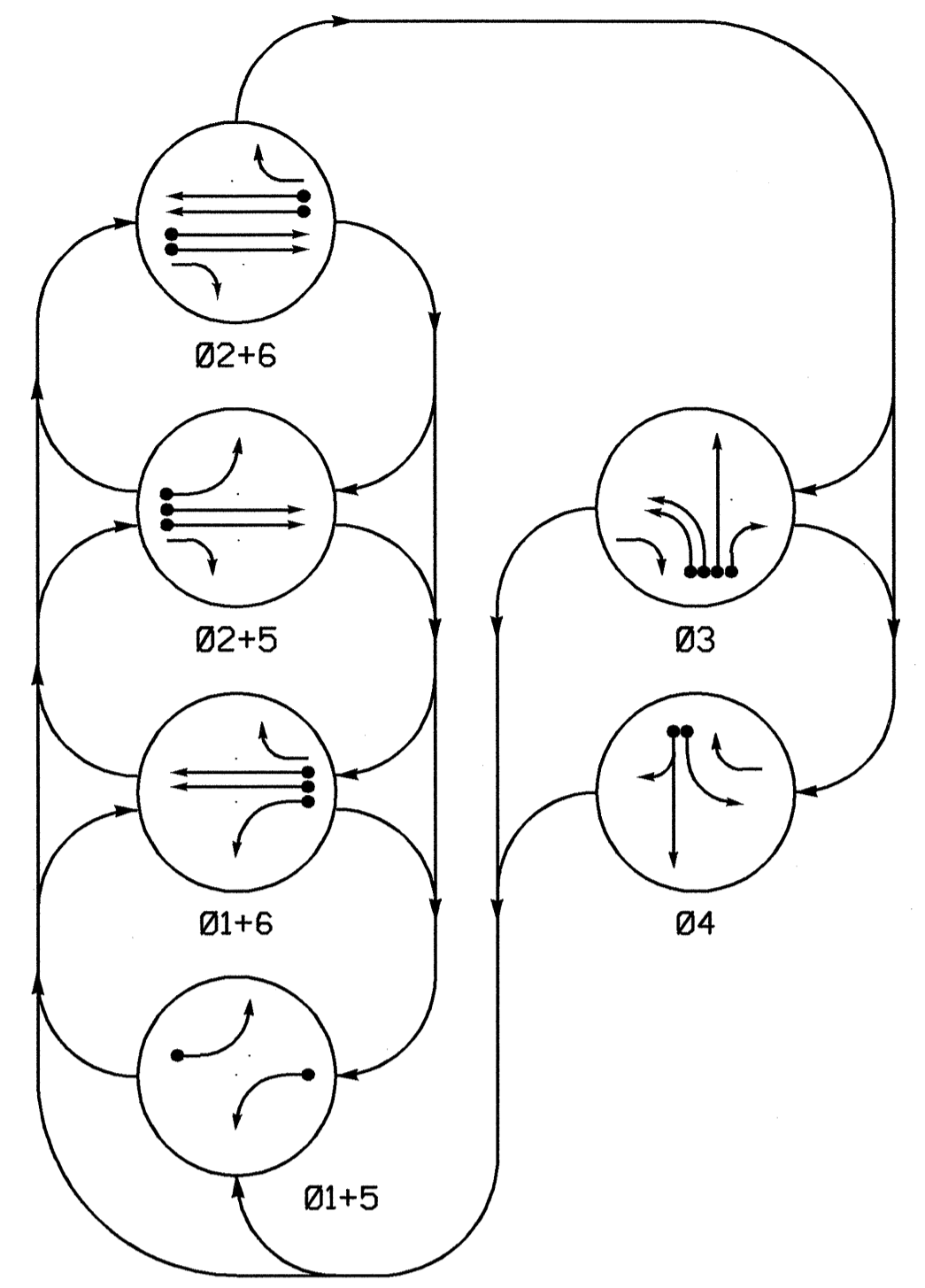


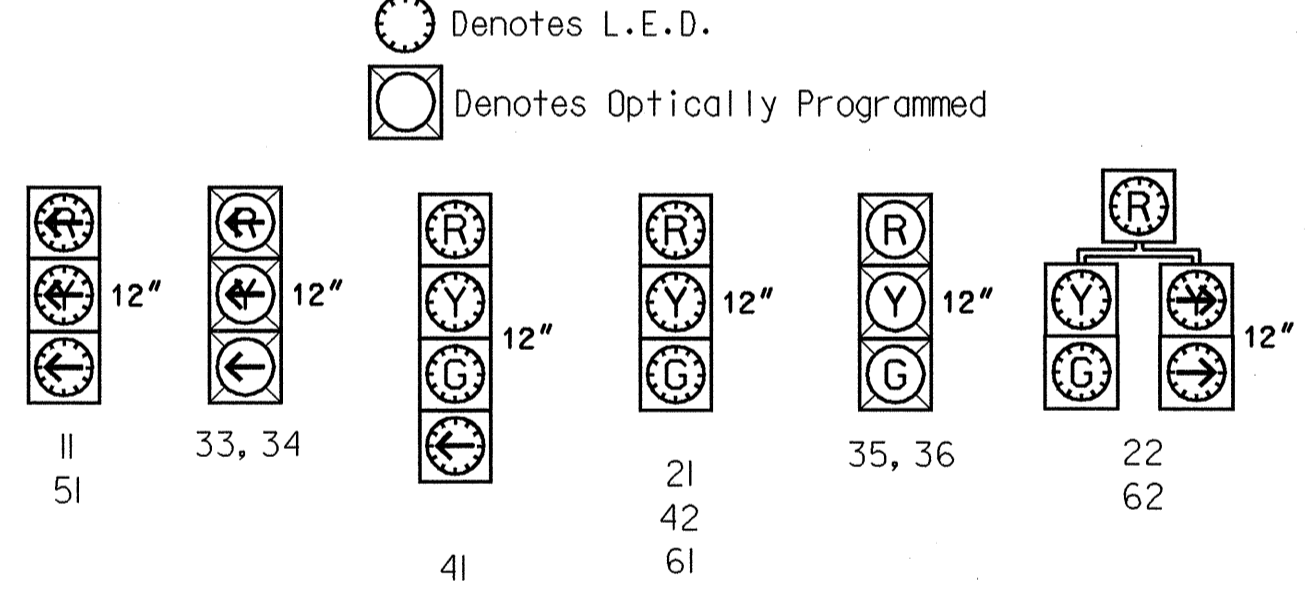
**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

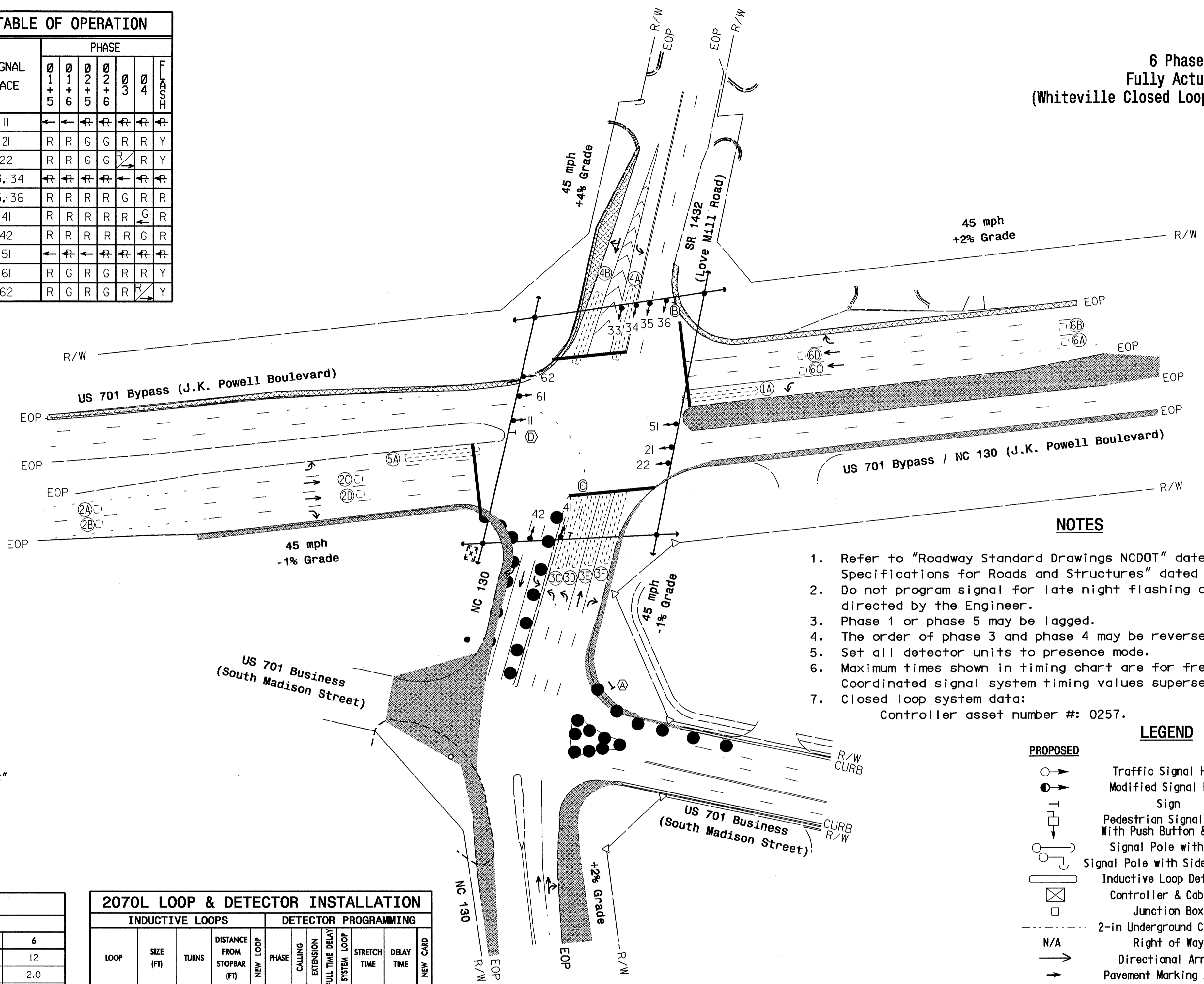
**SIGNAL FACE I.D.**



**TABLE OF OPERATION**

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
II	←	←	←	←	←	←
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
33, 34	←	←	←	←	←	←
35, 36	R	R	R	R	G	R
41	R	R	R	R	R	G
42	R	R	R	R	R	G
51	←	←	←	←	←	←
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

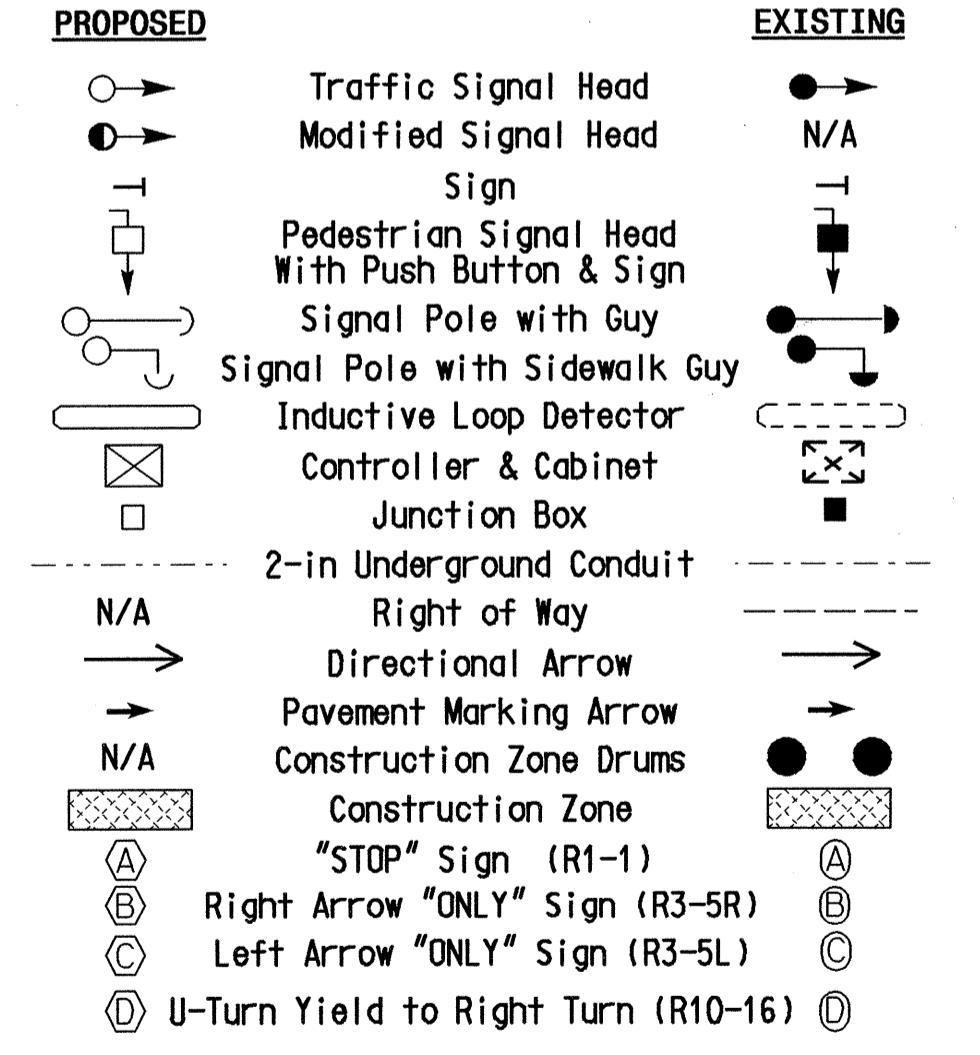
**6 Phase Fully Actuated (Whiteville Closed Loop Signal System)**



**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.
- 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 number #: 0257.

**LEGEND**



**2070L TIMING CHART**

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	1.0	2.0	1.0	1.0	1.0	2.0
Max Green 1 *	30	40	40	35	30	40
Yellow Clearance	3.0	4.6	4.6	4.3	3.0	4.3
Red Clearance	3.9	2.3	1.8	1.8	4.1	1.6
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduction *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

**2070L LOOP & DETECTOR INSTALLATION**

INDUCTIVE LOOPS		DETECTOR PROGRAMMING										
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
1A	6X60	2-4-2	+5	-	1	Y	Y	-	-	2.0	-	-
2A, 2B	6X6	EXISTING	300	-	2	Y	Y	-	-	1.8	-	-
2C, 2D	6X6	EXISTING	90	-	2	Y	Y	-	-	-	-	-
3C	6X60	2-4-2	0	-	3	Y	Y	-	-	-	-	-
3D	6X60	2-4-2	0	-	3	Y	Y	-	-	-	-	-
3E	6X60	2-4-2	0	-	3	Y	Y	-	-	-	-	-
3F	6X60	2-4-2	0	-	3	Y	Y	-	-	-	5	-
4A	6X60	2-4-2	+5	-	4	Y	Y	-	-	-	3	-
4B	6X60	2-4-2	+5	-	4	Y	Y	-	-	2.0	10	-
5A	6X60	2-4-2	+5	-	5	Y	Y	-	-	-	-	-
6A, 6B	6X6	EXISTING	300	-	6	Y	Y	-	-	1.8	-	-
6C, 6D	6X6	EXISTING	90	-	6	Y	Y	-	-	-	-	-

**Signal Upgrade - Temporary Design**

**US 701 Bypass (J.K. Powell Blvd) at NC 130 / SR 1432 (Love Mill Road)**

Division 6 Columbus County Whiteville

PLAN DATE: June 2008 REVIEWED BY: LM Moon

PREPARED BY: BK Scott REVIEWED BY: MR Cooney

REVISIONS: INIT. DATE

SCALE: 1"=50'

DATE: 6-17-08

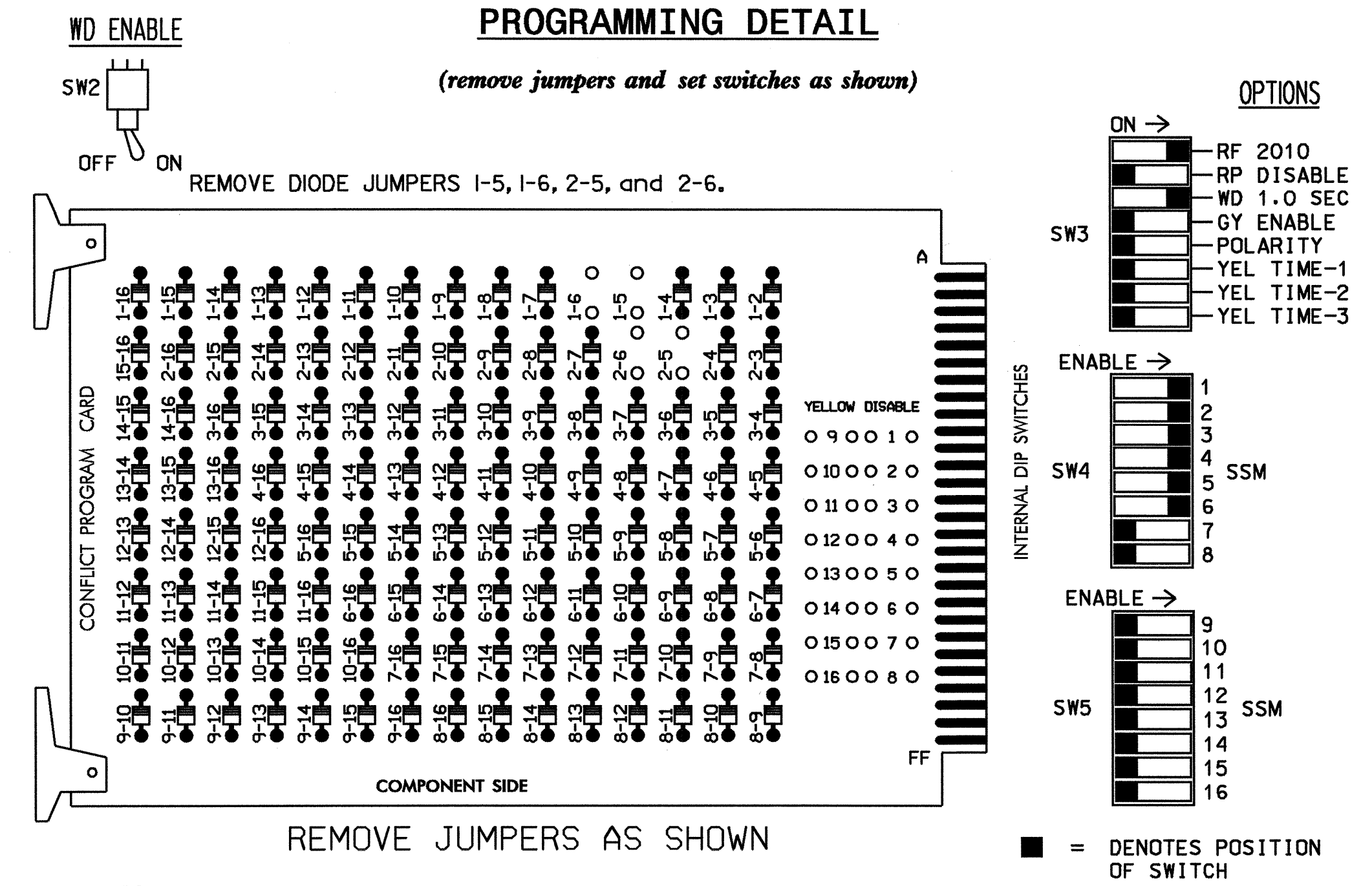
SIGNATURE: Lisa M. Moon

SIG. INVENTORY NO. 06-02577

### EDI MODEL 2010ECL CONFLICT MONITOR

#### PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- 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.
- The cabinet and controller are part of the Whiteville Closed Loop Signal System.

#### EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L  
 CABINET .....EXISTING 332 w/Aux.  
 SOFTWARE .....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS..18 (12-STD, 6 AUX)  
 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	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	33,34	35,36	22	41	42	62	NU	51	61,62	NU	NU	NU	NU	NU	NU
RED		128		116	101	101						134						
YELLOW		129		117	102	102						135						
GREEN		130		118	103	103						136						
RED ARROW	125			116								131						
YELLOW ARROW	126			117	117				102			132						
GREEN ARROW	127			118	118	103			103			133						
Hand icon																		
Person icon																		

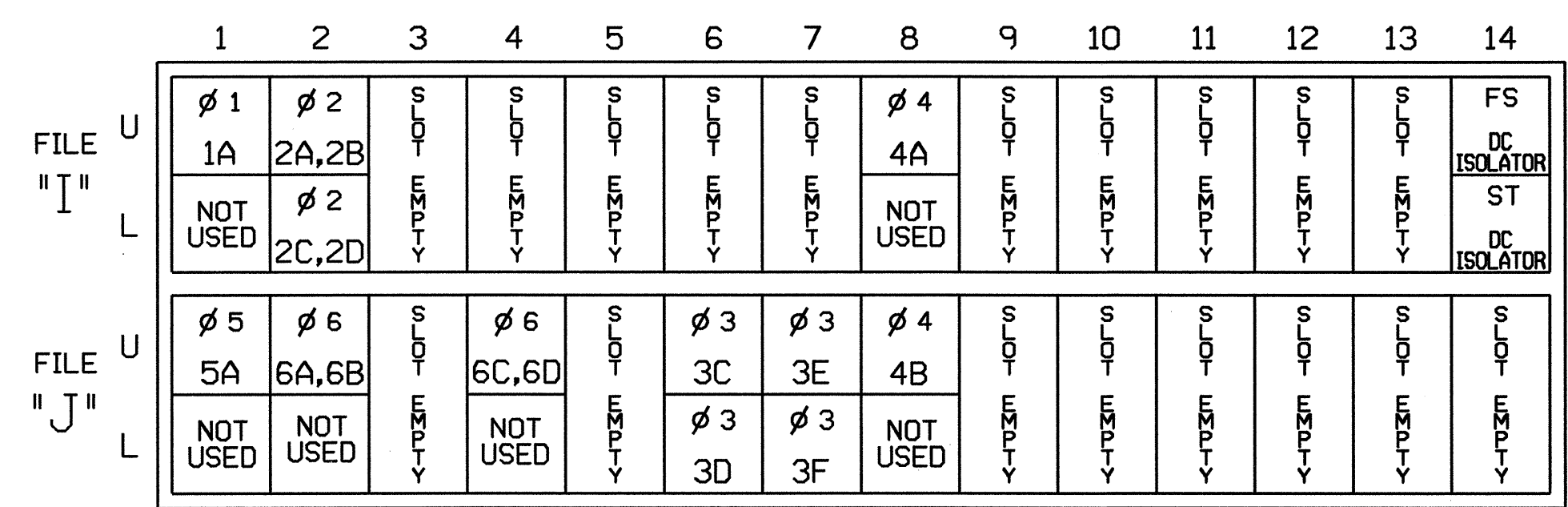
NU = Not Used

#### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y		2.0	--
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y		1.8	--
2C,2D	TB2-7,8	I2L	43	5	12	2	Y	Y		--	--
4A	TB6-5,6	I8U	49	11	24	4	Y	Y		--	3
5A	TB3-1,2	J1U	55	17	5	5	Y	Y		--	--
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		1.8	--
6C,6D	TB5-1,2	J4U	48	10	26	6	Y	Y		--	--
3C	TB5-9,10	J6U	42	4	8	3	Y	Y		--	--
3D	TB5-11,12	J6L	46	8	18	3	Y	Y		--	--
3E	TB7-1,2	J7U	66	28	38	3	Y	Y		--	--
3F	TB7-3,4	J7L	79	41	48	3	Y	Y		--	5
4B	TB7-5,6	J8U	50	12	28	4	Y	Y		2.0	10

#### INPUT FILE POSITION LAYOUT

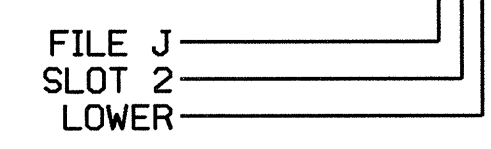
(front view)



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

FS = FLASH SENSE  
 ST = STOP TIME

#### INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-02577  
 DESIGNED: June 2008  
 SEALED: June 17, 2008  
 REVISED:

#### Signal Upgrade - Temporary Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 701 Bypass (J.K. Powell Blvd) at NC 130/ SR 1432 (Love Mill Road)

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

Division 06	Columbus County	Whiteville
PLAN DATE: June 2008	REVIEWED BY: MR Cooney	
PREPARED BY: LM Moon	REVIEWED BY:	
REVISIONS	INIT.	DATE

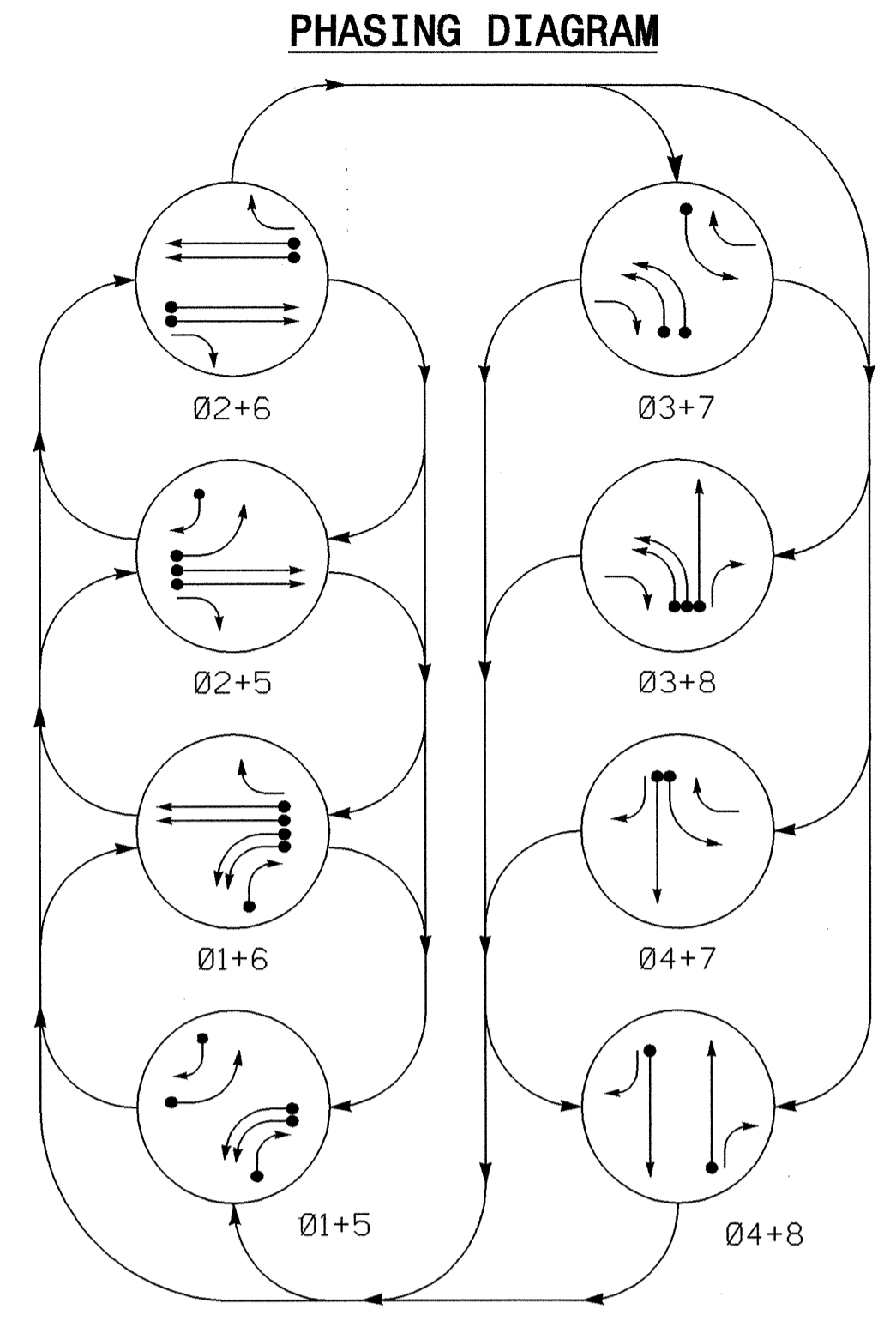
SEAL  
  
 SIGNATURE: *Melissa R. Cooney* DATE: 6-17-08

**PBSI** 1616 EAST MILLBROOK ROAD, SUITE 310  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888

SIG. INVENTORY NO. 06-02577

03-SEP-2008 15:09  
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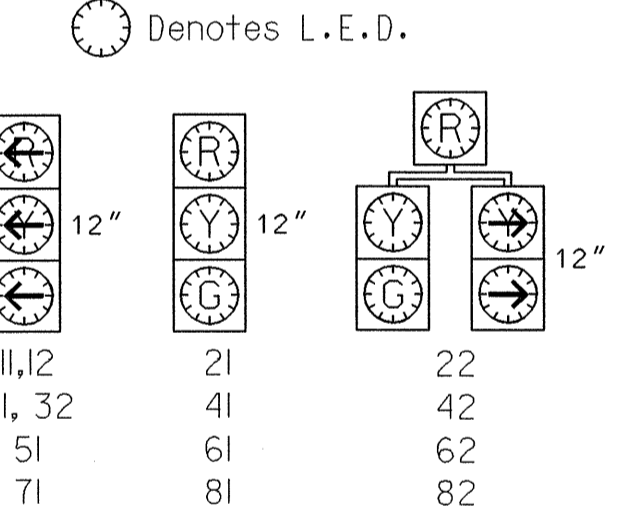
8 Phase Fully Actuated (Whiteville Closed Loop Signal System)



PHASING DIAGRAM DETECTION LEGEND

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

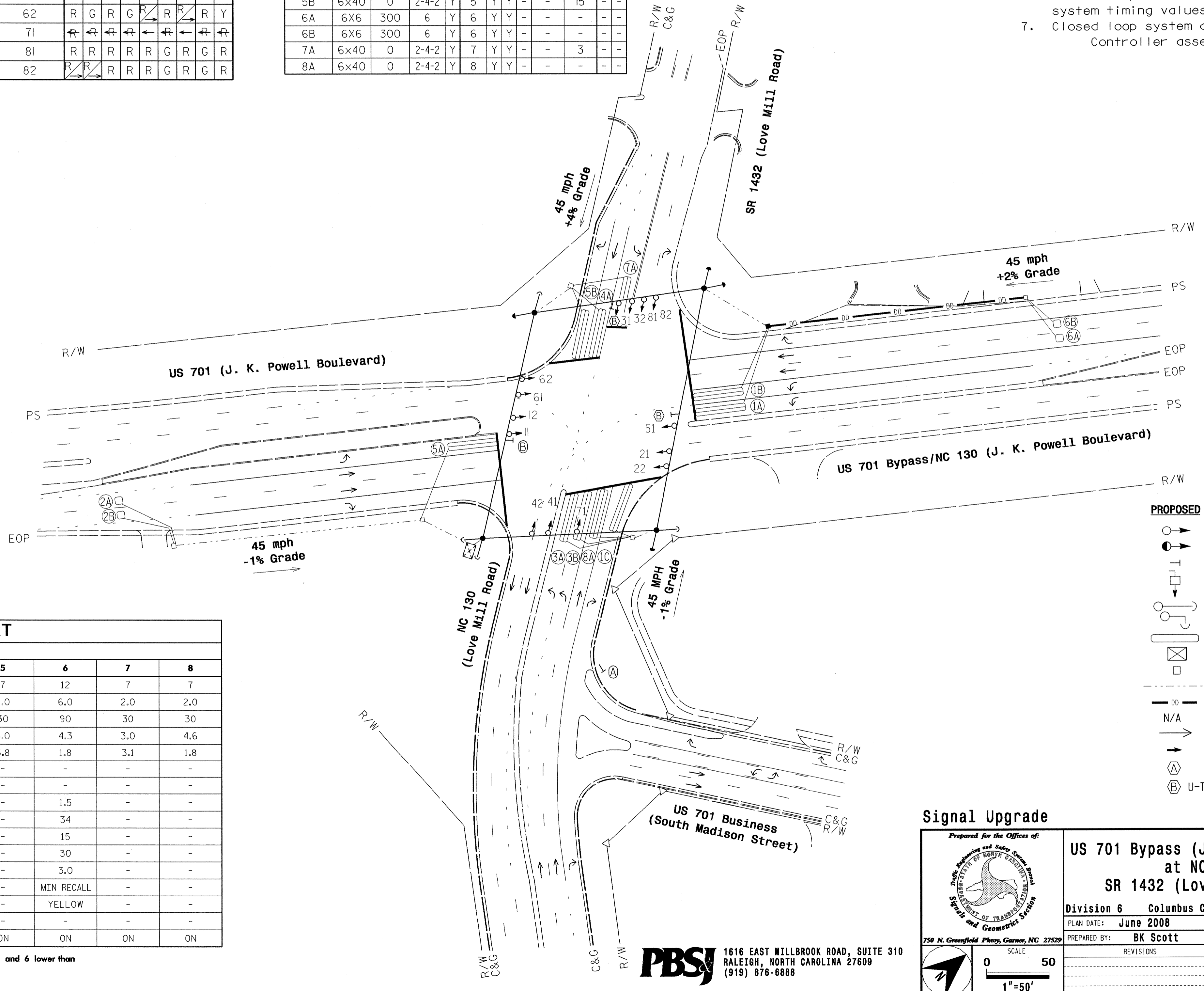
SIGNAL FACE I.D.



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

2070L LOOP & DETECTOR INSTALLATION											
INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP NEW CARD
1A	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	-	-	15	-
2A	6X6	300	4	Y	2	Y	Y	-	-	-	-
2B	6X6	300	4	Y	2	Y	Y	-	-	-	-
3A	6x40	0	2-4-2	Y	3	Y	Y	-	-	-	-
3B	6x40	0	2-4-2	Y	3	Y	Y	-	-	-	-
4A	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	6X6	300	6	Y	6	Y	Y	-	-	-	-
6B	6X6	300	6	Y	6	Y	Y	-	-	-	-
7A	6x40	0	2-4-2	Y	7	Y	Y	-	-	3	-
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.
  - Phase 3 or phase 7 may be lagged.
  - 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 number #: 0257.



FEATURE	2070L TIMING CHART							
	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	30	90	30	30	30	90	30	30
Yellow Clearance	3.0	4.6	3.0	4.3	3.0	4.3	3.0	4.6
Red Clearance	4.0	1.8	3.1	1.7	3.8	1.8	3.1	1.8
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 Reduction *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

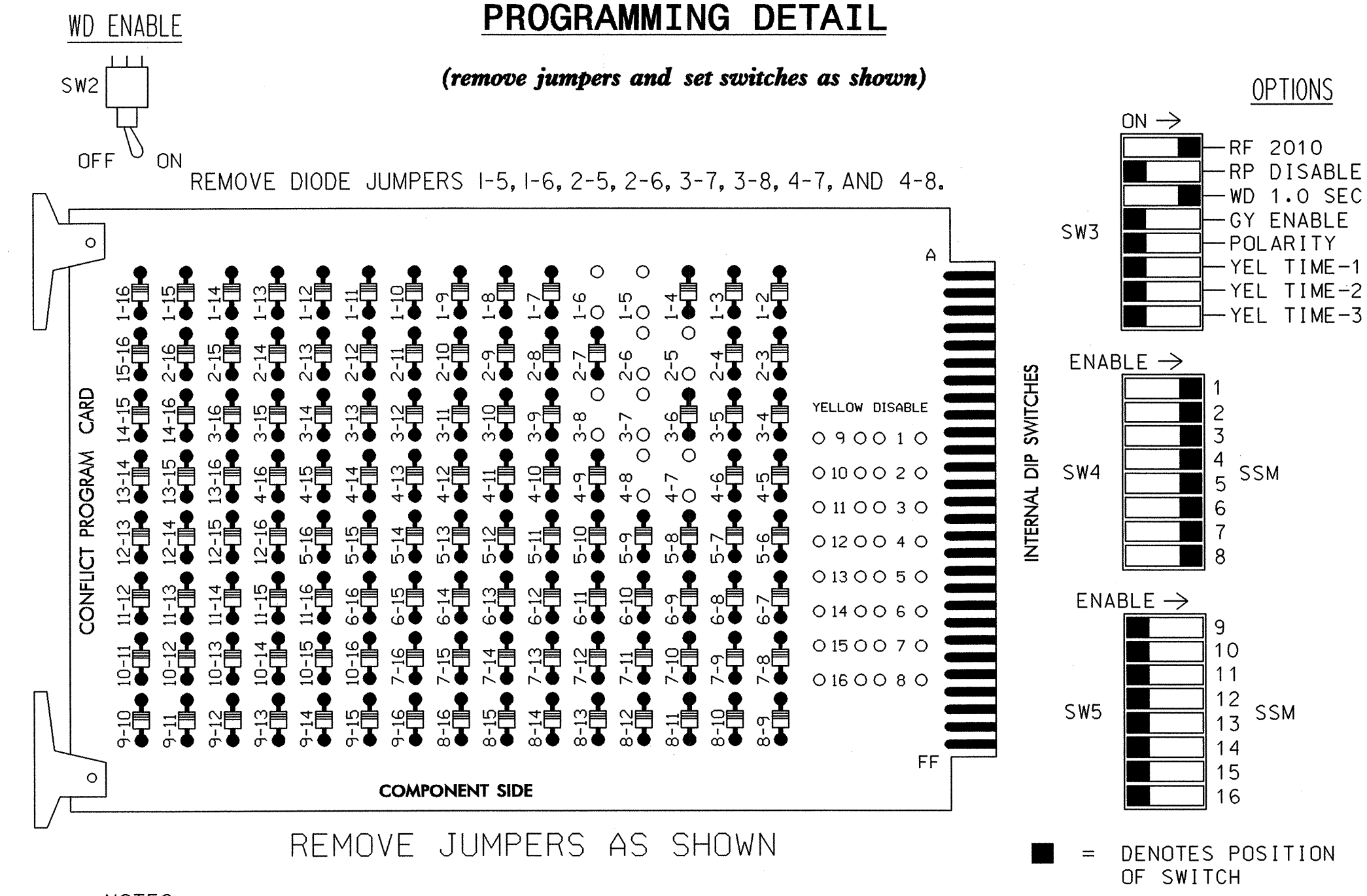
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

- LEGEND**
- |  |  |  |  |
|--|--|--|--|
|  | Proposed Traffic Signal Head                 |  | Existing Traffic Signal Head                 |
|  | Proposed Modified Signal Head                |  | Existing Modified Signal Head                |
|  | Proposed Pedestrian Signal Head              |  | Existing Pedestrian Signal Head              |
|  | Proposed Signal Pole with Guy                |  | Existing Signal Pole with Guy                |
|  | Proposed Inductive Loop Detector             |  | Existing Inductive Loop Detector             |
|  | Proposed Controller & Cabinet                |  | Existing Controller & Cabinet                |
|  | Proposed Junction Box                        |  | Existing Junction Box                        |
|  | Proposed 2-in Underground Conduit            |  | Existing 2-in Underground Conduit            |
|  | Proposed Directional Drill                   |  | Existing Directional Drill                   |
|  | Proposed Right of Way                        |  | Existing Right of Way                        |
|  | Proposed Directional Arrow                   |  | Existing Directional Arrow                   |
|  | Proposed Pavement Marking Arrow              |  | Existing Pavement Marking Arrow              |
|  | Proposed Stop Sign (R1-1)                    |  | Existing Stop Sign (R1-1)                    |
|  | Proposed U-Turn Yield to Right Turn (R10-16) |  | Existing U-Turn Yield to Right Turn (R10-16) |

Signal Upgrade

	<p>US 701 Bypass (J.K. Powell Blvd) at NC 130/ SR 1432 (Love Mill Road)</p>		<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER LISA M. MOON 022516</p>
	<p>Division 6 Columbus County Whiteville</p>	<p>Division 6 Columbus County Whiteville</p>	
<p>PLAN DATE: June 2008</p>	<p>REVIEWED BY: LM Moon</p>	<p>PREPARED BY: BK Scott</p>	<p>REVIEWED BY: MR Cooney</p>
<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>	<p>DATE</p>
<p>SCALE: 0 50 1"=50'</p>	<p>DATE: 6-13-08</p>	<p>SIGNATURE: Lisa M. Moon</p>	<p>DATE: 6-13-08</p>
<p>SIG. INVENTORY NO. 06-0257</p>			<p>DATE: 6-13-08</p>

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



**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 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 Whiteville Closed Loop Signal System.

**SIGNAL HEAD HOOK-UP CHART**

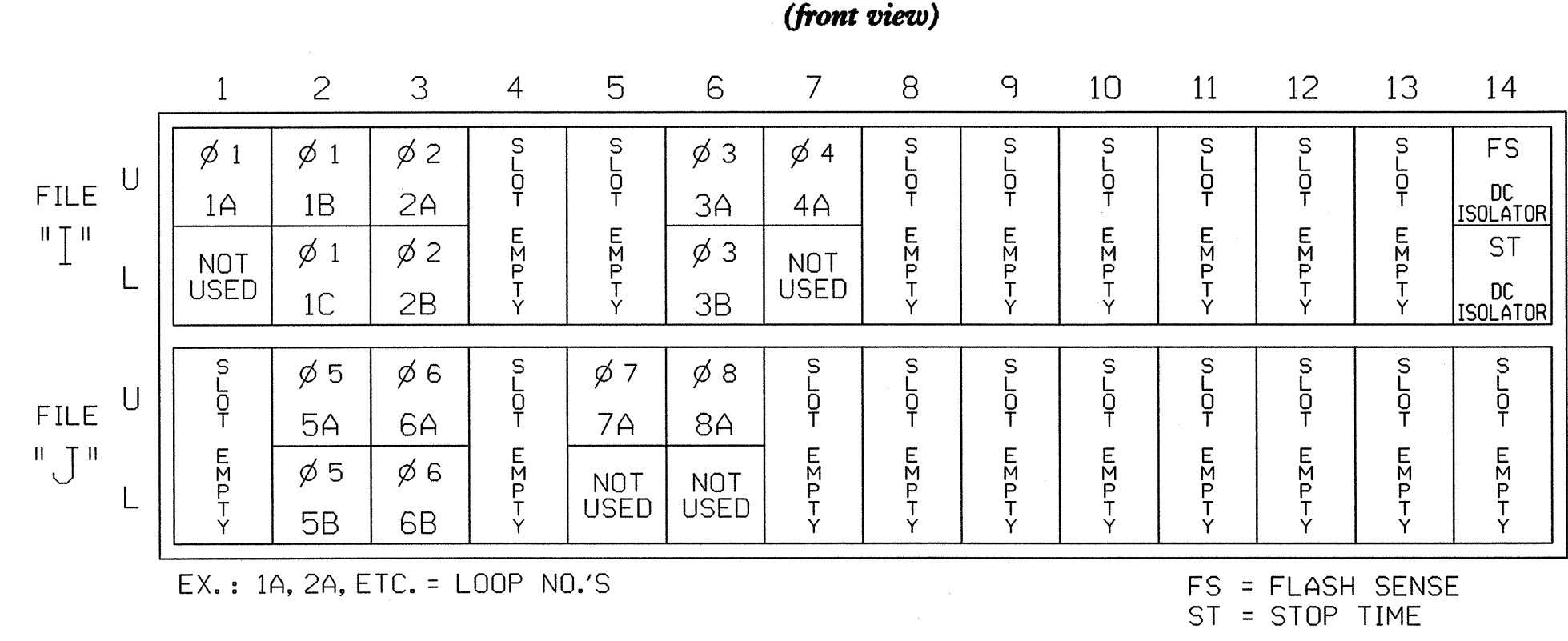
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,12	82	21,22	NU	31,32	22	41,42	NU	51	42	61,62	NU	71	62	81,82	NU	NU	NU
RED			128			101					134				107			
YELLOW			129			102					135				108			
GREEN			130			103					136				109			
RED ARROW	125				116				131				122					
YELLOW ARROW	126	126			117	117			132	132			123	123				
GREEN ARROW	127	127			118	118			133	133			124	124				

NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....EXISTING 2070L  
 CABINET .....EXISTING 332 w/Aux.  
 SOFTWARE .....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS..18 (12-STD, 6 AUX)  
 LOAD SWITCHES USED....S1,S2,S3,S4,S5,S6,S7,S8  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAPS.....NONE

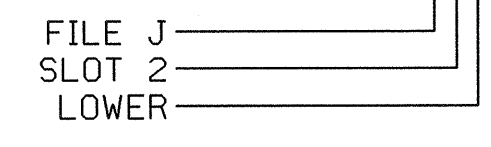
**INPUT FILE POSITION LAYOUT**



**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	TB2-9,10	I3U	63	25	32	2	Y	Y	-	---	--
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	---	--
3A	TB4-9,10	I6U	41	3	4	3	Y	Y	-	---	--
3B	TB4-11,12	I6L	45	7	14	3	Y	Y	-	---	--
4A	TB6-1,2	I7U	65	27	34	4	Y	Y	-	---	--
5A	TB3-5,6	J2U	40	2	6	5	Y	Y	-	---	--
5B	TB3-7,8	J2L	44	6	16	5	Y	Y	-	---	15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y	-	---	--
6B	TB3-11,12	J3L	77	39	46	6	Y	Y	-	---	--
7A	TB5-5,6	J5U	57	19	7	7	Y	Y	-	---	3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y	-	---	--

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0257  
 DESIGNED: June 2008  
 SEALED: June 13, 2008  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 701 Bypass (J.K. Powell Blvd) at NC 130/ SR 1432 (Love Mill Road)

Division 06 Columbus County Whiteville

PLAN DATE: June 2008 REVIEWED BY: MR Cooney

PREPARED BY: LM Moon REVIEWED BY:

750 N. Greenfield Pkwy, Garner, NC 27529

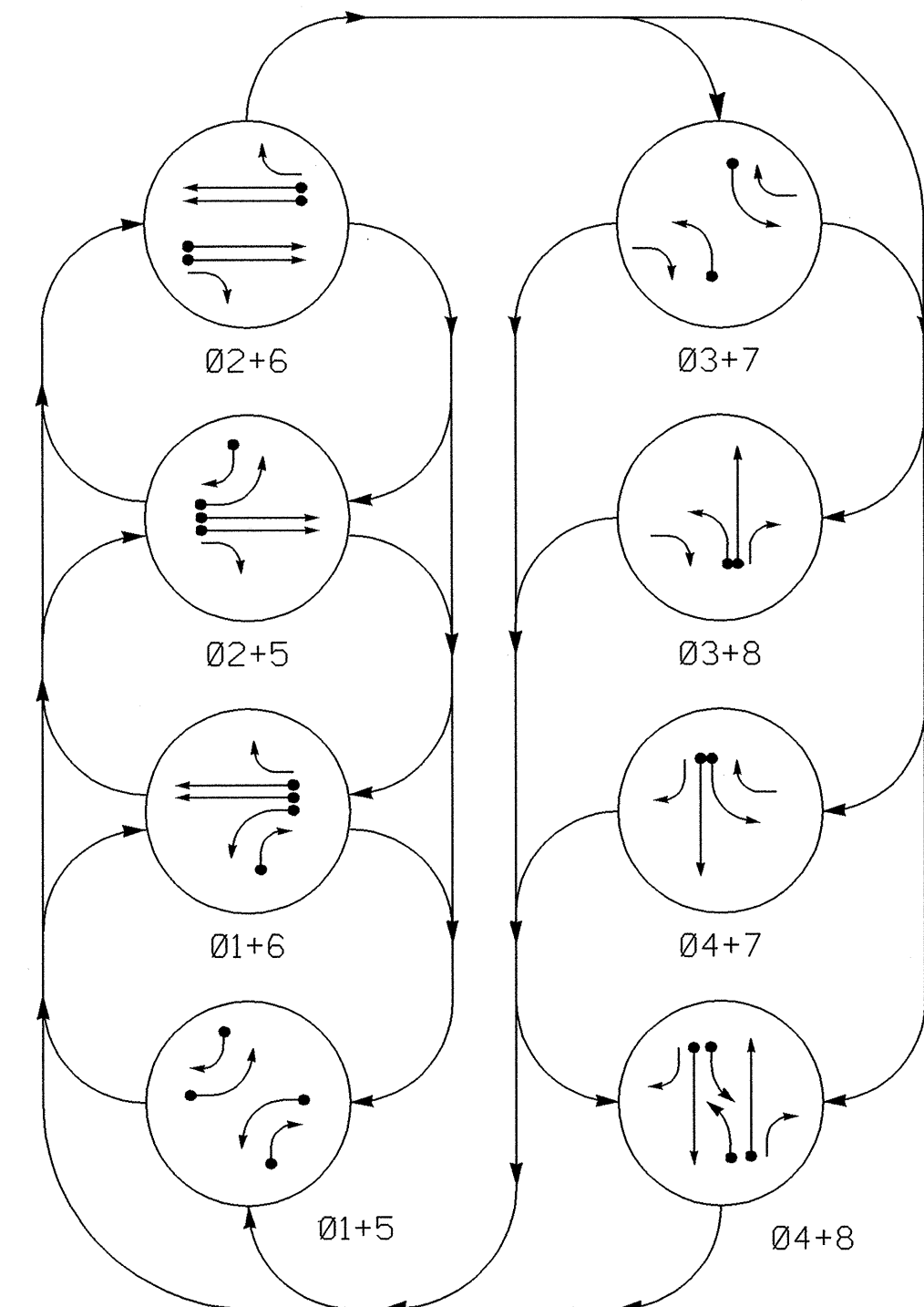
Seal: NORTH CAROLINA PROFESSIONAL ENGINEER 025092 BRASSA R. COONEY

DATE: 6-17-08

SIG. INVENTORY NO. 06-0257

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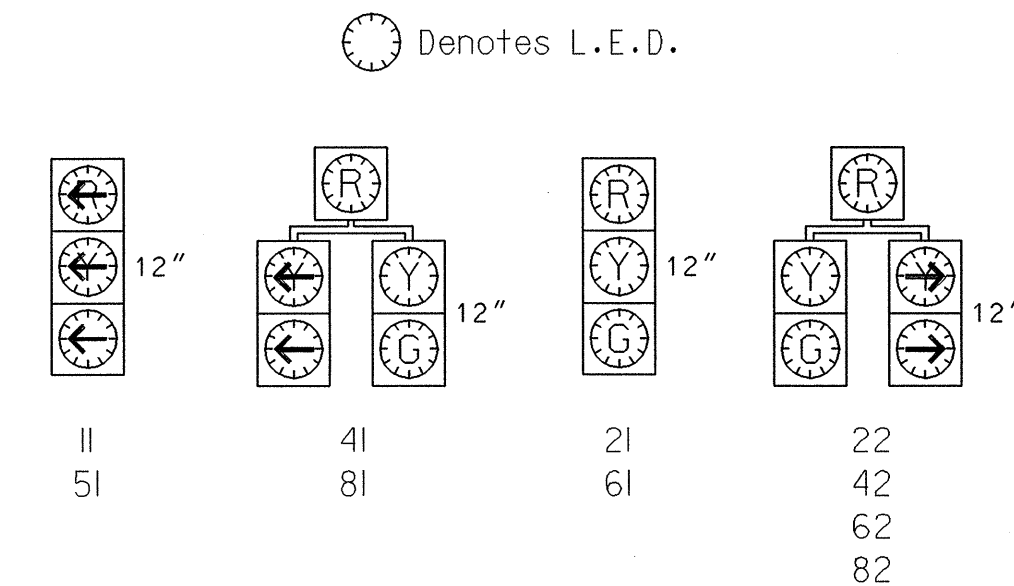
**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

**SIGNAL FACE I.D.**



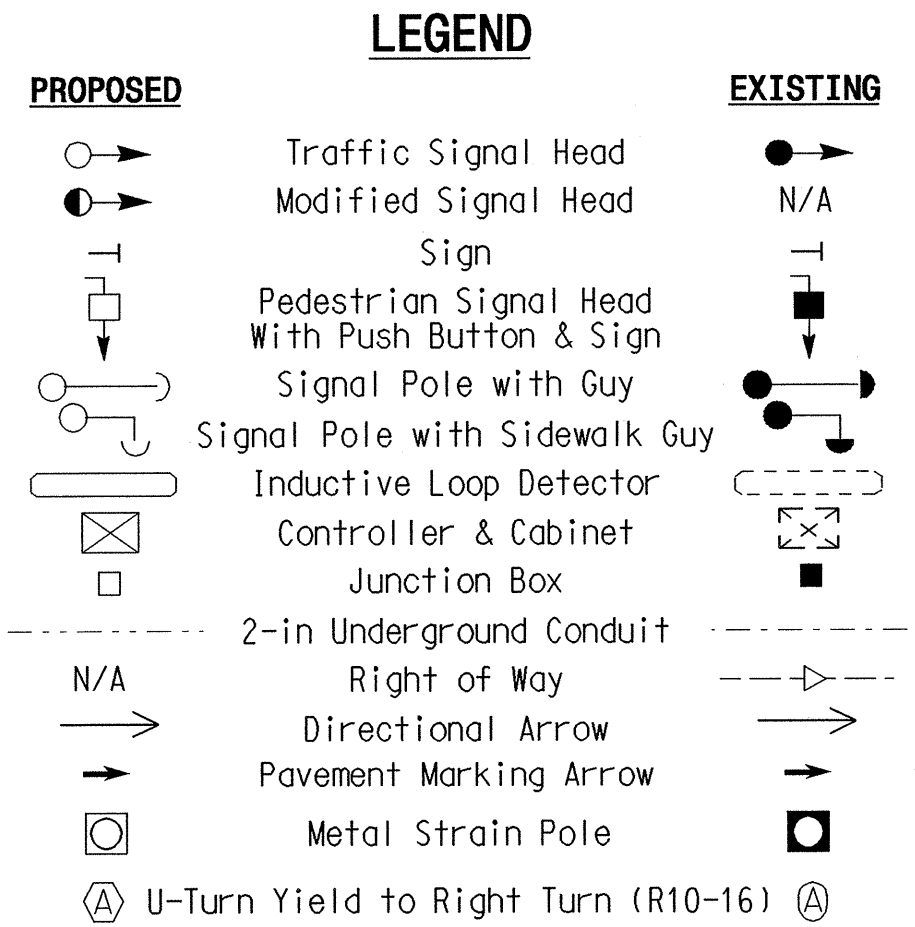
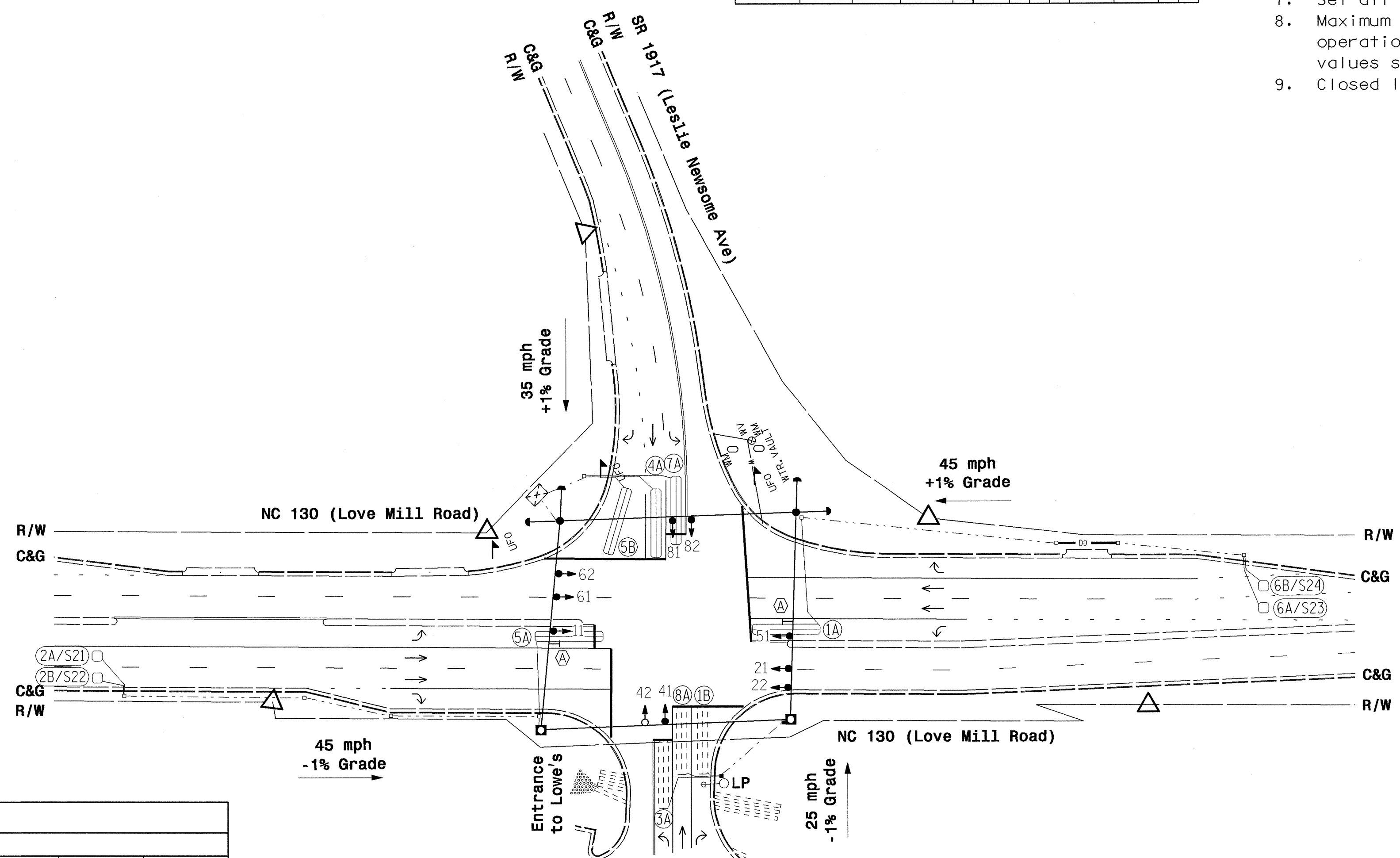
SIGNAL FACE	PHASE							
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8
II	←	←	→	→	←	←	→	→
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	R	R	R	Y
41	R	R	R	R	R	R	G	R
42	R	R	R	R	R	R	G	R
51	←	←	→	→	←	←	→	→
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	R	R	R	Y
81	R	R	R	R	R	R	G	R
82	R	R	R	R	R	R	G	R

2070L LOOP & DETECTOR INSTALLATION												
INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	2-4-2	0	Y	1	Y	Y	-	-	2	-	-
1B	6X40	2-4-2	0	-	1	Y	Y	-	-	15	-	-
2A/S21	6X6	5	300	Y	2	Y	Y	-	-	-	Y	-
2B/S22	6X6	5	300	Y	2	Y	Y	-	-	-	Y	Y
3A	6X40	2-4-2	0	-	3	Y	Y	-	-	15	-	-
4A	6X40	2-4-2	0	Y	4	Y	Y	-	-	2	-	-
5A	6X40	2-4-2	+5	Y	5	Y	Y	-	-	2	-	-
5B	6X40	2-4-2	0	Y	5	Y	Y	-	-	15	-	Y
6A/S23	6X6	5	300	Y	6	Y	Y	-	-	-	Y	-
6B/S24	6X6	5	300	Y	6	Y	Y	-	-	-	Y	Y
7A	6X40	2-4-2	+5	Y	7	Y	Y	-	-	15	-	-
8A	6X40	2-4-2	0	-	8	Y	Y	-	-	2	-	-

**8 Phase Fully Actuated (Whiteville Closed Loop Signal System)**

**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.
- Omit phase 3 during phase 4 on.
- Omit phase 7 during phase 8 on.
- Phase 1 or phase 5 may be lagged.
- Reposition existing signal heads numbered 21,22,41,61,62.
- 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 #: 1273.



FEATURE	2070L TIMING CHART							
	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	12	7	7	7	12	7	7
Extension 1*	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1*	30	90	30	30	20	90	30	30
Yellow Clearance	3.0	4.6	3.0	3.8	3.0	4.4	3.0	3.2
Red Clearance	2.8	1.1	3.2	1.8	2.8	1.5	2.6	3.0
Walk 1*	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation*	-	1.5	-	-	-	1.5	-	-
Max Variable Initial*	-	34	-	-	-	34	-	-
Time Before Reduction*	-	15	-	-	-	15	-	-
Time To Reduction*	-	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	ON	ON

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

**Signal Upgrade**

Prepared for the Offices of:

1616 EAST MILLBROOK ROAD, SUITE 310  
RALEIGH, NORTH CAROLINA 27609  
(919) 876-6888

**NC 130 (Love Mill Road) at SR 1917 (Leslie Newsome Ave.) / Entrance to Lowe's**

Division 6 Columbus County Whiteville

PLAN DATE: June 2008 REVIEWED BY: LM Moon

PREPARED BY: BK Scott REVIEWED BY: MR Cooney

SCALE: 1"=50'

SEAL

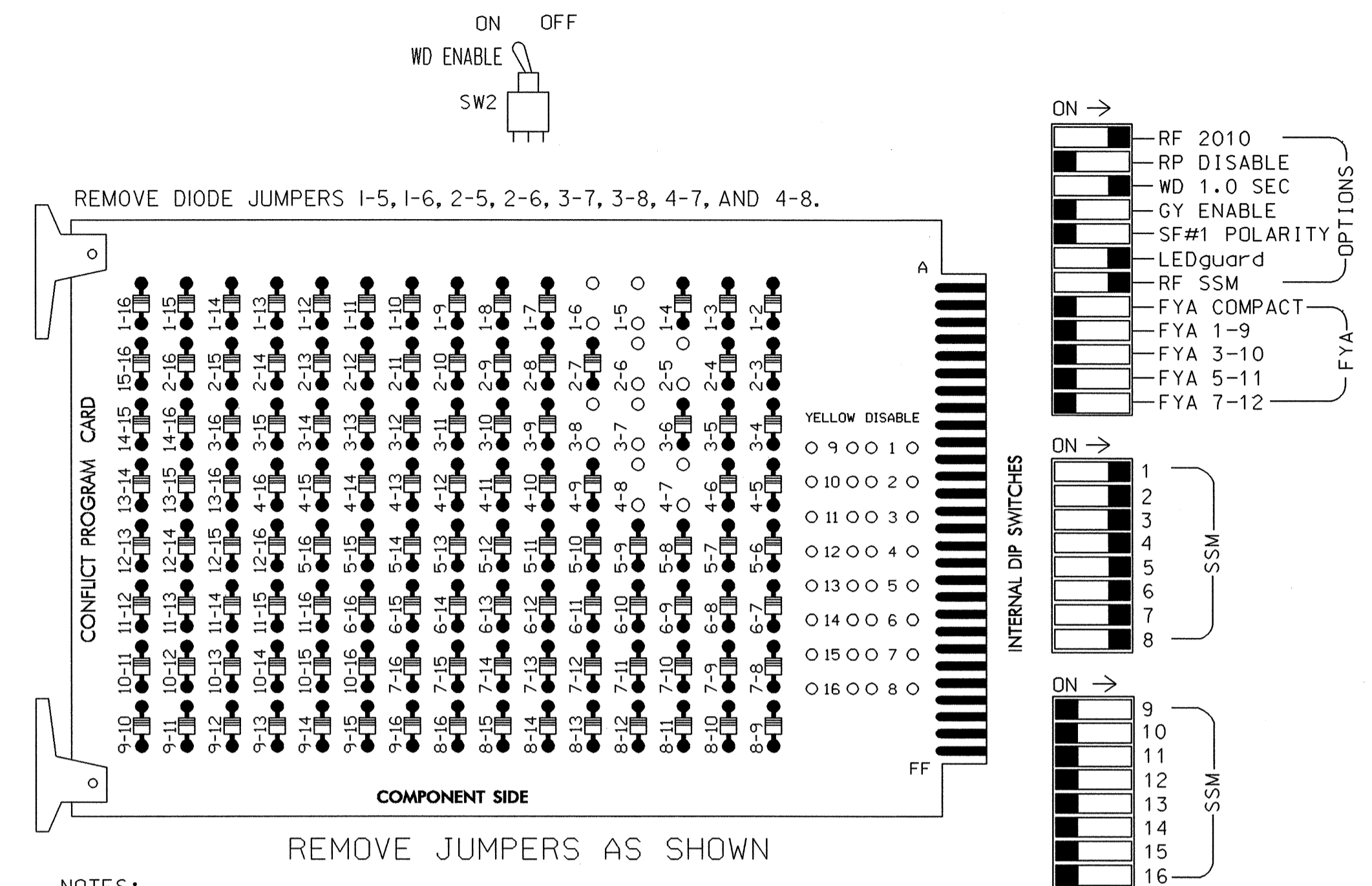
LISA M. MOON  
ENGINEER  
DATE: 6-13-08

SIG. INVENTORY NO. 06-1273

03-SEP-2008 15:09  
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 18566 AT BAL200401

### 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 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 Whiteville Closed Loop Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L  
 CABINET.....EXISTING 332 w/ Aux.  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 (12-STD, 6 AUX)  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAPS.....NONE

#### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	PED	3	4	4	5	6	6	7	8	8	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	NU	22, 21	41,42	NU	51	42	61,62	NU	41, 62	81,82	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	126			117		132	132			123							
GREEN ARROW	127	127			118		133	133			124							

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

### INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	1A	2A/S21				3A	4A							FS
L	1B	2B/S22				3A	NOT USED							ST
U	5A	6A/S23				7A	8A							
L	5B	6B/S24				7A	NOT USED							

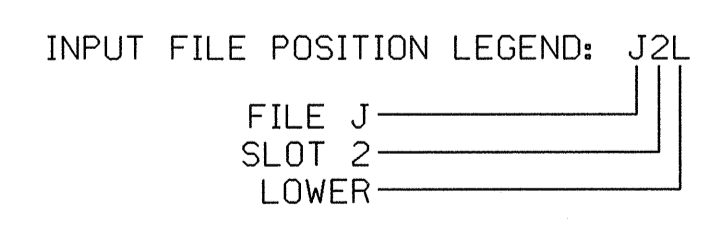
EX.: 1A, 2A, ETC. = LOOP NO.'S

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	TB2-5,6	I2U	39	1	2	1	Y	Y	-	---	2
1B	TB2-7,8	I2L	43	5	12	1	Y	Y	-	---	15
2A/S21	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y	-	---	--
2B/S22	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y	-	---	--
3A <sup>1</sup>	TB4-9,10	I6U	41	3	4	3	Y	Y	-	---	15
	TB4-11,12	I6L	45	7	14	8	Y	Y	-	---	2
4A	TB6-1,2	I7U	65	27	34	4	Y	Y	-	---	--
5A	TB3-5,6	J2U	40	2	6	5	Y	Y	-	---	2
5B	TB3-7,8	J2L	44	6	16	5	Y	Y	-	---	15
6A/S23	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y	-	---	--
6B/S24	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y	-	---	--
7A <sup>2</sup>	TB5-9,10	J6U	42	4	8	7	Y	Y	-	---	15
	TB5-11,12	J6L	46	8	18	4	Y	Y	-	---	2
8A	TB7-1,2	J7U	66	28	38	8	Y	Y	-	---	--

<sup>1</sup>Add jumpers from TB4-9 to TB4-11, and from TB4-10 to TB4-12.  
<sup>2</sup>Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.



### BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE DYNAMIC/BACKUP CONTROL FUNCTIONS 1 AND 2.
- FROM PHASE CONTROL FUNCTION MENU PRESS '2' (DYNAMIC/BACKUP CONTROL FUNCTIONS).

DYNAMIC/BACKUP CONTROL FUNCTION #01  
 OVERLAPS ARE ACTIVE : ABCDEFGHIJKLMNP  
 IF PHASES ARE ON : X  
 OMIT PHASES :  
 CALL PHASES :  
 PRESS 'NEXT'

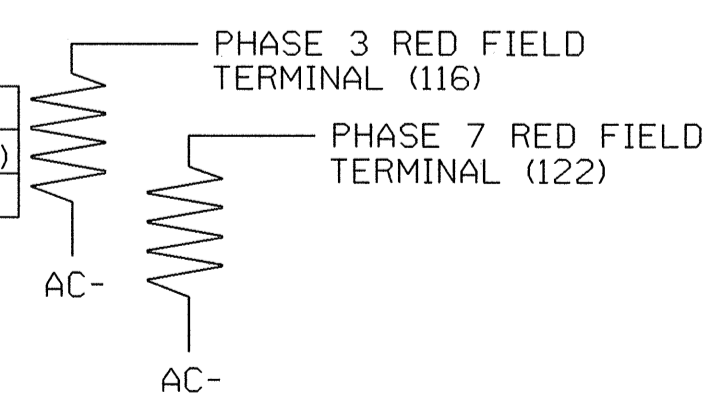
DYNAMIC/BACKUP CONTROL FUNCTION #02  
 OVERLAPS ARE ACTIVE : ABCDEFGHIJKLMNP  
 IF PHASES ARE ON : X  
 OMIT PHASES :  
 CALL PHASES :  
 BACKUP PROTECTION PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-1273  
 DESIGNED: June 2008  
 SEALED: June 13, 2008  
 REVISED:

### LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



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

### Signal Upgrade

Electrical and Programming Details For:

Prepared for the Offices of:

NC 130 (Love Mill Road) at SR 1917 (Leslie Newsome Ave.) / Entrance to Lowe's

Division 06 Columbus County Whiteville

PLAN DATE: June 2008 REVIEWED BY: MR Cooney

PREPARED BY: LM Moon REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

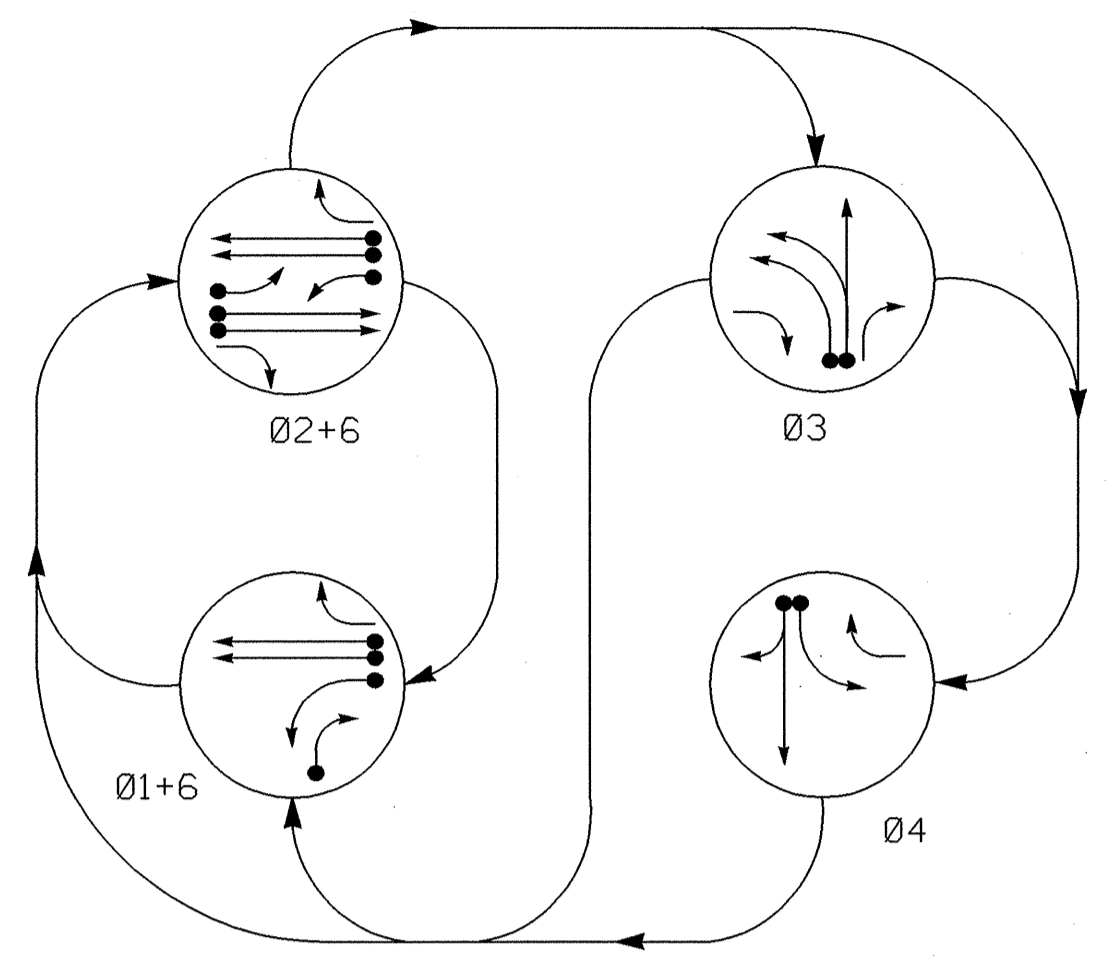
1616 EAST HILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER WELISSA R. GOONEY 025892

SIG. INVENTORY NO. 06-1273

05-SEP-2008 15:09 G:\TECH\2008\2008246-03\_Mhi\1e\51\gnd\sm\1r\ng\061273\_sm.ele\_200802xx.dgn 18556 AT BAL2004001

**PHASING DIAGRAM**  
(Backup Protect with Red Revert)



**TABLE OF OPERATION**

SIGNAL FACE	PHASE				FLASH
	01+6	02+6	03	04	
21, 22	R	G	R	R	Y
23	R	G	R	R	Y
31	R	R	G	R	R
32	R	R	G	R	R
41	R	R	R	G	R
42	R	R	R	G	R
61	G	G	R	R	Y
62	G	G	R	R	Y
63	G	G	R	R	Y

**SIGNAL FACE I.D.**

Denotes L.E.D.

**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME			
1A	6x40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
1B	6x40	0	2-4-2	Y	6	Y	Y	-	-	3	-	Y
2A	6x6	300	5	Y	2	Y	Y	-	-	-	-	Y
2B	6x6	300	5	Y	2	Y	Y	-	-	-	-	Y
2C	6x40	0	2-4-2	Y	2	Y	Y	-	-	3	-	Y
3A	6x40	0	2-4-2	Y	3	Y	Y	-	-	3	-	Y
3B	6x40	0	2-4-2	Y	3	Y	Y	-	-	-	-	Y
4A	6x40	0	2-4-2	Y	4	Y	Y	-	-	2	-	Y
4B	6x40	0	2-4-2	Y	4	Y	Y	-	-	5	-	Y
4C	6x6	0	4	Y	4	Y	Y	-	-	15	-	Y
6A/S13	6x6	300	6	Y	6	Y	Y	-	-	-	-	Y
6B/S14	6x6	300	6	Y	6	Y	Y	-	-	-	-	Y
S15	6x6	+195	3	Y	-	-	-	-	-	-	-	Y
S16	6x6	+195	3	Y	-	-	-	-	-	-	-	Y

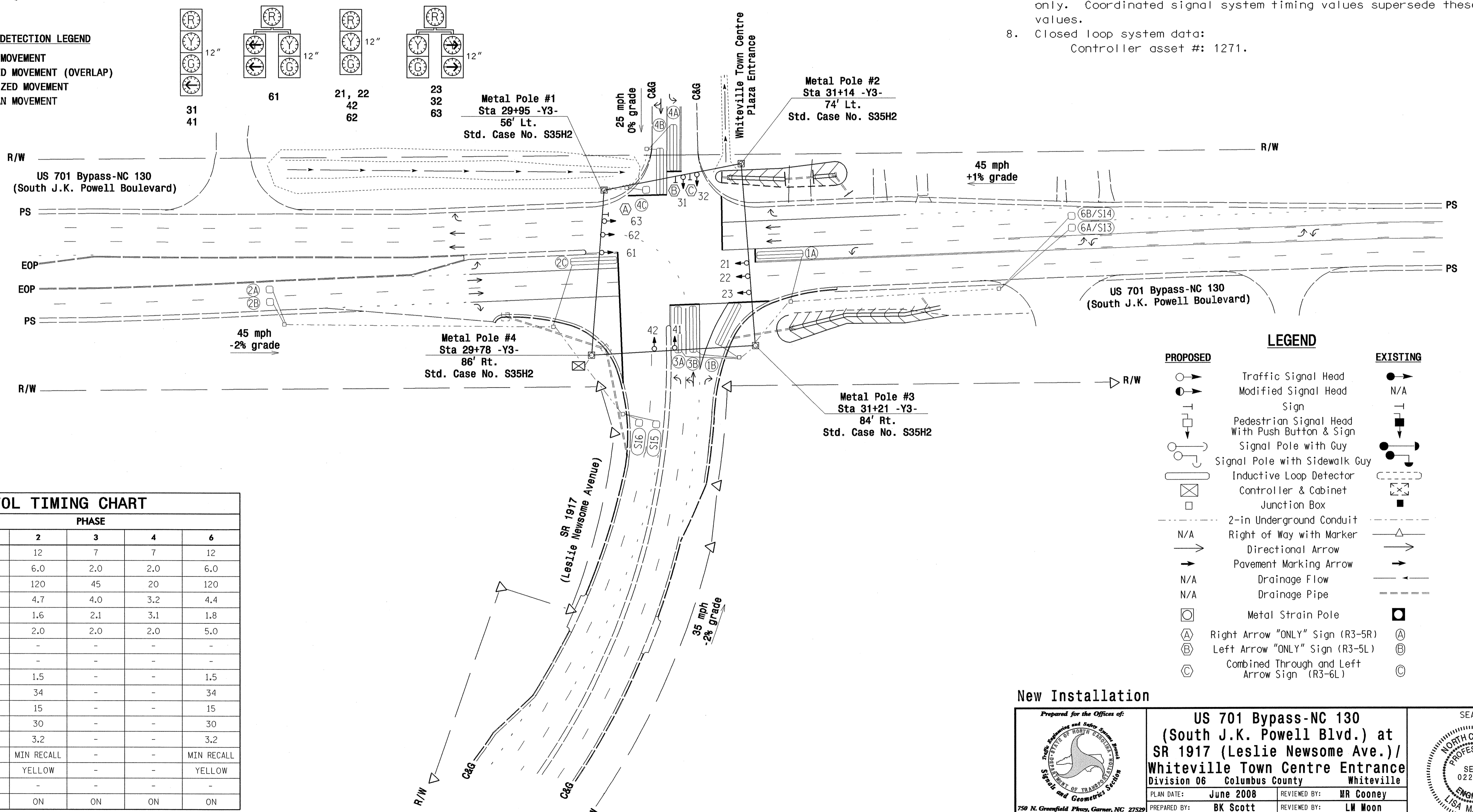
**4 Phase Fully Actuated**  
(Whiteville Closed Loop Signal System)

**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
4. Phases 3 and 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data:  
Controller asset #: 1271.

**PHASING DIAGRAM DETECTION LEGEND**

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



**2070L TIMING CHART**

FEATURE	PHASE				
	1	2	3	4	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	6.0
Max Green 1 *	30	120	45	20	120
Yellow Clearance	3.0	4.7	4.0	3.2	4.4
Red Clearance	3.2	1.6	2.1	3.1	1.8
Red Revert	2.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5
Max Variable Initial *	-	34	-	-	34
Time Before Reduction *	-	15	-	-	15
Time To Reduce *	-	30	-	-	30
Minimum Gap	-	3.2	-	-	3.2
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

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

**LEGEND**

- | PROPOSED   | EXISTING   |
|--|--|
| ○ → Traffic Signal Head                          | ● → Traffic Signal Head                          |
| ○ → Modified Signal Head                         | N/A  |
| ○ → Sign   | ○ → Sign   |
| ○ → Pedestrian Signal Head                       | ○ → Pedestrian Signal Head                       |
| ○ → With Push Button & Sign                      | ○ → 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 with Marker                     |
| ○ → Directional Arrow                            | ○ → Directional Arrow                            |
| ○ → Pavement Marking Arrow                       | ○ → Pavement Marking Arrow                       |
| N/A  | ○ → Drainage Flow                                |
| N/A  | ○ → Drainage Pipe                                |
| ○ → Metal Strain Pole                            | ○ → Metal Strain Pole                            |
| ○ → Right Arrow "ONLY" Sign (R3-5R)              | ○ → Right Arrow "ONLY" Sign (R3-5R)              |
| ○ → Left Arrow "ONLY" Sign (R3-5L)               | ○ → Left Arrow "ONLY" Sign (R3-5L)               |
| ○ → Combined Through and Left Arrow Sign (R3-6L) | ○ → Combined Through and Left Arrow Sign (R3-6L) |

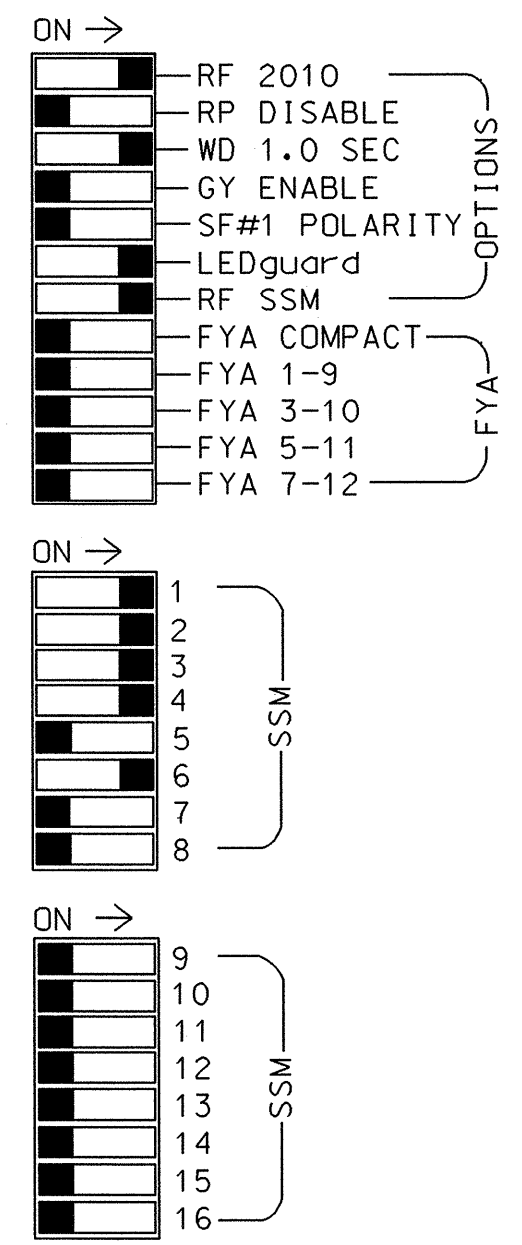
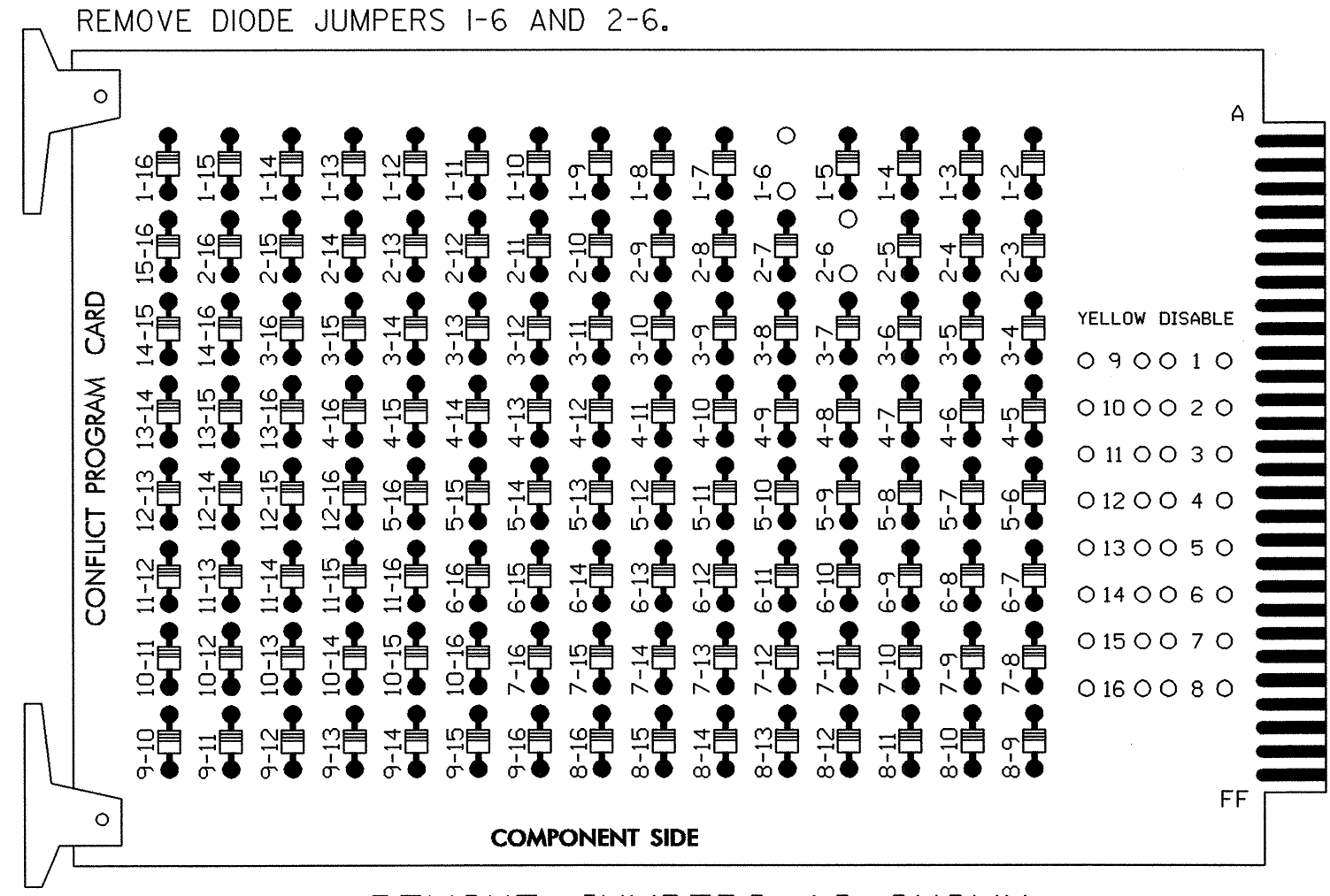
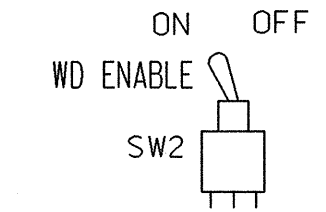
**New Installation**

Prepared for the Office of:  
  
**US 701 Bypass-NC 130**  
 (South J.K. Powell Blvd.) at  
**SR 1917 (Leslie Newsome Ave.) /**  
**Whiteville Town Centre Entrance**  
 Division 06 Columbus County Whiteville  
 PLAN DATE: June 2008 REVIEWED BY: MR Cooney  
 PREPARED BY: BK Scott REVIEWED BY: LM Moon  
 SCALE: 0 50  
 1"=50'  
 SIGNATURE: *Chris M. Moore* 6-13-08  
 DATE: 6-13-08  
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022516  
 T.S.A. M. MOON  
 SIG. INVENTORY NO. 08-1271

**PBS&J** 1616 EAST WILLBROOK ROAD, SUITE 310  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888

**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 5,7,8, 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 Whiteville Closed Loop Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET .....CONTRACTOR SUPPLIED 332  
 SOFTWARE .....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS..18 (12-STD, 6 AUX)  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S6  
 PHASES USED.....1,2,3,4,6  
 OVERLAPS.....NONE

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	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.	32,61	21,22 23	NU	31 32 23	41 42 63	NU	NU	61,62 63	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED	*	128		116 116	101 101			134										
YELLOW		129		117 117	102 102			135										
GREEN		130		118 118	103 103			136										
RED ARROW																		
YELLOW ARROW	126				117		102											
GREEN ARROW	127			118	118 103	103												
↓																		
↓																		

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

**INPUT FILE POSITION LAYOUT**

(front view)

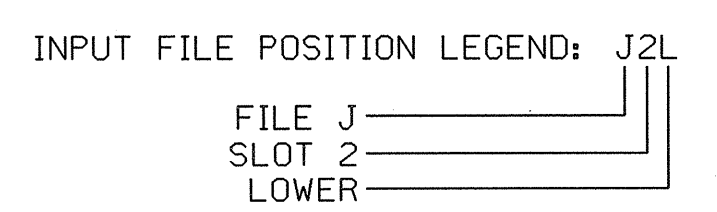
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	∅ 1 1B	∅ 1 1A	∅ 2 2A	∅ 2 2C	∅ 3 3A	∅ 3 3B	∅ 4 4A	∅ 4 4B	∅ 4 4C	SYS. DET. S15	SYS. DET. S16	SYS. DET. S17	SYS. DET. S18	FS DC ISOLATOR
FILE "J"	NOT USED	∅ 6 1A	∅ 2 2B	NOT USED	∅ 3 3B	∅ 4 4B	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

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
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	-	---	15
	TB2-7,8	I2L	43	5	12	6	Y	Y	Y	---	3
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	---	--
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	---	--
2C	TB4-1,2	I4U	47	9	22	2	Y	Y	Y	---	3
3A	TB4-9,10	I6U	41	3	4	3	Y	Y	-	---	3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y	-	---	--
4A	TB6-1,2	I7U	65	27	34	4	Y	Y	-	---	2
4B	TB6-3,4	I7L	78	40	44	4	Y	Y	-	---	5
4C	TB6-5,6	I8U	49	11	24	4	Y	Y	-	---	15
*S15	TB6-9,10	I9U	60	22	11	SYS	-	-	-	---	--
*S16	TB6-11,12	I9L	62	24	13	SYS	-	-	-	---	--
6A/S13	TB3-5,6	J2U	40	2	6	6	Y	Y	-	---	--
6B/S14	TB3-7,8	J2L	44	6	16	6	Y	Y	-	---	--

<sup>1</sup>Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.  
 \*System detector only. Remove the vehicle phase assigned to this detector in the default programming.



**BACKUP PROTECTION NOTE**

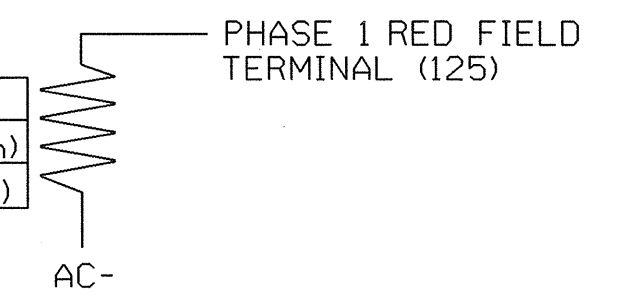
(program controller as shown below)

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-1271  
 DESIGNED: June 2008  
 SEALED: June 13, 2008  
 REVISED:

**LOAD RESISTOR INSTALLATION DETAIL**

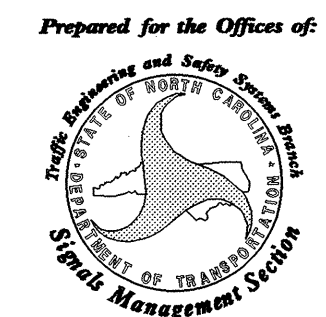
ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



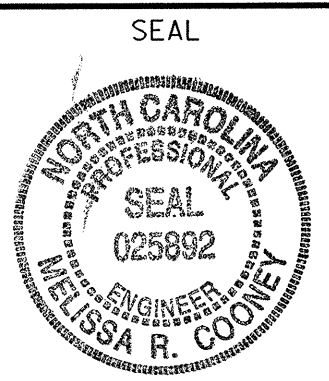
NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

**New Installation**

ELECTRICAL AND PROGRAMMING DETAILS FOR:



US 701 Bypass-NC 130 (South J.K. Powell Blvd.) at SR 1917 (Leslie Newsome Ave.) / Whiteville Town Centre Entrance			
Division 06	Columbus County	Whiteville	
PLAN DATE: June 2008	REVIEWED BY: MR Cooney		
PREPARED BY: LM Moon	REVIEWED BY:		
REVISIONS	INIT.	DATE	

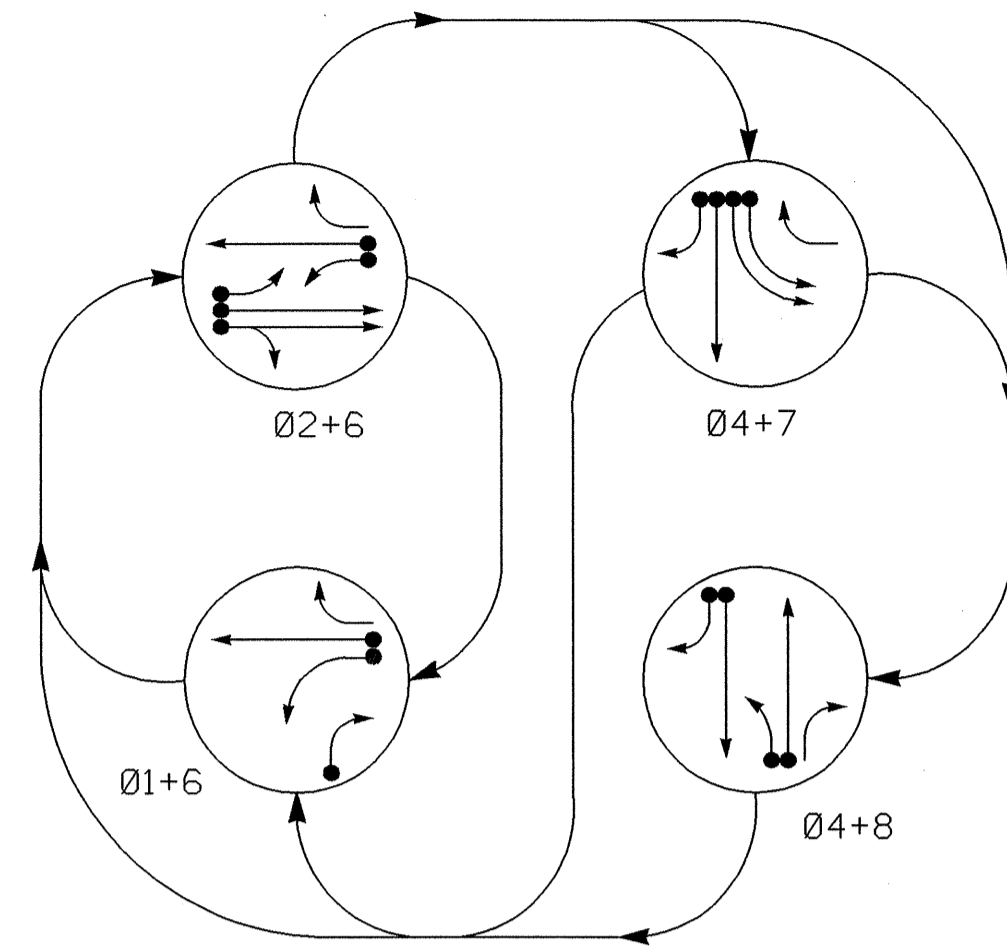


SIGNATURE: Melissa R. Cooney 6-17-08  
 DATE: 6-17-08

03\_SEP\_2008\_15:09 C:\TECH\2008\200806\03\_Whi19eCl\gnc1\sm\177\img\061271\_sml\_ele\_200802xx.dgn 15556 AT BAL2004001



**PHASING DIAGRAM**  
(Backup Protect with Red Revert)



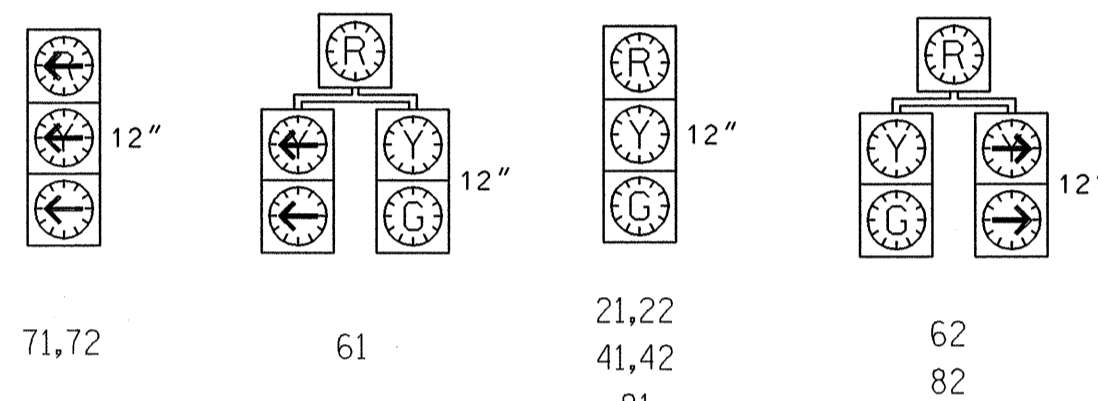
**PHASING DIAGRAM DETECTION LEGEND**

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

**TABLE OF OPERATION**

SIGNAL FACE	PHASE				
	01+6	02+6	04+7	04+8	FLASH
21,22	R	G	R	R	Y
41,42	R	R	G	G	R
61	G	G	R	R	Y
62	G	G	R	R	Y
71,72	R	R	R	R	Y
81	R	R	R	G	R
82	R	R	R	G	R

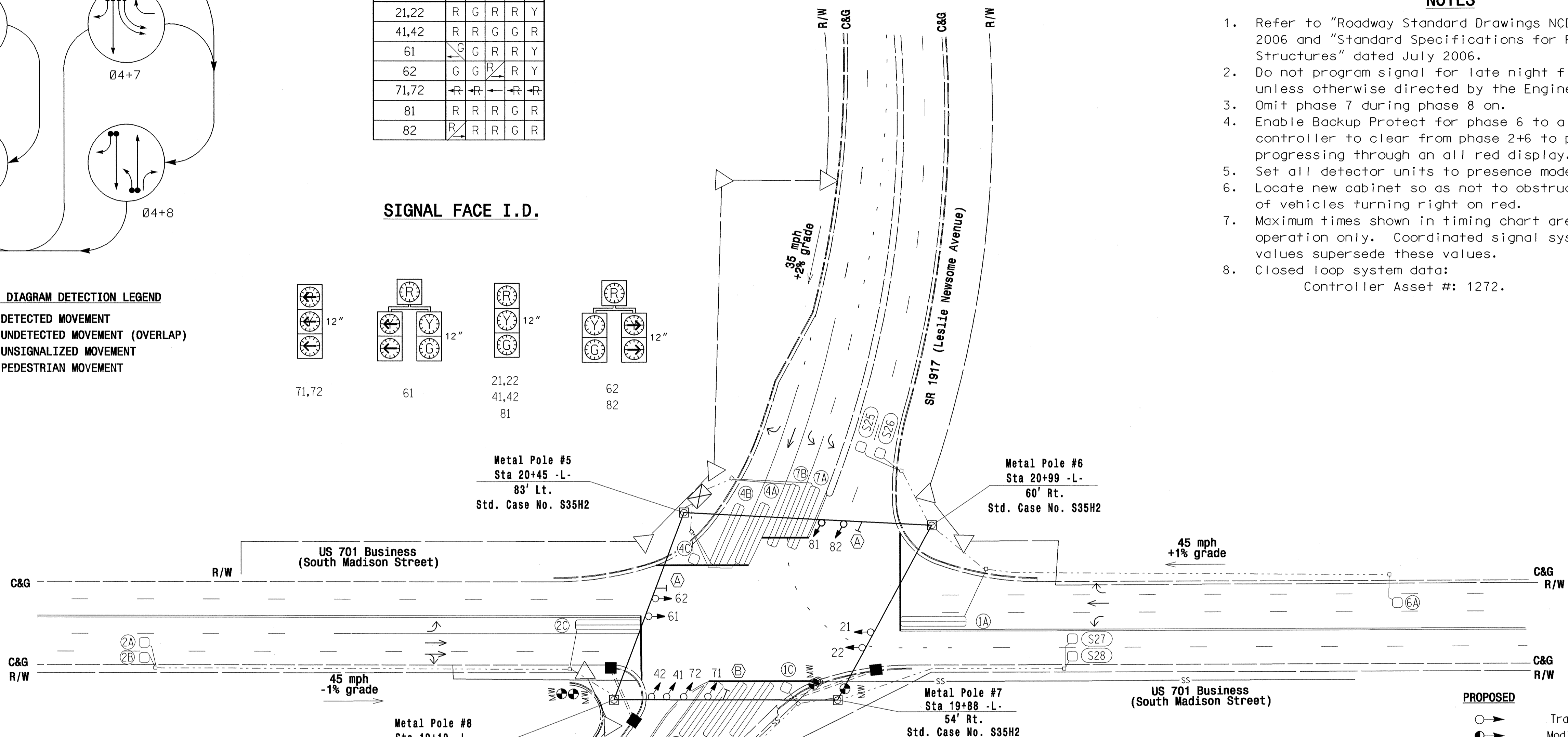
**SIGNAL FACE I.D.**



**4 Phase Fully Actuated**  
(Whiteville Closed Loop Signal System)

**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.
- Omit phase 7 during phase 8 on.
- 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.
- 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 #: 1272.



**2070L TIMING CHART**

FEATURE	PHASE					
	1	2	4	6	7	8
Min Green 1*	7	12	7	12	7	7
Extension 1*	2.0	6.0	2.0	6.0	2.0	2.0
Max Green 1*	35	50	35	50	35	35
Yellow Clearance	3.0	4.6	3.7	4.4	3.0	3.9
Red Clearance	3.8	1.6	1.5	2.4	2.6	1.4
Red Revert	2.0	2.0	2.0	5.0	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 Reduction*	-	30	-	30	-	-
Minimum Gap	-	3.0	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-	-
Dual Entry	-	-	ON	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	
IA	6x40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
IB	6x40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
IC	6x6	0	4	Y	1	Y	Y	-	15	-	Y
2A	6x6	300	4	Y	2	Y	Y	-	-	-	Y
2B	6x6	300	4	Y	2	Y	Y	-	-	-	Y
2C	6x40	0	2-4-2	Y	2	Y	Y	-	2	-	Y
4A	6x40	0	2-4-2	Y	4	Y	Y	-	-	-	Y
4B	6x40	0	2-4-2	Y	4	Y	Y	-	15	-	Y
4C	6x6	0	4	Y	4	Y	Y	-	15	-	Y
6A	6x6	300	4	Y	6	Y	Y	-	-	-	Y
7A	6x40	+5	2-4-2	Y	7	Y	Y	-	2	-	Y
7B	6x40	+5	2-4-2	Y	7	Y	Y	-	-	-	Y
8A	6x40	0	2-4-2	Y	8	Y	Y	-	2	-	Y
8B	6x40	0	2-4-2	Y	8	Y	Y	-	-	-	Y
S25	6x6	+150	4	Y	-	-	-	-	-	-	Y
S26	6x6	+150	4	Y	-	-	-	-	-	-	Y
S27	6x6	+260	4	Y	-	-	-	-	-	-	Y
S28	6x6	+260	4	Y	-	-	-	-	-	-	Y

**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
○ 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 with Marker	○ Right of Way with Marker
→ Directional Arrow	→ Directional Arrow
→ Pavement Marking Arrow	→ Pavement Marking Arrow
⊙ Right Arrow "ONLY" Sign (R3-5R)	⊙ Right Arrow "ONLY" Sign (R3-5R)
⊙ U-Turn Yield to Right Turn (R10-16)	⊙ U-Turn Yield to Right Turn (R10-16)
○ Metal Strain Pole	○ Metal Strain Pole
N/A Sanitary Sewer	SS Sanitary Sewer
N/A Monitoring Well	○ Monitoring Well

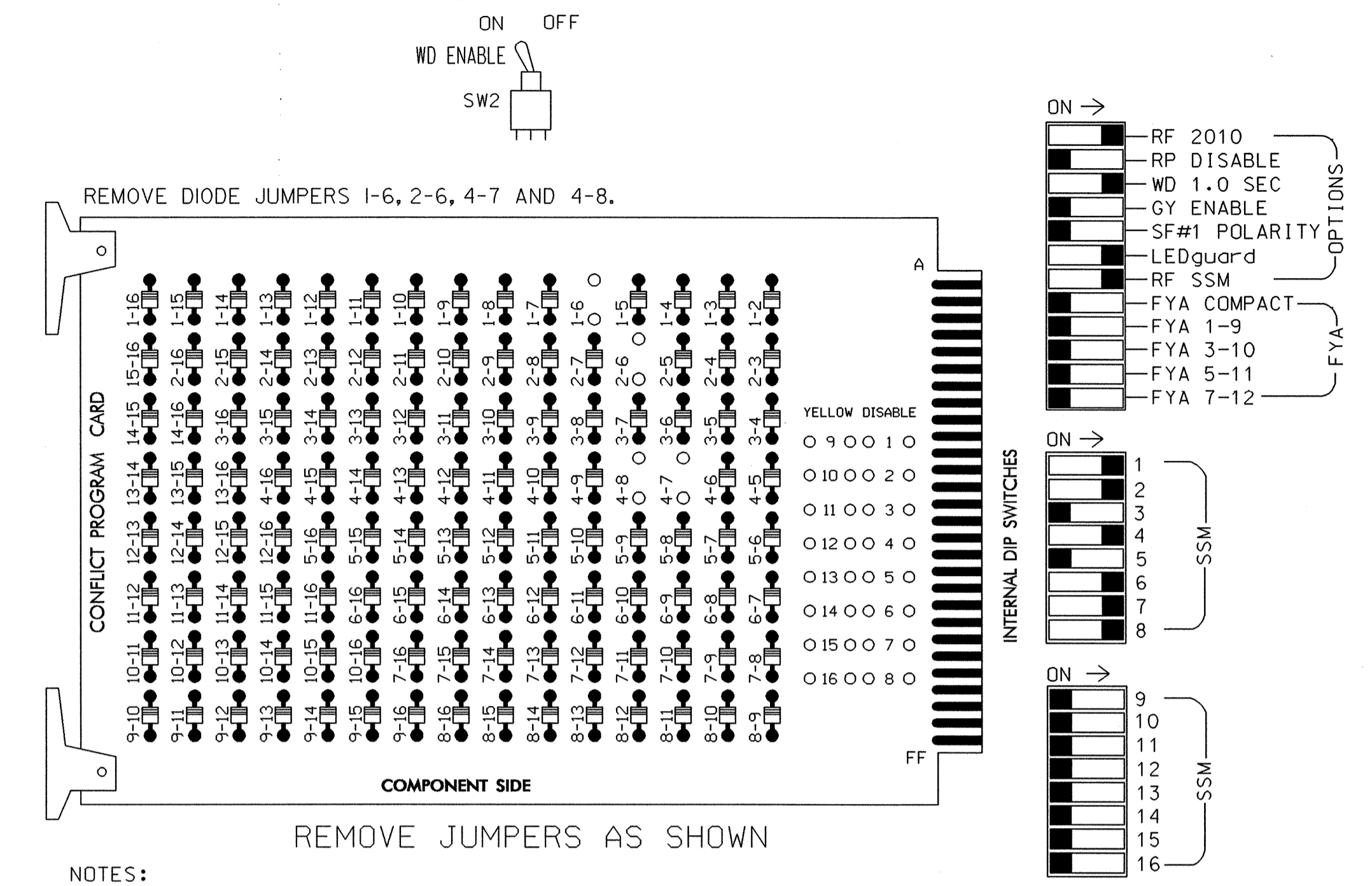
**New Installation**

Prepared for the Offices of:  
**US 701 Business (South Madison Street) at SR 1917 (Leslie Newsome Avenue)**  
 Division 06 Columbus County Whiteville  
 PLAN DATE: June 2008 REVIEWED BY: MR Cooney  
 PREPARED BY: LMM REVIEWED BY: LW Moon  
 SCALE: 1"=40'  
 REVISIONS: \_\_\_\_\_ INITI. DATE \_\_\_\_\_  
 SIGNATURE: *Lisa M. Moon* 6-13-08  
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022516 ENGINEER LISA M. MOON  
 SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_  
 SIG. INVENTORY NO. 06-1272

05-SEP-2006 15:59  
 C:\REC\cnc\2006\03\_Whit\05\cpl\061272.dgn  
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## 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 3,5,9,10, 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 phase 4, 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 Whiteville Closed Loop Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET .....CONTRACTOR SUPPLIED 332  
 SOFTWARE .....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS..18 (12-STD, 6 AUX)  
 LOAD SWITCHES USED.....S1,S2,S4,S6,S7,S8  
 PHASES USED.....1,2,4,6,7,8  
 OVERLAPS.....NONE

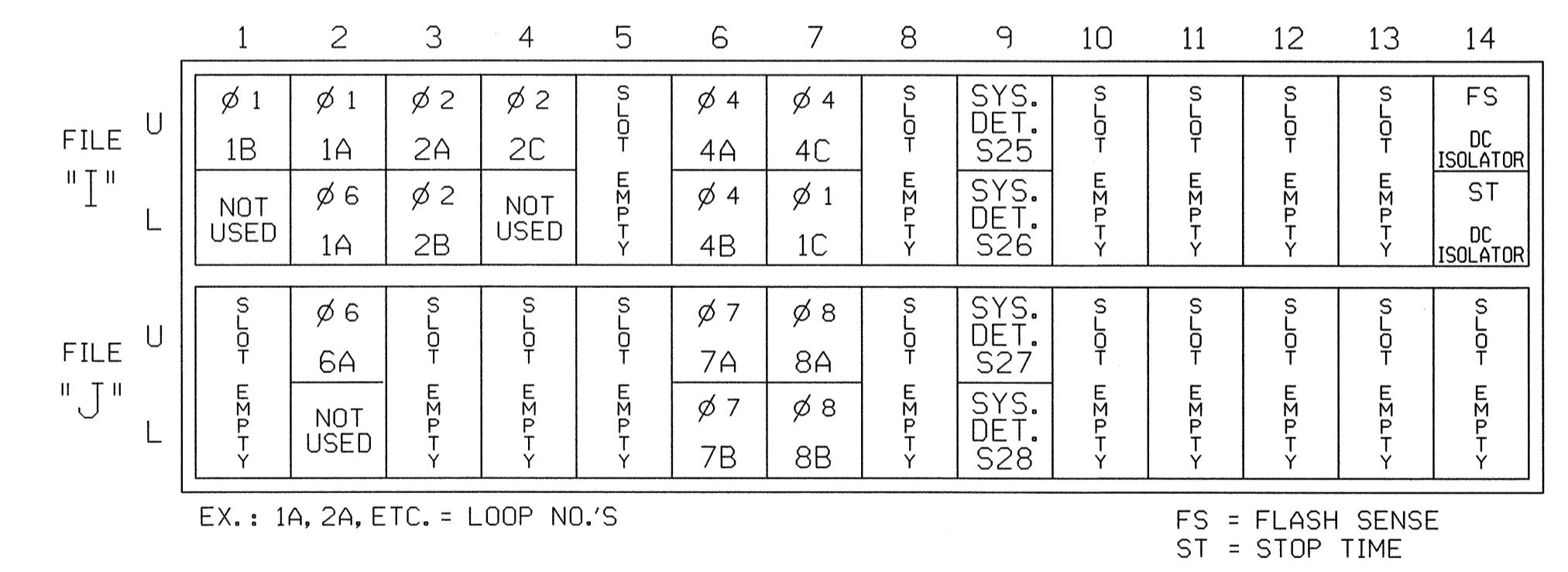
### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61,82	21,22	NU	NU	41,42	NU	NU	61,62	NU	71,72	62	81,82	NU	NU	NU	NU	NU	NU
RED	*	128			101			134				107						
YELLOW		129			102			135				108						
GREEN		130			103			136				109						
RED ARROW											122							
YELLOW ARROW	126											123	123					
GREEN ARROW	127											124	124					

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

### INPUT FILE POSITION LAYOUT

(front view)

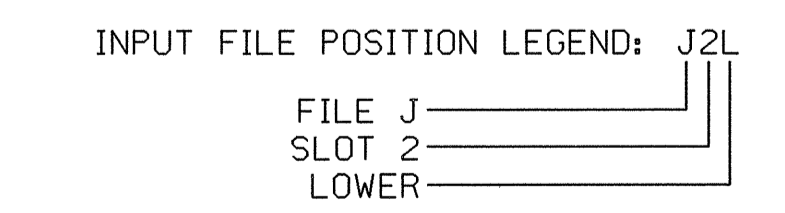


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

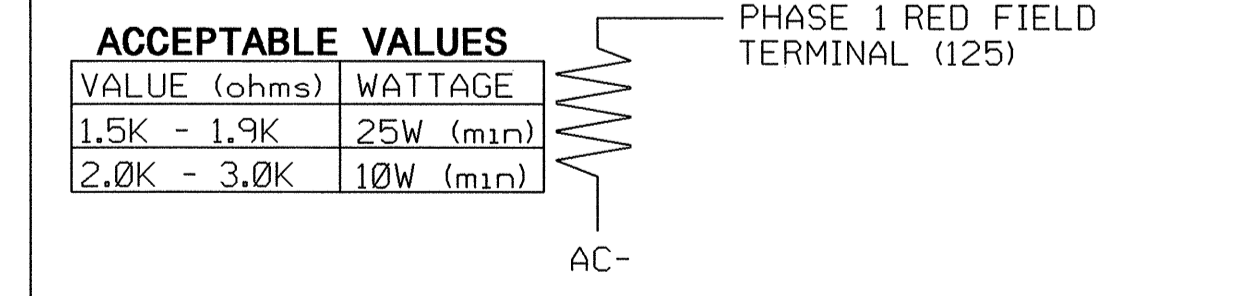
### INPUT FILE CONNECTION & PROGRAMMING CHART

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
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	-	---	15
	TB2-7,8	I2L	43	5	12	6	Y	Y	Y	---	2
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	---	--
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	---	--
2C	TB4-1,2	I4U	47	9	22	2	Y	Y	Y	---	2
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	---	--
4B	TB4-11,12	I6L	45	7	14	4	Y	Y	-	---	15
4C	TB6-1,2	I7U	65	27	34	4	Y	Y	-	---	15
1C	TB6-3,4	I7L	78	40	44	1	Y	Y	-	---	15
*S25	TB6-9,10	I9U	60	22	11	SYS	-	-	-	---	--
*S26	TB6-11,12	I9L	62	24	13	SYS	-	-	-	---	--
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	---	--
7A	TB5-9,10	J6U	42	4	8	7	Y	Y	-	---	2
7B	TB5-11,12	J6L	46	8	18	7	Y	Y	-	---	--
8A	TB7-1,2	J7U	66	28	38	8	Y	Y	-	---	2
8B	TB7-3,4	J7L	79	41	48	8	Y	Y	-	---	--
*S27	TB7-9,10	J9U	59	21	15	SYS	-	-	-	---	--
*S28	TB7-11,12	J9L	61	23	17	SYS	-	-	-	---	--

<sup>1</sup>Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.  
 \*System detector only. Remove the vehicle phase assigned to this detector in the default programming.



### LOAD RESISTOR INSTALLATION DETAIL



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

### BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE DYNAMIC/BACKUP CONTROL FUNCTION 1.
- FROM PHASE CONTROL FUNCTION MENU PRESS '2' (DYNAMIC/BACKUP CONTROL FUNCTIONS).

DYNAMIC/BACKUP CONTROL FUNCTION #01

OVERLAPS: ; ABCDEFGHIJKLMNOP

IF OVERLAPS ARE ACTIVE

OR PHASES: ; 12345678910111213141516

IF PHASES ARE ON: ; X

OMIT PHASES: ; X

CALL PHASES: ; X

BACKUP PROTECTION PROGRAMMING COMPLETE

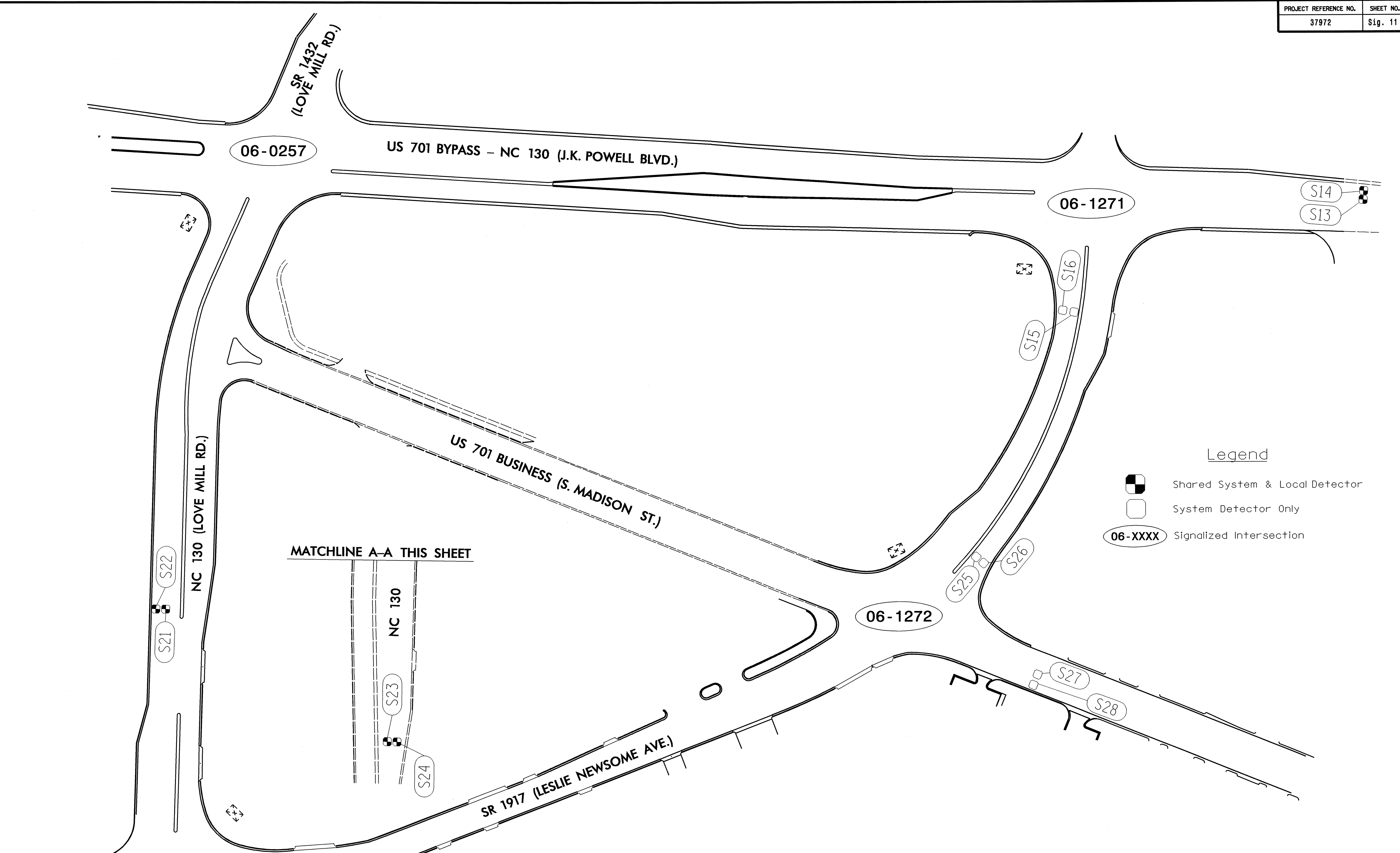
### BACKUP PROTECTION NOTE

(program controller as shown below)


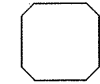
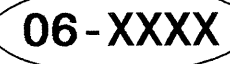
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 06-1272  
 DESIGNED: June 2008  
 SEALED: June 13, 2008  
 REVISED:

<p><b>New Installation</b></p> <p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p>	<p><b>US 701 Business</b>                  (South Madison Street)                  at  <b>SR 1917 (Leslie Newsome Avenue)</b></p> <p>Division 06 Columbus County Whiteville</p> <p>PLAN DATE: June 2008 REVIEWED BY: MR Cooney</p> <p>PREPARED BY: LM Moon REVIEWED BY:</p>	<p>SEAL</p>						
<p>Prepared for the Offices of:</p>	<p><b>PBS</b> 1616 EAST WILLBROOK ROAD, SUITE 310                  RALEIGH, NORTH CAROLINA 27609                  (919) 876-6888</p>	<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	INIT.	DATE			
NO.	INIT.	DATE						
<p>750 N. Greenfield Parkway, Garner, NC 27529</p>		<p>SIG. INVENTORY NO. 06-1272</p>						



**Legend**

-  Shared System & Local Detector
-  System Detector Only
-  06-XXXX Signalized Intersection

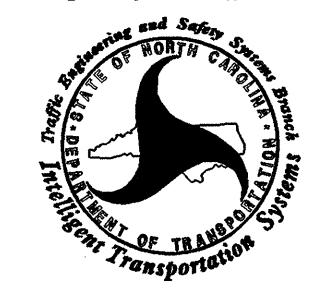
ENTRANCE TO LOWE'S

MATCHLINE A-A THIS SHEET

MATCHLINE A-A THIS SHEET

**PBS&J** 1616 EAST MILLBROOK ROAD, SUITE 310  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888


Prepared for the Offices of:



750 N. Greenfield Place, Garner, NC 27529

<b>Whiteville Closed Loop Signal System System Detector Schematic</b>	
Division 6	Columbus Co. Whiteville
PLAN DATE: June 2008	REVIEWED BY: MR Cooney
PREPARED BY: JA Wiles	REVIEWED BY: LM Moon
REVISIONS	INIT. DATE

SEAL



*Lisa M. Moon* 6-13-08  
 SIGNATURE DATE

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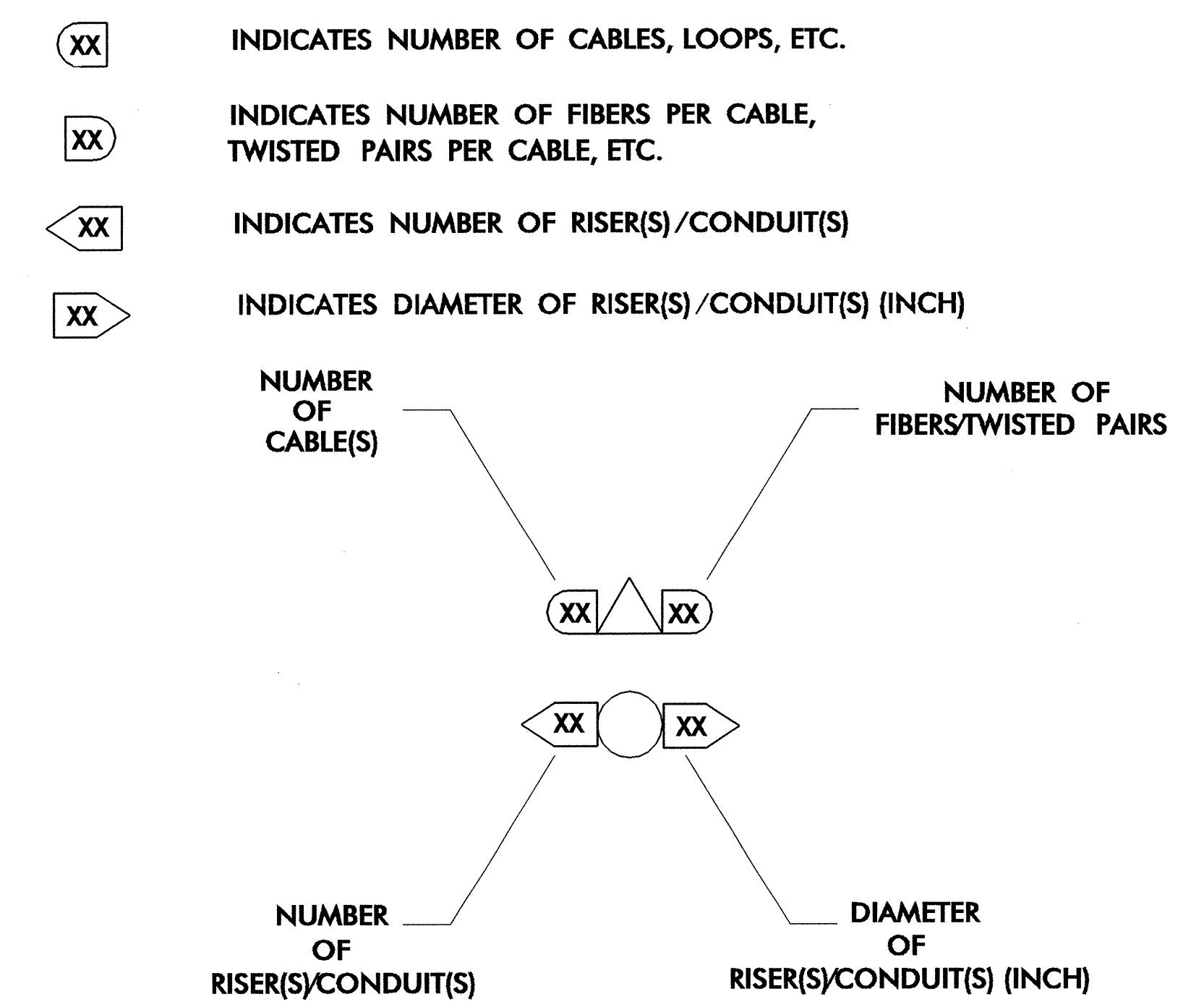
- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE - 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE - 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 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 FIBER OPTIC CABLE SEAL
- 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 INTERCONNECT CENTER 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 30 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
- 59 BOND MESSENGER CABLE TO POLE GROUND
- 60 BOND RISER TO POLE GROUND

**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 OVERSIZED JUNCTION BOX
- EXISTING OVERSIZED JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- AERIAL SPICE 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 CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- EXISTING SPICE CABINET
- NEW SPICE CABINET
- SIGNAL POLE
- SIGNAL INVENTORY NUMBER

**CONSTRUCTION NOTE SYMBOLOGY KEY**

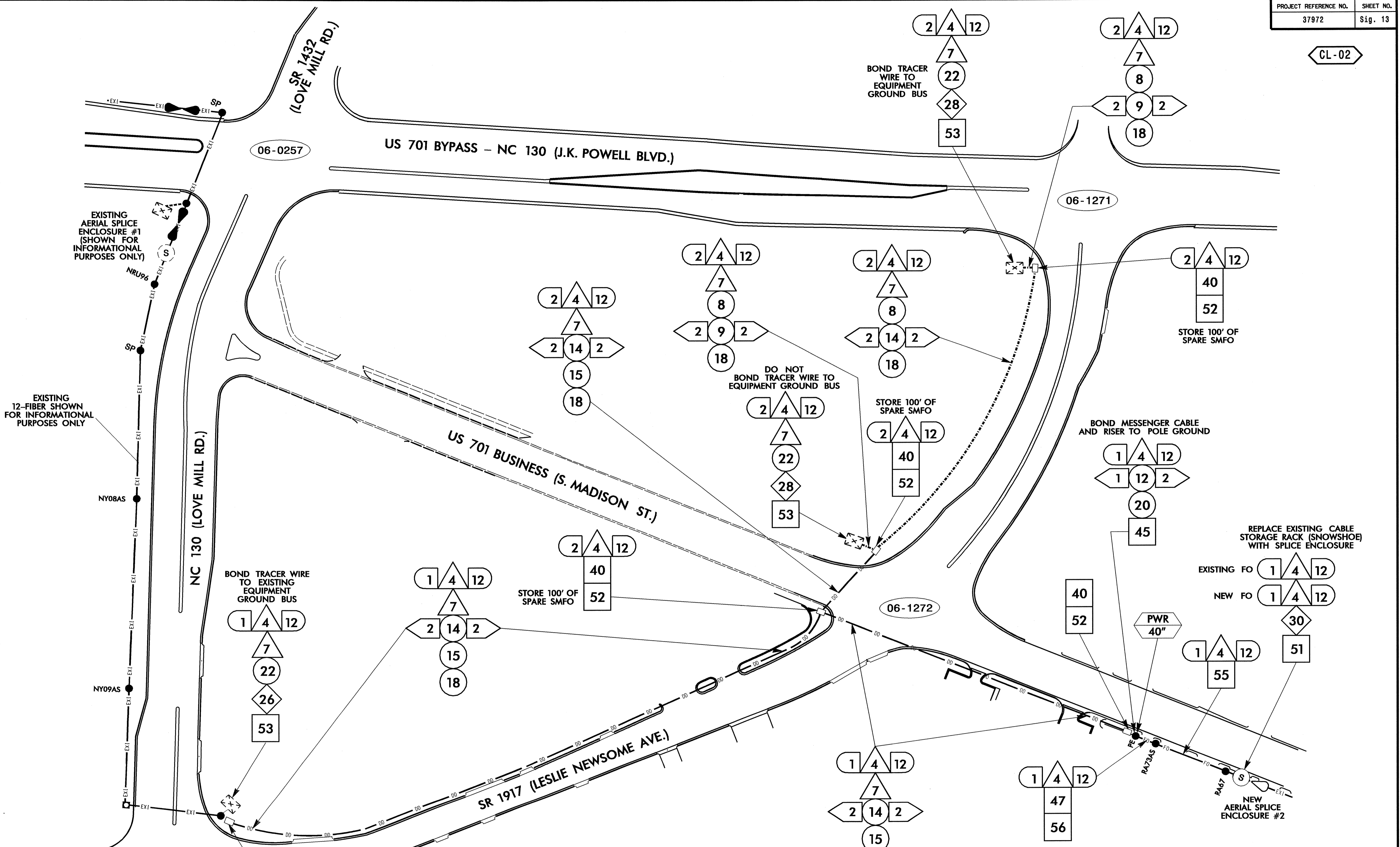


**PBS&J** 1616 EAST WILLBROOK ROAD, SUITE 310  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888

	<b>Whiteville Closed Loop Signal System Construction Notes</b>		
	Division 6 Columbus County Whiteville		
PLAN DATE: June 2008	REVIEWED BY: LW Moon		
PREPARED BY: BK Scott	REVIEWED BY: MR Cooney		
SCALE: N/A	REVISIONS:	INIT.:	DATE:
		Signature: <i>Lisa M. Moon</i> 6-13-08 DATE:	

CADD Filename: CLnotesE.dgn

CL-02



EXISTING AERIAL SPLICE ENCLOSURE #1 (SHOWN FOR INFORMATIONAL PURPOSES ONLY)

EXISTING 12-FIBER SHOWN FOR INFORMATIONAL PURPOSES ONLY

BOND TRACER WIRE TO EXISTING EQUIPMENT GROUND BUS

DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS

STORE 100' OF SPARE SMFO

BOND MESSANGER CABLE AND RISER TO POLE GROUND

REPLACE EXISTING CABLE STORAGE RACK (SNOWSHOE) WITH SPLICE ENCLOSURE

EXISTING FO

NEW FO

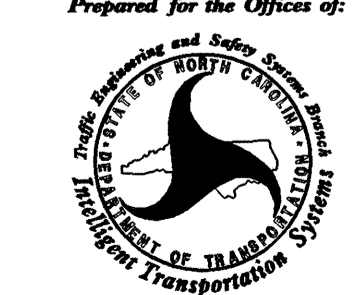
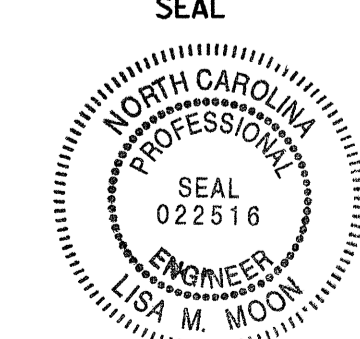
NEW AERIAL SPLICE ENCLOSURE #2

ENTRANCE TO LOWE'S

- Legend**
- CATV = Cable Television
  - NEU = Neutral
  - PWR = Power
  - RIS = Riser
  - SIG = Signal
  - STLT = Street Light
  - TEL = Telephone
  - TELDR = Telephone Drop
  - TRANS = Transformer
  - EXFO = Existing Fiber Optic Cable

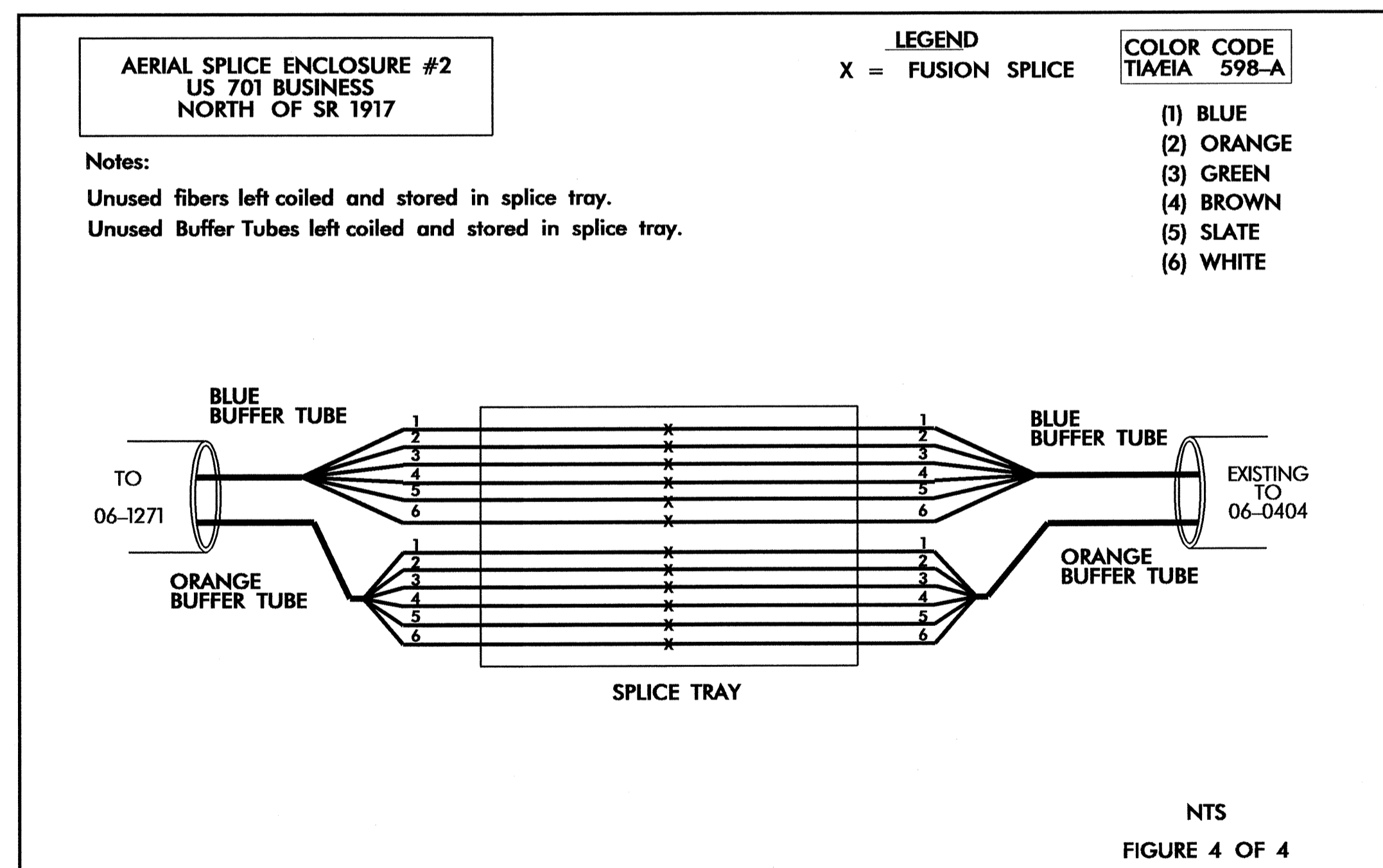
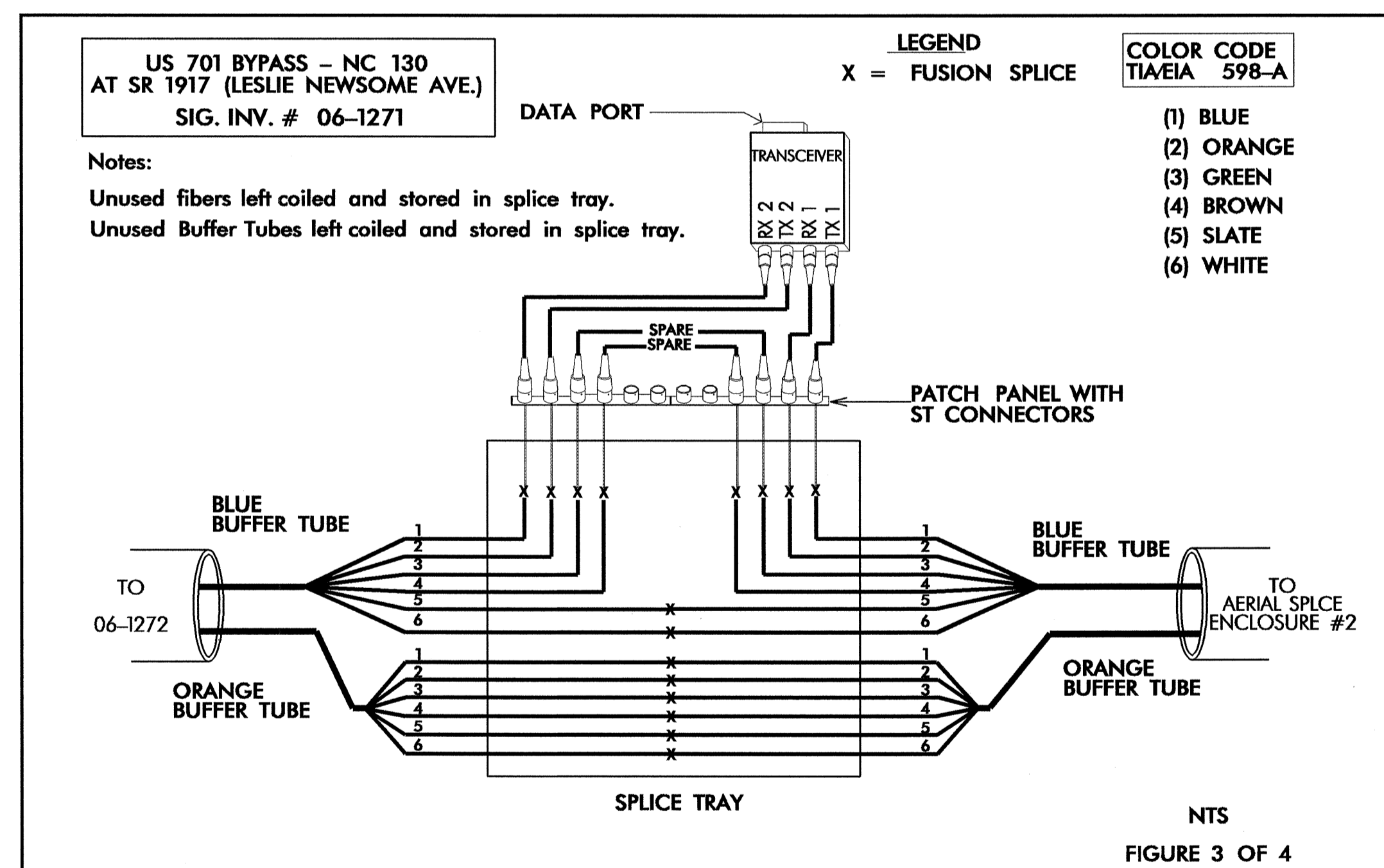
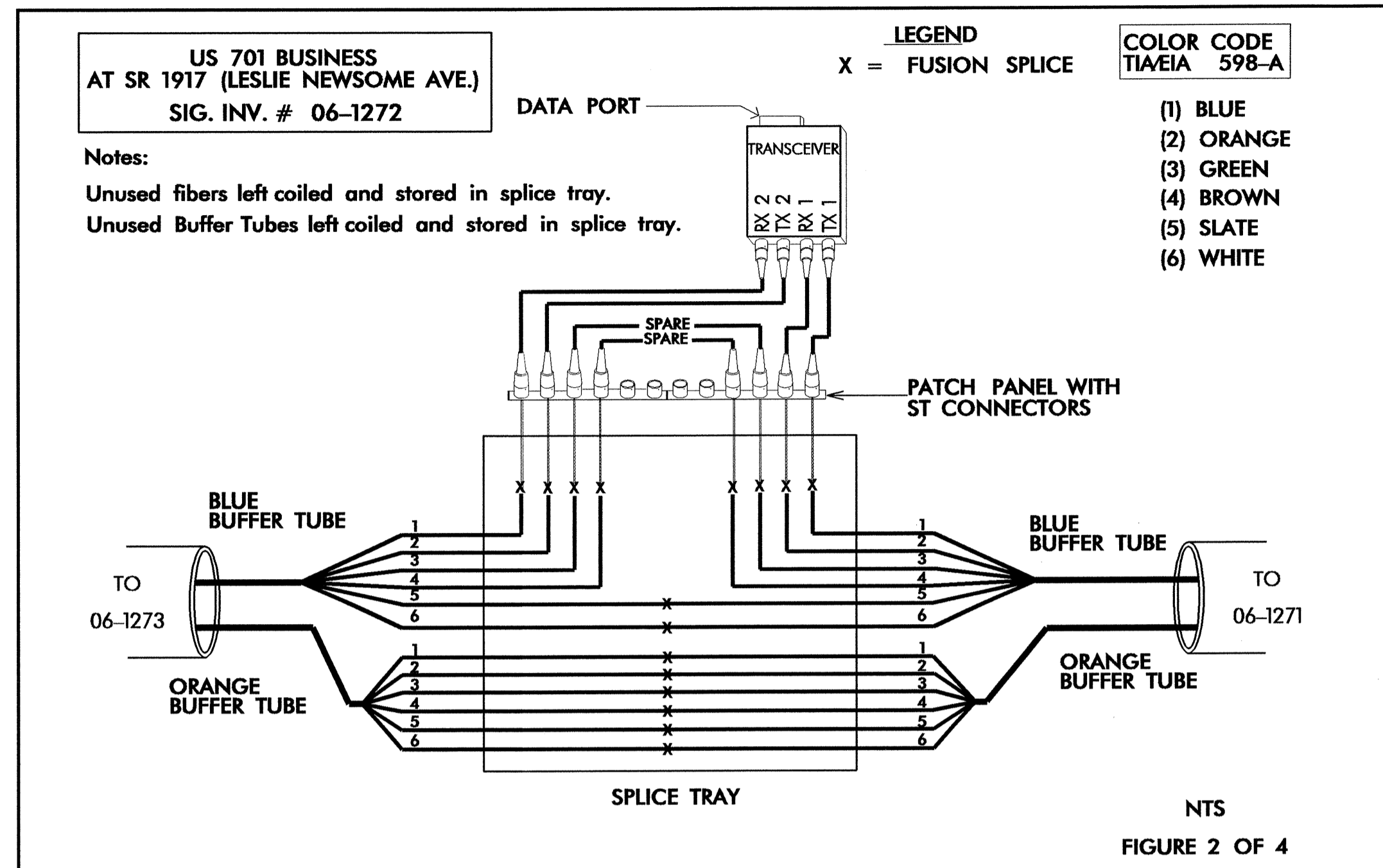
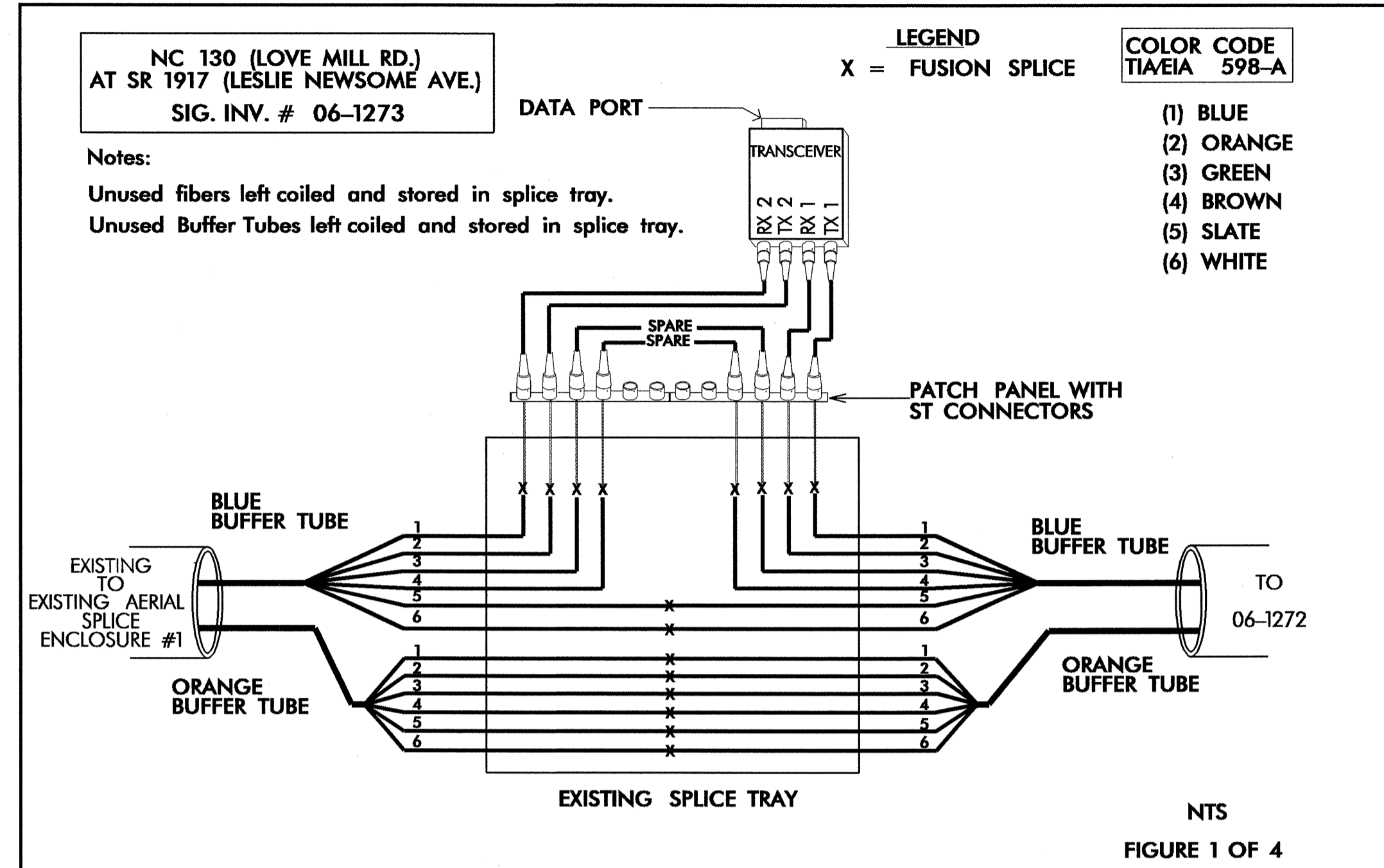
40  
52 STORE 100' OF SPARE SMFO

**PBS** 1616 EAST MILLBROOK ROAD, SUITE 310  
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<p>Prepared for the Offices of:</p>  <p>250 N. Greenfield Place, Garner, NC 27529</p>	<p><b>Whiteville Closed Loop Signal System</b></p> <p>Communications Cable and Conduit Routing Plans</p>		<p>SEAL</p>  <p>ISA M. MOON</p>						
	<p>Division 6 Columbus Co. Whiteville</p>								
	<p>PLAN DATE: June 2008</p>	<p>REVIEWED BY: MR Cooney</p>							
	<p>PREPARED BY: JA Wiles</p>	<p>REVIEWED BY: LM Moon</p>							
<p>SCALE: 1" = 60'</p>		<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p>Signature: <i>Lisa M. Moon</i> 6/13/08</p> <p>CADD File Name: CL02.dgn</p>
REVISIONS	INIT.	DATE							



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 18566

# FIBER OPTIC CABLE



1. CONTRACTOR FURNISH SELF HEALING RING TYPE TRANSCEIVERS IN ALL SIGNAL CABINETS.
2. TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING THE PROPER TERMINATIONS

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Prepared for the Offices of:  750 N. Greenfield Place, Garner, NC 27529	<b>Whiteville Closed Loop Signal System Splice Plan</b>		SEAL  ENGINEER LISA M. MOON
	Division 06 Columbus County Whiteville	PLAN DATE: June 2008	
SCALE NTS	PREPARED BY: LM Moon	REVIEWED BY:	SIGNATURE: <i>Lisa M. Moon</i> 6-13-08 DATE: