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TIP PROJECT: U-5701A

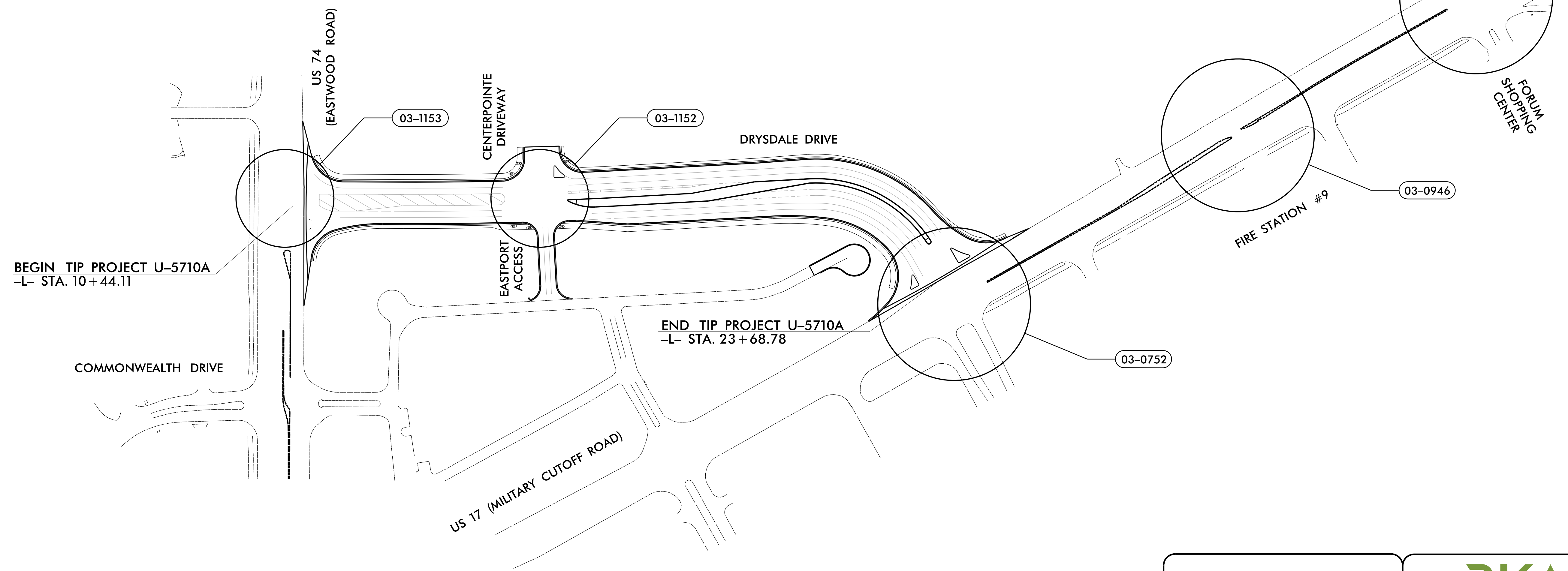
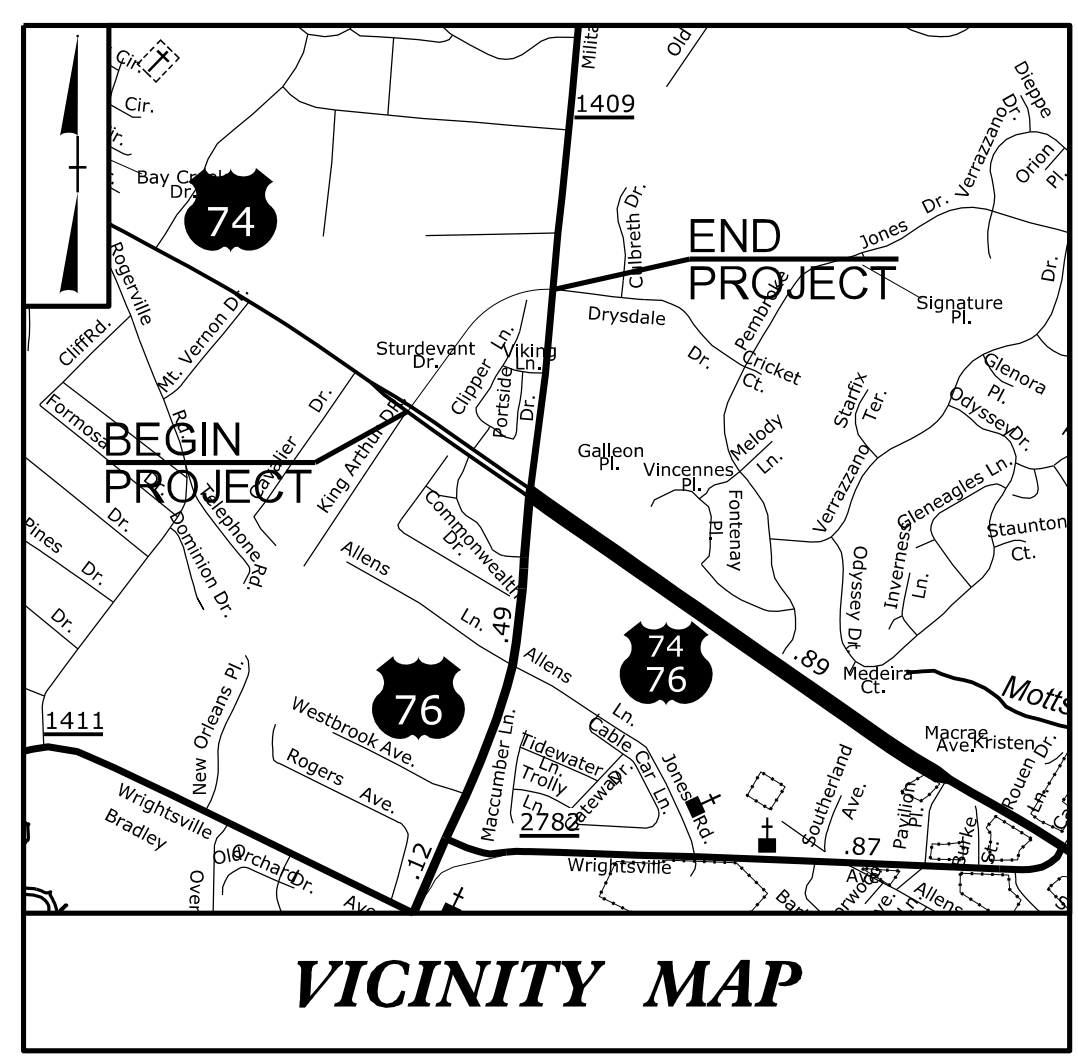
CONTRACT: C204747

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

**LOCATION: NEW LOCATION NORTHWESTERN QUADRANT CONNECTION BETWEEN
US 74 (EASTWOOD RD.) AND US 17 (MILITARY CUTOFF RD.)**
**TYPE OF WORK: TRAFFIC SIGNAL AND
COMMUNICATION DESIGN**

PROJECT REFERENCE NO. U-5710A	SHEET NO. Sig-1.0
APPROVED: <i>William J. Hamilton</i> DATE: 03/23/2022	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



PLANS PREPARED BY:

W. Jason Hamilton, P.E., PTOE – Project Manager

Alicia D. Andrews, E.I. – Project Engineer

INDEX OF PLANS		
Sheet Number	SIN	Location/Description
Sig. 1.0	-	Title Sheet
Sig. 2.0-2.9	03-0752	US 17 (Military Cutoff Road) at Drysdale Drive
Sig. 3.0-3.4	03-1153	US 74 (Eastwood Road) at Drysdale Drive
Sig. 4.0-4.7	03-1152	Drysdale Drive at Centerpointe/Eastport Access
Sig. 5.0-5.2	03-0946	US 17 (Military Cutoff Road) at Wilmington Fire Station #19
Sig. 6.0-6.1	03-0895	US 17 (Military Cutoff Road) at Forum Shopping Center/Parker Farm Drive
Sig. 7.0-Sig. M8	-	Signal Standard Drawings
SCP 1-6	-	Cable Routing and Splice Details

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

LEGEND

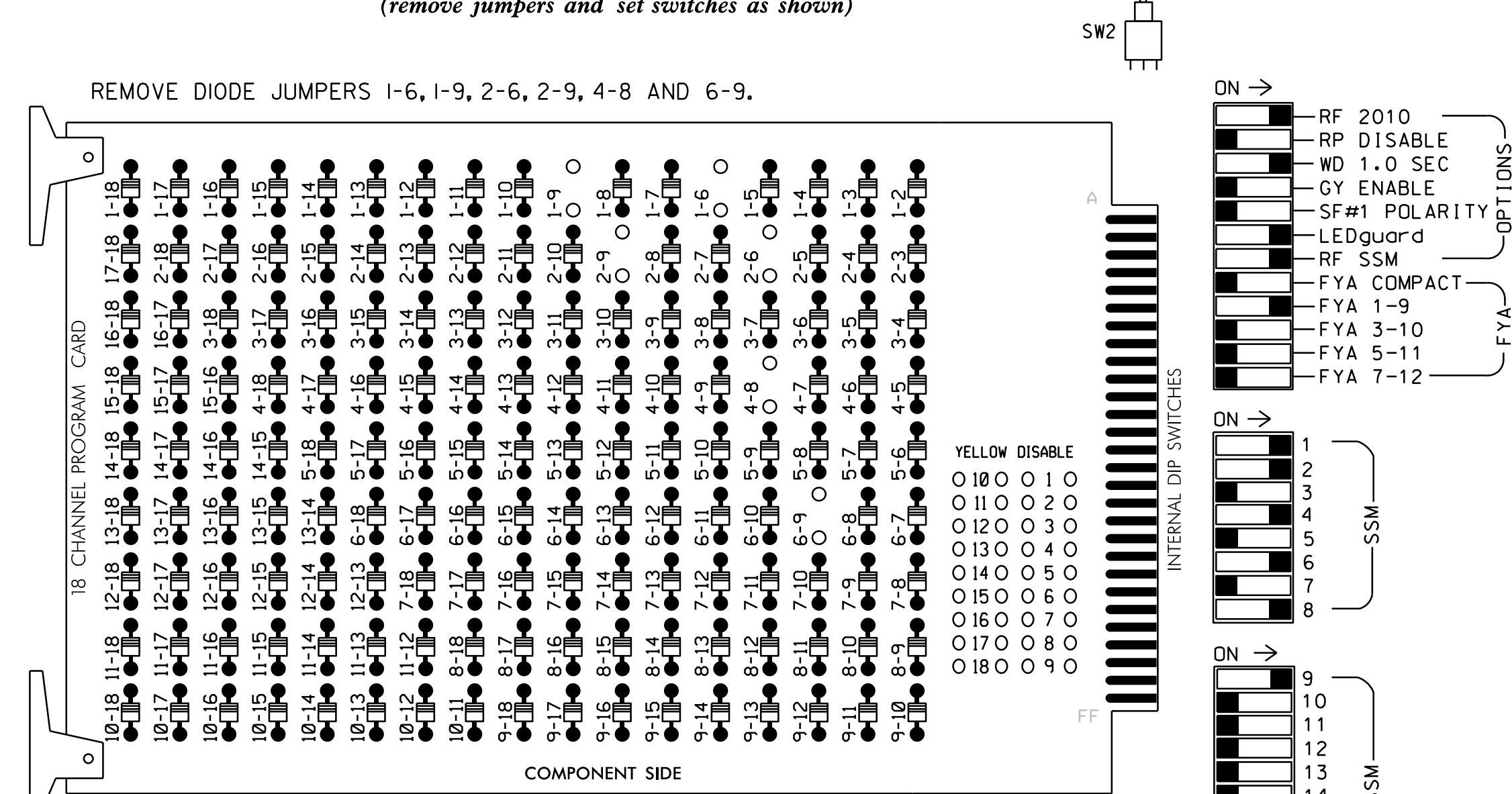
(#####) SIGNAL INVENTORY NUMBER

**INTELLIGENT TRANSPORTATION
AND SIGNALS UNIT**

Contacts:
Zachary Little, P.E. – Eastern Region Signals Engineer
D. Todd Joyce, P.E. – Signal Equipment Design Review Engineer
Neil Avery – ITS Engineer

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 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 1 as Wag Overlaps.
- The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S5,S8,S11,AUX S1
 PHASES USED.....1,2,4,6,8
 OVERLAP "A".....1+2
 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	21,22,23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	NU	NU	
RED	*	128			101			134			107								
YELLOW		129			102			135			108								
GREEN		130			103			136			109								
RED ARROW																		A121	
YELLOW ARROW	126																		A122
FLASHING YELLOW ARROW																			A123
GREEN ARROW	127	127																	

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

INPUT FILE POSITION LAYOUT

(front view)

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

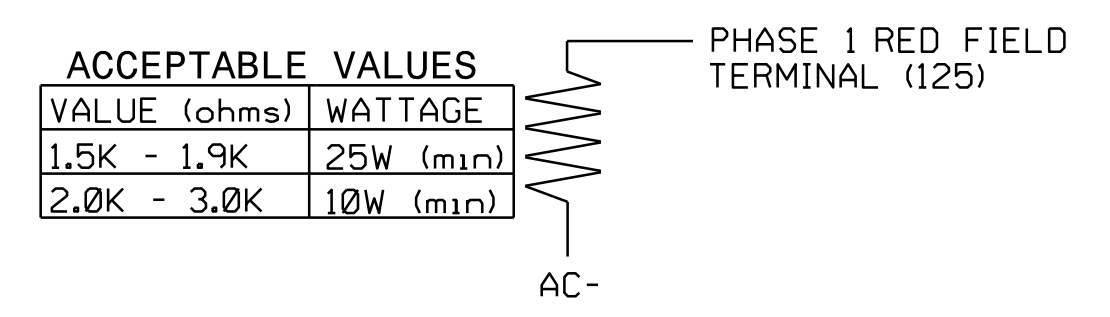
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

SPECIAL DETECTOR NOTE

For detector zones 1B, 4A, 4B and 8A, install a microwave detection system for vehicle detection. Perform installation according to the manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

LOAD RESISTOR INSTALLATION DETAIL

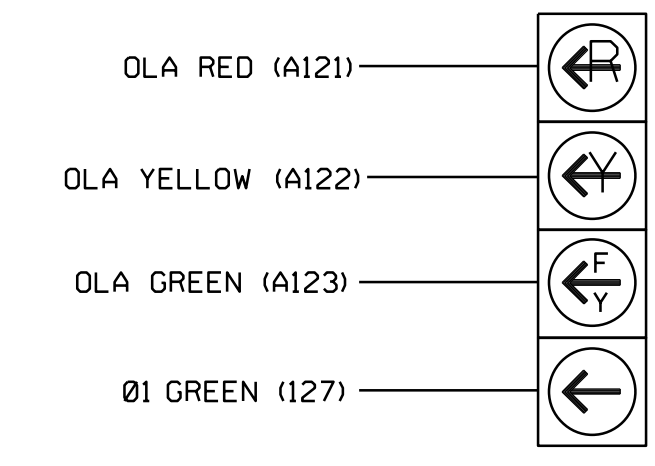
(install resistor as shown below)



11/08/2021
 User: J.Wendel

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



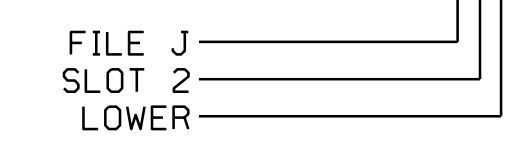
- NOTE
- The sequence display for signal head 11 requires special programming. See sheet 2 for programming instructions.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			

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

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0752T
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

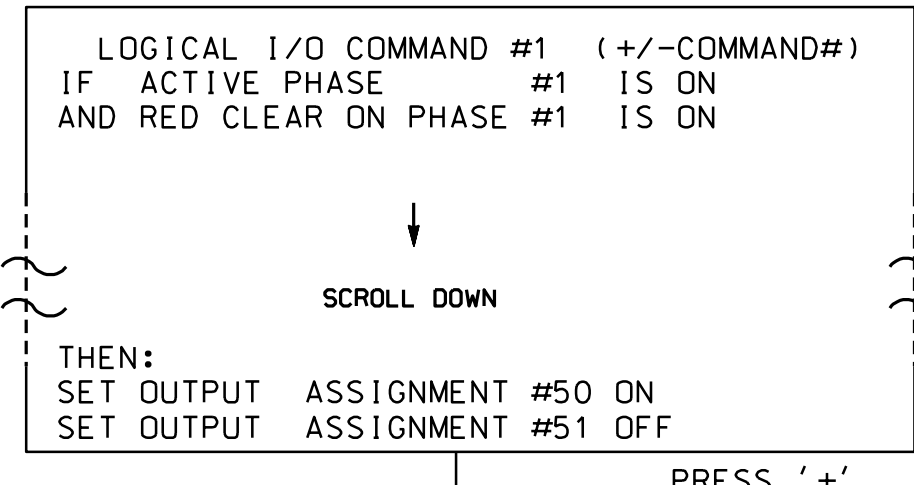
Electrical Detail - Temporary Design
 Sheet 1 of 2

 RAMEY KEMP ASSOCIATES 5808 Farringdon Place Raleigh, North Carolina 27609 Phone: 919-872-6116 www.rameykemp.com NC License No. C-6910	ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 17 (Military Cutoff Road) at Drysdale Drive	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Division 3 New Hanover County Wilmington	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER WILLIAM J. HAMILTON 32396	SEAL 32396
PLAN DATE: November 2021 PREPARED BY: A. Andrews	REVIEWED BY: WJ Hamilton RKA PROJ. NO.: 19258 (040)	Division 3 New Hanover County Wilmington PREPARED BY: A. Andrews REVIEWED BY: WJ Hamilton RKA PROJ. NO.: 19258 (040)	DATE: 11/08/2021 DATE:
REVISIONS	INIT.	DATE	SIG. INVENTORY NO. 03-0752T

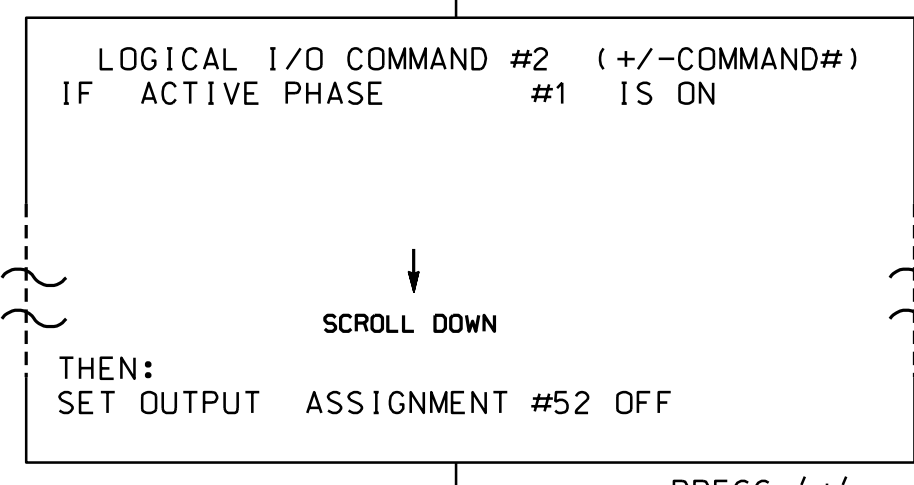
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

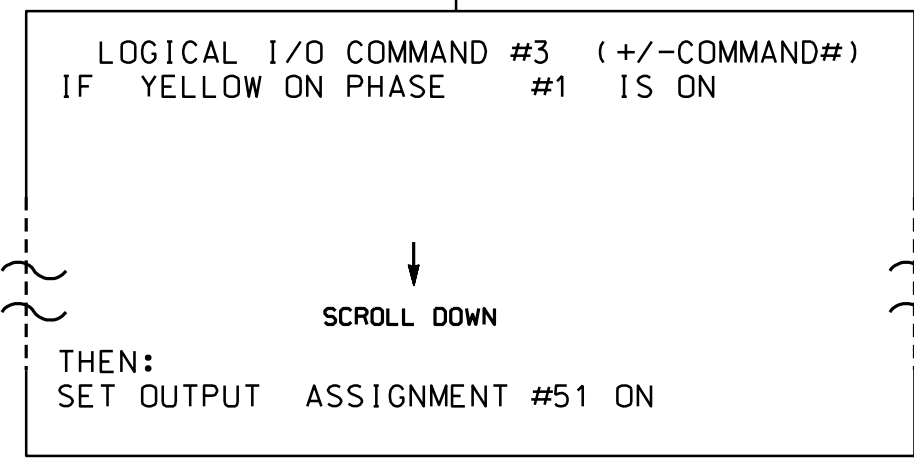
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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



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



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

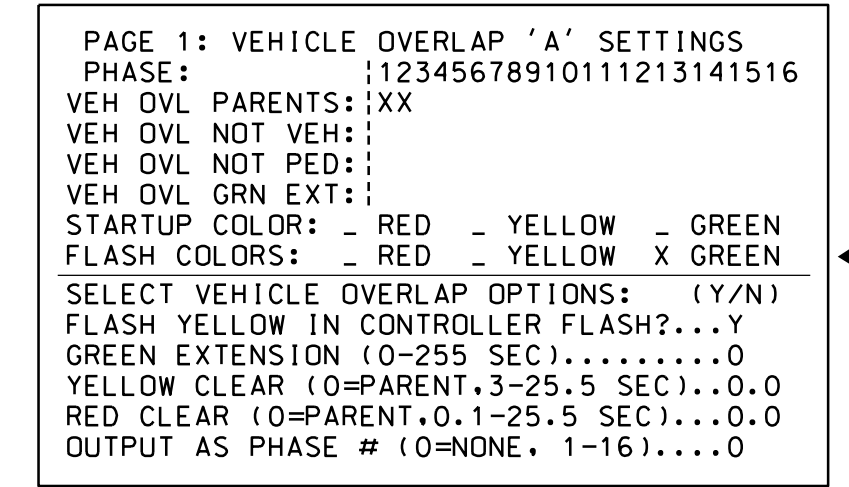
LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
OUTPUT 50	= Overlap A Red
OUTPUT 51	= Overlap A Yellow
OUTPUT 52	= Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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



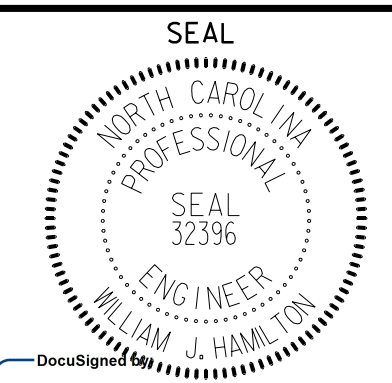


← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

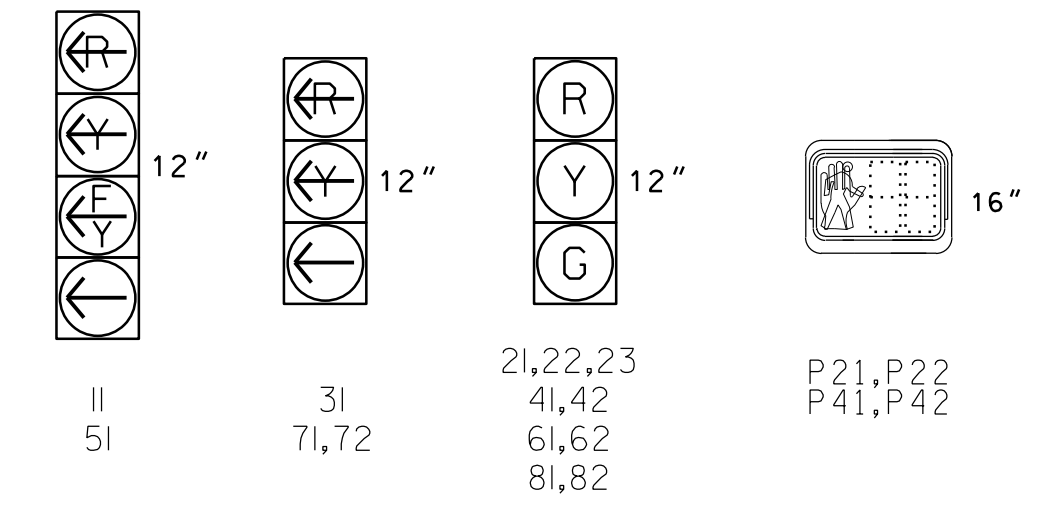
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0752T
DESIGNED: Nov 2021
SEALED: 11/08/2021
REVISED: N/A

Electrical Detail - Temporary Design
Sheet 2 of 2

 <p>RKA RAMEY KEMP ASSOCIATES 8808 Farrington Place Raleigh, North Carolina 27609 Phone: 919-872-8115 www.rameykemp.com NC License No. C-0910</p>	 <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	US 17 (Military Cutoff Road) at Drysdale Drive		 <p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER WILLIAM J. HAMILTON 32396</p>
		Division 3 New Hanover County Wilmington	PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton	

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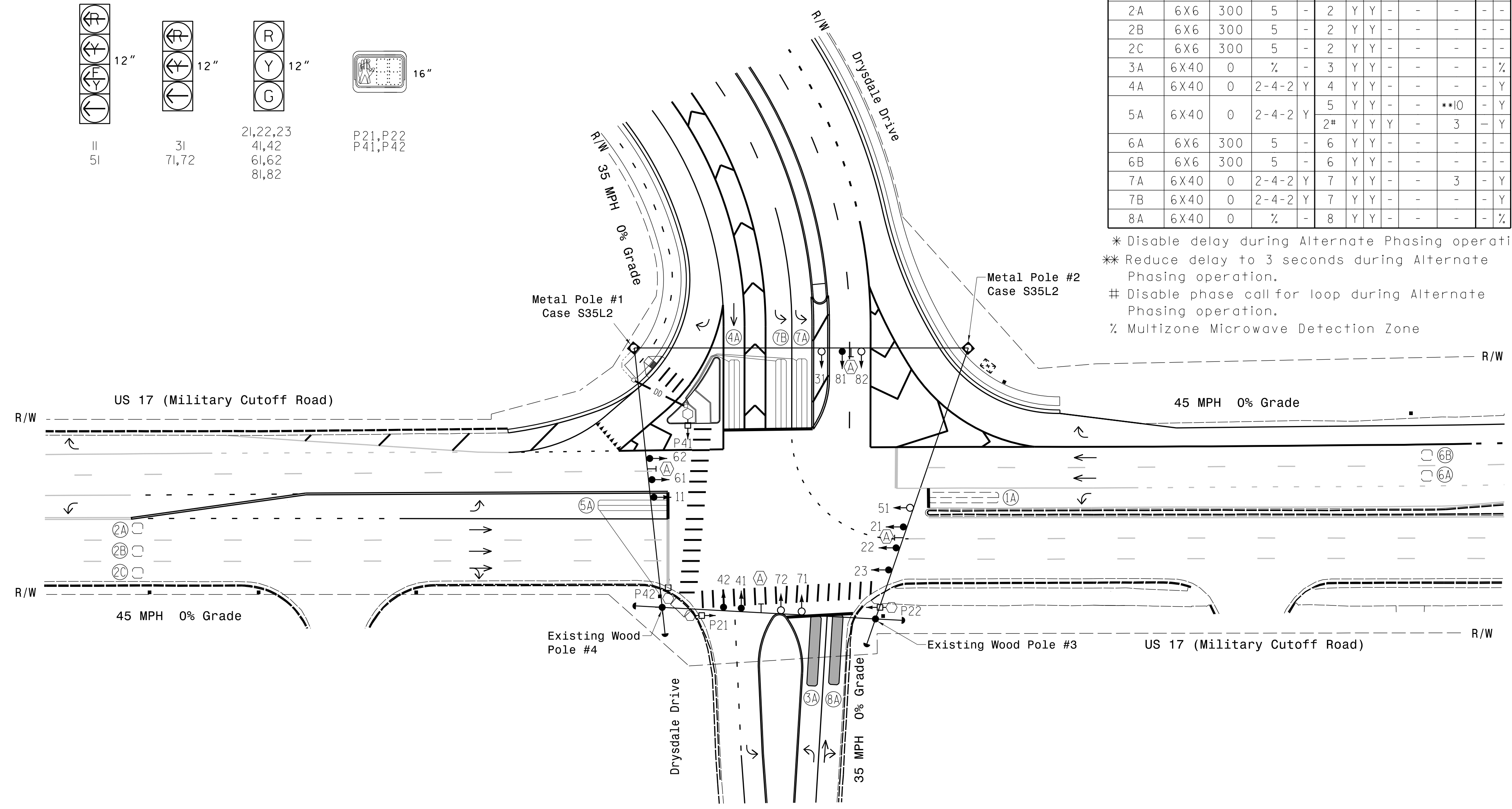
SIGNAL FACE I.D.
All Heads L.E.D.



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

8 Phase Fully Actuated (Wilmington Signal System)

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "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 41, 42 and 81.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program the pedestrian heads to countdown the flashing "DON'T WALK" time only.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Relabel existing loops 8A as 3A and 1B as 8A.
- Incorporate Microwave Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Microwave Detection locations and mounting heights to obtain detection zones as shown.
- Signal system data:
Controller Asset #0752.
- Refer to pavement marking plans for stop bar and crosswalk locations.
- Type II pedestals shall be black powder-coated.

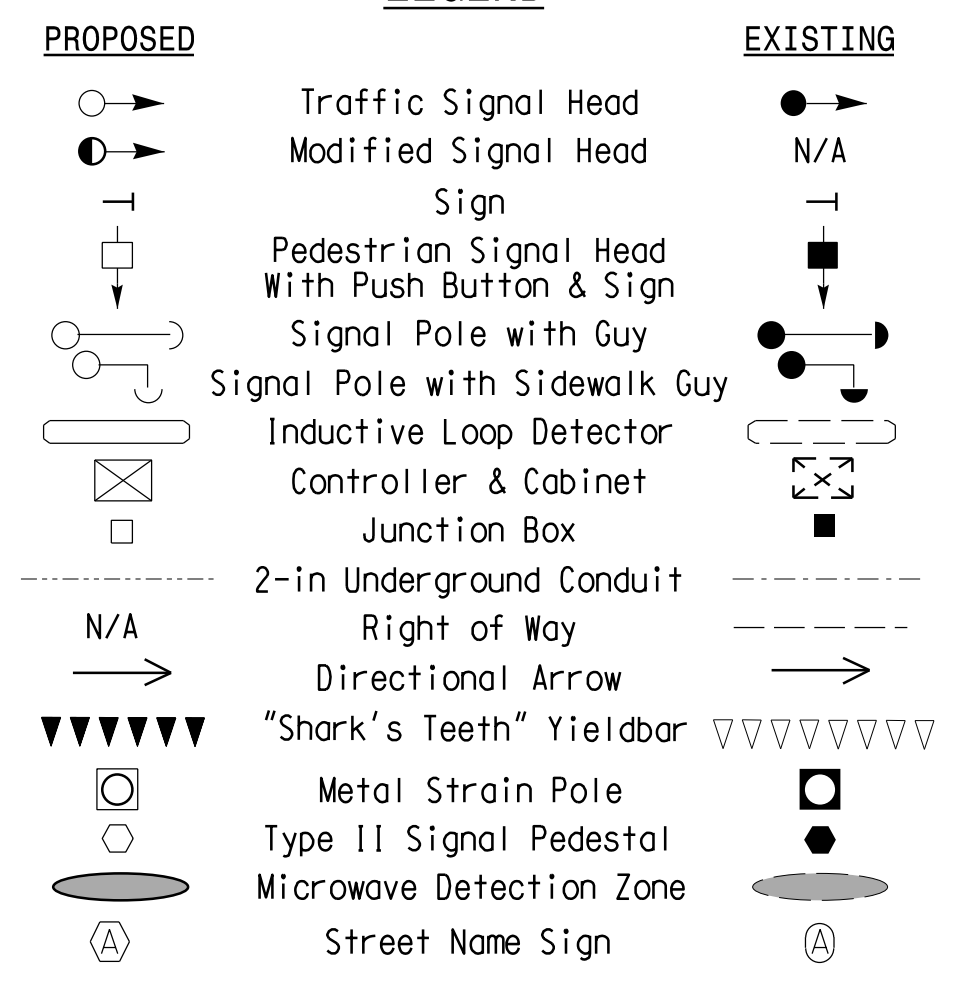


* Disable delay during Alternate Phasing operation.
 ** Reduce delay to 3 seconds during Alternate Phasing operation.
 # Disable phase call for loop during Alternate Phasing operation.
 % Multizone Microwave Detection Zone

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	5	12	5	5	5	12	5	5
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	15	100	25	25	15	100	25	25
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clearance	3.6	2.1	3.1	2.0	3.3	2.1	3.3	1.9
Walk 1 *	-	7	-	7	-	-	-	-
Don't Walk 1	-	27	-	27	-	-	-	-
Seconds Per Actuation *	-	1.2	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

LEGEND

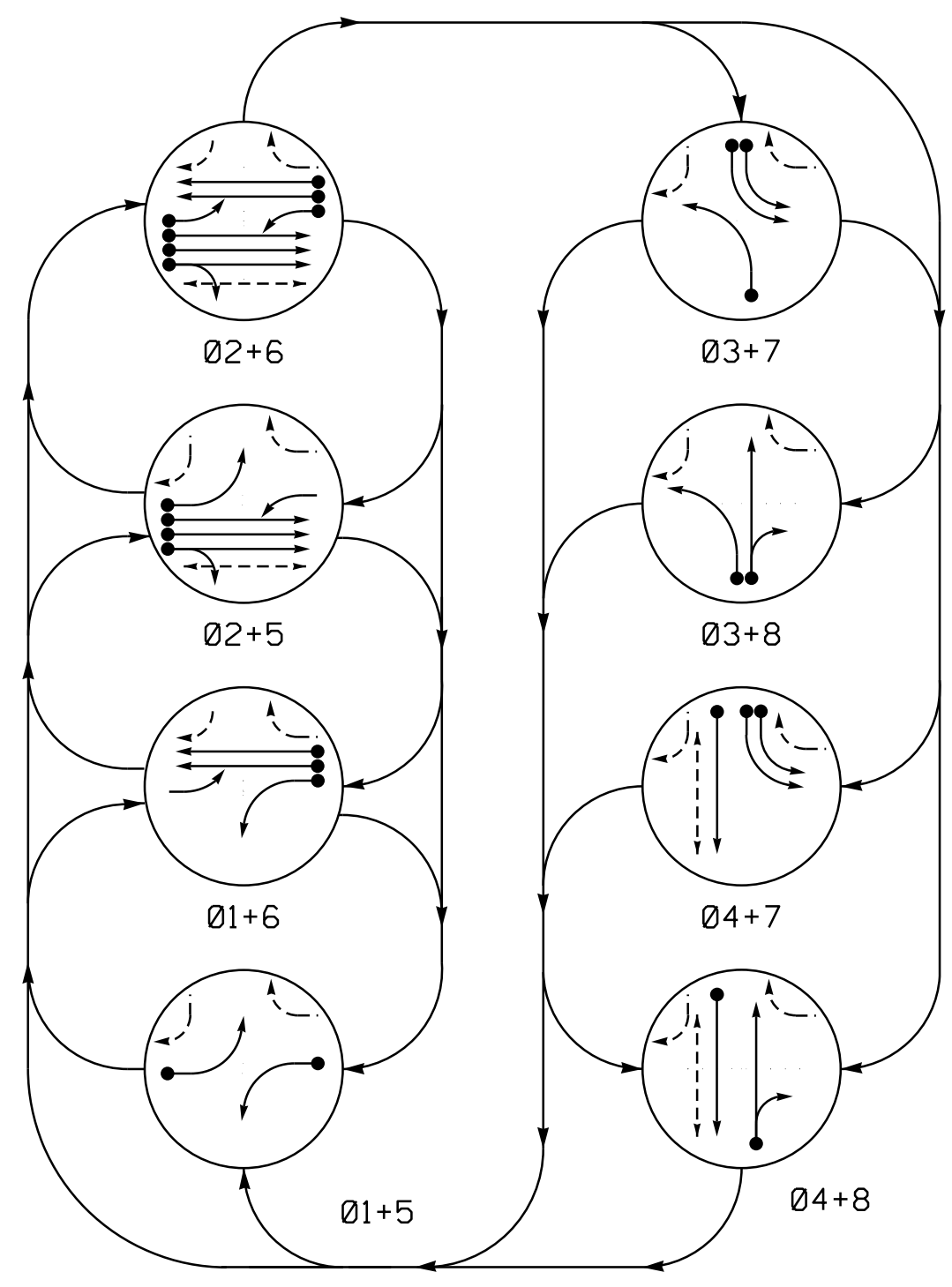


Signal Upgrade - Final Design
Sheet 1 of 2

 RAMEY KEMP ASSOCIATES 808 Parkington Place Raleigh, North Carolina 27609 Phone: 919-872-5115 www.rkainc.com NC License No. C-0810	Prepared for: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	US 17 (Military Cutoff Road) at Drysdale Drive Division 3 New Hanover County Wilmington PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)	SEAL William J. Hamilton 11/08/2021 DATE

11/08/2021
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 User: jhamon

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

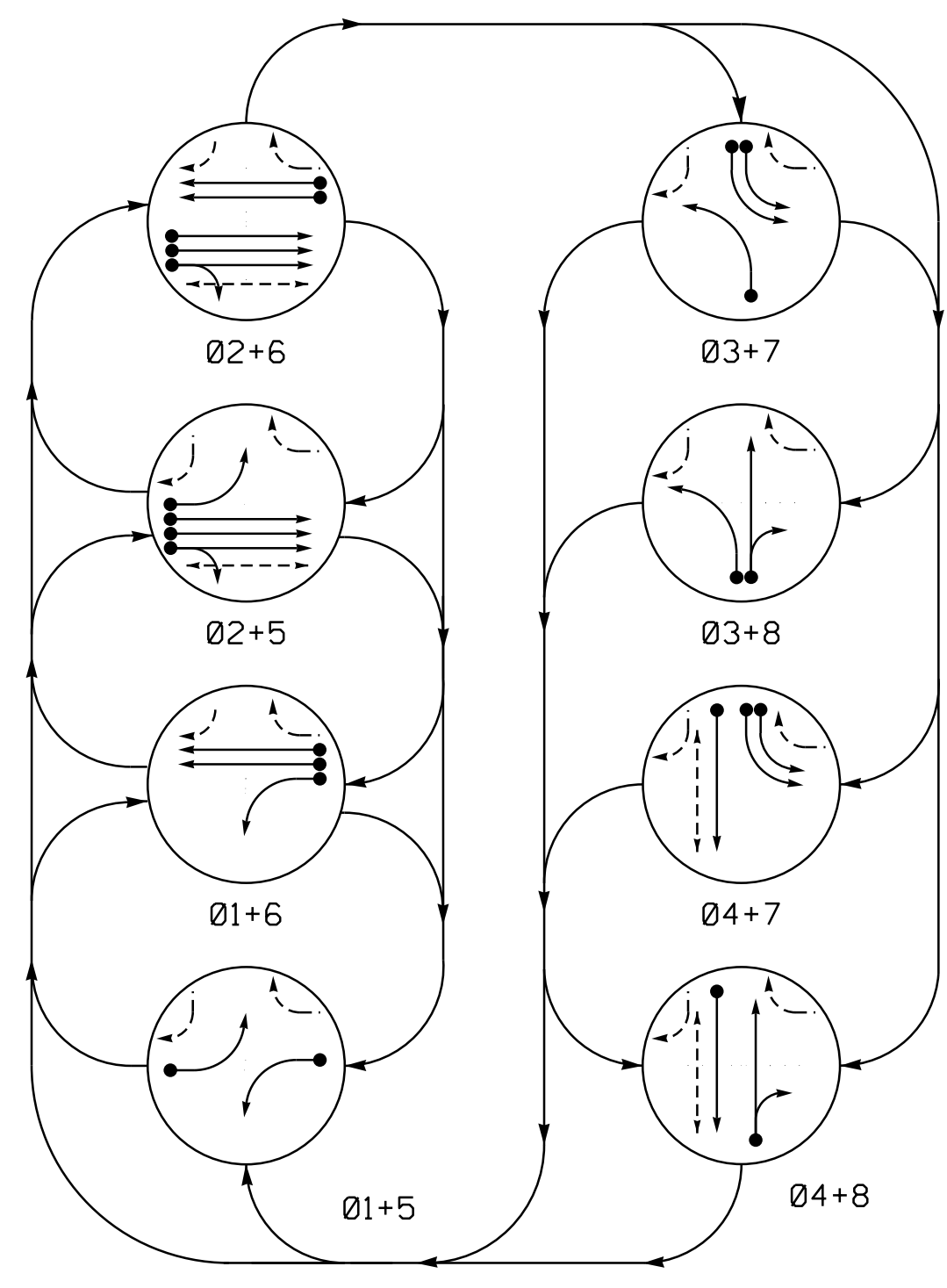
DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	←	←	←	←	←	←	Y
21,22,23	R	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←	Y
41,42	R	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←	Y
61,62	R	G	R	G	R	R	R	R	Y
71,72	←	←	←	←	←	←	←	←	Y
81,82	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

8 Phase Fully Actuated (Wilmington Signal System)

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "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 41, 42 and 81.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program the pedestrian heads to countdown the flashing "DON'T WALK" time only.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Relabel existing loops 8A as 3A and 1B as 8A.
- Incorporate Microwave Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Microwave Detection locations and mounting heights to obtain detection zones as shown.
- Signal system data:
Controller Asset #0752.
- Refer to pavement marking plans for stop bar and crosswalk locations.
- Type II pedestals shall be black powder-coated.

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	←	←	←	←	←	←	Y
21,22,23	R	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←	Y
41,42	R	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←	Y
61,62	R	G	R	G	R	R	R	R	Y
71,72	←	←	←	←	←	←	←	←	Y
81,82	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

Signal Upgrade - Final Design
Sheet 2 of 2

	US 17 (Military Cutoff Road) at Drysedale Drive		
	Division 3 New Hanover County Wilmington	PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)	
750 N. Greenfield Pkwy, Garner, NC 27529	SCALE: 0 40 1" = 40'	REVISIONS:	DATE: 11/08/2021



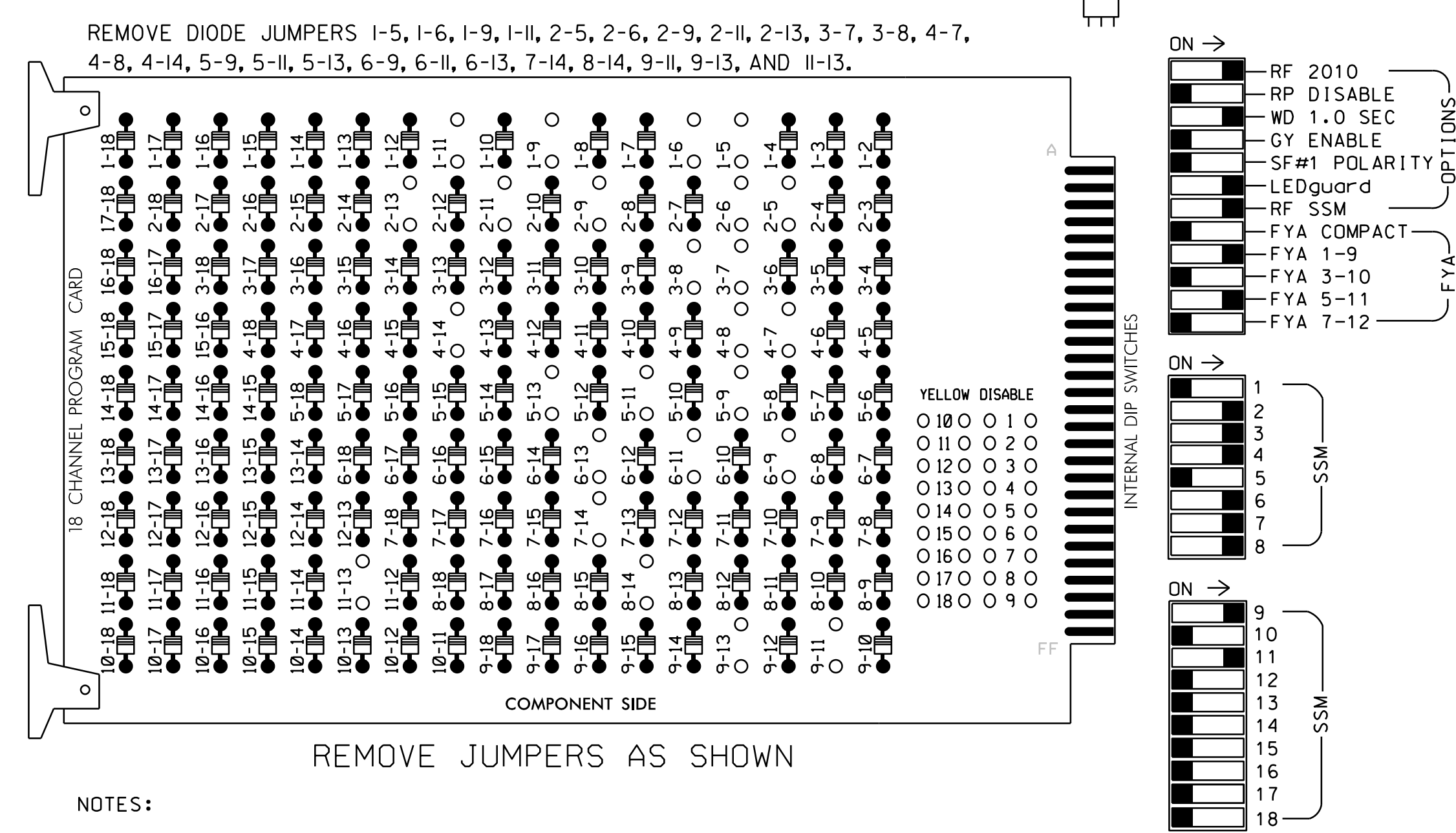
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 User: jhamon

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 03-0752

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.
- 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 phase 2 and 4 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CHU 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, 23	P21, P22	31	41,42	P41, P42	51	61,62	NU	71,72	81,82	NU	11	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW					116						122		A121			A114		
YELLOW ARROW					117						123		A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127				118			133			124							
Hand					113			104										
Walker					115			106										

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

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 2	∅ 2	∅ 3	∅ 4	∅ 4	∅ 5	∅ 5	∅ 6	∅ 6	∅ 7	∅ 7	∅ 8
L	1A	2A	2C	2D	3A	4A	4B	5A	5B	6A	6B	7A	7B	8A
U	∅ 5	∅ 6	∅ 7	∅ 7	∅ 8	∅ 9	∅ 9	∅ 10	∅ 10	∅ 11	∅ 11	∅ 12	∅ 12	∅ 13
L	5A	6A	7A	7B	8A	9A	9B	10A	10B	11A	11B	12A	12B	13A
	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

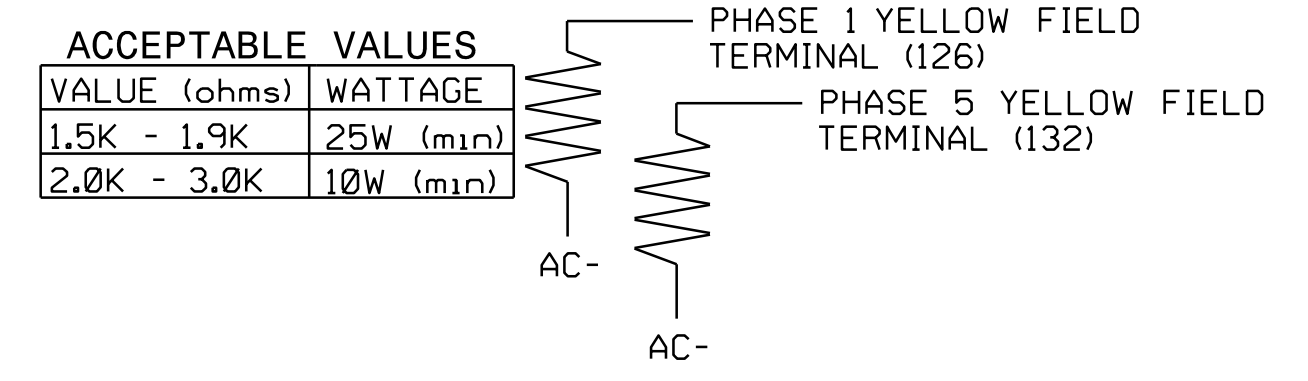
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card

SPECIAL DETECTOR NOTE

For detector zones 3A and 8A, install a microwave detection system for vehicle detection. Perform installation according to the manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



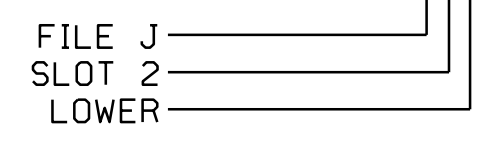
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10 ★	26	6	Y	Y	Y		3
	-	I1U	56	18 ★	51	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9 ★	22	2	Y	Y	Y		3
	-	J1U	55	17 ★	55	5	Y	Y			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
7B	TB5-9,10	J6U	42	4	8	7	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2	PED				
P41,P42	TB8-5,6	I12L	69	31	PED 4	4	PED				

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

- ¹Add jumper from I1-W to J4-W, on rear of input file.
²Add jumper from J1-W to I4-W, on rear of input file.
 ★ See Input Page Assignment programming details on sheets 3 and 4.

INPUT FILE POSITION LEGEND: J2L

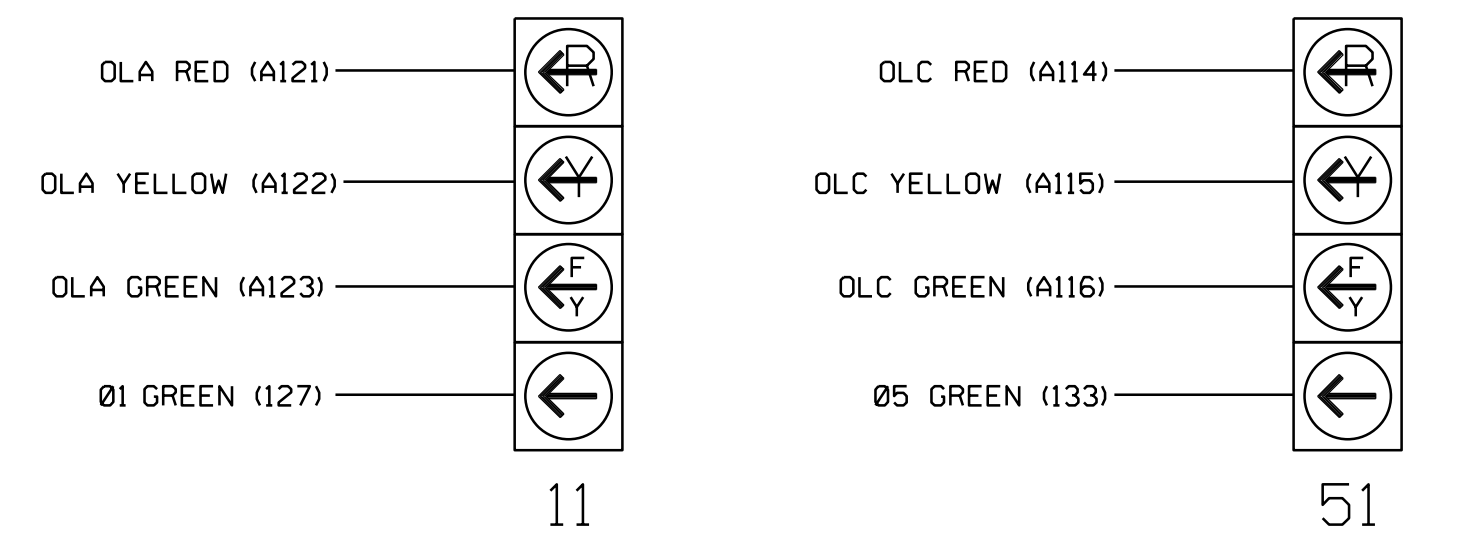


COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for signal heads 11 and 51 requires special programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0752
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

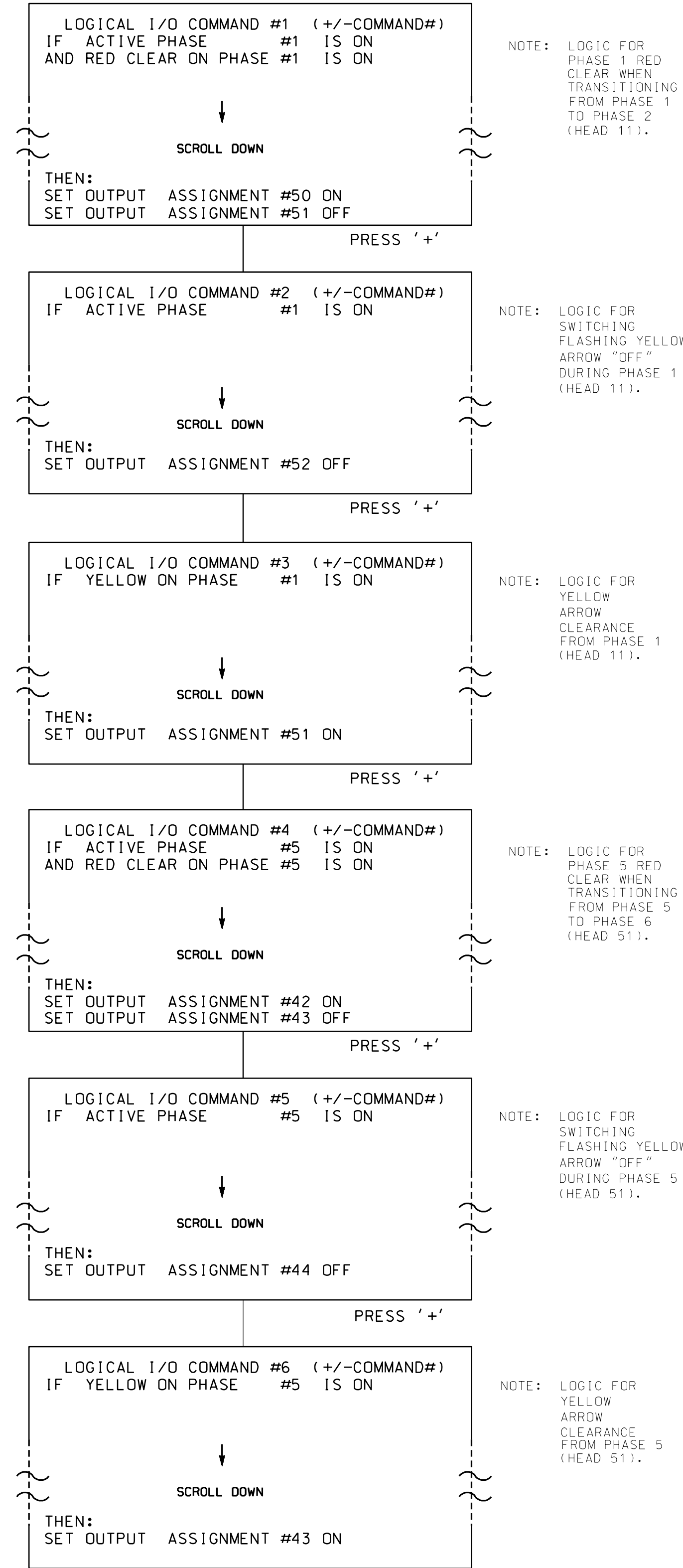
Electrical Detail - Final Design
 Sheet 1 of 5

	ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 17 (Military Cutoff Road) at Drysdale Drive	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Division 3 New Hanover County Wilmington	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER WILLIAM J. HAMILTON 32396	SEAL 03-0752
PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton	PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)	DocuSigned by: William J. Hamilton 11/08/2021	SIG. INVENTORY NO. 03-0752

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).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: XX
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: _ RED _ YELLOW _ GREEN
 FLASH COLORS: _ RED _ YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...0.0
 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: XX
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: _ RED _ YELLOW _ GREEN
 FLASH COLORS: _ RED _ YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...0.0
 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PAGE 2: VEHICLE OVERLAP 'A' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: X
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: _ RED _ YELLOW _ GREEN
 FLASH COLORS: _ RED _ YELLOW _ GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...0.0
 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+' TWICE

PAGE 2: VEHICLE OVERLAP 'C' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: X
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: _ RED _ YELLOW _ GREEN
 FLASH COLORS: _ RED _ YELLOW _ GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...0.0
 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0752
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

Electrical Detail - Final Design
Sheet 2 of 5

<p>RKA RAMEY KEMP ASSOCIATES 8808 Farrington Place Raleigh, North Carolina 27609 Phone: 919-872-8115 www.rameykemp.com NC License No. C-0910</p>	<p>ELECTRICAL AND PROGRAMMING DETAILS FOR: US 17 (Military Cutoff Road) at Drysdale Drive</p> <p>Division 3 New Hanover County Wilmington</p> <p>PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton</p> <p>PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)</p>	<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32396 WILLIAM J. HAMILTON</p> <p>DocuSigned by: William J. Hamilton 11/08/2021</p> <p>SIG. INVENTORY NO. 03-0752</p>											
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REVISIONS	INIT.	DATE											

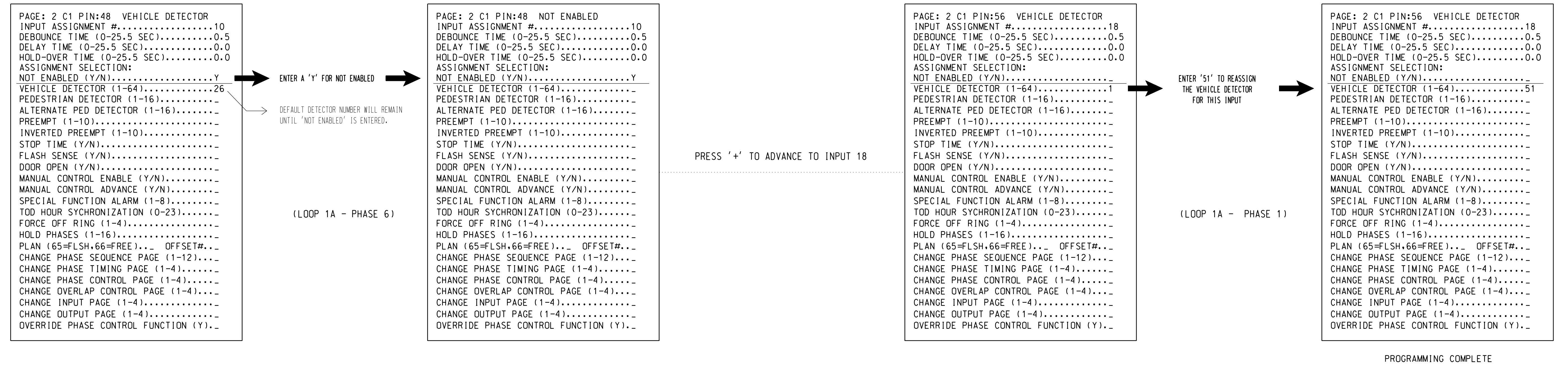
11/18/2021 4:43:58 PM C:\Users\jwendt\Documents\03-0752-sm-01\02.dgn User: jwendt

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 10 SECONDS TO 0 SECONDS.

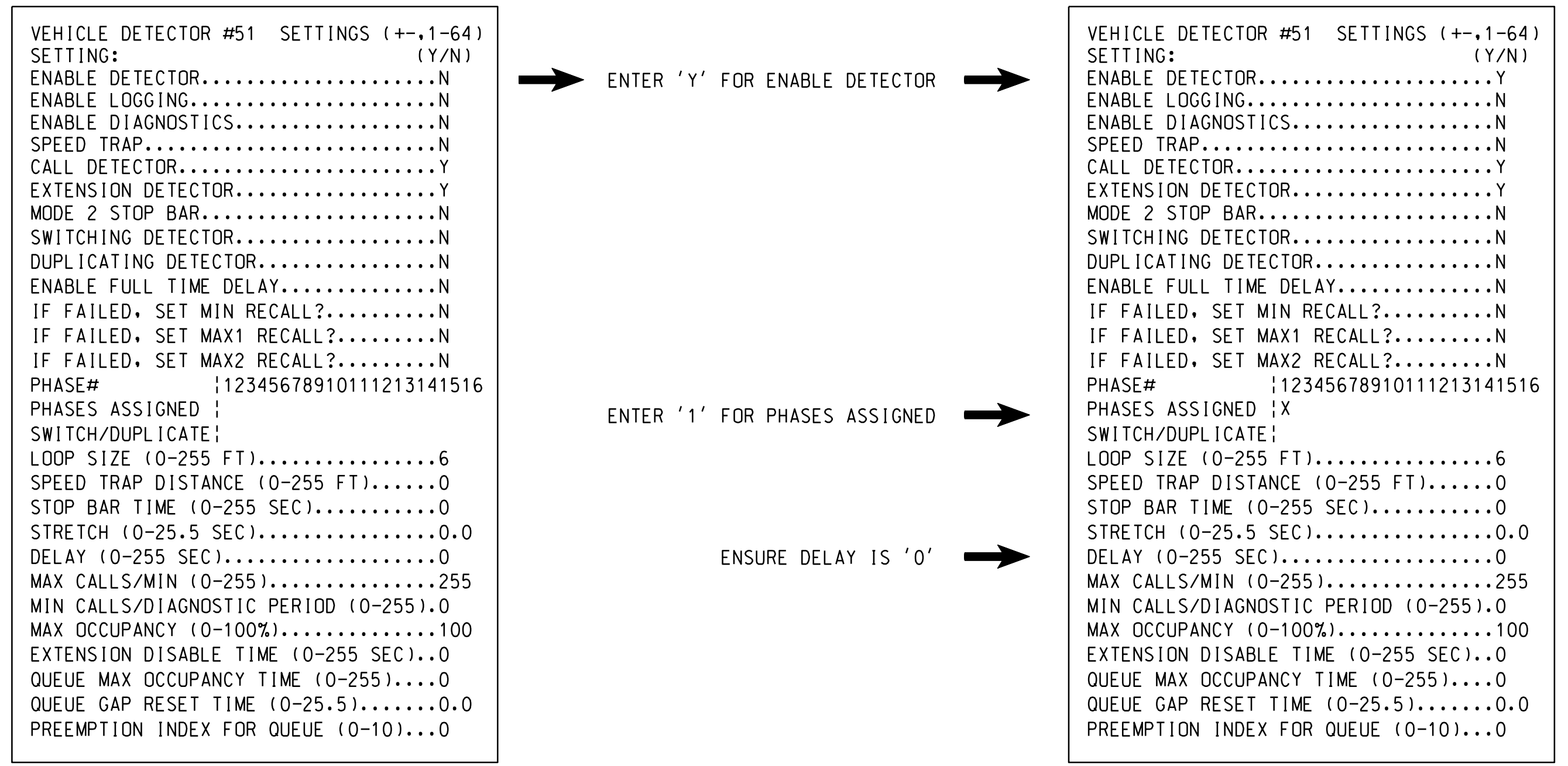
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)


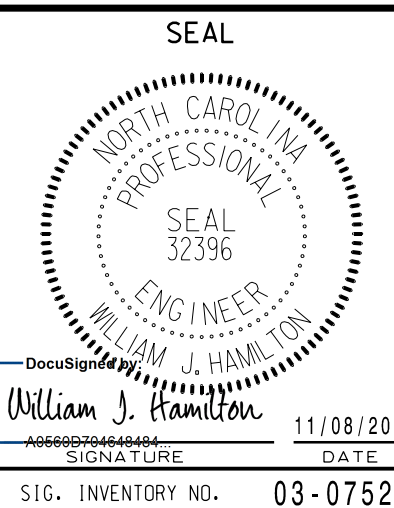
FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.



NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0752
DESIGNED: Nov 2021
SEALED: 11/08/2021
REVISED: N/A

Electrical Detail - Final Design Sheet 3 of 5

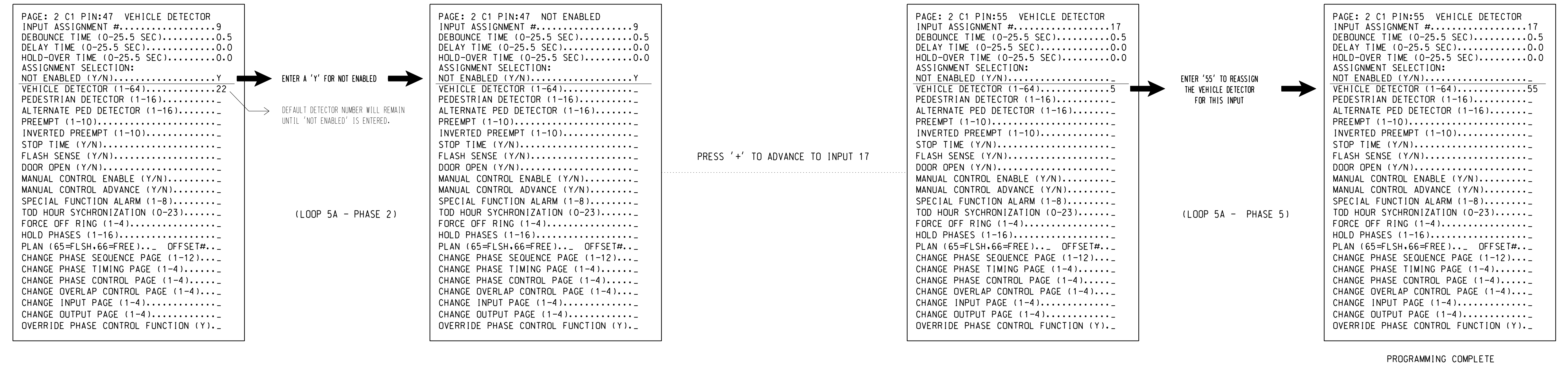
 RKA RAMEY KEMP ASSOCIATES 8808 Farrington Place Raleigh, North Carolina 27609 Phone: 919-872-8115 www.rameykemp.com NC License No. C-0910	US 17 (Military Cutoff Road) at Drysdale Drive	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL  WILLIAM J. HAMILTON ENGINEER SEAL 32396 11/08/2021 DATE
	Division 3 New Hanover County Wilmington PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton PREPARED BY: A. Andrews RKA PROJ. NO: 19258 (040) REVISIONS INIT. DATE SIGNATURE DATE SIG. INVENTORY NO. 03-0752	750 N. Greenfield Pkwy, Garner, NC 27529

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 10 SECONDS TO 3 SECONDS.

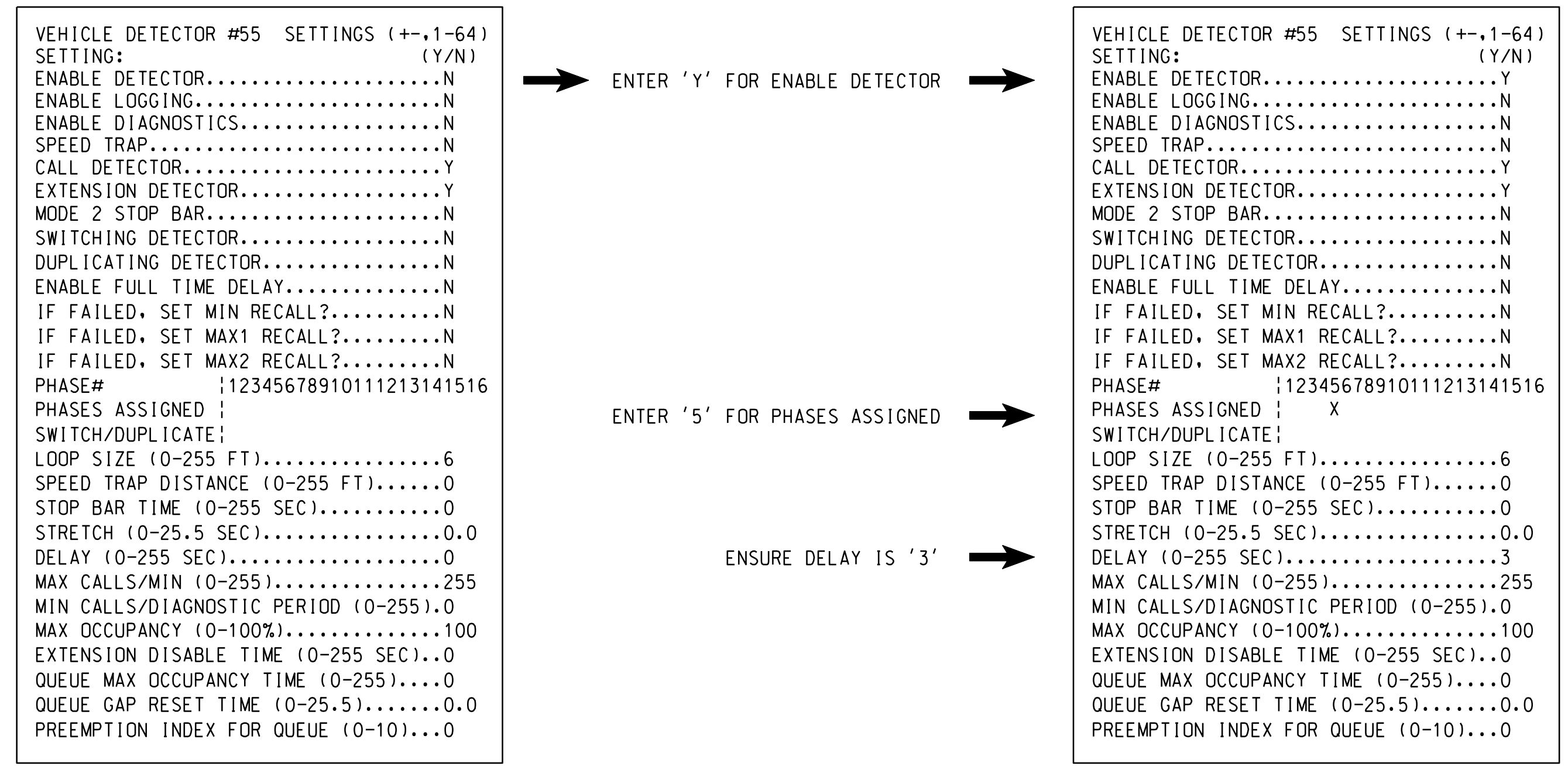
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)


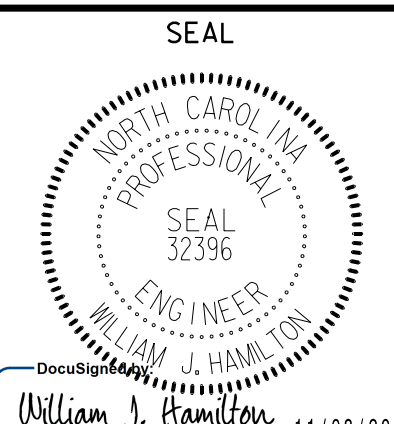
FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0752
DESIGNED: Nov 2021
SEALED: 11/08/2021
REVISED: N/A

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

Electrical Detail - Final Design Sheet 4 of 5

 RKA RAMEY KEMP ASSOCIATES 8808 Farrington Place Raleigh, North Carolina 27609 Phone: 919-872-6115 www.rameykemp.com NC License No. C-0910	ELECTRICAL AND PROGRAMMING DETAILS FOR: US 17 (Military Cutoff Road) at Drysdale Drive	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL  WILLIAM J. HAMILTON ENGINEER 32396 11/08/2021
	Division 3 New Hanover County Wilmington PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton PREPARED BY: A. Andrews RKA PROJ. NO: 19258 (040) REVISIONS: INIT. DATE	750 N. Greenfield Pkwy, Garner, NC 27529 11/08/2021 SIG. INVENTORY NO. 03-0752

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

<u>PHASING</u>	<u>INPUTS PAGE</u>	<u>OVERLAPS PAGE</u>
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.


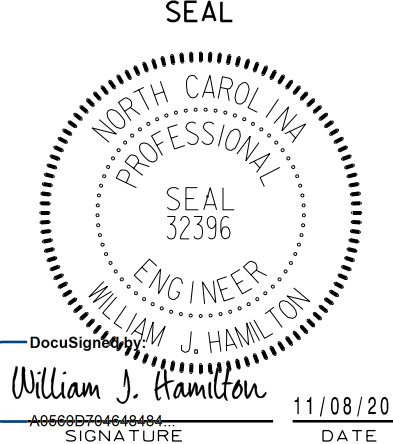

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

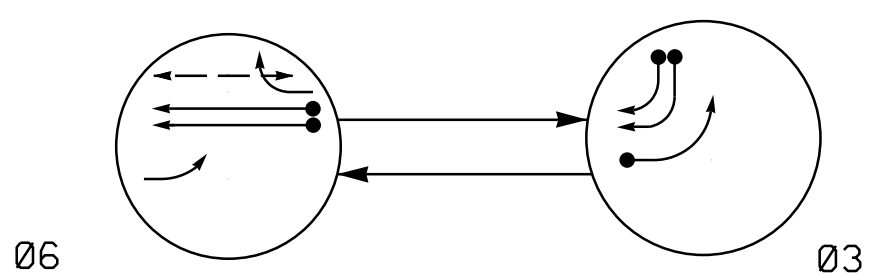
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0752
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

Electrical Detail - Final Design
 Sheet 5 of 5

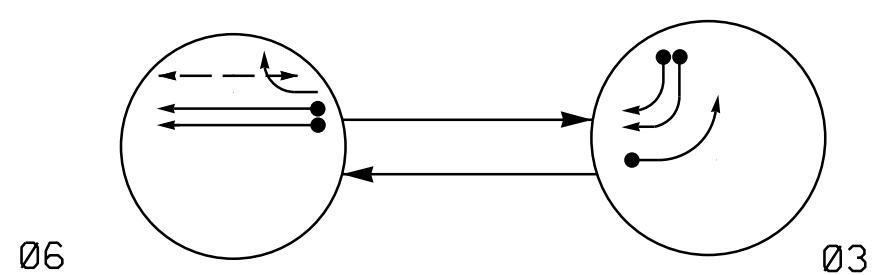
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:  750 N. Greenfield Pkwy, Garner, NC 27529	US 17 (Military Cutoff Road) at Drysdale Drive Division 3 - New Hanover County Wilmington	SEAL  WILLIAM J. HAMILTON ENGINEER
PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton PREPARED BY: A. Andrews RKA PROJ. NO: 19258 (040)		11/08/2021 DATE
REVISIONS INIT. DATE		
 RAMEY KEMP ASSOCIATES 8808 Faringdon Place Raleigh, North Carolina 27609 Phone: 919-872-8115 www.rameykemp.com NC License No. C-0910		11/08/2021 DATE SIG. INVENTORY NO. 03-0752

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		
	06	03	F
31,32	Y	←	Y
33,34,35	R	→	R
61,62,63	G	R	Y
P61,P62	W	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		
	06	03	F
31,32	←	Y	Y
33,34,35	R	→	R
61,62,63	G	R	Y
P61,P62	W	DW	DRK

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

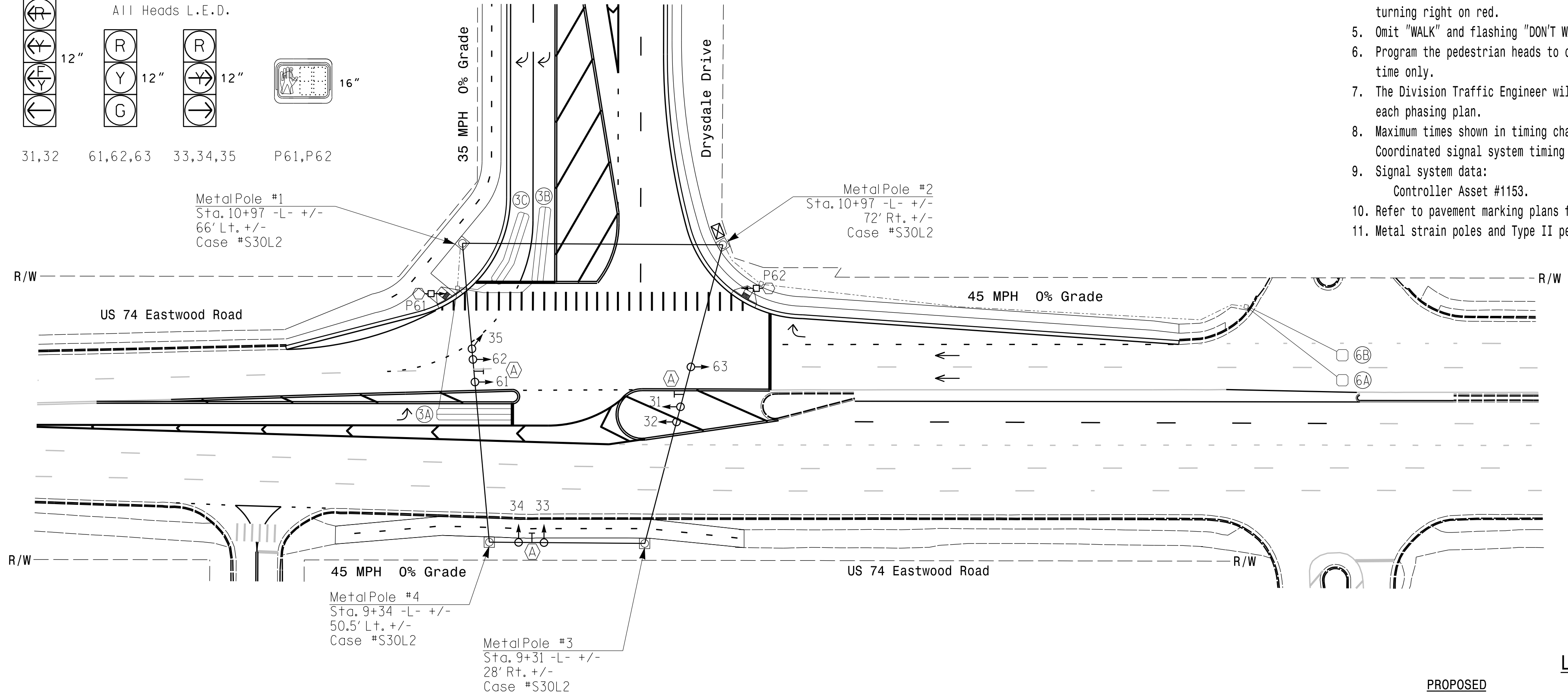
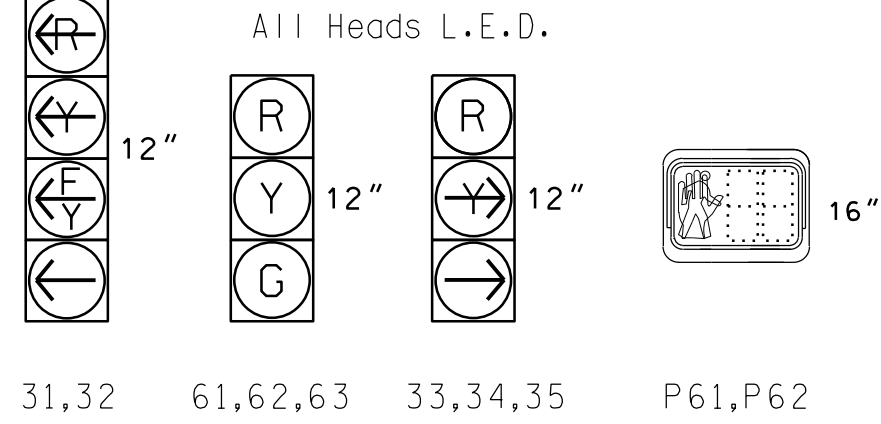
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY				
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	+10	-	Y
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	-	Y
3C	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	-	Y
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	Y

* Disable Delay During Alternate Phasing Operation.

2 Phase Fully Actuated (Wilmington Signal System)

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program the pedestrian heads to countdown the flashing "DON'T WALK" time only.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Signal system data:
Controller Asset #1153.
- Refer to pavement marking plans for stop bar and crosswalk location.
- Metal strain poles and Type II pedestals shall be black powder-coated.

SIGNAL FACE I.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE	
	3	6
Min Green 1 *	5	12
Extension 1 *	2.0	6.0
Max Green 1 *	15	90
Yellow Clearance	3.0	4.5
Red Clearance	3.2	2.2
Walk 1 *	-	7
Don't Walk 1	-	40
Seconds Per Actuation *	-	1.5
Max Variable Initial *	-	34
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.0
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 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 Modified Signal Head | | EXISTING N/A |
| | PROPOSED Pedestrian Signal Head | | EXISTING Pedestrian Signal Head |
| | PROPOSED Signal Pole with Guy | | EXISTING Signal Pole with Guy |
| | PROPOSED Signal Pole with Sidewalk Guy | | EXISTING Signal Pole with Sidewalk Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED 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 |
| | PROPOSED Metal Strain Pole | | EXISTING Metal Strain Pole |
| | PROPOSED Type II Signal Pedestal | | EXISTING Type II Signal Pedestal |
| | PROPOSED Street Name Sign | | EXISTING Street Name Sign |

New Installation

Prepared for:

 TRANSPORTATION MOBILITY AND SAFETY DIVISION
 STATE OF NORTH CAROLINA
 Signal Design Section
 750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE: 0 40
 1" = 40'

US 74 (Eastwood Road) at Drysdale Drive
 Division 3 New Hanover County Wilmington
 PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton
 PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)
 REVISIONS: INIT. DATE

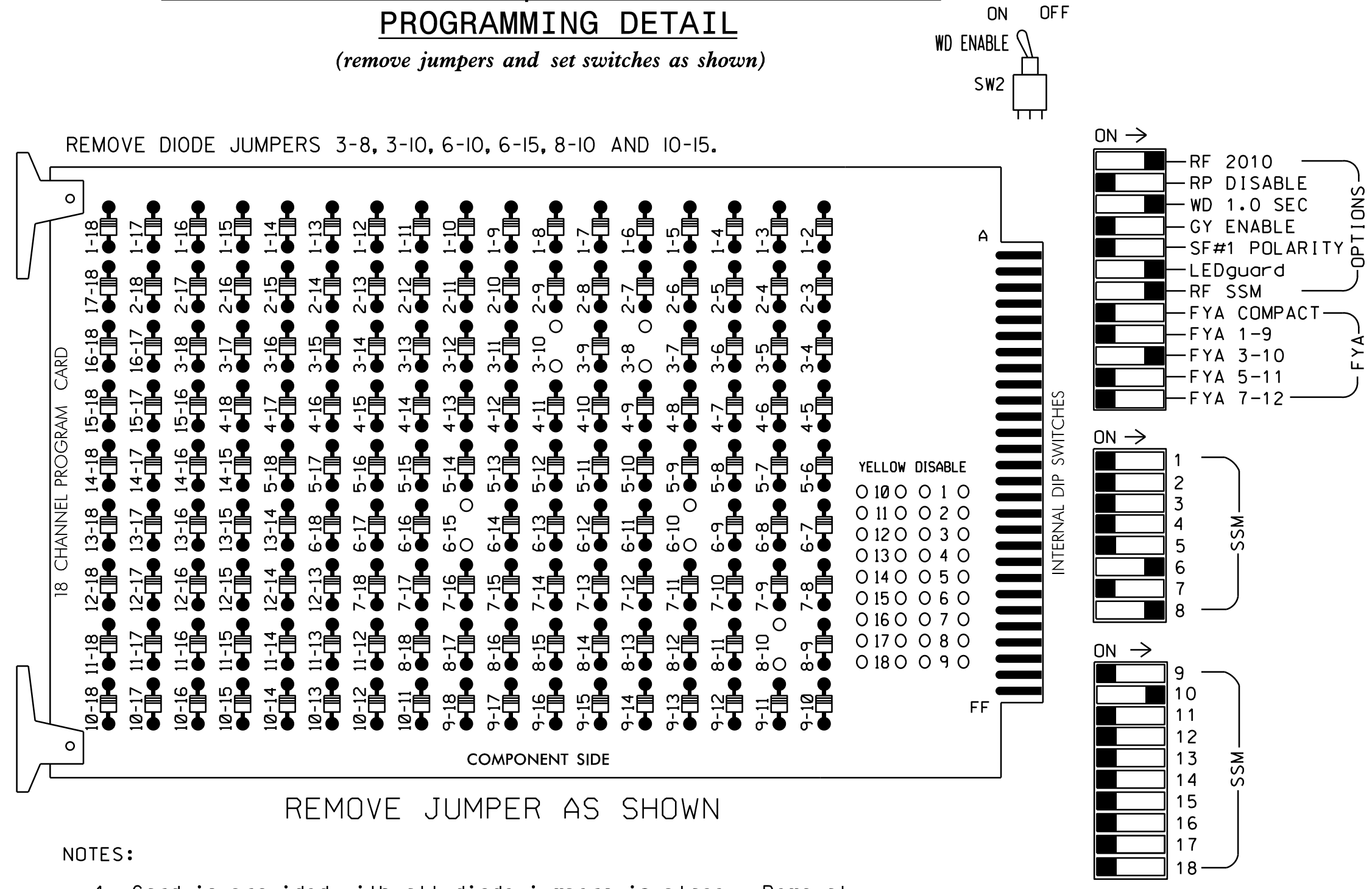
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

 WILLIAM J. HAMILTON
 ENGINEER
 32396
 11/08/2021
 DATE
 SIG. INVENTORY NO. 03-1153



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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phase 6 for Variable Initial and Gap Reduction.
- Program phase 6 for Startup In Green.
- Program phase 6 for Startup Ped Call.
- Program phase 6 for Yellow Flash.
- The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S4,S8,S9,S11,AUX S2
 PHASES USED.....3,6,6PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....3+6
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED
 OVERLAP "G".....3

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	* * OLG	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31,32	NU	NU	NU	61,62, 63	P61, P62	NU	33,34, 35	NU	NU	31,32	NU	NU	NU	NU
RED								134			107							
YELLOW				*				135										
GREEN								136										
RED ARROW																		A124
YELLOW ARROW												108						A125
FLASHING YELLOW ARROW																		A126
GREEN ARROW					118									109				
Hand icon										119								
Walking person icon											121							

NU = Not Used
 * See pictorial of head wiring in detail this sheet.
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ** Requires special programming and output remapping. See sheets 2 and 4.

INPUT FILE POSITION LAYOUT
(front view)

FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	S	S	S	S	∅ 3	∅ 3	S	S	S	S	S	S	S	∅ 6 PED	FS
	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	3A	3B	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
"J"	S	∅ 6	S	S	S	S	S	S	S	S	S	S	S	S	S
	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
"U"	S	∅ 6	S	S	S	S	S	S	S	S	S	S	S	S	S
	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
"L"	S	∅ 6	S	S	S	S	S	S	S	S	S	S	S	S	S
	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR

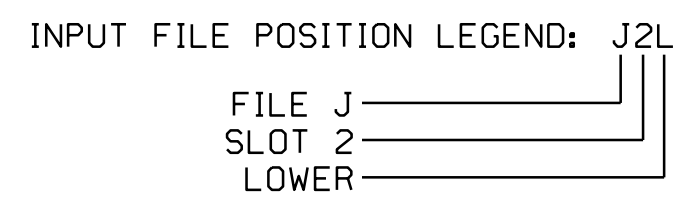
EX. : 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

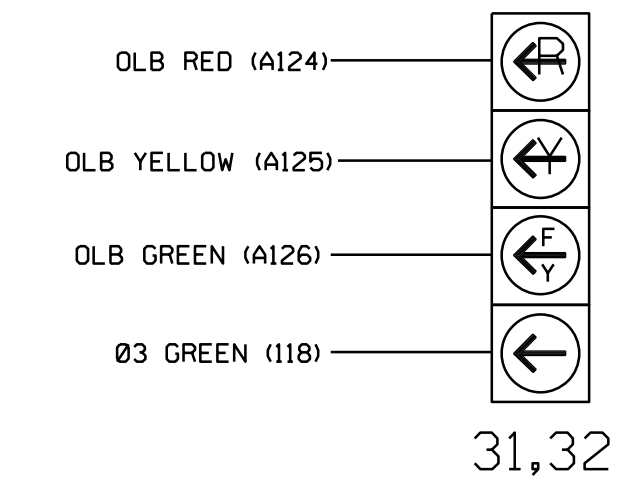
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			10
	-	I5U	58	20 *	53	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			15
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

* See Input Page Assignment programming details on sheet 3.



FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)



NOTE
 1. The display sequence for signal heads 31 and 32 requires special programming. See sheet 2 for programming instructions.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

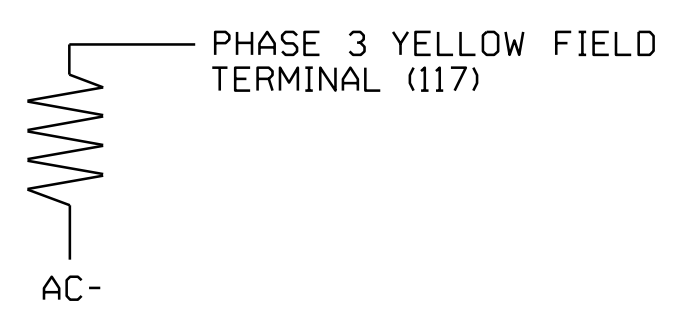
Countdown ped signals are required to display timing only during ped clearance interval. Consult ped signal module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1153
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

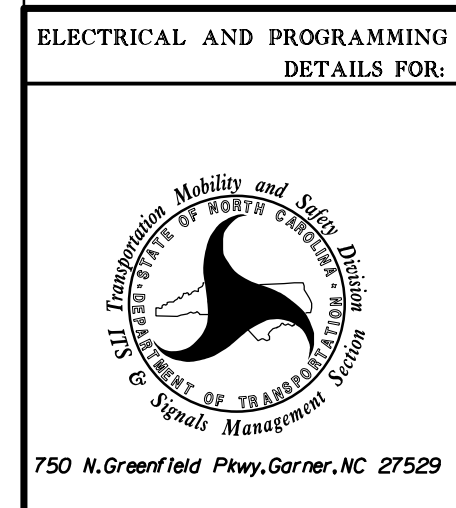
LOAD RESISTOR INSTALLATION DETAIL
(install resistor as shown)

ACCEPTABLE VALUES

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



Electrical Detail
 Sheet 1 of 4



US 74 (Eastwood Road)
 at
 Drysdale Drive
 Division 3 New Hanover County Wilmington
 PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton
 PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 WILLIAM J. HAMILTON
 11/08/2021
 DATE
 SIG. INVENTORY NO. 03-1153

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

(program controller as shown below)

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

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

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 6 (HEADS 31 AND 32).

SCROLL DOWN

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

PRESS '+'

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

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEADS 31 AND 32).

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

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

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEADS 31 AND 32).

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
OUTPUT 47	= Overlap B Red
OUTPUT 48	= Overlap B Yellow
OUTPUT 49	= Overlap B Green

DEFAULT OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: |12345678910111213141516
VEH OVL PARENTS: | X X
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?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

NOTICE GREEN FLASH

OVERLAP 'B' PROGRAMMING COMPLETE

PRESS '+' UNTIL OVERLAP 'G' APPEARS

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

OVERLAP 'G' PROGRAMMING COMPLETE

ALTERNATE OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PRESS '+'

NOTICE PAGE 2

PAGE 2: VEHICLE OVERLAP 'B' SETTINGS
PHASE: |12345678910111213141516
VEH OVL PARENTS: | X
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

REMOVE GREEN FLASH PROGRAMMING

OVERLAP 'B' PROGRAMMING COMPLETE

PRESS '+' UNTIL OVERLAP 'G' APPEARS

NOTICE PAGE 2


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

OVERLAP 'G' PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1153
DESIGNED: Nov 2021
SEALED: 11/08/2021
REVISED: N/A

Electrical Detail
Sheet 2 of 4

ELECTRICAL AND PROGRAMMING
DETAILS FOR:



750 N. Greenfield Pkwy, Garner, NC 27529

US 74 (Eastwood Road)
at
Drysdale Drive

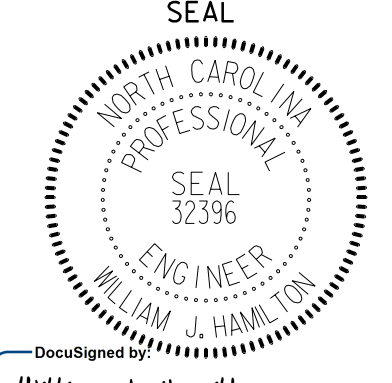
Division 3 New Hanover County Wilmington

PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton
PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
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SEAL



William J. Hamilton
11/08/2021

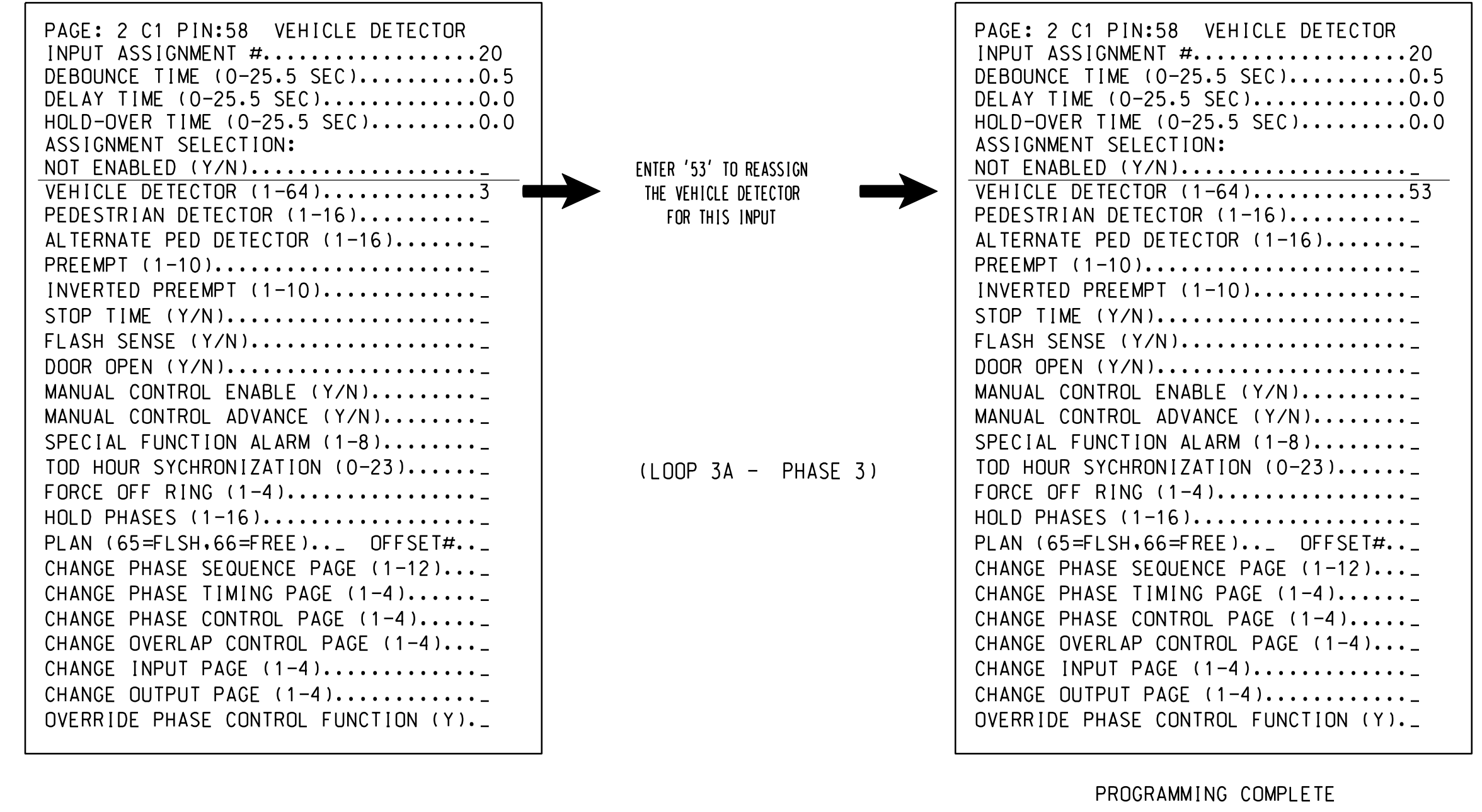
SIG. INVENTORY NO. 03-1153

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 3A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THIS PROGRAMMING REASSIGNS DETECTOR 53 TO INPUT #20 SO THAT THE DELAY ON LOOP 3A CAN BE REDUCED FROM 10 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 20 IS REACHED.

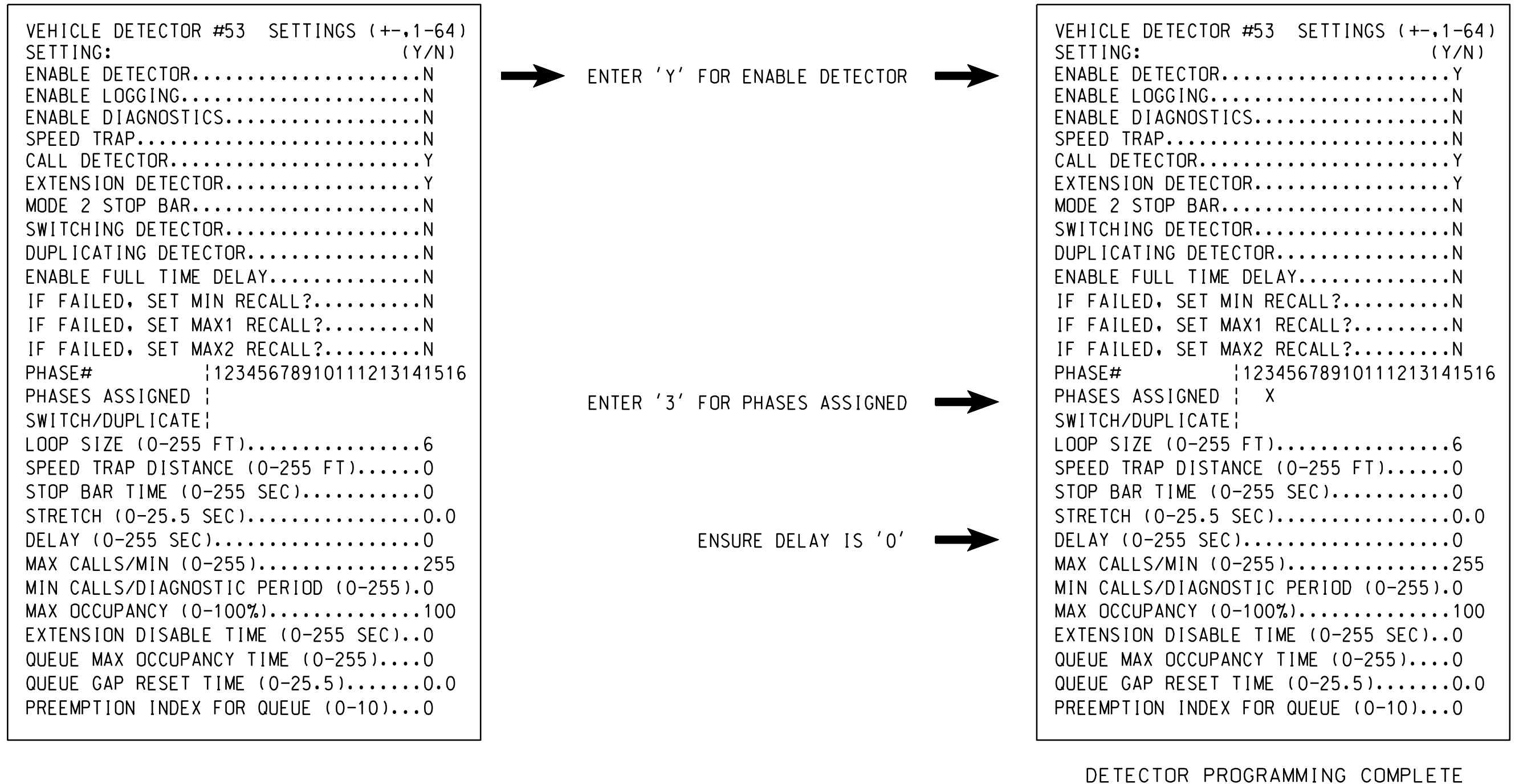


SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 3A (ALT.)

(program controller as shown below)

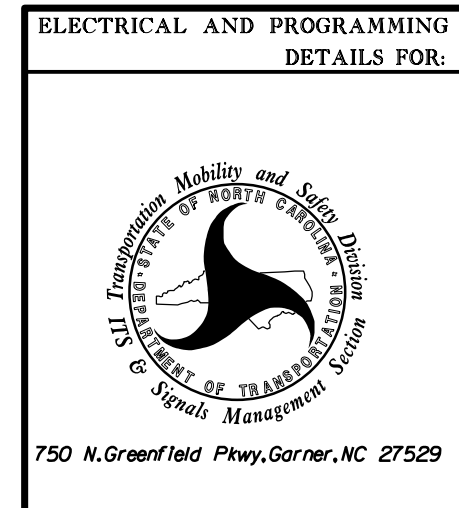
FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #53.

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1153
DESIGNED: Nov 2021
SEALED: 11/08/2021
REVISED: N/A

Electrical Detail Sheet 3 of 4



US 74 (Eastwood Road) at Drysdale Drive	
Division 3 New Hanover County Wilmington	
PLAN DATE: November 2021	REVIEWED BY: WJ Hamilton
PREPARED BY: A. Andrews	RKA PROJ. NO: 19258 (040)
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11/08/2021
DATE

SIG. INVENTORY NO. 03-1153

RKA
RAMEY KEMP ASSOCIATES
8008 Farrington Place Raleigh, North Carolina 27609
Phone: 919-872-6115 | www.rameykemp.com | NC License No. C-0910

OUTPUT ASSIGNMENT PROGRAMMING DETAIL FOR OVERLAP "G" TO LOADSWITCH "S11"

(program controller as shown below)

- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
- WITH CURSOR IN "OUTPUT ASSIGNMENT #" FIELD, USE + KEY TO FIND THE OUTPUT ASSIGNMENT NUMBER 19. AS SHOWN BELOW.
- PROGRAM CONTROLLER AS SHOWN:

```

PAGE:1 C1 PIN:21 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....19
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...1
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:21 C1 PIN:21 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=161)...7
SELECT COLOR (0=RED,1=YEL,2=GRN)...0

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER INPUTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:21 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....19
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...1
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS '+' KEY FOR OUTPUT 20

```

PAGE:1 C1 PIN:22 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....20
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...1
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:22 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=161)...7
SELECT COLOR (0=RED,1=YEL,2=GRN)...1

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER INPUTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:22 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....20
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...1
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS '+' KEY FOR OUTPUT 21

```

PAGE:1 C1 PIN:23 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....21
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...1
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:23 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=161)...7
SELECT COLOR (0=RED,1=YEL,2=GRN)...2

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' AFTER INPUTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:23 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....21
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...1
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

OUTPUT PROGRAMMING COMPLETE

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED. NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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 BIT 1 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":


OVERLAPS PAGE 2: Modifies overlap parent phase for heads 31 and 32 to run protected turns only.

INPUTS PAGE 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1153
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

Electrical Detail
 Sheet 4 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:



750 N. Greenfield Pkwy, Garner, NC 27529

US 74 (Eastwood Road) at Drysdale Drive

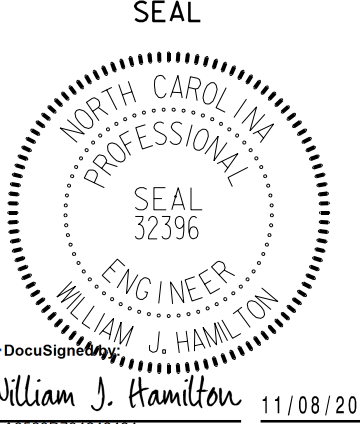
Division 3 New Hanover County Wilmington

PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton
 PREPARED BY: A. Andrews RKA PROJ. NO: 19258 (040)

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL



William J. Hamilton 11/08/2021

SIG. INVENTORY NO. 03-1153

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM

SIGNAL FACE I.D.

All Heads L.E.D.

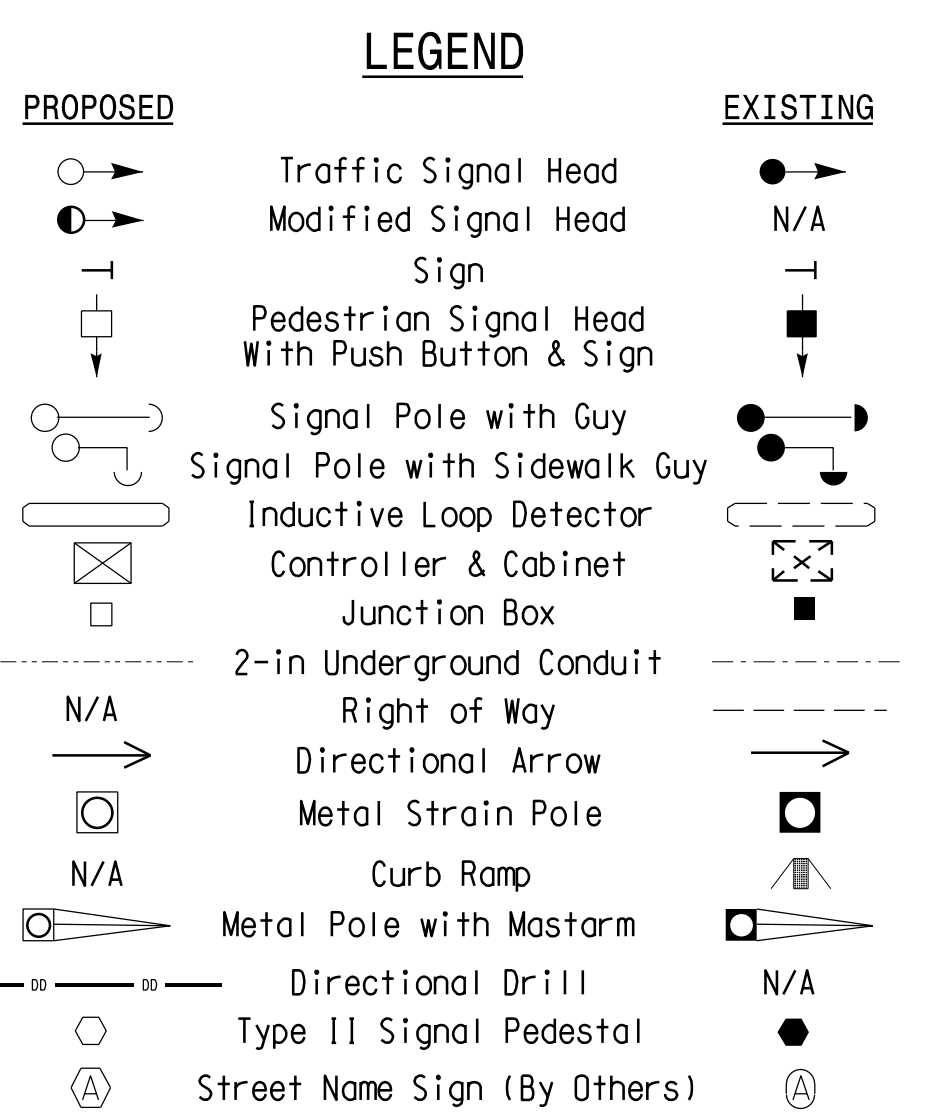
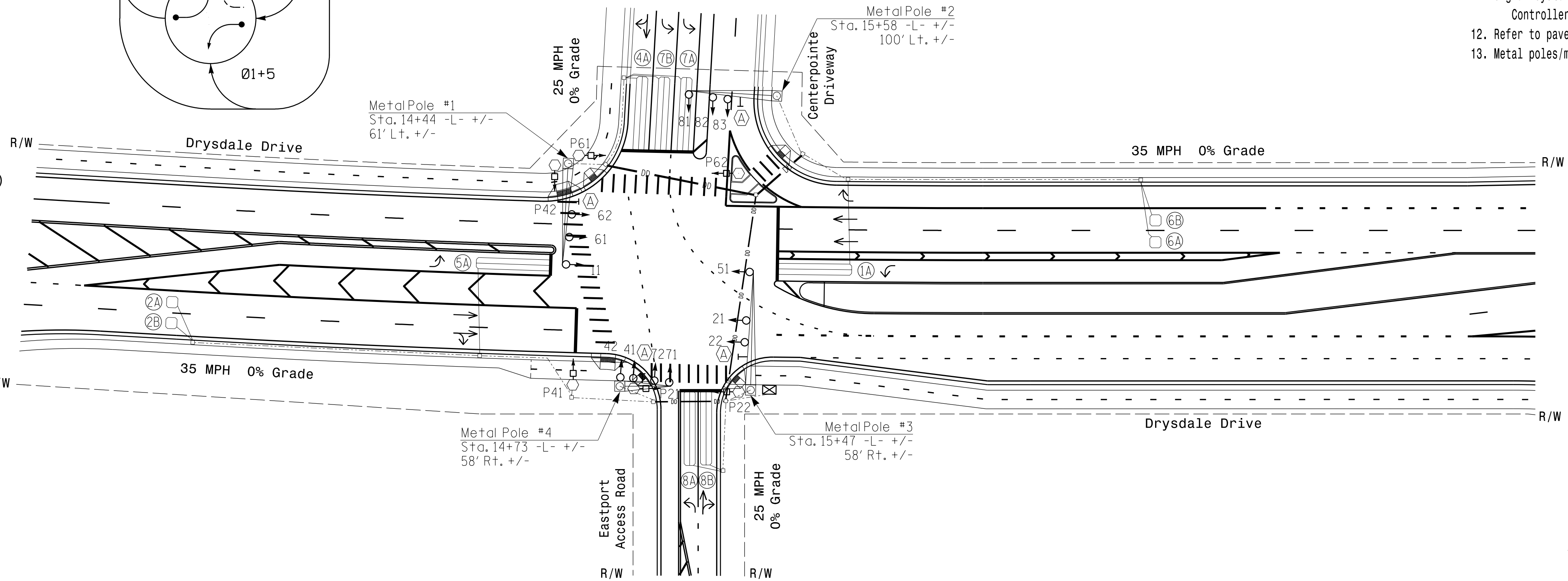
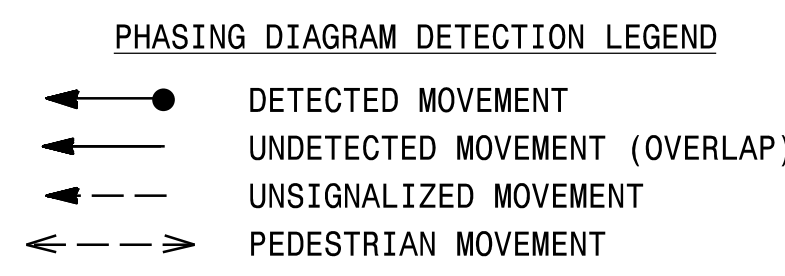
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						LOOP SYSTEM	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME		
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	10*	-	Y
2A	6X6	200	5	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	200	5	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	10*	-	Y
6A	6X6	200	5	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	200	5	Y	6	Y	Y	-	-	-	-	Y
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	Y
7B	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y

* Disable delay during Alternate Phasing operation.
 ** Disable phase call for loop during Alternate Phasing operation.

6 Phase Fully Actuated (Wilmington Signal System)

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "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 7 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program the pedestrian heads to countdown the flashing "DON'T WALK" time only.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Signal system data:
Controller Asset #1152.
- Refer to pavement marking plans for stop bar and crosswalk location.
- Metal poles/mast arms and Type II pedestals shall be black powder-coated.



OASIS 2070 TIMING CHART

FEATURE	PHASE							
	1	2	4	5	6	7	8	
Min Green 1 *	5	12	5	5	12	5	5	
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0	2.0	
Max Green 1 *	15	100	25	15	100	15	25	
Yellow Clearance	3.0	3.8	3.2	3.0	3.8	3.0	3.2	
Red Clearance	2.8	2.4	3.2	3.2	2.4	3.2	3.1	
Walk 1 *	-	7	7	-	7	-	-	
Don't Walk 1	-	11	23	-	18	-	-	
Seconds Per Actuation *	-	1.5	-	-	1.5	-	-	
Max Variable Initial *	-	24	-	-	24	-	-	
Time Before Reduction *	-	15	-	-	15	-	-	
Time To Reduce *	-	30	-	-	30	-	-	
Minimum Gap	-	3.0	-	-	3.0	-	-	
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-	-	
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-	-	
Dual Entry	-	-	ON	-	-	-	-	
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01	02	04	05	06	07	08	F
11	-	-	-	-	-	-	-	Y
21,22	R	R	G	G	R	R	Y	
41,42	R	R	R	R	G	G	R	
51	-	-	-	-	-	-	-	Y
61,62	R	G	R	G	R	R	Y	
71,72	-R	-R	-R	-R	-R	-R	-R	
81	-R	-R	-R	-R	-R	-R	-R	
82,83	R	R	R	R	G	R		
P21,P22	DW	DW	W	W	DW	DRK		
P41,P42	DW	DW	DW	DW	W	DRK		
P61,P62	DW	W	DW	W	DW	DRK		

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01	02	04	05	06	07	08	F
11	-	-	-	-	-	-	-	Y
21,22	R	R	G	G	R	R	Y	
41,42	R	R	R	R	G	G	R	
51	-	-	-	-	-	-	-	Y
61,62	R	G	R	G	R	R	Y	
71,72	-R	-R	-R	-R	-R	-R	-R	
81	-R	-R	-R	-R	-R	-R	-R	
82,83	R	R	R	R	G	R		
P21,P22	DW	DW	W	W	DW	DRK		
P41,P42	DW	DW	DW	DW	W	DRK		
P61,P62	DW	W	DW	W	DW	DRK		

* 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.

New Installation

RKA
RAMEY KEMP ASSOCIATES
888 Fallspring Place Raleigh, North Carolina 27609
Phone: 919-872-5115 | www.rkainc.com | NC License No. C-0810

Drysdale Drive at Centerpointe/Eastport Access

Division 3 New Hanover County Wilmington

PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton

PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)

SCALE: 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

William J. Hamilton
11/08/2021

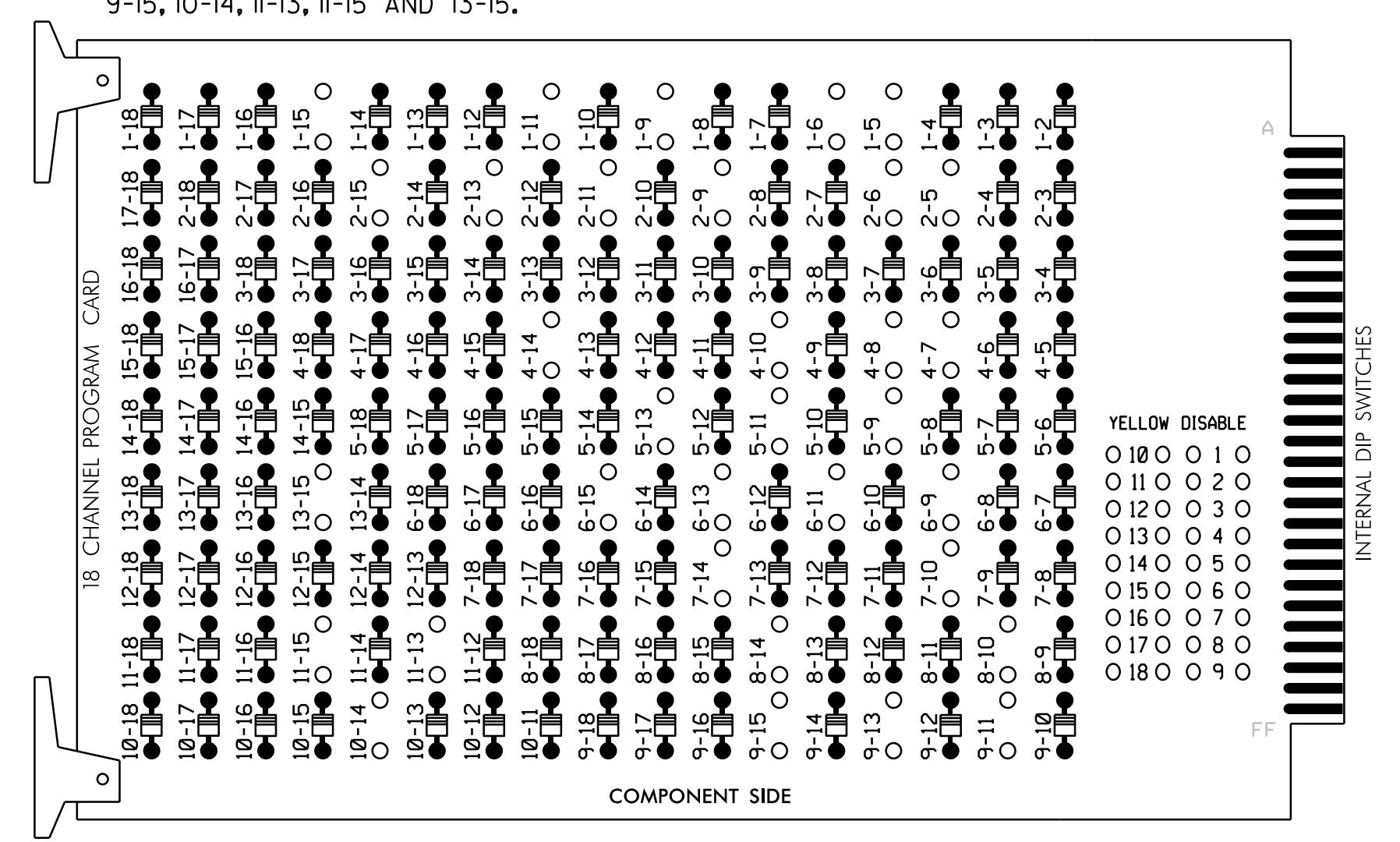
SIG. INVENTORY NO. 03-1152

11/08/2021 10:04:00 Des: gnm03-1152_s1g_dsm.dgn User: j.wend

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

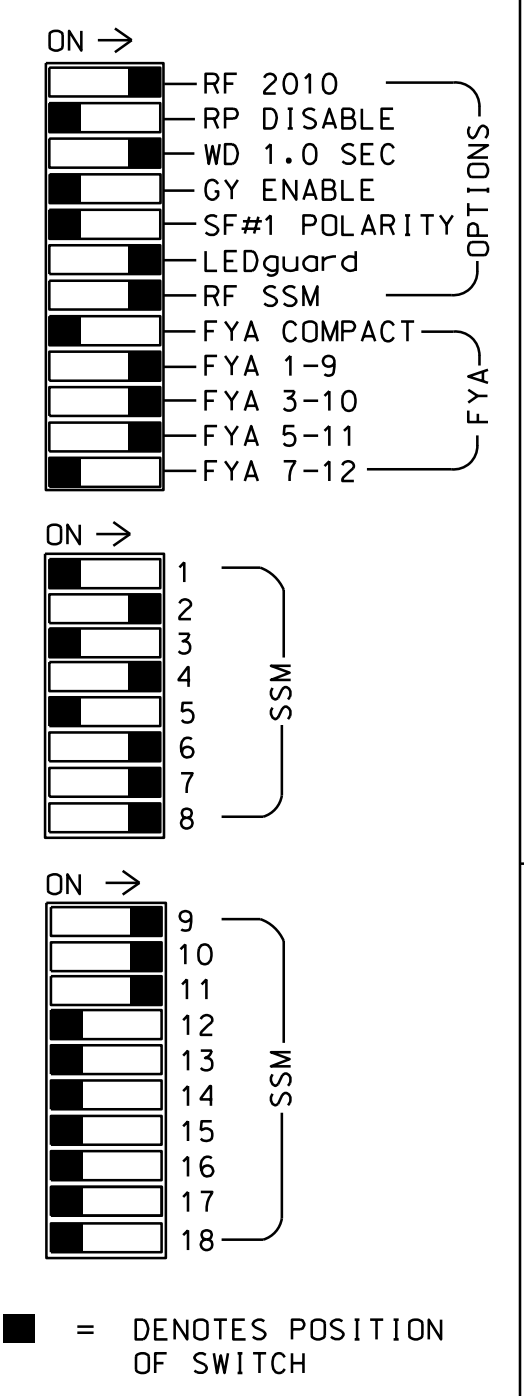
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-7, 4-8, 4-10, 4-14, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-10, 7-14, 8-10, 8-14, 9-11, 9-13, 9-15, 10-14, 11-13, 11-15 AND 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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 phase 4 for Dual Entry.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2, 4 and 6 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash and overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	71,72	82,83	NU	11	81	NU	51	NU	NU
RED	128			101				134		107								
YELLOW	*	129		102		*	135		108									
GREEN	130			103			136		109									
RED ARROW										122			A121	A124		A114		
YELLOW ARROW										123			A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		A116		
GREEN ARROW	127						133		124									
Hand			113			104			119									
Walking						106			121									

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

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 2 2A	∅ 3 3A	∅ 4 4A	∅ 5 5A	∅ 6 6A	∅ 7 7A	∅ 8 8A	∅ 9 9A	∅ 10 10A	∅ 11 11A	∅ 12 12A	∅ 13 13A	∅ 14 14A
L	NOT USED	∅ 2 2B	∅ 3 3B	∅ 4 4B	∅ 5 5B	∅ 6 6B	∅ 7 7B	∅ 8 8B	∅ 9 9B	∅ 10 10B	∅ 11 11B	∅ 12 12B	∅ 13 13B	∅ 14 14B
U	∅ 5 5A	∅ 6 6A	∅ 7 7A	∅ 8 8A	∅ 9 9A	∅ 10 10A	∅ 11 11A	∅ 12 12A	∅ 13 13A	∅ 14 14A	∅ 15 15A	∅ 16 16A	∅ 17 17A	∅ 18 18A
L	NOT USED	∅ 6 6B	∅ 7 7B	∅ 8 8B	∅ 9 9B	∅ 10 10B	∅ 11 11B	∅ 12 12B	∅ 13 13B	∅ 14 14B	∅ 15 15B	∅ 16 16B	∅ 17 17B	∅ 18 18B

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

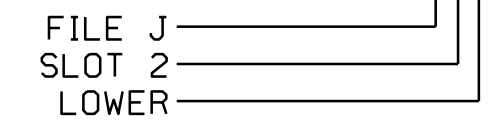
INPUT FILE CONNECTION & PROGRAMMING CHART

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 ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10★	26	6	Y	Y			
	-	I1U	56	18★	51	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9★	22	2	Y	Y			
	-	J1U	55	17★	55	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-9,10	J6U	42	4	8	7	Y	Y			
8A	TB5-11,12	J6L	46	8	18	8	Y	Y			
8B	TB7-1,2	J7U	66	28	38	8	Y	Y			10
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2	PED				
P41,P42	TB8-5,6	I12L	69	31	PED 4	4	PED				
P61,P62	TB8-7,9	I13U	68	30	PED 6	6	PED				

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

- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from J1-W to I4-W, on rear of input file.
- ★ See Input Page Assignment programming details on sheets 3 and 4.

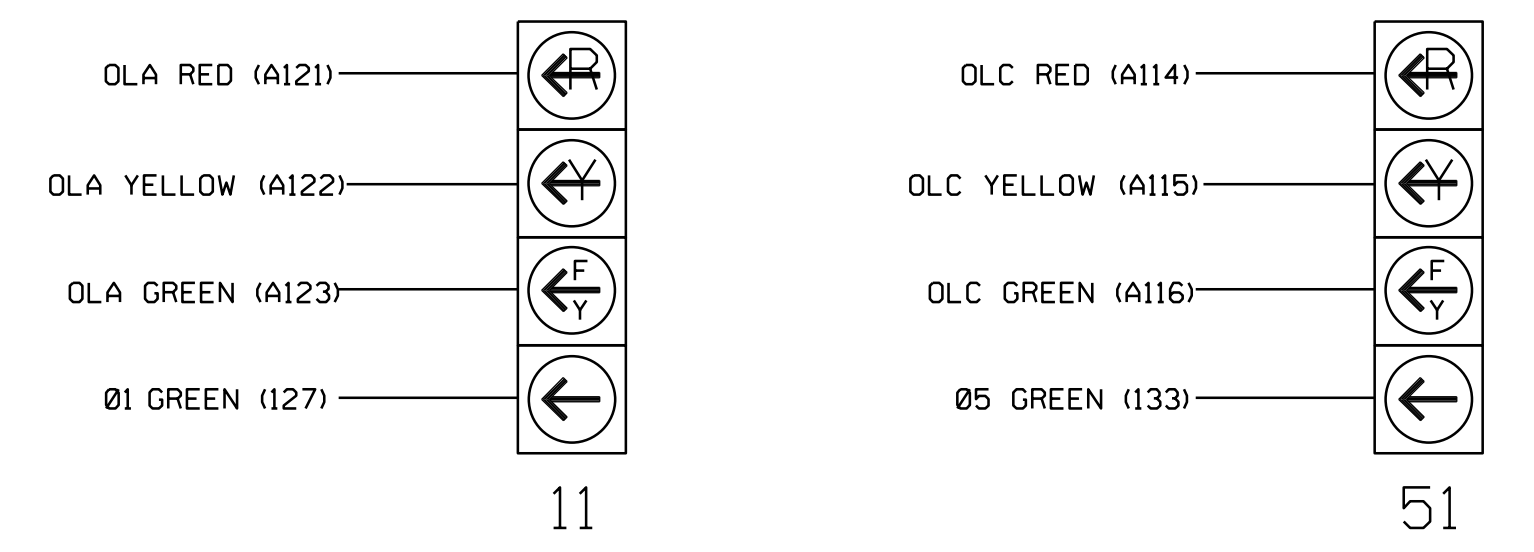
INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1152
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

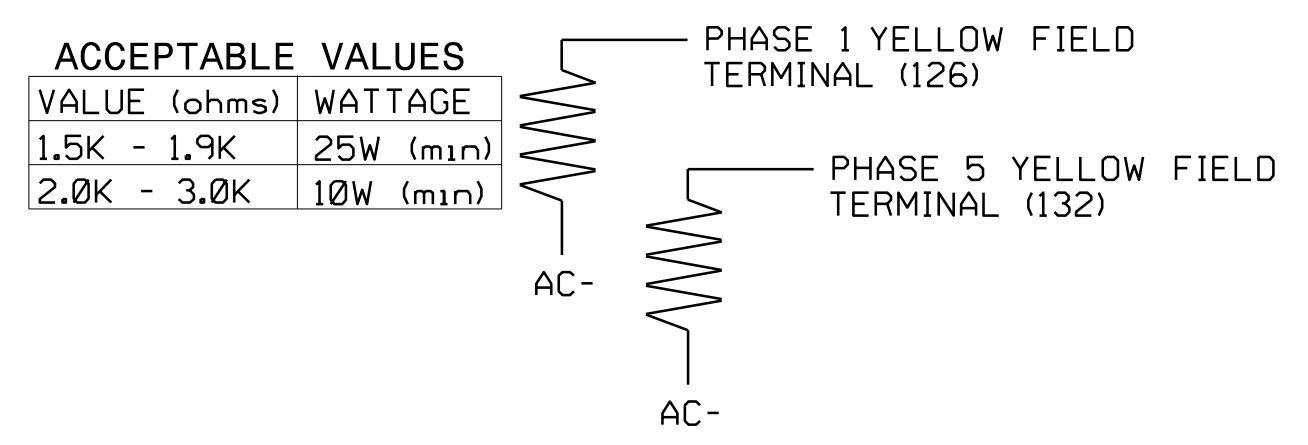
1. The sequence display for signal heads 11 and 51 requires special programming. See sheet 2 for programming instructions.

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



Electrical Detail Sheet 1 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER, WILLIAM J. HAMILTON, SEAL 32396

Drysdale Drive at Centerpointe/Eastport Access

Division 3 New Hanover County Wilmington

PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton

PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)

REVISIONS: INIT. DATE

DocuSigned by: William J. Hamilton 11/08/2021

750 N. Greenfield Pkwy, Garner, NC 27529

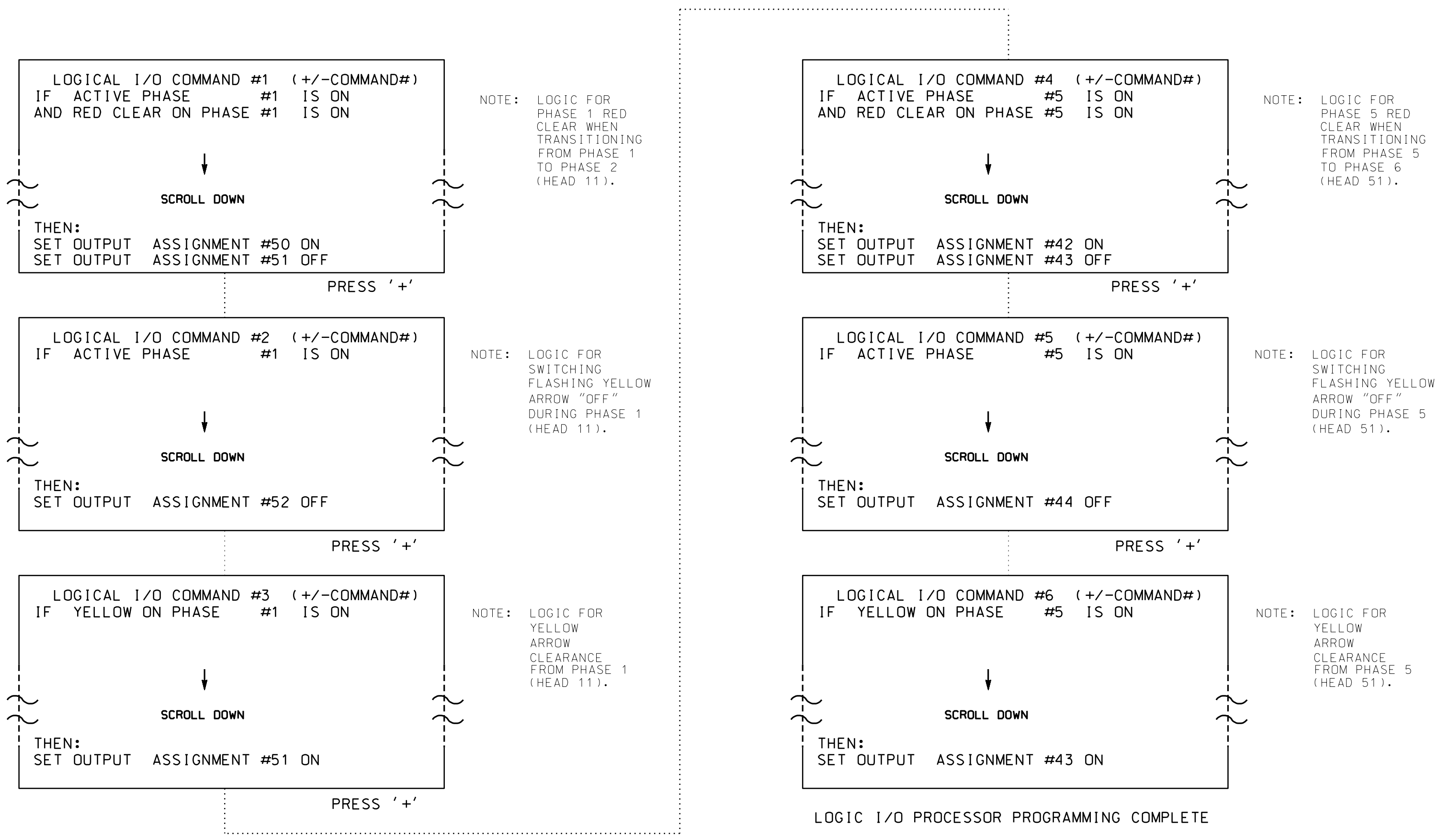
RKA RAMEY KEMP ASSOCIATES
 5808 Farrington Place Raleigh, North Carolina 27609
 Phone: 919-872-6115 | www.rameykemp.com | NC License No. C-0910

SIG. INVENTORY NO. 03-1152

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).



OUTPUT REFERENCE SCHEDULE	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green
OUTPUT 50 =	Overlap A Red
OUTPUT 51 =	Overlap A Yellow
OUTPUT 52 =	Overlap A Green

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":


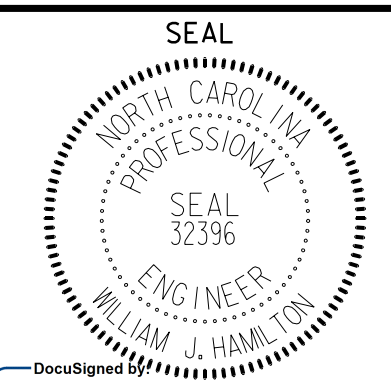
OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.

INPUTS PAGE 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1152
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

Electrical Detail
Sheet 2 of 5

 RKA RAMEY KEMP ASSOCIATES <small>8808 Farrington Place Raleigh, North Carolina 27609 Phone: 919-872-8115 www.rameykemp.com NC License No. C-0910</small>	ELECTRICAL AND PROGRAMMING DETAILS FOR:	Drysdale Drive at Centerpointe/Eastport Access	SEAL  SEAL 32396 WILLIAM J. HAMILTON ENGINEER
	Division 3 New Hanover County Wilmington	PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)	DocuSigned by William J. Hamilton 11/08/2021

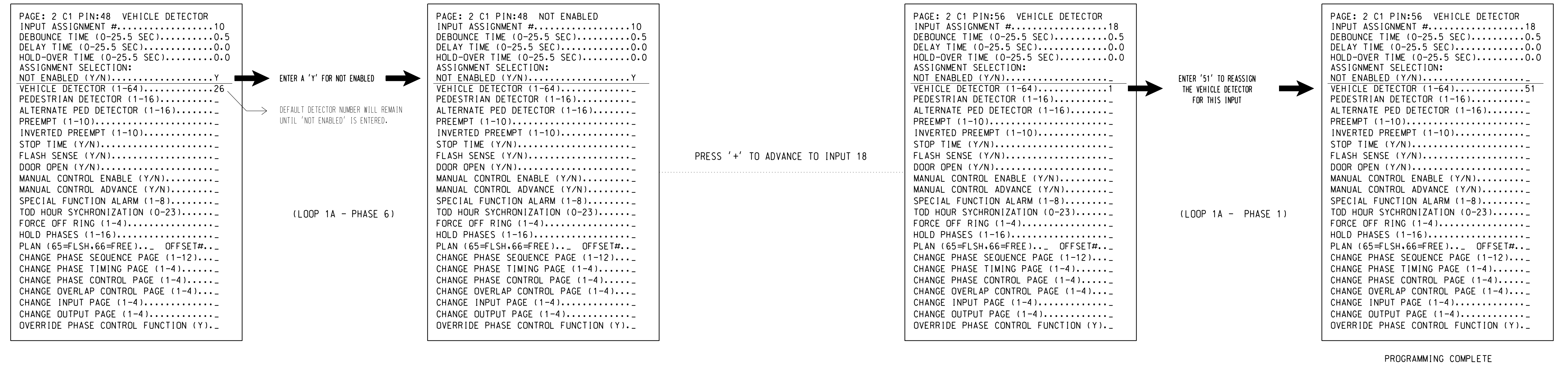
11/08/2021
 ...\\03-1152..._sm.dwg
 User: jwendt

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 10 SECONDS TO 0 SECONDS.

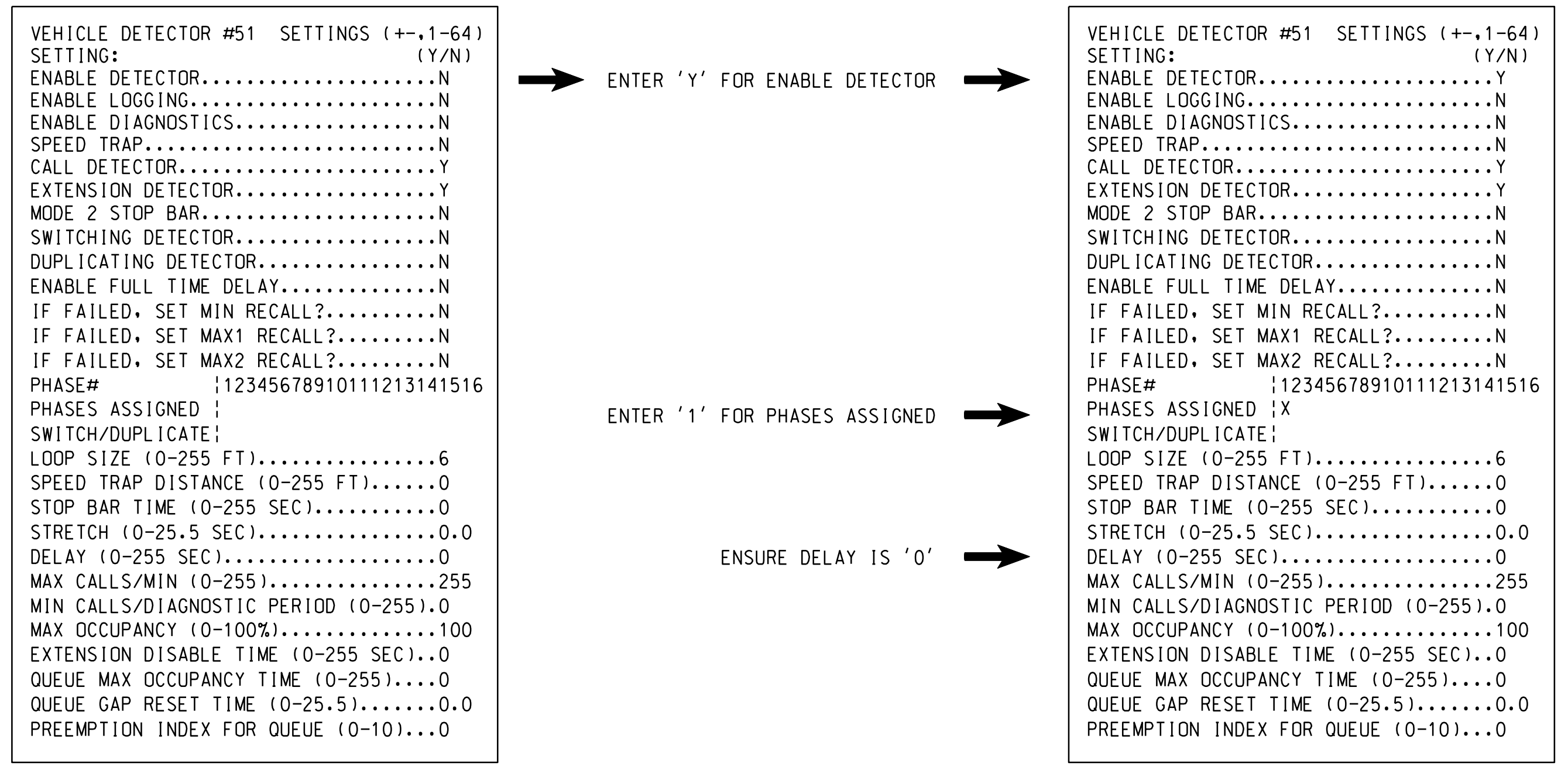
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)


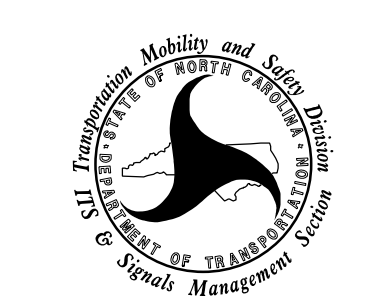
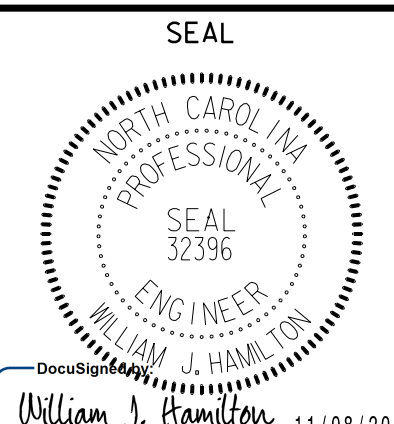
FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.



NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1152
DESIGNED: Nov 2021
SEALED: 11/08/2021
REVISED: N/A

Electrical Detail
Sheet 3 of 5

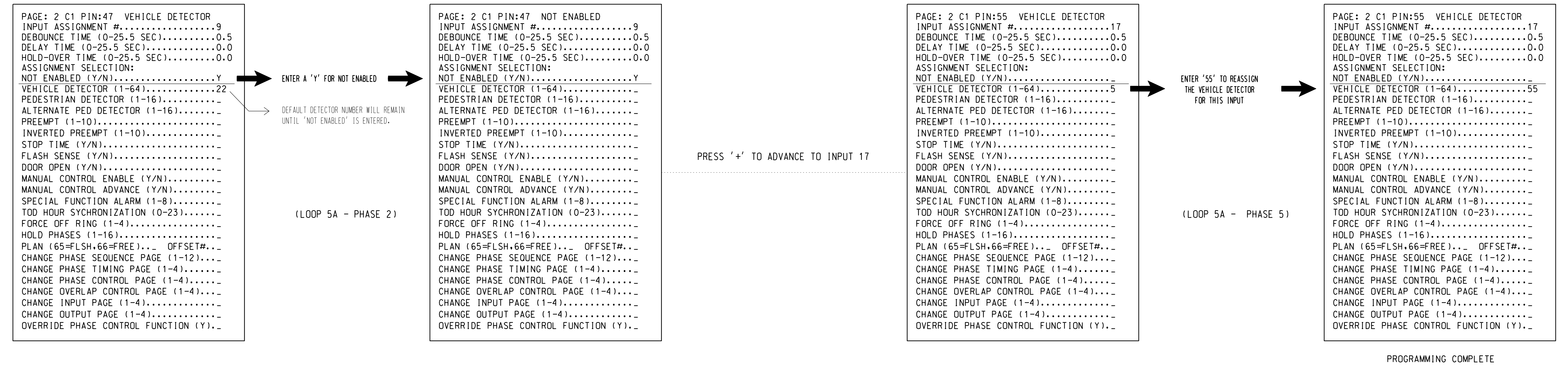
 RKA RAMEY KEMP ASSOCIATES 8808 Farrington Place Raleigh, North Carolina 27609 Phone: 919-872-8115 www.rameykemp.com NC License No. C-20910	ELECTRICAL AND PROGRAMMING DETAILS FOR:  750 N. Greenfield Pkwy, Garner, NC 27529	Drysdale Drive at Centerpointe/Eastport Access Division 3 New Hanover County Wilmington PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton PREPARED BY: A. Andrews RKA PROJ. NO: 19258 (040)	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL  WILLIAM J. HAMILTON 11/08/2021 DATE SIG. INVENTORY NO. 03-1152
	REVISIONS INIT. DATE	REVISIONS INIT. DATE	REVISIONS INIT. DATE

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 10 SECONDS TO 0 SECONDS.

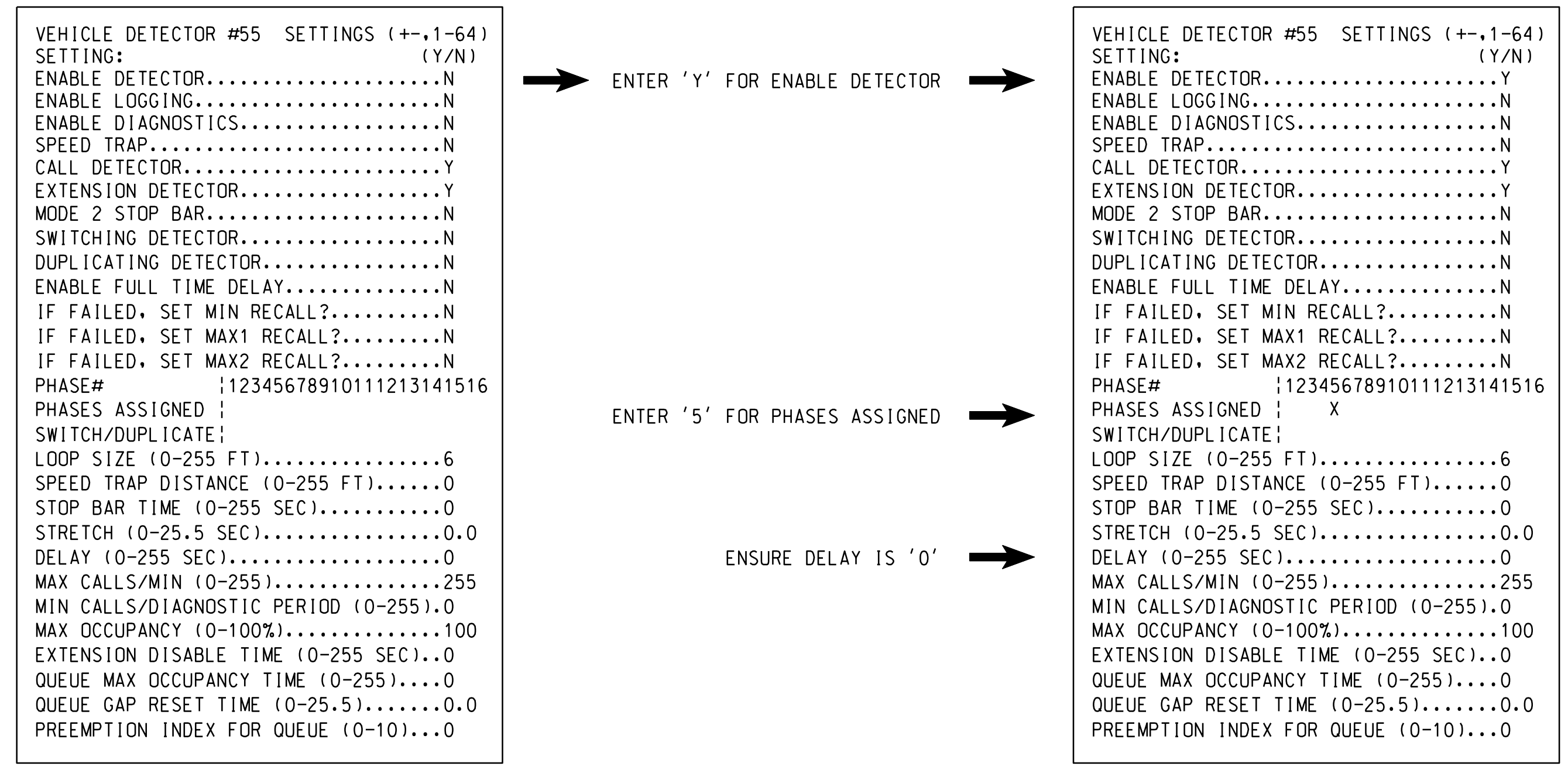
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.

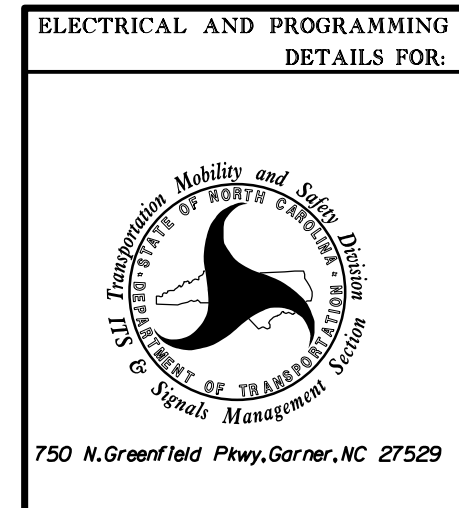


NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1152
DESIGNED: Nov 2021
SEALED: 11/08/2021
REVISED: N/A

11/08/2021
...WJH-70681 (04/03-1152_sm.dwg) (e4.dgn)
User: jwmcncf

Electrical Detail
Sheet 4 of 5



Division 3		New Hanover County		Wilmington	
PLAN DATE:	November 2021	REVIEWED BY:	WJ Hamilton		
PREPARED BY:	A. Andrews	RKA PROJ. NO.:	19258 (040)		
REVISIONS	INIT.	DATE			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
NORTH CAROLINA PROFESSIONAL ENGINEER	
WILLIAM J. HAMILTON	
11/08/2021	
SIG. INVENTORY NO. 03-1152	

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING (program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS PHASE: 12345678910111213141516 VEH OVL PARENTS: XX VEH OVL NOT VEH: VEH OVL NOT PED: VEH OVL GRN EXT: STARTUP COLOR: RED YELLOW GREEN FLASH COLORS: RED YELLOW X GREEN SELECT VEHICLE OVERLAP OPTIONS: (Y/N) FLASH YELLOW IN CONTROLLER FLASH?...Y GREEN EXTENSION (0-255 SEC)...0.0 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0 OUTPUT AS PHASE # (0=NONE, 1-16)...0

NOTICE GREEN FLASH

PRESS '+'

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

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS PHASE: 12345678910111213141516 VEH OVL PARENTS: XX VEH OVL NOT VEH: VEH OVL NOT PED: VEH OVL GRN EXT: STARTUP COLOR: RED YELLOW GREEN FLASH COLORS: RED YELLOW X GREEN SELECT VEHICLE OVERLAP OPTIONS: (Y/N) FLASH YELLOW IN CONTROLLER FLASH?...Y GREEN EXTENSION (0-255 SEC)...0.0 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0 OUTPUT AS PHASE # (0=NONE, 1-16)...0

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING (program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PAGE 2: VEHICLE OVERLAP 'A' SETTINGS PHASE: 12345678910111213141516 VEH OVL PARENTS: X VEH OVL NOT VEH: VEH OVL NOT PED: VEH OVL GRN EXT: STARTUP COLOR: RED YELLOW GREEN FLASH COLORS: RED YELLOW GREEN SELECT VEHICLE OVERLAP OPTIONS: (Y/N) FLASH YELLOW IN CONTROLLER FLASH?...Y GREEN EXTENSION (0-255 SEC)...0.0 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0 OUTPUT AS PHASE # (0=NONE, 1-16)...0

NOTICE GREEN FLASH

PRESS '+'

PAGE 2: VEHICLE OVERLAP 'B' SETTINGS PHASE: 12345678910111213141516 VEH OVL PARENTS: X VEH OVL NOT VEH: VEH OVL NOT PED: VEH OVL GRN EXT: STARTUP COLOR: RED YELLOW GREEN FLASH COLORS: RED YELLOW X GREEN 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 '+'

PAGE 2: VEHICLE OVERLAP 'C' SETTINGS PHASE: 12345678910111213141516 VEH OVL PARENTS: X VEH OVL NOT VEH: VEH OVL NOT PED: VEH OVL GRN EXT: STARTUP COLOR: RED YELLOW GREEN FLASH COLORS: RED YELLOW GREEN SELECT VEHICLE OVERLAP OPTIONS: (Y/N) FLASH YELLOW IN CONTROLLER FLASH?...Y GREEN EXTENSION (0-255 SEC)...0.0 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0 OUTPUT AS PHASE # (0=NONE, 1-16)...0

OVERLAP PROGRAMMING COMPLETE

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: 03-1152 DESIGNED: Nov 2021 SEALED: 11/08/2021 REVISED: N/A

Electrical Detail Sheet 5 of 5

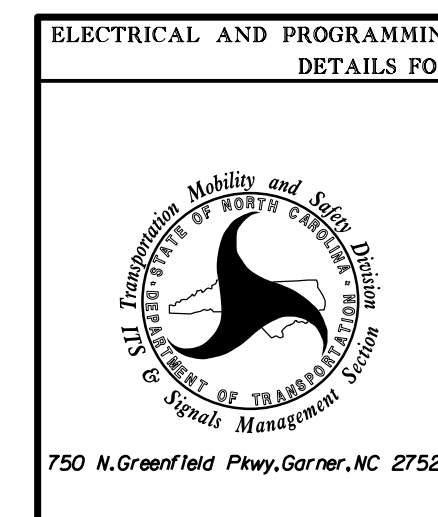
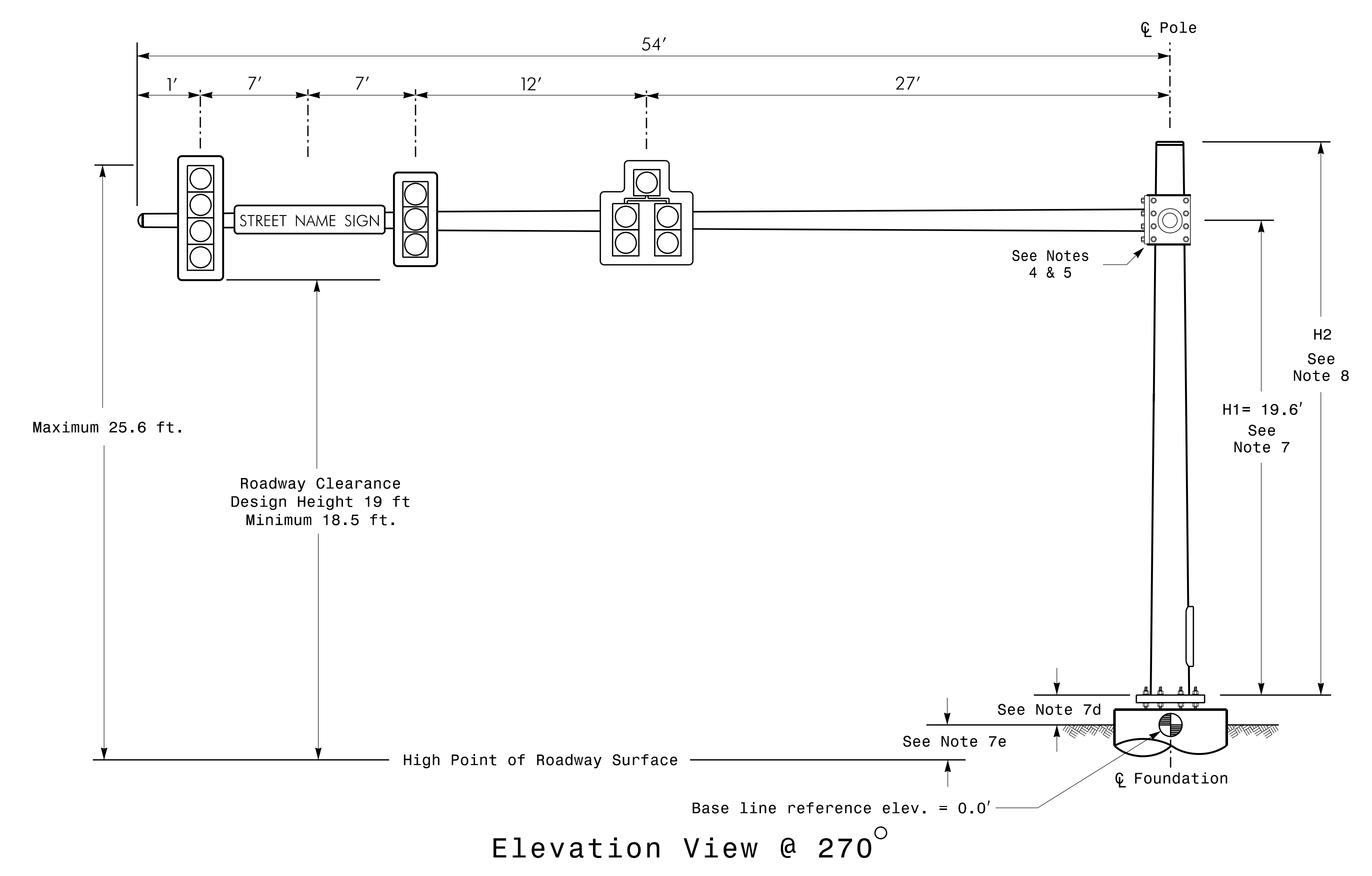


Table with project details: Drysdale Drive at Centerpointe/Eastport Access, Division 3, New Hanover County, Wilmington. Includes dates for plan, preparation, and review, and names of A. Andrews and WJ Hamilton.

Professional Engineer seal for William J. Hamilton, No. 32396, dated 11/08/2021. Includes inventory number 03-1152.

11/08/2021 10:47:08 AM J:\03-1152_sm.dwg User: jwmcn

Design Loading for METAL POLE NO. 1



Elevation View @ 270°

SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+ 0.6 ft.	+ 0.9 ft.
Elevation difference at Edge of travelway or face of curb	+ 1.0 ft.	+ 0.3 ft.

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE-RIGID MOUNTED	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE-RIGID MOUNTED	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE-RIGID MOUNTED	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

DESIGN REFERENCE MATERIAL

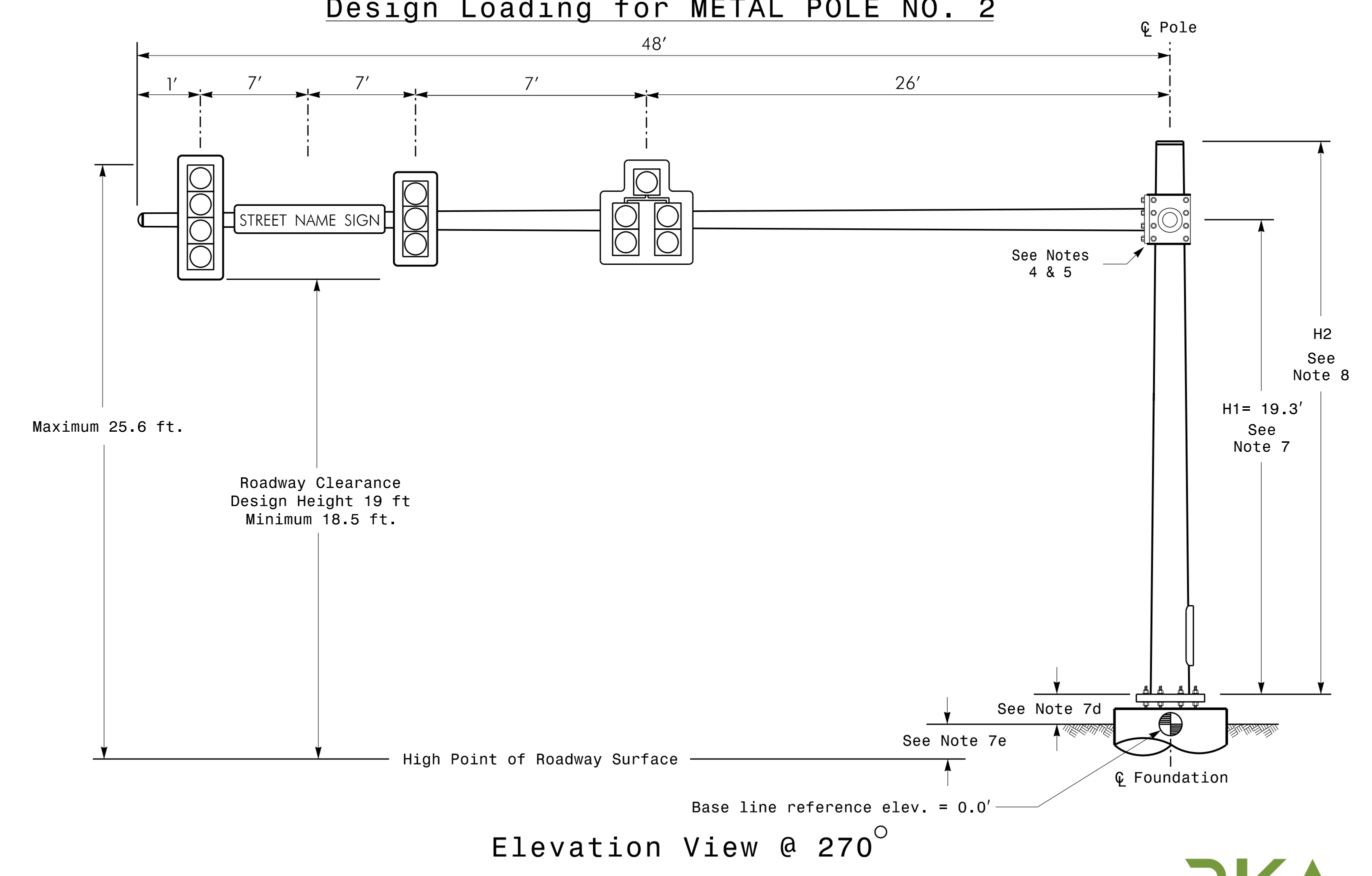
- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

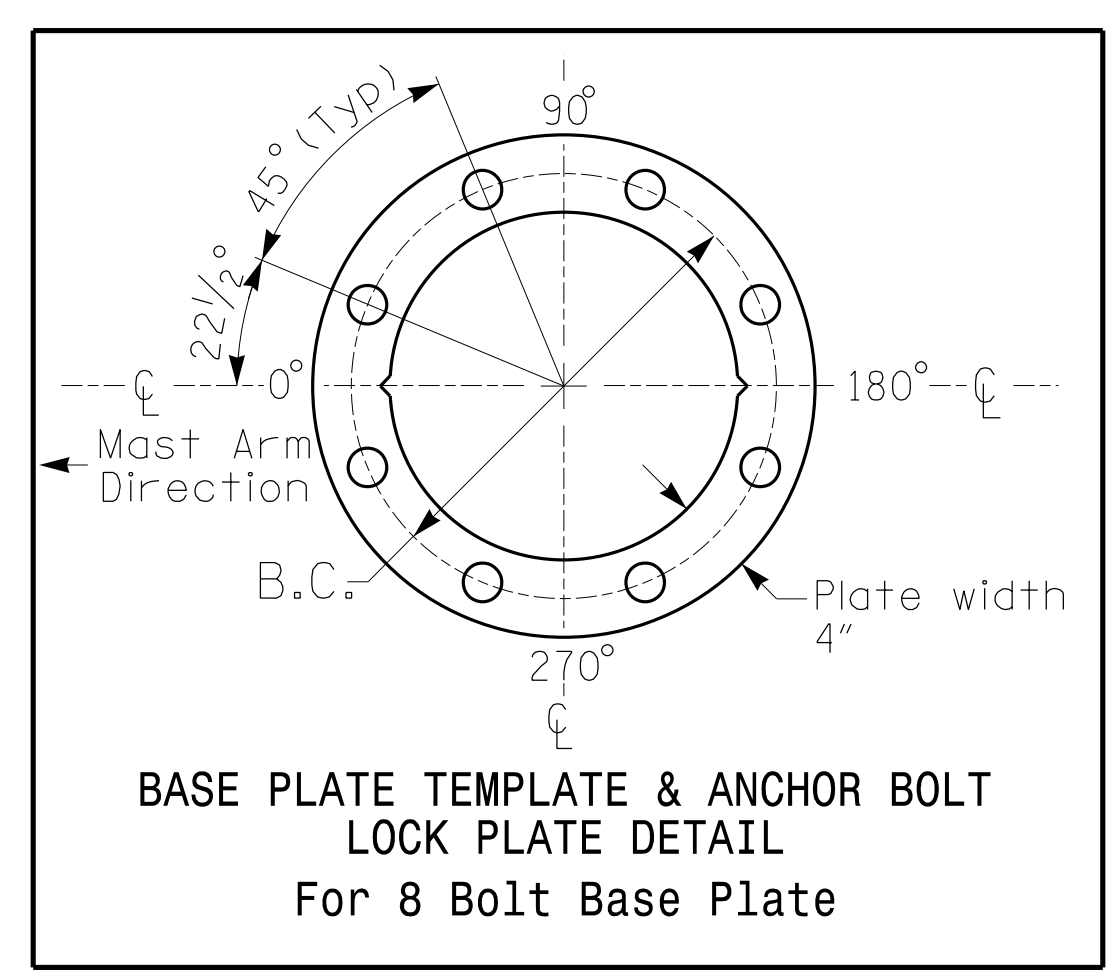
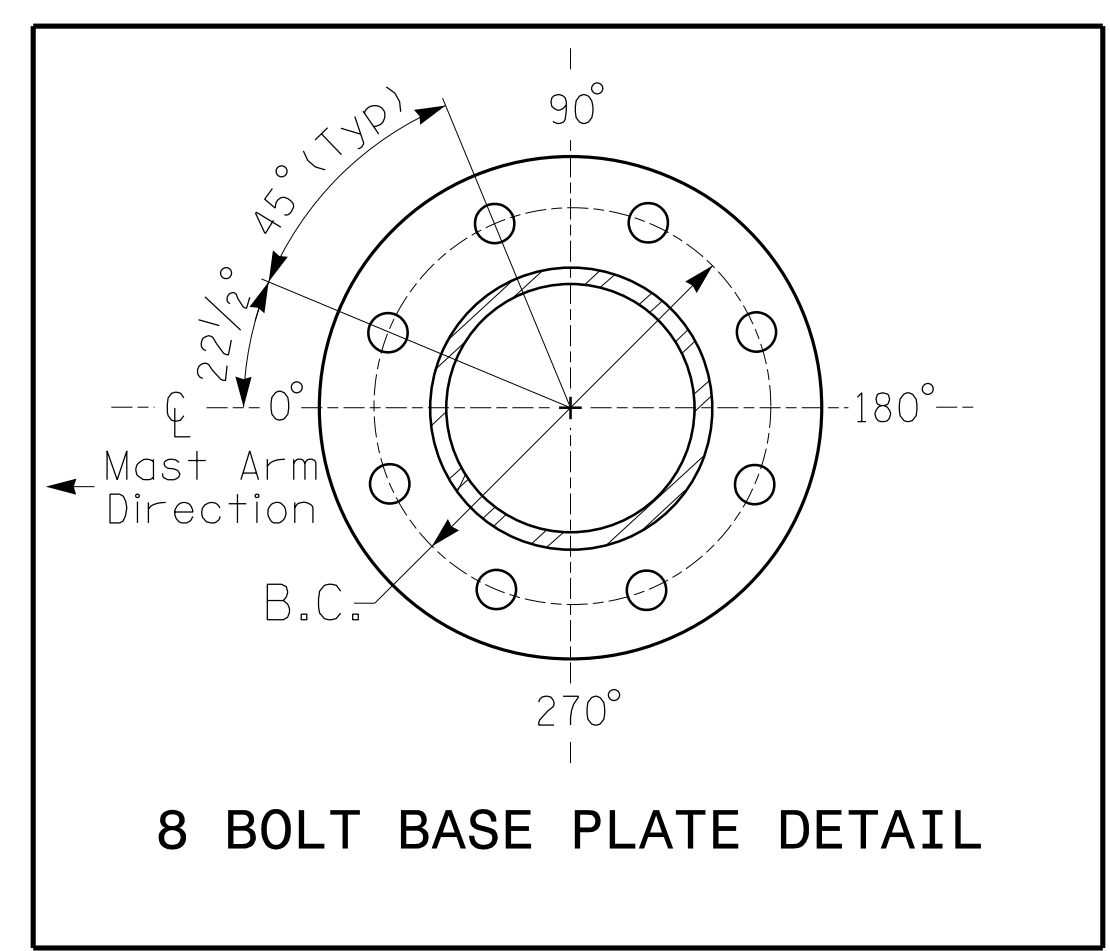
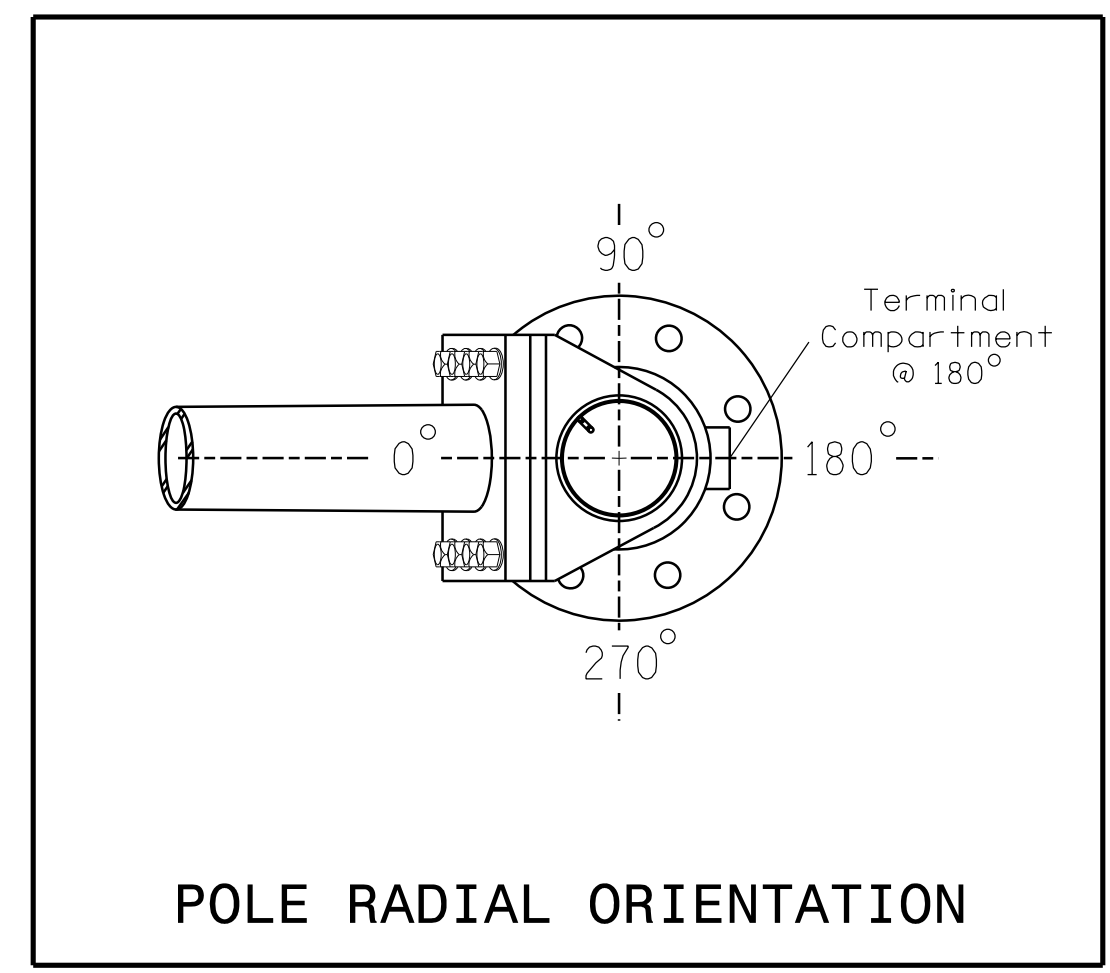
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be black in color as specified in the project special provisions.

Design Loading for METAL POLE NO. 2



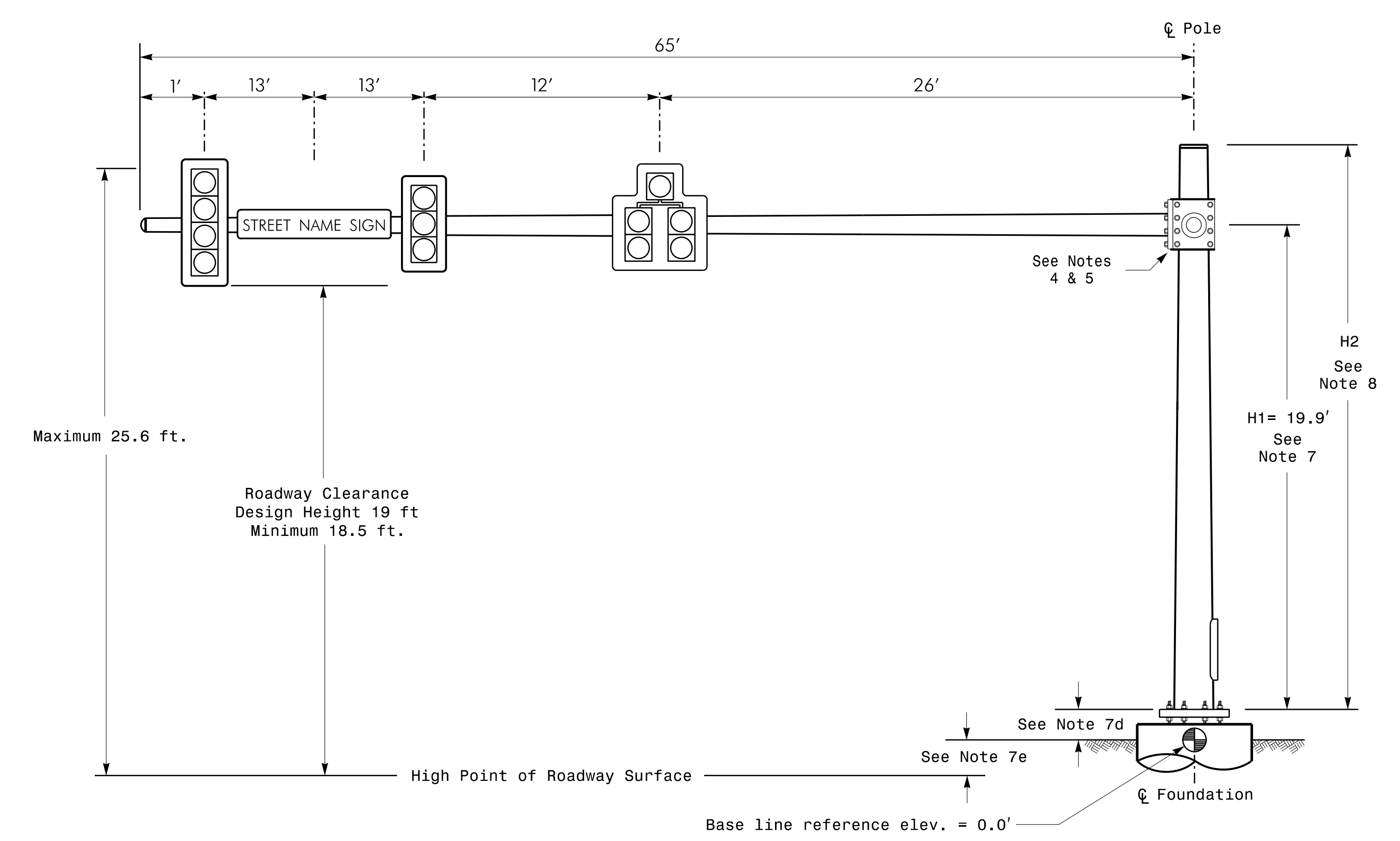
Elevation View @ 270°



NCDOT Wind Zone 2 (130 mph)

	<p>Drysdale Drive at Centerpointe/Eastport Access</p>		
	<p>Division 3 New Hanover County Wilmington</p>	<p>SEAL</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>PLAN DATE: November 2021</p>	<p>REVIEWED BY: WJ Hamilton</p>	<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>
<p>SCALE: 0 N/A</p>	<p>PREPARED BY: A. Andrews</p>	<p>RKA PROJ. NO: 19258 (040)</p>	<p>11/08/2021</p>
<p>N/A</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>SIGNATURE</p>
			<p>SIG. INVENTORY NO. 03-1152</p>

Design Loading for METAL POLE NO. 3



Elevation View @ 270°

SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+ 0.8 ft.	- 0.1 ft.
Elevation difference at Edge of travelway or face of curb	+ 0.5 ft.	+ 0.2 ft.

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE-RIGID MOUNTED	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE-RIGID MOUNTED	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE-RIGID MOUNTED	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

DESIGN REFERENCE MATERIAL

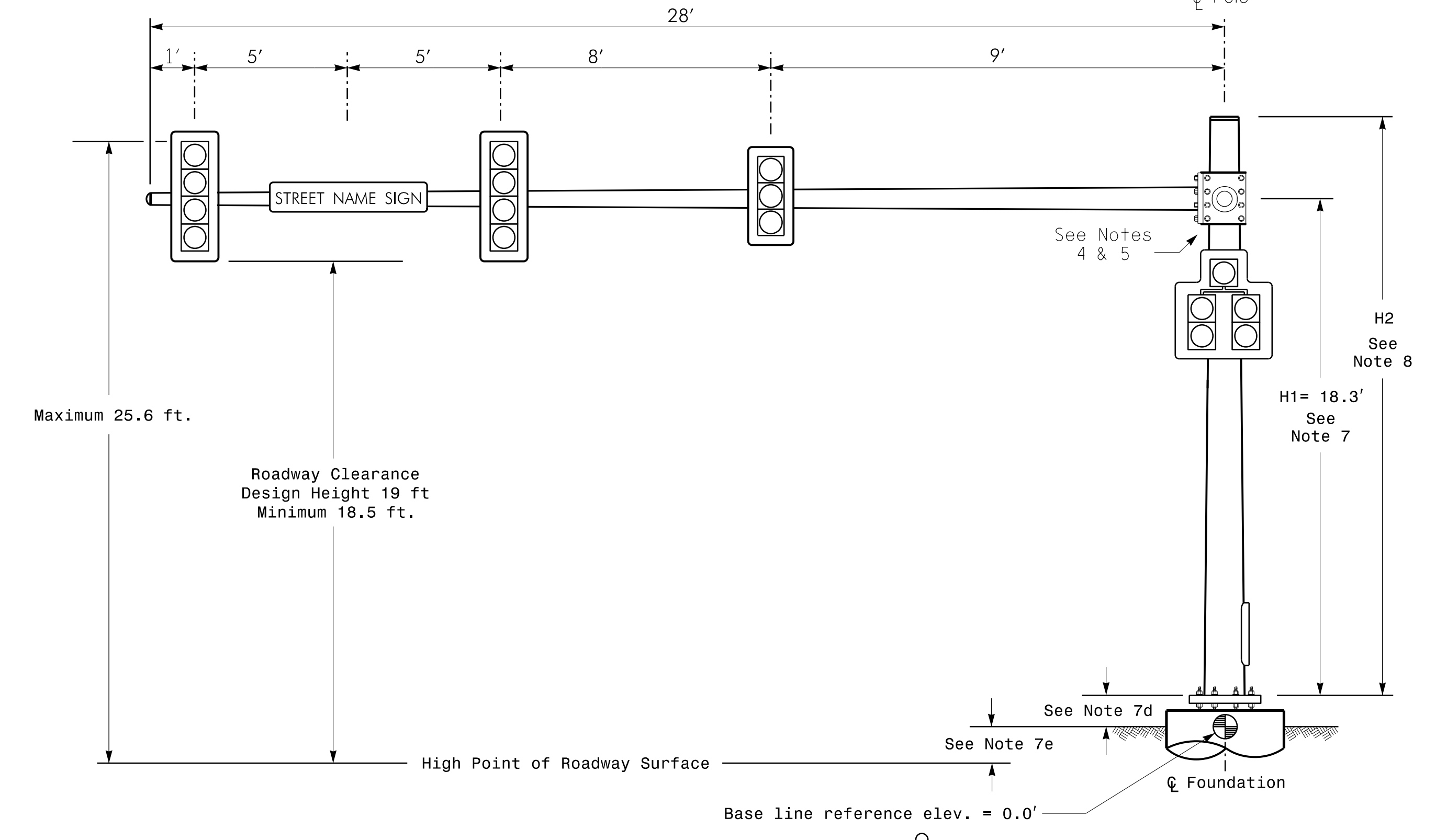
- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

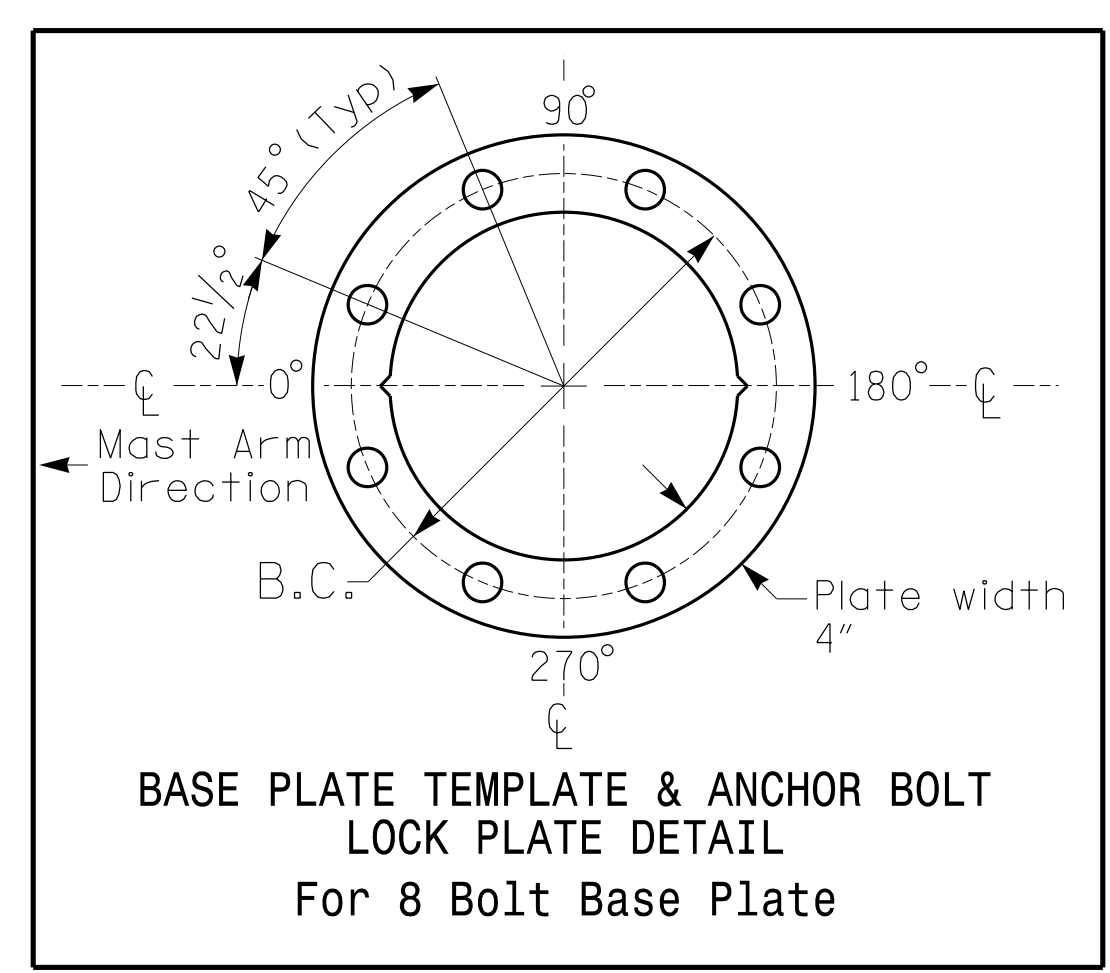
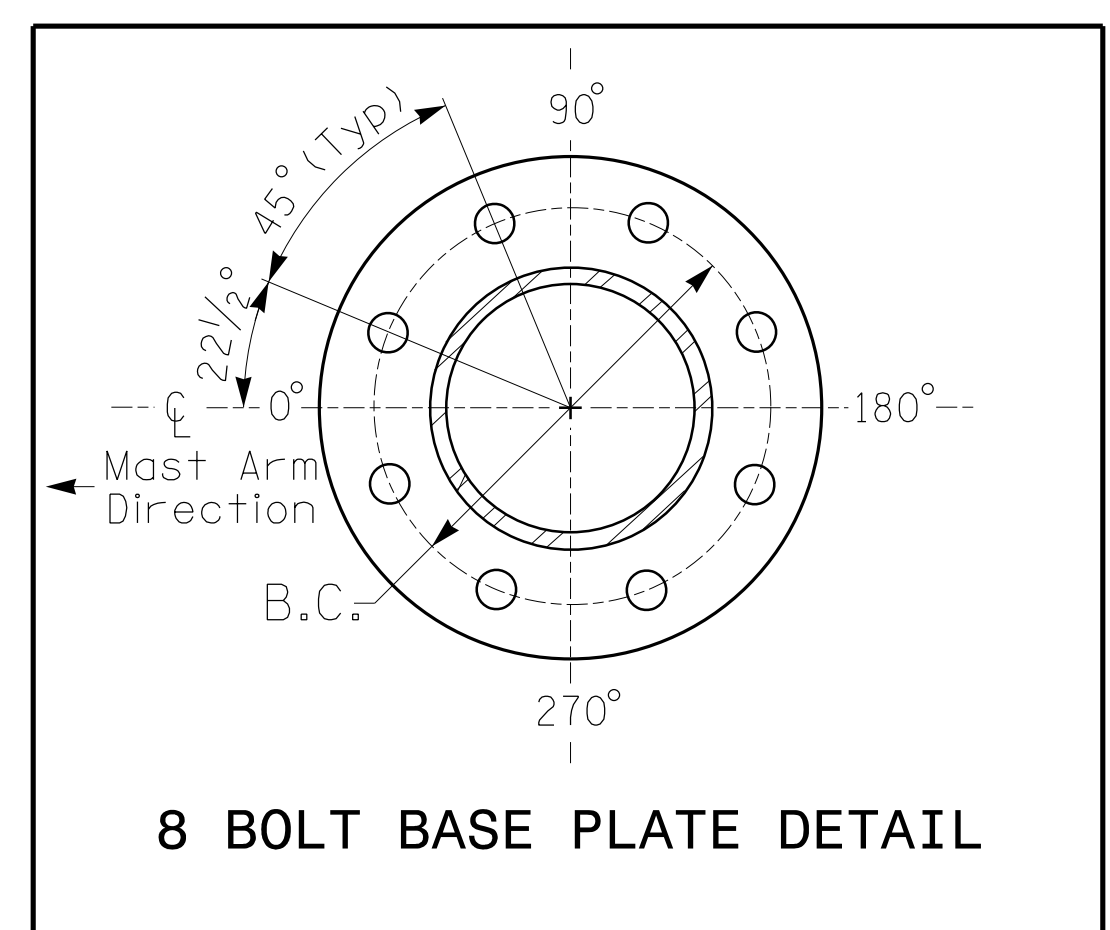
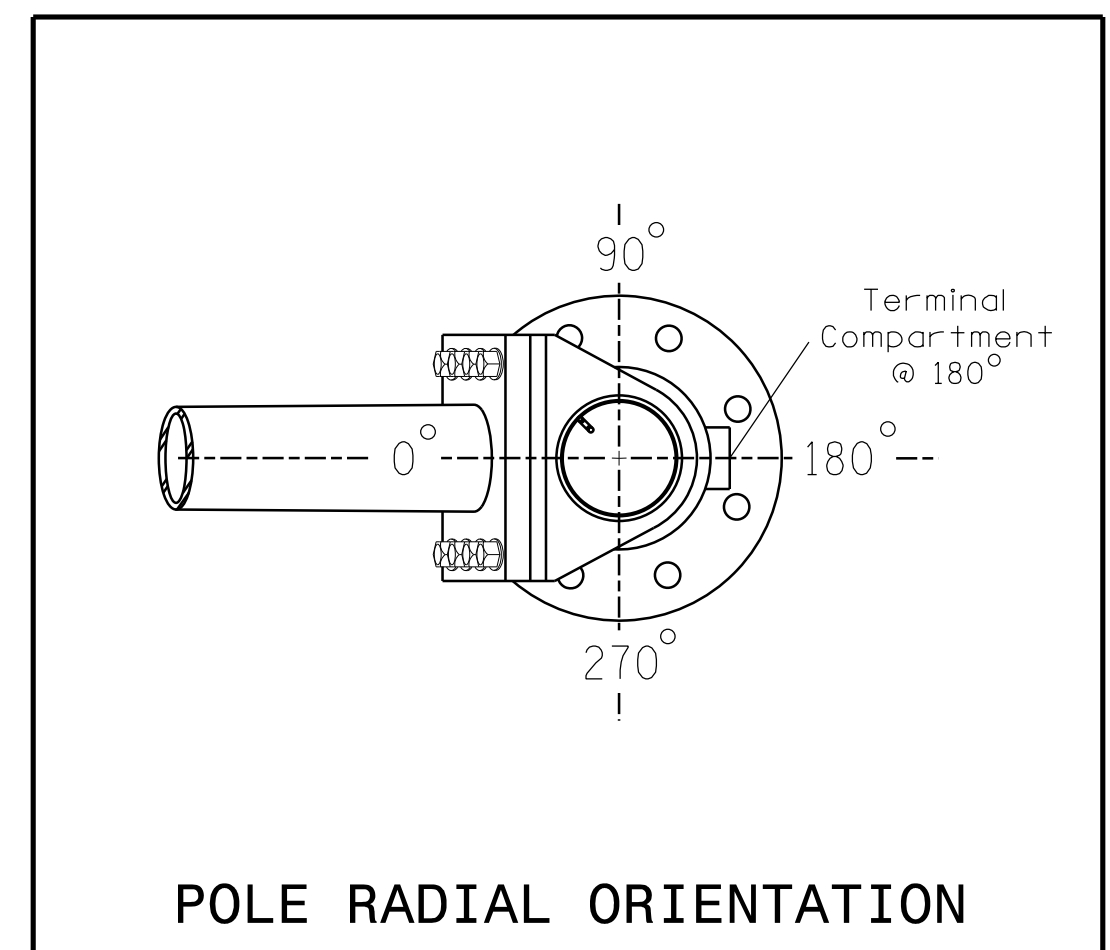
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be black in color as specified in the project special provisions.

Design Loading for METAL POLE NO. 4



Elevation View @ 270°



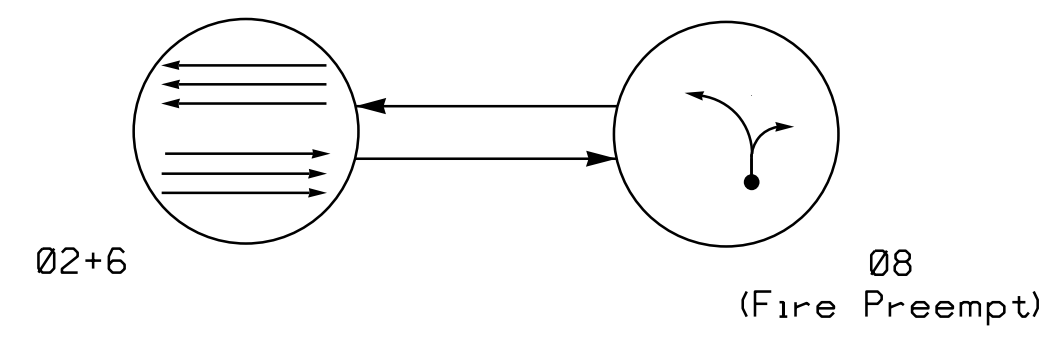
NCDOT Wind Zone 2 (130 mph)

	<p>Drysdale Drive at Centerpointe/Eastport Access</p>		
	<p>Division 3 New Hanover County Wilmington</p>	<p>Division 3 New Hanover County Wilmington</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Prepared by: A. Andrews</p>	<p>Reviewed by: WJ Hamilton</p>	<p>Scale: N/A</p>
<p>Scale: N/A</p>	<p>Revisions:</p>	<p>Initials:</p>	<p>Date:</p>
<p>Signature:</p>	<p>Signature:</p>	<p>Signature:</p>	<p>Signature:</p>

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
WILLIAM J. HAMILTON
11/08/2021
SIG. INVENTORY NO. 03-1152

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

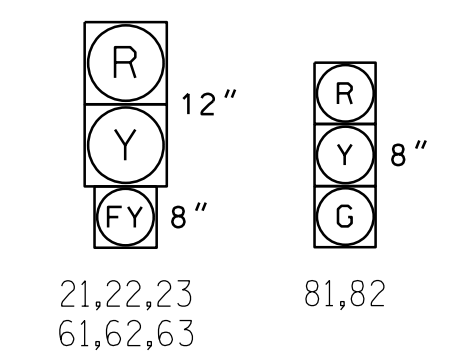
TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	08	FLASH
21, 22, 23	FY	R	Y
61, 62, 63	FY	R	Y
81, 82	DRK	G	R

FY = 8" FLASHING YELLOW
DRK = DARK

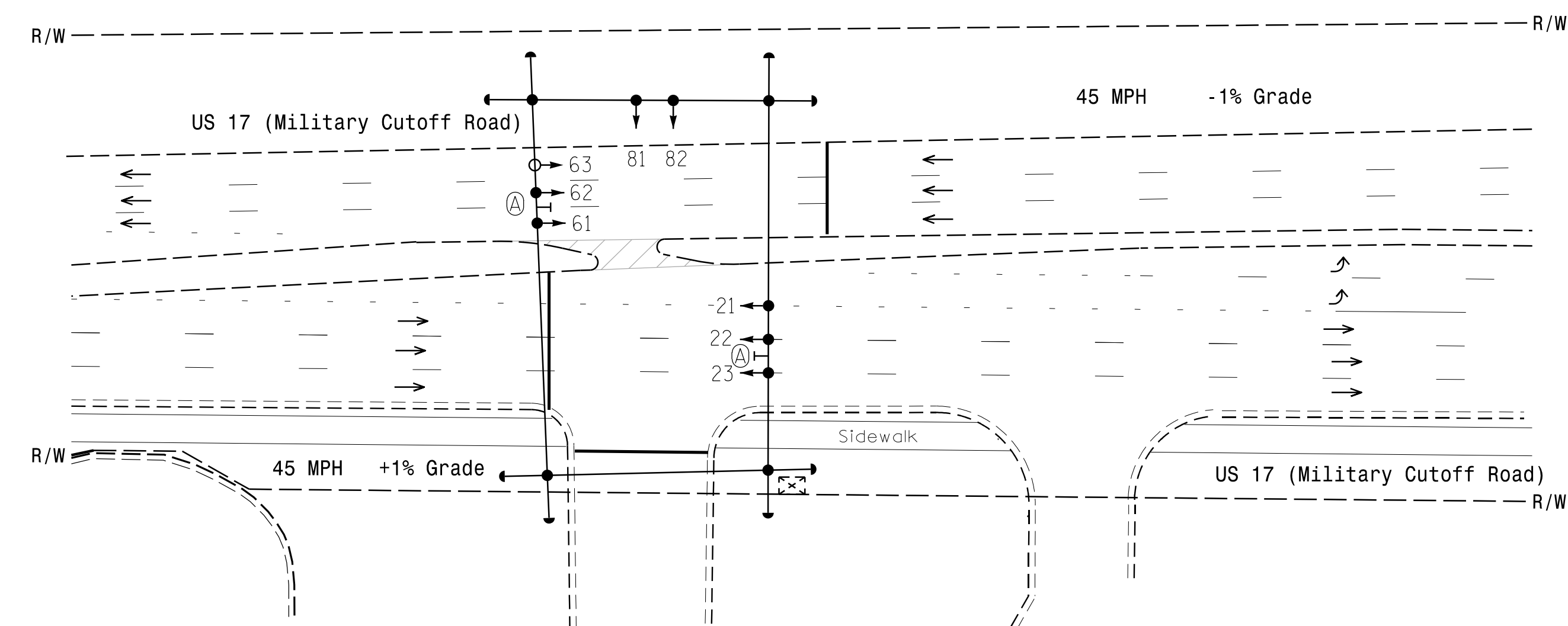
SIGNAL FACE I.D.

All Heads L.E.D.



2 Phase Semi-Actuated (Wilmington Signal System)

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Maintain emergency vehicle preemption switch in Fire Station.
- The City Traffic Engineer will determine the Delay before Preempt and Preempt Dwell Min Green time for the emergency vehicle preemption timing.
- Clear signal heads 21, 22, 23, 61, 62, and 63 from flashing 8" yellow to steady 12" yellow during interval 1 and steady red during interval 2.
- When clearing to preemption, signal heads 81 and 82 shall display red during interval 1 and 2. When clearing from preemption, signal heads 81 and 82 shall display yellow during interval 1 and red during interval 2.
- Pavement markings are existing.
- Signal system data:
Controller Asset #0946.



OASIS 2070 TIMING CHART

FEATURE	PHASE		
	2	6	8
Min Green 1 *	12	12	7
Extension 1 *	0.0	0.0	0.0
Max Green 1 *	30	30	30
Yellow Clearance	4.4	4.6	3.0
Red Clearance	1.0	1.6	3.1
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	-	-
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.

2070 EV PREEMPTION

Interval 1 - Dwell Green	255
Interval 1 - Dwell Yellow	3.0
Interval 1 - Dwell Red	3.1
Interval 5 - Exit Green	1
Interval 5 - Yellow	0.0
Interval 5 - Red	0.0
Delay Time	**
Min Green Before Pre	1
Ped Clear Before Pre	0
Yellow Clear Before Pre	0.0 *
Red Clear Before Pre	0.0 *
Dwell Min Time	**
Enable Backup Protection	N
Ped Clear Through Yellow	N

* Clearance time defaults to times used for phase during normal operation.
** See Note 4.

LEGEND

PROPOSED	EXISTING
○→	●→
○→	N/A
⊥	⊥
⊥	⊥
○→	●→
○→	●→
⊗	⊗
□	□
---	---
N/A	---
→	→
⊗	⊗

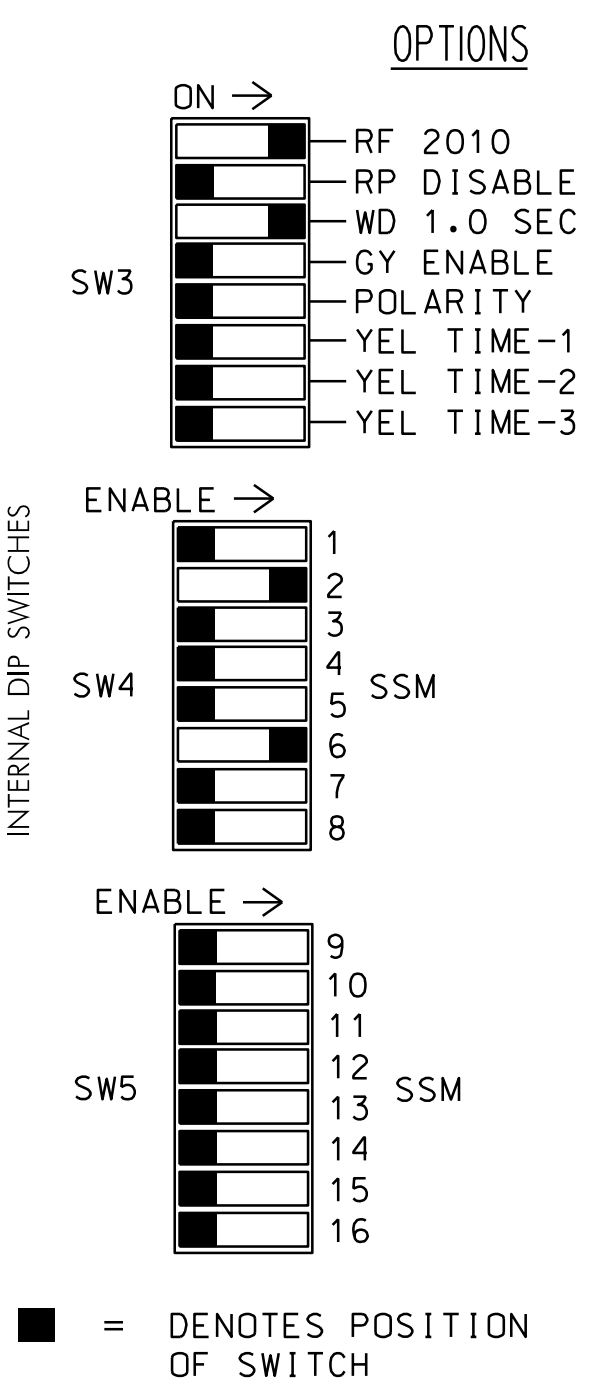
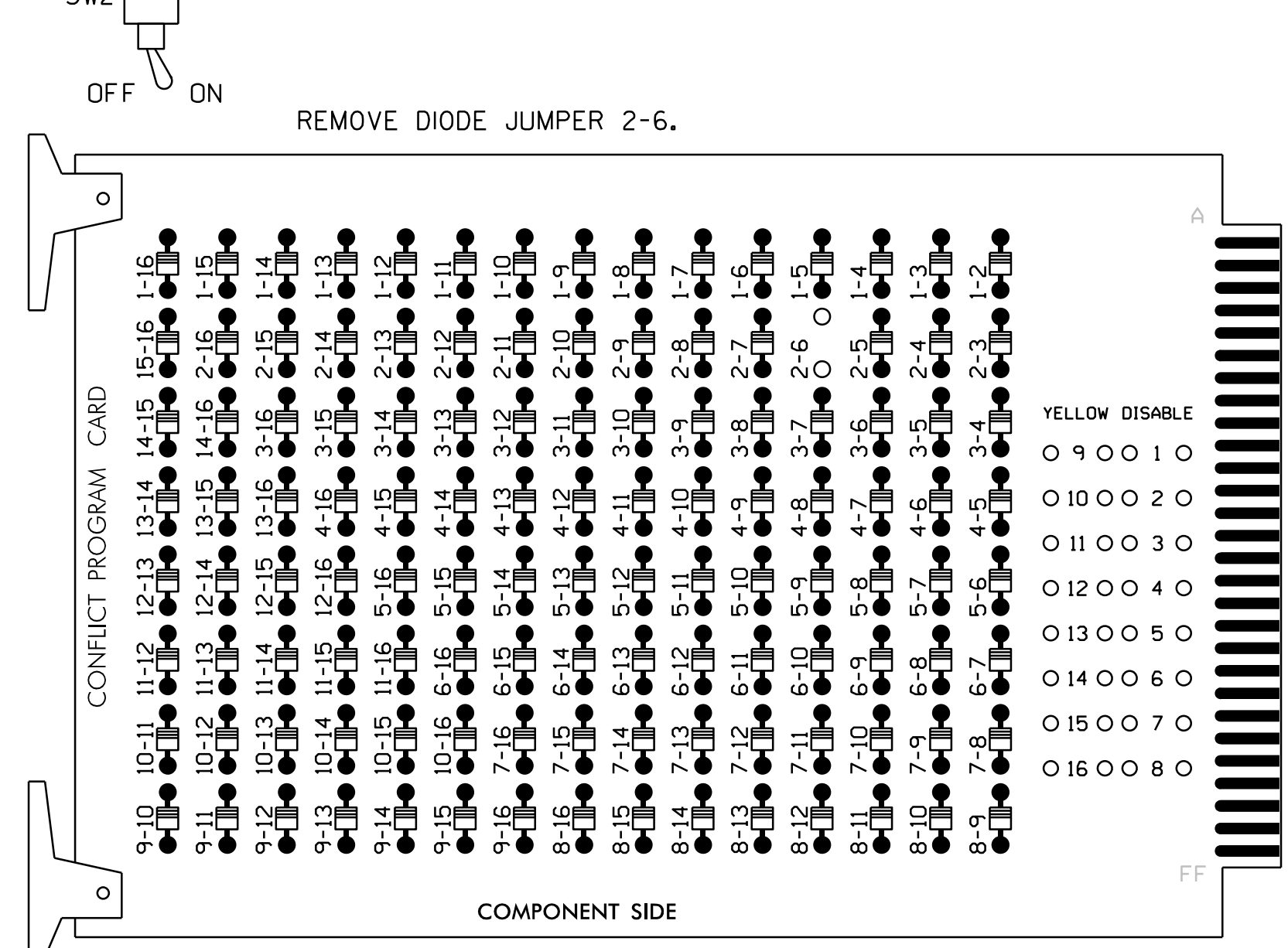
Signal Upgrade

	<p>US 17 (Military Cutoff Road) at Wilmington Fire Station #9</p>		
	<p>Division 3 New Hanover County Wilmington</p> <p>PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton</p> <p>PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)</p>	<p>750 N. Greenfield Pkwy, Garner, NC 27529</p> <p>SCALE: 0 40 1" = 40'</p>	



EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL
(remove jumper 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.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program controller to start up in phases 2 and 6 green.
- Enable Simultaneous Gap-Out, for all phases.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Wilmington Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22,23	*	NU	NU	NU	NU	61,62,63	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN											109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

8' FLASHING YELLOW → 130 8' FLASHING YELLOW → 136

NU = Not Used
* See Lamp Notes (Sheet 2 of 2)

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S2P**,S6,S8
 PHASES USED.....2,6,8*
 OVERLAPS.....NONE
 * USED DURING PREEMPT ONLY
 ** USED FOR PILOT LAMP

PREEMPT ONLY PHASE OMIT NOTE

(program controller as noted below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 8 for 'Omit Phase' and phases 2 and 6 for 'Startup Calls'. This is to prevent phase 8 from being served when not in Preempt.

INPUT FILE POSITION LAYOUT

(front view)

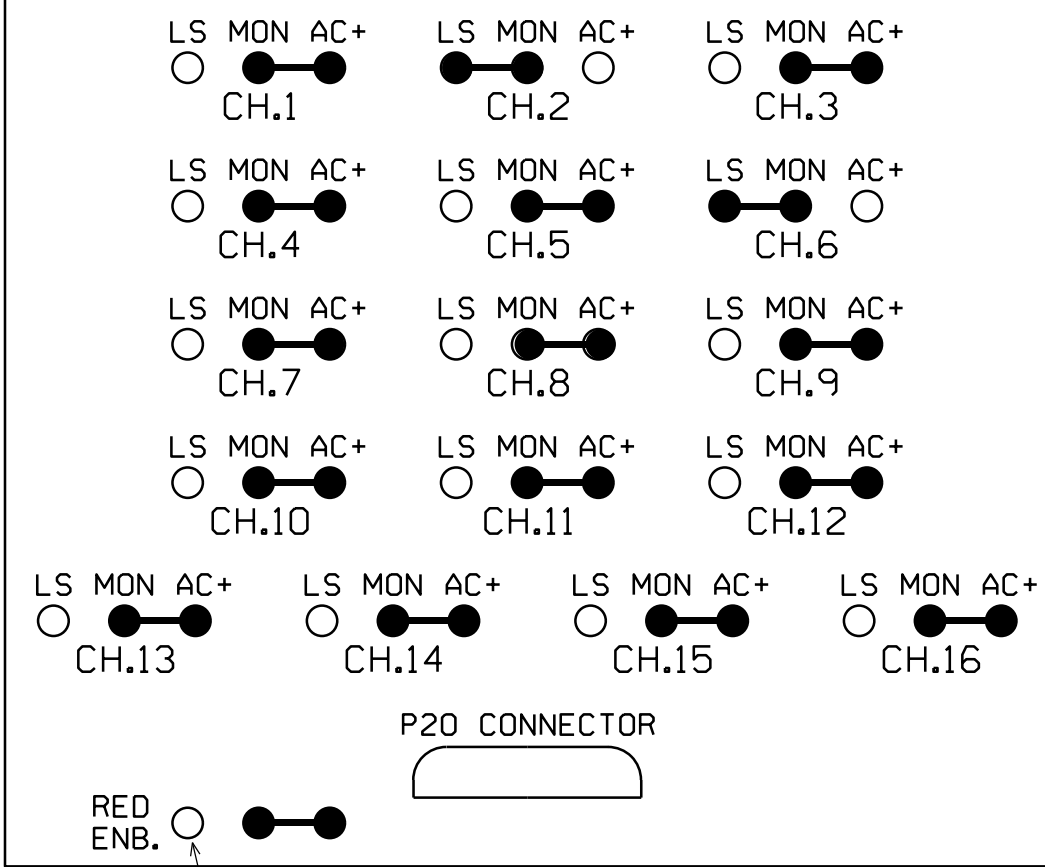
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	U	U	U	U	U	U	U	U	U	U	U	U	U
FILE "J"	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
	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
	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2	PRE-2
	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR	AC ISOLATOR

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

FS = FLASH SENSE
 ST = STOP TIME
 PRE-2 = PREEMPT 2

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



This pin clipped at the factory.

IN-CYCLE FLASH PROGRAMMING NOTE

FOR HEADS 21,22,23,61 AND 62

(program controller as noted below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Green Int Flash'. This is done to flash phases 2 and 6 yellow when not in Preempt.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0946
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A

Electrical Detail
 Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: **US 17 (Military Cutoff Road) at Wilmington Fire Station #9**

Division 3 New Hanover County Wilmington

PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton

PREPARED BY: A. Andrews RKA PROJ. NO.: 19258 (040)

REVISIONS: _____ INIT. DATE

DocuSigned by: **William J. Hamilton** 11/08/2021

750 N. Greenfield Pkwy, Garner, NC 27529

RKA
 RAMEY KEMP ASSOCIATES
 8808 Farrington Place Raleigh, North Carolina 27609
 Phone: 919-872-8115 | www.rameykemp.com | NC License No. C-0910

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SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 32396
 WILLIAM J. HAMILTON

SIG. INVENTORY NO. 03-0946

PHASING DIAGRAM

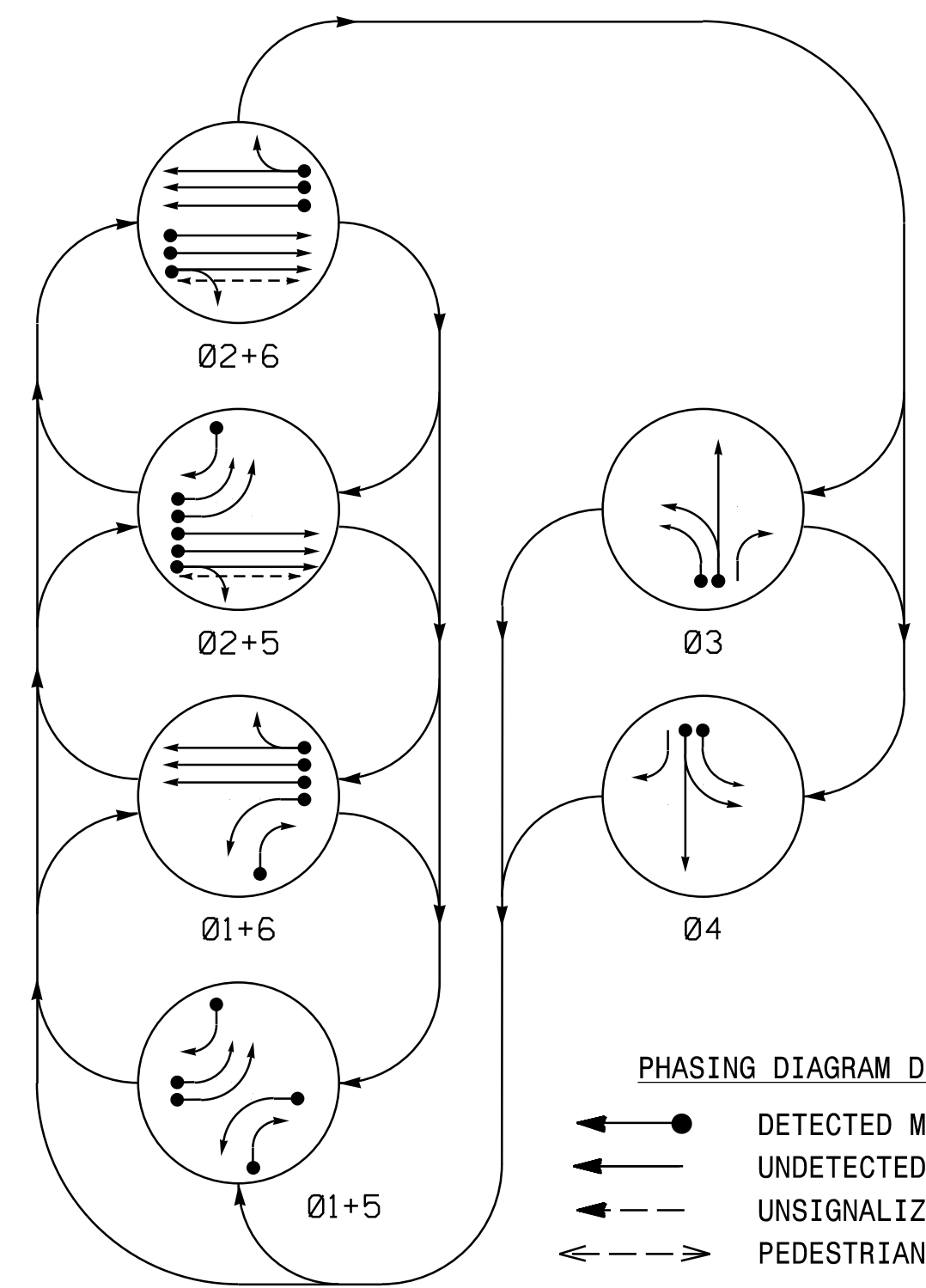
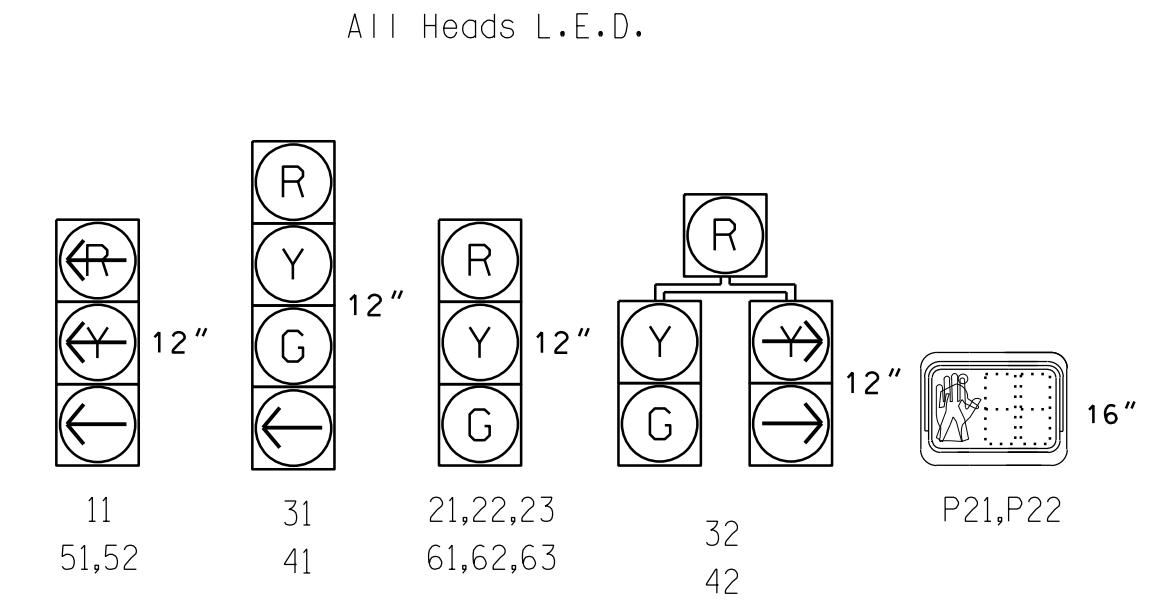


TABLE OF OPERATION

Table with columns for Signal Face and Phase (01+5, 01+6, 02+5, 02+6, 03, 04, FLASH). It details the sequence of lights (R, G, Y) for each phase.

SIGNAL FACE I.D.



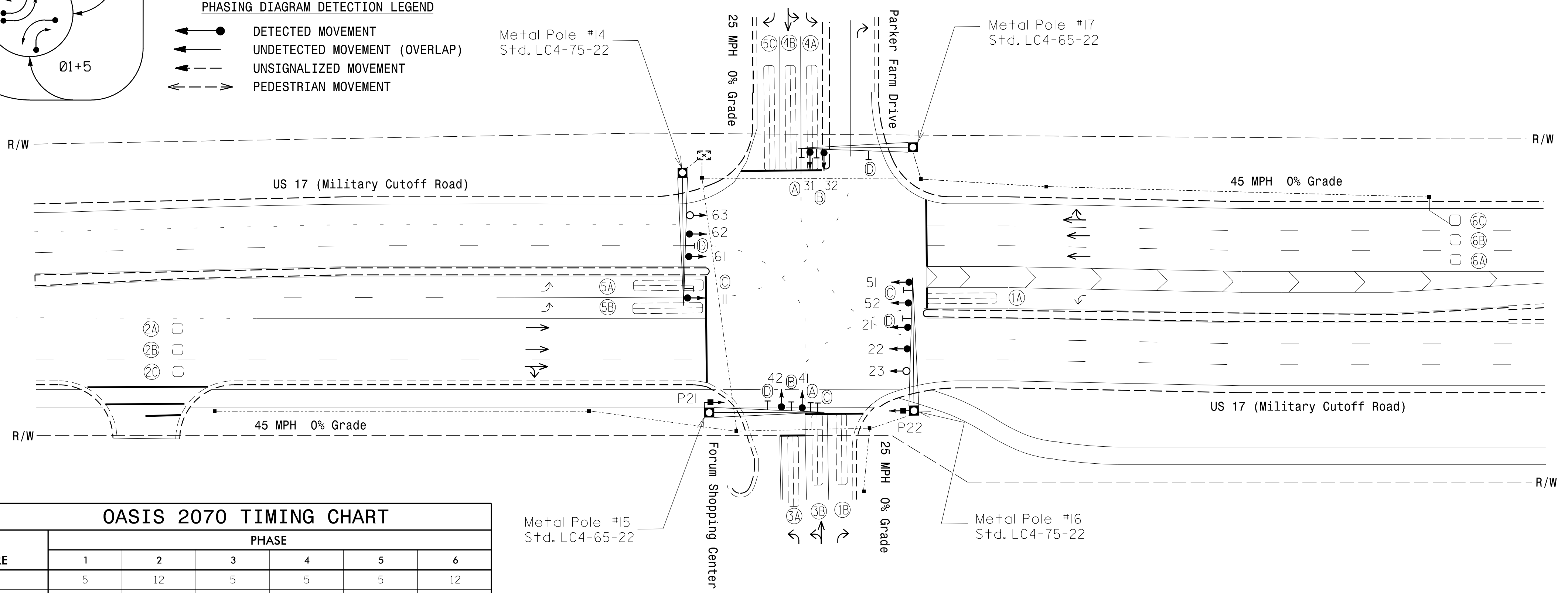
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

Table with columns for Loop, Size (FT), Distance from Stopbar (FT), Turns, New Loop, Phase, Calling, Extension, Full Time Delay, Stretch Time, Delay Time, System Loop, and New Card. It lists loops 1A through 6C.

6 Phase Fully Actuated (Wilmington 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. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Reposition existing signal heads numbered 21, 22, 61 and 62.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
11. Signal system data: Controller Asset #: 0895.
12. Reposition existing sign 'D' on Metal Pole #14.

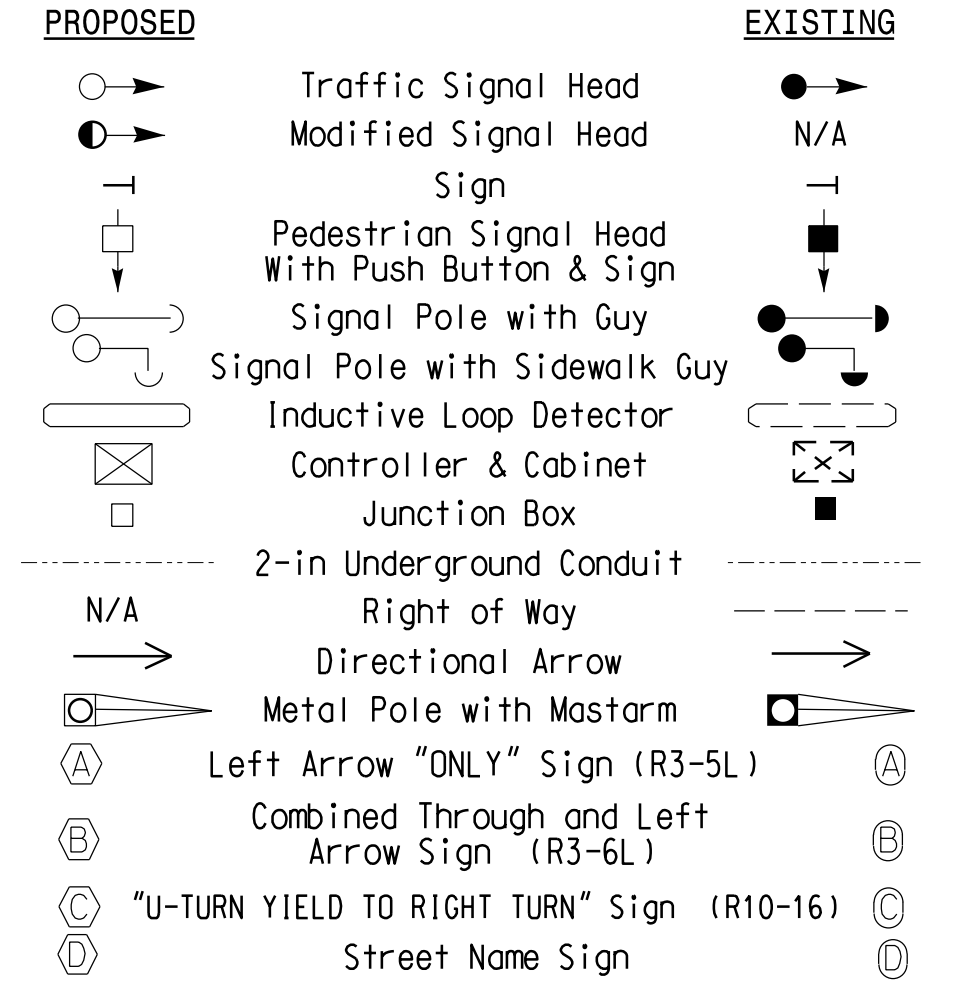


OASIS 2070 TIMING CHART

Timing chart table with columns for Feature and Phases 1 through 6. It lists values for Min Green, Extension, Max Green, Yellow Clearance, Red Clearance, Walk, Don't Walk, Seconds Per Actuation, Max Variable Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Recall Mode, Vehicle Call Memory, 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



Signal Upgrade

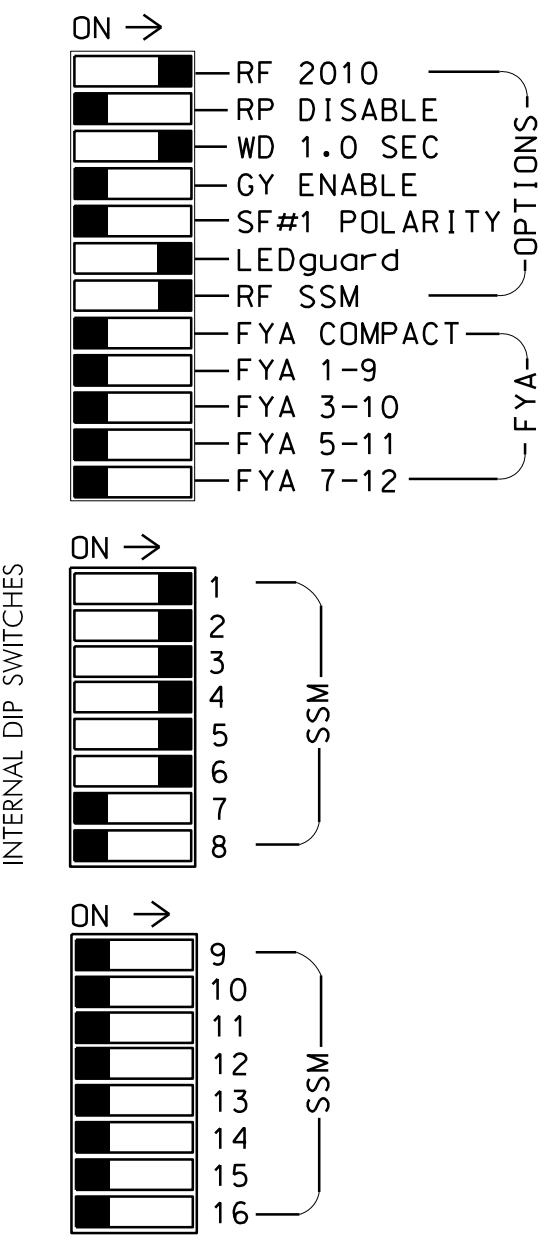
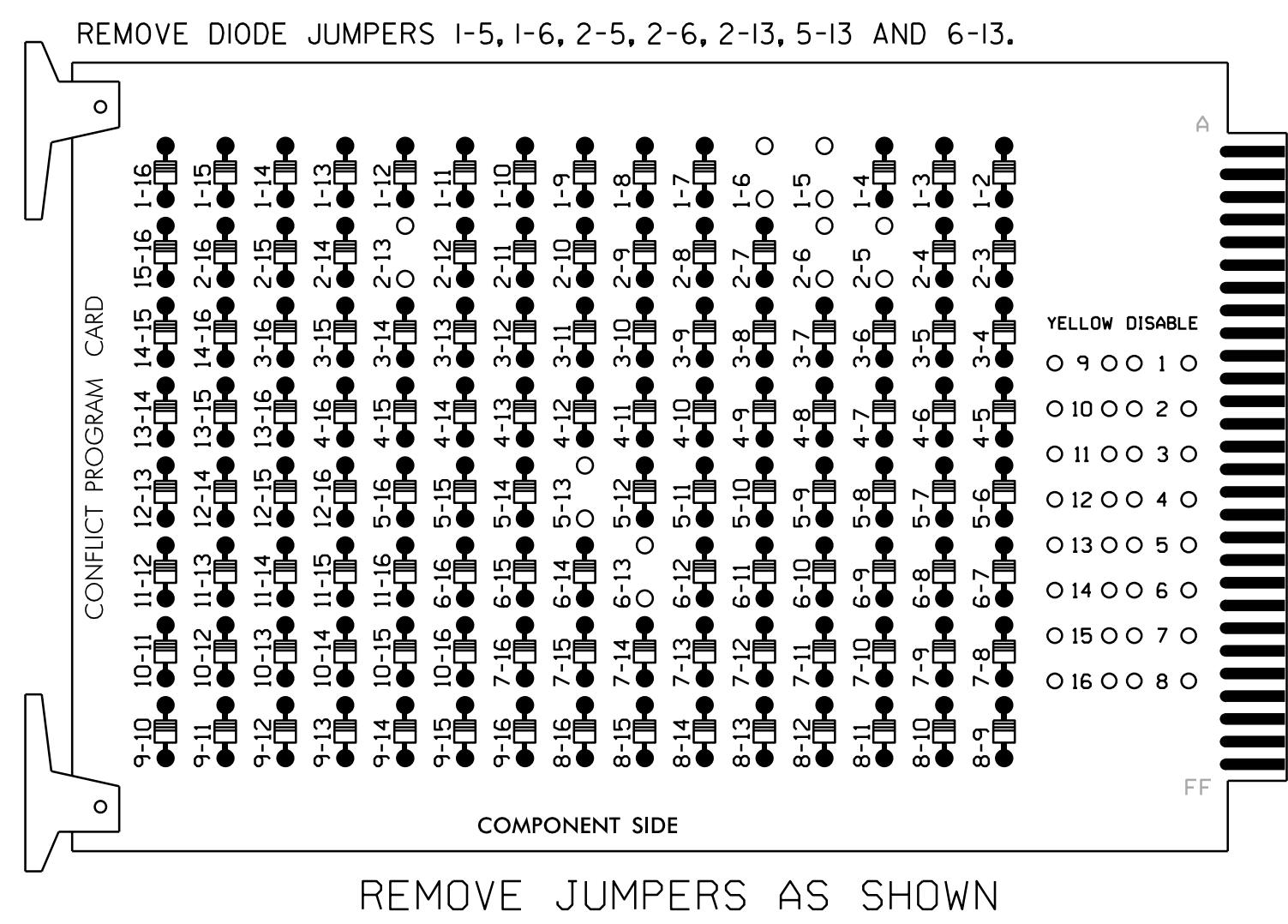
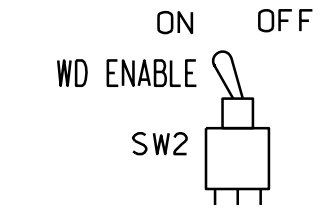
Project information block including: Prepared For (Transportation Mobility and Safety), Project Name (US 17 (Military Cutoff Road) at Forum Shopping Center/Parker Farm Drive), Division (Division 3 New Hanover County Wilmington), Plan Date (November 2021), Reviewed By (WJ Hamilton), Prepared By (A. Andrews), RKA Proj. No. (19258 (040)), Scale (1"=40'), and a seal for William J. Hamilton, Professional Engineer, License No. 32396. Includes a 'DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED' warning.



11/18/2021 11:42:05 AM \\s103-0895_s10_dsn.dgn User: jwrench

EDI MODEL 2010ECL-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.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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.
- Ensure that red enable is active at all times during normal operation. To prevent red failures on unused monitor channels, tie unused red monitor unputs 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per cabinet manufacturer's instructions.
- 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 phase 2 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET332
 SOFTWAREECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S5,S6
 PHASES USED.....1,2,2PED,3,4,5,6
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	32	21,22,23	31	32	41	42	51,52	61,62,63	71	81	82
RED		128		116	116	101	101		134			
YELLOW		129		117	117	102	102		135			
GREEN		130		118	118	103	103		136			
RED ARROW	125								131			
YELLOW ARROW	126	126						132	132			
GREEN ARROW	127	127		118		103		133	133			
Hand icon				113								
Walking person icon				115								

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)

FILE U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
∅ 1	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
1A	1B	2B	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A
NOT USED	2A	2C	NOT USED	4B	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B
∅ 5	∅ 5	∅ 6	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17
5A	5B	6A	6C	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A
NOT USED	5C	6B	NOT USED	7B	8B	9B	10B	11B	12B	13B	14B	15B	16B	17B

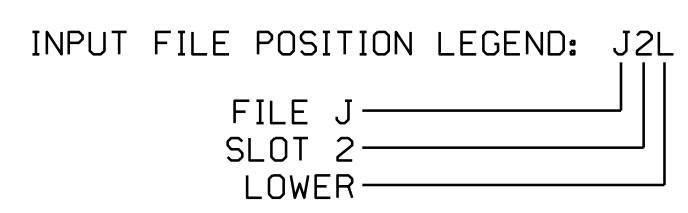
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	11U	56	18	1	1	Y	Y			
1B	TB2-5,6	12U	39	1	2	1	Y	Y			15
2A	TB2-7,8	12L	43	5	12	2	Y	Y			
2B	TB2-9,10	13U	63	25	32	2	Y	Y			
2C	TB2-11,12	13L	76	38	42	2	Y	Y			
3A	TB4-5,6	15U	58	20	3	3	Y				3
3B	TB6-5,6	18U	49	11	24	3	Y				
4A	TB4-9,10	16U	41	3	4	4	Y	Y			
4B	TB4-11,12	16L	45	7	14	4	Y	Y			
5A	TB3-1,2	11U	55	17	5	5	Y	Y			
5B	TB3-5,6	12U	40	2	6	5	Y	Y			
5C	TB3-7,8	12L	44	6	16	5	Y	Y			15
6A	TB3-9,10	13U	64	26	36	6	Y	Y			
6B	TB3-11,12	13L	77	39	46	6	Y	Y			
6C	TB5-1,2	14U	48	10	26	6	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	112U	67	29	PED 2	2 PED					

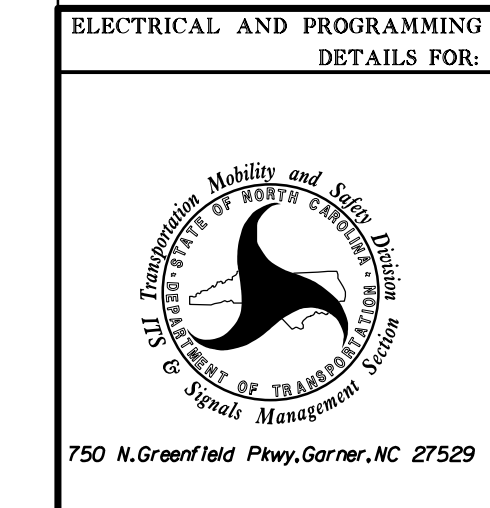
NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 112.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0895
 DESIGNED: Nov 2021
 SEALED: 11/08/2021
 REVISED: N/A



Electrical Detail



ELECTRICAL AND PROGRAMMING DETAILS FOR:

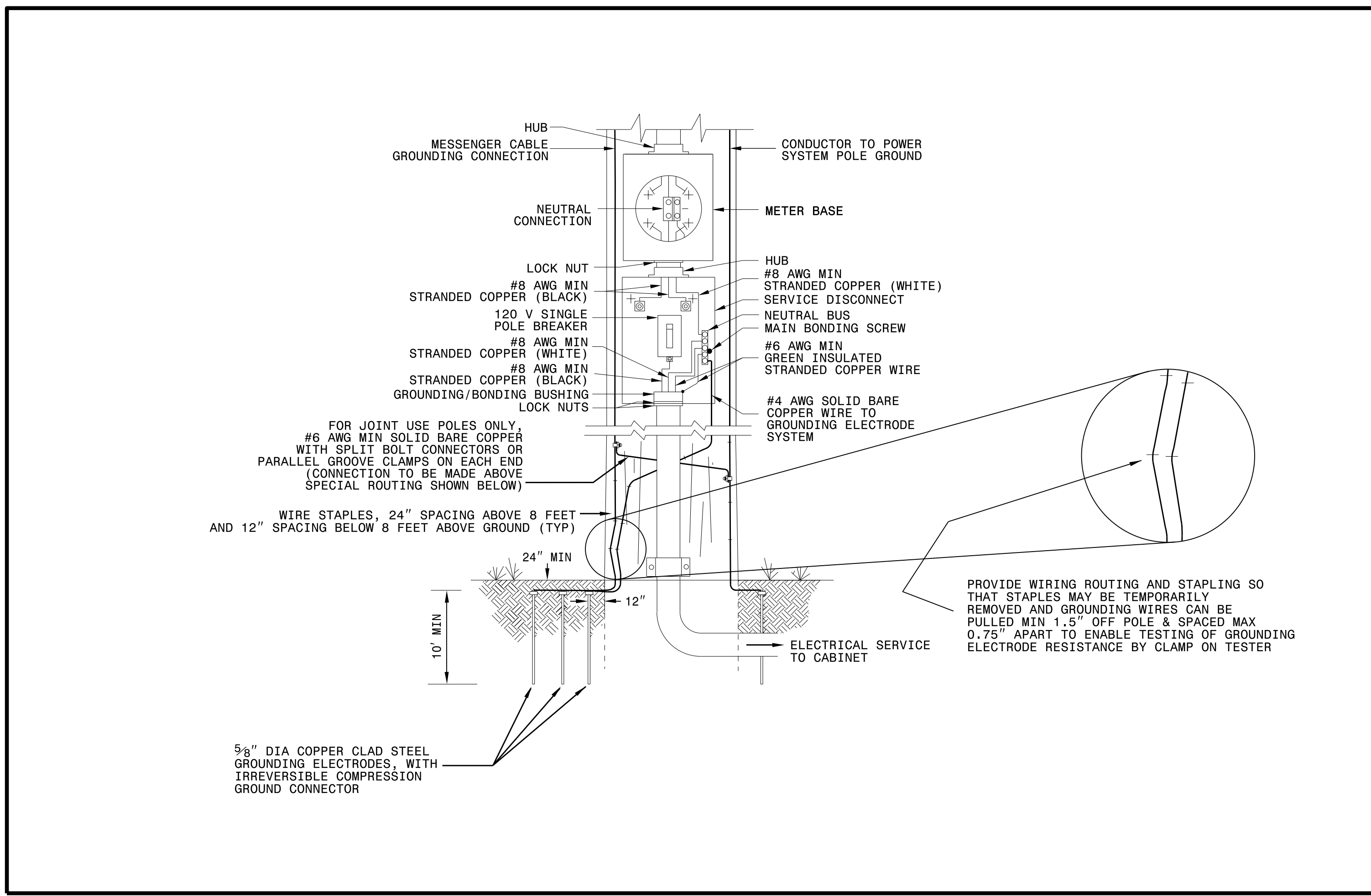
US 17 (Military Cutoff Road)
 at
**Forum Shopping Center/
 Parker Farm Drive**
 Division 3 New Hanover County Wilmington

PLAN DATE: November 2021 REVIEWED BY: WJ Hamilton
 PREPARED BY: A Andrews RKA PROJ. NO: 19258 (040)

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Seal area with signature and date: William J. Hamilton, 11/08/2021



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

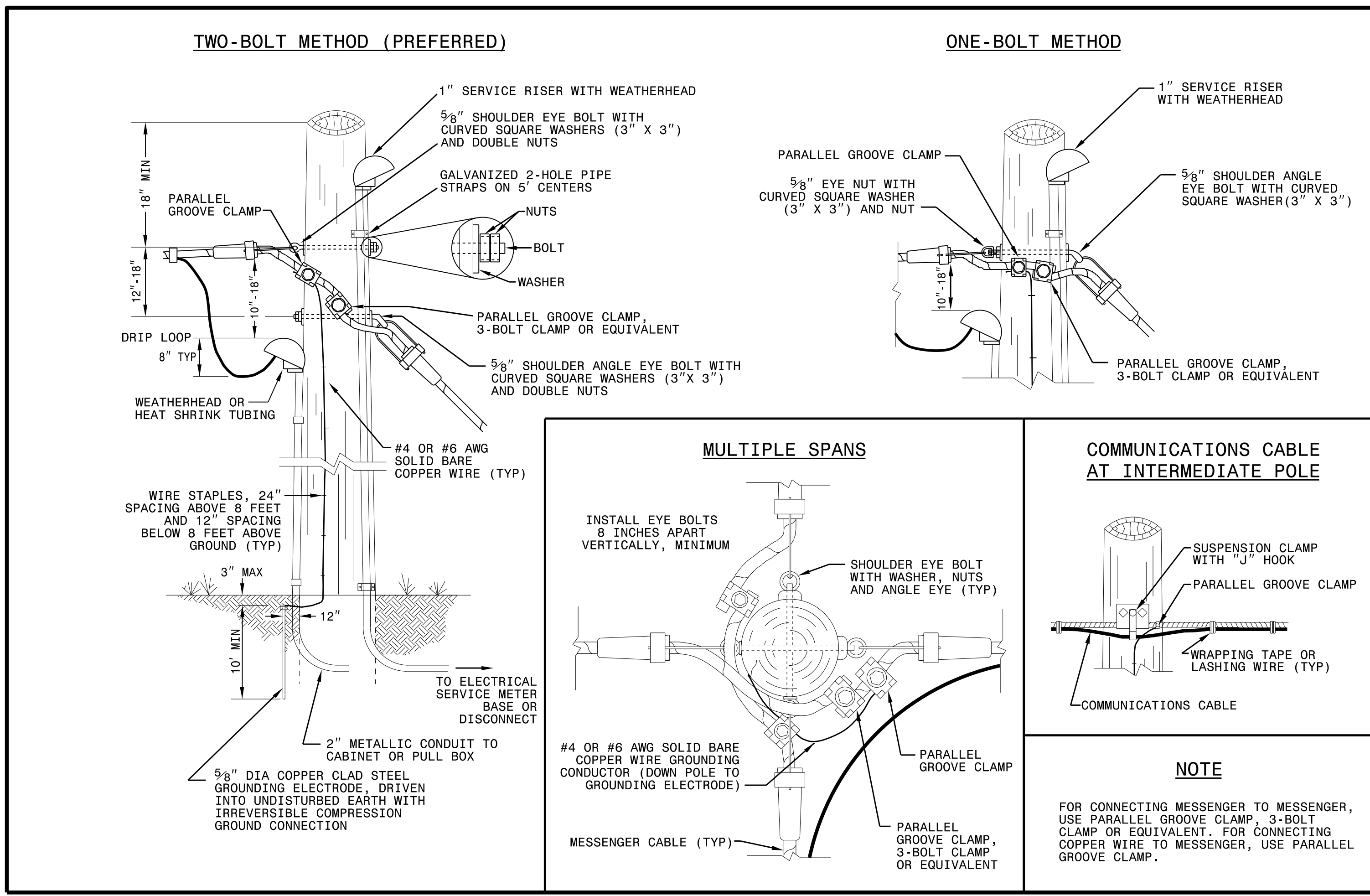
ENGLISH STANDARD DRAWING FOR

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

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See Plate for Title

Prepared in the Offices of:

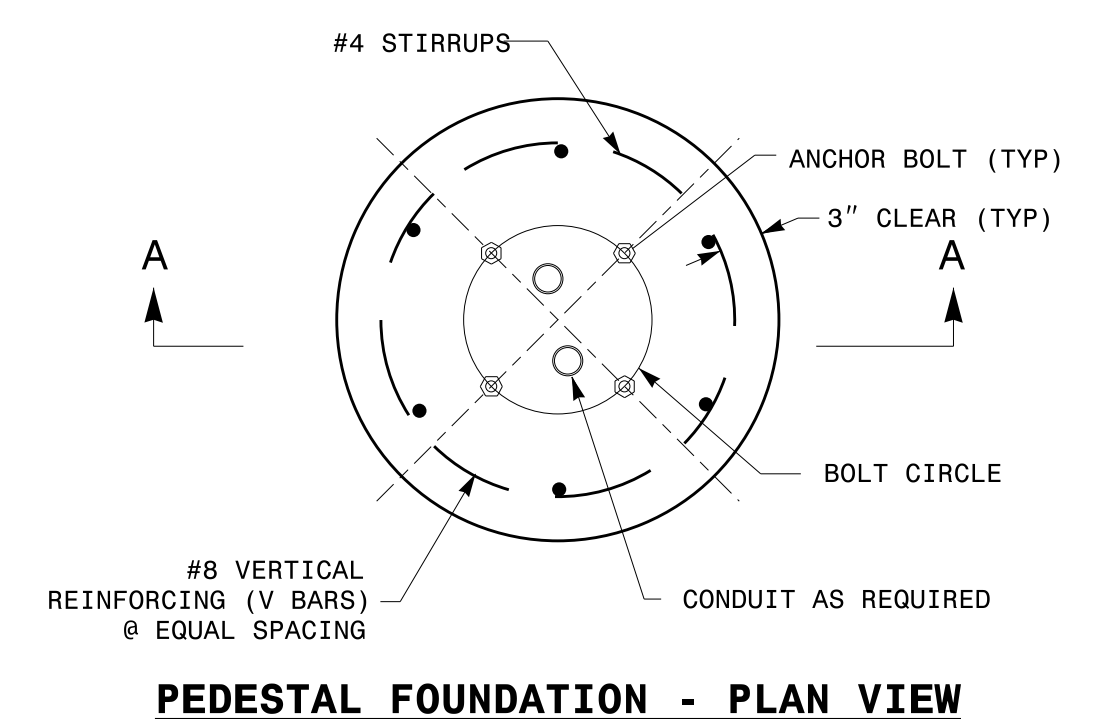
750 N. Greenfield Parkway
Garner, NC 27529

SEAL

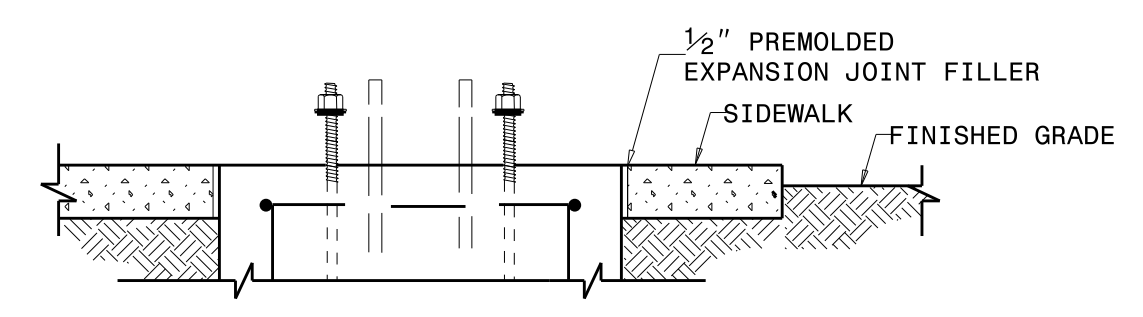
DocuSigned by:
Mohd Aslami

10/11/2017
DATE

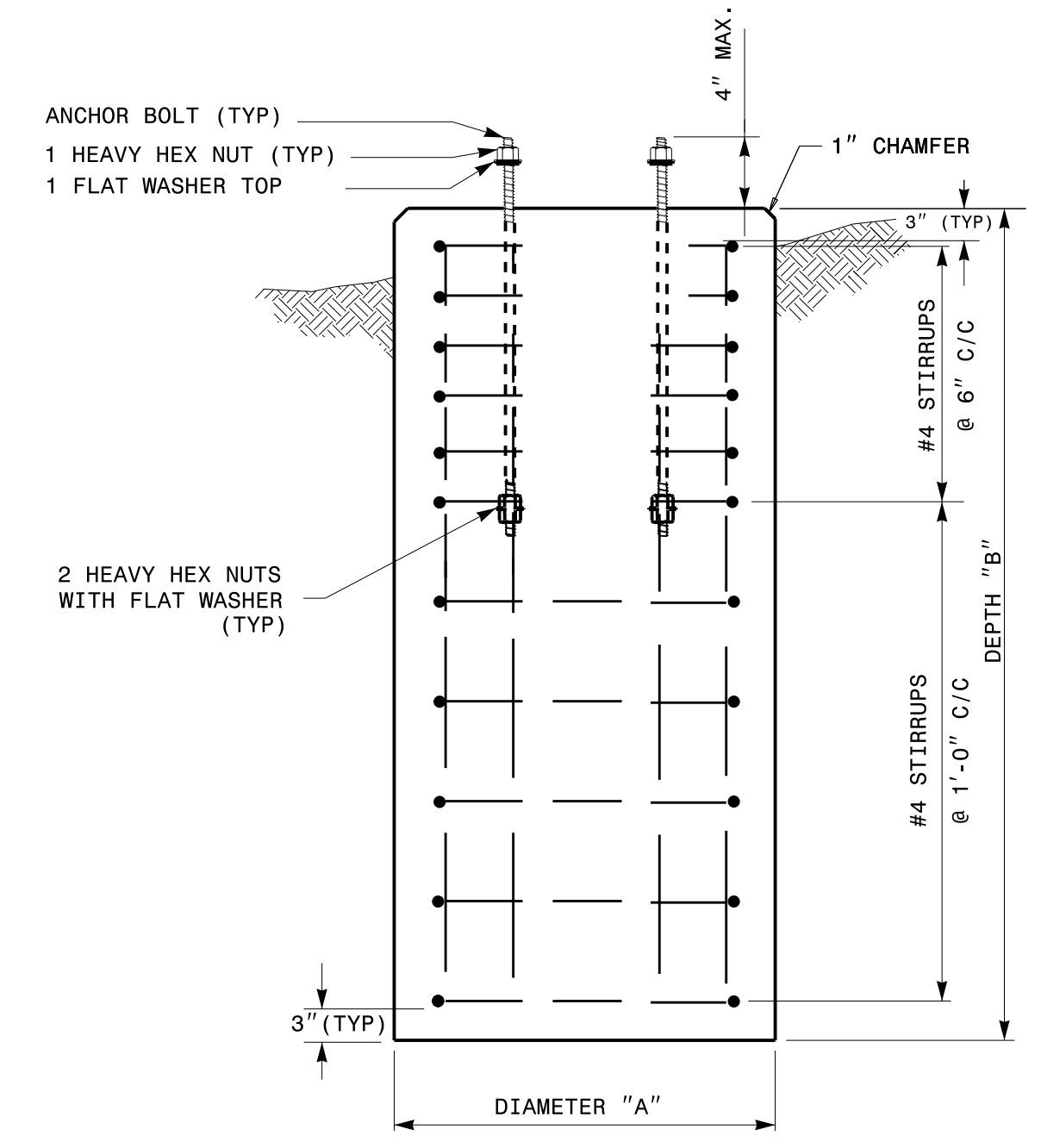
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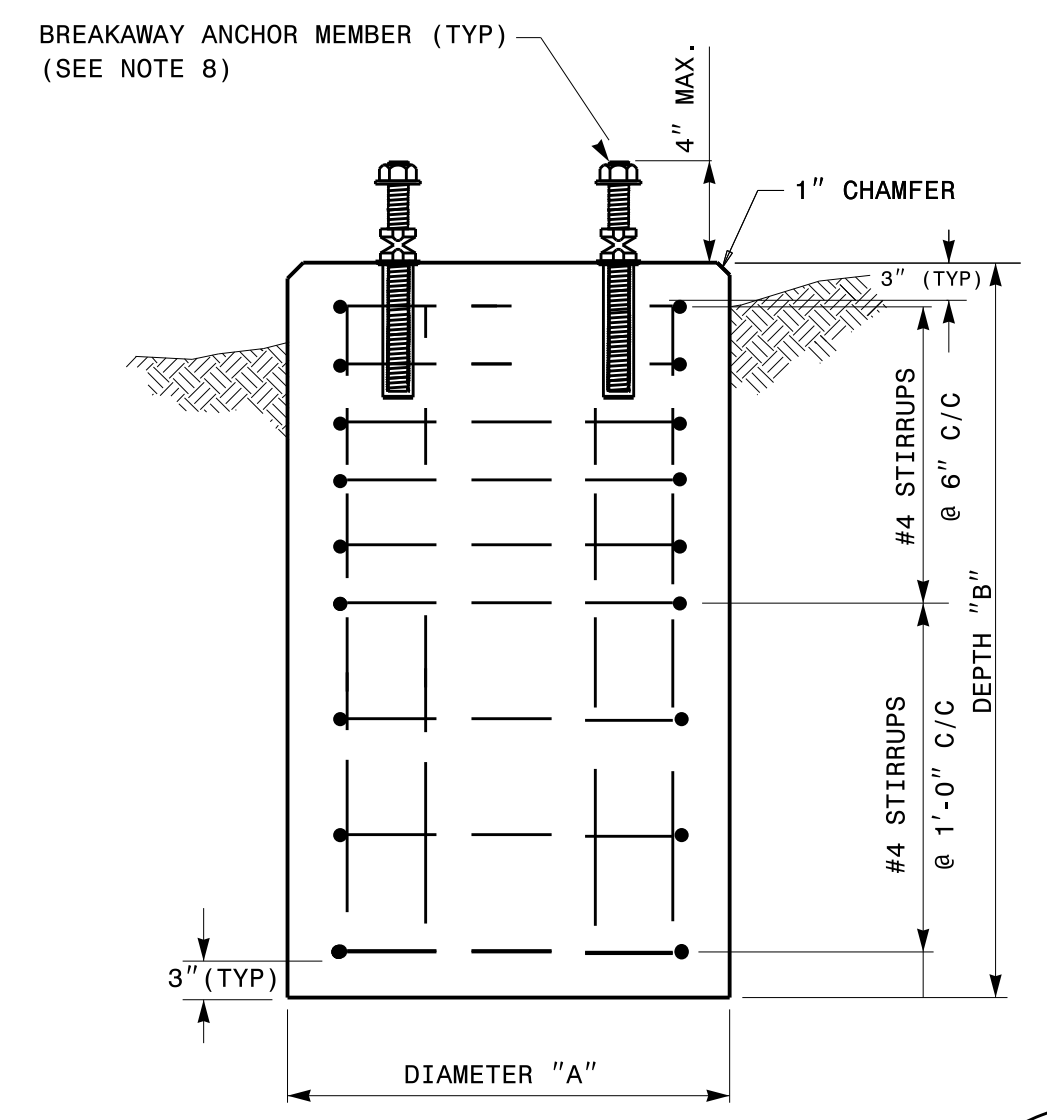
PEDESTAL FOUNDATION - PLAN VIEW



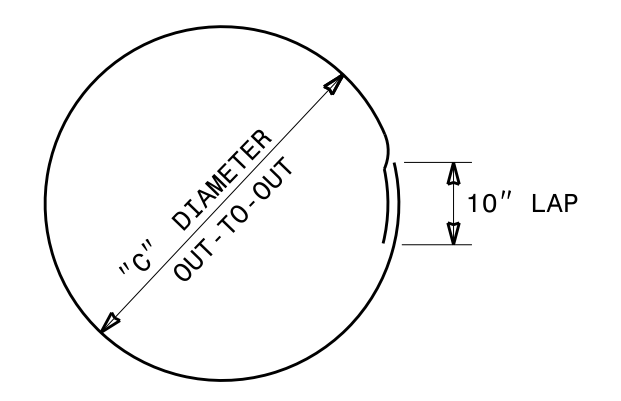
PEDESTAL FOUNDATION DETAILS FOR SIDEWALK



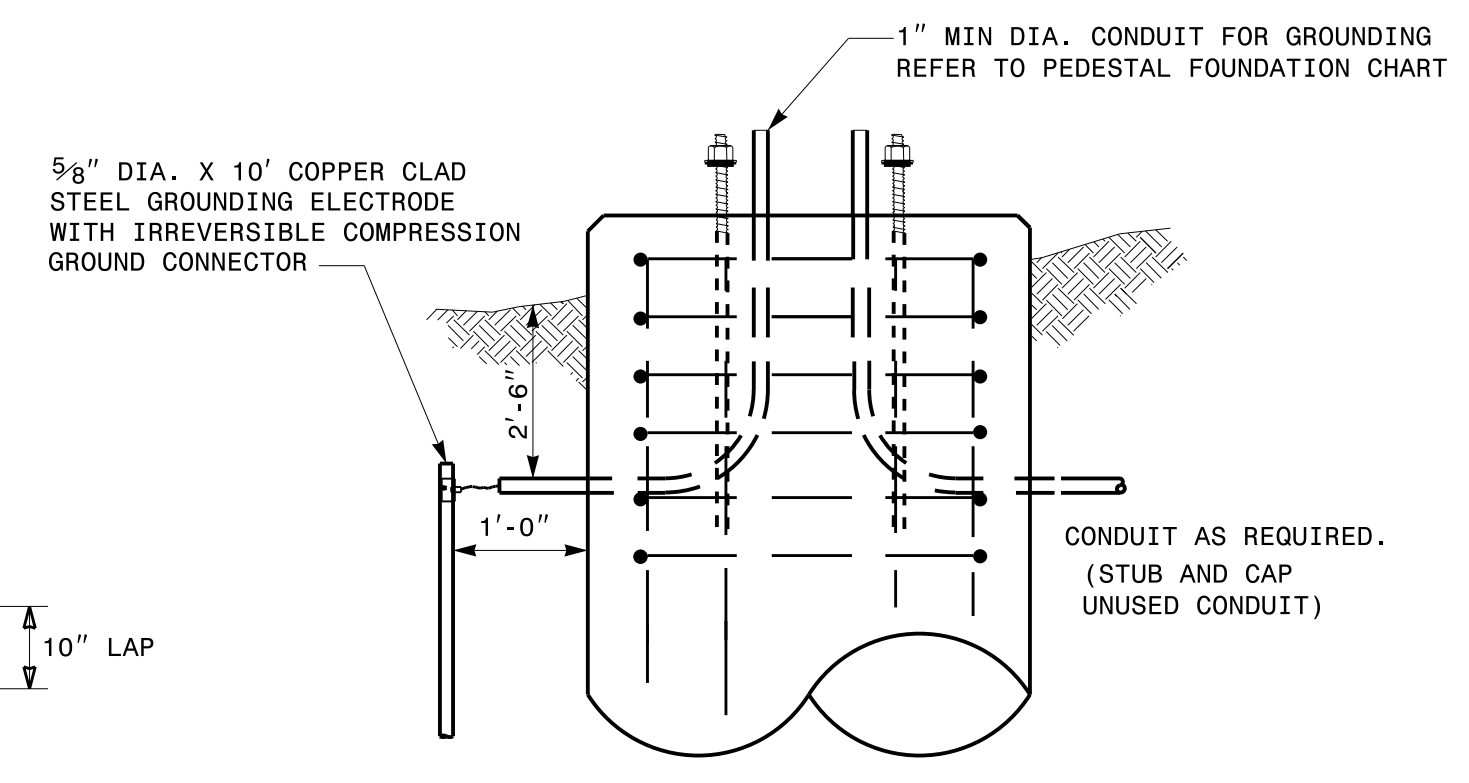
**TYPES I, II & III
SECTION A-A**



**TYPES I & II ONLY
SECTION A-A**



CLOSED HOOPS



GROUNDING & CONDUIT DETAIL

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:
 - A. SANDY TYPE SOIL
 - B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - C. 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	SPACING 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.

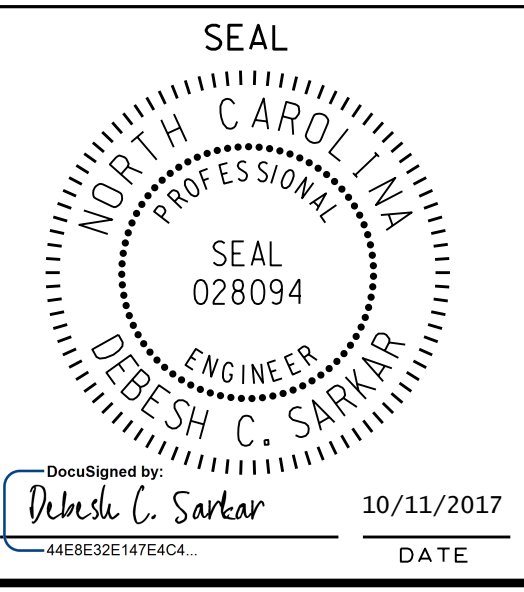
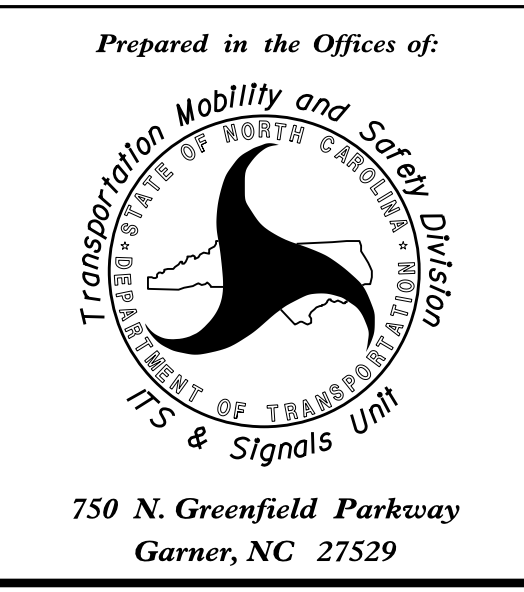
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
1743D01

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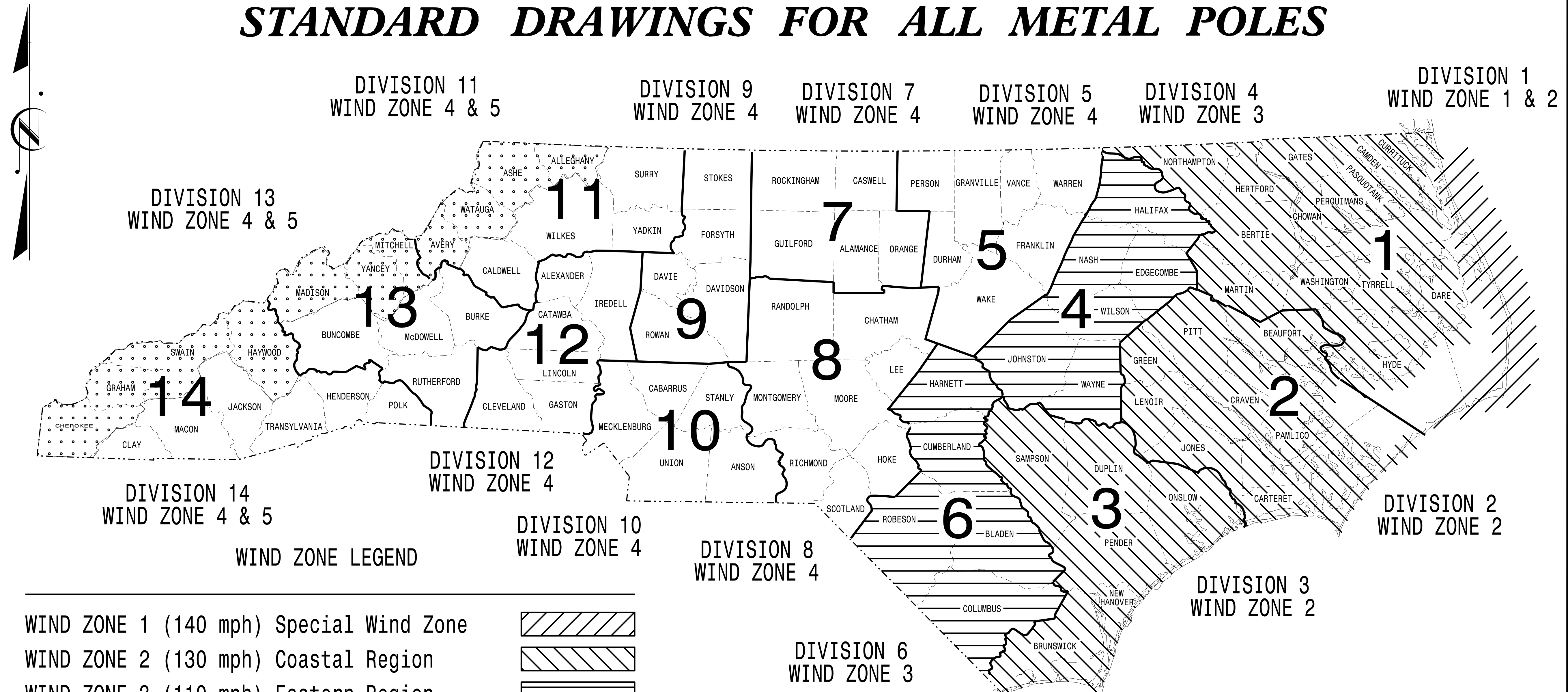
See Plate for Title



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO. U-5710A	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 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

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

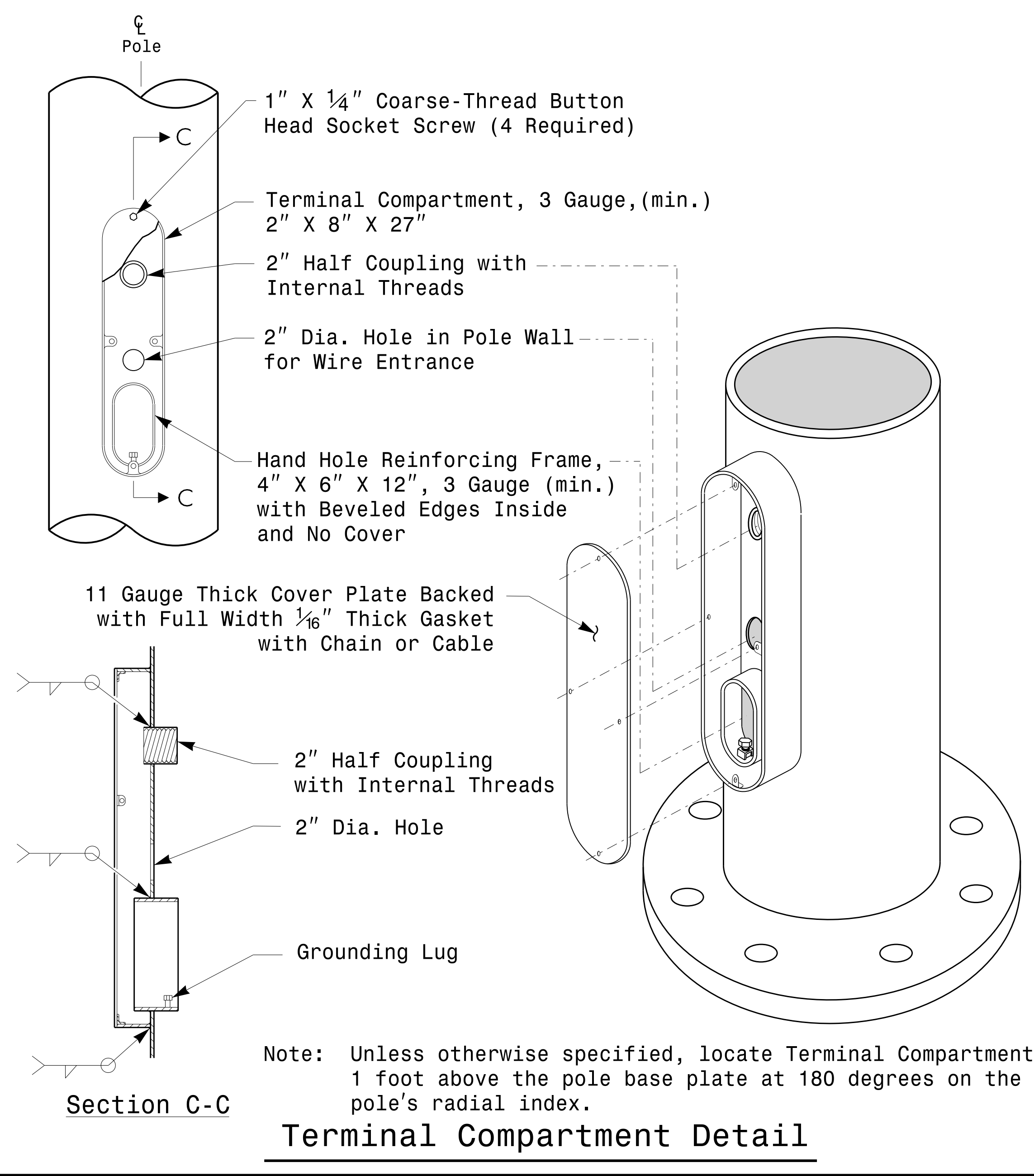
J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

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

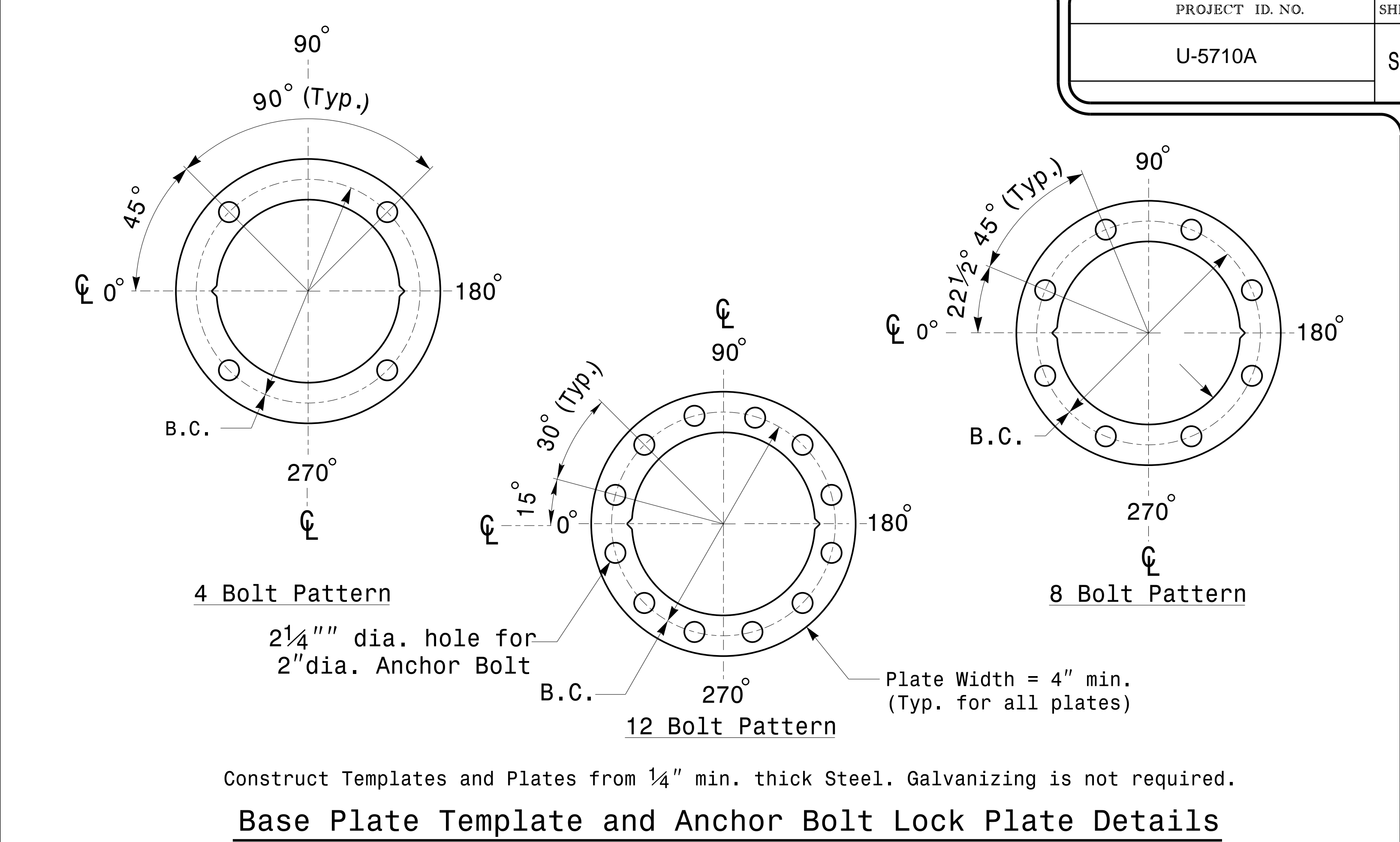
SEAL

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

PROJECT ID. NO.	SHEET NO.
U-5710A	Sig.M2



Terminal Compartment Detail



Base Plate Template and Anchor Bolt Lock Plate Details

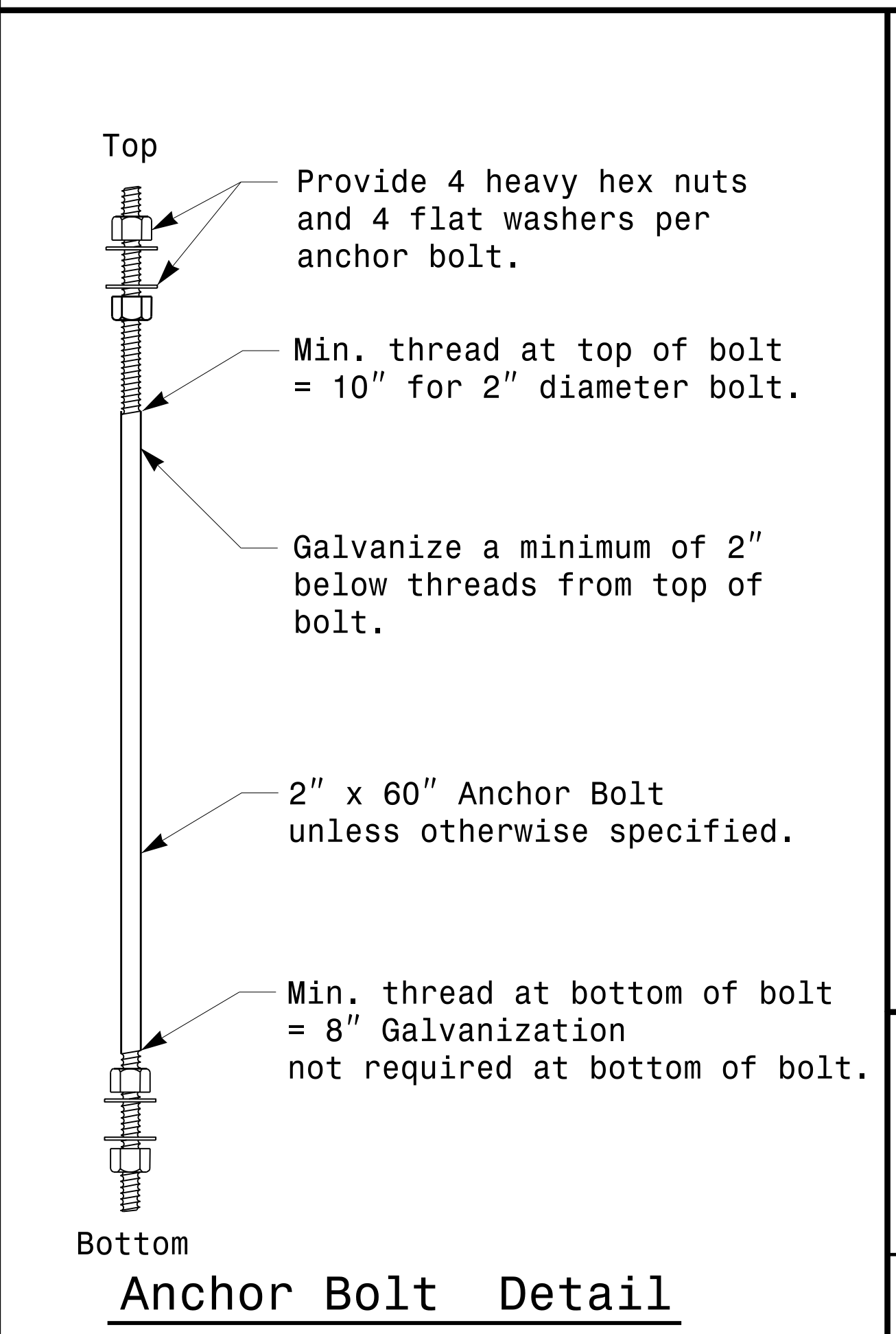
MFG _____ MFG. DATE: MM/YY	MFG _____ MFG. DATE:MM/YY
SHAFT D/T/L/Y _____	SECTION D/T/L/Y _____
ARM-A D/T/L/Y _____	NCDOT SIG. INV. NO. _____
ARM-B D/T/L/Y _____	NCDOT POLE NO. _____
A.B. DIA./B.C./L/Y _____	
NCDOT SIG. INV. NO. _____	
NCDOT POLE NO. _____	

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

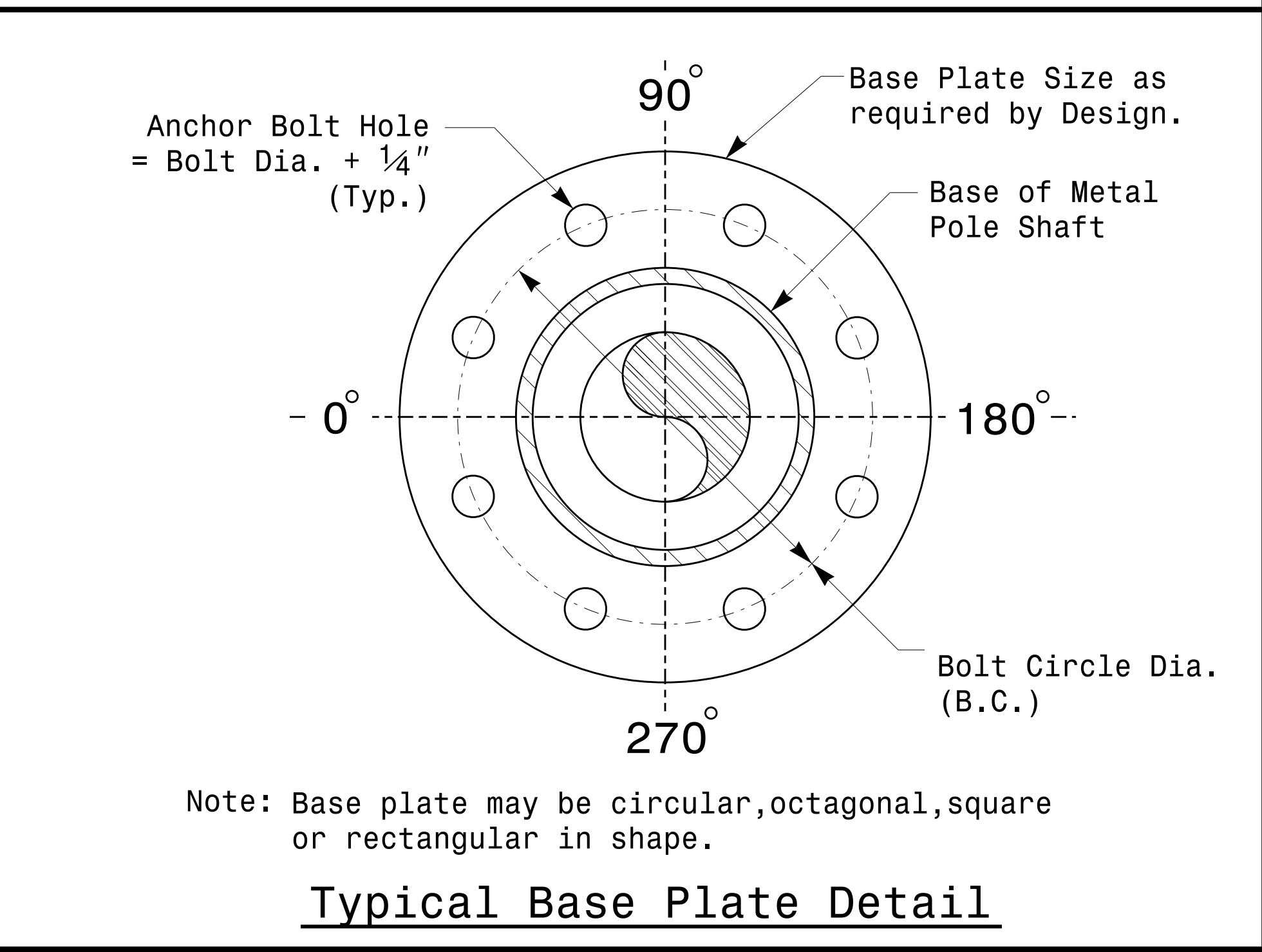
Arm I.D. Tag
(Provide on each section of a multi-section mast arm.)

- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
 - 2) A.B. = Anchor Bolt
 - 3) B.C. = Bolt Circle of Anchor Bolts
 - 4) If Custom Design, use "NCDOT STANDARD" line for 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



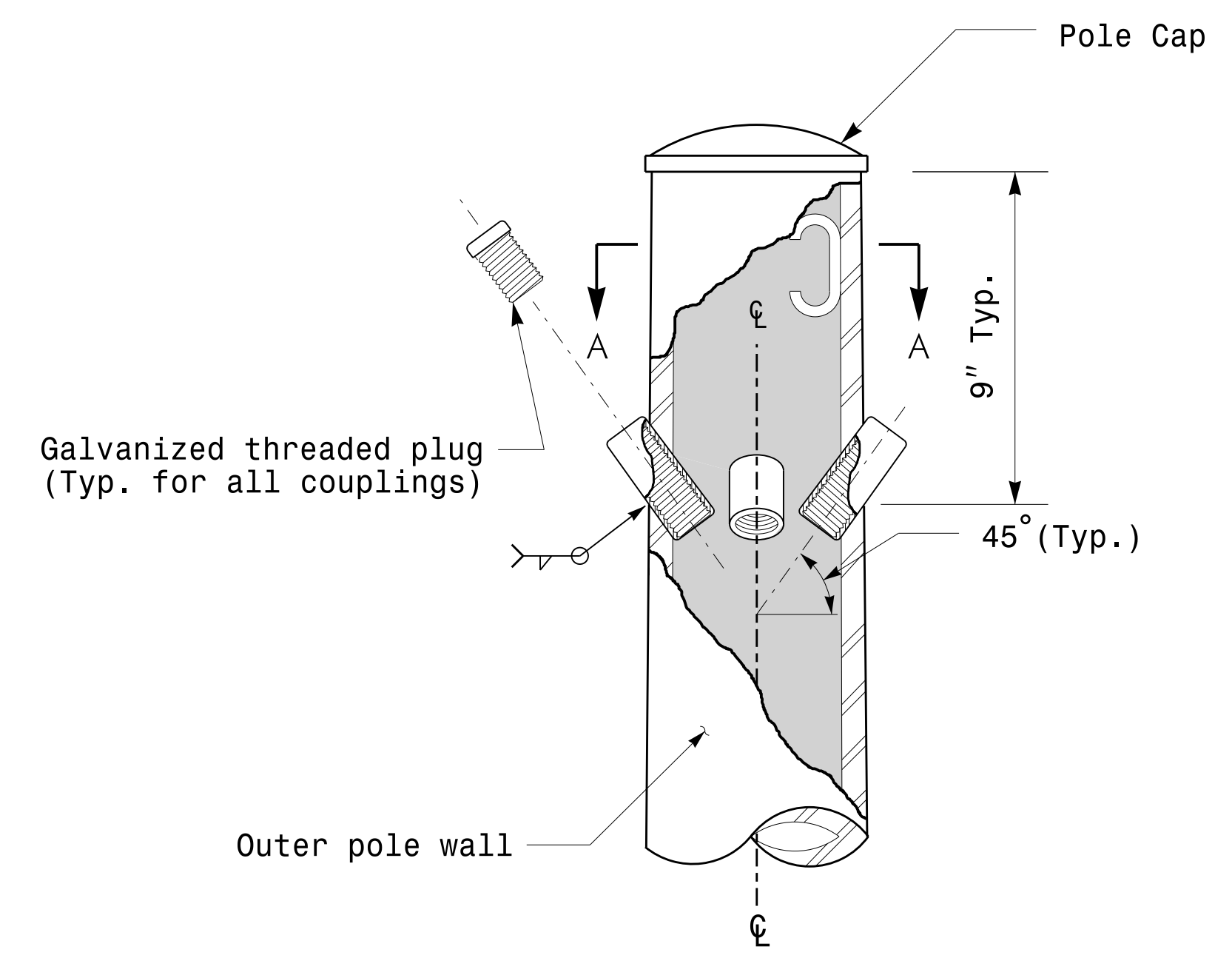
Typical Base Plate Detail

	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	
Prepared In the Offices of:			SEAL NORTH CAROLINA PROFESSIONAL ENGINEER D. C. SARKAR 448E328 SIGNATURE

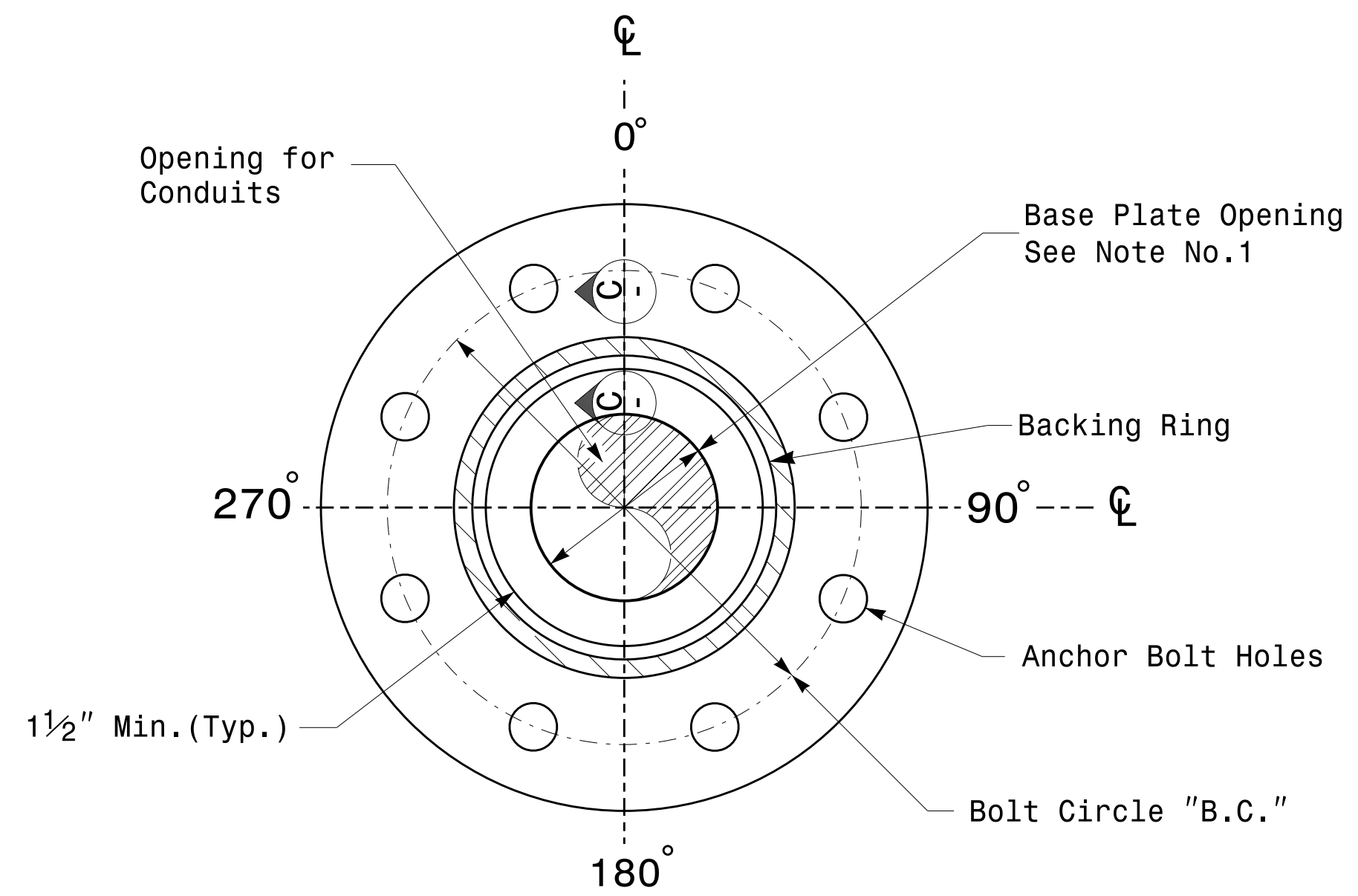
Fabrication Details – All Metal Poles

11-01-2017 08:30 136504115 Signal Design Section Eastern Region 46 Sheets 2016 2014 Sig.M2 Std. Fabrication Detail: All Poles.dgn

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".

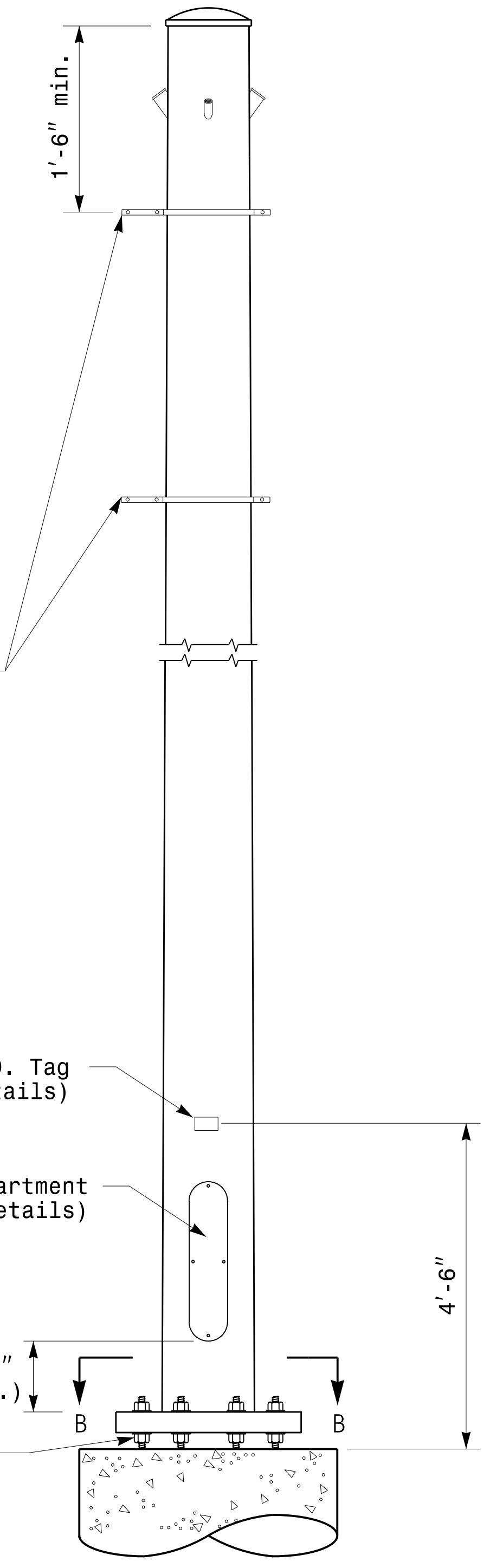


Cable Entrances at Top of Pole

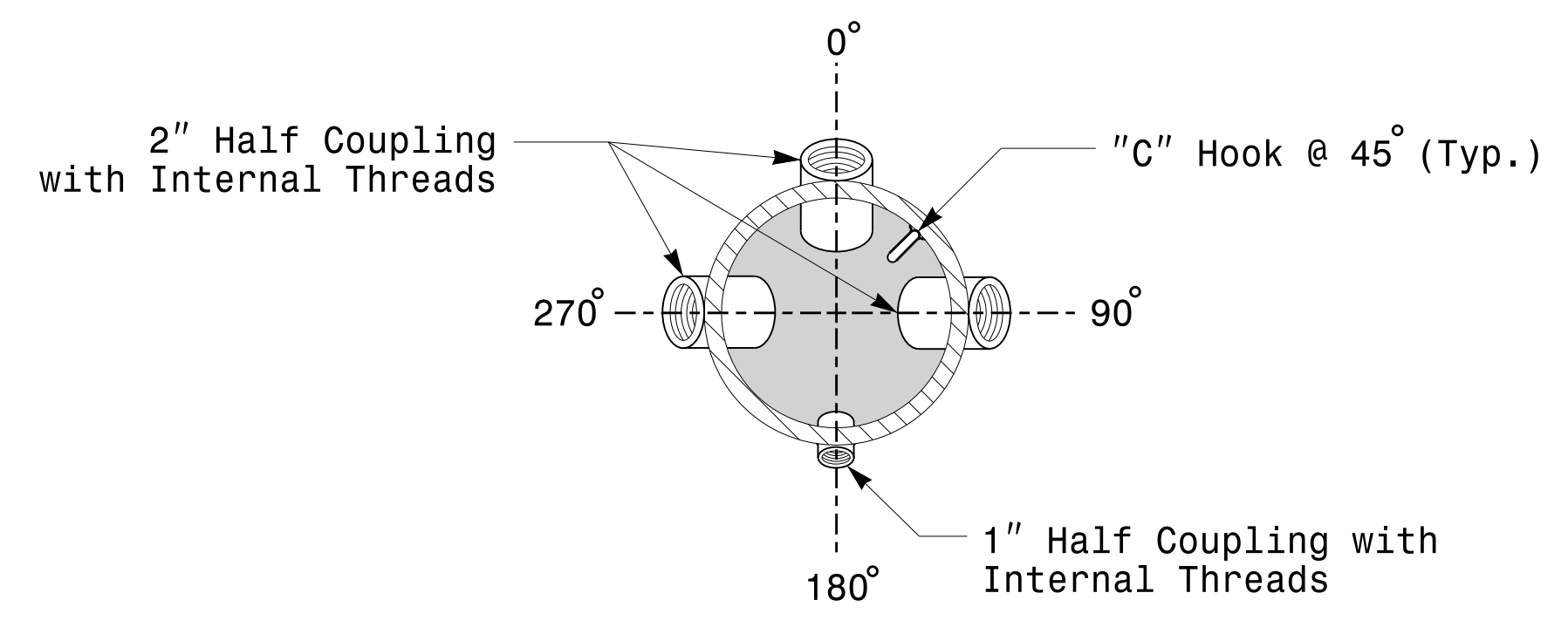


Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)

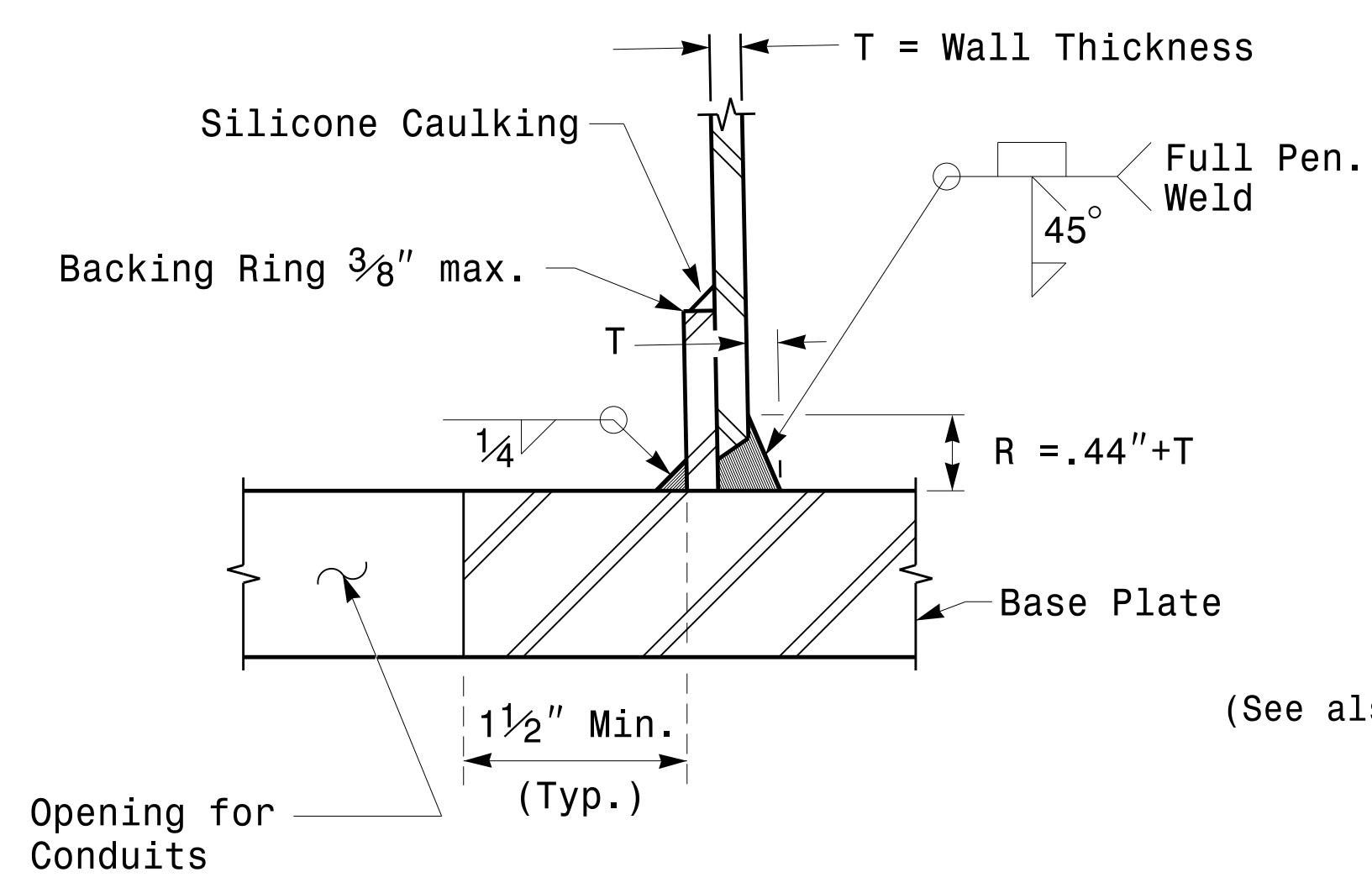
2 Cable Clamps designed for variable attachment heights from 1'-6" to 5'-0" below the top of the pole.



Monotube Strain Pole



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

Shaft I.D. Tag (See drawing M2 for details)
 Terminal Compartment (See drawing M2 for details)
 4'-6"
 1'-0" (Typ.)
 Anchor Bolt (See also drawing M2 for details)

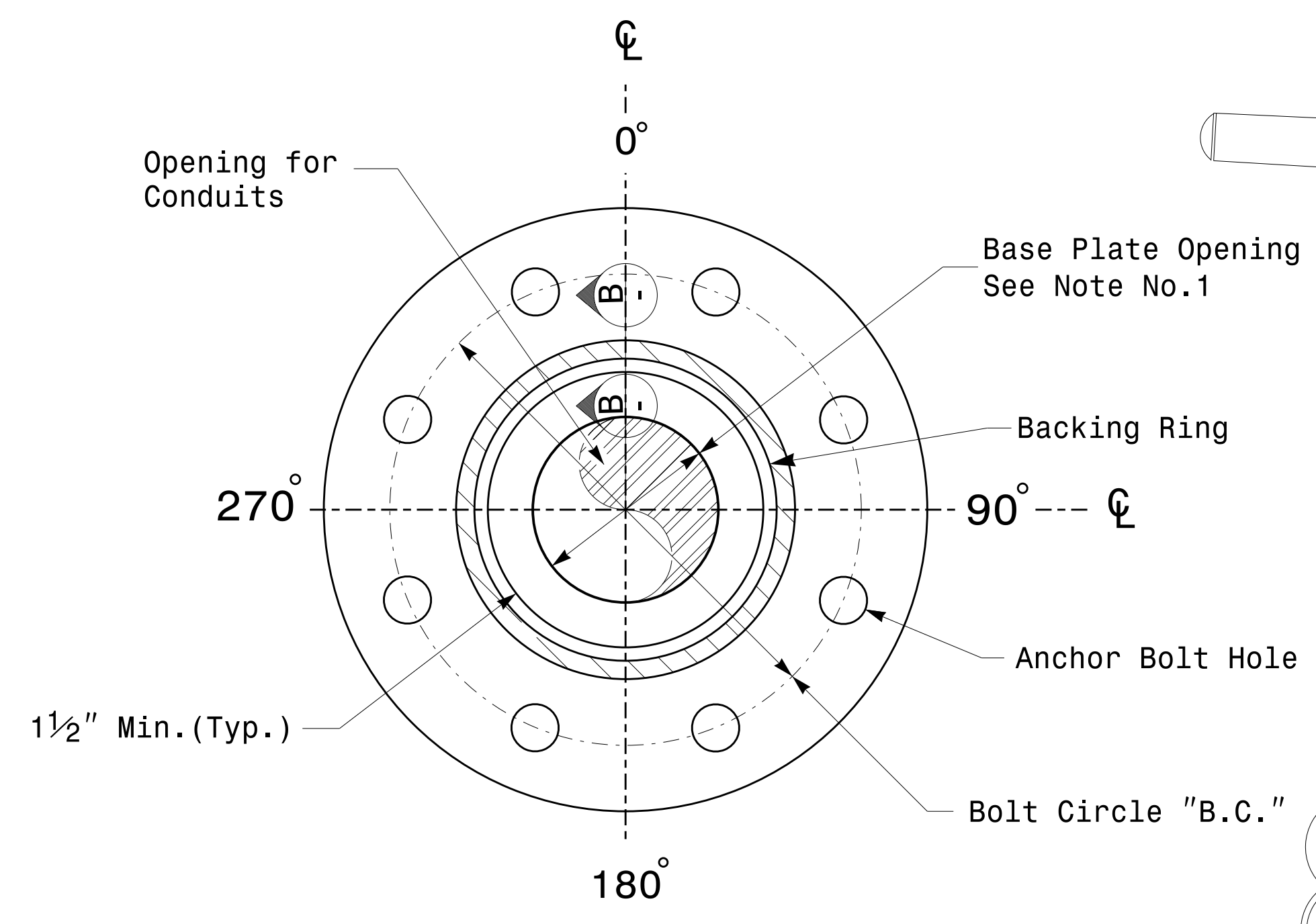
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 Design Section Eastern Region
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 Design Section Eastern Region
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 136504115 StrainPoles.dgn
 Design Section Eastern Region

<p>750 N. Greenleaf Pkwy, Garner, NC 27529</p>	Typical Fabrication Details For Strain Poles		SEAL DocuSigned by: Debesh C. Sarkar 44E8E7816FA4F49E
	PLAN DATE: OCTOBER 2017 DESIGNED BY: K.C. DURIGON	PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	

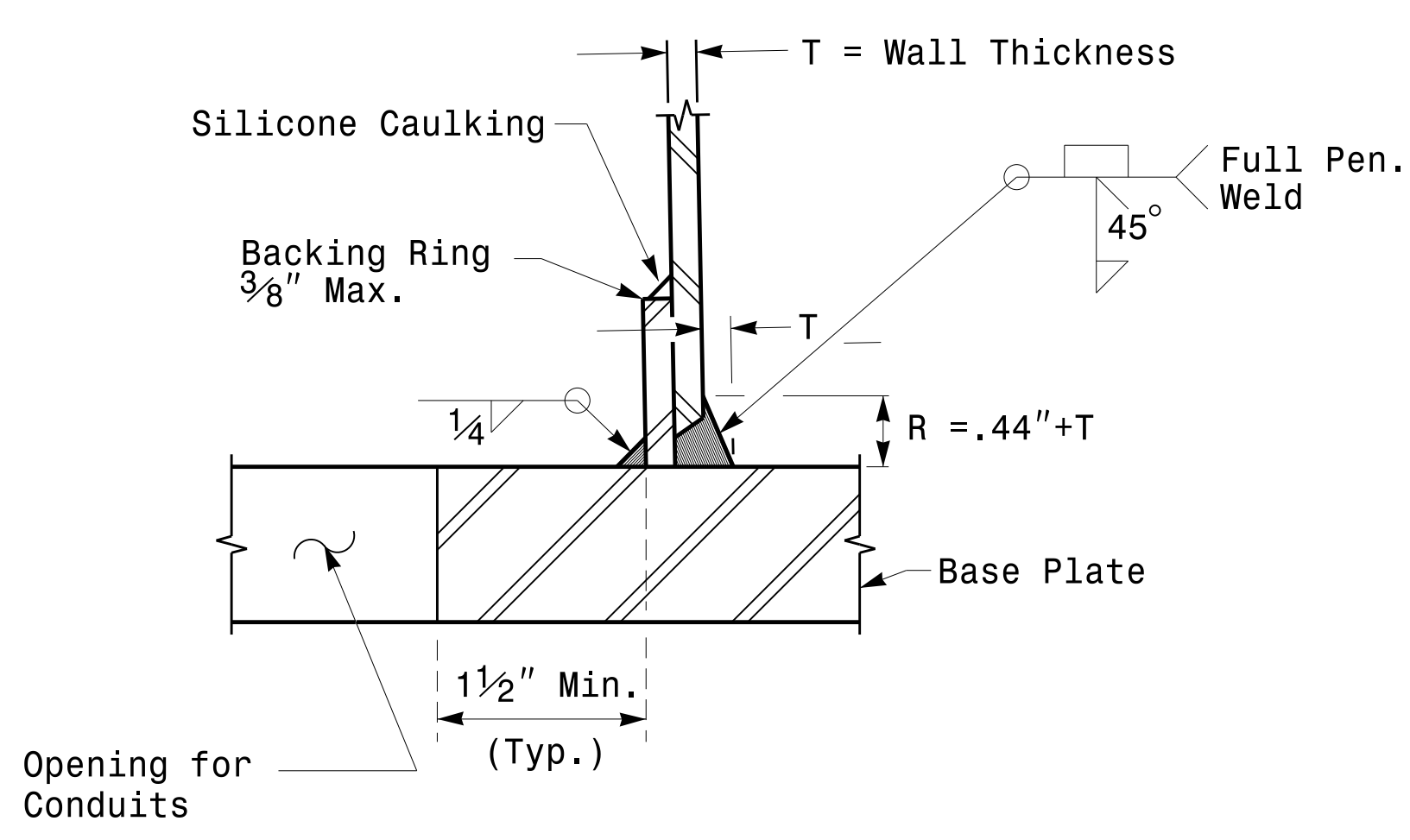
Fabrication Details – Strain Poles

PROJECT ID. NO.	SHEET NO.
U-5710A	Sig.M4

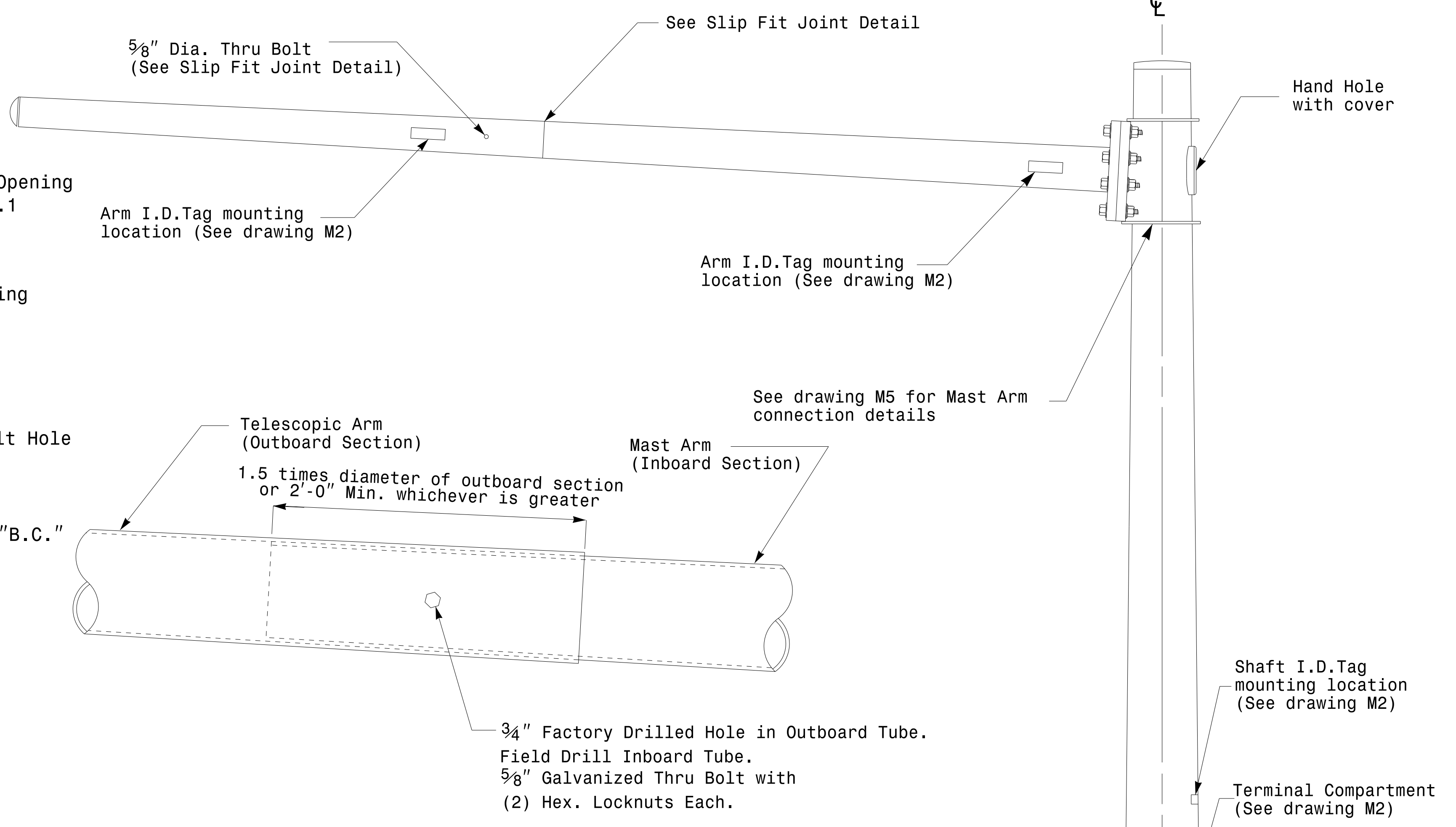
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



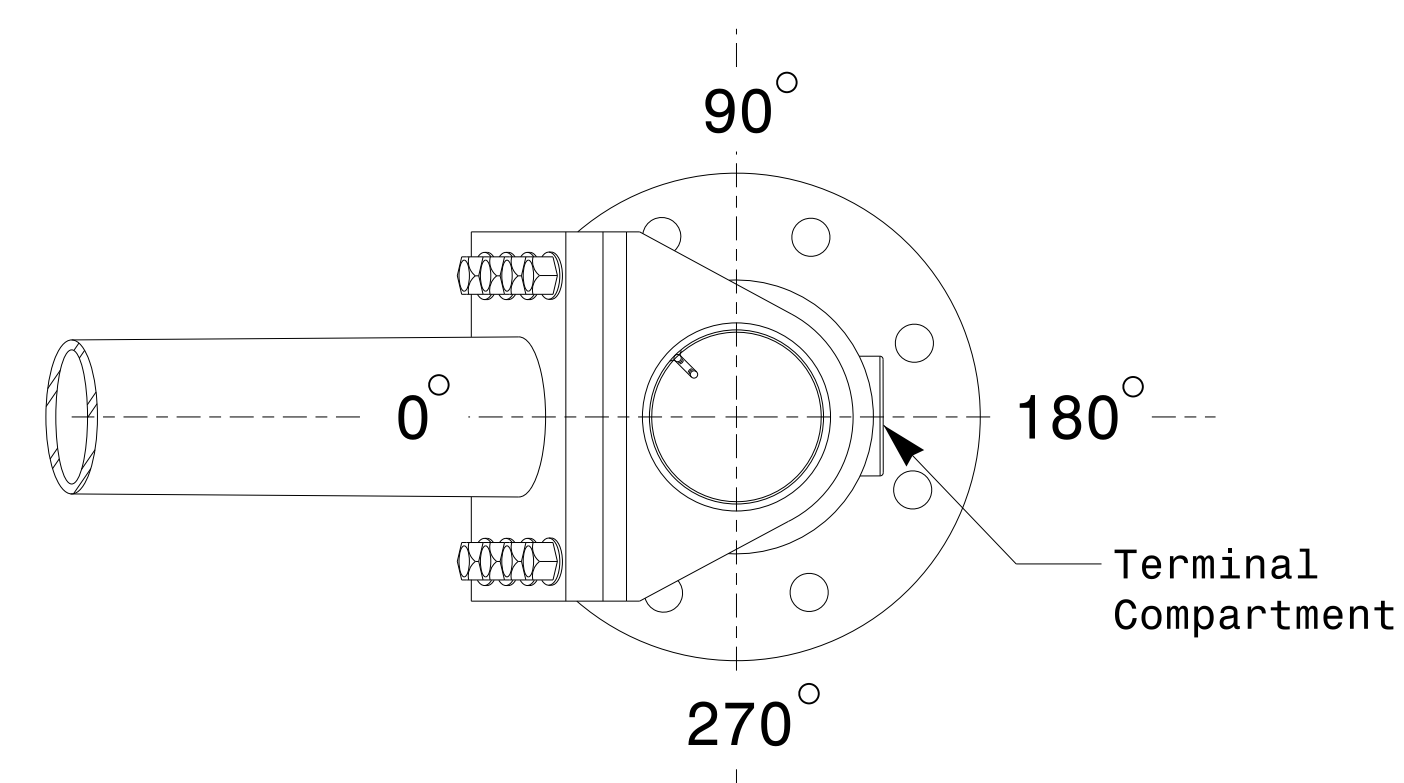
Section A-A
Pole Base Plate Details



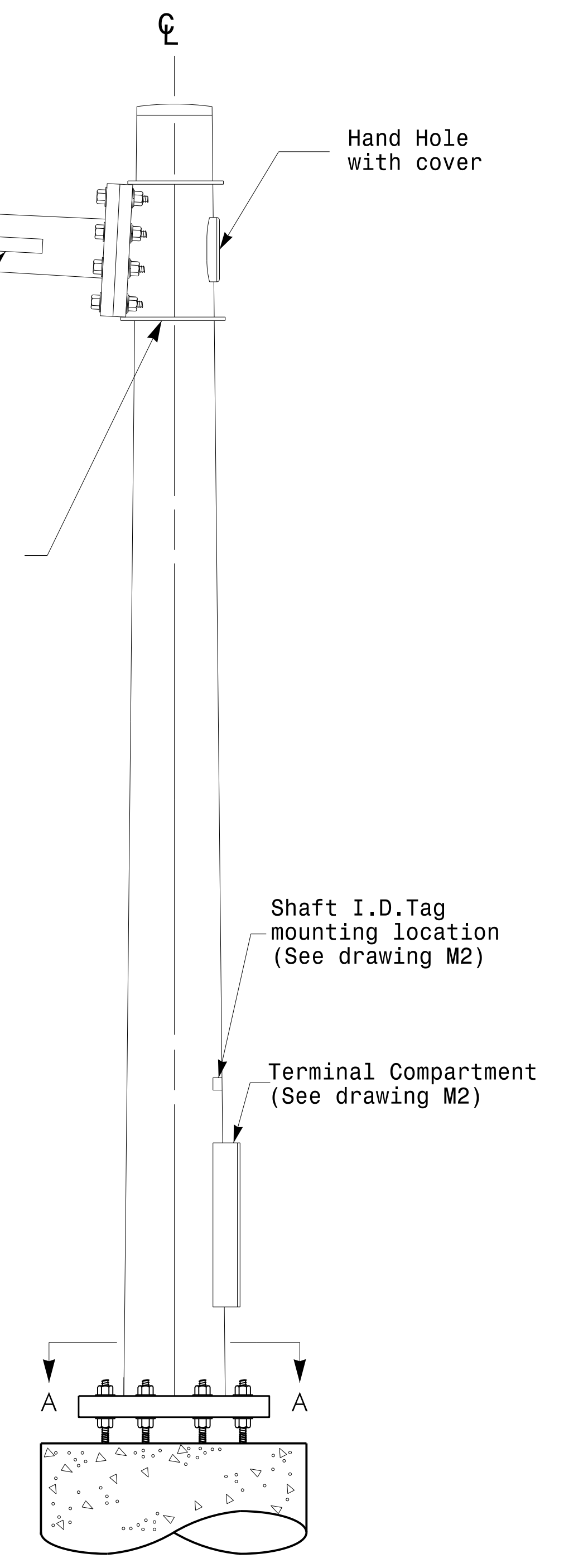
Section B-B
 (Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

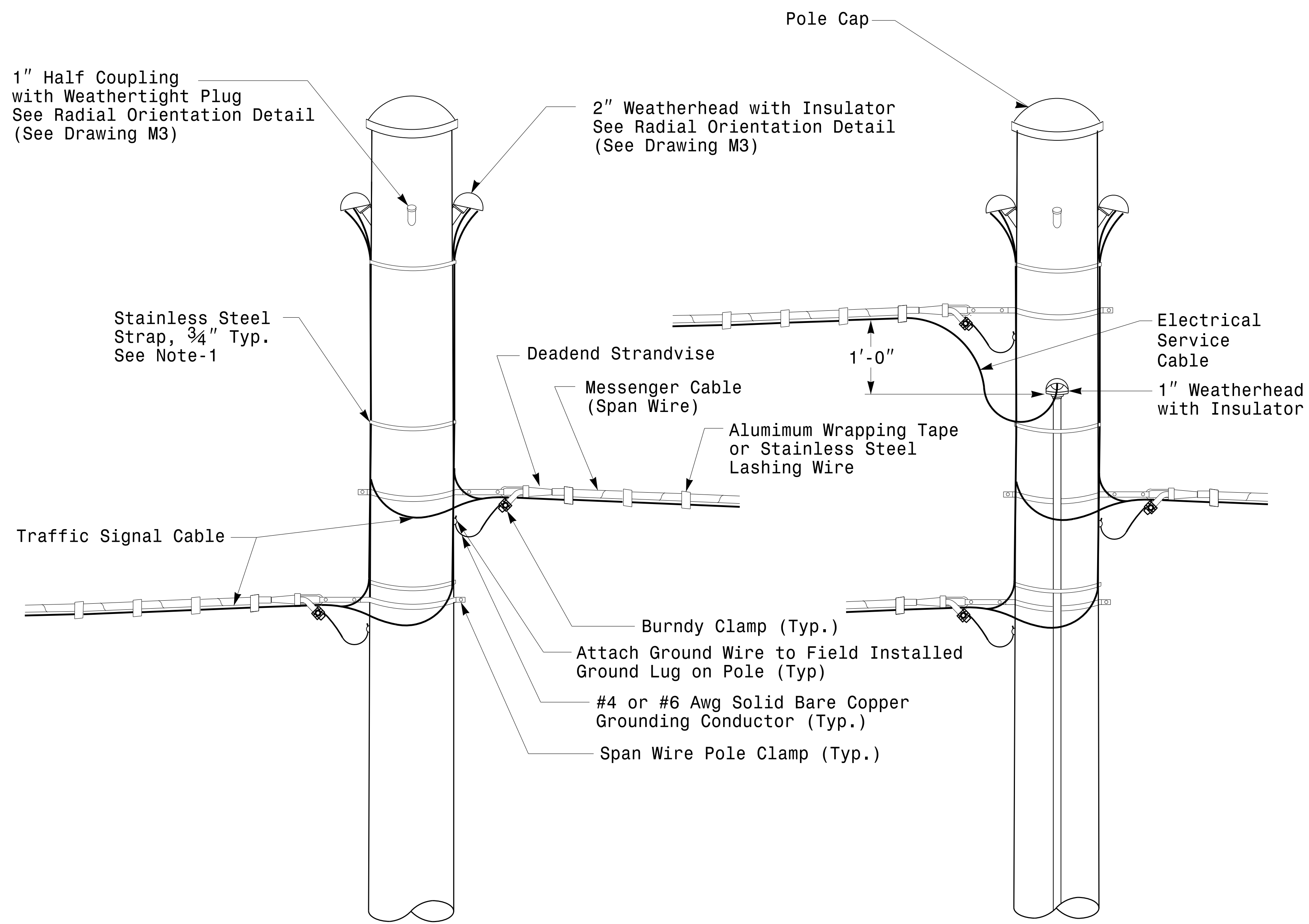


Mast Arm Pole

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: 		10/11/2017 DATE

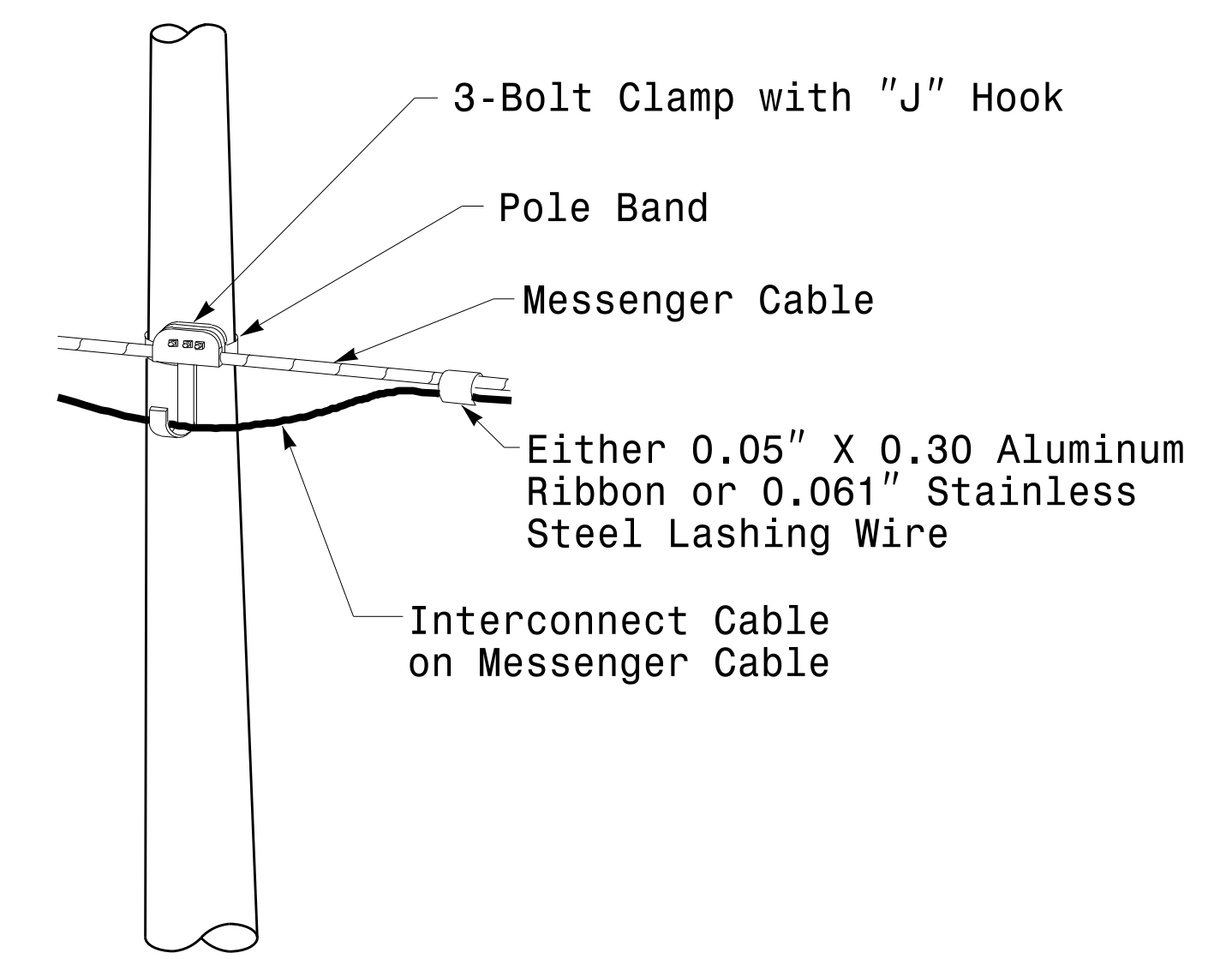
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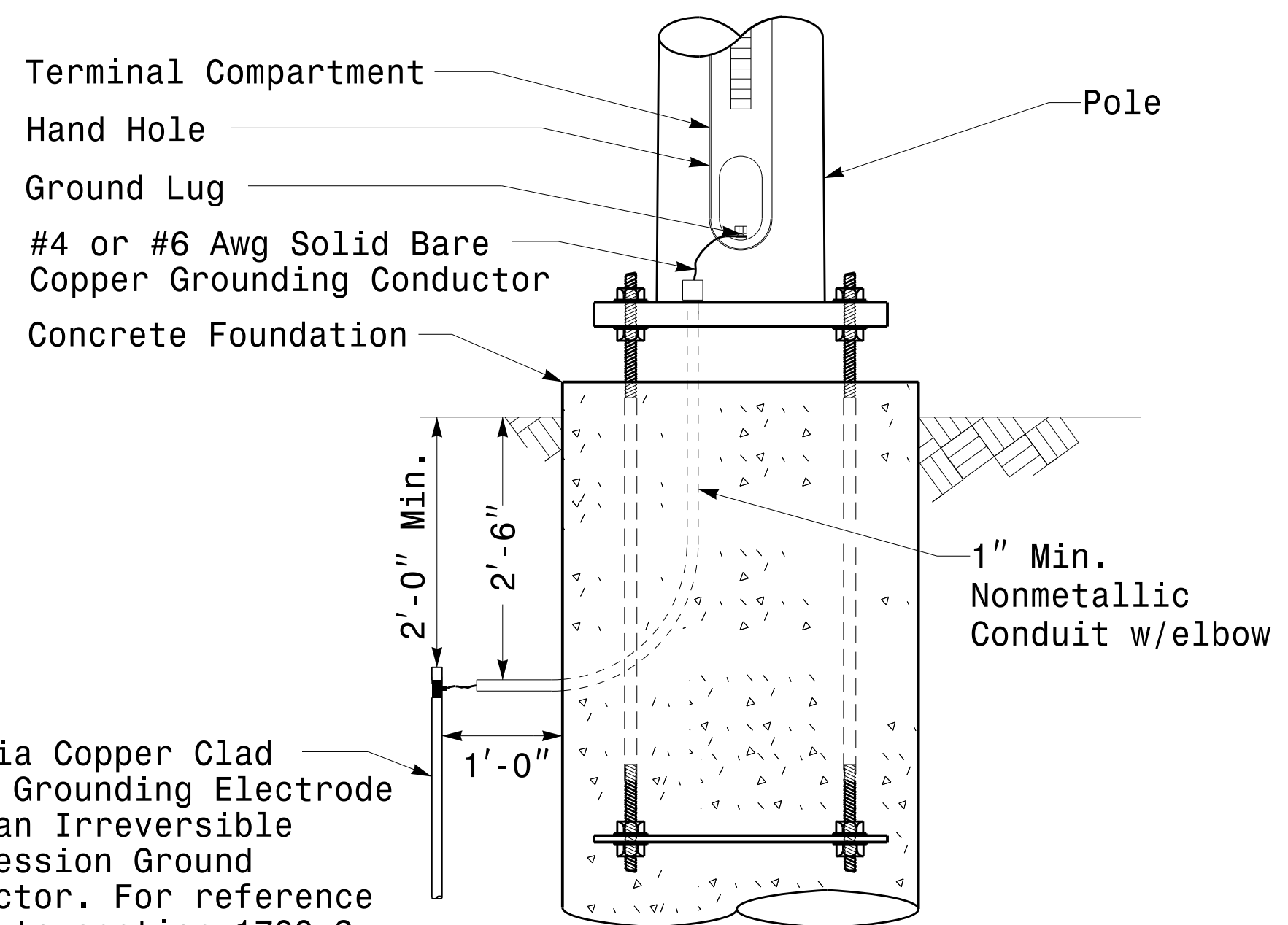
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2018.



Attachment of Cable to Intermediate Metal Pole

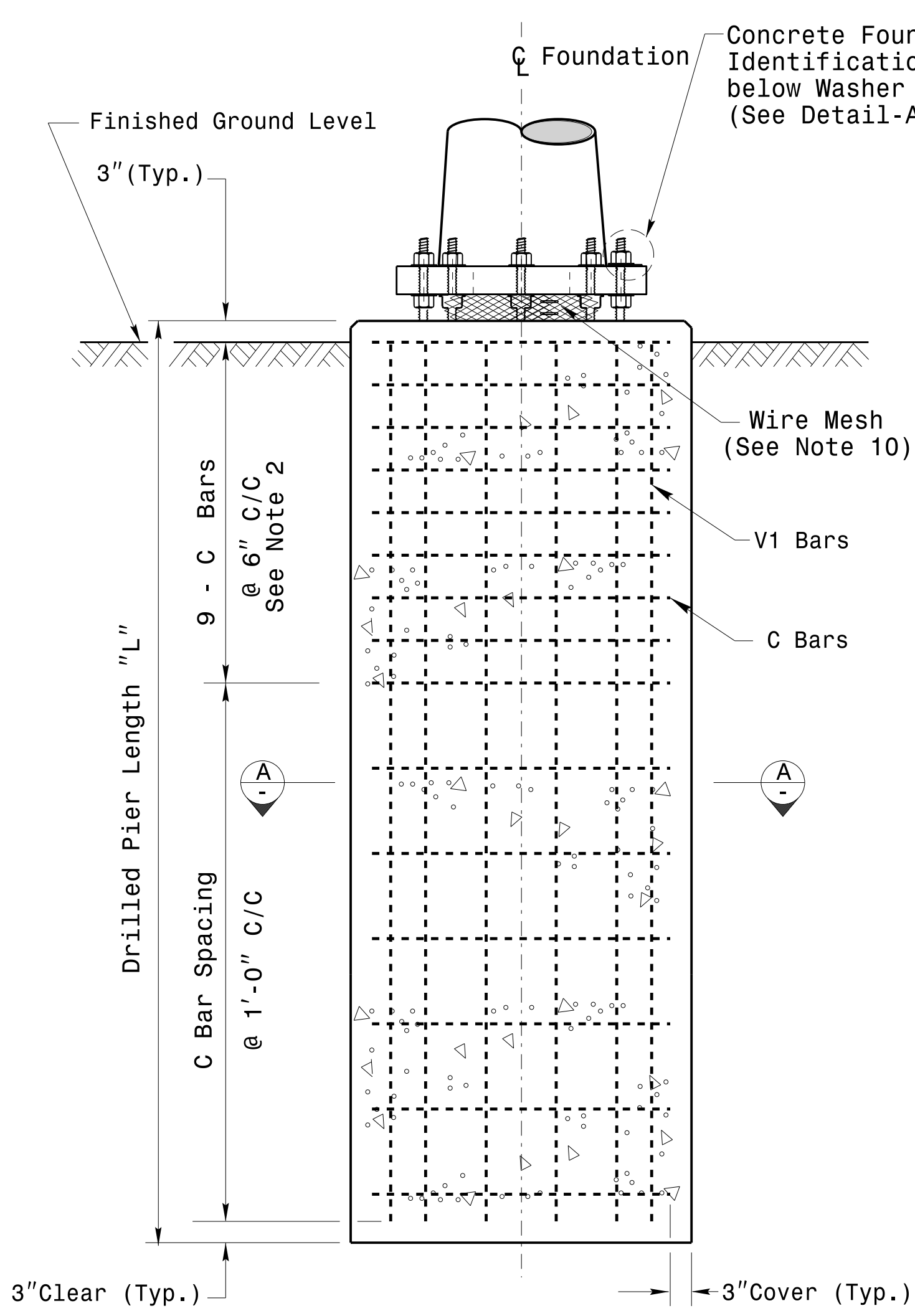


5/8" Dia Copper Clad Steel Grounding Electrode with an Irreversible Compression Ground Connector. For reference refer to section 1700-3 K and L for electrical grounding and bonding requirements, See Note 4.

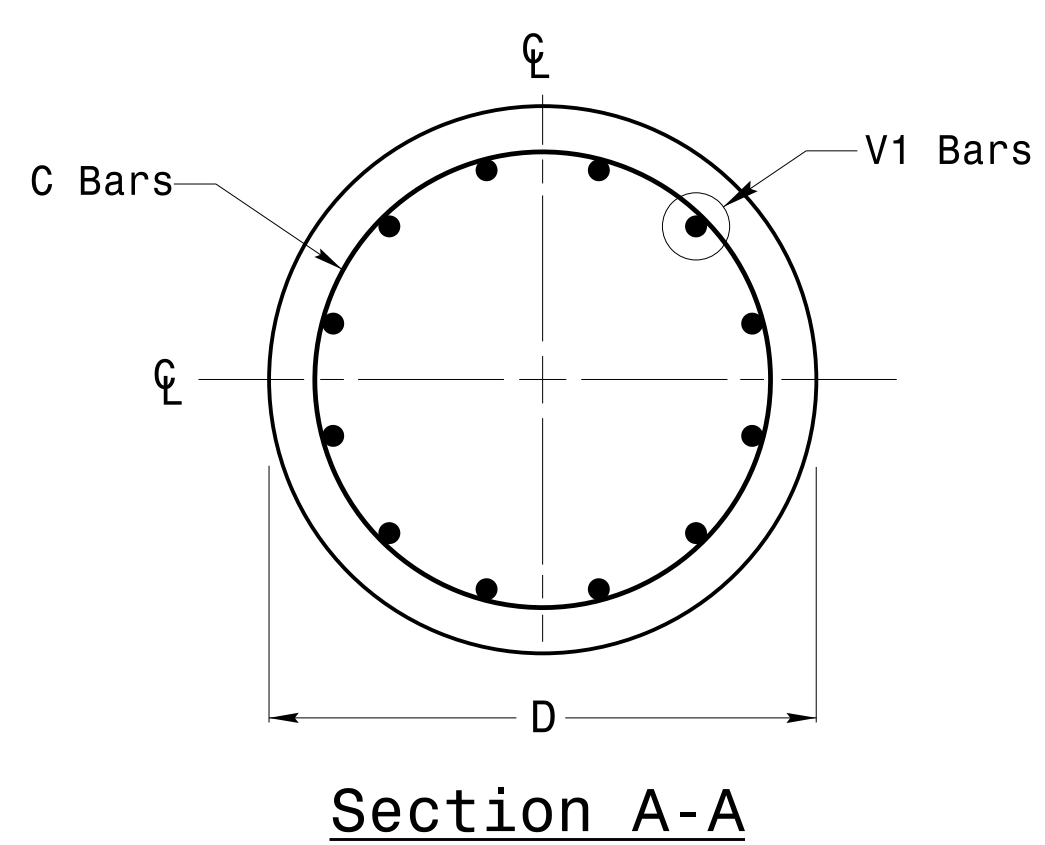
Metal Pole Grounding Detail For Strain Pole and Mast Arm

	<p>Typical Fabrication Details For Strain Pole Attachments</p>		
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: C.F. ANDREWS</p>	
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>DocuSigned by: Dinesh C. Sarkar 10/11/2017</p>

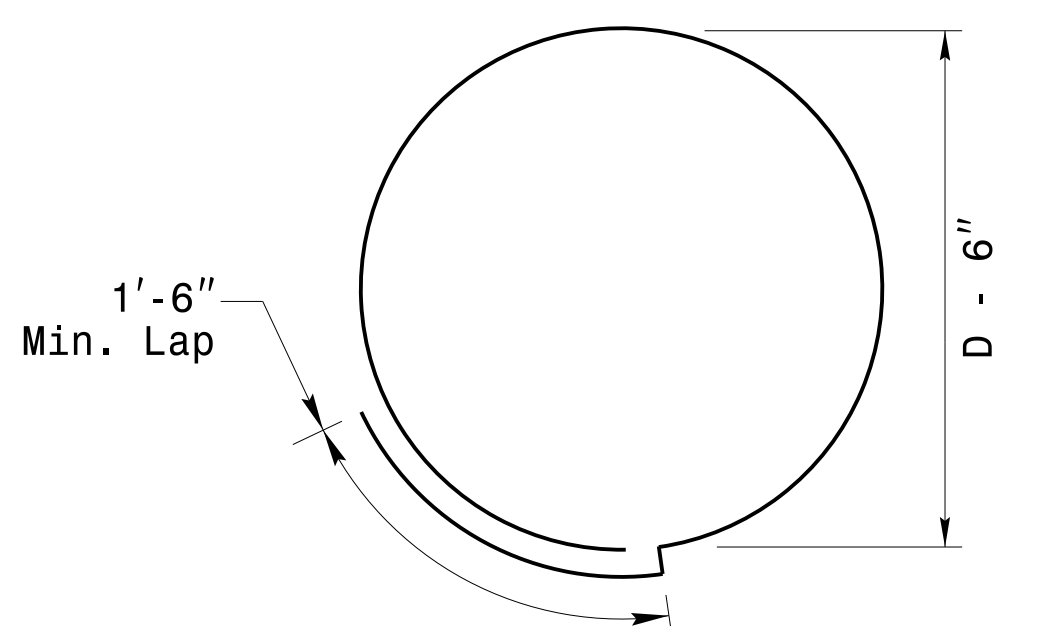
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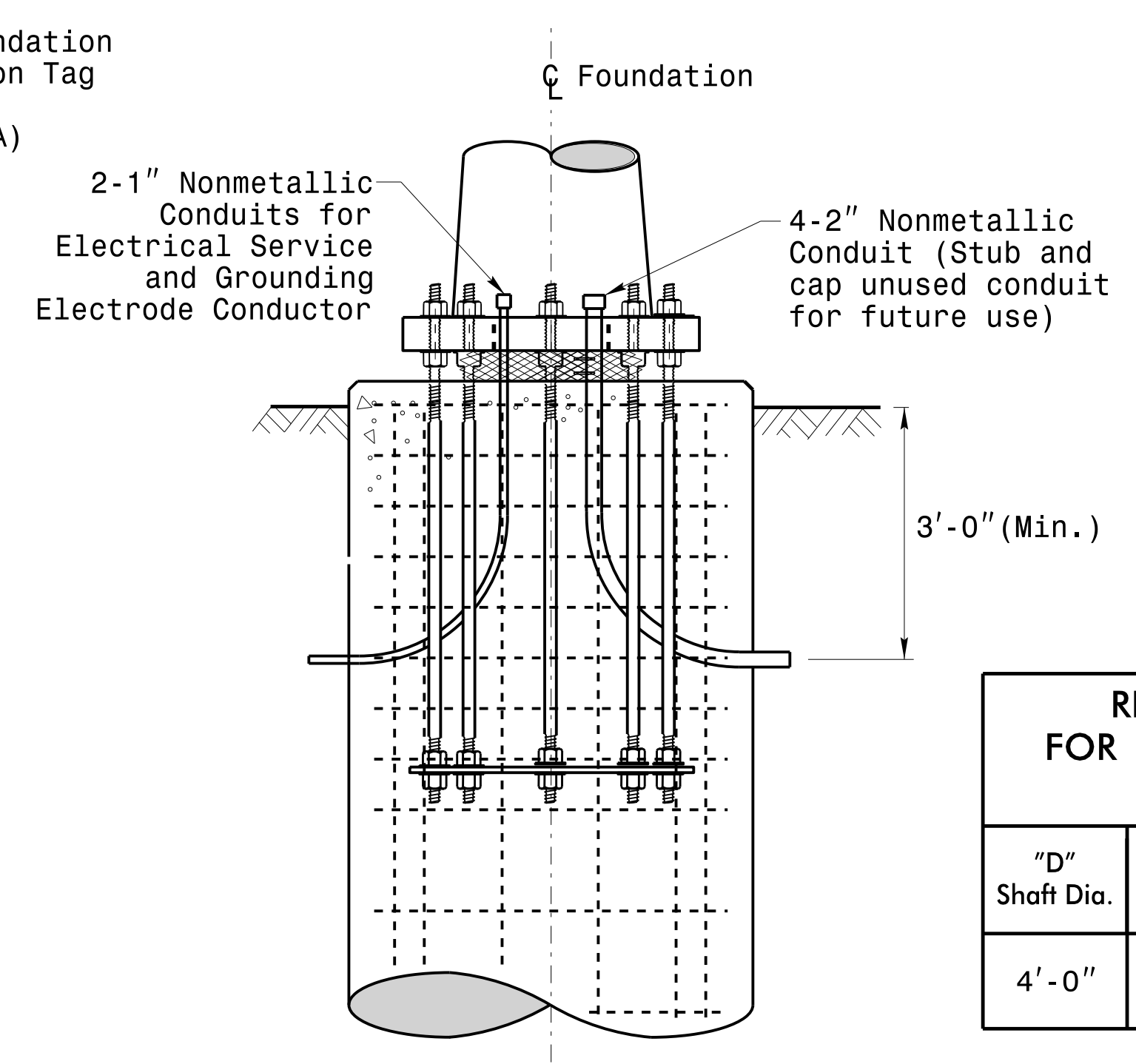
Concrete Shaft Elevation



Section A-A



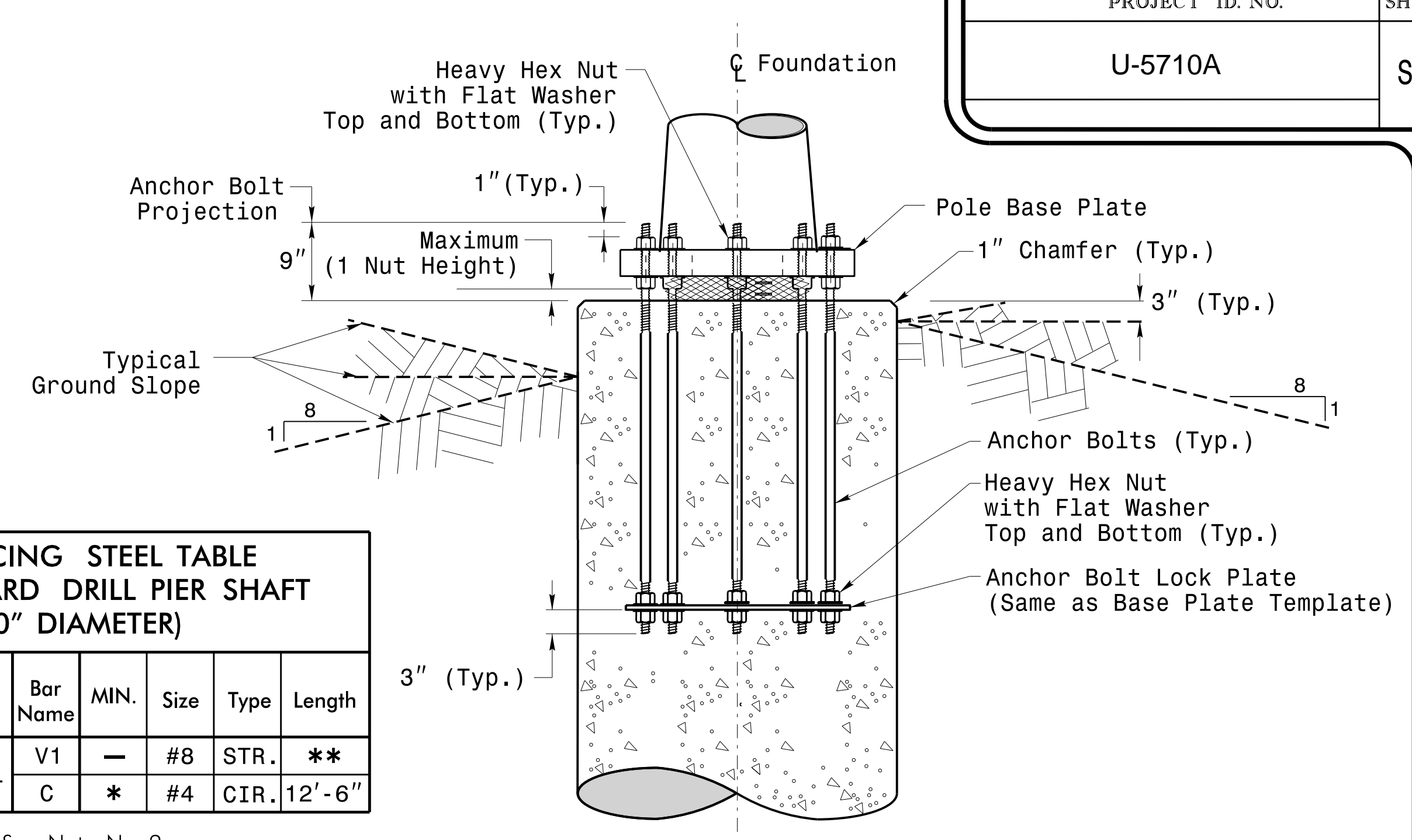
Typical "C" Bar Detail



Typical Foundation Conduit Details

"D" Shaft Dia.	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
4'-0"	.465 x L	V1	-	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 2
 ** See Note No. 3

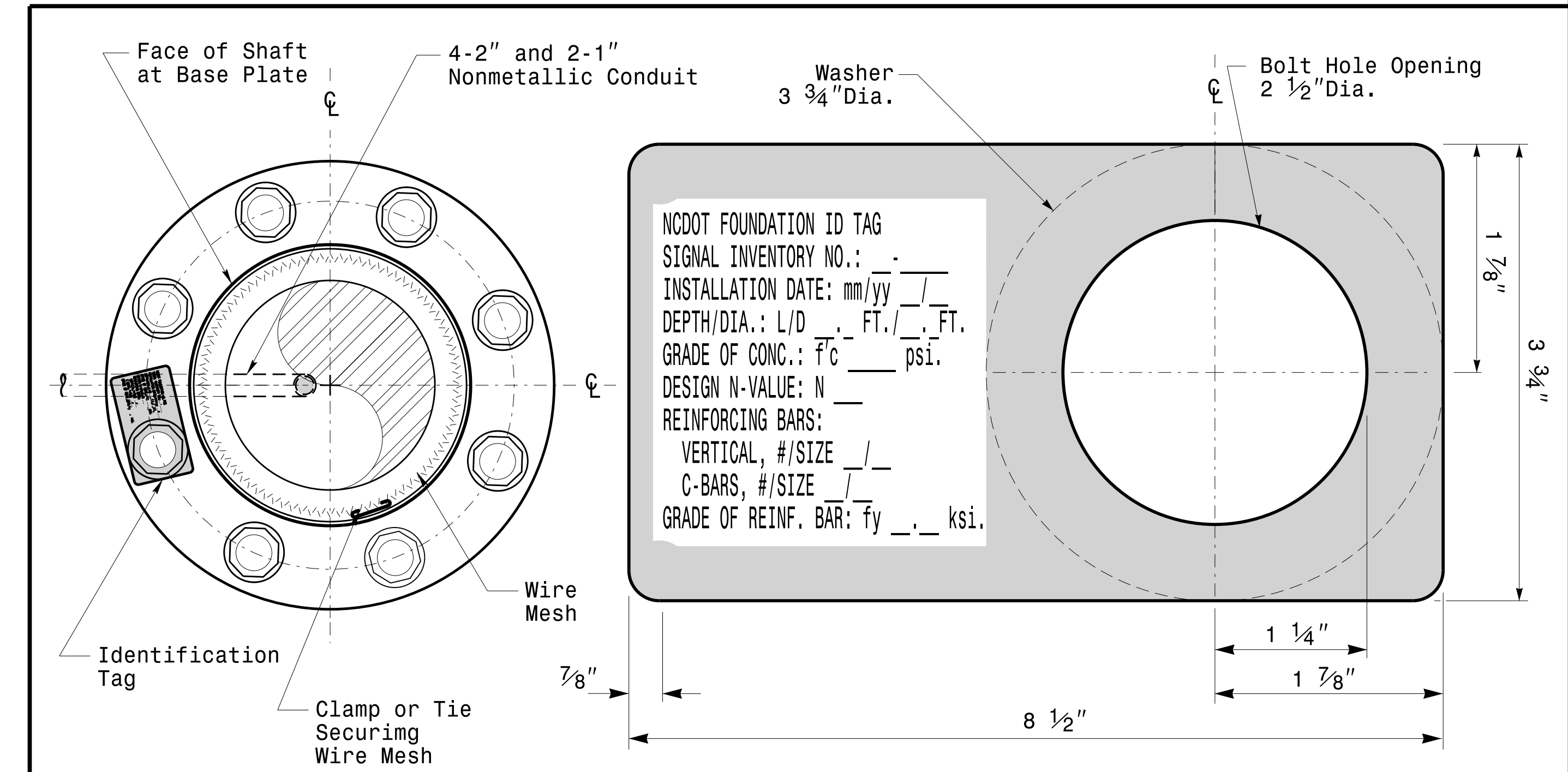


Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)

General Notes:

1. If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
2. Circular tie reinforcing rings may be vertically adjusted by +/-3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
3. For standard foundations, see sheet Sig. M8 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/-3" to facilitate the installation of electrical conduit entering into the cage.
4. Provide 2" to 5" foundation projection above ground level depending on the ground slope.
5. Unless otherwise shown, foundation designs are based on non-sloping level ground surfaces with slope ratios of 8:1 (H:V) or flatter. If actual ground line slopes are steeper contact the Engineer before excavating or placing concrete.
6. Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2018 NCDOT Standard Specifications are referenced in this provision. Refer to the NCDOT Resources/Specifications page located on the Connect NCDOT website.
[https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx](https://connect.ncdot.gov/resources/Specifications%20and%20Special%20Provisions.aspx)
7. Use air entrained AA concrete mix with a compression strength of f'c=4500 psi.(min.) after 28 days.
8. Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3" cover on all reinforcement.
9. Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
10. Provide two layers of galvanized welded 23 gauge (0.25) 6" wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
11. Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



Concrete Foundation Identification Tag Details

D = Diameter
 L = Length/Depth
 mm = Month
 yy = Year

Detail-A

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Construction Details For Foundations</p>		
	<p>PLAN DATE: OCTOBER 2018</p> <p>DESIGNED BY: C.B. COGDILL</p> <p>PREPARED BY: N. BITTING</p> <p>REVIEWED BY: D.C. SARKAR</p>	<p>REV. NO.</p> <p>COMMENTS</p> <p>INIT.</p> <p>DATE</p>	

Construction Details - Foundations

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 PLOT

SOIL CONDITION

PROJECT ID. NO.	SHEET NO.
U-5710A	Sig.M8

		STANDARD STRAIN POLES					STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) - Feet							Reinforcement				
Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups			
			Axial (kip)	Shear (kip)	Moment (ft-kip)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Bar Size (#)	Quantity (ea.)	Bar Size (#)	Spacing (in.)		
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	10	8	17	14.5	12.5	8	12	4	12
		S30L3	30	25	2	11	300	19.5	13.5	10	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	10.5	8	17.5	15	13	8	14	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	16	12	9	21	17.5	15	8	16	4	6
		S35H3	35	29	4	16	515	26	17	12.5	9.5	22	18.5	16	8	16	4	6
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11.5	8.5	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	9	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	9	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	13.5	10.5	8	18	15	13.5	8	16	4	6
		S35H1	35	25	4	12	350	21	14	10.5	8.5	18.5	15.5	13.5	8	16	4	6
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6

General Notes:

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or from the Engineer.
5. Select the appropriate column under "Standard Foundations" based on soil type and "N" value. Select the appropriate row based on the pole load case.
6. The foundation depth is the value shown in the "Standard Foundations" category where the column and the row intersect.
7. Use Construction Procedures and Design Methods prescribed by FHWA-NHI-10-016 for Reference Drilled Shafts.

Standard Strain Pole Foundation-All Soil Condition

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Drilled Pier Length

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE: OCTOBER 2017 DESIGNED BY: C.B. COGDILL
 PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR

10/11/2017
DATE

REVISIONS

NO.	DATE	DESCRIPTION
1	7/12/2015	Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn.

SCALE: 0 NA NONE

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