)\03-0288\030288.sig_dsn.20080312.dgn
rziemba

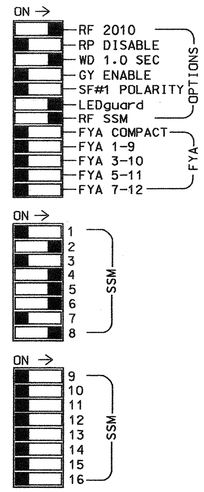
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A108

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 1,3,7, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
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.	NU	21,22	P21, P22	NU	41,42	P41, P42	21,42	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
✋			113			104			119			110
🚶			115			106			121			112

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S2P,S4,S4P,S5,S6,S6P,S8,S8P
PHASES USED.....2,2PED,4,4PED,5,6,6PED,8,8PED
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 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	SLOT	Ø2	SLOT	SLOT	SLOT	Ø4	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	EMPTY	2A	EMPTY	EMPTY	EMPTY	4A	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
			NOT USED				4B								
FILE "J"	U	Ø5	Ø5	Ø6	SLOT	SLOT	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	5B	5A	6A,6B	EMPTY	EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
		NOT USED	Ø2 5A	NOT USED			Ø8 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
2A	TB2-5,6	I2U	39	1	2	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			10
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
5B	TB3-1,2	J1U	55	17	5	5	Y	Y			20
5A[1]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A,6B	TB3-9,10	J3U	64	26	36	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			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

[1] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

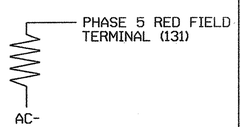
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

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 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: 03-0288
DESIGNED: Nov. 2007
SEALED: 3/12/08
REVISED: NA

SIGNAL UPGRADE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1411 (Wrightsville Ave.)
at
SR 1175 (S. Kerr Ave.)

Division 3 New Hanover County Wilmington

PLAN DATE: Dec. 2007 REVIEWED BY: T. Vaja
PREPARED BY: A. Wasiewicz REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

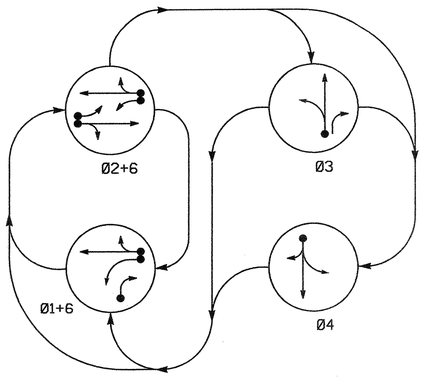
George C. Brown 4/4/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0288

03-APR-2008 08:18
s:*ts signals\workgroups\sig members\GBrown\03288_sheet_XXXXXXXX.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.109

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

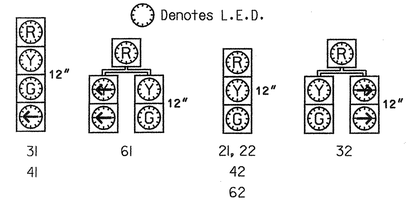
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø3	PHASE Ø4	FLASH
21, 22	R	G	R	R	Y
31	R	R	G	R	R
32	R	R	G	R	R
41	R	R	R	G	R
42	R	R	R	G	R
61	G	G	R	R	Y
62	G	G	R	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.



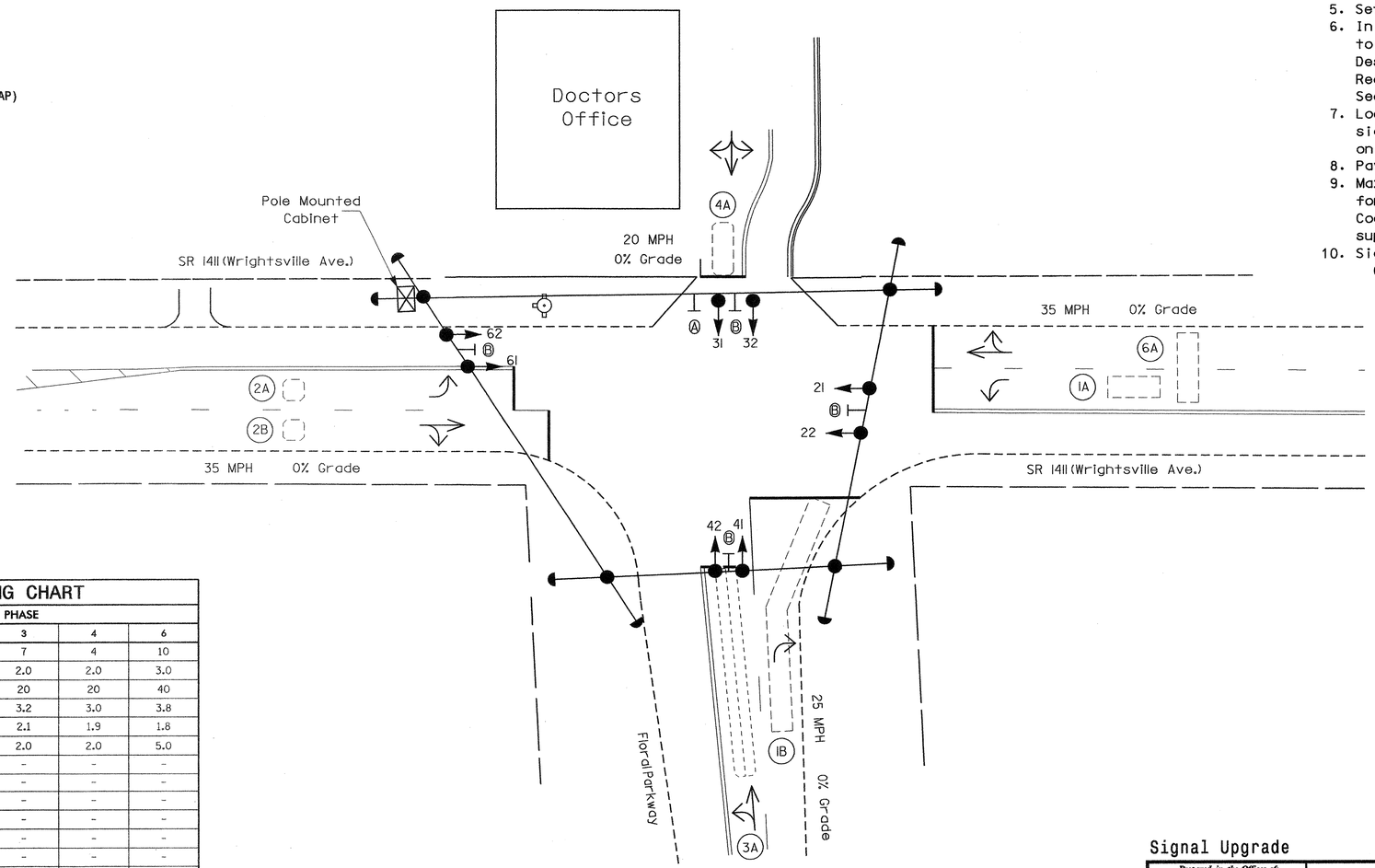
2070L LOOP & DETECTOR INSTALLATION

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	6X15	50	Existing	-	1	Y	Y	-	-	5	-	Y
1B	6X60	0	Existing	-	1	Y	Y	-	-	15	-	Y
2A	6X6	70	Existing	-	2	Y	Y	-	-	-	-	Y
2B	6X8	70	Existing	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	3	-	Y
4A	6X15	0	Existing	-	4	Y	Y	-	-	10	-	Y
6A	6x20	70	Existing	-	6	Y	Y	-	-	-	-	Y

4 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 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. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0318.



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	
A	Combined Through and Left Arrow Sign (R3-6L)	A
B	Street Sign	B

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	4	10
Extension 1 *	3.0	3.0	2.0	2.0	3.0
Max Green 1 *	15	40	20	20	40
Yellow Clearance	3.0	3.8	3.2	3.0	3.8
Red Clearance	2.6	1.5	2.1	1.9	1.8
Red Revert	2.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

SR 1411 (Wrightsville Ave.) at Floral Parkway

Division 3 New Hanover County Wilmington

PLAN DATE: November 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 3/3/08
SIG. INVENTORY NO. 03-0318

03-MAR-2008 09:53
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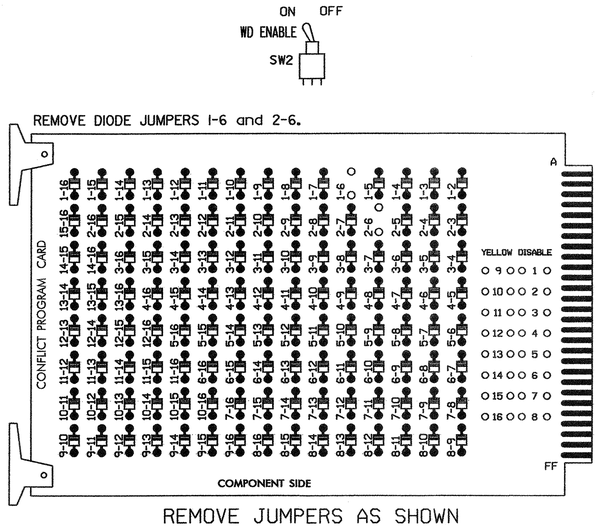
rzieMbo

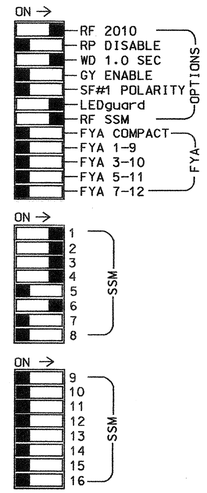
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.110

EDI MODEL 2010ECL-NC 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 5,7,8, 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. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S6
PHASES USED.....1,2,3,4,6
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.	32,61	21,22	NU	31	32	41	42	NU	NU	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														
YELLOW ARROW	126													
GREEN ARROW	127			118		103								

NU = Not Used

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

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program 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)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

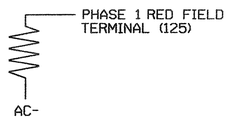
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB21-1,2	I1U	56	18	1	1	Y	Y			5
1B	TB23-1,2	I1L	47	9	22	1	Y	Y			15
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
3A	TB21-5,6	I3U	58	20	3	3	Y	Y			3
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
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 this resistor 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: 03-0318
DESIGNED: November 2007
SEALED: 3/3/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1411 (Wrightsville Ave.)
at
Floral Parkway

Division 3 New Hanover County Wilmington

PLAN DATE: February 2008 REVIEWED BY: T. Joyce
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

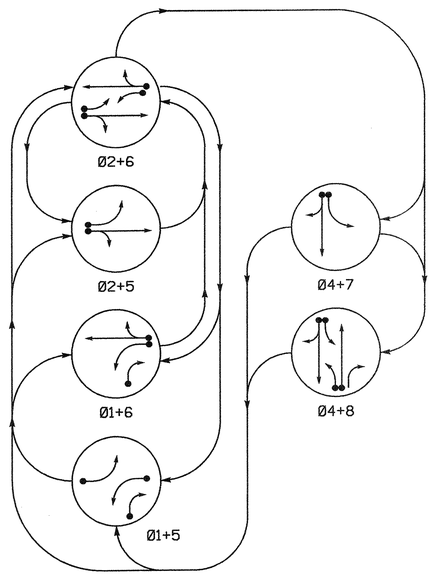
George C. Brown 3/4/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0318

18-MAR-2008 09:36
s:\its signals\workgroups\sig mon\brown\03-0318.dgn
(Brown)

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 111

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	04+7	04+8	FLASH
21	↖R	R	←G	G	R	R	Y
22	R	R	G	G	R	R	Y
41	R	R	R	R	↖G	G	R
42	R	R	R	R	G	G	R
61	↖R	↖G	R	G	R	R	Y
62	R	G	R	G	R	R	Y
81	R	R	R	R	R	G	R
82	R↖	R↖	R	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

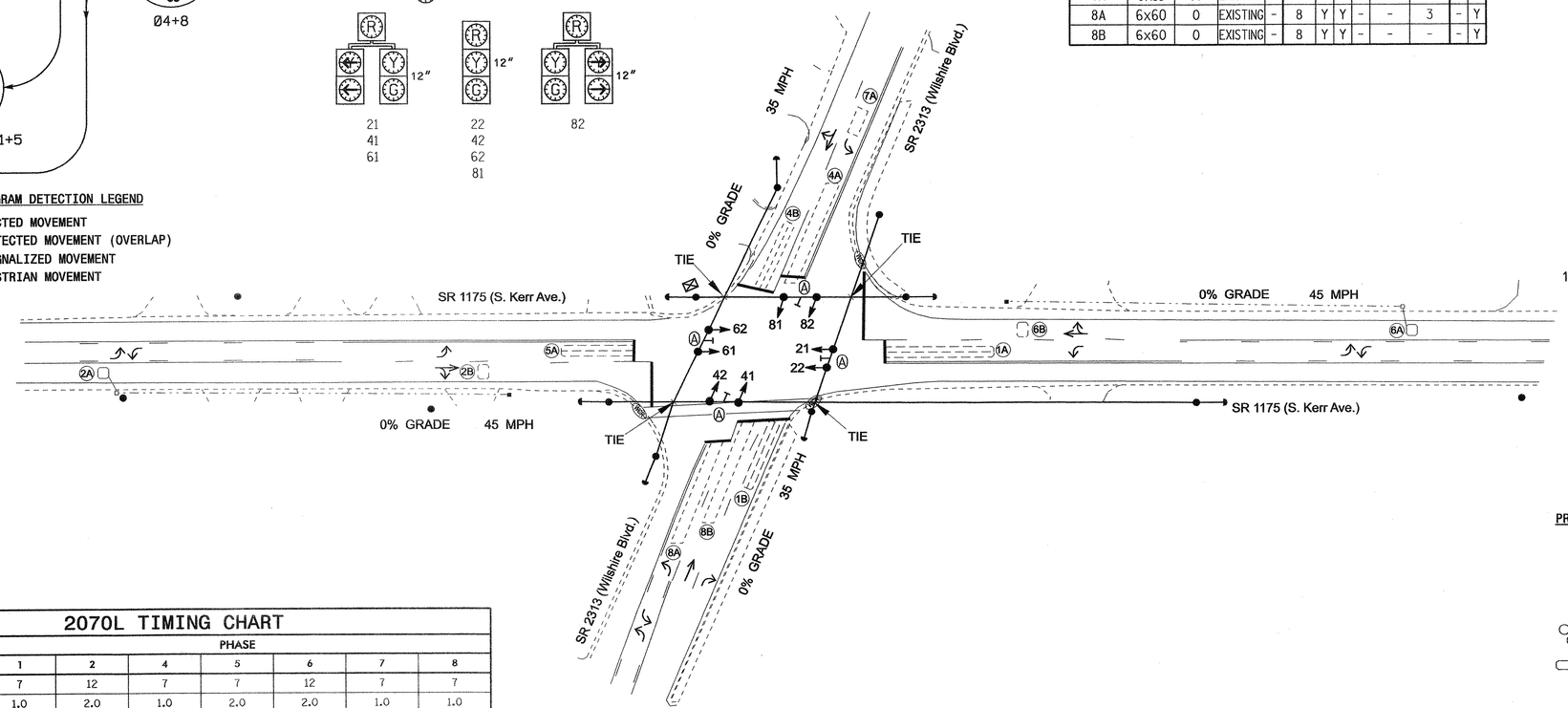
2070L LOOP & DETECTOR INSTALLATION

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	6x60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
1B	6x40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6x6	300	6	Y	2	Y	Y	-	1.6	-	-	Y
2B	6x8	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6x60	+3	EXISTING	-	4	Y	Y	-	-	3	-	Y
4B	6x40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A	6x6	300	6	Y	6	Y	Y	-	1.6	-	-	Y
6B	6x8	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
7A	6x15	85	EXISTING	-	7	Y	Y	-	-	15	-	Y
8A	6x60	0	EXISTING	-	8	Y	Y	-	-	3	-	Y
8B	6x60	0	EXISTING	-	8	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 7 during phase 8 on.
4. Enable Backup Protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1+6 or 2+5 by progressing through an all red display.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0332.



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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	7	8
Min Green 1 *	7	12	7	7	12	7	7
Extension 1 *	1.0	2.0	1.0	2.0	2.0	1.0	1.0
Max Green 1 *	30	60	30	30	30	60	30
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.0	3.8
Red Clearance	3.2	1.7	1.4	3.2	1.8	1.8	1.4
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	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 Upgrade

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

SCALE 0 40 1"=40'

SR 1175 (S. Kerr Ave.)
at
SR 2313 (Wilshire Blvd.)

Division 3 New Hanover County Wilmington

PLAN DATE:	May 2007	PREPARED BY:	Sterling
PREPARED BY:	J Navarrete	REVIEWED BY:	

REVISIONS	INIT.	DATE

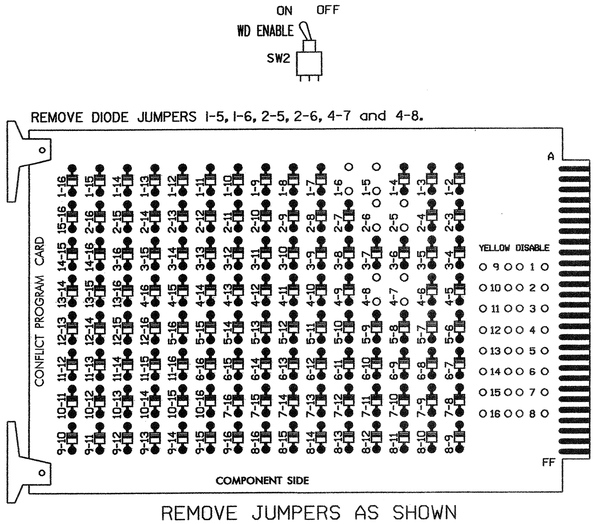
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. TEMPA
SIGNATURE 4/21/08 DATE
SIG. INVENTORY NO. 03-0332

31-JUL-2008 13:01
s:\ite signals\workgroups\wilmington city system\W03-0332\W030332_sig_dsn_20080421.dgn
rzembo

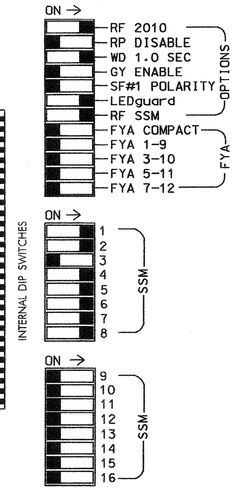
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 112

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 3, 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S7,S8
PHASES USED.....1,2,4,5,6,7,8
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.	61,82	21,22	NU	NU	41,42	NU	21	61,62	NU	41	81,82	NU
RED	*	128			101		*	134		*	107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132			123		
GREEN ARROW	127						133			124		

NU = Not Used

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

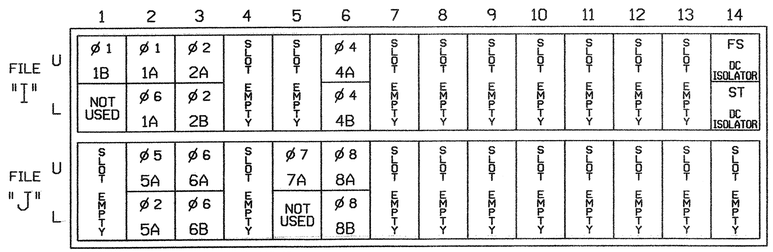
BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 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)



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
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2B	TB2-11,12	I3L	76	38	42	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			10
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			15
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

DYNAMIC BACK-UP CONTROL PROGRAMMING

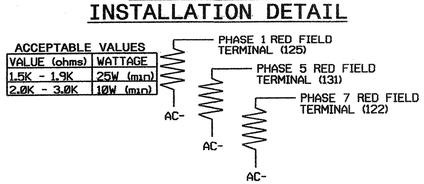
(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦1234567891011121314151 6
IF PHASES ARE ON¦        X
OMIT PHASES     ¦       X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

LOAD RESISTOR INSTALLATION DETAIL



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: 03-0332
DESIGNED: May 2007
SEALED: 04-21-08
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

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

750 N. Greenfield Pwky, Garner, NC 27529

SR 1175 (S. Kerr Ave.)
at
SR 2313 (Wilshire Blvd.)

Division 3 New Hanover County Wilmington

PLAN DATE:	April 2008	REVIEWED BY:	JTR
PREPARED BY:	James Peterson	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

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

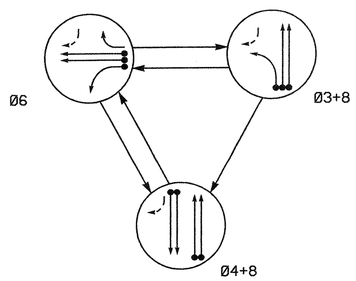
John T. Rowe Jr. 4-23-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0332

22-APR-2008 07:07
s:\traffic\signals\workgroups\sig man\peterson\03332_smple_xxx.dgn
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5B.113

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

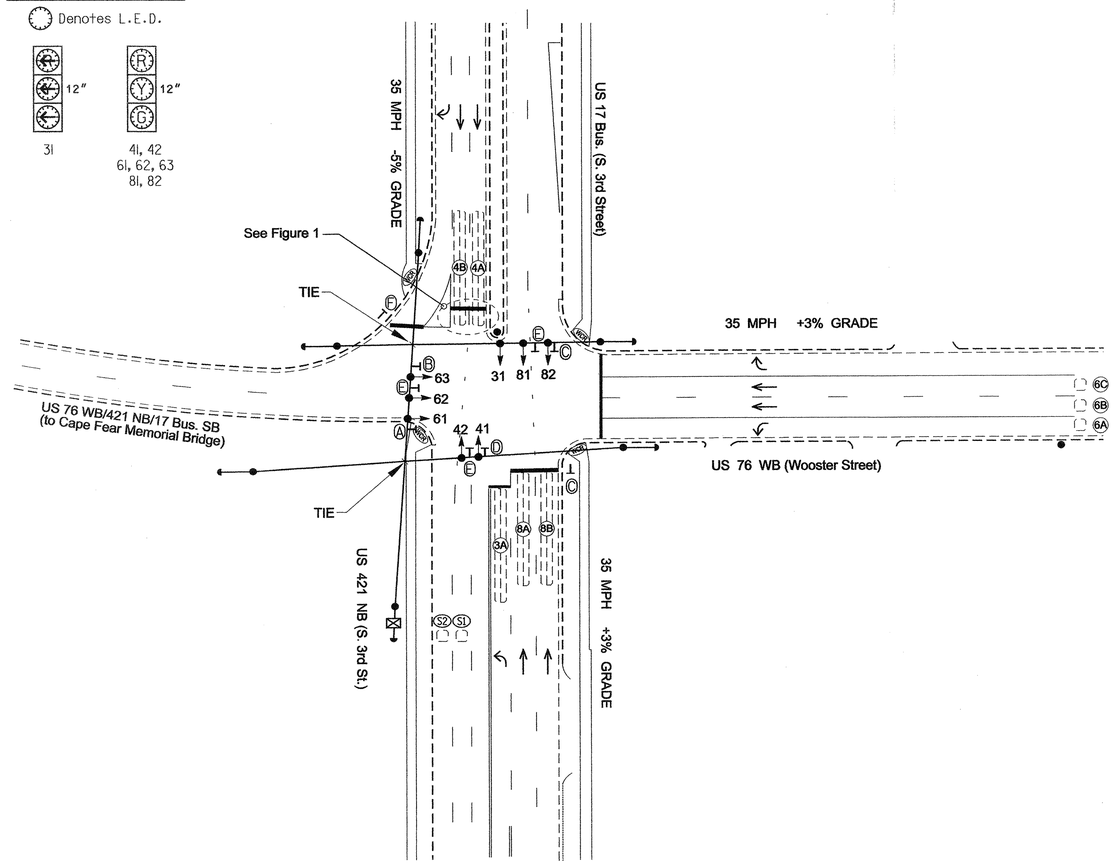
SIGNAL FACE	PHASE 06	PHASE 03+08	PHASE 04+08	PHASE FLASH
31	~~R~~	~~-~~	~~R~~	~~R~~
41, 42	R	R	G	R
61, 62, 63	G	R	R	Y
81, 82	R	G	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

2070L 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
3A	6X60	0	2-4-2	-	3	Y	Y	-	——	3	-	Y
4A	6X60	+10	2-4-2	-	4	Y	Y	-	——	——	-	Y
4B	6X60	+10	2-4-2	-	4	Y	Y	-	——	——	-	Y
6A	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
6B	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
6C	6X6	250	Existing	-	6	Y	Y	-	——	——	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
S1	6X6	+160	Existing	-	-	-	-	-	——	——	Y	Y
S2	6X6	+160	Existing	-	-	-	-	-	——	——	Y	Y



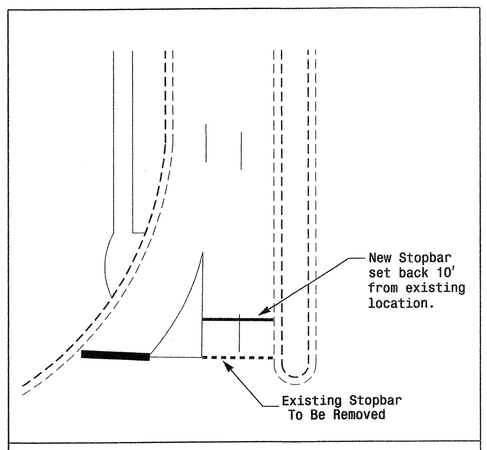


Figure 1: Stopbar Location

2070L TIMING CHART

FEATURE	PHASE 3	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	7	10	7
Extension 1 *	2.0	2.0	6.0	2.0
Max Green 1 *	15	20	60	20
Yellow Clearance	3.0	4.2	3.7	3.7
Red Clearance	2.1	1.4	1.8	1.2
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	1.8	-
Max Variable Initial *	-	-	24	-
Time Before Reduction *	-	-	10	-
Time To Reduce *	-	-	25	-
Minimum Gap	-	-	3.0	-
Recall Mode	-	-	MIN RECALL	-
Vehicle Call Memory	-	-	YELLOW	-
Dual Entry	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 3 may be lagged.
4. Renumber existing signal heads and loops as shown.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing unless otherwise shown.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0334.

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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	No Right Turn Sign (R3-1)	C
D	No Left Turn Sign (R3-2)	D
E	Street Sign	E
F	"YIELD" Sign (R1-2)	F

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 76 WB (Wooster Street)
at
US 421 NB / US 17 Business
(S. 3rd Street)

Division 3 New Hanover County Wilmington

PLAN DATE: January 2008 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

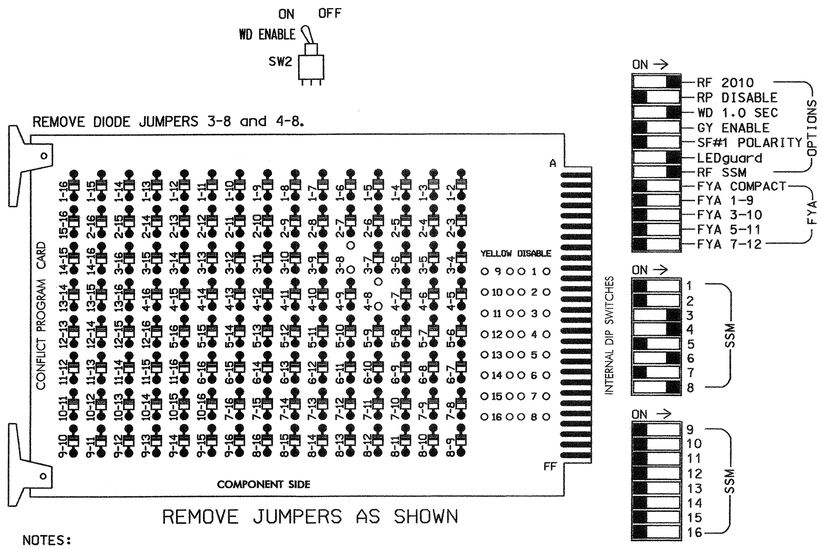
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 4/17/08
SIG. INVENTORY NO. 03-0334

17-APR-2008 18:15
r:\traffic\signals\wmngrcounsel\alexander\wu-5017 (wilmington city system)\03-0334\03034_sig.dgn 20080417.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 1/4

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 1,2,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phase 8 on the controller unit, for Dual Entry.
6. Program phase 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington City 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.	NU	NU	NU	31	41,42	NU	NU	61, 62,63	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW				116								
YELLOW ARROW				117								
GREEN ARROW				118								

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S3,S4,S6,S8
PHASES USED.....3,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	SLOT	SLOT	SLOT	Ø3 3A	Ø4 4A	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	EMPTY	EMPTY	EMPTY	NOT USED	Ø4 4B	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A	Ø6 6C	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø6 6B	NOT USED	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
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			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0334
DESIGNED: January 2008
SEALED: 04/17/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 76 WB (Wooster Street)
at
US 421 NB / US 17 Business
(S. 3rd. Street)

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008 REVIEWED BY: T. Jyer
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

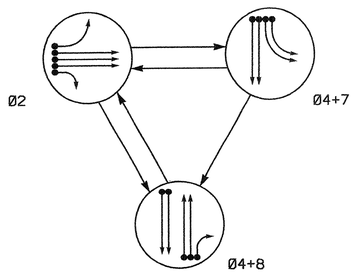
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 4/21/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0334

18-APR-2008 07:34
S:\TTS-SIGNAL\Dwg\Groups\sig mon\strickland\03334_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.115

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

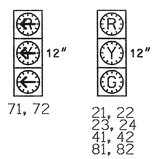
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	Ø4+7	Ø4+8	FLASH
21,22,23,24	G	R	R	Y
41, 42	R	G	G	R
71, 72	~~R~~	~~-~~	~~R~~	~~R~~
81, 82	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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
2A, 2C	6X6	70	Existing	-	2	Y	Y	-	——	——	-	Y
2B	6X26	70	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X60	+5	2-4-2	-	4	Y	Y	-	——	——	-	Y
4B	6X60	+5	2-4-2	-	4	Y	Y	-	——	——	-	Y
7A	6X40	+5	2-4-2	-	7	Y	Y	-	——	3	-	Y
7B	6X40	+5	2-4-2	-	7	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
8C	6X40	0	2-4-2	-	8	Y	Y	-	——	15	-	Y
S1	6X6	375	Existing	-	-	-	-	-	——	——	Y	Y
S2	6X6	375	Existing	-	-	-	-	-	——	——	Y	Y
S3	6X6	+200	Existing	-	-	-	-	-	——	——	Y	Y
S4	6X6	+200	Existing	-	-	-	-	-	——	——	Y	Y

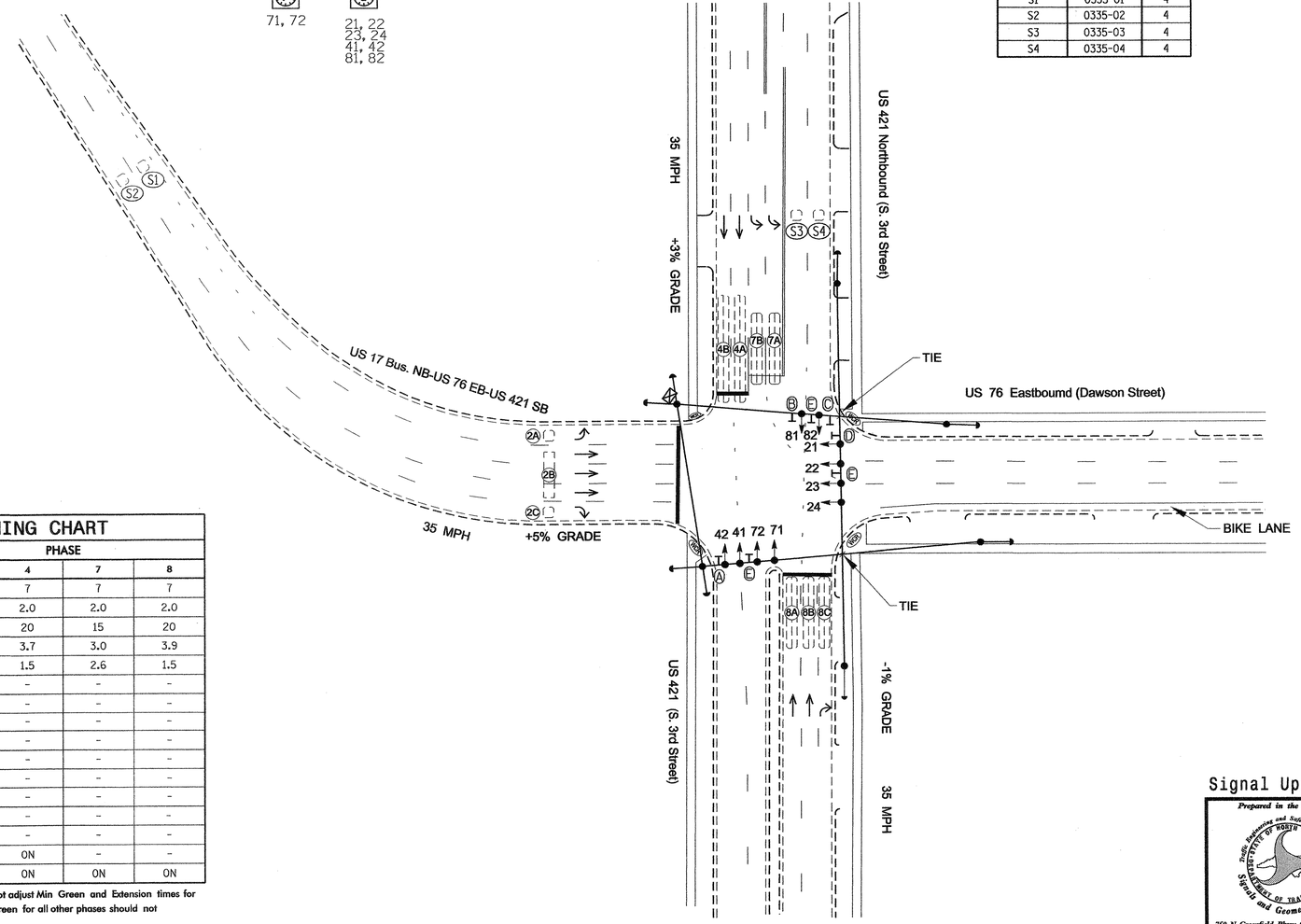
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0335-01	4
S2	0335-02	4
S3	0335-03	4
S4	0335-04	4

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 7 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0335.



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	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	Left Arrow "ONLY" Sign (R3-5L)	D
E	Street Sign	E

2070L TIMING CHART

FEATURE	PHASE 2	4	7	8
Min Green 1 *	10	7	7	7
Extension 1 *	3.0	2.0	2.0	2.0
Max Green 1 *	60	20	15	20
Yellow Clearance	3.6	3.7	3.0	3.9
Red Clearance	1.8	1.5	2.6	1.5
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	-
Vehicle Call Memory	YELLOW	-	-	-
Dual Entry	-	ON	-	-
Simultaneous Gap	ON	ON	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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 17 Bus.-US 76 EB-US 421 SB
(Dawson Street)
at
US 17 Bus./US 421 (S. 3rd St.)

Division 3 New Hanover County Wilmington

PLAN DATE: January 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

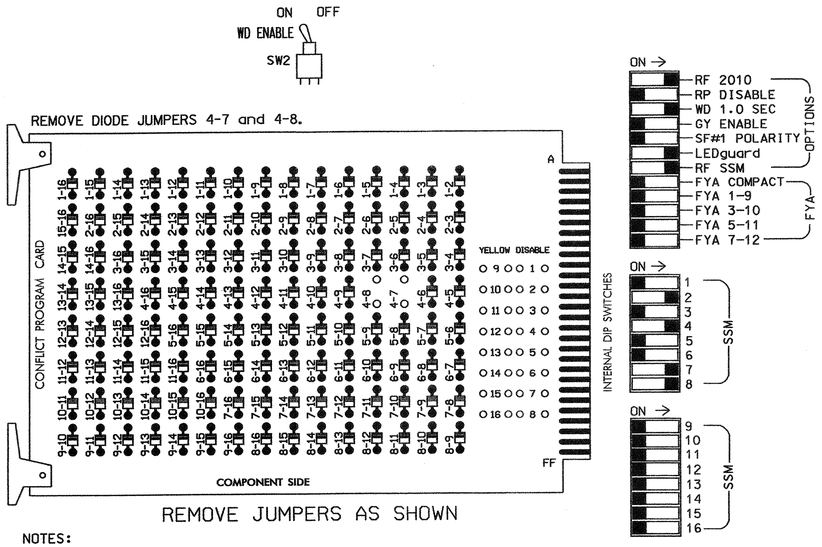
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/1/08 DATE
SIG. INVENTORY NO. 03-0335

07-MAY-2008 11:58
s:\traffic\Signals\workgroups\wilalexander\wu-5017 (wilmington city system)\03-0335\03335_sig_dsn_20080501.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 116

EDI MODEL 2010ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 1,3,5,6,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phase 4, on the controller unit, for Dual Entry.
6. 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.	NU	21,22 23,24	NU	NU	41,42	NU	NU	NU	NU	71,72	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW										122		
YELLOW ARROW										123		
GREEN ARROW										124		

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S7,S8
PHASES USED.....2,4,7,8
OVERLAPS.....NONE

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,2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		ø2 2B				ø4 4B			SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	ø7 7A	SLOT EMPTY	SLOT EMPTY	ø8 8A	ø8 8C	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L			ø7 7B			ø8 8B	NOT USED		SYS. DET. S4					

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,2C	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			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
7A	TB3-9,10	J3U	64	26	36	7	Y	Y			3
7B	TB3-11,12	J3L	77	39	46	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15
* S3	TB7-9,10	J9U	59	21	15	SYS					
* S4	TB7-11,12	J9L	61	23	17	SYS					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0335
DESIGNED: JAN. 2008
SEALED: 5/01/08
REVISED: N/A

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 17 Bus.-US 76 EB-US 421 SB
(Dawson Street)
at
US 17 Bus./US 421 (S. 3rd St.)

Division 3 | New Hanover County | Wilmington

PLAN DATE: 4-29-08 | REVIEWED BY: T. Ogle
PREPARED BY: A.A. Klooz | REVIEWED BY:

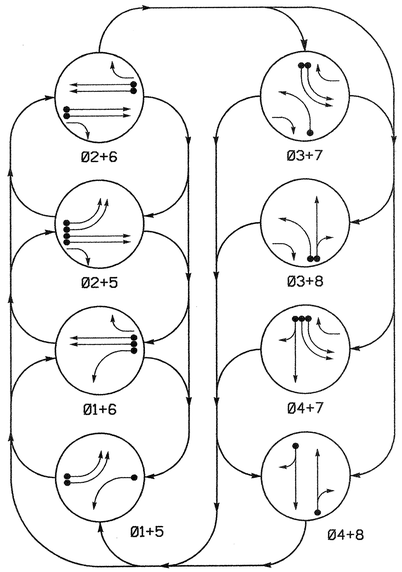
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 5-12-08
SIG. INVENTORY NO. 03-0335

07-MAY-2008 12:29
S:\TEB\Signals\workgroups\sig mgmt\loozw030335_smu_ele_2008mmdd.dgn
ckloo2

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.117

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

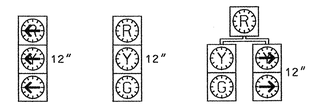
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	↚	↚	R̸	R̸	R̸	R̸	R̸	R̸	R̸
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/	R/	R	R	Y
31	R̸	R̸	R̸	R̸	↚	↚	R̸	R̸	R̸
41,42	R	R	R	R	R	R	G	G	R
51,52	↚	R̸	↚	R̸	R̸	R̸	R̸	R̸	R̸
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/	R	R/	R	Y
71,72	R̸	R̸	R̸	R̸	↚	R̸	↚	R̸	R̸
81,82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



11, 31, 51, 52, 71, 72 — 21, 41, 42, 61, 81, 82 — 22, 62

2070L 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	-	1	Y	Y	-	——	——	-	Y
2A	6X6	420	Existing	-	2	Y	Y	-	——	——	-	Y
2B	6X6	420	Existing	-	2	Y	Y	-	——	——	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	——	3	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	10	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	——	——	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	——	——	-	Y
6A	6X6	420	Existing	-	6	Y	Y	-	——	——	-	Y
6B	6X6	420	Existing	-	6	Y	Y	-	——	——	-	Y
7A	6X40	0	2-4-2	-	7	Y	Y	-	——	——	-	Y
7B	6X40	0	2-4-2	-	7	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	10	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	5	——	-	Y
S1	6X6	+115	Existing	-	-	-	-	-	——	——	Y	Y
S2	6X6	+115	Existing	-	-	-	-	-	——	——	Y	Y
S3	6X6	605	Existing	-	-	-	-	-	——	——	Y	Y
S4	6X6	605	Existing	-	-	-	-	-	——	——	Y	Y
S5	6X6	605	Existing	-	-	-	-	-	——	——	Y	Y

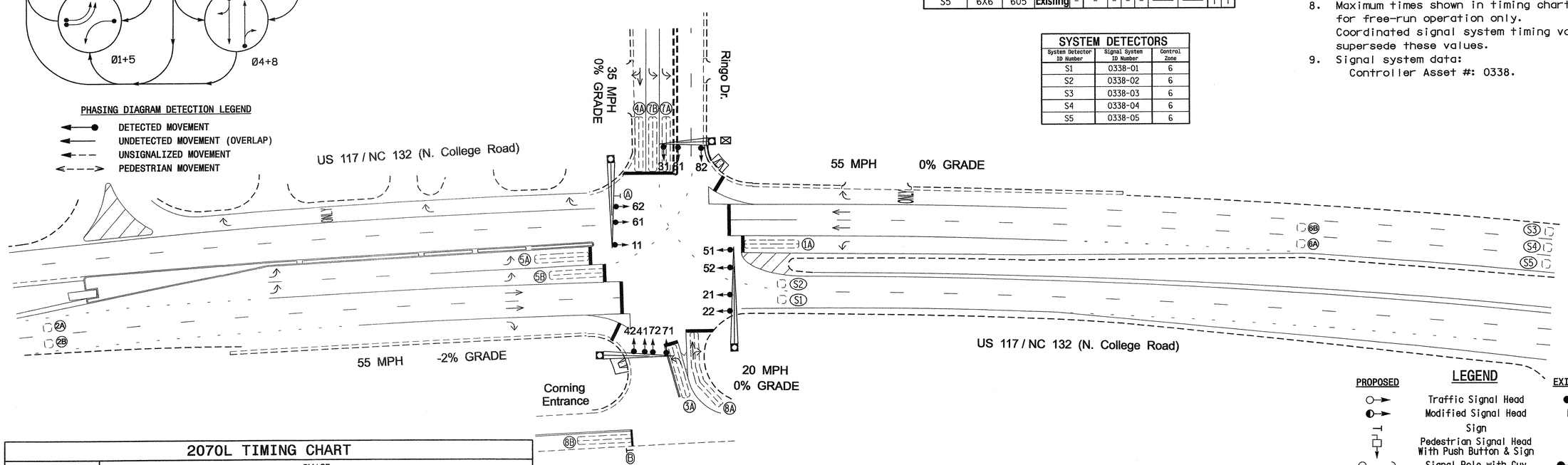
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0338-01	6
S2	0338-02	6
S3	0338-03	6
S4	0338-04	6
S5	0338-05	6

8 Phase
Fully Actuated
(Wilmington City Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0338.



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	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	"STOP" Sign (R1-1)	Ⓑ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	14	7	7	7	14	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	30	90	20	30	30	90	20	30
Yellow Clearance	3.0	5.4	3.0	3.8	3.0	5.2	3.0	3.0
Red Clearance	3.2	1.0	2.9	2.4	3.3	1.0	3.1	3.4
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	46	-	-	-	46	-	-
Time Before Reduction *	-	20	-	-	-	20	-	-
Time To Reduce *	-	50	-	-	-	50	-	-
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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 — 1"=40'

US 117/NC 132 (N. College Rd.)
at
Ringo Dr./
Corning Entrance

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2007	REVIEWED BY:	Wynn
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

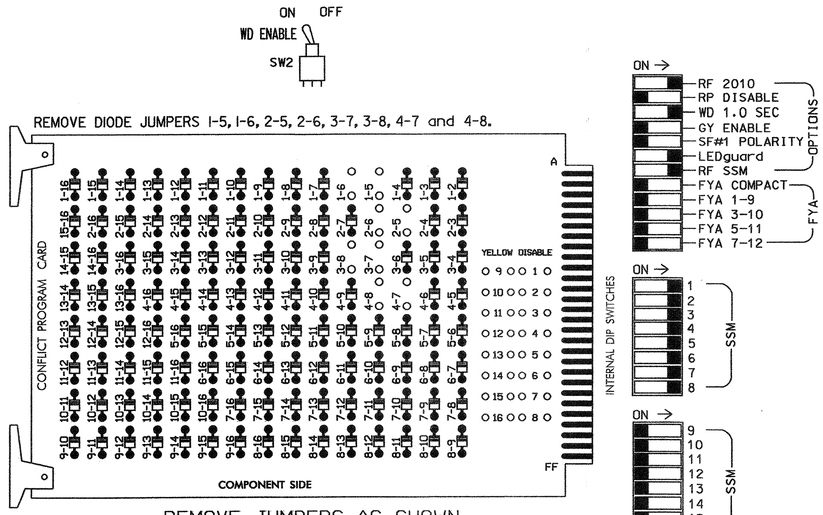
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 3/3/08 DATE
SIG. INVENTORY NO. 03-0338

03-MAR-2008 15:01
s:\its signal\workgroups\alexander\u-5017 (wilmington city system)\03-0338\030338_sig_dsn_20080303.dgn
rziemba

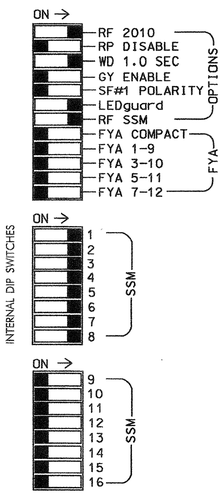
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 18

EDI MODEL 2010ECL-NC 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 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. The cabinet and controller are part of the Wilmington City 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.	11	21,22	NU	22	31	41,42	NU	51,52	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			117	117			132			123	123		
GREEN ARROW	127			118	118			133			124	124		

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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	SLOT	Ø3 3A	Ø4 4A	SYS. DET. S1	SLOT	SYS. DET. S3	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	Ø2 2B	EMPTY	EMPTY	NOT USED	NOT USED	SYS. DET. S2	EMPTY	SYS. DET. S4	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø5 5A	Ø6 6A	SLOT	Ø7 7A	Ø8 8A	SLOT	SLOT	SYS. DET. S5	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø5 5B	Ø6 6B	EMPTY	Ø7 7B	Ø8 8B	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	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			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-7,8	J5L	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
8B	TB5-11,12	J6L	46	8	18	8	Y	Y		5.0	
* S1	TB6-1,2	I7U	65	27	34	SYS					
* S2	TB6-3,4	I7L	78	40	44	SYS					
* S3	TB6-9,10	I9U	60	22	11	SYS					
* S4	TB6-11,12	I9L	62	24	13	SYS					
* S5	TB7-9,10	J9U	59	21	15	SYS					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0338
DESIGNED: March 2007
SEALED: 03/03/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117/NC 132 (N. College Rd.)
at
Ringo Dr./
Corning Entrance

Division 3 New Hanover County Wilmington

PLAN DATE: October 2007 REVIEWED BY: T. Upp
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS | INIT. | DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 3/6/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0338

04-MAR-2008 15:22
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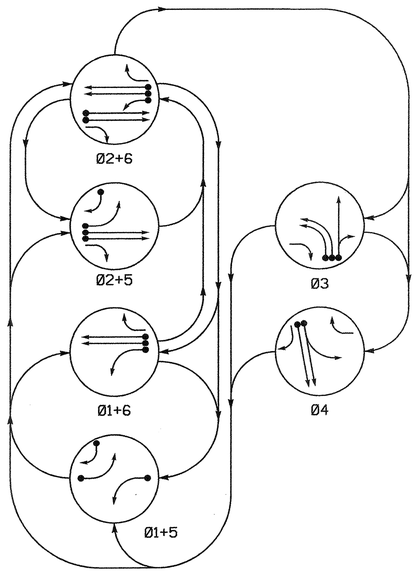
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 119

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

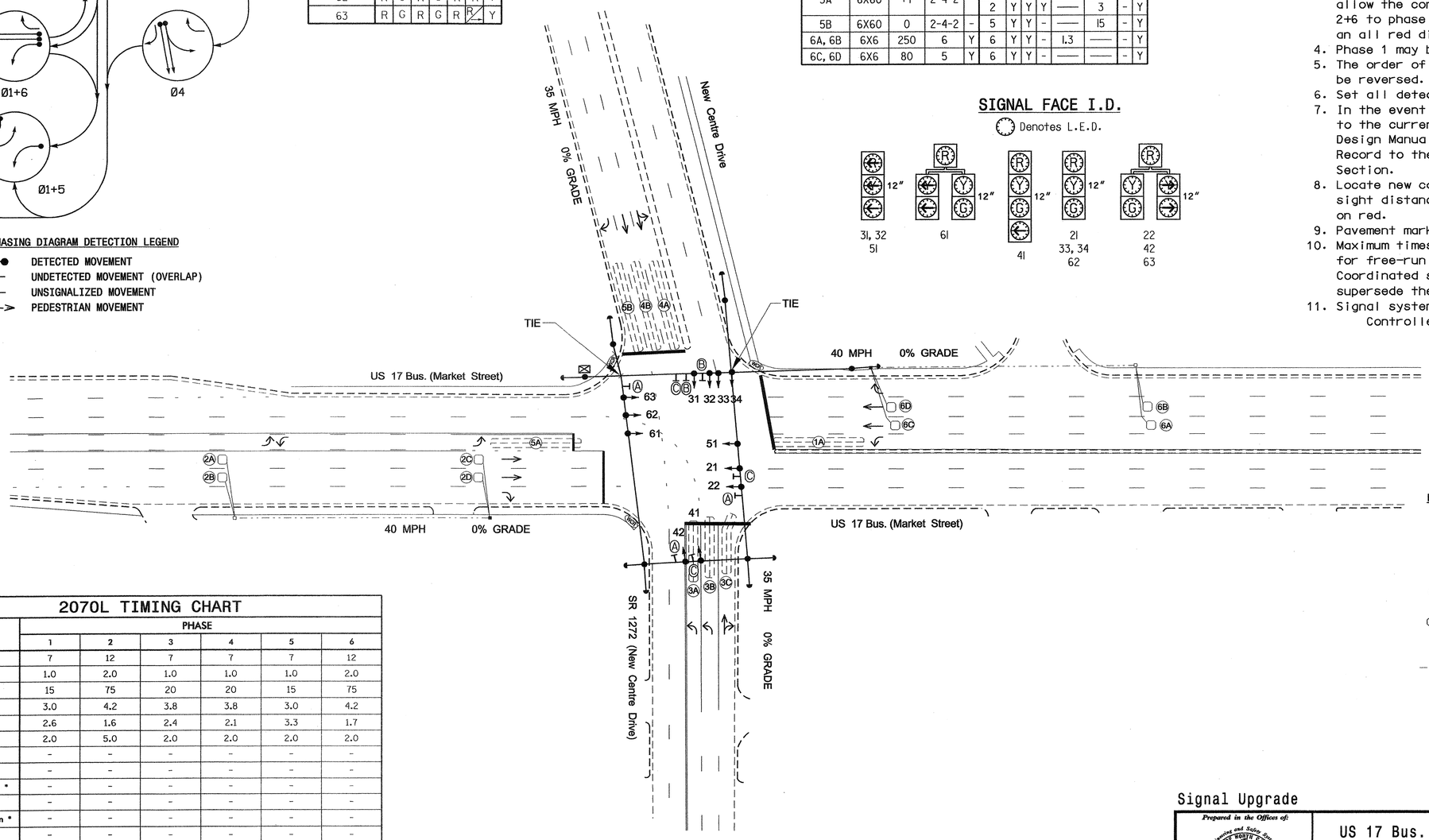
SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/←	R	Y
31, 32	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~R~~	~~R~~
33, 34	R	R	R	R	G	R	R
41	R	R	R	R	R	G/←	R
42	R/←	R	R/←	R	R	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~
61	R/←	G/←	R	G	R	R	Y
62	R	G	R	G	R	R	Y
63	R	G	R	G	R	R/←	Y

2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	——	——	-	Y
2A, 2B	6X6	250	5	Y	2	Y	Y	-	1.3	——	-	Y
2C, 2D	6X6	80	4	Y	2	Y	Y	-	——	——	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	——	——	-	Y
3B	6X40	+4	2-4-2	-	3	Y	Y	-	——	——	-	Y
3C	6X40	+6	2-4-2	-	3	Y	Y	-	——	——	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	10	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	——	10	-	Y
5A	6X60	+7	2-4-2	-	5	Y	Y	-	——	15	-	Y
					2	Y	Y	Y	——	3	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	——	15	-	Y
6A, 6B	6X6	250	6	Y	6	Y	Y	-	1.3	——	-	Y
6C, 6D	6X6	80	5	Y	6	Y	Y	-	——	——	-	Y

SIGNAL FACE I.D.

Denotes L.E.D.



6 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
4. Phase 1 may be lagged.
5. The order of phase 3 and phase 4 may be reversed.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0346.

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	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Street Sign	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	1.0	2.0	1.0	1.0	1.0	2.0
Max Green 1 *	15	75	20	20	15	75
Yellow Clearance	3.0	4.2	3.8	3.8	3.0	4.2
Red Clearance	2.6	1.6	2.4	2.1	3.3	1.7
Red Revert	2.0	5.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	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

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 17 Bus. (Market Street) at SR 1272 (New Centre Drive)

Division 3 New Hanover County Wilmington

PLAN DATE:	April 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

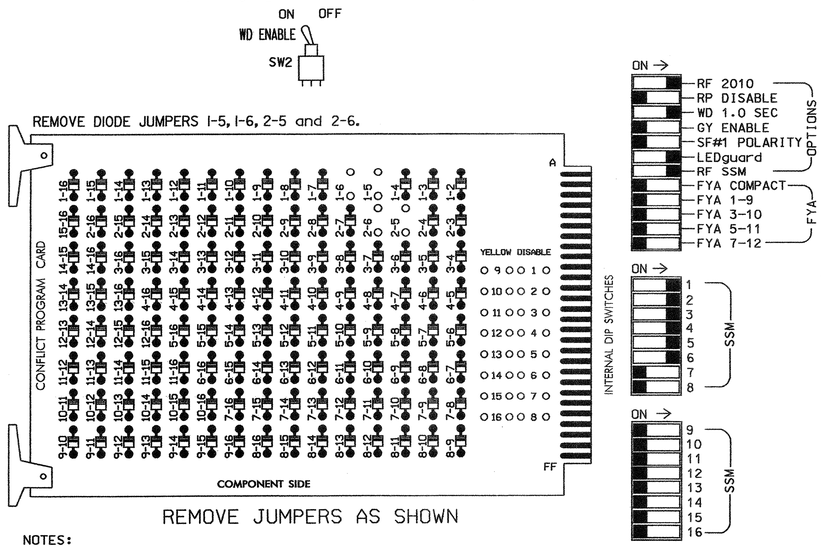
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/9/08 DATE
SIG. INVENTORY NO. 03-0346

31-JUL-2008 14:21
S:\TEAMS\signalsworkgroupsteleander\wu-5017 (wilmington city system)\03-0346w030346_sig_dsn_20080409.dgn
$USER$
Fziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.12D

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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. 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. The cabinet and controller are part of the Wilmington City Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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	22	31,32	33,34	41	42	63	NU	42	51	61, 62,63	NU	NU	NU	NU
RED	*	128				116	101	101					134				
YELLOW		129				117	102	102					135				
GREEN		130				118	103	103					136				
RED ARROW					116							131					
YELLOW ARROW	126			117	117				102		132	132					
GREEN ARROW	127			118	118		103		103		133	133					

NU = Not Used

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

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,2B	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø3 3B	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2C,2D			NOT USED	Ø3 3C	Ø4 4B							ST DC ISOLATOR
FILE "J"	U	Ø5 5B	Ø5 5A	Ø6 6A,6B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø2 5A	Ø6 6C,6D											

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,2B	TB2-5,6	I2U	39	1	2	2	Y	Y		1.3	
2C,2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			10
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A[1]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y	Y		3
5B	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y		1.3	
6C,6D	TB3-11,12	J3L	77	39	46	6	Y	Y			

[1] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

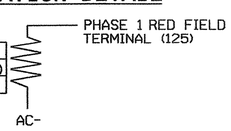
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0346
DESIGNED: April 2007
SEALED: 04/09/08
REVISED: N/A

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 red monitor input 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.

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.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
750 N. Greenfield Pwky, Garner, NC 27529

US 17 Bus. (Market Street)
at
SR 1272 (New Centre Drive)

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008 REVIEWED BY: T. Jones
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 4/10/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0346

09-APR-2008 11:47
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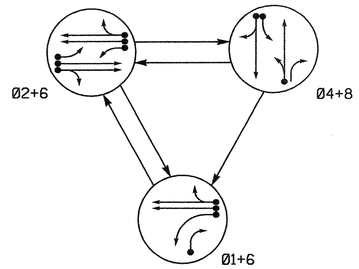
cbstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 121

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

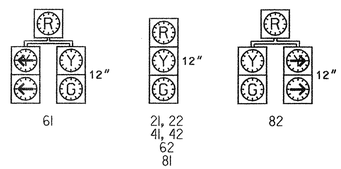
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04+8	FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

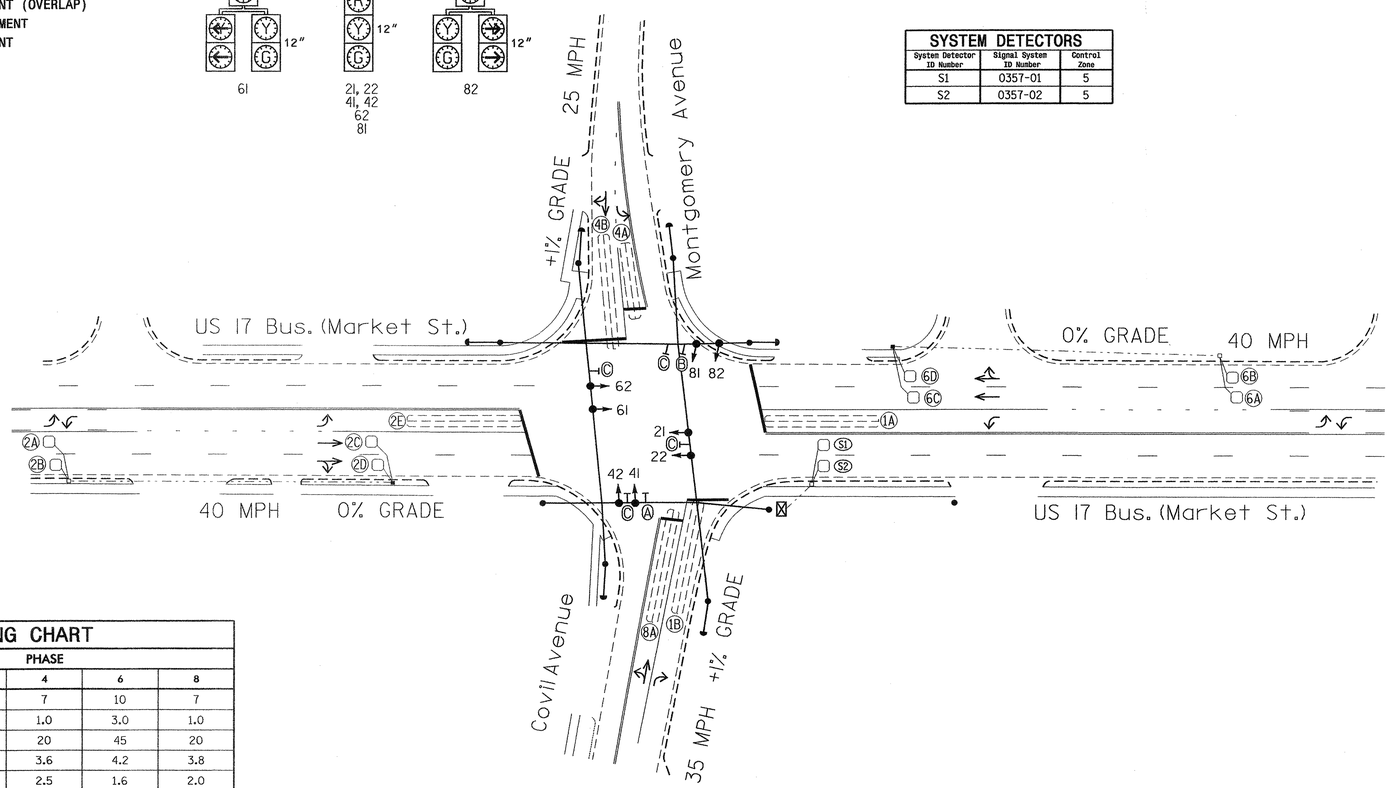


2070L LOOP & DETECTOR INSTALLATION

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	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
					6	Y	Y	-	——	——	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
2A, 2B	6X6	250	5	Y	2	Y	Y	-	1.3	——	-	Y
2C, 2D	6X6	80	4	Y	2	Y	Y	-	——	——	-	Y
2E	6X60	0	2-4-2	-	2	Y	Y	-	——	——	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	——	3	-	Y
4B	6X60	+5	2-4-2	-	4	Y	Y	-	——	15	-	Y
6A, 6B	6X6	250	5	Y	6	Y	Y	-	1.3	——	-	Y
6C, 6D	6X6	80	4	Y	6	Y	Y	-	——	——	-	Y
8A	6X40	+5	2-4-2	-	8	Y	Y	-	——	3	-	Y
S1	6X6	+150	4	Y	-	-	-	-	——	——	Y	Y
S2	6X6	+150	4	Y	-	-	-	-	——	——	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0357-01	5
S2	0357-02	5



2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	10	7
Extension 1 *	1.0	3.0	1.0	3.0	1.0
Max Green 1 *	15	45	20	45	20
Yellow Clearance	3.0	4.2	3.6	4.2	3.8
Red Clearance	2.3	1.8	2.5	1.6	2.0
Red Revert	2.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	ON	-	ON
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.

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Existing lane control signs may be removed.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0357.

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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Combined Through and Left Arrow Sign (R3-6L)	B
C	Street Sign	C

Signal Upgrade

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

US 17 Bus. (Market Street)
at
Covil Avenue/
Montgomery Avenue

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

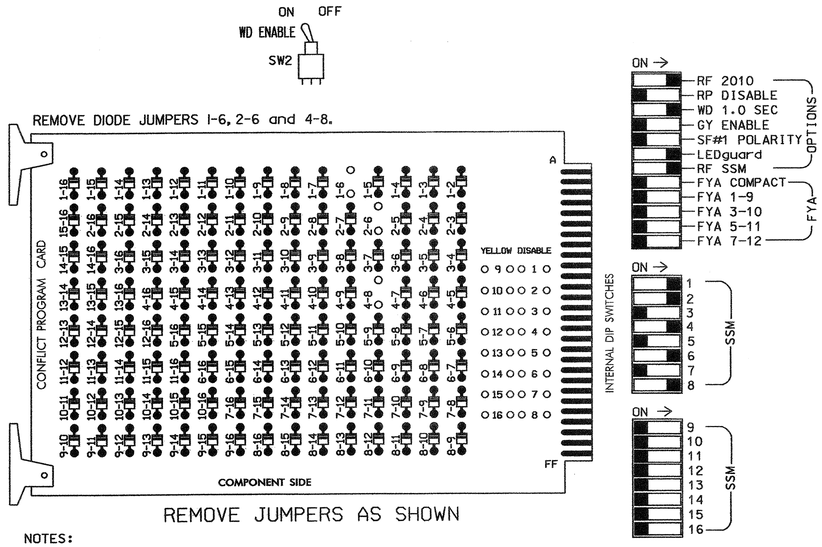
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZELMER
SIGNATURE 4/17/08 DATE
SIG. INVENTORY NO. 03-0357

31-JUL-2008 14:32
s:\eng\sig&wkgroups\alexander\u-5017 (wilmington city system)\03-0357\03357_sig_dsn_20080417.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 122

EDI MODEL 2010ECL-NC 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 3,5,7,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. 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.	61,82	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED	*	128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

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

EQUIPMENT INFORMATION

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1	Ø1	Ø2	Ø2	SLOT	Ø4	SLOT	SLOT	SYS. DET.	SLOT	SLOT	SLOT	SLOT	FS
		1B	1A	2A,2B	2E	EMPTY	4A	EMPTY	EMPTY	S1	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	Ø6	Ø2	NOT USED		Ø4			SYS. DET.					ST
			1A	2C,2D			4B			S2					DC ISOLATOR
FILE "J"	U	SLOT	Ø6	SLOT	SLOT	SLOT	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		EMPTY	6A,6B	EMPTY	EMPTY	EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L		Ø6				NOT USED								
			6C,6D												

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
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A [1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y		1.3	
2C,2D	TB2-11,12	I3L	76	38	42	2	Y	Y			
2E	TB4-1,2	I4U	47	9	22	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
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		1.3	
6C,6D	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					

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

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

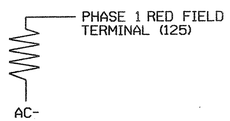
(program controller as shown below)

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

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 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: 03-0357
DESIGNED: March 2007
SEALED: 4-17-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17 Bus. (Market Street) at Covil Avenue/ Montgomery Avenue

Division 03 New Hanover County Wilmington

PLAN DATE: 4-16-08 REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS | INIT. | DATE

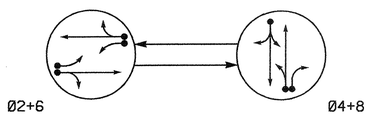
Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Department of Transportation, State of North Carolina, Signal Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 4/23/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0357

22-APR-2008 08:41
s:\traffic_signal\sheetkgroups\sig mon\spaulding\in-progress\03357_sm_ele_2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.123

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

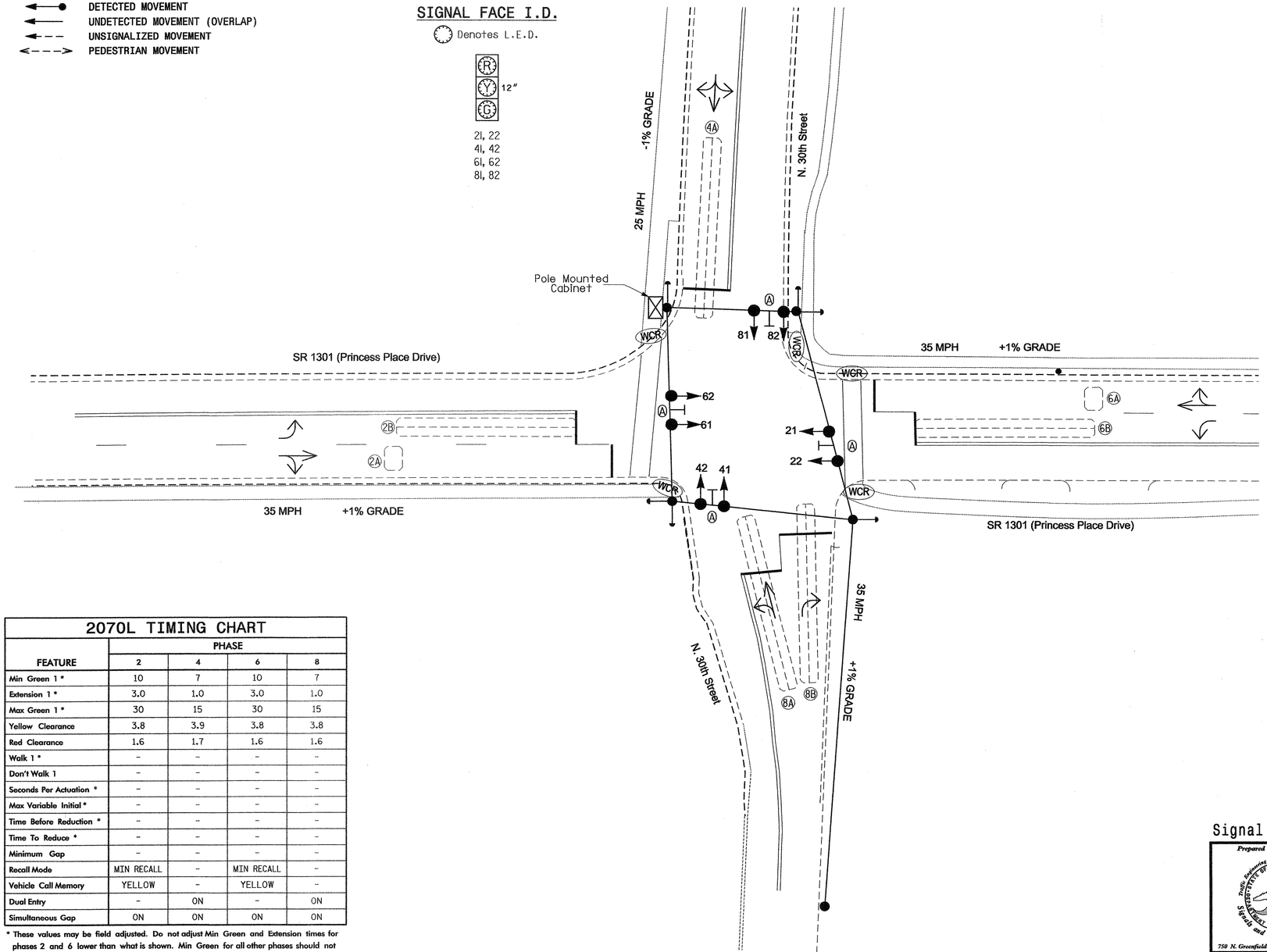
2070L LOOP & DETECTOR INSTALLATION

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
2A	6X8	70	Existing	-	2	Y	Y	-	——	——	-	Y
2B	6X60	0	2-4-2	-	2	Y	Y	-	——	——	-	Y
4A	6X60	+5	2-4-2	-	4	Y	Y	-	——	10	-	Y
6A	6X8	70	Existing	-	6	Y	Y	-	——	——	-	Y
6B	6X60	0	2-4-2	-	6	Y	Y	-	——	——	-	Y
8A	6X60	+20	2-4-2	-	8	Y	Y	-	——	3	-	Y
8B	6X60	+10	2-4-2	-	8	Y	Y	-	——	15	-	Y

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22
41, 42
61, 62
81, 82



2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Repaint existing stopbars and crosswalks.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0379.

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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	1.0	3.0	1.0
Max Green 1 *	30	15	30	15
Yellow Clearance	3.8	3.9	3.8	3.8
Red Clearance	1.6	1.7	1.6	1.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

SR 1301 (Princess Place Drive) at N. 30th Street

Division 3 New Hanover County Wilmington

PLAN DATE:	April 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

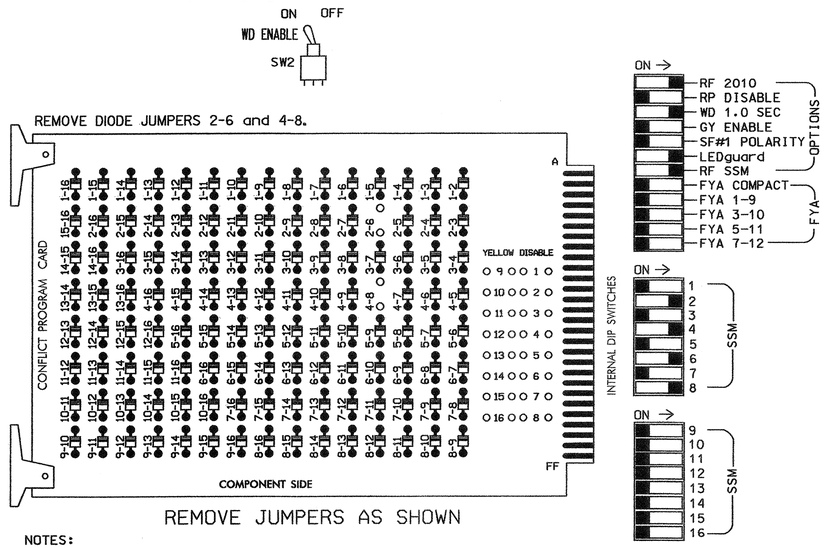
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/17/08 DATE
SIG. INVENTORY NO. 03-0379

17-APR-2008 18:15
s:\its signalsworkgroups\alexander\u-5017 (wilmington city system)\03-0379\03379_sig_dsn_20080417.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.124

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)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			15

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,3,5,7,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S6,S8
PHASES USED.....2,4,6,8
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.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0379
DESIGNED: April 2007
SEALED: 4-17-08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1301 (Princess Place Drive)
at
N. 30th Street

Division 03 New Hanover County Wilmington

PLAN DATE: 4-15-08 REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Traffic Engineering Unit
Division of Highways
Department of Transportation
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

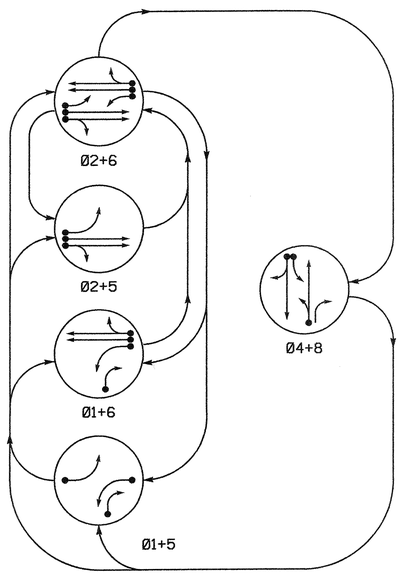
George C. Brown 4/21/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0379

18-APR-2008 10:42
s:*kits signals*workgroups*sig mon*spaulding*in-progress*03379_smuelle_2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.125

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

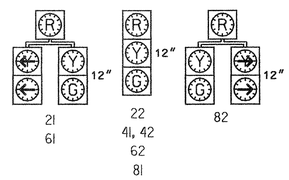
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
21	R	R	G	G	R	Y
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
81	R	R	R	R	G	R
82	R	R	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	-	—	—	-	Y
1B	6X60	+7	Existing	-	1	Y	Y	-	—	15	-	Y
2A, 2B	6X6	330	Existing	-	2	Y	Y	-	1.6	—	-	Y
2C	6X16	90	Existing	-	2	Y	Y	-	—	—	-	Y
4A	6X20	0	Existing	-	4	Y	Y	-	—	3	-	Y
4B	6X30	0	2-4-2	-	4	Y	Y	-	—	10	-	Y
5A	6X60	+5	Existing	-	5	Y	Y	-	—	15	-	Y
					2	Y	Y	-	—	—	-	Y
6A, 6B	6X6	330	Existing	-	6	Y	Y	-	1.6	—	-	Y
6C, 6D	6X6	90	Existing	-	6	Y	Y	-	—	—	-	Y
8A	6X60	+11	Existing	-	8	Y	Y	-	—	—	-	Y
S1	6X6	+125	4	Y	-	-	-	-	—	—	Y	Y
S2	6X6	+125	4	Y	-	-	-	-	—	—	Y	Y
S3	6X6	+350	Existing	-	-	-	-	-	—	—	Y	Y
S4	6X6	+350	Existing	-	-	-	-	-	—	—	Y	Y

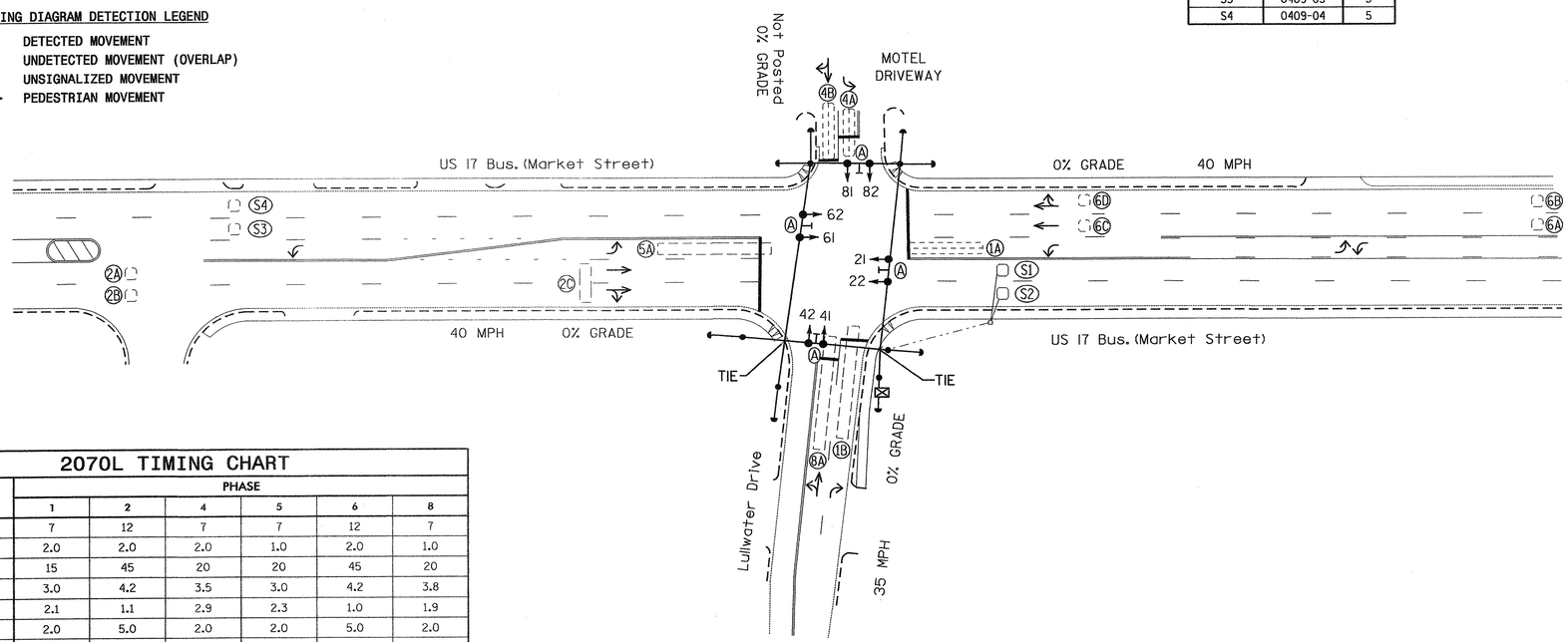
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0409-01	5
S2	0409-02	5
S3	0409-03	5
S4	0409-04	5

5 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0409.



2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	2.0	2.0	1.0	2.0	1.0
Max Green 1 *	15	45	20	20	45	20
Yellow Clearance	3.0	4.2	3.5	3.0	4.2	3.8
Red Clearance	2.1	1.1	2.9	2.3	1.0	1.9
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	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.

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	
	Street Sign	

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 17 Bus. (Market Street) at Lullwater Drive/ Motel Driveway

Division 3 New Hanover County Wilmington

PLAN DATE:	April 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

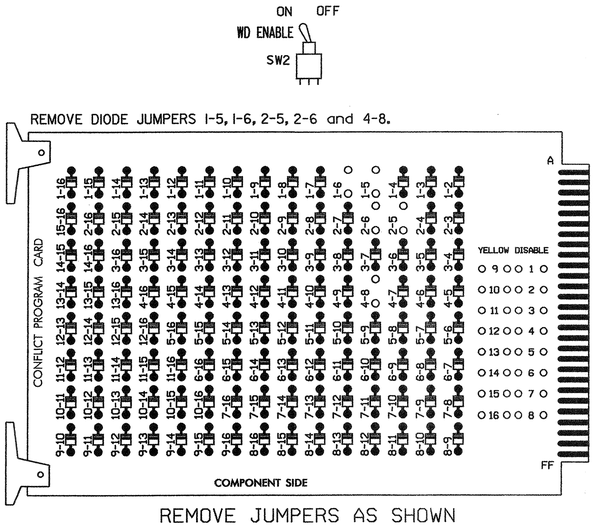
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 2/4/08 DATE
SIG. INVENTORY NO. 03-0409

07-APR-2008 18:02
s:\ttg signals\workgroups\alexander\u-5017 (wilmington city system)\03-0409\03409_sig_dsn_20080407.dgn
rziemba

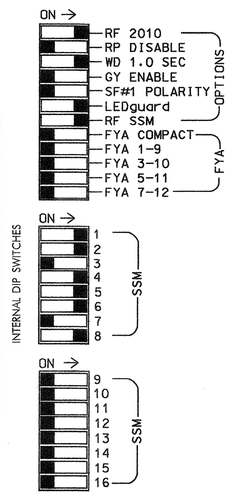
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig.126

EDI MODEL 2010ECL-NC 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 3,7,9,10, 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8
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.	61,82	21,22	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					

NU = Not Used

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

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 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	Ø 1 1B	Ø 1 1A	Ø 2 2A,2B	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 6 1A	Ø 2 2C			Ø 4 4B			SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 5 5A	Ø 6 6A,6B	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 2 5A	Ø 6 6C,6D			NOT USED			SYS. DET. S4					

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
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2C	TB2-11,12	I3L	76	38	42	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			10
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6C,6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
* S3	TB7-9,10	J9U	59	21	15	SYS					
* S4	TB7-11,12	J9L	61	23	17	SYS					

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

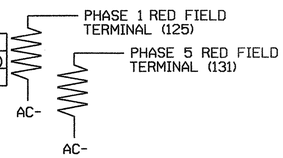
* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

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: 03-0409
DESIGNED: April 2007
SEALED: 04-07-08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

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

750 N. Greenfield Pwky, Garner, NC 27529

US 17 Bus. (Market Street) at Lullwater Drive/ Motel Driveway

Division 3 | New Hanover County | Wilmington

PLAN DATE: April 2008 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

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

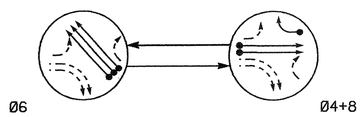
SIGNATURE | DATE 4-15-08

SIG. INVENTORY NO. 03-0409

15-APR-2008 08:19
r:\traffic\sod\sheetworkgroups\sig mon\petersonW030409_smu\ele_xxx.dgn
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	516.127

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	FLASH
4I, 42	R	G	R
6I, 62	G	R	Y
8I, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

4I, 42
6I, 62
8I, 82

2070L 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
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	15	-	Y
6A, 6B, 6C	6X6	250	5	-	6	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	——	——	-	Y
S1	6X6	+170	5	-	-	-	-	-	——	——	Y	Y
S2	6X6	+170	5	-	-	-	-	-	——	——	Y	Y
S3	6X6	+170	5	-	-	-	-	-	——	——	Y	Y

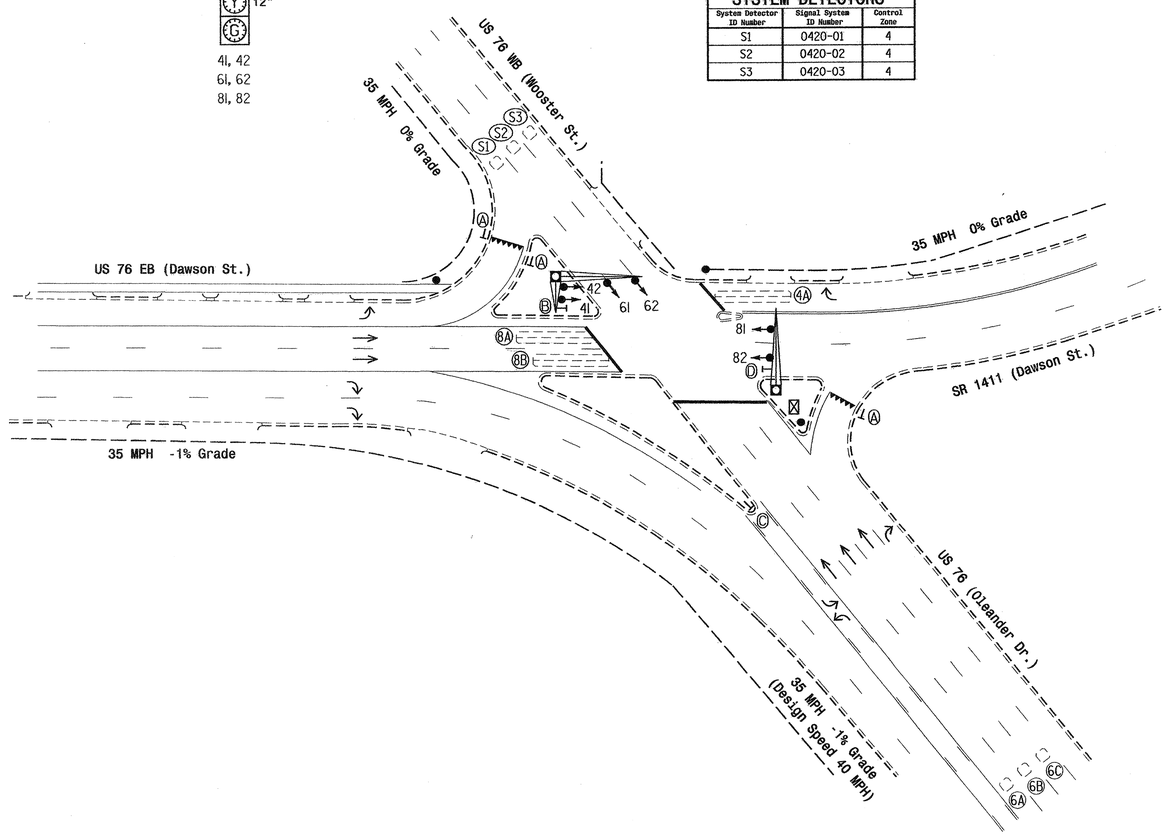
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0420-01	4
S2	0420-02	4
S3	0420-03	4

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
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 #: 0420.



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	
A	"YIELD" Sign (R1-2)	A
B	No Left Turn Sign (R3-2)	B
C	Keep Right Sign (R4-7)	C
D	No Right Turn Sign (R3-1)	D

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7
Extension 1 *	2.0	3.0	2.0
Max Green 1 *	35	30	35
Yellow Clearance	3.9	4.2	3.9
Red Clearance	1.3	1.5	13
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	1.5	-
Max Variable Initial *	-	29	-
Time Before Reduction *	-	10	-
Time To Reduce *	-	20	-
Minimum Gap	-	3.0	-
Recall Mode	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-
Dual Entry	ON	-	ON
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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Traffic Signal Design Section
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 76
(Oleander Dr./Wooster St.)
at
SR 1411 (Dawson Street)
Division 3 New Hanover County Wilmington

PLAN DATE: June 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

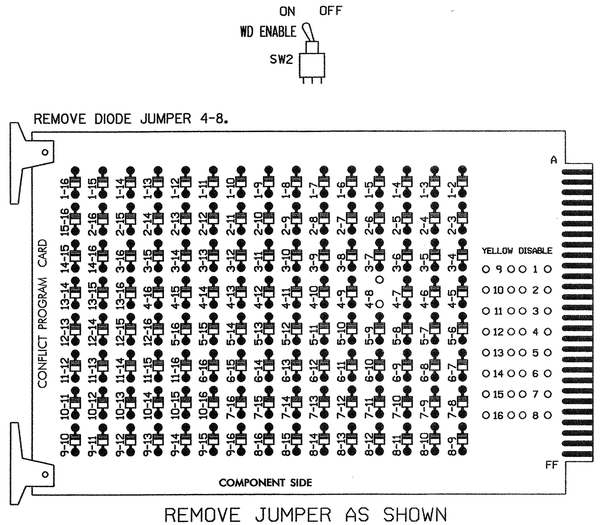
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 6/27/08 DATE
SIG. INVENTORY NO. 03-0420

02-JUL-2008 16:22
s:\ts_signals\signal&sewer\kgroupsewalexander#u-5017 (wilmington city system)\03-0420\03420_sig_dsn_20080627.dgn
c:\ztemba

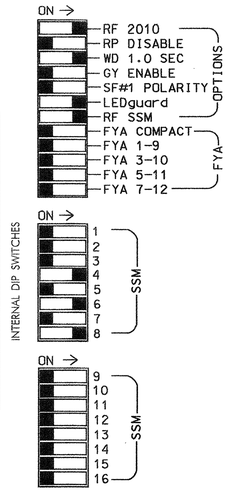
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.128

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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 1,2,3, 5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. 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.	NU	NU	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
OVERLAPS.....NONE

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	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L						NOT USED			SYS. DET. S2					ST DC ISOLATOR
FILE "J" U	SLOT EMPTY	Ø 6 6A,6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" L		NOT USED				Ø 8 8B			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
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			15
6A,6B,6C	TB3-5,6	J2U	40	2	6	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			
* 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					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0420
DESIGNED: June 2008
SEALED: 6/27/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 76
(Oleander Dr./Wooster St.)
at
SR 1411 (Dawson Street)

Division 3 | New Hanover County | Wilmington

PLAN DATE: February 2008 | REVIEWED BY: T. Vaf
PREPARED BY: G. C. Brown | REVIEWED BY:

REVISIONS	INIT.	DATE

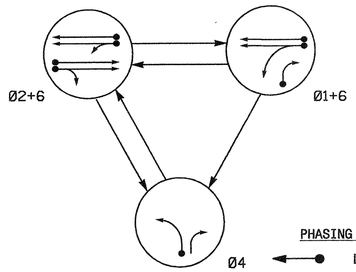
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/2/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0420

30-JUN-2008 09:18
S:\Traffic Signal\Work Groups\Sig Monitor Owner\03-0420_smt_ele_20080307.dgn
$$$$USER

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.129

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

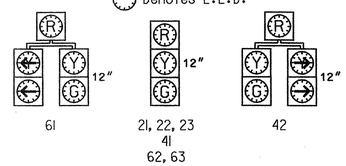
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø4	FLASH
21, 22, 23	R	G	R	Y
41	R	R	G	R
42	R/G	R	G	R
61	R/G	G	R	Y
62, 63	G	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X18	70	Existing	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
6A	6X6	70	Existing	-	6	Y	Y	-	-	-	-	Y
S1	6X6	+410	Existing	-	-	-	-	-	-	-	Y	Y
S2	6X6	+410	Existing	-	-	-	-	-	-	-	Y	Y

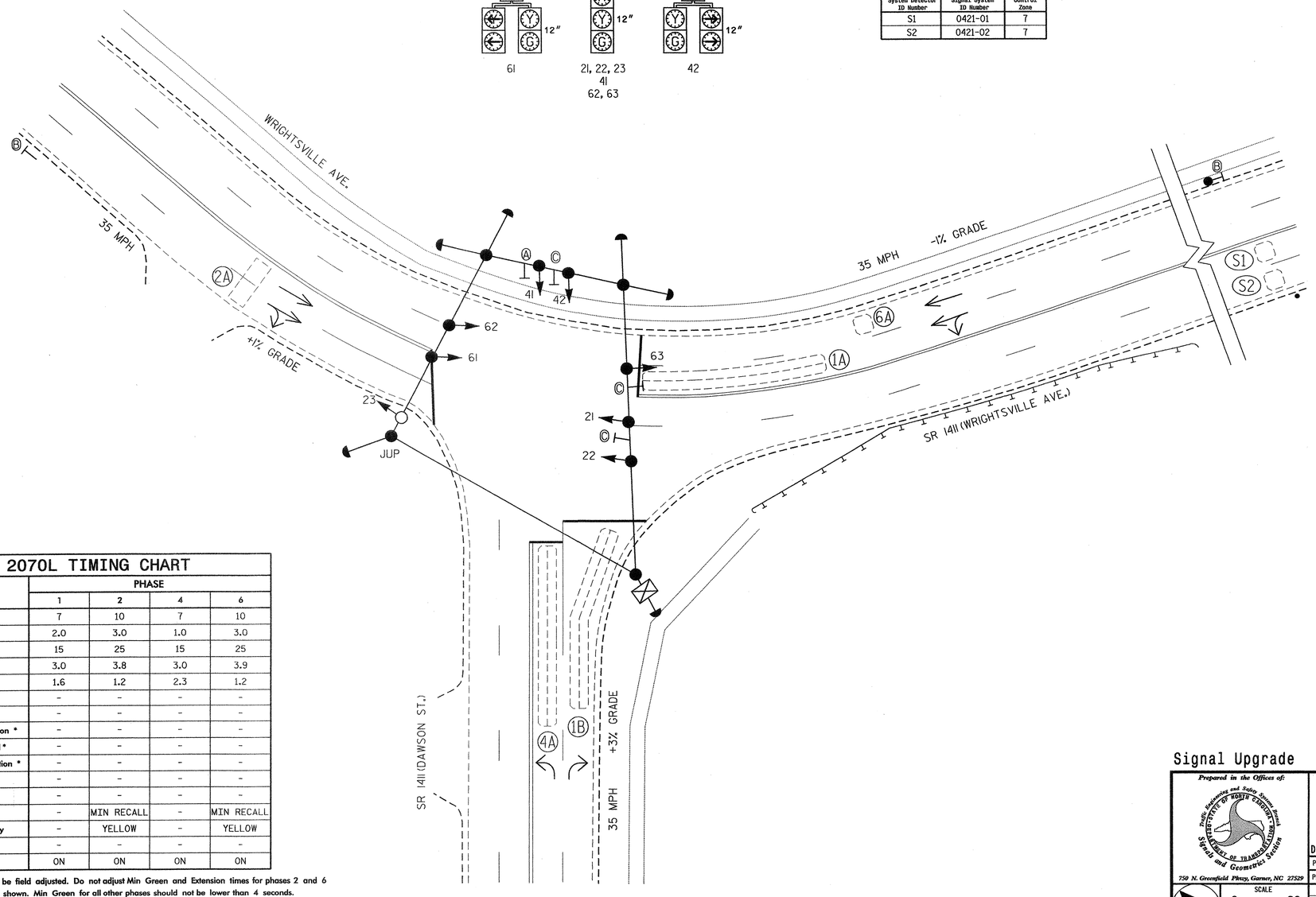
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0421-01	7
S2	0421-02	7

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lead.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Existing Left Arrow "ONLY" sign (R3-5L) may be removed.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0421.



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	
	Guardrail	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Signal Ahead Sign (W3-3) W/ Warning Beacons	Ⓑ
Ⓒ	Street Sign	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	1.0	3.0
Max Green 1 *	15	25	15	25
Yellow Clearance	3.0	3.8	3.0	3.9
Red Clearance	1.6	1.2	2.3	1.2
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
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.

Signal Upgrade

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

SR 1411 (Wrightsville Avenue)
at
SR 1411 (Dawson Street)

Division 3 New Hanover County Wilmington

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

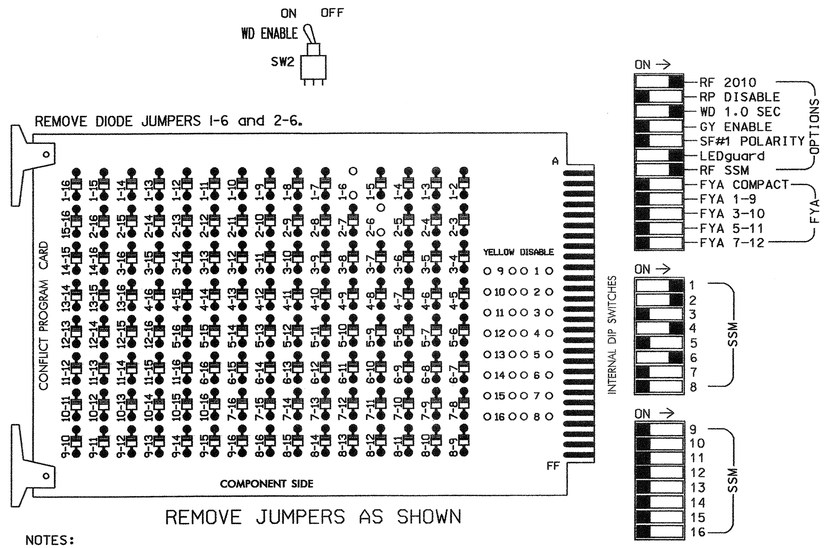
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELINSKI
SIGNATURE 3/3/08 DATE
SIG. INVENTORY NO. 03-0421

03-MAR-2008 11:59
s:\its signalsworkgroups\alexander\u-5017 (wilmington city system)\03-0421\030421_sig_dsn_20080303.dgn
rzielinski

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A.130

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 3,5,7, 8,9,10,11,12,13,14,15 & 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. 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.	42,61	21 22,23	NU	NU	41,42	NU	NU	61 62,63	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

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

EQUIPMENT INFORMATION

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	ø1 1A	ø2 2A	SLOT	SLOT	ø4 4A	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	ø6 1A	ø1 1B	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
1B	TB2-11,12	I3L	76	38	42	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	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			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

* 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

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

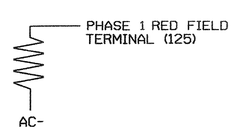
PHASE SEQUENCE: PAGE 1 NEXT: PAGES) ↘

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

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 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: 03-0421
DESIGNED: May 2007
SEALED: 3/3/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1411 (Wrightsville Avenue) at SR 1411 (Dawson Street)

Division 3 New Hanover County Wilmington

PLAN DATE: February 2008 REVIEWED BY: T. Jogs
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signal Management Section, Division of Highways, State of North Carolina, Department of Transportation
750 N. Greenfield Pwky, Garner, NC 27529

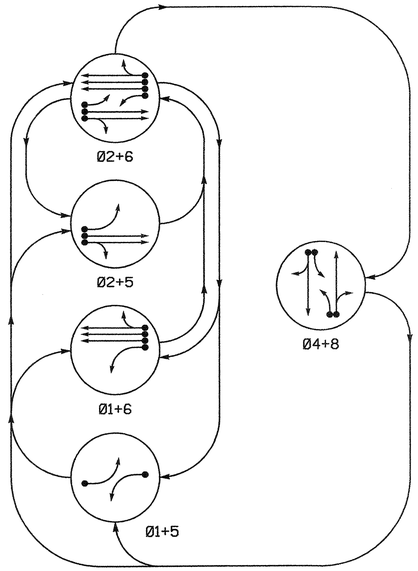
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 3/10/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0421

DG-MAP-2008 15:17
s:\traffic signal sheet\groups\sig manbrown\03-0421.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.131

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

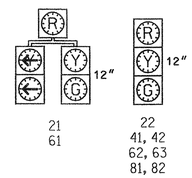
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62, 63	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

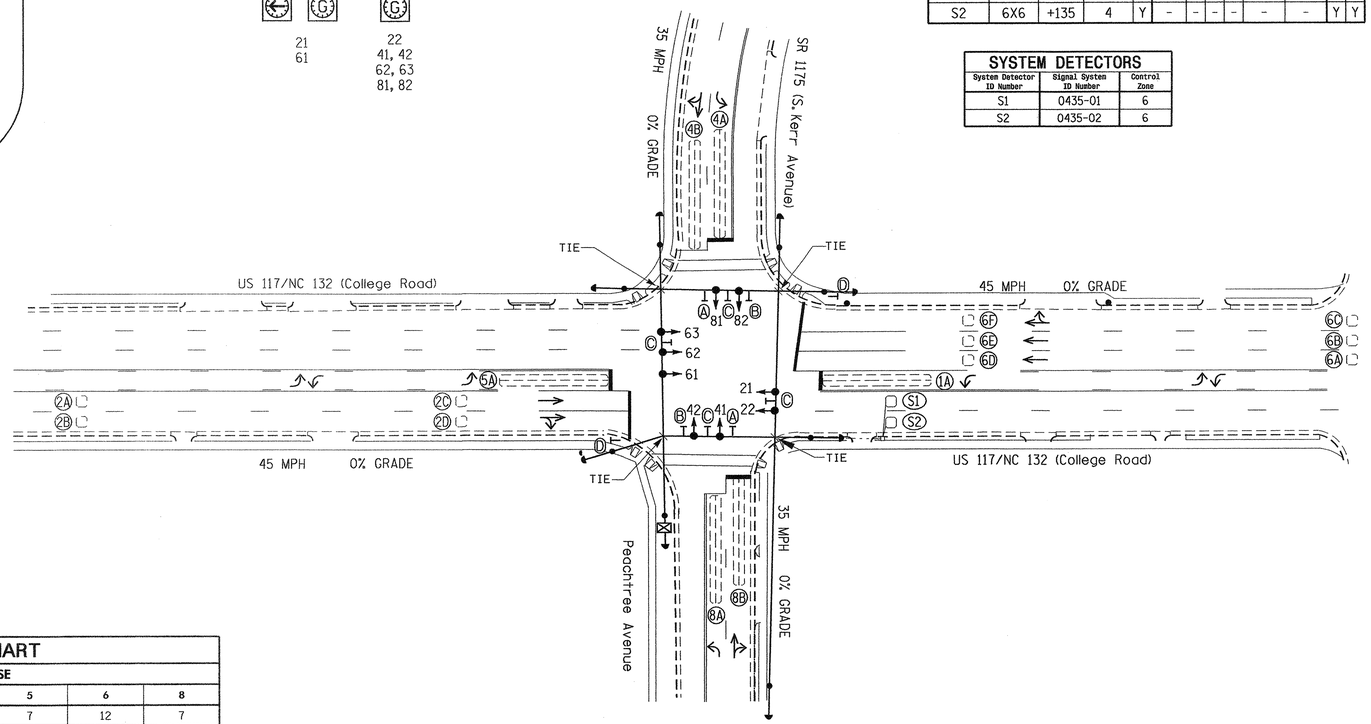


2070L LOOP & DETECTOR INSTALLATION

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	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A, 2B	6X6	300	EXISTING	-	2	Y	Y	-	1.6	-	-	Y
2C, 2D	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A,6B,6C	6X6	300	EXISTING	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	EXISTING	-	6	Y	Y	-	-	-	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	10	-	Y
S1	6X6	+135	4	Y	-	-	-	-	-	-	Y	Y
S2	6X6	+135	4	Y	-	-	-	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0435-01	6
S2	0435-02	6



5 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Existing lane control signs may be removed.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0435.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Right Arrow Sign (R3-6R)	Ⓑ
Ⓒ	Street Sign	Ⓒ
Ⓓ	"DO NOT BLOCK INTERSECTION" Sign (R10-7)	Ⓓ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	1.0	3.0	1.0	1.0	3.0	1.0
Max Green 1 *	15	70	30	15	70	30
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.8
Red Clearance	2.6	1.6	2.2	3.1	1.1	2.2
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	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: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Traffic Engineering Division, Division of Highways, Department of Transportation, 750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (College Road) at SR 1175 (S. Kerr Ave.) and Peachtree Ave.

Division 3 New Hanover County Wilmington

PLAN DATE:	March 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIENDA

SIGNATURE 3/3/08 DATE

SIG. INVENTORY NO. 03-0435

03-WED-2008 14:22
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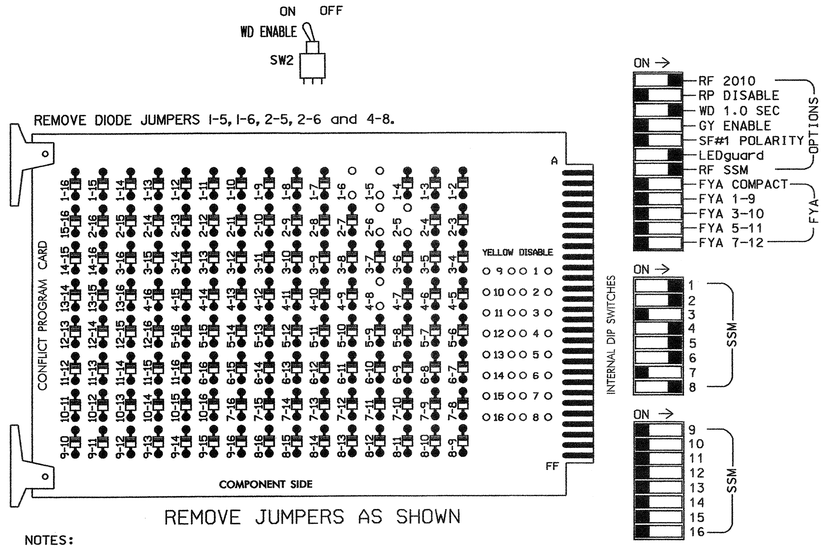
rziendo

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.132

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 3,7,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. 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	NU	41,42	NU	21	61 62,63	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					

NU = Not Used

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

EQUIPMENT INFORMATION

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø1 1A	Ø2 2A,2B	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø6 1A	Ø2 2C,2D	EMPTY	EMPTY	Ø4 4B	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø5 5A	Ø6 6A,6B,6C	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø2 5A	Ø6 6D,6E,6F	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2C,2D	TB2-11,12	I3L	76	38	42	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			10
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	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			10
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

* 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

BACKUP PROTECTION NOTE

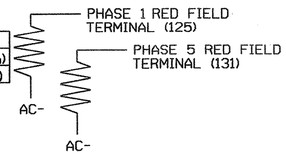
(program controller as shown below)

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

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: 03-0435
DESIGNED: March 2007
SEALED: 3/3/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (College Road) at SR 1175 (S. Kerr Ave.) and Peachtree Ave.

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY:
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

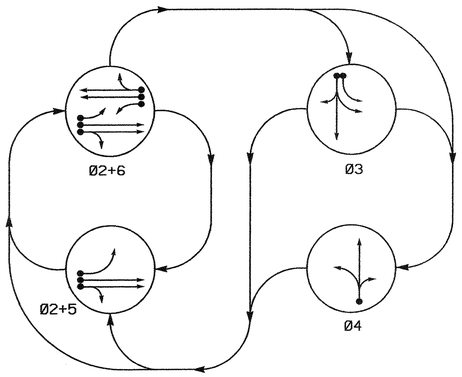
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE: George C. Brown DATE: 3/10/08
SIG. INVENTORY NO. 03-0435

06-MAR-2008 10:48
s:\ws\signals\working\cupdesig\member\wm03-0435.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	3161.33

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

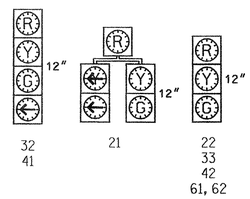
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø3	Ø4	FLASH
21	G	G	R	R	Y
22	G	G	R	R	Y
32	R	R	G	R	R
33	R	R	G	R	R
41	R	R	R	G	R
42	R	R	R	G	R
61, 62	R	G	R	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.



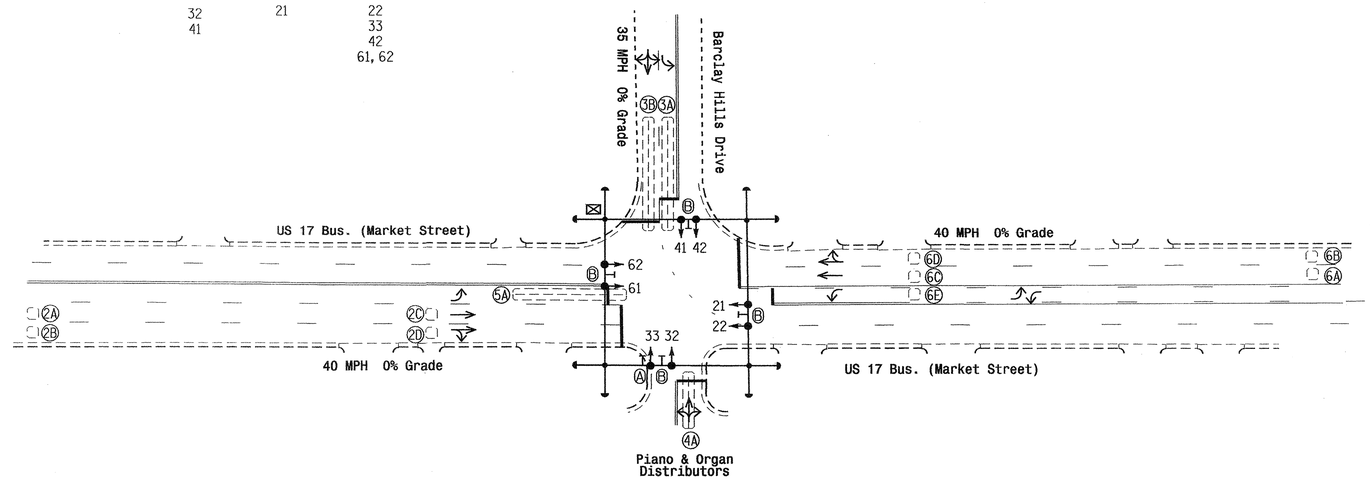
2070L LOOP & DETECTOR INSTALLATION

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
2A, 2B	6X6	300	Existing	-	2	Y	Y	-	1.4	—	-	Y
2C, 2D	6X6	90	Existing	-	2	Y	Y	-	—	—	-	Y
3A	6X60	+17	2-4-2	-	3	Y	Y	-	—	3	-	Y
3B	6X60	+5	2-4-2	-	3	Y	Y	-	—	10	-	Y
4A	6X60	+5	2-4-2	-	4	Y	Y	-	—	5	-	Y
5A	6X60	+10	2-4-2	-	5	Y	Y	-	—	15	-	Y
					2	Y	Y	-	—	—	-	Y
6A, 6B	6X6	285	Existing	-	6	Y	Y	-	1.3	—	-	Y
6C, 6D	6X6	75	Existing	-	6	Y	Y	-	—	—	-	Y
6E	6X6	75	Existing	-	6	Y	Y	-	—	—	-	Y

4 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+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. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal System system data: Controller Asset #: 0440.



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	
A	Dual Turn and Through Arrows Sign (R3-19)	A
B	Street Sign	B

2070L TIMING CHART

FEATURE	PHASE 2	3	4	5	6
Min Green 1 *	12	7	7	7	12
Extension 1 *	2.0	1.0	2.0	1.0	2.0
Max Green 1 *	60	30	30	20	60
Yellow Clearance	4.2	3.8	3.2	3.0	4.2
Red Clearance	1.0	1.5	2.0	1.8	1.0
Red Revert	5.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	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.

Signal Upgrade

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

SCALE 0 40 1"=40'

US 17 Bus. (Market St.)
at
Barclay Hills Drive and
Piano & Organ Distributors Ent.
Division 3 New Hanover County Wilmington

PLAN DATE: December 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

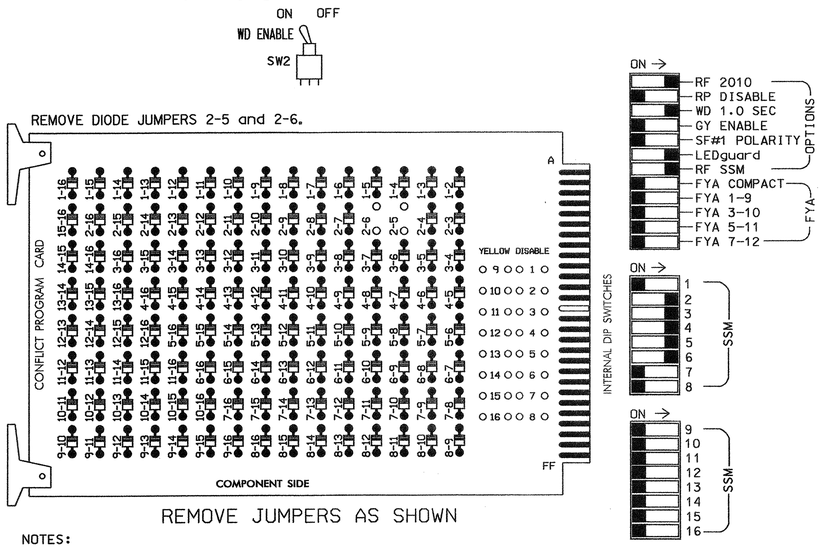
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE
SIG. INVENTORY NO. 03-0440

11-JUN-2008 16:08
s:\its\signal\workgroups\alexander\u-5017 (wilmington city system)\03-0440\03040_sig_dsn_20080611.dgn
zziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig.134

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 1,7,8, 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. 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.	NU	21,22	NU	32	33	41	42	NU	21	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														
YELLOW ARROW									132					
GREEN ARROW				118		103			133					

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S3,S4,S5,S6
PHASES USED.....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 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	SLOT EMPTY	Ø2 2A,2B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2C,2D				Ø3 3B	NOT USED							ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B	Ø6 6E	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6C,6D	NOT USED											

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,2B	TB2-5,6	I2U	39	1	2	2	Y	Y		1.4	
2C,2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			10
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			5
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		1.3	
6C,6D	TB3-7,8	J2L	44	6	16	6	Y	Y			
6E	TB3-9,10	J3U	64	26	36	6	Y	Y			

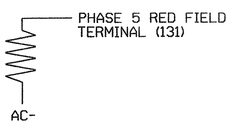
[1] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

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 red monitor input 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: 03-0440
DESIGNED: December 2007
SEALED: 06/11/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
750 N. Greenfield Parkway, Garner, NC 27529

US 17 Bus. (Market St.)
at
Barclay Hills Drive and
Piano & Organ Distributors Ent.

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

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

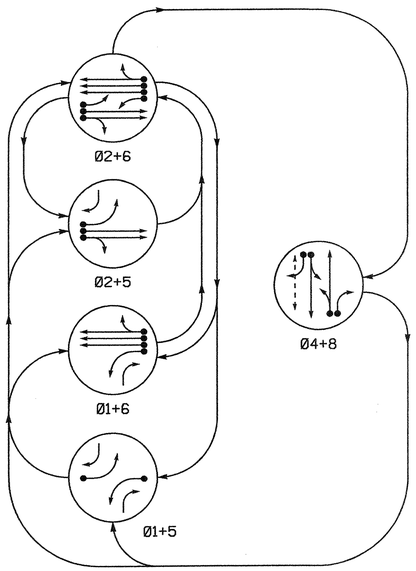
SIGNATURE 7-1-08 DATE

SIG. INVENTORY NO. 03-0440

26-JUN-2008 08:18
s:\traffic\signal\workgroups\sig mon\petersonm\030440_smlele.xxx.dgn
petersonm

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A.135

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	04+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
43	R	R	R	R	G	R
61	R	G	R	G	R	Y
62, 63	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R	R	R	R	G	R
P41, P42	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

Denotes L.E.D.

2070L 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	6X60	0	2-4-2	–	1	Y	Y	–	–	15	–	Y
					6	Y	Y	–	–	–	–	Y
2A	6X16	330	EXISTING	–	2	Y	Y	–	1.6	–	–	Y
2B	6X30	90	EXISTING	–	2	Y	Y	–	–	–	–	Y
4A	6X60	+5	2-4-2	–	4	Y	Y	–	–	–	–	Y
5A	6X60	+5	2-4-2	–	5	Y	Y	–	–	15	–	Y
					2	Y	Y	–	–	–	–	Y
5B	6X60	+5	2-4-2	–	5	Y	Y	–	–	10	–	Y
6A,6B,6C	6X6	300	EXISTING	–	6	Y	Y	–	1.6	–	–	Y
6D,6E,6F	6X6	90	EXISTING	–	6	Y	Y	–	–	–	–	Y
8A	6X60	+5	2-4-2	–	8	Y	Y	–	–	3	–	Y
8B	6X60	+5	2-4-2	–	8	Y	Y	–	–	10	–	Y
S1	6X6	+245	EXISTING	–	–	–	–	–	–	–	Y	Y
S2	6X6	+245	EXISTING	–	–	–	–	–	–	–	Y	Y

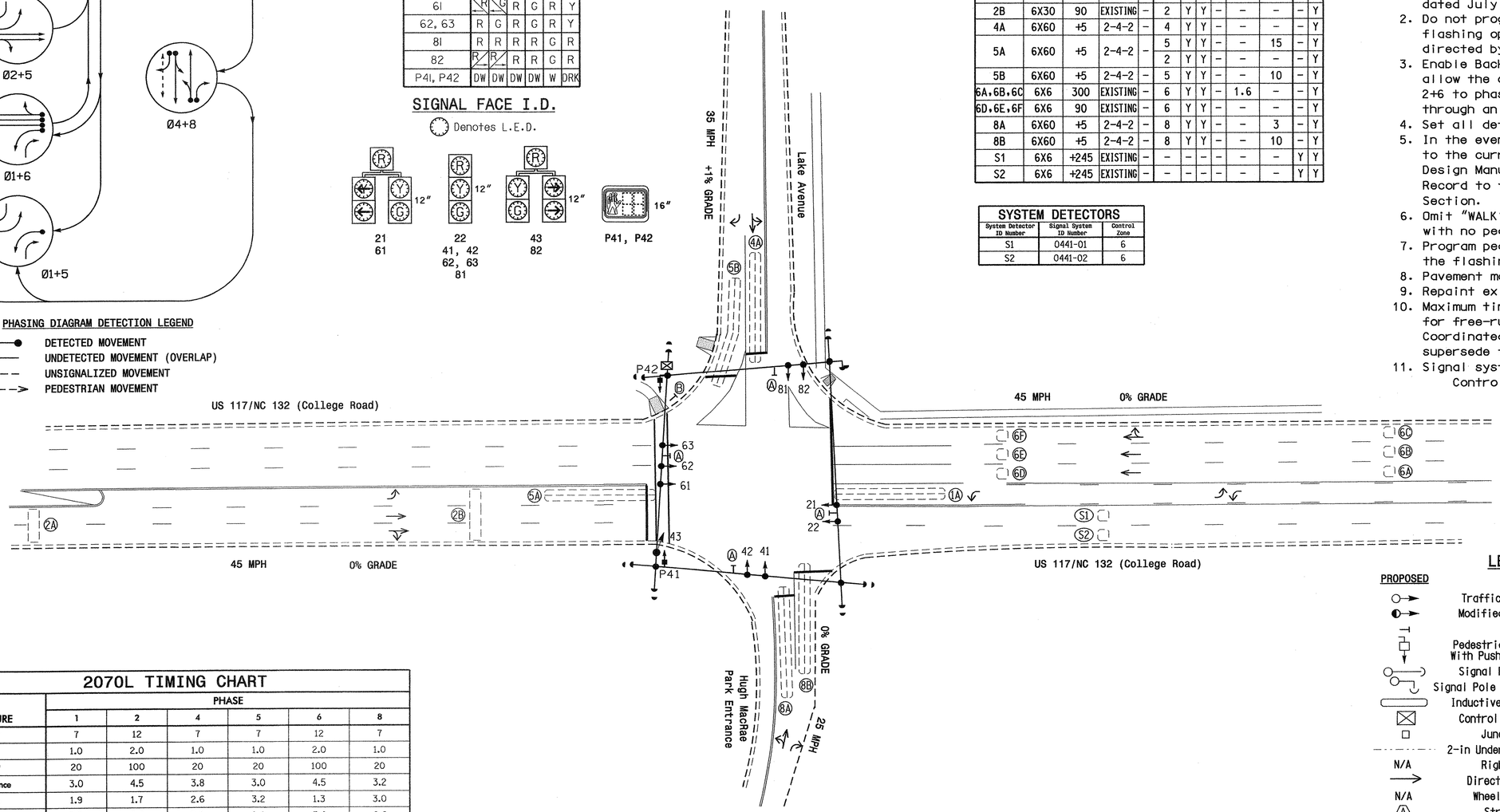
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0441-01	6
S2	0441-02	6

5 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. Repaint existing stopbars.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0441.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
	Street Sign	
	"YIELD TO PEDESTRIAN" Sign	

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	1.0	2.0	1.0	1.0	2.0	1.0
Max Green 1 *	20	100	20	20	100	20
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.2
Red Clearance	1.9	1.7	2.6	3.2	1.3	3.0
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	–	–	4	–	–	–
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	–	–	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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
Department of Transportation
State of North Carolina
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 1"=40' (0 – 40)

US 117/NC 132 (College Road) at Lake Avenue and Entrance to Hugh MacRae Park
Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

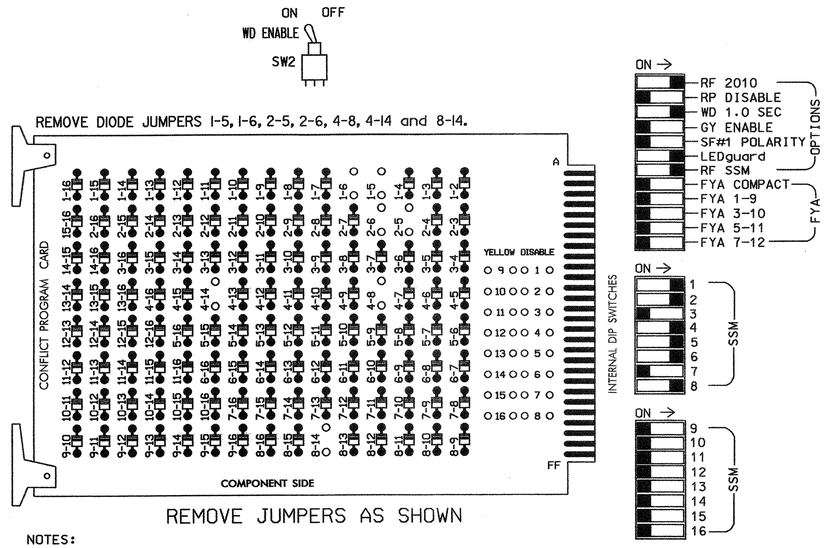
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZELMER
SIGNATURE 3/3/08 DATE
SIG. INVENTORY NO. 03-0441

03-MAR-2008 13:12
s:#ts signals#workgroups#alexander#u-5017 (wilmington city system)#03-0441#030441.dgn
2:2 (2:2)

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.136

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø1	Ø2	SLOT	SLOT	Ø4	SLOT	SLOT	SYS. DET. S1	SLOT	SLOT	NOT USED	SLOT	FS DC ISOLATOR
		EMPTY	1A	2A	EMPTY	EMPTY	4A	EMPTY	EMPTY		EMPTY	EMPTY		EMPTY	
	L	EMPTY	Ø6	Ø2	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	SYS. DET. S2	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	EMPTY	ST DC ISOLATOR
			1A	2B											
FILE "J"	U	Ø5	Ø5	Ø6	SLOT	SLOT	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5B	5A	6A,6B,6C	EMPTY	EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	Ø2	Ø6			Ø8								
			5A	6D,6E,6F			8B								

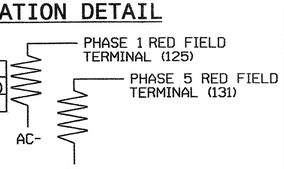
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

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.

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 3,7,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 4 for 'STARTUP PED CALL'.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S4P,S5,S6,S8
PHASES USED.....1,2,4,4 PED,5,6,8
OVERLAPS.....NONE

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y		1.6	
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
5B	TB3-1,2	J1U	55	17	5	5	Y	Y			10
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	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			10
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.
[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

* 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

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.	61,82	21,22	NU	NU	41 42,43	P41, P42	21,43	61 62,63	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
✋						104						
🚶						106						

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.

BACKUP PROTECTION NOTE

(program controller as shown below)

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

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: 03-0441
DESIGNED: March 2007
SEALED: 3/3/08
REVISED:

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (College Road)
at
Lake Avenue and
Entrance to Hugh MacRae Park

Division 3 | New Hanover County | Wilmington

PLAN DATE: October 2007	REVIEWED BY:	T.J.Y.	
PREPARED BY: G. C. Brown	REVIEWED BY:		

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

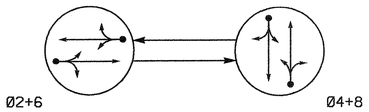
George C. Brown 3/11/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0441

05-MAR-2008 12:14
s:#rts signalsworkgroupsesig monitorowen03-0441.dgn
$$$$open

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.137

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
2I, 22	G	R	Y
4I, 42	R	G	R
6I, 62	G	R	Y
8I, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

2I, 22
6I, 62

4I, 42
8I, 82

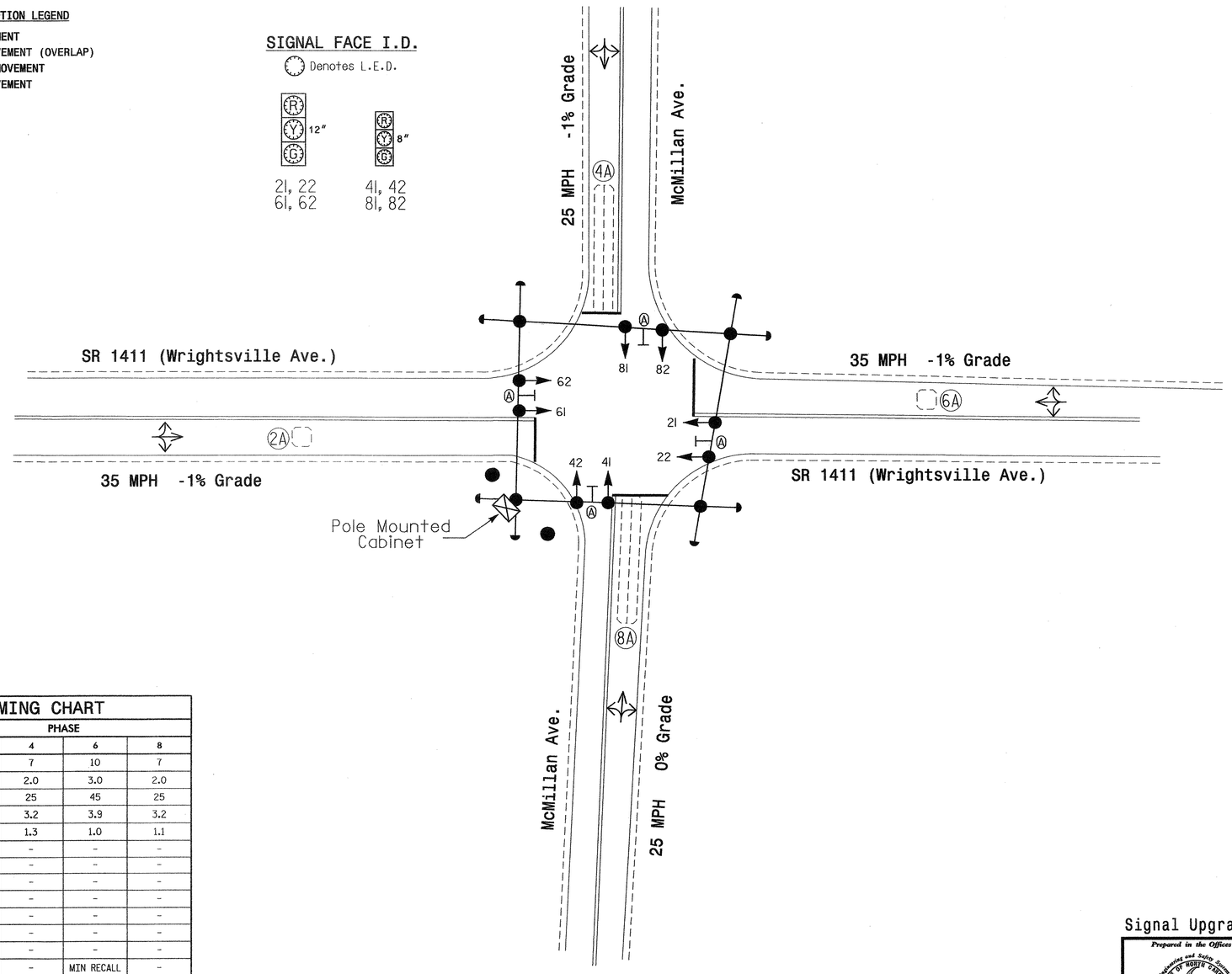
2070L LOOP & DETECTOR INSTALLATION

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
2A	6X6	70	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	——	3	-	Y
6A	6X6	70	Existing	-	6	Y	Y	-	——	——	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	——	3	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
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: # 0483.



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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	45	25	45	25
Yellow Clearance	3.9	3.2	3.9	3.2
Red Clearance	1.0	1.3	1.0	1.1
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
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

* 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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20 1"=20'

SR 1411 (Wrightsville Avenue)
at
McMillan Avenue

Division 3 New Hanover County Wilmington

PLAN DATE: February 2008 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

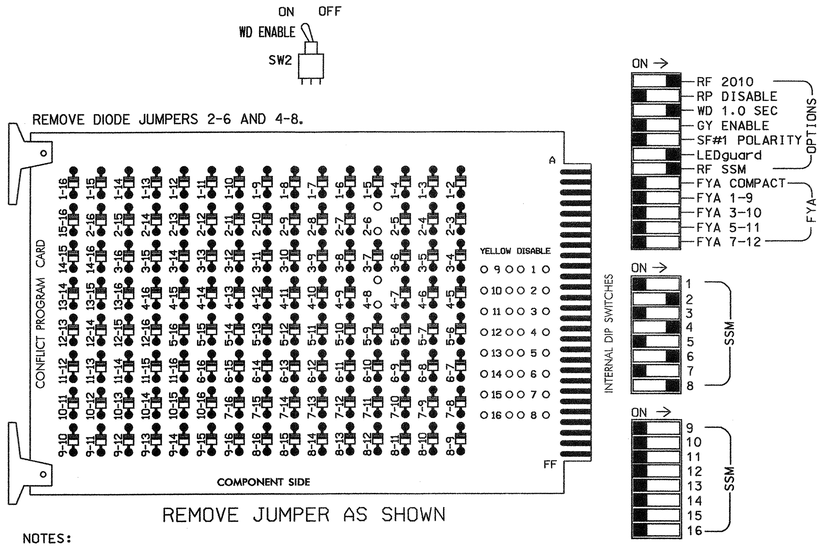
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 5/20/08
SIG. INVENTORY NO. 03-0483

20-MAY-2008 15:56
s:\traffic\signal\Working\groups\alexander\u-5017(wilmington city system)\03-0483\03-0483_sig_dsn_20080520.dgn
r2tembo

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.138

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPER 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 1,3,5,7,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. 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.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S6,S8
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			3
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0483
DESIGNED: Feb. 2008
SEALED: 5/20/08
REVISED: N.A.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1411 (Wrightsville Ave.) at McMillan Avenue

Division 03 New Hanover County Wilmington

PLAN DATE: May 2008 REVIEWED BY: T. Jan
PREPARED BY: A.A. Klooz REVIEWED BY:

REVISIONS INIT. DATE

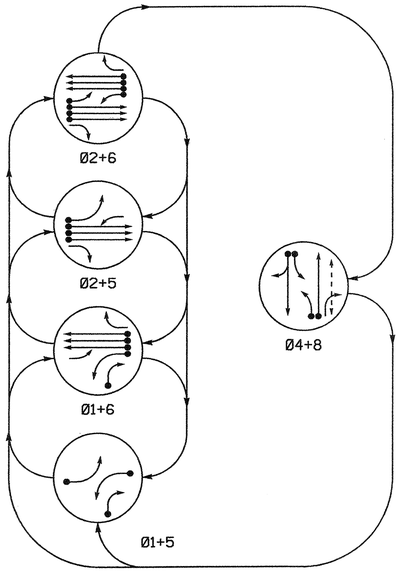
Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Department of Transportation
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 5-21-08
SIG. INVENTORY NO. 03-0483

21-MAY-2008 10:38
S:\traffic\Signal\Work\groups\design manual\klooz\03483_sm_ela_2008mod.dgn
klooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5A.1137

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	04+8	FLASH
11	←	←	↓Y	↓Y	R	R
22, 23, 24	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	↓Y	←	↓Y	R	R
62, 63, 64	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/→	R/→	R	R	G	R
P81, P82	DW	DW	DW	DW	W	DRK

STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO ↓Y 1	TO ↓Y 2	TO R 1	TO R 2
←	←	←	↓Y	R	↓Y	R
↓Y	↓Y	↓Y	↓Y	↓Y	↓Y	R
R	R	R	R	R	R	R

↓Y = FLASHING YELLOW ARROW

SIGNAL FACE I.D.

Denotes L.E.D.

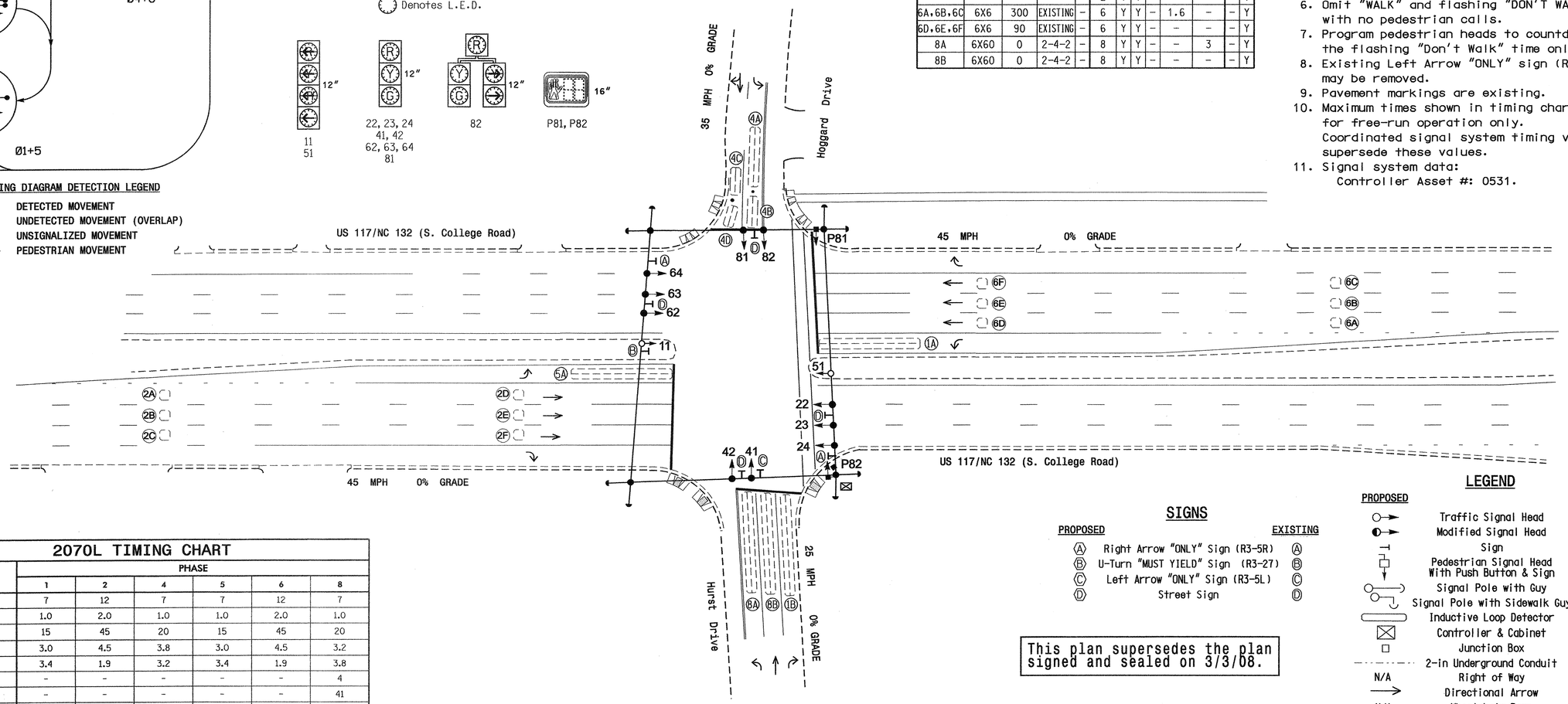
2070L LOOP & DETECTOR INSTALLATION

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	6X60	0	2-4-2	–	1	Y	Y	–	–	10	–	Y
					6	Y	Y	–	–	–	–	Y
1B	6X60	0	2-4-2	–	1	Y	Y	–	–	15	–	Y
2A,2B,2C	6X6	300	EXISTING	–	2	Y	Y	–	1.6	–	–	Y
2D,2E,2F	6X6	90	EXISTING	–	2	Y	Y	–	–	–	–	Y
4A	6X36	24	2-4-2	–	4	Y	Y	–	–	–	–	Y
4B	6X19	0	2-4-2	–	4	Y	Y	–	–	3	–	Y
4C	6X19	20	2-4-2	–	4	Y	Y	–	–	5	–	Y
4D	6X13	0	2-4-2	–	4	Y	Y	–	–	10	–	Y
5A	6X60	0	2-4-2	–	5	Y	Y	–	–	10	–	Y
					2	Y	Y	–	–	–	–	Y
6A,6B,6C	6X6	300	EXISTING	–	6	Y	Y	–	1.6	–	–	Y
6D,6E,6F	6X6	90	EXISTING	–	6	Y	Y	–	–	–	–	Y
8A	6X60	0	2-4-2	–	8	Y	Y	–	–	3	–	Y
8B	6X60	0	2-4-2	–	8	Y	Y	–	–	–	–	Y

5 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Existing Left Arrow "ONLY" sign (R3-5L) may be removed.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0531.



SIGNS

PROPOSED		EXISTING
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓑ
Ⓒ	Left Arrow "ONLY" Sign (R3-5L)	Ⓒ
Ⓓ	Street Sign	Ⓓ

This plan supersedes the plan signed and sealed on 3/3/08.

LEGEND

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

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	1.0	2.0	1.0	1.0	2.0	1.0
Max Green 1 *	15	45	20	15	45	20
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.2
Red Clearance	3.4	1.9	3.2	3.4	1.9	3.8
Walk 1 *	–	–	–	–	–	4
Don't Walk 1	–	–	–	–	–	41
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

* 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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Road) at Hoggard Drive / Hurst Drive

Division 3 New Hanover County Wilmington

PLAN DATE: March 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

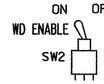
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 5/16/08
SIG. INVENTORY NO. 03-0531

16-MAY-2008 10:23
st#its signalsworkgroups#alexander#u-5017 (wilmington city system)#03-0531#030531_sig_dsn_20080516.dgn
rzziemba

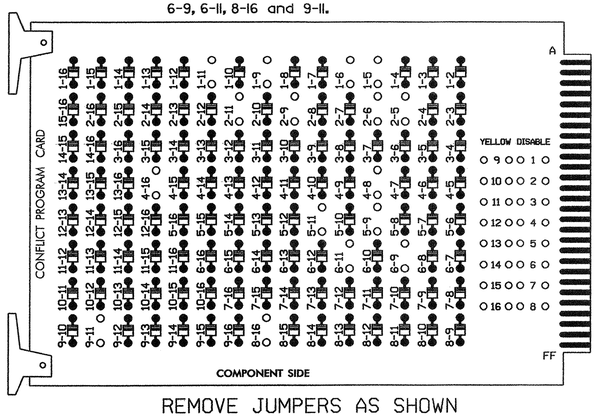
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.140

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

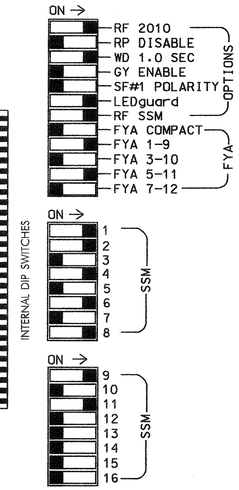
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, 2-5, 2-6, 2-9, 2-11, 4-8, 4-16, 5-9, 5-11 6-9, 6-11, 8-16 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

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,2B,2C	Ø1 1B	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	Ø4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	FS DC ISOLATOR
	L	NOT USED	Ø2 2D,2E,2F	NOT USED			Ø4 4B	Ø4 4D						Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B,6C	SOT EMPTY	WIRED INPUT ⊗	SOT EMPTY	Ø8 8A	SOT EMPTY	SOT EMPTY	SOT EMPTY	SOT EMPTY	SOT EMPTY	SOT EMPTY	SOT EMPTY	SOT EMPTY
	L	NOT USED	Ø6 6D,6E,6F				Ø8 8B								

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

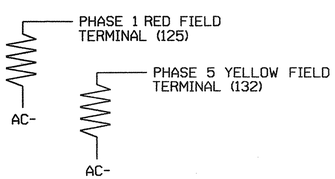
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



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 3,5,7, 10,12,13,14,15 & 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phase 8 for 'STARTUP PED CALL'.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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,S8P,S9,S12.
PHASES USED.....1,2,4,5,6,8,8PED.
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

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			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2D,2E,2F	TB2-7,8	I2L	43	5	12	2	Y	Y			
1B	TB2-9,10	I3U	63	25	32	1	Y	Y			15
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			3
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			5
4D	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y		1.6	
6D,6E,6F	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			

[1] Add jumper from I1W to J4W, on rear of input file.
[2] Add jumper from J1W to I4W, on rear of input file.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0531
DESIGNED: March 2008
SEALED: 5-16-08
REVISED: N.A.

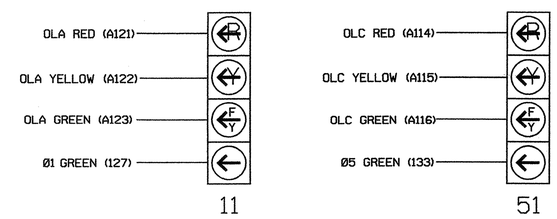
SIGNAL HEAD HOOK-UP CHART

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★	82	22,23 24	NU	NU	41,42	NU	51	62,63 64	NU	NU	81,82	P81, P82	11	NU	NU	51	NU	NU
RED		✳	128			101			134			107							
YELLOW			129			102		✳	135			108							
GREEN			130			103			136			109							
RED ARROW														A121			A114		
YELLOW ARROW		126												A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127						133											
✋													110						
🚶													112						

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 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.

This Detail Supersedes the Detail Signed and sealed on 3-11-08

Signal Upgrade ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117/NC 132 (S. College Road) at Hoggard Drive / Hurst Drive

Division 03 New Hanover County Wilmington

PLAN DATE: 5-06-08 REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals Management Section, Department of Transportation, State of North Carolina
750 N. Greenfield Pwky, Garner, NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 6/9/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0531

16-MAY-2008 16:29
s:\its\signals\workgroups\sig monksspaulding\in-progress\030531_sm_ele_2008xx.dgn
dsspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5B.141

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:            |123456789101112131415 16
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
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:            |123456789101112131415 16
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

This Detail Supersedes the Detail
Signed and sealed on 3-11-08

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0531
DESIGNED: March 2008
SEALED: 5-16-08
REVISED: N.A.

Signal Upgrade — ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117/NC 132 (S. College Road)
at
Hoggard Drive / Hurst Drive

Division 03 — New Hanover County — Wilmington

PLAN DATE: 5-06-08 — REVIEWED BY: D.T. Joyce DTJ

PREPARED BY: D.H. Spaulding — REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
759 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

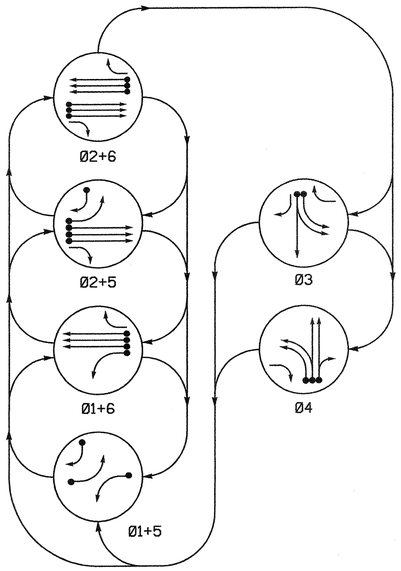
George C. Brown 6/9/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0531

16-MAY-2008 16:30
c:\pw_work\groupsdsig mon#spoulding#in-progress#030531_sm_ela_2008xx.dgn
dspoulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5B.142

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

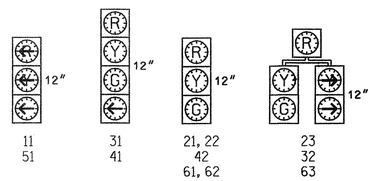
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	↚	↚	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	Y
23	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	G/←	R	R
42	R	R	R	R	R	G	R
51	↚	~~R~~	↚	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y
63	R	G	R	G	R/←	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

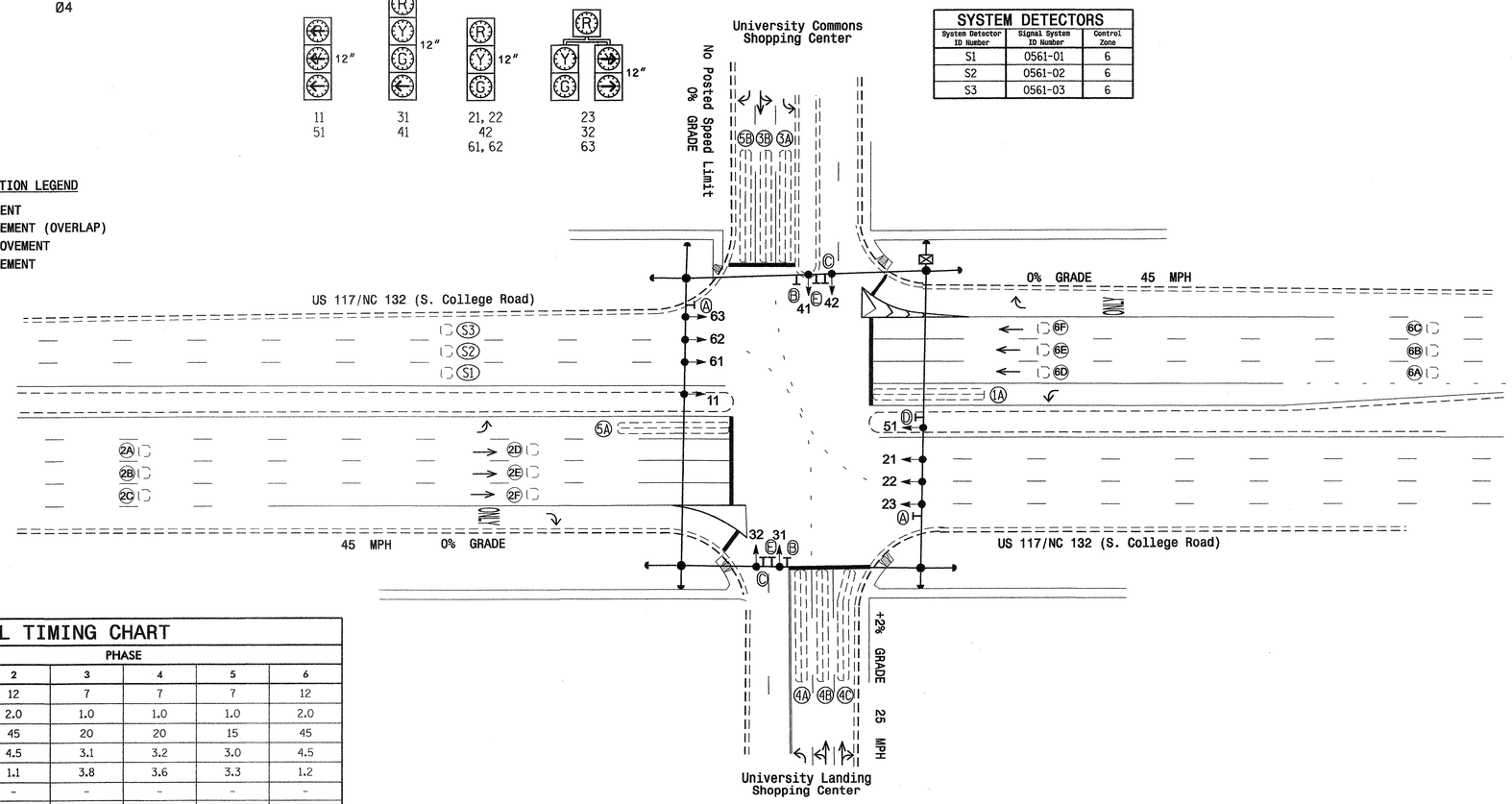


2070L LOOP & DETECTOR INSTALLATION

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	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A,2B,2C	6X6	300	Existing	-	2	Y	Y	-	1.6	-	-	Y
2D,2E,2F	6X6	90	Existing	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
3B	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4C	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B,6C	6X6	300	Existing	-	6	Y	Y	-	1.6	-	-	Y
6D,6E,6F	6X6	90	Existing	-	6	Y	Y	-	-	-	-	Y
S1	6X6	+270	Existing	-	-	-	-	-	-	-	Y	Y
S2	6X6	+270	Existing	-	-	-	-	-	-	-	Y	Y
S3	6X6	+270	Existing	-	-	-	-	-	-	-	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0561-01	6
S2	0561-02	6
S3	0561-03	6



2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	1.0	2.0	1.0	1.0	1.0	2.0
Max Green 1 *	15	45	20	20	15	45
Yellow Clearance	3.0	4.5	3.1	3.2	3.0	4.5
Red Clearance	3.2	1.1	3.8	3.6	3.3	1.2
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* 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.

6 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Renumber existing loops and signal heads as shown for new phasing.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0561.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Combined Through and Left Arrow Sign (R3-6L)	Ⓒ
Ⓓ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓓ
Ⓔ	Street Sign	Ⓔ

Signal Upgrade

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

SCALE 0 40 1"=40'

US 117/NC 132 (S. College Rd.)
at
University Landing / University Commons
Division 3 New Hanover County Wilmington

PLAN DATE:	March 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

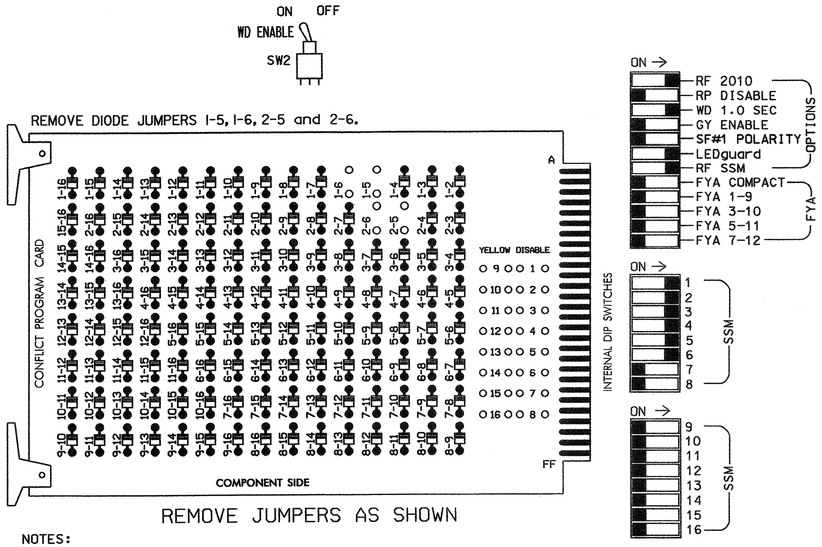
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 9/3/08 DATE
SIG. INVENTORY NO. 03-0561

03-MAR-2008 14:58
s:\traffic\signals\workgroups\alexander\u-5017 (wilmington city system)\03-0561\03-0561_sig_dsn_20080303.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	96.143

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 7,8,9, 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. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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	21 22,23	NU	31	32	63	41	42	23	NU	51	32	61 62,63	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	125										131						
YELLOW ARROW	126					117			102		132	132					
GREEN ARROW	127			118		118	103		103		133	133					

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	Ø 1 1A	Ø 2 2A,2B,2C	Ø 3 3A	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	Ø 4 4C	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 2 2D,2E,2F	Ø 3 3B			Ø 4 4B	NOT USED		SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 5 5A	Ø 6 6A,6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 5 5B	Ø 6 6D,6E,6F						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
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2D,2E,2F	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB2-9,10	I3U	63	25	32	3	Y	Y			
3B	TB2-11,12	I3L	76	38	42	3	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			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			10
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6D,6E,6F	TB3-11,12	J3L	77	39	46	6	Y	Y			
* 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					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0561
DESIGNED: March 2007
SEALED: 3/3/08
REVISED:

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

US117/NC 132 (S. College Rd.)
at
University Landing/
University Commons

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY: T. Jyle
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

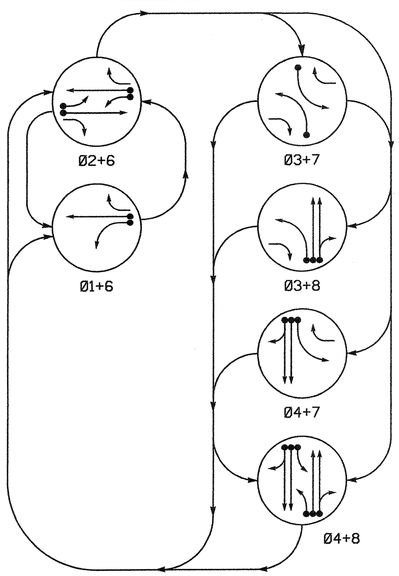
George C. Brown 3/10/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0561

06-MAR-2008 09:33
s:\its signals\workgroups\sig management\03-0561.dgn
GCBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	36.144

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

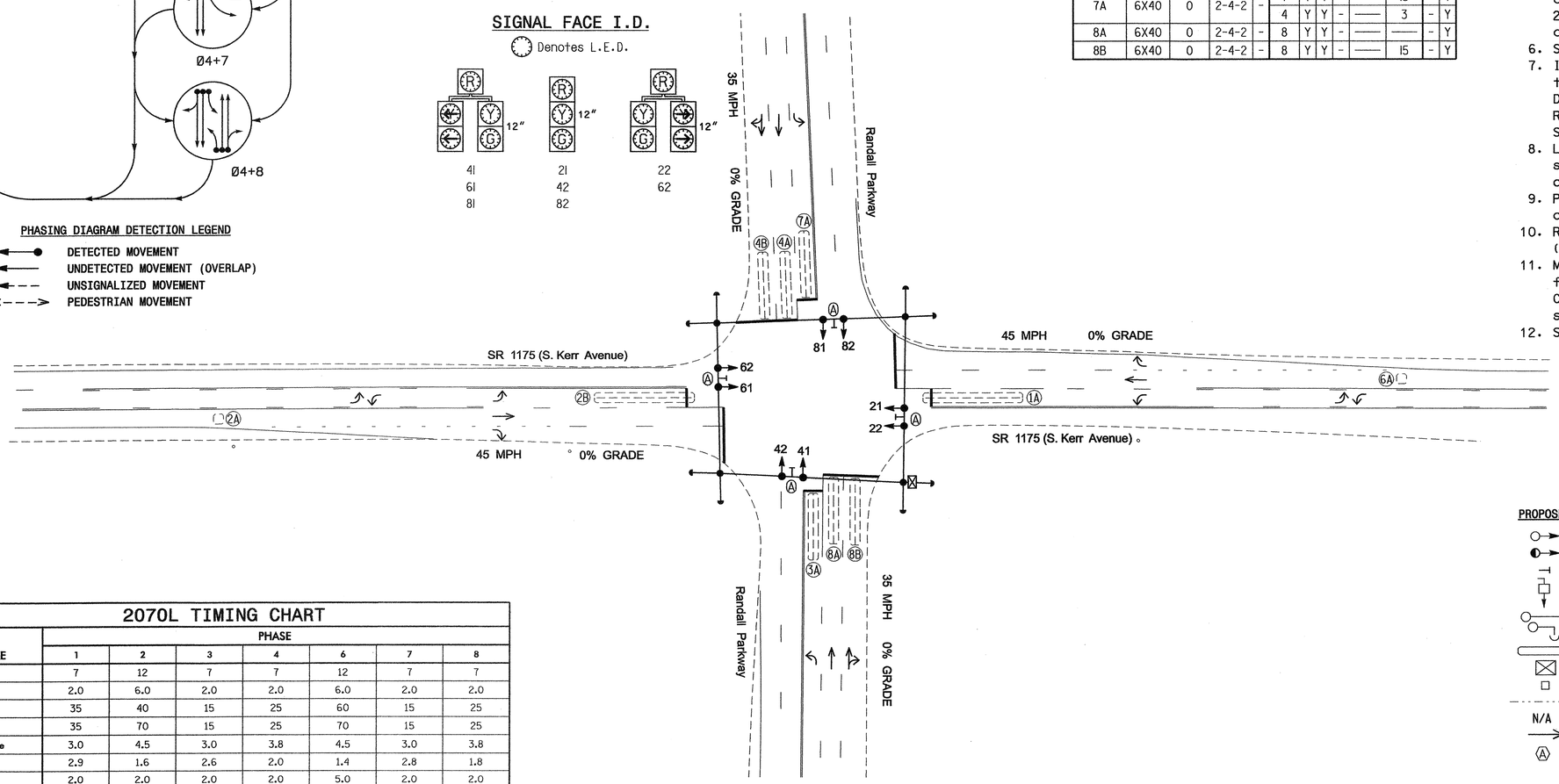
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	03+7	03+8	04+7	04+8	FLASH
21	R	G	R	R	R	R	Y
22	R	G	R/G	R/G	R	R	Y
41	R	R	R/G	R	G/R	G	R
42	R	R	R	R	G	G	R
61	G/R	G	R	R	R	R	Y
62	G	G	R/G	R	R/G	R	Y
81	R	R	R/G	G/R	R	G	R
82	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	6X60	+5	2-4-2	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	Y	—	3	-	Y
2A	6X6	300	Existing	-	2	Y	Y	-	—	—	-	Y
2B	6X60	+5	2-4-2	-	2	Y	Y	Y	—	3	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	—	15	-	Y
					8	Y	Y	-	—	3	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	—	—	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	—	15	-	Y
6A	6X6	300	Existing	-	6	Y	Y	-	—	—	-	Y
7A	6X40	0	2-4-2	-	7	Y	Y	-	—	15	-	Y
					4	Y	Y	-	—	3	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	—	—	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	—	15	-	Y

6 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing unless otherwise noted.
10. Repaint existing stopbars on SR 1175 (S. Kerr Ave.).
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Signal system data:
    Controller Asset #: 0605.

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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	6	7	8
Min Green 1 *	7	12	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	35	40	15	25	60	15	25
Max Green 2 *	35	70	15	25	70	15	25
Yellow Clearance	3.0	4.5	3.0	3.8	4.5	3.0	3.8
Red Clearance	2.9	1.6	2.6	2.0	1.4	2.8	1.8
Red Revert	2.0	2.0	2.0	2.0	5.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-
Seconds Per Actuation *	-	2.5	-	-	2.5	-	-
Max Variable Initial *	-	30	-	-	30	-	-
Time Before Reduction *	-	10	-	-	10	-	-
Time To Reduce *	-	25	-	-	25	-	-
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	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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1175 (S. Kerr Avenue) at Randall Parkway

Division 3 New Hanover County Wilmington

PLAN DATE:	September 2007	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

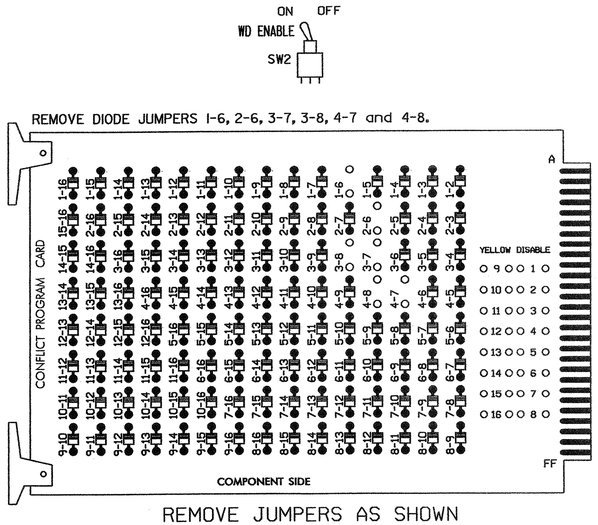
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 4/7/08
SIG. INVENTORY NO. 03-0605

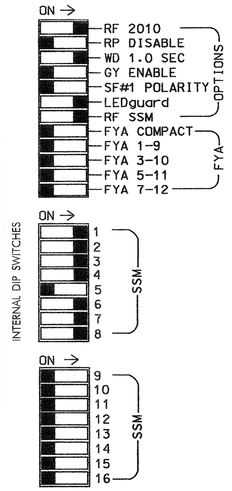
07-APR-2008 17:31
s:\ts signals\workgroups\alexander\u-5017 (wilmington city system)\03-0605\03060 5_sig_dsn_20080407.dgn
rziemba

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 5,9,10, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
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	22,81	41,42	NU	NU	61,62	NU	41,62	81,82	NU
RED	*	128		*	101			134		*	107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126			117						123		
GREEN ARROW	127			118						124		

NU = Not Used

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

EQUIPMENT INFORMATION

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

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program 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	SLOT	Ø1 / 1A	Ø2 / 2A	SLOT	SLOT	Ø3 / 3A	Ø4 / 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS / DC ISOLATOR
	L	EMPTY	Ø6 / 1A	Ø2 / 2B	EMPTY	EMPTY	Ø8 / 3A	Ø4 / 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST / DC ISOLATOR
FILE "J"	U	SLOT	Ø6 / 6A	SLOT	SLOT	SLOT	Ø7 / 7A	Ø8 / 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	Ø4 / 7A	Ø8 / 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	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	Y		3
3A[2]	TB4-9,10	I6U	41	3	4	3	Y	Y			15
	TB4-11,12	I6L	45	7	14	8	Y	Y			3
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A[3]	TB5-9,10	J6U	42	4	8	7	Y	Y			15
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			
8B	TB7-3,4	J7L	79	41	48	8	Y	Y			15

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.
[2] Add jumpers from TB4-9 to TB4-11, and from TB4-10 to TB4-12.
[2] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦   X
OMIT PHASES     ¦  X
CALL PHASES     ¦
```

PRESS 'NEXT'

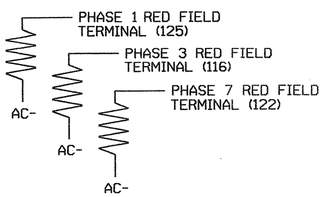
```
DYNAMIC/BACKUP CONTROL FUNCTION #02
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦      X
OMIT PHASES     ¦     X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

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: 03-0605
DESIGNED: September 2007
SEALED: 04-07-08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1175 (S. Kerr Avenue) at Randall Parkway

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008	REVIEWED BY: JTR
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Division of Highways, Department of Transportation, State of North Carolina, Signal Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 4-14-08
SIG. INVENTORY NO. 03-0605

08-APR-2008 08:39
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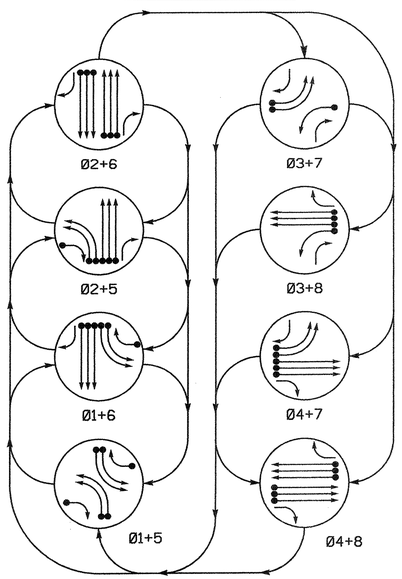
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	5B.146

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

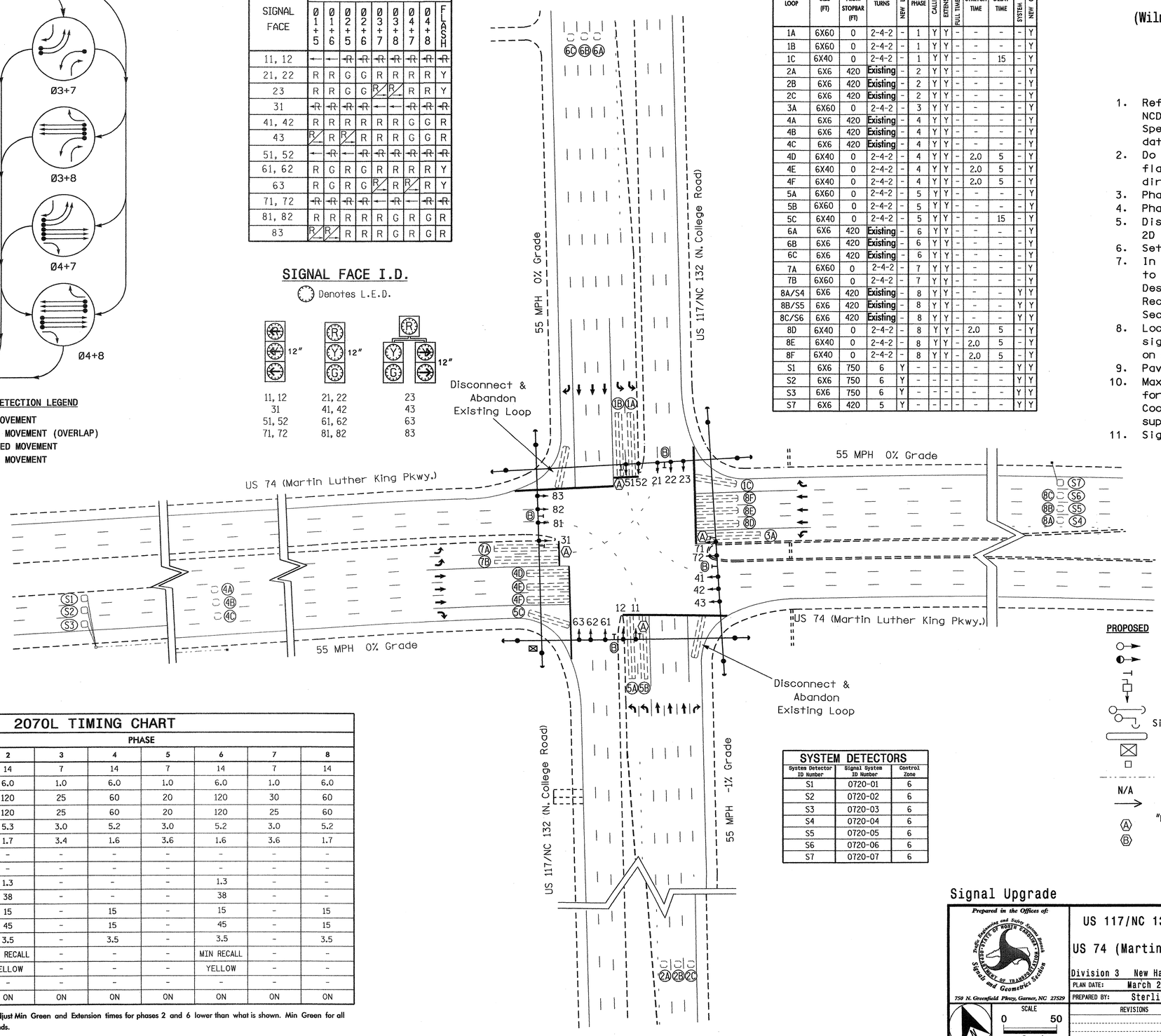
TABLE OF OPERATION

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	G	G	R/←	R/←	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
43	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
63	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
83	R/←	R/←	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

11, 12	21, 22	23
31	41, 42	43
51, 52	61, 62	63
71, 72	81, 82	83



2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1C	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	420	Existing	-	2	Y	Y	-	-	-	-	Y
2B	6X6	420	Existing	-	2	Y	Y	-	-	-	-	Y
2C	6X6	420	Existing	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X6	420	Existing	-	4	Y	Y	-	-	-	-	Y
4B	6X6	420	Existing	-	4	Y	Y	-	-	-	-	Y
4C	6X6	420	Existing	-	4	Y	Y	-	-	-	-	Y
4D	6X40	0	2-4-2	-	4	Y	Y	-	2.0	5	-	Y
4E	6X40	0	2-4-2	-	4	Y	Y	-	2.0	5	-	Y
4F	6X40	0	2-4-2	-	4	Y	Y	-	2.0	5	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5C	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	420	Existing	-	6	Y	Y	-	-	-	-	Y
6B	6X6	420	Existing	-	6	Y	Y	-	-	-	-	Y
6C	6X6	420	Existing	-	6	Y	Y	-	-	-	-	Y
7A	6X60	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
7B	6X60	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A/S4	6X6	420	Existing	-	8	Y	Y	-	-	-	Y	Y
8B/S5	6X6	420	Existing	-	8	Y	Y	-	-	-	Y	Y
8C/S6	6X6	420	Existing	-	8	Y	Y	-	-	-	Y	Y
8D	6X40	0	2-4-2	-	8	Y	Y	-	2.0	5	-	Y
8E	6X40	0	2-4-2	-	8	Y	Y	-	2.0	5	-	Y
8F	6X40	0	2-4-2	-	8	Y	Y	-	2.0	5	-	Y
S1	6X6	750	6	Y	-	-	-	-	-	-	Y	Y
S2	6X6	750	6	Y	-	-	-	-	-	-	Y	Y
S3	6X6	750	6	Y	-	-	-	-	-	-	Y	Y
S7	6X6	420	5	Y	-	-	-	-	-	-	Y	Y

8 Phase Fully Actuated (Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Disconnect and abandon existing loops 2D and 6D.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset #: 0720.

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

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	14	7	14	7	14	7	14
Extension 1 *	1.0	6.0	1.0	6.0	1.0	6.0	1.0	6.0
Max Green 1 *	30	120	25	60	20	120	30	60
Max Green 2 *	40	120	25	60	20	120	25	60
Yellow Clearance	3.0	5.3	3.0	5.2	3.0	5.2	3.0	5.2
Red Clearance	3.7	1.7	3.4	1.6	3.6	1.6	3.6	1.7
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.3	-	-	-	1.3	-	-
Max Variable Initial *	-	38	-	-	-	38	-	-
Time Before Reduction *	-	15	-	15	-	15	-	15
Time To Reduce *	-	45	-	15	-	45	-	15
Minimum Gap	-	3.5	-	3.5	-	3.5	-	3.5
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.

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0720-01	6
S2	0720-02	6
S3	0720-03	6
S4	0720-04	6
S5	0720-05	6
S6	0720-06	6
S7	0720-07	6

Signal Upgrade

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

SCALE 0 50 1"=50'

US 117/NC 132 (N. College Road) at US 74 (Martin Luther King Parkway)

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

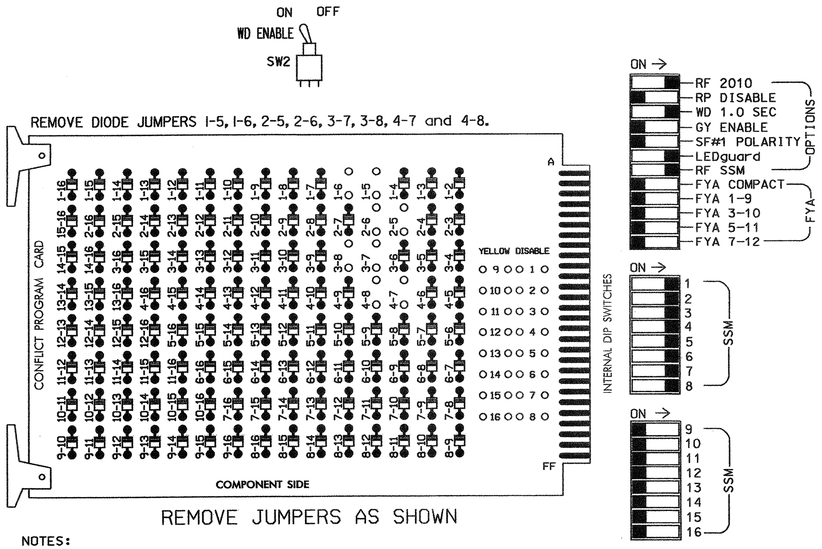
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 3/6/08 DATE
SIG. INVENTORY NO. 03-0720

06-MAR-2008 10:29
s:\traffic\signals\workgroups\wilexander\u-5017(wilmington city system)\03-0720\03720_sig_dsn_20080306.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 147

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.

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 phases 2, 4, 6 and 8, for Gap Reduction.
6. 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.	11,12	83	21, 22,23	NU	23	31	41, 42,43	NU	43	51,52	61, 62,63	NU	63	71,72	81, 82,83	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	132			123	123		
GREEN ARROW	127	127			118	118			133	133			124	124		

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

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	Ø 1	Ø 4	Ø 2	Ø 3	Ø 4	Ø 4	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
		1A	1C	4A	2A	3A	4C	4E							
	L	Ø 1	Ø 2	Ø 4	Ø 2	NOT USED	Ø 4	Ø 4		SYS. DET. S2					ST DC ISOLATOR
		1B	2C	4B	2B		4D	4F							
FILE "J"	U	Ø 5	Ø 5	Ø8/SYS	Ø 6	Ø 7	Ø8/SYS	Ø 8	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
		5A	5C	8A/S4	6A	7A	8C/S6	8E							
	L	Ø 5	Ø 6	Ø8/SYS	Ø 6	Ø 7	Ø 8	Ø 8		SYS. DET. S7					
		5B	6C	8B/S5	6B	7B	8D	8F							

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	TB2-3,4	I1L	56	18	1	1	Y	Y			
1C	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB4-1,2	I4U	47	9	22	2	Y	Y			
2B	TB4-3,4	I4L	47	9	22	2	Y	Y			
2C	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB2-9,10	I3U	63	25	32	4	Y	Y			
4B	TB2-11,12	I3L	76	38	42	4	Y	Y			
4C	TB4-9,10	I6U	41	3	4	4	Y	Y			
4D	TB4-11,12	I6L	45	7	14	4	Y	Y		2.0	5
4E	TB6-1,2	I7U	65	27	34	4	Y	Y		2.0	5
4F	TB6-3,4	I7L	78	40	44	4	Y	Y		2.0	5
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-3,4	J1L	55	17	5	5	Y	Y			
5C	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB5-1,2	J4U	48	10	26	6	Y	Y			
6B	TB5-3,4	J4L	48	10	26	6	Y	Y			
6C	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-7,8	J5L	57	19	7	7	Y	Y			
8A/S4	TB3-9,10	J3U	64	26	36	8/SYS	Y	Y			
8B/S5	TB3-11,12	J3L	77	39	46	8/SYS	Y	Y			
8C/S6	TB5-9,10	J6U	42	4	8	8/SYS	Y	Y			
8D	TB5-11,12	J6L	46	8	18	8	Y	Y		2.0	5
8E	TB7-1,2	J7U	66	28	38	8	Y	Y		2.0	5
8F	TB7-3,4	J7L	79	41	48	8	Y	Y		2.0	5
* 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					
* S7	TB7-11,12	J9L	61	23	17	SYS					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0720
DESIGNED: March 2007
SEALED: 03/06/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pwky, Garner, NC 27529

US 117/NC 132 (N. College Road)
at
US 74 (Martin Lurther King Parkway)

Division 3 New Hanover County Wilmington

PLAN DATE: October 2007 REVIEWED BY: T. Jyll
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 3/27/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0720

13-MAR-2008 07:40
s:\its signals\workgroups\sig management\cstrickland\03720_sm_ele_xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S6.148

PHASING DIAGRAM

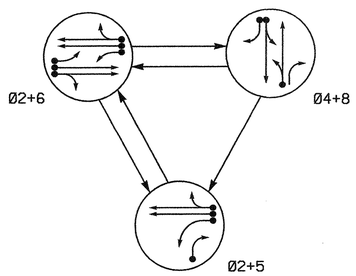


TABLE OF OPERATION

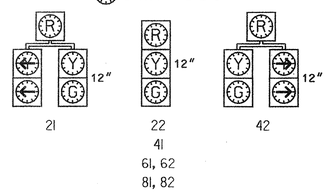
SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	G	G	R	Y
22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
61, 62	R	G	R	Y
81, 82	R	R	G	R

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

Denotes L.E.D.

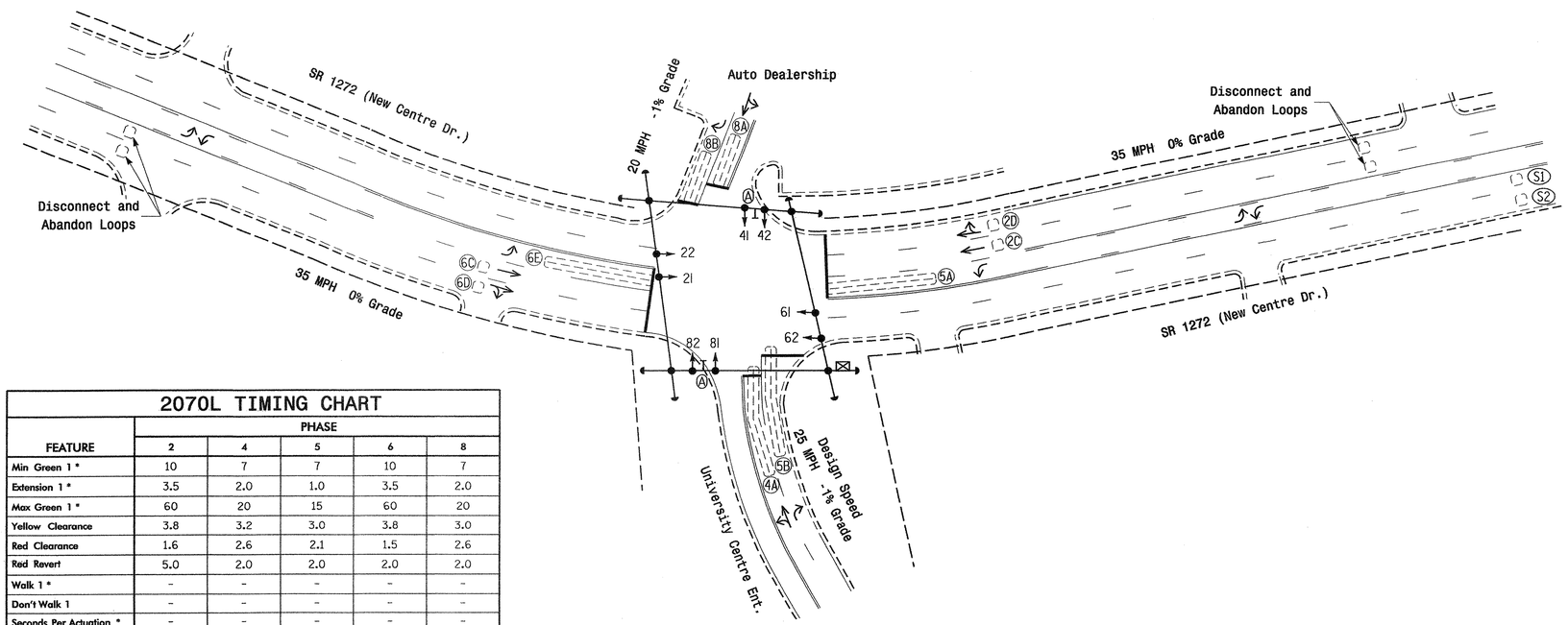


2070L LOOP & DETECTOR INSTALLATION

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
2C, 2D	6X6	90	Existing	-	2	Y	Y	-	——	——	-	Y
4A	6X60	+5	2-4-2	-	4	Y	Y	-	——	3	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	——	15	-	Y
					2	Y	Y	-	——	——	-	Y
5B	6X60	+5	2-4-2	-	5	Y	Y	-	——	15	-	Y
6C, 6D	6X6	90	Existing	-	6	Y	Y	-	——	——	-	Y
6E	6X60	0	2-4-2	-	6	Y	Y	-	——	——	-	Y
8A	6X30	0	2-4-2	-	8	Y	Y	-	——	3	-	Y
8B	6X30	0	2-4-2	-	8	Y	Y	-	——	15	-	Y
S1	6X6	+480	Existing	-	-	-	-	-	——	——	Y	Y
S2	6X6	+480	Existing	-	-	-	-	-	——	——	Y	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0784-01	6
S2	0784-02	6



2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.5	2.0	1.0	3.5	2.0
Max Green 1 *	60	20	15	60	20
Yellow Clearance	3.8	3.2	3.0	3.8	3.0
Red Clearance	1.6	2.6	2.1	1.5	2.6
Red Revert	5.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
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.

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
4. Disconnect and abandon existing loops 2A, 2B, 6A, and 6B.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Signal system data:
    Controller Asset #: 0784.

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	
	Street Sign	

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Traffic Signal Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1272 (New Centre Drive) at University Centre Entrance and Auto Dealership

Division 3 New Hanover County Wilmington

PLAN DATE: October 2007 REVIEWED BY:

PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

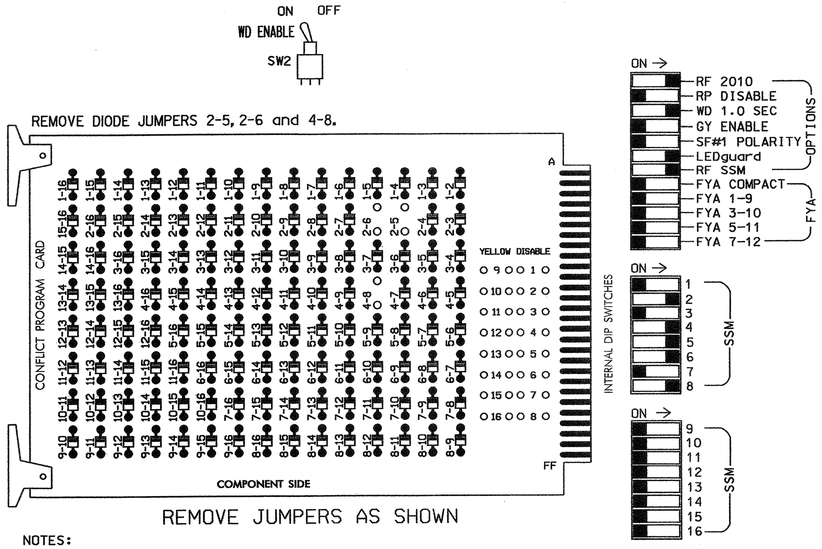
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMER
SIGNATURE 2/20/08 DATE
SIG. INVENTORY NO. 03-0784

30-APR-2008 11:39
c:\pwworking\sigmol\working\groups\#sigmol\alexander\#u-5017 (wilmington city system)\03-0784\#030784_sig_dsn_20080430.dgn
Signals
Ziemer

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	S16.149

EDI MODEL 2010ECL-NC 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 1,3,7,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmongton 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.	NU	21,22	NU	NU	41,42	NU	21,42	61,62	NU	NU	81,82	NU
RED		128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					

NU = Not Used

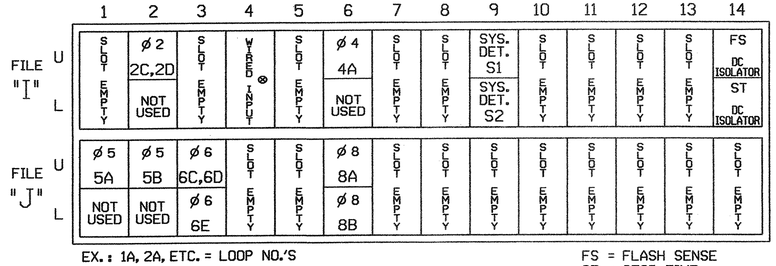
* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

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

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
2C,2D	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6C,6D	TB3-9,10	J3U	64	26	36	6	Y	Y			
6E	TB3-11,12	J3L	77	39	46	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
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					

[1] Add jumper from J1W to I4W, 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

BACKUP PROTECTION NOTE

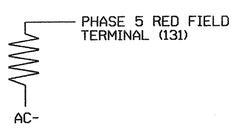
(program controller as shown below)

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.

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 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: 03-0784
DESIGNED: October 2007
SEALED: 4/30/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SR 1272 (New Centre Drive) at University Centre Entrance and Auto Dealership

Division 3 New Hanover County Wilmington

PLAN DATE: April 2008 REVIEWED BY: T. Jyll
PREPARED BY: G. C. Brown REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

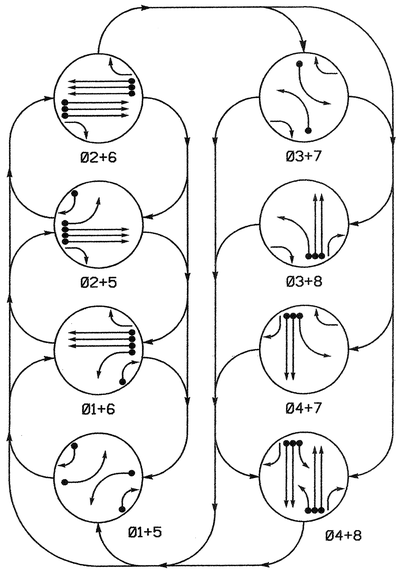
George C. Brown 5/1/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0784

01-MAY-2008 08:41
s:\its signals\workgroups\sig management\030784.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	9A.1.5D

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

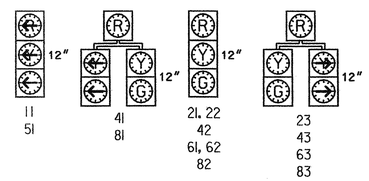
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
23	R	R	G	G	R→	R→	R	R	Y
41	R	R	R	R	→	R	→G	G	R
42	R	R	R	R	R	R	G	G	R
43	R→	R	R→	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
63	R	G	R	G	R→	R	R→	R	Y
81	R	R	R	R	R	→G	R	G	R
82	R	R	R	R	R	G	R	G	R
83	R→	R→	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



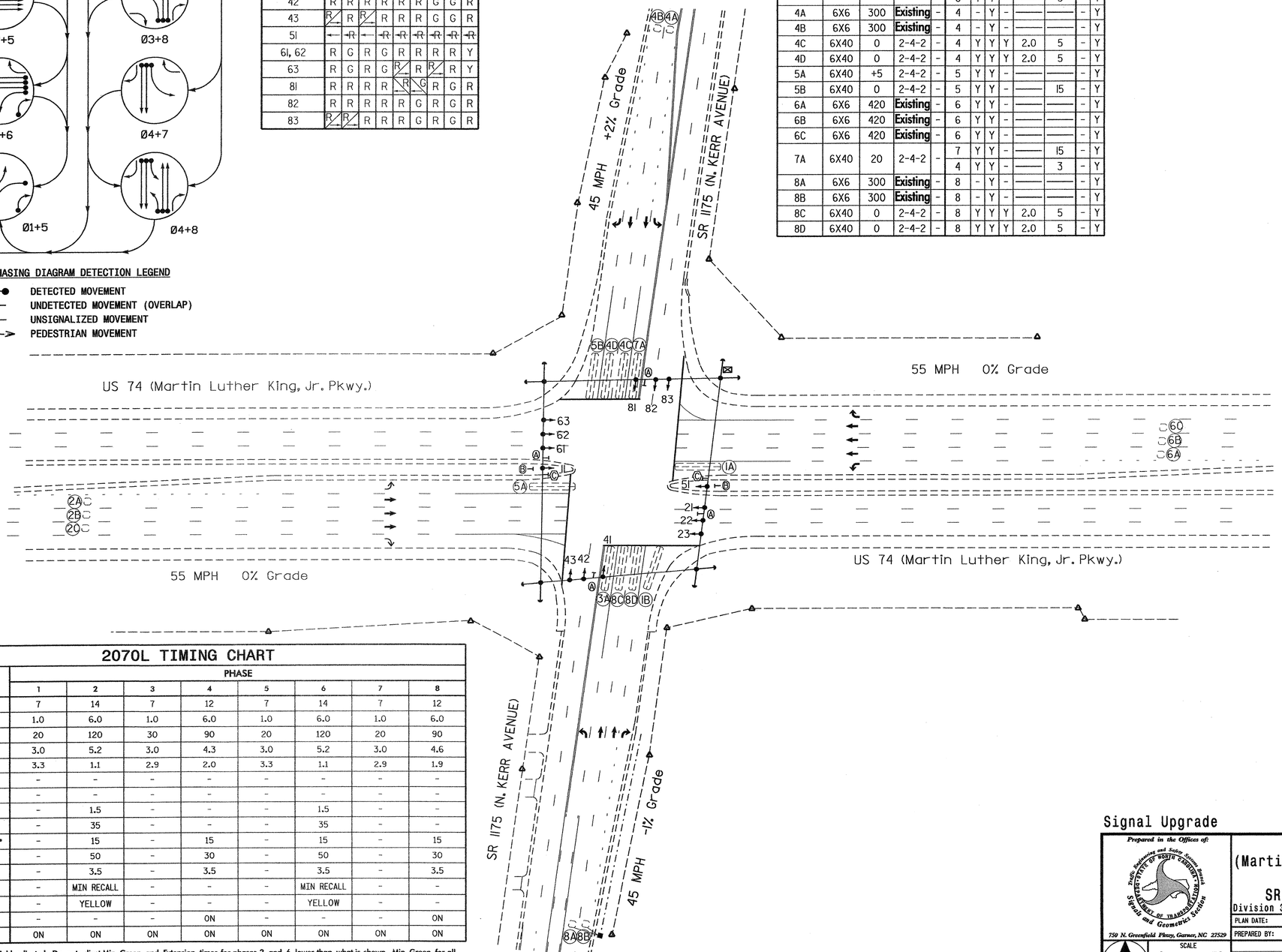
2070L LOOP & DETECTOR INSTALLATION

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	-	1	Y	Y	-	——	——	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
2A	6X6	420	Existing	-	2	Y	Y	-	——	——	-	Y
2B	6X6	420	Existing	-	2	Y	Y	-	——	——	-	Y
2C	6X6	420	Existing	-	2	Y	Y	-	——	——	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	——	15	-	Y
					8	Y	Y	-	——	3	-	Y
4A	6X6	300	Existing	-	4	-	Y	-	——	——	-	Y
4B	6X6	300	Existing	-	4	-	Y	-	——	——	-	Y
4C	6X40	0	2-4-2	-	4	Y	Y	Y	2.0	5	-	Y
4D	6X40	0	2-4-2	-	4	Y	Y	Y	2.0	5	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	——	——	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	——	15	-	Y
6A	6X6	420	Existing	-	6	Y	Y	-	——	——	-	Y
6B	6X6	420	Existing	-	6	Y	Y	-	——	——	-	Y
6C	6X6	420	Existing	-	6	Y	Y	-	——	——	-	Y
7A	6X40	20	2-4-2	-	7	Y	Y	-	——	15	-	Y
					4	Y	Y	-	——	3	-	Y
8A	6X6	300	Existing	-	8	-	Y	-	——	——	-	Y
8B	6X6	300	Existing	-	8	-	Y	-	——	——	-	Y
8C	6X40	0	2-4-2	-	8	Y	Y	Y	2.0	5	-	Y
8D	6X40	0	2-4-2	-	8	Y	Y	Y	2.0	5	-	Y

8 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Phase 1 or phase 5 may be lagged.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Signal system data:
    Controller Asset: # 0786.



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	
Ⓐ	Street Sign	Ⓐ
Ⓑ	Keep Right Sign (R4-7)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	14	7	12	7	14	7	12
Extension 1 *	1.0	6.0	1.0	6.0	1.0	6.0	1.0	6.0
Max Green 1 *	20	120	30	90	20	120	20	90
Yellow Clearance	3.0	5.2	3.0	4.3	3.0	5.2	3.0	4.6
Red Clearance	3.3	1.1	2.9	2.0	3.3	1.1	2.9	1.9
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	35	-	-	-	35	-	-
Time Before Reduction *	-	15	-	15	-	15	-	15
Time To Reduce *	-	50	-	30	-	50	-	30
Minimum Gap	-	3.5	-	3.5	-	3.5	-	3.5
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
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:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 50 1"=50'

US 74
(Martin Luther King, Jr. Pkwy.)
at
SR 1175 (N. Kerr Avenue)

Division 3 New Hanover County Wilmington

PLAN DATE: January 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

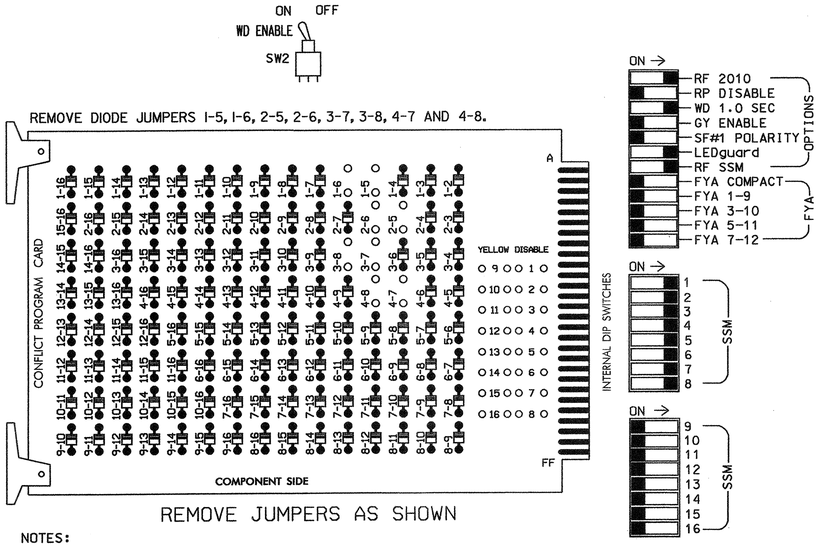
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/4/08
SIG. INVENTORY NO. 03-0786

04-JUN-2008 15:44
s:\its signals\workgroups\alexander\u-5017 (wilmington city system)\03-0786\03078 6_sig_dsn_20080604.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 151

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 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial.
7. Program phases 2, 4, 6 and 8 for Gap Reduction.
8. 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.	11	83	21 22,23	NU	23,81	41 42,43	NU	43	51	61 62,63	NU	41,63	81 82,83	NU
RED			128		*	101				134		*	107	
YELLOW			129			102				135			108	
GREEN			130			103				136			109	
RED ARROW	125								131					
YELLOW ARROW	126	126			117			132	132			123		
GREEN ARROW	127	127			118			133	133			124		

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR         PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦    X
OMIT PHASES     ¦   X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR         PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦        X
OMIT PHASES     ¦       X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

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	Ø1 1A	Ø2 2A	Ø2 2C	Ø3 3A	Ø4 4A	Ø4 4C	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø1 1B	Ø2 2B	NOT USED	NOT USED	Ø4 4B	Ø4 4D							ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A	Ø6 6C	Ø7 7A	Ø8 8A	Ø8 8C	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø5 5B	Ø6 6B	NOT USED	NOT USED	Ø8 8B	Ø8 8D							

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	TB2-5,6	I2U	39	1	2	1	Y	Y			
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y			
3A[1]	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12	28	8	Y	Y			3
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	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
6C	TB5-1,2	J4U	48	10	26	6	Y	Y			
7A[2]	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
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

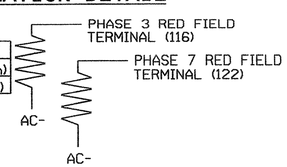
[1] Add jumper from I5-W to J8-W, on rear of input file.
[2] Add jumper from J5-W to I8-W, on rear of input file.

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: 03-0786
DESIGNED: JAN. 2008
SEALED: 6/04/08
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 74
(Martin Luther King, Jr. Pkwy.)
at
SR 1175 (N. Kerr Avenue)

Division 3 | New Hanover County | Wilmington

PLAN DATE: May 2008 | REVIEWED BY: T. Jyel
PREPARED BY: A.A. Klooz | REVIEWED BY:

REVISIONS	INIT.	DATE

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

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

John T. Rowe Jr. 6-11-08
SIGNATURE DATE

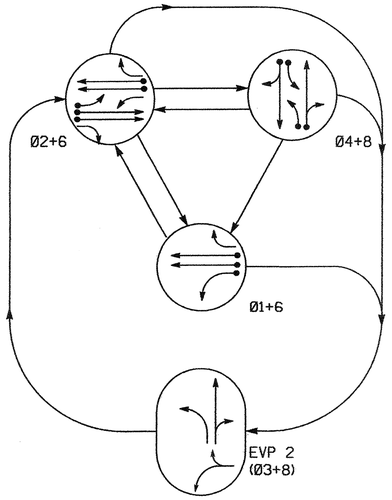
SIG. INVENTORY NO. 03-0786

15-JUN-2008 13:59
S:\TIS\Signal\Sheets\Groups\Sig mon\Klooz\03786_sm.sig.2008mod.dgn
aklooz

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 152

3 Phase Fully Actuated W/FIre Preemption (Wilmington Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

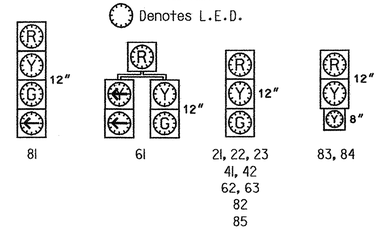
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø4+8	EVP 2	FLASH
21, 22, 23	R	G	R	R	Y
41, 42	R	R	G	R	R
61	G	G	R	R	Y
62, 63	G	G	R	R	Y
81	R	R	G	G	R
82	R	R	G	G	R
83, 84	FY	FY	FY	R	R
85	DRK	DRK	DRK	G	R
SIGN C	OFF	OFF	OFF	ON	DRK

FY = 8" FLASHING YELLOW
DRK = DARK

SIGNAL FACE I.D.

Denotes L.E.D.

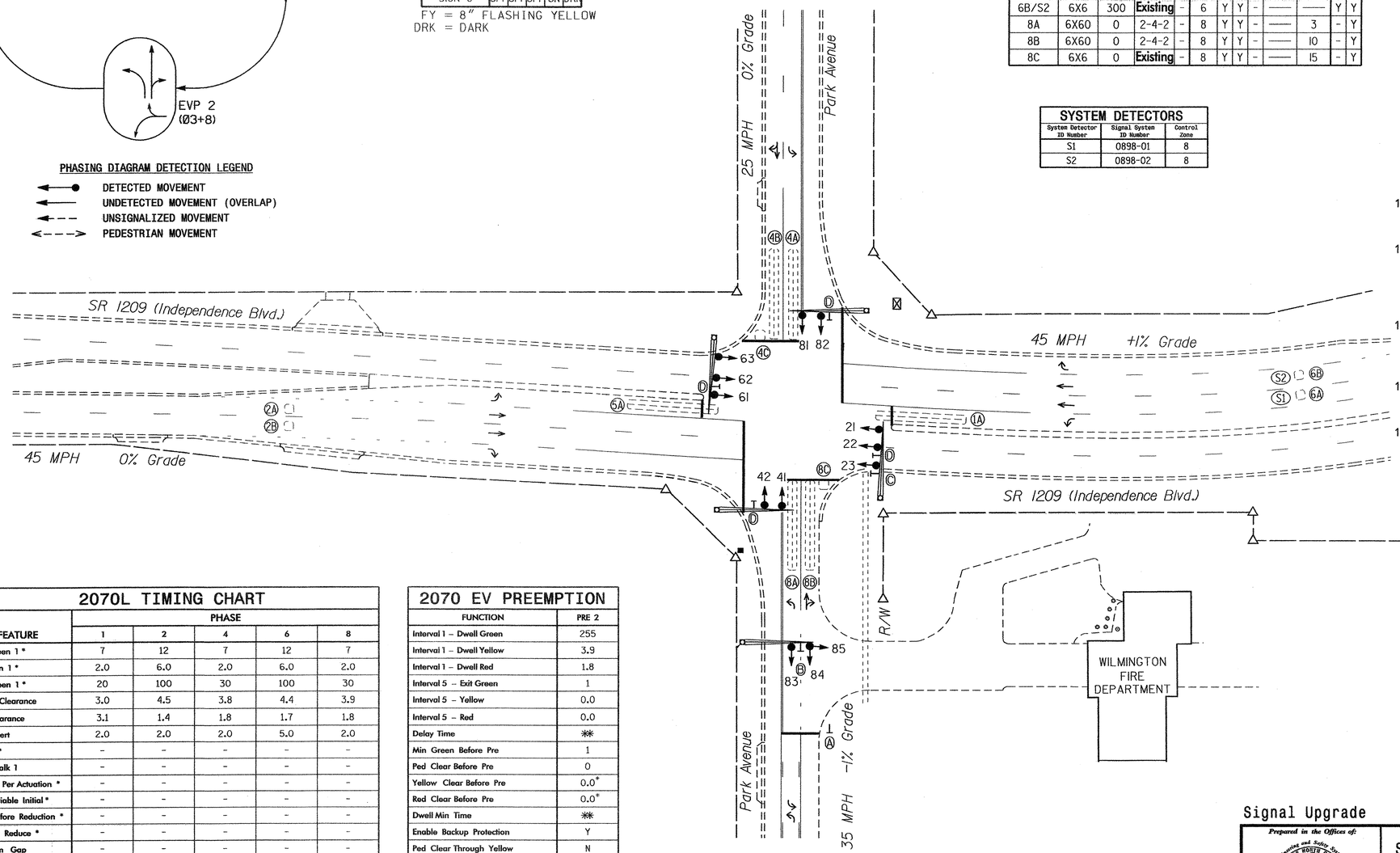


2070L LOOP & DETECTOR INSTALLATION

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	6X60	+10	2-4-2	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	Y	—	3	-	Y
2A	6X6	300	Existing	-	2	Y	Y	-	—	—	-	Y
2B	6X6	300	Existing	-	2	Y	Y	-	—	—	-	Y
2C	6X60	+10	2-4-2	-	2	Y	Y	Y	—	3	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	—	3	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	—	10	-	Y
4C	6X6	0	Existing	-	4	Y	Y	-	—	15	-	Y
6A/S1	6X6	300	Existing	-	6	Y	Y	-	—	—	Y	Y
6B/S2	6X6	300	Existing	-	6	Y	Y	-	—	—	Y	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	—	3	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	—	10	-	Y
8C	6X6	0	Existing	-	8	Y	Y	-	—	15	-	Y

SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0898-01	8
S2	0898-02	8



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Locate emergency vehicle preemption switch in Fire Station.
8. The City Traffic Engineer will determine the Delay before Preempt and Preempt Dwell Min Green time for the emergency vehicle preemption timing.
9. Program signal heads numbered 81 and 82 to clear to all red before going into preempt.
10. Clear signal heads 83 and 84 from flashing 8" yellow to steady 12" yellow during interval 1 and steady red during interval 2.
11. When clearing to preemption, signal head 85 shall display red during intervals 1 and 2. When clearing from preemption, signal head 85 shall display yellow during interval 1 and red during interval 2.
12. Illuminate sign Ⓒ at beginning of the preceeding red clearance interval. This sign will remain illuminated until the beginning of the succeeding green phase.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
14. Signal system data:
    Controller Asset #: 0898.

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	
Ⓐ	"STOP HERE ON RED" Sign (R10-6)	Ⓐ
Ⓑ	"EMERGENCY SIGNAL" Sign (R10-13)	Ⓑ
Ⓒ	"NO TURN ON RED" Fiber Optic Blankout Sign	Ⓒ
Ⓓ	Street Sign	Ⓓ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	6	8
Min Green 1 *	7	12	7	12	7
Extension 1 *	2.0	6.0	2.0	6.0	2.0
Max Green 1 *	20	100	30	100	30
Yellow Clearance	3.0	4.5	3.8	4.4	3.9
Red Clearance	3.1	1.4	1.8	1.7	1.8
Red Revert	2.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	ON	-	ON
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.

2070 EV PREEMPTION

FUNCTION	PRE 2
Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	3.9
Interval 1 – Dwell Red	1.8
Interval 5 – Exit Green	1
Interval 5 – Yellow	0.0
Interval 5 – Red	0.0
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	Y
Ped Clear Through Yellow	N

* Time defaults to time used for phase during normal operation
** See Note 8

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 1"=40'

SR 1209 (Independence Blvd.) at Park Avenue

Division 3 New Hanover County Wilmington

PLAN DATE: October 2007 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 4/11/08
SIG. INVENTORY NO. 03-0898

15-JUL-2008 15:28
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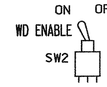
rziemba

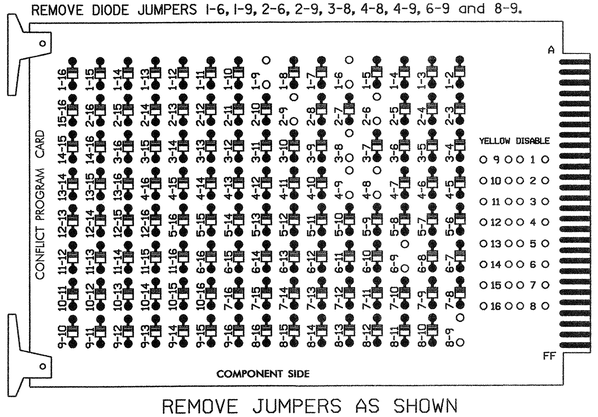
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 153

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

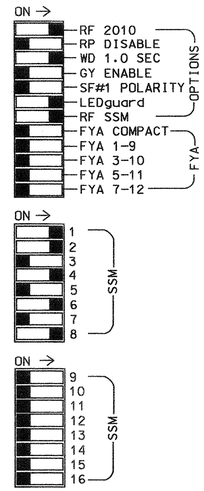
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 2-9, 3-8, 4-8, 4-9, 6-9 and 8-9.



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 3,5,7,10, 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,Δ S3,S4,S4P,Δ* S6,S8,S9
PHASES USED.....1,2,3,4,6,8
OVERLAPS.....OLA:1+2+4+6+8

Δ DENOTES S2P IS USED FOR FIRE HOUSE PREEMPT PILOT LAMP CONTROL.
Δ* DENOTES S4P IS USED FOR BLANKOUT SIGN CONTROL.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3		4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22 23	**	81	85	41,42	***	NU	61,62 63	NU	NU	81,82	NU	83,84	NU	NU	NU	NU	NU
RED	*	128			116	101			134			107		A121					
YELLOW		129			117	102			135			108		A122					
GREEN		130			118	103			136			109							
RED ARROW																			
YELLOW ARROW	126																		
GREEN ARROW	127			118															
✋																			
🚶																			

NU = Not Used

A123 8" Flashing Yellow

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

** SEE LAMP NOTES (SHEET 2 OF 3)

*** SEE BLANKOUT SIGN NOTES (SHEET 2 OF 3)

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	Ø2 2C	SLOT EMPTY	SLOT EMPTY	Ø4 4A	Ø4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B	NOT USED			Ø4 4B	NOT USED							ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6/SYS 6A/S1	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	Ø8 8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED
	L		Ø6/SYS 6B/S2				Ø8 8B	NOT USED							PRE2 AC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME
PRE2 = PREEMPTOR 2 (EV)

⊗ 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			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			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y	Y		3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
6A/S1	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S2	TB3-7,8	J2L	44	6	16	6/SYS	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			10
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

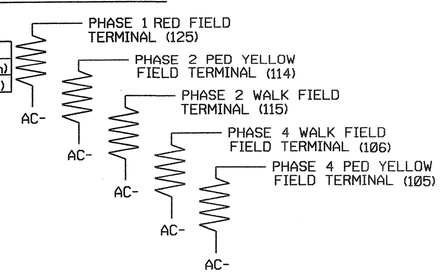
(program controller as shown below)

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

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 3 for 'Omit Phase' and Phases 1,2,4, 6 and 8 for 'Startup Calls'. This is to prevent Phase 3 from being served when not in Preempt.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0898
DESIGNED: October 2007
SEALED: 4-11-08
REVISED: N.A.

Signal Upgrade Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1209 (Independence Blvd.) at Park Avenue

Division 03 New Hanover County Wilmington

PLAN DATE: 2-6-08 REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS INIT. DATE

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

750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/24/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0898

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 154

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 X 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?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

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  3.9  1.8  |  X    X
2   0  0.0  0.0  |
3   0  0.0  0.0  |
4   0  0.0  0.0  |
5   1  0.0  0.0  |  X    X
EXIT CALLS       |
            OPTIONS
PRIORITY (Y/N TO SELECT) ............MED
DELAY TIMER (0-255 SEC) .............*
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0
DWELL MIN TIMER (0-255 SEC) .........*
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
DWELL HOLD-OVER TIMER (0-255) .......0
LATCH CALL? .........................Y
LINK TO NEXT PREEMPT? ...............N
ENABLE BACKUP PROTECTION? ...........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? .............Y
OVERLAPS:                | ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW   |
OMIT OVERLAPS:           | X
```

* Denotes timing to be determined in field.

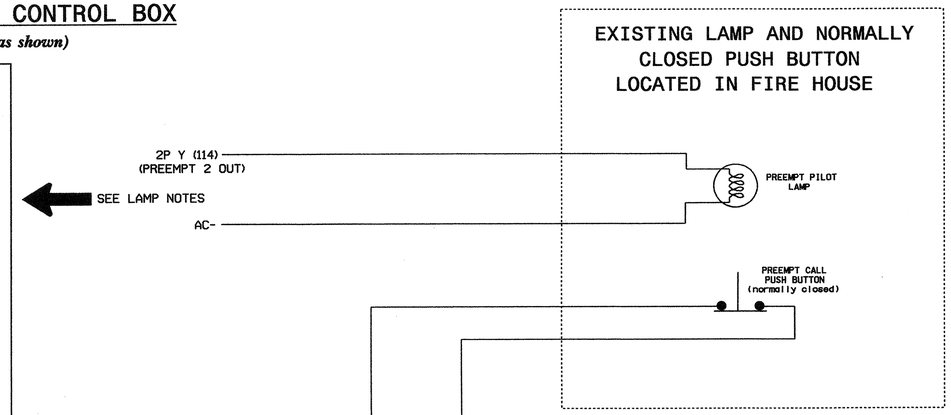
EMERGENCY VEH. PREEMPTION PUSHBUTTON AND INDICATOR LAMP WIRING DETAIL USING PREEMPT CONTROL BOX

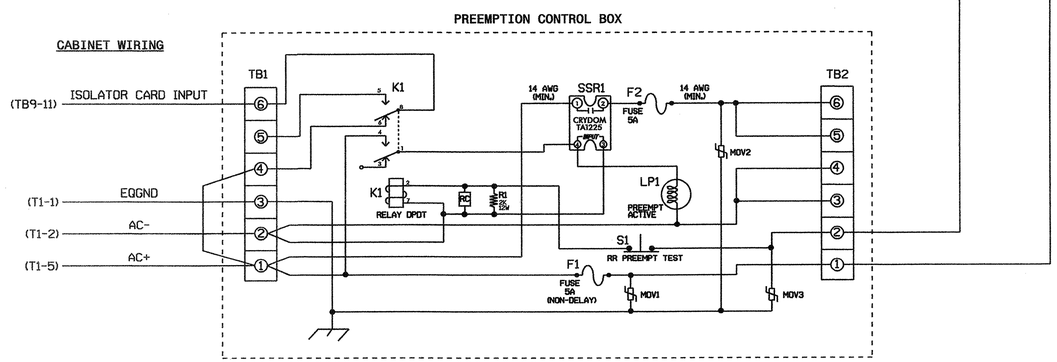
(wire sign as shown)

LAMP NOTES

In order for the pilot lamp in the fire house to function, make the following programming changes to Output No. 33:

1. Change the function of C1 pin 35 to be an output for Preempt 2. This is accomplished by the following:
   - A) From Main Menu select '6' (Outputs). Then select '1' (Output Assignments).
   - B) Scroll to C1 pin 35, Output No. 33. You will see that it is not enabled.
   - C) Scroll down to Preempt and input 'YES'. You will then be asked for a preempt number. Enter a '2' here.
   - D) The output is now assigned for PRE-2 output.
2. If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.
3. Make sure load resistors are in place as shown in the Load Resistor Installation Detail this sheet.
4. Insert Loadswitch For S2P.

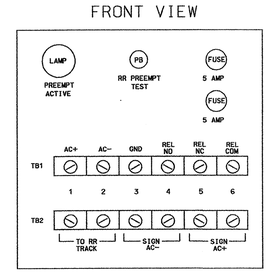




NOTES

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). To accomplish this set invert dip switch on AC Isolator Card.
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).

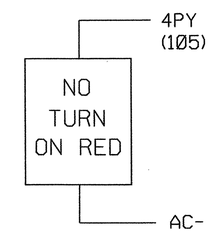
FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0898
DESIGNED: October 2007
SEALED: 4-11-08
REVISED: N.A.

BLANKOUT SIGN WIRING DETAIL

(wire sign as shown)



BLANKOUT SIGN NOTES

In order for the blankout sign at the intersection to function make the following programming changes to output No.35:

1. Change the function of C1 pin 37 to be an output for Preempt 2. This is accomplished by the following:
   - A) From Main Menu select '6' (Outputs). Then select '1' (Output Assignments).
   - B) Scroll to C1 pin 37, Output No. 35. You will see that it is not enabled.
   - C) Scroll down to Preempt and input 'YES'. You will then be asked for a preempt number. Enter a '2' here.
   - D) The output is now assigned for PRE-2 output.
2. If field terminal 105 has a conflict monitor wire attached, remove, tape, and label wire.
3. Make sure load resistors are in place as shown in the Load Resistor Installation Detail this sheet.
4. Insert Loadswitch For S4P.

Signal Upgrade Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Public Transportation and Safety Systems Unit, Division of North Carolina Department of Transportation, Traffic Management Section

759 N. Greenfield Pwky, Garner, NC 27529

SR 1209 (Independence Blvd.) at Park Avenue

Division 03 | New Hanover County | Wilmington

PLAN DATE: 12-11-07	REVIEWED BY: D.T. Joyce		
PREPARED BY: D.H. Spaulding	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/24/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0898

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PROJECT REFERENCE NO.	SHEET NO.
U-5017	Sig. 154A

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL FOR SPECIAL OUTPUT CONTROL

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 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  INPUT ASSIGNMENT   #14 IS ON
OR  ACTIVE PREEMPTION  #2  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #33 ON
```

PRESS '+'

NOTE:

FIRE HOUSE PILOT LAMP LOGIC.

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #33 OFF
```

PRESS '+'

NOTE:

FIRE HOUSE PILOT LAMP LOGIC.

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF GREEN ON PHASE  #4  IS ON
OR YELLOW ON PHASE  #4  IS ON
OR GREEN ON PHASE  #6  IS ON
OR YELLOW ON PHASE  #6  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #35 OFF
```

PRESS '+'

NOTE:

BLANKOUT SIGN CONTROL

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  GREEN ON PHASE     #3  IS OFF
AND YELLOW ON PHASE    #3  IS OFF
AND RED CLEAR ON PHASE #3  IS OFF

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #6 OFF
```

PRESS '+'

NOTE:

SIGNAL HEAD 85 LOGIC.

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PREEMPTION  #2  IS ON
AND NEXT PHASE         #3  IS ON
AND OUTPUT  ASSIGNMENT #7  IS OFF
AND OUTPUT  ASSIGNMENT #8  IS OFF

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #6 ON
```

PRESS '+'

NOTE:

SIGNAL HEAD 85 LOGIC.

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  OUTPUT  ASSIGNMENT #54 IS ON
AND OUTPUT  ASSIGNMENT #3  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #6 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

NOTE:

SIGNAL HEAD 85 SOFTWARE FLASH LOGIC.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0898
DESIGNED: October 2007
SEALED: 4-11-08
REVISED: N.A.

Signal Upgrade — Sheet 3 of 3

Traffic Engineering and Safety Systems Branch — Signal Management Section — 750 N. Greenfield Pwky, Garner, NC 27529

SR 1209 (Independence Blvd.) at Park Avenue

Division 03 — New Hanover County — Wilmington

PLAN DATE: 12-11-07 — REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding — REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL — NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/24/08 — SIGNATURE — DATE

SIG. INVENTORY NO. 03-0898

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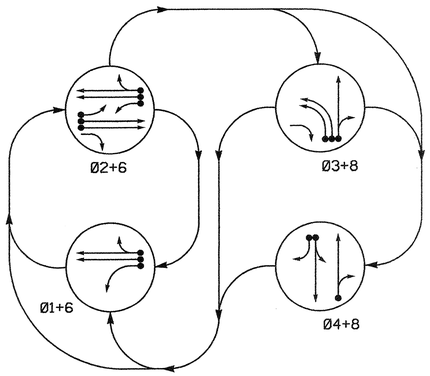
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 155

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

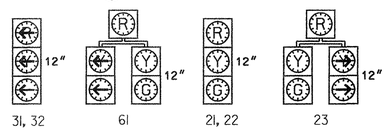
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	03+8	04+8	FLASH
2I, 22	R	G	R	R	Y
23	R	G	R/	R	Y
3I, 32	~~R~~	~~R~~	~~←~~	~~R~~	~~R~~
4I, 42, 43	R	R	R	G	R
6I	\G	G	R	R	Y
62	G	G	R	R	Y
8I, 82	R	R	G	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



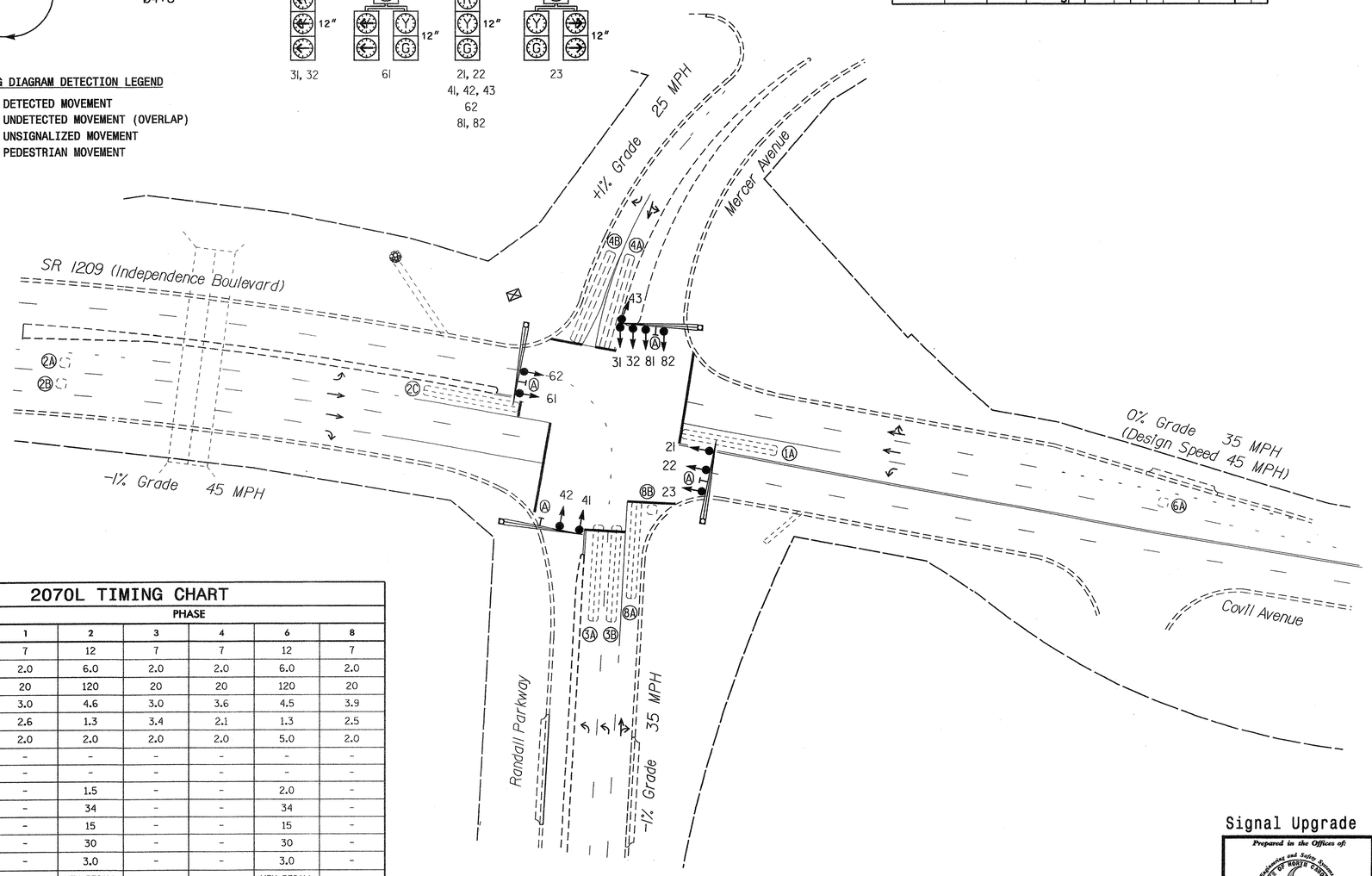
2070L LOOP & DETECTOR INSTALLATION

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	6X60	0	2-4-2	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	Y	—	3	-	Y
2A	6X6	300	Existing	-	2	Y	Y	-	—	—	-	Y
2B	6X6	300	Existing	-	2	Y	Y	-	—	—	-	Y
2C	6X6	0	2-4-2	-	2	Y	Y	Y	—	3	-	Y
3A	6X60	+5	2-4-2	-	3	Y	Y	-	—	3	-	Y
3B	6X60	+5	2-4-2	-	3	Y	Y	-	—	—	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	—	—	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	—	10	-	Y
6A	6X6	300	Existing	-	6	Y	Y	-	—	—	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	—	10	-	Y
8B	6X6	0	Existing	-	8	Y	Y	-	—	15	-	Y

4 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 3 during phase 4 on.
4. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Signal system data:
   Controller Asset #: 0900.



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	
	Pavement Marking Arrow	
	Metal Pole with Mastarm	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	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	120	20	20	120	20
Yellow Clearance	3.0	4.6	3.0	3.6	4.5	3.9
Red Clearance	2.6	1.3	3.4	2.1	1.3	2.5
Red Revert	2.0	2.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	2.0	-
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
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:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1209 (Independence Blvd.)/ Covil Ave. at Randall Parkway/Mercer Avenue

Division 3 New Hanover County Wilmington

PLAN DATE: March 2007	REVIEWED BY:	
PREPARED BY: Sterling	REVIEWED BY:	
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 4/4/08
SIG. INVENTORY NO. 03-0900

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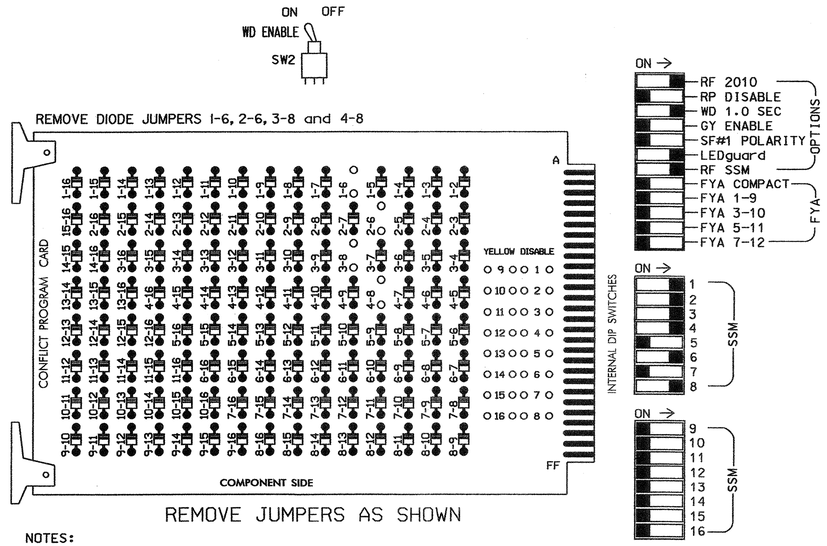
PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 156

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

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	Ø1 1A	Ø2 2A	Ø2 2C	Ø3 3A	Ø3 3B	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø6 1A	Ø2 2B	NOT USED	NOT USED	NOT USED	Ø4 4B							ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				Ø8 8B								

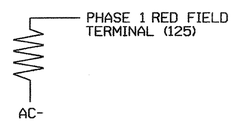
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

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 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.

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 5,7,9,10, 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 phase 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

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]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	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			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y	Y		3
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0900
DESIGNED: March 2007
SEALED: 4-4-08
REVISED: N.A.

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 23	NU	31,32	23	41,42 43	NU	NU	61,62	NU	NU	81,82	NU
RED	*	128				101			134			107	
YELLOW		129				102			135			108	
GREEN		130				103			136			109	
RED ARROW				116									
YELLOW ARROW	126			117	117								
GREEN ARROW	127			118	118								
✋													
🚶													

NU = Not Used

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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Dynamic/Backup Control Function 1.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
                OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦   X
OMIT PHASES     ¦   X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

BACKUP PROTECTION NOTE

(program controller as shown below)

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

Signal Upgrade

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 N. Greenfield Pwky, Garner, NC 27529

SR 1209 (Independence Blvd.)/ Covil Ave. at Randall Parkway/Mercer Avenue

Division 03 New Hanover County Wilmington

PLAN DATE: 4-1-08 REVIEWED BY: D.T. Joyce
PREPARED BY: D.H. Spaulding REVIEWED BY:

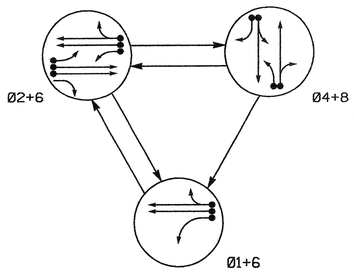
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 4/9/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0900

08-APR-2008 16:46
s:\#ts signals\workgroups\sig management\03900_smlele_2008xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 157

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

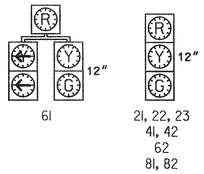
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04+8	FLASH
21, 22, 23	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	——	15	-	Y
					6	Y	Y	Y	——	3	-	Y
2A/S1	6X6	300	Existing	-	2	Y	Y	-	——	——	Y	Y
2B/S2	6X6	300	Existing	-	2	Y	Y	-	——	——	Y	Y
2C	6X60	0	2-4-2	-	2	Y	Y	Y	——	3	-	Y
4A	6X60	+2	2-4-2	-	4	Y	Y	-	——	——	-	Y
4B	6X60	+2	2-4-2	-	4	Y	Y	-	——	10	-	Y
6A/S3	6X6	300	Existing	-	6	Y	Y	-	——	——	Y	Y
6B/S4	6X6	300	Existing	-	6	Y	Y	-	——	——	Y	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	——	3	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	——	10	-	Y

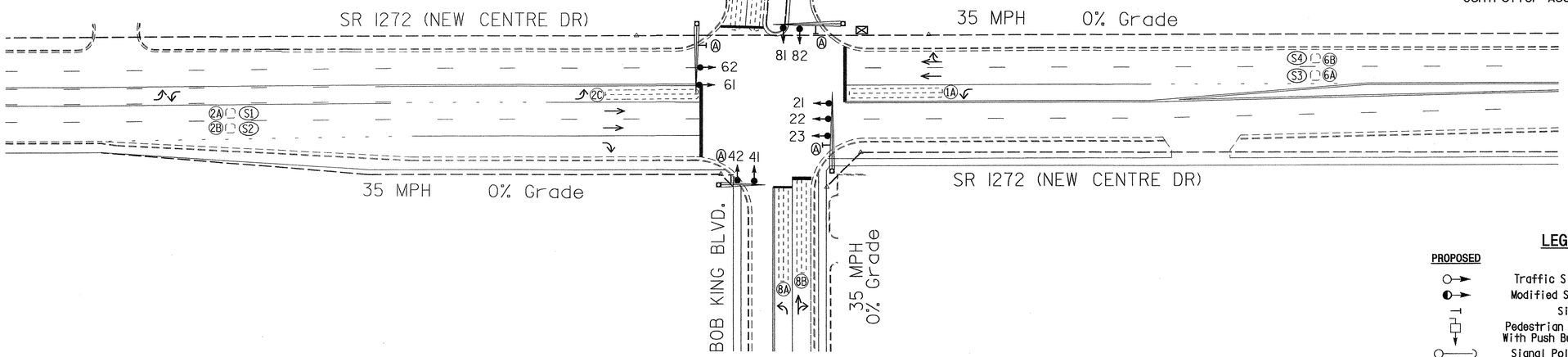
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0914-01	14
S2	0914-02	14
S3	0914-03	14
S4	0914-04	14

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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: # 0914.



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	
	Street Sign	

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	10	7
Extension 1 *	1.0	6.0	1.0	6.0	1.0
Max Green 1 *	15	75	20	75	20
Yellow Clearance	3.0	3.8	3.2	3.8	3.8
Red Clearance	2.3	1.5	2.4	1.5	2.1
Red Revert	2.0	2.0	2.0	5.0	2.0
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

* 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:
Traffic Engineering and Signal System Branch
Signals and Geometrics Section
DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1272 (New Centre Drive)
at
Bob King Blvd.
and Dapple Court

Division 3 New Hanover County Wilmington

PLAN DATE: September 2007 REVIEWED BY:
PREPARED BY: Sterling REVIEWED BY:

REVISIONS	INIT.	DATE

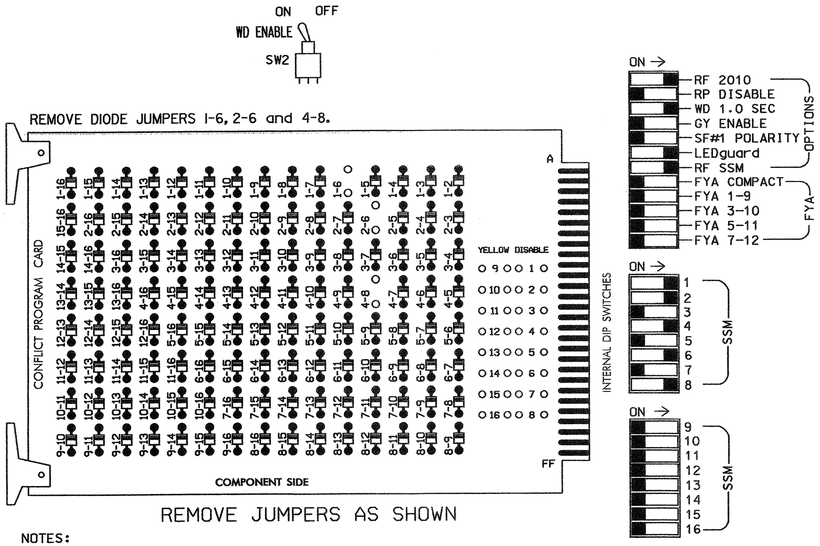
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 4/30/08
SIG. INVENTORY NO. 03-0914

30-APR-2008 17:55
s:\#ts signals\workgroups\wilexander\u-5017 (wilmington city system)\03-0914\03914_sig_dsn_20080430.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 15B

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 3,5,7,9, 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 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
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 22,23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED	*	128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

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

EQUIPMENT INFORMATION

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

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	Ø2/SYS	Ø 2	SLOT	SLOT	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A/S1	2C			4A								DC ISOLATOR
	L	NOT USED	Ø2/SYS	NOT USED	EMPTY	EMPTY	Ø 4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST
			2B/S2				4B								DC ISOLATOR
FILE "J"	U	SLOT	Ø 6/SYS	SLOT	WIRED ⊗ INPUT	SLOT	Ø 8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		EMPTY	6A/S3	EMPTY		EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L		Ø6/SYS				Ø 8								
			6B/S4				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			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y	Y		3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
6A/S3	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S4	TB3-7,8	J2L	44	6	16	6/SYS	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			10

[1] Add jumper from I1W to J4W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

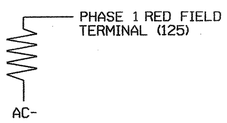
(program controller as shown below)

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

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 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: 03-0914
DESIGNED: Sept 2007
SEALED: 4/30/08
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1272 (New Centre Drive) at Bob King Blvd. and Dapple Court

Division 3 | New Hanover County | Wilmington

PLAN DATE: April 2008 | REVIEWED BY: T. Jyer
PREPARED BY: G. C. Brown | REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

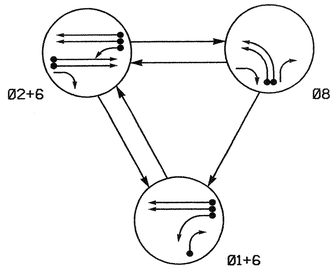
George C. Brown 5/1/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0914

01-MAY-2008 10:52
s:#its signals#workgroups#sig monitor#W030914.dgn
GBrown

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 159

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

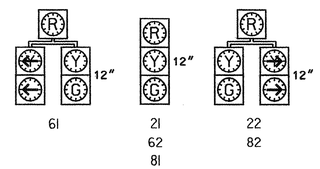
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	FLASH
21	R	G	R	Y
22	R	G	R	Y
61	G	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



2070L 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	6X60	0	2-4-2	-	1	Y	Y	-	—	15	-	Y
					6	Y	Y	-	—	—	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	—	15	-	Y
2A/S1	6X6	300	Existing	-	2	Y	Y	-	1.6	—	Y	Y
2B/S2	6X6	300	Existing	-	2	Y	Y	-	1.6	—	Y	Y
2C, 2D	6X6	90	Existing	-	2	Y	Y	-	—	—	-	Y
6A, 6B	6X6	300	Existing	-	6	Y	Y	-	1.6	—	-	Y
6C, 6D	6X6	90	Existing	-	6	Y	Y	-	—	—	-	Y
8A	6X60	0	2-4-2		8	Y	Y	-	—	—	-	Y
8B	6X60	0	2-4-2		8	Y	Y	-	—	—	-	Y

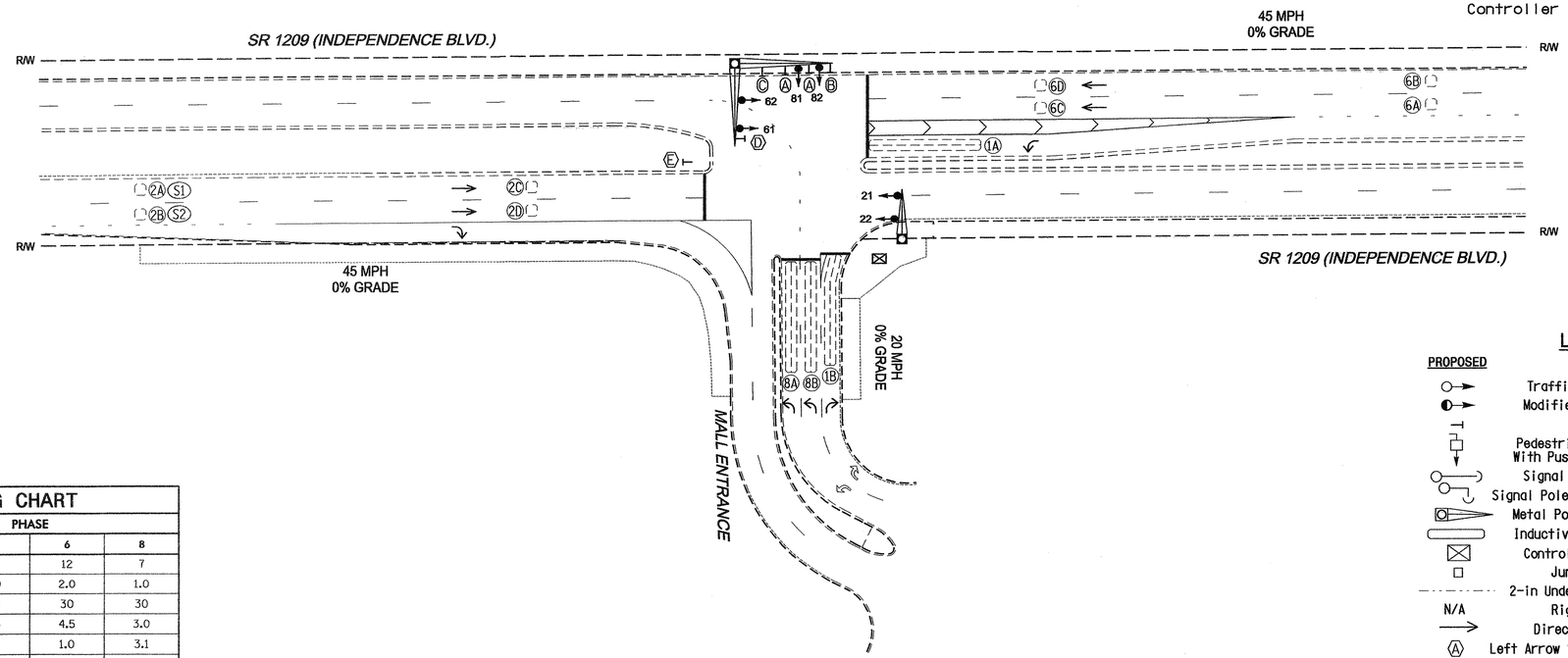
SYSTEM DETECTORS

System Detector ID Number	Signal System ID Number	Control Zone
S1	0947-01	8
S2	0947-02	8

3 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0947.



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	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	Street Sign	C
D	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	D
E	No U-Turn Sign (R3-4)	E

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	12	12	7
Extension 1 *	1.0	2.0	2.0	1.0
Max Green 1 *	30	30	30	30
Yellow Clearance	3.0	4.5	4.5	3.0
Red Clearance	2.4	1.2	1.0	3.1
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
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.

Signal Upgrade

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

SCALE 0 40 1"=40'

SR 1209 (Independence Blvd.) at South Entrance To Independence Mall

Division 3 New Hanover County Wilmington

PLAN DATE:	January 2008	REVIEWED BY:	
PREPARED BY:	Sterling	REVIEWED BY:	

REVISIONS	INIT.	DATE

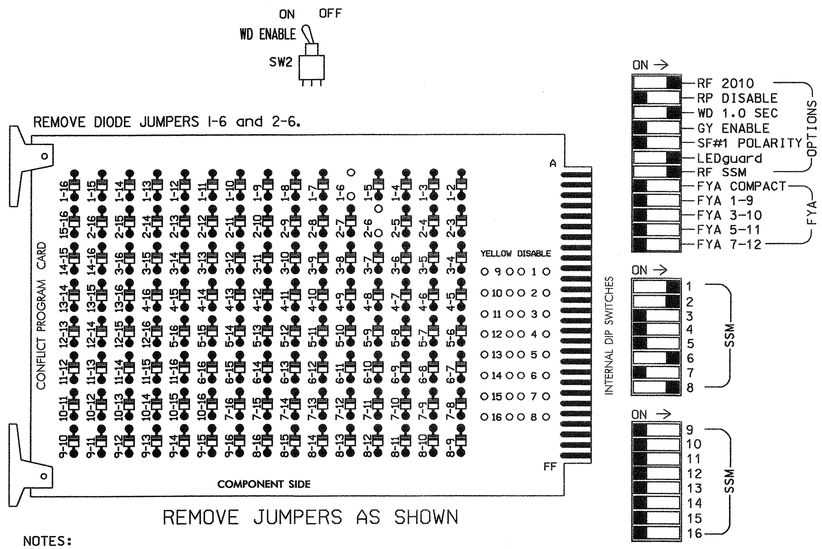
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 6/3/08
SIG. INVENTORY NO. 03-0947

03-JUN-2008 11:11
s:\traffic signals\workgroups\wilmington city system\03-0947\03-0947_sig_dgn_20080603.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 16D

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 3,4,5,7,9, 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. 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.	61,82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	22	NU
RED	*	128						134			107		
YELLOW		129						135			108		
GREEN		130						136			109		
RED ARROW													
YELLOW ARROW	126											108	
GREEN ARROW	127											109	
✋													
🚶													

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S6,S8
PHASES USED.....1,2,6,8
OVERLAPS.....NONE

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/SYS 2A/S1	ø 2 2C,2D	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	ø 2/SYS 2B/S2	ø 1 1B											ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø 6 6A,6B	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		ø 6 6C,6D				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			15
	-	J4U	48	10	26	6	Y	Y			
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y		1.6	
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y		1.6	
2C/2D	TB2-9,10	I3U	63	25	32	2	Y	Y			
1B	TB2-11,12	I3L	76	38	42	1	Y	Y			15
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		1.6	
6C,6D	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			

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

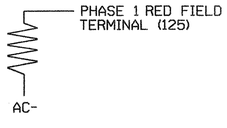
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0947
DESIGNED: January 2008
SEALED: 6-3-08
REVISED: N/A

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 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.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1209 (Independence Blvd.) at South Entrance to Independence Mall

Division 03 New Hanover County Wilmington

PLAN DATE: 5-28-08 REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Public Schools and Safety Corridor Passed
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 6/9/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0947

04-JUN-2008 11:33
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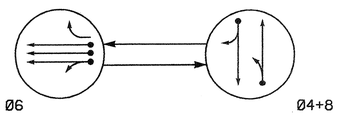
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 161

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	FLASH
41, 42	R	G	R
61, 62, 63	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

41, 42
61, 62, 63
81, 82

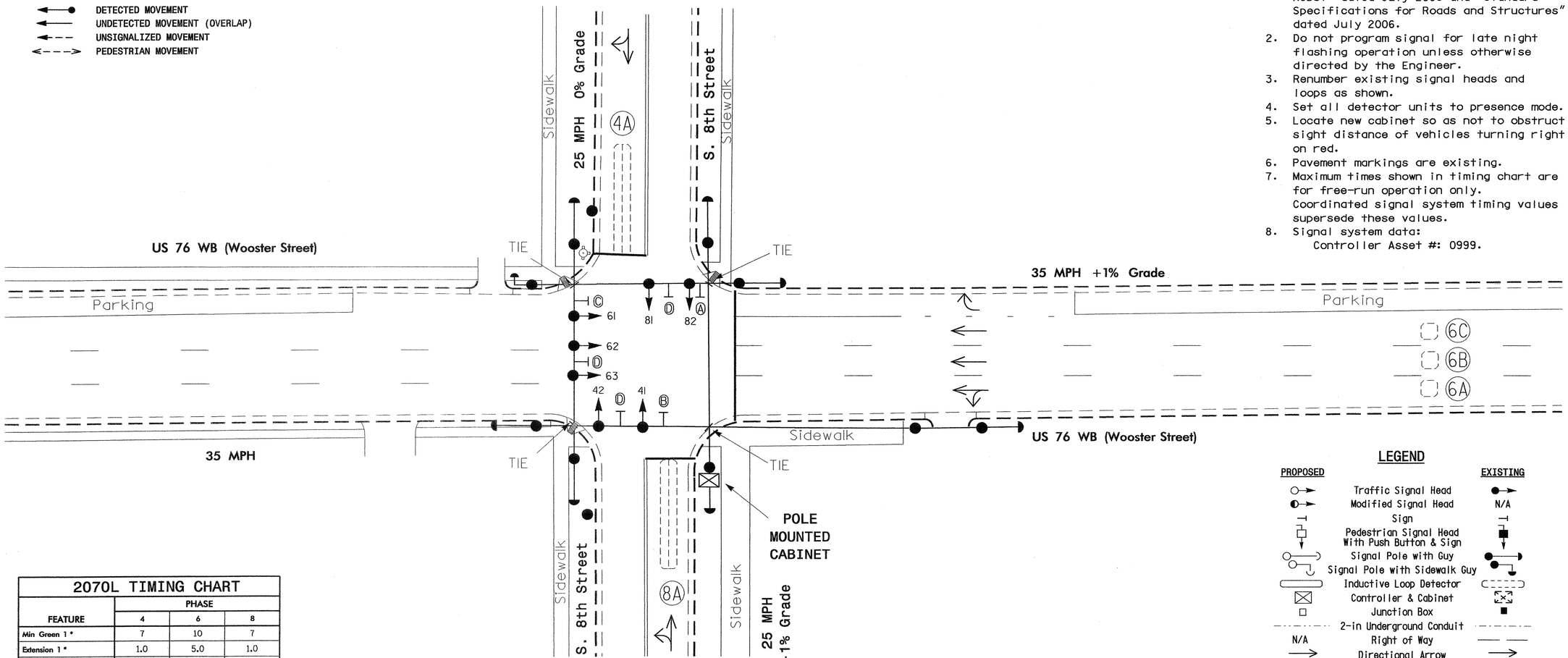
2070L LOOP & DETECTOR INSTALLATION

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
4A	6X40	0	2-4-2	-	4	Y	Y	-	—	10	-	Y
6A,6B,6C	6X6	250	Existing	-	6	Y	Y	-	—	—	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	—	—	-	Y

2 Phase
Fully Actuated
(Wilmington Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads and loops as shown.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
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 #: 0999.



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	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	Street Sign	D

2070L TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7
Extension 1 *	1.0	5.0	1.0
Max Green 1 *	25	35	25
Yellow Clearance	3.2	3.8	3.2
Red Clearance	1.7	1.0	1.7
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-
Dual Entry	ON	-	ON
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.

Signal Upgrade

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
759 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20
1"=20'

US 76 WB (Wooster Street)
at
S. 8th Street

Division 3 New Hanover County Wilmington

PLAN DATE: January 2008	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

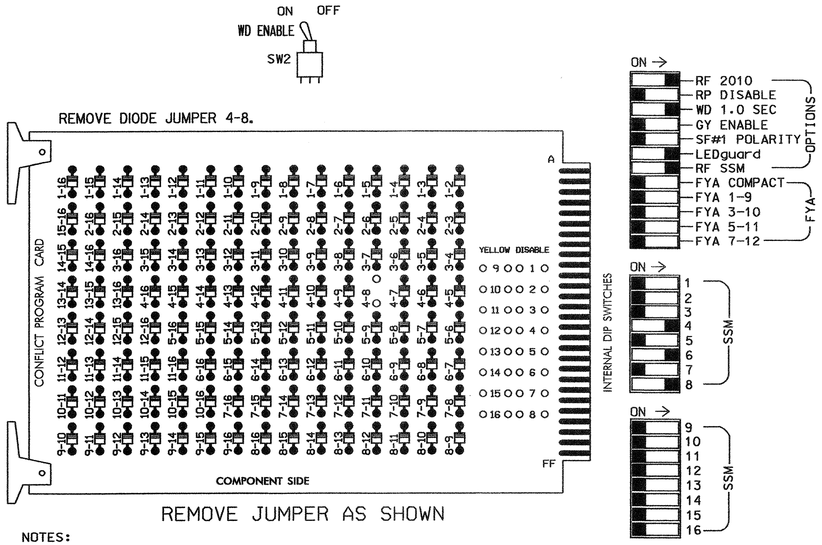
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/1/08 DATE
SIG. INVENTORY NO. 03-0999

01-MAY-2008 18:09
s:\its signals\workgroups\alexander\u-5017 (wilmington city system)\03-0999\03099_sig.dsn_20080501.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5017B	Sig. 162

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

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	ø4 4A	SLOT EMPTY	ø6 6A 6B,6C	SLOT EMPTY	ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L				NOT USED		NOT USED		NOT USED						ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
6A,6B,6C	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
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. 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 1,2,3,5,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 4 and 8, on the controller unit, for Dual Entry.
6. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S6,S8
PHASES USED.....4,6,8
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.	NU	NU	NU	NU	41,42	NU	NU	61 62,63	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0999
DESIGNED: JAN. 2008
SEALED: 5/01/08
REVISED: N/A

Signal Upgrade

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

122 N. McDowell St., Raleigh, NC 27603

US 76 WB (Wooster Street)
at
S. 8th Street

Division 03 New Hanover County Wilmington

PLAN DATE:	4-29-08	REVIEWED BY:	T. Jyll
PREPARED BY:	A.A. Klooz	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

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

John T. Rowe Jr. 5-7-08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0999

06-MAY-2008 15:39
state sigs\ols\workgroups\sig manh\klooz\U5017B_sm_ele_2008mdd.dgn
dklooz