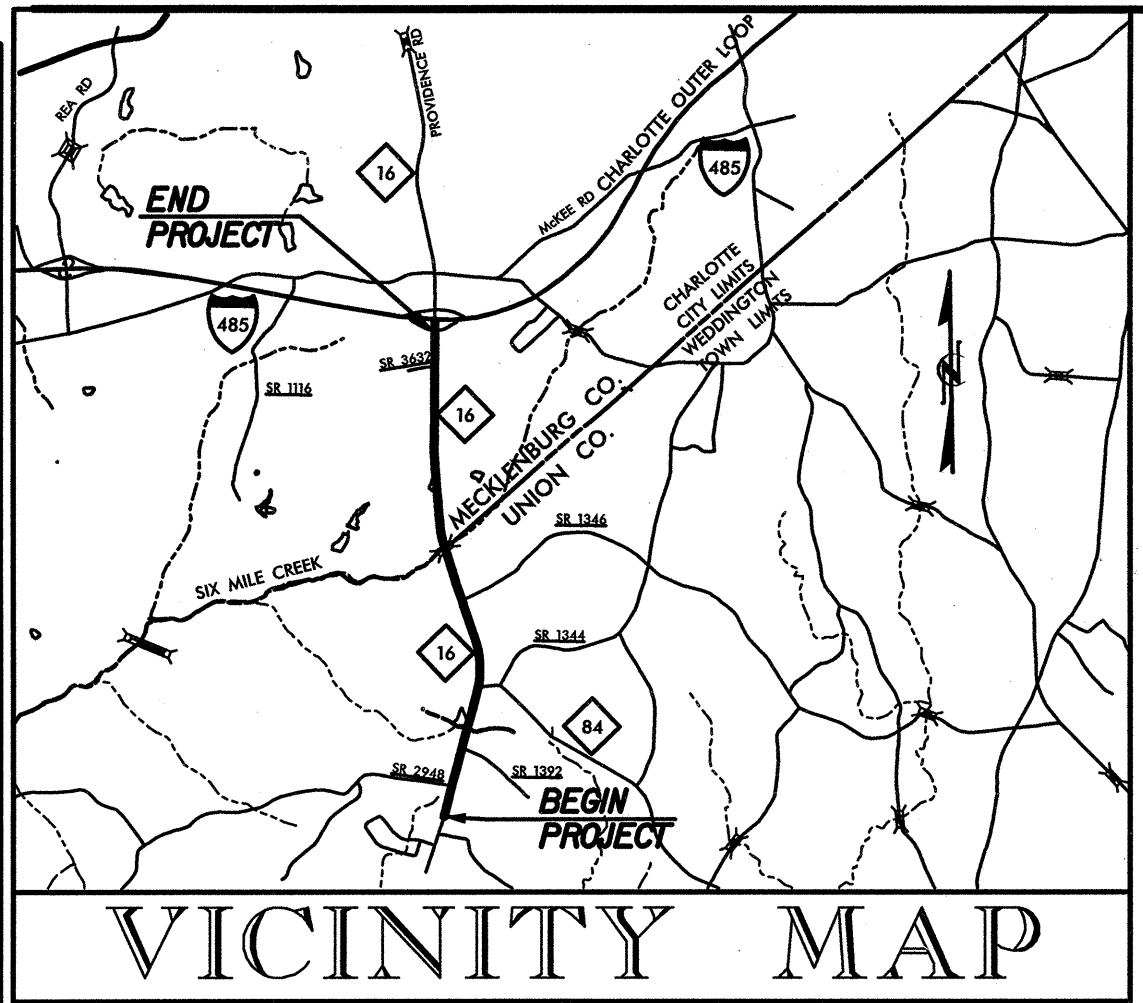


**TIP PROJECT: U-2510A**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2510A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34813.1.1		P.E.	
34813.2.3		CONST.	

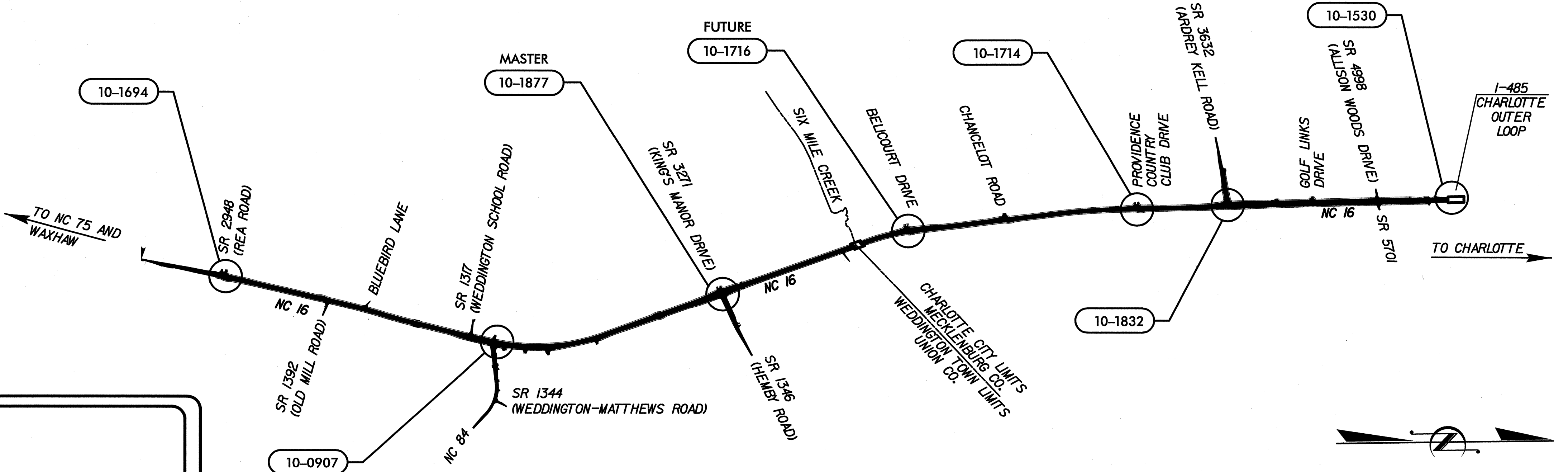
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**MECKLENBURG AND UNION COUNTIES**



**LOCATION: CHARLOTTE - NC 16 (OLD PROVIDENCE ROAD) FROM SOUTH OF SR 2948 (REA ROAD EXT.)  
IN UNION COUNTY TO SOUTH OF I-485 (CHARLOTTE OUTER LOOP) IN MECKLENBURG COUNTY.**

**TYPE OF WORK: TRAFFIC SIGNALS INSTALLATION AND FIBER OPTIC  
COMMUNICATION CABLE ROUTING**



**INDEX OF PLANS**

SHEET NUMBER	SIGNAL INVENTORY NUMBER	LOCATION /DESCRIPTION
SIG. 1		Title Sheet
SIG. 2-3	10-1694	NC 16 (Providence Rd) at SR 2948 (Rea Rd) Temporary 1
SIG. 4-5	10-1694	NC 16 (Providence Rd) at SR 2948 (Rea Rd) Temporary 2
SIG. 6-7	10-1694	NC 16 (Providence Rd) at SR 2948 (Rea Rd) Temporary 3
SIG. 8-9	10-1694	NC 16 (Providence Rd) at SR 2948 (Rea Rd) Final Design
SIG. 10-11	10-0907	NC 16 (Providence Rd) at NC 84 (Weddington Rd) Temporary 1
SIG. 12	10-0907	NC 16 (Providence Rd) at NC 84 (Weddington Rd) Temporary 2
SIG. 13-14	10-0907	NC 16 (Providence Rd) at NC 84 (Weddington Rd) Temporary 3
SIG. 15-16	10-0907	NC 16 (Providence Rd) at NC 84 (Weddington Rd) Temporary 4
SIG. 17-18	10-0907	NC 16 (Providence Rd) at NC 84 (Weddington Rd) Final Design
SIG. 19-20	10-1877	NC 16 (Providence Rd) at SR 1346 (Hemby Rd) / SR 3271 (King's Manor Dr) Temporary 1
SIG. 21-22	10-1877	NC 16 (Providence Rd) at SR 1346 (Hemby Rd) / SR 3271 (King's Manor Dr) Temporary 2
SIG. 23-24	10-1877	NC 16 (Providence Rd) at SR 1346 (Hemby Rd) / SR 3271 (King's Manor Dr) Temporary 3
SIG. 25-26	10-1877	NC 16 (Providence Rd) at SR 1346 (Hemby Rd) / SR 3271 (King's Manor Dr) Final Design
SIG. 27-40		Communications Cable Routing and Conduit Plans

**PLANS PREPARED BY:**

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

CHARLES A. JOHNSON, P.E. - PROJECT MANAGER  
HARVEY L. WINSTEAD, P.E. - PROJECT ENGINEER  
SPENCER T. FRANKLIN, P.E. - PROJECT ENGINEER

**LEGEND**

(##-####) SIGNAL INVENTORY NUMBER

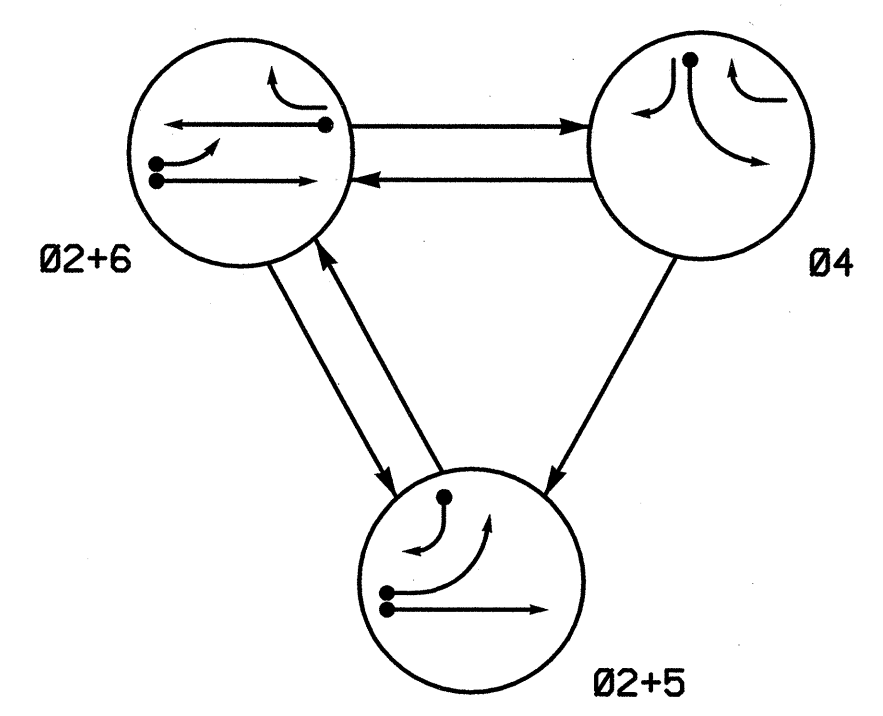
**PLANS PREPARED FOR:**  
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH  
TIMOTHY J. WILLIAMS, P.E. - S&G CONTRACTS & PEF SUPPORT ENGINEER  
I. NEIL AVERY - SIGNAL COMMUNICATIONS PROJECT ENGINEER  
MILTON I. DEAN, P.E. - SIGNALS MANAGEMENT ENGINEER

**ENGLISH**

ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED

SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 028657  
SPENCER T. FRANKLIN  
7-27-07

**PHASING DIAGRAM**



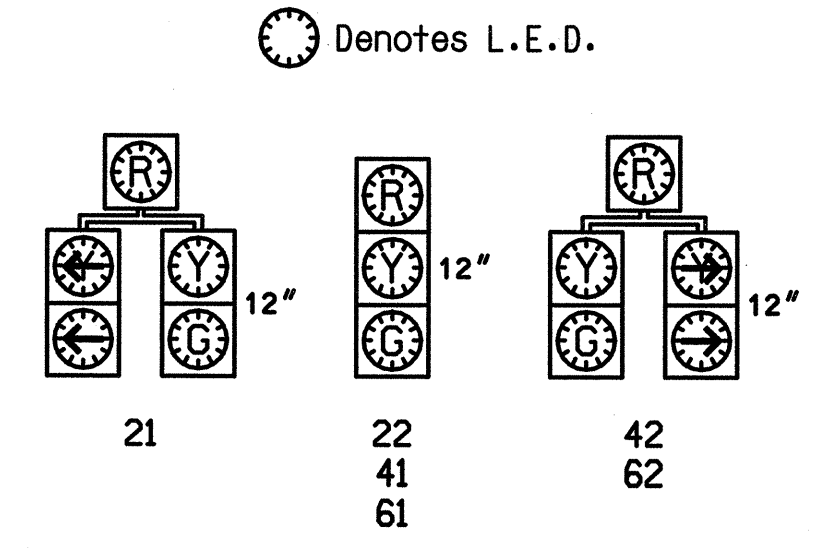
**PHASING DIAGRAM DETECTION LEGEND**

- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←○→ UNSIGNALIZED MOVEMENT
- ←○→ PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04	F.L. CROSS
21	Y	G	R	Y
22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
61	R	G	R	Y
62	R	G	R	Y

**Signal Face I.D.**



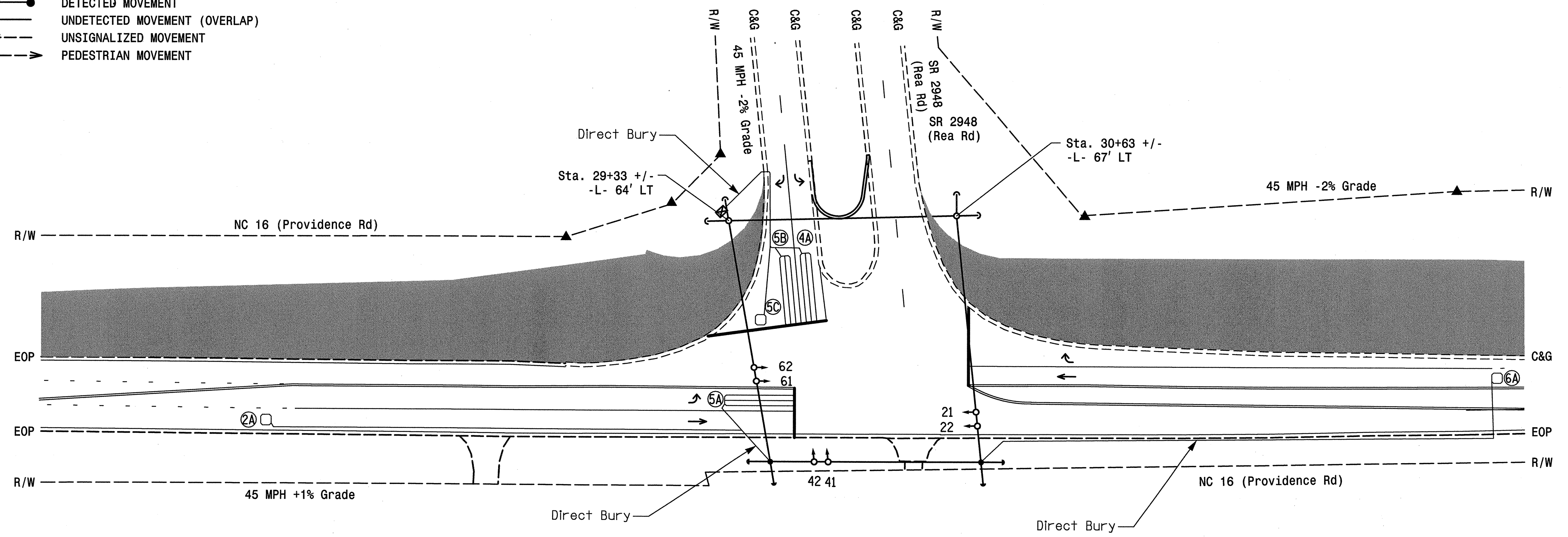
**2070L LOOP & DETECTOR INSTALLATION**

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

3 Phase Fully Actuated (Isolated)

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



**LEGEND**

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

**2070L TIMING CHART**

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	60	20	20	60
Yellow Clearance	4.4	4.7	3.0	4.7
Red Clearance	1.6	1.6	2.1	1.9
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
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	-	-	-	-
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.

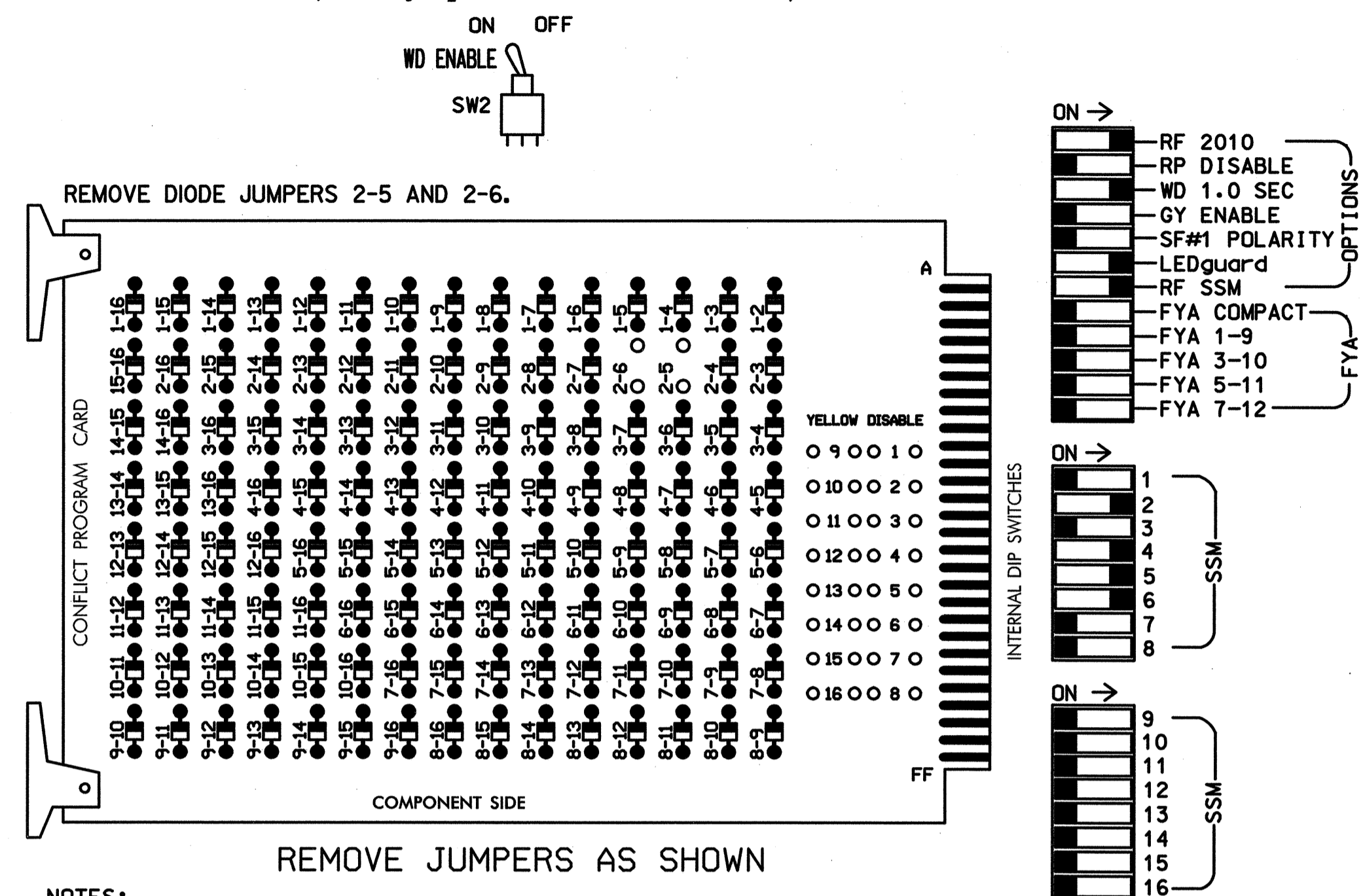
Phase I Step 1 - Temporary Signal 1

	NC 16 (Providence Rd) at SR 2948 (Rea Rd)		
	Division 10 Union County Weddington PLAN DATE: July 2007 REVIEWED BY: N.W. Rodevick PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin	REVISIONS: INIT. DATE	
750 Greenfield Parkway Garner, NC 27529 SCALE: 0 40 1"=40'	SIGNATURE: <i>S.T. Franklin</i> DATE: 7-27-07		SIG. INVENTORY NO. 10-1694 T1

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

**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 1,3,7,8,9,10, 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 NC 16 (Providence Rd) Closed Loop Signal System in Union County.

**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  
 PHASES USED.....2,4,5,6  
 OVERLAPS.....NONE

**SIGNAL HEAD HOOK-UP CHART**

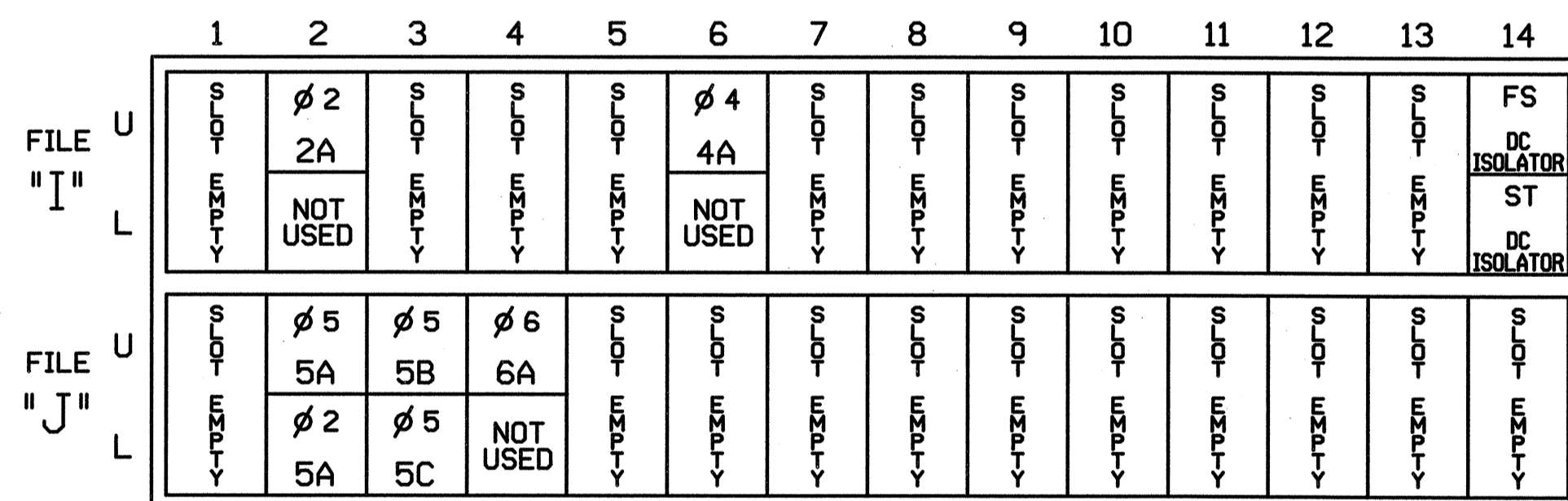
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	21,42	61,62	NU	NU	NU
RED		128			101		*	134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW					102		132					
GREEN ARROW					103		133					
Hand icon												
Person icon												

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

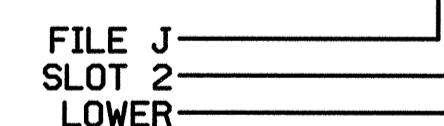
FS = FLASH SENSE  
ST = STOP TIME

**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 <sup>1</sup>	TB3-5,6	J2U	40	2	6	5	Y	Y	-	-	15
	TB3-7,8	J2L	44	6	16	2	Y	Y	Y	-	3
5B	TB3-9,10	J3U	64	26	36	5	Y	Y	-	-	15
5C	TB3-11,12	J3L	77	39	46	5	Y	Y	-	-	15
6A	TB5-1,2	J4U	48	10	26	6	Y	Y	-	-	-

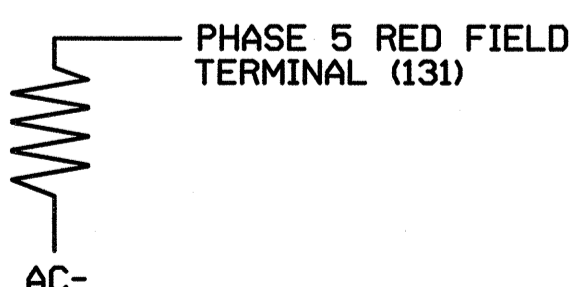
<sup>1</sup>ADD JUMPERS FROM TB3-5 TO TB3-7, AND FROM TB3-6 TO TB3-8.

INPUT FILE POSITION LEGEND: J2L



**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: 10-1694  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Phase I Step 1 - Temporary 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 16 (Providence Rd) at SR 2948 (Rea Rd)

Division 10 Union County Weddington

PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead

PREPARED BY: T.R. Terrell REVIEWED BY: N.M. Rodevick

REVISIONS INIT. DATE

Signature: Nathaniel Rodevick 7-27-07

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATHAN M. RODEVICK

122 N. McDowell St., Raleigh, NC 27603

HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609

SIG. INVENTORY NO. 10-1694 T1

PHASING DIAGRAM

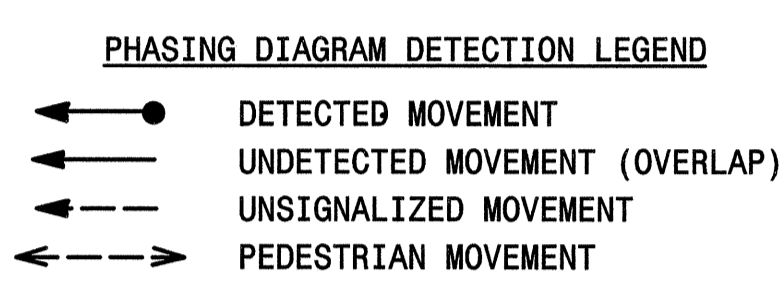
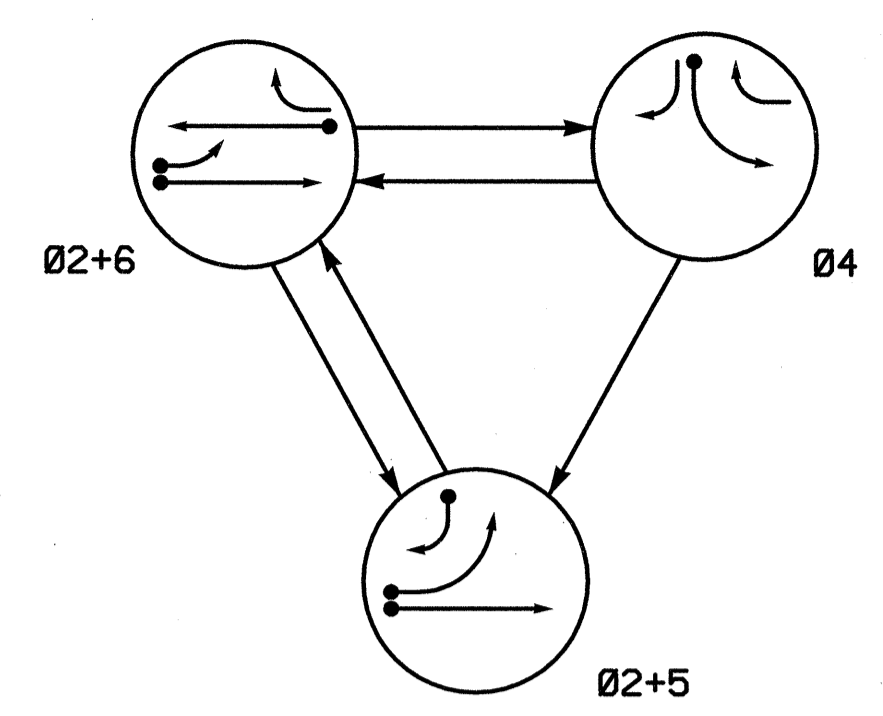
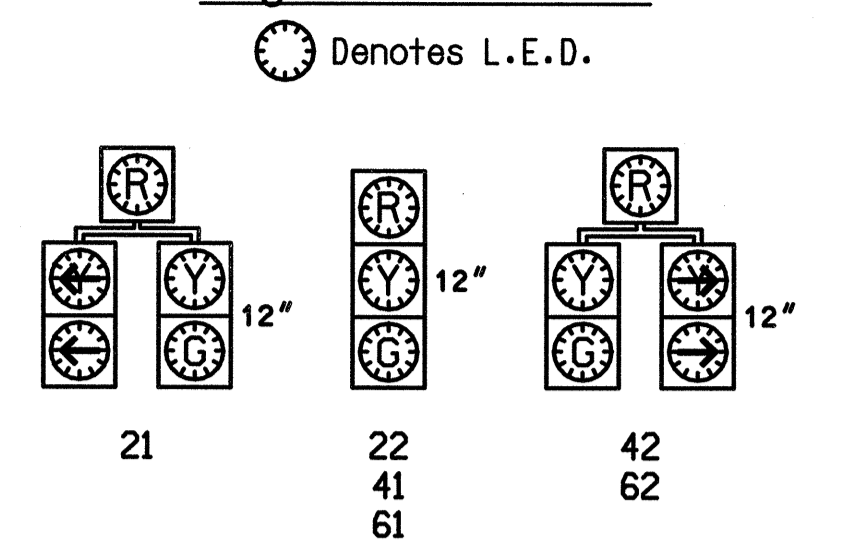


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04	LEGEND
21	G	R	Y	
22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
61	R	G	R	Y
62	R	G	R	Y

Signal Face I.D.



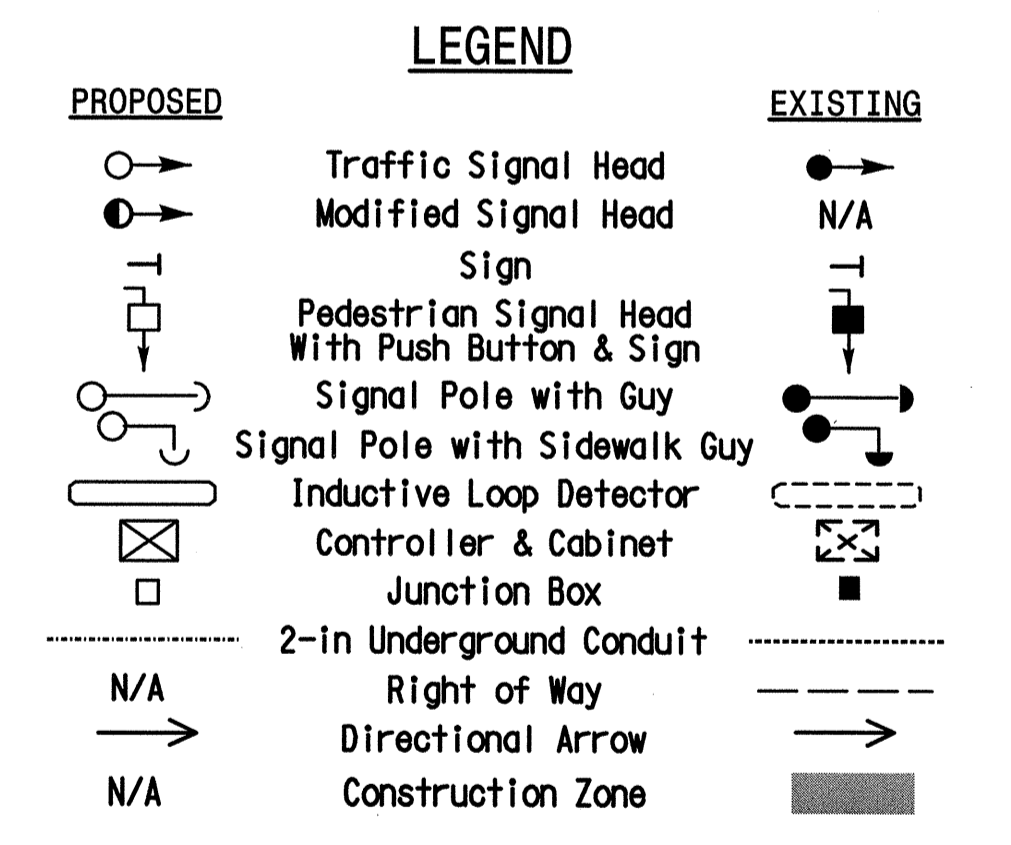
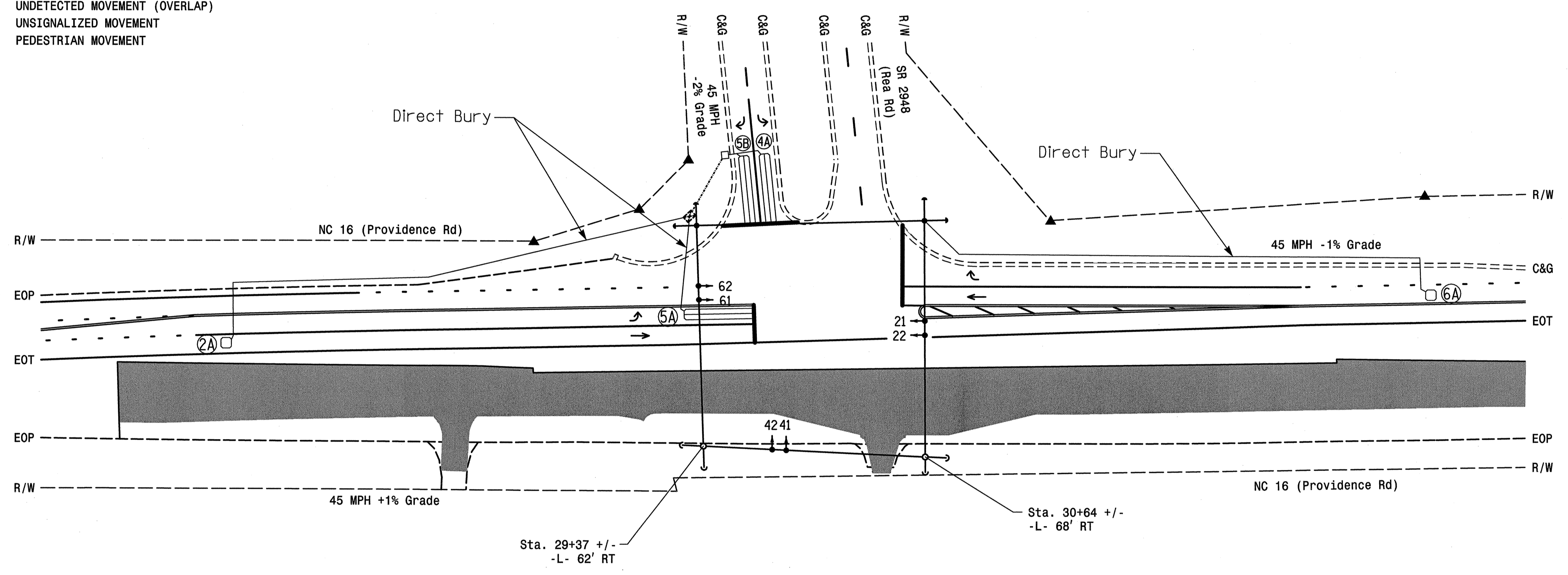
2070L LOOP & DETECTOR INSTALLATION

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

3 Phase Fully Actuated (Isolated)

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. Relocate existing signal heads numbered 21,22,41,42, 61 and 62.
4. Set all detector units to presence mode.



2070L TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	60	20	20	60
Yellow Clearance	4.4	4.7	3.0	4.6
Red Clearance	1.3	1.5	2.3	1.5
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
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	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

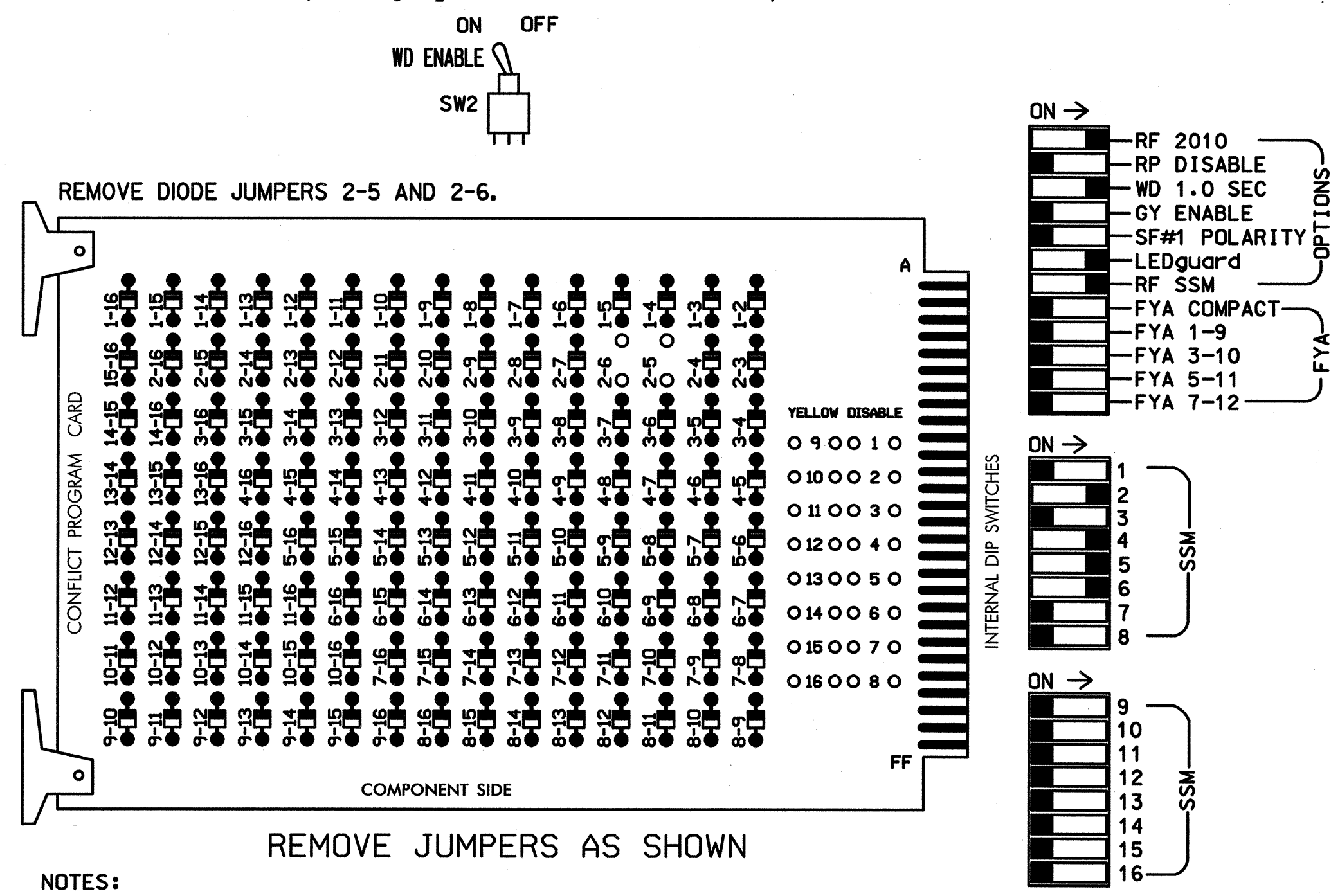
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Phase I Step 3 - Temporary Signal 2

<p>750 Greenfield Parkway Garner, NC 27529</p>	<p>NC 16 (Providence Rd) at SR 2948 (Rea Rd)</p>								
	<p>Division 10 Union County Weddington</p> <p>PLAN DATE: July 2007 REVIEWED BY: N.M. Rodevick</p> <p>PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin</p>	<p>SEAL</p> <p>SPENCER T. FRANKLIN</p> <p>2-27-07</p>							
<p>SCALE</p> <p>0 40</p> <p>1"=40'</p>		<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		NO.	INIT.	DATE			
NO.	INIT.	DATE							

### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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 1,3,7,8,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

### 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  
 PHASES USED.....2,4,5,6  
 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.	NU	21,22	NU	NU	41,42	62	NU	21,42	61,62	NU	NU	NU
RED		128			101		*	134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW					102		132					
GREEN ARROW					103		133					
Hand icon												
Person icon												

NU = Not Used

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

### INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
L	DC ISOLATOR	2A	NOT USED	4A	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	FS
		NOT USED		NOT USED										DC ISOLATOR
FILE "J"	∅ 5	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17
U	5B	5A	6A	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
L	NOT USED	∅ 2	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

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

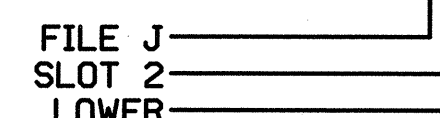
FS = FLASH SENSE  
ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT 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 <sup>1</sup>	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	TB3-9,10	J3U	64	26	36	6	Y	Y	-	-	-

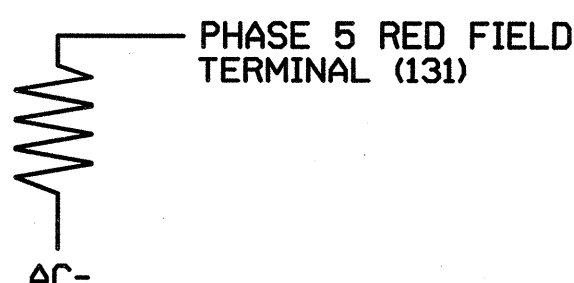
<sup>1</sup>ADD JUMPERS FROM TB3-5 TO TB3-7, AND FROM TB3-6 TO TB3-8.

INPUT FILE POSITION LEGEND: J2L



### LOAD RESISTOR INSTALLATION DETAIL

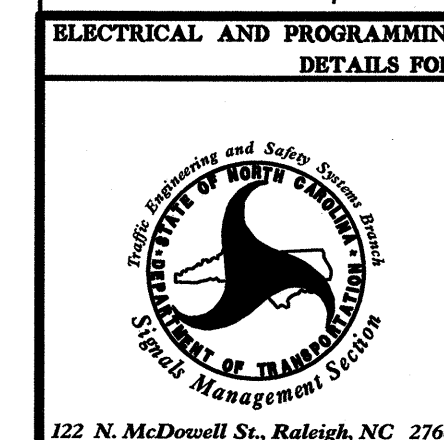
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



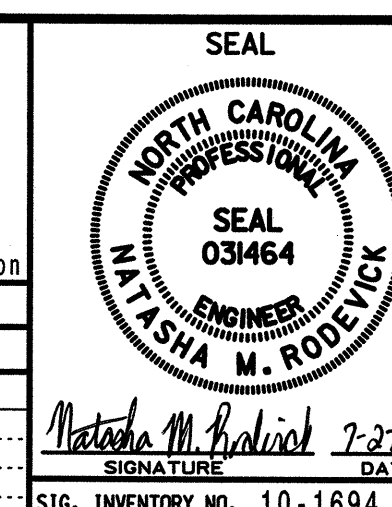
NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1694  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

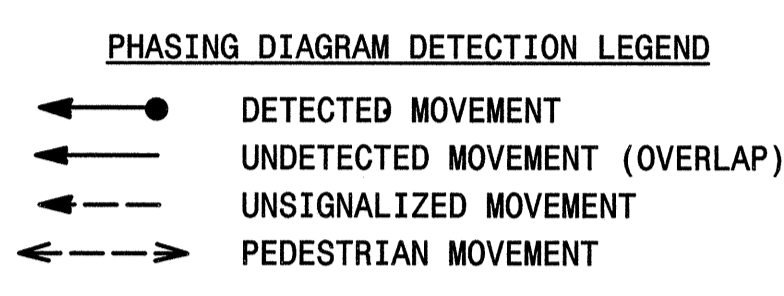
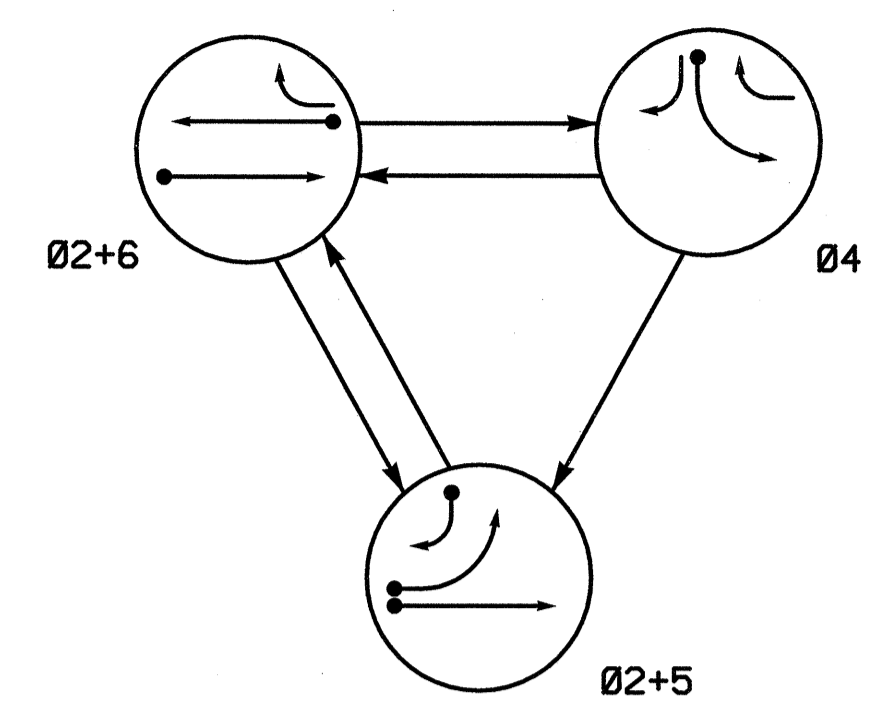
Phase I Step 3 - Temporary 2



ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 16 (Providence Rd) at SR 2948 (Rea Rd)	
Division 10	Union County	Weddington	
PLAN DATE: July 2007	REVIEWED BY: H.L. Winstead		
PREPARED BY: T.R. Terrell	REVIEWED BY: N.W. Rodevick		
REVISIONS	INIT.	DATE	
SIGNATURE: <i>W. Tasha M. Rodevick</i>		DATE: 7-27-07	



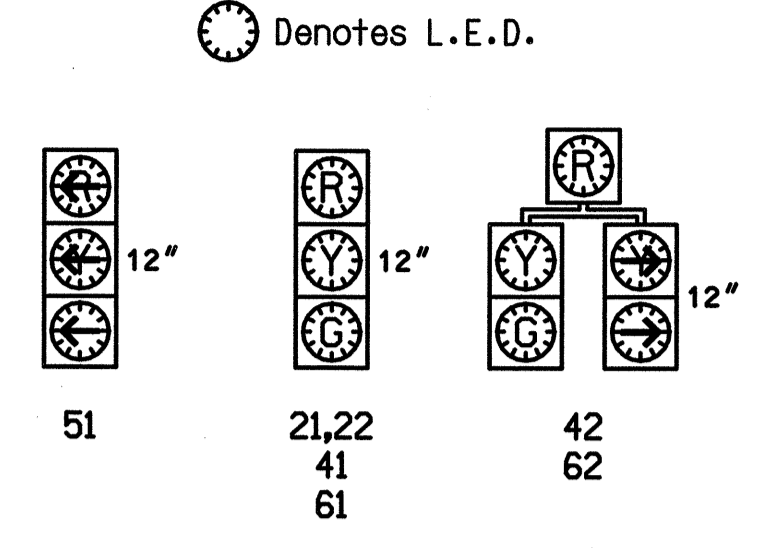
**PHASING DIAGRAM**



**TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04	LEGEND
21,22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	-	-	-	-
61	R	G	R	Y
62	R	G	R	Y

**Signal Face I.D.**



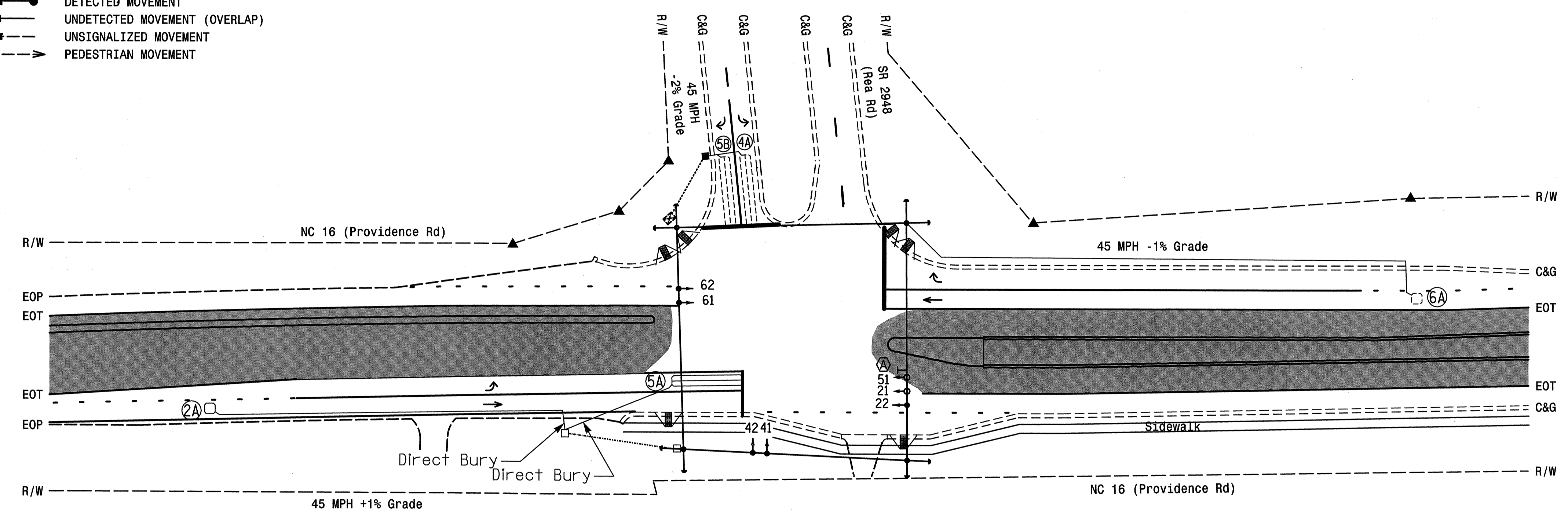
**2070L LOOP & DETECTOR INSTALLATION**

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

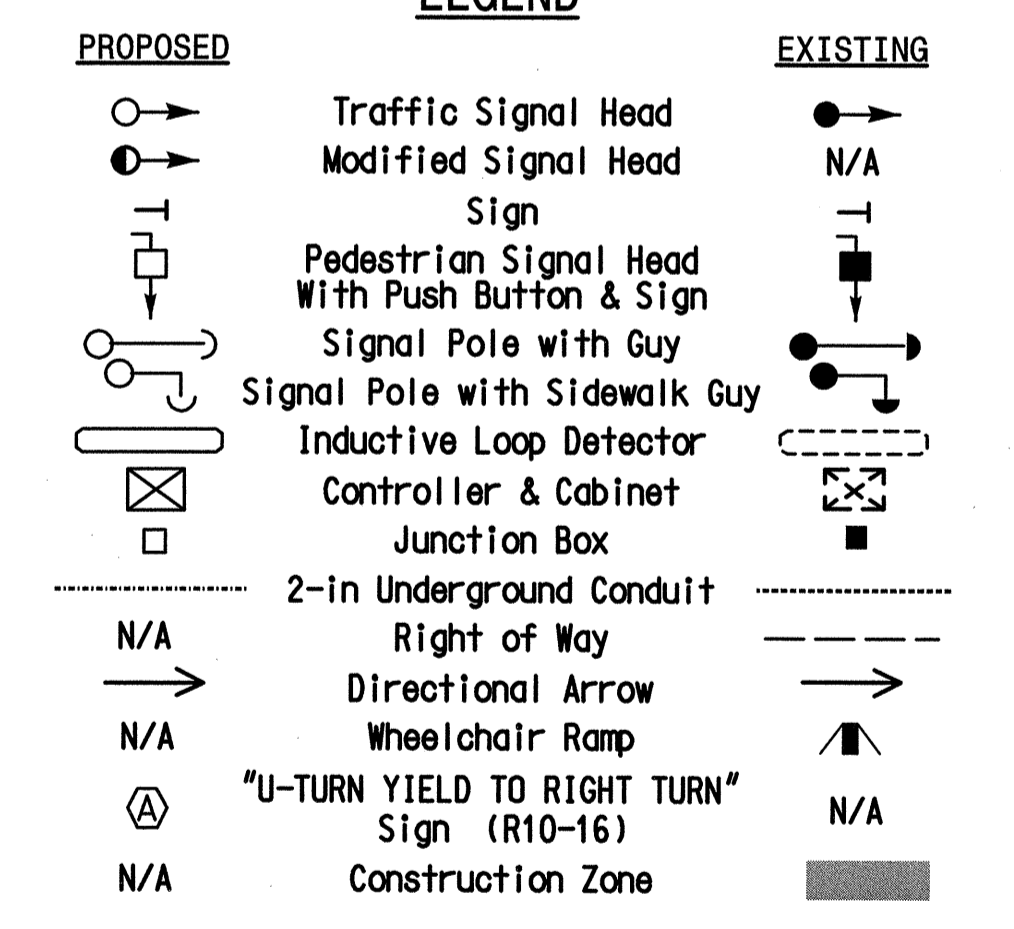
**3 Phase Fully Actuated (Isolated)**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 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.
- Reposition existing signal heads numbered 22.
- Set all detector units to presence mode.



**LEGEND**



**2070L TIMING CHART**

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	60	20	20	60
Yellow Clearance	4.4	4.7	3.0	4.6
Red Clearance	1.3	2.0	2.9	1.6
Red Revert	5.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
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	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

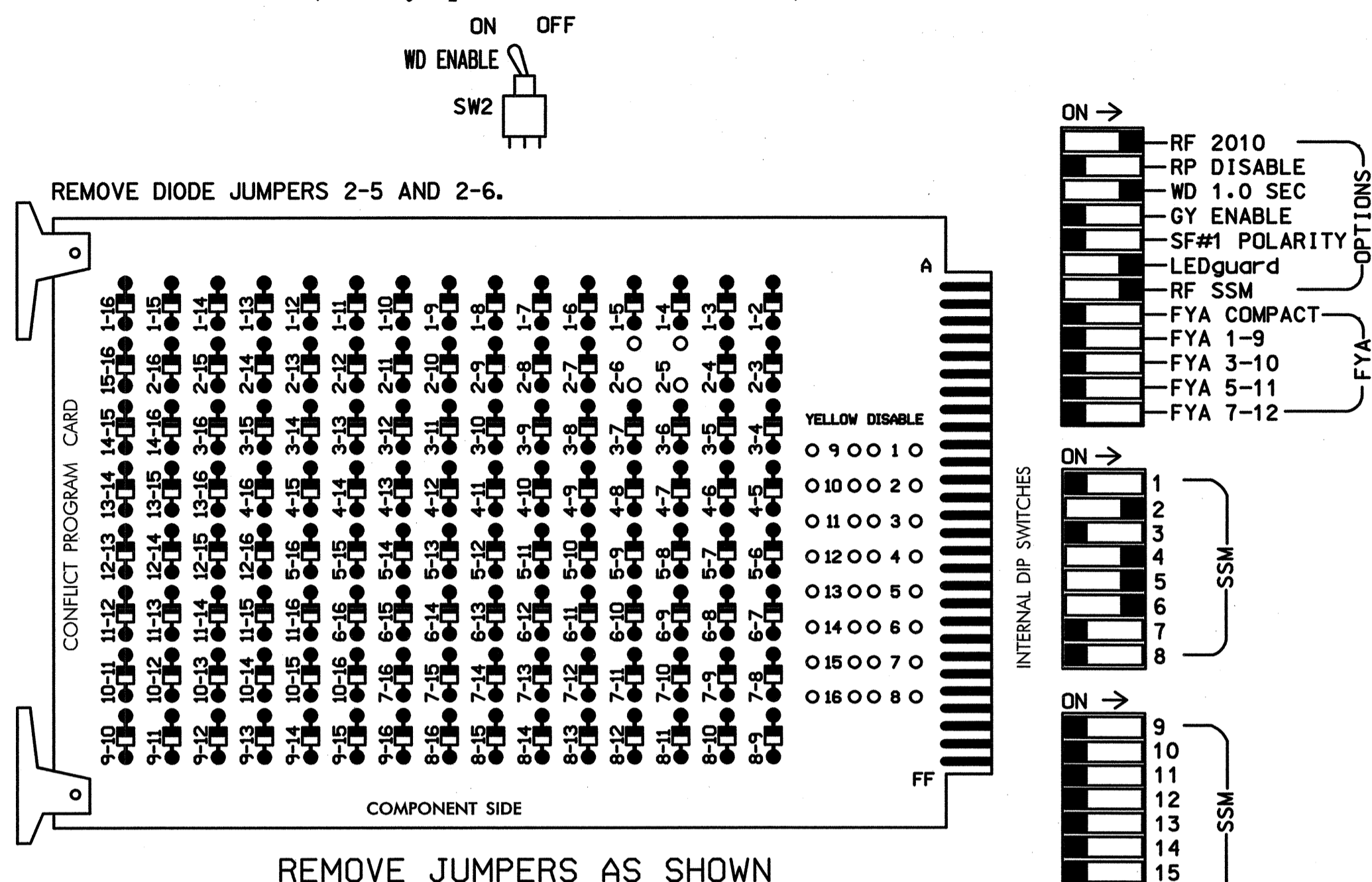
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

**Phase II Step 2 - Temporary Signal 3**

	<b>NC 16 (Providence Rd) at SR 2948 (Rea Rd)</b>	
	Division 10 Union County Weddington PLAN DATE: July 2007 PREPARED BY: T.R. Terrell	REVIEWED BY: N.M. Rodevick REVIEWED BY: S.T. Franklin
SCALE 0 40 1"=40'	REVISIONS INIT. DATE	SEAL SIGNATURE: Spencer T. Franklin DATE: 7-27-07 SIG. INVENTORY NO. 10-1694 T3

### 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 1,3,7,8,9,10, 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 NC 16 (Providence Rd) Closed Loop Signal System in Union County.

### 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  
 PHASES USED.....2,4,5,6  
 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.	NU	21,22	NU	NU	41,42	62	NU	51	42	61,62	NU	NU
RED		128			101					134		
YELLOW		129			102					135		
GREEN		130			103					136		
RED ARROW								131				
YELLOW ARROW					102		132	132				
GREEN ARROW					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	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	FS
	L	2A	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
FILE "J"	U	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	ST
	L	5A	6A	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
		∅ 5	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	
		5B												

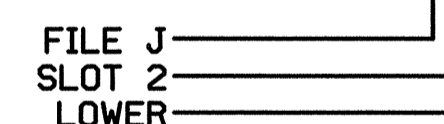
EX.: 1A, 2A, ETC. = LOOP NO.'S

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	-	-	-
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	-	-	-

INPUT FILE POSITION LEGEND: J2L



### BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '6' (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.

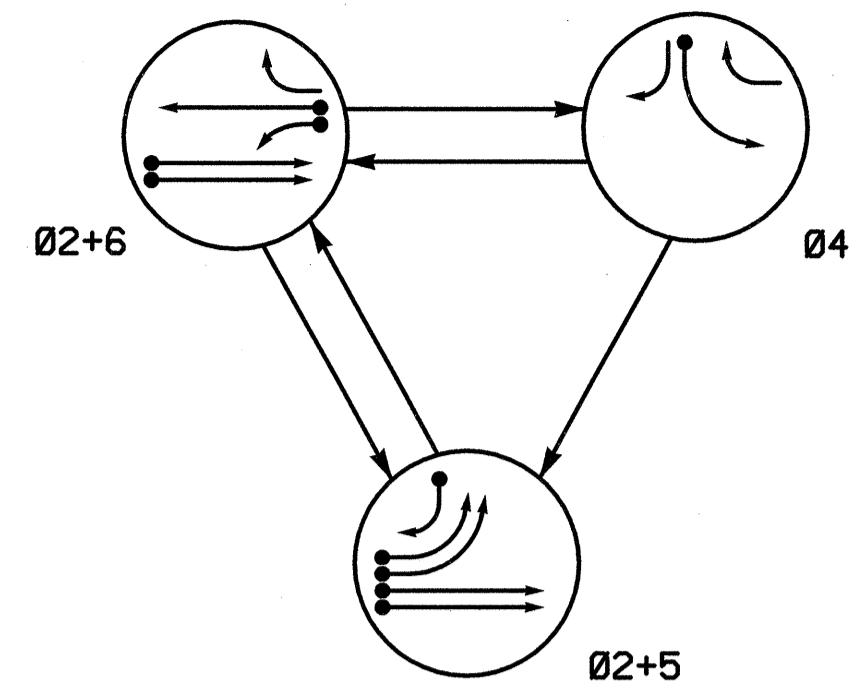
THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 10-1694  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Phase II Step 2 - Temporary 3

	NC 16 (Providence Rd) at SR 2948 (Rea Rd)		
	Division 10      Union County      Weddington	PLAN DATE: July 2007      REVIEWED BY: H.L. Winstead	
PREPARED BY: T.R. Terrell	REVIEWED BY: N.W. Rodevick	REVISIONS	INIT.      DATE
122 N. McDowell St., Raleigh, NC 27603		SIGNATURE: <i>N.W. Rodevick</i>	DATE: 7-27-07

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

PHASING DIAGRAM

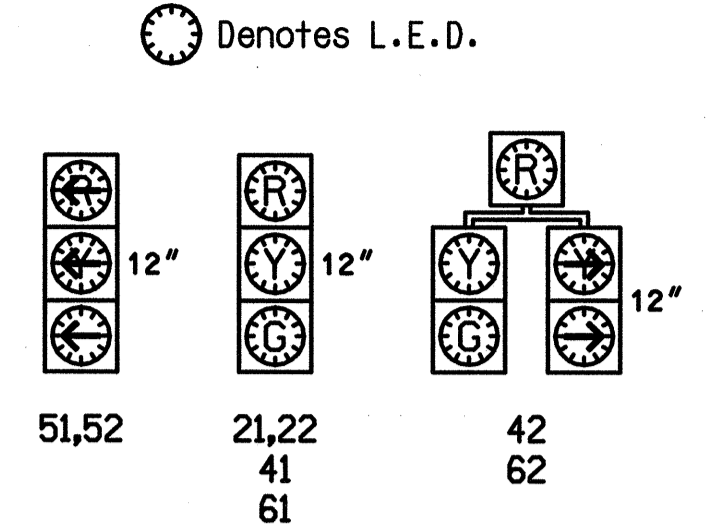


PHASING DIAGRAM DETECTION LEGEND

- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←○→ UNSIGNALIZED MOVEMENT
- ←○→ PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE			
	Ø 2+5	Ø 2+6	Ø 4	F L CROSS
21,22	G	G	R	Y
41	R	R	G	R
42	R	G	R	R
51,52	R	R	R	R
61	R	G	R	Y
62	R	G	R	Y

Signal Face I.D.



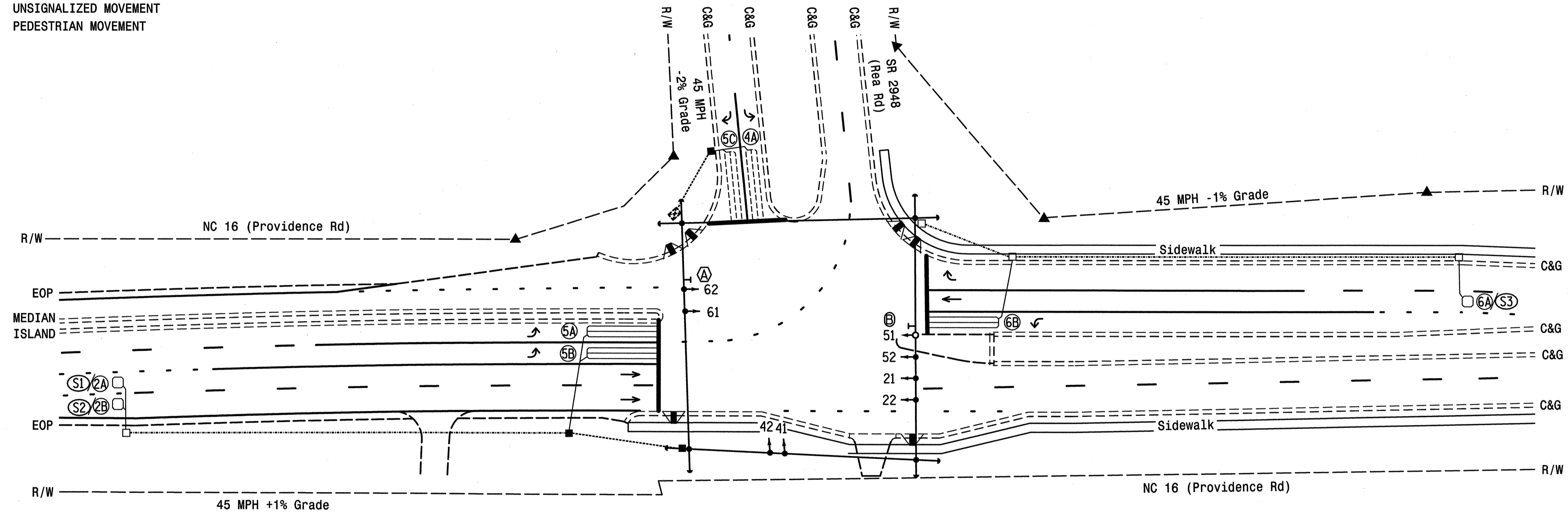
2070L LOOP & DETECTOR INSTALLATION

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

3 Phase Fully Actuated (NC 16 - Providence Rd CLS)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 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.
- Reposition existing signal heads numbered 21, 22, 52, 61 and 62.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1694.



FEATURE	PHASE			
	2	4	5	6
Min Green 1*	12	7	7	12
Extension 1*	6.0	2.0	2.0	6.0
Max Green 1*	60	20	20	60
Yellow Clearance	4.4	4.7	3.0	4.6
Red Clearance	2.0	1.7	3.6	1.9
Red Revert	5.0	2.0	2.0	2.0
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	1.5	-	-	2.5
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	-	-	-	-
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.

PROPOSED	EXISTING
	N/A
N/A	
N/A	
N/A	
	N/A
N/A	

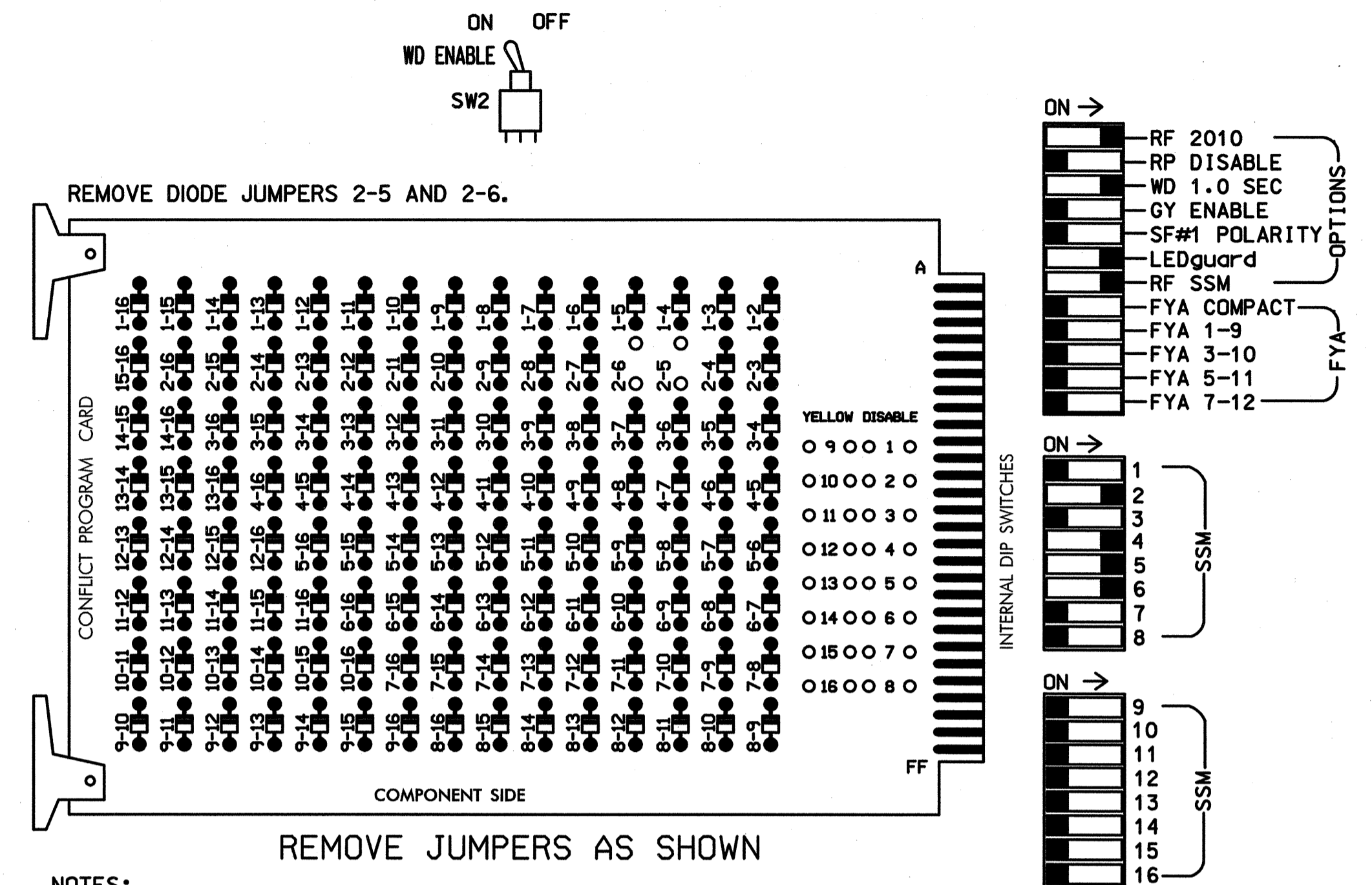
Final Signal

	NC 16 (Providence Rd) at SR 2948 (Rea Rd)	
	Division 10 Union County Weddington PLAN DATE: July 2007 PREPARED BY: T.R. Terrell	REVIEWED BY: N.W. Rodevick REVIEWED BY: S.T. Franklin
	REVISIONS: _____ INIT. DATE: _____	SIGNATURE: <i>Spencer T. Franklin</i> 7-27-07 DATE: _____ SIG. INVENTORY NO. 10-1694
	HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609	



**EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



- NOTES:**
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
  - Make sure jumpers SEL2-SEL5 are present on the monitor board.
- = DENOTES POSITION OF SWITCH

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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 1,3,7,8,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

**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	62	NU	51,52	42	61,62	NU	NU
RED		128			101					134		
YELLOW		129			102					135		
GREEN		130			103					136		
RED ARROW								131				
YELLOW ARROW						102	132	132				
GREEN ARROW						103	133	133				
Hand icon												
Person icon												

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,S5,S6  
 PHASES USED.....2,4,5,6  
 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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 2	2A/SYS	∅ 3	∅ 4	∅ 5	4A	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	FS
L	2B/SYS	∅ 2	∅ 3	∅ 4	∅ 5	NOT USED	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	DC ISOLATOR
U	∅ 5	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	FS
L	5A	5B	6A/SYS	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	DC ISOLATOR
U	NOT USED	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	FS
L	5C	6B	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	DC ISOLATOR

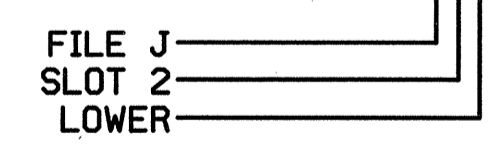
EX. : 1A, 2A, ETC. = LOOP NO.'S

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	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y	-	-	-
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y	-	-	-
4A	TB4-9,10	I6U	41	3	4	Y	Y	-	-	-	-
5A	TB3-1,2	J1U	55	17	5	Y	Y	-	-	-	-
5B	TB3-5,6	J2U	40	2	6	Y	Y	-	-	-	-
5C	TB3-7,8	J2L	44	6	16	Y	Y	-	-	-	10
6A/S3	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y	-	-	-
6B	TB3-11,12	J3L	77	39	46	6	Y	Y	Y	-	3

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1694  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

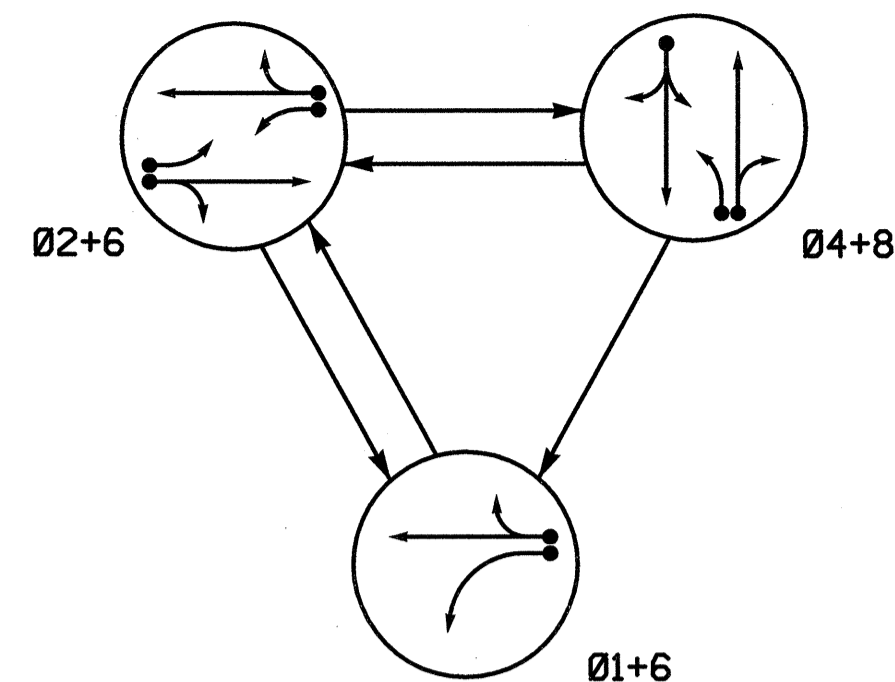
NC 16 (Providence Rd) at SR 2948 (Rea Rd)

Division 10	Union County	Weddington
PLAN DATE: July 2007	REVIEWED BY: H.L. Winstead	
PREPARED BY: T.R. Terrell	REVIEWED BY: N.M. Rodevick	
REVISIONS	INIT.	DATE

SEAL

SIGNATURE: N. M. Rodevick DATE: 7-27-07

**PHASING DIAGRAM**

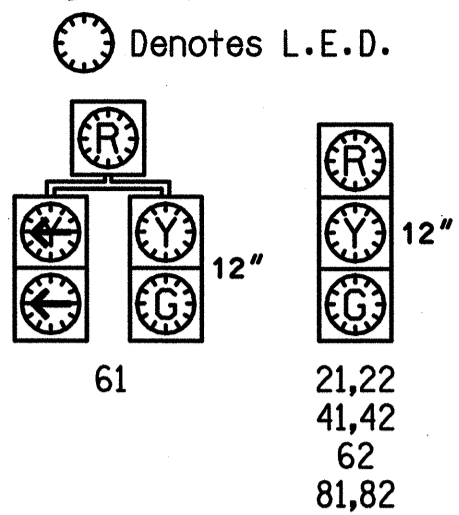


**PHASING DIAGRAM DETECTION LEGEND**

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

SIGNAL FACE	PHASE			
	Ø 1+6	Ø 2+6	Ø 4+8	FLASH
21,22	R	G	R	Y
41,42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y
81,82	R	R	G	R

**Signal Face I.D.**



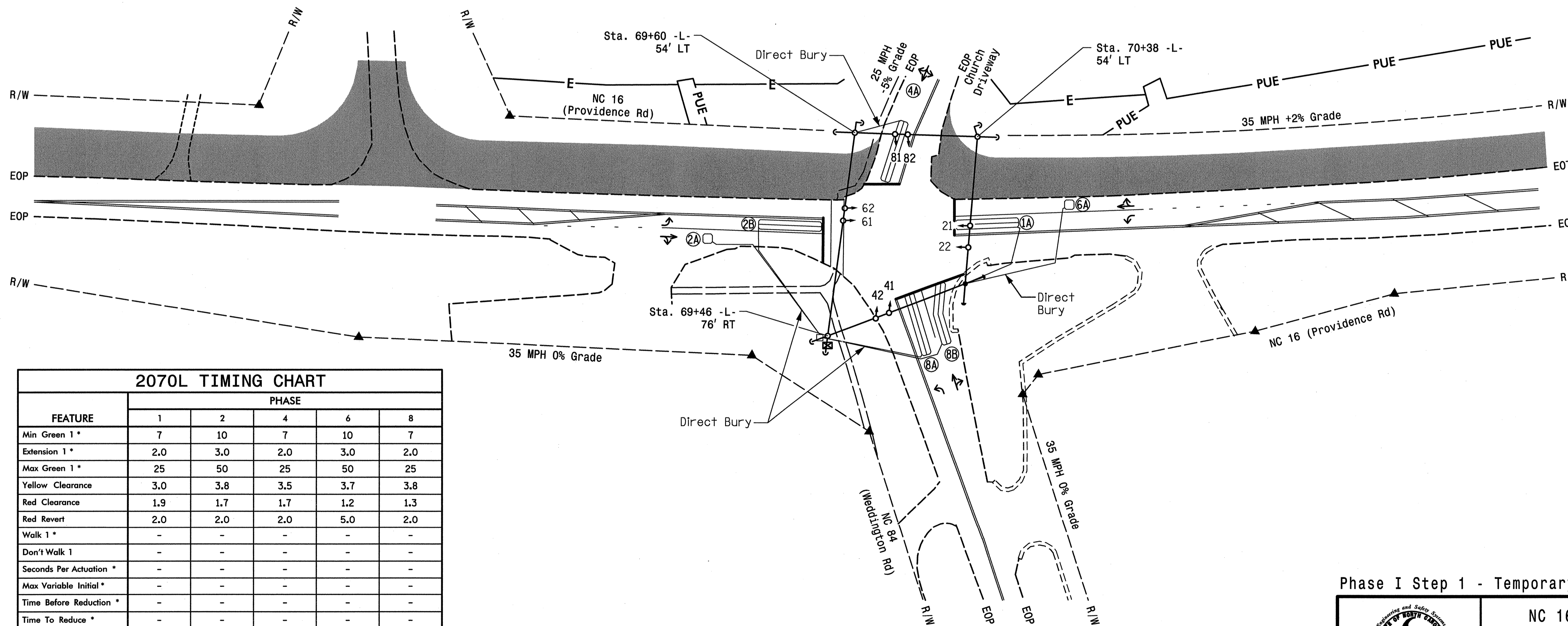
**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME			DELAY TIME
1A	6x40	0	2-4-2	Y	1	Y	Y	-	-	10	-	Y
2A	6x6	70	3	Y	2	Y	Y	-	-	-	-	Y
2B	6x40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	6x40	0	2-4-2	Y	4	Y	Y	-	-	10	-	Y
6A	6x6	70	3	Y	6	Y	Y	-	-	-	-	Y
8A	6x40	0	2-4-2	Y	8	Y	Y	-	-	3	-	Y
8B	6x40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y

3 Phase Fully Actuated (Isolated)

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



**2070L TIMING CHART**

FEATURE	PHASE				
	1	2	4	6	8
Min Green 1 *	7	10	7	10	7
Extension 1 *	2.0	3.0	2.0	3.0	2.0
Max Green 1 *	25	50	25	50	25
Yellow Clearance	3.0	3.8	3.5	3.7	3.8
Red Clearance	1.9	1.7	1.7	1.2	1.3
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

PROPOSED		EXISTING	
○	Traffic Signal Head	●	N/A
○	Modified Signal Head		
○	Sign		
○	Pedestrian Signal Head With Push Button & Sign		
○	Signal Pole with Guy		
○	Signal Pole with Sidewalk Guy		
○	Inductive Loop Detector		
○	Controller & Cabinet		
○	Guardrail		
○	Junction Box		
○	2-in Underground Conduit		
○	Right of Way		
○	Directional Arrow		
○	Easement Permanent Utility		
○	Easement Construction		
○	Construction Zone		

Phase I Step 1 - Temporary Signal 1

**NC 16 (Providence Rd) at NC 84 (Weddington Rd)**

Division 10 Union County Weddington

PLAN DATE: July 2007 REVIEWED BY: N.M. Rodevick

PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin

SCALE: 1"=40'

REVISIONS: \_\_\_\_\_ INIT. DATE

SIGNATURE: \_\_\_\_\_ DATE: 7-27-07

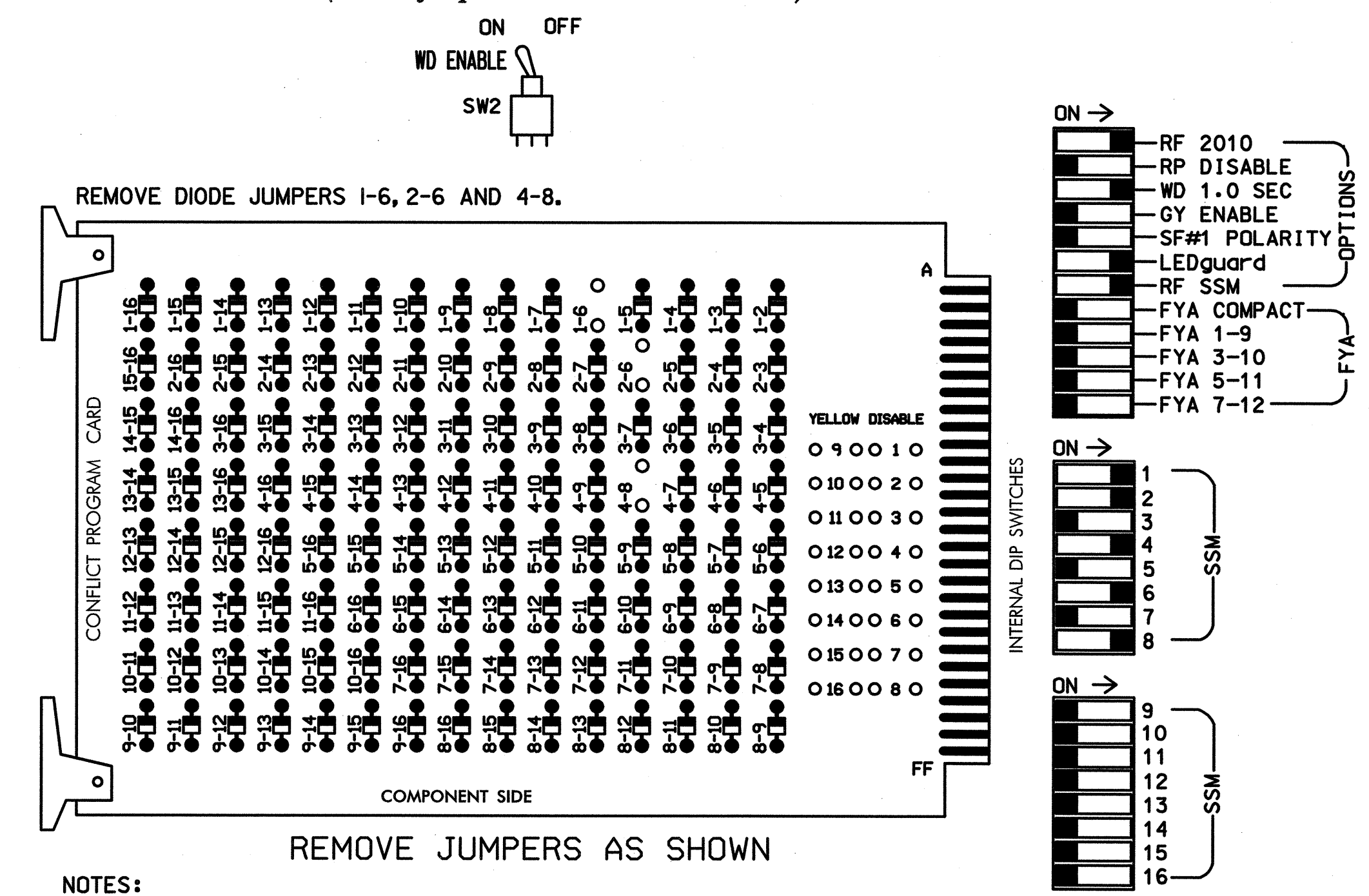
SIG. INVENTORY NO. 10-0907 T1

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

\* 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.

### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

### 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

### 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	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.

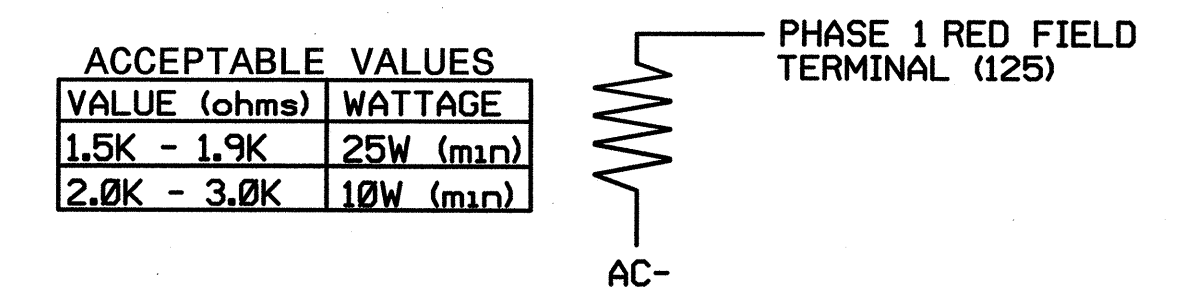
### INPUT FILE POSITION LAYOUT

(front view)

FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	L	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
		1A	2A	∅	4A	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅
"J"	L	∅ 6	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
		1A	2B	∅	NOT USED	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅
"U"	L	∅ 6	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
		6A	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅
"U"	L	∅ 6	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
		NOT USED	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅

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

### LOAD RESISTOR INSTALLATION DETAIL



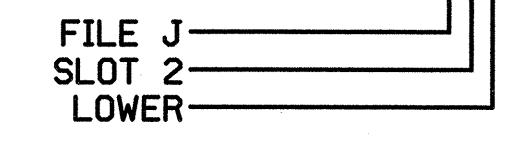
NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PTN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	10
	TB2-7,8	I2L	43	5	12	6	Y	Y	-	-	-
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	-	-
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	-	-
4A	TB4-9,10	I6U	41	3	4	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	-	-	3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y	-	-	10

<sup>1</sup>ADD JUMPERS FROM TB2-5 TO TB2-7, AND FROM TB2-6 TO TB2-8.

### INPUT FILE POSITION LEGEND: J2L



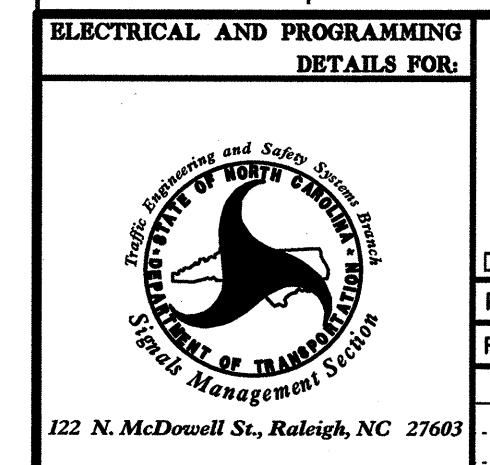
### BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '6' (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.

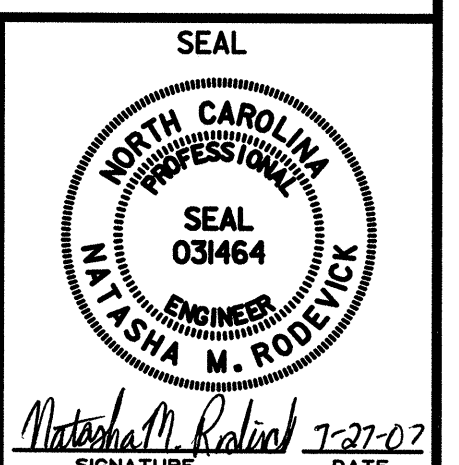
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0907  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Phase I Step 1 - Temporary 1  
 Phase I Step 3 - Temporary 2



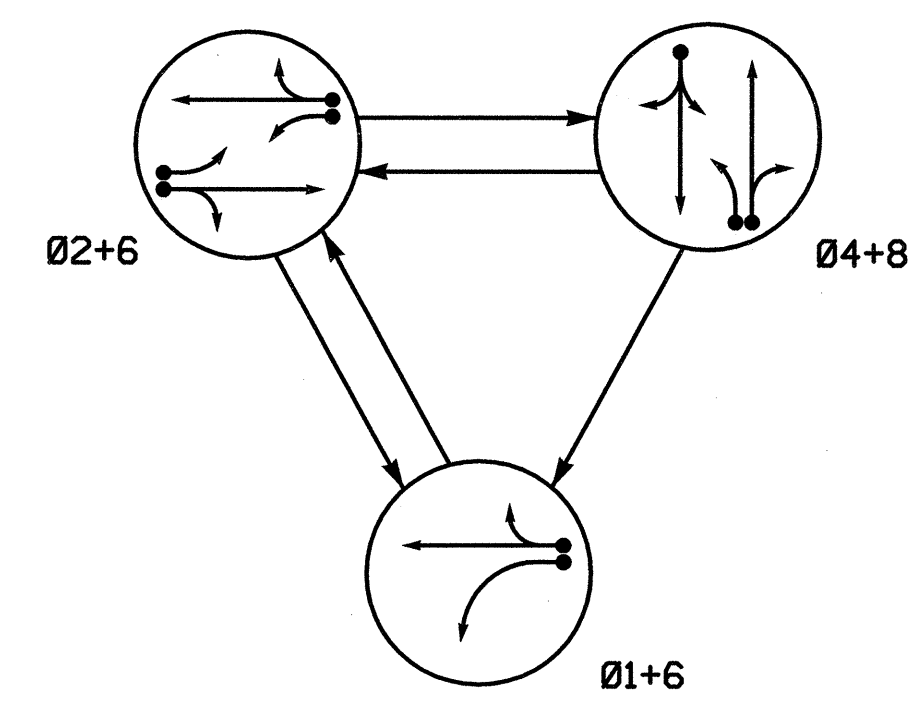
NC 16 (Providence Rd)  
 at  
 NC 84 (Weddington Rd)

Division 10 Union County Weddington  
 PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead  
 PREPARED BY: T.R. Terrell REVIEWED BY: N.M. Rodevick



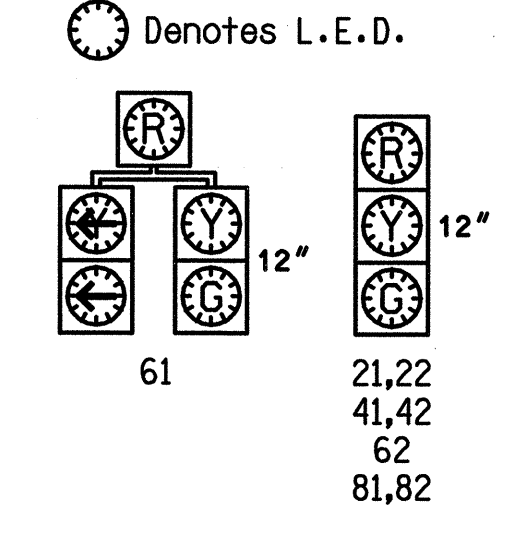
**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

**PHASING DIAGRAM**



SIGNAL FACE	PHASE			
	Ø 1+6	Ø 2+6	Ø 4+8	FLASH
21,22	R	G	R	Y
41,42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y
81,82	R	R	G	R

**Signal Face I.D.**



**2070L LOOP & DETECTOR INSTALLATION**

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	6x40	0	2-4-2	Y	1	Y	Y	-	-	10	-	-
2A	6x6	70	4	Y	2	Y	Y	-	-	-	-	-
2B	6x40	0	2-4-2	Y	2	Y	Y	-	-	-	-	-
4A	6x40	0	2-4-2	Y	4	Y	Y	-	-	10	-	-
6A	6x6	70	5	Y	6	Y	Y	-	-	-	-	-
8A	6x40	0	2-4-2	Y	8	Y	Y	-	-	3	-	-
8B	6x40	0	2-4-2	Y	8	Y	Y	-	-	10	-	-

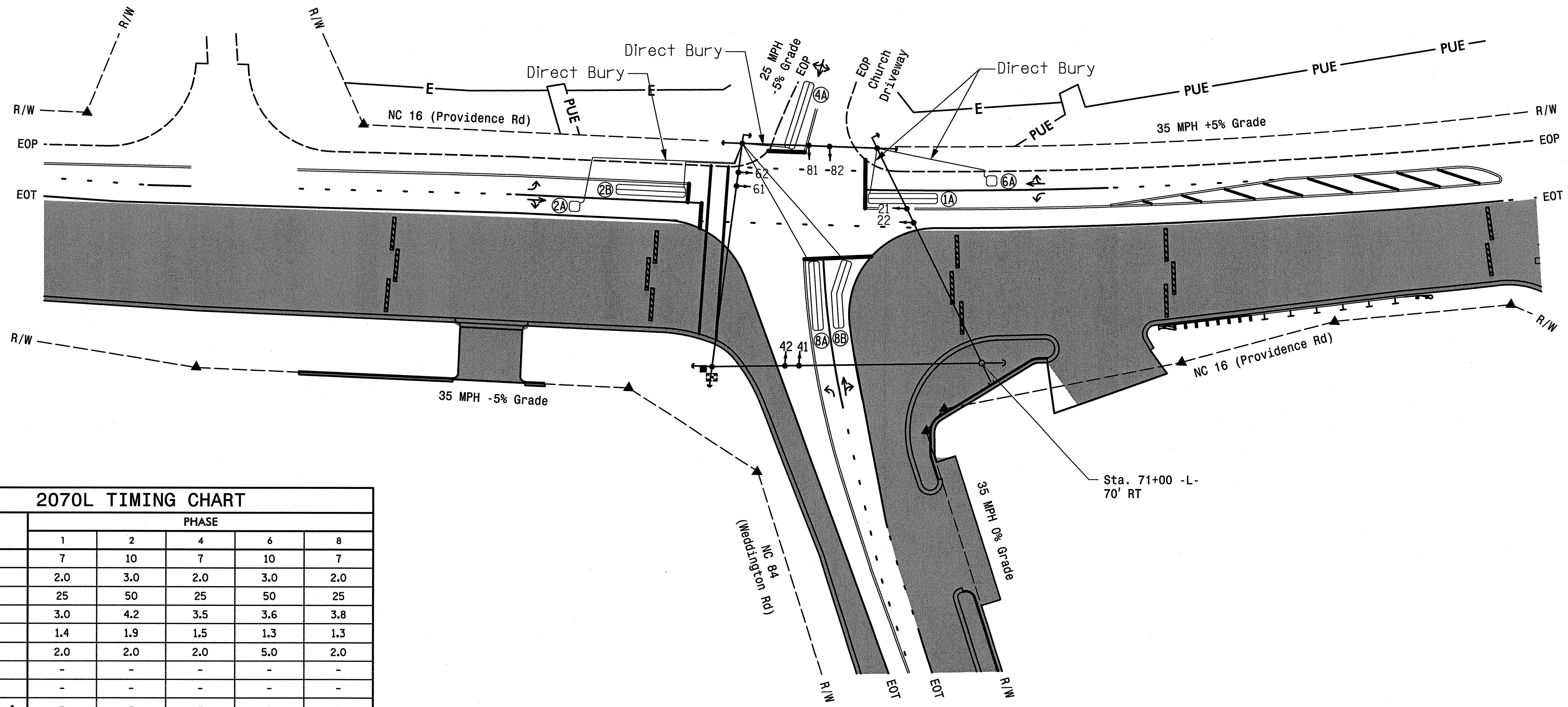
3 Phase Fully Actuated (Isolated)

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 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.
- Relocate existing signal heads numbered 21, 22, 41 and 42.
- Reposition existing signal heads numbered 61, 62, 81 and 82.
- Set all detector units to presence mode.

**PHASING DIAGRAM DETECTION LEGEND**

- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←○→ UNSIGNALIZED MOVEMENT
- ←○→ PEDESTRIAN MOVEMENT



**LEGEND**

- | PROPOSED   | EXISTING   |
|--|--|
| ○→ Traffic Signal Head                           | ○→ Traffic Signal Head                           |
| ●→ Modified Signal Head                          | N/A  |
| ⊥ Sign   | ⊥ Sign   |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ⊥ Signal Pole with Guy                           | ⊥ Signal Pole with Guy                           |
| ⊥ Signal Pole with Sidewalk Guy                  | ⊥ Signal Pole with Sidewalk Guy                  |
| ⊥ Inductive Loop Detector                        | ⊥ Inductive Loop Detector                        |
| ⊥ Controller & Cabinet                           | ⊥ Controller & Cabinet                           |
| ⊥ Guardrail                                      | ⊥ Guardrail                                      |
| ⊥ Junction Box                                   | ⊥ Junction Box                                   |
| ⊥ 2-in Underground Conduit                       | ⊥ 2-in Underground Conduit                       |
| → Right of Way                                   | → Right of Way                                   |
| → Directional Arrow                              | → Directional Arrow                              |
| N/A Guardrail                                    | ⊥ Guardrail                                      |
| N/A Easement Permanent Utility                   | — PUE  |
| N/A Easement Construction                        | — EC   |
| N/A Construction Zone                            | ▬  |
| N/A Construction Type III Barrier                | ▬  |

**2070L TIMING CHART**

FEATURE	PHASE				
	1	2	4	6	8
Min Green 1 *	7	10	7	10	7
Extension 1 *	2.0	3.0	2.0	3.0	2.0
Max Green 1 *	25	50	25	50	25
Yellow Clearance	3.0	4.2	3.5	3.6	3.8
Red Clearance	1.4	1.9	1.5	1.3	1.3
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.

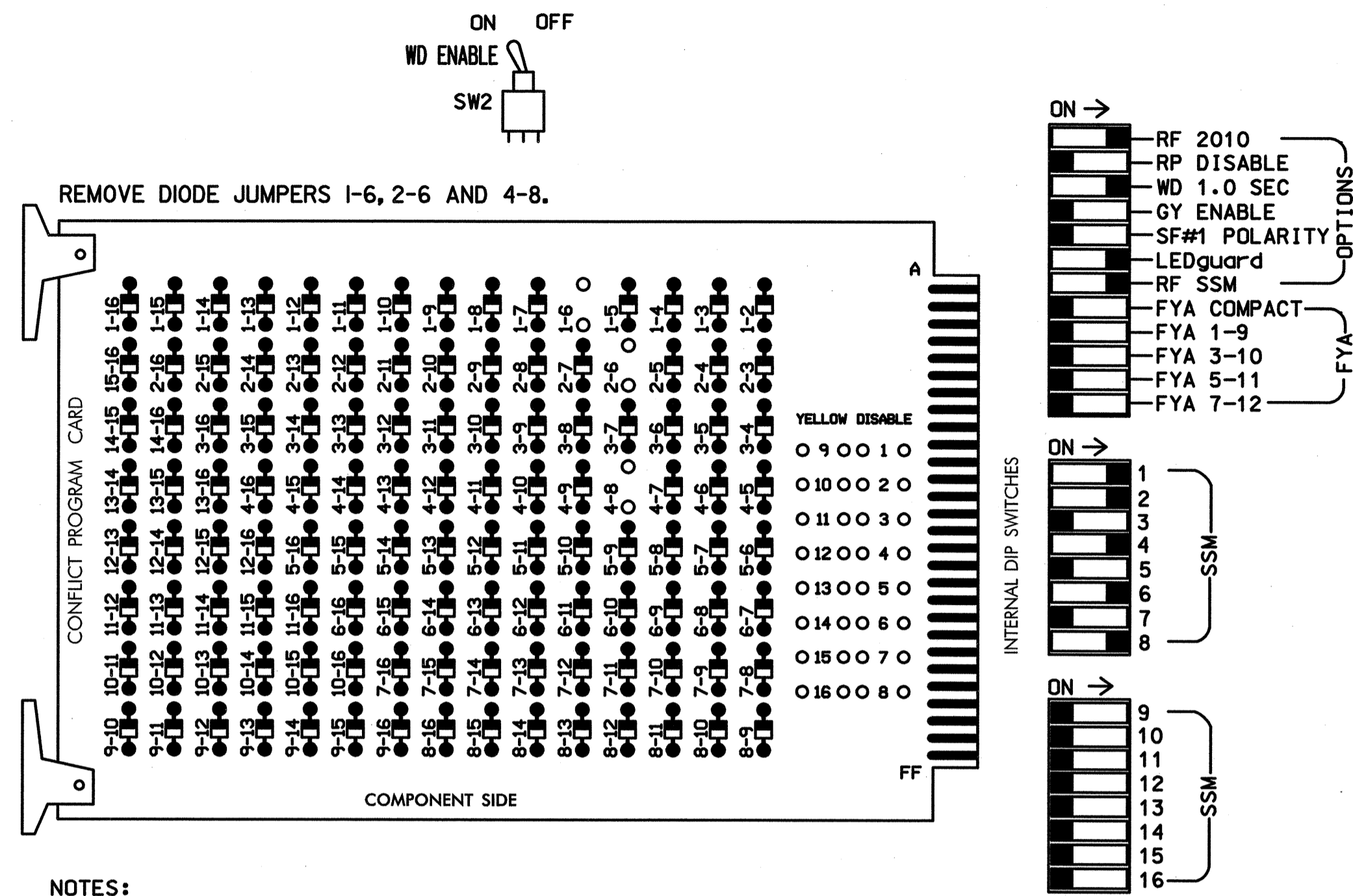
**Phase I Step 3 - Temporary Signal 2**

	<b>NC 16 (Providence Rd) at NC 84 (Weddington Rd)</b>		
	Division 10 Union County Weddington PLAN DATE: July 2007 REVIEWED BY: N.M. Rodevick PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin		
750 Greenfield Parkway Garner, NC 27529		SCALE 0 40 1"=40'	REVISIONS INIT. DATE



**EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

**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

**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 83	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82, 83	NU
RED	*	128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126	126										
GREEN ARROW	127	127										

NU = Not Used

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

**INPUT FILE POSITION LAYOUT**

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	S	S	∅ 4	S	S	S	S	S	S	S	FS
I	1B	1A	2A	-	-	4A	-	-	-	-	-	-	-	DC ISOLATOR
L	NOT USED	∅ 6	∅ 2	-	-	∅ 4	-	-	-	-	-	-	-	ST
U	S	∅ 6	S	S	S	∅ 8	S	S	S	S	S	S	S	DC ISOLATOR
I	-	6A	-	-	-	8A	-	-	-	-	-	-	-	-
L	-	NOT USED	-	-	-	∅ 8	-	-	-	-	-	-	-	-
U	-	-	-	-	-	8B	-	-	-	-	-	-	-	-

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

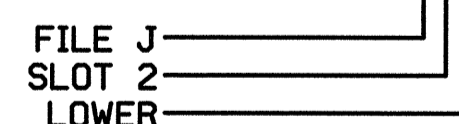
FS = FLASH SENSE  
 ST = STOP TIME

**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
1B	TB2-1,2	I1U	56	18	1	1	Y	Y	-	-	15
1A <sup>1</sup>	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	10
	TB2-7,8	I2L	43	5	12	6	Y	Y	-	-	-
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	-	-
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	-	-
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	-	10
4B	TB4-11,12	I6L	45	7	14	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	-	-	-
8B	TB5-11,12	J6L	46	8	18	8	Y	Y	-	-	-

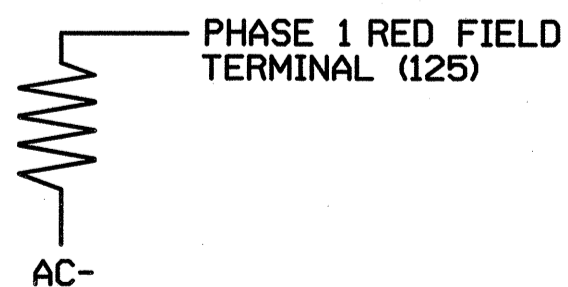
<sup>1</sup>ADD JUMPERS FROM TB2-5 TO TB2-7, AND FROM TB2-6 TO TB2-8.

INPUT FILE POSITION LEGEND: J2L



**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 '6' (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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0907  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Phase II Step 2 - Temporary 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 16 (Providence Rd) at NC 84 (Weddington Rd)

Division 10 Union County Weddington

PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead

PREPARED BY: T.R. Terrell REVIEWED BY: N.M. Rodevick

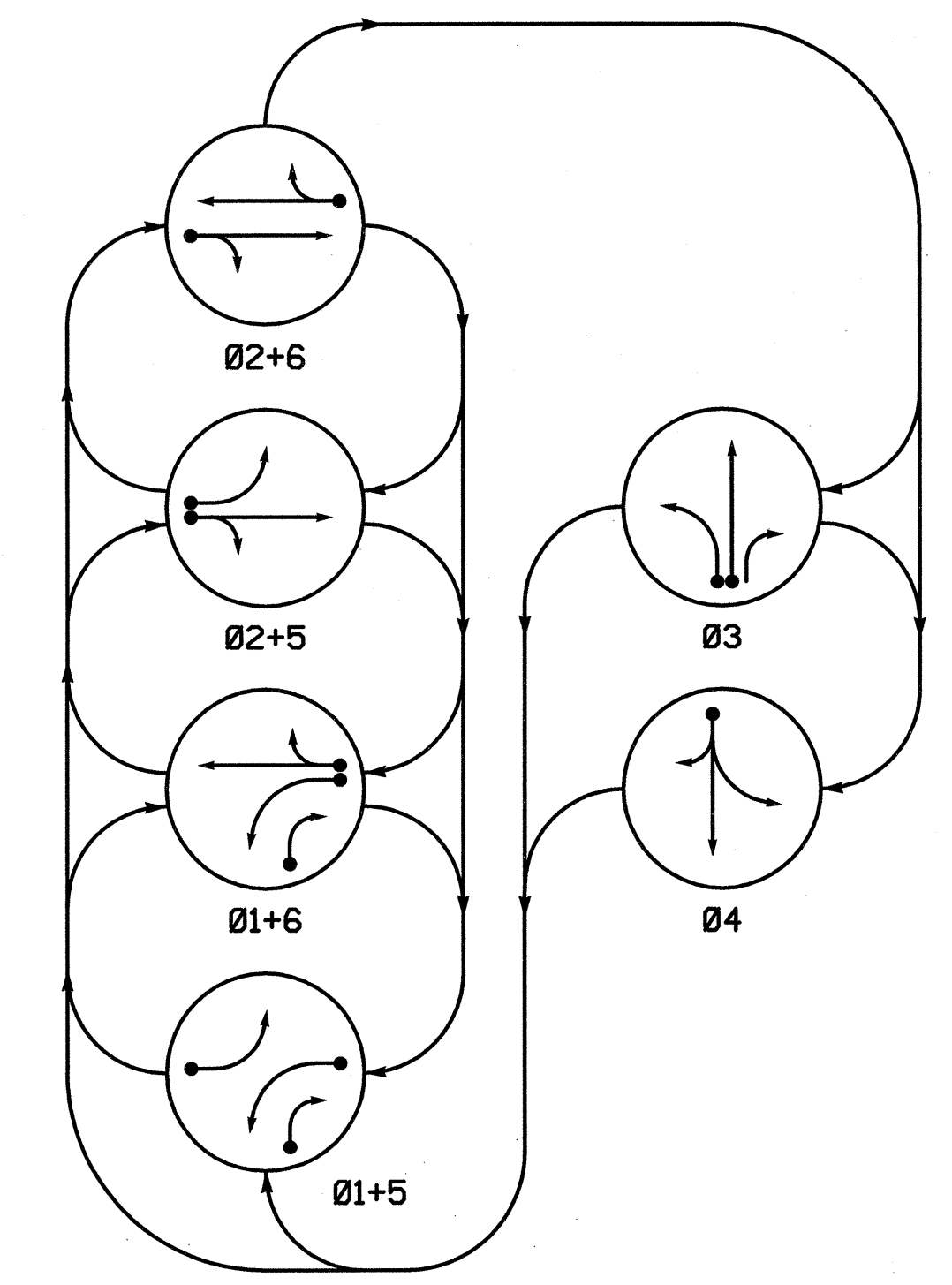
REVISIONS INIT. DATE

Signature: *Natasha M. Rodevick* DATE: 7-27-07

SIG. INVENTORY NO. 10-0907 T3

6 Phase Fully Actuated (Isolated)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

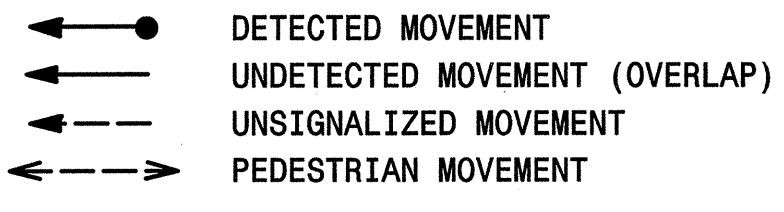
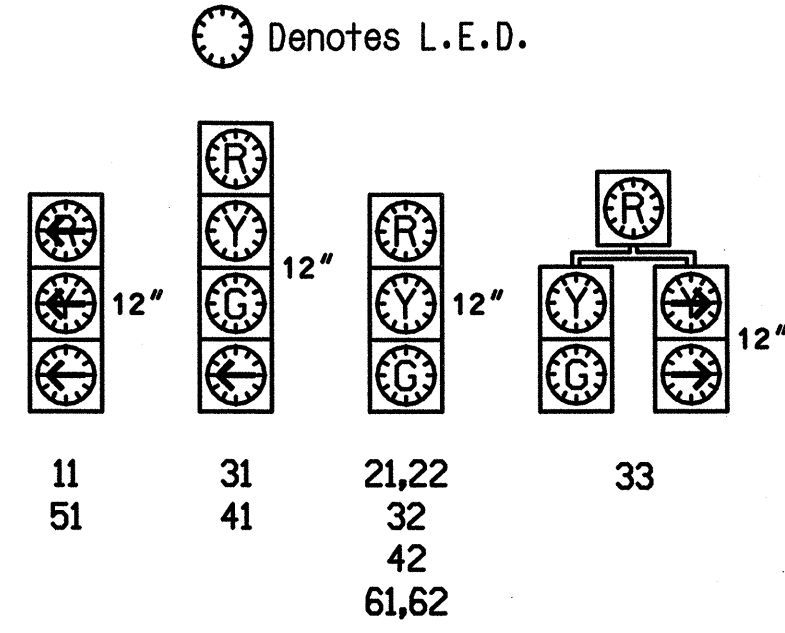


TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4
11	-	-	R	R	R	R
21,22	R	R	G	G	R	Y
31	R	R	R	R	G	R
32	R	R	R	R	G	R
33	R	R	R	R	G	R
41	R	R	R	R	R	G
42	R	R	R	R	R	G
51	-	R	-	R	-	R
61,62	R	G	R	G	R	Y

Signal Face I.D.

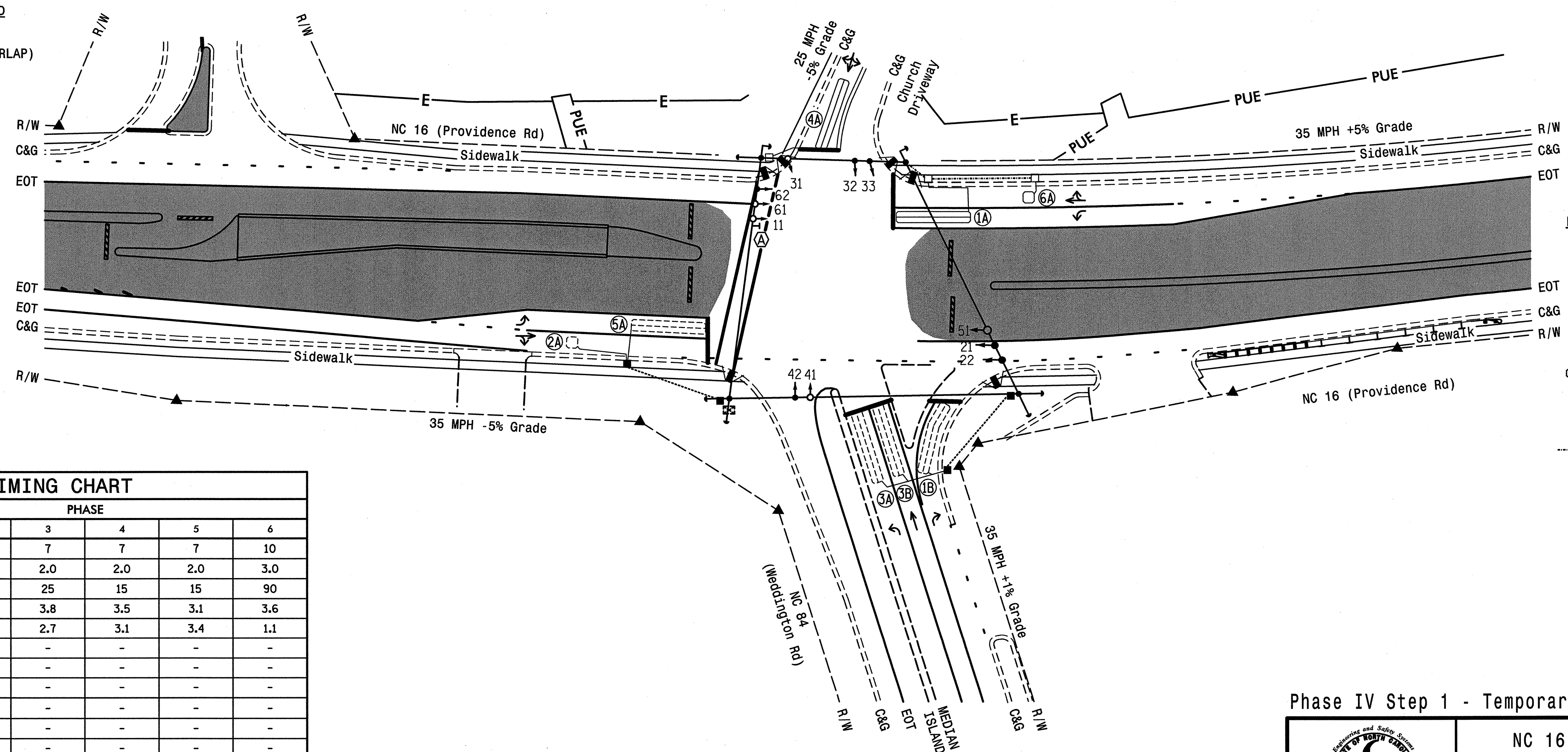


2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING							
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP
1A	6x40	0	2-4-2	Y	1	Y	Y	-	-	-	-
1B	6x40	0	2-4-2	-	1	Y	Y	-	-	15	-
2A	6x6	70	3	-	2	Y	Y	-	-	-	-
3A	6x40	0	2-4-2	-	3	Y	Y	-	-	-	-
3B	6x40	0	2-4-2	-	3	Y	Y	-	-	-	-
4A	6x40	0	2-4-2	Y	4	Y	Y	-	-	10	-
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	-	-
6A	6x6	70	5	Y	6	Y	Y	-	-	-	-

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Reposition existing signal heads numbered 21, 22 and 62.
- Set all detector units to presence mode.



2070L TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0
Max Green 1 *	25	90	25	15	15	90
Yellow Clearance	3.0	4.2	3.8	3.5	3.1	3.6
Red Clearance	3.2	3.0	2.7	3.1	3.4	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	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

LEGEND

PROPOSED	EXISTING
Traffic Signal Head	N/A
Modified Signal Head	N/A
Sign	N/A
Pedestrian Signal Head With Push Button & Sign	N/A
Signal Pole with Guy	N/A
Signal Pole with Sidewalk Guy	N/A
Inductive Loop Detector	N/A
Controller & Cabinet	N/A
Guardrail	N/A
Junction Box	N/A
2-in Underground Conduit	N/A
Right of Way	N/A
Directional Arrow	N/A
Wheelchair Ramp	N/A
"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	N/A
Guardrail	N/A
Easement Permanent Utility	N/A
Easement Construction	N/A
Construction Zone	N/A
Construction Type III Barrier	N/A

Phase IV Step 1 - Temporary Signal 4

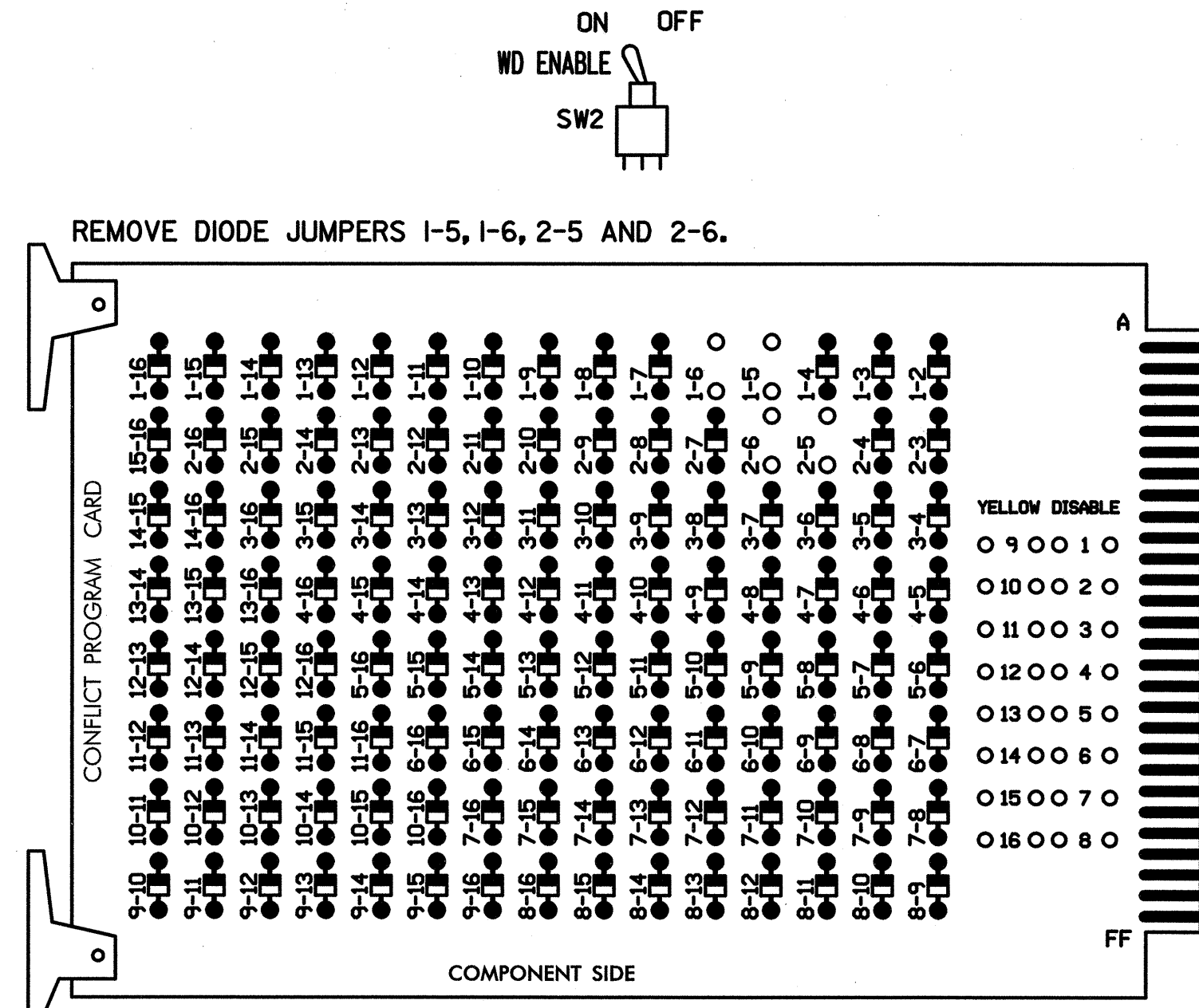
	NC 16 (Providence Rd) at NC 84 (Weddington Rd)			
	Division 10	Union County		Weddington
	PLAN DATE: July 2007	REVIEWED BY: N.M. Rodevick		
PREPARED BY: T.R. Terrell	REVIEWED BY: S.T. Franklin			
REVISIONS	INIT.	DATE		

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

\* 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.

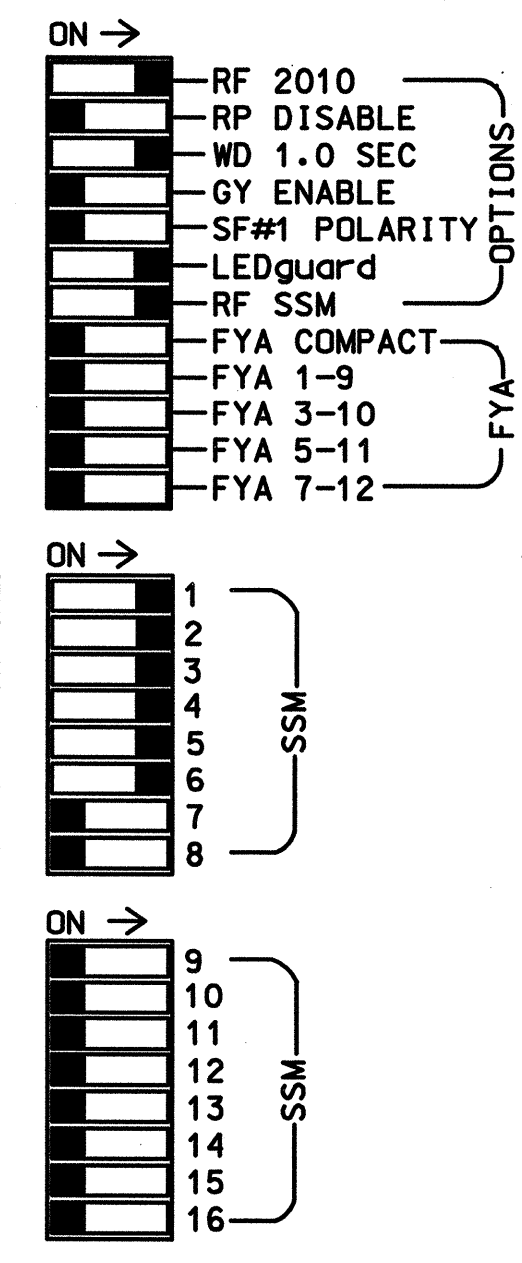
### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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 NC 16 (Providence Rd) Closed Loop Signal System in Union County.

### 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	33	21,22	NU	31	32,33	41	42	NU	51	61,62	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	126								132		
GREEN ARROW	127	127		118	103					133		
Hand icon												
Person icon												

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
L	1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A
U	1B	NOT USED	3B	NOT USED	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B
L	1B	NOT USED	3B	NOT USED	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B

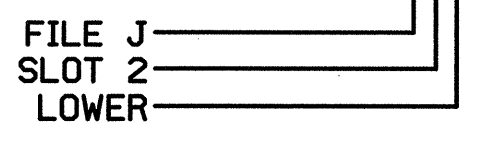
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

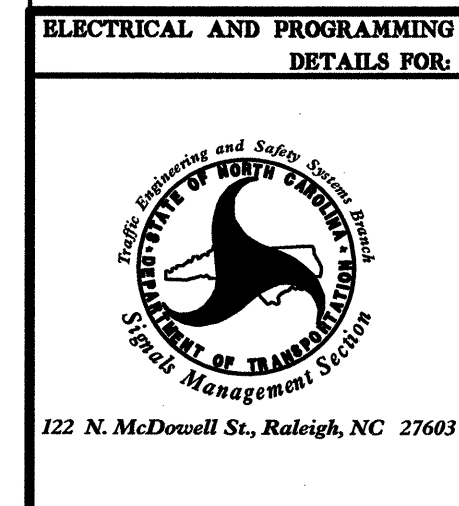
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	-
1B	TB2-7,8	I2L	43	5	12	1	Y	Y	-	-	15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	-	-
3A	TB4-9,10	I6U	41	3	4	3	Y	Y	-	-	-
3B	TB4-11,12	I6L	45	7	14	3	Y	Y	-	-	-
4A	TB6-1,2	I7U	65	27	34	4	Y	Y	-	-	10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y	-	-	-
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	-	-

### INPUT FILE POSITION LEGEND: J2L

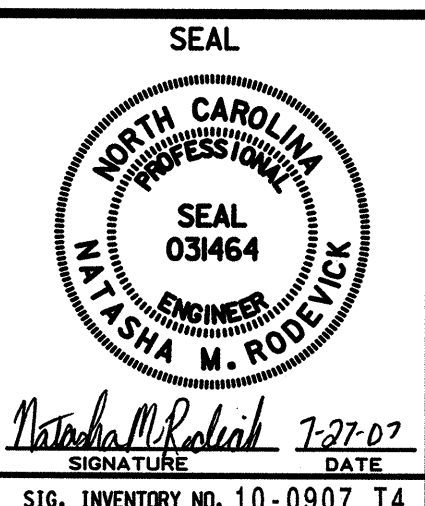


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0907  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Phase IV Step 1 - Temporary 4

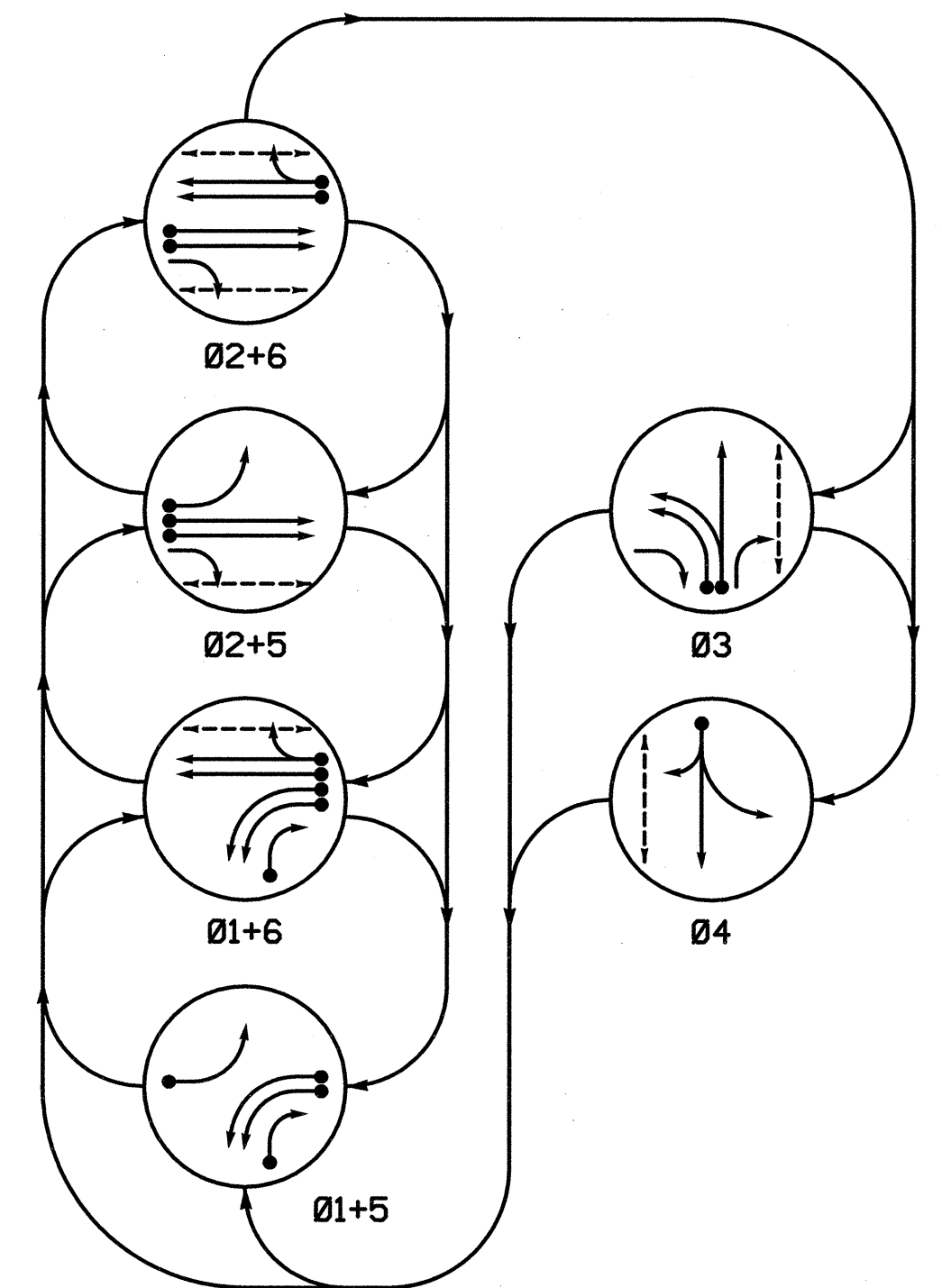


ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 16 (Providence Rd) at NC 84 (Weddington Rd)	
Division 10	Union County	Weddington	
PLAN DATE: July 2007	REVIEWED BY: H.L. Winstead		
PREPARED BY: T.R. Terrell	REVIEWED BY: N.M. Rodevick		
REVISIONS	INIT.	DATE	
		W. Tasha M. Rodevick SIGNATURE DATE 7-27-07	





**PHASING DIAGRAM**

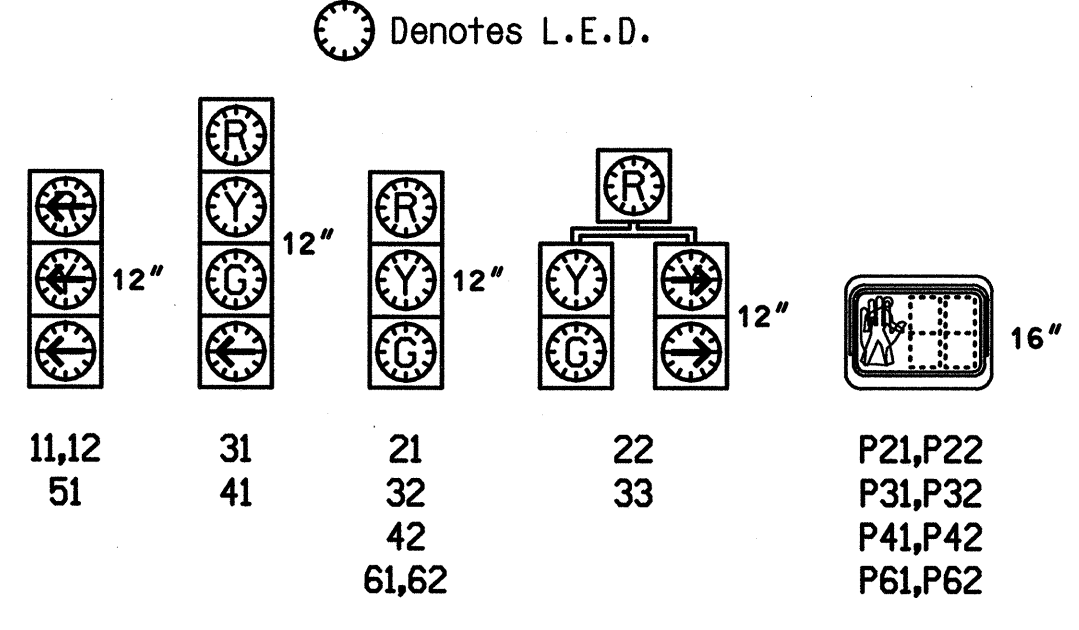


**TABLE OF OPERATION**

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11,12	---	---	---	---	---	---
21	R	R	G	G	R	R
22	R	R	G	G	R	Y
31	R	R	R	R	G	R
32	R	R	R	R	G	R
33	R	R	R	R	G	R
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	---	---	---	---	---	---
61,62	R	G	R	G	R	Y
P21,P22	DW	DW	W	W	DW	DRK
P31,P32	DW	DW	DW	DW	W	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK

W - Walk  
 DW - Don't Walk  
 DRK - Dark

**SIGNAL FACE I.D.**



**2070L LOOP & DETECTOR INSTALLATION**

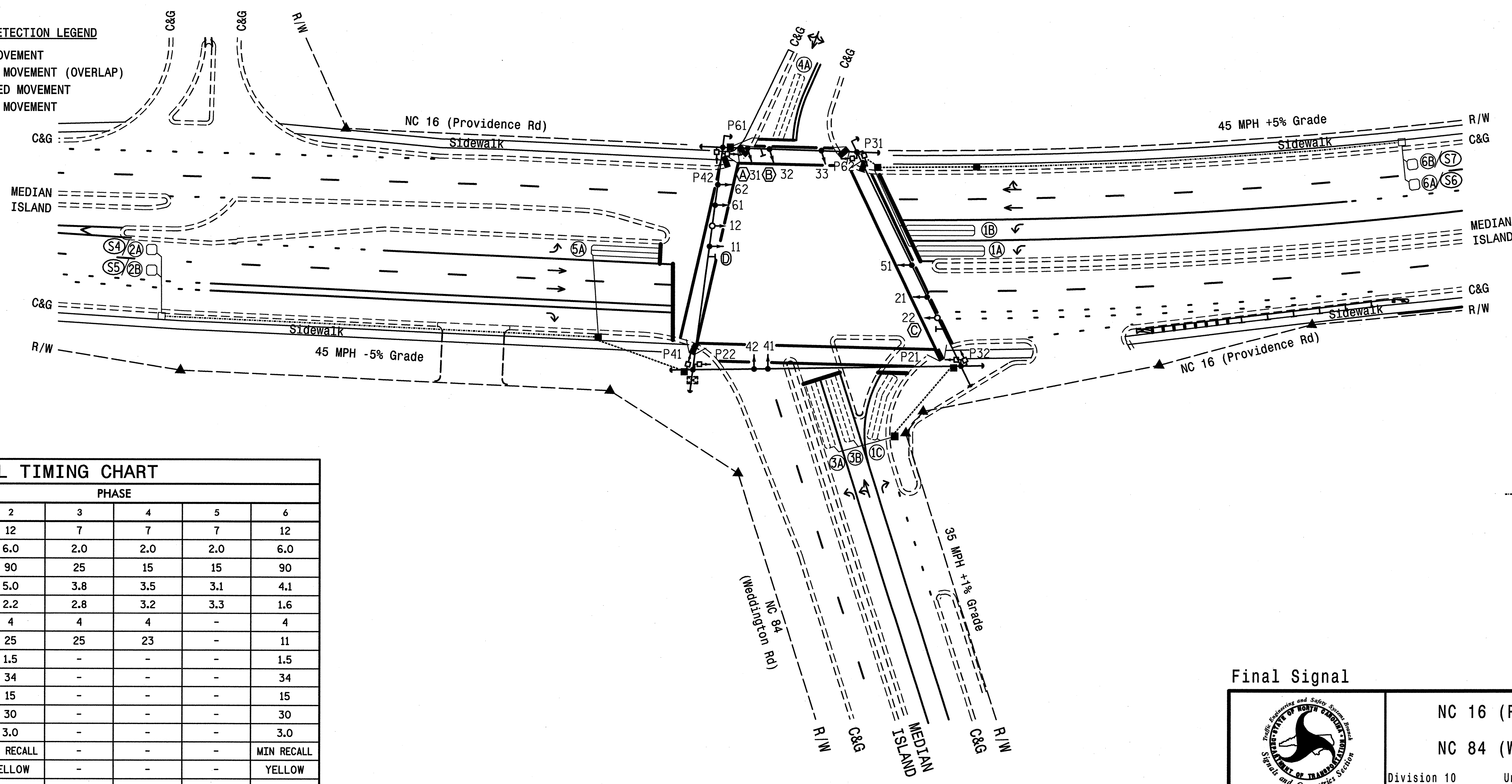
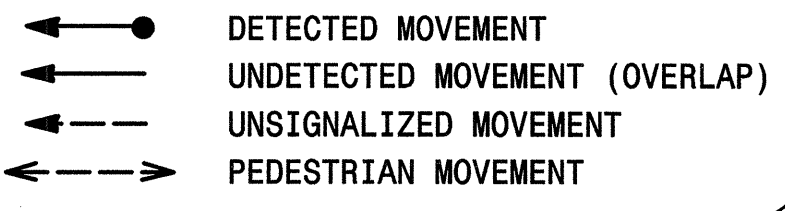
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING			
					PHASE	CALLING	EXTENSION	FULL TIME DELAY
1A	6x40	0	2-4-2	Y	1	Y	Y	-
1B	6x40	0	2-4-2	Y	1	Y	Y	-
1C	6x40	0	2-4-2	-	1	Y	Y	-
2A/S4	6x6	300	5	Y	2	Y	Y	-
2B/S5	6x6	300	5	Y	2	Y	Y	-
3A	6x40	0	2-4-2	-	3	Y	Y	-
3B	6x40	0	2-4-2	-	3	Y	Y	-
4A	6x40	0	2-4-2	-	4	Y	Y	-
5A	6x40	0	2-4-2	Y	5	Y	Y	-
6A/S6	6x6	300	5	Y	6	Y	Y	-
6B/S7	6x6	300	5	Y	6	Y	Y	-

6 Phase Fully Actuated (NC 16 - Providence Rd CLS)

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Reposition existing signal heads numbered 11,21,32,51,61 and 62.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #0907.

**PHASING DIAGRAM DETECTION LEGEND**



**LEGEND**

PROPOSED	EXISTING
	N/A
	N/A
	N/A
	N/A

**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 *	25	90	25	15	15	90
Yellow Clearance	3.0	5.0	3.8	3.5	3.1	4.1
Red Clearance	3.4	2.2	2.8	3.2	3.3	1.6
Walk 1 *	-	4	4	4	-	4
Don't Walk 1	-	25	25	23	-	11
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	-	-	-	-	-	-
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.

**Final Signal**

750 Greenleaf Parkway  
 Garner, NC 27529

**NC 16 (Providence Rd)  
 at  
 NC 84 (Weddington Rd)**

Division 10 Union County Weddington  
 PLAN DATE: July 2007 REVIEWED BY: N.W. Rodevick  
 PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin

SCALE: 1"=40'

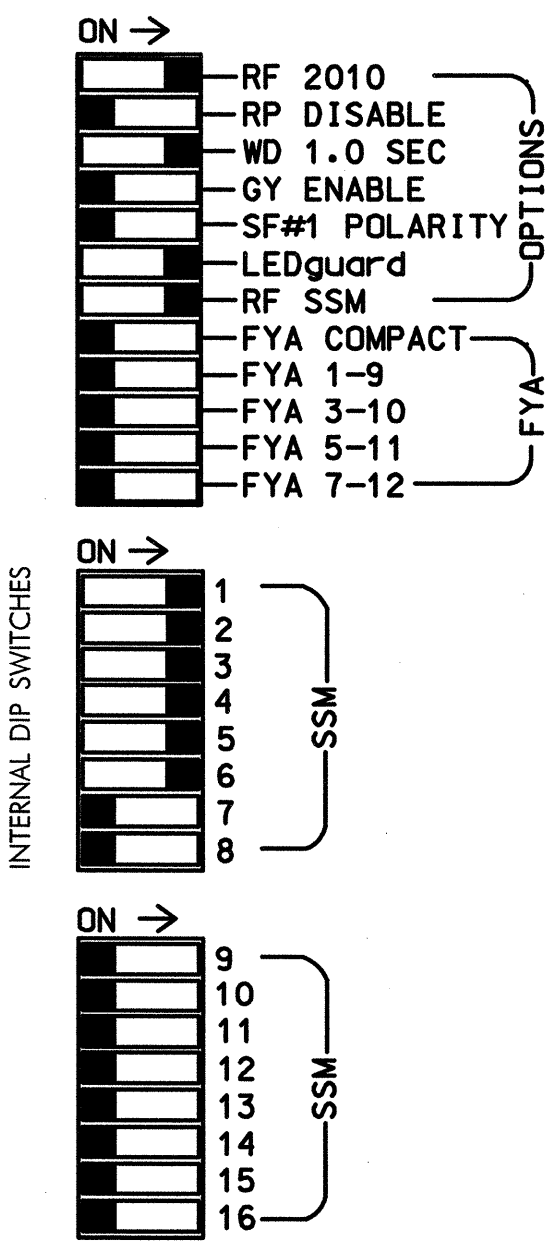
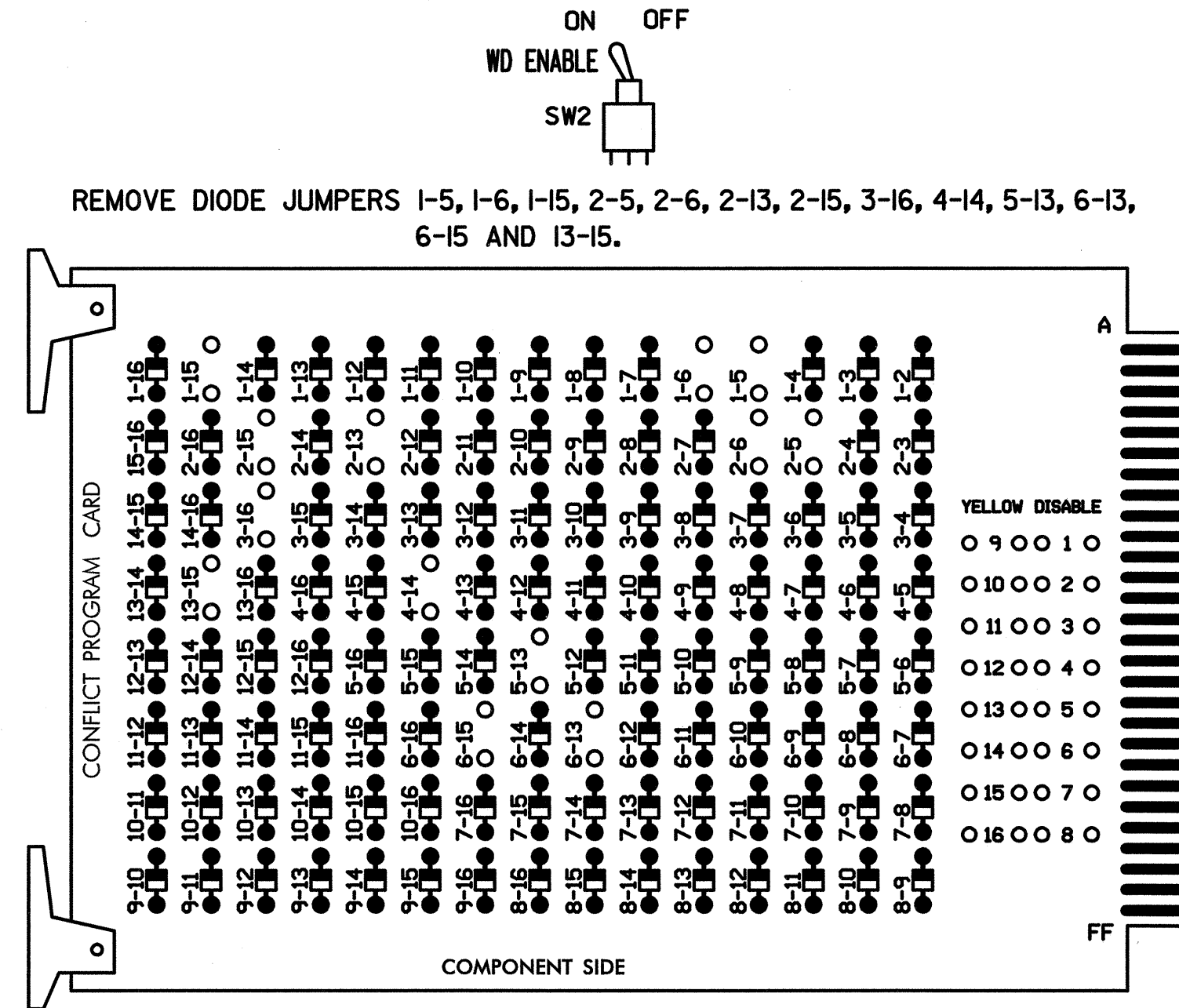
REVISIONS: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: 7-27-07

SIG. INVENTORY NO. 10-0907

**EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- Program phases 2, 3, 4 and 6 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

**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	3 PED				
SIGNAL HEAD NO.	11,12	33	21,22	P21, P22	31	32,33	22	41	42	P41, P42	51	61,62	P61, P62	NU	NU	P31, P32
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	126				117						132				
GREEN ARROW	127	127			118	118	103					133				
Hand icon					113				104			119				110
Walking person icon					115				106			121				112

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,S2P,S3,S4,S4P,S5,S6,S6P,S8P  
 PHASES USED.....1,2,2PED,3,3PED,4,4PED,5,6,6PED  
 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.

**PED 3 PROGRAMMING DETAIL**

(program controller as shown below)

**CHANGING OUTPUT ASSIGNMENTS**

- FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
- ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT # (C1 PIN: 19)
- SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' **REGARDLESS OF DEFAULT PROGRAMMING**
- ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
- BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
- SELECT '1' (OUTPUT ASSIGNMENTS)
- ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT # (C1 PIN: 20)
- REPEAT STEPS # 3 AND # 4.

**CHANGING INPUT ASSIGNMENTS**

- FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
- CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
- MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3  
PROGRAMMING COMPLETE

**INPUT FILE POSITION LAYOUT**

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	S	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12
L	1A	1B	2A/S4	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11
U	NOT USED	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13
L	1C	2B/S5	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
U	∅ 5	∅ 6	S	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17
L	5A	6A/S6	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12
U	NOT USED	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18
L	6B/S7	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18	∅ 19

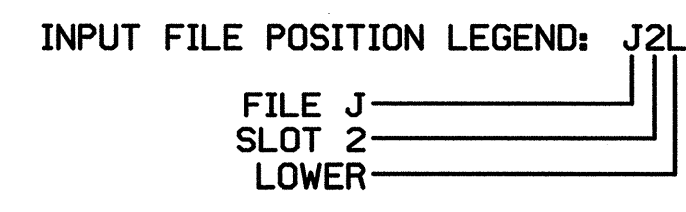
EX.: 1A, 2A, ETC. = LOOP NO.'S

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	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	-
1C	TB2-7,8	I2L	43	5	12	1	Y	Y	-	-	15
2A/S4	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y	-	-	-
2B/S5	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y	-	-	-
3A	TB4-9,10	I6U	41	3	4	3	Y	Y	-	-	-
3B	TB4-11,12	I6L	45	7	14	3	Y	Y	-	-	-
4A	TB6-1,2	I7U	65	27	34	4	Y	Y	-	-	10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y	-	-	-
6A/S6	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y	-	-	-
6B/S7	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y	-	-	-

NOTE:  
INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0907  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 16 (Providence Rd) at NC 84 (Weddington Rd)

Division 10 Union County Weddington

PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead

PREPARED BY: T.R. Terrell REVIEWED BY: N.W. Rodevick

REVISIONS INIT. DATE

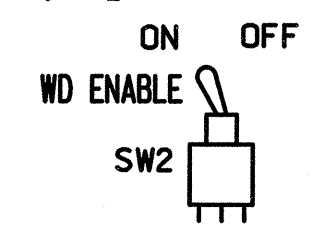
Signature: *Natasha M. Rodevick* 7-31-07

SIG. INVENTORY NO. 10-0907

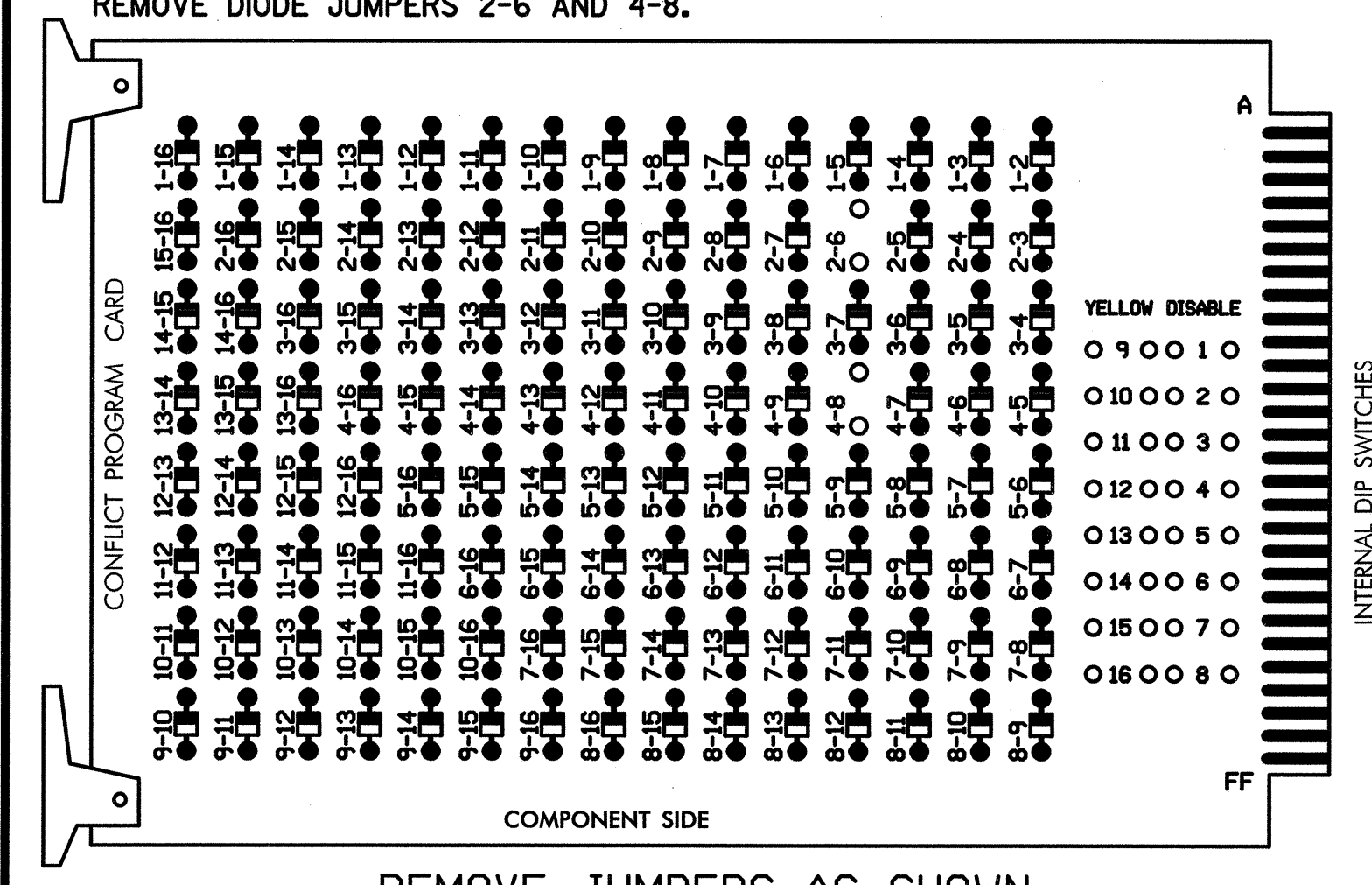


**EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

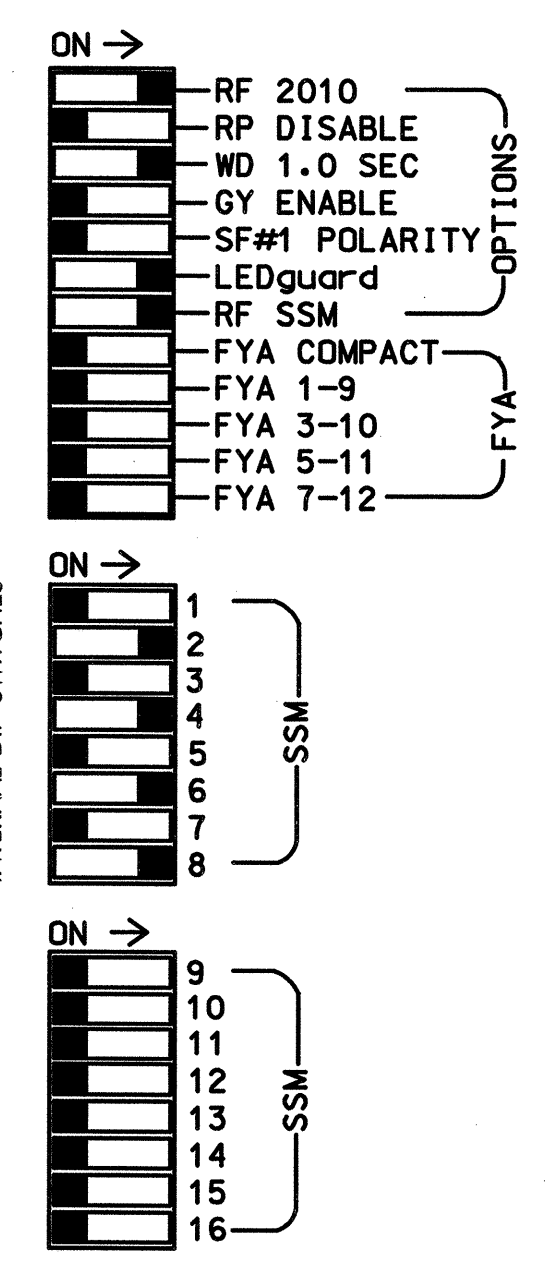
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-6 AND 4-8.



REMOVE JUMPERS AS SHOWN



**NOTES:**

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

■ = DENOTES POSITION OF SWITCH

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

**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.....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	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		
Hand icon																		
Person icon																		

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	∅ 2	2A	∅ 2	∅ 2	∅ 2	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	FS
FILE "I" L	∅ 2	2B	∅ 2	∅ 2	∅ 2	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	DC ISOLATOR
FILE "J" U	∅ 6	6A	∅ 6	∅ 6	∅ 6	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	DC ISOLATOR
FILE "J" L	∅ 6	6B	∅ 6	∅ 6	∅ 6	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	DC ISOLATOR

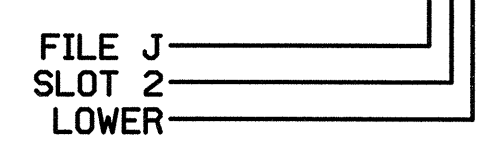
EX.: 1A, 2A, ETC. = LOOP NO.'S

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	TB2-5,6	I2U	39	1	2	2	Y	Y	-	-	-
2B	TB2-7,8	I2L	43	5	12	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	-	-	15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	-	-
6B	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

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1877  
 DESIGNED: July 2007  
 SEALED: July 31, 2007  
 REVISED:

Phase I Step 3 - Temporary 1

ELECTRICAL AND PROGRAMMING DETAILS FOR: **NC 16 (Providence Rd) at SR 1346 (Hemby Rd) / SR 3271 (King's Manor Dr)**

Division 10 Union County Weddington

PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead

PREPARED BY: T.R. Terrell REVIEWED BY: N.M. Rodevick

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER WYATSHA M. RODEVICK SEAL 031464

122 N. McDowell St., Raleigh, NC 27603

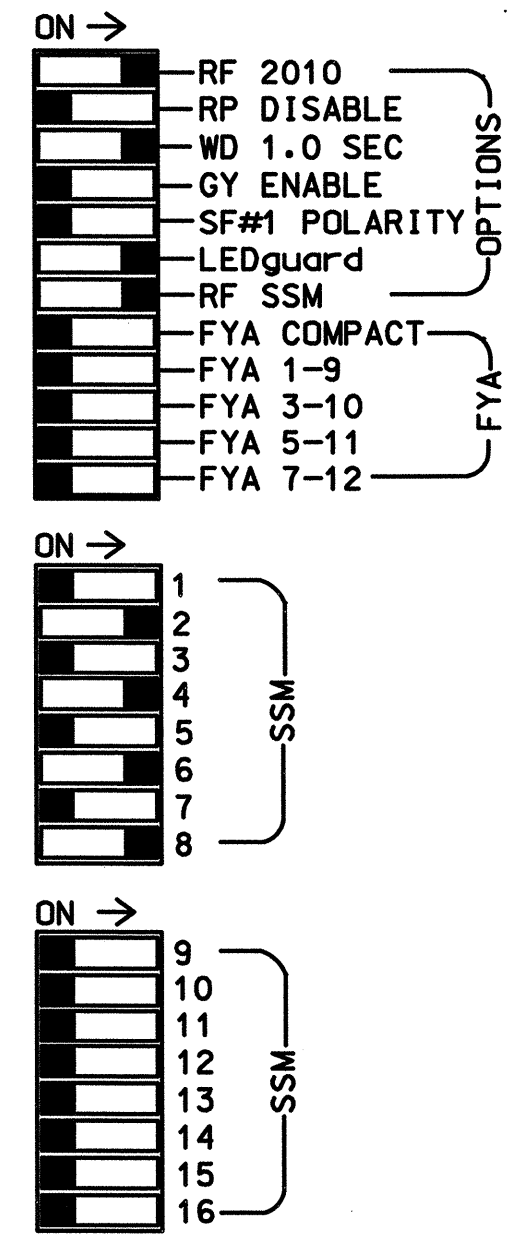
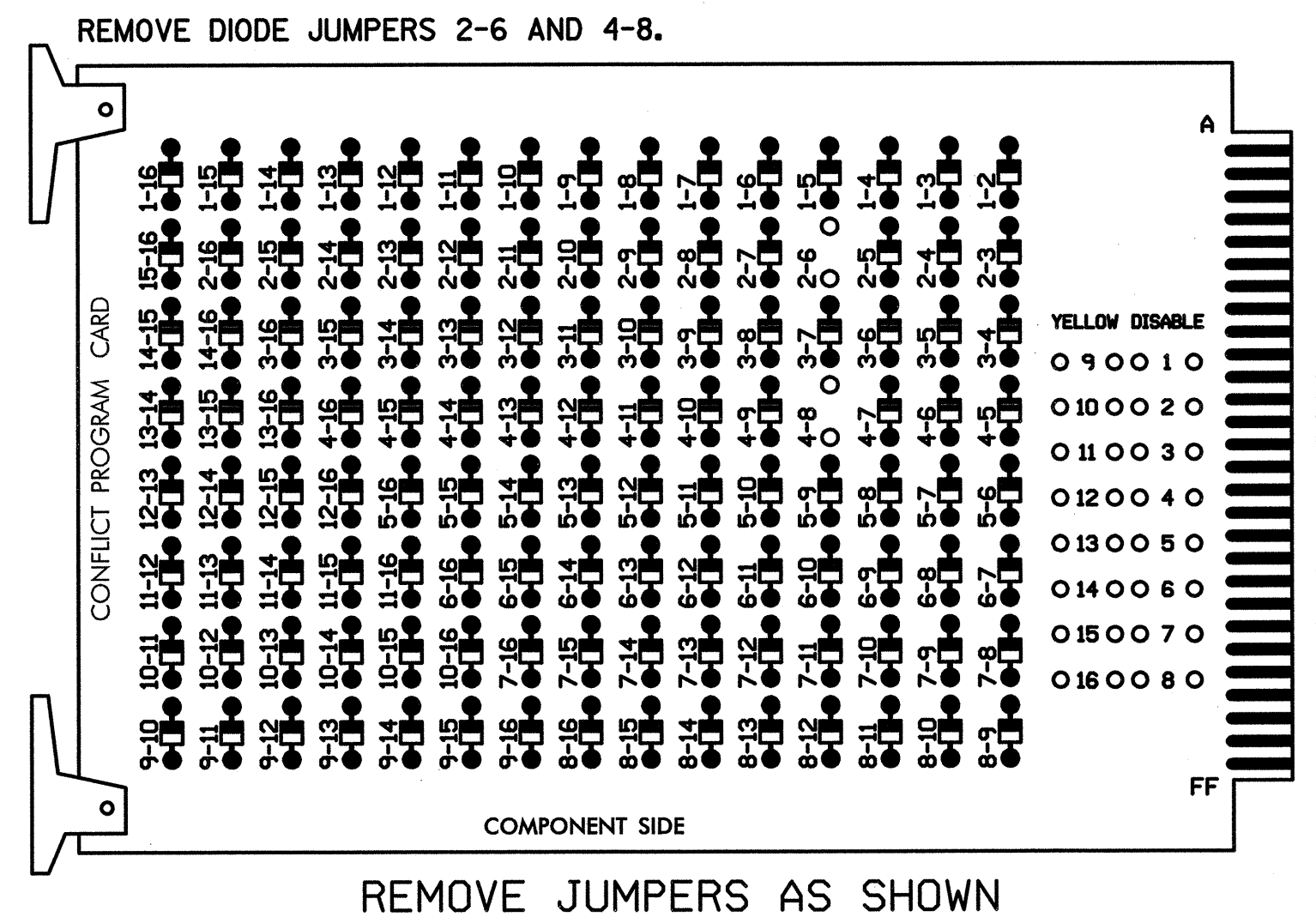
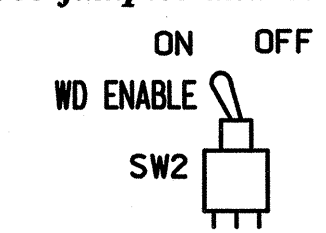
HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609

SIG. INVENTORY NO. 10-1877 T1



### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

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

■ = DENOTES POSITION OF SWITCH

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

### 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.....S2,S4,S6,S8  
 PHASES USED.....2,4,6,8  
 OVERLAPS.....NONE

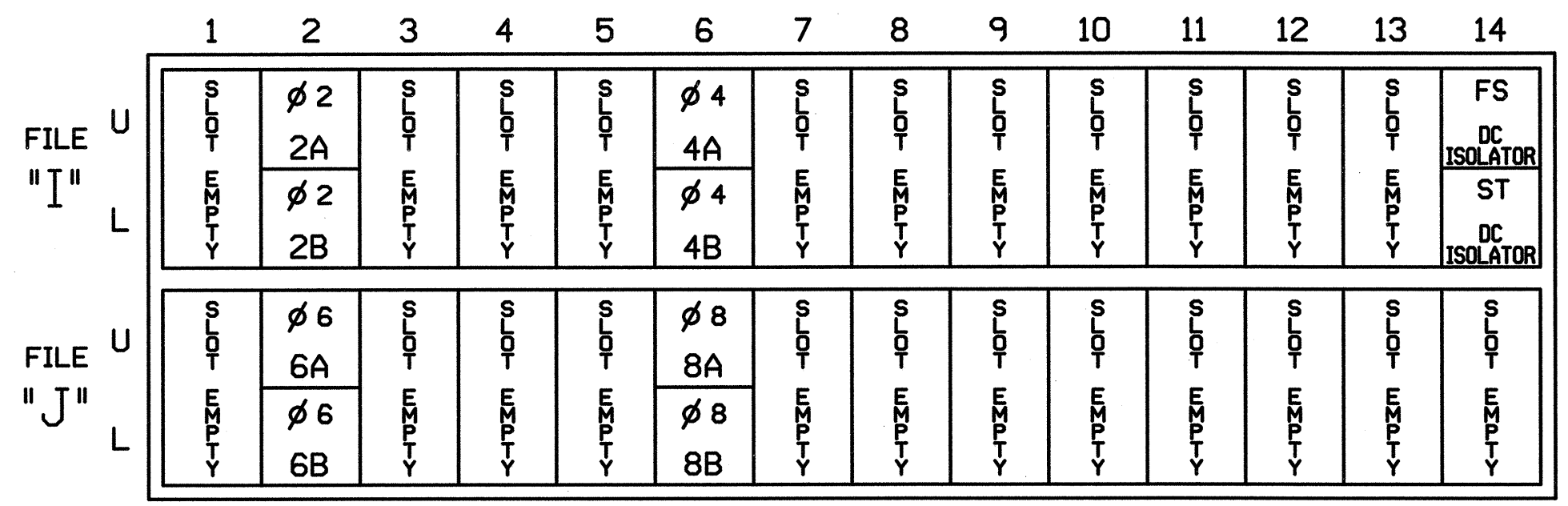
### SIGNAL HEAD HOOK-UP CHART

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

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)



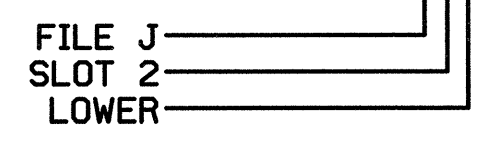
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	-	-
2B	TB2-7,8	I2L	43	5	12	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	-	-	15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	-	-
6B	TB3-7,8	J2L	44	6	16	6	Y	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	-	-	15

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1877  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

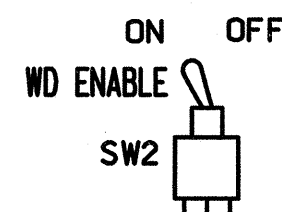
Phase II Step 2 - Temporary 2

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 16 (Providence Rd) at SR 1346 (Hemby Rd) / SR 3271 (King's Manor Dr)	
	Division 10 Union County Weddington		PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead	
PREPARED BY: T.R. Terrell		REVIEWED BY: N.M. Rodevick		SIGNATURE: <i>N. M. Rodevick</i> DATE: 7/31/07
REVISIONS		INIT. DATE		
122 N. McDowell St., Raleigh, NC 27603		HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609		SIG. INVENTORY NO. 10-1877 T2

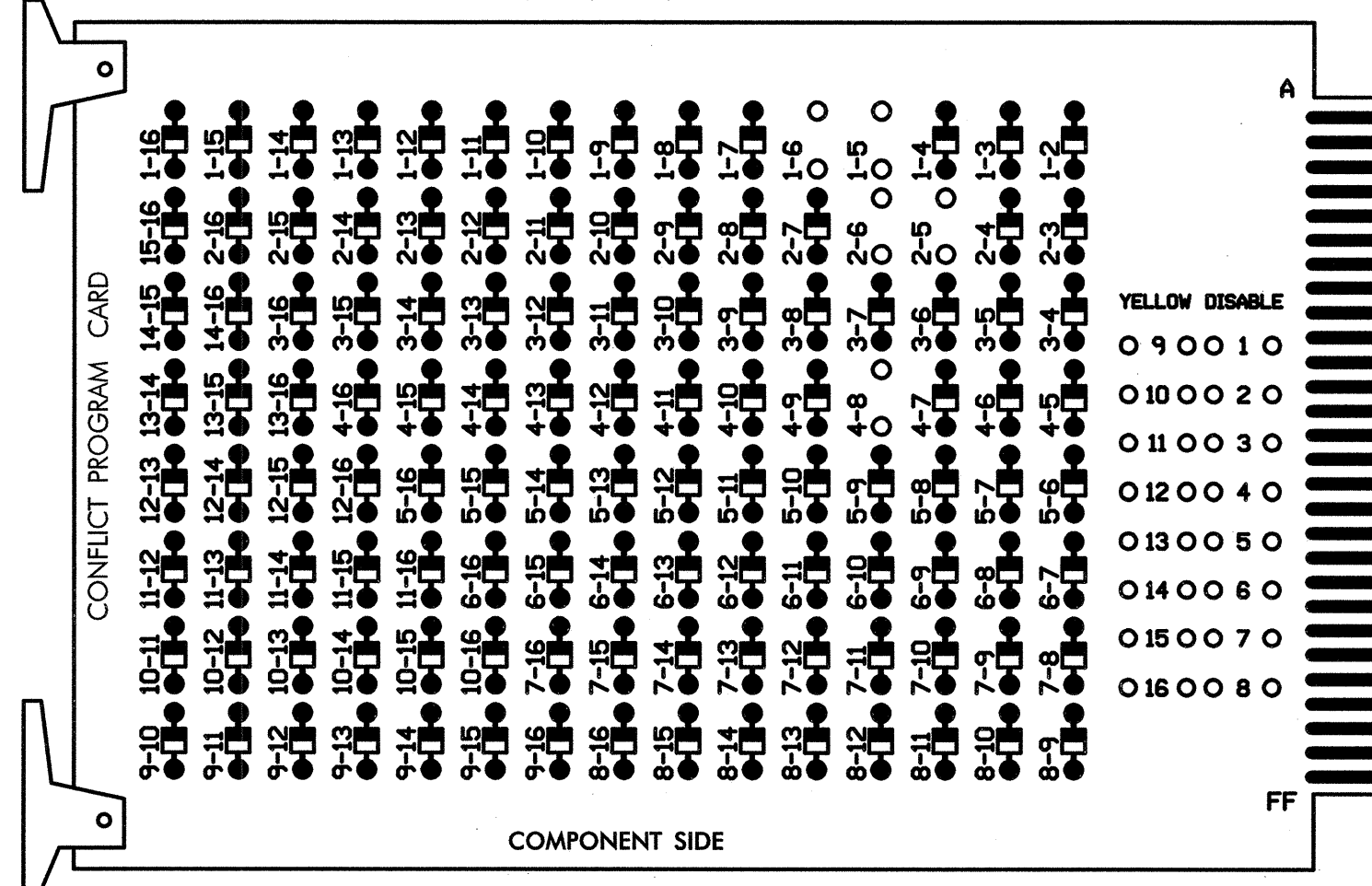


**EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



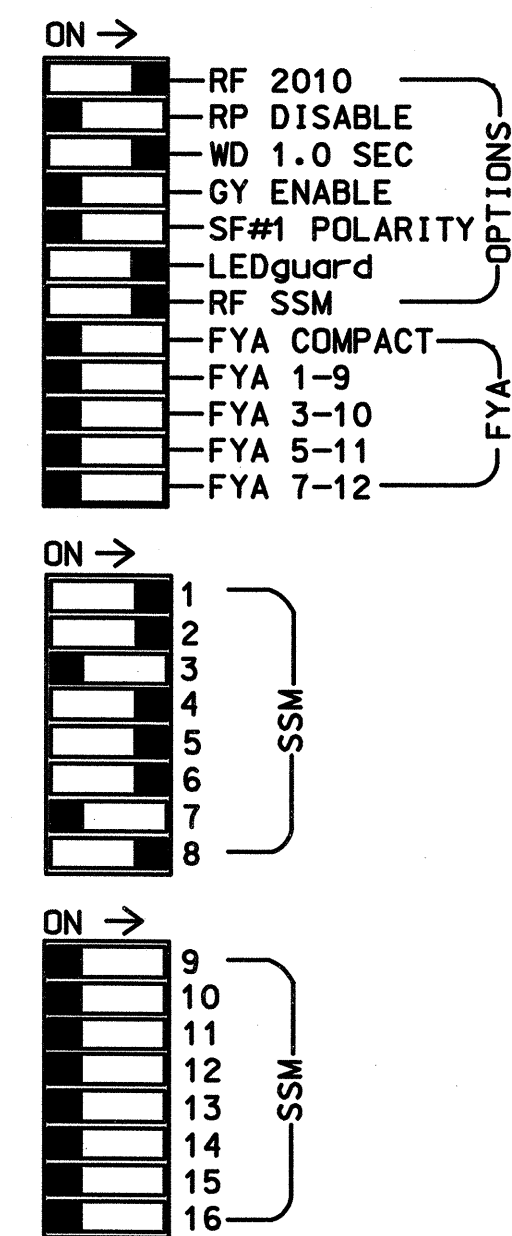
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6 AND 4-8.



REMOVE JUMPERS AS SHOWN

**NOTES:**

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



■ = DENOTES POSITION OF SWITCH

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

**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,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	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	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										
Hand icon																		
Person icon																		

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	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
L	1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A
U	NOT USED	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17
L	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	18A

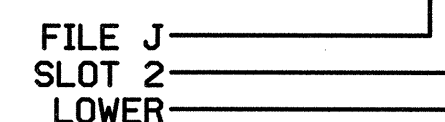
EX.: 1A, 2A, ETC. = LOOP NO.'S

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	-	-	-
5A	TB2-7,8	I2L	43	5	12	5	Y	Y	-	-	-
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	-	-
4B	TB4-11,12	I6L	45	7	14	4	Y	Y	-	-	15
6A	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	-	-	15

**INPUT FILE POSITION LEGEND: J2L**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1877  
 DESIGNED: July 2007  
 SEALED: July 31, 2007  
 REVISED:

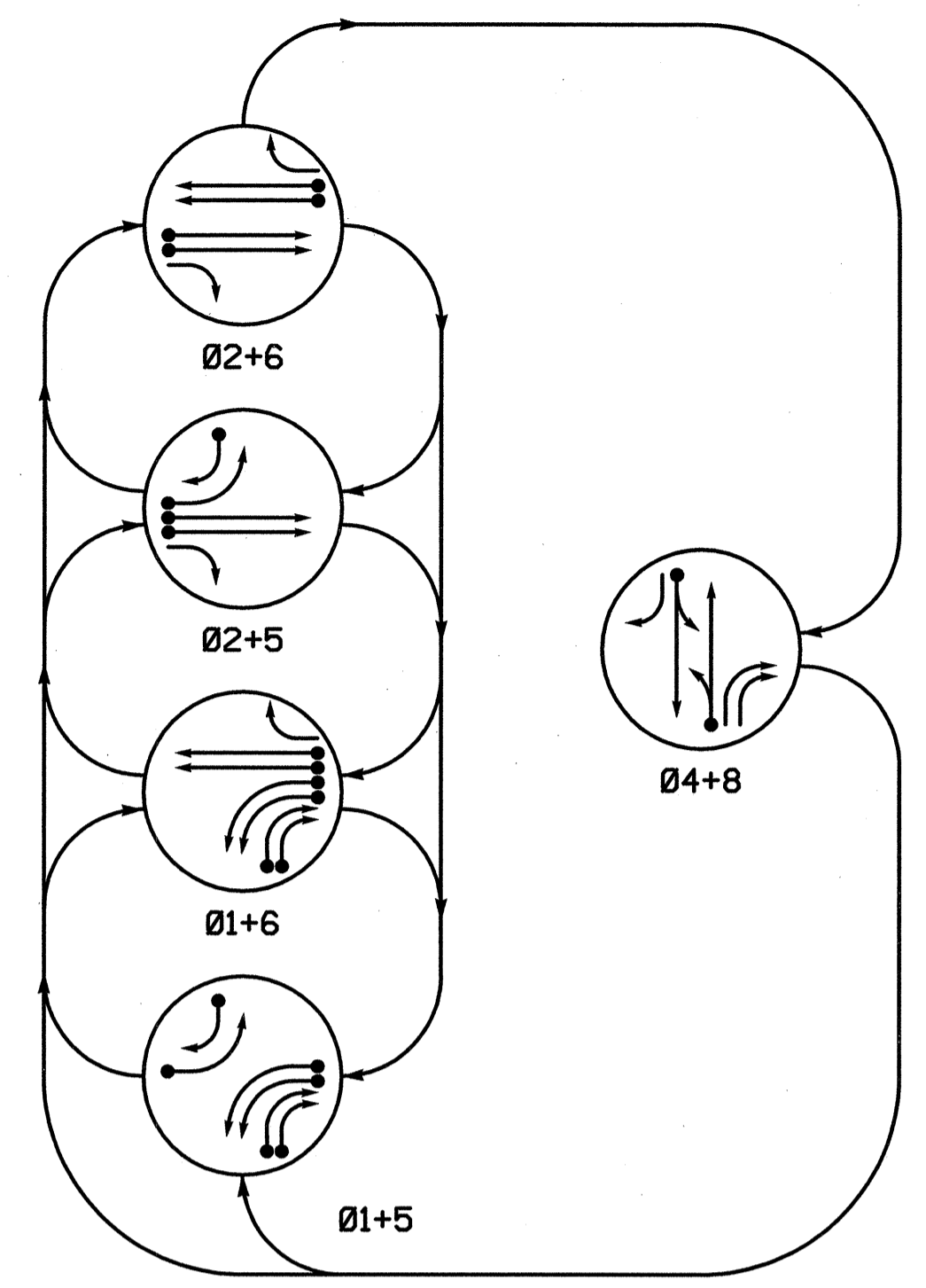
Phase IV Step 1 - Temporary 3

	NC 16 (Providence Rd) at SR 1346 (Hemby Rd)/ SR 3271 (King's Manor Dr)	
	Division 10 Union County Weddington	PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead
	PREPARED BY: T.R. Terrell REVIEWED BY: N.W. Rodevick	REVISIONS INIT. DATE
	SIGNATURE: <i>Natasha M. Rodevick</i> DATE: 7-31-07	SIG. INVENTORY NO. 10-1877 T3



5 Phase Fully Actuated (NC 16 - Providence Rd CLS)

PHASING DIAGRAM



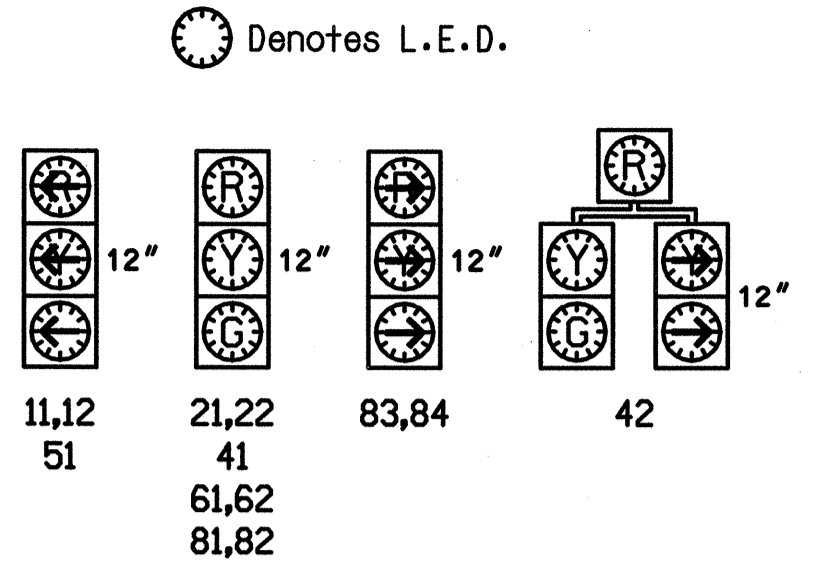
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	01+5	01+6	02+5	02+6	04+8
11,12	---	---	---	---	---
21,22	R	R	G	G	Y
41	R	R	R	R	G
42	R	R	R	R	G
51	---	---	---	---	---
61,62	R	G	R	G	Y
81,82	R	R	R	R	G
83,84	---	---	---	---	---

Signal Face I.D.

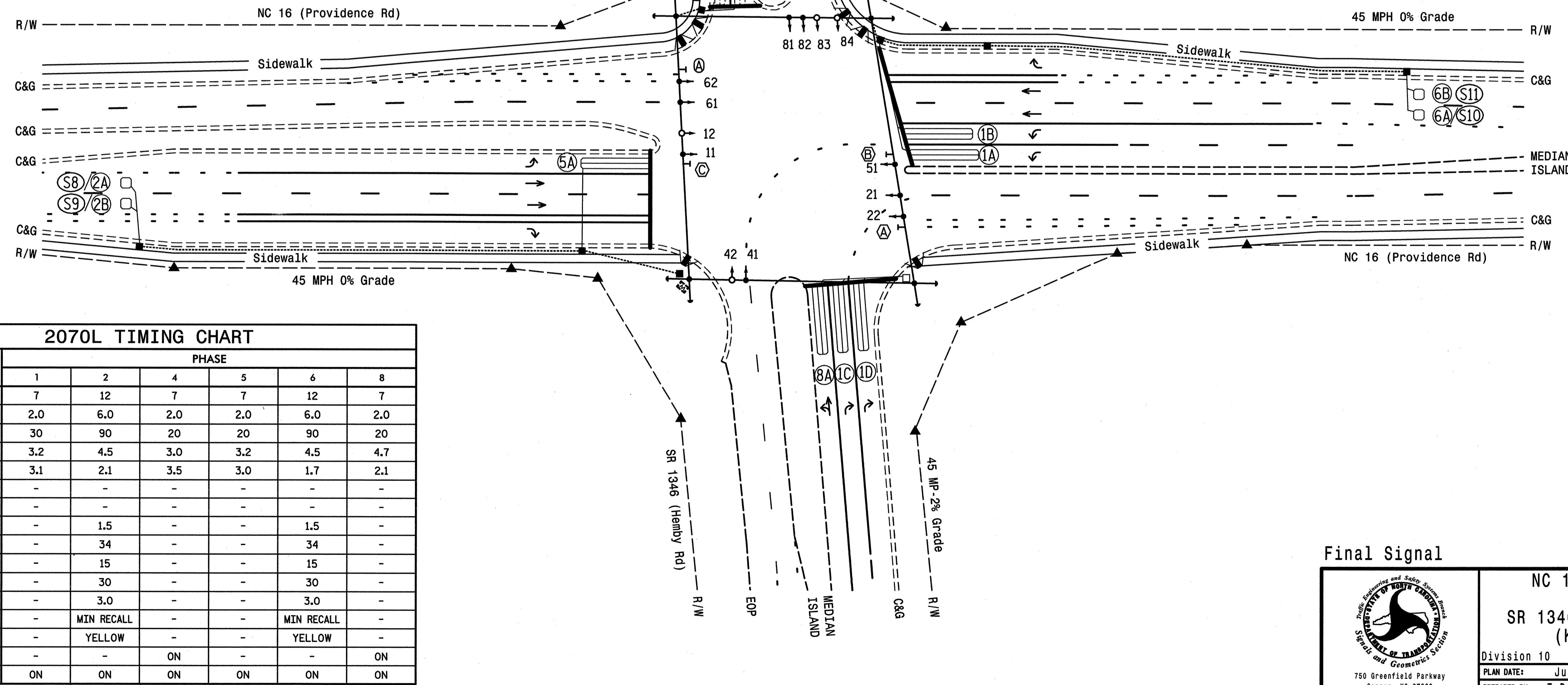


2070L LOOP & DETECTOR INSTALLATION

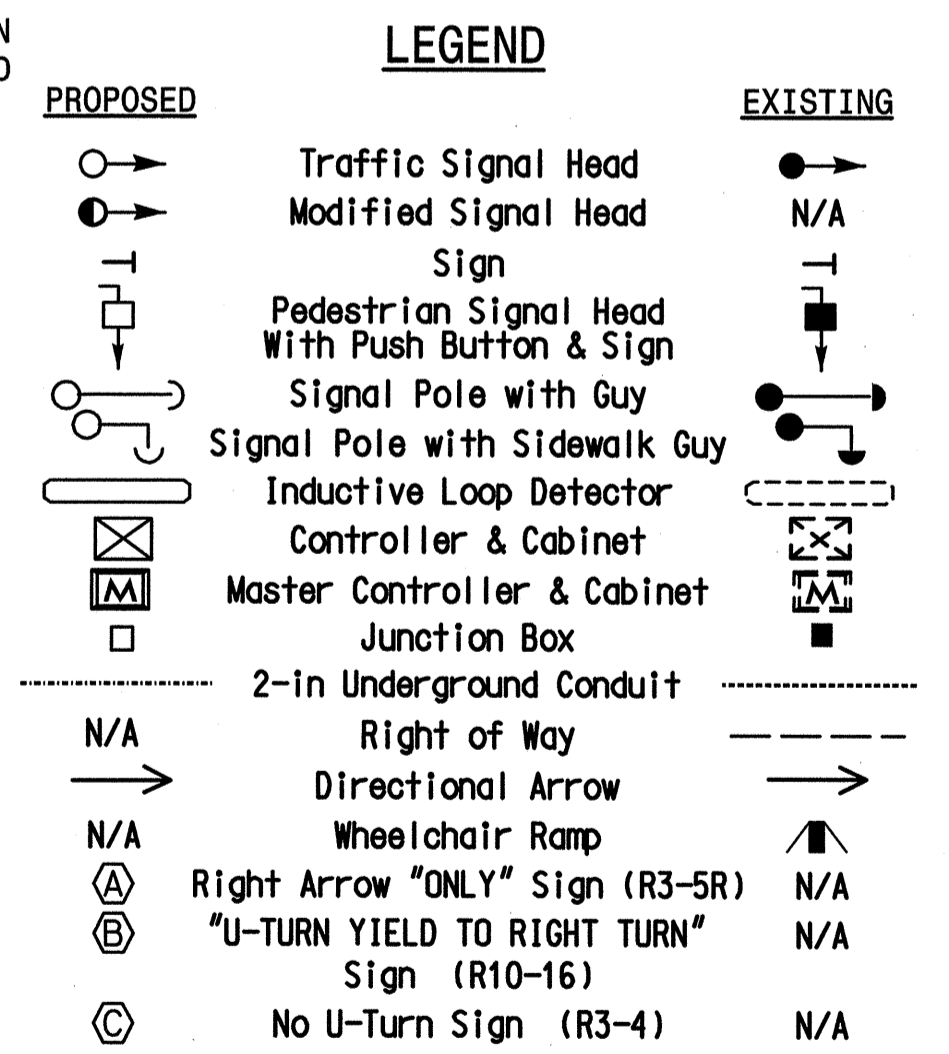
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	-
1C	6X40	0	2-4-2	Y	1	Y	Y	-	-	10	-	-
1D	6X40	0	2-4-2	Y	1	Y	Y	-	-	10	-	-
2A/S8	6X6	300	4	Y	2	Y	Y	-	-	-	-	-
2B/S9	6X6	300	4	Y	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
6A/S10	6X6	300	6	Y	6	Y	Y	-	-	-	-	-
6B/S11	6X6	300	6	Y	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- Reposition existing signal heads 11,21,22,41,51,61,62,81 and 82.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #11017 Controller Asset #1877



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*	30	90	20	20	90	20
Yellow Clearance	3.2	4.5	3.0	3.2	4.5	4.7
Red Clearance	3.1	2.1	3.5	3.0	1.7	2.1
Walk 1*	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation*	-	1.5	-	-	1.5	-
Max Variable Initial*	-	34	-	-	34	-
Time Before Reduction*	-	15	-	-	15	-
Time To Reduce*	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON



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

Final Signal

SEAL  
NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SEAL  
028657  
FRANKLIN T. FRANKLIN

NC 16 (Providence Rd)  
at  
SR 1346 (Hemby Rd)/SR 3271  
(King's Manor Dr)

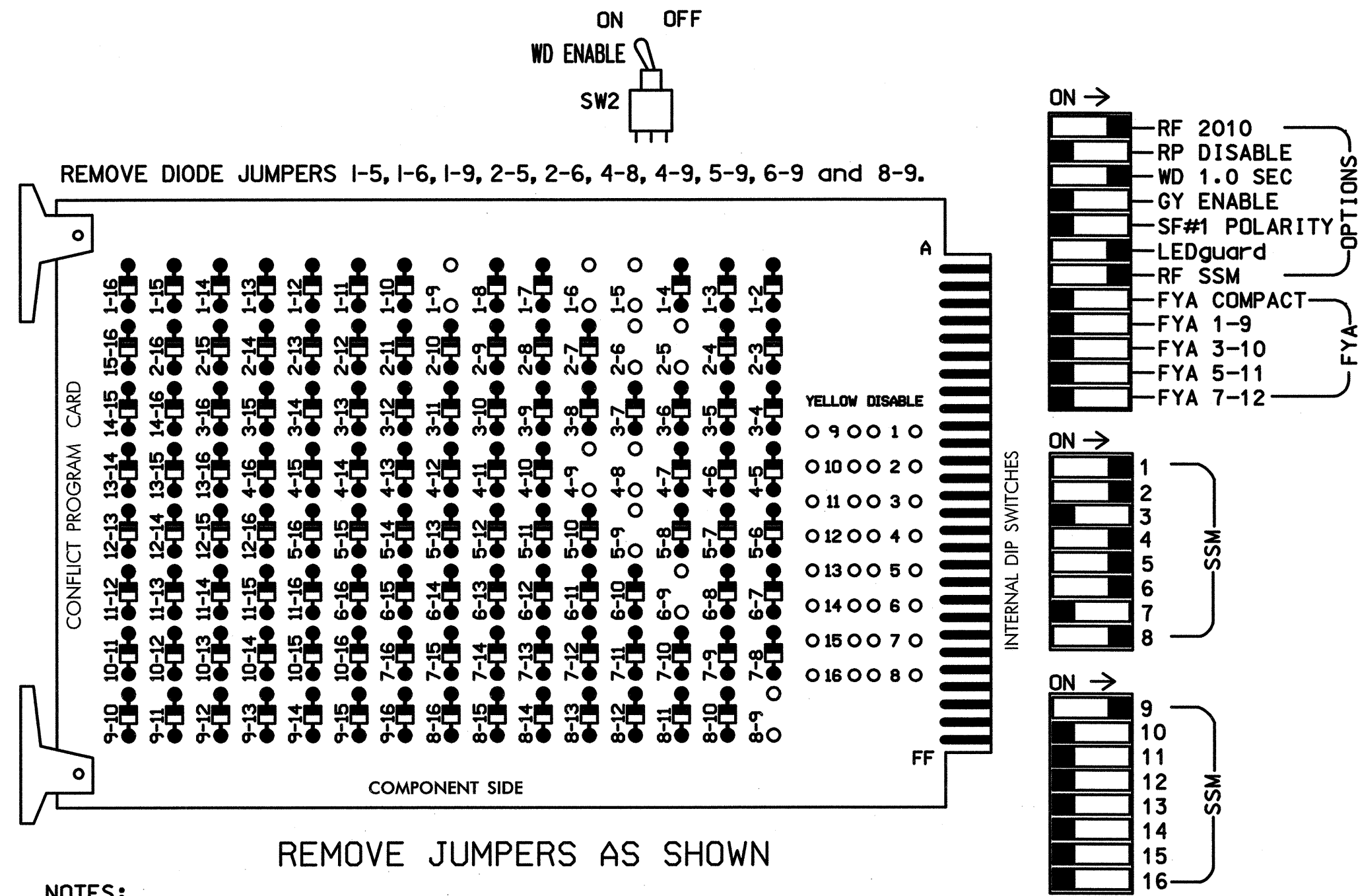
Division 10 Union County Weddington  
PLAN DATE: July 2007 REVIEWED BY: N.M. Rodevick  
PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin

SCALE 1"=40'  
REVISIONS INIT. DATE

SEAL  
NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SEAL  
028657  
FRANKLIN T. FRANKLIN

**EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 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 3,7,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 16 (Providence Rd) Closed Loop Signal System in Union County.

**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,S4,S5,S6,S8,S9  
 PHASES USED.....1,2,4,5,6,8  
 OVERLAPS.....OLA=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	9	10	11	12	13	14
SIGNAL HEAD NO.	11,12	21,22	NU	NU	41,42	NU	51	42	61,62	NU	NU	81,82	NU	83,84	NU	NU	NU	NU
RED		128			101				134			107						
YELLOW		129			102				135			108						
GREEN		130			103				136			109						
RED ARROW	125							131							A121			
YELLOW ARROW	126							132	132						A122			
GREEN ARROW	127							133	133						A123			

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	∅ 1	∅ 1	∅ 1	∅ 2	∅ 5	∅ 4	∅ 5	∅ 5	∅ 5	∅ 5	∅ 5	∅ 5	∅ 5	∅ 5
L	1A	1B	1D	2B/S9	NOT USED	4A	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	FS
U	NOT USED	∅ 1	∅ 2	NOT USED	∅ 5	∅ 6	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	DC ISOLATOR
L	2A/S8	2A/S8	2A/S8	2A/S8	5A	6A/S10	8A	8A	8A	8A	8A	8A	8A	ST
U		∅ 5	∅ 6	NOT USED	5B	6B/S11	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
L		5B	6B/S11	NOT USED	5B	6B/S11	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	

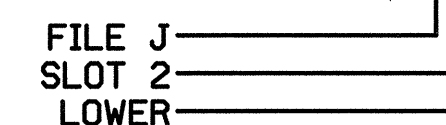
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT 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	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	-
1C	TB2-7,8	I2L	43	5	12	1	Y	Y	-	-	10
1D	TB2-9,10	I3U	63	25	32	1	Y	Y	-	-	10
2A/S8	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y	-	-	-
2B/S9	TB4-1,2	I4U	47	9	22	2/SYS	Y	Y	-	-	-
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	-	-	15
6A/S10	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y	-	-	-
6B/S11	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y	-	-	-
8A	TB5-9,10	J6U	42	4	8	8	Y	Y	-	-	-

INPUT FILE POSITION LEGEND: J2L



**OVERLAP PROGRAMMING DETAIL**

(program controller as shown below)

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

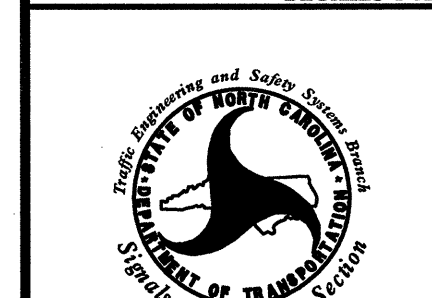
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS  
 PHASE: 12345678910111213141516  
 VEH OVL PARENTS: X X  
 VEH OVL NOT VEH: X  
 VEH OVL NOT PED: |  
 VEH OVL GRN EXT: |  
 STARTUP COLOR: - RED - YELLOW - GREEN  
 FLASH COLORS: - RED - YELLOW - GREEN  
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
 FLASH YELLOW IN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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1877  
 DESIGNED: July 2007  
 SEALED: July 27, 2007  
 REVISED:

Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:



NC 16 (Providence Rd) at SR 1346 (Hemby Rd) / SR 3271 (King's Manor Dr)

Division 10 Union County Weddington

PLAN DATE: July 2007 REVIEWED BY: H.L. Winstead

PREPARED BY: T.R. Terrell REVIEWED BY: N.M. Rodevick

REVISIONS INIT. DATE

SIGNATURE DATE



SIGNATURE DATE

SIG. INVENTORY NO. 10-1877



HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

122 N. McDowell St., Raleigh, NC 27603

- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE - 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE - 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH OR PLOW
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPlice CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPlice ENCLOSURE
- 30 INSTALL AERIAL SPlice ENCLOSURE
- 31 INSTALL POLE MOUNTED SPlice CABINET
- 32 INSTALL BASE MOUNTED SPlice CABINET
- 33 REMOVE EXISTING SPlice CABINET

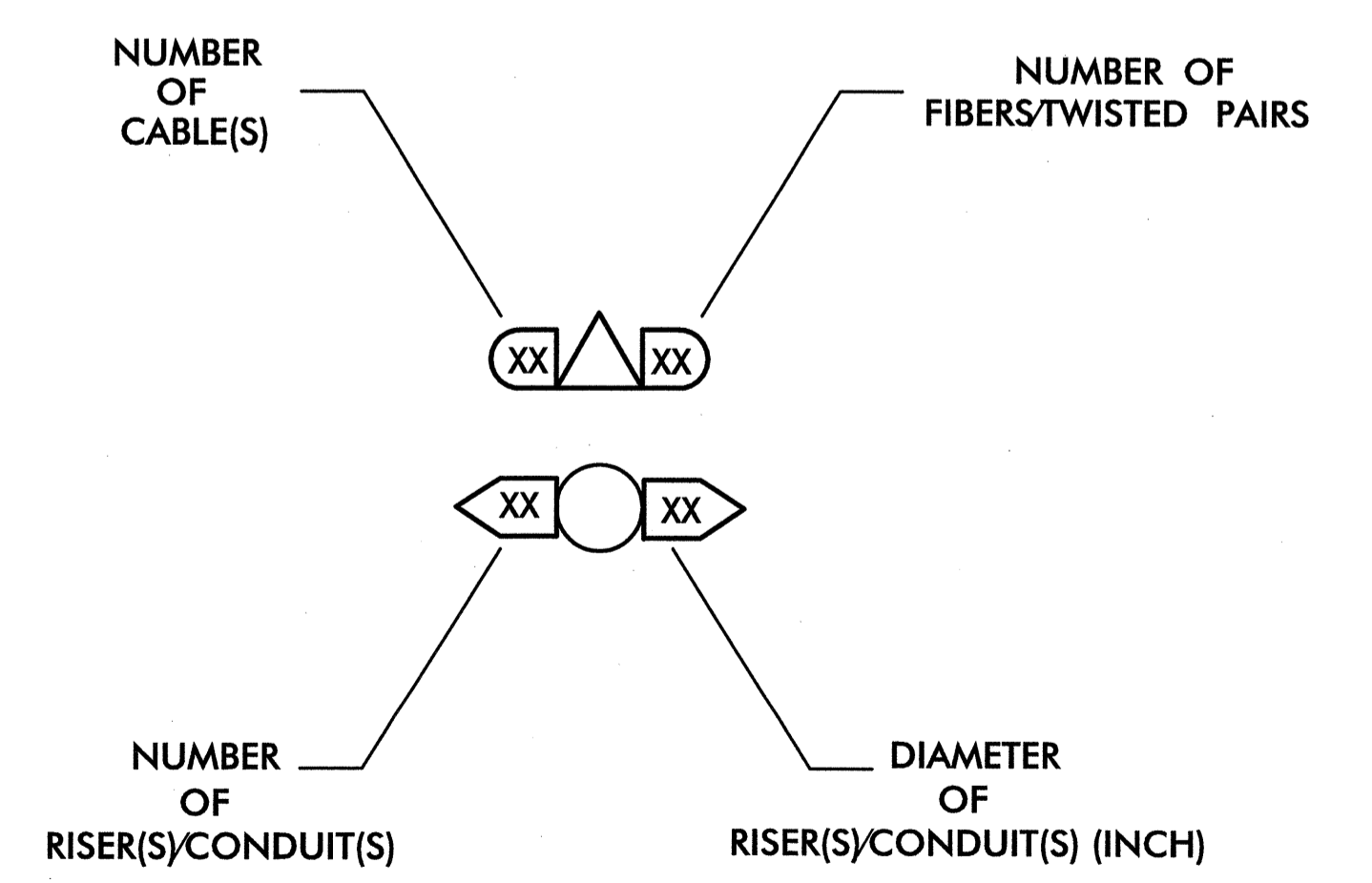
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49 REMOVE EXISTING MESSENGER CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE

**LEGEND**

- NEW FIBER OPTIC COMMUNICATIONS CABLE
- NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXISTING COMMUNICATIONS CABLE
- EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- NEW DIRECTIONAL DRILLED CONDUIT
- NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- AERIAL SPlice ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- EXISTING SPlice CABINET
- NEW SPlice CABINET
- SIGNAL POLE
- SIGNAL INVENTORY NUMBER

**CONSTRUCTION NOTE SYMBOLOGY KEY**

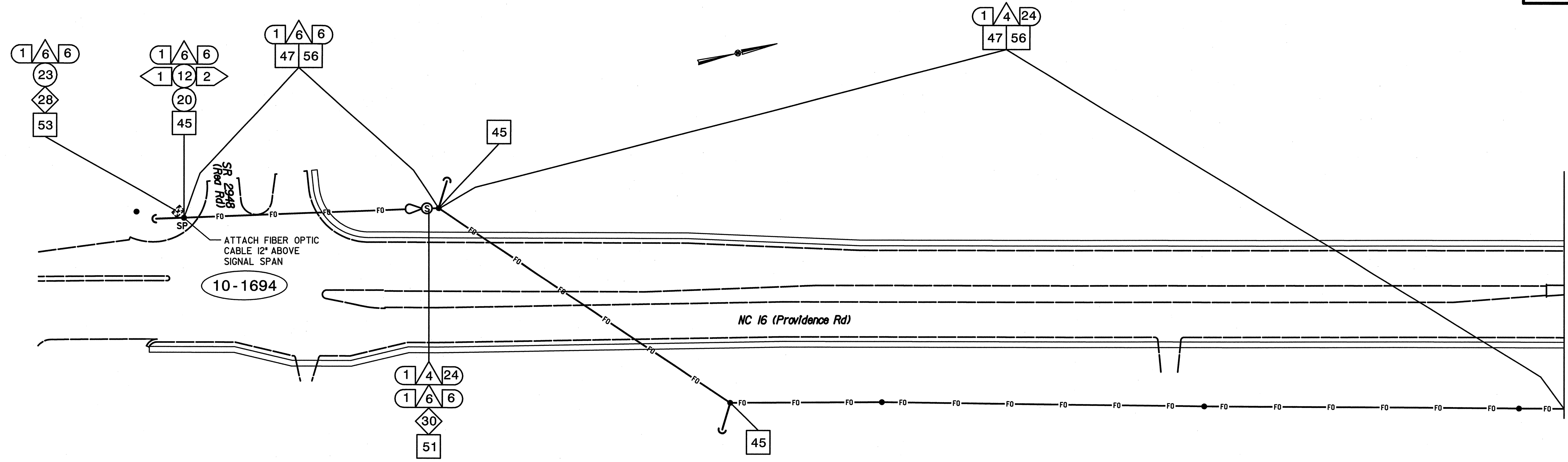
- INDICATES NUMBER OF CABLES, LOOPS, ETC.
- INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



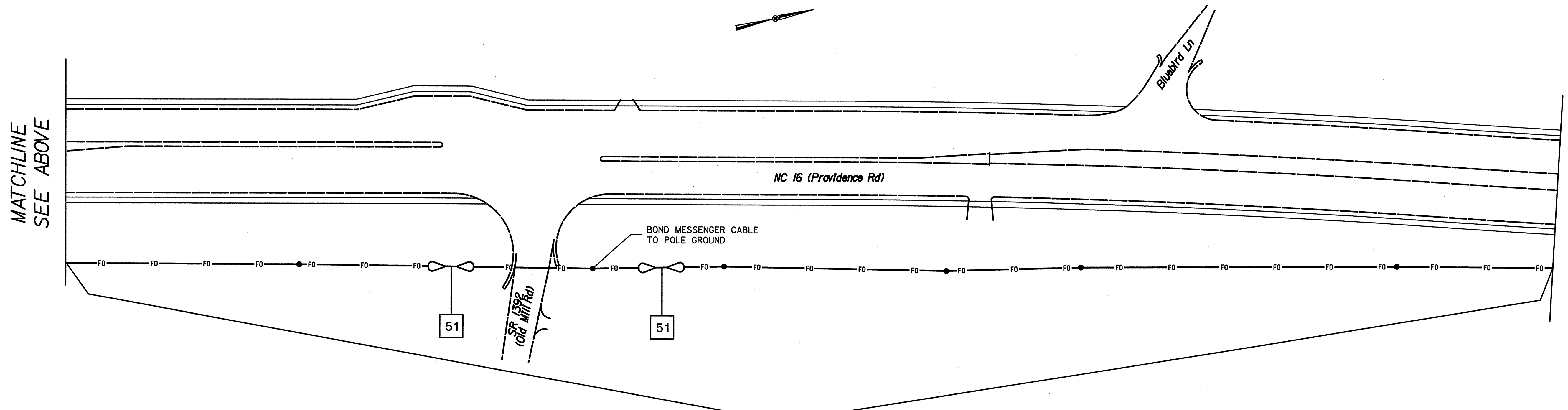
**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

	<b>CONSTRUCTION NOTES</b>	
	Div 10 Union & Mecklenburg Counties Weddington PLAN DATE: July 2007 PREPARED BY: P.M. Ward	REVIEWED BY: T.R. Terrell REVIEWED BY: H.L. Winstead
SCALE NONE	REVISIONS _____ _____	INIT. DATE _____ _____
Signature: <i>H.L. Winstead</i> DATE: 7/27/07		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER H.L. WINSTEAD, JR. 07983

CADD FILE NMECable Notes.dgn



MATCHLINE  
SEE BELOW

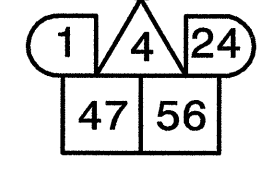


MATCHLINE  
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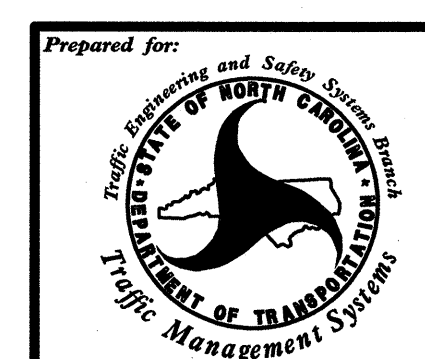
MATCHLINE  
SEE SHEET 29

**NOTES**

- ATTACH ALL FIBER OPTIC CABLE 40" BELOW POWER ON THE FRONT SIDE OF POLE UNLESS OTHERWISE NOTED.
- STORE 60 FEET OF COMMUNICATIONS CABLE WHERE NOTED.
- DISTANCES SHOWN BETWEEN JUNCTION BOXES ARE APPROXIMATE.
- SEAL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX/CABINET ENTRANCES.
- AT THE DIRECTION OF THE ENGINEER, INSTALL NEW MESSENGER CABLE TO RESERVE AN ATTACHMENT LOCATION ON THE NEW POLE LINE.

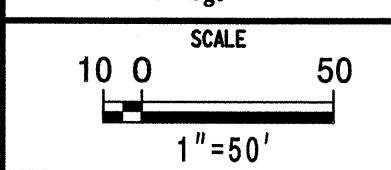


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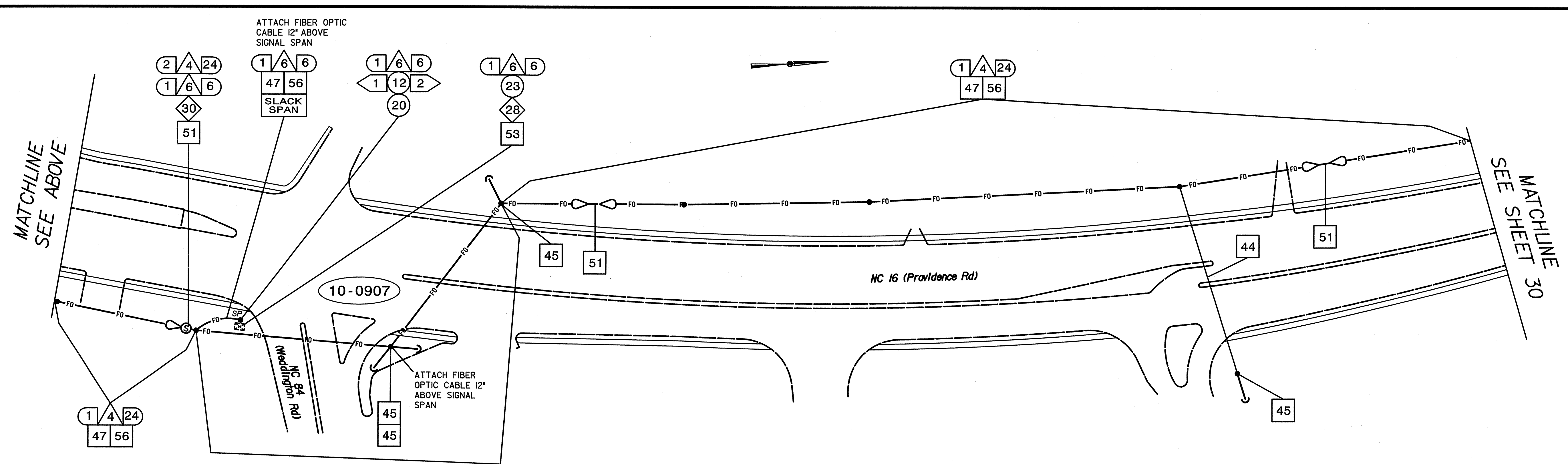
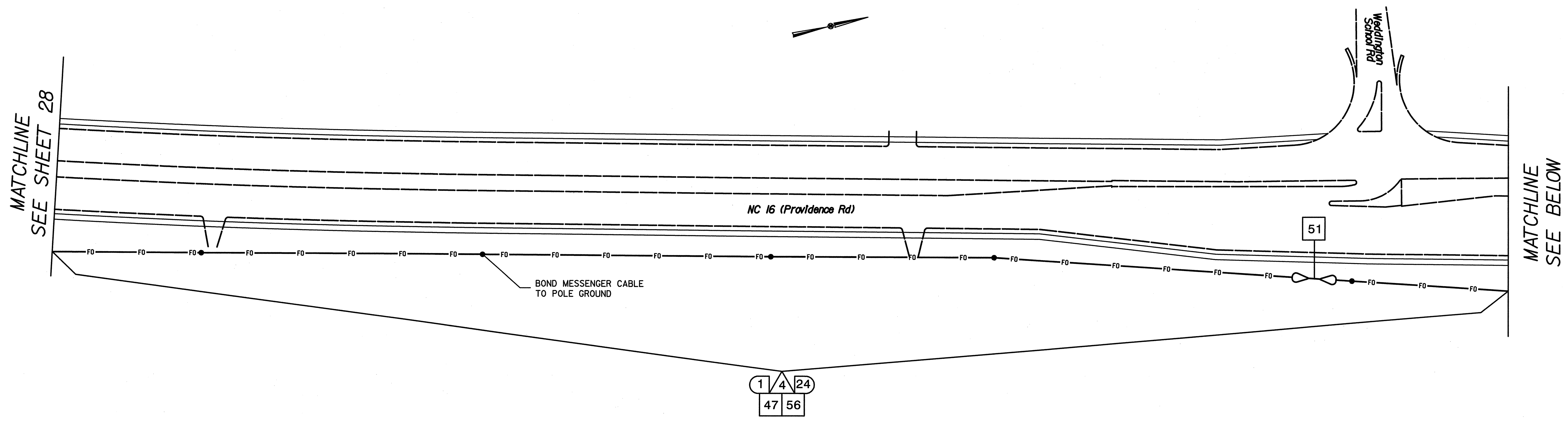
**Communications Cable and Conduit Routing Plans**

Div 10 Union & Mecklenburg Counties Waddington  
 PLAN DATE: July 2007 REVIEWED BY: T.R. Terrell  
 PREPARED BY: P.M. Ward REVIEWED BY: H.L. Winstead



REVISIONS	INIT.	DATE

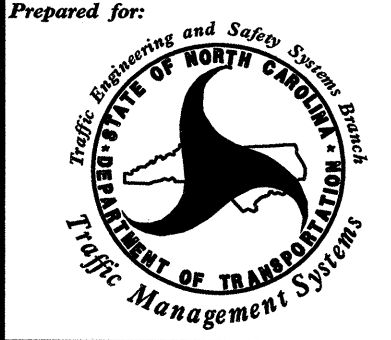
SEAL  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 H. L. WINSTEAD, JR.  
 07983  
 H. L. Winstead 7/27/07  
 SIGNATURE DATE  
 CADD FILE NAME CR-01.dgn




**NOTES**

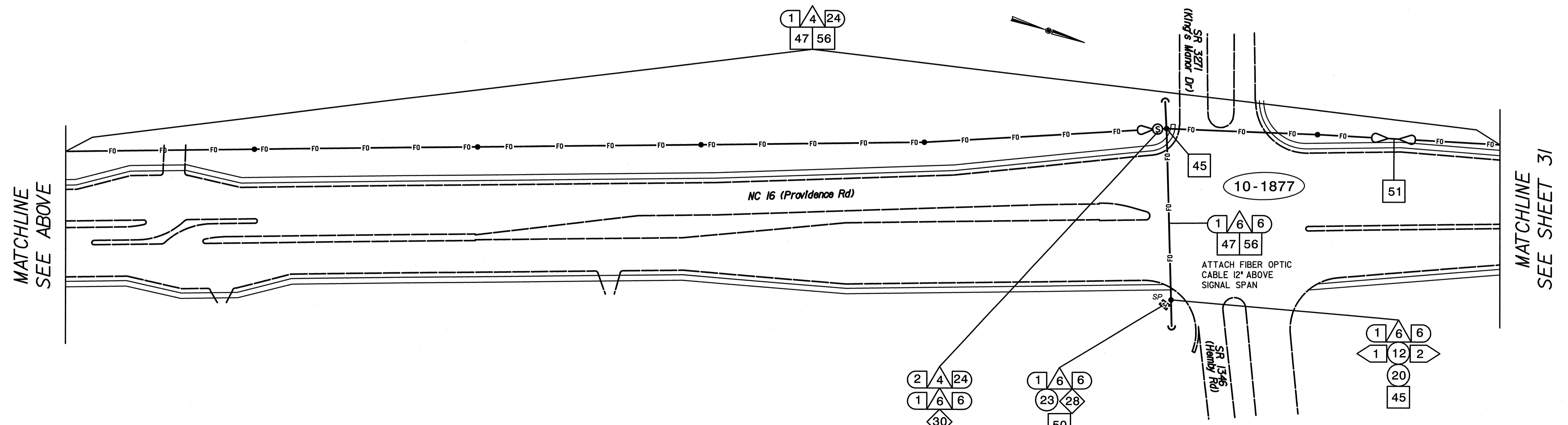
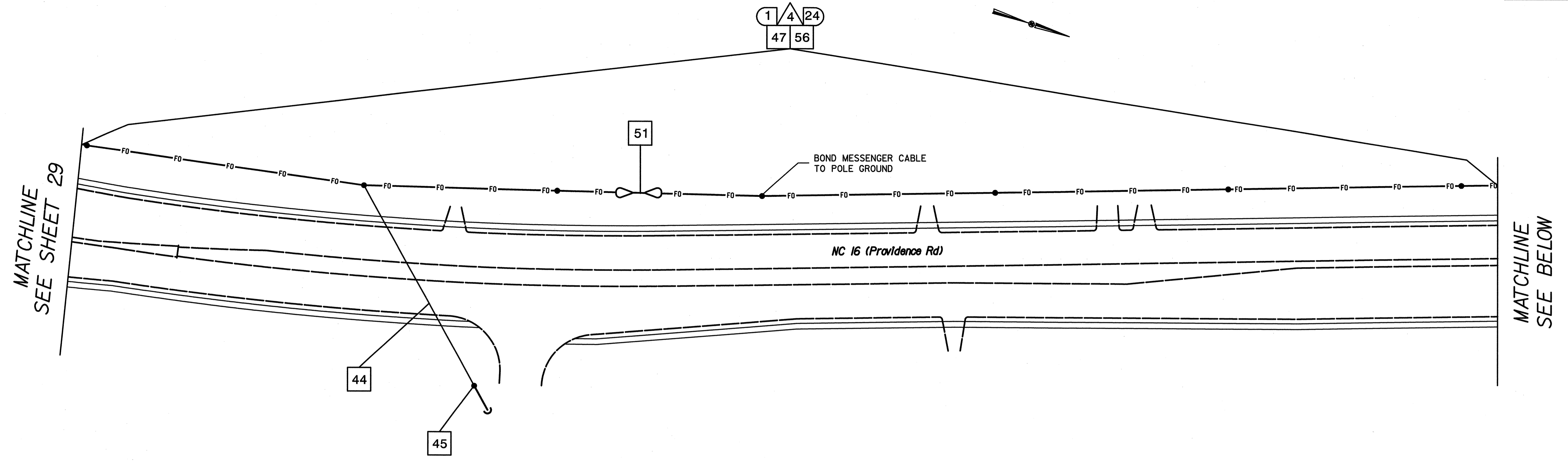
1. ATTACH ALL FIBER OPTIC CABLE 40" BELOW POWER ON THE FRONT SIDE OF POLE UNLESS OTHERWISE NOTED.
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3. DISTANCES SHOWN BETWEEN JUNCTION BOXES ARE APPROXIMATE.
4. SEAL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX/CABINET ENTRANCES.
5. AT THE DIRECTION OF THE ENGINEER, INSTALL NEW MESSENGER CABLE TO RESERVE AN ATTACHMENT LOCATION ON THE NEW POLE LINE.

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

Prepared for:  
  
 SCALE  
 10 0 50  
 1"=50'

<b>Communications Cable and Conduit Routing Plans</b>	
Div 10 Union & Mecklenburg Counties Weddington	
PLAN DATE: July 2007	REVIEWED BY: T.R. Terrell
PREPARED BY: P.M. Ward	REVIEWED BY: H.L. Winstead
REVISIONS	INIT. DATE

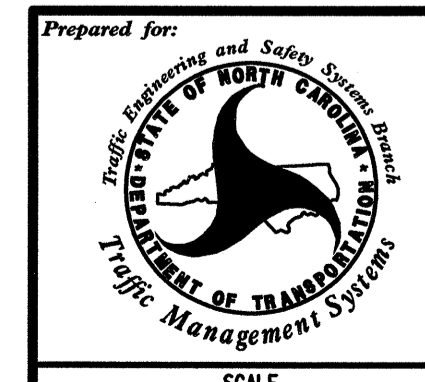
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 H.L. Winstead 7/27/07  
 SIGNATURE DATE  
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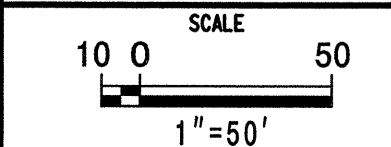
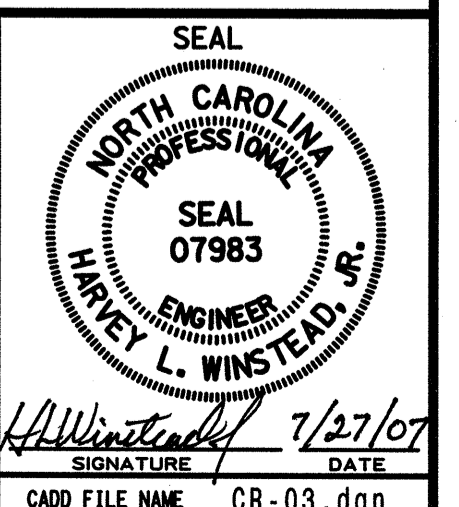
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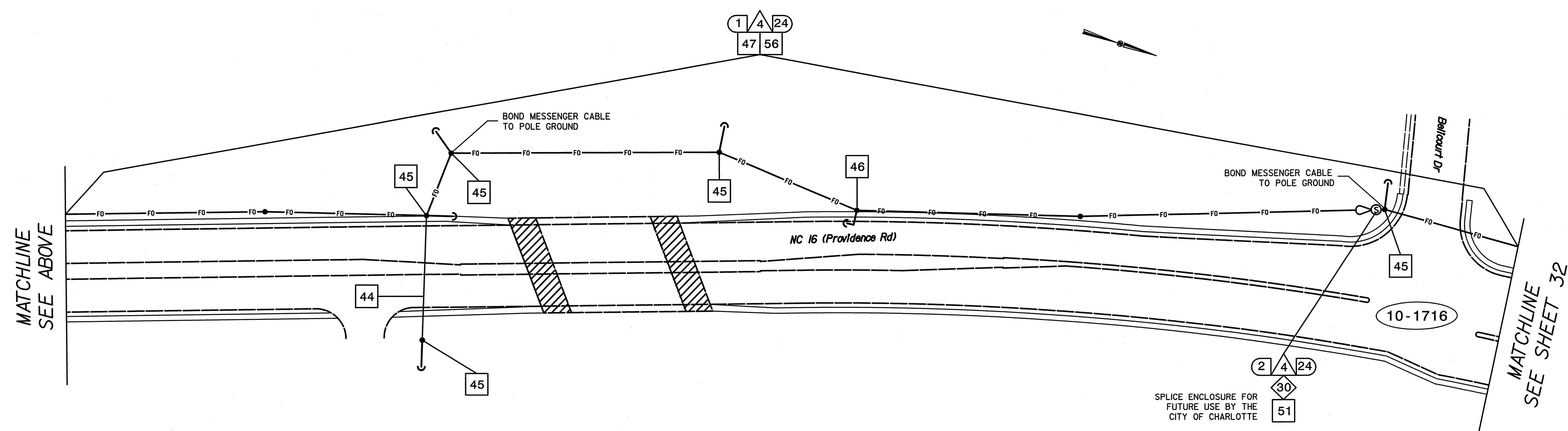
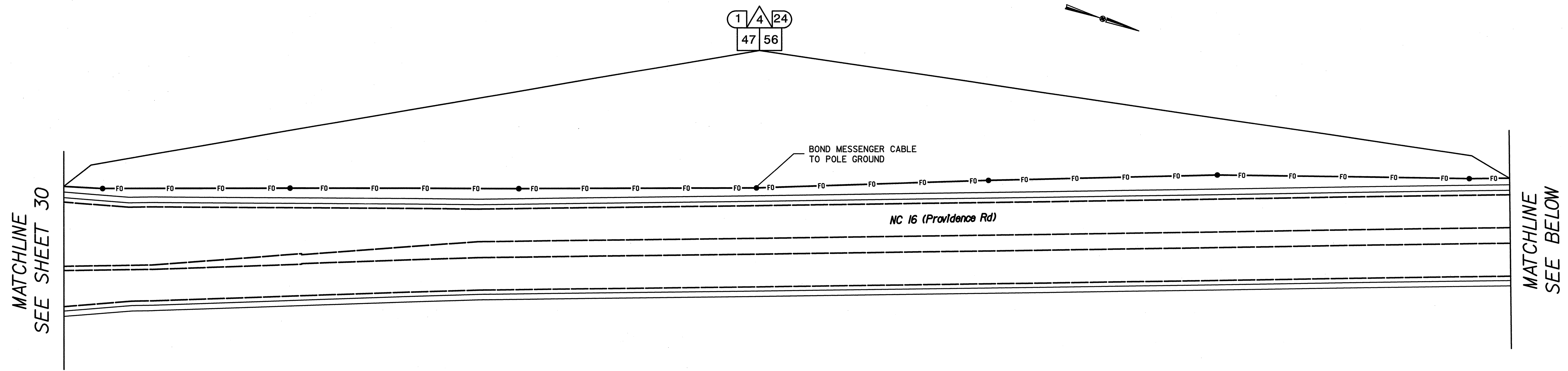
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 Raleigh, North Carolina 27609



<b>Communications Cable and Conduit Routing Plans</b> Div 10 Union & Mecklenburg Counties Weddington PLAN DATE: July 2007 REVIEWED BY: T.R. Terrell PREPARED BY: P.M. Ward REVIEWED BY: H.L. Winstead	
REVISIONS	INIT. DATE

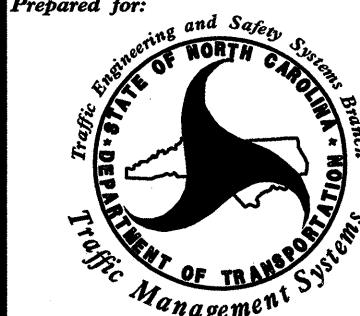




**NOTES**

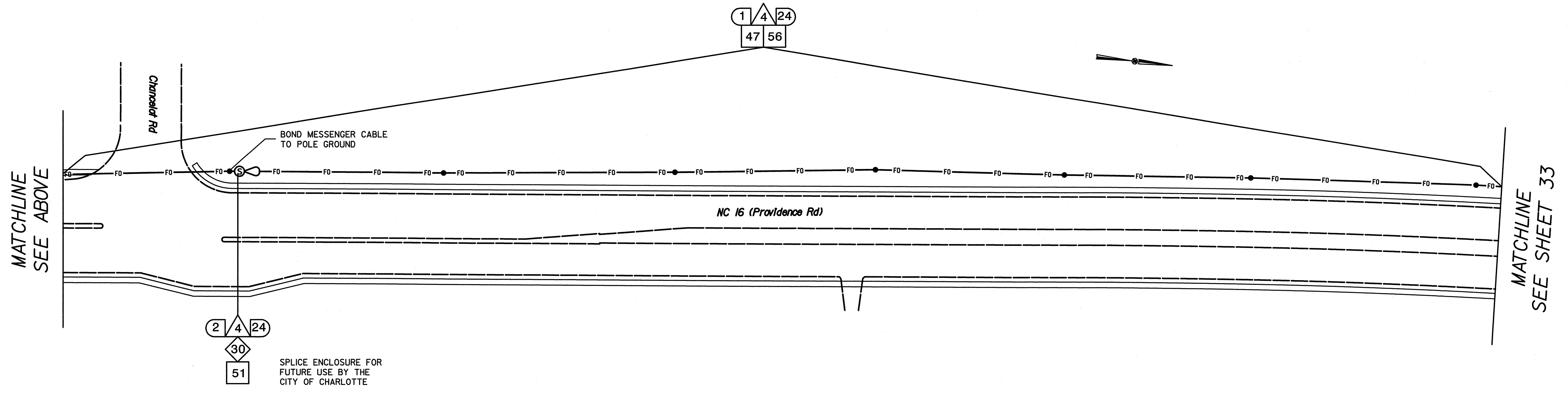
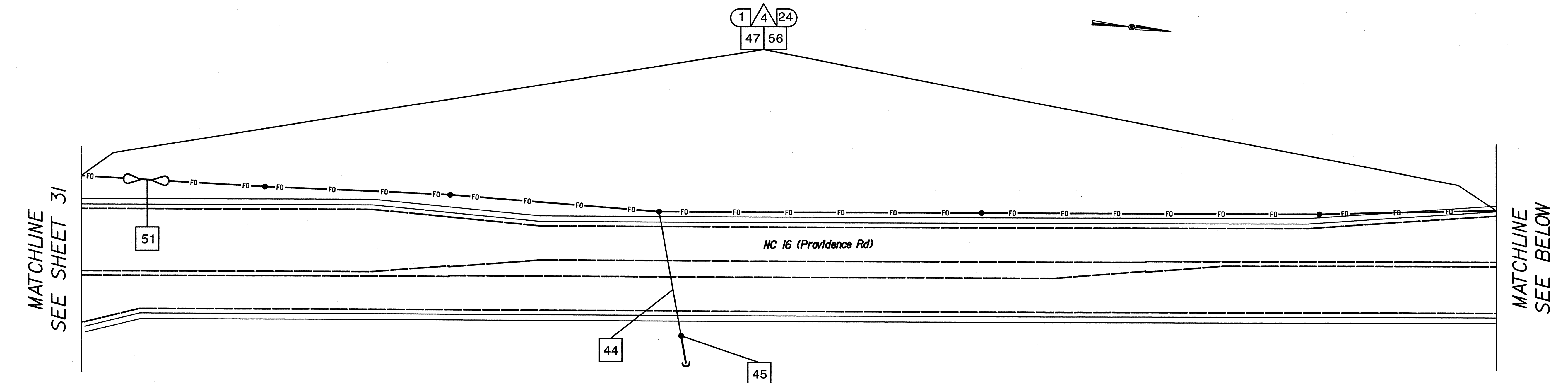
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343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

Prepared for:  
  
 SCALE  
 1" = 50'

<b>Communications Cable and Conduit Routing Plans</b>	
Div 10 Union & Mecklenburg Counties Waddington	
PLAN DATE: July 2007	REVIEWED BY: T.R. Terrell
PREPARED BY: P.M. Ward	REVIEWED BY: H.L. Winstead
REVISIONS	INIT. DATE

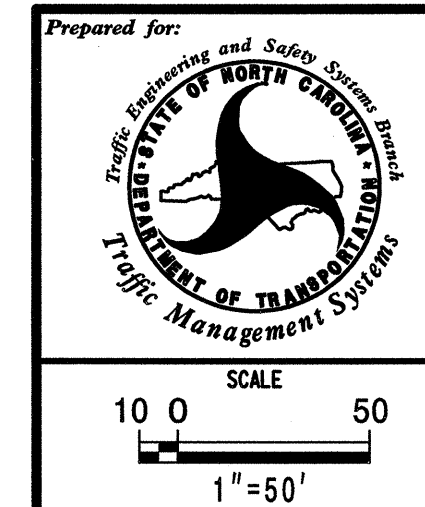
SEAL  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 07983  
 H. L. WINSTEAD, JR.  
 SIGNATURE DATE 7/27/07  
 CADD FILE NAME CR-04.dgn



**NOTES**

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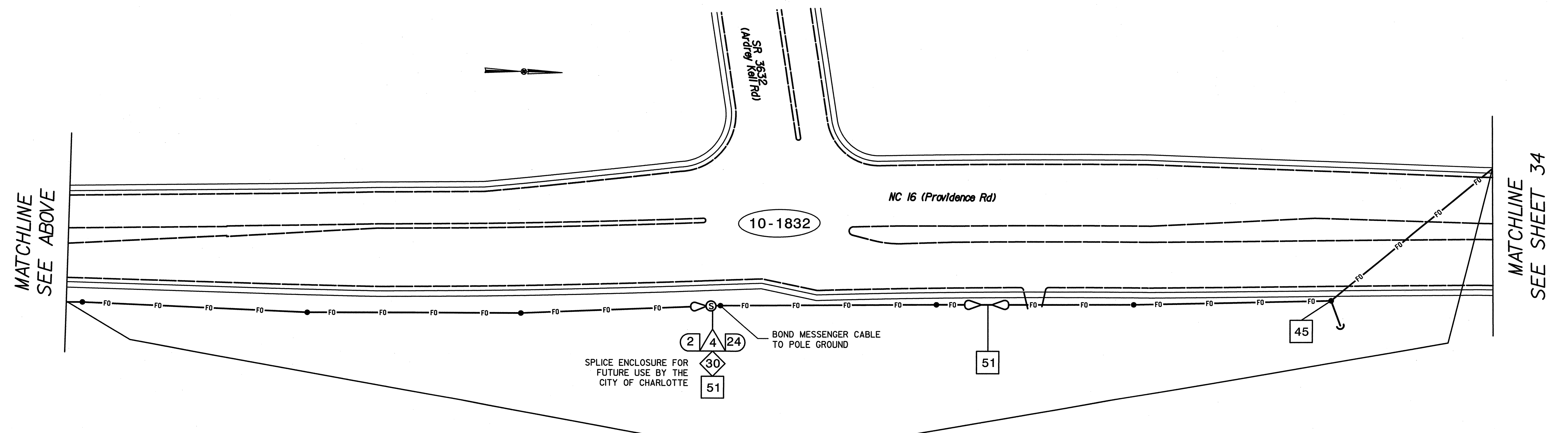
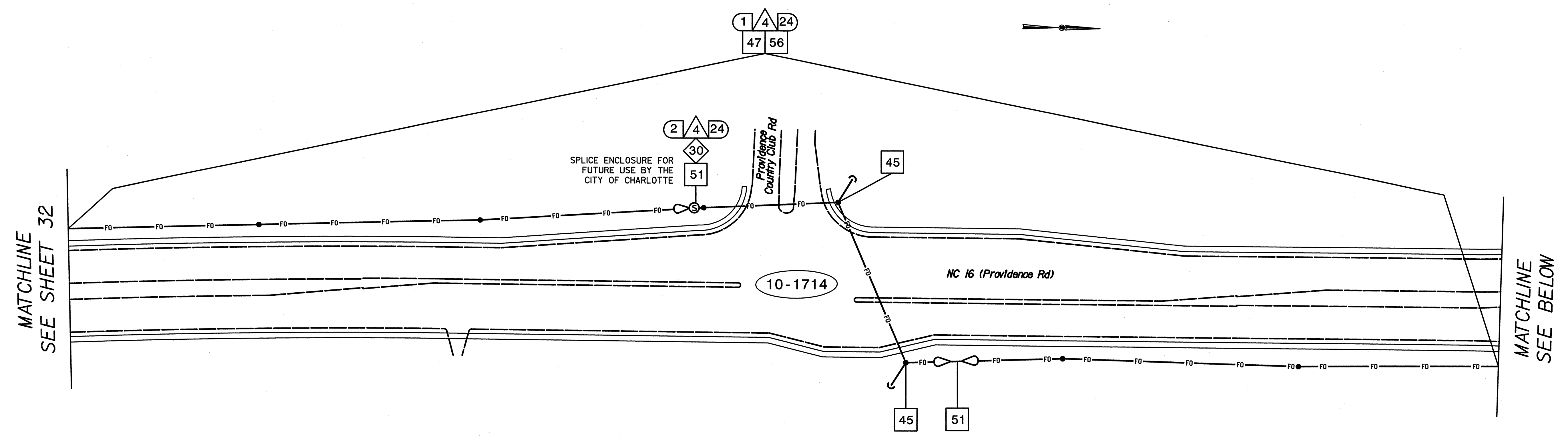


<b>Communications Cable and Conduit Routing Plans</b>	
Div 10 Union & Mecklenburg Counties Weddington	
PLAN DATE: July 2007	REVIEWED BY: T.R. Terrell
PREPARED BY: P.M. Ward	REVIEWED BY: H.L. Winstead
REVISIONS	INIT. DATE



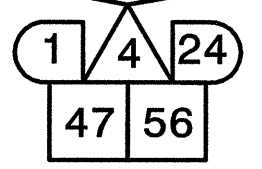
Signature: *H. L. Winstead* DATE: 7/27/07  
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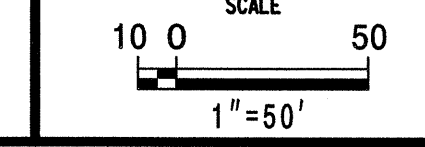
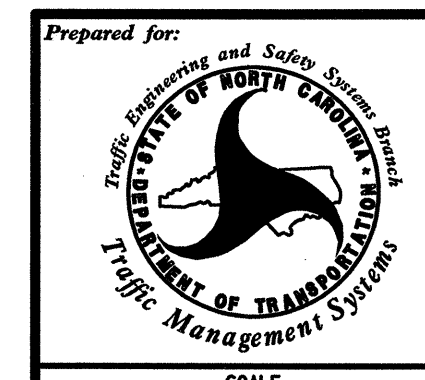


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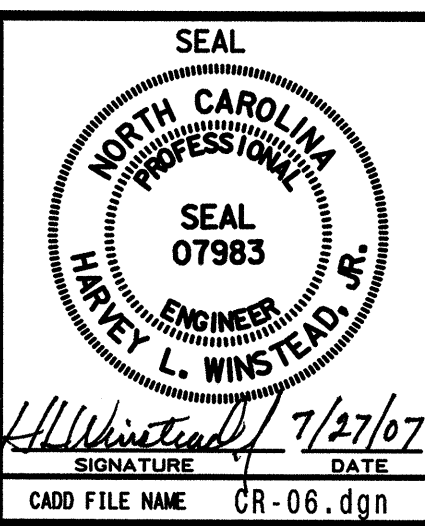
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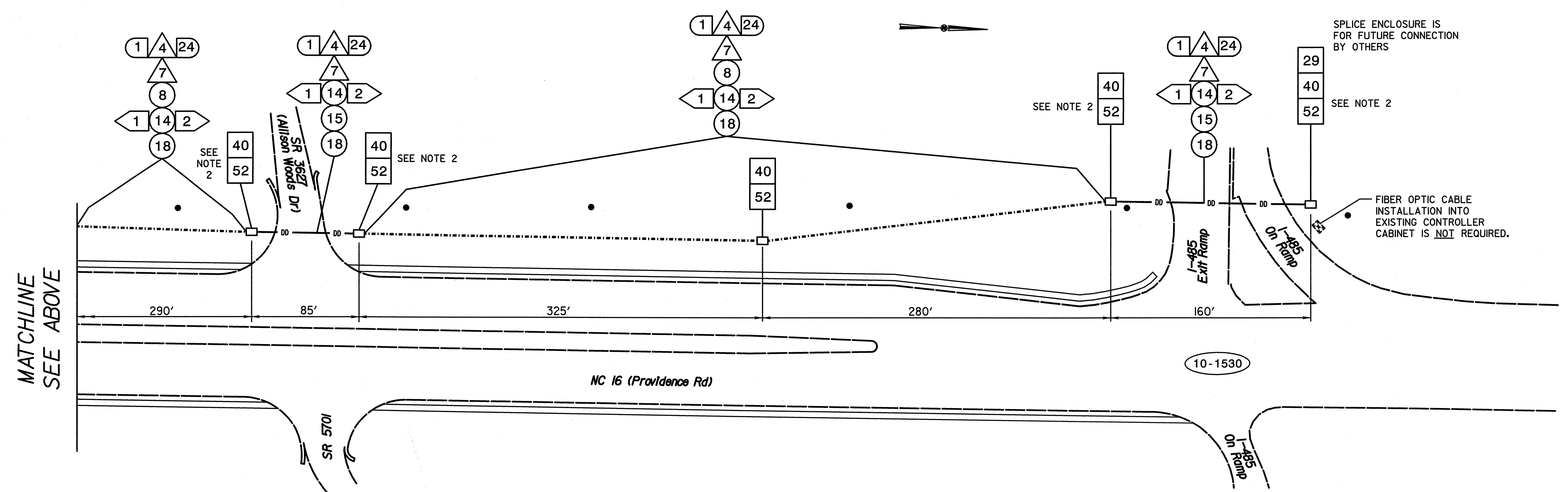
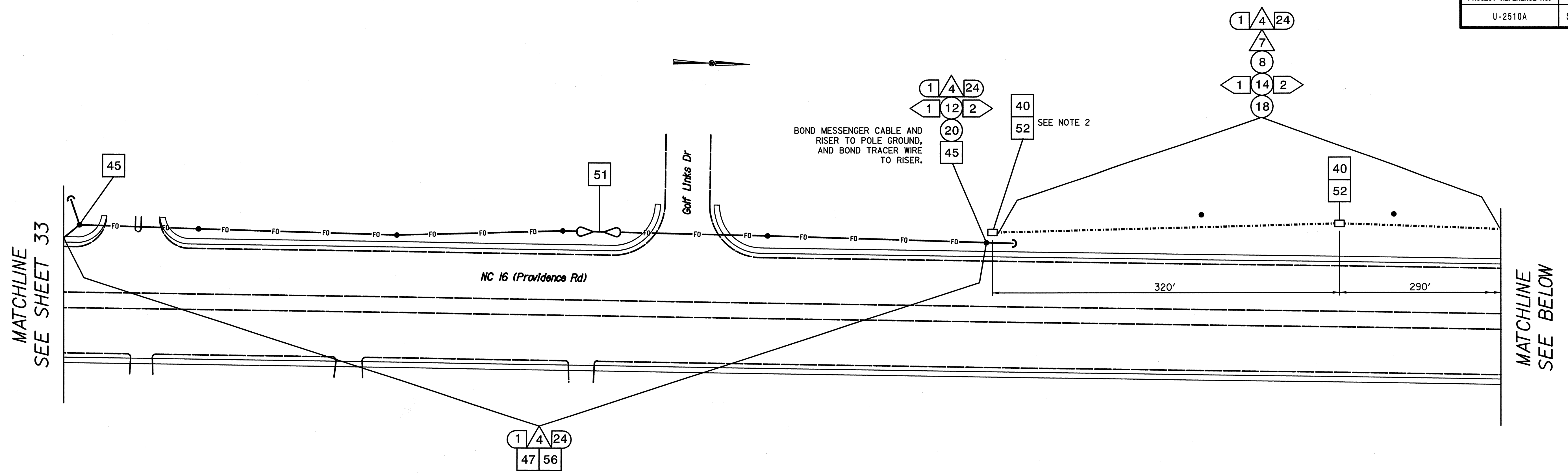
**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609



Prepared for:		Div 10 Union & Mecklenburg Counties Weddington	
PLAN DATE:	July 2007	REVIEWED BY:	T.R. Terrell
PREPARED BY:	P.M. Ward	REVIEWED BY:	H.L. Winstead
REVISIONS	INIT.	DATE	



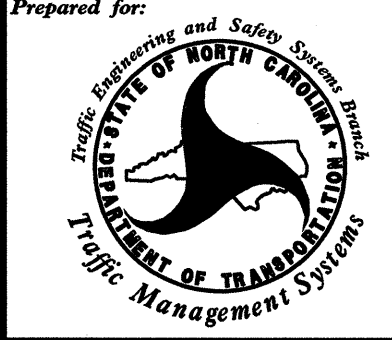
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**NOTES**

1. ATTACH ALL FIBER OPTIC CABLE 40" BELOW POWER ON THE FRONT SIDE OF POLE UNLESS OTHERWISE NOTED.
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Raleigh, North Carolina 27609


Prepared for:  
  
 SCALE  
 10 0 50  
 1"=50'

**Communications Cable and Conduit Routing Plans**

Div 10 Union & Mecklenburg Counties Weddington

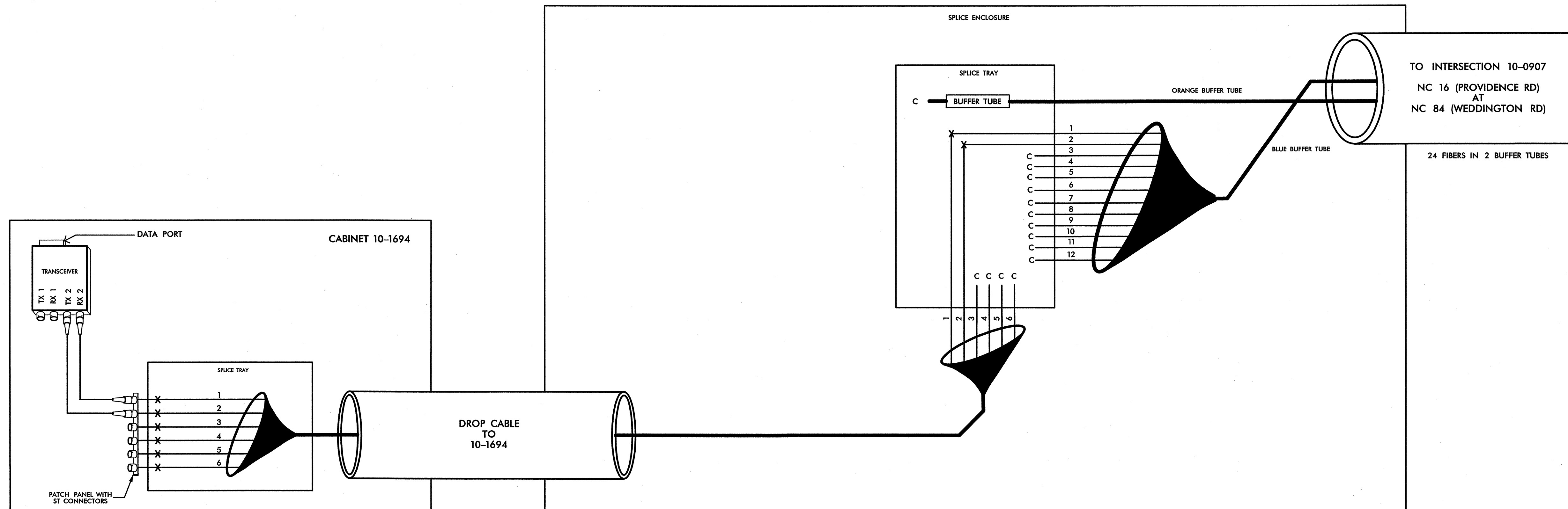
PLAN DATE: July 2007	REVIEWED BY: T.R. Terrell
PREPARED BY: P.M. Ward	REVIEWED BY: H.L. Winstead

REVISIONS	INIT.	DATE

SEAL  
  
 H.L. Winstead  
 ENGINEER  
 SIGNATURE DATE 7/27/07  
 CADD FILE NAME CR-07.dgn

# FIBER OPTIC CABLE

LEGEND	
COLOR CODE TIA/EIA 598-A	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA
X	= FUSION SPLICE INDIVIDUAL FIBER
C	= CAP AND SEAL
	= EXPRESS ENTIRE BUFFER TUBE
	= SPLICE ENTIRE BUFFER TUBE COLOR TO COLOR



**10-1694**  
NC 16 (Providence Rd)  
at  
SR 2948 (Rea Rd)

NOTE:  
TRANSCIVER TERMINATION CONFIGURATIONS ARE GENERIC.  
CONTRACTOR IS RESPONSIBLE FOR DETERMINING /ENSURING  
THE PROPER TERMINATIONS.

**HNTB** HNTB NORTH CAROLINA, P.C.  
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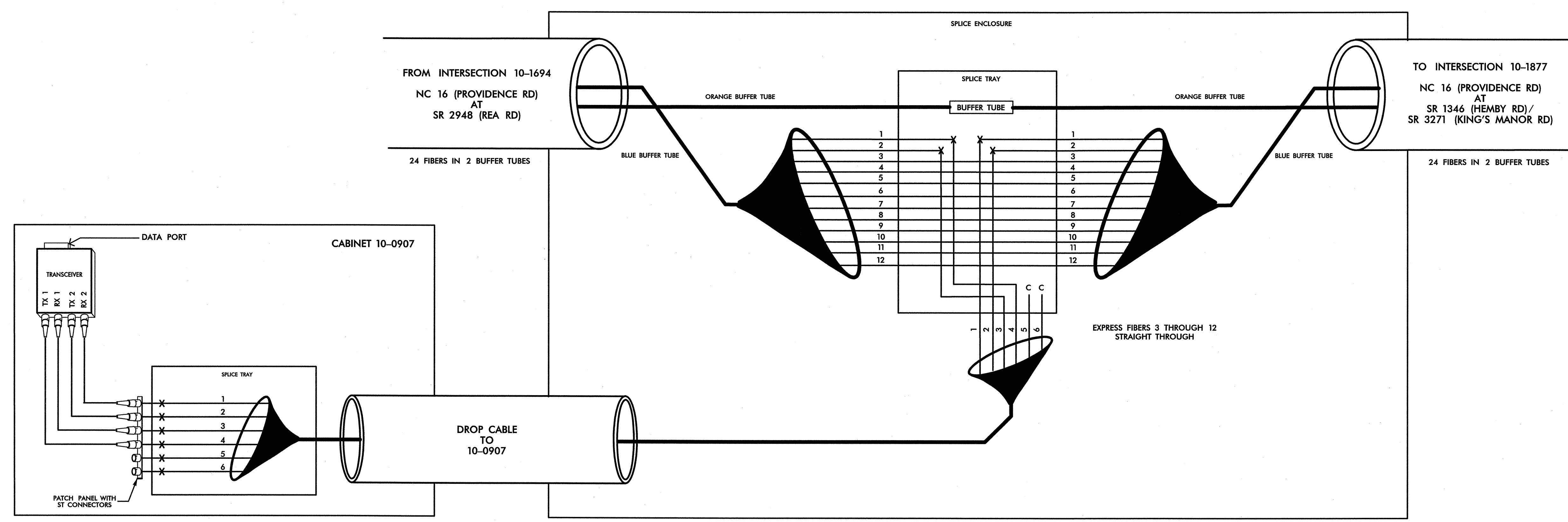
	<b>Fiber Optic Splice Details</b>		
	Div 10 Union & Mecklenburg Counties Weddington		
SCALE NONE	PLAN DATE: July 2007 PREPARED BY: T.R. Terrell	REVIEWED BY: S.T. Franklin REVIEWED BY: H.L. Winstead	SIGNATURE: <i>H.L. Winstead</i> DATE: 7/27/07
REVISIONS		INIT. DATE	CADD FILE NAME: Splice.dgn

# FIBER OPTIC CABLE

**LEGEND**

COLOR CODE  
TIA/EIA 598-A

(1) BLUE	(7) RED	X = FUSION SPLICE INDIVIDUAL FIBER
(2) ORANGE	(8) BLACK	C = CAP AND SEAL
(3) GREEN	(9) YELLOW	— BUFFER TUBE = EXPRESS ENTIRE BUFFER TUBE
(4) BROWN	(10) VIOLET	— BUFFER SPLICE = SPLICE ENTIRE BUFFER TUBE COLOR TO COLOR
(5) SLATE	(11) ROSE	
(6) WHITE	(12) AQUA	



**10-0907**  
 NC 16 (Providence Rd)  
 at  
 NC 84 (Weddington Rd)

NOTE:  
 TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC.  
 CONTRACTOR IS RESPONSIBLE FOR DETERMINING /ENSURING  
 THE PROPER TERMINATIONS.

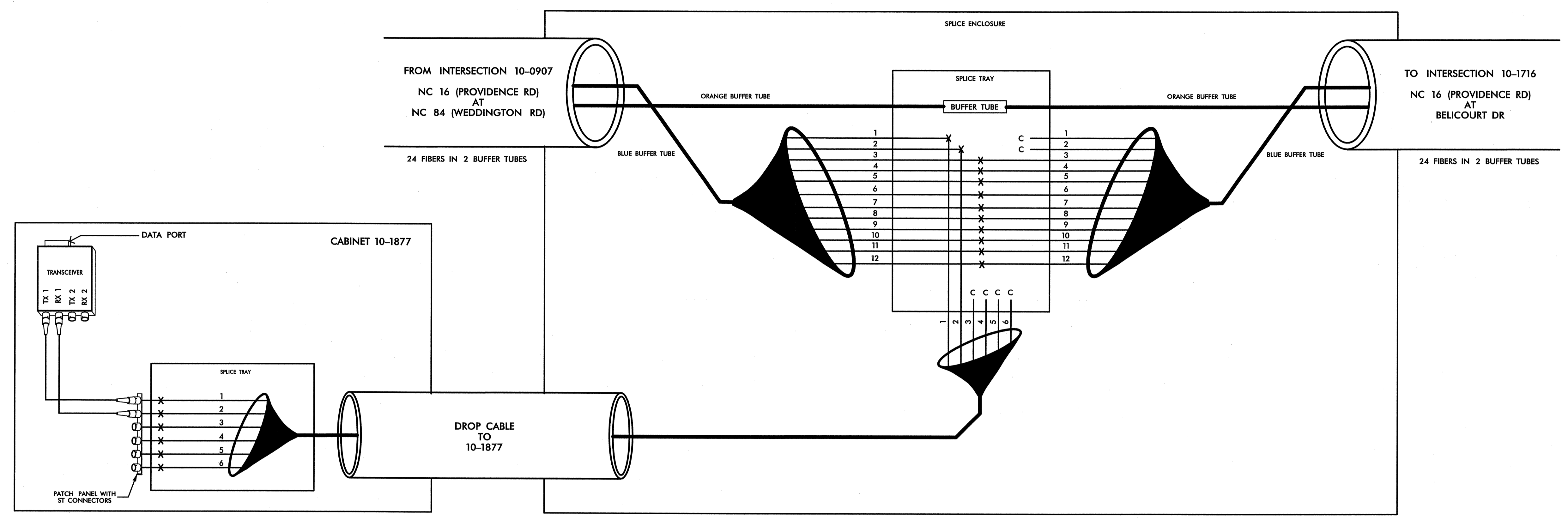
**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

	<b>Fiber Optic Splice Details</b>		
	Div 10 Union & Mecklenburg Counties Weddington		
SCALE NONE	PLAN DATE: July 2007 PREPARED BY: T.R. Terrell	REVIEWED BY: S.T. Franklin REVIEWED BY: H.L. Winstead	SIGNATURE: <i>H. Winstead</i> DATE: 7/27/07 CADD FILE NAME: Splice.dgn

# FIBER OPTIC CABLE

**LEGEND**

COLOR CODE TIA/EIA 598-A		
(1) BLUE	(7) RED	X = FUSION SPLICE INDIVIDUAL FIBER
(2) ORANGE	(8) BLACK	C = CAP AND SEAL
(3) GREEN	(9) YELLOW	BUFFER TUBE = EXPRESS ENTIRE BUFFER TUBE
(4) BROWN	(10) VIOLET	BUFFER SPLICE = SPLICE ENTIRE BUFFER TUBE COLOR TO COLOR
(5) SLATE	(11) ROSE	
(6) WHITE	(12) AQUA	



**MASTER CONTROLLER**



**10-1877**  
 NC 16 (Providence Rd)  
 at  
 SR 1346 (Hemby Rd) /  
 SR 3271 (King's Manor Dr)

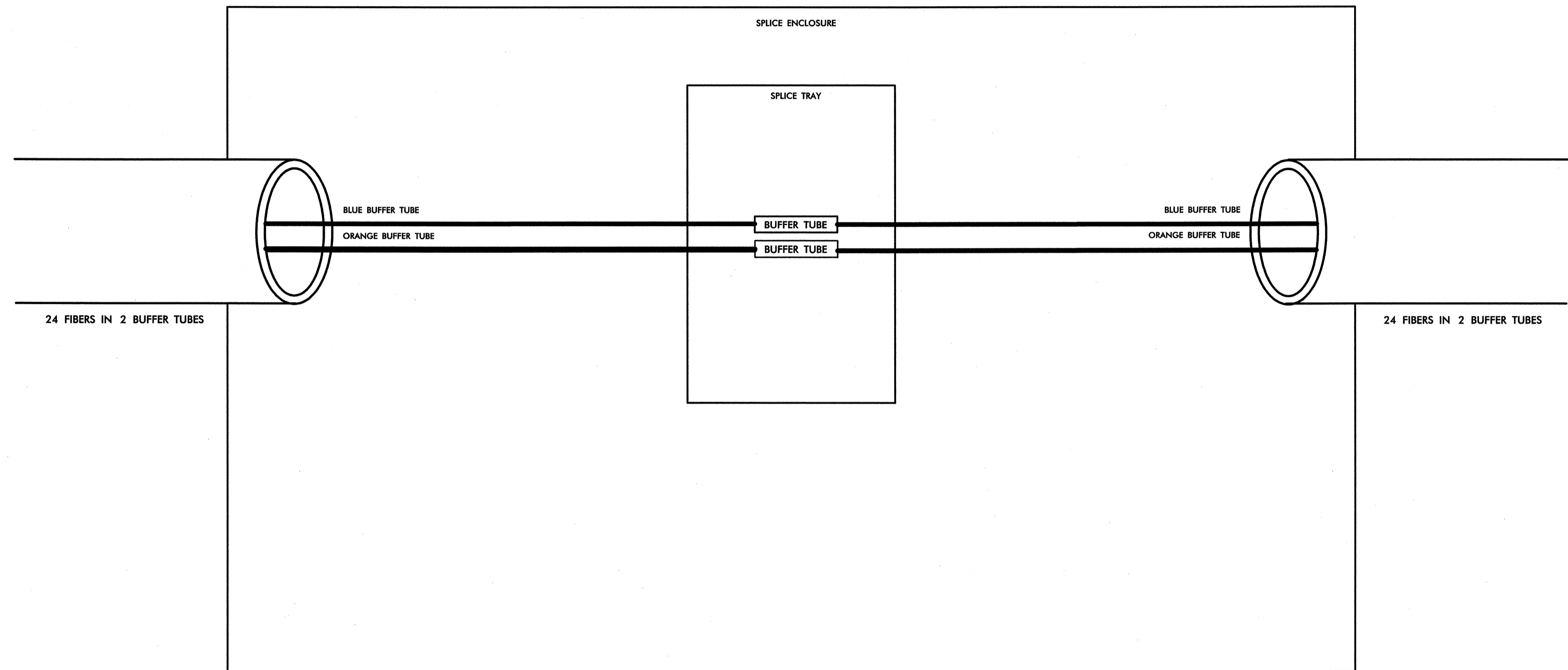
**NOTE:**  
 TRANSCIEVER TERMINATION CONFIGURATIONS ARE GENERIC.  
 CONTRACTOR IS RESPONSIBLE FOR DETERMINING /ENSURING  
 THE PROPER TERMINATIONS.

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

	<b>Fiber Optic Splice Details</b>		
	Div 10 Union & Mecklenburg Counties Weddington		
SCALE NONE	PLAN DATE: July 2007 PREPARED BY: T.R. Terrell	REVIEWED BY: S.T. Franklin REVIEWED BY: H.L. Winstead	SIGNATURE: <i>H.L. Winstead</i> / 7/27/07 DATE: 7/27/07 CADD FILE NAME: Splice.dgn

# FIBER OPTIC CABLE

LEGEND	
COLOR CODE TIA/EIA 598-A	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA
X = FUSION SPLICE INDIVIDUAL FIBER	
C = CAP AND SEAL	
 = EXPRESS ENTIRE BUFFER TUBE	
 = SPLICE ENTIRE BUFFER TUBE COLOR TO COLOR	



## TYPICAL SPLICE ENCLOSURE DETAIL FOR:

10-1716 (Future)

NC 16 (Providence Rd)  
at  
Belicourt Dr

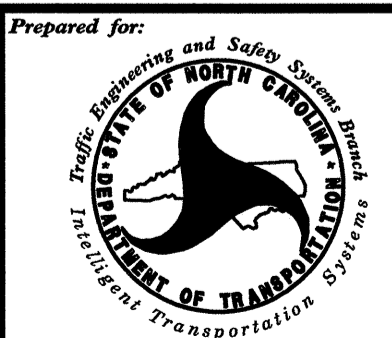
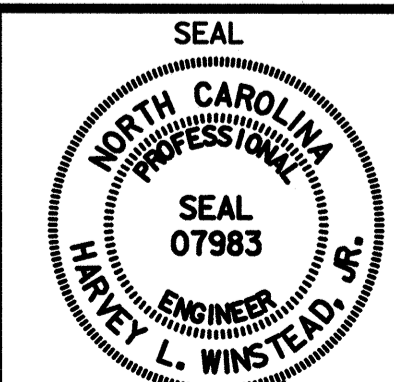

10-1714

NC 16 (Providence Rd)  
at  
Chancelot Rd



NC 16 (Providence Rd)  
at  
Providence Country Club Dr

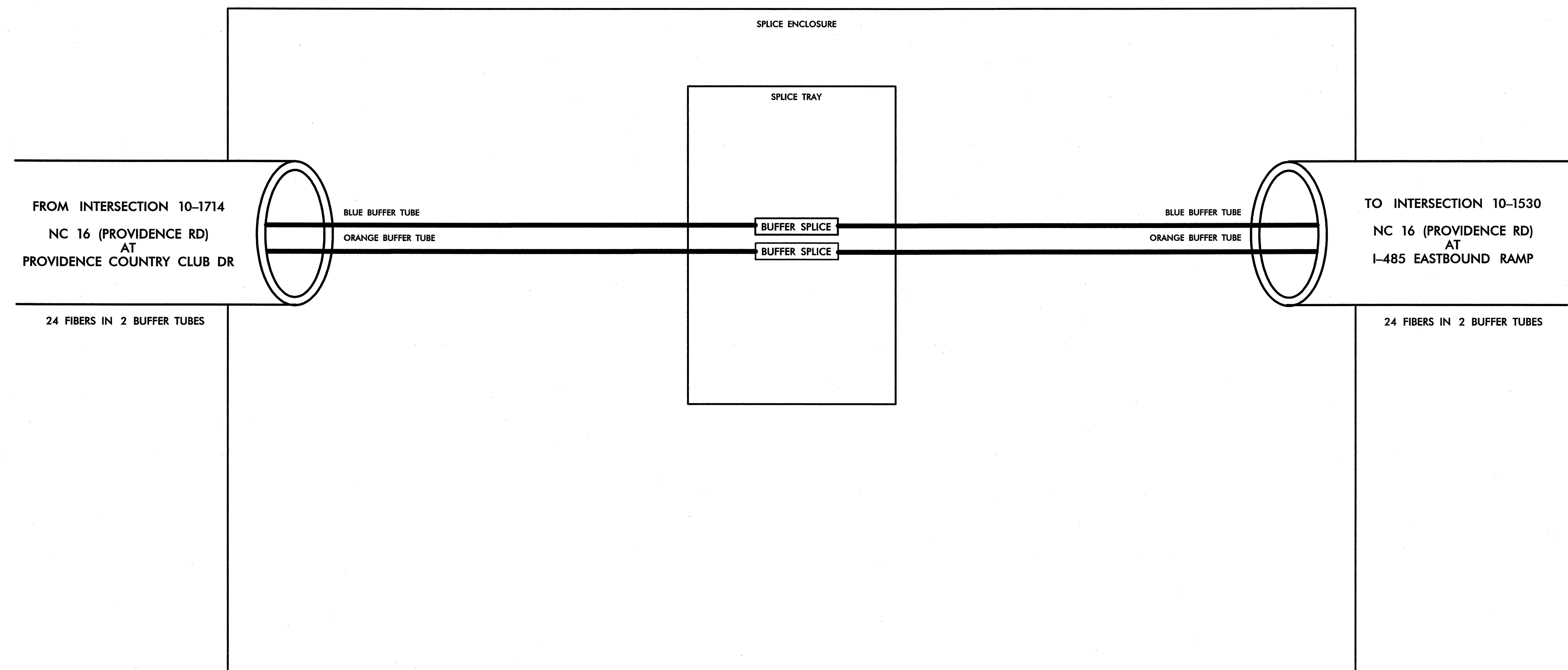
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**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

 Prepared for: SCALE NONE	<b>Fiber Optic Splice Details</b>		 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER H. L. WINSTEAD, P.E. 07983
	Div 10 Union & Mecklenburg Counties Waddington PLAN DATE: July 2007 REVIEWED BY: S.T. Franklin PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead		
	REVISIONS _____ _____ _____	INIT. _____ _____ _____	DATE _____ _____ _____
	SIGNATURE 		DATE 7/27/07
	CADD FILE NAME Splice.dgn		

# FIBER OPTIC CABLE

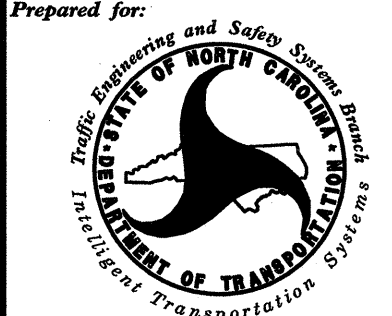



LEGEND	
COLOR CODE TIA/EIA 598-A	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA
	X = FUSION SPlice INDIVIDUAL FIBER
	C = CAP AND SEAL
	= EXPRESS ENTIRE BUFFER TUBE
	= SPlice ENTIRE BUFFER TUBE COLOR TO COLOR



10-1832  
 NC 16 (Providence Rd)  
 at  
 SR 3632 (Audrey Kell Rd)

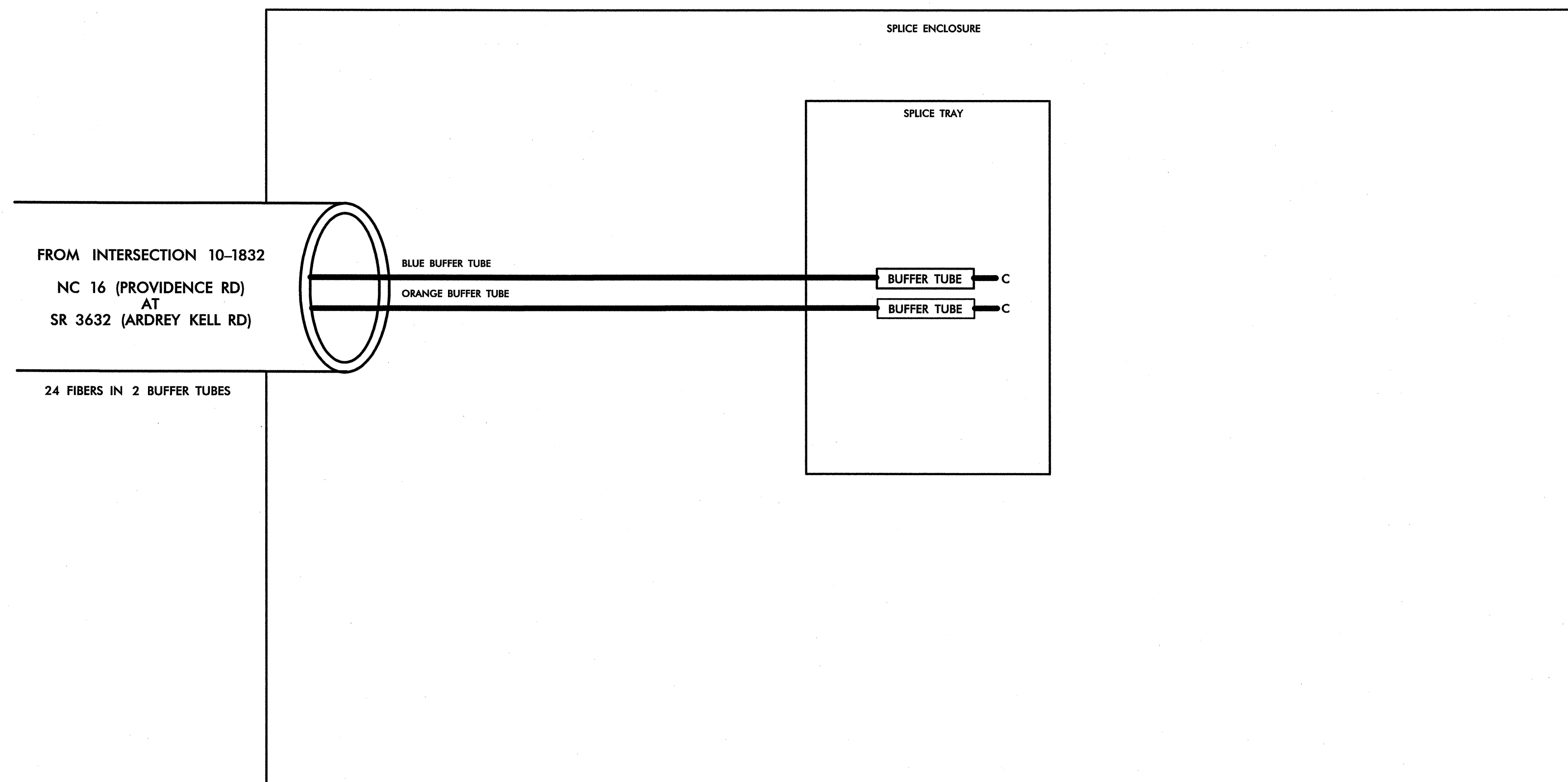
NOTE:  
 TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC.  
 CONTRACTOR IS RESPONSIBLE FOR DETERMINING /ENSURING  
 THE PROPER TERMINATIONS.

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

 Prepared for: SCALE  NONE	<b>Fiber Optic Splice Details</b>		
	Div 10 Union & Mecklenburg Counties Weddington PLAN DATE: July 2007 REVIEWED BY: S.T. Franklin PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead		
	REVISIONS _____ _____ _____	INIT. DATE _____ _____ _____	SIGNATURE DATE  7/27/07 CADD FILE NAME Splice.dgn

# FIBER OPTIC CABLE

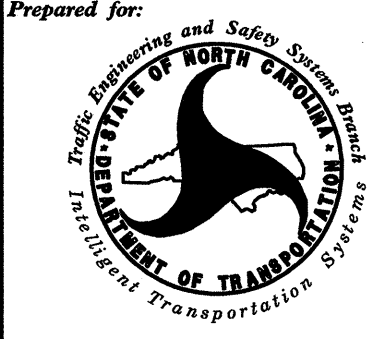

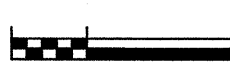
COLOR CODE TIA/EIA 598-A		
(1) BLUE	(7) RED	X = FUSION SPLICE INDIVIDUAL FIBER
(2) ORANGE	(8) BLACK	C = CAP AND SEAL
(3) GREEN	(9) YELLOW	BUFFER TUBE = EXPRESS ENTIRE BUFFER TUBE
(4) BROWN	(10) VIOLET	BUFFER SPLICE = SPLICE ENTIRE BUFFER TUBE COLOR TO COLOR
(5) SLATE	(11) ROSE	
(6) WHITE	(12) AQUA	



10-1530  
 NC 16 (Providence Rd)  
 at  
 I-485 Eastbound Ramp

NOTE:  
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 THE PROPER TERMINATIONS.

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 Prepared for:	<b>Fiber Optic Splice Details</b>		
	Div 10 Union & Mecklenburg Counties Weddington		
SCALE  NONE	PLAN DATE: July 2007 PREPARED BY: T.R. Terrell	REVIEWED BY: S.T. Franklin REVIEWED BY: H.L. Winstead	REVISIONS INT. DATE SIGNATURE: <i>H.L. Winstead</i> 7/27/07 DATE CADD FILE NAME: Splice.dgn