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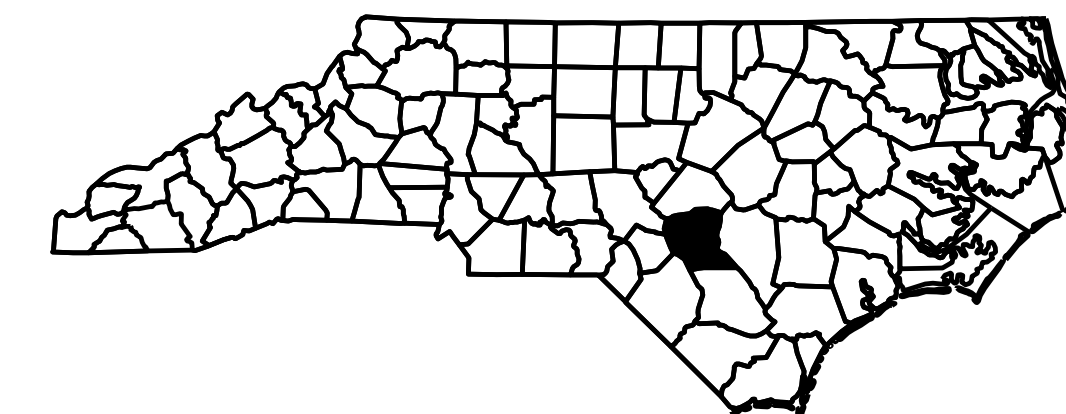
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STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CUMBERLAND COUNTY

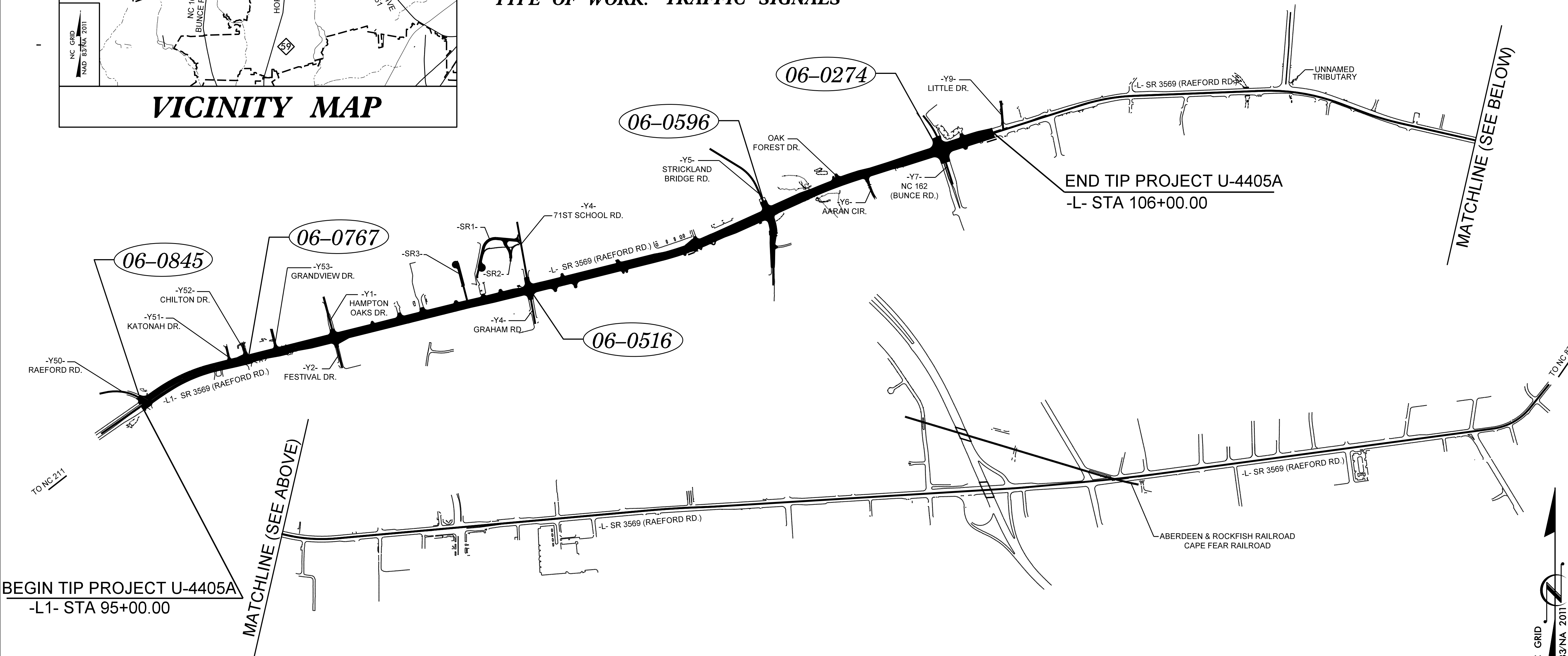
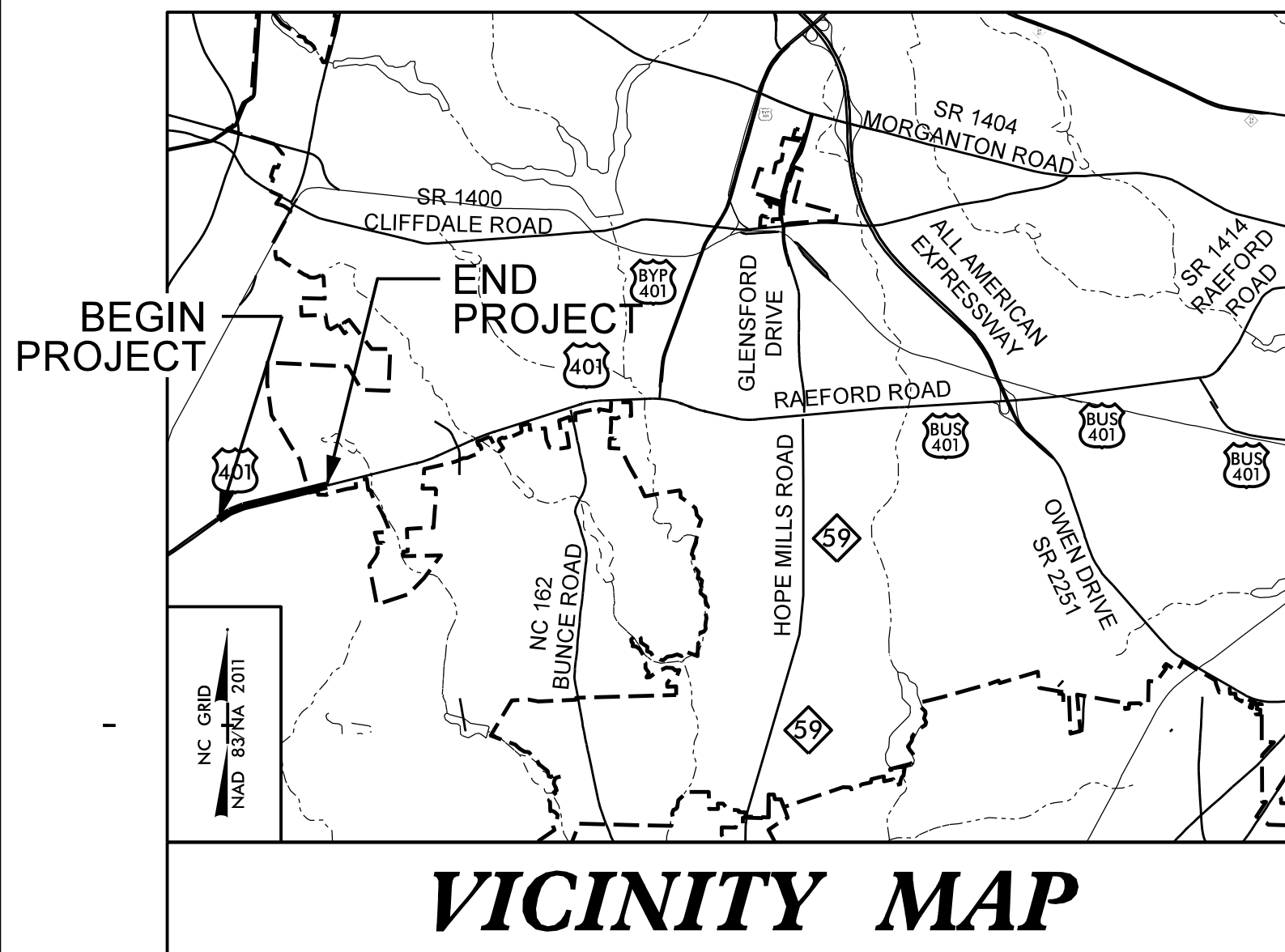
LOCATION: FAYETTEVILLE - US 401 (RAEFORD ROAD) FROM  
OLD RAEFORD ROAD TO EAST OF NC 162 (BUNCE ROAD)

TYPE OF WORK: TRAFFIC SIGNALS



TIP PROJECT: U-4405A

CONTRACT: C204404



INDEX OF PLANS	
SHEET NUMBER	DESCRIPTION
SIG 1.0	TITLE SHEET
SIG 1.1	SHEET INDEX
SIG 2.0 - SIG 18.2	SIGNAL AND ELECTRICAL DESIGNS
SIG 82.0 - SIG 83.0	REVISED STANDARD PLATE SHEETS
MI - M8	METAL POLE STANDARD DRAWINGS

LEGEND	
(XX-XXXX)	SIGNAL INVENTORY NUMBER

**INTELLIGENT TRANSPORTATION AND SIGNALS UNIT**  
Contacts:

**Zachary Little, PE**  
Signals Engineer, Eastern Region

**Todd Joyce, PE**  
Signal Equipment Design Review Engineer

Plans Prepared for:  
DIVISION OF HIGHWAYS  
**TRANSPORTATION MOBILITY AND SAFETY DIVISION**

750 N. Greenfield Parkway, Garner, NC 27529

**Stantec**  
Stantec Consulting Services Inc.  
801 Jones Franklin Rd-Suite 300  
Raleigh, NC 27606  
Tel. 919.851.6866  
Fax. 919.851.7024  
www.stantec.com  
License No. F-0672

**Betsy L. Watson, PE**  
Senior Principal

**Dean Harris**  
Senior Transportation Designer



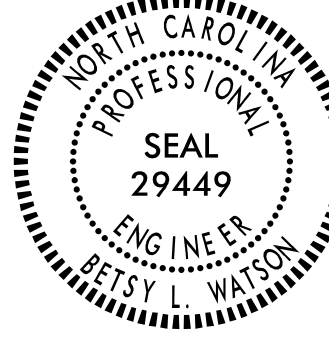
APPROVED:   
DATE: 6/3/2019

# INDEX OF SHEETS

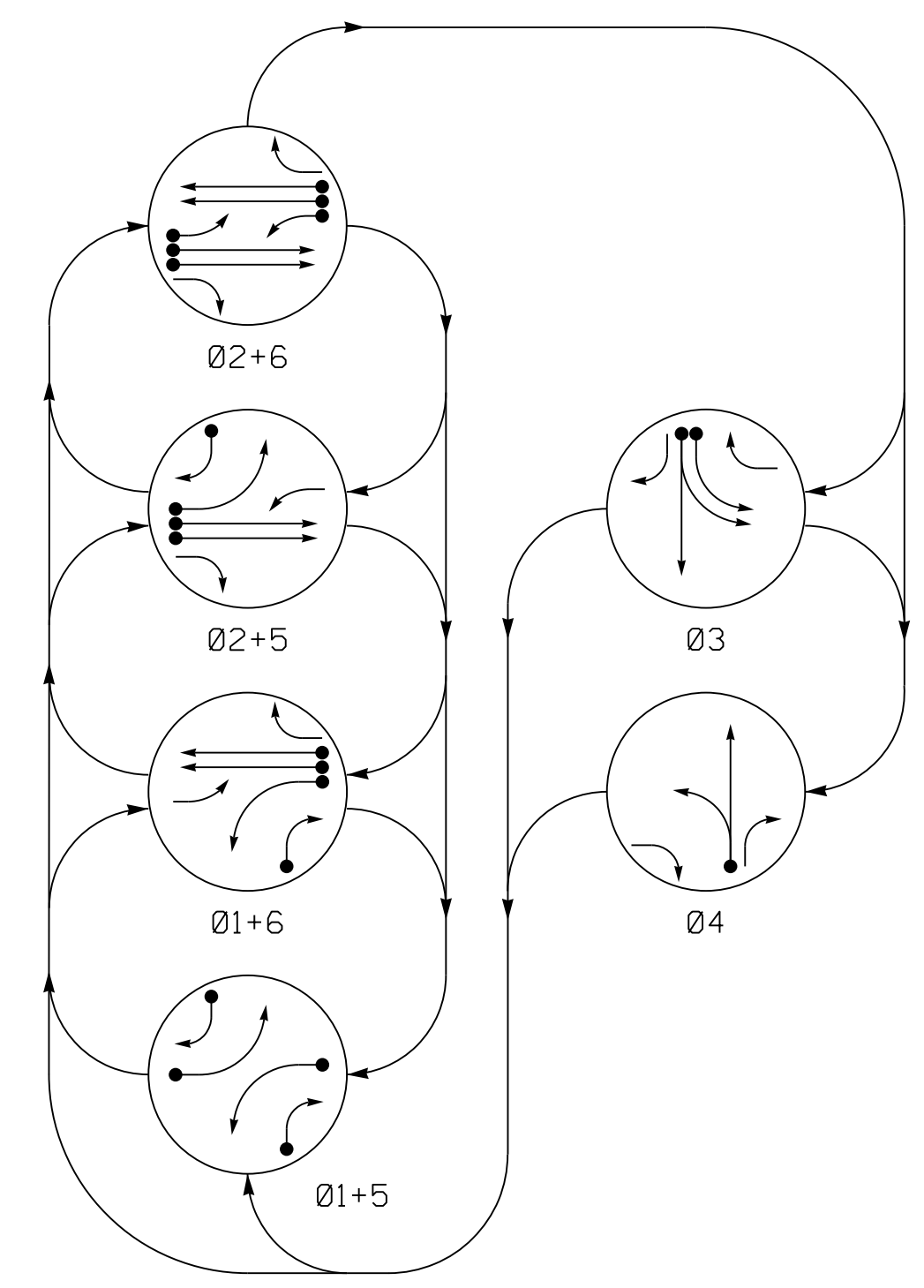
SIG-1.0	.....	TITLE SHEET (PROJECT OVERVIEW)
SIG-1.1	.....	INDEX OF SHEETS
SIG-2.0 - SIG-3.3	..... [06-0845]	US 401 (RAEFORD ROAD) AT OLD RAEFORD ROAD/BENTRIDGE LANE
SIG-4.0 - SIG-6.2	..... [06-0767]	US 401 (RAEFORD ROAD) AT CHILTON ROAD/RAYCONDA PLACE
SIG-7.0 - SIG-10.1	..... [06-0516]	US 401 (RAEFORD ROAD) AT 71ST SCHOOL ROAD/GRAHAM ROAD
SIG-11.0 - SIG-14.1	..... [06-0596]	US 401 (RAEFORD ROAD) AT SR 1104 (STRICKLAND BRIDGE ROAD)
SIG-15.0 - SIG-18.2	..... [06-0274]	US 401 (RAEFORD ROAD) AT SR 141/NC 162 (BUNCE ROAD)
SIG-19.0 - SIG-81.0	.....	SHEETS NOT INCLUDED IN THIS PROJECT
SIG-82.0 - SIG-83.0	.....	REVISED STANDARD PLATE SHEETS
M1 - M8	.....	METAL POLE STANDARD DRAWINGS

6/5/2019 11:45:11 AM  
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 Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	Prepared for the Offices of:  TRANSPORTATION MOBILITY AND SAFETY DIVISION STATE OF NORTH CAROLINA Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27526	Index of Sheets		
		Division 6 Cumberland County Fayetteville		
PLAN DATE: June 2019      REVIEWED BY: E D Harris		PREPARED BY: R M Muncey      REVIEWED BY: B L Watson		
NOT TO SCALE		REVISIONS	INIT.      DATE	
		DocuSigned by: Patsy L. Watson 6/5/2019 SIGNATURE      DATE		
SIG. INVENTORY NO.				

**PHASING DIAGRAM**



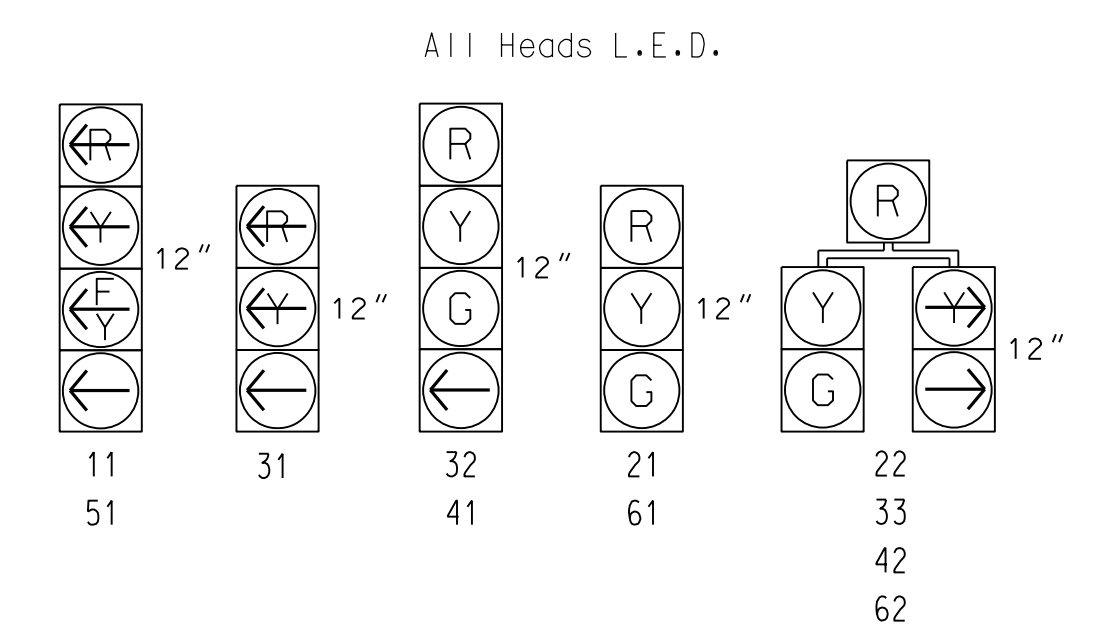
**PHASING DIAGRAM DETECTION LEGEND**

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

**TABLE OF OPERATION**

SIGNAL FACE	PHASE						L	F
	01+5	01+6	02+5	02+6	03	04		
11	←	←	←	←	←	←	←	
21	R	R	G	G	R	R	Y	
22	R	R	G	G	R	R	Y	
31	←	←	←	←	←	←	←	
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	←	←	←	←	←	←	←	
61	R	G	R	G	R	R	Y	
62	R	G	R	G	R	R	Y	

**SIGNAL FACE I.D.**



**ASC/3 DETECTOR INSTALLATION CHART**

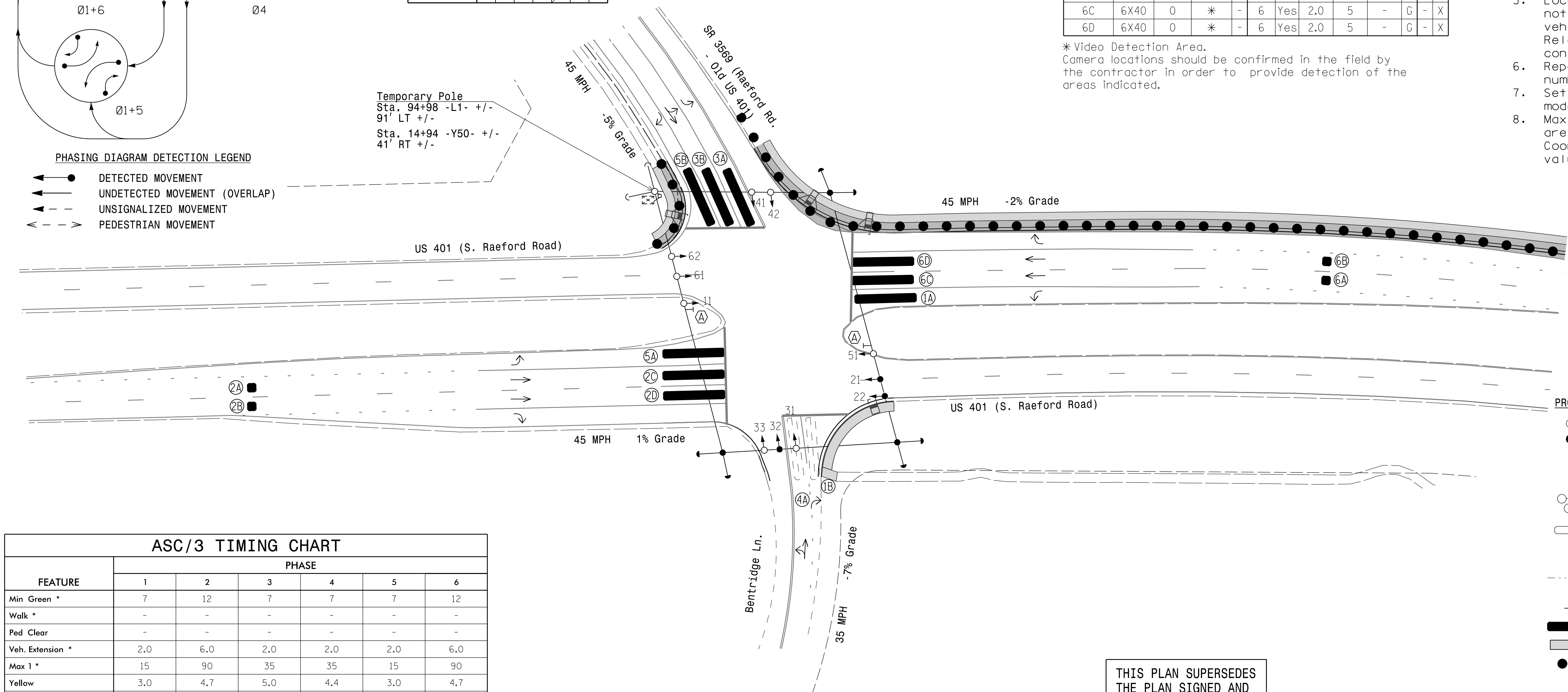
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	-	1	Yes	-	15	-	S	-	X
1B	6X40	0	EXIST	-	6	Yes	-	3	-	G	-	X
2A	6X6	300	*	-	2	Yes	-	-	-	N	-	X
2B	6X6	300	*	-	2	Yes	-	-	-	N	-	X
2C	6X40	0	*	-	2	Yes	2.0	5	-	G	-	X
2D	6X40	0	*	-	2	Yes	2.0	5	-	G	-	X
3A	6X40	0	*	-	3	Yes	-	3	-	S	-	X
3B	6X40	0	*	-	3	Yes	-	-	-	S	-	X
4A	6X40	0	EXIST	-	4	Yes	-	3	-	S	-	X
5A	6X40	0	*	-	5	Yes	-	15	-	S	-	X
5B	6X40	0	*	-	5	Yes	-	15	-	S	-	X
6A	6X6	300	*	-	6	Yes	-	-	-	N	-	X
6B	6X6	300	*	-	6	Yes	-	-	-	N	-	X
6C	6X40	0	*	-	6	Yes	2.0	5	-	G	-	X
6D	6X40	0	*	-	6	Yes	2.0	5	-	G	-	X

\* Video Detection Area. Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

**6 Phase Fully Actuated Fayetteville Signal System**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- 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.
- Locate new cabinet foundation so as not to obstruct sight distance of vehicles turning right on red. Relocate existing cabinet and controller onto new foundation.
- Reposition existing signal head numbered 32.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**ASC/3 TIMING CHART**

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	15	90	35	35	15	90
Yellow	3.0	4.7	5.0	4.4	3.0	4.7
Red Clear	3.3	1.7	2.0	2.4	3.1	1.6
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	X	-	-	-	X
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X

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

**LEGEND**

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
⊥ Sign	⊥ Sign
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ Sign
○ → 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	⊠ Junction Box
□ Junction Box	□ Junction Box
- - - 2-in Underground Conduit	- - - Right of Way
N/A	→ Directional Arrow
▬ Video Detection Area	N/A
▬ Construction Zone	N/A
● Drums	N/A
Ⓐ "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

THIS PLAN SUPERSEDES THE PLAN SIGNED AND SEALED ON 06/05/2019

**Signal Upgrade Temporary Design 1 - TMP Phase II**

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
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Prepared for the Offices of:  
 Transportation Mobility and Safety Division  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 STATE OF NORTH CAROLINA  
 Signal Design Section  
 750 N. Greenfield Pkwy, Garner, NC 27526  
 SCALE: 1"=40'

**US 401 (South Raeford Rd.) at SR 3569 (Raeford Rd-Old US 401) Bentrige Ln.**  
 Division 6 Cumberland County Fayetteville  
 PLAN DATE: July 2021 REVIEWED BY: E D Harris  
 PREPARED BY: R M Muncey REVIEWED BY: B L Watson

REVISIONS	INIT.	DATE

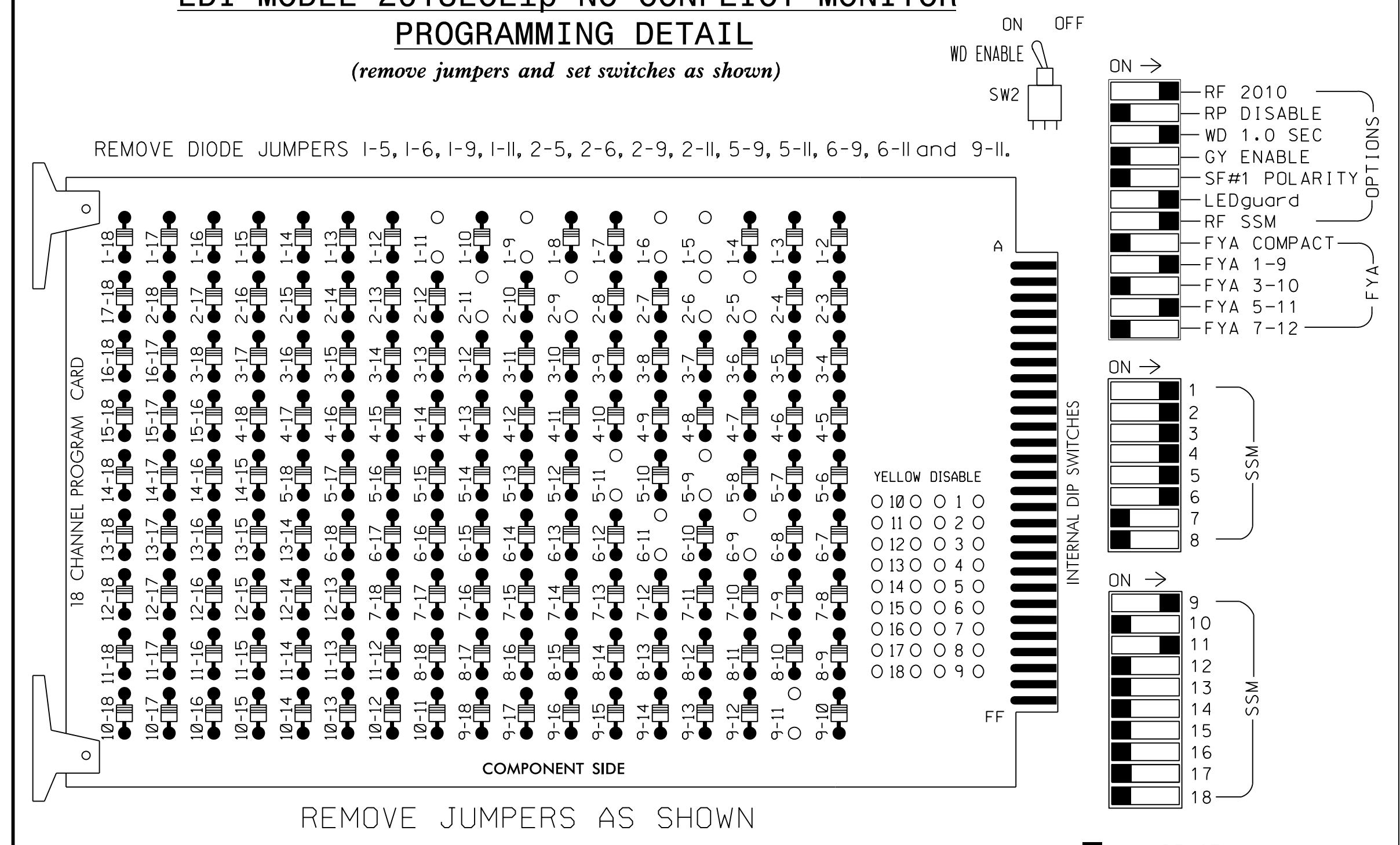
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Professional Engineer Seal 29449  
 Betsy L. Watson  
 DATE: 7/20/21  
 SIG. INVENTORY NO. 06-084511

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 User: jhambert

### EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



### 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 controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Fayetteville Signal System.

### SIGNAL HEAD HOOK-UP CHART

	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★	42	21,22	NU	31	32	33	41	42	22	NU	51★	33	61,62	NU	NU	NU	NU
RED	*	128			116	116	101	101				*	134					
YELLOW		129			117	117	102	102					135					
GREEN		130			118	118	103	103					136					
RED ARROW					116											A121		A114
YELLOW ARROW	126				117				102			132				A122		A115
FLASHING YELLOW ARROW																A123		A116
GREEN ARROW	127	127			118	118	103	103	133	133								

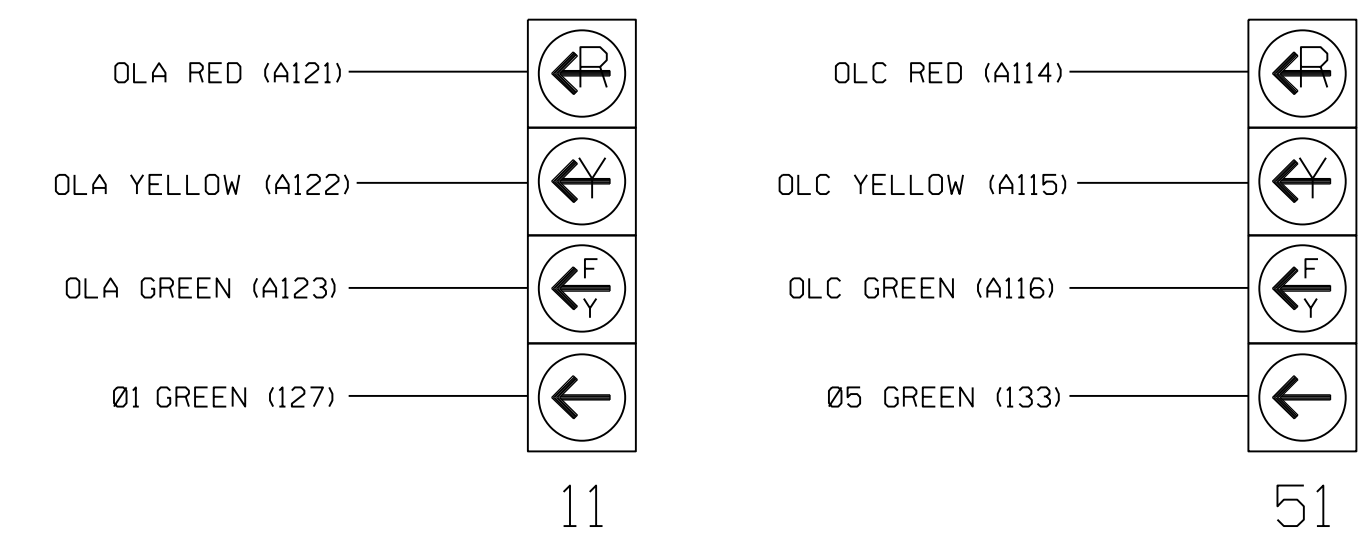
NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 ★ See pictorial of head wiring in detail this sheet.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX.  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8  
 AUX S1,AUX S4  
 PHASES USED.....1,2,3,4,5,6  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED  
 \* See overlap programming detail on sheet 2

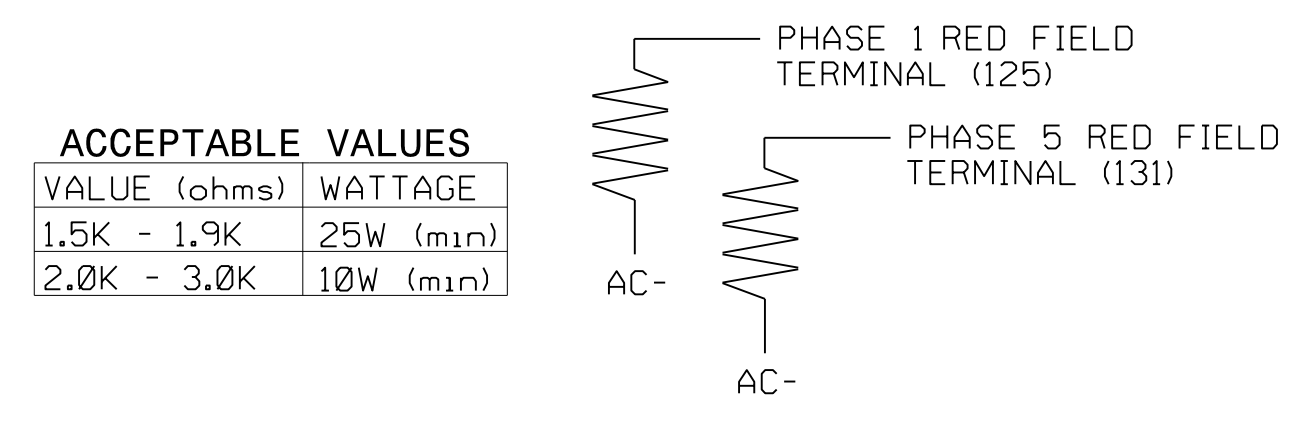
### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0845T1  
 DESIGNED: July 2021  
 SEALED: 7/9/2021  
 REVISED: N/A

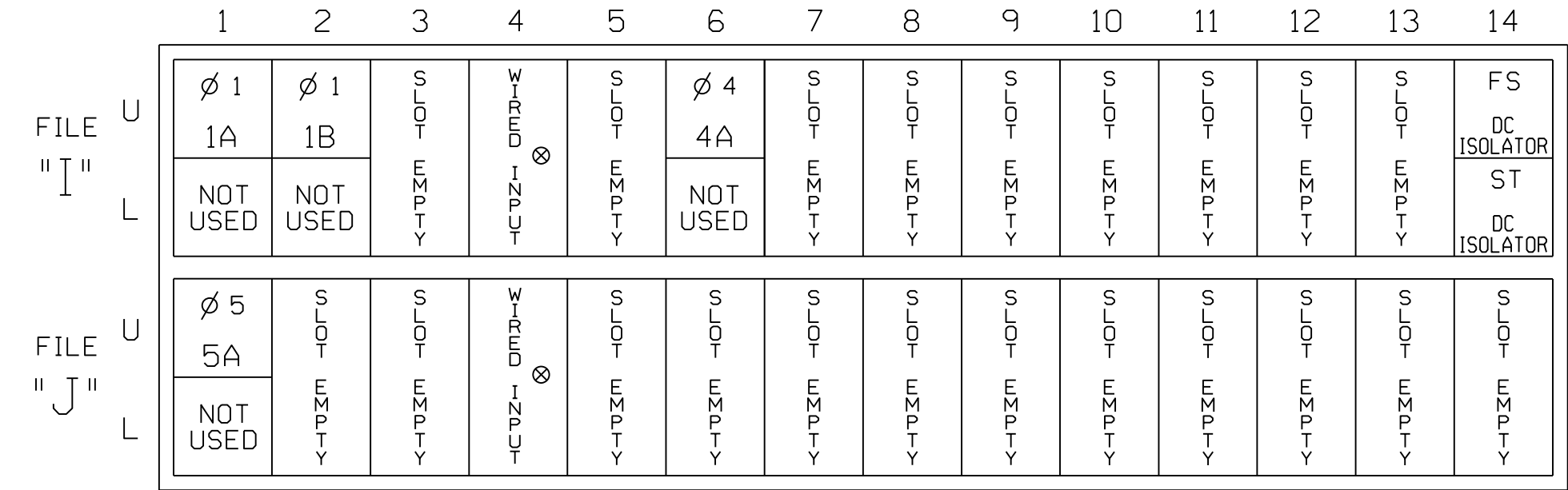
THIS PLAN SUPERSEDES THE PLAN SIGNED AND SEALED ON 06/05/2019

### DETECTOR NOTES

- For all loops, install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.
- For loops 1A and 5A detector card placements and slots reserved for wired inputs are typical for a NCDOT installation.

### INPUT FILE POSITION LAYOUT

(front view)

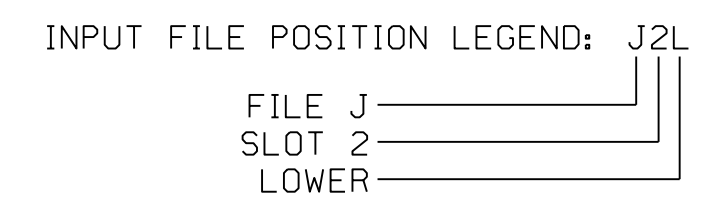


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 ⊗ Wired Input - Do not populate slot with detector card

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	-	I1U	56	1	1	YES		15		S
	-	J4U	48	26	6	YES		3		G
1B	TB2-5,6	I2U	39	2	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES				S
5A <sup>2</sup>	-	J1U	55	5	5	YES		15		S
	-	I4U	47	22	2	YES		3		G

<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
<sup>2</sup>Add jumper from J1-W to I4-W, on rear of input file.



### Temporary Design 1 - TMP Phase II Electrical Detail - Sheet 1 of 2

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 Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
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Prepared in the Offices of:

US 401 (South Raeford Road)  
 at  
 SR 3569 (Raeford Rd- Old US 401)/Bentridge Ln.  
 Division 6 Cumberland County Fayetteville

PLAN DATE: July 2021 REVIEWED BY: L Overn  
 PREPARED BY: R M Muncey REVIEWED BY:

REVISIONS	INIT.	DATE

Regina M. Muncey  
 6/27/2021  
 SIG. INVENTORY NO. 06-0845T1

06-0845T1.dgn  
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 User: jhambri

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

*(program controller as shown)*

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

*OVERLAP A*

Select TMG VEH OVLP [A] and 'PPLT FYA'

```

TMG VEH OVLP...[A] TYPE: ....[PPLT FYA]
PROTECTED LEFT TURN.... PHASE 1
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0

```

Toggle Twice

*OVERLAP C*

Select TMG VEH OVLP [C] and 'PPLT FYA'

```

TMG VEH OVLP...[C] TYPE: ....[PPLT FYA]
PROTECTED LEFT TURN.... PHASE 5
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT....CH11 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0

```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 06-0845T1  
DESIGNED: July 2021  
SEALED: 7/9/2021  
REVISED: N/A

THIS PLAN SUPERSEDES  
THE PLAN SIGNED AND  
SEALED ON 06/05/2019

Tempoary Design 1 - TMP Phase II  
Electrical Detail - Sheet 2 of 2

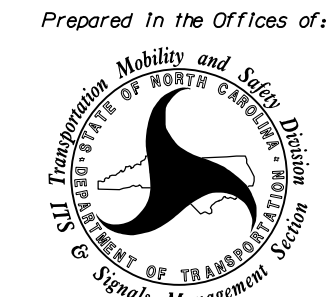
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ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

Prepared in the Offices of:




750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (South Raeford Road)  
at  
SR 3569 (Raeford Rd-  
Old US 401)/Bentridge Ln.  
Division 6 Cumberland County Fayetteville

PLAN DATE: July 2021	REVIEWED BY: L Overn
PREPARED BY: R M Muncey	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL



Regina M. Muncey  
DATE

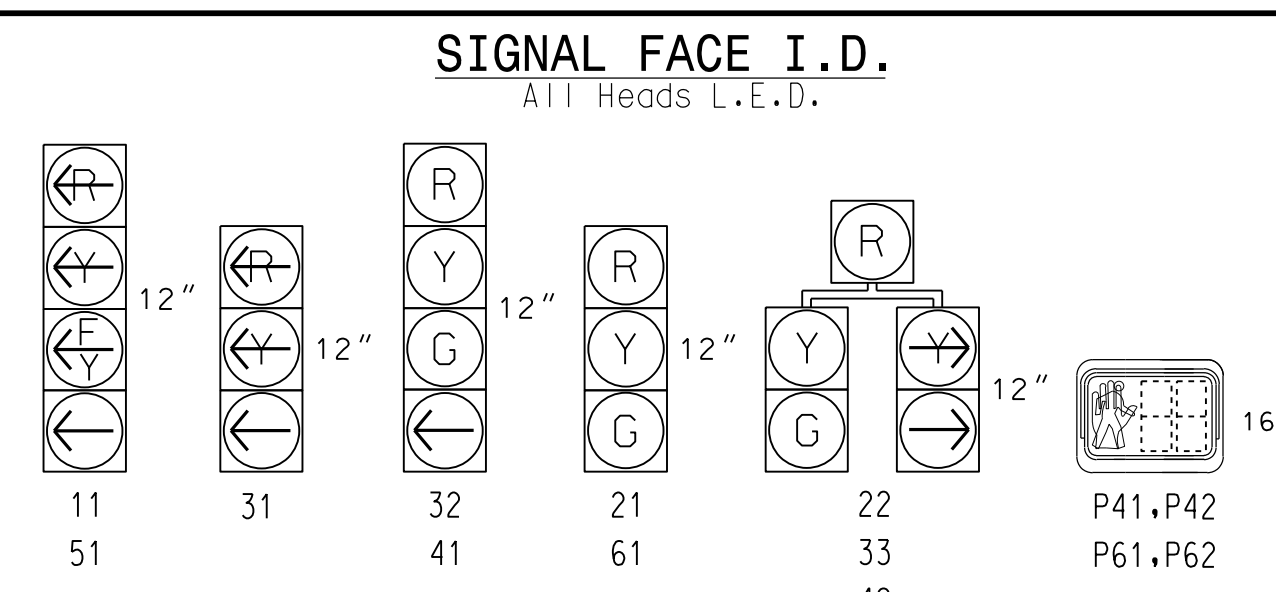
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### 6 Phase Fully Actuated Fayetteville Signal System

#### NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
10. Pedestrian pedestals are conceptual and shown for reference only. See 2018 NCDOT Roadway Standard Drawings 1705.04 Sheets 1-3 for push button location details.



#### ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING						TYPE	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL				
1A	6X40	0	2-4-2	X	1	Yes	-	15	★	-	S	-	X
1B	6X40	0	2-4-2	X	1	Yes	-	15	-	-	S	-	X
2A	6X6	300	6	X	2	Yes	-	-	-	-	N	-	X
2B	6X6	300	6	X	2	Yes	-	-	-	-	N	-	X
3A	6X40	0	2-4-2	X	3	Yes	-	3	-	-	S	-	X
3B	6X40	0	2-4-2	X	3	Yes	-	-	-	-	S	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	3	-	-	S	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	15	★	-	S	-	X
5B	6X40	0	2-4-2	X	5	Yes	-	15	-	-	S	-	X
6A	6X6	300	6	X	6	Yes	-	-	-	-	N	-	X
6B	6X6	300	6	X	6	Yes	-	-	-	-	N	-	X

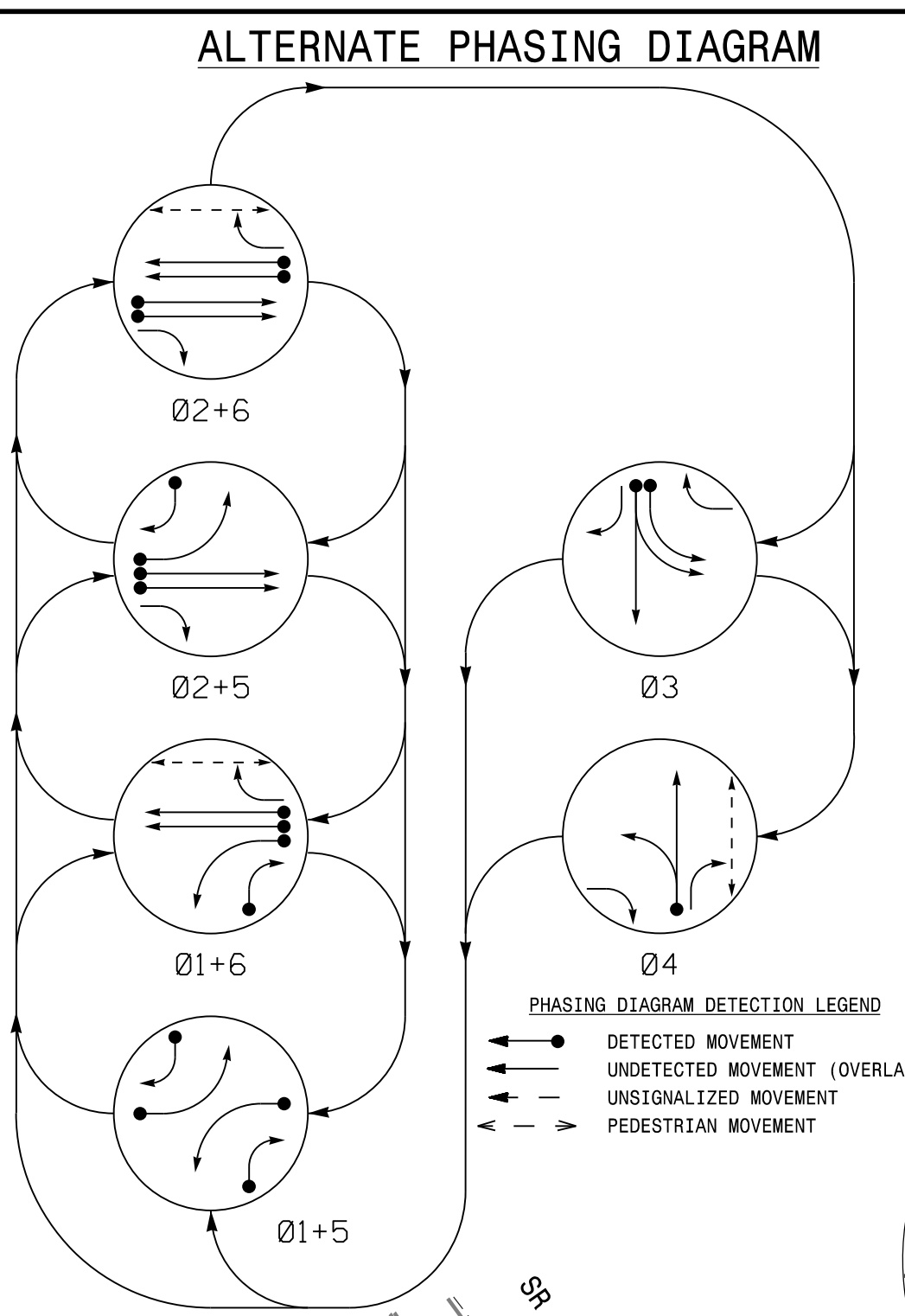
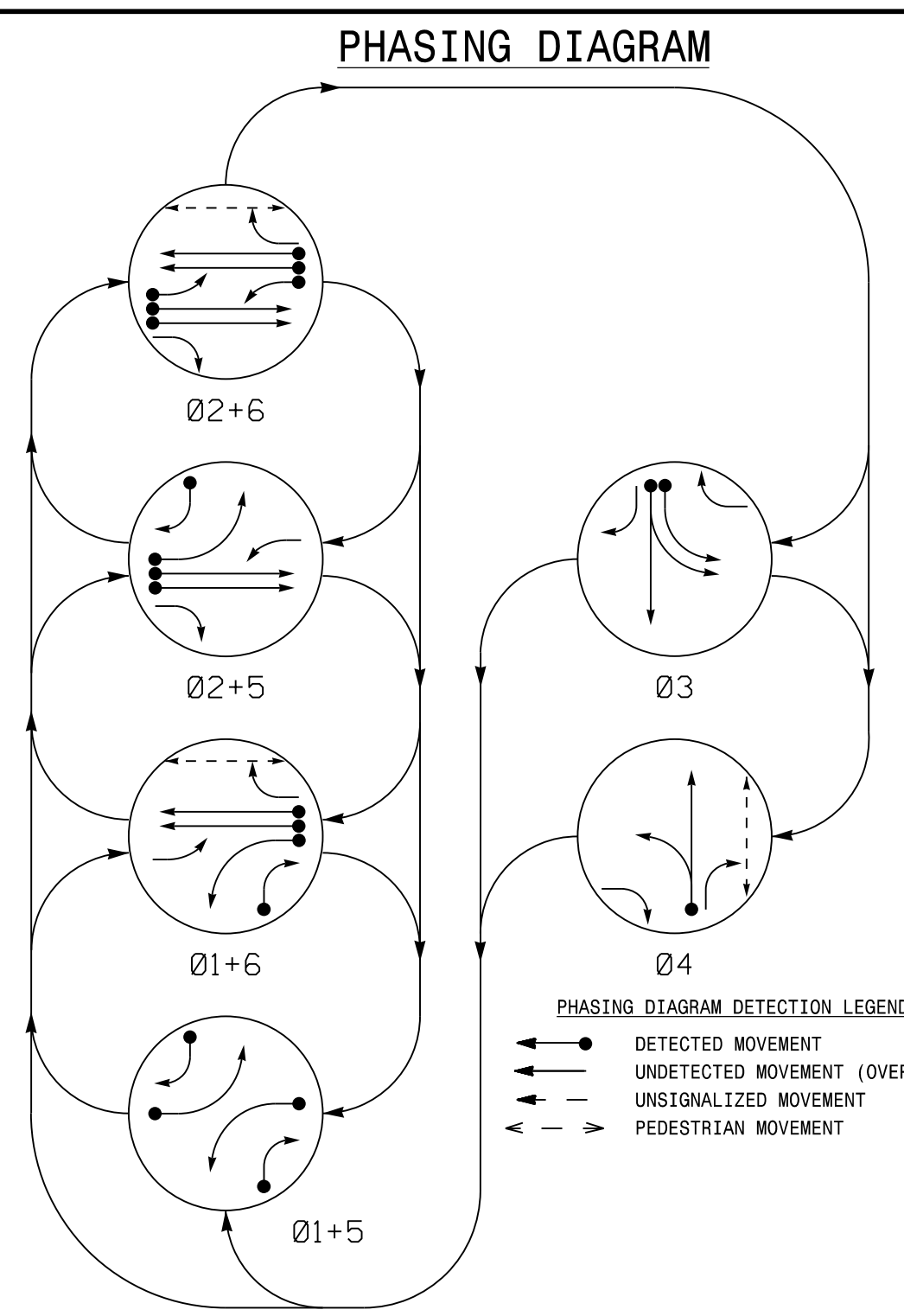
★ Disable delay during Alternate Phasing Operation.  
# Disable Phase(s) call during Alternate Phasing Operation.

#### ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE						FLASH
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3	Ø 4	
11	←	←	←	←	←	←	Y
21	R	R	G	G	R	R	Y
31	←	←	←	←	←	←	Y
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G	R
42	R	R	R	R	R	G	R
51	←	←	←	←	←	←	Y
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R	Y
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK

#### TABLE OF OPERATION

SIGNAL FACE	PHASE						FLASH
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3	Ø 4	
11	←	←	←	←	←	←	Y
21	R	R	G	G	R	R	Y
22	R	R	G	G	R	R	Y
31	←	←	←	←	←	←	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	←	←	←	←	←	←	Y
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R	Y
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK

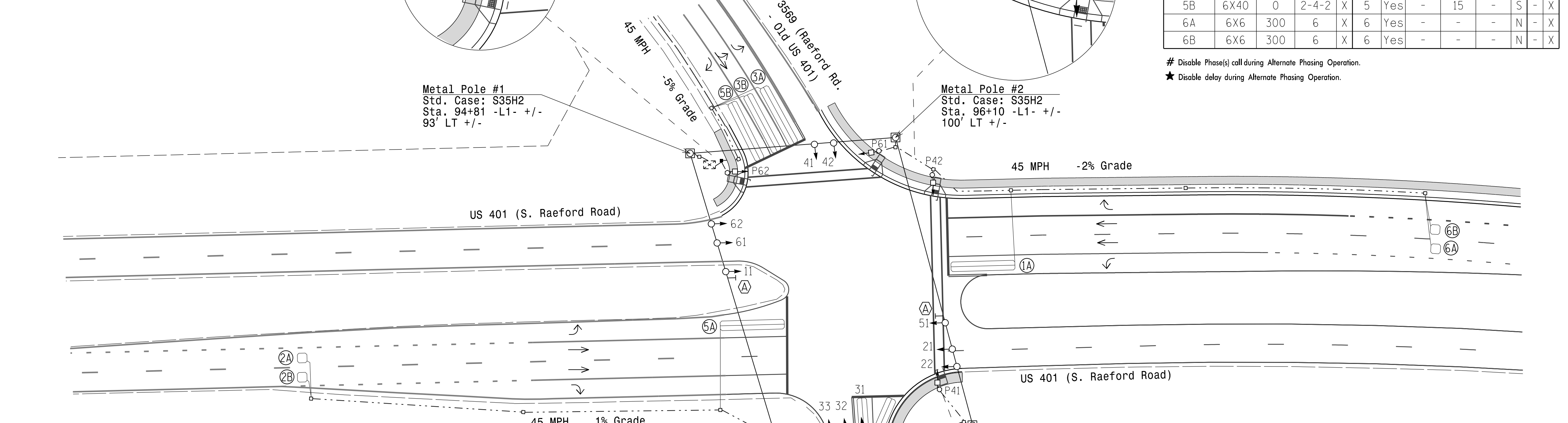


**PHASING DIAGRAM DETECTION LEGEND**

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

**PHASING DIAGRAM DETECTION LEGEND**

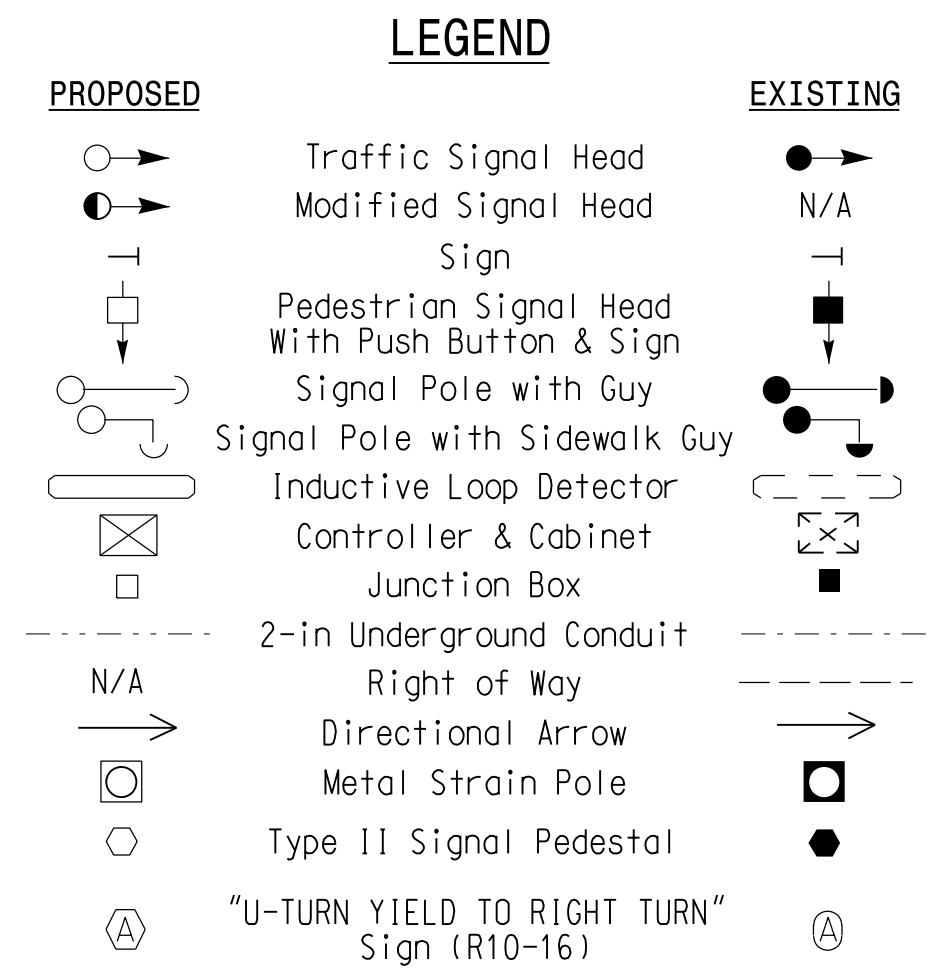
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



#### ASC/3 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Walk *	-	-	-	7	-	7
Ped Clear	-	-	-	29	-	20
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max I *	15	90	35	35	15	90
Yellow	3.0	4.4	5.0	4.4	3.0	4.7
Red Clear	3.3	1.9	2.4	2.8	3.3	1.6
Red Revert	-	-	-	-	-	-
Actuations B4 Add *	-	0	-	-	-	0
Seconds /Actuation *	-	1.5	-	-	-	1.5
Max Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	X	-	-	-	X
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X

\* 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.



THIS PLAN SUPERSEDES THE PLAN SIGNED AND SEALED ON 06/05/2019

#### Signal Upgrade - Final Design

Stantec Consulting Services Inc.  
801 Jones Franklin Road-Suite 300  
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Tel. (919) 851-6866  
Fax. (919) 851-7024  
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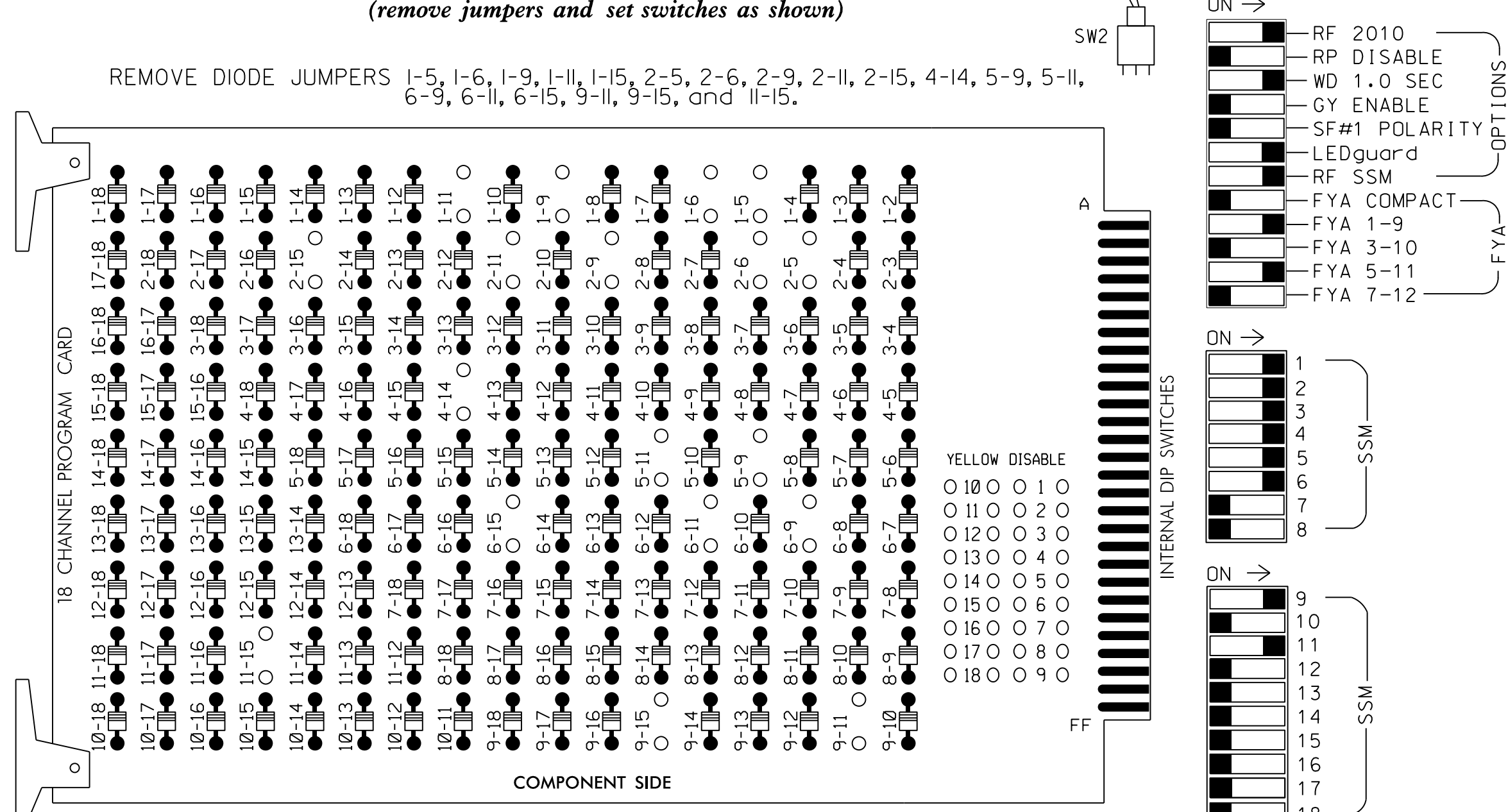
Prepared For the Offices of:  
Transportation Mobility and Safety Division  
STATE OF NORTH CAROLINA  
Signal Design Section  
750 N. Greenfield Pkwy, Garner, NC 27526

US 401 (South Raeford Rd.)  
at  
SR 3569 (Raeford Rd-Old US 401)  
Bentridge Ln.  
Division 6 Cumberland County Fayetteville  
PLAN DATE: July 2021 REVIEWED BY: E D Harris  
PREPARED BY: R M Muncey REVIEWED BY: B L Watson

Betsy L. Watson  
Professional Engineer  
No. 29449

### EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.

### 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 controller to start up in phase 2 Green and 6 WALK.
- The cabinet and controller are part of the Fayetteville Signal System.

### SIGNAL HEAD HOOK-UP CHART

	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★	42	21,22	NU	31	32	33	62	41	42	22	P41, P42	51★	33	61,62	P61, P62	NU	NU	NU	11★	NU	NU	51★	NU	NU
RED	*	128			116	116			101	101			*	134											
YELLOW		129			117	117			102	102				135											
GREEN		130			118	118			103	103				136											
RED ARROW					116																			A121	A114
YELLOW ARROW	126				117				102					132										A122	A115
FLASHING YELLOW ARROW																							A123	A116	
GREEN ARROW	127	127			118	118			103	103				133	133										
Hand														104											119
Person														106											121

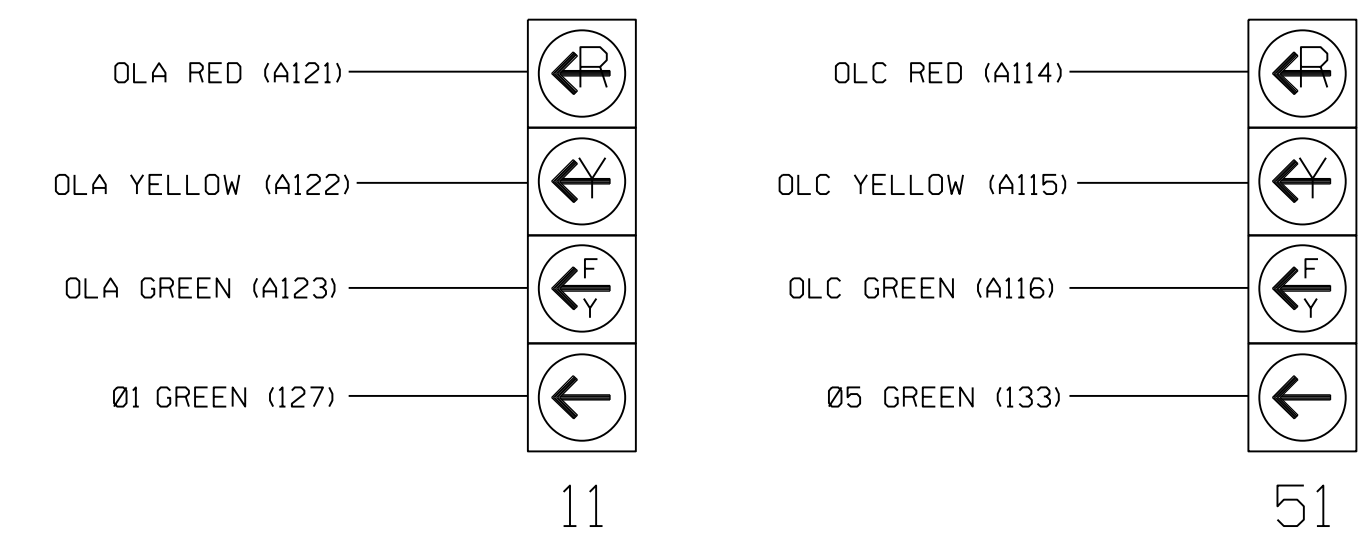
NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 ★ See pictorial of head wiring in detail this sheet.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX.  
 OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S7,S8,S9  
 AUX S1,AUX S4  
 PHASES USED.....1,2,3,4,4PED,5,6,6PED  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED  
 \* See overlap programming detail on sheet 2

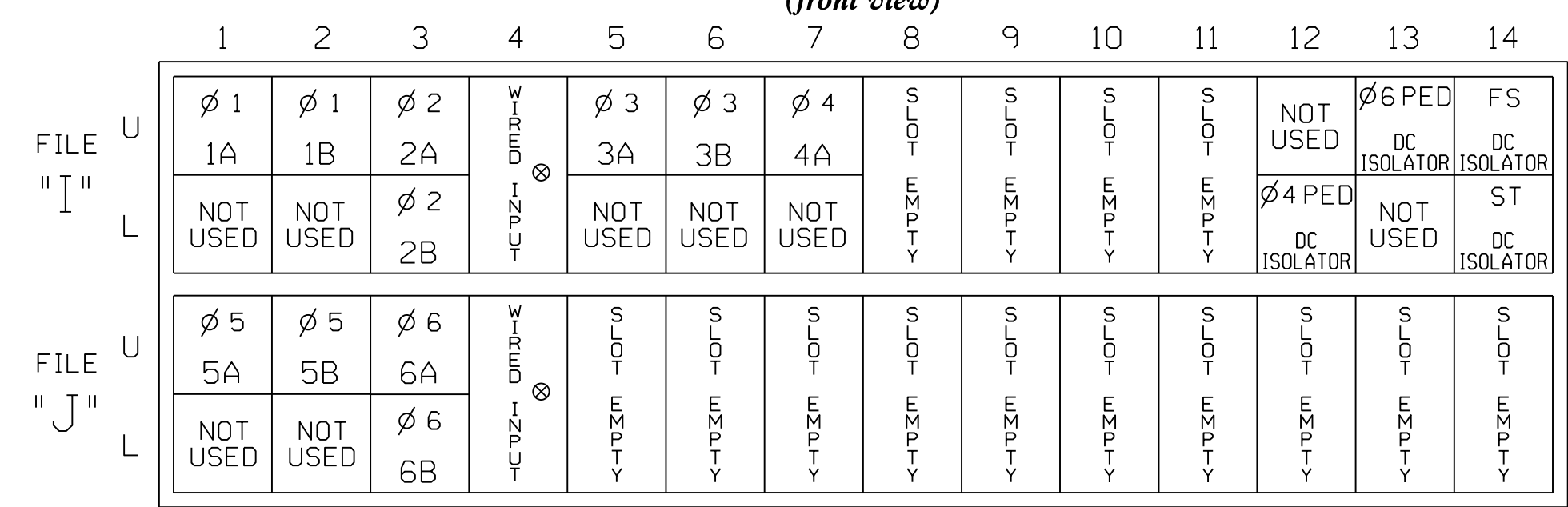
### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### INPUT FILE POSITION LAYOUT

(front view)

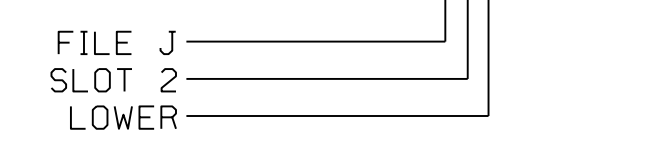


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ⊗ Wired Input - Do not populate slot with detector card  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	I1U	56	1★	1	YES		15		S
	-	J4U	48	26★	6	YES		3		G
1B	TB2-5,6	I2U	39	2	1	YES		15		S
2A	TB2-9,10	I3U	63	32	2	YES			X	N
2B	TB2-11,12	I3L	76	42	2	YES			X	N
3A	TB4-5,6	I5U	58	3	3	YES		3		S
3B	TB4-9,10	I6U	41	4	3	YES				S
4A	TB6-1,2	I7U	65	34	4	YES		3		S
5A <sup>2</sup>	TB3-1,2	J1U	55	5★	5	YES		15		S
	-	I4U	47	22★	2	YES		3		G
5B	TB3-5,6	J2U	40	6	5	YES		15		S
6A	TB3-7,8	J3U	64	6	6	YES			X	N
6B	TB3-9,10	J3L	77	16	6	YES			X	N
PED PUSH BUTTONS										
P41,P42	TB8-5,6	I12L	69	PED 4	4	PED				
P61,P62	TB8-7,9	I13U	68	PED 6	6	PED				

INPUT FILE POSITION LEGEND: J2L

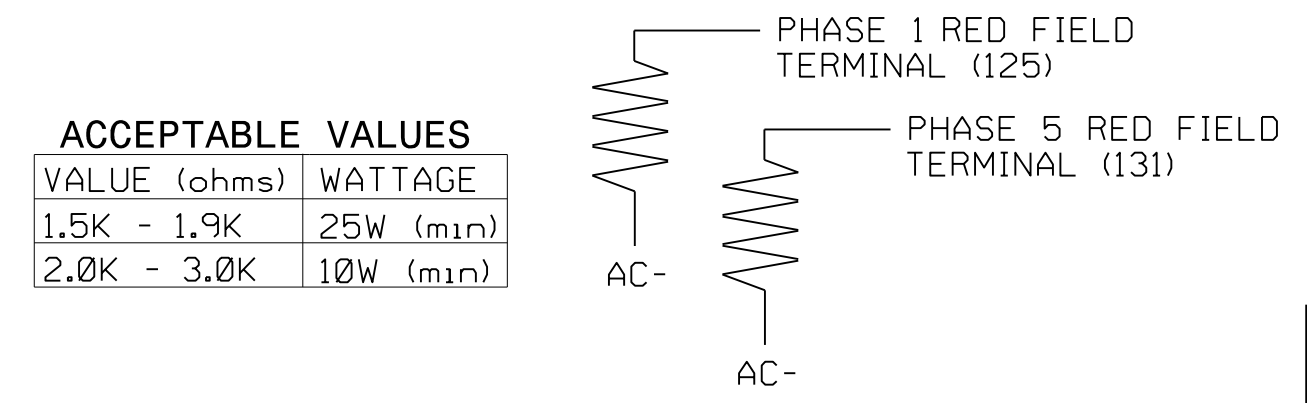


<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
<sup>2</sup>Add jumper from J1-W to I4-W, on rear of input file.  
 \* See Vehicle Detector Setup Programming Detail for alternate phasing on Sheet 3.

NOTE:  
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0845  
 DESIGNED: July 2021  
 SEALED: 7/9/2021  
 REVISED: N/A

THIS PLAN SUPERSEDES THE PLAN SIGNED AND SEALED ON 06/05/2019

Final Design  
 Electrical Detail - Sheet 1 of 3

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 Raleigh, NC 27606  
 Tel. (919) 851-6866  
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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (South Raeford Road)  
 at  
 SR 3569 (Raeford Rd-  
 Old US 401)/Bentridge Ln.  
 Division 6 Cumberland County Fayetteville

PLAN DATE: July 2021 REVIEWED BY: L Overn  
 PREPARED BY: R M Muncey REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 43239  
 REGINA M. MUNCEY  
 06/05/2019  
 DATE

SIG. INVENTORY NO. 06-0845



### ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

- From Main Menu select **5. TIME BASE**
- From TIME BASE Submenu select **2. ACTION PLAN**

ACTION PLAN...[ 1]	
PATTERN.....AUTO	SYS OVERRIDE.... NO
TIMING PLAN..... 0	SEQUENCE..... 0
VEH DETECTOR PLAN.. 2	DET LOG.....NONE
FLASH..... --	RED REST..... NO
VEH DET DIAG PLN... 0	PED DET DIAG PLN..0
DIMMING ENABLE.. NO	PRIORITY RETURN. NO
PED PR RETURN.. NO	QUEUE DELAY..... NO
PMT COND DELAY NO	
PHASE 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
PED RCL . . . . .	
WALK 2 . . . . .	
VEX 2 . . . . .	
VEH RCL . . . . .	
MAX RCL . . . . .	
MAX 2 . . . . .	
PHASE 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
MAX 3 . . . . .	
CS INH . . . . .	
OMIT . . . . .	
SPC FCT X . . . X . . . (1-8)	
AUX FCT . . . (1-3)	
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	
LP 1-15 . . . . .	
LP 16-30 . . . . .	
LP 31-45 . . . . .	
LP 46-60 . . . . .	
LP 61-75 . . . . .	
LP 76-90 . . . . .	
LP 91-100 . . . . .	

### ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**

#### OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

TMG VEH OVLP...[A] TYPE: ....	<b>PPLT FYA</b>
PROTECTED LEFT TURN....	PHASE 1
OPPOSING THROUGH.....	PHASE 2
FLASHING ARROW OUTPUT.....CH9	ISOLATE
DELAY START OF: FYA..0.0	CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.....	1

← NOTICE ACTION PLAN SF BIT "1"

Toggle Twice

#### OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

TMG VEH OVLP...[C] TYPE: ....	<b>PPLT FYA</b>
PROTECTED LEFT TURN....	PHASE 5
OPPOSING THROUGH.....	PHASE 6
FLASHING ARROW OUTPUT.....CH11	ISOLATE
DELAY START OF: FYA..0.0	CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE.....	5

← NOTICE ACTION PLAN SF BIT "5"

END PROGRAMMING

### ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	1, 5

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

#### ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1 AND 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

- SF BITS 1,5: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.
- VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.  
Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

### 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0845  
DESIGNED: July 2021  
SEALED: 7/9/2021  
REVISED: N/A

THIS PLAN SUPERSEDES THE PLAN SIGNED AND SEALED ON 06/05/2019

Final Design  
Electrical Detail - Sheet 2 of 3

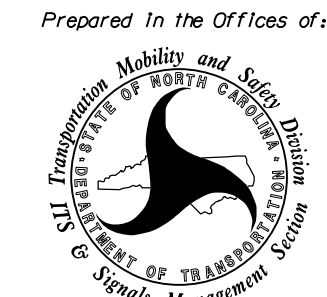
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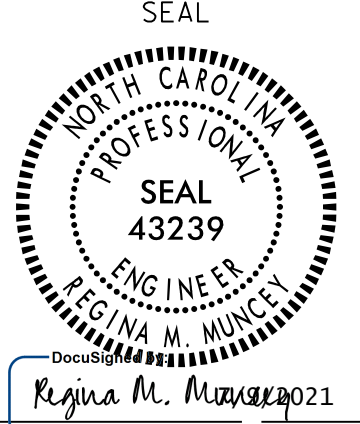
750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (South Raeford Road)  
at  
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Division 6 Cumberland County Fayetteville

PLAN DATE: July 2021	REVIEWED BY: L Overn
PREPARED BY: R M Muncie	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL



REGINA M. MUNCIE  
43239  
ENGINEER  
NORTH CAROLINA PROFESSIONAL ENGINEERS

REGINA M. MUNCIE 2021  
DATE

SIG. INVENTORY NO. 06-0845

06-0845.dgn User: jhambri

### ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A *(program controller as shown)*

## IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

- From Main Menu select **8. UTILITIES**
- From UTILITIES Submenu select **1. COPY/CLEAR**
- Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```

COPY / CLEAR UTILITY
FROM          TO
PHASE TIMING... > PHASE TIMING...
TIMING PLAN... > TIMING PLAN...
PH DET OPT PLAN... > PH DET OPT PLAN...
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
TOGGLE TO SELECT A "FROM" AND A "TO"
THEN PRESS ENTER
  
```

- From Main Menu select **6. DETECTORS**
- From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
- Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "1".  
 - Set delay time to "3.0".

```

VEH DETECTOR [ 1]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
1 1
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . DR OCC .
PMT QUEUE DELAY. NO
  
```

- Place cursor in VEH DETECTOR [ ] position and enter "26".  
 - Set assigned phase to "0".

```

VEH DETECTOR [26]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
26 0
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . DR OCC .
PMT QUEUE DELAY. NO
  
```

- Place cursor in VEH DETECTOR [ ] position and enter "5".  
 - Set delay time to "3.0".

```

VEH DETECTOR [ 5]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
5 5
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . DR OCC .
PMT QUEUE DELAY. NO
  
```

- Place cursor in VEH DETECTOR [ ] position and enter "22".  
 - Set assigned phase to "0".

```

VEH DETECTOR [22]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
22 0
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . DR OCC .
PMT QUEUE DELAY. NO
  
```

END PROGRAMMING


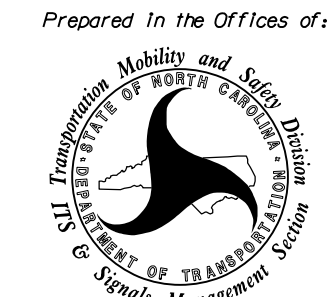

01:55:35 AM U:\Projects\Signal\Signal\Electrical\Details - U-4405A - Revised\Final\_Signal\SMU-4405A\Sig\_elec\_06-0845.dgn User: jhambri

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 06-0845  
 DESIGNED: July 2021  
 SEALED: 7/9/2021  
 REVISED: N/A

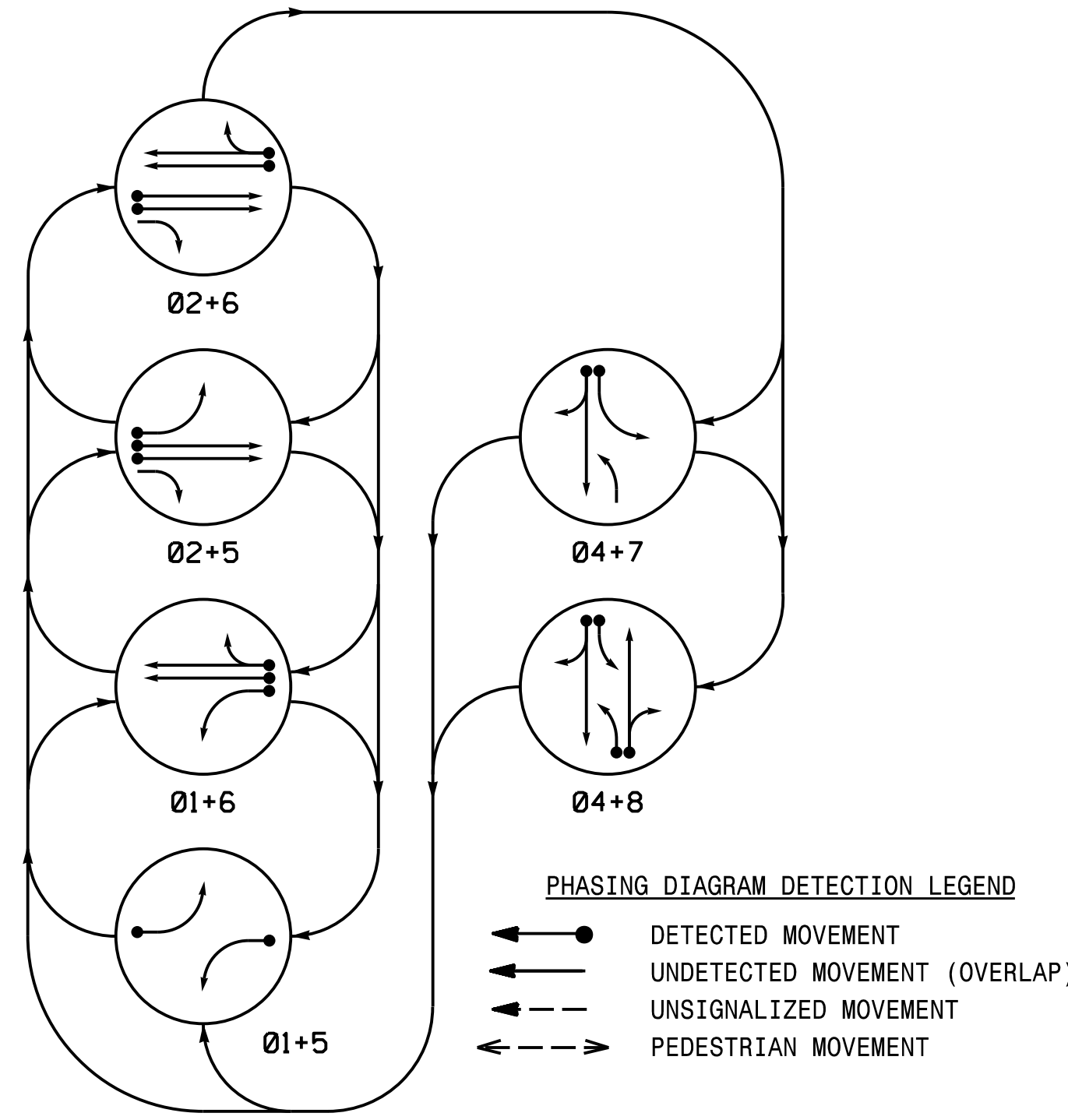
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Final Design  
 Electrical Detail - Sheet 3 of 3

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 Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	 Prepared in the Offices of: Mobility and Signal Division STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529	ELECTRICAL AND PROGRAMMING DETAILS FOR: US 401 (South Raeford Road) at SR 3569 (Raeford Rd- Old US 401)/Bentridge Ln. Division 6 Cumberland County Fayetteville		 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER REGINA M. MUNCEY 43239
		PLAN DATE: July 2021 REVIEWED BY: L Overn PREPARED BY: R M Muncey REVIEWED BY:		

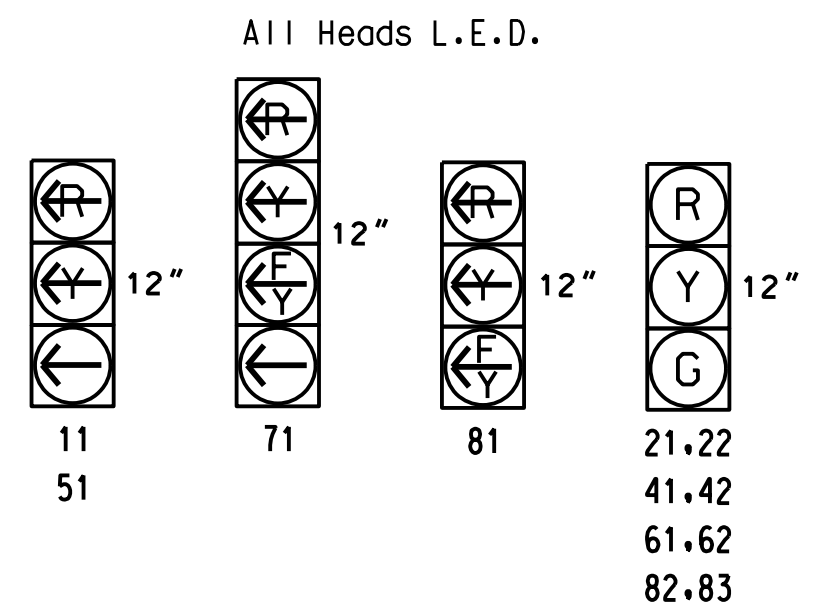
**PHASING DIAGRAM**



**TABLE OF OPERATION**

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+7	04+8	F	L
11	-	-	R	R	R	R	R	R
21, 22	R	R	G	G	R	R	R	Y
41, 42	R	R	R	R	G	G	R	R
51	-	-	R	R	R	R	R	R
61, 62	R	G	R	G	R	R	R	Y
71	R	R	R	R	-	F	F	R
81	R	R	R	R	F	F	R	R
82, 83	R	R	R	R	R	G	R	R

**SIGNAL FACE I.D.**



**ASC/3 DETECTOR INSTALLATION CHART**

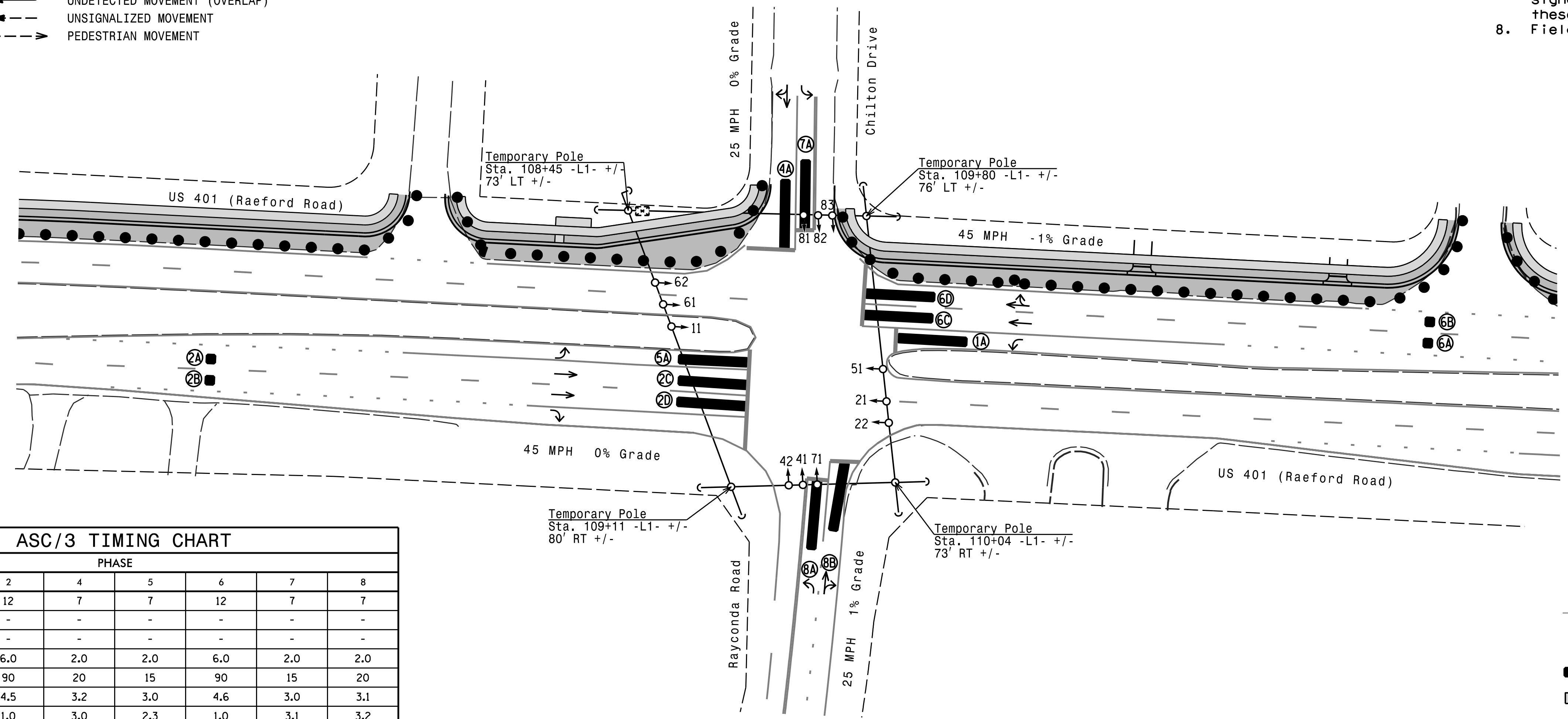
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	-	1	Yes	-	-	-	S	-	X
2A	6X6	300	*	-	2	Yes	-	-	-	N	-	X
2B	6X6	300	*	-	2	Yes	-	-	-	N	-	X
2C	6X40	0	*	-	2	Yes	2.0	5	-	G	-	X
2D	6X40	0	*	-	2	Yes	2.0	5	-	G	-	X
4A	6X40	0	*	-	4	Yes	-	10	-	S	-	X
5A	6X40	0	*	-	5	Yes	-	-	-	S	-	X
6A	6X6	300	*	-	6	Yes	-	-	-	N	-	X
6B	6X6	300	*	-	6	Yes	-	-	-	N	-	X
6C	6X40	0	*	-	6	Yes	2.0	5	-	G	-	X
6D	6X40	0	*	-	6	Yes	2.0	5	-	G	-	X
7A	6X40	0	*	-	7	Yes	-	15	-	S	-	X
8A	6X40	0	*	-	4	Yes	-	3	-	S	-	X
					8	Yes	-	3	-	S	-	X
8B	6X40	0	*	-	8	Yes	-	10	-	S	-	X
					8	Yes	-	10	-	S	-	X

\*Video Detection Area. Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

**6 Phase Fully Actuated Fayetteville Signal System**

**NOTES**

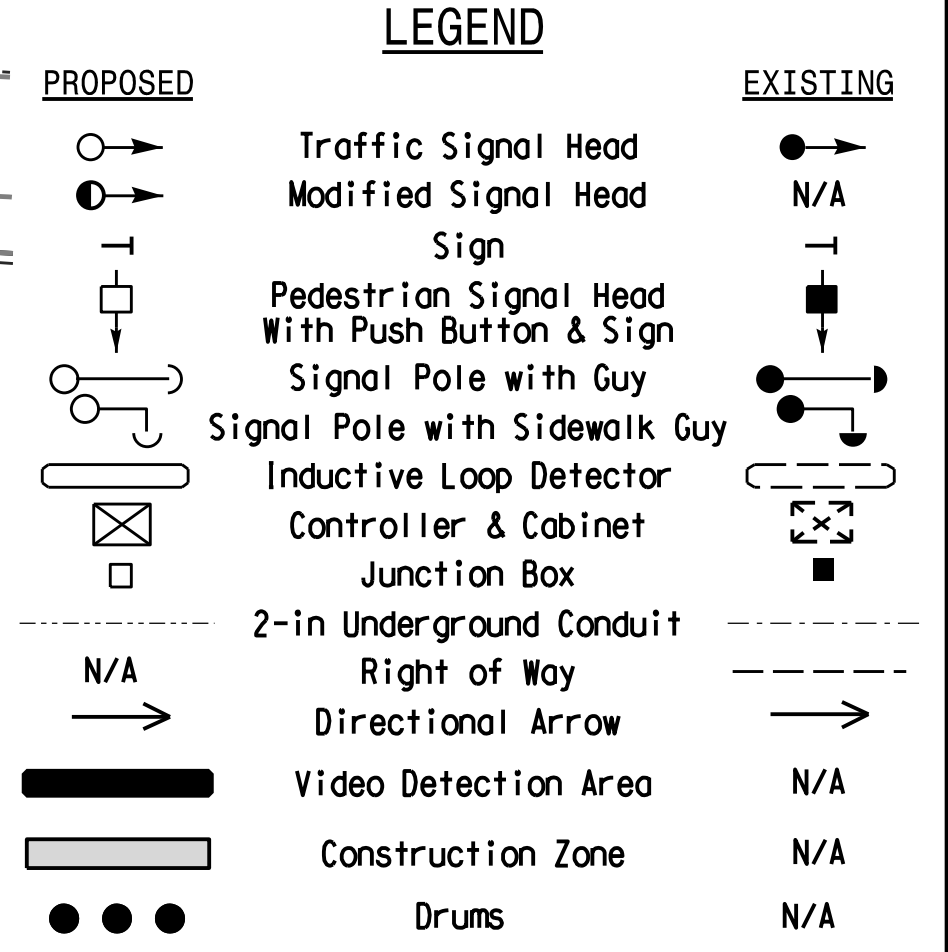
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet foundation so as not to obstruct sight distance of vehicles turning right on red. Relocate existing cabinet and controller onto new foundation.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Field adjust temporary poles as needed.



**ASC/3 TIMING CHART**

FEATURE	PHASE							
	1	2	4	5	6	7	8	
Min Green *	7	12	7	7	12	7	7	
Walk *	-	-	-	-	-	-	-	
Ped Clear	-	-	-	-	-	-	-	
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0	2.0	
Max I *	15	90	20	15	90	15	20	
Yellow	3.0	4.5	3.2	3.0	4.6	3.0	3.1	
Red Clear	2.8	1.0	3.0	2.3	1.0	3.1	3.2	
Red Revert	-	-	-	-	-	-	-	
Actuations B4 Add *	-	-	-	-	-	-	-	
Seconds / Actuation *	-	-	-	-	-	-	-	
Max Initial *	-	-	-	-	-	-	-	
Time Before Reduction *	-	15	-	-	15	-	-	
Time To Reduce *	-	30	-	-	30	-	-	
Minimum Gap	-	3.0	-	-	3.0	-	-	
Locking Detector	-	-	-	-	-	-	-	
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-	-	
Dual Entry	-	-	X	-	-	-	X	
Simultaneous Gap	X	X	X	X	X	X	X	

\* 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 1 - TMP Phase II**

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

Prepared for the Offices of:  
  
 Betsy L. Watson  
 Professional Engineer  
 License No. 27525

**US 401 (Raeford Rd.) at Chilton Dr / Rayconda Rd**  
 Division 6 Cumberland County Fayetteville  
 PLAN DATE: June 2019 REVIEWED BY: E D Harris  
 PREPARED BY: R M Muncey REVIEWED BY: B L Watson

REVISIONS	INIT.	DATE

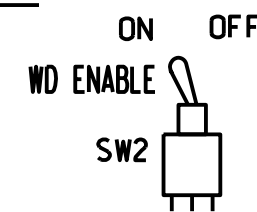
**Professional Engineer Seal**  
 Betsy L. Watson  
 License No. 29449  
 Date: 6/5/2019  
 Signature: Betsy L. Watson  
 Date: 6/5/2019  
 Inventory No. 06-076711

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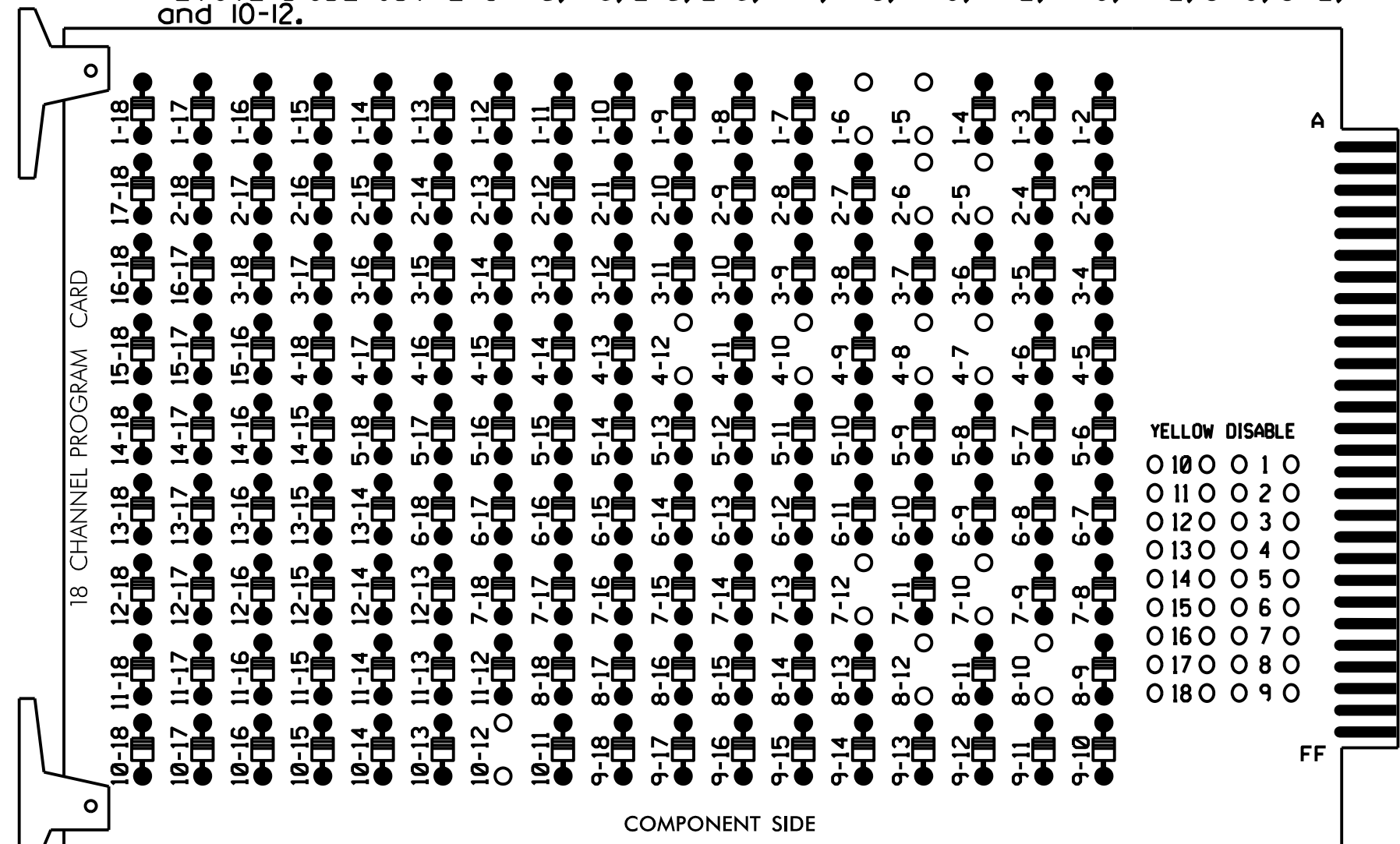
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

# EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



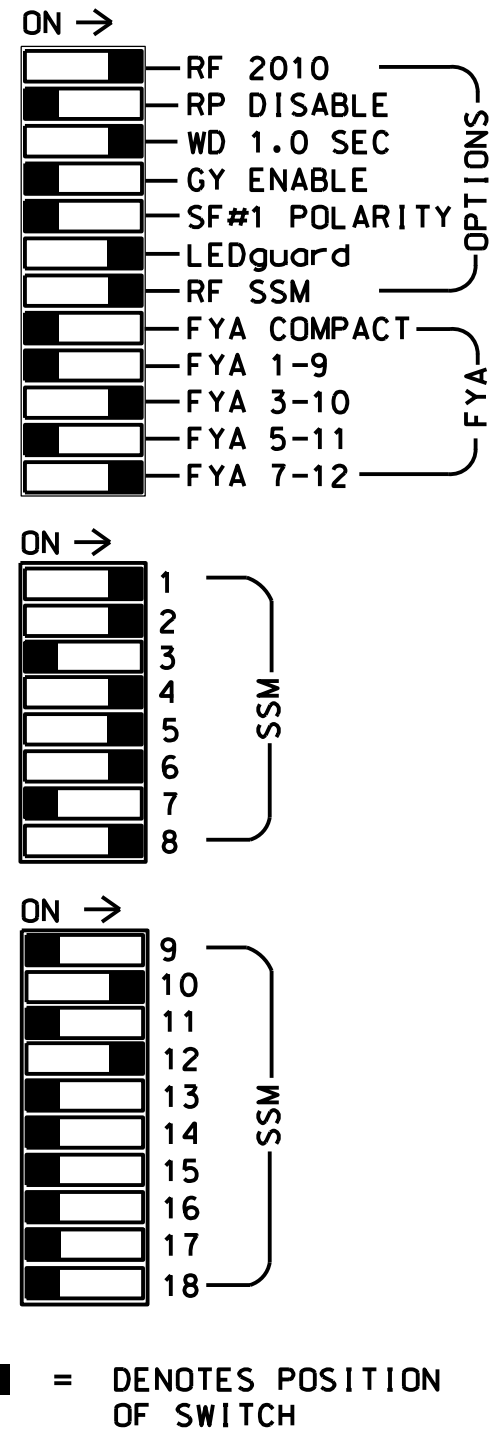
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 4-7, 4-8, 4-10, 4-12, 7-10, 7-12, 8-10, 8-12, and 10-12.



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.
- Integrate monitor with Ethernet network in cabinet.



■ = 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.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Fayetteville Signal System.

## EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S10,  
 S11,AUX S2,AUX S5  
 PHASES USED.....1,2,4,5,6,7,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....\*  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....\*  
 \* See overlap programming detail on sheet 2

## SIGNAL HEAD HOOK-UP CHART

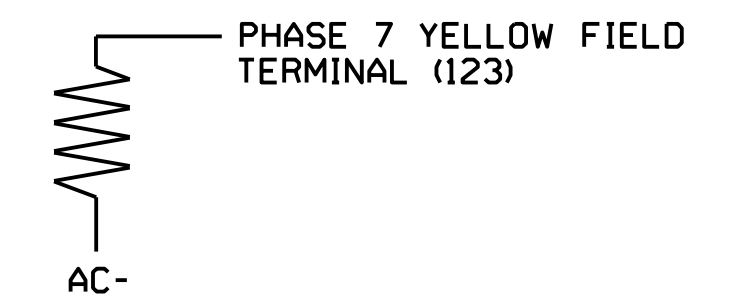
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	71*	82,83	NU	NU	81*	NU	NU	71*	NU
RED		128			101			134			107							
YELLOW		129			102			135		*	108							
GREEN		130			103			136			109							
RED ARROW	125							131							A124			A101
YELLOW ARROW	126							132							A125			A102
FLASHING YELLOW ARROW															A126			A103
GREEN ARROW	127							133			124							

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

## LOAD RESISTOR INSTALLATION DETAIL

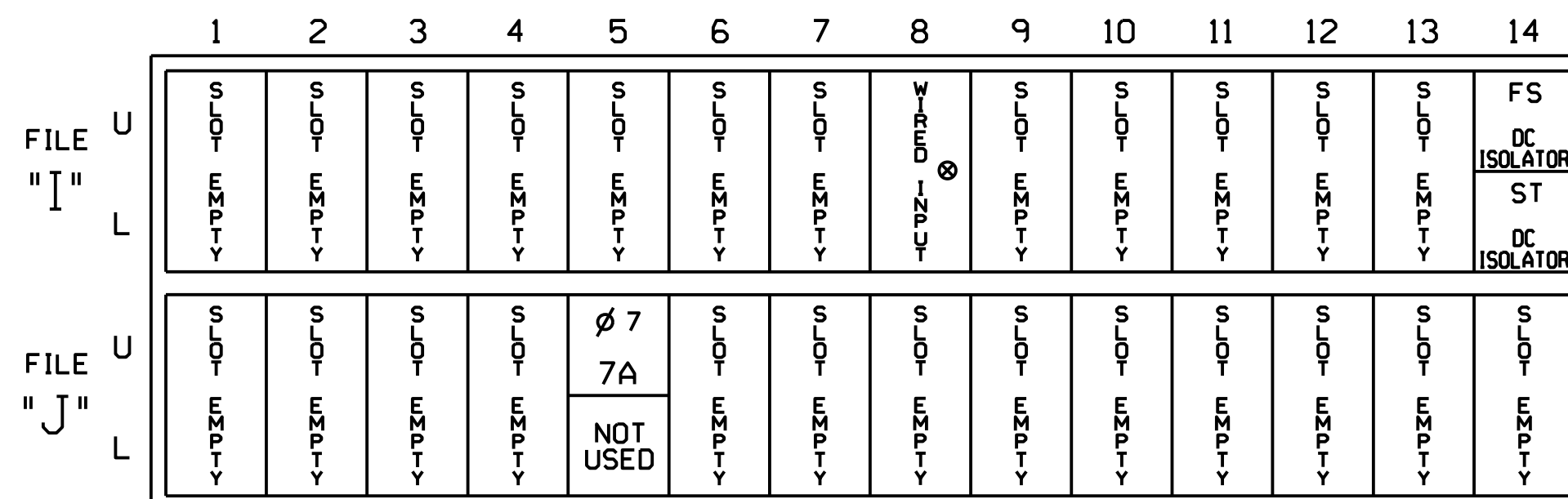
(install resistor as shown)

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



## INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE  
 ST = STOP TIME

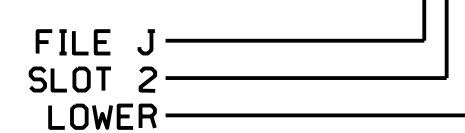
⊗ Wired Input - Do not populate slot with detector card

## INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
7A <sup>1</sup>	-	J5U	57	7	7	YES		15		S
	-	I8U	49	24	4	YES		3		S

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

INPUT FILE POSITION LEGEND: J2L

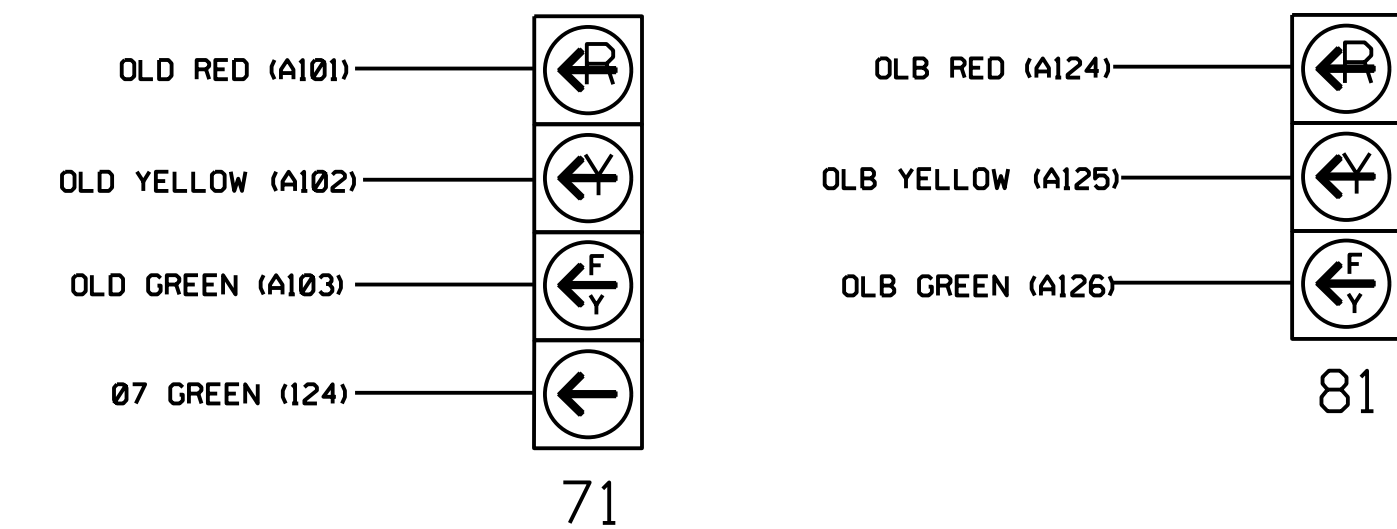


## DETECTOR NOTES

- For all loops install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.
- For loop 7A detector card placements and slots reserved for wired inputs are typical for a NCDOT installation.

## FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-076711  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 1 - TMP Phase II  
 Electrical Detail - Sheet 1 of 2

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Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
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 License No. F-0672

US 401 (Raeford Rd.)  
 at  
 Chilton Dr / Rayconda Rd

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: R M Muncey REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 045933  
 LAWRENCE E. OVERN  
 6/5/2019

**ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL**

(program controller as shown)

- 1. From Main Menu select 2. CONTROLLER
- 2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS
- 3. Toggle Once

**OVERLAP B**

Select TMG VEH OVLP [B] and 'OTHER/ECONOLITE'

TMG VEH OVLP... [B] TYPE: OTHER/ECONOLITE	
PHASES	1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED	. . . X . . . . .
PROTECT	. . . . .
PED PRTC	. . . . .
NOT OVLP	. . . . .
FLSH GRN	. . . 1 . . . . .
LAG X PH	. . . . .
LAG 2 PH	. . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0	

Toggle Twice

**OVERLAP D**

Select TMG VEH OVLP [D] and 'PPLT FYA'

TMG VEH OVLP... [D] TYPE: PPLT FYA	
PROTECTED LEFT TURN....	PHASE 7
OPPOSING THROUGH.....	PHASE 8
FLASHING ARROW OUTPUT.....CH12 ISOLATE	
DELAY START OF: FYA..0.0 CLEARANCE..0.0	
ACTION PLAN SF BIT DISABLE..... 0	

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 06-0767T1  
DESIGNED: June 2019  
SEALED: 6/5/2019  
REVISED: N/A

Temporary Design 1 - TMP Phase II  
Electrical Detail - Sheet 2 of 2

**DOCUMENT NOT CONSIDERED FINAL  
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Stantec Consulting Services Inc.  
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Tel. (919) 851-6866  
Fax. (919) 851-7024  
www.stantec.com  
License No. F-0672



**ELECTRICAL AND PROGRAMMING  
DETAILS FOR:**

US 401 (Raeford Rd.)  
at  
Chilton Dr / Rayconda Rd

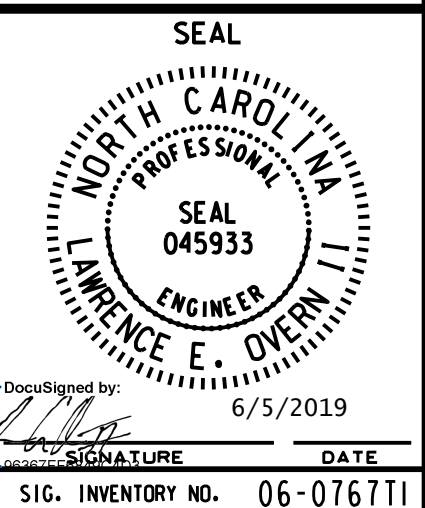
Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: L Overn

PREPARED BY: R M Muncey REVIEWED BY:

REVISIONS	INIT.	DATE

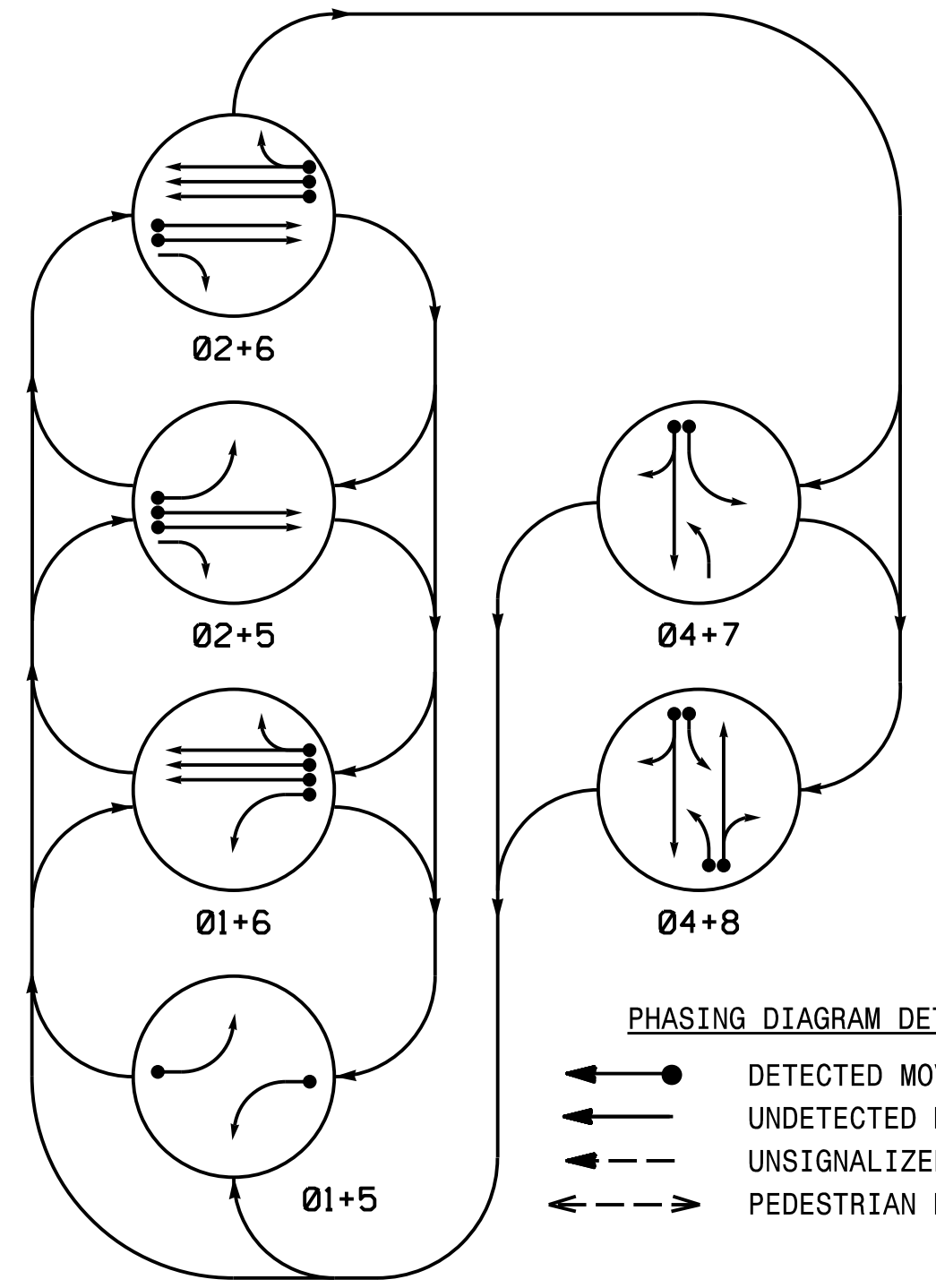
Digital Signed by: 6/5/2019  
LAWRENCE E. OVERN



DATE: 6/5/2019 10:45:30 AM  
User: jhombri@righi.com

SIG. INVENTORY NO. 06-0767T1

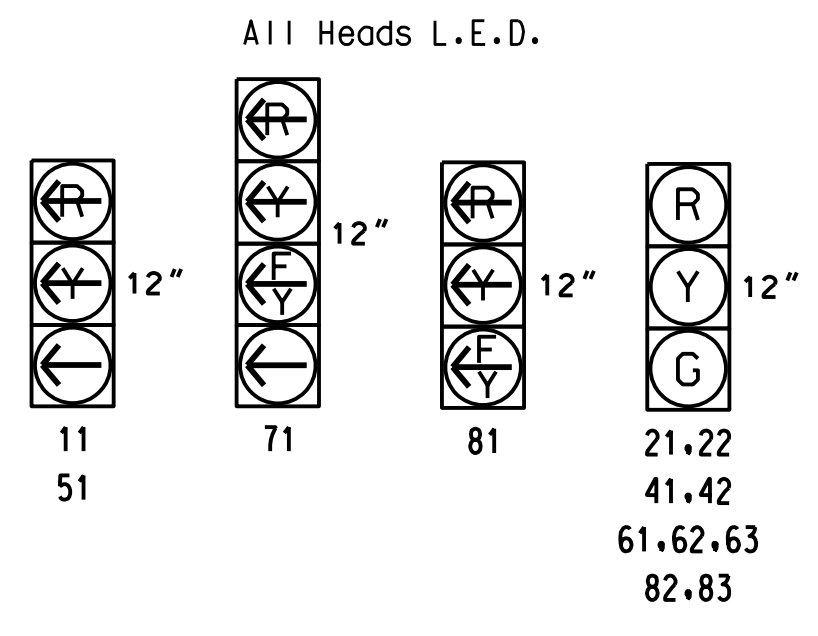
**PHASING DIAGRAM**



**TABLE OF OPERATION**

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+7	04+8	F	P
11	-	-	-	-	-	-	-	-
21, 22	R	R	G	G	R	R	Y	R
41, 42	R	R	R	R	G	G	R	R
51	-	-	-	-	-	-	-	-
61, 62, 63	R	G	R	G	R	R	Y	R
71	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-
82,83	R	R	R	R	R	G	R	R

**SIGNAL FACE I.D.**



**ASC/3 DETECTOR INSTALLATION CHART**

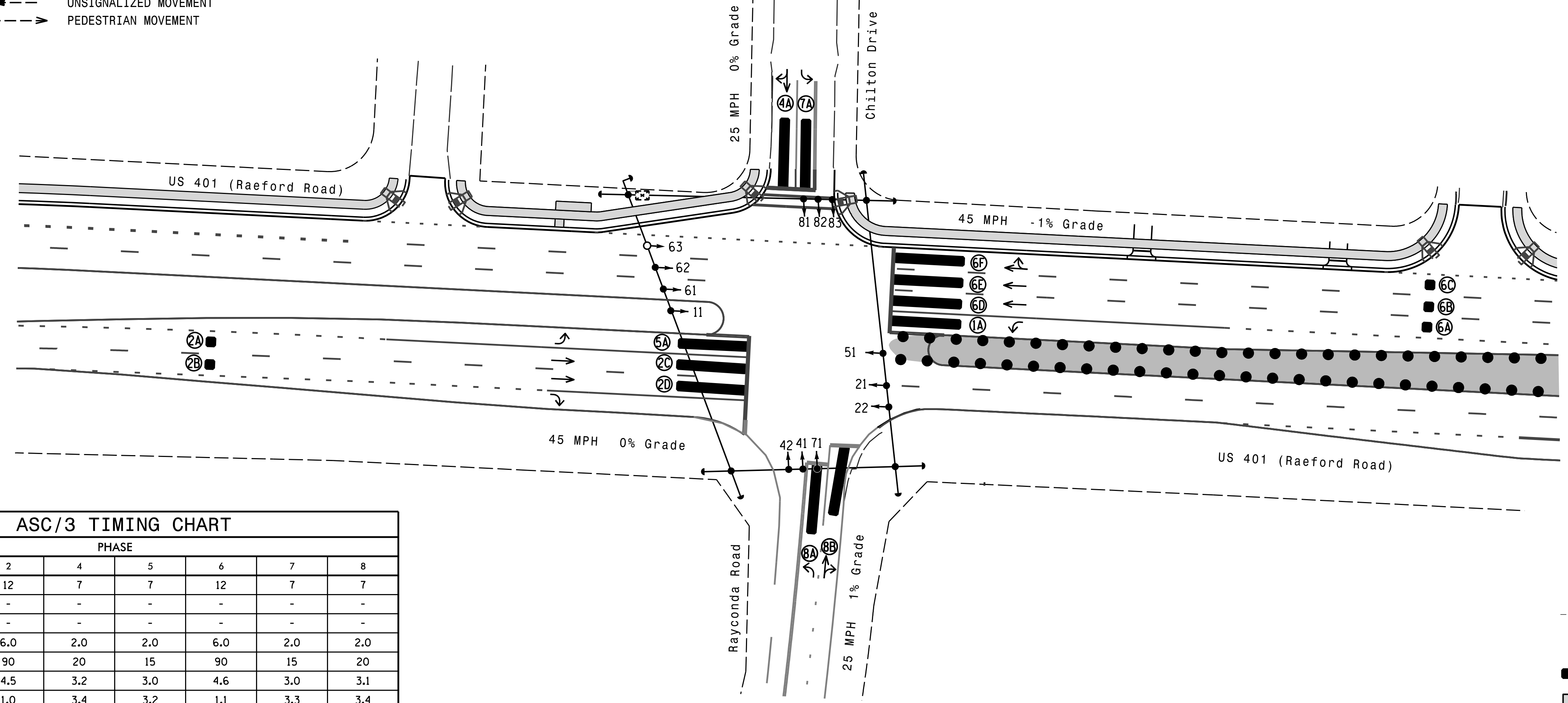
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
1A	6X40	0	*	-	1	Yes	-	-	-	S	-	-
2A	6X6	300	*	-	2	Yes	-	-	-	N	-	-
2B	6X6	300	*	-	2	Yes	-	-	-	N	-	-
2C	6X40	0	*	-	2	Yes	2.0	5	-	G	-	-
2D	6X40	0	*	-	2	Yes	2.0	5	-	G	-	-
4A	6X40	0	*	-	4	Yes	-	10	-	S	-	-
5A	6X40	0	*	-	5	Yes	-	-	-	S	-	-
6A	6X6	300	*	-	6	Yes	-	-	-	N	-	-
6B	6X6	300	*	-	6	Yes	-	-	-	N	-	-
6C	6X6	300	*	-	6	Yes	-	-	-	N	-	-
6D	6X40	0	*	-	6	Yes	2.0	5	-	G	-	-
6E	6X40	0	*	-	6	Yes	2.0	5	-	G	-	-
6F	6X40	0	*	-	6	Yes	2.0	5	-	G	-	-
7A	6X40	0	*	-	7	Yes	-	15	-	S	-	-
8A	6X40	0	*	-	8	Yes	-	3	-	S	-	-
8B	6X40	0	*	-	8	Yes	-	10	-	S	-	-

\*Video Detection Area. Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

**6 Phase Fully Actuated Fayetteville Signal System**

**NOTES**

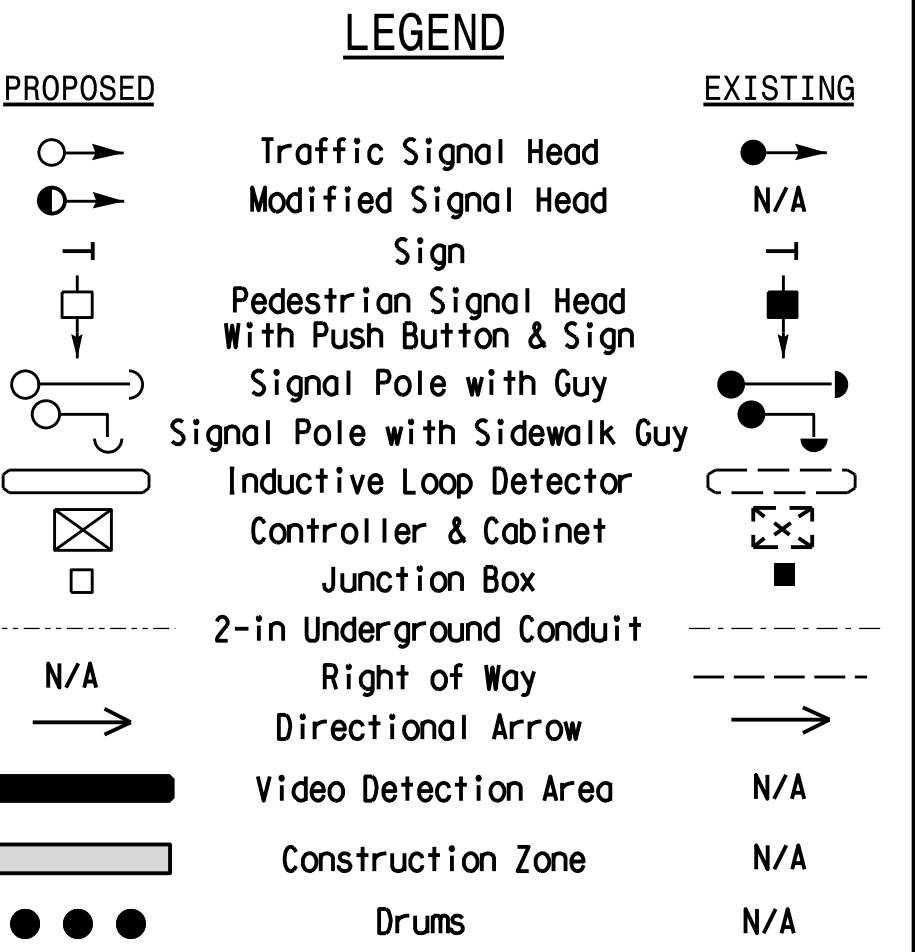
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**ASC/3 TIMING CHART**

FEATURE	PHASE							
	1	2	4	5	6	7	8	
Min Green *	7	12	7	7	12	7	7	
Walk *	-	-	-	-	-	-	-	
Ped Clear	-	-	-	-	-	-	-	
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0	2.0	
Max I *	15	90	20	15	90	15	20	
Yellow	3.0	4.5	3.2	3.0	4.6	3.0	3.1	
Red Clear	2.8	1.0	3.4	3.2	1.1	3.3	3.4	
Red Revert	-	-	-	-	-	-	-	
Actuations B4 Add *	-	-	-	-	-	-	-	
Seconds / Actuation *	-	-	-	-	-	-	-	
Max Initial *	-	-	-	-	-	-	-	
Time Before Reduction *	-	15	-	-	15	-	-	
Time To Reduce *	-	30	-	-	30	-	-	
Minimum Gap	-	3.0	-	-	3.0	-	-	
Locking Detector	-	-	-	-	-	-	-	
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-	-	
Dual Entry	-	-	X	-	-	-	X	
Simultaneous Gap	X	X	X	X	X	X	X	

\* 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 2 - TMP Phase III**

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

Prepared For the Offices of:  
  
 750 N. Greenfield Pkwy, Garner, NC 27526  
 SCALE 1"=40'

**US 401 (Raeford Rd.) at Chilton Dr / Rayconda Rd**  
 Division 6 Cumberland County Fayetteville  
 PLAN DATE: June 2019 REVIEWED BY: E D Harris  
 PREPARED BY: R M Muncey REVIEWED BY: B L Watson

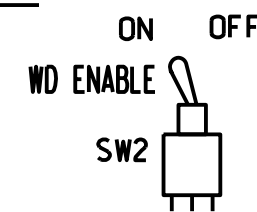
Betsy L. Watson  
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 SIG. INVENTORY NO. 06-076712

6/5/2019 10:45 AM  
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 User: jhamer

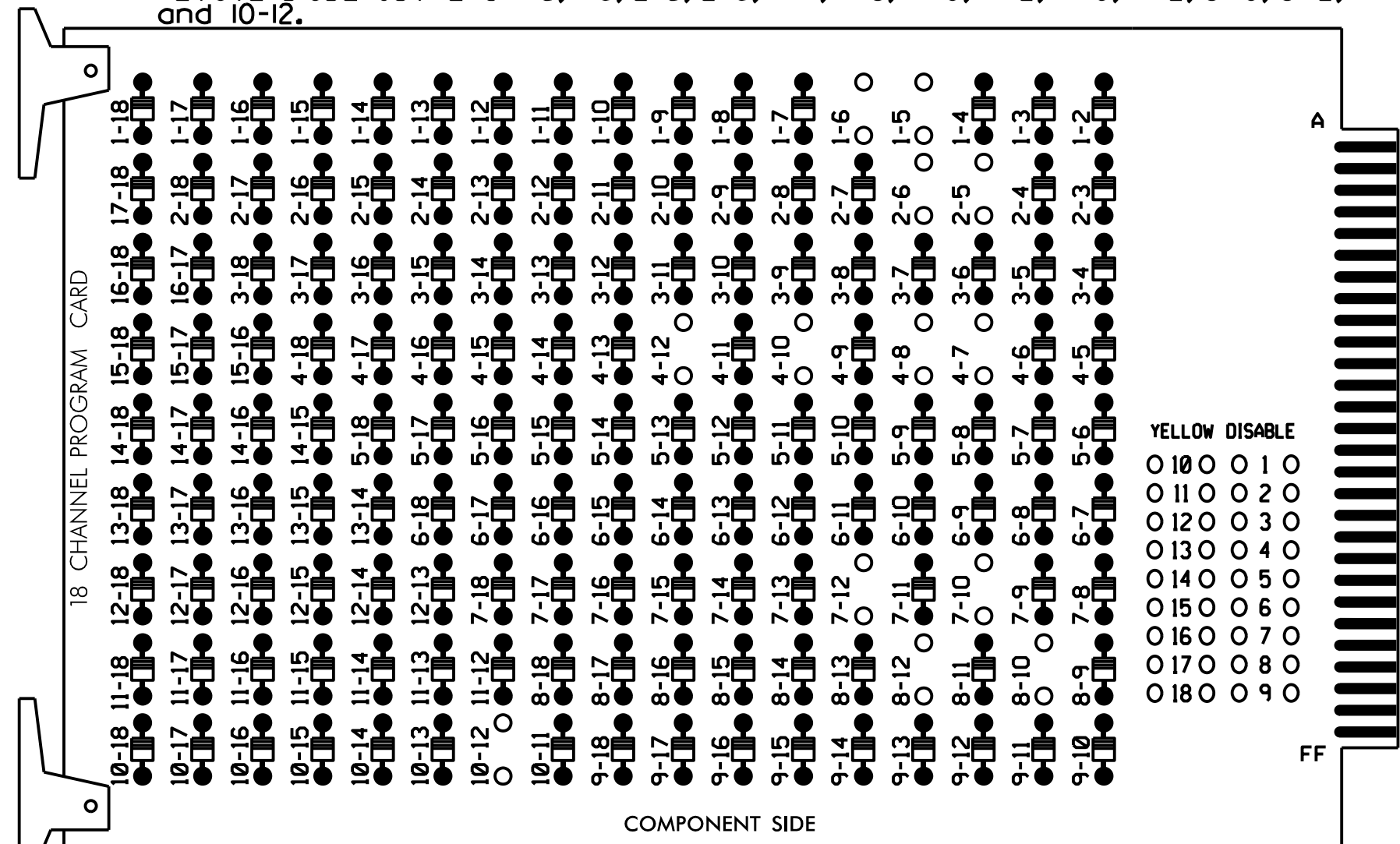
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

# EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



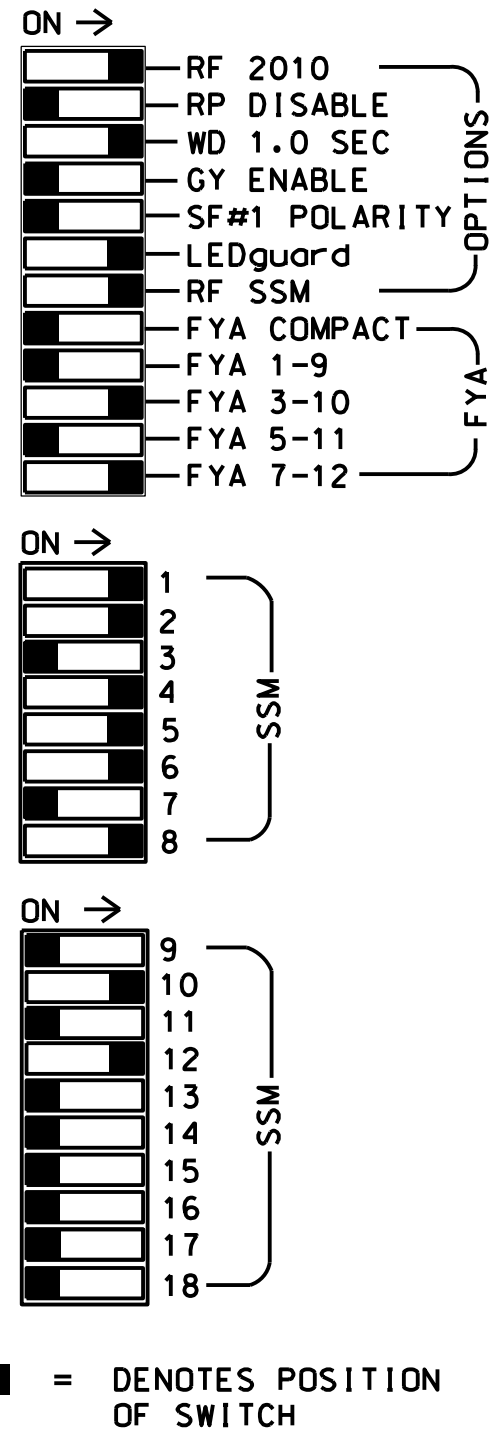
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 4-7, 4-8, 4-10, 4-12, 7-10, 7-12, 8-10, 8-12, and 10-12.



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.
- Integrate monitor with Ethernet network in cabinet.



■ = 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.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Fayetteville Signal System.

## EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S10,  
 S11,AUX S2,AUX S5  
 PHASES USED.....1,2,4,5,6,7,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....\*  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....\*  
 \* See overlap programming detail on sheet 2

## SIGNAL HEAD HOOK-UP CHART

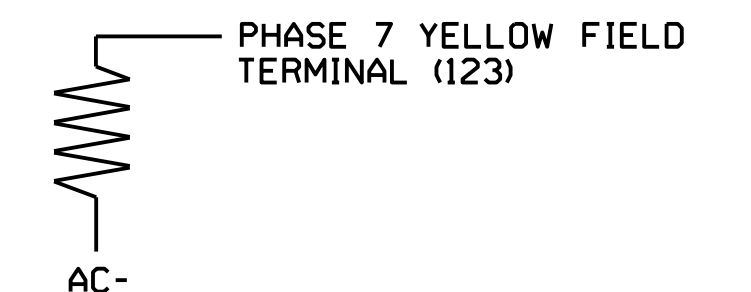
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62,63	NU	71*	82,83	NU	NU	81*	NU	NU	71*	NU
RED		128			101			134			107							
YELLOW		129			102			135		*	108							
GREEN		130			103			136			109							
RED ARROW	125							131								A124		A101
YELLOW ARROW	126							132								A125		A102
FLASHING YELLOW ARROW																A126		A103
GREEN ARROW	127							133			124							

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

## LOAD RESISTOR INSTALLATION DETAIL

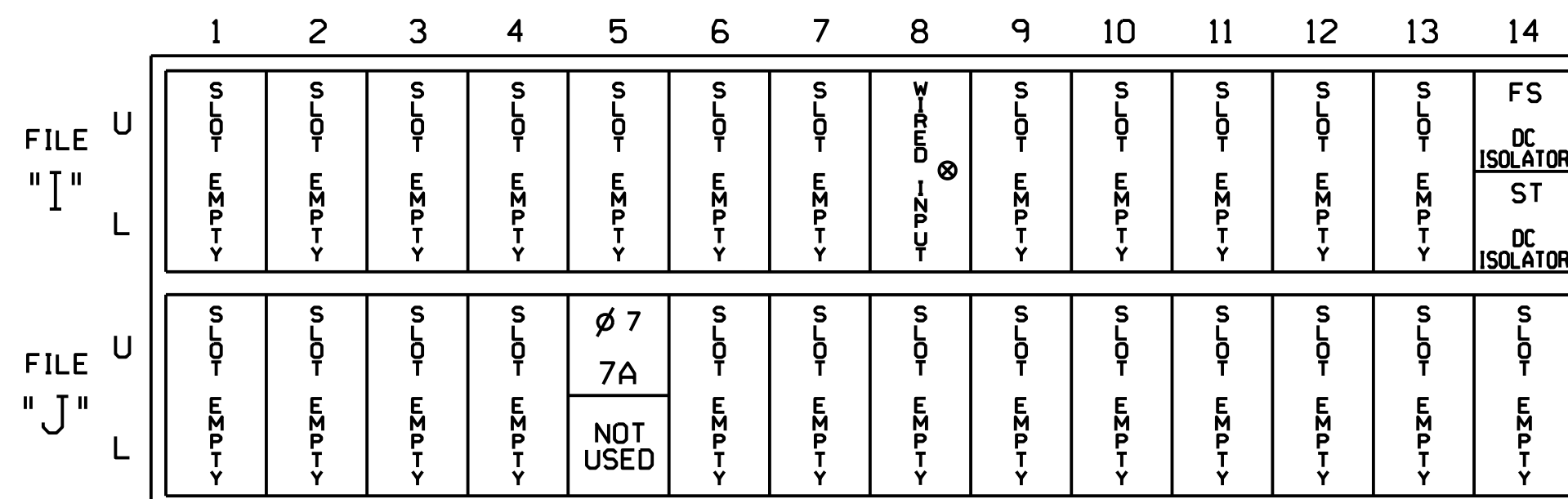
(install resistor as shown)

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



## INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE  
 ST = STOP TIME

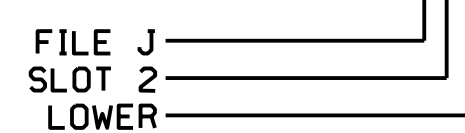
⊗ Wired Input - Do not populate slot with detector card

## INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
7A <sup>1</sup>	-	J5U	57	7	7	YES		15		S
	-	I8U	49	24	4	YES		3		S

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

INPUT FILE POSITION LEGEND: J2L

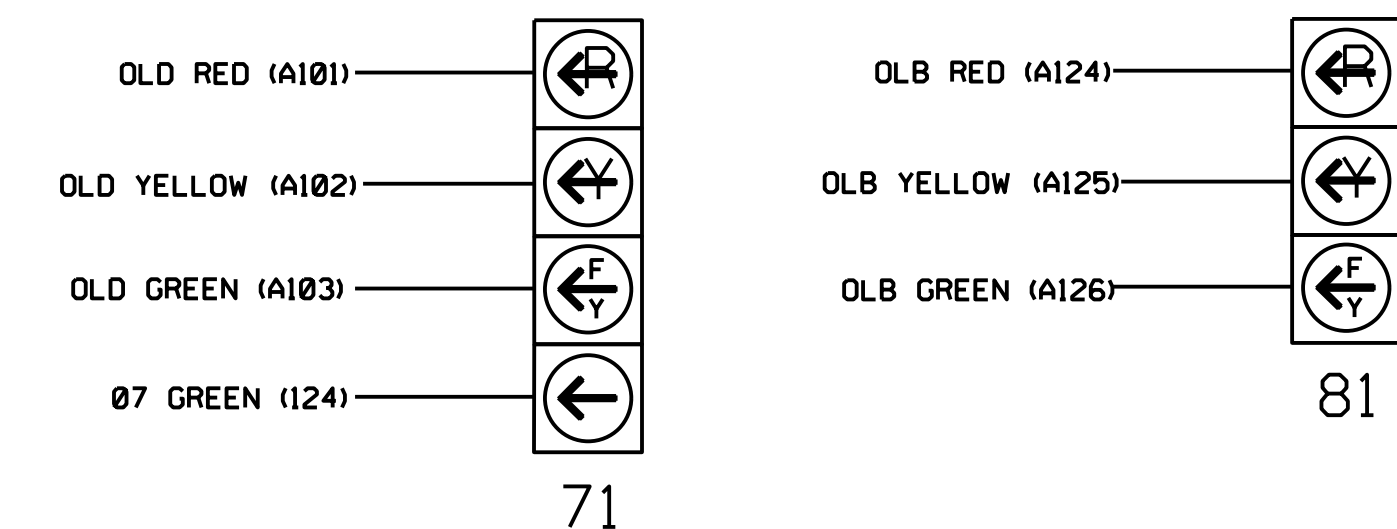


## DETECTOR NOTES

- For all loops install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.
- For loop 7A detector card placements and slots reserved for wired inputs are typical for a NCDOT installation.

## SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-076712  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 2- TMP Phase III  
 Electrical Detail - Sheet 1 of 2

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		Division 6 Cumberland County Fayetteville	SEAL 045933 ENGINEER
ELECTRICAL AND PROGRAMMING DETAILS FOR:		PLAN DATE: June 2019 PREPARED BY: R M Muncey	REVIEWED BY: L Overn REVIEWED BY:
REVISIONS		INIT. DATE	DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER LAWRENCE E. OVERN	SEAL 045933 ENGINEER
750 N. Greenfield Pkwy, Corner, NC 27529		6/5/2019	DATE
SIG. INVENTORY NO. 06-076712		DATE	

DATE: U:\Projects\Signal\Signal\Detail\U-4405A\Temporary\_Signals\U-4405A\_Sig.dwg, 06-076712.dgn  
 User: jhombert

### ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**
- Toggle Once

#### OVERLAP B

Select TMG VEH OVLP [B] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP...[B] TYPE:OTHER/ECONOLITE
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . . . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

```

Toggle Twice

#### OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```

TMG VEH OVLP...[D] TYPE: . . . . .PPLT FYA
PROTECTED LEFT TURN.... PHASE 7
OPPOSING THROUGH..... PHASE 8

FLASHING ARROW OUTPUT.....CH12 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0


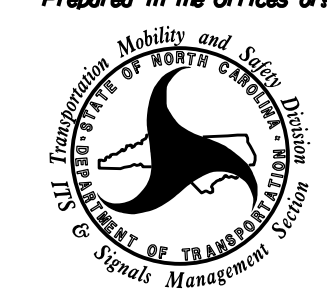
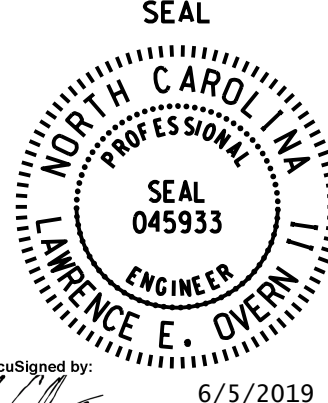

```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 06-0767T2  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 2- TMP Phase III  
Electrical Detail - Sheet 2 of 2

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 Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	 Prepared in the Office of: Transportation, Mobility and Safety Division DEPARTMENT OF TRANSPORTATION STATE OF NORTH CAROLINA 750 N. Greenfield Pkwy, Corner, NC 27529	US 401 (Raeford Rd.) at Chilton Dr / Rayconda Rd		 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045933 LAWRENCE E. OVERN					
		Division 6 Cumberland County Fayetteville PLAN DATE: June 2019 REVIEWED BY: L Overn PREPARED BY: R M Muncey REVIEWED BY:							
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REVISIONS	INIT.	DATE							
License No. F-0672				SIG. INVENTORY NO. 06-0767T2					

DATE: 6/5/2019 10:45:11 AM  
User: jhombert@stn.com



PHASING DIAGRAM

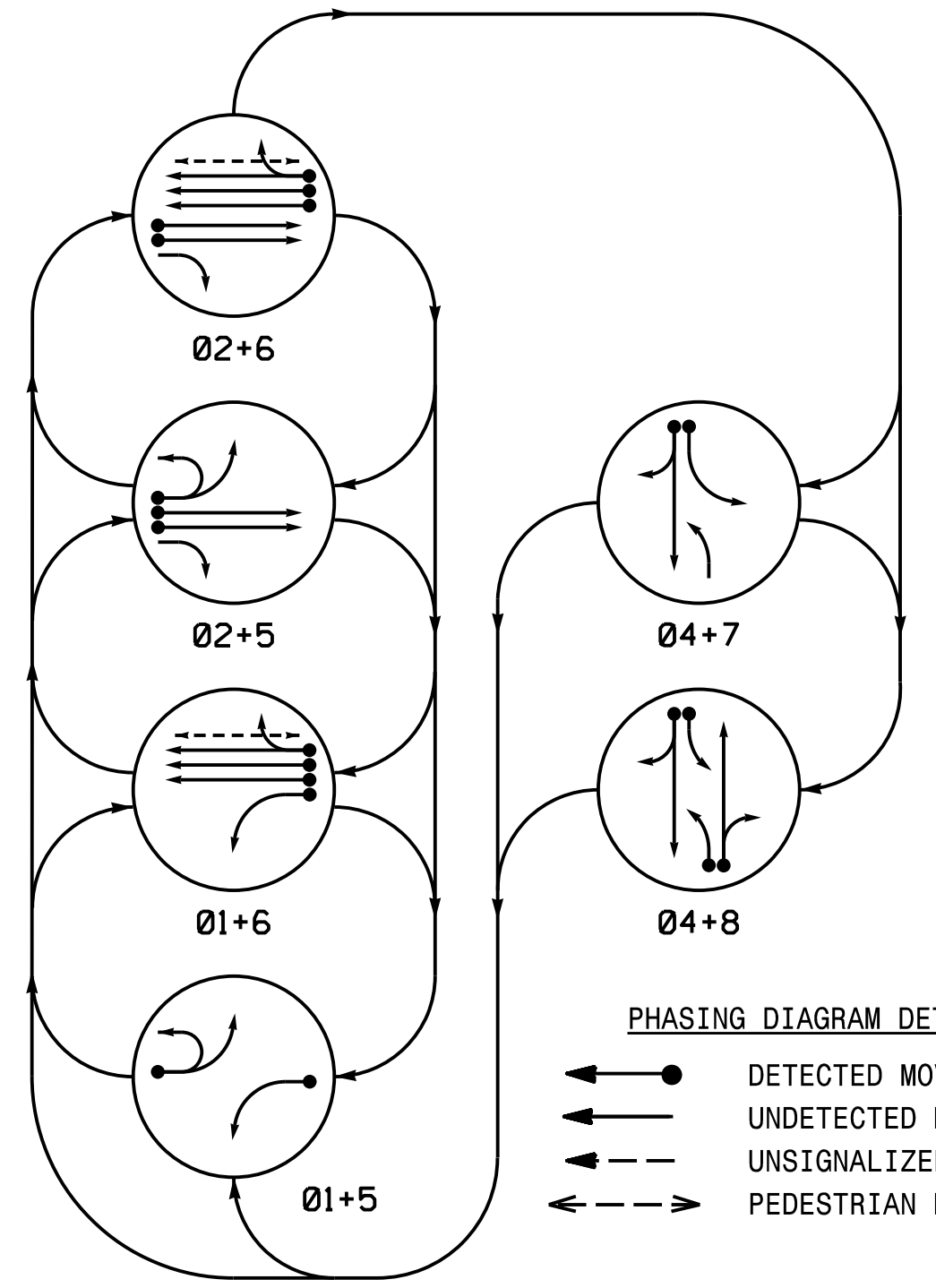
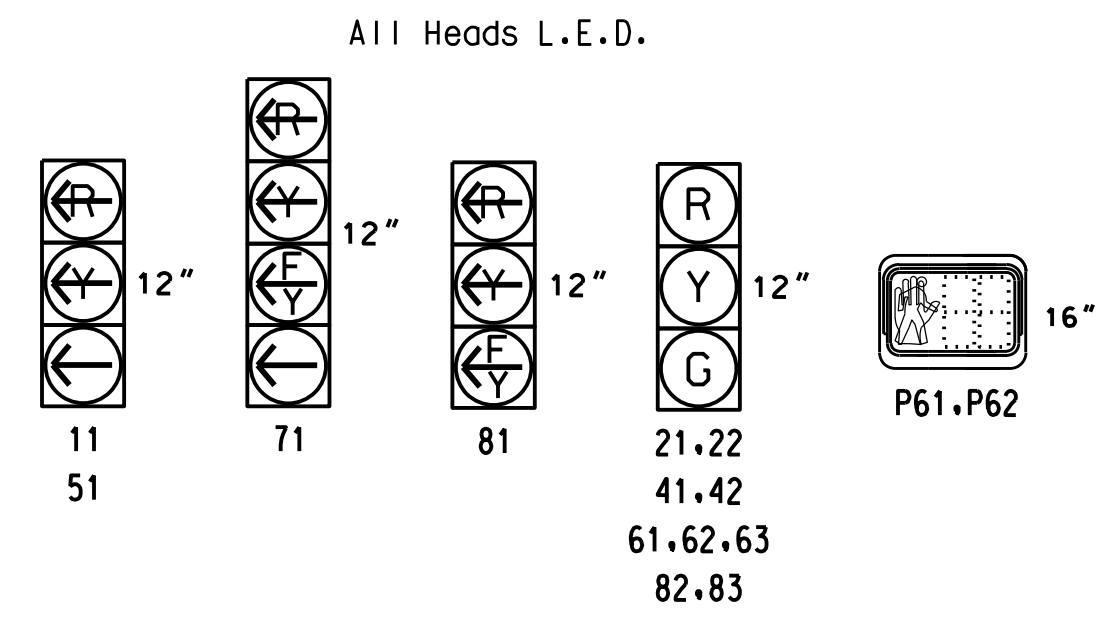


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+7	04+8	F	WALK
11	-	-	R	R	R	R	R	R
21, 22	R	R	G	G	R	R	Y	
41, 42	R	R	R	R	G	G	R	
51	-	-	R	R	R	R	R	
61, 62, 63	R	G	R	G	R	R	Y	
71	R	R	R	R	-	F	R	
81	R	R	R	R	F	F	R	
82,83	R	R	R	R	R	G	R	
P61,P62	DW	W	DW	W	DW	DW	DRK	

SIGNAL FACE I.D.



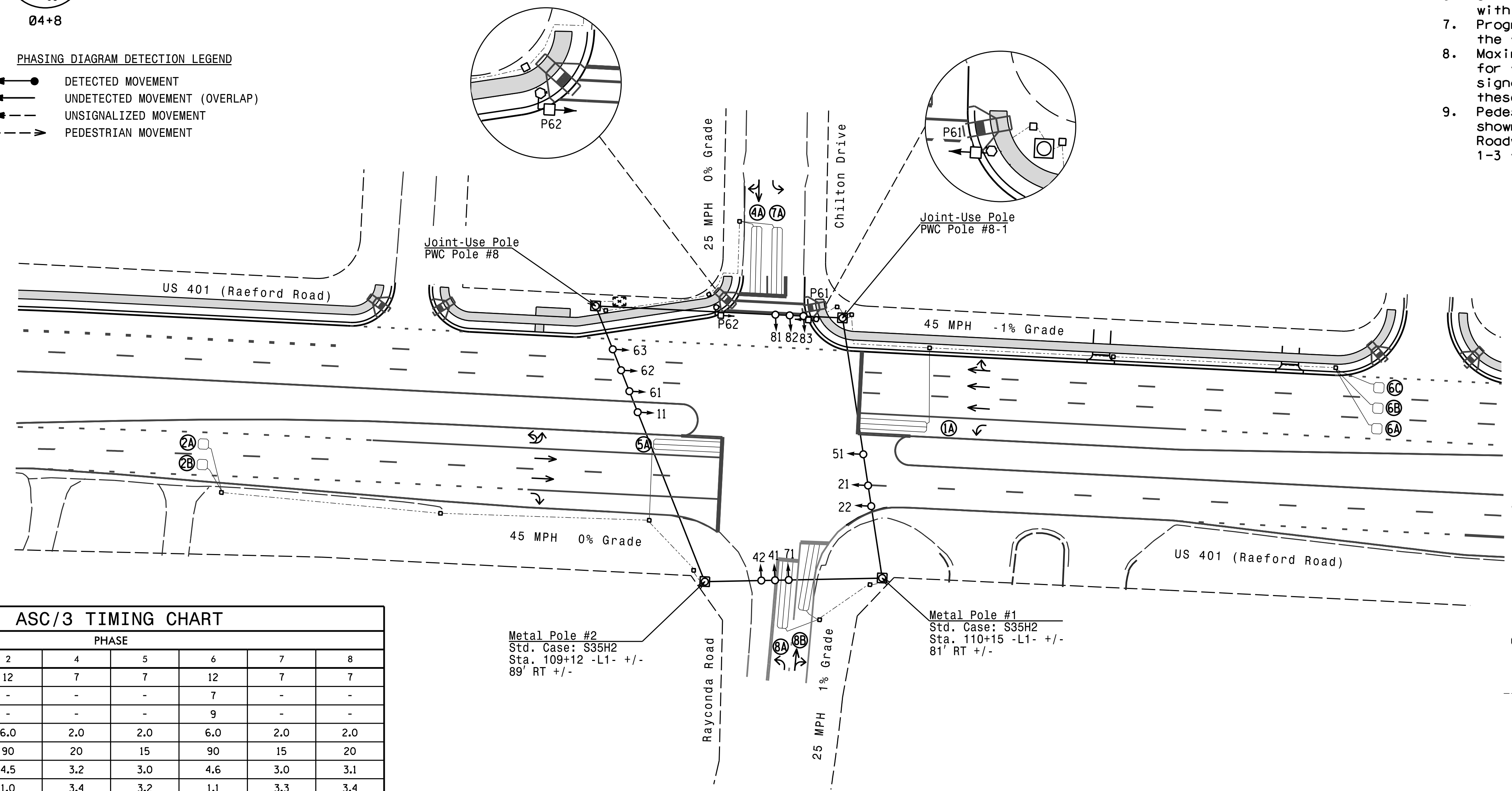
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	Yes	-	-	-	S	-	X
2A	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	5	X	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	10	-	S	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	-	-	S	-	X
6A	6X6	300	6	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	6	X	6	Yes	-	-	X	N	-	X
6C	6X6	300	6	X	6	Yes	-	-	X	N	-	X
7A	6X40	0	2-4-2	X	7	Yes	-	15	-	S	-	X
8A	6X6	0	2-4-2	X	8	Yes	-	3	-	G	-	X
8B	6X6	0	2-4-2	X	8	Yes	-	10	-	S	-	X

6 Phase Fully Actuated Fayetteville Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Pedestrian pedestals are conceptual and shown for reference only. See 2018 NCDOT Roadway Standard Drawings 1705.04 Sheets 1-3 for push button location details.

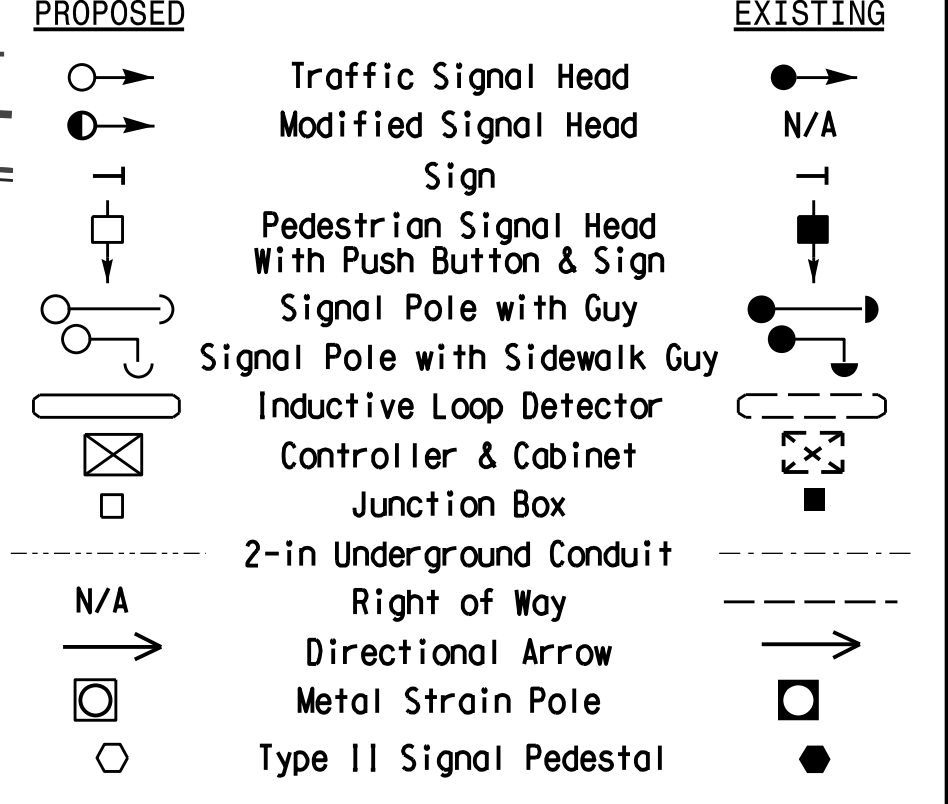


ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	4	5	6	7	8	
Min Green *	7	12	7	7	12	7	7	
Walk *	-	-	-	-	7	-	-	
Ped Clear	-	-	-	-	9	-	-	
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0	2.0	
Max I *	15	90	20	15	90	15	20	
Yellow	3.0	4.5	3.2	3.0	4.6	3.0	3.1	
Red Clear	2.8	1.0	3.4	3.2	1.1	3.3	3.4	
Red Revert	-	-	-	-	-	-	-	
Actuations B4 Add *	-	0	-	-	0	-	-	
Seconds / Actuation *	-	1.5	-	-	1.5	-	-	
Max Initial *	-	34	-	-	34	-	-	
Time Before Reduction *	-	15	-	-	15	-	-	
Time To Reduce *	-	30	-	-	30	-	-	
Minimum Gap	-	3.0	-	-	3.0	-	-	
Locking Detector	-	X	-	-	X	-	-	
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-	-	
Dual Entry	-	-	X	-	-	-	X	
Simultaneous Gap	X	X	X	X	X	X	X	

\* 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 - Final Design

Stantec Consulting Services Inc.  
801 Jones Franklin Road-Suite 300  
Raleigh, NC 27606  
Tel. (919) 851-6866  
Fax. (919) 851-7024  
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US 401 (Raeford Rd.)  
at  
Chilton Dr / Rayconda Rd

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: E D Harris

PREPARED BY: R M Muncey REVIEWED BY: B L Watson

DocuSigned by:  
Betsy L. Watson 6/5/2019

REVISIONS

NO.	DATE	INIT.	DATE

SCALE: 1"=40'

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 User: jhambricht



### ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**
- Toggle Once

#### OVERLAP B

Select TMG VEH OVLP [B] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP... [B] TYPE: OTHER/ECONOLITE
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . . . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

```

Toggle Twice

#### OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```

TMG VEH OVLP... [D] TYPE: . . . . PPLT FYA
PROTECTED LEFT TURN... PHASE 7
OPPOSING THROUGH..... PHASE 8

FLASHING ARROW OUTPUT.....CH12 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0

```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 06-0767  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Final Design  
Electrical Detail - Sheet 2 of 2

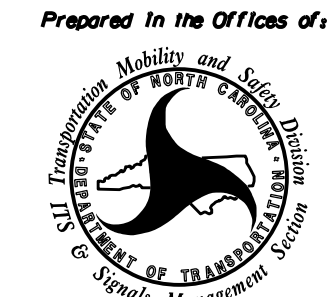
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ELECTRICAL AND PROGRAMMING  
 DETAILS FOR:

Prepared in the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529

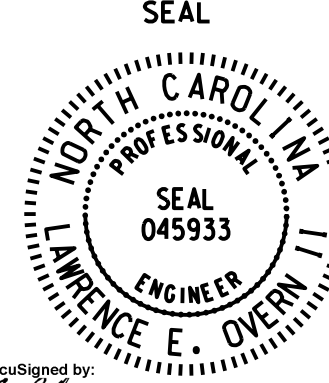
US 401 (Raeford Rd.)  
 at  
 Chilton Dr / Rayconda Rd

Division 6 Cumberland County Fayetteville

PLAN DATE: March 2018 REVIEWED BY: L Overn  
 PREPARED BY: R M Muncey REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL



Lawrence E. Overn  
 ENGINEER  
 STATE OF NORTH CAROLINA  
 License No. 045933

DocuSigned by:  
 L Overn  
 6/5/2019

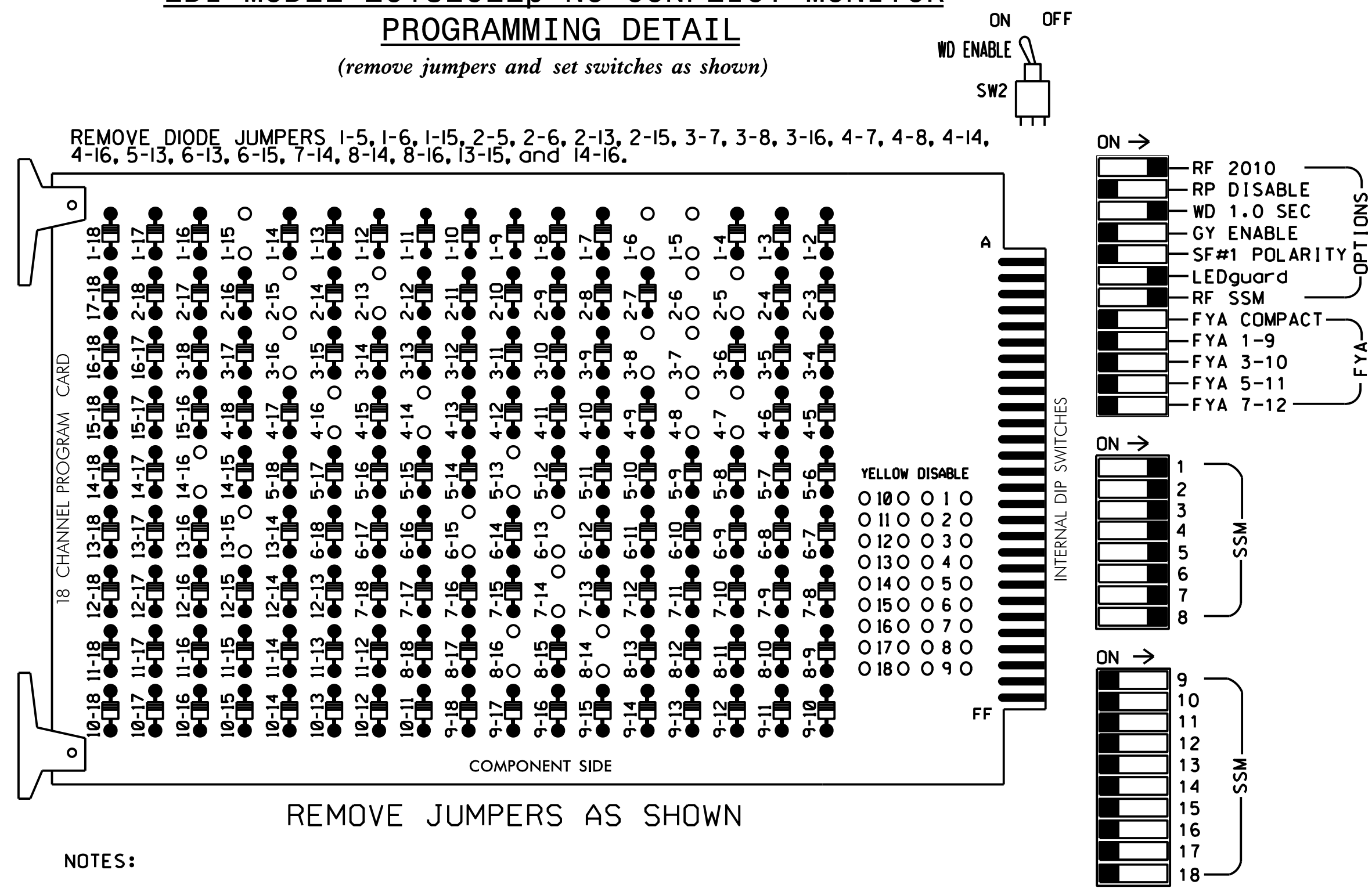
SIG. INVENTORY NO. 06-0767

DATE: 6/5/2019 10:45:11 AM  
 User: jhambri@stn.com



### EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

■ = DENOTES POSITION OF SWITCH

### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to Start Up in phase 2 WALK and phase 6 WALK.
3. The cabinet and controller are part of the Fayetteville Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,  
 S9,S10,S11,S12  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,  
 6PED,7,8,8PED  
 OVERLAPS.....NONE

### 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	8 PED
SIGNAL HEAD NO.	11	21,22	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	71	81,82	P81, P82
RED		128			101			134				107
YELLOW		129			102			135				108
GREEN		130			103			136				109
RED ARROW	125				116			131		122		
YELLOW ARROW	126				117			132		123	123	
GREEN ARROW	127				118			133		124	124	
Hand			113			104			119			110
Walking			115			106			121			112

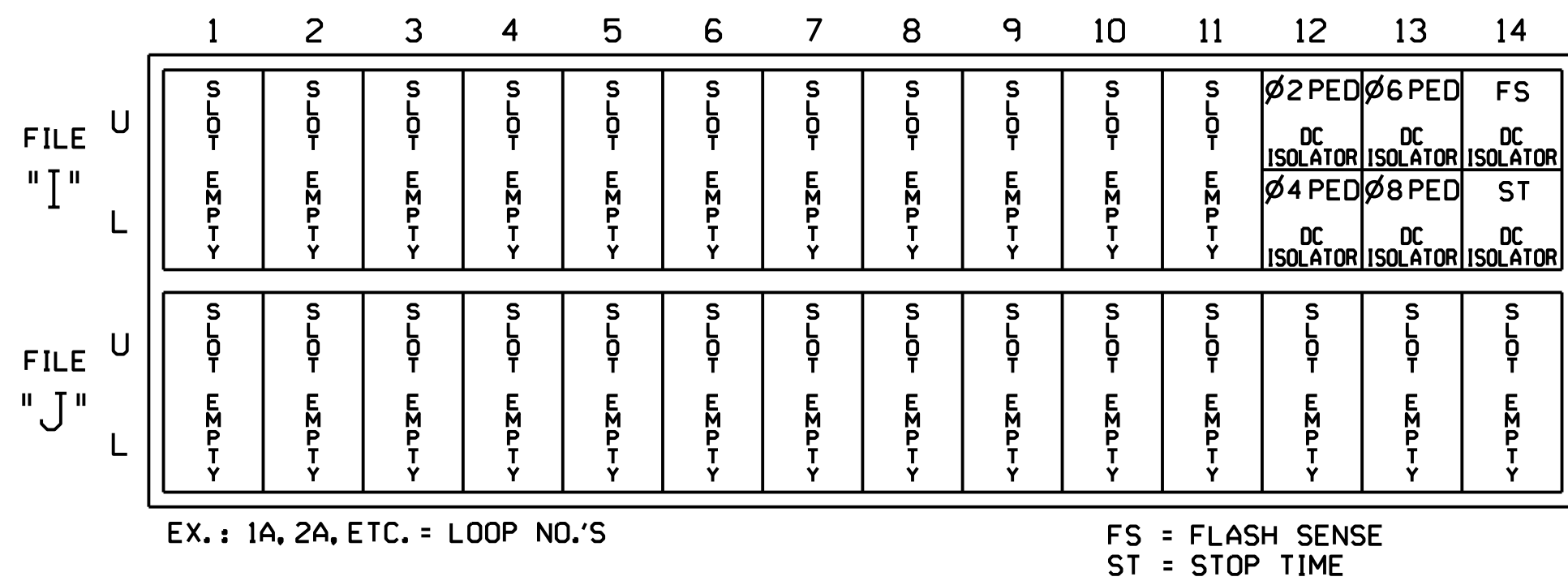
NU = Not Used

### 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.

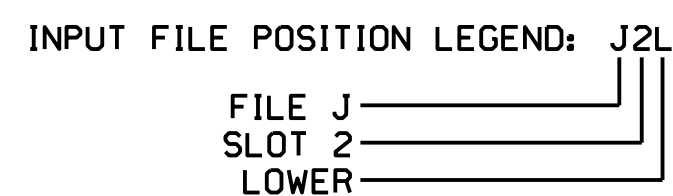
### INPUT FILE POSITION LAYOUT

(front view)



### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE
P21,P22	T88-4,6	I12U	67	PED 2	2 PED
P41,P42	T88-5,6	I12L	69	PED 4	4 PED
P61,P62	T88-7,9	I13U	68	PED 6	6 PED
P81,P82	T88-8,9	I13L	70	PED 8	8 PED



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

### SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0516T1  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 1 - TMP Phase I  
 Electrical Detail

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 Fax. (919) 851-7024  
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 License No. F-0672

Prepared in the Office of:

750 N. Greenfield Pkwy, Corner, NC 27529

US 401 (Raeford Road)  
 at SR 1409 (71st School Rd) /  
 SR 1105 (Graham Rd)

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: M RG WILSON REVIEWED BY:

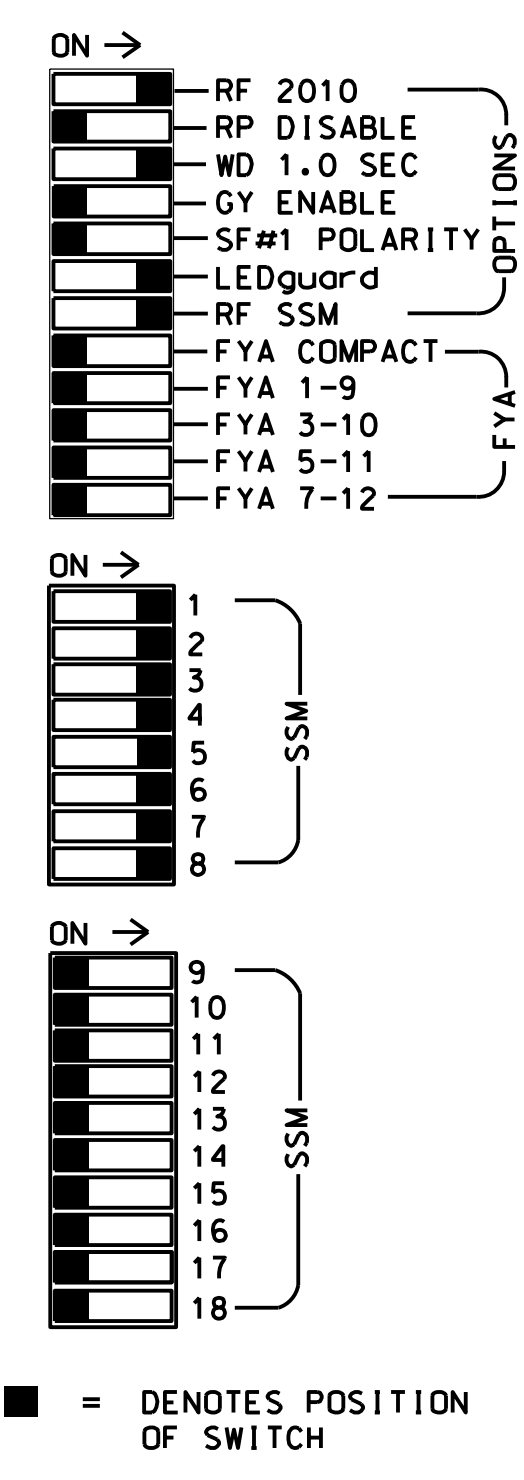
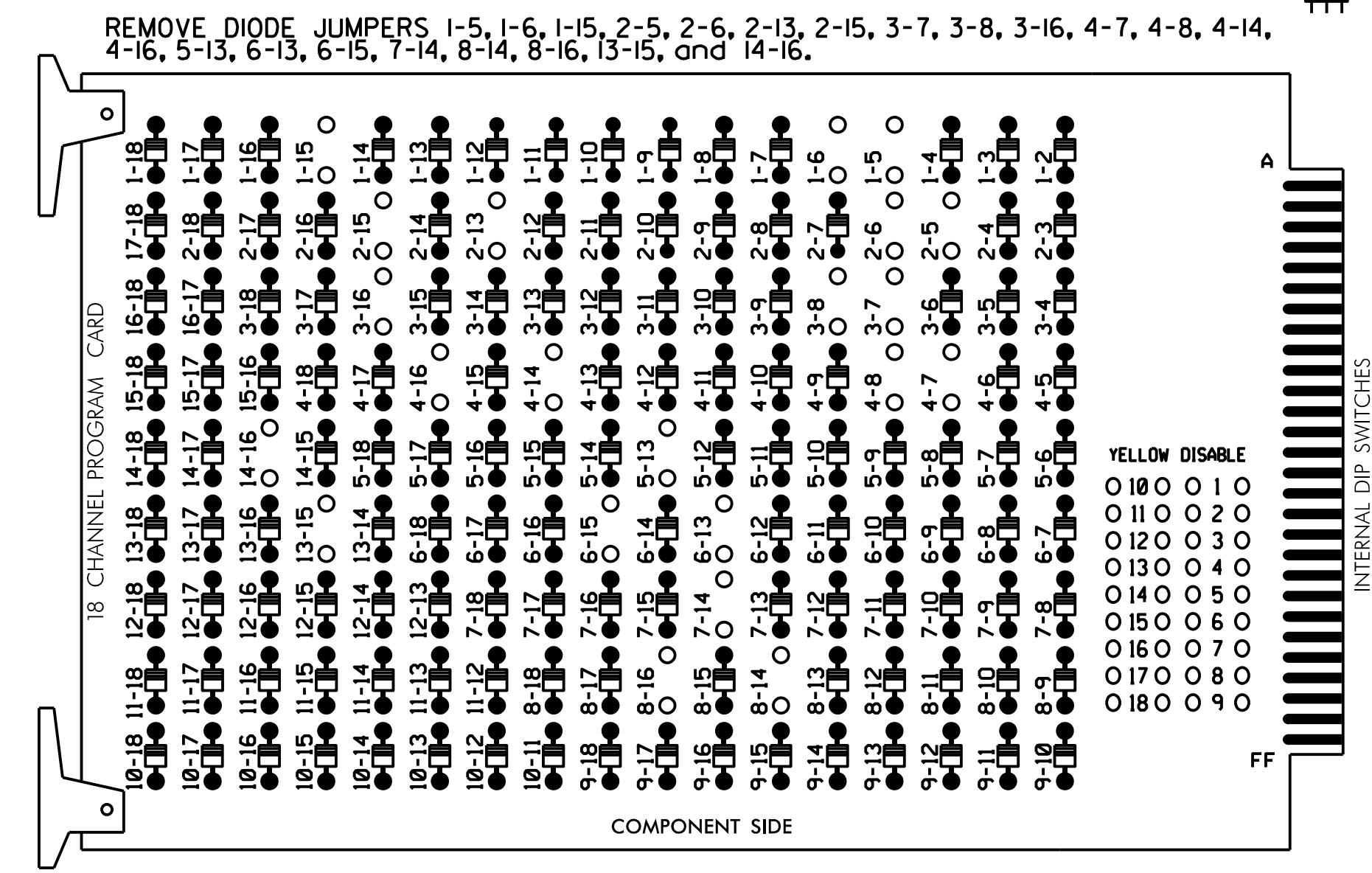
REVISIONS	INIT.	DATE

Designed by: *[Signature]* 6/5/2019  
 SEAL 045933  
 LAWRENCE E. OVERN  
 ENGINEER  
 DATE  
 SIG. INVENTORY NO. 06-0516T1



### EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
  - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
  - Ensure that Red Enable is active at all times during normal operation.
  - Integrate monitor with Ethernet network in cabinet.

### 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 controller to Start Up in phase 2 WALK and phase 6 WALK.
- The cabinet and controller are part of the Fayetteville Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,  
 S9,S10,S11,S12  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,  
 6PED,7,8,8PED  
 OVERLAPS.....NONE

### 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	8 PED
SIGNAL HEAD NO.	11	21,22,23	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	71	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		
Hand			113		104			119		110		
Hand			115		106			121		112		

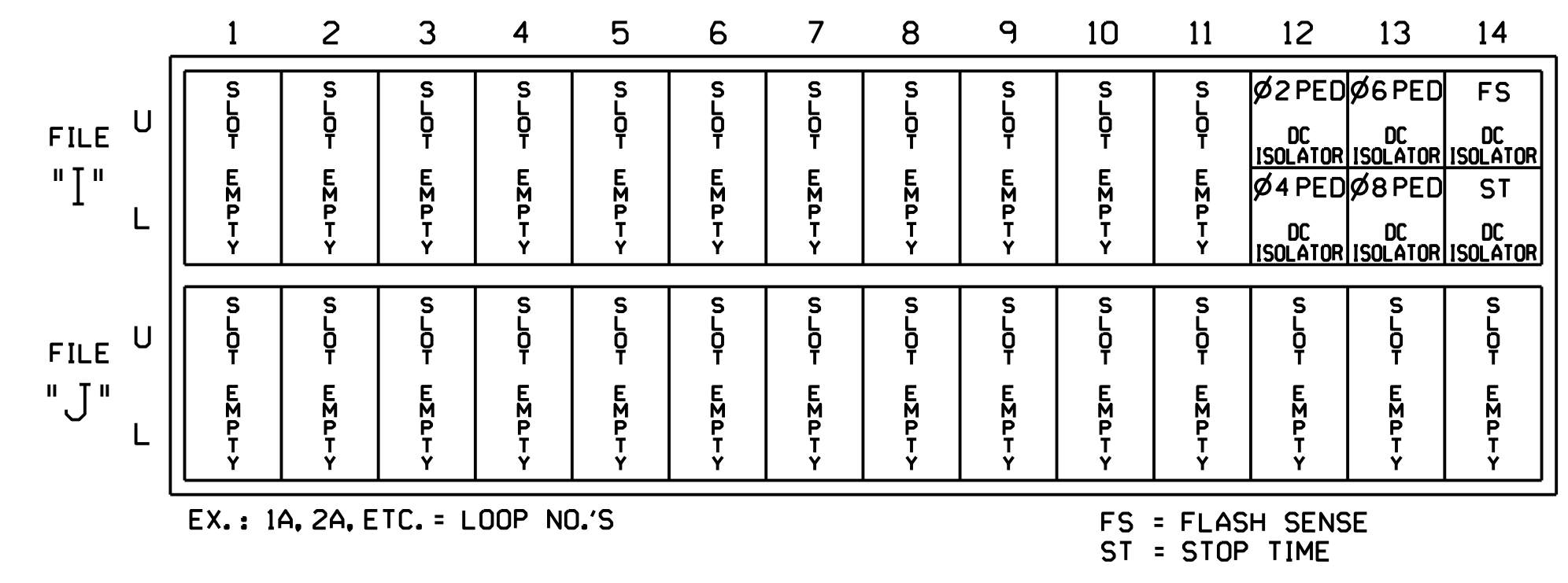
NU = Not Used

### 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.

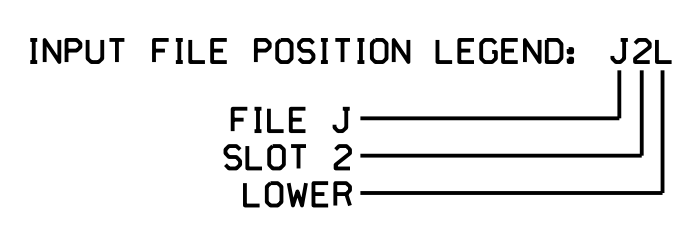
### INPUT FILE POSITION LAYOUT

(front view)



### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE
P21,P22	T88-4,6	I12U	67	PED 2	2 PED
P41,P42	T88-5,6	I12L	69	PED 4	4 PED
P61,P62	T88-7,9	I13U	68	PED 6	6 PED
P81,P82	T88-8,9	I13L	70	PED 8	8 PED



NOTE:  
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

### SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0516T2  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 2 - TMP Phase II  
 Electrical Detail

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 Raleigh, NC 27606  
 Tel. (919) 851-6866  
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US 401 (Raeford Road)  
 at SR 1409 (71st School Rd) /  
 SR 1105 (Graham Rd)

Division 6 Cumberland County Fayetteville

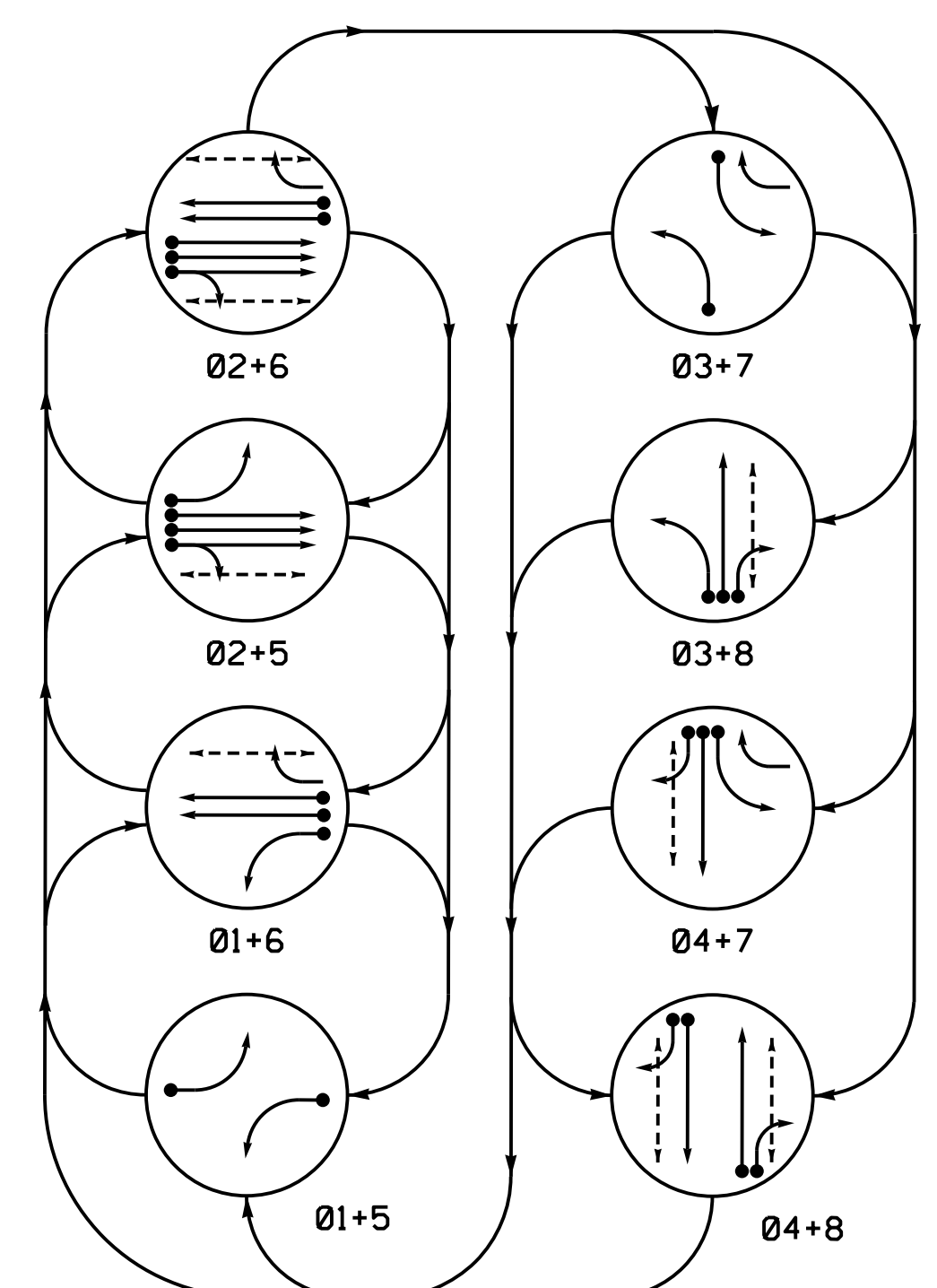
PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: M RG WILSON REVIEWED BY:

REVISIONS	INIT.	DATE

6/5/2019  
 DATE  
 SIG. INVENTORY NO. 06-0516T2

8 Phase Fully Actuated Fayetteville Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

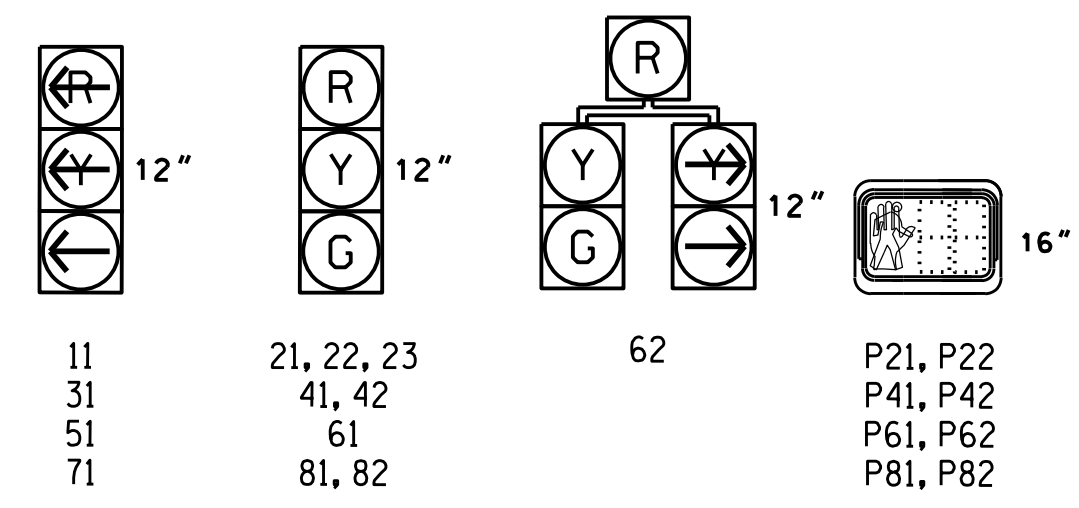
- DETECTED MOVEMENT
UNDETECTED MOVEMENT (OVERLAP)
UNSIGNALIZED MOVEMENT
PEDESTRIAN MOVEMENT

TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (01+5 to 04+8), and FLASH. Rows include signal face numbers like 11, 21, 22, 23, 31, 41, 42, 51, 61, 62, 71, 81, 82 and program numbers P21, P22, P41, P42, P61, P62, P81, P82.

SIGNAL FACE I.D.

All Heads L.E.D.



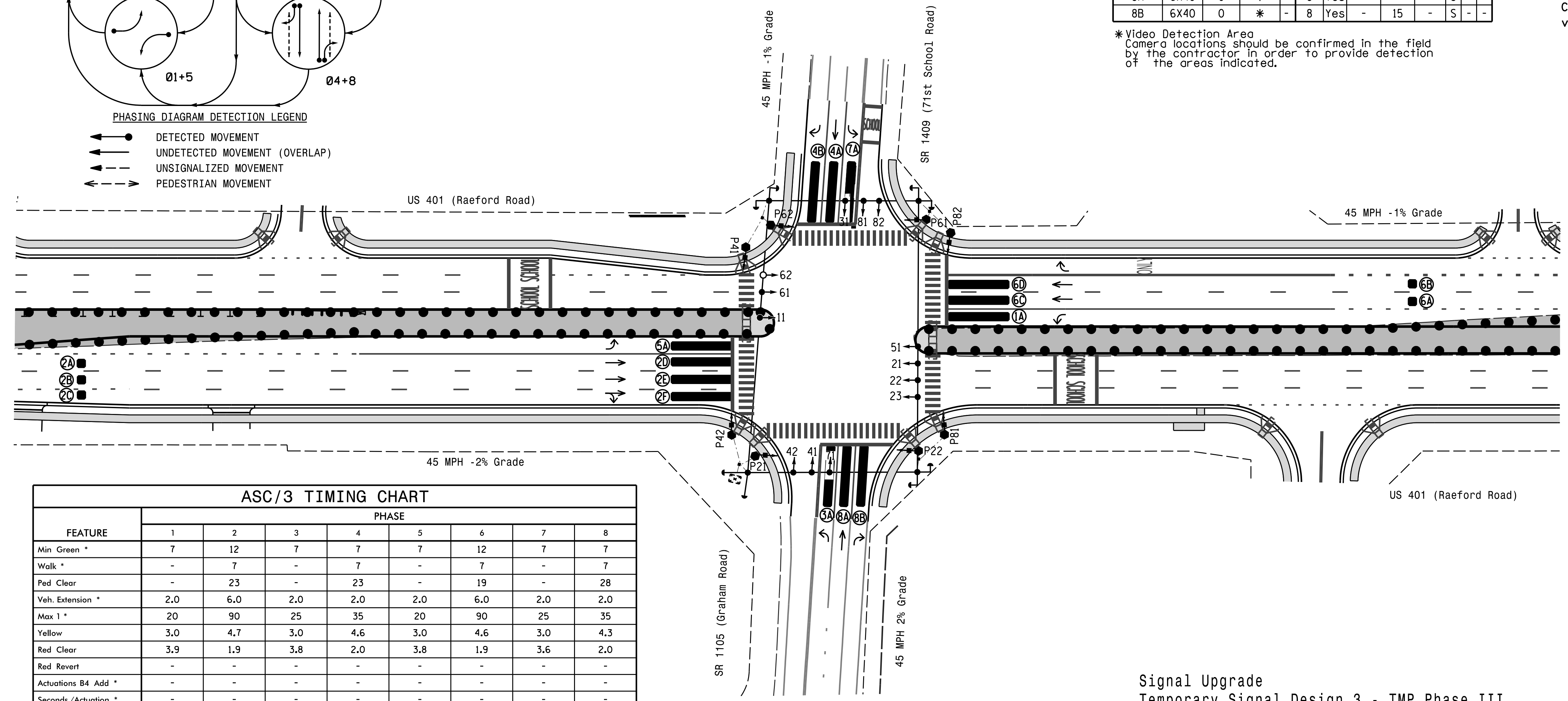
ASC/3 DETECTOR INSTALLATION CHART

Table with columns: LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD. Rows include detector loops 1A through 8B.

\*Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered 11 & 61.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



ASC/3 TIMING CHART

Table with columns: FEATURE, PHASE (1-8), and timing values for various features like Min Green, Walk, Ped Clear, Veh. Extension, Max I, Yellow, Red Clear, Red Revert, Actuations B4 Add, Seconds / Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, Simultaneous Gap.

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

LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Video Detection Area, Construction Zone, Drums, Type II Signal Pedestal.
EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

Signal Upgrade Temporary Signal Design 3 - TMP Phase III

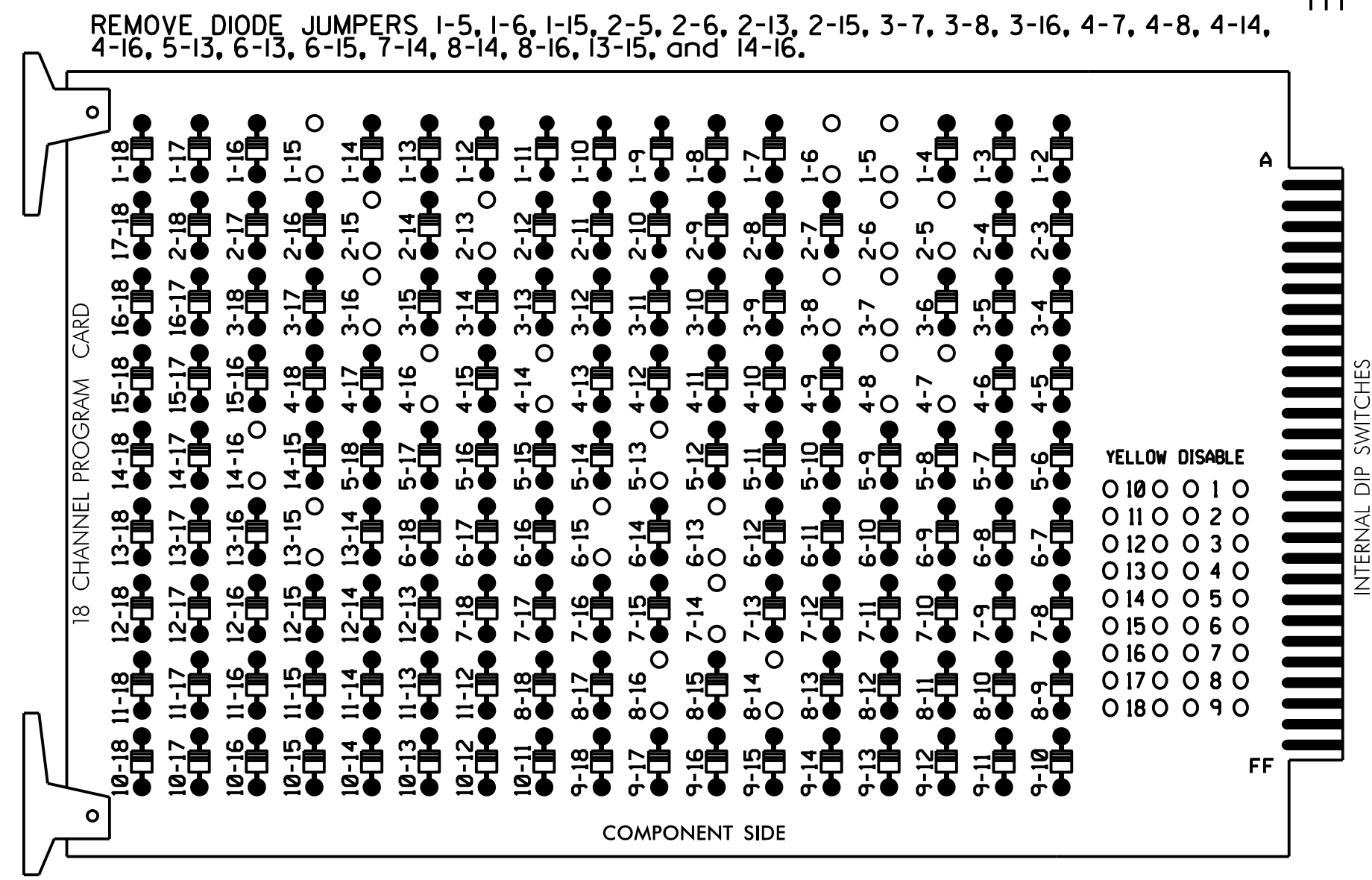
Stantec logo and contact info, project details for US 401 at SR 1409/SR 1105, division 6, Cumberland County, Fayetteville. Includes plan date (June 2019), reviewed by (E D Harris), and signatures of A D Smith and B L Watson. Also includes a professional engineer seal for Betsy L. Watson.

6/5/2019 10:14:00 AM User: jhambert



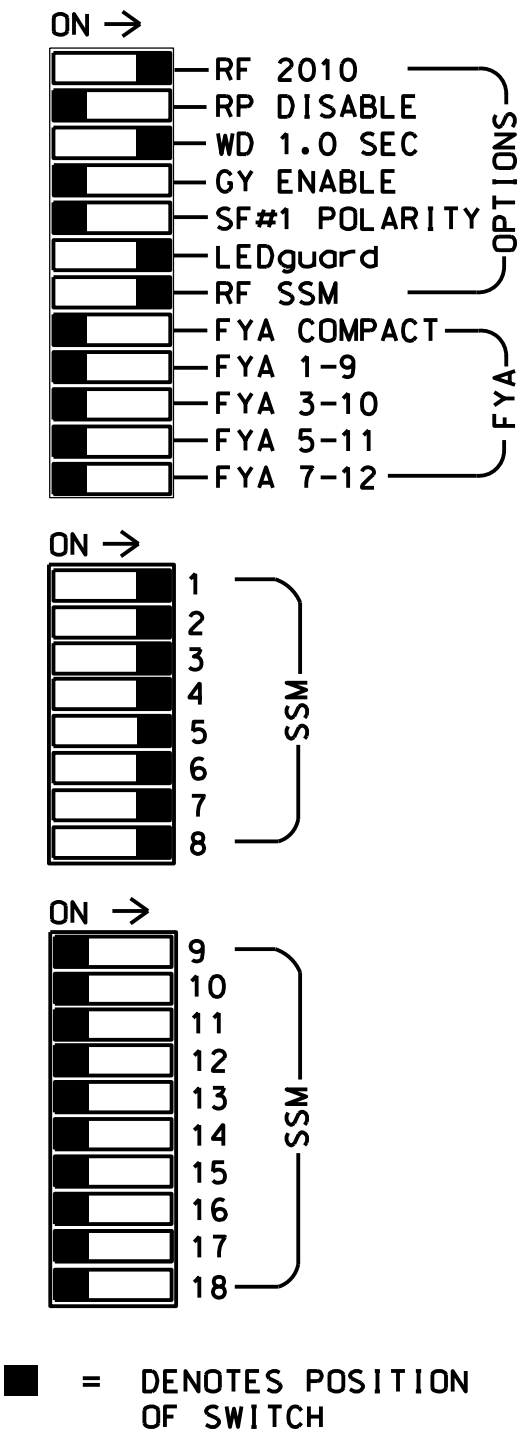
**EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.



**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 controller to Start Up in phase 2 WALK and phase 6 WALK.
- The cabinet and controller are part of the Fayetteville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,  
 S9,S10,S11,S12  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,  
 6PED,7,8,8PED  
 OVERLAPS.....NONE

**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	8 PED
SIGNAL HEAD NO.	11	21,22,23	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	71	81,82	P81, P82
RED		128			101			134				107
YELLOW		129			102			135				108
GREEN		130			103			136				109
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123	123	
GREEN ARROW	127			118			133			124	124	
Hand			113			104			119			110
Walking			115			106			121			112

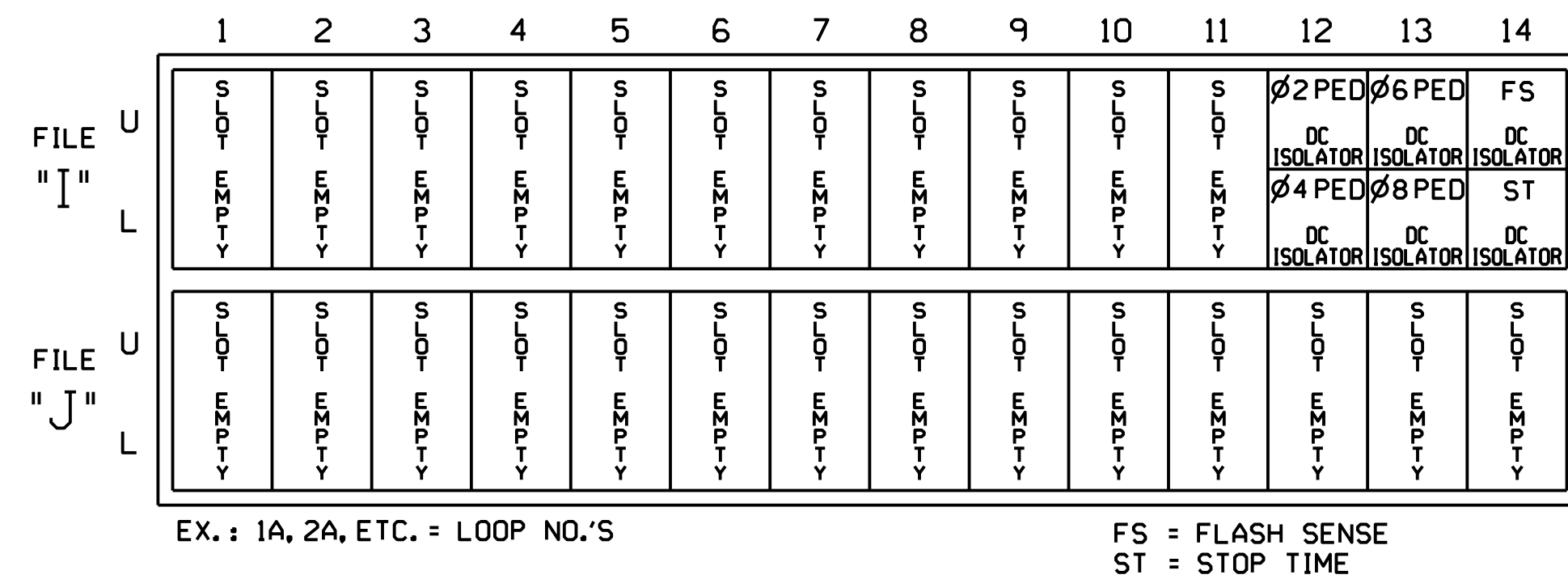
NU = Not Used

**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.

**INPUT FILE POSITION LAYOUT**

(front view)

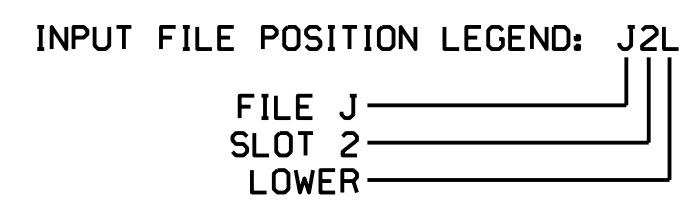


EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE
P21,P22	T88-4,6	I12U	67	PED 2	2 PED
P41,P42	T88-5,6	I12L	69	PED 4	4 PED
P61,P62	T88-7,9	I13U	68	PED 6	6 PED
P81,P82	T88-8,9	I13L	70	PED 8	8 PED



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

**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0516T3  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 3-TMP Phase III  
 Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

Prepared in the Office of:

750 N. Greenfield Pkwy, Corner, NC 27529

US 401 (Raeford Road)  
 at SR 1409 (71st School Rd) /  
 SR 1105 (Graham Rd)

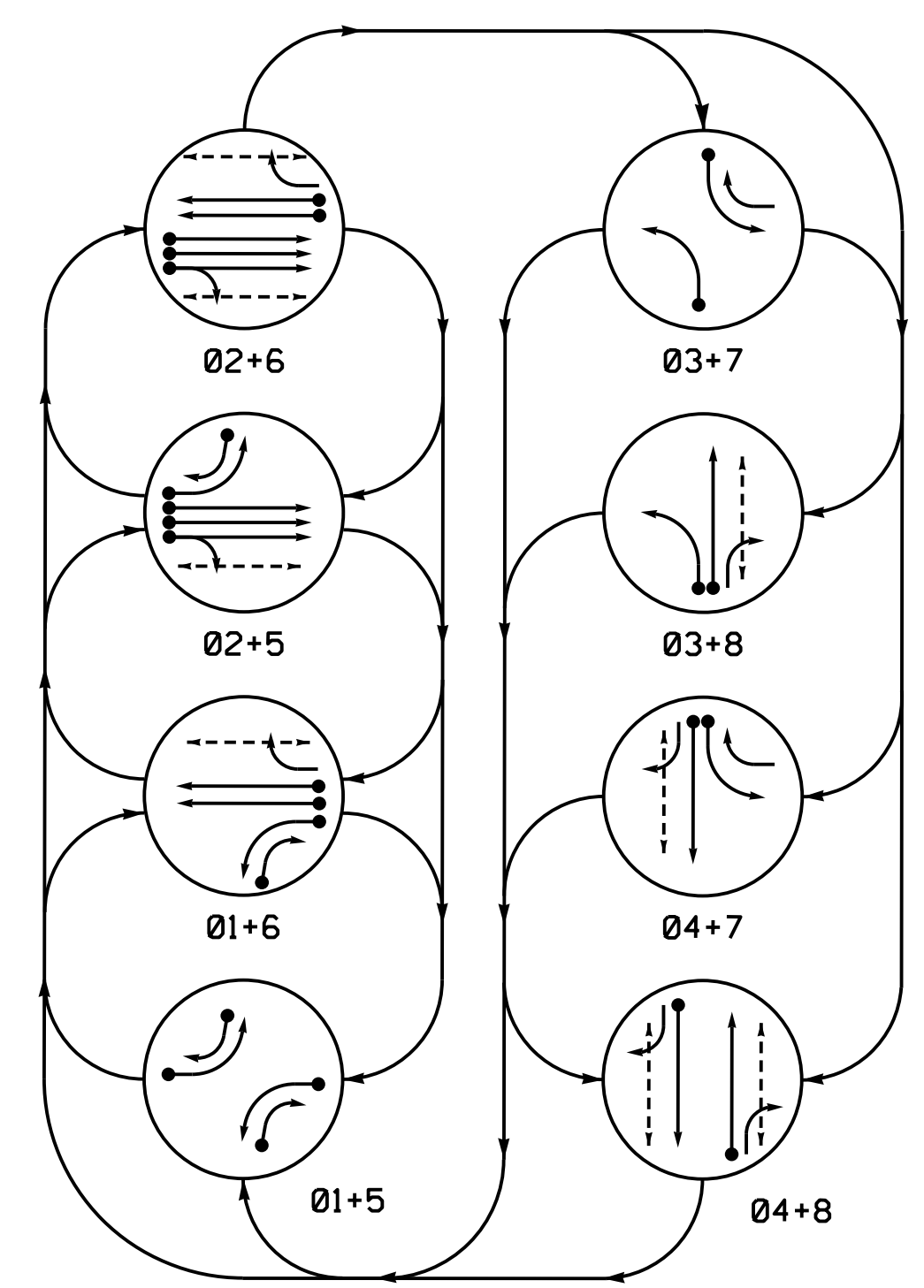
Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: M RG WILSON REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 045933  
 LAWRENCE E. OVERN  
 DATE 6/5/2019  
 SIG. INVENTORY NO. 06-0516T3

PHASING DIAGRAM



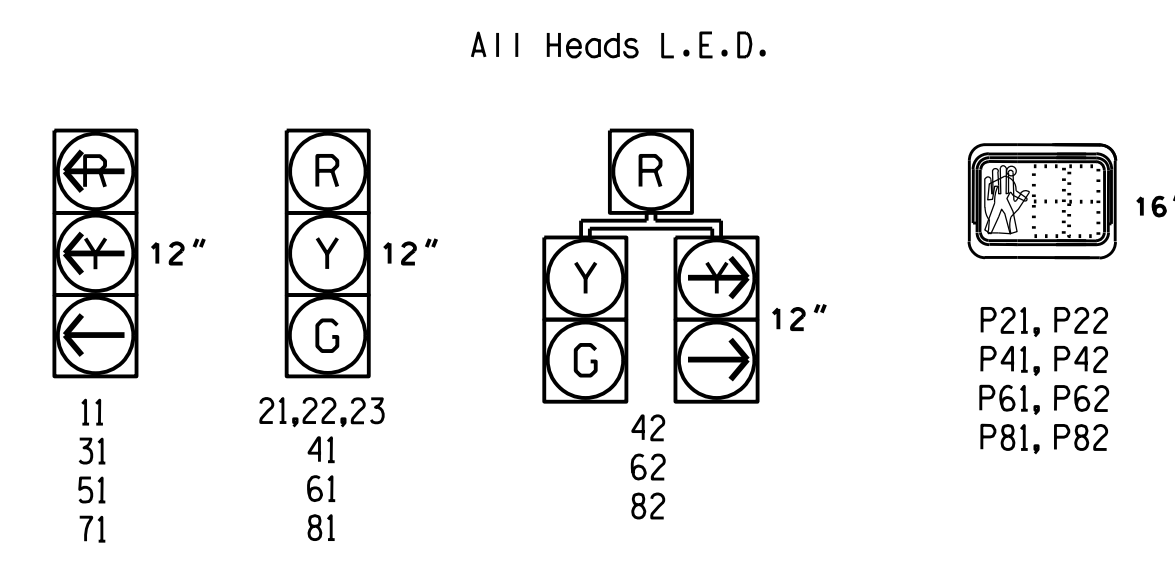
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	-	-	R	R	R	R	R	R	R
21,22,23	R	R	G	G	R	R	R	R	Y
31	R	R	R	R	-	-	R	R	R
41	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
51	-	-	R	R	R	R	R	R	R
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	-	-	R	R	R
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

SIGNAL FACE I.D.



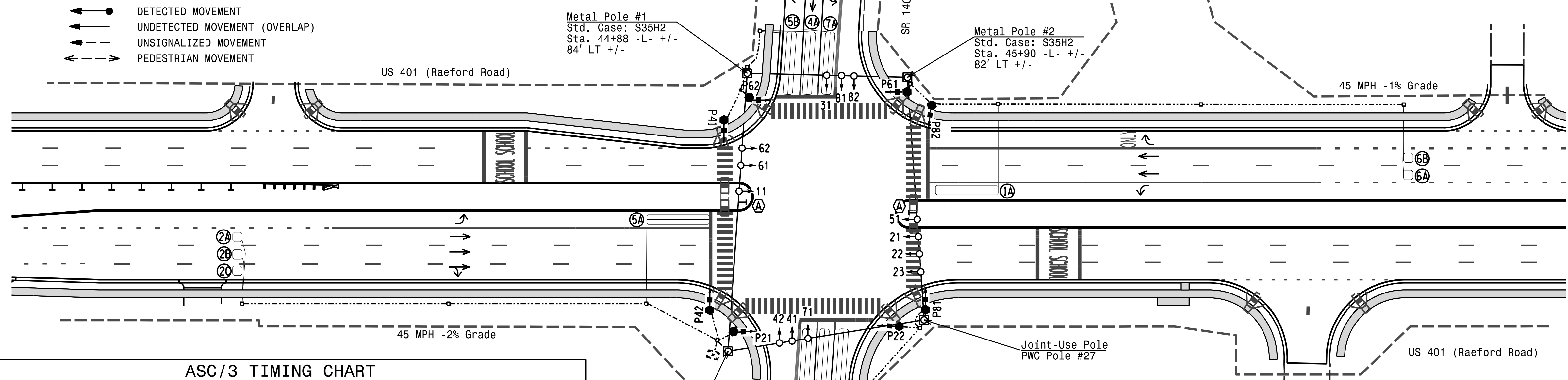
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	Yes	-	-	-	S	-	-
1B	6X40	0	2-4-2	X	1	Yes	-	15	-	S	-	-
2A	6X6	300	5	X	2	Yes	-	-	X	N	-	-
2B	6X6	300	5	X	2	Yes	-	-	X	N	-	-
2C	6X6	300	5	X	2	Yes	-	-	X	N	-	-
3A	6X40	0	2-4-2	X	3	Yes	-	3	-	S	-	-
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	S	-	-
5A	6X40	0	2-4-2	X	5	Yes	-	-	-	S	-	-
5B	6X40	0	2-4-2	X	5	Yes	-	15	-	S	-	-
6A	6X6	300	5	X	6	Yes	-	-	X	N	-	-
6B	6X6	300	5	X	6	Yes	-	-	X	N	-	-
7A	6X40	0	2-4-2	X	7	Yes	-	3	-	S	-	-
8A	6X40	0	2-4-2	X	8	Yes	-	-	-	S	-	-

8 Phase Fully Actuated Fayetteville Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- 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.



ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	7	-	7	-	7	-	7
Ped Clear	-	23	-	23	-	19	-	28
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	25	35	20	90	25	35
Yellow	3.0	4.7	3.0	4.6	3.0	4.6	3.0	4.3
Red Clear	3.7	1.9	3.6	2.0	3.7	1.9	3.6	2.0
Red Revert	-	-	-	-	-	-	-	-
Actuations B4 Add *	-	0	-	-	-	0	-	-
Seconds / Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

\* 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

- |     |  |     |          |
|-----|--|-----|----------|
| ○   | Traffic Signal Head                            | ●   | EXISTING |
| ○   | Modified Signal Head                           | N/A |          |
| ⊥   | Sign   | ⊥   |          |
| ⊥   | Pedestrian Signal Head With Push Button & Sign | ⊥   |          |
| ⊥   | Signal Pole with Guy                           | ⊥   |          |
| ⊥   | Signal Pole with Sidewalk Guy                  | ⊥   |          |
| ⊥   | Inductive Loop Detector                        | ⊥   |          |
| ⊥   | Controller & Cabinet                           | ⊥   |          |
| ⊥   | Junction Box                                   | ⊥   |          |
| ⊥   | 2-in Underground Conduit                       | ⊥   |          |
| N/A | Right of Way                                   | →   |          |
| →   | Directional Arrow                              | →   |          |
| ○   | Metal Strain Pole                              | ○   |          |
| ○   | Type II Signal Pedestal                        | ○   |          |
| (A) | "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)     | (A) |          |

Signal Upgrade - Final Design

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

Prepared For the Offices of:  
 Transportation Mobility and Safety Division  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 STATE OF NORTH CAROLINA  
 Signal Design Section  
 750 N. Greenfield Pkwy, Garner, NC 27526

US 401 (Raeford Road) at  
 SR 1409 (71st School Road) /  
 SR 1105 (Graham Road)  
 Division 6 Cumberland County Fayetteville  
 PLAN DATE: June 2019 REVIEWED BY: E D Harris  
 PREPARED BY: A D Smith REVIEWED BY: B L Watson

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

Professional Engineer Seal:  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 29449  
 TETSY L. WATSON

Signature:  
 Tetsy L. Watson 6/5/2019  
 DATE

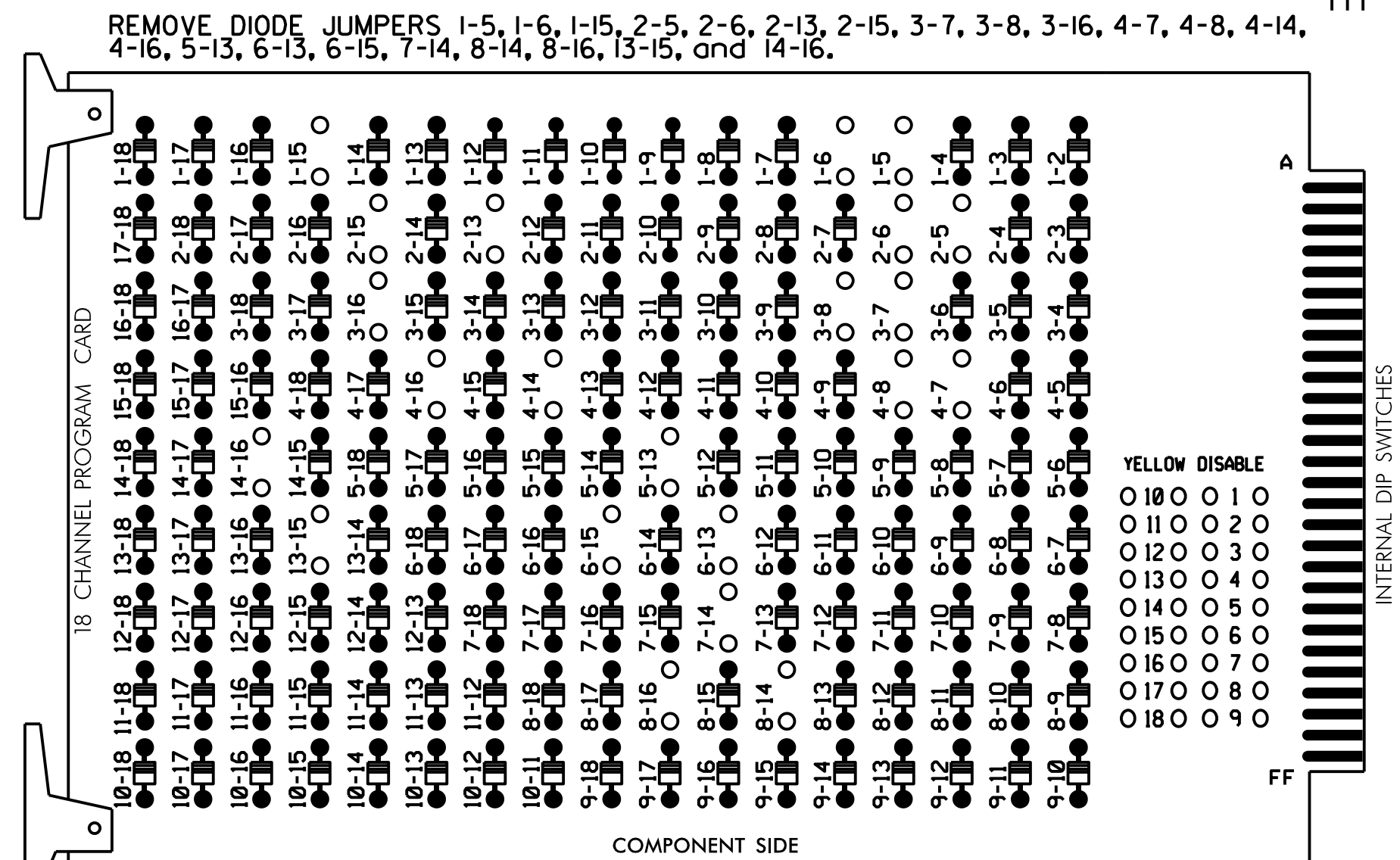
REVISIONS: INITI. DATE

SIG. INVENTORY NO. 06-0516

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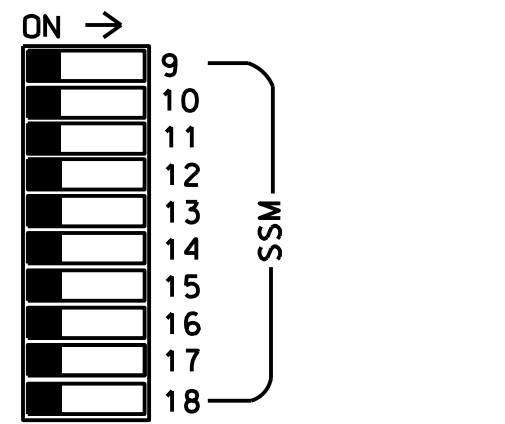
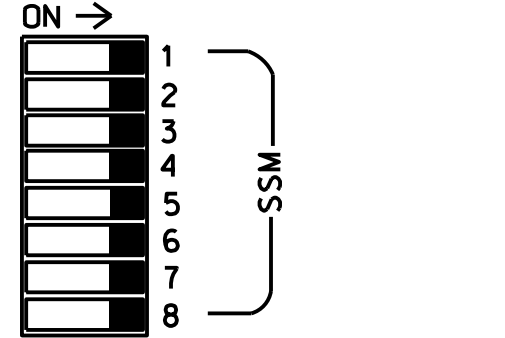
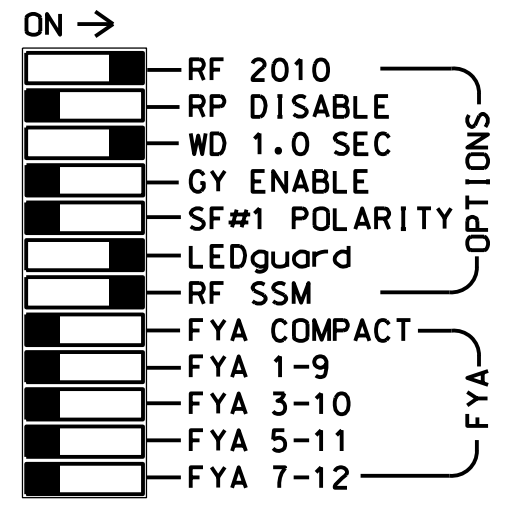
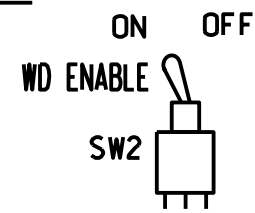
### EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.



■ = 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 controller to Start Up in phase 2 WALK and phase 6 WALK.
- The cabinet and controller are part of the Fayetteville Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,  
 S9,S10,S11,S12  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,  
 6PED,7,8,8PED  
 OVERLAPS.....NONE

### 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	8 PED			
SIGNAL HEAD NO.	11	82	21, 22, 23	P21, P22	31	41, 42	P41, P42	51	42	61, 62	P61, P62	71	62	81, 82	P81, P82
RED			128		101				134			107			
YELLOW			129		102				135			108			
GREEN			130		103				136			109			
RED ARROW	125				116			131			122				
YELLOW ARROW	126	126			117			132	132		123	123			
GREEN ARROW	127	127			118			133	133		124	124			
Hand				113			104			119		110			
Walking Person				115			106			121		112			

NU = Not Used

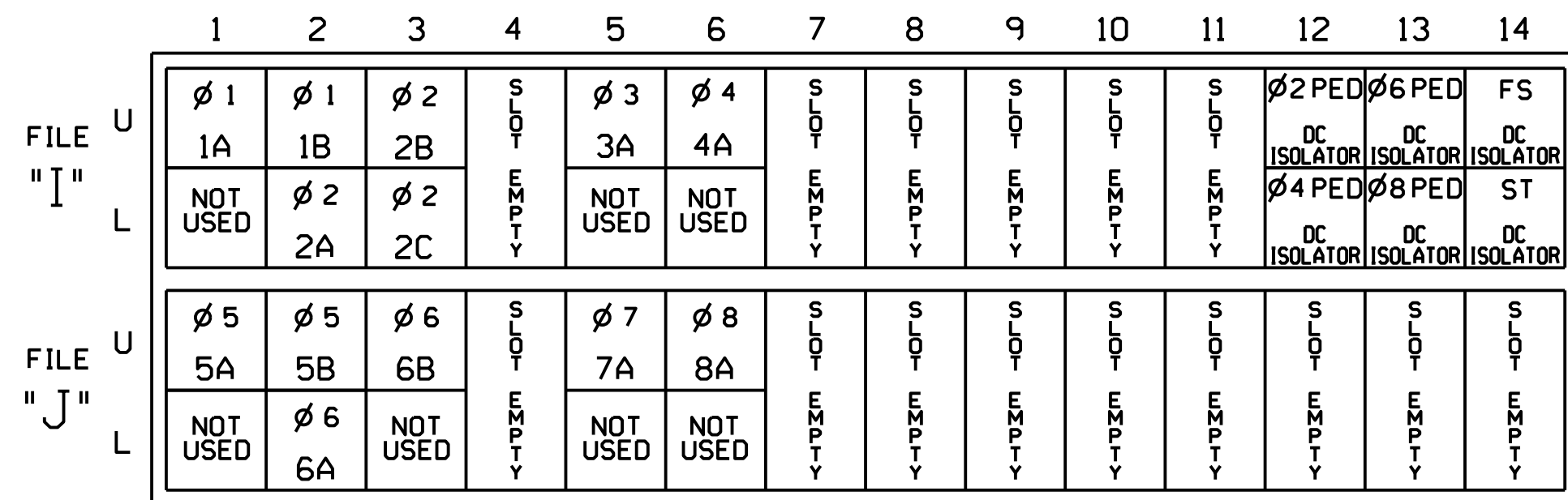
### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

### INPUT FILE CONNECTION & PROGRAMMING CHART

### INPUT FILE POSITION LAYOUT

(front view)



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

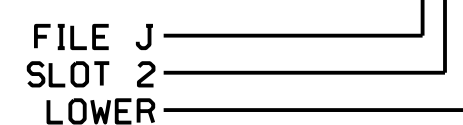
FS = FLASH SENSE  
 ST = STOP TIME

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES				S
1B	TB2-5,6	I2U	39	2	1	YES		15		S
2A	TB2-7,8	I2L	43	12	2	YES			X	N
2B	TB2-9,10	I3U	63	32	2	YES			X	N
2C	TB2-11,12	I3L	76	42	2	YES			X	N
3A	TB4-5,6	I5U	58	3	3	YES		3		S
4A	TB4-9,10	I6U	41	4	4	YES				S
5A	TB3-1,2	J1U	55	5	5	YES				S
5B	TB3-5,6	J2U	40	6	5	YES		15		S
6A	TB3-7,8	J2L	44	16	6	YES			X	N
6B	TB3-9,10	J3U	64	36	6	YES			X	N
7A	TB5-5,6	J5U	57	7	7	YES		3		S
8A	TB5-9,10	J6U	42	8	8	YES				S

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE
PED PUSH BUTTONS					
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED

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

### INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0516  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Final Design  
 Electrical Detail

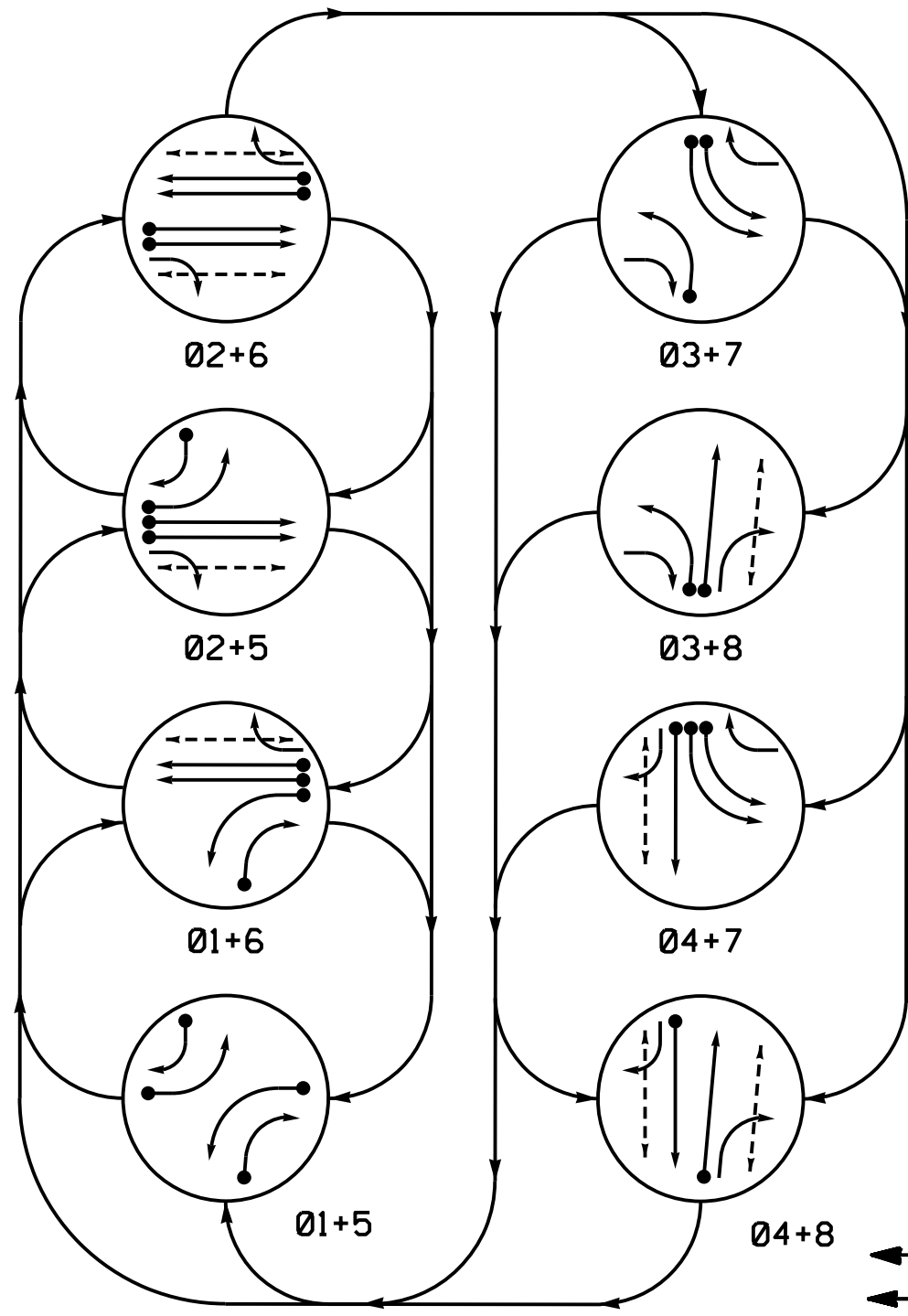
US 401 (Raeford Road) at SR 1409 (71st School Road) / SR 1105 (Graham Road)  
 Division 6 Cumberland County Fayetteville  
 PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: M RG WILSON REVIEWED BY:

DOCUMENT NOT CONSIDERED VALID UNLESS ALL SIGNATURES COMPLETED

REVISIONS	INIT.	DATE

6/5/2019  
 06-0516

PHASING DIAGRAM

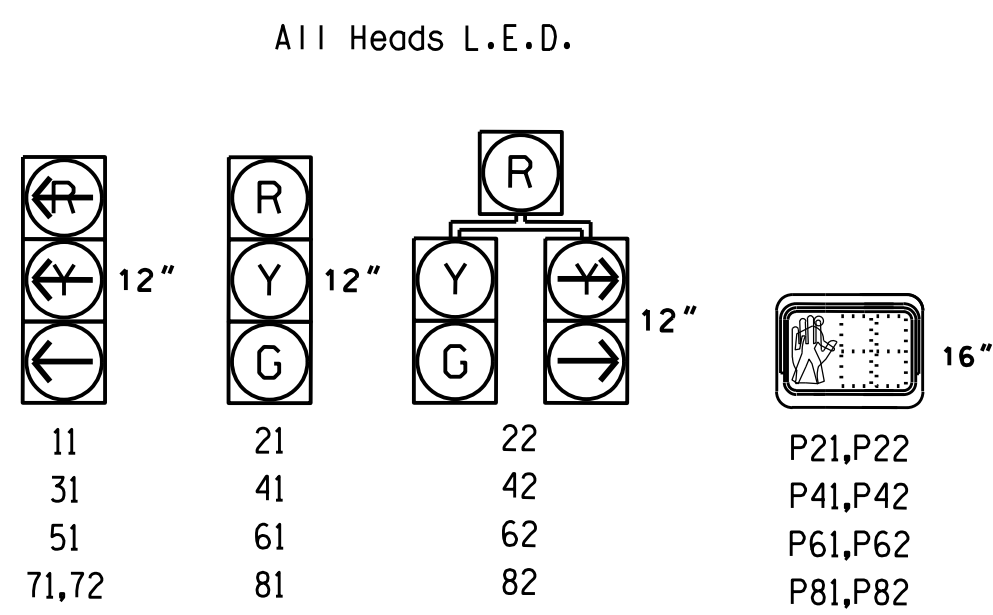


PHASING DIAGRAM DETECTION LEGEND
DETECTED MOVEMENT
UNDETECTED MOVEMENT (OVERLAP)
UNSIGNALIZED MOVEMENT
PEDESTRIAN MOVEMENT

TABLE OF OPERATION

Table with columns for SIGNAL FACE and PHASE (01+5 to 04+8). Rows include signal face numbers (11, 21, 22, 31, 41, 42, 51, 61, 62, 71,72, 81, 82) and pole identifiers (P21,P22, P41,P42, P61,P62, P81,P82).

SIGNAL FACE I.D.



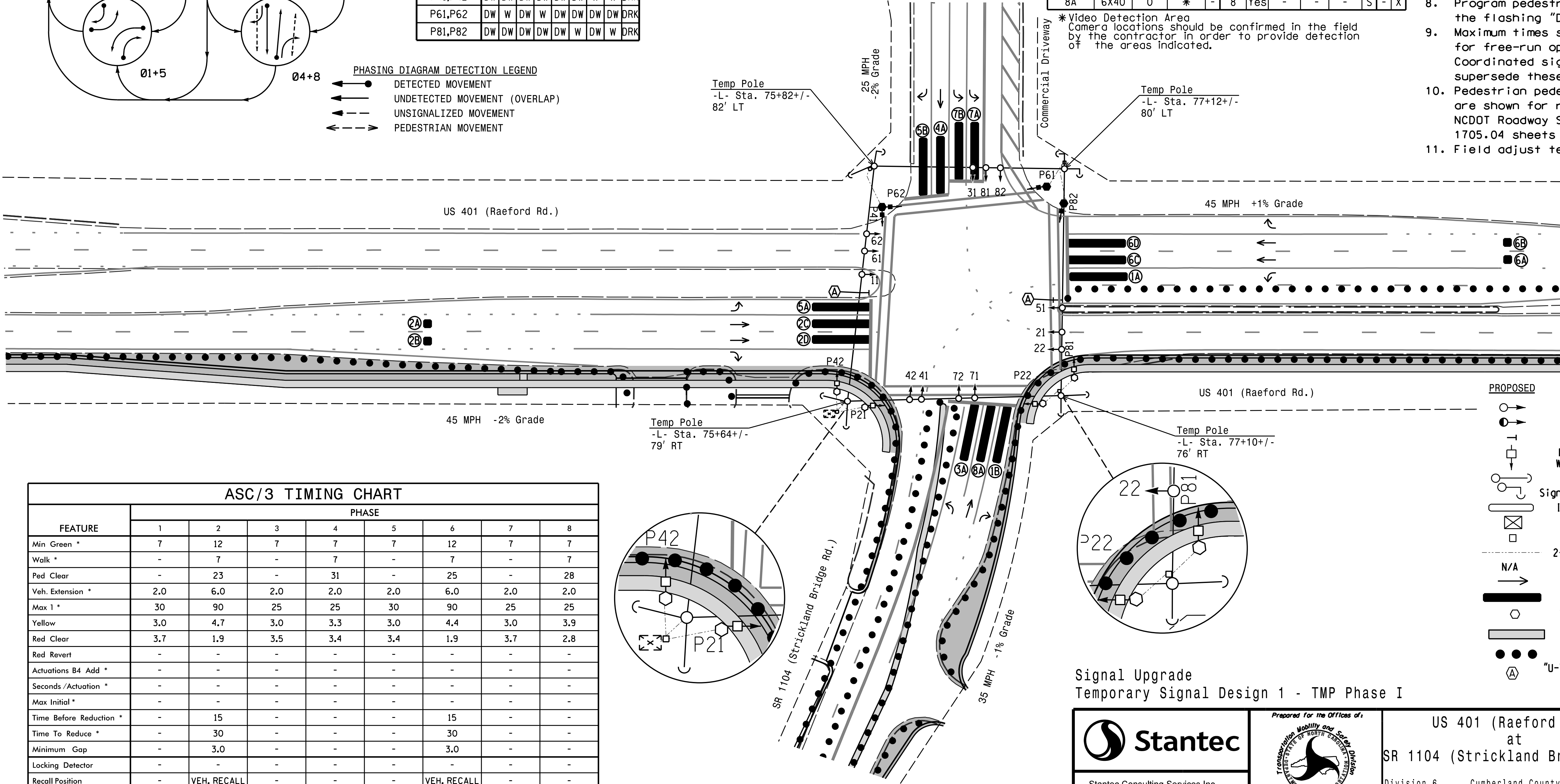
ASC/3 DETECTOR INSTALLATION CHART

Table with columns for LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD. Rows 1A through 8A.

\*Video Detection Area
Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

8 Phase Fully Actuated Fayetteville Signal System NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet foundation so as not to obstruct sight distance of vehicles turning right on red. Relocate existing cabinet and controller onto new foundation.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Pedestrian pedestals are conceptual and are shown for reference only. See 2018 NCDOT Roadway Standard Drawings 1705.04 sheets 1-3 for push button details.
11. Field adjust temporary poles as needed.



ASC/3 TIMING CHART

Timing chart table with columns for FEATURE and PHASE (1-8). Rows include Min Green, Walk, Ped Clear, Veh. Extension, Max I, Yellow, Red Clear, Red Revert, Actuations B4 Add, Seconds/Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, Simultaneous Gap.

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

LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Video Detection Area, Type II Signal Pedestal, Construction Zone, Drums.
EXISTING: Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Video Detection Area, Type II Signal Pedestal, Construction Zone, Drums.

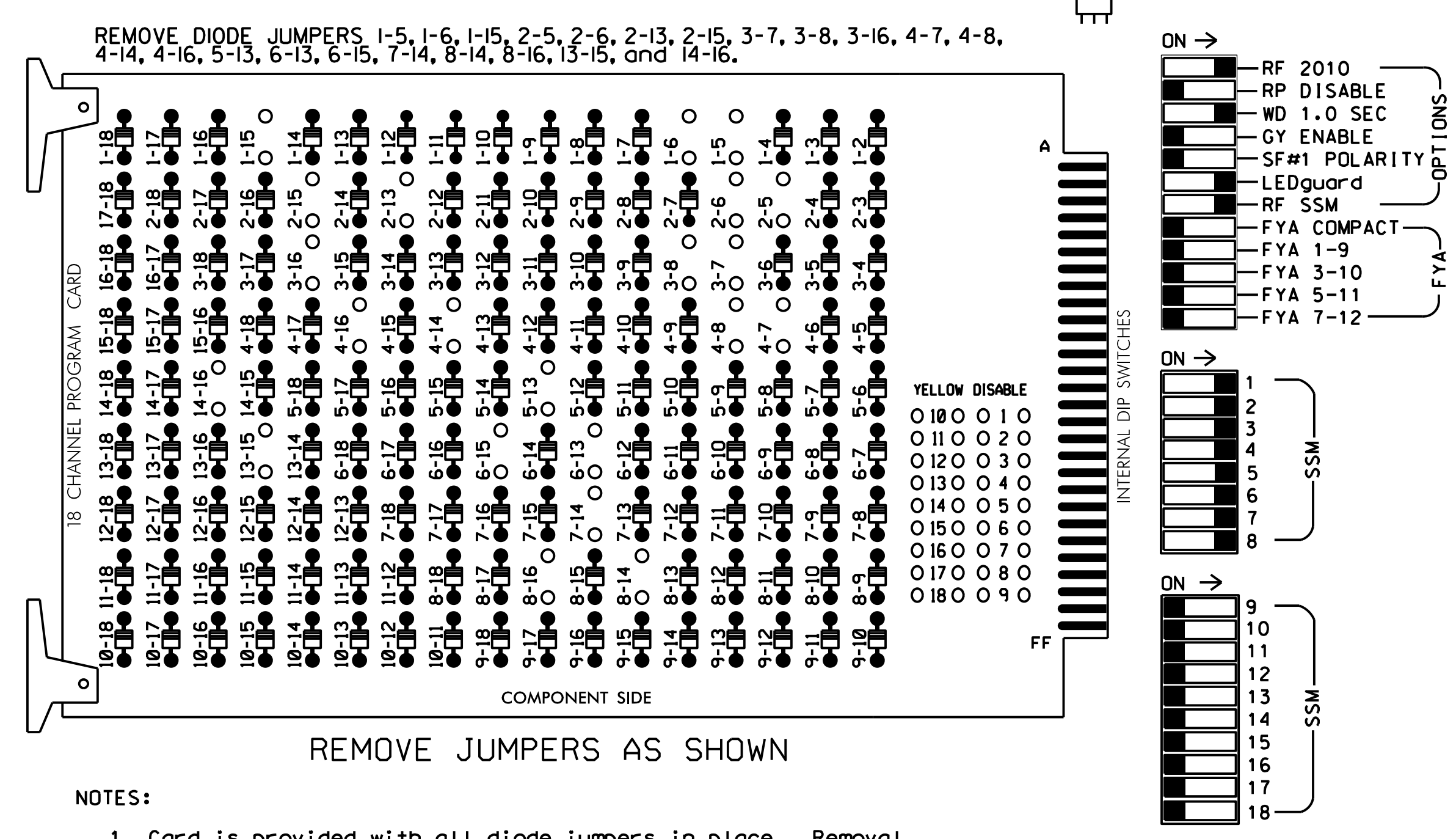
Signal Upgrade Temporary Signal Design 1 - TMP Phase I

Stantec logo and contact info, project location (US 401 at SR 1104), dates (June 2019), and professional seal of E D Harris.

6/5/2019 11:01 AM U:\Projects\4405A\Sigs\Signal Design\4405A\Sig.dwg User: jhanrath

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

(remove jumpers and set switches as shown)



**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 controller to Start Up in phase 2 WALK and phase 6 WALK.
- The cabinet and controller are part of the Fayetteville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,  
 S7,S8,S9,S10,S11,S12  
 PHASES USED.....1,2,2PED,3,4,4PED,5,  
 6,6PED,7,8,8PED

OVERLAP A.....NOT USED  
 OVERLAP B.....NOT USED  
 OVERLAP C.....NOT USED  
 OVERLAP D.....NOT USED

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6				
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	82	21,22	P21, P22	31	22	41,42	P41, P42	51	42	61,62	P61, P62	71,72	62	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED			128			101				134					107							
YELLOW			129			102				135					108							
GREEN			130			103				136					109							
RED ARROW	125				116					131				122								
YELLOW ARROW	126	126			117	117				132	132			123	123							
GREEN ARROW	127	127			118	118				133	133			124	124							
Hand icon					113					104				119							110	
Walking person icon					115					106				121							112	

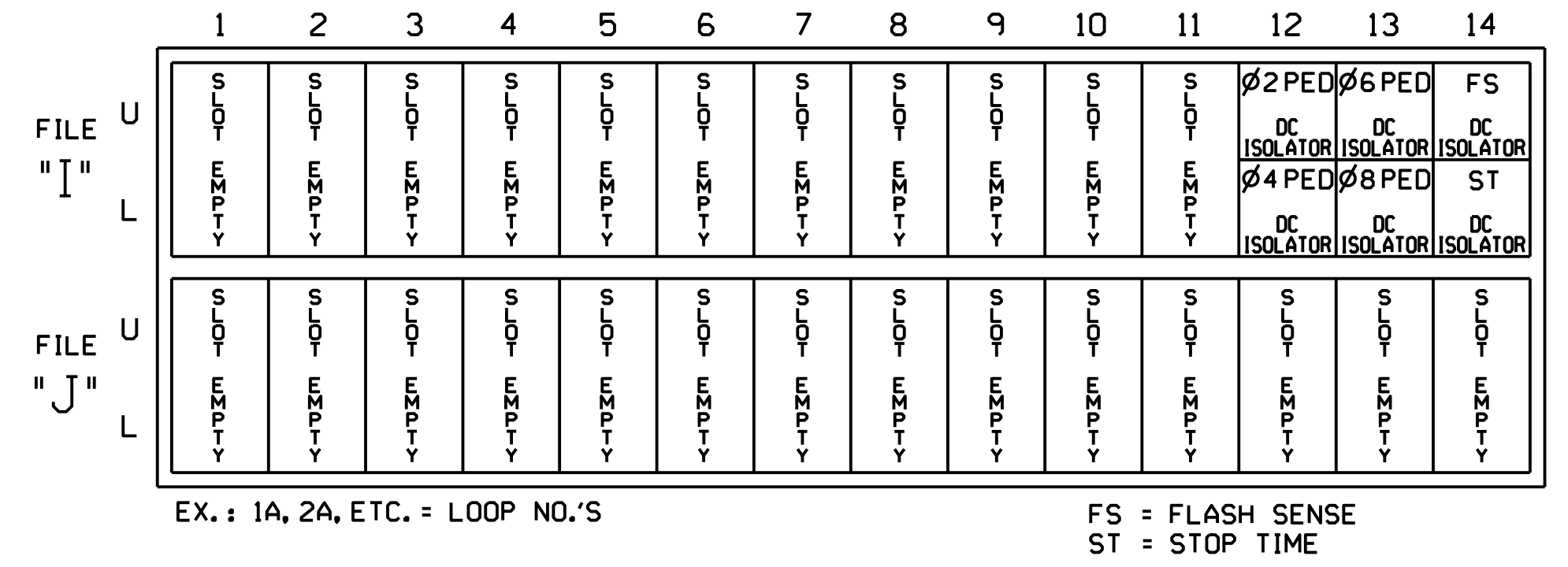
NU = Not Used

**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.

**INPUT FILE POSITION LAYOUT**

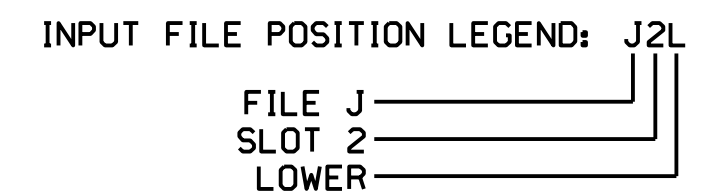
(front view)



**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE
PED PUSH BUTTONS					
P21,P22	TB8-4,6	112U	67	PED 2	2 PED
P41,P42	TB8-5,6	112L	69	PED 4	4 PED
P61,P62	TB8-7,9	113U	68	PED 6	6 PED
P81,P82	TB8-8,9	113L	70	PED 8	8 PED

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



**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0596T1  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 1 - TMP Phase I  
 Electrical Detail

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

**US 401 (Raeford Road) at SR 1104 (Strickland Bridge Road)**  
 Division 6 Cumberland County Fayetteville  
 PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: M RG WILSON REVIEWED BY:

REVISIONS: INIT. DATE

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045933 LAWRENCE E. OVERN

Documented by: 6/5/2019  
 Signature: DATE  
 SIG. INVENTORY NO. 06-0596T1

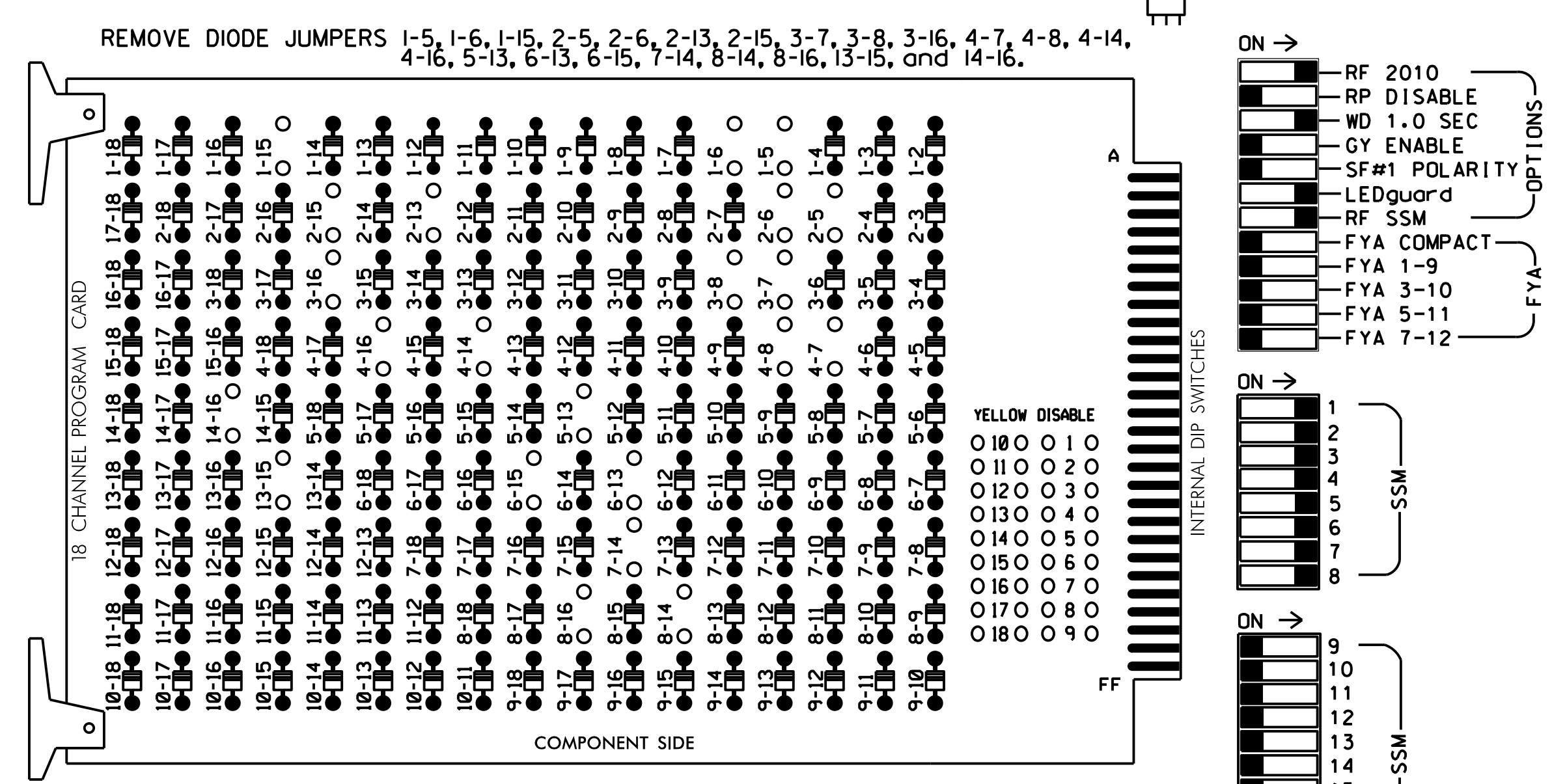
DOCUMENT NOT CONSIDERED VALID UNLESS ALL SIGNATURES COMPLETED

DATE: U:\Projects\Signal\Signal\Local Details - U-4405A\Temporary\_Signals\MU-4405A.slg.dwg, 06-0596T1.dgn  
 User: lhambr.fgh



### EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.

### 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 controller to start up in phase 2 WALK and phase 6 WALK.
- The cabinet and controller are part of the Fayetteville Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,  
 S9,S10,S11,S12  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,  
 6PED,7,8,8PED  
 OVERLAP A.....NOT USED  
 OVERLAP B.....NOT USED  
 OVERLAP C.....NOT USED  
 OVERLAP D.....NOT USED

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
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.	11,12	82	21,22	P21, P22	31,32	22	41,42	P41, P42	51	42	61,62	P61, P62	71,72	62	81,82	P81, P82	NU	NU	NU
RED			128				101				134				107				
YELLOW			129				102				135				108				
GREEN			130				103				136				109				
RED ARROW	125						116			131			122						
YELLOW ARROW	126	126					117	117		132	132		123	123					
GREEN ARROW	127	127					118	118		133	133		124	124					
Hand							113			104			119						110
Walking							115			106			121						112

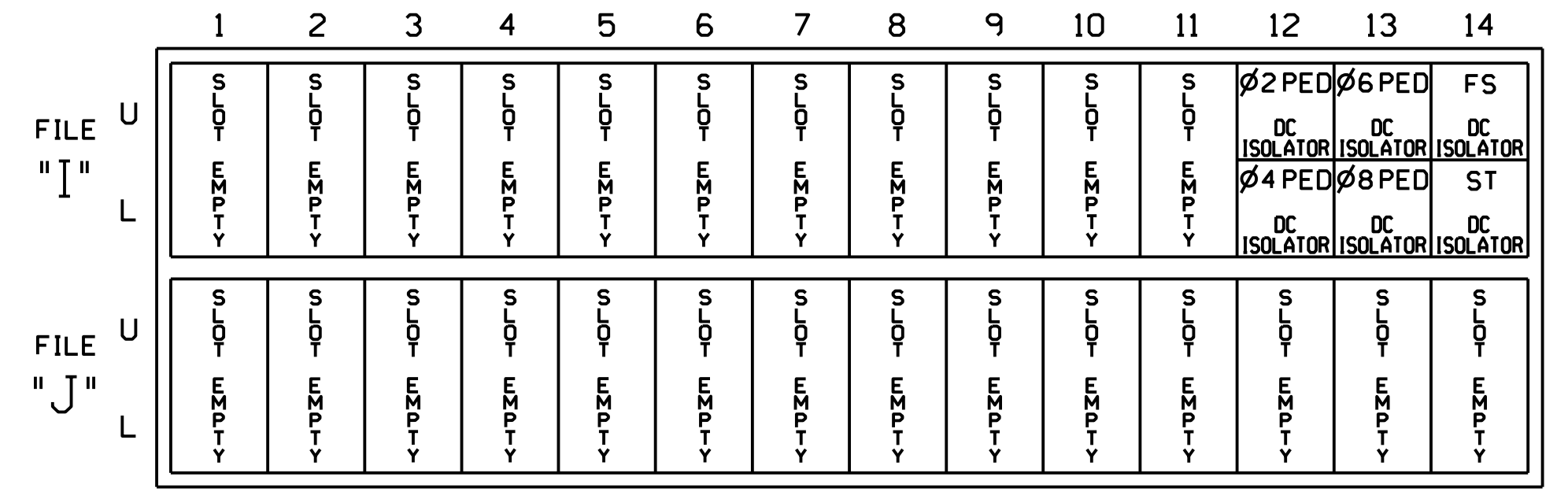
NU = Not Used

### 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.

### INPUT FILE POSITION LAYOUT

(front view)



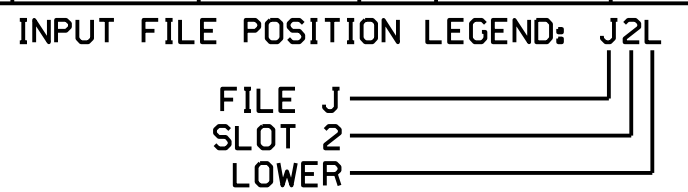
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE
PED PUSH BUTTONS					
P21,P22	T88-4,6	112U	67	PED 2	2 PED
P41,P42	T88-5,6	112L	69	PED 4	4 PED
P61,P62	T88-7,9	113U	68	PED 6	6 PED
P81,P82	T88-8,9	113L	70	PED 8	8 PED

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



### SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0596T2  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 2 - TMP Phase II  
 Electrical Detail

Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

US 401 (Raeford Road)  
 at  
 SR 1104 (Strickland Bridge Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: M RG WILSON REVIEWED BY:

SEAL  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL  
 045933  
 LAWRENCE E. OVERN

6/5/2019

SIG. INVENTORY NO. 06-0596T2

PHASING DIAGRAM

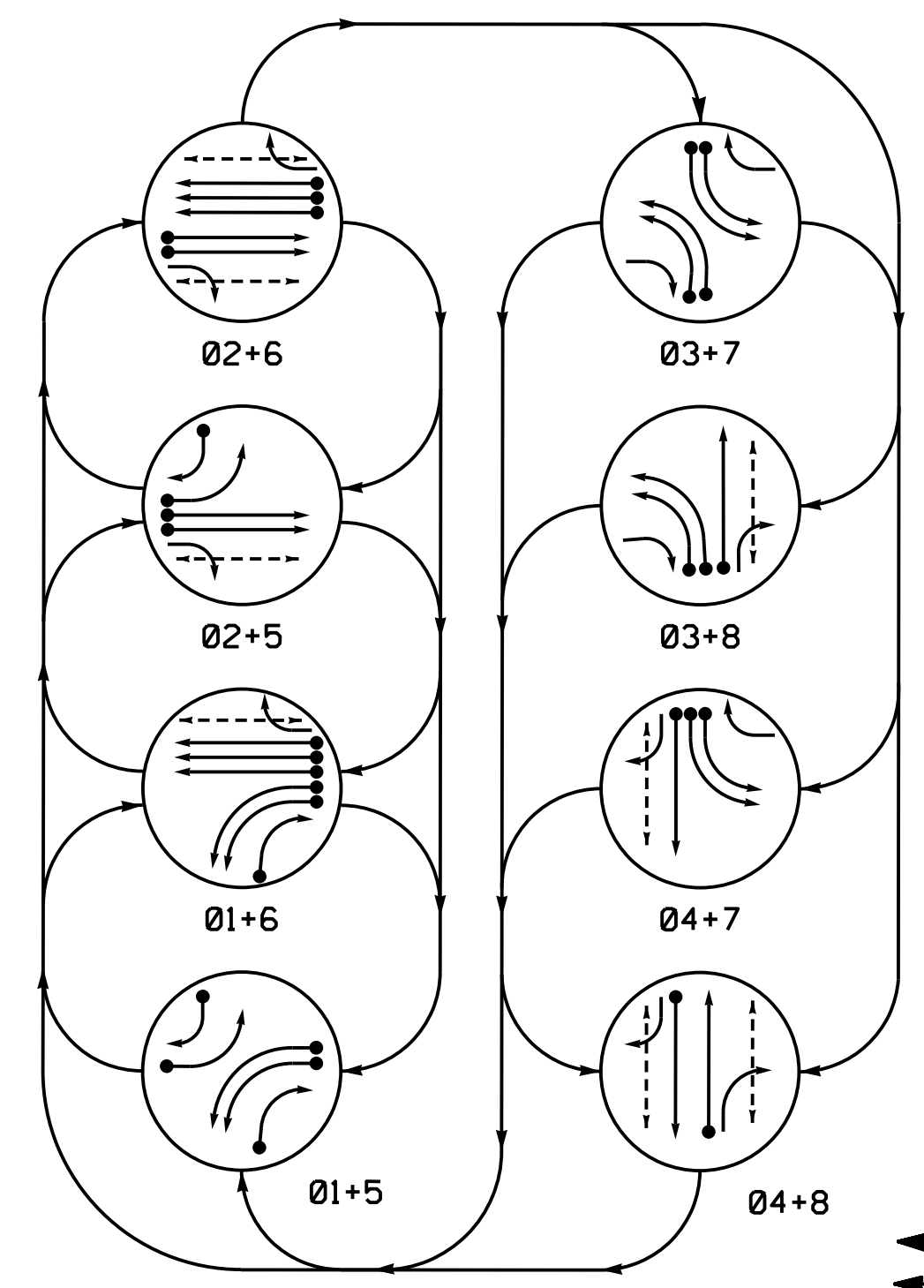
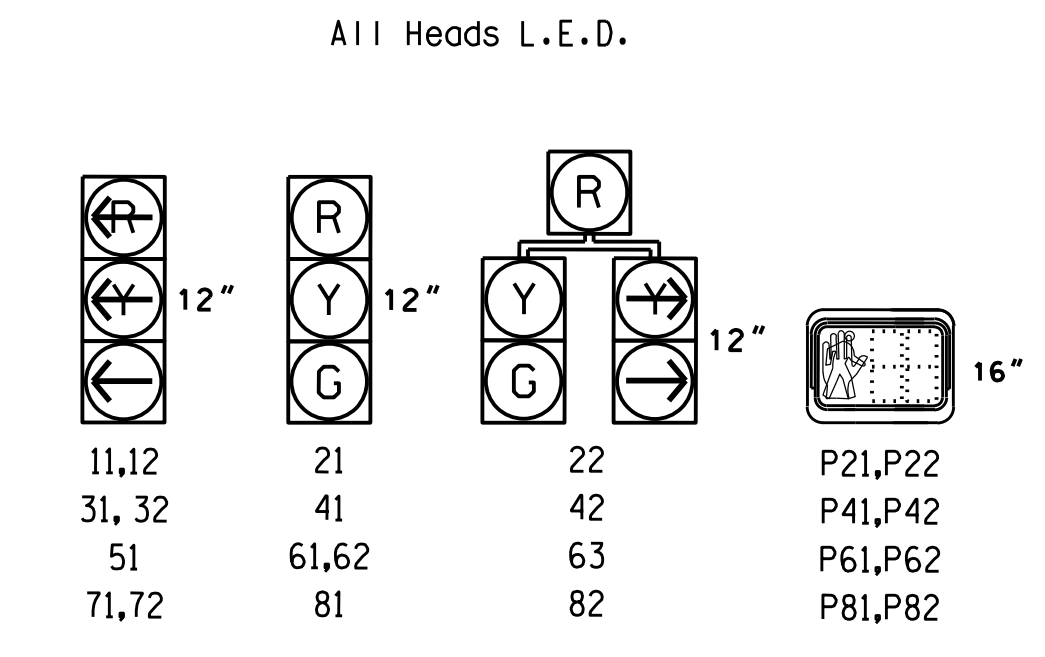


TABLE OF OPERATION table with columns for Signal Face, Phase (01+5 to 04+8), and Flash. Rows list signal head numbers and their corresponding phases.

PHASING DIAGRAM DETECTION LEGEND with symbols for detected movement, undetected movement (overlap), unsignalized movement, and pedestrian movement.

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

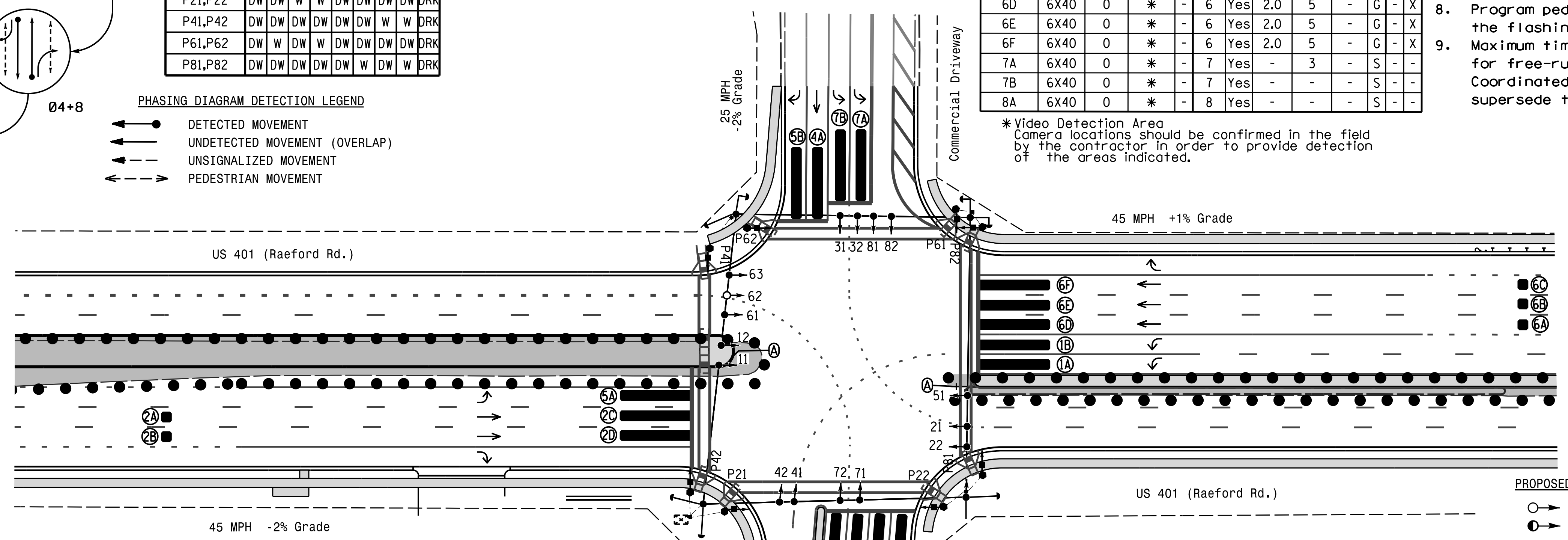
ASC/3 DETECTOR INSTALLATION CHART table with columns for Loop, Size, Distance from Stopbar, Turns, New Loop, Phase, Calling, Extend Time, Delay Time, Use Added Initial, Type, System Loop, and New Card.

\*Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

8 Phase Fully Actuated Fayetteville Signal System

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered 11,12,61,63, & sign A.
6. Set all detector units to presence mode. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



ASC/3 TIMING CHART table with columns for Feature and Phase (1-8). Rows list timing parameters like Min Green, Walk, Ped Clear, Veh. Extension, Max I, Yellow, Red Clear, Red Revert, Actuations B4 Add, Seconds / Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, and Simultaneous Gap.

\* 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 table with columns for Proposed and Existing symbols. Items include Traffic Signal Head, Modified Signal Head, Sign, Pedestrian Signal Head, Signal Pole with Guy, Signal Pole with Sidewalk Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Video Detection Area, Type II Signal Pedestal, Construction Zone, Drums, and "U-TURN YIELD TO RIGHT TURN" Sign (R10-16).

Signal Upgrade Temporary Signal Design 3 - TMP Phase III

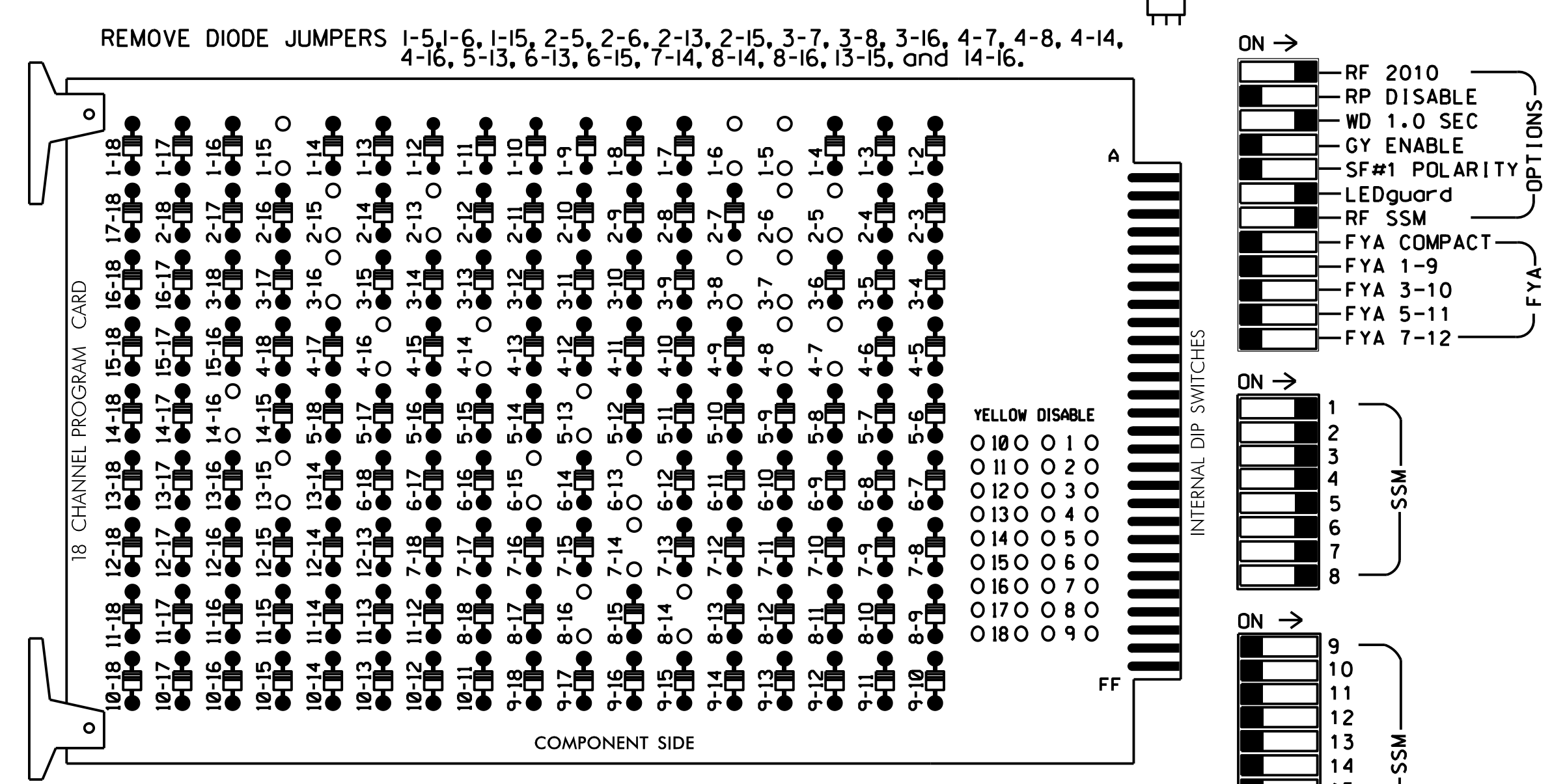
Project information block including Stantec logo, project name (US 401 at SR 1104), dates (June 2019), and signatures of A D Smith and B L Watson. Includes a seal for the Professional Engineer, Patsy L. Watson.

6/5/2019 10:46 AM User: jhambert User: jhambert



### EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.

### 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 controller to start up in phase 2 WALK and phase 6 WALK.
- The cabinet and controller are part of the Fayetteville Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,  
 S9,S10,S11,S12  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,  
 6PED,7,8,8PED  
 OVERLAP A.....NOT USED  
 OVERLAP B.....NOT USED  
 OVERLAP C.....NOT USED  
 OVERLAP D.....NOT USED

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6				
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.	11,12	82	21,22	P21, P22	31,32	22	41,42	P41, P42	51	42	61,62, 63	P61, P62	71,72	63	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED			128				101					134							107			
YELLOW			129				102					135							108			
GREEN			130				103					136							109			
RED ARROW	125						116					131							122			
YELLOW ARROW	126	126					117	117				132	132						123	123		
GREEN ARROW	127	127					118	118				133	133						124	124		
Hand							113					104							119			110
Walking							115					106							121			112

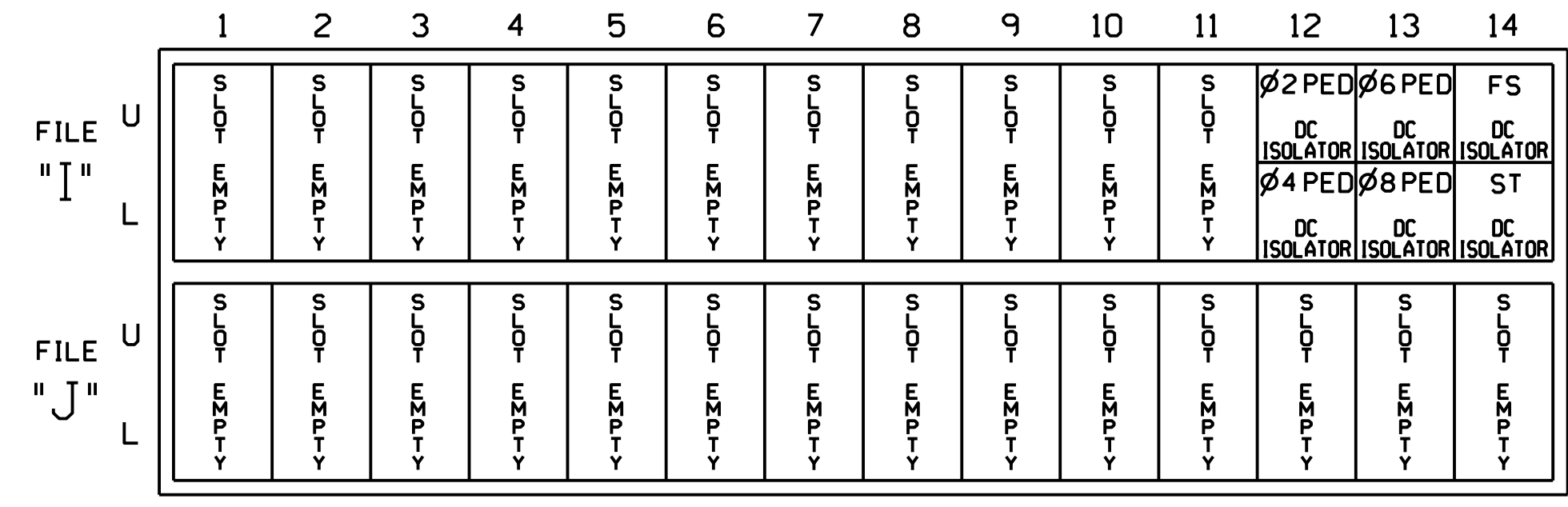
NU = Not Used

### 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.

### INPUT FILE POSITION LAYOUT

(front view)



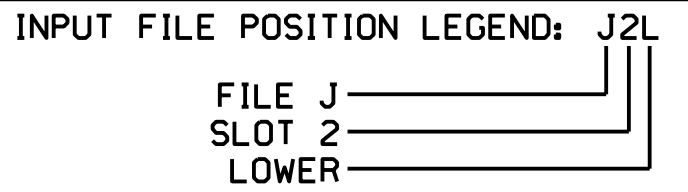
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE
PED PUSH BUTTONS					
P21,P22	T88-4,6	I12U	67	PED 2	2 PED
P41,P42	T88-5,6	I12L	69	PED 4	4 PED
P61,P62	T88-7,9	I13U	68	PED 6	6 PED
P81,P82	T88-8,9	I13L	70	PED 8	8 PED

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



### SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

DATE: U:\Projects\Signal\4405A\Temporary\_Signals\4405A\_Sig.dwg, 06-05-2019 13:40  
 User: jhombert

Temporary Design 3 - TMP Phase III  
 Electrical Detail

Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

US 401 (Raeford Road)  
 at  
 SR 1104 (Strickland Bridge Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: M RG WILSON REVIEWED BY:

SEAL  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 045933  
 LAWRENCE E. OVERN

6/5/2019

SIG. INVENTORY NO. 06-059613

PHASING DIAGRAM

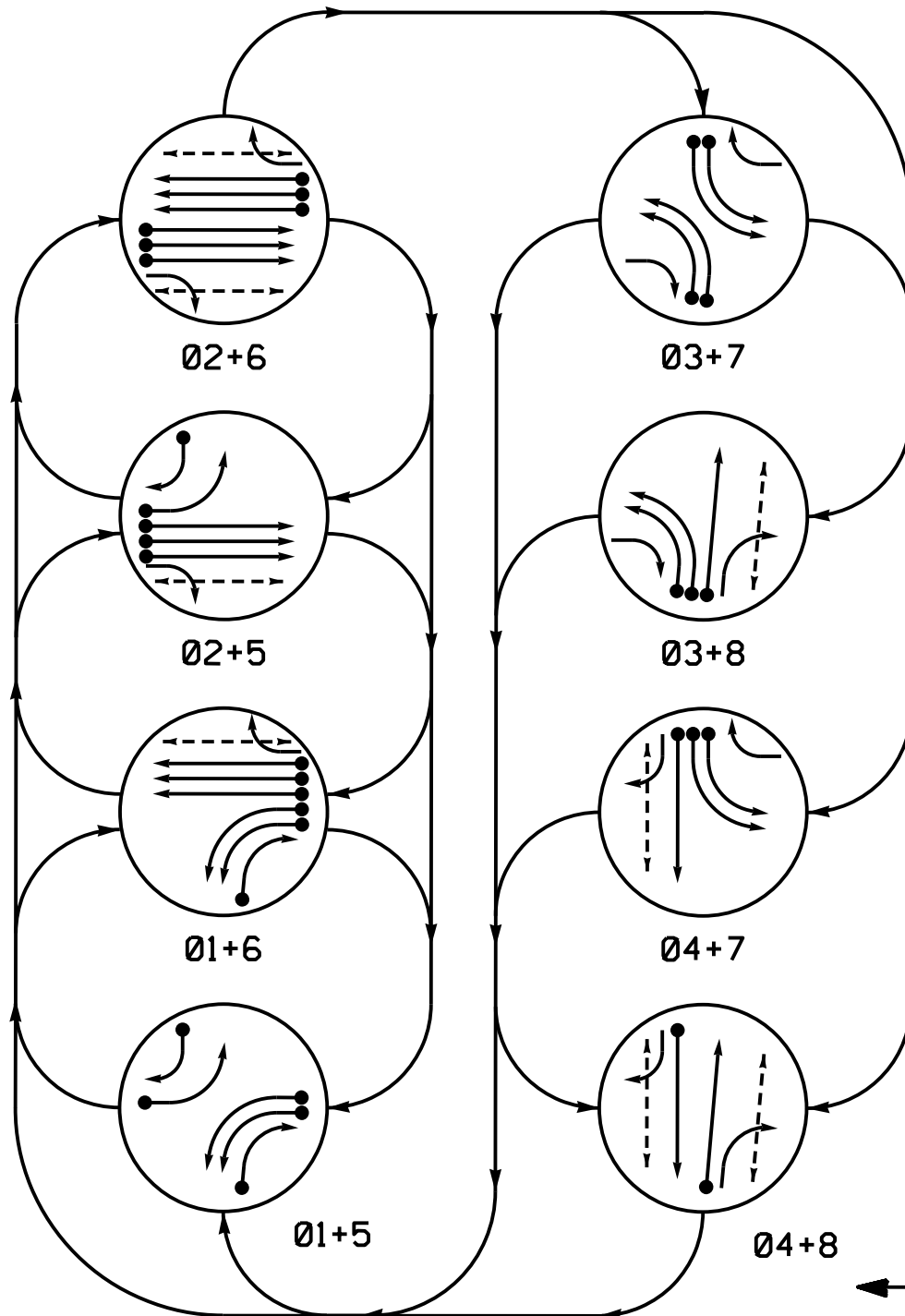
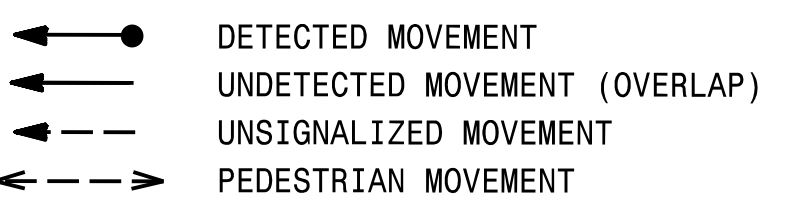


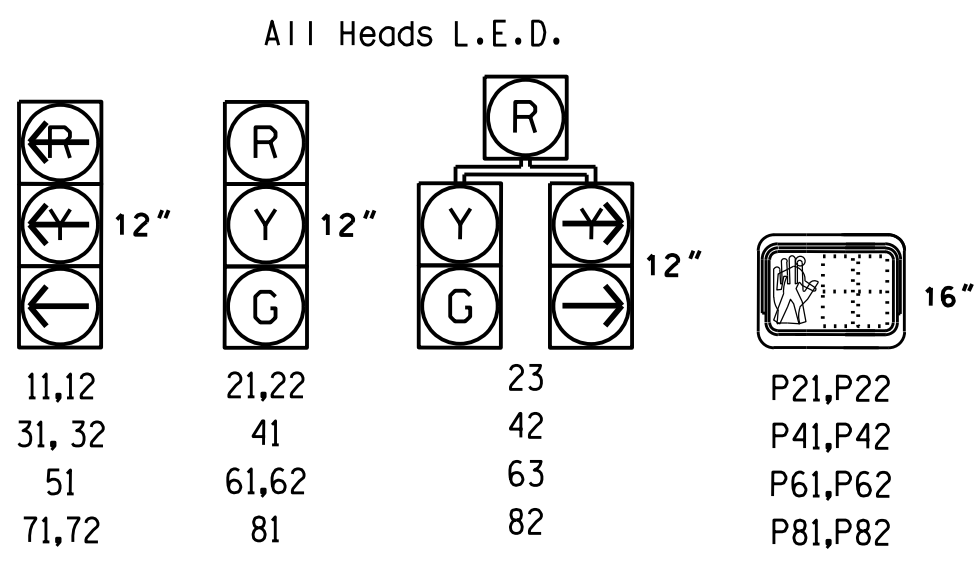
TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH
	01+5	02+5	03+7	03+8	04+7	04+8	01+6	02+6	
11,12	-	-	-	-	-	-	-	-	-
21,22	R	R	G	G	R	R	R	Y	
23	R	R	G	G	R	R	Y		
31	-	-	-	-	-	-	-	-	
41	R	R	R	R	R	G	G	R	
42	R	R	R	R	R	G	G	R	
51	-	-	-	-	-	-	-	-	
61,62	R	G	R	G	R	R	R	Y	
63	R	G	R	G	R	R	Y		
71,72	-	-	-	-	-	-	-	-	
81	R	R	R	R	R	G	G	R	
82	R	R	R	R	R	G	G	R	
P21,P22	DW	DW	W	W	DW	DW	DRK		
P41,P42	DW	DW	DW	DW	DW	W	DRK		
P61,P62	DW	W	DW	W	DW	DW	DRK		
P81,P82	DW	DW	DW	DW	W	DW	DRK		

PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.



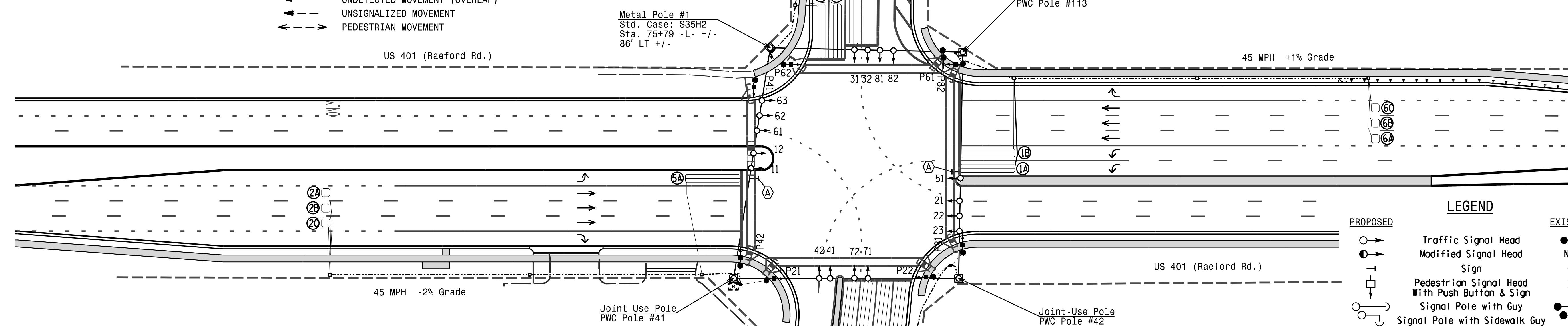
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	UIUSE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	Yes	-	-	-	S	-	X
1B	6X40	0	2-4-2	X	1	Yes	-	-	-	S	-	X
1C	6X40	0	2-4-2	X	1	Yes	-	15	-	S	-	X
2A	6X6	300	4	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	4	X	2	Yes	-	-	X	N	-	X
2C	6X6	300	4	X	2	Yes	-	-	X	N	-	X
3A	6X40	0	2-4-2	X	3	Yes	-	-	-	S	-	X
3B	6X40	0	2-4-2	X	3	Yes	-	-	-	S	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	S	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	-	-	S	-	X
5B	6X40	0	2-4-2	X	5	Yes	-	15	-	S	-	X
6A	6X6	300	4	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	4	X	6	Yes	-	-	X	N	-	X
6C	6X6	300	4	X	6	Yes	-	-	X	N	-	X
7A	6X40	0	2-4-2	X	7	Yes	-	3	-	S	-	X
7B	6X40	0	2-4-2	X	7	Yes	-	-	-	S	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	-	-	S	-	X

8 Phase Fully Actuated Fayetteville Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- 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.

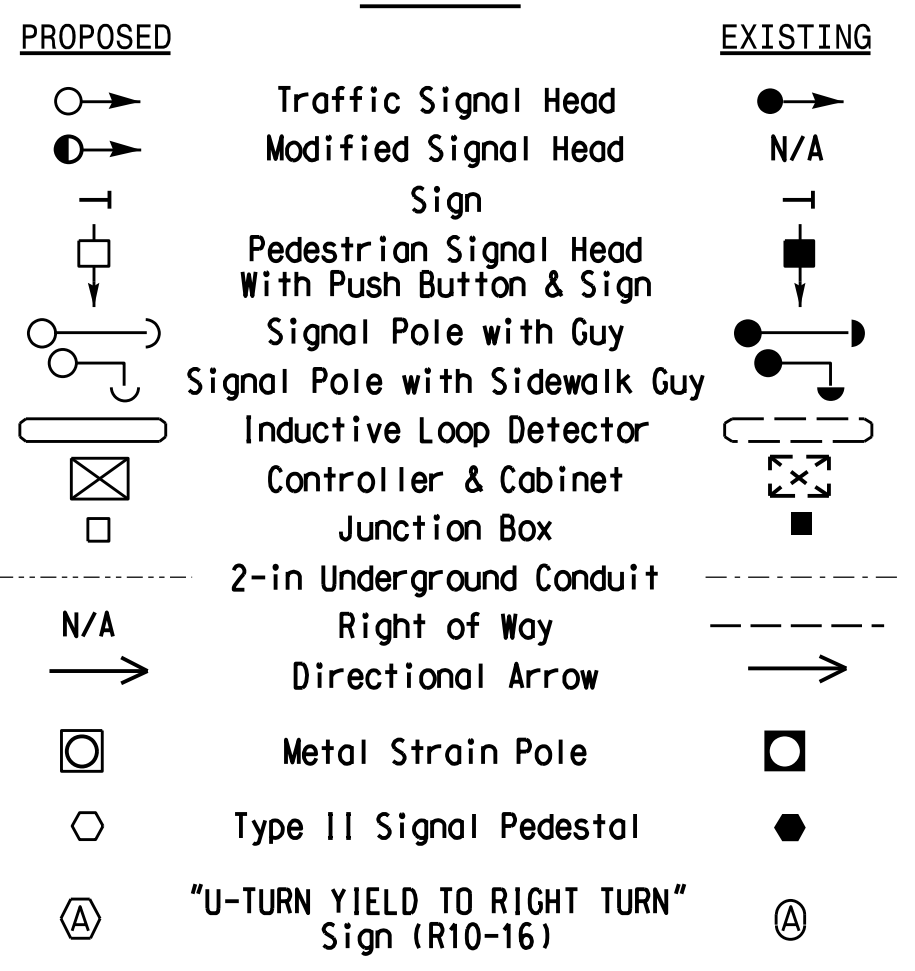


ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	7	-	7	-	7	-	7
Ped Clear	-	29	-	29	-	25	-	31
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max I *	30	90	25	25	30	90	25	25
Yellow	3.0	4.7	3.0	3.3	3.0	4.4	3.0	3.9
Red Clear	3.8	2.3	4.4	3.6	4.1	2.3	3.9	3.1
Red Revert	-	-	-	-	-	-	-	-
Actions B4 Add *	-	0	-	-	-	0	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

\* 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 - Final Design

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

Prepared For the Offices of:  
  
 750 N. Greenfield Pkwy, Garner, NC 27526  
 SCALE: 0 40  
 1" = 40'

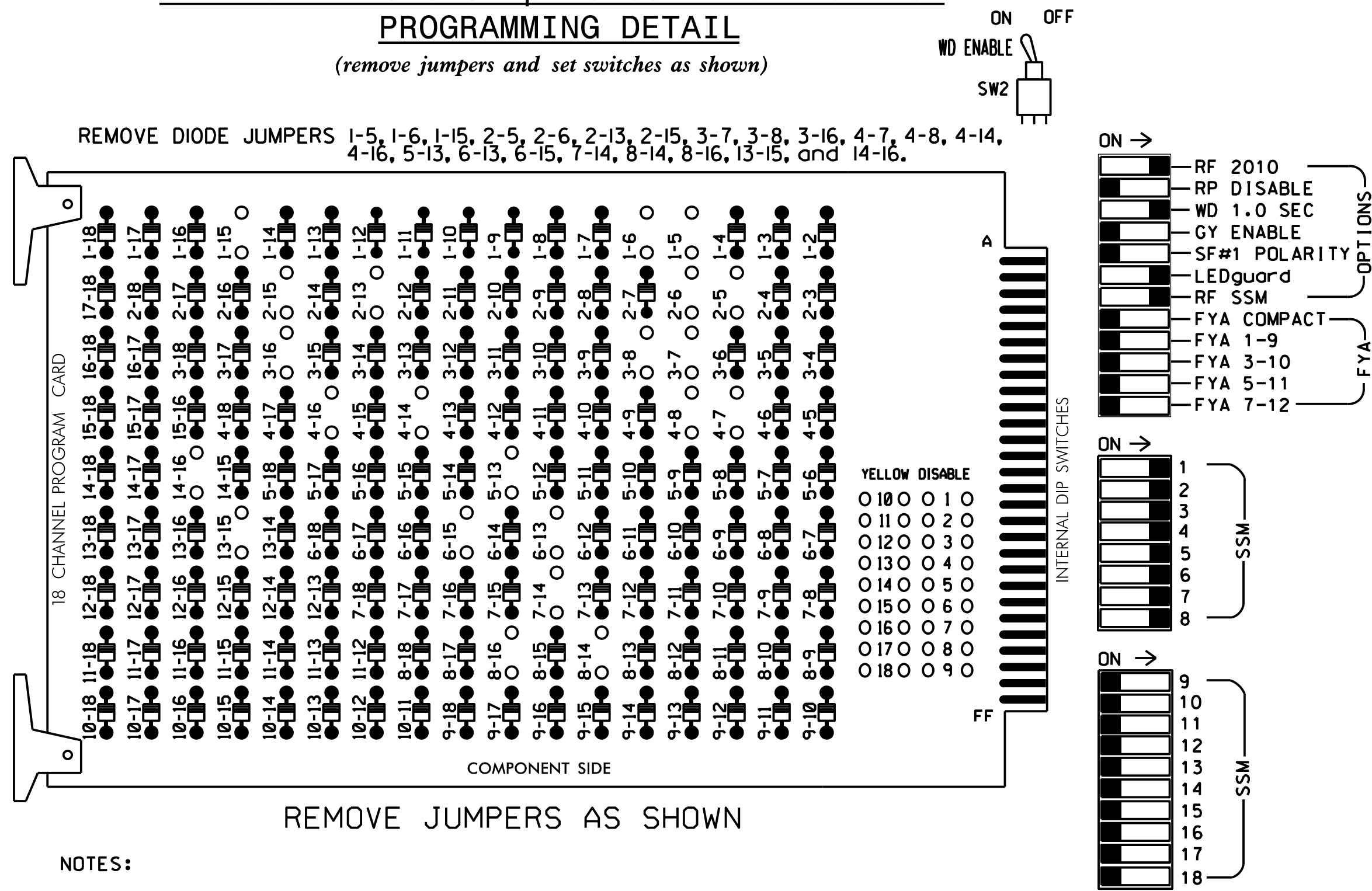
US 401 (Raeford Road)  
 at  
 SR 1104 (Strickland Bridge Road)  
 Division 6 Cumberland County Fayetteville  
 PLAN DATE: June 2019 REVIEWED BY: E D Harris  
 PREPARED BY: A D Smith REVIEWED BY: B L Watson

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED  
  
 Betsy L. Watson  
 DATE: 6/5/2019  
 SIG. INVENTORY NO. 06-0596

6/5/2019 AM  
 User: jhambert  
 D:\Projects\4405A\Final Design\4405A\_Sig.dwg  
 User: jhambert

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

- 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file.
2. Program controller to start up in phase 2 WALK and phase 6 WALK.
3. The cabinet and controller are part of the Fayetteville Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S11,S12
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED

SIGNAL HEAD HOOK-UP CHART

Table with columns for LOAD SWITCH NO., CMU CHANNEL NO., PHASE, SIGNAL HEAD NO., and various signal head types (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, GREEN ARROW) with corresponding hook-up numbers.

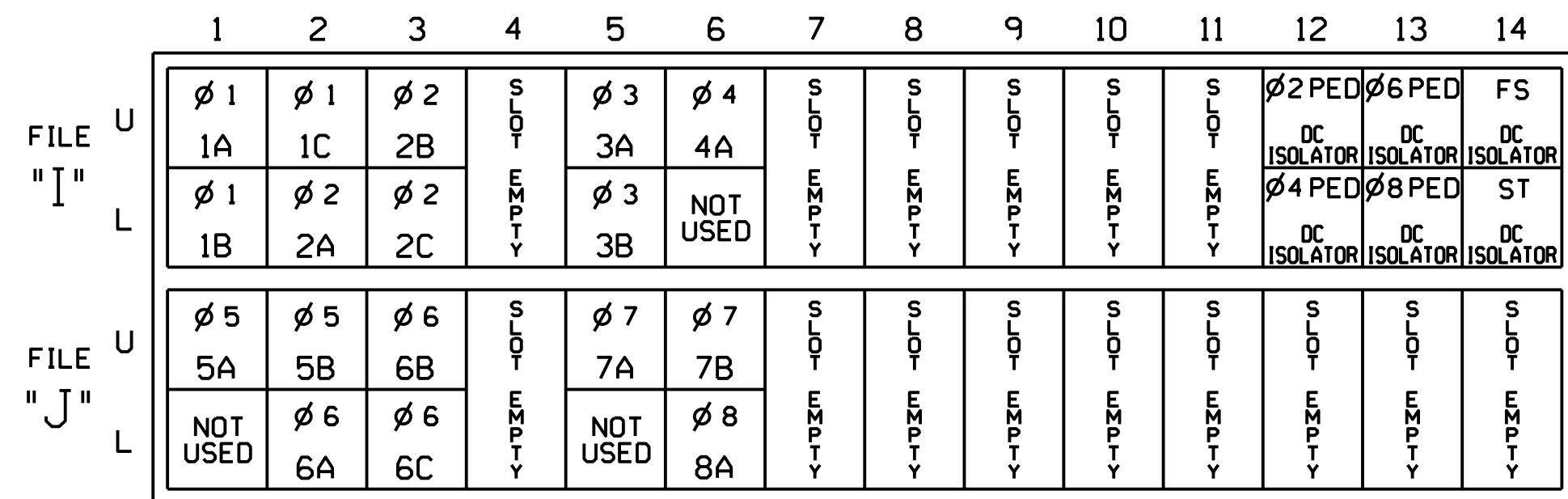
NU = Not Used

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.

INPUT FILE POSITION LAYOUT

(front view)



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

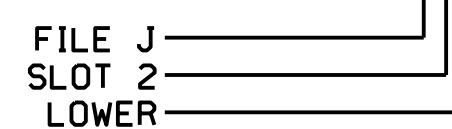
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., DETECTOR NO., NEMA PHASE, CALL, EXTEND TIME, DELAY TIME, ADDED INITIAL, DETECTOR TYPE. Includes rows for loops 1A-8A and PED PUSH BUTTONS.

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

INPUT FILE POSITION LEGEND: J2L



Final Design
Electrical Detail

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0596
DESIGNED: June 2019
SEALED: 6/5/2019
REVISED: N/A

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer seal for Lawrence E. Overn, State of North Carolina, License No. 045933.

Project information: US 401 (Raeford Road) at SR 1104 (Strickland Bridge Road), Division 6, Cumberland County, Fayetteville.

Revision table and signature lines for the document.

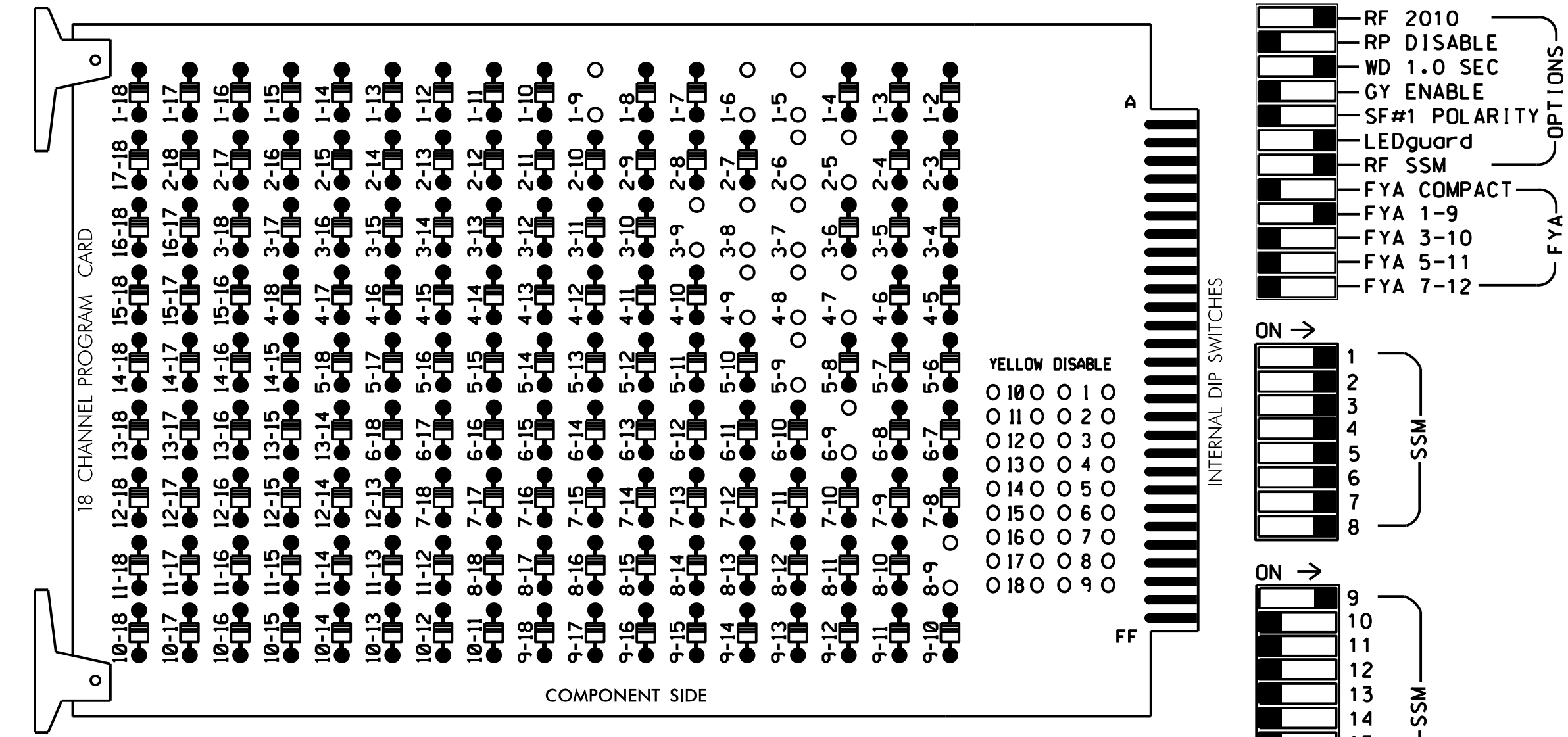
DOCUMENT NOT CONSIDERED VALID UNLESS ALL SIGNATURES COMPLETED



### EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 2-5, 2-6, 3-7, 3-8, 3-9, 4-7, 4-8, 4-9, 5-9, 6-9, and 8-9.



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.
- Integrate monitor with Ethernet network in cabinet.

**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 controller to start up in phase 2 and 6 Green.
- The cabinet and controller are part of the Fayetteville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....Contractor Supplied  
 ECONOLITE 2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,  
 S11,AUX S1  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP A.....\*  
 OVERLAP B.....NOT USED  
 OVERLAP C.....NOT USED  
 OVERLAP D.....NOT USED  
 OVERLAP G.....\*

\* See Overlap Programming Detail on Sheet 2

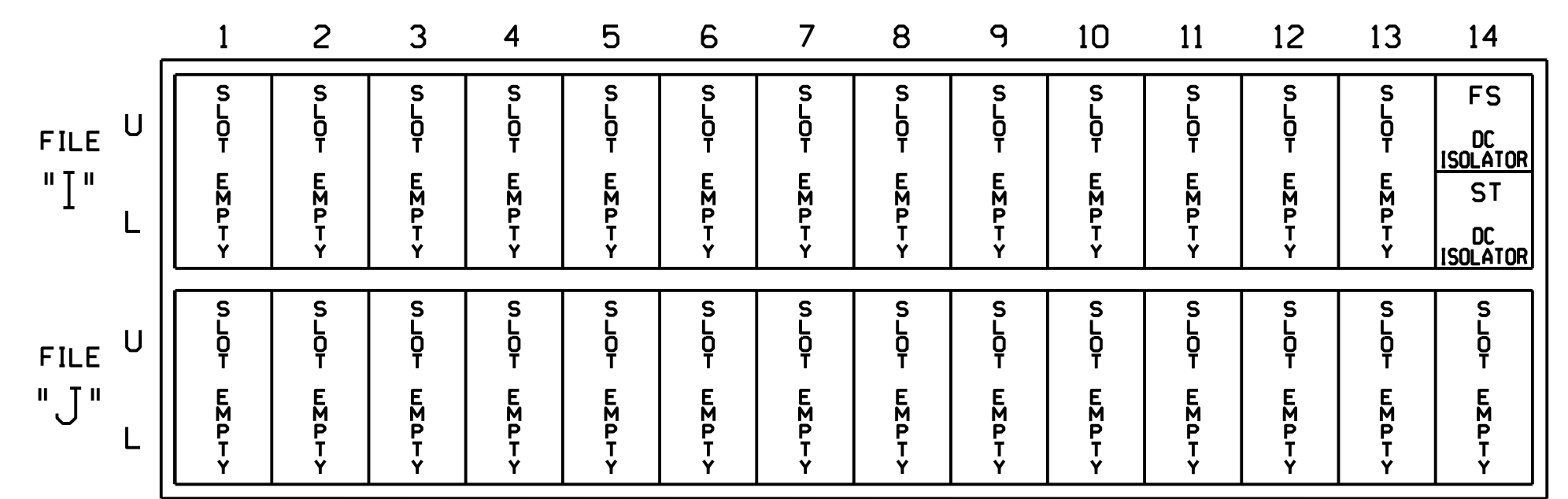
**SIGNAL HEAD HOOK-UP CHART**

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.	11,12	83,84	21,22,23,24	NU	23	31,32	41,42,43	NU	51	42	61,62,63	NU	71,72	62	81,82,85	NU	83,84	NU
RED			128			101		134			107		A121					
YELLOW			129			102		135			108							
GREEN			130			103		136			109							
RED ARROW	125				116			131			122							
YELLOW ARROW	126			117	117			132	132		123	123		A122				
FLASHING YELLOW ARROW														A123				
GREEN ARROW	127	127		118	118			133	133		124	124						

NU = Not Used  
 \* See pictorial of head wiring in detail this sheet.

**INPUT FILE POSITION LAYOUT**

(front view)



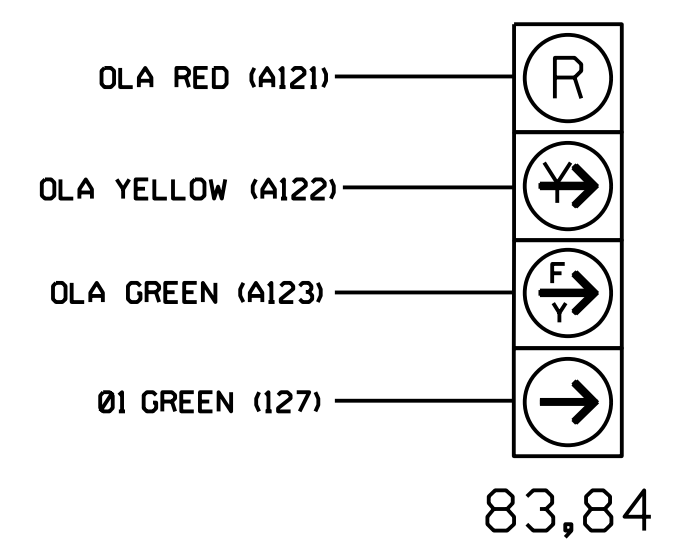
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

**FYA SIGNAL WIRING DETAIL**

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0274T1  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 1 - TMP Phase I  
 Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 801 Jones Franklin Road-Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

Prepared in the Office of:

750 N. Greenfield Pkwy, Corner, NC 27529

US 401 (Raeford Road)  
 at  
 NC 162 (Bunce Road) /  
 SR 1411 (Bunce Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: L Overn  
 PREPARED BY: G B Spell REVIEWED BY:

REVISIONS	INIT.	DATE

6/5/2019  
 DATE  
 SIG. INVENTORY NO. 06-0274T1

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

Toggle Until Positioned  
on Overlap G

*OVERLAP G*

Select TMG VEH OVLP [G] and 'NORMAL'

```

TMG VEH OVLP...[G] TYPE: .....NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . . . X . . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0

```

↓ Toggle Until Positioned  
on Overlap A

*OVERLAP A*

Select TMG VEH OVLP [A] and 'PPLT FYA'

```

TMG VEH OVLP...[A] TYPE: .....PPLT FYA
PROTECTED LEFT TURN.... PHASE 1
OPPOSING THROUGH..... OVERLAP G

FLASHING ARROW OUTPUT.....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0

```

END PROGRAMMING

## FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 06-027411  
DESIGNED: June 2019  
SEALED: 6/5/2019  
REVISED: N/A

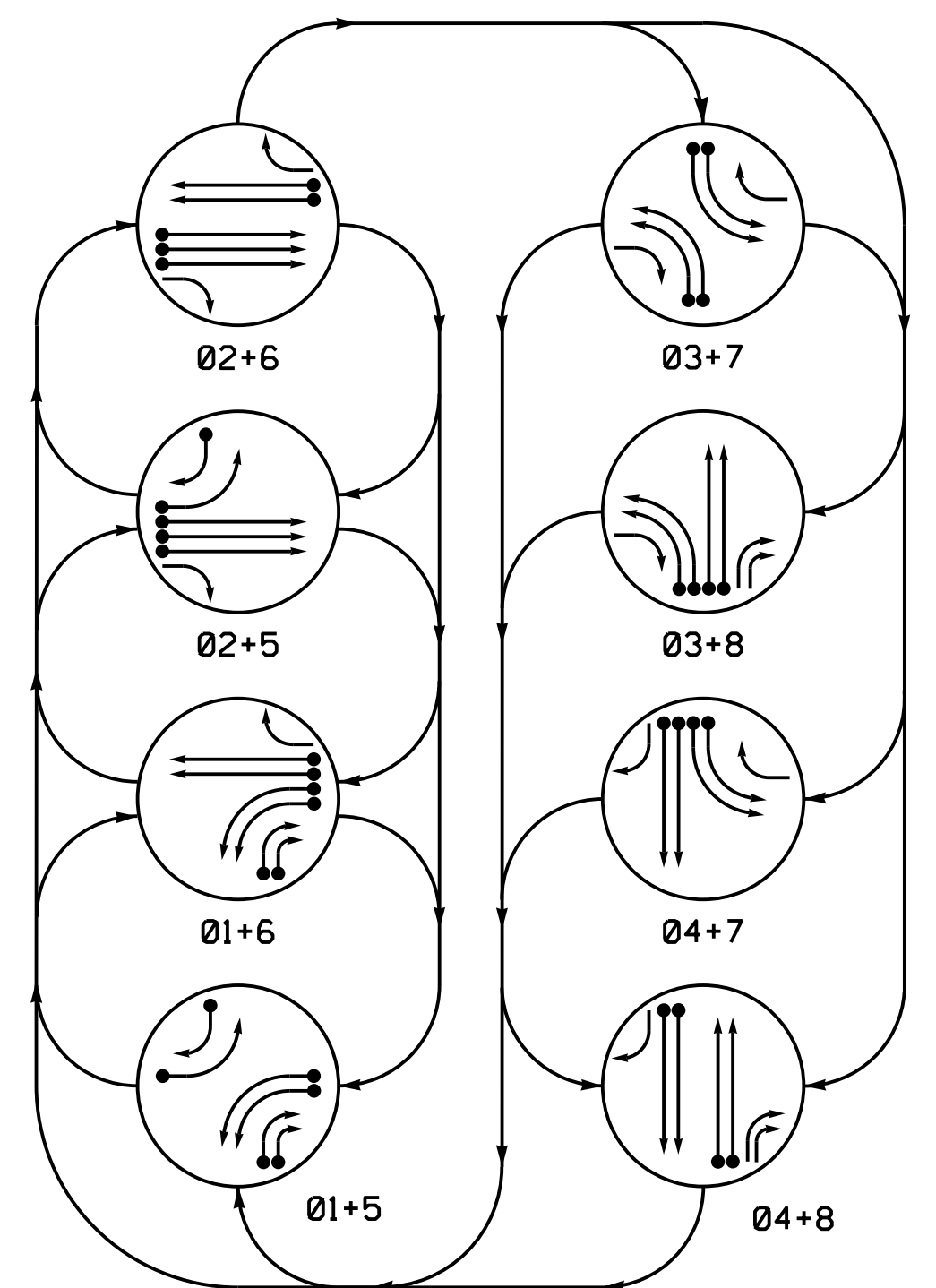
Temporary Design 1 - TMP Phase I  
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

 <b>Stantec</b> <small>Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</small>	<small>ELECTRICAL AND PROGRAMMING DETAILS FOR:</small>  <small>Prepared in the Office of: Transportation Mobility and Safety Division DEPARTMENT OF NORTH CAROLINA STATE OF NORTH CAROLINA Signal Management Section 750 N. Greenfield Pkwy, Corner, NC 27529</small>	<b>US 401 (Raeford Road)</b> at <b>NC 162 (Bunce Road) / SR 1411 (Bunce Road)</b> <small>Division 6 Cumberland County Fayetteville</small>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 60px; margin: auto;"> <small>SEAL</small>  <small>NORTH CAROLINA</small>  <small>PROFESSIONAL</small>  <small>SEAL</small>  <small>045933</small>  <small>ENGINEER</small>  <small>LAWRENCE E. OVERN</small> </div>									
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PLAN DATE: June 2019	REVIEWED BY: L Overn											
PREPARED BY: G B Spell	REVIEWED BY:											
REVISIONS	INIT.	DATE										

DATE: 6/5/2019 10:45:11 AM User: jhombert@stn.com

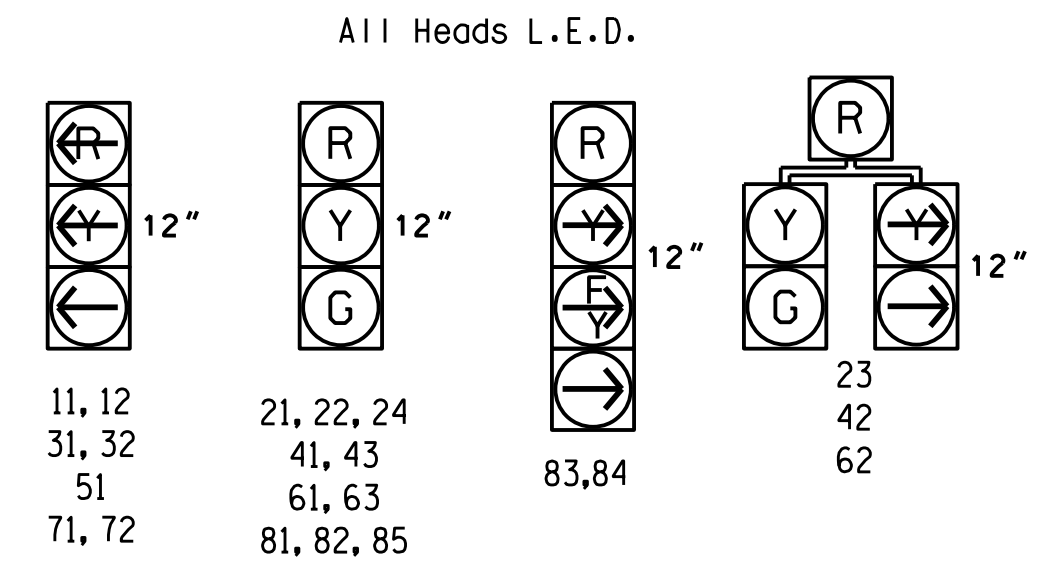
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND
DETECTED MOVEMENT
UNDETECTED MOVEMENT (OVERLAP)
UNSIGNALIZED MOVEMENT
PEDESTRIAN MOVEMENT

TABLE OF OPERATION
SIGNAL FACE | PHASE | 01+5 | 01+6 | 02+5 | 02+6 | 03+7 | 03+8 | 04+7 | 04+8 | FISH

SIGNAL FACE I.D.

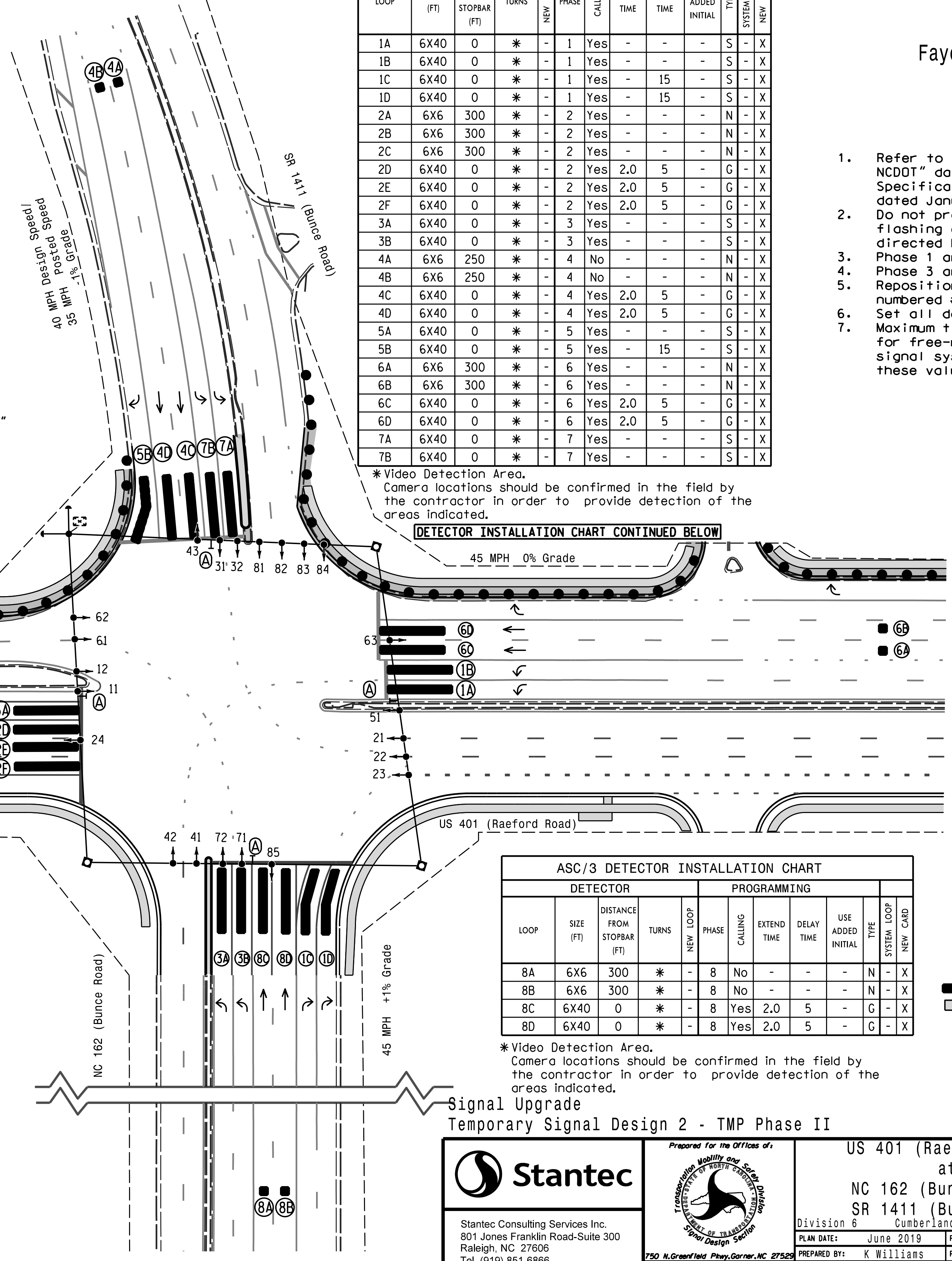


ASC/3 DETECTOR INSTALLATION CHART
DETECTOR | PROGRAMMING
LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | PHASE | CALLING | EXTEND TIME | DELAY TIME | USE ADDED INITIAL | TYPE | SYSTEM LOOP | NEW CARD

8 Phase Fully Actuated Fayetteville Signal System

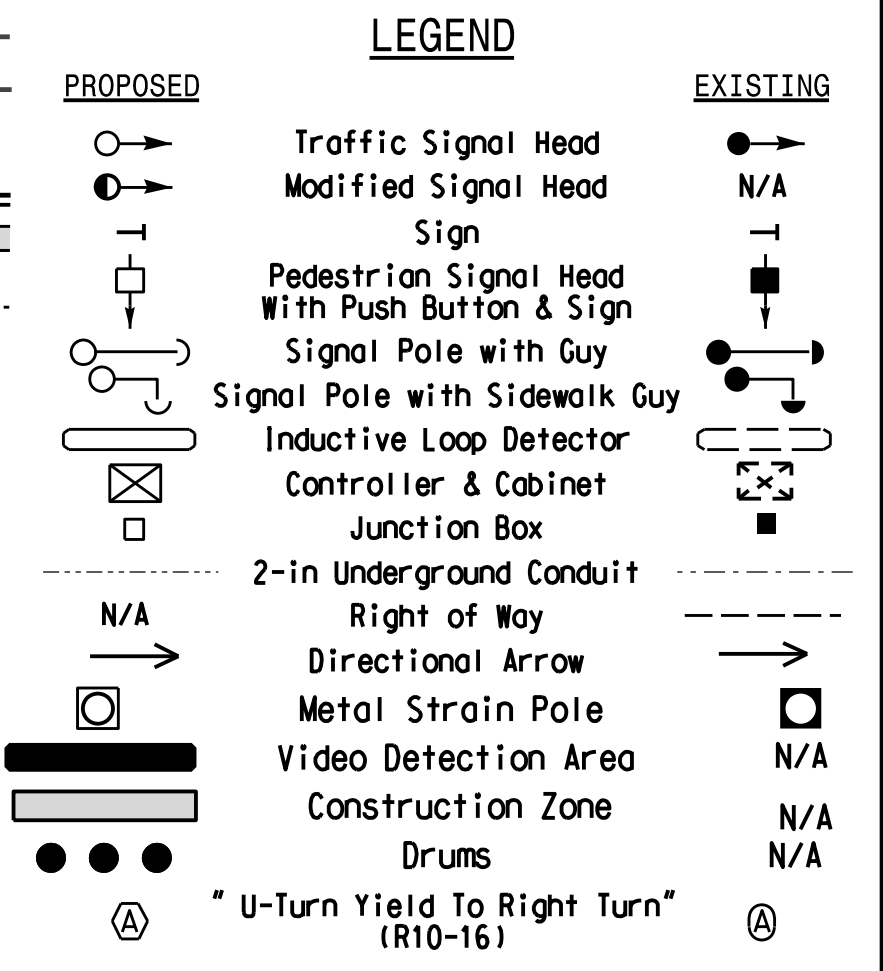
NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered #21, 22, 23, 51, and sign A.
6. Set all detector units to presence mode.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



ASC/3 TIMING CHART
FEATURE | PHASE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

ASC/3 DETECTOR INSTALLATION CHART (Continued)
DETECTOR | PROGRAMMING
LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | PHASE | CALLING | EXTEND TIME | DELAY TIME | USE ADDED INITIAL | TYPE | SYSTEM LOOP | NEW CARD



\*Video Detection Area. Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

Signal Upgrade Temporary Signal Design 2 - TMP Phase II

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal: K. Williams, State of North Carolina, License No. 27525.

Project Information: US 401 (Raeford Road) at NC 162 (Bunce Road) / SR 1411 (Bunce Road). Division 6, Cumberland County, Fayetteville. Plan Date: June 2019. Prepared by: K Williams. Reviewed by: E D Harris, B L Watson.

Professional Engineer Seal: Betsy L. Watson, State of North Carolina, License No. 29449.

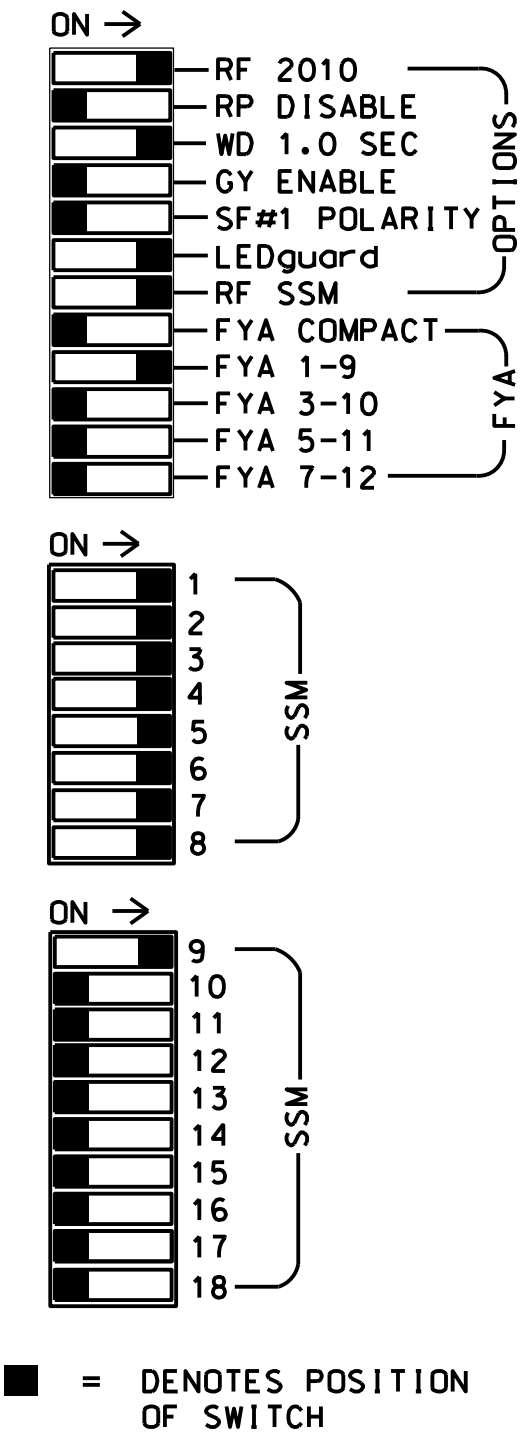
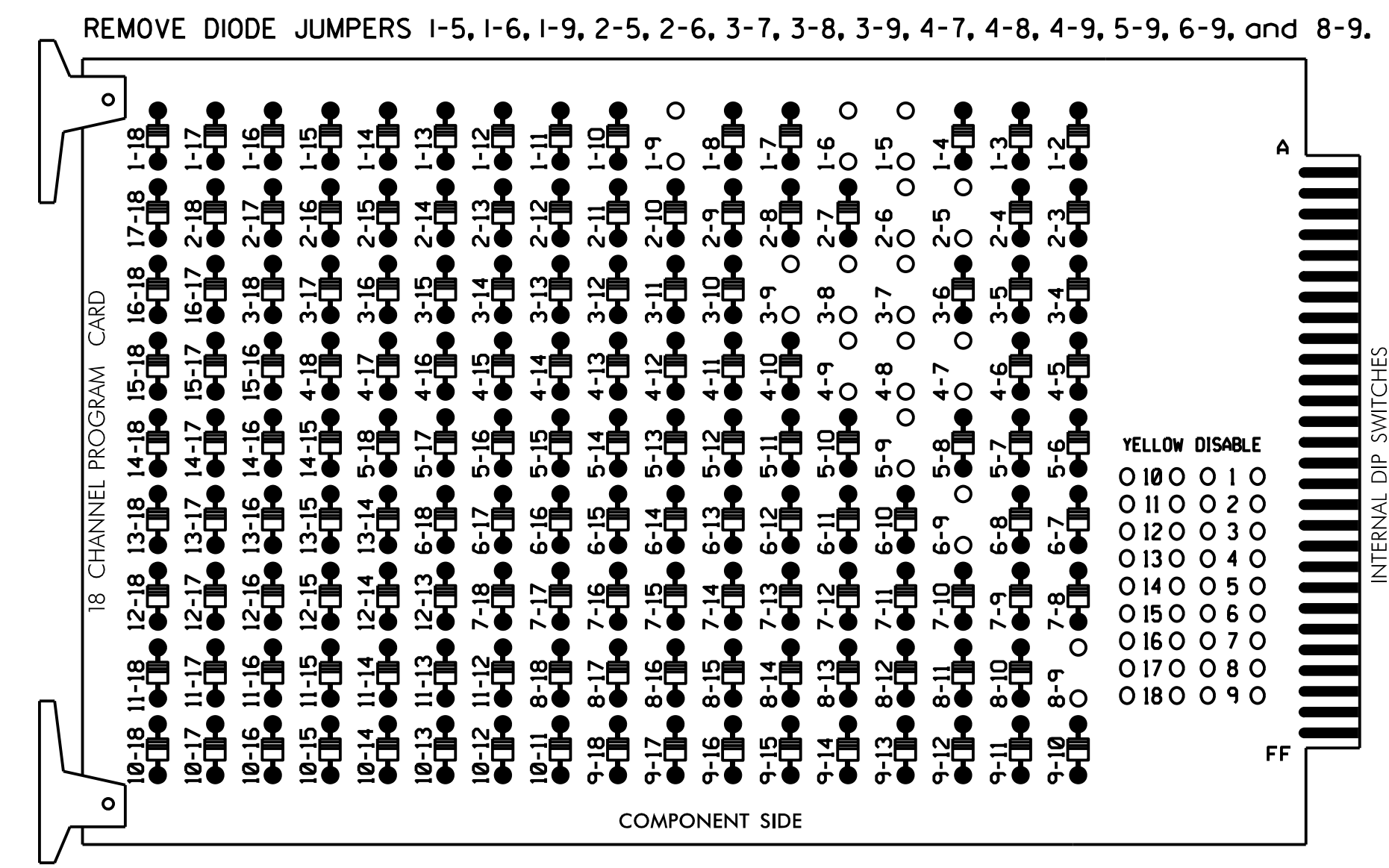
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REVISIONS table with columns for REVISIONS, INITI, and DATE.

### EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 and 6 Green.
3. The cabinet and controller are part of the Fayetteville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,  
 S11,AUX S1  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP A.....\*  
 OVERLAP B.....NOT USED  
 OVERLAP C.....NOT USED  
 OVERLAP D.....NOT USED  
 OVERLAP G.....\*

\* See Overlap Programming Detail on Sheet 2

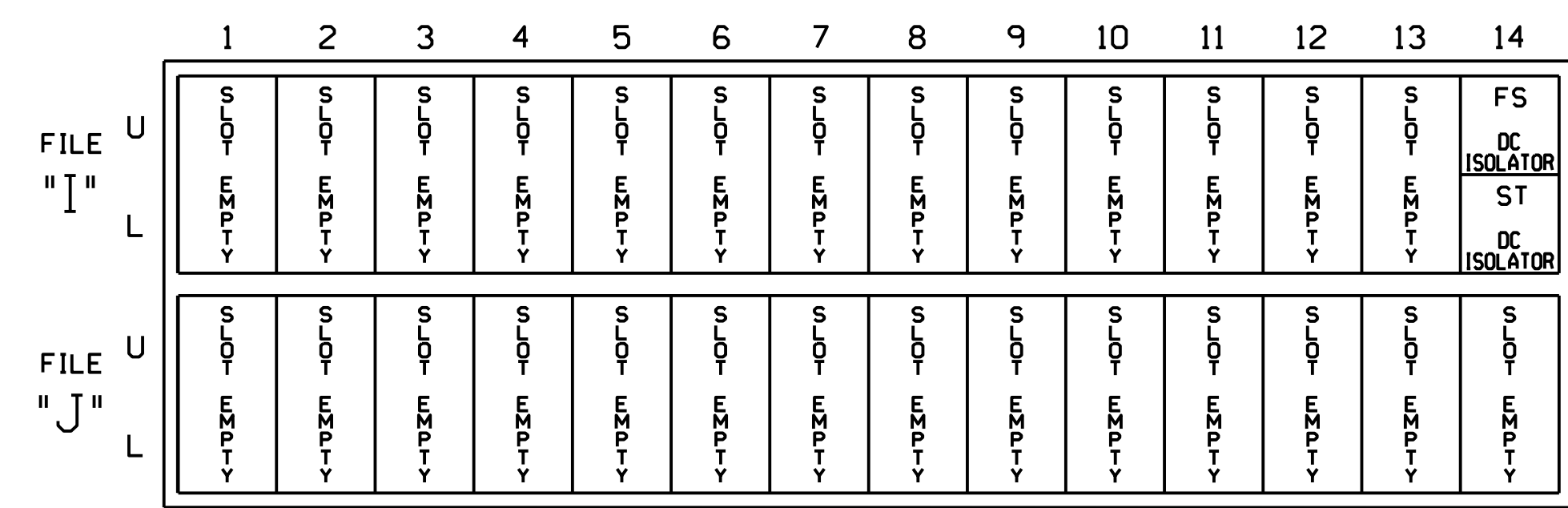
**SIGNAL HEAD HOOK-UP CHART**

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.	11,12	83,84	21,22, 23,24	31	23	41,42, 43	51	42	61,62, 63	71,72	62	81,82, 85	83,84	NU	NU	NU	NU	NU
RED		128			101			134			107		A121					
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125			116			131			122								
YELLOW ARROW	126			117	117		132	132		123	123		A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127	127		118	118		133	133		124	124							

NU = Not Used  
 \* See pictorial of head wiring in detail this sheet.

**INPUT FILE POSITION LAYOUT**

(front view)



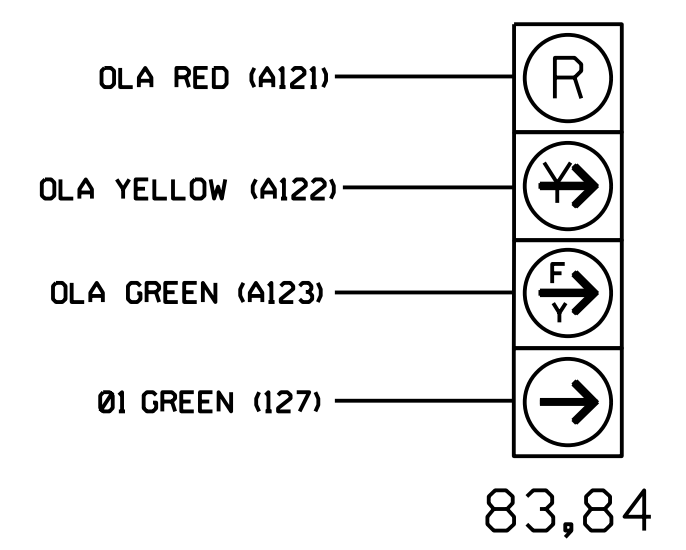
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

**FYA SIGNAL WIRING DETAIL**

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0274T2  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 2 - TMP Phase II  
 Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>Stantec Consulting Services Inc.                  801 Jones Franklin Road-Suite 300                  Raleigh, NC 27606                  Tel. (919) 851-6866                  Fax. (919) 851-7024                  www.stantec.com                  License No. F-0672</p>		US 401 (Raeford Road) at NC 162 (Bunce Road)/ SR 1411 (Bunce Road) Division 6 Cumberland County Fayetteville	
		PLAN DATE: June 2019 PREPARED BY: G B Spell	REVIEWED BY: L Overn REVIEWED BY:
REVISIONS:		DATE: 6/5/2019	INVENTORY NO. 06-0274T2



## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

Toggle Until Positioned  
on Overlap G

*OVERLAP G*

Select TMG VEH OVLP [G] and 'NORMAL'

TMG VEH OVLP...[G] TYPE: .....NORMAL

PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6

INCLUDED . . . . . X . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0

↓

Toggle Until Positioned  
on Overlap A

*OVERLAP A*

Select TMG VEH OVLP [A] and 'PPLT FYA'

TMG VEH OVLP...[A] TYPE: .....PPLT FYA

PROTECTED LEFT TURN.... PHASE 1

OPPOSING THROUGH..... OVERLAP G

FLASHING ARROW OUTPUT.....CH9 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE..... 0

END PROGRAMMING

## FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 06-0274T2  
DESIGNED: June 2019  
SEALED: 6/5/2019  
REVISED: N/A

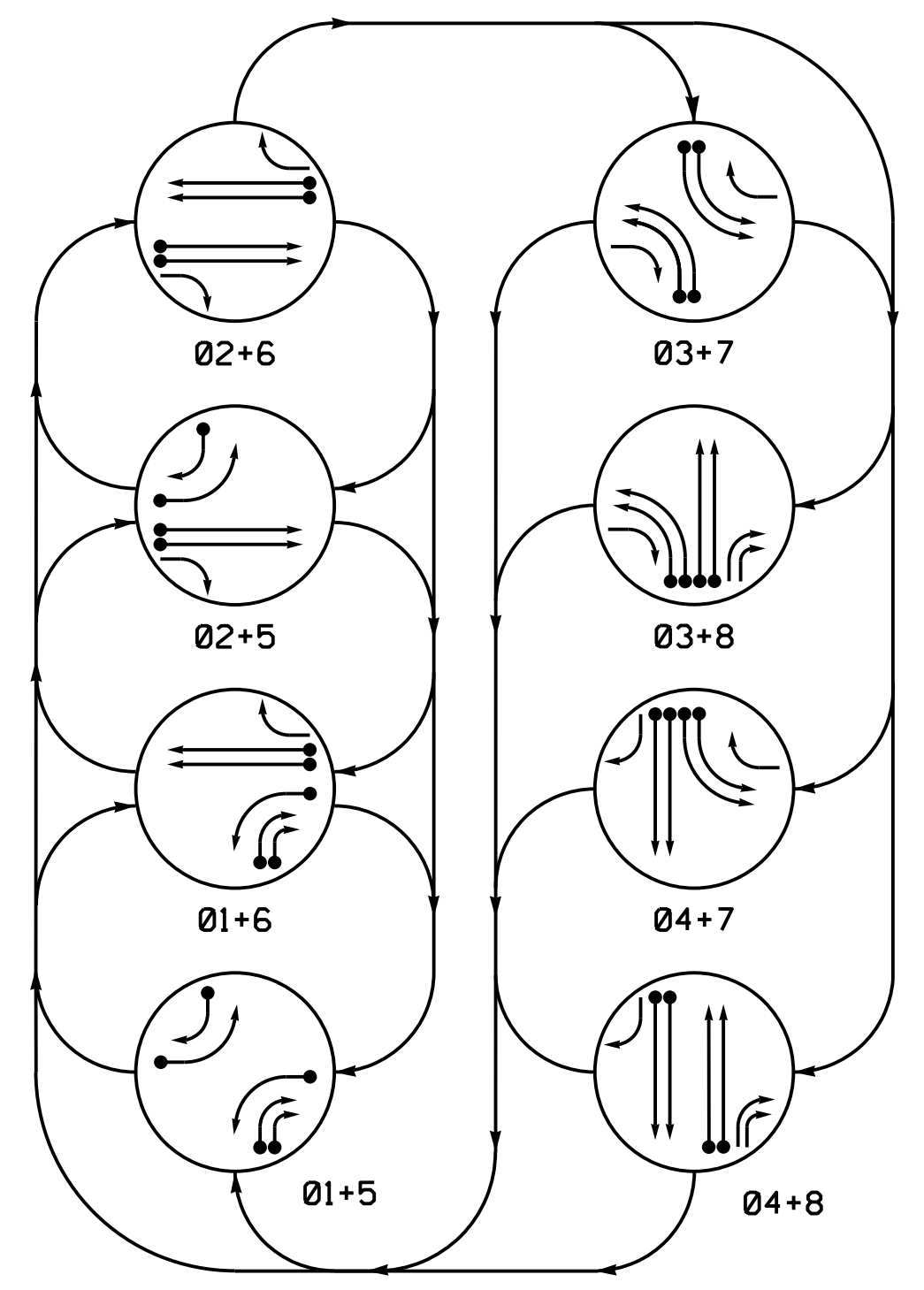
Temporary Design 2 - TMP Phase II  
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

 <b>Stantec</b> <small>Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</small>	<small>ELECTRICAL AND PROGRAMMING DETAILS FOR:</small>  <small>Prepared in the Office of: Transportation Mobility and Safety Division DEPARTMENT OF TRANSPORTATION STATE OF NORTH CAROLINA</small>	<b>US 401 (Raeford Road)</b> at <b>NC 162 (Bunce Road) / SR 1411 (Bunce Road)</b> <small>Division 6 Cumberland County Fayetteville</small>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center; font-size: x-small;">SEAL NORTH CAROLINA PROFESSIONAL ENGINEER LAWRENCE E. OVERN</p> </div>													
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>PLAN DATE: June 2019</td> <td>REVIEWED BY: L Overn</td> </tr> <tr> <td>PREPARED BY: G B Spell</td> <td>REVIEWED BY:</td> </tr> </table>	PLAN DATE: June 2019	REVIEWED BY: L Overn	PREPARED BY: G B Spell	REVIEWED BY:	<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				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"> <small>DocuSigned by: LAWRENCE E. OVERN</small> </td> <td style="width: 50%; text-align: center;"> <small>6/5/2019</small> </td> </tr> <tr> <td style="text-align: center;"> <small>SIGNATURE</small> </td> <td style="text-align: center;"> <small>DATE</small> </td> </tr> </table>	<small>DocuSigned by: LAWRENCE E. OVERN</small>	<small>6/5/2019</small>	<small>SIGNATURE</small>
PLAN DATE: June 2019	REVIEWED BY: L Overn															
PREPARED BY: G B Spell	REVIEWED BY:															
REVISIONS	INIT.	DATE														
<small>DocuSigned by: LAWRENCE E. OVERN</small>	<small>6/5/2019</small>															
<small>SIGNATURE</small>	<small>DATE</small>															

DATE: 6/5/2019 10:45:11 AM  
User: jhombert@stantec.com  
File: U:\Projects\Signal\Signal\Local Details - U-4405A\Temporary Signal\Signal\U-4405A.sig.dwg  
User: jhombert

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

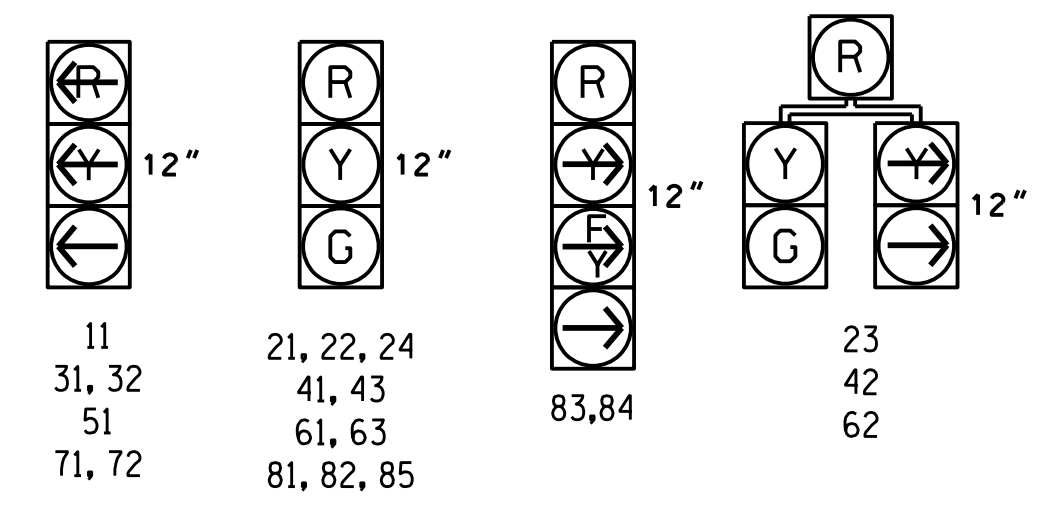
- ← ● → DETECTED MOVEMENT
- ← ○ → UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- ← - - - → PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11								
21, 22, 24	R	R	G	G	R	R	R	R
23	R	R	G	G	R	R	R	R
31, 32	R	R	R	R				
41, 43	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51								
61, 63	R	G	R	G	R	R	R	R
62	R	G	R	G	R	R	R	R
71, 72	R	R	R	R	R	R	G	R
81, 82, 85	R	R	R	R	R	G	R	R
83, 84			R	R	R	R	R	R

**SIGNAL FACE I.D.**

All Heads L.E.D.



**ASC/3 DETECTOR INSTALLATION CHART**

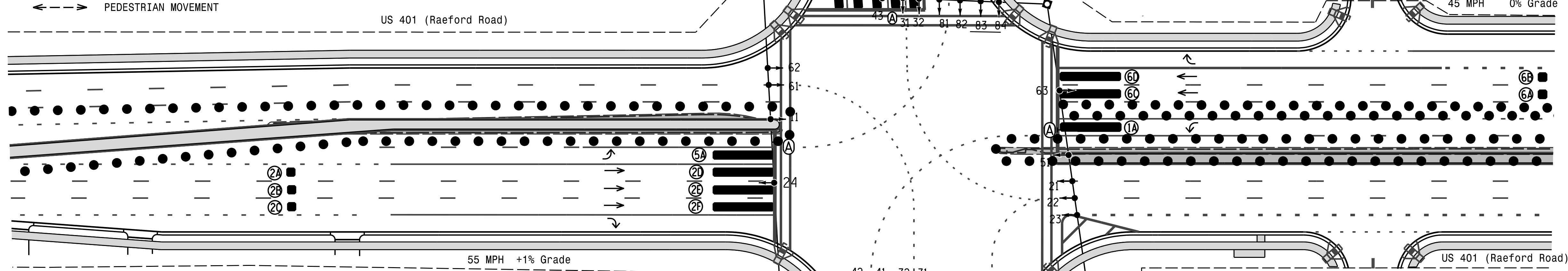
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	-	1	Yes	-	-	-	S	-	-
1B	6X40	0	*	-	1	Yes	-	15	-	S	-	-
1C	6X40	0	*	-	1	Yes	-	15	-	S	-	-
2A	6X6	300	*	-	2	Yes	-	-	-	N	-	-
2B	6X6	300	*	-	2	Yes	-	-	-	N	-	-
2C	6X6	300	*	-	2	Yes	-	-	-	N	-	-
2D	6X40	0	*	-	2	Yes	2.0	5	-	G	-	-
2E	6X40	0	*	-	2	Yes	2.0	5	-	G	-	-
2F	6X40	0	*	-	2	Yes	2.0	5	-	G	-	-
3A	6X40	0	*	-	3	Yes	-	-	-	S	-	-
3B	6X40	0	*	-	3	Yes	-	-	-	S	-	-
4A	6X6	250	*	-	4	No	-	-	-	N	-	-
4B	6X6	250	*	-	4	No	-	-	-	N	-	-
4C	6X40	0	*	-	4	Yes	2.0	5	-	G	-	-
4D	6X40	0	*	-	4	Yes	2.0	5	-	G	-	-
5A	6X40	0	*	-	5	Yes	-	-	-	S	-	-
5B	6X40	0	*	-	5	Yes	-	15	-	S	-	-
6A	6X6	300	*	-	6	Yes	-	-	-	N	-	-
6B	6X6	300	*	-	6	Yes	-	-	-	N	-	-
6C	6X40	0	*	-	6	Yes	2.0	5	-	G	-	-
6D	6X40	0	*	-	6	Yes	2.0	5	-	G	-	-
7A	6X40	0	*	-	7	Yes	-	-	-	S	-	-
7B	6X40	0	*	-	7	Yes	-	-	-	S	-	-

\*Video Detection Area. Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

**8 Phase Fully Actuated Fayetteville Signal System**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Reposition existing signal heads numbered #11, 21, 22, 23, 51, 61, and 62.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**DETECTOR INSTALLATION CHART CONTINUED BELOW**

**ASC/3 DETECTOR INSTALLATION CHART**

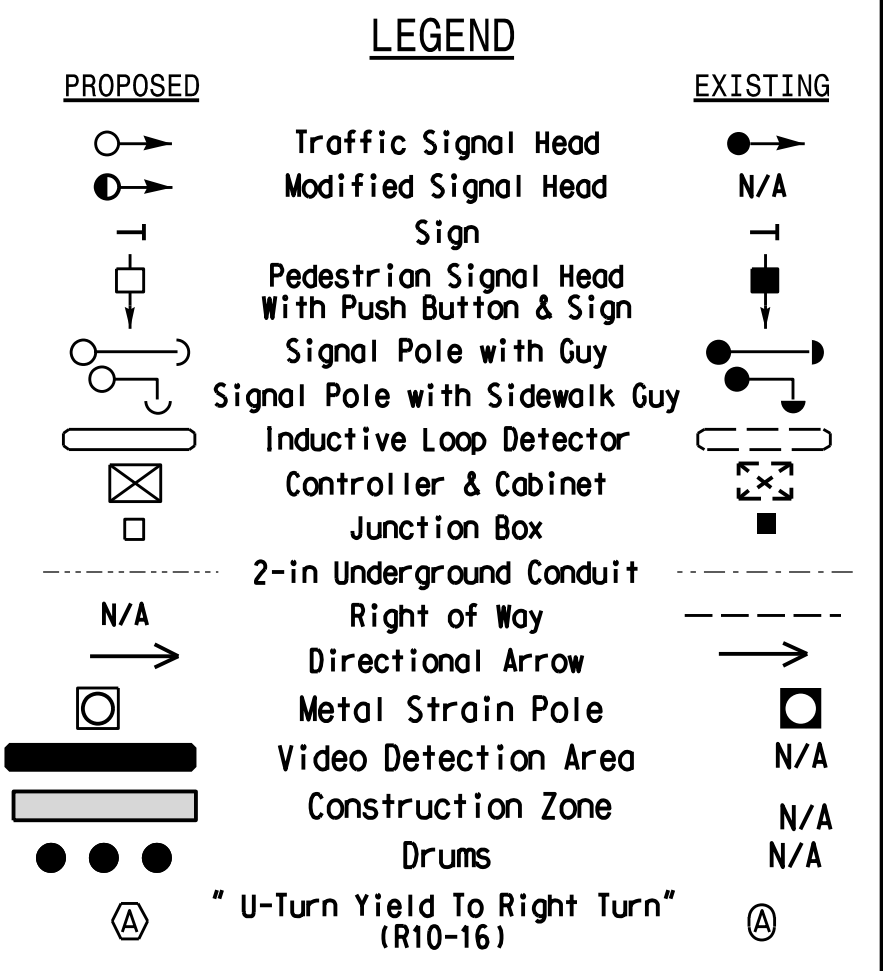
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
8A	6X6	300	*	-	8	No	-	-	-	N	-	-
8B	6X6	300	*	-	8	No	-	-	-	N	-	-
8C	6X40	0	*	-	8	Yes	2.0	5	-	G	-	-
8D	6X40	0	*	-	8	Yes	2.0	5	-	G	-	-

\*Video Detection Area. Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

**ASC/3 TIMING CHART**

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	6.0	2.0	6.0	2.0	6.0
Max 1 *	20	60	30	40	20	60	30	40
Yellow	3.0	4.4	3.0	4.2	3.0	4.5	3.0	4.4
Red Clear	4.5	2.7	4.6	3.1	4.0	2.7	4.6	2.8
Red Revert	-	-	-	-	-	-	-	-
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	15	-	5	-	15	-	5
Time To Reduce *	-	30	-	20	-	30	-	20
Minimum Gap	-	3.0	-	3.0	-	3.0	-	3.0
Locking Detector	-	-	-	-	-	-	-	-
Recall Position	-	VEH, RECALL	-	-	-	VEH, RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

\* 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 Signal Design 3 - TMP Phase III**

US 401 (Raeford Road) at NC 162 (Bunce Road) / SR 1411 (Bunce Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2019 REVIEWED BY: E D Harris

PREPARED BY: R M Muncey REVIEWED BY: B L Watson

REVISIONS

NO.	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DATE: 6/5/2019

SIGNATURE: Patsy L. Watson

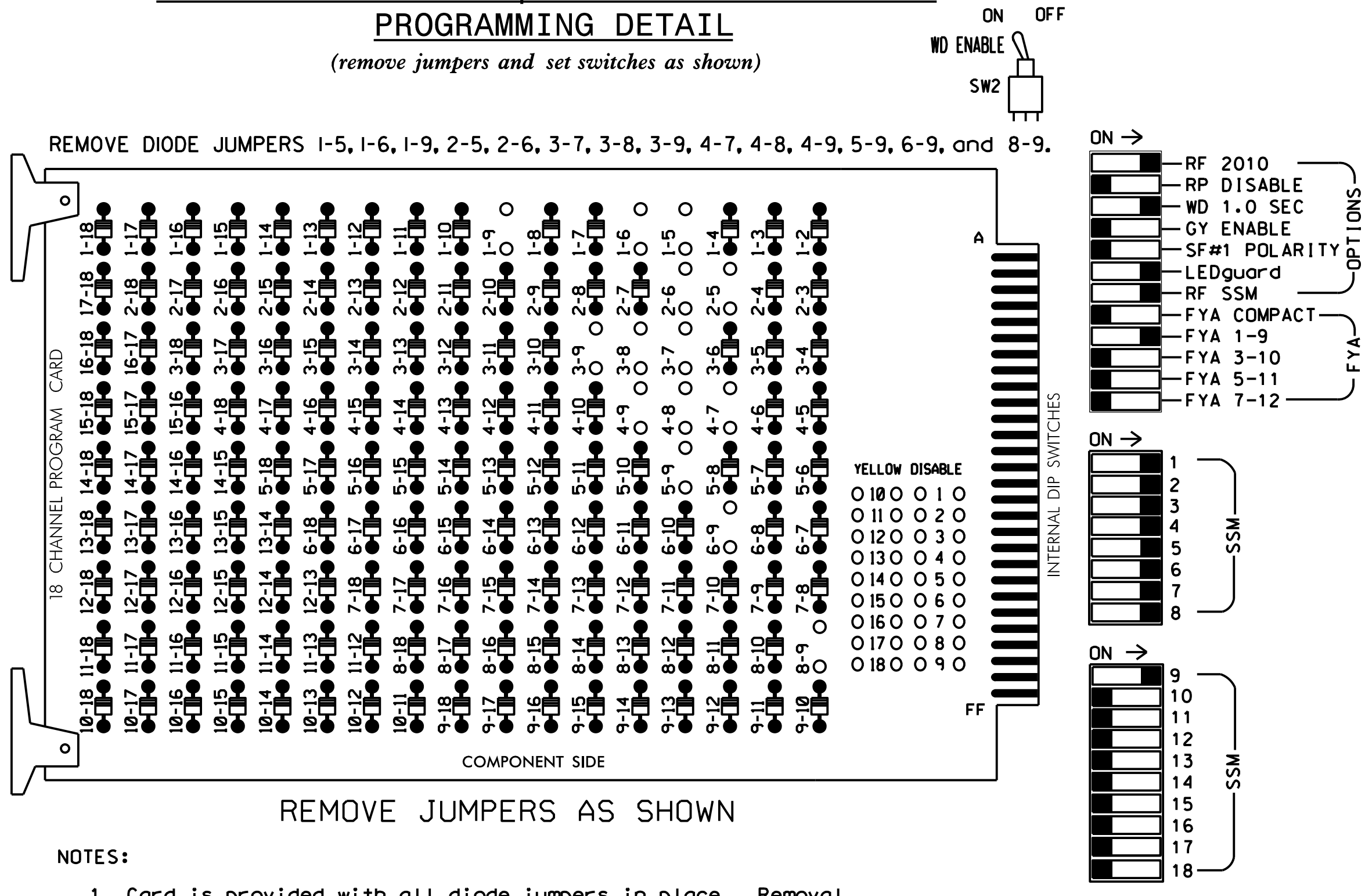
DATE: 6/5/2019

SIG. INVENTORY NO. 06-027413

6/5/2019 10:45 AM  
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 User: jhambert

### EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 and 6 Green.
3. The cabinet and controller are part of the Fayetteville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,  
 S11,AUX S1  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP A.....\*  
 OVERLAP B.....NOT USED  
 OVERLAP C.....NOT USED  
 OVERLAP D.....NOT USED  
 OVERLAP G.....\*  
 \* See Overlap Programming Detail on Sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-4405A	SIG-17.1

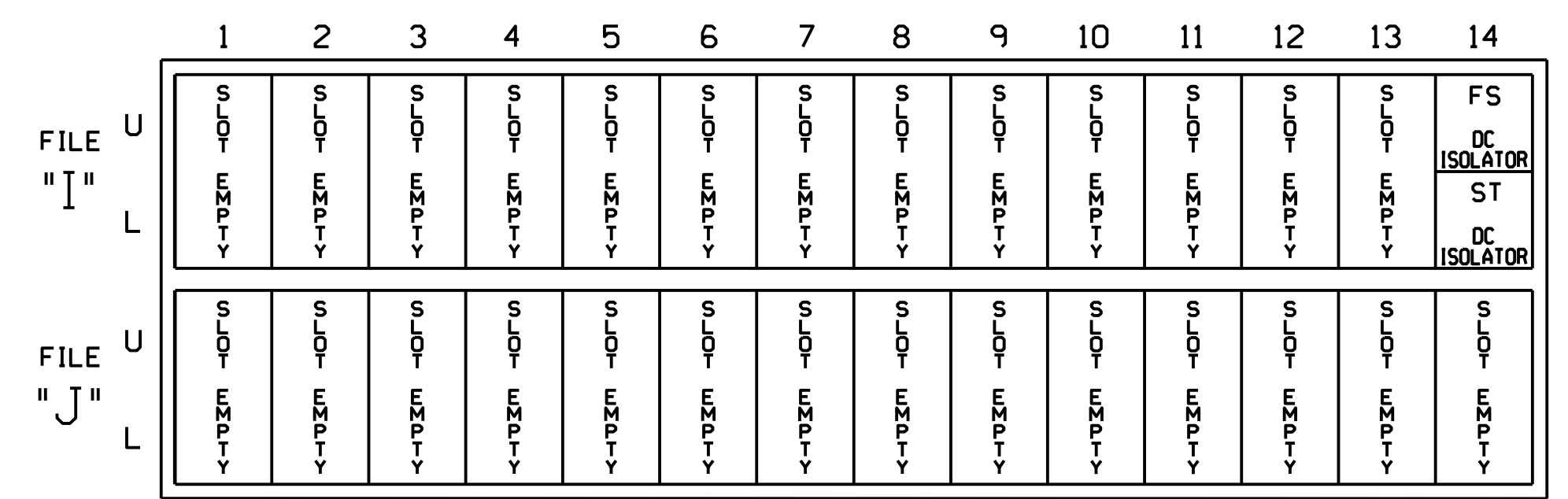
**SIGNAL HEAD HOOK-UP CHART**

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	83,84	21,22 23,24	NU	23	31,32	41,42 43	NU	51	42	61,62 63	NU	71,72	62	81,82 85	NU	83,84	NU	NU	NU	NU
RED			128			101				134			107		A121						
YELLOW			129			102				135			108								
GREEN			130			103				136			109								
RED ARROW	125				116				131				122								
YELLOW ARROW	126			117	117				132	132			123	123		A122					
FLASHING YELLOW ARROW																A123					
GREEN ARROW	127	127		118	118				133	133			124	124							

NU = Not Used  
 \* See pictorial of head wiring in detail this sheet.

**INPUT FILE POSITION LAYOUT**

(front view)



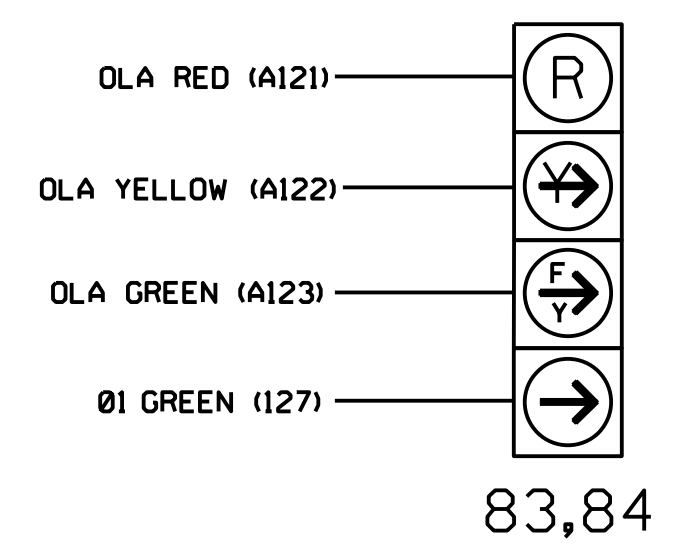
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

**FYA SIGNAL WIRING DETAIL**

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0274T3  
 DESIGNED: June 2019  
 SEALED: 6/5/2019  
 REVISED: N/A

Temporary Design 3 - TMP Phase III  
 Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>Stantec Consulting Services Inc.                  801 Jones Franklin Road-Suite 300                  Raleigh, NC 27606                  Tel. (919) 851-6866                  Fax. (919) 851-7024                  www.stantec.com                  License No. F-0672</p>		US 401 (Raeford Road) at NC 162 (Bunce Road)/ SR 1411 (Bunce Road) Division 6 Cumberland County Fayetteville	
		PLAN DATE: June 2019 PREPARED BY: G B Spell	REVIEWED BY: L Overn REVIEWED BY:
REVISIONS:		INIT. DATE	SEAL

## ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

Toggle Until Positioned  
on Overlap G

### OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

```

TMG VEH OVLP...[G] TYPE: .....NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . . . X . . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0
    
```

↓  
Toggle Until Positioned  
on Overlap A

### OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```

TMG VEH OVLP...[A] TYPE: .....PPLT FYA
PROTECTED LEFT TURN.... PHASE 1
OPPOSING THROUGH..... OVERLAP G

FLASHING ARROW OUTPUT.....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
    
```

END PROGRAMMING

## FLASHER CIRCUIT MODIFICATION DETAIL

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


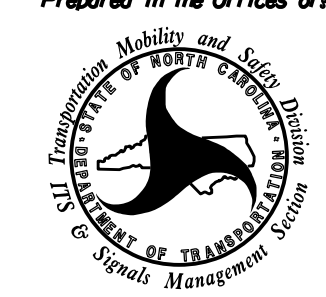
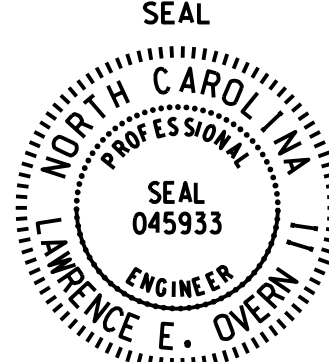
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 06-0274T3  
DESIGNED: June 2019  
SEALED: 6/5/2019  
REVISED: N/A

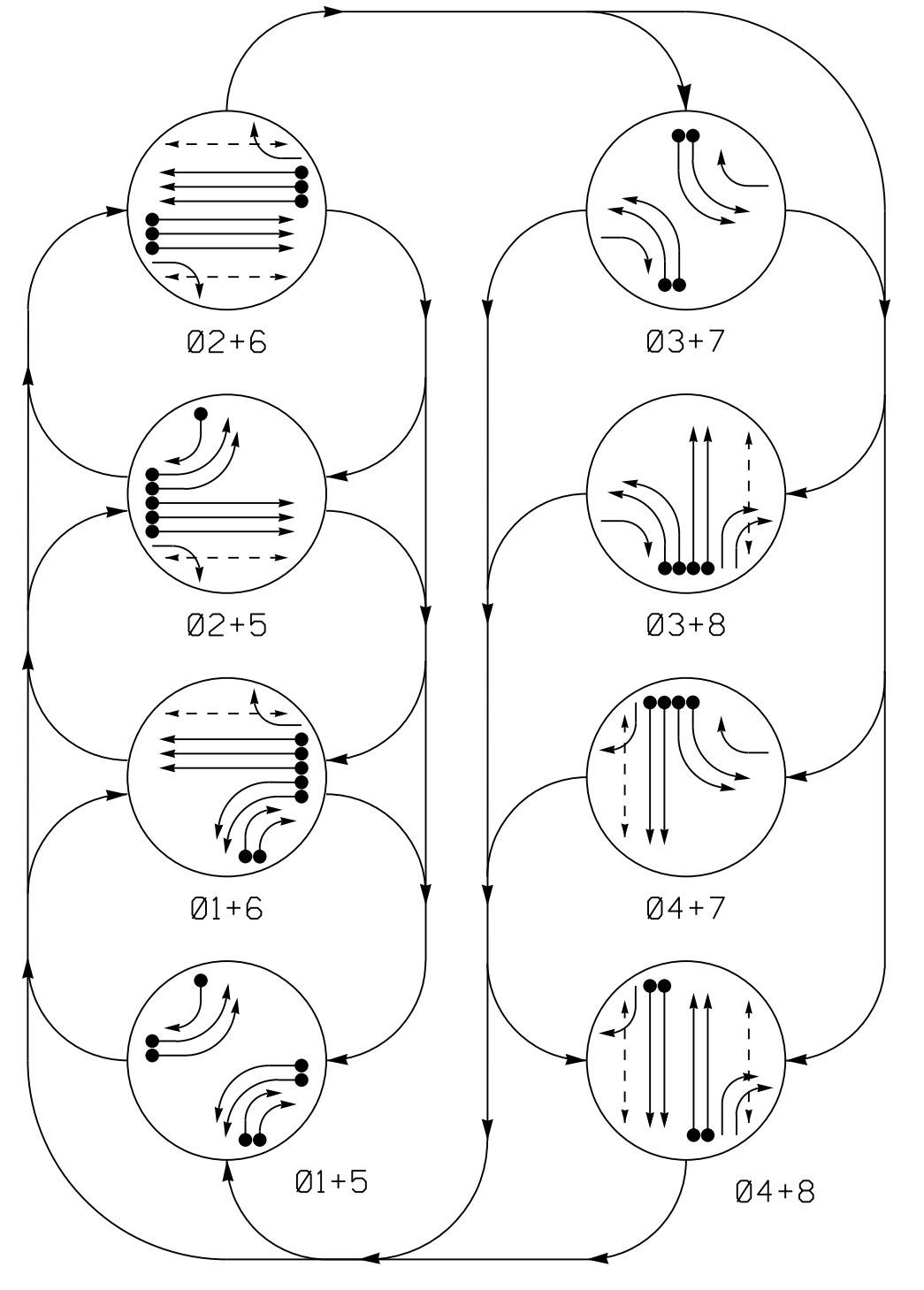
Temporary Design 3 - TMP Phase III  
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

 Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	Prepared in the Offices of:  750 N. Greenfield Pkwy, Corner, NC 27529	US 401 (Raeford Road) at NC 162 (Bunce Road) / SR 1411 (Bunce Road) Division 6 Cumberland County Fayetteville	 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER LAWRENCE E. OVERN SEAL 045933
ELECTRICAL AND PROGRAMMING DETAILS FOR:		PLAN DATE: June 2019    REVIEWED BY: L Overn PREPARED BY: G B Spell    REVIEWED BY:	
REVISIONS    INIT.    DATE		DocuSigned by: 6/5/2019 SIGNATURE    DATE SIG. INVENTORY NO. 06-027413	

DATE: 6/5/2019 10:58:00 AM  
User: jhombert@stantec.com

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

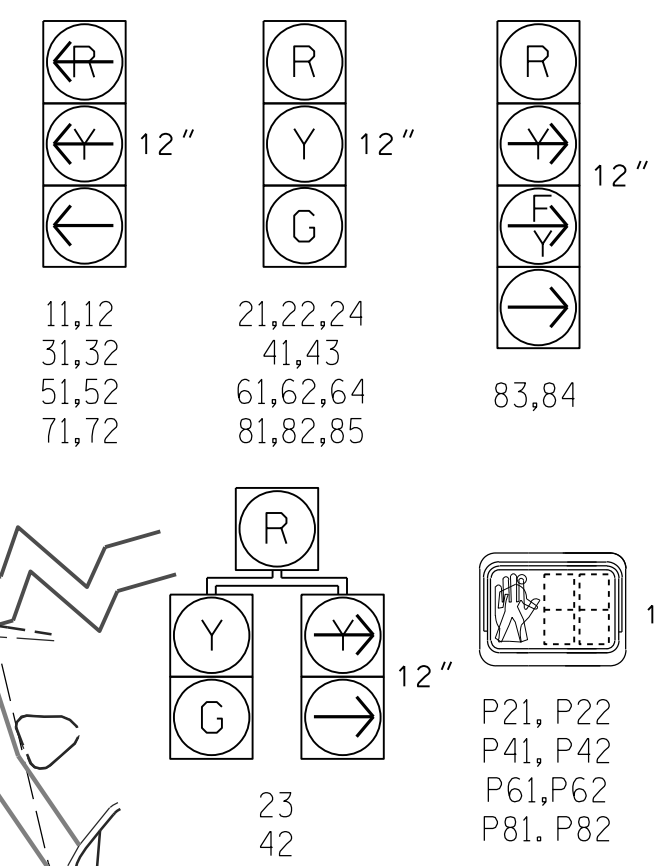
- DETECTED MOVEMENT (solid arrow)
UNDETECTED MOVEMENT (OVERLAP) (dashed arrow)
UNSIGNALIZED MOVEMENT (dotted arrow)
PEDESTRIAN MOVEMENT (dashed arrow with triangle)

TABLE OF OPERATION

Table with columns for Signal Face, Phase (0-8), and Flash. Rows list signal face numbers and their corresponding phase settings (R, G, Y).

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

Table with columns for Loop, Size, Distance, Turns, New Loop, Phase, Calling, Extend Time, Delay Time, Use Added Initial, Type, System Loop, New Card. Lists 80 detector loops with their specifications.

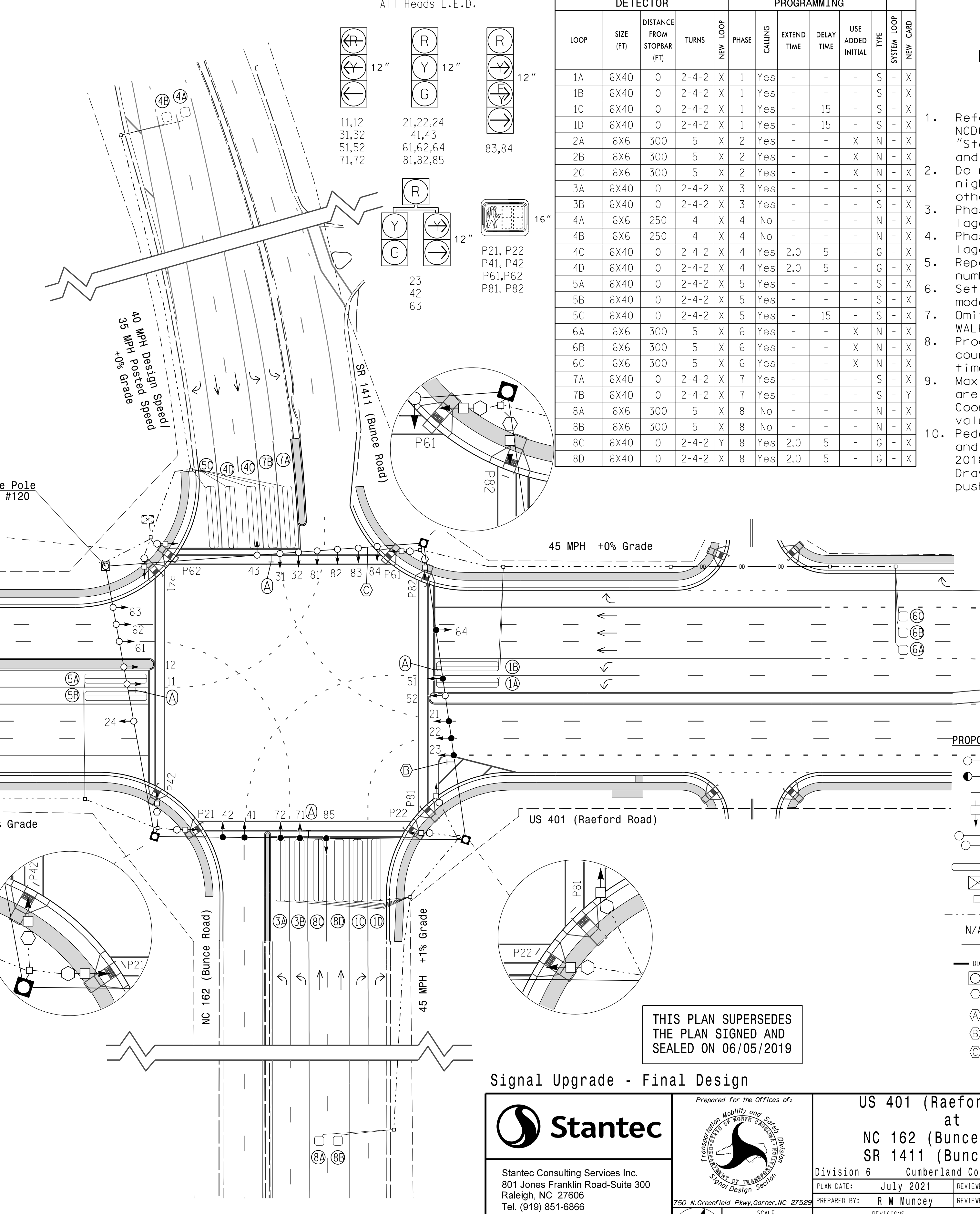
8 Phase Fully Actuated Fayetteville Signal System

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018...
2. Do not program signal for late night flashing operation unless otherwise directed...
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal head numbered #51.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Maximum times shown in timing chart are for free-run operation only.
10. Pedestrian pedestals are conceptual and shown for reference only.

ASC/3 TIMING CHART. Table with columns for Feature and Phase (1-8). Rows include Min Green, Walk, Ped Clear, Veh. Extension, Max 1, Yellow, Red Clear, Red Revert, Actuations B4 Add, Seconds/Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, Simultaneous Gap.

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



THIS PLAN SUPERSEDES THE PLAN SIGNED AND SEALED ON 06/05/2019

LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Directional Arrow, Directional Drill, Metal Strain Pole, Type II Signal Pedestal, U-Turn Yield to Right Turn, Right Arrow ONLY Sign, Turning Vehicles Yield to Peds Sign.
EXISTING: N/A, Signal, Signal Pole with Sidewalk Guy, Junction Box, Right of Way, Directional Arrow, Metal Strain Pole, Type II Signal Pedestal, U-Turn Yield to Right Turn, Right Arrow ONLY Sign, Turning Vehicles Yield to Peds Sign.

Signal Upgrade - Final Design

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal for Tetsy L. Watson, No. 29449, State of North Carolina.

Project information: US 401 (Raeford Road) at NC 162 (Bunce Road) / SR 1411 (Bunce Road). Includes plan date (July 2021), reviewed by (E D Harris), and other project details.

Professional Engineer Seal for Tetsy L. Watson, No. 29449, State of North Carolina.

7/9/2021 10:17 AM U:\Traffic\GIS\Signal\4405A\_Rev\Signal\Signal Design\Final\_Signal\_Design\4405A\_4006-0274\_Final.dgn User: jhamer.righ



### ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL (program controller as shown)

- 1. From Main Menu select 2. CONTROLLER
- 2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

Toggle Until Positioned  
on Overlap G

OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

TMG VEH OVLP...[G] TYPE: .....NORMAL

PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6

INCLUDED . . . . . X . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0

Toggle Until Positioned  
on Overlap A

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

TMG VEH OVLP...[A] TYPE: .....PPLT FYA

PROTECTED LEFT TURN.... PHASE 1

OPPOSING THROUGH..... OVERLAP G

FLASHING ARROW OUTPUT.....CH9 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE..... 0

END PROGRAMMING

### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 06-0274  
DESIGNED: July 2021  
SEALED: 7/9/2021  
REVISED: N/A

THIS PLAN SUPERSEDES  
THE PLAN SIGNED AND  
SEALED ON 06/05/2019

Final Design  
Electrical Detail - Sheet 2 of 2

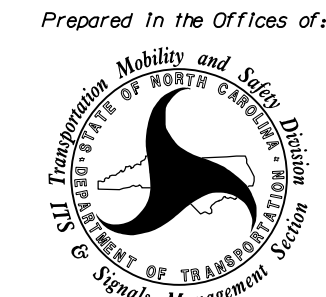
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ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

Prepared in the Offices of:




750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (Raeford Road)  
at  
NC 162 (Bunce Road) /  
SR 1411 (Bunce Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: July 2021	REVIEWED BY: L Overn
PREPARED BY: G B Spell	REVIEWED BY:
REVISIONS	INIT. DATE

SEAL

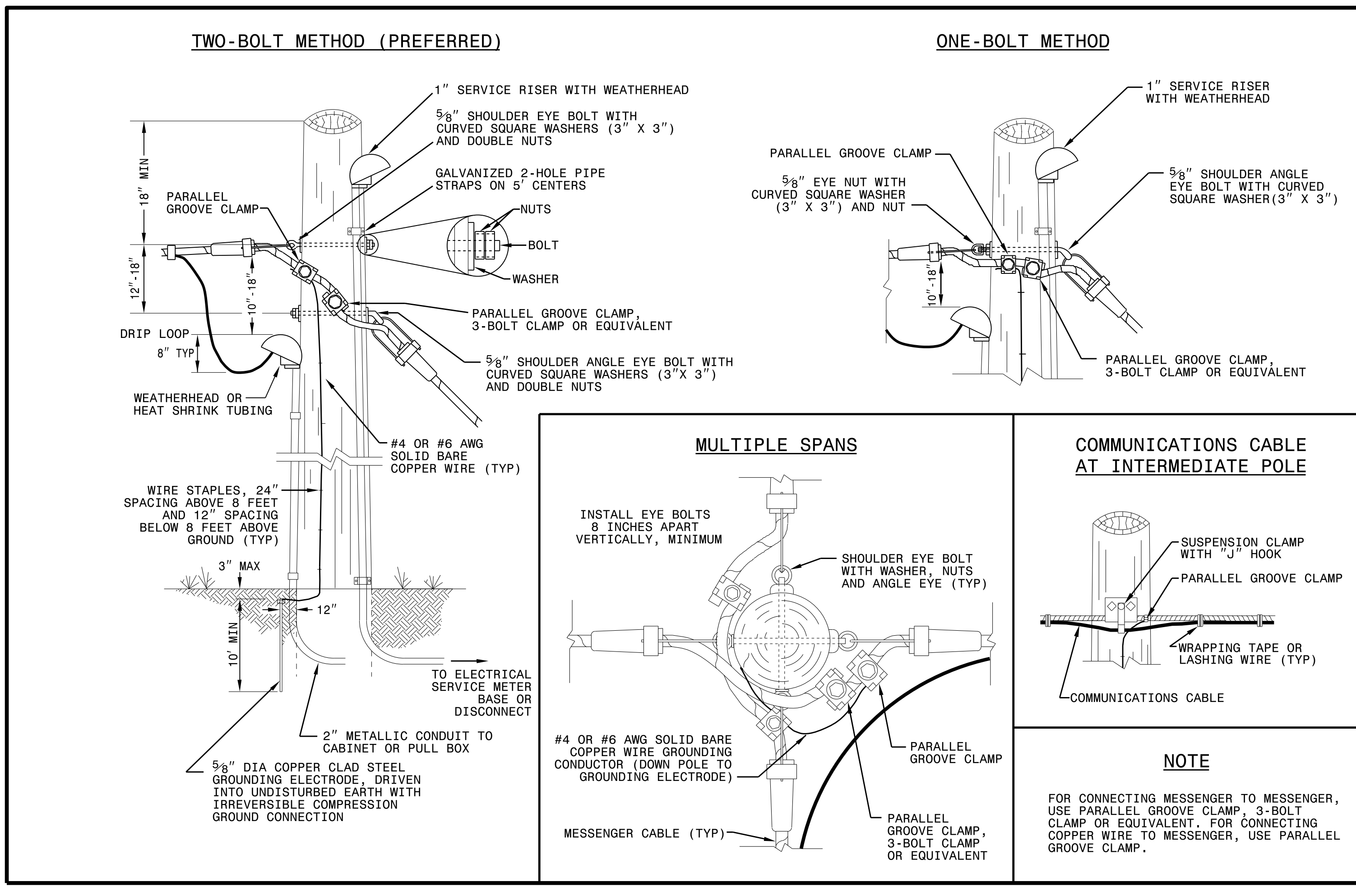
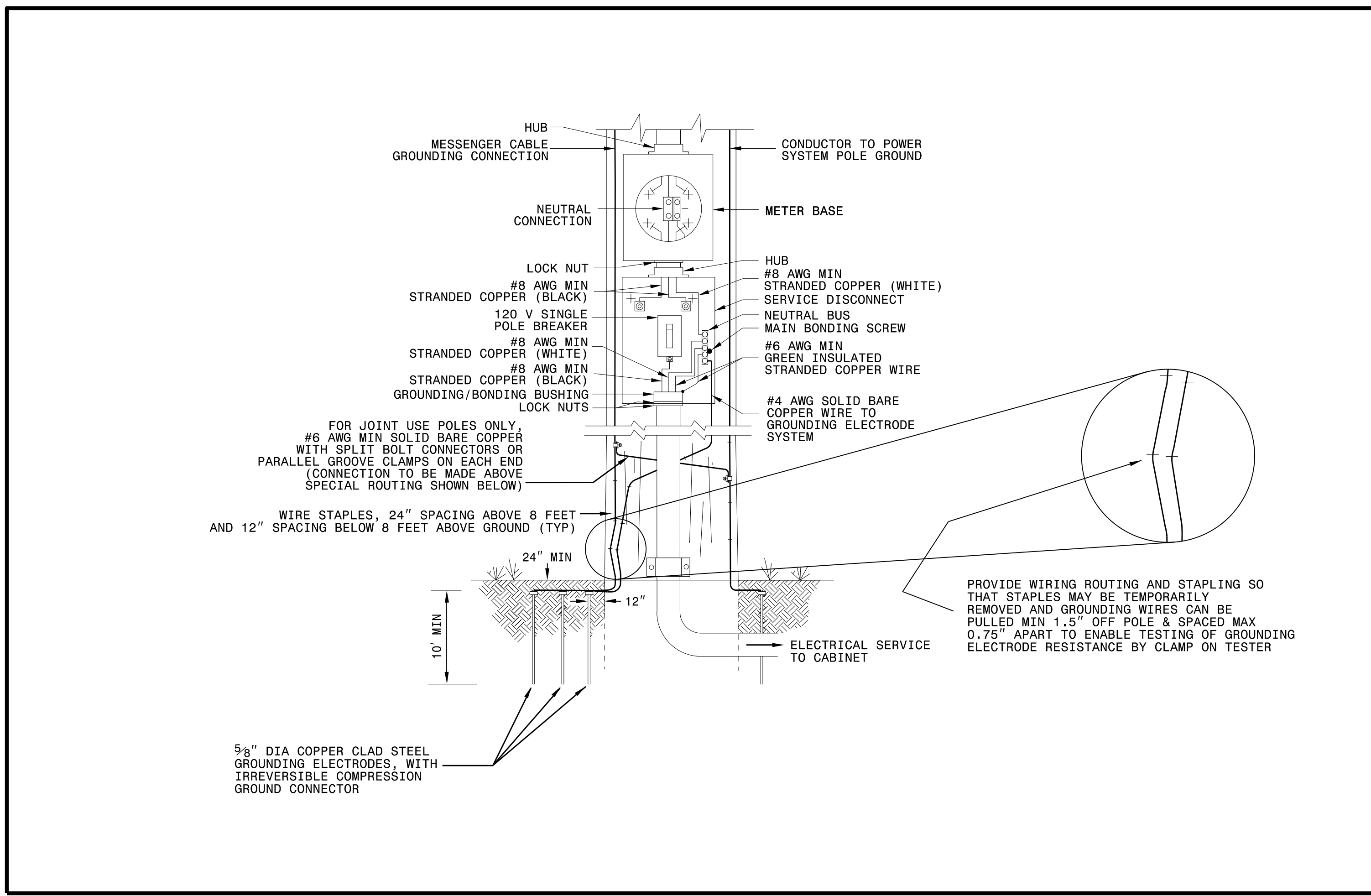


REGINA M. MUNCIE  
Professional Engineer  
No. 43239  
July 2021

Date: \_\_\_\_\_  
Signature: *Regina M. Muncie*  
Date: \_\_\_\_\_

SIG. INVENTORY NO. 06-0274

06-05-2021 AM  
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User: jhambri@stn.com



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

See Plate for Title

Prepared in the Offices of:

SEAL

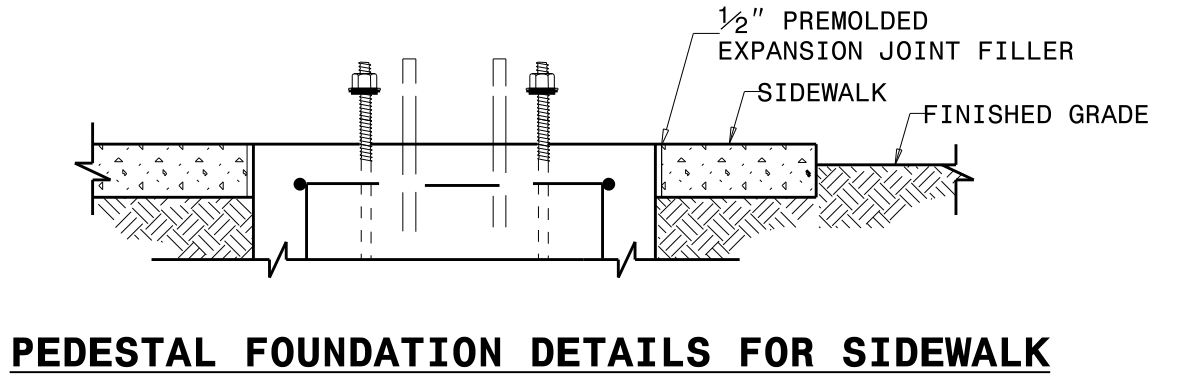
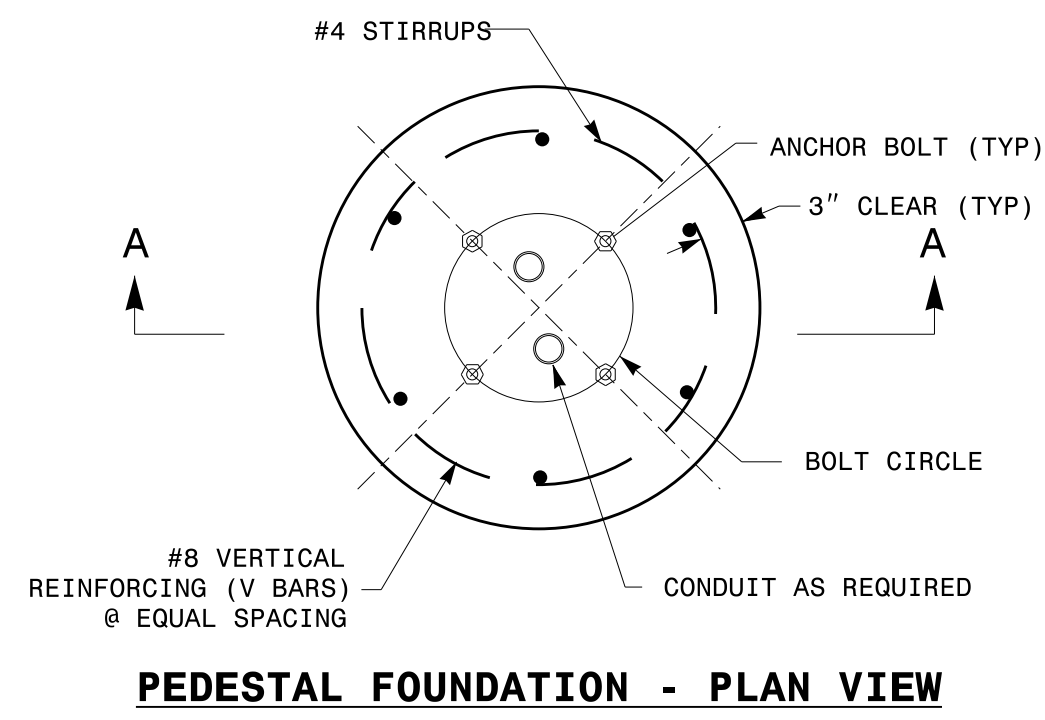
DocuSigned by:  
*Mohd Aslami*

750 N. Greenfield Parkway  
Garner, NC 27529

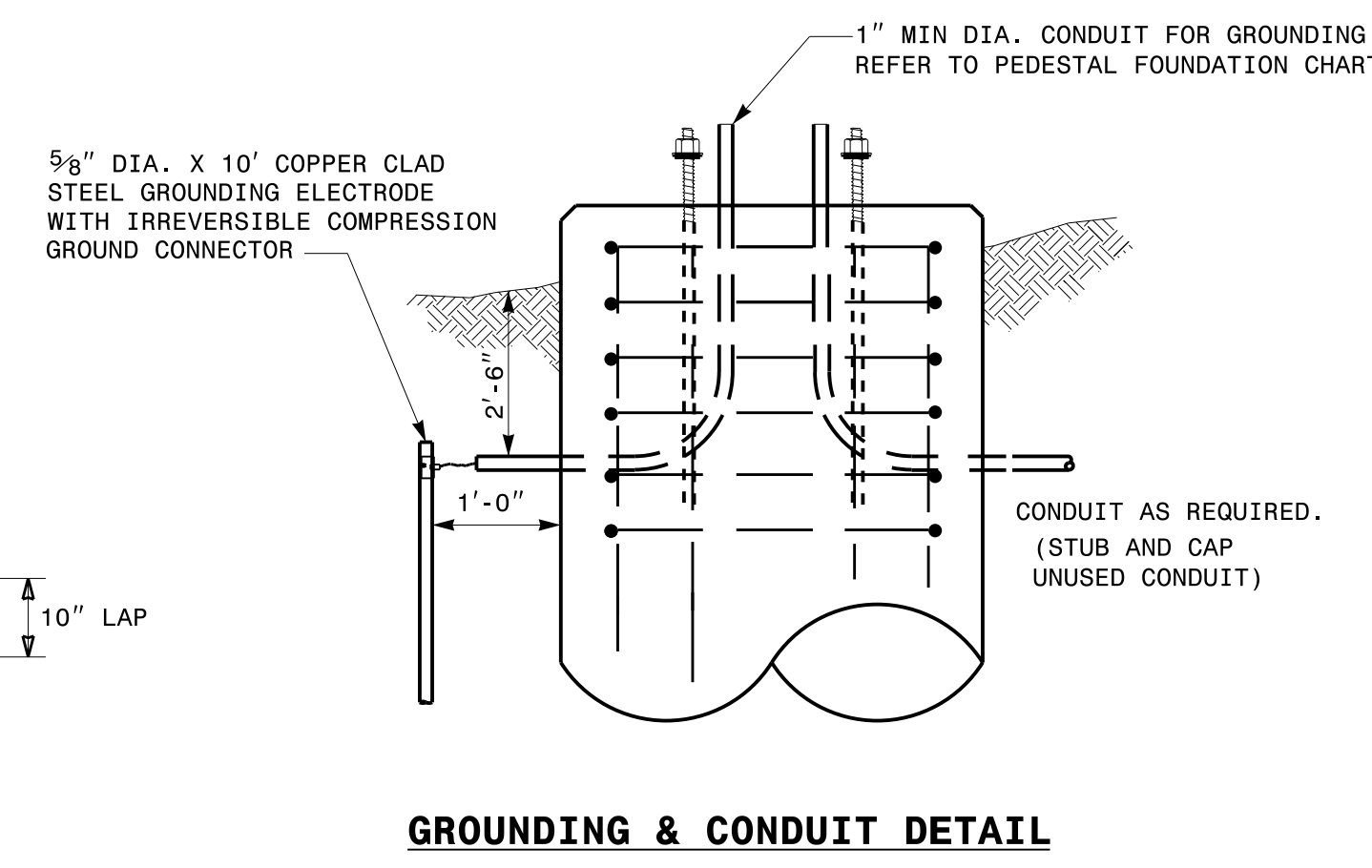
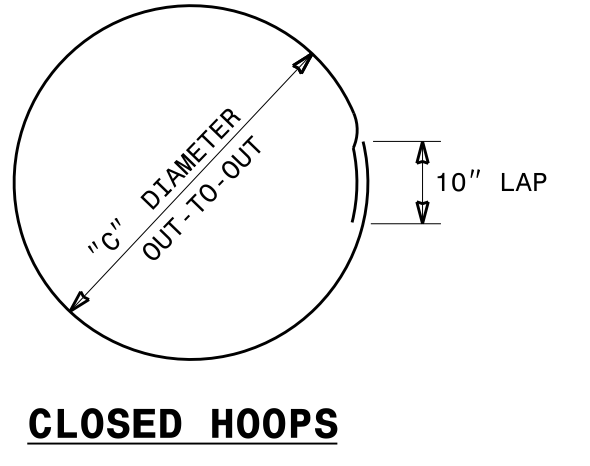
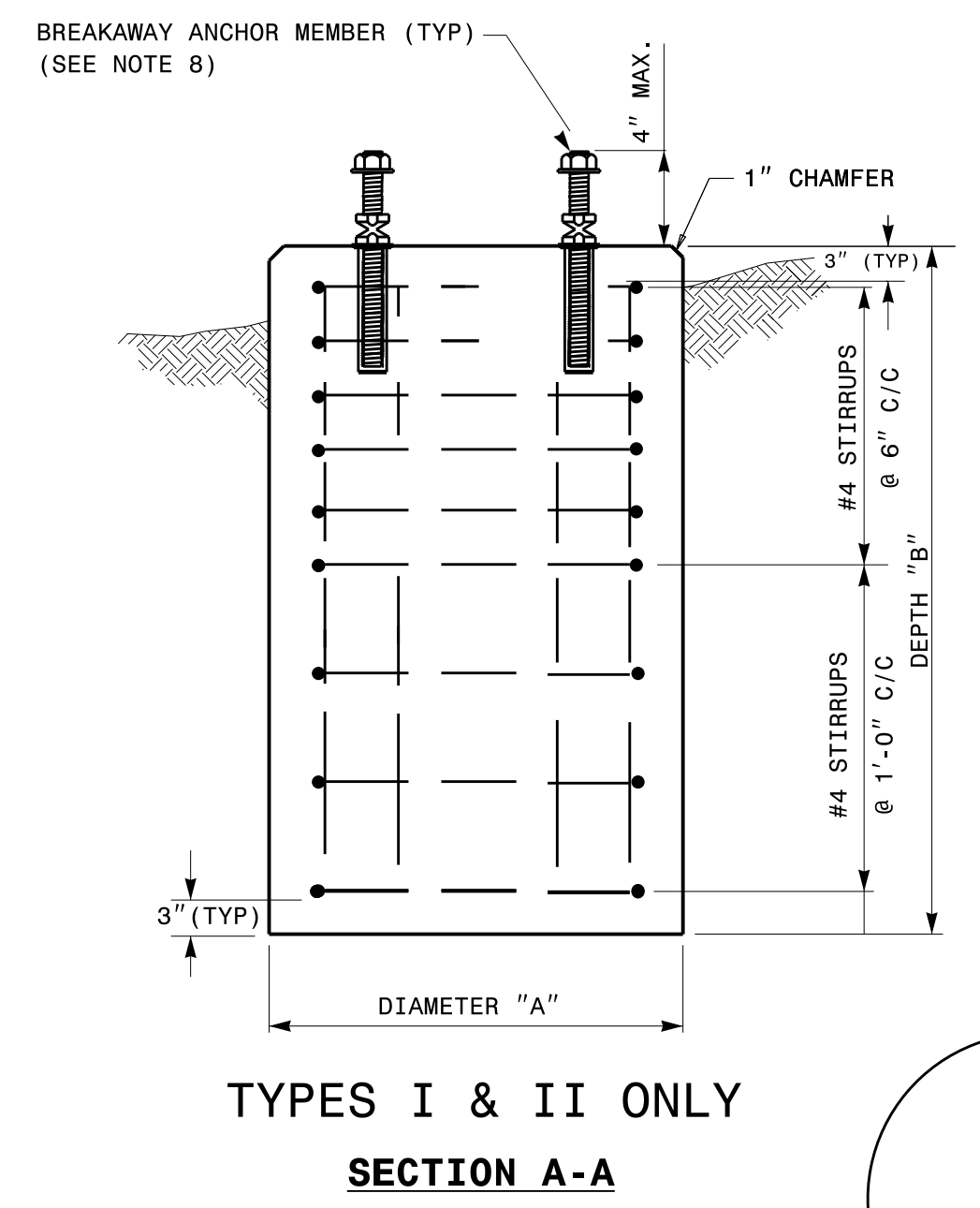
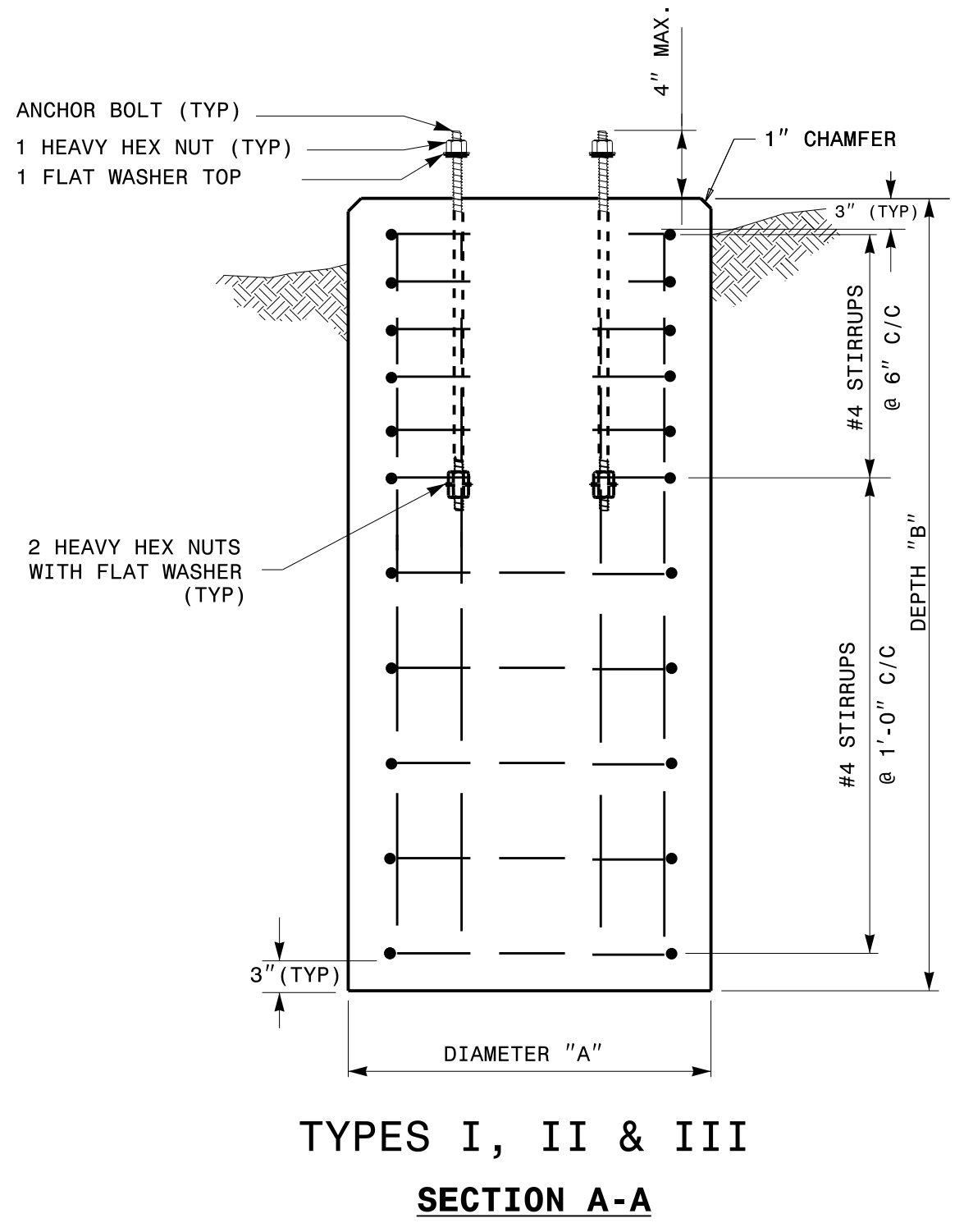
10/11/2017  
DATE

11-001-2017\_08-56  
11-2018\_S14\_DrawingPlate\_Sheets2018\_Plate\_Sheet.dgn  
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- NOTES:**
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
  - COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
  - USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF  $F'c = 3000$  PSI (MIN.).
  - USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
  - GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
    - SANDY TYPE SOIL
    - NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
    - WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
  - MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
  - ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
  - USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.



PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

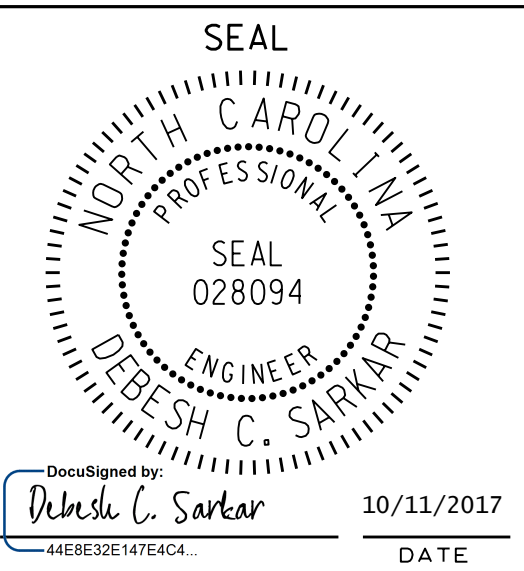
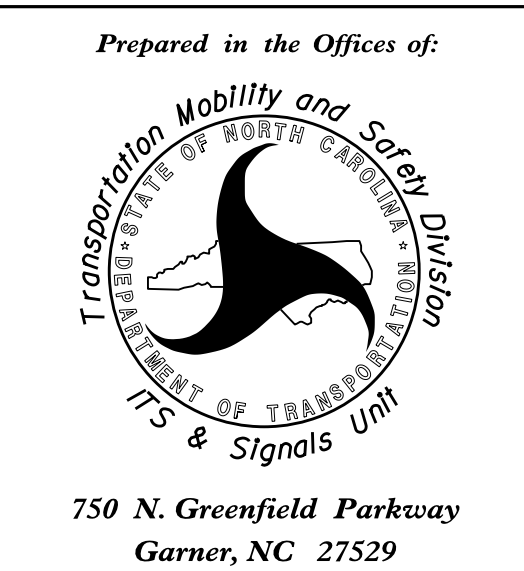
REINFORCING STEEL SCHEDULE												
TYPE	V-BAR				STIRRUP							
	SIZE #	QTY	LENGTH	WEIGHT LBS	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
					VERTICAL ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	7'-2"	2'-0"	0'-10"	53	175

STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.  
 1-18  
 ENGLISH STANDARD DRAWING FOR  
**PEDESTALS**  
 FOUNDATIONS  
 SHEET 1 OF 1  
**1743D01**

11-10CT-2017\_08x03  
 11-2018\_S14 Drawings#Plate\_Sheets#2018\_Plate\_Sheet - .dgn  
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FINAL UNLESS ALL  
SIGNATURES COMPLETED

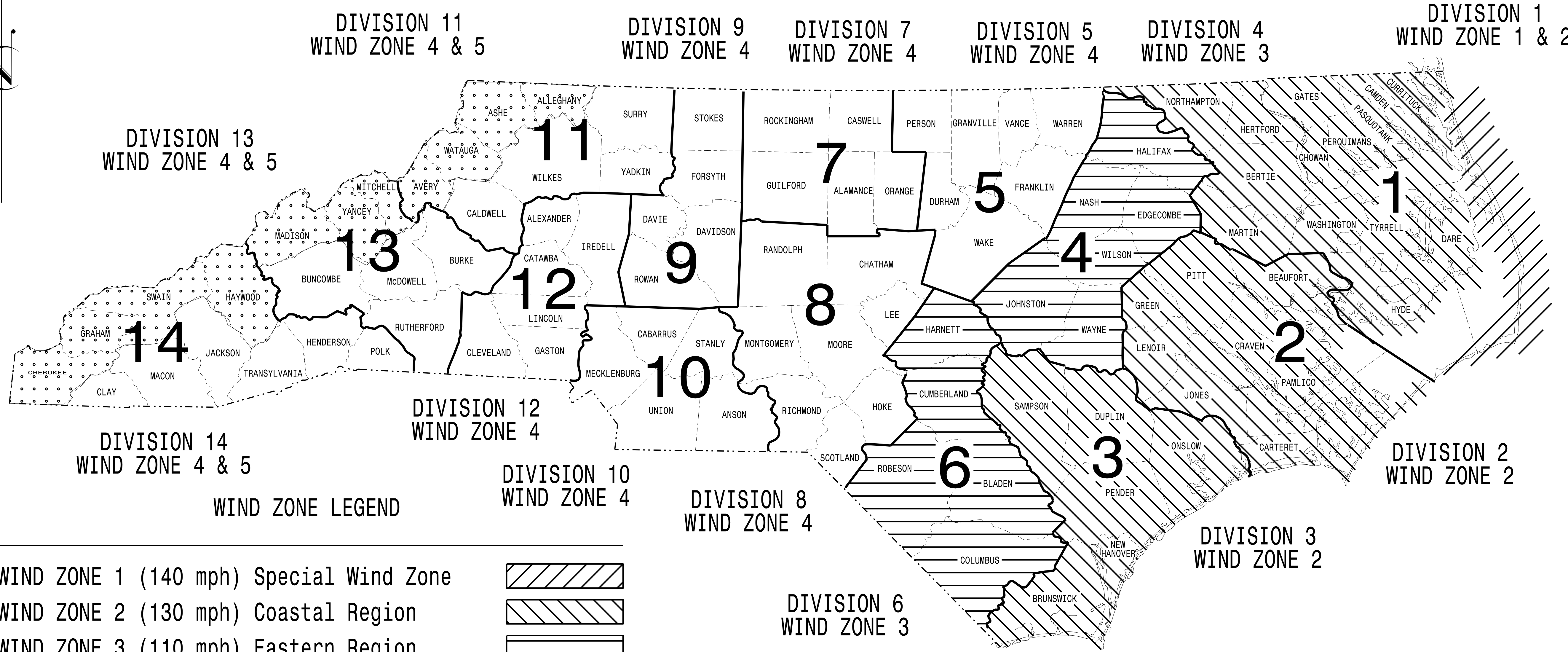
See Plate for Title



# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO.	SHEET NO.
	Sig.M1

## STANDARD DRAWINGS FOR ALL 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	

<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

Prepared In the Offices of:

750 N. Greenfield Pkwy.  
Garner, NC 27529

Designed in conformance  
with the latest  
2015 Interim to the  
6th Edition 2013  
**AASHTO**  
Standard Specifications for  
Structural Supports for  
Highway Signs, Luminaires,  
and Traffic Signals

DRAWING NUMBER	DESCRIPTION
Sig. M 1	Statewide Wind Zone Map
Sig. M 2	Typical Fabrication Details-All Metal Poles
Sig. M 3	Typical Fabrication Details-Strain Poles
Sig. M 4	Typical Fabrication Details-Mast Arm Poles
Sig. M 5	Typical Fabrication Details-Mast Arm Connection
Sig. M 6	Typical Fabrication Details-Strain Pole Attachments
Sig. M 7	Construction Details-Foundations
Sig. M 8	Standard Strain Pole Foundation-All Soil Conditions

**NC DOT CONTACTS:**

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

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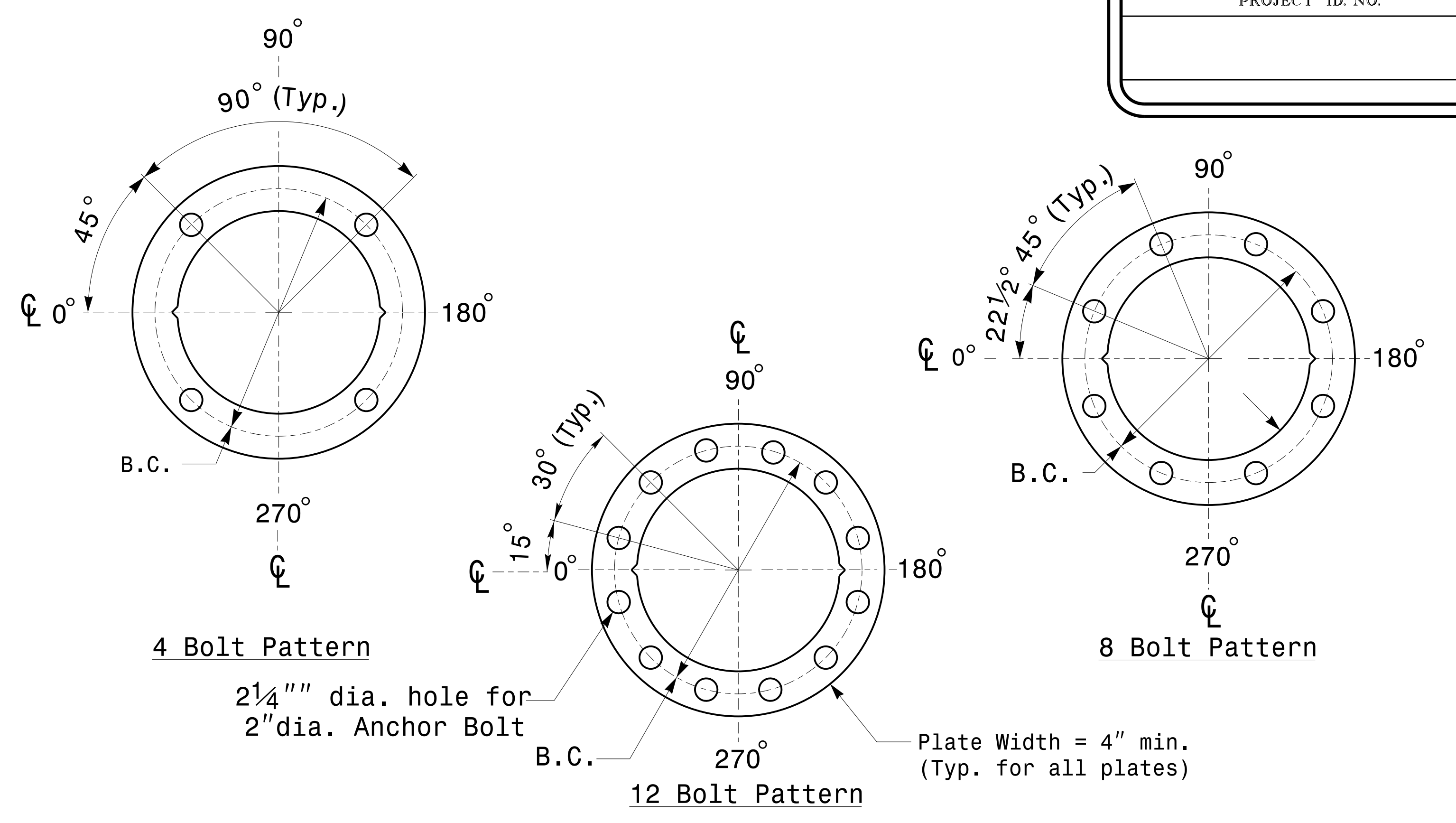
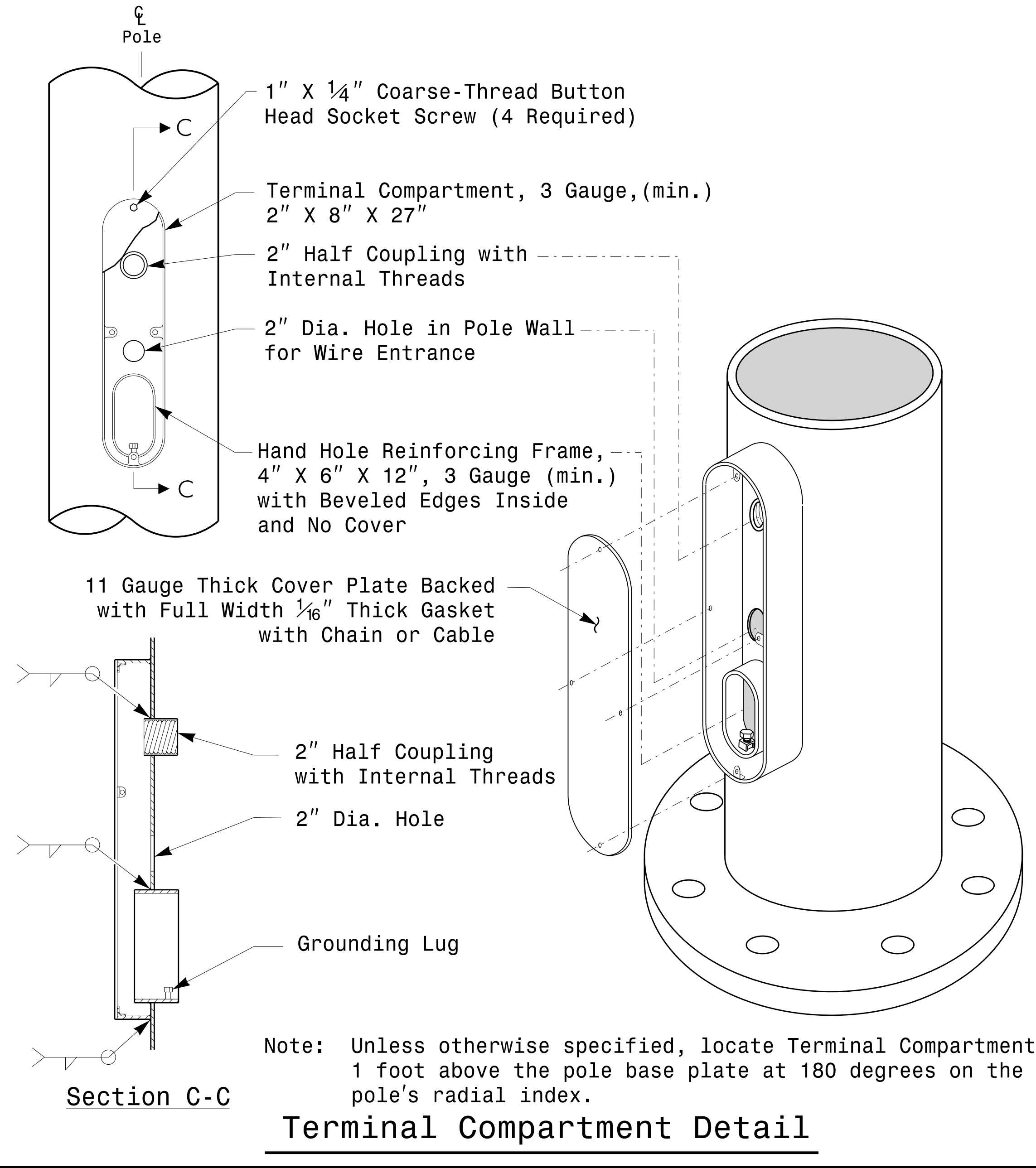
M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL

DocuSigned by:  
Debesh C. Sarkar  
DATE 10/11/2017



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

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

MFG _____	MFG. DATE: MM/YY _____
SHAFT D/T/L/Y _____	SECTION D/T/L/Y _____
ARM-A D/T/L/Y _____	NCDOT SIG. INV. NO. _____
ARM-B D/T/L/Y _____	NCDOT POLE NO. _____
A.B. DIA./B.C./L/Y _____	
NCDOT SIG. INV. NO. _____	
NCDOT POLE NO. _____	

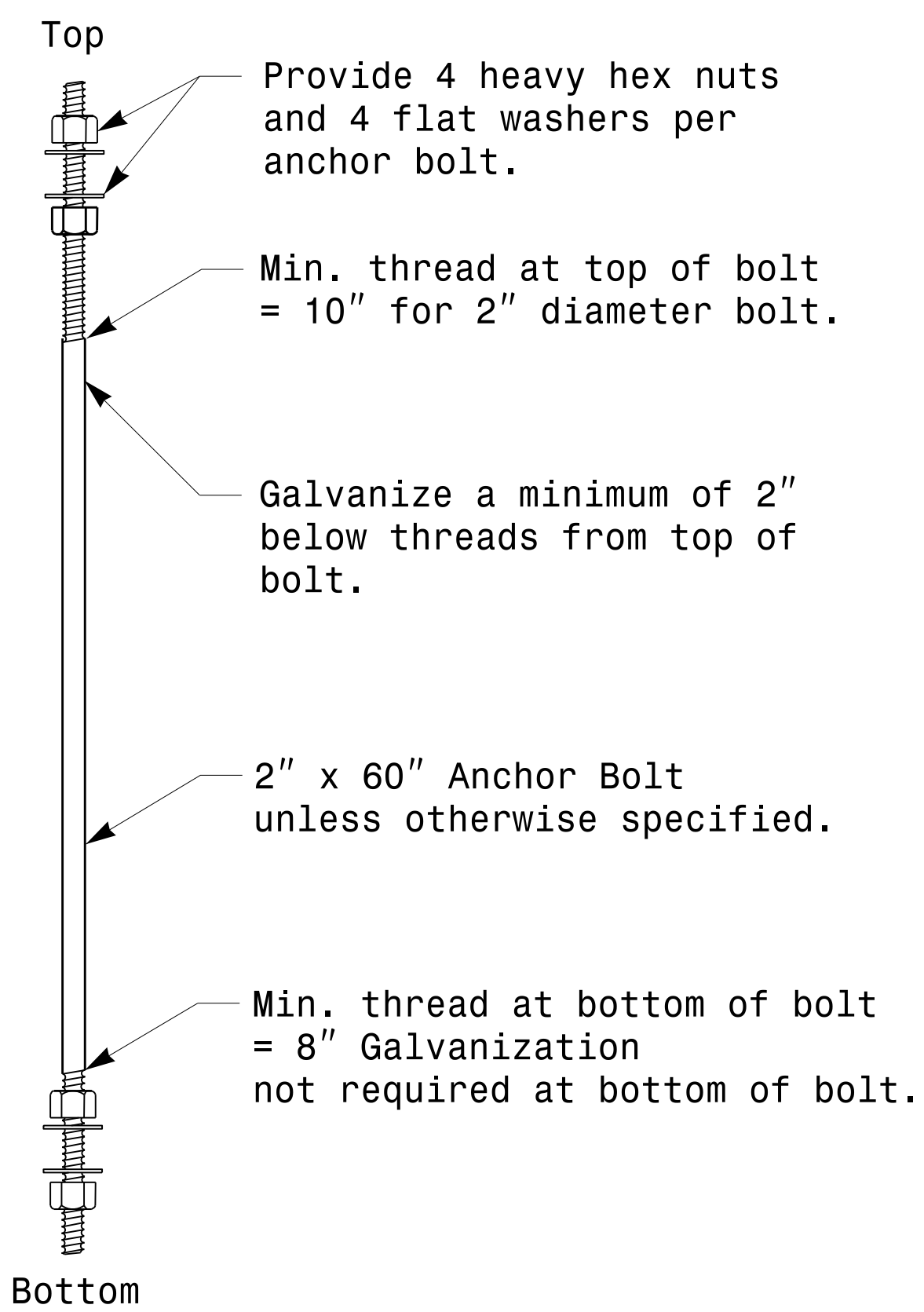
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	NCDOT SIG. INV. NO. _____
NCDOT SIG. INV. NO. _____	NCDOT POLE NO. _____

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

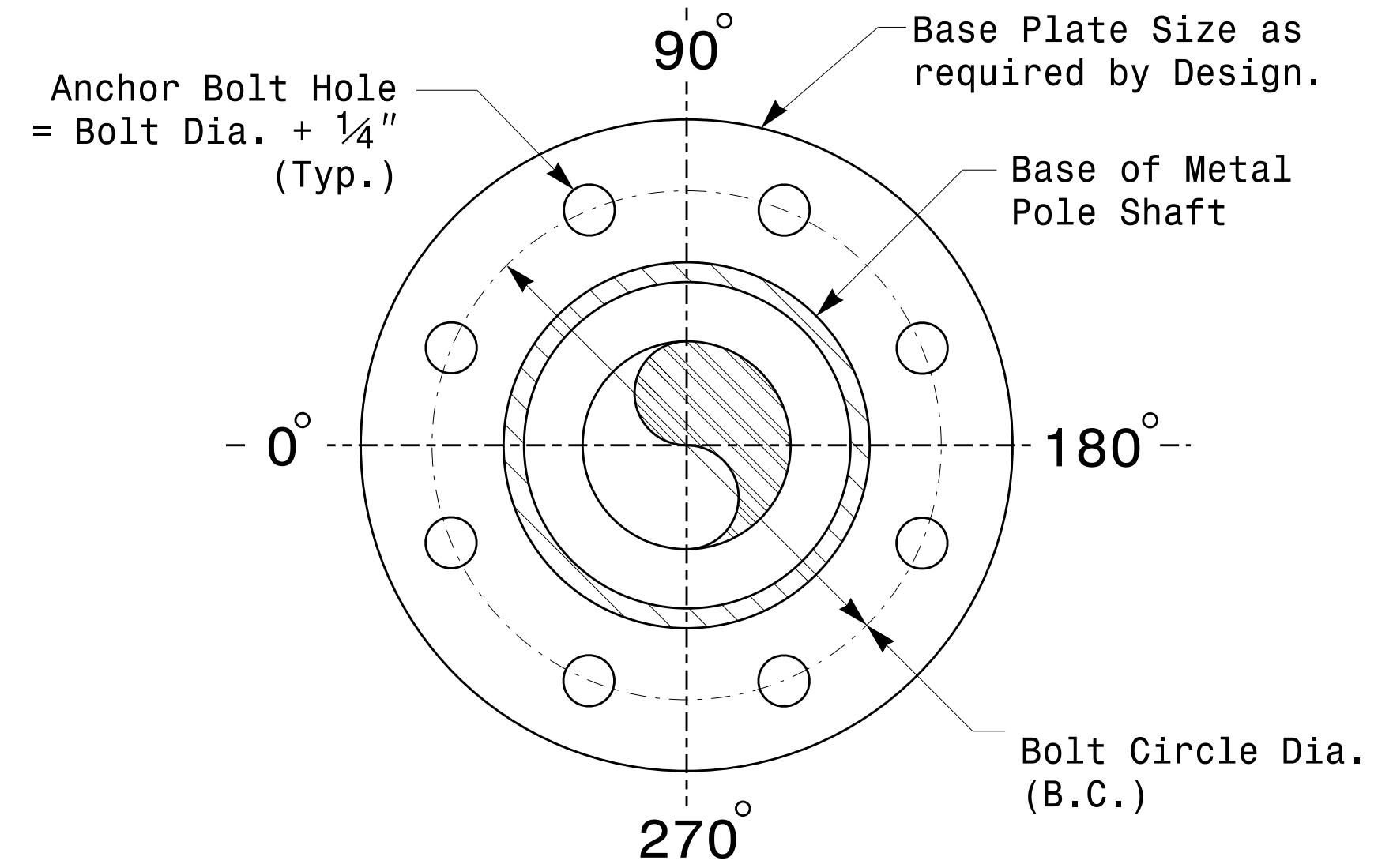
Shaft I.D. Tag  
(Provide on Shaft of Strain Poles and Mast Arm Poles Shaft)

- 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 Signal Inv. Number and pole I.D. number
  - 5) See drawing M3 and M4 for mounting positions of I.D. tags.

**Identification Tag Details**



**Anchor Bolt Detail**



Note: Base plate may be circular, octagonal, square or rectangular in shape.

**Typical Base Plate Detail**

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Typical Fabrication Details For All Metal Poles	
PLAN DATE: OCTOBER 2017	DESIGNED BY: C.F. ANDREWS
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL

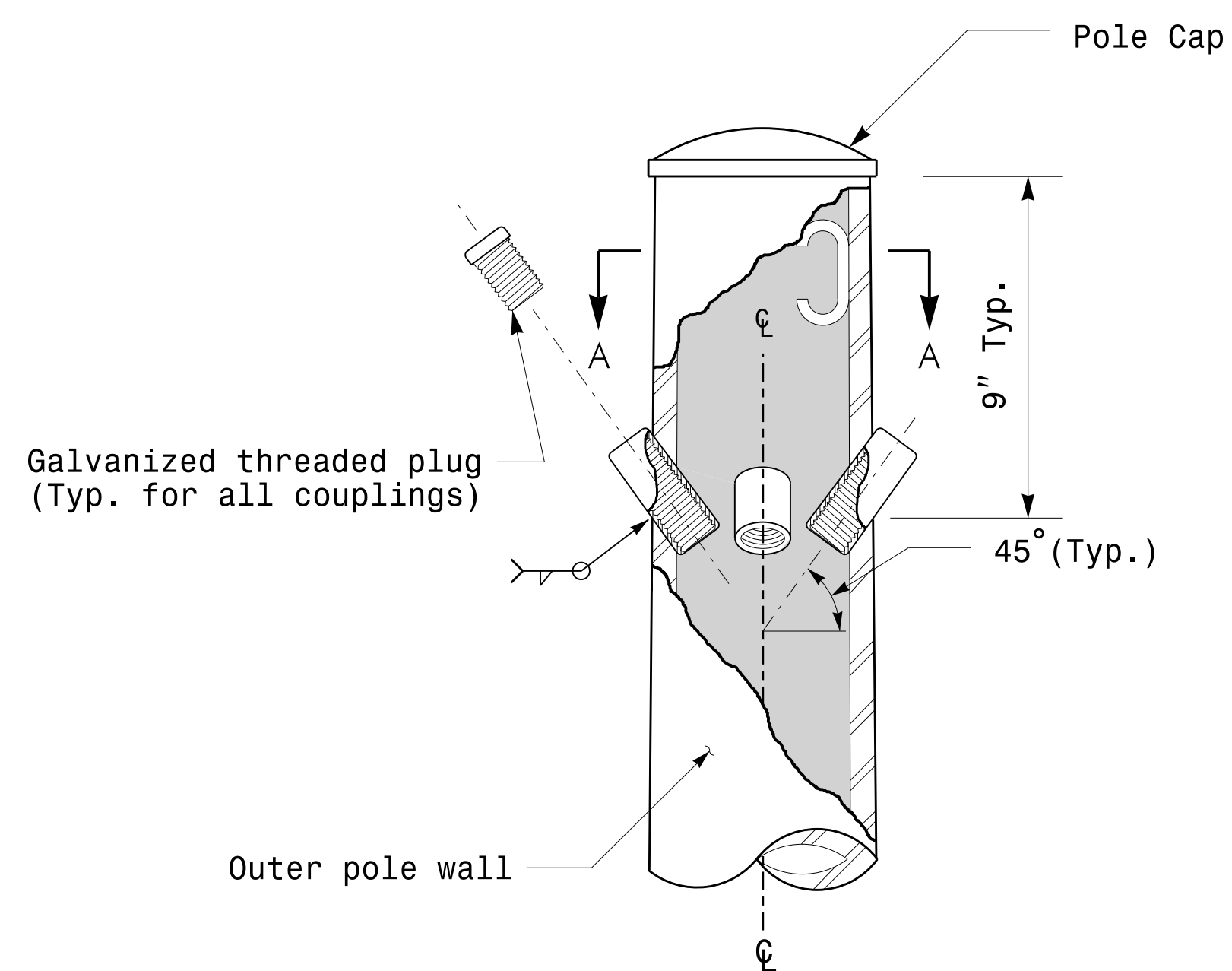
DocuSign by: D.C. Sarkar

10/11/2017 DATE

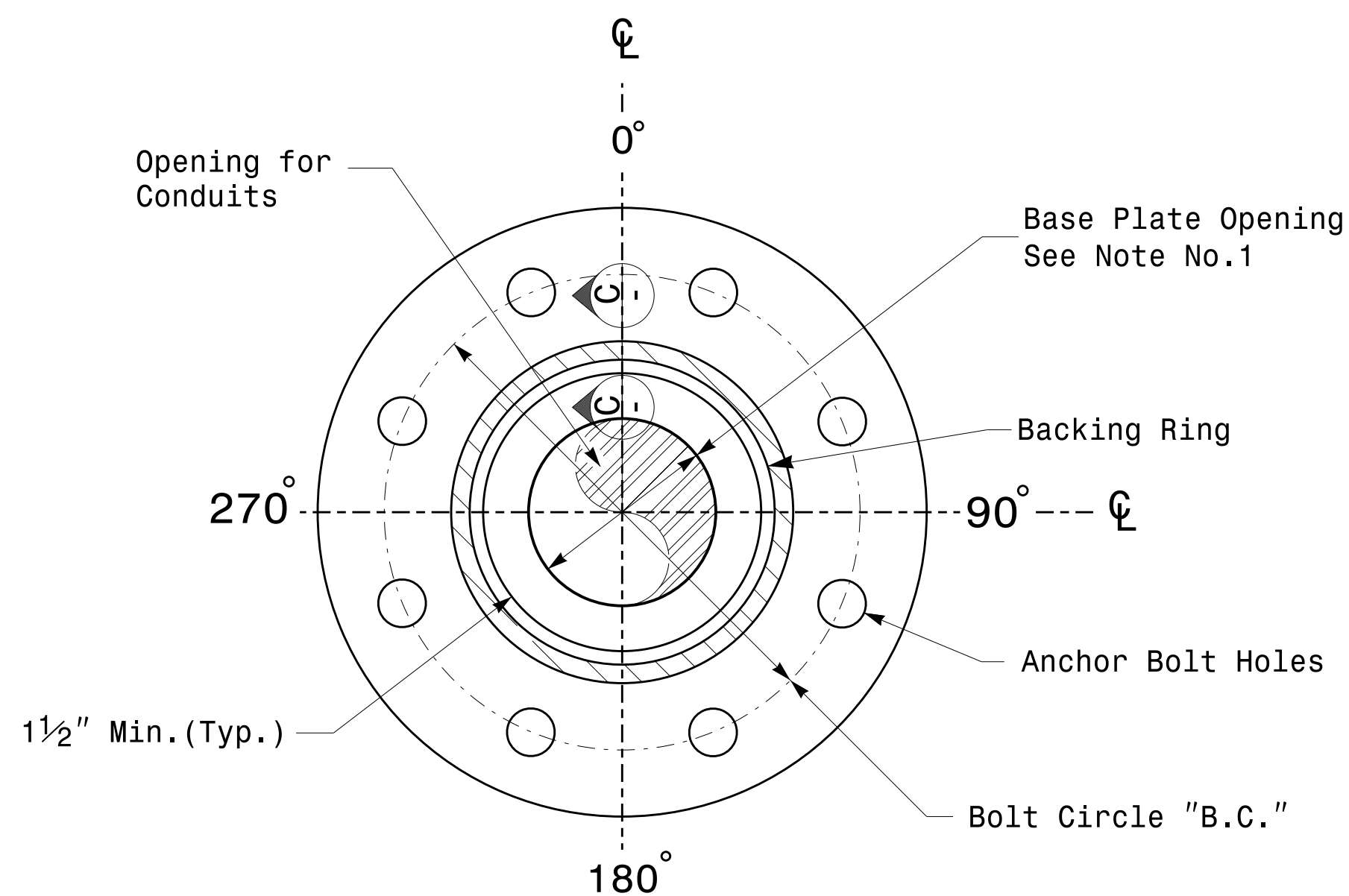
**Fabrication Details - All Metal Poles**

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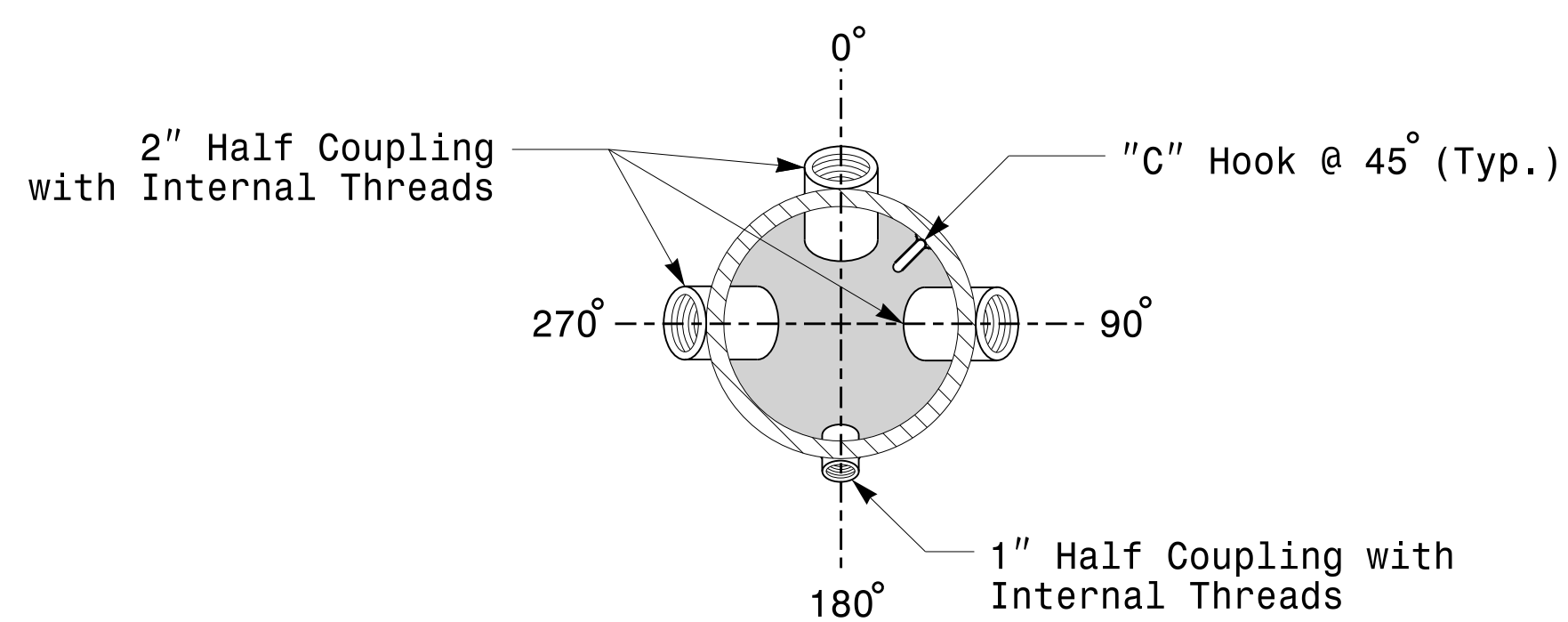
Note:  
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



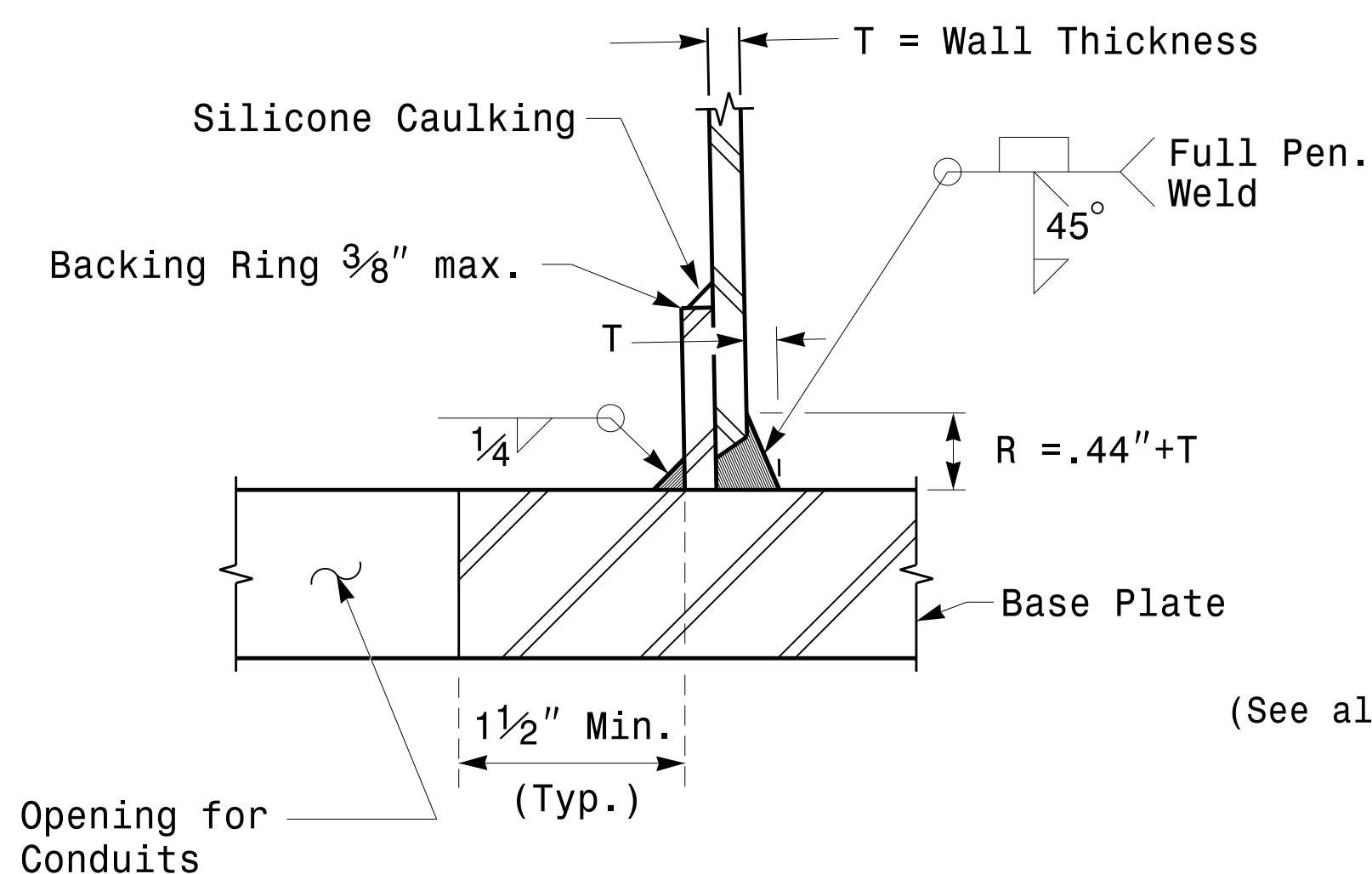
Cable Entrances at Top of Pole



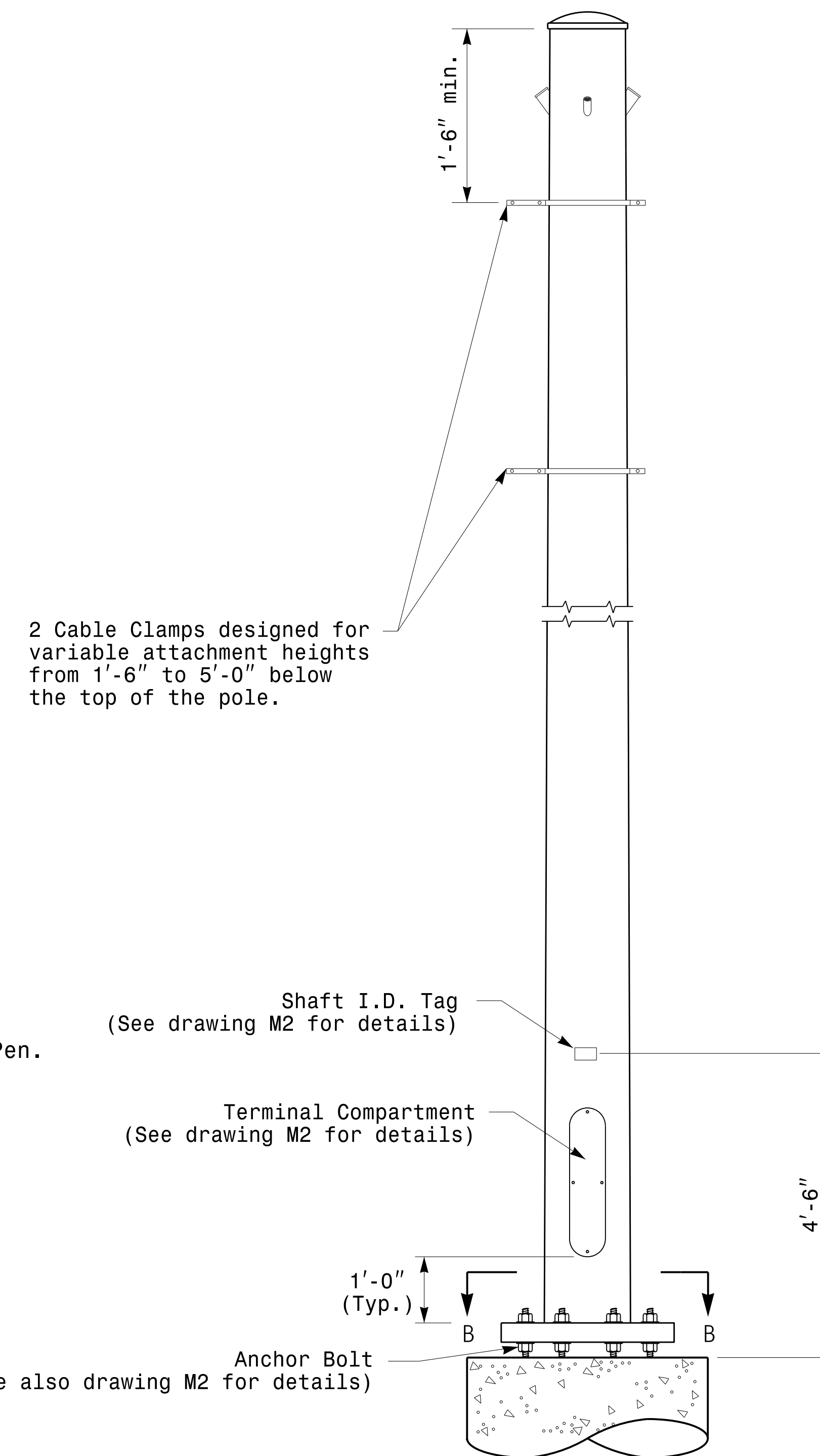
Section B-B  
Pole Base Plate Details  
(8 and 12 Bolt Pattern)



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



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



Monotube Strain Pole

Prepared in the Offices of:  
  
 750 N. Greenleaf Pkwy, Garner, NC 27529

SCALE: 0 NONE

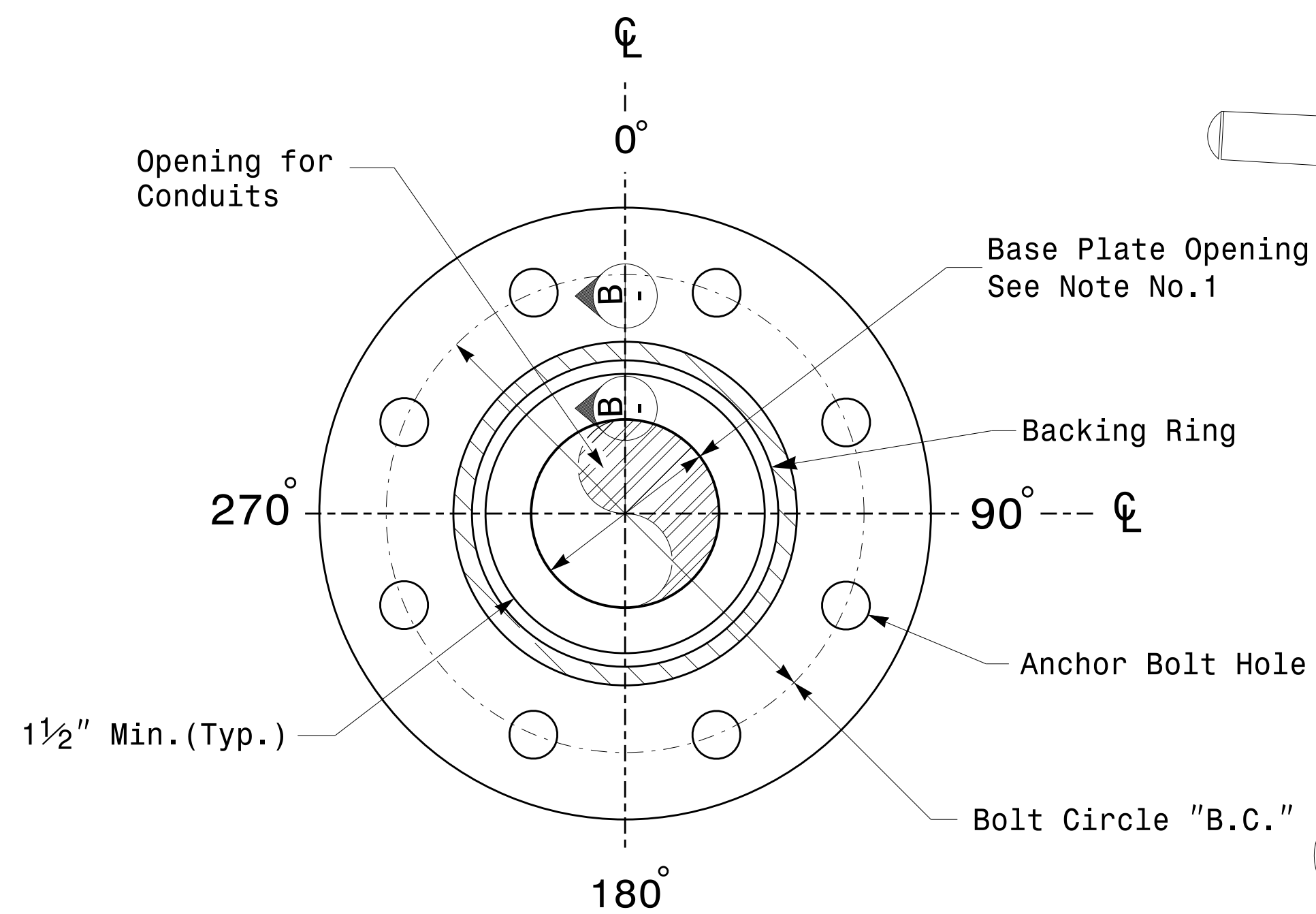
Typical Fabrication Details For Strain Poles

PLAN DATE: OCTOBER 2017	DESIGNED BY: K.C. DURIGON
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

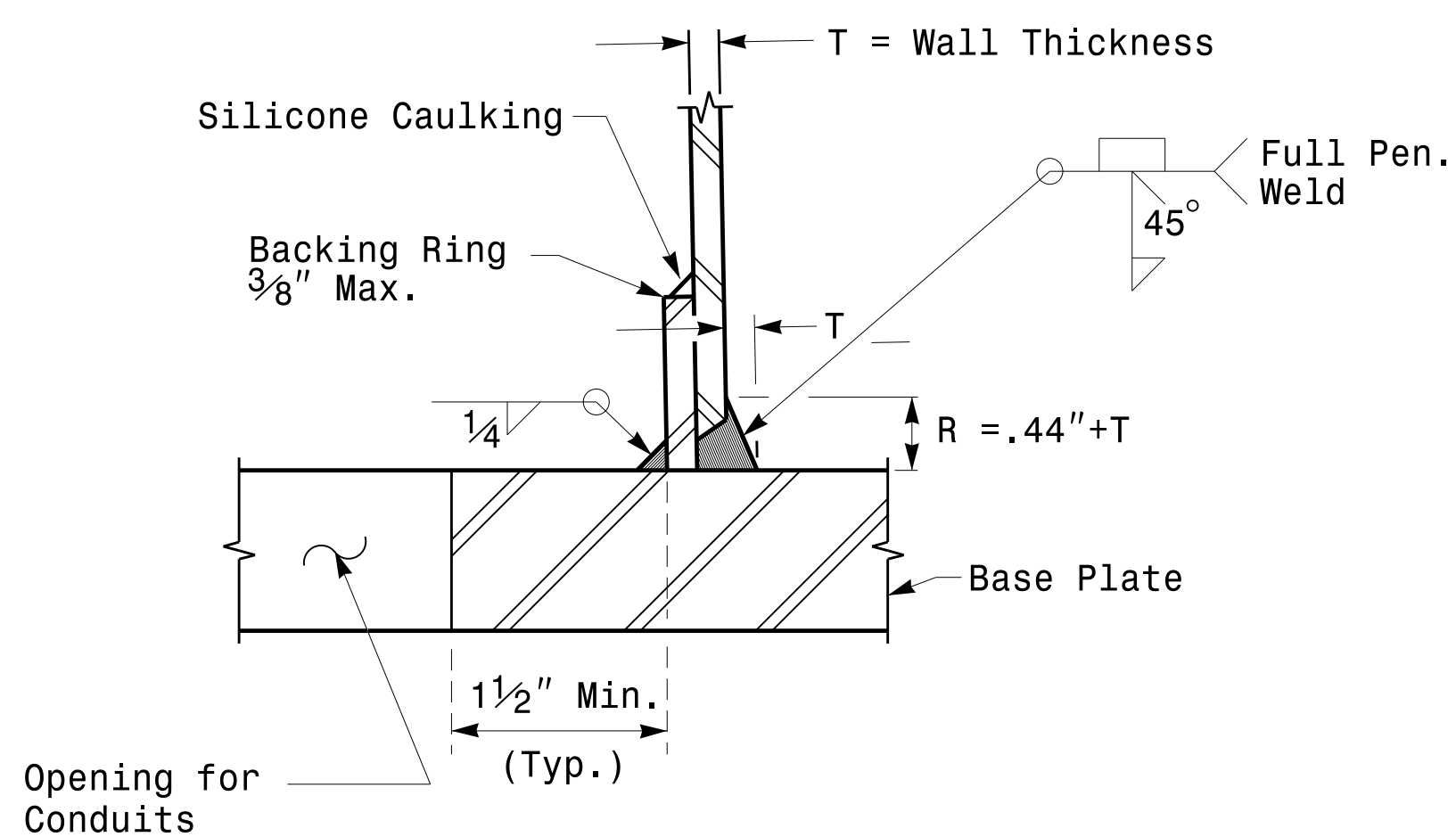
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 44EB87816FA4F49E  
 10/11/2017  
 DATE

Fabrication Details – Strain Poles

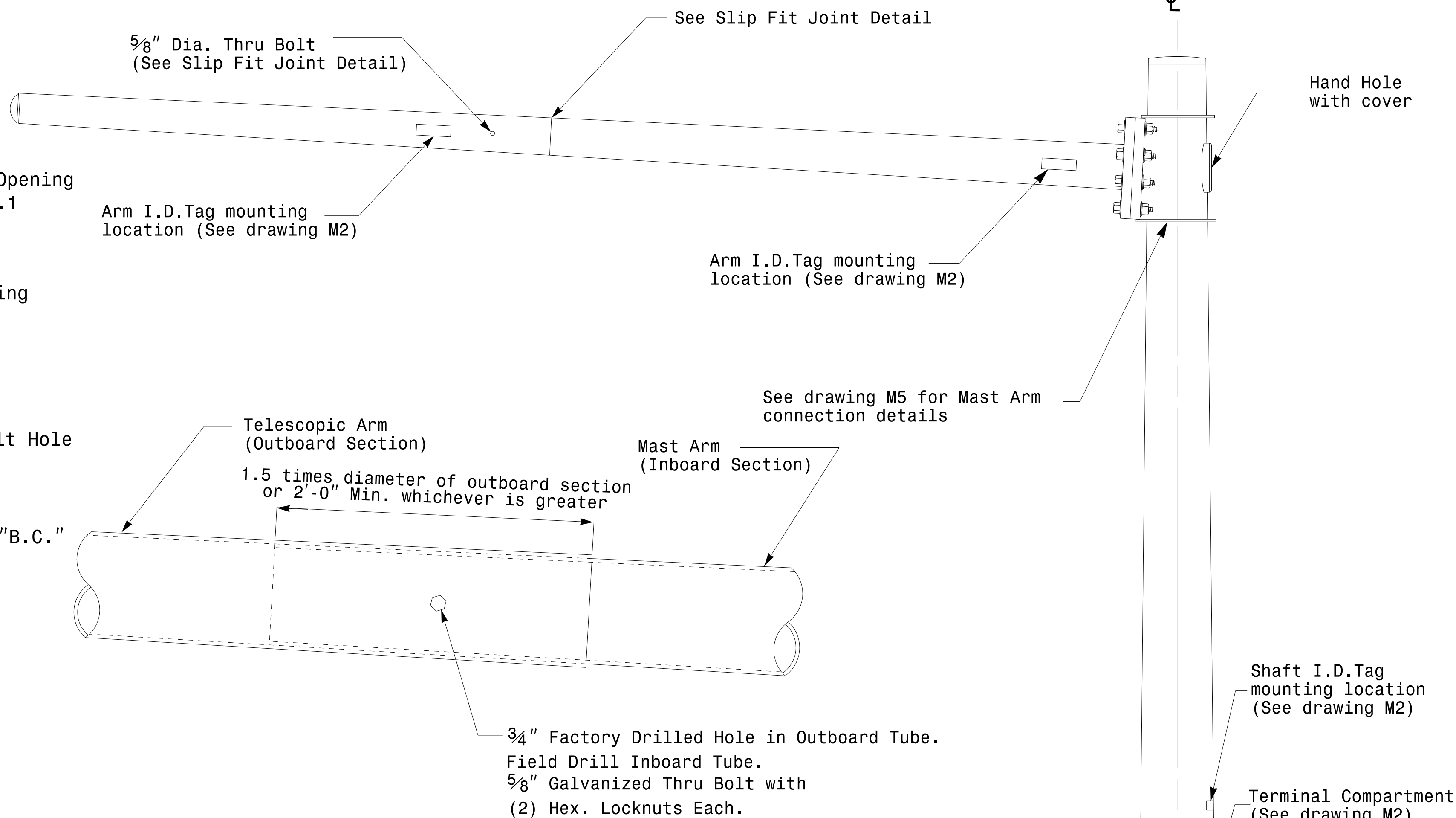
Note:  
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



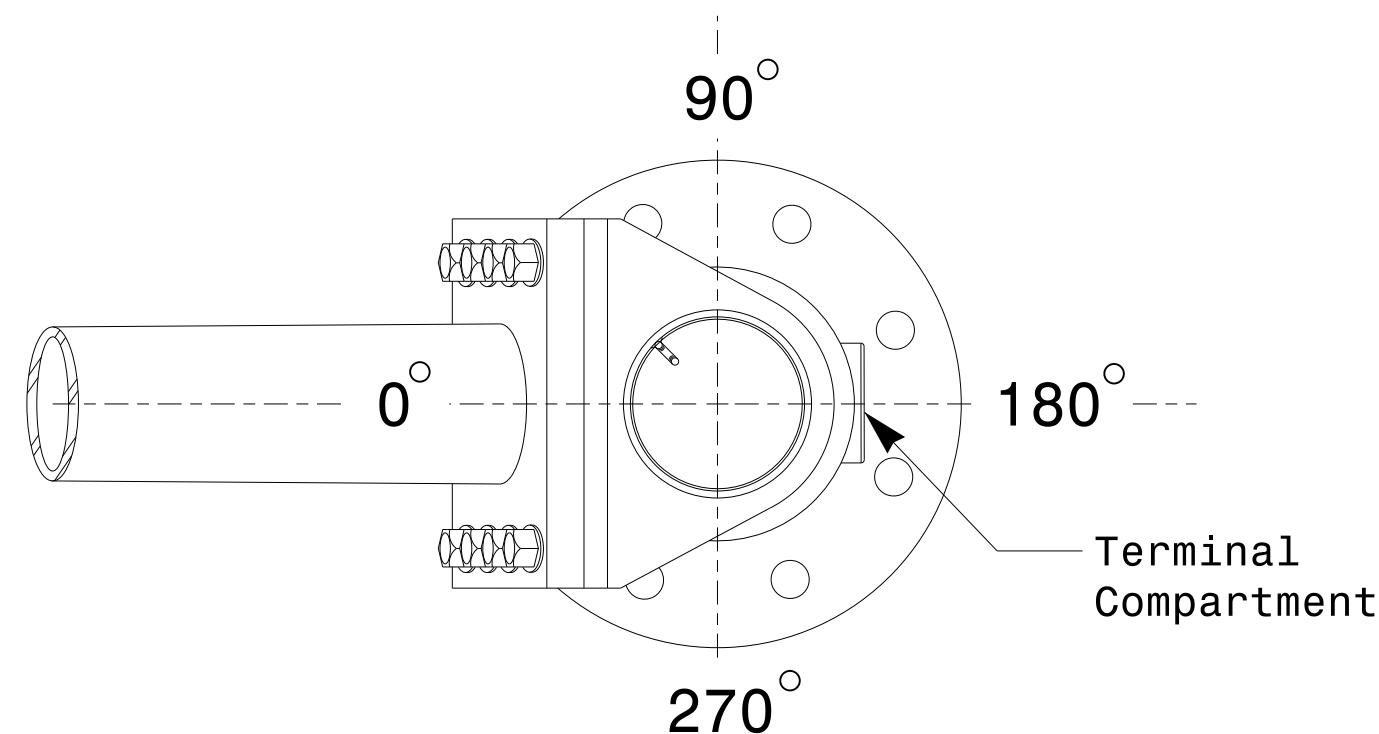
**Section A-A**  
**Pole Base Plate Details**



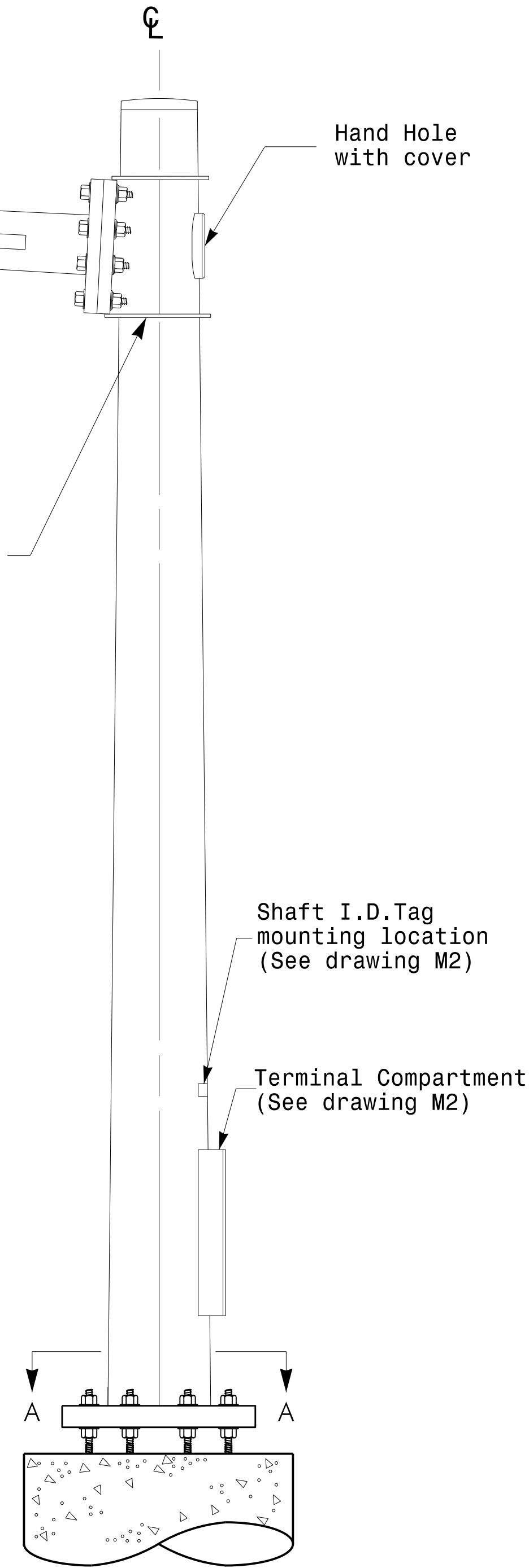
**Section B-B**  
 (Pole Attachment to Base Plate)  
**Full-Penetration Groove Weld Detail**



**Slip Fit Joint Detail for Mast Arm**



**Mast Arm Radial Orientation**



**Mast Arm Pole**

**Fabrication Details – Mast Arm Poles**

	Typical Fabrication Details For Mast Arm Poles		SEAL 
	PLAN DATE: OCTOBER 2017 PREPARED BY: N. BITTING	DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	DocuSigned by: Dinesh C. Sarkar (Signature)		10/11/2017 DATE

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