

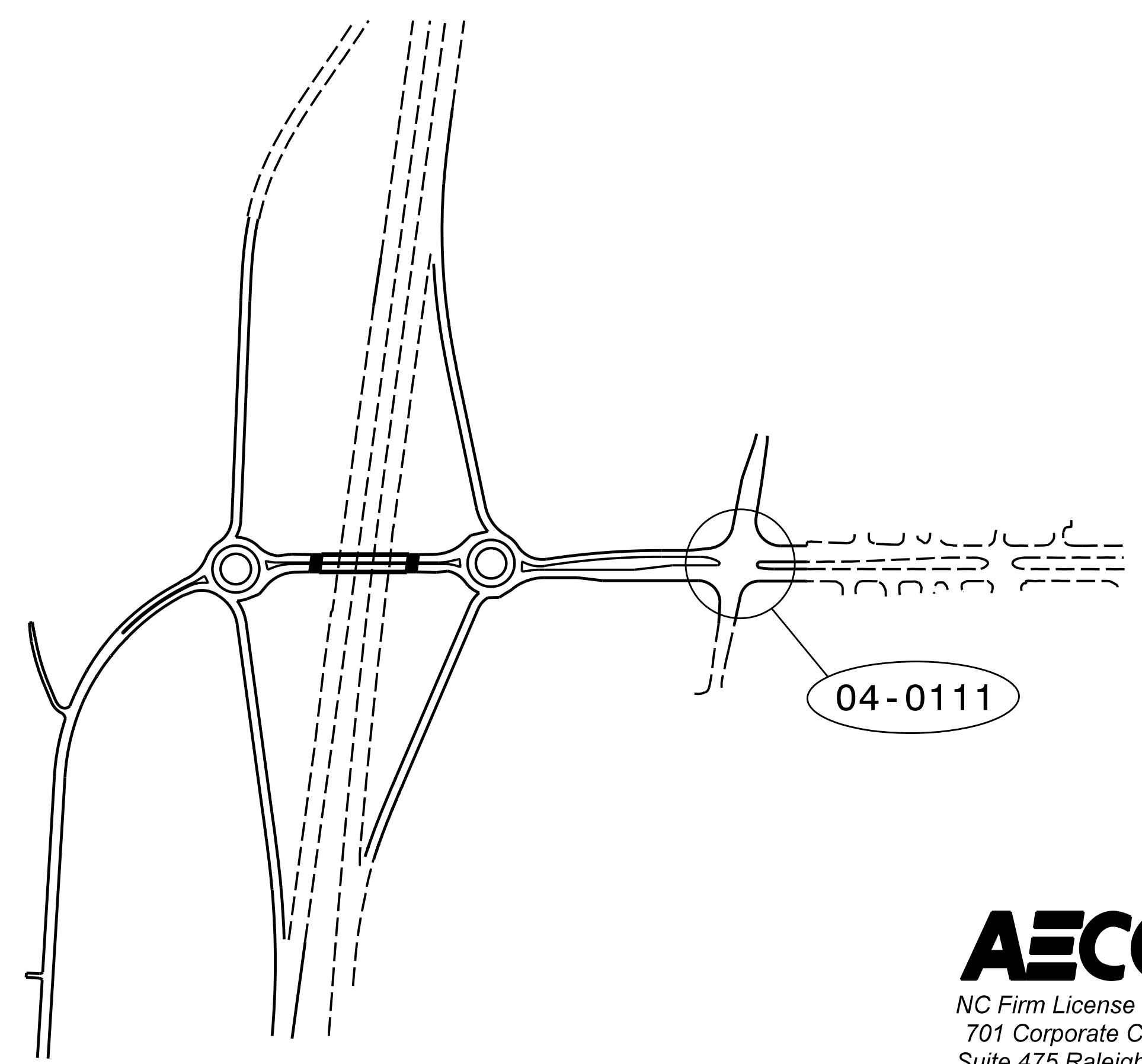
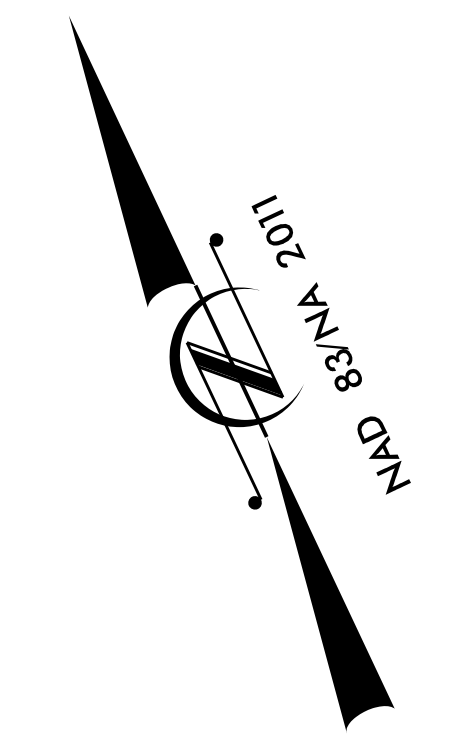
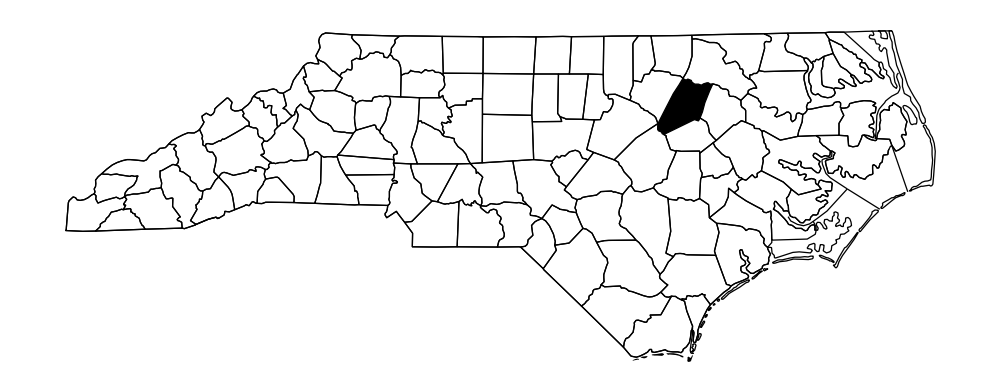
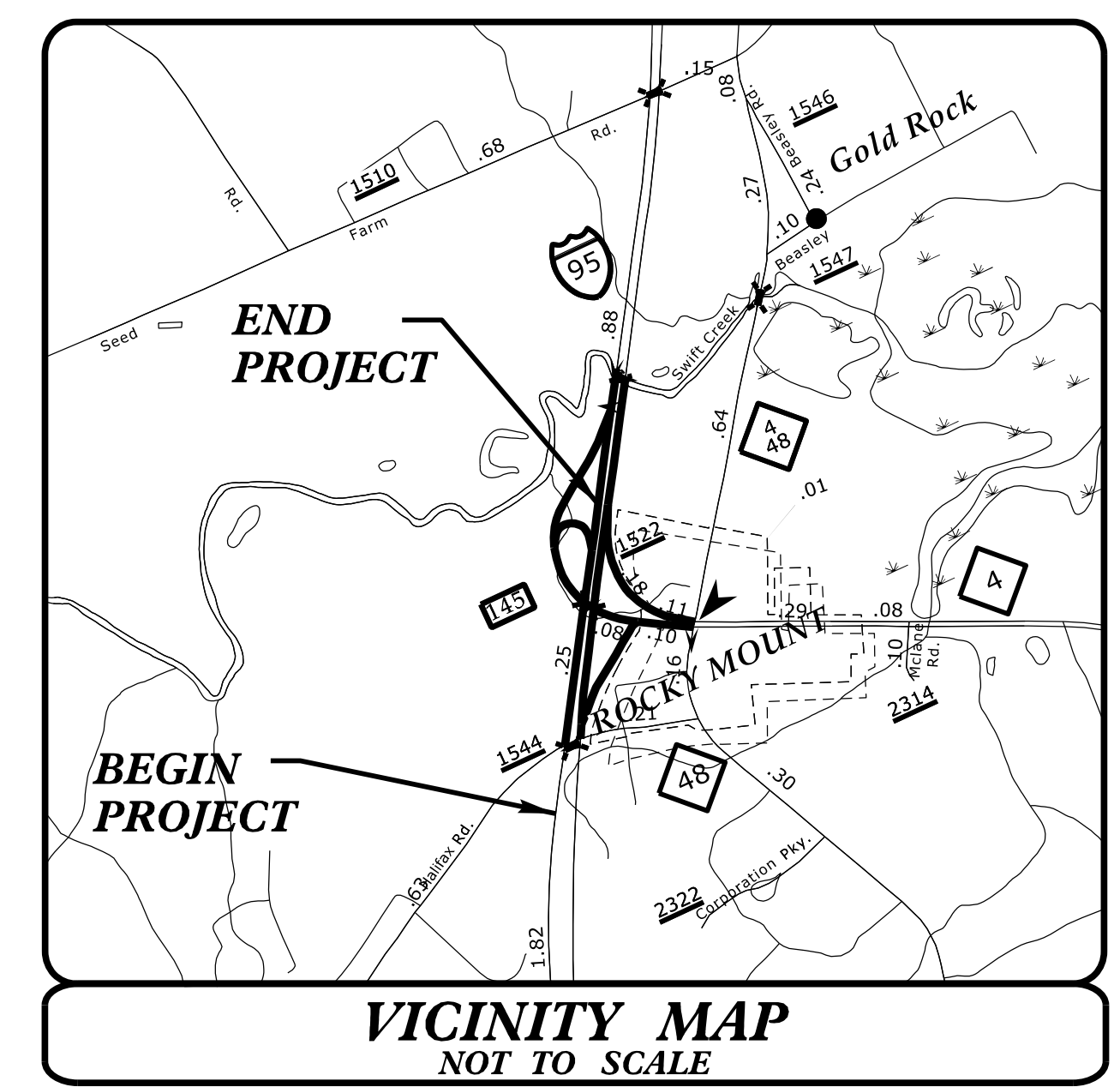
Project: B-5980

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NASH COUNTY

**LOCATION: I-95 INTERCHANGE IMPROVEMENTS
AT HALIFAX ROAD (SR 1544)**

TYPE OF WORK: TRAFFIC SIGNALS



AECOM
NC Firm License No.: F-0342
701 Corporate Center Drive
Suite 475 Raleigh, NC 27607
Phone: 919-854-6200

Refer to "Roadway Standard Drawings
NCDOT" dated January 2018 and
"Standard Specifications for Roads
and Structures" dated January 2018.

Sheet #	Reference #	Index of Plans	Location/Description
Sig. 1.0	N/A	Title Sheet	
Sig. 2.0-2.2	04-0111T1	I-95 Ramps and NC 4 at NC 4 /NC 48 - Temporary Design 1	
Sig. 3.0-3.2	04-0111T2	I-95 Ramps and NC 4 at NC 4 /NC 48 - Temporary Design 2	
Sig. 4.0-4.2	04-0111	I-95 Ramps and NC 4 at NC 4 /NC 48 - Final	
Sig. 5.0	N/A	Standard Plate Sheet	

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
Contacts:

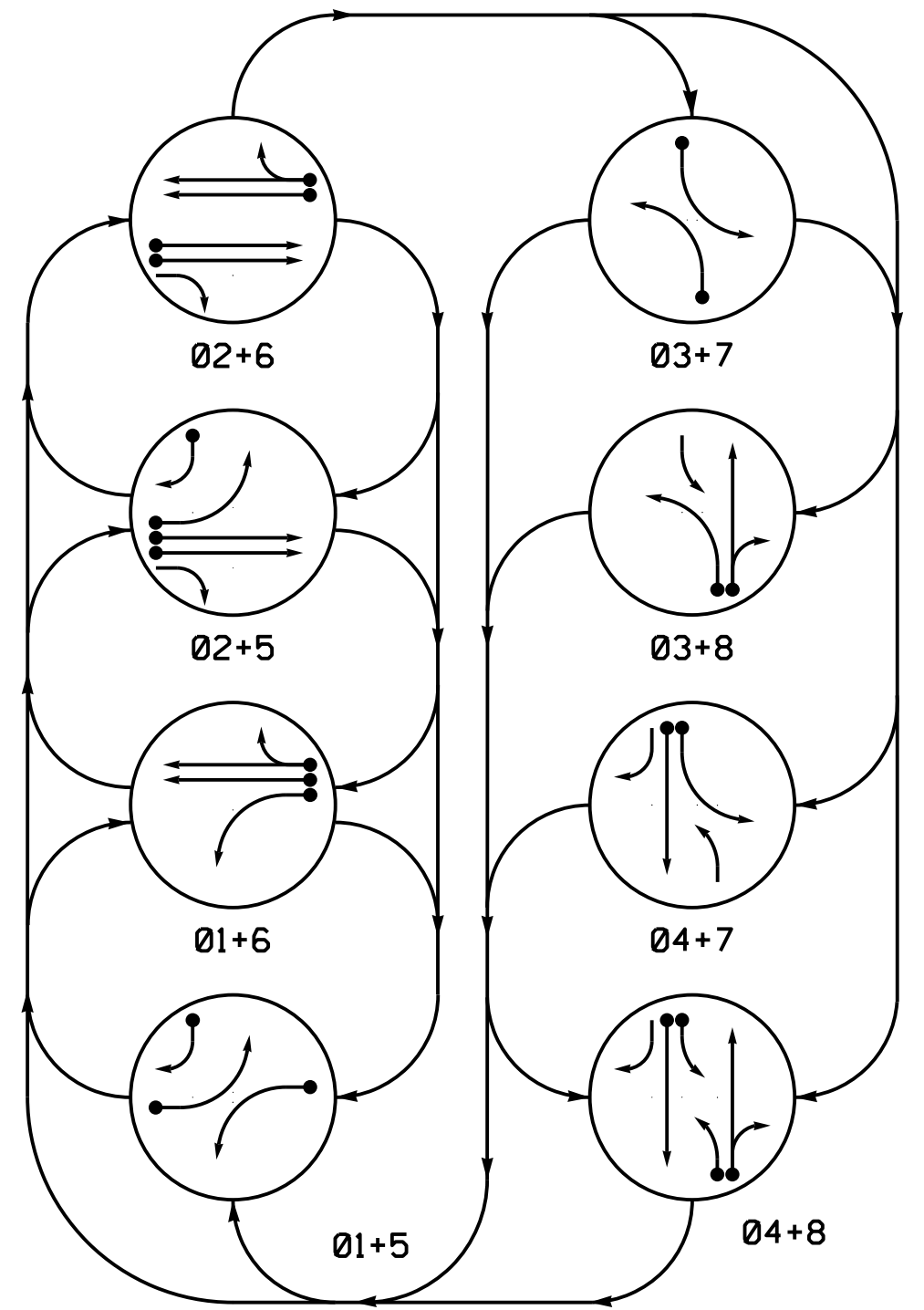
Zachary Little, PE - Eastern Region Signals Engineer
Keith M. Mims, PE - Signal Equipment Design Engineer

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

750 N. Greenfield Parkway, Garner, NC 27529

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PHASING DIAGRAM



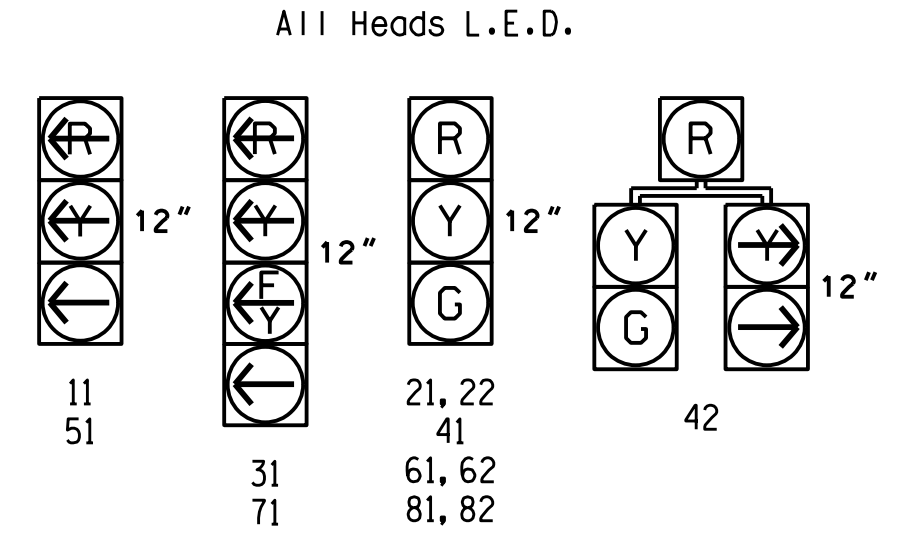
PHASING DIAGRAM DETECTION LEGEND

- ← ● → 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	R	R	G	G	R	R	R	Y
31	—	—	—	—	—	—	—	—
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	—	—	—	—	—	—	—	—
61, 62	R	G	R	G	R	R	R	Y
71	—	—	—	—	—	—	—	—
81, 82	R	R	R	R	R	G	R	G

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
				PHASE	CALLING	EXTENSION	STRETCH TIME			DELAY TIME
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	Y
2A/S3	6X6	300	*	Y	2	Y	Y	-	-	Y*
2B/S4	6X6	300	*	Y	2	Y	Y	-	-	Y*
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	15
4A	6X40	0	*	Y	4	Y	Y	-	-	-
5A	6X40	0	*	Y	5	Y	Y	-	-	-
5B	6X40	0	*	Y	5	Y	Y	-	-	15
6A/S1	6X6	300	5	Y	6	Y	Y	-	-	Y
6B/S2	6X6	300	5	Y	6	Y	Y	-	-	Y
7A	6X40	0	*	Y	7	Y	Y	-	-	15
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	10

* Video Detection Zone

8 Phase Fully Actuated (Rocky Mount 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 signal head numbered 82.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Relocate existing wireless broadband communication equipment to the new cabinet.
- System data: Zone # 15 Controller Asset # 0111.

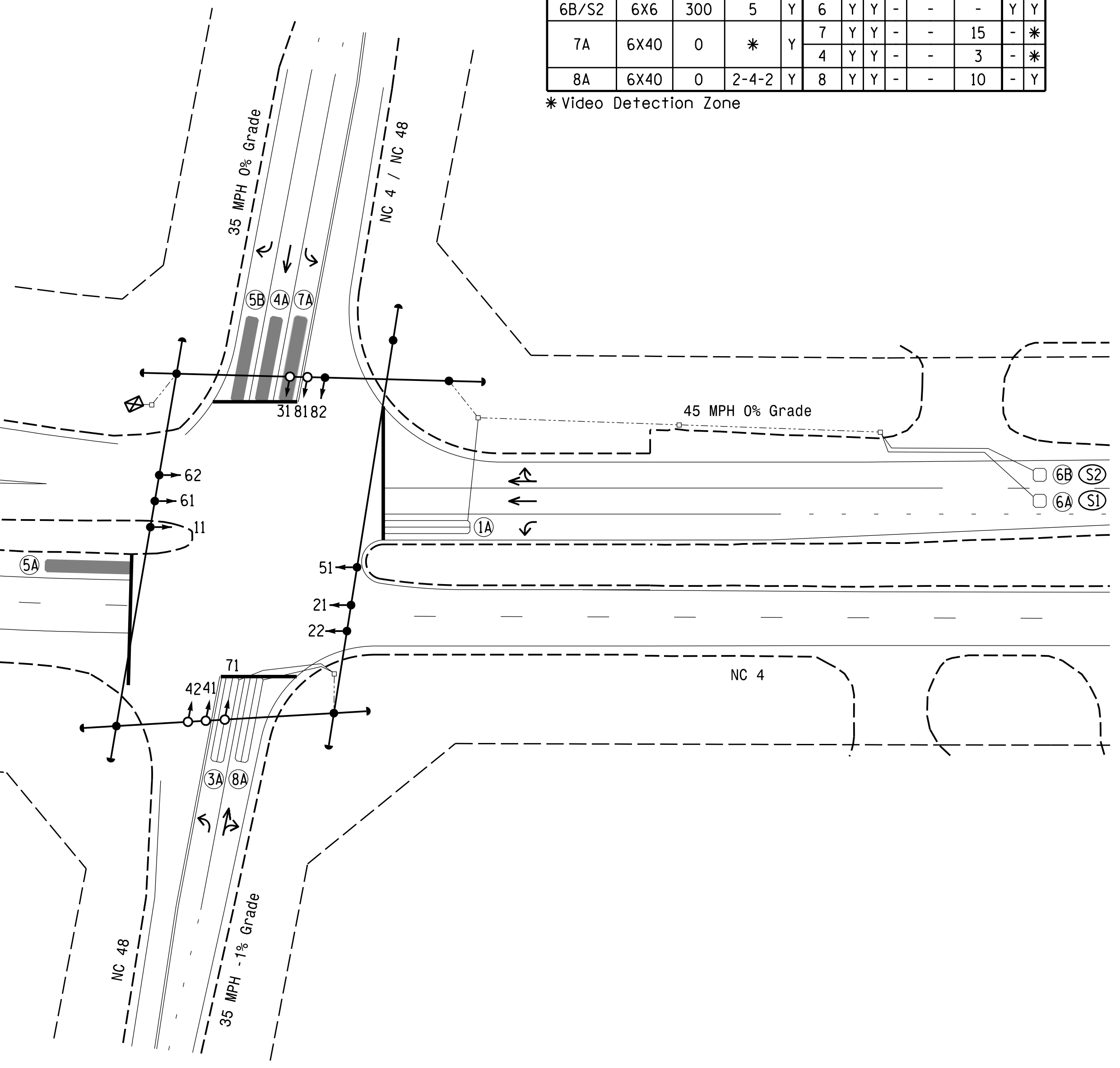
OASIS 2070 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	12	7	7	7	12	7	7
Extension 1*	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1*	25	90	25	30	25	90	25	30
Yellow Clearance	3.0	4.8	3.0	3.9	3.0	4.5	3.0	3.9
Red Clearance	3.3	1.2	2.6	2.5	3.2	1.3	3.1	2.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1*	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation*	-	1.5	-	-	-	1.5	-	-
Max Variable Initial*	-	34	-	-	-	34	-	-
Time Before Reduction*	-	15	-	-	-	15	-	-
Time To Reduce*	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

LEGEND

- | | | | |
|--|-----------------------------------|--|-----------------------------------|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Signal Pole with Guy | | EXISTING Signal Pole with Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED Video Detection Zone | | EXISTING Video Detection Zone |
| | PROPOSED Controller & Cabinet | | EXISTING Controller & Cabinet |
| | PROPOSED Junction Box | | EXISTING Junction Box |
| | PROPOSED 2-in Underground Conduit | | EXISTING 2-in Underground Conduit |
| | PROPOSED Right of Way | | EXISTING Right of Way |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |



Signal Upgrade - Temporary Design 1 (TMP Phases I & II)

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 Suite 475 Raleigh, NC 27607
 Phone: 919-854-6200

Prepared For the Offices of:

 TRANSPORTATION MOBILITY AND SAFETY DIVISION
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 SIGNAL DESIGN SECTION
 750 N. Greenfield Pkwy, Garner, NC 27529

I-95 Ramps and NC 4
 at
 NC 4 / NC 48
 Division 4 Nash County Rocky Mount
 PLAN DATE: June 2019 REVIEWED BY: A. Ravipati
 PREPARED BY: S. W. Cox REVIEWED BY: C.L. Kalencik
 REVISIONS: INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

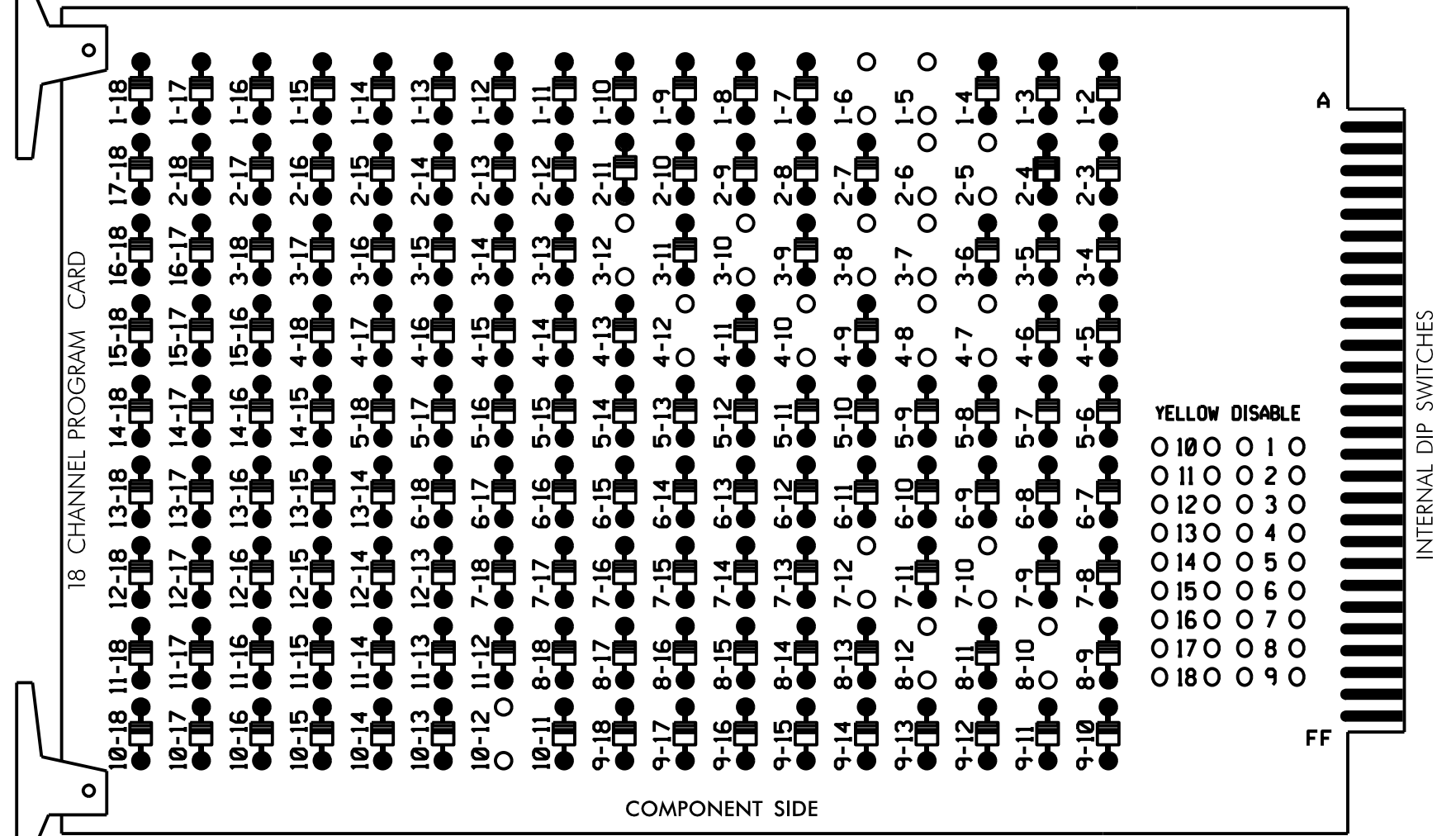
 COURTNEY L. KALENICK
 ENGINEER
 3/17/2020
 SIG. INVENTORY NO. 04-01111

3/16/2020
 P:\60557176 - B-5980\400_CAD_GIS\4910_NCDOT_T1PMT\F01\ca5\gnal\4055980_04-0111_2019\XXXX11.dgn
 COAST

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 3-10, 3-12, 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.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
- The cabinet and controller are part of the Rocky Mount Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
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	31	41,42	NU	42	51	61,62	NU	71	81,82	NU	NU	31	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	132					A125			A102	
FLASHING YELLOW ARROW															A126			A103	
GREEN ARROW	127				118				133	133		124							

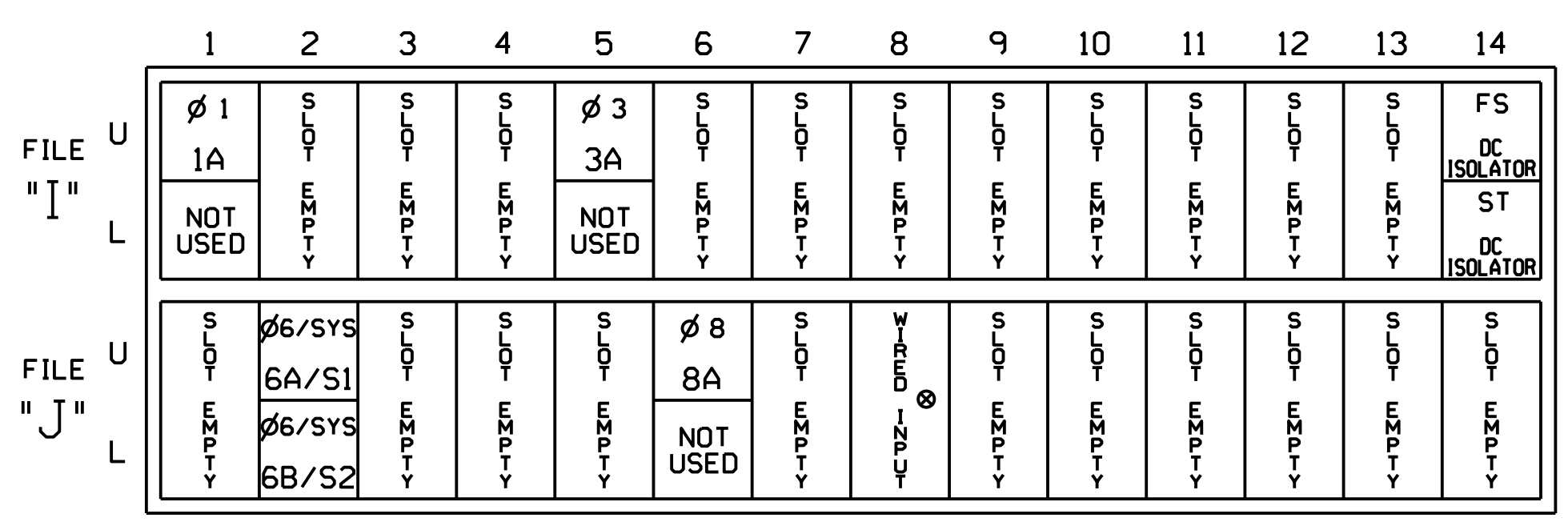
NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

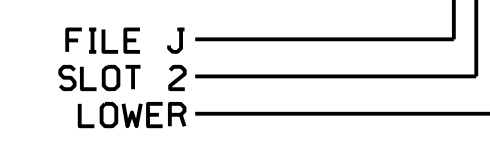
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	11U	56	18	1	1	Y	Y			
3A'	TB4-5,6	15U	58	20	3	3	Y	Y			15
6A/S1	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S2	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10

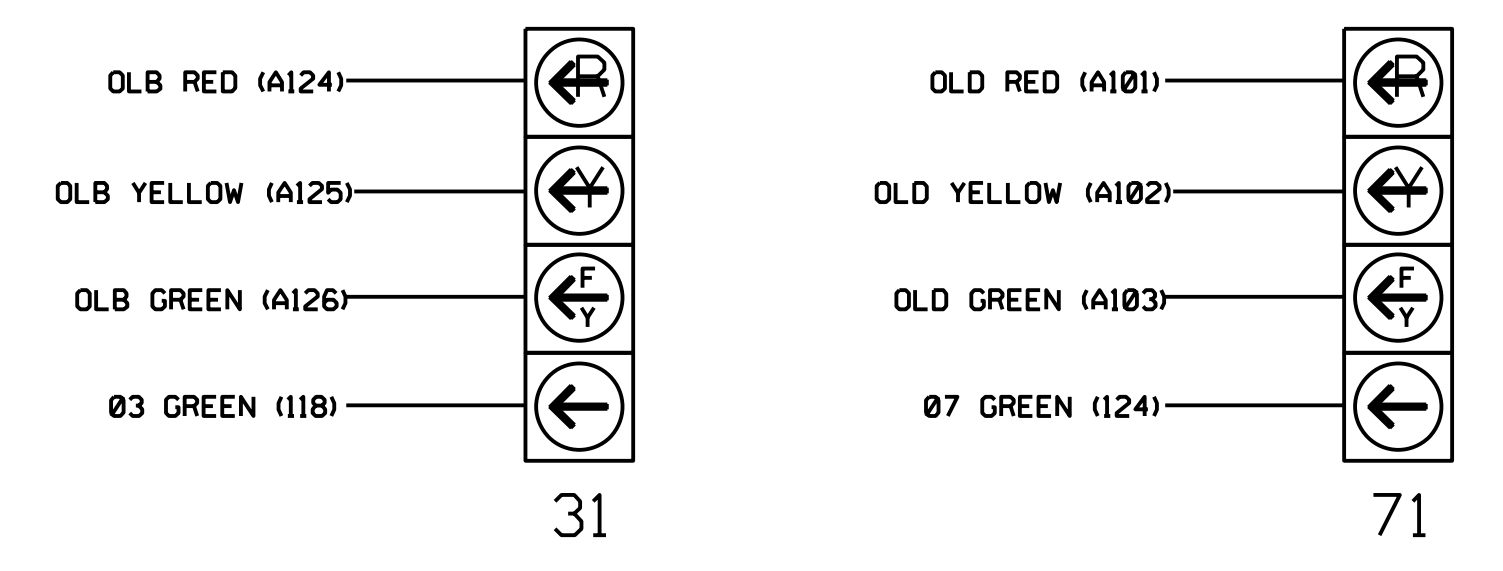
⊗ Add jumper from 15-W to J8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



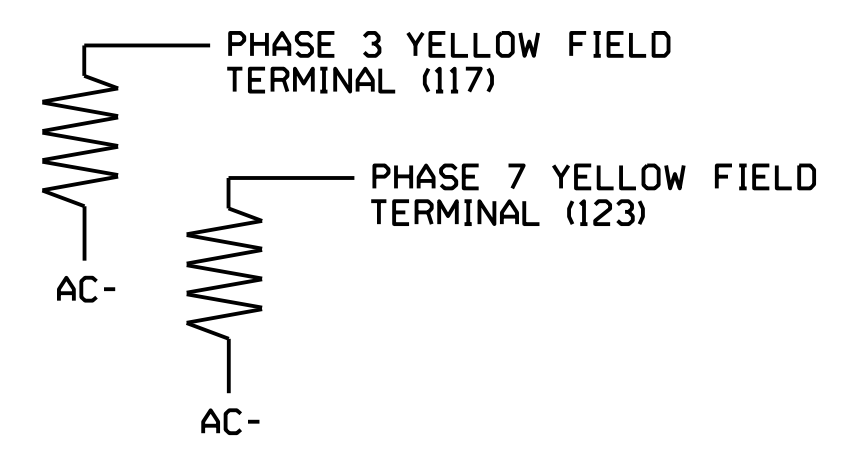
NOTE

1. The sequence display for signal heads 31, and 71 requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTORS INSTALLATION DETAIL

(install resistors as shown below)

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



SPECIAL DETECTOR NOTE

For zones 2A/S3, 2B/S4, 4A, 5A, 5B, and 7A 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: 04-0111T1
 DESIGNED: June 2019
 SEALED: 3/17/2020
 REVISED: N/A

Temporary Design 1 (TMP Phase I & II)
 Electrical Detail Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N. Greenfield Pkwy, Carrboro, NC 27529	I-95 Ramps and NC 4 at NC 4 / NC 48		 James O. Deaton 3/17/2020 40FFRAC4308D40F SIG. INVENTORY NO. 04-0111T1	
	Division 4	Nash County		Rocky Mount
	PLAN DATE: June 2019	REVIEWED BY: J. O. Deaton		
	PREPARED BY: A. Raviapati	REVIEWED BY: M. W. Valch		
REVISIONS INIT. DATE				

AECOM
 NC Firm License No.: F-0342
 701 Corporate Center Drive
 Suite 475 Raleigh, NC 27607
 Phone: 919-854-6200

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

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

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 39	= Overlap D Red
OUTPUT 40	= Overlap D Yellow
OUTPUT 41	= Overlap D Green
OUTPUT 47	= Overlap B Red
OUTPUT 48	= Overlap B Yellow
OUTPUT 49	= Overlap B Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

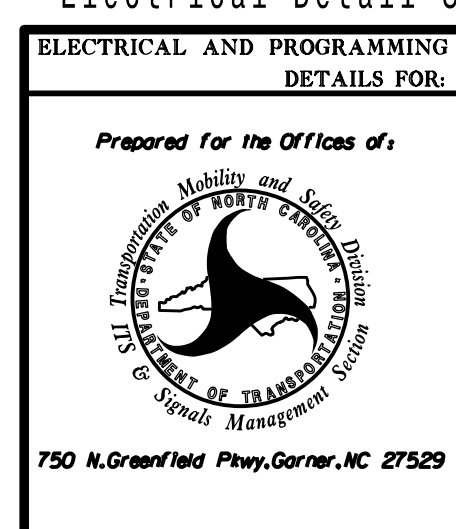
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0111T1
DESIGNED: June 2019
SEALED: 3/17/2020
REVISED: N/A

Temporary Design 1 (TMP Phase I & II)
Electrical Detail Sheet 2 of 2

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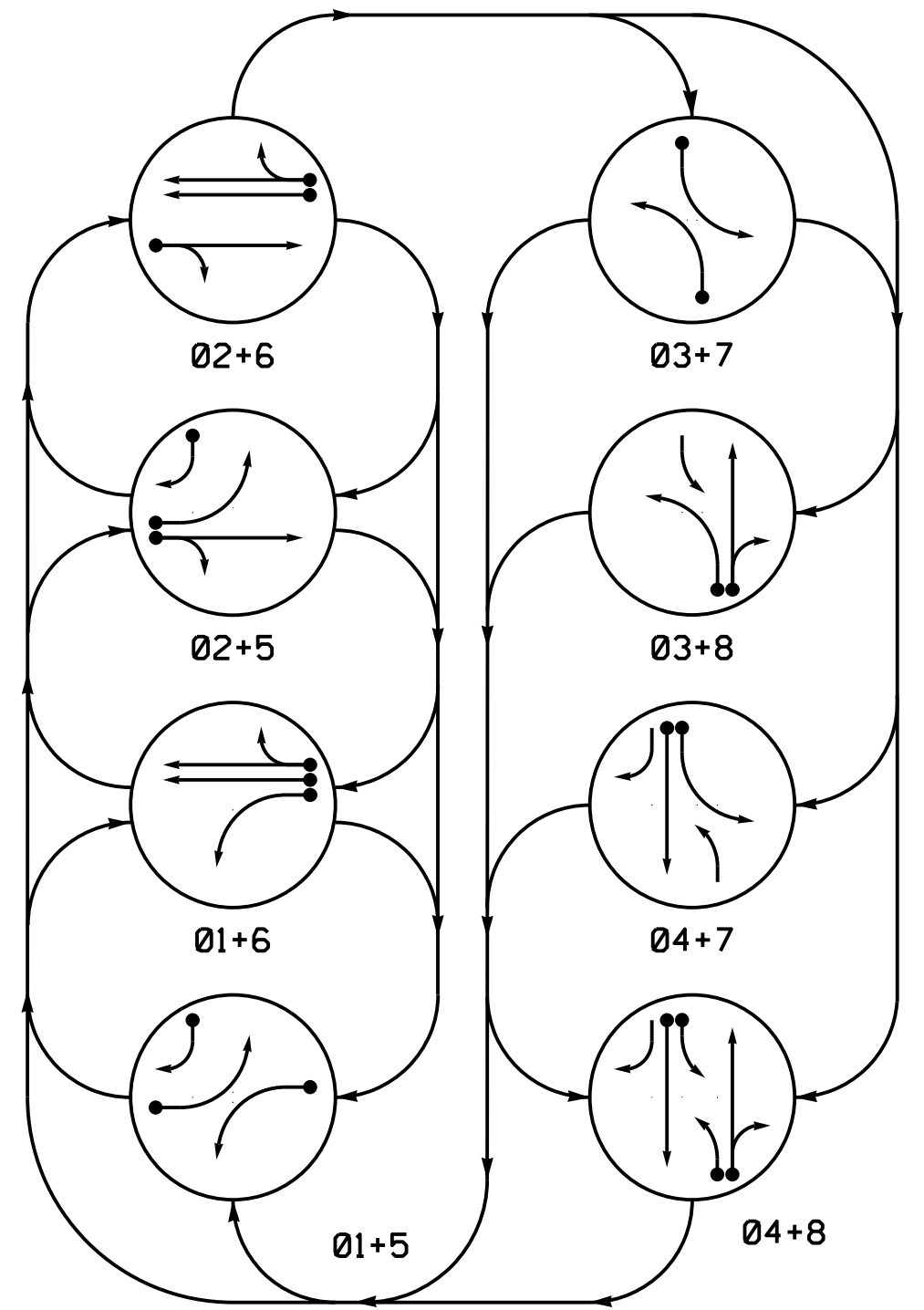


ELECTRICAL AND PROGRAMMING DETAILS FOR:		I-95 Ramps and NC 4 at NC 4 / NC 48	
Prepared for the Offices of:	Division 4	Nash County	Rocky Mount
PLAN DATE: June 2019	REVIEWED BY: J. O Deaton	PREPARED BY: A. Ravipati	REVIEWED BY: M. W. Valch
REVISIONS		INIT.	DATE

DocuSigned by: James O. Deaton 40FF8AC430B040F...	3/17/2020
SIG. INVENTORY NO. 04-0111T1	

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

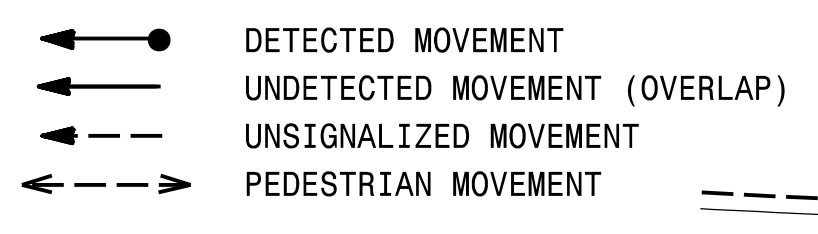
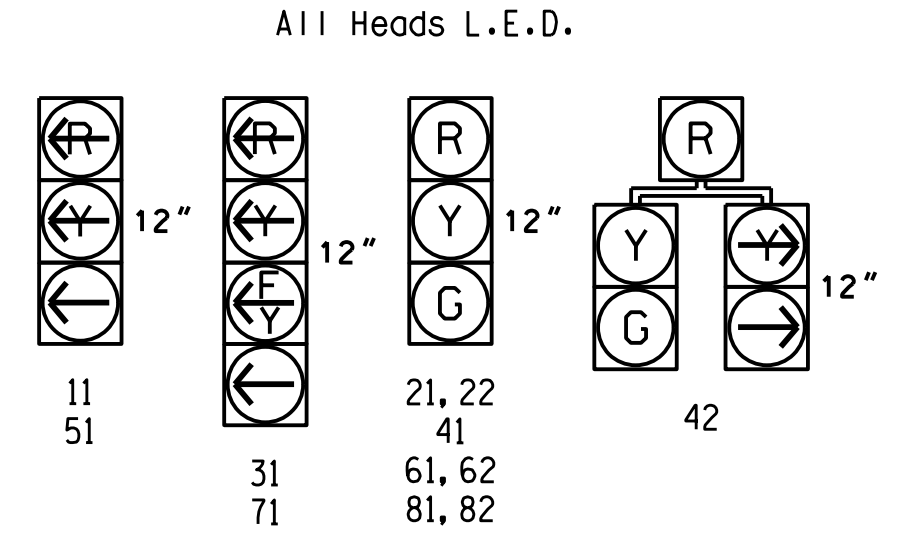


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	-	-	R	R	R	R	R	R
21, 22	R	R	G	G	R	R	R	Y
31	R	R	R	R	-	-	F	F
41	R	R	R	R	R	G	G	R
42	R	R	R	R	R	G	G	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, 82	R	R	R	R	R	G	R	G

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

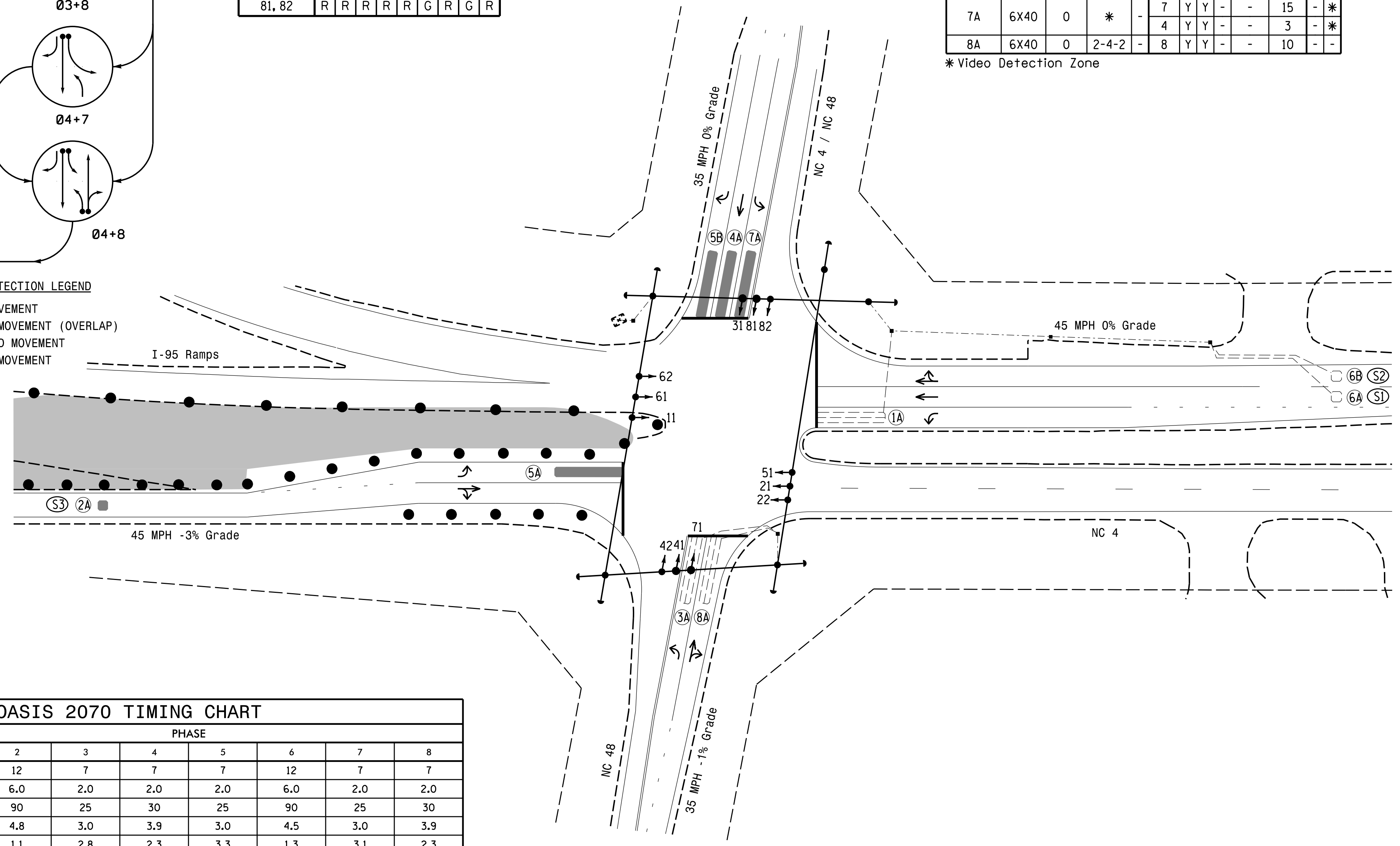
LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
				NEW LOOP	PHASE	CALLING EXTENSION	FULL TIME DELAY		
1A	6X40	0	2-4-2	-	1	Y	Y	-	-
2A/S3	6X6	300	*	Y	2	Y	Y	-	Y *
3A	6X40	0	2-4-2	-	3	Y	Y	-	-
4A	6X40	0	*	-	4	Y	Y	-	- *
5A	6X40	0	*	Y	5	Y	Y	-	- *
5B	6X40	0	*	-	5	Y	Y	-	15 - *
6A/S1	6X6	300	5	-	6	Y	Y	-	Y -
6B/S2	6X6	300	5	-	6	Y	Y	-	Y -
7A	6X40	0	*	-	7	Y	Y	-	15 - *
8A	6X40	0	2-4-2	-	8	Y	Y	-	10 - *

*Video Detection Zone

8 Phase Fully Actuated (Rocky Mount Signal System)

NOTES

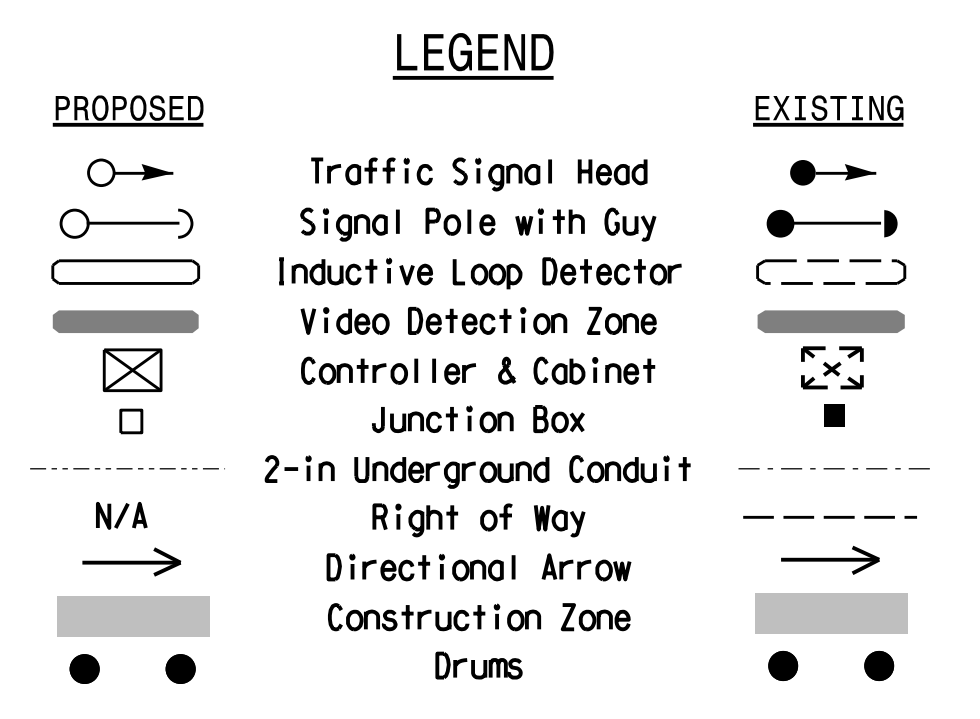
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition signal heads numbered 21, 22, and 51.
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.
8. System data: Zone # 15
Controller Asset # 0111.



OASIS 2070 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	4	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	25	90	25	30	25	90	25	30
Yellow Clearance	3.0	4.8	3.0	3.9	3.0	4.5	3.0	3.9
Red Clearance	3.2	1.1	2.8	2.3	3.3	1.3	3.1	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	2.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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



Signal Upgrade - Temporary Design 2 (TMP Phase II)



Prepared For the Offices of:
 Transportation Mobility and Safety Solutions
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 Signal Design Section
 750 N. Greenfield Pkwy, Garner, NC 27529

I-95 Ramps and NC 4 at NC 4 / NC 48

Division 4 Nash County Rocky Mount
 PLAN DATE: June 2019 REVIEWED BY: A. Ravipati
 PREPARED BY: S. W. Cox REVIEWED BY: C.L. Kalencik

SEAL 040715
 ENGINEER
 COURTNEY L. KALENICK

DocuSigned by:
 Courtney L. Kalencik
 3/17/2020
 SIG. INVENTORY NO. 04-01112

REVISIONS: INIT. DATE

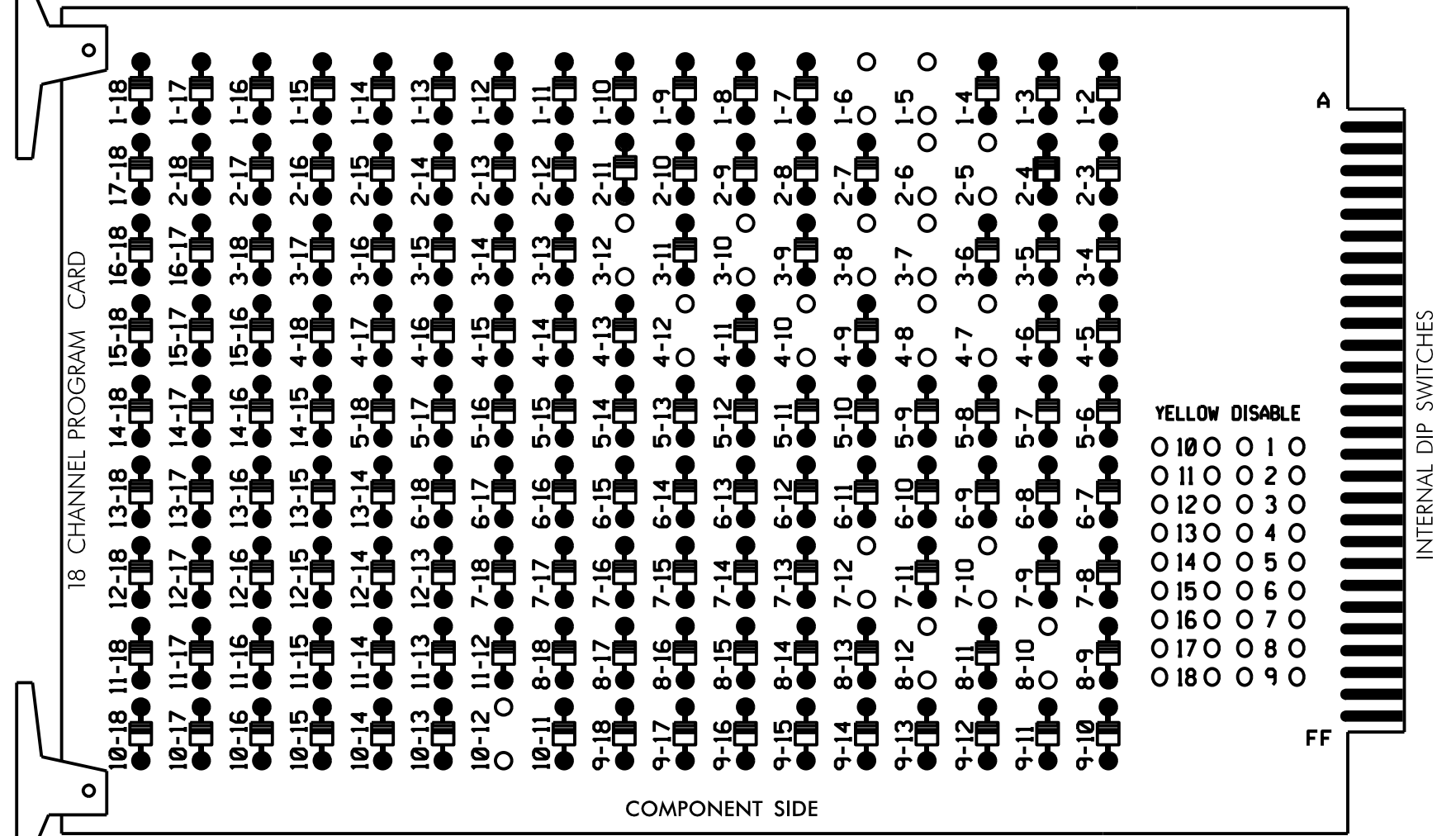
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3/16/2020
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 C:\Users\jcalderon

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 3-10, 3-12, 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.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
- The cabinet and controller are part of the Rocky Mount Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
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	31	41,42	NU	42	51	61,62	NU	71	81,82	NU	NU	31	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	132					A125			A102	
FLASHING YELLOW ARROW															A126			A103	
GREEN ARROW	127				118				133	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.

INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ S	∅ S	∅ S	∅ 3	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	FS
I	1A				3A									DC ISOLATOR
L	NOT USED				NOT USED									DC ISOLATOR
U		∅ 6/SYS	∅ S	∅ S	∅ S	∅ 8	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S
J		6A/S1				8A								
L		6B/S2				NOT USED								

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

FS = FLASH SENSE
 ST = STOP TIME

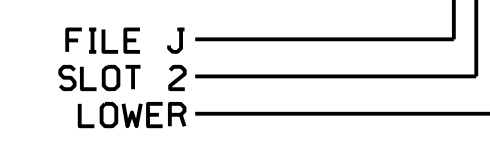
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
3A'	TB4-5,6	I5U	58	20	3	3	Y	Y			15
		J8U	50	12	28	8	Y	Y			3
6A/S1	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S2	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10

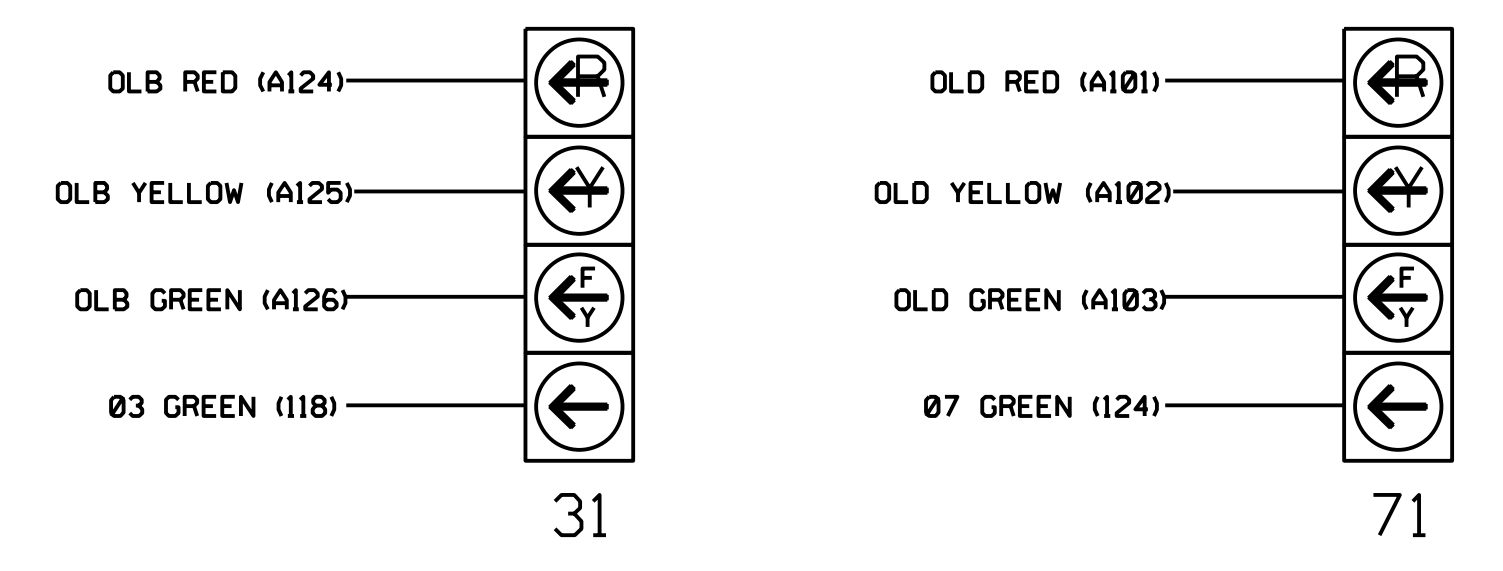
*Add jumper from I5-W to J8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



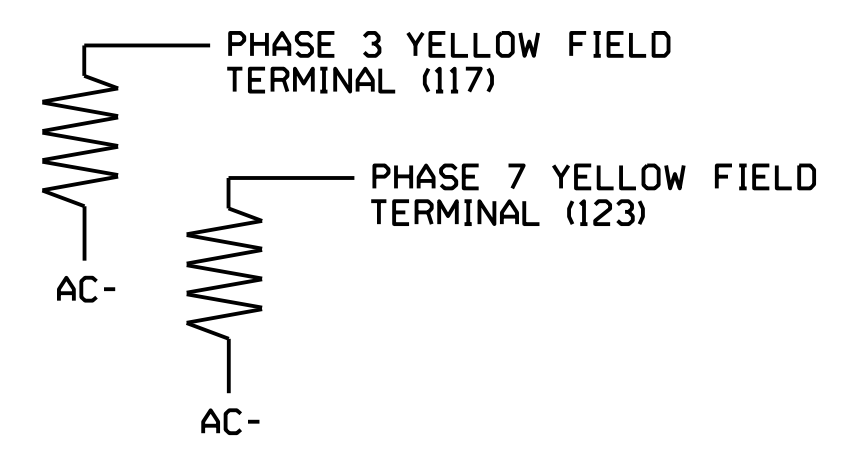
NOTE

1. The sequence display for signal heads 31, and 71 requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTORS INSTALLATION DETAIL

(install resistors as shown below)

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



SPECIAL DETECTOR NOTE

For zones 2A/S3, 4A, 5A, 5B, and 7A 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: 04-0111T2
 DESIGNED: June 2019
 SEALED: 3/17/2020
 REVISED: N/A

Temporary Design 2 (TMP Phase II)
 Electrical Detail Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

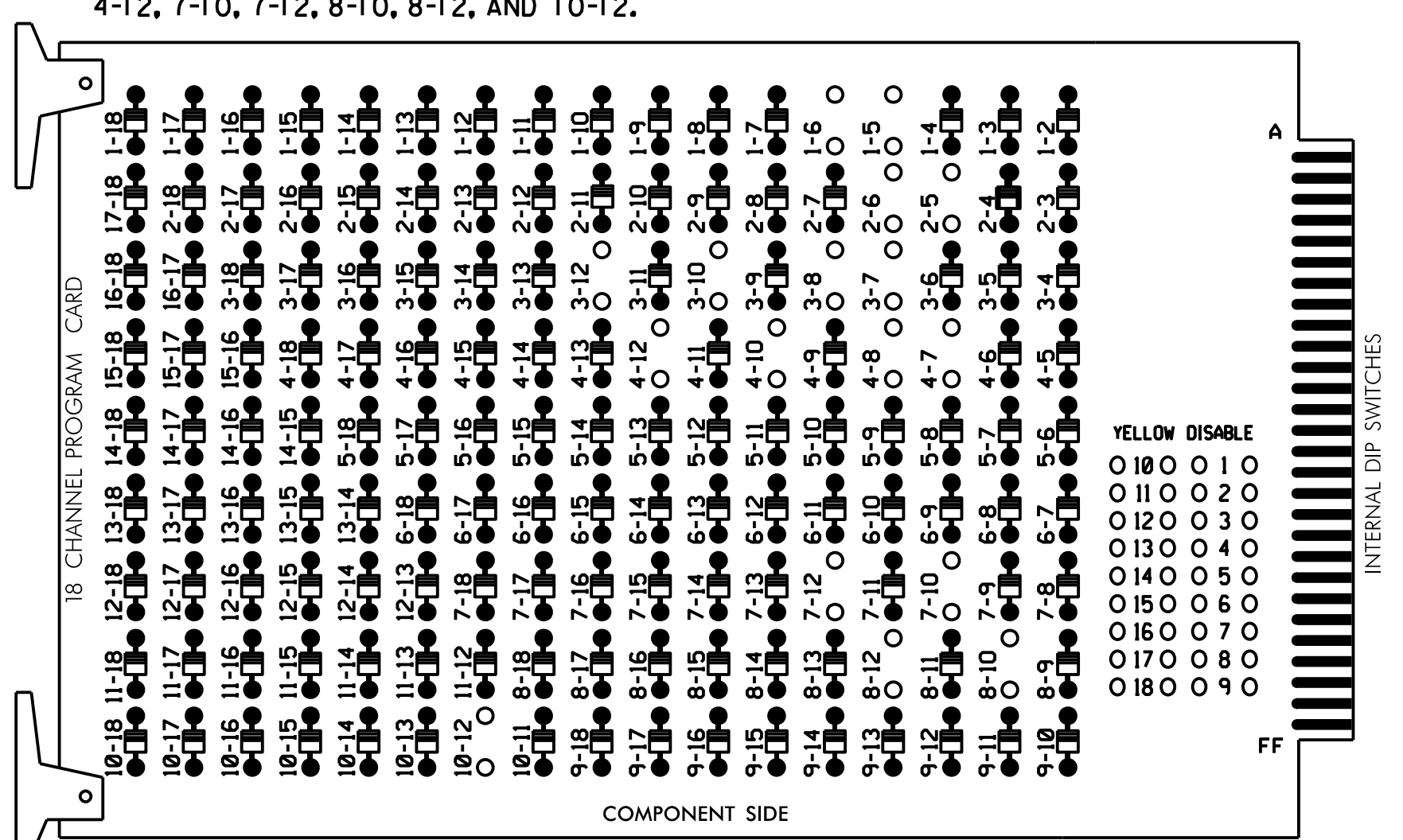
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N. Greenfield Pkwy, Carrboro, NC 27529	I-95 Ramps and NC 4 at NC 4 / NC 48		 James O. Deaton 3/17/2020	
	Division 4	Nash County		Rocky Mount
	PLAN DATE: June 2019	REVIEWED BY: J. O. Deaton		
	PREPARED BY: A. Raviipati	REVIEWED BY: M. W. Valch		
REVISIONS INIT. DATE				
DocuSigned by: James O. Deaton 40FFRAC430BD46F 3/17/2020				
SIG. INVENTORY NO. 04-0111T2				

AECOM
 NC Firm License No.: F-0342
 701 Corporate Center Drive
 Suite 475 Raleigh, NC 27607
 Phone: 919-854-6200

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

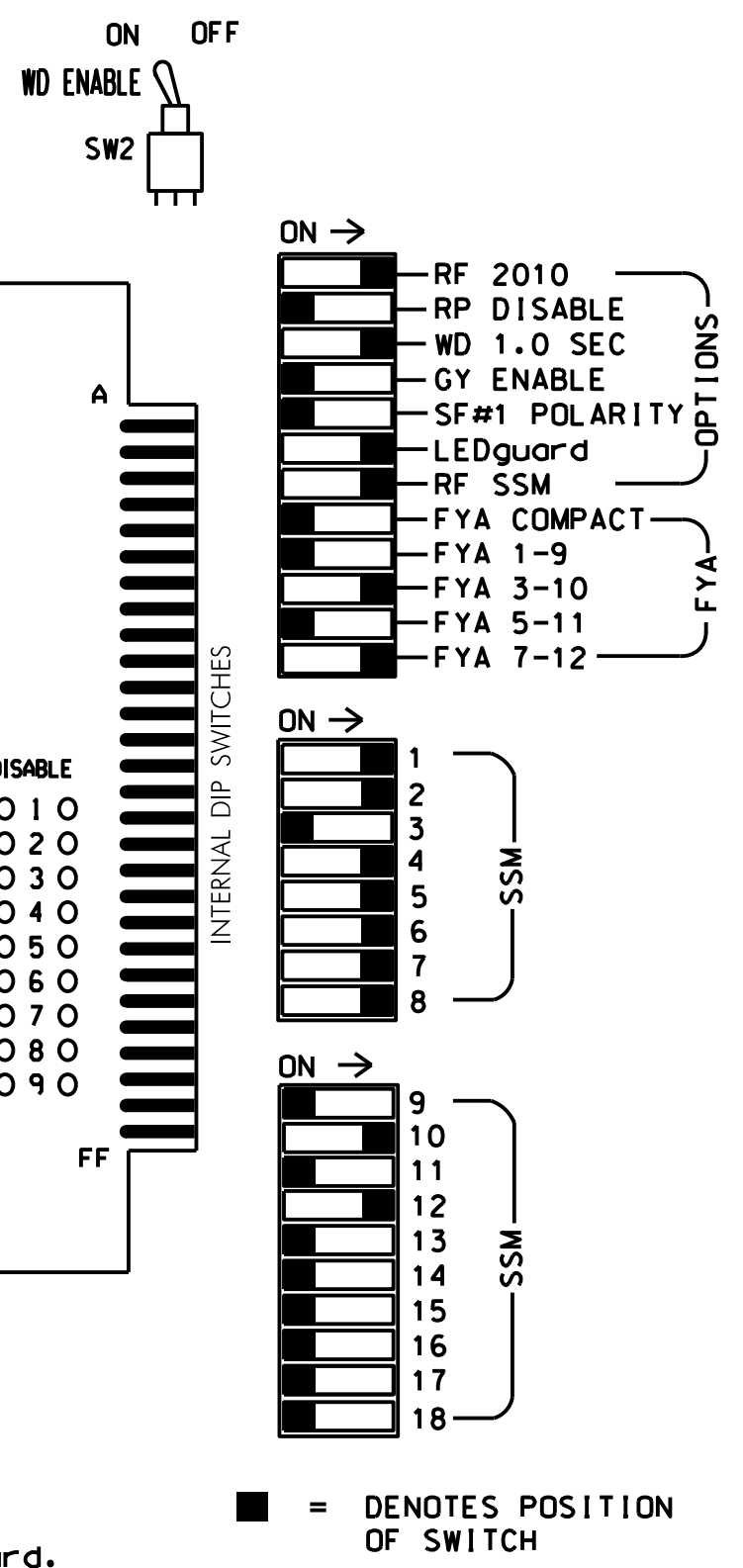
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 7-10, 7-12, 8-10, 8-12, AND 10-12.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all Phases.
4. Remove phase 2 for Variable Initial and Gap Reduction.
5. Program phase 6 for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Startup In Green.
7. Program phases 2 and 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
8. The cabinet and controller are part of the Rocky Mount Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
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	31*	41,42	NU	42	51	61,62	NU	62	71*	81,82	NU	31*	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	132			123		A125			A102
FLASHING YELLOW ARROW															A126			A103
GREEN ARROW	127			118					133	133			124	124				

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
U	∅ 1	∅ 2/SYS	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	FS
L	1A	2A/S3	2C	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	DC ISOLATOR
U	NOT USED	∅ 2	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
L	2B	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

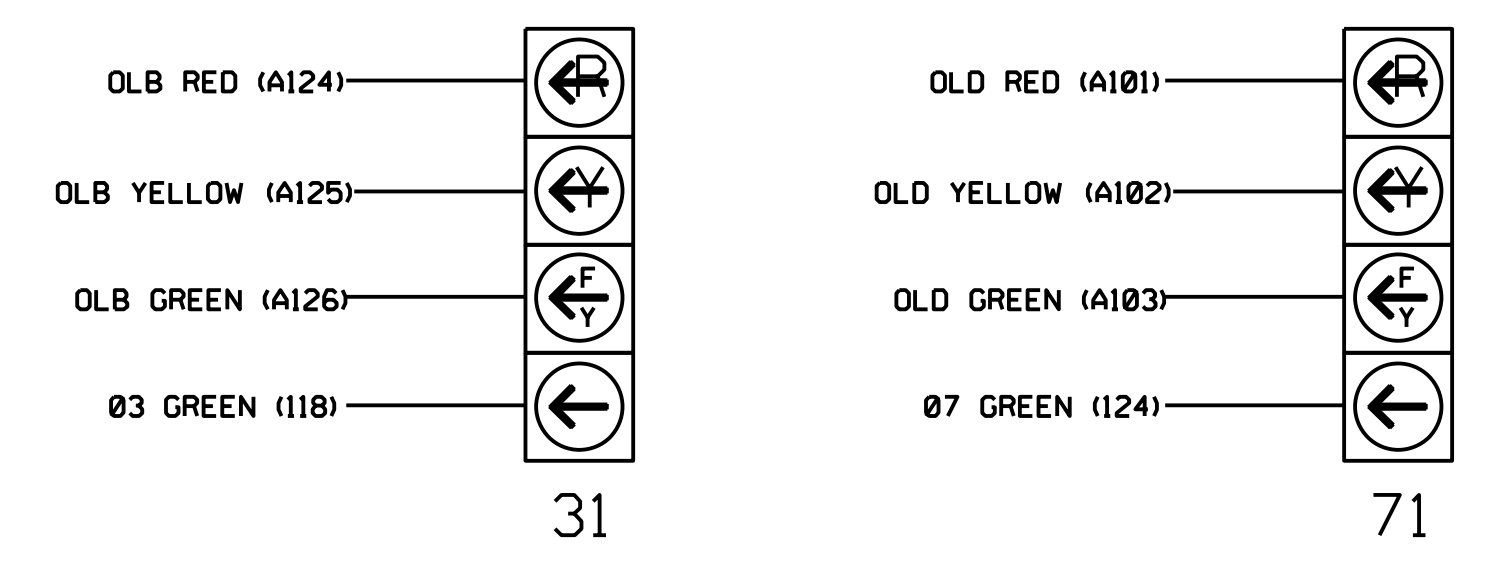
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A/S3	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y		2.8	
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A ¹	TB4-5,6	I5U	58	20	3	3	Y	Y			15
		J8U	50	12	28	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-9,10	J3U	64	26	36	5	Y	Y			15
6A/SI	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
7A ²	TB5-5,6	J5U	57	19	7	7	Y	Y			15
		I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10

¹Add jumper from I5-W to J8-W, on rear of input file.

²Add jumper from J5-W to I8-W, on rear of input file.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



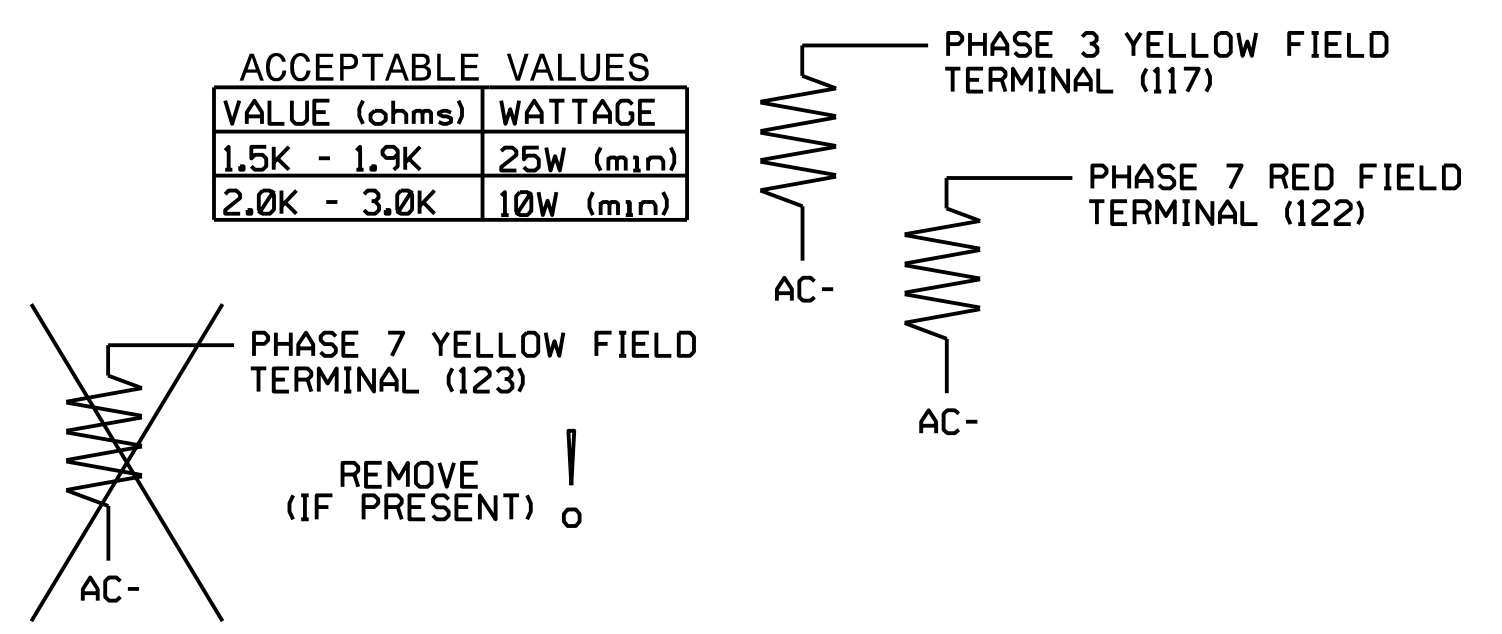
NOTE

1. The sequence display for signal heads 31, and 71 requires special logic programming. See sheet 2 for programming instructions.

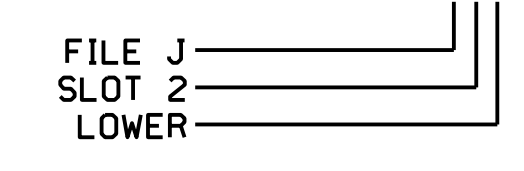
LOAD RESISTORS INSTALLATION DETAIL

(install resistors as shown below)

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



INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0111
 DESIGNED: July 2019
 SEALED: 3/17/2020
 REVISED: N/A

Final Design (TMP Phases III & IV)
 Electrical Detail Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	I-95 Ramps and NC 4 at NC 4 / NC 48		
	Division 4 PLAN DATE: July 2019 PREPARED BY: A. Ravipati	Nash County REVIEWED BY: J. O. Deaton REVIEWED BY: M. W. Valch	

AECOM
 NC Firm License No.: F-0342
 701 Corporate Center Drive
 Suite 475 Raleigh, NC 27607
 Phone: 919-854-6200

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

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

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 39	= Overlap D Red
OUTPUT 40	= Overlap D Yellow
OUTPUT 41	= Overlap D Green
OUTPUT 47	= Overlap B Red
OUTPUT 48	= Overlap B Yellow
OUTPUT 49	= Overlap B Green

OVERLAP PROGRAMMING DETAIL (program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

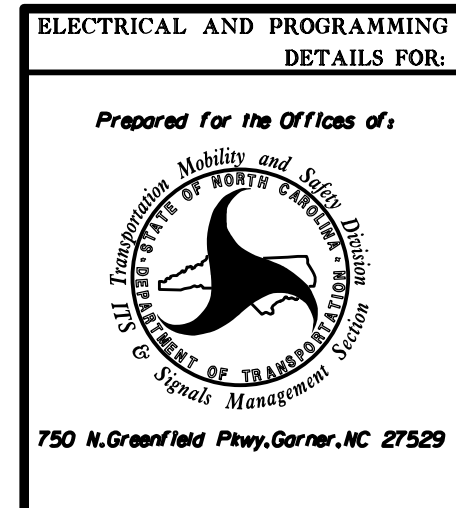
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0111
DESIGNED: July 2019
SEALED: 3/17/2020
REVISED: N/A

Final Design (TPM Phases III & IV)
Electrical Detail Sheet 2 of 2

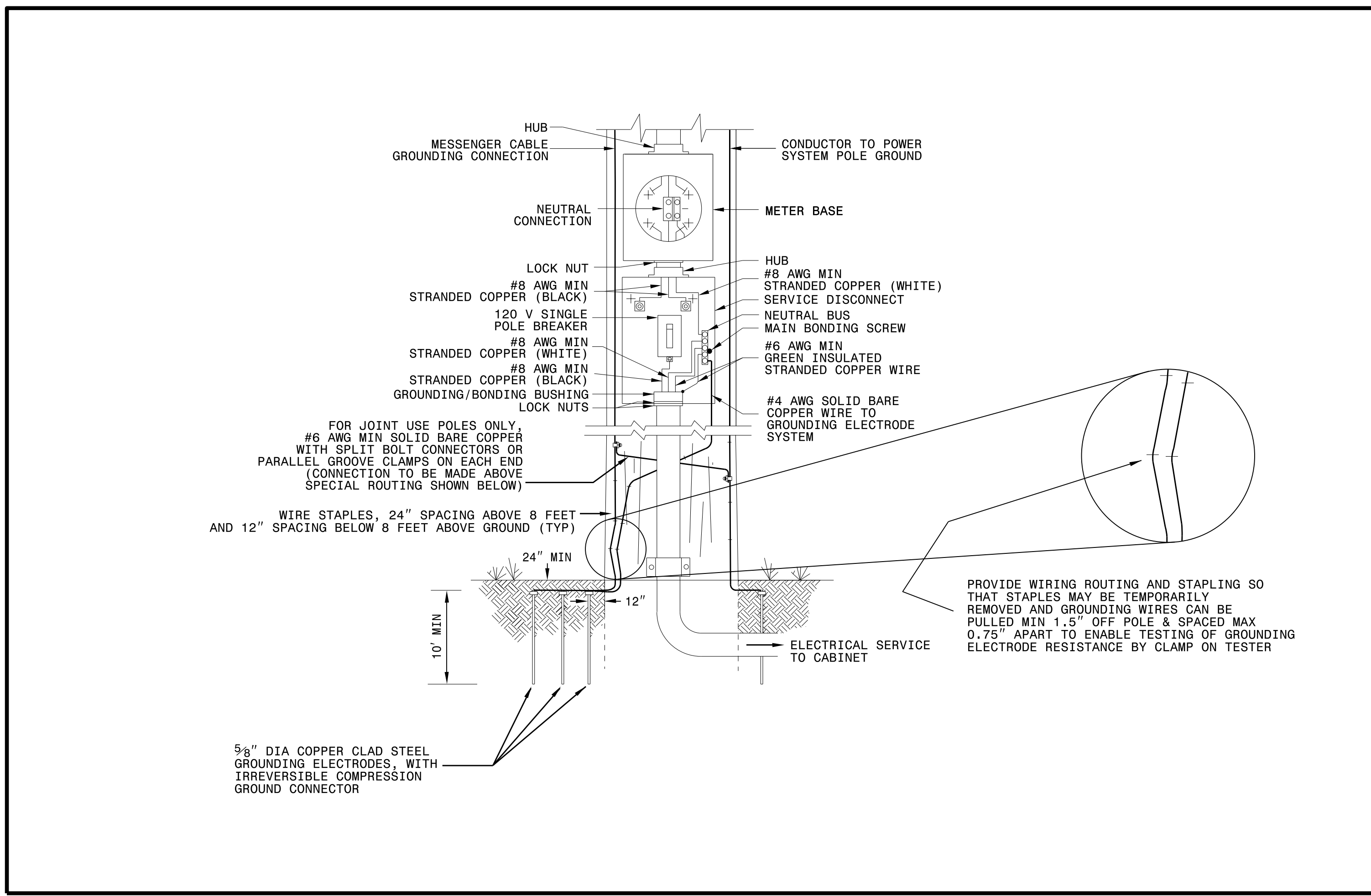
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



ELECTRICAL AND PROGRAMMING DETAILS FOR:		I-95 Ramps and NC 4 at NC 4 / NC 48	
Prepared for the Offices of:	Division 4	Nash County	Rocky Mount
PLAN DATE: July 2019	REVIEWED BY: J. O. Deaton	PREPARED BY: A. Ravipati	REVIEWED BY: M. W. Valch
REVISIONS		INIT.	DATE

DocuSigned by: James O. Deaton 3/17/2020	
40FFBAC30B040F	
SIG. INVENTORY NO. 04-0111	

3/17/2020 P:\60551716 - B-5980-400-CAD-GIS\4910_NCDOT_TIP\Trf\Fic\Signal\Design\Sig\04-0111\Fel.dgn



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

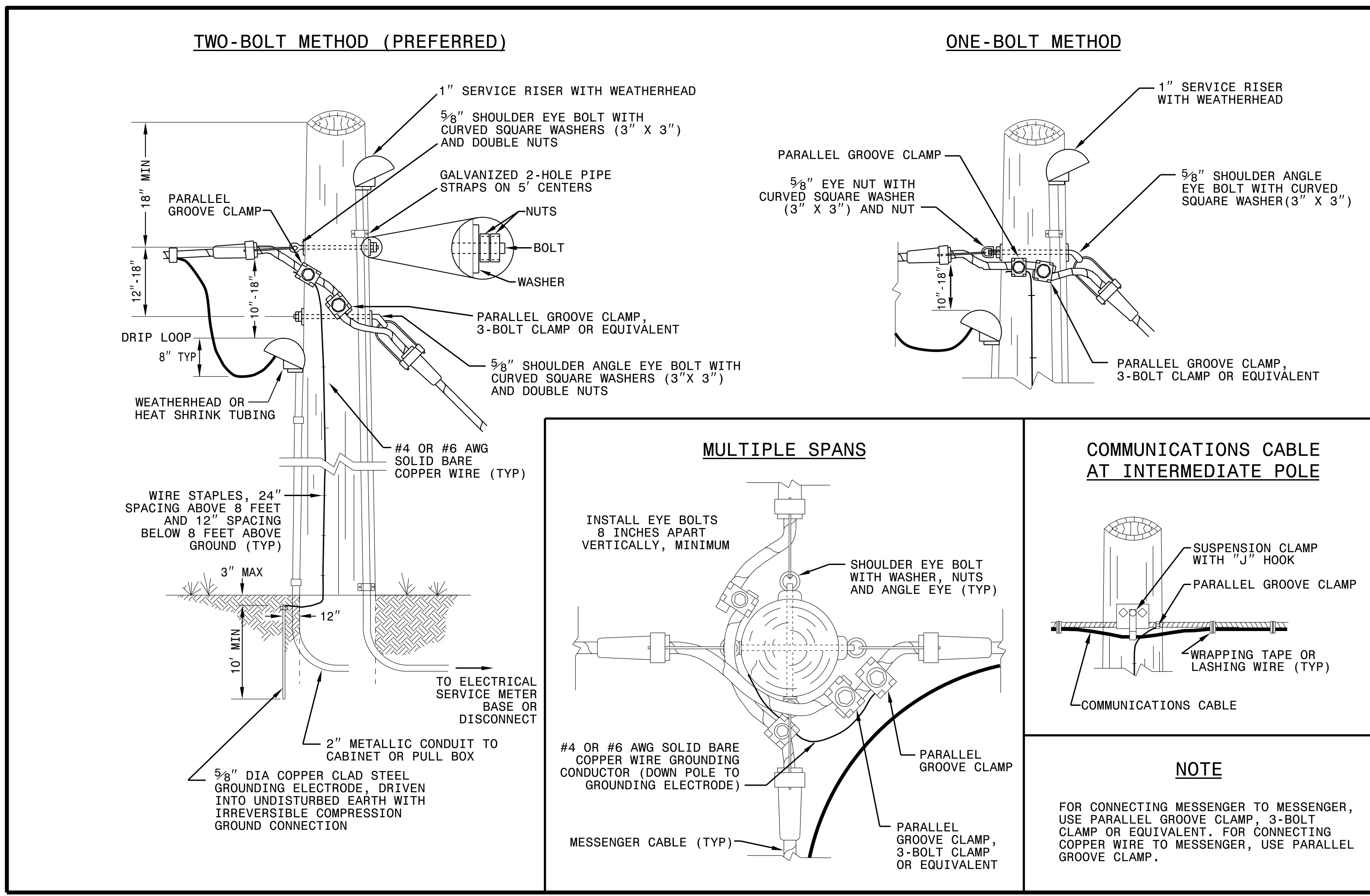
ENGLISH STANDARD DRAWING FOR

ELECTRICAL SERVICE GROUNDING

GROUNDING AND BONDING

SHEET 1 OF 1

1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1

1720D01

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

See Plate for Title

Prepared in the Offices of:

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10/11/2017

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