Project No.	Sheet No.
B–4013	Sig. 1

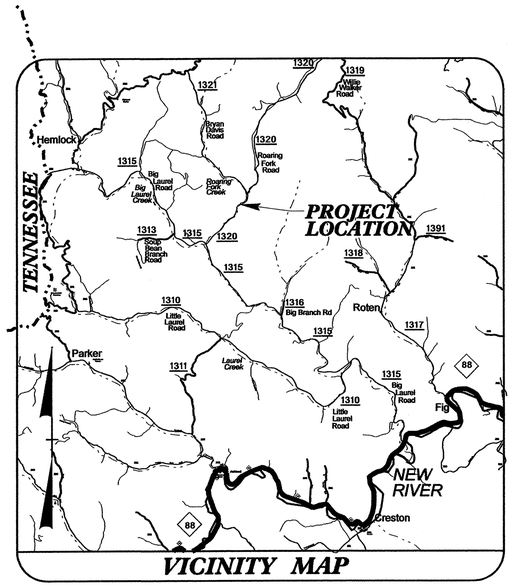
Project: B–4013

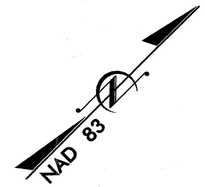
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

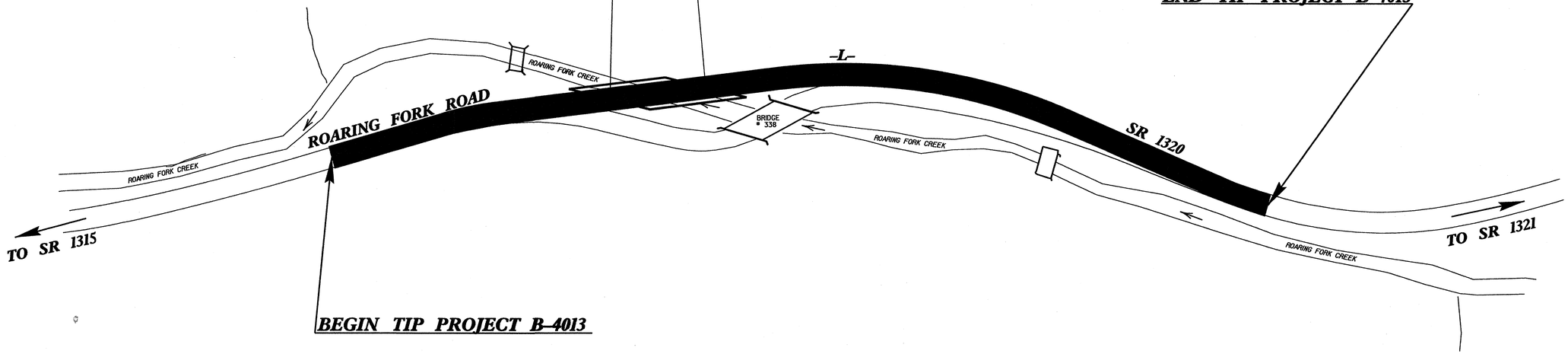
ASHE COUNTY

LOCATION: BRIDGE NO. 338 OVER ROARING FORK CREEK ON SR 1320 (ROARING FORK ROAD)

TYPE OF WORK: TRAFFIC SIGNALS







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	11–1398	SR 1320 (Roaring Fork Road) @ Bridge #338

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

D. Y. Ishak – Signals and Geometrics Contracts Engineer
G. C. Brown, PE – Signal Equipment Design Engineer
G. G. Murr, Jr., PE – Intelligent Transportation Systems Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

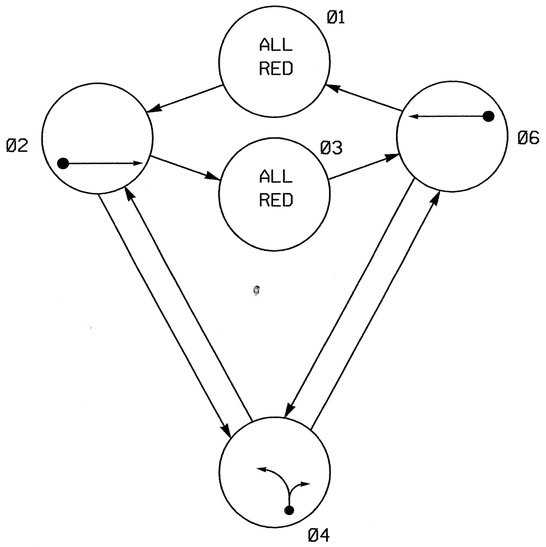
Intelligent Transportation Systems & Signals Unit

122 N. McDowell St., Raleigh, NC 27603

06-NOV-2006 08:13
tthigpen

PROJECT REFERENCE NO.	SHEET NO.
B-4013	Sig. 2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1	Ø2	Ø3	Ø4	Ø6	FLASH
21, 22	R	G	R	R	R	R
41, 42	R	R	R	G	R	R
61, 62	R	R	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22
41, 42
61, 62

2070L LOOP & DETECTOR INSTALLATION

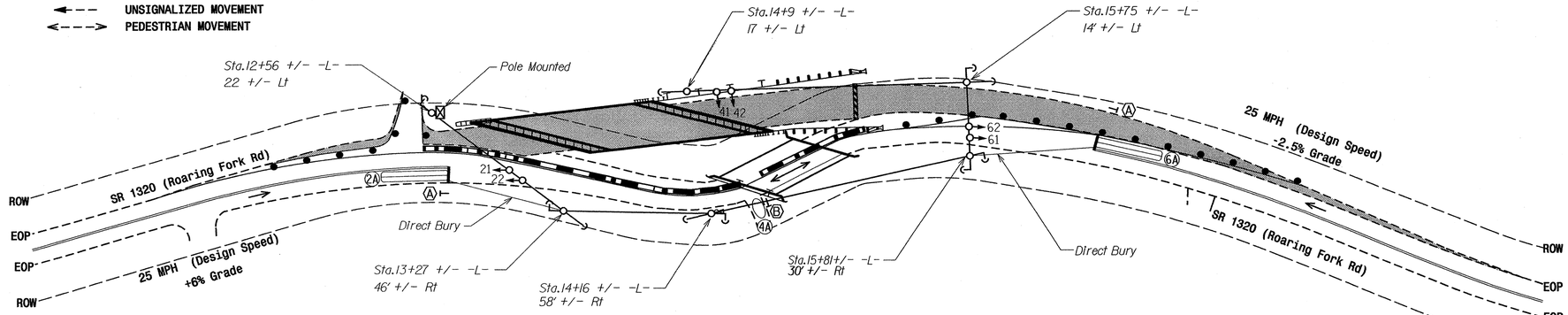
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	*	-	*	Y	4	Y	Y	-	-	-	-	*
6A	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y

* Microwave Detection Zone

3 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Program controller to start-up in Phase 6 red clearance. Program "First Phases" as Phase 1.
4. In the absence of vehicle calls, program controller for Red Rest after phase 2, 4, or 6.
5. Set all detector units to presence mode.



2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Min Green 1 *	1	10	1	7	10
Extension 1 *	0.0	2.0	0.0	2.0	2.0
Max Green 1 *	1	30	1	15	30
Yellow Clearance	3.0	3.5	3.0	3.5	3.5
Red Clearance	1.0	6.0	1.0	6.0	6.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	-	-	-	-
Vehicle Call Memory	-	-	-	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	●→
◐→	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	→
N/A	Guardrail	
	Construction Zone	
	Construction Zone Drums	
	Microwave Detection Zone	
Ⓐ	"STOP HERE ON RED" Sign (R10-6)	Ⓐ
Ⓑ	"NO TURN ON RED" Sign (R10-11)	Ⓑ

New Installation Temporary Design 1

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

SCALE 0 40 1"=40'

SR 1320 (Roaring Fork Road) at Bridge #338

Division 11 Ashe County Near Hemlock
PLAN DATE: September 2006 REVIEWED BY: RM Duffy
PREPARED BY: TS Thigpen REVIEWED BY: D. SHAK

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032021 ENGINEER RICHARD E. MULLINAX
SIGNATURE DATE
SIG. INVENTORY NO. 11-1398T1

06-NOV-2006 08:01
s:#tis signals#workgroups#tip projects#b-4013#roadway#11-1398_sig_dsn_2006mmdd.dgn
tthigpen

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, 2, 3, 4, 5, 6, and 7.
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     ¦ XX X
CALL PHASES     ¦
```

PRESS 'NEXT'

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

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #03
                OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR            PHASES:¦12345678910111213141516
IF PHASES ARE ON¦  X
OMIT PHASES     ¦XX X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #04
                OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR            PHASES:¦12345678910111213141516
IF PHASES ARE ON¦   X
OMIT PHASES     ¦X X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #05
                OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR            PHASES:¦12345678910111213141516
IF PHASES ARE ON¦    X
OMIT PHASES     ¦ XX
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #06
                OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR            PHASES:¦12345678910111213141516
IF PHASES ARE ON¦ X
OMIT PHASES     ¦
CALL PHASES     ¦    X
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #07
                OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR            PHASES:¦12345678910111213141516
IF PHASES ARE ON¦X
OMIT PHASES     ¦
CALL PHASES     ¦ X
```

BACKUP PROTECTION PROGRAMMING COMPLETE

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1 AND 2.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).
3. THE PROGRAMMING SHOWN BELOW IS NECESSARY FOR SIGNALS TO OPERATE AS SHOWN ON THE SIGNAL DESIGN PLANS.

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE              #2   IS ON
AND VEHICLE CALL ON PHASE     #6   IS ON

               SCROLL DOWN

THEN:
SET  INPUT ASSIGNMENT         #20  ON
```

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE              #6   IS ON
AND VEHICLE CALL ON PHASE     #2   IS ON

               SCROLL DOWN

THEN:
SET INPUT ASSIGNMENT          #18  ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

NOTES: INPUT 18 IS THE DEFAULT DETECTOR (DETECTOR 1) FOR PHASE 1.

INPUT 20 IS THE DEFAULT DETECTOR (DETECTOR 3) FOR PHASE 3.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1398T1
DESIGNED: September 2006
SEALED: 11/02/06
REVISED: N/A

New Installation - Temporary Design 1 - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch · State of North Carolina · Department of Transportation · Signals Management Section

122 N. McDowell St., Raleigh, NC 27603

SR 1320 (Roaring Fork Rd)
at
Bridge #338

Division 11 | Ashe County | Near Hemlock

PLAN DATE: November 2006 | REVIEWED BY: T. [signature]

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

North Carolina Professional Engineer Seal 022013 George C. Brown

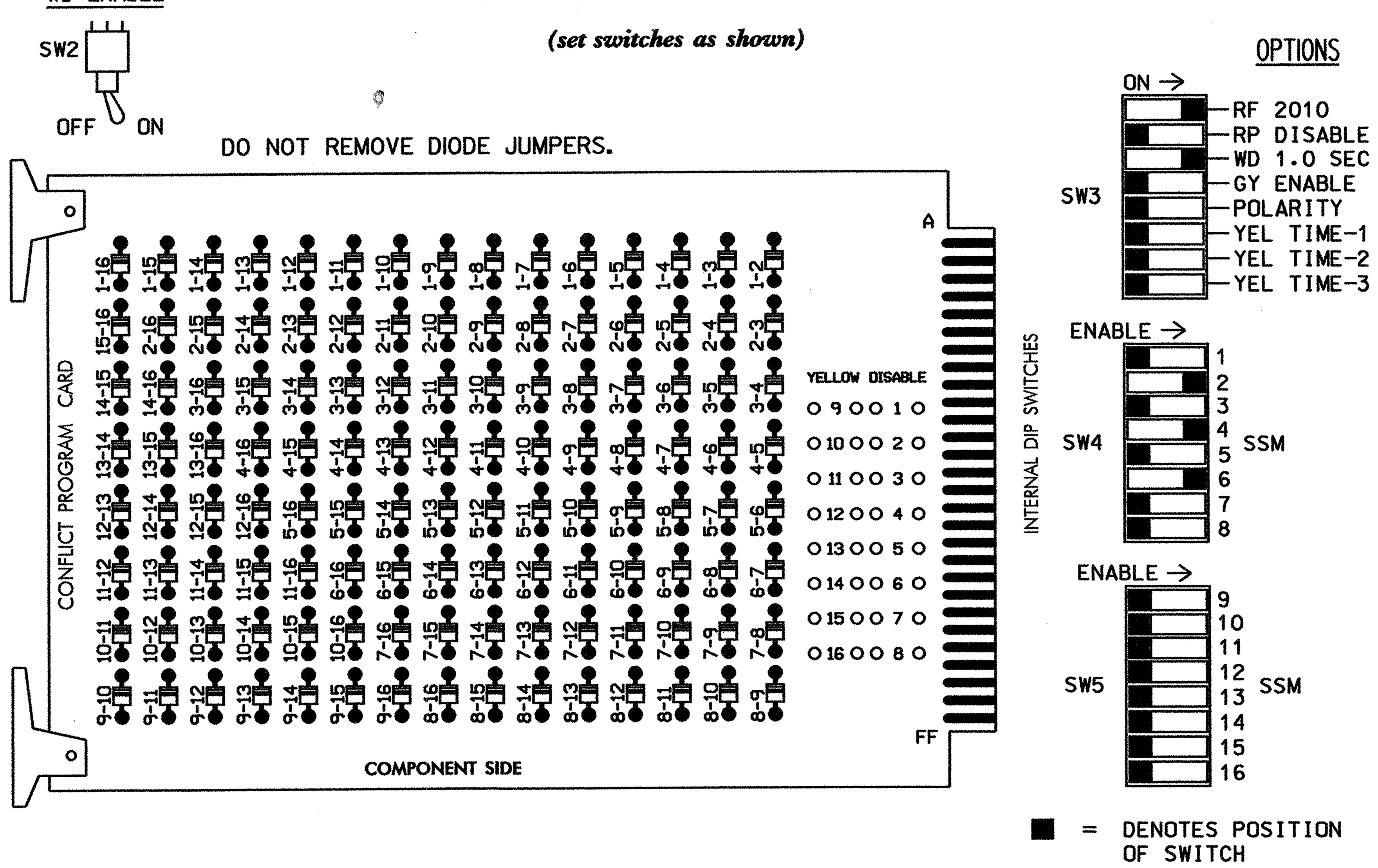
[signature] George C Brown 11/6/06
SIGNATURE DATE

SIG. INVENTORY NO. 11-1398T1

PROJECT REFERENCE NO.	SHEET NO.
B-4013	Sig.4

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

NOTE: INSTALL MODEL 252 AC ISOLATORS IN SLOT I4 FOR USE WITH MICROWAVE DETECTOR. SEE MICROWAVE DETECTOR WIRING ON THIS PAGE.

! IMPORTANT: For proper operation of the microwave detector, remove surge protection from TB21-7 and TB21-8. A DIRECT SHORT WILL OCCUR IF THIS IS NOT DONE. Tie TB21-8 to AC neutral.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
*4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

*MICROWAVE DETECTOR. (SEE WIRING DETAIL SHEET 1)

INPUT FILE POSITION LEGEND: I2L
- FILE I
- SLOT 2
- LOWER

NOTES

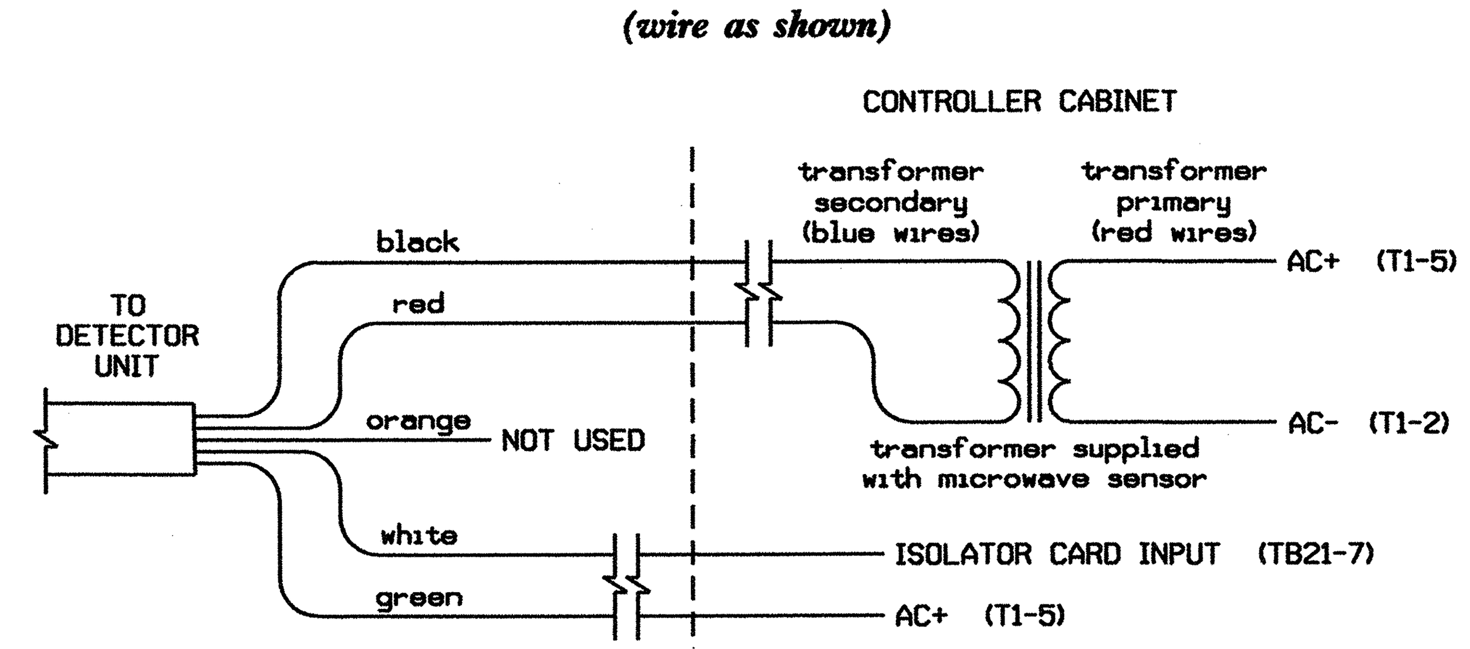
1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent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

EQUIPMENT INFORMATION

CONTROLLER.............CONTRACTOR SUPPLIED 2070L
CABINET................CONTRACTOR SUPPLIED 336
SOFTWARE...............ECONOLITE OASIS
CABINET MOUNT..........POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S4,S6
PHASES USED............1,2,3,4,6
OVERLAPS...............NONE

MICROWAVE DETECTOR '4A' WIRING DETAIL

(wire as shown)



TC26B WIRE LIST

COLOR	FUNCTION
black	12V to 24V AC/DC (no polarity)
red	12V to 24V AC/DC (no polarity)
orange	Output Relay Normally Open
white	Output Relay Normally Closed
green	Output Relay Common

NOTES:

1. Sensor is a Microwave Sensors, Inc. Model TC-26B microwave motion detector mounted on poles as indicated on the Signal Design Plans.
2. Configure AC isolator card to place call upon removal of AC+ from the input.
3. Important: For proper operation of the microwave detector, remove surge protection from TB21-7 and TB21-8. Tie TB21-8 to AC neutral.

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

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

USE RIGHT ARROW KEY TO SCROLL TO BARRIER 2

```
PHASE SEQUENCE: PAGE 1  NEXT: PAGES)      ↘
RNG¦LEAD  BARRIER 1   X-LAG¦LEAD  BARRIER 2   X-LAG
1  ¦1     2     3     4    ¦6     0     0     0
2  ¦0     0     0     0    ¦0     0     0     0
3  ¦0     0     0     0    ¦0     0     0     0
4  ¦0     0     0     0    ¦0     0     0     0
```

NOTE: THIS PHASE SEQUENCE PROGRAMMING IS CRITICAL TO THE PROPER OPERATION OF SIGNALS.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1398T1
DESIGNED: September 2006
SEALED: 11/02/06
REVISED: N/A

New Installation - Temporary Design 1 - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1320 (Roaring Fork Road)
at
Bridge #338

Division 11 | Ashe County | Near Hemlock

PLAN DATE: November 2006 | REVIEWED BY: T. [signature]
PREPARED BY: C. Strickland | REVIEWED BY:

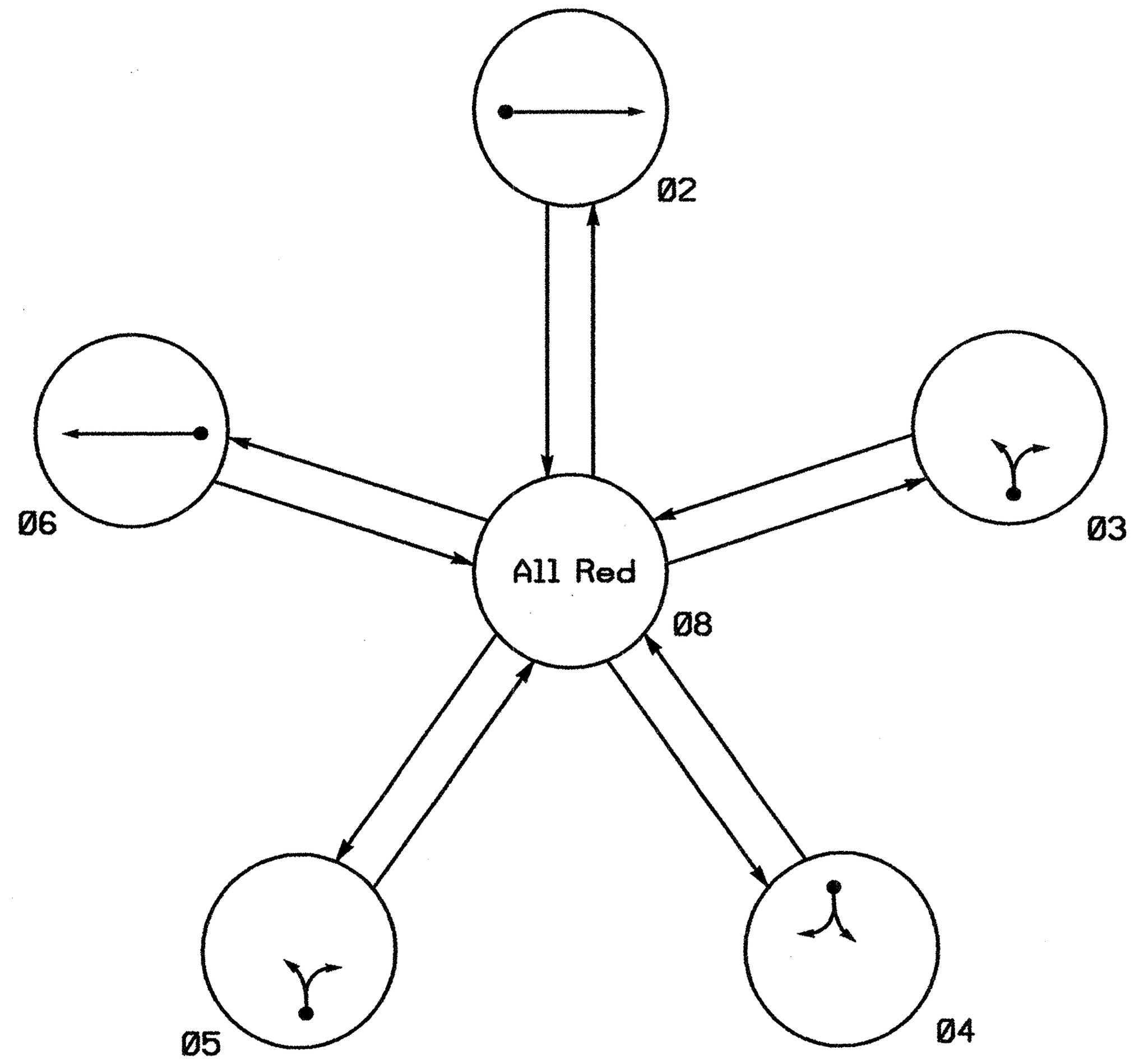
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
[signature] George C. Brown 11/6/06
SIGNATURE DATE

SIG. INVENTORY NO. 11-1398T1

PROJECT REFERENCE NO.	SHEET NO.
B-4013	Sig.5

PHASING DIAGRAM



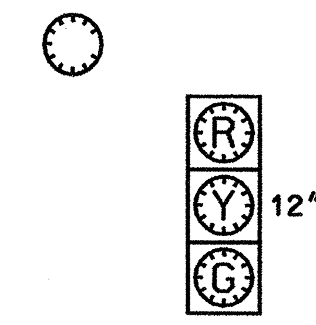
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	Ø3	Ø4	Ø5	Ø6	Ø8	FLASH
21, 22	G	R	R	R	R	R	R
31, 32	R	G	R	R	R	R	R
41, 42	R	R	G	R	R	R	R
51, 52	R	R	R	G	R	R	R
61, 62	R	R	R	R	G	R	R

SIGNAL FACE I.D.



21, 22
31, 32
41, 42
51, 52
61, 62

2070L LOOP & DETECTOR INSTALLATION

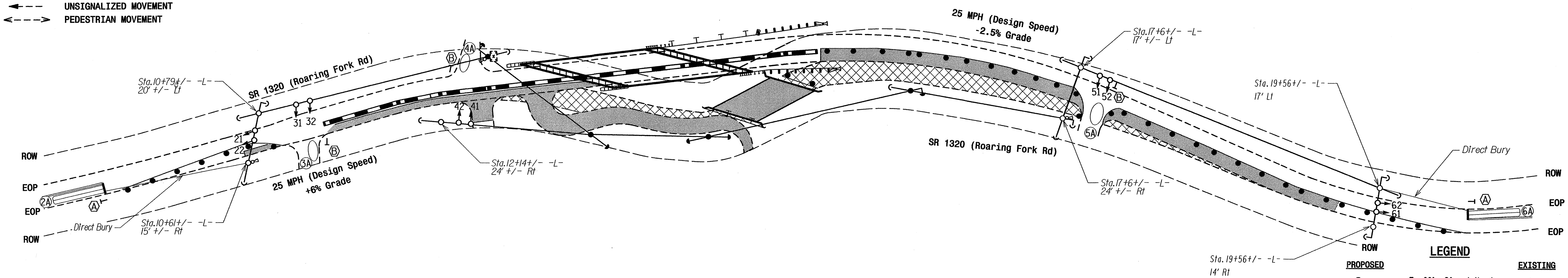
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	-
3A	*	-	*	Y	3	Y	Y	-	-	-	-	*
4A	*	-	*	Y	4	Y	Y	-	-	-	-	*
5A	*	-	*	Y	5	Y	Y	-	-	-	-	*
6A	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	-

* Microwave Detection Zone

5 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. Program controller to start-up in Phase 2 red clearance. Program "First Phase" as Phase 8.
4. In the absence of vehicle calls, program controller for Red Rest after phase 2, 3, 4, 5, 6, or 8.
5. Set all detector units to presence mode.



2070L TIMING CHART

FEATURE	PHASE 2	3	4	5	6	8
Min Green 1 *	10	7	7	7	10	13
Extension 1 *	2.0	2.0	2.0	2.0	2.0	0.0
Max Green 1 *	45	15	15	15	45	13
Yellow Clearance	3.5	3.5	3.5	3.5	3.5	4.0
Red Clearance	10.0	7.0	3.0	3.0	10	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	-	-	-	-	-
Vehicle Call Memory	-	YELLOW	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.

SIGNS

- Ⓐ "STOP HERE ON RED" Sign (R10-6) Ⓐ
- Ⓑ "NO TURN ON RED" Sign (R10-11) Ⓑ

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	
N/A	Guardrail	
	Construction Zone	
	Construction Zone Drums	
	Microwave Detection Zone	

New Installation Temporary Design 2

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

SR 1320 (Roaring Fork Rd) at Bridge #338

Division 11 Ashe County Near Hemlock

PLAN DATE:	October 2006	REVIEWED BY:	RM Duffy
PREPARED BY:	TS Thigpen	REVIEWED BY:	D. ISHAK

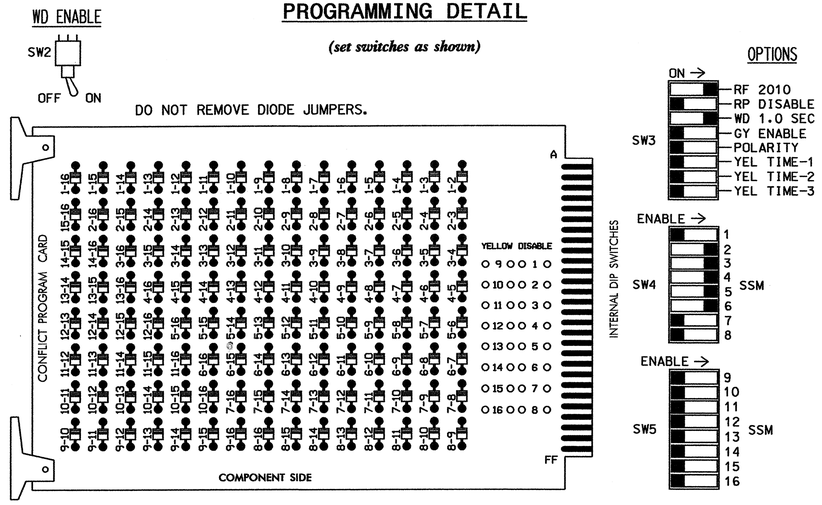
SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22027 RICHARD E. MULLINAX
2 NOVEMBER 06
SIGNATURE DATE
SIG. INVENTORY NO. 11-1398T2

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT EMPTY	ø2 2A	ø3 3A AC ISOLATOR	ø4 4A AC ISOLATOR	ø5 5A AC ISOLATOR	ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L	SLOT EMPTY	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

NOTE: INSTALL MODEL 252 AC ISOLATORS IN SLOT I3, I4 AND SLOT I5 FOR USE WITH MICROWAVE DETECTOR. SEE MICROWAVE DETECTOR WIRING ON THIS PAGE.

! IMPORTANT: For proper operation of the microwave detector, remove surge protection from TB21-5 and TB21-6. A DIRECT SHORT WILL OCCUR IF THIS IS NOT DONE. Tie TB21-6 to AC neutral.

! IMPORTANT: For proper operation of the microwave detector, remove surge protection from TB21-7 and TB21-8. A DIRECT SHORT WILL OCCUR IF THIS IS NOT DONE. Tie TB21-8 to AC neutral.

! IMPORTANT: For proper operation of the microwave detector, remove surge protection from TB21-9 and TB21-10. A DIRECT SHORT WILL OCCUR IF THIS IS NOT DONE. Tie TB21-10 to AC neutral.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
*3A	TB21-5,6	I3U	58	20	3	3	Y	Y			
*4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
*5A	TB21-9,10	I5U	55	17	5	5	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

*MICROWAVE DETECTOR. (SEE WIRING DETAIL SHEET 1 AND SHEET 2)

INPUT FILE POSITION LEGEND: I2L
- FILE I
- SLOT 2
- LOWER

NOTES

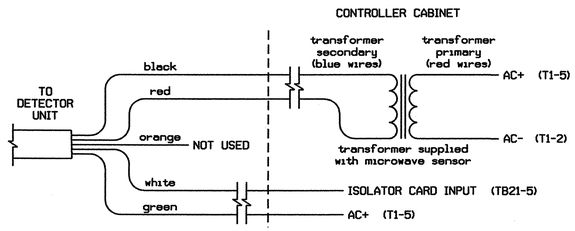
1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S3,S4,S5,S6
PHASES USED.....2,3,4,5,6,8
OVERLAPS.....NONE

MICROWAVE DETECTOR '3A' WIRING DETAIL

(wire as shown)



TC26B WIRE LIST

COLOR	FUNCTION
black	12V to 24V AC/DC (no polarity)
red	12V to 24V AC/DC (no polarity)
orange	Output Relay Normally Open
white	Output Relay Normally Closed
green	Output Relay Common

NOTES:

1. Sensor is a Microwave Sensors, Inc. Model TC-26B microwave motion detector mounted on poles as indicated on the Signal Design Plans.
2. Configure AC isolator card to place call upon removal of AC+ from the input.
3. Important: For proper operation of the microwave detector, remove surge protection from TB21-5 and TB21-6. Tie TB21-6 to AC neutral.
4. Refer to Sheet 2 for additional Microwave detector wiring details.

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	31,32	41,42	NU	51,52	61,62	NU	NU	NU	NU
RED		128		116	101		131	134				
YELLOW		129		117	102		132	135				
GREEN		130		118	103		133	136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

USE RIGHT ARROW KEY TO SCROLL TO BARRIERS 2 AND 3

PHASE SEQUENCE: PAGE 1 NEXT: PAGES) ↘											↘	
RNG	LEAD	BARRIER 1		X-LAG	LEAD	BARRIER 2		X-LAG	LEAD	BARRIER 3		X-LAG
1	2	8	3	8	4	8	5	8	6	8	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: THIS PHASE SEQUENCE PROGRAMMING IS CRITICAL TO THE PROPER OPERATION OF SIGNALS.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1398T2
DESIGNED: October 2006
SEALED: 11/02/06
REVISED: N/A

New Installation - Temporary Design 2 - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1320 (Roaring Fork Rd)
at
Bridge #338

Division 11 | Ashe County | Near Hemlock

PLAN DATE: October 2006 | REVIEWED BY: T. Logue
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
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

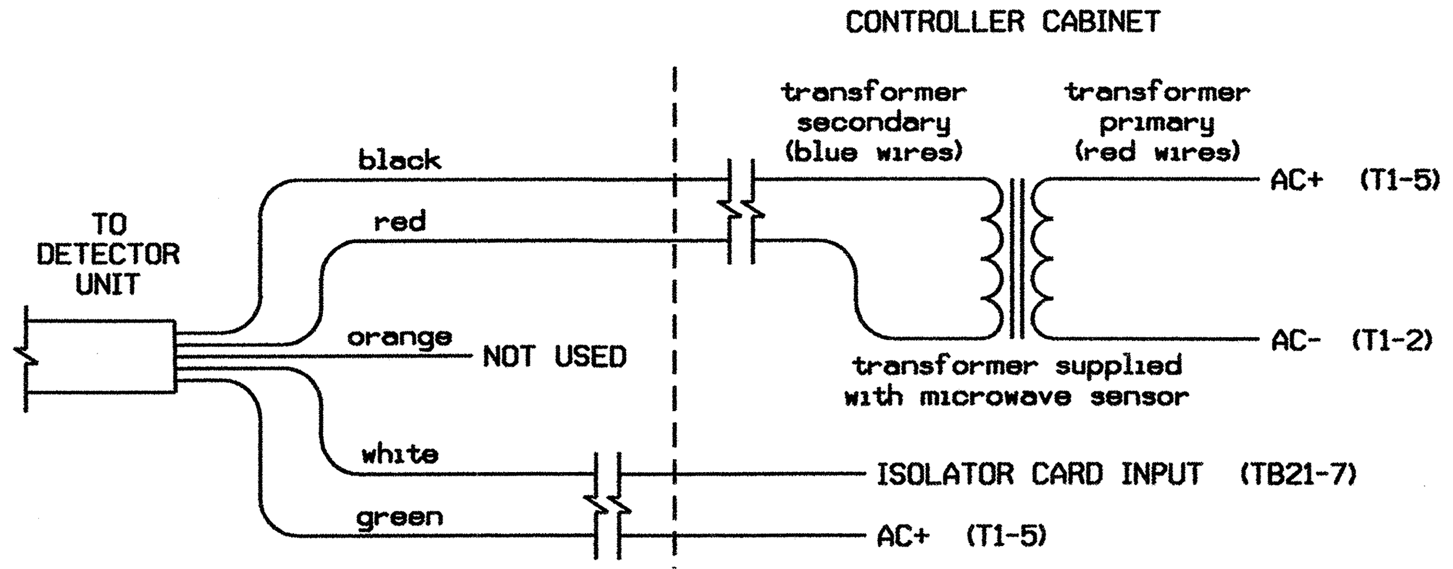
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 11/6/06
SIGNATURE DATE

SIG. INVENTORY NO. 11-1398T2

PROJECT REFERENCE NO.	SHEET NO.
B-4013	Sig. 7

MICROWAVE DETECTOR '4A' WIRING DETAIL

(wire as shown)



TC26B WIRE LIST

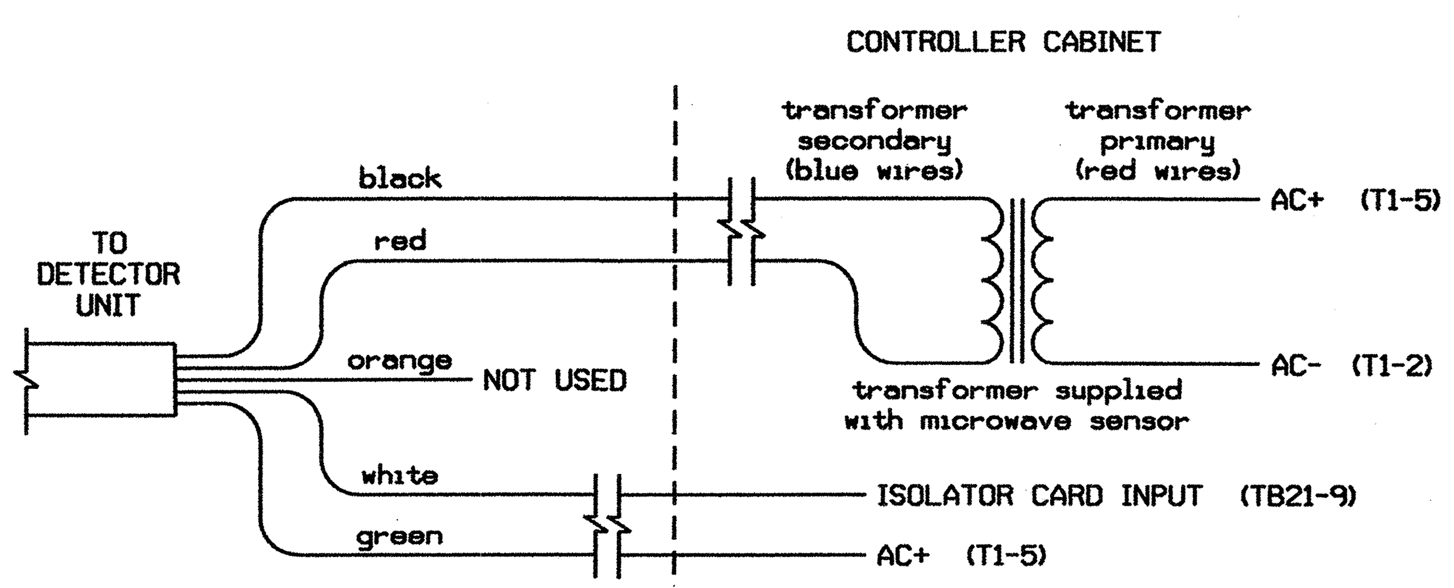
COLOR	FUNCTION
black	12V to 24V AC/DC (no polarity)
red	12V to 24V AC/DC (no polarity)
orange	Output Relay Normally Open
white	Output Relay Normally Closed
green	Output Relay Common

NOTES:

1. Sensor is a Microwave Sensors, Inc. Model TC-26B microwave motion detector mounted on poles as indicated on the Signal Design Plans.
2. Configure AC isolator card to place call upon removal of AC+ from the input.
3. Important: For proper operation of the microwave detector, remove surge protection from TB21-7 and TB21-8. Tie TB21-8 to AC neutral.

MICROWAVE DETECTOR '5A' WIRING DETAIL

(wire as shown)



TC26B WIRE LIST

COLOR	FUNCTION
black	12V to 24V AC/DC (no polarity)
red	12V to 24V AC/DC (no polarity)
orange	Output Relay Normally Open
white	Output Relay Normally Closed
green	Output Relay Common

NOTES:

1. Sensor is a Microwave Sensors, Inc. Model TC-26B microwave motion detector mounted on poles as indicated on the Signal Design Plans.
2. Configure AC isolator card to place call upon removal of AC+ from the input.
3. Important: For proper operation of the microwave detector, remove surge protection from TB21-9 and TB21-10. Tie TB21-10 to AC neutral.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Act Logic Commands 1 and 2.
2. From Main Menu press '6' (Outputs), then '3' (Logical I/O Processor).
3. The programming shown below is necessary for signals to operate as shown on the signal design plans.

```
 LOGICAL I/O COMMAND #1   (+/-COMMAND#)
IF   ACTIVE PHASE       #2    IS ON
OR   ACTIVE PHASE       #3    IS ON
OR   ACTIVE PHASE       #4    IS ON
OR   ACTIVE PHASE       #5    IS ON
OR   ACTIVE PHASE       #6    IS ON

              SCROLL DOWN

THEN:
SET  INPUT ASSIGNMENT  #12  ON
```

PRESS '+'

```
 LOGICAL I/O COMMAND #2   (+/-COMMAND#)
IF   ACTIVE PHASE       #8    IS ON

              SCROLL DOWN

THEN:
SET  INPUT ASSIGNMENT  #12  OFF
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

NOTE: INPUT 12 IS THE DEFAULT DETECTOR (DETECTOR 28) FOR PHASE 8.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1398T2
DESIGNED: October 2006
SEALED: 11/02/06
REVISED: N/A

New Installation - Temporary Design 2 - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1320 (Roaring Fork Rd)
at
Bridge #338

Division 11 | Ashe County | Near Hemlock

PLAN DATE: October 2006 | 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 11/6/06
SIGNATURE DATE

SIG. INVENTORY NO. 11-1398T2

06-NOV-2006 13:47
s:\its signals\workgroups\sig man\strickland\11398t2_sm_ele_xxx.dgn
cestrickland