

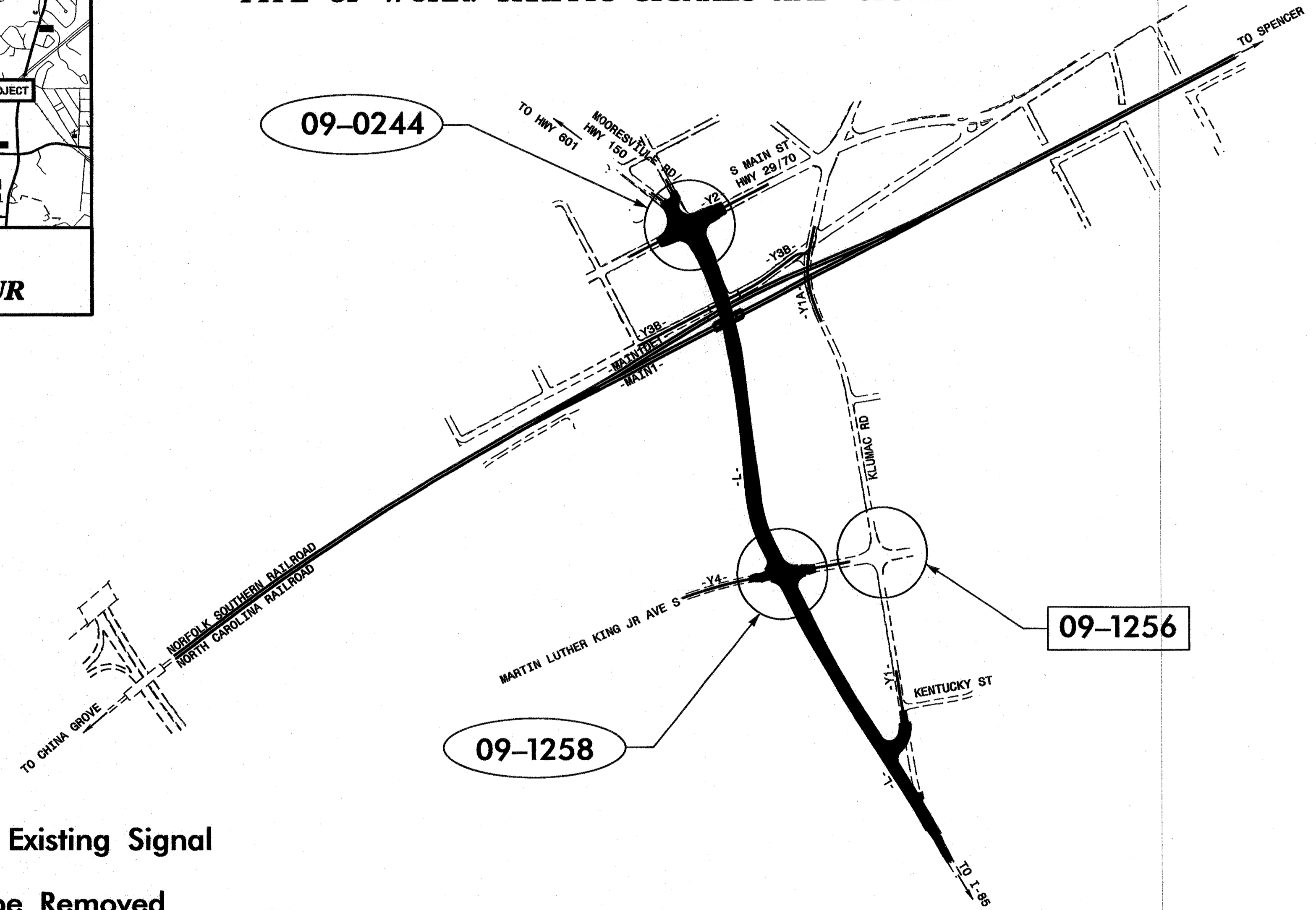
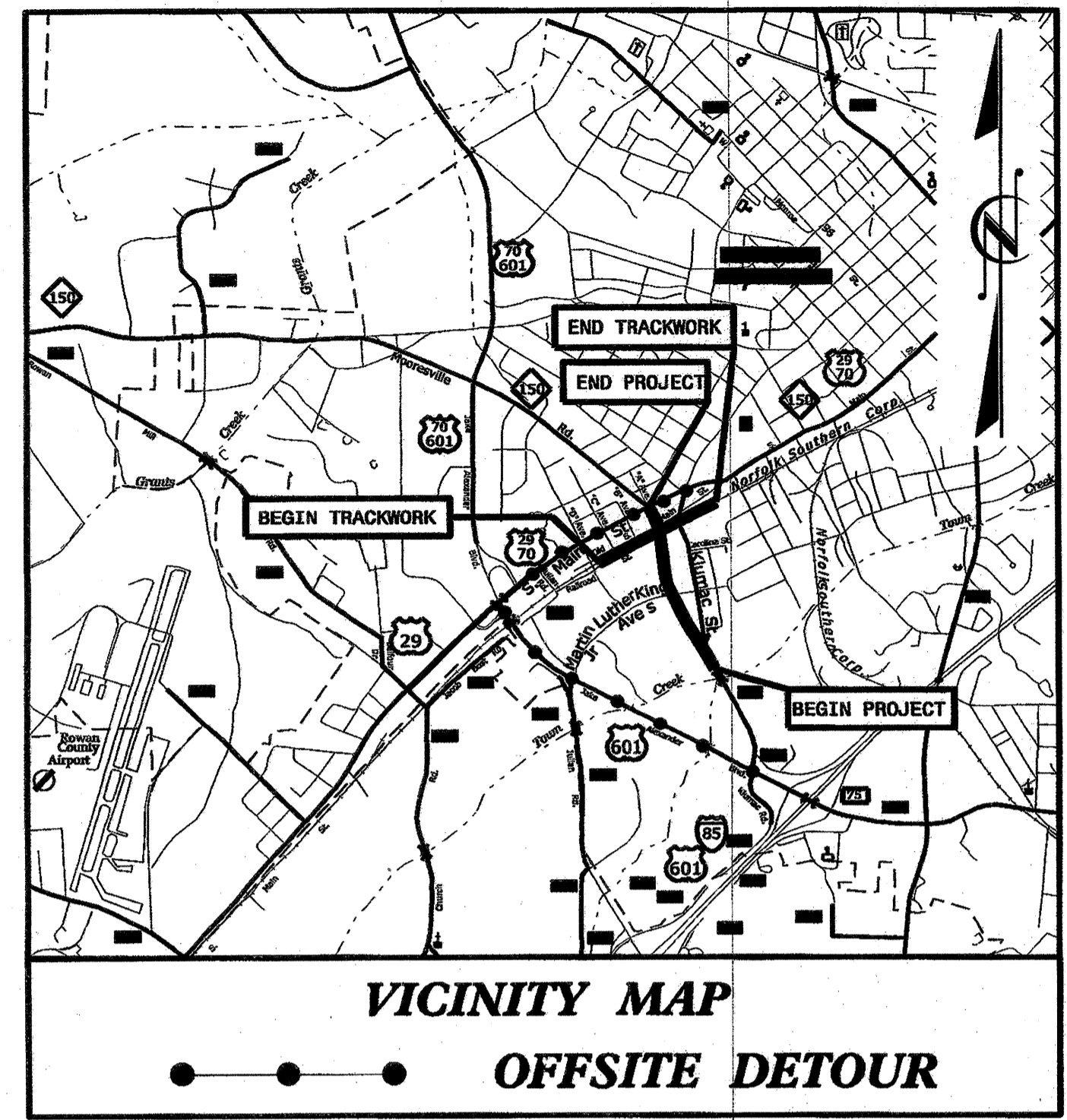
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROWAN COUNTY

LOCATION: PROPOSED SR 2541 (KLUMAC ROAD) GRADE SEPERATION WITH NORTH CAROLINA RAILROAD/NORFOLK SOUTHERN RAILWAY.

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS

Project: U-3459



- 09-XXXX New or Modified Existing Signal
- 09-XXXX Existing Signal to be Removed

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

Contract: 202826

Index of Plans		
Sheet #	Reference #	Location/Description
Sig. 1	09-1258	Title Sheet
Sig. 2-4	09-0244	SR 2541 (Klumac Road) at Martin Luther King, Jr. Avenue
Sig. 5-12		US 29-70/NC 150 (S. Main Street) at NC 150 (Moorsville Road)/SR 2541 (Klumac Road)
Sig. 13-18		Metal Pole Standard Sheets
Sig. 19-25		Signal Communication Plans

INTELLIGENT TRANSPORTATION SYSTEMS AND SIGNALS UNIT

Contacts:

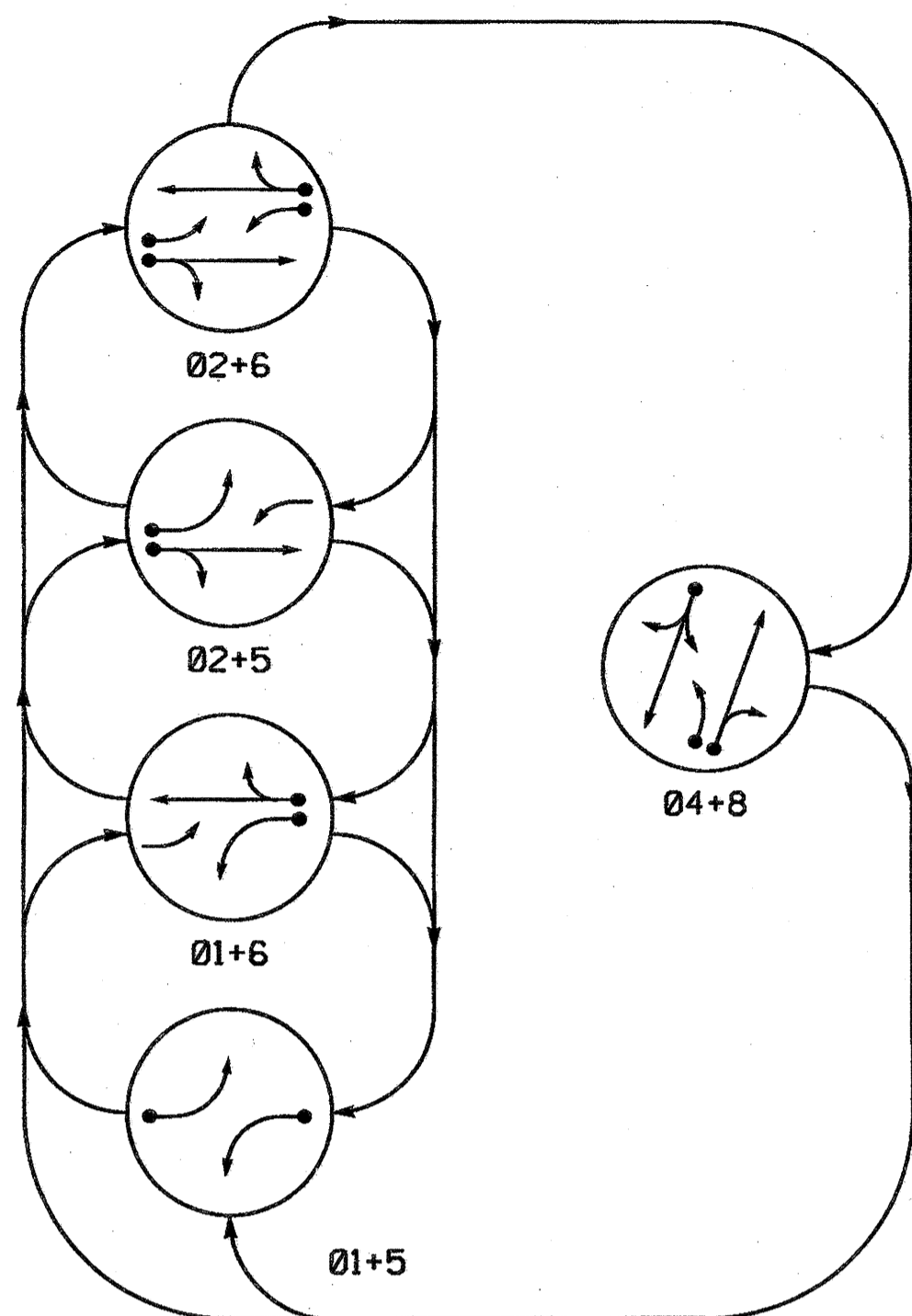
Robert J. Ziemba, PE - Central Region Signals Project Engineer
John T. Rowe, Jr., PE - Signal Equipment Design Engineer
I. Neil Avery - Signal Communications Project Engineer

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

750 N. Greenfield Parkway, Garner, NC 27529

SR 2541 (Klumac Road) at Martin Luther King, Jr. Avenue, Signal Design, Central Region, Div 9, U-3459, U3459, sig. 1, sig. 1.dgn

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

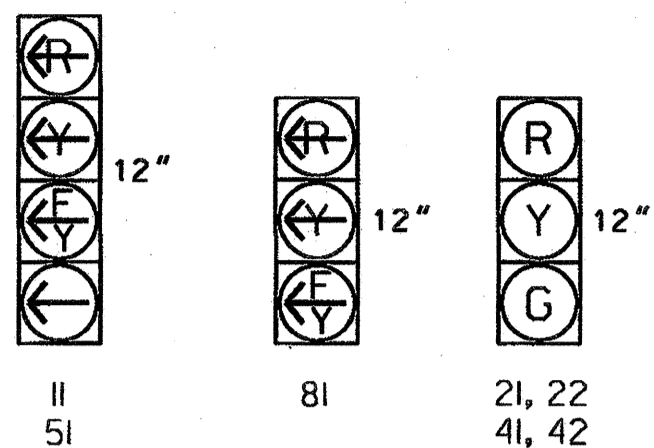
TABLE OF OPERATION

SIGNAL FACE	PHASE					FLASH
	Ø1+5	Ø2+6	Ø3+7	Ø4+8	Ø5+9	
II	---	---	---	---	---	
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	R	R	R	R	G	R
82, 83	R	R	R	R	G	R

⚡ = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



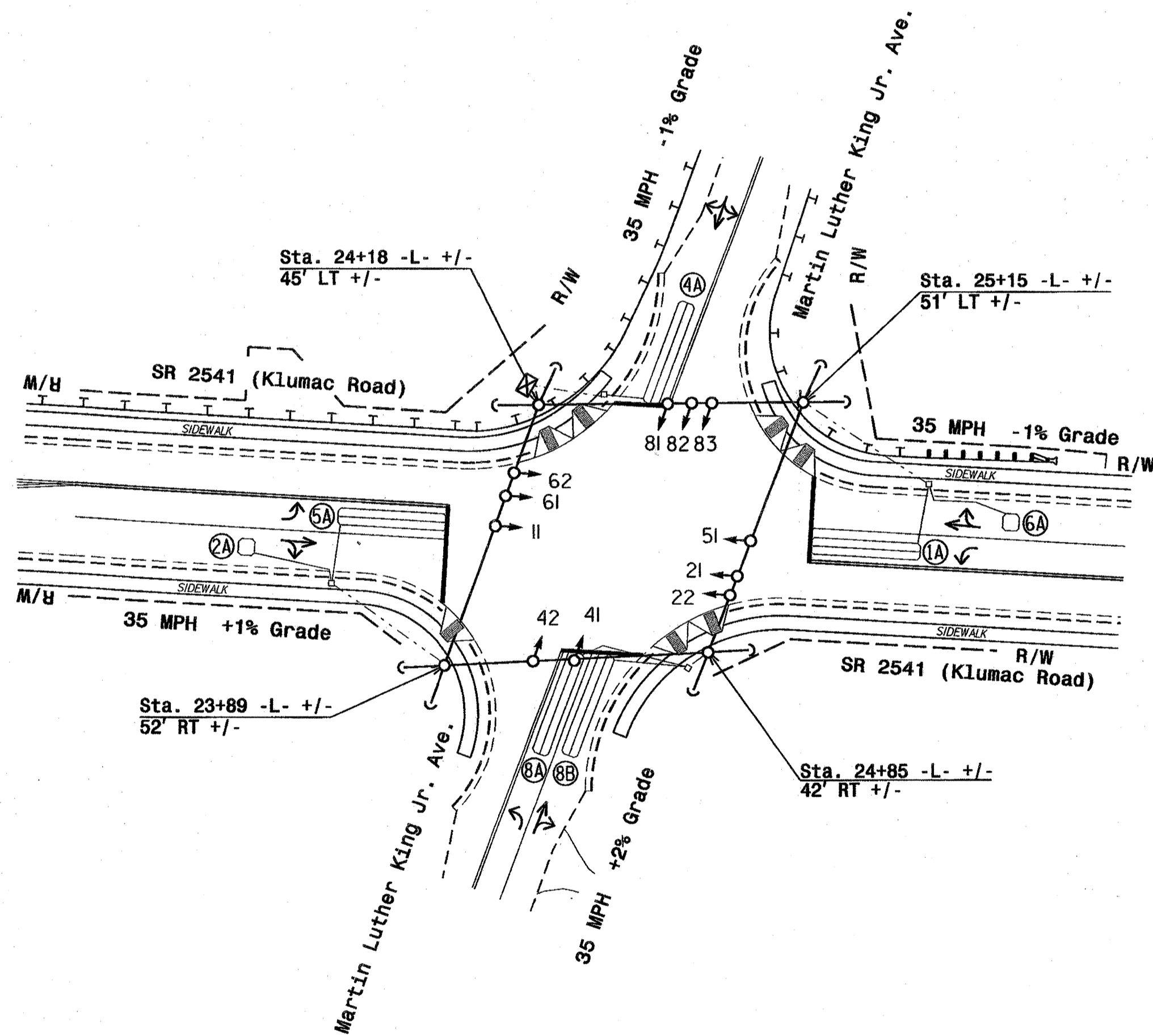
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				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	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	2	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	70	4	Y	2	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

5 Phase Fully Actuated (Isolated)

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 and/or phase 5 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.



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	90	30	20	90	30
Yellow Clearance	3.0	3.9	3.9	3.0	3.9	3.9
Red Clearance	3.1	2.2	1.7	2.8	2.2	1.7
Red Revert	2.0	2.0	2.0	2.0	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	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

LEGEND

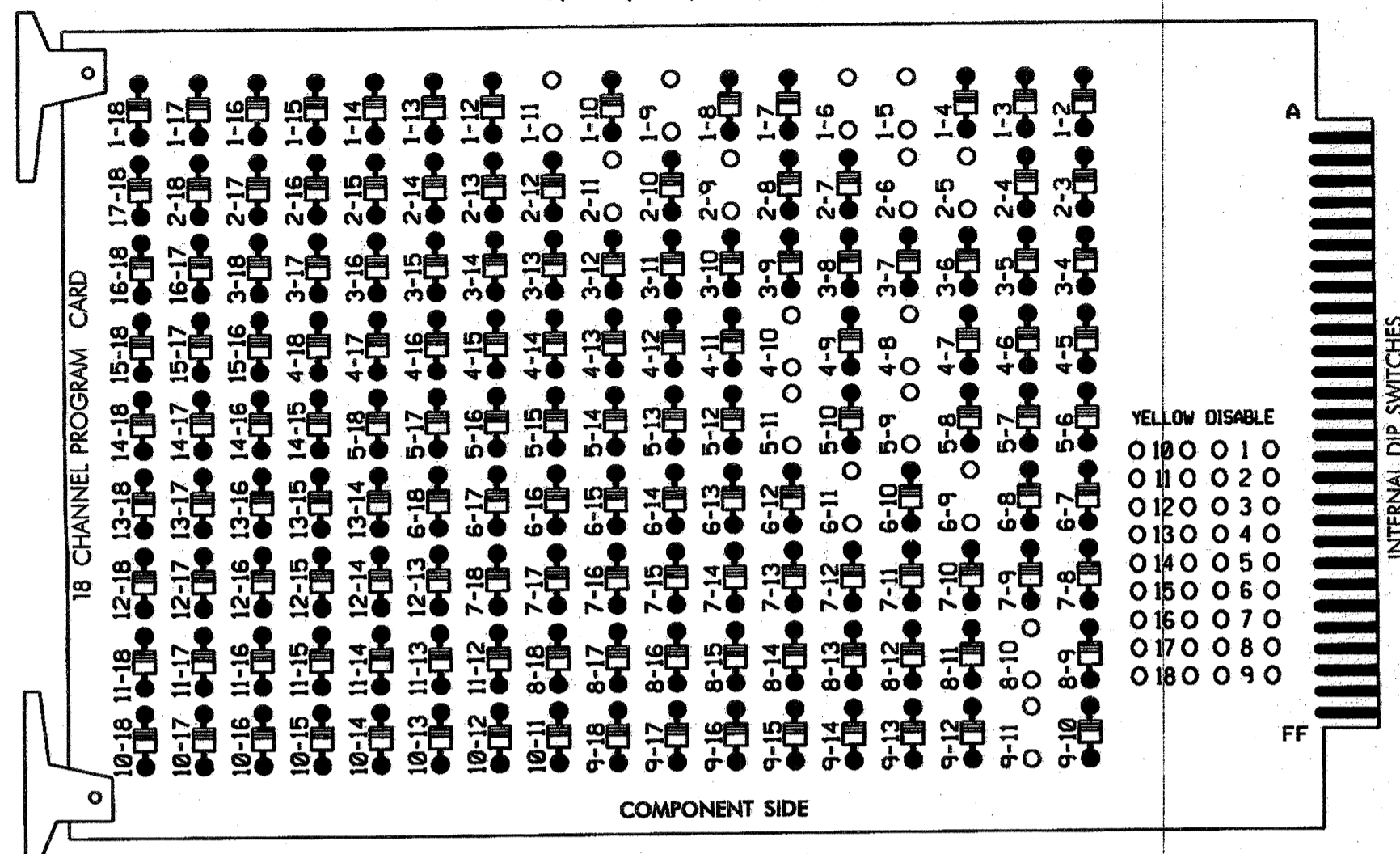
- | PROPOSED | EXISTING |
|--|-----------------------------------|
| ○ → Traffic Signal Head | ● → Traffic Signal Head |
| ○ → Modified Signal Head | N/A |
| ○ → Sign | N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | N/A |
| ○ → Signal Pole with Guy | ○ → Signal Pole with Guy |
| ○ → Signal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

New Installation

	<p>SR 2541 (Klumac Road) at Martin Luther King, Jr. Ave.</p>	
	<p>Division 9 Rowan County Salisbury</p> <p>PLAN DATE: May 2012 REVIEWED BY:</p>	<p>PREPARED BY: C.E. Carter REVIEWED BY:</p>
<p>SCALE: 1" = 40'</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>SIGNATURE: [Signature]</p>	<p>DATE: 5/15/12</p>	<p>SIG. INVENTORY NO. 09-1258</p>

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, 4-10, 5-9, 5-11, 6-9, 6-11, 8-10, 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 overlaps 1 and 2 as Wag Overlaps.

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 S2,AUX S4
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....8
 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	82,83	NU	11	81	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114		
YELLOW ARROW													A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		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)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	FS
FILE L	1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	DC ISOLATOR
FILE U	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18
FILE L	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	DC ISOLATOR

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
 ST = STOP TIME

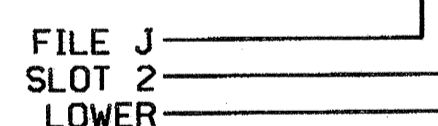
INPUT FILE CONNECTION & PROGRAMMING CHART

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
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	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

¹Add jumper from I1-W to J4-W. on rear of input file.

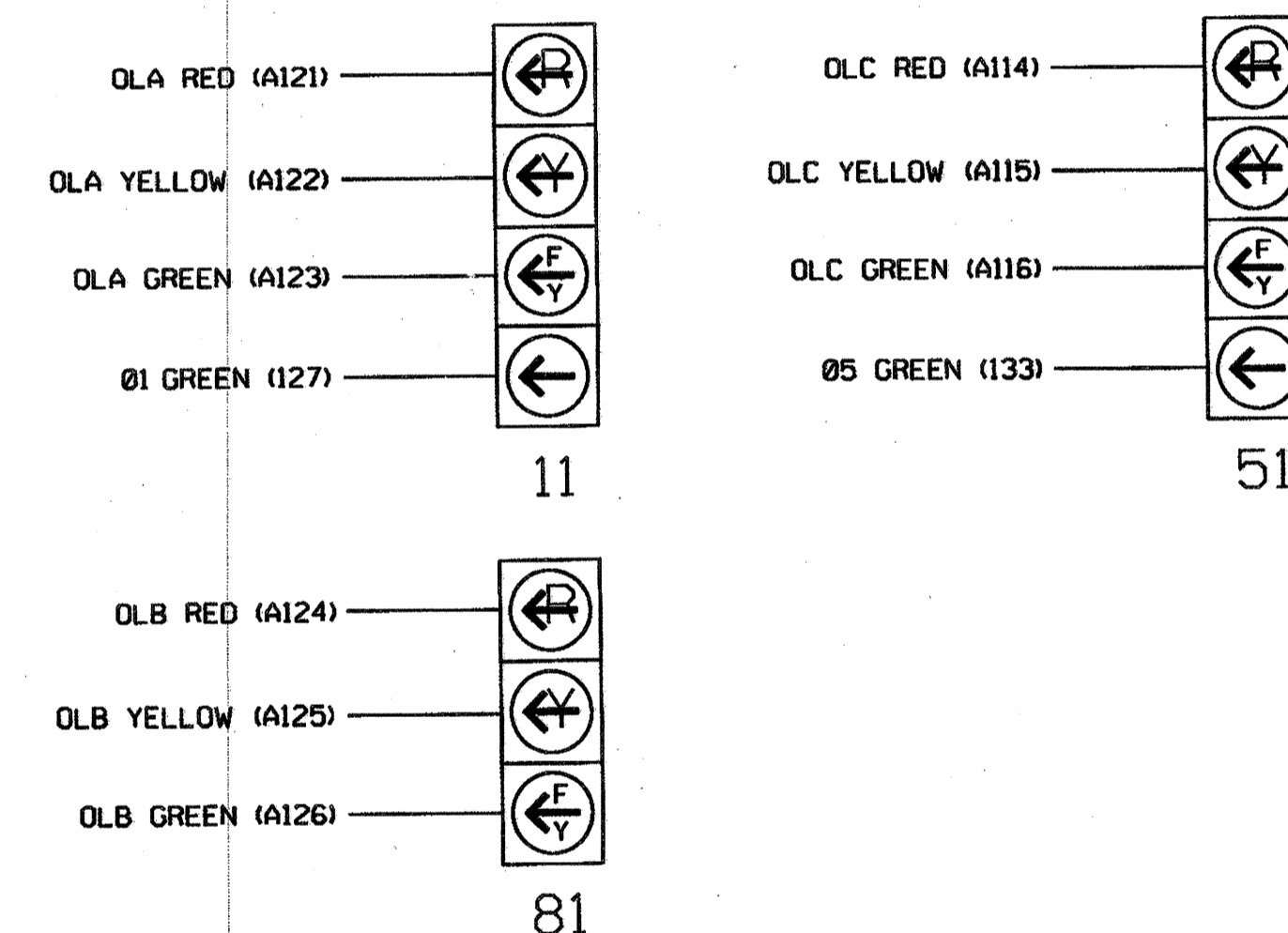
²Add jumper from J1-W to I4-W. on rear of input file.

INPUT FILE POSITION LEGEND: J2L



3 & 4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



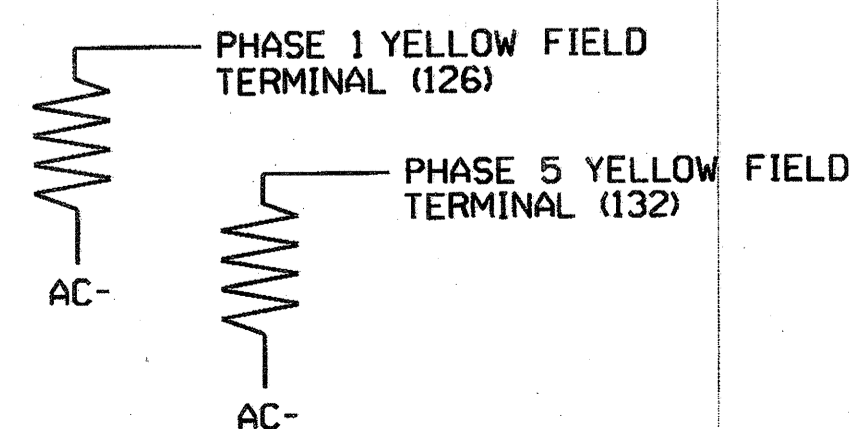
NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 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)



FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

New Installation - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Office of:
 Transportation Mobility and Safety Division
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 Signal Management Section
 750 N. Greenfield Pkwy, Garner, NC 27529

SR 2541 (Klumac Road)
 at
 Martin Luther King, Jr. Ave.

Division 9 Rowan County Salisbury
 PLAN DATE: June 2012 REVIEWED BY: JTR
 PREPARED BY: S. Armstrong REVIEWED BY:
 REVISIONS INIT. DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 008453
 JOHN T. ROWE, III
 SIGNATURE DATE 6-15-12
 SIG. INVENTORY NO. 09-1258

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

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

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

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

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

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

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

← NOTICE GREEN FLASH

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

PRESS '+' ONCE

PAGE 1: VEHICLE OVERLAP 'B' 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

← NOTICE GREEN FLASH

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
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

PRESS '+' ONCE

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

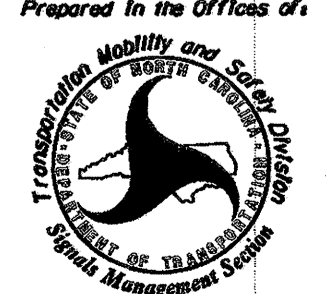
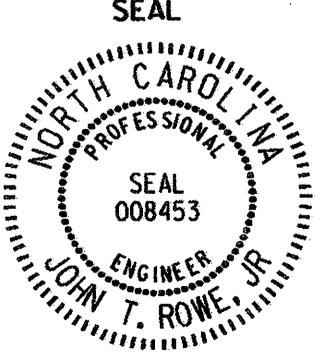
← NOTICE GREEN FLASH

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

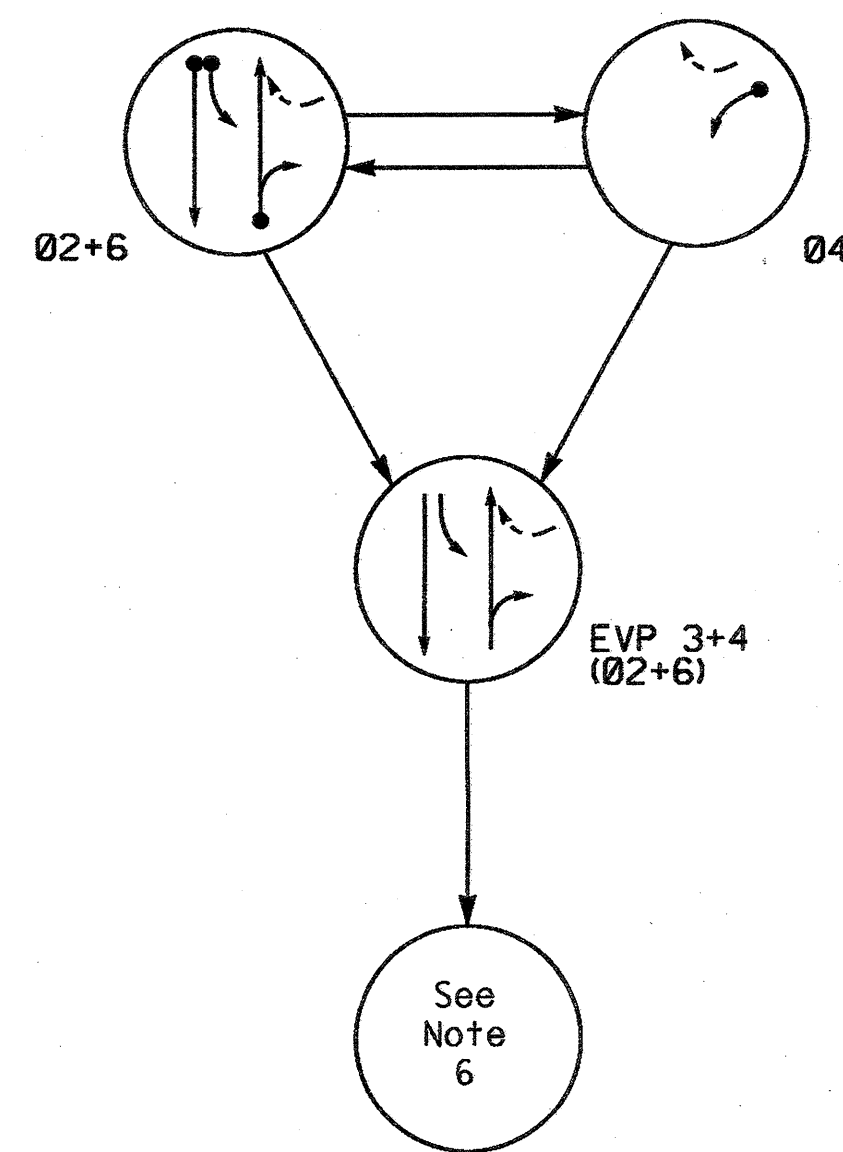
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1258
DESIGNED: May 2012
SEALED: 6/15/12
REVISED: N/A

New Installation - Sheet 2 of 2

 Prepared in the Office of: TRANSPORTATION MOBILITY AND SAFETY SOLUTIONS, INC. Signal Management Services 750 N. Greenfield Parkway, Garner, NC 27529	SR 2541 (Klumac Road) at Martin Luther King, Jr. Ave.		SEAL  SEAL 008453 ENGINEER JOHN T. ROWE, P.E. SIGNATURE DATE 6-15-12 SIG. INVENTORY NO. 09-1258
	Division 9 Rowan County Salisbury		
	PLAN DATE: June 2012 PREPARED BY: S. Armstrong	REVIEWED BY: JTR REVIEWED BY:	
REVISIONS		INIT. DATE	

PHASING DIAGRAM



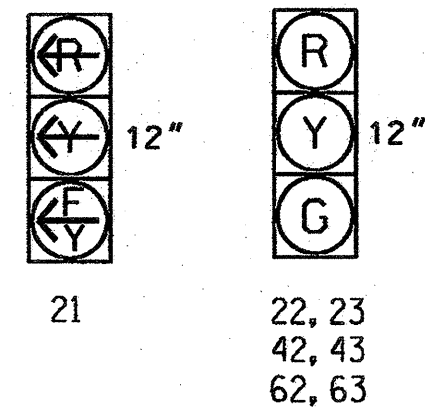
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	02+6	04	EVP 3+4 (02+6)	F L L F
21	F	R	F	Y
22, 23	G	R	G	Y
42, 43	R	G	R	R
62, 63	G	R	G	Y

F = Flashing Yellow Arrow

SIGNAL FACE I.D.



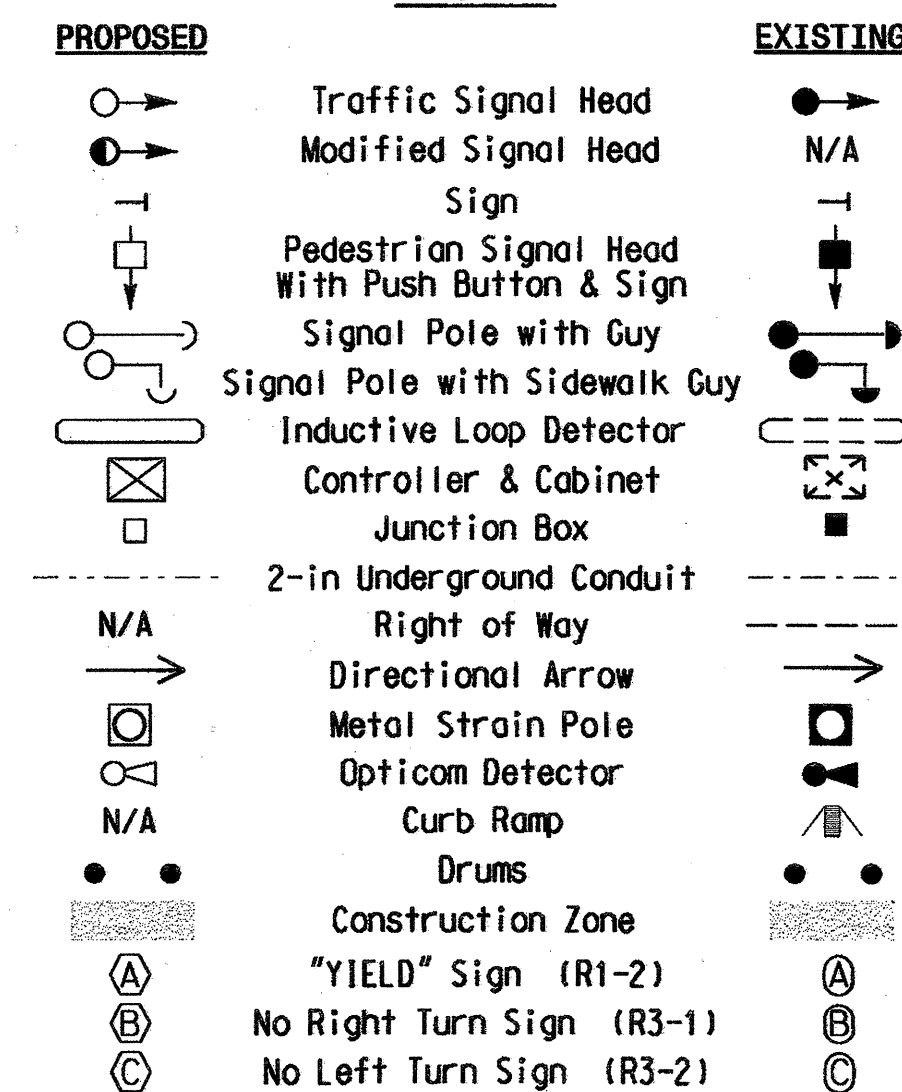
NEMA LOOP & DETECTOR INSTALLATION CHART with TS-2 CABINET										
LOOP NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	TURNS	NEMA PHASE		TIMING			INHIBIT DELAY DURING GREEN?	
				NEW	EXISTING	FEATURE	TIME			
2A	6X6	70	3	X	-	2	X	-	-	NO
2B	6X40	0	2-4-2	X	-	2	X	-	-	NO
4A	6X40	0	2-4-2	X	-	4	X	-	DELAY 3	YES
6A	6X6	70	3	X	-	6	X	-	-	NO

2 Phase W/ Emergency Vehicle Preemption Fully Actuated (Salisbury Signal System)

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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Upon completion of Emergency Vehicle Preemption, controller returns to normal operation based on vehicle demand.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND



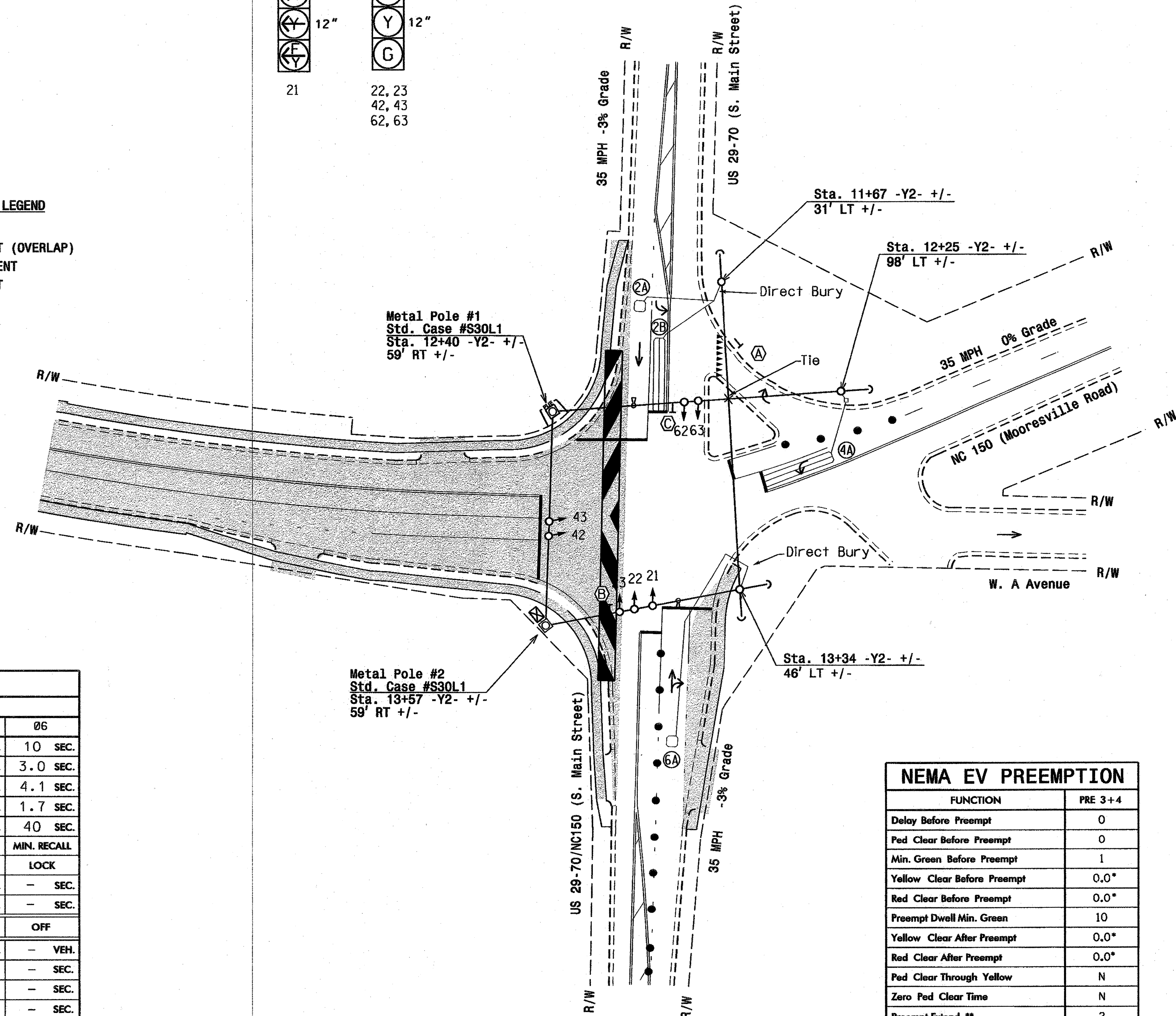
NEMA EV PREEMPTION

FUNCTION	PRE 3+4
Delay Before Preempt	0
Ped Clear Before Preempt	0
Min. Green Before Preempt	1
Yellow Clear Before Preempt	0.0*
Red Clear Before Preempt	0.0*
Preempt Dwell Min. Green	10
Yellow Clear After Preempt	0.0*
Red Clear After Preempt	0.0*
Ped Clear Through Yellow	N
Zero Ped Clear Time	N
Preempt Extend **	2

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

FEATURE	PHASE		
	02	04	06
MINIMUM GREEN *	10 SEC.	7 SEC.	10 SEC.
PASSAGE GAP *	3.0 SEC.	2.0 SEC.	3.0 SEC.
YELLOW CHANGE INT.	4.1 SEC.	3.8 SEC.	4.1 SEC.
RED CLEARANCE	1.7 SEC.	2.3 SEC.	1.7 SEC.
MAX. I *	40 SEC.	20 SEC.	40 SEC.
RECALL POSITION	MIN. RECALL	NONE	MIN. RECALL
VEHICLE CALL MEMORY	LOCK	NONLOCK	LOCK
WALK *	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.
VOLUME DENSITY	OFF	OFF	OFF
ACTION B4 ADD *	- VEH.	- VEH.	- VEH.
SEC. PER ACTION *	- SEC.	- SEC.	- SEC.
MAX. INITIAL *	- SEC.	- SEC.	- SEC.
TIME B4 REDUCTION *	- SEC.	- SEC.	- SEC.
TIME TO REDUCE *	- SEC.	- SEC.	- SEC.
MINIMUM GAP	- SEC.	- SEC.	- SEC.

* 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 - Temporary Design (TMP Phase III)

750 N. Greenfield Pkwy, Garner, NC 27529

US 29-70/NC 150 (S. Main Street) at NC 150 (Mooresville Road)

Division 9 Rowan County Salisbury

PLAN DATE: May 2012 REVIEWED BY:

PREPARED BY: R. Hough REVIEWED BY:

SCALE: 1"=40'

SEAL

ROBERT J. ZIEBA
ENGINEER
026486

DATE: 6/10/12

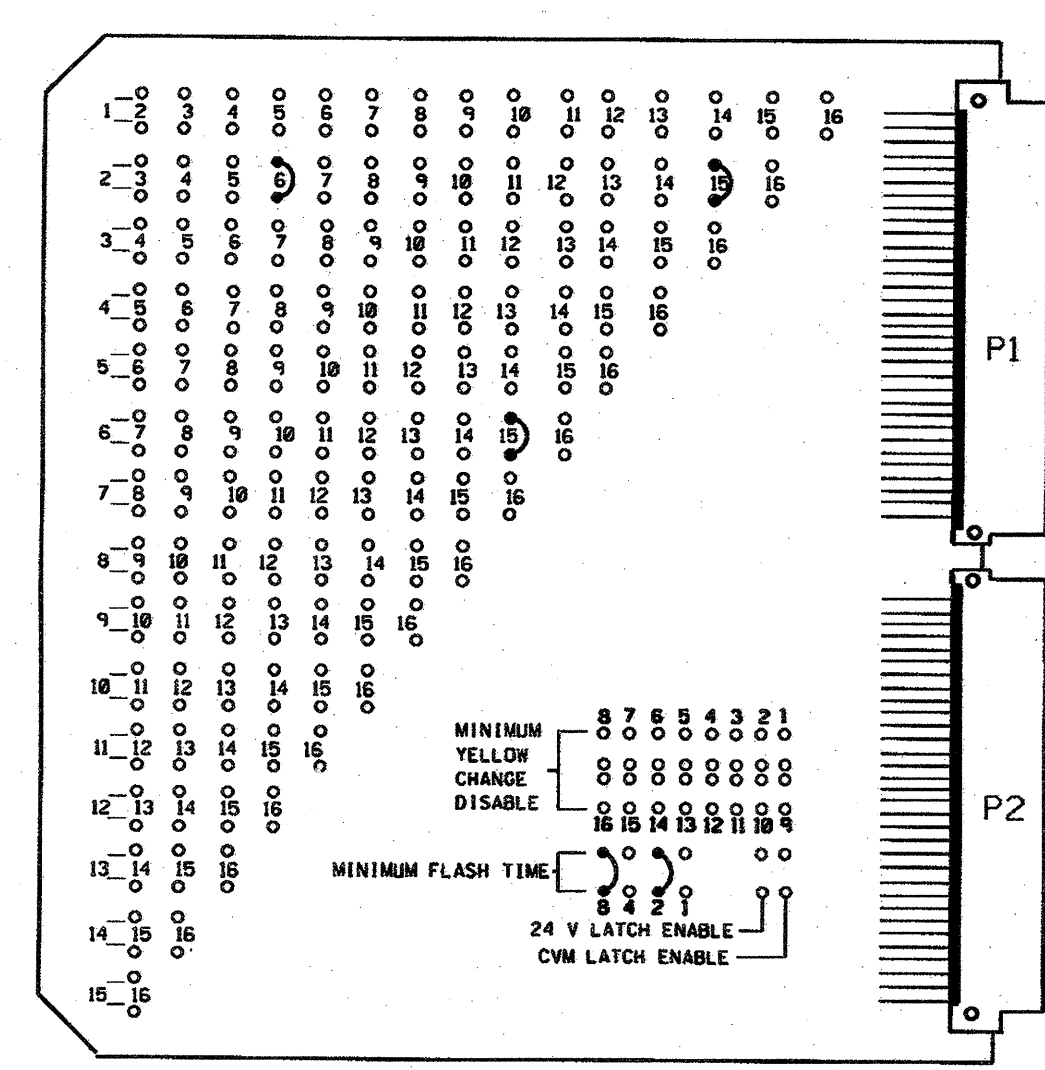
SIGNATURE: [Signature]

DATE: 6/10/12

SIG. INVENTORY NO. 09-02441

EDI MODEL MMU-16LE MALFUNCTION MANAGEMENT UNIT PROGRAMMING DETAIL

(program card and tables as shown below)



MMU PROGRAMMING CARD

FIELD CHECK ENABLE	
CHANNEL NUMBER	ENABLE/DISABLE
1	DISABLE
2	ENABLE
3	ENABLE
4	ENABLE
5	DISABLE
6	ENABLE
7	DISABLE
8	DISABLE
9	DISABLE
10	DISABLE
11	DISABLE
12	DISABLE
13	DISABLE
14	DISABLE
15	ENABLE
16	DISABLE

UNIT OPTIONS	
OPTION	SETTING
RECURRENT PULSE	ON
WALK DISABLE	OFF
LOG CVM FAULTS	ON
EXTERN WATCHDOG	OFF
24V-2=12VDC	OFF
PGM CARD MEMORY	ON
LEDgaurd	ON
FORCE TYPE 16	OFF
TYPE12-SDLC	OFF

FLASHING YELLOW ARROW	
CH. GROUP FOR PROTECTED GREEN ARROWS	CH. 1,3,5,7
ENABLE CHANNEL PAIR, FYA	
CH 1-13	OFF
CH 3-14	OFF
CH 5-15	OFF
CH 7-16	OFF

MMU PROGRAMMING NOTE
1. ENSURE YELLOW CHANGE PLUS RED CLEARANCE MONITORING IS ENABLED FOR ALL CHANNELS.

- #### NOTES
1. To prevent "Flash-conflict" problems, wire all unused load switches to flash red. Verify that signal heads flash in accordance with the signal plans.
 2. To prevent red failures on unused monitor channels, tie unused load switch red outputs 1,3,5,7,8,9,10,11,12,13, 14, and 16 to load switch AC+ by inserting a jumper plug in the unused load switch socket from pin 1 (LS AC+) to pin 3 (red out). Make sure all flash transfer relays are in place.
 3. Program controller to start up in phases 2 and 6 green.
 4. Set power-up flash time to 10 seconds and implement on the Malfunction Management Unit. Set controller power-up flash time to 0 seconds.
 5. Enable simultaneous gap-out feature, on controller unit, for all phases.
 6. Program detectors in accordance with the manufacturer's instructions to accomplish the detection schemes shown on the signal design plans.
 7. Program detector call delay and extension timing on the controller, unless otherwise specified.
 8. Set all detector card unit channels to "presence" mode.
 9. Ensure optical detectors are wired for preempt inputs 3 and 4 as needed.
 10. This controller and cabinet are part of the Salisbury Signal System.

SIGNAL HEAD HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD	
SIGNAL HEAD NO.	NU	22,23	NU	42,43	NU	62,63	NU	NU	NU	NU	NU	NU	NU	NU	21*	NU	
RED		2R		4R		6R											
YELLOW		2Y		4Y		6Y											
GREEN		2G		4G		6G											
RED ARROW																15R	
YELLOW ARROW																	15Y
FLASHING YELLOW ARROW																	15G
GREEN ARROW																	

NU = Not Used
* See pictorial of head wiring detail below.

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

RACK #1	BIU	CH1	CH1	SLOT	CH1	SLOT	SLOT	SLOT	SLOT	CHA	SLOT	SLOT
		L3 Ø 4	L1 Ø 2		L5 Ø 6					EVP 3 Ø 2.6		
		CH2	CH2	EMPTY	CH2	EMPTY	EMPTY	EMPTY	EMPTY	CHB	EMPTY	EMPTY
		NOT USED	L2 Ø 2		NOT USED					EVP 4 Ø 2.6		

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
2A	L1A, L1B
2B	L2A, L2B
4A	L3A, L3B
NU	L4A, L4B
6A	L5A, L5B
NU	L6A, L6B
NU	L7A, L7B
NU	L8A, L8B
NU	L9A, L9B
NU	L10A, L10B
NU	L11A, L11B
NU	L12A, L12B
NU	L13A, L13B
NU	L14A, L14B
NU	L15A, L15B
NU	L16A, L16B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.
ASSIGN CONTROLLER SYSTEM DETECTORS TO LOCAL CONT. DET. NUMBERS AS SHOWN IN CHART BELOW

CONTROLLER SYS. DET. NO.	LOCAL CONT. DETECTOR NO.
1	
2	
3	
4	
5	
6	
7	
8	

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1	Ø 2		
2	Ø 2		
3	Ø 4	DELAY	3
4			
5	Ø 6		
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

EQUIPMENT INFORMATION

- CONTROLLER.....ECONOLITE ASC/2-2100
CABINET.....ECONOLITE TS2-TYPE 1 **NC-8A**
CABINET MOUNT.....BASE
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....2,4,6,15
PHASES USED.....2,4,6
OLA.....NOT USED
OLB.....NOT USED
OLC.....*
OLD.....NOT USED

* SEE SHEET 2 FOR ECONOLITE ASC/2 OVERLAP PROGRAMMING DETAIL

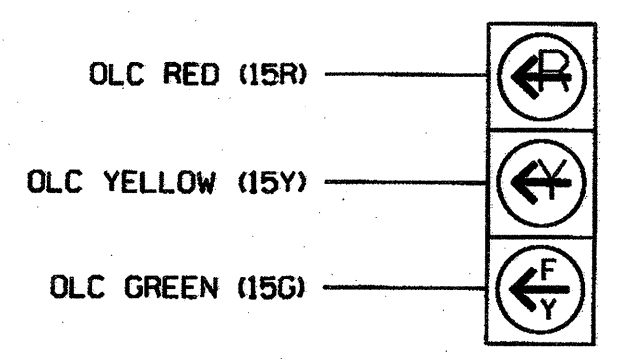
LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	Ø 1
2	Ø 2
3	Ø 3
4	Ø 4
5	Ø 5
6	Ø 6
7	Ø 7
8	Ø 8
9	Ø 2 PED
10	Ø 4 PED
11	Ø 6 PED
12	Ø 8 PED
13	OLA
14	OLB
15	OLC
16	OLD

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



21

NOTE
See Overlap Programming Details on sheet 2.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0244T
DESIGNED: May 2012
SEALED: 6/19/12
REVISED: N/A

Signal Upgrade - Temporary Design (TMP Phase III) - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 29-70/NC 150 (S. Main St.)
at
NC 150 (Mooresville Road)

Division 8 Rowan County Salisbury

PLAN DATE: June 2012 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS

REVISIONS	INIT.	DATE

Signature: John Rowe 6-20-12
DATE: 6-20-12

SIG. INVENTORY NO. 09-0244T

Prepared in the Office of: (Seal of North Carolina State Traffic Management System)

20-JUN-2012 09:34 S:\ITS\SSM\115 Signal\work\gr\sup\es1\g Man\mstr\con\090244-sm-8 (e,xxx).dgn

**ECONOLITE ASC/2-2100 OVERLAP
PROGRAMMING DETAIL**

(program controller as shown)

FROM MAIN MENU SELECT 2 (CONTROLLER) AND THEN 5 (OVERLAP DATA)

OVERLAP C

CONTROLLER OVERLAP DATA												
OVERLAP C	1	2	3	4	5	6	7	8	9	0	1	2
STANDARD . . . . .	.	X	.	.	.	.	.	.	.	.	.	.
PROTECTED . . . . .	.	.	.	.	.	.	.	.	.	.	.	.
PERMITTED . . . . .	.	.	.	.	.	.	.	.	.	.	.	.
ENABLE LAG . . . . .	.	.	.	.	.	.	.	.	.	.	.	.
ENABLE LEAD . . . . .	.	.	.	.	.	.	.	.	.	.	.	.
SPARE . . . . .	.	.	.	.	.	.	.	.	.	.	.	.
ADVANCE GREEN TIMER	0.0											
LAG/LEAD GREEN TIMER	0.0											
LAG/LEAD YELLOW TIMER	0.0											
LAG/LEAD RED TIMER	0.0											
ADDITIONAL PAGE(S)												

END OF OVERLAP PROGRAMMING

WRITE-PROTECT FOR FLASHING YELLOW ARROWS DETAIL

(program controller as shown below)

FROM MAIN MENU SELECT 8 (UTILITIES) AND THEN 9 (WRITE PROTECT DATA)

UTILITIES SUBMENU	
1. COPY	5. SIGN ON
2. MEMORY CLEAR	6. LOG BUFFERS
3. RESERVED	7. SEND D.M.
4. RESERVED	8. D.M. UTILS

PRESS KEYS 1..8 TO SELECT

WRITE PROTECT DATA

ADDRESS	1/9
008-00F	40

ECONOLITE ASC/2070 SPECIAL MMU PROGRAMMING

(program controller as shown below)

CONFIGURATION SUBMENU	
1. CONTROLLER SEQUENCE	6. PORT 3
2. PHASES IN USE	7. ENABLE LOGGING
3. PH TO LS ASSIGNMENT	8. OPTIONS
4. SDLC OPTIONS	9. MMU PROGRAM
5. PORT 2	

PRESS KEYS 1..9 TO SELECT

MMU PROGRAM															
CAN SERVE WITH:															
CHANNEL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2
2	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
6	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

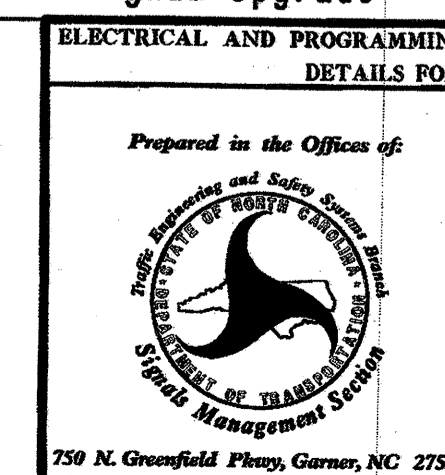
END OF SUBMENU

CAUTION!

SET INTERSECTION TO FLASH BEFORE ATTEMPTING TO ENTER OR CHANGE ANY MMU PROGRAMMING DATA. THIS PROGRAMMING AND THAT OF THE MMU PROGRAMMING CARD MUST MATCH EXACTLY. IF THEY DO NOT, THE INTERSECTION WILL BE PLACED INTO FLASH.

Signal Upgrade - Temporary Design (TMP Phase III) - Sheet 2 of 3

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0244T
DESIGNED: May 2012
SEALED: 6/19/12
REVISED: N/A



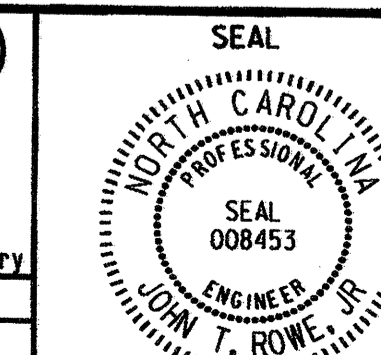
**US 29-70/NC 150 (S. Main St.)
at
NC 150 (Mooresville Road)**

Division 9 Rowan County Salisbury

PLAN DATE: June 2012 REVIEWED BY: JTK

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE



John T. Rowley 6-20-12
SIGNATURE DATE

SIG. INVENTORY NO. 09-0244T



**ECONOLITE ASC/2-1000 EMERGENCY VEHICLE
PREEMPTOR PROGRAMMING DETAIL**

(program controller as shown below)

EVP 3:

PREEMPTOR SUBMENU	
1. PRIORITY PMT 1	5. PRIORITY PMT 5
2. PRIORITY PMT 2	6. PRIORITY PMT 6
3. PRIORITY PMT 3	7. BUS PREEMPTORS
4. PRIORITY PMT 4	

PRIORITY PREEMPTOR 3	
PHASE.....	1 2 3 4 5 6 7 8 9 0 1 2
TERM PHASE OVLP	
TRK CLR PHASE..	
HOLD PHASES....	X . . . X
EXIT PHASES....	
EXIT CALLS....	
TERM OVERLAP... A:	B: . C: . D: .
ACTIVE.....YES	PED DARK..... NO
PRIORITY..... NO	PED ACTIVE..... NO
DET LOCK.....YES	ZERO PC TIME... NO
HOLD FLASH..... NO	PC THRU YELLOW. NO
TERM OVLP ASAP. NO	TERM PHASES.... NO
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 3	
DON'T OVERRIDE FLASH.....	.
FLASH ALL OUTPUTS.....	.
YELLOW-RED GOES GREEN....	.
ENABLE MAX PREEMPT TIME..	.
ACTIVE ONLY DURING HOLD..	.
NO CVM IN FLASH.....	.
FAST FLASH GRN ON HOLD...	.
OUT OF FLASH.....	GREEN
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 3	
MAX TIME.....	0 DURATION TIME.. 0
MIN HOLD TIME. 10	DELAY TIME..... 0
MIN PED CLEAR. 0	INHIBIT TIME... 0
EXIT MAX.....	0 HLD DELAY TIME. 0
	GRN YEL RED
MINIMUM.....	1 0.0 0.0
TRACK CLEAR...	0 0.0 0.0
HOLD.....	0.0 0.0
LINKED PREEMPTOR.....	0
END OF SUBMENU	

EVP 4:

PREEMPTOR SUBMENU	
1. PRIORITY PMT 1	5. PRIORITY PMT 5
2. PRIORITY PMT 2	6. PRIORITY PMT 6
3. PRIORITY PMT 3	7. BUS PREEMPTORS
4. PRIORITY PMT 4	

PRIORITY PREEMPTOR 4	
PHASE.....	1 2 3 4 5 6 7 8 9 0 1 2
TERM PHASE OVLP	
TRK CLR PHASE..	
HOLD PHASES....	X . . . X
EXIT PHASES....	
EXIT CALLS....	
TERM OVERLAP... A:	B: . C: . D: .
ACTIVE.....YES	PED DARK..... NO
PRIORITY..... NO	PED ACTIVE..... NO
DET LOCK.....YES	ZERO PC TIME... NO
HOLD FLASH..... NO	PC THRU YELLOW. NO
TERM OVLP ASAP. NO	TERM PHASES.... NO
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 4	
DON'T OVERRIDE FLASH.....	.
FLASH ALL OUTPUTS.....	.
YELLOW-RED GOES GREEN....	.
ENABLE MAX PREEMPT TIME..	.
ACTIVE ONLY DURING HOLD..	.
NO CVM IN FLASH.....	.
FAST FLASH GRN ON HOLD...	.
OUT OF FLASH.....	GREEN
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 4	
MAX TIME.....	0 DURATION TIME.. 0
MIN HOLD TIME. 10	DELAY TIME..... 0
MIN PED CLEAR. 0	INHIBIT TIME... 0
EXIT MAX.....	0 HLD DELAY TIME. 0
	GRN YEL RED
MINIMUM.....	1 0.0 0.0
TRACK CLEAR...	0 0.0 0.0
HOLD.....	0.0 0.0
LINKED PREEMPTOR.....	0
END OF SUBMENU	

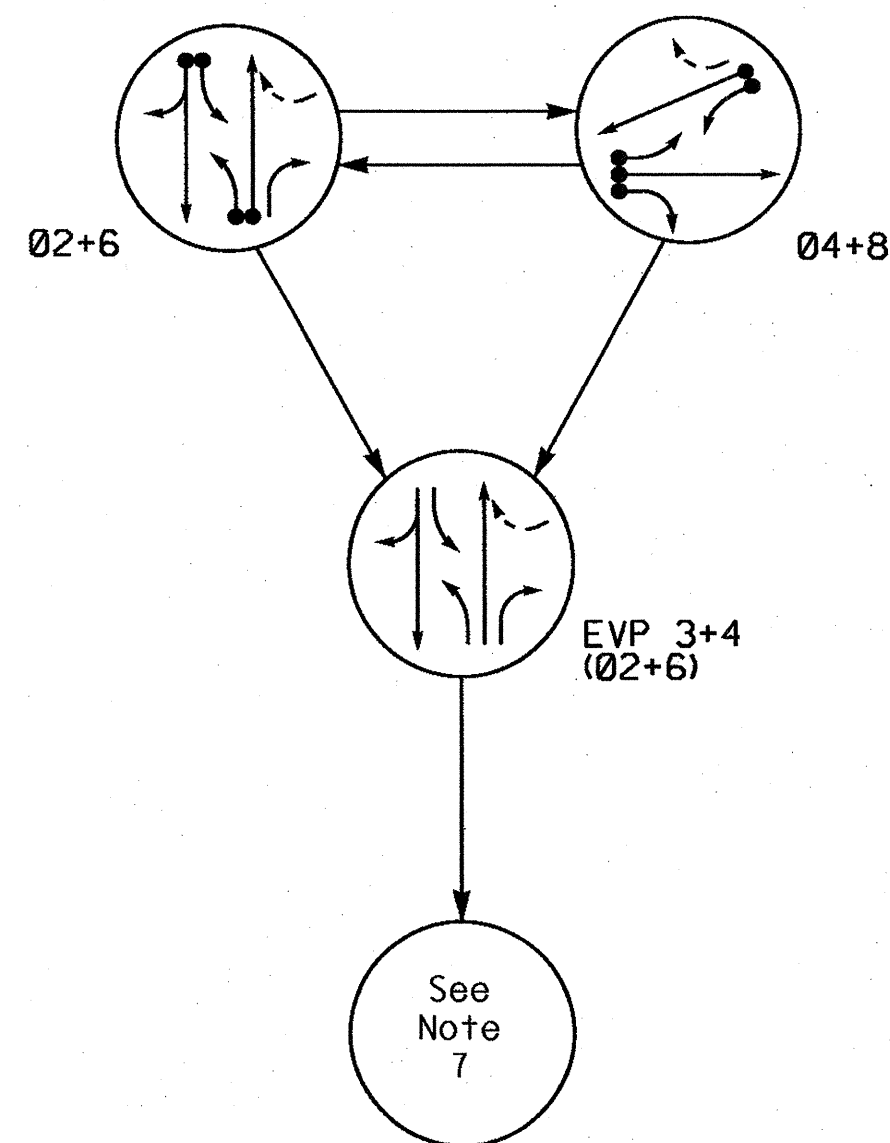
PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0244T
DESIGNED: May 2012
SEALED: 6/19/12
REVISED: N/A

Signal Upgrade - Temporary Design (TMP Phase III) - Sheet 3 of 3

	US 29-70/NC 150 (S. Main St.) at NC 150 (Mooreville Road)	
	Division 9 PLAN DATE: June 2012 PREPARED BY: S. Armstrong	Rowan County Salisbury REVIEWED BY: JTR REVIEWED BY:
REVISIONS INIT. DATE	SIGNATURE DATE	SEAL INVENTORY NO. 09-0244T

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

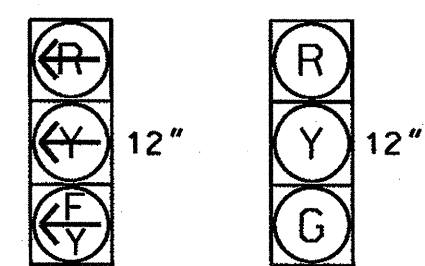
TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+6	04+8	EVP 3+4 (02+6)	PEDESTRIAN
21	F	R	F	Y
22, 23	G	R	G	Y
41	F	F	R	R
42, 43	R	G	R	R
61	F	R	F	Y
62, 63	G	R	G	Y
81	R	F	R	R
82, 83	R	G	R	R

F = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



- 21 22, 23
- 41 42, 43
- 61 62, 63
- 81 82, 83

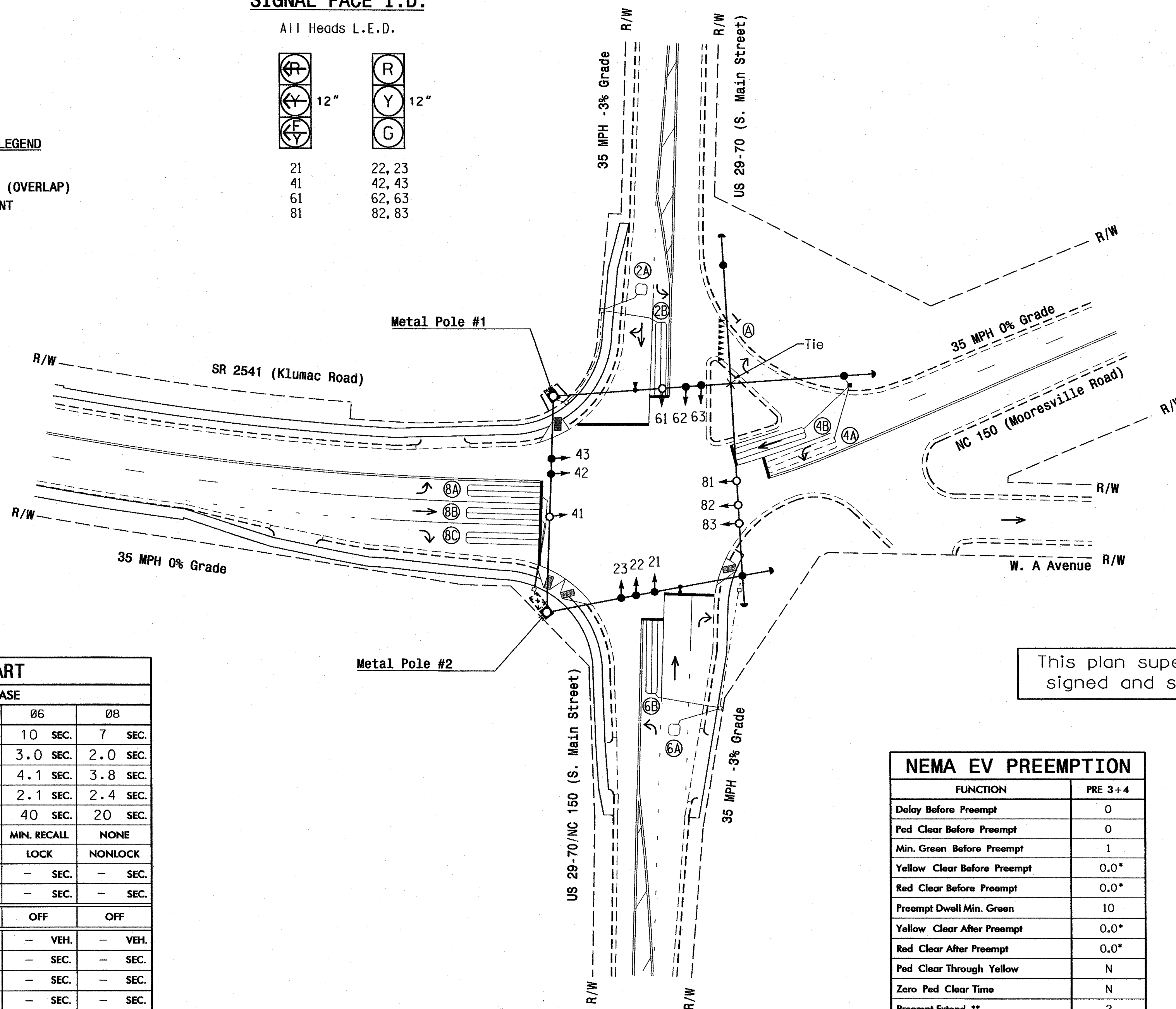
NEMA LOOP & DETECTOR INSTALLATION CHART
with TS-2 CABINET

LOOP NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	TURNS	INDUCTIVE LOOPS		DETECTOR UNITS		TIMING FEATURE	TIMING TIME	INHIBIT DELAY DURING GREEN#	
				NEW	EXISTING	NEW	EXISTING				
2A	6X6	70	3	X	-	2	-	X	-	-	NO
2B	6X40	0	2-4-2	X	-	2	X	-	-	-	NO
4A	6X40	0	2-4-2	-	X	4	-	X	DELAY	3	YES
4B	6X40	0	2-4-2	X	-	4	X	-	-	-	NO
6A	6X6	70	3	X	-	6	-	X	-	-	NO
6B	6X40	0	2-4-2	X	-	6	-	X	-	-	NO
8A	6X40	0	2-4-2	X	-	8	X	-	DELAY	3	YES
8B	6X40	0	2-4-2	X	-	8	X	-	-	-	NO
8C	6X40	0	2-4-2	X	-	8	X	-	DELAY	15	YES

**2 Phase
W/ Emergency Vehicle Preemption
Fully Actuated
(Salisbury Signal System)**

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.
- Program phase 4 and phase 8 for dual entry.
- Reposition existing signal heads numbered 42 and 43.
- Set all detector units to presence mode.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Upon completion of Emergency Vehicle Preemption, controller returns to normal operation based on vehicle demand.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



This plan supersedes the plan signed and sealed on 6/19/12.

NEMA TIMING CHART

FEATURE	PHASE			
	02	04	06	08
MINIMUM GREEN *	10 SEC.	7 SEC.	10 SEC.	7 SEC.
PASSAGE/GAP *	3.0 SEC.	2.0 SEC.	3.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	4.1 SEC.	3.8 SEC.	4.1 SEC.	3.8 SEC.
RED CLEARANCE	2.1 SEC.	2.4 SEC.	2.1 SEC.	2.4 SEC.
MAX. I *	40 SEC.	20 SEC.	40 SEC.	20 SEC.
RECALL POSITION	MIN. RECALL	NONE	MIN. RECALL	NONE
VEHICLE CALL MEMORY	LOCK	NONLOCK	LOCK	NONLOCK
WALK *	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	- SEC.
VOLUME DENSITY	OFF	OFF	OFF	OFF
ACTUATION B4 ADD *	- VEH.	- VEH.	- VEH.	- VEH.
SEC. PER ACTUATION *	- SEC.	- SEC.	- SEC.	- SEC.
MAX. INITIAL *	- SEC.	- SEC.	- SEC.	- SEC.
TIME B4 REDUCTION *	- SEC.	- SEC.	- SEC.	- SEC.
TIME TO REDUCE *	- SEC.	- SEC.	- SEC.	- SEC.
MINIMUM GAP	- SEC.	- SEC.	- SEC.	- SEC.

* 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.

NEMA EV PREEMPTION

FUNCTION	PRE 3+4
Delay Before Preempt	0
Ped Clear Before Preempt	0
Min. Green Before Preempt	1
Yellow Clear Before Preempt	0.0*
Red Clear Before Preempt	0.0*
Preempt Dwell Min. Green	10
Yellow Clear After Preempt	0.0*
Red Clear After Preempt	0.0*
Ped Clear Through Yellow	N
Zero Ped Clear Time	N
Preempt Extend **	2

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

LEGEND

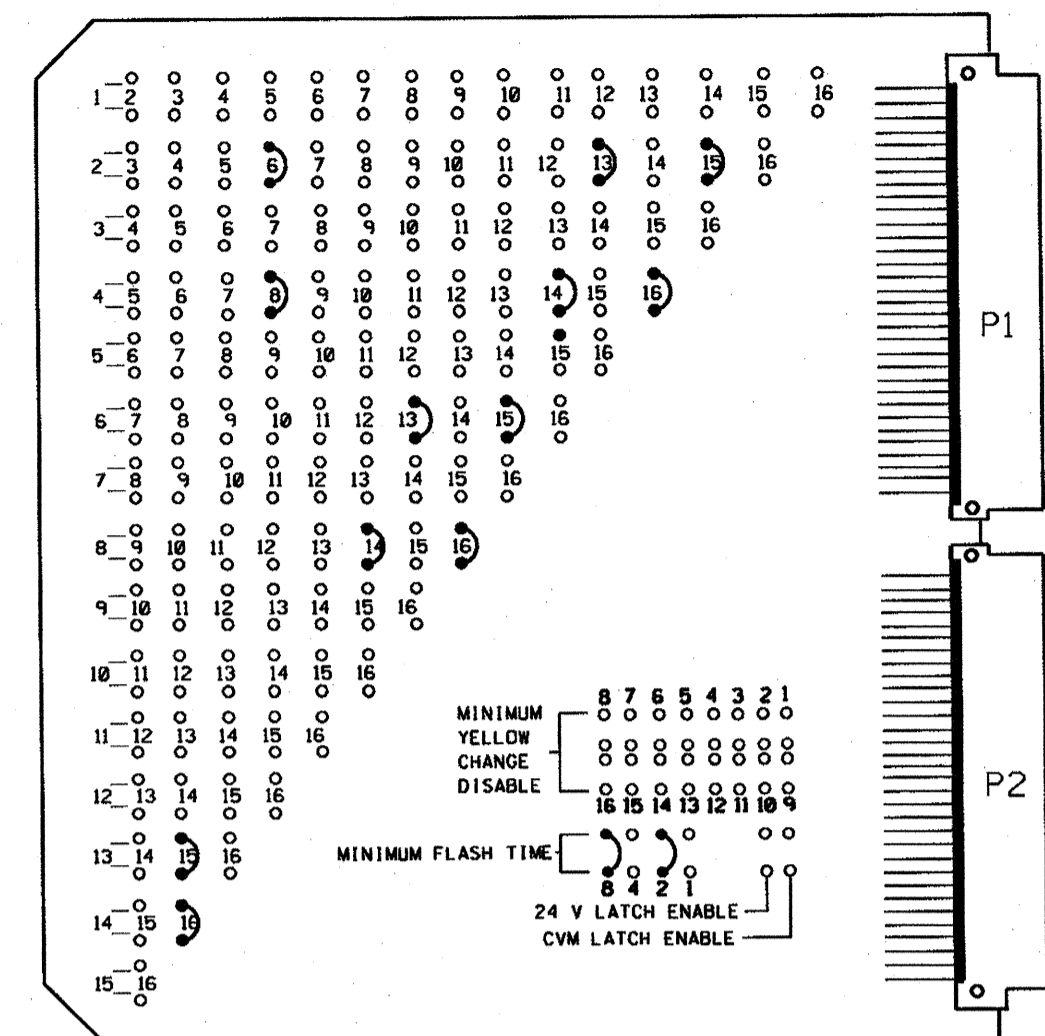
PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	N/A
○ → Pedestrian Signal Head	N/A
○ → Signal Pole with Guy	○ → Signal Pole with Guy
○ → Inductive Loop Detector	○ → Inductive Loop Detector
○ → Controller & Cabinet	○ → Controller & Cabinet
○ → Junction Box	○ → Junction Box
○ → 2-in Underground Conduit	○ → 2-in Underground Conduit
N/A → Right of Way	N/A → Right of Way
○ → Directional Arrow	○ → Directional Arrow
○ → Metal Strain Pole	○ → Metal Strain Pole
○ → Opticom Detector	○ → Opticom Detector
○ → Signal Pedestal	○ → Signal Pedestal
○ → Curb Ramp	○ → Curb Ramp
○ → "YIELD" Sign (R1-2)	○ → "YIELD" Sign (R1-2)

Signal Upgrade - Final Design (TMP Phase IV)

Prepared To the Office of:

US 29-70/NC 150 (S. Main Street) at NC 150 (Mooresville Road)/ SR 2541 (Klumac Road)
 Division 9 Rowan County Salisbury
 PLAN DATE: May 2012 REVIEWED BY:
 PREPARED BY: R. Hough REVIEWED BY:
 SCALE: 1" = 40'
 REVISIONS: INIT. DATE
 Signature:
 Date: 7/12/12
 Sig. Inventory No. 09-0244

**EDI MODEL MMU-16LE
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**
(program card and tables as shown below)



MMU PROGRAMMING CARD

CHANNEL NUMBER	ENABLE/DISABLE
1	DISABLE
2	ENABLE
3	DISABLE
4	ENABLE
5	DISABLE
6	ENABLE
7	DISABLE
8	ENABLE
9	DISABLE
10	DISABLE
11	DISABLE
12	DISABLE
13	ENABLE
14	ENABLE
15	ENABLE
16	ENABLE

OPTION	SETTING
RECURRENT PULSE	ON
WALK DISABLE	OFF
LOG CVM FAILTS	ON
EXTERN WATCHDOG	OFF
24V-212VDC	OFF
PCM CARD MEMORY	ON
LEDguard	ON
FORCE TYPE 16	OFF
TYPE12-SDLC	OFF

CH. GROUP FOR PROTECTED GREEN ARROWS	CH. 1,3,5,7
ENABLE CHANNEL PAIR, FYA	
CH 1-13	OFF
CH 3-14	OFF
CH 5-15	OFF
CH 7-16	OFF

MMU PROGRAMMING NOTE
1. ENSURE YELLOW CHANGE PLUS RED CLEARANCE MONITORING IS ENABLED FOR ALL CHANNELS.

NOTES

- To prevent "Flash-conflict" problems, wire all unused load switches to flash red. Verify that signal heads flash in accordance with the signal plans.
- To prevent red failures on unused monitor channels, tie unused load switch red outputs 1,3,5,7,9,10,11, and 12 to load switch AC+ by inserting a jumper plug in the unused load switch socket from pin 1 (LS AC+) to pin 3 (red out). Make sure all flash transfer relays are in place.
- Program controller to start up in phases 2 and 6 green.
- Set power-up flash time to 10 seconds and implement on the Malfunction Management Unit. Set controller power-up flash time to 0 seconds.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program detectors in accordance with the manufacturer's instructions to accomplish the detection schemes shown on the signal design plans.
- Program detector call delay and extension timing on the controller, unless otherwise specified.
- Set all detector card unit channels to "presence" mode.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Ensure optical detectors are wired for preempt inputs 3 and 4 as needed.
- This controller and cabinet are part of the Salisbury Signal System.

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	NU	22,23	NU	42,43	NU	62,63	NU	82,83	NU	NU	NU	NU	61★	81★	21★	41★
RED		2R		4R		6R		8R								
YELLOW		2Y		4Y		6Y		8Y								
GREEN		2G		4G		6G		8G								
RED ARROW													13R	14R	15R	16R
YELLOW ARROW													13Y	14Y	15Y	16Y
FLASHING YELLOW ARROW													13G	14G	15G	16G
GREEN ARROW																
Hand icon																
Person icon																

NU = Not Used
★ See pictorial of head wiring detail below.

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

RACK #1	BIU				SLOT	SLOT	SLOT	CHA	SLOT	SLOT
	CH1	CH1	CH1	CH1						
	L3	L1	L7	L5			EVP 3			
	∅ 4	∅ 2	∅ 8	∅ 6			∅ 2.6			
	CH2	CH2	CH2	CH2	EMPTY	EMPTY	CHB	EMPTY	EMPTY	EMPTY
	L4	L2	L8	L6						
	∅ 4	∅ 2	∅ 8	∅ 6			EVP 4			
					NOT USED		∅ 2.6			

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
2A	L1A.L1B
2B	L2A.L2B
4A	L3A.L3B
4B	L4A.L4B
6A	L5A.L5B
6B	L6A.L6B
8A	L7A.L7B
8B	L8A.L8B
8C	L9A.L9B
NU	L10A.L10B
NU	L11A.L11B
NU	L12A.L12B
NU	L13A.L13B
NU	L14A.L14B
NU	L15A.L15B
NU	L16A.L16B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

ASSIGN CONTROLLER SYSTEM DETECTORS TO LOCAL CONT. DET. NUMBERS AS SHOWN IN CHART BELOW

CONTROLLER SYS. DET. NO.	LOCAL CONT. DETECTOR NO.
1	
2	
3	
4	
5	
6	
7	
8	

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1	∅ 2		
2	∅ 2		
3	∅ 4	DELAY	3
4	∅ 4		
5	∅ 6		
6	∅ 6		
7	∅ 8	DELAY	3
8	∅ 8		
9	∅ 8	DELAY	15
10			
11			
12			
13			
14			
15			
16			

EQUIPMENT INFORMATION

CONTROLLER.....ECONOLITE ASC/2-2100
 CABINETECONOLITE TS2-TYPE 1 **NC-8A**
 CABINET MOUNT.....BASE
 LOADBAY POSITIONS.....16
 LOAD SWITCHES USED.....2,4,6,8,13,14,15,16
 PHASES USED.....2,4,6,8
 OLA.....*
 OLB.....*
 OLC.....*
 OLD.....*

* SEE SHEET 2 FOR ECONOLITE ASC/2 OVERLAP PROGRAMMING DETAIL

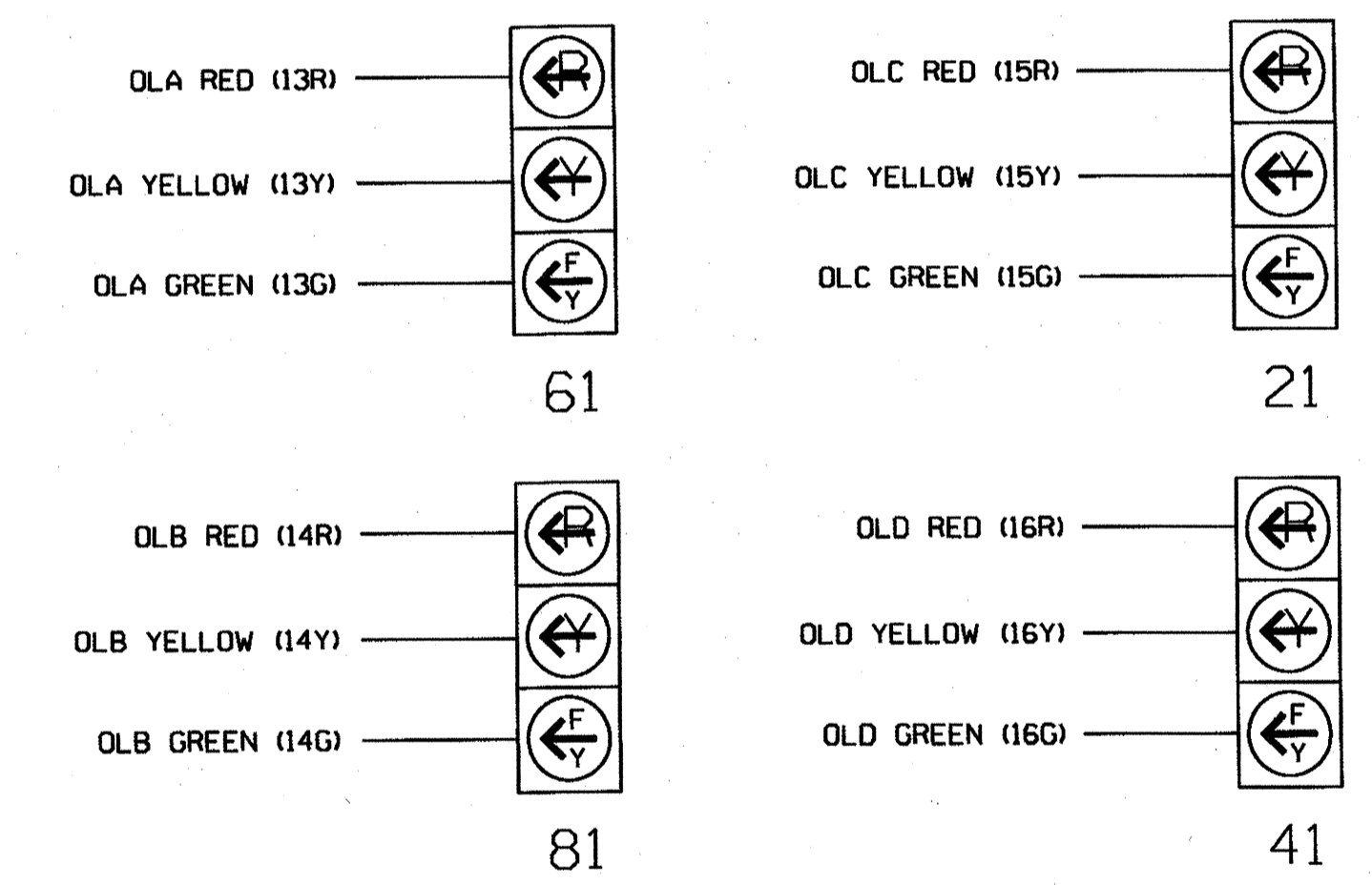
LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	∅ 2 PED
10	∅ 4 PED
11	∅ 6 PED
12	∅ 8 PED
13	OLA
14	OLB
15	OLC
16	OLD

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE
See Overlap Programming Details on sheet 2.

**THIS ELECTRICAL DETAIL SUPERSEDES THE
DETAIL ORIGINALLY SEALED ON 6-20-12.**

Signal Upgrade - Final Design (TMP Phase IV) - Sheet 1 of 3

Electrical and Programming Details For: **US 29-70/NC 150 (S. Main St.)**
 at **NC 150 (Mooresville Road) / SR 2541 (Klumac Road)**
 Division 9 Rowan County Salisbury
 PLAN DATE: July 2012 REVIEWED BY: JTR
 PREPARED BY: S. Armstrong ENGINEER REVIEWED BY:
 REVISIONS INIT. DATE
 Signature: *S. Armstrong* 7-25-12
 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453
 750 N. Greenfield Place, Garner, NC 27529
 SIG. INVENTORY NO. 09-0244

25-JUL-2012 11:17
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 armstrong

ECONOLITE ASC/2-2100 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

FROM MAIN MENU SELECT 2 (CONTROLLER) AND THEN 5 (OVERLAP DATA)

OVERLAP A

CONTROLLER OVERLAP DATA												
OVERLAP A	1	2	3	4	5	6	7	8	9	0	1	1
STANDARD						X						
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG/LEAD GREEN TIMER	0.0											
LAG/LEAD YELLOW TIMER	0.0											
LAG/LEAD RED TIMER	0.0											
ADDITIONAL PAGE(S)												

OVERLAP B

CONTROLLER OVERLAP DATA												
OVERLAP B	1	2	3	4	5	6	7	8	9	0	1	1
STANDARD								X				
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG/LEAD GREEN TIMER	0.0											
LAG/LEAD YELLOW TIMER	0.0											
LAG/LEAD RED TIMER	0.0											
ADDITIONAL PAGE(S)												

OVERLAP C

CONTROLLER OVERLAP DATA												
OVERLAP C	1	2	3	4	5	6	7	8	9	0	1	1
STANDARD		X										
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG/LEAD GREEN TIMER	0.0											
LAG/LEAD YELLOW TIMER	0.0											
LAG/LEAD RED TIMER	0.0											
ADDITIONAL PAGE(S)												

OVERLAP D

CONTROLLER OVERLAP DATA												
OVERLAP D	1	2	3	4	5	6	7	8	9	0	1	1
STANDARD				X								
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG/LEAD GREEN TIMER	0.0											
LAG/LEAD YELLOW TIMER	0.0											
LAG/LEAD RED TIMER	0.0											
ADDITIONAL PAGE(S)												

END OF OVERLAP PROGRAMMING

WRITE-PROTECT FOR FLASHING YELLOW ARROWS DETAIL

(program controller as shown below)

FROM MAIN MENU SELECT 8 (UTILITIES) AND THEN 9 (WRITE PROTECT DATA)

UTILITIES SUBMENU	
1. COPY	5. SIGN ON
2. MEMORY CLEAR	6. LOG BUFFERS
3. RESERVED	7. SEND D.M.
4. RESERVED	8. D.M. UTILS

WRITE PROTECT DATA
ADDRESS 1/9
008-00F FO

PRESS KEYS 1..8 TO SELECT

ECONOLITE ASC/2070 SPECIAL MMU PROGRAMMING

(program controller as shown below)

CONFIGURATION SUBMENU	
1. CONTROLLER SEQUENCE	6. PORT 3
2. PHASES IN USE	7. ENABLE LOGGING
3. PH TO LS ASSIGNMENT	8. OPTIONS
4. SDLC OPTIONS	9. MMU PROGRAM
5. PORT 2	

PRESS KEYS 1..9 TO SELECT

MMU PROGRAM														
CAN SERVE WITH:														
CHANNEL	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CHANNEL	6	5	4	3	2	1	0	9	8	7	6	5	4	3
1														
2	X	X									X			
3														
4	X	X									X			
5														
6	X	X												
7														
8	X	X												
9														
10														
11														
12														
13	X													
14	X													
15														

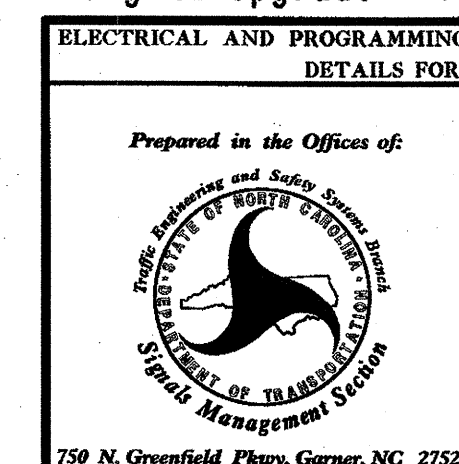
END OF SUBMENU

CAUTION!

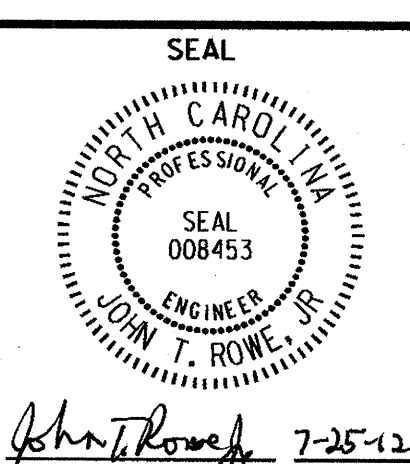
SET INTERSECTION TO FLASH BEFORE ATTEMPTING TO ENTER OR CHANGE ANY MMU PROGRAMMING DATA. THIS PROGRAMMING AND THAT OF THE MMU PROGRAMMING CARD MUST MATCH EXACTLY. IF THEY DO NOT, THE INTERSECTION WILL BE PLACED INTO FLASH.

THIS ELECTRICAL DETAIL SUPERSEDES THE DETAIL ORIGINALLY SEALED ON 6-20-12.

Signal Upgrade - Final Design (TMP Phase IV) - Sheet 2 of 3



ELECTRICAL AND PROGRAMMING DETAILS FOR:		US 29-70/NC 150 (S. Main St.)	
at		at	
NC 150 (Mooresville Road)/		SR 2541 (Klumac Road)	
Division 9	Rowan County	Salisbury	
PLAN DATE: July 2012	REVIEWED BY: JTR		
PREPARED BY: S. Armstrong	REVIEWED BY:		
REVISIONS	INIT.	DATE	



SIG. INVENTORY NO. 09-0244

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0244
DESIGNED: May 2012
SEALED: 7/12/12
REVISED: N/A

25-JUL-2012 11:17 C:\TSS\ASB\TSS\Sigs\work\p090244_sml\elc_xxx.dgn sarmstrong



**ECONOLITE ASC/2-1000 EMERGENCY VEHICLE
PREEMPTOR PROGRAMMING DETAIL**
(program controller as shown below)

EVP 3:

PREEMPTOR SUBMENU	
1. PRIORITY PMT 1	5. PRIORITY PMT 5
2. PRIORITY PMT 2	6. PRIORITY PMT 6
3. PRIORITY PMT 3	7. BUS PREEMPTORS
4. PRIORITY PMT 4	

PRIORITY PREEMPTOR 3	
PHASE.....	1 2 3 4 5 6 7 8 9 0 1 2
TERM PHASE OVLP	.....
TRK CLR PHASE..	.....
HOLD PHASES....	X . . . X
EXIT PHASES....	.....
EXIT CALLS....	.....
TERM OVERLAP... A:	B: . C: . D: .
ACTIVE.....YES	PED DARK..... NO
PRIORITY.....NO	PED ACTIVE..... NO
DET LOCK.....YES	ZERO PC TIME... NO
HOLD FLASH.... NO	PC THRU YELLOW. NO
TERM OVLP ASAP. NO	TERM PHASES.... NO
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 3	
DON'T OVERRIDE FLASH.....	.
FLASH ALL OUTPUTS.....	.
YELLOW-RED GOES GREEN....	.
ENABLE MAX PREEMPT TIME..	.
ACTIVE ONLY DURING HOLD..	.
NO CVM IN FLASH.....	.
FAST FLASH GRN ON HOLD...	.
OUT OF FLASH.....	GREEN
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 3			
MAX TIME.....	0	DURATION TIME..	0
MIN HOLD TIME.	10	DELAY TIME.....	0
MIN PED CLEAR.	0	INHIBIT TIME...	0
EXIT MAX.....	0	HLD DELAY TIME.	0
	GRN	YEL	RED
MINIMUM.....	1	0.0	0.0
TRACK CLEAR...	0	0.0	0.0
HOLD.....		0.0	0.0
LINKED PREEMPTOR.....	0		
END OF SUBMENU			

EVP 4:

PREEMPTOR SUBMENU	
1. PRIORITY PMT 1	5. PRIORITY PMT 5
2. PRIORITY PMT 2	6. PRIORITY PMT 6
3. PRIORITY PMT 3	7. BUS PREEMPTORS
4. PRIORITY PMT 4	

PRIORITY PREEMPTOR 4	
PHASE.....	1 2 3 4 5 6 7 8 9 0 1 2
TERM PHASE OVLP	.....
TRK CLR PHASE..	.....
HOLD PHASES....	X . . . X
EXIT PHASES....	.....
EXIT CALLS....	.....
TERM OVERLAP... A:	B: . C: . D: .
ACTIVE.....YES	PED DARK..... NO
PRIORITY.....NO	PED ACTIVE..... NO
DET LOCK.....YES	ZERO PC TIME... NO
HOLD FLASH.... NO	PC THRU YELLOW. NO
TERM OVLP ASAP. NO	TERM PHASES.... NO
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 4	
DON'T OVERRIDE FLASH.....	.
FLASH ALL OUTPUTS.....	.
YELLOW-RED GOES GREEN....	.
ENABLE MAX PREEMPT TIME..	.
ACTIVE ONLY DURING HOLD..	.
NO CVM IN FLASH.....	.
FAST FLASH GRN ON HOLD...	.
OUT OF FLASH.....	GREEN
ADDITIONAL PAGE(S)	

PRIORITY PREEMPTOR 4			
MAX TIME.....	0	DURATION TIME..	0
MIN HOLD TIME.	10	DELAY TIME.....	0
MIN PED CLEAR.	0	INHIBIT TIME...	0
EXIT MAX.....	0	HLD DELAY TIME.	0
	GRN	YEL	RED
MINIMUM.....	1	0.0	0.0
TRACK CLEAR...	0	0.0	0.0
HOLD.....		0.0	0.0
LINKED PREEMPTOR.....	0		
END OF SUBMENU			

**THIS ELECTRICAL DETAIL SUPERSEDES THE
DETAIL ORIGINALLY SEALED ON 6-20-12.**

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0244
DESIGNED: May 2012
SEALED: 7/12/12
REVISED: N/A

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

Signal Upgrade - Final Design (TMP Phase IV) - Sheet 3 of 3

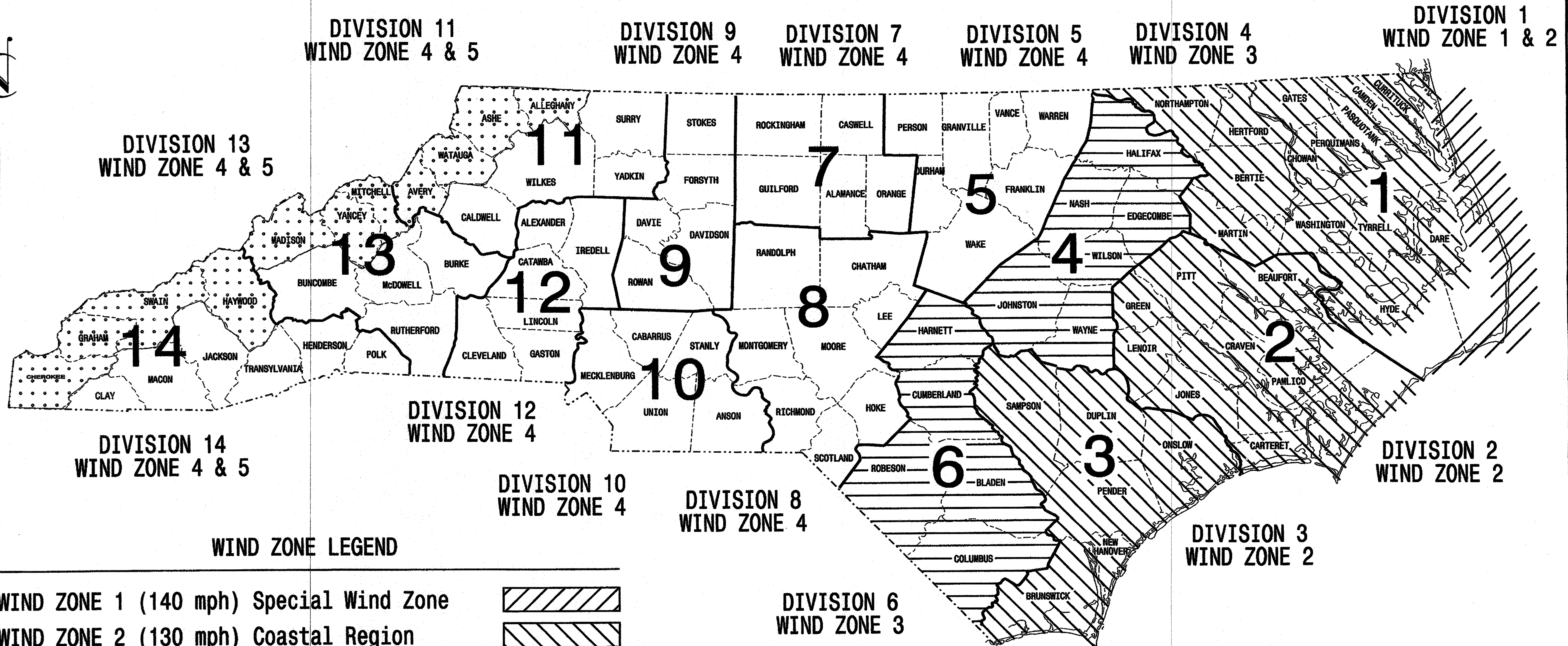
	ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 29-70/NC 150 (S. Main St.) at NC 150 (Mooresville Road)/ SR 2541 (Klumac Road)	
	Division 9 PLAN DATE: July 2012 PREPARED BY: S. Armstrong	Rowan County REVIEWED BY: JTR REVIEWED BY:	Salisbury DATE:
	REVISIONS	INIT.	DATE
	Signature: <i>John T. Rowe</i> 7-25-12 DATE:		SIG. INVENTORY NO. 09-0244

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STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	U-3459	Sig.13
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

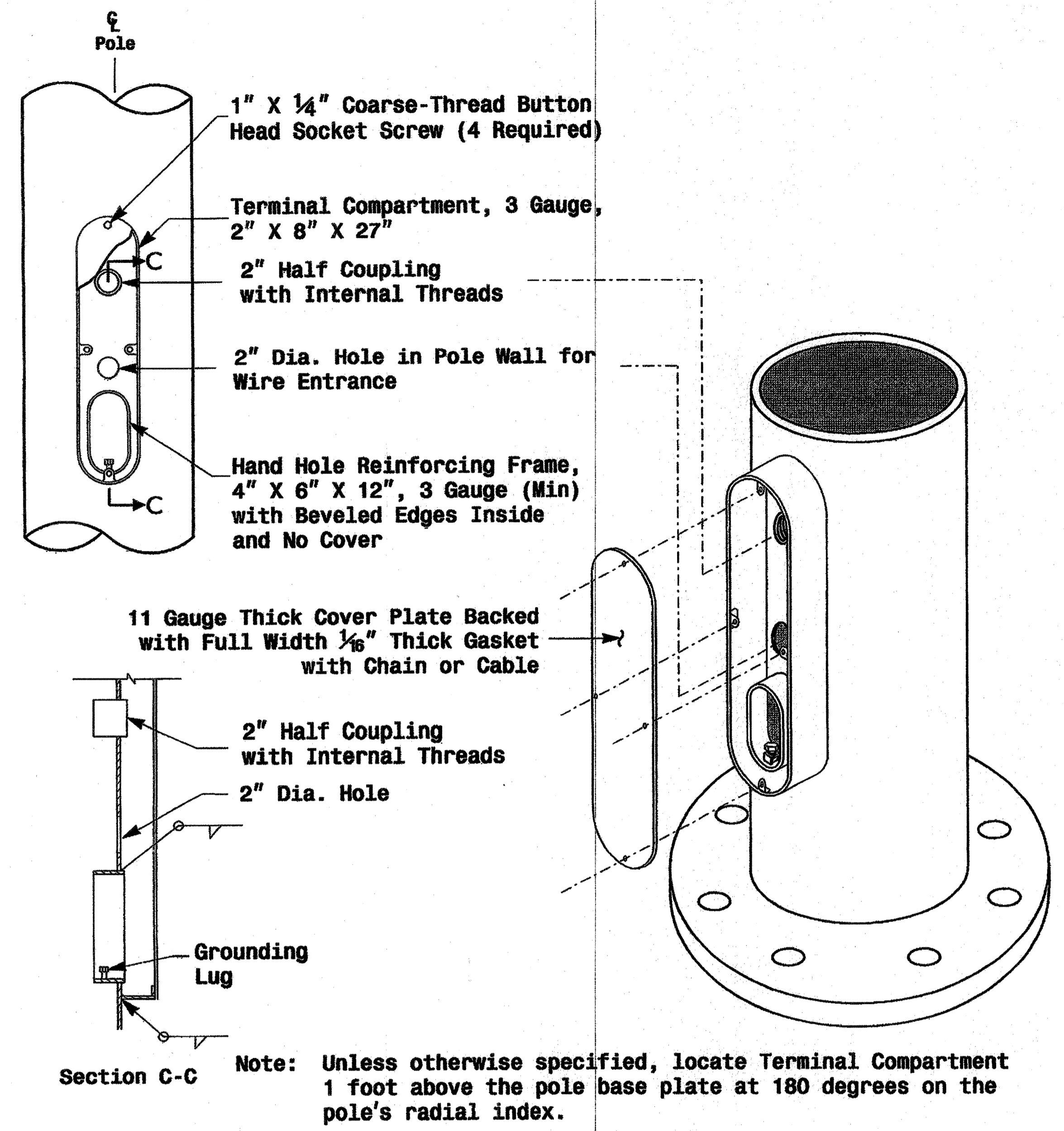
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

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

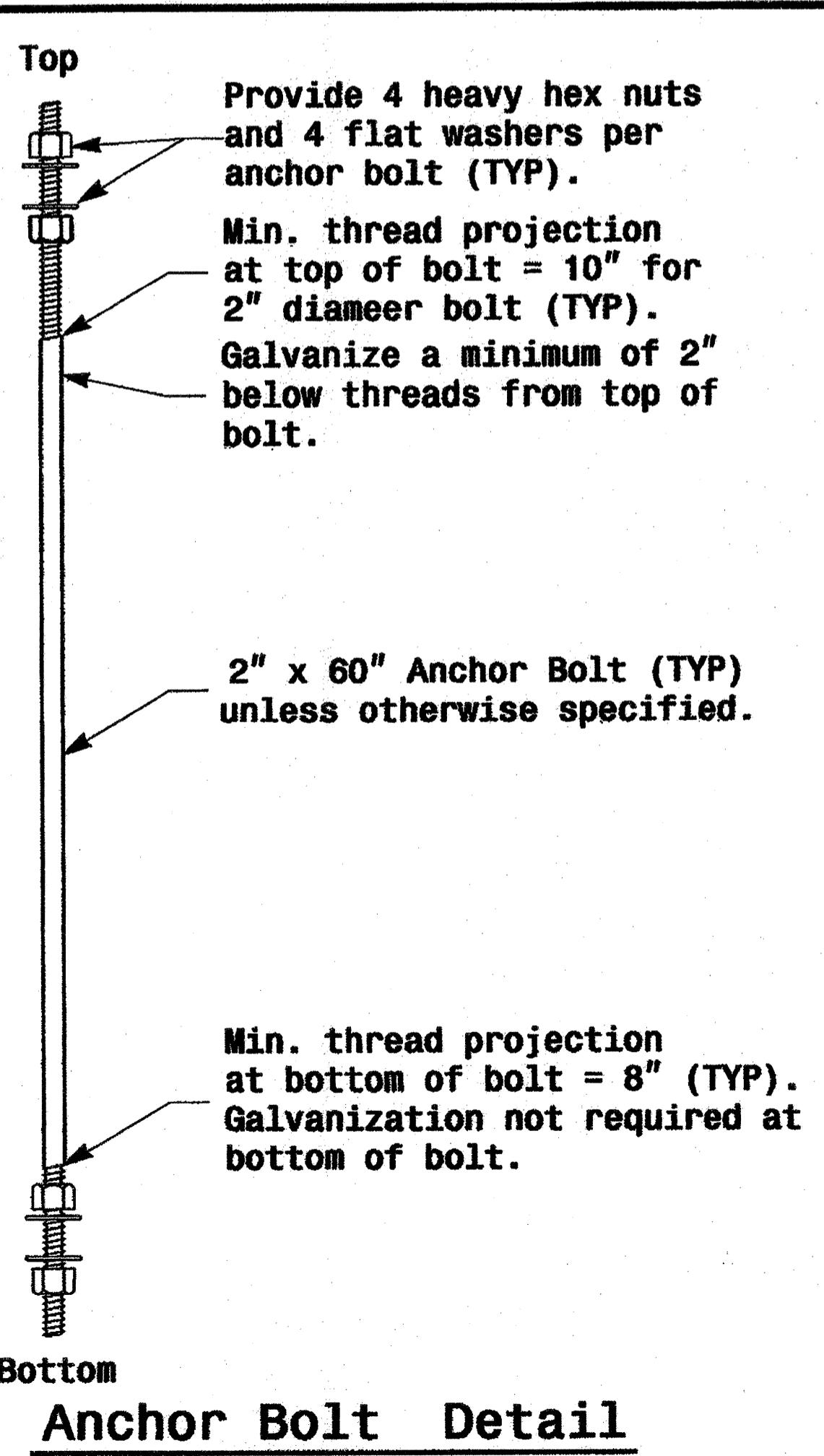
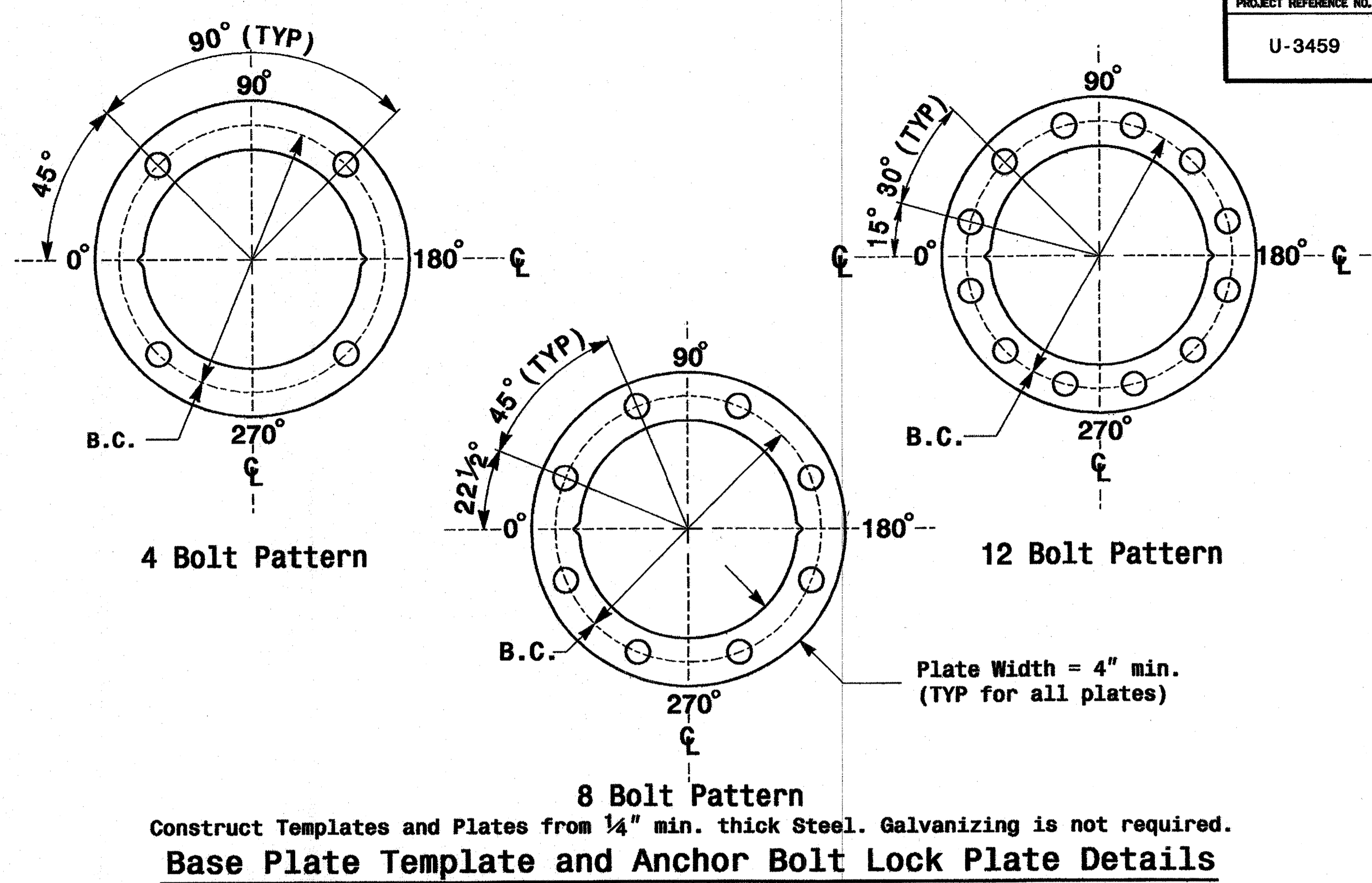
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7.21.2009
SIGNATURE DATE

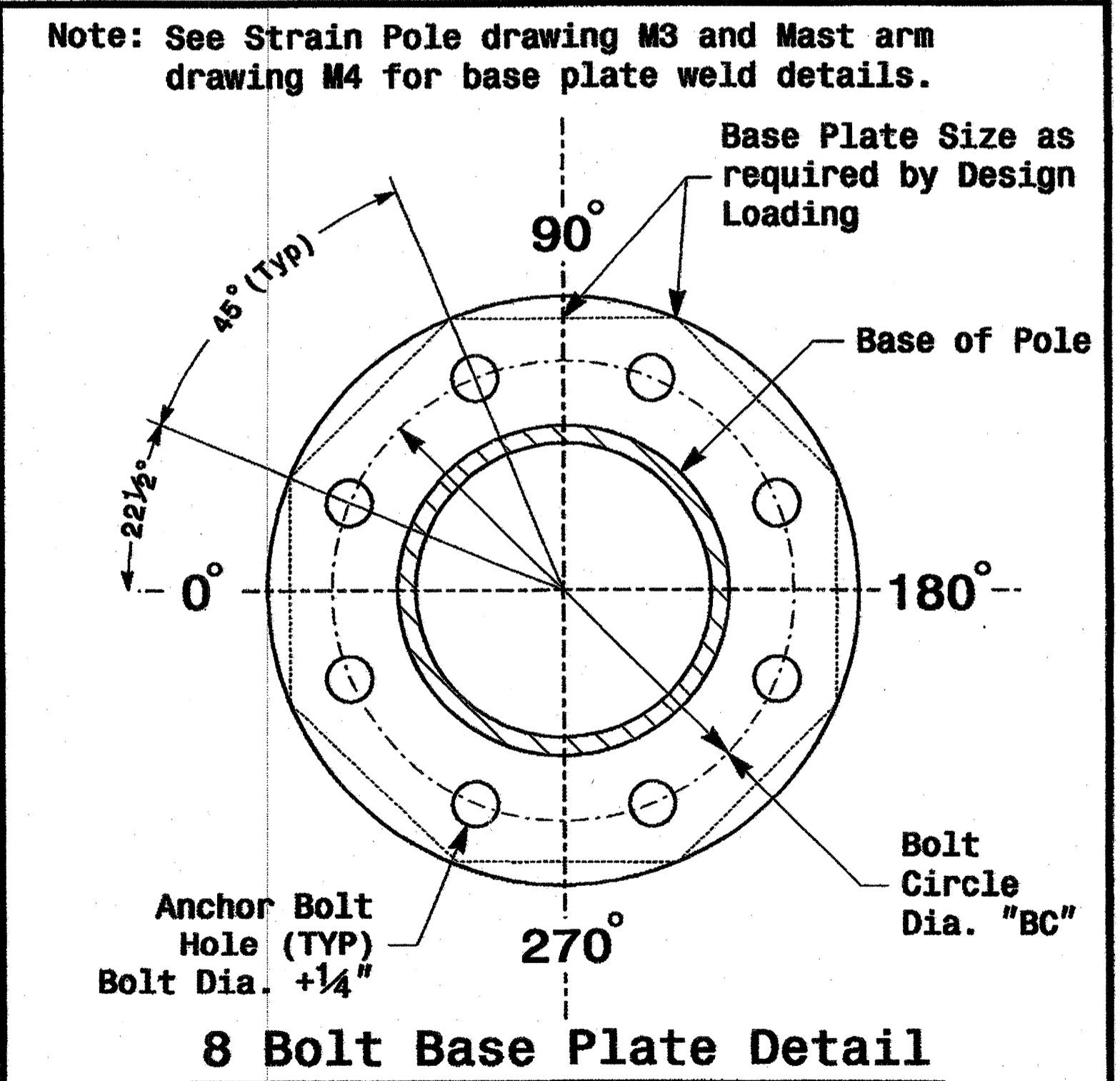


Terminal Compartment Detail

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



Anchor Bolt Detail



8 Bolt Base Plate 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)

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)

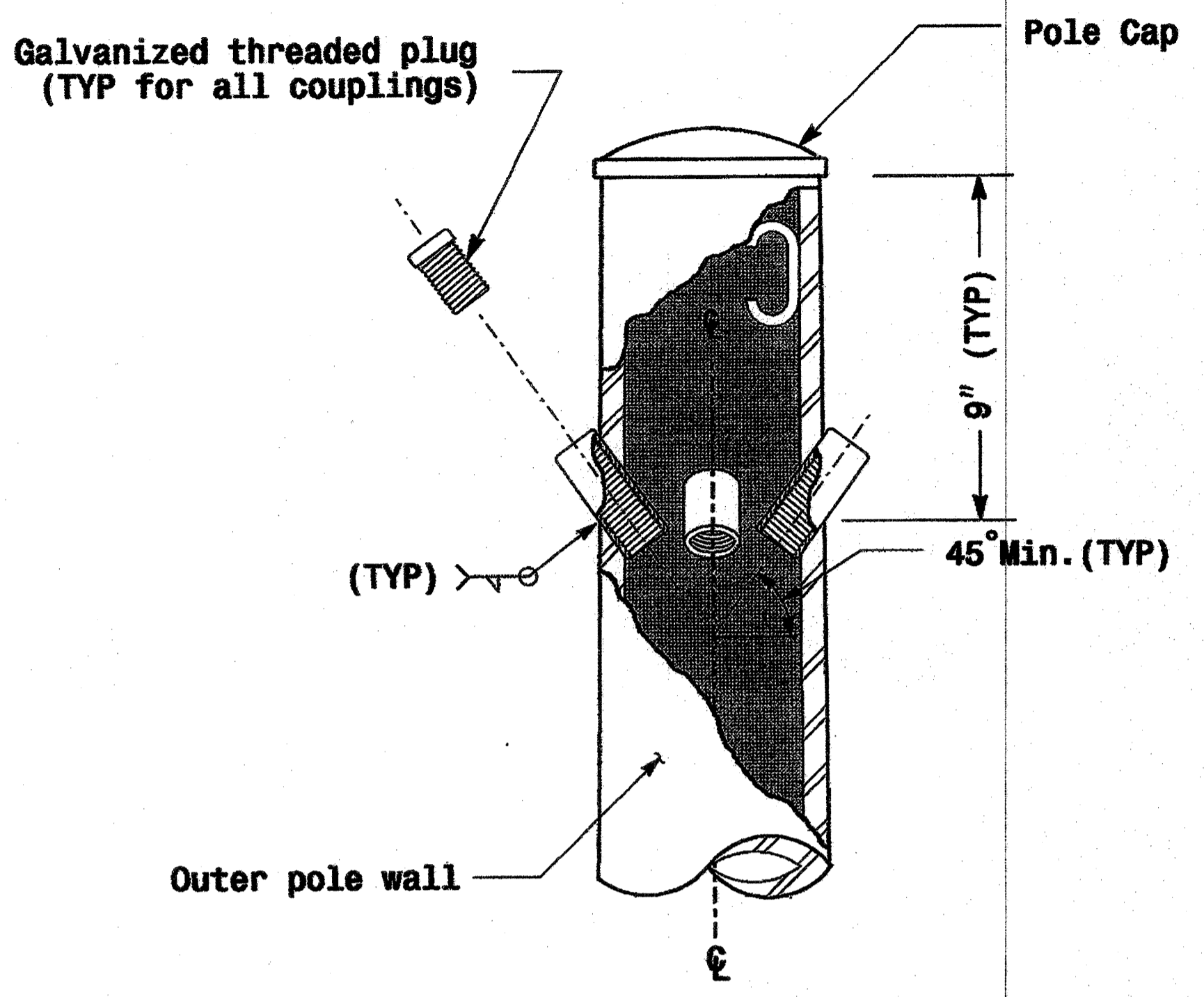
- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
 - 2) A.B. = Anchor Bolt
 - 3) B.C. = Bolt Circle of Anchor Bolts
 - 4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
 - 5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details

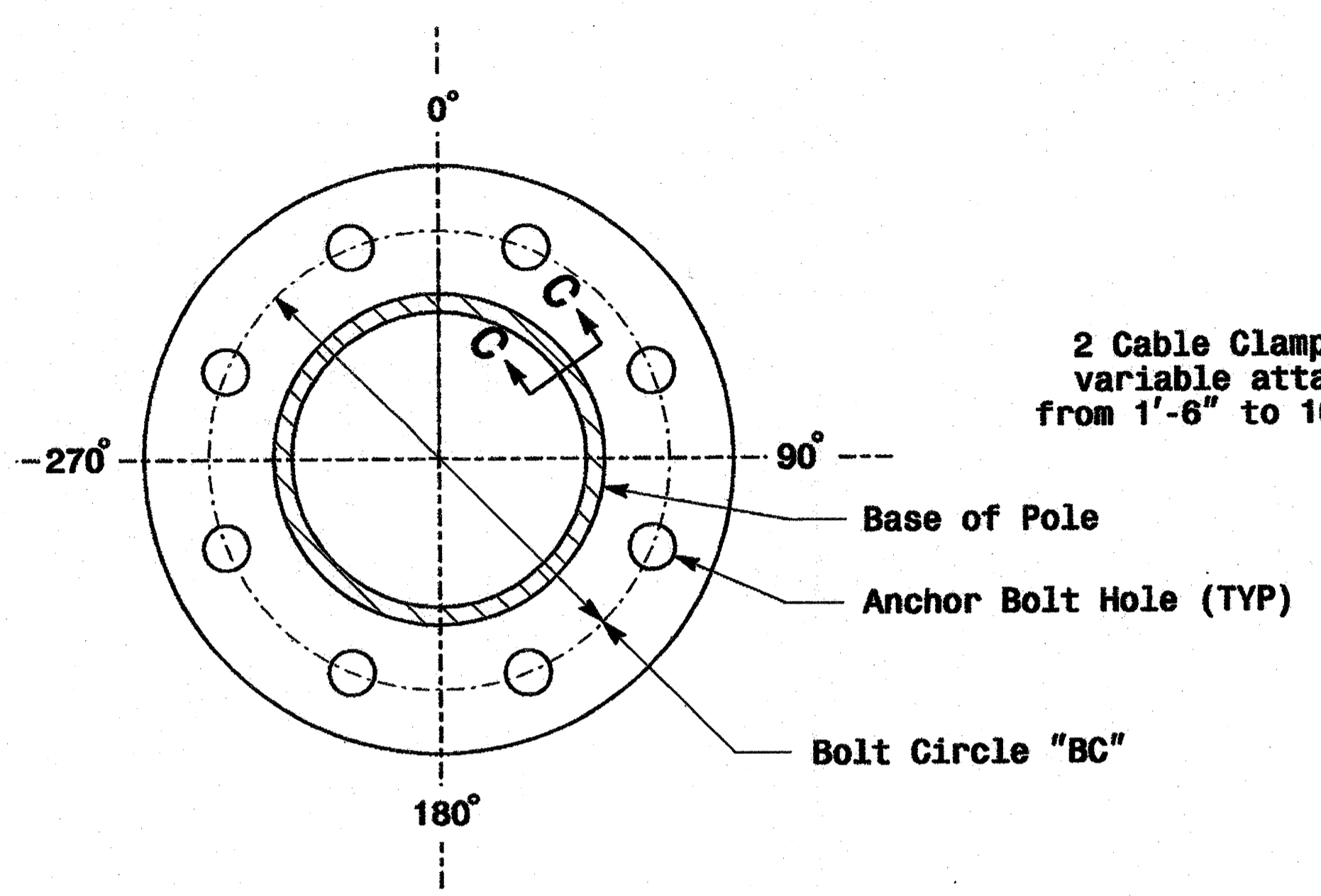
Fabrication Details - All Poles

	Typical Fabrication Details Common To All Metal Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito		SCALE: NONE SIGNATURE: D. Sarker DATE: 9.2.2005

01-255-2005 18 22 01-255-2005 18 22 01-255-2005 18 22 01-255-2005 18 22 01-255-2005 18 22

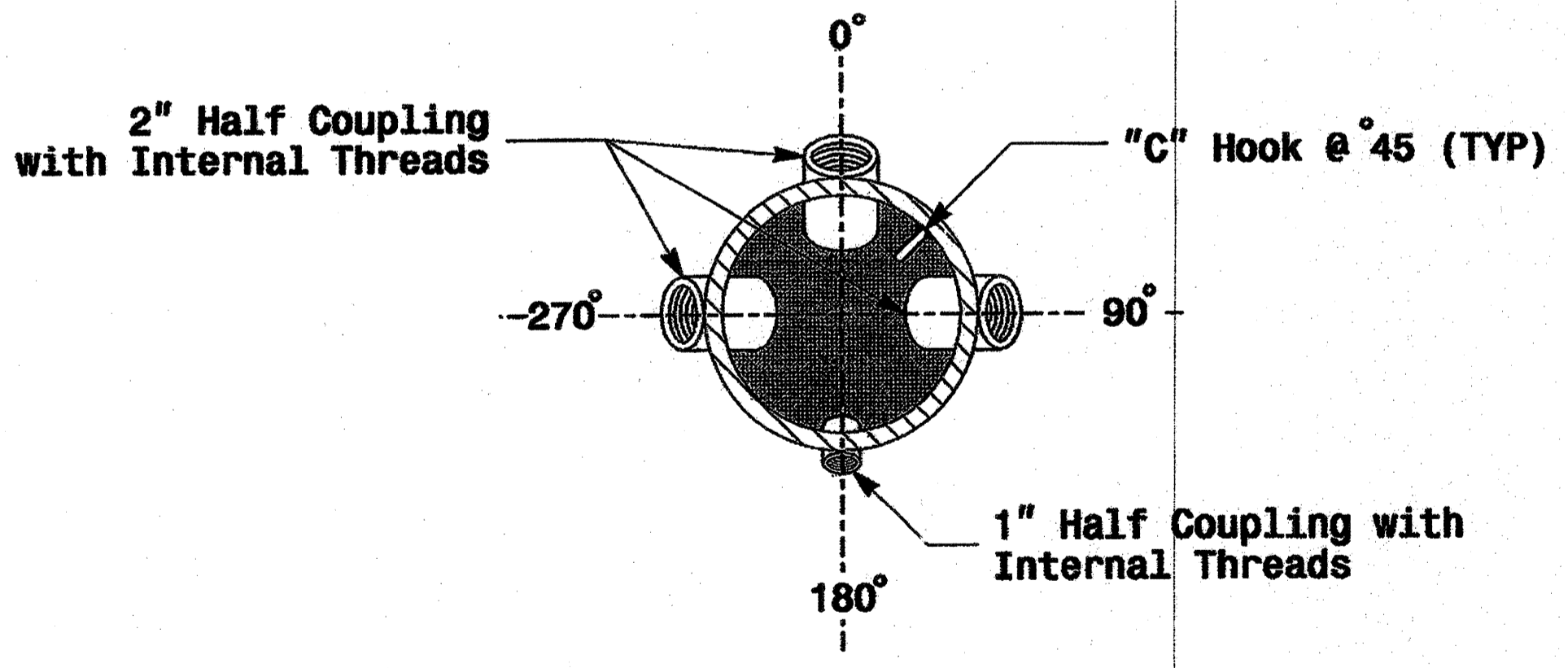
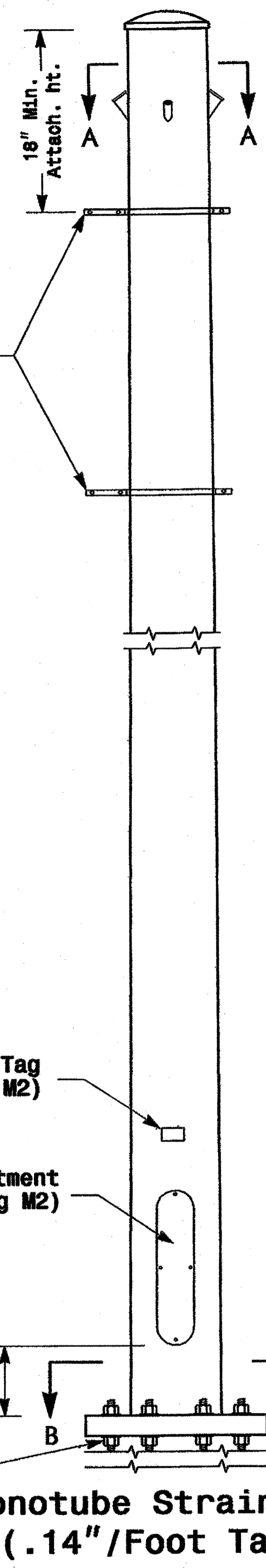


Cable Entrances at Top of Pole

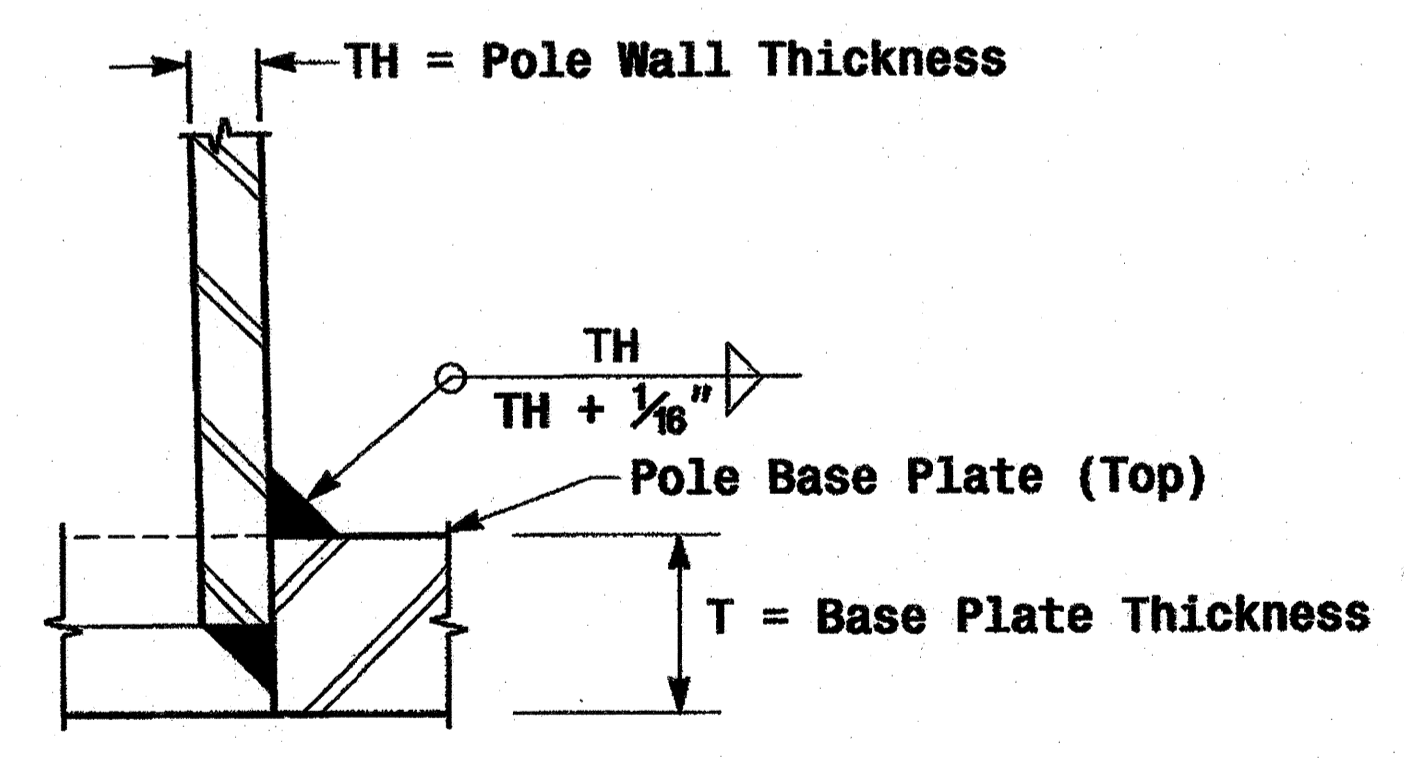


Section B-B
(See drawing M2)
Pole Base Plate

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

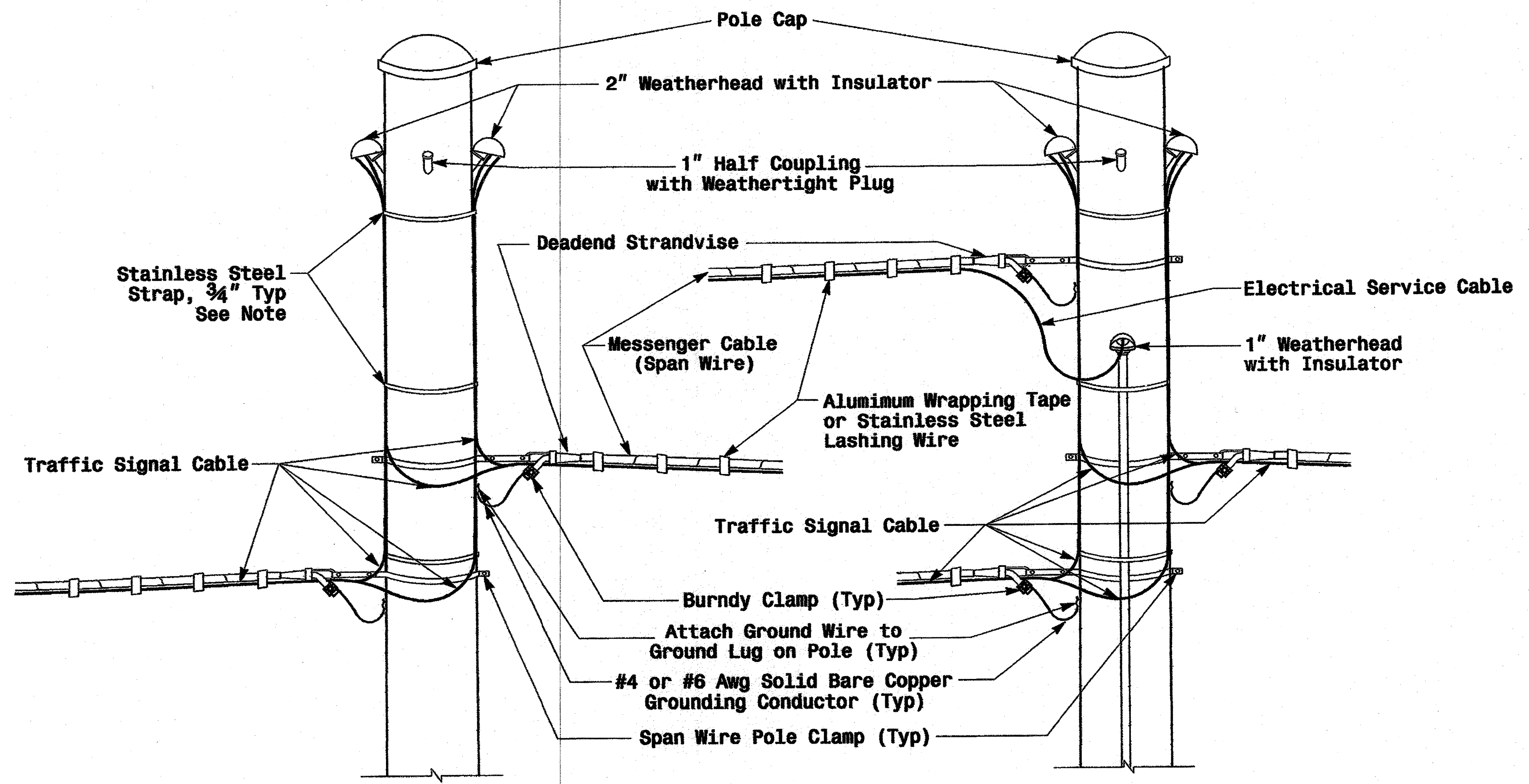


Section C-C
Socket Connection Weld Detail

Fabrication Details - Strain Poles

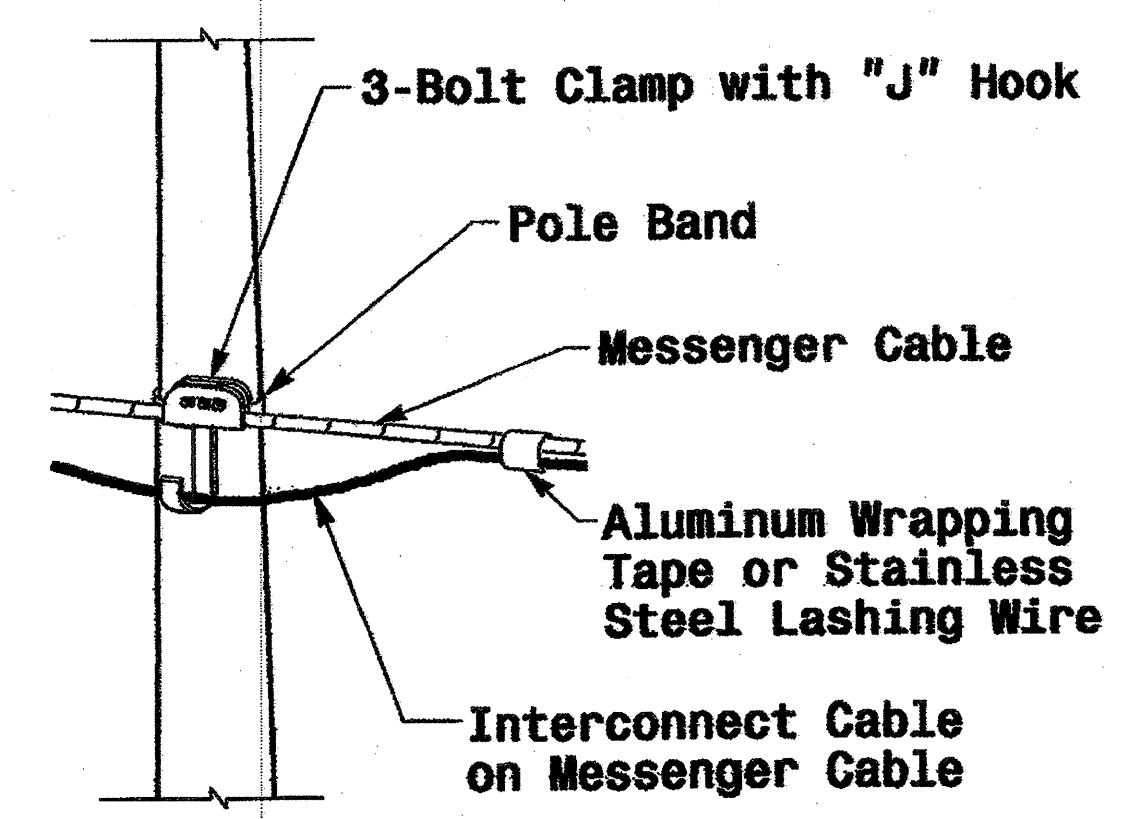
	Typical Fabrication Details For Strain Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: G.F. Andrews REVIEWED BY: A.W. Esposito	
SCALE: 0 NA NONE	SIGNATURE: <i>D. Sacker</i> 9.2.2005 DATE		SEAL INVENTORY NO.

01-SEP-2005 14:07 w:\p001es-un\hwork\p001es\004.mxd pole standard.dwg m3.dgn p.l.alexander

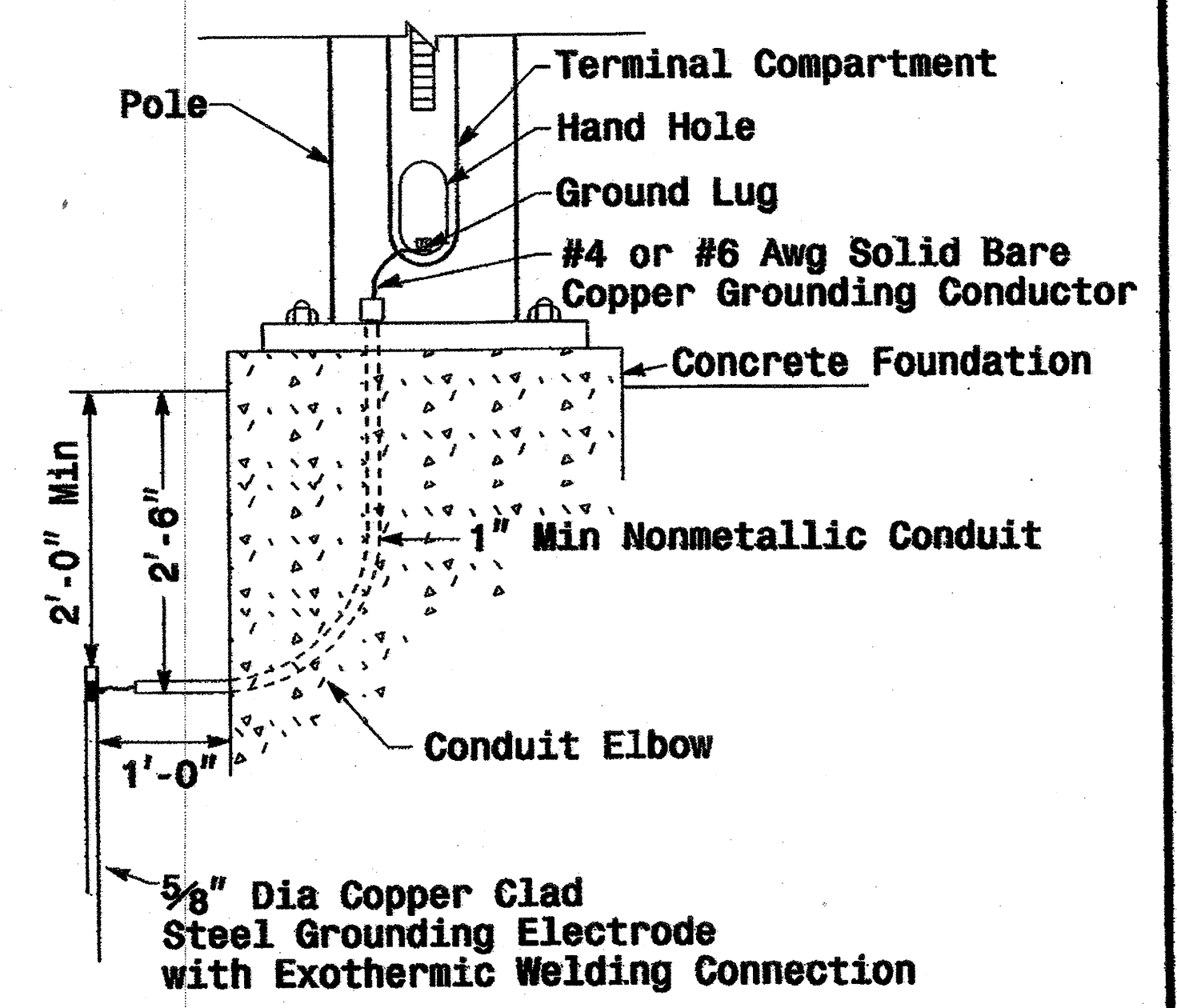


Note: Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



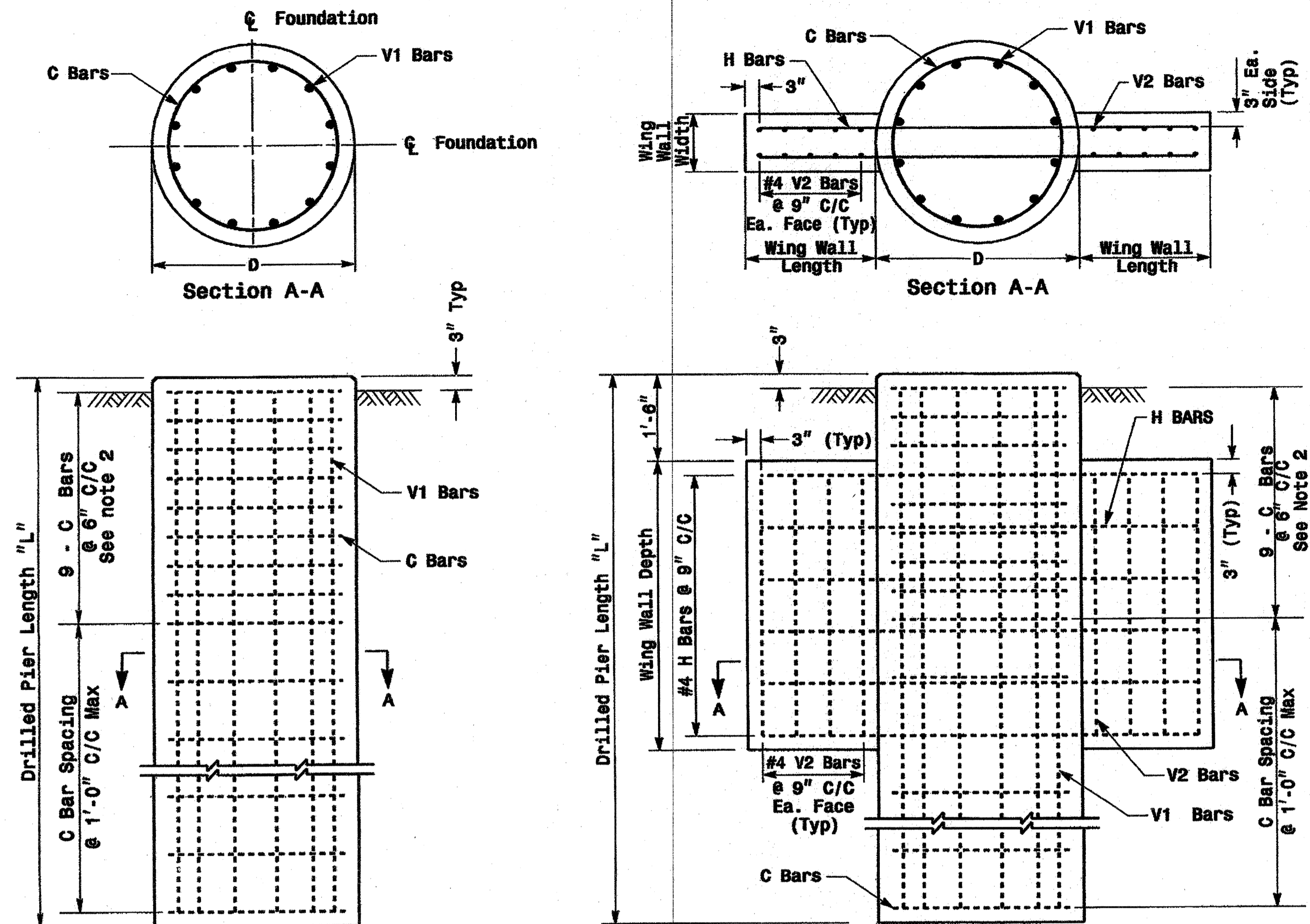
Metal Pole Grounding Detail

Construction Details - Strain Poles

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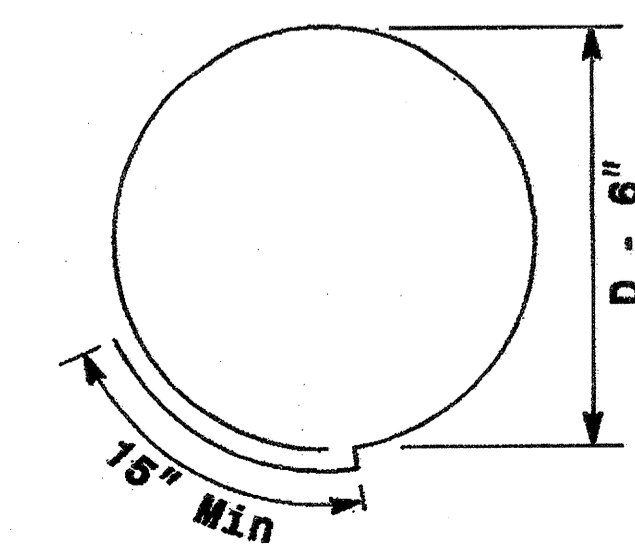
	Construction Details Strain Poles		SEAL
	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: D.C. SARKAR	REVISIONS INIT. DATE
SCALE: NONE NA			

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"

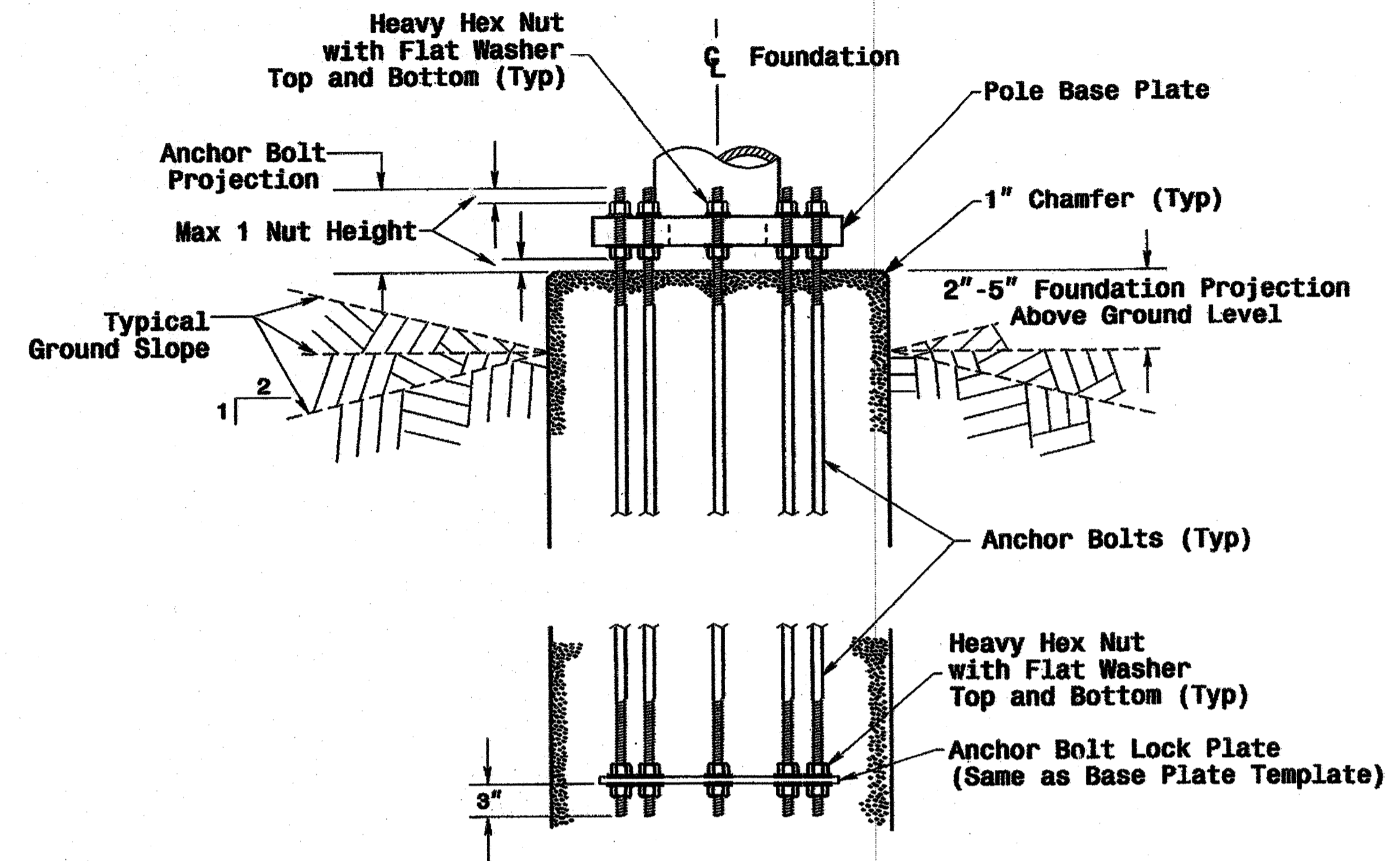
* See Note No. 1
 ** See Note No. 3

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

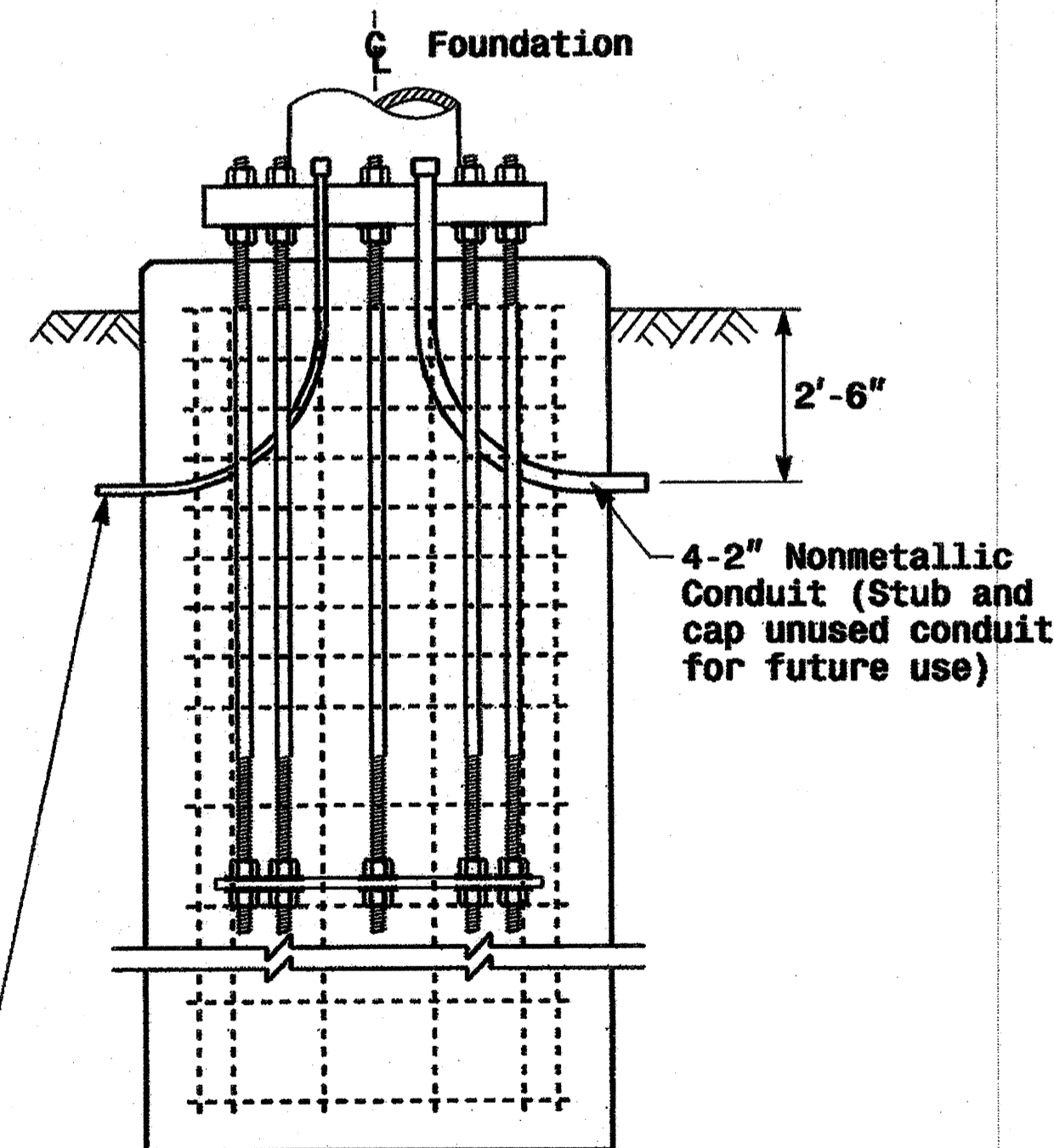
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



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.)

PROJECT REFERENCE NO.	SHEET NO.
U-3459	Sig.17 M 7

Construction Details - Foundations

	Construction Details Foundations		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 D. SARKAR DATE 9.2.2005
	Prepared in the Office of 	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS SCALE: NONE	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: A.M. ESPOSITO REVISIONS: _____ INIT. DATE _____	SIG. INVENTORY NO.

		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.


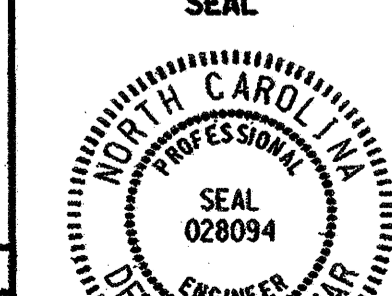
2. Base plate thickness (T) is 2.0 inches.

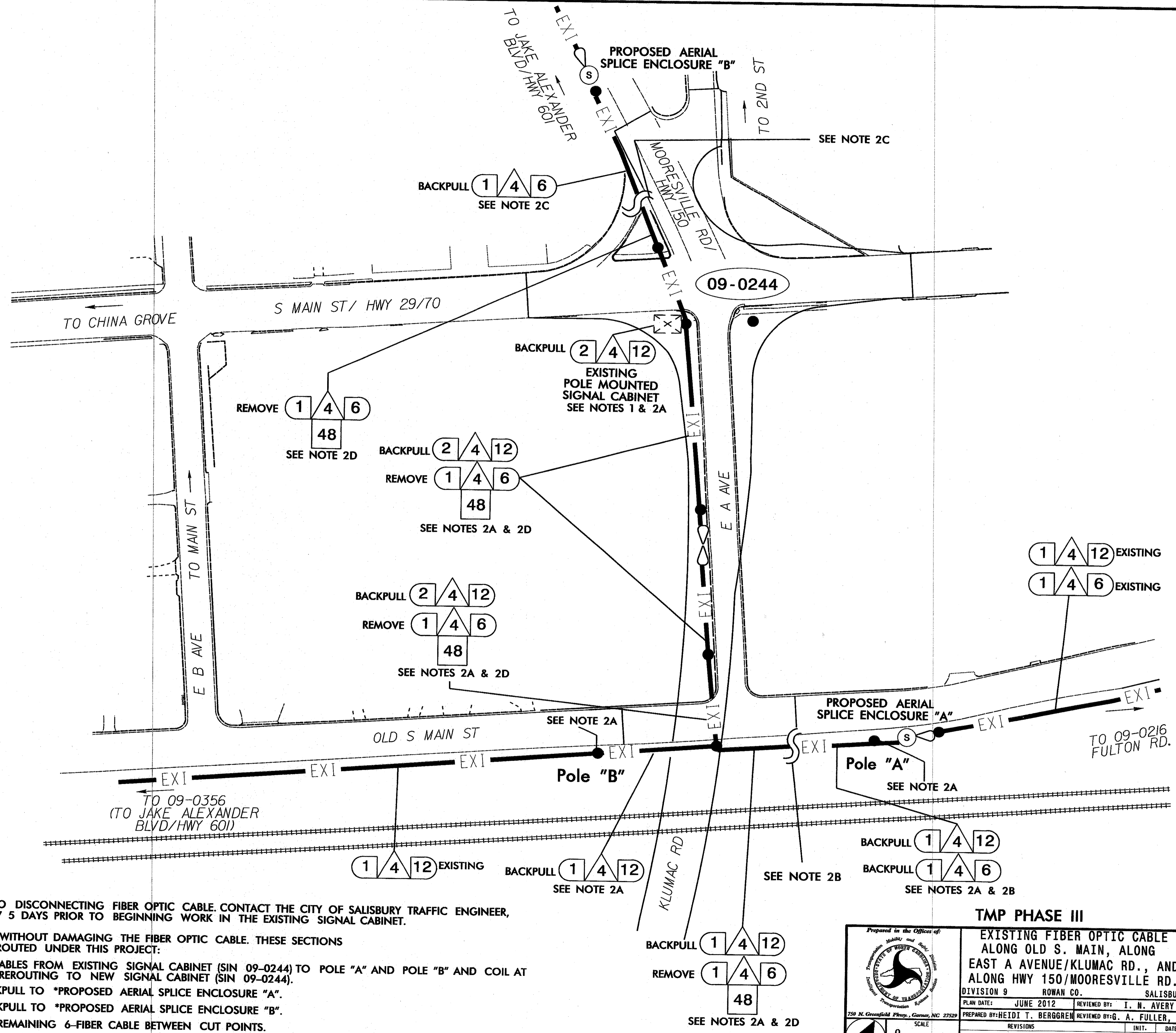
Foundation Selection:

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
V:\p\p\lee-unit\work\groups\2004 metal pole standard\2004 m8 std strain pole.dgn
D:\alexander

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



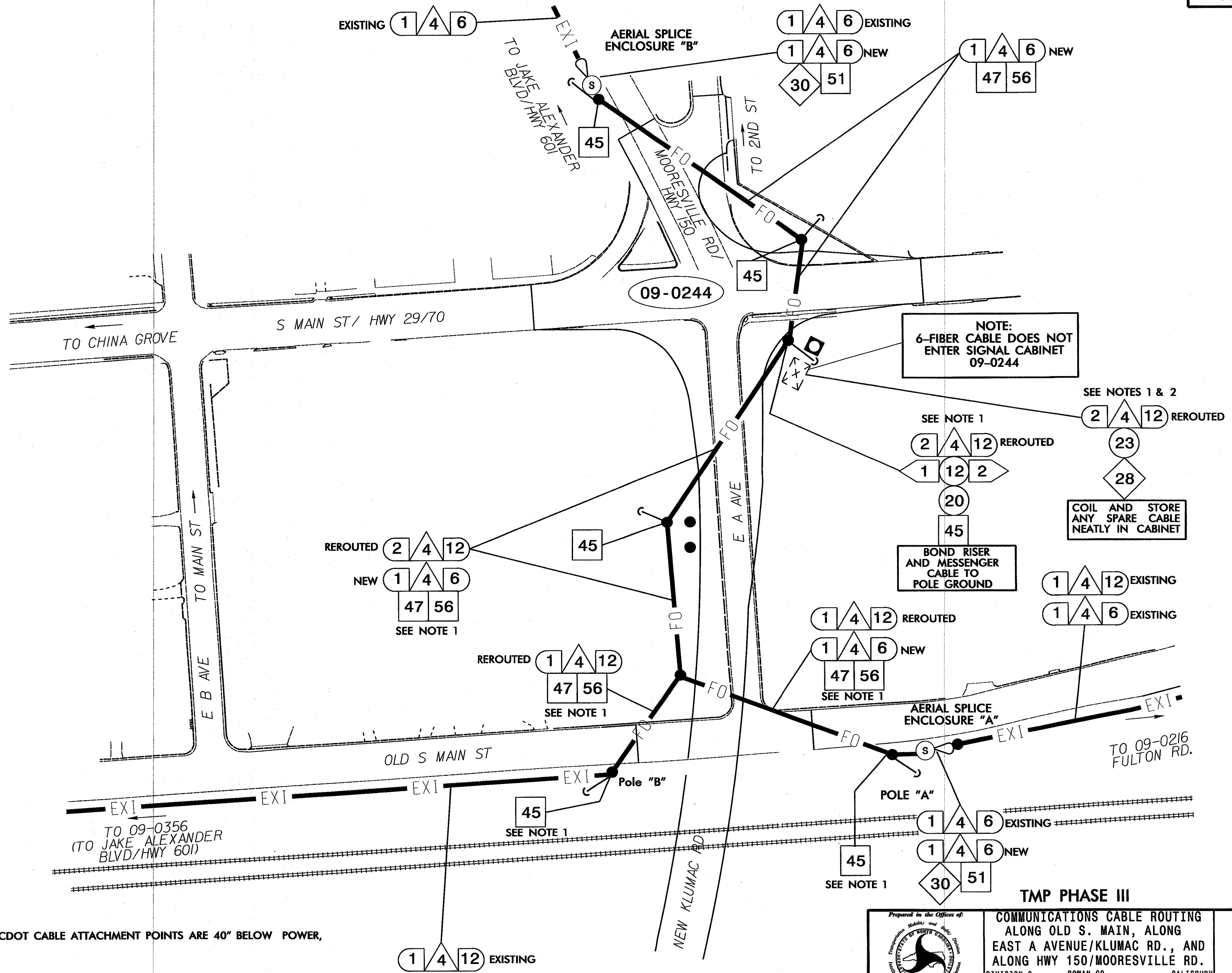
- NOTES:**
- RECORD EXISTING SPLICES PRIOR TO DISCONNECTING FIBER OPTIC CABLE. CONTACT THE CITY OF SALISBURY TRAFFIC ENGINEER, WENDY BRINDLE, AT (704) 639-7567 5 DAYS PRIOR TO BEGINNING WORK IN THE EXISTING SIGNAL CABINET.
 - PERFORM THE FOLLOWING WORK WITHOUT DAMAGING THE FIBER OPTIC CABLE. THESE SECTIONS OF FIBER OPTIC CABLE WILL BE REROUTED UNDER THIS PROJECT:
 - BACKPULL TWO (2) 12-FIBER CABLES FROM EXISTING SIGNAL CABINET (SIN 09-0244) TO POLE "A" AND POLE "B" AND COIL AT THE TOP OF THE POLES FOR REROUTING TO NEW SIGNAL CABINET (SIN 09-0244).
 - CUT 6-FIBER CABLE AND BACKPULL TO *PROPOSED AERIAL SPLICE ENCLOSURE "A".
 - CUT 6-FIBER CABLE AND BACKPULL TO *PROPOSED AERIAL SPLICE ENCLOSURE "B".
 - REMOVE AND DISCARD ANY REMAINING 6-FIBER CABLE BETWEEN CUT POINTS.

TMP PHASE III

EXISTING FIBER OPTIC CABLE ALONG OLD S. MAIN, ALONG EAST A AVENUE/KLUMAC RD., AND ALONG HWY 150/MOOREVILLE RD.

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> PREPARED BY: HEIDI T. BERGGREN SCALE: 0 </td> <td style="width: 50%;"> REVIEWED BY: G. A. FULLER, PE DATE: </td> </tr> <tr> <td style="width: 50%;"> PLAN DATE: JUNE 2012 </td> <td style="width: 50%;"> REVIEWED BY: I. N. AVERY </td> </tr> <tr> <td style="width: 50%;"> DIVISION 9 </td> <td style="width: 50%;"> ROWAN CO. SALISBURY </td> </tr> <tr> <td colspan="2" style="text-align: center;"> REVISIONS: </td> </tr> <tr> <td style="width: 50%;"> INIT. </td> <td style="width: 50%;"> DATE </td> </tr> </table>	PREPARED BY: HEIDI T. BERGGREN SCALE: 0	REVIEWED BY: G. A. FULLER, PE DATE:	PLAN DATE: JUNE 2012	REVIEWED BY: I. N. AVERY	DIVISION 9	ROWAN CO. SALISBURY	REVISIONS:		INIT.	DATE
PREPARED BY: HEIDI T. BERGGREN SCALE: 0	REVIEWED BY: G. A. FULLER, PE DATE:										
PLAN DATE: JUNE 2012	REVIEWED BY: I. N. AVERY										
DIVISION 9	ROWAN CO. SALISBURY										
REVISIONS:											
INIT.	DATE										

Signature: *Gregory A. Fuller* 6/20/12
 CAD FILE NAME:

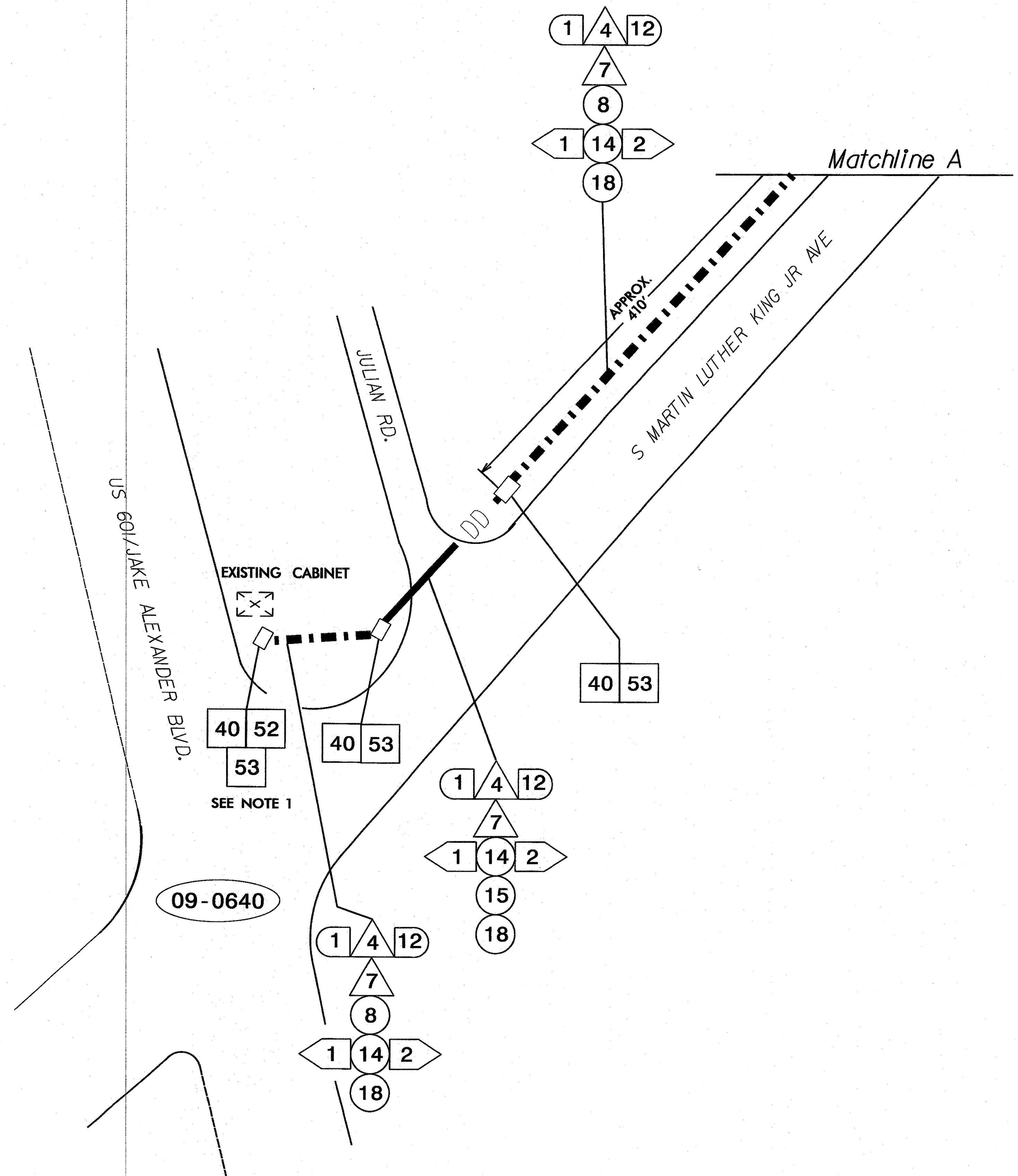


GENERAL NOTE:
 —UNLESS OTHERWISE NOTED, ALL NCDOT CABLE ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE (FS) OF POLE.
NOTES:
 1. REROUTE THE TWO (2) 12-FIBER CABLES AS SHOWN.
 2. TERMINATE FIBER IN NEW SIGNAL CABINET (SIN 09-0244).

TMP PHASE III

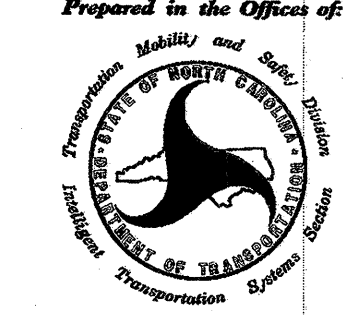

	COMMUNICATIONS CABLE ROUTING		
	ALONG OLD S. MAIN, ALONG EAST A AVENUE/KLUMAC RD., AND ALONG HWY 150/MOORESVILLE RD.		
DIVISION 9 ROWAN CO.	SALISBURY		PREPARED BY: <i>Heidi T. Berggren</i> REVIEWED BY: <i>G. A. Fuller</i>
PLAN DATE: JUNE 2012	REVIEWED BY: I. N. AVERY		
PREPARED BY: HEIDI T. BERGGREN	REVIEWED BY: G. A. FULLER, PE		SIGNATURE: <i>Gregory A. Fuller</i> DATE: 6-20-12
REVISIONS	INIT. DATE		

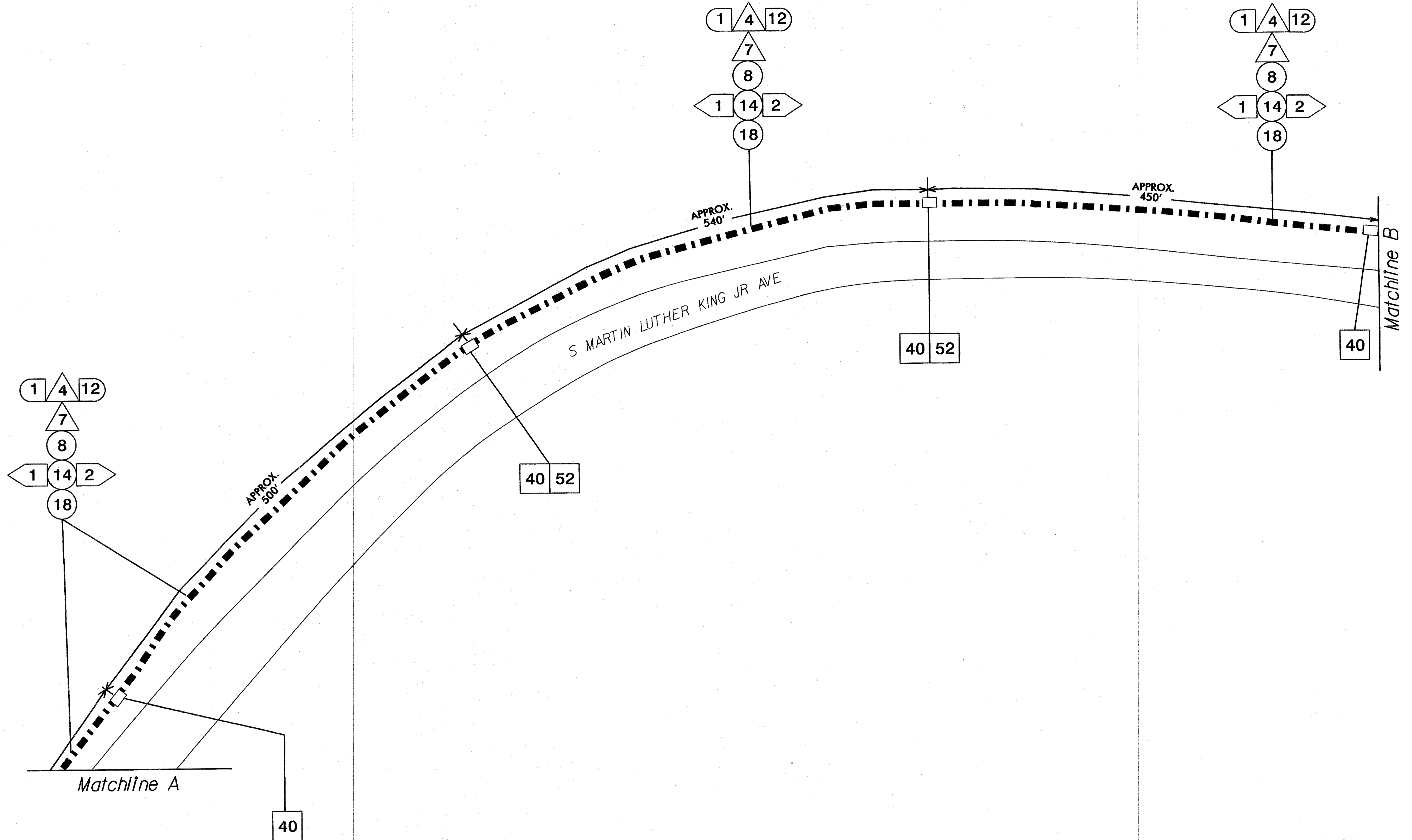
750 N. Greenfield Plaza, Salisbury, NC 27305



NOTES:
1. COIL AND CAP 12-FIBER CABLE WITH WATERPROOF, HEAT SHRINK END CAP FOR FUTURE USE BY OTHERS.

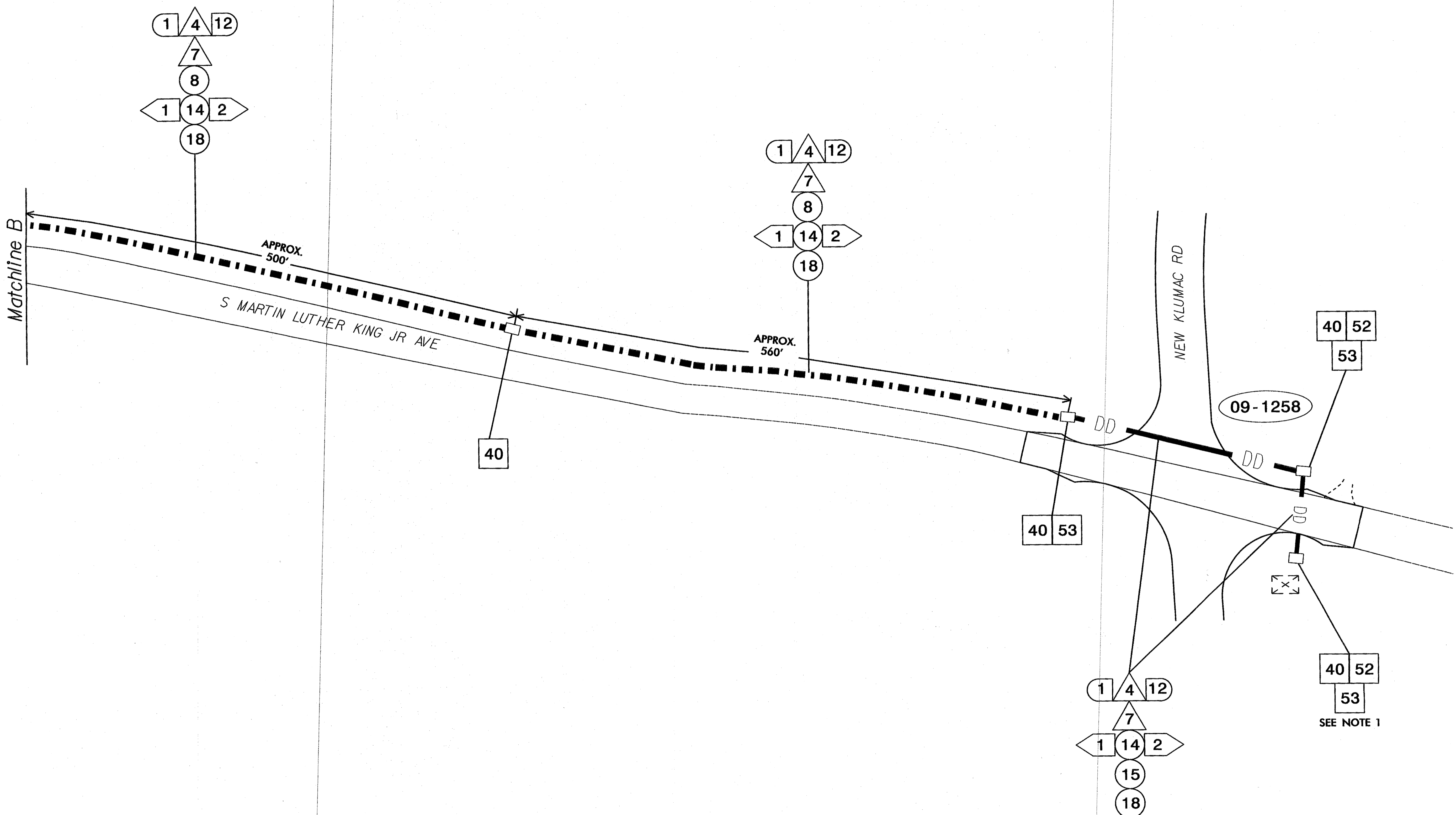
TMP FINAL PHASE

 Prepared in the Offices of: Mobility and Safety Division DEPARTMENT OF TRANSPORTATION 750 N. Greenfield Place, Cary, NC 27513	CONDUIT ROUTING PLANS ALONG S. MARTIN LUTHER KING JR AVE. TO KLUMAC RD.		SEAL  GREGORY A. FULLER ENGINEER
	DIVISION 9 ROWAN CO. SALISBURY	PLAN DATE: JUNE 2012 REVIEWED BY: I. N. AVERY	
PREPARED BY: HEIDI T. BERGGREN REVIEWED BY: G. A. FULLER, PE	REVISIONS	INIT. DATE	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 6-20-12
SCALE: 0	CADD File Name:		



TMP FINAL PHASE

	CONDUIT ROUTING PLANS ALONG S. MARTIN LUTHER KING JR AVE TO KLUMAC RD.		
	DIVISION 9 ROWAN CO. SALTSBURY		
PLAN DATE: JUNE 2012	REVIEWED BY: I. N. AVERY		PREPARED BY: HEIDI T. BERGGREN REVIEWED BY: G. A. FULLER, PE
SCALE: 0	REVISIONS	INIT. DATE	
SIGNATURE: <i>Gregory A. Fuller</i>		DATE: 6-20-12	SEAL



NOTES:
 1. COIL AND CAP 12-FIBER CABLE WITH WATERPROOF, HEAT SHRINK END CAP FOR FUTURE USE BY OTHERS.

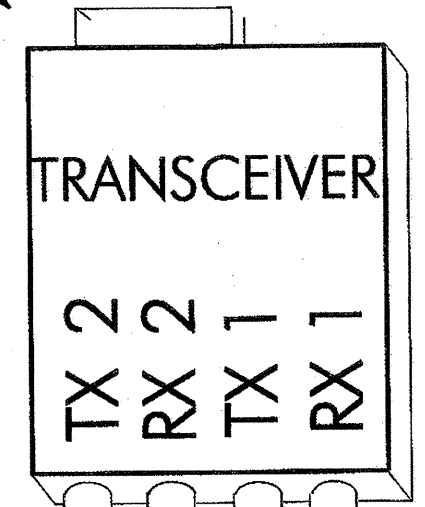
TMP FINAL PHASE

	CONDUIT ROUTING PLANS ALONG S. MARTIN LUTHER KING JR AVE TO KLUMAC RD.	
	DIVISION 9 PLAN DATE: JUNE 2012 PREPARED BY: HEIDI T. BERGGREN	ROWAN CO. REVIEWED BY: I. N. AVERY REVIEWED BY: G. A. FULLER, PE	SALISBURY DATE:
SCALE: 0	REVISIONS:	INIT. DATE:
	SIGNATURE: <i>Gregory A. Fuller</i>	DATE: 6/20/12

**LOCAL INTERSECTION LOCATION:
S. MAIN ST. AT NC 150/MOORESVILLE RD.
SIGNAL INVENTORY # 09-0244**

Notes:
Unused fibers left coiled and stored in splice tray.
Unused Buffer Tubes left coiled and stored in splice tray.

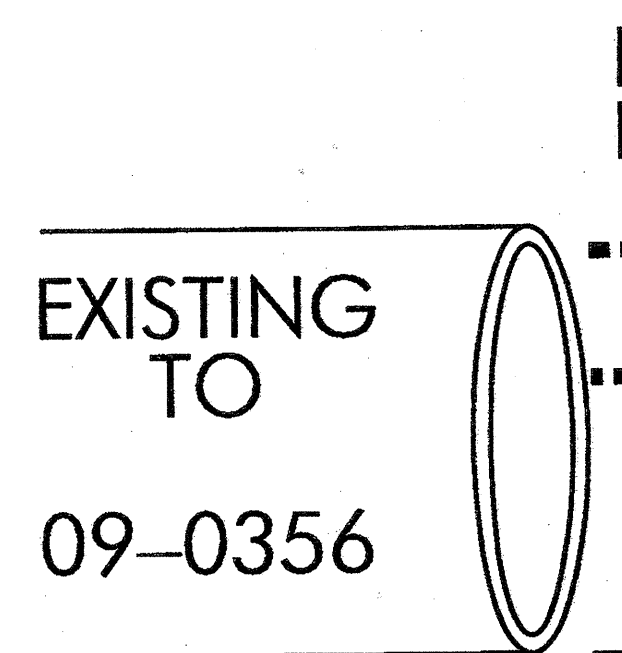
DATA PORT



REUSE EXISTING TRANSCEIVER

NEW PATCH PANEL WITH ST CONNECTORS

NEW PATCH PANEL WITH ST CONNECTORS



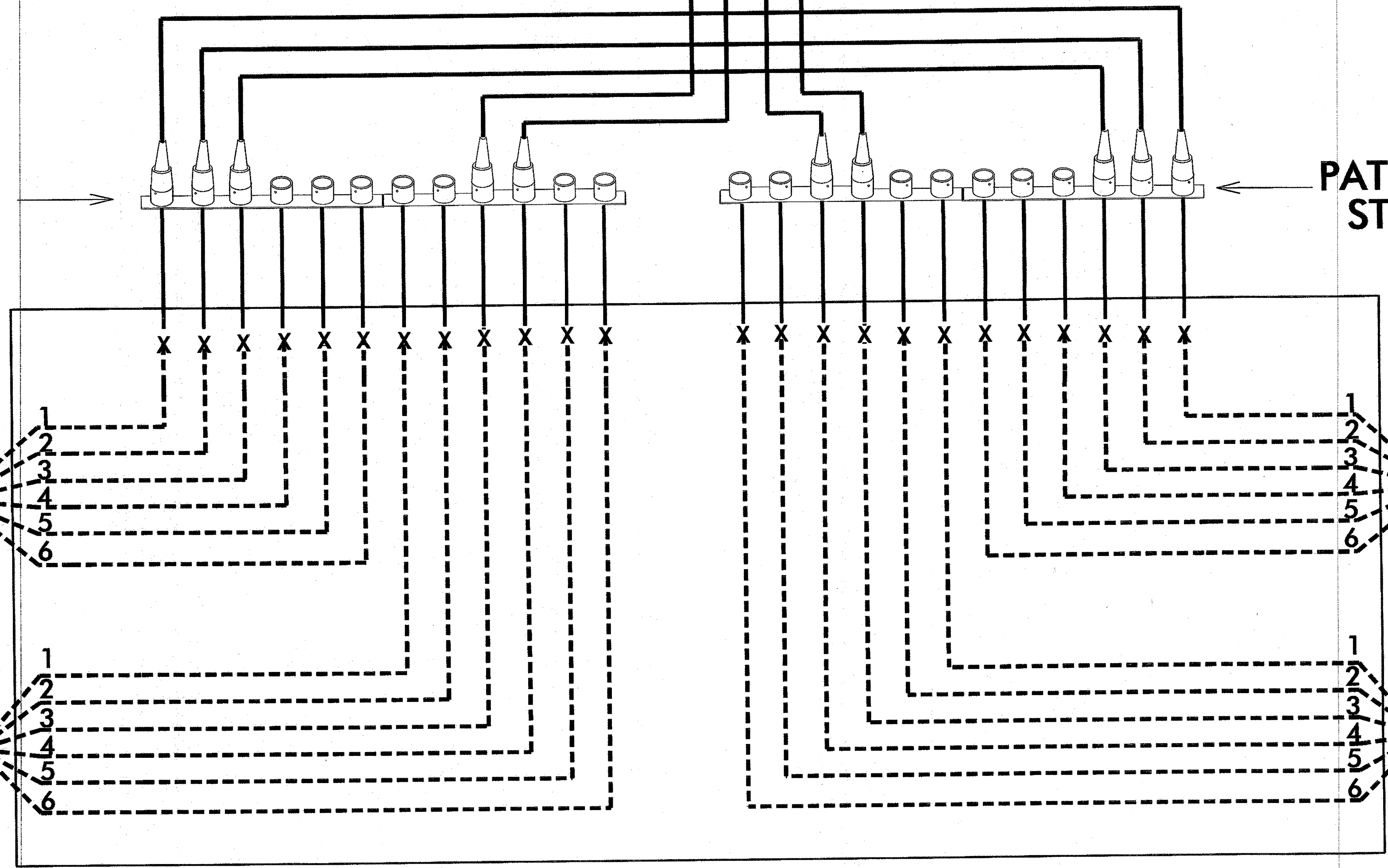
EXISTING BLUE BUFFER TUBE

EXISTING ORANGE BUFFER TUBE

EXISTING BLUE BUFFER TUBE

EXISTING TO 09-0216

EXISTING ORANGE BUFFER TUBE



NEW SPICE TRAYS

TMP PHASE III

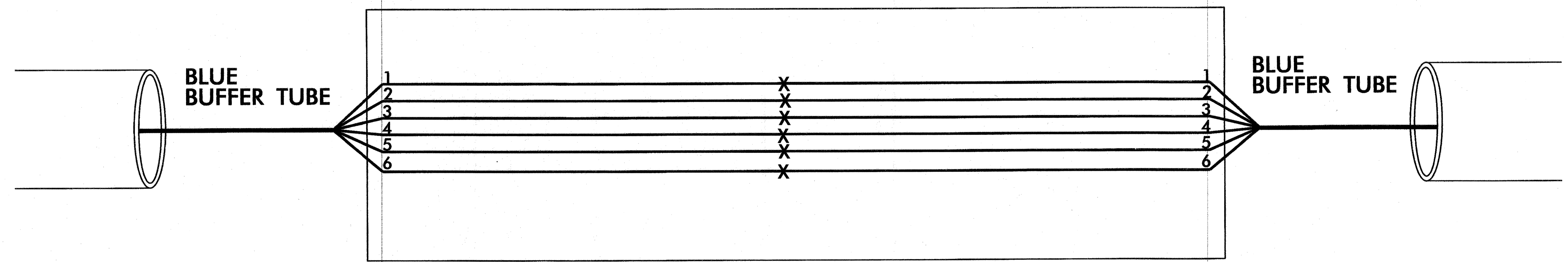
NOTES:

- CONTACT THE CITY OF SALISBURY TRAFFIC ENGINEER, WENDY BRINDLE, AT (704) 639-7567 5 DAYS PRIOR TO BEGINNING WORK IN THE EXISTING SIGNAL CABINET.
- RECORD EXISTING SPLICES PRIOR TO DISCONNECTING FIBER OPTIC CABLE AND PROVIDE DOCUMENTATION TO THE ENGINEER. IF RECORDED SPLICE INFORMATION IS DIFFERENT FROM WHAT IS SHOWN ABOVE, SPLICE BACK USING RECORDED INFORMATION.
- ALL TRANSCEIVER CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING PROPER TERMINATIONS.
- ALL WORK IS NOT COMPLETE UNTIL THE SALISBURY SIGNAL SYSTEM IS BACK UP AND RUNNING.

	SPLICE PLAN		
	DIVISION 9 ROWAN CO. SALISBURY PLAN DATE: JUNE 2012 REVIEWED BY: I. N. AVERY PREPARED BY: HEIDI T. BERGGREN REVIEWED BY: G. A. FULLER, PE	SCALE: 0		REVISIONS INIT. DATE

**NEW AERIAL SPLICE ENCLOSURES
FOR 6-FIBER CABLE**

Notes:
 Unused fibers left coiled and stored in splice tray.
 Unused Buffer Tubes left coiled and stored in splice tray.



**NEW AERIAL SPLICE ENCLOSURE "A"
AND
NEW AERIAL SPLICE ENCLOSURE "B"**

TMP PHASE III

NOTE:
 1. ALL WORK IS NOT COMPLETE UNTIL THE SALISBURY SIGNAL SYSTEM IS BACK UP AND RUNNING.

	SPLICE PLAN		
	DIVISION 9 PLAN DATE: JUNE 2012 PREPARED BY: HEIDI T. BERGGREN SCALE: 0	ROWAN CO. REVIEWED BY: I. N. AVERY REVIEWED BY: G. A. FULLER, PE REVISIONS:		SALISBURY DATE:
REVISIONS:			SIGNATURE: <i>Gregory A. Fuller</i> DATE: 6/20/12 CAD: F116.mdb