



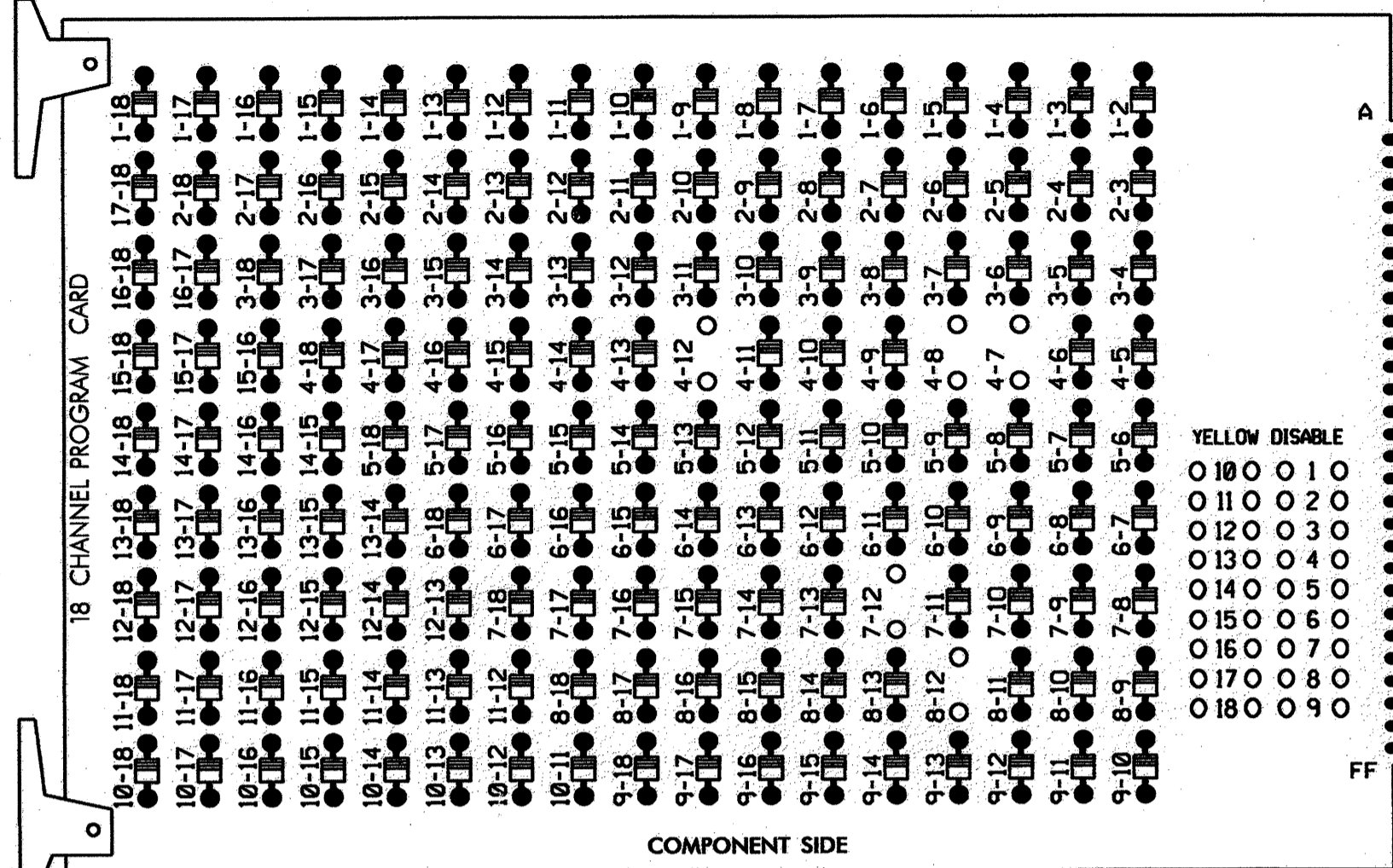


**EDI MODEL 2018ECL-NC CONFLICT MONITOR**

**PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)

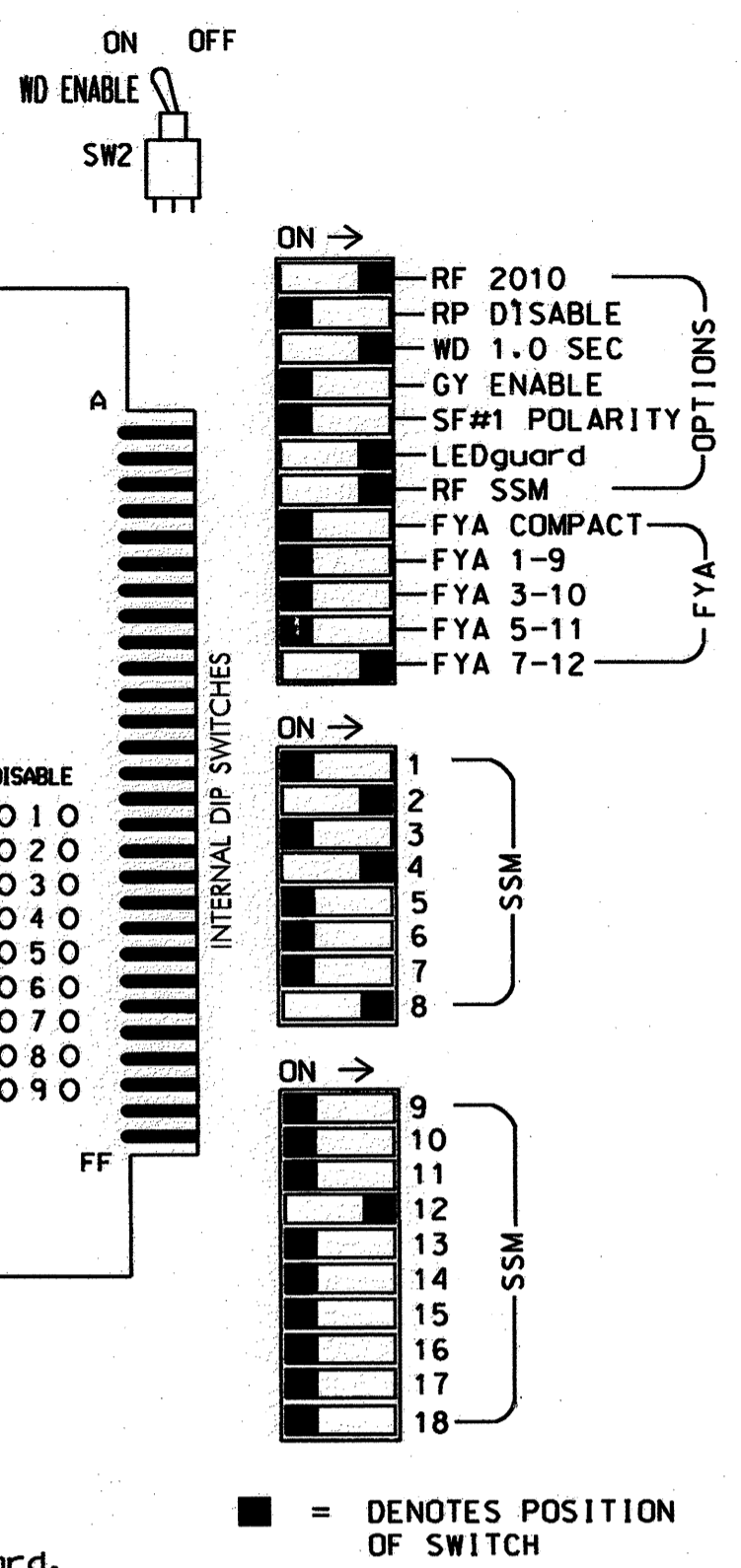
REMOVE DIODE JUMPERS 4-7, 4-8, 4-12, 7-12, and 8-12.



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.



■ = DENOTES POSITION OF SWITCH

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phase 2 for Variable Initial and Gap Reduction.
5. Program phase 2 for Start Up In Green.
6. Program phase 2 for Yellow Flash.
7. The cabinet and controller are part of the US 64 (Four Seasons Blvd) CLS Hendersonville Signal 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,S5,S10,S11,AUX S5  
 PHASES USED.....2,4,7,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....7+8

**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	
CPU 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	41,42	NU	NU	NU	NU	71*	81,82	NU	NU	NU	NU	NU	71*	NU	
RED		128			101						107								
YELLOW		129			102					*	108								
GREEN		130			103						109								
RED ARROW																		A101	
YELLOW ARROW																			A102
FLASHING YELLOW ARROW																			A103
GREEN ARROW											124								

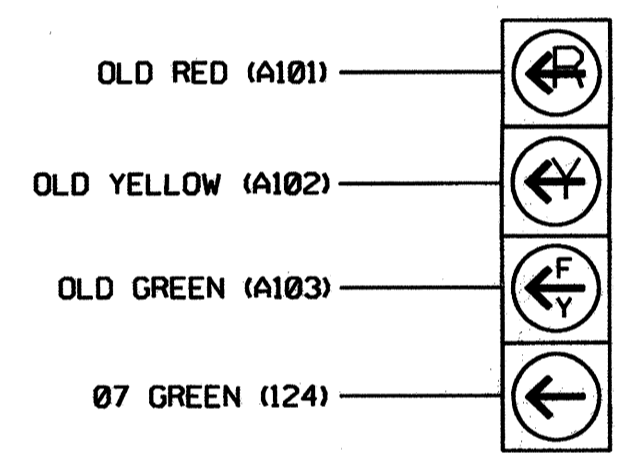
NU = Not Used

\* 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 head as shown)



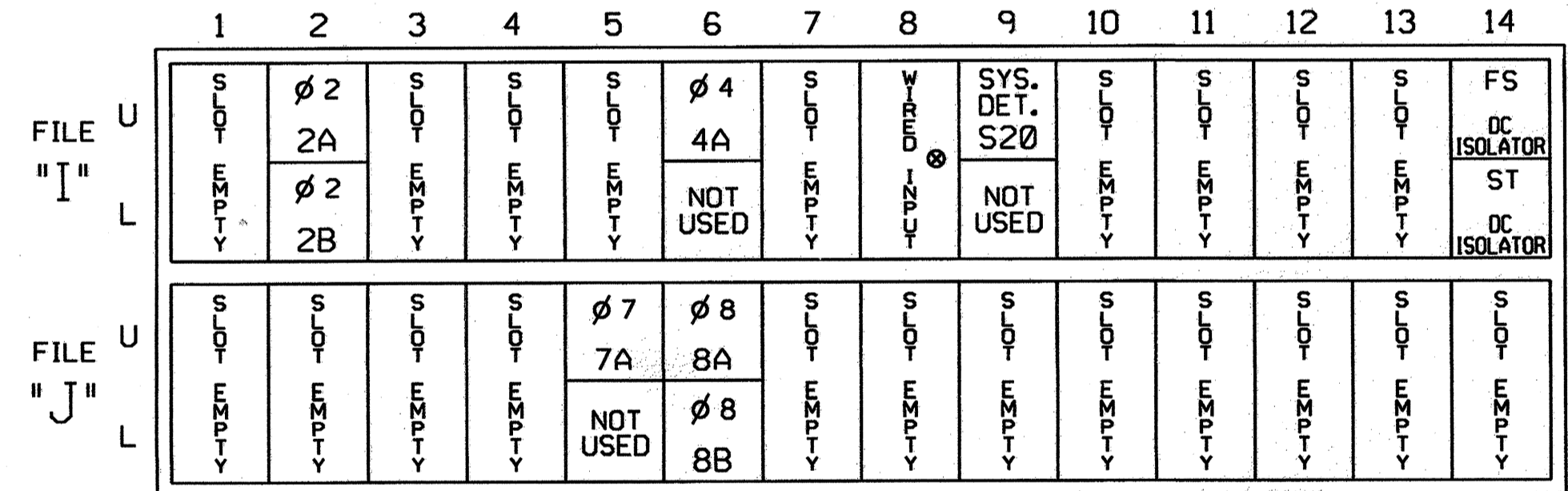
71

**NOTE**

The sequence display for signal head 71 requires special logic programming. See sheet 2 for programming instructions.

**INPUT FILE POSITION LAYOUT**

(front view)



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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE  
 ST = STOP TIME

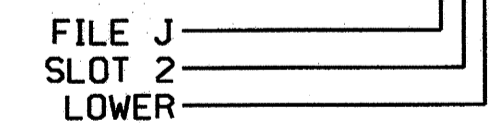
**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
7A <sup>1</sup>	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15
*S20	TB6-9,10	I9U	60	22	11	SYS					

<sup>1</sup>Add jumper from J5-W to I8-W, on rear of input file.

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

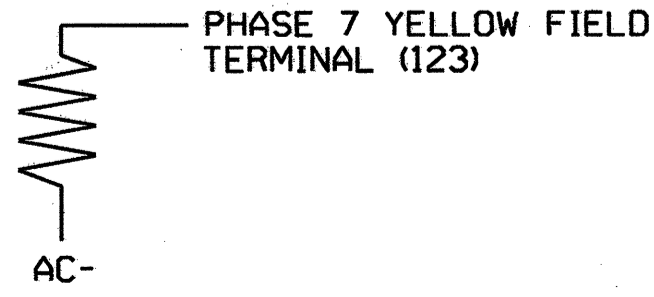
**INPUT FILE POSITION LEGEND: J2L**



**LOAD RESISTOR INSTALLATION DETAIL**

(install resistor as shown below)

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



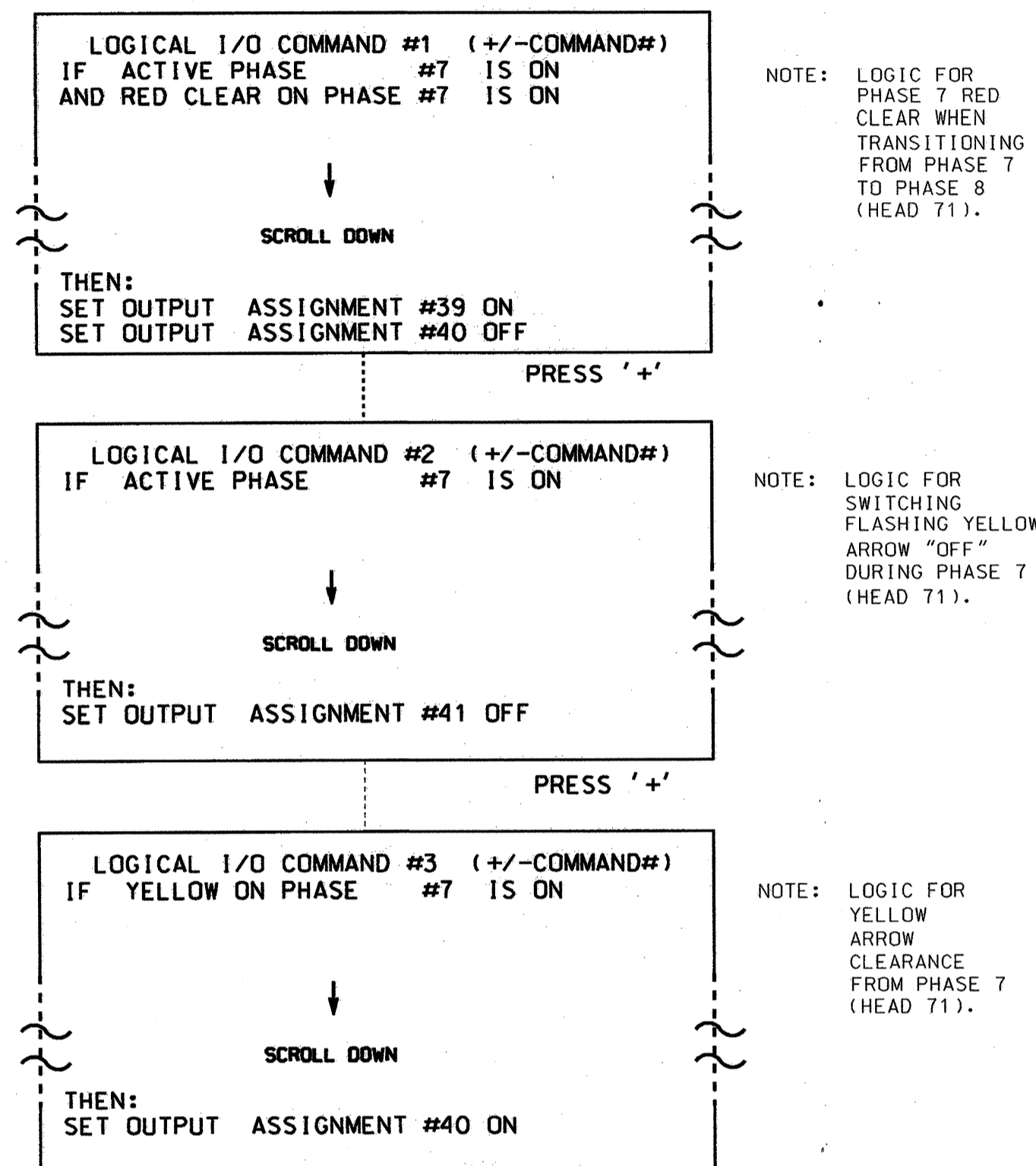
Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	US 64 E (Chimney Rock Road) at SR 1006 (Howard Gap Road)		SEAL JOHN T. ROWE, P.E.
	Division 14 PLAN DATE: August 2012 PREPARED BY: S. Armstrong	Henderson County Hendersonville REVIEWED BY: JR REVIEWED BY:	

**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).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

**OUTPUT REFERENCE SCHEDULE**

OUTPUT 39 = Overlap D Red  
OUTPUT 40 = Overlap D Yellow  
OUTPUT 41 = Overlap D Green

**OVERLAP PROGRAMMING DETAIL**

(program controller as shown below)

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

PRESS '+' THREE TIMES

PAGE 1: VEHICLE OVERLAP 'D' 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?...N  
 GREEN EXTENSION (0-255 SEC)...0  
 YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0  
 RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0  
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

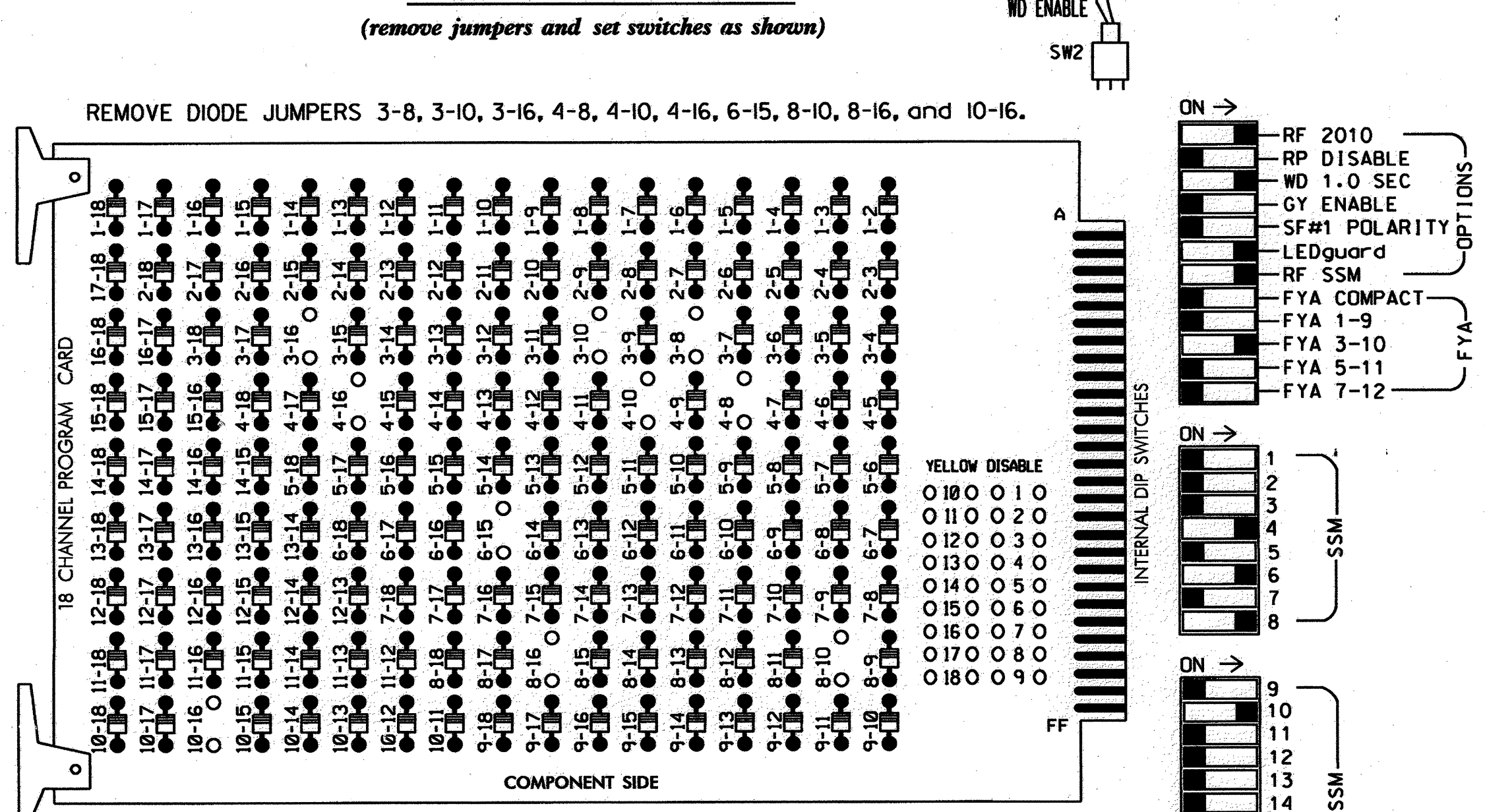
THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 14-0811  
 DESIGNED: August 2012  
 SEALED: 8/24/12  
 REVISED: N/A

Signal Upgrade - Sheet 2 of 2

Prepared In the Offices of:  S. Armstrong 750 N. Greenfield Pkwy, Garner, NC 27529	US 64 E (Chimney Rock Road) at SR 1006 (Howard Gap Road)		SEAL  JOHN T. ROWE, JR. ENGINEER
	Division 14 Henderson County Hendersonville	PLAN DATE: August 2012 REVIEWED BY: JTR PREPARED BY: S. Armstrong REVIEWED BY:	
REVISIONS _____ _____	INIT. _____ _____	DATE _____ _____	SIGNATURE: John Rowe 9-4-12 DATE: 9-4-12 SIG. INVENTORY NO. 14-0811



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



- REMOVE DIODE JUMPERS 3-8, 3-10, 3-16, 4-8, 4-10, 4-16, 6-15, 8-10, 8-16, and 10-16.
- 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.

**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 phase 6 for Variable Initial and Gap Reduction.
- Program phase 6 for Start Up In Green.
- Program phases 6 and 8 for 'STARTUP PED CALL'.
- Program phase 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
- The cabinet and controller are part of the US 64 (Four Seasons Blvd) CLS Hendersonville Signal System.

**EQUIPMENT INFORMATION**

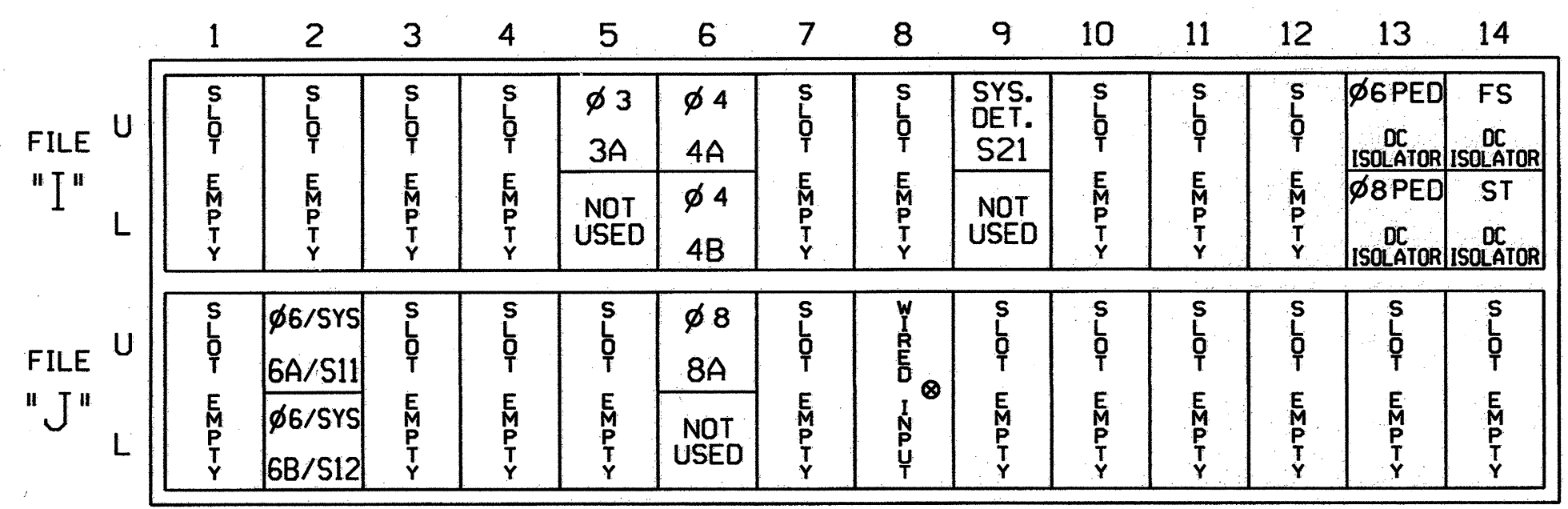
CONTROLLER.....2070L  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S4,S5,S8,S9,S11,S12,AUX S2  
 PHASES USED.....3,4,6,6PED,8,8PED  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....3+4  
 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	
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	NU	NU	31*	41,42	NU	NU	61,62	P61, P62	NU	81,82	P81, P82	NU	31*	NU	NU	NU	NU	
RED					101			134			107								
YELLOW				*	102			135			108								
GREEN					103			136			109								
RED ARROW																		A124	
YELLOW ARROW																			A125
FLASHING YELLOW ARROW																			A126
GREEN ARROW						118													
Hand icon									119		110								
Hand icon									121		112								

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)

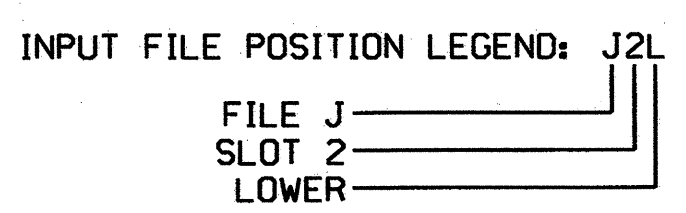


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 \* Wired Input - Do not populate slot with detector card

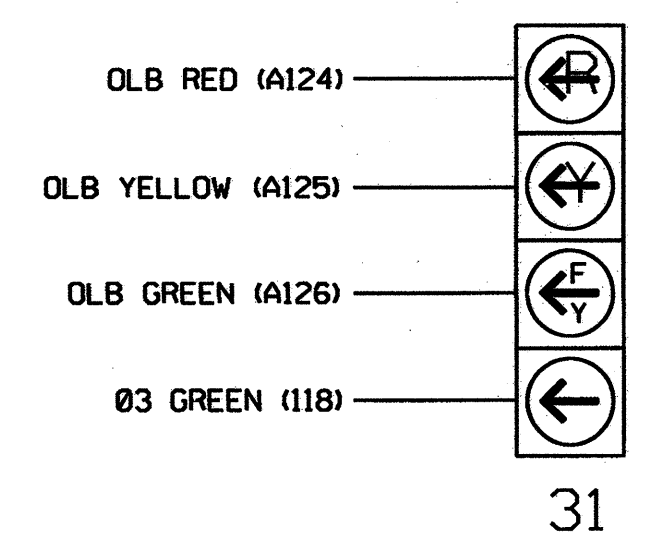
**INPUT FILE CONNECTION & PROGRAMMING CHART**

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
3A <sup>1</sup>	TB4-5,6	I5U	58	20	3	3	Y	Y			15
		J8U	50	12	28	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
6A/S11	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S12	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
* S21	TB6-9,10	I9U	60	22	11	SYS					
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

- <sup>1</sup>Add jumper from I5-W to J8-W. on rear of input file.  
 \* System detector only. Remove the vehicle phase assigned to this detector in the default programming.



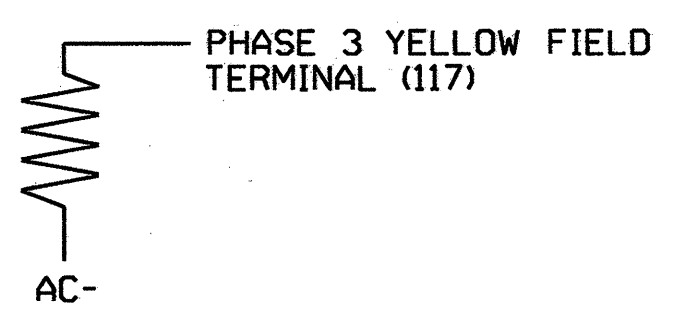
**FYA SIGNAL WIRING DETAIL**  
(wire signal head as shown)



NOTE  
 The sequence display for signal head 31 requires special logic programming. See sheet 2 for programming instructions.

**LOAD RESISTOR INSTALLATION DETAIL**  
(install resistor as shown below)

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



**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

Signal Upgrade - Sheet 1 of 2

Electrical and Programming Details For: **US 64 W (Chimney Rock Road) at SR 1006 (Howard Gap Road)**

Prepared in the Offices of: **Transportation Utility and Safety Division**

Division 14 Henderson County Hendersonville

PLAN DATE: August 2012 REVIEWED BY: JTK

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: INIT. DATE

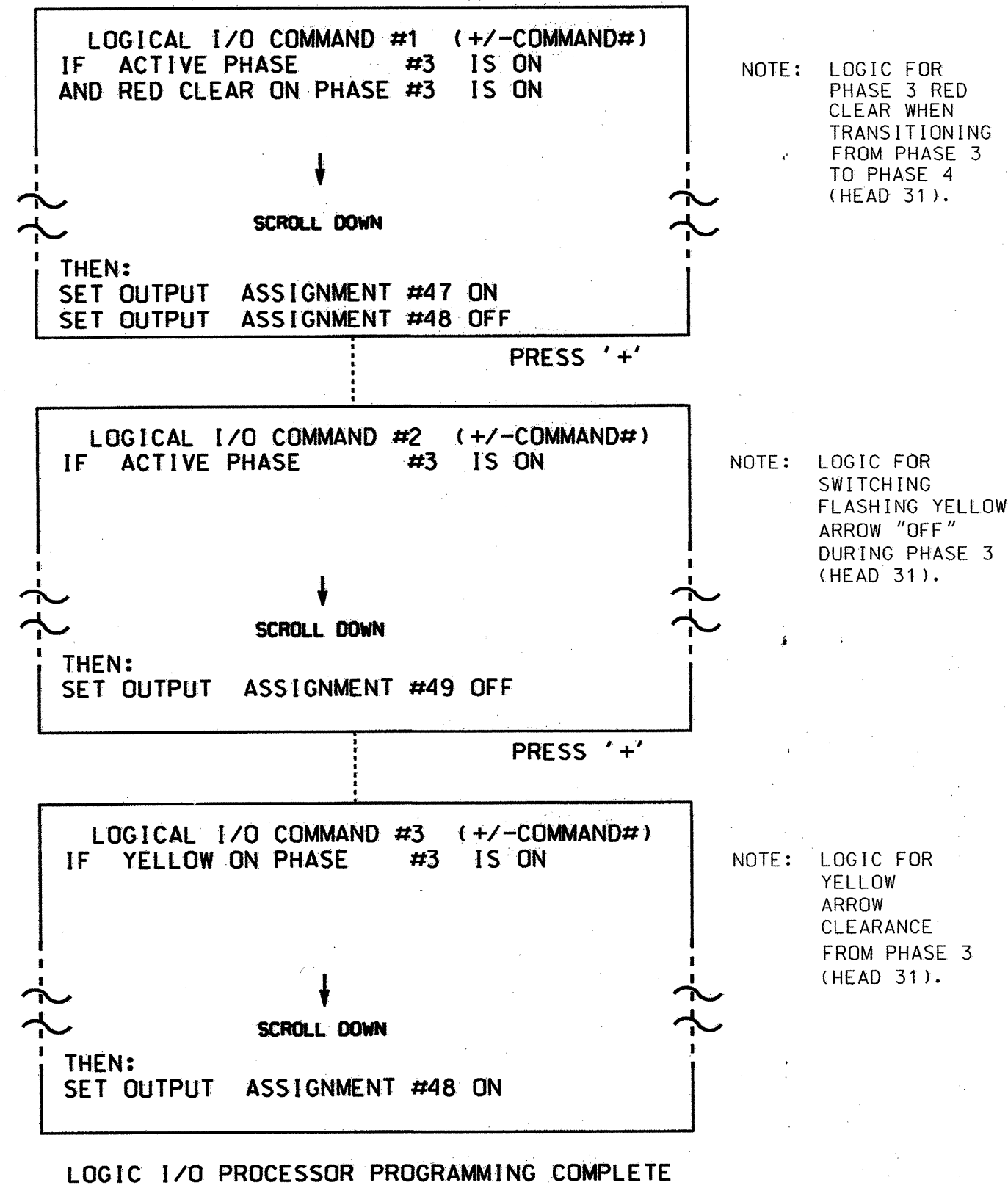
Signature: *John T. Rowe* 9-4-12

SIG. INVENTORY NO. 14-0744

**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).



<b>OUTPUT REFERENCE SCHEDULE</b>	
OUTPUT 47 =	Overlap B Red
OUTPUT 48 =	Overlap B Yellow
OUTPUT 49 =	Overlap B Green

**OVERLAP PROGRAMMING DETAIL**

*(program controller as shown below)*

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

PRESS '+' ONCE

PAGE 1: VEHICLE OVERLAP 'B' 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?...	N
GREEN EXTENSION (0-255 SEC).....	0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..	0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)..	0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....	0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0744 DESIGNED: August 2012 SEALED: 8/29/12 REVISED: N/A
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Signal Upgrade - Sheet 2 of 2

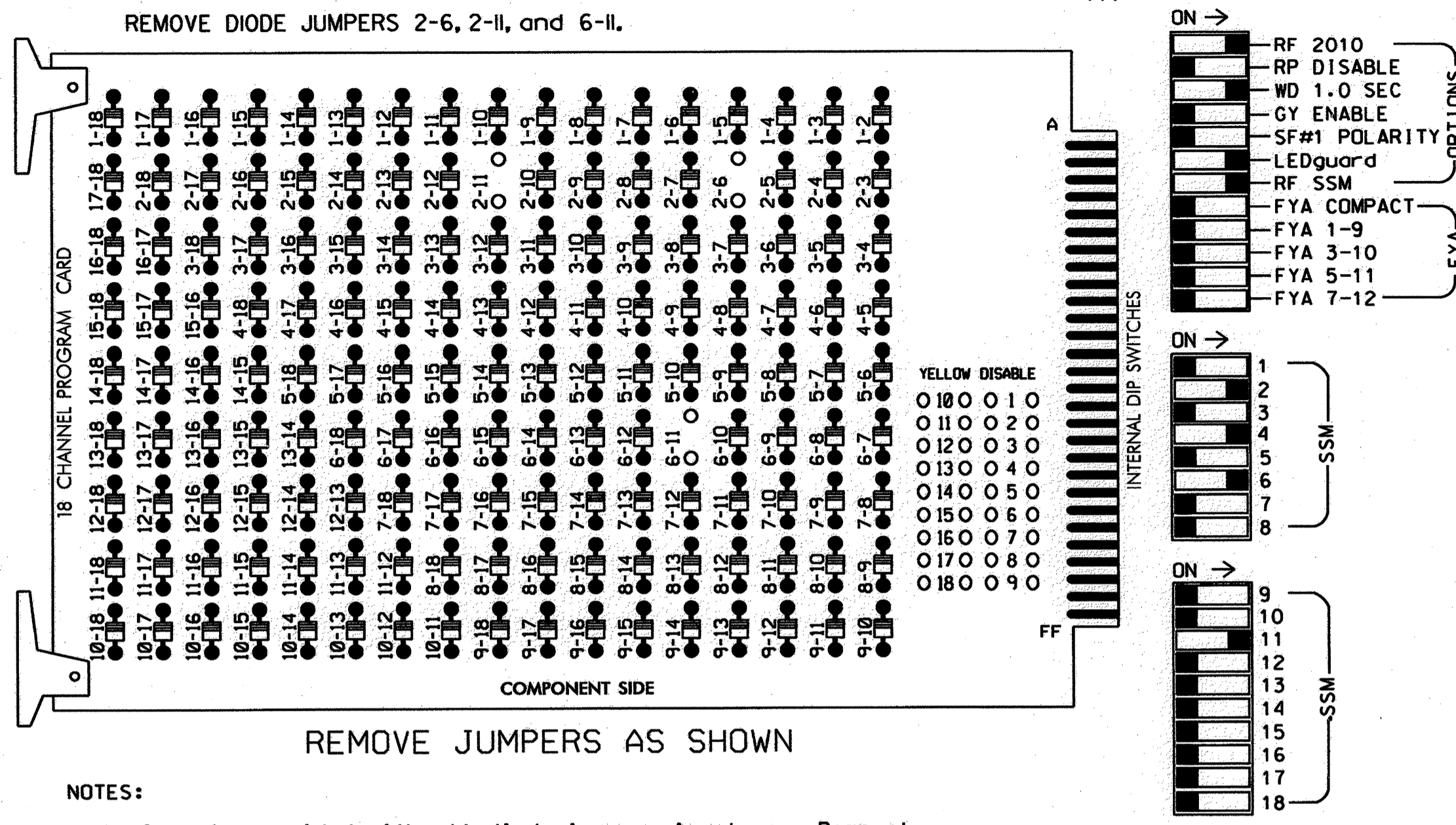
	<b>ELECTRICAL AND PROGRAMMING DETAILS FOR:</b> US 64 W (Chimney Rock Road) at SR 1006 (Howard Gap Road)		SEAL 
	Prepared in the Offices of: S. Armstrong 750 N. Greenfield Pkwy, Garner, NC 27529	Division 14 Henderson County Hendersonville PLAN DATE: August 2012 REVIEWED BY: JTR PREPARED BY: S. Armstrong REVIEWED BY:	
REVISIONS		INIT. DATE	SIG. INVENTORY NO. 14-0744





**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.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- 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 US 64 (Four Seasons Blvd) CLS Hendersonville Signal 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,S5,S8,AUX S4  
 PHASES USED.....2,4,6  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....6  
 OVERLAP "D".....NOT USED

**SIGNAL HEAD HOOK-UP CHART**

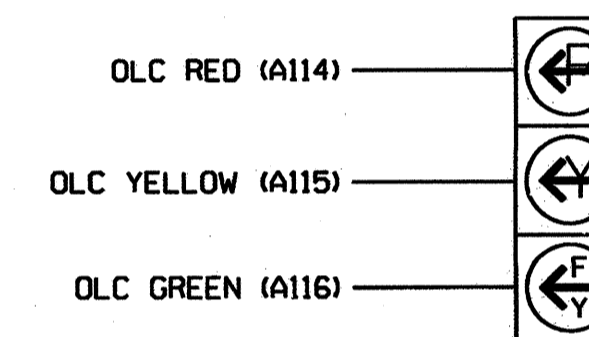
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	PED	3	4	PED	5	6	PED	7	8	PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42 43,44	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	21	NU	NU
RED		128			101			134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																	A114	
YELLOW ARROW																	A115	
FLASHING YELLOW ARROW																	A116	
GREEN ARROW																		

NU = Not Used

\* See pictorial of head wiring in detail below.

**FYA SIGNAL WIRING DETAIL**

(wire signal head as shown)



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**INPUT FILE POSITION LAYOUT**

(front view)

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

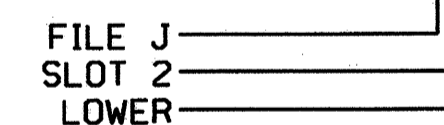
EX. : 1A, 2A, ETC. = LOOP NO.'S

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/S22	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	Y		3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
6A/S23	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			

INPUT FILE POSITION LEGEND: J2L



**OVERLAP PROGRAMMING DETAIL**

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS). THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS '+' TWO TIMES TO ADVANCE TO OVERLAP 'C'.

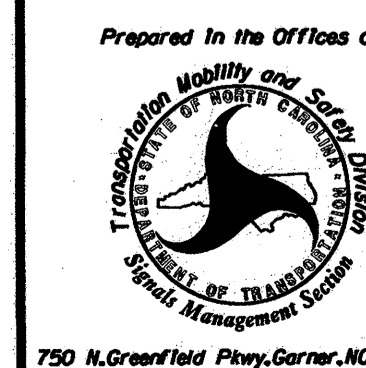
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS  
 PHASE: 12345678910111213141516  
 VEH OVL PARENTS: X  
 VEH OVL NOT VEH: X  
 VEH OVL NOT PED: X  
 VEH OVL GRN EXT: X  
 STARTUP COLOR: \_ RED \_ YELLOW \_ GREEN  
 FLASH COLORS: \_ RED \_ YELLOW X GREEN  
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
 FLASH YELLOW 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

**New Installation**

ELECTRICAL AND PROGRAMMING DETAILS FOR:



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-1266  
 DESIGNED: August 2012  
 SEALED: 8/24/12  
 REVISED: N/A

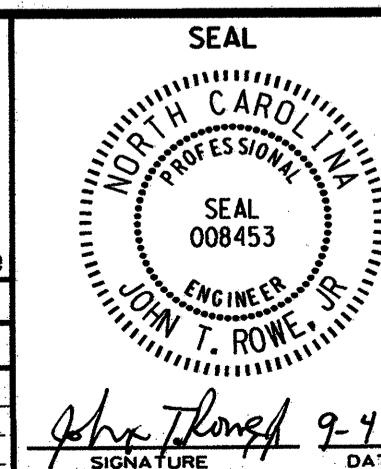
SR 1006 (Howard Gap Road)  
 at  
 SR 1513 (Nix Road)

Division 14 Henderson County Hendersonville

PLAN DATE: August 2012 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

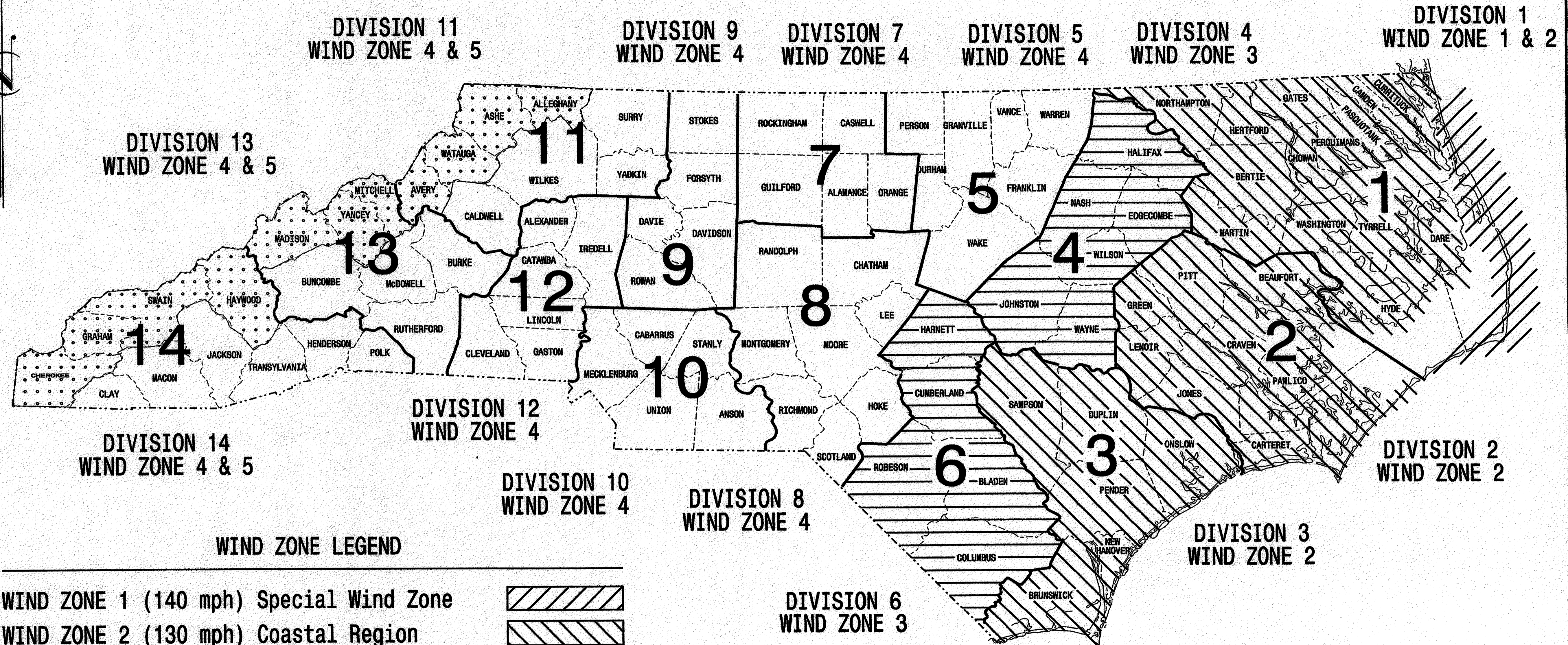


Sig. Inventory No. 14-1266

**STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS**

STATE	PROJECT NO.	SHEET NO.
N.C.	R-5207A	Sig. 10
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

**STANDARD DRAWINGS FOR METAL POLES**

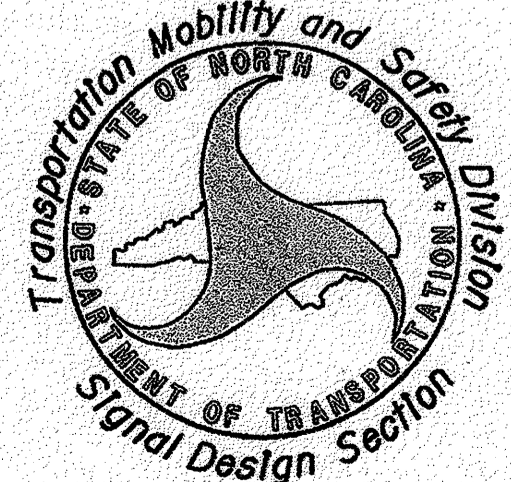


**WIND ZONE LEGEND**

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**

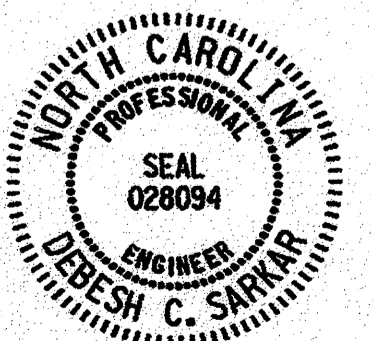
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

**NCDOT CONTACTS:**

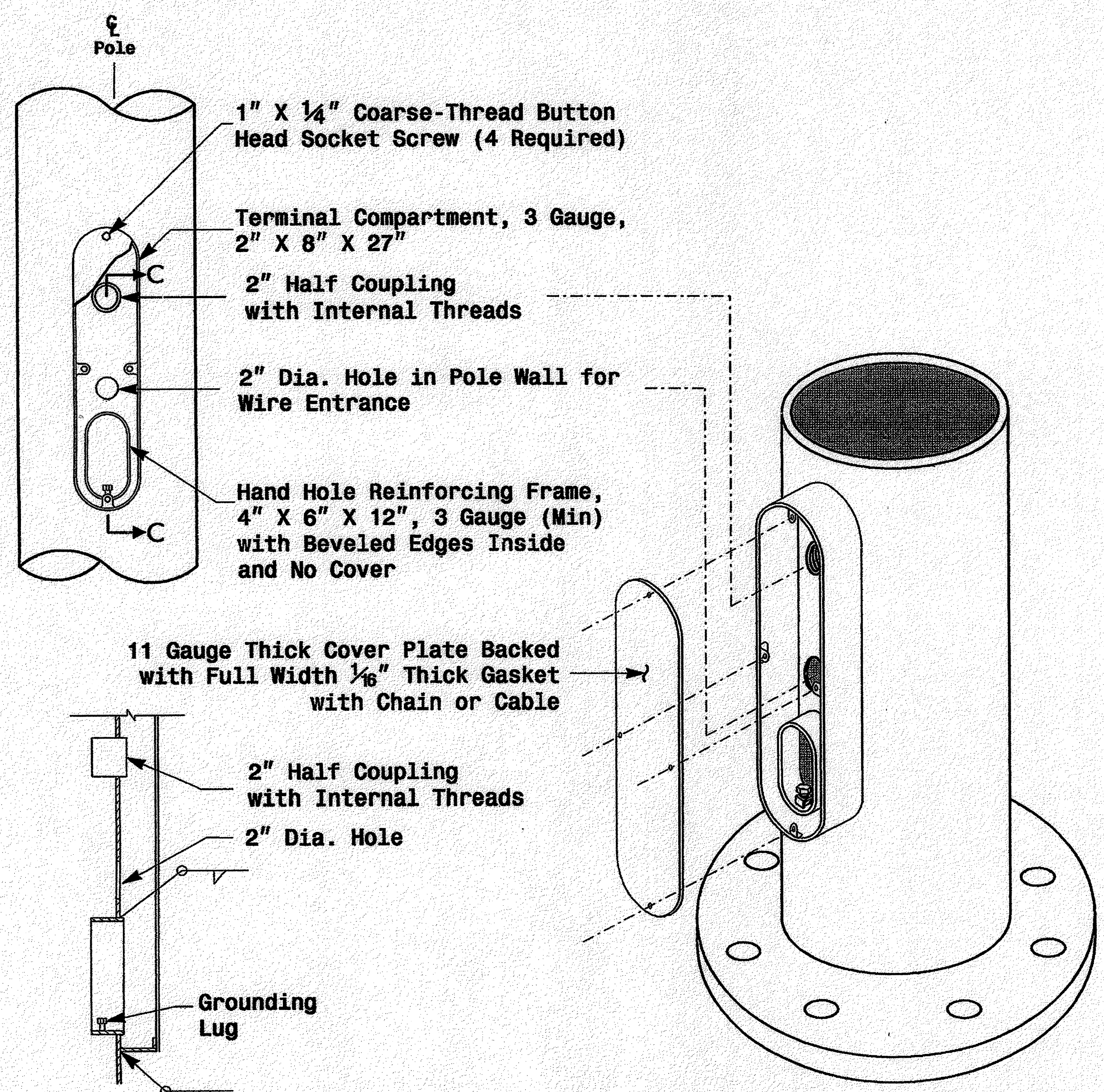
**MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT**

- 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. Sarkar* 7.26.2009  
SIGNATURE DATE



Section C-C 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 _____	

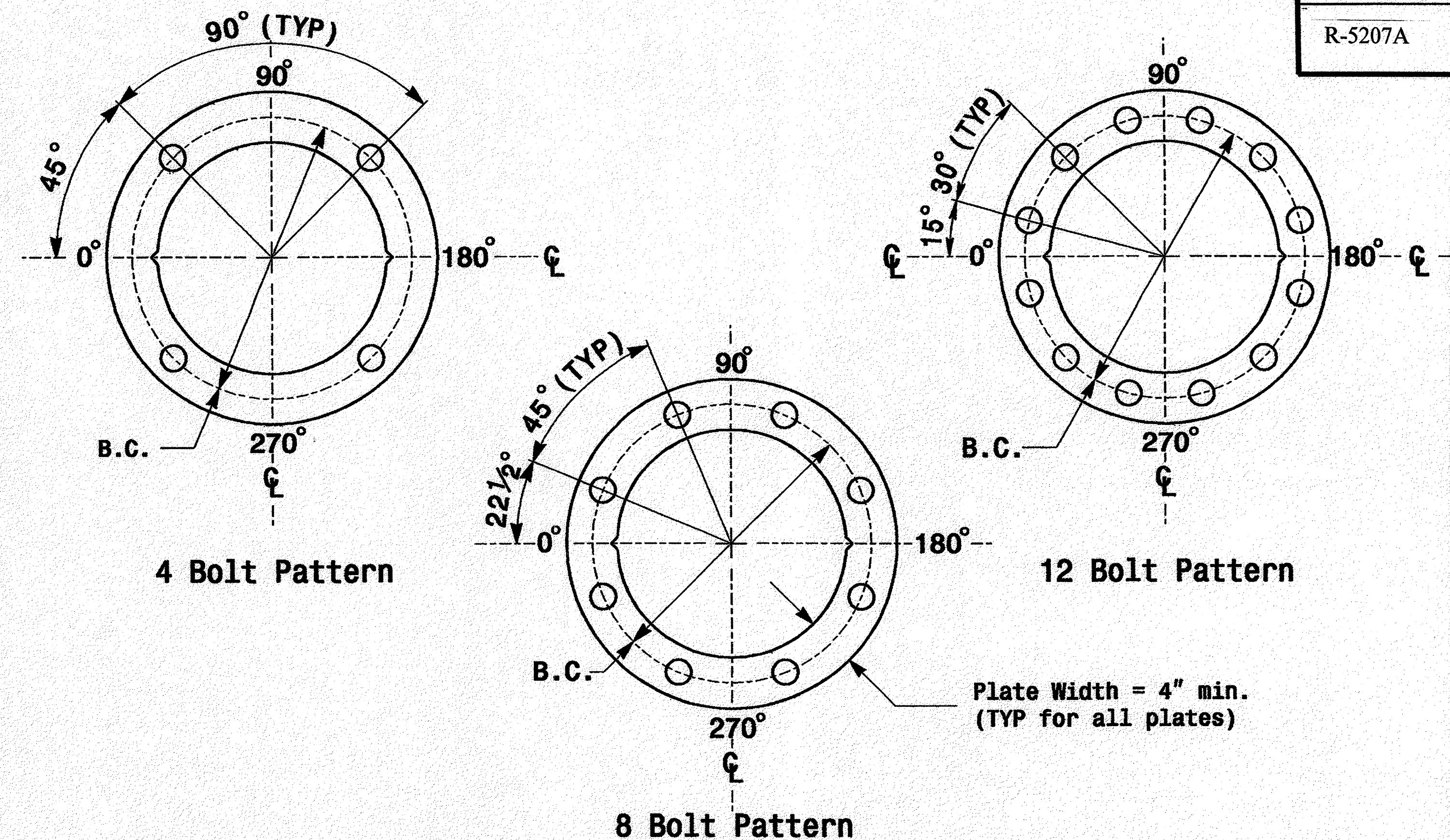
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

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

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

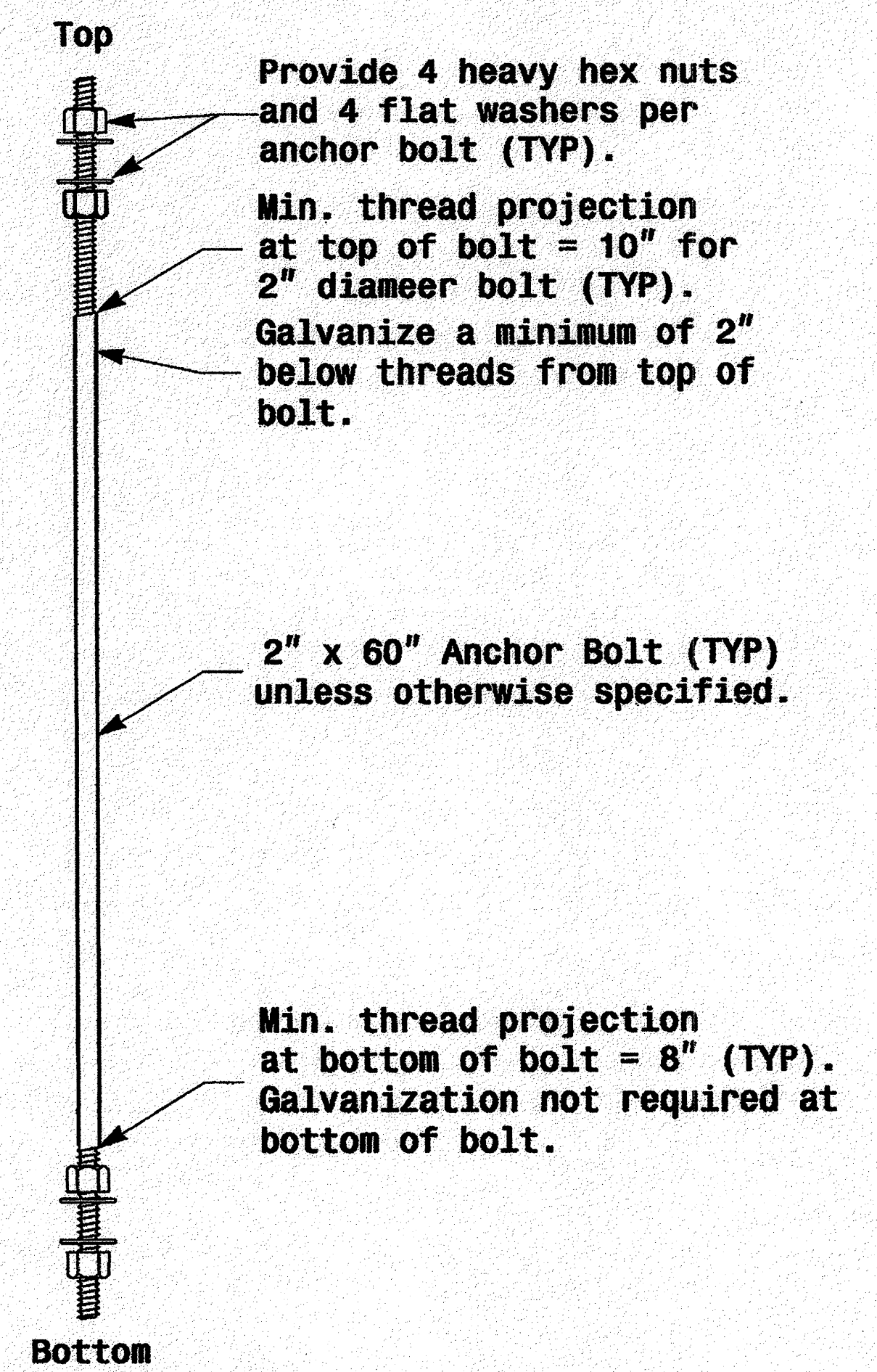
- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
  - 2) A.B. = Anchor Bolt
  - 3) B.C. = Bolt Circle of Anchor Bolts
  - 4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
  - 5) See drawing M4 for mounting positions of I.D. tags.

**Identification Tag Details**

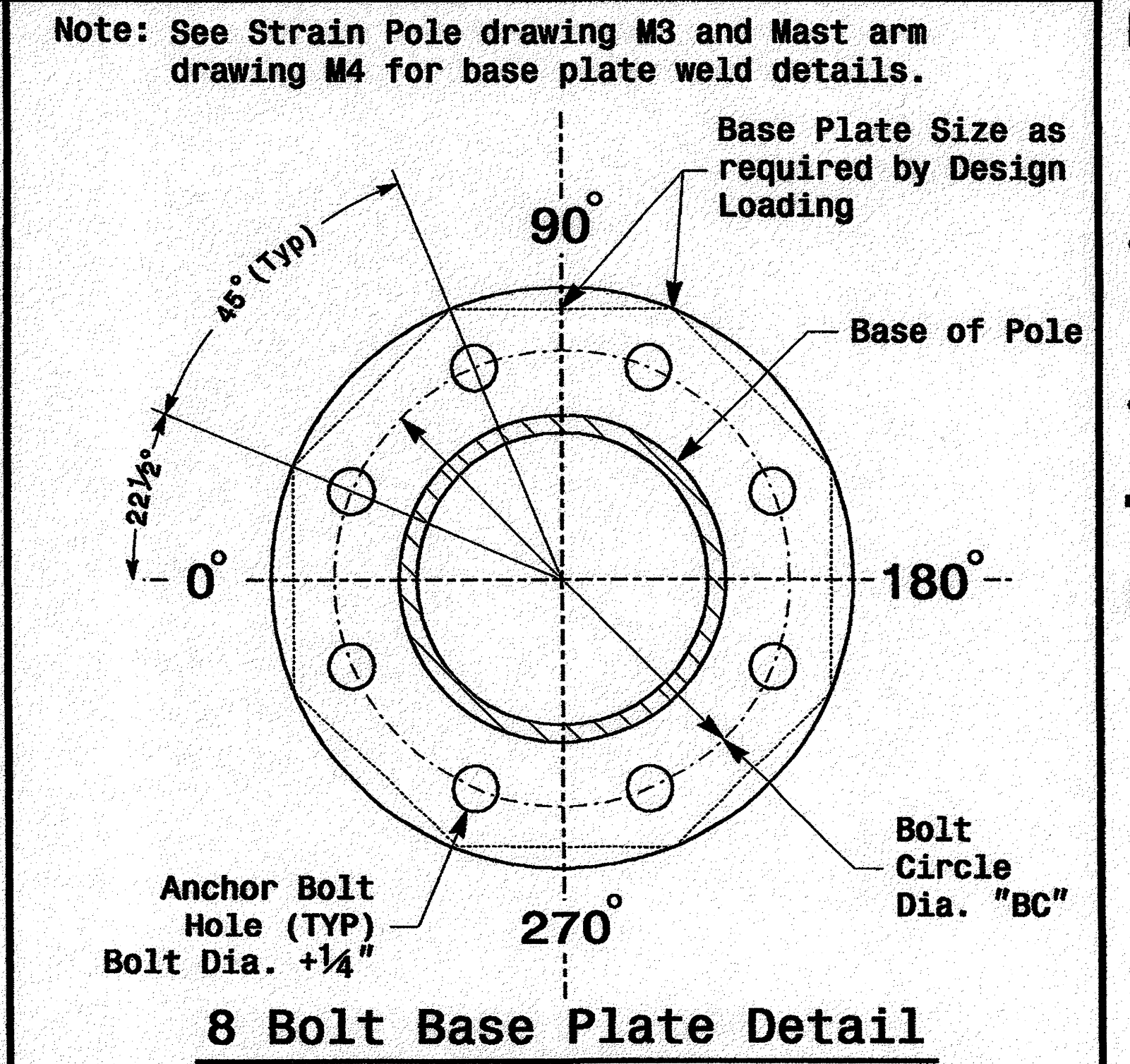


Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.

**Base Plate Template and Anchor Bolt Lock Plate Details**



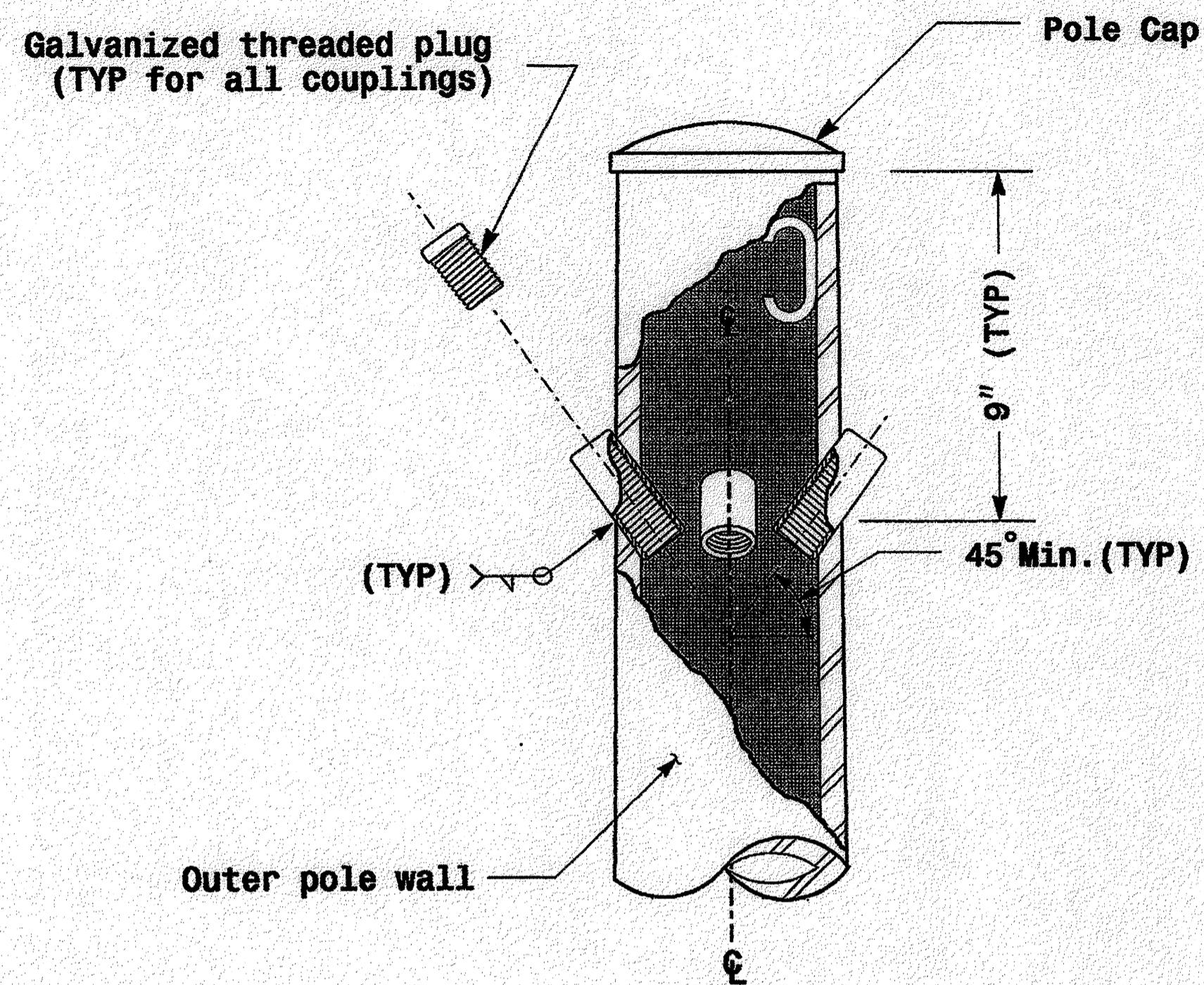
**Anchor Bolt Detail**



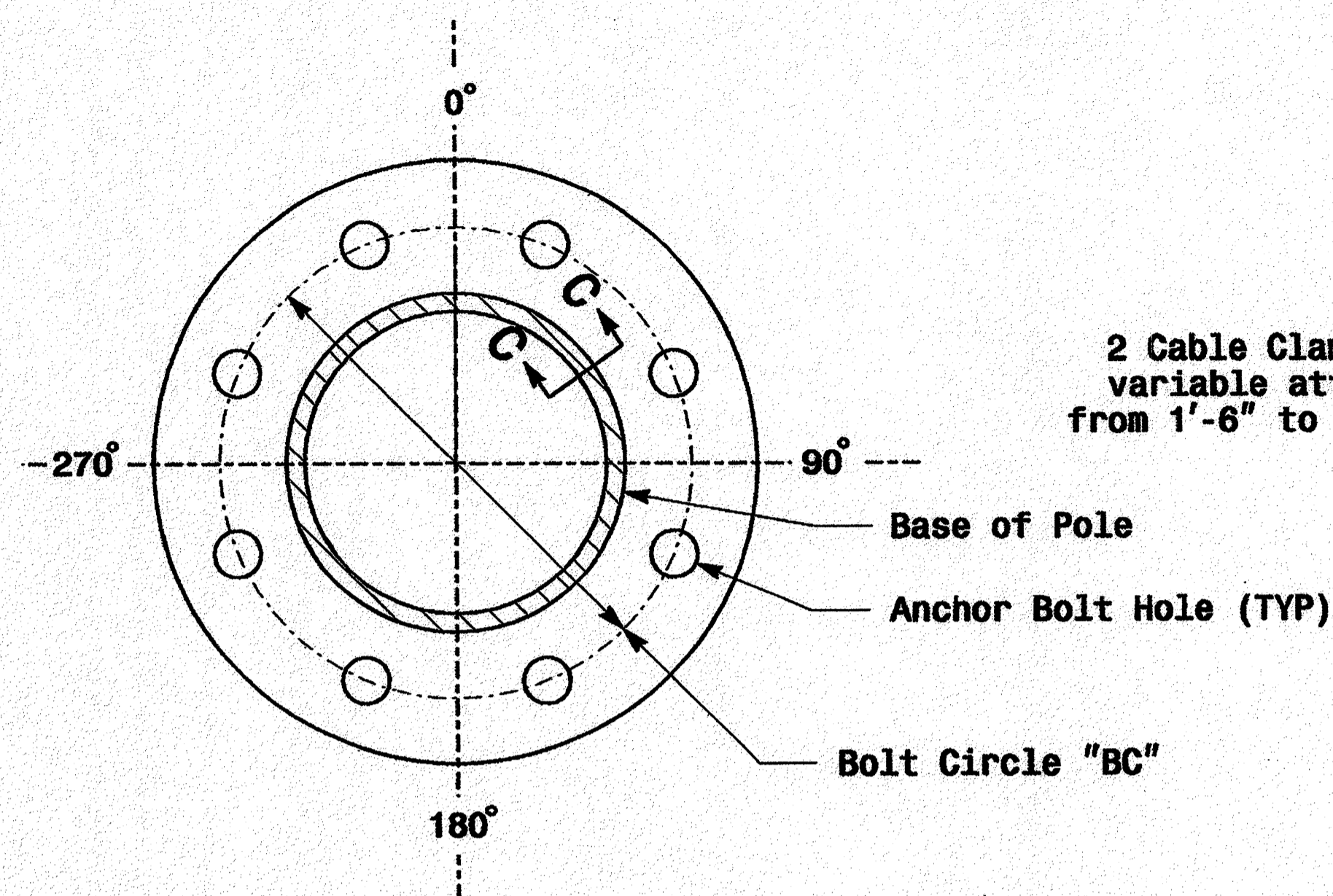
	<b>Typical Fabrication Details Common To All Metal Poles</b>		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander REVISIONS: _____ SCALE: NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito INIT. DATE: _____	

**Fabrication Details - All Poles**

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

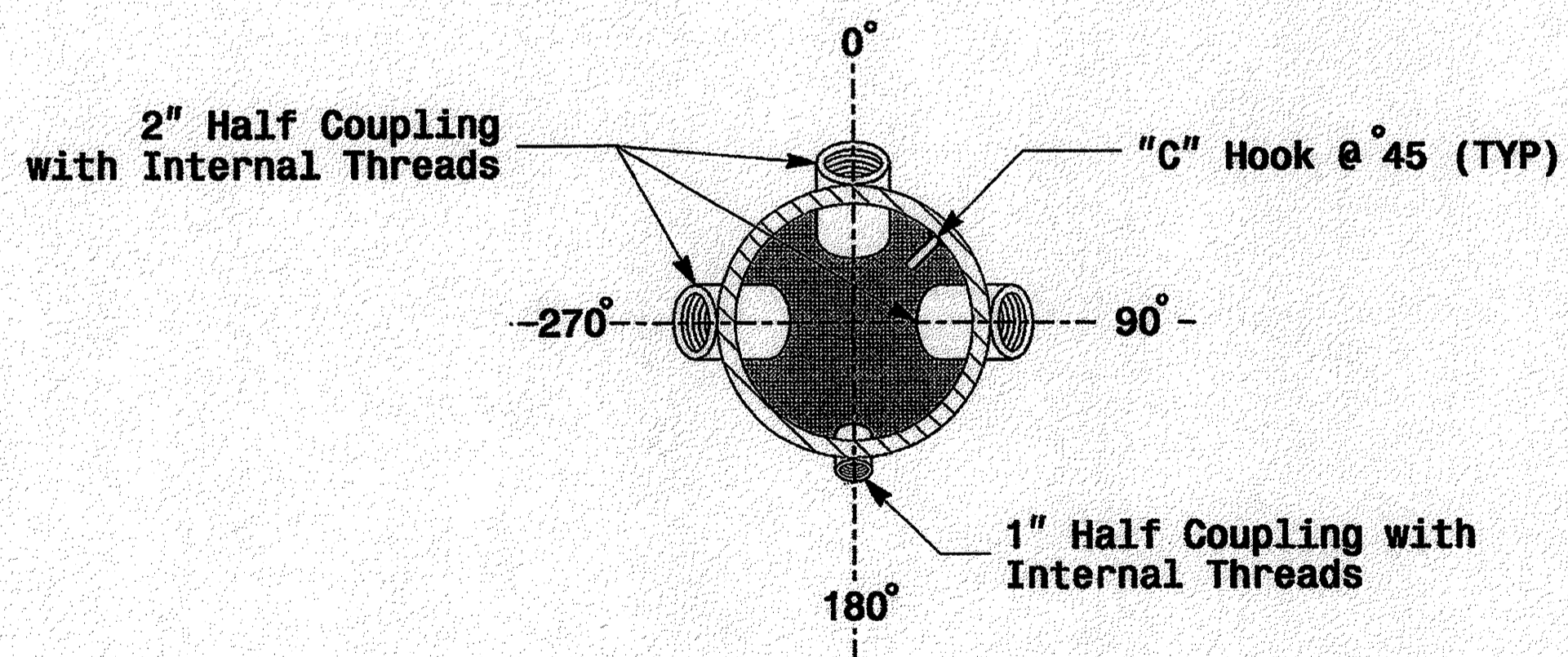
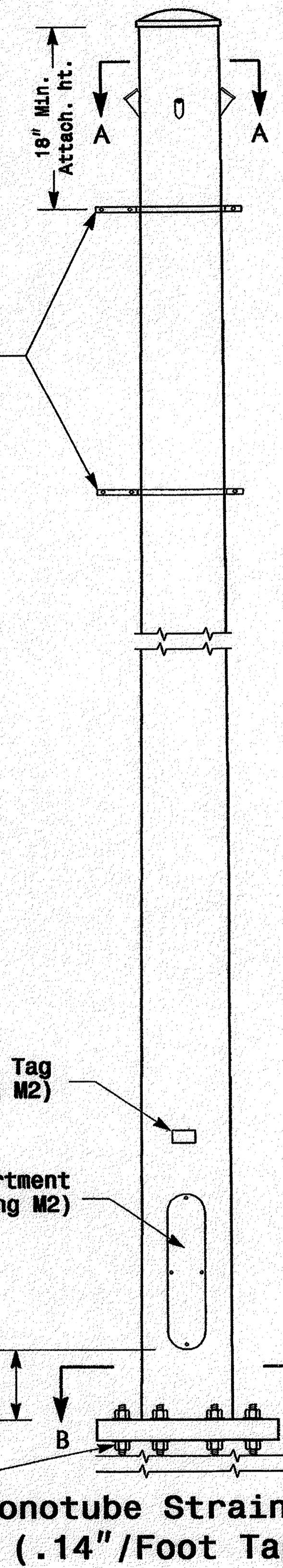


Cable Entrances at Top of Pole

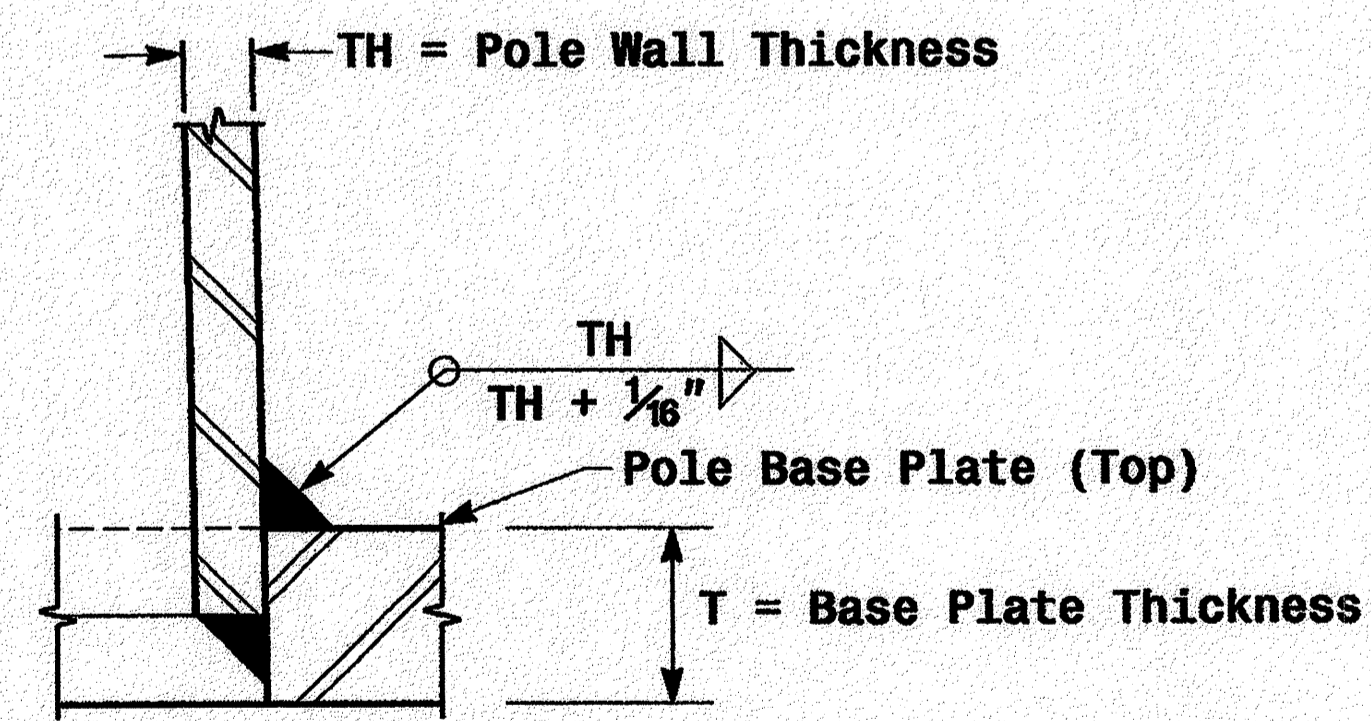


Section B-B  
(See drawing M2)  
Pole Base Plate

2 Cable Clamps designed for variable attachment heights from 1'-6" to 10' below the top of the pole.



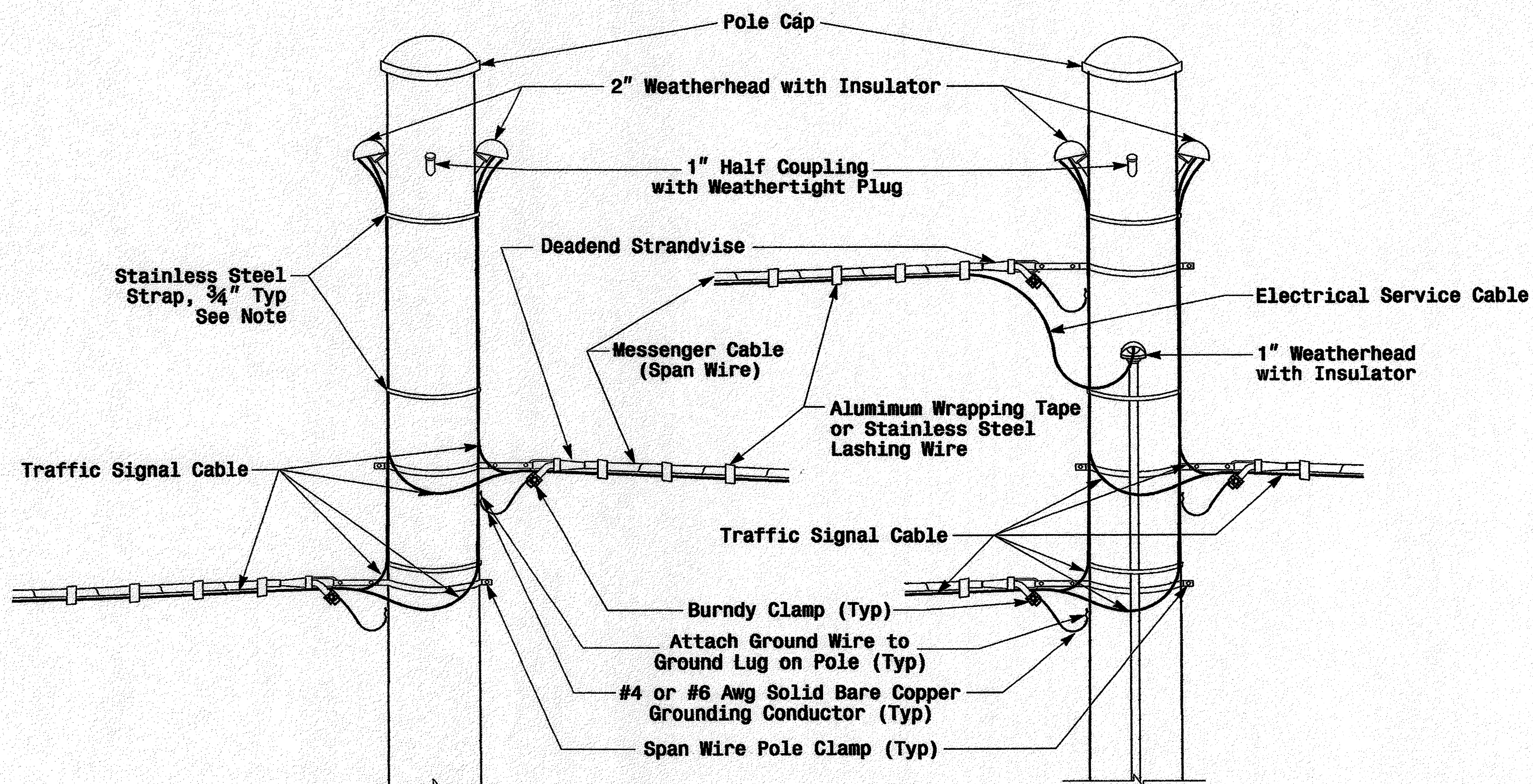
Section A-A  
Radial Orientation for Factory Installed Accessories at Top of Pole



Section C-C  
Socket Connection Weld Detail

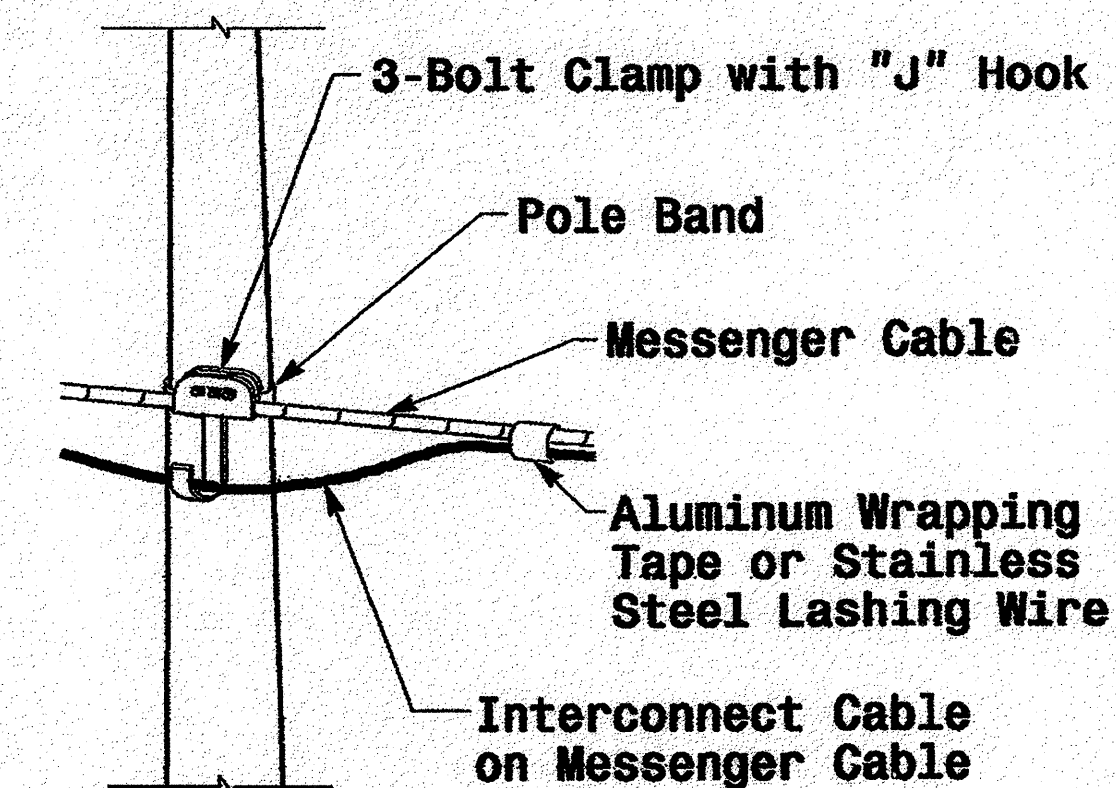
	<p>Typical Fabrication Details For Strain Poles</p>	
	<p>PLAN DATE: May 2005</p> <p>PREPARED BY: P.L. Alexander</p>	<p>REVIEWED BY: C.F. Andrews</p> <p>REVIEWED BY: A.M. Esposito</p>
<p>SCALE: 0 NA NONE</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>SIGNATURE: <i>D. Sankar</i> 9.2.2005</p>		<p>DATE</p>
<p>SIG. INVENTORY NO.</p>		

01-SEP-2005 14:07 w:\pepp\es-un\work\prouse2004\_metal\_pole\_standard.dwg2004.mtd.dgn p.l.alexander

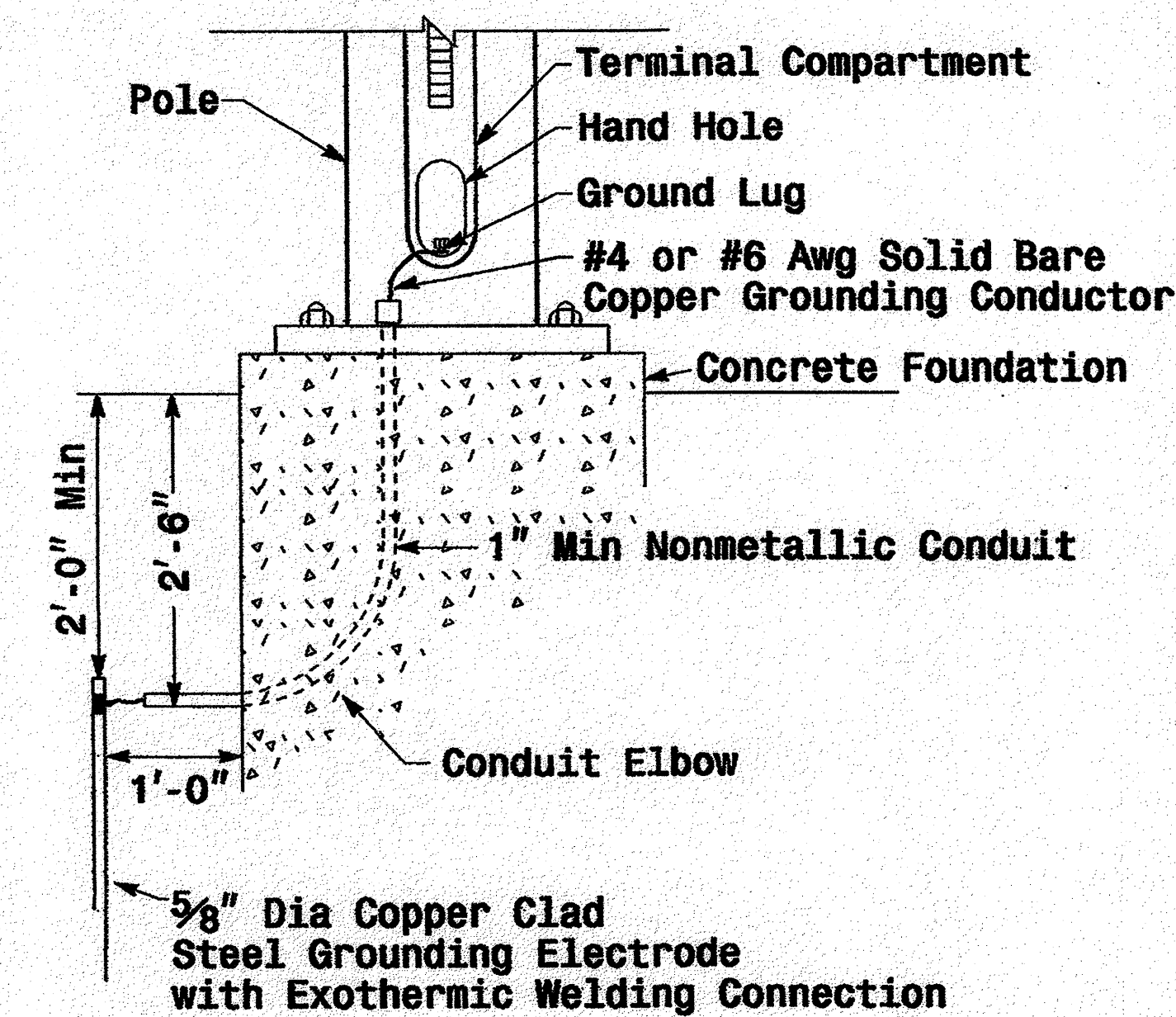


Note: Strap all signal cables to the side of the pole with  $\frac{3}{4}$ " stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

### Strain Pole Attachments



### Attachment of Cable to Intermediate Metal Pole

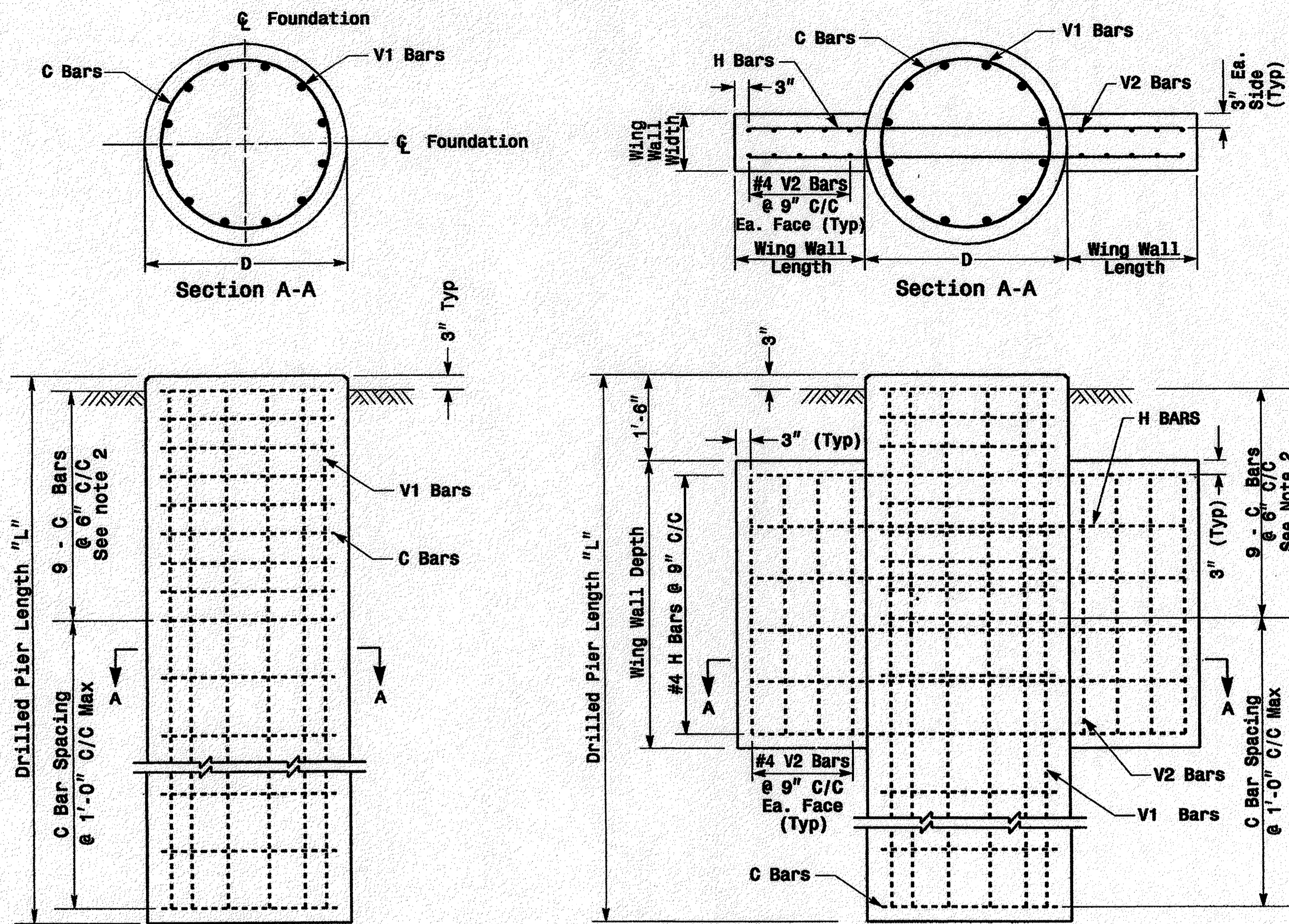


### Metal Pole Grounding Detail

Construction Details - Strain Poles

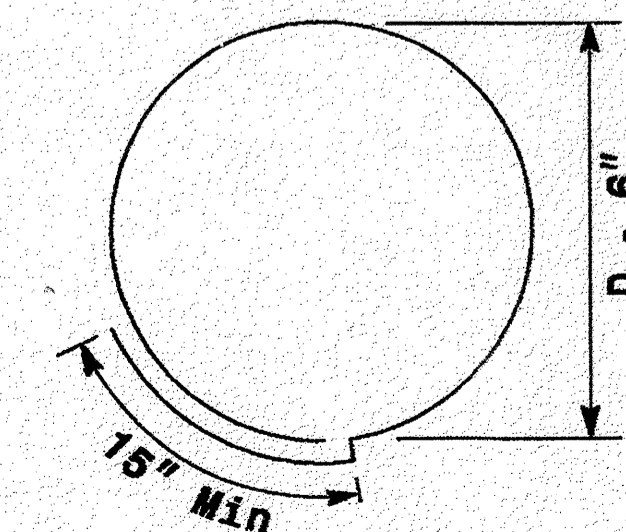
	<b>Construction Details Strain Poles</b>		
	PLAN DATE: <b>May 2005</b> PREPARED BY: <b>G.F. ANDREWS</b>	REVIEWED BY: <b>P.L. ALEXANDER</b> REVIEWED BY: <b>D.C. SARKAR</b>	
SCALE: <b>0 NA</b> NONE	REVISIONS:	INIT.:	DATE:
			SIG. INVENTORY NO.

## Reinforcing Steel Bars



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

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"
		C	*	#4	CIR.	10'-9"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-6"
		C	*	#4	CIR.	12'-6"

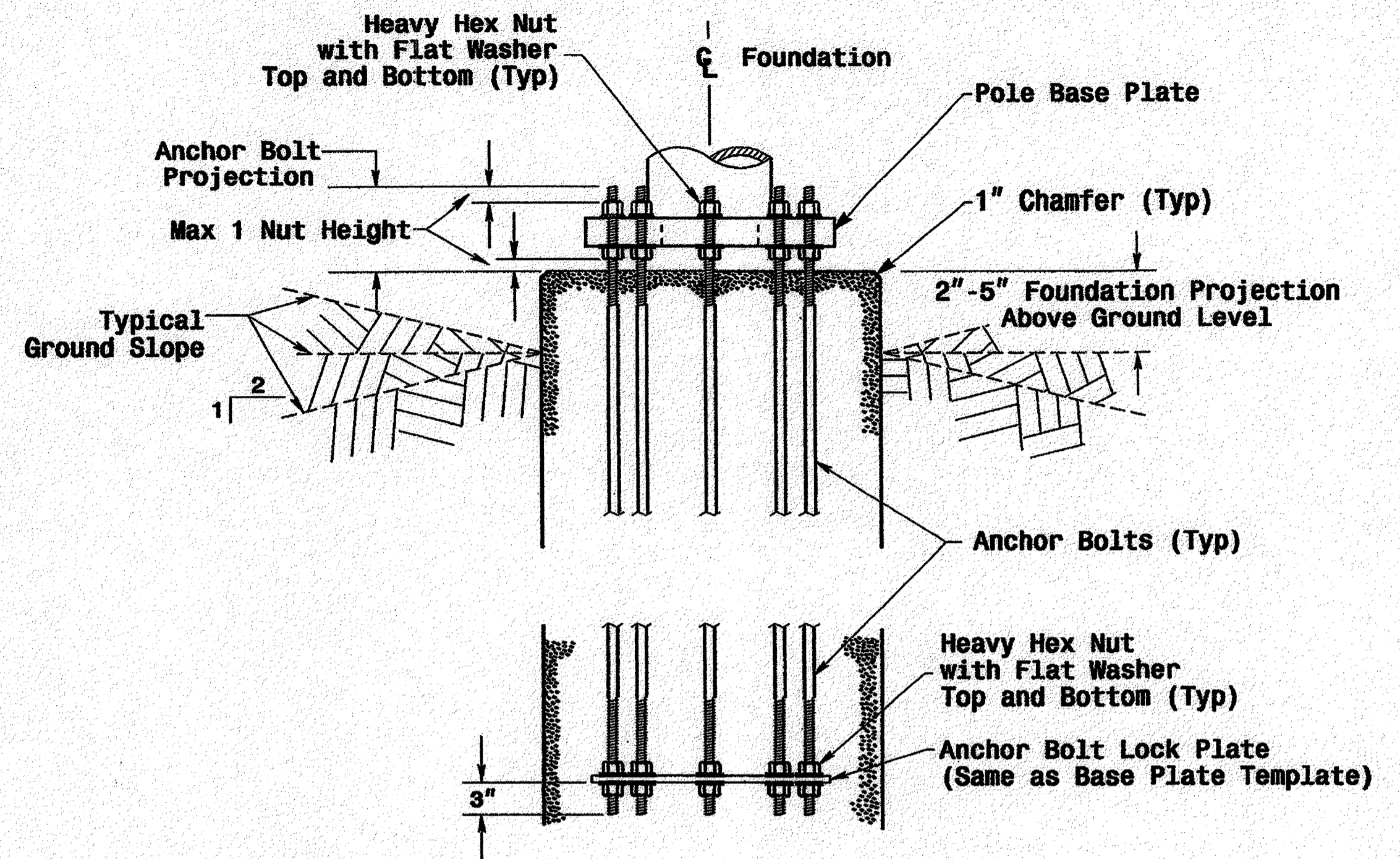
\* See Note No. 1  
\*\* See Note No. 3

Wing Wall 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

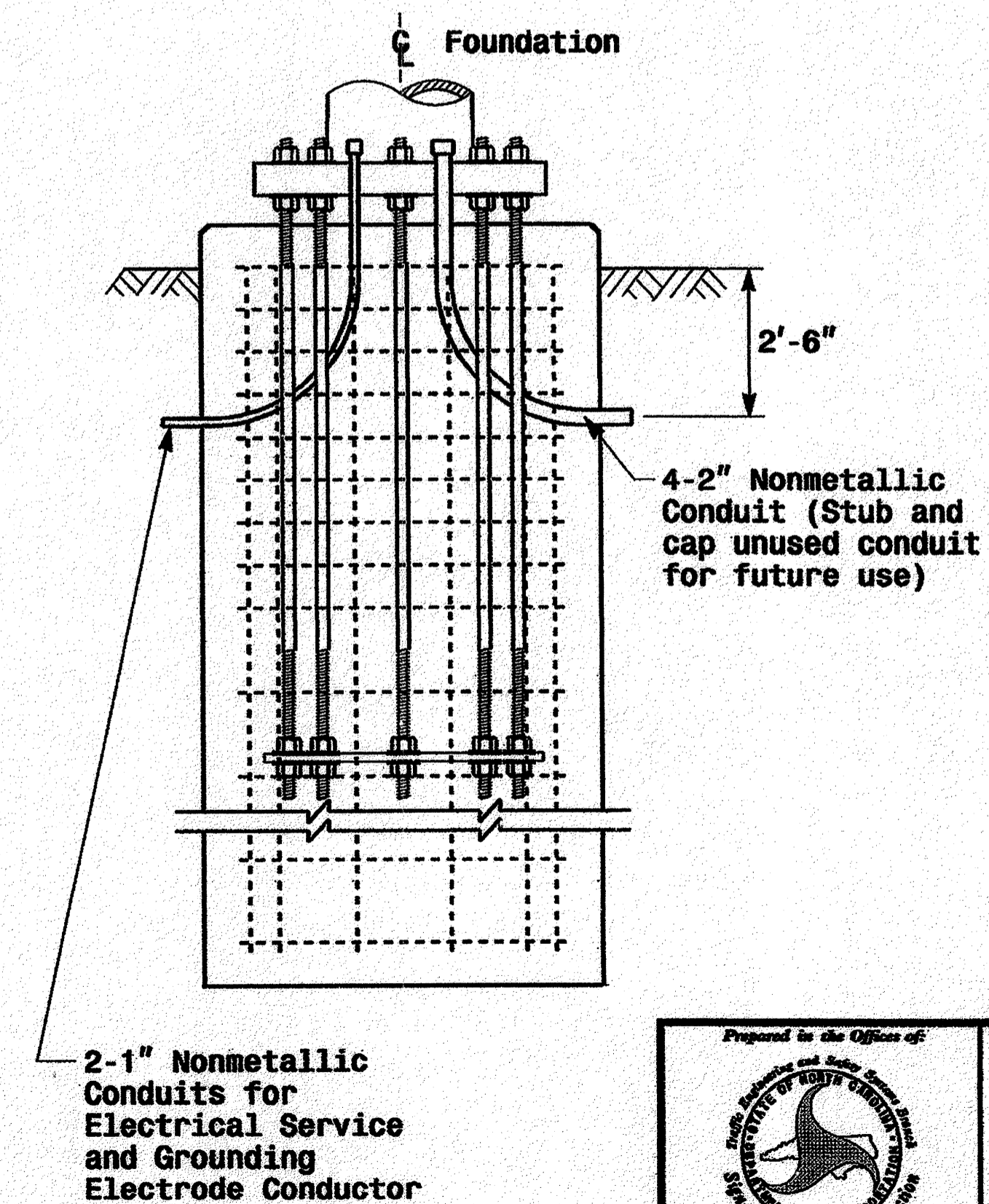
See Note No. 4

## Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



## Typical Foundation Conduit Details



## 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.)

	<b>Construction Details Foundations</b>		SCALE 0 NA NONE
	PLAN DATE: <b>May 2005</b> PREPARED BY: <b>C.F. ANDREWS</b>	REVIEWED BY: <b>P.L. ALEXANDER</b> REVIEWED BY: <b>A.M. ESPOSITO</b>	REVISIONS INIT. DATE

		STANDARD STRAIN POLES				STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) - Feet						
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	Clay				Sand		
						Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30
WIND ZONE 1	LIGHT	S26L3	26	25	280	20.5	14.0	11.5	9.5	18.0	16.0	14.0
		S30L3	30	25	310	21.0	14.5	11.5	9.5	18.5	16.5	14.5
		S35L3	35	25	350	22.5	15.0	12.0	10.0	19.5	17.5	15.5
	HEAVY	S30H3	30	29	450	25.5	16.5	13.0	11.0	21.0	18.5	16.5
		S35H3	35	29	540	26.0	17.0	13.5	11.5	22.0	19.5	17.0
WIND ZONE 2	LIGHT	S26L2	26	23	250	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S30L2	30	23	290	20.0	14.0	11.5	9.5	18.5	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	9.5	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	24.5	16.0	13.0	10.5	21.0	18.5	16.0
		S35H2	35	29	485	25.5	16.5	13.5	11.0	21.5	19.0	16.5
WIND ZONE 3	LIGHT	S26L2	26	23	250	18.5	13.0	10.5	9.0	17.5	15.0	13.5
		S30L2	30	23	290	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S35L2	35	23	315	20.0	14.0	11.5	9.5	18.5	16.0	14.5
	HEAVY	S30H2	30	29	415	23.0	15.5	12.5	10.0	20.5	17.5	16.0
		S35H2	35	29	485	24.0	16.0	13.0	10.5	21.0	18.0	16.5
WIND ZONE 4	LIGHT	S26L1	26	22	195	18.0	13.0	10.5	9.0	16.5	14.5	13.0
		S30L1	30	22	225	18.5	13.0	10.5	9.0	17.0	15.0	13.5
		S35L1	35	22	255	19.0	13.5	11.0	9.0	17.5	15.5	14.0
	HEAVY	S30H1	30	25	330	22.0	15.0	12.0	9.5	19.5	17.0	15.0
		S35H1	35	25	385	23.0	15.5	12.5	10.0	20.0	17.5	15.5
WIND ZONE 5	LIGHT	S26L2	26	23	250	19.0	13.5	10.5	9.0	17.5	15.5	13.5
		S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
		S35H2	35	29	485	25.0	16.5	13.0	11.0	21.5	18.5	16.5

Concrete Volume (cubic yards)=.356 X L

**Fabrication Design Notes:**


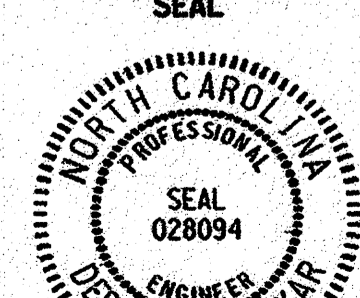
1. Values shown in "Moment at the Pole Base" column represents the minimum acceptable capacity allowable for design using a design CSR of 1.
2. Base plate thickness (T) is 2.0 inches.

**Foundation Selection:**

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from sheet M 1.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate pole case load number from the plans or from the Engineer.
5. Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case. The foundation depth is the value where the column and the row intersect.

Standard Strain Poles

02-SEP-2005 12:42 w:\paco\res-un\frank\krcupae004.mxd pole standard\sig004.m8 std strain pole.dgn pol alexander

	<b>Standard Strain Poles and Standard Foundations</b>		
	PLAN DATE: <b>May 2005</b> PREPARED BY: <b>P.L. Alexander</b>	REVIEWED BY: <b>C.F. Andrews</b> REVIEWED BY: <b>A.M. Esposito</b>	
SCALE: <b>None</b>		SIGNATURE: <i>D. Sarkar</i> DATE: <b>9.2.2005</b>	