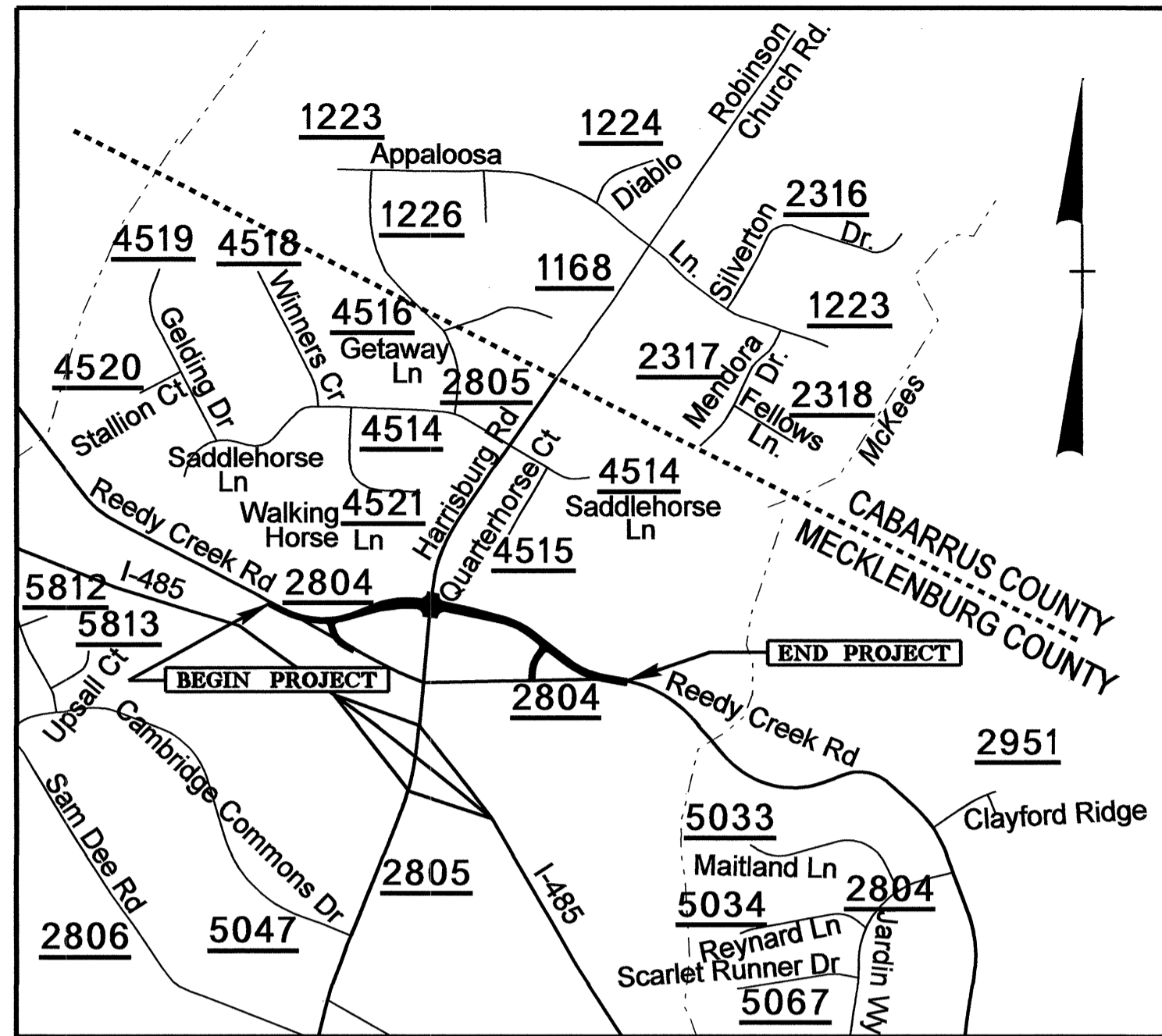


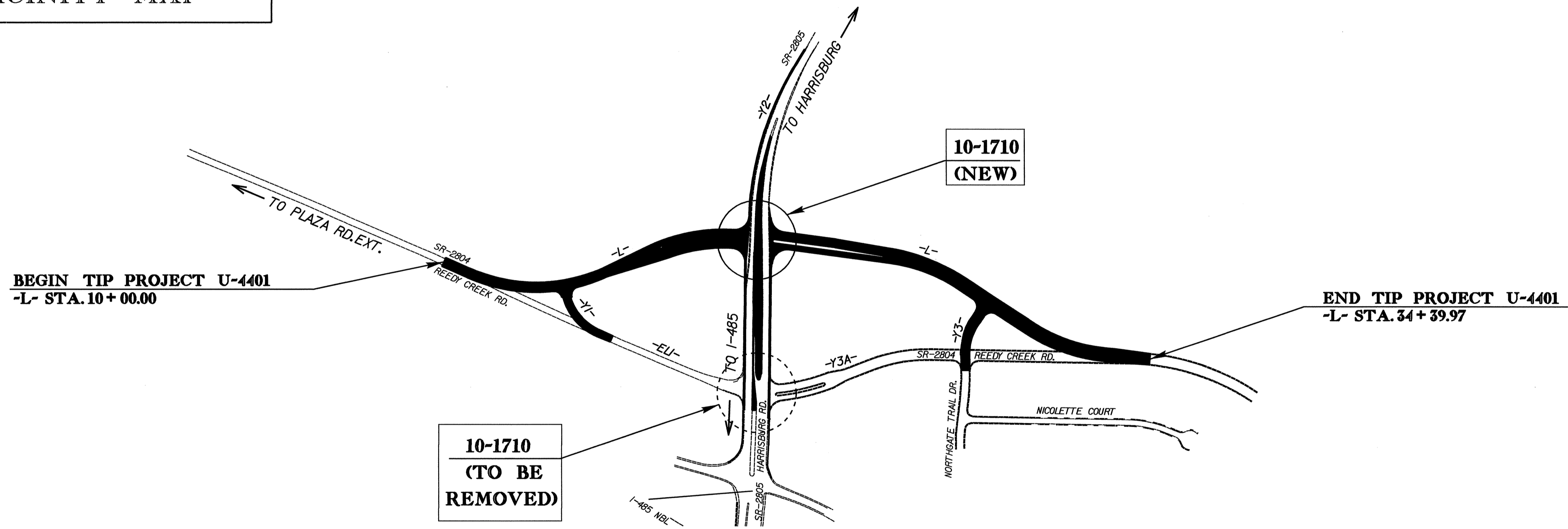
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
MECKLENBURG COUNTY

**LOCATION: SR 2804 (REEDY CREEK RD.) AND SR 2805 (HARRISBURG RD.);
 INTERSECTION REALIGNMENT**

TYPE OF WORK: TRAFFIC SIGNAL INSTALLATION & REMOVAL



VICINITY MAP



TIP PROJECT: U-4401

Index of Plans

Sheet Number	Signal Inventory Number	Location/Description
Sig. 1	N/A	Title Sheet
Sig. 2-4	10-1710	SR 2805 (Harrisburg Road) at SR 2804 (Reedy Creek Road)
Sig. 5-6	---	Wireless Radio Antenna Typical Details
Sig. 7	---	Wireless Radio Antenna Notes and Legend

INTELLIGENT TRANSPORTATION SYSTEMS AND SIGNALS UNIT

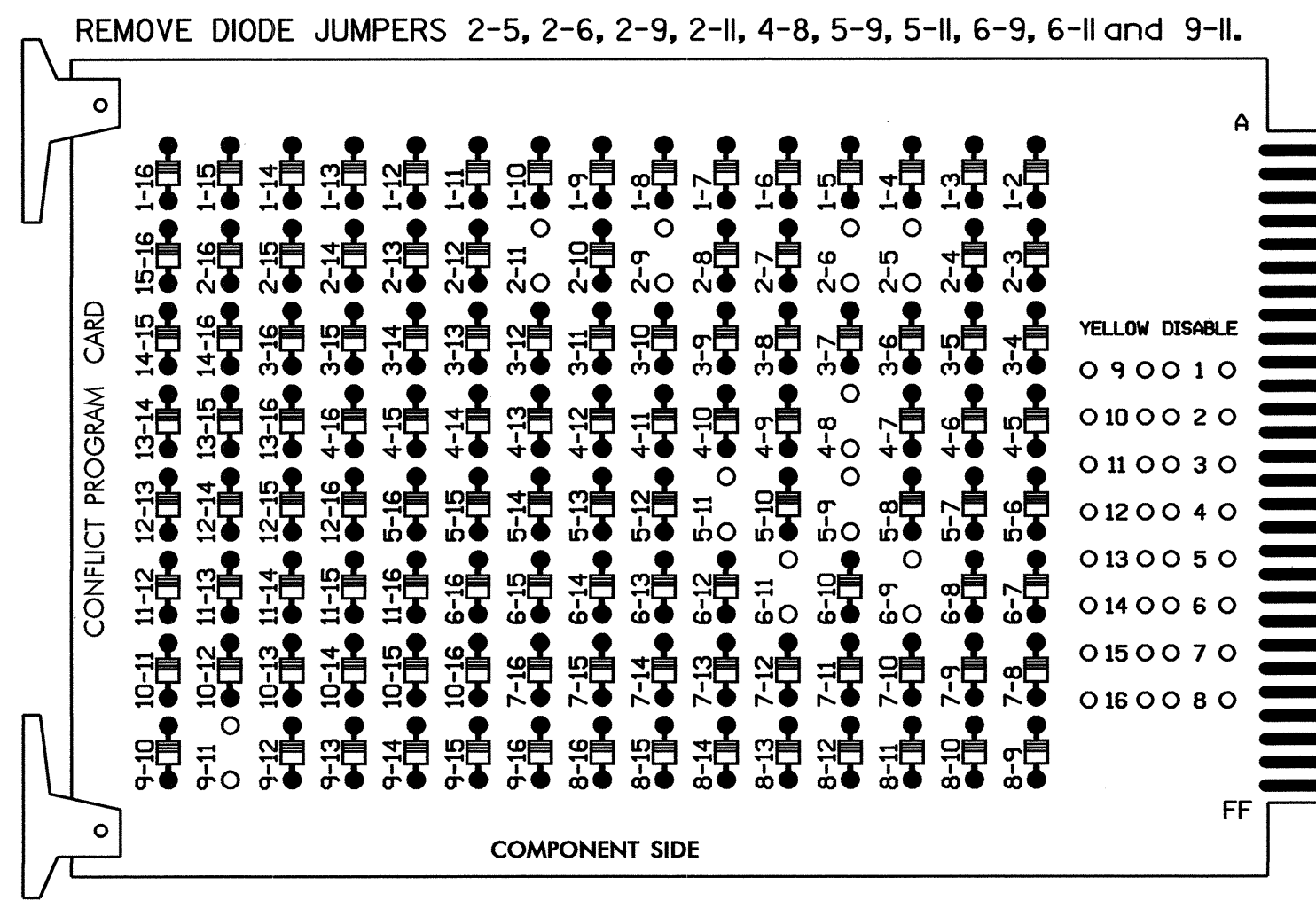
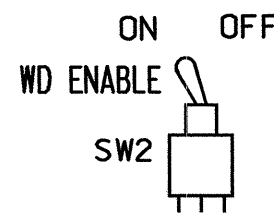
Contacts:

- Gregory A. Fuller, PE - STATE ITS & SIGNALS ENGINEER
- Timothy J. Williams, PE - WESTERN REGION SIGNALS ENGINEER
- George C. Brown, PE - SIGNAL EQUIPMENT DESIGN ENGINEER



EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

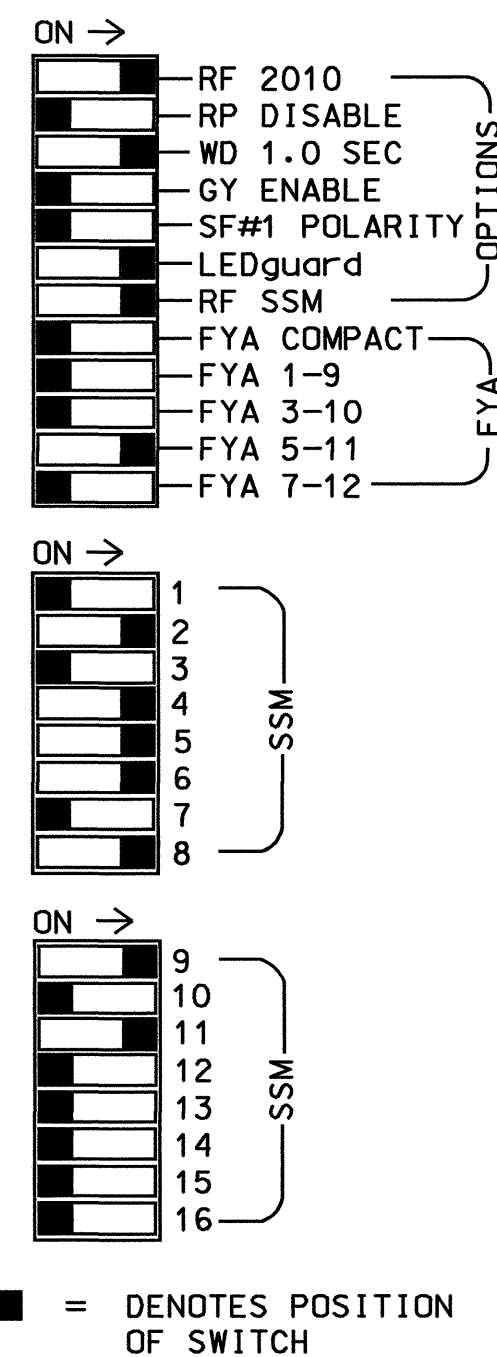
(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as WAG Overlaps.
- The cabinet and controller are part of the SR 2805 (Harrisburg Rd.) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S4,S5,S6,S8,S9,S12
 PHASES USED.....2,4,5,6,8
 OVERLAP "A".....5+6
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

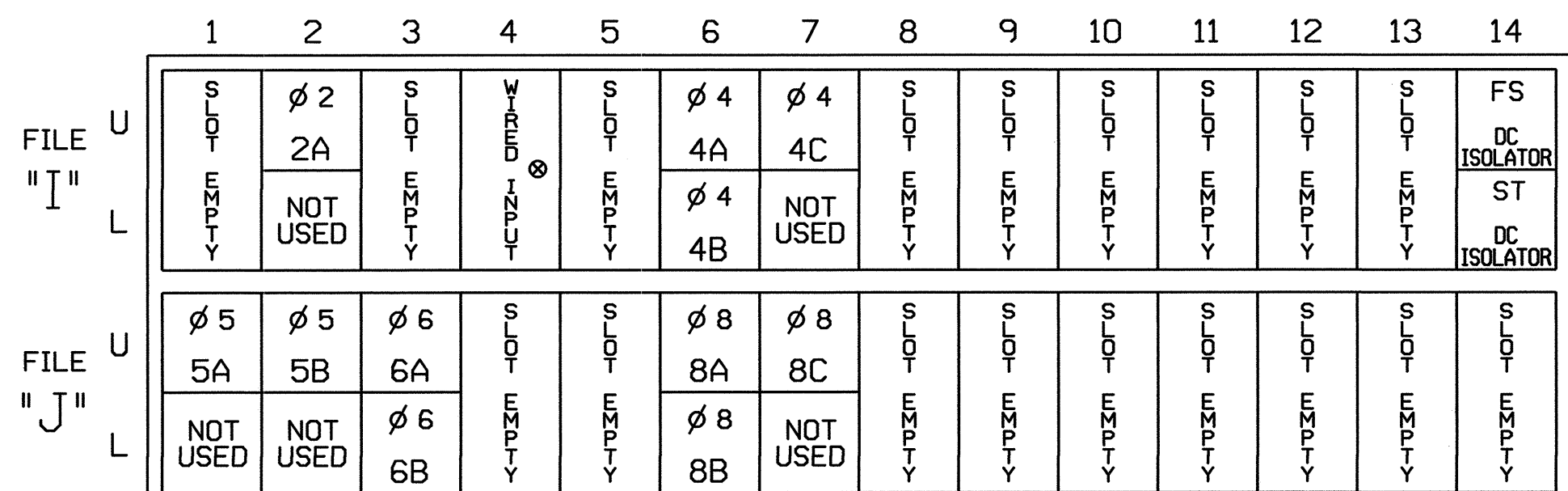
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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, 42,43	NU	42	51*	62,63	NU	NU	81,82	NU	61*	NU	51*	NU	NU
RED		128			101		*		134			107						
YELLOW		129			102				135			108						
GREEN		130			103				136			109						
RED ARROW																A121		A114
YELLOW ARROW								132								A122		A115
FLASHING YELLOW ARROW																A123		A116
GREEN ARROW							133	133										

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

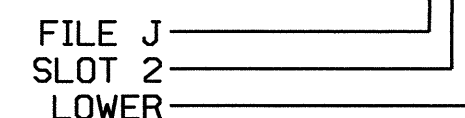
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y		2.4	
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
		I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y	Y		3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y		2.4	
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			10

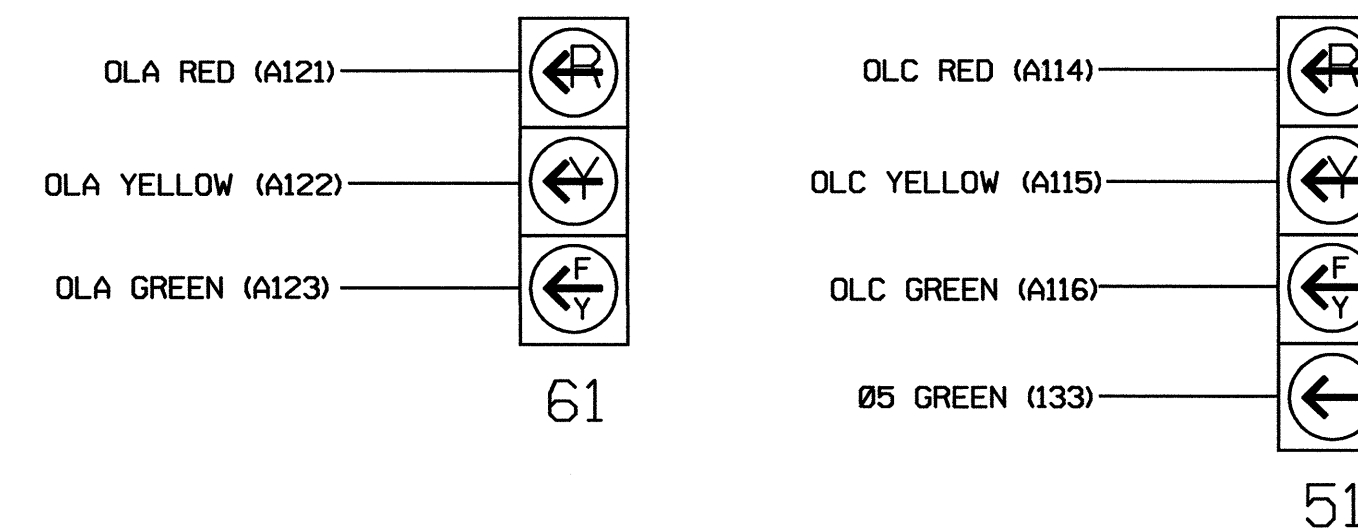
¹Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

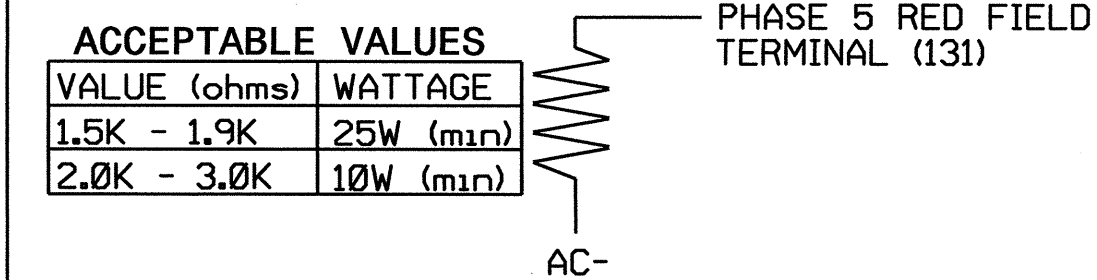
(wire signal heads as shown)



NOTE

- The sequence display for signal head 51 requires special logic programming. See sheet 2 of 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

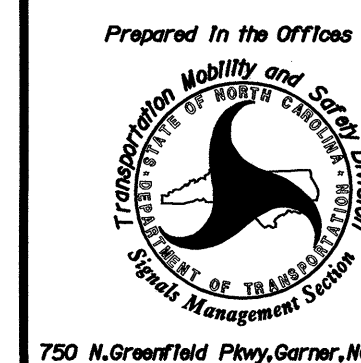


NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2805 (Harrisburg Road)
 at
 SR 2804 (Reedy Creek Road)



Division 10 Mecklenburg County Charlotte
 PLAN DATE: January 2010 REVIEWED BY: T. Joffe
 PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE 1/5/10

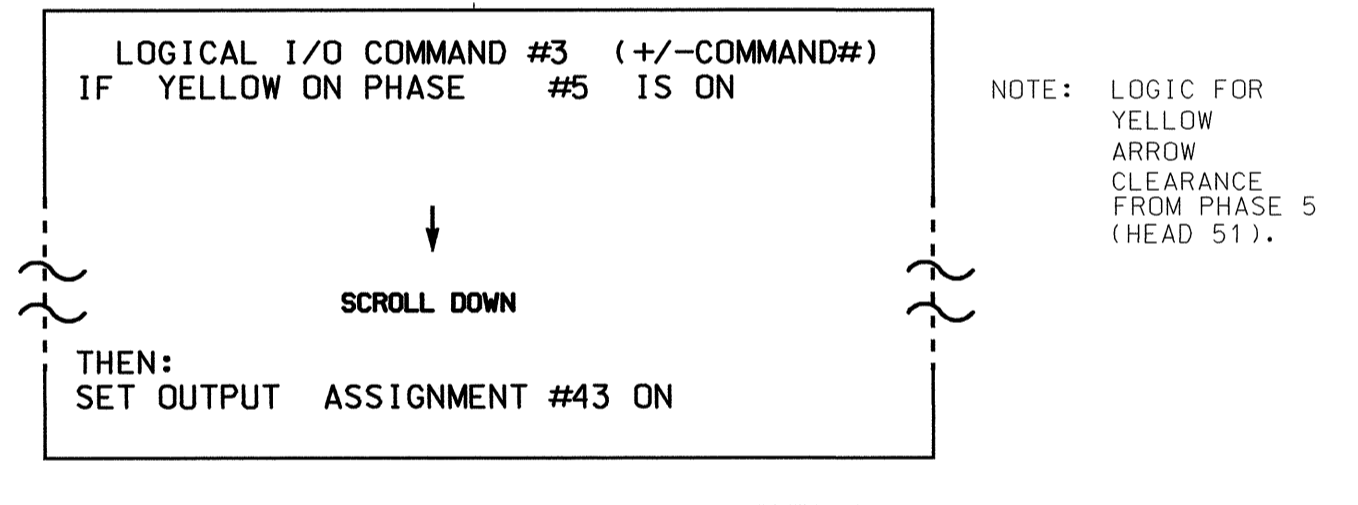
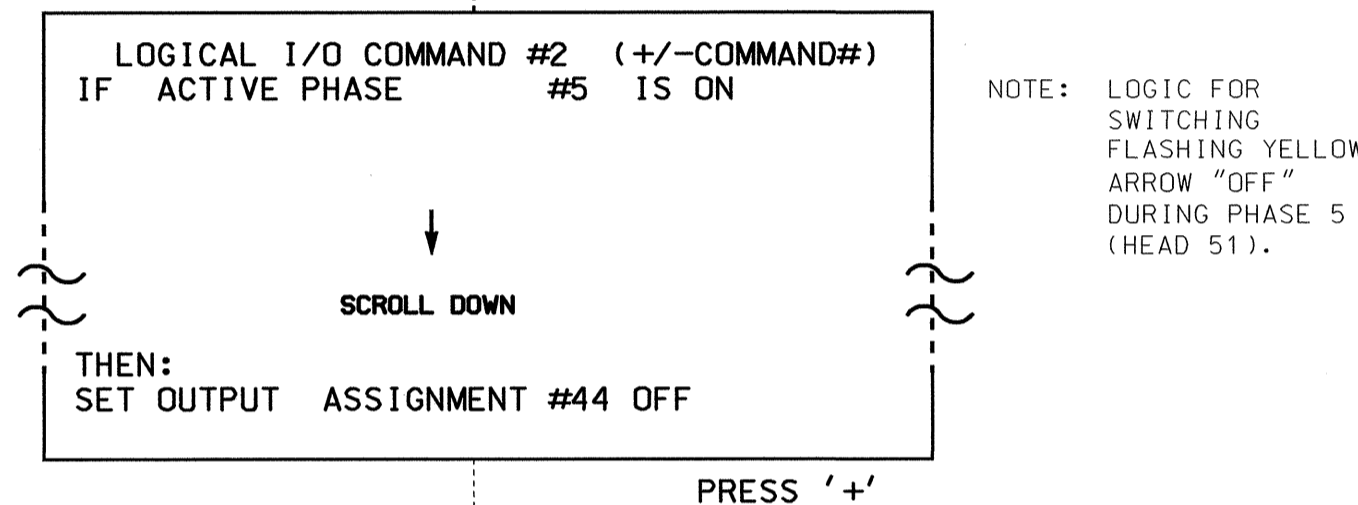
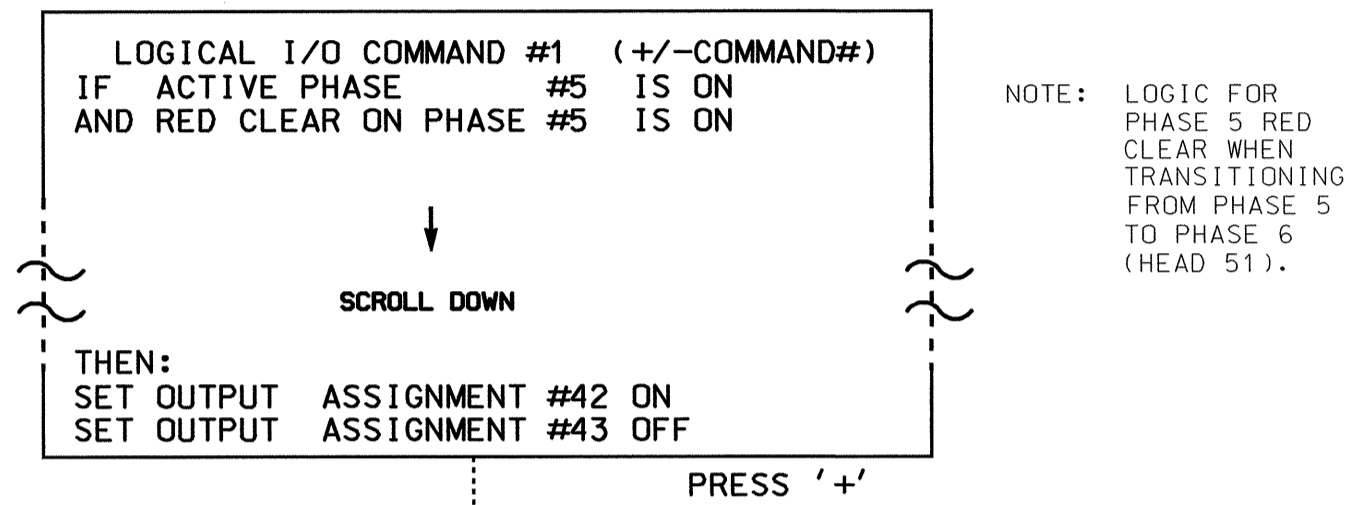
SIG. INVENTORY NO. 10-1710

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1710
 DESIGNED: December 2009
 SEALED: 01/04/2010
 REVISED:

**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

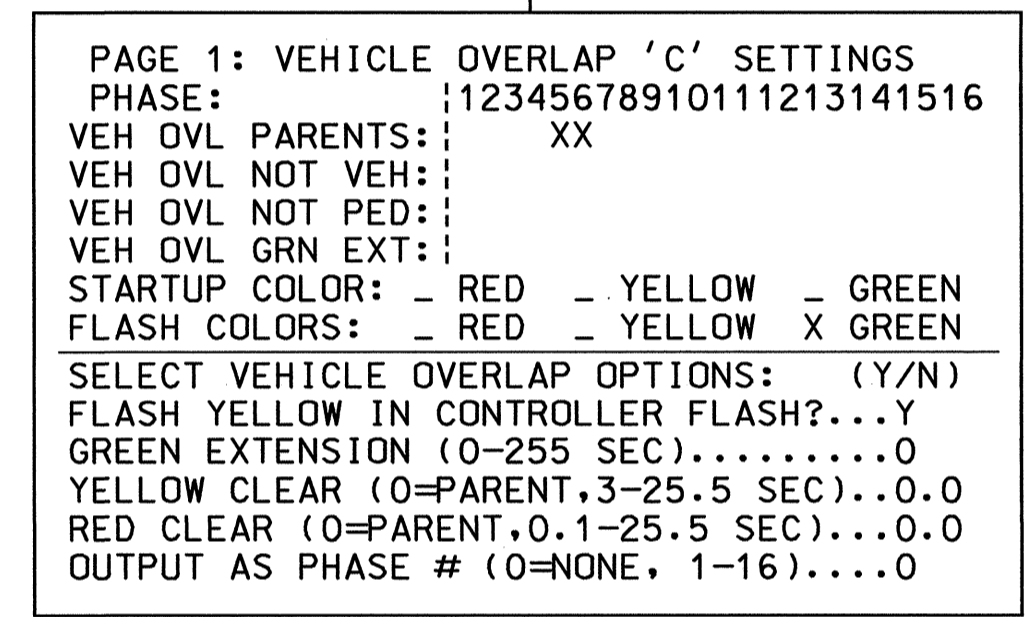
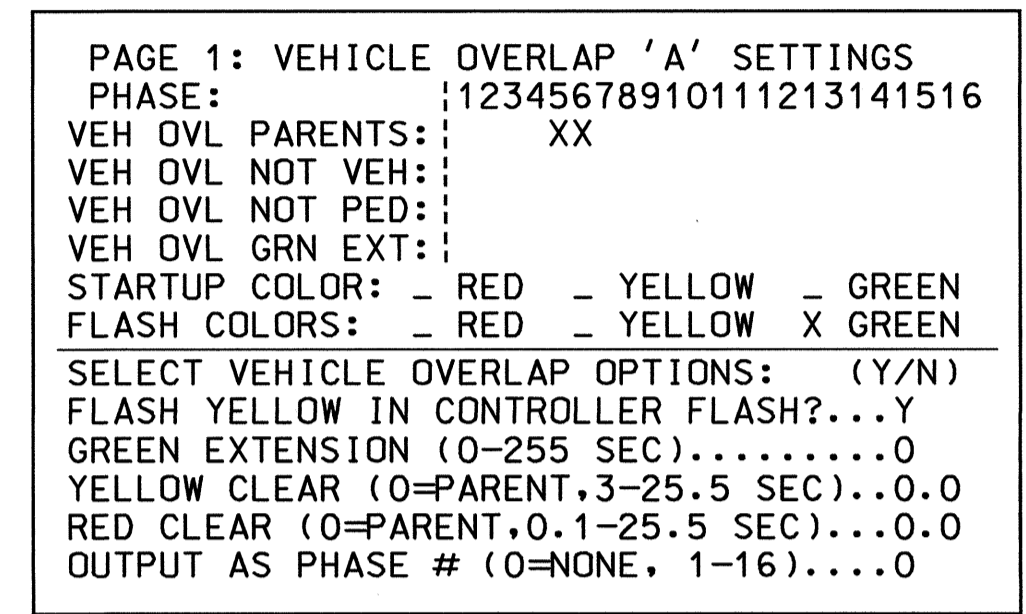
OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

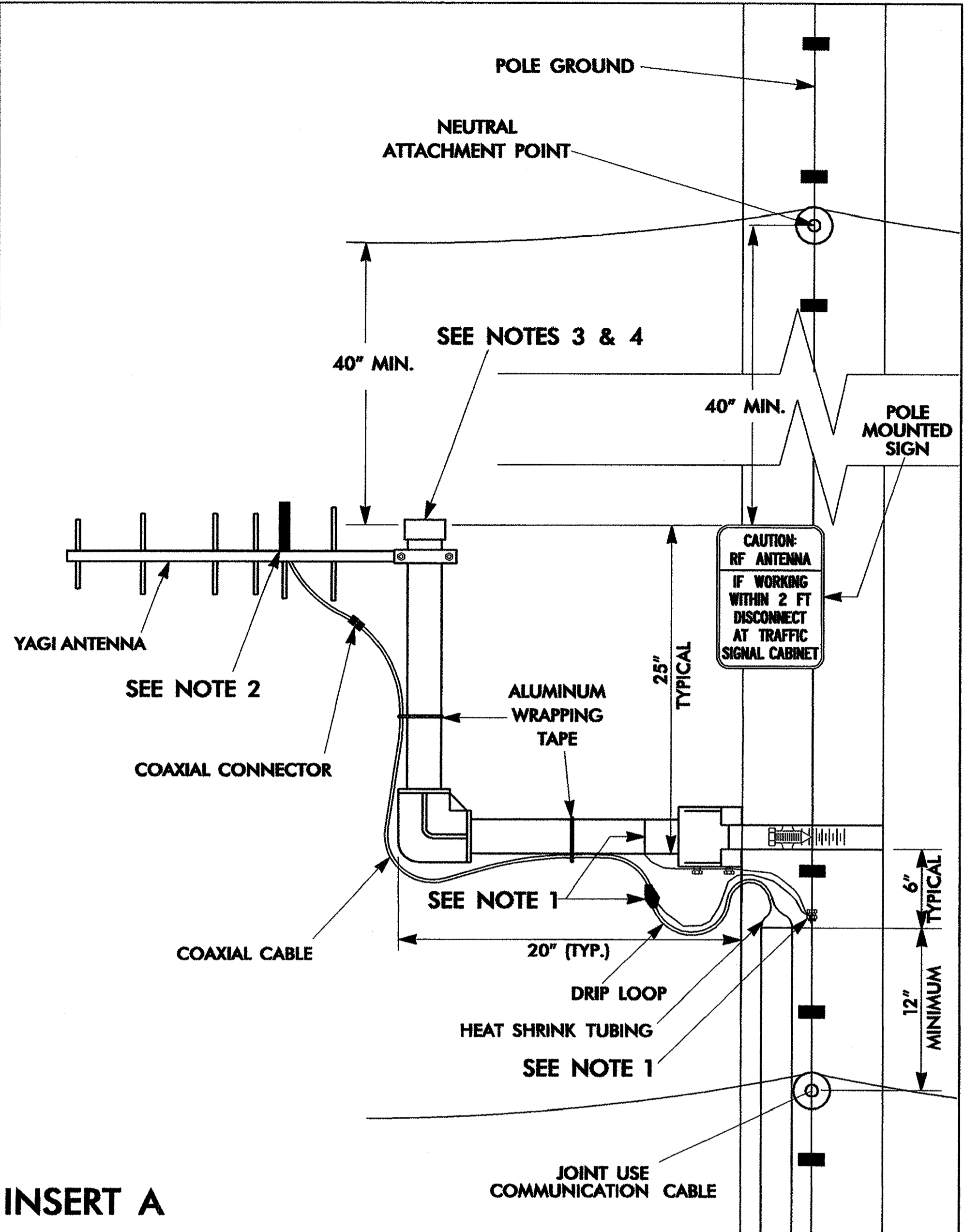


OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1710
DESIGNED: December 2009
SEALED: 01/04/2010
REVISED:

ELECTRICAL DETAIL SHEET 2 OF 2

<p>Prepared in the Office of: TRANSPORTATION Mobility and Safety Solutions, Inc. DIVISION OF TRANSPORTATION Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529</p>	ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 2805 (Harrisburg Road) at SR 2804 (Reedy Creek Road)		SEAL
	Division 10 PLAN DATE: January 2010 PREPARED BY: C. Strickland	Mecklenburg County Charlotte REVIEWED BY: T. J. J... REVIEWED BY:	
REVISIONS:			SIG. INVENTORY NO. 10-1710

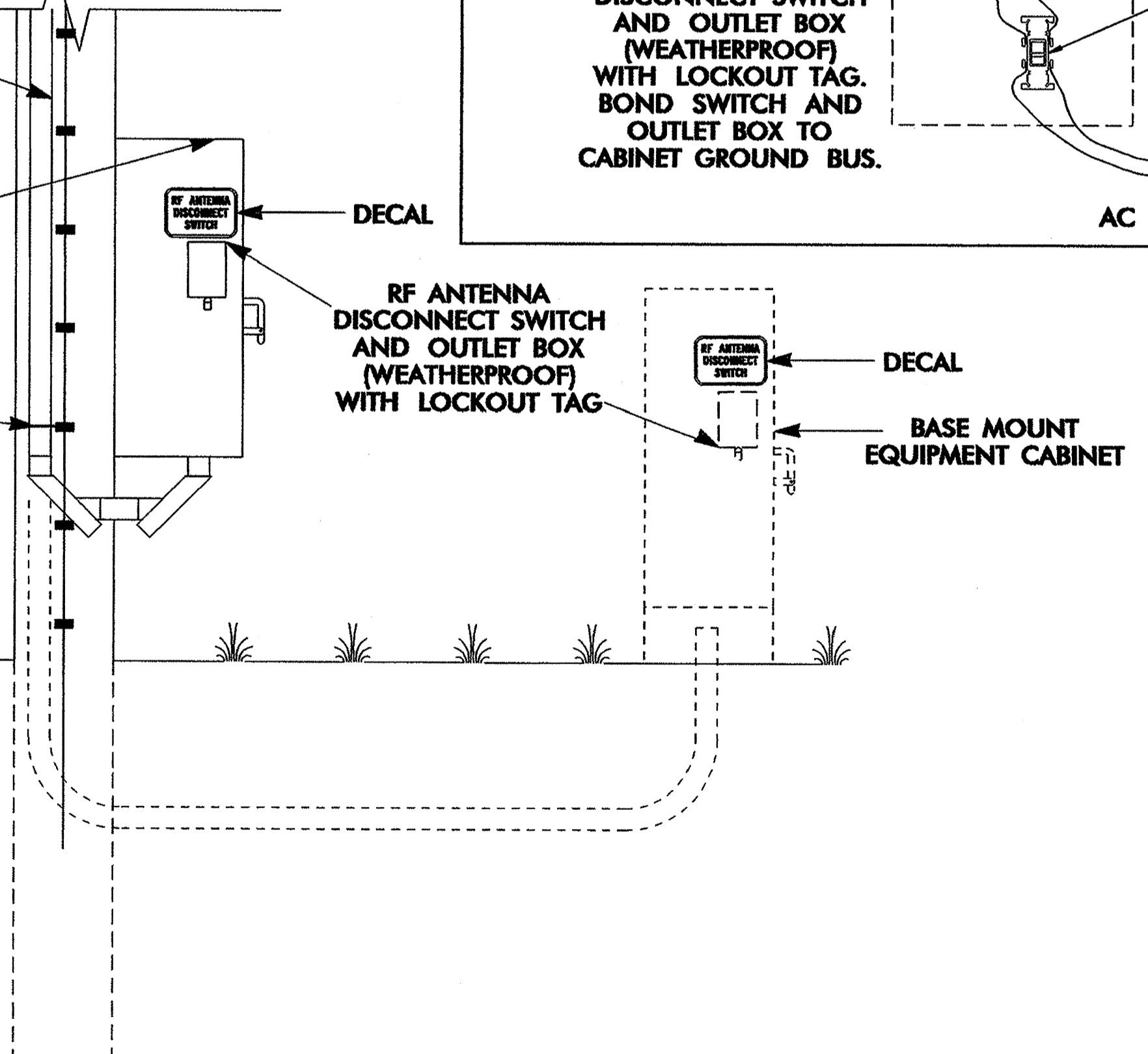
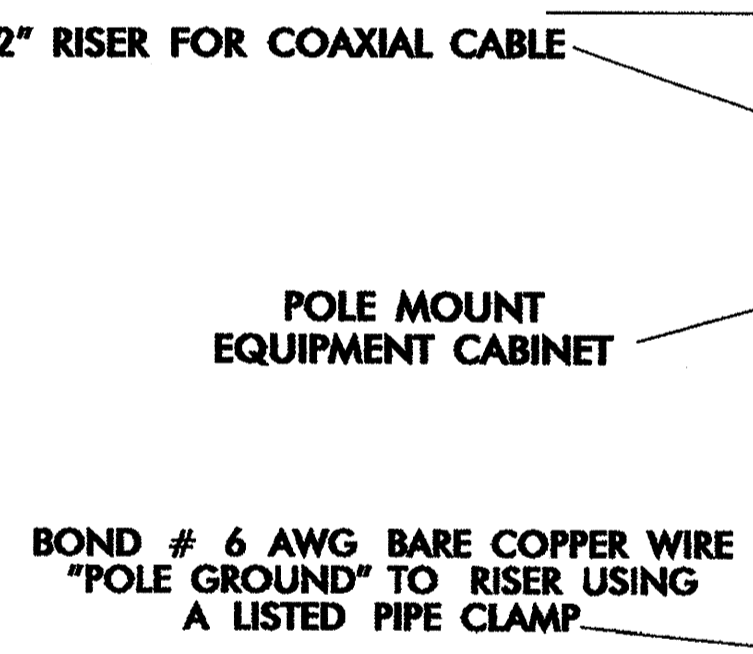
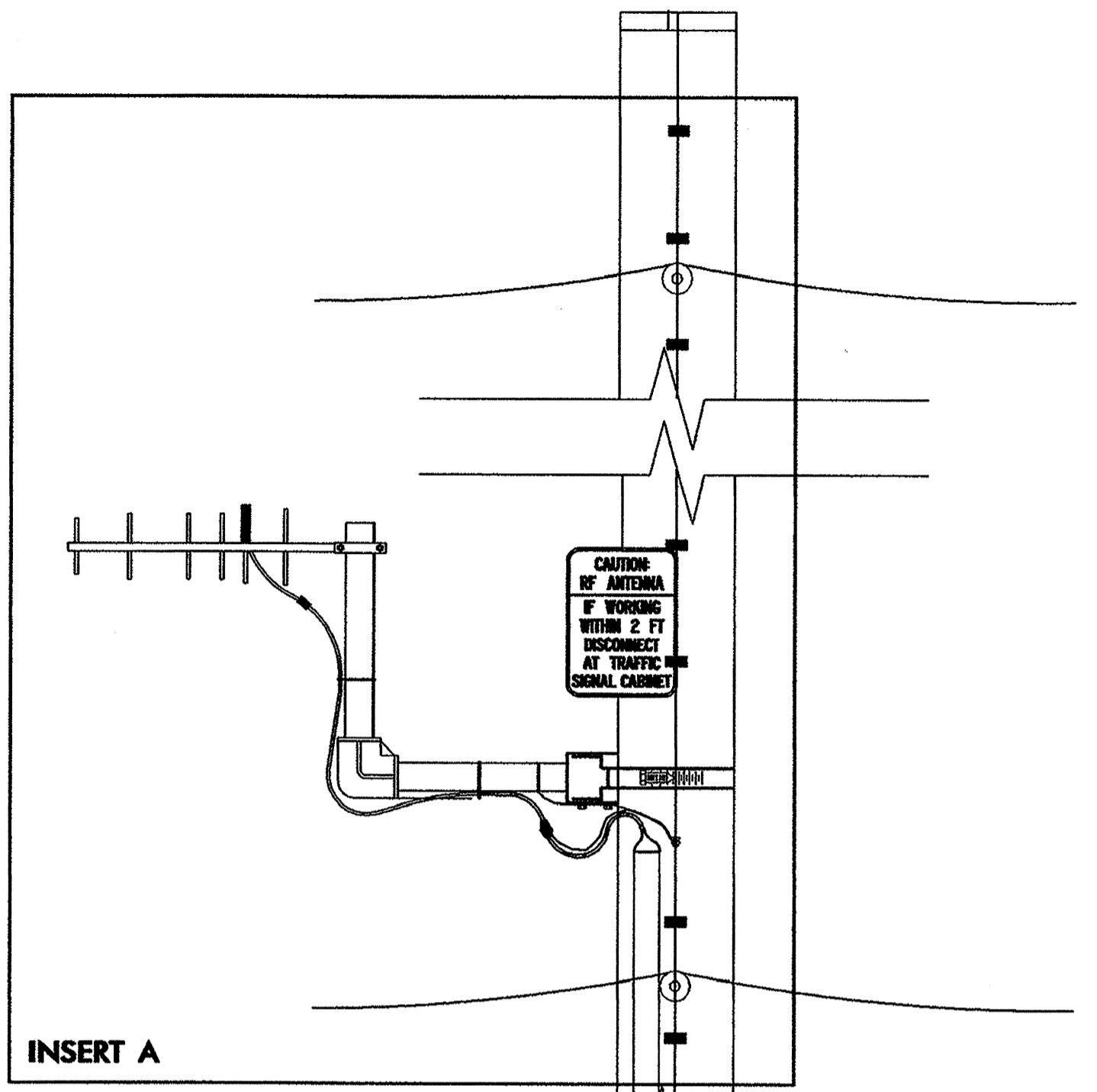


INSERT A

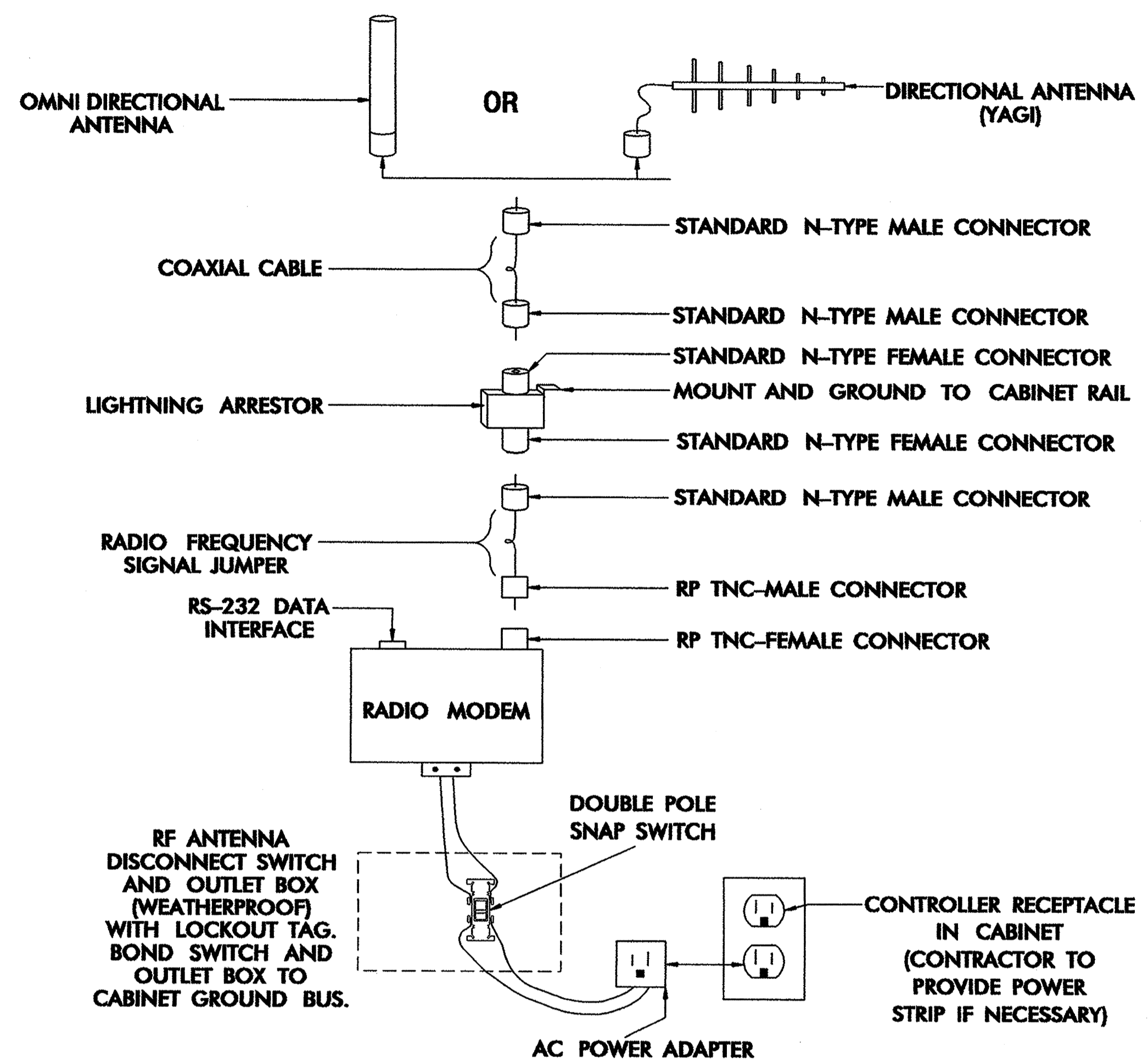
NOTES

- WOOD POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE GROUND USING A SPLIT BOLT CONNECTOR. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE GROUND. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "POLE GROUND" IS IN PLACE.

METAL POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE OR EXISTING SYSTEM GROUND USING A METHOD APPROVED BY THE ENGINEER. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE BY A METHOD APPROVED BY THE ENGINEER. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "SYSTEM GROUND" IS IN PLACE.
- YAGI ANTENNA SHOWN IN VERTICAL POLARIZATION POSITION FOR CLARIFICATION. TYPICALLY INSTALL ANTENNA IN HORIZONTAL POLARIZATION POSITION.
- TO CONSERVE VERTICAL SPACING ON THE POLE (JOINT-USE OR SIGNAL POLE) WITH REGARDS TO THE SURROUNDING UTILITIES, INSTALL THE ANTENNA MOUNTING HARDWARE USING ONE OF THE TWO METHODS LISTED BELOW: (ENSURE THAT THE MOUNTING METHOD DOES NOT DEGRADE THE ANTENNA'S SIGNAL INTEGRITY)
 - ROTATE THE VERTICAL SUPPORT ARM 90 DEGREES SUCH THAT THE ANTENNA IS AT THE SAME HEIGHT AS THE HORIZONTAL SUPPORT ARM.
 - ELIMINATE THE VERTICAL SUPPORT ARM AND MOUNT THE ANTENNA TO THE HORIZONTAL SUPPORT ARM.
 - ANTENNA, ANTENNA SUPPORT ARM, AND SIGN TO MAINTAIN A 40" SEPARATION FROM NEUTRAL /POWER AND 12" FROM OTHER UTILITIES.
- INSTALL AN END CAP TO SEAL THE EXPOSED END OF THE MOUNTING PIPE.



ANTENNA AND COAXIAL CABLE CONNECTION SCHEMATIC



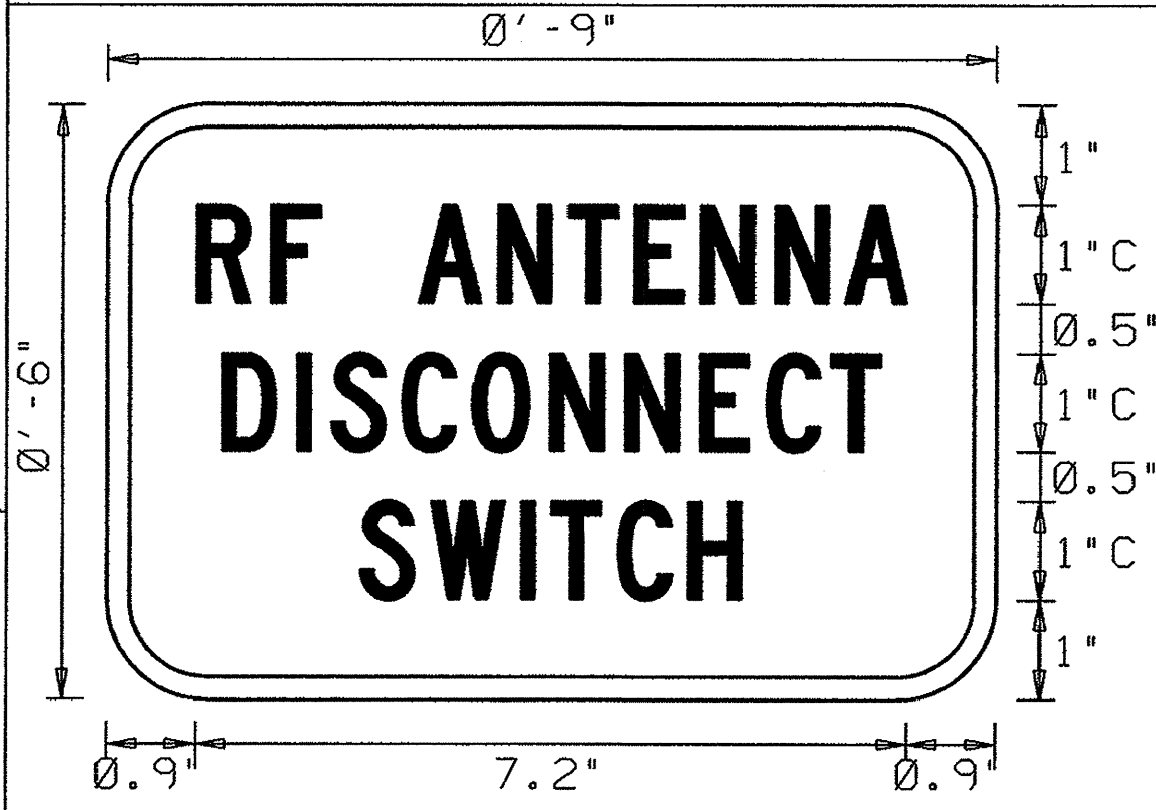
	WIRELESS RADIO ANTENNA TYPICAL DETAILS		
	PLAN DATE: JULY 2005 PREPARED BY: A. CREECH	REVIEWED BY: I. N. AVERY REVIEWED BY: A. T. FAULKNER	

DECAL

POLE MOUNTED SIGN

SIGN NUMBER: SPO5224
 TYPE: DECAL
 QUANTITY:
 SIGN WIDTH: 0'-9"
 HEIGHT: 0'-6"
 TOTAL AREA: 0.4 Sq.Ft.
 BORDER TYPE: FLUSH
 RECESS: 0"
 WIDTH: 0.25"
 RADII: 1"
 NO. Z BARS:
 LENGTH:
 BACKG COLOR: Yellow
 COPY COLOR: Black
 SYMBO L X Y WID HT
 MAT'L: 0.063" (1.6 mm) ALUMINUM

DESIGN BY: S PIOTROWSKI DATE: Jul 18, 2005 CHECKED BY: SUSAN B. KUNZ
 PROJECT ID: ID DIV: INTELLIGENT TRANSPORTATION SYSTEM



NOTE:
 THIS
 SIGN
 SHALL
 BE
 PRODUCED
 AS
 A
 DECAL

- USE NOTES: 2, 4
- Legend and border shall be direct applied Type III reflective sheeting.
 - Legend and border shall be direct applied non-reflective sheeting.
 - Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.
 - Background shall be Type III reflective sheeting.
 - Background shall be Type I reflective sheeting.
 - Center arrow(s) vertically on sign.
 - Bottom panel shall be yellow Type III sheeting. Legend shall be direct applied black non-reflective sheeting. Yellow panel is:

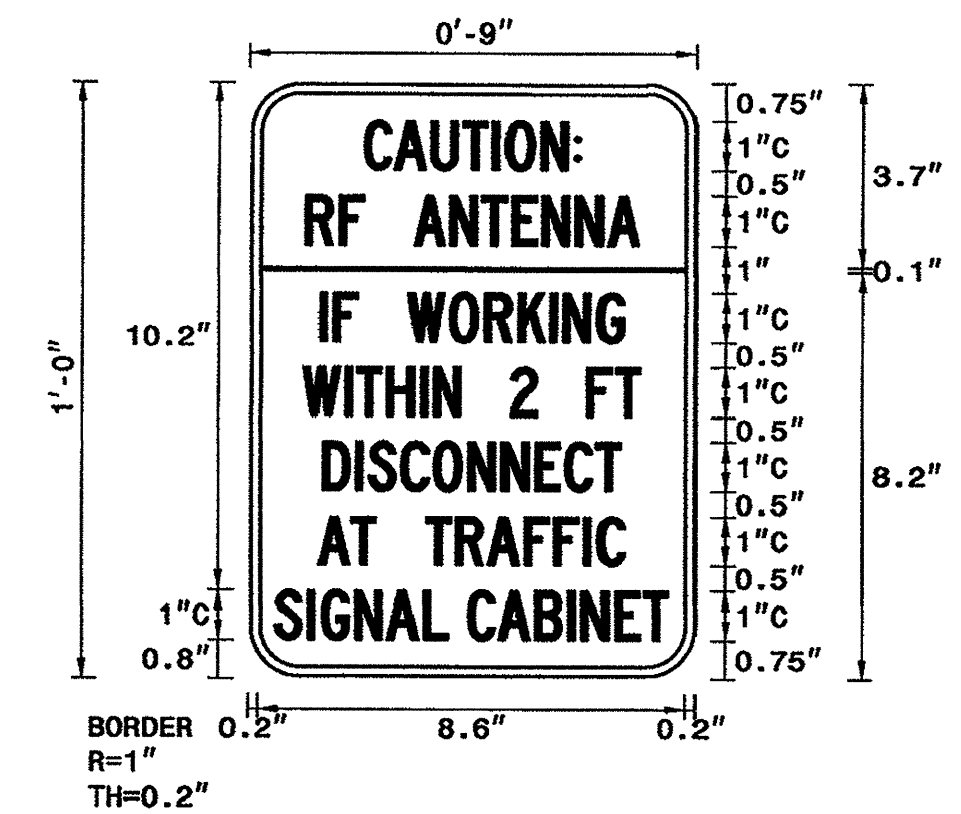
LETTER POSITIONS

Letter spacings are to start of next letter												Series/Size Text Length	
	R	F		A	N	T	E	N	N	A			C1
0.9	0.8	0.5	1	0.8	0.7	0.7	0.7	0.8	0.7	0.6	0.9		7.2
	D	I	S	C	O	N	N	E	C	T			C1
1.2	0.8	0.3	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.5	1.2		6.7
	S	W	I	T	C	H							C1
2.6	0.7	0.9	0.3	0.7	0.7	0.5	2.6						3.9

Spacing Factor is 1 unless specified otherwise

SIGN NUMBER: SPO5223
 TYPE: D
 QUANTITY:
 SIGN WIDTH: 0'-9"
 HEIGHT: 1'-0"
 TOTAL AREA: 0.8 Sq.Ft.
 BORDER TYPE: FLUSH
 RECESS: 0"
 WIDTH: 0.2"
 RADII: 1"
 NO. Z BARS:
 LENGTH:
 BACKG COLOR: Yellow
 COPY COLOR: Black
 SYMBO L X Y WID HT
 BAR 0.2 8.2 8.6 1.0
 MAT'L: 0.063" (1.6 mm) ALUMINUM

DESIGN BY: M. TRACEY DATE: Oct 25, 2007 CHECKED BY: SUSAN KUNZ
 PROJECT ID: DIV: INTELLIGENT TRANSPORTATION SYSTEMS



- USE NOTES: 2, 4
- Legend and border shall be direct applied Type III reflective sheeting.
 - Legend and border shall be direct applied non-reflective sheeting.
 - Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.
 - Background shall be Type III reflective sheeting.
 - Background shall be Type I reflective sheeting.
 - Center arrow(s) vertically on sign.
 - Bottom panel shall be yellow Type III sheeting. Legend shall be direct applied black non-reflective sheeting. Yellow panel is:

LETTER POSITIONS

Letter spacings are to start of next letter														Series/Size Text Length		
	C	A	U	T	I	O	N	:						C		
2.3	0.6	0.7	0.6	0.6	0.3	0.7	0.7	0.1	2.3					4.4		
	R	F		A	N	T	E	N	N	A				C		
1.2	0.7	0.5	1	0.7	0.6	0.6	0.6	0.7	0.6	0.6	1.2			6.7		
	I	F		W	O	R	K	I	N	G				C		
1.4	0.3	0.5	1	0.8	0.7	0.7	0.6	0.3	0.7	0.5	1.4			6.1		
	W	I	T	H	I	N		2		F	T			C		
1.1	0.8	0.2	0.6	0.7	0.3	0.5	1	0.5	1	0.6	0.5	1.1		6.8		
	D	I	S	C	O	N	N	E	C	T				C		
1.5	0.7	0.3	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.5	1.5			6		
	A	T		T	R	A	F	F	I	C				C		
1.4	0.7	0.5	1	0.6	0.6	0.7	0.6	0.6	0.3	0.5	1.4			6.2		
	S	I	G	N	A	L		C	A	B	I	N	E	T	C	
0.5	0.7	0.3	0.7	0.6	0.7	0.5	0.4	0.6	0.7	0.7	0.3	0.7	0.6	0.5	0.5	7.9

Spacing Factor is 1 unless specified otherwise

NORTH CAROLINA D.O.T. SIGN DETAIL

750 N. Greenfield Blvd., Cary, NC 27529

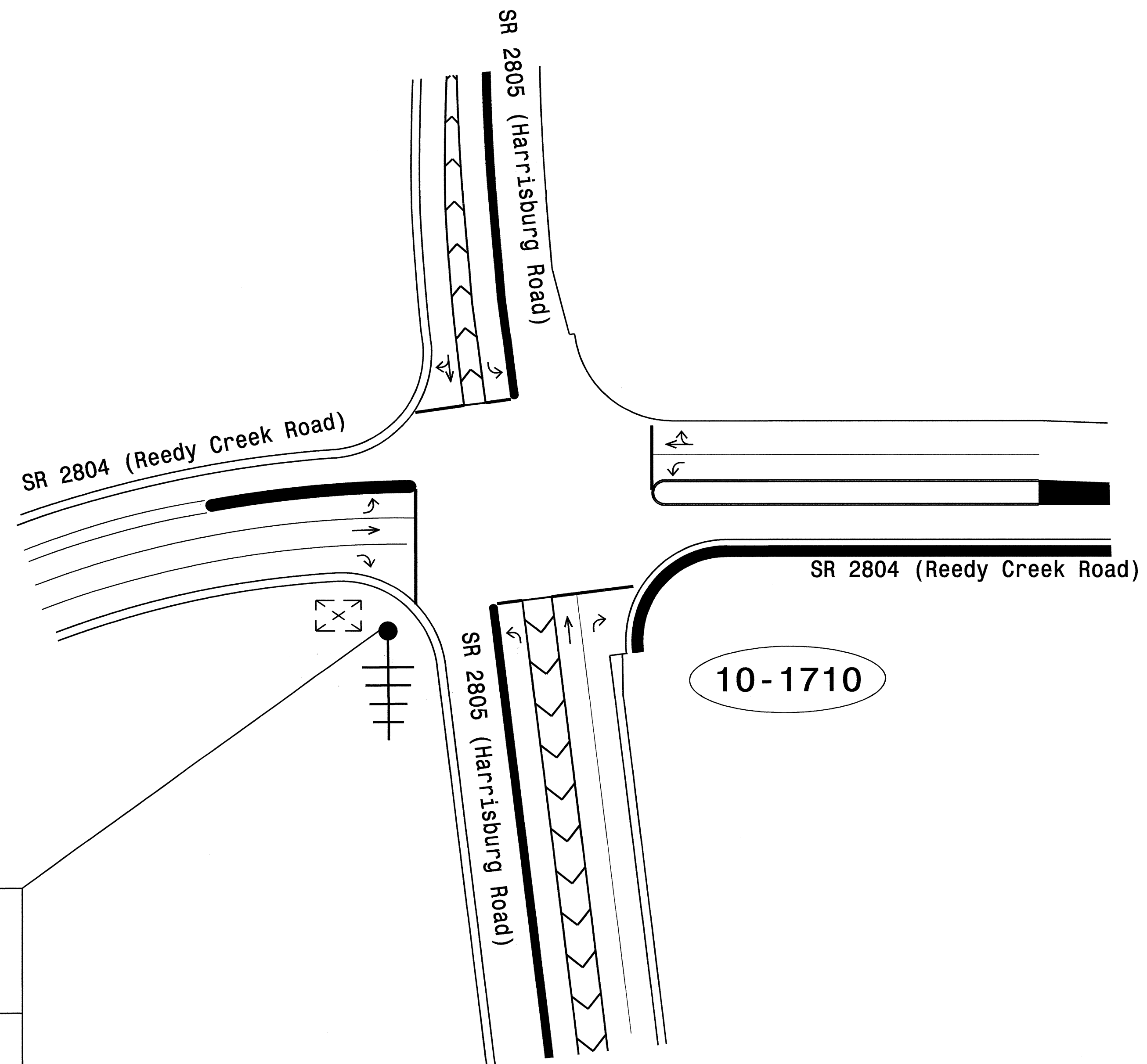
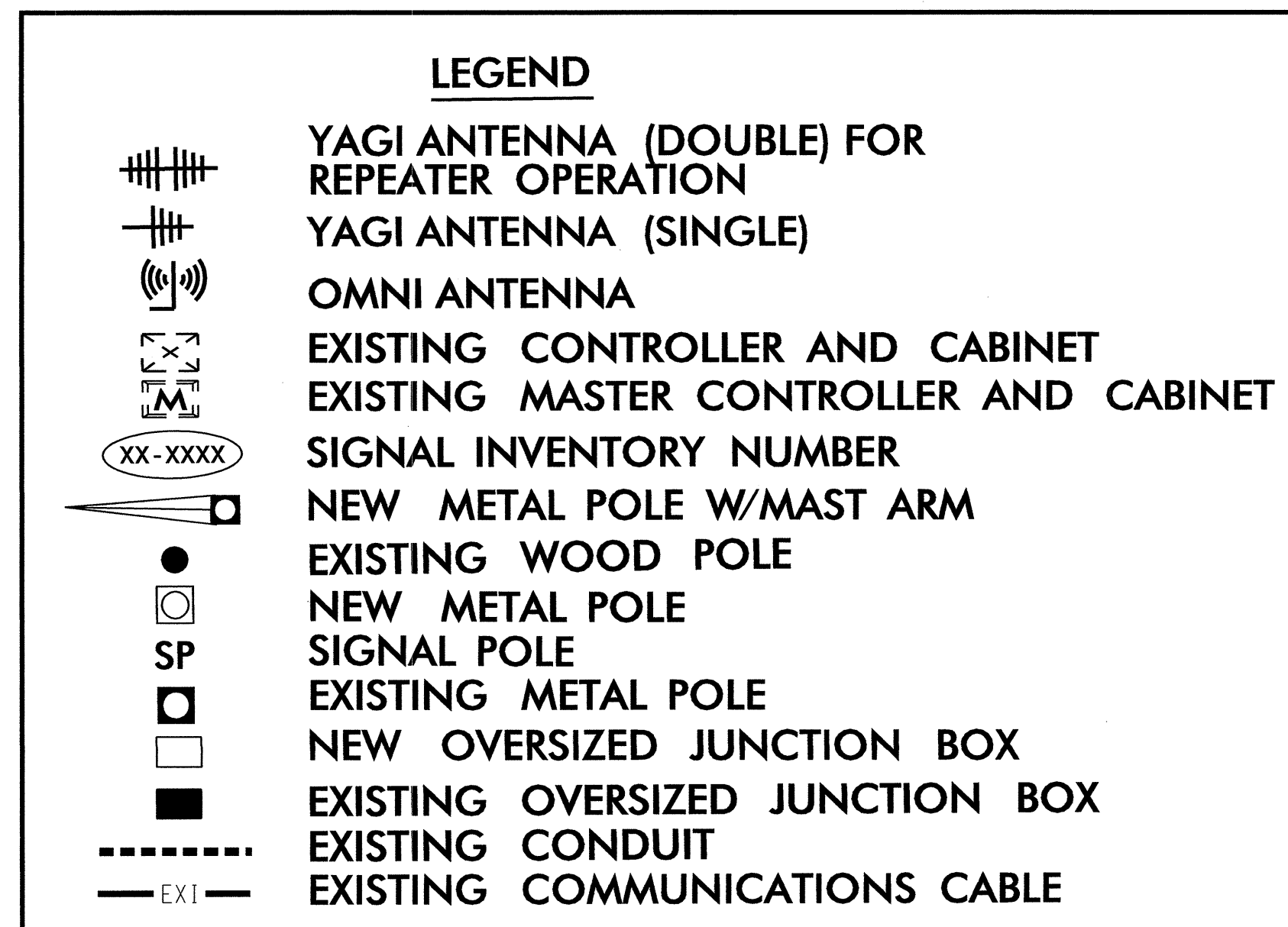
**WIRELESS
 RADIO ANTENNA
 TYPICAL DETAILS**

PLAN DATE: JULY 2005 REVIEWED BY: I. N. AVERY
 PREPARED BY: A. CREECH REVIEWED BY: A. T. FAULKNER

SCALE: 0

SEAL
 NORTH CAROLINA
 PROFESSIONAL
 ENGINEER
 CATEGORY A, FULL

Signature: Gregory A. Faulkner
 Date: 9/12/05



INSTALL 8.5 DB GAIN
YAGI ANTENNA
HORIZONTALLY POLARIZED

ATTACH ANTENNA
12" ABOVE SIGNAL CABLE

INTERFACE WITH EXISTING
WIRELESS SYSTEM
INSTALLED BY OTHERS

10-1722

NOTES FOR WIRELESS COMMUNICATIONS:

1. INSTALL COAXIAL CABLE:
 - A. ON WOOD POLES, REQUIRING A NEW RISER, INSTALL A 2" RISER WITH WEATHERHEAD TO ROUTE THE COAXIAL CABLE TO THE ANTENNA. ON POLES WITH EXISTING RISERS WITH WEATHER HEADS REUSE THE RISER ASSEMBLY.
 - B. ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - D. BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
2. IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
3. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER. (NOTE: RF WARNING SIGN NOT REQUIRED ON NCDOT-OWNED POLE.)
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
5. INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET. (NOTE: RF ANTENNA DISCONNECT SWITCH NOT REQUIRED ON NCDOT-OWNED POLE.)
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

 <small>750 N. Greenfield Place, Garner, NC 27529</small>	SR 2805 (HARRISBURG ROAD) AT SR 2804 (REEDY CREEK ROAD)	
	DIVISION 10 Mecklenburg Co. Charlotte PLAN DATE: December, 2009 REVIEWED BY: S. C. Wardle PREPARED BY: I. N. Avery REVIEWED BY: G. A. Fuller	REVISIONS: _____ INIT.: _____ DATE: _____ _____ _____ _____
	SIGNATURE: <i>Gregory A. Fuller</i> 12/7/09 <small>CADD File name:</small>	