Project No.	Sheet No.
U–3816	Sig. 1

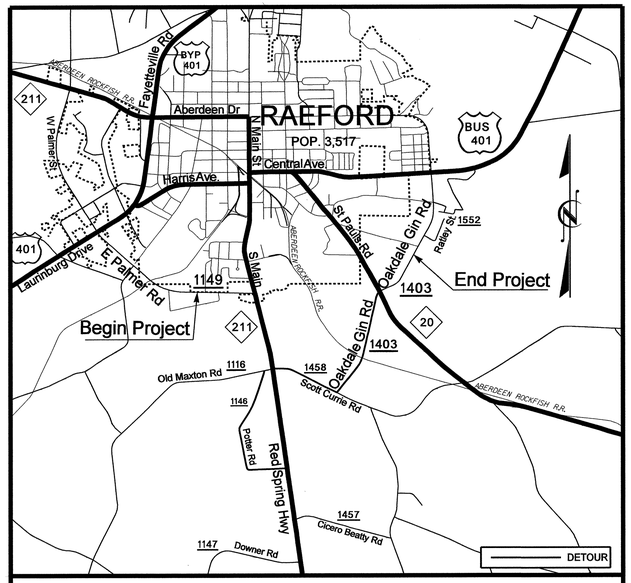
TIP: U–3816

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

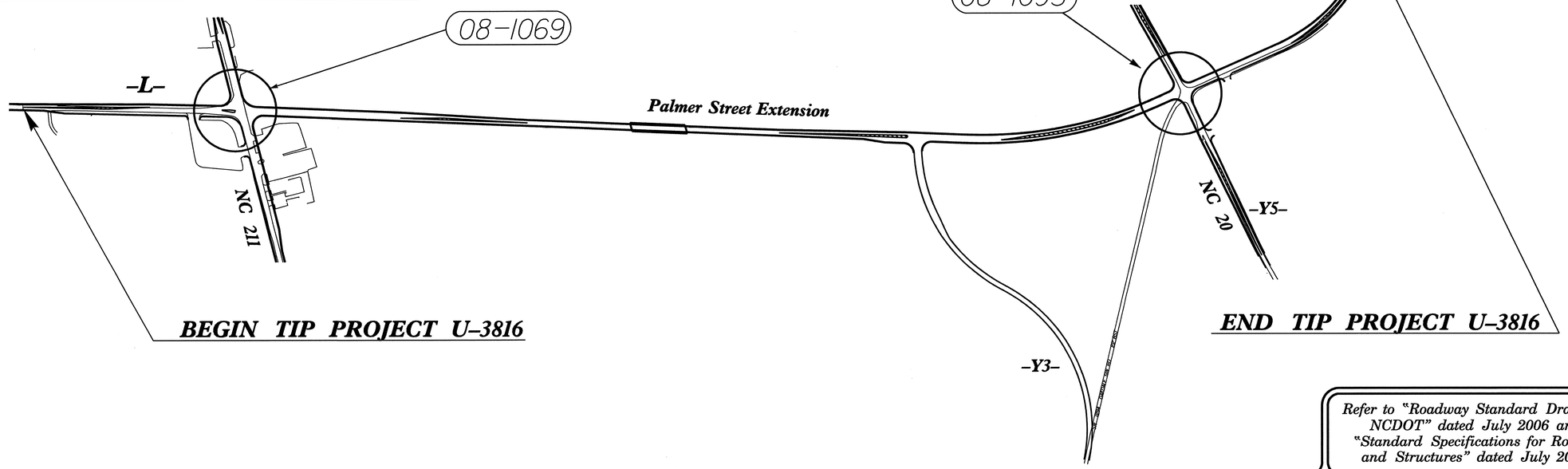
HOKE COUNTY

LOCATION: PALMER STREET EXTENSION FROM NC 211 AT SR 1149 TO NC 20 AT SR 1403

TYPE OF WORK: TRAFFIC SIGNALS



Vicinity Map



Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1	------	Title Sheet
Sig. 2–5	08–1069	NC 211 (Red Spring Road/S. Main Street) at SR 1149 (Palmer Street)
Sig. 6–7	08–1093	NC 20 (St. Paul Road) at SR 1149 (Palmer Road)/SR 1403 (Prospect Avenue)
Sig. 8–10	------	Inductive Detective Loops Details

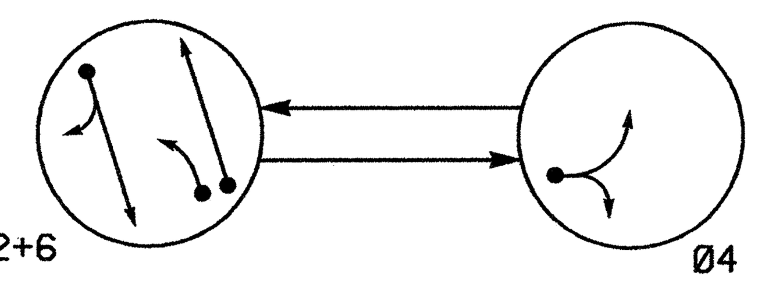
INTELLIGENT TRANSPORTATION SYSTEMS & SIGNALS UNIT

Contacts:

Timothy J. Williams, PE – S&G Contracts & PEF Support Engineer
George C. Brown, PE – Signal Equipment Design Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
Intelligent Transportation Systems & Signals Unit
750 N. Greenfield Parkway, Garner, NC 27529

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

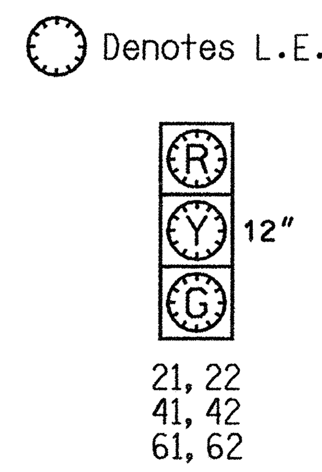
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.



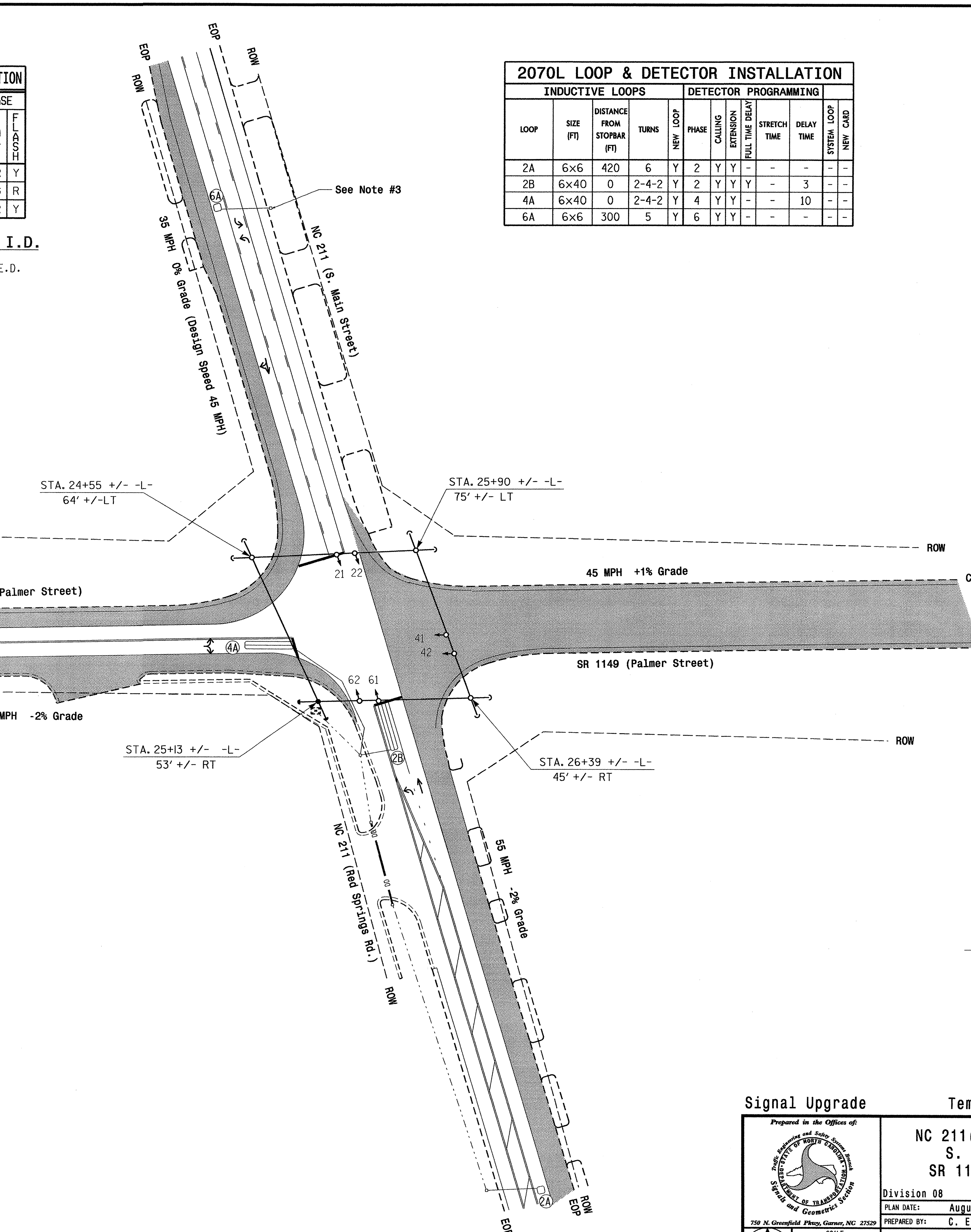
2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x6	420	6	Y	2	Y	Y	-	-	-	-	-
2B	6x40	0	2-4-2	Y	2	Y	Y	Y	-	3	-	-
4A	6x40	0	2-4-2	Y	4	Y	Y	-	-	10	-	-
6A	6x6	300	5	Y	6	Y	Y	-	-	-	-	-

2 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. Run all lead-in cable overhead on existing utility poles where possible.
4. Set all detector units to presence mode.



2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	14	7	12
Extension 1 *	6.0	2.0	6.0
Max Green 1 *	90	20	90
Yellow Clearance	5.4	3.0	4.5
Red Clearance	1.3	2.6	1.4
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	2.5	-	2.5
Max Variable Initial *	46	-	34
Time Before Reduction *	15	-	15
Time To Reduce *	45	-	45
Minimum Gap	3.4	-	3.0
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
DD	Directional Drill 1-2" Polyethelyne Conduit	N/A
	Construction Zone	

Signal Upgrade

Temporary Design (TCP Phase I & II)

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

SCALE 0 50 1"=50'

NC 211(Red Springs Rd./ S. Main St.) at SR 1149 (Palmer St.)

Division 08 Hoke County Raeford

PLAN DATE: August 2007	REVIEWED BY: T. S. Thigpen
PREPARED BY: C. E. Pierce	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 24393 TIMOTHY J. WILLIAMS

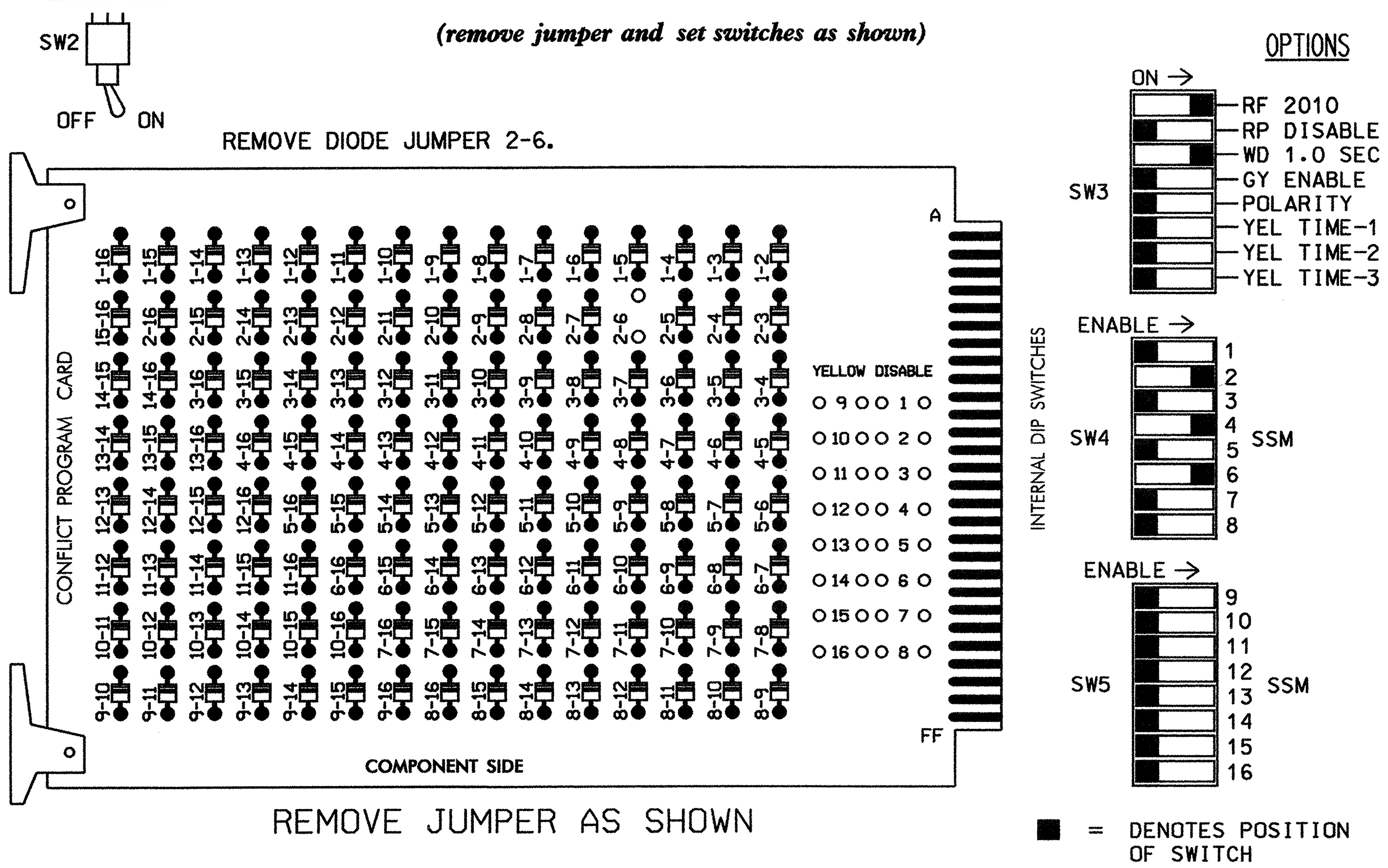
SIGNATURE 9/4/07 DATE

SIG. INVENTORY NO. 08-1069 T

04-SEP-2007 09:03
s:*its signals*workgroups*tip projects*u-3816*signals*081069_sig_dsn_2007xxxx.dgn
tthigpen

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL1-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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
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.

SIGNAL HEAD HOOK-UP CHART

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

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER..............EXISTING EAGLE TYPE 2070L
CABINET.................EXISTING McCAIN/CONTROL TECHNOLOGIES (DWG.NO.9500-332-NCDOT)
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S4,S6
PHASES USED.............2,4,6
OVERLAPS................NONE

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

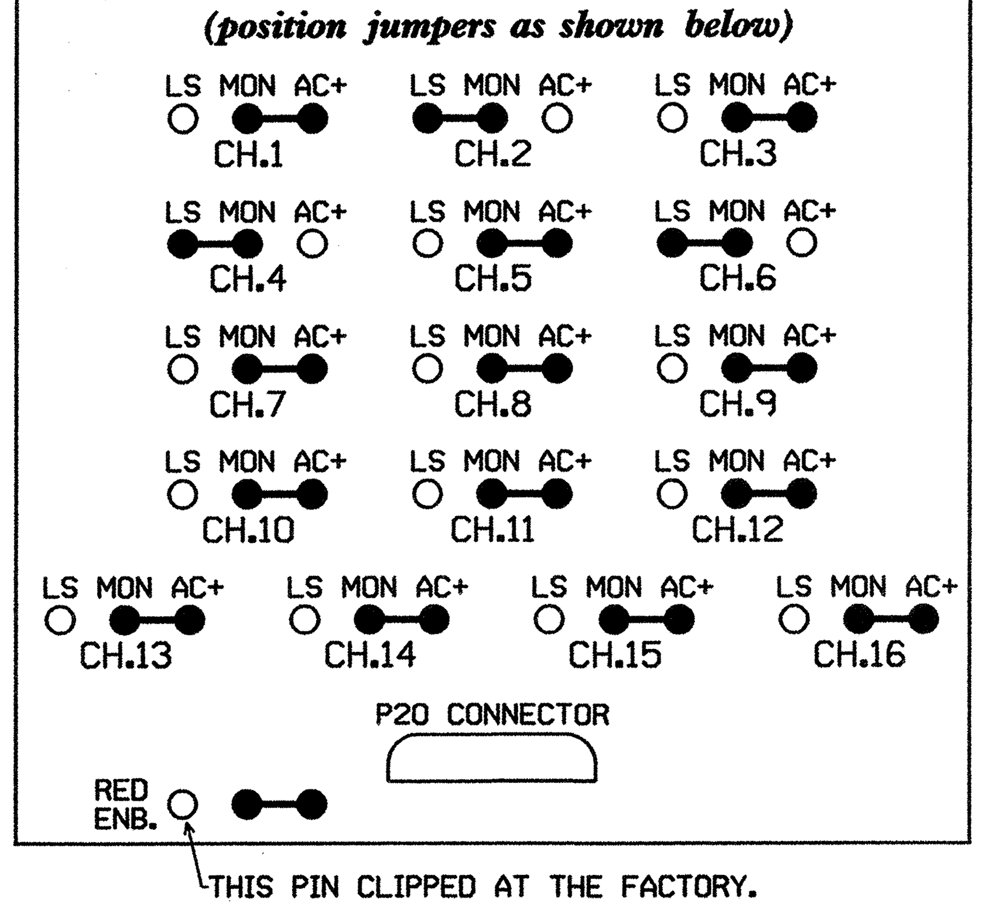
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	Y		3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-1069 T
DESIGNED: August 2007
SEALED: 09/04/07
REVISED: N/A

Signal Upgrade Temporary Design (TCP Phase I & II)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

NC 211(Red Springs Rd./ S. Main St.) at SR 1149 (Palmer St.)

Division 8	Hoke County	Raeford
PLAN DATE: August 2007	REVIEWED BY: T. Joyce	
PREPARED BY: C. Strickland	REVIEWED BY:	
REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

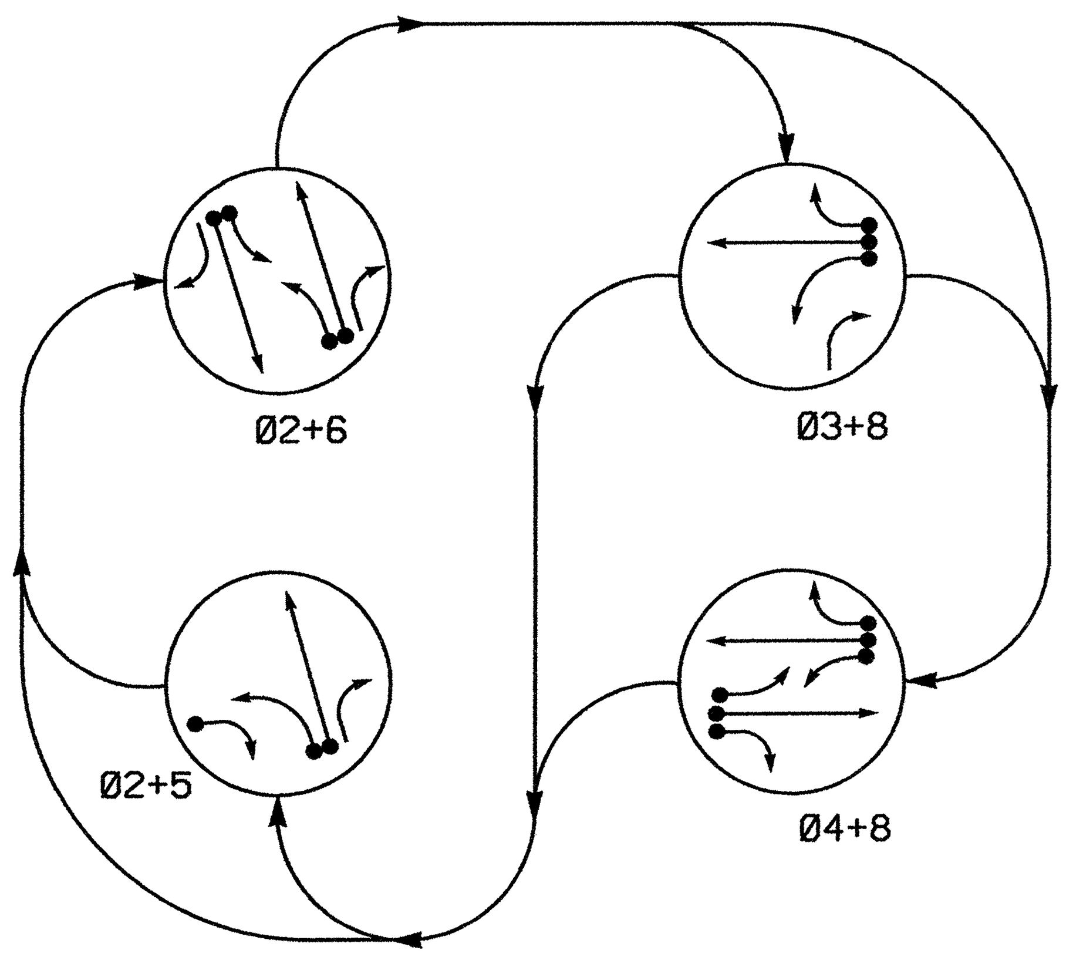
George C. Brown 9/4/07
SIGNATURE DATE

SIG. INVENTORY NO. 08-1069 T

04-SEP-2007 10:33
s:\its signals\workgroups\sig man\strickland\081069t_sm_ele_xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-3816	Sig. 4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

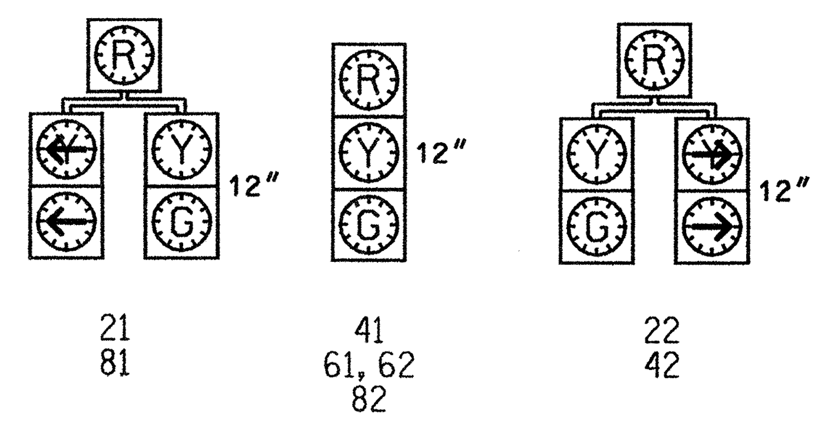
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø3+8	Ø4+8	FLASH
21	↖G	G	R	R	Y
22	G	G	R/	R	Y
41	R	R	R	G	R
42	R/	R	R	G	R
61, 62	R	G	R	R	Y
81	R	R	↖G	G	R
82	R	R	G	G	R

SIGNAL FACE I.D.

◯ Denotes L.E.D.



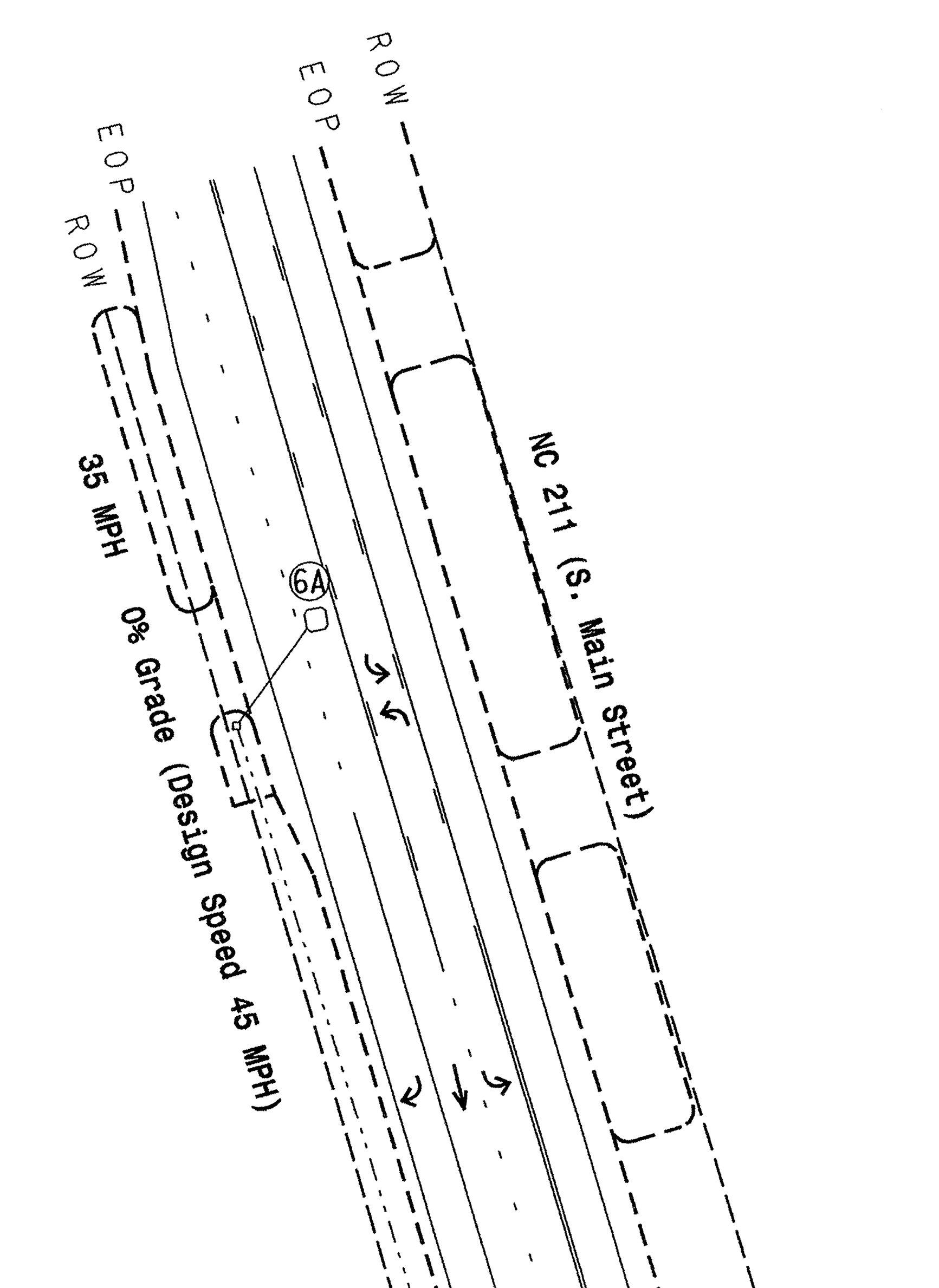
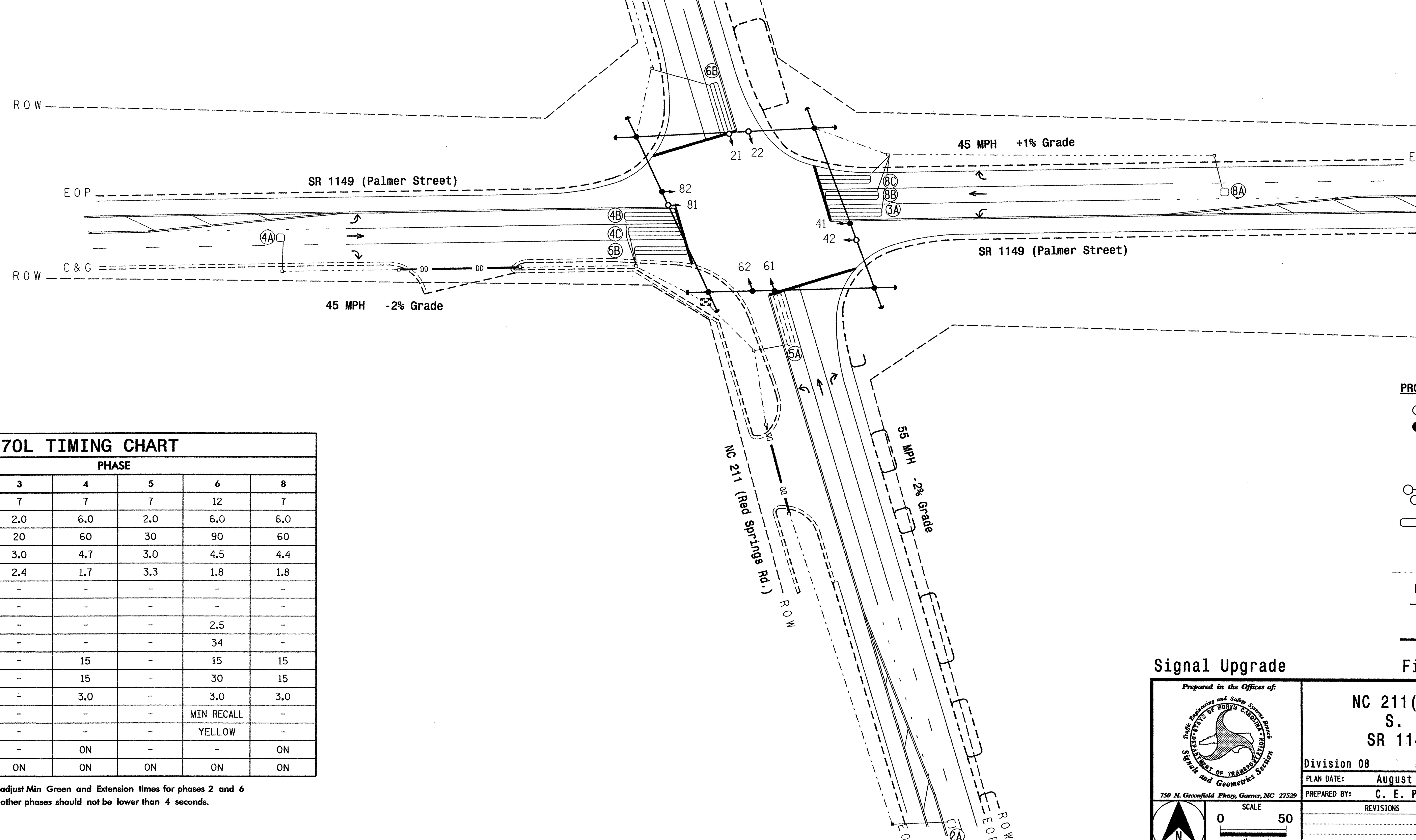
2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x6	420	6	-	2	Y	Y	-	-	-	-	-
3A	6x40	0	2-4-2	Y	3	Y	Y	-	-	3	-	Y
					8	Y	Y	-	-	15	-	Y
4A	6x6	300	5	Y	4	-	Y	-	-	-	-	Y
4B	6x40	0	2-4-2	Y	4	Y	Y	-	-	3	-	-
4C	6x40	0	2-4-2	Y	4	Y	Y	Y	2	5	-	Y
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	Y	-	3	-	-
5B	6x40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6x6	300	6	-	6	Y	Y	-	-	-	-	-
6B	6x40	0	2-4-2	Y	6	Y	Y	Y	-	3	-	Y
8A	6x6	300	6	Y	8	-	Y	-	-	-	-	Y
8B	6x40	0	2-4-2	Y	8	Y	Y	Y	2	5	-	Y
8C	6x40	0	2-4-2	Y	8	Y	Y	-	-	15	-	Y

4 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. Omit phase 5 during phase 6 on.
4. Omit phase 3 during phase 4 on.
5. Program controller to clear from phase 2+6 to phase 2+5 by progressing through phase 4+8 (see Electrical Details).
6. Set all detector units to presence mode.

2070L TIMING CHART

FEATURE	PHASE 2	3	4	5	6	8
Min Green 1 *	14	7	7	7	12	7
Extension 1 *	6.0	2.0	6.0	2.0	6.0	6.0
Max Green 1 *	90	20	60	30	90	60
Yellow Clearance	5.4	3.0	4.7	3.0	4.5	4.4
Red Clearance	1.2	2.4	1.7	3.3	1.8	1.8
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	2.5	-	-	-	2.5	-
Max Variable Initial *	46	-	-	-	34	-
Time Before Reduction *	15	-	15	-	15	15
Time To Reduce *	30	-	15	-	30	15
Minimum Gap	3.4	-	3.0	-	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.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
DD	Directional Drill 1-2" Polyethelyne Conduit	N/A

Signal Upgrade

Final Design

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, North Carolina Department of Transportation

750 N. Greenfield Pkwy, Garner, NC 27529

NC 211 (Red Springs Rd./ S. Main St.) at SR 1149 (Palmer St.)

Division 08 Hoke County Raeford

PLAN DATE:	August 2007	REVIEWED BY:	T. S. Thigpen
PREPARED BY:	C. E. Pierce	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

SEAL: North Carolina Professional Engineer, Seal 24393, Timothy Williams

9/4/07

SIGNATURE DATE

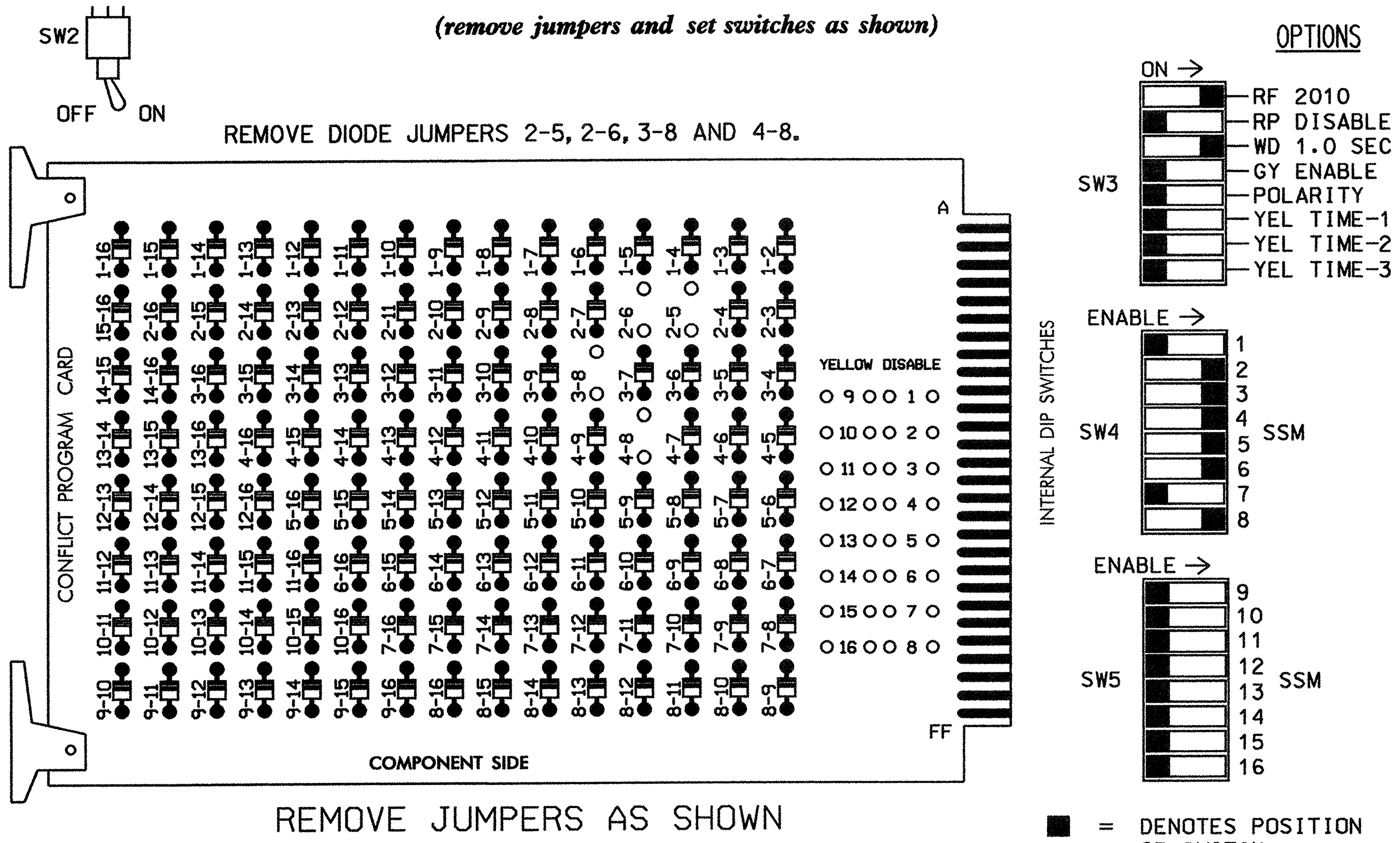
SIG. INVENTORY NO. 08-1069

04-SEP-2007 07:21
s:\its signals\workgroups\ip projects\u-3816\signals\081069_sig_dsn_2007xxxx.dgn
tthigpen

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL1-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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial.
7. Program phases 2, 4, 6 and 8, on the controller unit, for Gap Reduction.

EQUIPMENT INFORMATION

CONTROLLER..............EXISTING EAGLE TYPE 2070L
CABINET.................EXISTING McCAIN/CONTROL TECHNOLOGIES (DWG.NO.9500-332-NCDOT)
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S3,S4,S5,S6,S8
PHASES USED.............2,3,4,5,6,8
OVERLAPS................NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	22,81	41,42	NU	21,42	61,62	NU	NU	81,82	NU
RED		128		*	101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW				117			132					
GREEN ARROW				118			133					

NU = Not Used

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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:|ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE |
OR            PHASES:|12345678910111213141516
IF PHASES ARE ON|     X
OMIT PHASES     |    X
CALL PHASES     |   X
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
              OVERLAPS:|ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE |
OR            PHASES:|12345678910111213141516
IF PHASES ARE ON|  X
OMIT PHASES     |  X
CALL PHASES     |
```

BACKUP PROTECTION PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A[1]	TB2-9,10	I3U	63	25	32	3	Y	Y			3
	TB2-11,12	I3L	76	38	42	8	Y	Y			15
4A	TB4-9,10	I6U	41	3	4	4		Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			3
4C	TB6-1,2	I7U	65	27	34	4	Y	Y	Y	2.0	5
5A[2]	TB3-9,10	J3U	64	26	36	5	Y	Y			15
	TB3-11,12	J3L	77	39	46	2	Y	Y	Y		3
5B	TB3-1,2	J1U	55	17	5	5	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			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y	Y	2.0	5
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15

[1] Add jumpers from TB2-9 to TB2-11, and from TB2-10 to TB2-12.

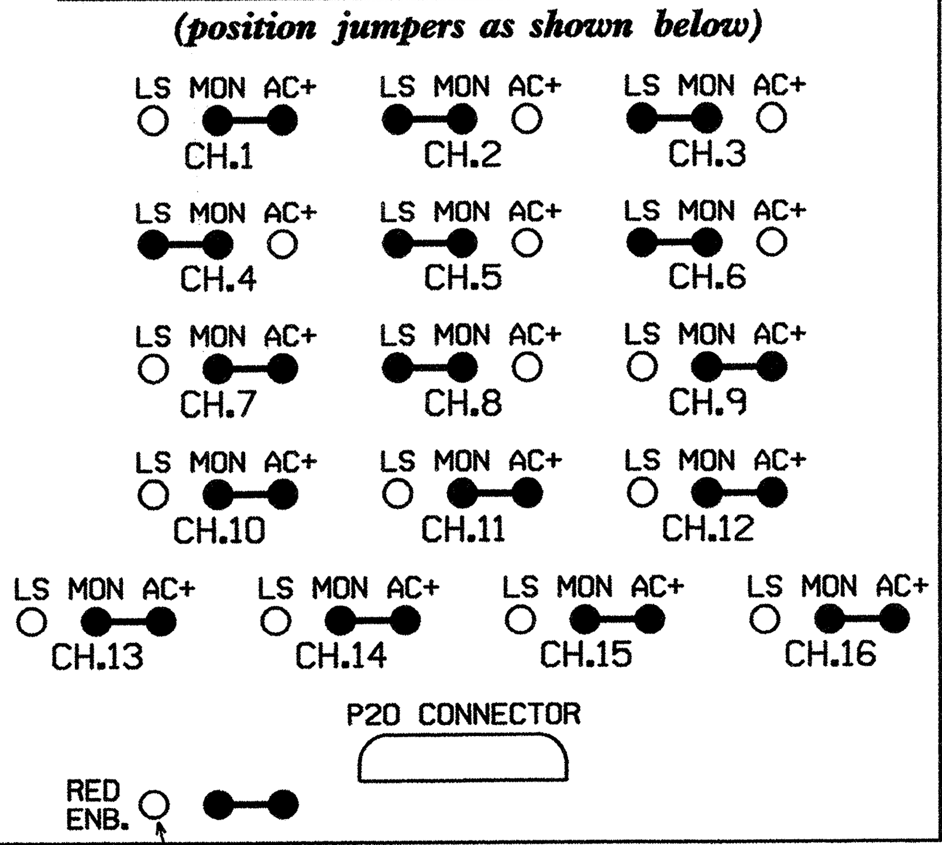
[2] Add jumpers from TB3-9 to TB3-11, and from TB3-10 to TB3-12.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)

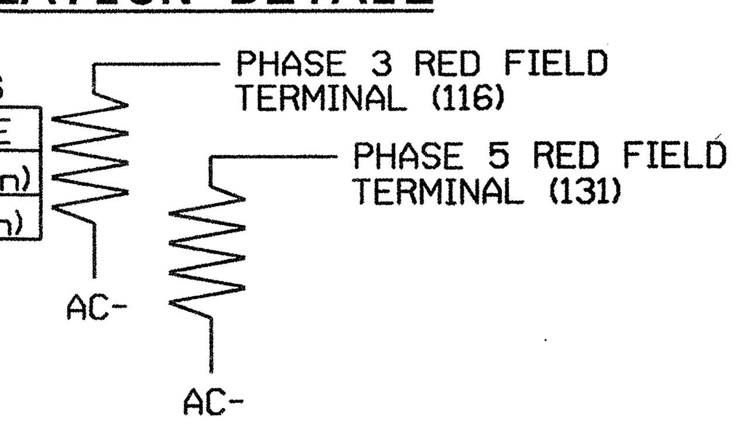


THIS PIN CLIPPED AT THE FACTORY.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 08-1069
DESIGNED: August 2007
SEALED: 09/04/07
REVISED: N/A

Signal Upgrade Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, State of North Carolina, Department of Transportation, Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 211(Red Springs Rd./ S. Main St.) at SR 1149 (Palmer St.)

Division 8 Hoke County Raeford

PLAN DATE: August 2007 | REVIEWED BY: T. Vyr

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS | INIT. | DATE

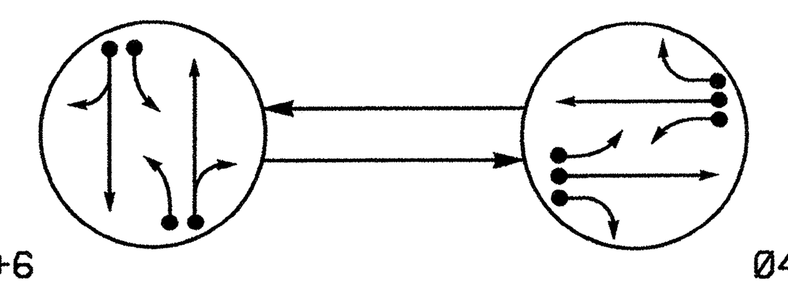
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C Brown 9/4/07
SIGNATURE DATE

SIG. INVENTORY NO. 08-1069

PROJECT REFERENCE NO.	SHEET NO.
U-3816	Sig. 6

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

◯ Denotes L.E.D.

R Y G 12"

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

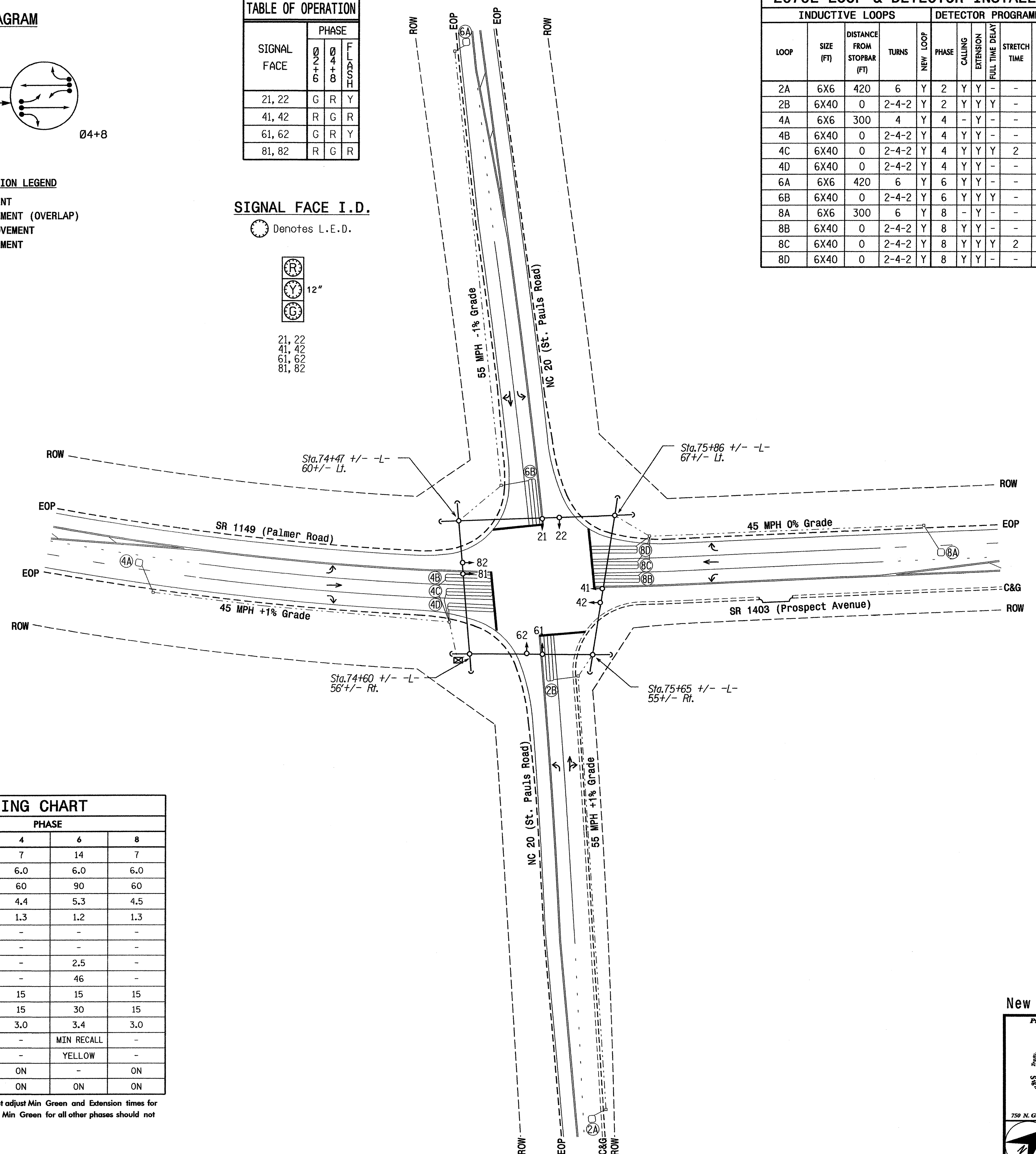
2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
	INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
2A	6X6	420	6	Y	2	Y	Y	-	-	-	-	Y
2B	6X40	0	2-4-2	Y	2	Y	Y	Y	-	3	-	Y
4A	6X6	300	4	Y	4	-	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	Y
4C	6X40	0	2-4-2	Y	4	Y	Y	Y	2	5	-	Y
4D	6X40	0	2-4-2	Y	4	Y	Y	-	-	15	-	Y
6A	6X6	420	6	Y	6	Y	Y	-	-	-	-	Y
6B	6X40	0	2-4-2	Y	6	Y	Y	Y	-	3	-	Y
8A	6X6	300	6	Y	8	-	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	Y
8C	6X40	0	2-4-2	Y	8	Y	Y	Y	2	5	-	Y
8D	6X40	0	2-4-2	Y	8	Y	Y	-	-	15	-	Y

2 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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	12	7	14	7
Extension 1 *	6.0	6.0	6.0	6.0
Max Green 1 *	90	60	90	60
Yellow Clearance	5.1	4.4	5.3	4.5
Red Clearance	1.2	1.3	1.2	1.3
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	2.5	-
Max Variable Initial *	46	-	46	-
Time Before Reduction *	15	15	15	15
Time To Reduce *	30	15	30	15
Minimum Gap	3.4	3.0	3.4	3.0
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

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

New Installation

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

SCALE 0 50
1"=50'

**NC 20 (St. Pauls Road)
at
SR 1149 (Palmer Road)/
SR 1403 (Prospect Avenue)**

Division 08 Hoke County near Raeford

PLAN DATE: August 2007	REVIEWED BY: TJ Williams
PREPARED BY: TS Thigpen	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS

SIGNATURE: T. J. Williams DATE: 9/4/07

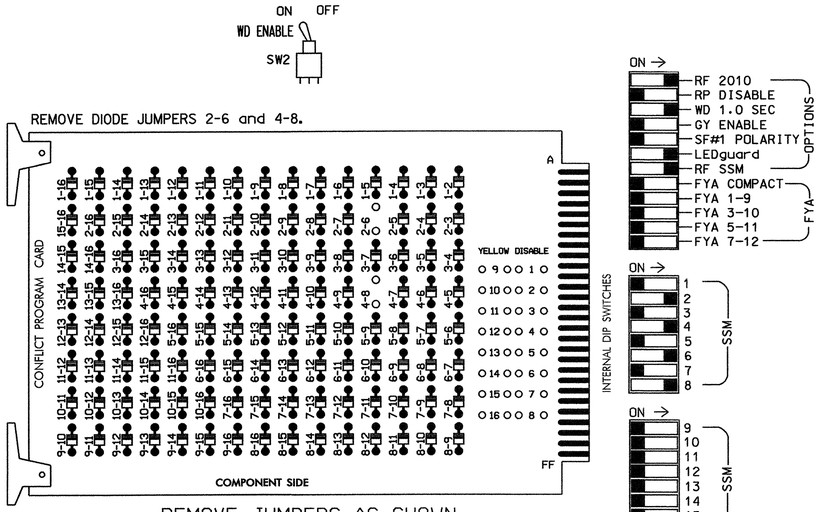
SIG. INVENTORY NO. 08-1093

04-SEP-2007 07:29

PROJECT REFERENCE NO.	SHEET NO.
U-3816	Sig. 7

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2 and 6, on the controller unit, for Variable Initial.
7. Program phases 2, 4, 6 and 8, on the controller unit, for Gap Reduction.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

EQUIPMENT INFORMATION

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø4 4A	ø4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		ø2 2B				ø4 4B	ø4 4D							ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø8 8A	ø8 8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		ø6 6B				ø8 8B	ø8 8D							

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			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			3
4C	TB6-1,2	I7U	65	27	34	4	Y	Y	Y	2.0	5
4D	TB6-3,4	I7L	78	40	44	4	Y	Y			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			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			3
8C	TB7-1,2	J7U	66	28	38	8	Y	Y	Y	2.0	5
8D	TB7-3,4	J7L	79	41	48	8	Y	Y			15

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-1093
DESIGNED: August 2007
SEALED: 09/04/07
REVISED: N/A

New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 20 (St. Pauls Road)
at
SR 1149 (Palmer Road)/
SR 1403 (Prospect Avenue)

Division 8 | Hoke County | near Raeford

PLAN DATE: August 2007 | REVIEWED BY:
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 9/4/07
SIGNATURE DATE

SIG. INVENTORY NO. 08-1093

04-SEP-2007 10:36
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cstrickland

PROJECT REFERENCE NO.	SHEET NO.
U-3816	Sig. 8

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

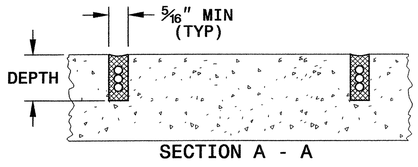
ENGLISH DETAIL DRAWING FOR

INDUCTIVE DETECTION LOOPS

CONVENTIONAL 4-SIDED LOOP

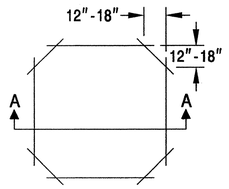
SAW SLOT DEPTH CHART

DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0

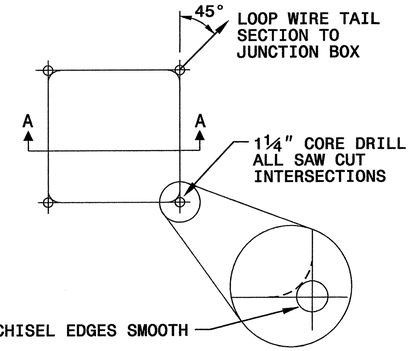


SAW CUT OPTIONS

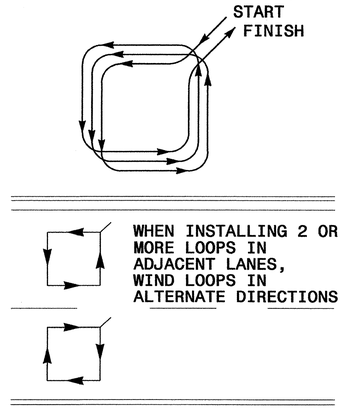
OPTION 1



OPTION 2
(POOR PAVEMENT)



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE

CORRECT WAY TO TWIST WIRE

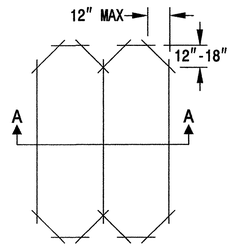
NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

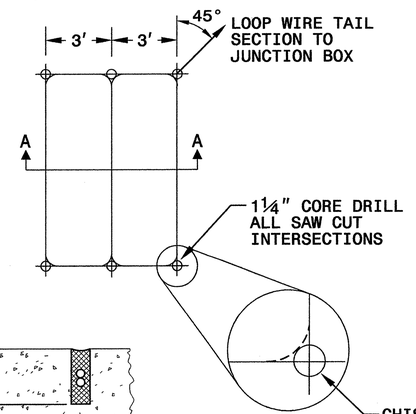
QUADRUPOLE LOOP

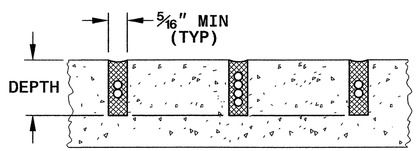
SAW CUT OPTIONS

OPTION 1



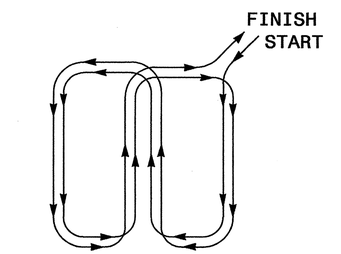
OPTION 2
(POOR PAVEMENT)





DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR

INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3

1725D01

SHEET 1 OF 3

1725D01

See Plate for Title

Prepared in the Offices of:

Intelligent Transportation Systems & Signals Unit
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON I. DEAN

Milton I. Dean 9/5/07
SIGNATURE DATE

05-SEP-2007 14:00
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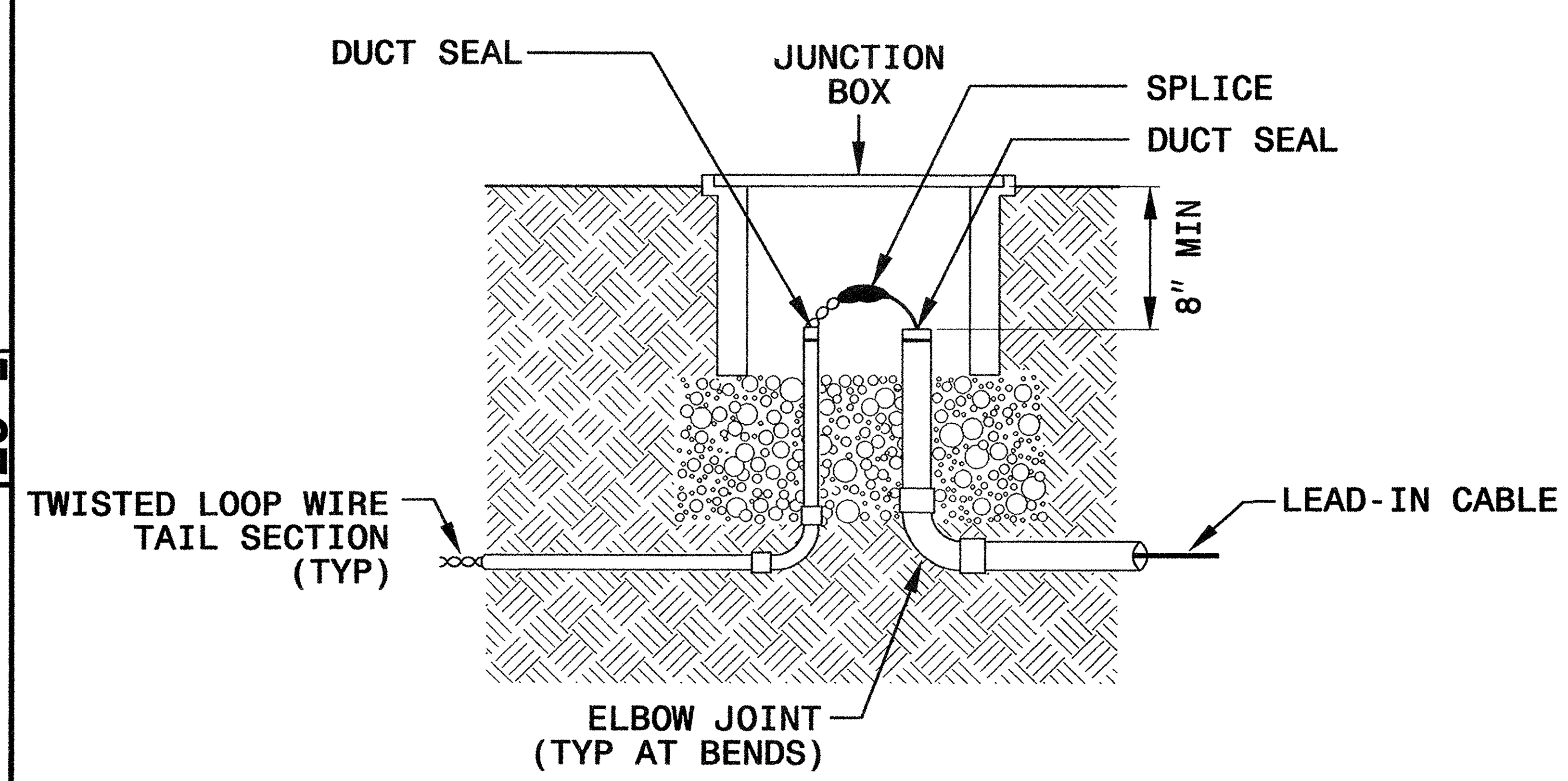
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

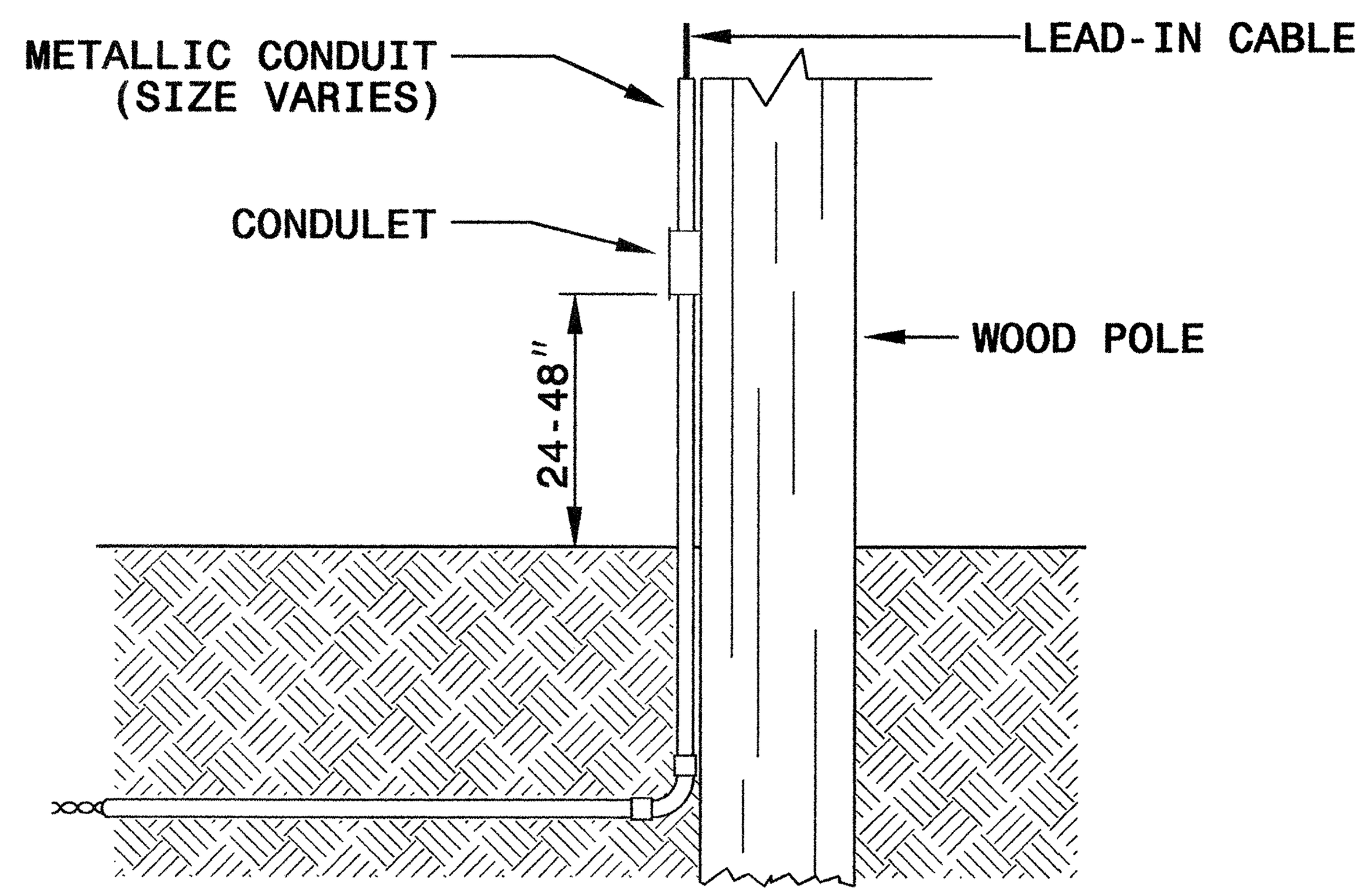
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

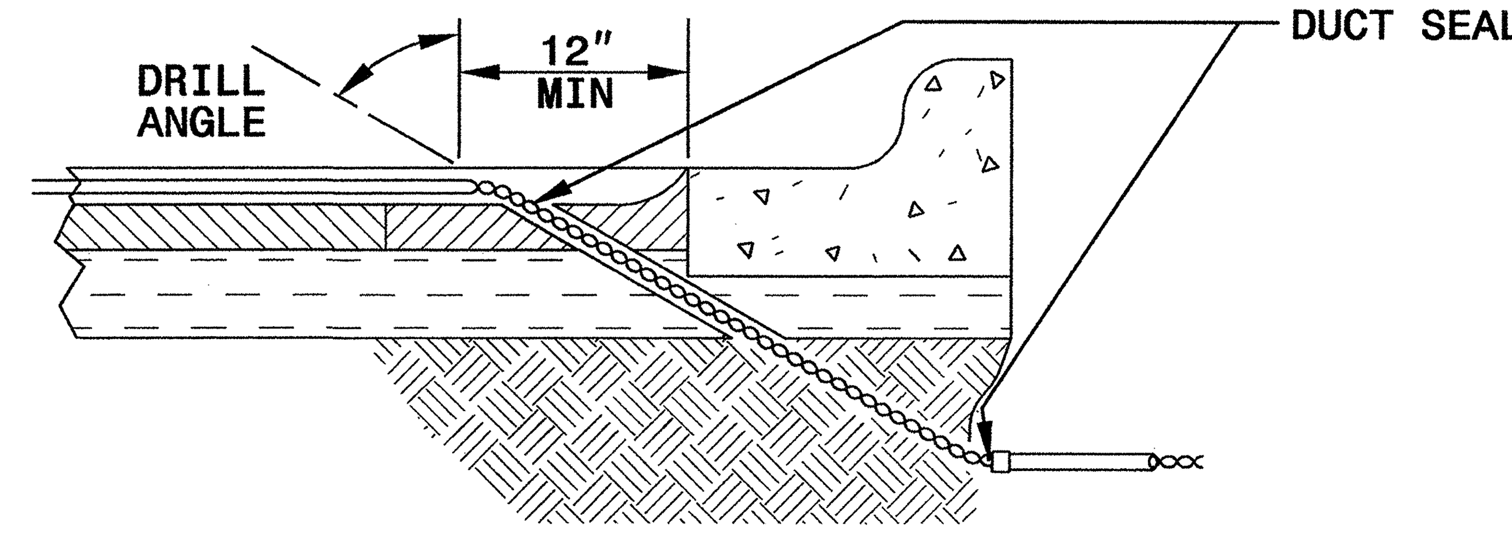


NOTE

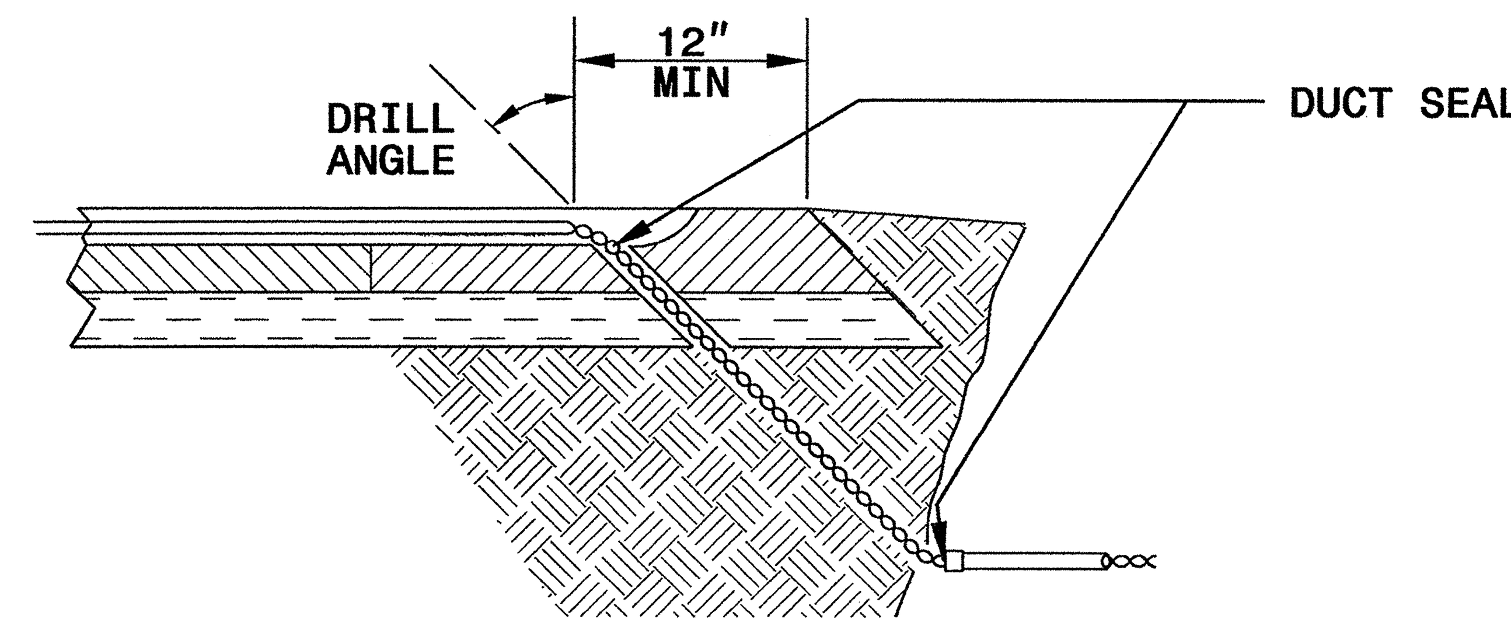
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
2. TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
3. BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

SHEET 2 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
State of North Carolina Department of Transportation
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON I. DEAN

Milton I. Dean 9/5/07
SIGNATURE DATE

PROJECT REFERENCE NO.	SHEET NO.
U-3816	Sig. 10

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR

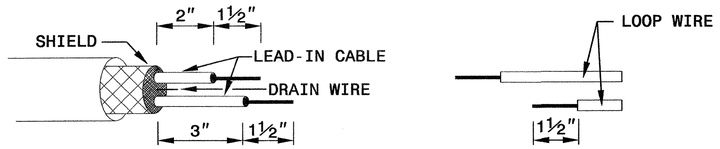
INDUCTION DETECTION LOOPS

SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

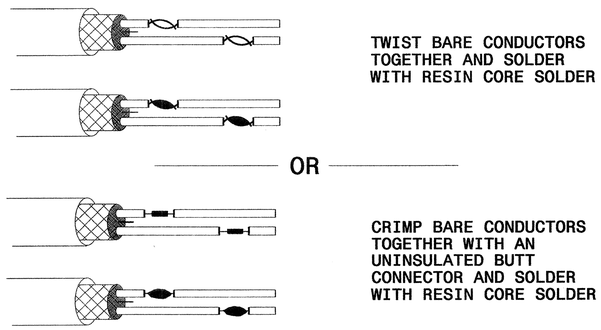
SHEET 3 OF 3

1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



STEP 2. CONNECT AND SOLDER



TWIST BARE CONDUCTORS TOGETHER AND SOLDER WITH RESIN CORE SOLDER

OR

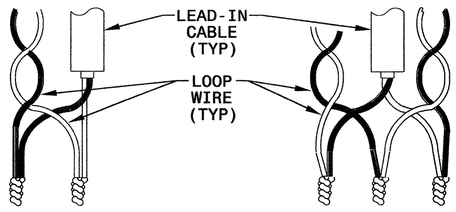
CRIMP BARE CONDUCTORS TOGETHER WITH AN UNINSULATED BUTT CONNECTOR AND SOLDER WITH RESIN CORE SOLDER

BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

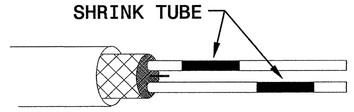
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS

SINGLE CONNECTION

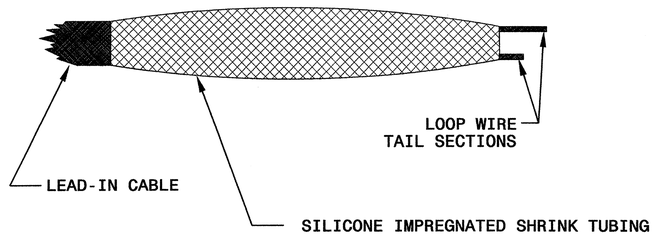
SERIES CONNECTION



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR

INDUCTIVE DETECTION LOOPS

SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3

1725D01

See Plate for Title

Prepared in the Offices of:

Intelligent Transportation Systems & Signals Unit

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON I. DEAN

Milton I. Dean 9/5/07

SIGNATURE DATE