

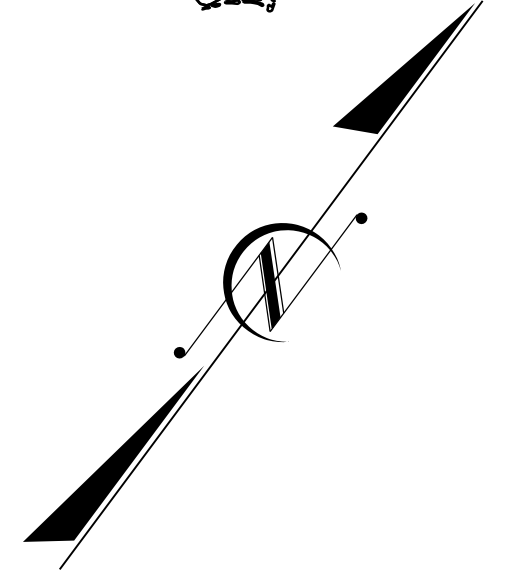
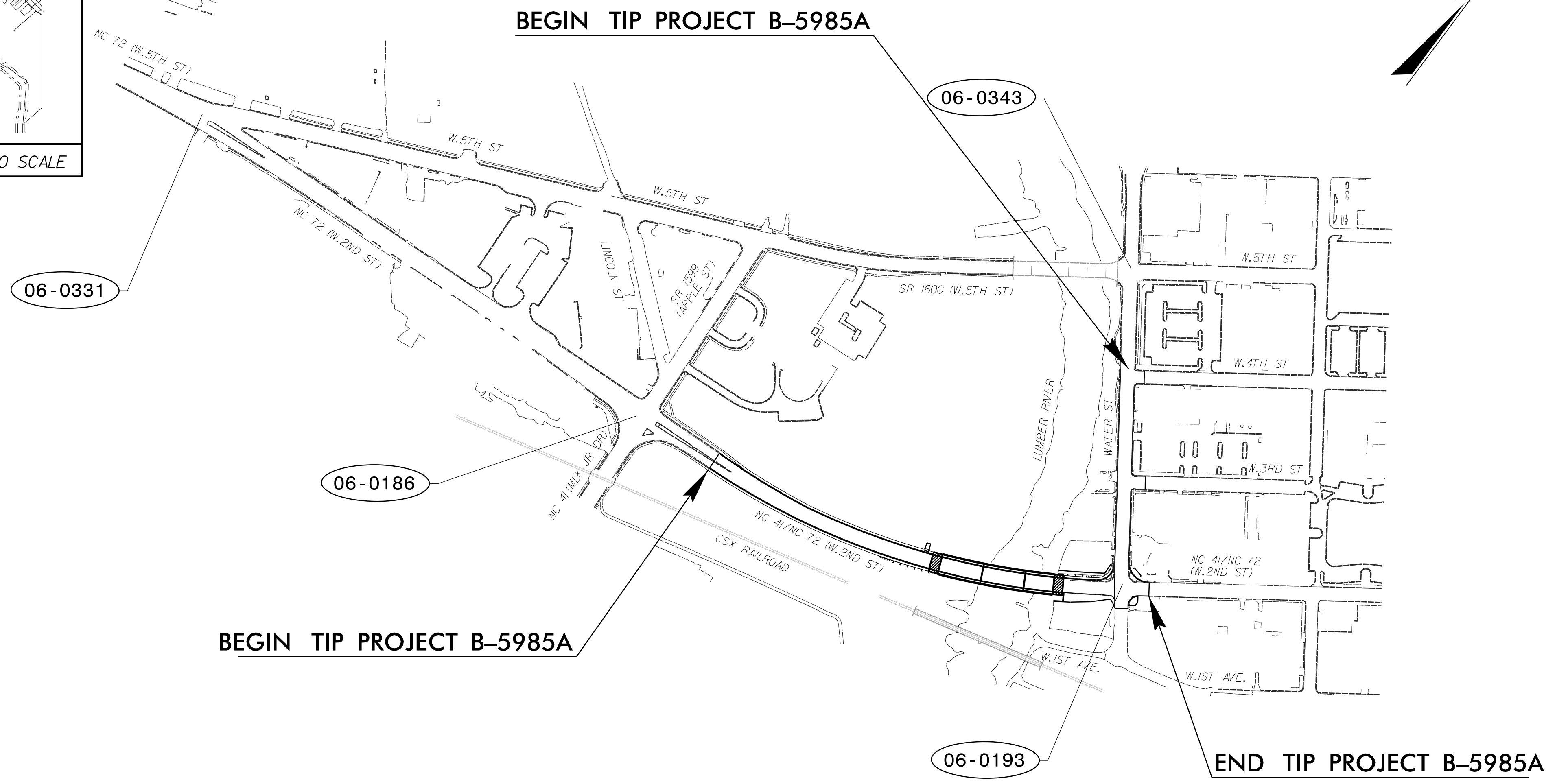
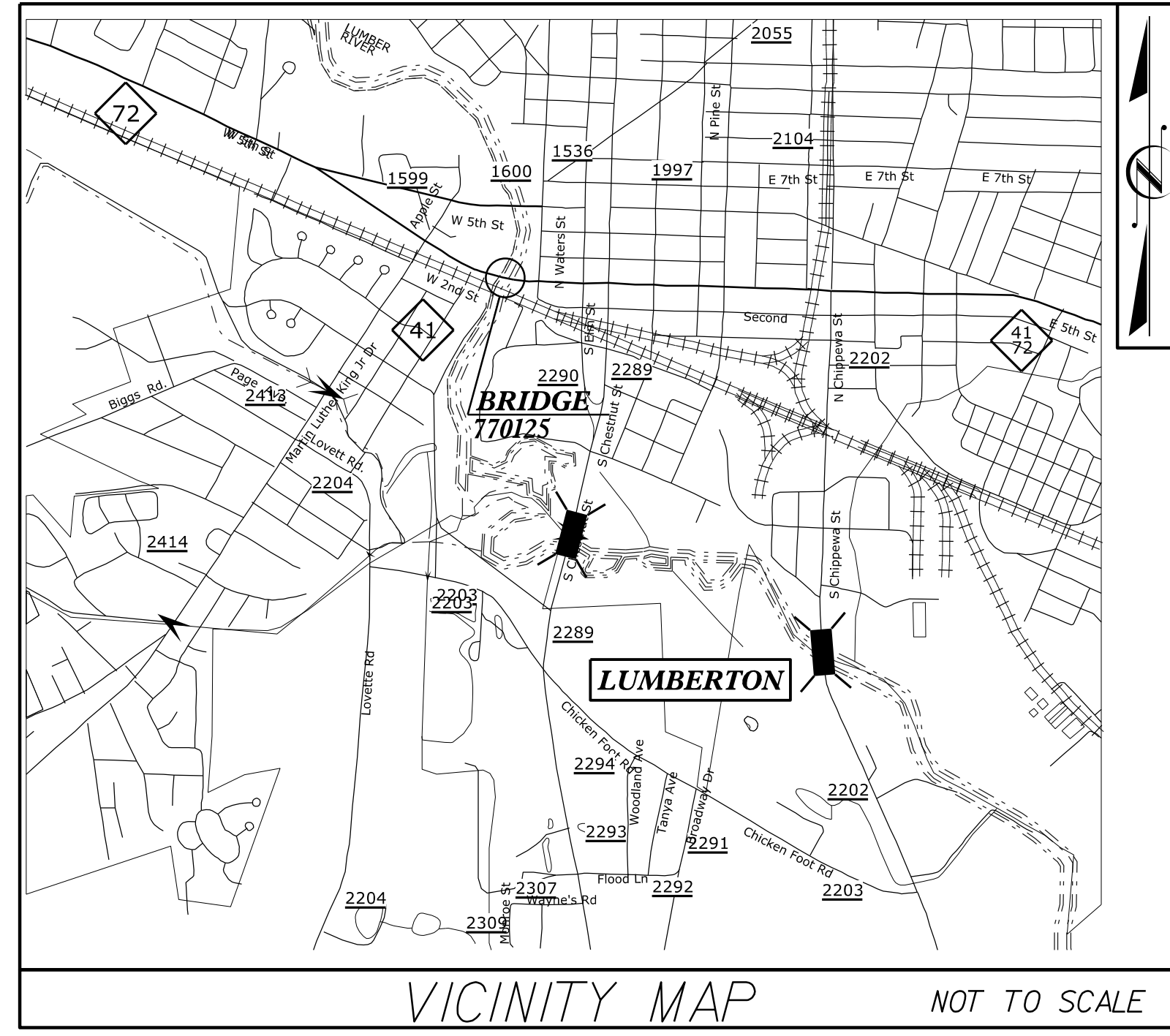
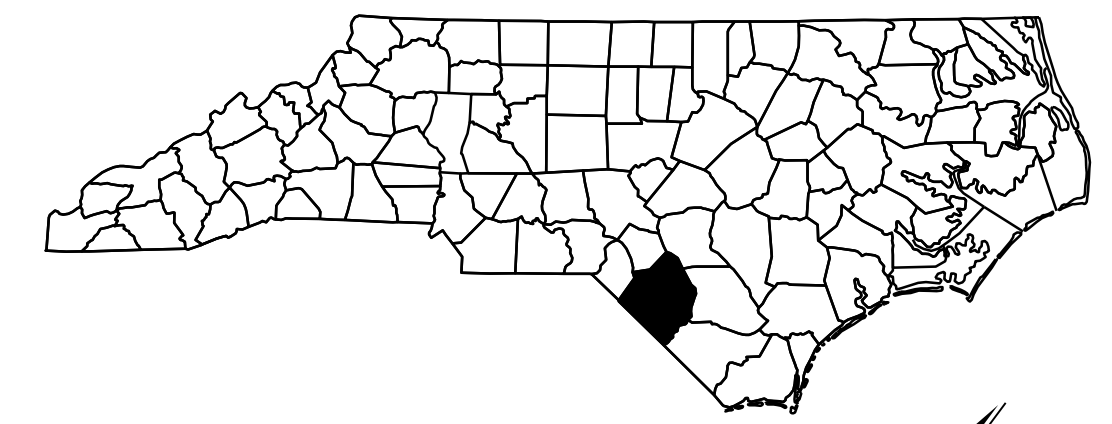
TIP PROJECT: B-5985A

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

ROBESON COUNTY

LOCATION: BRIDGE NO. 770125 OVER LUMBER RIVER ON NC 41/72

TYPE OF WORK: TRAFFIC SIGNALS



Index of Plans	
Sheet #	Location/Description
<i>Title Sheet</i> Standard Plate Sheets	
SIG 1.0 to SIG 1.2	
SIG 2.0 to SIG 2.1	06-0193T - NC 41/NC 72 (West 2nd Street) @ SR 1536 (Water Street)
SIG 3.0 to SIG 3.5	06-0193 - NC 41/NC 72 (West 2nd Street) @ SR 1536 (Water Street)
SIG 4.0 to SIG 4.3	06-0343T - SR 1600 (West 5th Street) @ SR 1536 (Water Street)
SIG 5.0 to SIG 5.3	06-0186T - NC 72/NC 41-72 (West 2nd Street) @ NC 41/SR 1599 (MLK Jr. Dr)
SIG 6.0 to SIG 6.3	06-0186 - NC 72/NC 41-72 (West 2nd Street) @ NC 41/SR 1599 (MLK Jr. Dr)
SIG 7.0 to SIG 7.1	06-0331T - NC 72 (West Fifth St.)(West Second St.) @ SR 1600 (West Fifth St.)
SIG 8.0 to SIG 8.1	06-0331 - NC 72 (West Fifth St.)(West Second St.) @ SR 1600 (West Fifth St.)
MI to M8	Metal Pole Standards
LEGEND	
XX-XXXX	SIGNAL INVENTORY NUMBER
XX-XXXX	SIGNAL REMOVAL

**TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATION UNIT**

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Gregory A. Green
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Prepared for the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY & SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

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Regina Muncey, PE
Transportation Engineer

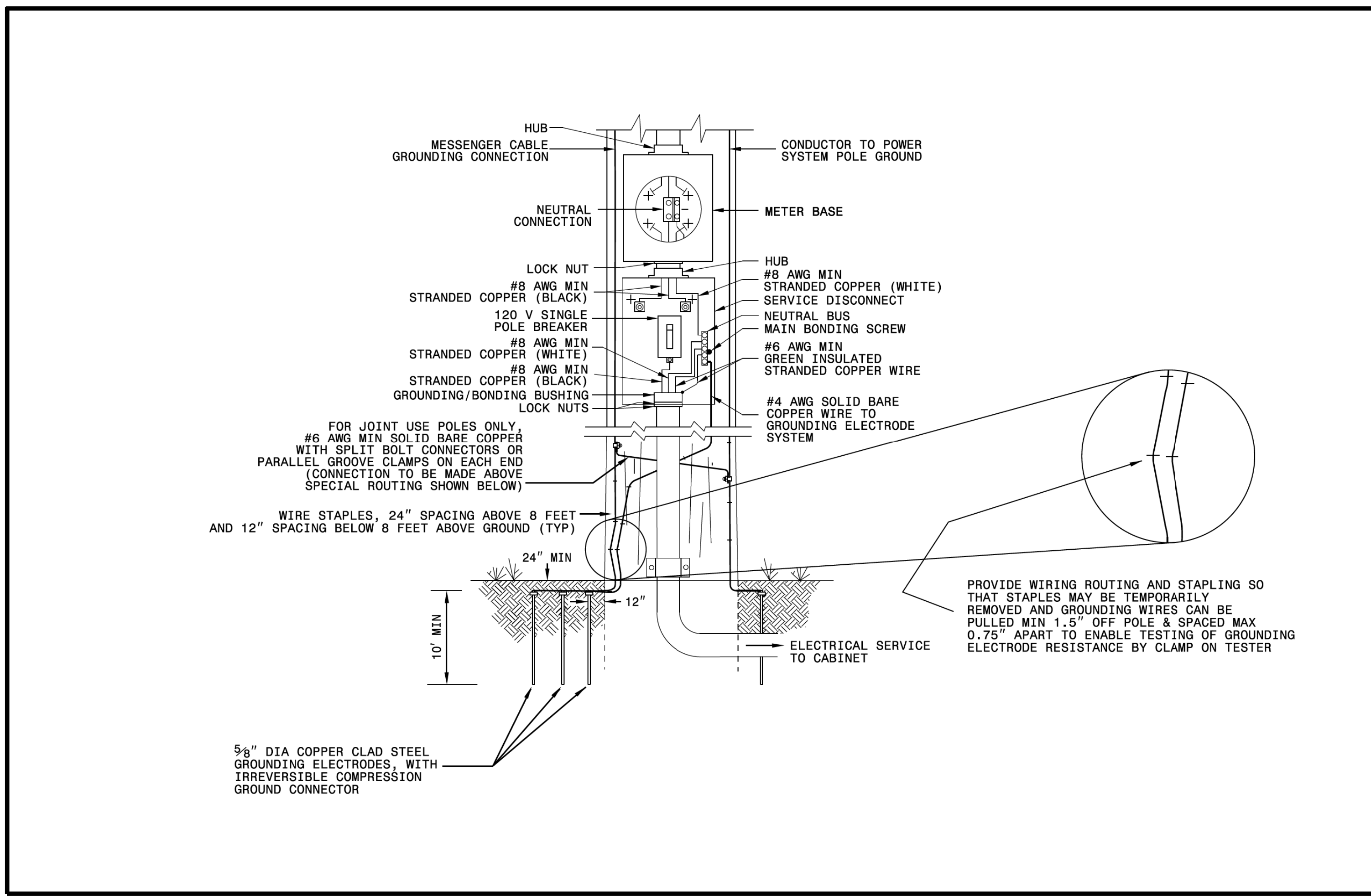
Derrick Waller, PE
Transportation Engineer

James Hambricht
Senior Transportation Technician

APPROVED:

DATE: 2/2/2023

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

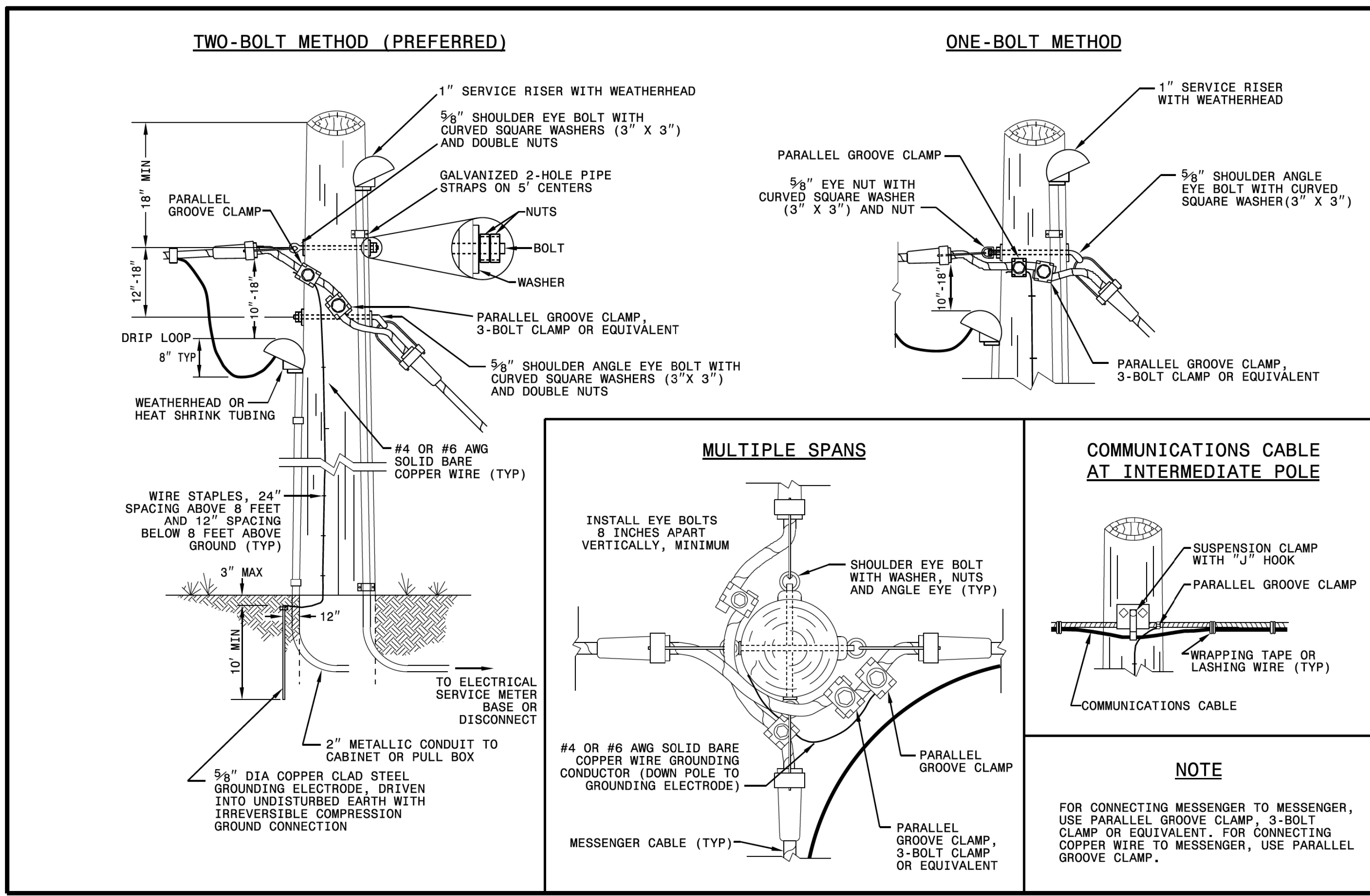
ENGLISH STANDARD DRAWING FOR

ELECTRICAL SERVICE GROUNDING

GROUNDING AND BONDING

SHEET 1 OF 1

1700D01



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

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1

1720D01

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

See Plate for Title

Prepared in the Offices of:

SEAL

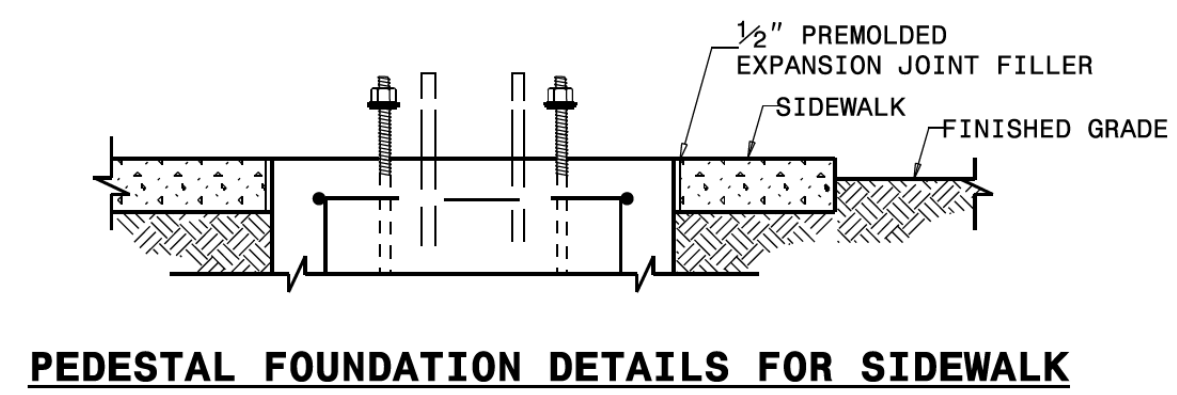
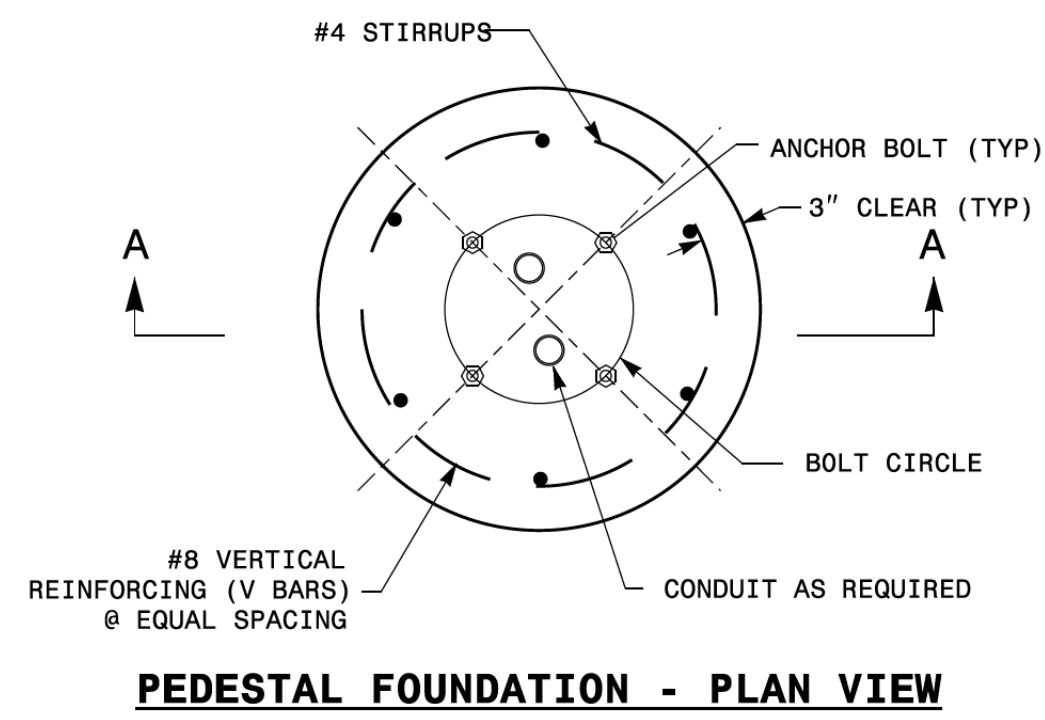
DocuSigned by:
Mohd Aslami

10/11/2017

DATE

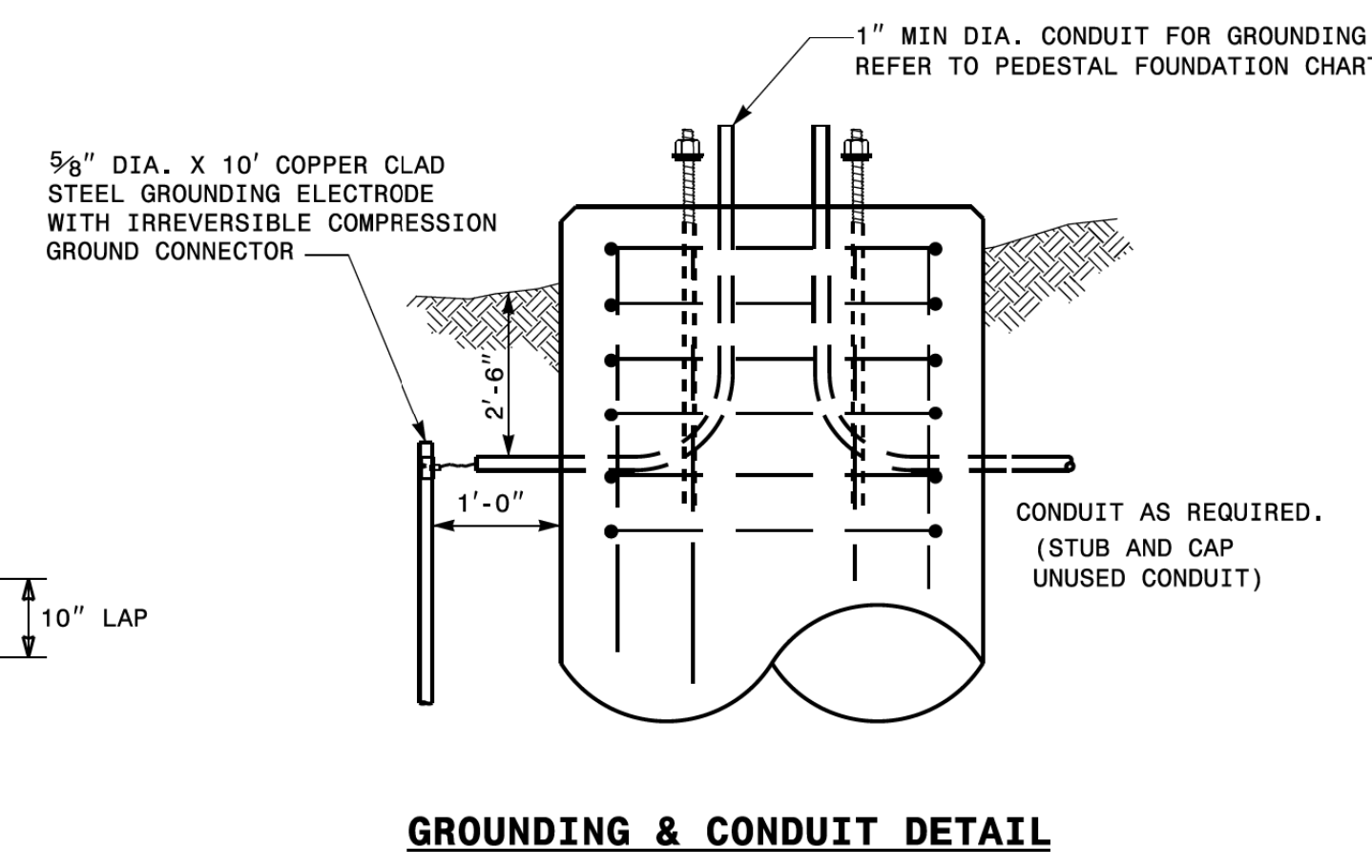
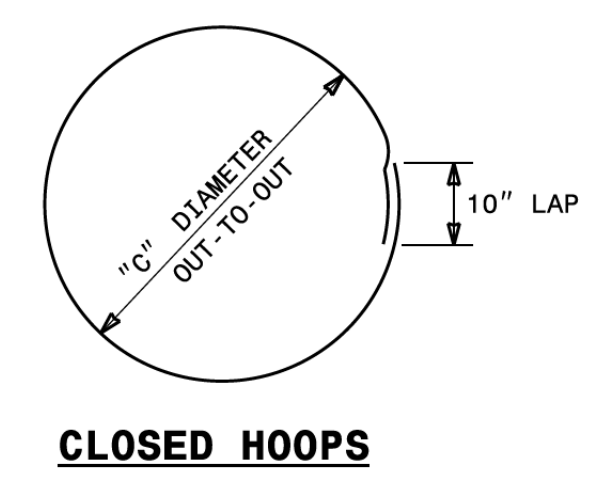
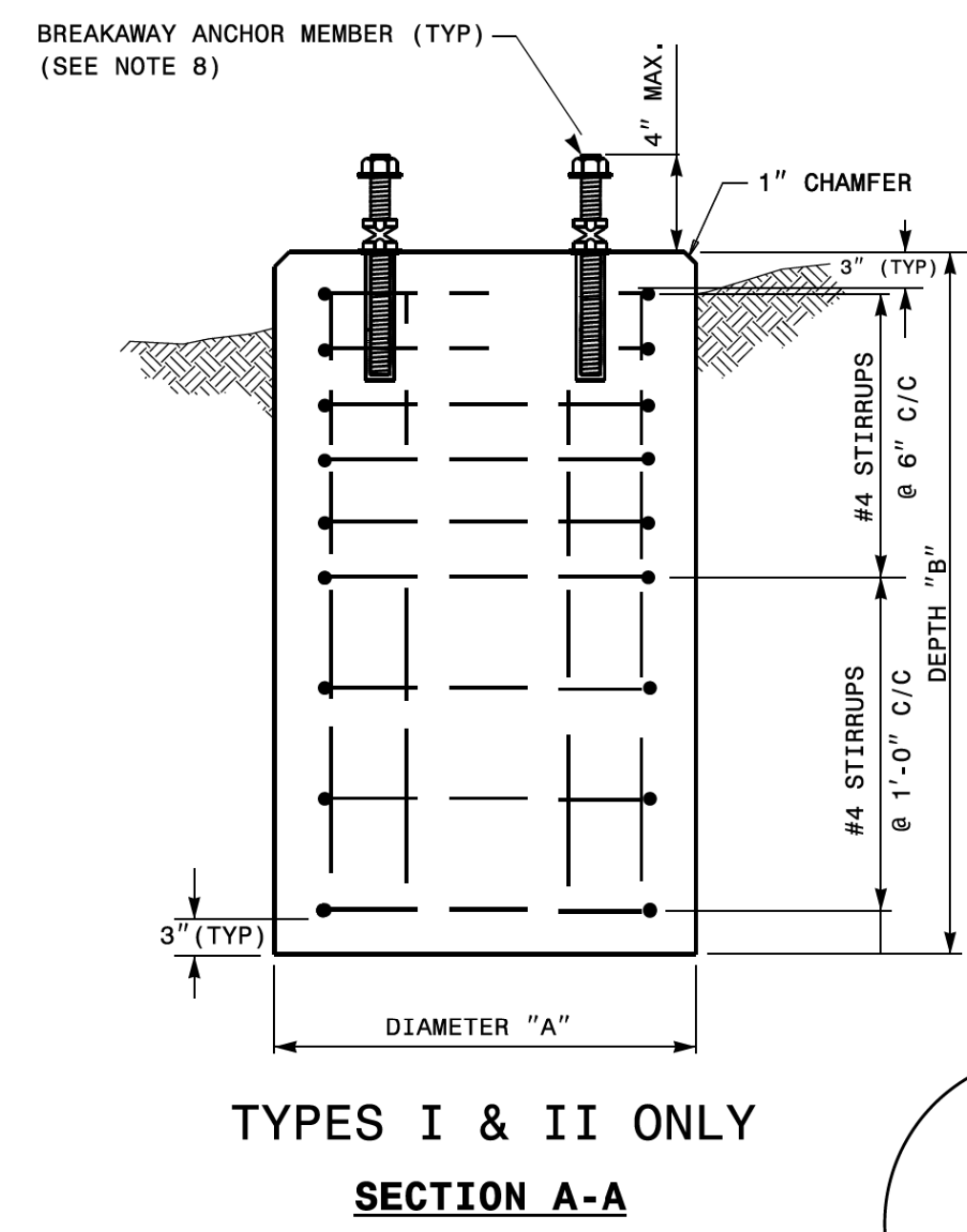
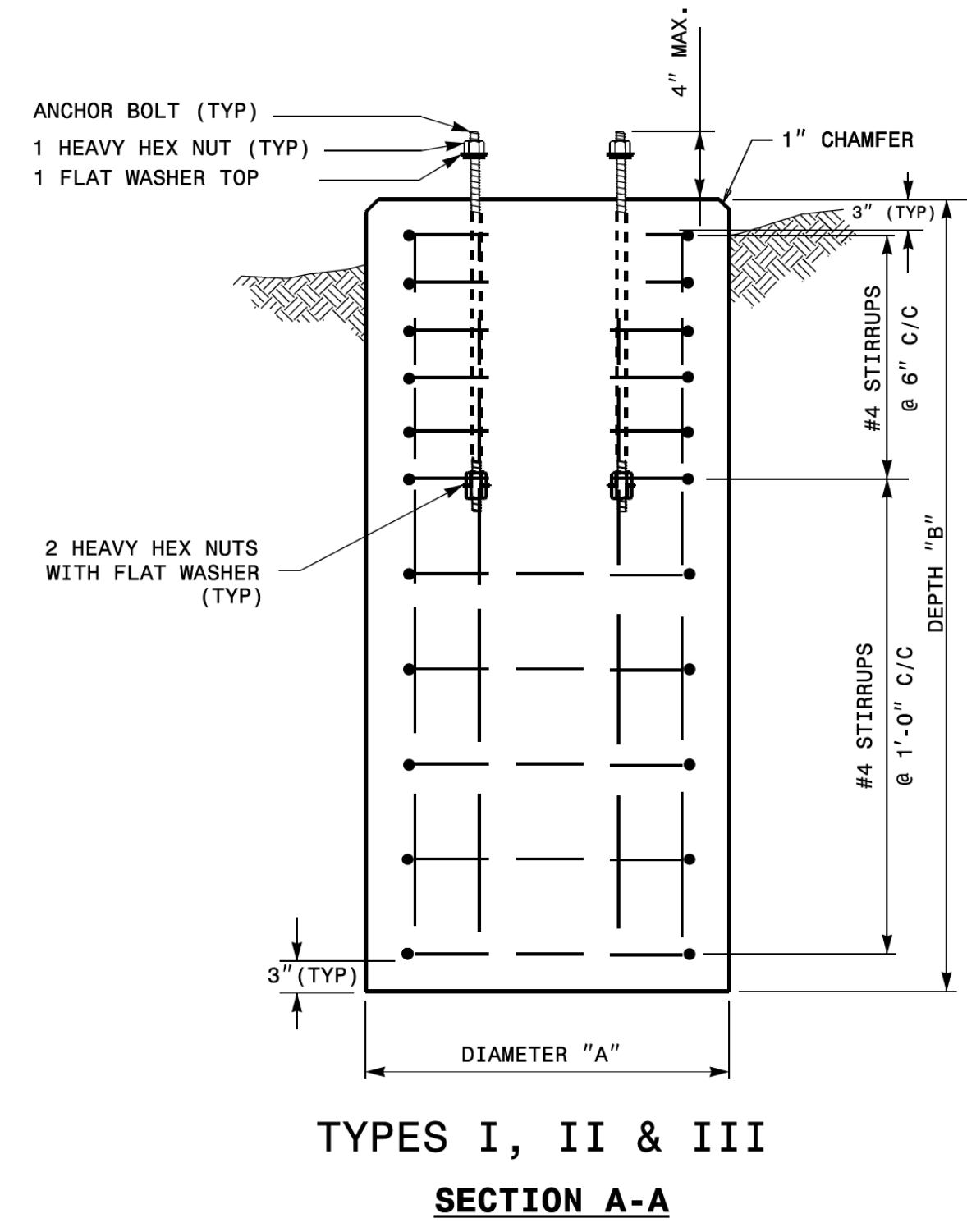
750 N. Greenfield Parkway
Garner, NC 27529

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U:\2018 Std Drawings\Plate Sheets\2018_Plate Sheet -dgn
r.wrough



NOTES:

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



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

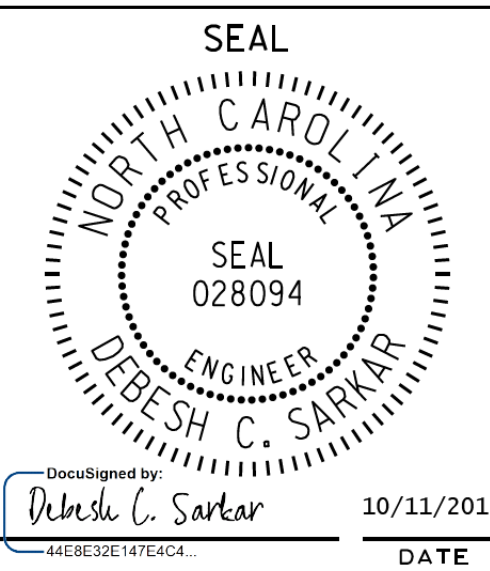
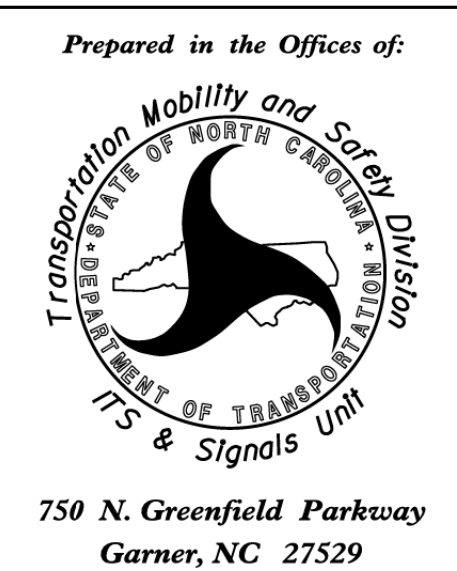
TYPE	V-BAR				STIRRUP								
	SIZE #	QTY	LENGTH	WEIGHT LBS	SIZE #	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
						ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
PEDESTALS
FOUNDATIONS

SHEET 1 OF 1
1743D01

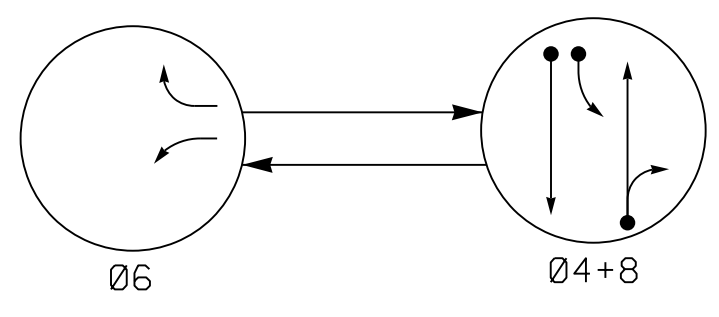
See Plate for Title



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r.wrough

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

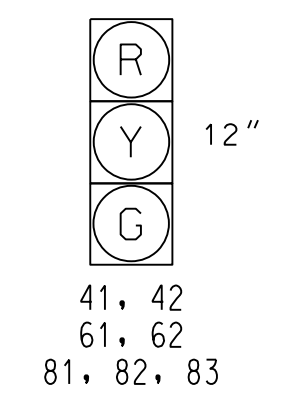
- ◄● DETECTED MOVEMENT
- ◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄-- UNSIGNALIZED MOVEMENT
- ◄--> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø6	Ø4+8	FLIGHT
41, 42	R	G	R
61, 62	G	R	Y
81, 82, 83	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



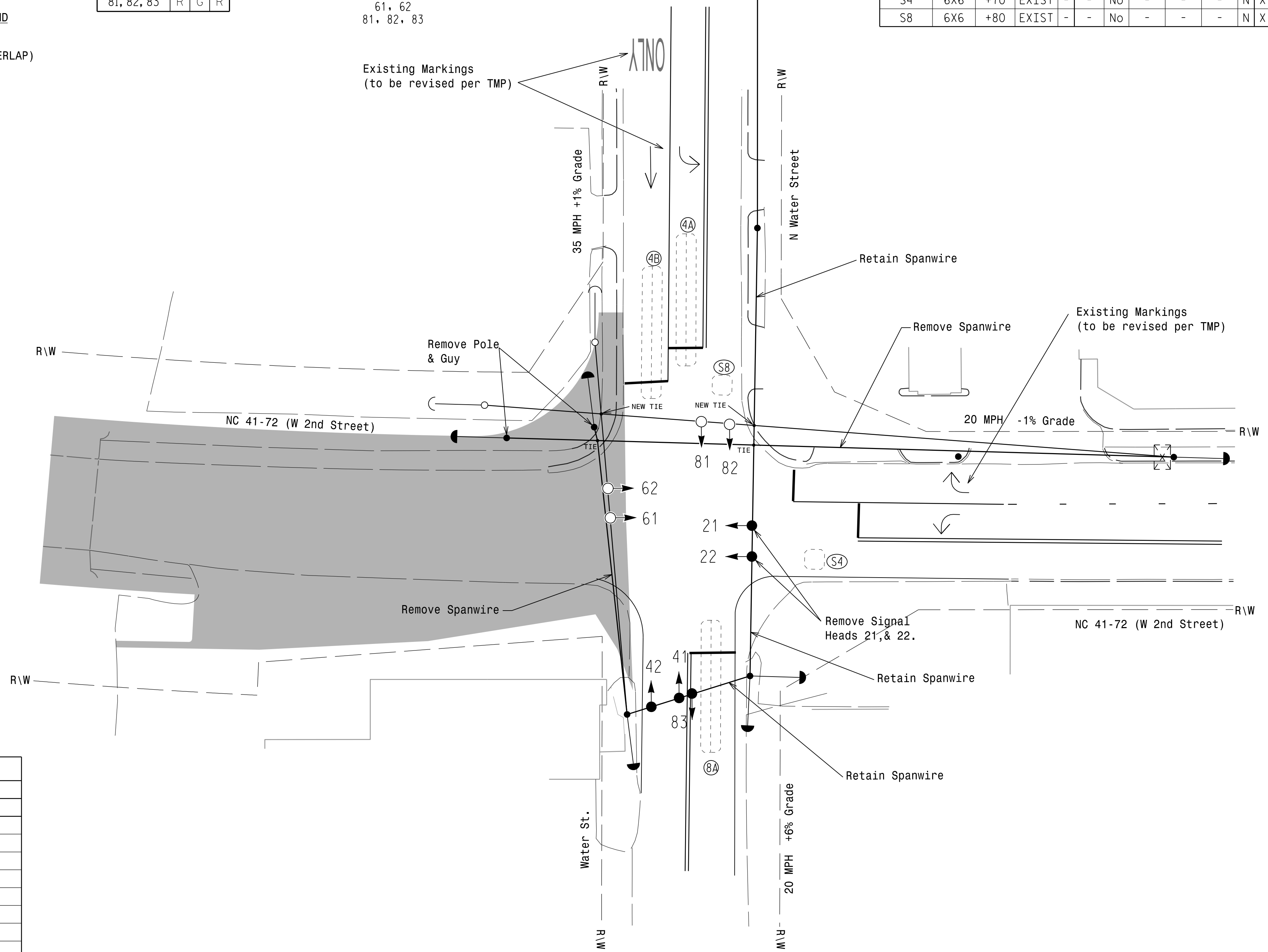
ASC/3 DETECTOR INSTALLATION CHART

LOOP	DETECTOR			PROGRAMMING							
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
4A	6X40	+5	EXIST	-	4	Yes	-	-	-	N	-
4B	6X40	+5	EXIST	-	4	Yes	-	-	-	N	-
8A	6X40	+10	EXIST	-	8	Yes	-	5	-	N	-
S4	6X6	+70	EXIST	-	-	No	-	-	-	N	X
S8	6X6	+80	EXIST	-	-	No	-	-	-	N	X

2 Phase Semi-Actuated Signal System #D06-24 Lumberton NC 41-72 (Second St.)

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. Revise existing pavement markings per TMP.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Remove signal head #21 & #22.



ASC/3 TIMING CHART

FEATURE	PHASE		
	4	6	8
Min Green *	7	10	7
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	2.0	3.0	2.0
Max 1 *	15	35	15
Yellow	3.8	3.0	3.0
Red Clear	1.5	2.3	2.1
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	-	-	-
Max Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Locking Detector	-	-	-
Recall Position	-	MAX. RECALL	-
Dual Entry	X	-	X
Simultaneous Gap	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.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
◐ → Modified Signal Head	◐ → N/A
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head	⊥ N/A
⊥ With Push Button & Sign	⊥ N/A
○ Signal Pole with Guy	● Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	● Signal Pole with Sidewalk Guy
⊠ Inductive Loop Detector	⊠ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Controller & Cabinet
⊠ Junction Box	⊠ Junction Box
⊠ 2-in Underground Conduit	⊠ 2-in Underground Conduit
--- Right of Way	--- Right of Way
→ Directional Arrow	→ Directional Arrow
█ Construction Zone	N/A

Signal Upgrade Temporary Design

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

Prepared For the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE: 1" = 20'

NC 41-72 (West 2nd Street) at SR 1536 (North Water Street)
 Division 6 Robeson County Lumberton
 PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
 PREPARED BY: J. Hambricht REVIEWED BY: D Waller

REVISIONS	INIT.	DATE

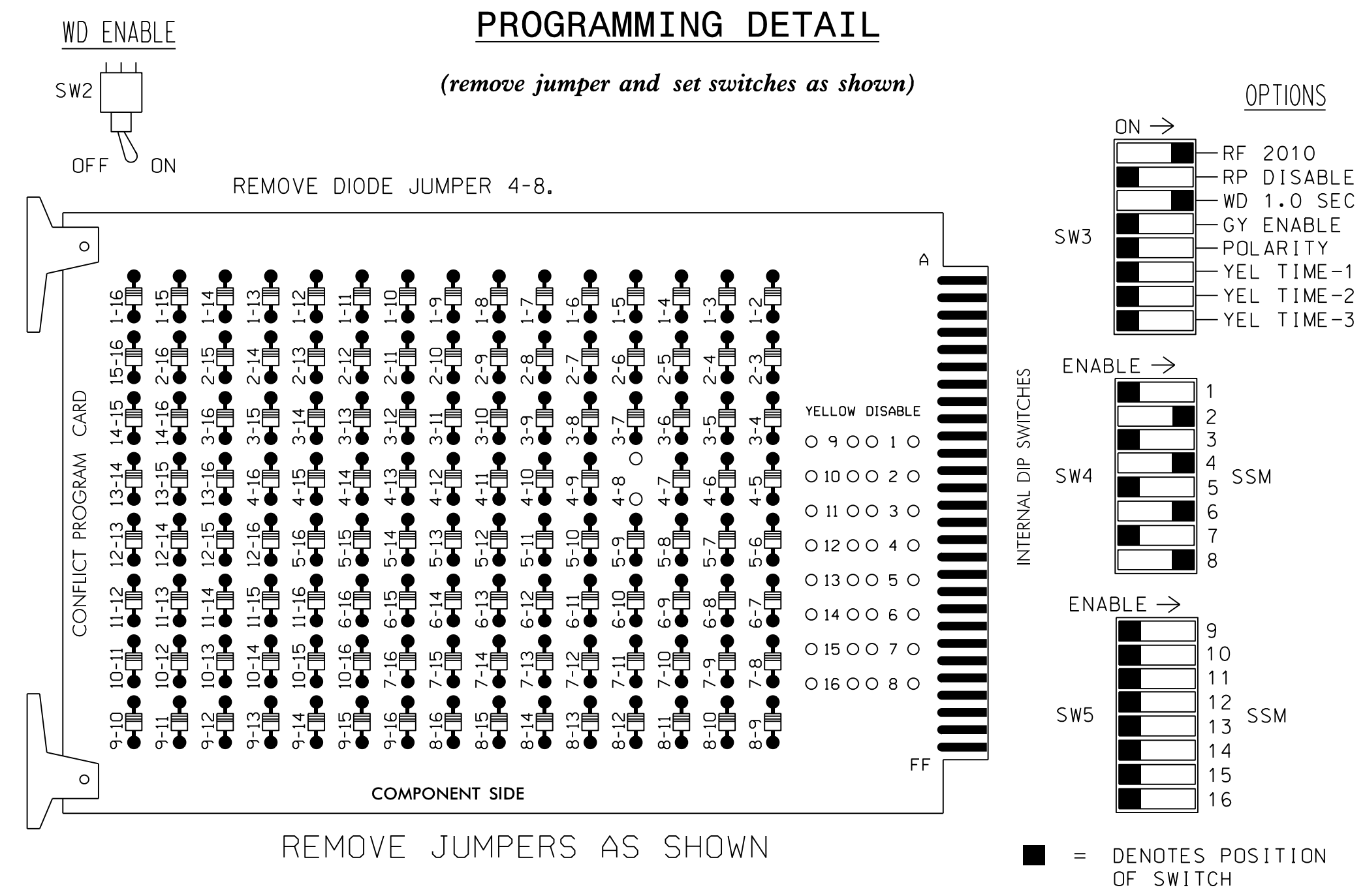
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DocuSigned by:
 Regina M. Muncey 2/2/2023
 SIGNATURE DATE
 SIG. INVENTORY NO. 06-0193T

5985AS\SIG-2.0\DATE:02/02/2023
 User: r.muncey

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on used monitor channels, tie unused red monitor inputs 1,2,3, 5,7,9,10,11,12,13,14,15, & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 6 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 Signal System D06-24 Lumberton, NC 41-72 (Second St.)

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	NU	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82 83	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

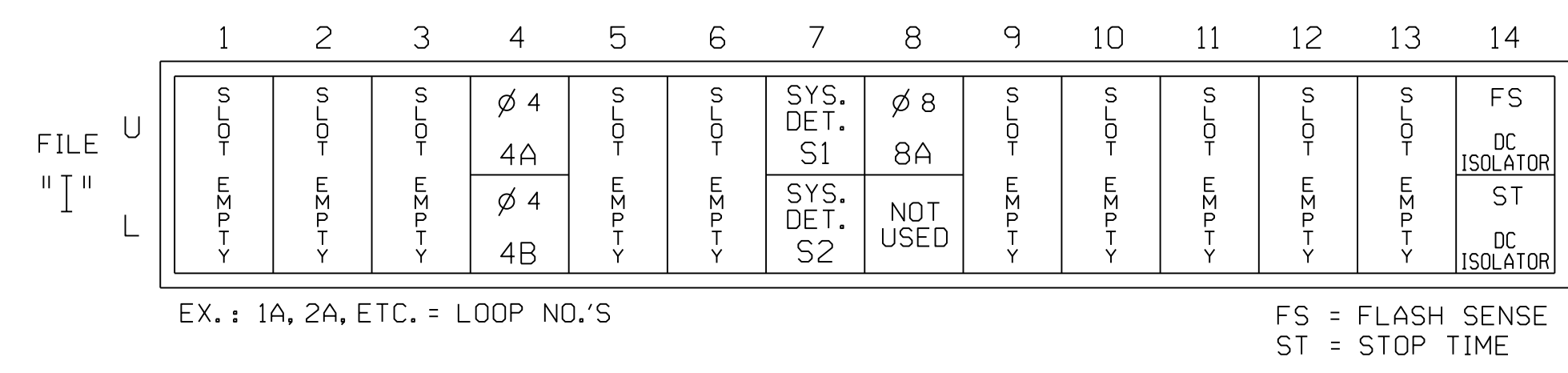
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S4,S6,S8
 PHASES USED.....4,6,8
 OVERLAPS USED.....NONE

INPUT FILE POSITION LAYOUT

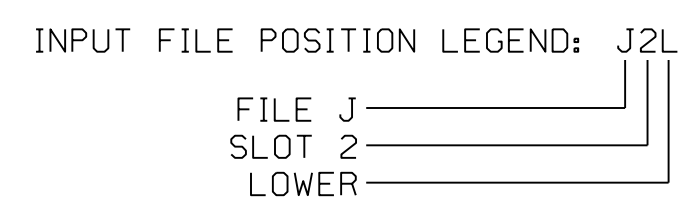
(front view)



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
4A	TB21-7,8	I4U	41	4	4	YES				N
4B	TB23-7,8	I4L	45	14	4	YES				N
8A	TB22-1,2	I8U	42	8	8	YES		5		N
* S1	TB21-13,14	I7U	57	7	SYS	NO				N
* S2	TB23-13,14	I7L	50	28	SYS	NO				N

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0193T
 DESIGNED: JULY 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

Electrical Detail - Temporary Design

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 41-72 (West 2nd Street)
 at
 SR 1536 (North Water Street)

Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey

PREPARED BY: D. Waller REVIEWED BY:

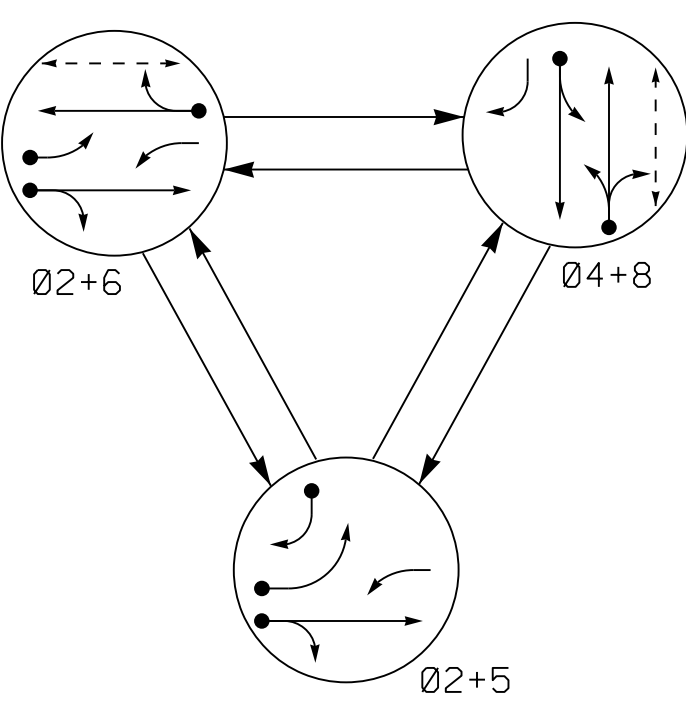
REVISIONS	INIT.	DATE

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Regina M. Muncey 2/2/2023

SIG. INVENTORY NO. 06-0193T

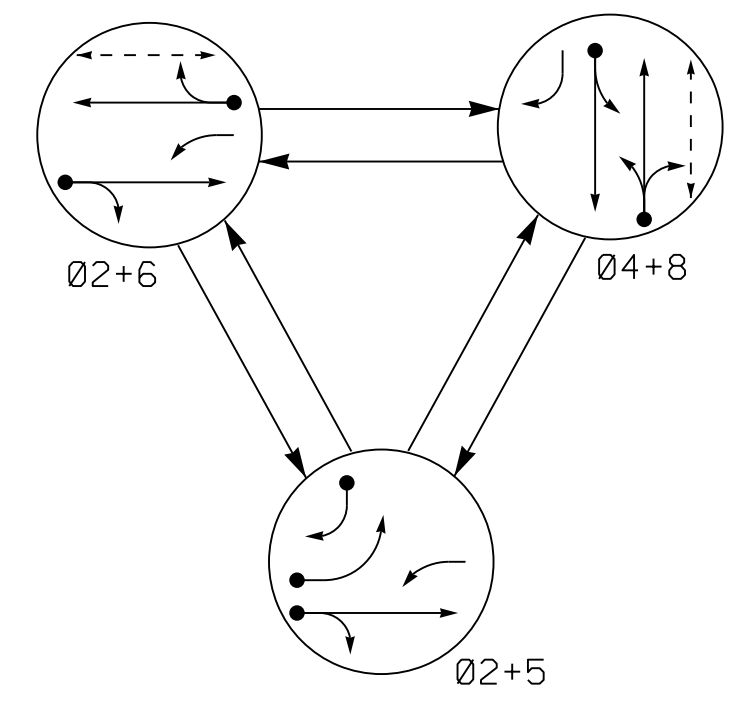
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
43	-	R	F	R
51	-	F	R	Y
61	F	F	R	Y
62, 63	R	G	R	Y
81, 82	R	R	G	R
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
43	-	R	F	R
51	-	F	R	Y
61	F	F	R	Y
62, 63	R	G	R	Y
81, 82	R	R	G	R
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR				PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
2A	6x6	70	3	X	2	Yes	-	-	-	N	-	X
4A	6x40	0	2-4-2	X	4	Yes	-	3	-	N	-	X
5A	6x40	0	2-4-2	X	5	Yes	-	★15	-	N	-	X
5B	6x40	0	2-4-2	X	5	Yes	-	15	-	N	-	X
6A	6x6	0	2-4-2	X	6	Yes	-	-	-	N	-	X
6B	6x6	70	3	X	6	Yes	-	-	-	N	-	X
8A	6x40	0	2-4-2	X	8	Yes	-	10	-	N	-	X
S4	6x6	+65	3	X	-	No	-	-	-	N	X	X
S8	6x6	+77	3	X	-	No	-	-	-	N	X	X

★ Reduce delay to 3 sec during Alternate Phasing Operation.
 # Disable Phase(s) call during Alternate Phasing Operation.

3 Phase Fully Actuated System D06-24_Lumberton

NOTES

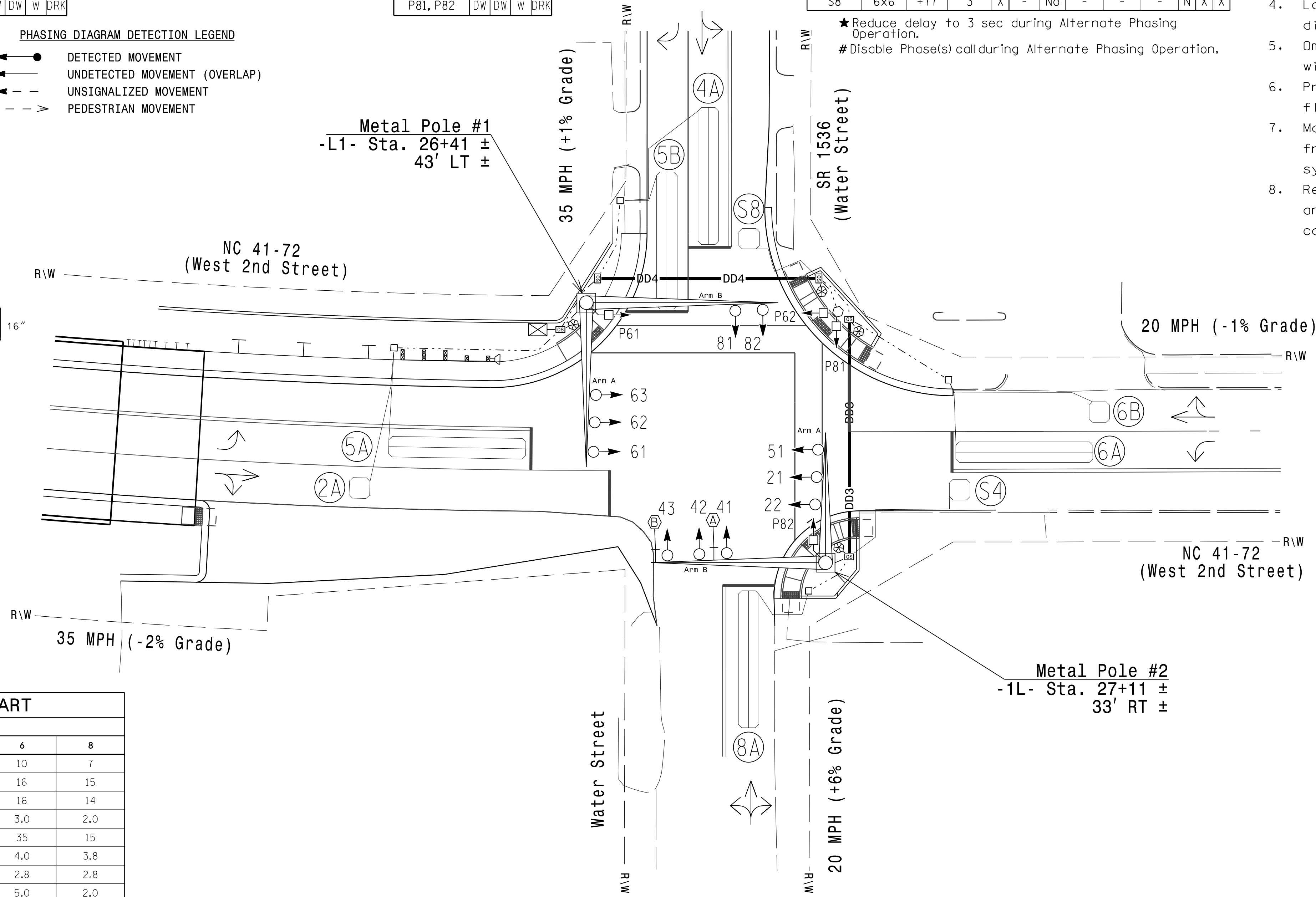
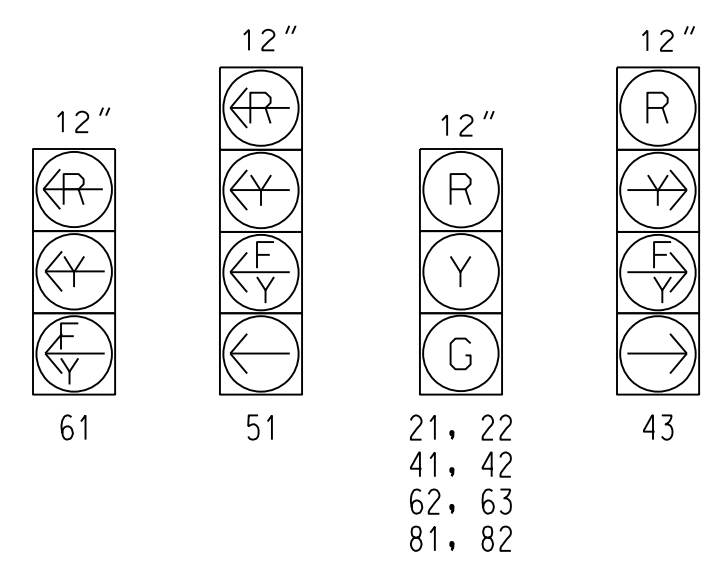
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet 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.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Relocate existing wireless radio, antenna, and any additional communication equipment and/or cabling to new cabinet.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 TIMING CHART

FEATURE	PHASE				
	2	4	5	6	8
Min Green *	10	7	7	10	7
Walk *	-	-	-	16	15
Ped Clear	-	-	-	16	14
Veh. Extension *	3.0	2.0	2.0	3.0	2.0
Max I *	35	15	25	35	15
Yellow	4.0	3.8	3.0	4.0	3.8
Red Clear	2.8	2.8	2.4	2.8	2.8
Red Revert	5.0	2.0	2.0	5.0	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-
Max Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Locking Detector	X	-	-	X	-
Recall Position	SOFT RECALL	-	-	SOFT RECALL	-
Dual Entry	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X

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

LEGEND

- | PROPOSED | EXISTING |
|--|--|
| ○ → Traffic Signal Head | ● → Traffic Signal Head |
| ○ → Modified Signal Head | N/A |
| ⊥ Sign | ⊥ Sign |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ○ Signal Pole with Guy | ○ Signal Pole with Guy |
| ○ Signal Pole with Sidewalk Guy | ○ Signal Pole with Sidewalk Guy |
| ⊗ Inductive Loop Detector | ⊗ Inductive Loop Detector |
| ⊠ Controller & Cabinet | ⊠ Controller & Cabinet |
| ⊠ Junction Box | ⊠ Junction Box |
| --- 2-in Underground Conduit | --- 2-in Underground Conduit |
| N/A Right of Way | N/A Right of Way |
| → Directional Arrow | → Directional Arrow |
| ⊠ Metal Pole with Mastarm | ⊠ Metal Pole with Mastarm |
| --- Directional Drill | N/A |
| ⊕ Type I Pushbutton Post | ⊕ Type I Pushbutton Post |
| ○ Type II Signal Pedestal | ○ Type II Signal Pedestal |
| N/A Curb Ramp | N/A |
| ⊕ Combined Thru and Left Arrow Sign (R3-6L) | ⊕ Combined Thru and Left Arrow Sign (R3-6L) |
| ⊕ Right Arrow "ONLY" Sign (R3-5R) | ⊕ Right Arrow "ONLY" Sign (R3-5R) |

Signal Upgrade - Final Design

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

Prepared for the Offices of:
 Transportation Mobility and Safety Division
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 SIGNAL DESIGN SECTION
 750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE: 1" = 20'

NC 41-72 (West 2nd Street) at SR 1536 (Water Street)
 Division 6 Robeson County Lumberton
 PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
 PREPARED BY: J. Hambricht REVIEWED BY: D Waller

REGINA M. MUNCEY
 PROFESSIONAL ENGINEER
 SEAL 43239
 REGINA M. MUNCEY
 SIGNATURE DATE: 2/2/2023
 SIG. INVENTORY NO. 06-0193

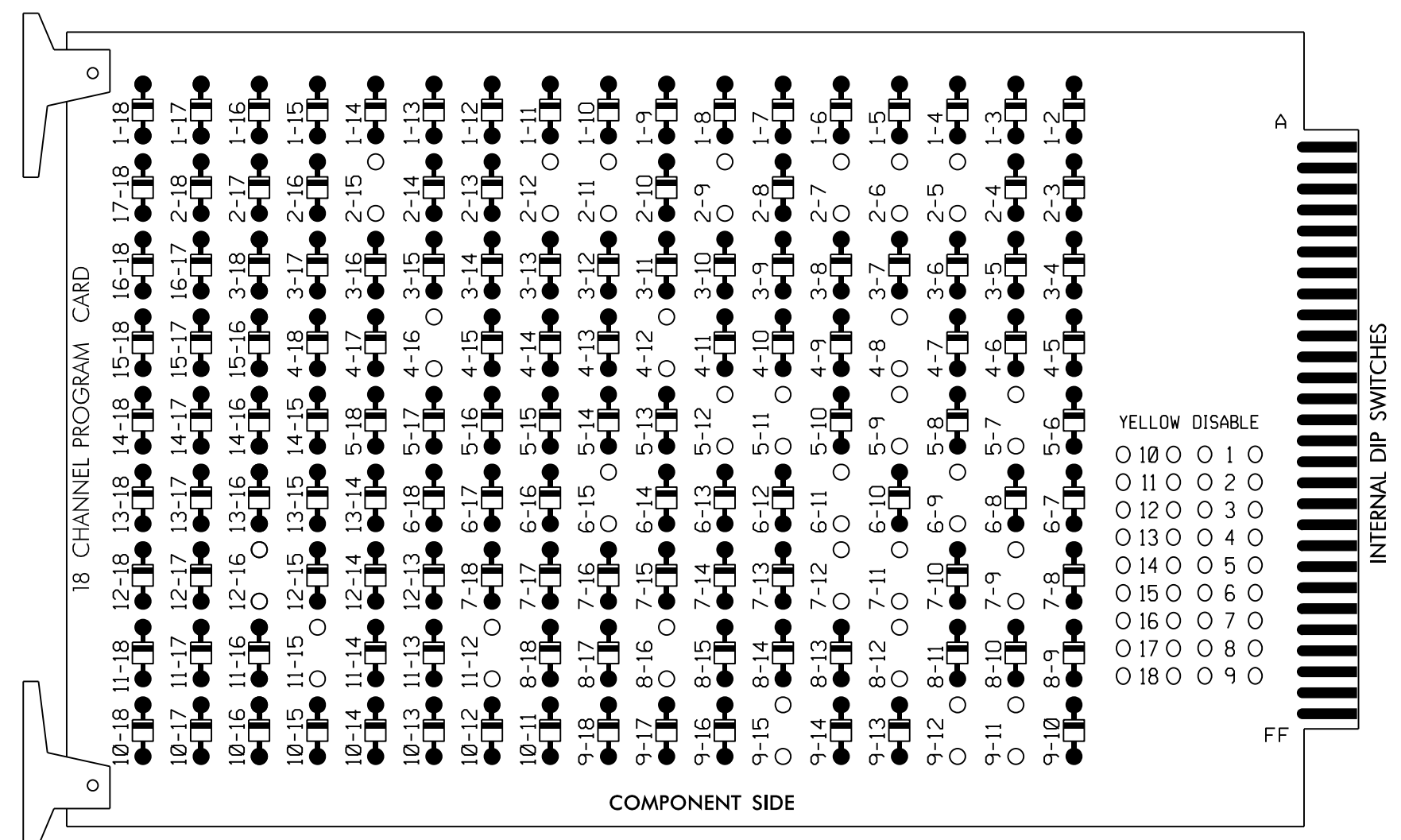
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33888457.DWG DATE: 2/2/2023
 User: r.muncey

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-7, 2-9, 2-11, 2-12, 2-15, 4-8, 4-12, 4-16, 5-7, 5-9, 5-11, 5-12, 6-9, 6-11, 6-15, 7-9, 7-11, 7-12, 8-12, 8-16, 9-11, 9-12, 9-15, 11-12, 11-15, and 12-16.



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.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 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 Signal System D06-24 Lumberton, NC 41-72 (Second St.)

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,S7,S8,S9,S10,S11,S12,
 AUX S1,AUX S4,AUX S5
 PHASES USED.....2,4,5,6,6PED,8,8PED
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....*
 OVERLAP "G".....*

* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

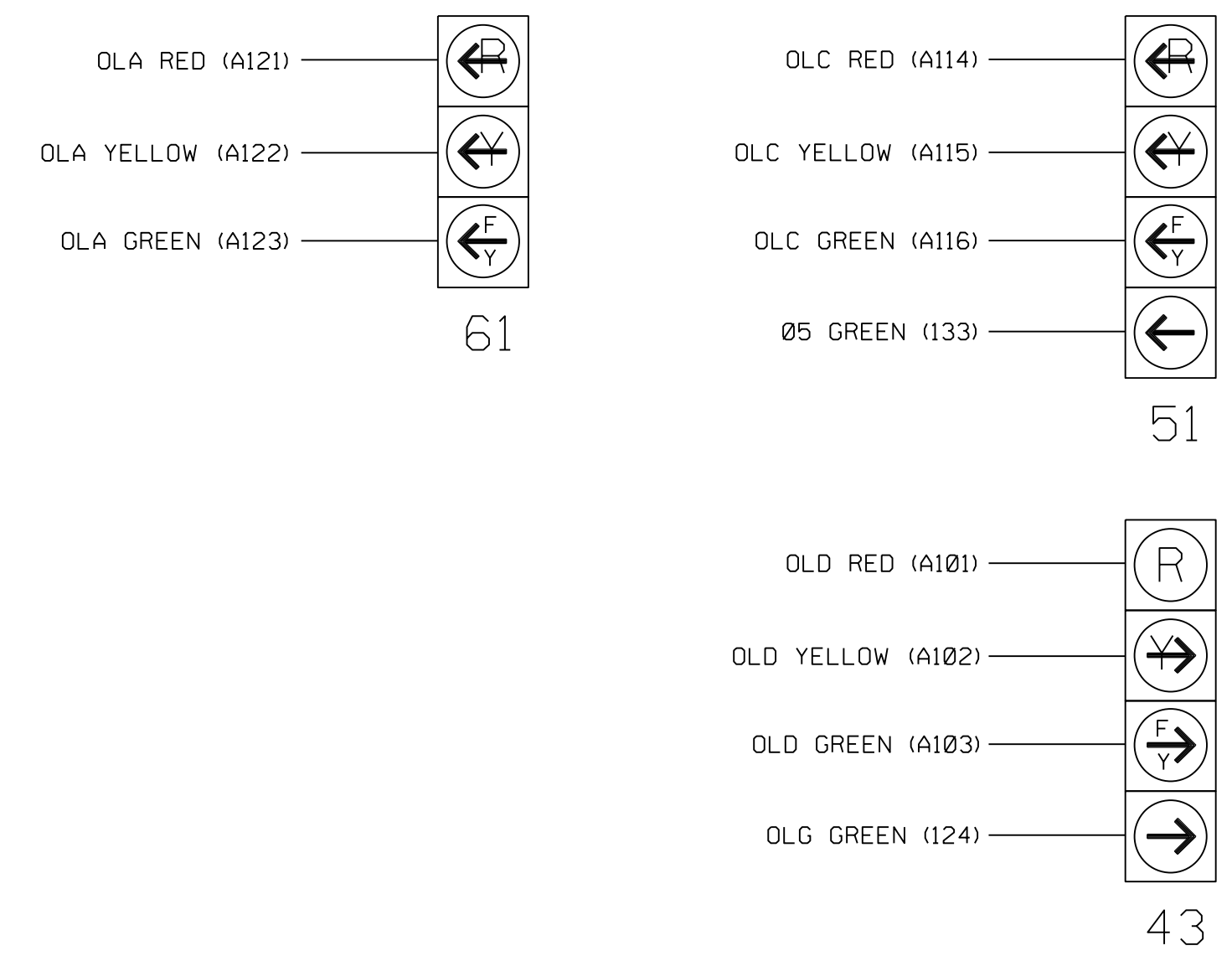
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6		
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18		
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	OLG	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE		
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51	62,63	P61, P62	43	81,82	P81, P82	61	NU	NU	51	43	NU		
RED		128			101			134			107							A101		
YELLOW		129			102		*	135		*	108									
GREEN		130			103			136			109									
RED ARROW																		A121	A114	
YELLOW ARROW																		A122	A115	A102
FLASHING YELLOW ARROW																		A123	A116	A103
GREEN ARROW								133			124									
Hand										119										
Walker																				

NU = Not Used

- * Denotes install load resistor. See load resistor installation detail this sheet.
- ★ See pictorial of head wiring in detail below.

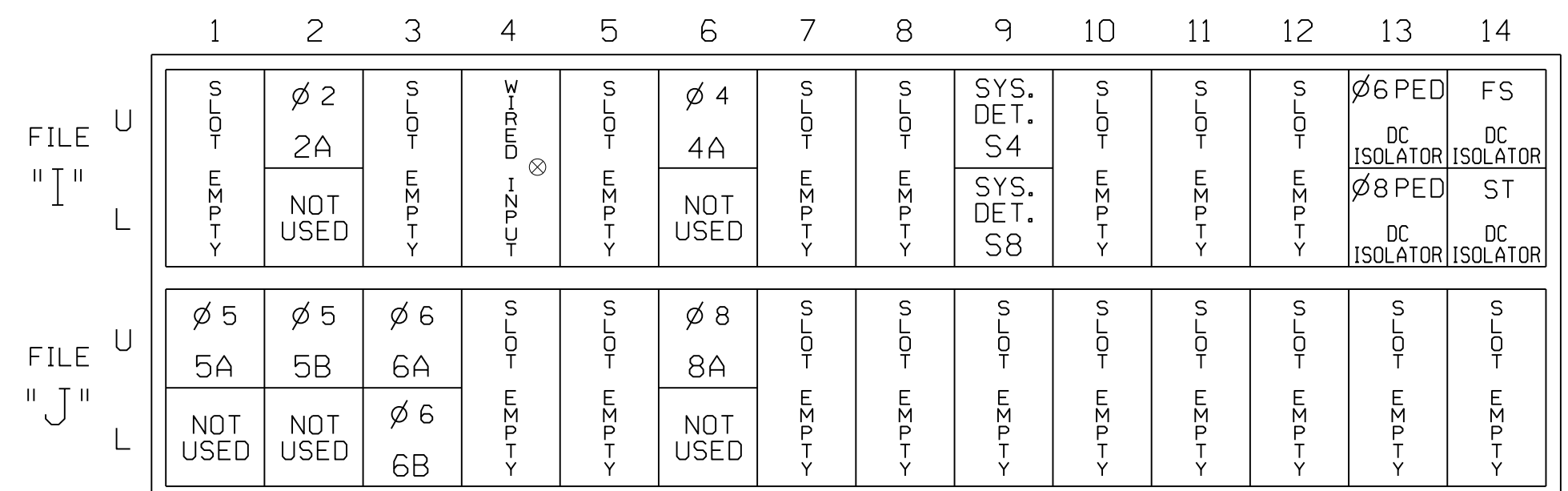
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

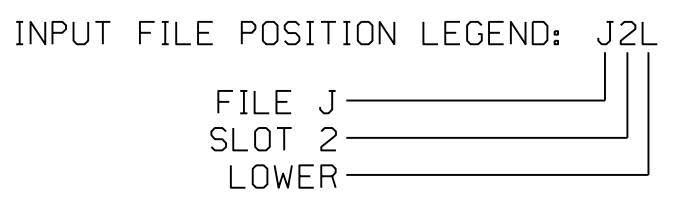
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES				N
4A	TB4-9,10	I6U	41	4	4	YES	3			N
5A ¹	TB3-1,2	J1U	55	5 ★	5	YES	15			N
		I4U	47	22 ★	2	YES	3			N
5B	TB3-5,6	J2U	40	6	5	YES	15			N
6A	TB3-9,10	J3U	64	36	6	YES				N
6B	TB3-11,12	J3L	77	46	6	YES				N
8A	TB5-9,10	J6U	42	8	8	YES	10			N
* S4	TB6-9,10	I9U	60	11	SYS	NO				N
* S8	TB6-11,12	I9L	62	13	SYS	NO				N
PED PUSH BUTTONS										
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT 113.

- * System detector only. Remove any assigned vehicle phase.
- ¹Add jumper from J1-W to I4-W. on rear of input file.
- ★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheets 2 and 3.

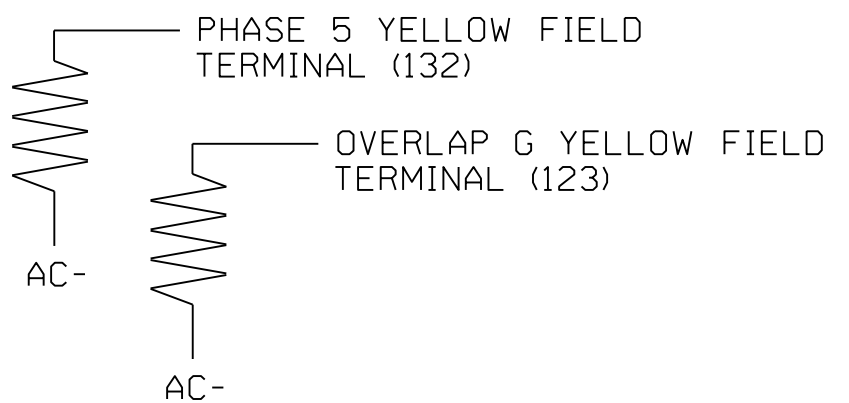


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0193
 DESIGNED: JULY 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



Final Design
Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:
 Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 41-72 (West 2nd Street)
 at
 SR 1536 (North Water Street)
 Division 6 Robeson County Lumberton
 PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
 PREPARED BY: D. Waller REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 REGINA M. MUNCY
 2/2/2023
 SIGNATURE DATE
 SIG. INVENTORY NO. 06-0193

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

(program controller as shown)

IMPORTANT!

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

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

```

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

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

- Place cursor in VEH DETECTOR [] position and enter "5".
- Set delay time to "3".

```

VEH DETECTOR [ 5]  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
5 5
EXTEND TIME... 0.0 DELAY TIME... 3.0
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 '3'

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

```

VEH DETECTOR [22]  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
22 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
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 '3'

← ENSURE PHASE IS SET TO "0"

END PROGRAMMING

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

Toggle 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 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 'PPLT FYA'

```

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

← NOTICE ACTION PLAN SF BIT "5"

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 4
FLASHING ARROW OUTPUT.....CH12 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
  
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0193
DESIGNED: JULY 2022
SEALED: FEBRUARY 2023
REVISED: N/A

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 '0' as shown below.

- From Main Menu select **1. CONFIGURATION**
- 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	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	R	.
12	4	O	.	.	.	-	A	R	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	3	P	.	.	.	-	A	.	.

NOTICE OVERLAP G ASSIGNED TO LD SWITCH 7

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

Final Design
Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

<p>Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</p>	<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 41-72 (West 2nd Street) at SR 1536 (North Water Street)</p>													
		<p>Division 6 Robeson County Lumberton</p> <p>PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey</p> <p>PREPARED BY: D. Waller REVIEWED BY:</p>													
<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE										<p>SIGNATURE: <i>Regina M. Muncey</i> DATE: 2/2/2023</p>	
REVISIONS	INIT.	DATE													
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>		<p>SIG. INVENTORY NO. 06-0193</p>													

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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 5.

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

<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	5

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

ALTERNATE PHASING CHANGE SUMMARY

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

SF BIT 5: Modifies overlap parent phase for head 51, to run protected turns only.

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

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

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.

2:58:37 PM
 U:\Traffic\cas\gn\l\sig\Detail\sig\Detail\sig\el\06-0193.dgn
 User:rmuncey

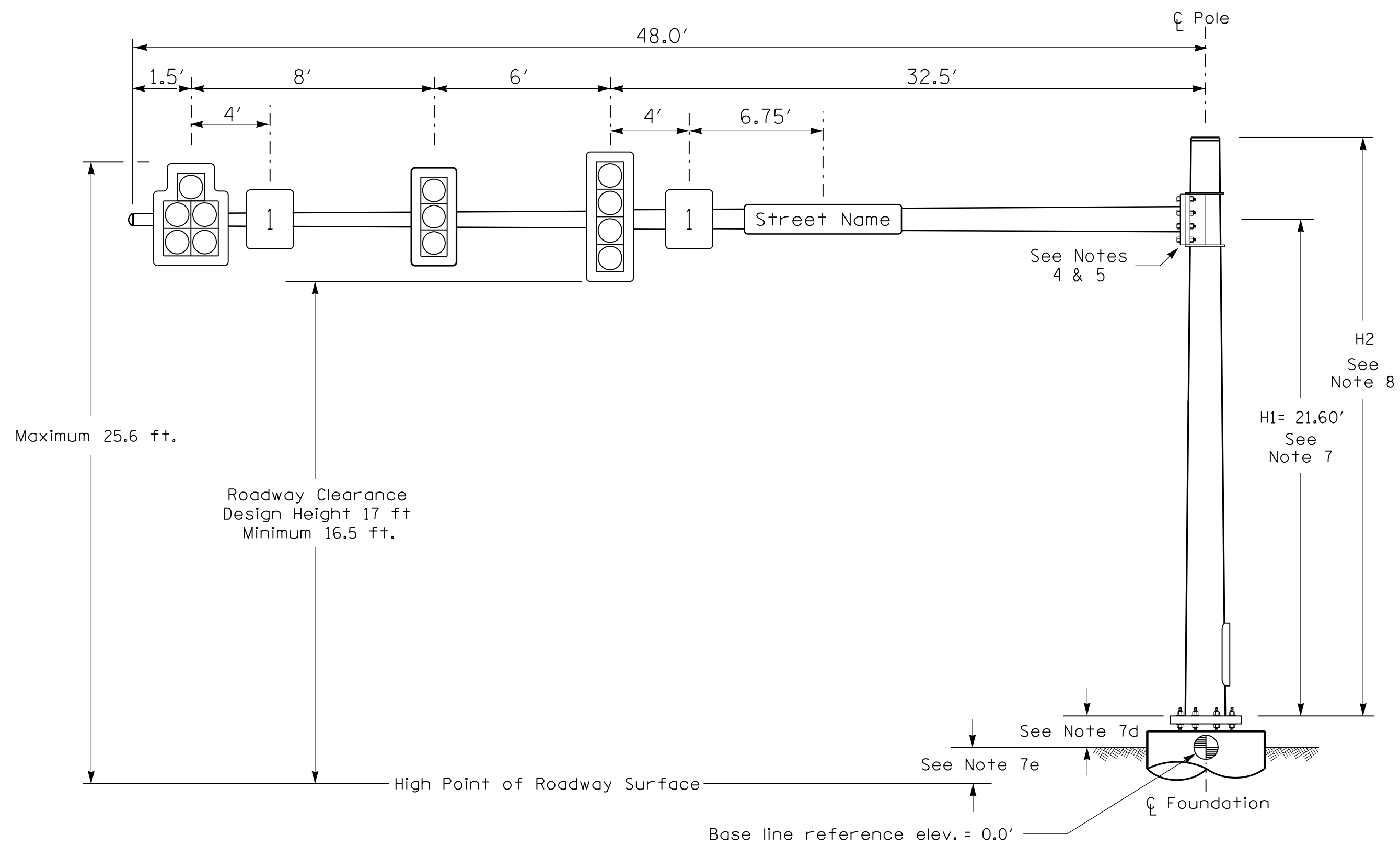
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0193
 DESIGNED: JULY 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

Final Design
 Electrical Detail - Sheet 3 of 3

**DOCUMENT NOT CONSIDERED FINAL
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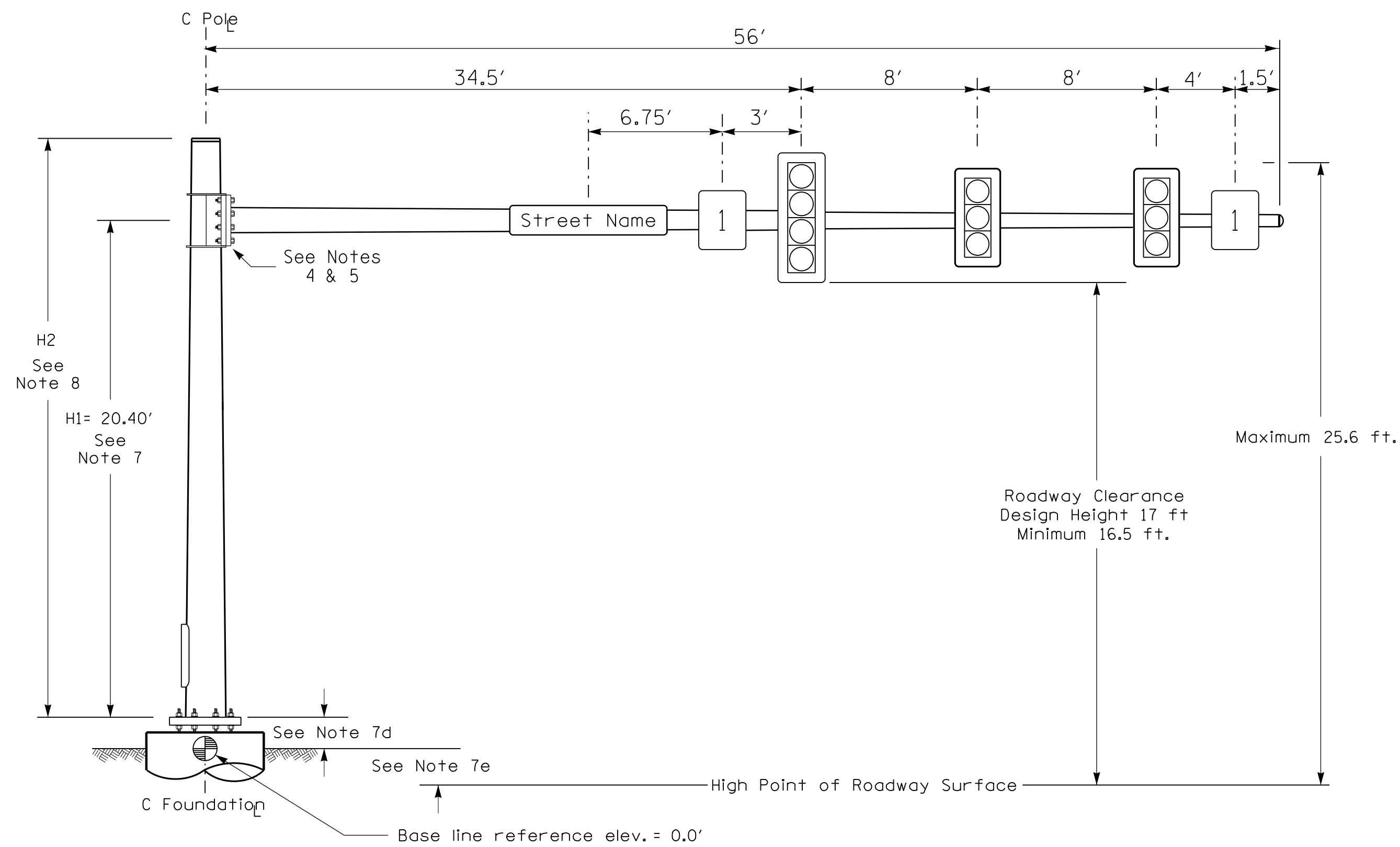
 Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 41-72 (West 2nd Street) at SR 1536 (North Water Street) Division 6 Robeson County Lumberton	
	Prepared for the Offices of: CITY OF LUMBERTON Department of Transportation Signal Management	PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey PREPARED BY: D. Waller REVIEWED BY:	REVISIONS INIT. DATE _____ _____ _____

Design Loading for METAL POLE NO. 1, Mast Arm "A"



Elevation View

Design Loading for METAL POLE NO. 1, Mast Arm "B"



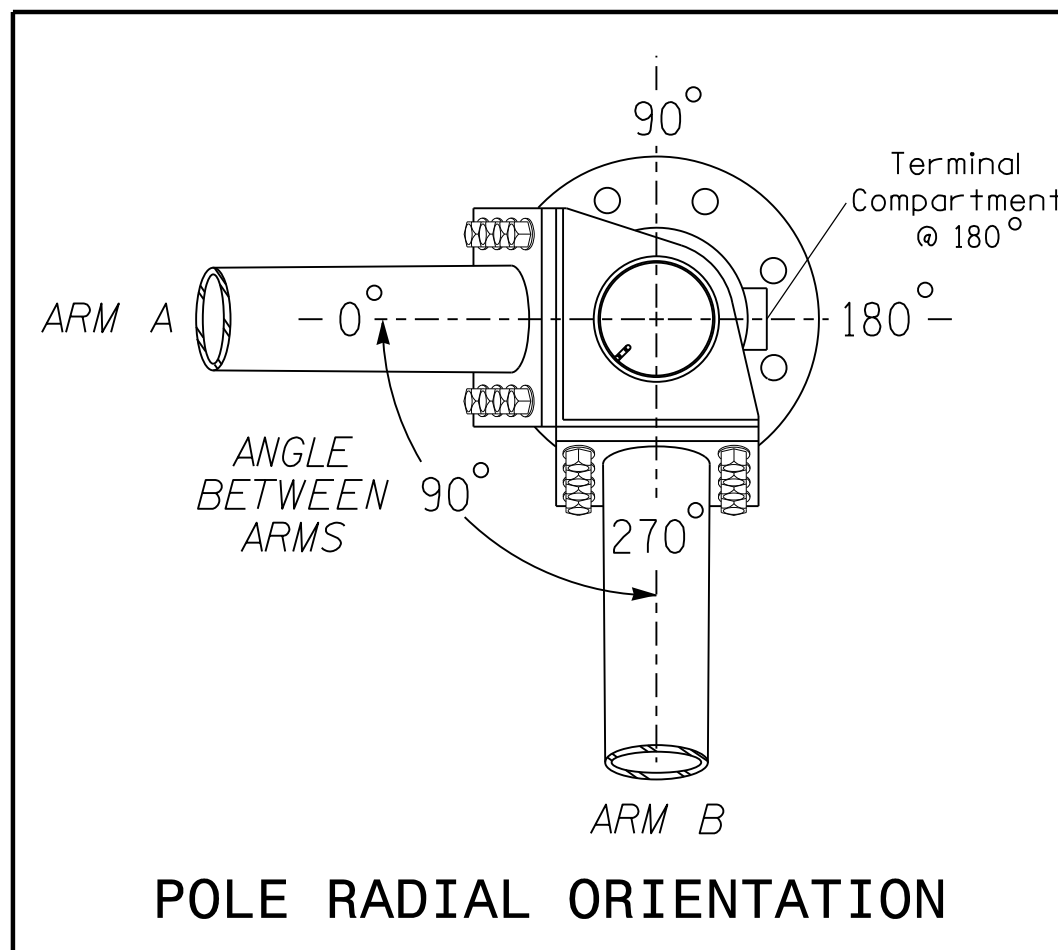
Elevation View

SPECIAL NOTE

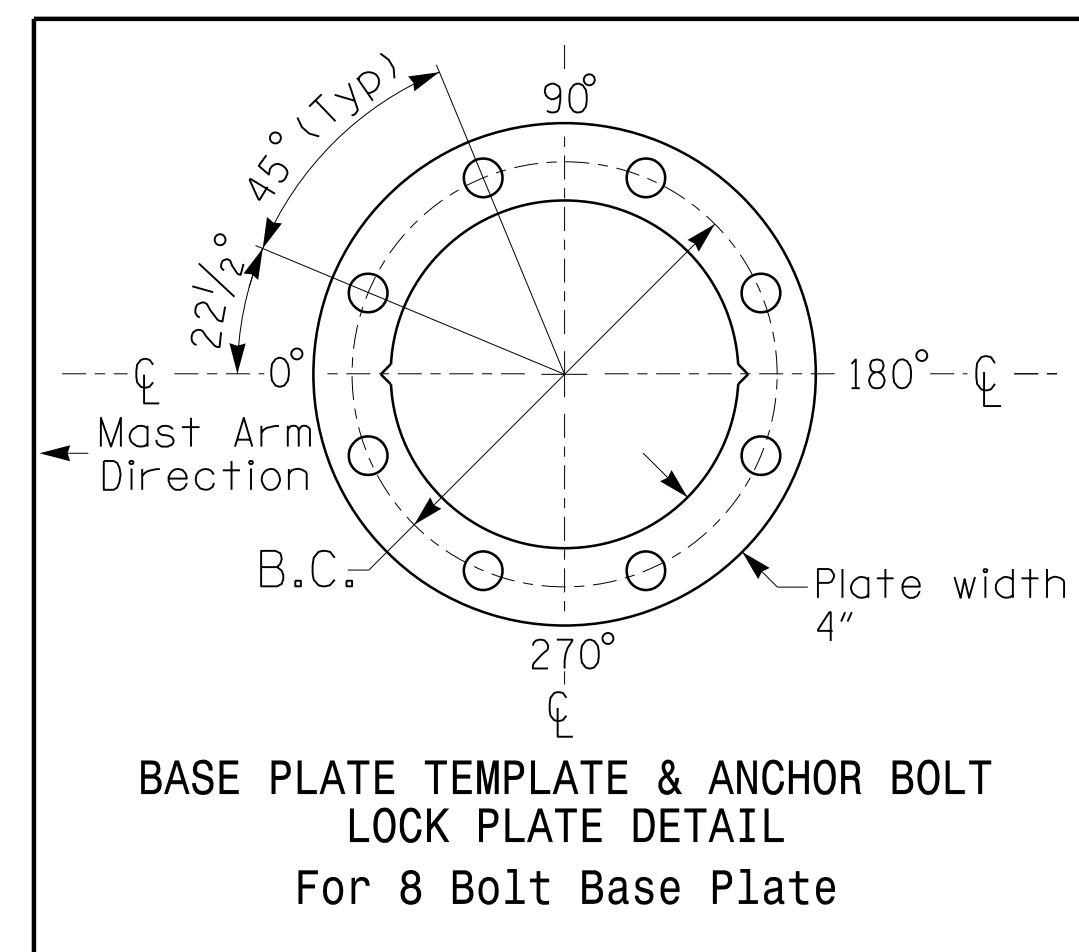
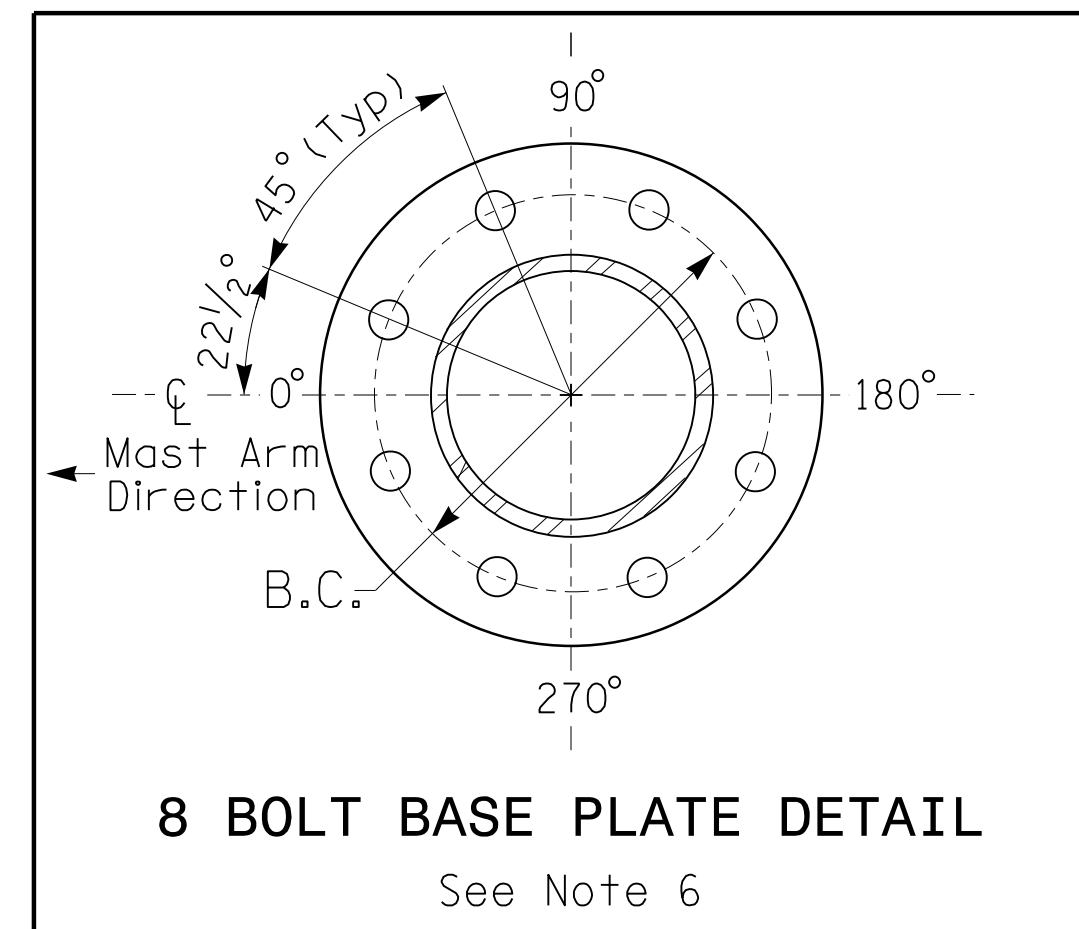
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+ 0.57 ft.	- 0.70 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.



POLE RADIAL ORIENTATION



METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
B-5985A	SIG.-3.4

MAST ARM LOADING SCHEDULE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0"W X 56.0"L	103 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS
[Symbol]	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- 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 3 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 N/A

NC 41-72 (West 2nd Street)
at
SR 1536 (Water Street)

Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey

PREPARED BY: J Hambricht REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

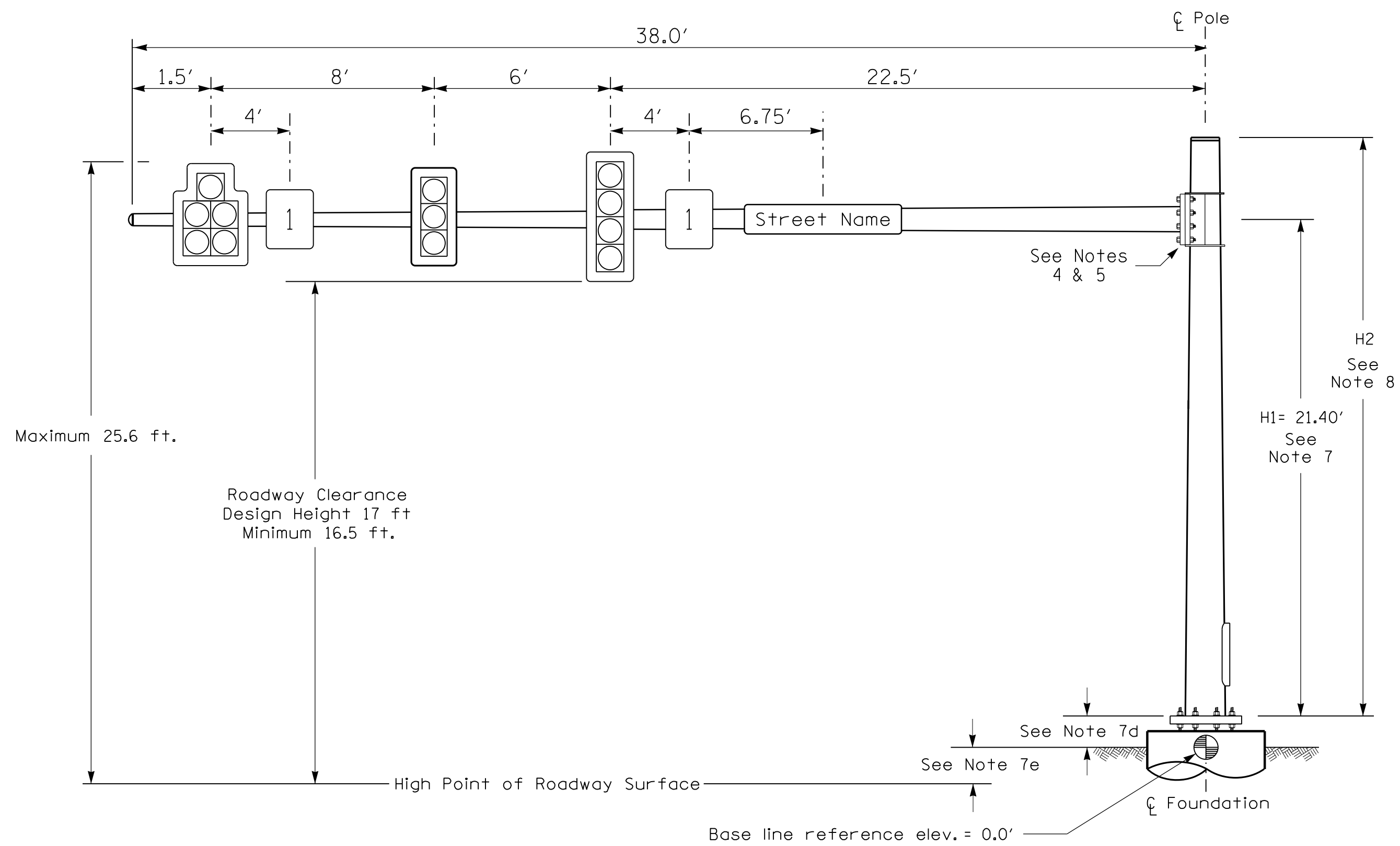
DocuSigned by:
Regina M. Muncey 2/2/2023

SIGNATURE DATE

SIG. INVENTORY NO. 06-0193

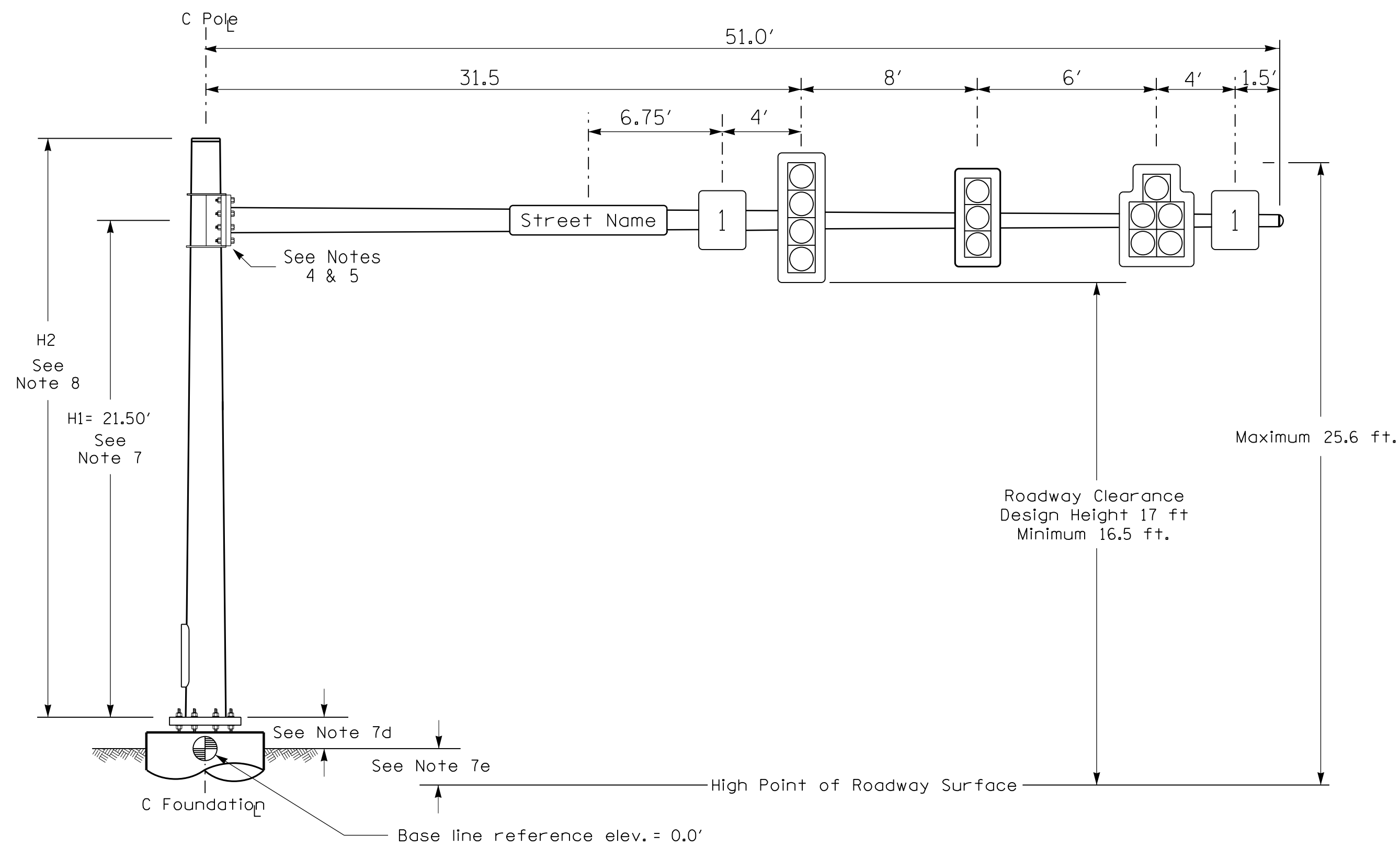
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 User: r.muncey

Design Loading for METAL POLE NO. 2, Mast Arm "A"



Elevation View

Design Loading for METAL POLE NO. 2, Mast Arm "B"



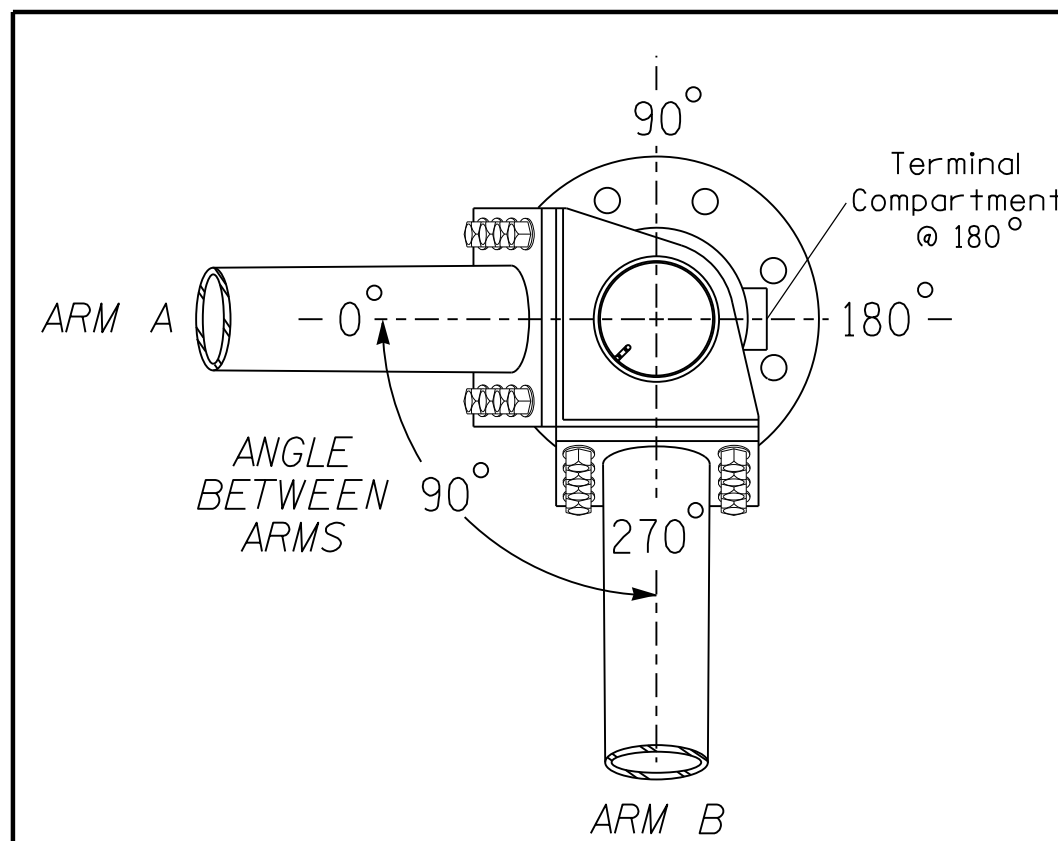
Elevation View

SPECIAL NOTE

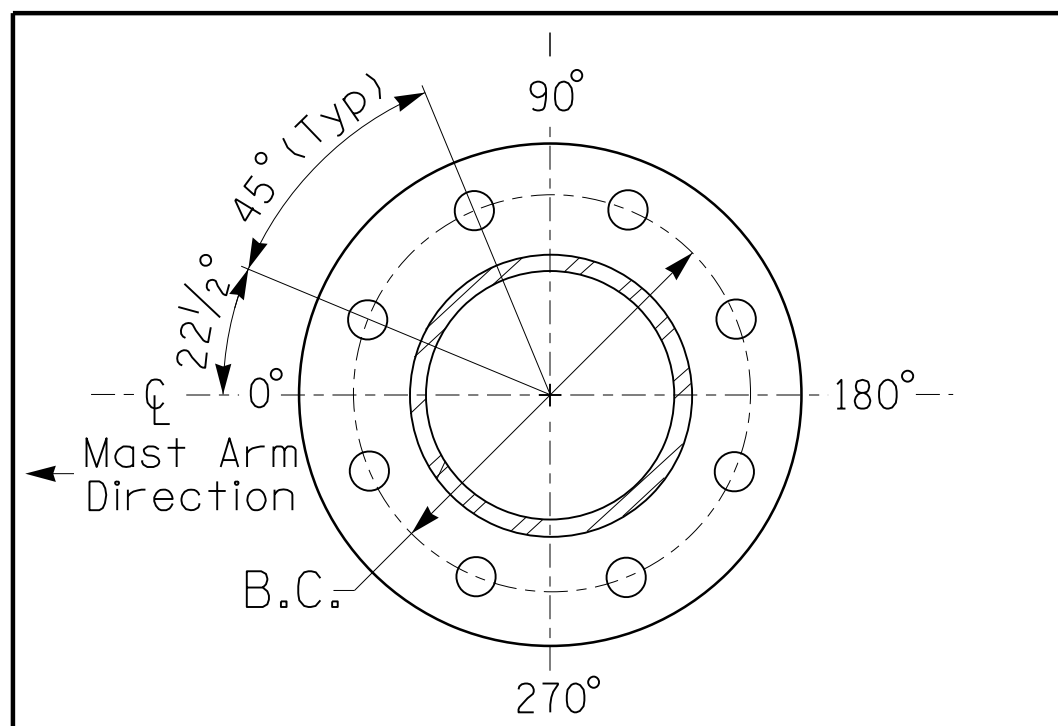
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at \odot Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+ 0.36 ft.	+ 0.48 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.

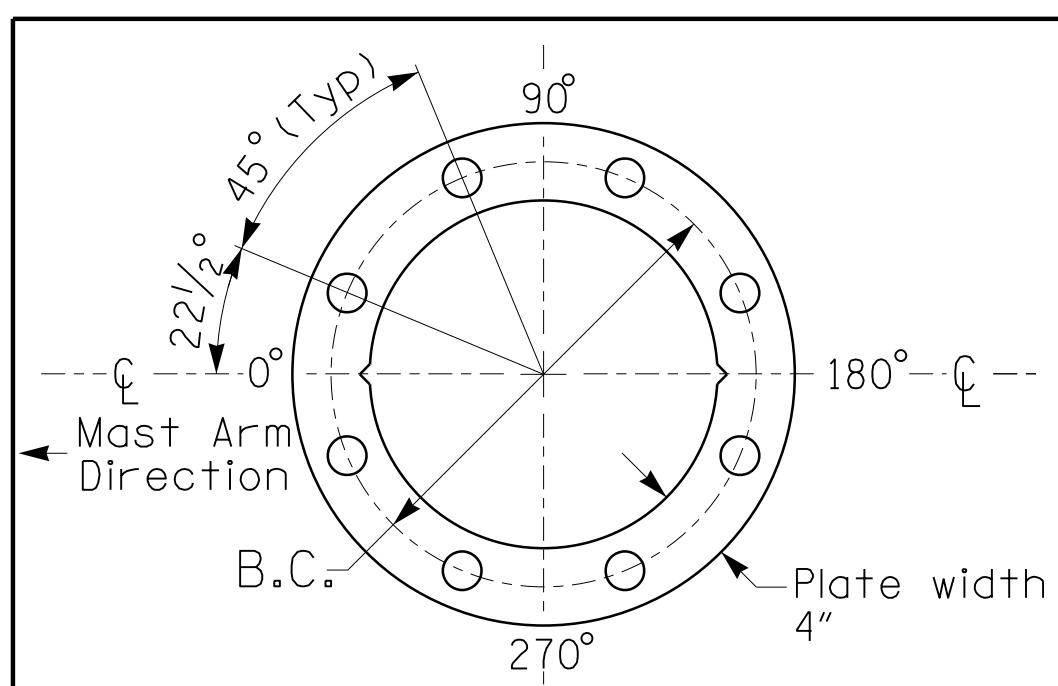


POLE RADIAL ORIENTATION



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

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
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 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

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NCDOT Wind Zone 3 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE: 0 N/A

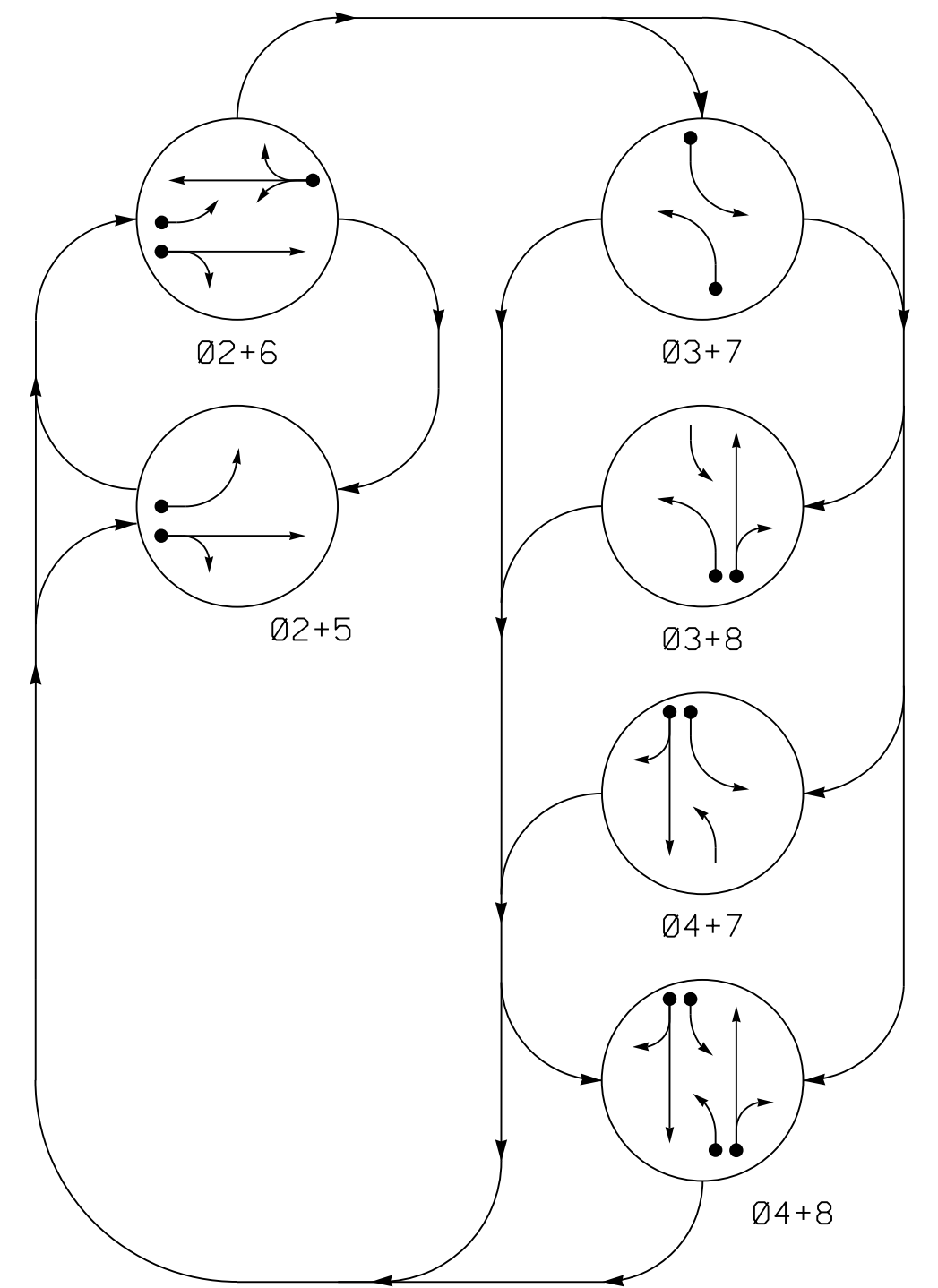
NC 41-72 (West 2nd Street)
 at
 SR 1536 (Water Street)
 Division 6 Robeson County Lumberton
 PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
 PREPARED BY: J Hambricht REVIEWED BY:
 REVISIONS INIT. DATE

SEAL

 REGINA M. MUNCEY
 ENGINEER
 43239
 DocuSigned by:
 Regina M. Muncey 2/2/2023
 SIGNATURE DATE
 SIG. INVENTORY NO. 06-0193

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

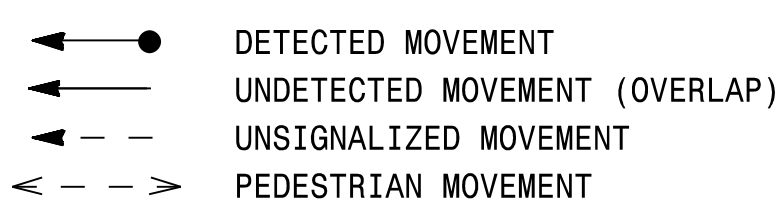
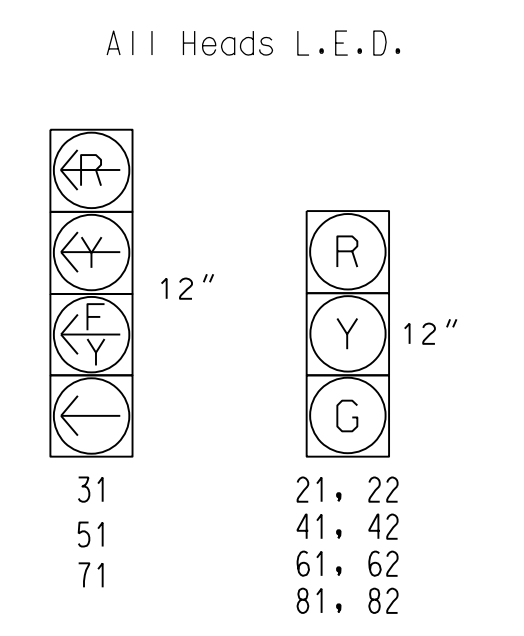


TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (02+5, 02+6, 03+7, 03+8, 04+7, 04+8), FLASH, and H.

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

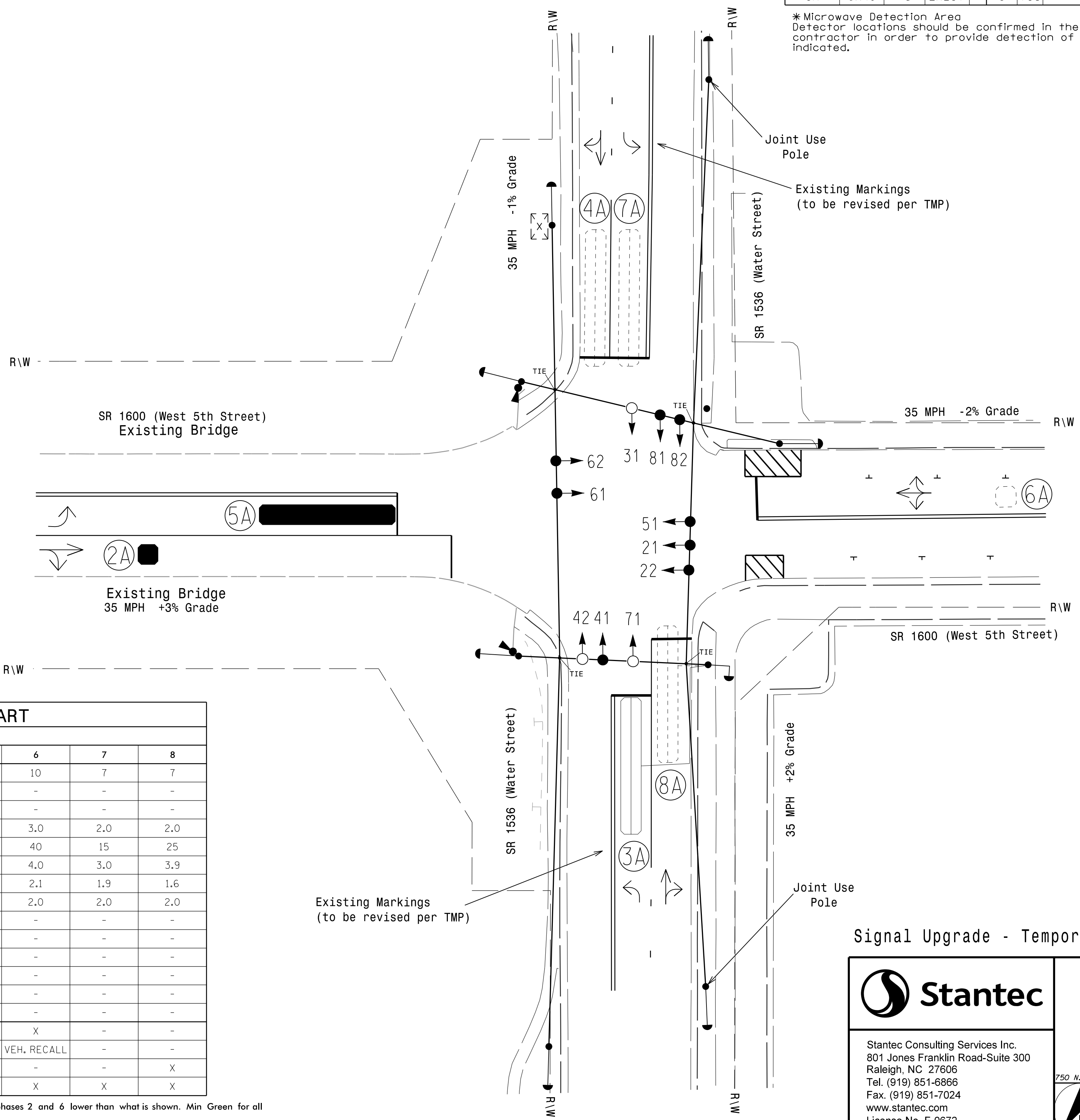
Table with columns: LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, TYPE, SYSTEM LOOP, NEW CARD.

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

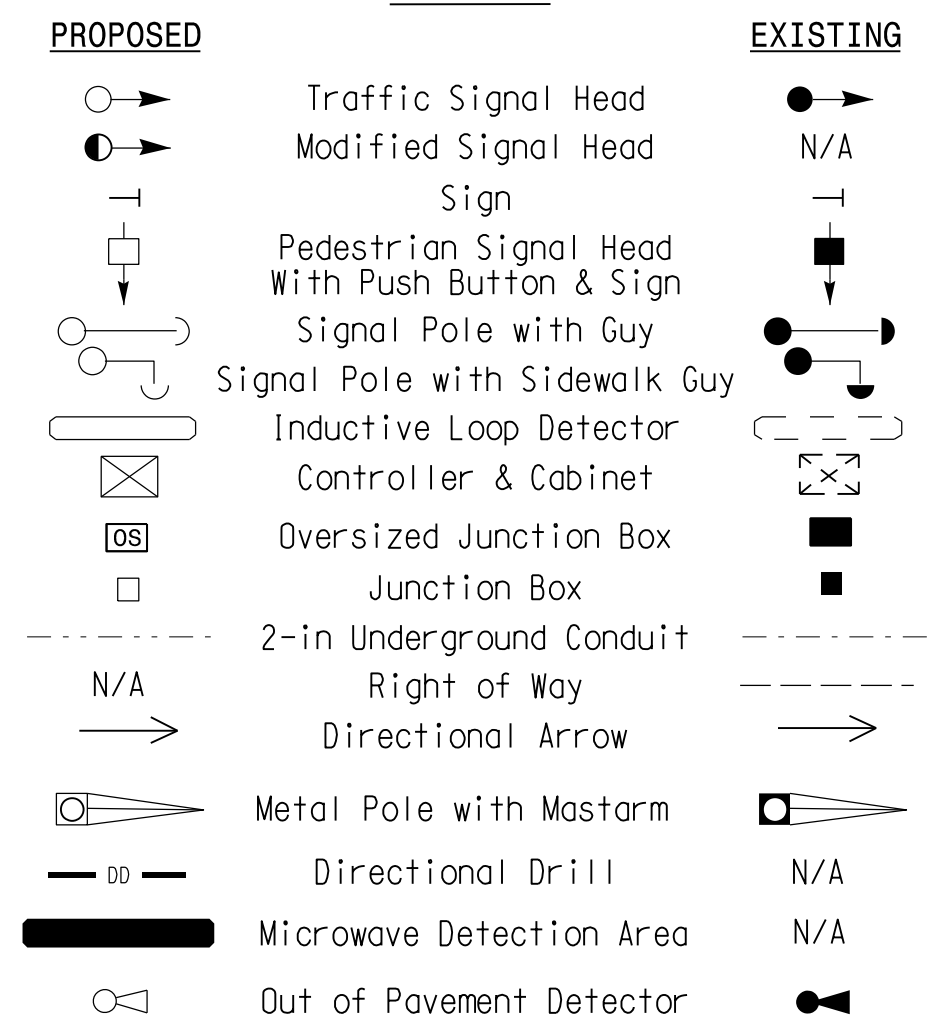
6 Phase Fully Actuated System D06-24_Lumberton

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 3 and/or phase 7 may be lagged.
4. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
5. Set all detector units to presence mode.
6. This intersection has existing microwave detection. Adjust detectors and detector zones according to manufacturer's instructions to achieve the desired detection.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND



ASC/3 TIMING CHART

Timing chart table with columns: FEATURE, PHASE (2, 3, 4, 5, 6, 7, 8) and rows for Min Green, Walk, Ped Clear, Veh. Extension, Max 1, Yellow, Red Clear, Red Revert, Actuations B4 Add, Seconds / Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, Simultaneous Gap.

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

Signal Upgrade - Temporary Design

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

Professional Engineer seal for Regina M. Muncey, No. 43239, State of North Carolina.

Project information: SR 1600 (West 5th Street) at SR 1536 (Water Street), Division 6, Robeson County, Lumberton. Prepared by: J. Hambricht, Reviewed by: R. M. Muncey, D. Waller.

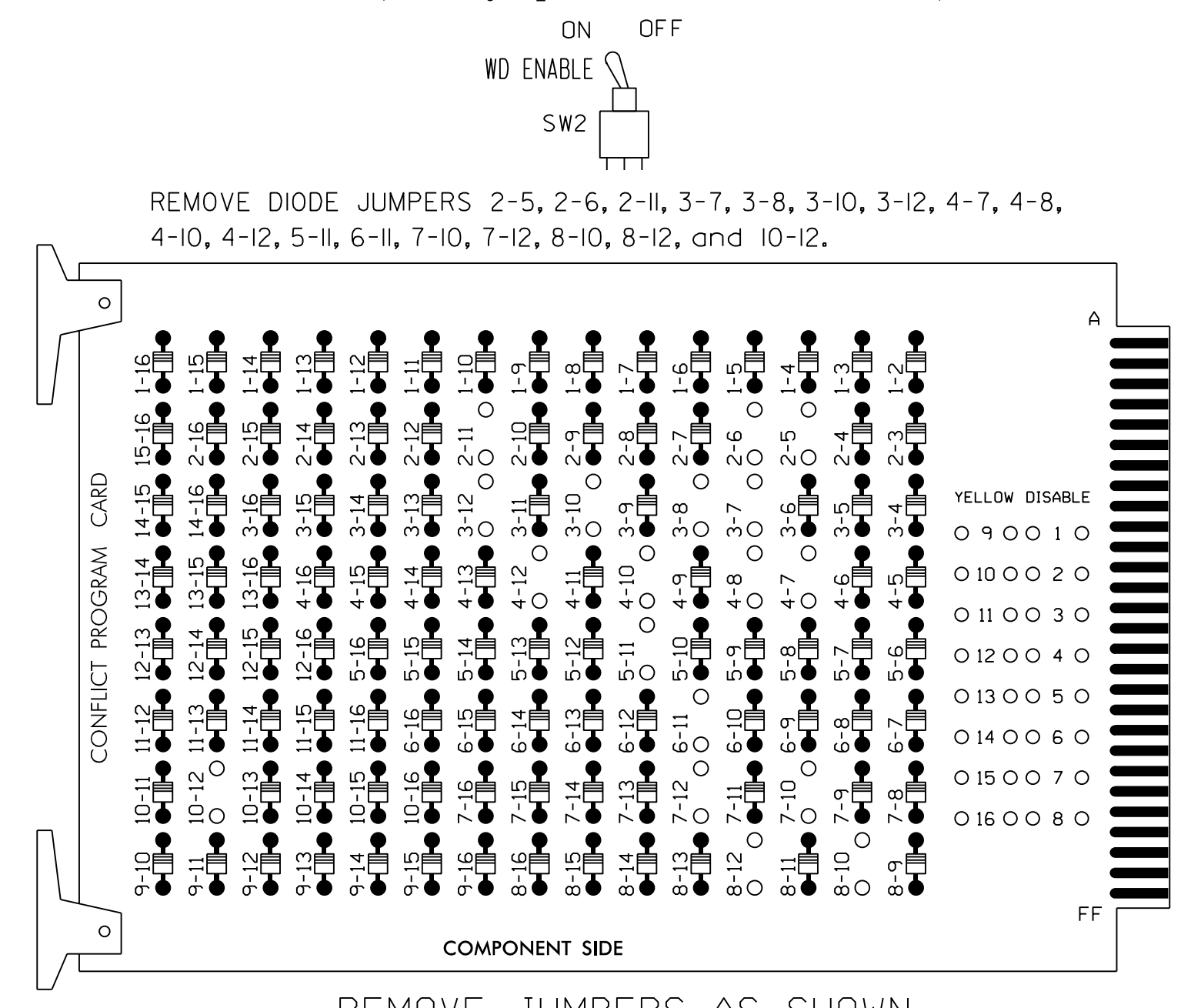
Professional Engineer seal for Regina M. Muncey, No. 43239, State of North Carolina.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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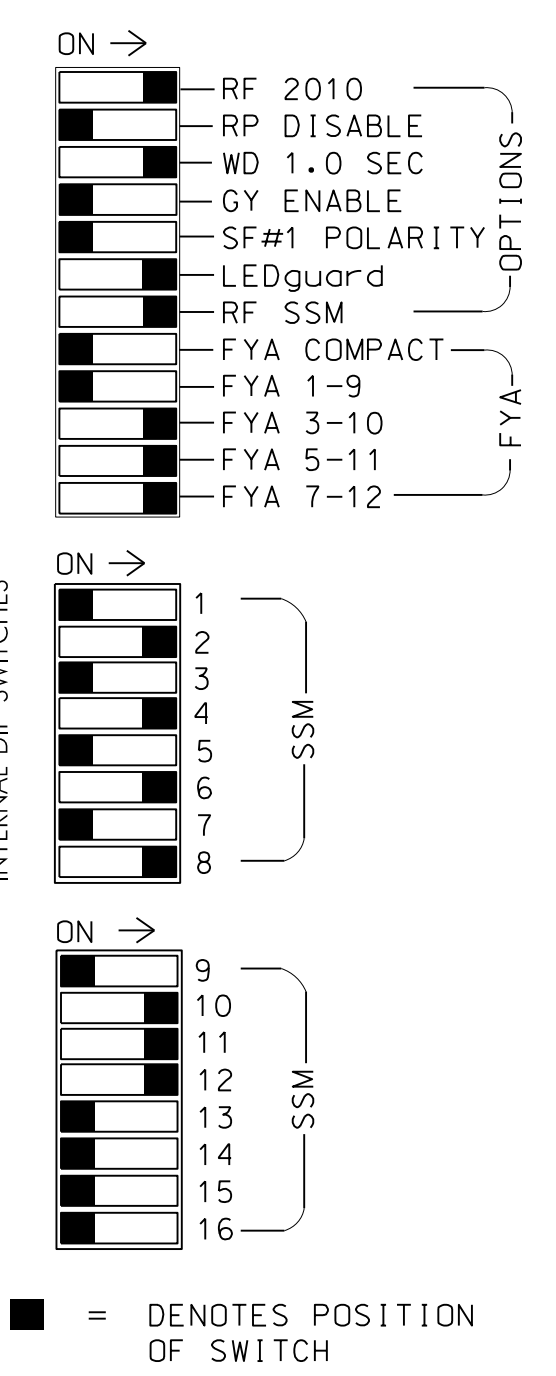
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-11, 6-11, 7-10, 7-12, 8-10, 8-12, and 10-12.

- NOTES: 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently. 2. Make sure jumpers SEL2-SEL5 are present on the monitor board.



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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5,7,9,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions. 3. Program phases 4 and 8 for Dual Entry. 4. Program controller to start up in phase 2 Green and 6 Green. 5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location. 6. The cabinet and controller are part of Signal System D06-24 Lumberton, NC 41-72 (Second St.)

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,S4,S5,S7,S8,S10,S11,AUX S2 AUX S4,AUX S5 PHASES USED.....2,3,4,5,6,7,8 OVERLAP "A".....NOT USED OVERLAP "B".....* OVERLAP "C".....* OVERLAP "D".....* * See overlap programming detail on sheet 2

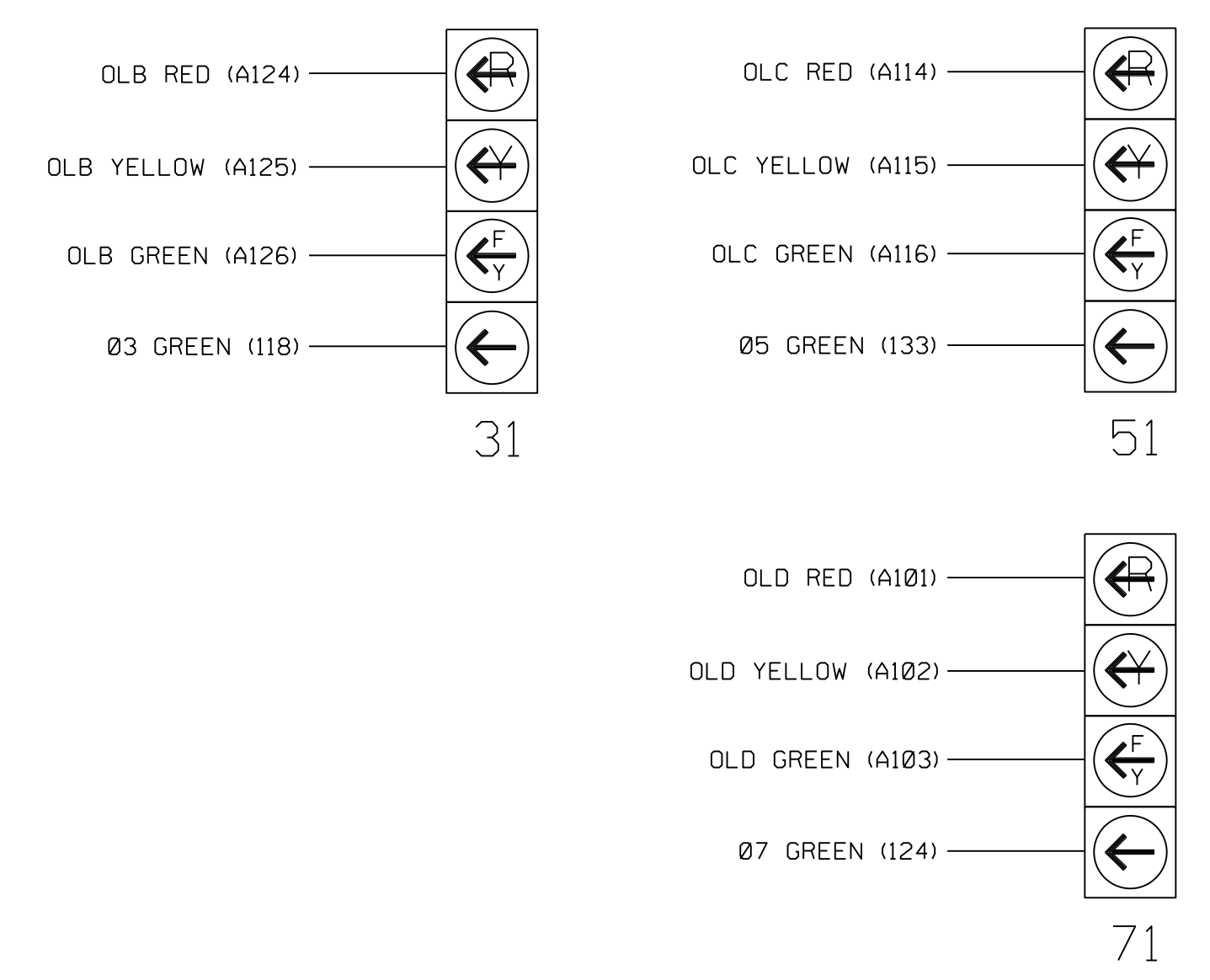
SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., S1-S12, AUX S1-S6, and Signal Head No. with corresponding hook-up values.

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

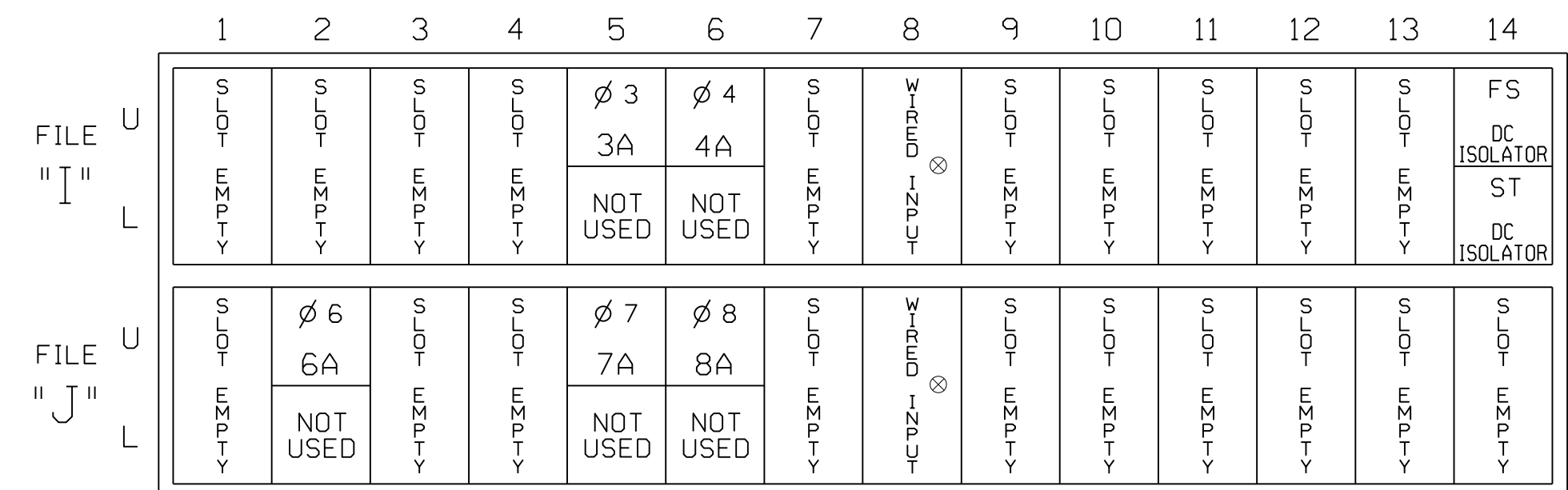
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



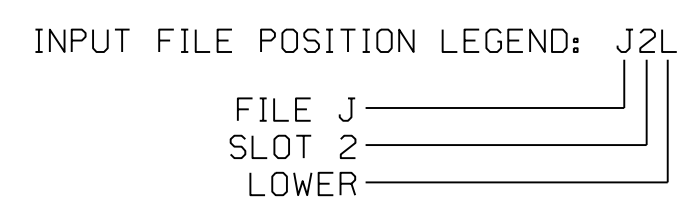
EX.: 1A, 2A, ETC. = LOOP NO.'S FS = FLASH SENSE ST = STOP TIME

* Microwave Detector Input - Do not populate slot with detector card.

INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns for Loop No., Loop Terminal, Input File Pos., Pin No., Detector No., Nema Phase, Call, Extend Time, Delay Time, Added Initial, and Detector Type.

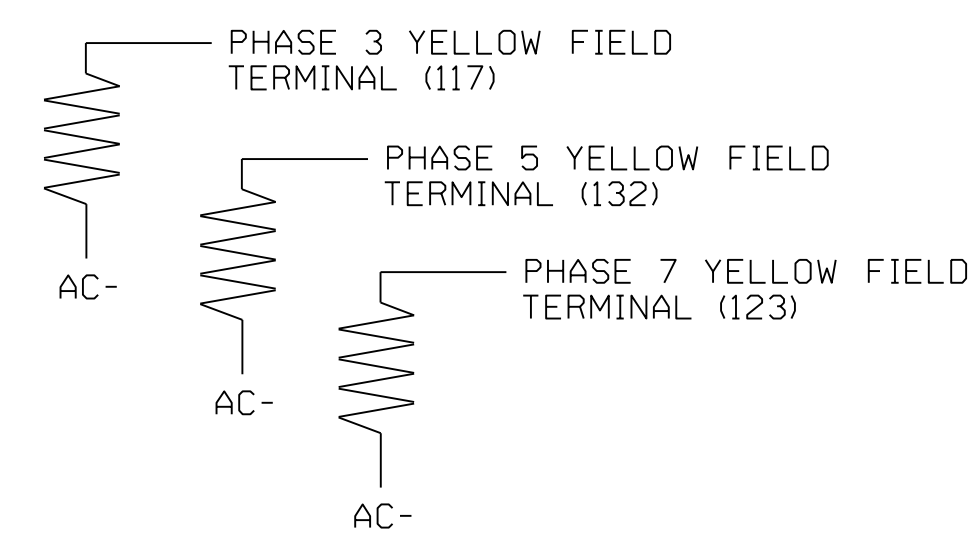
- * Microwave detector - see wiring detail on sheet 2. 1 Add jumper from J5-W to J8-W, on rear of input file. 2 Add jumper from J5-W to J8-W, on rear of input file.



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Table of acceptable values for load resistors: VALUE (ohms) and WATTAGE.



SPECIAL DETECTOR NOTES

- 1. Install a microwave detection system for vehicle detection for zones 2A and 5A. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Temporary Design Electrical Detail - Sheet 1 of 3

Stantec logo and contact information for Stantec Consulting Services Inc.

Logo for the State of North Carolina Department of Transportation, Signal Management Section.

Project information including address (SR 1600, SR 1536), division (Robeson County), and dates (February 2023).

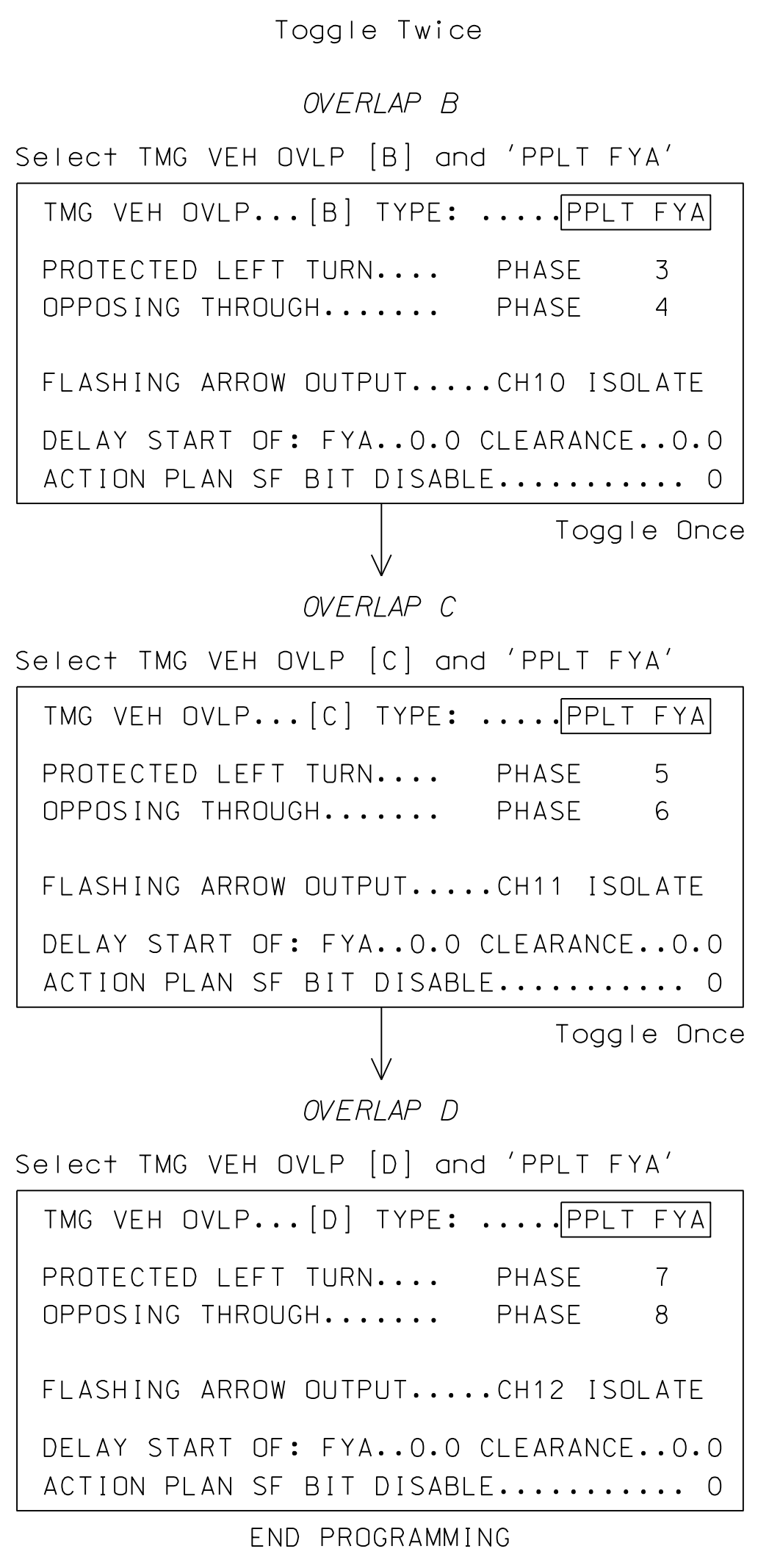
Professional Engineer seal for Regina M. Muncey, License No. 43239.

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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

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



FLASHER CIRCUIT MODIFICATION DETAIL

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

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

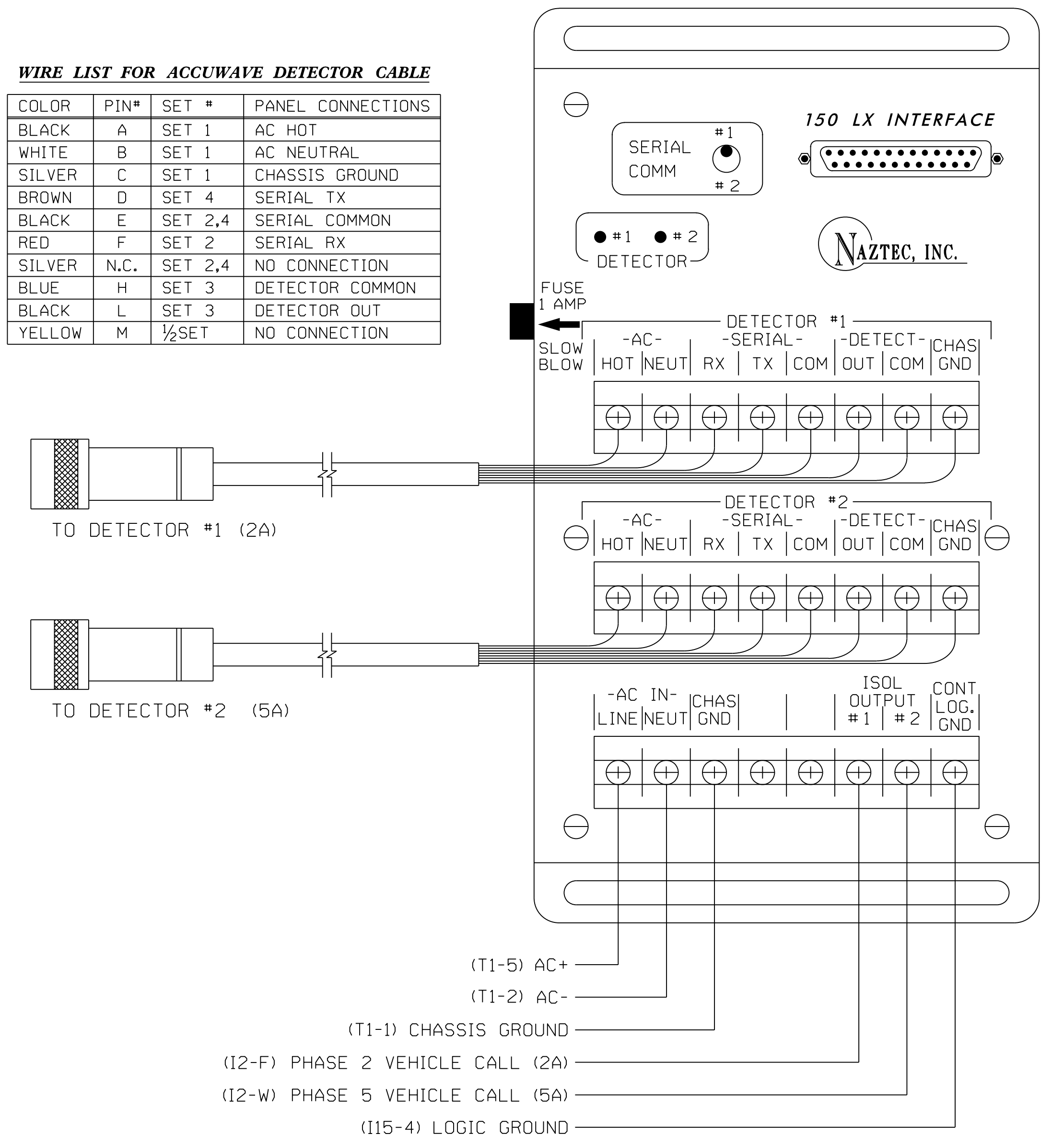
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

ACCUWAVE DETECTOR PANEL WIRING DETAIL FOR LOOPS 2A & 5A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN#	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2SET	NO CONNECTION



NOTES:

- Detectors are Accuwave Model 150LX presence detectors.
- Information in the detector cable wire list chart is for cable purchased from Naztec and may vary if purchased from another source.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0343T
 DESIGNED: JULY 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

Temporary Design Electrical Detail - Sheet 2 of 3

<p>Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</p>	<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 1600 (West 5th Street) at SR 1536 (Water Street)</p> <p>Division 6 Robeson County Lumberton</p>							
		<p>PLAN DATE: FEBRUARY 2023</p> <p>PREPARED BY: D. Waller</p>	<p>REVIEWED BY: R M Muncey</p> <p>REVIEWED BY:</p>		<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	INIT.	DATE	
NO.	INIT.	DATE							

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**ECONOLITE ASC/3-2070 BACKUP
PROTECTION ENABLE PROGRAMMING**
(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **1. CONTROLLER SEQ**
- From CONTROLLER SEQUENCE Submenu select **3. BACKUP PREVENT PHASES**

Follow programming as shown below. On the 'ENABLE BACKUP PREVENT' screen move cursor to the appropriate field and press 'YES/NO' on the controller keypad to toggle field value between 'X', 'B', 'C' and 'OFF'.

ENABLE BACKUP PREVENT	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
TMG/BKUP	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	6	.	.	.	B	.	.	.	.	.	.	.	.	.	.	.
	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

END PROGRAMMING




NOTE

- 'B' without a 'C' programmed for the 'TIMING' (row) phase inhibits the controller from servicing the 'BACKUP' (column) phase when the 'TIMING' (row) phase is active, or next, until the controller goes through Red Revert and Red Clear. Make sure the proper Red Revert and Red Clear times shown on the Signal Design plan are programmed in the controller phase timing.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0343T
DESIGNED: JULY 2022
SEALED: FEBRUARY 2023
REVISED: N/A

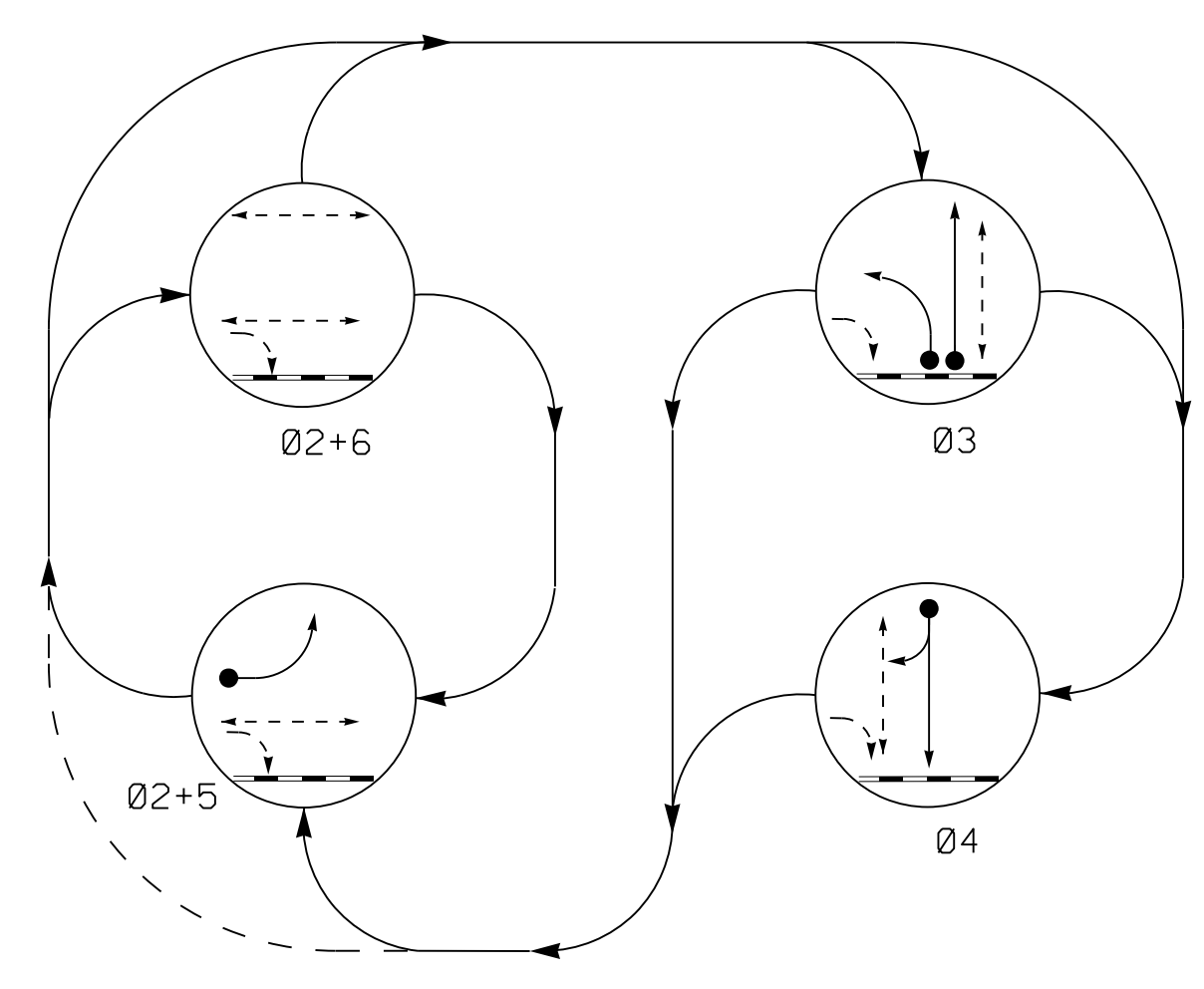
Temporary Design
Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

 Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	SR 1600 (West 5th Street) at SR 1536 (Water Street) Division 6 Robeson County Lumberton	 REGINA M. MUNCEY ENGINEER 2/2/2023
	PLAN DATE: FEBRUARY 2023 PREPARED BY: D. Waller REVIEWED BY: R M Muncey	REVIEWED BY: R M Muncey REVISIONS INIT. DATE	SIGNATURE: <i>Regina M. Muncey</i> DATE: 2/2/2023

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

RAIL PREEMPT PHASES
(High Priority)

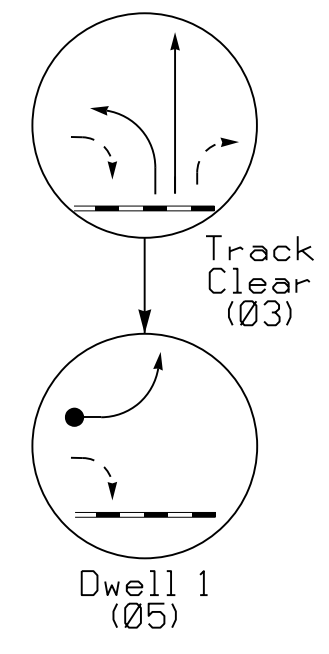


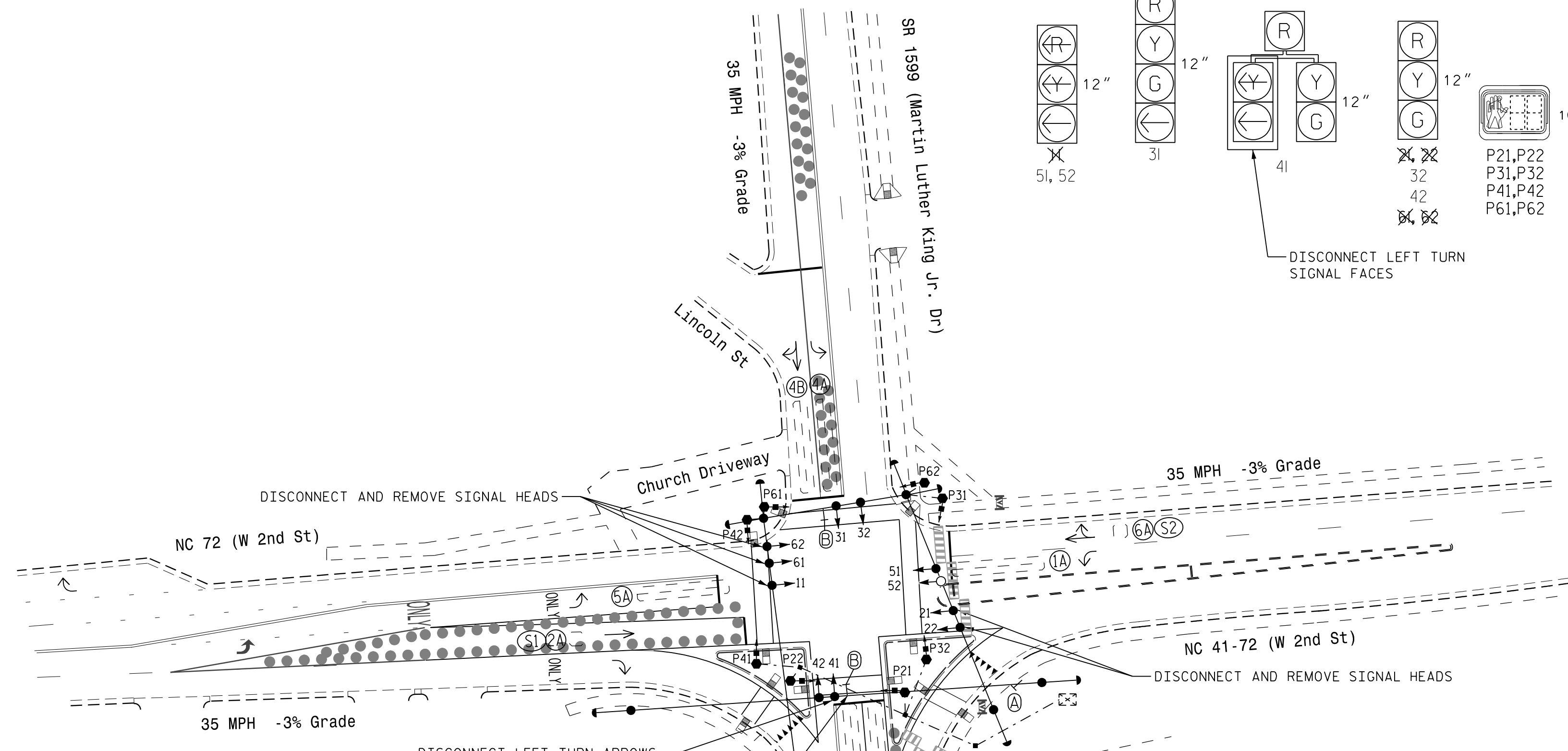
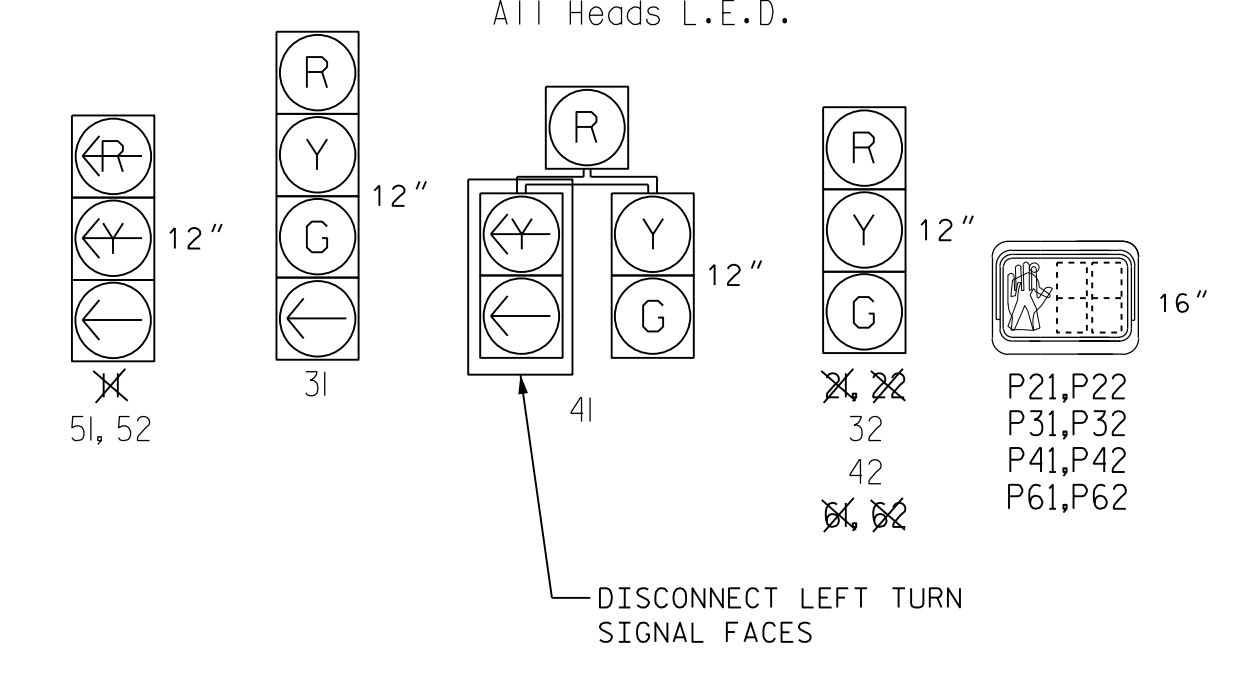
TABLE OF OPERATION

SIGNAL FACE	PHASE							
	02+5	02+6	03	04	TRUCK	TRUCK	TRUCK	FLASH
31	R	R	G	R	C	R	R	R
32	R	R	G	R	G	R	R	R
41	R	R	G	R	R	R	R	R
42	R	R	G	R	R	R	R	R
51, 52	←	←	←	←	←	←	←	←
P21,P22	W	W	DW	DW	DW	DW	DRK	
P31,P32	DW	DW	W	DW	DW	DW	DRK	
P41,P42	DW	DW	DW	W	DW	DW	DRK	
P61,P62	DW	W	DW	DW	DW	DW	DRK	

DETECTOR INSTALLATION CHART

DISCONNECT	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
Disconnect	1A	6X40	0	EXIST	-	1	Yes				N		
Disconnect	2A/S1	6X6	70	EXIST	-	2	Yes				N	X	
	3A	6X40	0	EXIST	-	3	Yes		3		N		
	3B	6X40	0	EXIST	-	3	Yes				N		
Disconnect	4A	6X40	0	EXIST	-	4/7	Yes		3		N		
	4B	6X40	0	EXIST	-	4	Yes		10		N		
	5A	6X40	+5	EXIST	-	5	Yes		3		N		
Disconnect	6A/S2	6X6	75	EXIST	-	6	Yes				N	X	

SIGNAL FACE I.D.



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. The order of phase 3 and phase 4 may be reversed.
4. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Program the controller to allow an Advance Walk movement before serving phase 2, 3, 4, and 6 vehicle phases.
11. Disconnect and remove existing signal heads 11, 21, 22, 61, and 62.
12. Disconnect and cover existing signal head 41 left turn arrow faces.

TIMING CHART

FEATURE	PHASE					
	2 PED	3	4	5	6 PED	
Min Green *	10	7	7	7	10	
Walk *	7	7	7	-	7	
Ped Clear	7	14	10	-	13	
Veh. Extension *	0.0	1.0	1.0	2.0	0.0	
Advance Walk	4	5	4	-	5	
Max 1 *	20	35	35	35	20	
Yellow	3.0	4.1	4.1	3.0	3.0	
Red Clear	0.0	1.6	1.6	2.4	0.0	
Actuations B4 Add *	-	-	-	-	-	
Seconds / Actuation *	-	-	-	-	-	
Max Initial *	-	-	-	-	-	
Time Before Reduction *	-	-	-	-	-	
Time To Reduce *	-	-	-	-	-	
Minimum Gap	-	-	-	-	-	
Locking Detector	X	-	-	-	X	
Recall Position	-	-	-	SOFT RECALL	-	
Dual Entry	-	-	-	-	-	
Simultaneous Gap	X	X	X	X	X	

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

RR PREEMPT

FUNCTION	PRE 1
Exit Phase(s)	-
Preempt Override	ON
Delay Time	0
Ped Clear Through Yellow	Y
Terminate Phases	N
Track Clear Reserve	Y
Entrance Walk	0
Entrance Ped Clear	4
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Track Clear Min Green	23
Track Clear Yellow Change	4.1
Track Clear Red Clear	1.6
Min Dwell Time	10
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Allows normal phase times to be used.

This Intersection is designed for SIMULTANEOUS preemption.

Signal Upgrade - Temporary Signal

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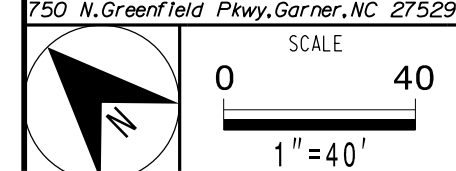
Regina M. Muncey
Professional Engineer
No. 43239
State of North Carolina

NC 72/NC 41-72 (W 2nd St)
at
NC 41/SR 1599
(Martin Luther King Jr. Dr)
Division 6 Robeson County Lumberton
PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
PREPARED BY: J. Hambright REVIEWED BY: D Waller

Regina M. Muncey
Professional Engineer
No. 43239
State of North Carolina

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 User: rlmuncey

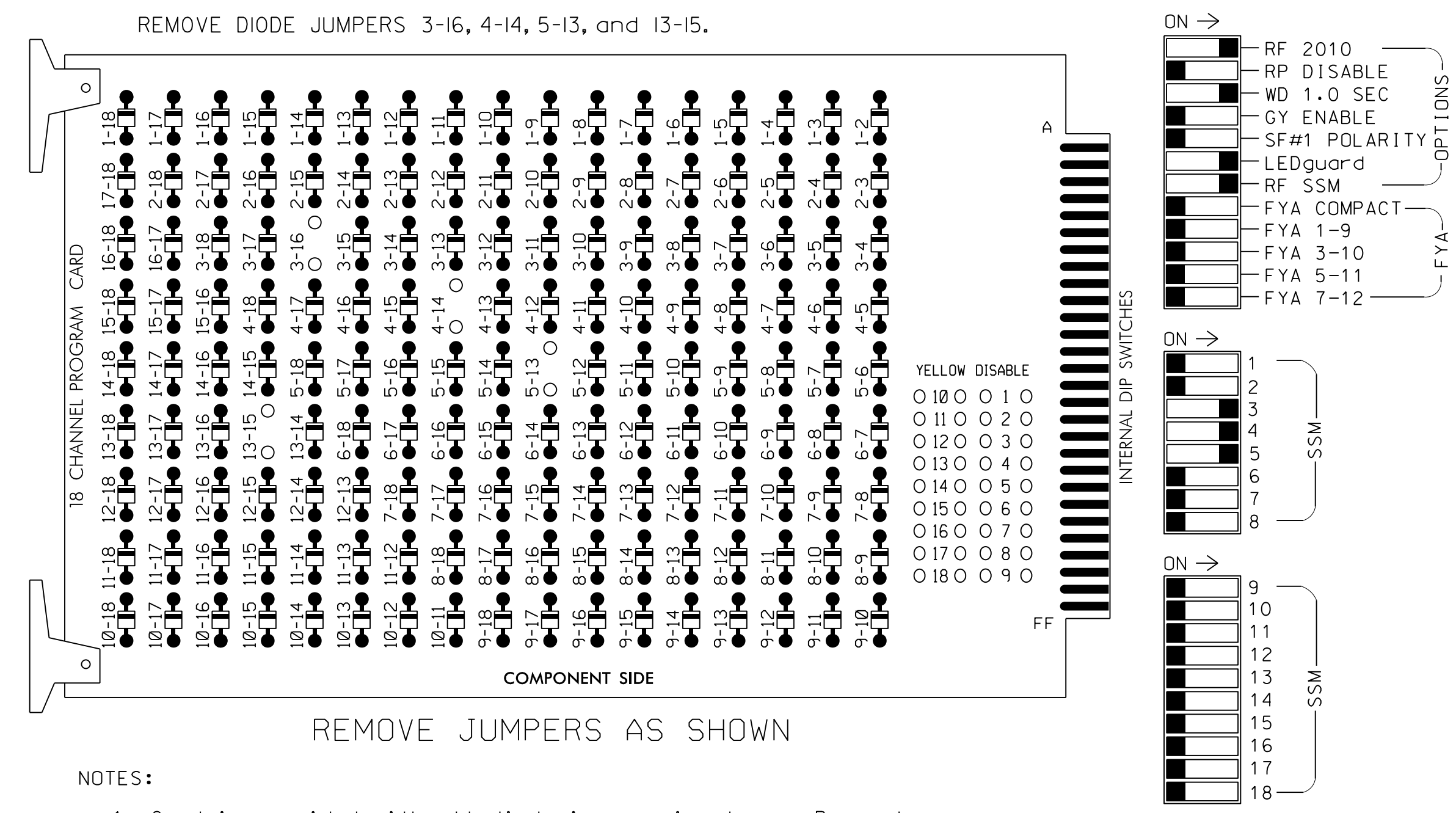
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REVISIONS	INIT.	DATE

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 3 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 D06-24 NC 72 (Second Street) and Water Street Signal System.

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	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	P21, P22	31	32	41,42	P41, P42	51,52	NU	P61, P62	NC	NU	P31, P32	NU	NU	NU	NU	NU
RED				116	116	101												
YELLOW				117	117	102												
GREEN				118	118	103												
RED ARROW									131									
YELLOW ARROW									132									
GREEN ARROW				118					133									
Hand			113				104		119		110							
Walking			115				106		121		112							

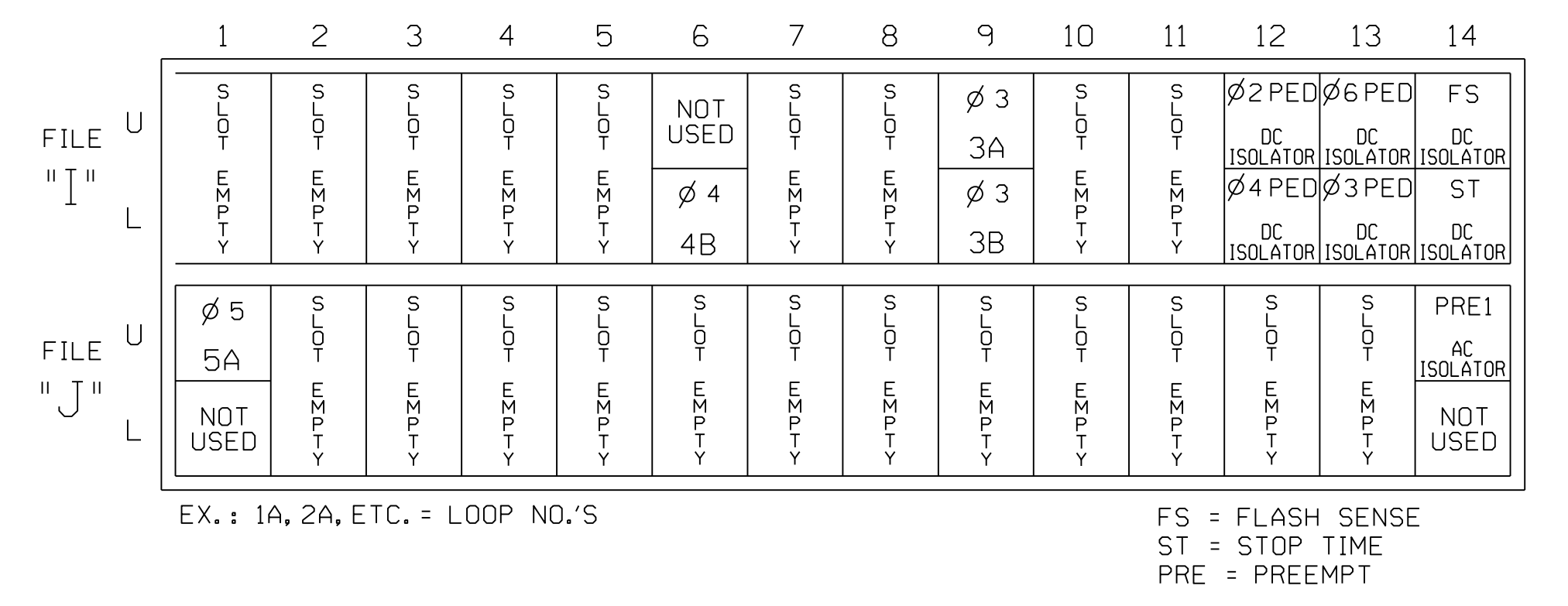
NU = Not Used
NC = No Connection

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.....S3,S4,S5,S6,S7,
 S9,S12
 PHASES USED.....2PED,3,3PED,4,4PED,
 5,6PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

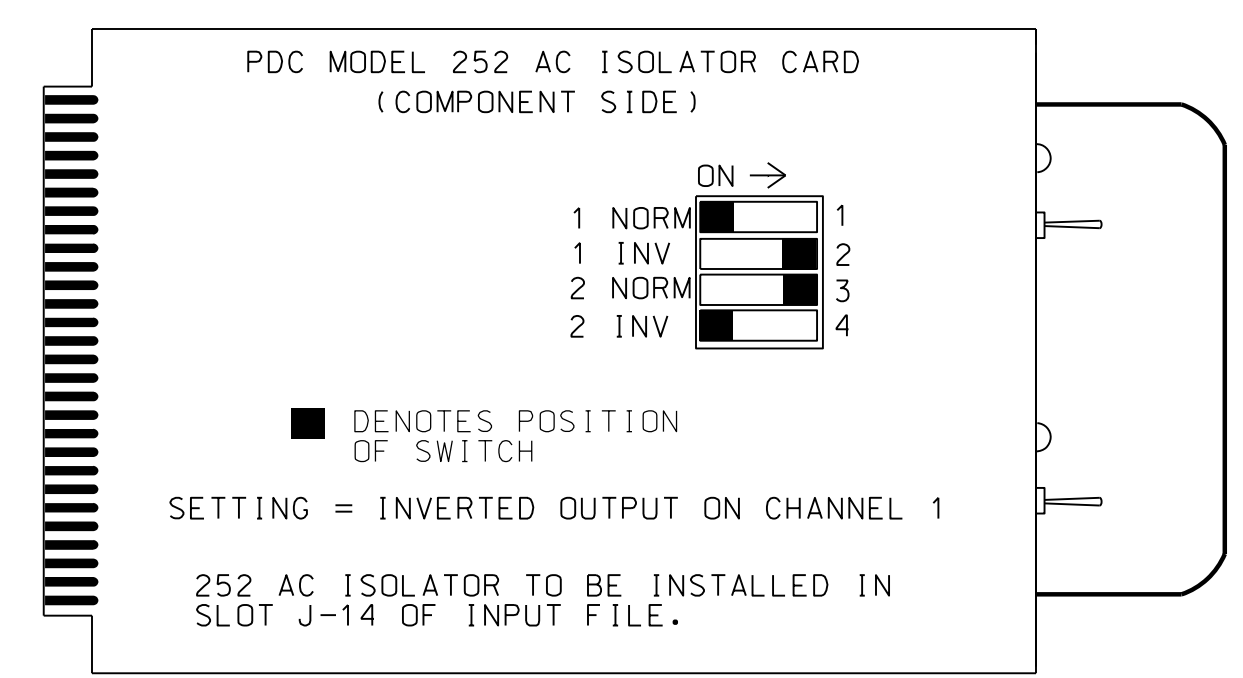
INPUT FILE POSITION LAYOUT

(front view)



PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
3A	TB6-9,10	I9U	60	11	3	YES		3		N
3B	TB6-11,12	I9L	62	13	3	YES				N
4B	TB4-11,12	I6L	45	14	4	YES		10		N
5A	TB3-1,2	J1U	55	5	5	YES		3		N

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

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

Temporary Design
Electrical Detail - Sheet 1 of 3

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REGINA M. MUNCEY
Professional Engineer
No. 43239
February 2, 2023

NC 72/NC 41-72 (W 2nd St)
at
NC 41/SR 1599
(Martin Luther King Jr. Dr)
Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023	REVIEWED BY: R M Muncey
PREPARED BY: D. Waller	REVIEWED BY:
REVISIONS	INIT. DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
REGINA M. MUNCEY
43239
FEBRUARY 2, 2023

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2:59:18 PM
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 User: rmmuncey

ECONOLITE ASC/3-2070 PED 3 PROGRAMMING ASSIGNMENT DETAIL

(program controller as shown)

- 1. From Main Menu select **6. DETECTORS**
- 2. From DETECTOR Submenu select **3. PED DETECTOR INPUT ASSIGNMENT**

PED DET PHASE ASSIGNMENT MODE: NTCIP								
PHASE	1	2	3	4	5	6	7	8
DETECTOR	0	2	8	4	0	6	0	0
PHASE	9	10	11	12	13	14	15	16
DETECTOR	0	0	0	0	0	0	0	0

← NOTICE PED DETECTOR 8 ASSIGNED TO PHASE 3

- 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	V	.	.	.	-	A	R	.
8	8	V	.	.	.	-	A	R	X
9	1	O	.	.	.	+	A	R	X
10	2	O	.	.	.	+	A	R	X
11	3	O	.	.	.	-	A	R	.
12	4	O	.	.	.	-	A	R	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	-	A	.	.
15	6	P	.	.	.	+	A	.	.
16	3	P	.	.	.	-	A	.	.

→ NOTICE PHASE 3 PED ASSIGNED TO LD SWITCH 16

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 06-0186T
 DESIGNED: AUGUST 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

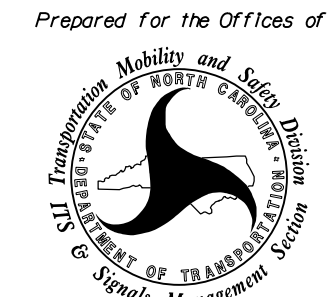
Temporary Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 72/NC 41-72 (W 2nd St)
 at
 NC 41/SR 1599
 (Martin Luther King Jr. Dr)
 Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
 PREPARED BY: D. Waller REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 43239
 ENGINEER
 REGINA M. MUNCEY
 FEBRUARY 2023

SIGNATURE DATE
 REGINA M. MUNCEY 2/2/2023

SIG. INVENTORY NO. 06-0186T

2:58:22 PM
U:\Traffic\cas\gma\is\Das\gn\electr\loc\Detail\temp\Temporary Design\MB-5985A\MB-5985A.sig_ele_06-0186T.dgn
User:rmuncey

ECONOLITE ASC/3-2070 RAILROAD PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select 4. PREEMPTOR/TSP
- From PREEMPTOR/TSP/SCP Submenu select 1. PREEMPT PLAN 1-10

Place cursor in [] next to Preempt Plan and press 1. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Railroad Preempt #1.

```

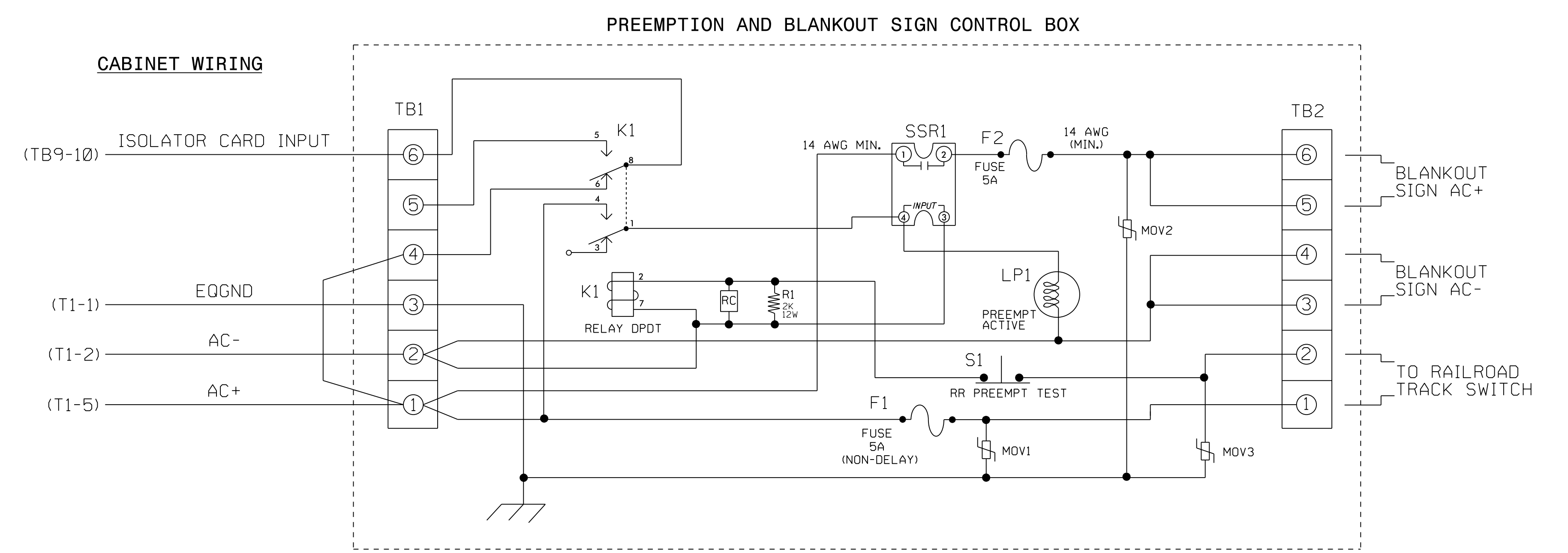
PREEMPT PLAN [ 1 ]  ENABLE....YES
VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . X . . . . .
TRKCLR 0 . . . . .
ENA TRL . . . . .
DWEL VEH . . . . .
DWEL PED . . . . .
DWEL OLP . . . . .
CYC VEH . . . . X . . . . .
CYC PED . . . . .
CYC OLP . . . . .
EXIT PH . . . . .
EXIT CAL . . . . .
SP FUNC . . . . .
    
```

```

ENABLE... YESIPMT OVRIDE.XIINTERLOCK. NO
DET LOCK... XIDELAY.. 0IINHIBIT... 0
OVERIDE FL. .IDURATION 0ICLR-GRN... NO
TERM OLP. NOIPC>YEL YESITERM PH NO
PED DARK.. NOITC RESRV YESIDWELL FL OFF
LINK PMT....0IX FLCOLR REDIEXIT OPT. OFF
X TMG PLN...0IRE-SERV.. 0IFLT TYPE.HARD
FREE DUR PMTIR1 NOIR2 NOIR3 NOIR4 NO
--TIMING----WALKIPED CLIMN GRI YELI RED
ENTRANCE TM. 01 41 1125.5125.5
-----MIN GRIEXT GRIMX GRI YELI RED
TRACK CLEAR 231 01 01 4.11 1.6
-----MIN DLIPMTEXTIMX TMI YELI RED
DWL/CYC-EXIT 101 0.01 0125.5125.5
PMT ACTIVE OUT..ON PMT ACT DWELL...NO
OTHER - PRI PMT.OFF NON-PRI PMT.....OFF
INH EXT TIME... 0.0 PED PR RETURN...OFF
PRIORITY RETURN.OFF QUEUE DELAY.... OFF
COND DELAY.....OFF
PHASES 1 2 3 4 5 6 7 8
PR RTN% 0 0 0 0 0 0 0 0
PHASES 9 10 11 12 13 14 15 16
PR RTN% 0 0 0 0 0 0 0 0
    
```

RAILROAD PREEMPTION WIRING DETAIL

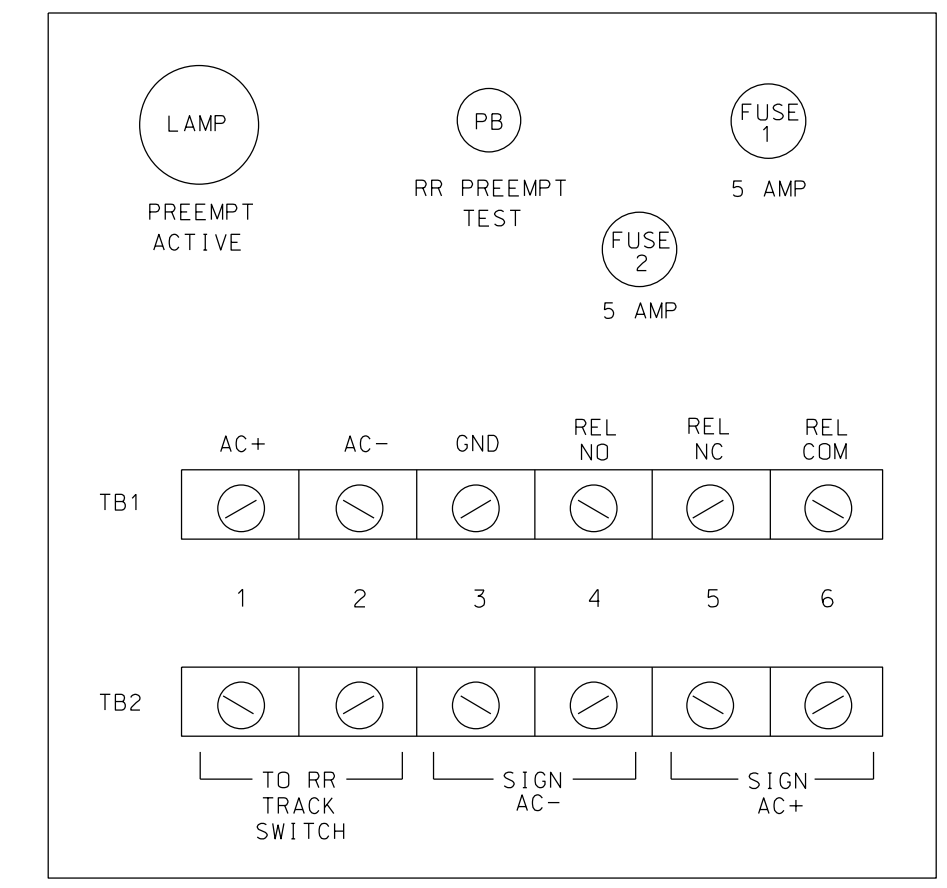
(wire as shown below)



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil with octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
- IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



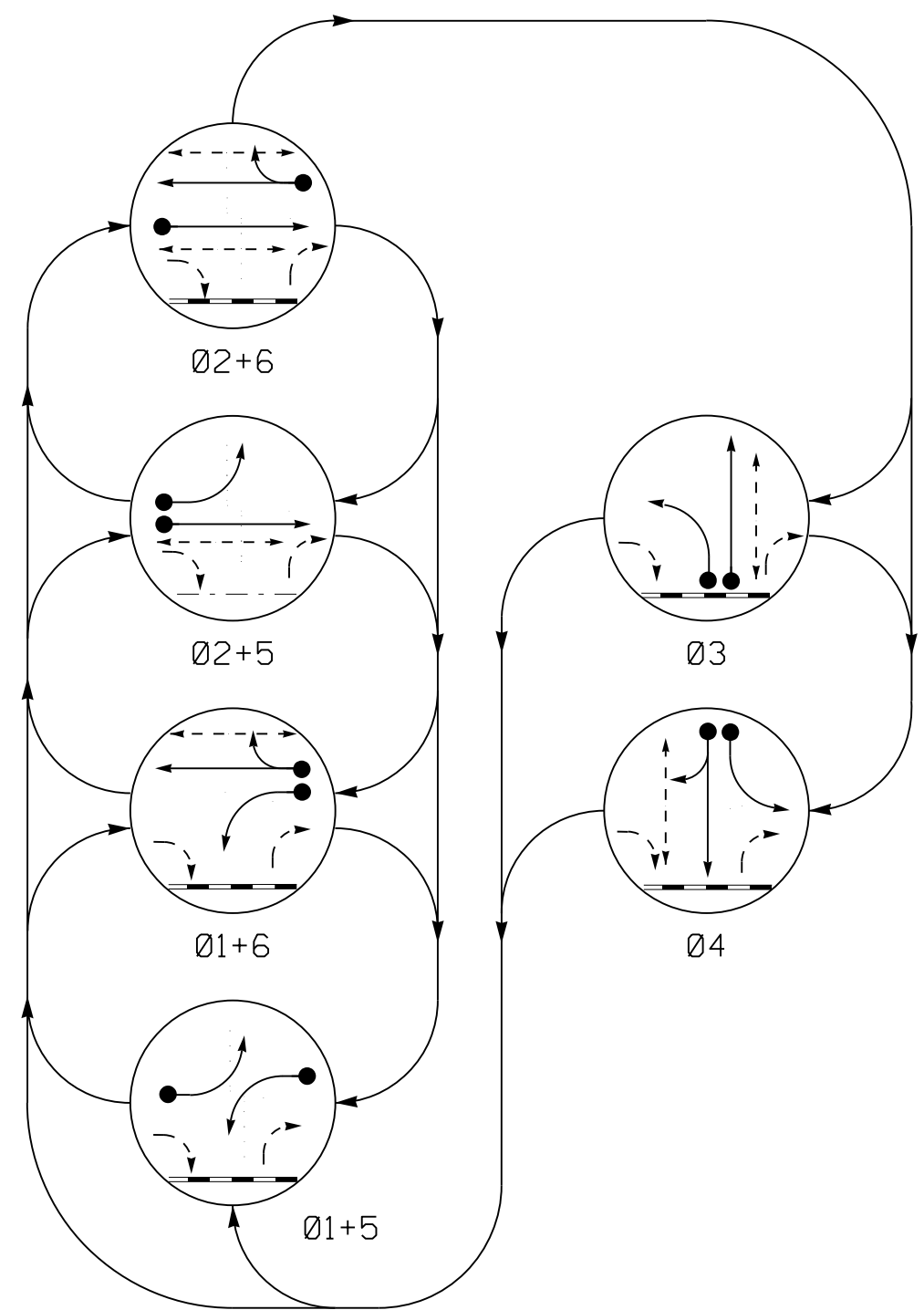
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0186T
 DESIGNED: AUGUST 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

Temporary Design
 Electrical Detail - Sheet 3 of 3

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		PREPARED BY: D. Waller REVIEWED BY: R M Muncey		

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 User: rlmuncey

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

RAIL PREEMPT PHASES
(High Priority)

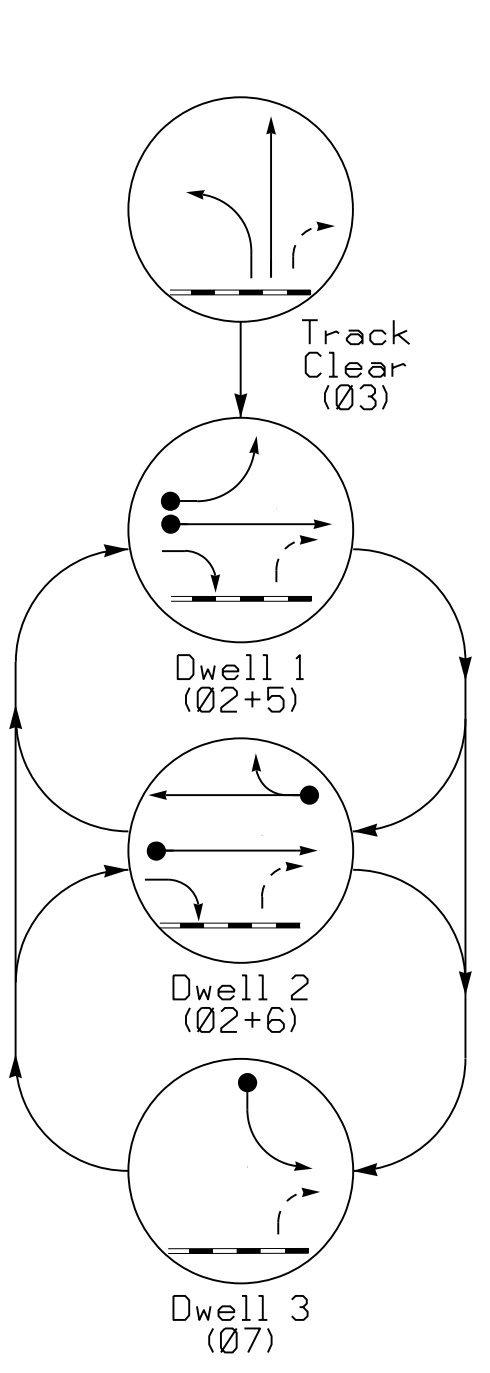
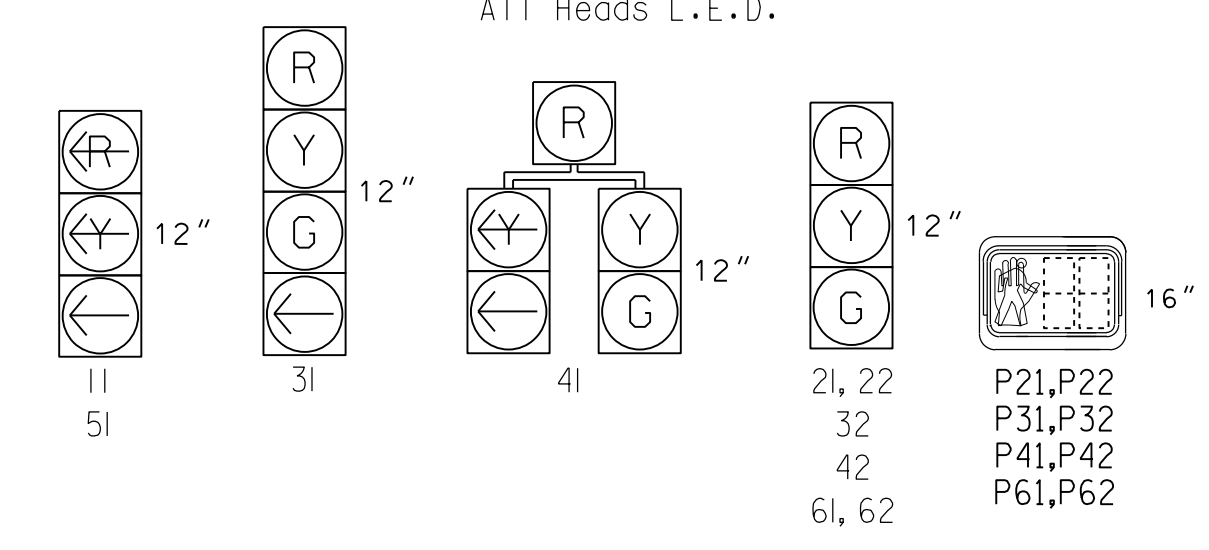


TABLE OF OPERATION

SIGNAL FACE	PHASE											
	01+5	01+6	02+5	02+6	03	04	05	06	07	08	09	10
11												
21, 22	R	R	G	G	R	R	R	G	R	R	R	Y
31	R	R	R	R	G	R	G	R	R	R	R	R
32	R	R	R	R	G	R	G	R	R	R	R	R
41	R	R	R	R	R	G	R	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R	R	R
51												
61, 62	R	G	R	G	R	R	R	R	G	R	R	Y
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DRK	
P31,P32	DW	DW	DW	DW	W	DW	DW	DW	DW	DW	DRK	
P41,P42	DW	DW	DW	DW	DW	W	DW	DW	DW	DW	DRK	
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	DRK	

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



DETECTOR INSTALLATION CHART

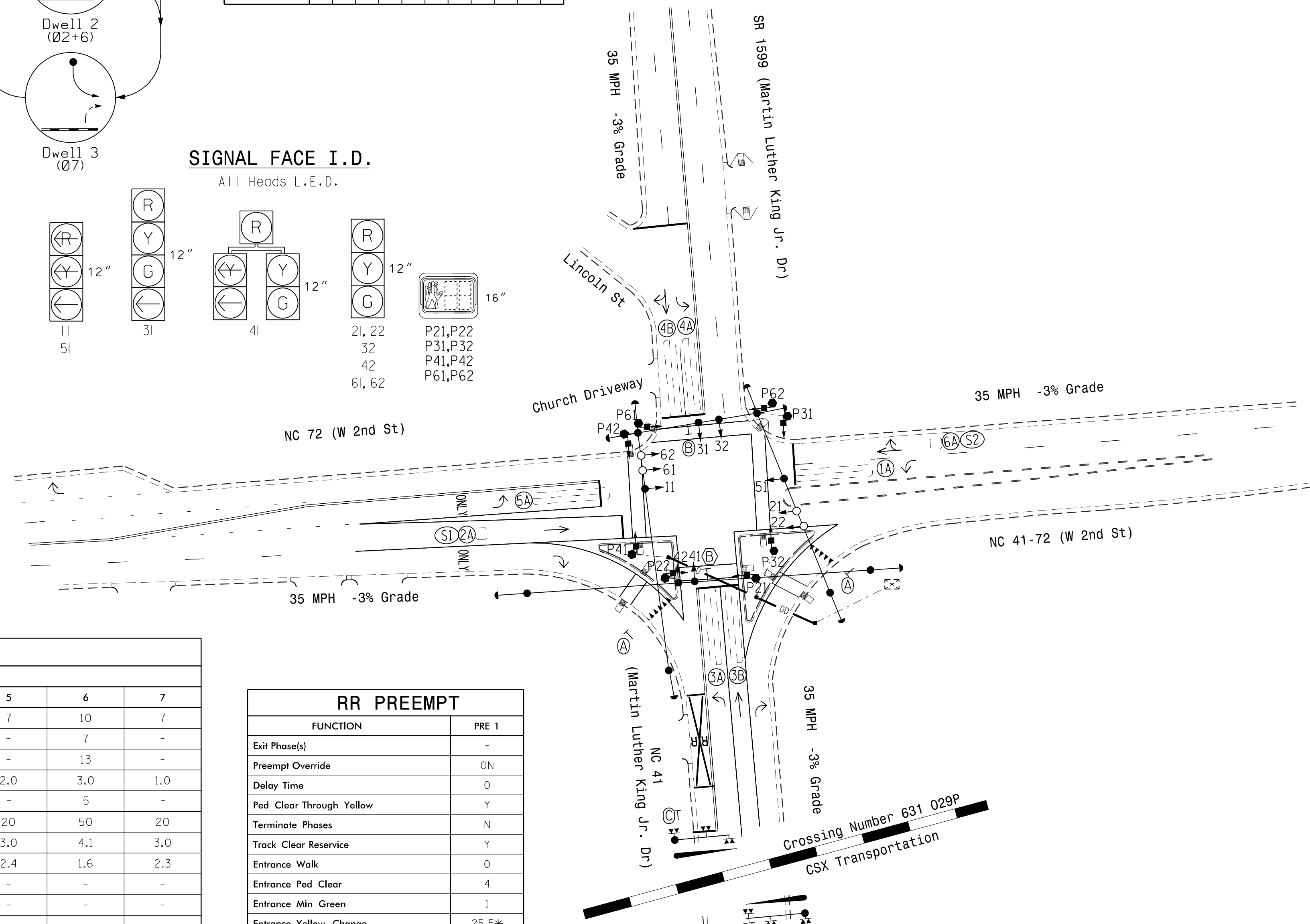
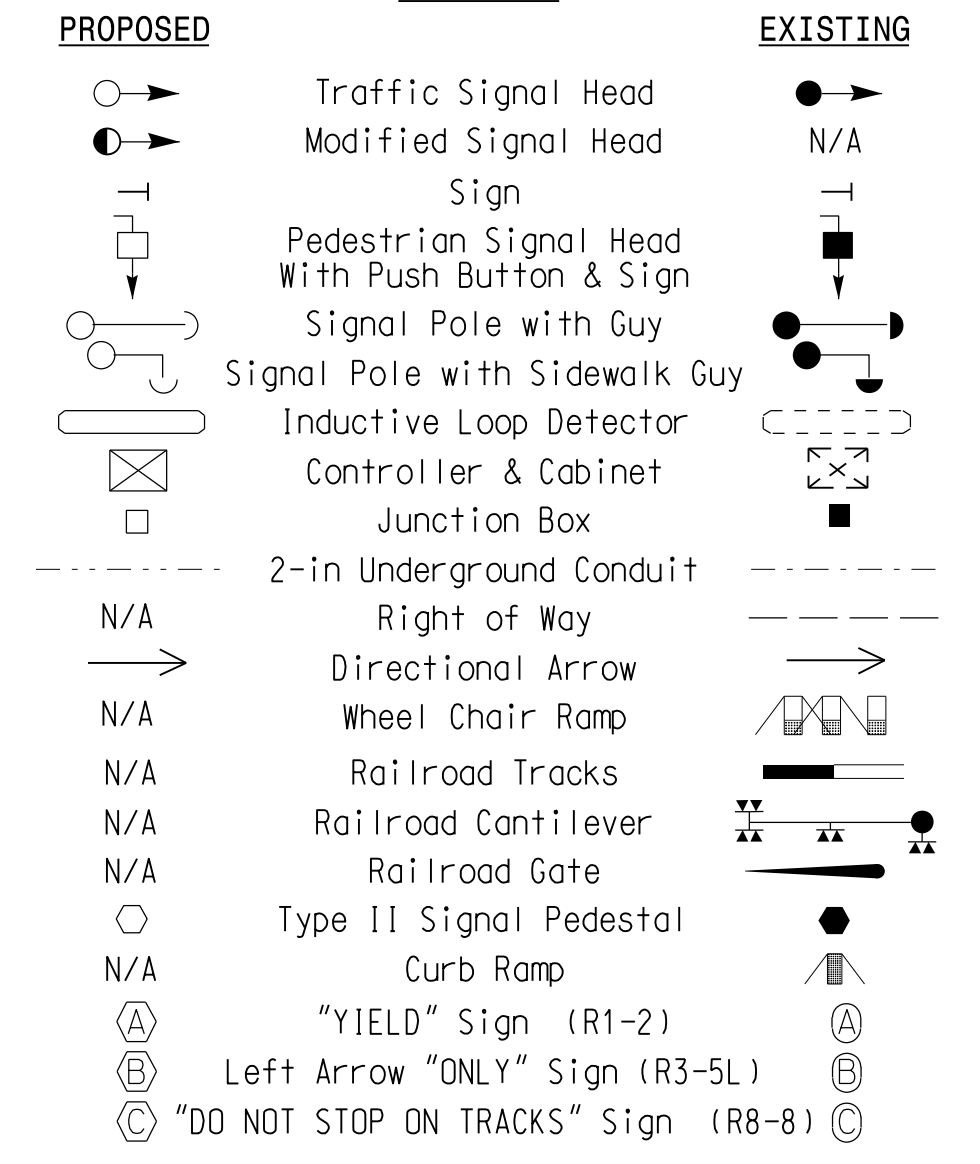
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	-	-	N	-	X
2A/S1	6X6	70	EXIST	-	2	Yes	-	-	-	N	X	X
3A	6X40	0	2-4-2	-	3	Yes	-	3	-	N	-	-
3B	6X40	0	2-4-2	-	3	Yes	-	-	-	N	-	-
4A	6X40	0	2-4-2	-	4/7	Yes	-	3	-	N	-	-
4B	6X40	0	2-4-2	-	4	Yes	-	10	-	N	-	-
5A	6X40	+5	2-4-2	-	5	Yes	-	3	-	N	-	-
6A/S2	6X6	75	EXIST	-	6	Yes	-	-	-	N	X	X

6 Phase Fully Actuated W/ Railroad Preemption
D06-24 NC 72 (Second Street) and Water Street

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- This location contains railroad preemptions phasing. Do not program signal for late night flashing operation.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- 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.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program the controller to allow an Advance Walk movement before serving phase 2, 3, 4, and 6 vehicles phases.

LEGEND



TIMING CHART

FEATURE	PHASE						
	1	2	3	4	5	6	7
Min Green *	7	10	7	7	7	10	7
Walk *	-	7	7	7	-	7	-
Ped Clear	-	7	14	10	-	13	-
Veh. Extension *	1.0	3.0	1.0	1.0	2.0	3.0	1.0
Advance Walk	-	4	5	4	-	5	-
Max 1 *	30	50	35	35	20	50	20
Yellow	3.0	4.1	4.1	4.1	3.0	4.1	3.0
Red Clear	2.6	1.6	1.6	1.6	2.4	1.6	2.3
Actuations B4 Add *	-	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-
Locking Detector	-	X	-	-	-	X	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-
Dual Entry	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X

RR PREEMPT

FUNCTION	PRE 1
Exit Phase(s)	-
Preempt Override	ON
Delay Time	0
Ped Clear Through Yellow	Y
Terminate Phases	N
Track Clear Reserve	Y
Entrance Walk	0
Entrance Ped Clear	4
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Track Clear Min Green	23
Track Clear Yellow Change	4.1
Track Clear Red Clear	1.6
Min Dwell Time	10
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Allows normal phase times to be used.

This Intersection is designed for SIMULTANEOUS preemption.

Signal Upgrade - Final Design

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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

NC 72/NC 41-72 (W 2nd St)
at
NC 41/SR 1599
(Martin Luther King Jr. Dr)
Division 6 Robeson County Lumberton
PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
PREPARED BY: J. Hambright REVIEWED BY: D Waller

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Seal: REGINA M. MUNCEY, PROFESSIONAL ENGINEER, No. 43239, State of North Carolina.
Signature: Regina M. Muncey, 2/2/2023

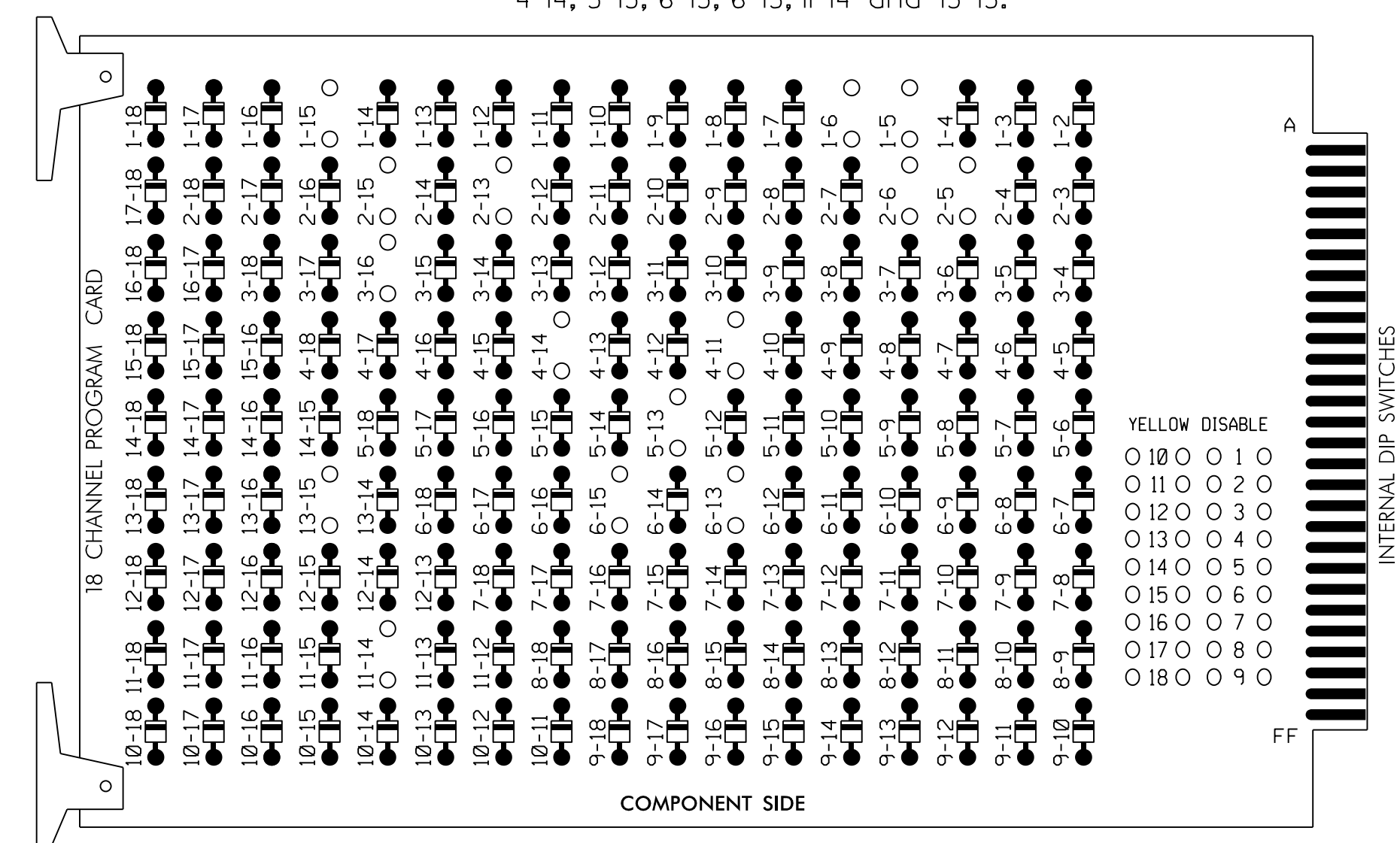
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 User: rmmuncey
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* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than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

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

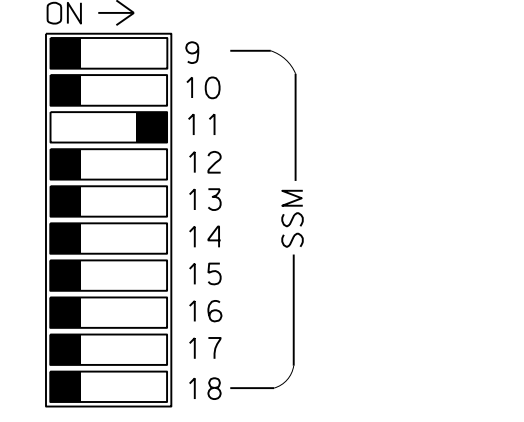
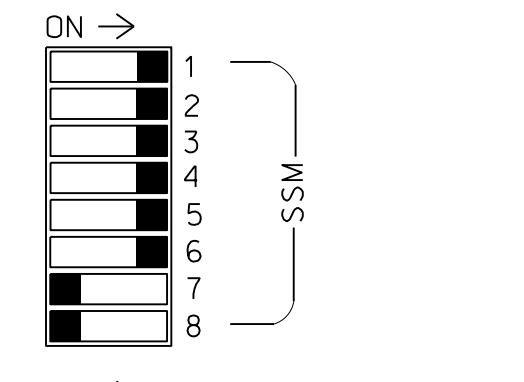
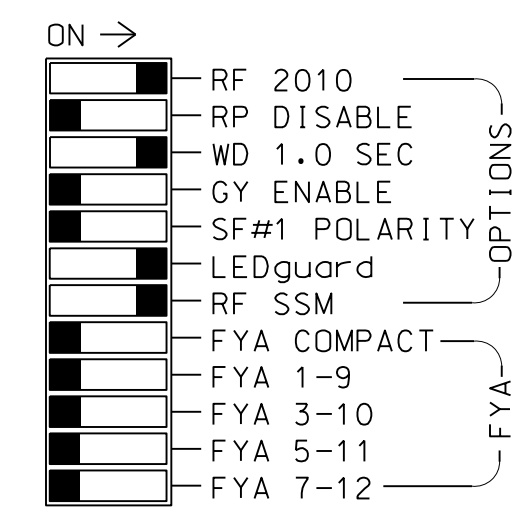
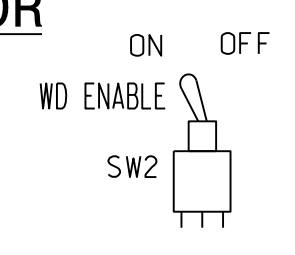
REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-16, 4-11, 4-14, 5-13, 6-13, 6-15, 11-14 and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 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 D06-24 NC 72 (Second Street) and Water Street Signal 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.....S1,S2,S3,S4,S5,S6,S7,S8,
 S9,S12,AUX S4
 PHASES USED.....1,2,2 PED,3,3 PED,4,4 PED,
 5,6,6PED,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED

* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

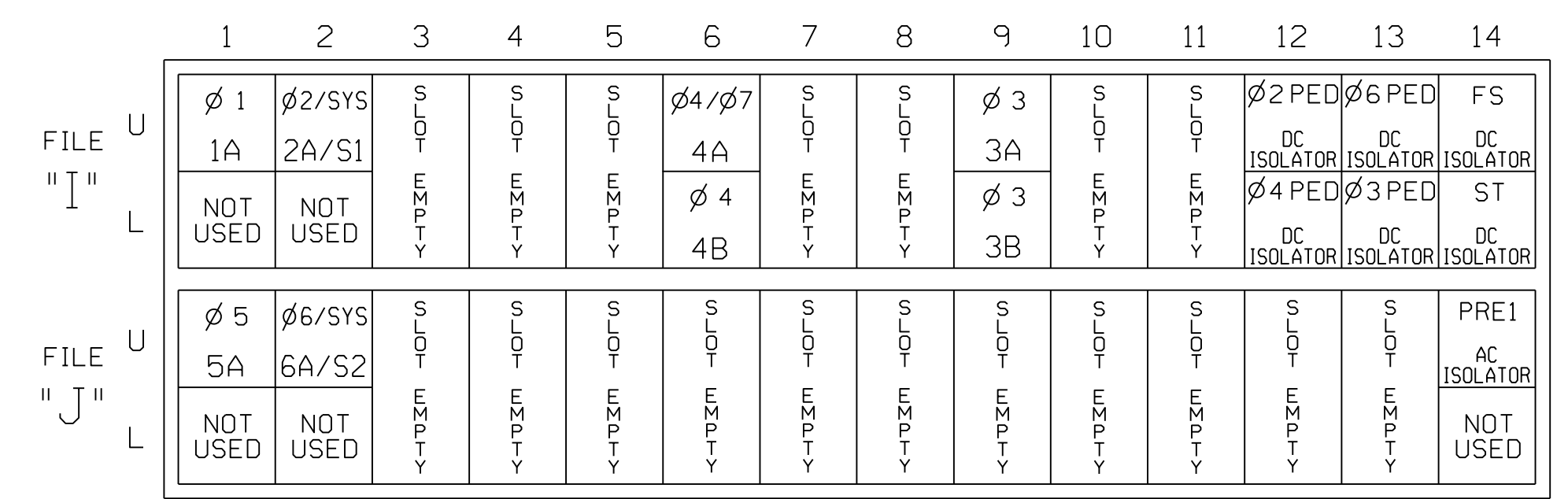
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	31	32	41,42	P41, P42	51	61,62	P61, P62	NC	NU	P31, P32	NU	NU	NU	41	NU
RED	128			116	116	101			134									*
YELLOW		129		117	117	102			135									
GREEN		130		118	118	103			136									
RED ARROW	125								131									
YELLOW ARROW	126								132									A115
FLASHING YELLOW ARROW																		
GREEN ARROW	127			118					133									A116
Hand icon				113					104				119					110
Person icon				115					106				121					112

NU = Not Used
NC = No Connection

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

INPUT FILE POSITION LAYOUT

(front view)



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

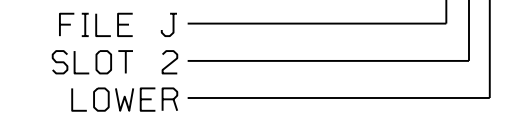
FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES				N
2A/S1	TB2-5,6	I2U	39	2	2/SYS	YES				N
3A	TB6-9,10	I9U	60	11	3	YES		3		N
3B	TB6-11,12	I9L	62	13	3	YES				N
4A	TB4-9,10	I6U	41	4	4/7	YES		3		N
4B	TB4-11,12	I6L	45	14	4	YES		10		N
5A	TB3-1,2	J1U	55	5	5	YES		3		N
6A/S2	TB3-5,6	J2U	40	6	6/SYS	YES				N

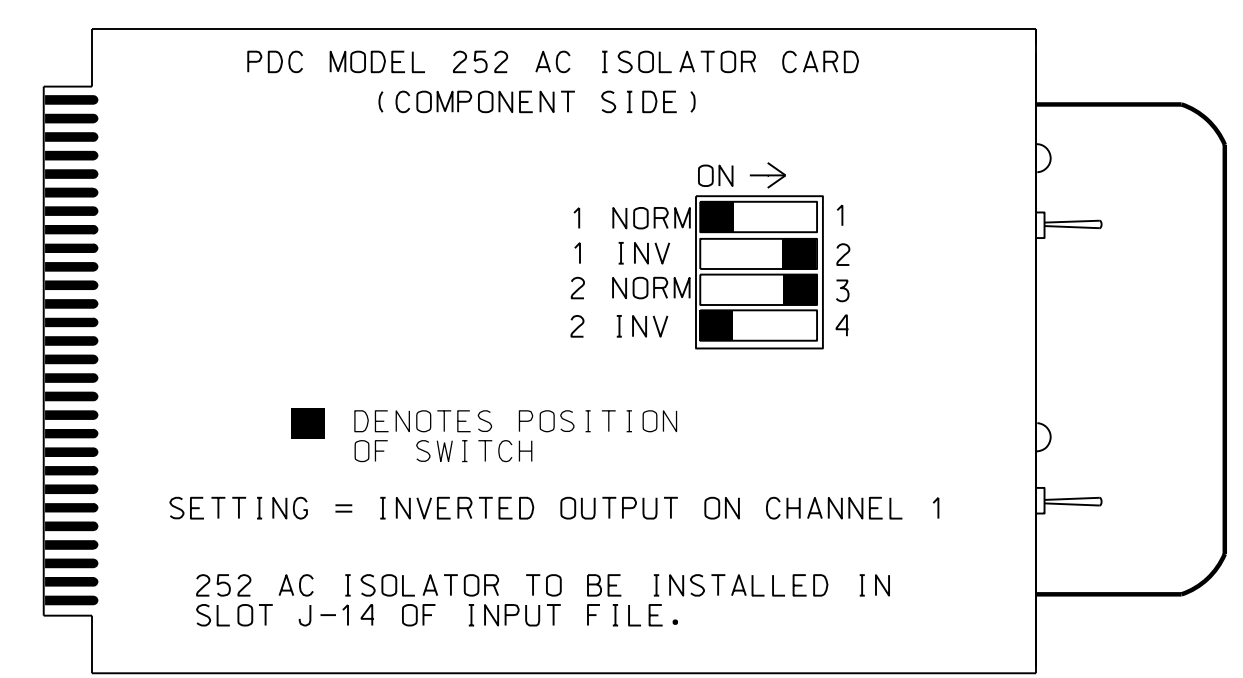
NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

INPUT FILE POSITION LEGEND: J2L



PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

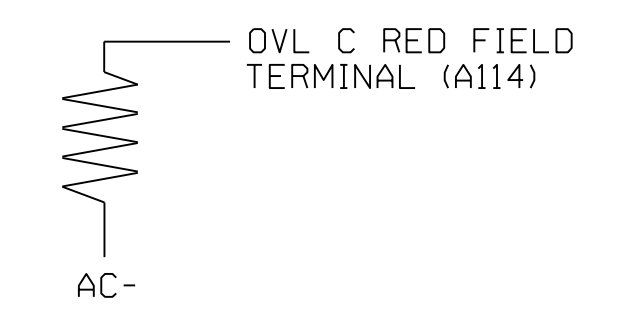
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0186
DESIGNED: AUGUST 2022
SEALED: FEBRUARY 2023
REVISED: N/A

Final Design
Electrical Detail - Sheet 1 of 3

Stantec Consulting Services Inc.
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License No. F-0672

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 72/NC 41-72 (W 2nd St)
at
NC 41/SR 1599
(Martin Luther King Jr. Dr)
Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
PREPARED BY: D. Waller REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 43239
REGINA M. MUNCEY
2/2/2023

SIG. INVENTORY NO. 06-0186

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 the LOGIC PROCESSOR Submenu select 2. LOGIC STATEMENTS

This logic statement prevents the controller from serving phase 7 at controller startup.

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

Table with columns: LP#, COPY FROM, ACTIVE, M (T/F), IF, PMT, PREEMPT, ACTIVE, IS, OFF, THEN, CTR, OMIT, PHASE, 7, ON, ELSE.

LOGIC FOR OMITTING PHASE 7 AT STARTUP AND/OR WHEN NOT IN PREEMPT

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

ENABLE LOGIC PROCESSOR STATEMENT 1 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

Table for LOGIC STATEMENT CONTROL with columns 1-15 and rows for LP 1-15, 16-30, 31-45, 46-60, 61-75, 76-90.

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 Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'NORMAL'

Table for TMG VEH OVLP... [C] TYPE: NORMAL, PHASES 1-6 INCLUDED, LAG GRN 0.0, YEL 0.0, RED 0.0

END PROGRAMMING

ECONOLITE ASC/3-2070 CONTROLLER SEQUENCE PROGRAMMING DETAIL

(program controller as shown)

- 1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 1. CONTROLLER SEQ
3. From CONTROLLER SEQUENCE Submenu select

1. PHASE RING SEQUENCE AND ASSIGNMENT

Move the cursor to the SEQUENCE COMMANDS field, toggle to select "C" mode, enter phases in desired sequence.

Table for CONTROLLER SEQUENCE [1] showing SEQUENCE COMMANDS and BC, R1-4 values.

END SEQUENCE AND ASSIGNMENT PROGRAMMING

- 1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 1. CONTROLLER SEQ
3. From CONTROLLER SEQUENCE Submenu select 2. PHASE COMPATIBILITY

Program phase compatibility as shown below to ensure phases 3 and 7 cannot run concurrently.

Table for PHASE COMPATIBILITY showing grid for phases 1-15.

END COMPATIBILITY PROGRAMMING

ECONOLITE ASC/3-2070 PED 3 PROGRAMMING ASSIGNMENT DETAIL

(program controller as shown)

- 1. From Main Menu select 6. DETECTORS
2. From DETECTOR Submenu select 3. PED DETECTOR INPUT ASSIGNMENT

Table for PED DET PHASE ASSIGNMENT MODE: NTCIP showing PHASE and DETECTOR values.

NOTICE PED DETECTOR 8 ASSIGNED TO PHASE 3

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

Table for LD SWITCH ASSIGN showing PHASE, DIMMING, and /OVLP TYPE values.

NOTICE PHASE 3 PED ASSIGNED TO LD SWITCH 16

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0186 DESIGNED: AUGUST 2022 SEALED: FEBRUARY 2023 REVISED: N/A

2:58:40 PM U:\Projects\Signal\Signal\Tech\Local Detail\Signal\B-5985A\B-5985A\Sig-el6_06-0186.dgn User:rmuncey

Stantec logo and project details for NC 72/NC 41-72 (W 2nd St) at NC 41/SR 1599 (Martin Luther King Jr. Dr). Includes seal for Regina M. Muncey, Professional Engineer.

ECONOLITE ASC/3-2070 RAILROAD PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **4. PREEMPTOR/TSP**
- From PREEMPTOR/TSP/SCP Submenu select **1. PREEMPT PLAN 1-10**

Place cursor in [] next to Preempt Plan and press 1. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Railroad Preempt #1.

```

PREEMPT PLAN [ 1 ] ENABLE...YES
VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . X . . . . . . . . . . . .
TRKCLR O . . . . . . . . . . . . . . . .
ENA TRL . . . . . . . . . . . . . . . .
DWEL VEH . . . . . . . . . . . . . . . .
DWEL PED . . . . . . . . . . . . . . . .
DWEL OLP . . . . . . . . . . . . . . . .
CYC VEH . X . . X X X . . . . . . . . .
CYC PED . . . . . . . . . . . . . . . .
CYC OLP . . X . . . . . . . . . . . . .
EXIT PH . . . . . . . . . . . . . . . .
EXIT CAL . . . . . . . . . . . . . . . .
SP FUNC . . . . . . . . . . . . . . . .
    
```

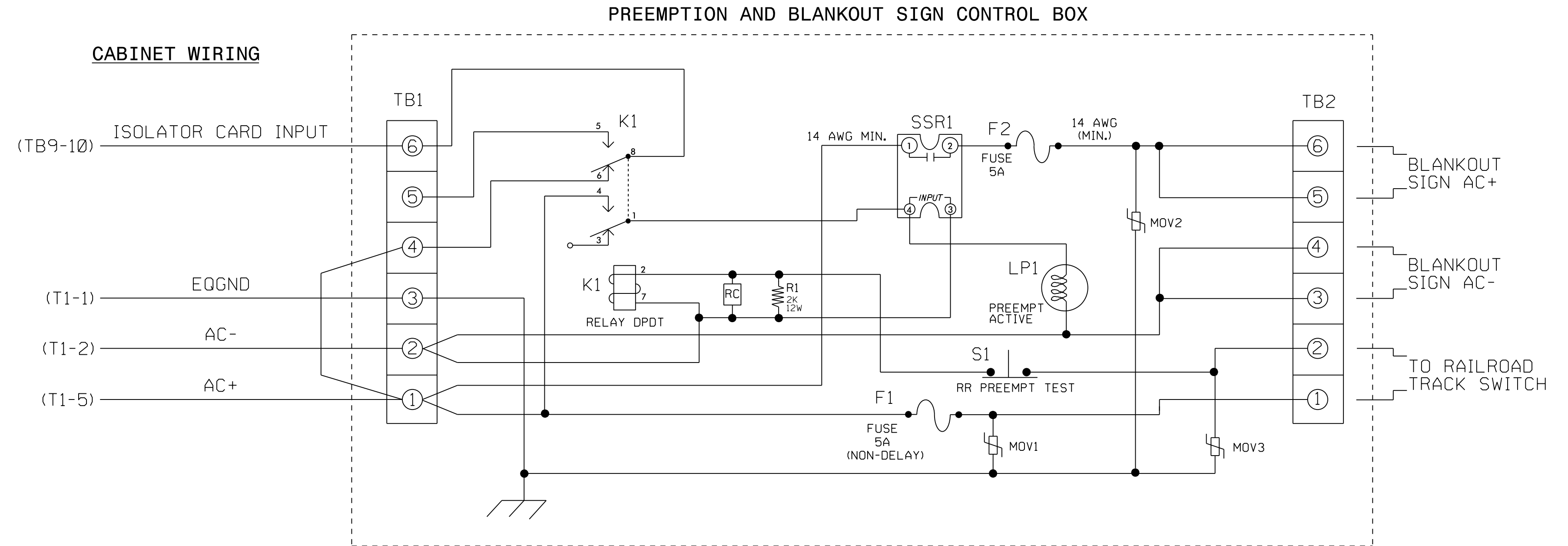
```

ENABLE... YES IPMT OVRIDE.XIINTERLOCK. NO
DET LOCK... XIDELAY.. 0IINHIBIT... 0
OVERIDE FL. .IDURATION OICLR-GRN... NO
TERM OLP. NOIPC>YEL YESITERM PH NO
PED DARK.. NOITC RESRV YESIDWELL FL OFF
LINK PMT....OIX FLCOLR REDIEEXIT OPT. OFF
X TMG PLN...OIRE-SERV.. OIFLT TYPE.HARD
FREE DUR PMTIR1 NOIR2 NOIR3 NOIR4 NO
--TIMING----WALKIPED CLIMN GRI YELI RED
ENTRANCE TM. 0I 4I 1I25.5I25.5
-----MIN GRIEXT GRIMX GRI YELI RED
TRACK CLEAR 23I 0I 0I 4.1I 1.6
-----MIN DLI PMTEXTIMX TMI YELI RED
DWL/CYC-EXIT 10I 0.0I 0I25.5I25.5
PMT ACTIVE OUT..ON PMT ACT DWELL...NO
OTHER - PRI PMT.OFF NON-PRI PMT.....OFF
INH EXT TIME... 0.0 PED PR RETURN...OFF
PRIORITY RETURN.OFF QUEUE DELAY.... OFF
COND DELAY.....OFF
PHASES 1 2 3 4 5 6 7 8
PR RTN% 0 0 0 0 0 0 0 0
PHASES 9 10 11 12 13 14 15 16
PR RTN% 0 0 0 0 0 0 0 0
    
```

2:59:45 PM U:\Triff\Projects\Signal\Signaling\Detailing\B-5985A\Wiring\Sig_6.3-0186.dgn User:rmuncey

RAILROAD PREEMPTION WIRING DETAIL

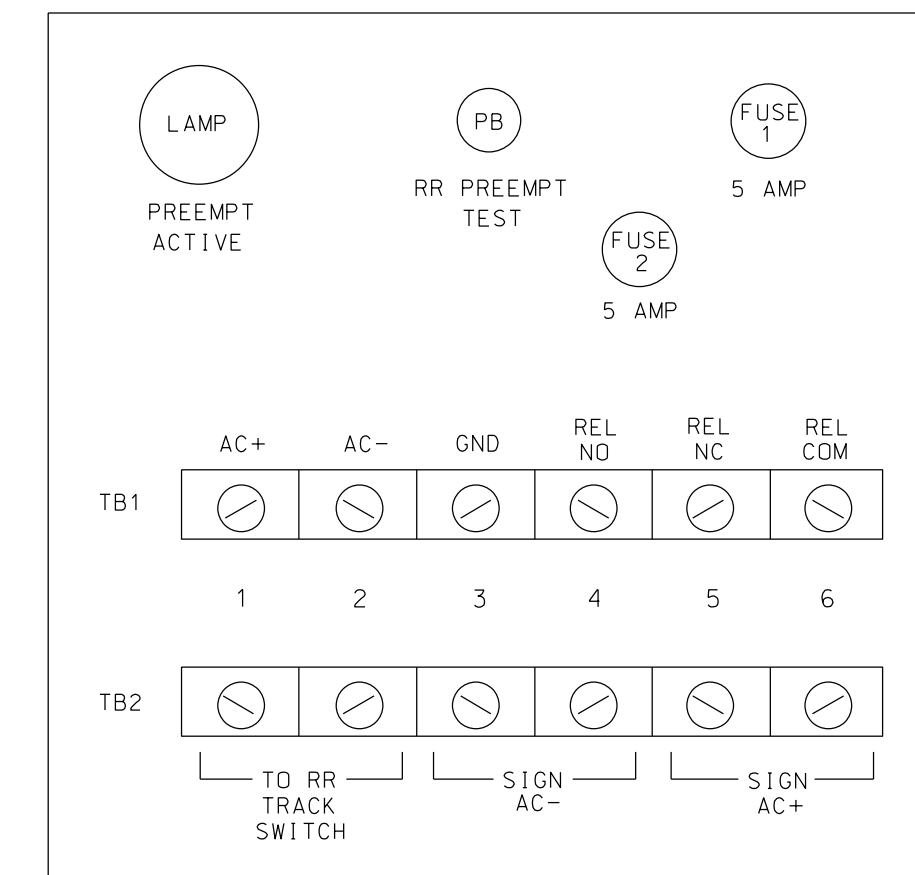
(wire as shown below)



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil with octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
- IMPORTANT!!** A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW

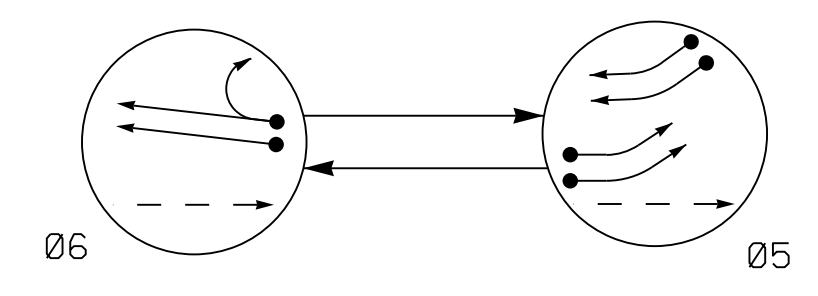


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0186
DESIGNED: AUGUST 2022
SEALED: FEBRUARY 2023
REVISED: N/A

Final Design
Electrical Detail - Sheet 3 of 3

<p>Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</p>	<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p>	<p>NC 72/NC 41-72 (W 2nd St) at NC 41/SR 1599 (Martin Luther King Jr. Dr) Division 6 Robeson County Lumberton</p>										
	<p>Prepared for the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>PLAN DATE: FEBRUARY 2023 PREPARED BY: D. Waller</p>		<p>REVIEWED BY: R M Muncey</p>								
<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				REVISIONS	INIT.	DATE						
REVISIONS	INIT.	DATE										
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SIG. INVENTORY NO. 06-0186</p>												

PHASING DIAGRAM

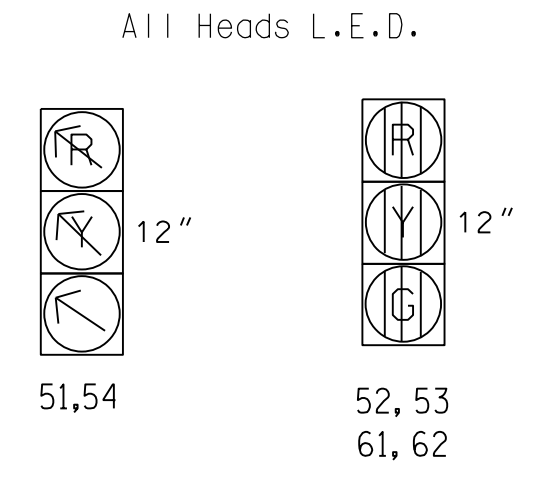


PHASING DIAGRAM DETECTION LEGEND
 ● DETECTED MOVEMENT
 ○ UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 <- - - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	05	06	FLASH
51,54	R	R	R
52,53	G	R	R
61,62	R	G	Y

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

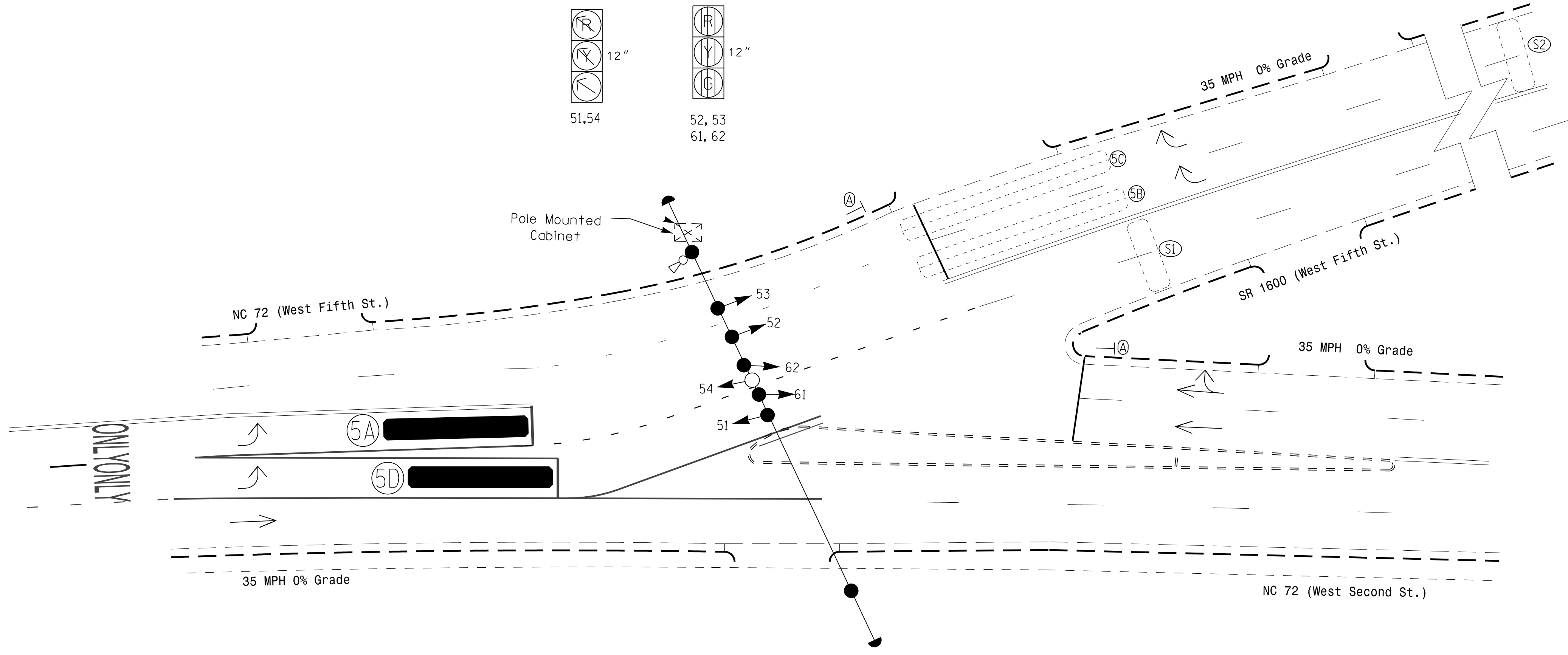
LOOP	SIZE (FT)	DETECTOR			PROGRAMMING						SYSTEM LOOP	NEW CARD
		DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE		
5A	6X40	0	*	*	5	Yes	-	-	-	N	-	*
5B	6X60	+5	2-4-2	-	5	Yes	-	-	-	N	-	-
5C	6X60	+5	2-4-2	-	5	Yes	-	-	-	N	-	-
5D	6X40	0	*	*	5	Yes	-	-	-	N	-	*
S1	6X20	+180	EXIST	-	-	No	-	-	-	N	X	-
S2	6X20	200	EXIST	-	-	No	-	-	-	N	X	-

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

2 Phase Semi-Actuated Signal System #D06-24 Lumberton NC 41-72 (Second St.)

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. This intersection uses video detection. Install detectors according to manufacturer's instructions to achieve the desired detection.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

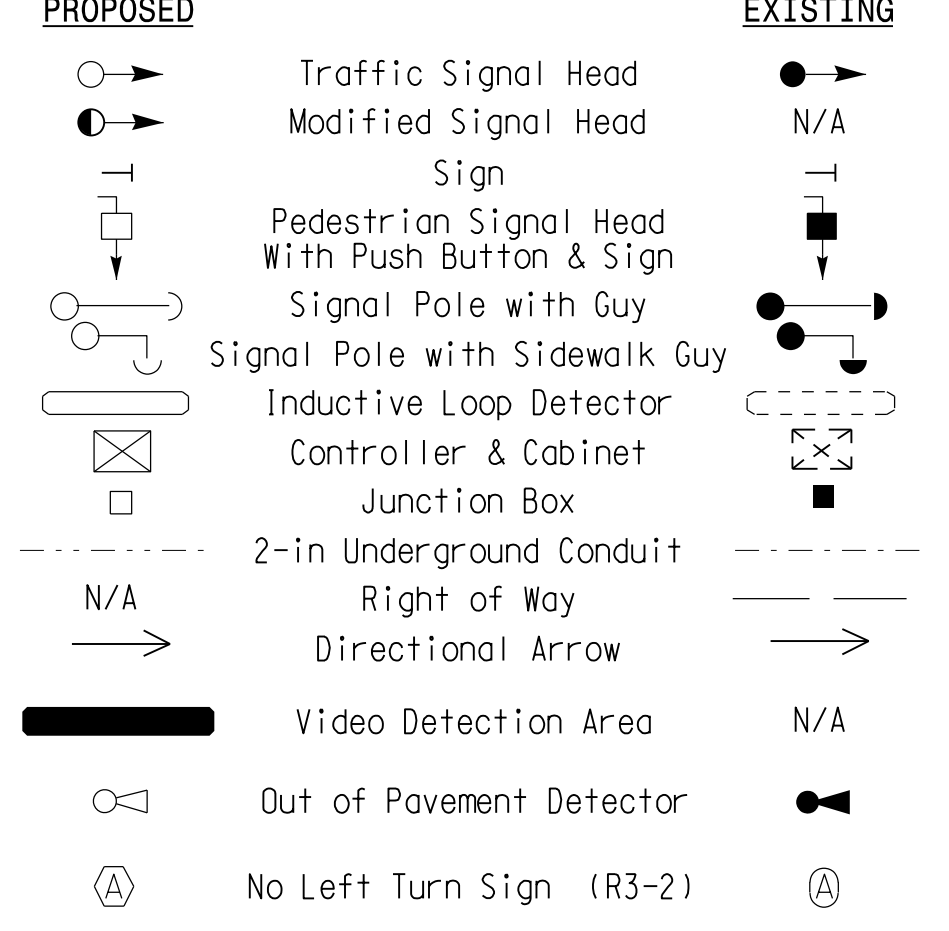


ASC/3 TIMING CHART

FEATURE	PHASE	
	5	6
Min Green *	7	10
Walk *	-	-
Ped Clear	-	-
Veh. Extension *	2.0	-
Max I *	25	35
Yellow	3.8	3.8
Red Clear	3.9	3.1
Red Revert	2.0	2.0
Actuations B4 Add *	-	-
Seconds / Actuation *	-	-
Max Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Locking Detector	-	-
Recall Position	-	MAX RECALL
Dual Entry	-	-
Simultaneous Gap	X	X

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

LEGEND



Signal Upgrade - Temporary Signal

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Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 72 (West Fifth St.) / (West Second St.) at SR 1600 (West Fifth St.)
 Division 6 Robeson County Lumberton
 PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey
 PREPARED BY: J. Hambricht REVIEWED BY: D Waller

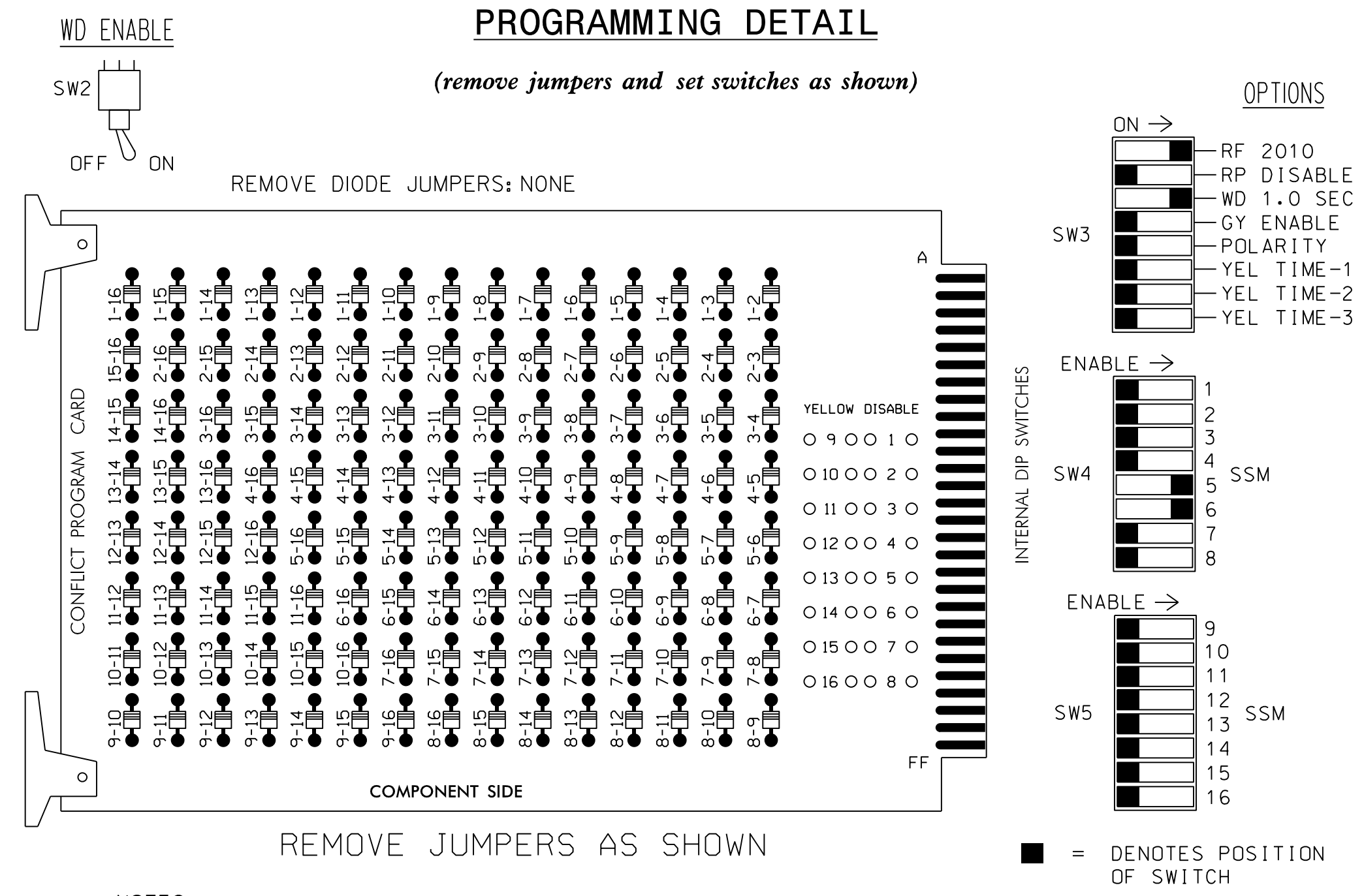
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
 Regina M. Muncey 2/2/2023
 SIGNATURE DATE
 SIG. INVENTORY NO. 06-0331T

5985A-SIG-7.0-DWG.dwg
 User: rmmuncey

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,2,3,4,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phase 6 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 Signal System D06-24 Lumberton, NC 41-72 (Second St.)

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	NU	NU	NU	NU	NU	51,54	52,53	61,62	NU	NU	NU
RED								131	134			
YELLOW								132	135			
GREEN								133	136			
RED ARROW								131				
YELLOW ARROW								132				
GREEN ARROW								133				

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S5,S6
 PHASES USED.....5,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	SYS. DET. S1	S	NOT USED	NOT USED	S	S	S	S	S	S	S	S	FS
L	S	SYS. DET. S2	S	∅ 5	∅ 5	S	S	S	S	S	S	S	S	DC ISOLATOR
				5C	5B									ST

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

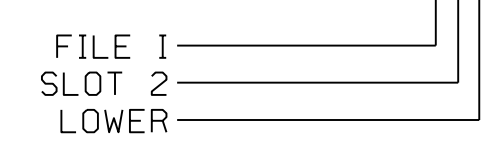
FS = FLASH SENSE
 ST = STOP TIME

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
5B	TB23-9,10	I5L	48	26	5	YES				N
5C	TB21-7,8	I4U	41	4	5	YES				N
* S1	TB21-3,4	I2U	39	2	SYS	NO				N
* S2	TB23-3,4	I2L	43	12	SYS	NO				N

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

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0331T
 DESIGNED: JULY 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

DETECTOR NOTES

- Install a video detection system for vehicle detection for loops 5A and 5D. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.
- For all other loops, detector card placements are as illustrated above in the "INPUT FILE POSITION LAYOUT" chart.

Electrical Detail - Temporary Design

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 72 (West Fifth St.)/
 (West Second St.)
 at
 SR 1600 (West Fifth St.)
 Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey

PREPARED BY: D. Waller REVIEWED BY:

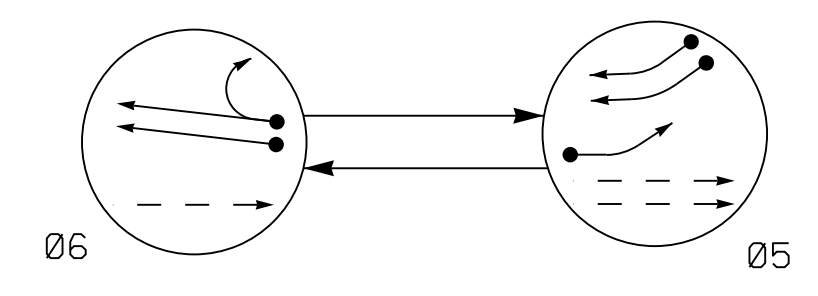
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REGINA M. MUNCEY
 ENGINEER
 2/2/2023

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PHASING DIAGRAM



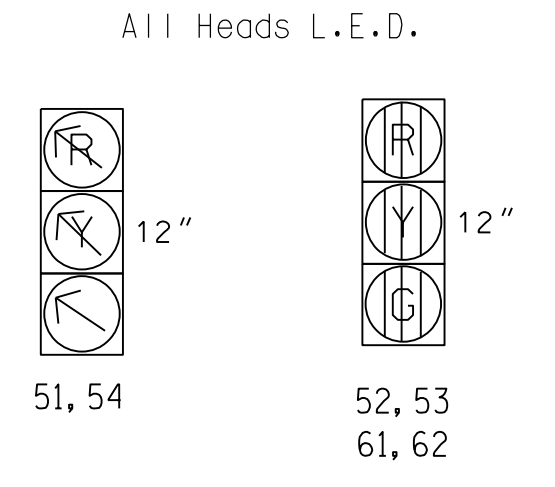
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	05	06	FLASH
51, 54	R	R	R
52, 53	G	R	R
61, 62	R	G	Y

SIGNAL FACE I.D.



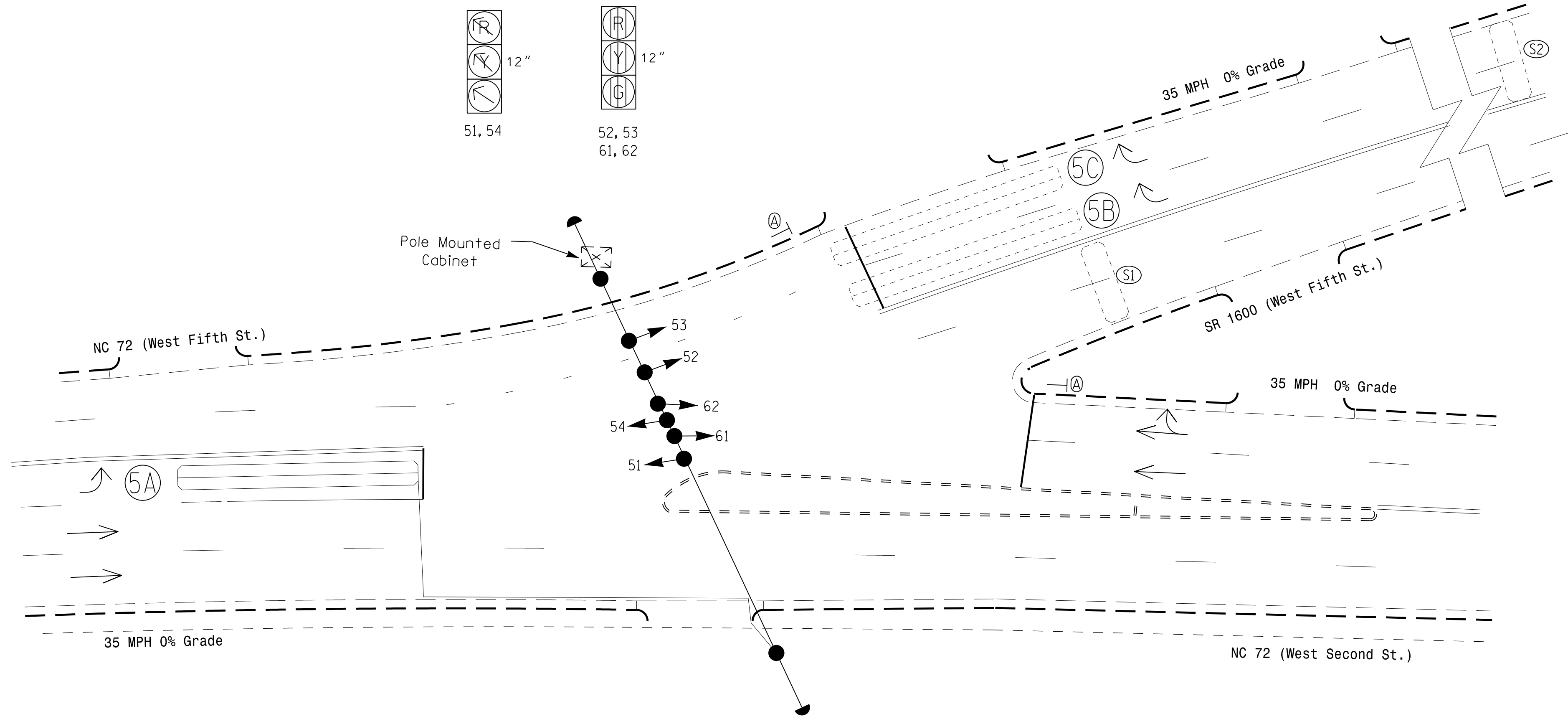
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DETECTOR			PROGRAMMING						SYSTEM LOOP	NEW CARD
		DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE		
5A	6X40	0	2-4-2	X	5	Yes	-	-	-	N	-	-
5B	6X60	+5	2-4-2	-	5	Yes	-	-	-	N	-	-
5C	6X60	+5	2-4-2	-	5	Yes	-	-	-	N	-	-
S1	6X20	+180	EXIST	-	-	No	-	-	-	N	X	-
S2	6X20	200	EXIST	-	-	No	-	-	-	N	X	-

2 Phase Semi-Actuated Signal System #D06-24 Lumberton NC 41-72 (Second St.)

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.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

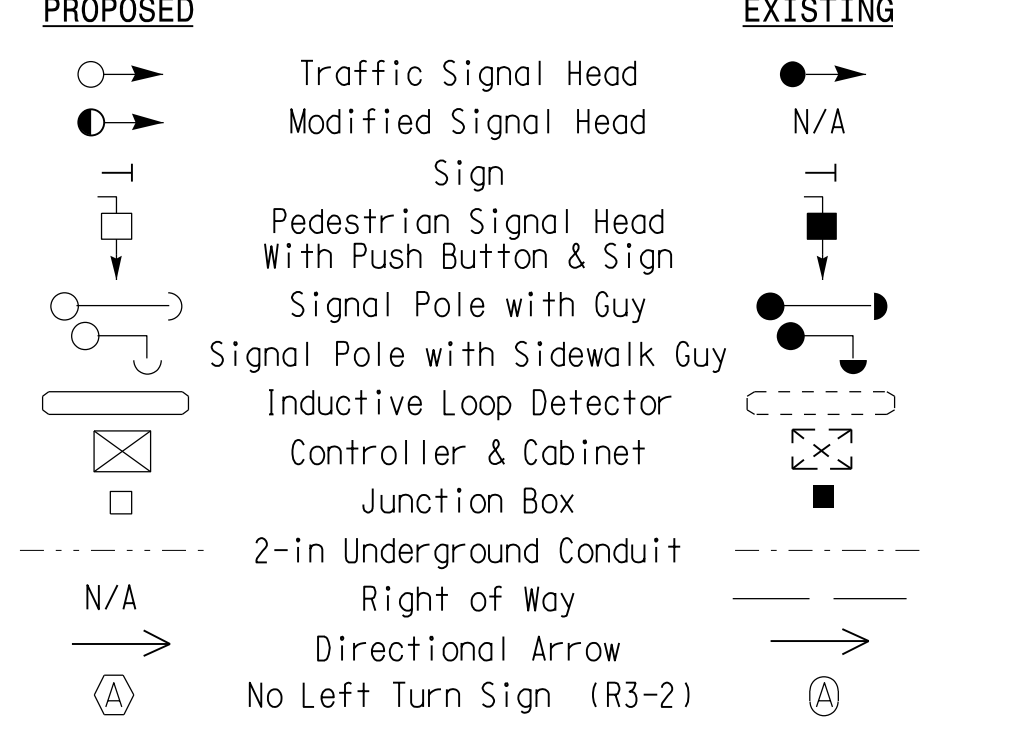


ASC/3 TIMING CHART

FEATURE	PHASE	
	5	6
Min Green *	7	10
Walk *	-	-
Ped Clear	-	-
Veh. Extension *	2.0	-
Max I *	25	35
Yellow	3.8	3.8
Red Clear	3.9	3.1
Red Revert	2.0	2.0
Actuations B4 Add *	-	-
Seconds / Actuation *	-	-
Max Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Locking Detector	-	-
Recall Position	-	MAX RECALL
Dual Entry	-	-
Simultaneous Gap	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



Final Design

NC 72 (West Fifth St.) / (West Second St.) at SR 1600 (West Fifth St.)

Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey

PREPARED BY: J. Hambricht REVIEWED BY: D Waller

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

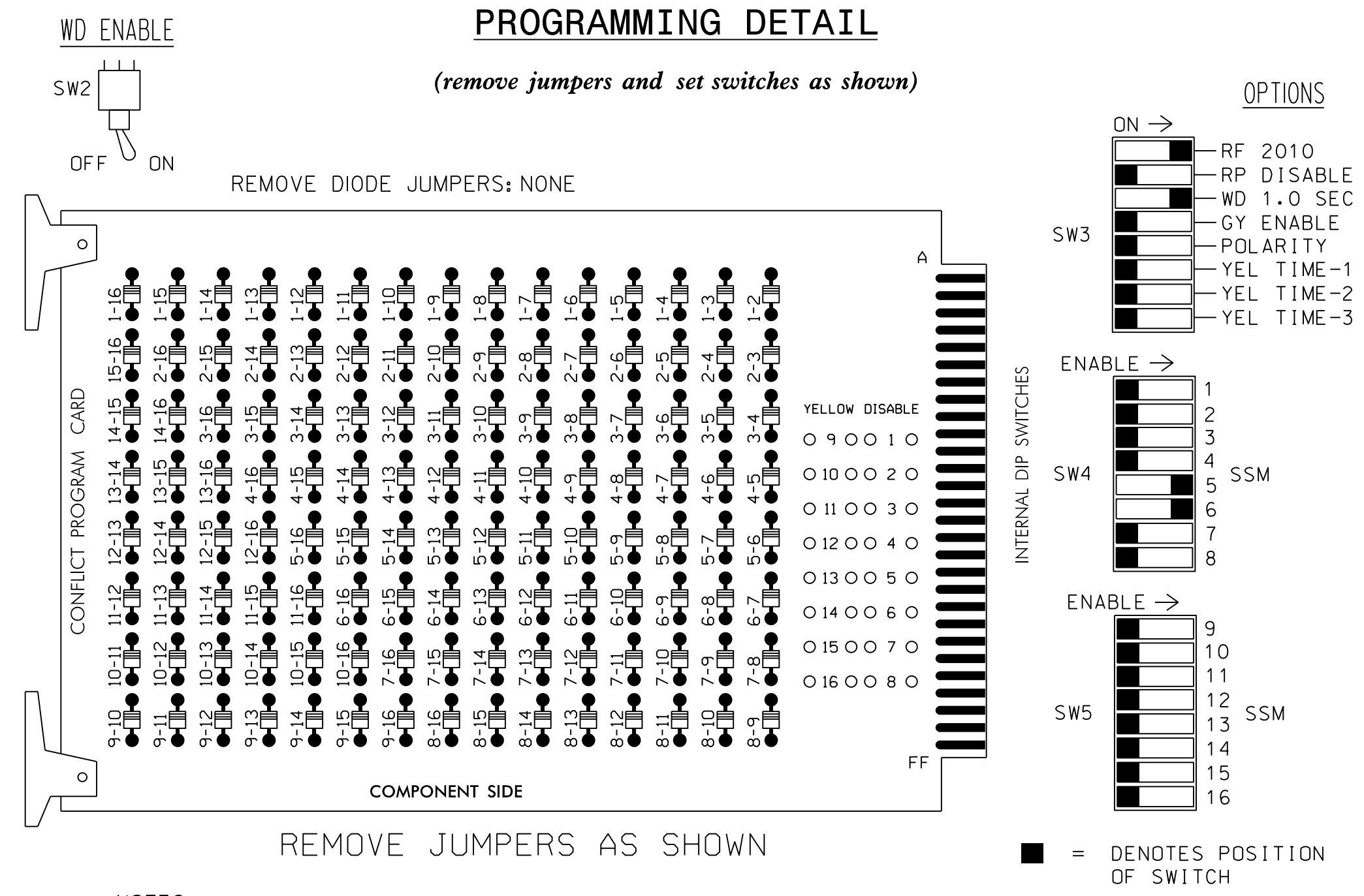
DocuSigned by: Regina M. Muncey 2/2/2023

SIGNATURE DATE

SIG. INVENTORY NO. 06-0331

43239.DWG DATE 02/02/2023
 User: r.muncey

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL



- REMOVE JUMPERS AS SHOWN
- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,2,3,4,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phase 6 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 Signal System D06-24 Lumberton, NC 41-72 (Second St.)

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	NU	NU	NU	NU	NU	51,54	52,53	61,62	NU	NU	NU
RED								131	134			
YELLOW								132	135			
GREEN								133	136			
RED ARROW								131				
YELLOW ARROW								132				
GREEN ARROW								133				

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S5,S6
 PHASES USED.....5,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	SYS. DET. S1	S	NOT USED	∅ 5	S	S	S	S	S	S	S	S	FS
L	S	SYS. DET. S2	S	∅ 5	∅ 5	S	S	S	S	S	S	S	S	DC ISOLATOR
				5C	5B									ST
														DC ISOLATOR

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

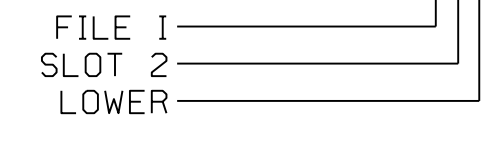
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
5A	TB21-9,10	15U	55	5	5	YES				N
5B	TB23-9,10	15L	48	26	5	YES				N
5C	TB21-7,8	14U	41	4	5	YES				N
* S1	TB21-3,4	12U	39	2	SYS	NO				N
* S2	TB23-3,4	12L	43	12	SYS	NO				N

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

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0331
 DESIGNED: JULY 2022
 SEALED: FEBRUARY 2023
 REVISED: N/A

4:00:10 PM U:\Projects\Signal\5985A\electrical\Detail\sig_elec_06-0331.dgn User:rmuncey

Electrical Detail - Final Design

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 72 (West Fifth St.)/
 (West Second St.)
 at
 SR 1600 (West Fifth St.)
 Division 6 Robeson County Lumberton

PLAN DATE: FEBRUARY 2023 REVIEWED BY: R M Muncey

PREPARED BY: D. Waller REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REGINA M. MUNCEY
 PROFESSIONAL ENGINEER
 License No. 43239

SIGNATURE DATE

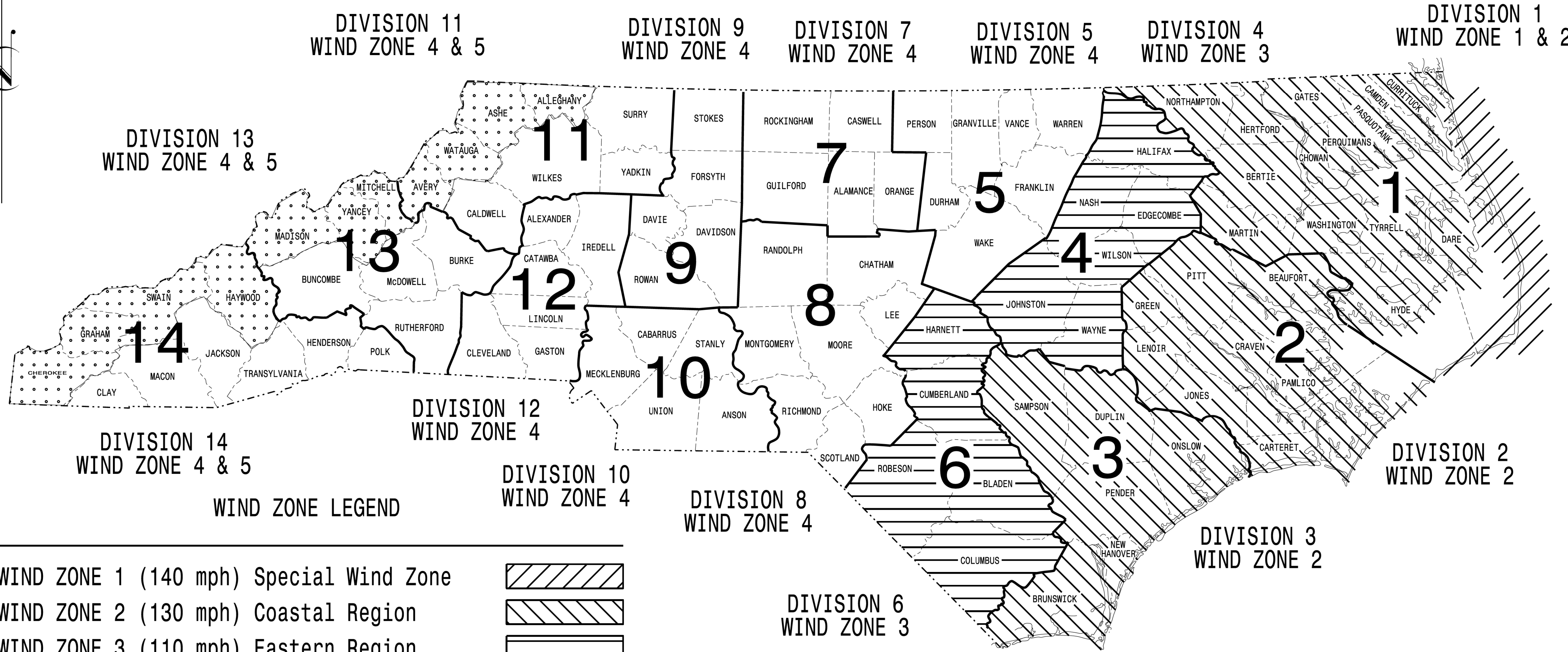
SIG. INVENTORY NO. 06-0331

NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO. B-5985A	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

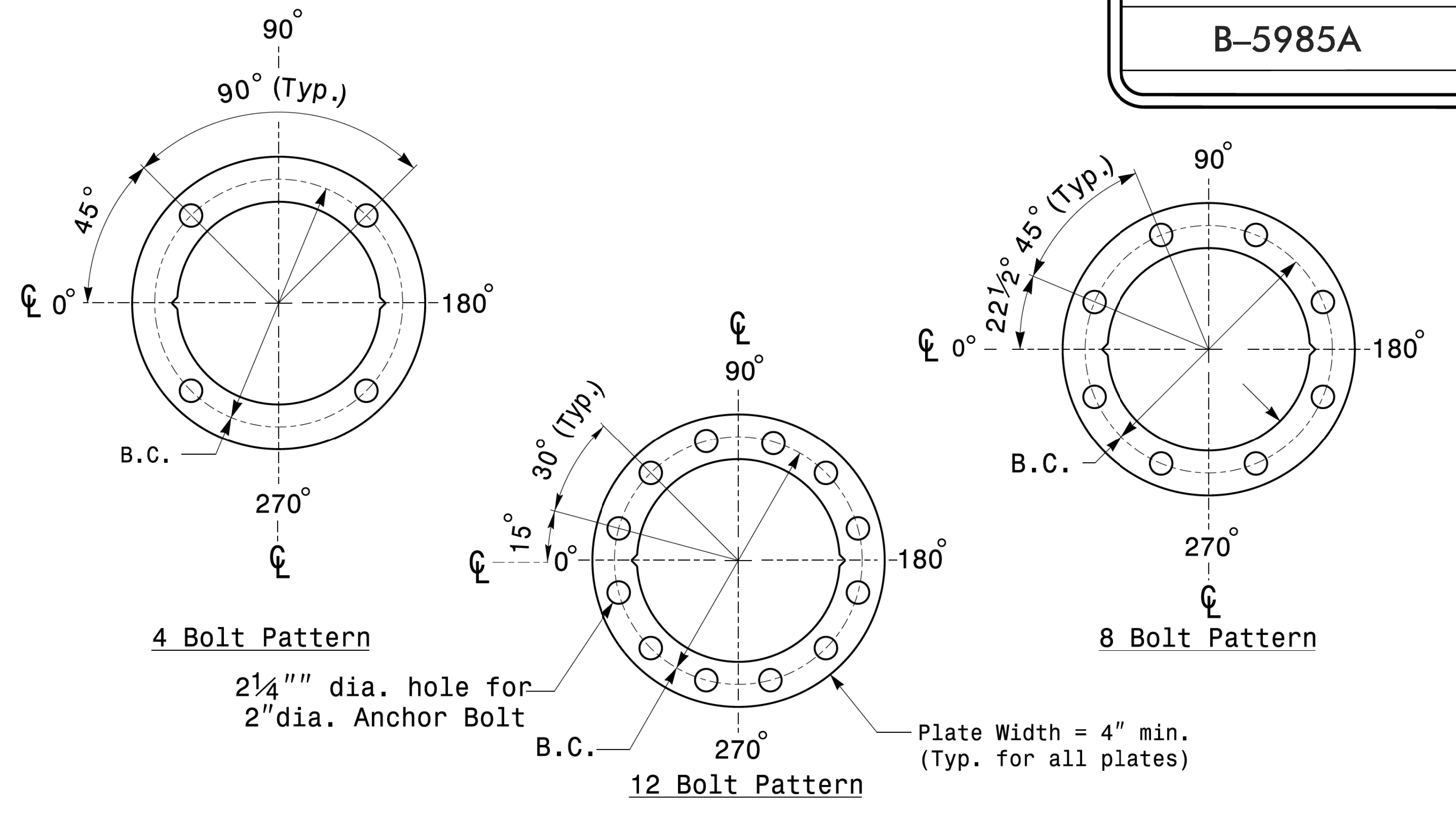
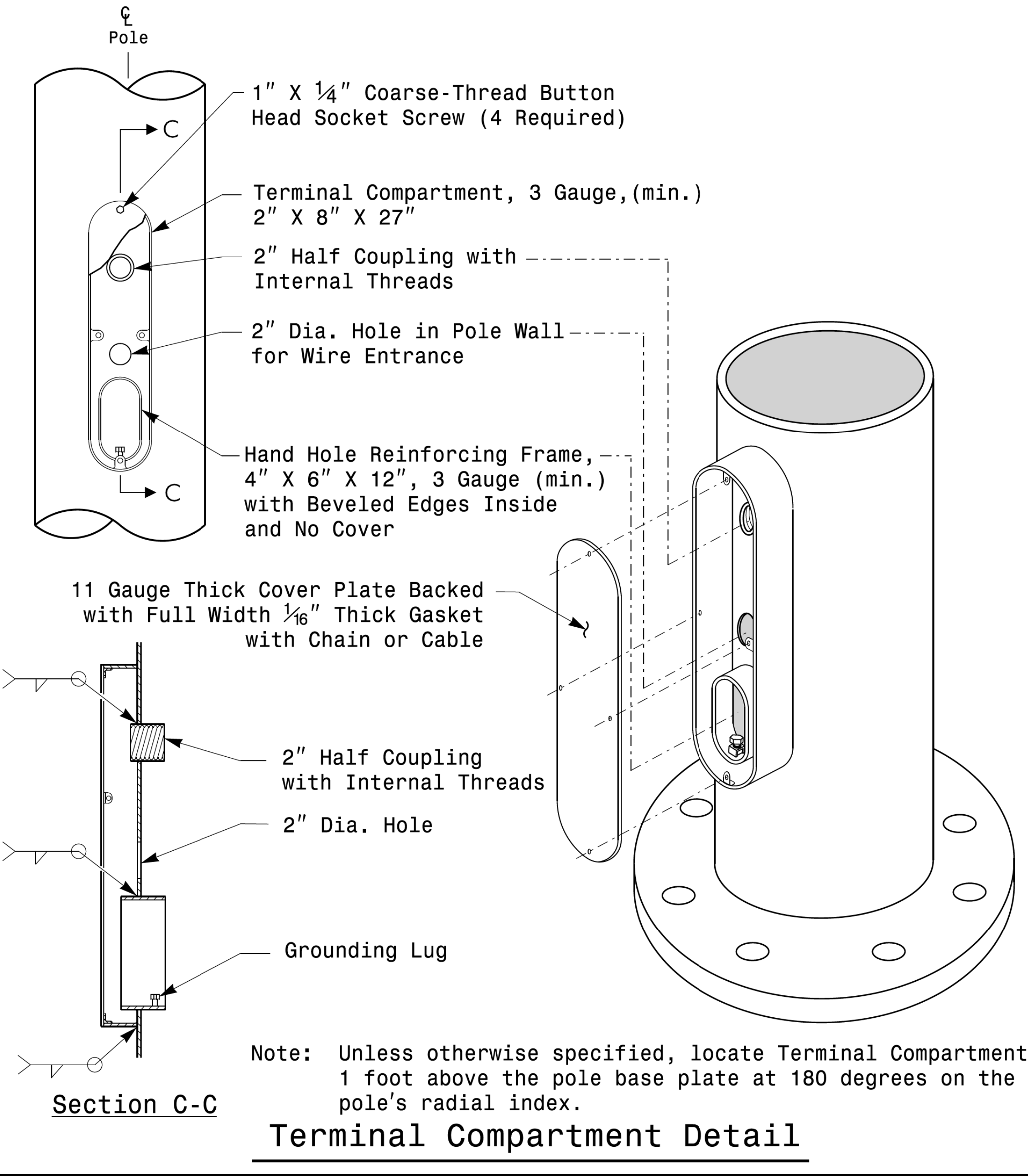
J. P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

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

SEAL

DocuSigned by:
Debesh C. Sarkar
SIGNATURE

10/11/2017
DATE



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

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

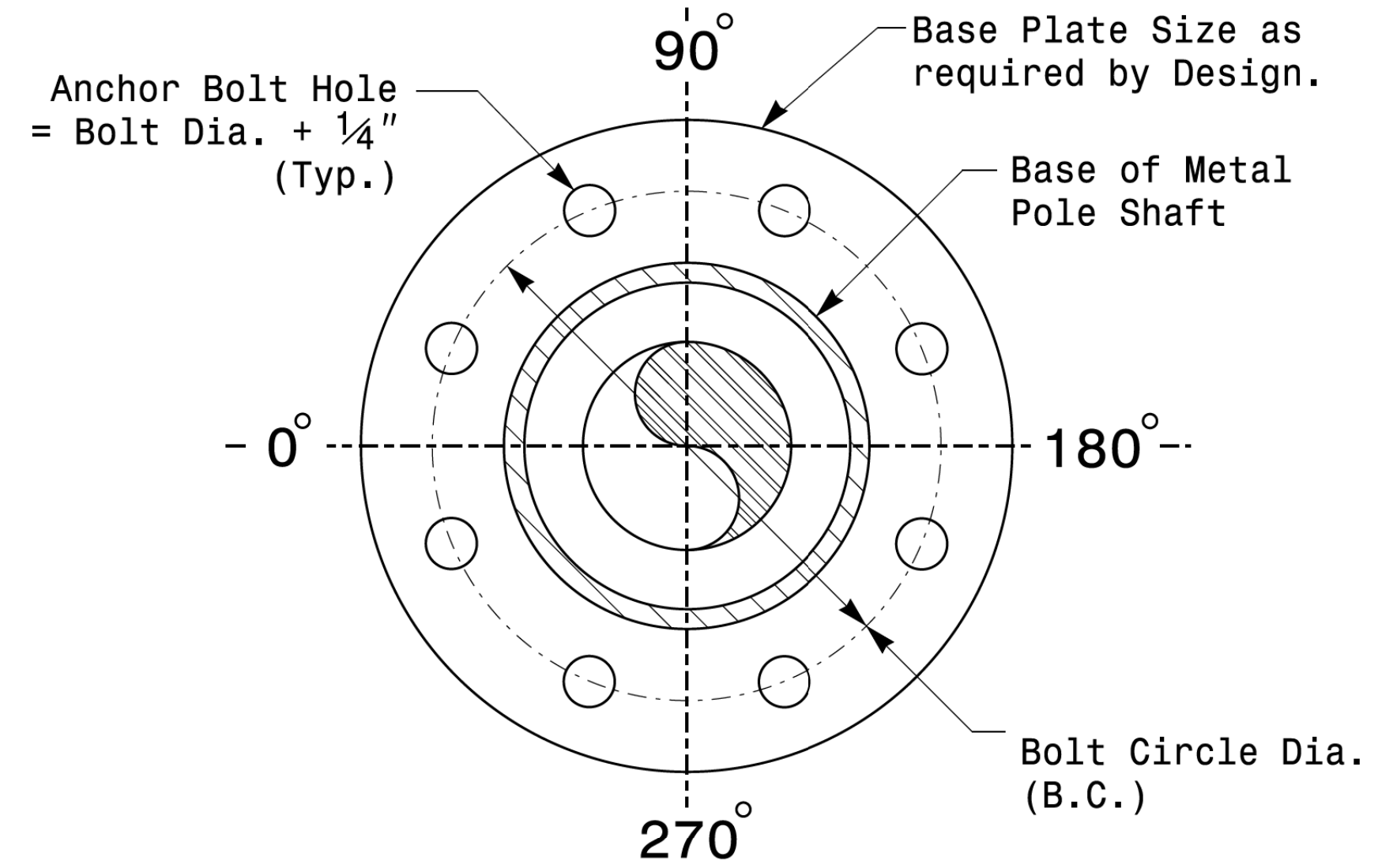
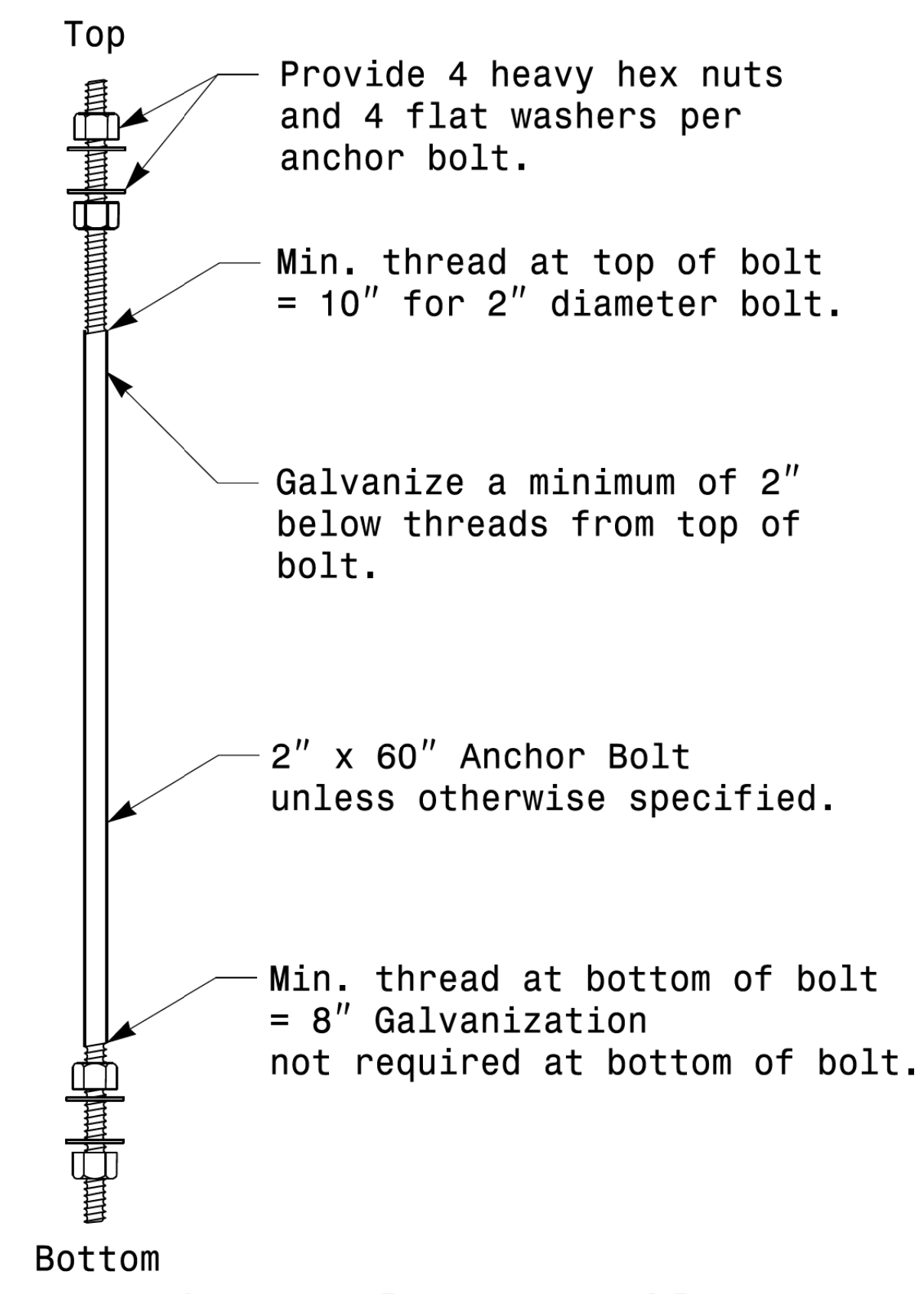
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	_____
NCDOT SIG. INV. NO. _____	_____
NCDOT POLE NO. _____	_____

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

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

- Notes:**
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
 - 2) A.B. = Anchor Bolt
 - 3) B.C. = Bolt Circle of Anchor Bolts
 - 4) If Custom Design, use "NCDOT STANDARD" line for Signal Inv. Number and pole I.D. number
 - 5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details

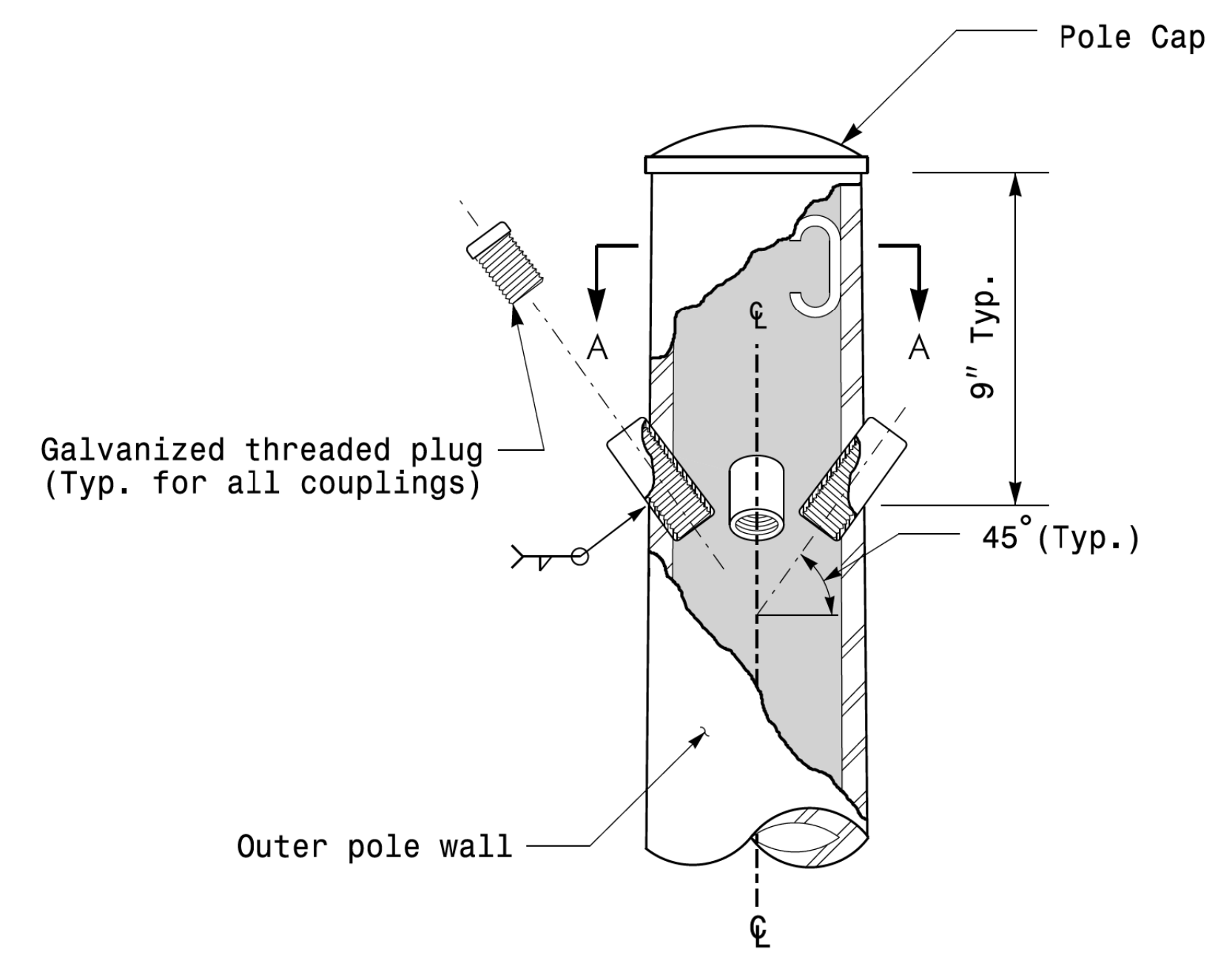


Note: Base plate may be circular, octagonal, square or rectangular in shape.

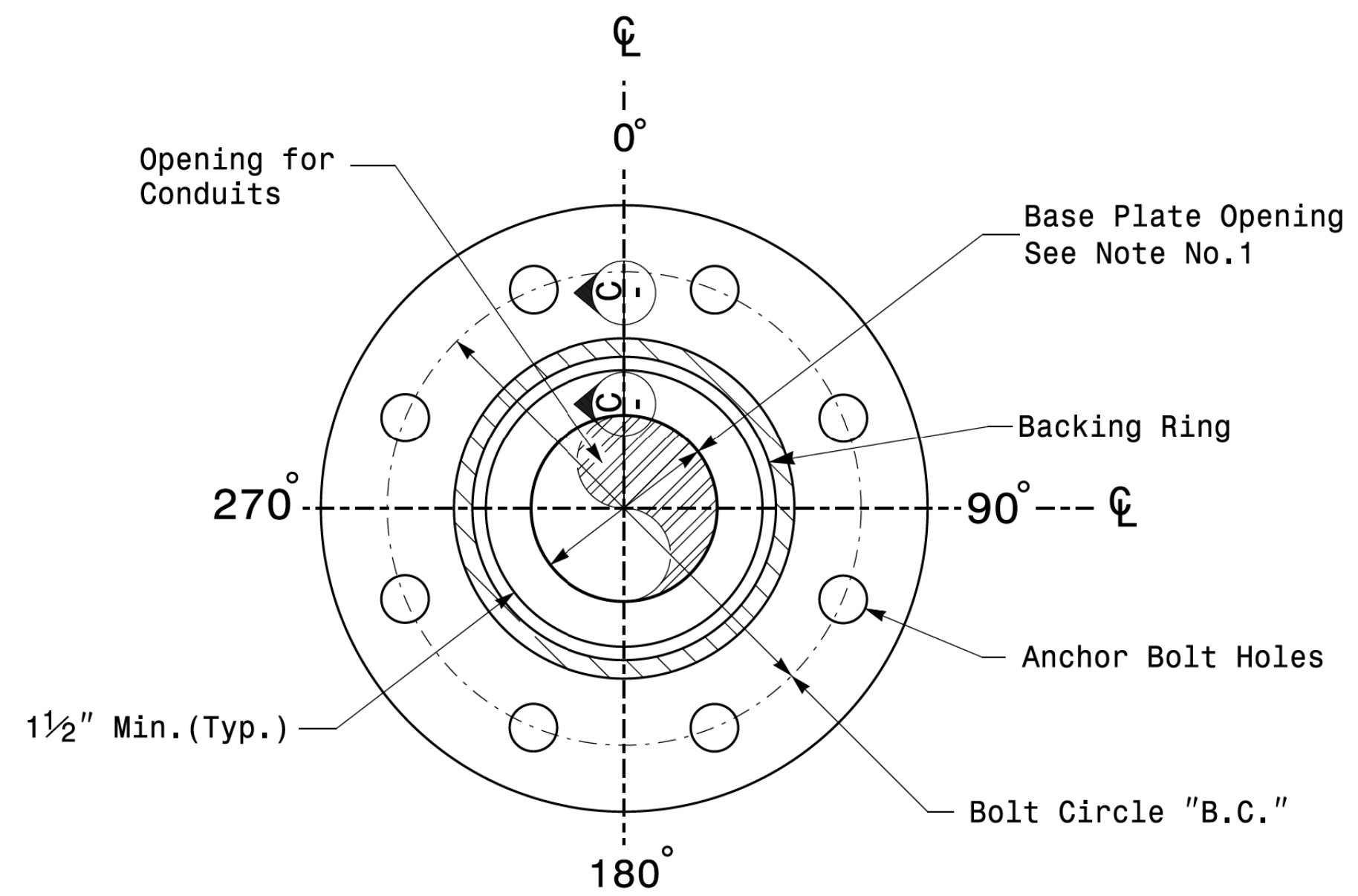
Typical Base Plate Detail

	Typical Fabrication Details For All Metal Poles		
	PLAN DATE: OCTOBER 2017 DESIGNED BY: C.F. ANDREWS	PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	
SCALE: NONE	REVISIONS:	INITI:	DATE:
Signature: <i>D. C. Sarkar</i>			DATE: 10/11/2017

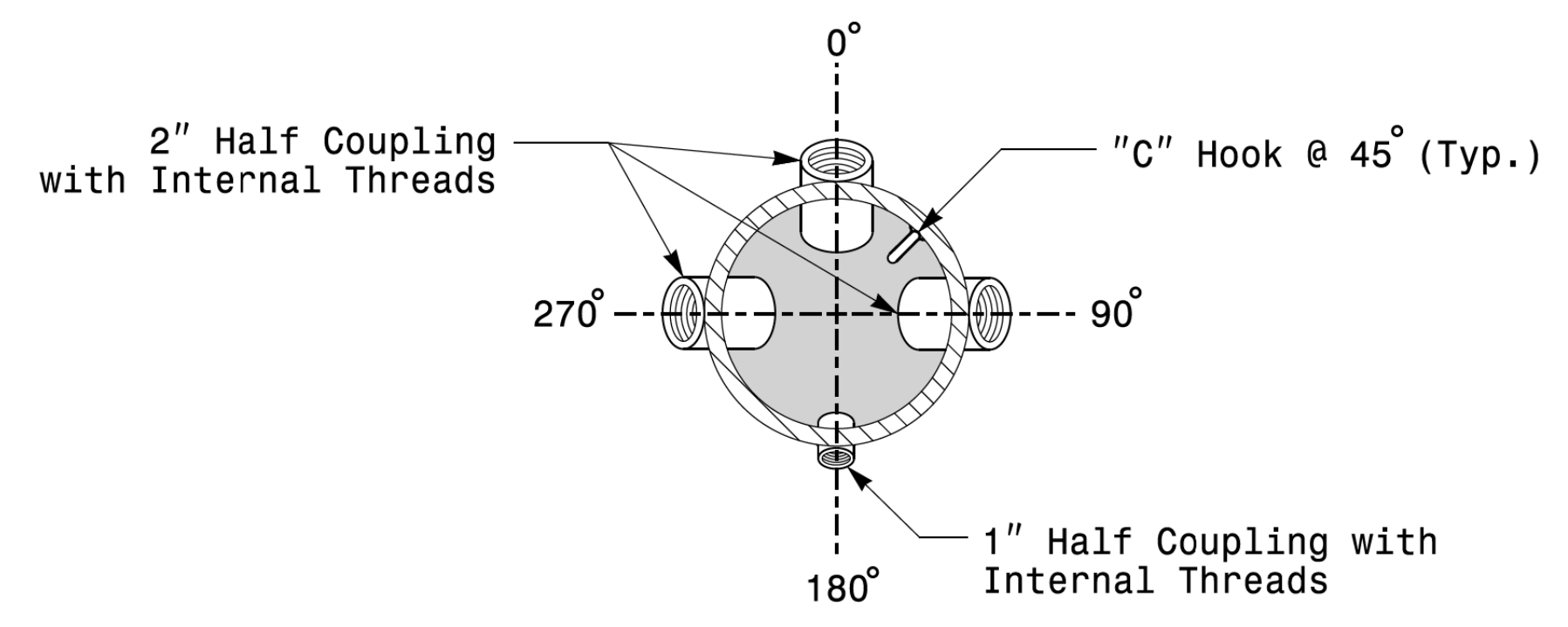
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



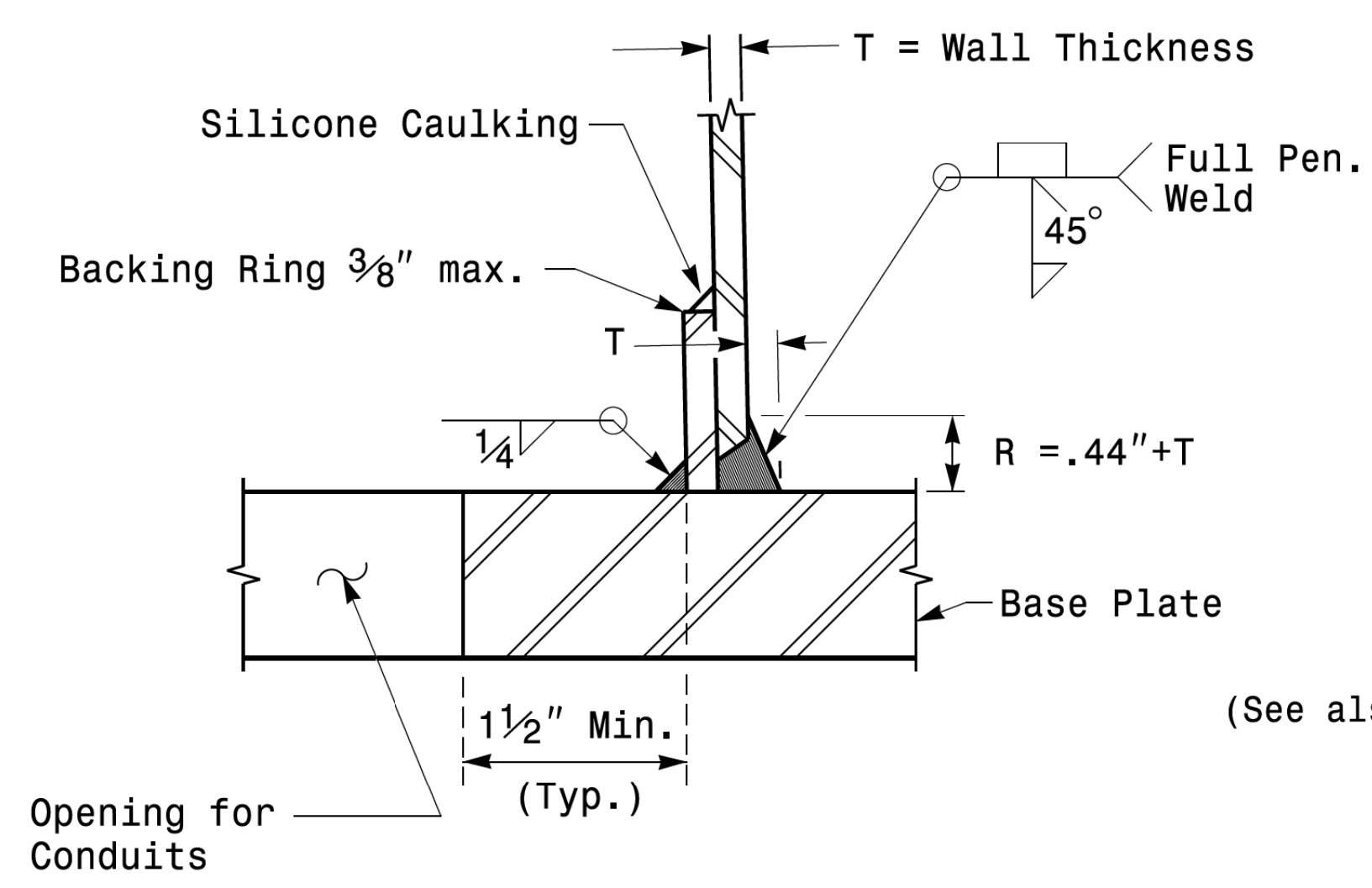
Cable Entrances at Top of Pole



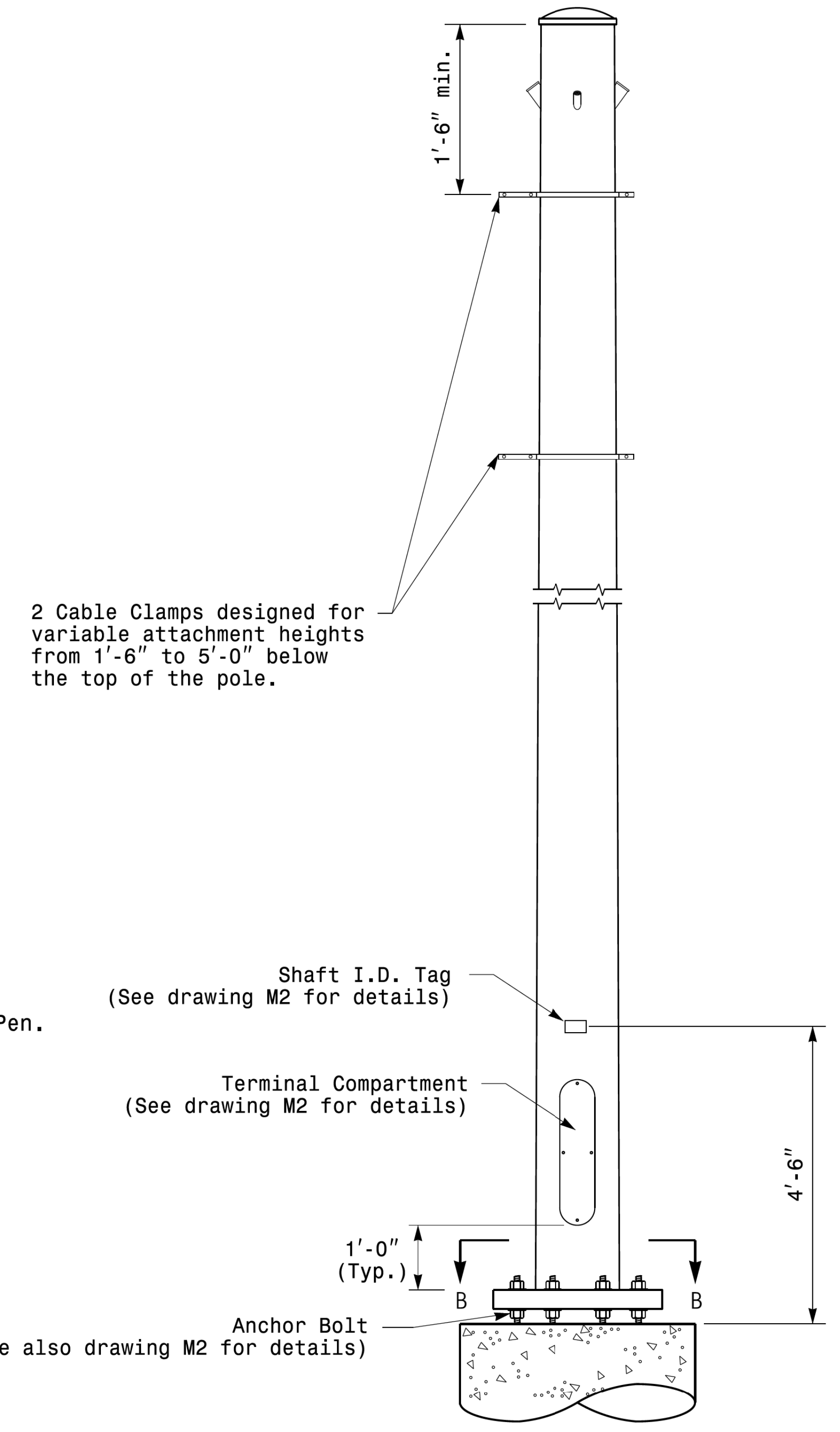
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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. Greenfield Hwy, 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

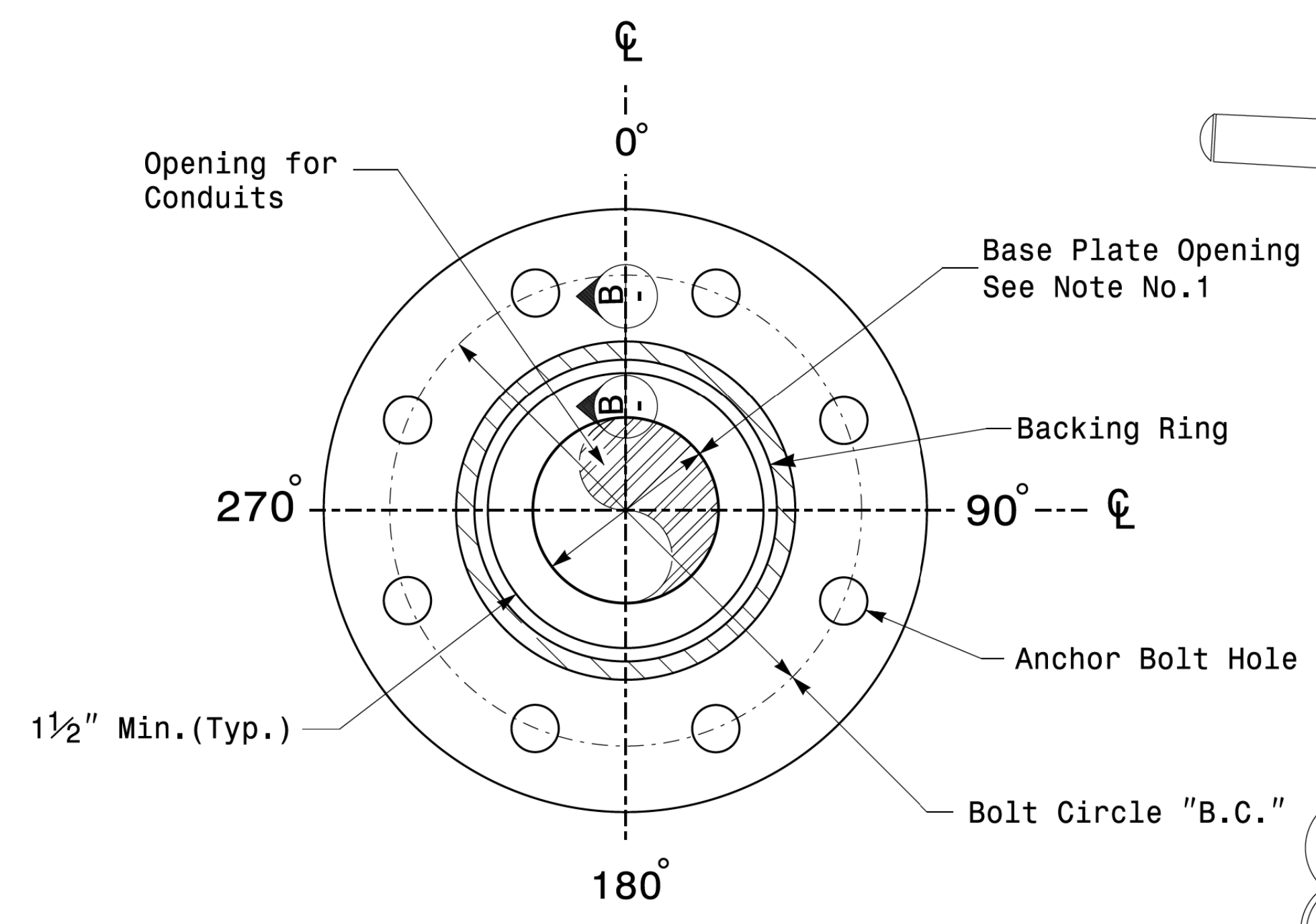
SEAL

 Debesh C. Sarkar
 DATE: 10/11/2017

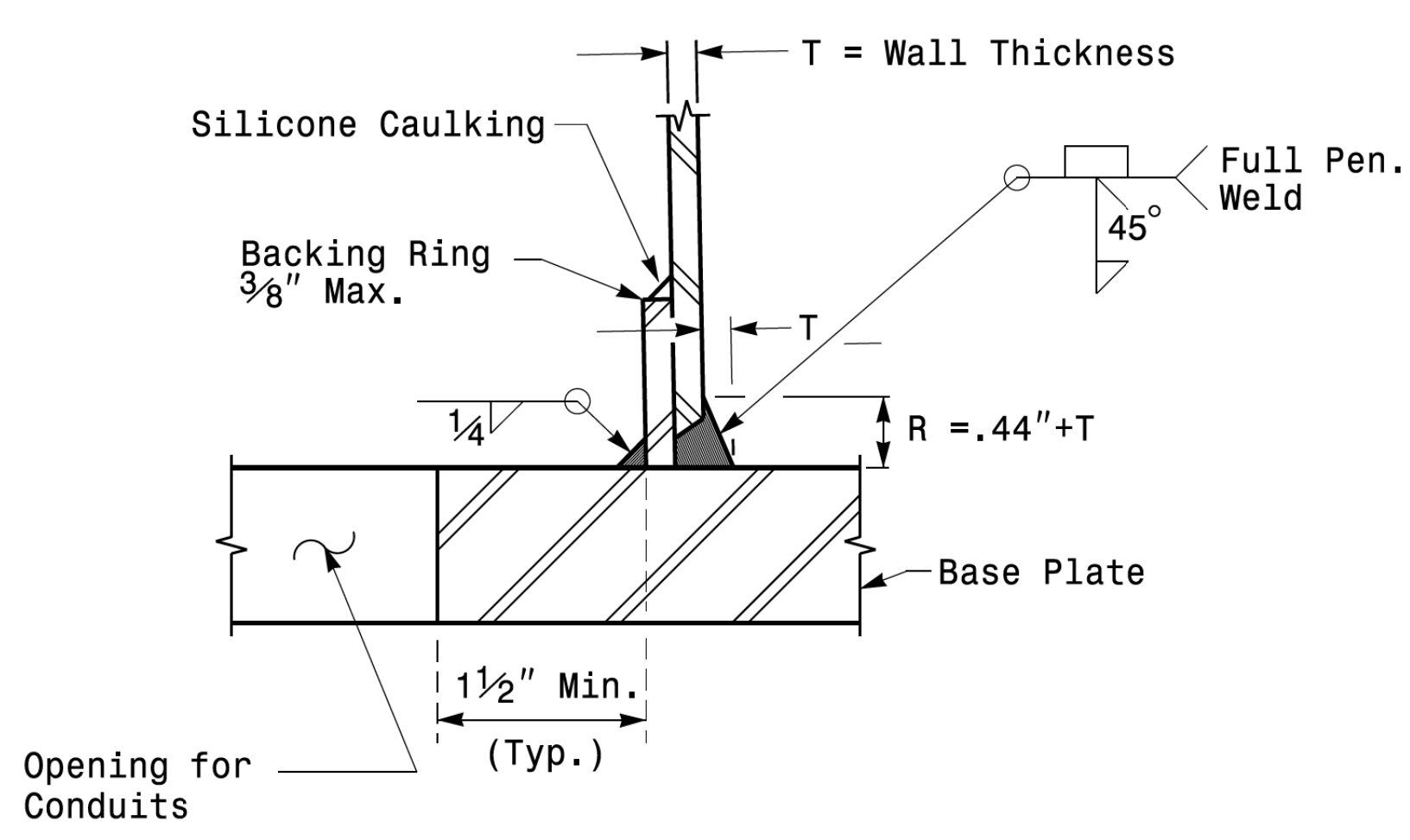
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Fabrication Details – Strain Poles

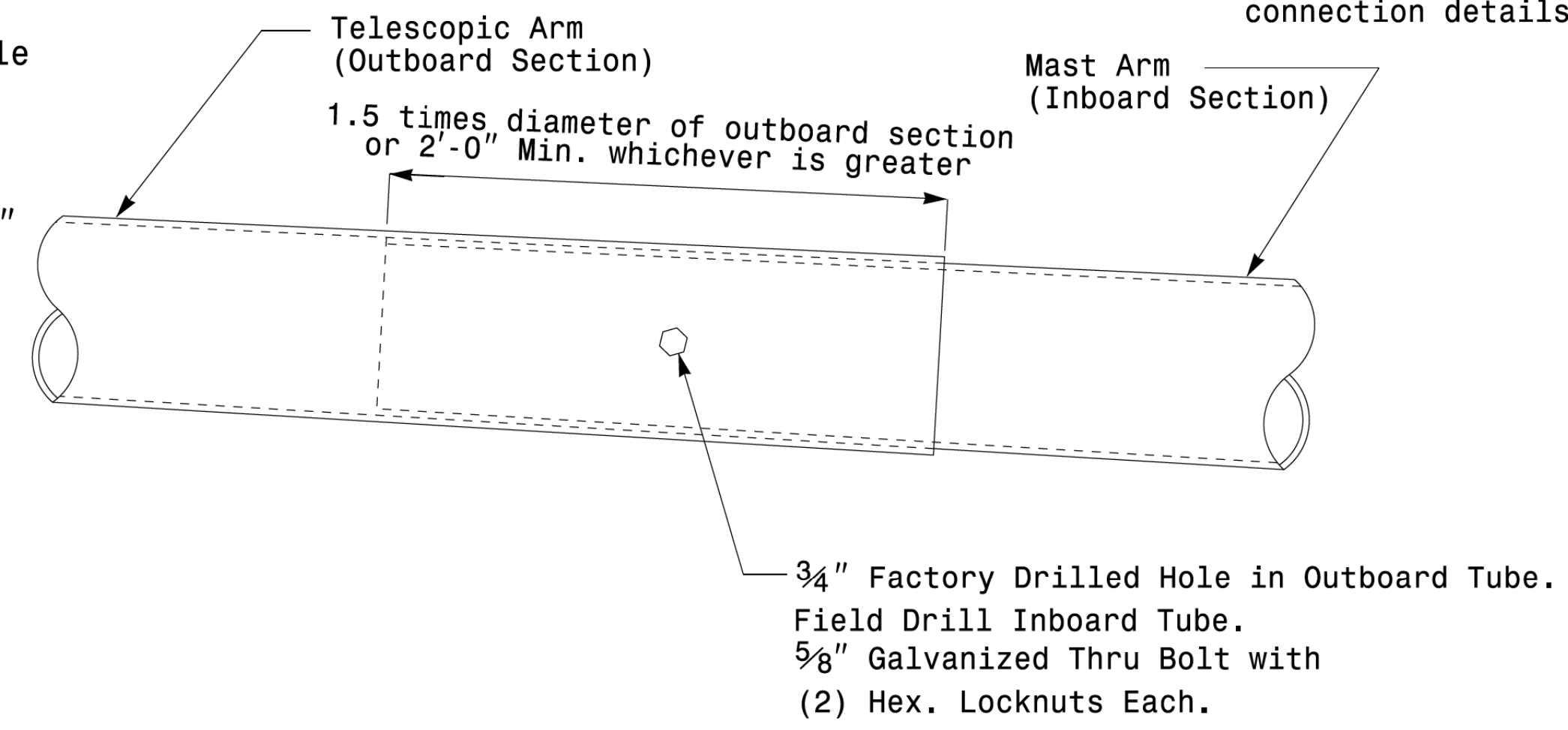
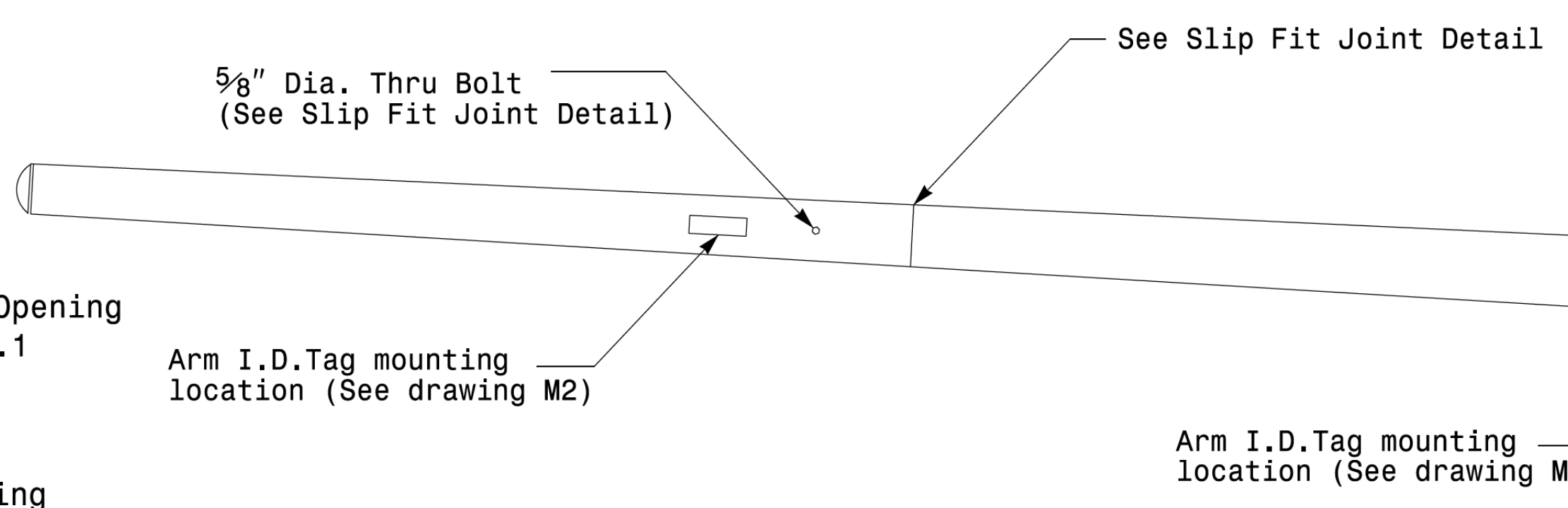
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



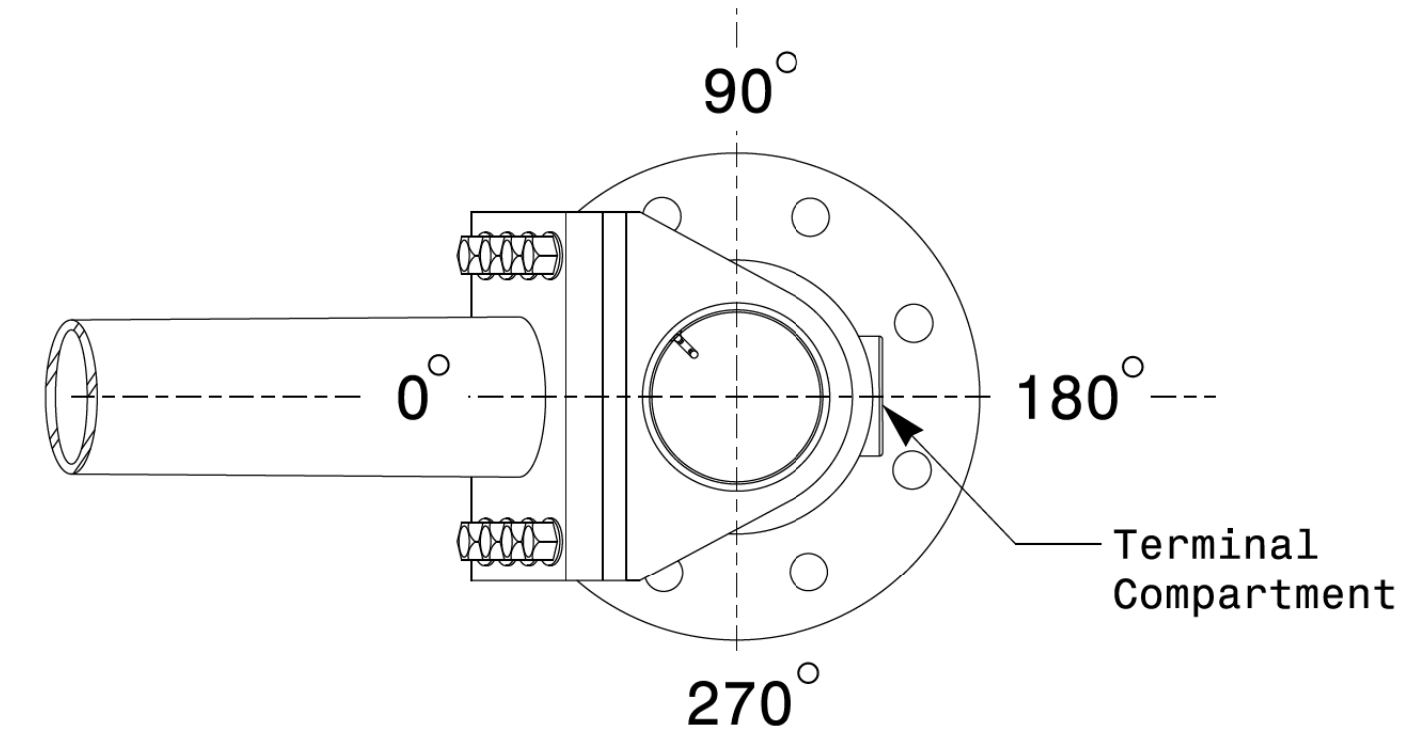
Section A-A
Pole Base Plate Details



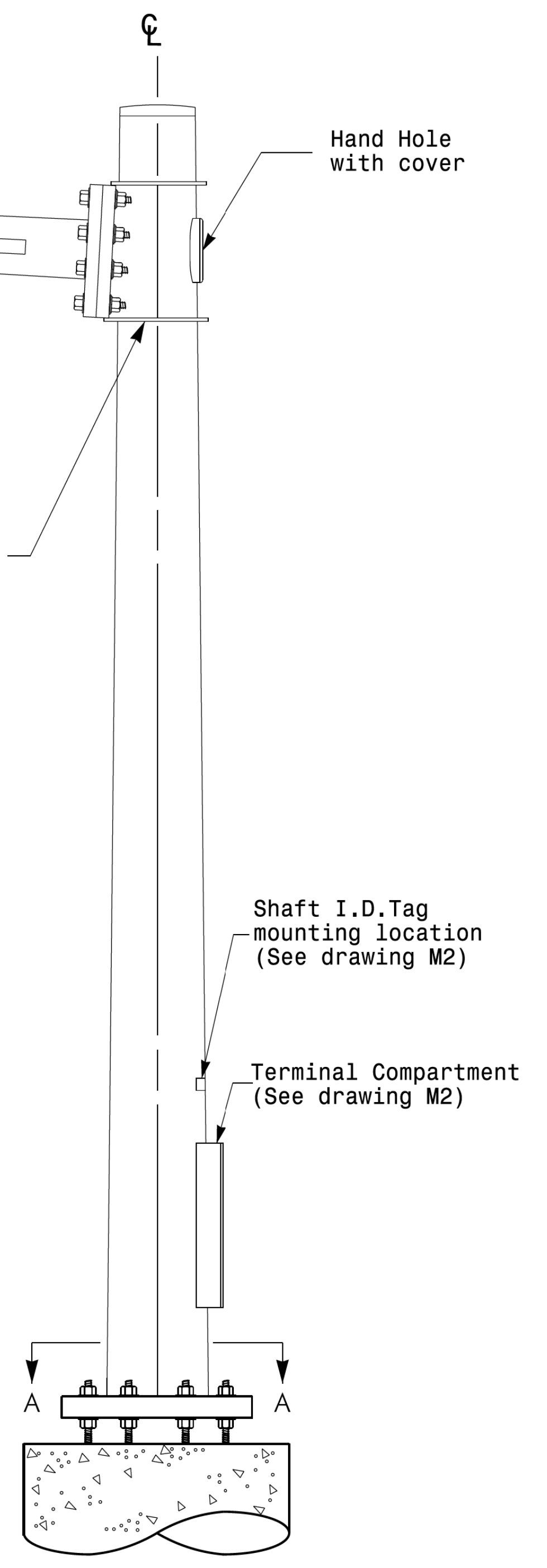
Section B-B
 (Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

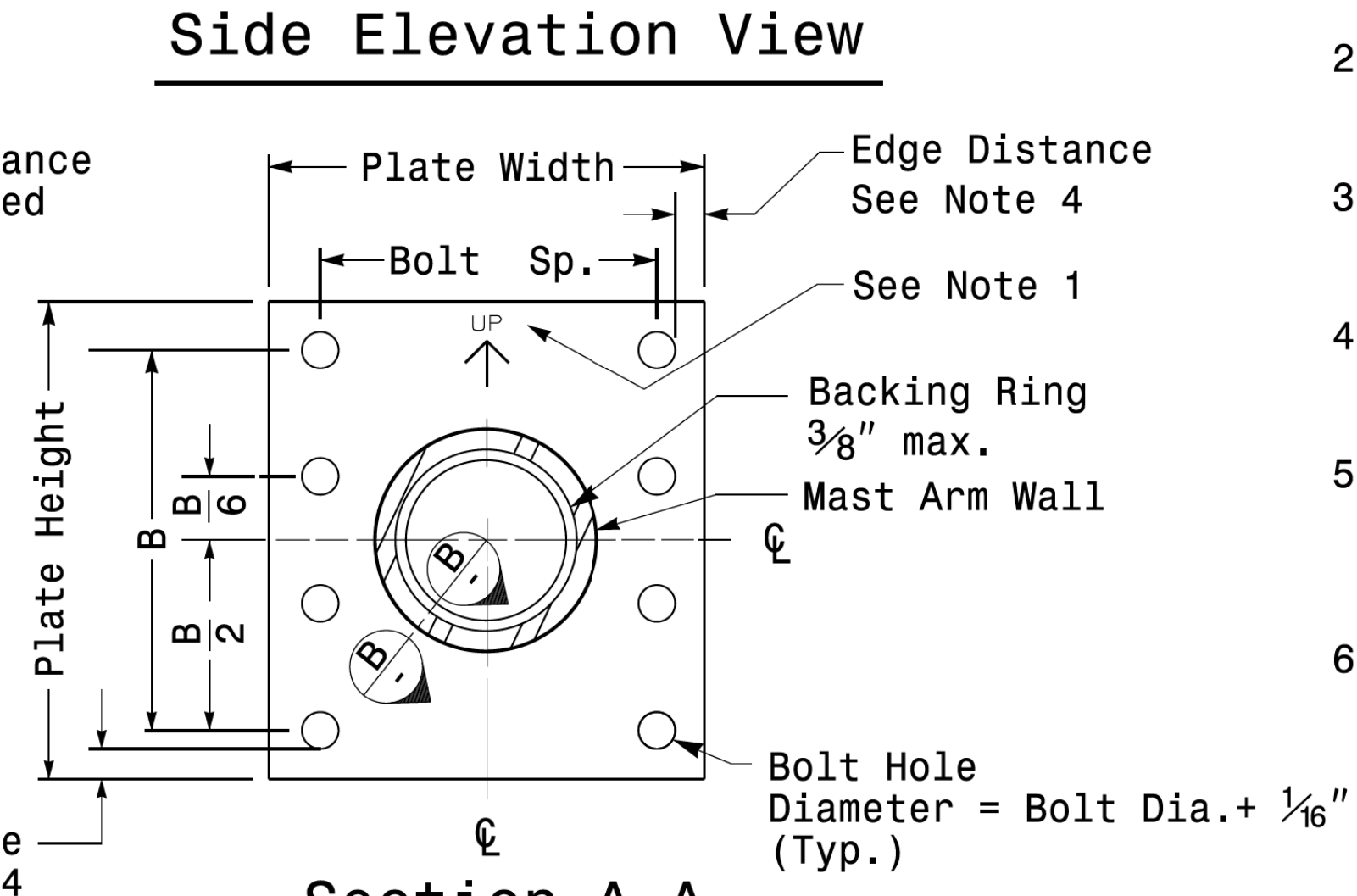
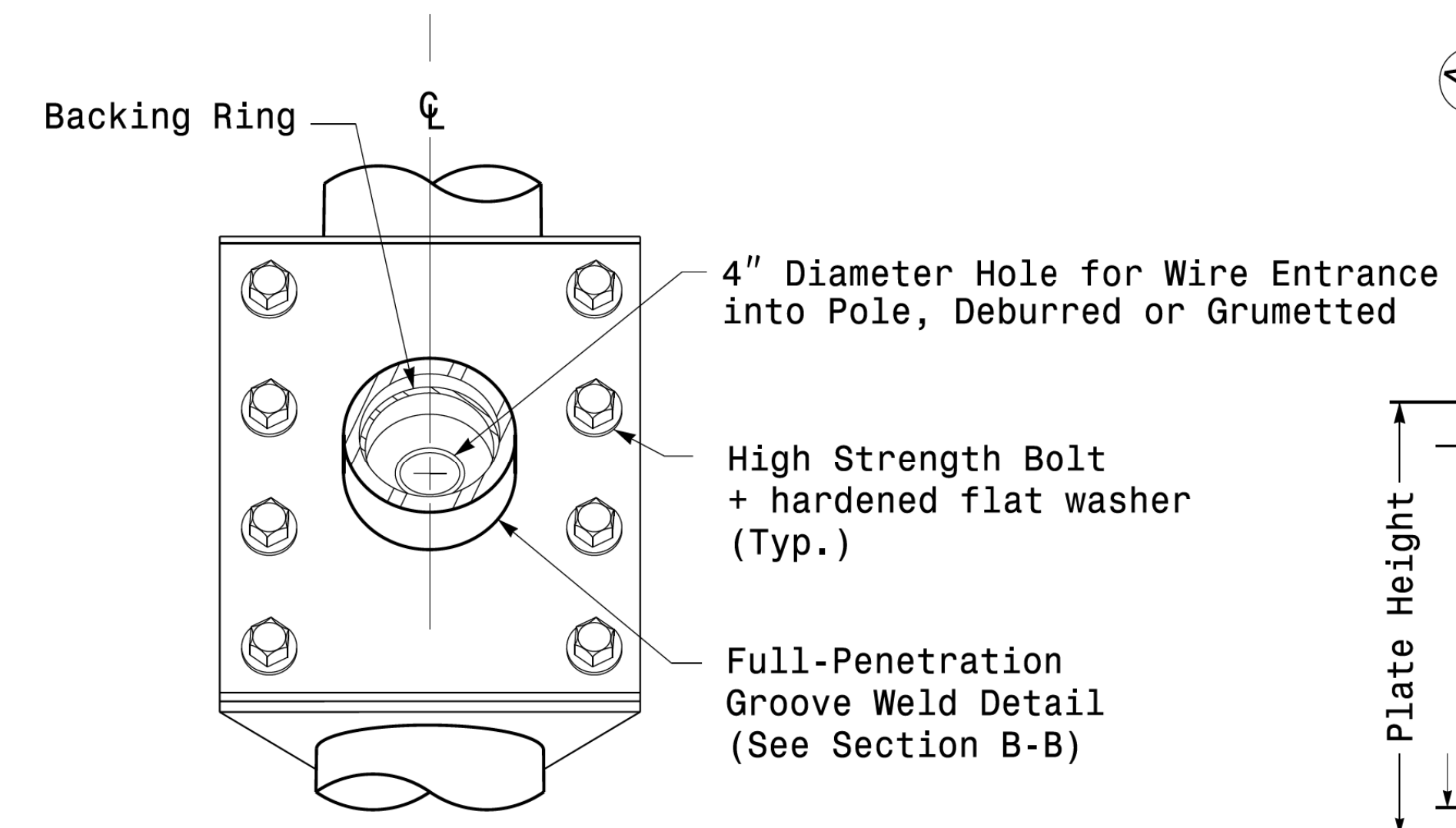
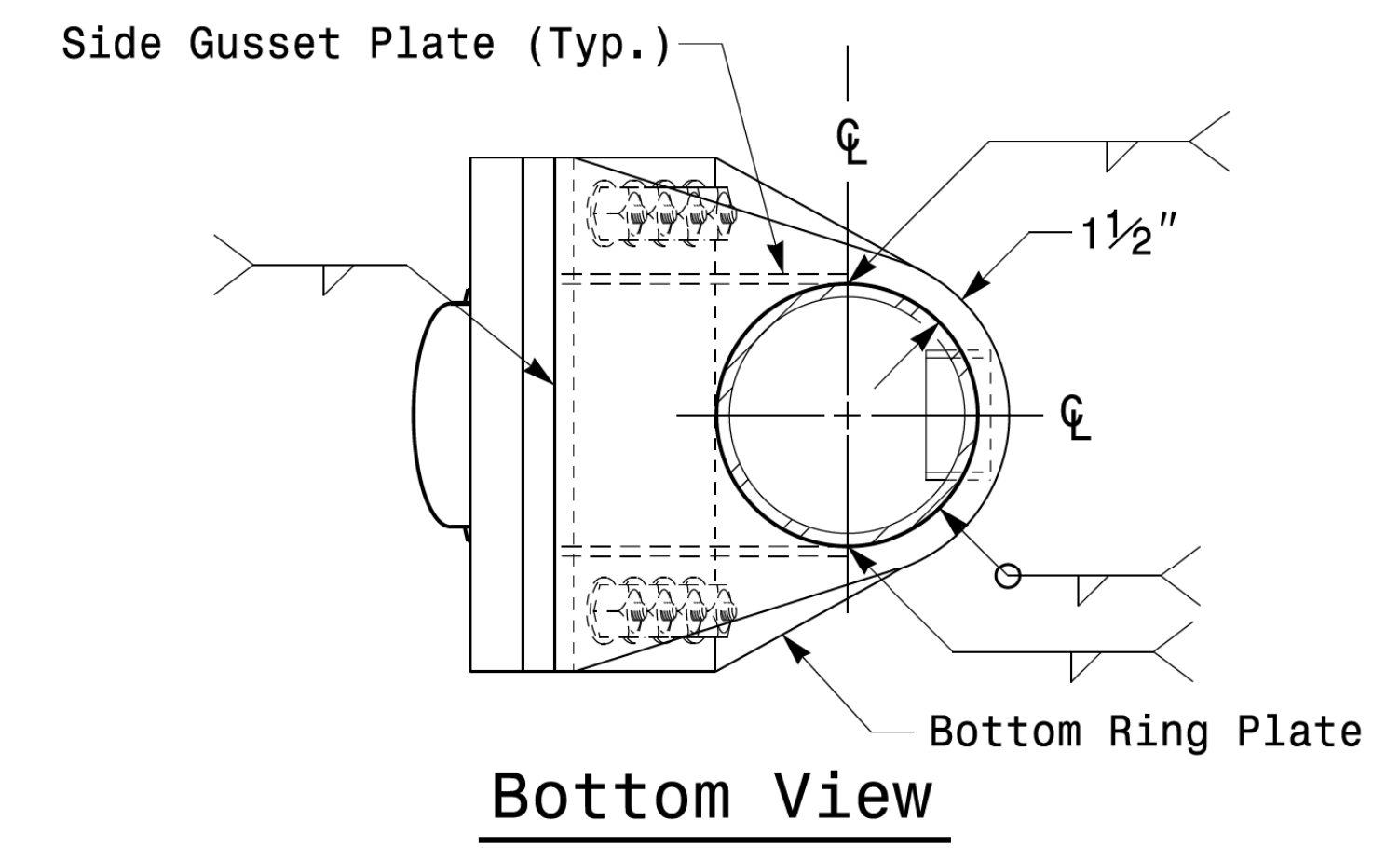
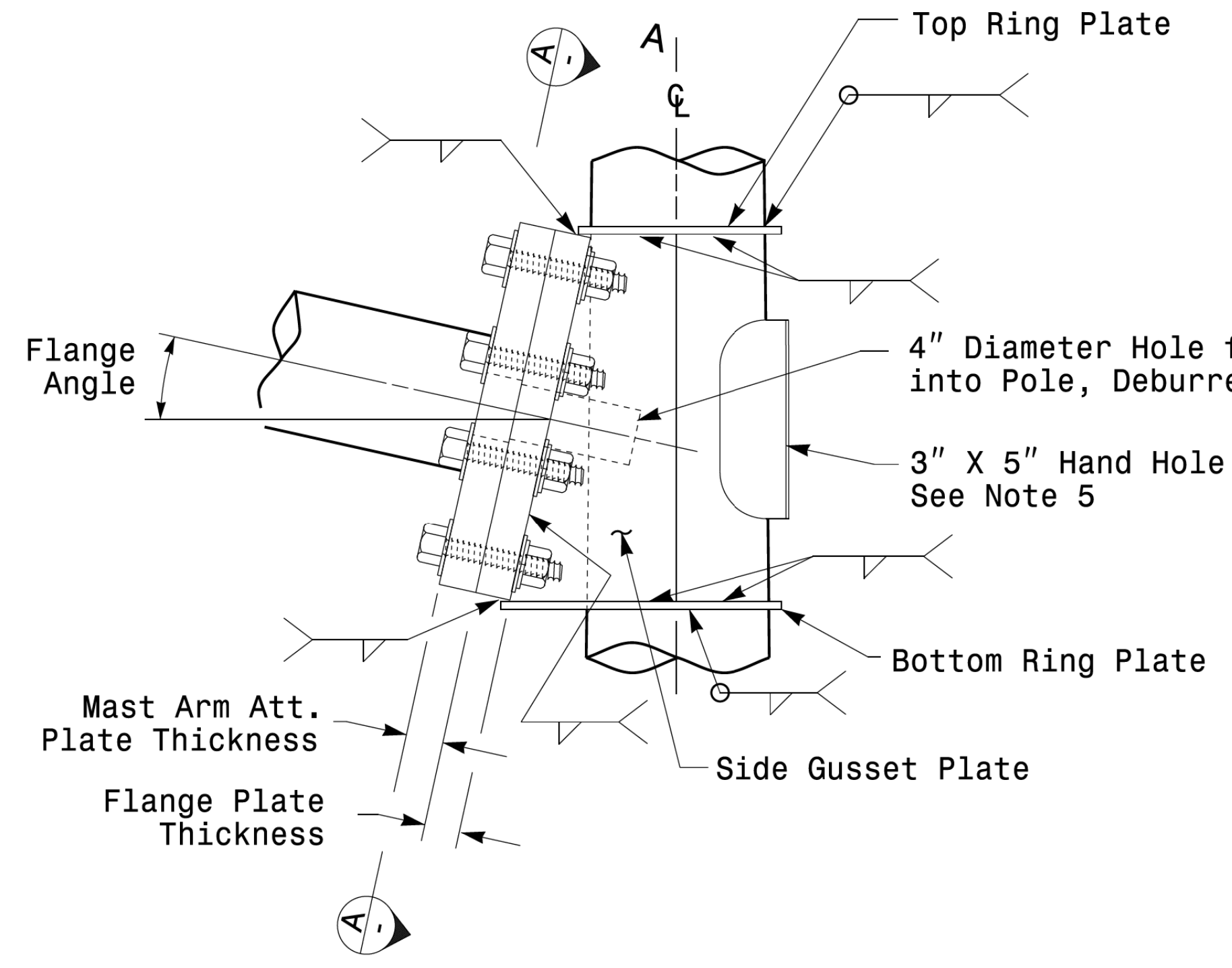
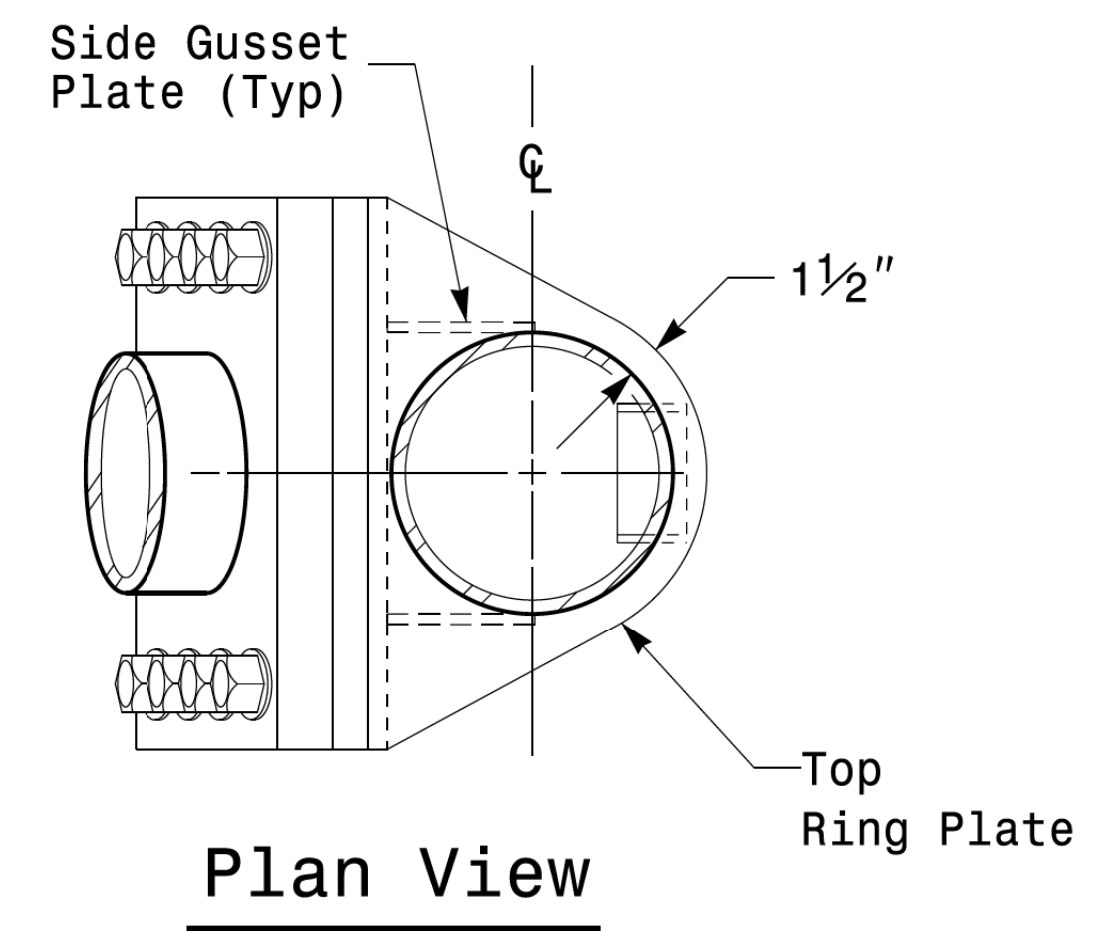
Fabrication Details - Mast Arm Poles

11-01-2017 08:33 13560W115 Signal&Sign Design Section Eastern Region\MT Sheets\2016\2014 Sig.M4 Std. Fabrication Detail\Mast Arm Poles.dgn

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

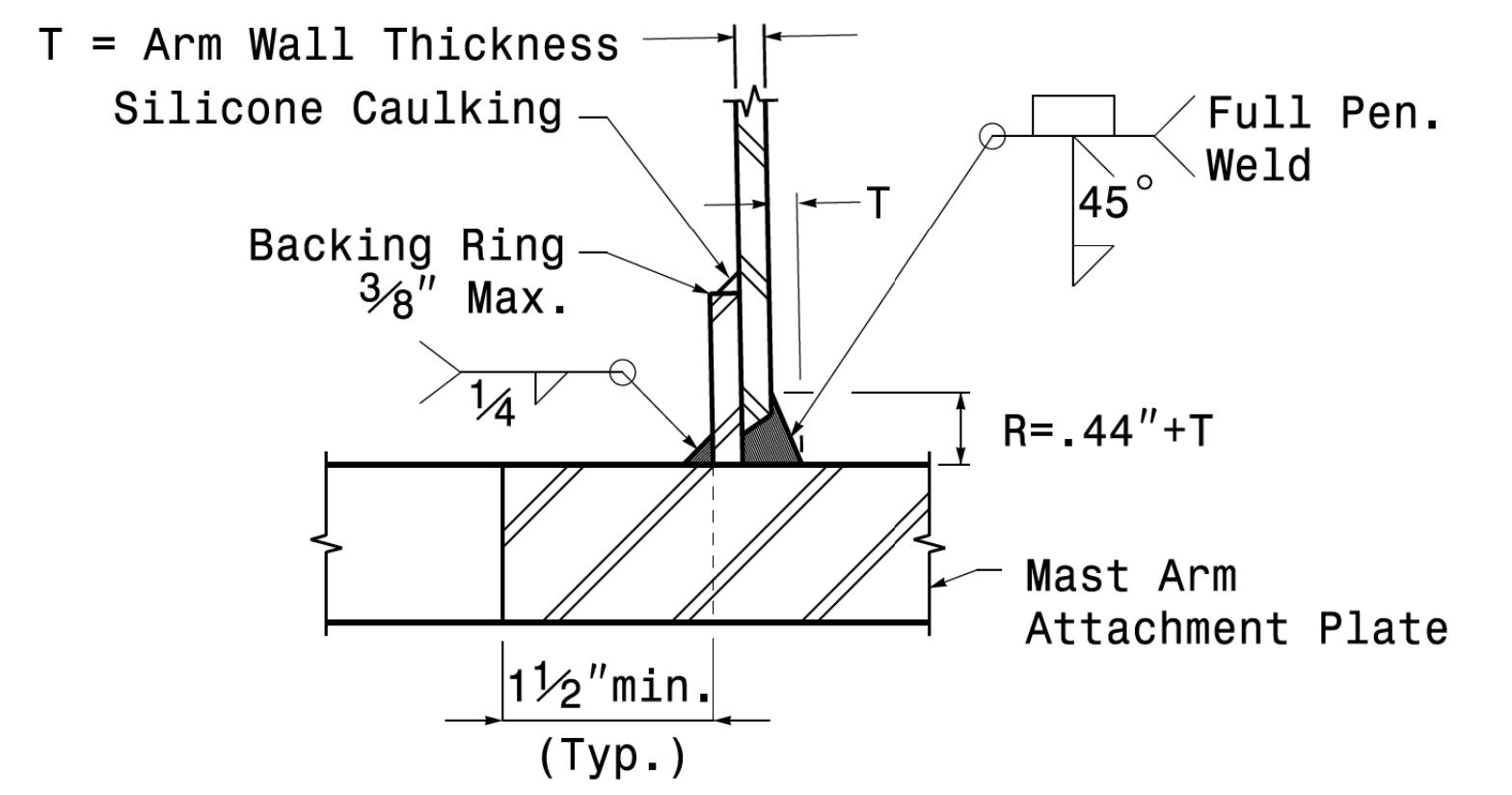
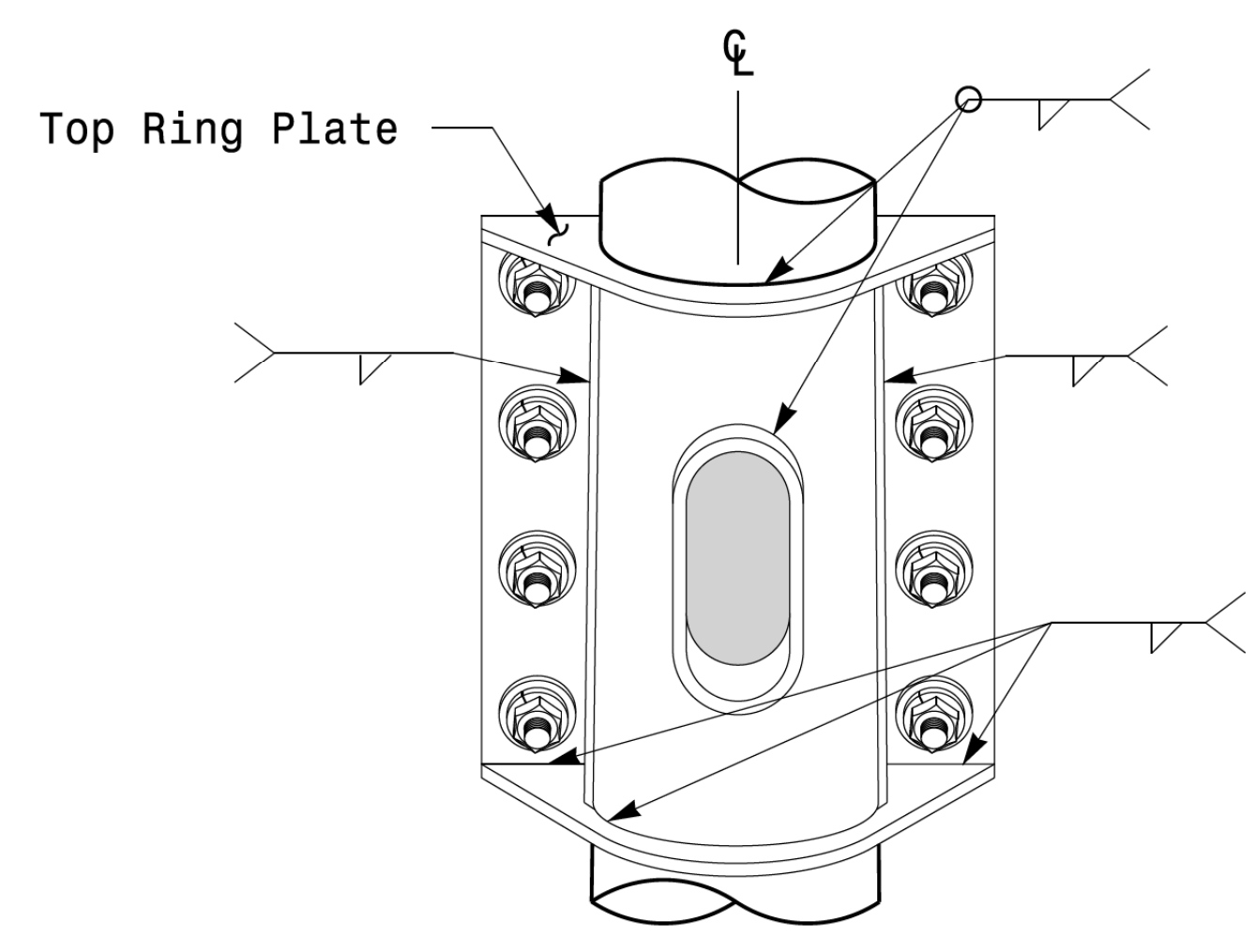
Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.	SHEET NO.
B-5985A	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.



Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

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

SEAL

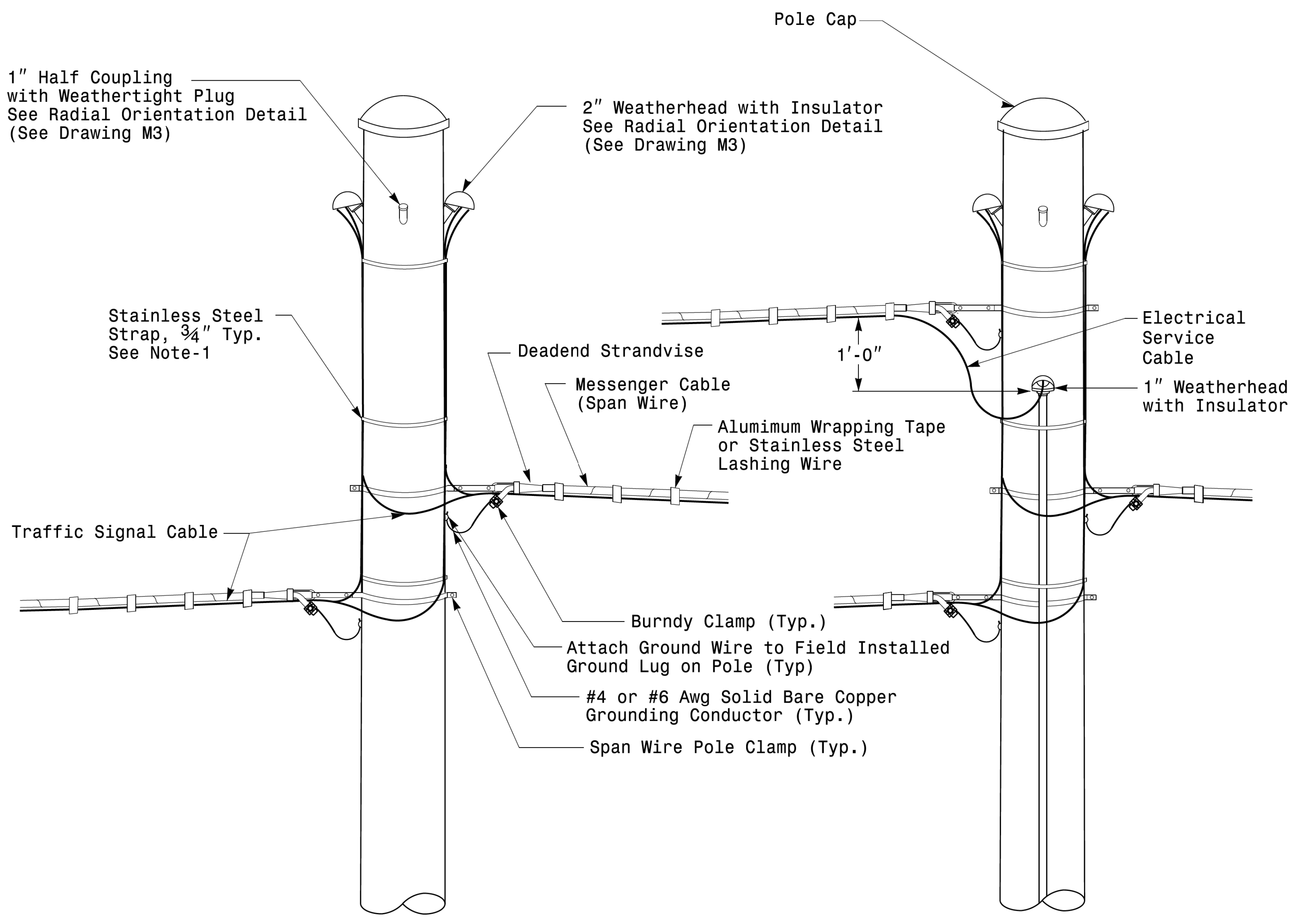
Desigined by: *Dibesh C. Sarkar*

10/11/2017

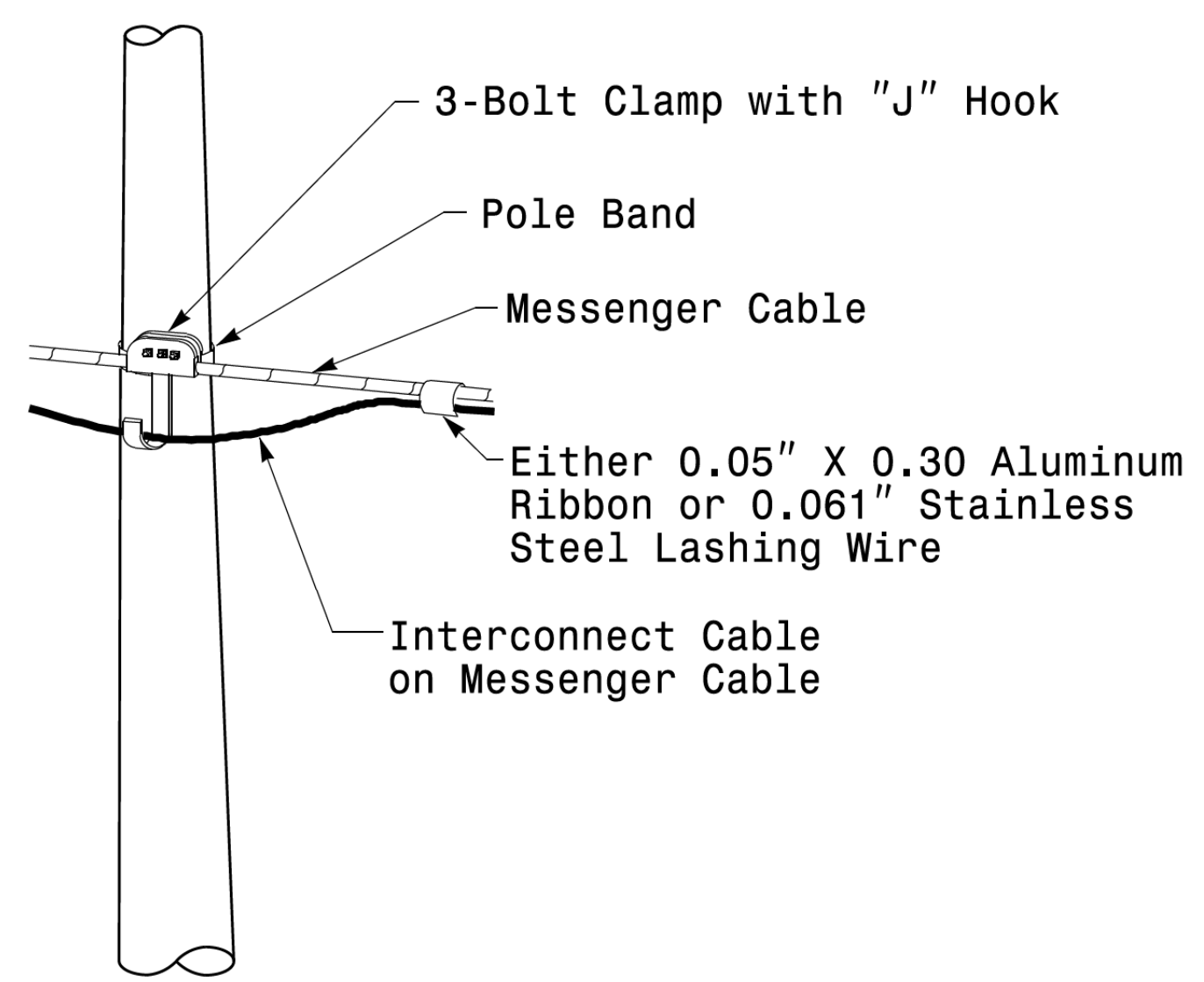
DATE

Fabrication Details - Mast Arm Connection

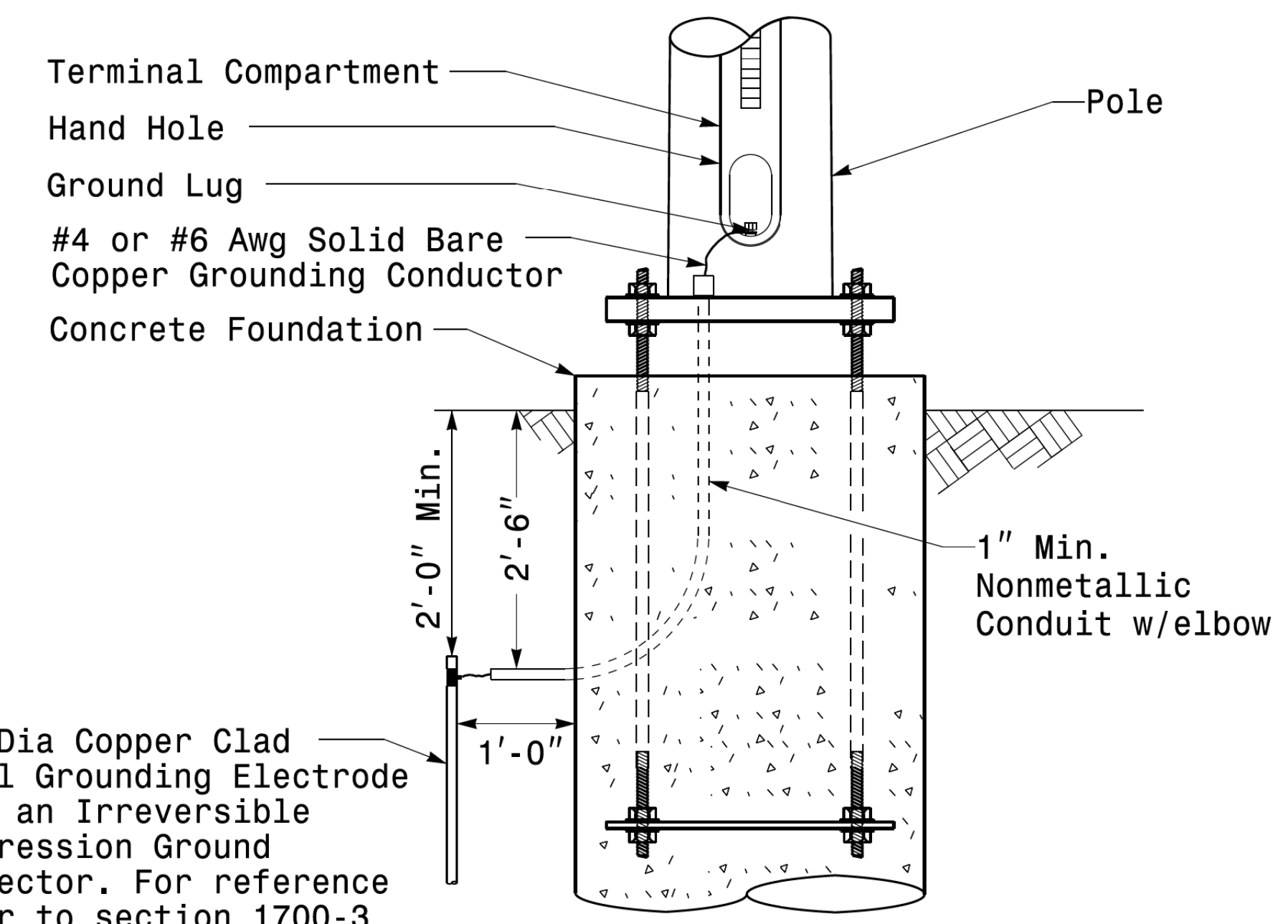
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Strain Pole Attachments



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

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.

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Fabrication Details – Strain Pole Attachments

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Typical Fabrication Details For Strain Pole Attachments	
PLAN DATE: OCTOBER 2017	DESIGNED BY: C.F. ANDREWS
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL

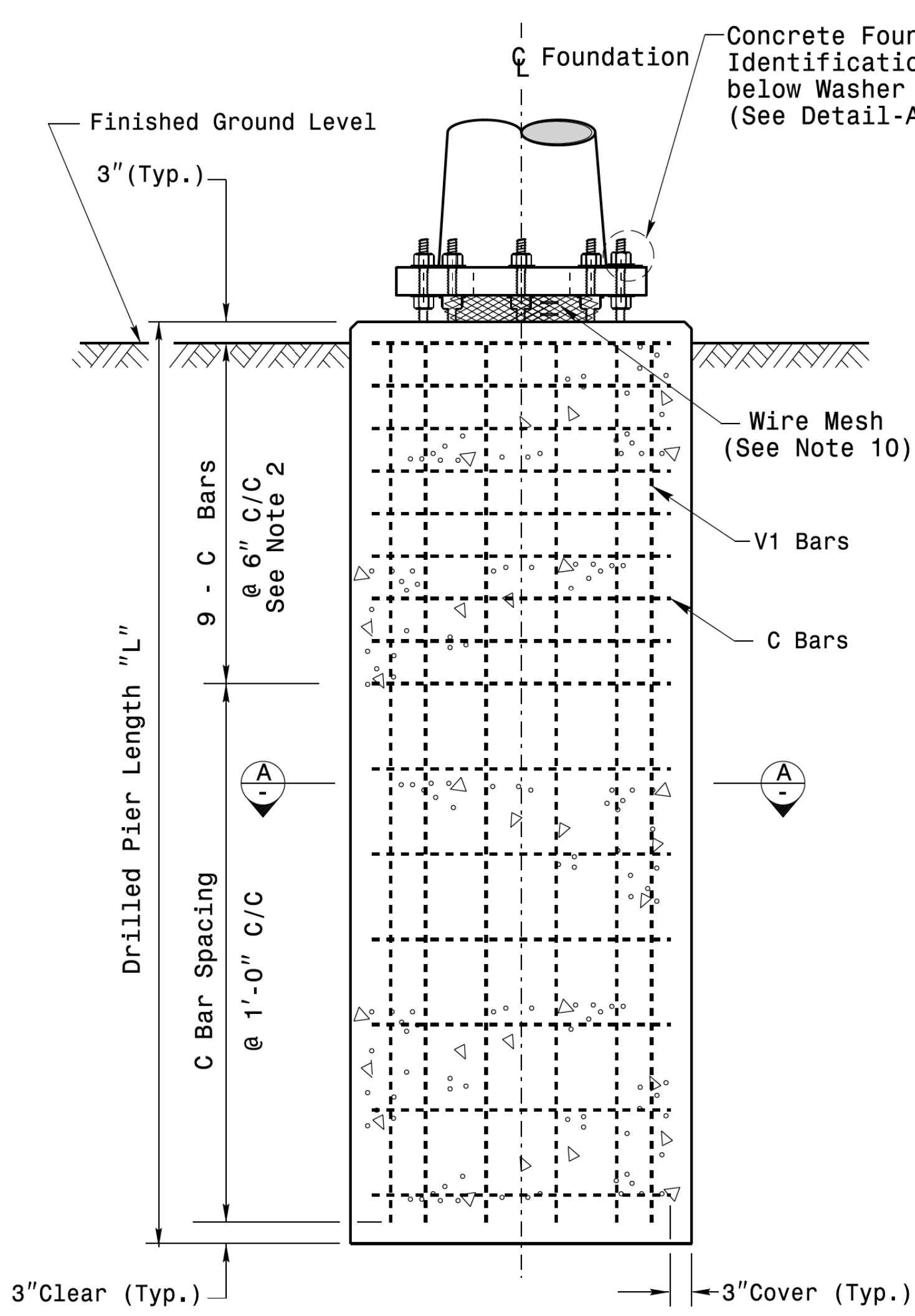
DocuSigned by:
Debesh C. Sarkar
 ENGINEER

10/11/2017
 DATE

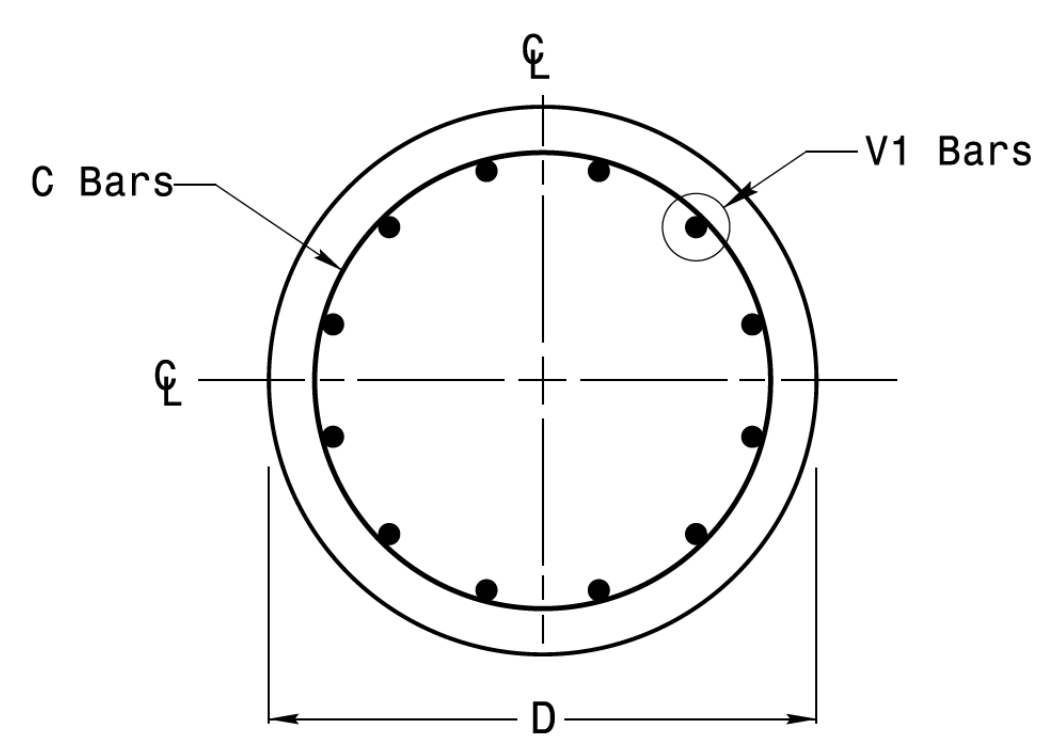
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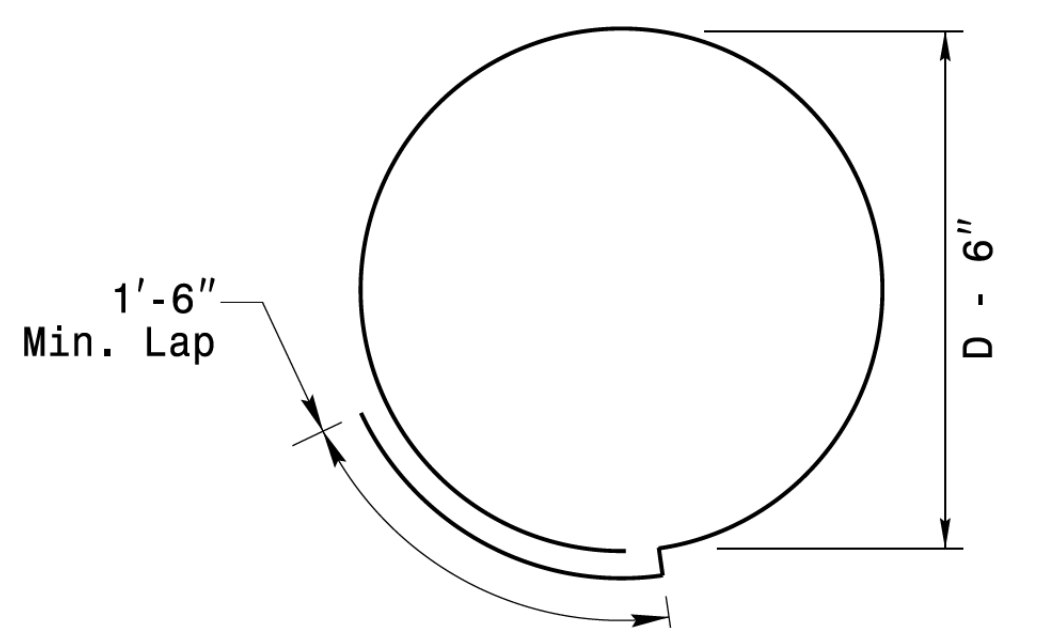
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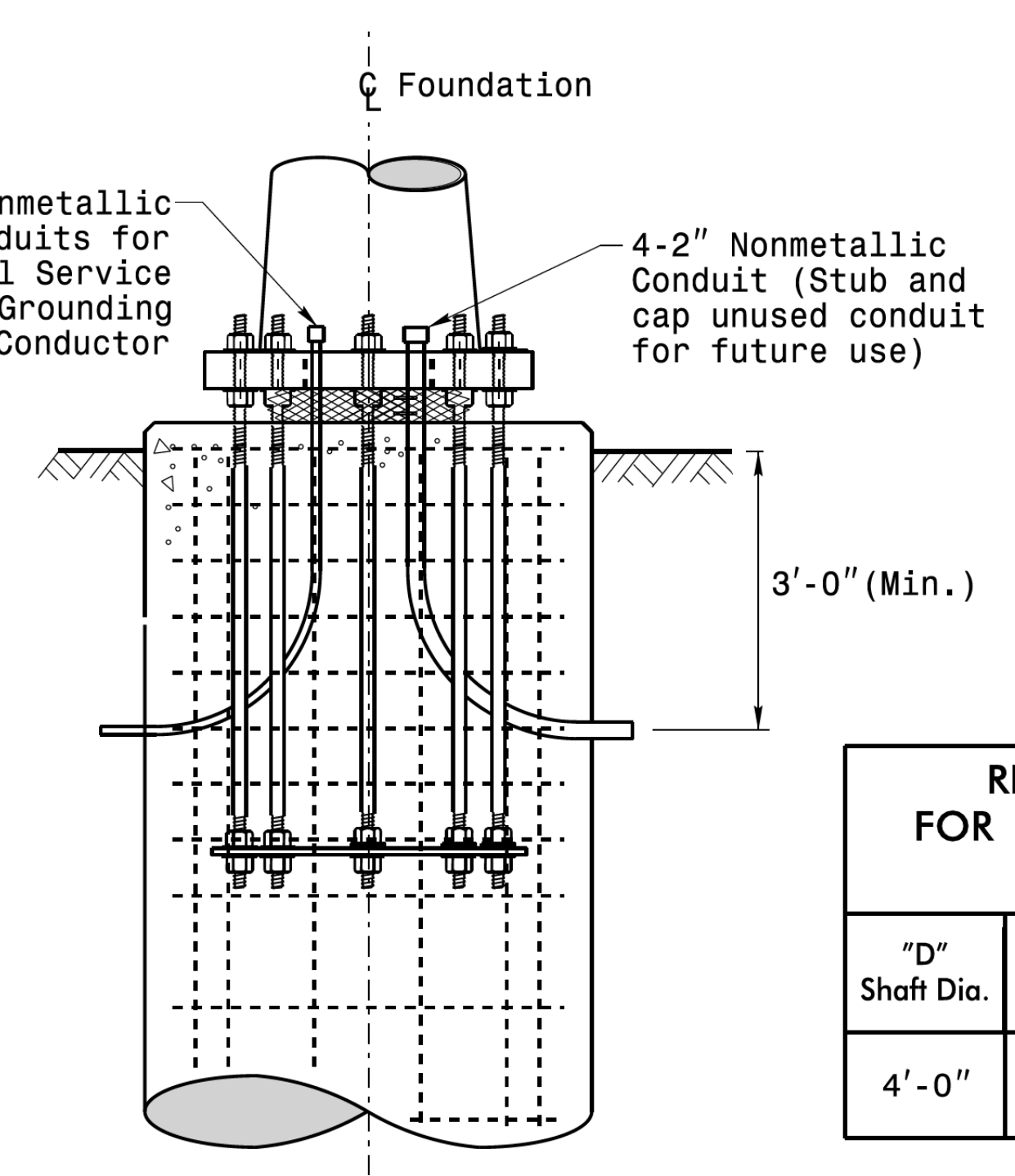
Concrete Shaft Elevation



Section A-A



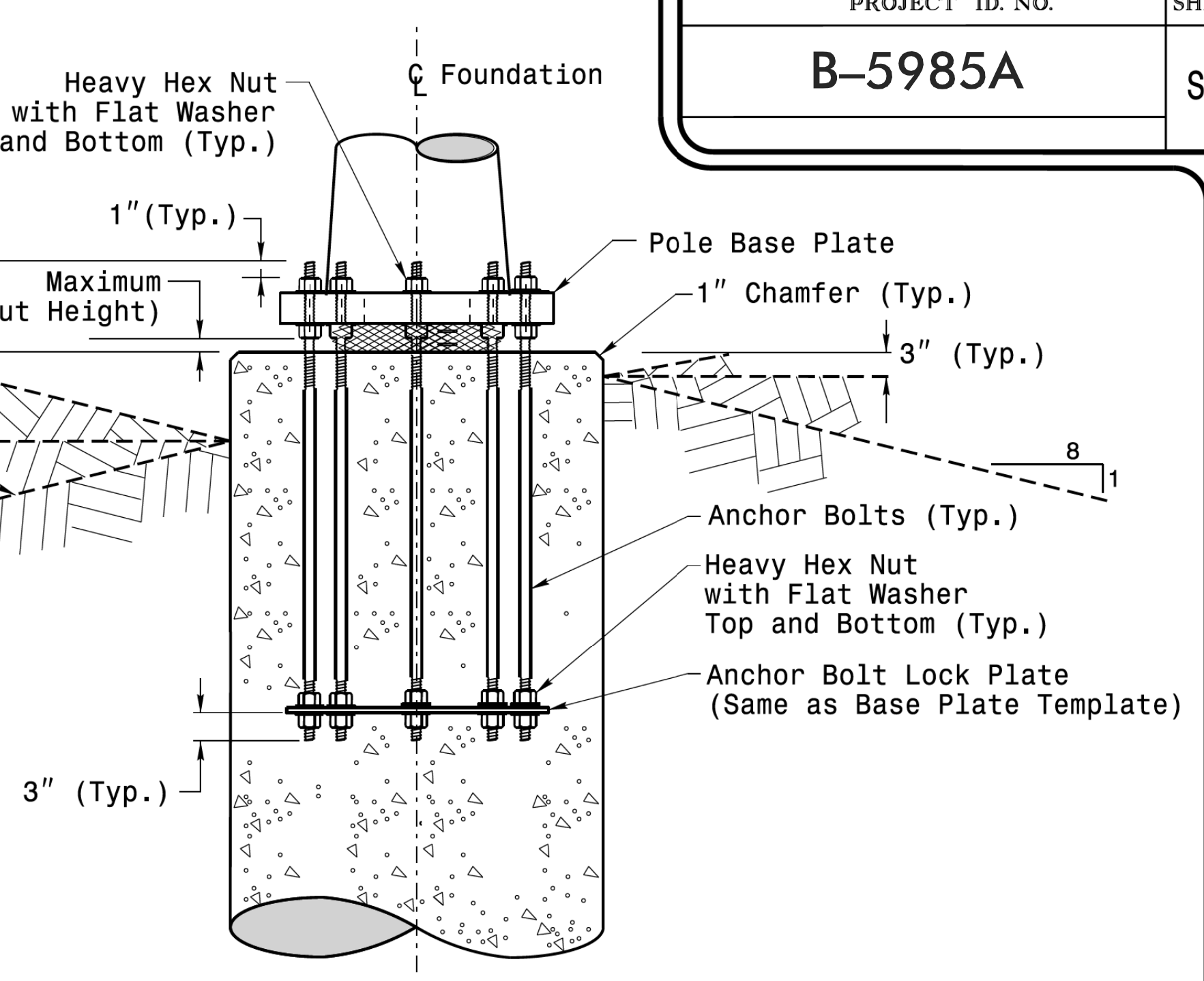
Typical "C" Bar Detail



Typical Foundation Conduit Details

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

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

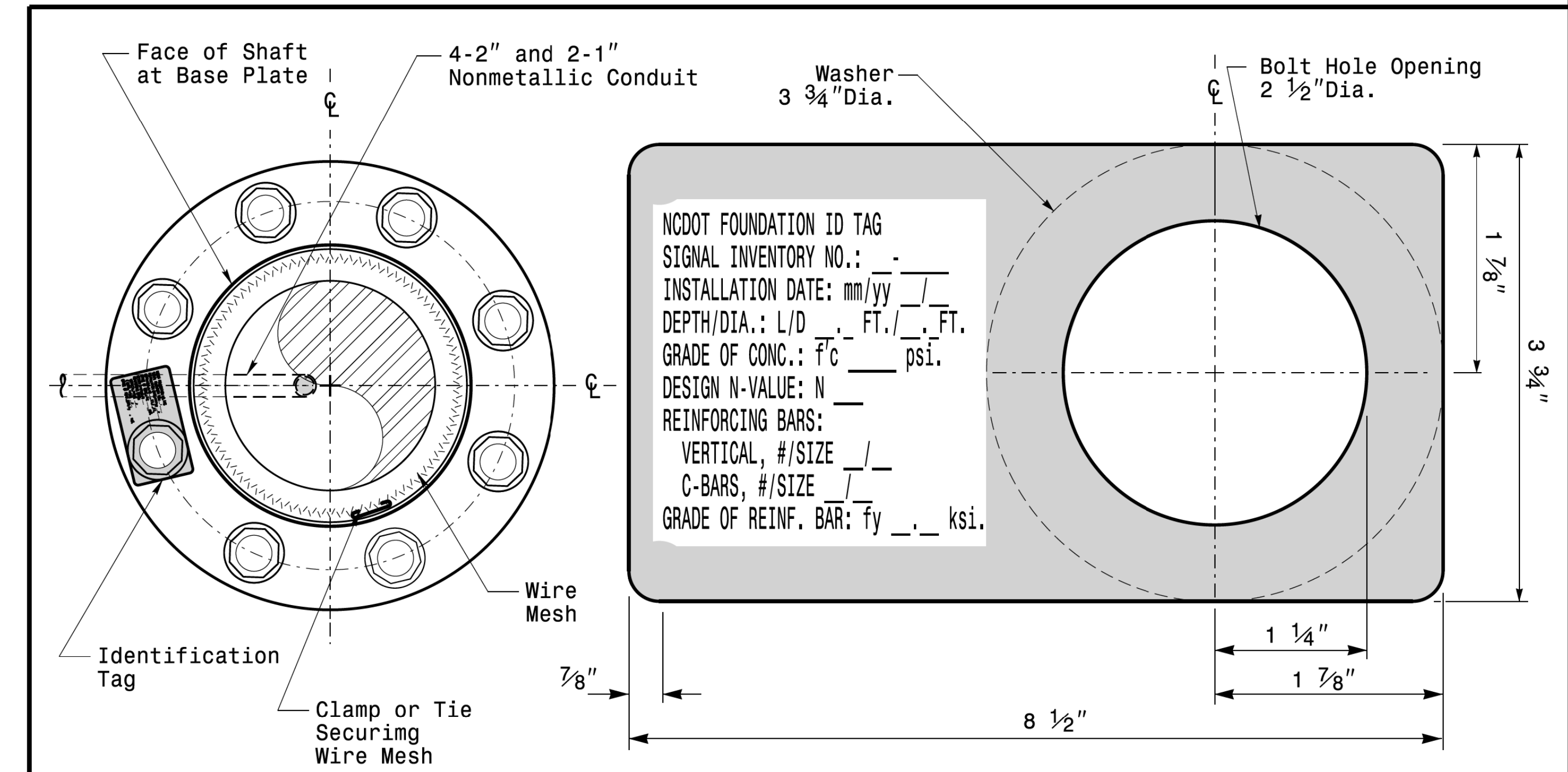


Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)

General Notes:

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



Concrete Foundation Identification Tag Details

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

Detail-A

<p>750 N. Grant Street, Raleigh, NC 27629</p>	<p>Construction Details For Foundations</p>		
	<p>PLAN DATE: OCTOBER 2018</p> <p>DESIGNED BY: C.B. COGDILL</p>	<p>PREPARED BY: N. BITTING</p> <p>REVIEWED BY: D.C. SARKAR</p>		SCALE: NONE
<p>REV. NO. 1</p> <p>COMMENTS: Revised Foundation Tag Details</p>	<p>INIT. N.B.</p> <p>DATE: 5/11/2015</p>	<p>SCALE: NONE</p>	<p>Disciplined by: <i>Debra C. Sarkar</i></p> <p>10/11/2017</p>

Construction Details - Foundations

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SOIL CONDITION

PROJECT ID. NO. B-5985A	SHEET NO. Sig.M8
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		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:


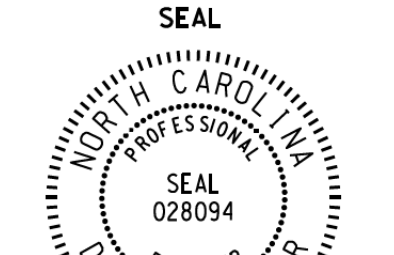
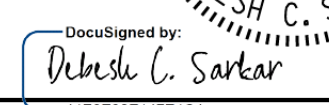
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

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

 Prepared in the Office of: Transportation Mobility and Safety Engineering Division of Transportation Planning 150 N. Greenfield Pkwy, Garner, NC 27529	Standard Strain Pole Foundation for All Soil Conditions	SEAL  NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEEPAK C. SARKAR
PLAN DATE: OCTOBER 2017 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	REVISIONS Changed Foundation Depth to Drilled Pier Length in Conc. Eqn. N.B. 7/12/2015	DATE: 10/11/2017 Signature: 

11/05/2017 08:10 S:\IT\ASUM\15 Signal\1\Signal\Design Section\Eastern Region\MM Sheets\2016\2014 Sig.M8 Std. Strain Pole Found-Saturated Soil Condition.dgn rnz/insg