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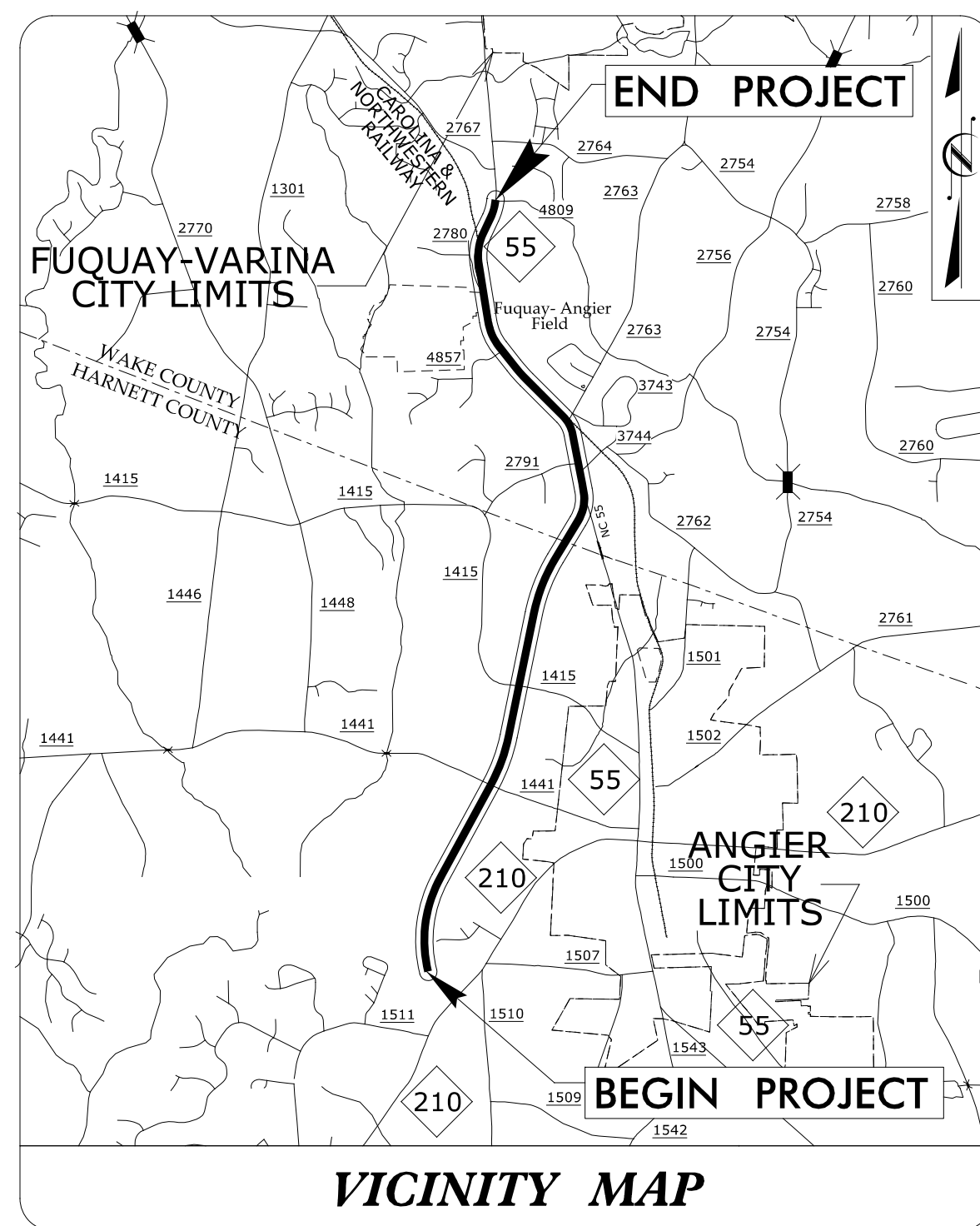
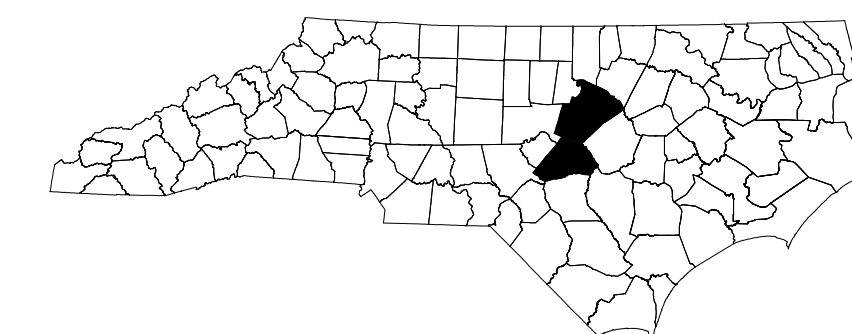
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HARNETT & WAKE COUNTY

LOCATION: NC 55 FROM NC 210 TO SR 4809 (JICARILLA LANE)

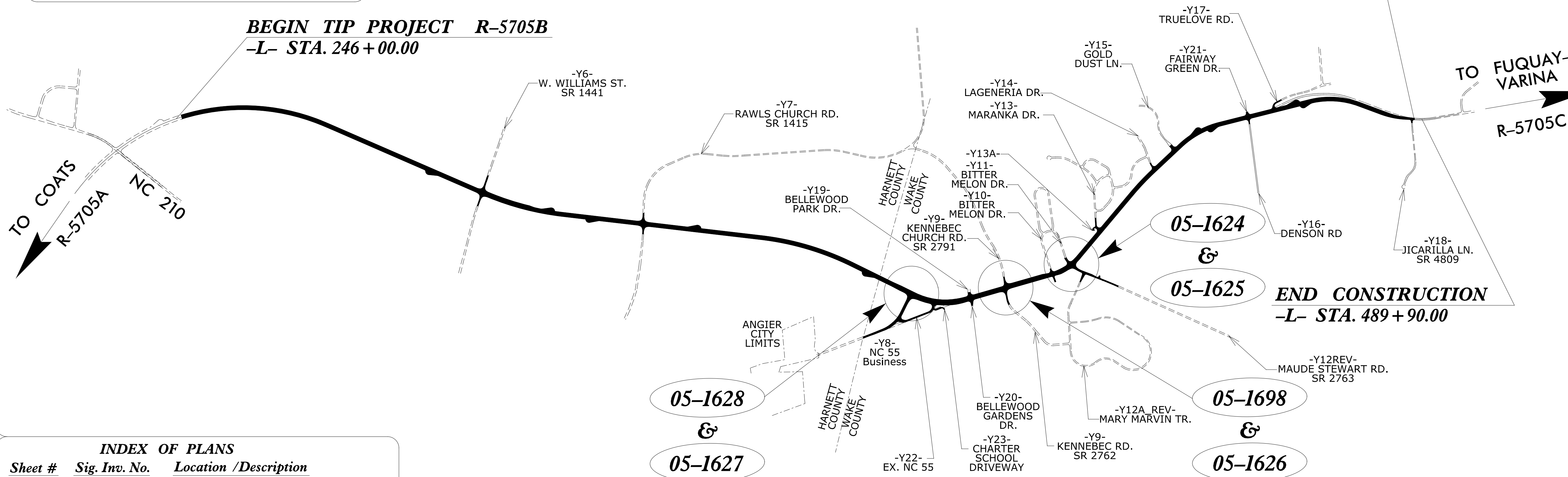
TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATION



TIP PROJECT: R-5705B

END TIP PROJECT R-5705B
-L- STA. 485 + 57.00

BEGIN TIP PROJECT R-5705B
-L- STA. 246 + 00.00



CONTRACT:

INDEX OF PLANS		
Sheet #	Sig. Inv. No.	Location /Description
Sig. 1.0		Title Sheet
Sig 1.1-1.2		Revised Standard Drawings
Sig. 2.0-2.2	05-1627	NC 55WB at NC 55 Business
Sig. 3.0-3.3	05-1628	NC 55 Eastbound at NC 55 Business Pedestrian Crossing
Sig. 4.0-6.4	05-1698	NC 55 at SR 2791 (Kennebec Church Road)
Sig. 7.0-7.4	05-1626	NC 55 at SR 2762 (Kennebec Road)
Sig. 8.0-8.4	05-1625	NC 55 at SR 2763 (Maude Stewart Road)
Sig. 9.0-9.4	05-1624	NC 55 at Bitter Melon Drive
MI-M8		Standard Metal Pole Details
SCP. 1-7		Signal Communication Plans

LEGEND

##-#### SIGNAL INVENTORY NUMBER

TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

Contacts:

Robert J. Ziemba, PE – Central Region Signals Engineer
Keith M. Mims, PE – Signal Equipment Design Engineer
Gregory A. Green – Signal Communications Project Engineer

Prepared for the North Carolina Department of Transportation
In the Office of:

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328

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

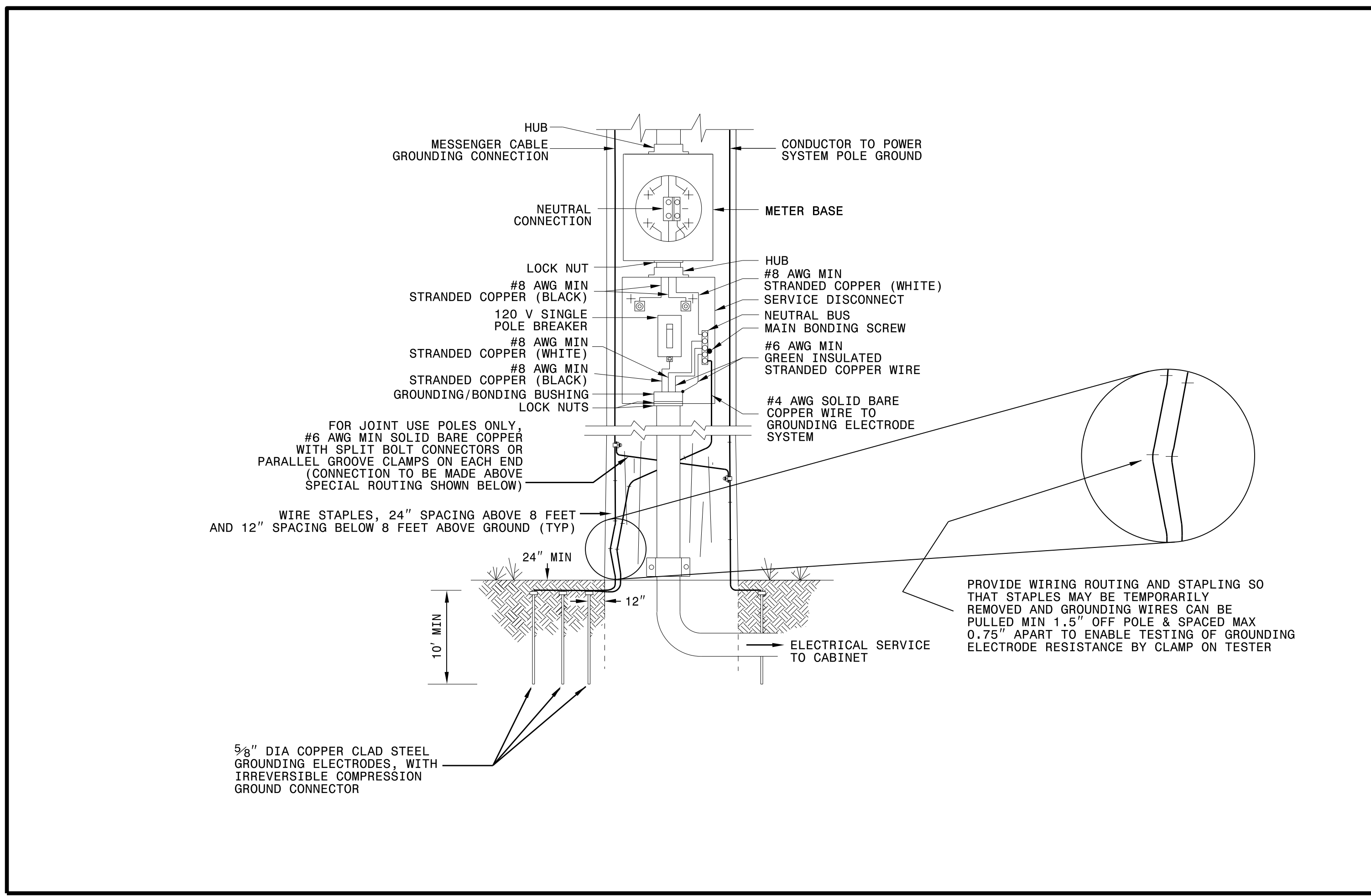
SEAL

DocuSigned by:
Joseph L. Lewis
8001EA08823641E
SIGNATURE

7/12/2022
DATE

DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529



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

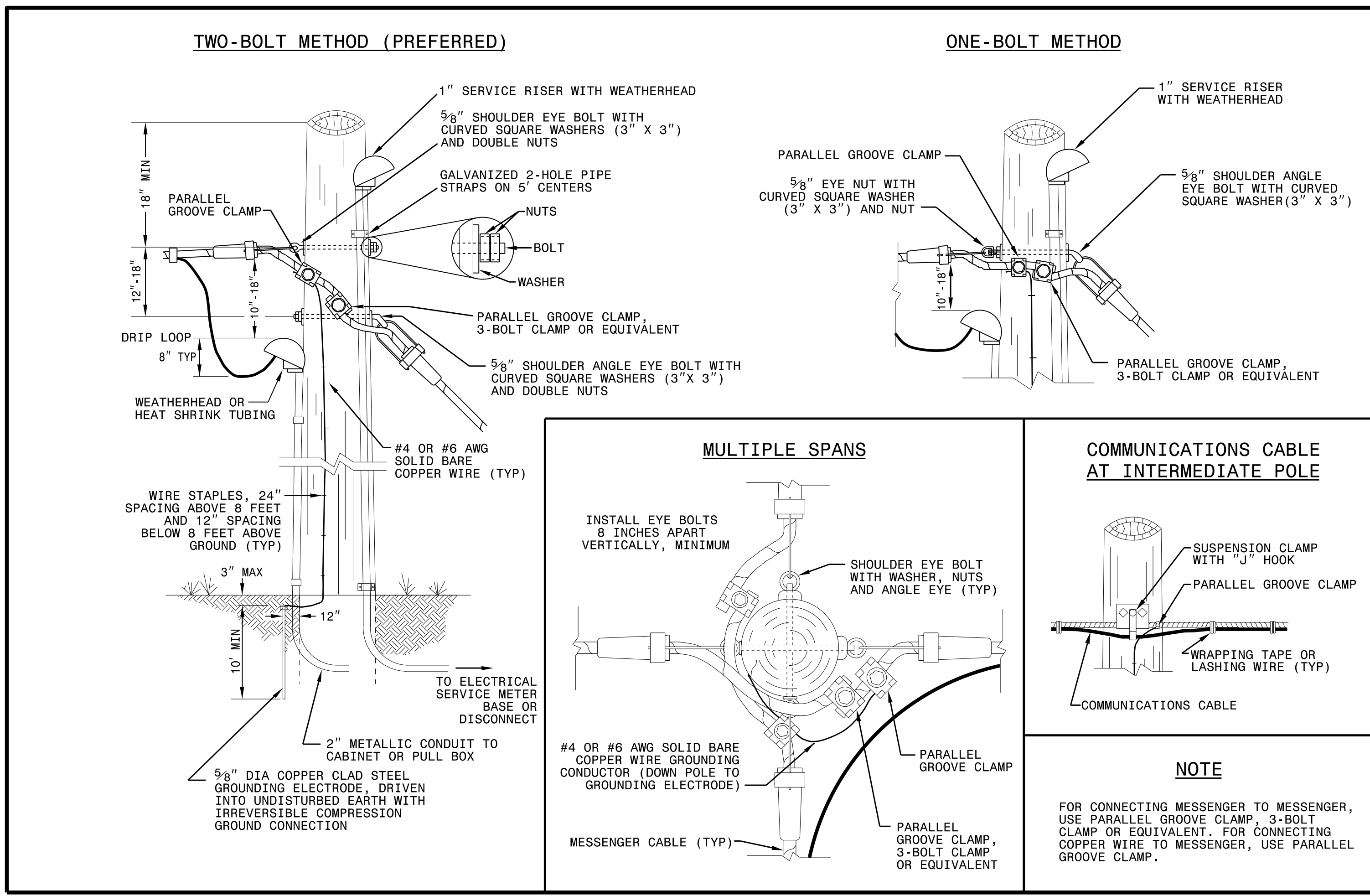
ENGLISH STANDARD DRAWING FOR

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

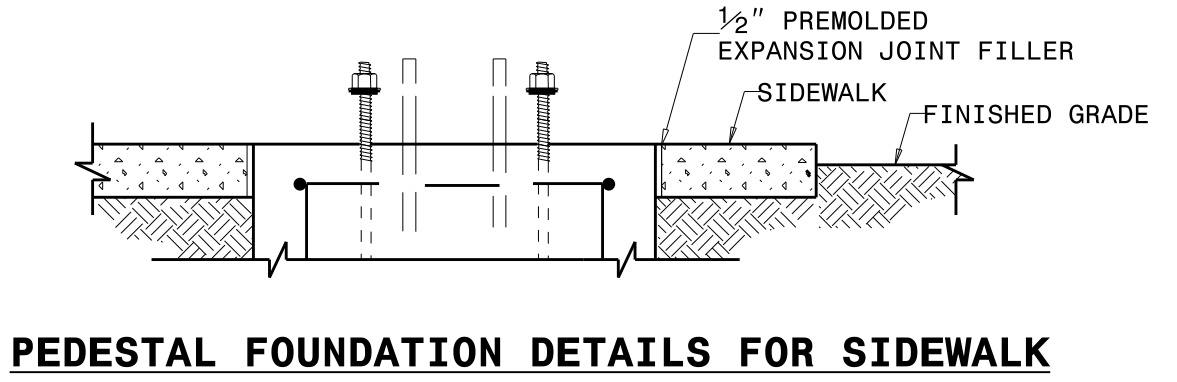
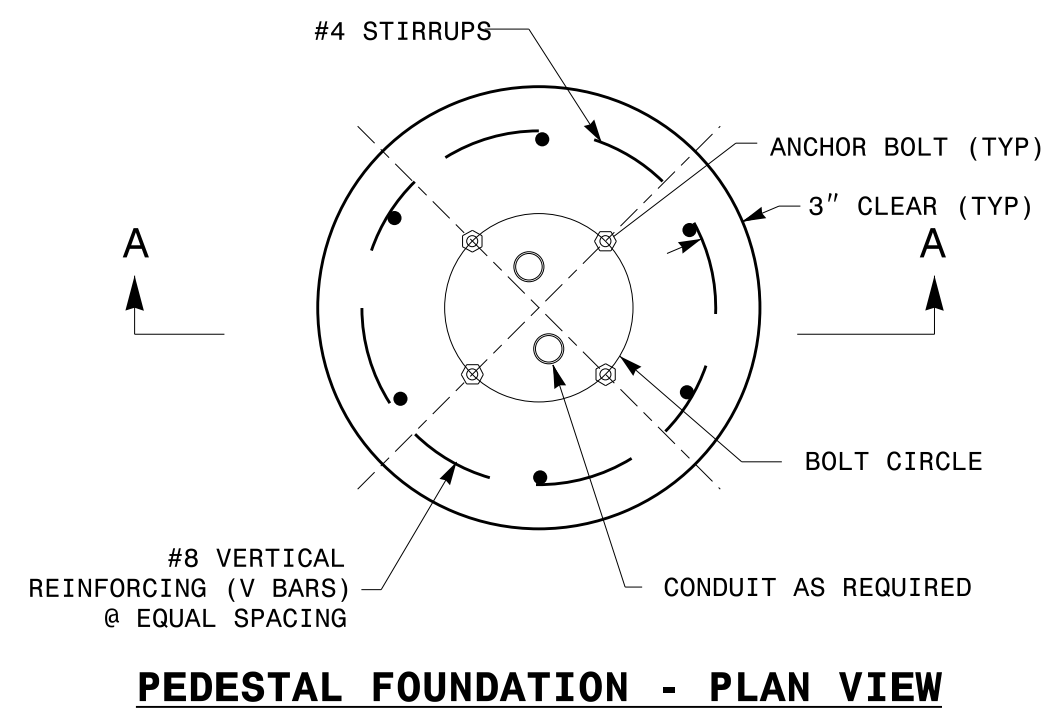
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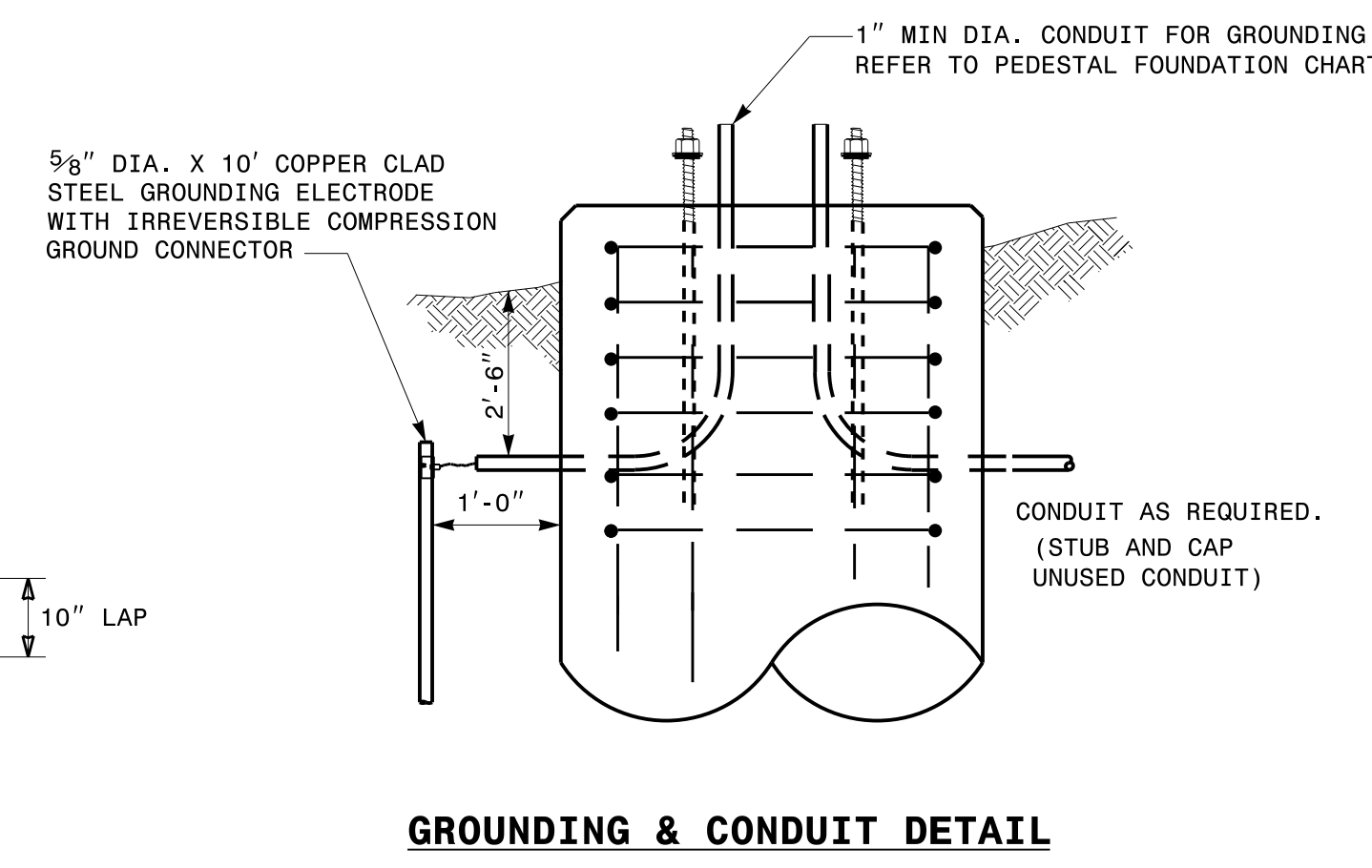
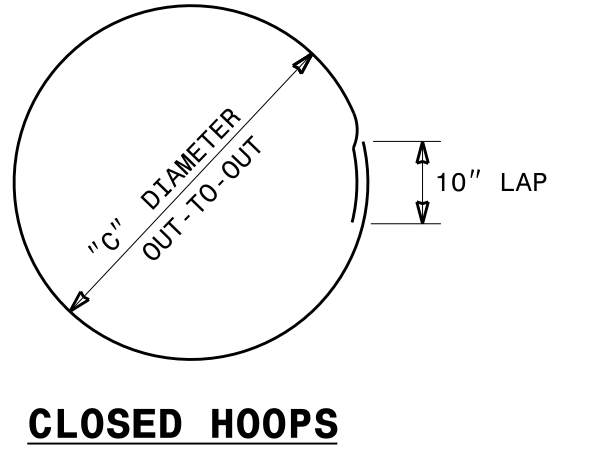
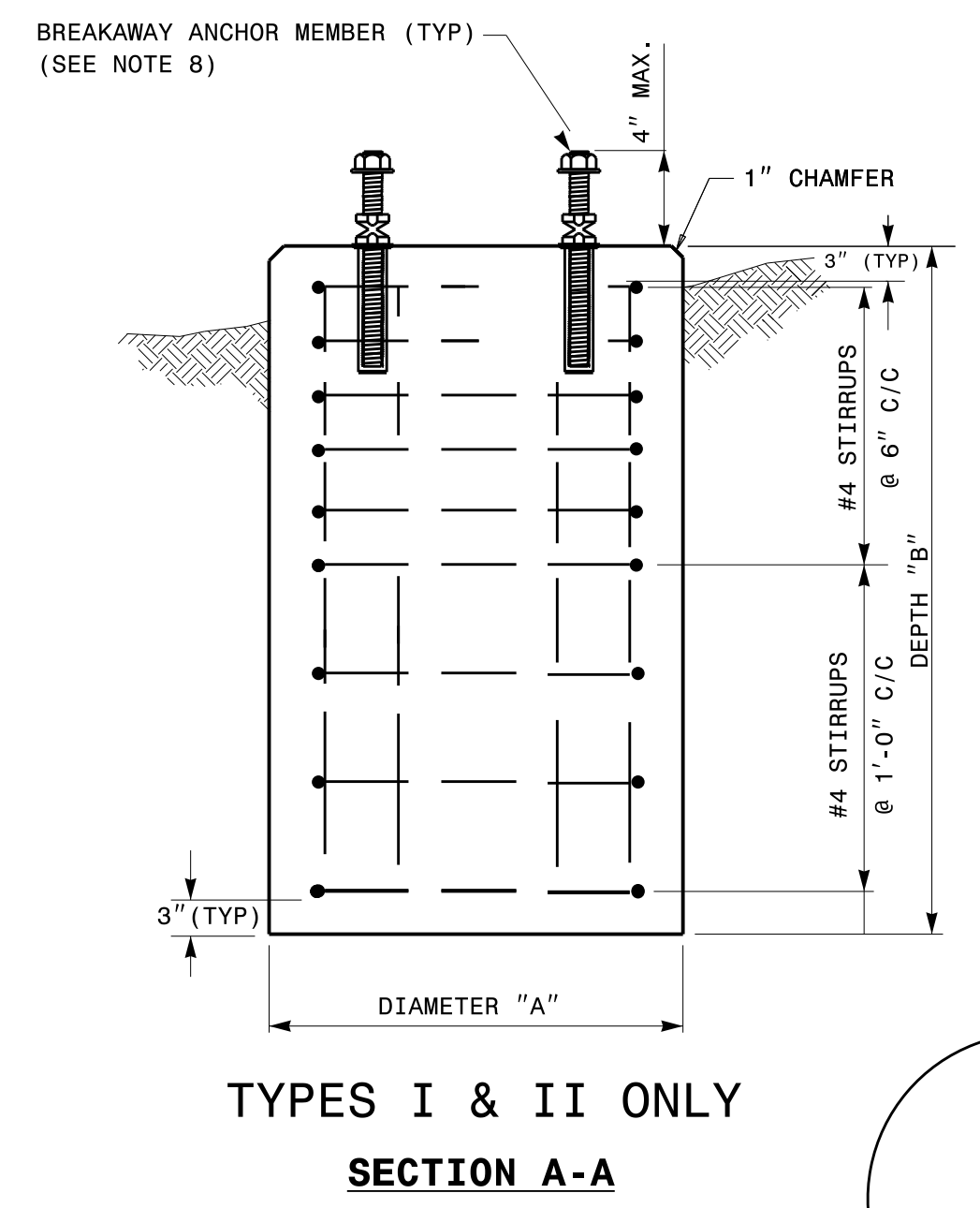
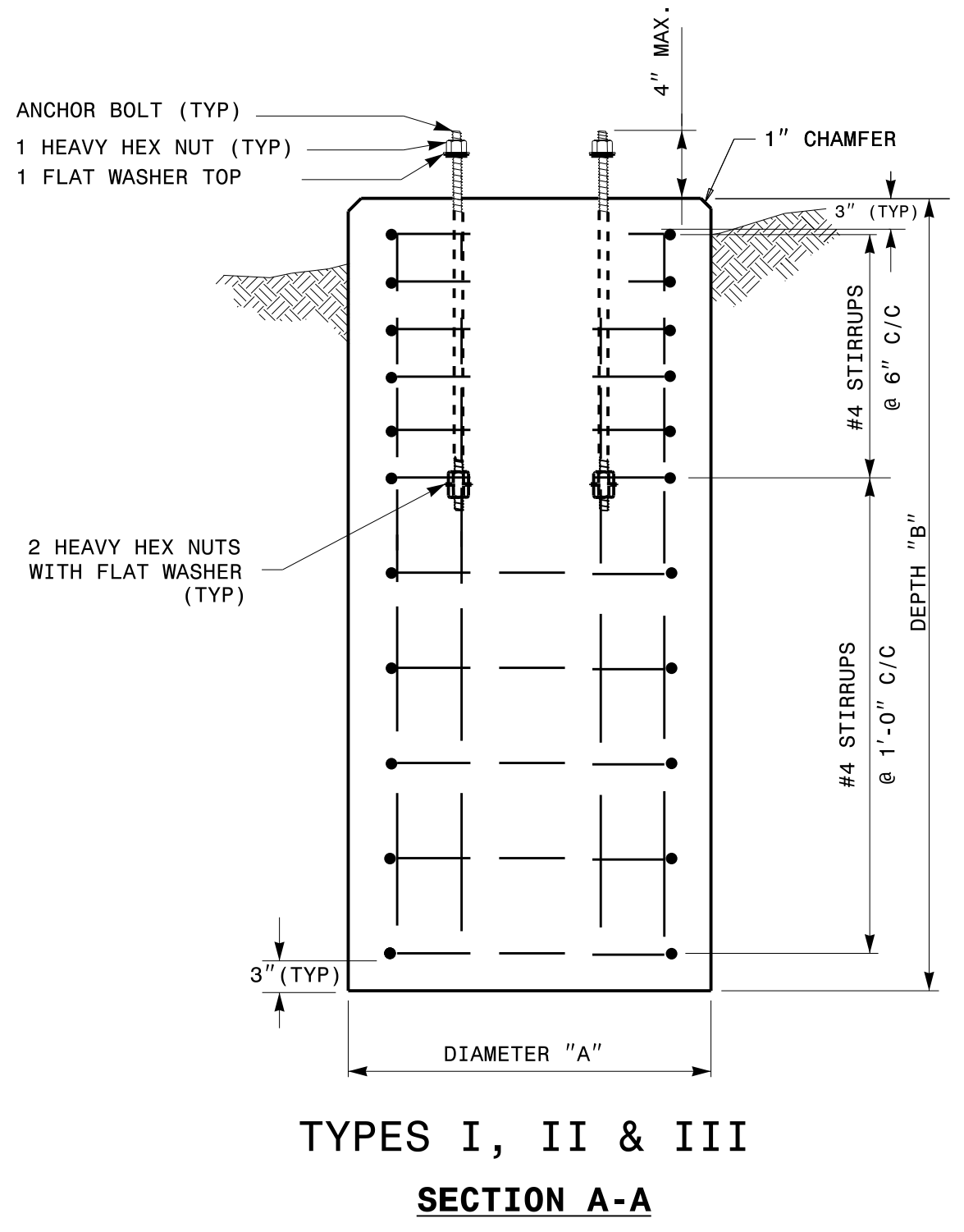
See Plate for Title

<p>Prepared in the Offices of:</p>	<p>SEAL</p>
<p>750 N. Greenfield Parkway Garner, NC 27529</p>	<p>DocuSigned by: <i>Mohd Aslami</i> 10/11/2017 DATE</p>

11-001-2017_08-56
11-2018_S14_DrawingPlate_Sheets2018_Plate_Sheet.dgn
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- NOTES:**
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
 - COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
 - USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
 - USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
 - GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - 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	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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 11-2018_S14 Drawings#Plate_Sheets#2018_Plate_Sheet - .dgn
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See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

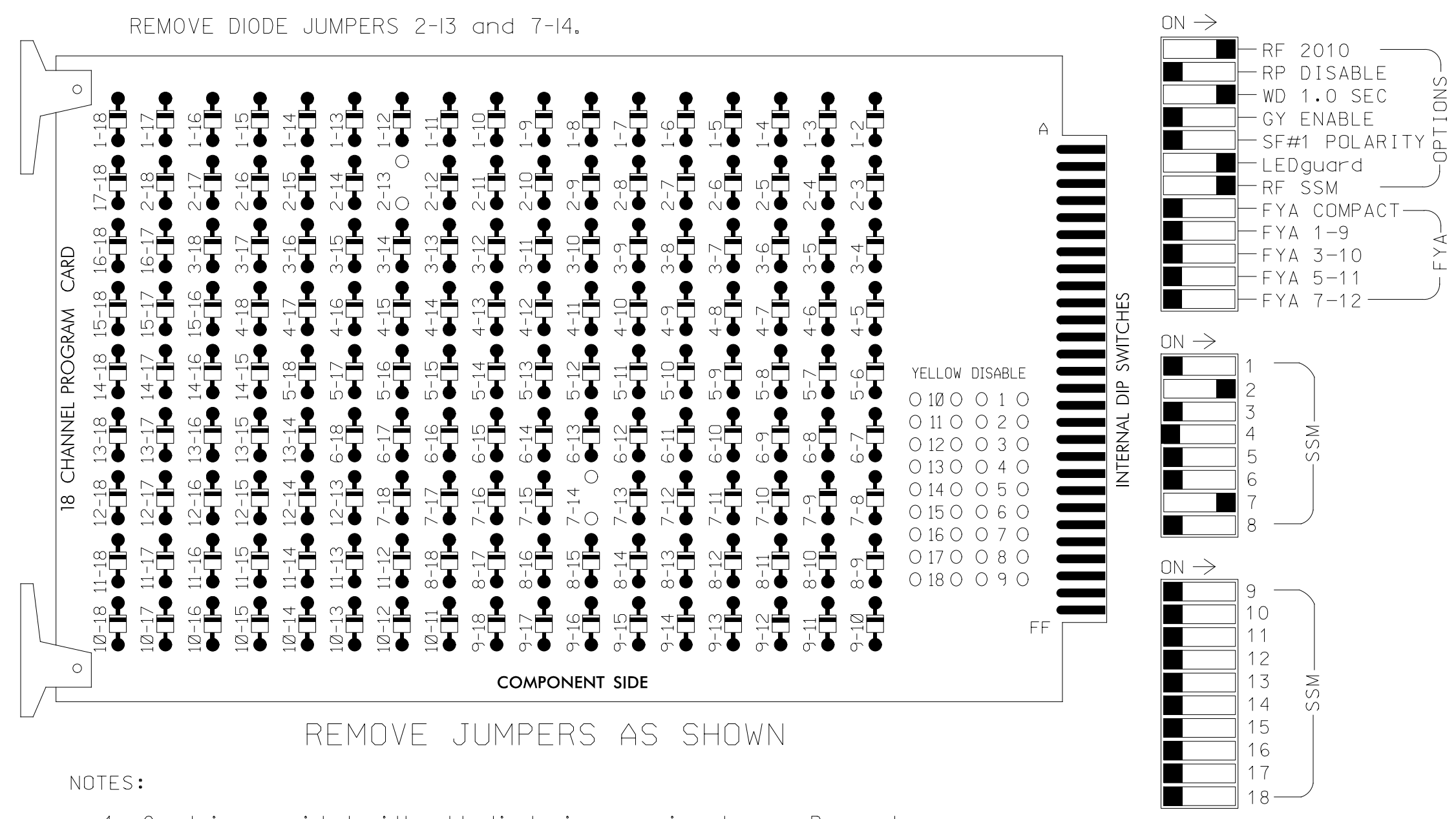
SEAL

SEAL
028094
ENGINEER
DEBESH C. SARKAR

Disc Signed by
Debesh C. Sarkar
10/11/2017
DATE

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the D05-48_Fuquay-Varina System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S3,S6,S10
 PHASES USED.....2,2PED,7,7PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

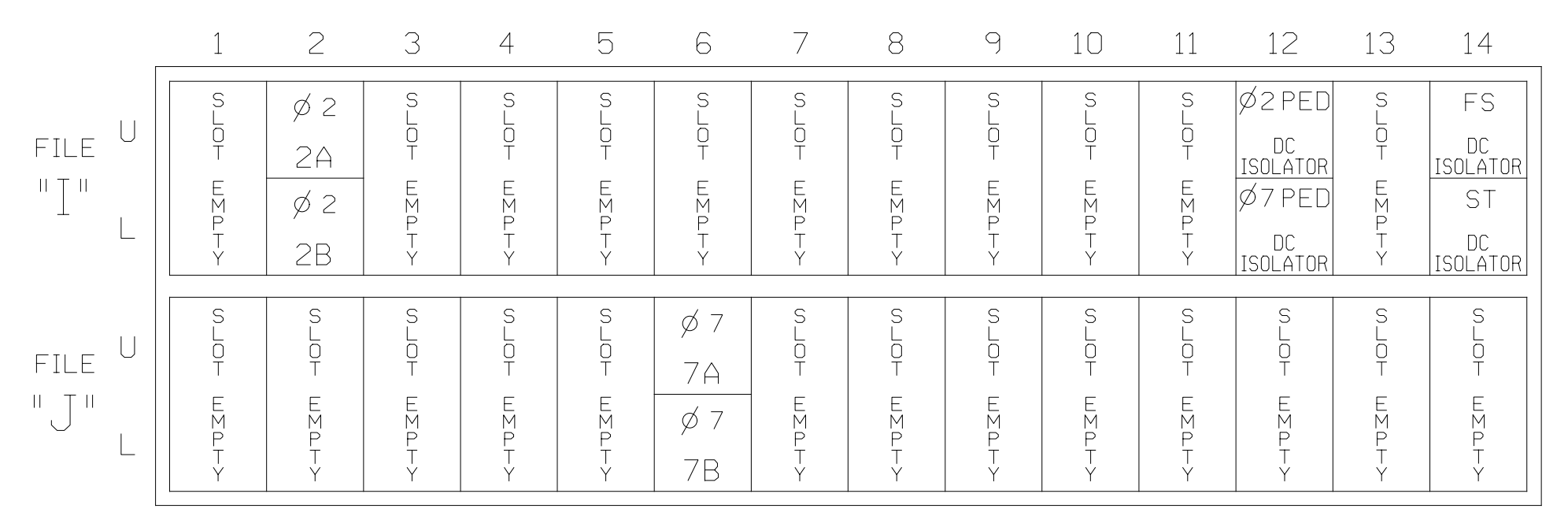
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	7 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	DLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	NU	P71, P72	NU	NU	NU	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128																
YELLOW		129																
GREEN																		
RED ARROW										121								
YELLOW ARROW										123								
FLASHING YELLOW ARROW																		
GREEN ARROW		130								124								
Hand icon			113			104												
Person icon			115			106												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

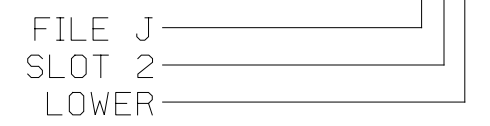


INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	2	2	YES			X	N
7A	TB5-9,10	J6U	42	8	7	YES				N
7B	TB5-11,12	J6L	46	18	7	YES				N
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P71,P72	TB8-5,6	I12L	69	PED 4	7 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT 112.

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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1627
 DESIGNED: July 2022
 SEALED: 07/11/2022
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:

 VHB Engineering NC, P.C. (C-3705)
 940 Main Campus Drive, Suite 500
 Raleigh, NC 27606
 919.829.0328

Division 5 Wake County Fuquay-Varina
 PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis
 PREPARED BY: M.L. Stygles REVIEWED BY: J. Ma

NC 55 WB at NC 55 Business

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 046057
 MATTHEW L. STYGLES

DocuSigned by:

 2048516407ABC
 SIGNATURE DATE 7/11/2022
 SIG. INVENTORY NO. 05-1627

7/11/2022 2:1:05:1627...s1.g.ele.2022.dgn mstygles

ECONOLITE ASC/3-2070 PEDESTRIAN DETECTOR PHASE ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 6. DETECTORS
2. From DETECTOR Submenu select 3. PED DETECTOR INPUT ASSIGNMENT
3. Press the TOGGLE key to select ECONOLITE MODE and press ENTER.

PED DET PHASE ASSIGNMENT MODE: ECONOLITEV																	
PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	
D	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E	2	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
T	3	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
E	4	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
C	5	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.
T	6	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
Q	7	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
R	8	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
	9	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.
	10	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
	11	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
	13	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.
	14	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
	16	X

"." = No assignment, disabled
 X = Assigns Pedestrian Push Button (PPB) to call the phase or phases
 2 = Call for Ped timing 2
 B = Allows for the PPB to call for Min Green 2 (BIKE GREEN)

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S14 as PED 7,
program LD SWITCH 14 as PHASE '7' TYPE 'P'.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 3. LOAD SW ASSIGN

LD SWITCH ASSIGN									
LD SWITCH	PHASE	/OVLP	TYPE	DIMMING			---FLASH---		
				R	Y	G	D	PWR	AUT	TGR
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	Y	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	-	A	R	.
6	6	V	.	.	.	-	A	Y	X
7	7	V	.	.	.	-	A	R	.
8	8	V	.	.	.	-	A	R	X
9	1	O	.	.	.	+	A	Y	X
10	2	O	.	.	.	+	A	R	X
11	3	O	.	.	.	-	A	Y	.
12	4	O	.	.	.	-	A	Y	.
13	2	P	.	.	.	+	A	.	.
14	7	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	8	P	.	.	.	-	A	.	.

NOTICE PED 7
ASSIGNED TO LD SWITCH 14 →

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1627
 DESIGNED: July 2022
 SEALED: 07/11/2022
 REVISED: N/A

Electrical Detail - Sheet 2 of 2

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

 DEPARTMENT OF TRANSPORTATION AND SAFETY
 Signal Management Section
 750 N. Greenfield Pkwy, Garner, NC 27529

NC 55 WB at NC 55 Business	
Division 5	Wake County
Fuquay-Varina	Fuquay-Varina
PLAN DATE: July 2022	REVIEWED BY: J.L. Lewis
PREPARED BY: M.L. Stygles	REVIEWED BY: J. Ma
REVISIONS	INIT. DATE

SEAL

SEAL
046057
ENGINEER
MATTHEW L. STYGLES

DocuSigned by:

 MATTHEW L. STYGLES
 DATE: 7/11/2022
 SIG. INVENTORY NO. 05-1627

PHASING DIAGRAM

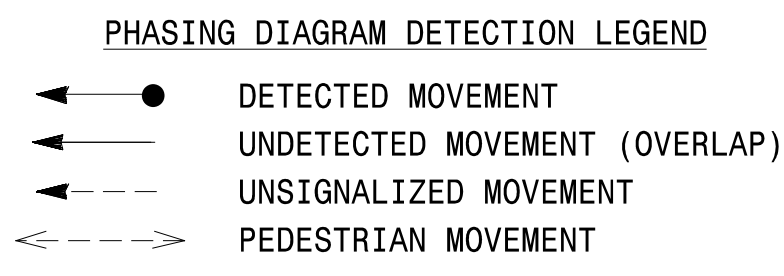
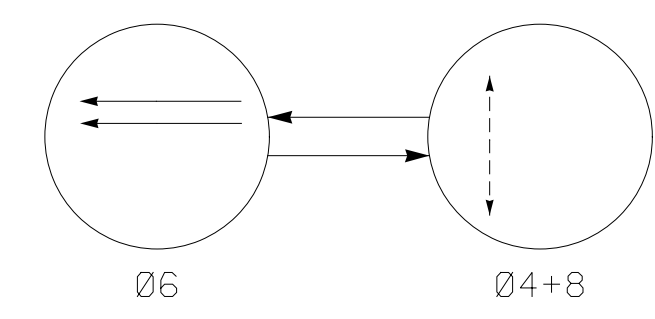


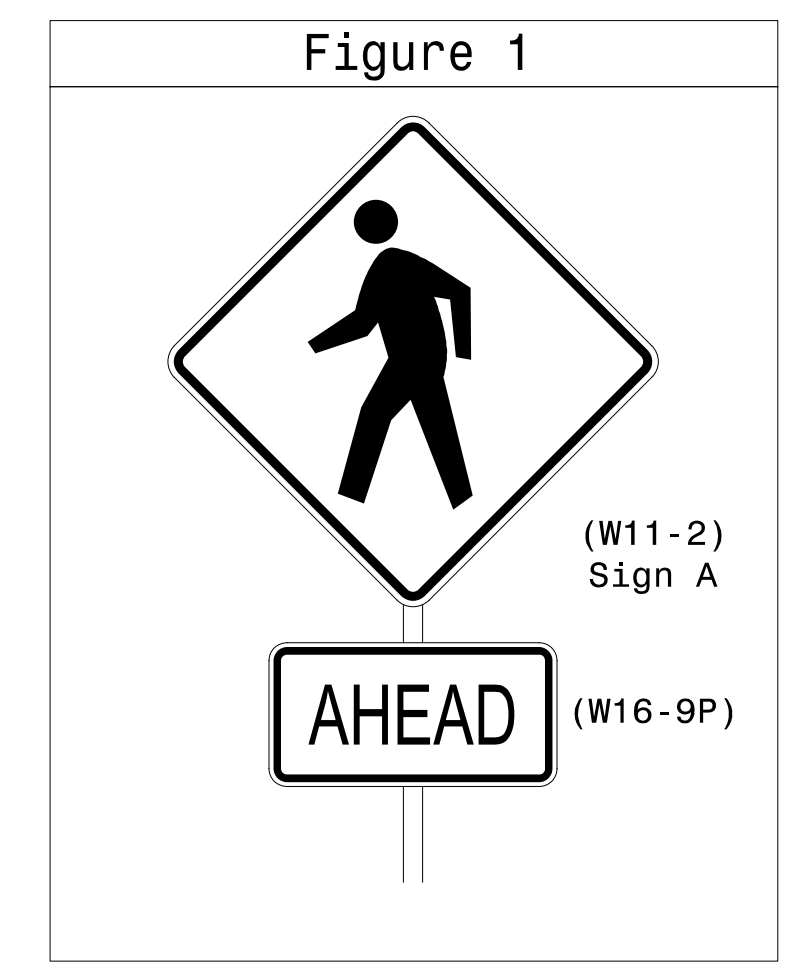
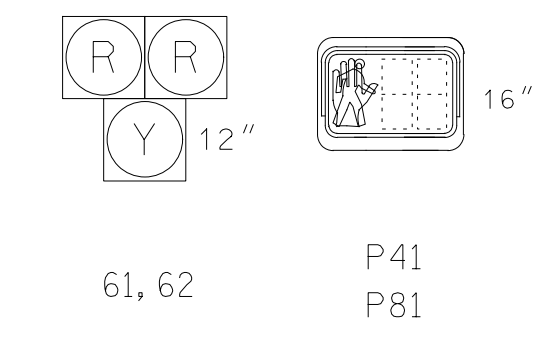
TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø6 DARK	ACTIVATION	STEADY YELLOW	ALL RED	Ø4+8 PED	Ø4+8 PED	FLASH	
61, 62	DRK	FY	Y	R	R	FR*	Y	
P41	DW	DW	DW	DW	W	FDW	DRK	
P81	DW	DW	DW	DW	W	FDW	DRK	

* ALTERNATING FLASH

- FY - STEADY YELLOW
- FR - FLASHING YELLOW
- R - STEADY RED
- FR - FLASHING RED
- W - WALK
- DW - DON'T WALK
- FDW - FLASHING DON'T WALK
- DRK - DARK

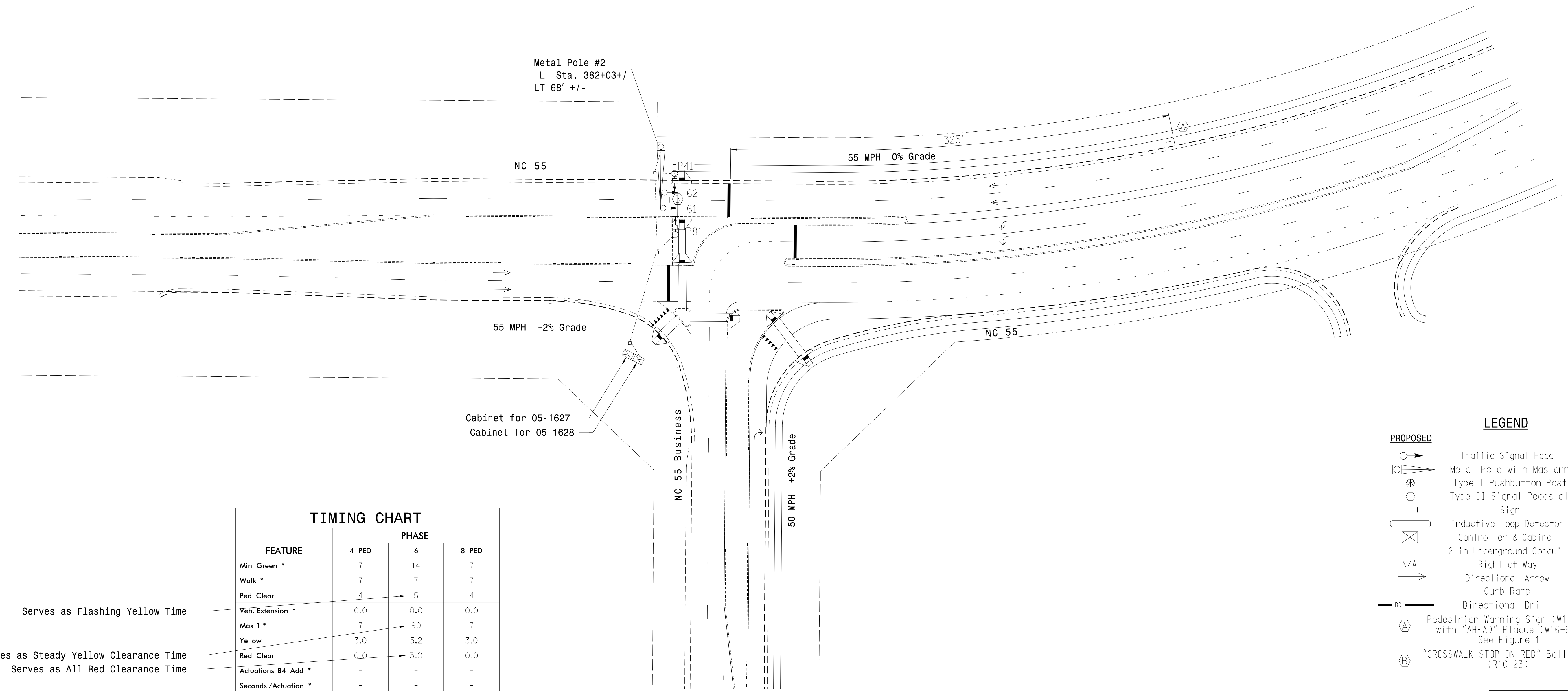
SIGNAL FACE I.D.
All Heads L.E.D.



2 Phase Semi-Actuated Pedestrian Hybrid Beacon
NC 55 - Fuquay-Varina
Signal System #: D05-48_Fuquay-Varina

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Locate Pedestrian and Crosswalk advance signs in accordance with Table 2C-4 in Section 2C.05 of the 2009 MUTCD or as otherwise directed by the Engineer.



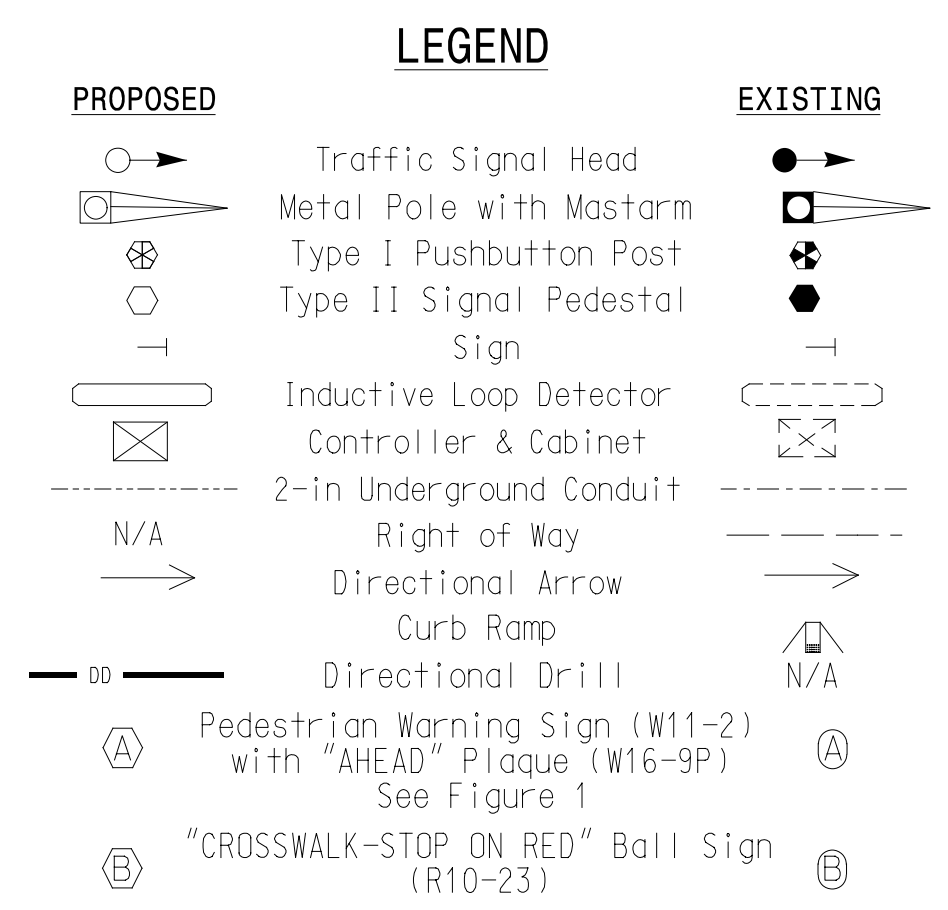
TIMING CHART

FEATURE	PHASE		
	4 PED	6	8 PED
Min Green *	7	14	7
Walk *	7	7	7
Ped Clear	4	5	4
Veh. Extension *	0.0	0.0	0.0
Max I *	7	90	7
Yellow	3.0	5.2	3.0
Red Clear	0.0	3.0	0.0
Actuations B4 Add *	-	-	-
Seconds / Actuation *	-	-	-
Max Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Locking Detector	-	-	-
Recall Position	-	PED. RECALL	-
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

Serves as Flashing Yellow Time

Serves as Steady Yellow Clearance Time

Serves as All Red Clearance Time



New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For the Office of: **Ped Hybrid Beacon on NC 55 EB at NC 55 Business**

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis

PREPARED BY: M.L. Stygles REVIEWED BY: J. Ma

REVISIONS: _____ INIT. DATE

SCALE: 1" = 40'

750 N. Greenfield Pkwy, Garner, NC 27529

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046057 MATTHEW L. STYGLES

Signed by: *Matthew L. Stygles* DATE: 7/11/2022

SIGNATURE DATE

SIG. INVENTORY NO. 05-1628

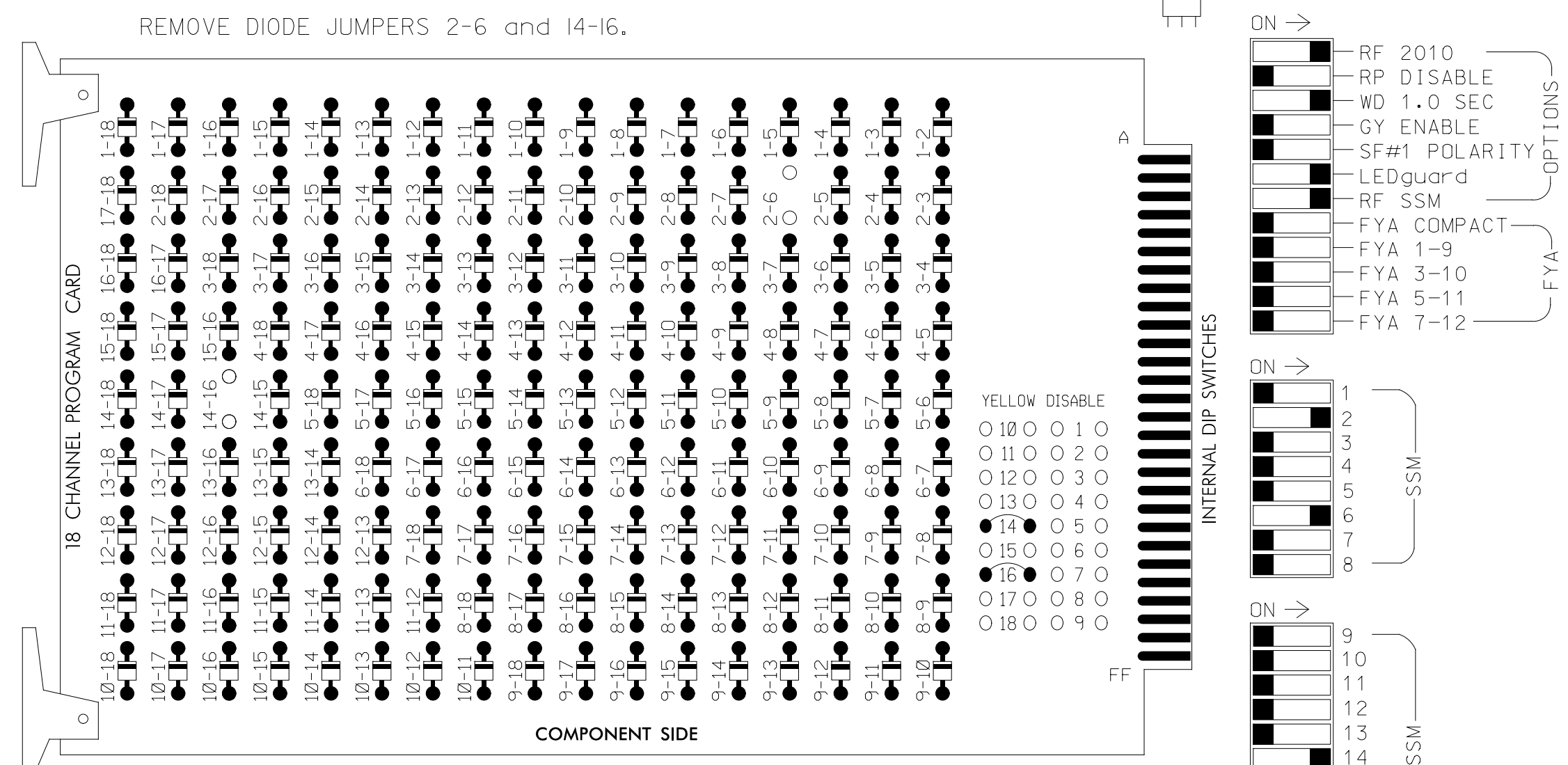
vhb

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328

7/11/2022
3:00:05 PM
mstygles

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- REMOVE DIODE JUMPERS 2-6 and 14-16.
- REMOVE JUMPERS AS SHOWN
- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phases 2 Walk and 6 Walk.
- Enable simultaneous gap-out for all phases.
- Program phases 2 and 6 for Rest In Walk.
- Program phases 2 and 6 for Ped Recall.
- Program phases 4 and 8 for PED CLR>RED.
- The cabinet and controller are part of the D05-48_Fuquay-Varina System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S6,S8,S12
 PHASES USED.....4*,4PED,6,6PED*,8*,8PED
 OVERLAPS.....NONE

* For timing purposes only

SIGNAL HEAD HOOK-UP CHART

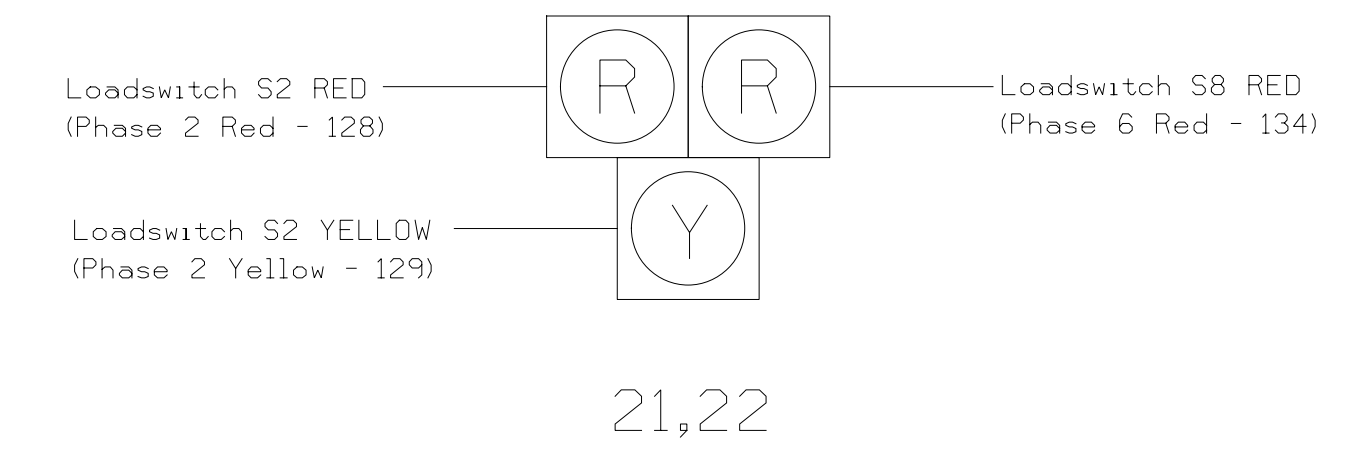
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NC	NU	NC	P41	NU	21,22	NC	NU	NC	P81
RED		128						134				
YELLOW		129						*				
GREEN		*						*				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon							104					110
Person icon							106					112

NU = Not Used
 NC = Not Connected

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

SIGNAL HEAD WIRING DETAIL

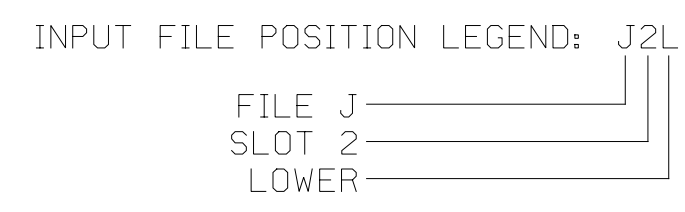
(wire signal heads as shown)



INPUT FILE CONNECTION & PROGRAMMING CHART

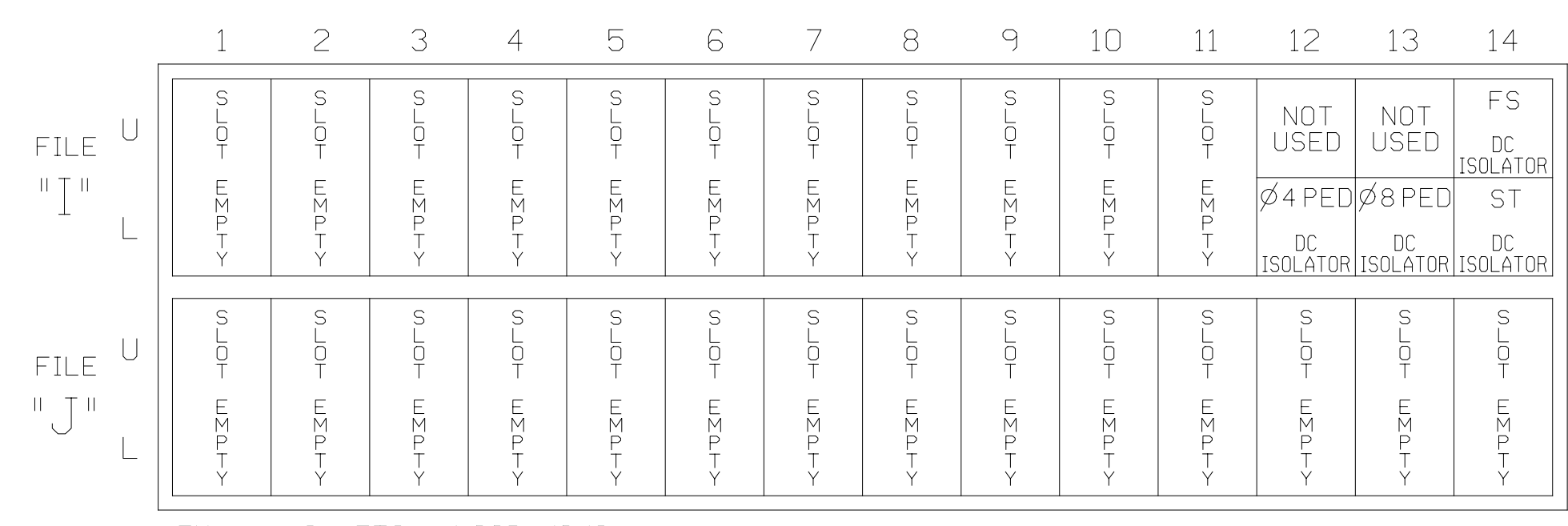
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
PED PUSH BUTTONS										
P41	T88-5,6	112L	69	PED 4	4/8 PED					
P81	T88-8,9	113L	70	PED 8	4/8 PED					

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



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

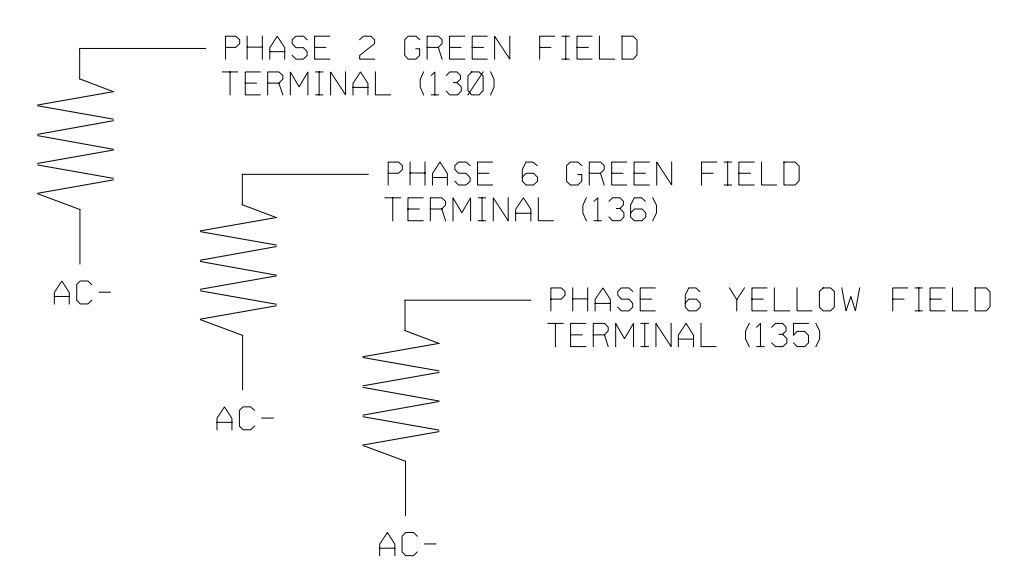
⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1628
 DESIGNED: July 2022
 SEALED: 07/11/2022
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For: Ped Hybrid Beacon on NC 55 EB at NC 55 Business

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis

PREPARED BY: M.L. Stygles REVIEWED BY: J. Ma

REVISIONS: _____ INIT. DATE: _____

750 N. Greenfield Pkwy, Garner, NC 27529

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046057 MATTHEW L. STYGLES

7/11/2022

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 8. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 2. LOGIC STATEMENTS

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 1 COPY FROM: 1 ACTIVE: M (T/F)
IF PED ON PH PED CLR 2 IS ON
AND LP COB CODE ON 546

THEN SIG SET PH YELLOW 2 ON

ELSE
  
```

LOGIC TO FLASH YELLOW SIGNAL FACES AFTER A PED CALL IS PLACED.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 8. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 1. LOGIC STATEMENT CONTROL

ENABLE LOGIC PROCESSOR STATEMENTS 1-4 BY POSITIONING THE CURSOR OVER THE FIELDS SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM.

LOGIC STATEMENT CONTROL												
	1	2	3	4	5	6	7	8	9	0	1	2
LP 1-15	E	E	E	E	.	.	.	.	.	.	.	.
LP 16-30
LP 31-45
LP 46-60
LP 61-75
LP 76-90

END PROGRAMMING

ENTER A "2" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 2 COPY FROM: 2 ACTIVE: M (T/F)
IF PED ON PH PED CLR 4 IS ON
AND LP COB CODE ON 546

THEN SIG SET PH RED 2 OFF

ELSE
  
```

LOGIC FOR ALTERNATING FLASH ON THE RED SIGNAL FACES DURING PED 4+8 CLEAR (FORCES PHASE 2 RED OFF).

ENTER A "3" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 3 COPY FROM: 3 ACTIVE: M (T/F)
IF PED ON PH PED CLR 4 IS ON
AND LP COB CODE OFF 546

THEN SIG SET PH RED 6 OFF

ELSE
  
```

LOGIC FOR ALTERNATING FLASH ON THE RED SIGNAL FACES DURING THE PHASE 4 PED CLEAR (FORCES PHASE 6 OFF).

ENTER A "4" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 4 COPY FROM: 4 ACTIVE: M (T/F)
IF PED ON PH PED CLR 2 IS ON
AND LP COB CODE OFF 546

THEN SIG SET PH GREEN 2 OFF

ELSE
  
```

URNS LOAD SWITCH 2 GREEN OFF DURING PHASE 2 PED CLEAR TO PREVENT DUAL INDICATION.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1628
 DESIGNED: July 2022
 SEALED: 07/11/2022
 REVISED: N/A

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.

ECONOLITE ASC/3-2070 PEDESTRIAN DETECTOR PHASE ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 6. DETECTORS
2. From DETECTOR Submenu select 3. PED DETECTOR INPUT ASSIGNMENT
3. Press the TOGGLE key to select ECONOLITE MODE and press ENTER.

PED DET PHASE ASSIGNMENT MODE: ECONOLITEV																
PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
D	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E	2	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
T	3	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
E	4	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.
C	5	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.
T	6	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
O	7	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
R	8	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.
	9	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
	10	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.
	11	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.
	13	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
	14	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.
	15	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

"." = No assignment, disabled
 X = Assigns Pedestrian Push Button (PPB) to call the phase or phases
 2 = Call for Ped timing 2
 B = Allows for the PPB to call for Min Green 2 (BIKE GREEN)

NOTE: COB CODE 546 is a 1 Hz 50% Duty Cycle internal logic processor reference.

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Management Section</p>	<p>Ped Hybrid Beacon on NC 55 EB at NC 55 Business</p> <p style="font-size: x-small;">Division 5 Wake County Fuquay-Varina</p> <p style="font-size: x-small;">PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis</p> <p style="font-size: x-small;">PREPARED BY: M.L. Stygles REVIEWED BY: J. Ma</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE				<p style="font-size: x-small;">SEAL</p> <div style="border: 1px solid black; border-radius: 50%; width: 60px; height: 60px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <p style="font-size: 8px; text-align: center;">NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046057 MATTHEW L. STYGLES</p> </div> <p style="font-size: x-small;">DocuSigned by: MATTHEW L. STYGLES</p> <p style="font-size: x-small;">7/11/2022</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 05-1628</p>
REVISIONS	INIT.	DATE						



TIMING INTERVAL

PHASE 2+6 WALK = Dark Display
 PHASE 2+6 PED CLEAR = Flashing Yellow Display
 PHASE 2+6 VEH YEL CLR = Steady Yellow Display
 PHASE 2+6 RED CLEAR = Steady Red Display
 PHASE 4+8 WALK = Steady Red Display
 PHASE 4+8 PED CLEAR = Alternating Flashing Red Display
 PHASE 4+8 VEH YEL CLR = Alternating Flashing Red Display
 PHASE 4+8 RED CLEAR = Alternating Flashing Red Display

OPERATIONAL NOTES

1. In order for the controller to perform the Pedestrian Hybrid Beacon (HAWK signal) sequence, special logic programming is necessary. Refer to sheet 2 for the Econolite ASC/3-2070 Logic Processor Programming Detail.
2. For operational purposes, Phase 2 and Phase 6 both run dummy pedestrian phases that are required to produce the correct HAWK signal sequence. There are no Phase 2 or Phase 6 pedestrian heads.
3. The only Phase 6 load switch output that is being used drives one of the red signal faces of each signal head.
4. The Logic Processor flashes Phase 2 Yellow during the Phase 2 pedestrian clearance phase, and Phase 2 Yellow drives the solid Yellow signal faces during Phase 2 vehicle Yellow clear.
5. The Phase 2 and Phase 6 red outputs drive the solid Red displays during Phase 2 and Phase 6 Red. The Logic Processor flashes the Phase 2 and 6 Red outputs in a wig-wag pattern during the Phase 4+8 Ped Clear and thru Phase 4+8 vehicle Yellow and Red clear.
6. The controller must be programmed for Ped Clear Thru Red for Pedestrian Phases 4 and 8 so that the Red displays continue to flash during Phases 4 and 8 Yellow and Red clear.
7. Make sure that all Phase 2 and Phase 6 clearance timings match each other, and that all Phase 4 and Phase 8 timings are the same.
8. The Ped 4 push button is programmed to call Ped 4 and Ped 8, and the Ped 8 push button is programmed to call Ped 4 and Ped 8.

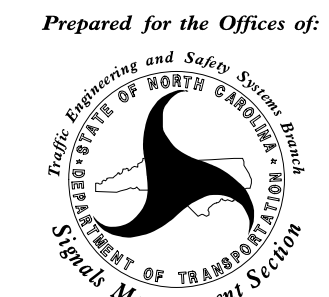
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-1628
 DESIGNED: July 2022
 SEALED: 07/11/2022
 REVISED: N/A

Electrical Detail - Sheet 3 of 3

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



**ELECTRICAL AND PROGRAMMING
 DETAILS FOR:**

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

Ped Hybrid Beacon on NC 55 EB at NC 55 Business	
Division 5	Wake County Fuquay-Varina
PLAN DATE: July 2022	REVIEWED BY: J.L. Lewis
PREPARED BY: M.L. Stygles	REVIEWED BY: J. Ma
REVISIONS	INIT. DATE

SEAL



DocuSigned by:

 7/11/2022

SIG. INVENTORY NO. 05-1628

7/11/2022
 3:1:05:16:28 -s:1:g:el:2022-dgn
 msstygles

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	10.0 S.F.	38.0" W X 38.0" L	70 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0" W X 30.0" L	11 LBS
2	SIGN RIGID MOUNTED	10.0 S.F.	60.0" W X 24.0" L	36 LBS

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 2
Baseline reference point at ☉ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+1.4 ft.
Elevation difference at Edge of travelway or face of curb	+0.5 ft

NOTES

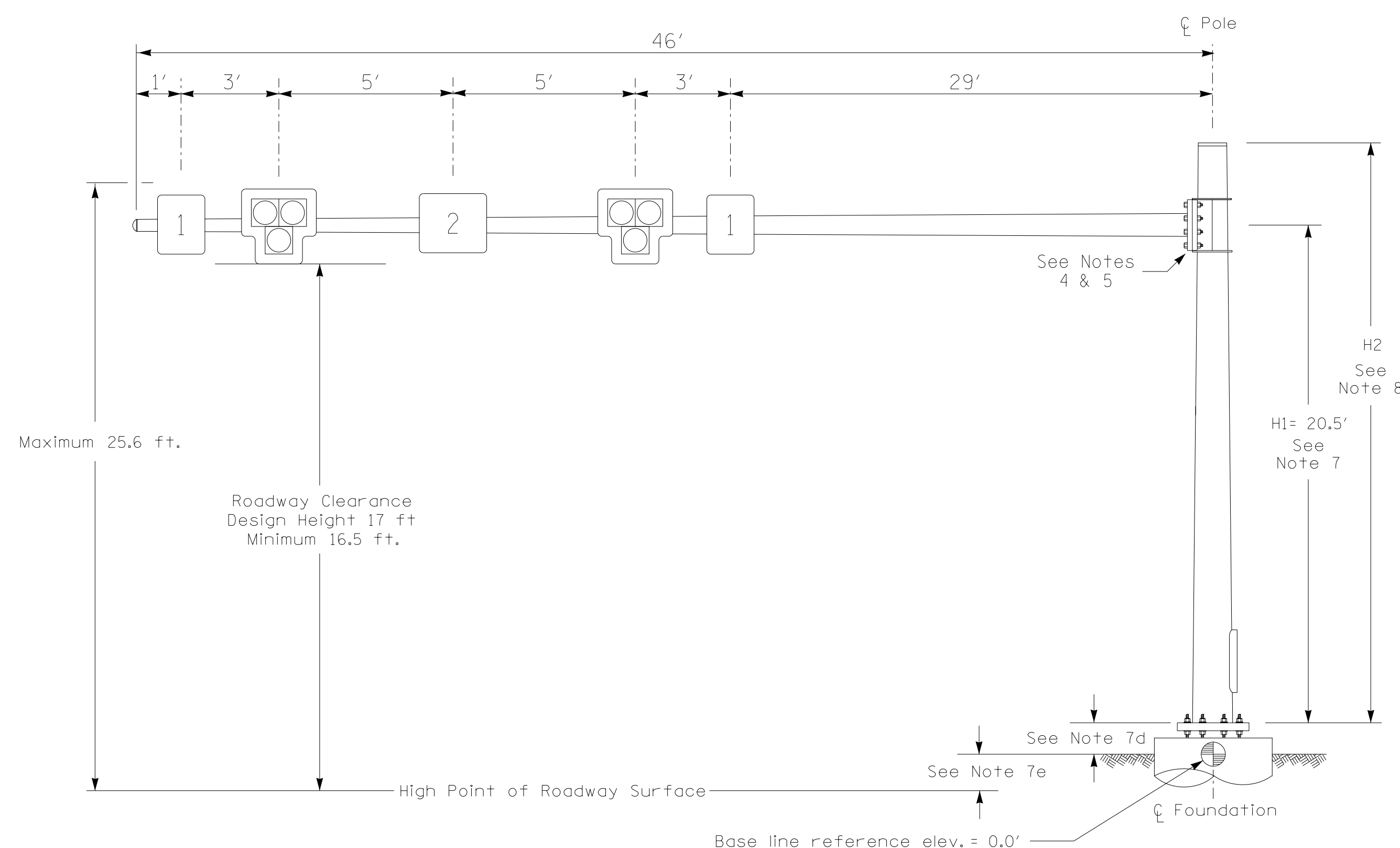
DESIGN REFERENCE MATERIAL

- 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>

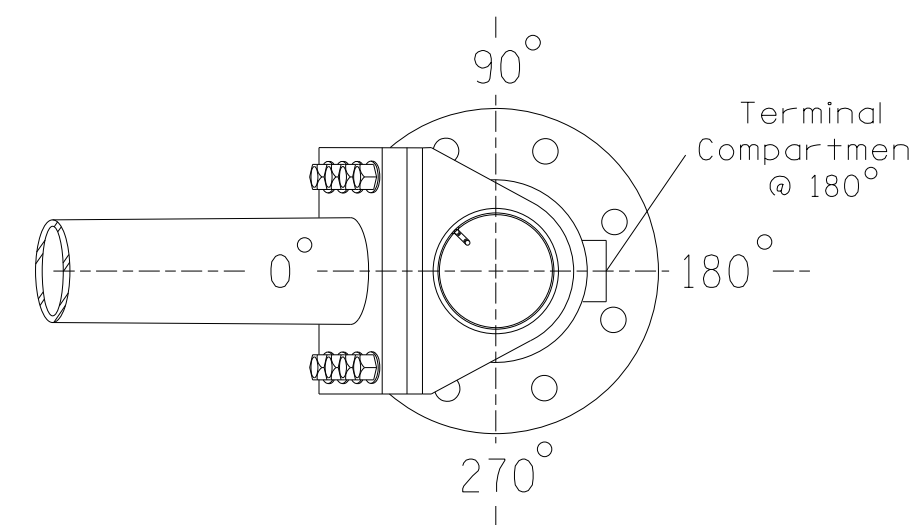
DESIGN REQUIREMENTS

- 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.

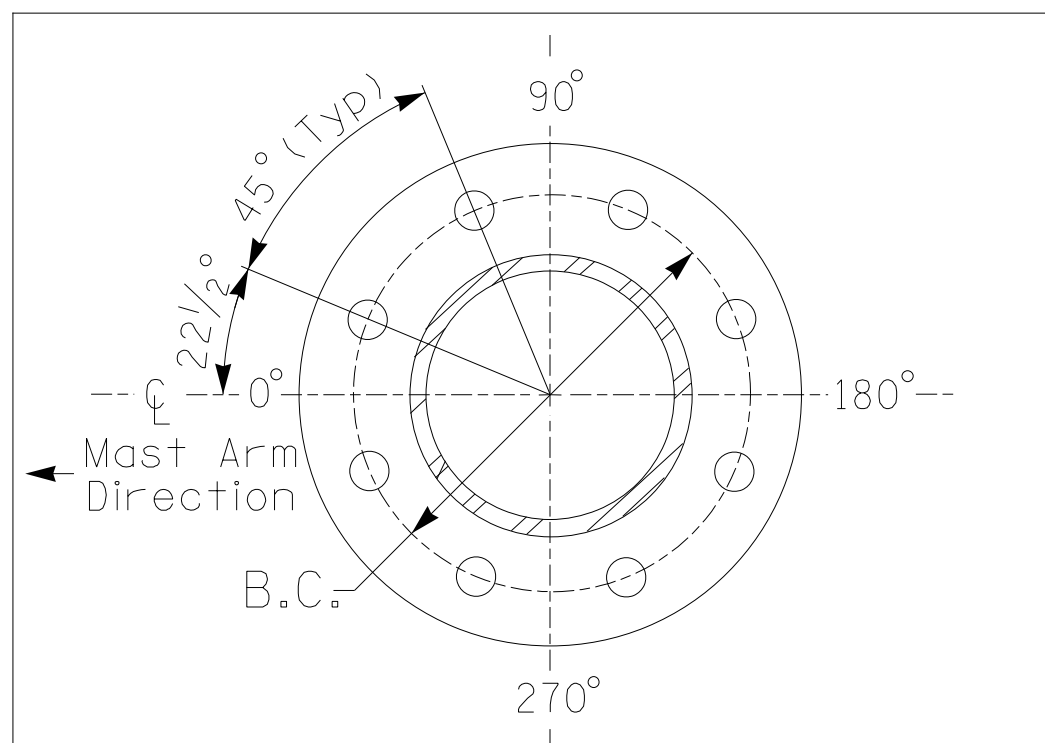
Design Loading for METAL POLE NO. 2



Elevation View

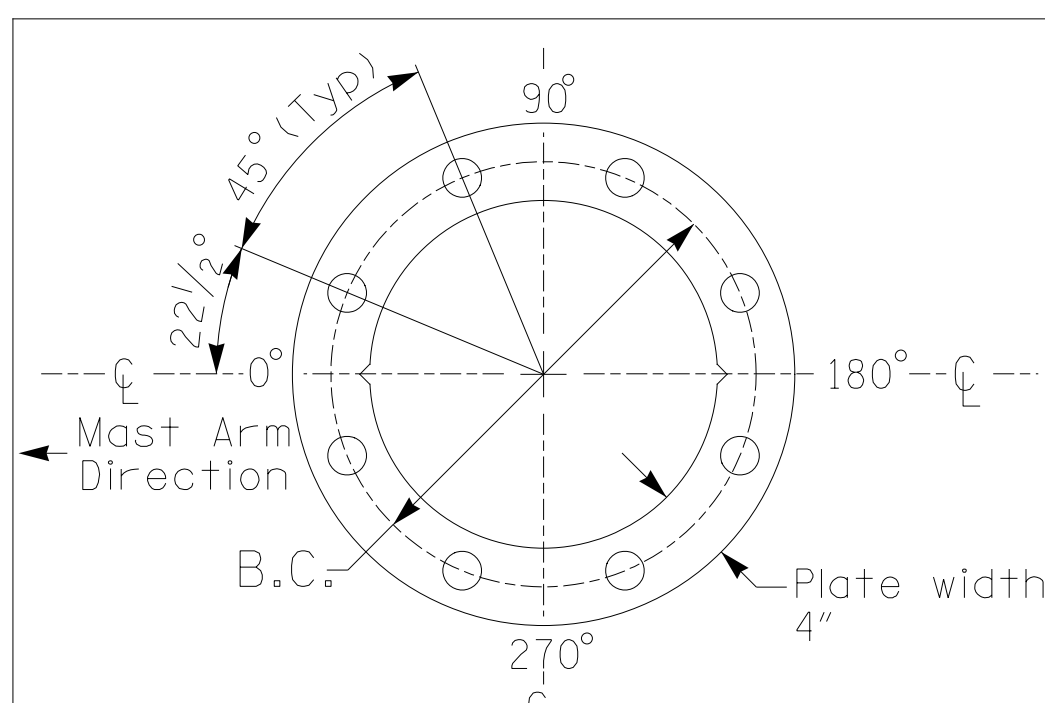


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

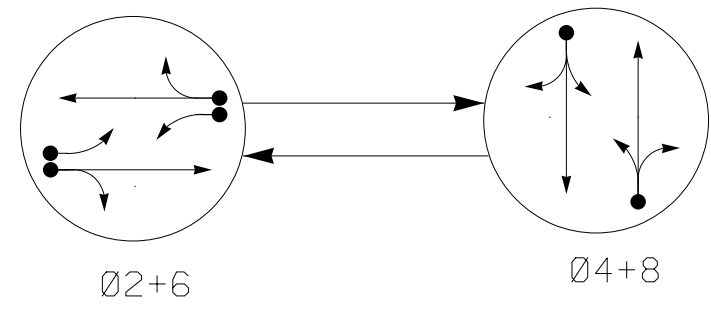


NCDOT Wind Zone 4 (90 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	<p>Ped Hybrid Beacon on NC 55 EB at NC 55 Business</p>		
	<p>Division 5 Wake County Fuquay-Varina</p>	<p>PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis</p>		DocuSigned by: Matthew L. Stygles 9/13/2022
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>PREPARED BY: M.L. Stygles</p>	<p>REVIEWED BY: J. Ma</p>	<p>SIGNATURE DATE</p>
<p>SCALE: 0 N/A</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>SIG. INVENTORY NO. 05-1628</p>

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

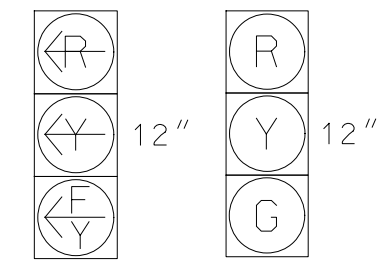
- DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ⋯ UNSIGNALIZED MOVEMENT
- ⋯ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø2+6	Ø4+8	F L H S
21	F	R	Y
22, 23	G	R	Y
41, 42	R	G	R
61	F	R	Y
62, 63	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21 22, 23
61 41, 42
62, 63
81, 82

DETECTOR INSTALLATION CHART

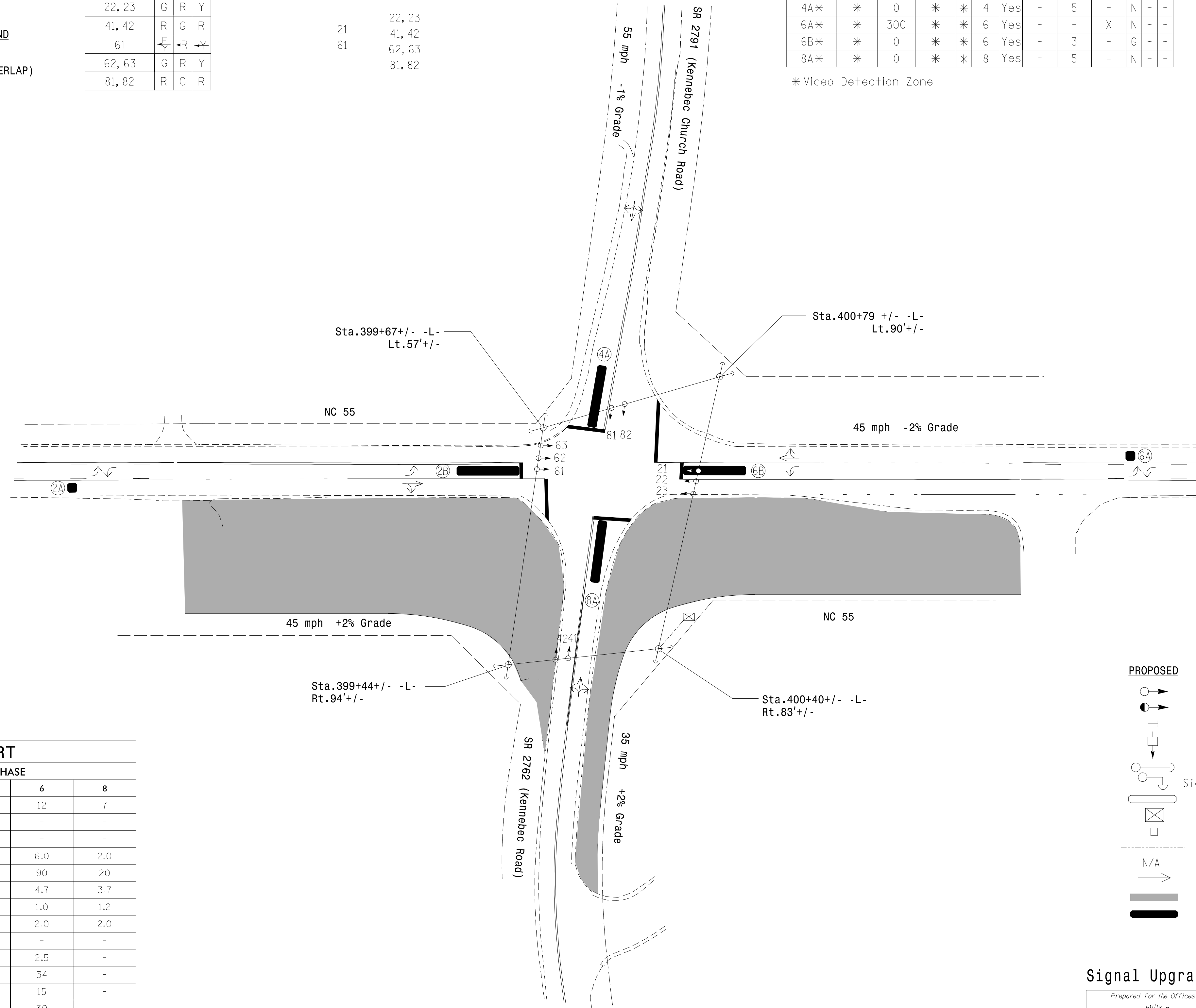
ZONE	SIZE (FT)	DETECTOR			PROGRAMMING							
		DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
2A*	*	300	*	*	2	Yes	-	-	X	N	-	-
2B*	*	0	*	*	2	Yes	-	3	-	G	-	-
4A*	*	0	*	*	4	Yes	-	5	-	N	-	-
6A*	*	300	*	*	6	Yes	-	-	X	N	-	-
6B*	*	0	*	*	6	Yes	-	3	-	G	-	-
8A*	*	0	*	*	8	Yes	-	5	-	N	-	-

* Video Detection Zone

2 Phase Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.



TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	2.0	6.0	2.0
Max 1 *	90	20	90	20
Yellow	4.3	5.3	4.7	3.7
Red Clear	1.0	1.0	1.0	1.2
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	2.5	-	2.5	-
Max Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Locking Detector	-	-	-	-
Recall Position	VEH RECALL	-	VEH RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

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

LEGEND

PROPOSED	EXISTING
	N/A
	N/A
	N/A
	N/A

Signal Upgrade-Temporary Design 1 (TMP Phase I)

Prepared For the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 55
at
SR 2791 (Kennebec Church Road)
and **SR 2762 (Kennebec Road)**

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

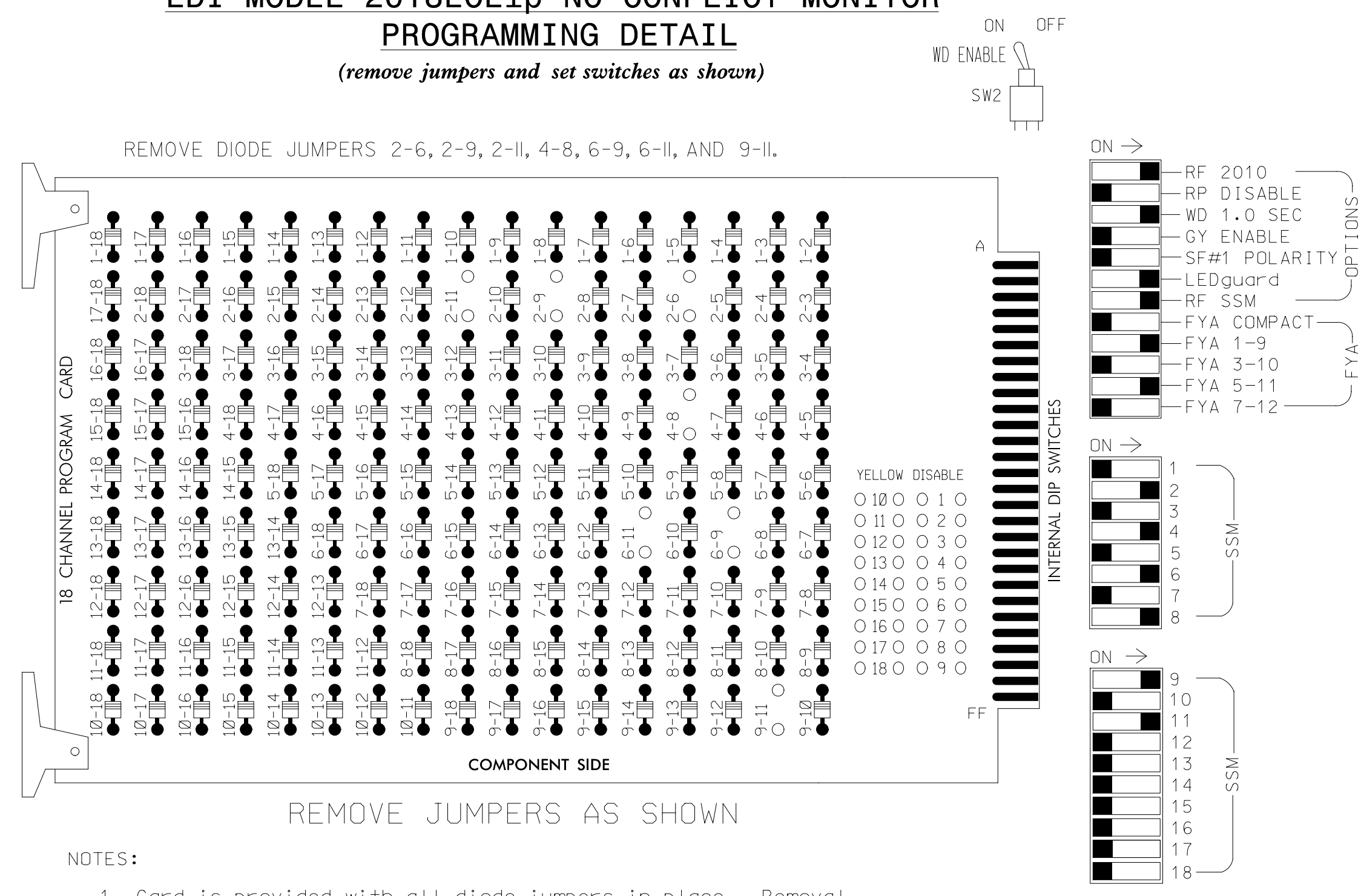
SEAL

7/12/2022

SIG. INVENTORY NO. 05-1698T1

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S8,S11,AUX S1,AUX S4,
 AUX S5
 PHASES USED.....2,4,6,8
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on this sheet.

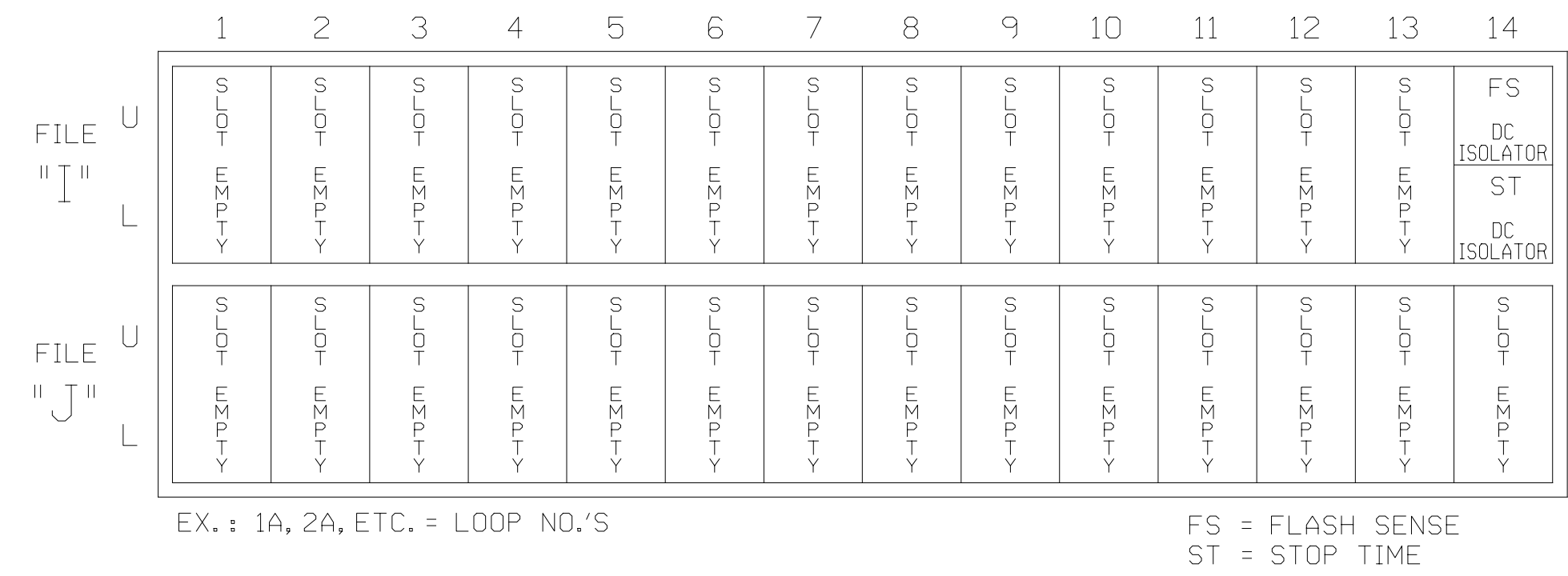
SIGNAL HEAD HOOK-UP CHART

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.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81,82	NU	61★	NU	NU	21★	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW																		

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

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

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

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

Toggle to 'Overlap A'

OVERLAP A

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

```

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

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
    
```

Toggle Twice

OVERLAP C

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

```

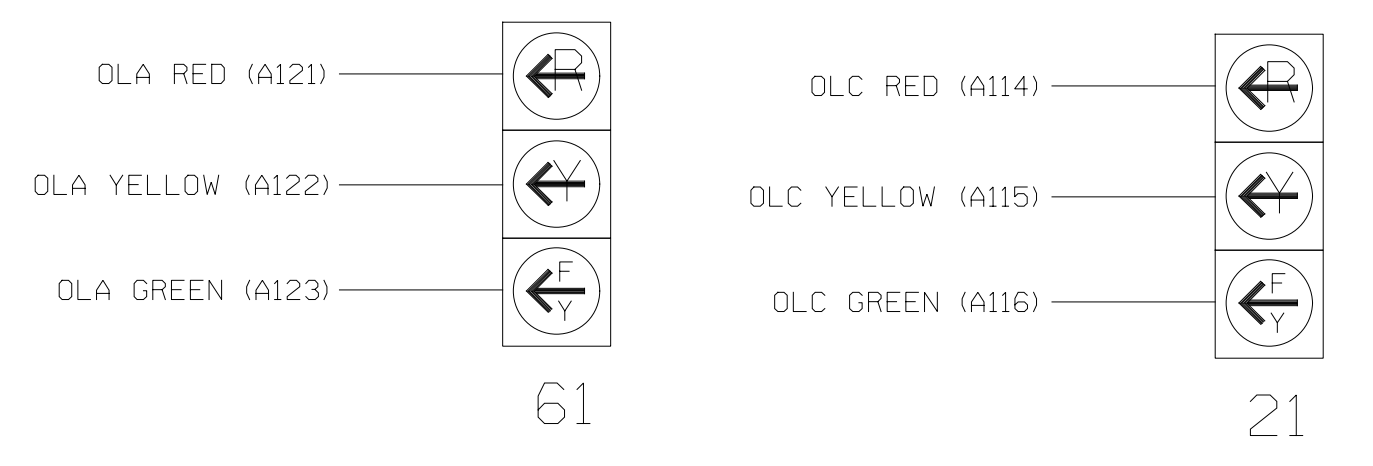
TMG VEH OVLP...[C] TYPE: OTHER/ECONOLITE
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . . . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . . . . . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
    
```

END PROGRAMMING

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1698T1
 DESIGNED: July 2022
 SEALED: 07/12/2022
 REVISED: N/A

Electrical Detail - Temporary Design 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 55	
at SR 2791 (Kennebec Church Road) and SR 2762 (Kennebec Road)	
Division 5 Wake County Fuquay-Varina	
PLAN DATE: July 2022	REVIEWED BY: M. L. Stygles
PREPARED BY: J. Ma	REVIEWED BY:
REVISIONS	INIT. DATE

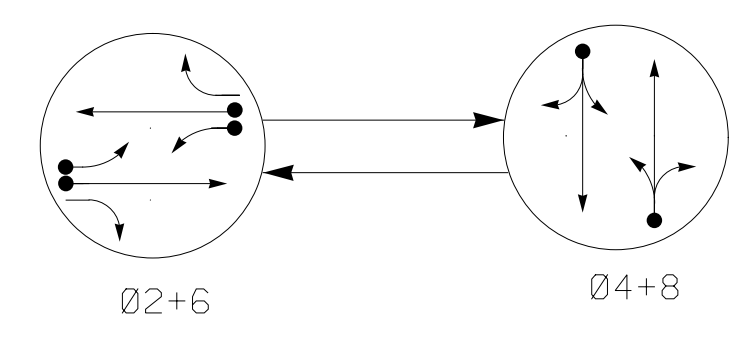
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

 7/12/2022
 DATE

VHB Engineering NC, P.C. (C-3705)
 940 Main Campus Drive, Suite 500
 Raleigh, NC 27607
 P: 919-829-0328

PHASING DIAGRAM



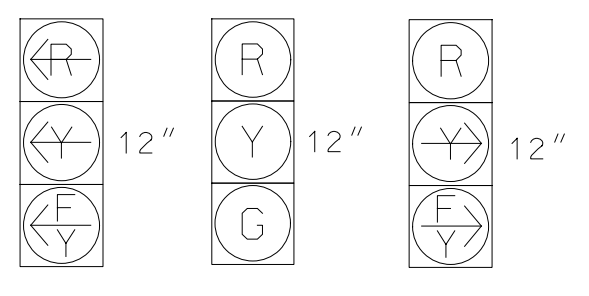
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø 2 + 6	Ø 4 + 8	F L S P H S
21	Y	R	Y
22, 23	G	R	Y
24	Y	R	Y
41, 42	R	G	R
61	Y	R	Y
62, 63	G	R	Y
64	Y	R	Y
81, 82	R	G	R

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



21 61 22, 23 41, 42 62, 63 81, 82 24 64

DETECTOR INSTALLATION CHART

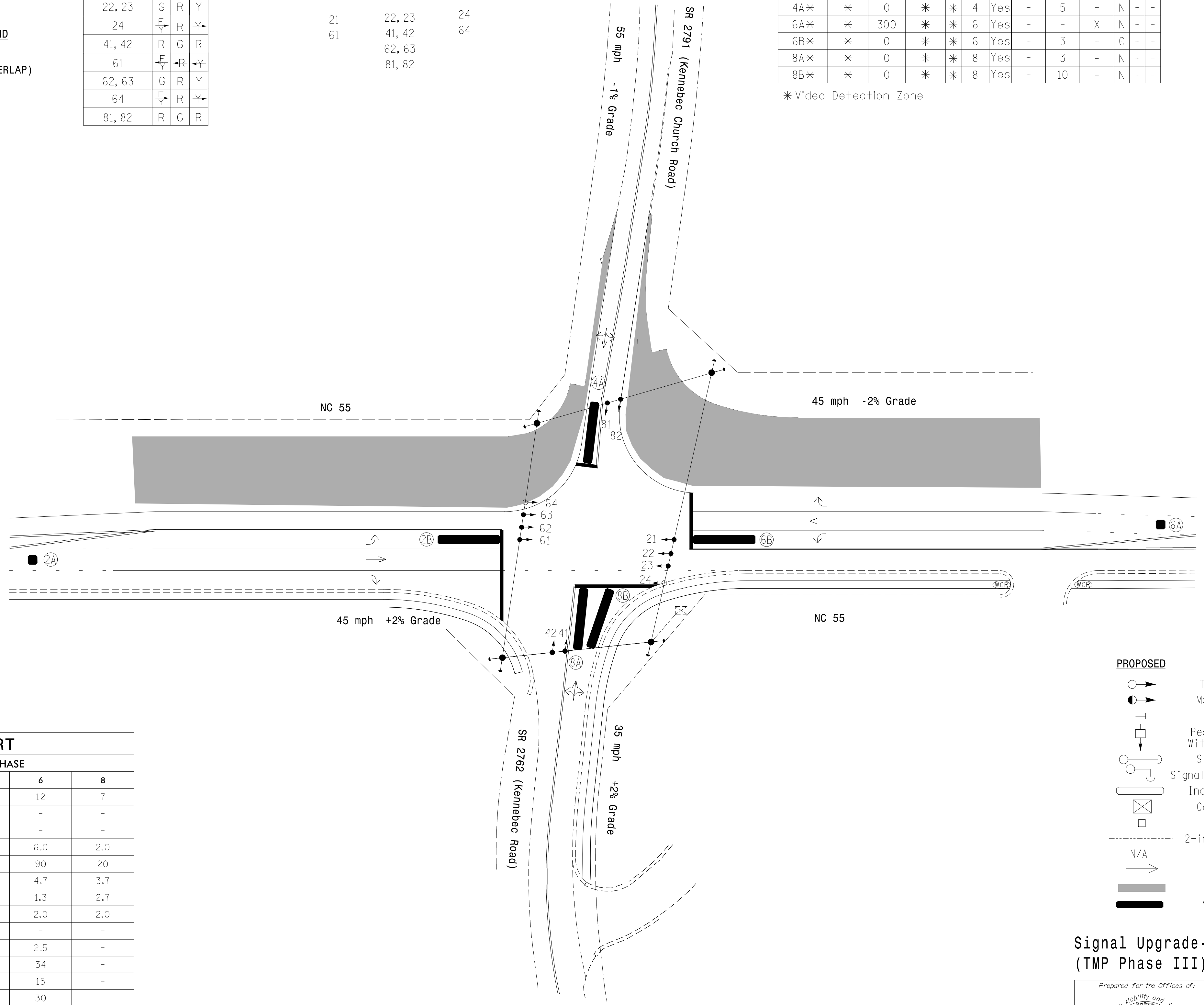
ZONE	SIZE (FT)	DETECTOR			PROGRAMMING							
		DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A*	*	300	*	*	2	Yes	-	-	X	N	-	-
2B*	*	0	*	*	2	Yes	-	3	-	G	-	-
4A*	*	0	*	*	4	Yes	-	5	-	N	-	-
6A*	*	300	*	*	6	Yes	-	-	X	N	-	-
6B*	*	0	*	*	6	Yes	-	3	-	G	-	-
8A*	*	0	*	*	8	Yes	-	3	-	N	-	-
8B*	*	0	*	*	8	Yes	-	10	-	N	-	-

* Video Detection Zone

2 Phase Fully Actuated Isolated

NOTES

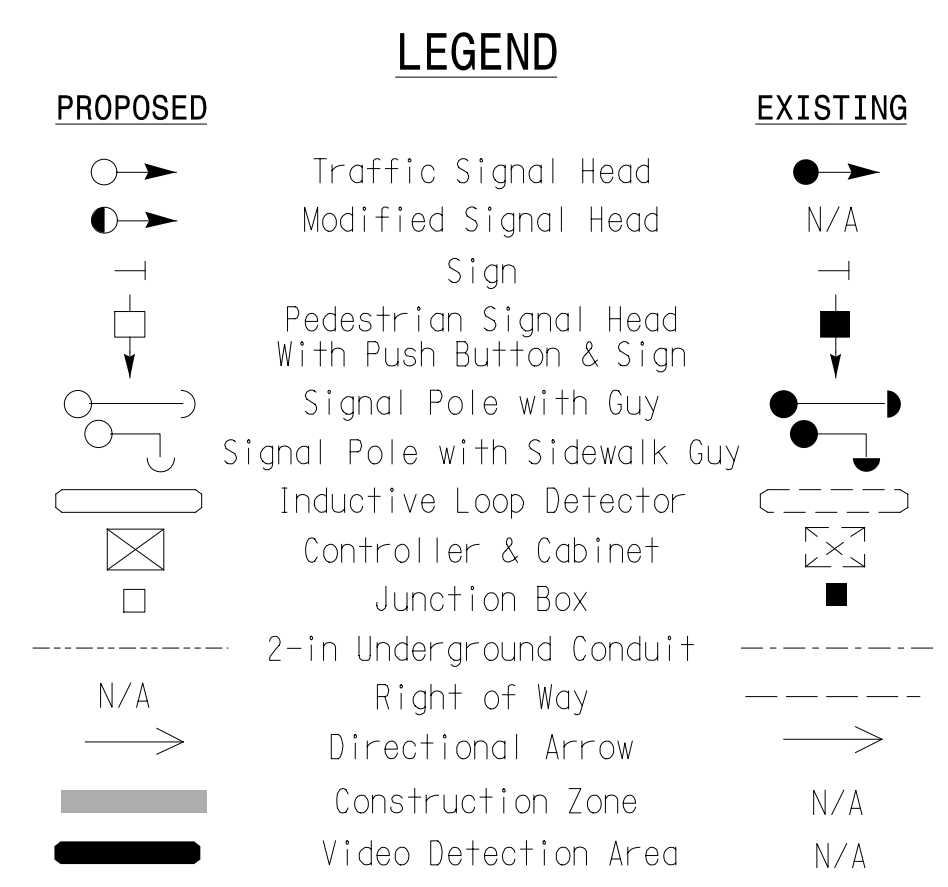
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Reposition all existing signal heads.



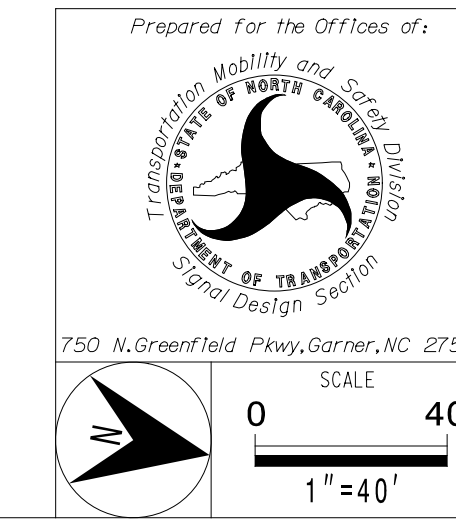
TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	2.0	6.0	2.0
Max 1 *	90	20	90	20
Yellow	4.3	5.3	4.7	3.7
Red Clear	1.6	1.1	1.3	2.7
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	2.5	-	2.5	-
Max Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Locking Detector	-	-	-	-
Recall Position	VEH RECALL	-	VEH RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

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



Signal Upgrade-Temporary Design 2 (TMP Phase III)



Prepared for the Office of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 55 at SR 2791 (Kennebec Church Road) and SR 2762 (Kennebec Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE: 1" = 40'



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

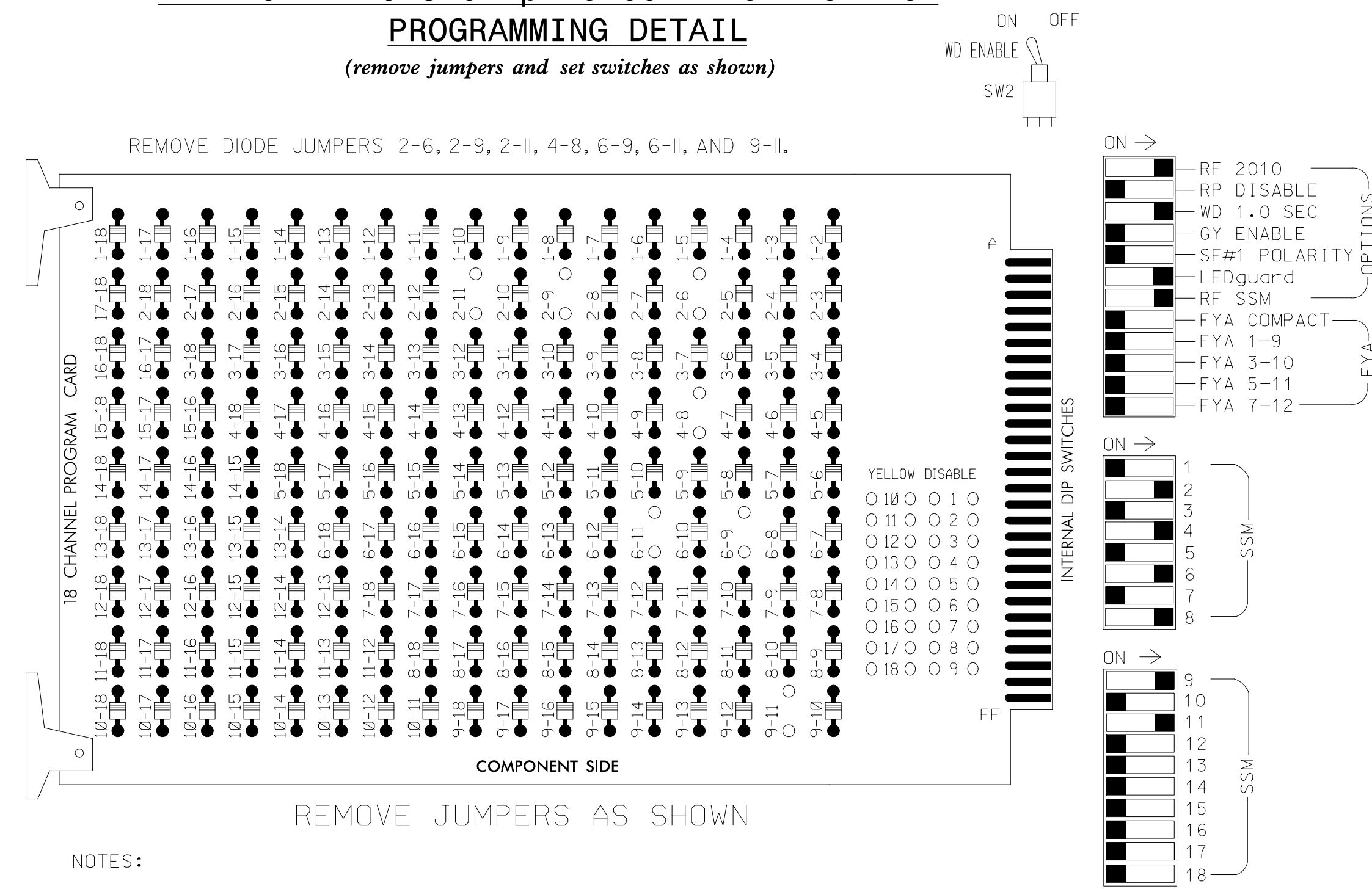
STATE OF NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033108

DATE: 7/12/2022

SIG. INVENTORY NO. 05-1698T2

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S8,S11,AUX S1,AUX S4,
 AUX S5
 PHASES USED.....2,4,6,8
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on this sheet.

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.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81,82	NU	61,64	NU	NU	21,24	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW																		

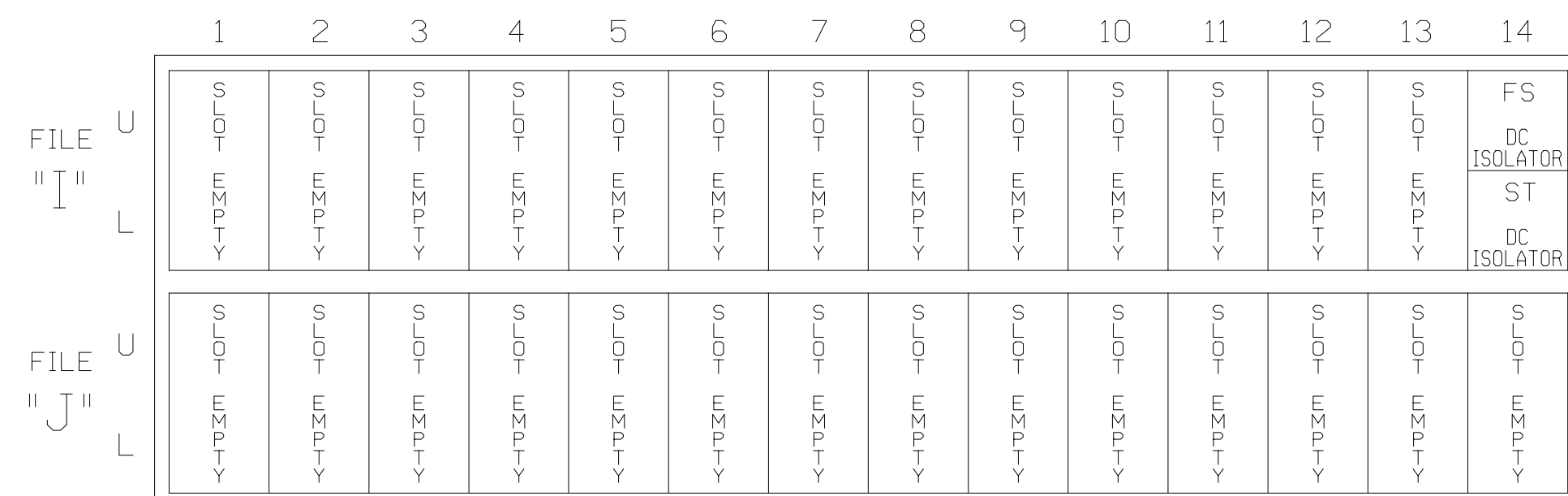
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

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

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

Toggle to 'Overlap A'

OVERLAP A

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

```

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

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
    
```

Toggle Twice

OVERLAP C

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

```

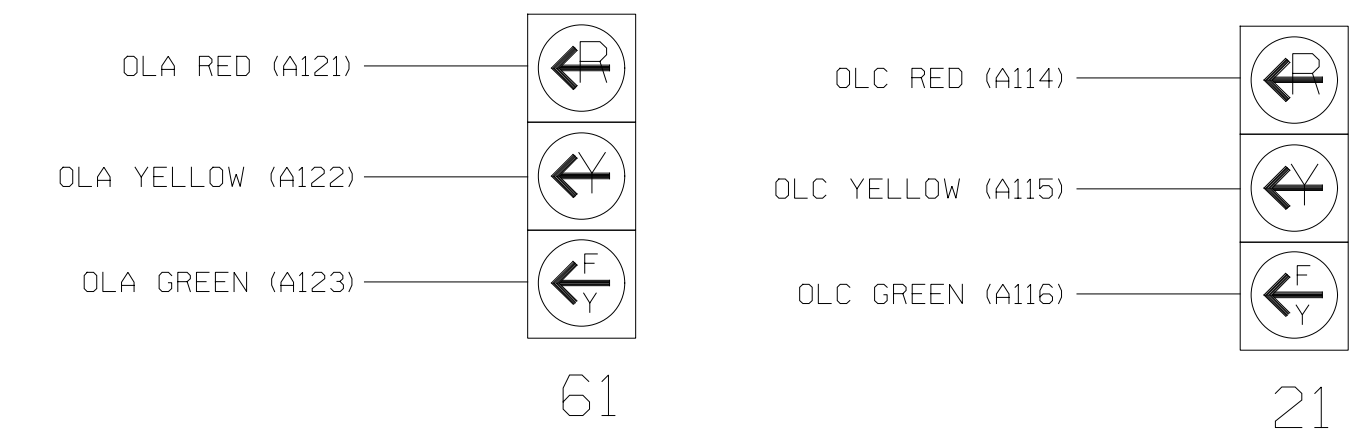
TMG VEH OVLP...[C] TYPE: OTHER/ECONOLITE
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . . . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . . . . . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
    
```

END PROGRAMMING

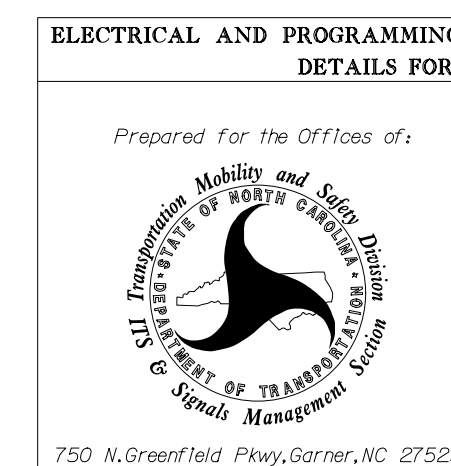
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1698T2
 DESIGNED: July 2022
 SEALED: 07/12/2022
 REVISED: N/A

Electrical Detail - Temporary Design 2



NC 55
 at
 SR 2791 (Kennebec Church Road)
 and SR 2762 (Kennebec Road)
 Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles
 PREPARED BY: J. Ma REVIEWED BY:

REVISIONS INIT. DATE

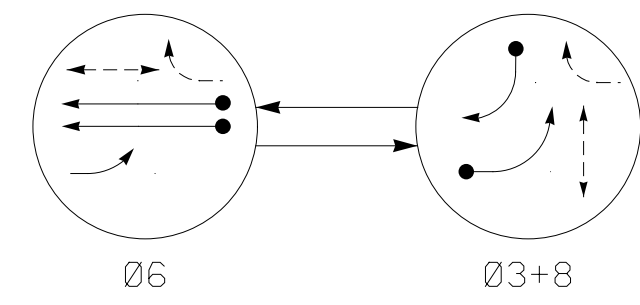
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SIG. INVENTORY NO. 05-1698T2

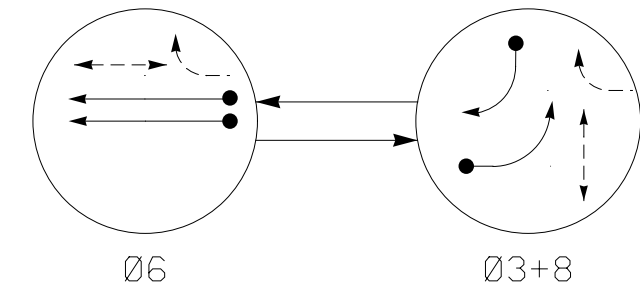


DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE		
	06	03+8	F
31	←	←	←
61, 62	G	R	Y
81, 82	R	→	R
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

ALTERNATE PHASING DIAGRAM



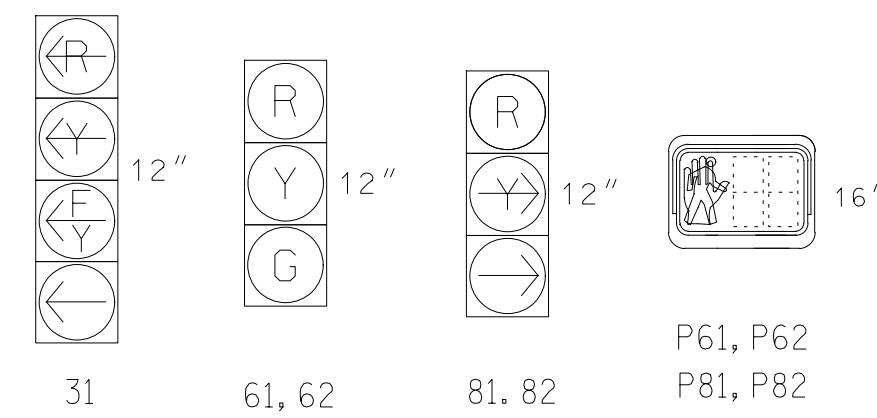
SIGNAL FACE	PHASE		
	06	03+8	F
31	←	←	←
61, 82	G	R	Y
81, P62	R	→	R
P61, P82	W	DW	DRK
P81, P82	DW	W	DRK

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



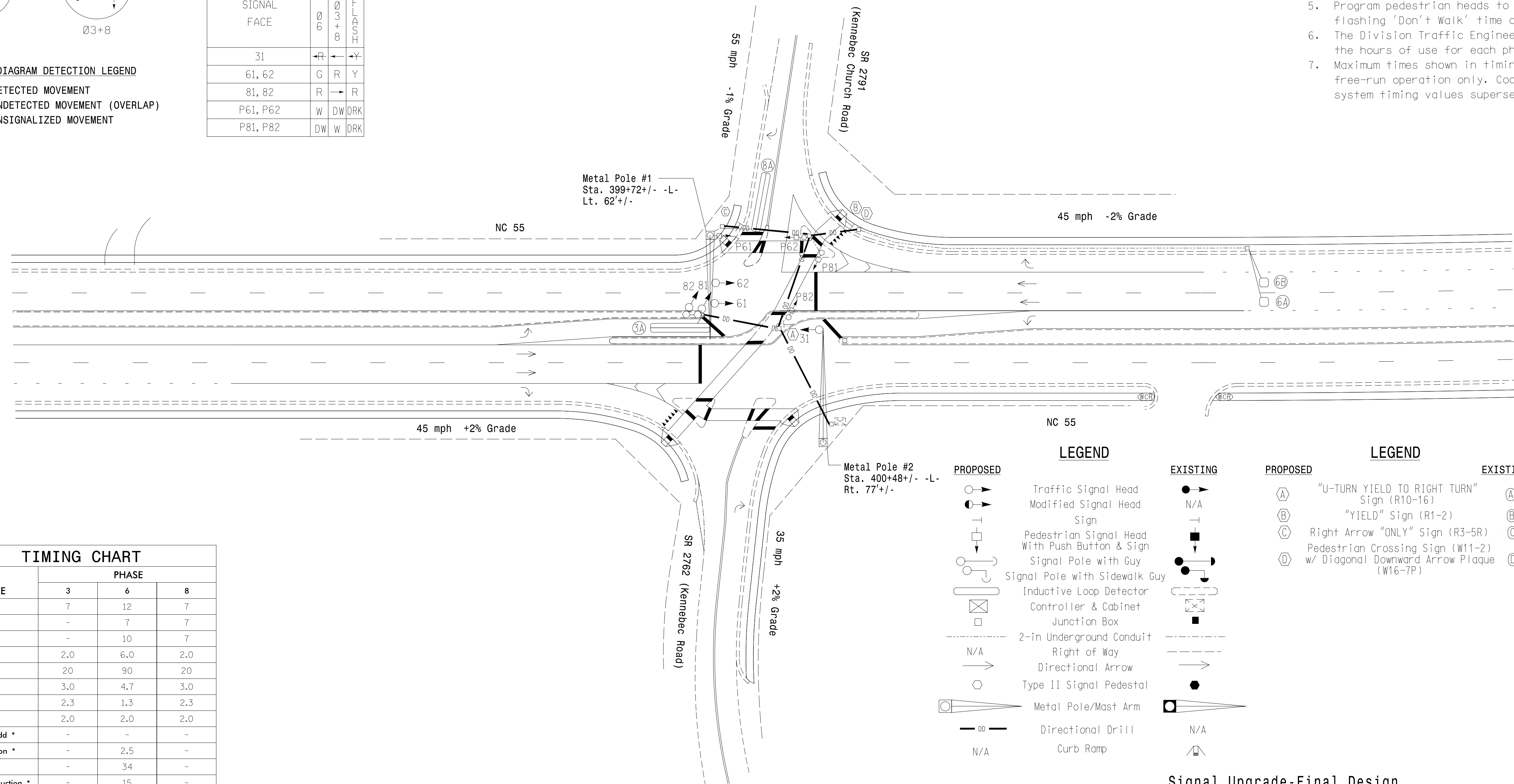
DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
3A	6X60	0	2-4-2	X	3	Yes	-	15*	-	N	-	X
6A	6X6	300	4	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	4	X	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	15	-	N	-	X

* Disable delay during Alternate Phasing Operation.

2 Phase Fully Actuated NC 55 - Fuquay-Varina Signal System #: D05-48_Fuquay-Varina

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing 'Don't Walk' time only.
- 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.



FEATURE	PHASE		
	3	6	8
Min Green *	7	12	7
Walk *	-	7	7
Ped Clear	-	10	7
Veh. Extension *	2.0	6.0	2.0
Max I *	20	90	20
Yellow	3.0	4.7	3.0
Red Clear	2.3	1.3	2.3
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds / Actuation *	-	2.5	-
Max Initial *	-	34	-
Time Before Reduction *	-	15	-
Time To Reduce *	-	30	-
Minimum Gap	-	3.0	-
Locking Detector	-	X	-
Recall Position	-	VEH RECALL	-
Dual Entry	X	-	X
Simultaneous Gap	X	X	X

* 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		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING
	PROPOSED		EXISTING

Signal Upgrade-Final Design

Prepared For the Office of:

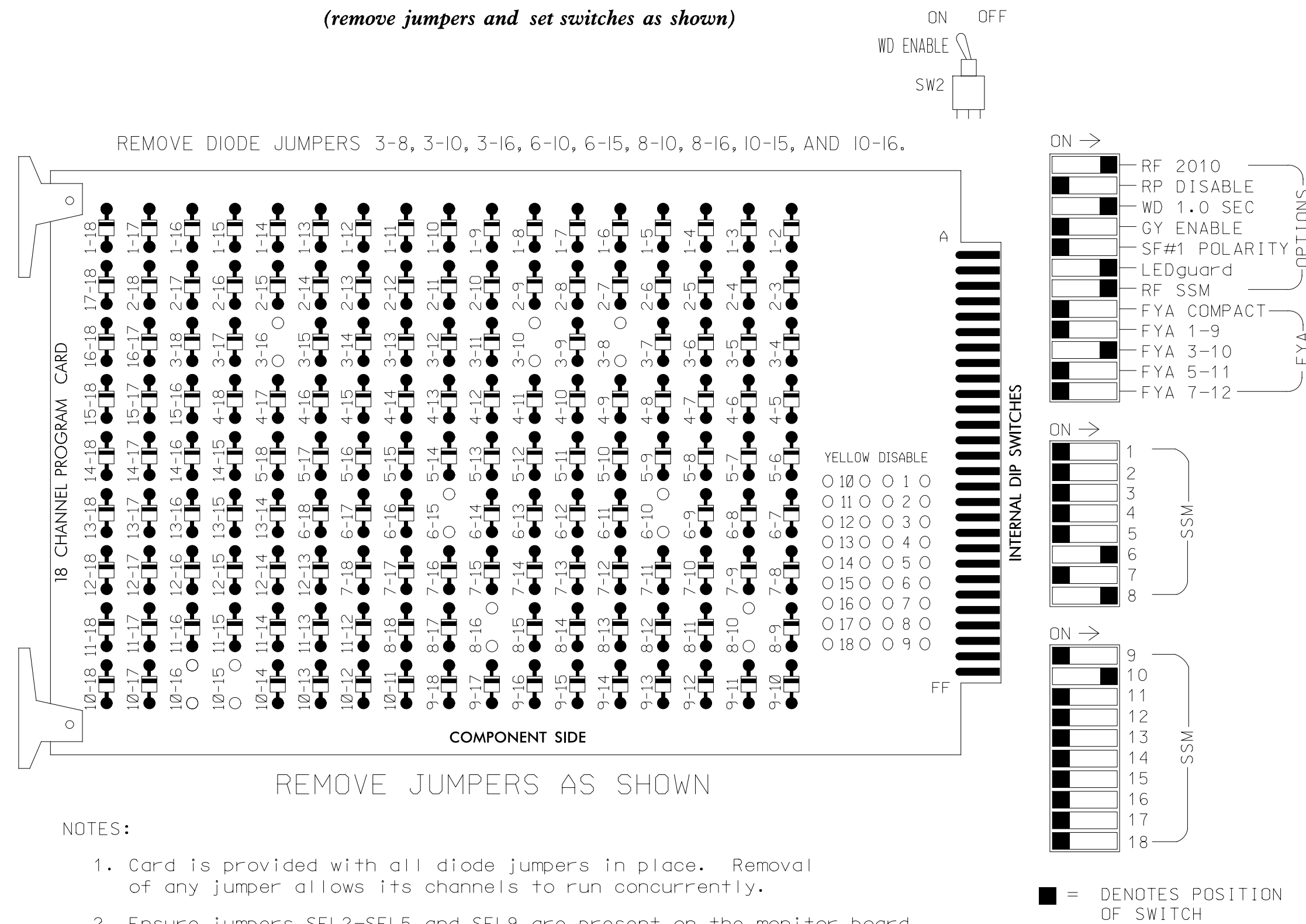
NC 55 EB at SR 2791 (Kennebec Church Road)
 Division 5 Wake County Fuquay-Varina
 PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles
 PREPARED BY: J. Ma REVIEWED BY:
 SCALE: 1"=40'
 REVISIONS: _____ INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

 J. Ma 7/12/2022
 SIG. INVENTORY NO. 05-1698

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 3 and 8 for Dual Entry.
- Program controller to start up in phase 6 Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the D05-48_Fuquay-Varina System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S4,S8,S9,S11,S12,AUX S2
 PHASES USED.....3,6,6PED,8,8PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....*
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED
 OVERLAP "G".....*
 * See overlap programming detail on sheet 2

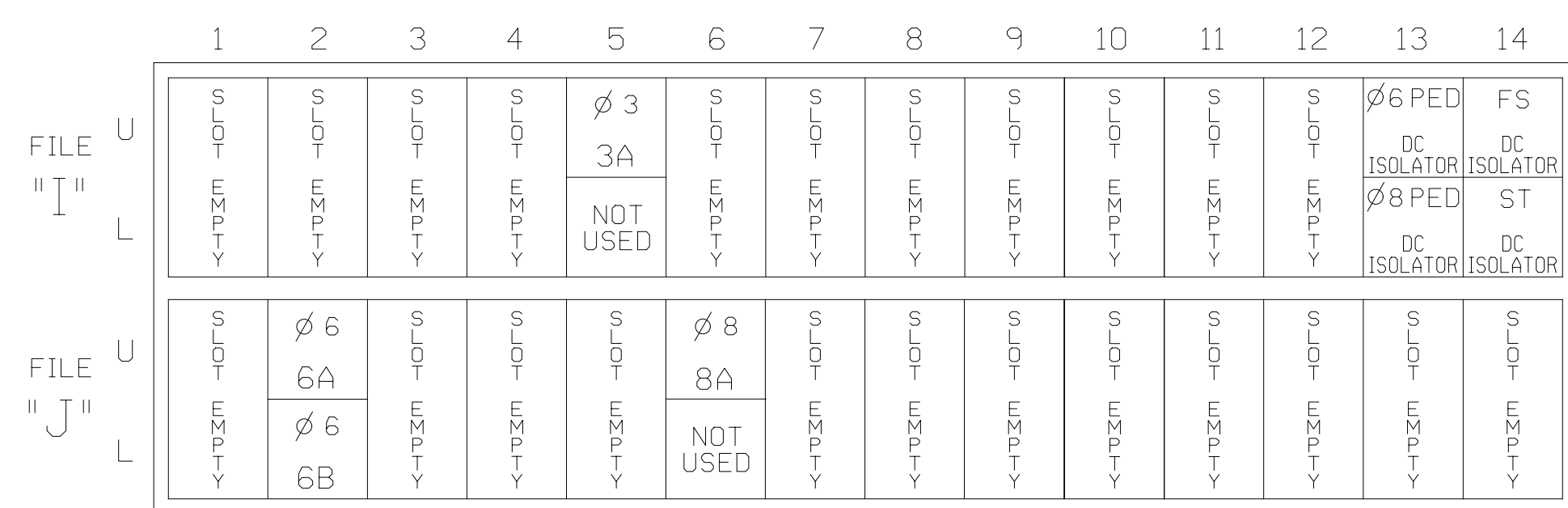
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
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	OLG	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31*	NU	NU	NU	61,62	P61, P62	NU	81,82	P81, P82	NU	31*	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			110						
Person icon									121			112						

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

INPUT FILE POSITION LAYOUT

(front view)



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

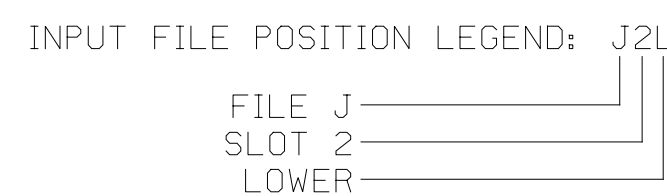
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
3A	TB4-5,6	I5U	58	3 ★	3	YES		15		N
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES		15		N
PED PUSH BUTTONS										
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	PED 8	3 PED					

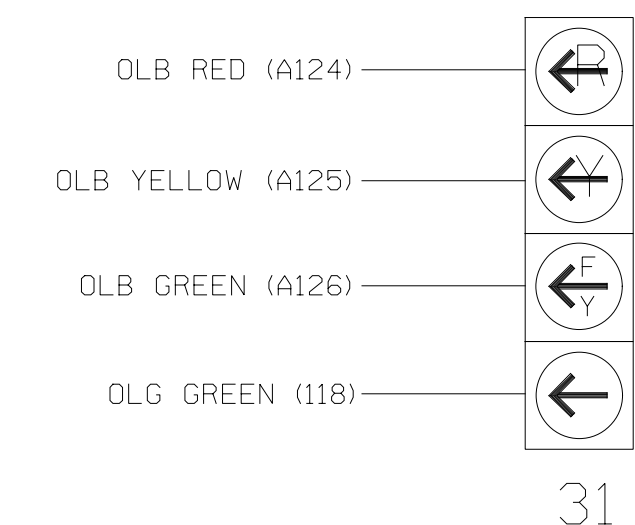
NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

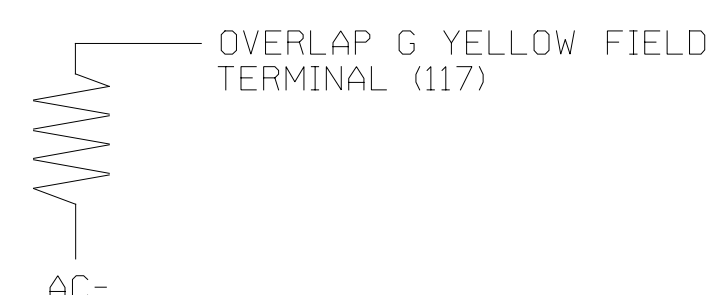


LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



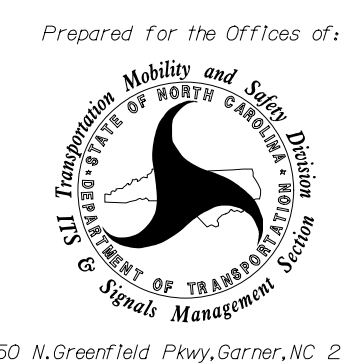
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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: 05-1698
 DESIGNED: July 2022
 SEALED: 07/12/2022
 REVISED: N/A

Electrical Detail - Sheet 1 of 3 - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:



NC 55 EB
 at
 SR 2791 (Kennebec Church Road)

Division 5 Wake County Fuquay-Varina

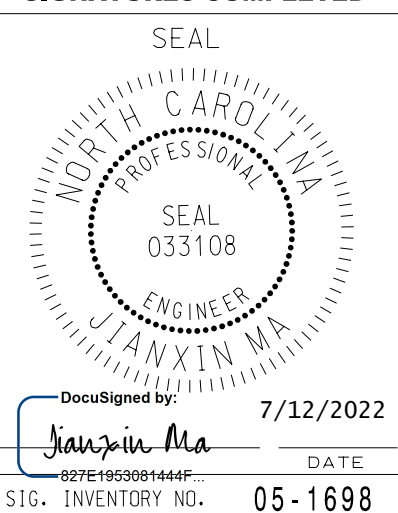
PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: J. Ma 07/12/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DocuSigned by: M. L. Stygles 07/12/2022
 SIG. INVENTORY NO. 05-1698



ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 3A

(program controller as shown)

IMPORTANT!

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

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

```

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

4. From Main Menu select **6. DETECTORS**
 5. From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
 6. Place cursor in VEH DET PLAN [] position and enter "2".
- Place cursor in VEH DETECTOR [] position and enter "3".
- Set delay time to "0".

```

VEH DETECTOR [ 3]  VEH DET PLAN [ 2]
TYPE: N-NTCIP
TS2 DETECTOR..... X ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
3 3
CALL OPTION.... YES DELAY TIME... 0.0
EXT OPTION. PASSAGE EXTENSION TIME. 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

END PROGRAMMING

← NOTICE VEH
DET PLAN 2

← ENSURE DELAY
IS SET TO '0'

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

```

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

```

Toggle to 'Overlap B'
OVERLAP B
Select TMG VEH OVLP [B] and 'PPLT FYA'
TMG VEH OVLP...[B] TYPE: .....PPLT FYA
PROTECTED LEFT TURN.... OVERLAP G
OPPOSING THROUGH..... PHASE 6
FLASHING ARROW OUTPUT....CH10 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 3
    
```

END PROGRAMMING

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S4 as OLG,
program LD SWITCH 3 as OVLP '7' TYPE '0'.

1. From Main Menu select **1. CONFIGURATION**
2. From CONFIGURATION Submenu select **3. LOAD SW ASSIGN**

LD SWITCH ASSIGN									
PHASE	DIMMING	---FLASH---							
/OVLP	TYPE	R	Y	G	D	PWR	AUT	TGR	
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	Y	.
3	7	0	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	-	A	R	.
6	6	V	.	.	.	-	A	Y	X
7	7	V	.	.	.	-	A	R	.
8	8	V	.	.	.	-	A	R	X
9	1	0	.	.	.	+	A	R	X
10	2	0	.	.	.	+	A	Y	X
11	3	0	.	.	.	-	A	R	.
12	4	0	.	.	.	-	A	R	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	8	P	.	.	.	-	A	.	.

NOTICE OVERLAP G
ASSIGNED TO LD SWITCH 3 →

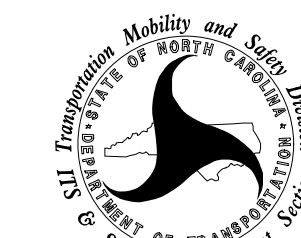
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1698
DESIGNED: July 2022
SEALED: 07/12/2022
REVISED: N/A



Electrical Detail - Sheet 2 of 3 - Final Design

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 55 EB
at
SR 2791 (Kennebec Church Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS	INIT.	DATE

DocuSign by: J. Ma 7/12/2022

827E1953081444E DATE

SIG. INVENTORY NO. 05-1698

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



ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 3.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 3.

<u>PHASING</u>	<u>VEH DET PLAN</u>	<u>SF BITS ENABLED</u>
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	3

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

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 3 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 3: Modifies overlap parent phases for head 31 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

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

```

ACTION PLAN... [ *]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --      RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  X  .  .  .  .  .  .  .  .  .  .  .  .  .
AUX FCT  .  .  .  (1-3)
                1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
    
```

* The Action Plan number(s) are to be determined by the Division and/or City Traffic Engineer.

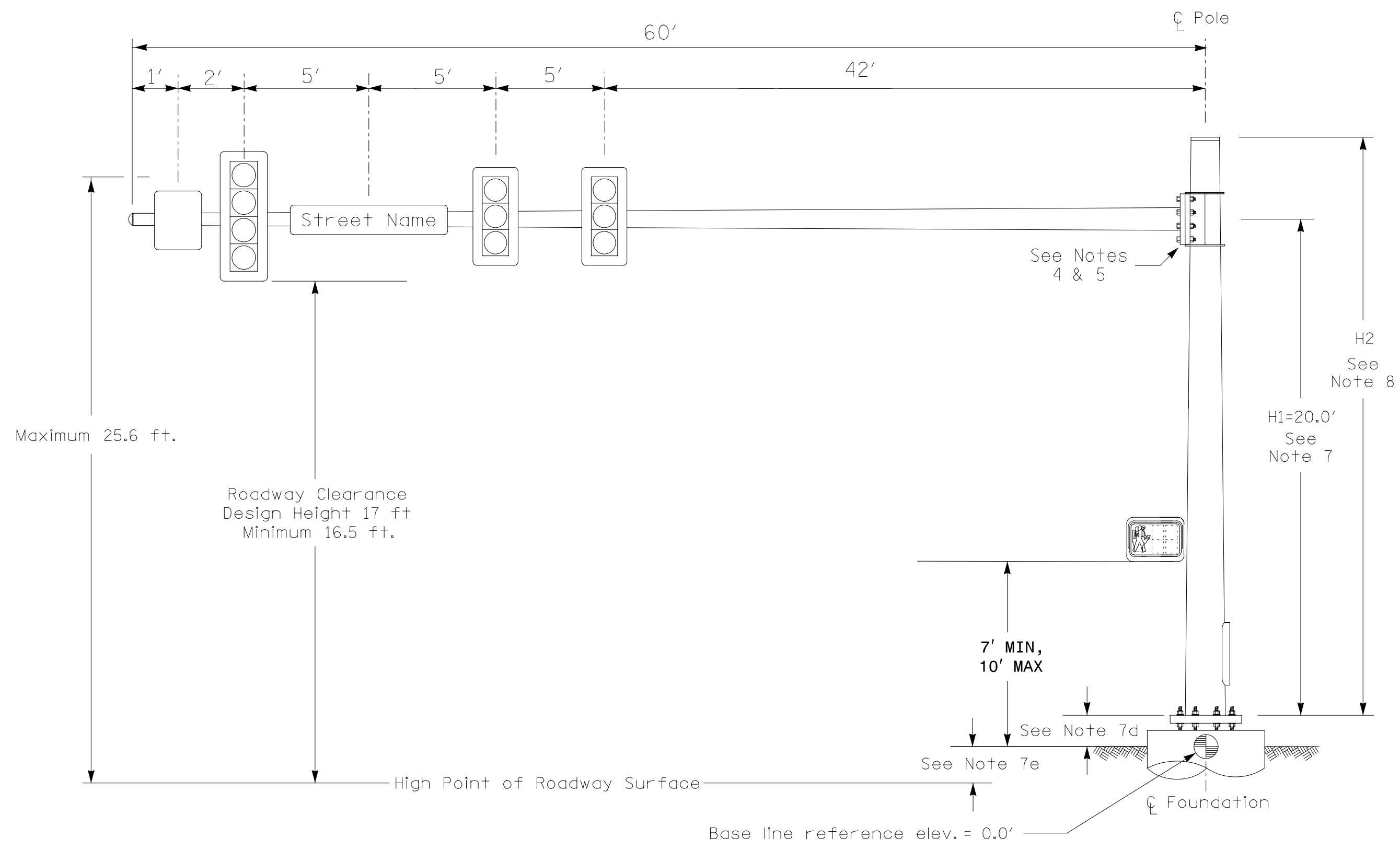
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1698
DESIGNED: July 2022
SEALED: 07/12/2022
REVISED: N/A



Electrical Detail - Sheet 3 of 3 - Final Design

<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>Prepared for the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 55 EB at SR 2791 (Kennebec Church Road)</p> <p>Division 5 Wake County Fuquay-Varina</p> <p>PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles</p> <p>PREPARED BY: J. Ma REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p style="text-align: center;">SEAL</p> <p style="text-align: center;">Sealed by: Jianxin Ma 7/12/2022</p> <p style="text-align: center;">SIG. INVENTORY NO. 05-1698</p>
REVISIONS	INIT.	DATE						

Design Loading for METAL POLE NO. 1



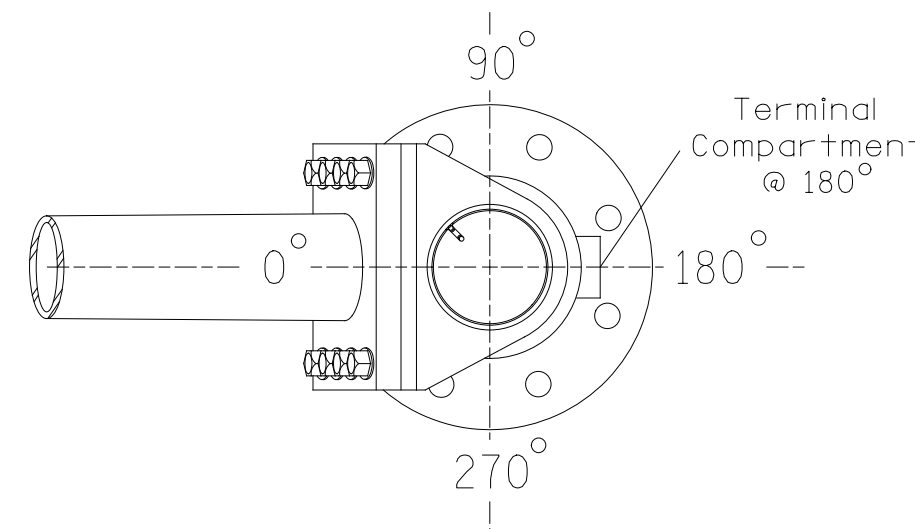
Elevation View

SPECIAL NOTE

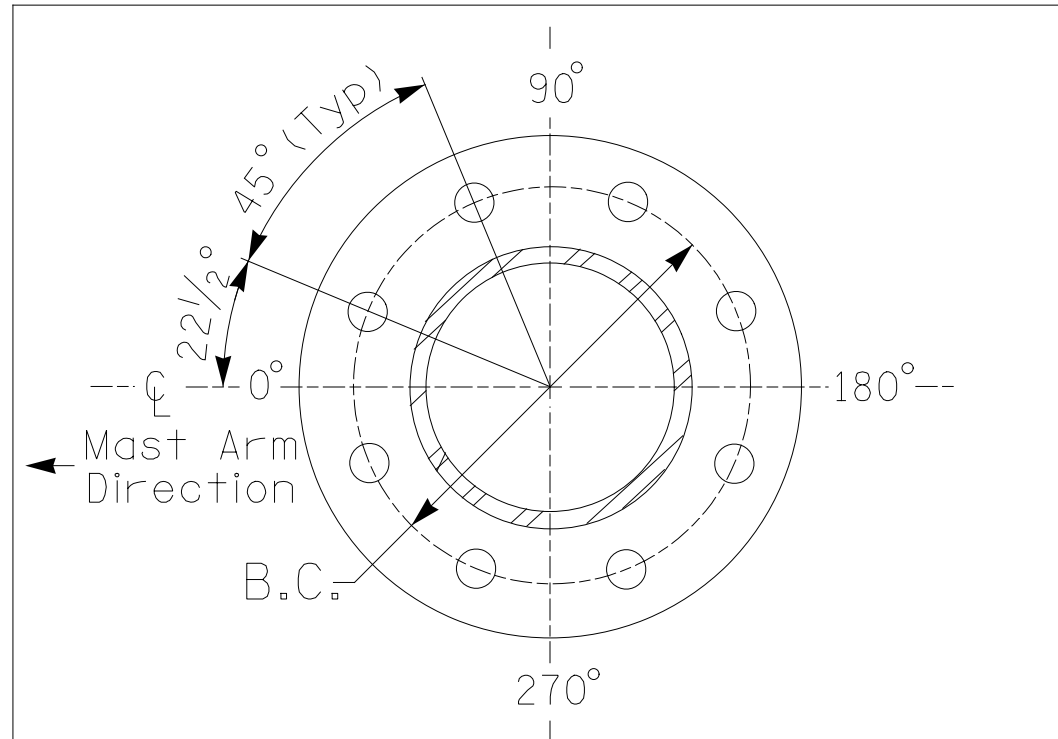
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

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

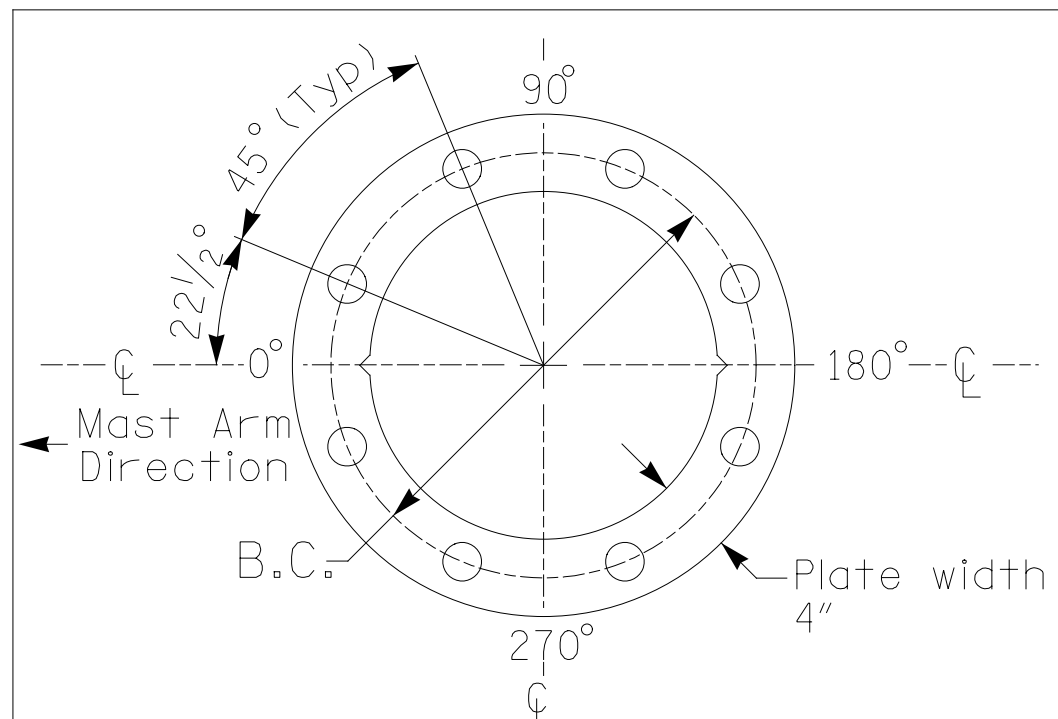


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5705B	Sig.6.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 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.

NCDOT Wind Zone 4 (90 mph)

Prepared For the Office of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 N/A

NC 55 EB at SR 2791 (Kennebec Church Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

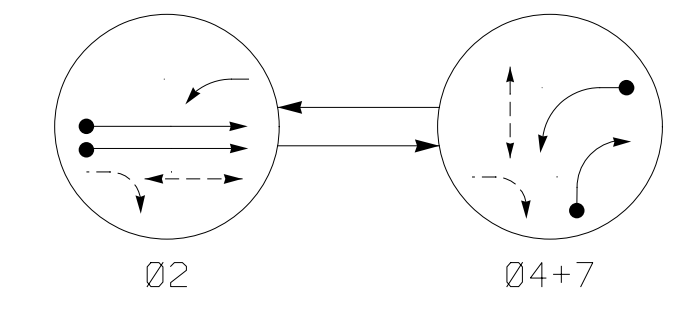
SEAL

DocuSign by **Juanita Ma** 7/12/2022

SIG. INVENTORY NO. 05-1698

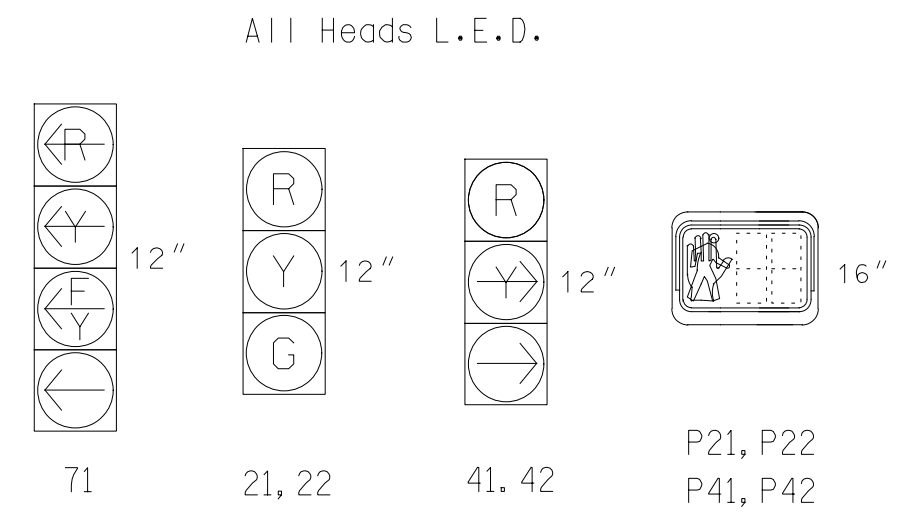
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE		
	Ø 2	Ø 4+7	FLASH
21, 22	G	R	Y
41, 42	R	→	R
71	←	←	←
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK

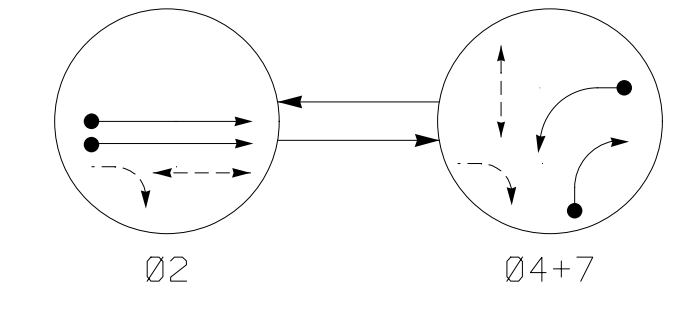
SIGNAL FACE I.D.



DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	5	X	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	15	-	N	-	X
7A	6X60	0	2-4-2	X	7	Yes	-	15*	-	N	-	X

* Disable delay during Alternate Phasing Operation.

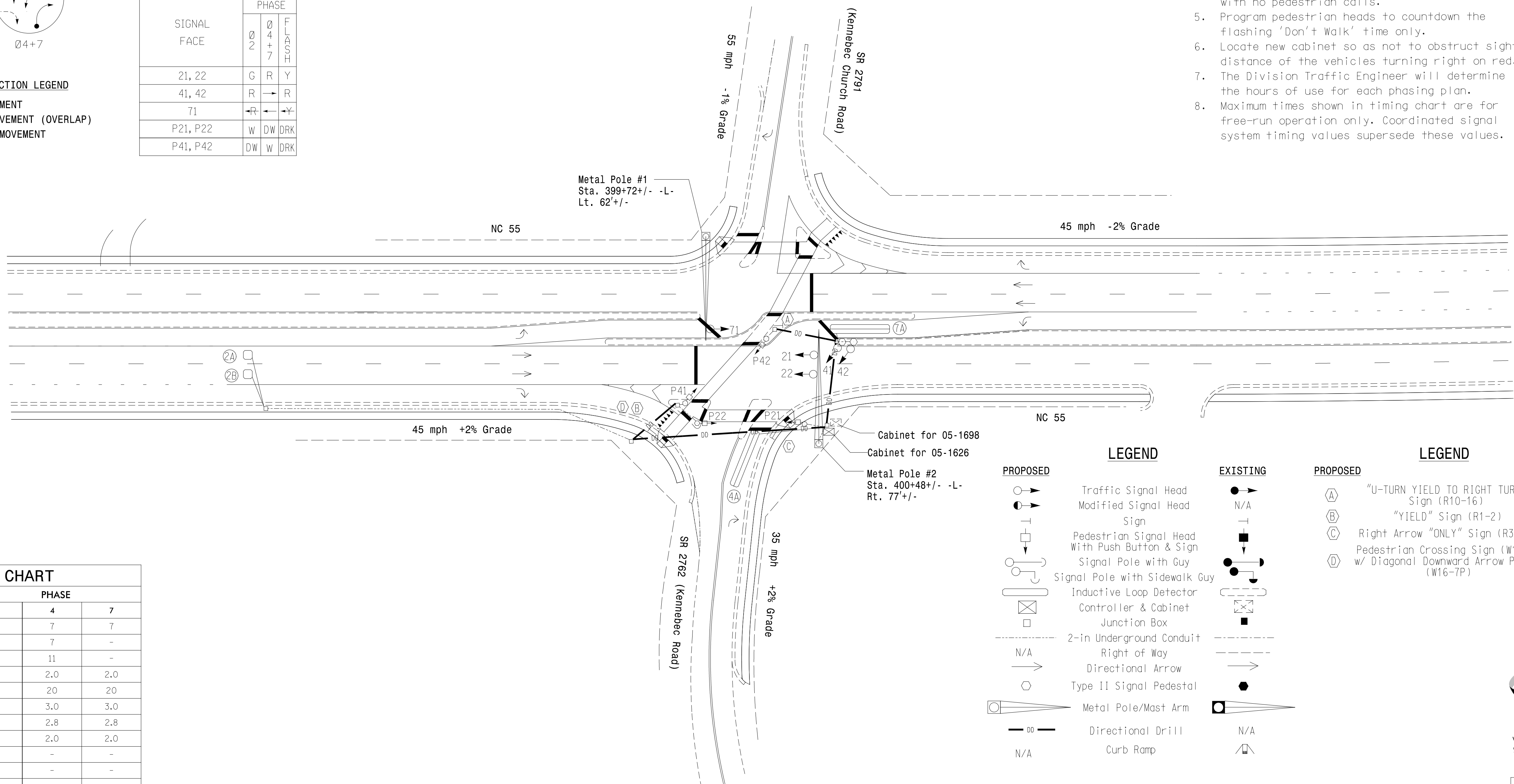
ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE		
	Ø 2	Ø 4+7	FLASH
21, 22	G	R	Y
41, 42	R	→	R
71	←	←	←
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK

PHASING DIAGRAM DETECTION LEGEND

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



FEATURE	PHASE		
	2	4	7
Min Green *	12	7	7
Walk *	7	7	-
Ped Clear	12	11	-
Veh. Extension *	6.0	2.0	2.0
Max I *	90	20	20
Yellow	4.3	3.0	3.0
Red Clear	1.0	2.8	2.8
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	2.5	-	-
Max Initial *	34	-	-
Time Before Reduction *	15	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.0	-	-
Locking Detector	X	-	-
Recall Position	VEH RECALL	-	-
Dual Entry	-	X	X
Simultaneous Gap	X	X	X

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

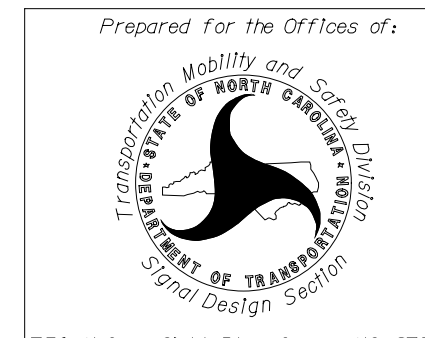
**2 Phase Fully Actuated
Signal System #: D05-48_Fuquay-Varina**

NOTES

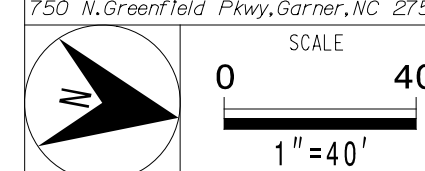
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing 'Don't Walk' time only.
6. Locate new cabinet so as not to obstruct sight distance of the vehicles turning right on red.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND		LEGEND	
PROPOSED	EXISTING	PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A	Ⓐ "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
● → Modified Signal Head Sign	□ → N/A	Ⓑ "YIELD" Sign (R1-2)	Ⓑ
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ → N/A	Ⓒ Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
⊥ Signal Pole with Guy	⊥ → N/A	Ⓓ Pedestrian Crossing Sign (W11-2) w/ Diagonal Downward Arrow Plaque (W16-7P)	Ⓓ
⊥ Signal Pole with Sidewalk Guy	⊥ → N/A		
⊠ Inductive Loop Detector	⊠ → N/A		
⊠ Controller & Cabinet	⊠ → N/A		
□ Junction Box	□ → N/A		
--- 2-in Underground Conduit	--- → N/A		
N/A Right of Way	N/A → N/A		
→ Directional Arrow	→ → N/A		
○ Type II Signal Pedestal	● → N/A		
⊥ Metal Pole/Mast Arm	⊥ → N/A		
--- Directional Drill	--- → N/A		
N/A Curb Ramp	⊥ → N/A		

New Installation



NC 55 WB at SR 2762 (Kennebec Road)
 Division 5 Wake County Fuquay-Varina
 PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles
 PREPARED BY: J. Ma REVIEWED BY:

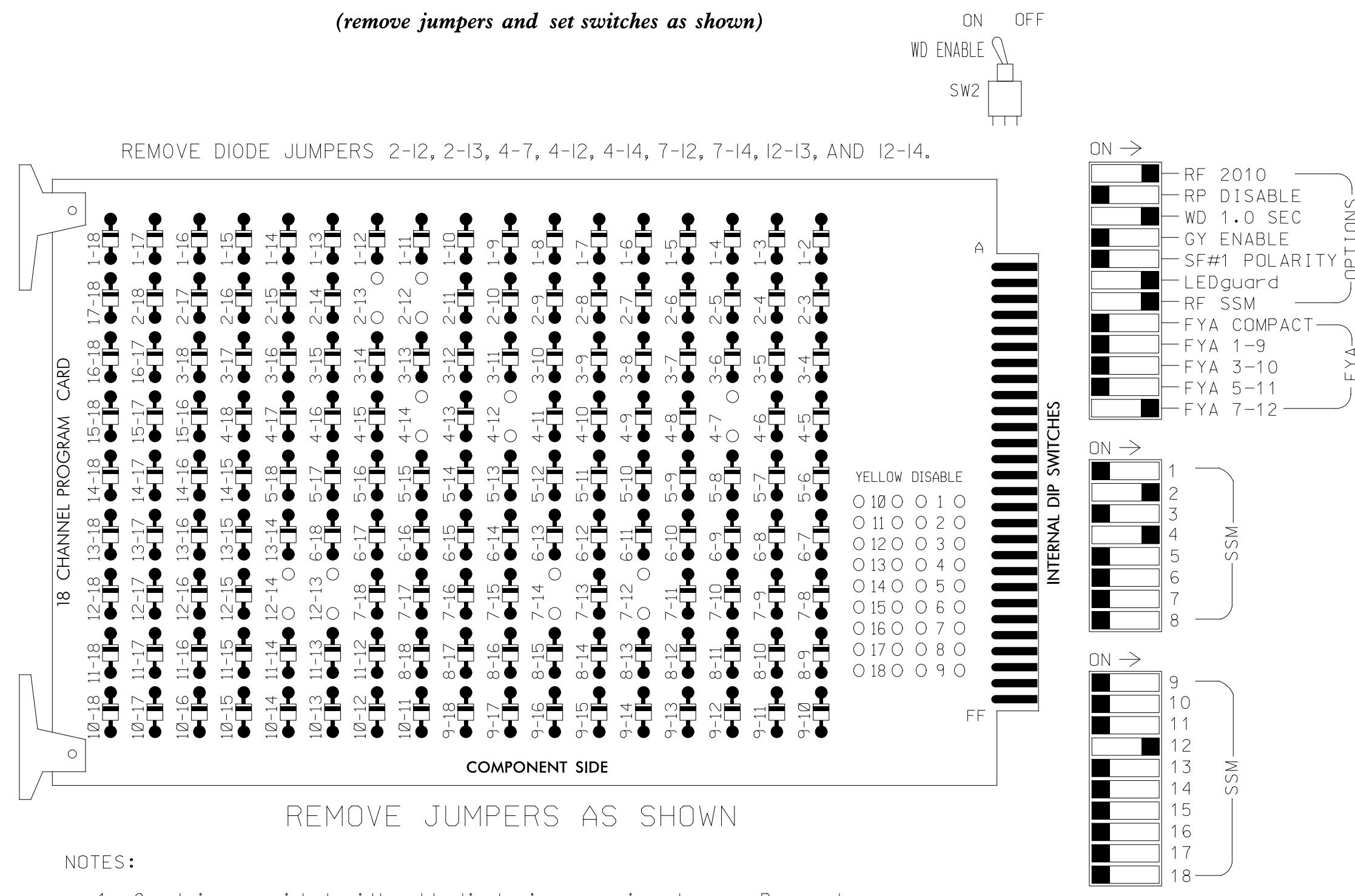


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 033108
 J. Ma
 DATE 7/12/2022
 SIG. INVENTORY NO. 05-1626

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 7 for Dual Entry.
- Program controller to start up in phase 2 Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the D05-48_Fuquay-Varina System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S3,S5,S6,S10,AUX S5
 PHASES USED.....2,2PED,4,4PED,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....*
 OVERLAP "G".....*

* See overlap programming detail on sheet 2

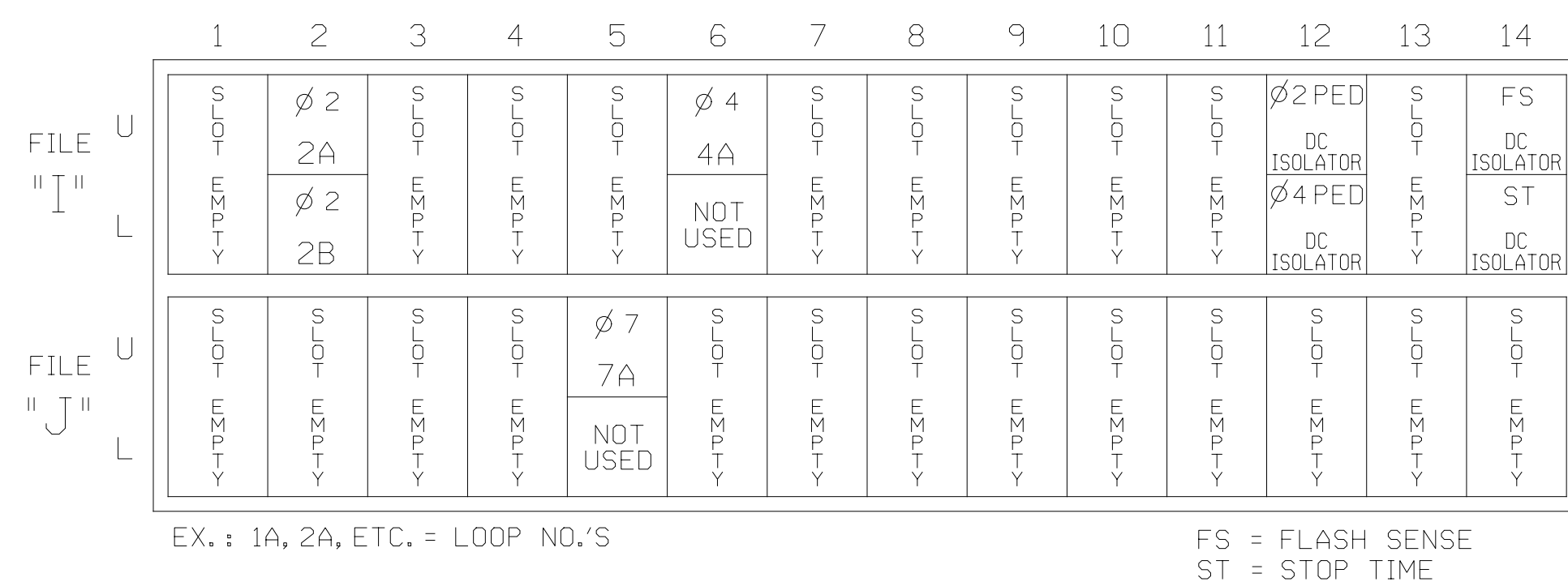
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
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	OLG	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	NU	NU	71*	NU	NU	NU	NU	NU	NU	71*	NU
RED		128			101													
YELLOW		129								*								
GREEN		130																
RED ARROW																		A101
YELLOW ARROW						102												A102
FLASHING YELLOW ARROW																		A103
GREEN ARROW						103				124								
			113			104												
			115			106												

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

INPUT FILE POSITION LAYOUT

(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

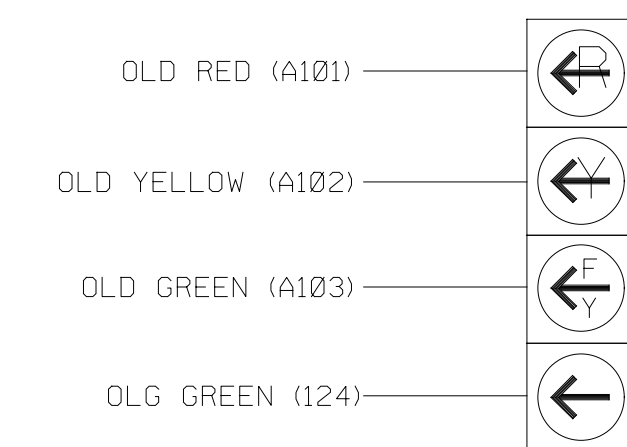
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		15		N
7A	TB5-5,6	J5U	57	7 ★	7	YES		15		N
PED. PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet(s) x.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



71

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



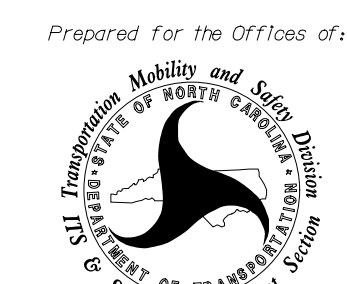
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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: 05-1626
 DESIGNED: July 2022
 SEALED: 07/12/2022
 REVISED: N/A

Electrical_Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 55 WB at SR 2791 (Kennebec Road)			
Division 5	Wake County	Fuquay-Varina	
PLAN DATE: July 2022	REVIEWED BY: M. L. Stygles		
PREPARED BY: J. Ma	REVIEWED BY:		
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEERS
 SEAL 033108
 J. Ma
 7/12/2022
 DATE
 SIG. INVENTORY NO. 05-1626

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 7A

(program controller as shown)

IMPORTANT!

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

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

```

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

4. From Main Menu select **6. DETECTORS**
 5. From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
 6. Place cursor in VEH DET PLAN [] position and enter "2".
- Place cursor in VEH DETECTOR [] position and enter "7".
- Set delay time to "0".

```

VEH DETECTOR [ 7]  VEH DET PLAN [ 2]
TYPE: N-NTCIP
TS2 DETECTOR..... X ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
7 7
CALL OPTION.... YES DELAY TIME... 0.0
EXT OPTION. PASSAGE EXTENSION TIME. 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

END PROGRAMMING

← NOTICE VEH
DET PLAN 2

← ENSURE DELAY
IS SET TO '0'

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

```

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

```

Toggle to 'Overlap D'
OVERLAP D
Select TMG VEH OVLP [B] and 'PPLT FYA'
TMG VEH OVLP...[B] TYPE: .....PPLT FYA
PROTECTED LEFT TURN.... OVERLAP G
OPPOSING THROUGH..... PHASE 2
FLASHING ARROW OUTPUT....CH10 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 7
    
```

END PROGRAMMING

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S10 as OLG,
program LD SWITCH 7 as OVLP '7' TYPE 'a'.

1. From Main Menu select **1. CONFIGURATION**
2. From CONFIGURATION Submenu select **3. LOAD SW ASSIGN**

LD SWITCH ASSIGN									
PHASE	DIMMING	---	FLASH	---					
/OVLP	TYPE	R	Y	G	D	PWR	AUT	TGR	
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	Y	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	-	A	R	.
6	6	V	.	.	.	-	A	Y	X
7	7	0	.	.	.	-	A	R	.
8	8	V	.	.	.	-	A	R	X
9	1	0	.	.	.	+	A	R	X
10	2	0	.	.	.	+	A	R	X
11	3	0	.	.	.	-	A	R	.
12	4	0	.	.	.	-	A	Y	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	8	P	.	.	.	-	A	.	.

NOTICE OVERLAP G
ASSIGNED TO LD SWITCH 7 →

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1626
DESIGNED: July 2022
SEALED: 07/12/2022
REVISED: N/A



Electrical_Detail - Sheet 2 of 3

<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>Prepared for the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 55 WB at SR 2791 (Kennebec Road)</p> <p>Division 5 Wake County Fuquay-Varina</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>PLAN DATE: July 2022</td> <td>REVIEWED BY: M. L. Stygles</td> </tr> <tr> <td>PREPARED BY: J. Ma</td> <td>REVIEWED BY:</td> </tr> <tr> <td>REVISIONS</td> <td>INIT. DATE</td> </tr> </table>	PLAN DATE: July 2022	REVIEWED BY: M. L. Stygles	PREPARED BY: J. Ma	REVIEWED BY:	REVISIONS	INIT. DATE	<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL</p> <p>SEAL 033108 M. L. Stygles 7/12/2022</p> <p>SIG. INVENTORY NO. 05-1626</p>
PLAN DATE: July 2022	REVIEWED BY: M. L. Stygles							
PREPARED BY: J. Ma	REVIEWED BY:							
REVISIONS	INIT. DATE							

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 3.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 3.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	7

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

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 3 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 3: Modifies overlap parent phases for head 71 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

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

```

ACTION PLAN... [ *]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --      RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  .  .  .  .  X  .  .  (1-8)
AUX FCT  .  .  .  (1-3)

  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .

```

* The Action Plan number(s) are to be determined by the Division and/or City Traffic Engineer.

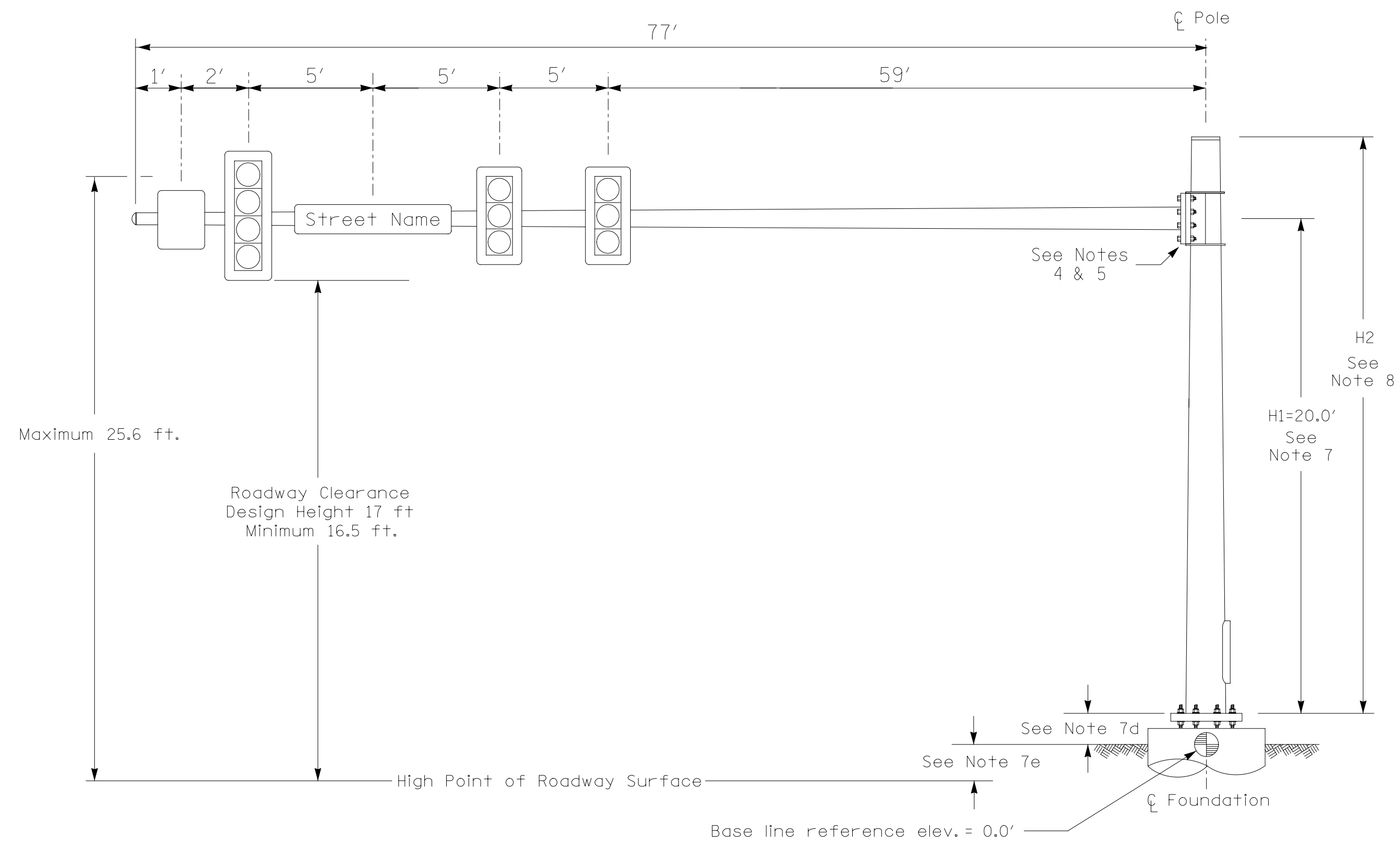
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1626
DESIGNED: July 2022
SEALED: 07/12/2022
REVISED: N/A



Electrical_Detail - Sheet 3 of 3

<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>Prepared for the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 55 WB at SR 2791 (Kennebec Road)</p> <p>Division 5 Wake County Fuquay-Varina</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>PLAN DATE: July 2022</td> <td>REVIEWED BY: M. L. Stygles</td> </tr> <tr> <td>PREPARED BY: J. Ma</td> <td>REVIEWED BY:</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	PLAN DATE: July 2022	REVIEWED BY: M. L. Stygles	PREPARED BY: J. Ma	REVIEWED BY:	REVISIONS	INIT.	DATE				<p style="text-align: center;">DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p style="text-align: center;">SEAL</p> <p style="text-align: center;">DocuSigned by: M. L. Stygles 827E1953081444F 7/12/2022</p> <p style="text-align: center;">DATE 7/12/2022</p> <p style="text-align: center;">SIG. INVENTORY NO. 05-1626</p>
PLAN DATE: July 2022	REVIEWED BY: M. L. Stygles											
PREPARED BY: J. Ma	REVIEWED BY:											
REVISIONS	INIT.	DATE										

Design Loading for METAL POLE NO. 2



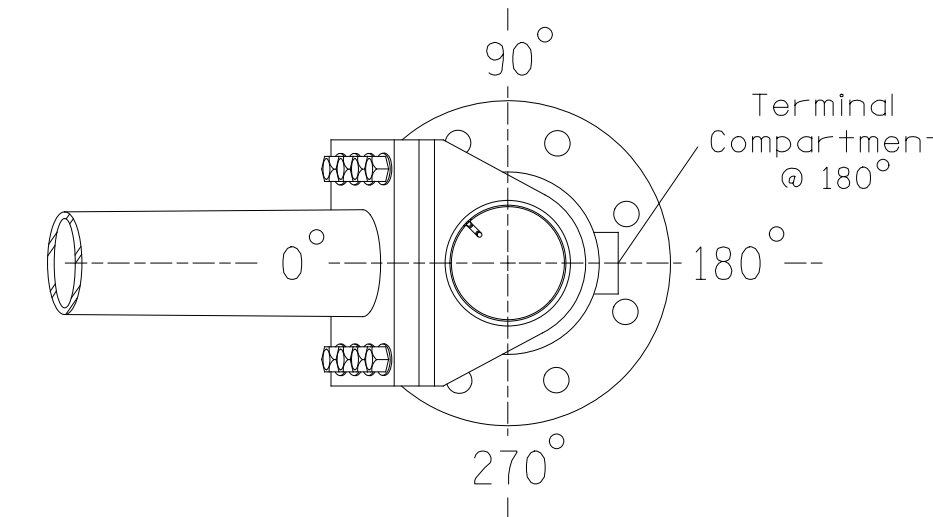
Elevation View

SPECIAL NOTE

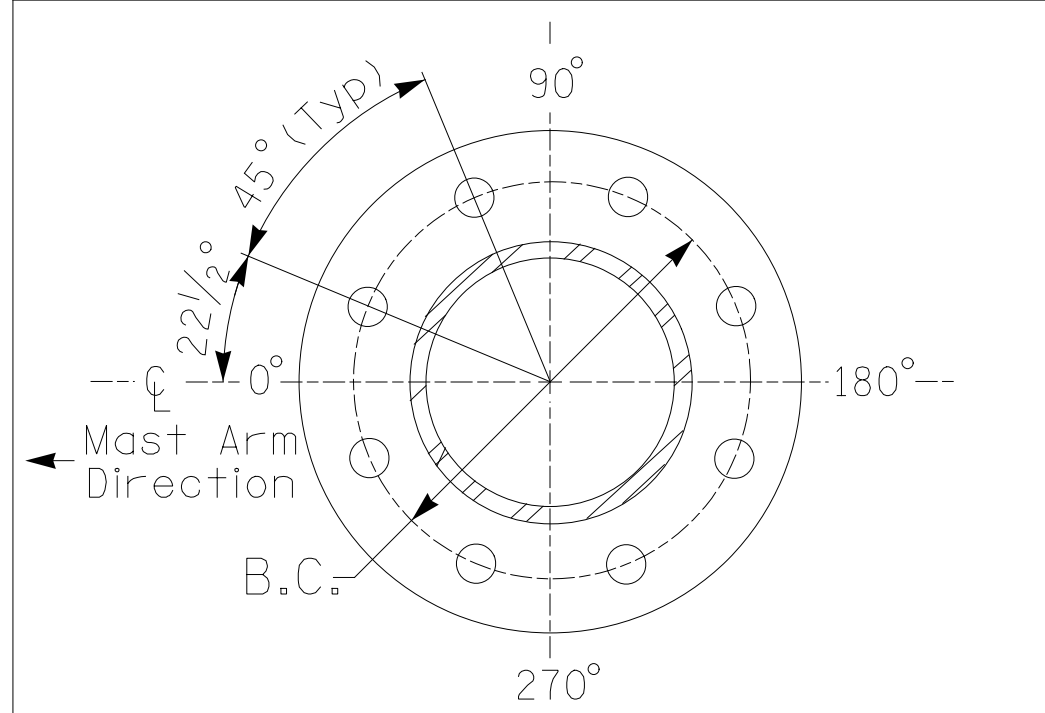
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

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

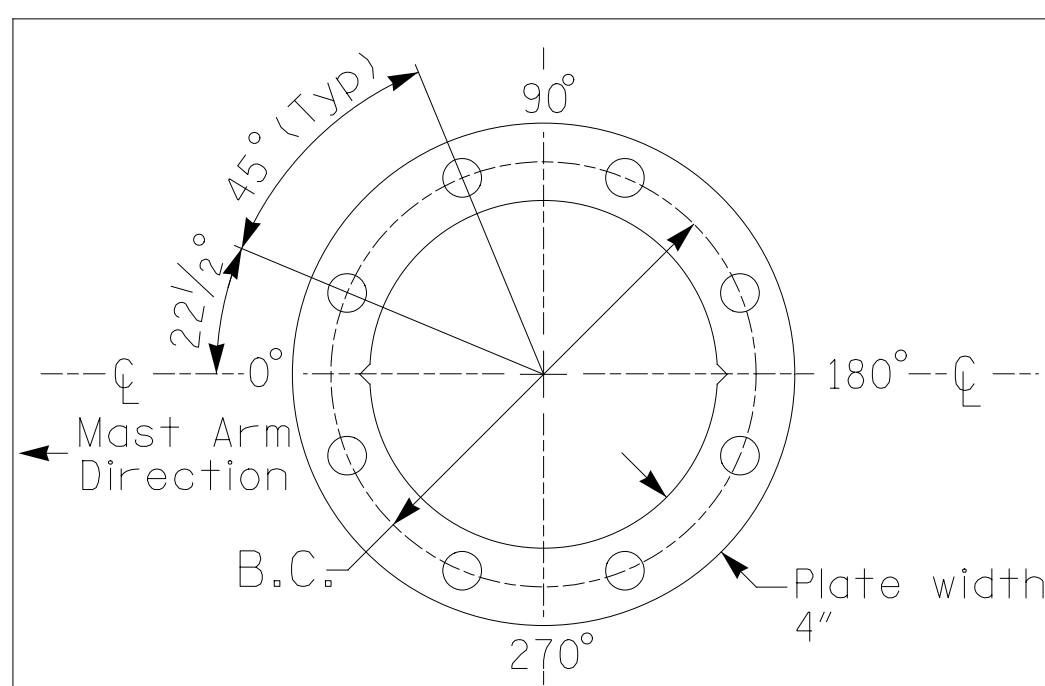


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
R-5705B	Sig.7.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 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.

NCDOT Wind Zone 4 (90 mph)

Prepared for the Office of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 N/A

NC 55 WB
at
SR 2762 (Kennebec Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS: INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

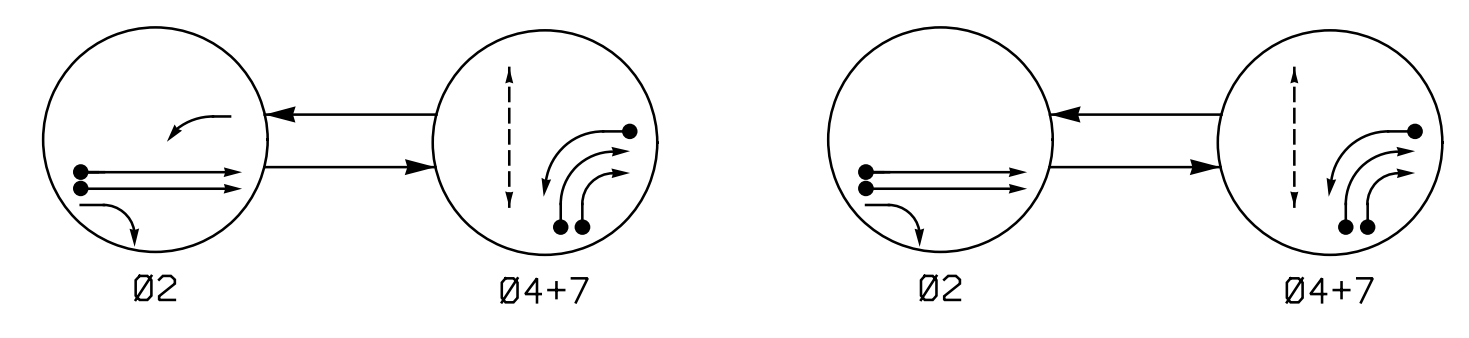
DocuSigned by: **Janzin Ma** 7/12/2022

SIG. INVENTORY NO. 05-1626

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

2 Phase Fully Actuated
NC 55 - Fuquay-Varina
Signal System #: D05-48_Fuquay-Varina

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		
	Ø 2	Ø 4 + 7	F L S H
21, 22	G	R	Y
23, 24	F	R	Y
41, 42, 43	R	→	R
71	F	←	Y
P41, P42	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø 2	Ø 4 + 7	F L S H
21, 22	G	R	Y
23, 24	F	R	Y
41, 42, 43	R	→	R
71	←	←	Y
P41, P42	DW	W	DRK

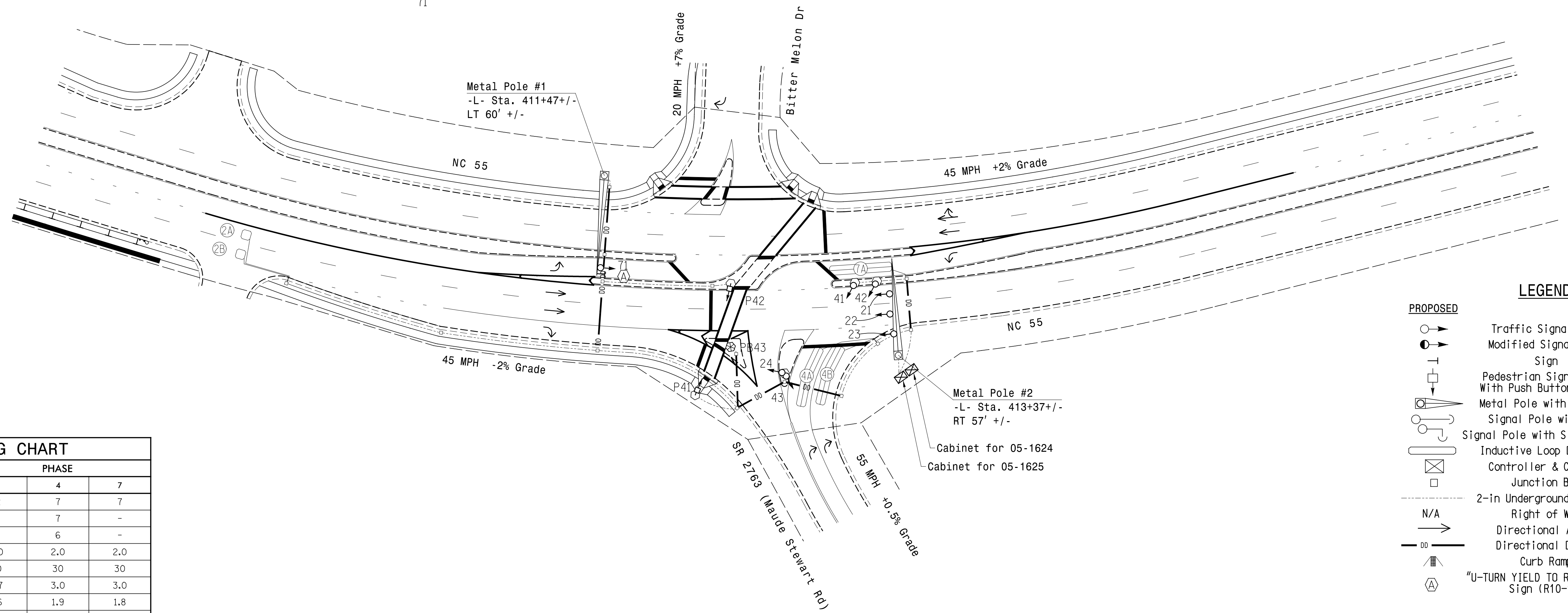
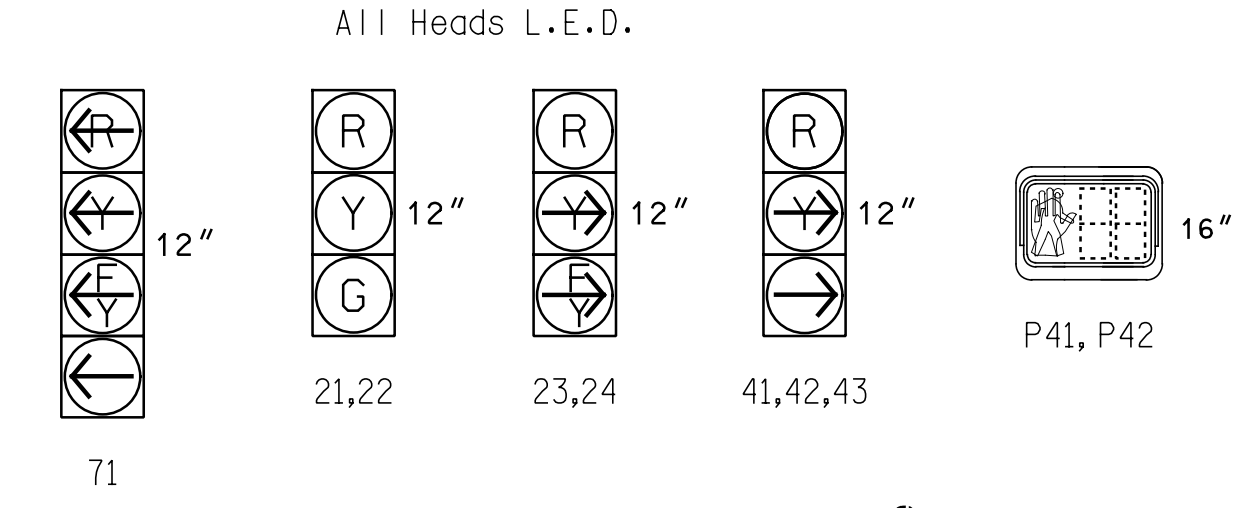
DETECTOR INSTALLATION CHART

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

*Disable Delay During Alternate Phasing Operation.

- NOTES
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018 and all applicable sections of the latest version of the generic Project Special Provisions.
 - 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 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 FACE I.D.



LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → N/A
○ → Metal Pole with Mastarm	○ → N/A
○ → Signal Pole with Sidewalk Guy	○ → N/A
⊗ → Inductive Loop Detector	⊗ → N/A
□ → Controller & Cabinet Junction Box	□ → N/A
--- → 2-in Underground Conduit	--- → N/A
→ → Right of Way	→ → N/A
→ → Directional Arrow	→ → N/A
→ → Directional Drill	→ → N/A
▲ → Curb Ramp	▲ → N/A
⊙ → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	⊙ → N/A

TIMING CHART

FEATURE	PHASE		
	2	4	7
Min Green *	12	7	7
Walk *	-	7	-
Ped Clear	-	6	-
Veh. Extension *	6.0	2.0	2.0
Max 1 *	90	30	30
Yellow	4.7	3.0	3.0
Red Clear	1.6	1.9	1.8
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds / Actuation *	1.5	-	-
Max Initial *	34	-	-
Time Before Reduction *	30	-	-
Time To Reduce *	50	-	-
Minimum Gap	3.0	-	-
Locking Detector	X	-	-
Recall Position	VEH. RECALL	-	-
Dual Entry	-	X	X
Simultaneous Gap	X	X	X

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

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
SIGNAL DESIGN SECTION

NC 55 WB at SR 2763 (Maude Stewart Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: J. Ma

PREPARED BY: J. Townsend REVIEWED BY: M.L. Styles

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 40
1" = 40'

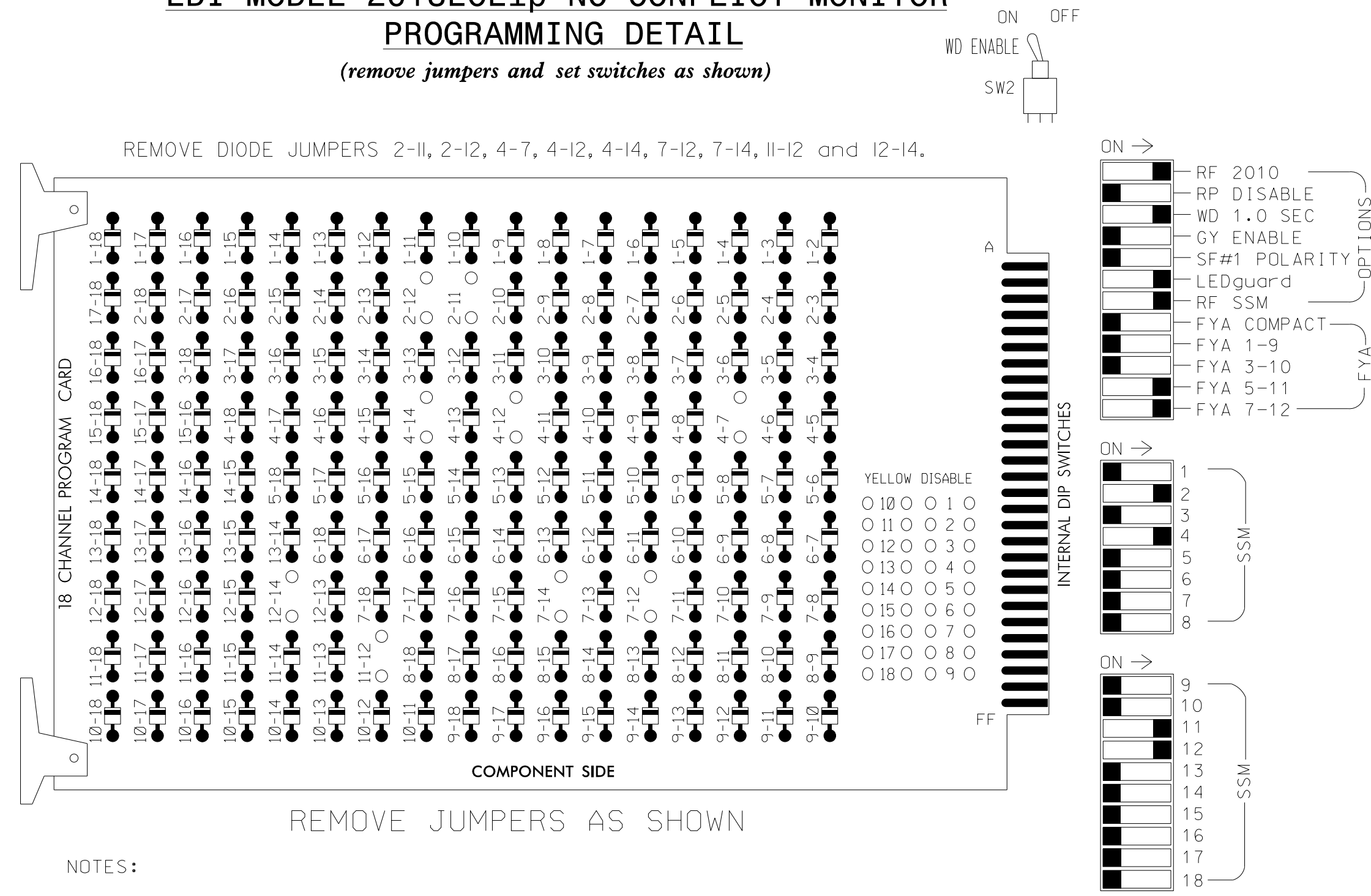
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046057 MATTHEW L. STYLES

7/12/2022

SIG. INVENTORY NO. 05-1625

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program Phase 4 and 7 for Dual Entry.
- Program controller to start up in phase 2 Green.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the D05-48_Fuquay-Varina System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S6,S10,AUX S4,AUX S5
 PHASES USED.....2,4,4PED,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....*
 OVERLAP "G".....*

* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

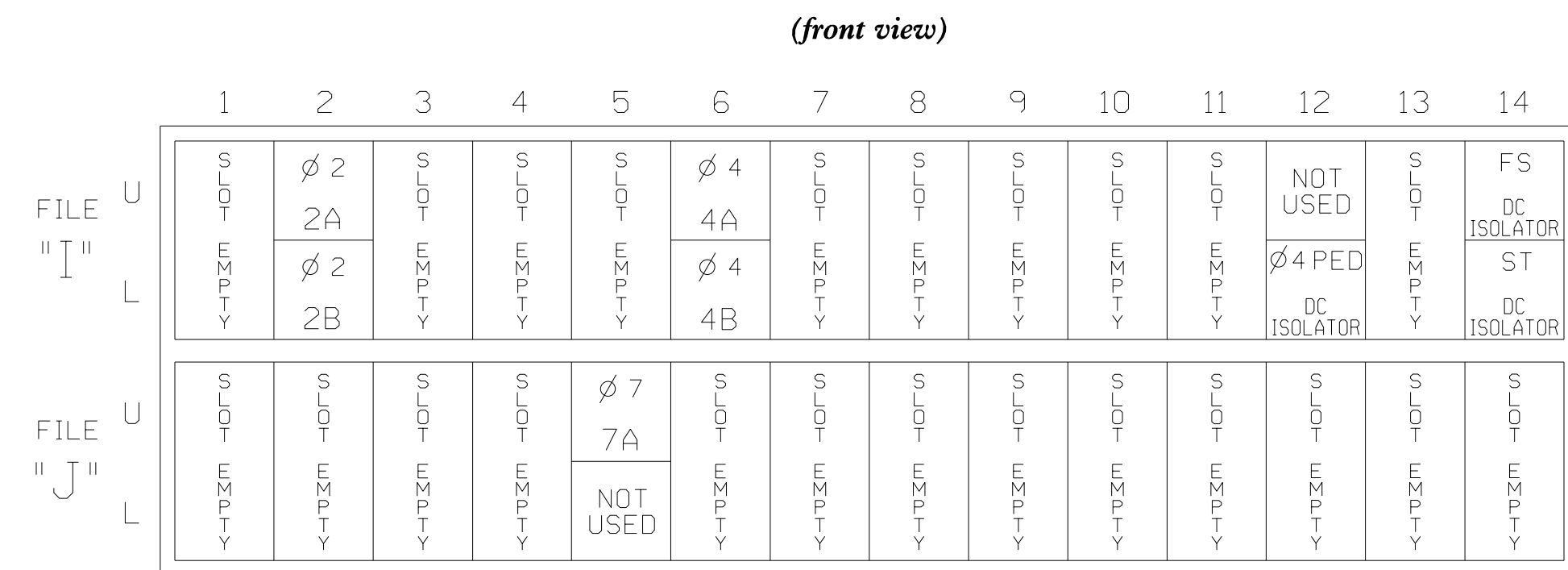
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	OLG	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42, 43	P41, P42	NU	NU	NU	71	NU	NU	NU	NU	NU	23,24	71	NU
RED		128			101											A114		
YELLOW		129								*								
GREEN		130																
RED ARROW																	A101	
YELLOW ARROW					102											A115	A102	
FLASHING YELLOW ARROW																A116	A103	
GREEN ARROW					103					124								
Hand icon						104												
Person icon						106												

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

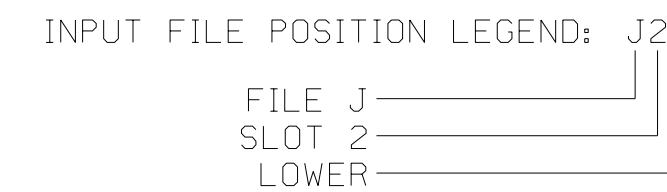


INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES		15		N
4B	TB4-11,12	I6L	45	14	4	YES		15		N
7A	TB5-5,6	J5U	57	7 ★	7	YES		15		N
PED PUSH BUTTONS										
P41,P42	TB24-9,10	I12L	69	PED 4	4 PED					

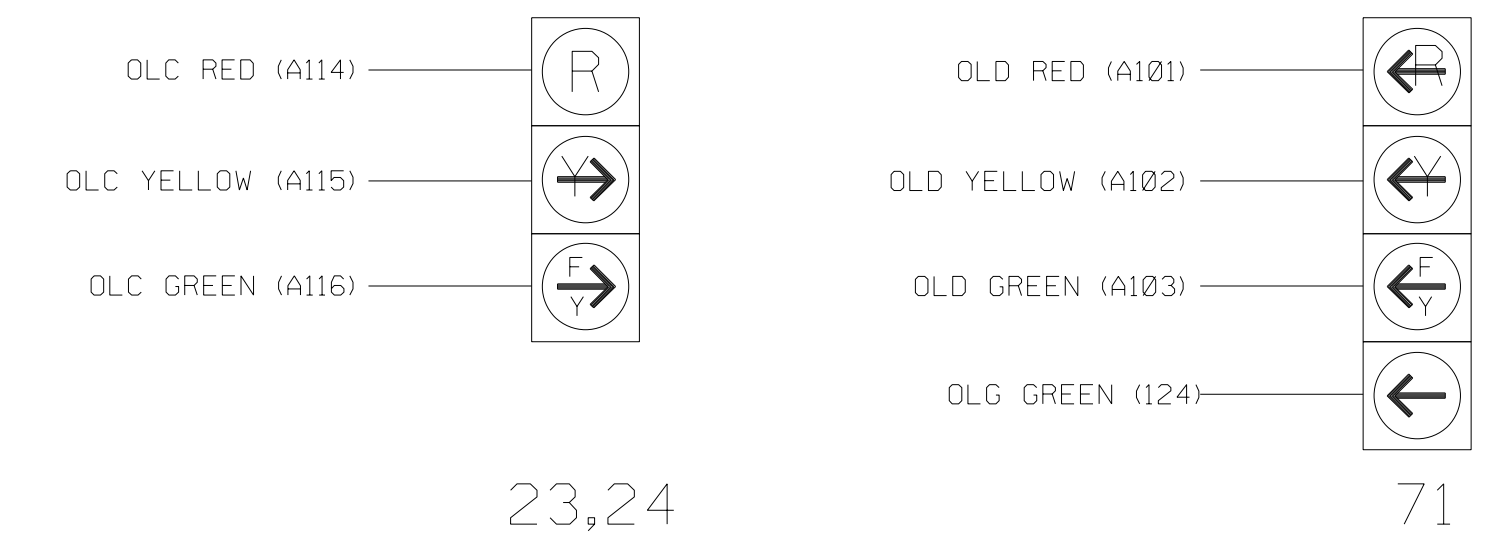
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet(s) x.



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES

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



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.

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	NC 55 at SR 2763 (Maude Stewart Road) / Bitter Melon Drive Division 5 Wake County Angier		SEAL
	PLAN DATE: July 2022 PREPARED BY: J. Townsend	REVIEWED BY: J. Ma REVIEWED BY: M.L. Stygles	
REVISIONS: _____ INITI.: _____ DATE: _____			SIG. INVENTORY NO. 05-1625



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1625
 DESIGNED: July 2022
 SEALED: 07/12/2022
 REVISED:

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

(program controller as shown)

IMPORTANT!

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

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

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

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

- Place cursor in VEH DETECTOR [] position and enter "7".
- Set delay time to "0".

```

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

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '0'

END PROGRAMMING

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

Toggle to 'Overlap G'

OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

```

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

Toggle to 'Overlap C'

OVERLAP C

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

```

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

Toggle Once

OVERLAP D

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

```

TMG VEH OVLP...[D] TYPE: ....[PPLT FYA]
PROTECTED LEFT TURN.... OVERLAP G
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT....CH12 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 7
    
```

← NOTICE ACTION PLAN SF BIT '7'

END PROGRAMMING

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S10 as OLG, program LD SWITCH 7 as OVLP '7' TYPE 'O' as shown below.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 3. LOAD SW ASSIGN

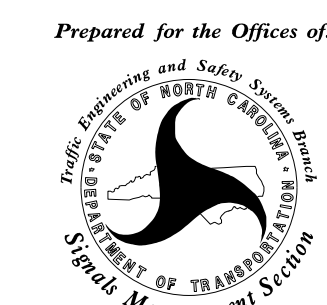
NOTICE OVERLAP G ASSIGNED TO LD SWITCH 7 →

LD SWITCH ASSIGN									
PHASE	DIMMING	---	FLASH	---					
/OVLP	TYPE	R	Y	G	D	PWR	AUT	TGR	
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	R	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	-	A	R	.
6	6	V	.	.	.	-	A	Y	X
7	7	O	.	.	.	-	A	R	.
8	8	V	.	.	.	-	A	R	X
9	1	O	.	.	.	+	A	R	X
10	2	O	.	.	.	+	A	R	X
11	3	O	.	.	.	-	A	Y	.
12	4	O	.	.	.	-	A	Y	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	8	P	.	.	.	-	A	.	.

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 55 at SR 2763 (Maude Stewart Road) / Bitter Melon Drive	
Division 5 Wake County Angier	
PLAN DATE: July 2022	REVIEWED BY: J. Ma
PREPARED BY: J. Townsend	REVIEWED BY: M.L. Stygles
REVISIONS	INIT. DATE

SEAL

NORTH CAROLINA
PROFESSIONAL
SEAL
046057
ENGINEER
MATTHEW L. STYGLES

7/12/2022

SIGNATURE DATE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1625
DESIGNED: July 2022
SEALED: 07/12/2022
REVISED:



ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 7.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BIT 7.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	7

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

SF BIT 7: Modifies overlap parent phases for head 71 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

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

```

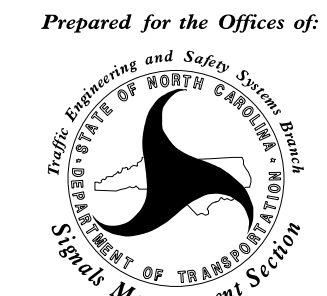
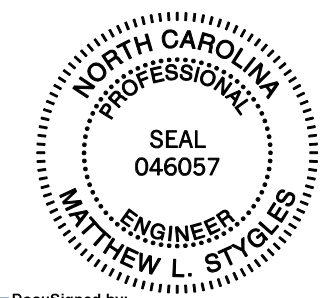

ACTION PLAN... [ *]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --      RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  .  .  .  .  X  .  (1-8)
AUX FCT  .  .  .  (1-3)
          1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
    
```

* The Action Plan number(s) are to be determined by the Division and/or City Traffic Engineer.

Electrical Detail - Sheet 3 of 3

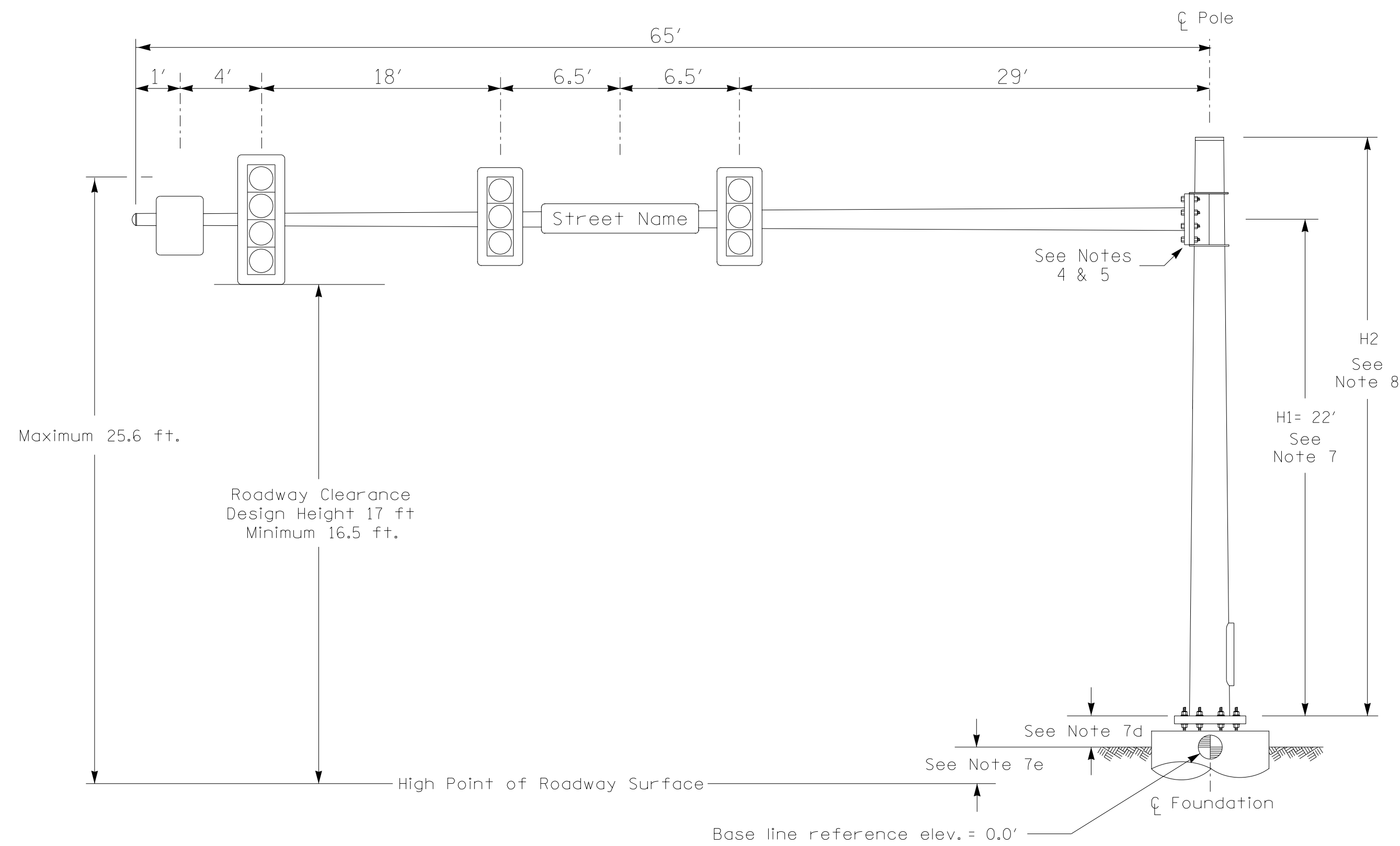
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Parkway, Garner, NC 27529	NC 55 at SR 2763 (Maude Stewart Road) / Bitter Melon Drive Division 5 Wake County Angier		SEAL  SEAL 046057 MATTHEW L. STYGLES ENGINEER
	PLAN DATE: July 2022 PREPARED BY: J. Townsend	REVIEWED BY: J. Ma REVIEWED BY: M.L. Stygles		INIT. DATE _____
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1625 DESIGNED: July 2022 SEALED: 07/12/2022 REVISED:			DocuSigned by:  3946E6A40743C SIGNATURE DATE 7/12/2022 SIG. INVENTORY NO. 05-1625



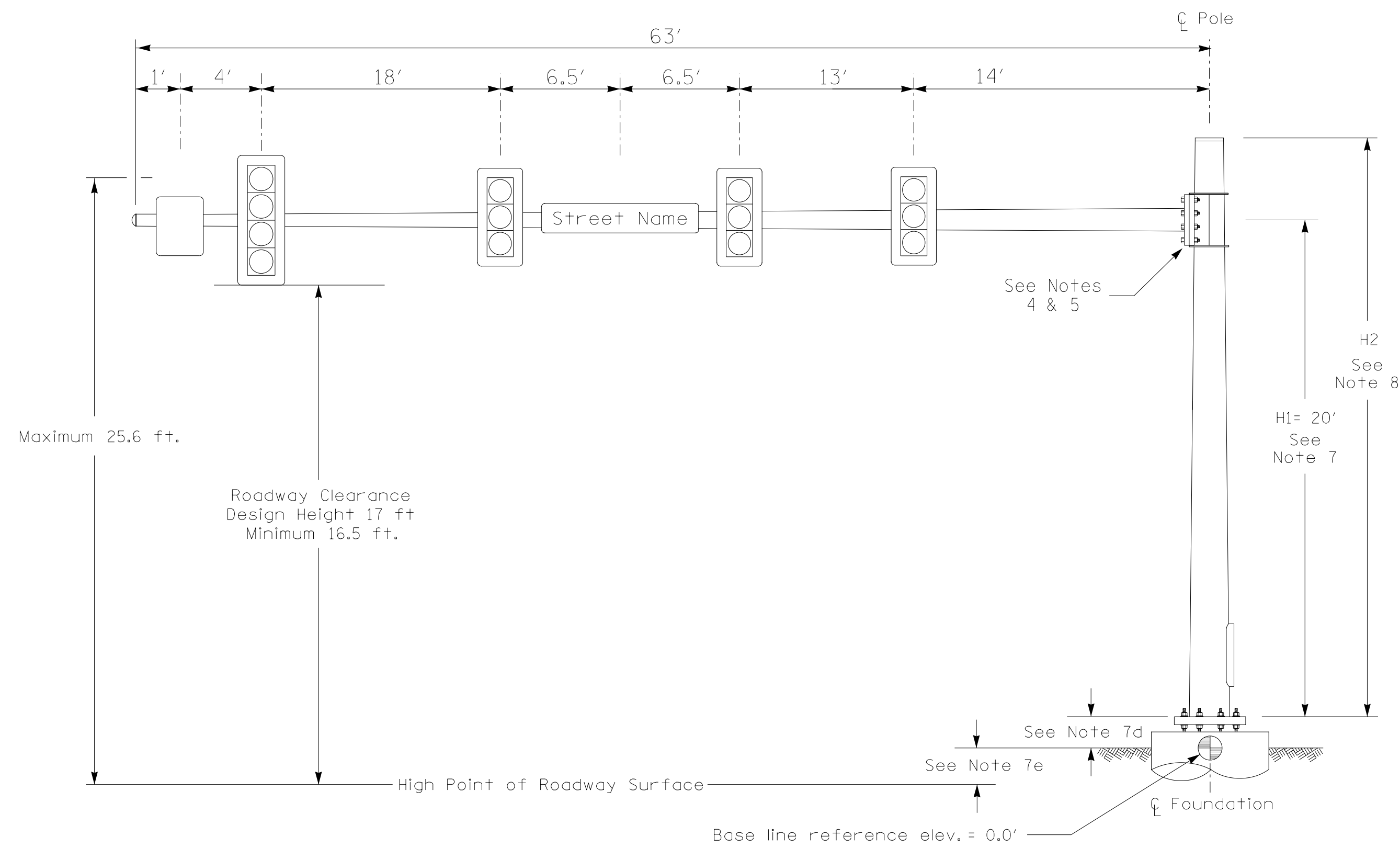
METAL POLE No. 1 and 2

Design Loading for METAL POLE NO. 1



Elevation View

Design Loading for METAL POLE NO. 2



Elevation View

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 \odot Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+2.9 ft.	+0.3 ft.
Elevation difference at Edge of travelway or face of curb	+1.74 ft.	+0.9 ft.

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
	SIGN RIGID MOUNTED	5.0 S.F.	24.0" W X 30.0" L	11 LBS

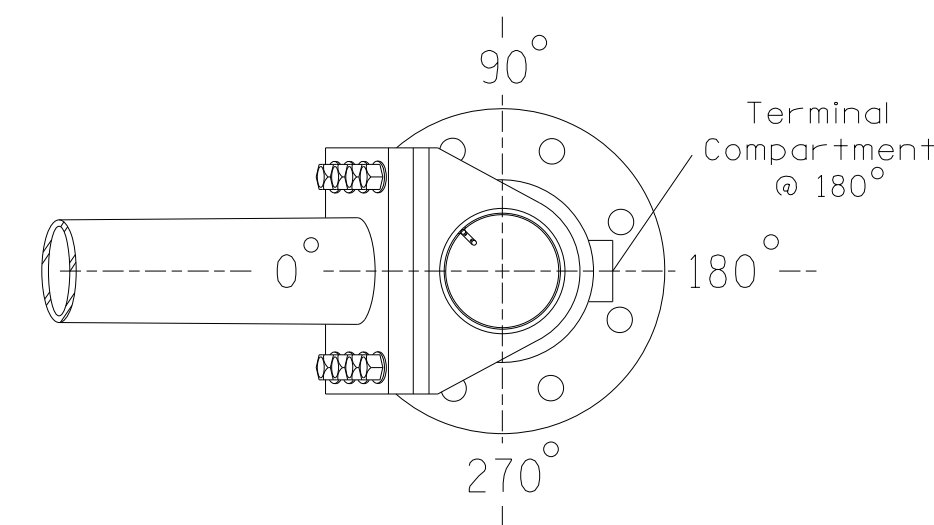
NOTES

DESIGN REFERENCE MATERIAL

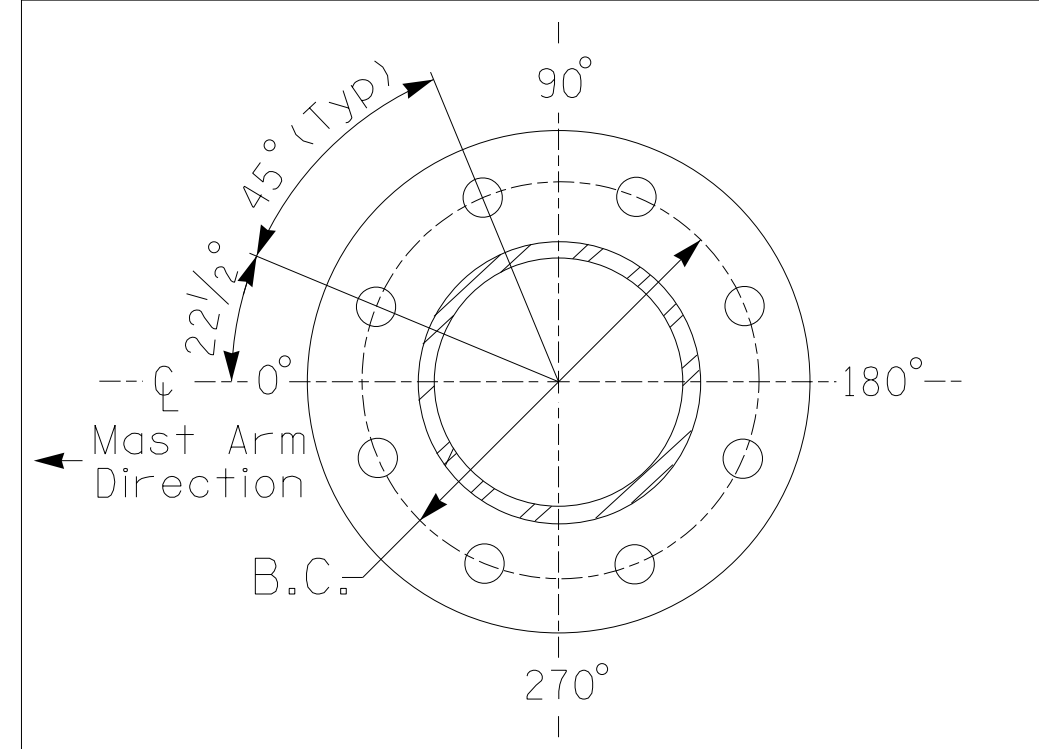
- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads 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.

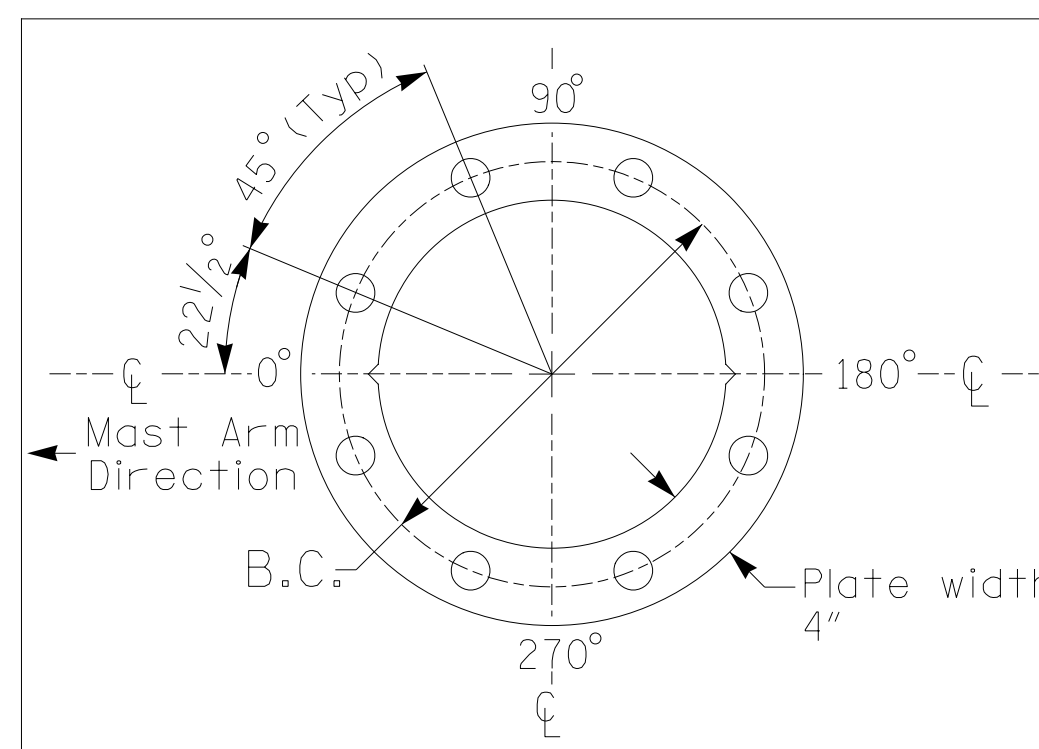


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate



NCDOT Wind Zone 4 (90 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For the Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 40
1" = 40'

NC 55 WB at SR 2763 (Maude Stewart Rd./ Bitter Melon Dr. (North Int.))

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: J. Ma

PREPARED BY: J. Townsend REVIEWED BY: M.L. Stygles

REVISIONS: INIT. DATE

7/12/2022

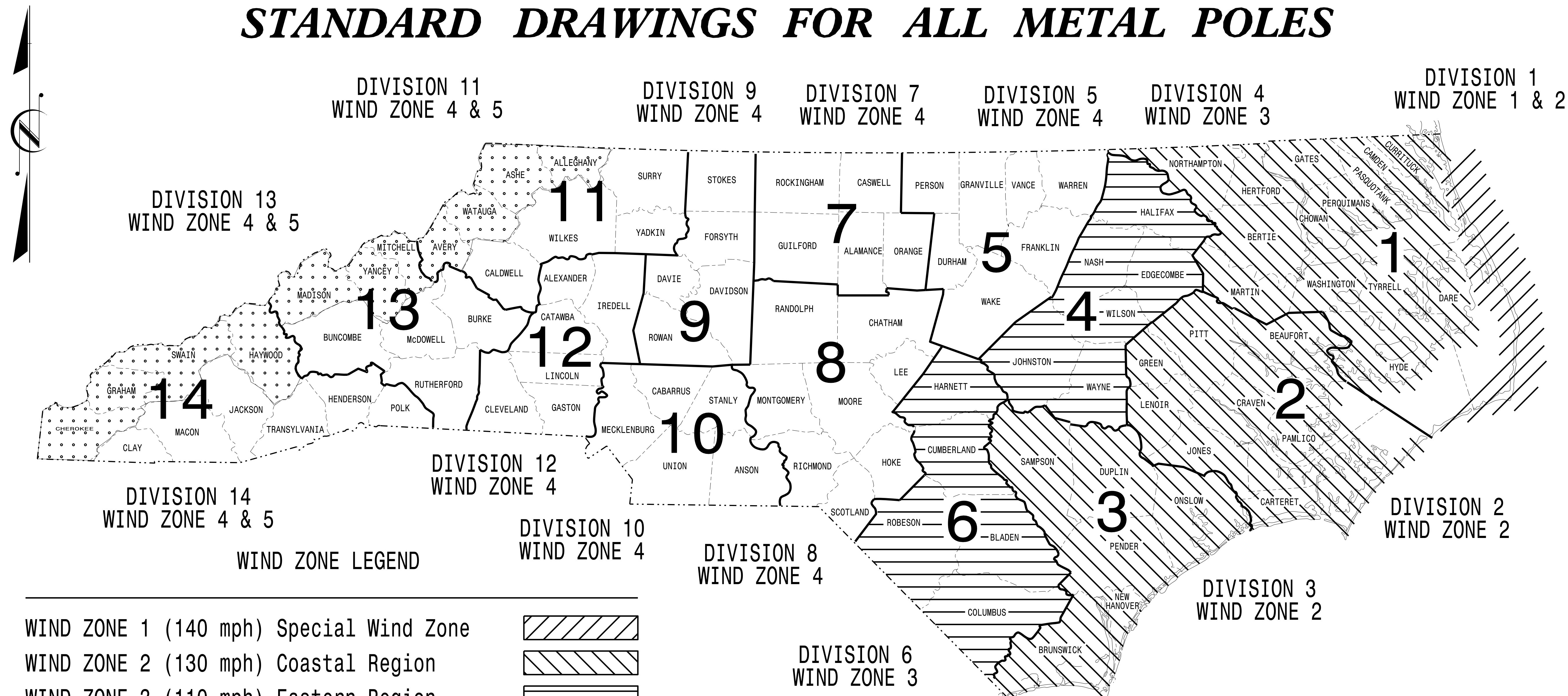
Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046057 MATTHEW L. STYGLES

SIG. INVENTORY NO. 05-1625

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

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

STANDARD DRAWINGS FOR ALL METAL POLES



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone	
WIND ZONE 2 (130 mph) Coastal Region	
WIND ZONE 3 (110 mph) Eastern Region	
WIND ZONE 4 (90 mph) Central & Mtn. Region	
WIND ZONE 5 (120 mph) Special Wind Zone	

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

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

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

INDEX OF PLANS

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

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

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

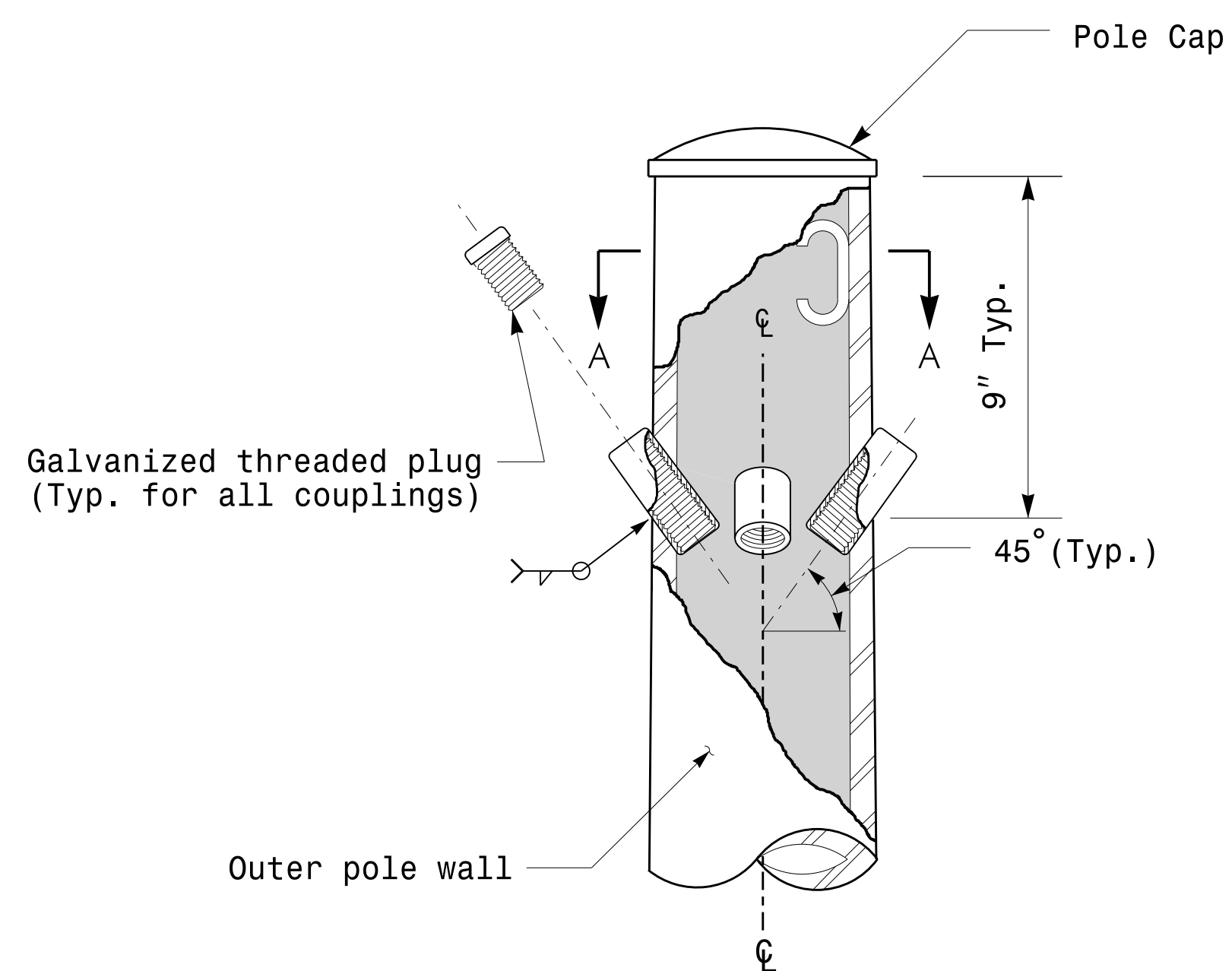
J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

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

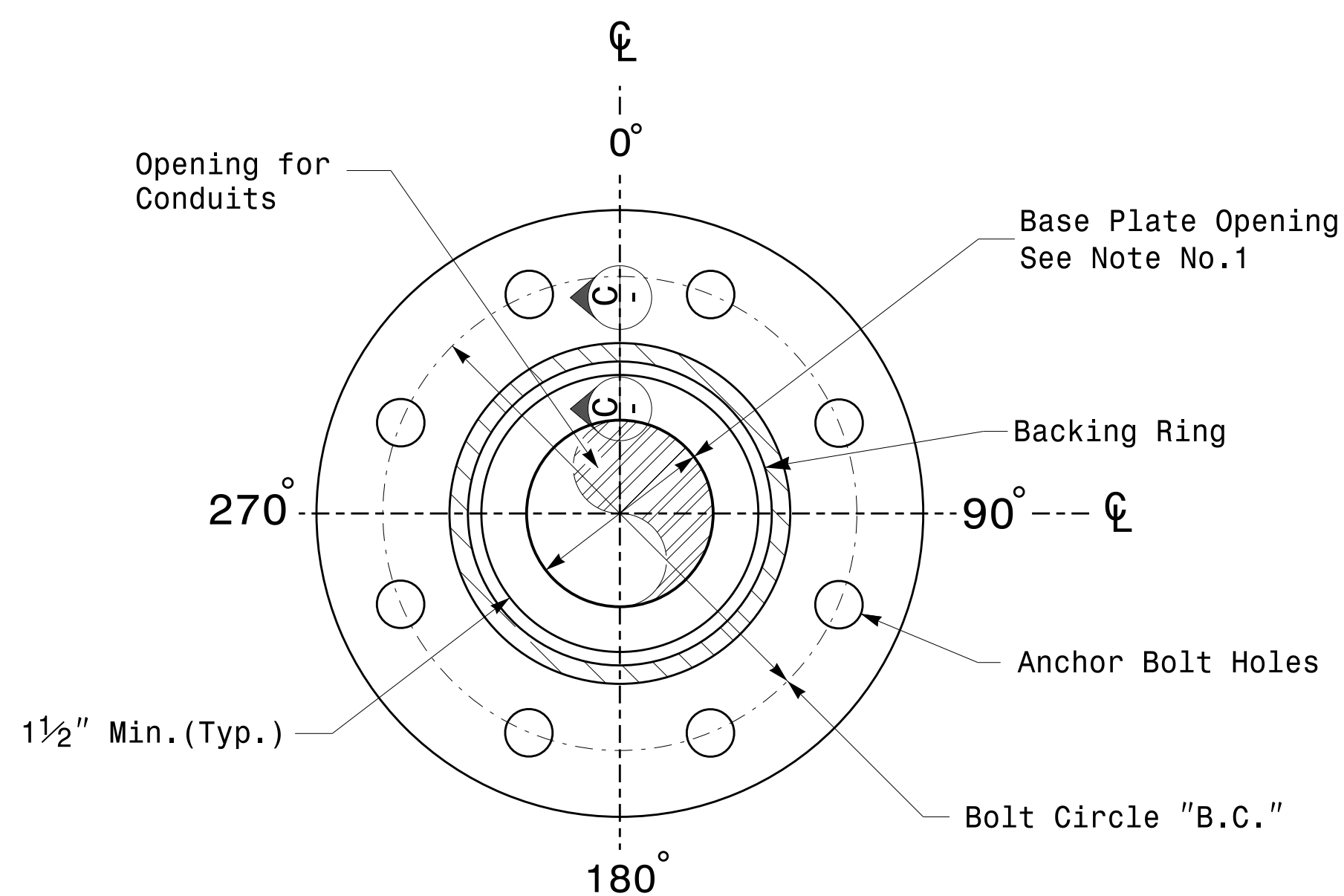
SEAL

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

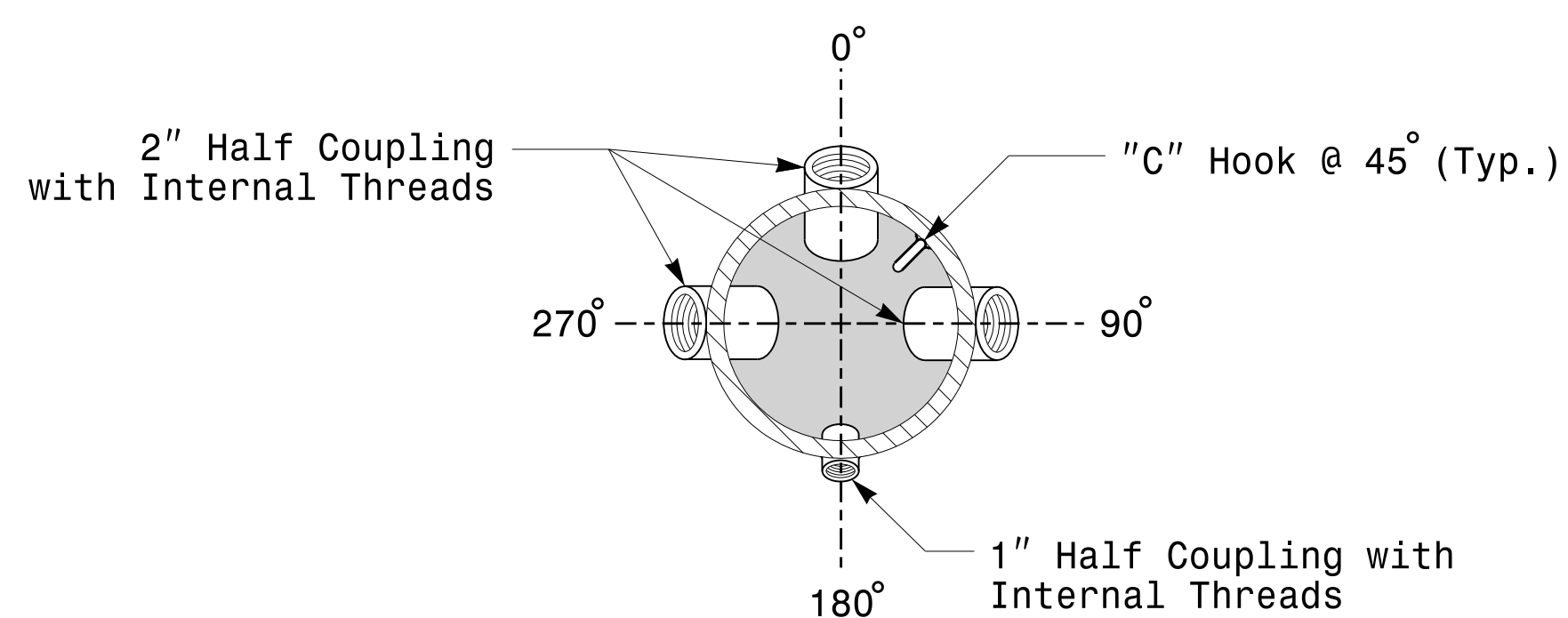
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



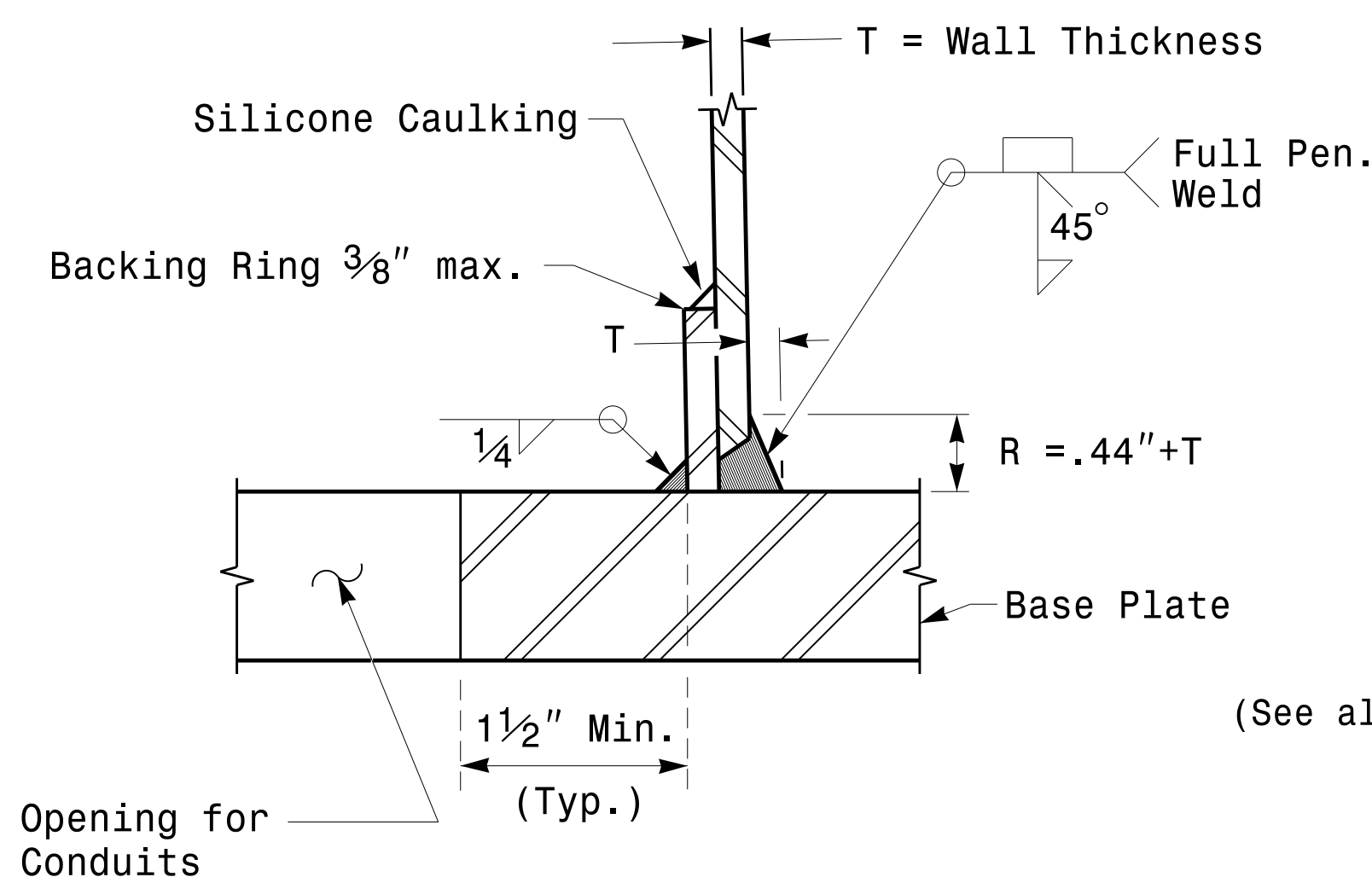
Cable Entrances at Top of Pole



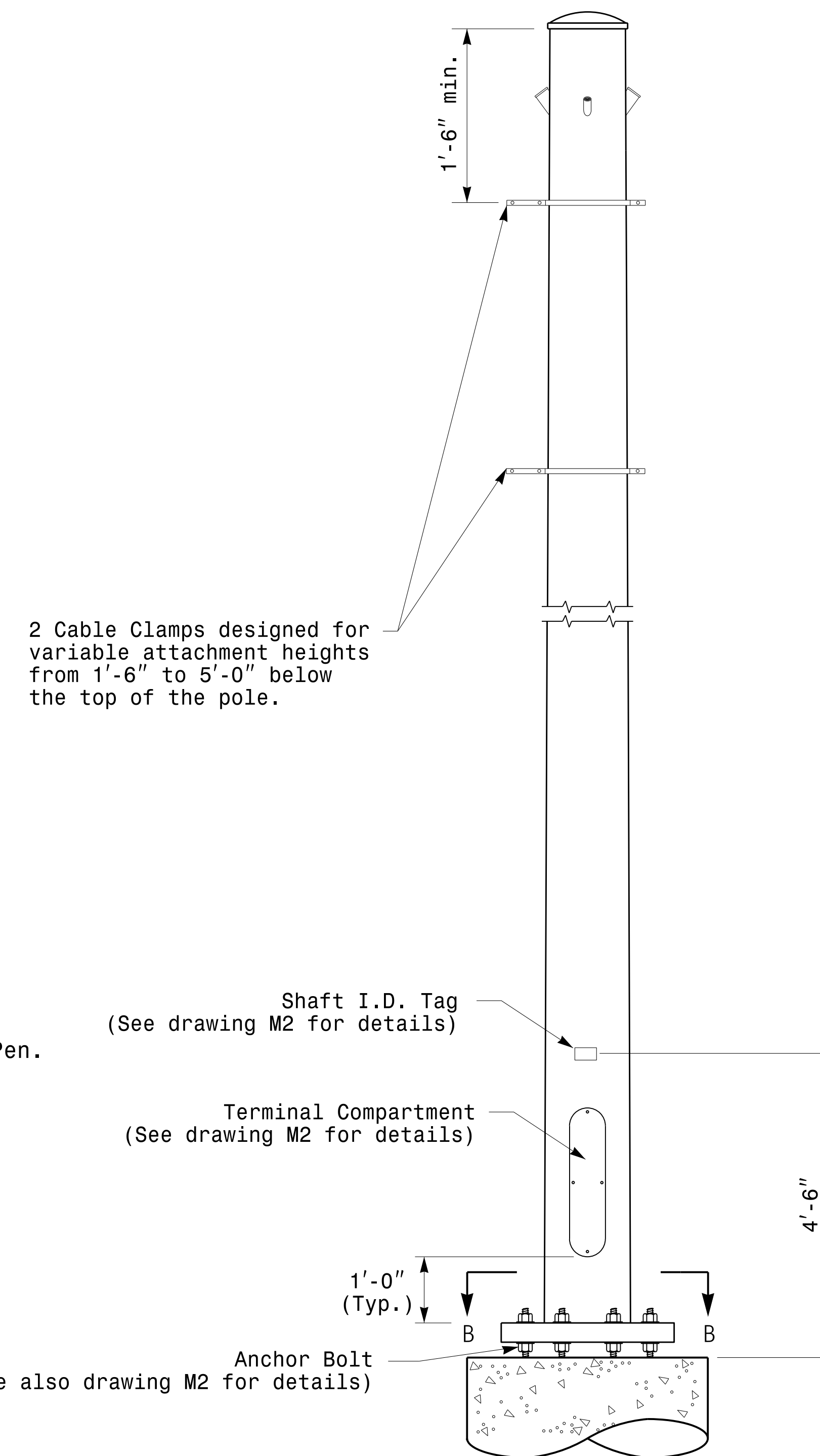
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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



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



Monotube Strain Pole

Prepared in the Offices of:

 750 N. Greenleaf Pkwy, Garner, NC 27529

Typical Fabrication Details For Strain Poles

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

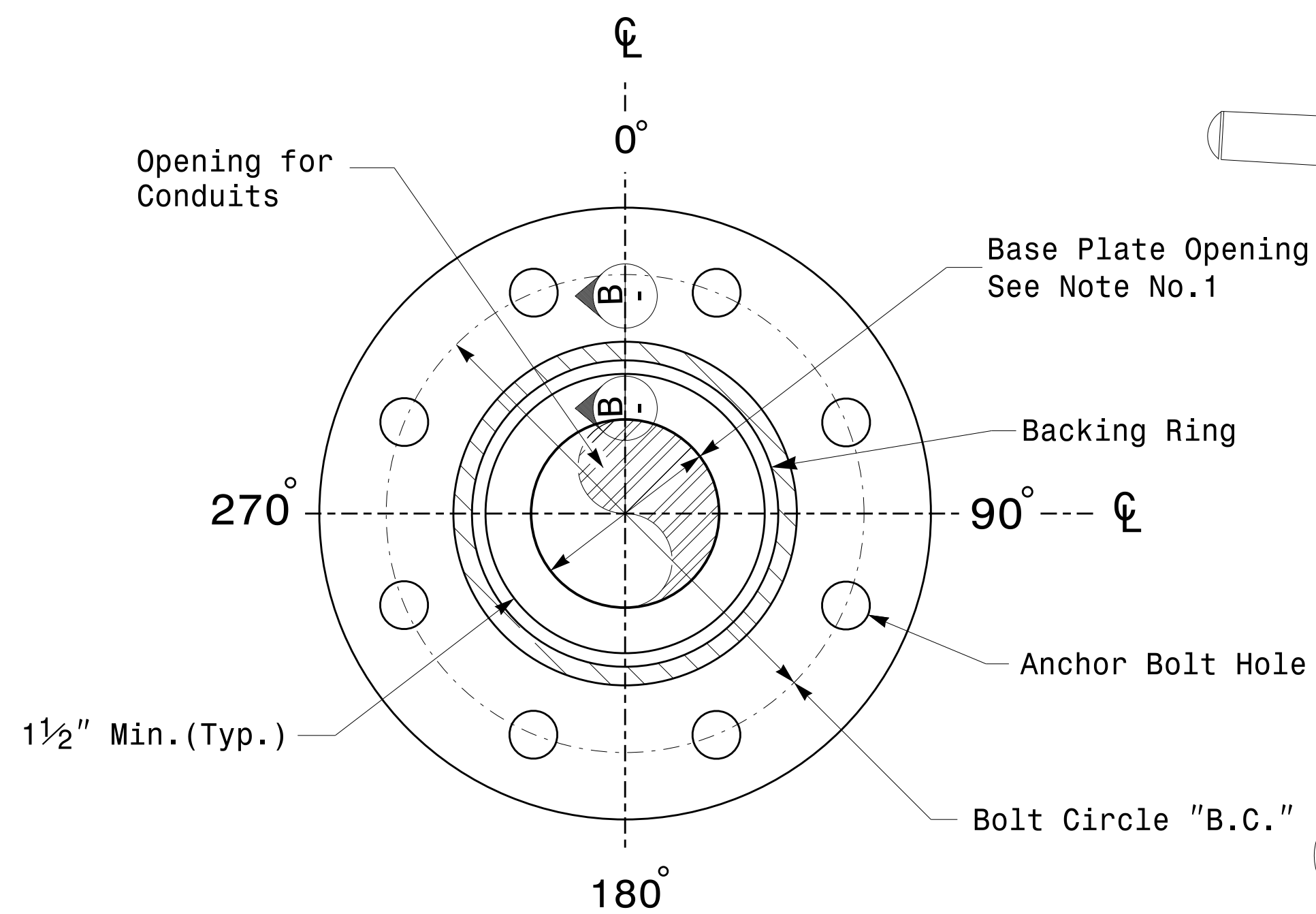
SEAL

 DocuSigned by: *Dibesh C. Sarkar*
 44EB87816FA4F49E
 10/11/2017
 DATE

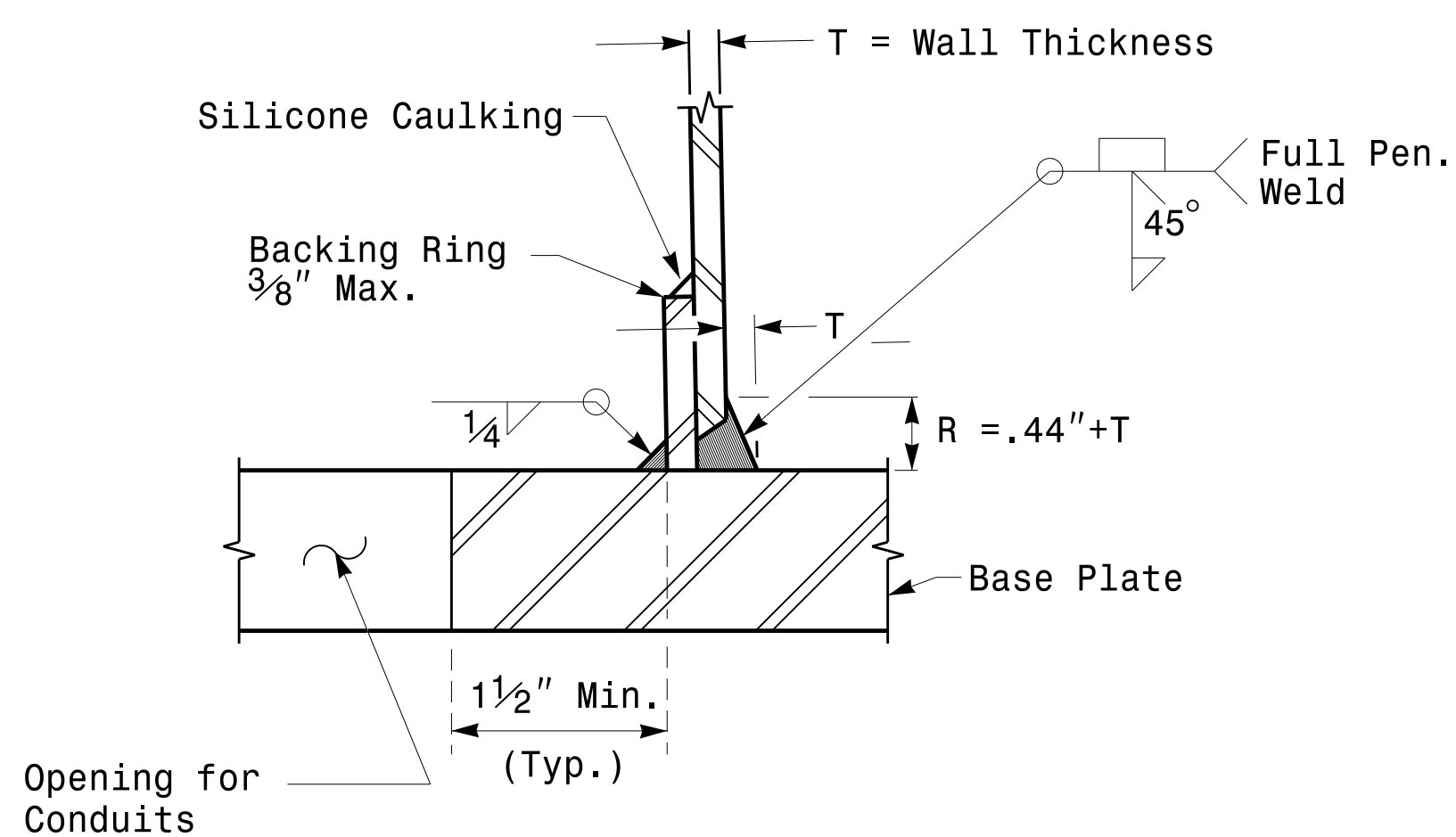
Fabrication Details – Strain Poles

11-0CT-2017-08:25 136504115 Signal&Sigs Design Section Eastern Region\m\ Sheets\2016\2014 Sig.M3 Std. Fabrication Details-Strain Poles.dgn

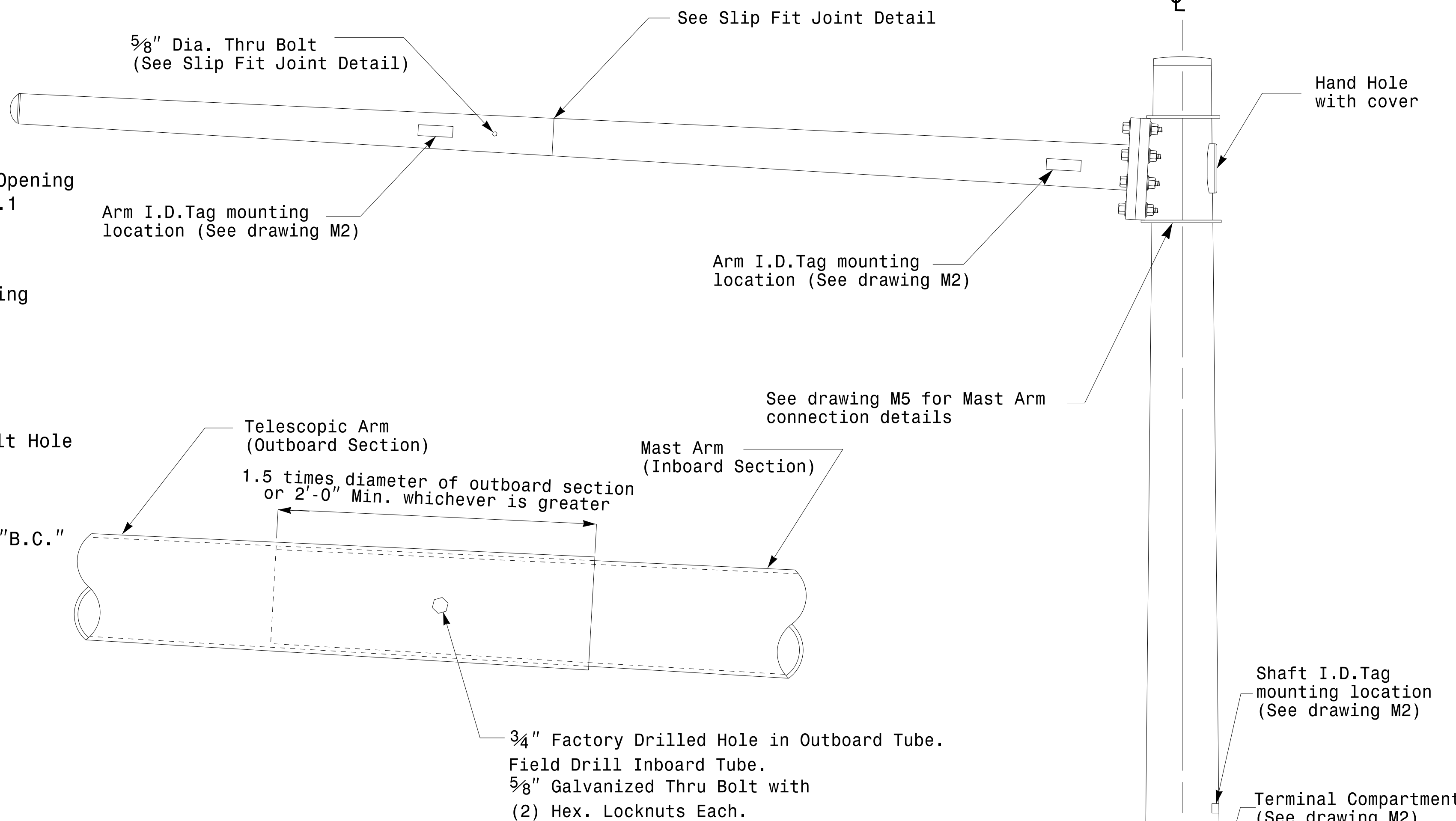
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



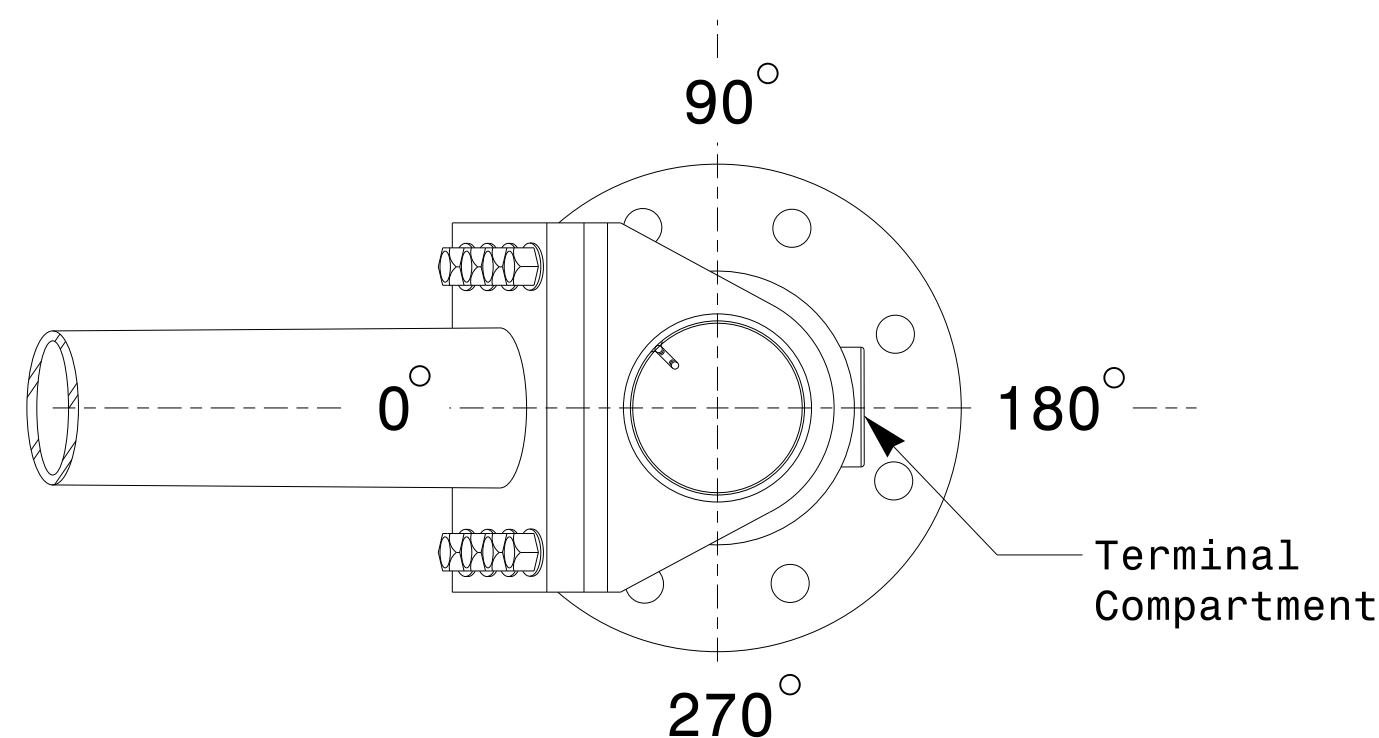
Section A-A
Pole Base Plate Details



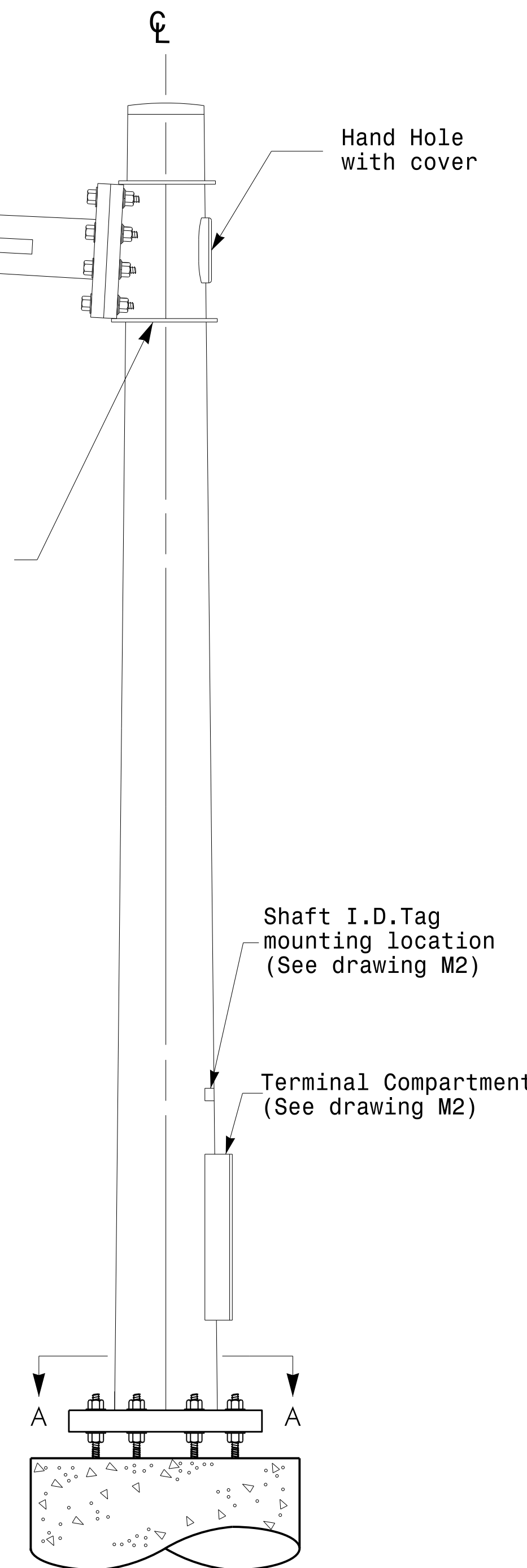
Section B-B
 (Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

Fabrication Details – Mast Arm Poles

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

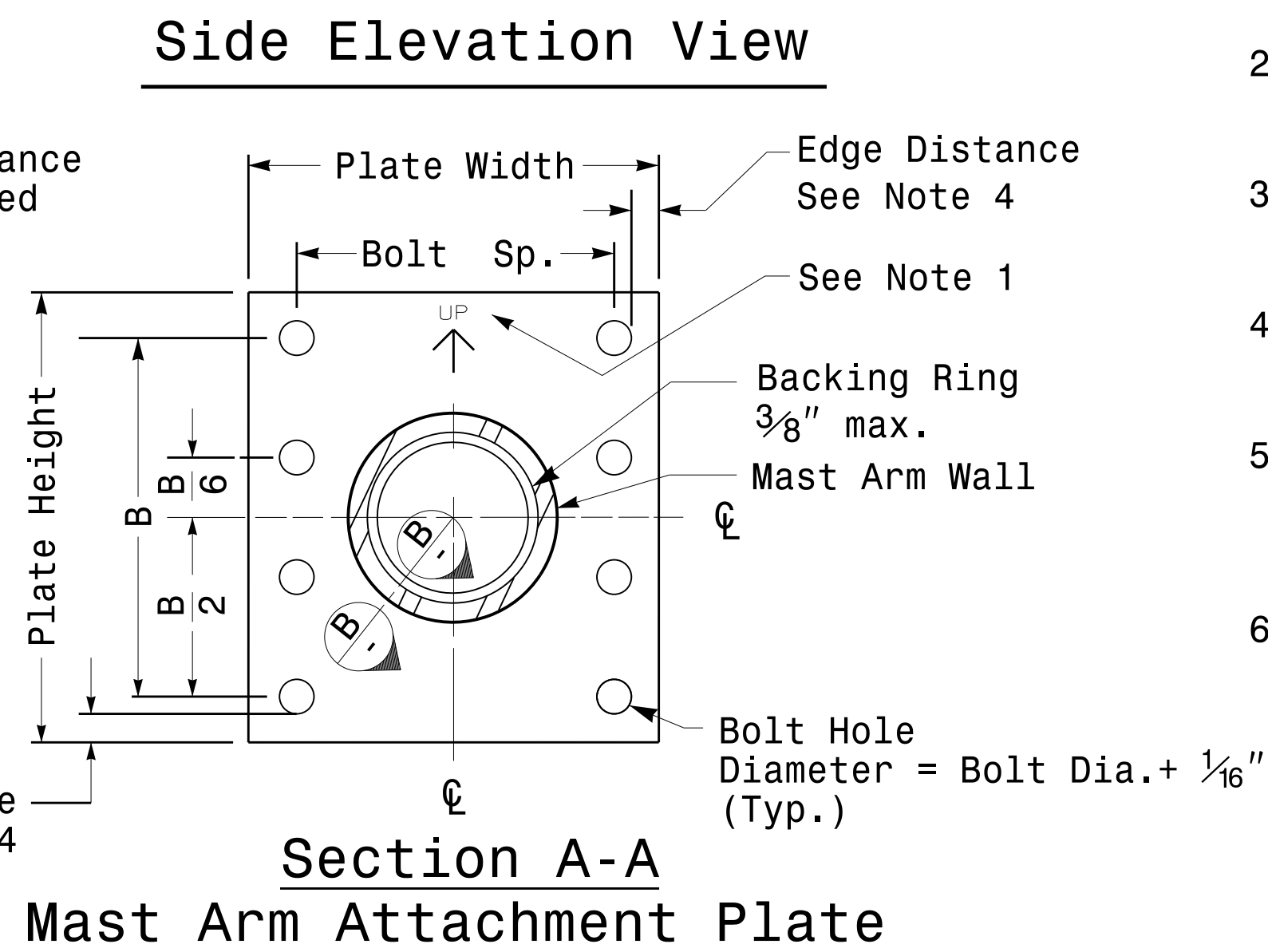
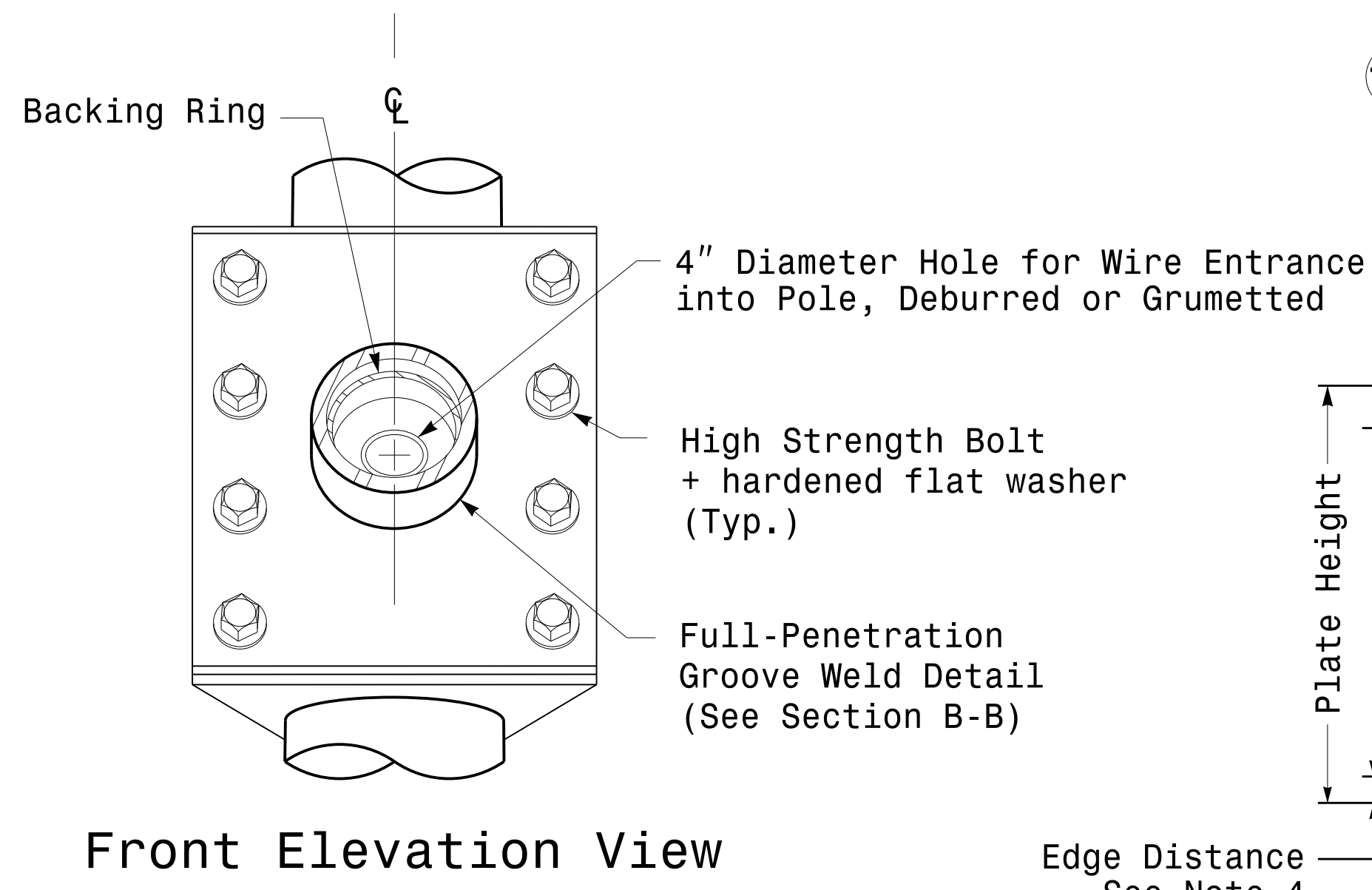
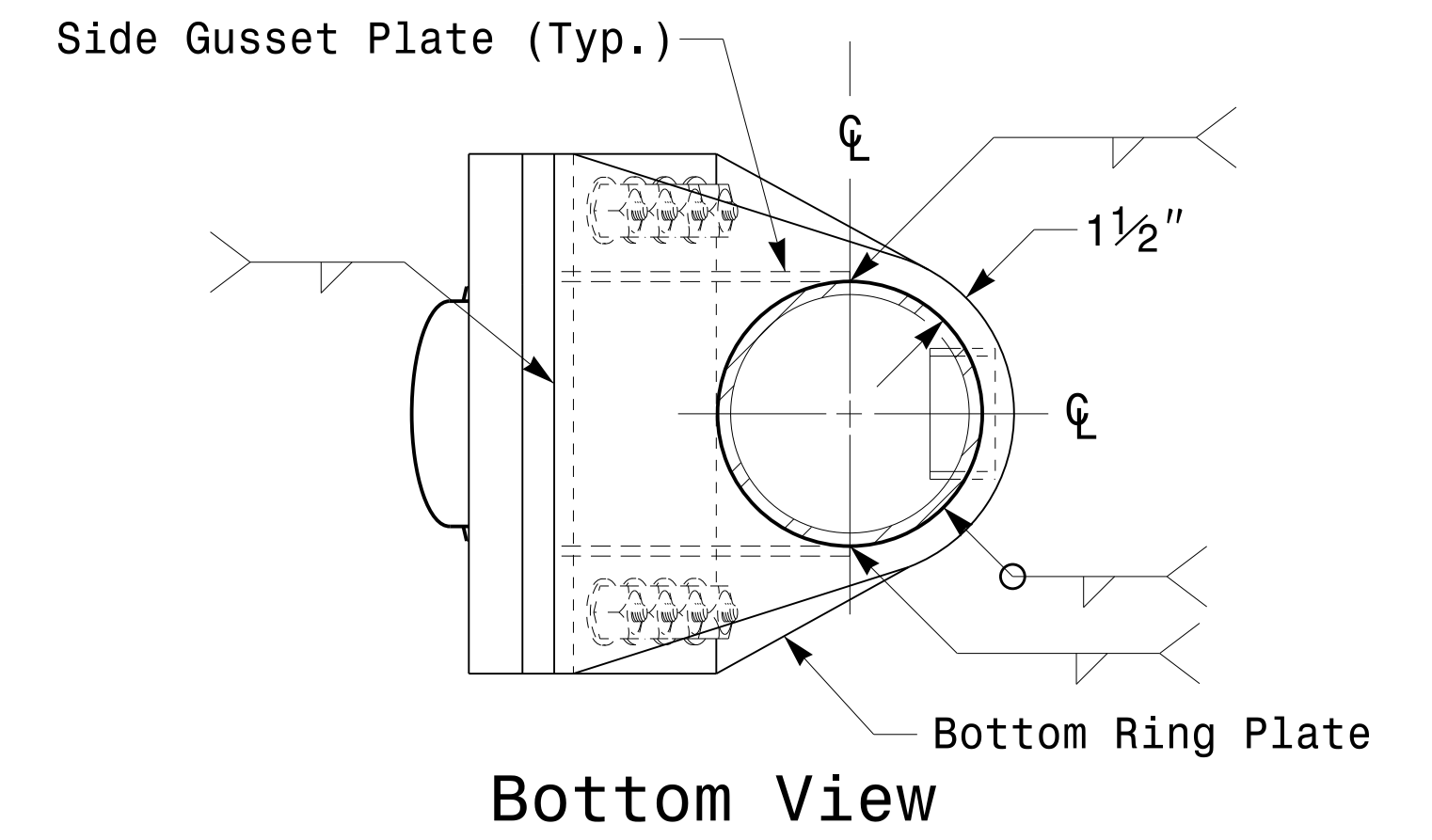
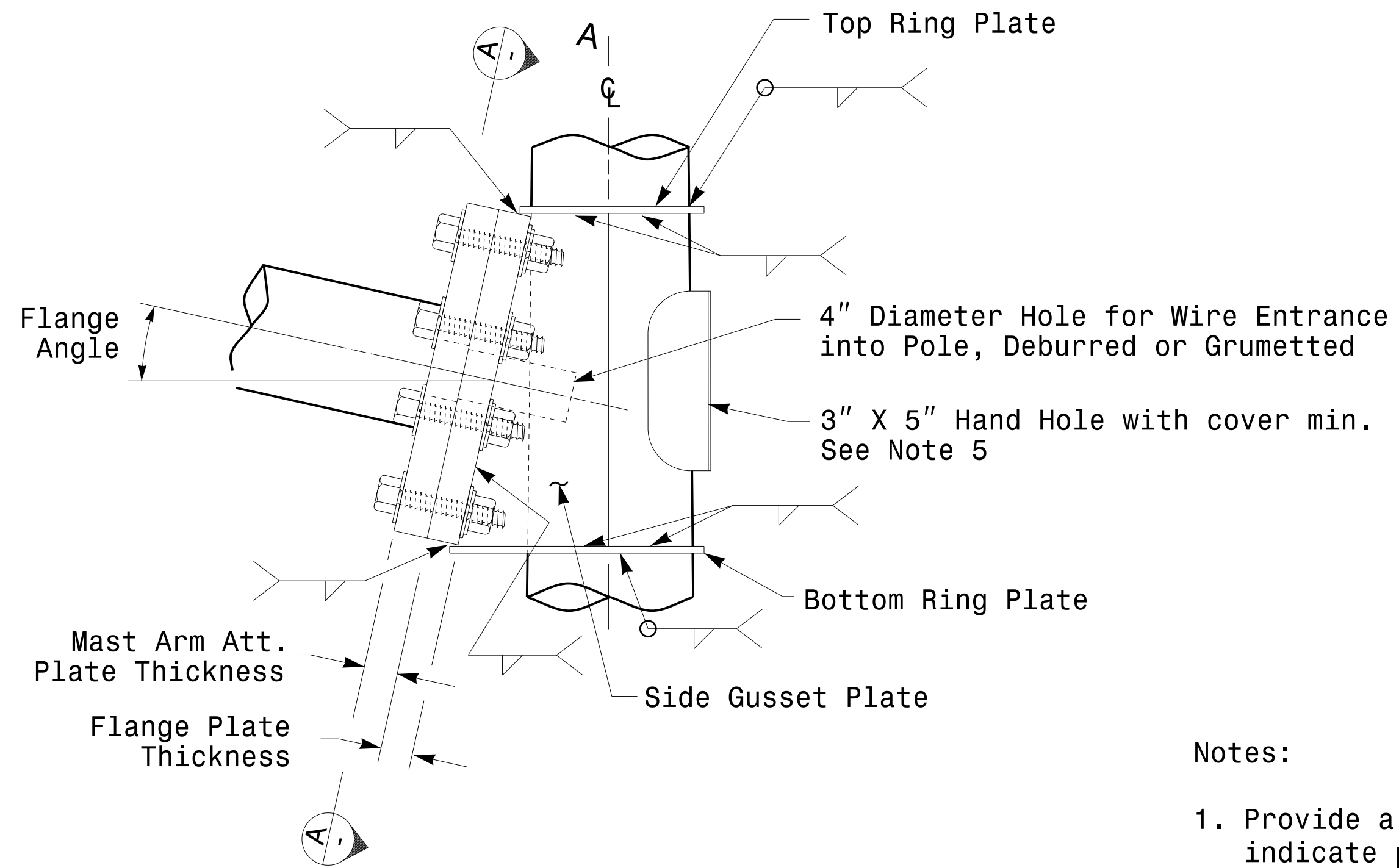
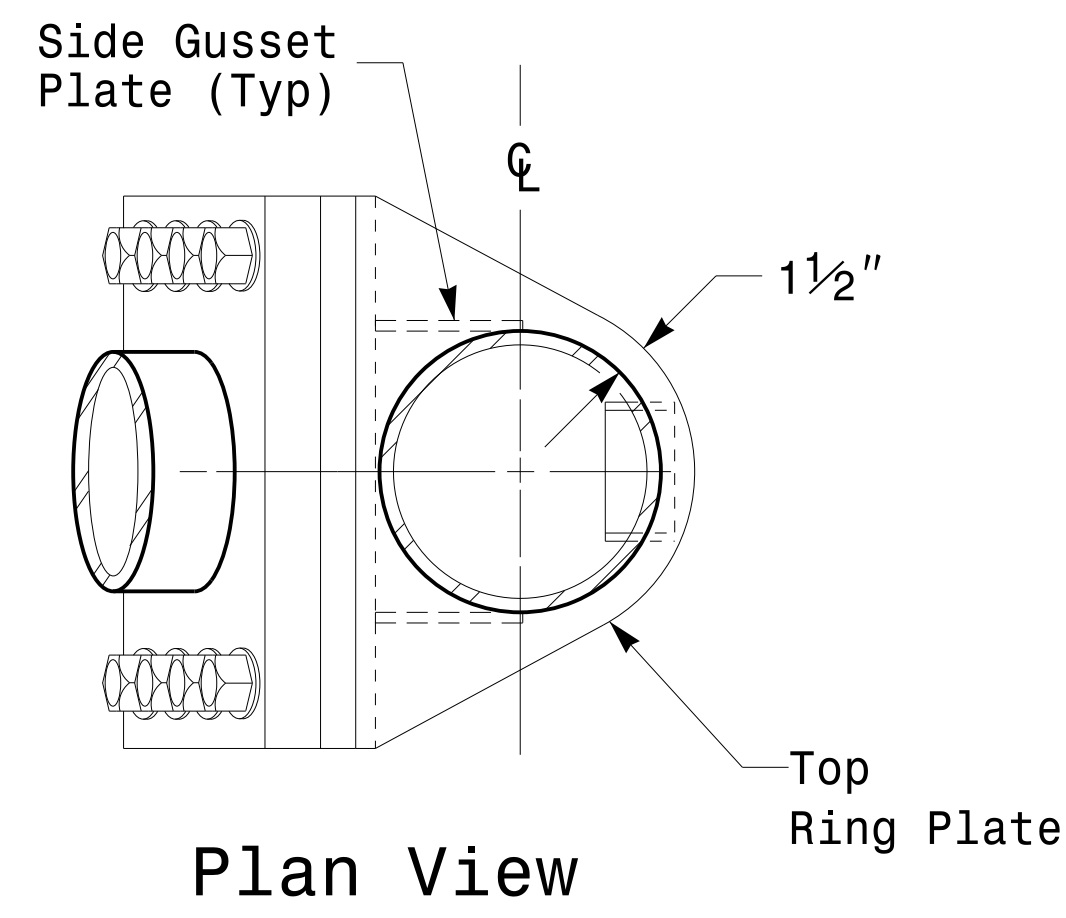
11-OCT-2017 08:33
 C:\Users\jsg\Documents\Signal Design Section\Eastern Region\Signal Design Section\2016\2014 Sig.M4 Std. Fabrication Detail\Mast Arm Poles.dgn
 P12/28

Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.

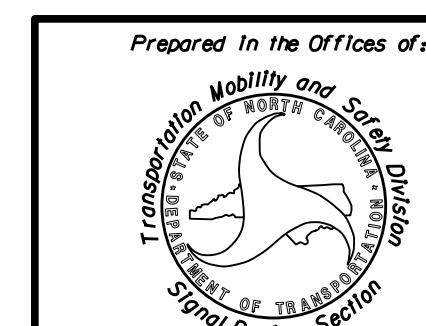
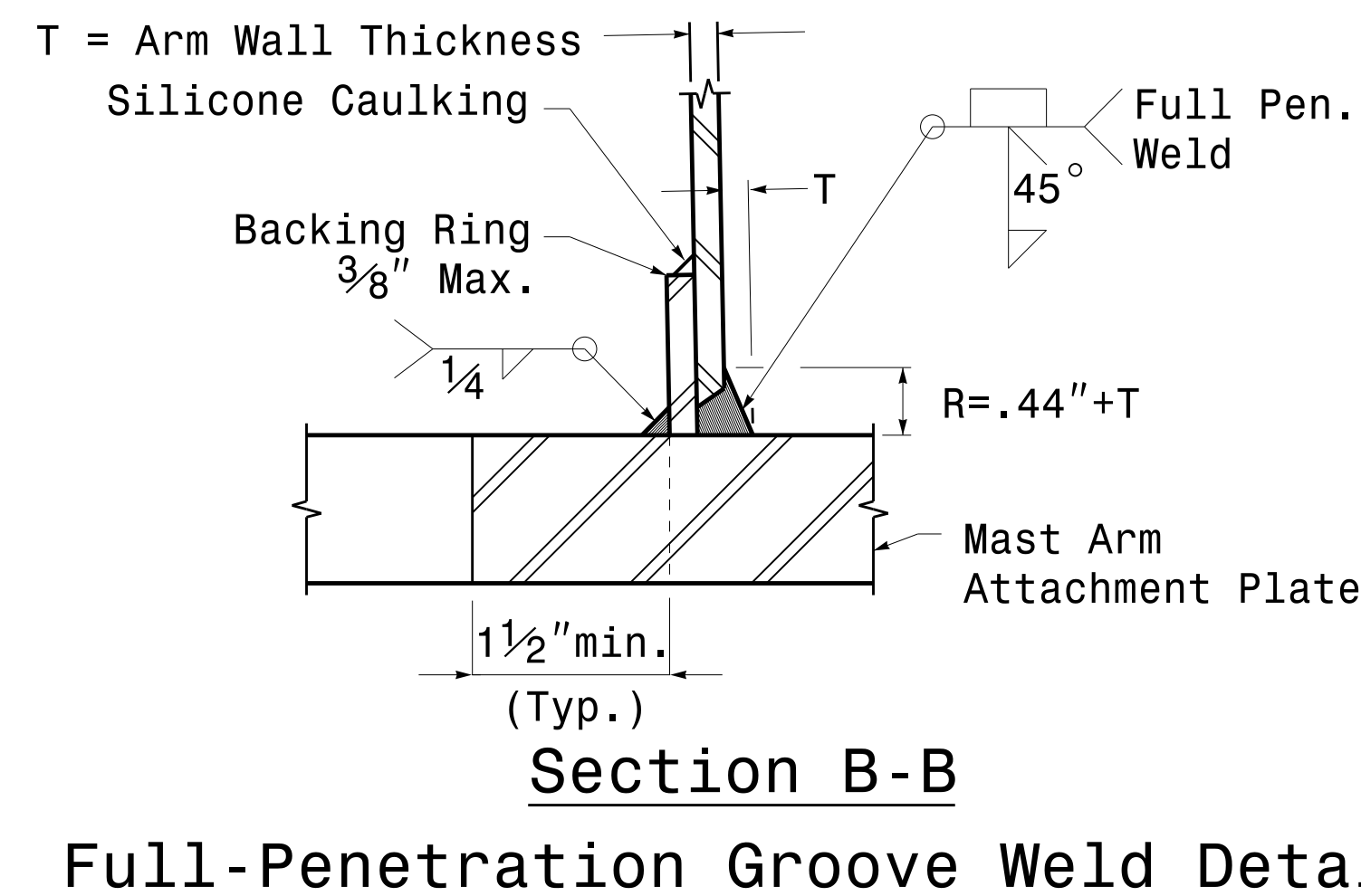
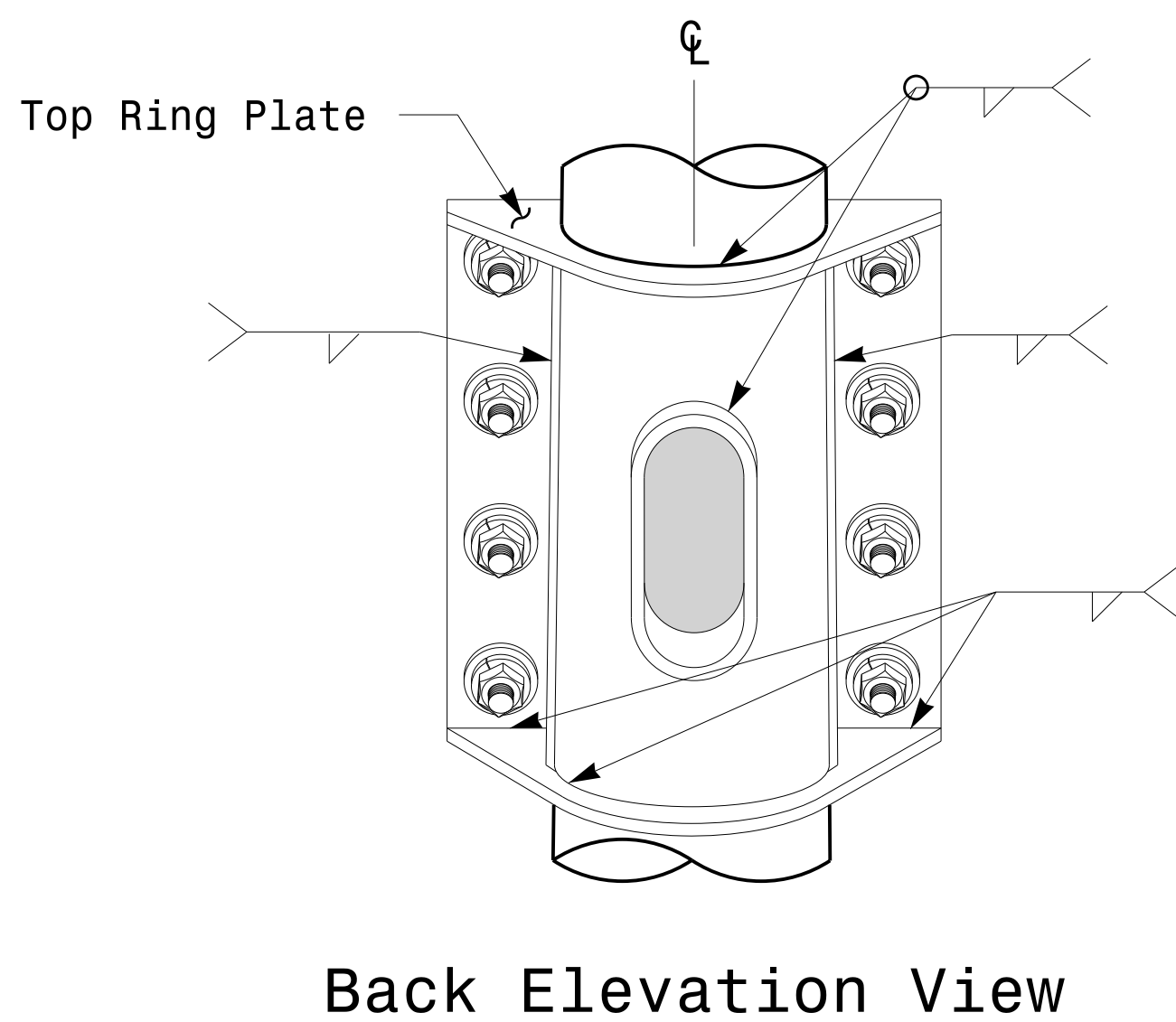
SHEET NO.

Sig.M5



Notes:

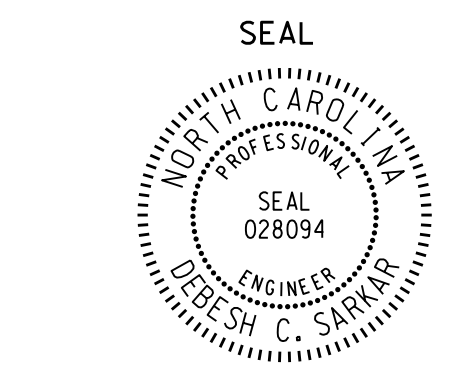
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing appropriate holes at drainage points to drain galvanizing materials.
4. For minimum edge distance follow AISC Table J3.4 and J3.5. For nominal bolt hole size use Table J3.3.
5. Provide upper handhole as necessary when shaft extensions are required for luminaire arms or camera. For poles without luminaires/camera, wiring can be done through the top of pole.
6. Allowable range of flange tilt angle will vary from 0° to as required.



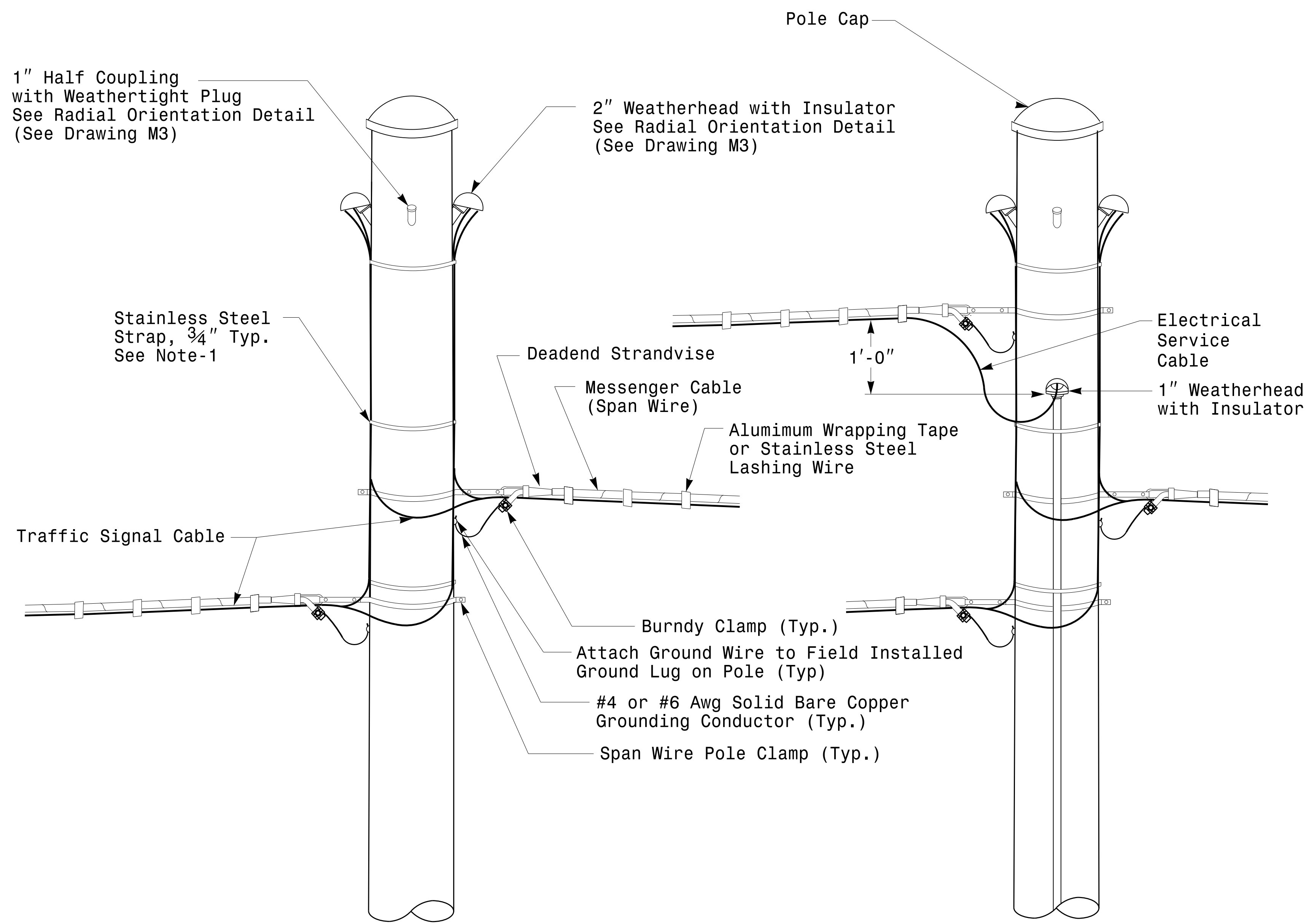
Typical Fabrication Details For Mast Arm Connection To Pole

PLAN DATE: OCTOBER 2017 DESIGNED BY: C.F. ANDREWS
 PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE



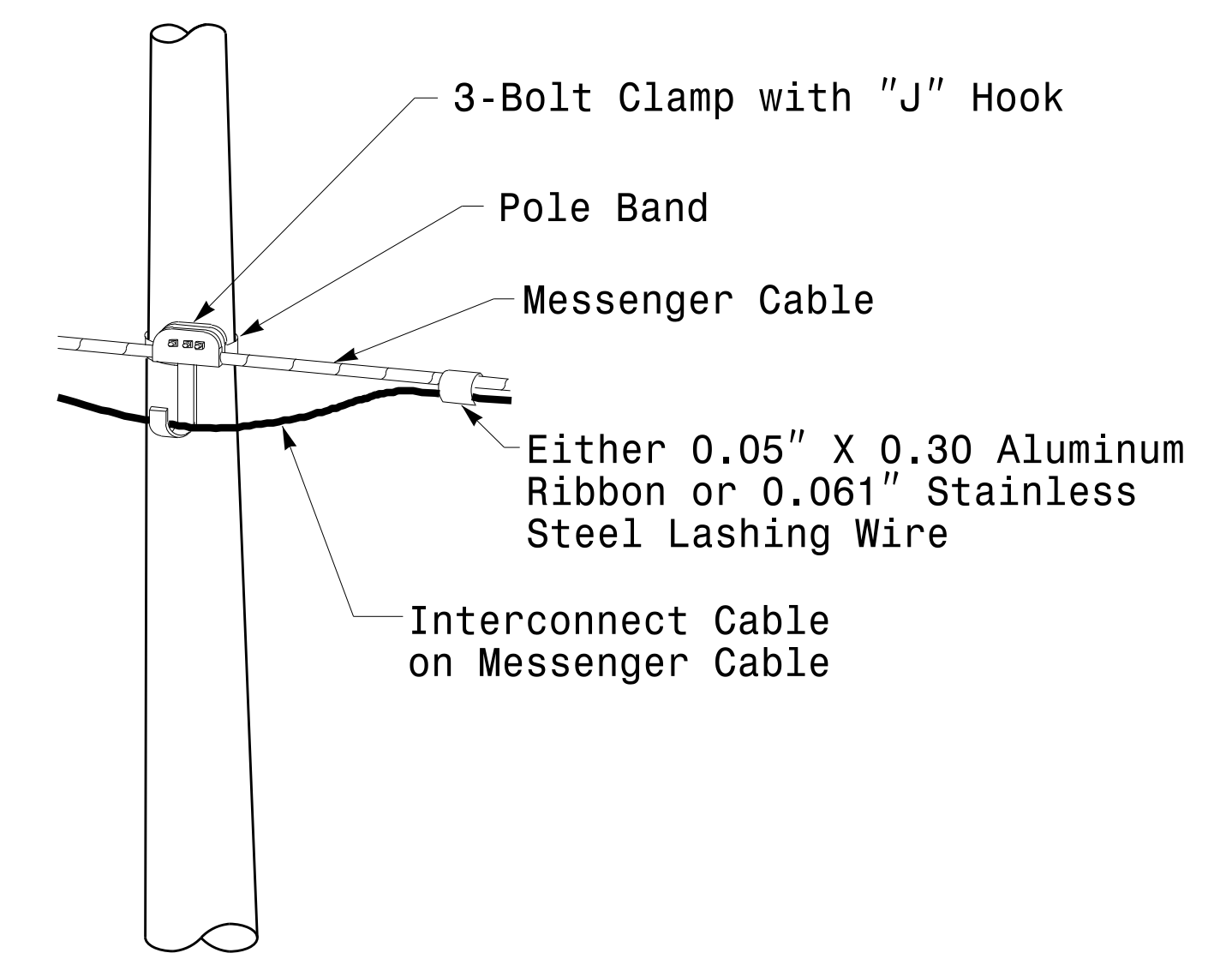
Discussed by: *Dibesh C. Sarkar* 10/11/2017
 DATE



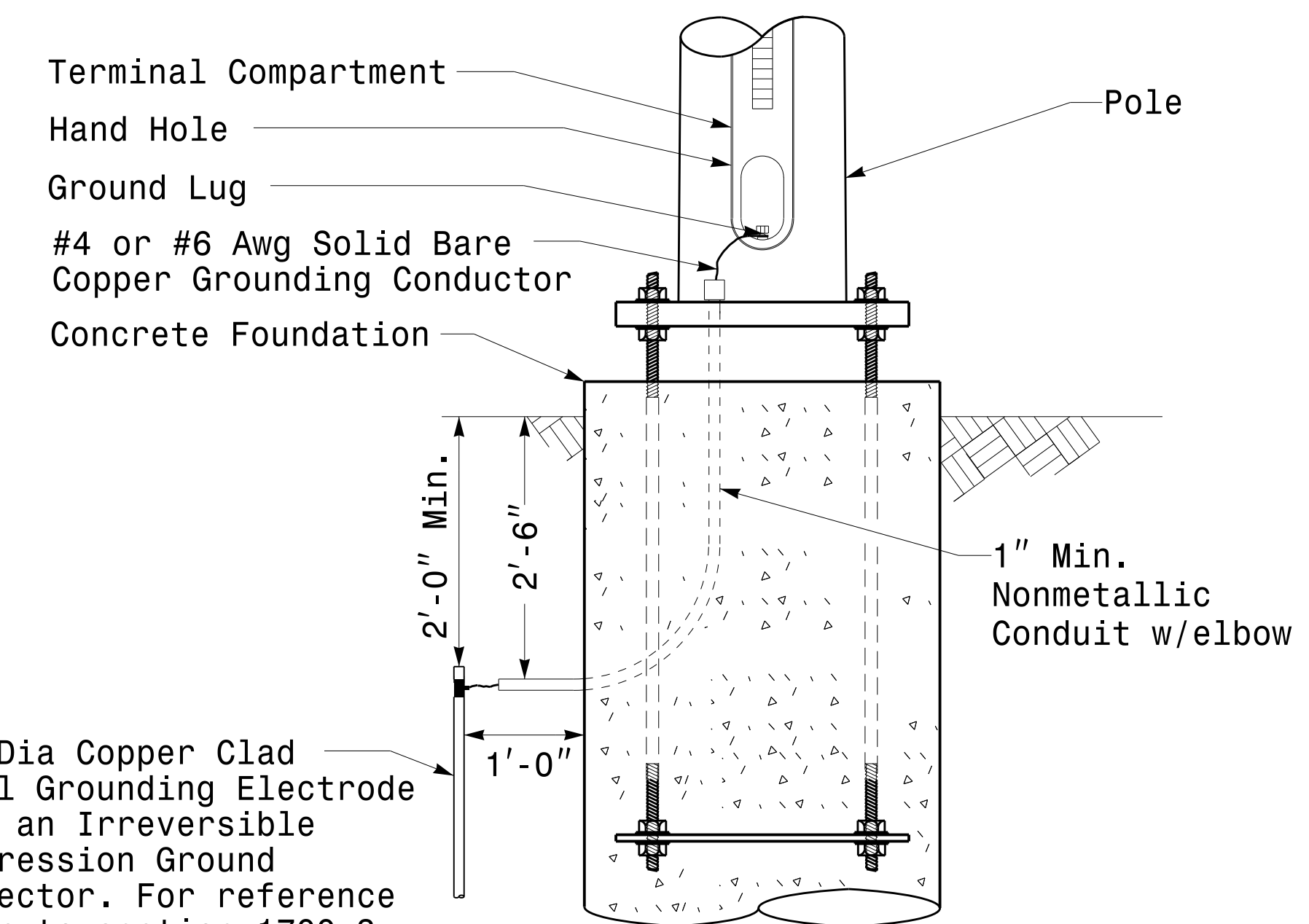
Strain Pole Attachments

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

11-0CT-2017-08:36 136504115 StrainPole.dgn Design Section Eastern Region 0162014 Sig.M6 Std. Fabrication Detail: Strain Poles.dgn

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Strain Pole Attachments</p>		
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: C.F. ANDREWS</p>		REVIEWED BY: D.C. SARKAR
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>DocuSigned by: <i>Deshi C. Sarkar</i></p>			<p>10/11/2017</p>

SOIL CONDITION

		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:

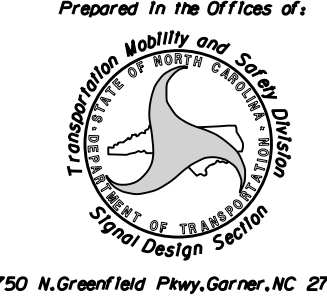
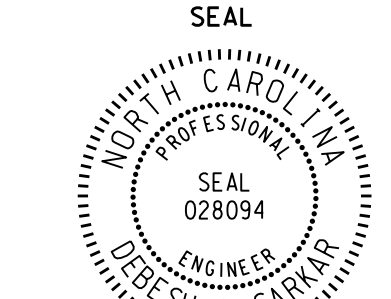
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

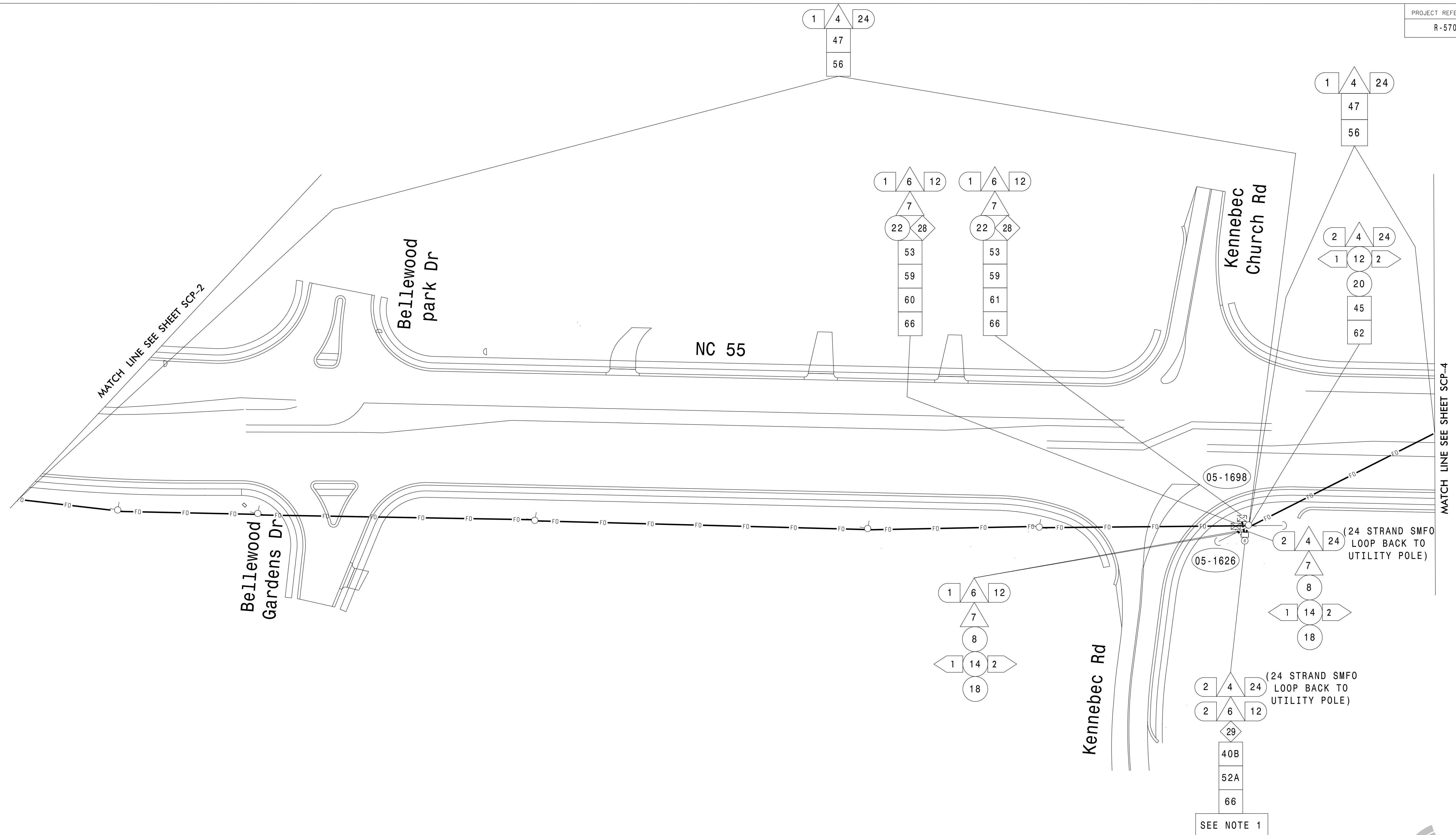
1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or 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

	<p>Standard Strain Pole Foundation for All Soil Conditions</p> <p>PLAN DATE: OCTOBER 2017 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR</p>									
SCALE: 0 NA NONE	REVISIONS: <table border="1" style="font-size: small;"> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DESCRIPTION</th> </tr> <tr> <td>1</td> <td>7/12/2015</td> <td>N.B.</td> <td>Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn.</td> </tr> </table>	NO.	DATE	INIT.	DESCRIPTION	1	7/12/2015	N.B.	Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn.	Documented by: <i>D. C. SARKAR</i> DATE: 10/11/2017
NO.	DATE	INIT.	DESCRIPTION							
1	7/12/2015	N.B.	Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn.							

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NOTES

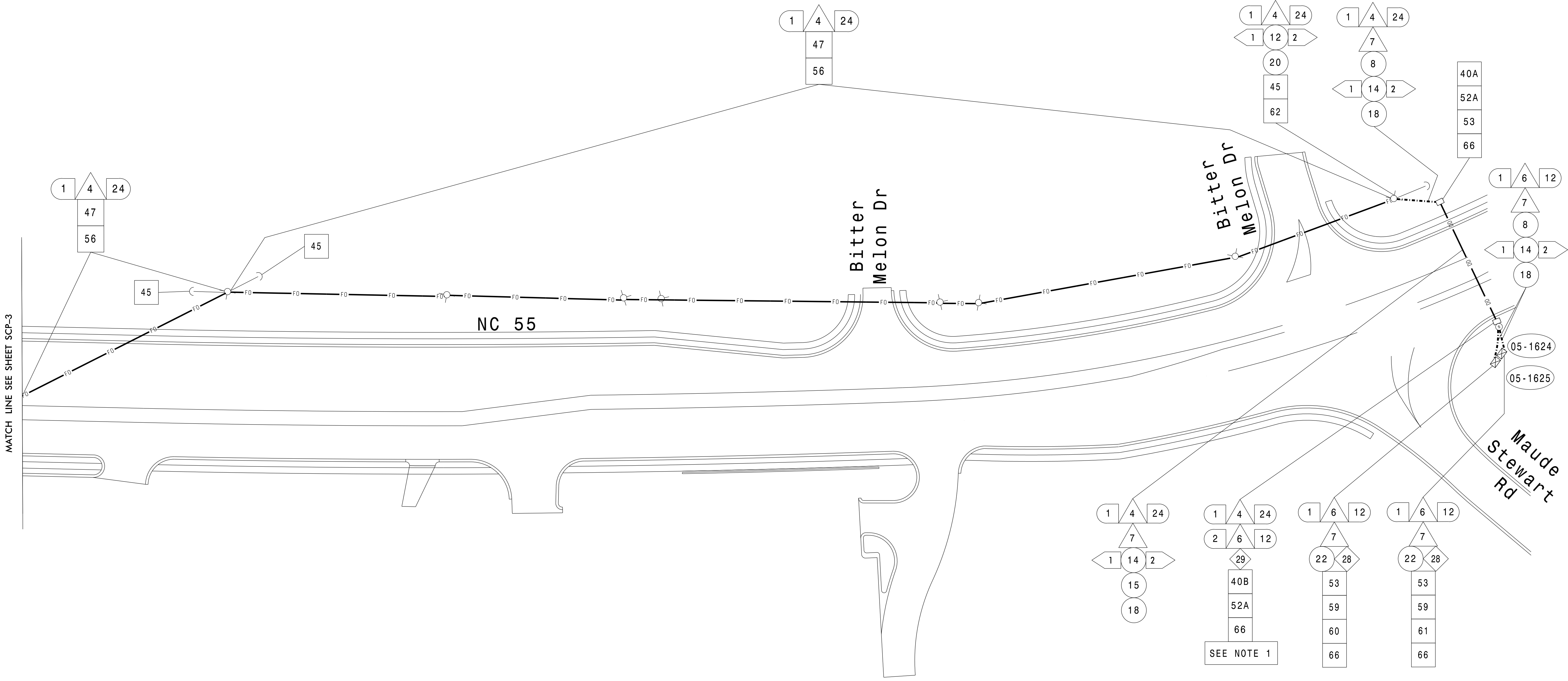
1. STORE 60 FOOT OF COMMUNICATIONS CABLE IN JUNCTION BOX.
2. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT DIVISION 5 ENGINEER, BRANDON JONES, AT (910) 317-4700 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL ALL SIGNALS ARE COMMUNICATING WITH THE CENTRAL SYSTEM.
3. ATTACH NCDOT CABLE 12" BELOW THE LOWEST ATTACHMENT UNLESS OTHERWISE NOTED.

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DOCS\$\$\$\$\$
\$\$\$\$\$SERIAL\$\$\$\$\$



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	<p>Prepared for the Offices of:</p> <p>NC 55 at Kennebec Church Rd/ Kennebec Road Signal System D05-50</p>		<p>SEAL</p>
	<p>Division 5 Wake County Fuquay-Varina</p> <p>PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis</p> <p>PREPARED BY: S.R. Chiluka REVIEWED BY: M.L. Stygles</p>	<p>REVISIONS INIT. DATE</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p> <p>SCALE: 0 40</p>	<p>SIGNATURE DATE</p> <p>S.R. Chiluka 7/12/2022</p>		<p>SIG. INVENTORY NO. 05-1626/1698</p>



NOTES

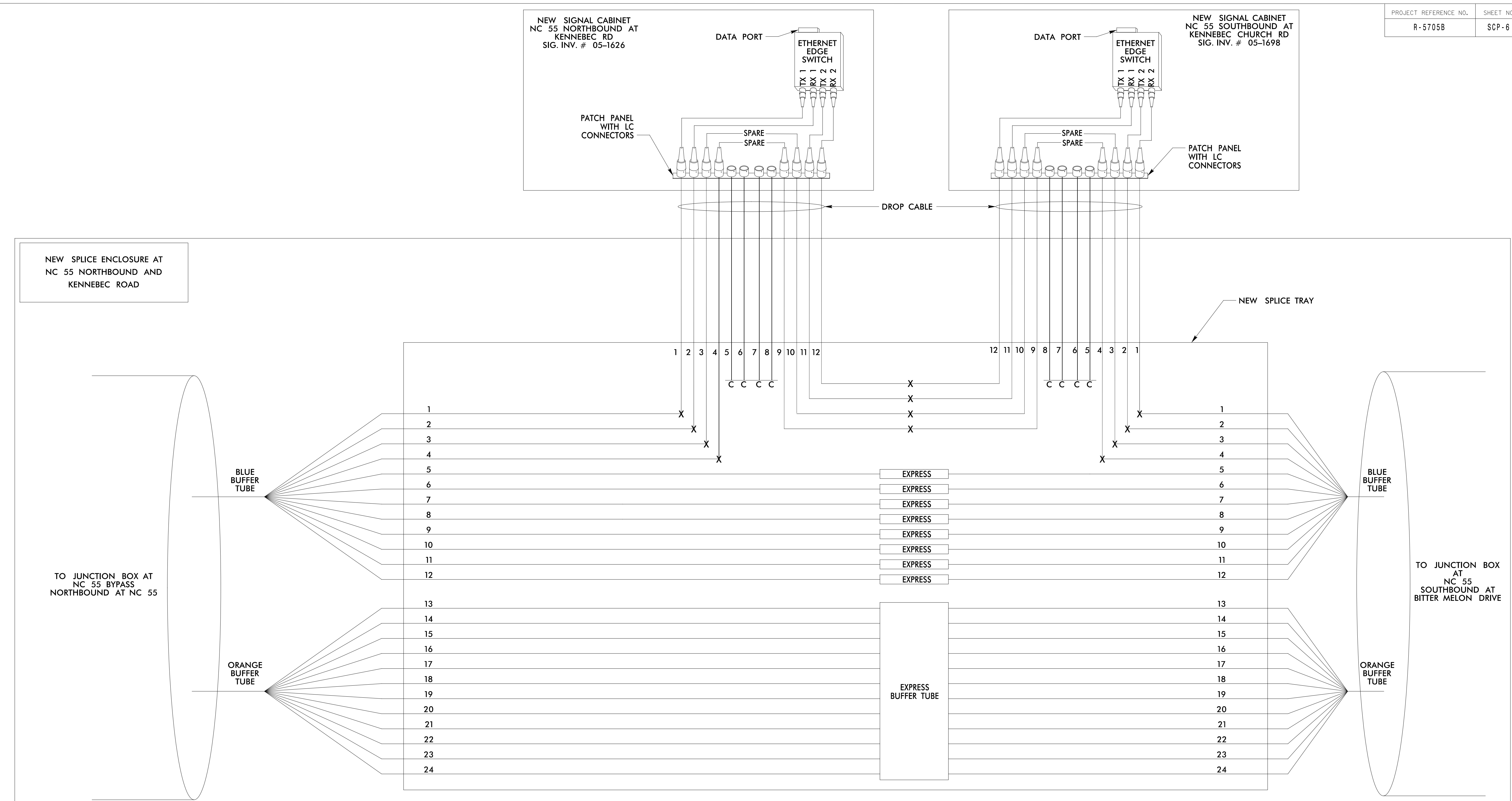
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2. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT DIVISION 5 ENGINEER, BRANDON JONES, AT (910) 317-4700 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL ALL SIGNALS ARE COMMUNICATING WITH THE CENTRAL SYSTEM.
3. ATTACH NCDOT CABLE 12" BELOW THE LOWEST ATTACHMENT UNLESS OTHERWISE NOTED.

\$\$\$\$\$SYTIME\$\$\$\$\$
 \$\$\$DOCSIGN\$\$\$\$\$
 \$\$\$USERNAME\$\$\$\$\$



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	NC 55 at Bitter melon Dr/ Maude Stewart Road Signal System D05-50		
	Division 5 Wake County Fuquay-Varina		
PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis			
PREPARED BY: S.R. Chiluka REVIEWED BY: M.L. Stygles			
REVISIONS: _____ INIT. DATE			7/12/2022
SCALE: 0 = 40'			SIG. INVENTORY NO. 05-1624/1625



NOTES

1. STORE 60 FEET OF COMMUNICATIONS CABLES ON EACH SIDE OF SPLICE ENCLOSURE IN JUNCTION BOX.
2. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT DIVISION 5 ENGINEER, BRANDON JONES, AT (910) 317-4700 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL ALL SIGNALS ARE COMMUNICATING WITH THE CENTRAL SYSTEM.
3. CONTRACTOR SHALL PROVIDE AS-BUILT PLANS TO THE ENGINEER FOR FINAL SPLICE ARRANGEMENT.
4. UNUSED/UNTERMINATED FIBER OPTIC STRANDS SHALL BE LEFT COILED, CAPPED, AND STORED IN THE SPLICE TRAYS/ENCLOSURES.
5. INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFER TO SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"
 - 1) SPLICE LOCATION
 - 2) DATE
 - 3) COMPANY NAME
 - 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING
6. PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPHY SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE AND SUBIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

LEGEND

- | | |
|--|--|
| <p>COLOR CODE
TIA/EIA 598-A</p> <p>(1) BLUE (7) RED
(2) ORANGE (8) BLACK
(3) GREEN (9) YELLOW
(4) BROWN (10) VIOLET
(5) SLATE (11) ROSE
(6) WHITE (12) AQUA</p> | <p>X = NEW FUSION SPLICE INDIVIDUAL FIBER
C = CAP, COIL, AND SEAL</p> <p>[EXPRESS BUFFER TUBE] = EXPRESS ENTIRE BUFFER TUBE THROUGH WITHOUT CUTTING
[EXPRESS] = EXPRESS INDIVIDUAL FIBER THROUGH WITHOUT CUTTING
[BUFFER SPLICE] = SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR</p> |
|--|--|

NC Dept of Transportation
Division of Highways

Final Drawing Date: _____

ITS & Signals Unit

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Splicing Details
NC 55 at
Kennebec Church Rd/
Kennebec Road

Division 5 Wake County Fuquay-Varina

PLAN DATE: July 2022 REVIEWED BY: J.L. Lewis
PREPARED BY: S.R. Chiluka REVIEWED BY: M.L. Stygles

REVISIONS	INIT.	DATE

SEAL

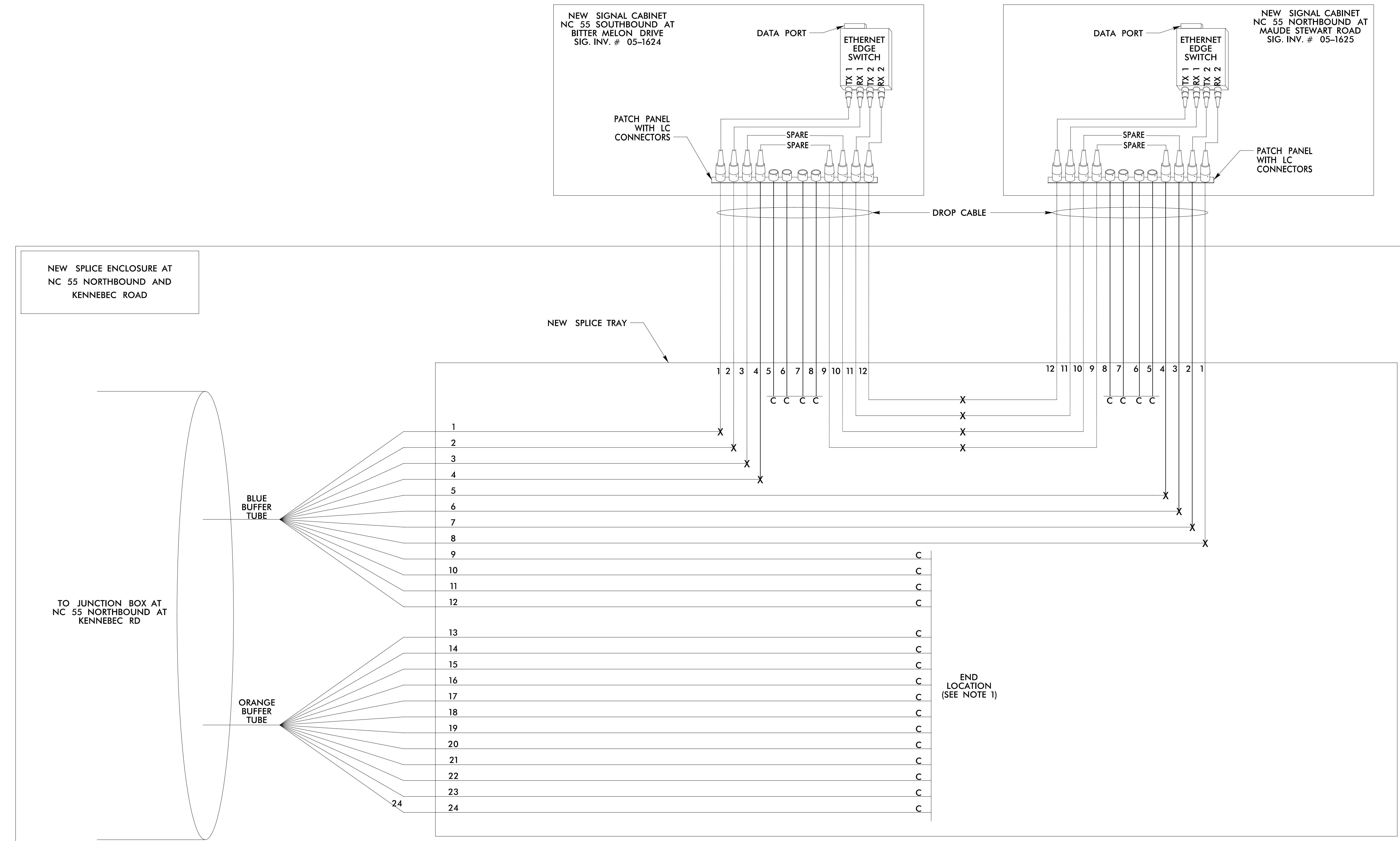
7/12/2022

SIGNATURE DATE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

7/12/2022 R5705B_202206_SCP-6.dgn sch11.tukg



NOTES

1. STORE 60 FEET OF COMMUNICATIONS CABLES ON EACH SIDE OF SPLICE ENCLOSURE IN JUNCTION BOX.
2. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT DIVISION 5 ENGINEER, BRANDON JONES, AT (910) 317-4700 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL ALL SIGNALS ARE COMMUNICATING WITH THE CENTRAL SYSTEM.
3. CONTRACTOR SHALL PROVIDE AS-BUILT PLANS TO THE ENGINEER FOR FINAL SPLICE ARRANGEMENT.
4. UNUSED/UNTERMINATED FIBER OPTIC STRANDS SHALL BE LEFT COILED, CAPPED, AND STORED IN THE SPLICE TRAYS/ENCLOSURES.
5. INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFER TO SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"
 - 1) SPLICE LOCATION
 - 2) DATE
 - 3) COMPANY NAME
 - 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING
6. PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPHY SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE AND SUBIT PHOTOGRAPH ALONG WITH OTRD TEST RESULTS.

LEGEND

COLOR	CODE	
TIA/EIA	598-A	
(1) BLUE	(7) RED	
(2) ORANGE	(8) BLACK	
(3) GREEN	(9) YELLOW	
(4) BROWN	(10) VIOLET	
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X	= NEW FUSION SPLICE INDIVIDUAL FIBER
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BUFFER SPLICE	= SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR

NC Dept of Transportation
Division of Highways
Final Drawing Date: _____
ITS & Signals Unit



Splicing Details		
NC 55 at Bitter Melon Drive/ Maude Stewart Road		
Division 5	Wake County	Fuquay-Varina
PLAN DATE: July 2022	REVIEWED BY: J.L. Lewis	
PREPARED BY: S.R. Chiluka	REVIEWED BY: M.L. Stygles	
REVISIONS	INIT.	DATE



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SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 047250
S. R. CHILUKA
7/12/2022
DATE

7/12/2022
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