

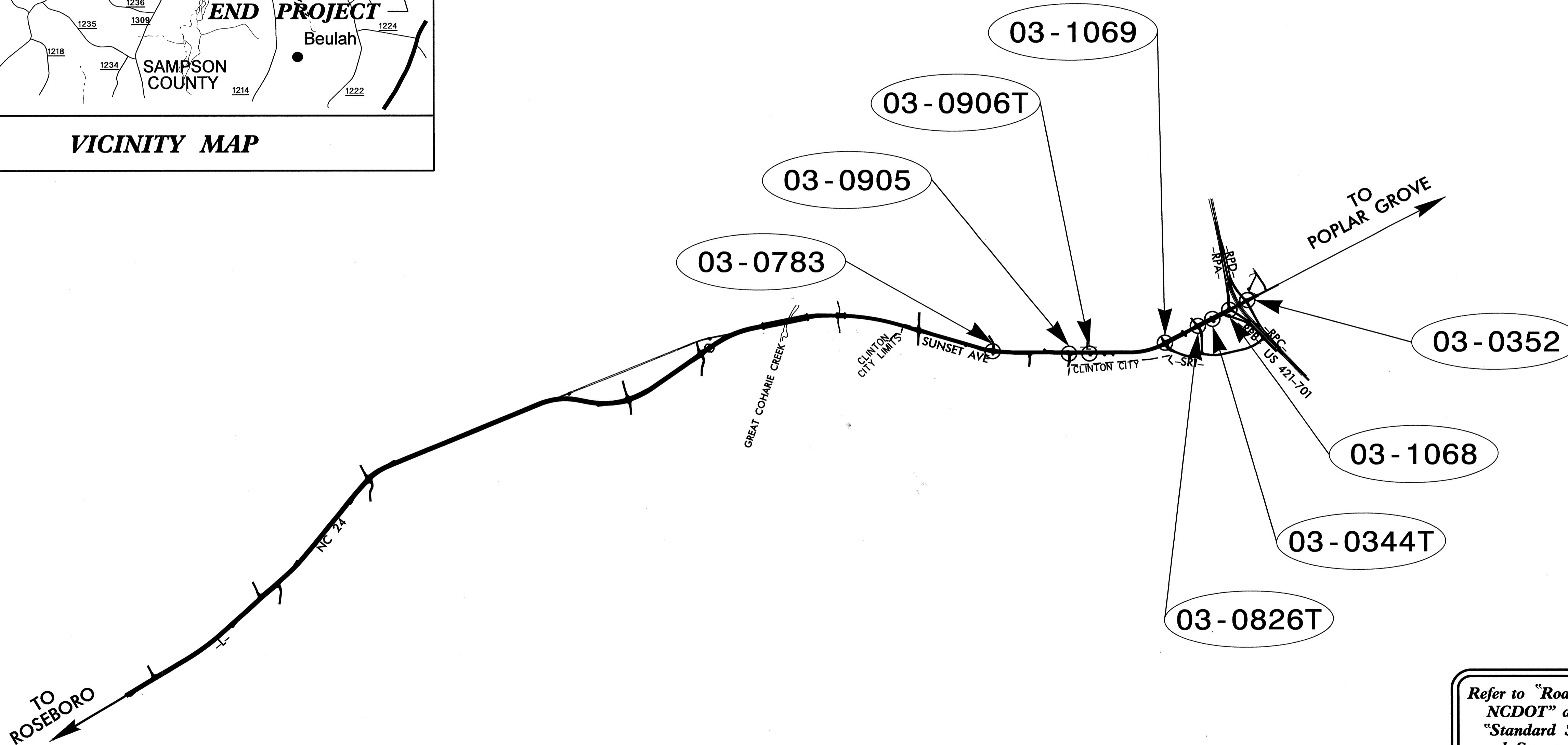
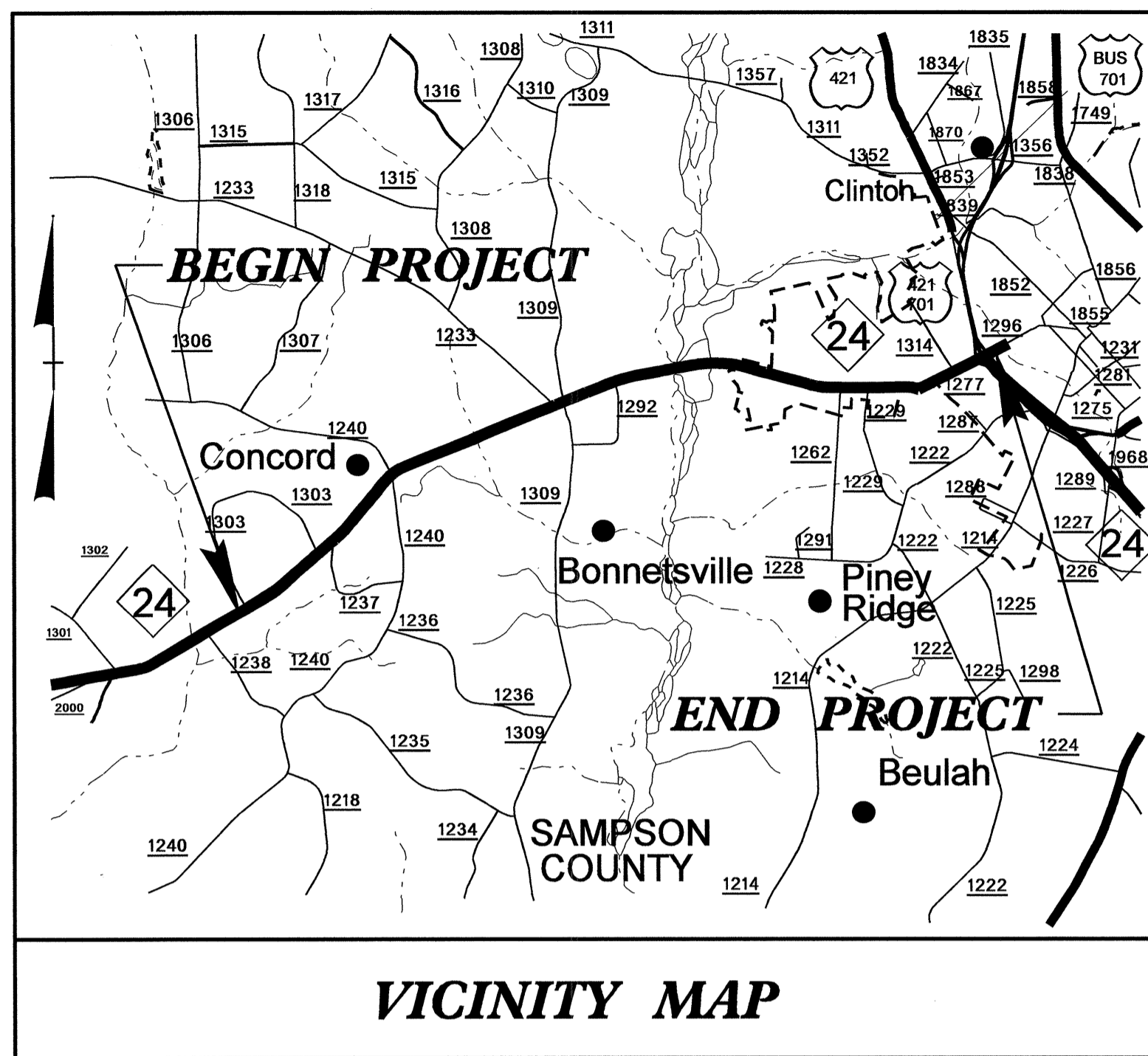
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SAMPSON COUNTY

**LOCATION: NC 24 FROM SR 1303 (MITCHELL LOOP ROAD)
TO US 421-701/SR 1296 (SUNSET AVENUE)**
TYPE OF WORK: TRAFFIC SIGNALS.



TIP PROJECT: R-2303D



Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.

Sheet #	Reference #	Location/Description
Index of Plans		
<i>Title Sheet</i>		
Sig. 1		NC 24 (Sunset Avenue) at Forest Drive/Sampson Community College
Sig. 2-15	03-0783	NC 24 (Sunset Avenue) at SR 1229 (Overland Road)
Sig. 16-20	03-0905	NC 24 (Sunset Avenue) at Sampson Crossing/Bojangles'
Sig. 21-22	03-0906T	NC 24 (Sunset Avenue) at Pierce Street/Service Road
Sig. 23-30	03-1069	NC 24 (Sunset Avenue) at Shamrock Plaza Entrance/KFC Entrance
Sig. 31-32	03-0826T	NC 24 (Sunset Avenue) at Shield Street/Coharie Plaza
Sig. 33-34	03-0344T	NC 24 (Sunset Avenue) at US 421-701 SB Ramps
Sig. 35-39	03-1068	NC 24/SR 1296 (Sunset Avenue) at US 421-701 NC 24 NB Ramp
Sig. 40-49	03-0352	Standard Drawings for Metal Poles
Sig. 50-54	N/A	Communications Cable and Conduit Routing Plans
Sig. 55-67	N/A	

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Jason P. Galloway, PE - Eastern Region Signals Project Engineer
George C. Brown, PE - Signal Equipment Design Engineer
Greg Fuller, PE - State ITS and Signals Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY
BRANCH

750 N. Greenfield Parkway, Garner, NC 27529

24-APR-2013 14:10 R:\Traffic\Signals\Design\TIP\sheet\R-2303D_rdy_tsh.dgn

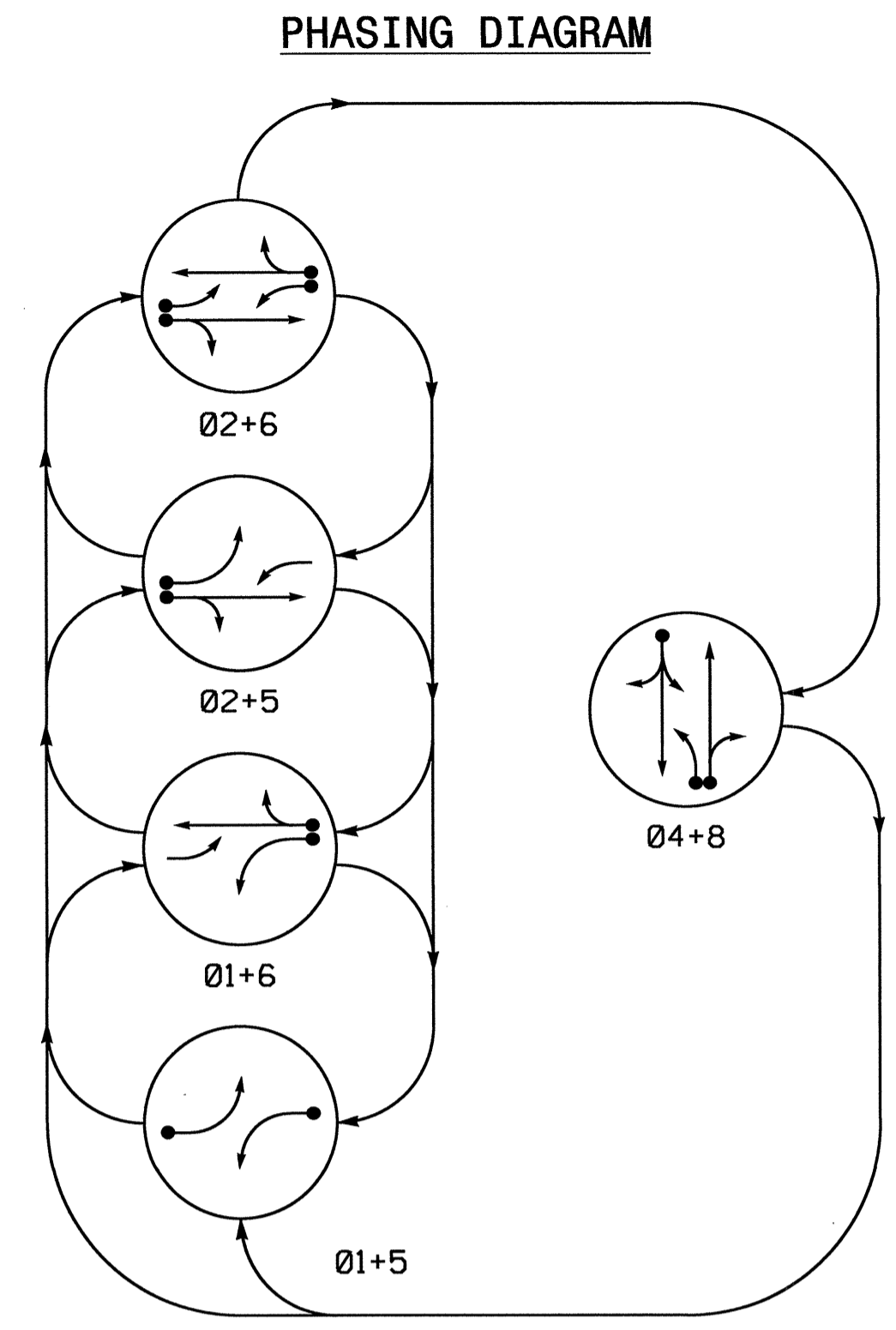
5 Phase Fully Actuated NC 24 (Sunset Avenue) CLS

NOTES

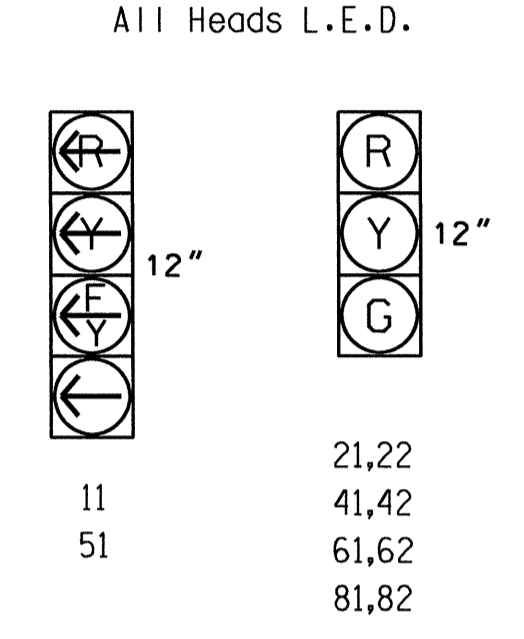
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data: Master Asset #10302. Controller Asset #0783.

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	F LASH
11	←	←	←	←	←	←
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	←	←	←	←	←
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R

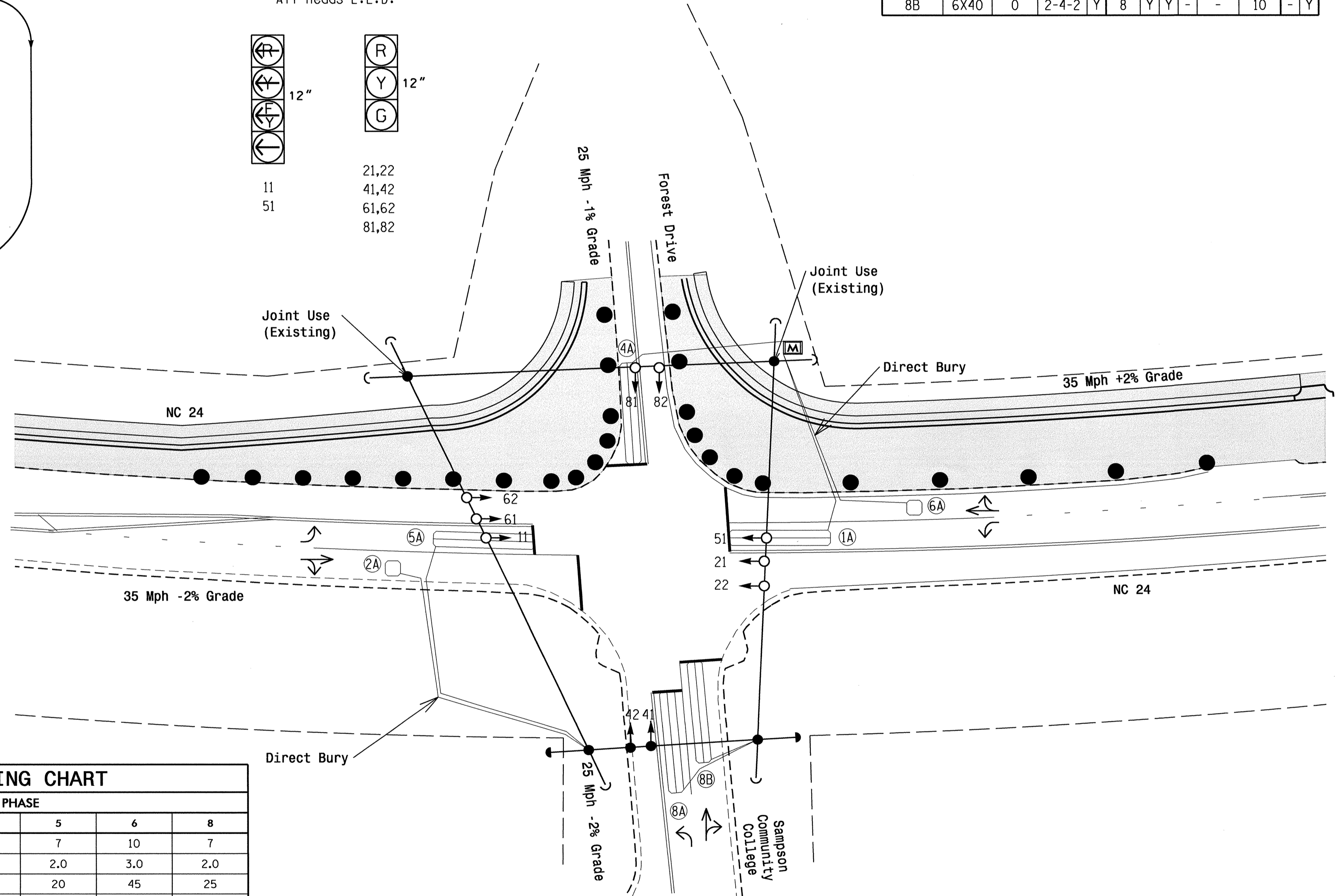


SIGNAL FACE I.D.



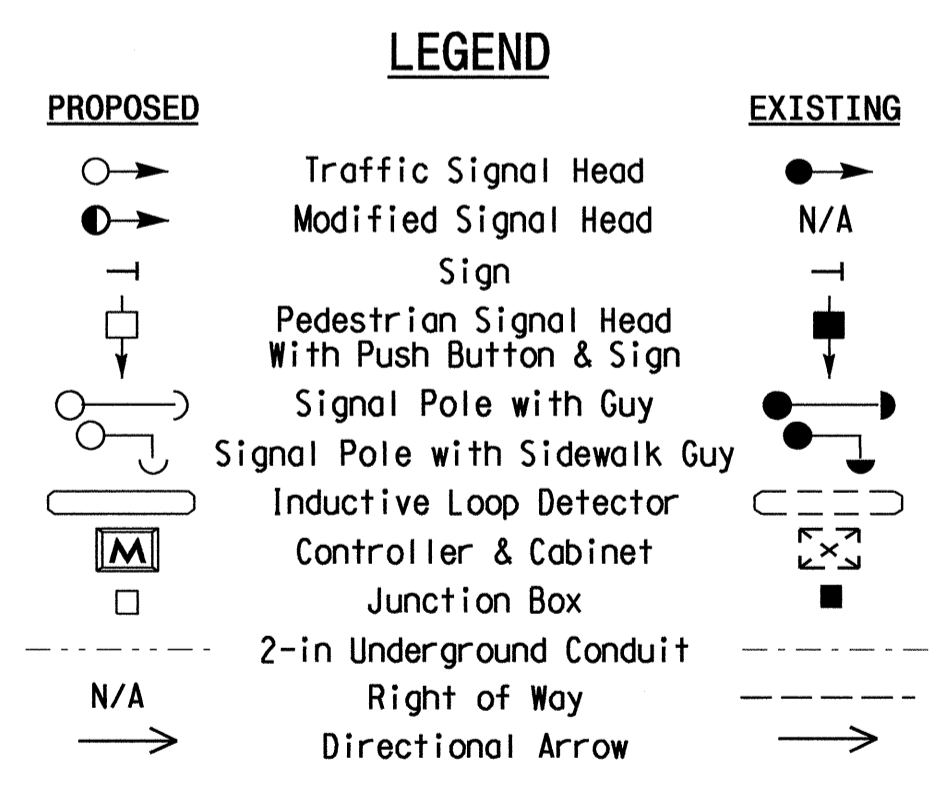
PHASING DIAGRAM DETECTION LEGEND

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



FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1*	7	10	7	7	10	7
Extension 1*	2.0	3.0	2.0	2.0	3.0	2.0
Max Green 1*	20	45	25	20	45	25
Yellow Clearance	3.0	4.0	3.2	3.0	4.0	3.3
Red Clearance	1.9	1.2	1.7	1.8	1.2	2.3
Walk 1*	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation*	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-
Time To Reduce*	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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



Signal Upgrade Temp. (Phase II)

Prepared in the Offices of:
TRANSPORTATION MOBILITY AND SAFETY DIVISION
STATE OF NORTH CAROLINA
SIGNAL DESIGN SECTION
750 N. Greenfield Pkwy, Garner, NC 27529

NC 24 At Forest Drive/ Sampson Community College
Division 3 Sampson County Clinton

PLAN DATE: January 2013 REVIEWED BY: J. P. Galloway
PREPARED BY: I. O. Umozurike REVIEWED BY:

SCALE: 1" = 30'

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904
JASON R. GALLOWAY
DATE: 4/23/13
SIGNATURE: [Signature] DATE: 4/23/13

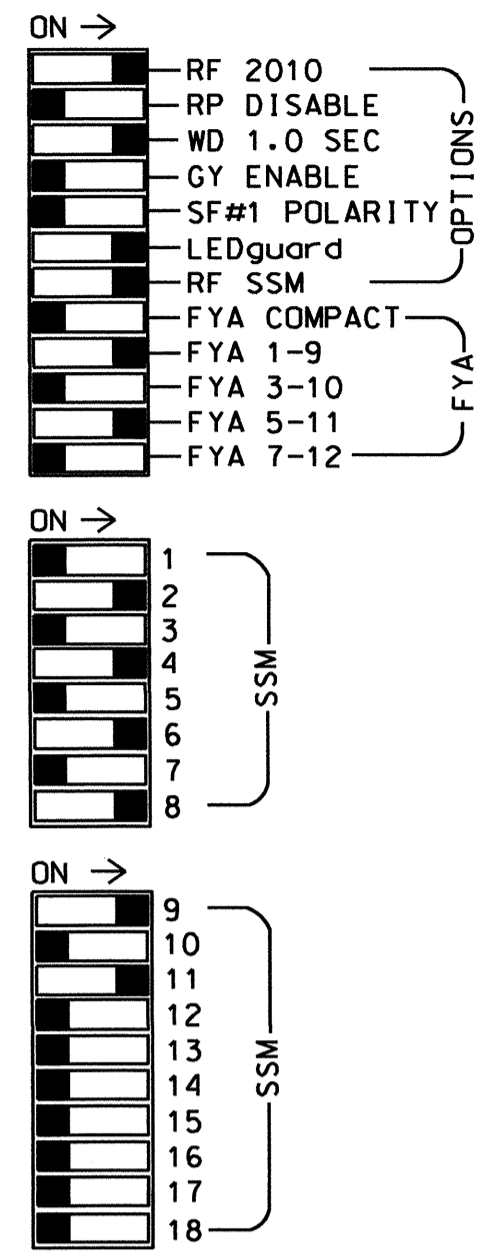
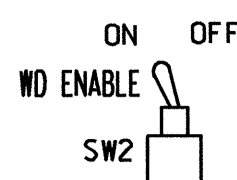
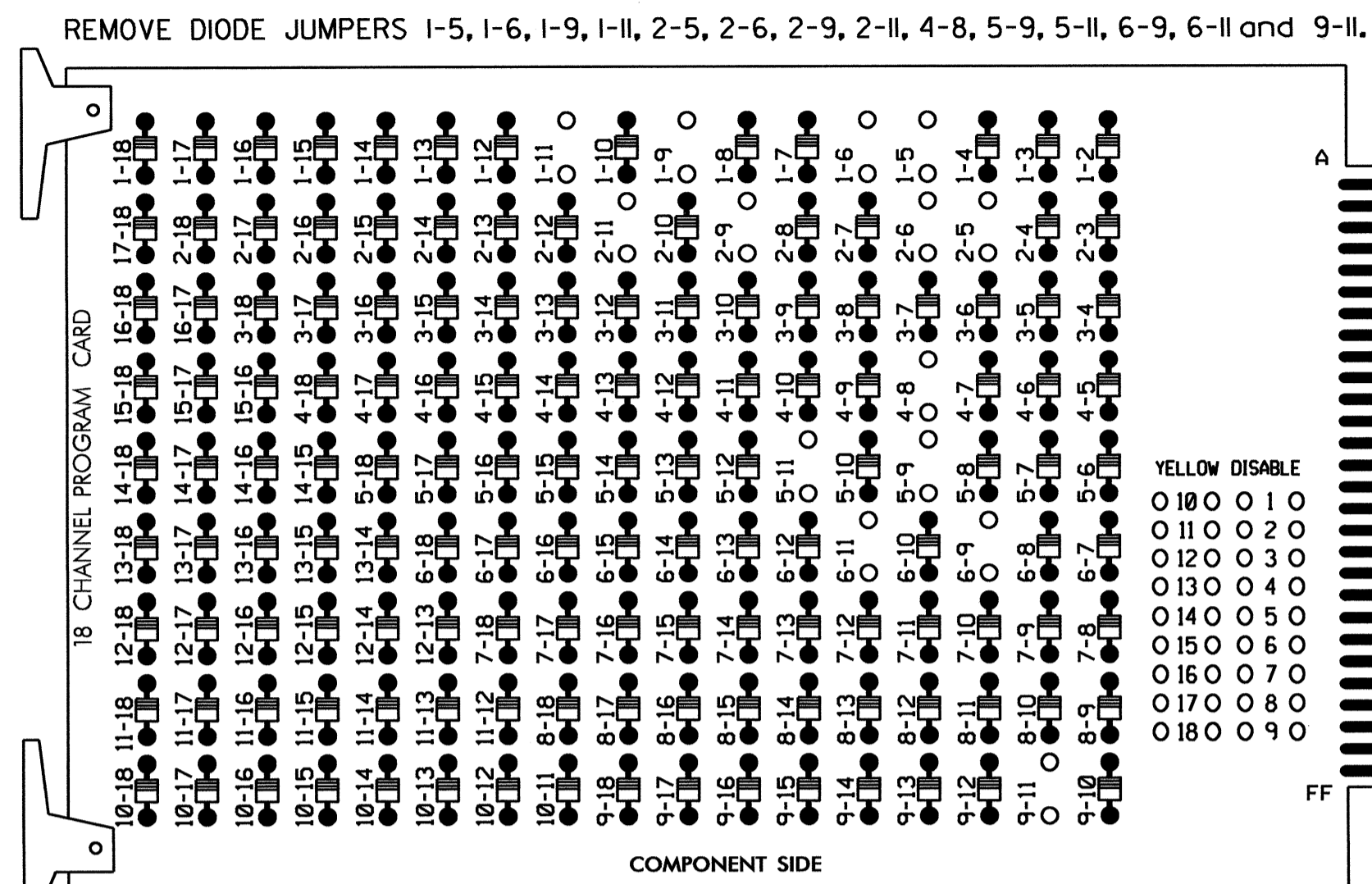
SIG. INVENTORY NO. 03-078311

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I:\gallloway

EDI MODEL 2018ECL-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.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1,AUX S4
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

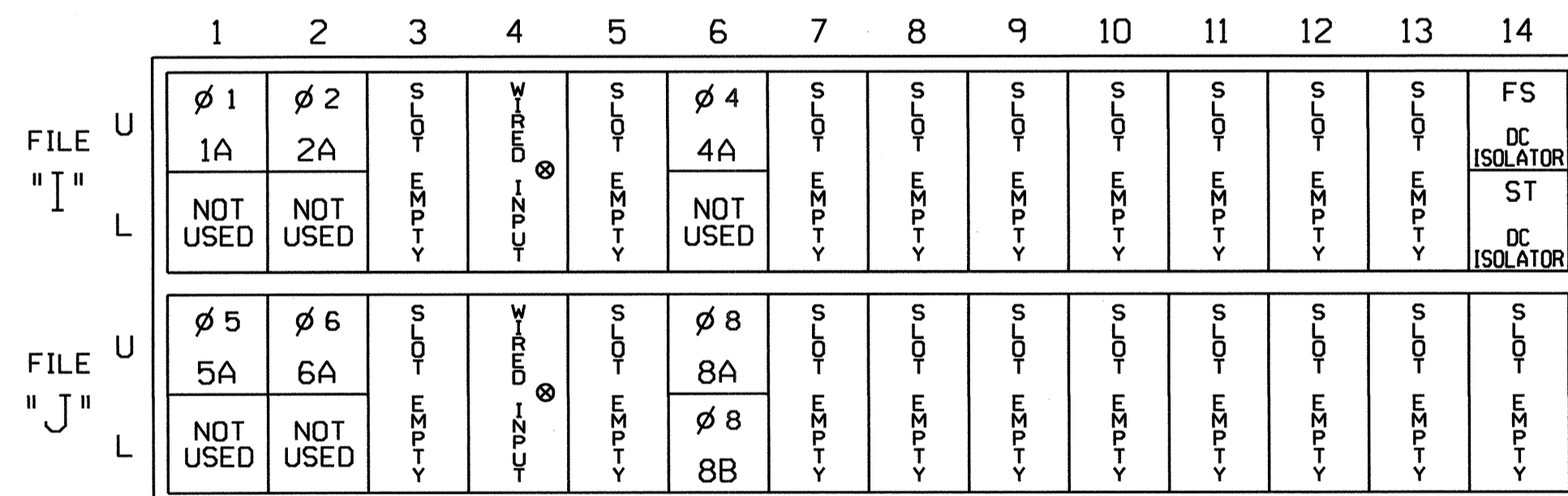
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121				A114	
YELLOW ARROW													A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127							133										

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

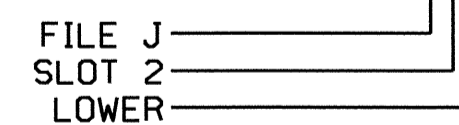
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

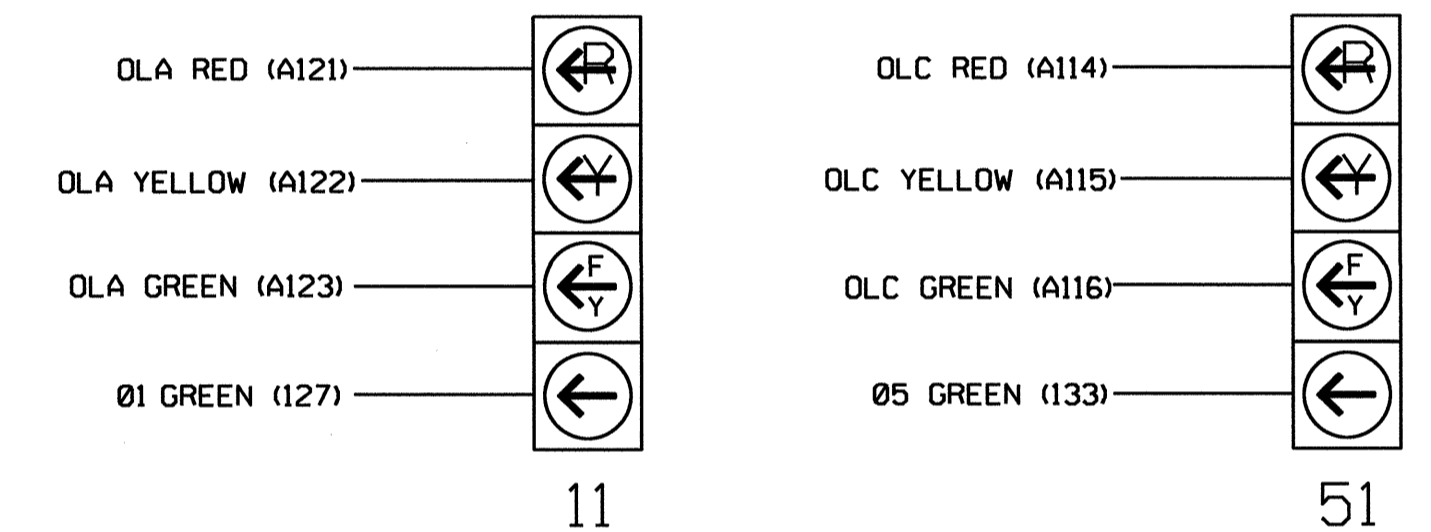
- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

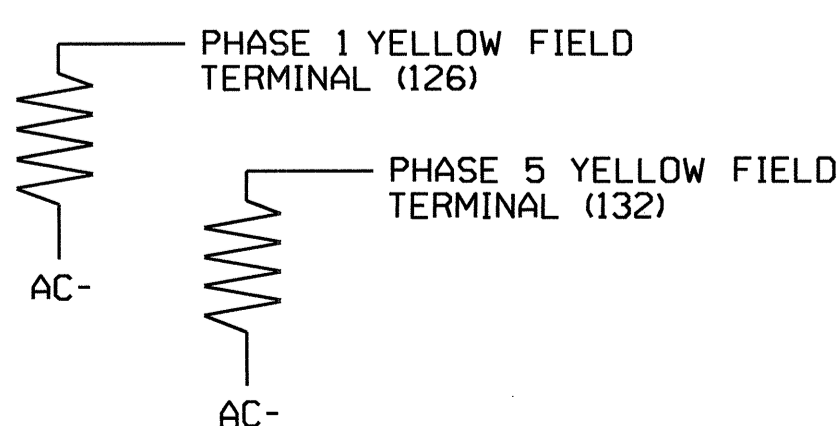
- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0783T1
 DESIGNED: January 2013
 SEALED: 4/23/13
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



ELECTRICAL DETAIL - TEMP1 - SHEET 1 OF 2

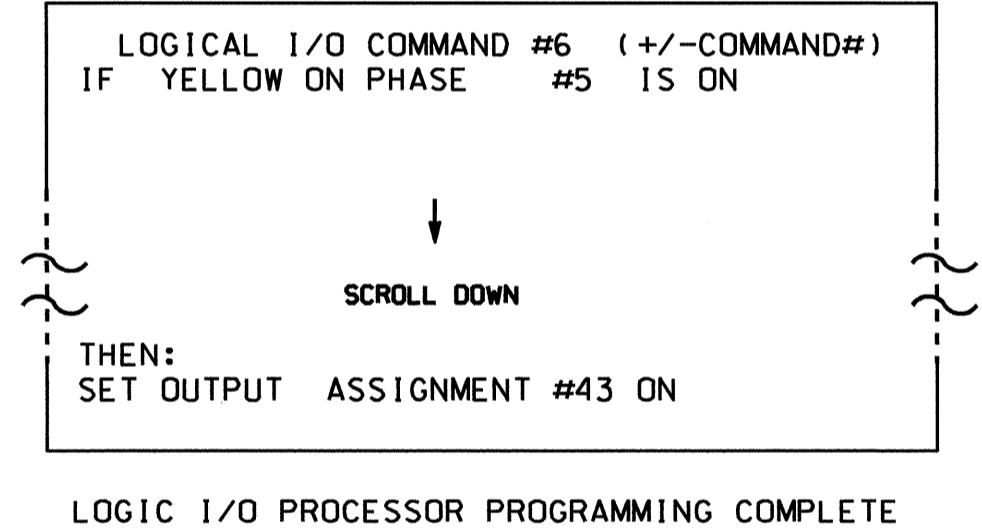
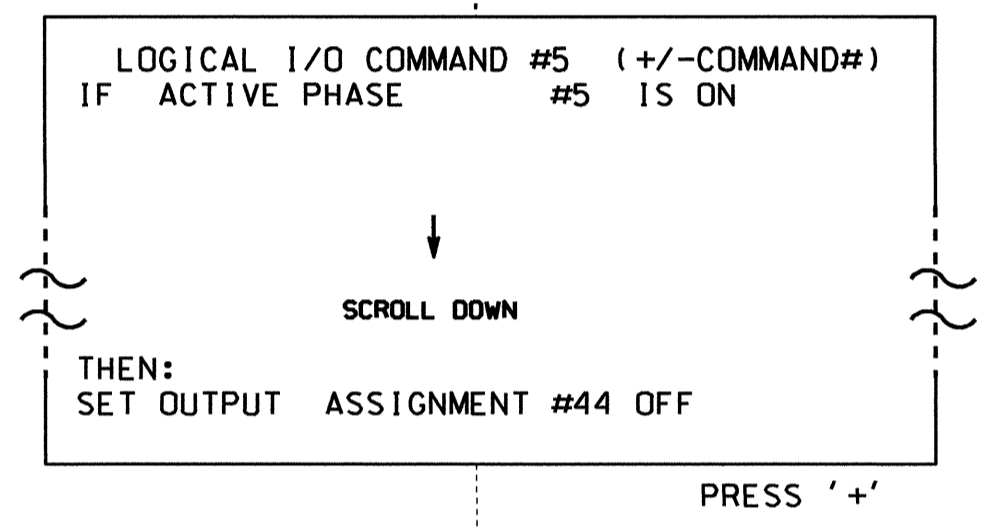
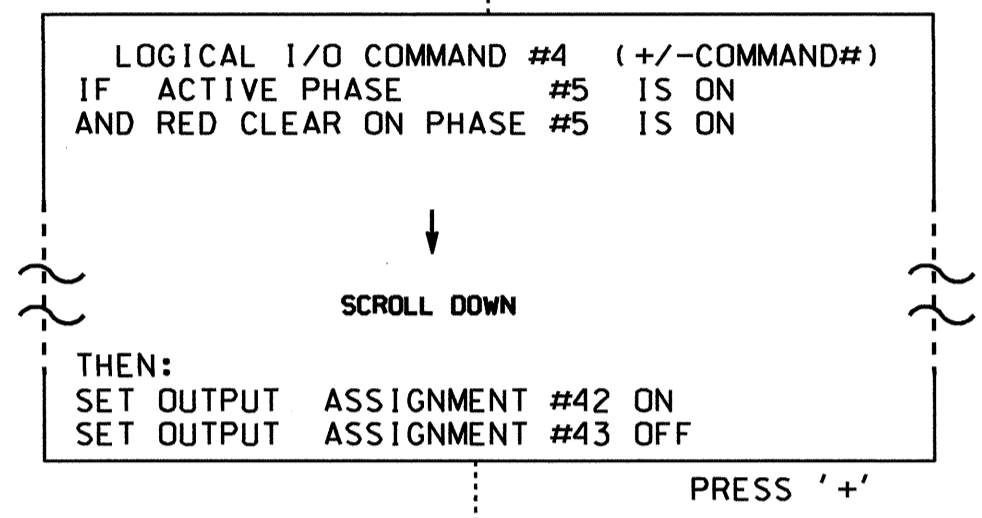
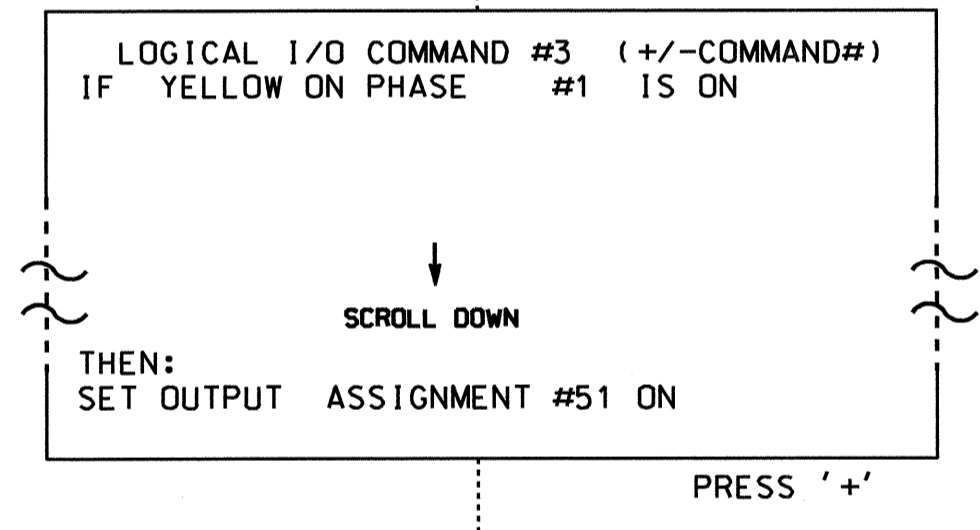
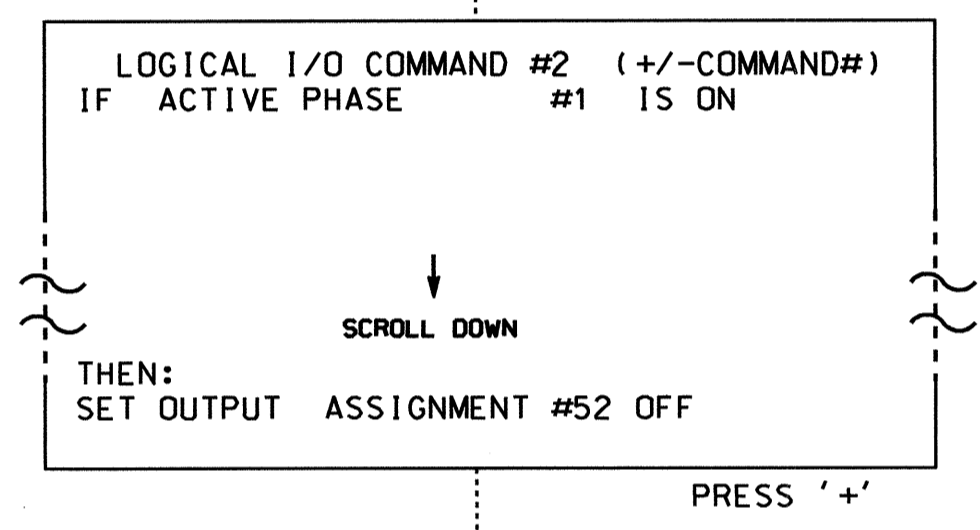
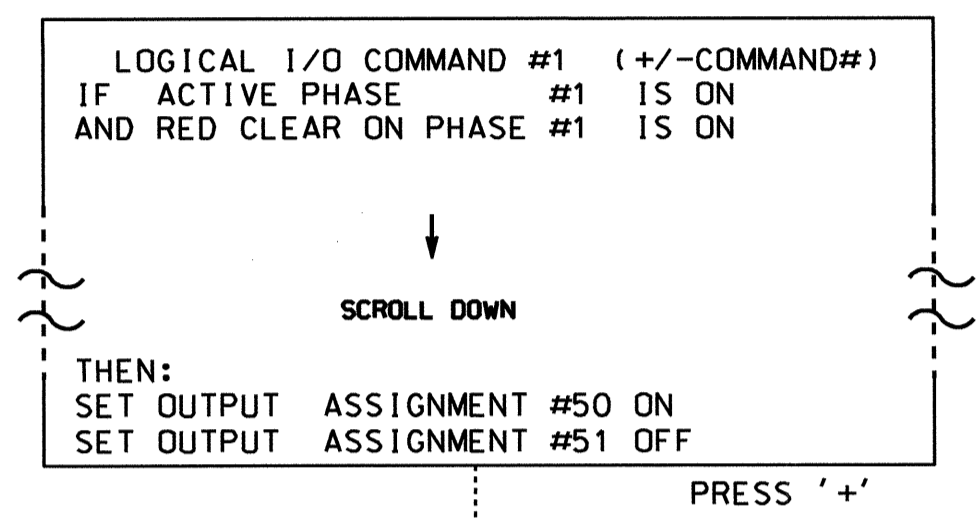
Prepared In the Offices of:

NC 24
 at
**Forest Drive/
 Sampson Community College**
 Division 3 Sampson County Clinton
 PLAN DATE: April 2013 REVIEWED BY: T. J. J...
 PREPARED BY: C. Strickland REVIEWED BY:
 REVISIONS INIT. DATE
 SIGNATURE: George C. Brown DATE: 4/24/13
 SIG. INVENTORY NO. 03-0783T1

**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

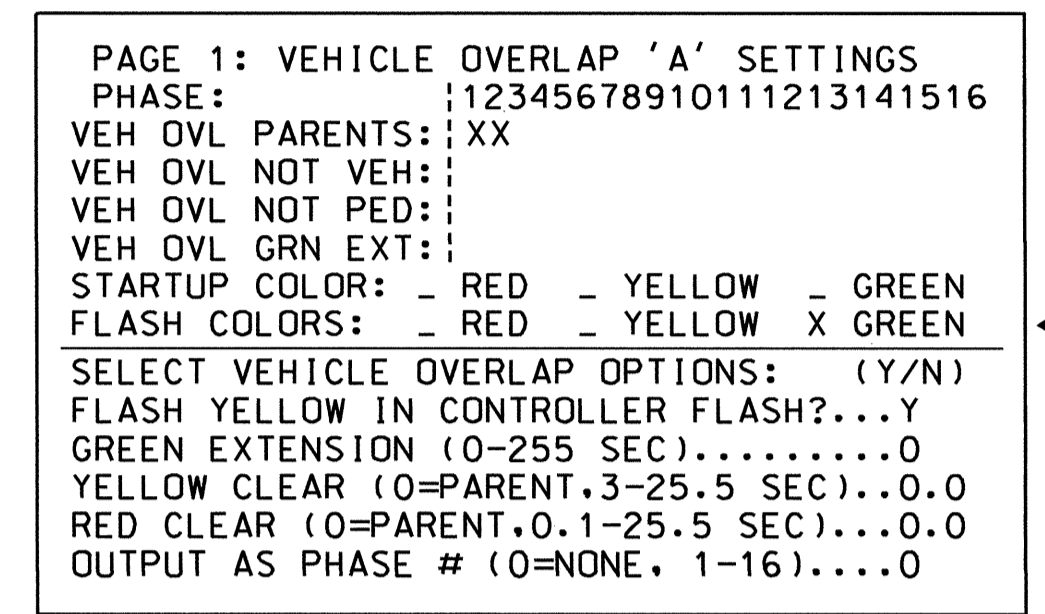
OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

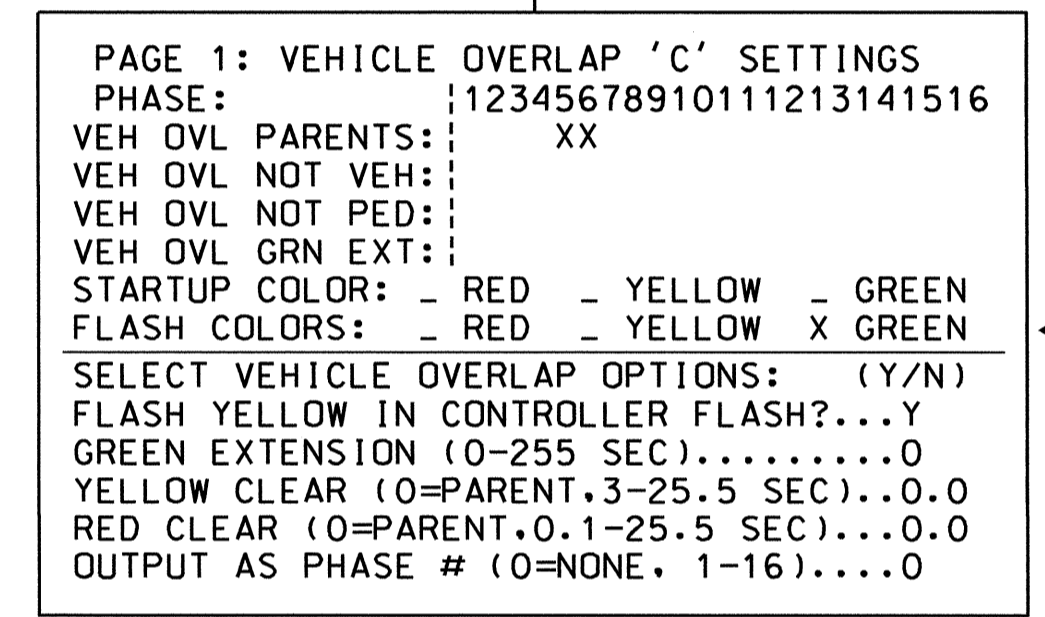
OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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



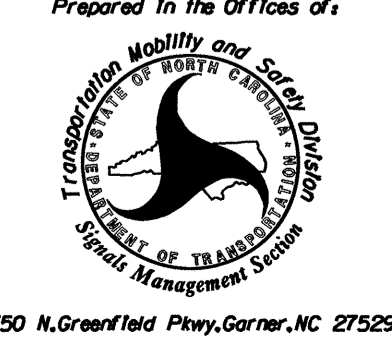
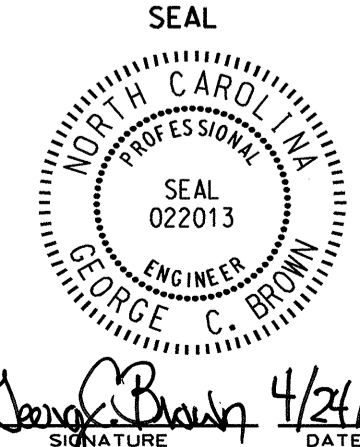
PRESS '+' TWICE



OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0783T1
DESIGNED: January 2013
SEALED: 4/23/13
REVISED: N/A

ELECTRICAL DETAIL - TEMP1 - SHEET 2 OF 2

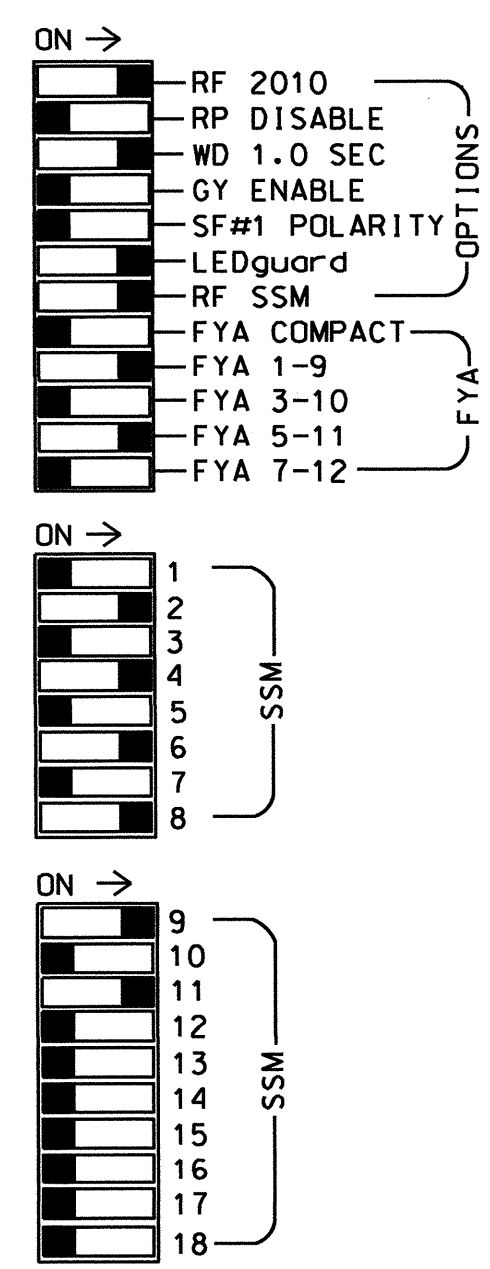
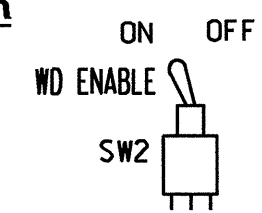
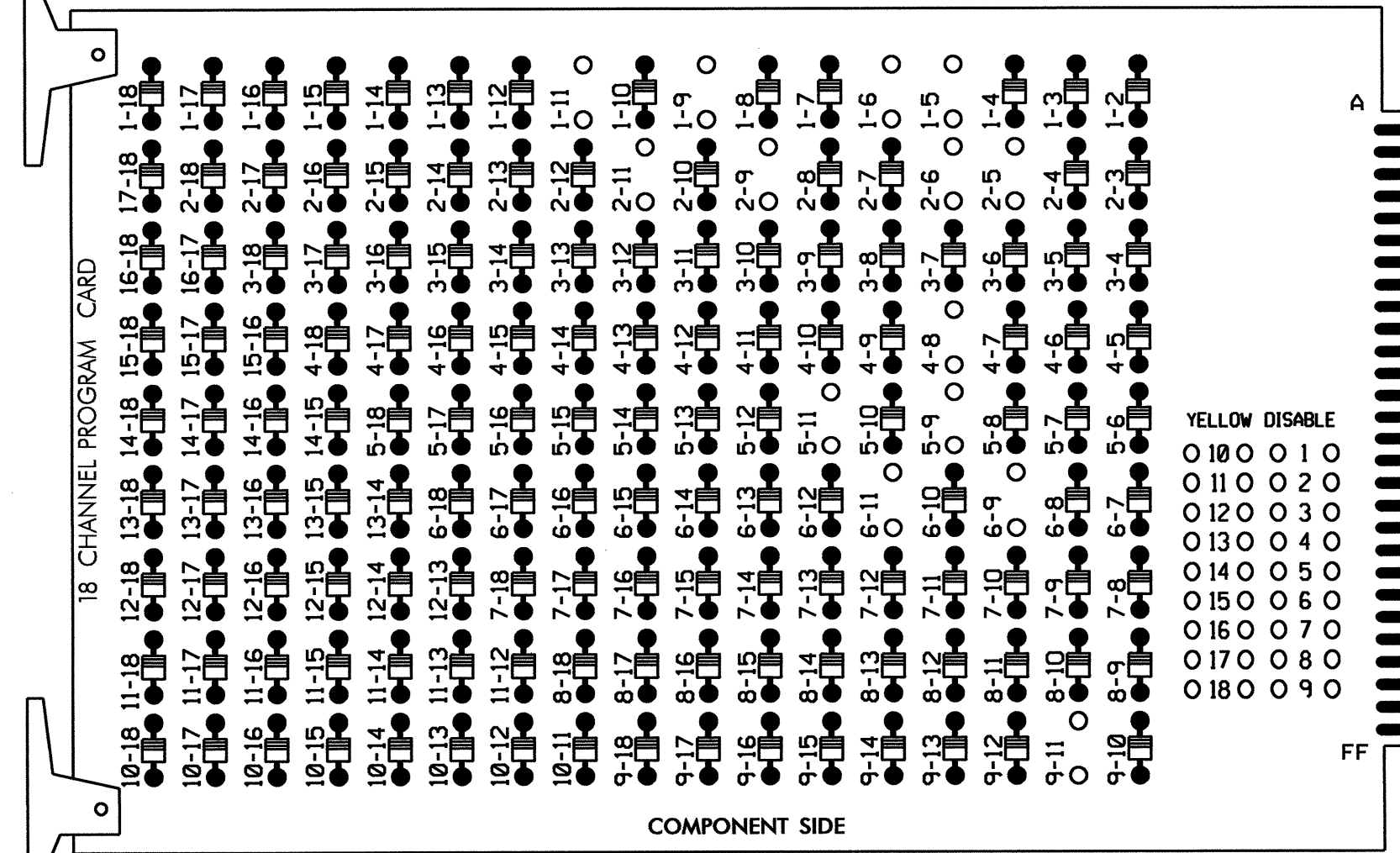
	NC 24 at Forest Drive/ Sampson Community College		
	Division 3 PLAN DATE: April 2013 PREPARED BY: C. Strickland	Sampson County REVIEWED BY: T. Jagan REVIEWED BY:	
REVISIONS			INIT. DATE SIGNATURE DATE 4/24/13

SIG. INVENTORY NO. 03-0783T1

24-Apr-2013 09:53
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EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 and 9-11.



NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

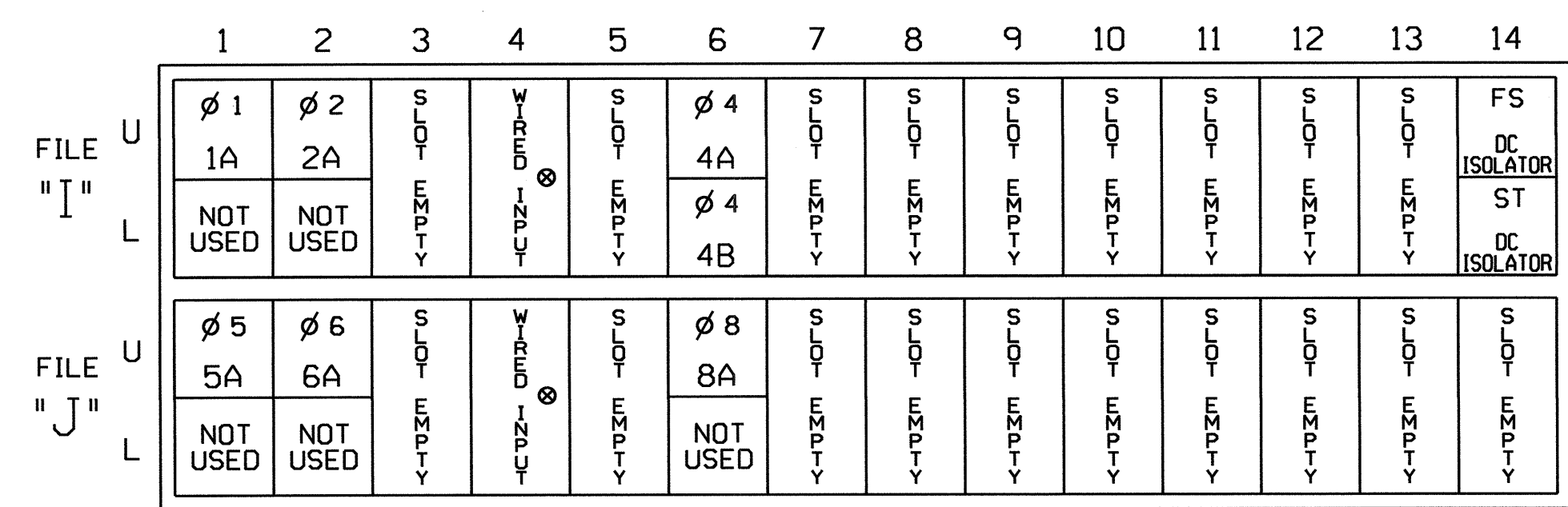
CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1,AUX S4
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127							133										

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT
(front view)

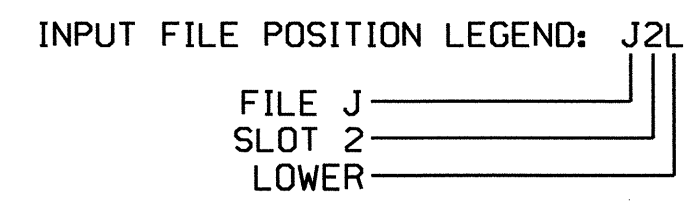


EX.: 1A, 2A, ETC. = LOOP NO.'S
 * Wired Input - Do not populate slot with detector cord

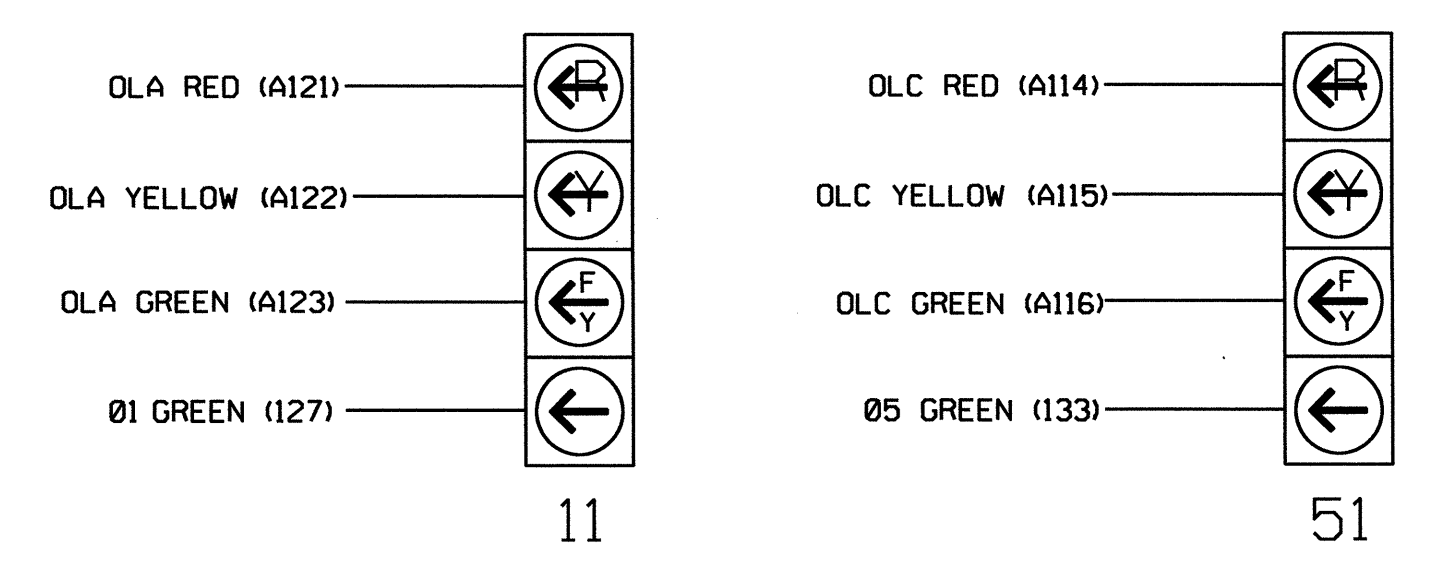
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.



4 SECTION FYA PPLT SIGNAL WIRING DETAIL
(wire signal heads as shown)

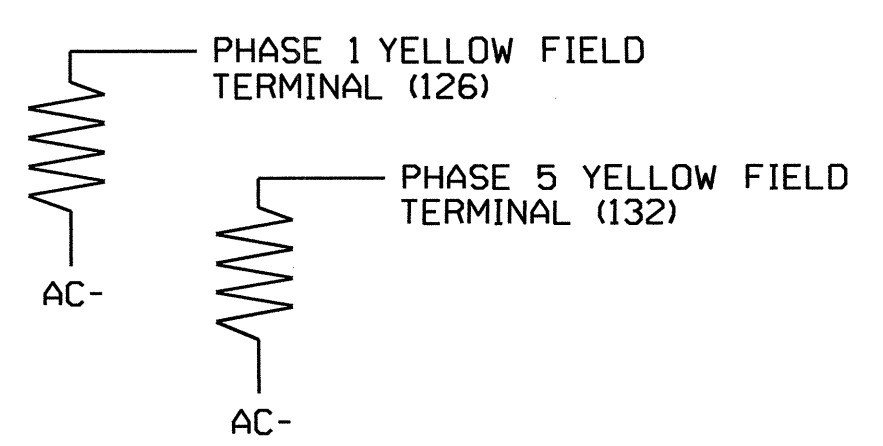


NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown below)

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



ELECTRICAL DETAIL - TEMP2 - SHEET 1 OF 2

Division 3 Sampson County Clinton

Prepared In the Offices of:

 750 N. Grant/old Hwy, Garner, NC 27529

NC 24
 at
 Forest Drive/
 Sampson Community College

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GORGE C. BROWN

PLAN DATE: April 2013 REVIEWED BY: T. J. J. J.
 PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS INIT. DATE

SIGNATURE: *George C. Brown* DATE: 4/23/13

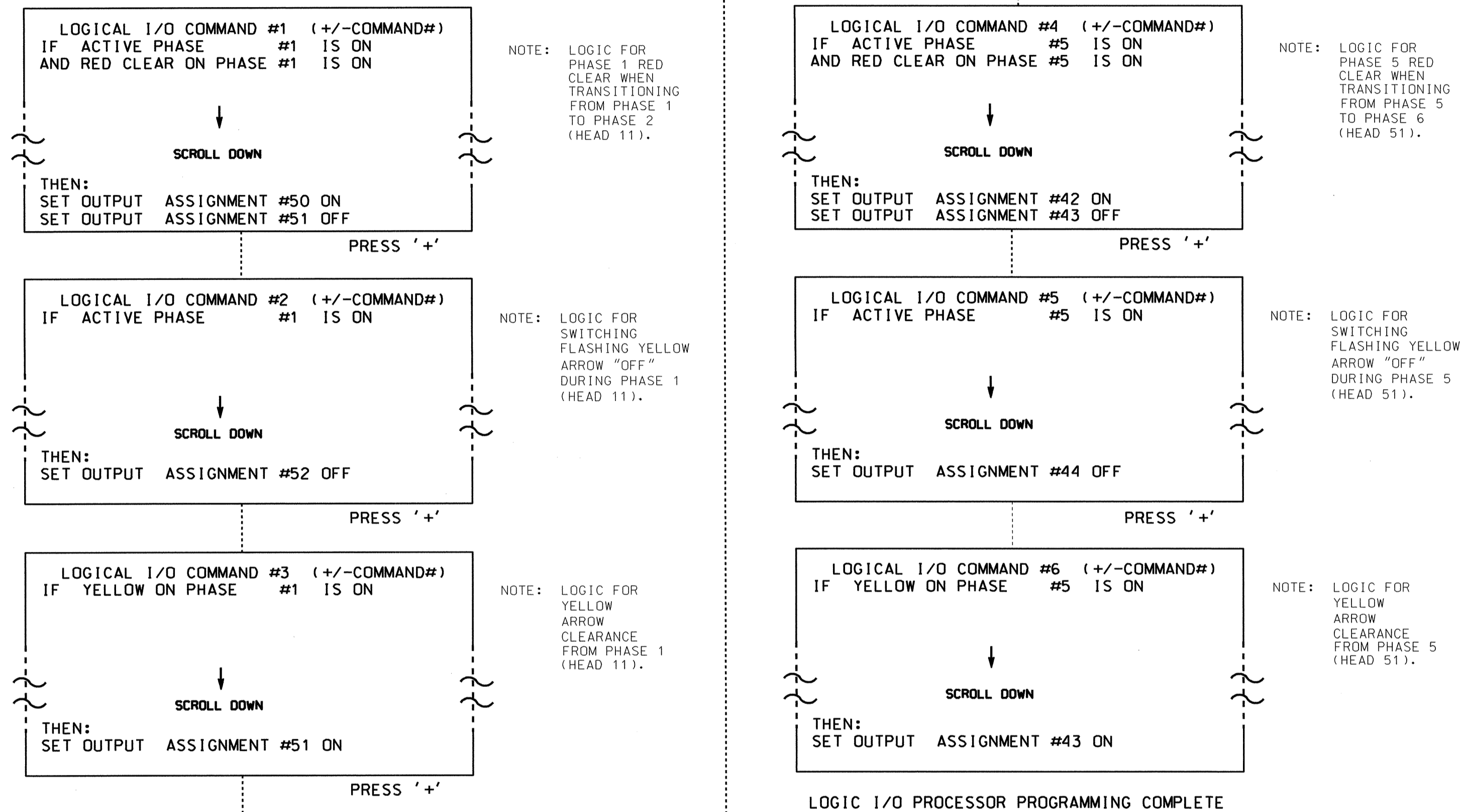
SIG. INVENTORY NO. 03-078372

24-ARR-001, 01/10
 S:\ITSS\SM\TSS\Sig\01\workgroups\sig.Mom\tr\ckl\and\030783.sm.e\e.xxx.dgn
 GAST/ckl and

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE	
OUTPUT 42	= Overlap C Red
OUTPUT 43	= Overlap C Yellow
OUTPUT 44	= Overlap C Green
OUTPUT 50	= Overlap A Red
OUTPUT 51	= Overlap A Yellow
OUTPUT 52	= Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:   _ RED  _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0
    
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:   _ RED  _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0783T2
DESIGNED: April 2013
SEALED: 4/23/13
REVISED: N/A

ELECTRICAL DETAIL - TEMP2 - SHEET 2 OF 2

	NC 24 at Forest Drive/ Sampson Community College			
	Division 3	Sampson County		Clinton
	PLAN DATE: April 2013	REVIEWED BY: T. J. J.		
	PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE	

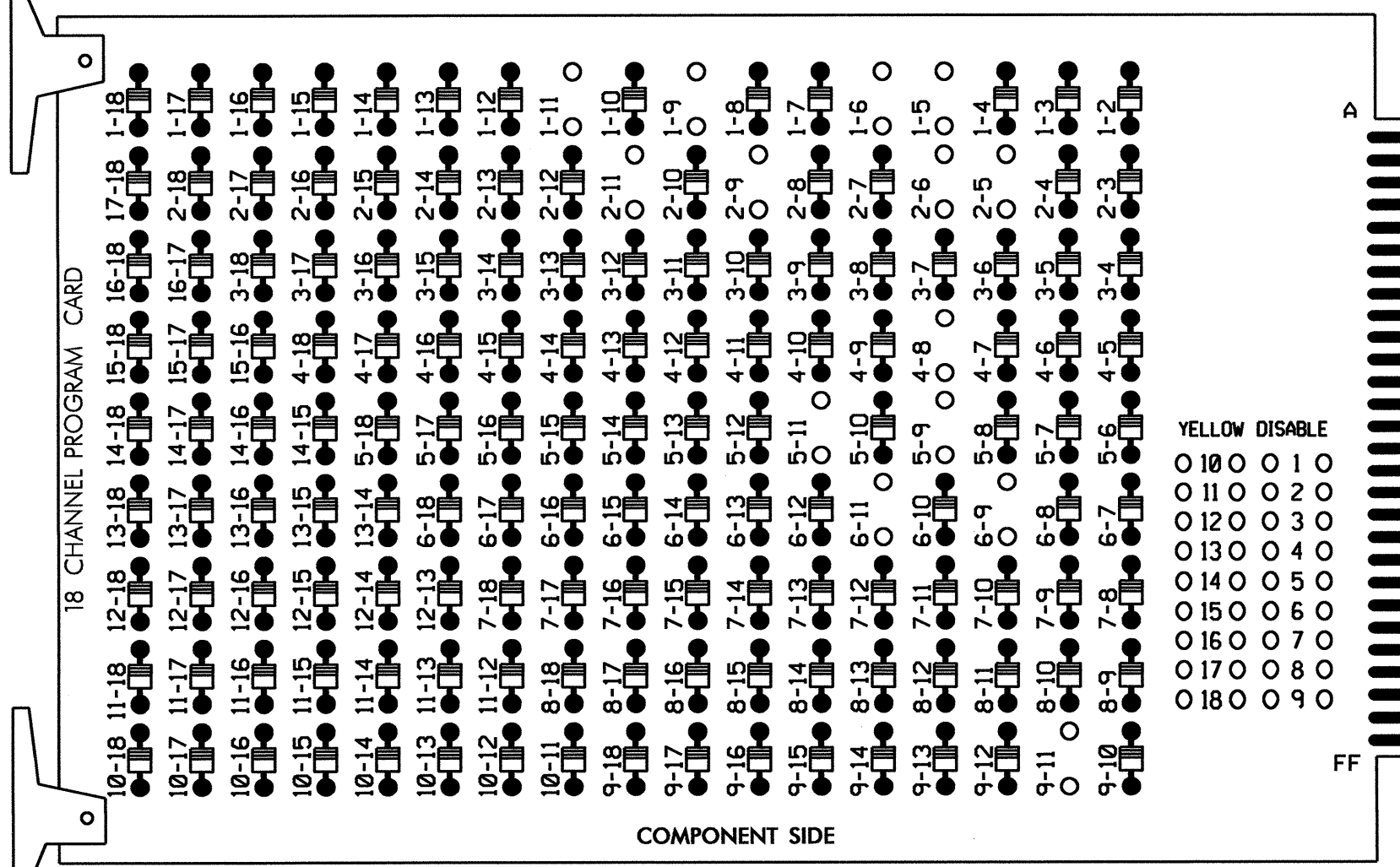
750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 03-0783T2

24-APR-2013 07:51 Signal (C:\work\projects\03-0783-001\03-0783-001.dgn)

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

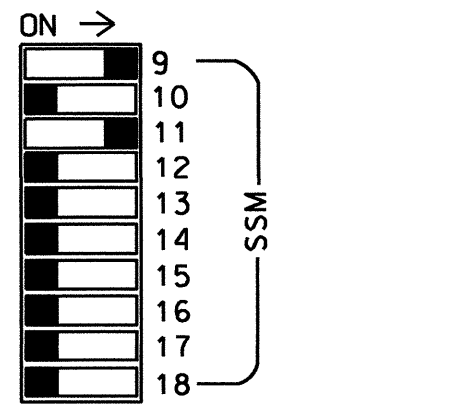
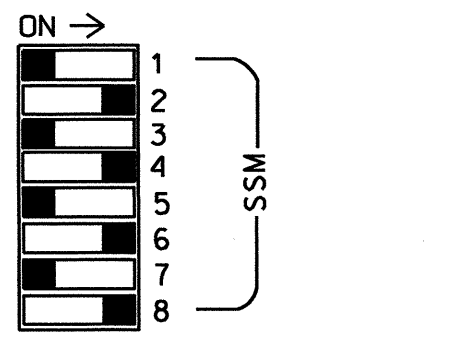
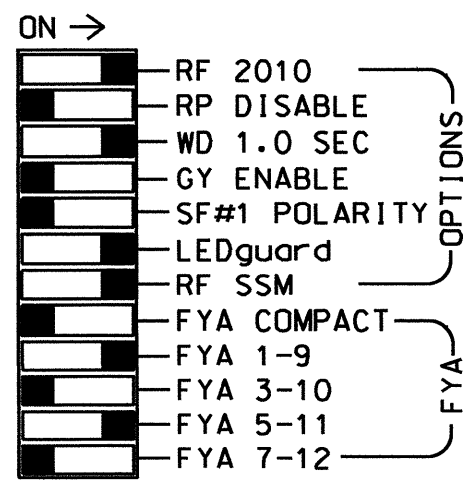
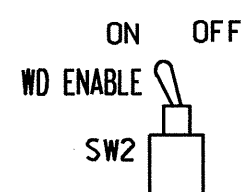
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 and 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



■ = 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.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

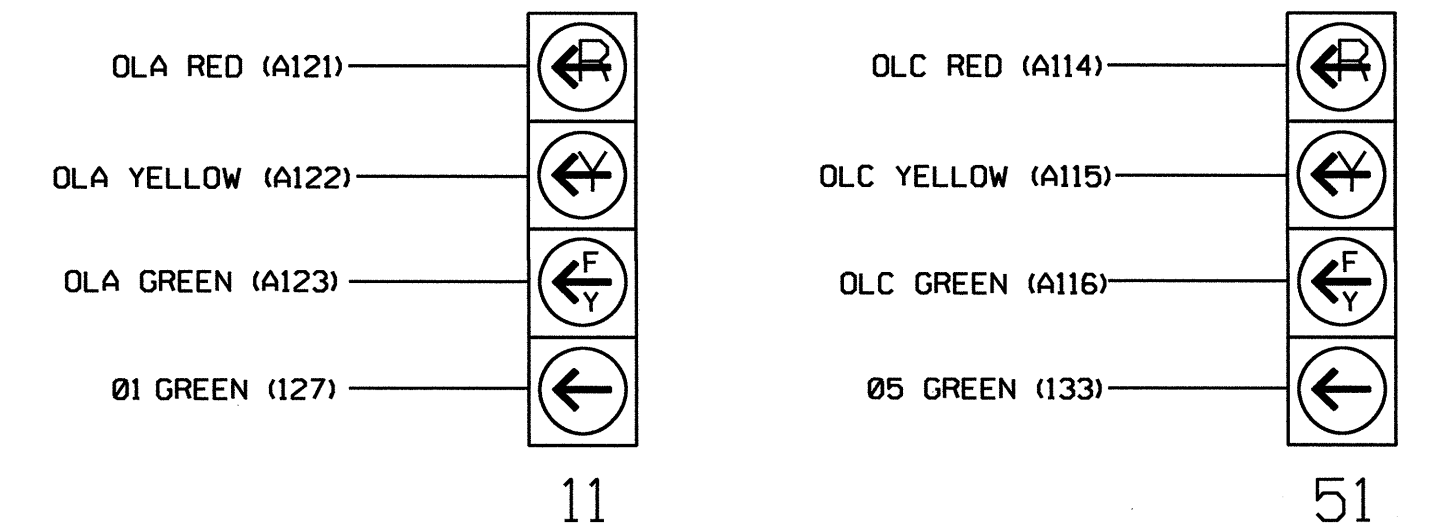
CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1,AUX S4
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127							133										

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL
(wire signal heads as shown)



NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT
(front view)

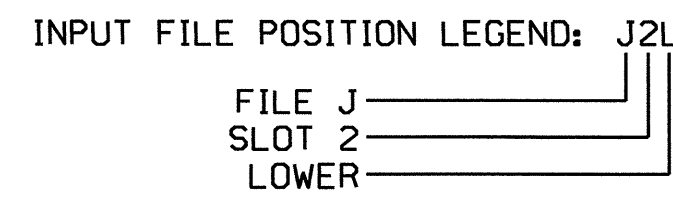
FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	S	S	S	∅ 4	S	S	S	S	S	S	S	FS
I	1A	2A	-O-S	-O-S	-O-S	4A	-O-S	-O-S	-O-S	-O-S	-O-S	-O-S	-O-S	DC ISOLATOR
L	NOT USED	NOT USED	←-V-S	←-V-S	←-V-S	4B	←-V-S	←-V-S	←-V-S	←-V-S	←-V-S	←-V-S	←-V-S	ST
U	∅ 5	∅ 6	S	S	S	∅ 8	S	S	S	S	S	S	S	S
J	5A	6A	-O-S	-O-S	-O-S	8A	-O-S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

EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card

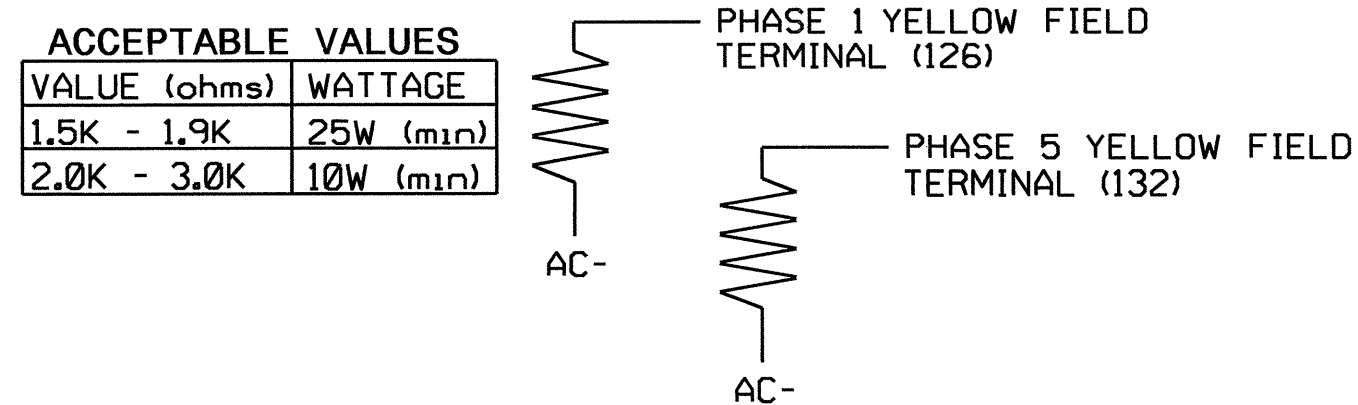
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB2-5,6	J4U	48	10	26	6	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.



LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown below)



ELECTRICAL DETAIL - TEMP3 - SHEET 1 OF 2

Electrical and Programming Details For: **NC 24 (Sunset Avenue) at Forest Drive/ Sampson Community College**

Division 3 Sampson County Clinton

Prepared In the Offices of: **Transylvania Mobility and Safety Solutions**
 750 N. Greenfield Pkwy, Garner, NC 27529

PLAN DATE: April 2013 REVIEWED BY: T. J. Jgs
 PREPARED BY: C. Strickland REVIEWED BY:

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

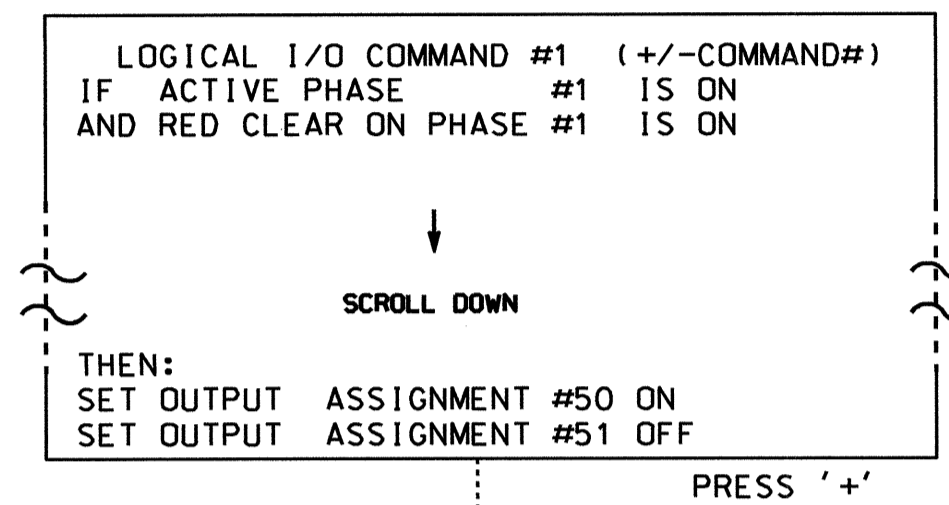
SIGNATURE: *George C. Brown* DATE: 4/24/13

SIG. INVENTORY NO. 03-078313

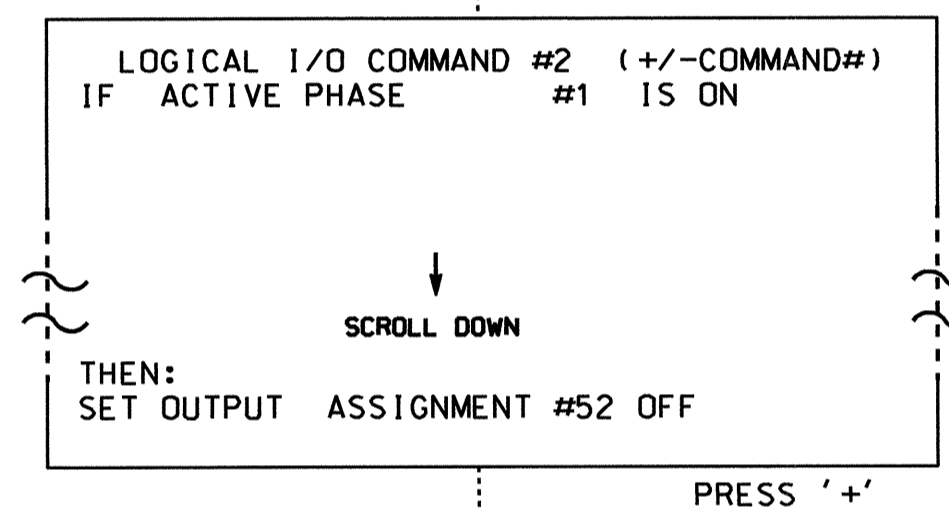
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

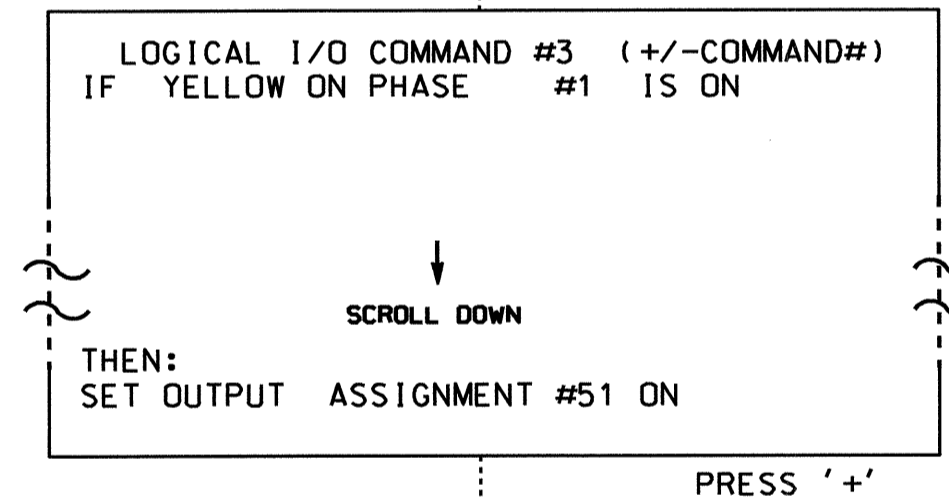
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



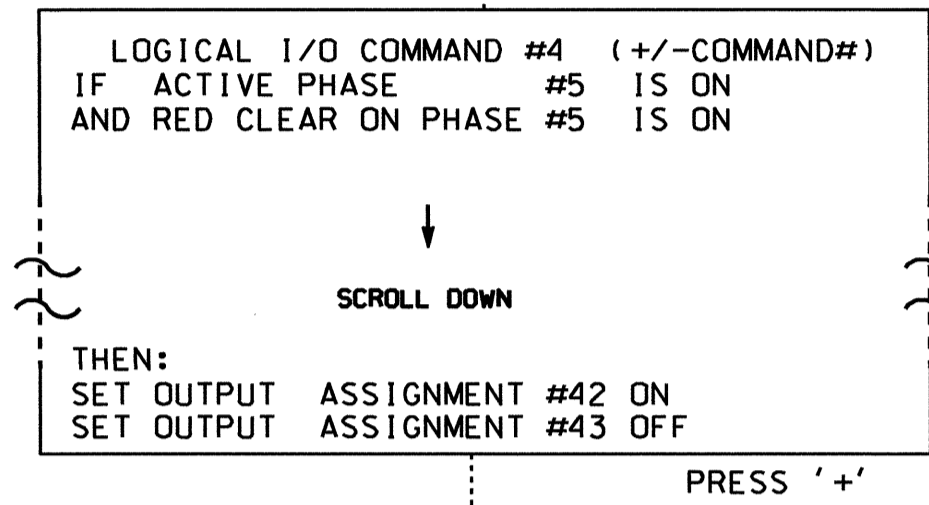
NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



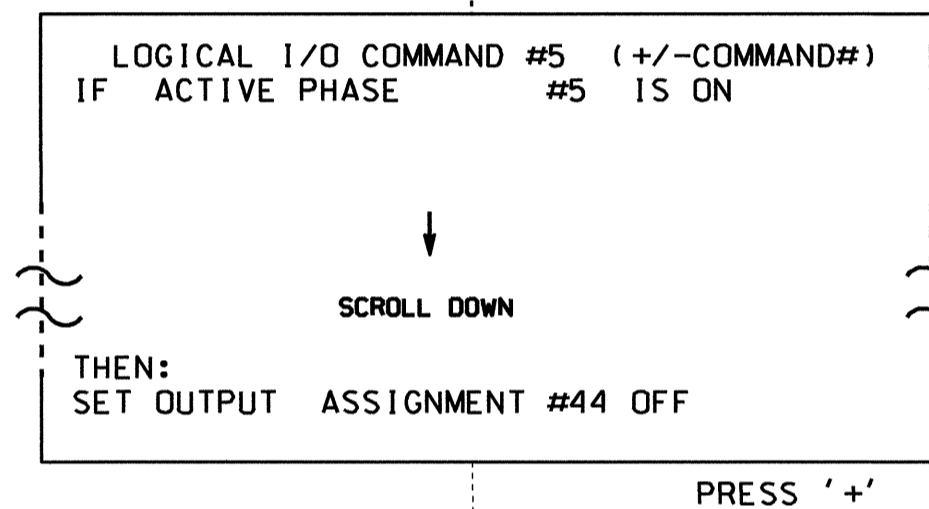
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).



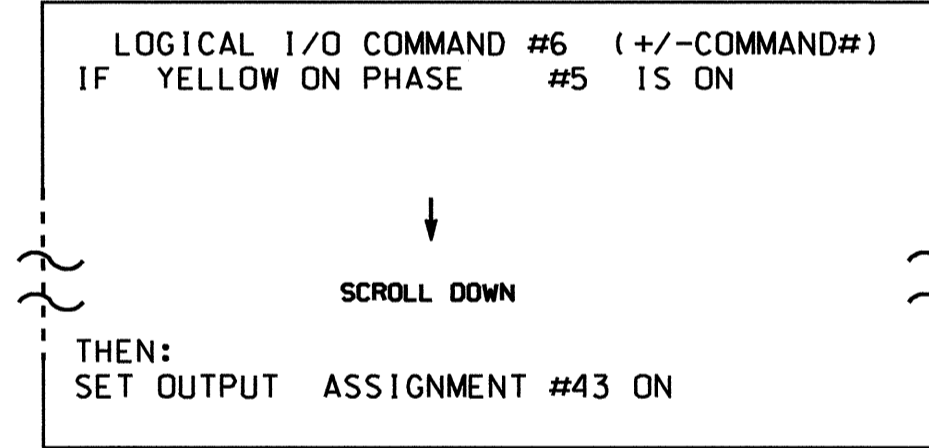
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).



NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE


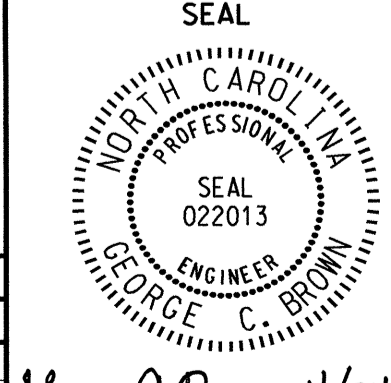
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0783T3
DESIGNED: January 2013
SEALED: 4/23/13
REVISED: N/A

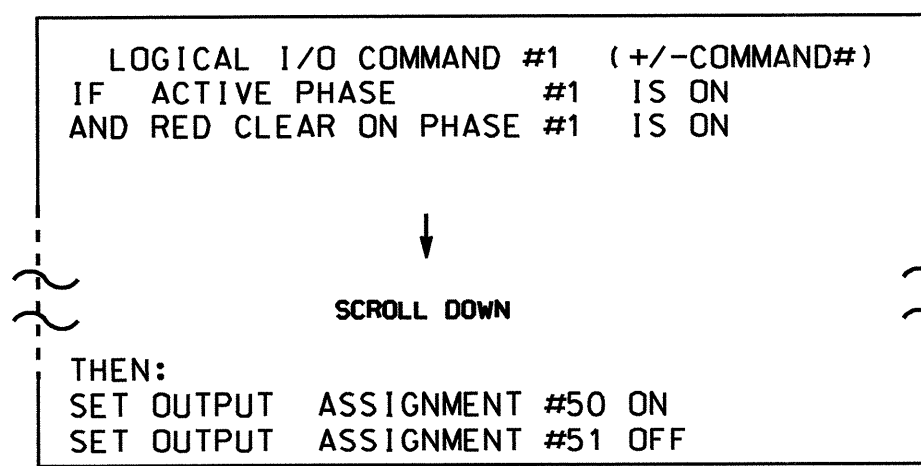
ELECTRICAL DETAIL - TEMP3 - SHEET 2 OF 2

<p>Prepared In the Offices of:</p>  <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 24 (Sunset Avenue) at Forest Drive/ Sampson Community College</p> <p>Division 3 Sampson County Clinton</p> <p>PLAN DATE: April 2013 REVIEWED BY: T. J. Jm</p> <p>PREPARED BY: C. Strickland REVIEWED BY:</p>	<p>SEAL</p>  <p>4/24/13</p> <p>SIG. INVENTORY NO. 03-0783T3</p>									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			REVISIONS	INIT.	DATE						
REVISIONS	INIT.	DATE									

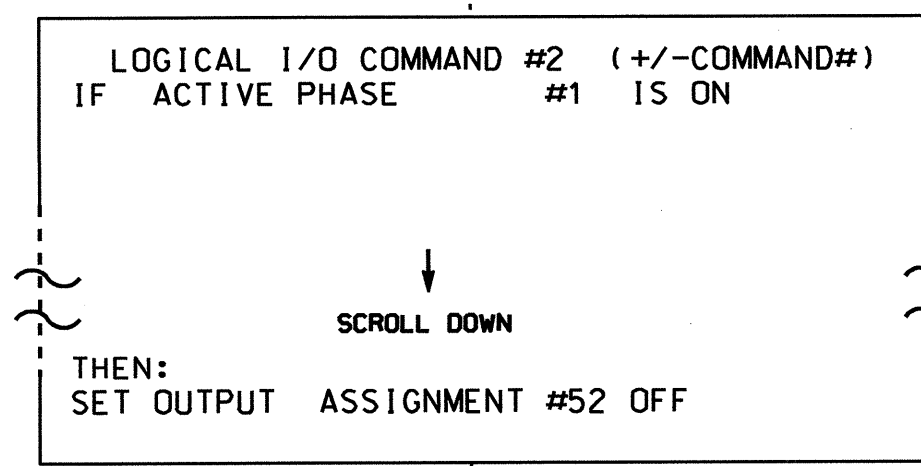
**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

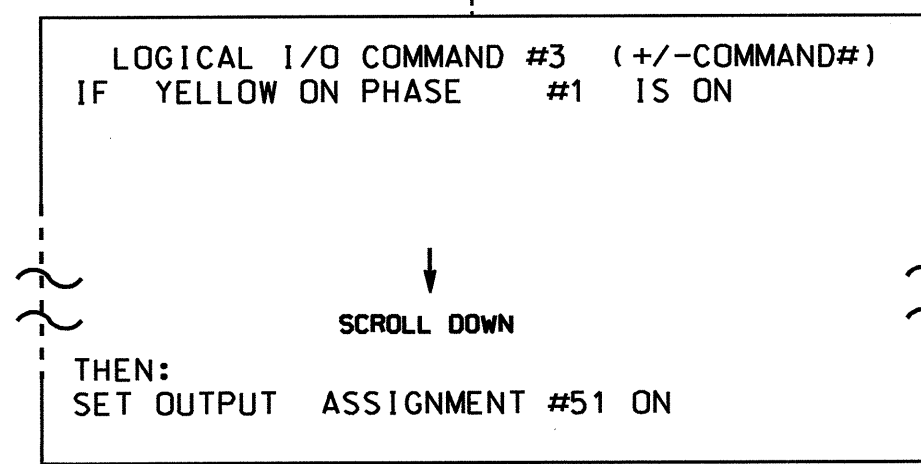
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



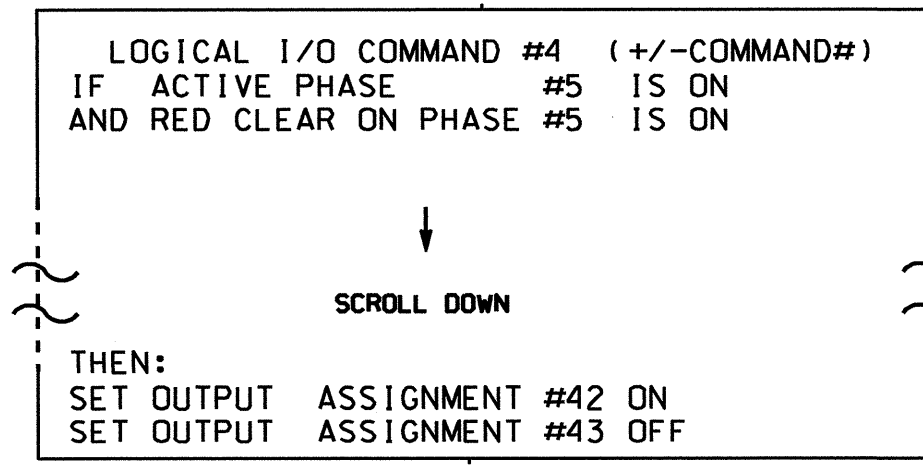
NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



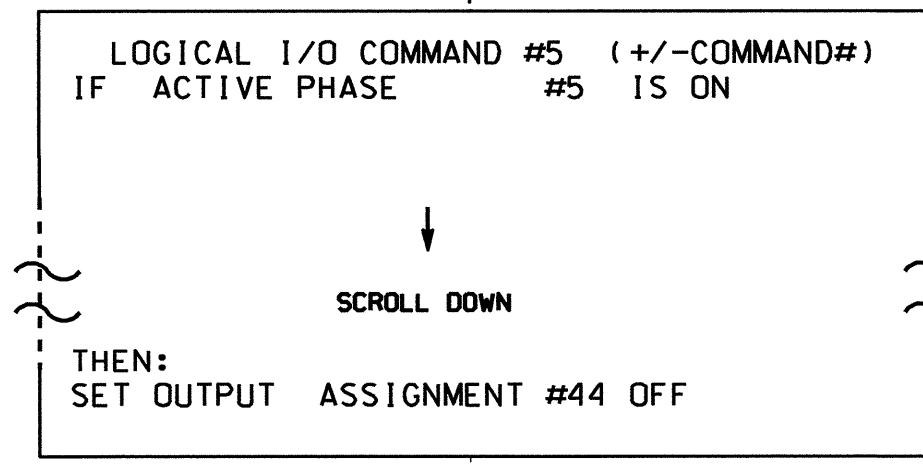
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).



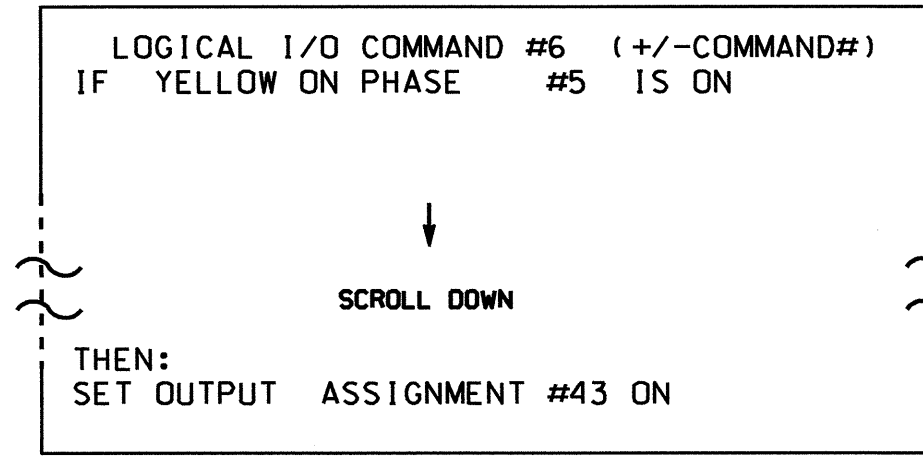
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).



NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green
- OUTPUT 50 = Overlap A Red
- OUTPUT 51 = Overlap A Yellow
- OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

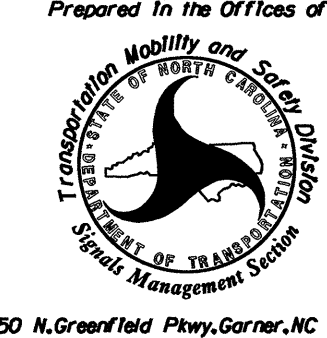
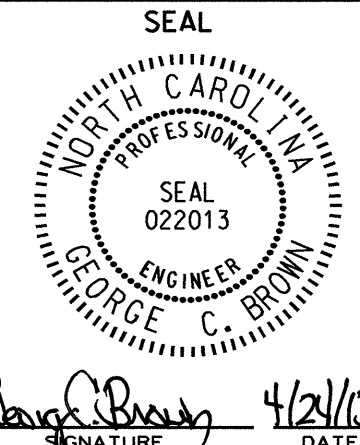
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0783
DESIGNED: January 2013
SEALED: 4/23/13
REVISED: N/A

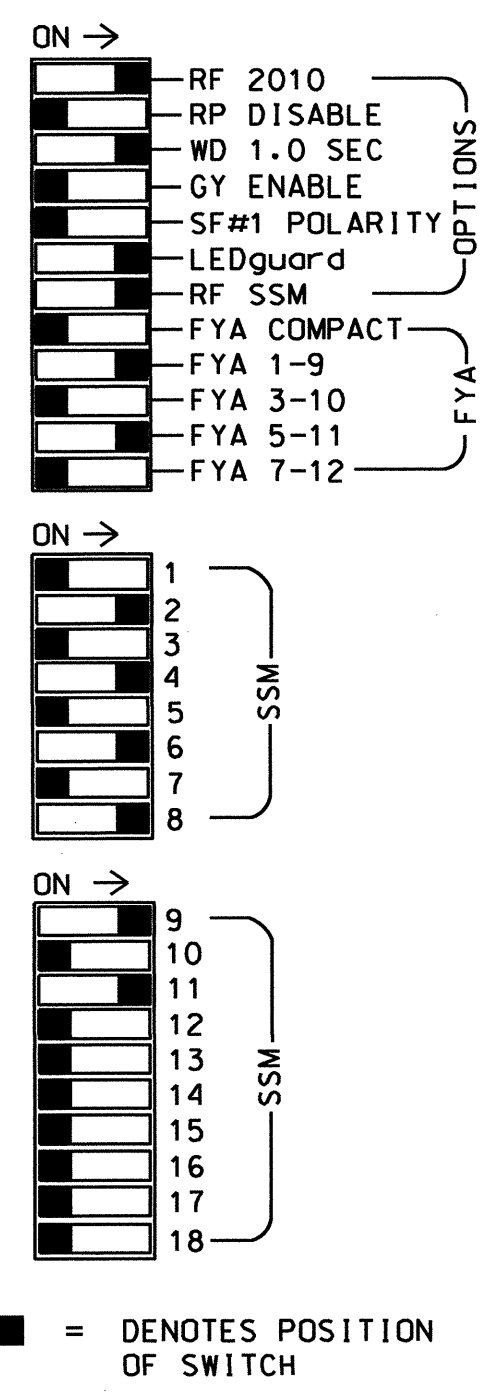
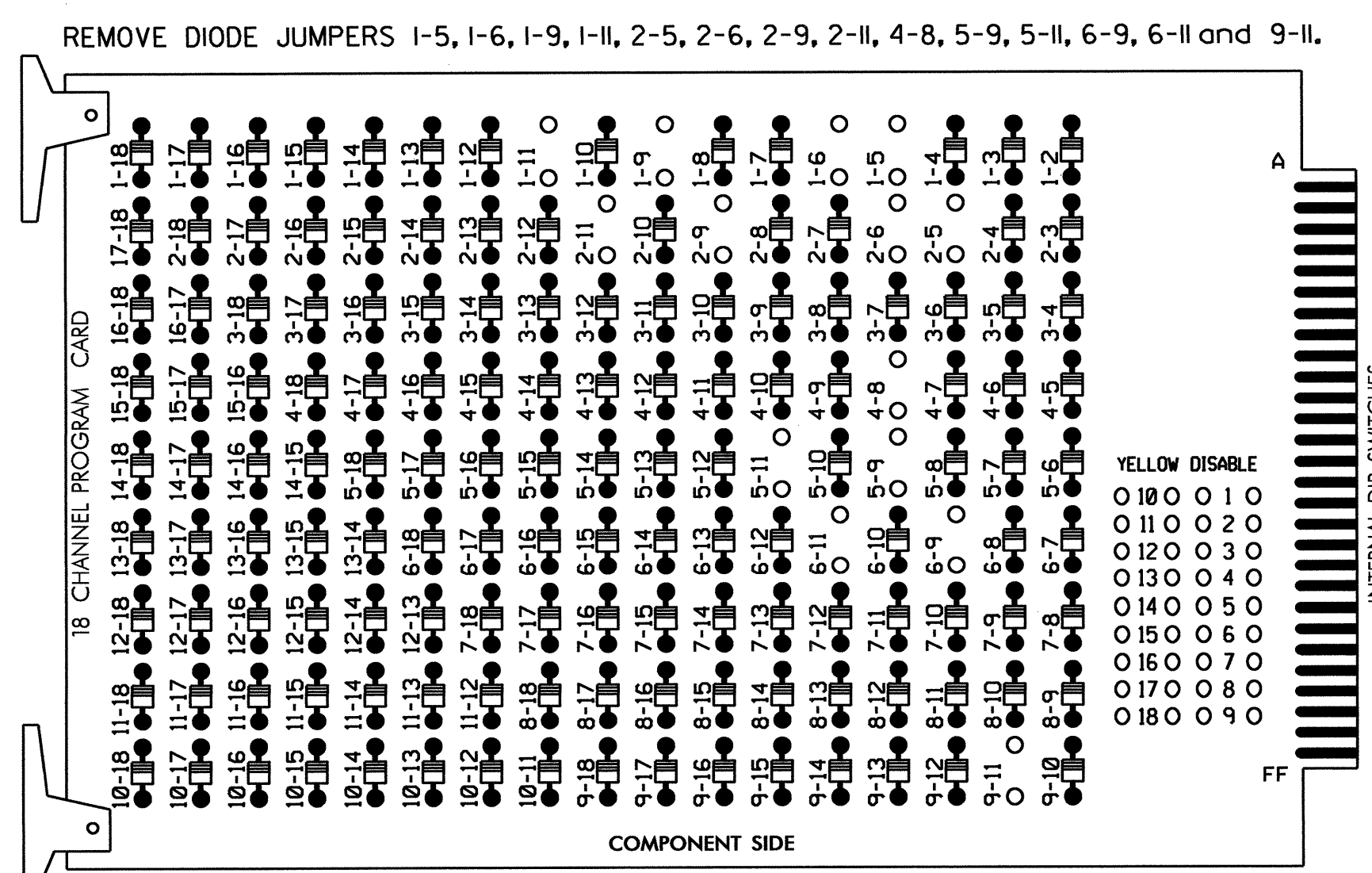
ELECTRICAL DETAIL - FINAL - SHEET 2 OF 2

 <p>750 N. Greenfield Hwy, Garner, NC 27529</p>	<p>NC 24 (Sunset Avenue) at Forest Drive/ Sampson Community College</p>							
	<p>Division 3 Sampson County Clinton</p>							
	<p>PLAN DATE: April 2013</p>	<p>REVIEWED BY: T. Lynn</p>						
	<p>PREPARED BY: C. Strickland</p>	<p>REVIEWED BY:</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>George C. Brown</i> DATE: 4/23/13</p>	<p>SIG. INVENTORY NO. 03-0783</p>
REVISIONS	INIT.	DATE						

EDI MODEL 2018ECL-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.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1,AUX S4
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

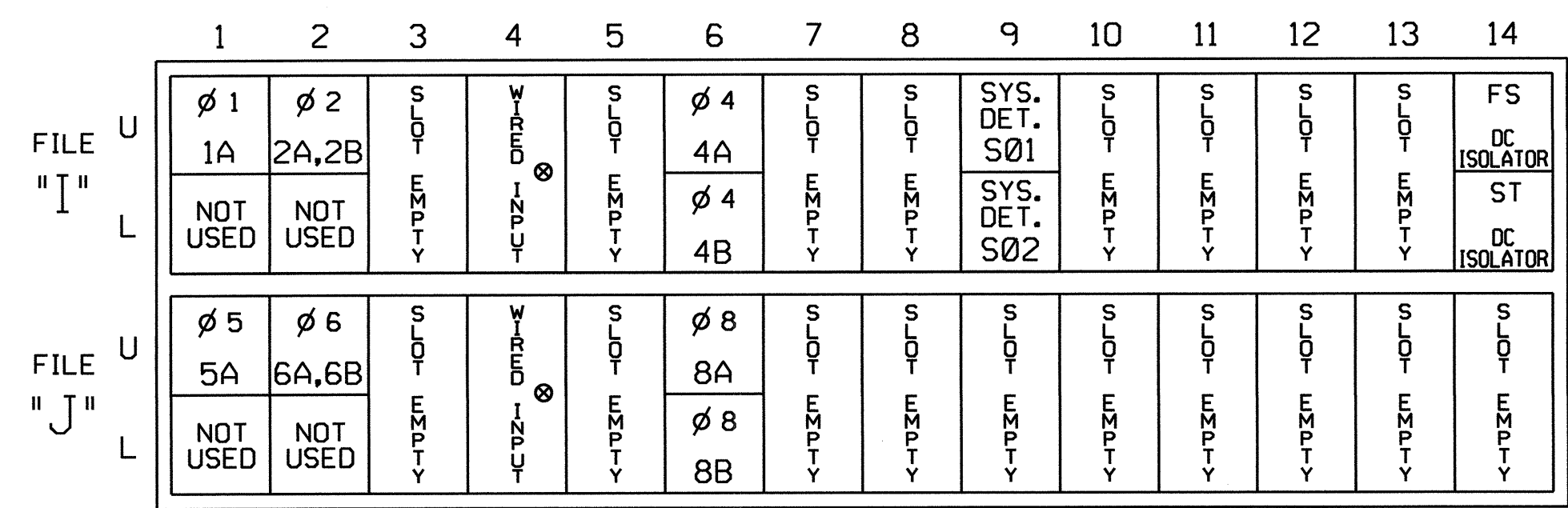
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127							133										

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)

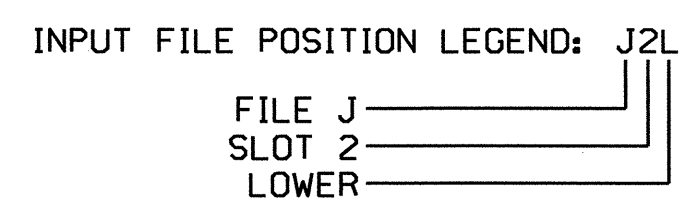


FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

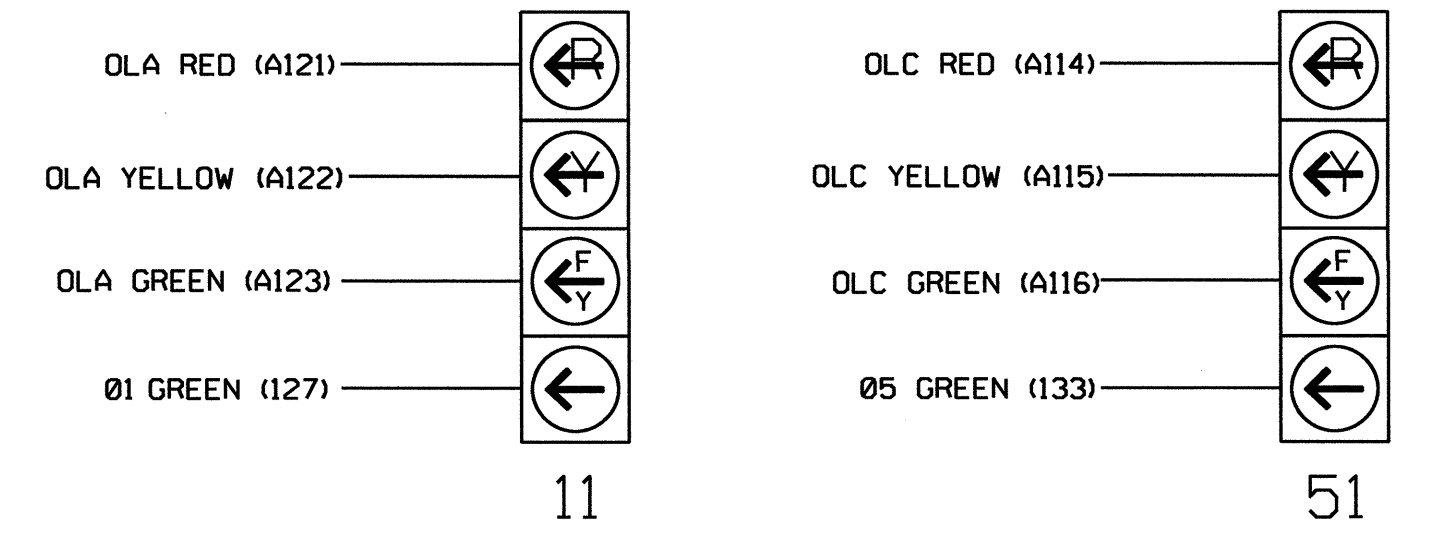
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
		I4U	47	9	22	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
*S01	TB6-9,10	I9U	60	22	11	SYS					
*S02	TB6-11,12	I9L	62	24	13	SYS					

- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from J1-W to I4-W, on rear of input file.
- * System detector only. Remove the vehicle phase assigned to this detector in the default programming.



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



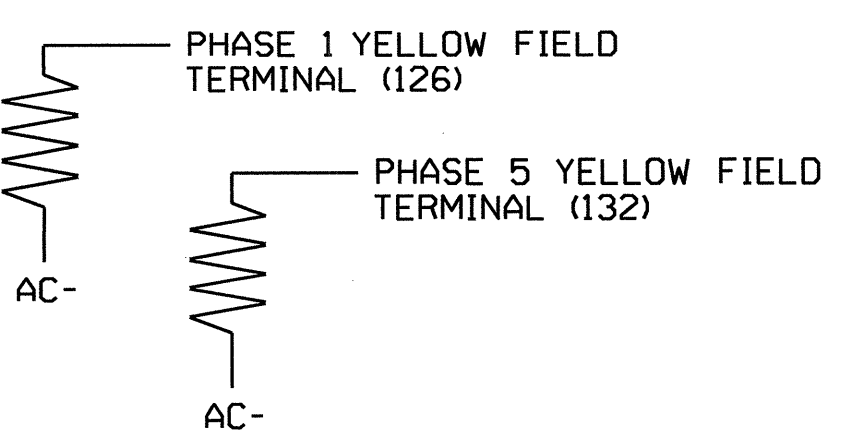
NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



ELECTRICAL DETAIL SHEET - FINAL - 1 OF 2

Prepared in the Offices of:

 750 N. Greenfield Hwy, Corner, NC 27529

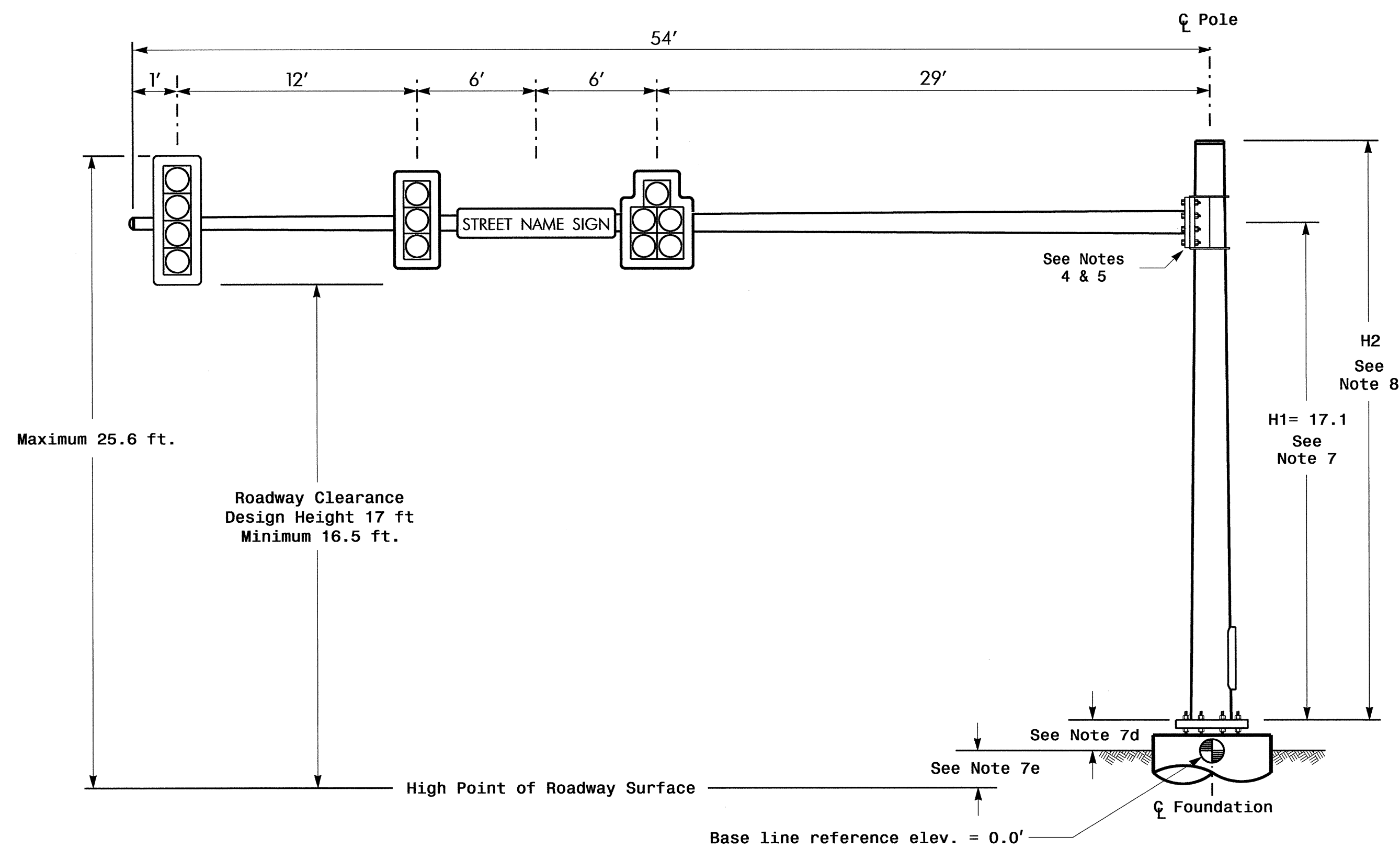
NC 24 (Sunset Avenue)
 at
 Forest Drive/
 Sampson Community College

Division 3 Sampson County Clinton
 PLAN DATE: April 2013 REVIEWED BY: T. J. Jap
 PREPARED BY: C. Strickland REVIEWED BY:
 REVISIONS INIT. DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE 4/24/13
 SIG. INVENTORY NO. 03-0783

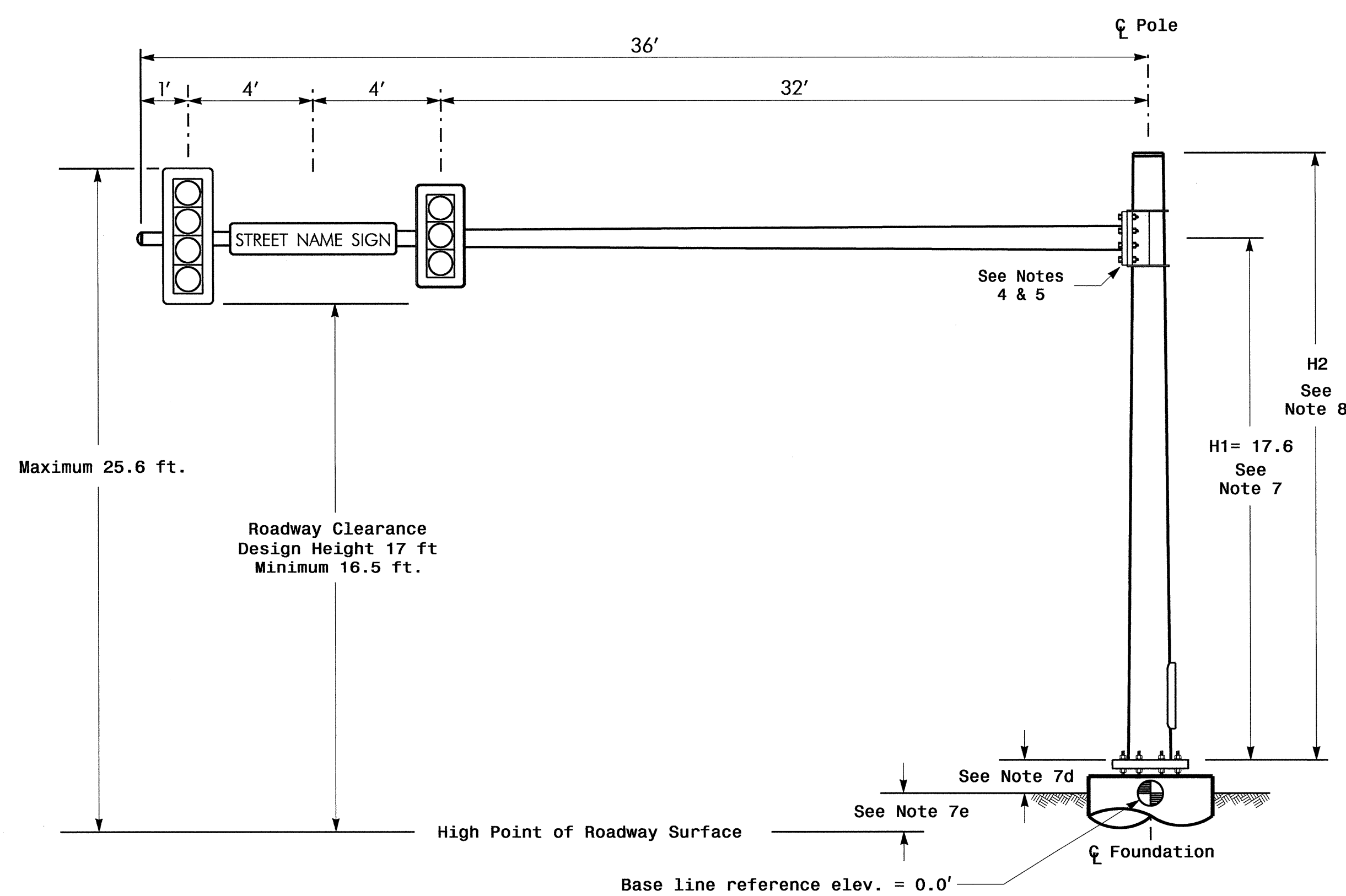
24-APP-2013_08-17
 S:\IT\SAS\SJ\TIS\Sig\pl\work\groups\sig\Main\Fr-Lck\land\030783_sml_e\e-xxx.dgn
 CASH-LCK-LAND

Design Loading for METAL POLE NO. 3



Elevation View

Design Loading for METAL POLE NO. 4



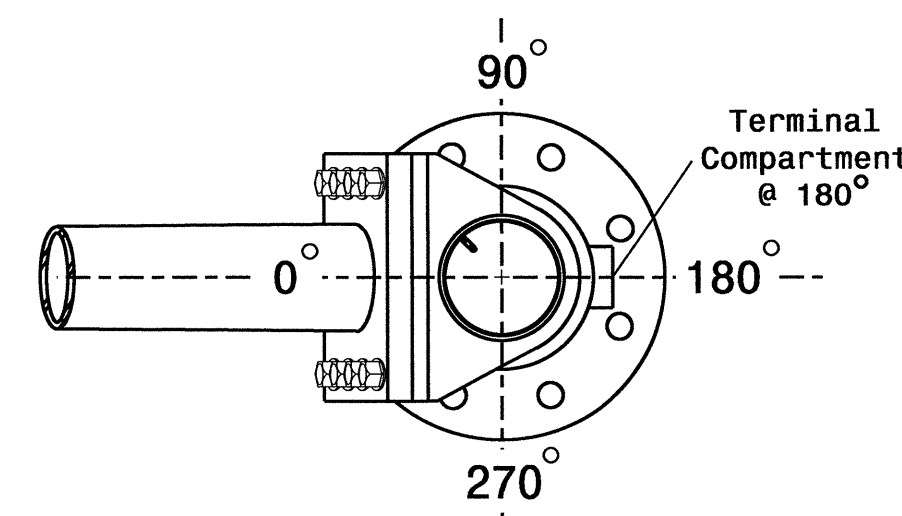
Elevation View

SPECIAL NOTE

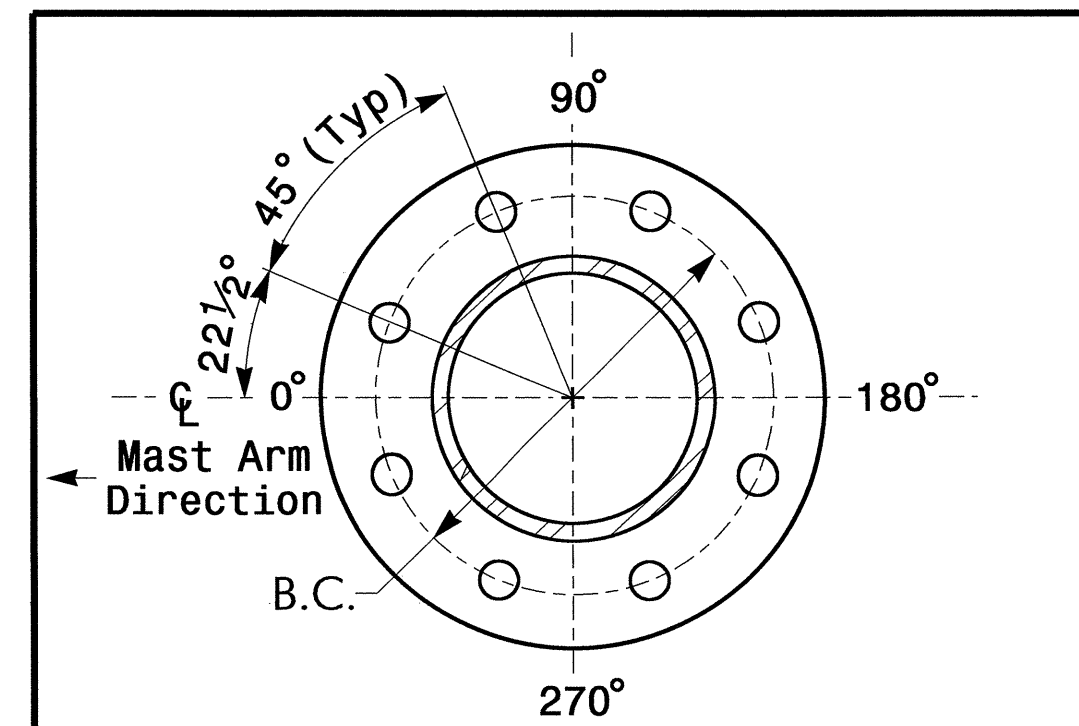
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

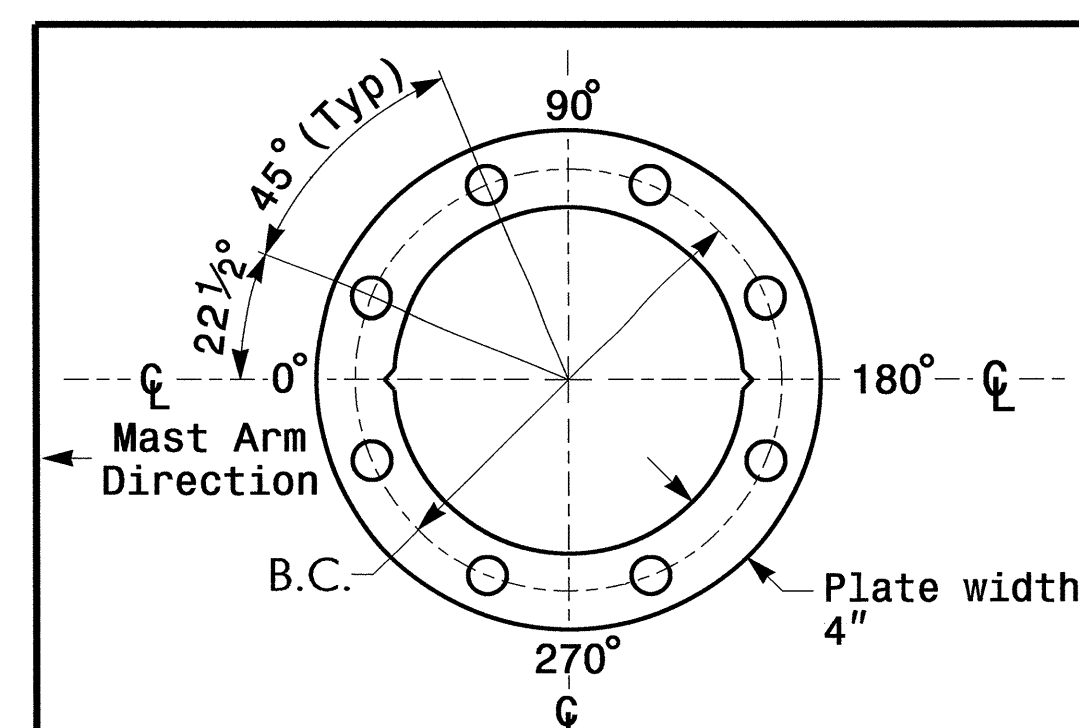
Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-1.9 ft.	-1.4 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.

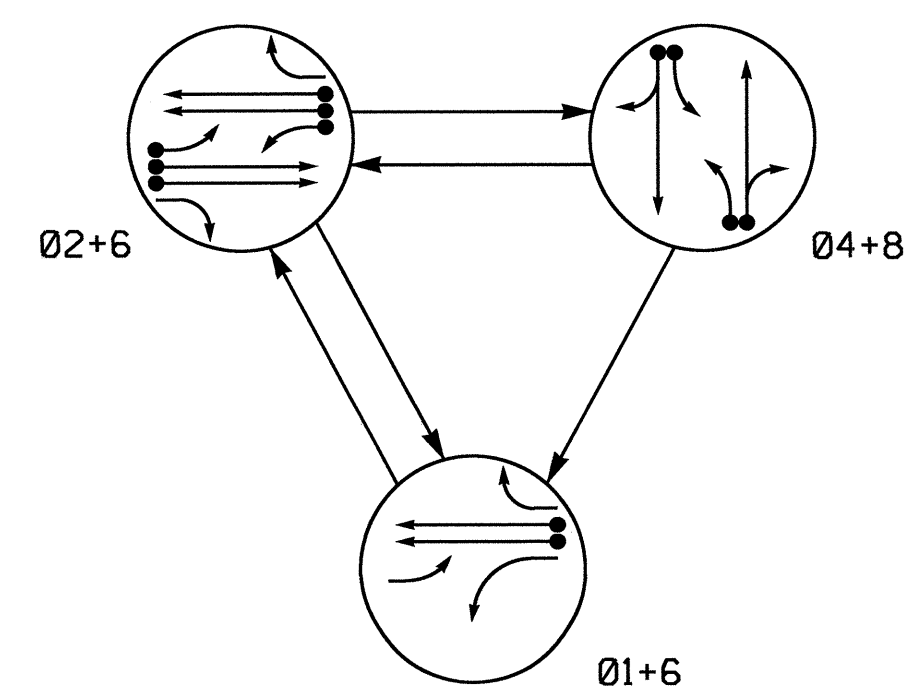
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

	NC 24 (Sunset Avenue) At Forest Drive/ Sampson Community College		SEAL JASON P. GALLOWAY ENGINEER No. 29904
	Division 3 PLAN DATE: January 2013 PREPARED BY: I. O. Umozurike	Sampson County REVIEWED BY: J. P. Galloway REVIEWED BY:	
REVISIONS		INIT. DATE	DATE 2/27/13
SIG. INVENTORY NO. 03-0783			DATE

PHASING DIAGRAM



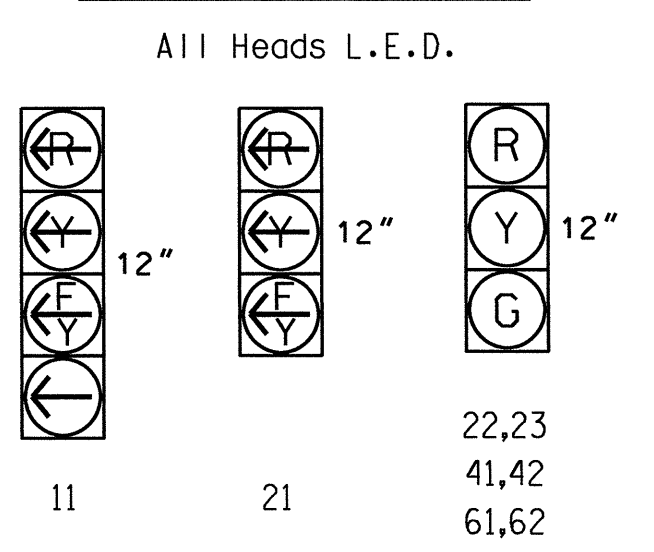
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				F L E D S H O
	01+6	02+6	04+8	01+6	
11	Y	Y	Y	Y	
21	Y	Y	Y	Y	
22,23	R	G	R	Y	
41,42	R	R	G	R	
61,62	G	G	R	Y	
81,82	R	R	G	R	

SIGNAL FACE I.D.



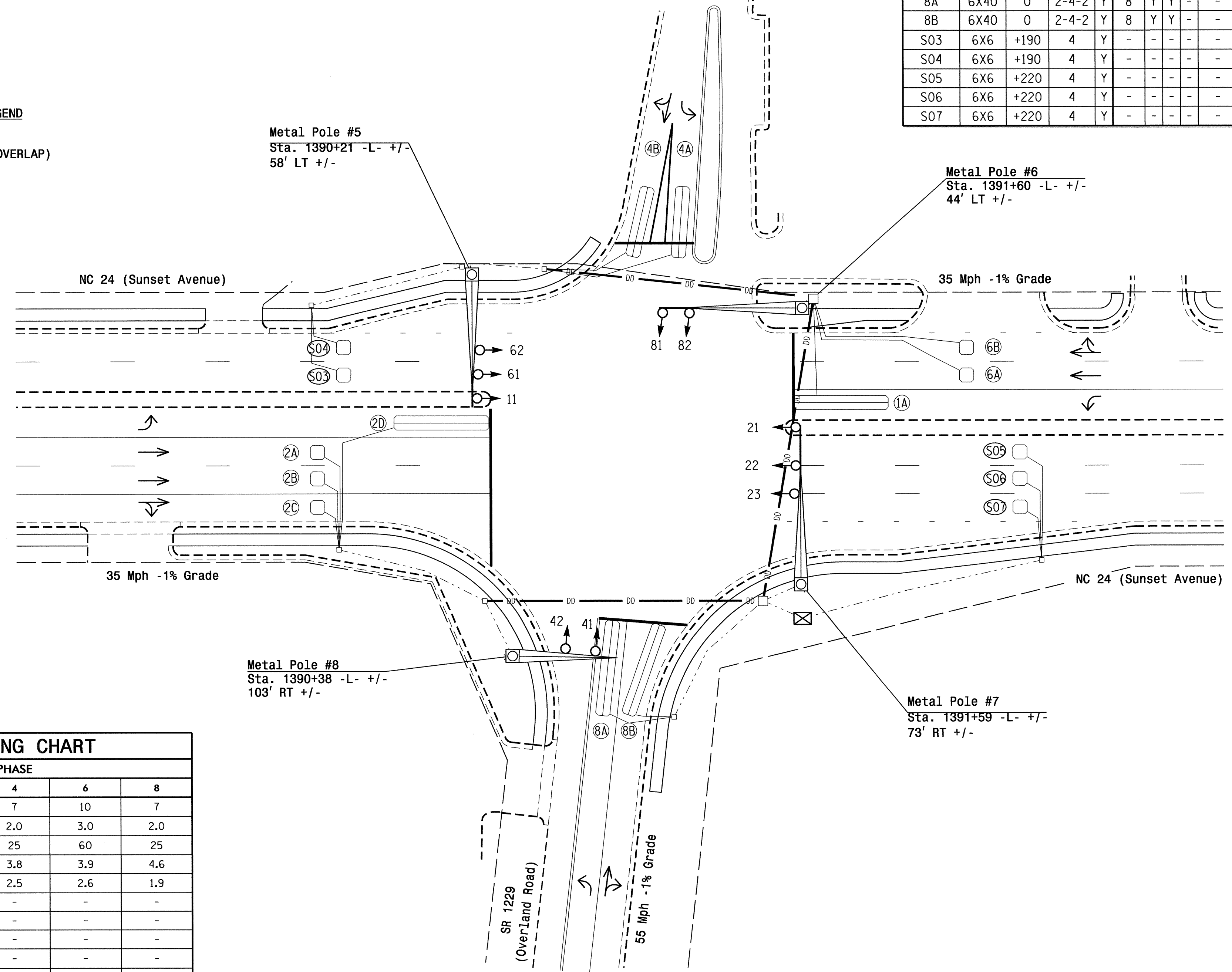
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	LOOP NEW	DETECTOR PROGRAMMING				STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY				
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A,2B,2C	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
2D	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	6X30	+5	2-4-2	Y	4	Y	Y	-	-	-	-	Y
4B	6X30	+5	2-4-2	Y	4	Y	Y	-	-	10	-	Y
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y
S03	6X6	+190	4	Y	-	-	-	-	-	-	-	Y
S04	6X6	+190	4	Y	-	-	-	-	-	-	-	Y
S05	6X6	+220	4	Y	-	-	-	-	-	-	-	Y
S06	6X6	+220	4	Y	-	-	-	-	-	-	-	Y
S07	6X6	+220	4	Y	-	-	-	-	-	-	-	Y

3 Phase Fully Actuated NC 24 (Sunset Avenue) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data: Controller Asset #0905.
8. Incorporate signal into the existing NC 24 (Sunset Avenue) CLS. Notify the Engineer thirty days prior to activating signal to allow for the development of coordination plans.



OASIS 2070L TIMING CHART

FEATURE	PHASE				
	1	2	4	6	8
Min Green 1 *	7	10	7	10	7
Extension 1 *	2.0	3.0	2.0	3.0	2.0
Max Green 1 *	20	60	25	60	25
Yellow Clearance	3.0	3.9	3.8	3.9	4.6
Red Clearance	3.5	2.6	2.5	2.6	1.9
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* 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 | ● → N/A |
| ○ → Modified Signal Head | ○ → N/A |
| ○ → Sign | ○ → N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → N/A |
| ○ → Signal Pole with Guy | ○ → N/A |
| ○ → Signal Pole with Sidewalk Guy | ○ → N/A |
| ○ → Inductive Loop Detector | ○ → N/A |
| ○ → Controller & Cabinet | ○ → N/A |
| ○ → Junction Box | ○ → N/A |
| ○ → 2-in Underground Conduit | ○ → N/A |
| ○ → Right of Way | ○ → N/A |
| ○ → Directional Arrow | ○ → N/A |
| ○ → Metal Pole with Mastarm | ○ → N/A |
| ○ → Directional Drill | ○ → N/A |

New Installation Phase II and Final

Prepared In the Offices of:

 TRANSPORTATION MOBILITY AND SAFETY SOLUTIONS, INC.
 750 N. Greenfield Pkwy, Garner, NC 27529

**NC 24 (Sunset Avenue)
At
SR 1229 (Overland Road)**

Division 3 Sampson County Clinton

PLAN DATE: January 2013 REVIEWED BY: J. P. Galloway

PREPARED BY: I. O. Umozurike REVIEWED BY:

SEAL

 J. P. GALLOWAY
 ENGINEER

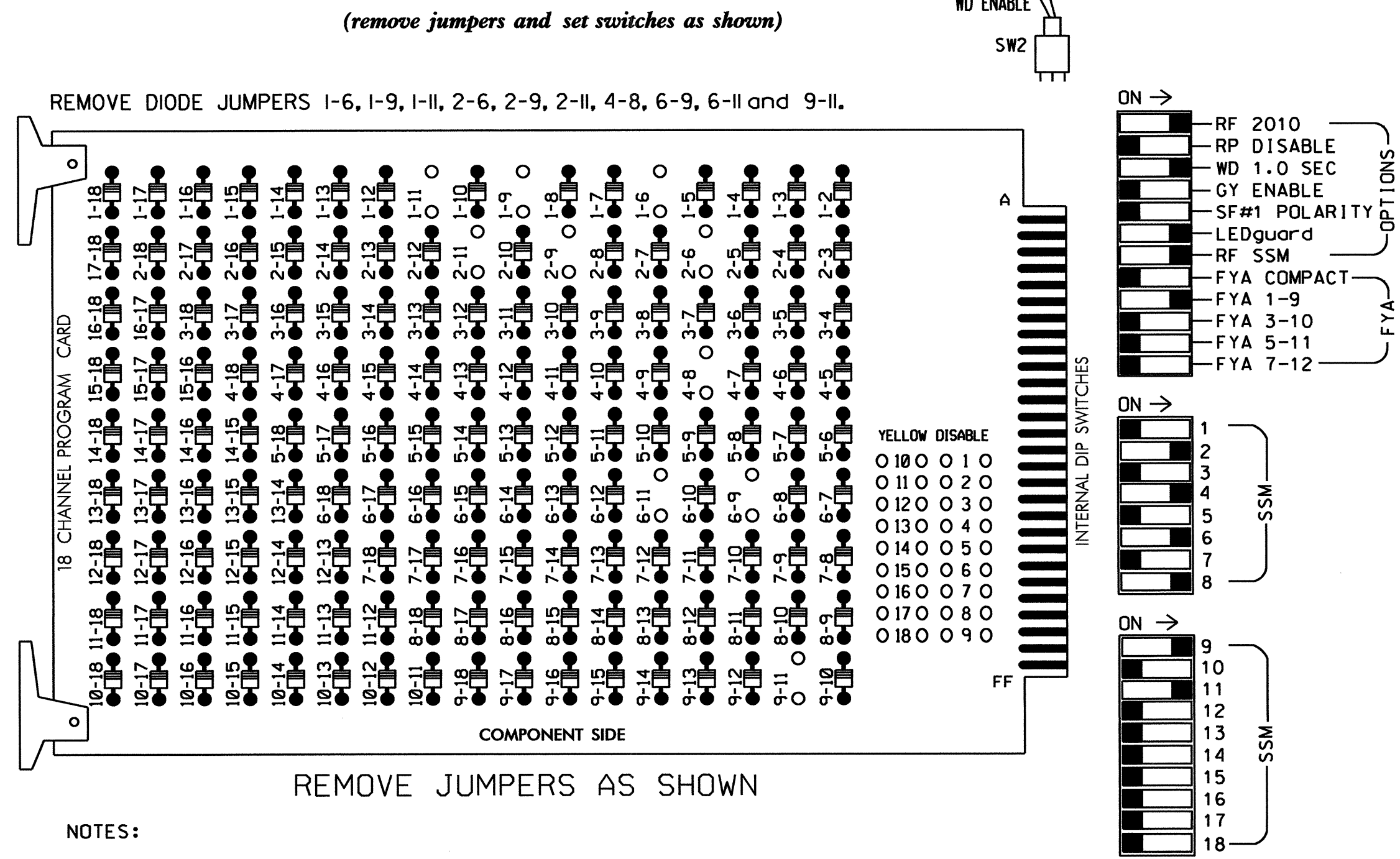
SCALE: 0 30
1"=30'

REVISIONS: _____ INIT. DATE

SIGNATURE: _____ DATE: 2/22/13

SIG. INVENTORY NO. 03-0905

EDI MODEL 2018ECL-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.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

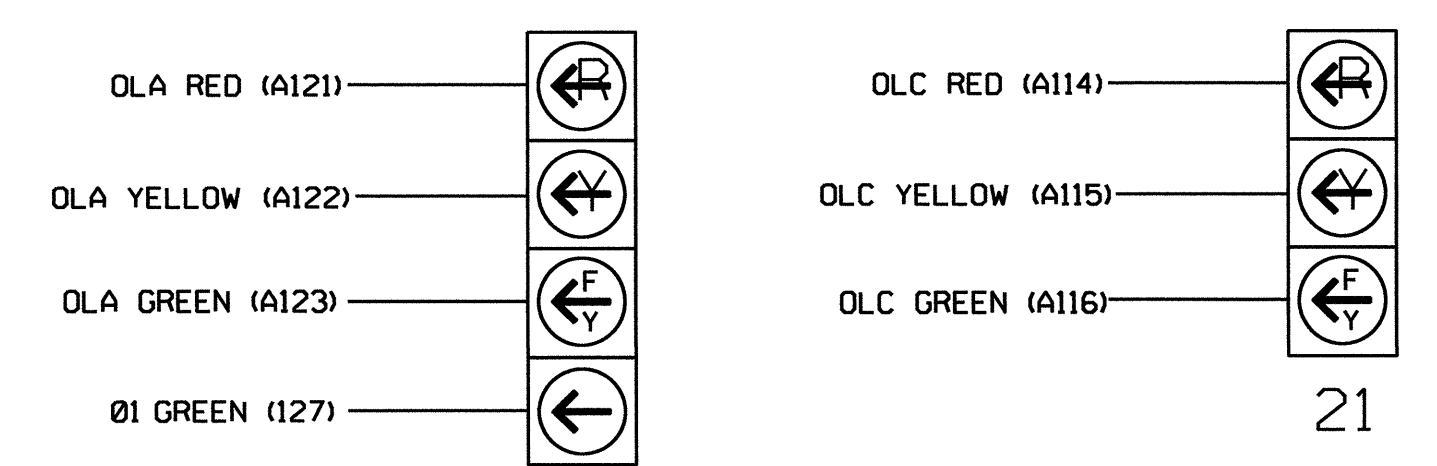
CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S8,S11,AUX S1,AUX S4
 PHASES USED.....1,2,4,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CNU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
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*	22,23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	11*	NU	NU	21*	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127																	

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)



- NOTE**
- The sequence display for signal head 11 requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT
(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 2 2A, 2B, 2C	S -	S -	S -	∅ 4 4A	SYS. DET. S05	S -	SYS. DET. S06	S -	S -	S -	S -	FS DC ISOLATOR
L	NOT USED	∅ 2 2D	Y-1-103F	Y-1-103F	Y-1-103F	∅ 4 4B	NOT USED	Y-1-103F	Y-1-103F	Y-1-103F	Y-1-103F	Y-1-103F	Y-1-103F	ST DC ISOLATOR
U	S -	∅ 6 6A, 6B	S -	S -	S -	∅ 8 8A	SYS. DET. S03	S -	S -	S -	S -	S -	S -	S -
L	Y-1-103F	NOT USED	Y-1-103F	Y-1-103F	Y-1-103F	∅ 8 8B	SYS. DET. S04	Y-1-103F	Y-1-103F	Y-1-103F	Y-1-103F	Y-1-103F	Y-1-103F	Y-1-103F

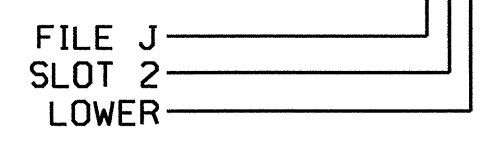
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

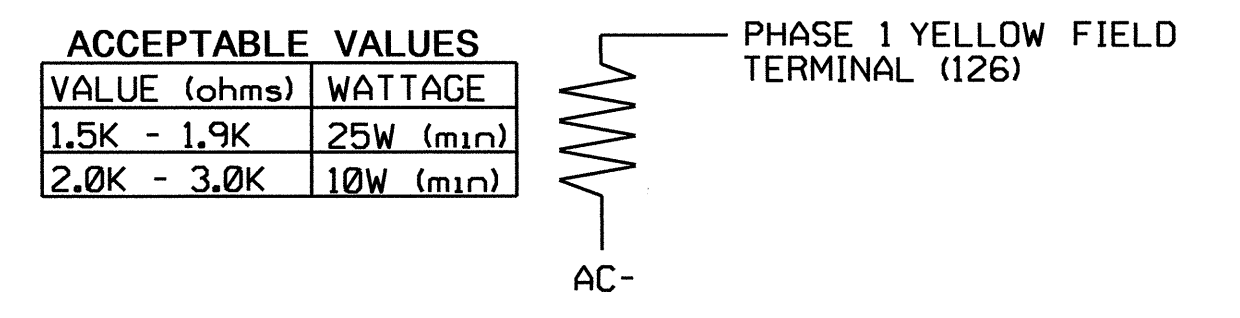
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A'	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
*S03	TB7-9,10	J9U	59	21	15	SYS					
*S04	TB7-11,12	J9L	61	23	17	SYS					
*S05	TB6-1,2	I7U	65	27	34	SYS					
*S06	TB6-9,10	I9U	60	22	11	SYS					
*S07	TB6-11,12	I9L	62	24	13	SYS					

- 1 Add jumper from I1-W to J4-W, on rear of input file.
 * System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL
(install resistor as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0905
 DESIGNED: January 2013
 SEALED: 2/22/13
 REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

Electrical and Programming Details For: **NC 24 (Sunset Avenue) at SR 1229 (Overland Road)**

Prepared In the Offices of: **T. J. Strickland**

Division 3 Sampson County Clinton

PLAN DATE: January 2013 REVIEWED BY: T. J. Strickland

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Grandfield Pkwy, Garner, NC 27529

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

SIGNATURE: *George C. Brown* DATE: 2/26/13

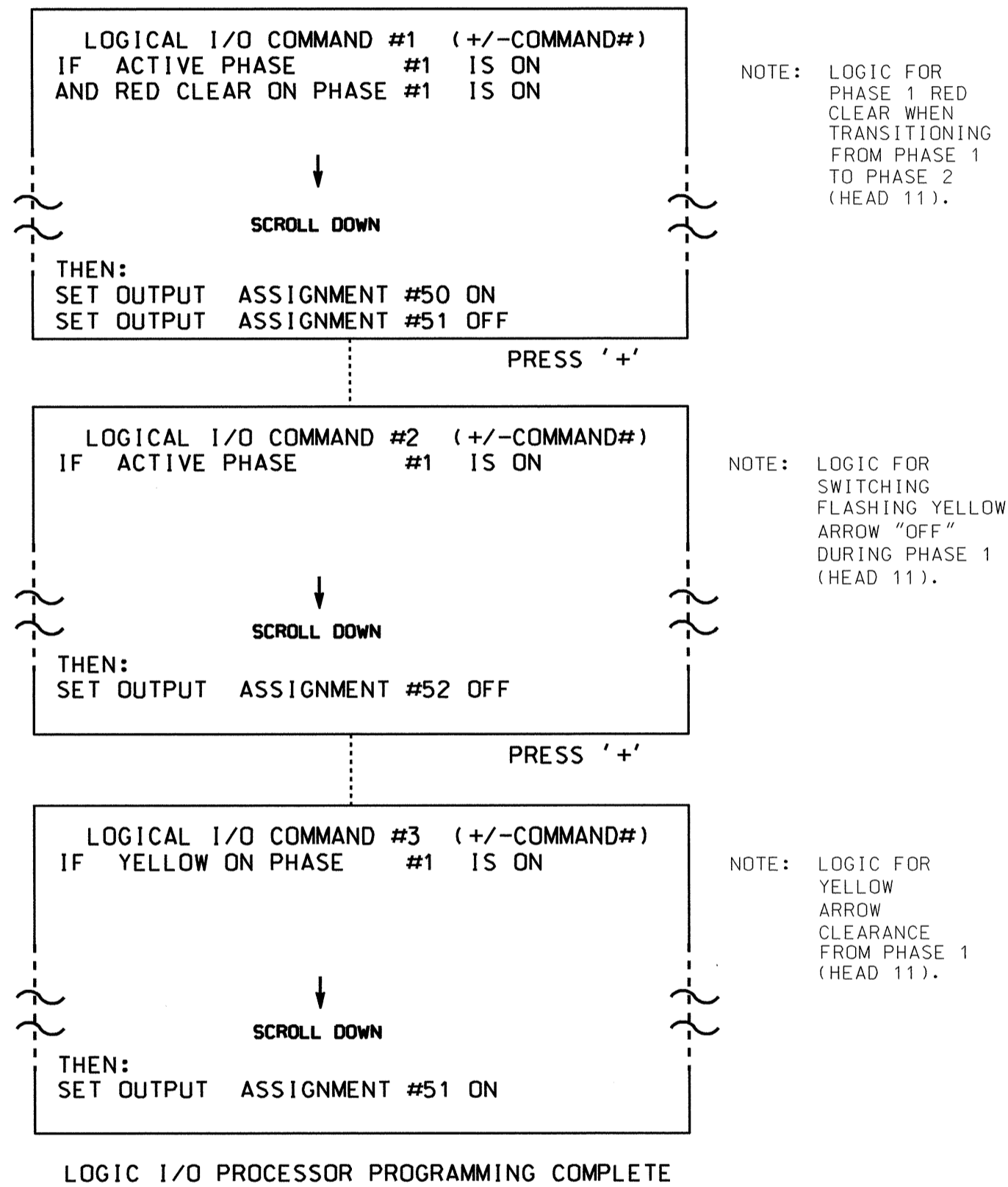
SIG. INVENTORY NO. 03-0905

26-FEB-2013 11:51
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 cbsr:ckl:and

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: !12345678910111213141516
VEH OVL PARENTS: !XX
VEH OVL NOT VEH: !
VEH OVL NOT PED: !
VEH OVL GRN EXT: !
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
  
```

PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: !12345678910111213141516
VEH OVL PARENTS: !X
VEH OVL NOT VEH: !
VEH OVL NOT PED: !
VEH OVL GRN EXT: !
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
  
```

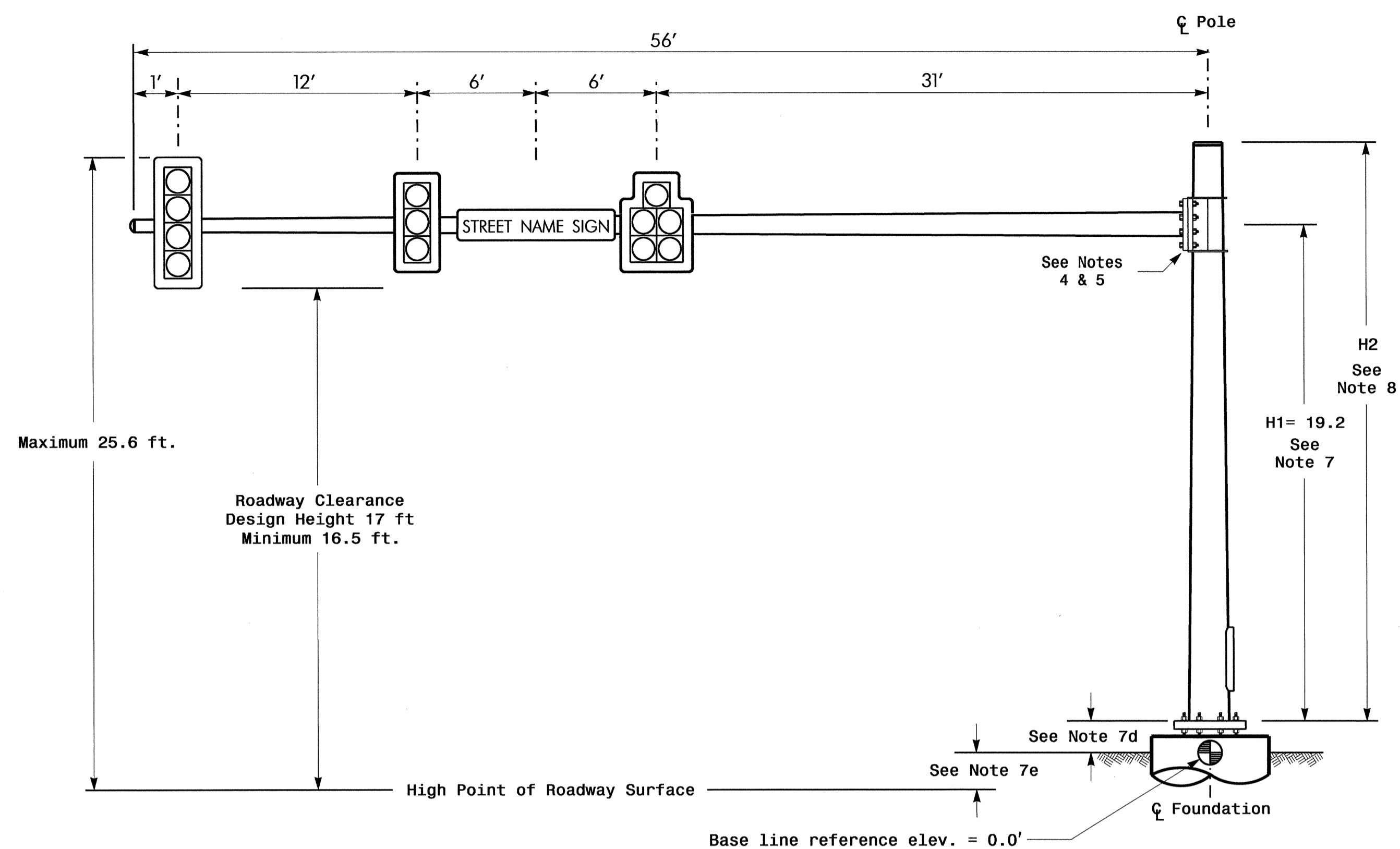
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0905
DESIGNED: January 2013
SEALED: 2/22/13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

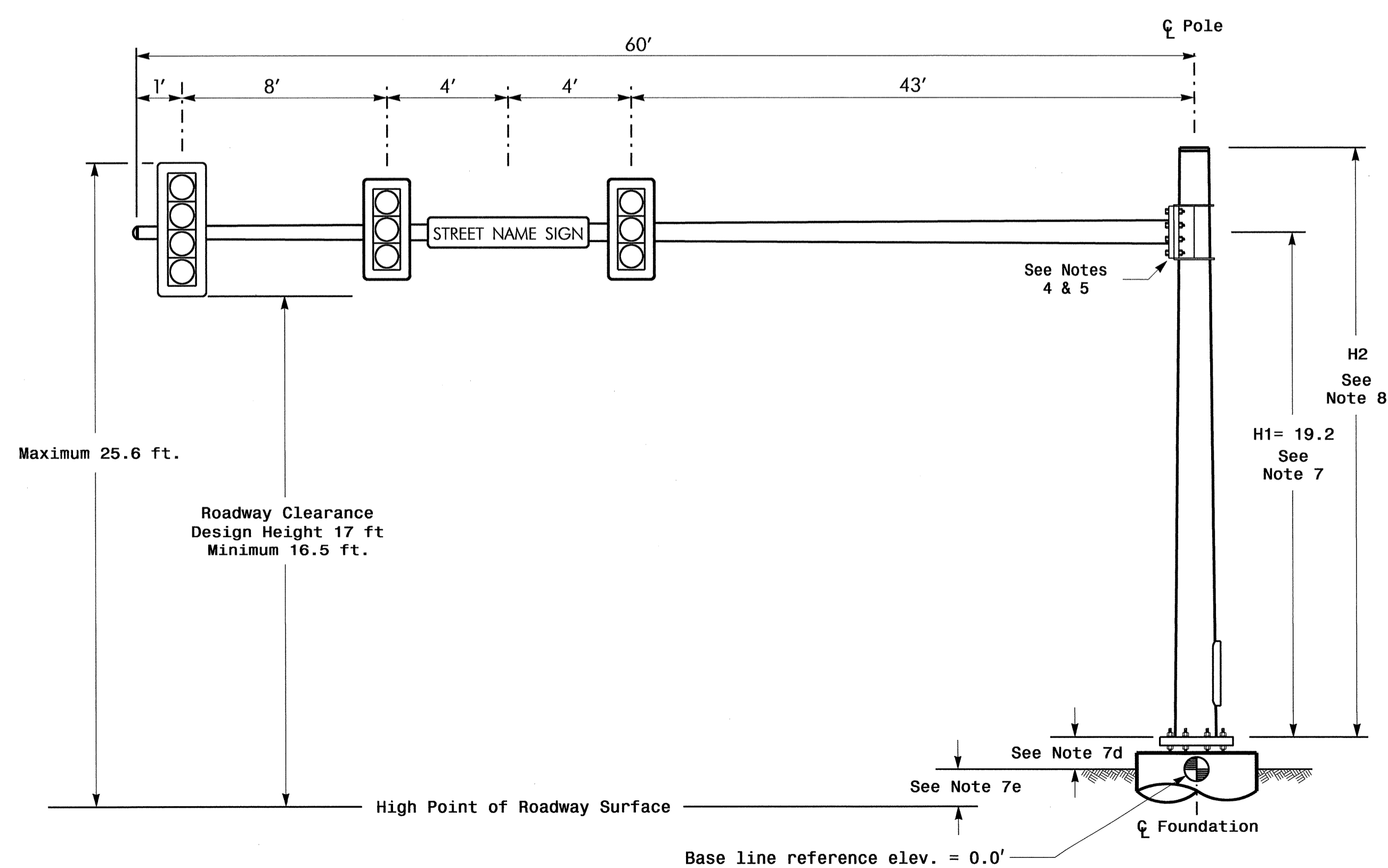
	NC 24 (Sunset Avenue) at SR 1229 (Overland Road)		
	Division 3 Prepared by: C. Strickland Revisions:	Sampson County Reviewed by: T. Jaffe Date:	
750 N. Greenfield Pkwy, Garner, NC 27529			SIG. INVENTORY NO. 03-0905

Design Loading for METAL POLE NO. 5



Elevation View

Design Loading for METAL POLE NO. 6



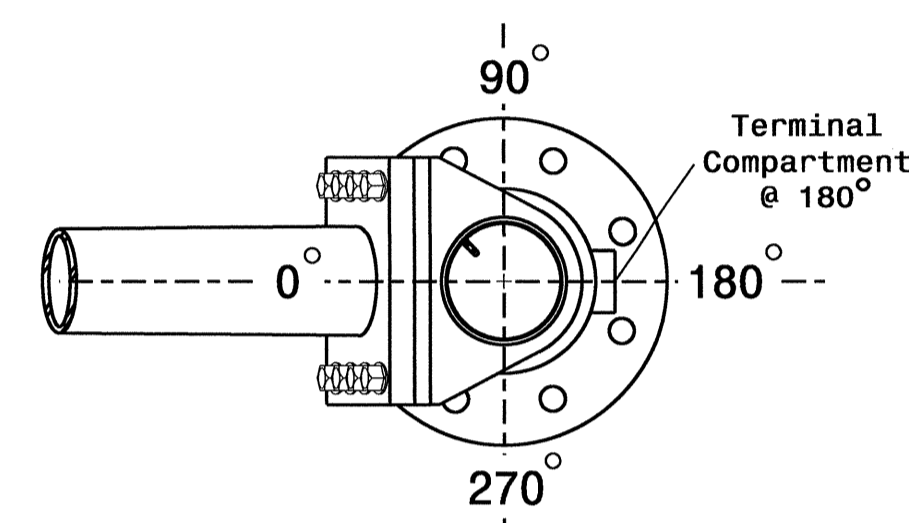
Elevation View

SPECIAL NOTE

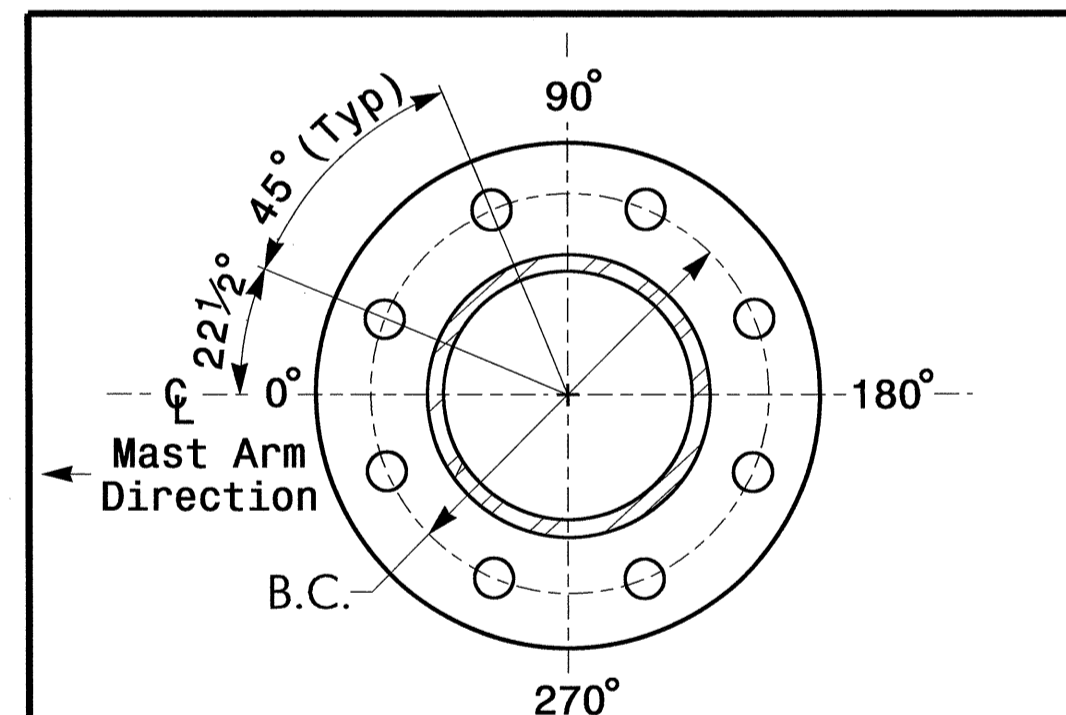
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

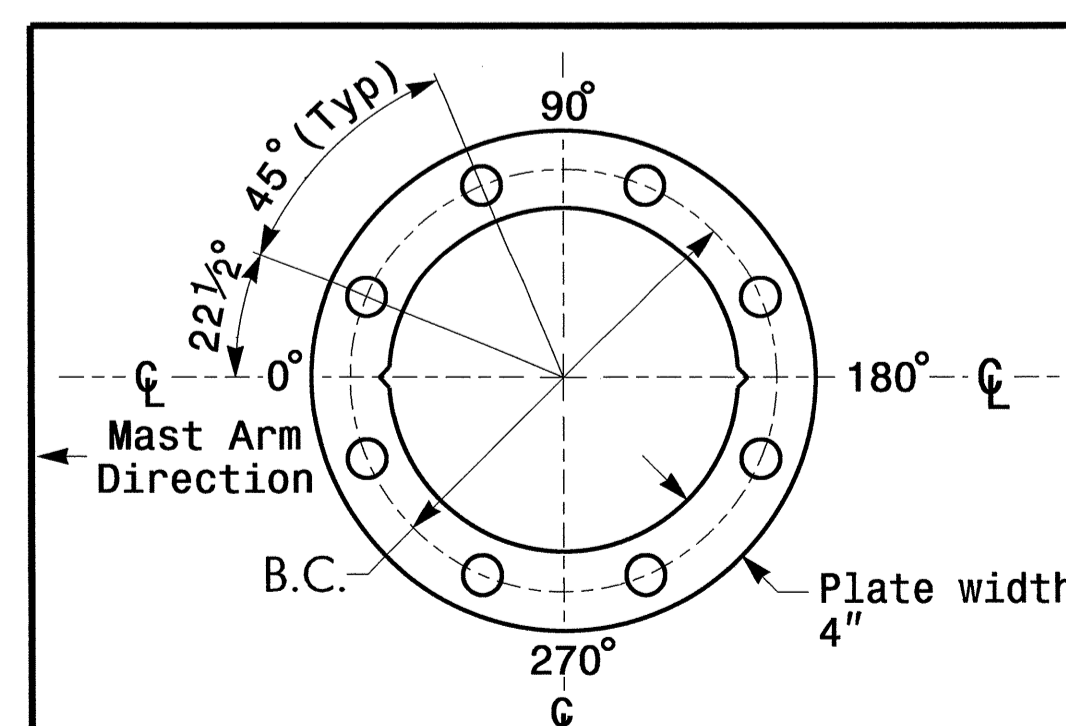
Elevation Differences for:	Pole 5	Pole 6
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.2 ft.	-0.5 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.

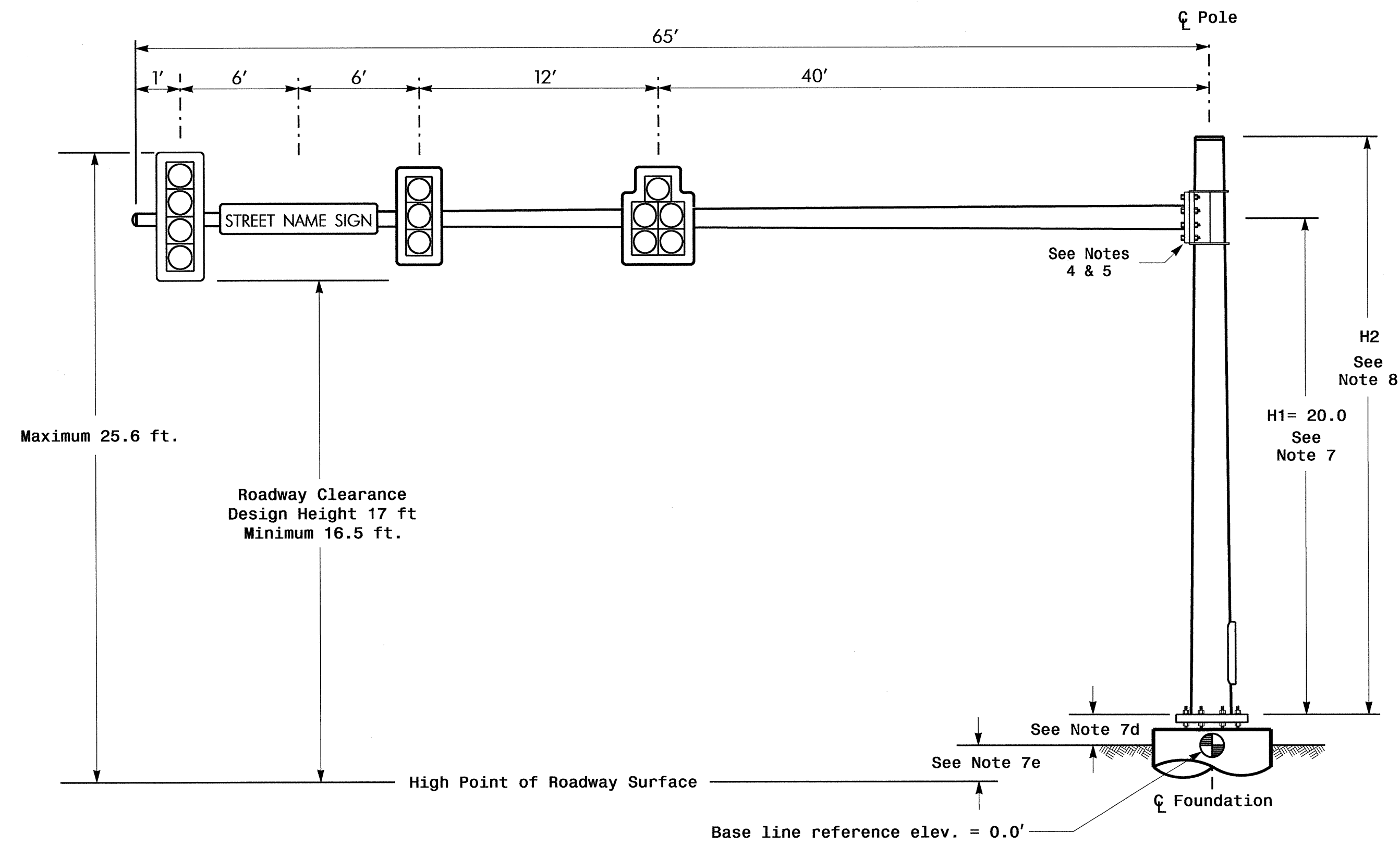
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

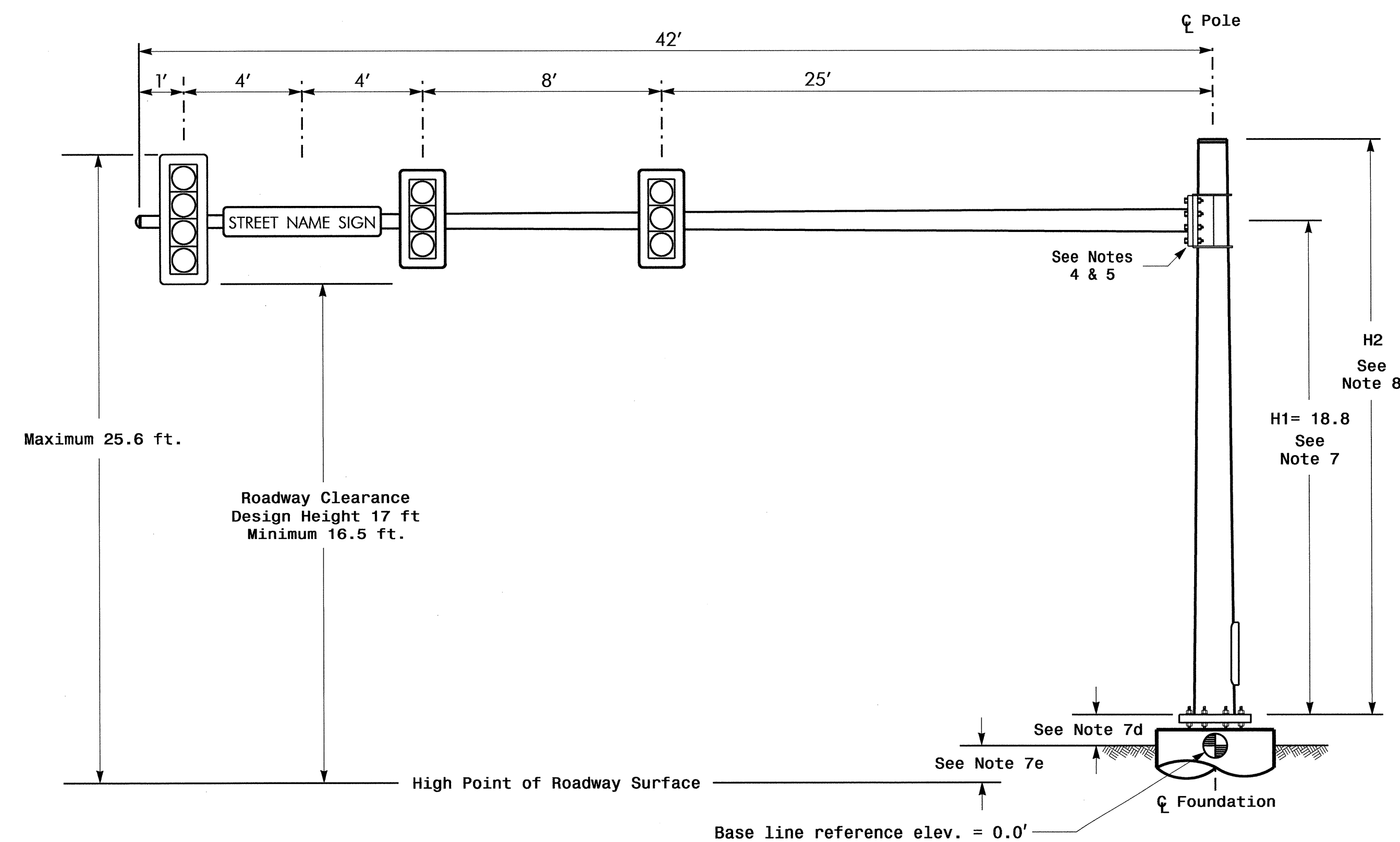
	NC 24 (Sunset Avenue) At SR 1229 (Overland Road)		SEAL
	Division 3 Sampson County PLAN DATE: January 2013 PREPARED BY: I. O. Umozurike	Clinton REVIEWED BY: J. P. Galloway REVIEWED BY:	
REVISIONS INIT. DATE		SIGNATURE DATE	

Design Loading for METAL POLE NO. 7



Elevation View

Design Loading for METAL POLE NO. 8



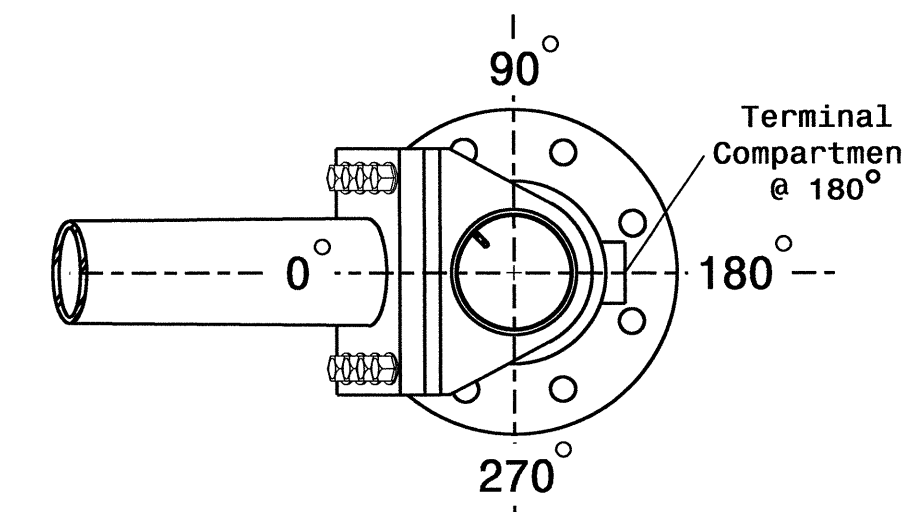
Elevation View

SPECIAL NOTE

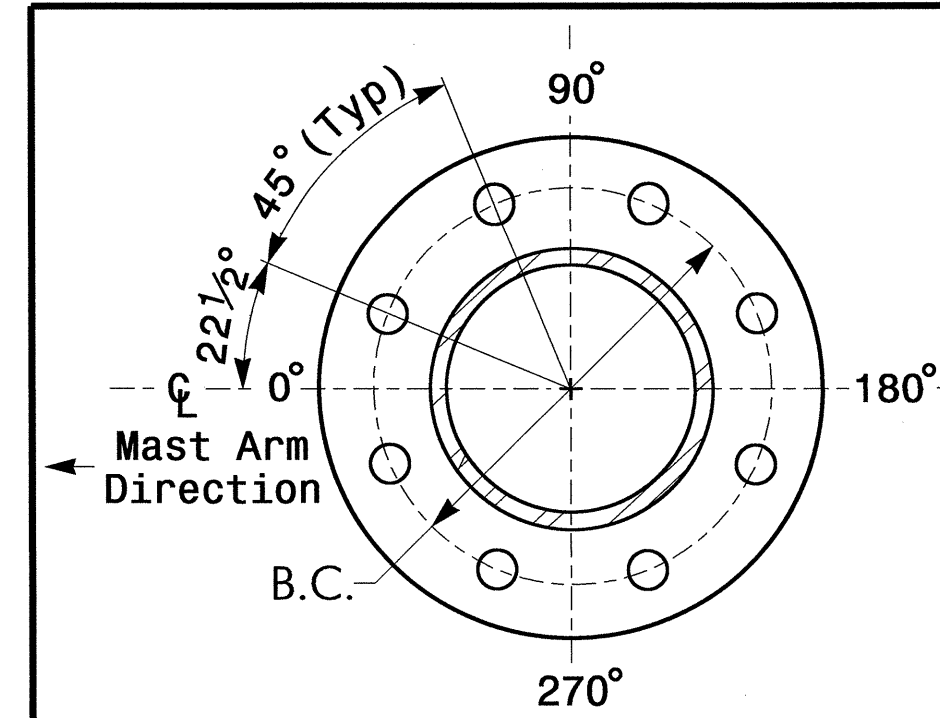
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

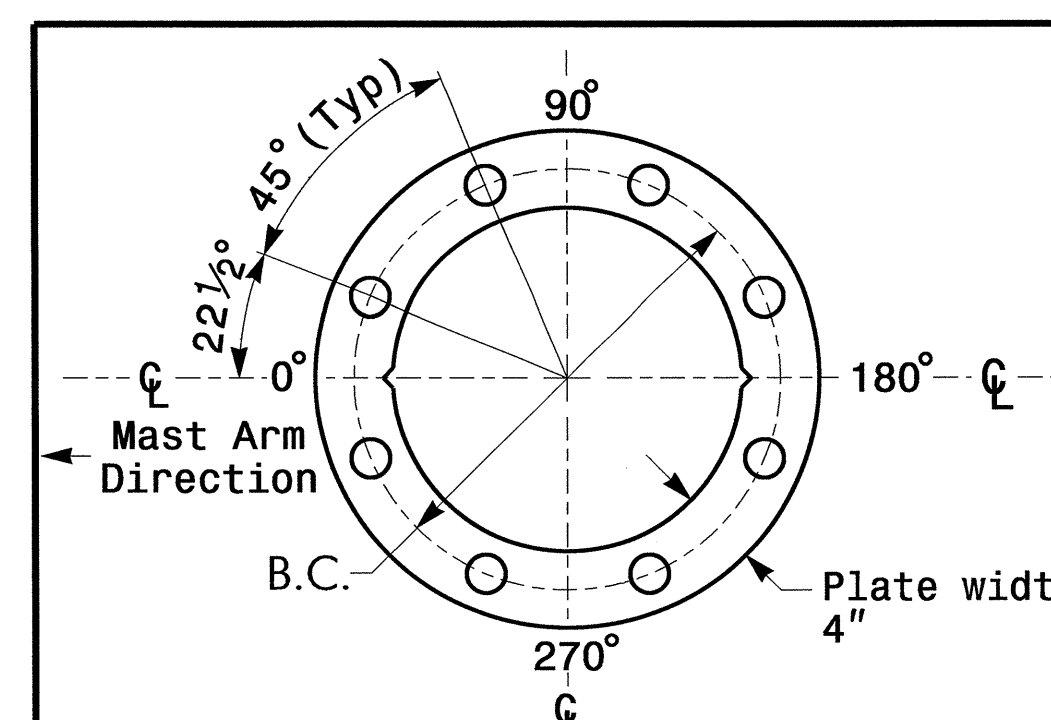
Elevation Differences for:	Pole 7	Pole 8
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.0 ft.	-0.2 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.

Design Requirements

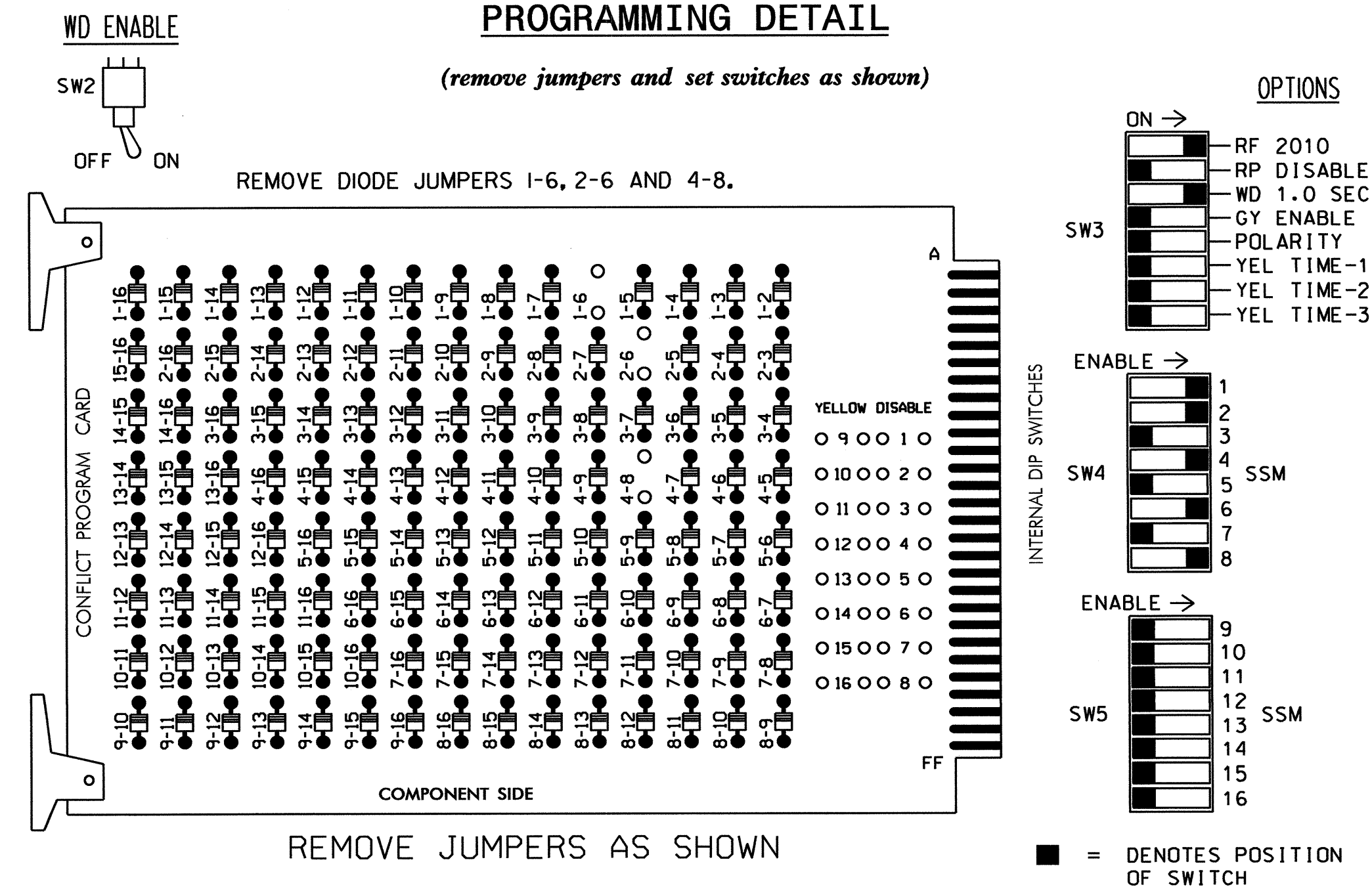
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

	NC 24 (Sunset Avenue) At SR 1229 (Overland Road)		SEAL
	Division 3 Sampson County Clinton PLAN DATE: January 2013 REVIEWED BY: J. P. Galloway PREPARED BY: I. O. Umozurike REVIEWED BY:	REVISIONS INIT. DATE	
SCALE 0 N/A N/A		SIGNATURE DATE 4/5/13	

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



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.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINETMcCAIN TRAFFIC MODEL 332
 (DWG.NO.C32036 REV.B)
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S6,S8
 PHASES USED.....1,2,4,6,8
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61,82	21, 22,23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED	*	128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(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 Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01
 OVERLAPS: ABCDEFGHIJKLMNP
 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)

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

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

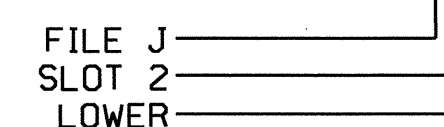
FS = FLASH SENSE
 ST = STOP TIME

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
1A ¹	TB2-9,10	I3U	63	25	32	1	Y	Y			15
	TB2-11,12	I3L	76	38	42	6	Y	Y			
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

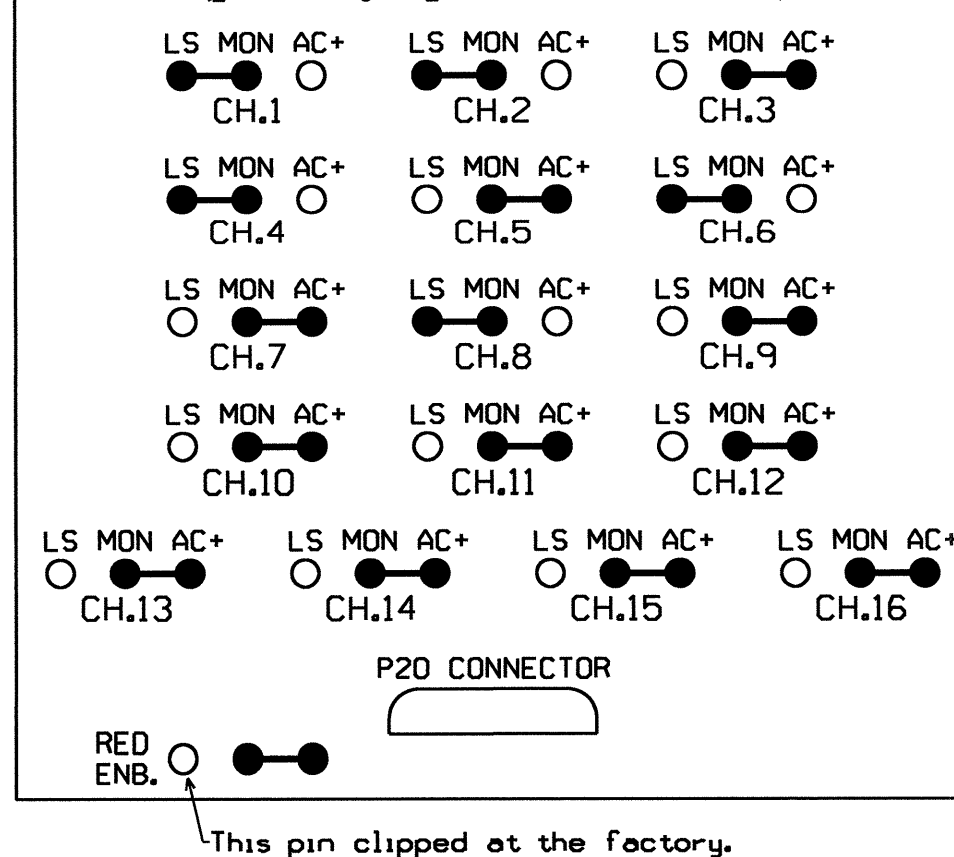
¹Add jumpers from TB2-9 to TB2-11, and from TB2-10 to TB2-12.

INPUT FILE POSITION LEGEND: J2L



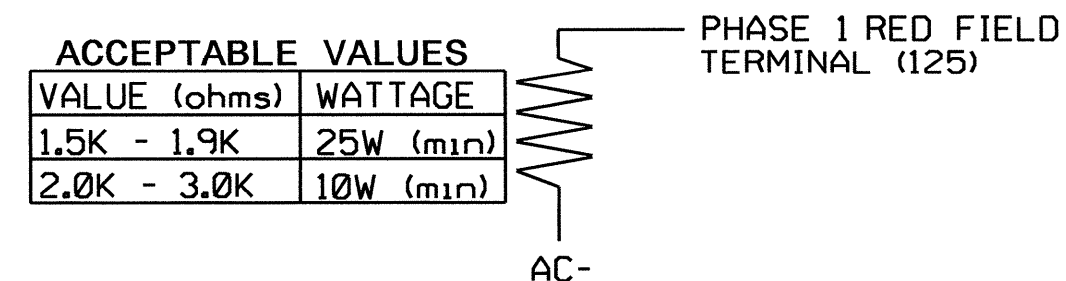
RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)



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

Electrical Detail - Temp

Electrical and Programming Details For:

NC 24 (Sunset Avenue) at Sampson Crossing/Bojangles'

Division 3 Sampson County Clinton

Prepared In the Office of: *George C. Brown*

PLAN DATE: February 2013 REVIEWED BY: *T. J. J.*

PREPARED BY: C. Strickland REVIEWED BY: *T. J. J.*

REVISIONS: _____ INIT. DATE

750 N. Grandfield Pkwy, Garner, NC 27529

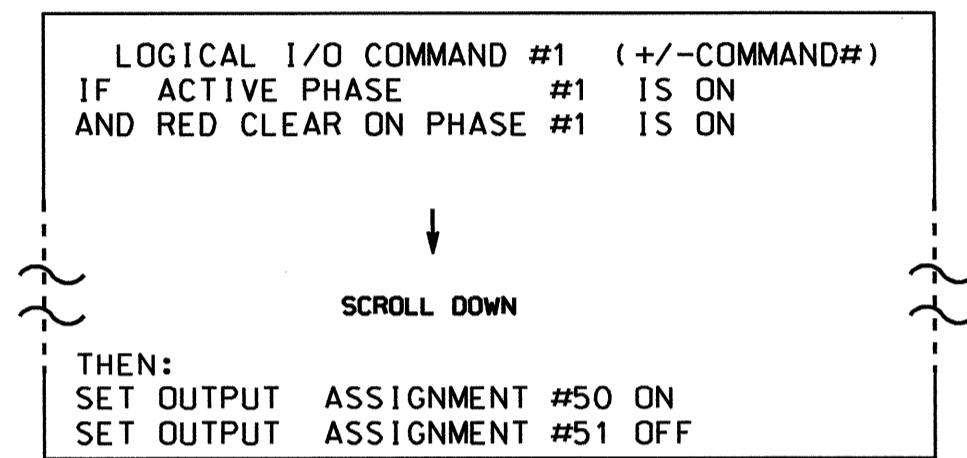
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 G. GEORGE C. BROWN

SIG. INVENTORY NO. 03-0906T

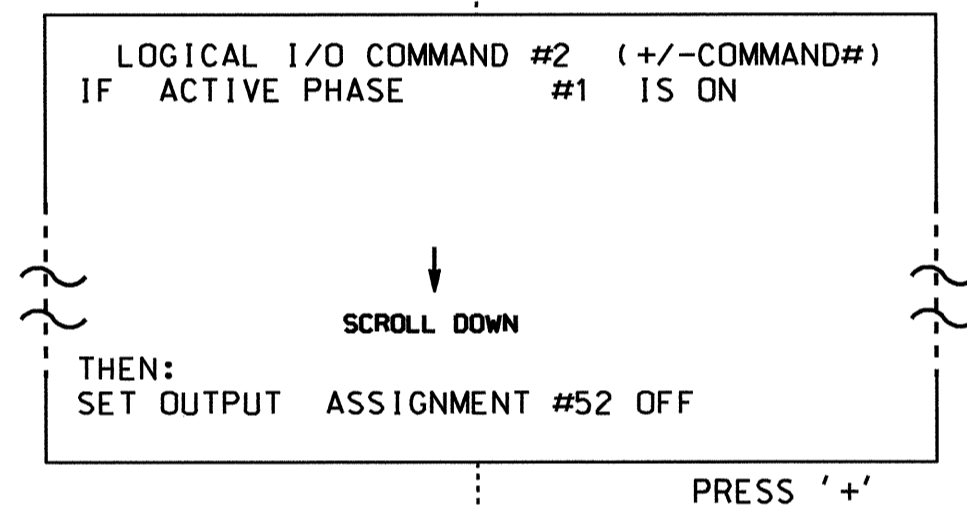
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

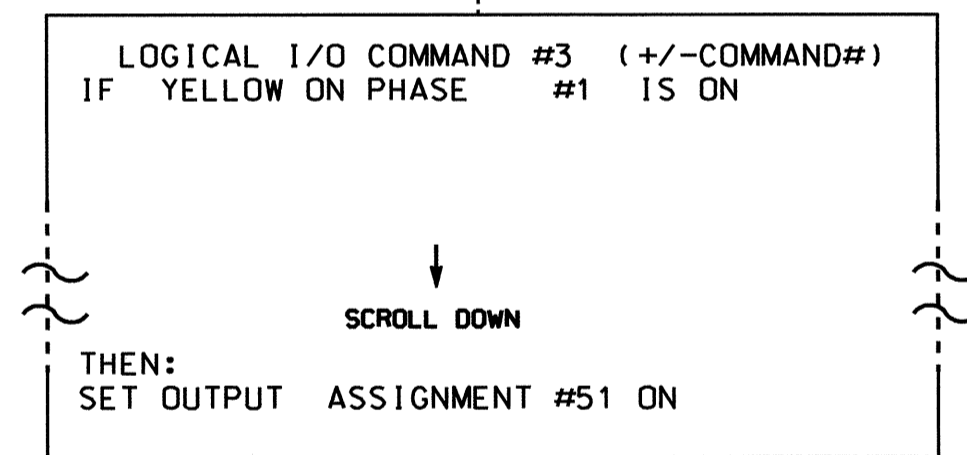
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```

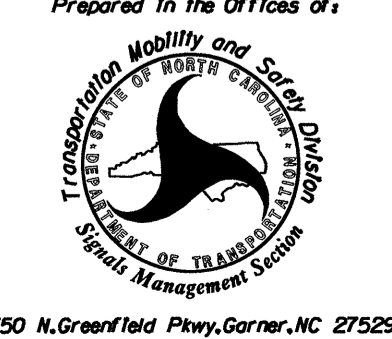
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

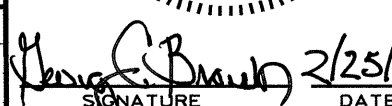
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

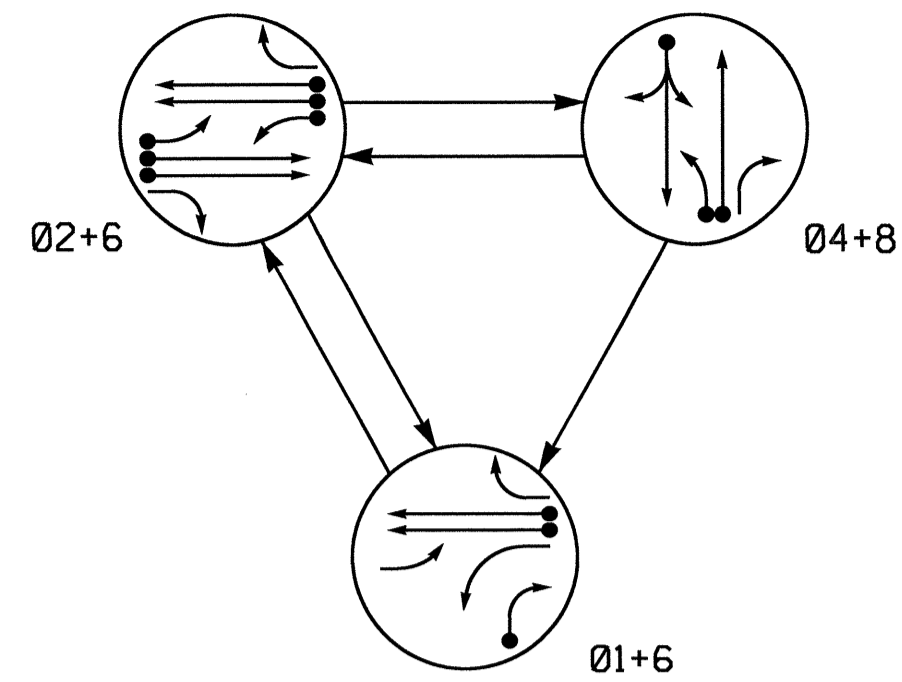
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1069T
DESIGNED: January 2013
SEALED: 2/22/13
REVISED: N/A

New Installation - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	NC 24 (Sunset Avenue) at Pierce Street/Service Road		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 3 PLAN DATE: February 2013 PREPARED BY: C. Strickland	Sampson County Clinton REVIEWED BY: T. J. J... REVIEWED BY:	

 2/25/13
 DATE
 SIG. INVENTORY NO. 03-1069T

PHASING DIAGRAM

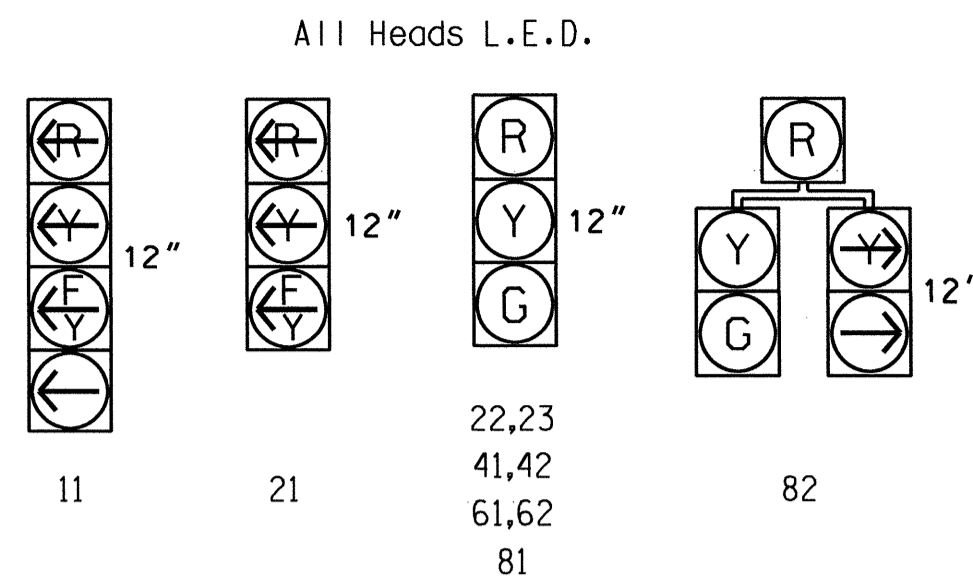


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	01+6	02+6	04+8	FLASH
11	Y	F	R	Y
21	F	Y	R	Y
22,23	R	G	R	Y
41,42	R	R	G	R
61,62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

SIGNAL FACE I.D.

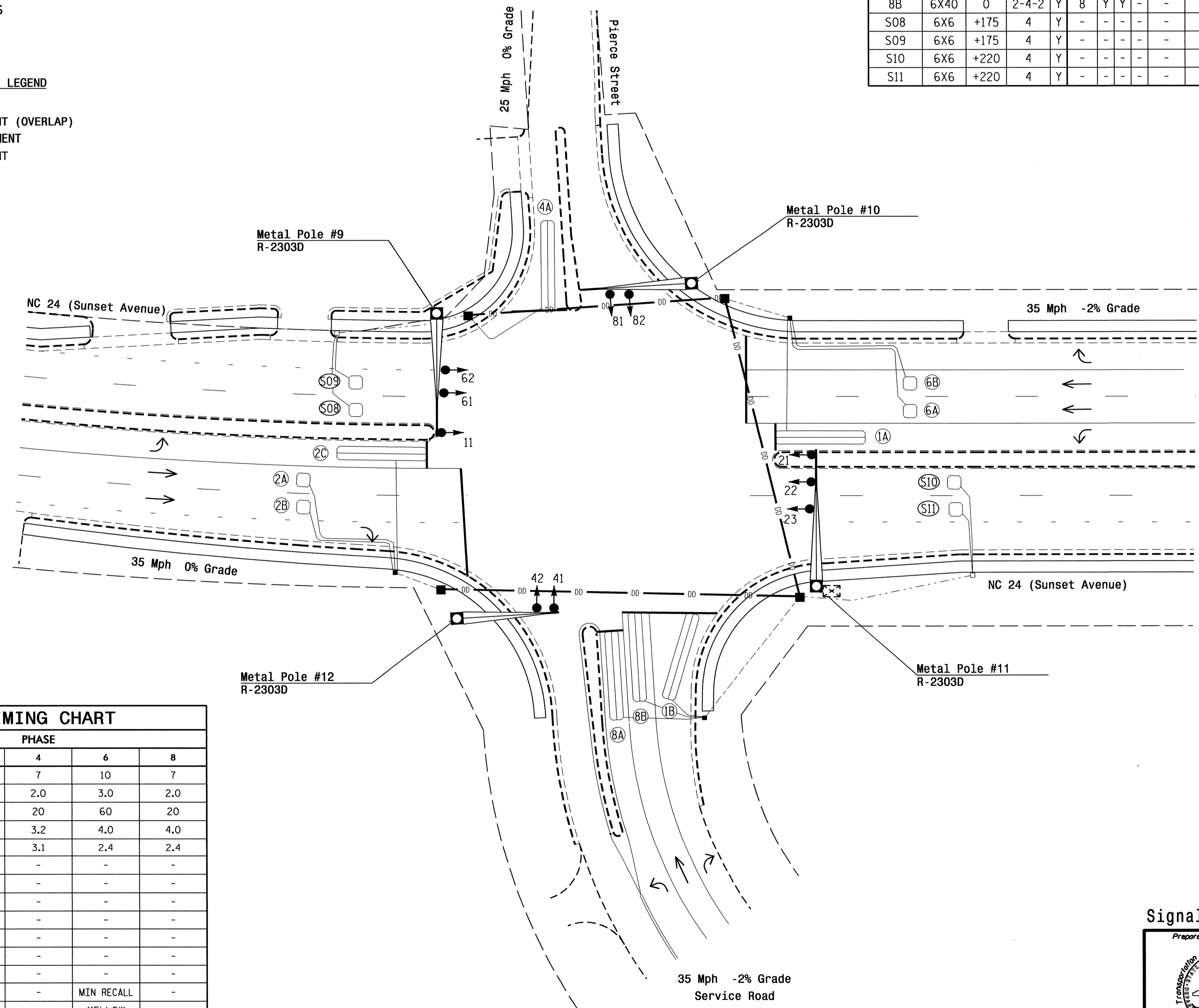


LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY		
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	15	-
2A,2B	6X6	70	4	Y	2	Y	Y	-	-	-
2C	6X40	0	2-4-2	Y	2	Y	Y	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	5	-
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	-
S08	6X6	+175	4	Y	-	-	-	-	-	Y
S09	6X6	+175	4	Y	-	-	-	-	-	Y
S10	6X6	+220	4	Y	-	-	-	-	-	Y
S11	6X6	+220	4	Y	-	-	-	-	-	Y

3 Phase Fully Actuated NC 24 (Sunset Avenue) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 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 #1069.



FEATURE	PHASE				
	1	2	4	6	8
Min Green 1 *	7	10	7	10	7
Extension 1 *	2.0	3.0	2.0	3.0	2.0
Max Green 1 *	20	60	20	60	20
Yellow Clearance	3.0	4.0	3.2	4.0	4.0
Red Clearance	2.4	2.4	3.1	2.4	2.4
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

PROPOSED	EXISTING
	N/A
N/A	
	N/A

Signal Upgrade - Phase II and Final

NC 24 (Sunset Avenue) At Pierce Street/Service Road

Division 3 Sampson County Clinton

PLAN DATE: January 2013 REVIEWED BY: JPG

PREPARED BY: I. O. Umozurike REVIEWED BY:

REVISIONS: INIT. DATE

SCALE: 1"=30'

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904

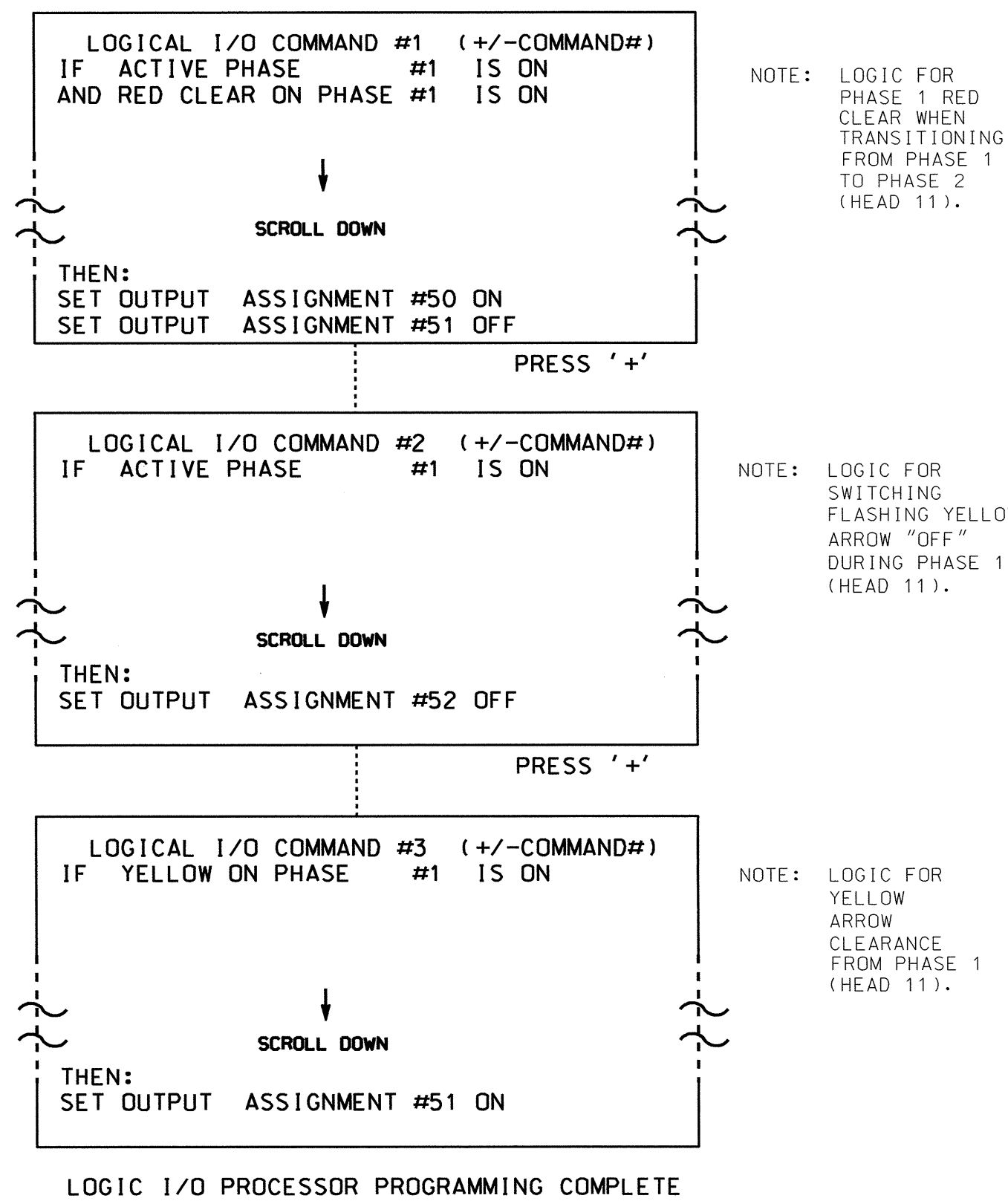
SIG. INVENTORY NO. 03-1069

22-EEB-2013 11-08 R:\Projects\2013\20130118\03-1069\03-1069.dgn J:\011\loway

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

OUTPUT REFERENCE SCHEDULE
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

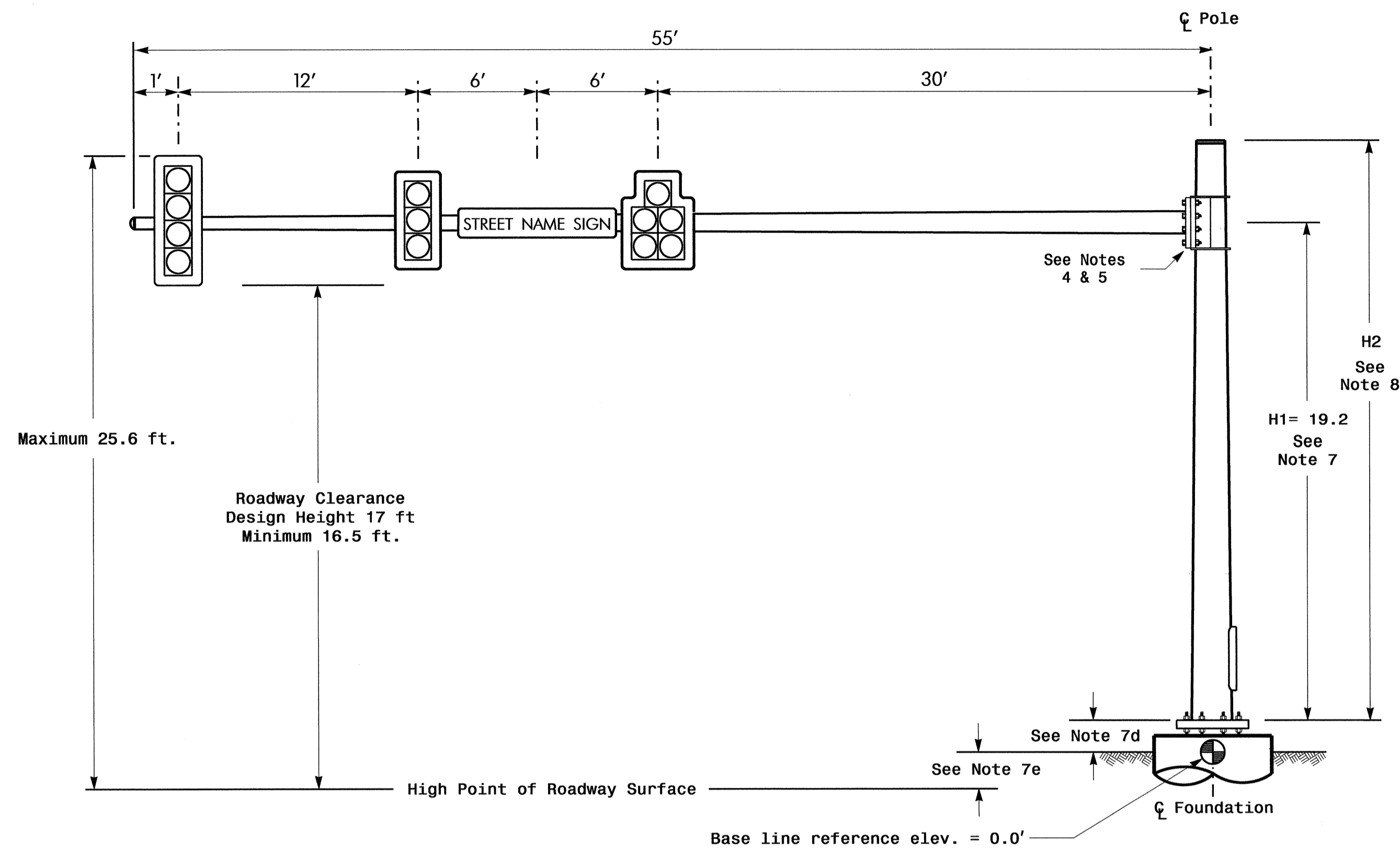
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1069
DESIGNED: January 2013
SEALED: 2/22/13
REVISED: N/A

Electrical Detail - Final - Sheet 2 of 2

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 24 (Sunset Avenue) at Pierce Street/Service Road</p>	<p>SEAL</p>						
	<p>Division 3 Sampson County Clinton</p> <p>PLAN DATE: February 2013 REVIEWED BY: T. Lynn</p> <p>PREPARED BY: C. Strickland REVIEWED BY:</p>							
<table border="1" style="width: 100%;"> <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>DATE: 2/25/13</p> <p>SIGNATURE: <i>George C. Brown</i></p>
REVISIONS	INIT.	DATE						
<p style="text-align: right;">SIG. INVENTORY NO. 03-1069</p>								

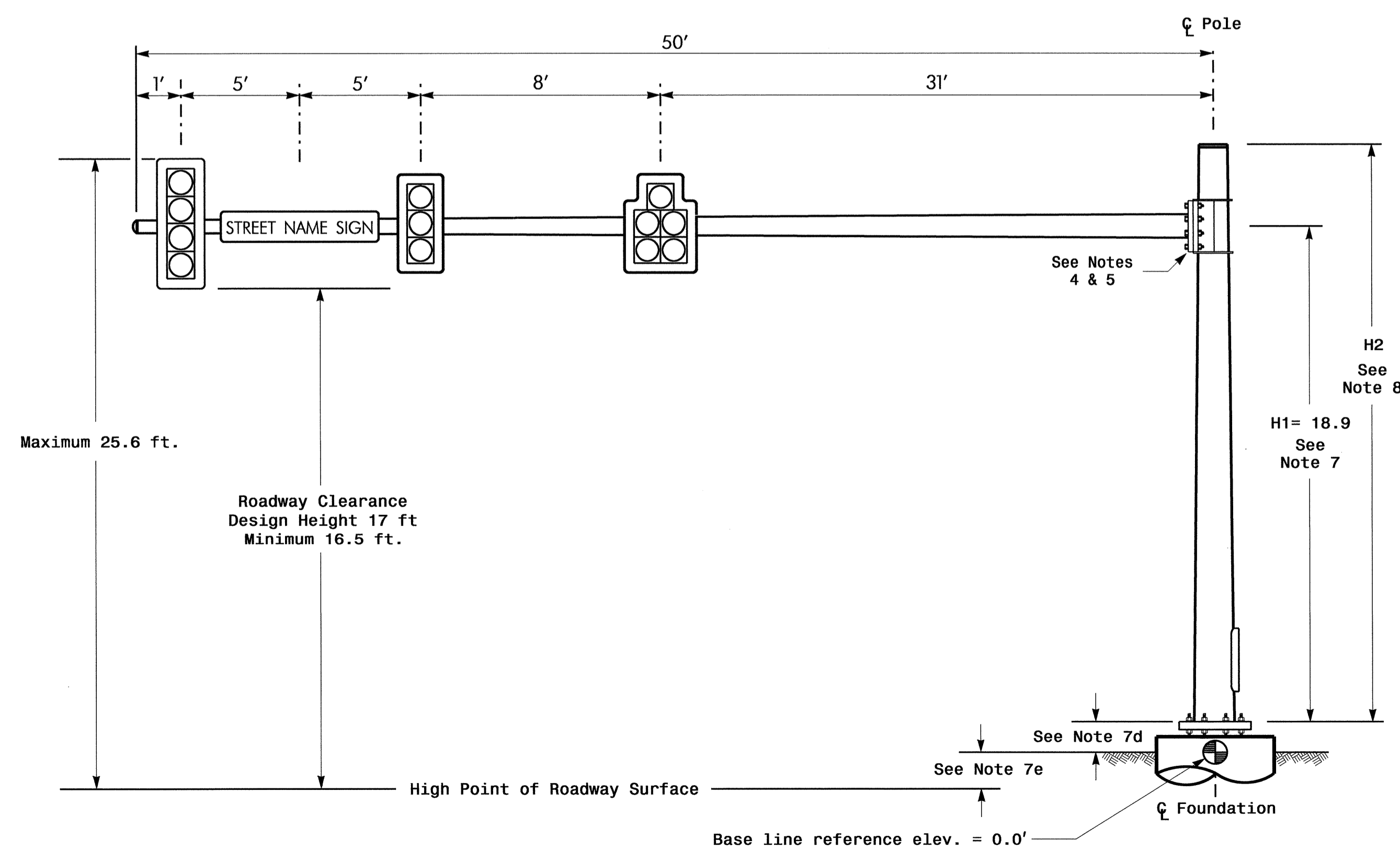
20-FEB-2013 13:11 S:\ITS\AS\175-1\p001\work\groups\sig.Memo\FTR\okland\031069_sml.ele.xxx.dgn

Design Loading for METAL POLE NO. 9



Elevation View

Design Loading for METAL POLE NO. 10



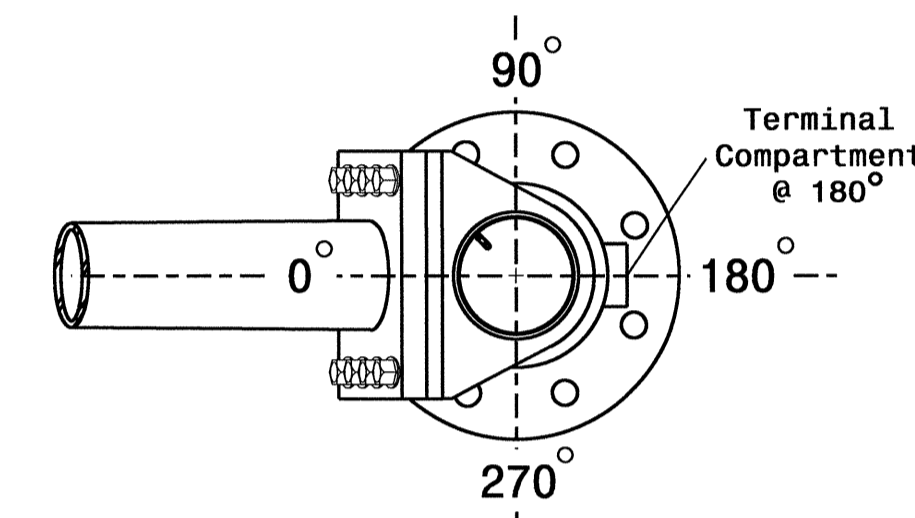
Elevation View

SPECIAL NOTE

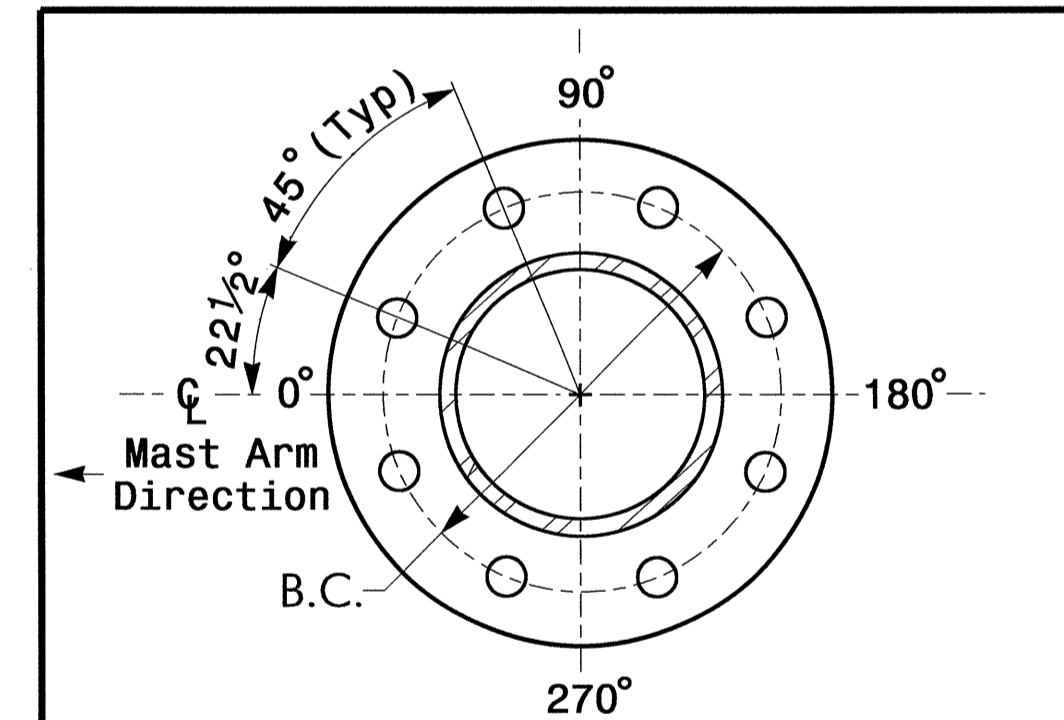
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 9	Pole 10
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.2 ft.	-0.1 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

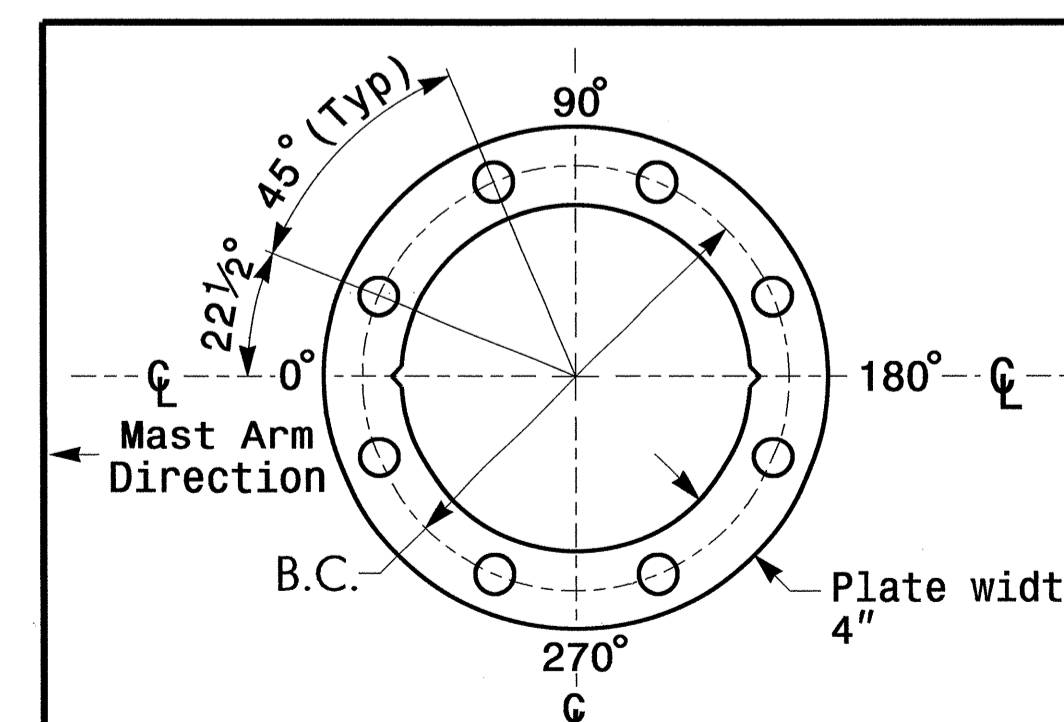


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.

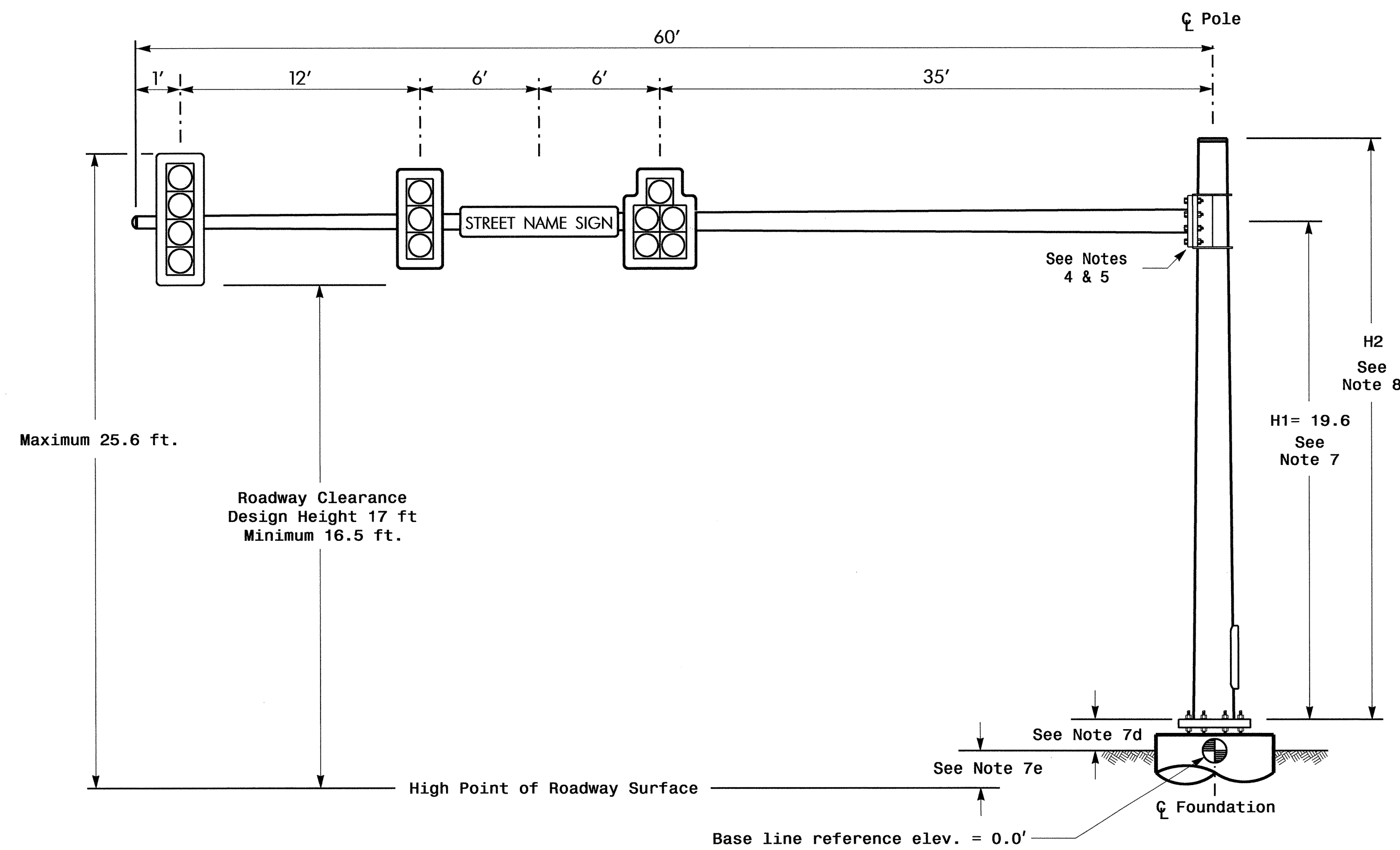
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

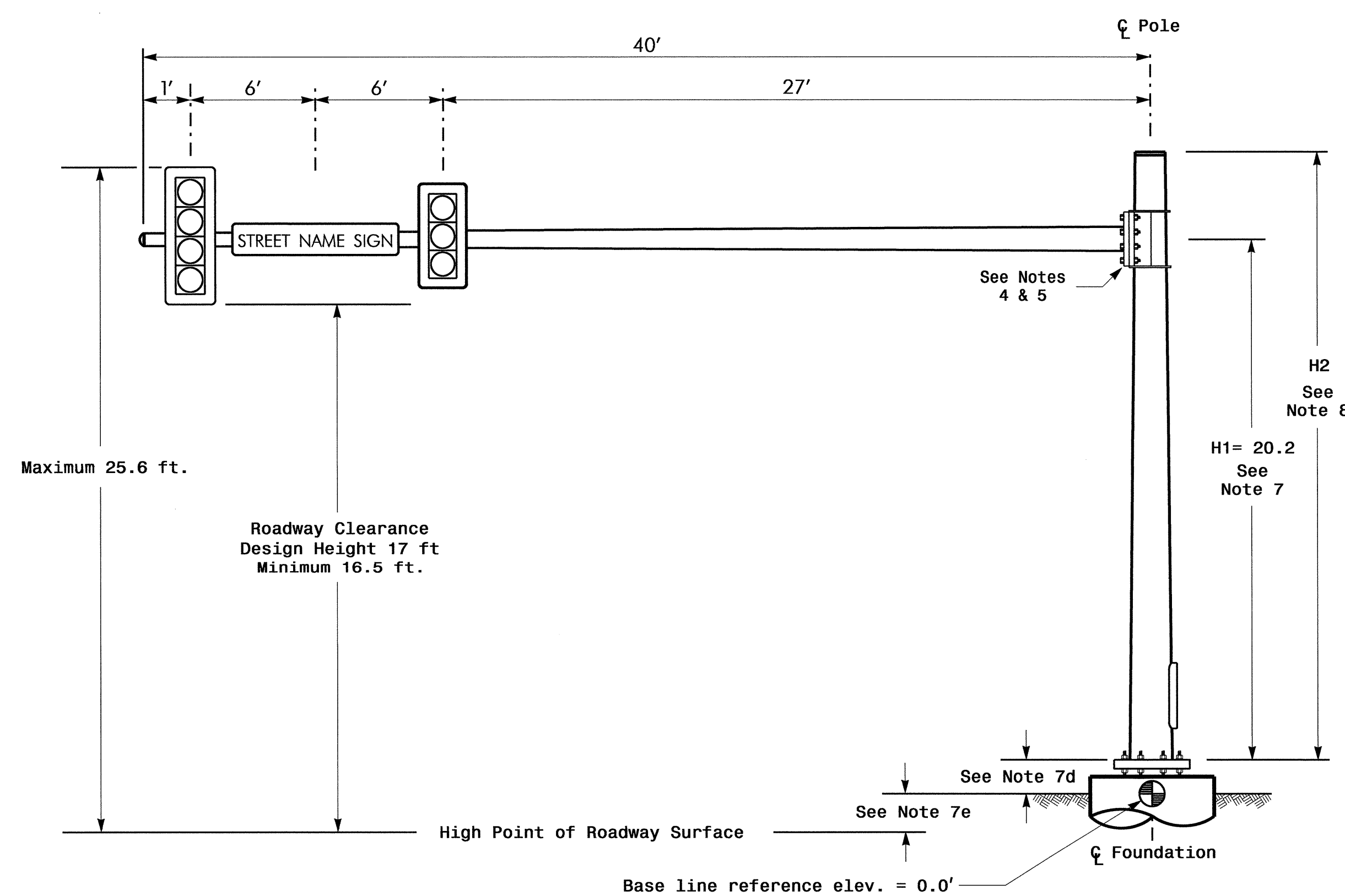
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 24 (Sunset Avenue) At Pierce Street/Service Road</p>		<p>SEAL</p>			
	<p>Division 3 Sampson County Clinton</p> <p>PLAN DATE: January 2013 REVIEWED BY: J. P. Galloway</p> <p>PREPARED BY: I. O. Umozurike REVIEWED BY:</p>	<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>		INIT.	DATE	
INIT.	DATE					

Design Loading for METAL POLE NO. 11



Elevation View

Design Loading for METAL POLE NO. 12



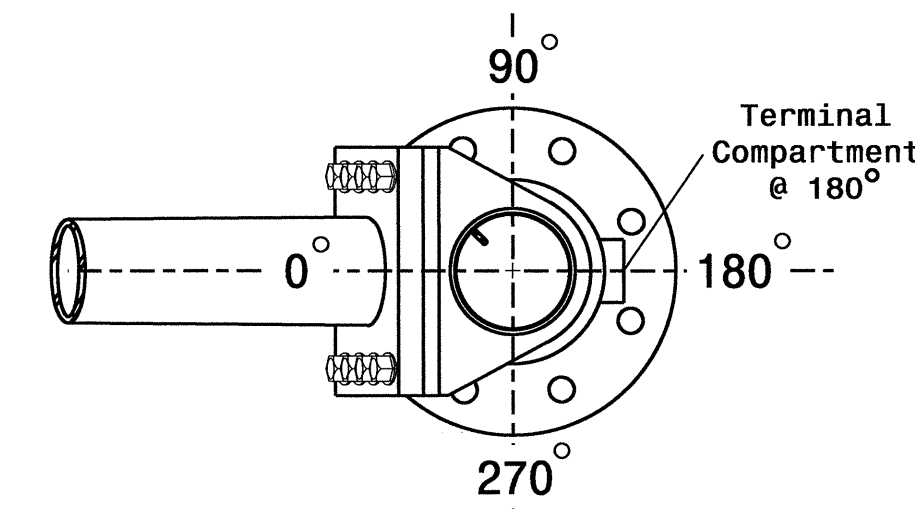
Elevation View

SPECIAL NOTE

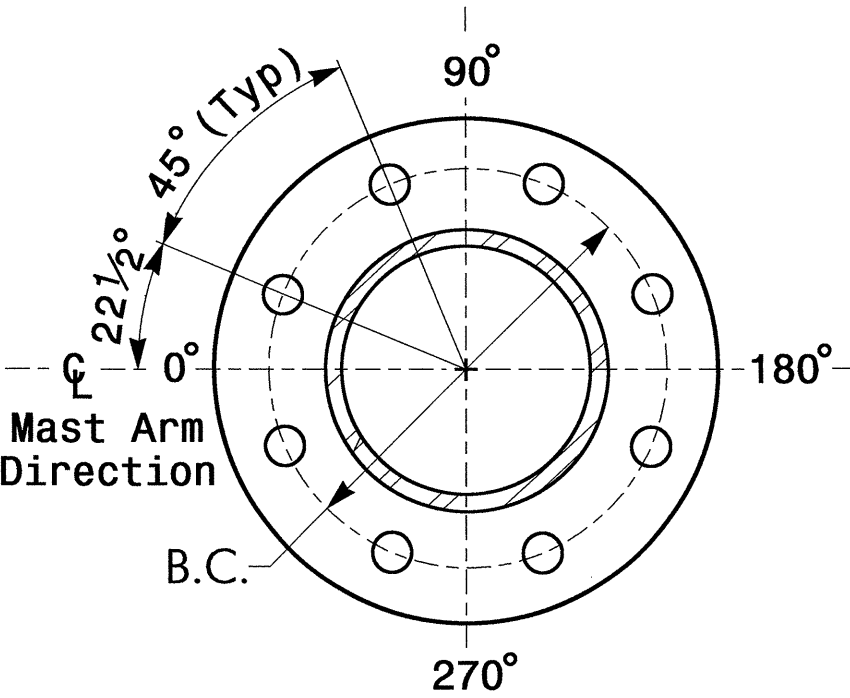
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Elevation Data for Mast Arm Attachment (H1)

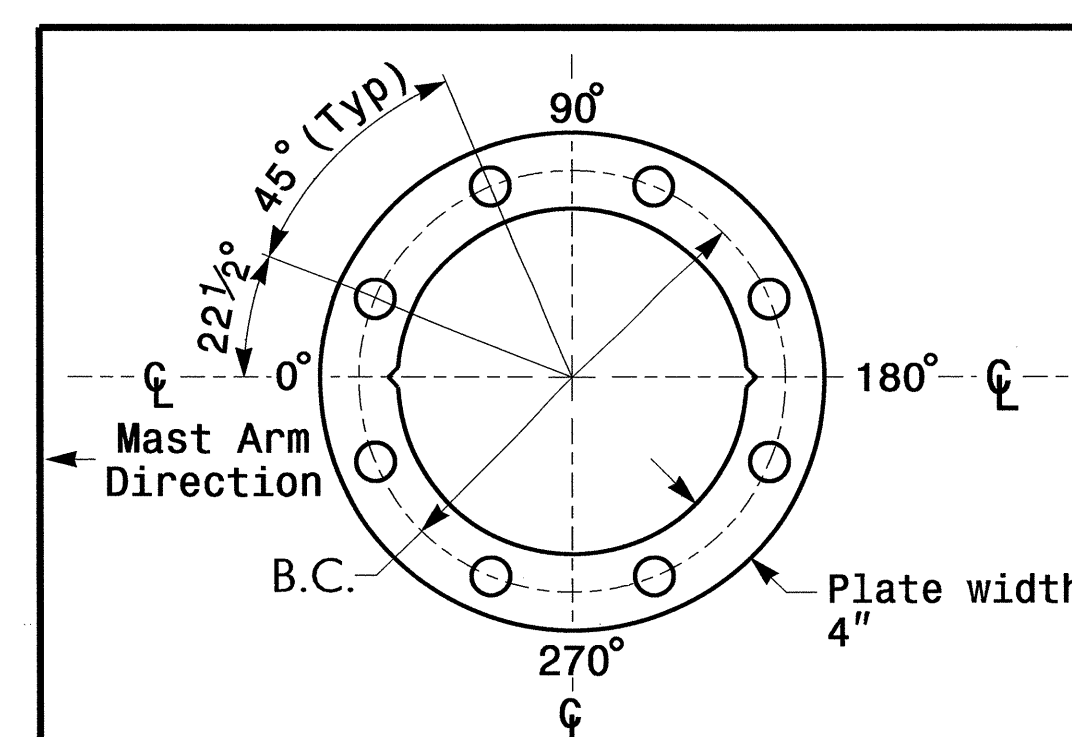
Elevation Differences for:	Pole 10	Pole 11
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.6 ft.	+1.2 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

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- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

Prepared in the Offices of:

NC 24 (Sunset Avenue)
At
Pierce Street/Service Road

Division 3 Sampson County
PLAN DATE: January 2013 REVIEWED BY: J. P. Galloway
PREPARED BY: I. O. Umozurike REVIEWED BY:

750 N. Greenfield Phyllis, Garner, NC 27526

SCALE: 0 N/A
N/A

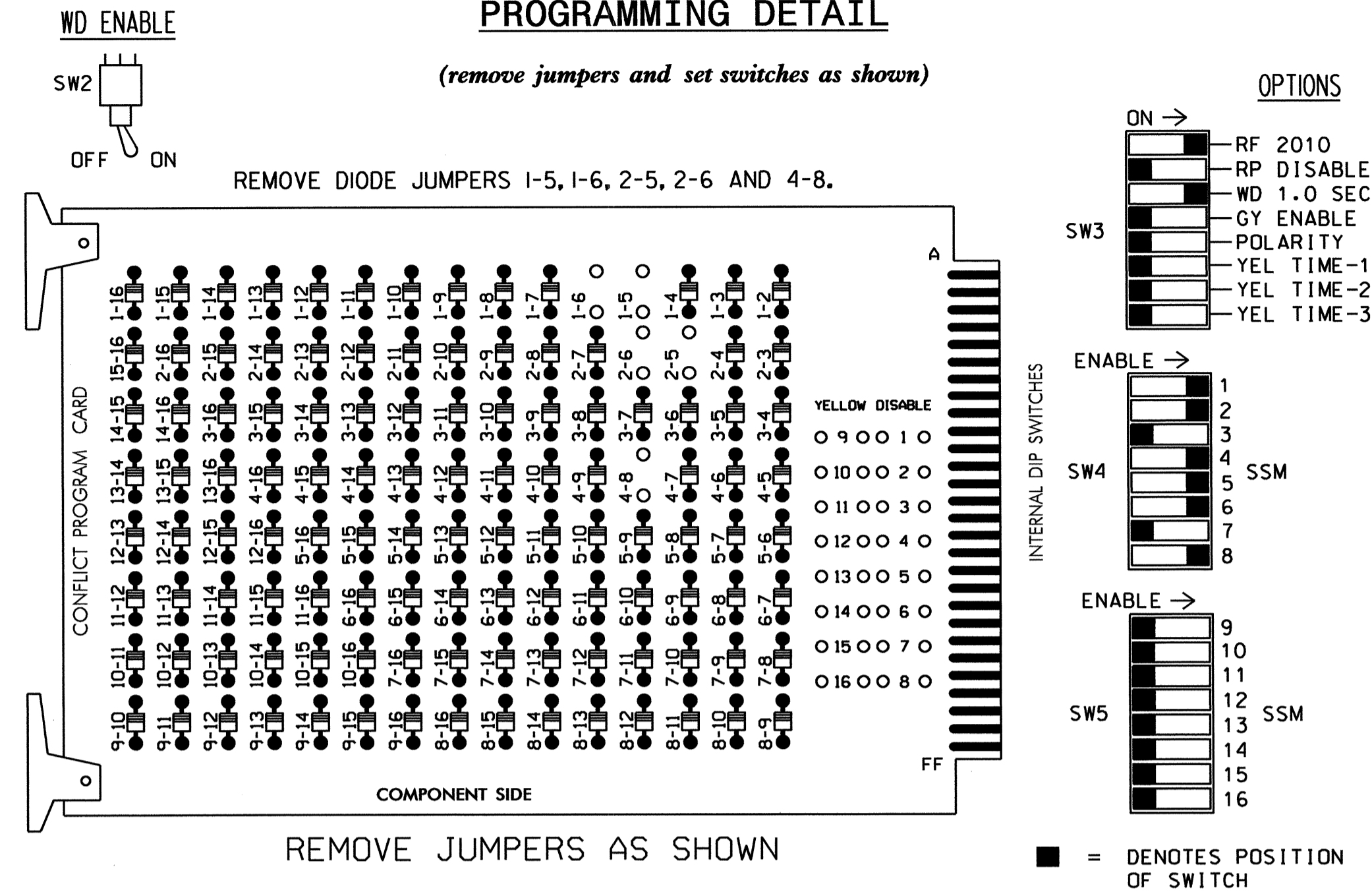
REVISIONS: INIT. DATE

SEAL: J. P. GALLOWAY
ENGINEER
2/27/13

SIG. INVENTORY NO. 03-1069

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



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.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....McCain/CONTROL TECHNOLOGIES (DWG.NO.9500-332-NCDOT)
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
 PHASES USED.....1,2,4,5,6,8
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61,82	21, 22,23	NU	NU	41,42	NU	21,42	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	126						132					
GREEN ARROW	127						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)

- 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 Functions Menu press '2' (Dynamic/Backup Control Functions).

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

BACKUP PROTECTION PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
 ST = STOP TIME

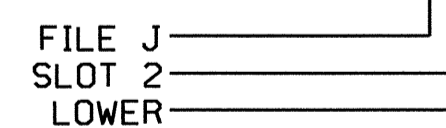
INPUT FILE CONNECTION & PROGRAMMING CHART

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 ¹	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A,2B	TB4-1,2	I4U	47	9	22	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A ²	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
5B	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A,6B	TB5-1,2	J4U	48	10	26	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3

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

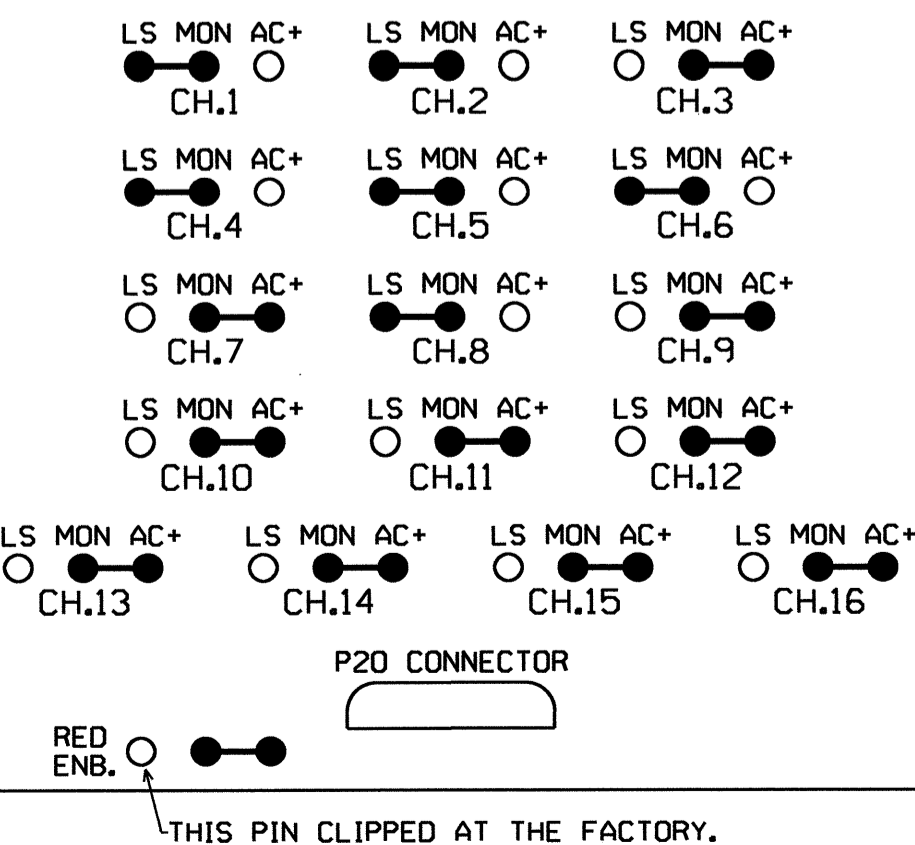
²Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

INPUT FILE POSITION LEGEND: J2L



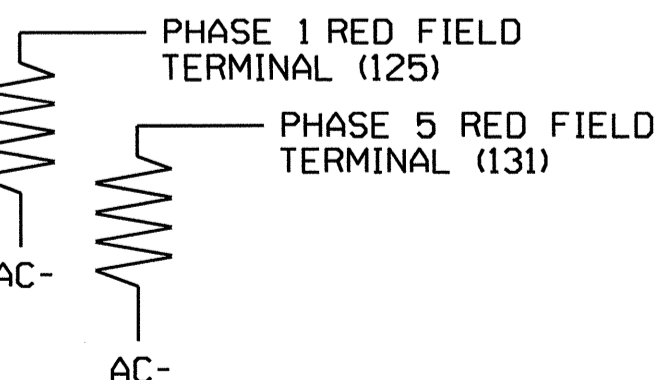
RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



LOAD RESISTOR INSTALLATION DETAIL

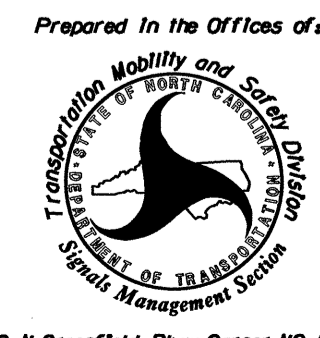
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



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.

Electrical Detail - Temp

ELECTRICAL AND PROGRAMMING DETAILS FOR:



750 N. Grantfield Pkwy, Garner, NC 27529

NC 24 (Sunset Avenue)
 at
 Shamrock Plaza Entrance/
 KFC Entrance

Division 3 Sampson County Clinton

PLANNED BY: February 2013 REVIEWED BY: T. J. J. J.

PREPARED BY: C. Strickland REVIEWED BY:

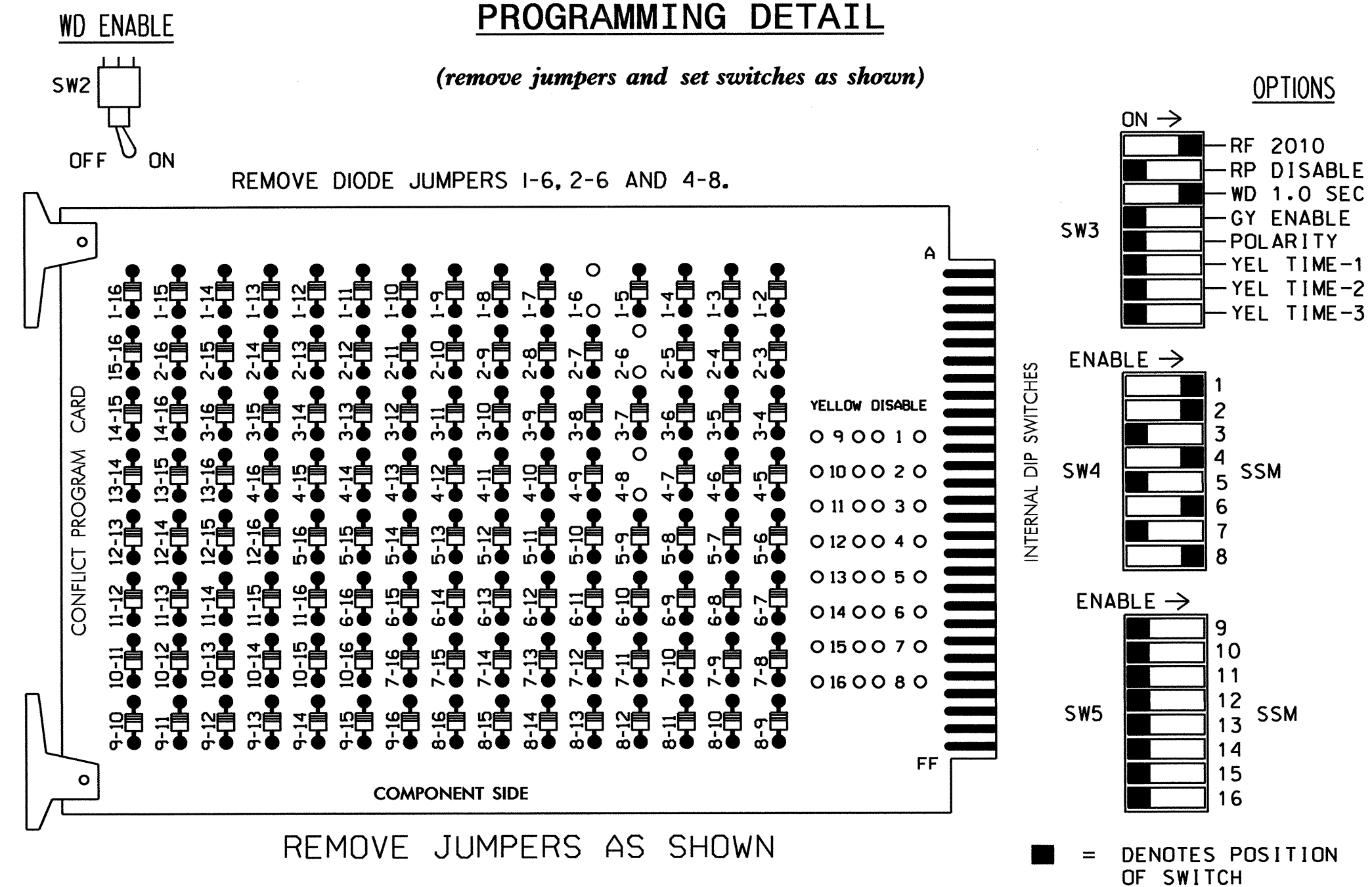
REVISIONS INIT. DATE



SIG. INVENTORY NO. 03-0826T

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61,82	21, 22,23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED	*	128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

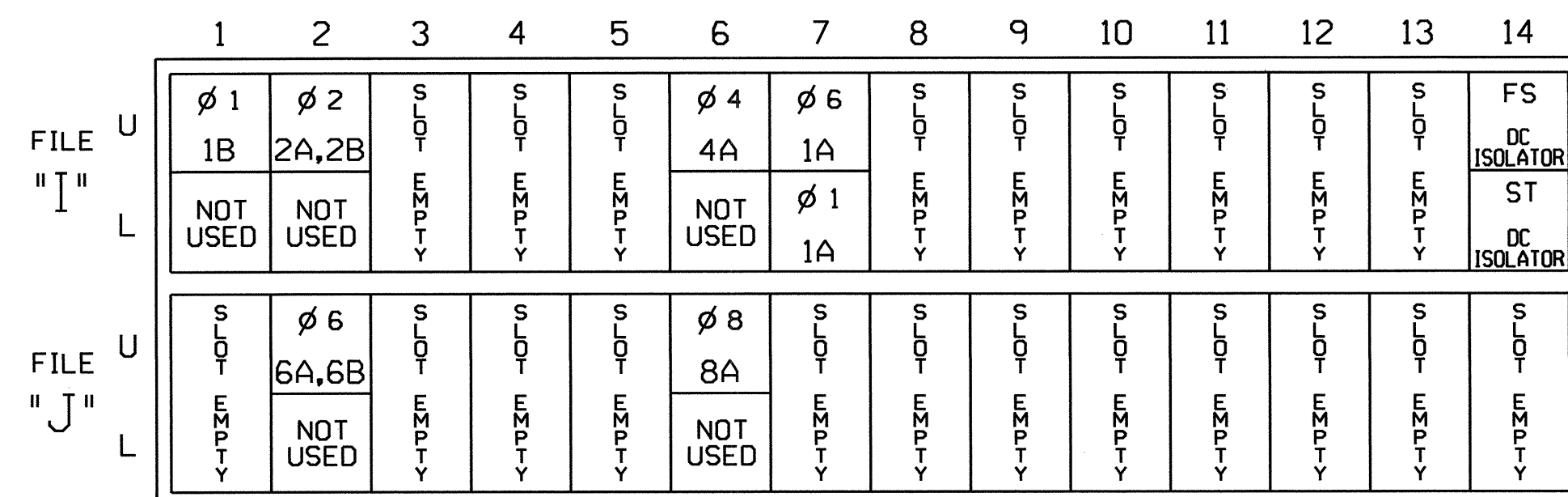
- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

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

BACKUP PROTECTION PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

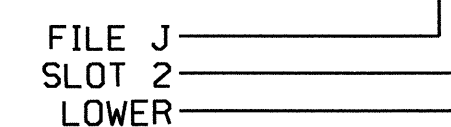


INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB6-1,2	I7U	65	27	34	6	Y	Y			
	TB6-3,4	I7L	78	40	44	1	Y	Y			15
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3

¹ Install jumpers from TB6-1 to TB6-3, and from TB6-2 to TB6-4

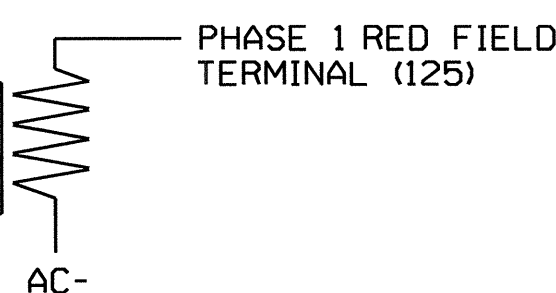
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



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

Electrical Detail - Temp

Electrical and Programming Details for: NC 24 (Sunset Avenue) at Shield Street/Coharie Plaza

Division 3 Sampson County Clinton

Prepared In the Office of: [Signature]

PLAN DATE: February 2013 REVIEWED BY: [Signature]

PREPARED BY: C. Strickland REVIEWED BY: [Signature]

REVISIONS: [Table with columns for REVISIONS, INIT., DATE]

750 N. Greenfield Pkwy, Garner, NC 27529

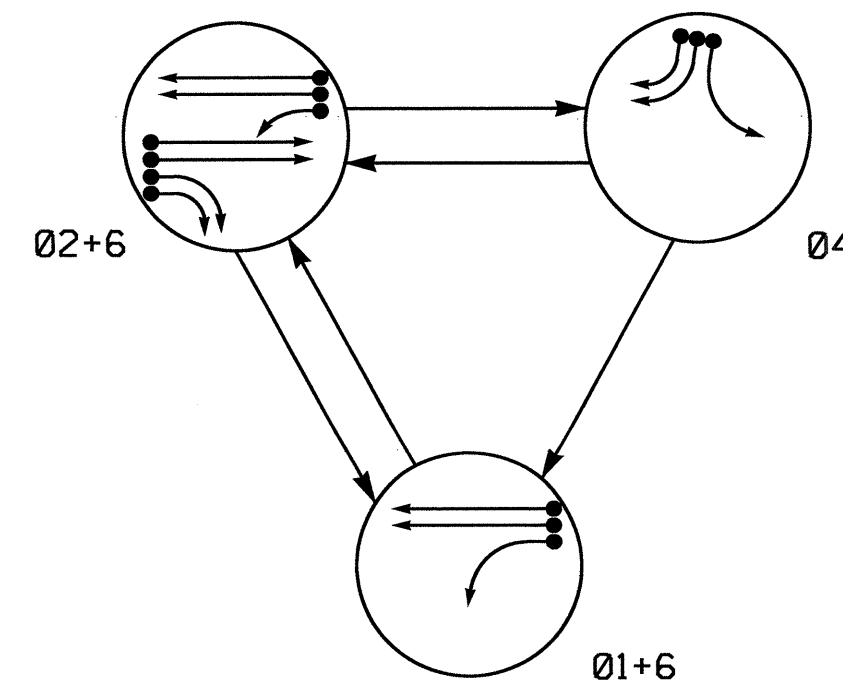
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0344T
 DESIGNED: December 2012
 SEALED: 2/20/13
 REVISED: N/A

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

Signature: [Signature] DATE: 2/25/13

SIG. INVENTORY NO. 03-0344T

PHASING DIAGRAM



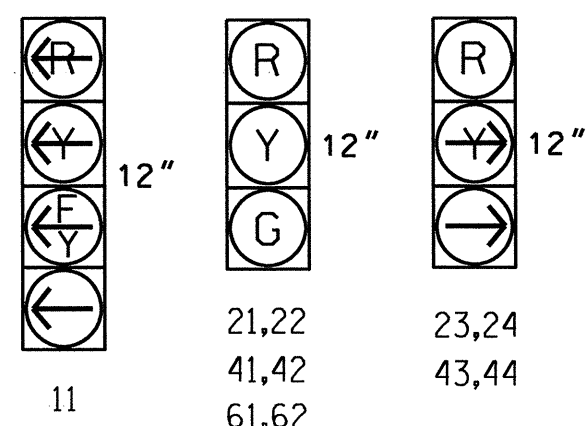
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	01+6	02+6	04	FLASH
11	←	←	←	←
21,22	R	G	R	Y
23,24	R	←	R	Y
41,42	R	R	G	R
43,44	R	R	←	R
61,62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

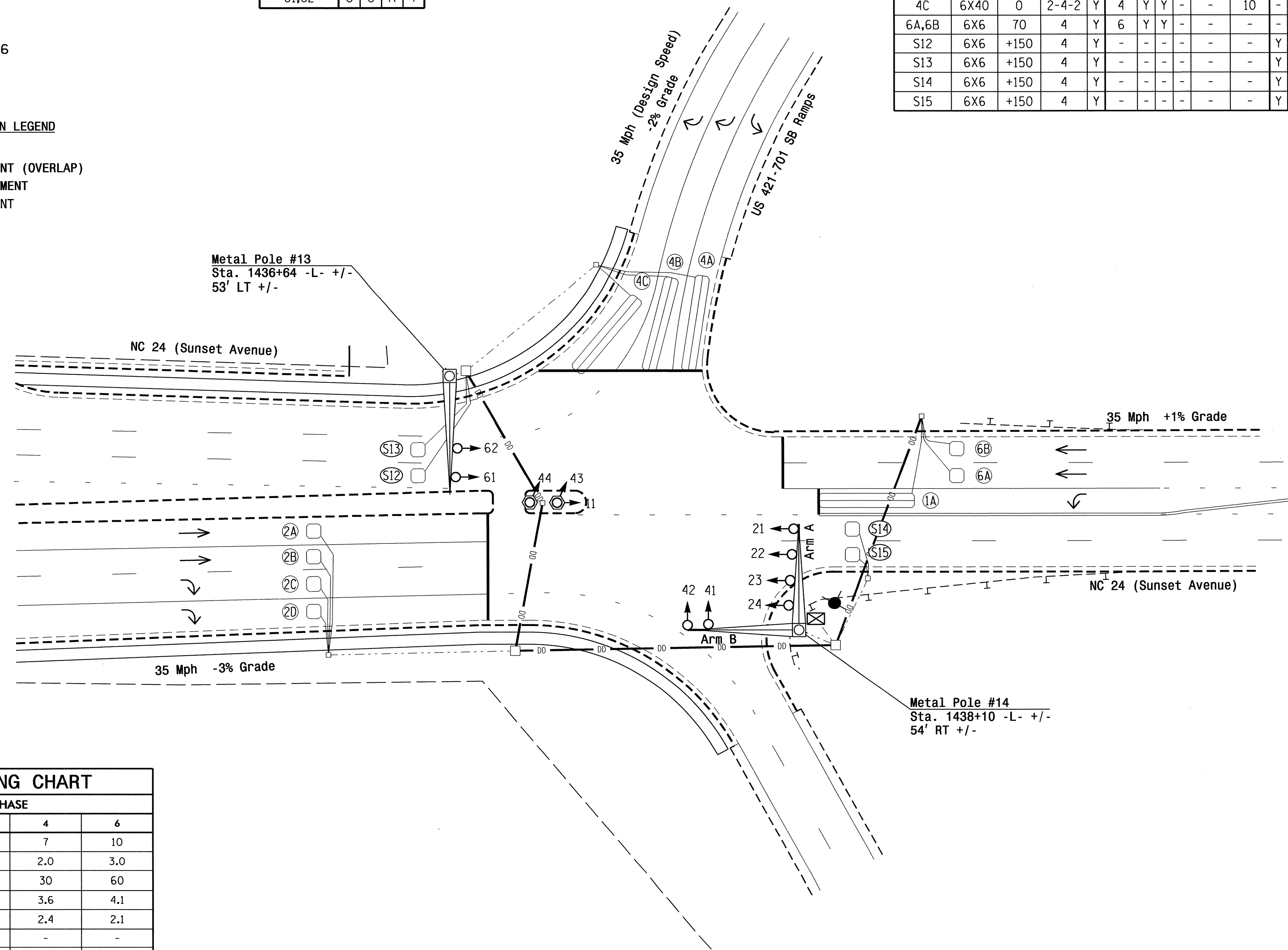


LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CAB	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
2A,2B	6X6	70	4	Y	2	Y	Y	-	-	-	Y
2C,2D	6X6	70	4	Y	2	Y	Y	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	10	-	Y
4C	6X40	0	2-4-2	Y	4	Y	Y	-	10	-	Y
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-	Y
S12	6X6	+150	4	Y	-	-	-	-	-	-	Y
S13	6X6	+150	4	Y	-	-	-	-	-	-	Y
S14	6X6	+150	4	Y	-	-	-	-	-	-	Y
S15	6X6	+150	4	Y	-	-	-	-	-	-	Y

3 Phase Fully Actuated NC 24 (Sunset Avenue) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- 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 #1068.



OASIS 2070L TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	15	60	30	60
Yellow Clearance	3.0	4.1	3.6	4.1
Red Clearance	2.8	2.1	2.4	2.1
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

- | | | | |
|-----|---|-----|---|
| ○→ | PROPOSED Traffic Signal Head | ●→ | EXISTING Traffic Signal Head |
| ○→ | PROPOSED Modified Signal Head | N/A | EXISTING Modified Signal Head |
| ↓ | PROPOSED Sign | ↓ | EXISTING Sign |
| ↓ | PROPOSED Pedestrian Signal Head With Push Button & Sign | ↓ | EXISTING Pedestrian Signal Head With Push Button & Sign |
| ○→ | PROPOSED Signal Pole with Guy | ○→ | EXISTING Signal Pole with Guy |
| ○→ | PROPOSED Signal Pole with Sidewalk Guy | ○→ | EXISTING Signal Pole with Sidewalk 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 |
| N/A | PROPOSED Right of Way | --- | EXISTING Right of Way |
| → | PROPOSED Directional Arrow | → | EXISTING Directional Arrow |
| → | PROPOSED Directional Drill | N/A | EXISTING Directional Drill |
| ○ | PROPOSED Type II Signal Pedestal | ○ | EXISTING Type II Signal Pedestal |
| ○ | PROPOSED Metal Pole with Mastarm | ○ | EXISTING Metal Pole with Mastarm |

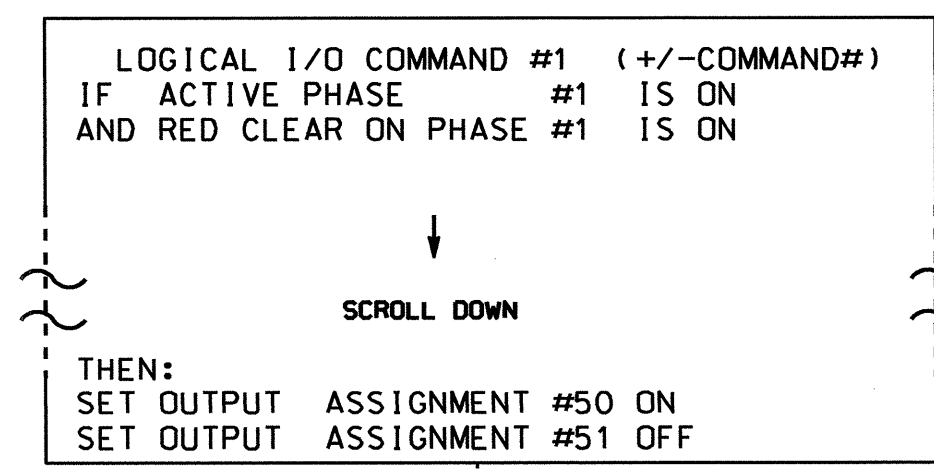
New Installation - Phase II and Final

<p>750 N. Greenfield Parkway, Corner, NC 27529</p>	<p>NC 24 (Sunset Avenue) At US 421-701 SB Ramps</p>		<p>SEAL</p>	
	<p>Division 3 Sampson County Clinton</p>	<p>REVIEWED BY: J. P. Galloway</p>		
	<p>PLAN DATE: January 2013</p>	<p>REVIEWED BY:</p>		
	<p>PREPARED BY: I. O. Umozurike</p>	<p>REVIEWED BY:</p>		
<p>REVISIONS</p>		<p>INIT.</p>	<p>DATE</p>	
<p>SCALE 0 30 1"=30'</p>		<p>2/20/13 DATE</p>		
<p>SIGNATURE</p>		<p>SIG. INVENTORY NO. 03-1068</p>		

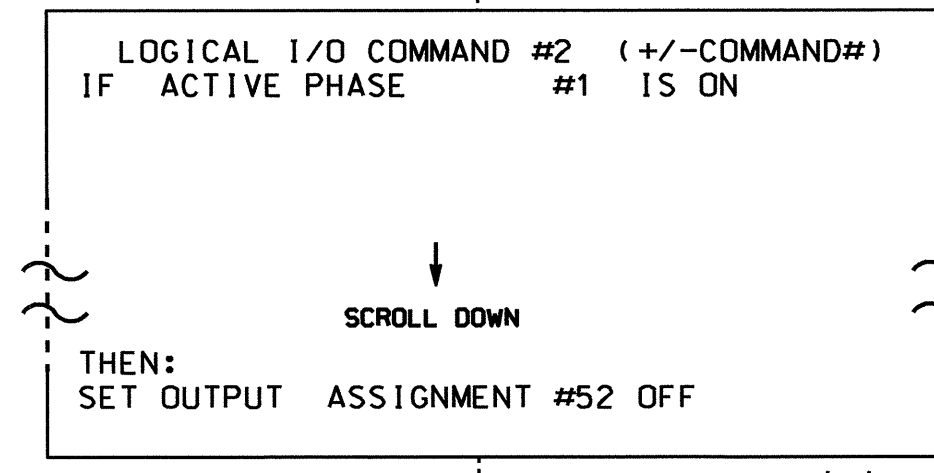
**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

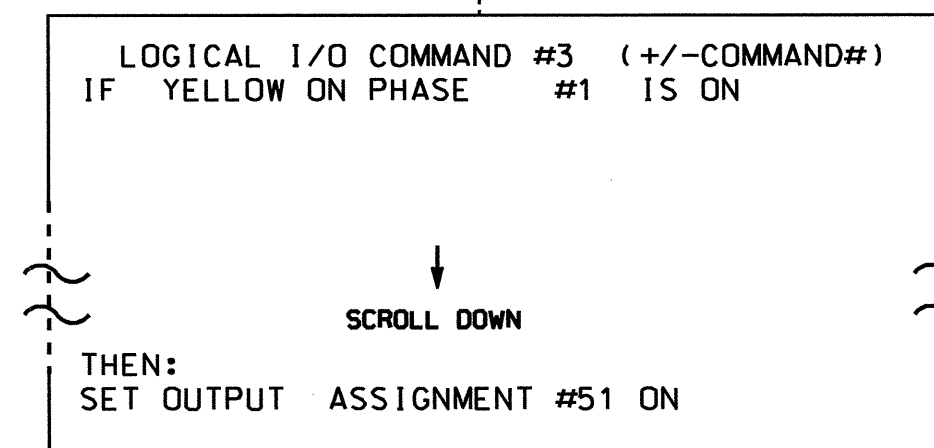
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
OUTPUT 50	= Overlap A Red
OUTPUT 51	= Overlap A Yellow
OUTPUT 52	= Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

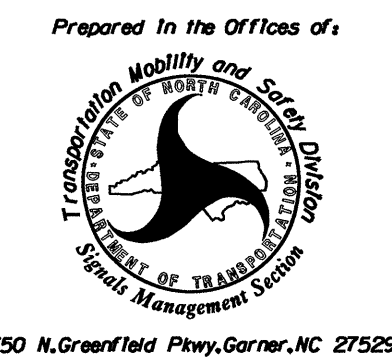
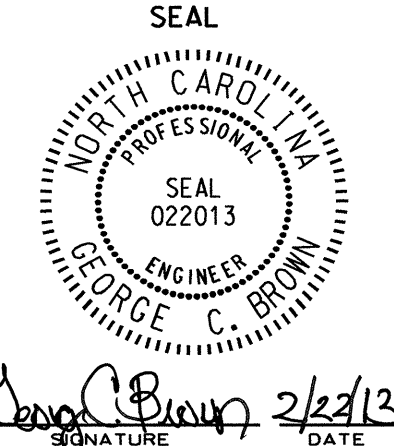
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS: |XX
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR:  - RED  - YELLOW  - GREEN
FLASH COLORS:   - RED  - YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
  
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1068
DESIGNED: January 2013
SEALED: 2/20/13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

	NC 24 (Sunset Avenue) at US 421-701 SB Ramps			
	Division 3 Sampson County Clinton	PLAN DATE: January 2013 REVIEWED BY: <i>T. J. J.</i>	PREPARED BY: C. Strickland REVIEWED BY:	REVISIONS INIT. DATE
	Prepared in the Offices of:	Signature: <i>George C. Brown</i> Date: 2/21/13	Signature: _____ Date: _____	_____
	750 N. Grandfield Pkwy, Garner, NC 27529	SIG. INVENTORY NO. 03-1068	_____	_____

SPECIAL NOTE
 The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

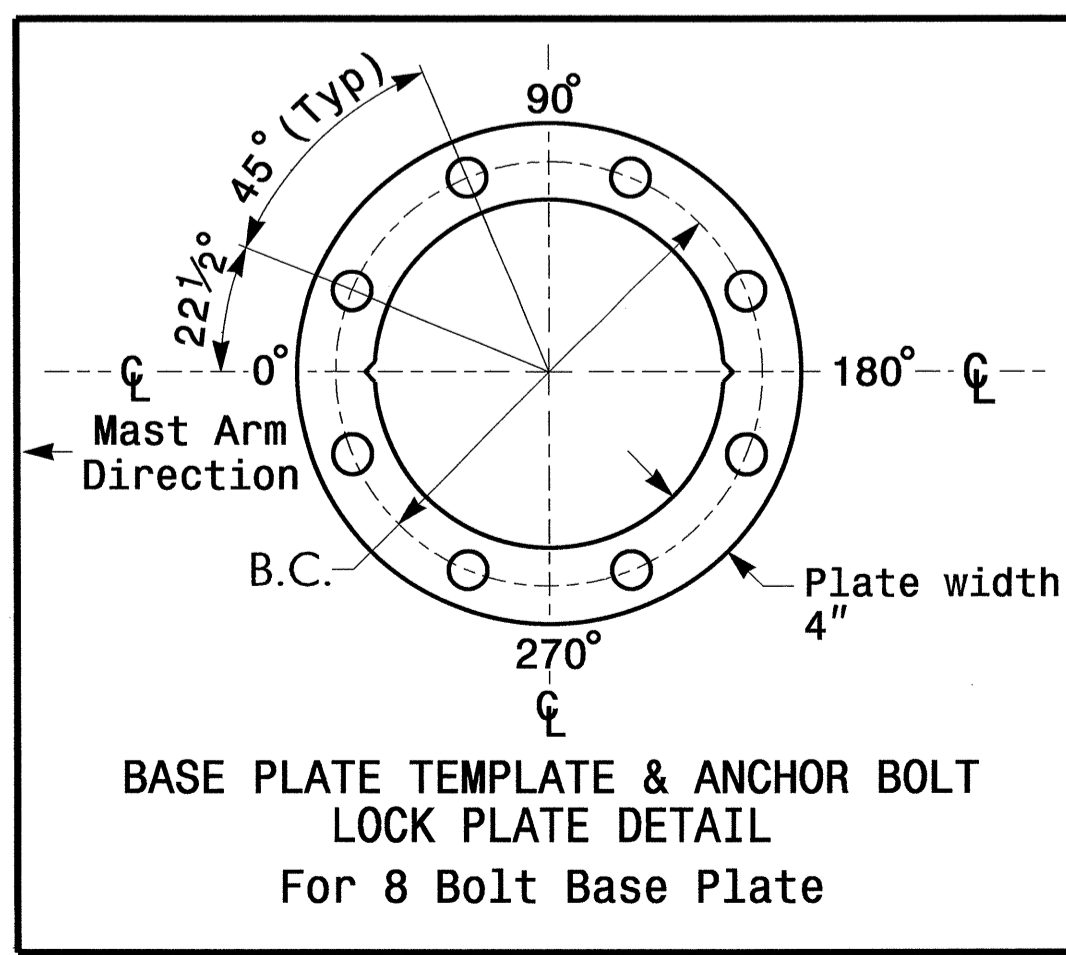
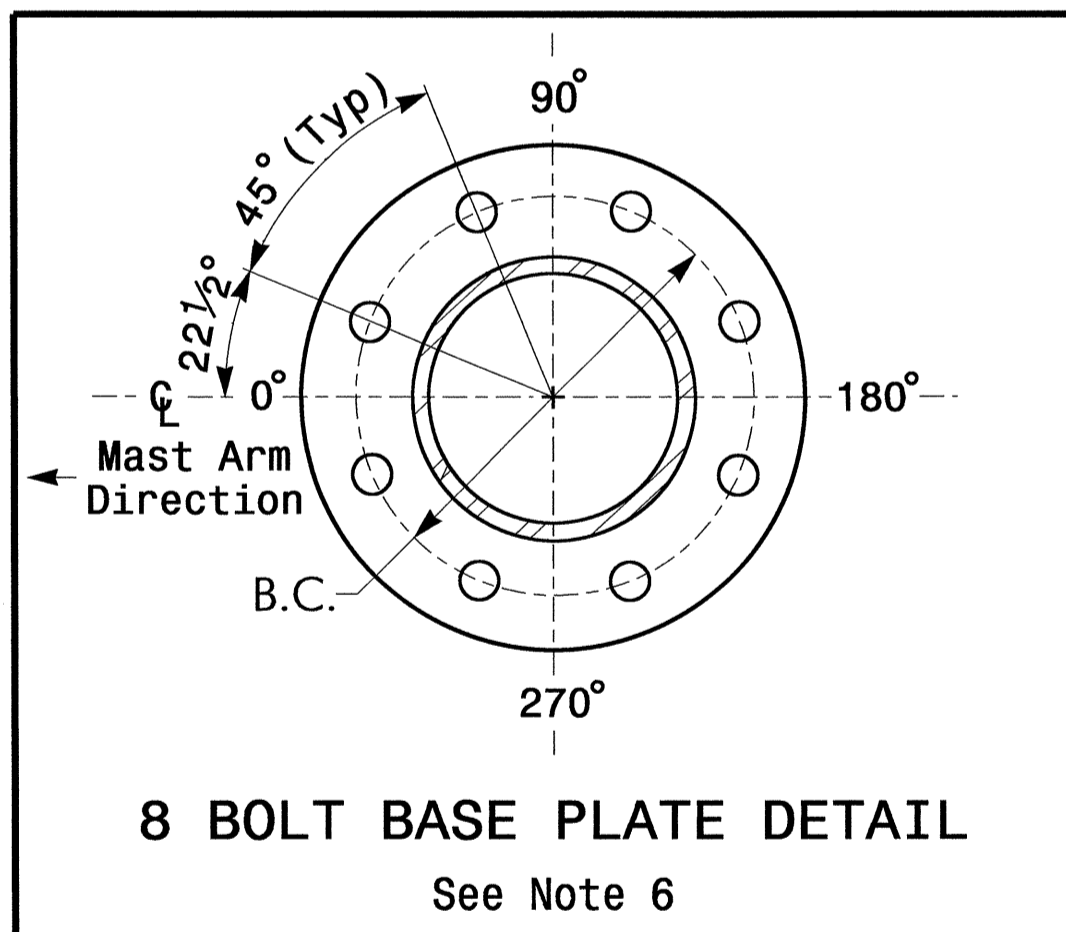
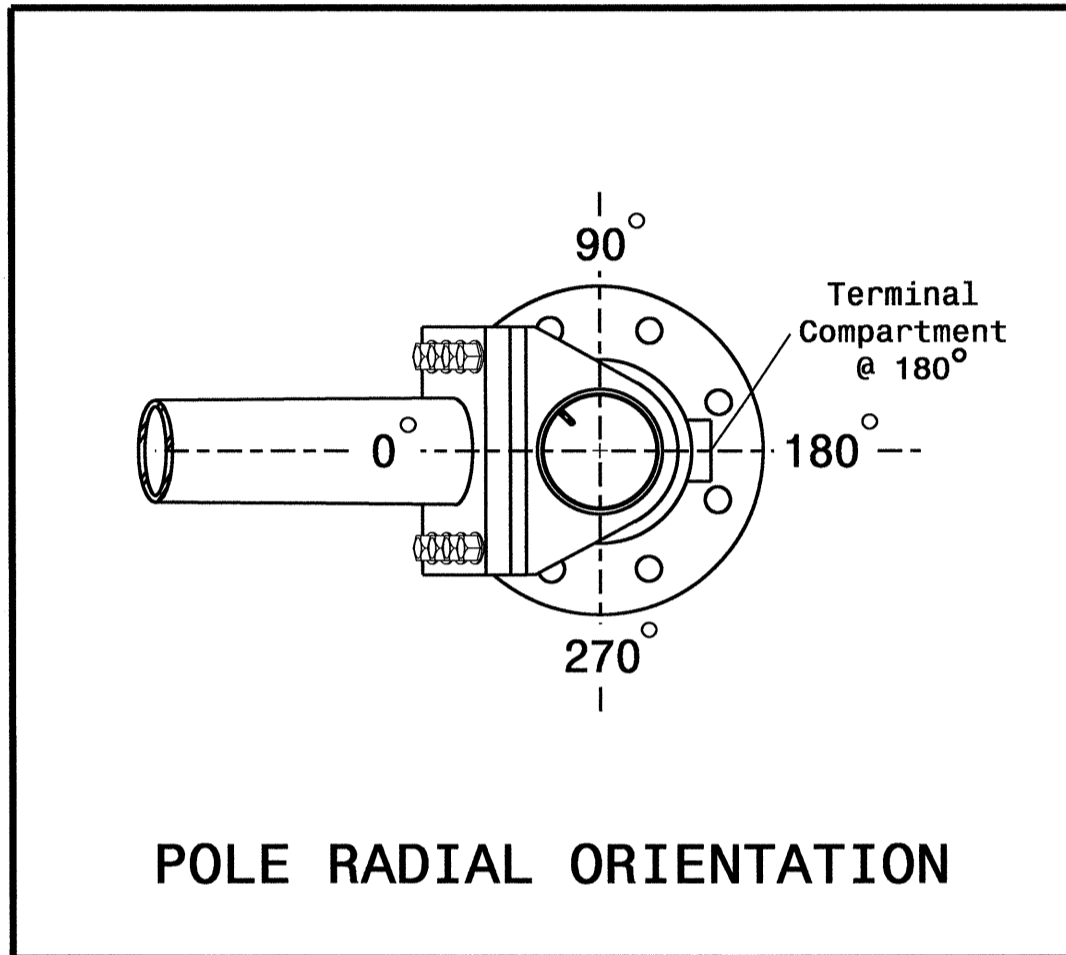
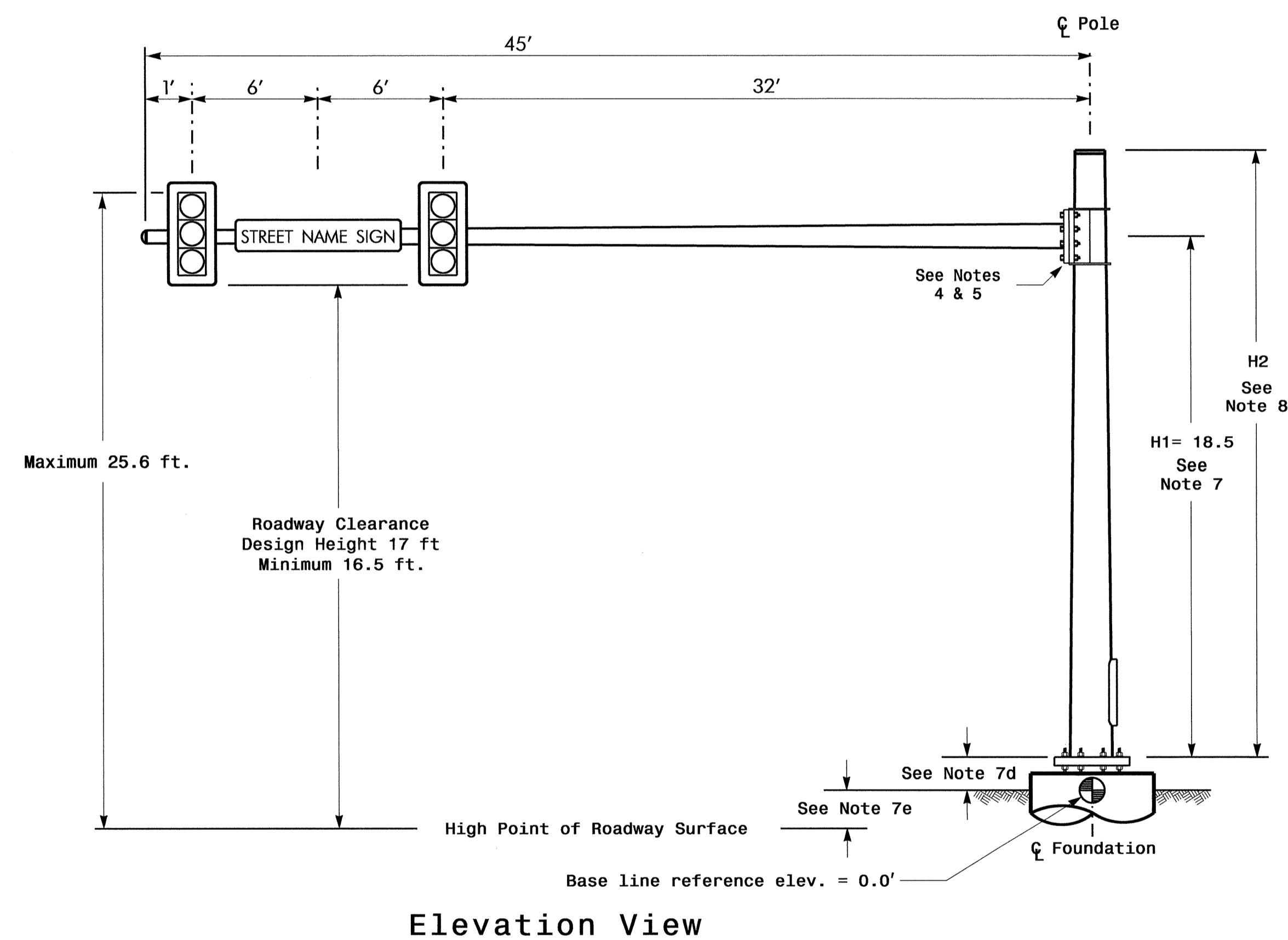
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 12
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

Design Loading for METAL POLE NO. 13



NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.

Design Requirements

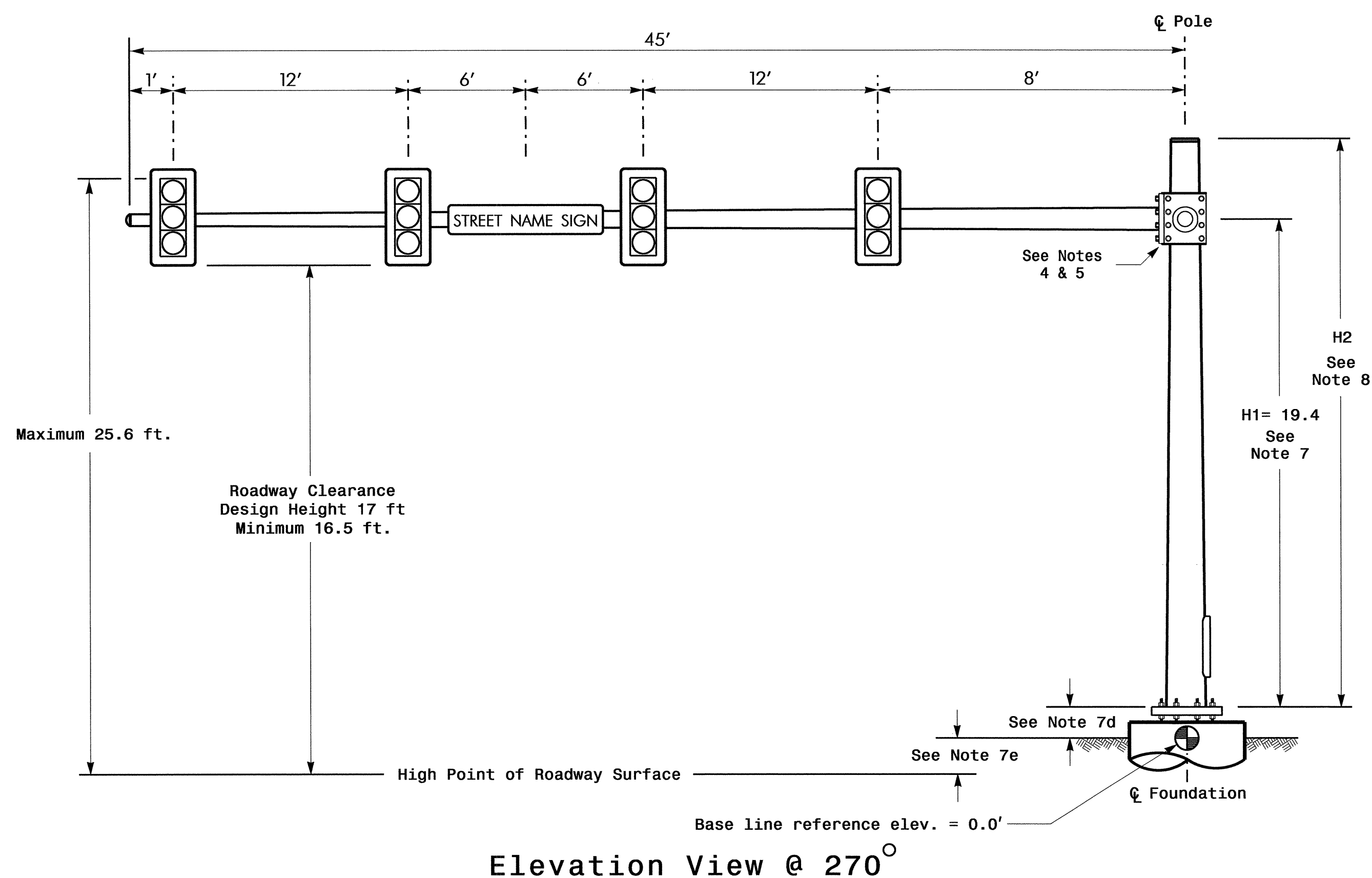
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

<p>Prepared In the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION SIGNALS & GEOMETRICS SECTION 750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 24 (Sunset Avenue) At US 421-701 SB Ramps</p>		<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904 J. P. GALLOWAY DATE 2/27/13</p>		
	<p>Division 3 Sampson County Clinton</p> <p>PLAN DATE: January 2013 REVIEWED BY: J. P. Galloway</p> <p>PREPARED BY: I. O. Umozurike REVIEWED BY:</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> </tr> </table>		INIT.	DATE
INIT.	DATE				
<p>SCALE 0 N/A N/A</p>	<p>SIG. INVENTORY NO. 03-1068</p>		<p>DATE 2/27/13</p>		

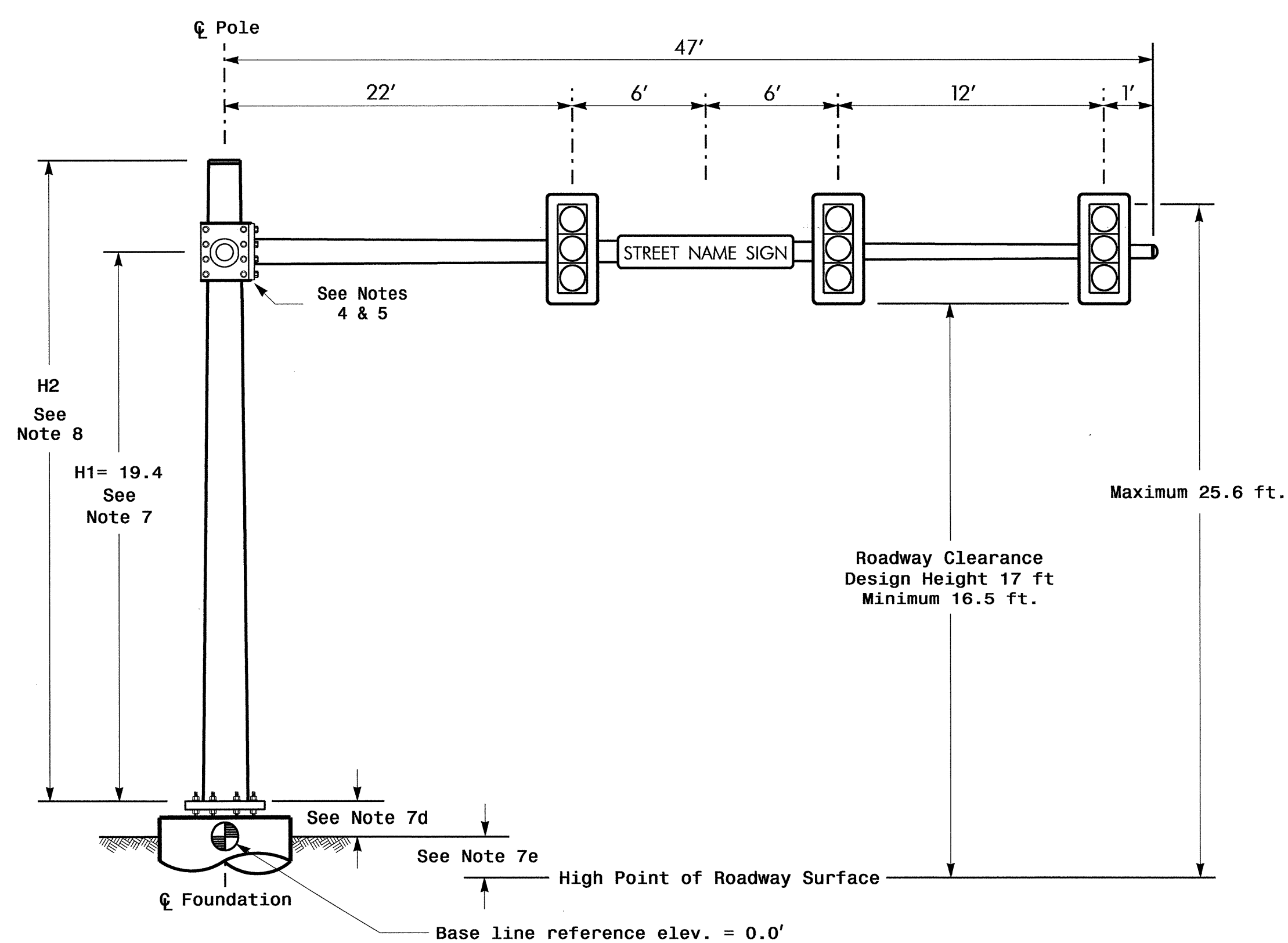
26-EEB-2013.1c:39
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 I:\2013\201301\201301068.dgn
 I:\2013\201301\201301068.dgn

Design Loading for METAL POLE NO. 14, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 14, MAST ARM B



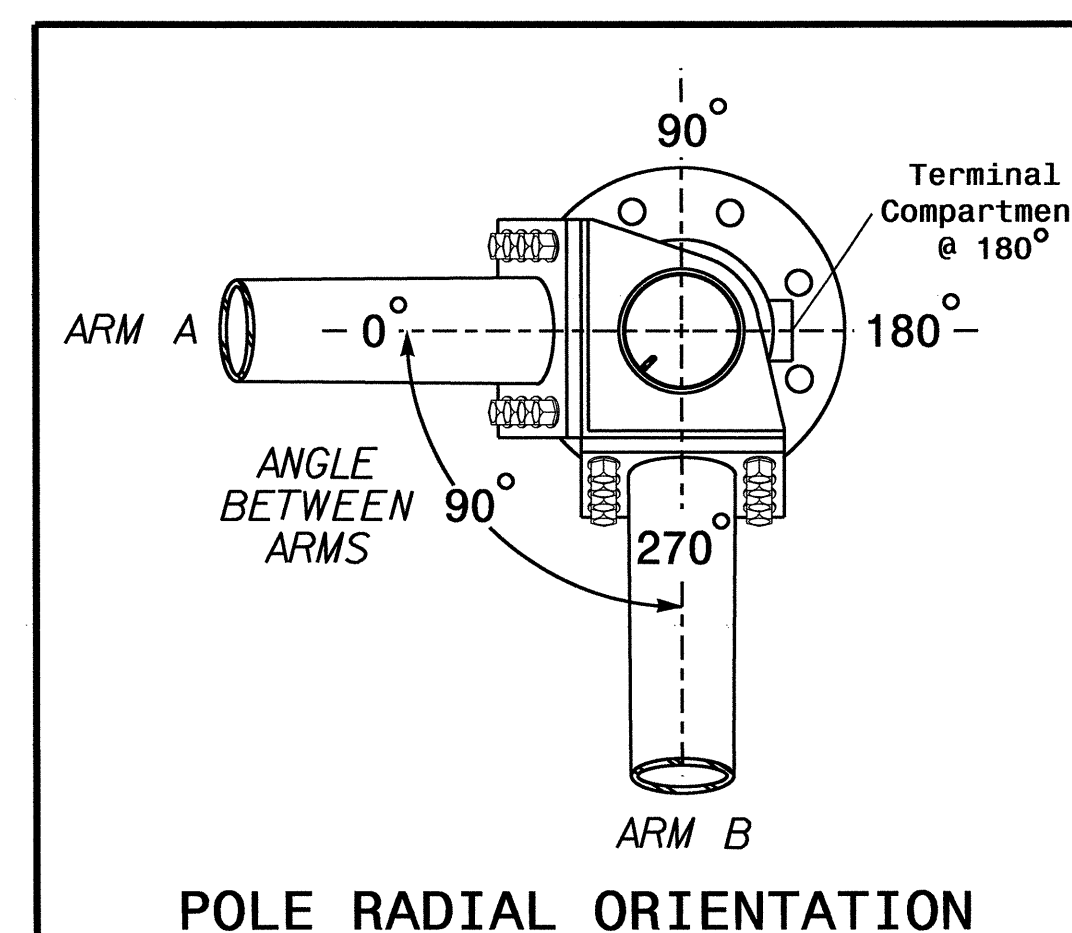
Elevation View @ 0°

SPECIAL NOTE

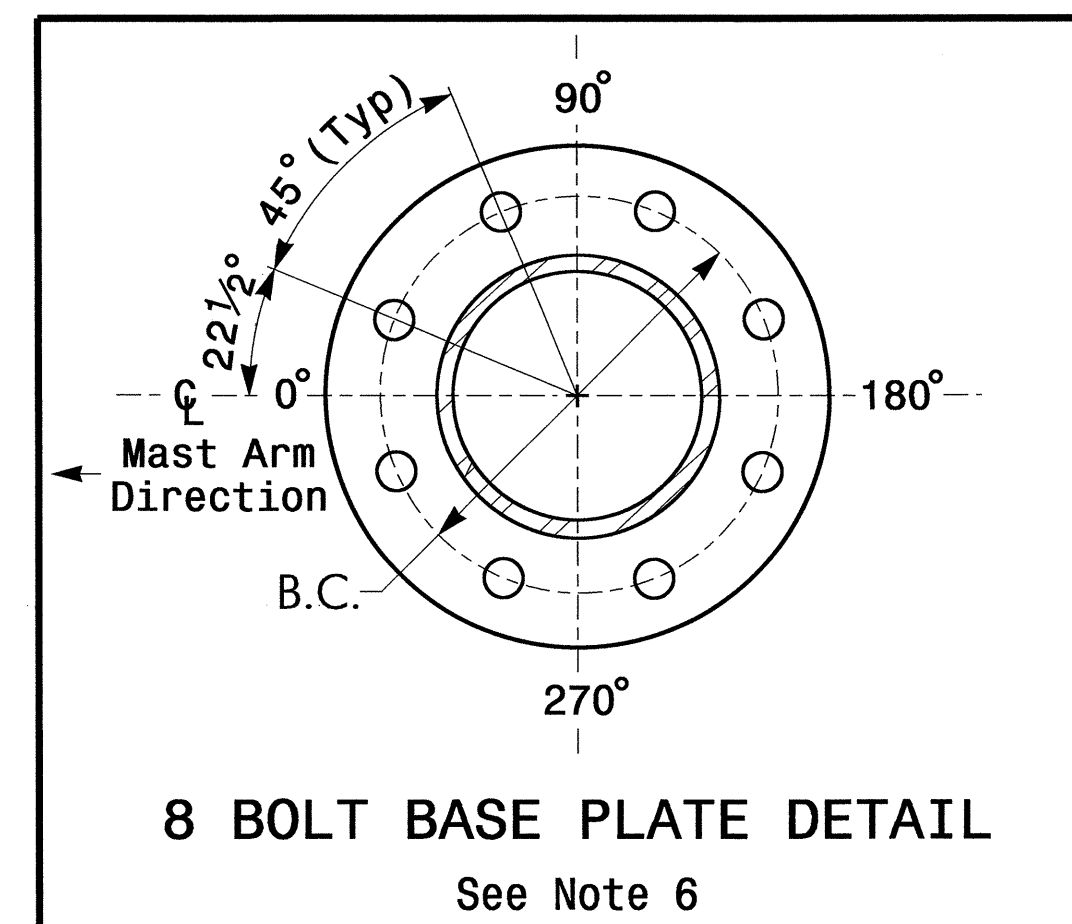
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

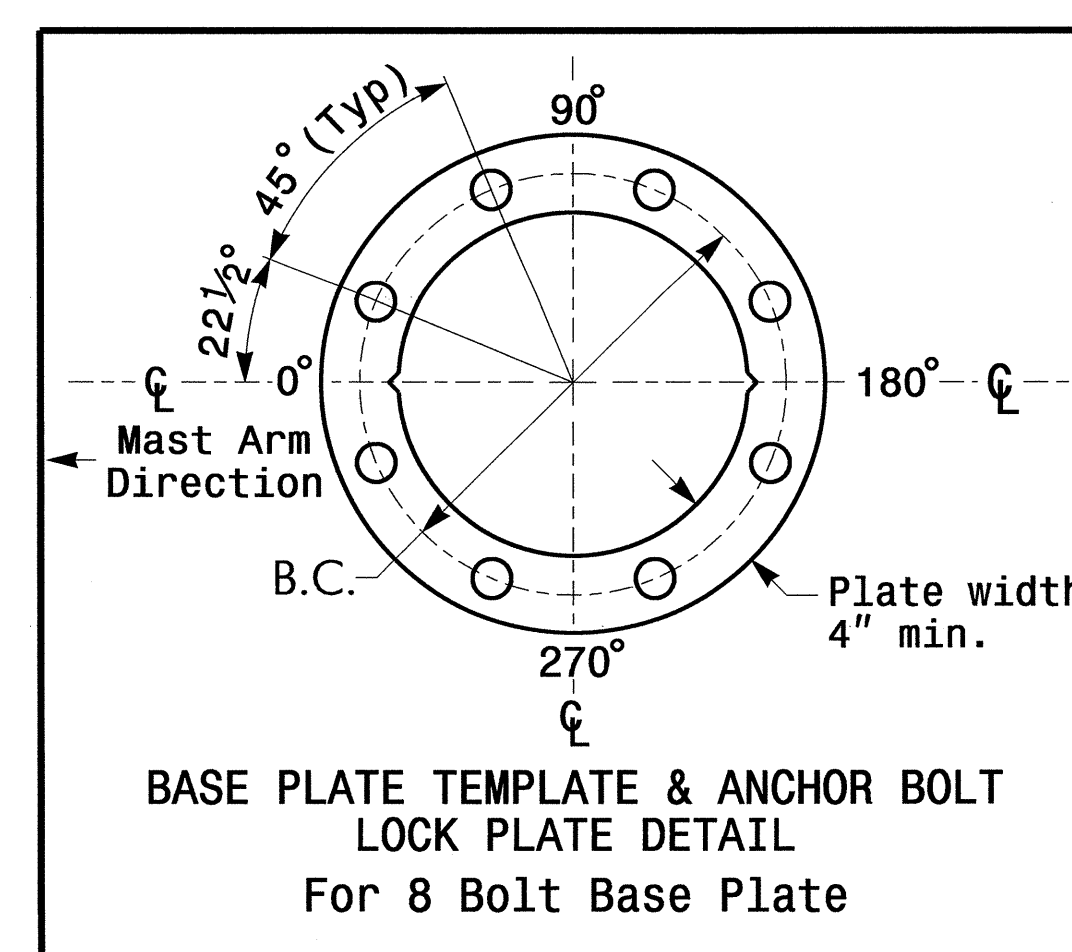
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.1 ft.	+0.9 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.

<http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

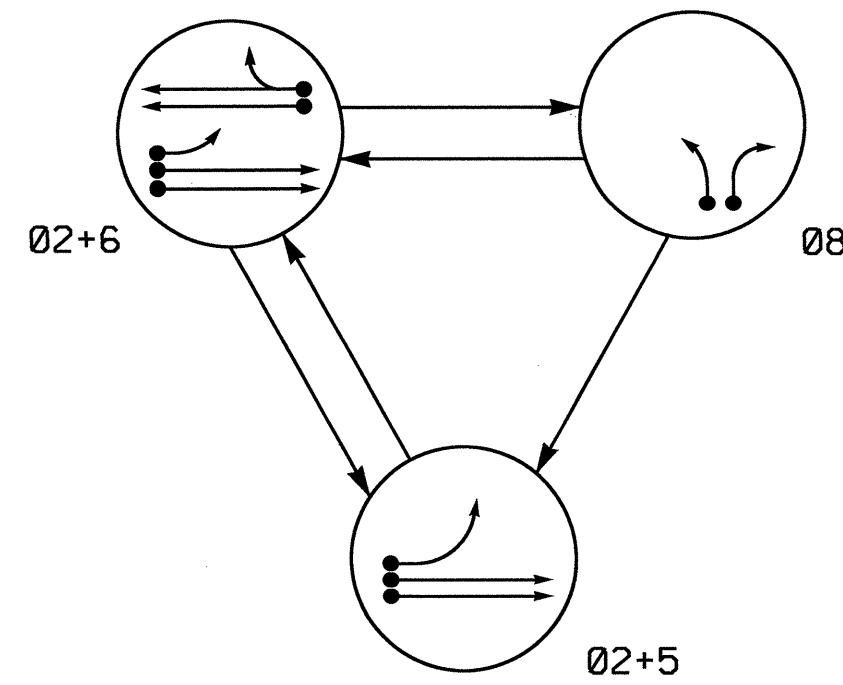
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

	NC 24 (Sunset Avenue) At US 421-701 SB Ramps		SEAL
	Division 3 Sampson County PLAN DATE: January 2013 PREPARED BY: I. O. Umozurike	Clinton REVIEWED BY: J. P. Galloway REVIEWED BY:	
SCALE 0 N/A N/A	REVISIONS	INIT. DATE	SIG. INVENTORY NO. 03-1068

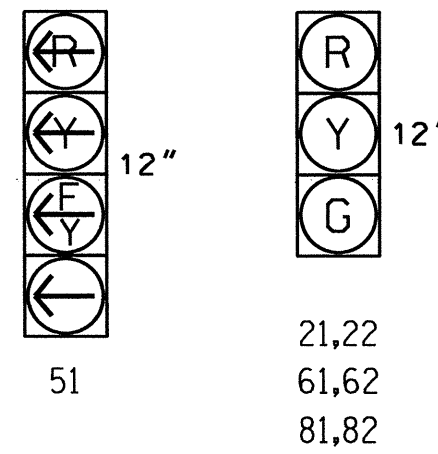
PHASING DIAGRAM



SIGNAL FACE	PHASE			
	Ø 2+5	Ø 2+6	Ø 8	FLASH
21,22	G	G	R	Y
51	-	F	R	Y
61,62	R	G	R	Y
81,82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP NEW CARD
2A,2B	6X6	70	4	Y	2	Y	Y	-	-	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	Y
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	Y

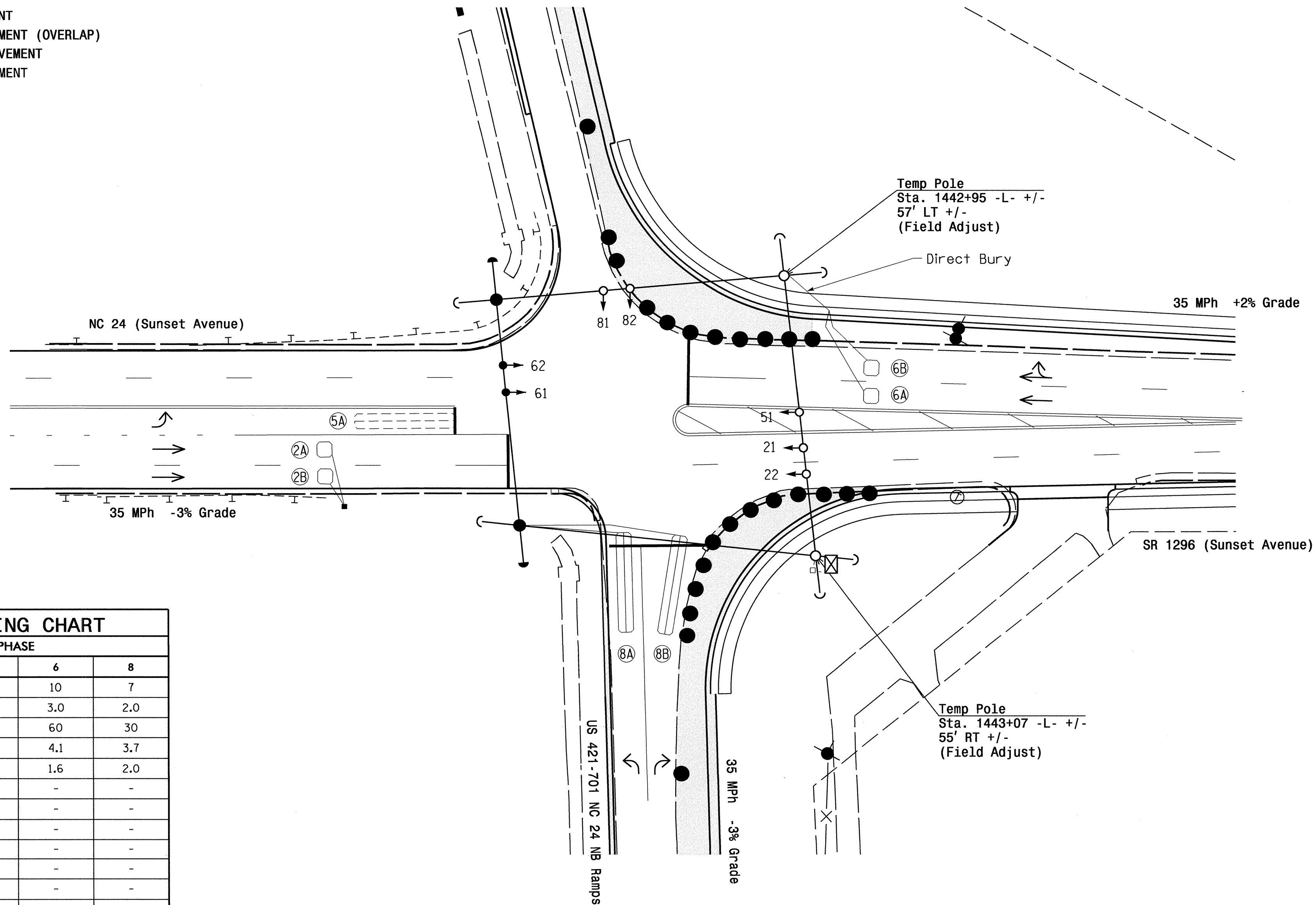
3 Phase Fully Actuated NC 24 (Sunset Avenue) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Pavement markings are existing.
- 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 # 0352.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070L TIMING CHART				
FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	25	60	30
Yellow Clearance	4.1	3.0	4.1	3.7
Red Clearance	1.6	2.3	1.6	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Dynamic Max/Max 3 *	-	-	-	-
Dynamic Max Adjust *	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

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

Signal Upgrade (TCP Phase I - Step 1)

Prepared In the Offices of:

 TRANSPORTATION MOBILITY AND SAFETY SOLUTIONS, INC.
 Signal Design Section

NC 24/SR 1296 (Sunset Avenue)
 At
 US 421-701 NC 24 NB Ramp

Division 3 Sampson County Clinton

PLAN DATE: January 2013 REVIEWED BY: JPG

PREPARED BY: IOU/JPG REVIEWED BY:

REVISIONS: _____

SCALE: 1"=30'

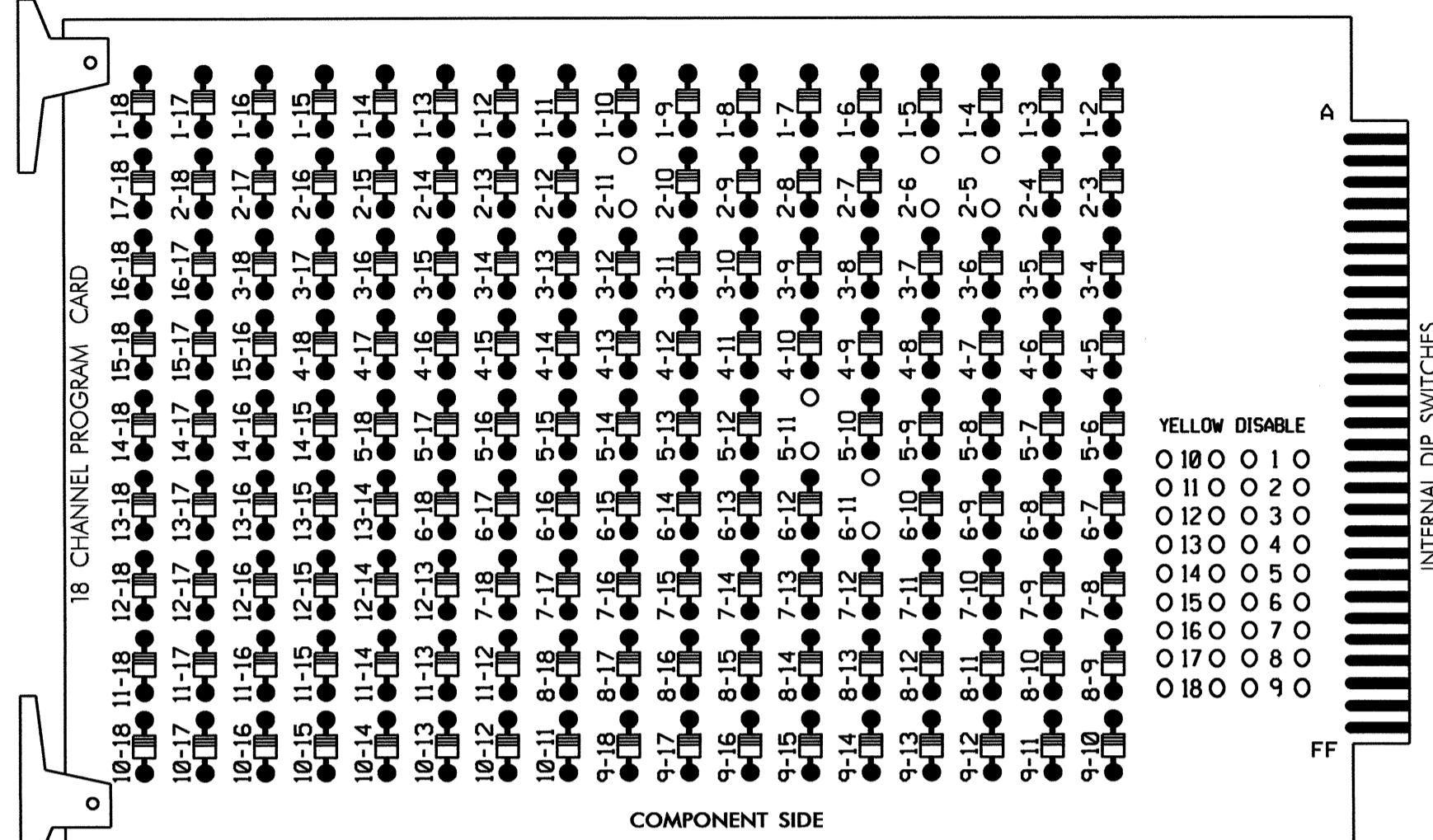
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 29904
 J. GALLAGHER
 DATE: 2/21/13
 SIG. INVENTORY NO. 03-035211

24-FEB-2013 13:35 R:\Projects\4411\4411\Oasis\Oasis\035211_s10.dgn, 2013madd.dgn

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

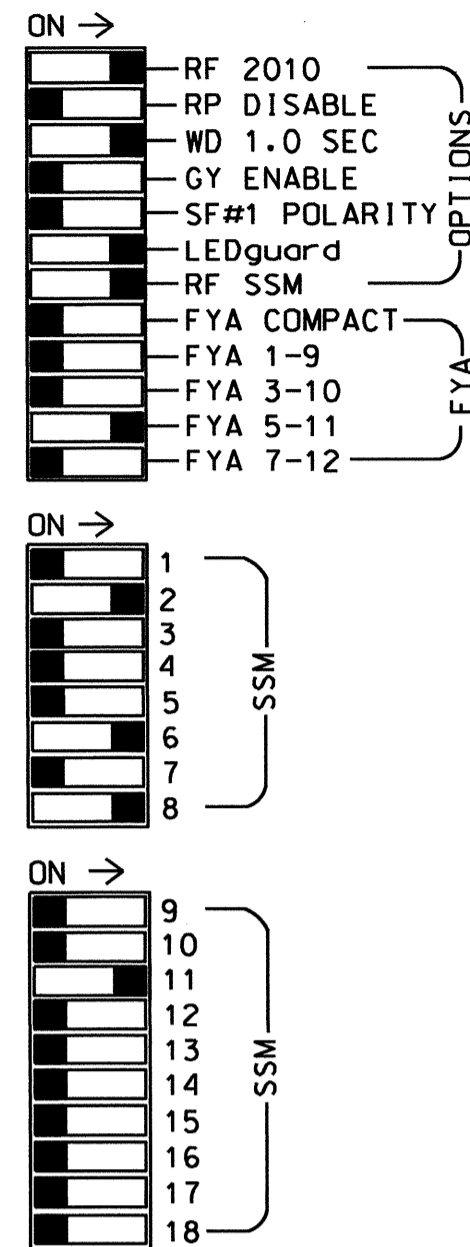
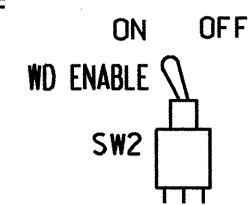
REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 5-11 and 6-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



■ = 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.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S7,S8,S11,AUX S4
 PHASES USED.....2,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

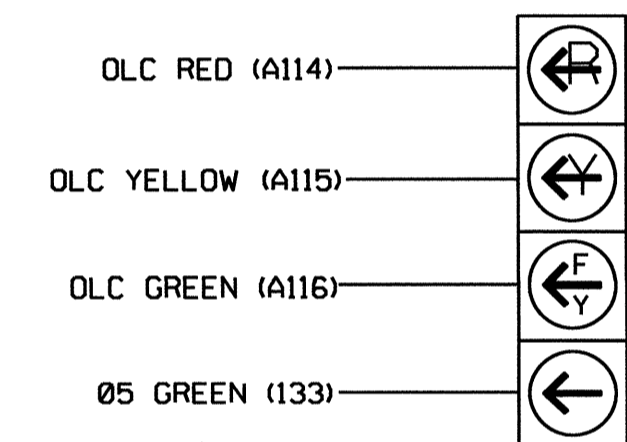
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51*	61,62	NU	NU	81,82	NU	NU	NU	NU	51*	NU	NU	
RED		128						134			107								
YELLOW		129					*	135			108								
GREEN		130						136			109								
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW								133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL
(wire signal head as shown)



51

NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT
(front view)

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

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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

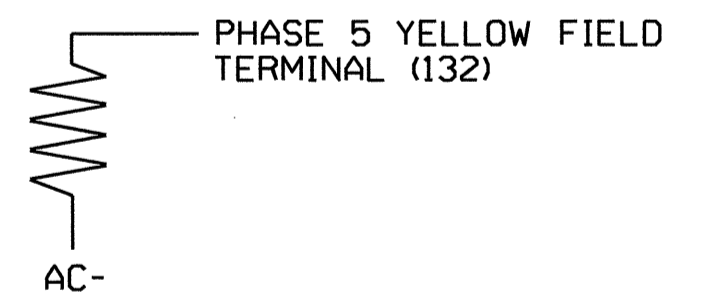
¹Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL
(install resistor as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0352T1
 DESIGNED: January 2013
 SEALED: 2/21/13
 REVISED: N/A

Electrical Detail - Step 1 - Sheet 1 of 2

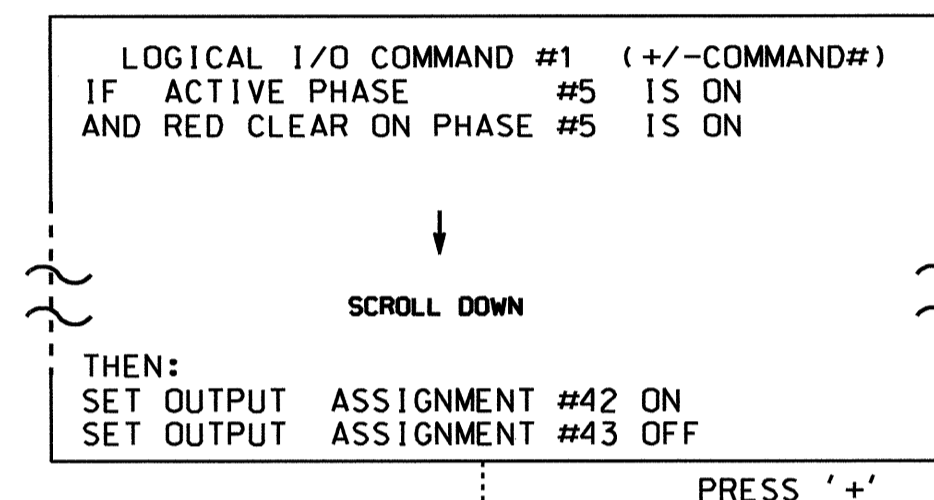
	NC 24/SR 1296 (Sunset Avenue) at US 421-701 NC 24 NB Ramp		
	Division 3 Sampson County Clinton		
	PLAN DATE: January 2013	REVIEWED BY: T. V. J.	
	PREPARED BY: C. Strickland	REVIEWED BY:	
REVISIONS		INIT. DATE	SIGNATURE DATE [Signature] 2/22/13

750 N. Greenfield Pkwy, Garner, NC 27529

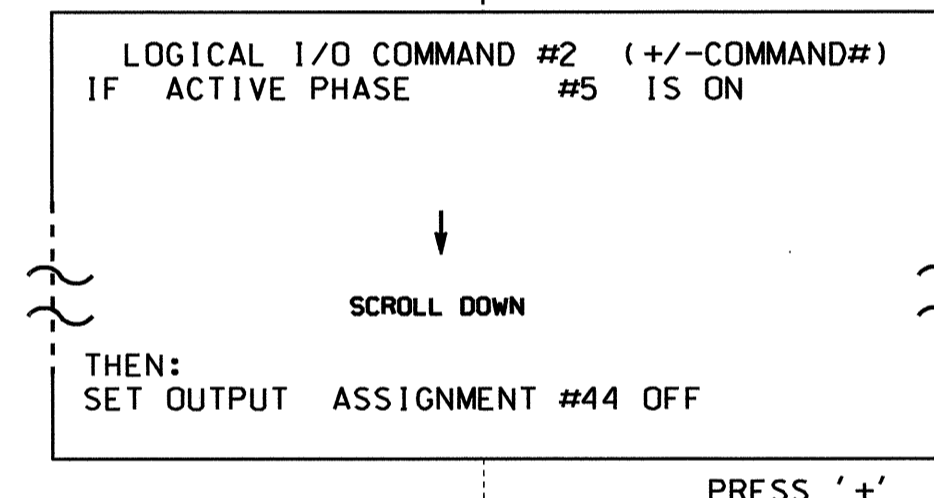
**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

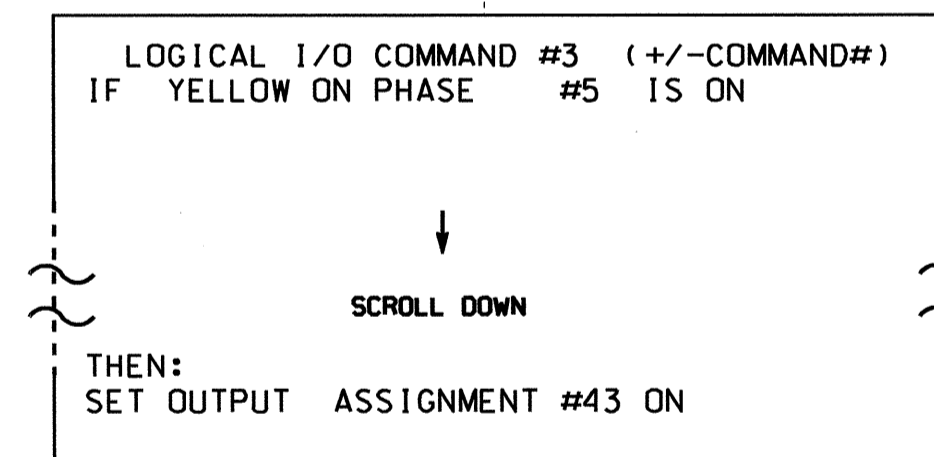
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

```

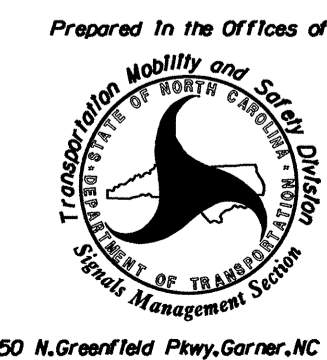
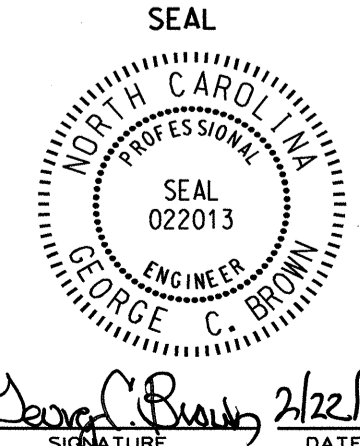
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PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
  
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

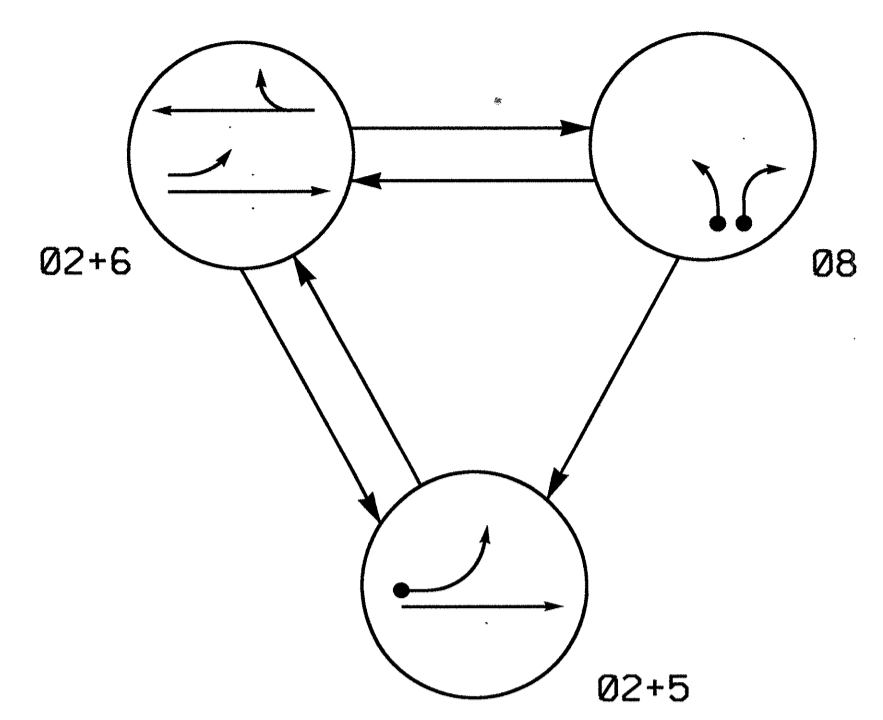
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0352T1
DESIGNED: January 2013
SEALED: 2/21/13
REVISED: N/A

Electrical Detail - Step 1 - Sheet 2 of 2

	ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: NC 24/SR 1296 (Sunset Avenue) at US 421-701 NC 24 NB Ramp		SEAL 					
	Division 3 Sampson County Clinton	PLAN DATE: January 2013		REVIEWED BY: T. Jyle				
	PREPARED BY: C. Strickland	REVIEWED BY:						
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REVISIONS	INIT.	DATE						

Signature: *George C. Brown* 2/22/13
 DATE: 2/22/13
 SIG. INVENTORY NO. 03-0352T1

PHASING DIAGRAM

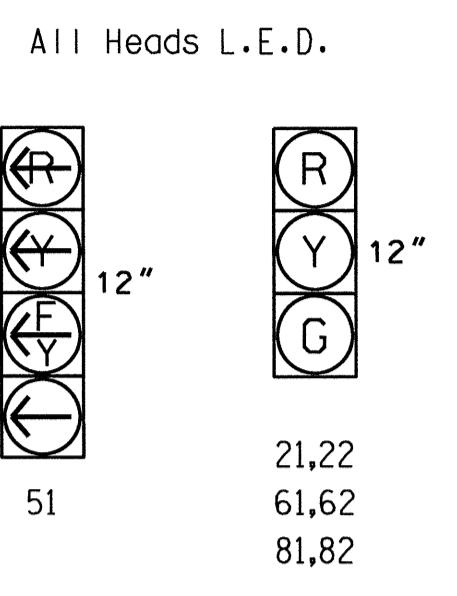


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21,22	G	G	R	Y
51	←	←	←	←
61,62	R	G	R	Y
81,82	R	R	G	R

SIGNAL FACE I.D.

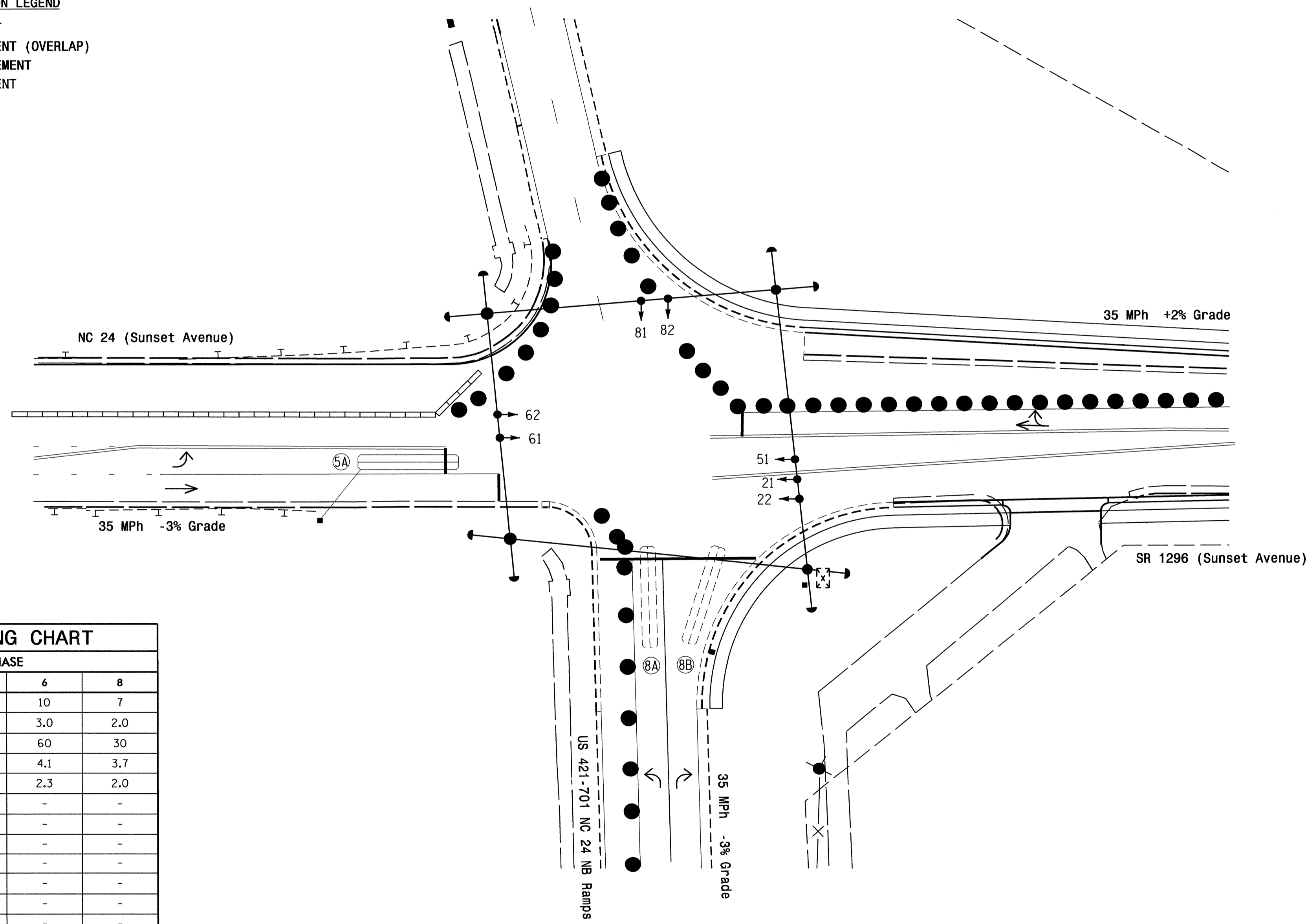


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART										
INDUCTIVE LOOPS					DETECTOR PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10

3 Phase Semi-Actuated NC 24 (Sunset Avenue) CLS

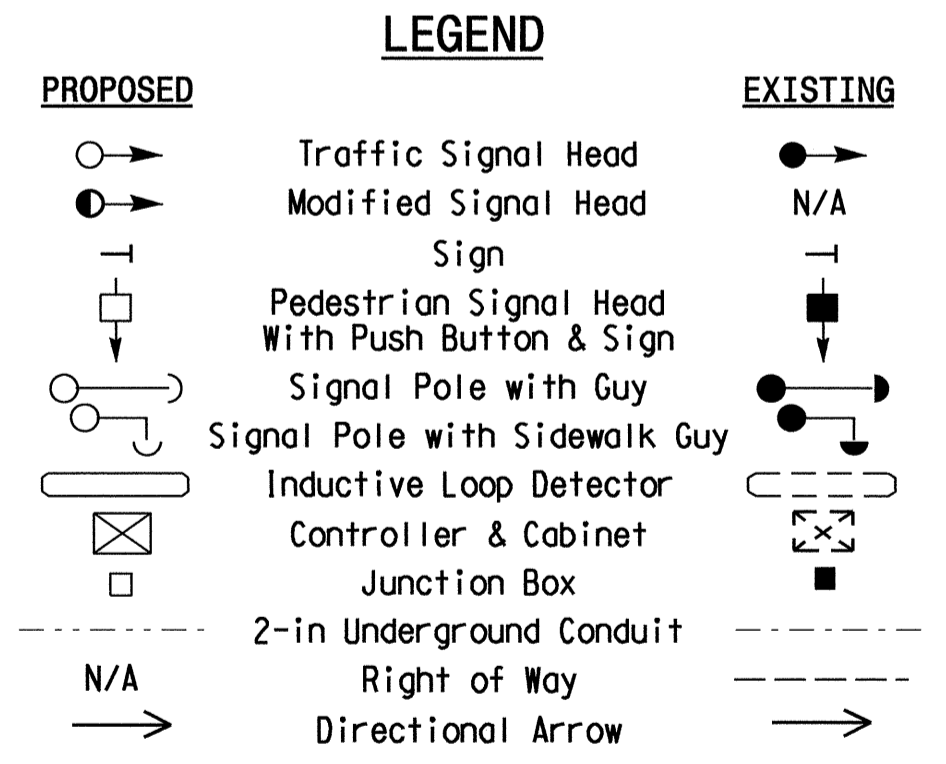
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Reposition existing signal heads 21,22,51,61 and 62.
- 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 # 0352.



FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	25	60	30
Yellow Clearance	4.1	3.0	4.1	3.7
Red Clearance	2.3	2.4	2.3	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Dynamic MaxMax 3*	-	-	-	-
Dynamic Max Adjust*	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	-	MAX RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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



Signal Upgrade Temp (Phase I)

Prepared in the Offices of:

NC 24/SR 1296 (Sunset Avenue)
At
US 421-701 NC 24 NB Ramp

Division 3 Sampson County Clinton
 PLAN DATE: January 2013 REVIEWED BY: JPG
 PREPARED BY: IOU/JPG REVIEWED BY: [Signature]
 SCALE: 1" = 30'
 DATE: 2/21/13
 SEAL 29904
 SIG. INVENTORY NO. 03-035212

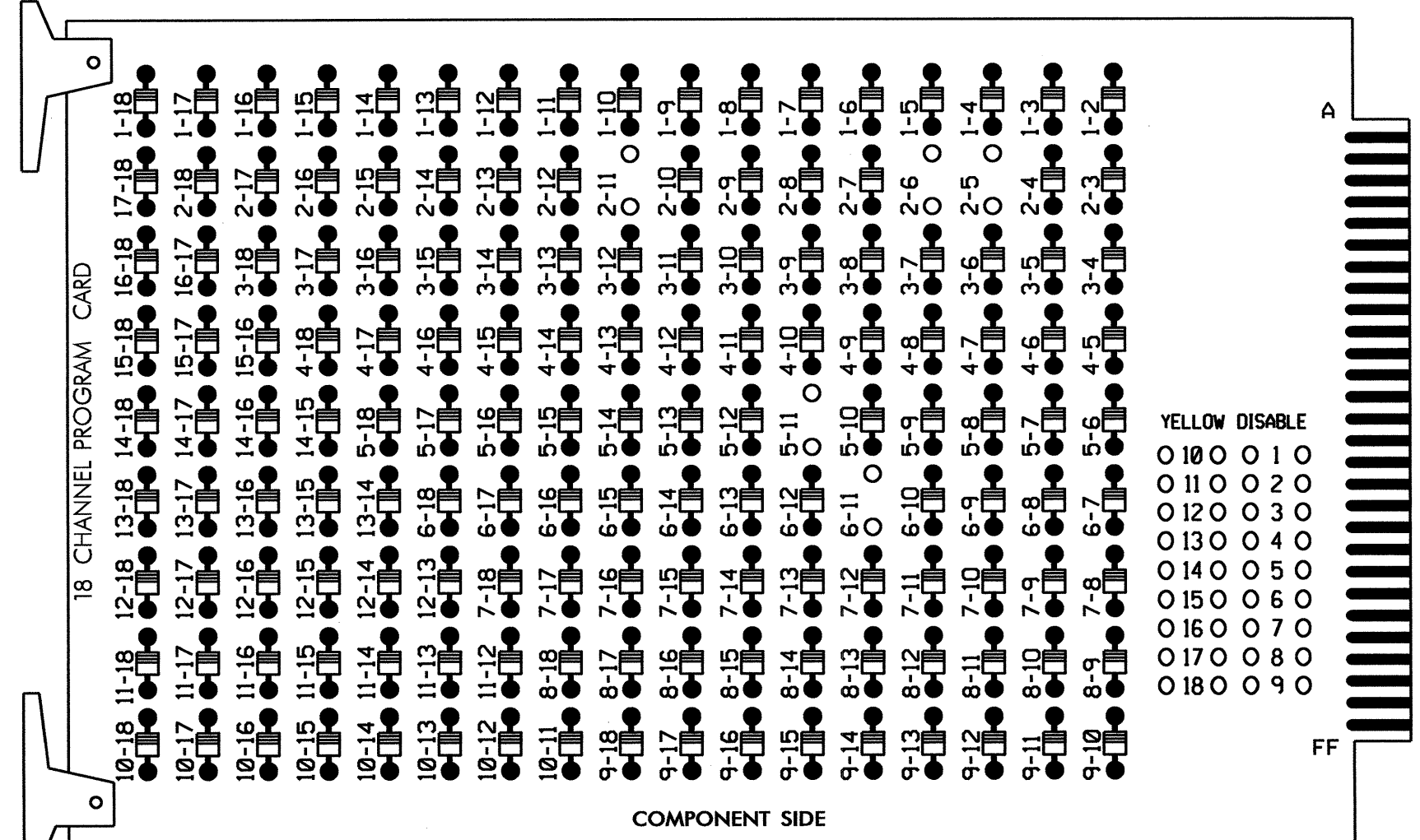
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EDI MODEL 2018ECL-NC CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 5-11 and 6-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = 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.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S7,S8,S11,AUX S4
 PHASES USED.....2,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMJ CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51	61,62	NU	NU	81,82	NU	NU	NU	NU	51	NU	NU	
RED		128							134			107							
YELLOW		129					*	135				108							
GREEN		130						136				109							
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW								133											

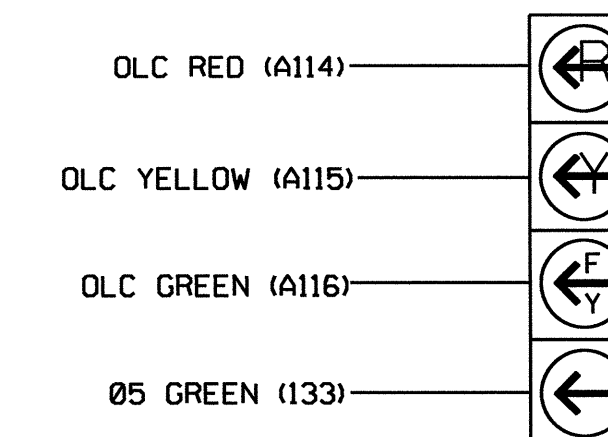
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



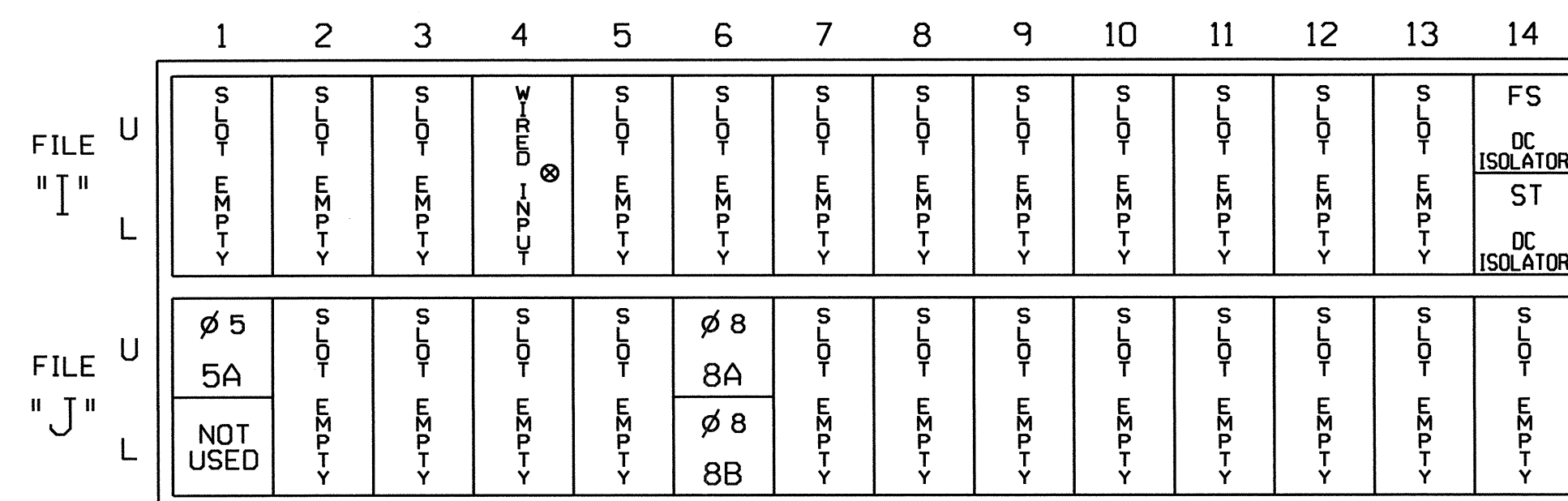
51

NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

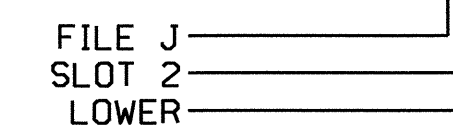
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE 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
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

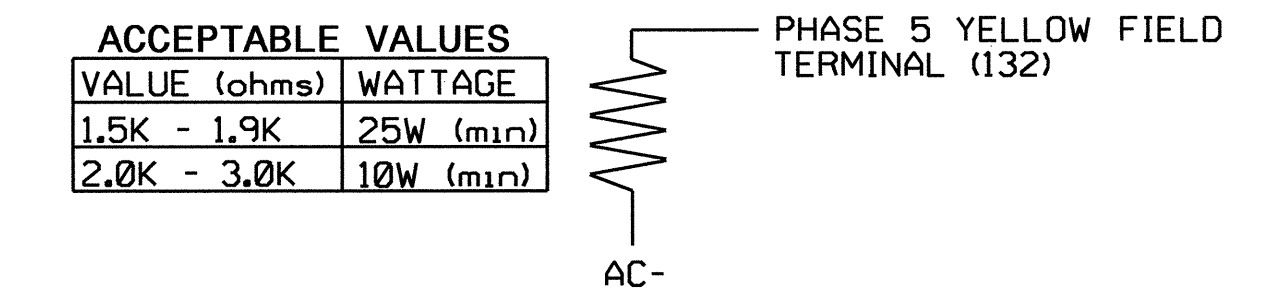
¹Add jumper from J1-W to 14-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)



THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0352T2
 DESIGNED: January 2013
 SEALED: 2/21/13
 REVISED: N/A

Electrical Detail - Step 2 - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

750 N. Grantfield Pkwy, Garner, NC 27529

NC 24/SR 1296 (Sunset Avenue) at US 421-701 NC 24 NB Ramp

Division 3 Sampson County Clinton

PLAN DATE: January 2013 REVIEWED BY: T. J. J...

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: INIT. DATE

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

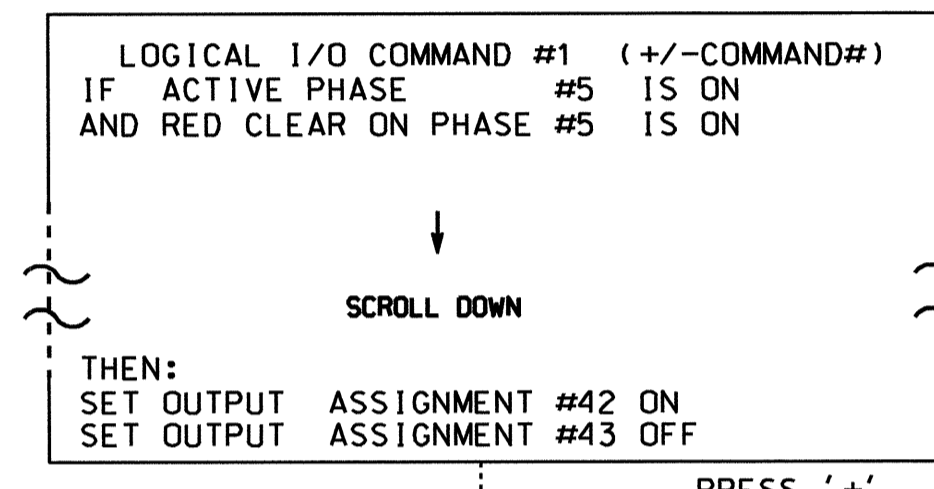
SIGNATURE: [Signature] DATE: 2/21/13

SIG. INVENTORY NO. 03-0352T2

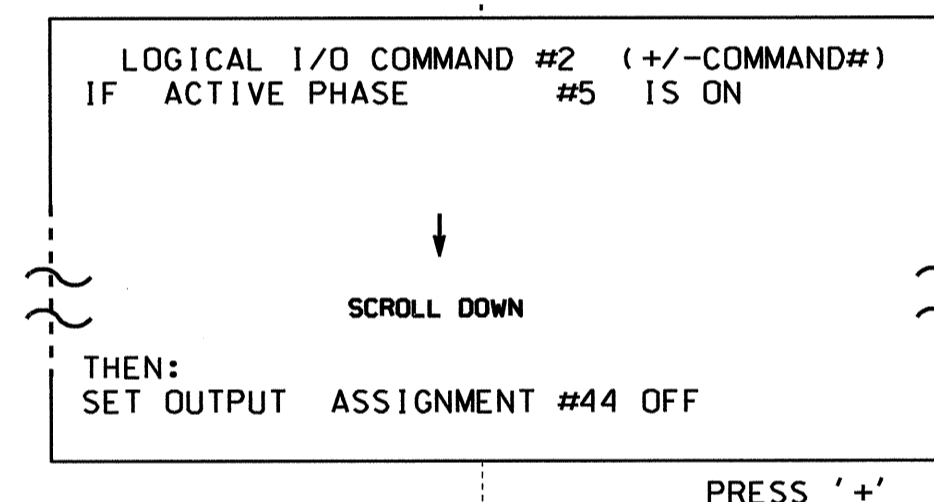
**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

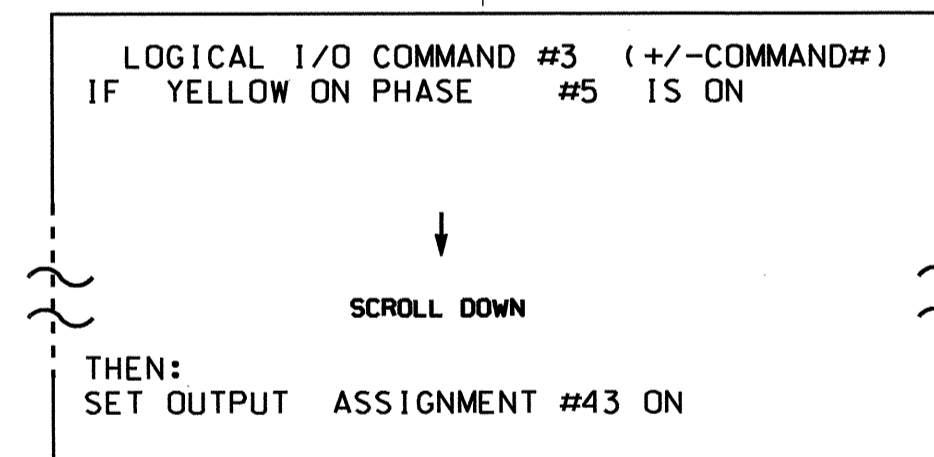
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

```

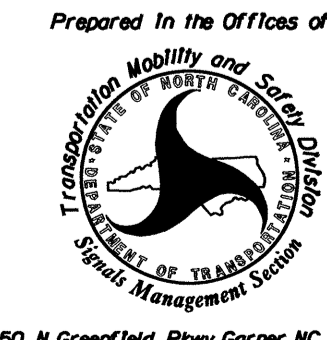
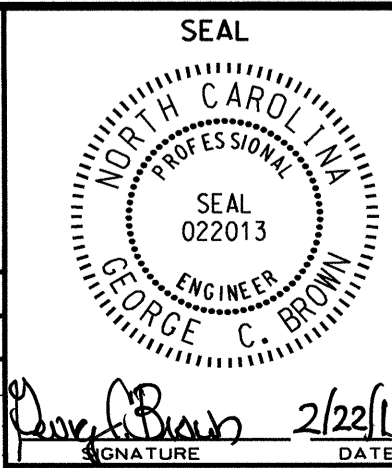
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
  
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

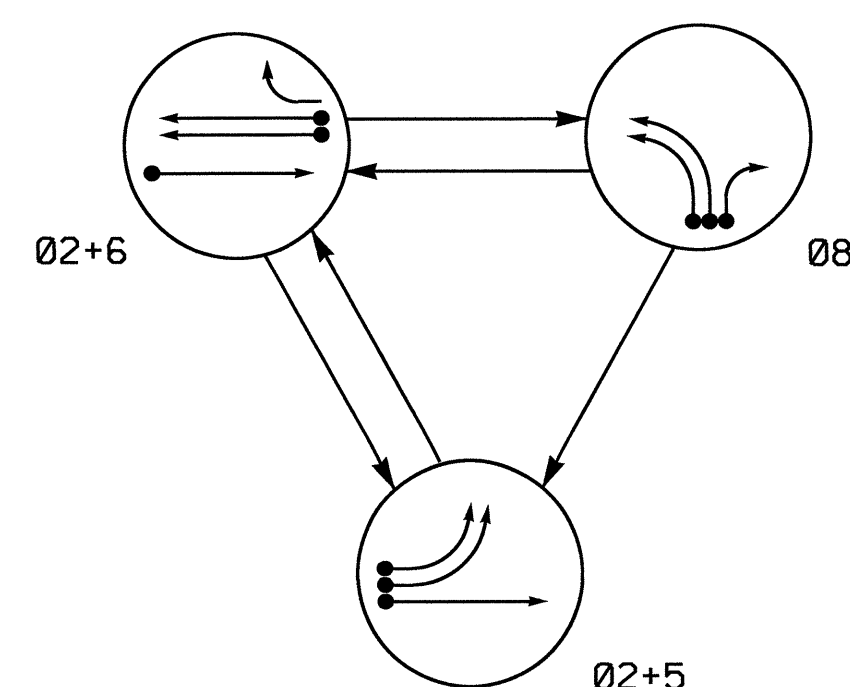
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0352T2
DESIGNED: January 2013
SEALED: 2/21/13
REVISED: N/A

Electrical Detail - Step 2 - Sheet 2 of 2

 <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	ELECTRICAL AND PROGRAMMING DETAILS FOR:		
	Prepared In the Offices of: NC 24/SR 1296 (Sunset Avenue) at US 421-701 NC 24 NB Ramp		
	Division 3 Sampson County Clinton		
	PLAN DATE: January 2013 PREPARED BY: C. Strickland	REVIEWED BY: T. J. [Signature] REVIEWED BY:	
REVISIONS		INIT. DATE	SIGNATURE DATE [Signature] 2/22/13
SIG. INVENTORY NO. 03-0352T2			

22-FEB-2013 09:38
 S:\ITS\ASU\TIS\Sig\Workgroups\sig\Main\511\Task\and\030322_sml_e_1e_1xxx.dgn
 cbsr:ck:and

PHASING DIAGRAM



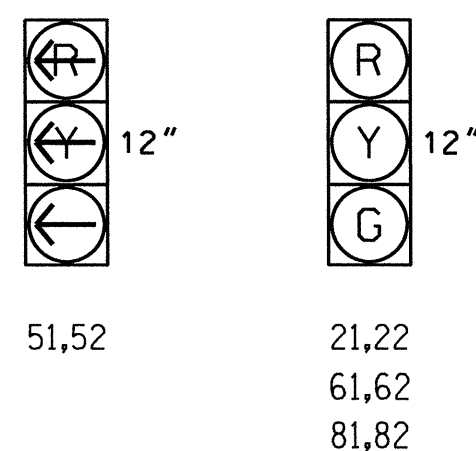
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21,22	G	G	R	Y
51,52	←	←	←	←
61,62	R	G	R	Y
81,82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

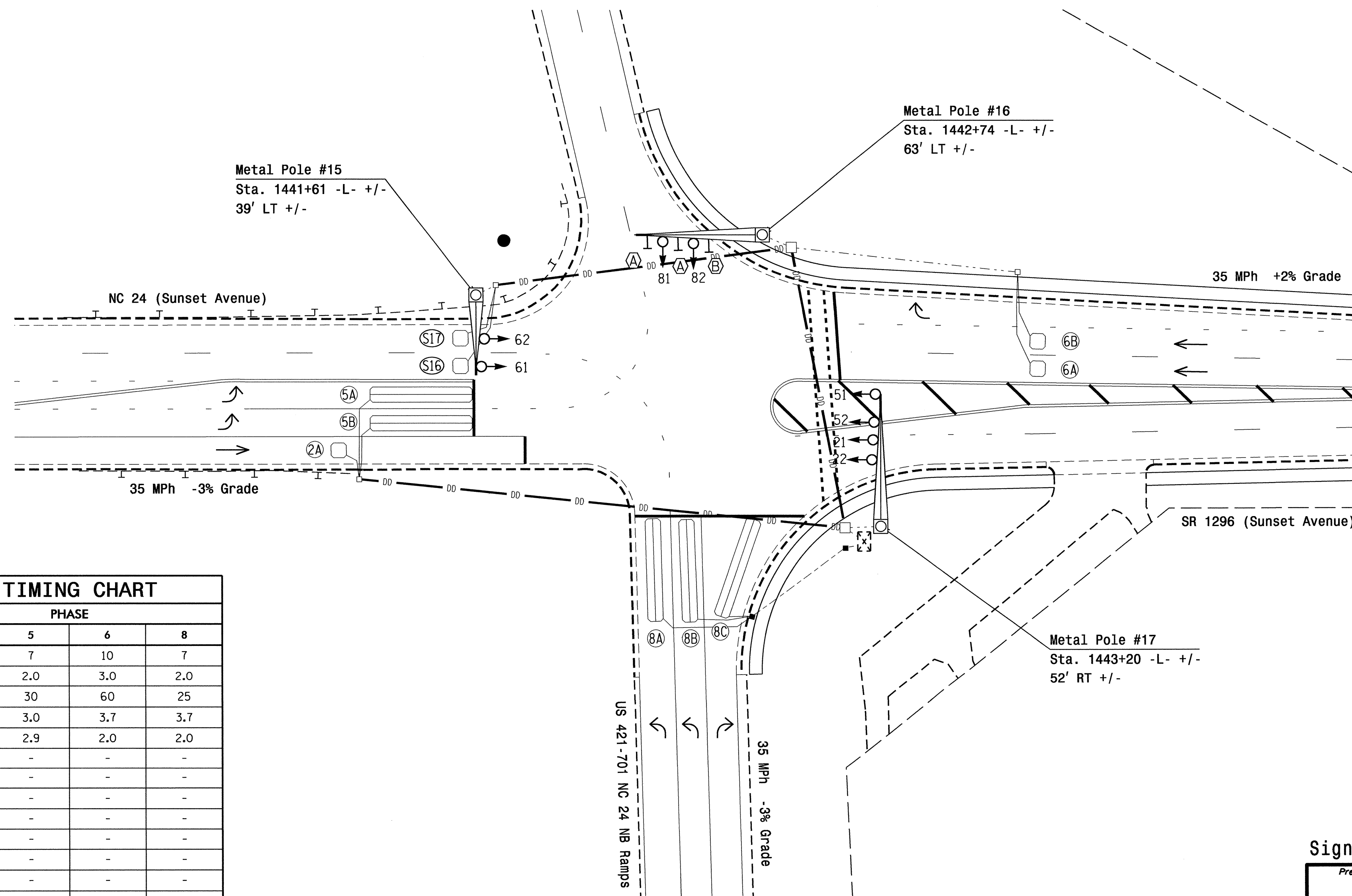


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART												
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	3	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-
8C	6X40	0	2-4-2	Y	8	Y	Y	-	-	15	-	-
S16	6X6	+150	4	Y	-	-	-	-	-	-	Y	Y
S17	6X6	+150	4	Y	-	-	-	-	-	-	Y	Y

3 Phase Fully Actuated NC 24 (Sunset Avenue) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Reposition existing signal heads 21, 22, 81, and 82.
- 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 #0352.



FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	30	60	25
Yellow Clearance	4.1	3.0	3.7	3.7
Red Clearance	2.4	2.9	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* 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	● → N/A
◉ → Modified Signal Head	- - - N/A
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ N/A
⊥ Signal Pole with Guy	⊥ N/A
⊥ Signal Pole with Sidewalk Guy	⊥ N/A
⊥ Inductive Loop Detector	⊥ N/A
⊥ Controller & Cabinet	⊥ N/A
⊥ Junction Box	⊥ N/A
⊥ 2-in Underground Conduit	⊥ N/A
N/A Right of Way	N/A
→ Directional Arrow	→ N/A
○ Metal Pole with Mastarm	○ N/A
- - - Directional Drill	- - - N/A
⊙ Left Arrow "ONLY" Sign (R3-5L)	⊙ N/A
⊙ Right Arrow "ONLY" Sign (R3-5R)	⊙ N/A

Signal Upgrade (Final)

Prepared in the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 24/SR 1296 (Sunset Avenue)
 At
 US 421-701 NC 24 NB Ramp

Division 3 Sampson County Clinton

PLAN DATE: October 2012 REVIEWED BY: JPG

PREPARED BY: IOU/JPG REVIEWED BY:

REVISIONS: INIT. DATE

SCALE: 1"=30'

2/2/18

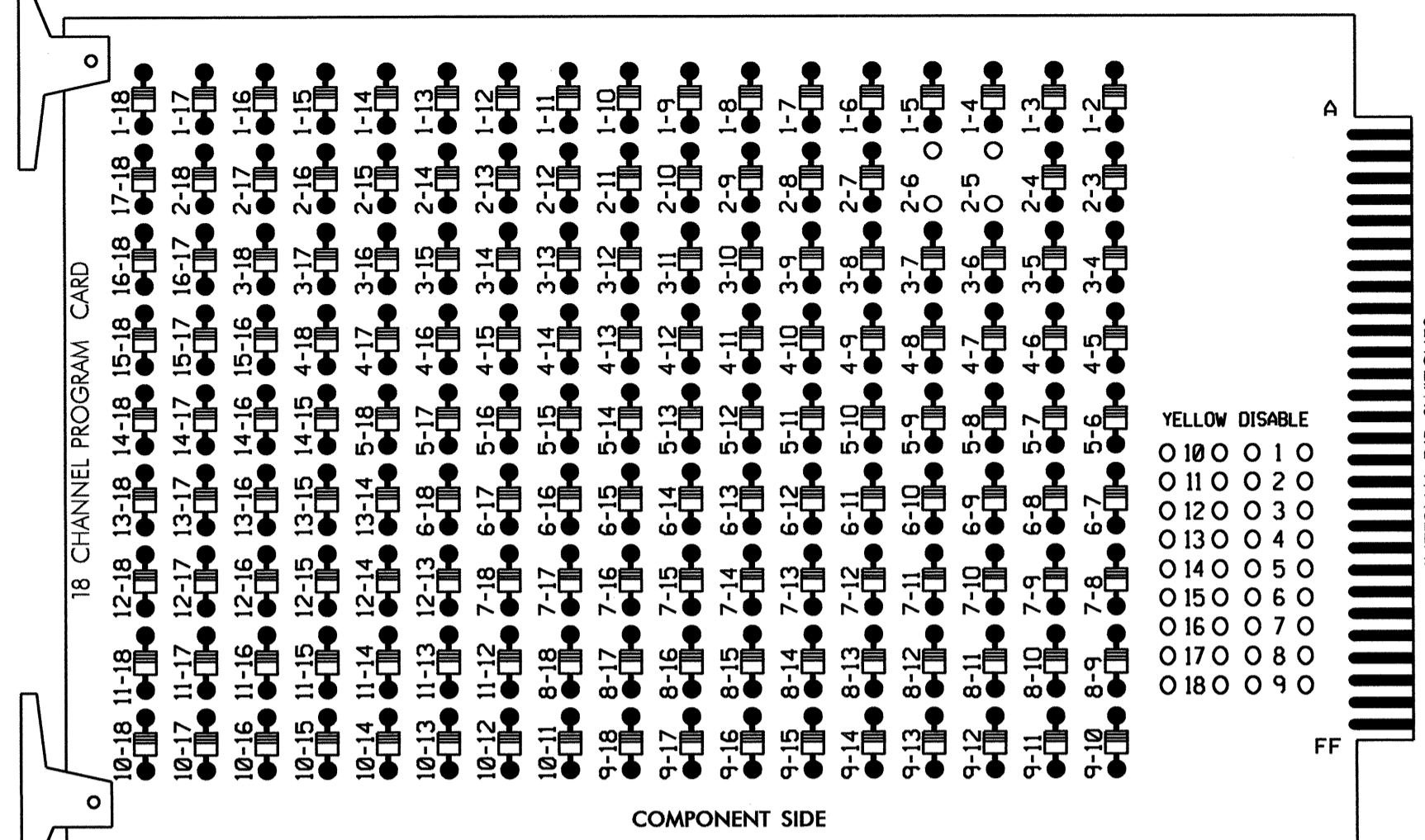
SIG. INVENTORY NO. 03-0352

17-APR-2013 12:30
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EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

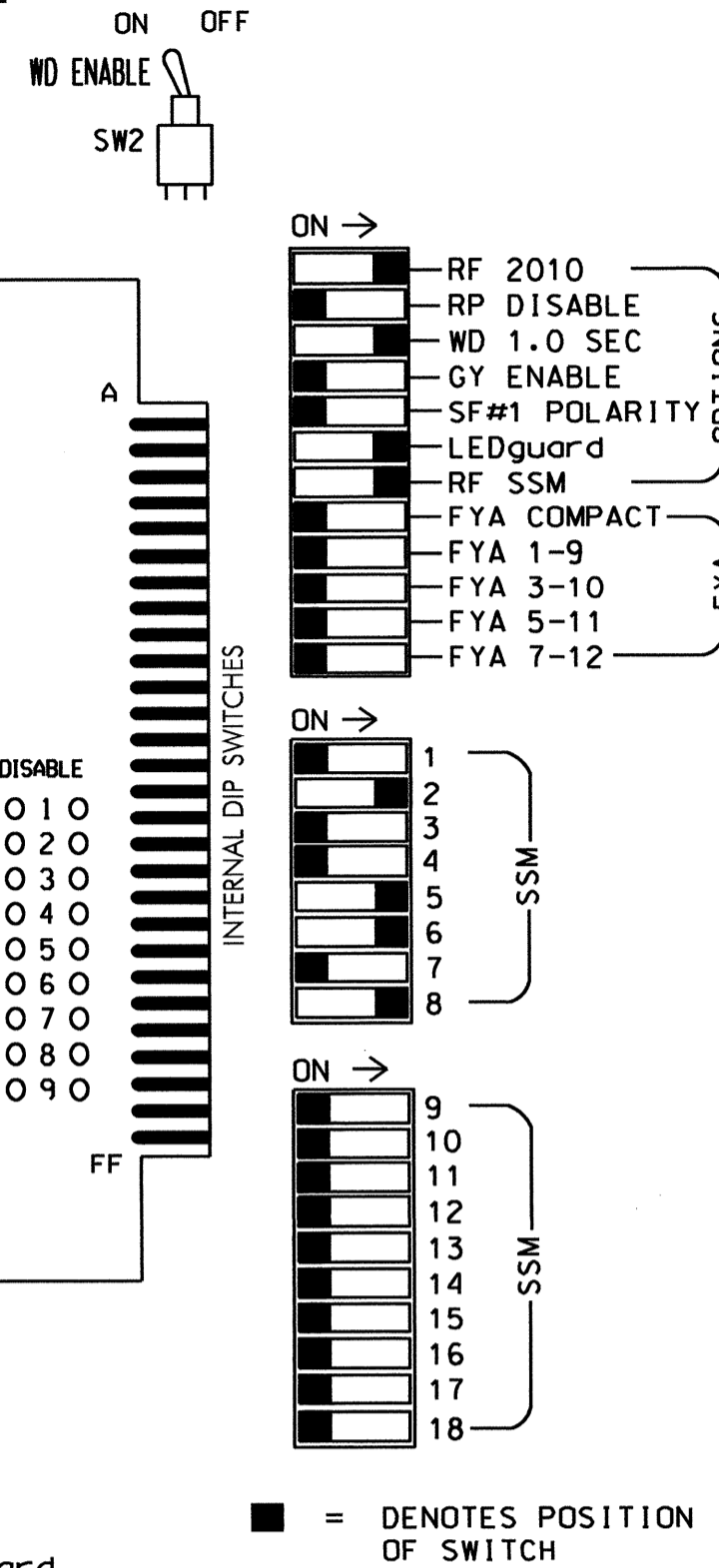
REMOVE DIODE JUMPERS 2-5 and 2-6.



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. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



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. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the NC 24 (Sunset Avenue) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S7,S8,S11
 PHASES USED.....2,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

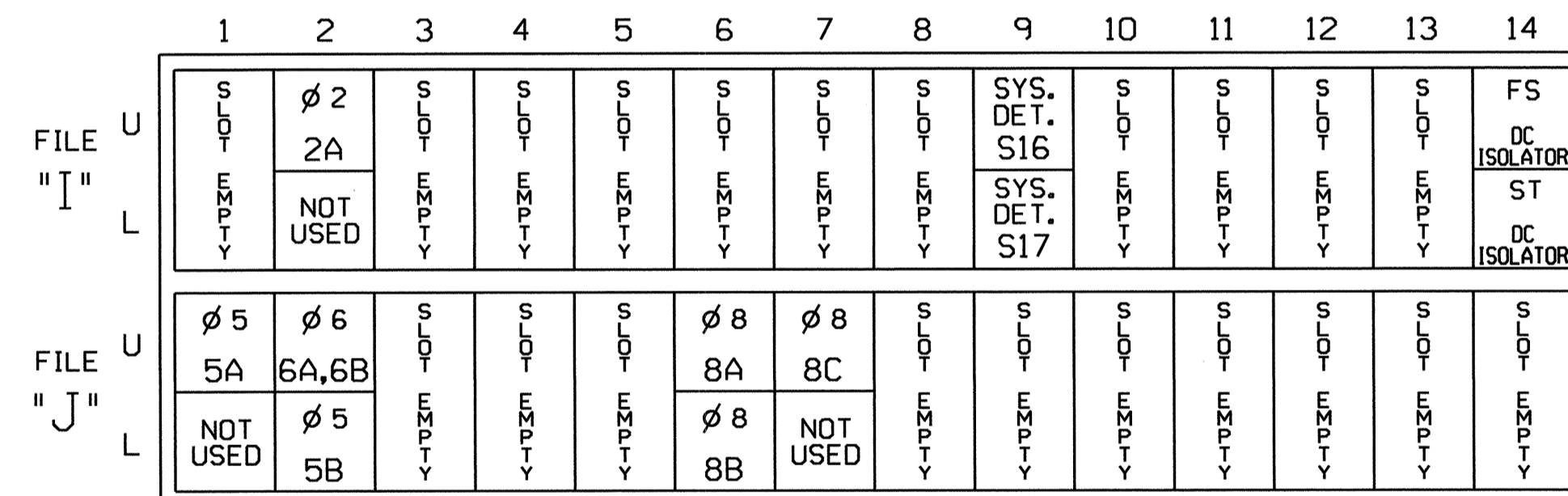
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMJ CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51,52	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128										134						107
YELLOW		129											135					108
GREEN		130												136				109
RED ARROW													131					
YELLOW ARROW														132				
FLASHING YELLOW ARROW																		
GREEN ARROW																		133

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

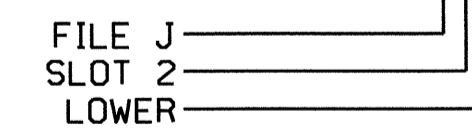
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15
* S16	TB6-9,10	I9U	60	22	11	SYS					
* S17	TB6-11,12	I9L	62	24	13	SYS					

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

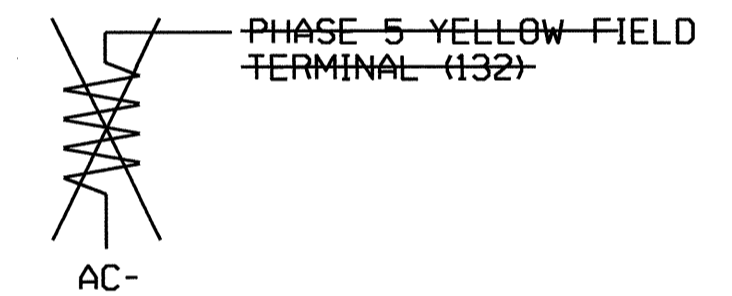
! If present, remove jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR REMOVAL DETAIL

(remove resistor as shown below)



! IMPORTANT: If present, remove load resistor PHASE 5 YELLOW FIELD TERMINAL (132)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0352
 DESIGNED: October 2012
 SEALED: 2/21/13
 REVISED: N/A

Electrical Detail - Final

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 24/SR 1296 (Sunset Avenue) at US 421-701 NC 24 NB Ramp

Division 3 Sampson County Clinton

PLAN DATE: January 2013 REVIEWED BY: T. J. J. J.

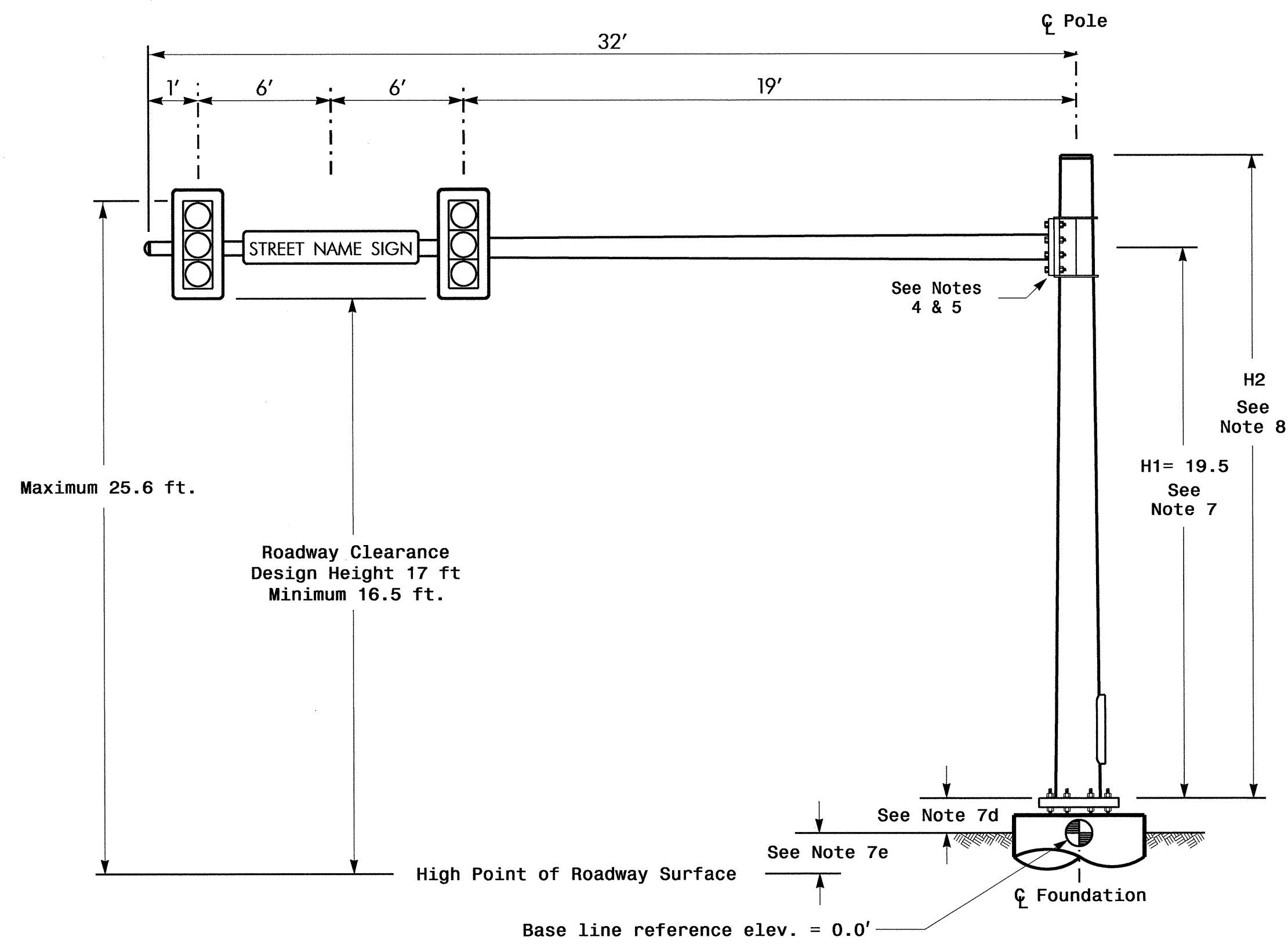
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS INIT. DATE

SIGNATURE: *George C. Brown* DATE: 2/21/13

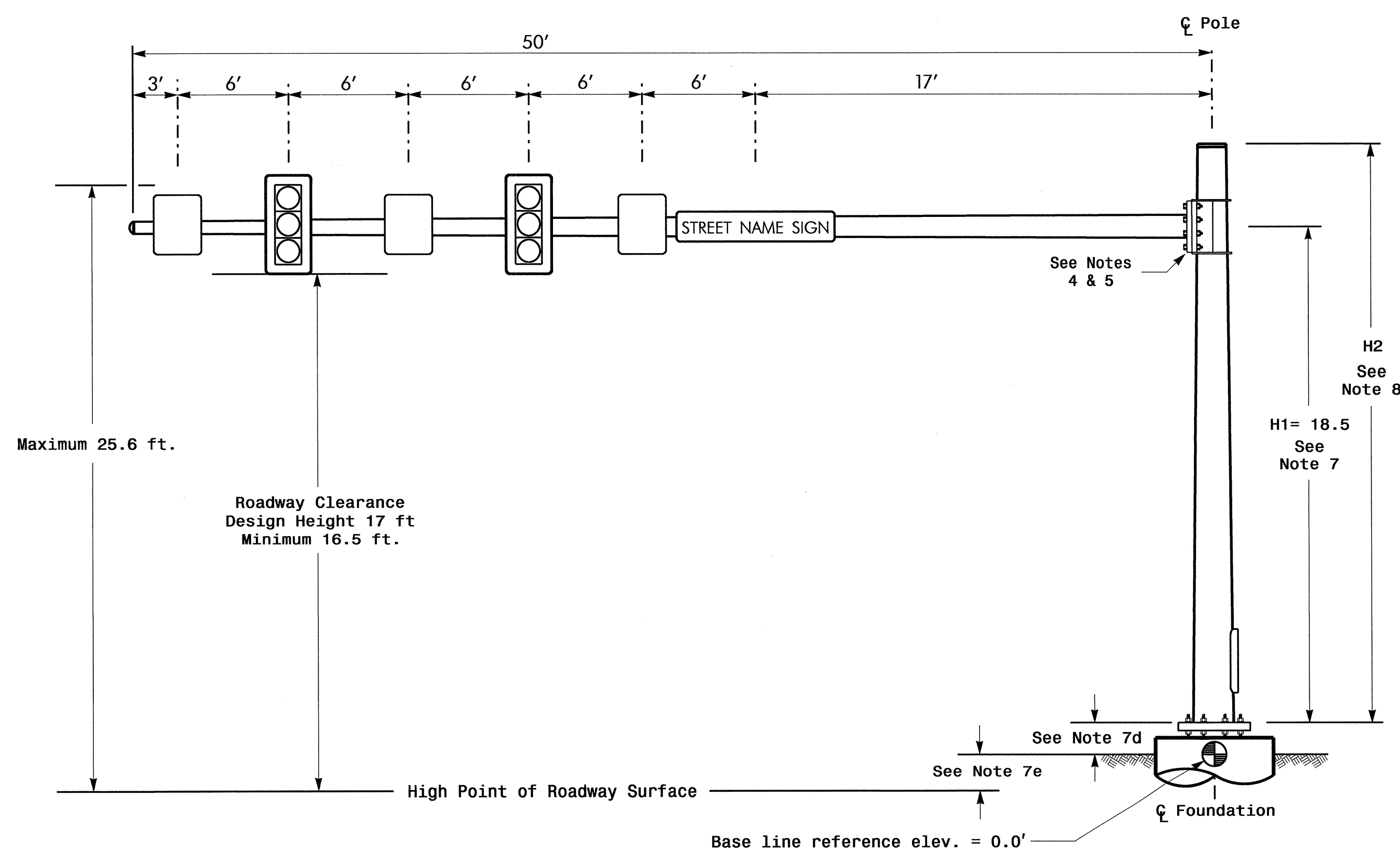
SIG. INVENTORY NO. 03-0352

Design Loading for METAL POLE NO. 15



Elevation View

Design Loading for METAL POLE NO. 16



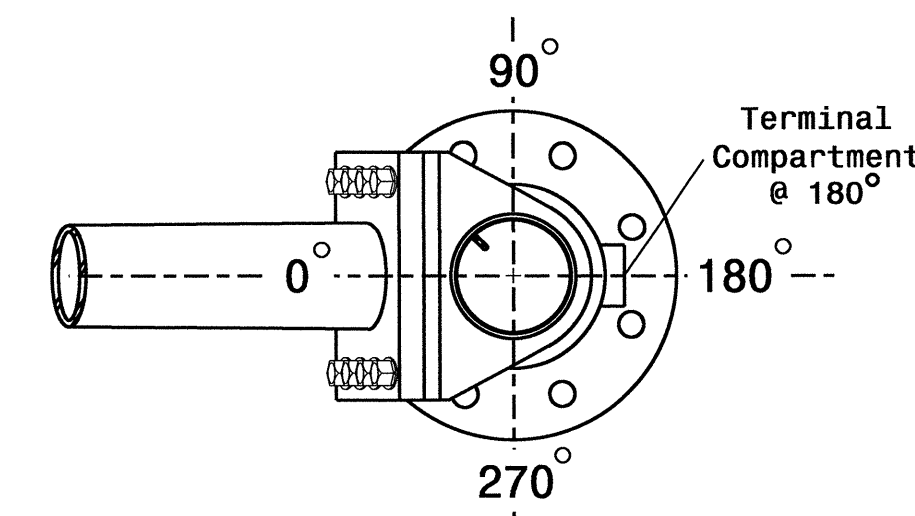
Elevation View

SPECIAL NOTE

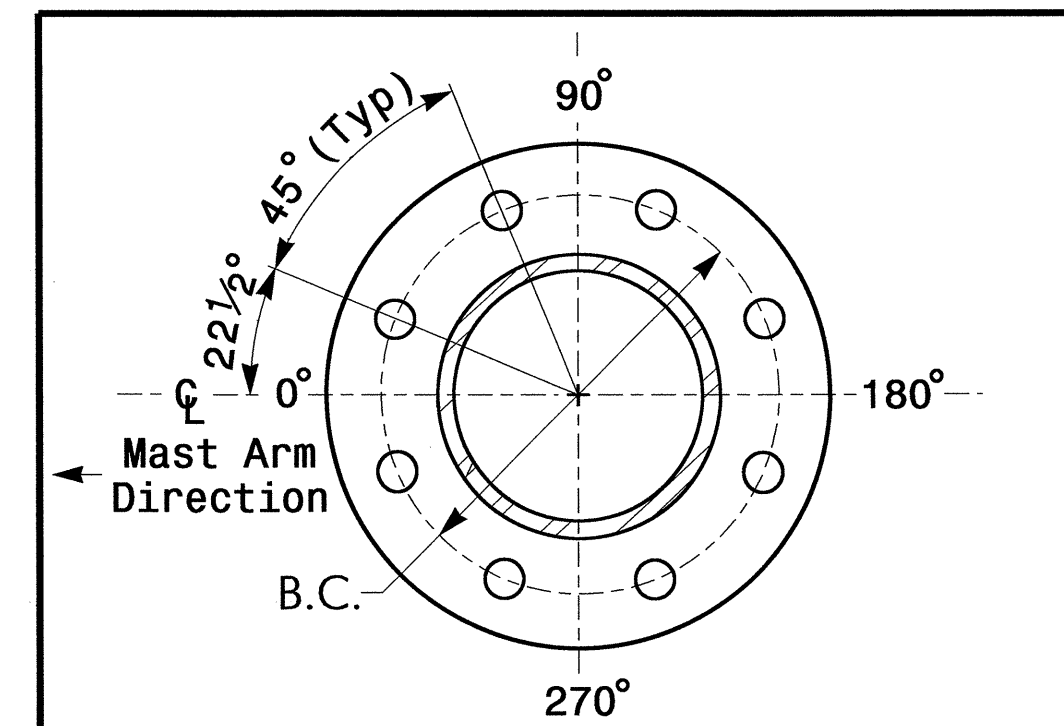
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

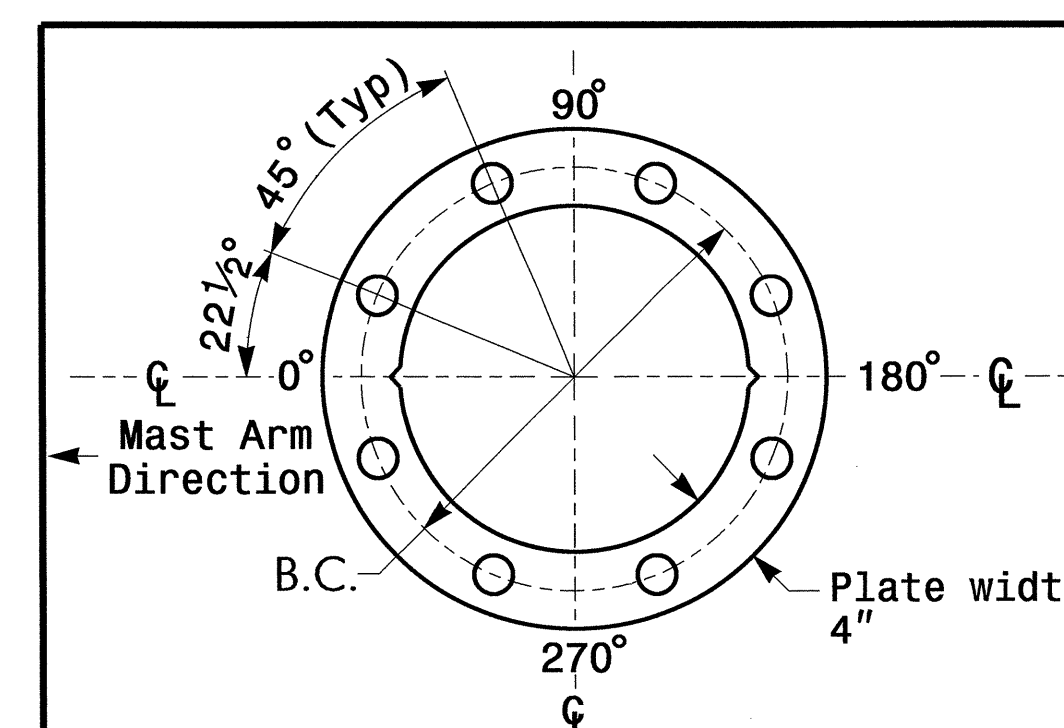
Elevation Differences for:	Pole 14	Pole 15
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT
LOCK PLATE DETAIL
For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.

Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed. Pole #16 is in a 3:1 Slope.

NCDOT Wind Zone 2 (130 mph)

	NC 24/SR 1296 (Sunset Avenue) At US 421-701 NC 24 NB Ramp		SEAL
	Division 3 Sampson County Clinton PLAN DATE: January 2013 REVIEWED BY: J.P. Galloway	PREPARED BY: I.O. Umozurike REVIEWED BY:	
SCALE 0 N/A N/A	REVISIONS	INIT. DATE	DATE 2/27/13 DATE

2/7-FEB-2013 08:07:15 I:\p1\des\gn\451\gn1\403-0352-4030352-51\p1.mtl_2013medu.dgn

SPECIAL NOTE
 The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

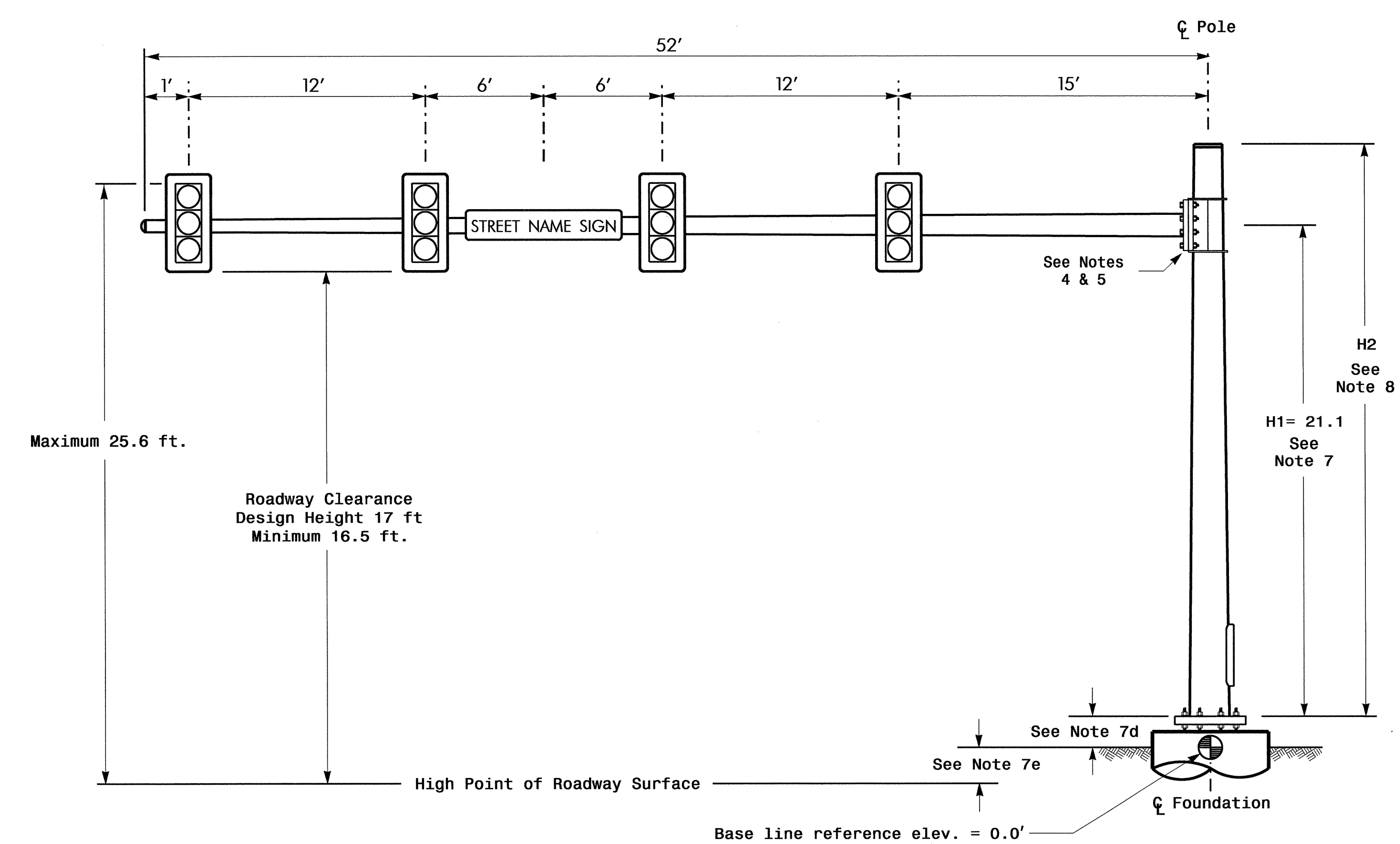
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 16
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+2.1 ft.
Elevation difference at Edge of travelway or face of curb	N/A

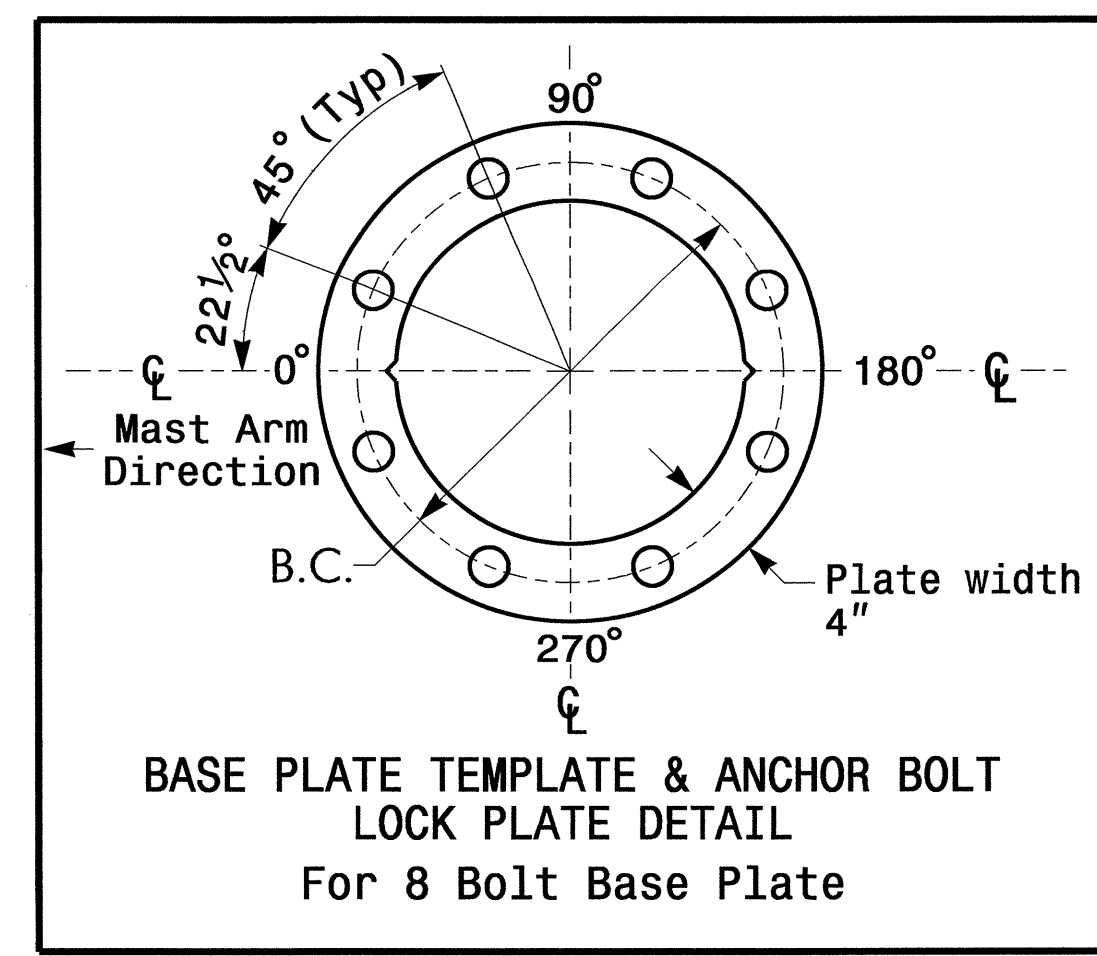
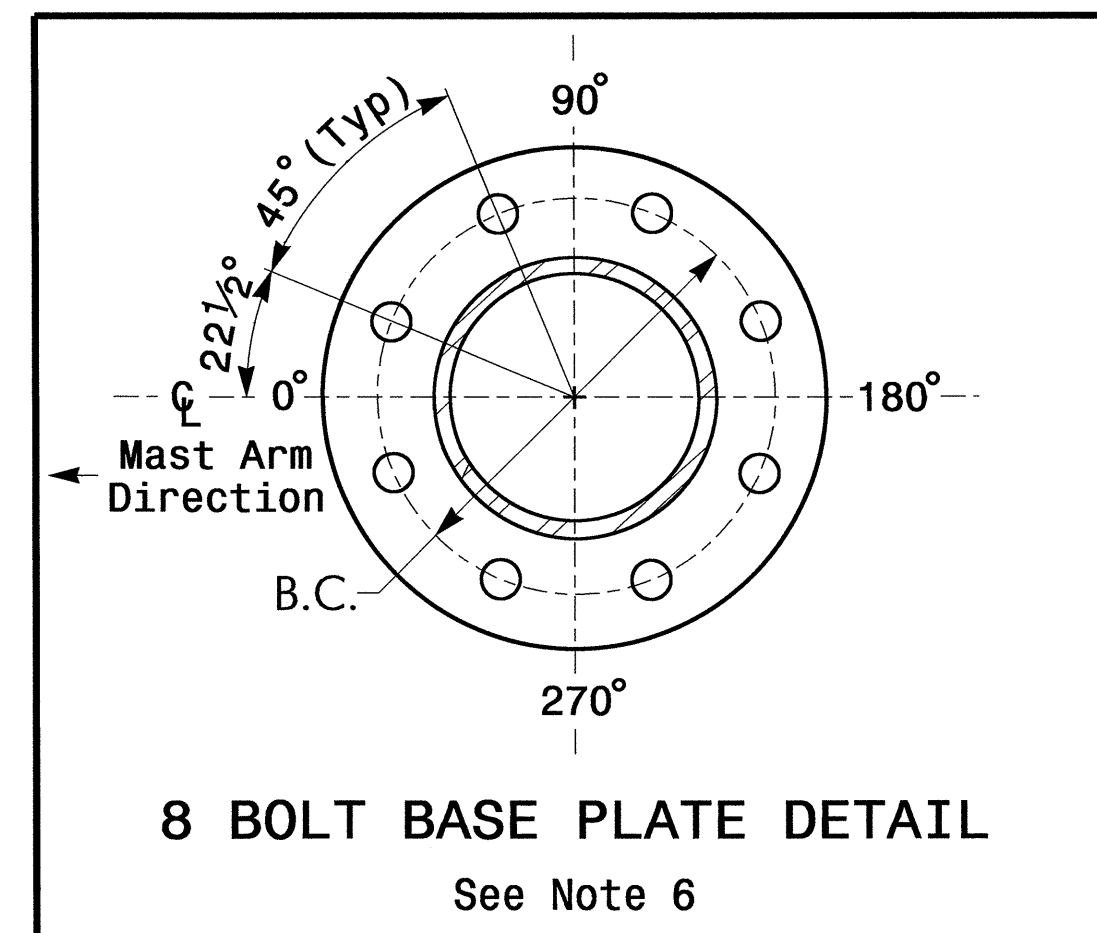
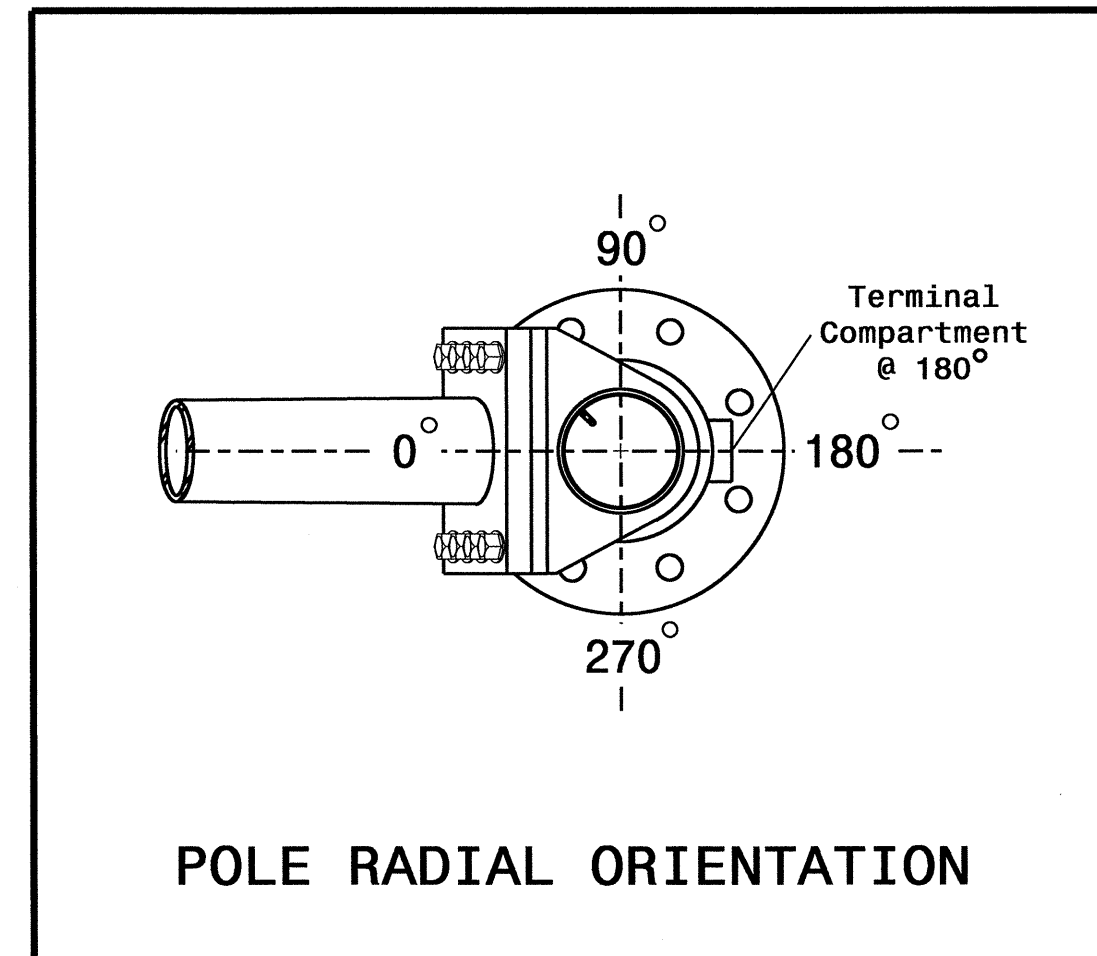
MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

Design Loading for METAL POLE NO. 17



Elevation View



NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
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Design Requirements

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- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed. Pole #17 is in a 3:1 Slope.

NCDOT Wind Zone 2 (130 mph)

	NC 24/SR 1296 (Sunset Avenue) At US 421-701 NC 24 NB Ramp		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J.P. GALLOWAY 29904 2/27/13	
	Division 3 Sampson County Clinton	PLAN DATE: January 2013		REVIEWED BY: J.P. Galloway
	PREPARED BY: I.O. Umozurike	REVISIONS		REVIEWED BY:
	SCALE: 0 N/A N/A	INIT.		DATE

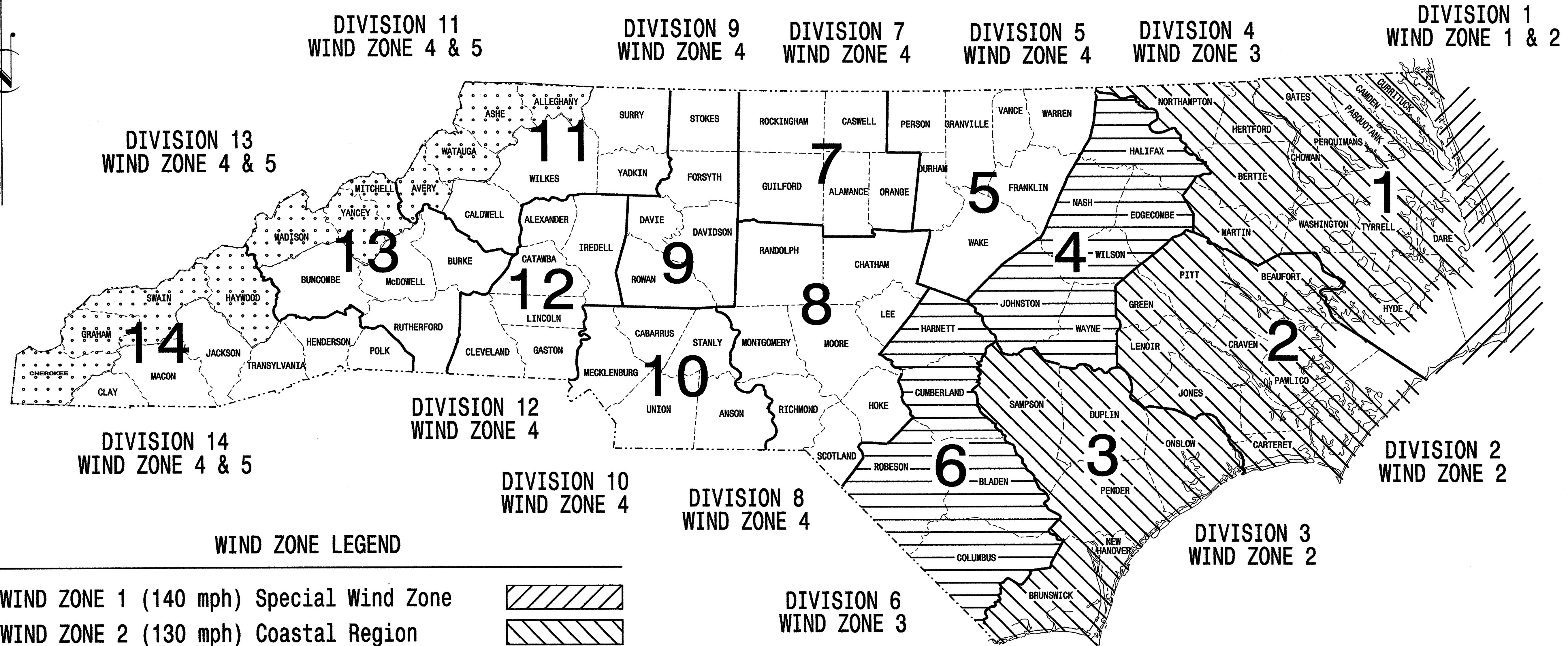
SIG. INVENTORY NO. 03-0352

27-FEB-2013 08:00
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STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	R-2303D	Sig.50
F. A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES

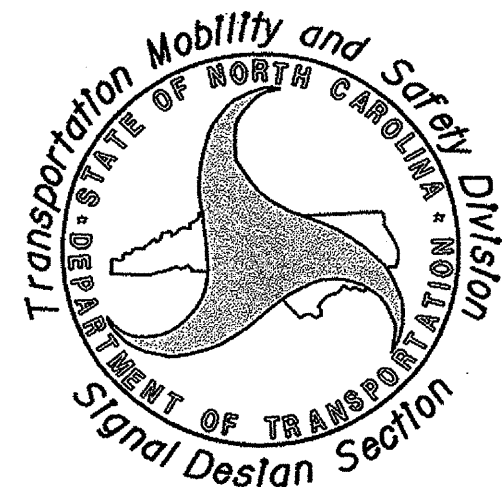


WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone		
WIND ZONE 2 (130 mph) Coastal Region		
WIND ZONE 3 (110 mph) Eastern Region		
WIND ZONE 4 (90 mph) Central & Mtn. Region		
WIND ZONE 5 (120 mph) Special Wind Zone		

<http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

Designed in conformance
with the
2002 Interim to the
4th Edition 2001

AASHTO

Standard Specifications for
Structural Supports for
Highway Signs, Luminaires,
and Traffic Signals

INDEX OF PLANS

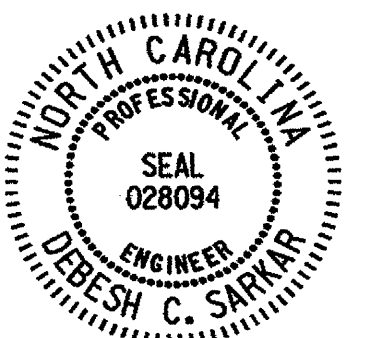
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NCDOT CONTACTS:

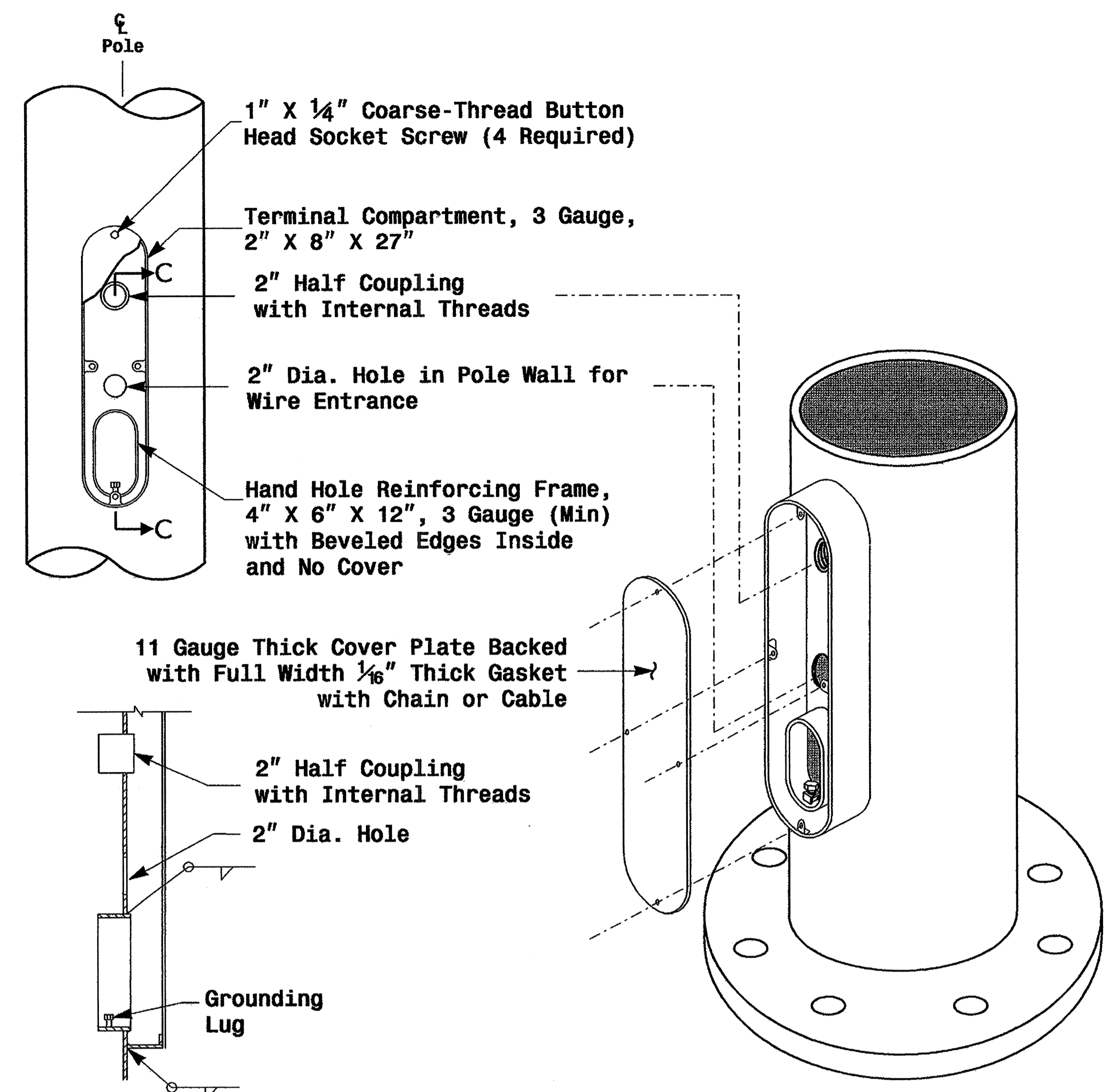
MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT

- G. A. Fuller, P.E. - State ITS and Signals Engineer
- G. G. Murr, Jr., P.E. - State Signals Engineer
- D. C. Sarkar, P.E. - ITS and Signals Senior Structural Engineer
- C. F. Andrews, Jr. - ITS and Signals Structural Project Engineer
- M. Aslam - ITS and Signals Structural Project Engineer
- N. Bitting, P.E. - ITS and Signals Structural Project Engineer

SEAL



D. C. Sarkar 7.21.2009
SIGNATURE DATE



Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail

MFG _____	MFG. DATE: MM/YY _____
SHAFT D/T/L/Y _____	
ARM-A D/T/L/Y _____	
ARM-B D/T/L/Y _____	
A.B. DIA./B.C./L/Y _____	
NCDOT STANDARD _____	

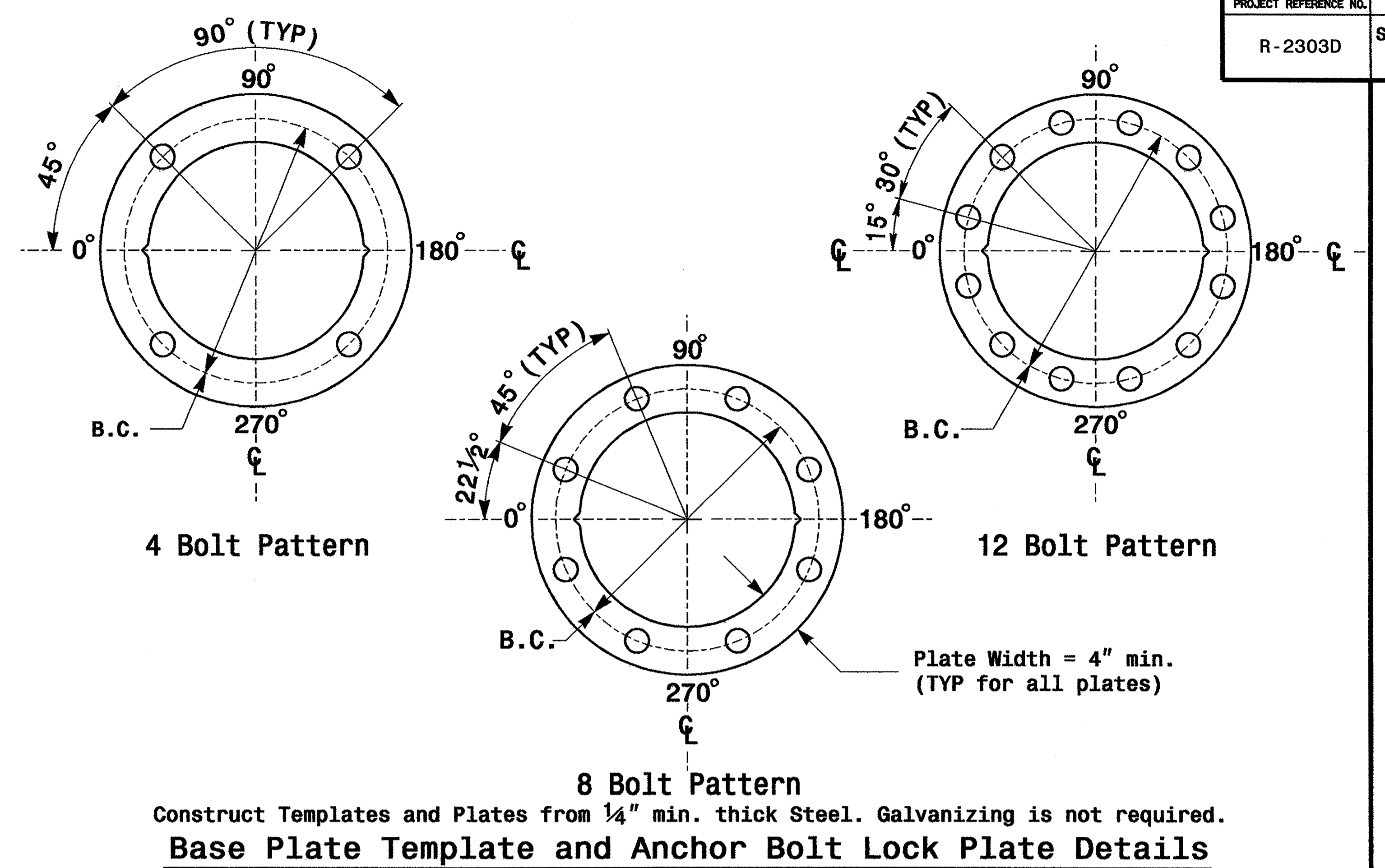
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
 - 2) A.B. = Anchor Bolt
 - 3) B.C. = Bolt Circle of Anchor Bolts
 - 4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
 - 5) See drawing M4 for mounting positions of I.D. tags.

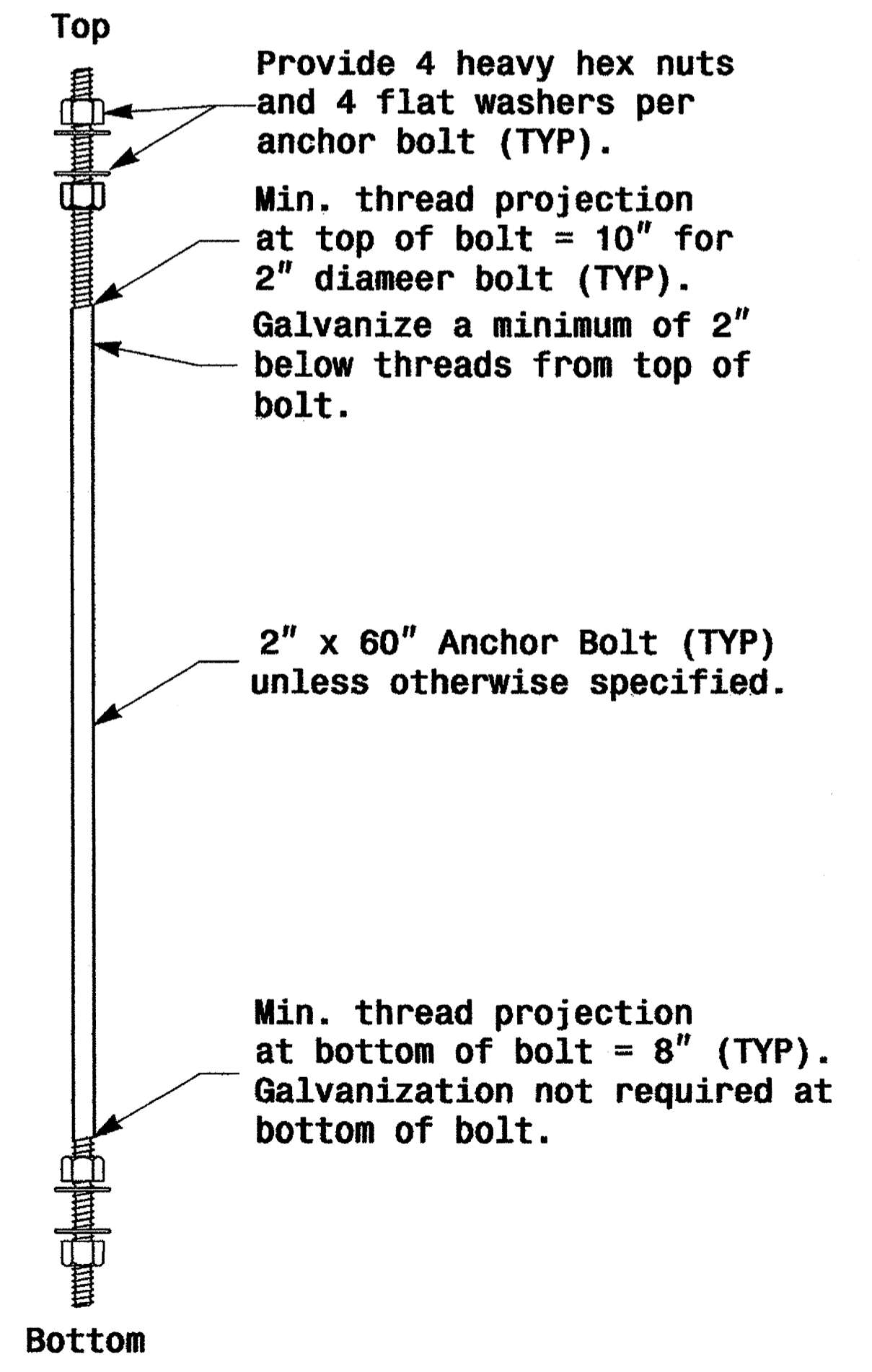
Identification Tag Details

MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

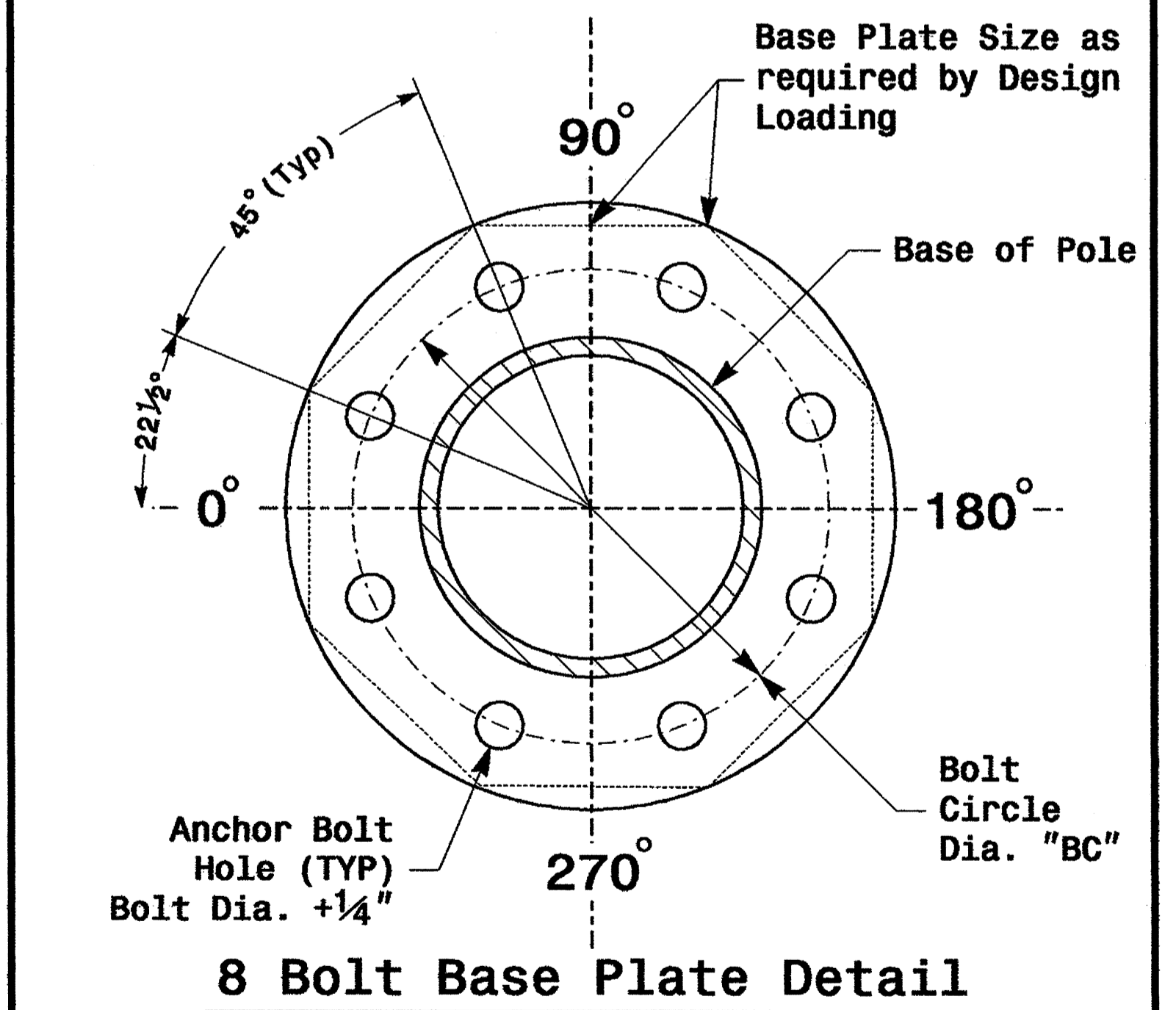
Arm I.D. Tag
(Provide on each section of a multi-section mast arm)



Note: See Strain Pole drawing M3 and Mast arm drawing M4 for base plate weld details.



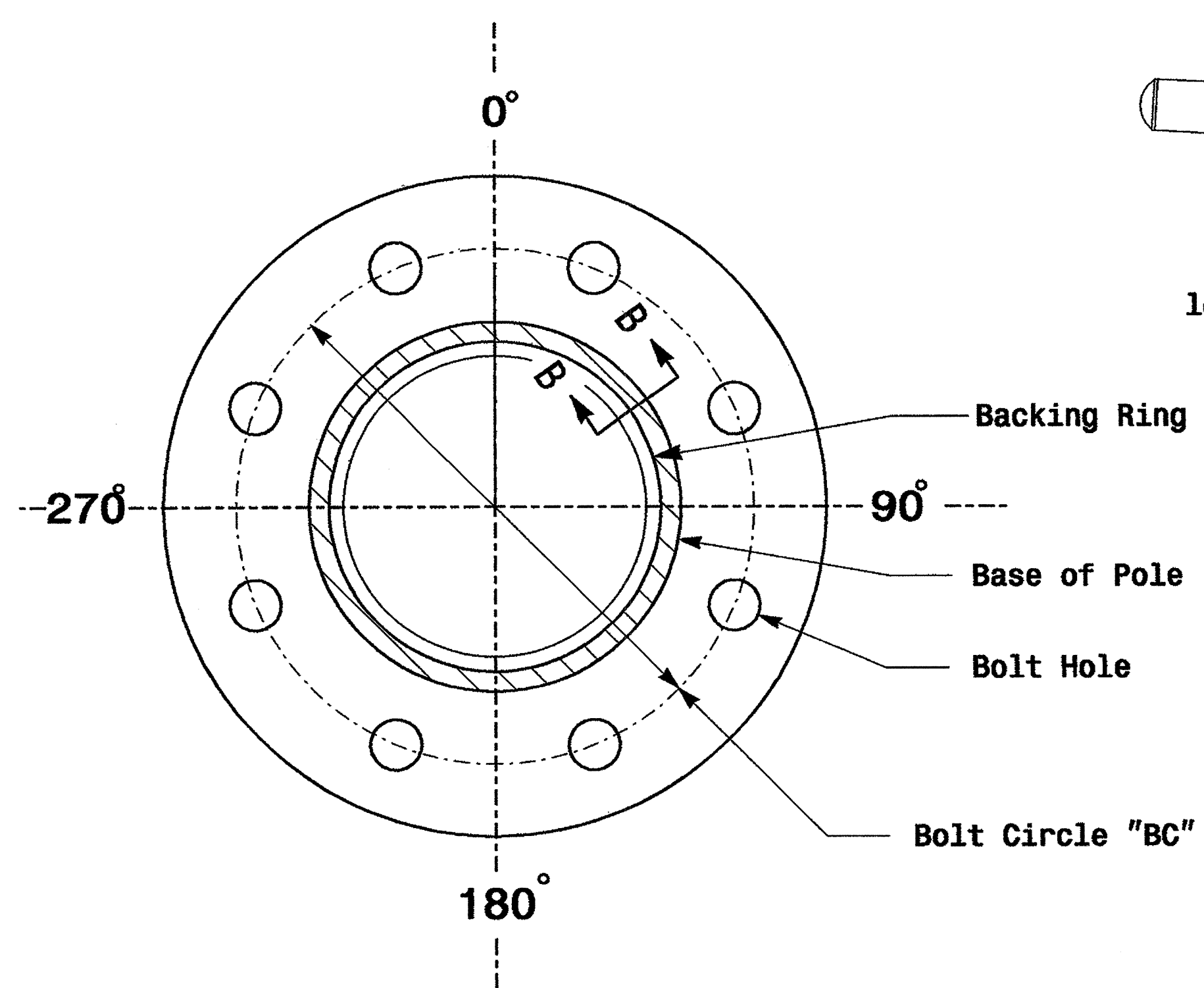
Anchor Bolt Detail



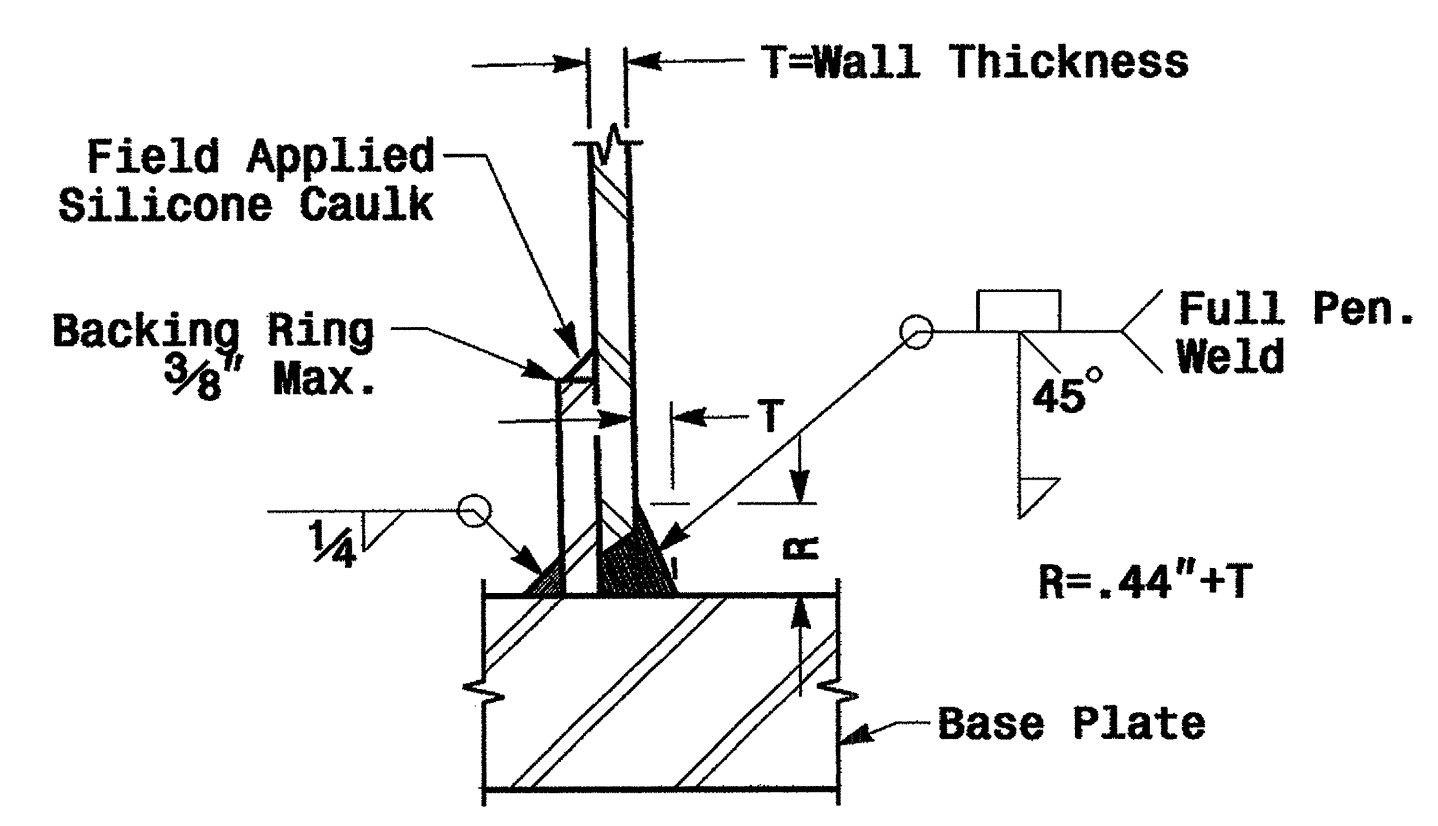
	Typical Fabrication Details Common To All Metal Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander SCALE: 0 NA NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito REVISIONS: _____	

Fabrication Details - All Poles

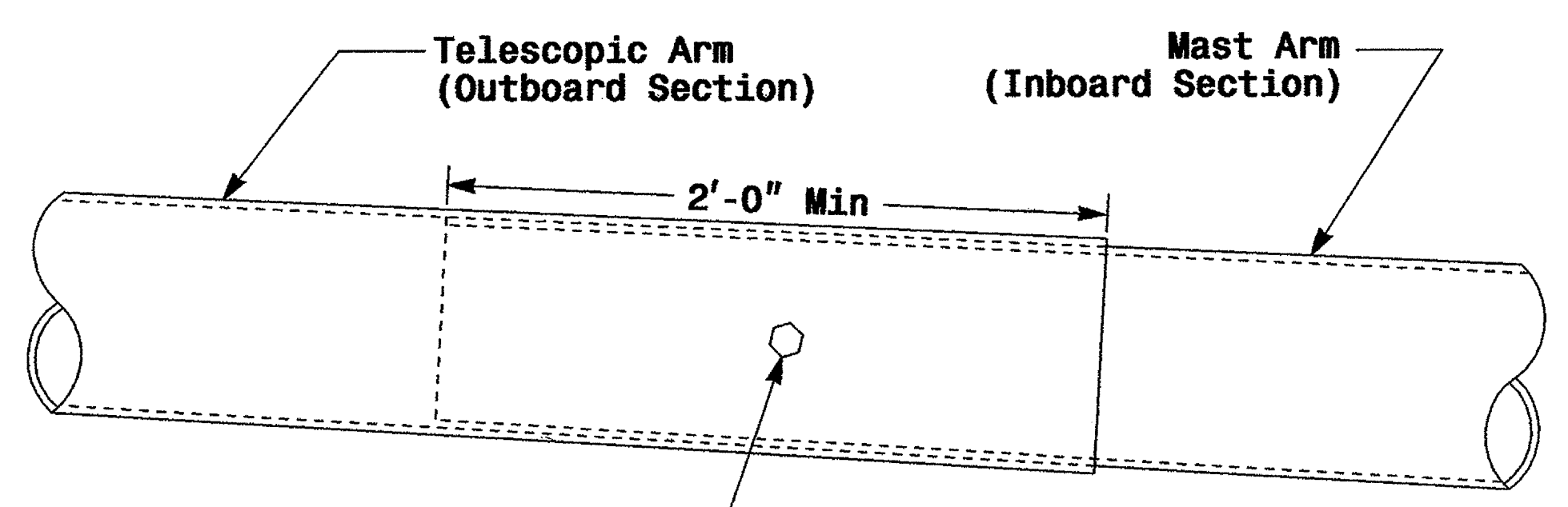
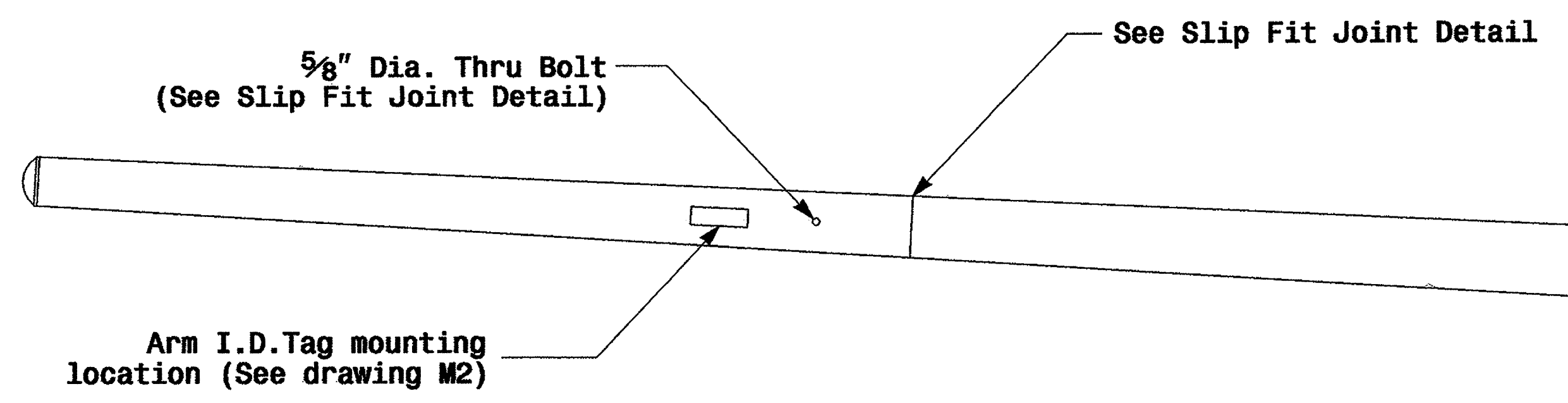
01-SEP-2005 18:22 D:\2004 Metro Pole Standards\2004 m2 thru m5.dgn



Section A-A
(See drawing M 2)
Pole Base Plate

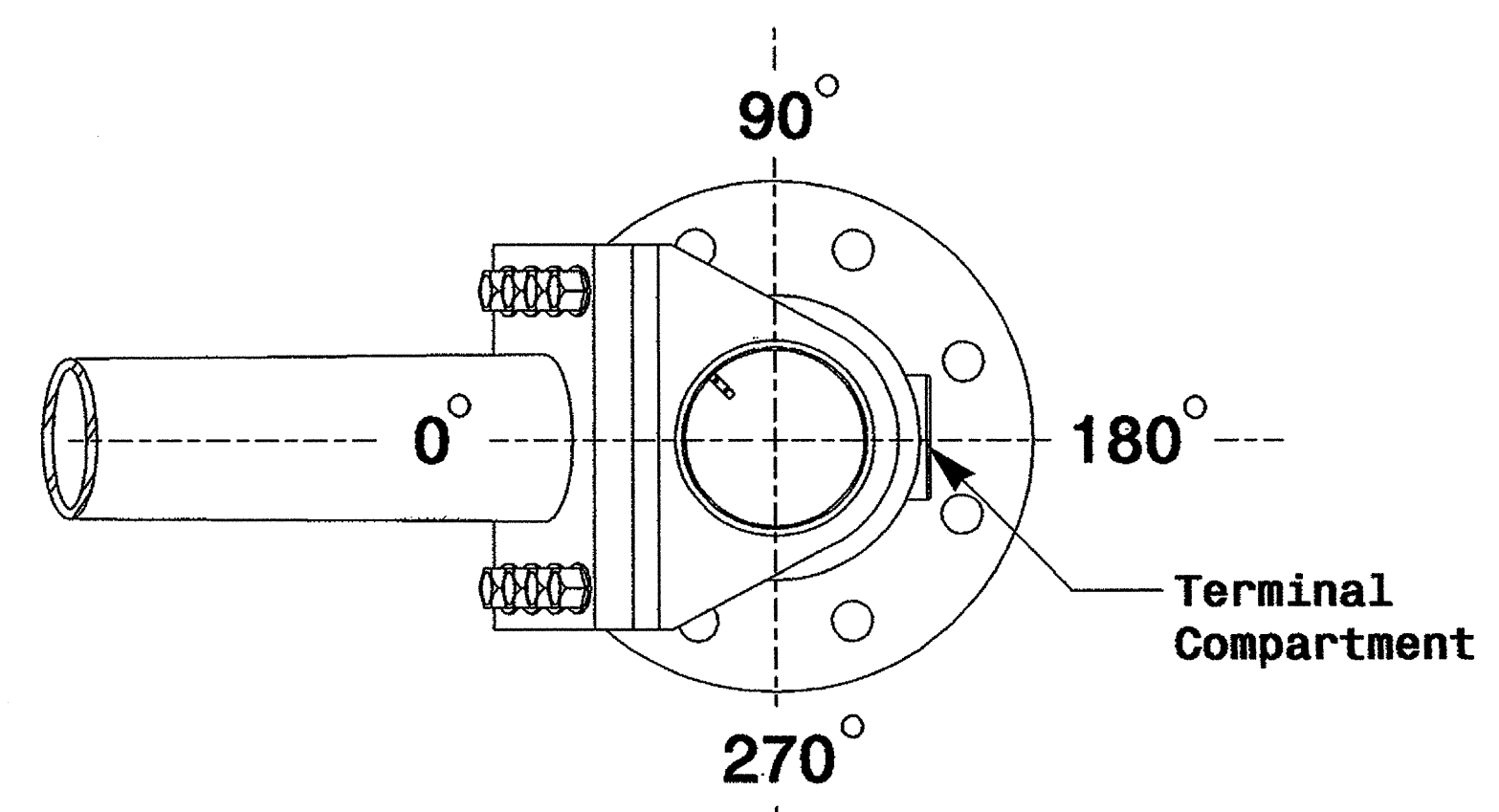


Section B-B
(Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail

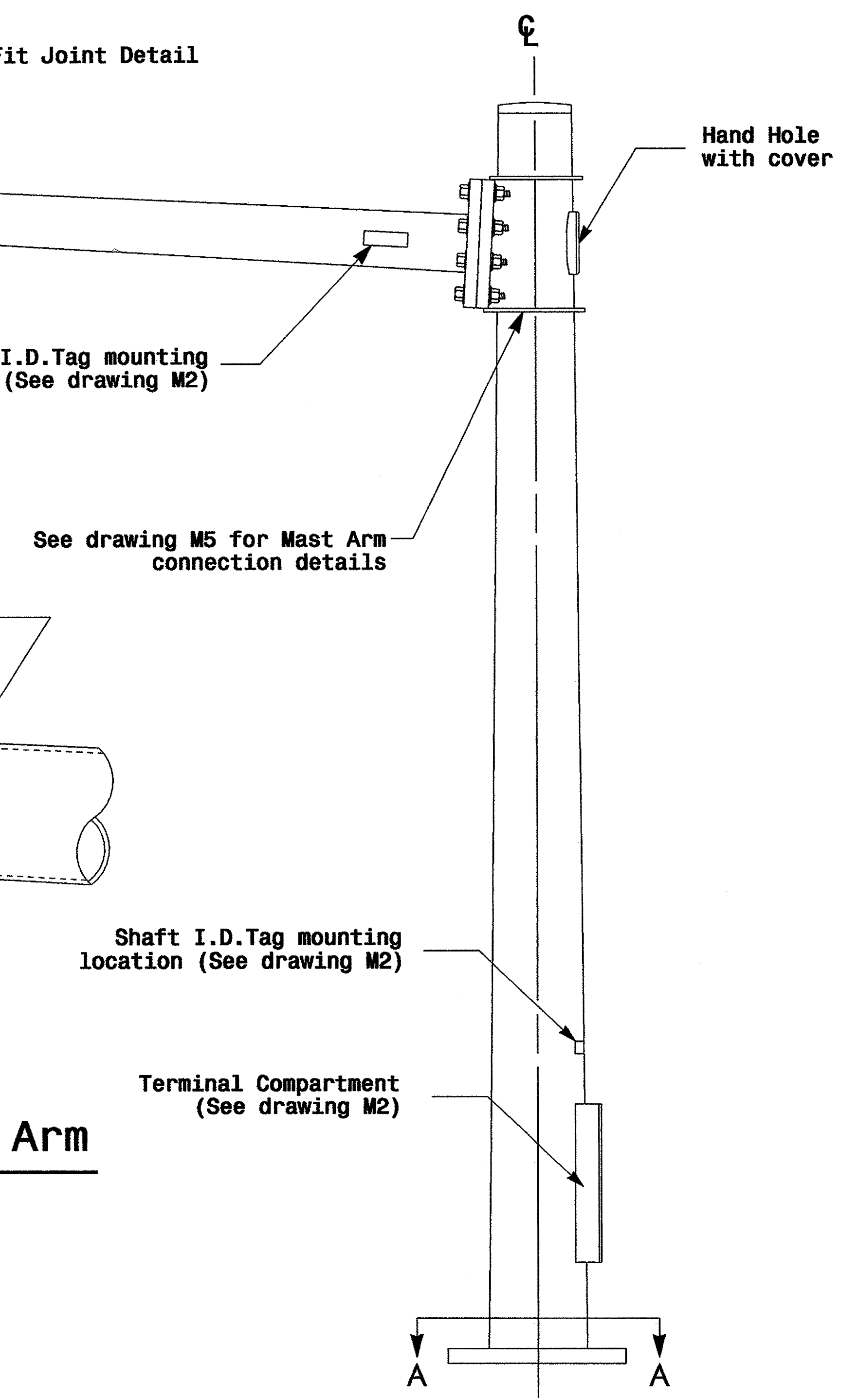


3/4" Factory Drilled Hole in Outboard Tube. Field Drill Inboard Tube. 5/8" Galvanized Thru Stud with (2) Hex. Locknuts Ea.

Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

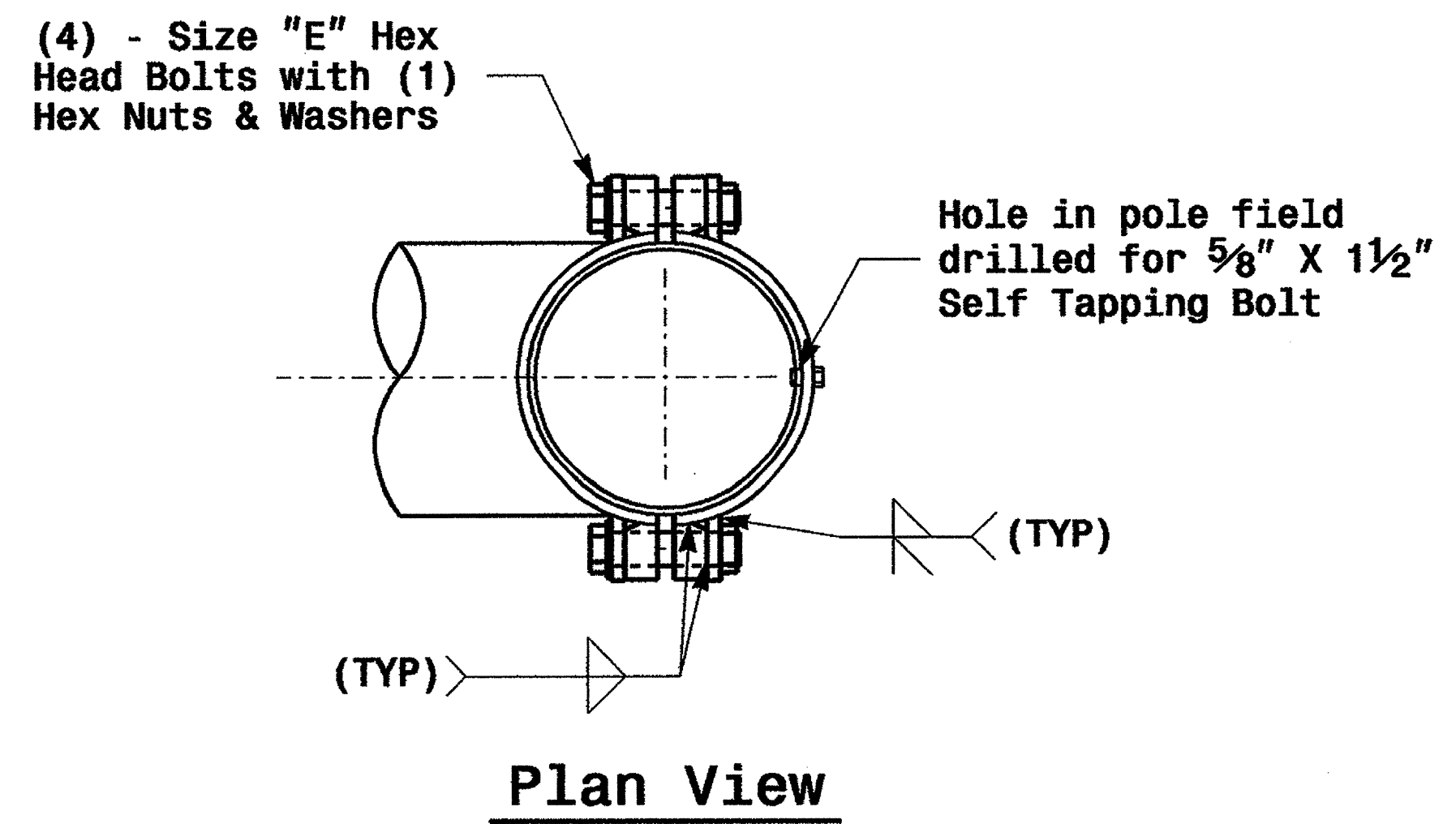
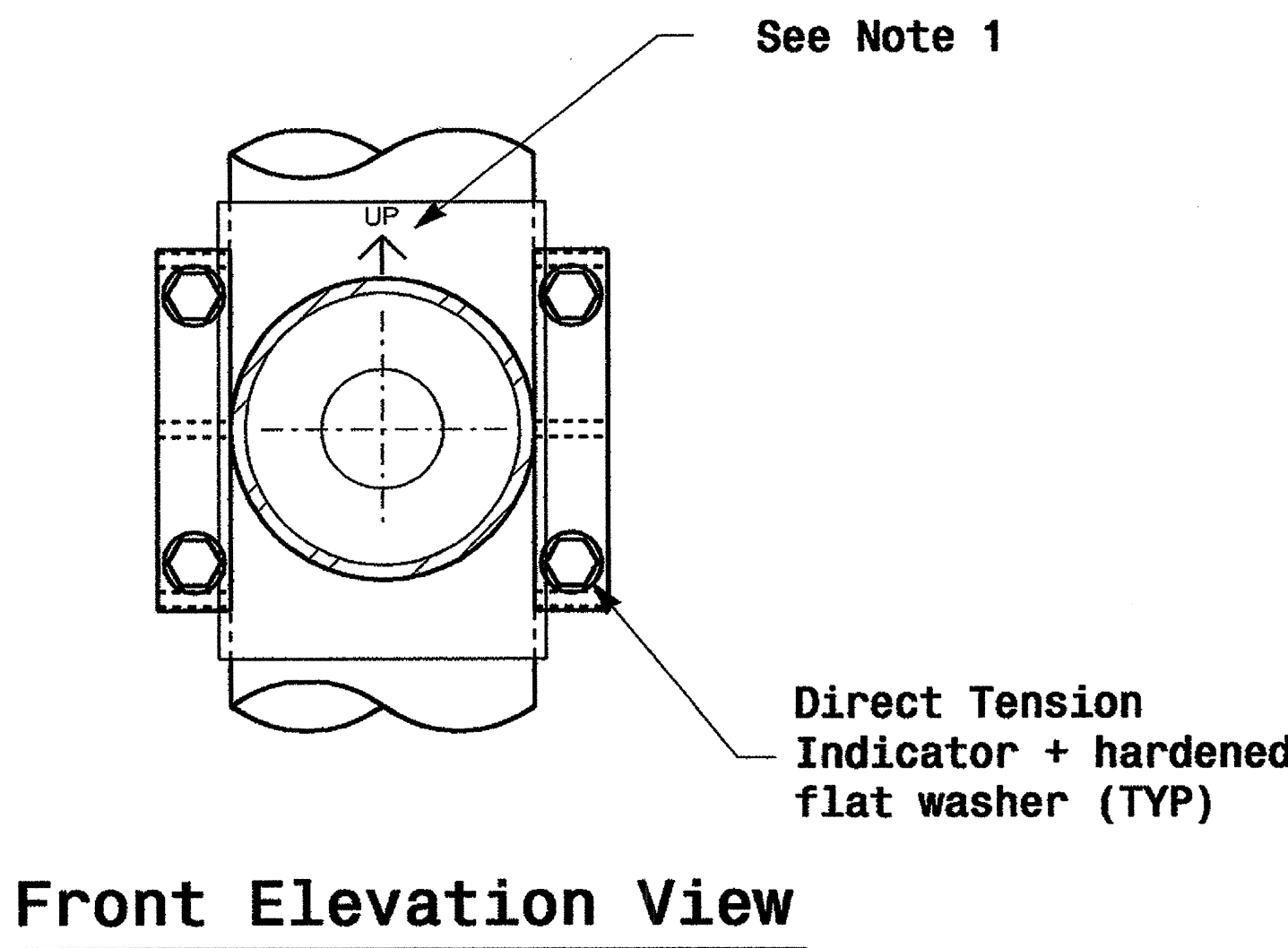
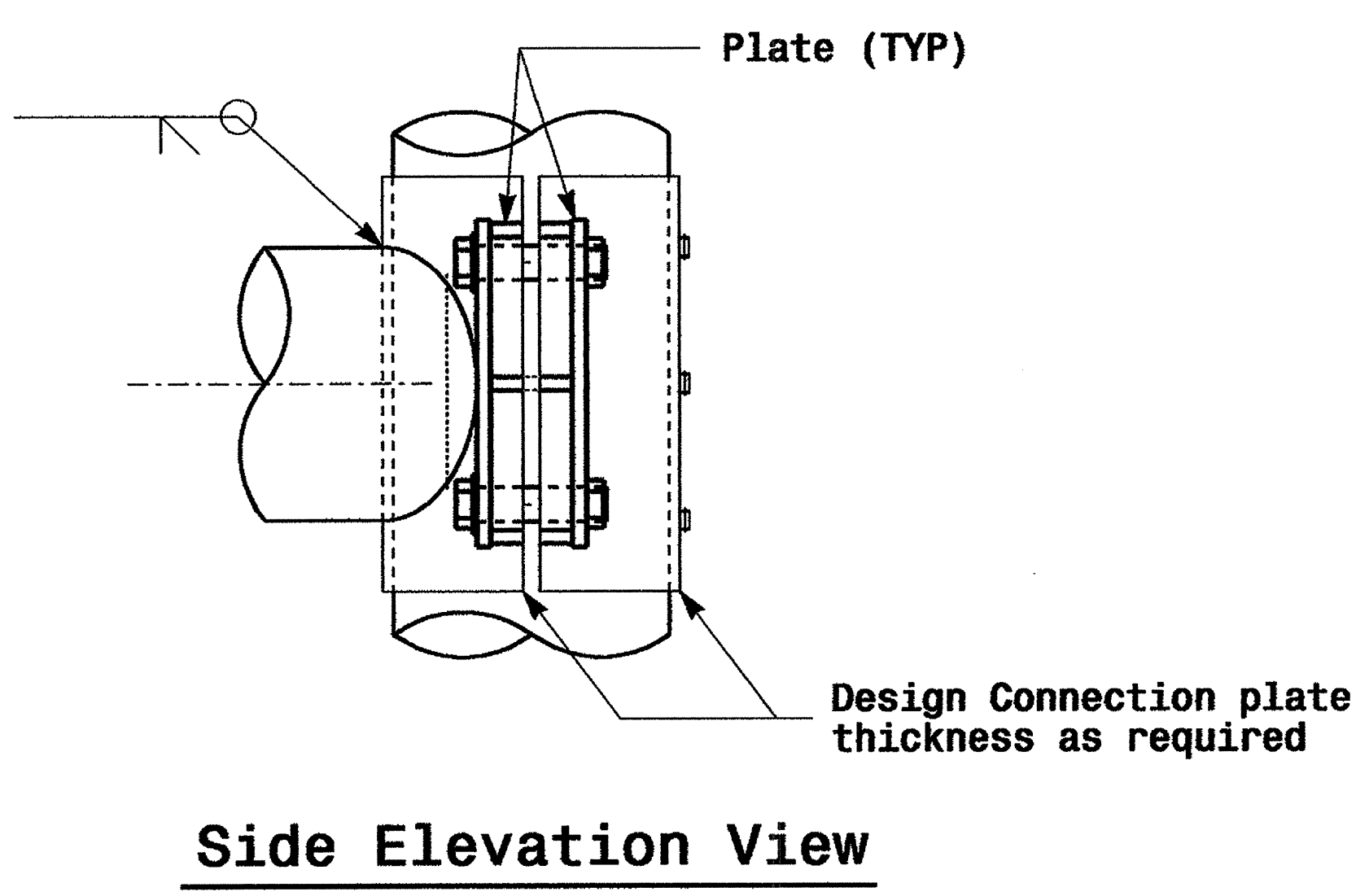


Monotube Mast Arm Pole (.14in./ft. taper)

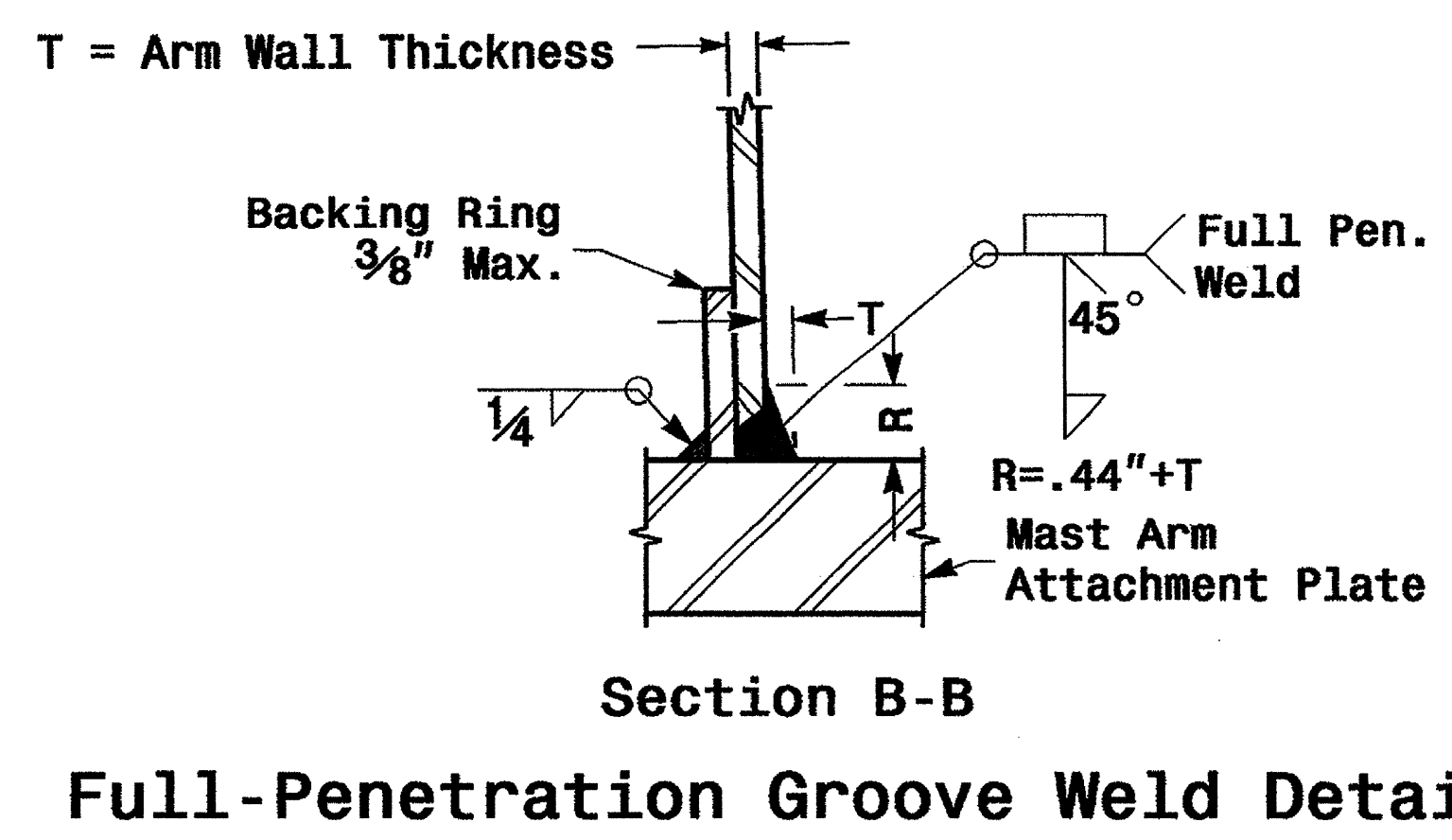
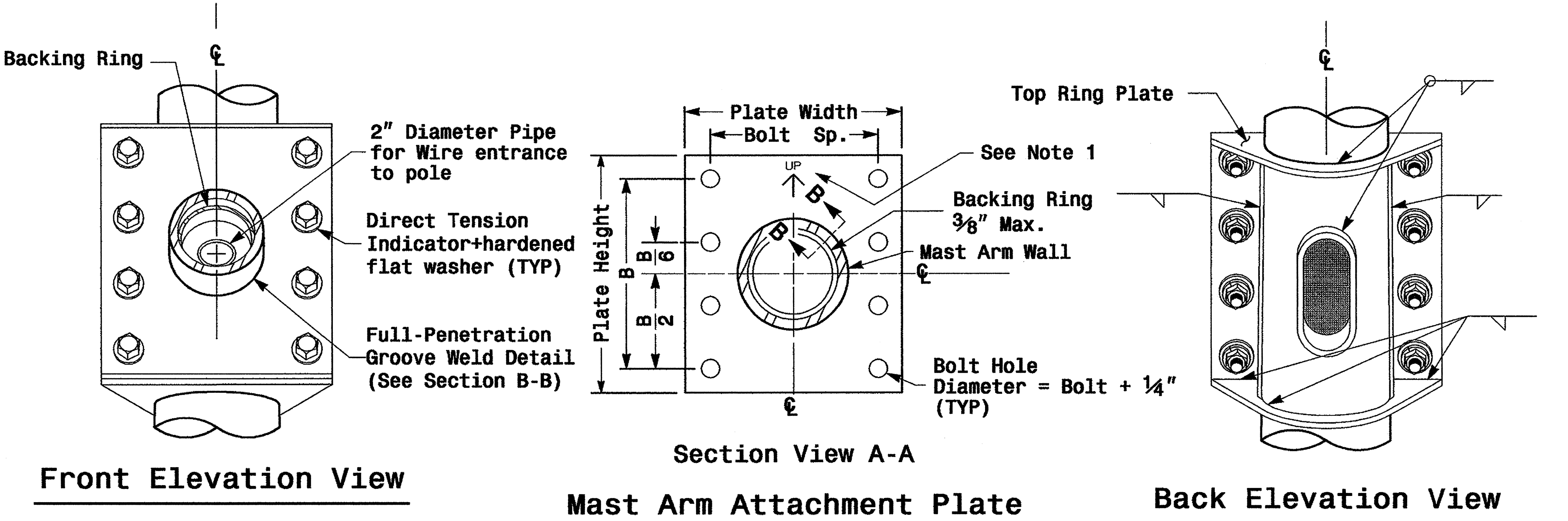
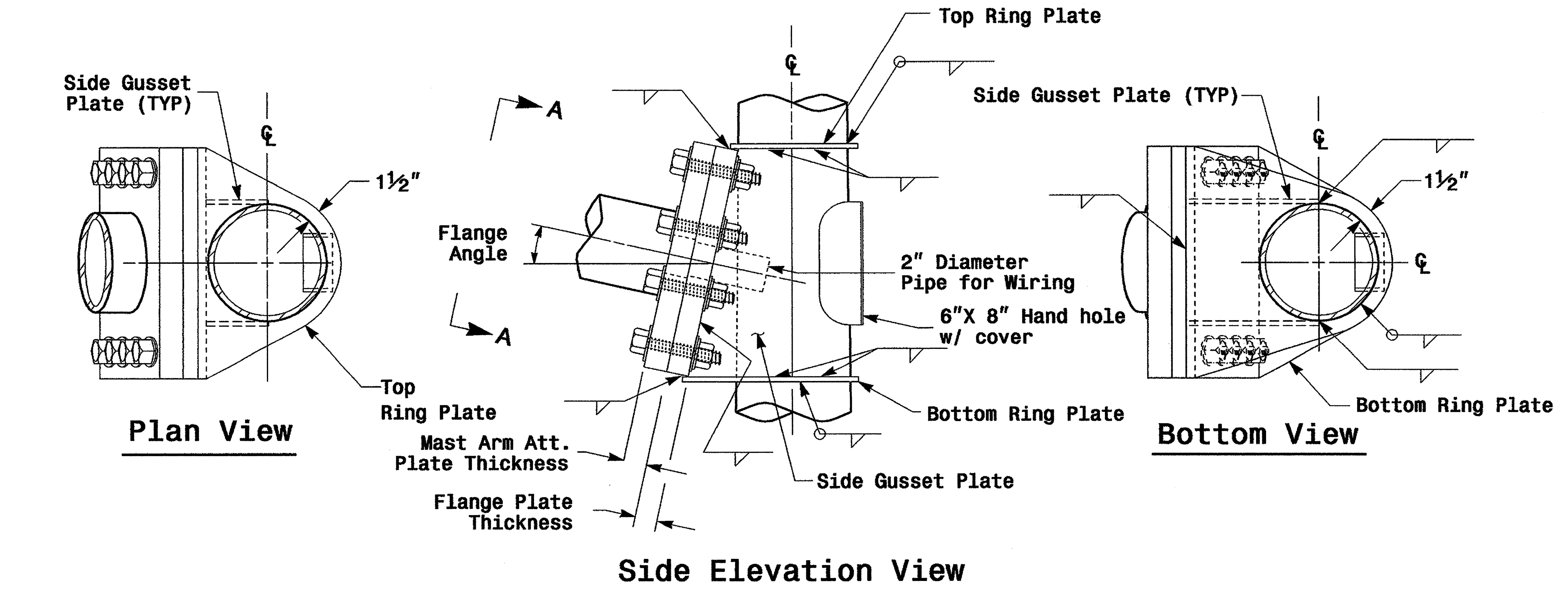
01-SEP-2005 14:08 w:\shop\lee-un1\workgroups\2004 metal pole standards\2004 m4.dgn pol escender

<p>Prepared in the Office of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Road and Geometric Division 222 N. McDowell St., Raleigh, NC 27603</p>	<p>Typical Fabrication Details for Mast Arm Poles</p>		<p>SEAL</p>					
	<p>PLAN DATE: May 2005</p>	<p>REVIEWED BY: C.F. Andrews</p>		<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	DESCRIPTION	
NO.	DATE	DESCRIPTION						
<p>SCALE: NONE</p>	<p>PREPARED BY: P.L. Alexander</p>	<p>REVIEWED BY: A.M. Esposito</p>	<p>SIGNATURE: <i>P.L. Alexander</i> DATE: 9.2.2005</p>					
<p>STG. INVENTORY NO.</p>	<p> </p>	<p> </p>	<p> </p>					

Adjustable Clamp Type Bolted Mast Arm Connection



Welded Ring Stiffened Mast Arm Connection



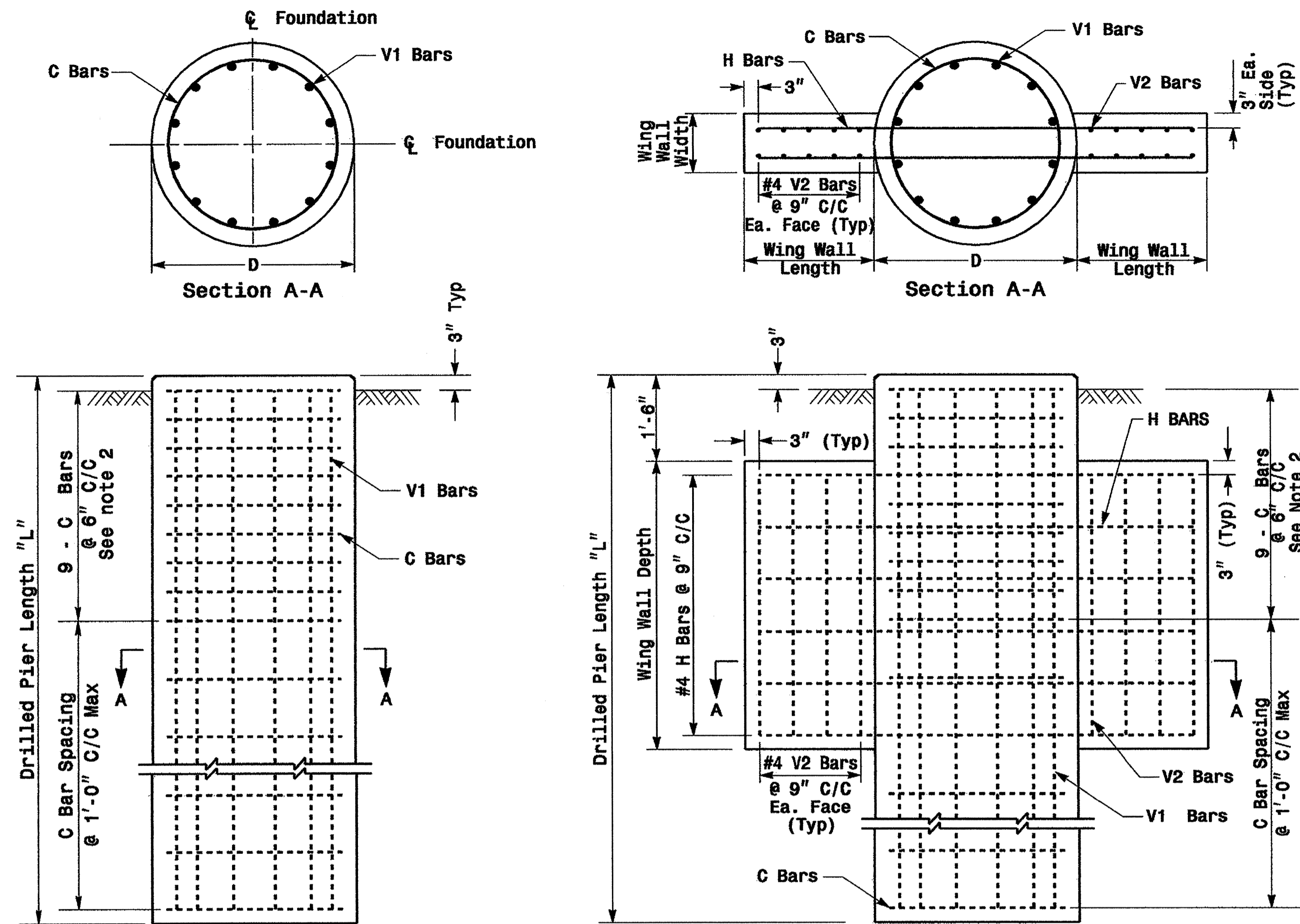
- Notes:
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
 2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
 3. Designer is responsible for providing appropriate drainage points.

Fabrication Details - Mast Arm Poles

01-SEP-2005 14:11 v1:psd01 (4) d:\work\pops\2004 metrol pole.standards\2004_m6.dgn

	Fabrication Details For Mast Arm Connection To Pole		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DRESH C. SPRAR
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito	SCALE: 0 NA NONE

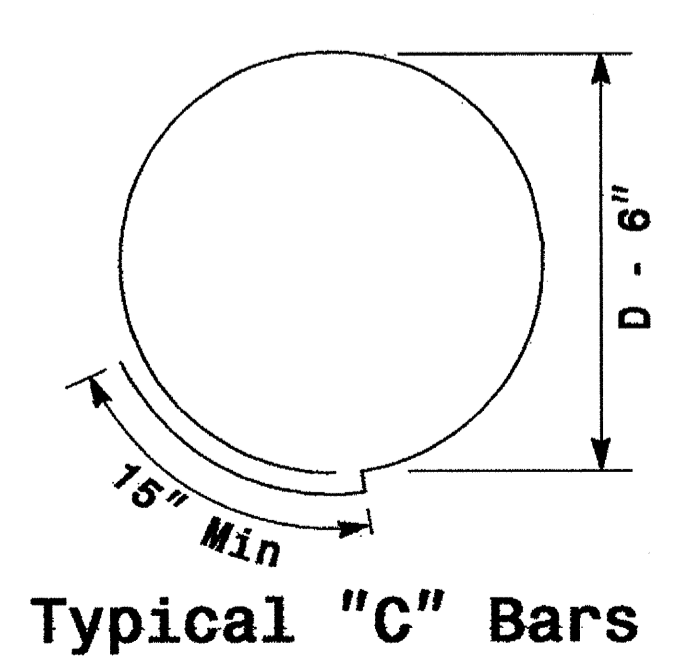
Reinforcing Steel Bars



REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)

Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3



Typical "C" Bars

REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS

Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel				
		Bar Name	No.	Size	Type	Length
TYPE 1	42"	V1	9	#8	STR.	**
		V2	12	#4	STR.	2'-6"
		H	8	#4	STR.	6'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	42"	V1	9	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-6"
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3

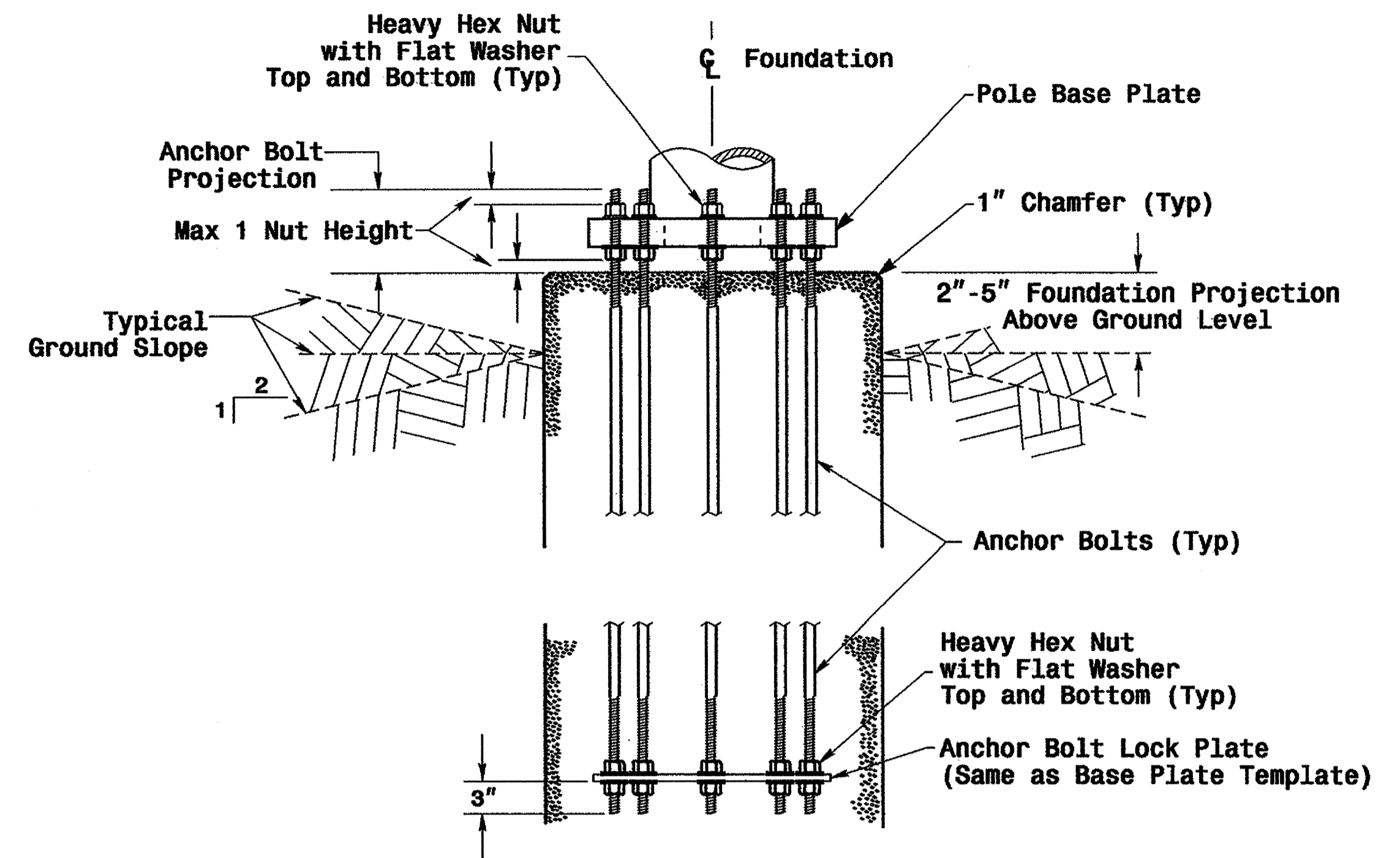
WING WALL DETAILS

Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

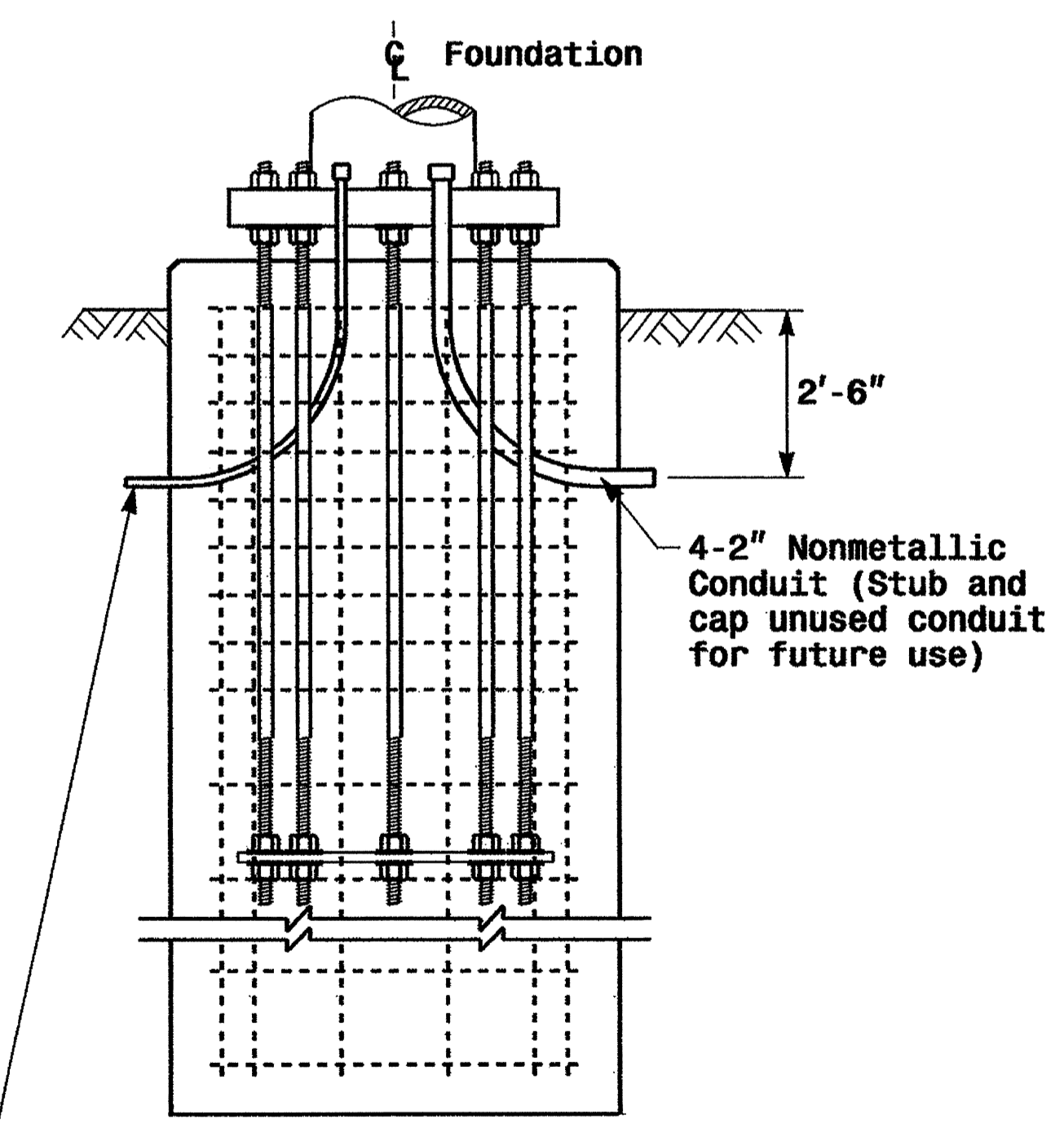
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



2-1" Nonmetallic Conduits for Electrical Service and Grounding Electrode Conductor

Notes

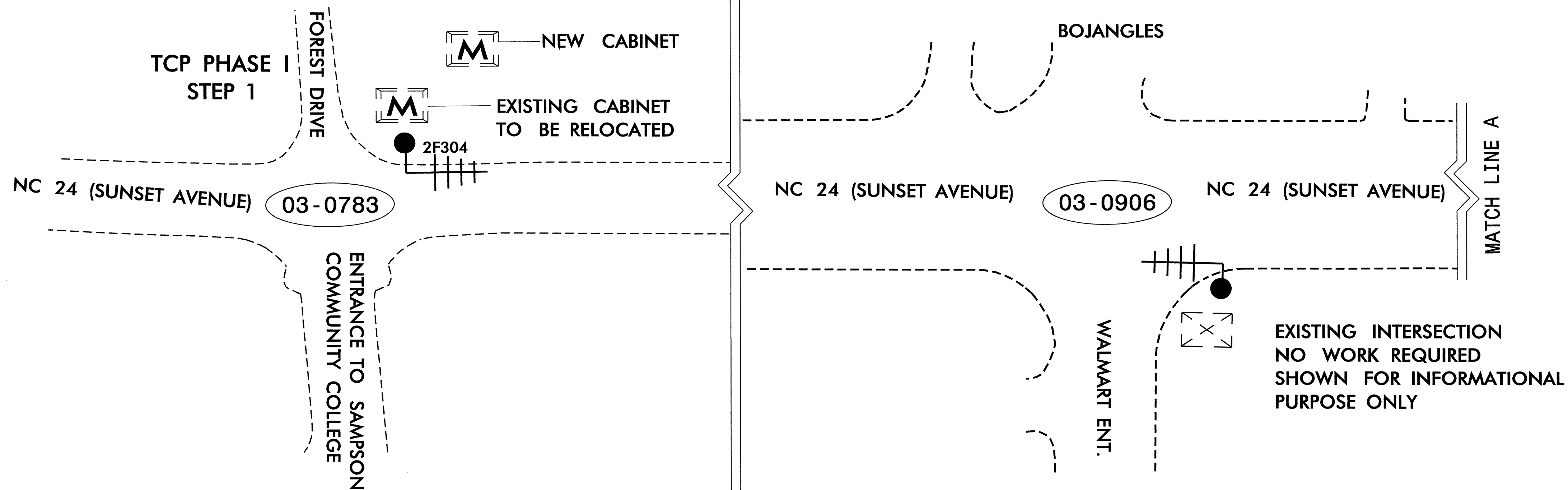
- The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
- Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
- The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
- The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

Construction Details - Foundations

Prepared in the Office of

Construction Details Foundations
 PLAN DATE: May 2005 REVIEWED BY: P.L. ALEXANDER
 PREPARED BY: C.F. ANDREWS REVIEWED BY: A.M. ESPOSITO
 SCALE: 0 NA NONE
 REVISIONS: _____ INIT. DATE
 SIGNATURE: *D. Sarker* 9.2.2005
 DATE: _____
 SIG. INVENTORY NO. _____

- 1) RELOCATE RADIO FROM EXISTING CABINET TO THE NEW SIGNAL CABINET
- 2) INSTALL NEW 2" RISER WITH WEATHERHEAD, CONDUIT AND COAXIAL CABLE BETWEEN RELOCATED RADIO AND EXISTING ANTENNA
- 3) INSTALL NEW COAXIAL CABLE SHIELD GROUNDING AND WEATHERPROOFING KIT.

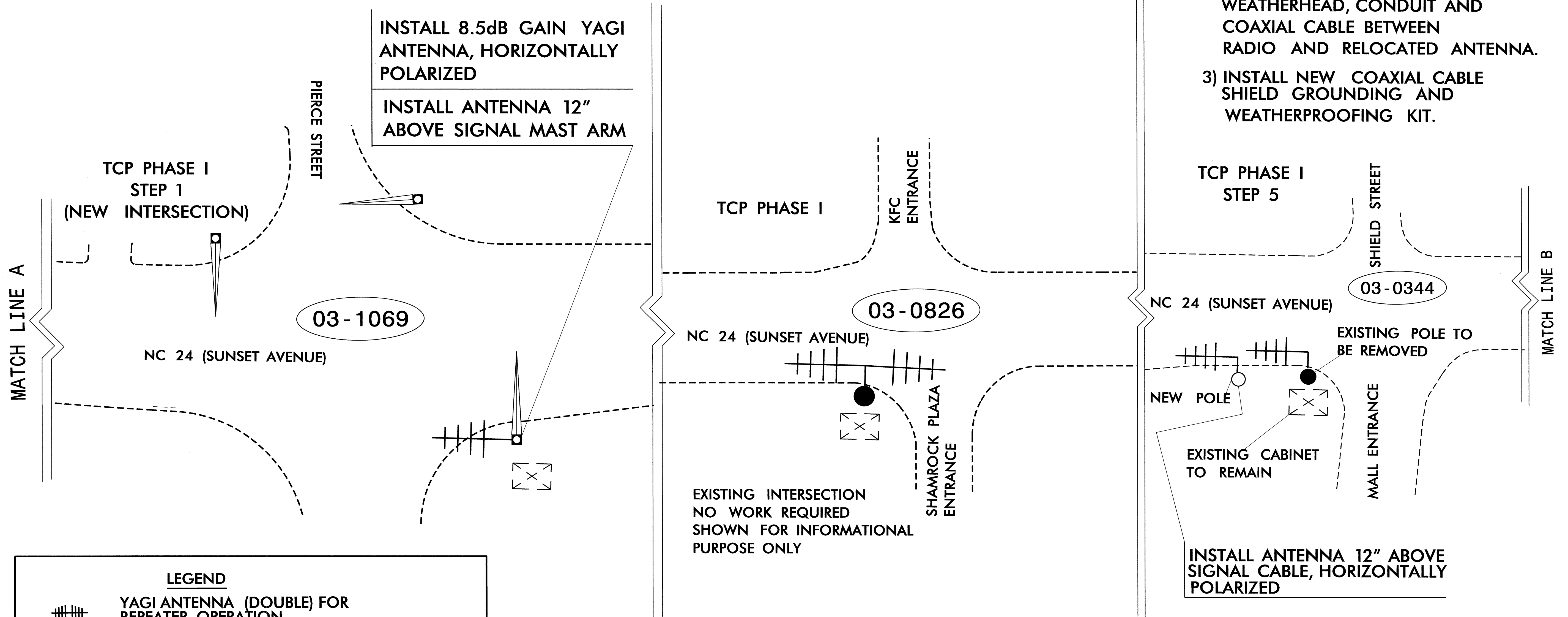


LEGEND	
	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
	YAGI ANTENNA (SINGLE)
	OMNI ANTENNA
	EXISTING CONTROLLER AND CABINET
	EXISTING MASTER CONTROLLER AND CABINET
	SIGNAL INVENTORY NUMBER
	NEW METAL POLE W/MAST ARM
	EXISTING WOOD POLE
	NEW METAL POLE
	SIGNAL POLE
	EXISTING METAL POLE
	NEW OVERSIZED JUNCTION BOX
	EXISTING OVERSIZED JUNCTION BOX
	EXISTING CONDUIT
	EXISTING COMMUNICATIONS CABLE

TCP PHASE I (MAINTAIN RADIO SYSTEM)

	NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO NC 421 NBL		
	DIVISION 03 SAMPSON COUNTY CLINTON		
PLAN DATE: FEBRUARY 2013	PREPARED BY: P. C. LOUDER	REVIEWED BY: I. N. AVERY	REVIEWED BY: G.A. FULLER, PE
SCALE: 0	REVISIONS	INIT.	DATE
Signature: <i>Gregory A. Fuller</i>			DATE: 2-19-13

- 1) RELOCATE EXISTING ANTENNA FROM EXISTING SIGNAL POLE TO NEW POLE
- 2) INSTALL NEW 2" RISER WITH WEATHERHEAD, CONDUIT AND COAXIAL CABLE BETWEEN RADIO AND RELOCATED ANTENNA.
- 3) INSTALL NEW COAXIAL CABLE SHIELD GROUNDING AND WEATHERPROOFING KIT.



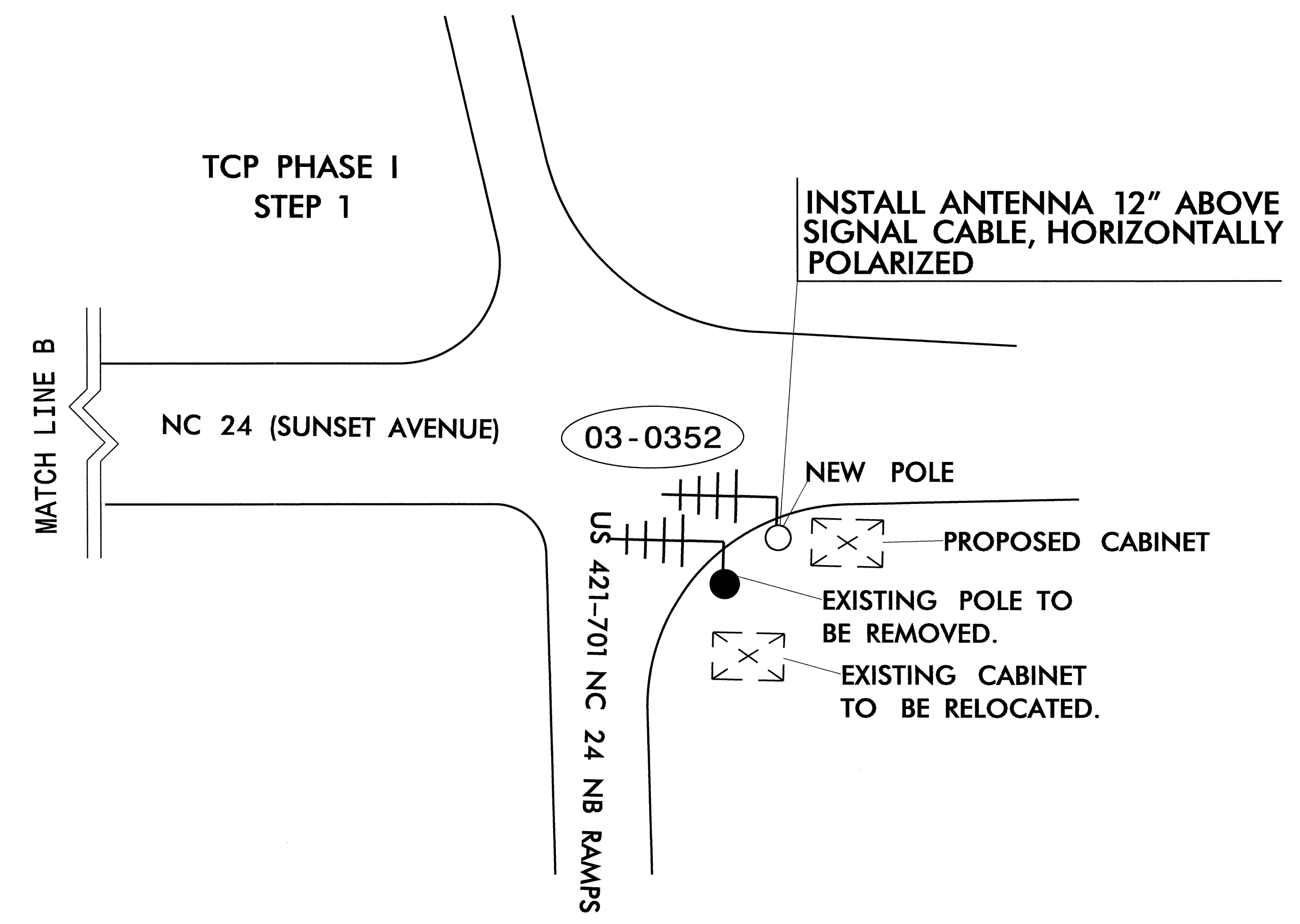
LEGEND

- YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA
- EXISTING CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- SIGNAL INVENTORY NUMBER
- NEW METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- NEW METAL POLE
- SIGNAL POLE
- EXISTING METAL POLE
- NEW OVERSIZED JUNCTION BOX
- EXISTING OVERSIZED JUNCTION BOX
- EXISTING CONDUIT
- EXISTING COMMUNICATIONS CABLE

TCP PHASE I (MAINTAIN RADIO SYSTEM)

	NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 24 NBL		
	DIVISION 03 SAMPSON COUNTY CLINTON	PLAN DATE: FEBRUARY 2013 REVIEWED BY: I. N. AVERY	
750 N. Greenfield Pkwy., Garner, NC 27529	SCALE: 0	REVISIONS:	INIT. DATE
	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 2-19-13	CADD File Name:	

- 1) RELOCATE RADIO FROM EXISTING CABINET TO THE NEW SIGNAL CABINET.
- 2) RELOCATE EXISTING ANTENNA FROM EXISTING SIGNAL POLE TO NEW SIGNAL POLE.
- 3) INSTALL NEW 2" RISER WITH WEATHERHEAD, CONDUIT AND COAXIAL CABLE BETWEEN RELOCATED RADIO AND ANTENNA.
- 4) INSTALL NEW COAXIAL CABLE SHIELD GROUNDING AND WEATHERPROOFING KIT.

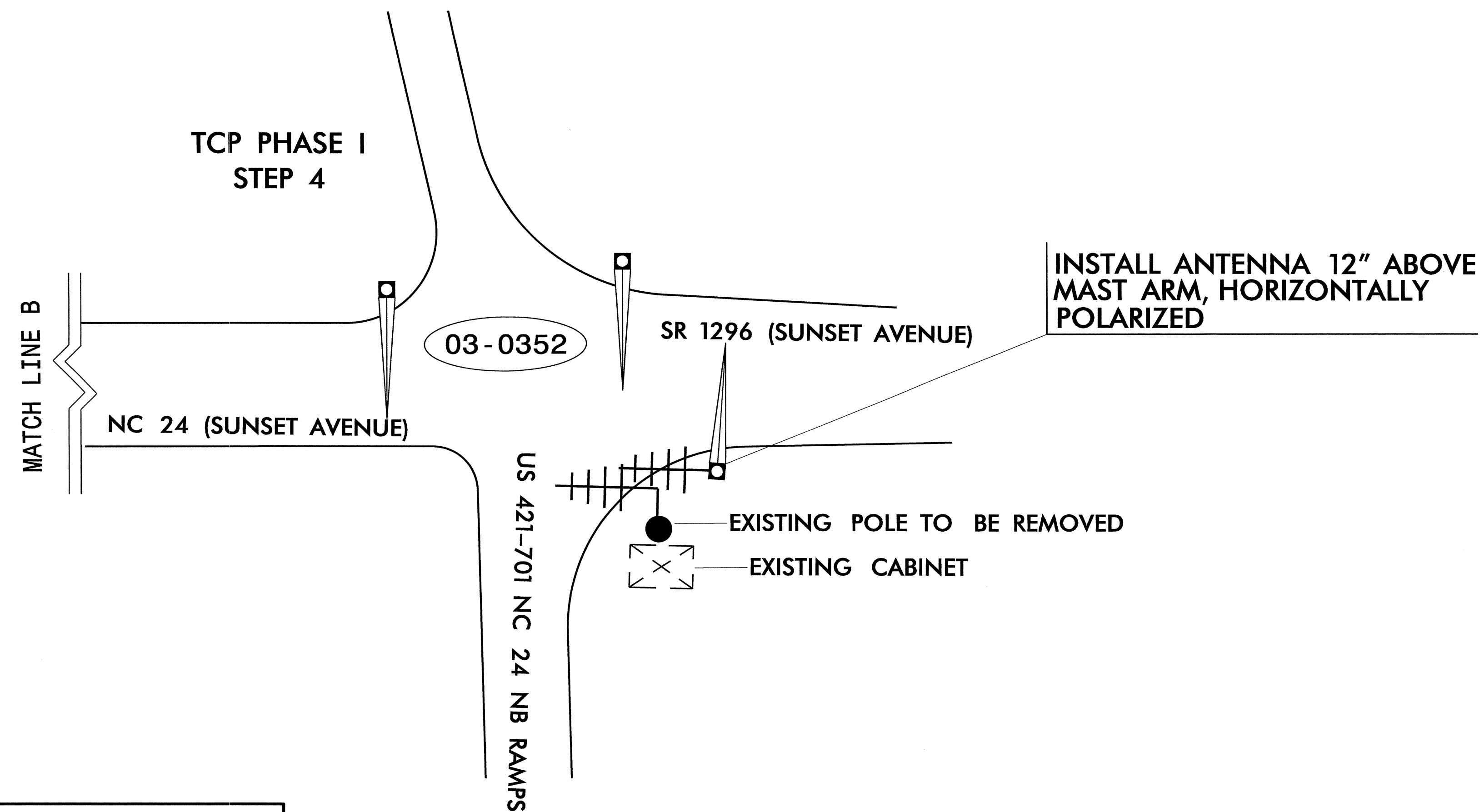


LEGEND	
	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
	YAGI ANTENNA (SINGLE)
	OMNI ANTENNA
	EXISTING CONTROLLER AND CABINET
	EXISTING MASTER CONTROLLER AND CABINET
	SIGNAL INVENTORY NUMBER
	NEW METAL POLE W/MAST ARM
	EXISTING WOOD POLE
	NEW METAL POLE
	SIGNAL POLE
	EXISTING METAL POLE
	NEW OVERSIZED JUNCTION BOX
	EXISTING OVERSIZED JUNCTION BOX
	EXISTING CONDUIT
	EXISTING COMMUNICATIONS CABLE

TCP PHASE I (MAINTAIN RADIO SYSTEM)

	NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 NBL		
	DIVISION 03 SAMPSON COUNTY CLINTON	PLAN DATE: FEBRUARY 2013 REVIEWED BY: I. N. AVERY	
SCALE: 0' = 1"	REVISIONS:	INIT. DATE	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 2-19-13

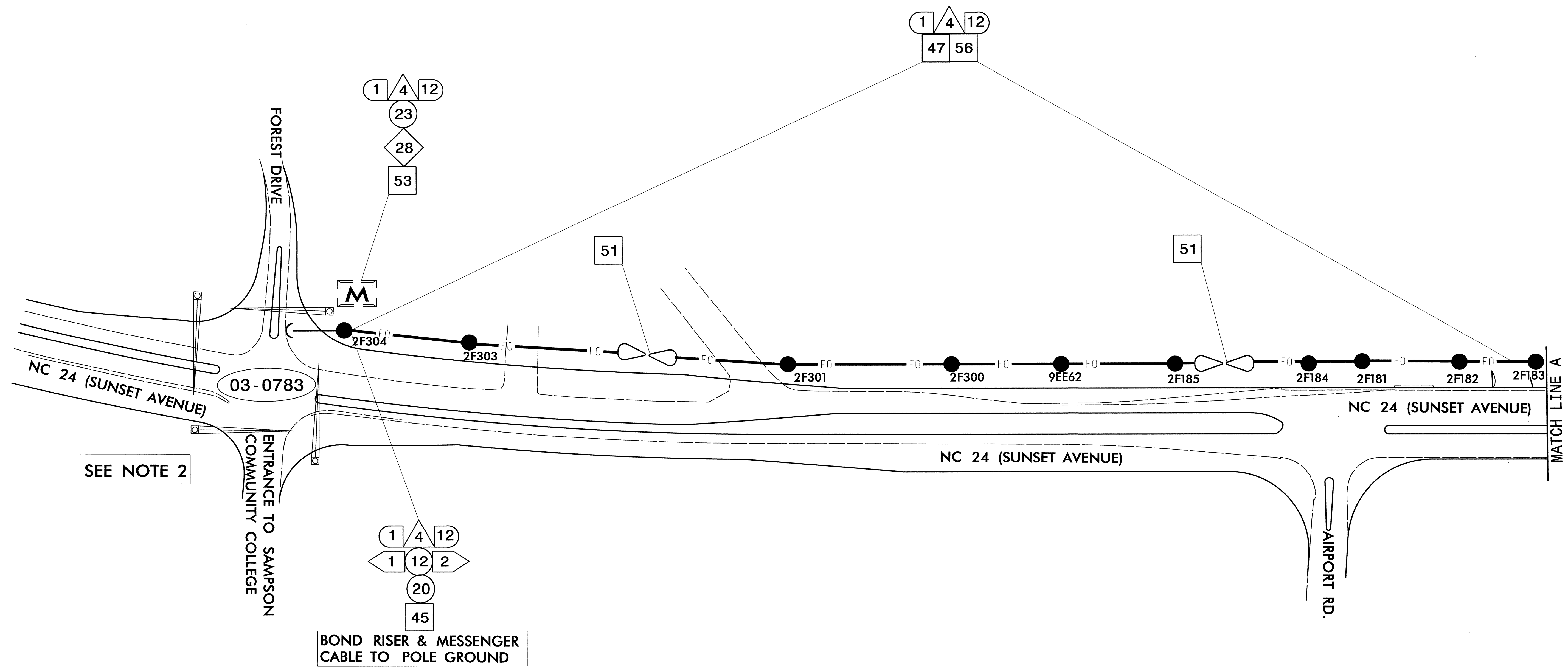
- 1) RELOCATE EXISTING ANTENNA FROM EXISTING SIGNAL POLE TO THE NEW METAL POLE.
- 2) INSTALL NEW COAXIAL CABLE BETWEEN RADIO AND RELOCATED ANTENNA.
- 3) INSTALL NEW COAXIAL CABLE SHIELD GROUNDING AND WEATHERPROOFING KIT.



LEGEND	
	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
	YAGI ANTENNA (SINGLE)
	OMNI ANTENNA
	EXISTING CONTROLLER AND CABINET
	EXISTING MASTER CONTROLLER AND CABINET
	SIGNAL INVENTORY NUMBER
	NEW METAL POLE W/MAST ARM
	EXISTING WOOD POLE
	NEW METAL POLE
	SIGNAL POLE
	EXISTING METAL POLE
	NEW OVERSIZED JUNCTION BOX
	EXISTING OVERSIZED JUNCTION BOX
	EXISTING CONDUIT
	EXISTING COMMUNICATIONS CABLE

TCP PHASE I STEP 4 (MAINTAIN RADIO SYSTEM)

	NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 NBL	
	DIVISION 03 SAMPSON COUNTY CLINTON	
PLAN DATE: FEBRUARY 2013 REVIEWED BY: I. N. AVERY		
PREPARED BY: P. C. LOUDER REVIEWED BY: G.A. FULLER, PE		
REVISIONS: _____ INIT.: _____ DATE: _____		
SCALE: _____		
SIGNATURE: <i>Gregory A. Fuller</i> DATE: 2/19/13		



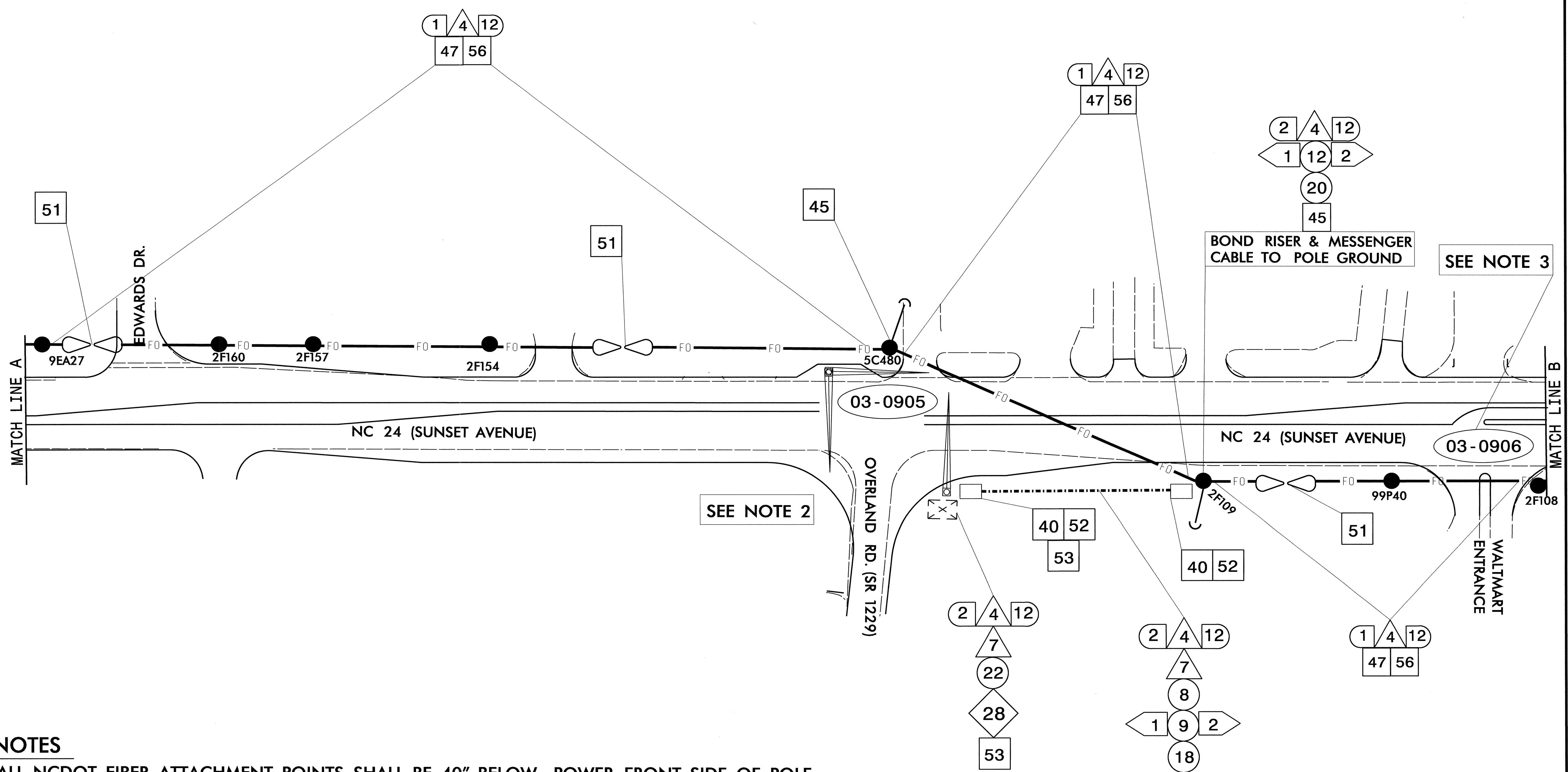
NOTES

- 1) ALL NCDOT FIBER ATTACHMENT POINTS SHALL BE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
- 2) REMOVE EXISTING RADIO SYSTEM (RADIO, ANTENNA, ANTENNA MOUNTING HARDWARE, AND COAXIAL CABLE). RETURN RADIO, ANTENNA AND ANTENNA MOUNTING HARDWARE TO THE ENGINEER. ALSO REMOVE ANY POLE THAT WAS USED EXCLUSIVELY FOR THE ANTENNA.

TCP PHASE II-FINAL

	NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 nb1		
	DIVISION 03 SAMPSON COUNTY CLINTON PLAN DATE: FEBRUARY 3013 PREPARED BY: P. C. LOUDER	REVIEWED BY: I. N. AVERY REVIEWED BY: G. A. FULLER, PE	

Signature: *Gregory A. Fuller* 2-19-13
 Date: 2-19-13
 CADD File Name: _____

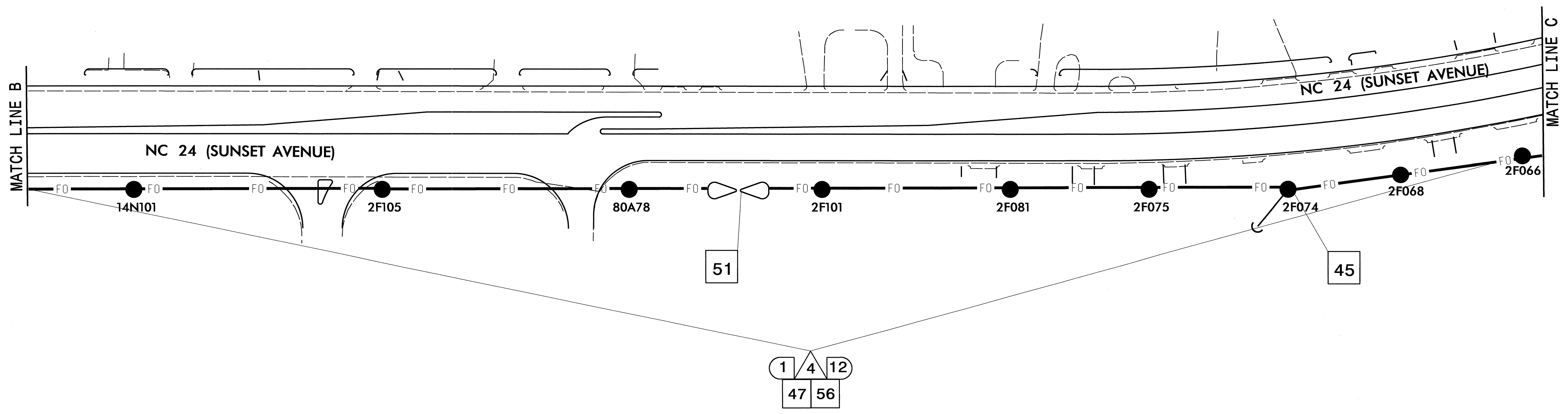


NOTES

- 1) ALL NCDOT FIBER ATTACHMENT POINTS SHALL BE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
- 2) REMOVE EXISTING RADIO SYSTEM (RADIO, ANTENNA, ANTENNA MOUNTING HARDWARE, AND COAXIAL CABLE). RETURN RADIO, ANTENNA AND ANTENNA MOUNTING HARDWARE TO ENGINEER. ALSO REMOVE ANY POLE THAT WAS USED EXCLUSIVELY FOR THE ANTENNA.
- 3) EXISTING SIGNAL (03-0906) TO BE REMOVED DURING TCP PHASE II. RETURN RADIO, ANTENNA AND ANTENNA MOUNTING HARDWARE TO THE ENGINEER. ALSO REMOVE ANY POLE THAT WAS USED EXCLUSIVELY FOR THE ANTENNA.

TCP PHASE II-FINAL

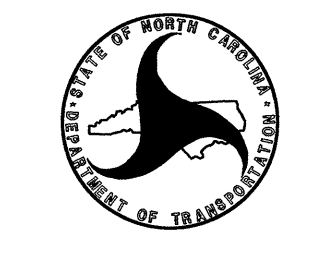

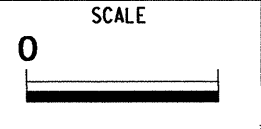

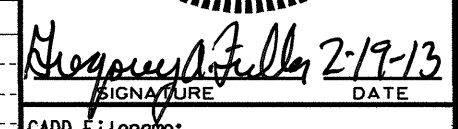
<p>750 N. Greenfield Place, Garner, NC 27529</p>	<p>NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 NBL</p>		
	<p>DIVISION 03 SAMPSON COUNTY CLINTON</p> <p>PLAN DATE: FEBRUARY 2013 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: P. C. LOUDER REVIEWED BY: G.A. FULLER, PE</p>	<p>REVISIONS</p> <p>INIT. DATE</p>	
<p>Signature: <i>Gregory A. Fuller</i> 2-19-13</p> <p>DATE</p>		<p>CADD File name:</p>	

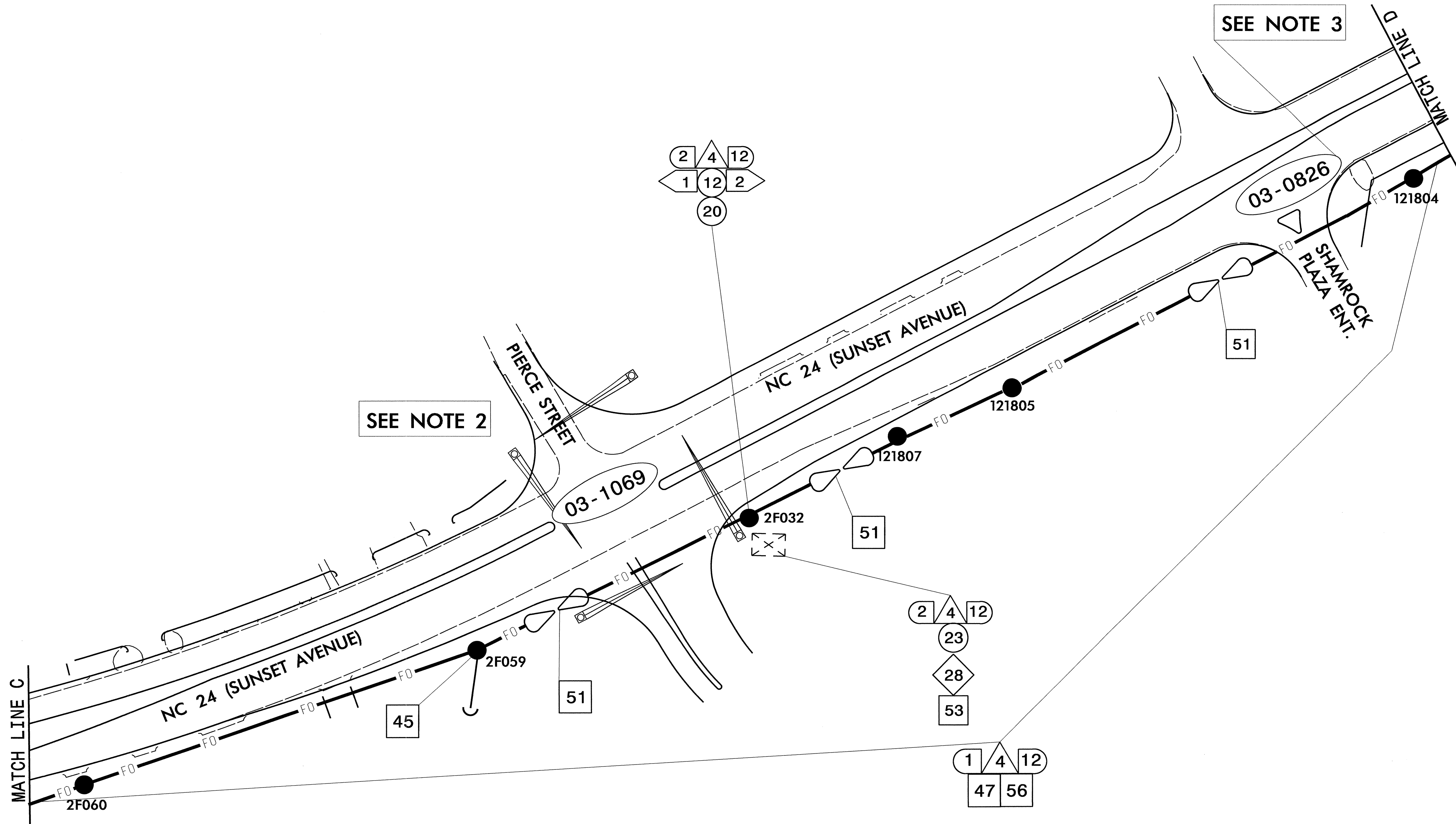


NOTES

1) ALL NCDOT FIBER ATTACHMENT POINTS SHALL BE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

TCP PHASE II-FINAL


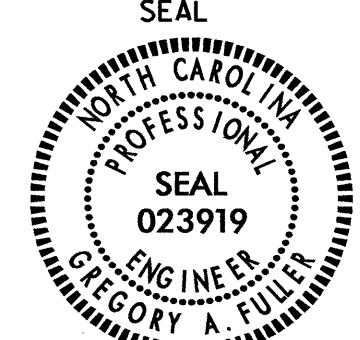


 <small>750 N. Greenfield Place, Garner, NC 27529</small>	NC24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 NBL							
	<small>DIVISION 03 SAMPSON COUNTY CLINTON</small> <small>PLAN DATE: FEBRUARY 2013</small> <small>PREPARED BY: P. C. LOUDER</small>	<small>REVIEWED BY: I. N. AVERY</small> <small>REVIEWED BY: G.A. FULLER, PE</small>		<small>SCALE</small> 				
	<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				<small>CADD Filename:</small> 
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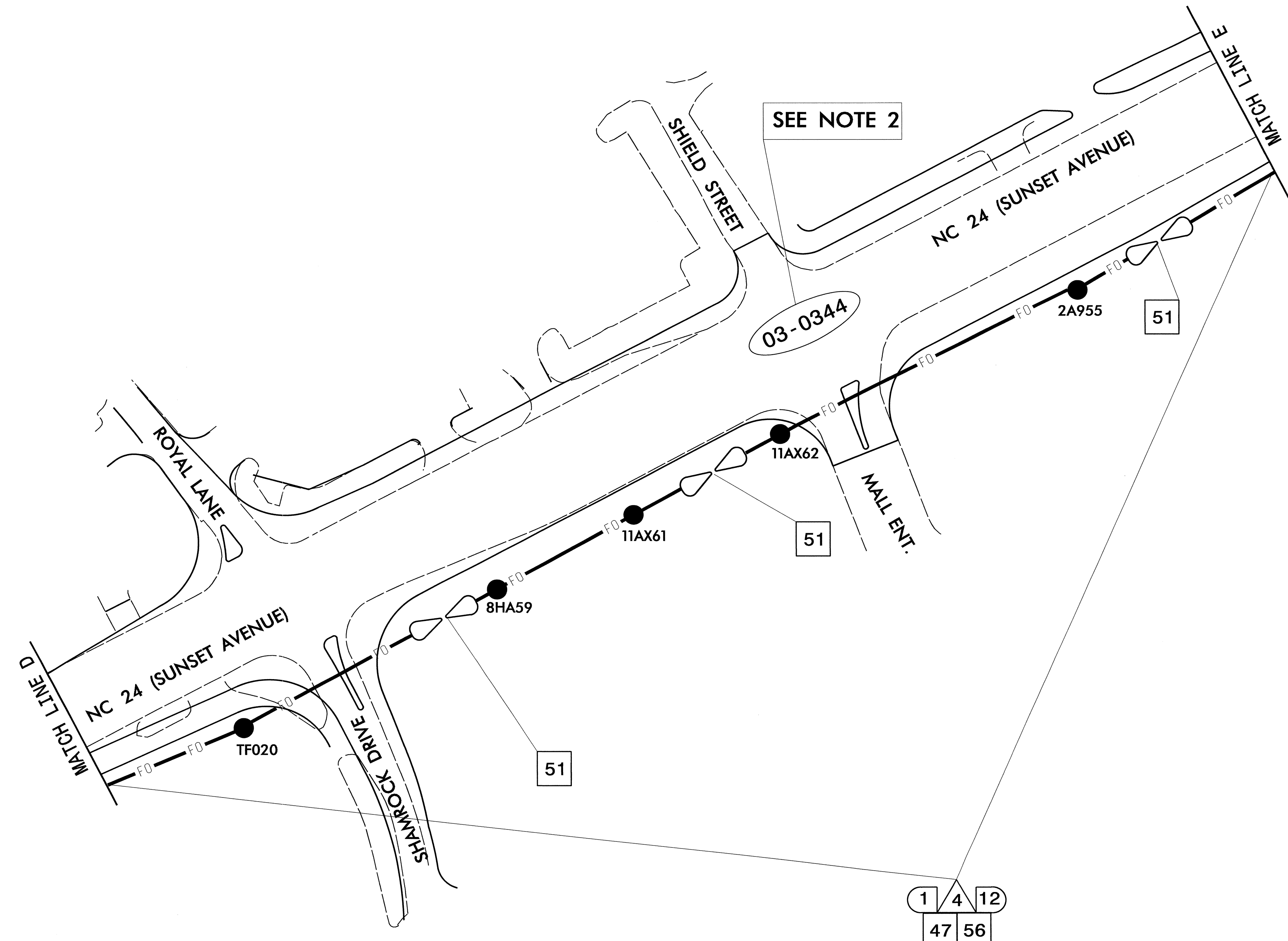


NOTES

- 1) ALL NCDOT FIBER ATTACHMENT POINTS SHALL BE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
- 2) REMOVE EXISTING RADIO SYSTEM (RADIO, ANTENNA, ANTENNA MOUNTING HARDWARE, AND COAXIAL CABLE). RETURN RADIO, ANTENNA AND ANTENNA MOUNTING HARDWARE TO THE ENGINEER. ALSO REMOVE ANY POLE THAT WAS USED EXCLUSIVELY FOR THE ANTENNA.
- 3) EXISTING SIGNAL (03-0826) TO BE REMOVED DURING TCP PHASE II. RETURN RADIO, ANTENNA AND ANTENNA MOUNTING HARDWARE TO THE ENGINEER. ALSO REMOVE ANY POLE THAT WAS USED EXCLUSIVELY FOR THE ANTENNA.

TCP PHASE II-FINAL





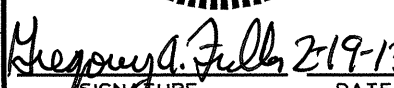
 Prepared in the Offices of: 750 N. Greenfield Pkwy., Garner, NC 27529	NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 NBL		 SEAL 023919 GREGORY A. FULLER ENGINEER
	DIVISION 03 SAMPSON COUNTY CLINTON PLAN DATE: FEBRUARY 2013 REVIEWED BY: I. N. AVERY PREPARED BY: P. C. LOUDER REVIEWED BY: G. A. FULLER, PE	REVISIONS _____ _____ _____	
	SCALE 	Signature: <i>Gregory A. Fuller</i> 2/17/13 DATE	

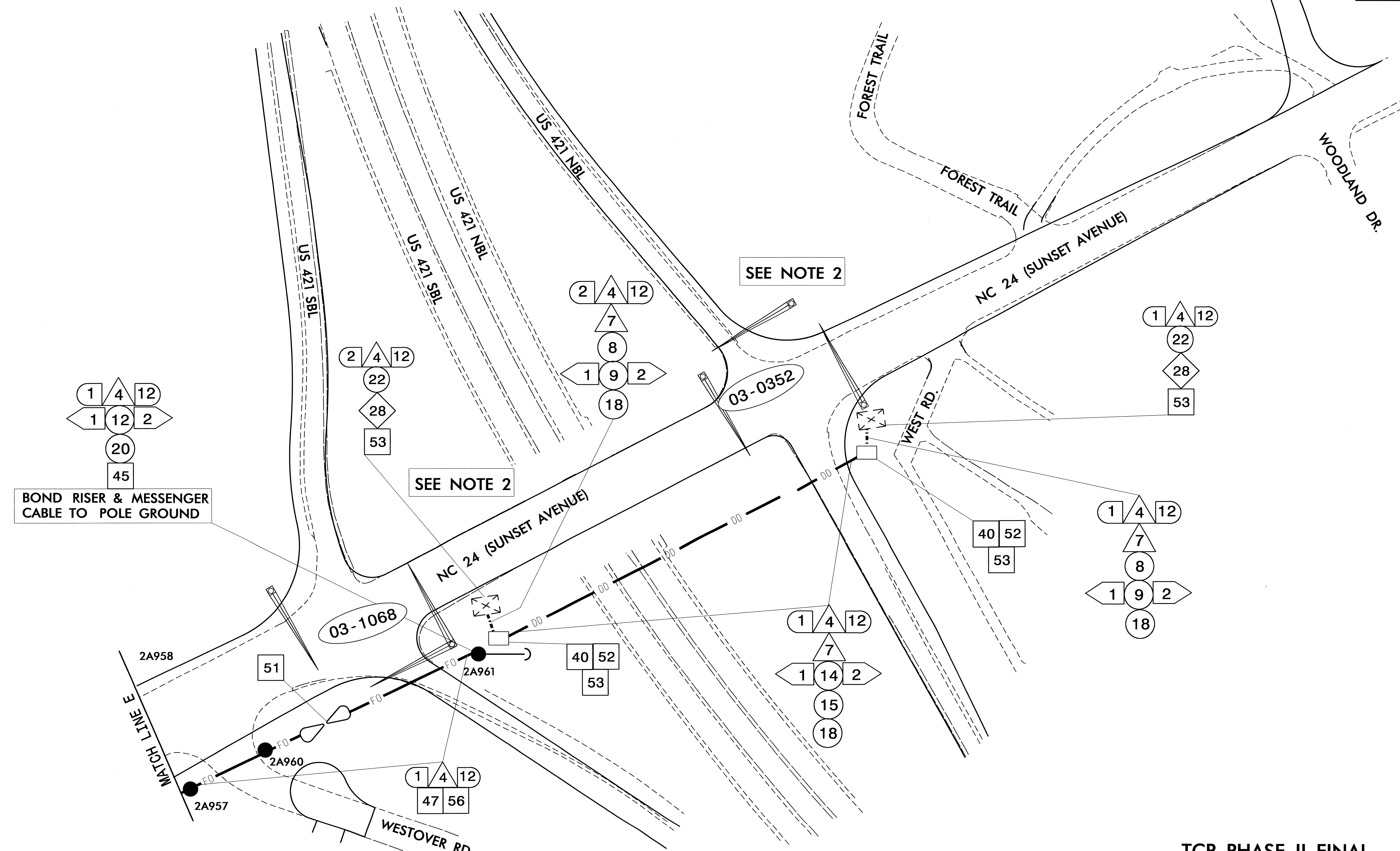


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TCP PHASE II-FINAL

 <small>750 N. Greenfield Pkwy., Garner, NC 27529</small>	NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 NBL		 <small>SEAL GREGORY A. FULLER ENGINEER 023919 NORTH CAROLINA</small>
	<small>DIVISION 03 SAMPSON COUNTY CLINTON</small> <small>PLAN DATE: FEBRUARY 2013</small> <small>PREPARED BY: P. C. LOUDER</small>	<small>REVIEWED BY: I. N. AVERY</small> <small>REVIEWED BY: G. A. FULLER, PE</small>	
 <small>SCALE</small> 	<small>SIGNATURE</small>  <small>DATE</small> <small>2/19/13</small>		<small>CADD FILE NAME:</small>

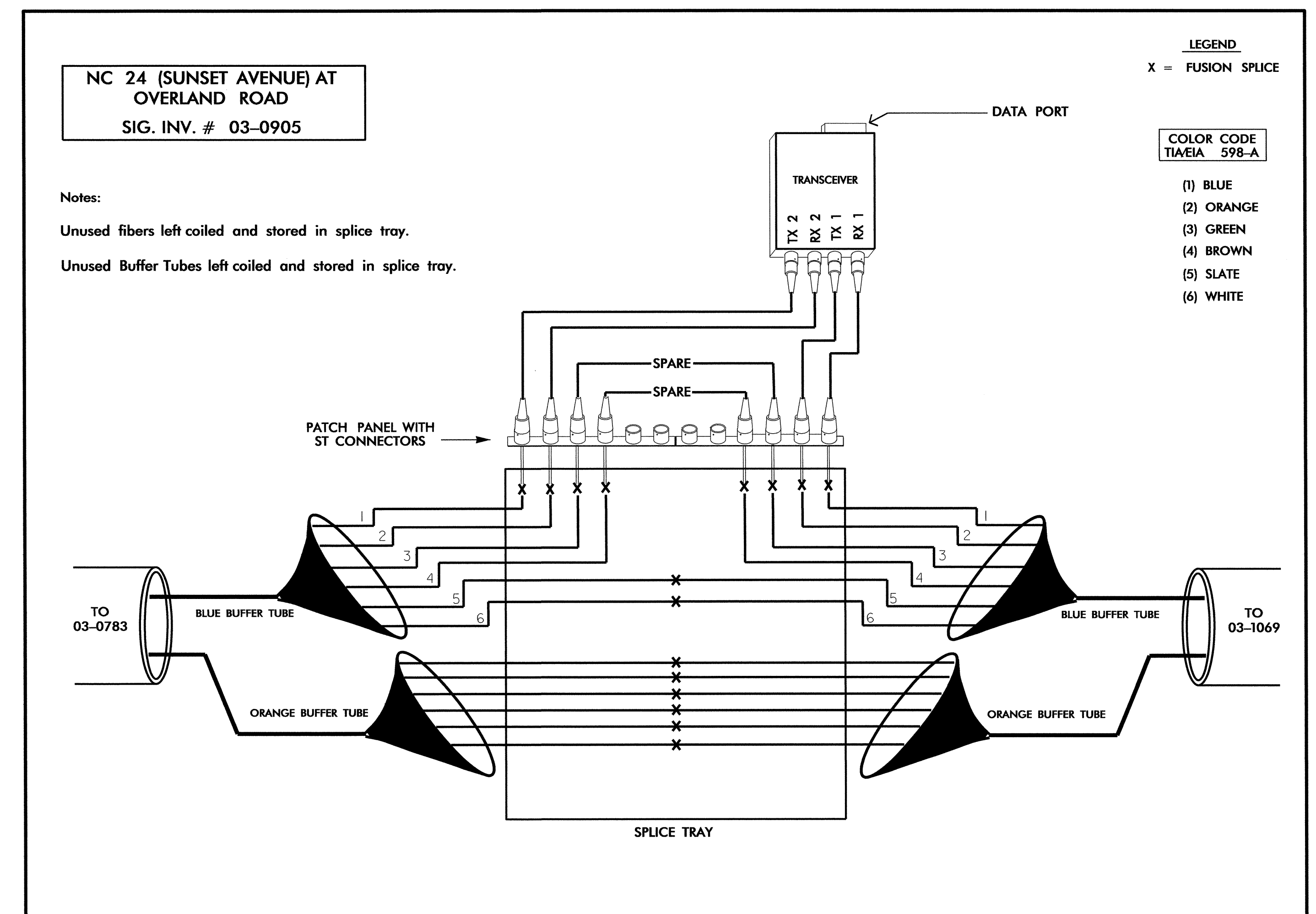
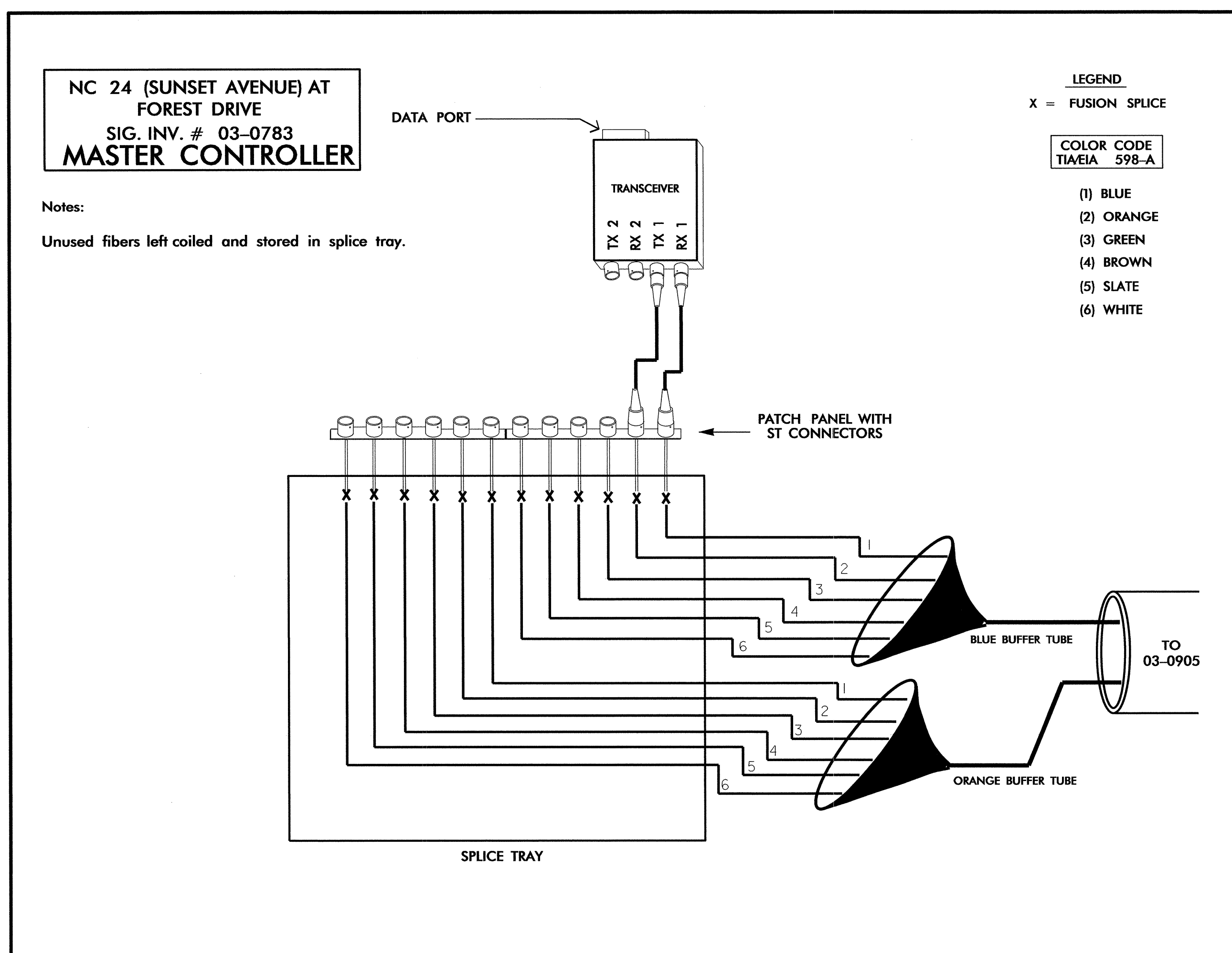


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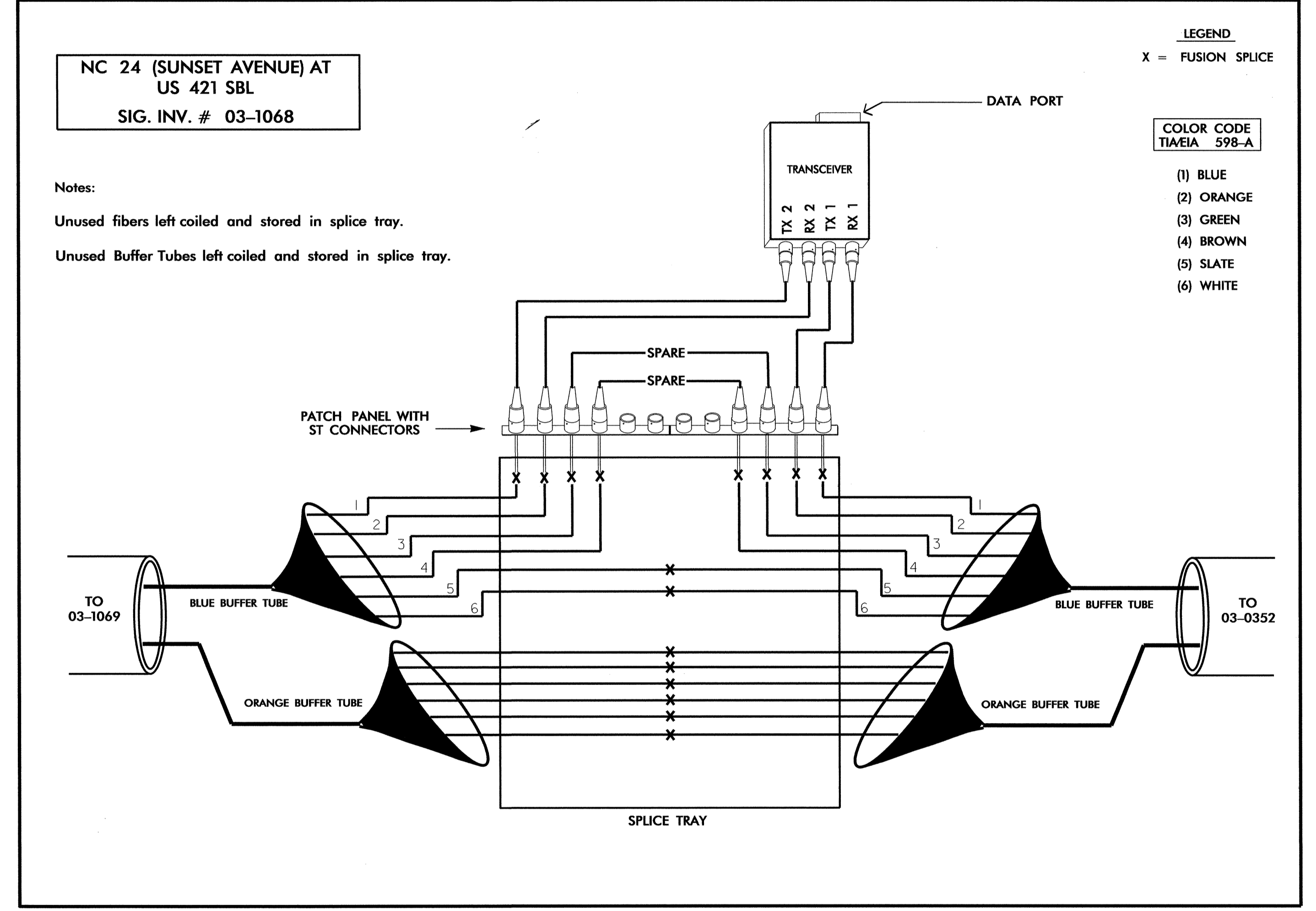
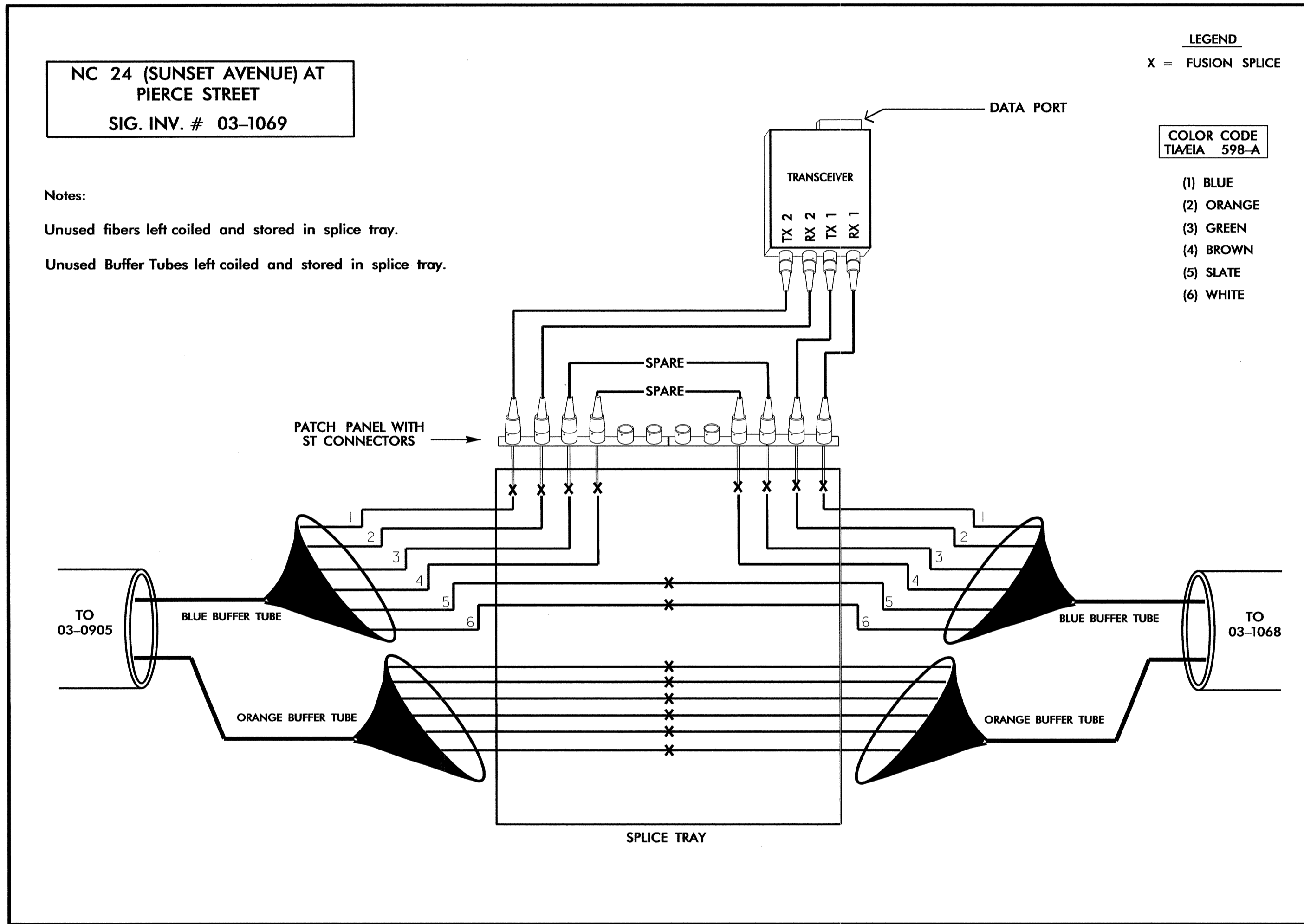
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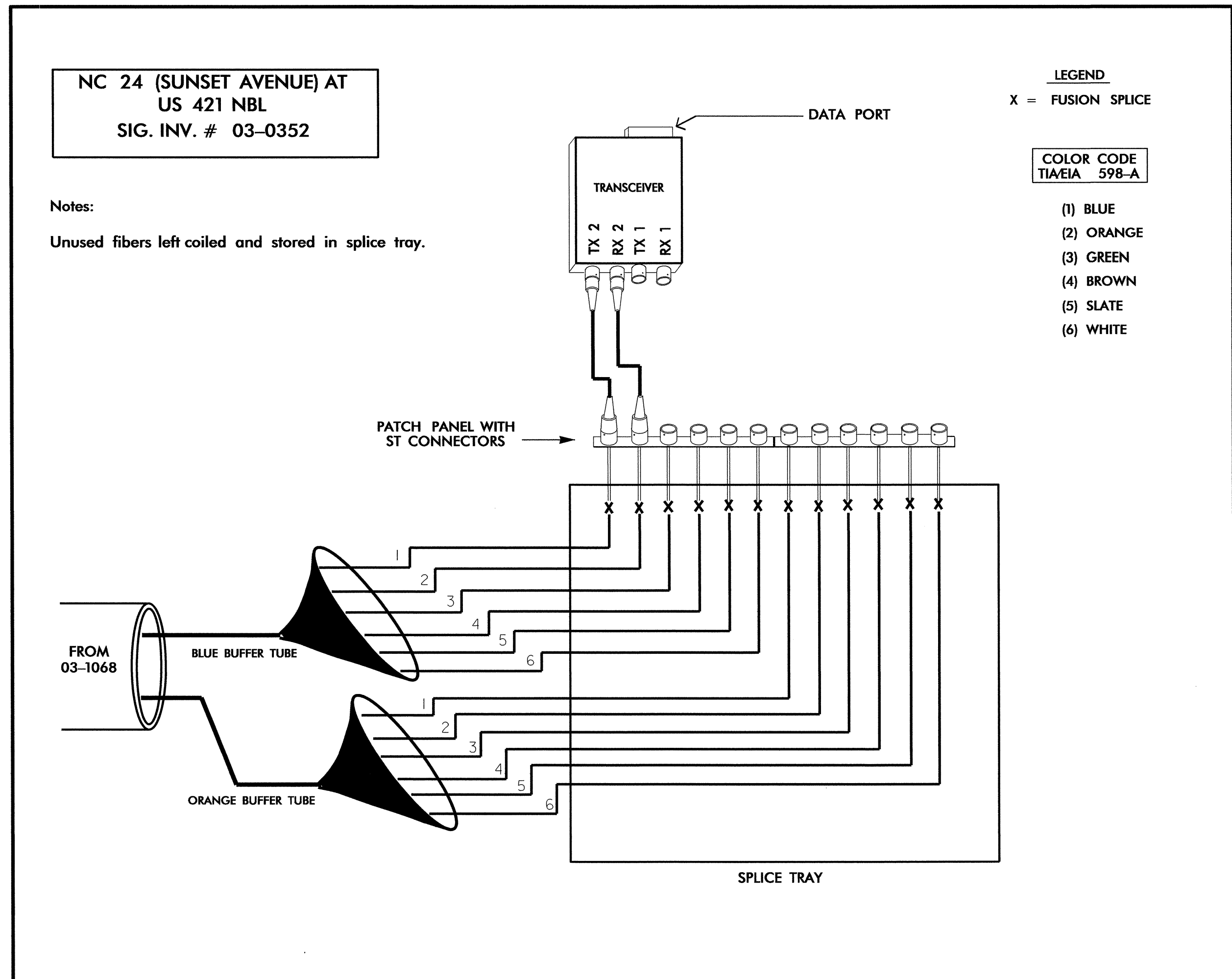
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	DIVISION 03 SAMPSON COUNTY CLINTON	PLAN DATE: FEBRUARY 2013 REVIEWED BY: I. N. AVERY	
750 N. Greenfield Place, Garner, NC 27529	SCALE: 0	REVISIONS:	INIT. DATE
	SCALE: 0	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 2-19-13	SEAL:



 <small>750 N. Greenfield Pkwy., Garner, NC 27529</small>	<p>NC 24 (SUNSET AVENUE) FROM FOREST DRIVE TO US 421 NBL</p>	<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER GARY J. FULLER</p>								
	<p>DIVISION 03 SAMPSON COUNTY CLINTON</p> <p>PLAN DATE: FEBRUARY 2013 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: P. C. LOUDER REVIEWED BY: G. A. FULLER, PE</p>	<p>SCALE 0</p>								
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