

**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

**The documents contained herein were originally issued  
and sealed by the individuals whose names and license  
numbers appear on each page, on the dates appearing  
with their signature on that page.**

**This file or an individual page  
shall not be considered a certified document.**

See Sheet 1-A For Index of Sheets

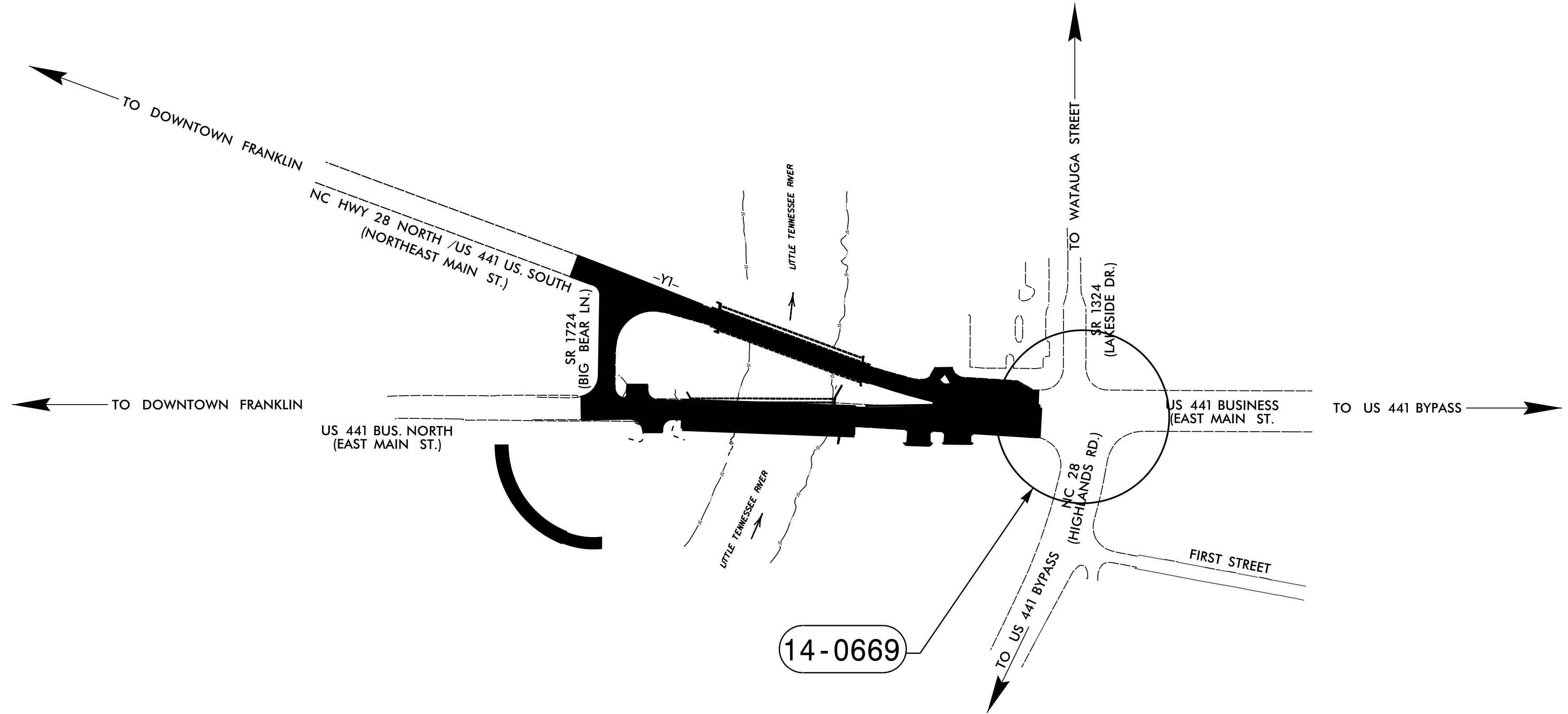
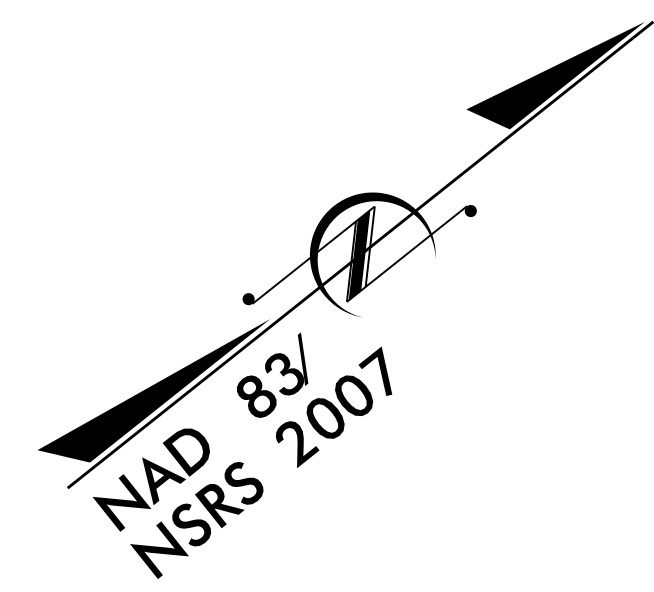
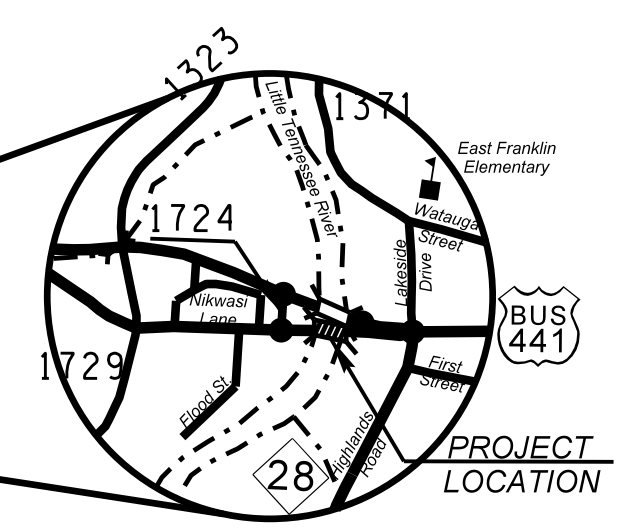
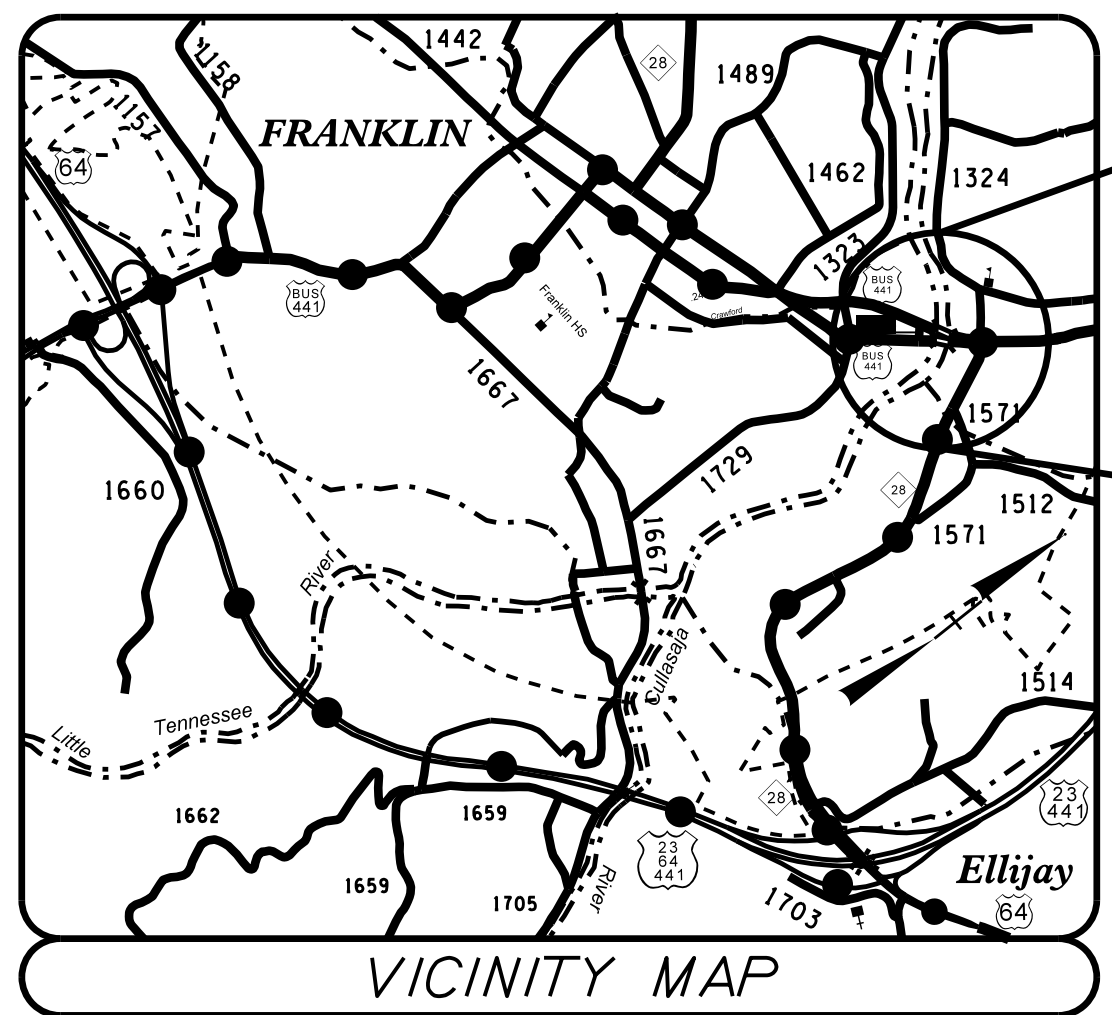
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**MACON COUNTY**

**LOCATION: BRIDGE No. 22 OVER LITTLE TENNESSEE RIVE  
ON US 441 BUSINESS**

**TYPE OF WORK: TRAFFIC SIGNALS**

**Project: B-5125**



**THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF FRANKLIN.**

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

Sheet #	Reference #
Sig. 1.0	-----
Sig. 2.0 - 2.1	14-0669 TEMP
Sig. 3.0 - 3.1	14-0669 FINAL
SCP. 1	-----
SCP. 2	-----
SCP. 3 - 4	-----

**Index of Plans**

Location/Description
Title Sheet
US 441 BUS. (East Main Street) at NC 28 (Highland Road) / SR 1324 (Lakeside Drive)
US 441 BUS. (East Main Street) at NC 28 (Highland Road) / SR 1324 (Lakeside Drive)
Construction Notes
Communications Cable and Conduit Routing Plans
Splice Detail

**INTELLIGENT TRANSPORTATION AND SIGNALS UNIT**

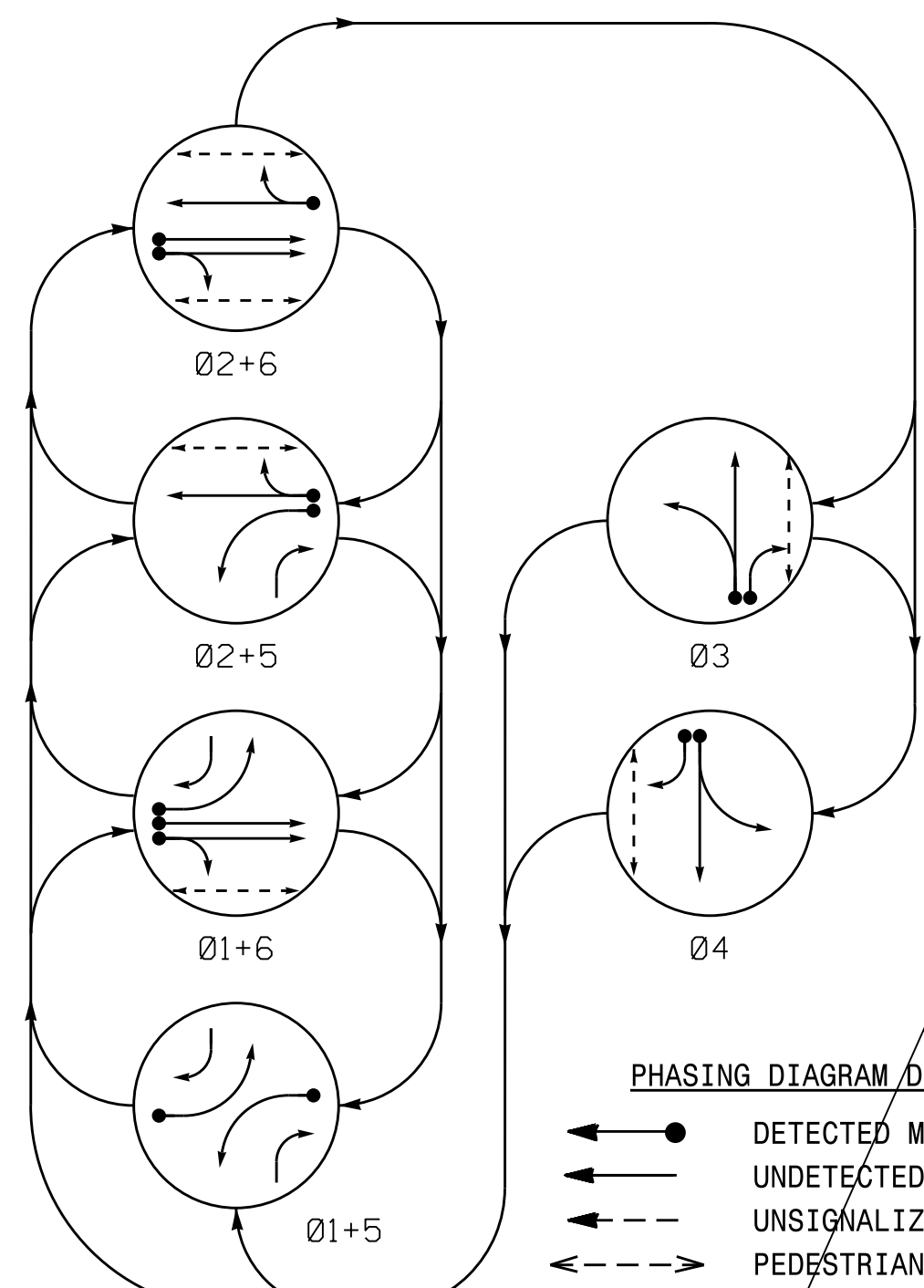
Contacts:  
**Gregory A. Fuller, PE** - State ITS and Signals Engineer  
**Timothy J. Williams, PE** - Western Region Signals Engineer  
**Keith M. Mims, PE** - Signal Equipment Design Engineer

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



P:\APR-2016-09\B-5125\Traffic\SIGNALS\Design\Traffic\sheet\B5125\_s1gnal\_tsh.dgn

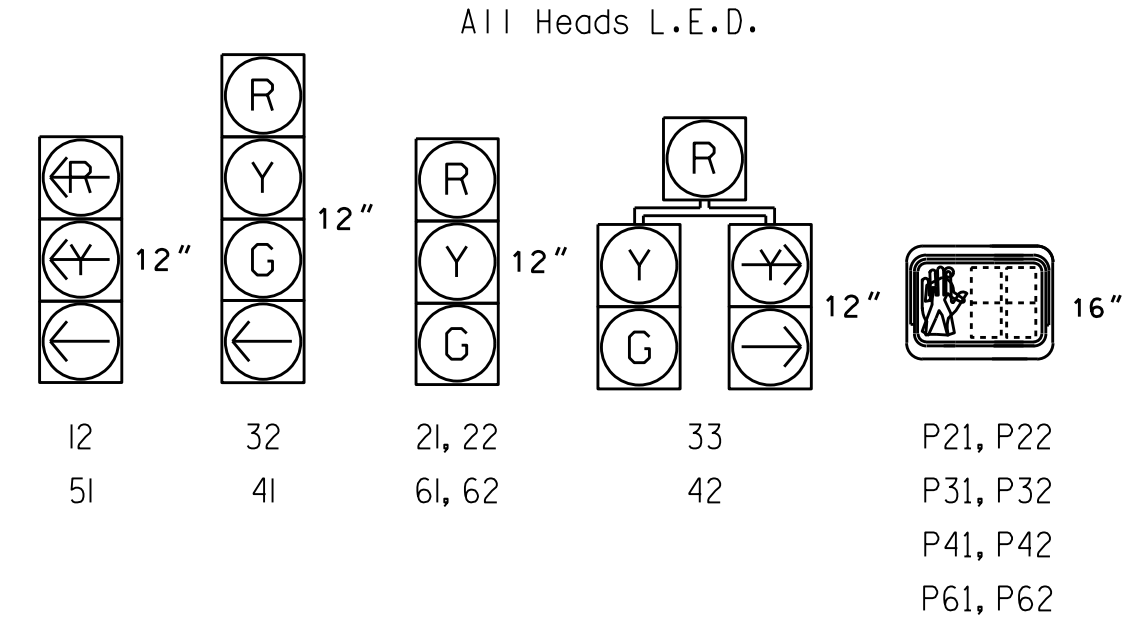
**PHASING DIAGRAM**



**TABLE OF OPERATION**

SIGNAL FACE	PHASE						FLASH
	01+5	01+6	02+5	02+6	03	04	
12	-	-	R	R	R	R	Y
21, 22	R	R	G	G	R	R	Y
32	R	R	R	R	G	R	R
33	R	R	R	R	G	R	R
41	R	R	R	R	R	G	R
42	R	R	R	R	R	G	R
51	-	-	R	R	R	R	Y
61, 62	R	G	R	G	R	R	Y
P21, P22	DW	DW	W	W	DW	DRK	
P31, P32	DW	DW	DW	DW	W	DRK	
P41, P42	DW	DW	DW	DW	W	DRK	
P61, P62	DW	W	DW	W	DW	DRK	

**SIGNAL FACE I.D.**



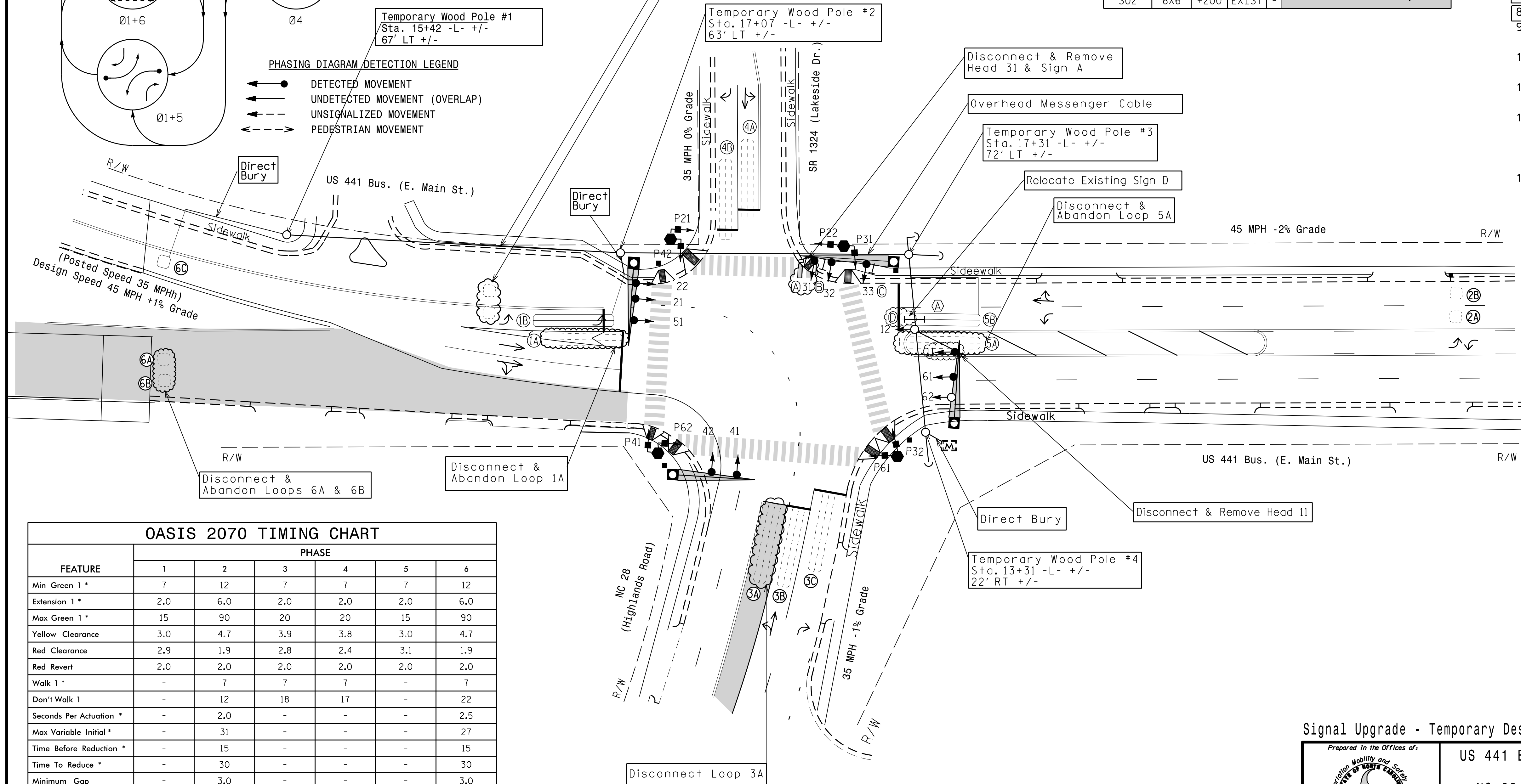
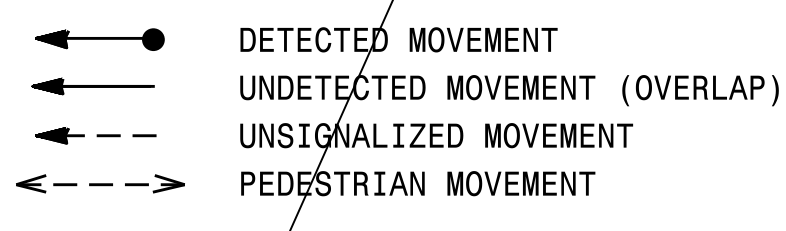
**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
IA	6X40	0	2-4-2	-	<b>Disconnect Loop</b>						
IB	6X40	+5	2-4-2	Y	1	Y	Y	-	3	-	-
2A, 2B	6X6	270	EXIST	-	2	Y	Y	-	-	-	-
3A	6X40	+5	2-4-2	-	<b>Disconnect Loop</b>						
3B	6X40	+5	2-4-2	-	3	Y	Y	-	-	-	-
3C	6X40	+5	2-4-2	-	3	Y	Y	-	15	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	3	-	-
4B	6X40	+5	2-4-2	-	4	Y	Y	-	15	-	-
5A	6X40	+5	2-4-2	-	<b>Disconnect Loop</b>						
5B	6X40	+5	2-4-2	Y	5	Y	Y	-	3	-	-
6A	6X6	270	5	-	<b>Disconnect Loops</b>						
6B	6X6	270	5	-	<b>Disconnect Loops</b>						
6C	6X6	230	6	Y	6	Y	Y	-	-	-	-
S01	6X6	+200	EXIST	-	<b>Disconnect Loops</b>						
S02	6X6	+200	EXIST	-	<b>Disconnect Loops</b>						

**6 Phase Fully Actuated US 441 Bus./Main Street (Franklin CBD)**

- 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.
  - The order of phase 3 and phase 4 may be reversed.
  - Disconnect and maintain existing loop 3A for future use.
  - Disconnect and abandon existing loops 1A, 5A, 6A, 6B, S01 & S02.
  - Disconnect and remove existing signal heads 11 & 31 and sign "A".
  - Relocate existing "No U-Turn" Sign "D".
  - Set all detector units to presence mode.
  - Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
  - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
  - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
  - Closed loop system data: Master Asset # 11411, Controller Asset # 0669.

**PHASING DIAGRAM DETECTION LEGEND**

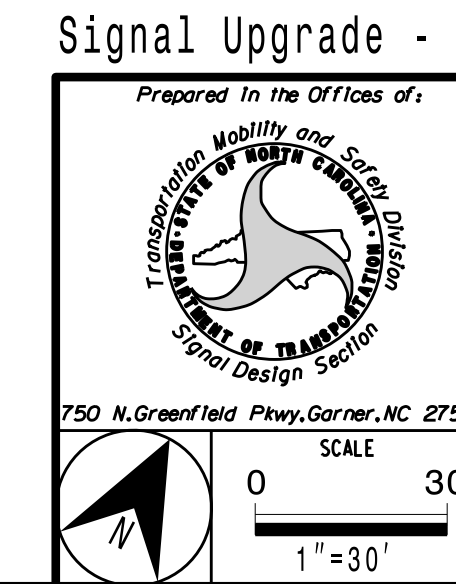
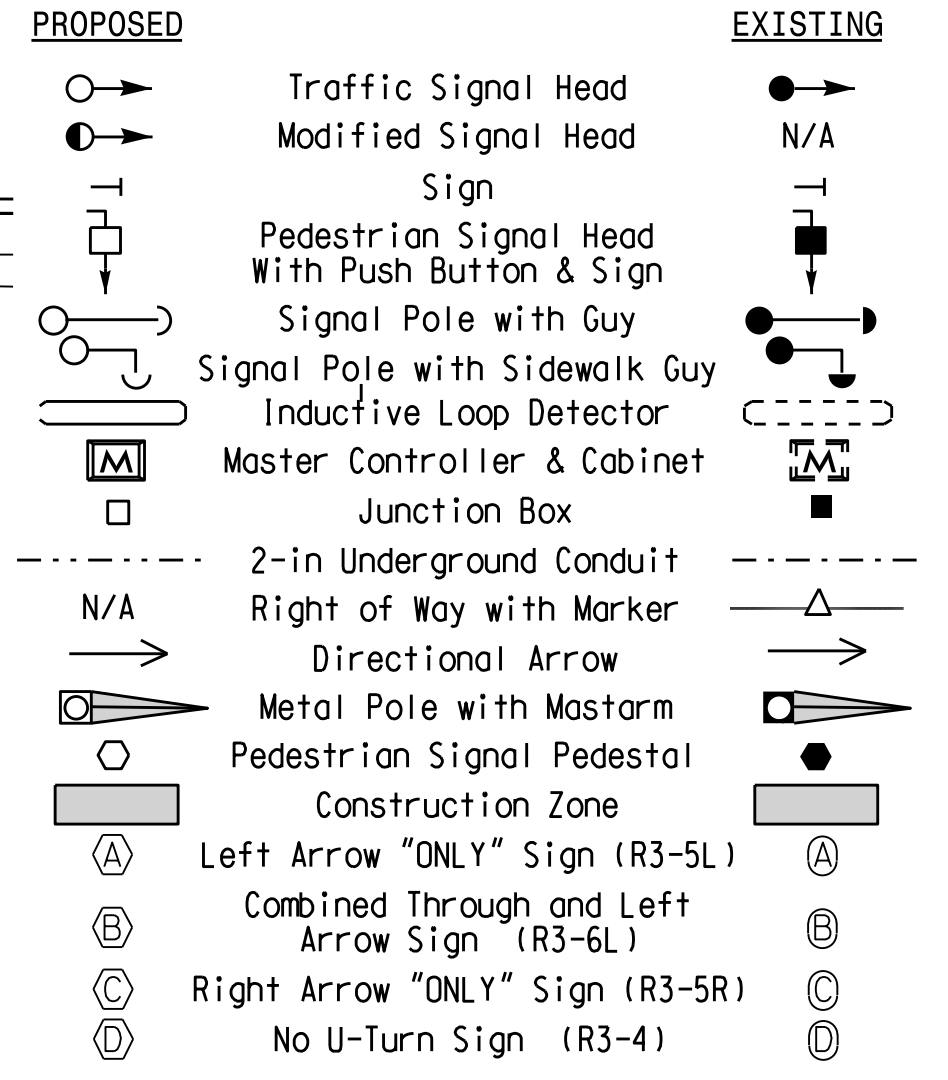


**OASIS 2070 TIMING CHART**

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	15	90	20	20	15	90
Yellow Clearance	3.0	4.7	3.9	3.8	3.0	4.7
Red Clearance	2.9	1.9	2.8	2.4	3.1	1.9
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	7	7	-	7
Don't Walk 1	-	12	18	17	-	22
Seconds Per Actuation *	-	2.0	-	-	-	2.5
Max Variable Initial *	-	31	-	-	-	27
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

**LEGEND**



Signal Upgrade - Temporary Design - TMP Phase I & II  
 at  
 US 441 Bus. (E. Main Street)  
 NC 28 (Highlands Road) /  
 SR 1324 (Lakeside Drive)  
 Division 14 Macon County Franklin  
 PLAN DATE: February 2016 REVIEWED BY: T. Williams  
 PREPARED BY: M. Mahbooba REVIEWED BY:  
 REVISIONS: \_\_\_\_\_ INIT. DATE \_\_\_\_\_  
 SCALE: 1"=30'

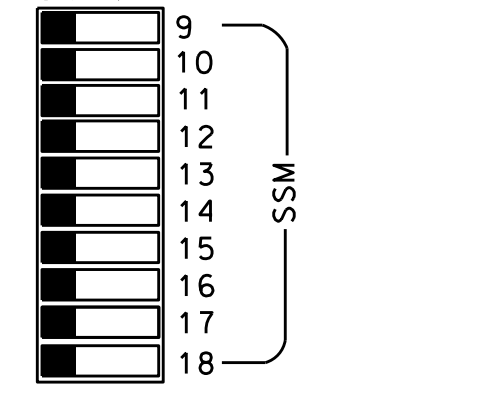
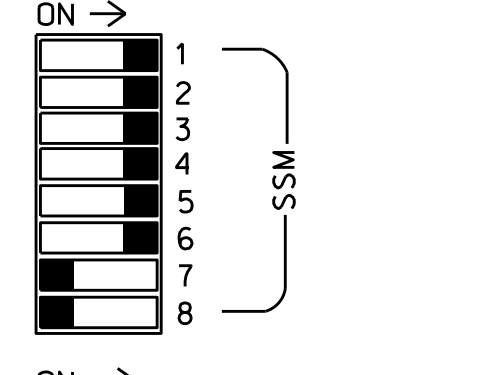
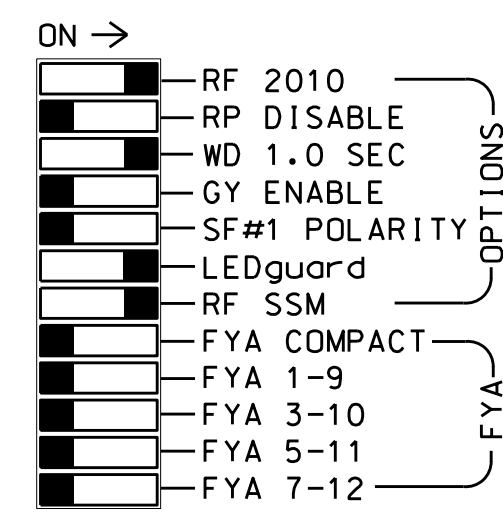
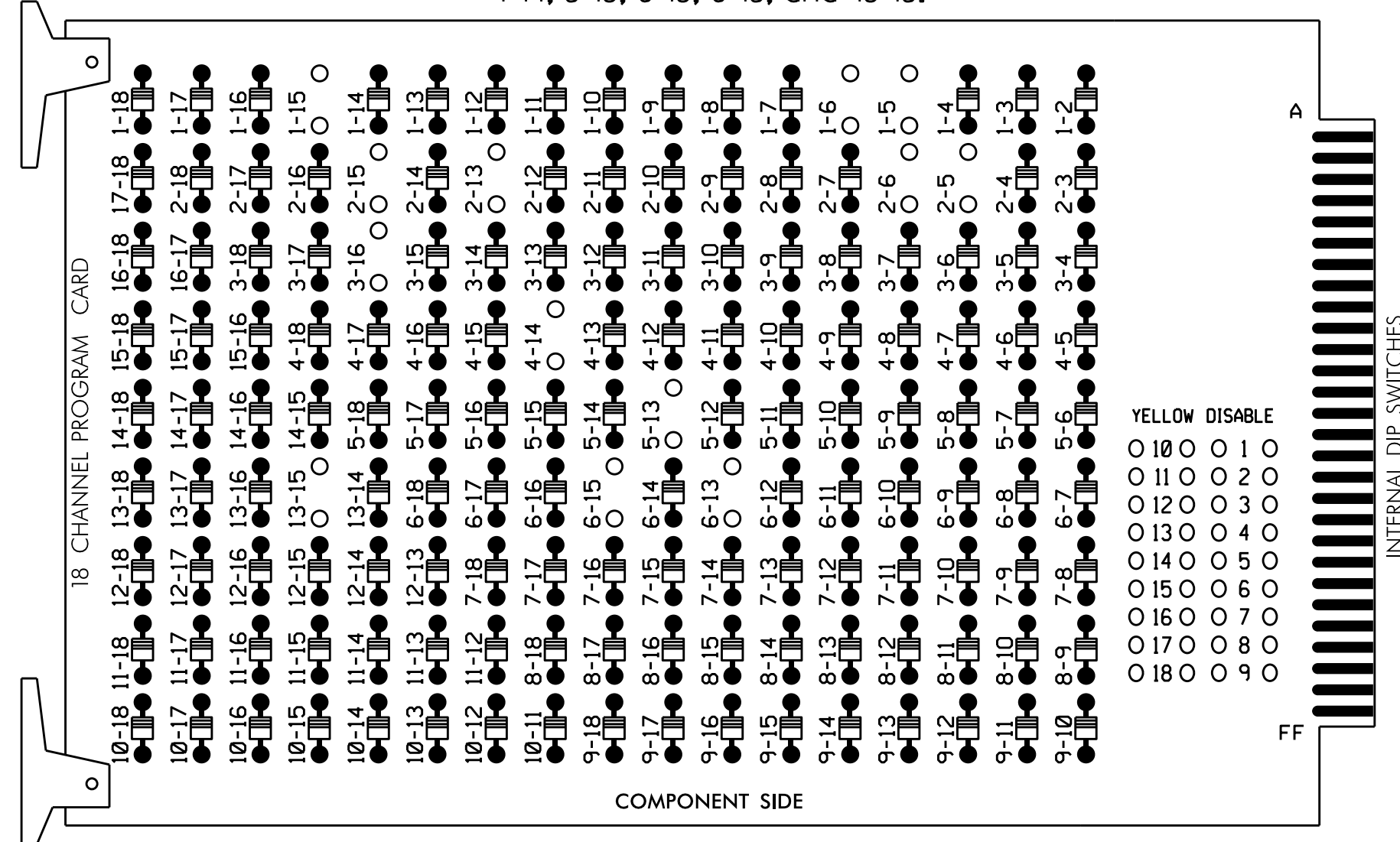
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED  
 SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 TIMOTHY J. WILLIAMS  
 3/1/2016  
 SIG. INVENTORY NO. 14-0669 T

01-MAR-2016 11:28  
 R:\mrb\proj\14-0669\sig\14-0669-001.dwg  
 mmb0000

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

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-16, 4-14, 5-13, 6-13, 6-15, and 13-15.



■ = DENOTES POSITION OF SWITCH

**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, 3, 4 and 6 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the US 441 Bus./ Main Street (Franklin CBD) Closed Loop System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S12  
 PHASES USED.....1,2,2PED,3,3PED,4,4PED,5,6,6PED  
 OVERLAPS.....NONE

**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 HEAD HOOK-UP CHART**

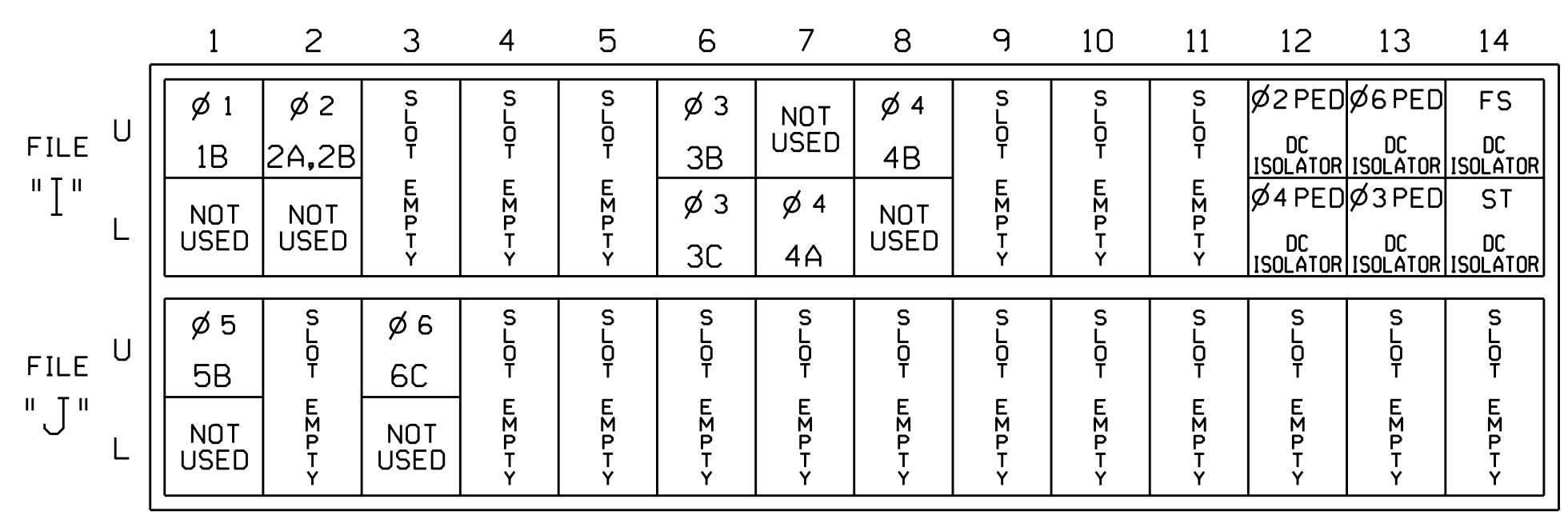
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12				
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16				
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED				
SIGNAL HEAD NO.	12	42	21,22	P21, P22	32	33	41	42	P41, P42	33	51	61,62	P61, P62	NU	NU	P31, P32
RED		128		116	116	101	101					134				
YELLOW			129		117	117	102	102					135			
GREEN				130		118	118	103	103				136			
RED ARROW	125												131			
YELLOW ARROW	126	126								132	132					
GREEN ARROW	127	127				118		103		133	133					
Hand icon						113				104				119		110
Walker icon										106					121	

NU = Not Used

NOTE: Existing heads 11 and 31 have been removed, and existing head 62 was changed from a 5-section to a 3-section head.

**INPUT FILE POSITION LAYOUT**

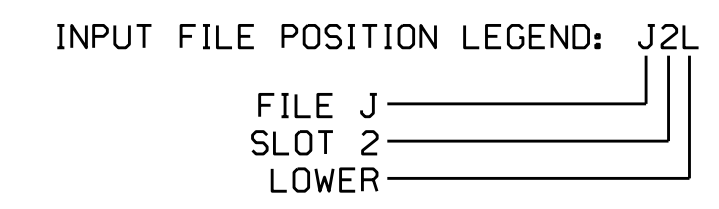
(front view)



**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			3
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			15
4A	TB6-3,4	I7L	78	40	44	4	Y	Y			3
4B	TB6-5,6	I8U	49	11	24	4	Y	Y			15
5B	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.



**PED 3 PROGRAMMING DETAIL**

(program controller as shown below)

**CHANGING OUTPUT ASSIGNMENTS**

- FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
- ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT #.
- SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' REGARDLESS OF DEFAULT PROGRAMMING
- ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR' BUTTON ON KEYBOARD.
- BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
- SELECT '1' (OUTPUT ASSIGNMENTS)
- ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT #.
- REPEAT STEPS # 3 AND # 4.

**CHANGING INPUT ASSIGNMENTS**

- FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
- CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
- MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3

PROGRAMMING COMPLETE

Electrical Detail - Temp Design - TMP Phase I & II DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details for: US 441 Bus. (E. Main Street) at NC 28 (Highlands Road)/ SR 1324 (Lakeside Drive)

Prepared In the Offices of:

PLAN DATE: February 2016 REVIEWED BY: T. Joyce  
 PREPARED BY: S. Armstrong REVIEWED BY:

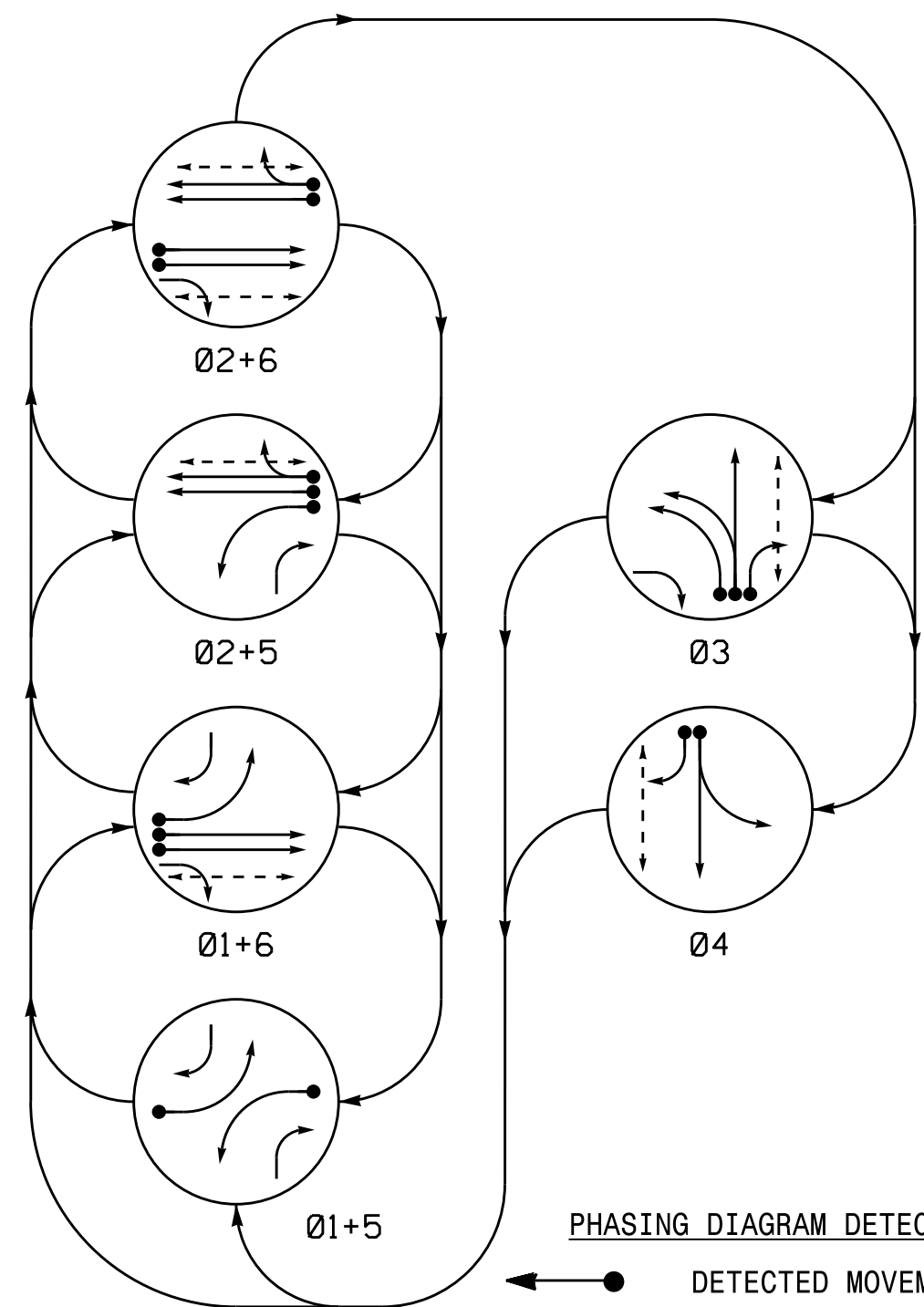
750 N. Greenfield Pkwy, Garner, NC 27529

Division 14 Macon County Franklin  
 KEITH M. MINS ENGINEER  
 3/8/2016  
 SIG. INVENTORY NO. 14-0669T

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0669T  
 DESIGNED: February 2016  
 SEALED: 3/1/2016  
 REVISED: N/A

09-0486-2016 10:57 S:\MITS\15\Sig\01\work\hgc\040669\_sm.elec.xxx.dgn sarmstrong

**PHASING DIAGRAM**



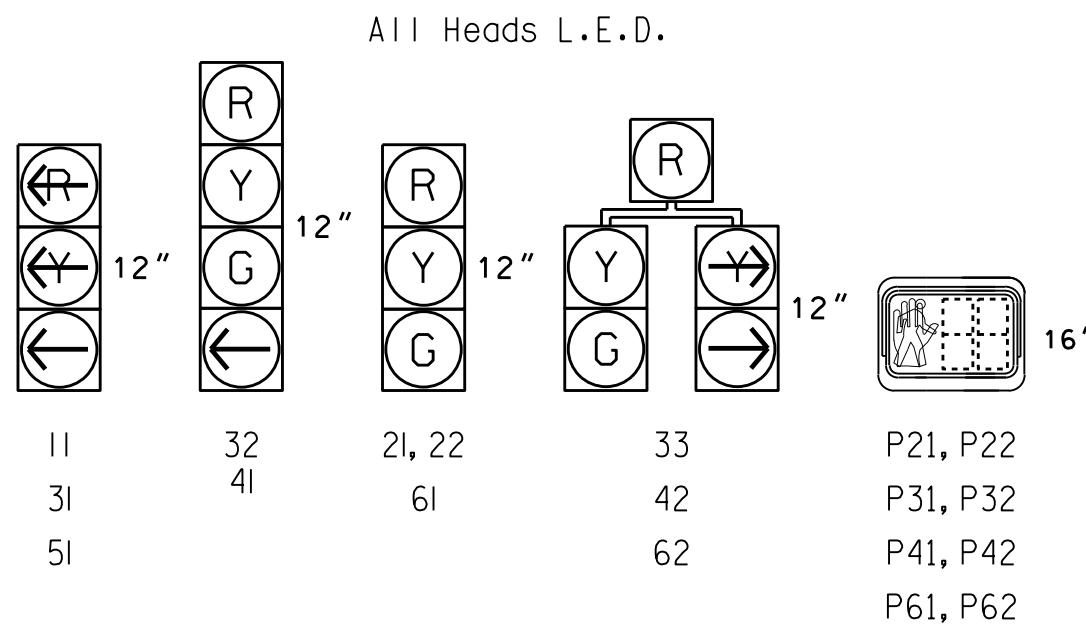
SIGNAL FACE	PHASE						FLASH
	01+5	01+6	02+5	02+6	03	04	
11	-	-	R	R	R	R	-
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	-	R	R
32	R	R	R	R	G	R	R
33	R	R	R	R	G	R	R
41	R	R	R	R	R	G	R
42	R	R	R	R	R	G	R
51	-	-	R	R	R	R	-
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R	Y
P21, P22	DW	DW	W	W	DW	DW	DRK
P31, P32	DW	DW	DW	DW	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK

W - Walk  
 DW - Don't Walk  
 DRK - Dark

**PHASING DIAGRAM DETECTION LEGEND**

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

**SIGNAL FACE I.D.**



LOOP	SIZE (FT)	INDUCTIVE LOOPS		DETECTOR PROGRAMMING								
		DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	3	-	-
2A	6X6	270	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X6	270	EXIST	-	2	Y	Y	-	-	-	-	-
3A	6X40	+5	2-4-2	-	3	Y	Y	-	-	3	-	-
3B	6X40	+5	2-4-2	-	3	Y	Y	-	-	-	-	-
3C	6X40	+5	2-4-2	-	3	Y	Y	-	-	15	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X40	+5	2-4-2	-	4	Y	Y	-	-	15	-	-
5A	6X40	+5	2-4-2	Y	5	Y	Y	-	-	3	-	-
6A	6X6	240	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	240	5	Y	6	Y	Y	-	-	-	-	-
SO1	6X6	+200	4	Y	-	-	-	-	-	-	Y	-
SO2	6X6	+200	4	Y	-	-	-	-	-	-	Y	-

**6 Phase Fully Actuated  
 US 441 Bus./Main Street (Franklin CBD)**

**NOTES**

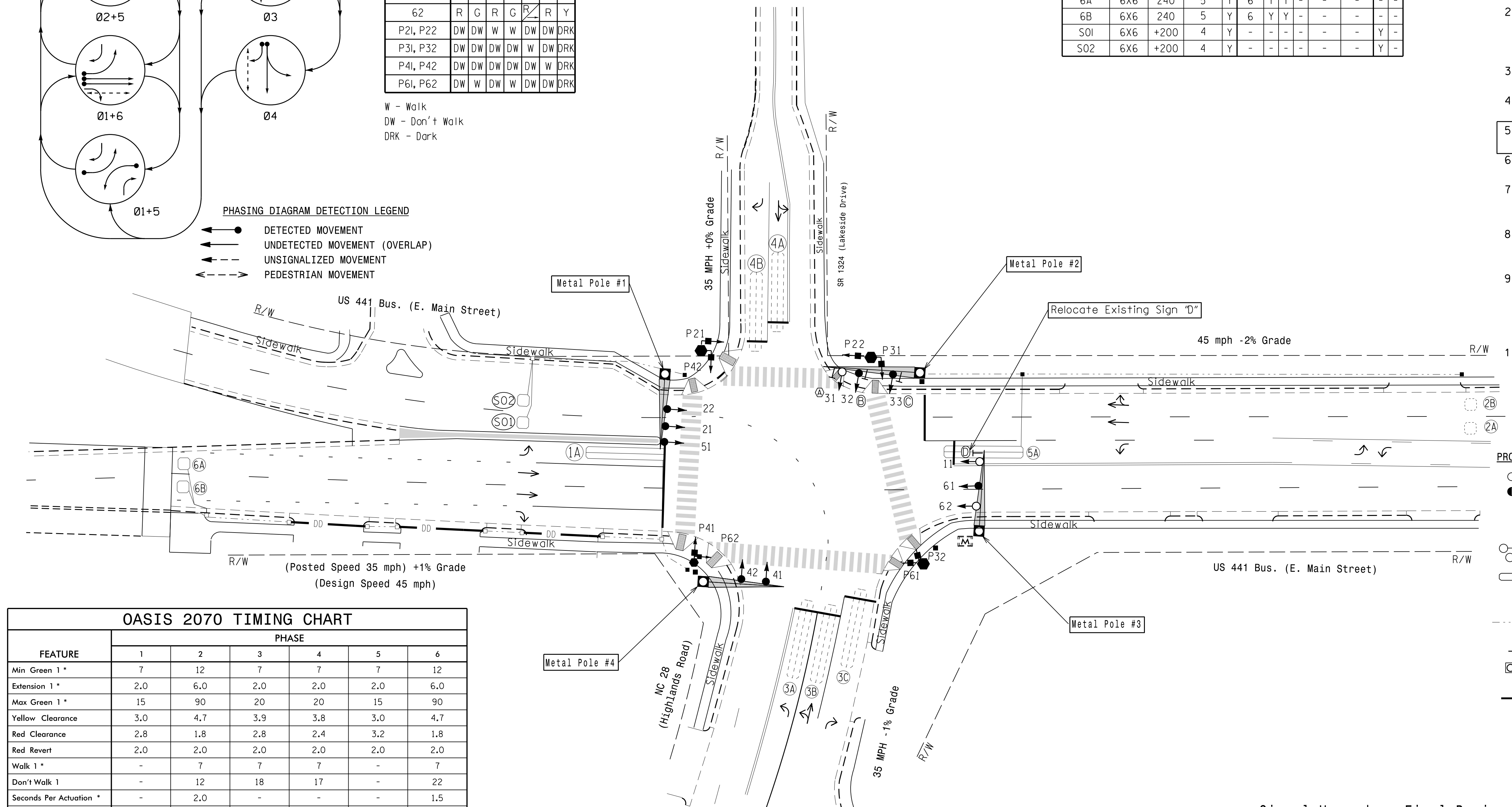
- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Relocate existing "No U-Turn" Sign "D".
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset # 1411, Controller Asset # 0669.

**LEGEND**

- |     |   |     |   |
|-----|---|-----|---|
| ○   | PROPOSED Traffic Signal Head                            | ●   | EXISTING Traffic Signal Head                          |
| ○   | PROPOSED Modified Signal Head                           | N/A | EXISTING Modified Signal Head                         |
| ○   | PROPOSED Sign   | -   | EXISTING Sign   |
| ○   | PROPOSED Pedestrian Signal Head With Push Button & Sign | ○   | EXISTING Pedestrian Signal Head                       |
| ○   | PROPOSED Signal Pole with Guy                           | ○   | EXISTING Signal Pole with Guy                         |
| ○   | PROPOSED Signal Pole with Sidewalk Guy                  | ○   | EXISTING Signal Pole with Sidewalk Guy                |
| ○   | PROPOSED Inductive Loop Detector                        | ○   | EXISTING Inductive Loop Detector                      |
| ○   | PROPOSED Master Controller & Cabinet                    | ○   | EXISTING Master Controller & Cabinet                  |
| ○   | PROPOSED Junction Box                                   | ○   | EXISTING Junction Box                                 |
| ○   | PROPOSED 2-in Underground Conduit                       | ○   | EXISTING 2-in Underground Conduit                     |
| N/A | PROPOSED Right of Way with Marker                       | ○   | EXISTING Right of Way with Marker                     |
| ○   | PROPOSED Directional Arrow                              | ○   | EXISTING Directional Arrow                            |
| ○   | PROPOSED Metal Pole with Mastarm                        | ○   | EXISTING Metal Pole with Mastarm                      |
| ○   | PROPOSED Pedestrian Signal Pedestal                     | ○   | EXISTING Pedestrian Signal Pedestal                   |
| ○   | PROPOSED Directional Drill                              | N/A | EXISTING Directional Drill                            |
| ○   | PROPOSED Left Arrow "ONLY" Sign (R3-5L)                 | ○   | EXISTING Left Arrow "ONLY" Sign (R3-5L)               |
| ○   | PROPOSED Combined Through and Left Arrow Sign (R3-6L)   | ○   | EXISTING Combined Through and Left Arrow Sign (R3-6L) |
| ○   | PROPOSED Right Arrow "ONLY" Sign (R3-5R)                | ○   | EXISTING Right Arrow "ONLY" Sign (R3-5R)              |
| ○   | PROPOSED No U-Turn Sign (R3-4)                          | ○   | EXISTING No U-Turn Sign (R3-4)                        |

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	15	90	20	20	15	90
Yellow Clearance	3.0	4.7	3.9	3.8	3.0	4.7
Red Clearance	2.8	1.8	2.8	2.4	3.2	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	7	7	-	7
Don't Walk 1	-	12	18	17	-	22
Seconds Per Actuation *	-	2.0	-	-	-	1.5
Max Variable Initial *	-	31	-	-	-	28
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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



**Signal Upgrade - Final Design**

Prepared In the Offices of:  
  
 750 N. Greenfield Pkwy, Garner, NC 27529  
 SCALE 1"=30'

US 441 Bus. (E. Main Street) at NC 28 (Highlands Road) / SR 1324 (Lakeside Drive)			
Division 14	Macon County	Franklin	
PLAN DATE: February 2016	REVIEWED BY: T. Williams	PREPARED BY: M. Mahbooba	REVIEWED BY:
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

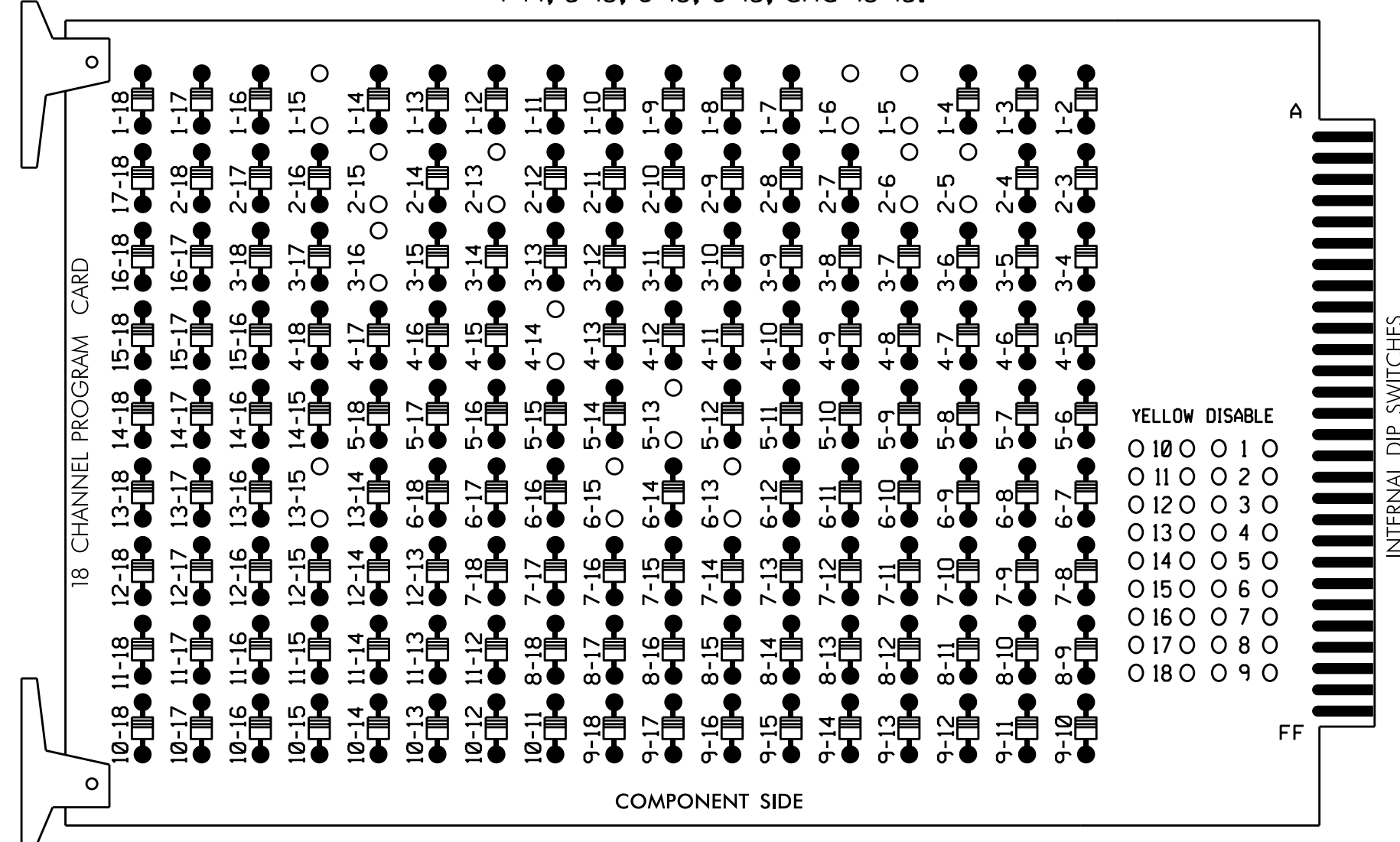
SEAL  
  
 TIMOTHY J. WILLIAMS  
 3/1/2016  
 DATE  
 SIG. INVENTORY NO. 14-0669

04-MAR-2016 10:33  
 P:\M\2016\14-0669\Signal\Signal Design Section\Signal Design Section.dgn  
 mmb00000

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

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-16, 4-14, 5-13, 6-13, 6-15, and 13-15.



REMOVE JUMPERS AS SHOWN

**NOTES:**

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

■ = DENOTES POSITION OF SWITCH

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2, 3, 4 and 6 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the US 441 Bus./ Main Street (Franklin CBD) Closed Loop System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
CABINET.....332  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...12  
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S12  
PHASES USED.....1,2,2PED,3,3PED,4,4PED,5,6,6PED  
OVERLAPS.....NONE

**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 HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12						
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16						
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED						
SIGNAL HEAD NO.	11	42	21,22	P21, P22	31	32	33	62	41	42	P41, P42	33	51	61,62	P61, P62	NU	NU	P31, P32
RED			128			116	116		101	101					134			
YELLOW			129			117	117		102	102					135			
GREEN			130			118	118		103	103					136			
RED ARROW	125					116									131			
YELLOW ARROW	126	126				117			117				132	132				
GREEN ARROW	127	127				118	118		118	103			133	133				
Hand icon						113							104			119		110
Walking person icon						115							106			121		112

NU = Not Used

**INPUT FILE POSITION LAYOUT**

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 2 2A	S TOP	S TOP	∅ 3 3A	∅ 3 3B	NOT USED	∅ 4 4B	SYS. DET. S01	S TOP	S TOP	∅ 2 PED DC ISOLATOR	∅ 6 PED DC ISOLATOR	FS DC ISOLATOR
L	NOT USED	∅ 2 2B	Y TOP	Y TOP	NOT USED	∅ 3 3C	∅ 4 4A	NOT USED	SYS. DET. S02	Y TOP	Y TOP	∅ 4 PED DC ISOLATOR	∅ 3 PED DC ISOLATOR	ST DC ISOLATOR
U	∅ 5 5A	∅ 6 6A	S TOP	S TOP	S TOP	S TOP	S TOP	S TOP	S TOP	S TOP	S TOP	S TOP	S TOP	S TOP
L	NOT USED	∅ 6 6B	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP	Y TOP

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

FS = FLASH SENSE  
ST = STOP TIME

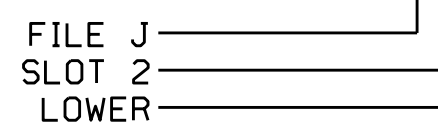
**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			15
4A	TB6-3,4	I7L	78	40	44	4	Y	Y			3
4B	TB6-5,6	I8U	49	11	24	4	Y	Y			15
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
* S01	TB6-9,10	I9U	60	22	11	SYS					
* S02	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:  
INSTALL DC ISOLATORS  
IN INPUT FILE SLOTS  
112 AND 113.

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

INPUT FILE POSITION LEGEND: J2L



**PED 3 PROGRAMMING DETAIL**

(program controller as shown below)

**CHANGING OUTPUT ASSIGNMENTS**

- FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
- ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT #.
- SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' REGARDLESS OF DEFAULT PROGRAMMING
- ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
- BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
- SELECT '1' (OUTPUT ASSIGNMENTS)
- ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT #.
- REPEAT STEPS # 3 AND # 4.

**CHANGING INPUT ASSIGNMENTS**

- FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
- CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
- MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3

PROGRAMMING COMPLETE

Electrical Detail - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

US 441 Bus. (E. Main Street) at NC 28 (Highlands Road)/ SR 1324 (Lakeside Drive)

Division 14 Macon County Franklin

PLAN DATE: February 2016 REVIEWED BY: T. Joyce

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

Seal of North Carolina Professional Engineer Keith M. Mims

DocuSigned by: Keith M. Mims 3/8/2016

SIG. INVENTORY NO. 14-0669

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0669  
DESIGNED: February 2016  
SEALED: 3/1/2016  
REVISED: N/A

- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE - 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE - 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPlice CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPlice ENCLOSURE
- 30 INSTALL AERIAL SPlice ENCLOSURE
- 31 INSTALL POLE MOUNTED SPlice CABINET
- 32 INSTALL BASE MOUNTED SPlice CABINET
- 33 REMOVE EXISTING SPlice CABINET

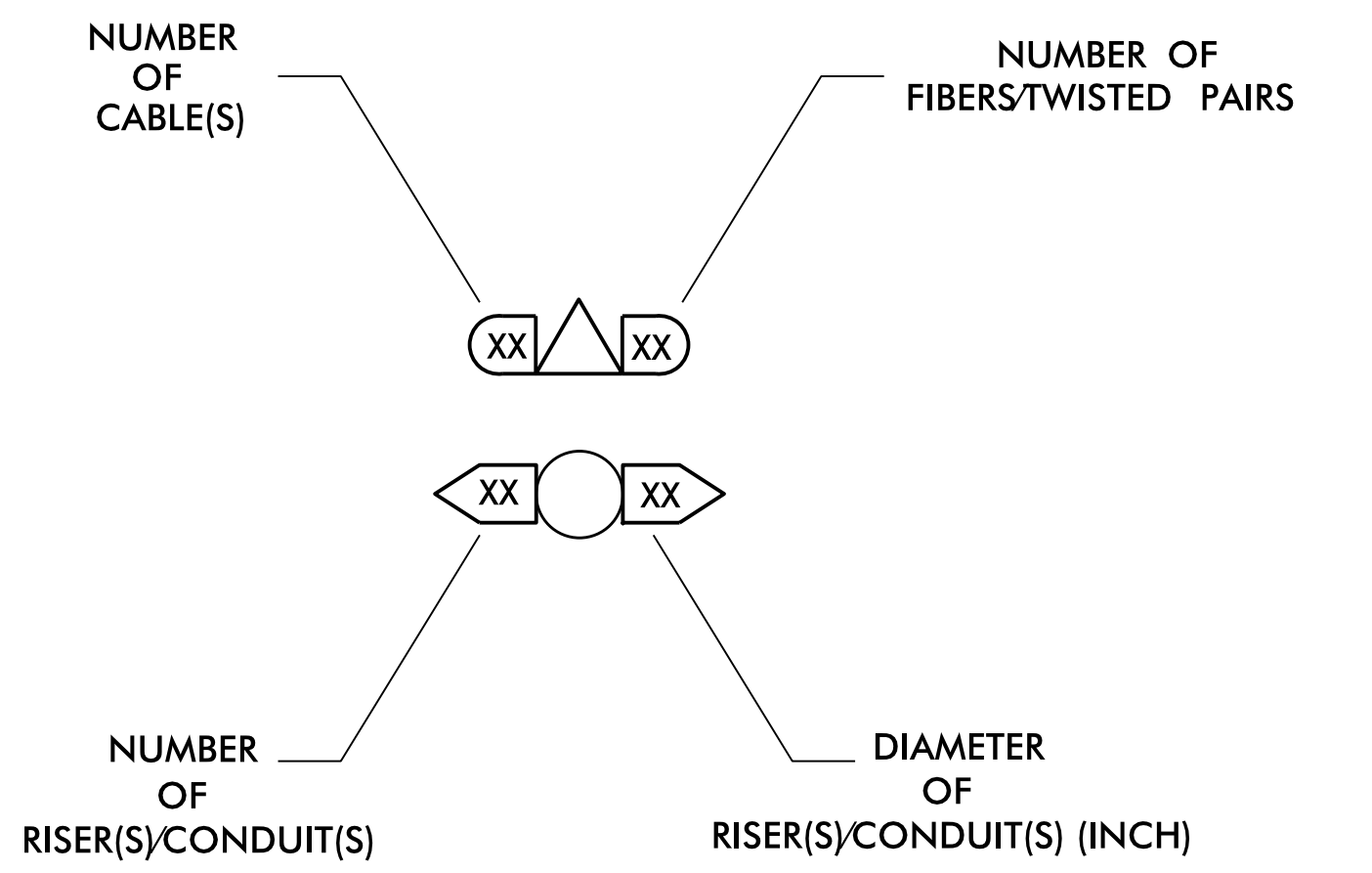
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49 REMOVE EXISTING MESSENGER CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE

**LEGEND**

	NEW FIBER OPTIC COMMUNICATIONS CABLE
	NEW TWISTED PAIR COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
	NEW AERIAL GUY ASSEMBLY
	NEW CONDUIT
	EXISTING CONDUIT
	NEW DIRECTIONAL DRILLED CONDUIT
	NEW BORED AND JACKED CONDUIT
	NEW JUNCTION BOX
	EXISTING JUNCTION BOX
	NEW WOOD POLE
	EXISTING WOOD POLE
	AERIAL SPlice ENCLOSURE
	NEW METAL POLE
	EXISTING METAL POLE
	NEW CCTV ASSEMBLY
	NEW STANDARD GUY ASSEMBLY
	NEW SIDEWALK GUY ASSEMBLY
	NEW CABLE STORAGE RACKS (SNOW SHOES)
	EXISTING CONTROLLER AND CABINET
	EXISTING SPlice CABINET
	NEW SPlice CABINET
	SIGNAL POLE
	SIGNAL INVENTORY NUMBER

**CONSTRUCTION NOTE SYMBOLOGY KEY**

- INDICATES NUMBER OF CABLES, LOOPS, ETC.
- INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)

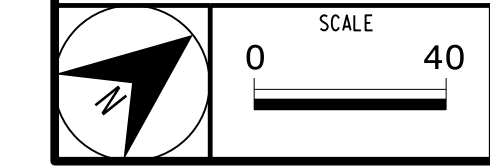
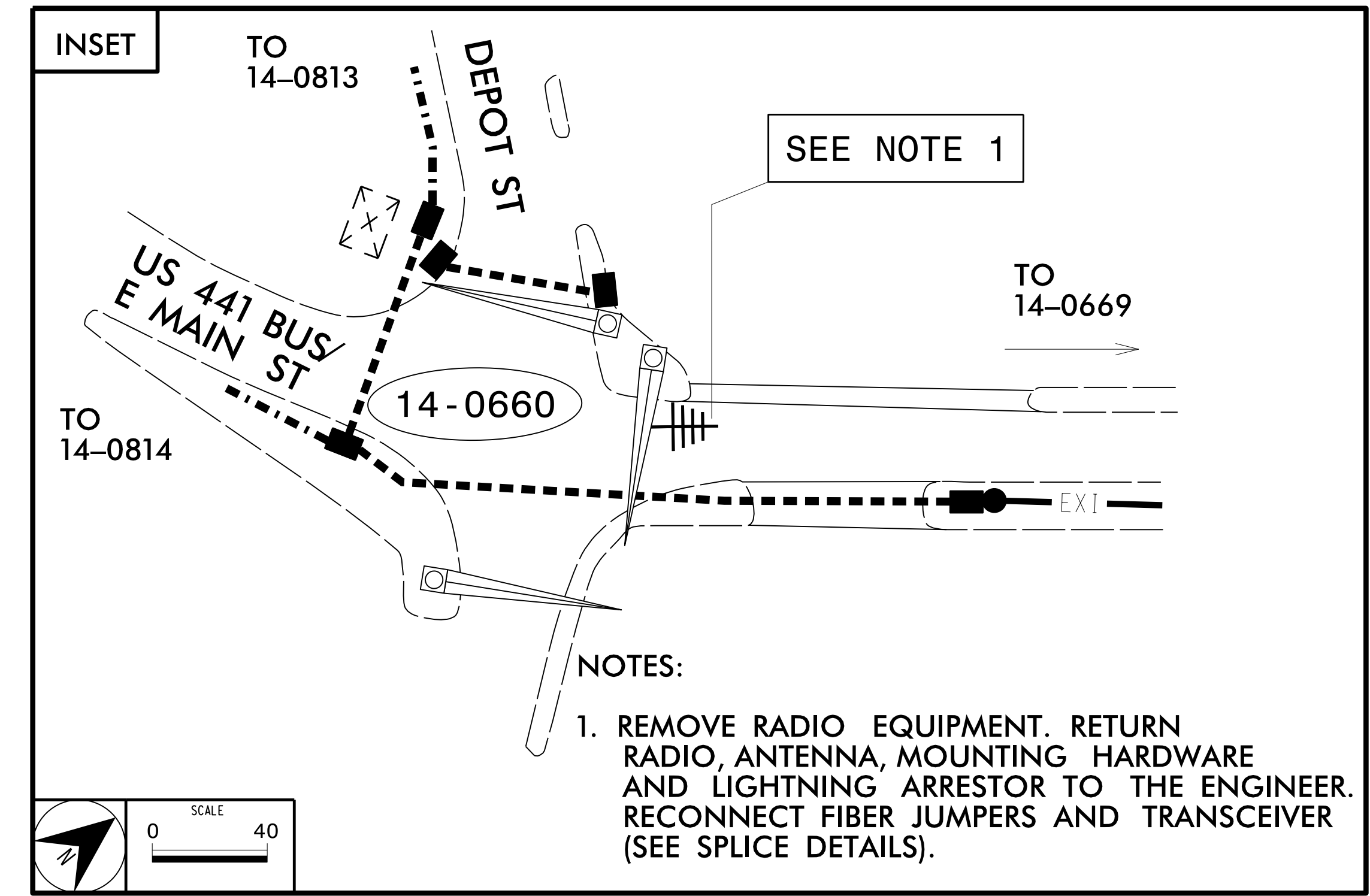
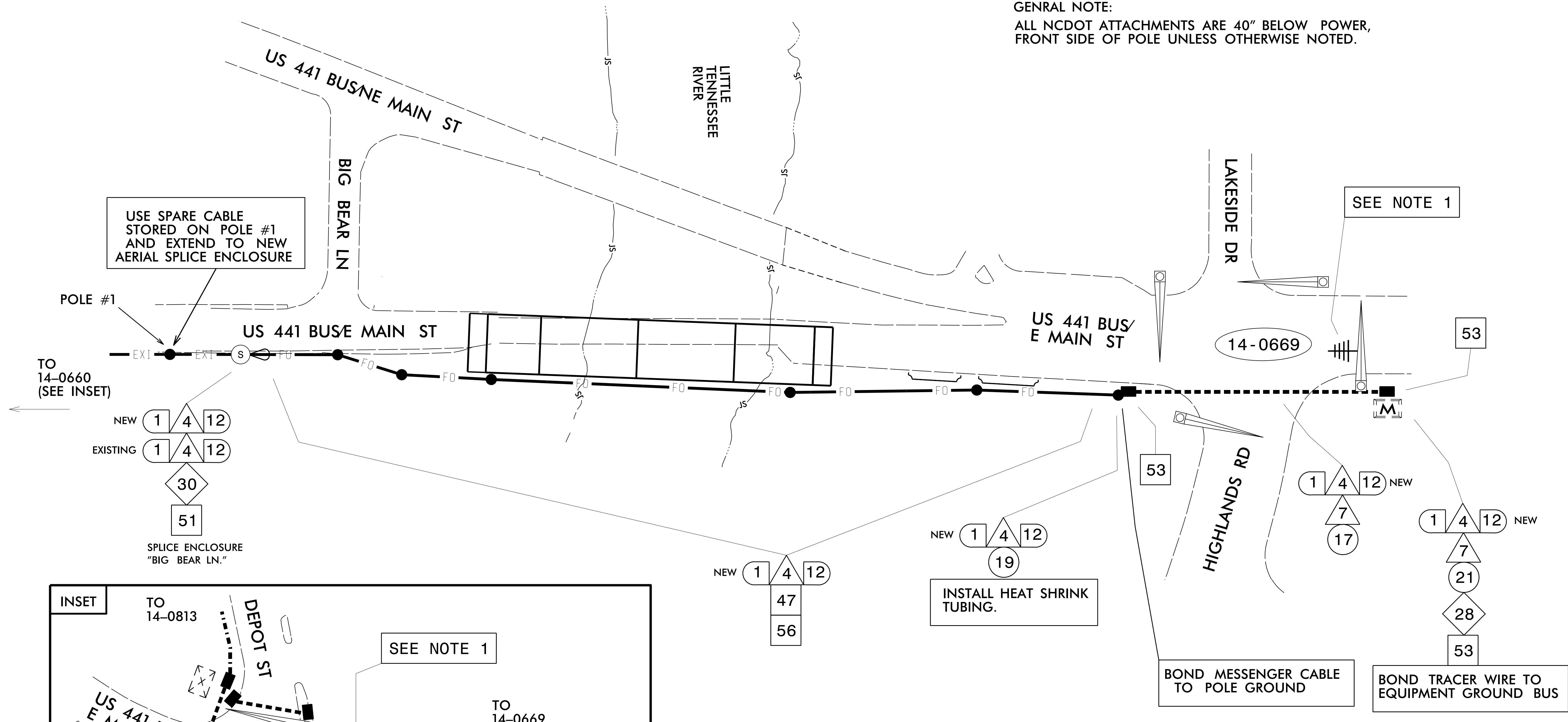


**TMP FINAL**

	<p><b>CONSTRUCTION NOTES</b></p> <p>DIVISION 14      MACON CO.      FRANKLIN</p> <p>PLAN DATE: MARCH 2016      REVIEWED BY:</p> <p>PREPARED BY: I. N. AVERY      REVIEWED BY:</p>	<p>SEAL</p> <p>PROFESSIONAL ENGINEER</p> <p>SEAL 023919</p> <p>GREGORY A. FULLER</p>						
750 N. Greenfield Pkwy., Garner, NC 27529	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE				<p>DocuSigned by: Gregory A. Fuller      3/29/2016</p> <p>CADD Filename:</p>
REVISIONS	INIT.	DATE						

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

GENERAL NOTE:  
ALL NCDOT ATTACHMENTS ARE 40" BELOW POWER,  
FRONT SIDE OF POLE UNLESS OTHERWISE NOTED.



NOTES:  
1. REMOVE RADIO EQUIPMENT. RETURN RADIO, ANTENNA, MOUNTING HARDWARE AND LIGHTNING ARRESTOR TO THE ENGINEER. RECONNECT FIBER JUMPERS AND TRANSCEIVER (SEE SPLICE DETAILS).

NOTES:  
1. REMOVE RADIO EQUIPMENT. RETURN RADIO, ANTENNA, MOUNTING HARDWARE AND LIGHTNING ARRESTOR TO THE ENGINEER. RECONNECT TRANSCEIVER AND CONTROLLER. (SEE SPLICE DETAILS).

TMP FINAL

Prepared in the Offices of:

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS

DIVISION 14 MACON CO. FRANKLIN

PLAN DATE: MARCH 2016 REVIEWED BY:

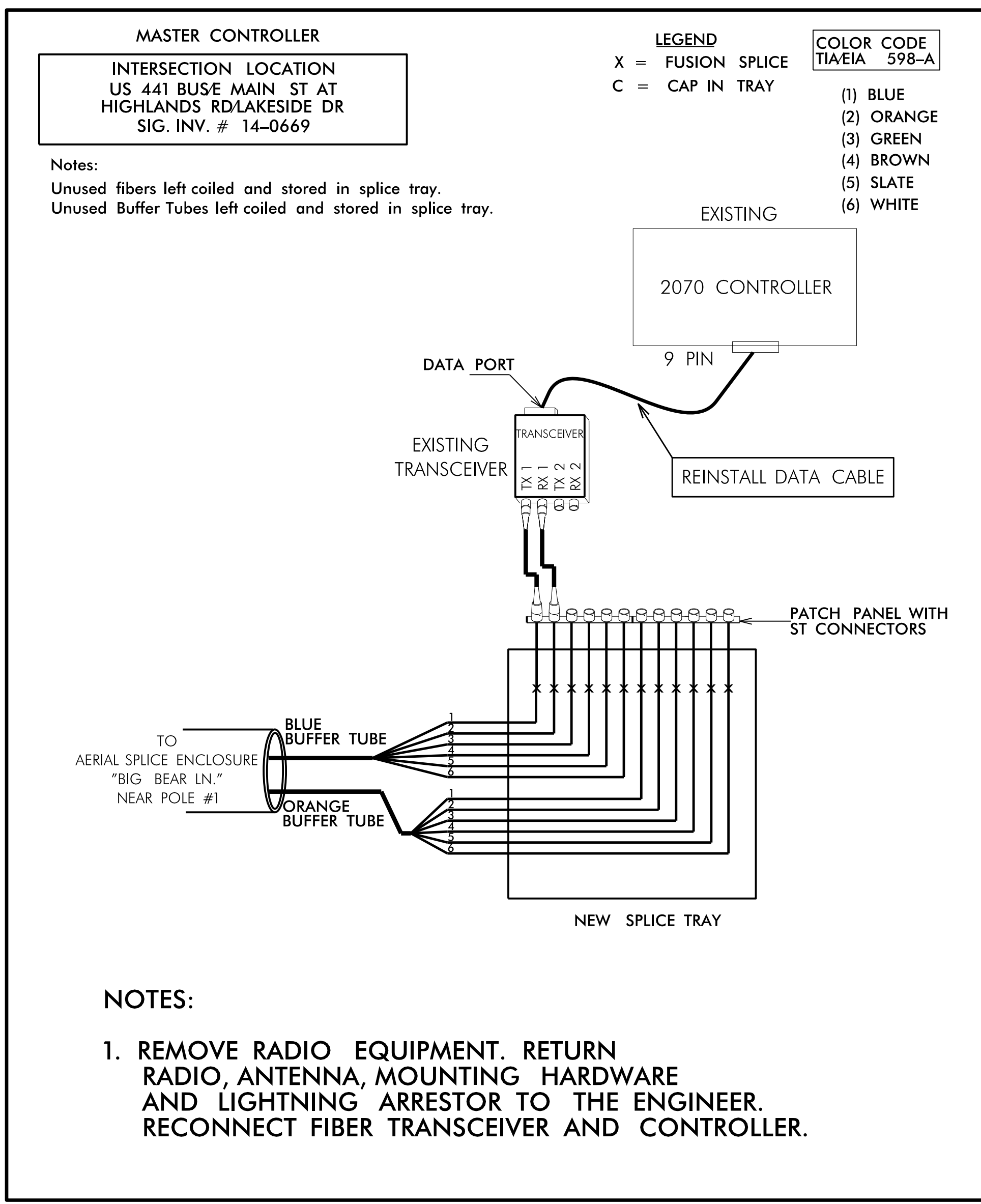
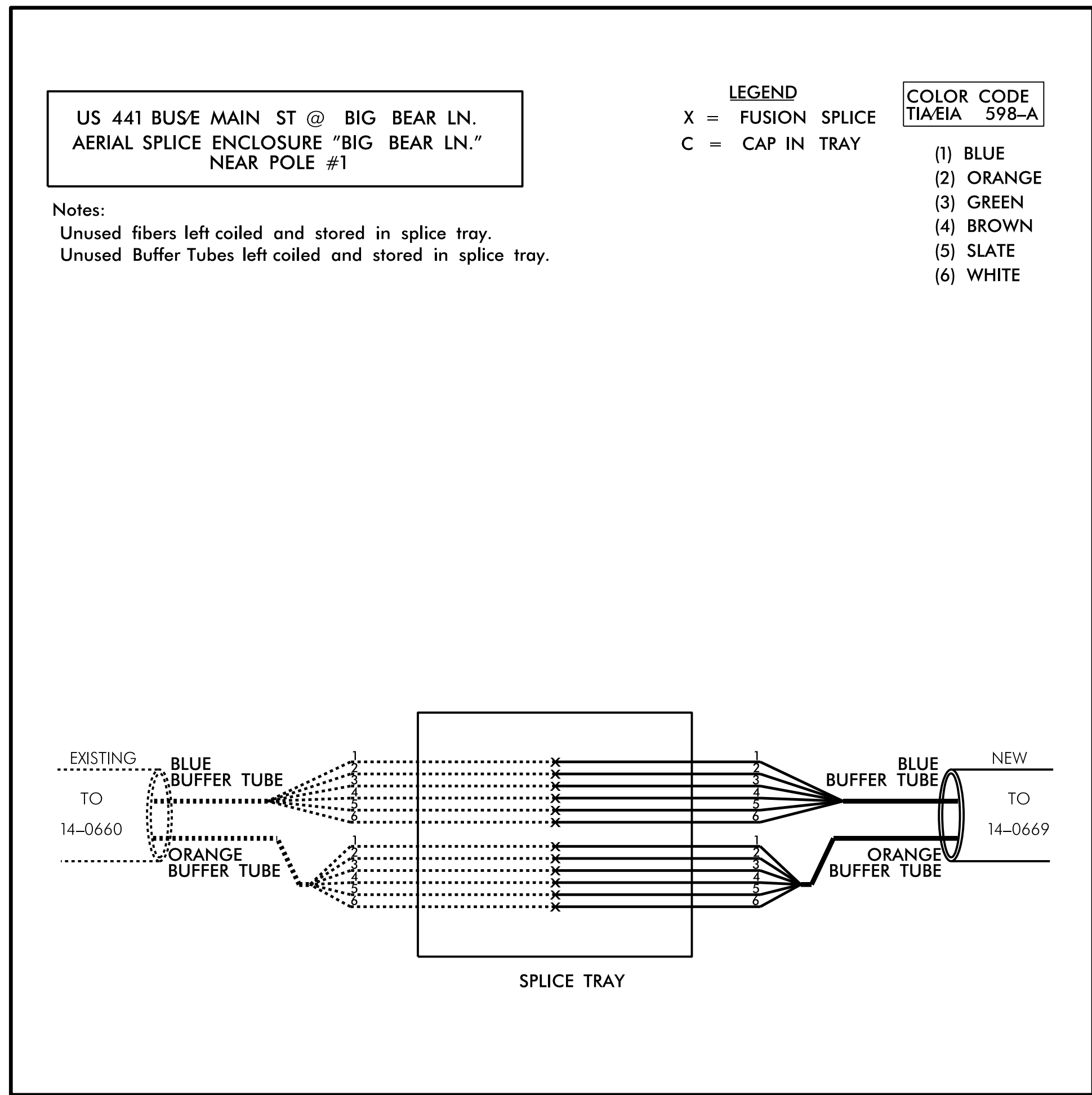
PREPARED BY: I. N. AVERY REVIEWED BY:

REVISIONS	INIT.	DATE

DocuSigned by: Gregory A. Fuller 3/29/2016

CADD Filename:





- NOTES:**
1. REMOVE RADIO EQUIPMENT. RETURN RADIO, ANTENNA, MOUNTING HARDWARE AND LIGHTNING ARRESTOR TO THE ENGINEER. RECONNECT FIBER TRANSCEIVER AND CONTROLLER.

INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:  
REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

- 1) SPLICE LOCATION
- 2) DATE
- 3) COMPANY NAME
- 4) NAME OF INDIVIDUAL PERFORMING THE SPlicing

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

**NOTES:**

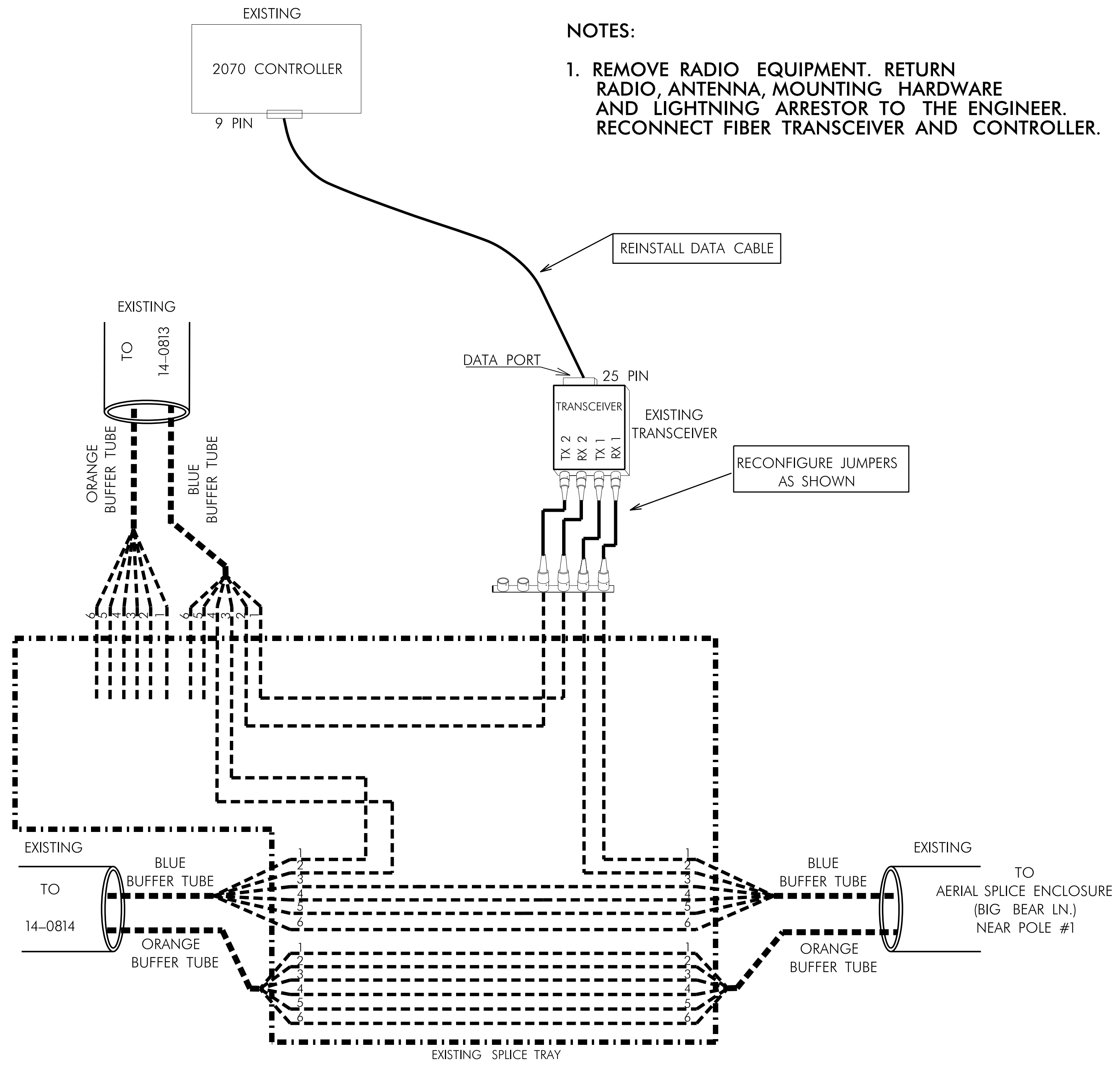
TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

TMP FINAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	<b>SPLICE DETAIL</b>		
	DIVISION 14      MACON CO.      FRANKLIN		
PLAN DATE: MARCH 2016	REVIEWED BY:	REVIEWED BY:	DATE:
PREPARED BY: I. N. AVERY	REVIEWED BY:	REVIEWED BY:	DATE:
REVISIONS	INIT.	DATE	DATE
DocuSigned by: Gregory A. Fuller	3/29/2016	DATE	DATE
CADD Filename:	DATE	DATE	DATE

INTERSECTION LOCATION  
US 441/E. MAIN STREET AT DEPOT STREET  
SIG. INV. # 14-0660



- NOTES:
1. REMOVE RADIO EQUIPMENT. RETURN RADIO, ANTENNA, MOUNTING HARDWARE AND LIGHTNING ARRESTOR TO THE ENGINEER. RECONNECT FIBER TRANSCEIVER AND CONTROLLER.

ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

- NOTES:
- TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

TMP FINAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	<p><b>SPLICE DETAIL</b></p>		
	<p>DIVISION 14      MACON CO.      FRANKLIN</p>		
<p>PLAN DATE: MARCH 2016      REVIEWED BY:</p>		<p>PREPARED BY: I. N. AVERY      REVIEWED BY:</p>	
<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>		<p>REVISIONS      INIT.      DATE</p>	
<p>SCALE: 0</p>		<p>DocuSigned by: Gregory A. Fuller      3/29/2016</p>	
<p>CADD Filename:</p>		<p>DATE</p>	