

Project: BR-0043

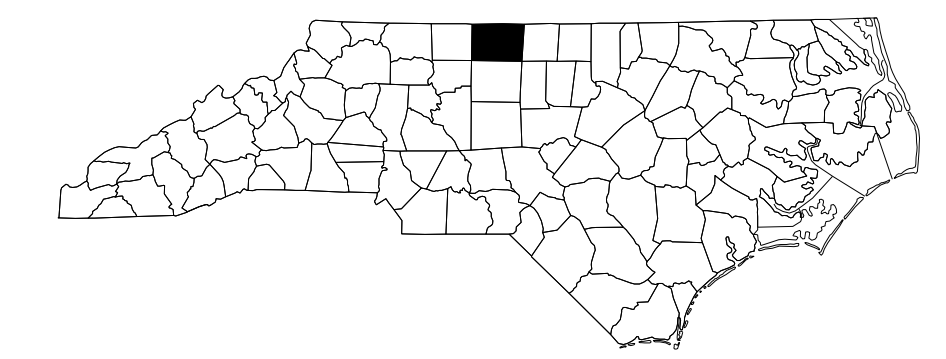
CONTRACT: C204793

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

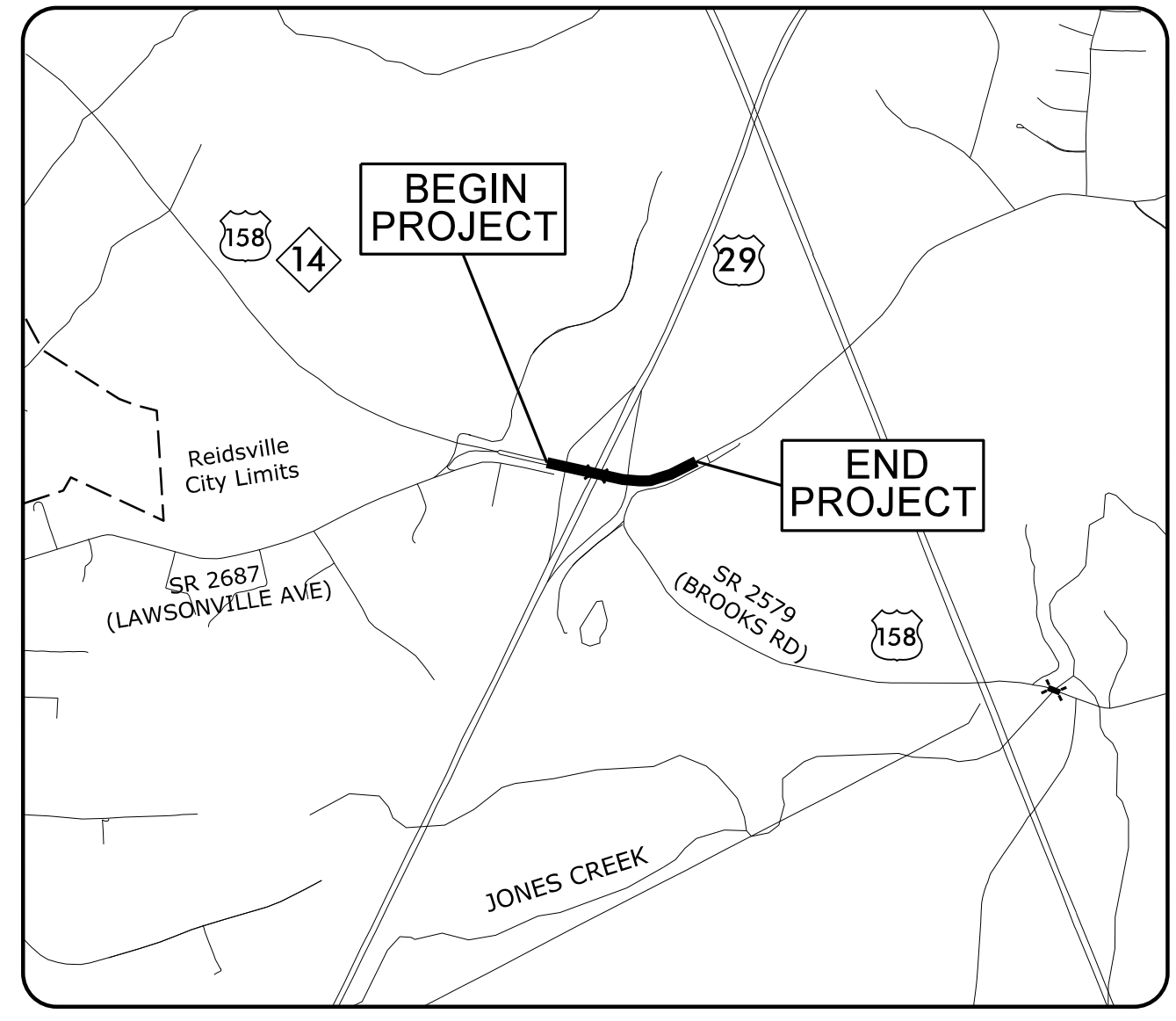
ROCKINGHAM COUNTY

**LOCATION: REPLACE BRIDGE 780151 ON US 158 /NC 14
OVER US 29 NEAR REIDSVILLE**

TYPE OF WORK: TRAFFIC SIGNALS

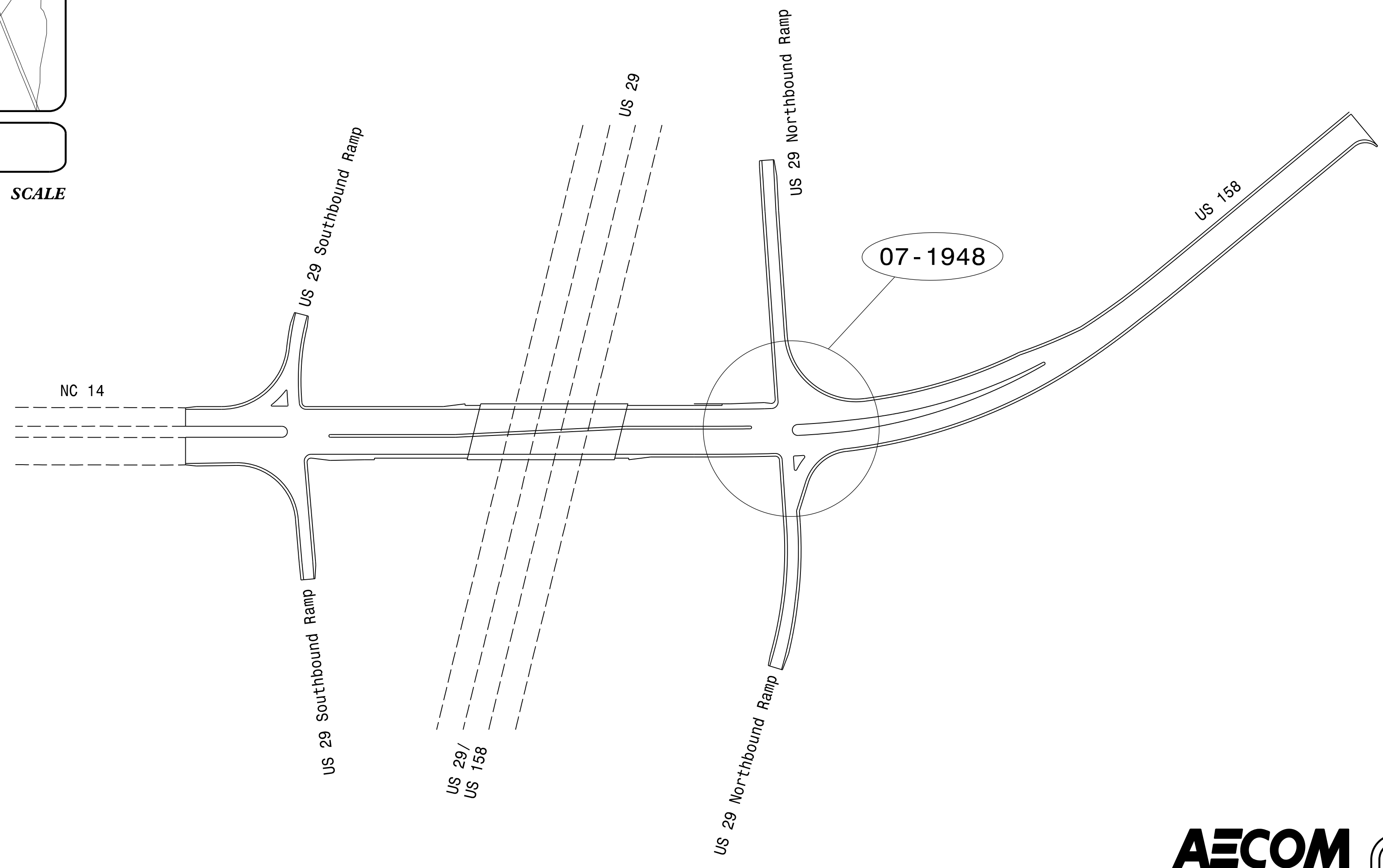


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UNLESS ALL SIGNATURES COMPLETED



VICINITY MAP

NOT TO SCALE



AECOM
NC Firm License No.: F-0342
5438 Wade Park Boulevard
Suite 200 Raleigh, NC 27607
Phone: 919-461-1100

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

Index of Plans		
Sheet #	Reference #	Location/Description
Sig. 1.0	N/A	Project Titlesheet
Sig. 1.1 - 1.2	N/A	2018 Standard Plate Sheets
Sig. 2.0 - 5.2	07-1948	US 158/NC 14 at US 29 Northbound Ramps
Sig. M1 - M8	N/A	Standard Metal Pole Sheets

**NC DOT TRANSPORTATION SYSTEMS
MANAGEMENT AND OPERATIONS UNIT**

Contacts:
Robert J. Ziembra, PE, CPM - Central Region Signals Engineer
Keith M. Mims, PE - Signal Equipment Design Engineer

AECOM
 Contact:
Hemang M. Surti, PE - NC Signals & ITS Lead

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

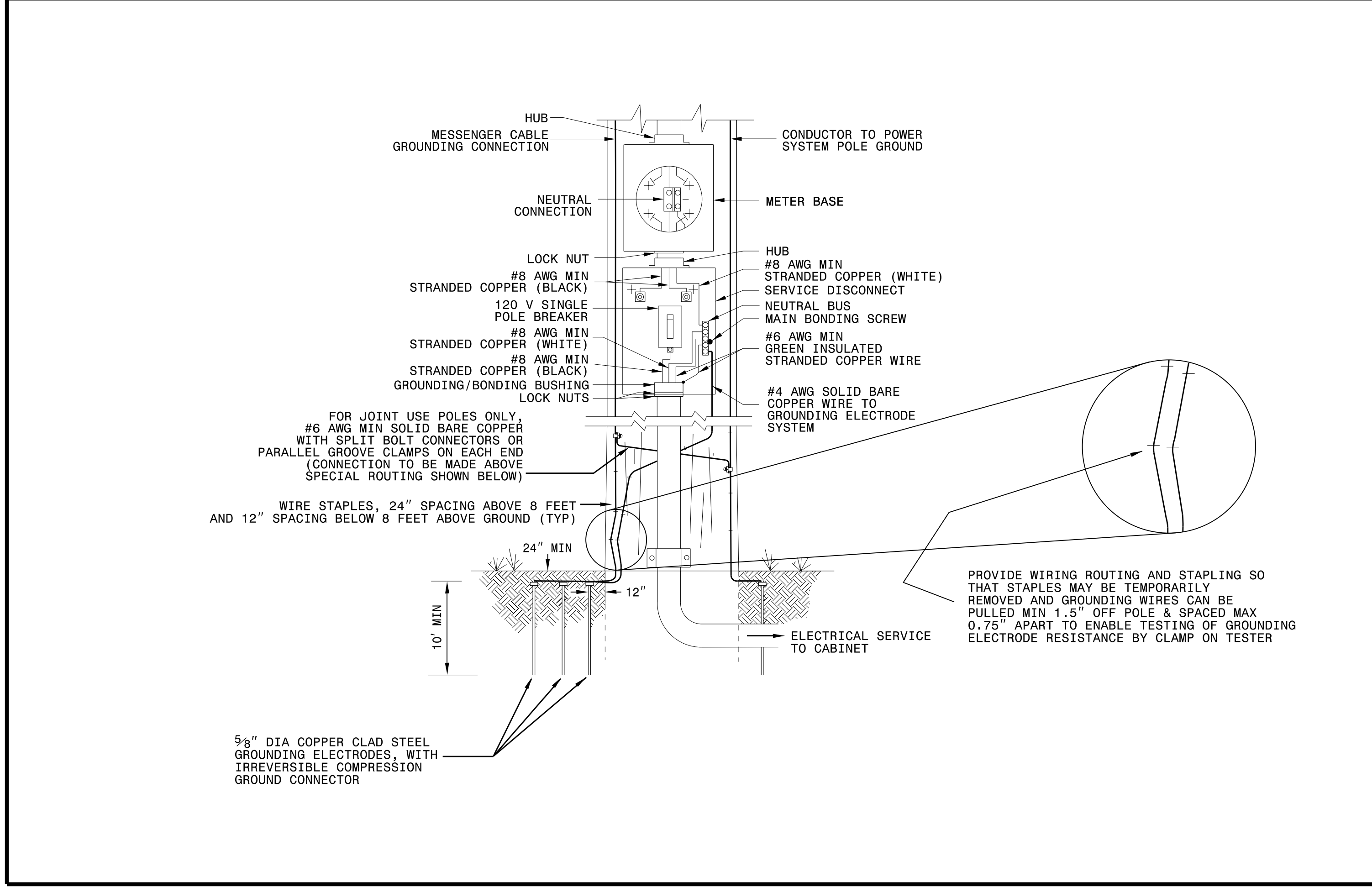
750 N. Greenfield Parkway, Garner, NC 27529

3/10/2023
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michael.leavenough

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

ENGLISH STANDARD DRAWING FOR
ELECTRICAL SERVICE GROUNDING
GROUNDING AND BONDING

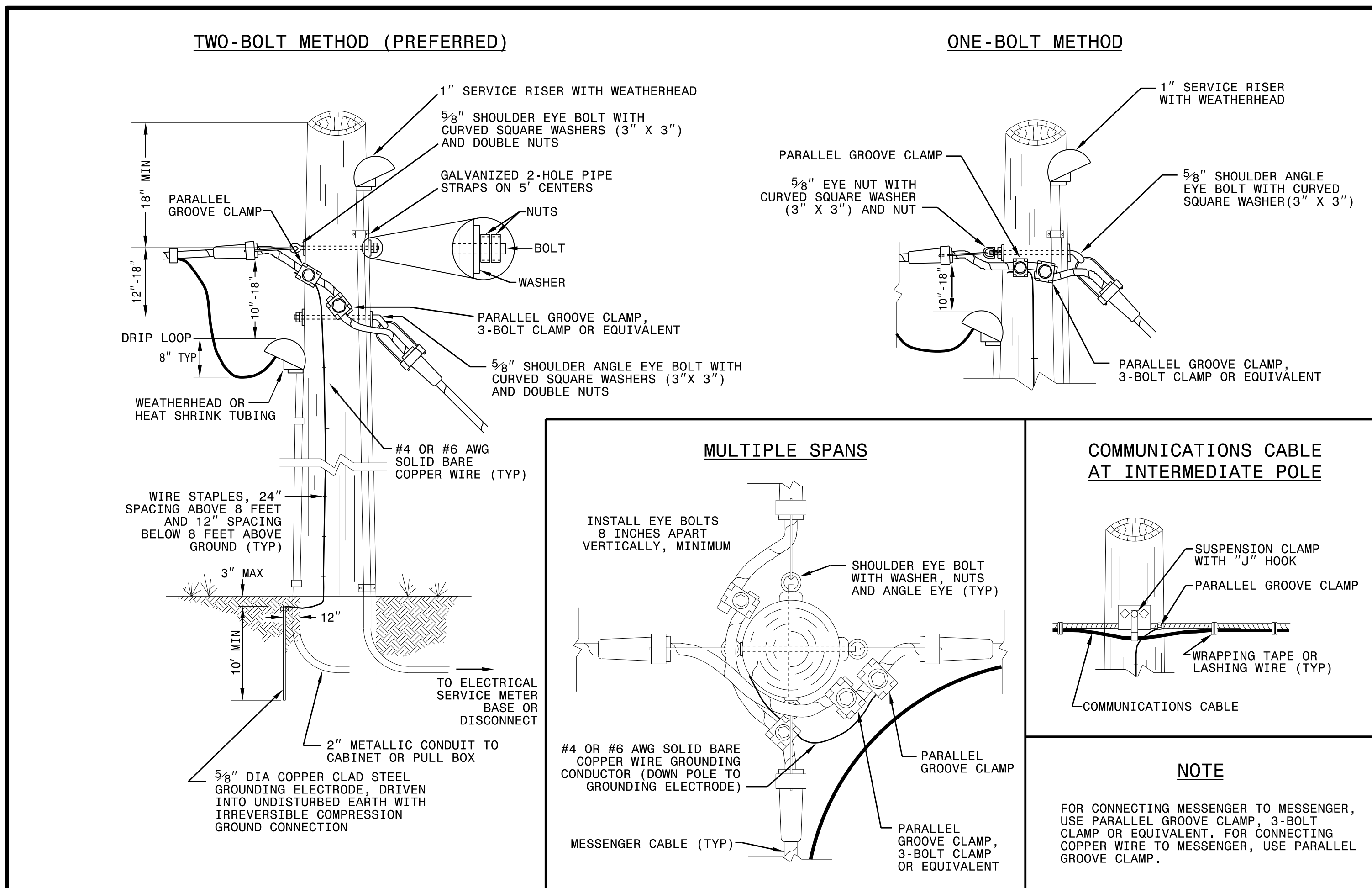
SHEET 1 OF 1
1700D01



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

ENGLISH STANDARD DRAWING FOR
WOOD POLES
METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1
1720D01

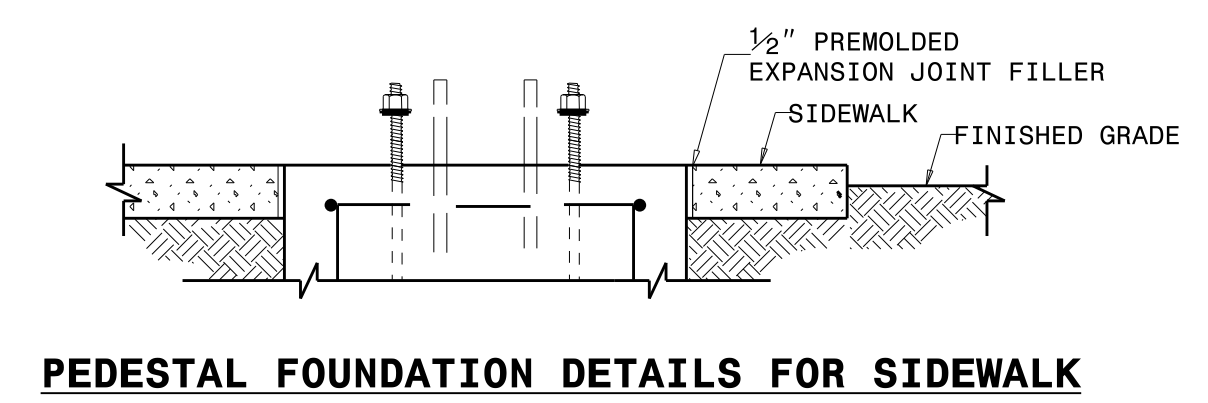
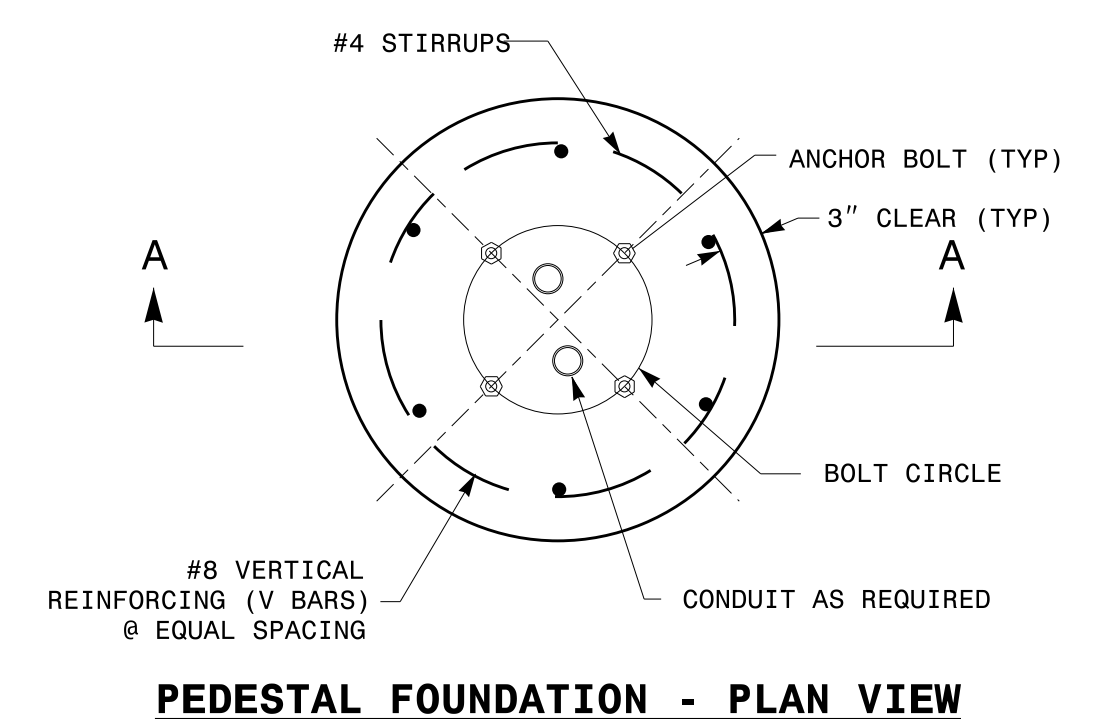


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See Plate for Title

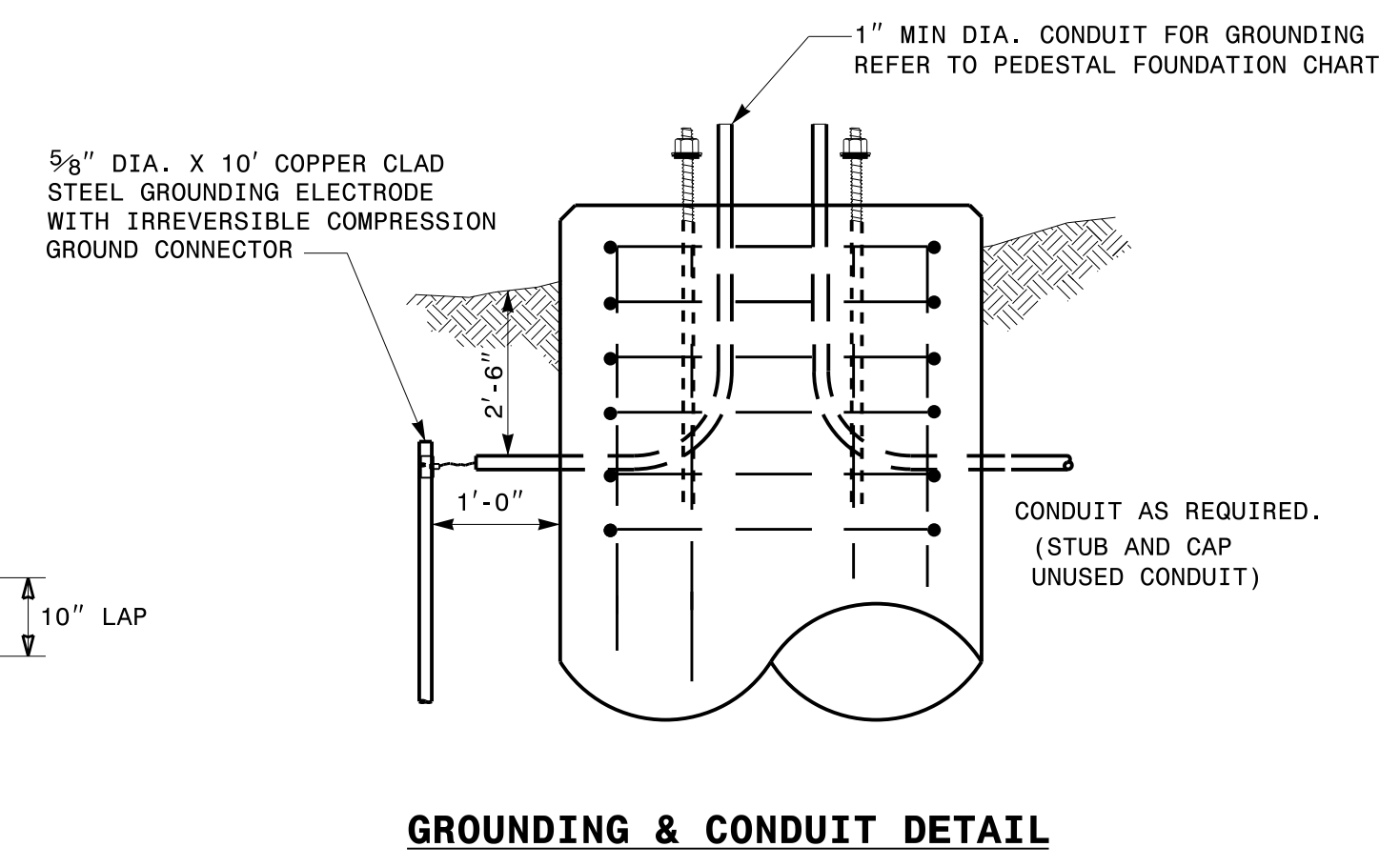
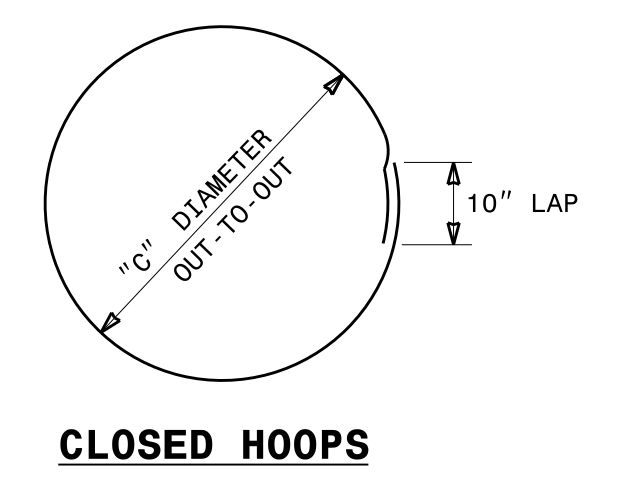
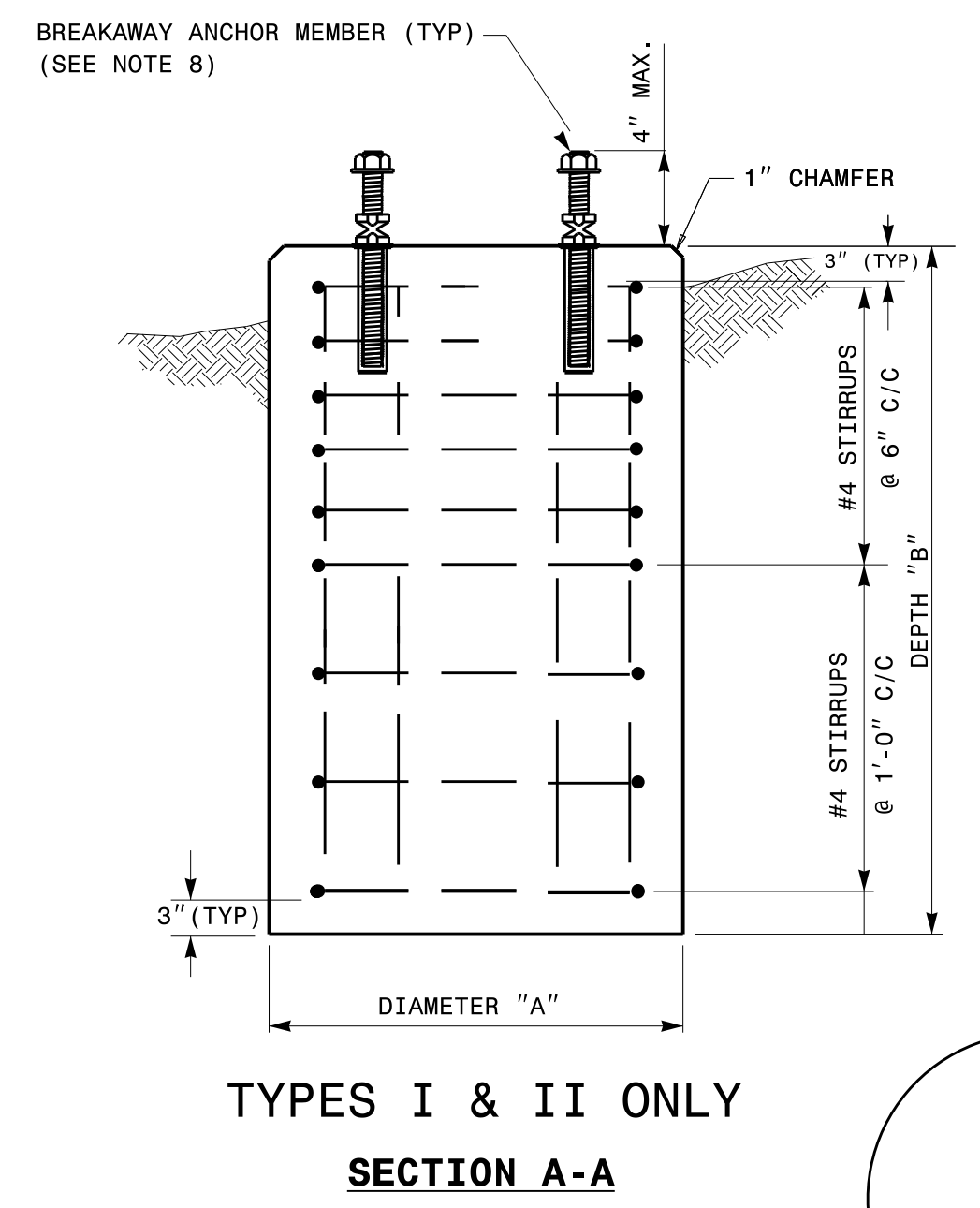
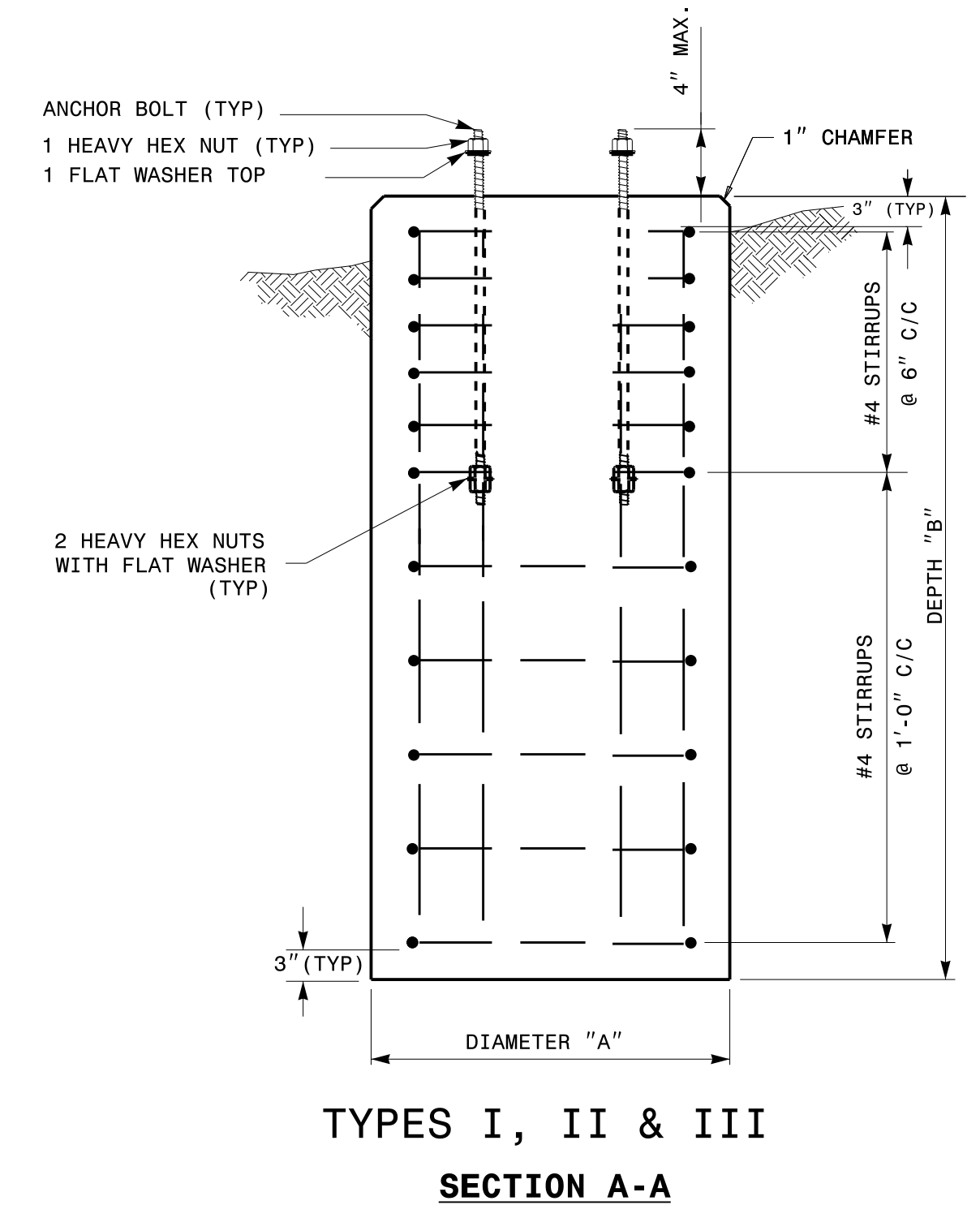
<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Parkway Garner, NC 27529</p>	<p>SEAL</p> <p>DocuSigned by: Mohd Aslami</p> <p>10/11/2017 DATE</p>
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NOTES:

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



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

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

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

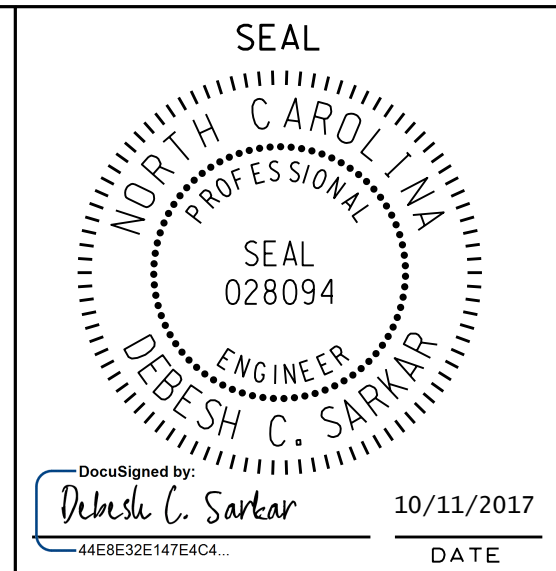
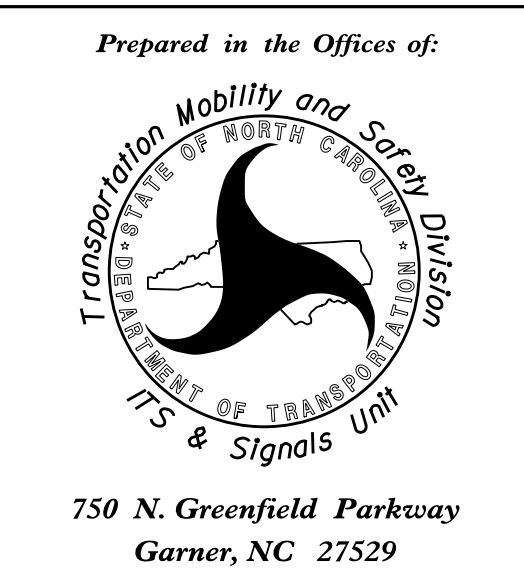
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
1743D01

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SIGNATURES COMPLETED

See Plate for Title



750 N. Greenfield Parkway
 Garner, NC 27529

PHASING DIAGRAM

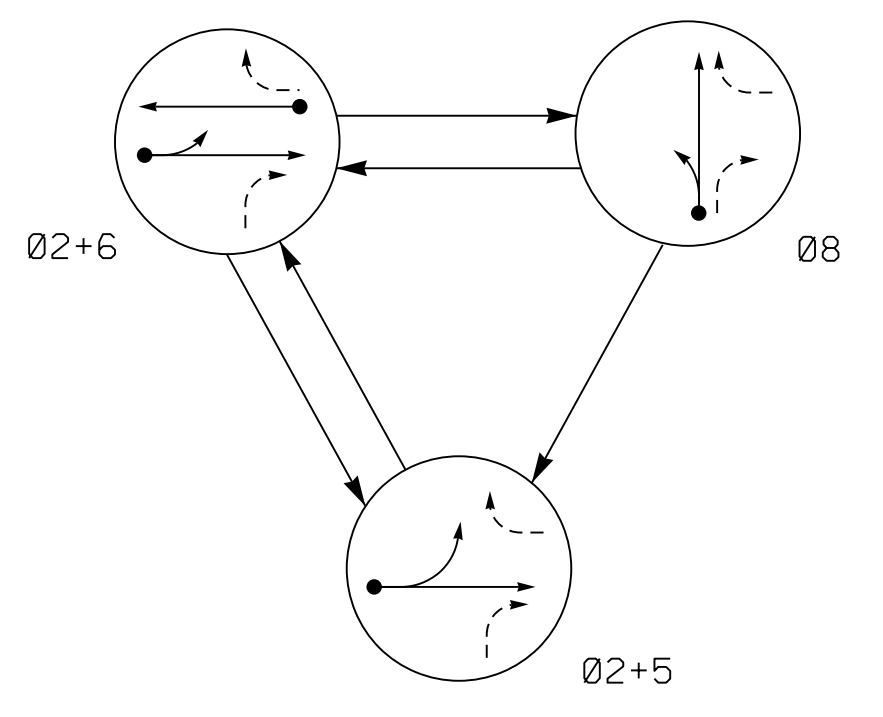


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21	G	R	Y	
22	↑	↑	R	Y
61	R	↑	R	Y
62, 63	R	G	R	Y
81, 82	R	R	G	R

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING									
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	QUEUE	CALL	PASSAGE 2	SYSTEM LOOP	NEW CARD
2A*	6X6	300	*	*	2	-	-	X	X	-	X	-	-	*
5A*	6X40	0	*	*	5	10	-	X	-	-	X	-	-	*
6A*	6X6	300	*	*	6	-	-	X	X	-	X	-	-	*
8A*	6X40	0	*	*	8	-	-	X	-	-	X	-	-	*

* Video Detection Zone

3 Phase Fully Actuated (Isolated)

NOTES

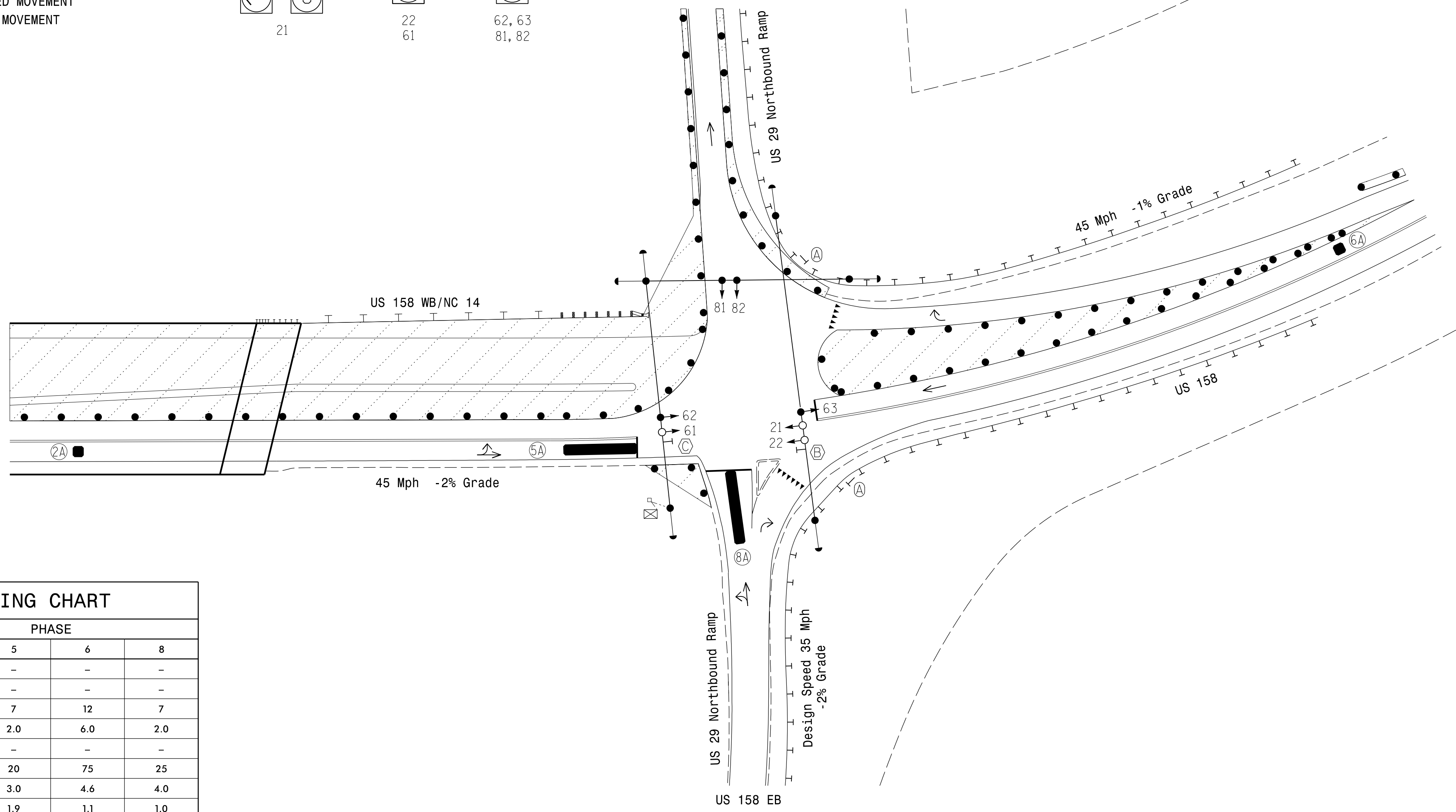
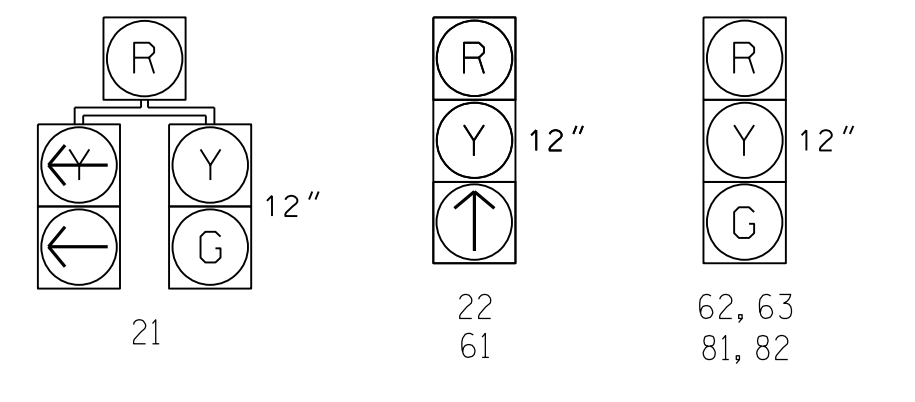
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Reposition existing signal heads numbered 62 and 63.
6. Install backplates for signal heads numbered 21, 22, and 61.
7. Existing signal head numbered 62 has backplate.
8. Locate new cabinet so as not to obstruct distance of vehicles turning right on red.
9. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART

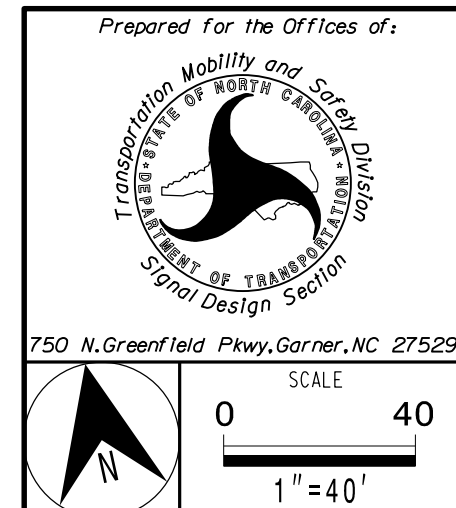
FEATURE	PHASE			
	2	5	6	8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Passage 2 *	-	-	-	-
Max I *	75	20	75	25
Yellow Change	4.7	3.0	4.6	4.0
Red Clear	1.0	1.9	1.1	1.0
Added Initial *	2.5	-	2.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	20	-	20	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	-	X	-	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	-	-	-

* 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

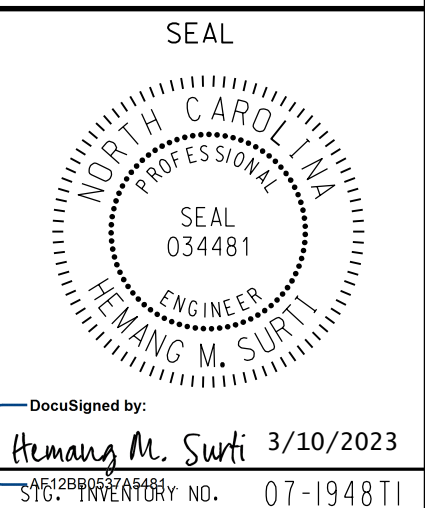
- | PROPOSED | EXISTING |
|--|--|
| ○ Traffic Signal Head | ● Traffic Signal Head |
| ○ Modified Signal Head | N/A |
| ○ Sign | ○ Sign |
| ○ Pedestrian Signal Head With Push Button & Sign | ○ Pedestrian Signal Head With Push Button & Sign |
| ○ Signal Pole with Guy | ○ Signal Pole with Guy |
| ○ Signal 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 | ○ Right of Way |
| ○ Directional Arrow | ○ Directional Arrow |
| ○ Construction Zone Drums | ○ Construction Zone Drums |
| ○ Video Detection Zone | ○ Video Detection Zone |
| ○ Construction Zone | ○ Construction Zone |
| N/A Guardrail | ○ Guardrail |
| ○ "YIELD" Sign (R1-2) | ○ "YIELD" Sign (R1-2) |
| ○ No Right Turn Sign (R3-1) | ○ No Right Turn Sign (R3-1) |
| ○ No Left Turn Sign (R3-2) | ○ No Left Turn Sign (R3-2) |

Signal Upgrade - Temp Design 1 (TMP Phase I)



US 158/NC 14 at US 29 Northbound Ramps	
Division 7	Rockingham County Reidsville
PLAN DATE: Jan 2023	REVIEWED BY: H.M. Surti
PREPARED BY: M.D. Tindal	REVIEWED BY:
REVISIONS	INIT. DATE

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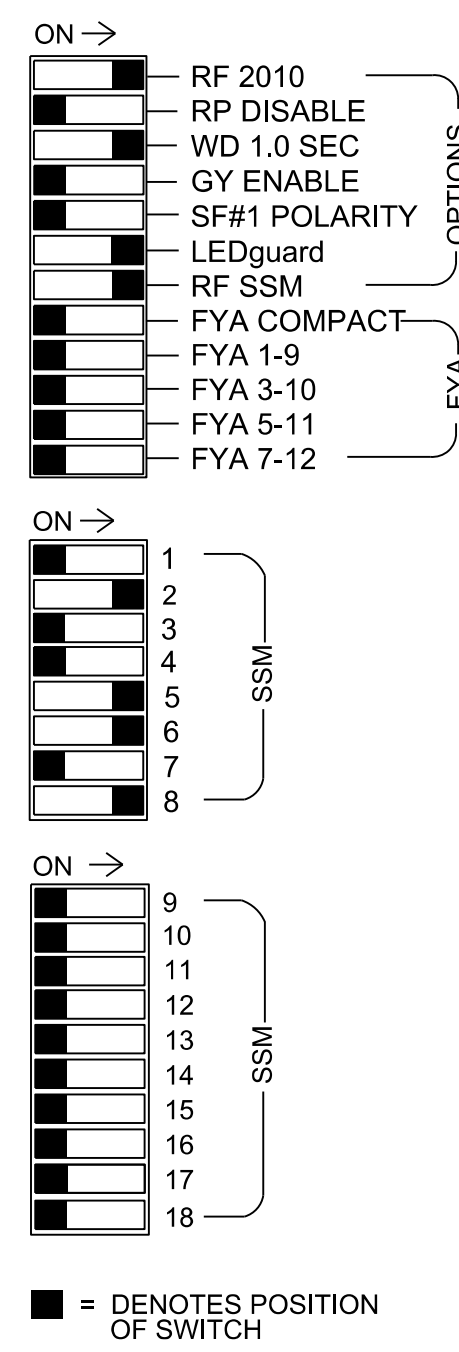
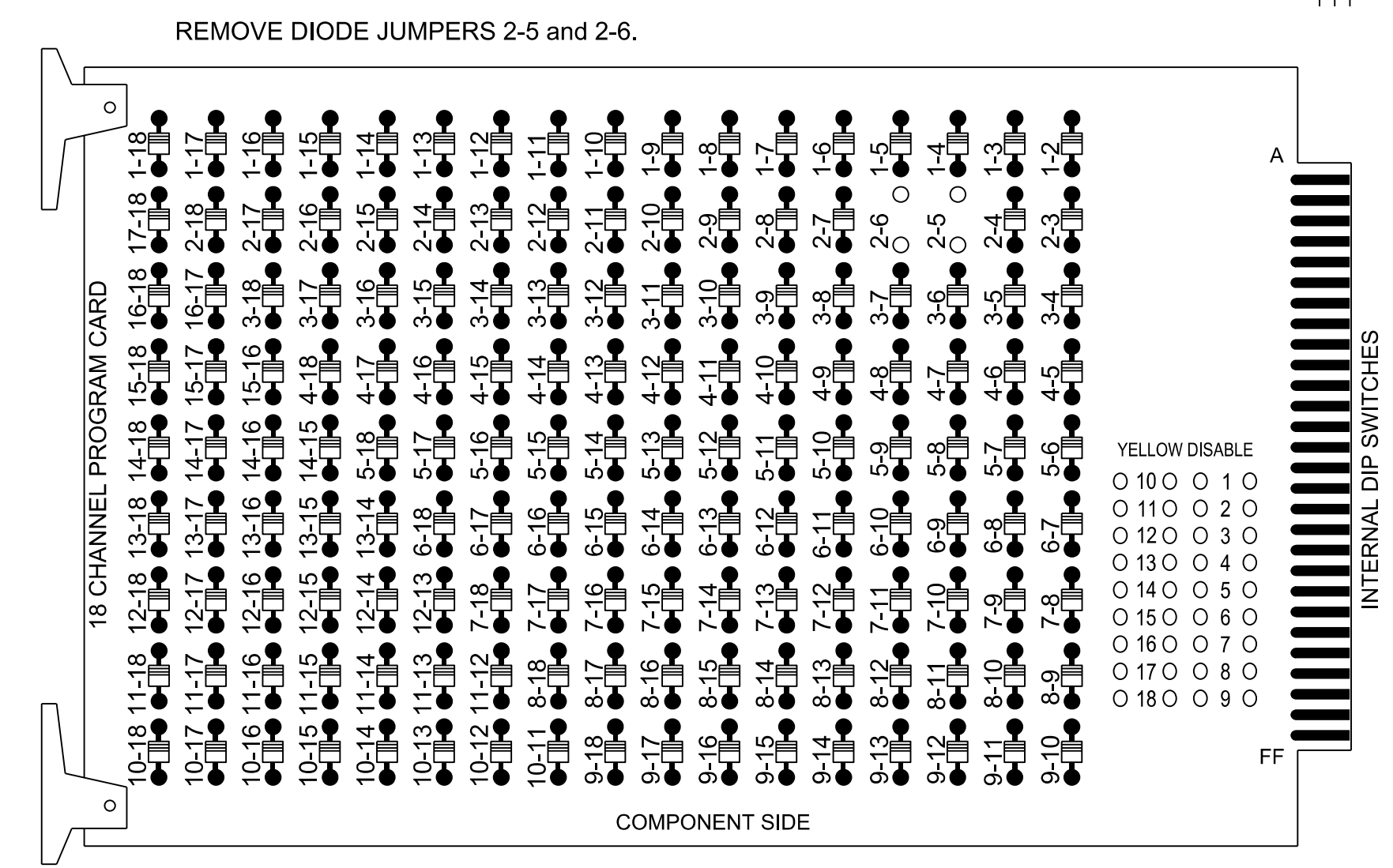


DocuSigned by: Hemang M. Surti 3/10/2023

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18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that the 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.

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 plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....BASE
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S2, S7, S8, S11
 Phases Used.....2, 5, 6, 8
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....NOT USED
 Overlap "4".....NOT USED

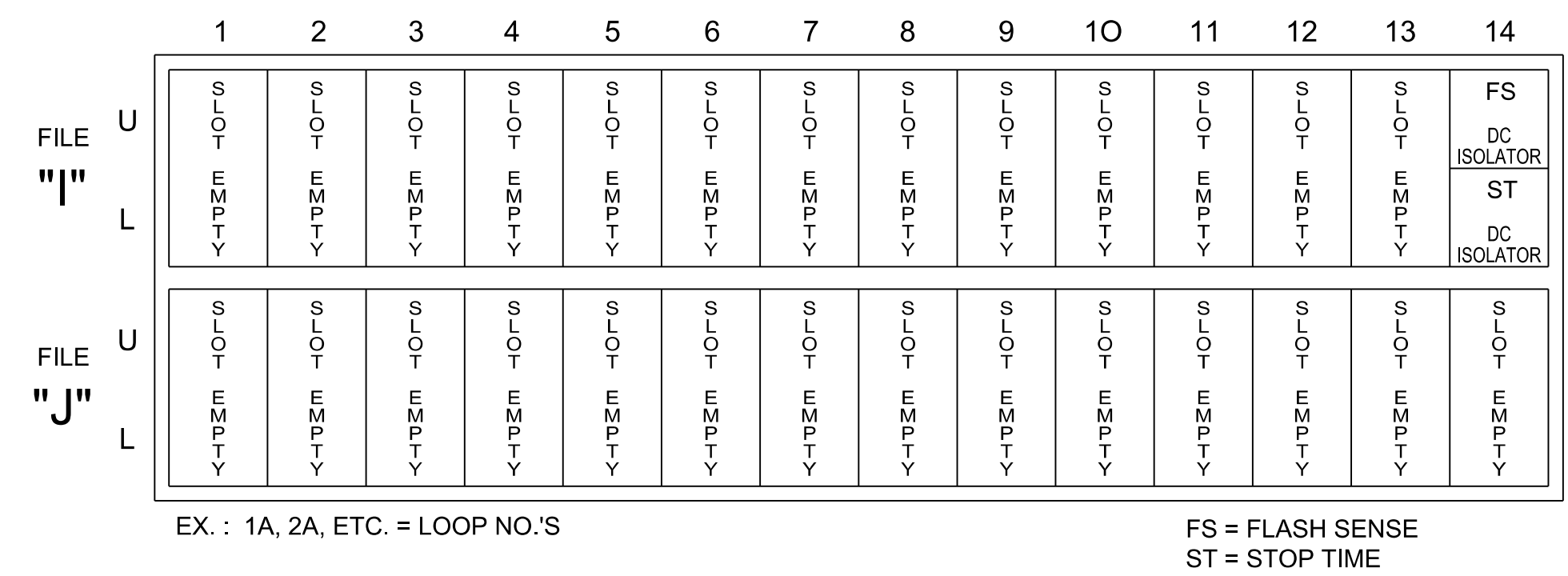
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	21	61	62,63	NU	NU	81,82	NU	NU	NU	NU	NU	NU
RED		128	128				*	134	134			107						
YELLOW		129	129					135	135			108						
GREEN		130						136				109						
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW		130					133	136										

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

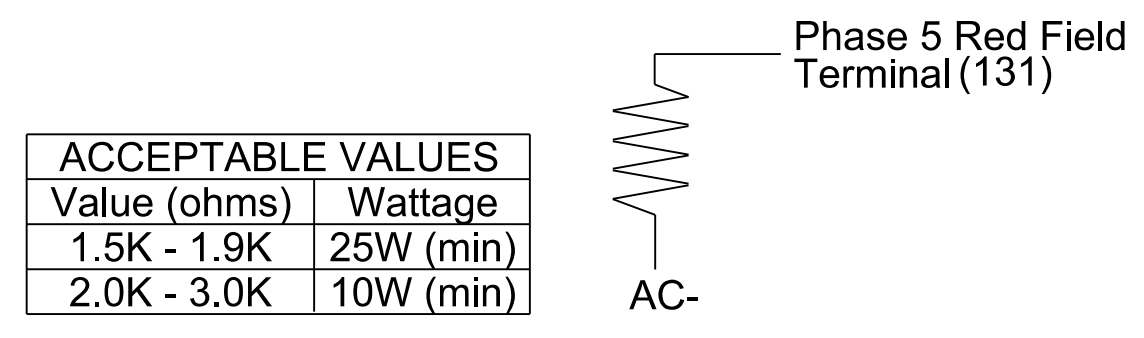


SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1948T1
 DESIGNED: Jan 2023
 SEALED: 3/10/2023
 REVISED:

Temporary Design 1 (TMP Phase I)
 Electrical Detail

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

US 158/ NC 14
 at
 US 29 Northbound Ramps

Division 7 Rockingham County Reidsville

PLAN DATE: January 2023 REVIEWED BY: H M Surti

PREPARED BY: A Ravipati REVIEWED BY:

REVISIONS	INIT.	DATE

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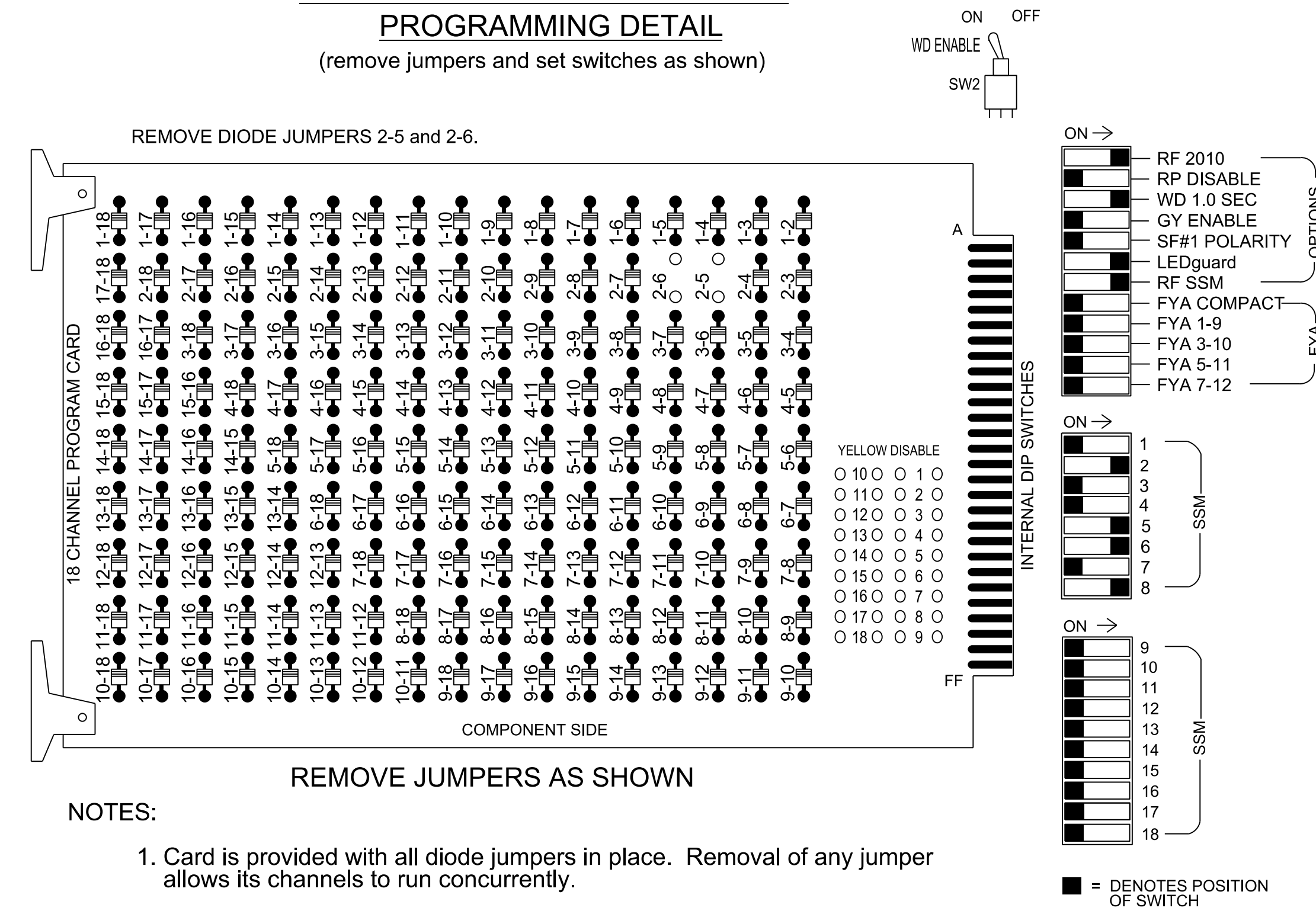
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 Hemang M. Surti 3/10/2023
 SIG. INVENTORY NO. 07-1948T1

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 5438 Wade Park Boulevard
 Suite 200, Raleigh, NC 27607
 Phone: 919-461-1100

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18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

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- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
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 Overlap "2".....NOT USED
 Overlap "3".....NOT USED
 Overlap "4".....NOT USED

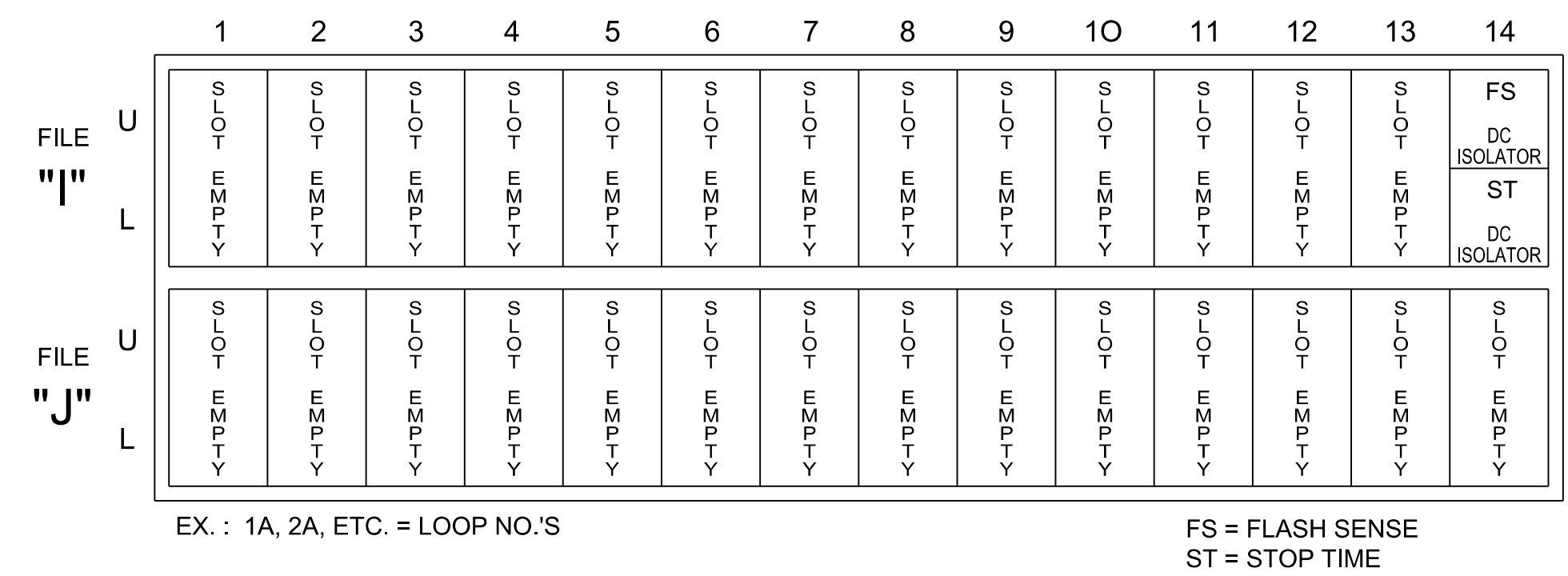
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	21	61	62	NU	NU	81,82	NU	NU	NU	NU	NU	NU
RED		128	128				*	134	134			107						
YELLOW		129	129						135	135		108						
GREEN		130								136		109						
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW			130				133	136										

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

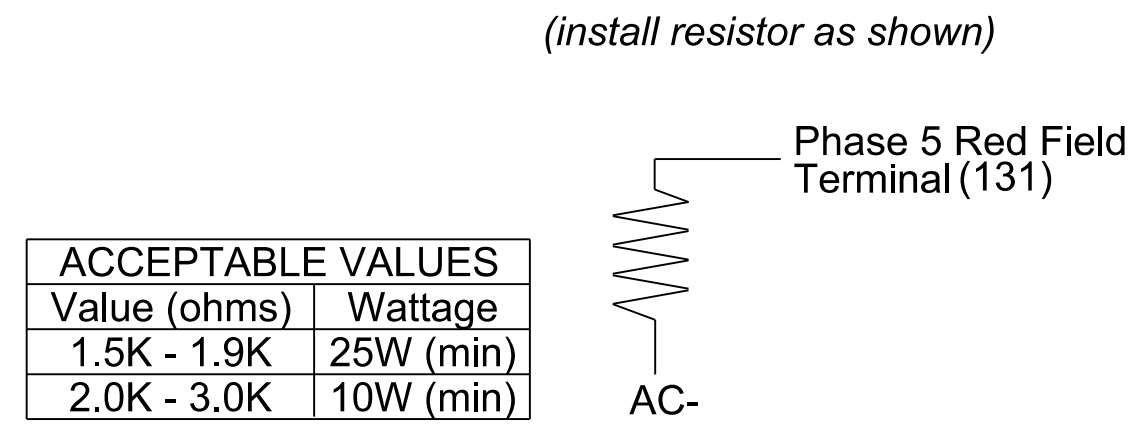


SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1948T2
 DESIGNED: Jan 2023
 SEALED: 3/10/2023
 REVISED:

Temporary Design 2 (TMP Phase II)
 Electrical Detail

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 158/ NC 14
 at
 US 29 Northbound Ramps

Division 7 Rockingham County Reidsville

PLAN DATE: January 2023 REVIEWED BY: H M Surti

PREPARED BY: A Ravipti REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

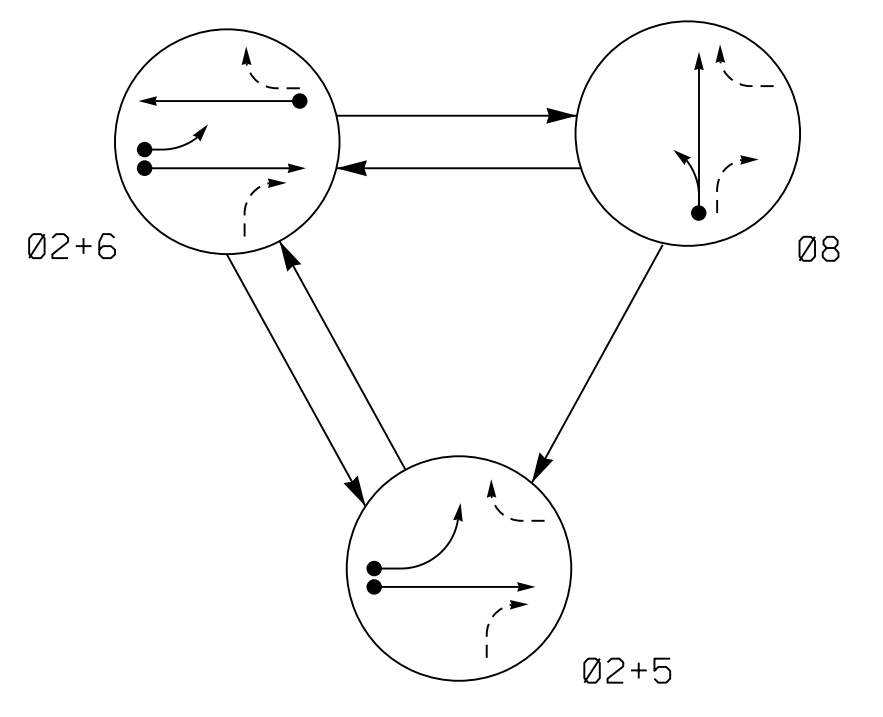
SEAL

DocuSigned by:
 Hwang M. Surti 3/10/2023
 SIG. INVENTORY NO. 07-1948T2

NC Firm License No.: F-0342
 5438 Wade Park Boulevard
 Suite 200, Raleigh, NC 27607
 Phone: 919-461-1100

3/10/2023
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PHASING DIAGRAM



SIGNAL FACE	PHASE			
	Ø 2 + 5	Ø 2 + 6	Ø 8	FLASH
21	G	R	Y	
22	↑	↑	R	Y
51	←	←	←	←
61	R	↑	R	Y
62	R	G	R	Y
81, 82	R	R	G	R

MAXTIME DETECTOR INSTALLATION CHART														
DETECTOR					PROGRAMMING									
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND INITIAL	ADDED INITIAL	QUEUE	CALL	PASSAGE 2	SYSTEM LOOP	NEW CARD
2A*	6X6	300	*	*	2	-	-	X	X	-	X	-	-	*
5A*	6X40	0	*	*	5	15	-	X	-	-	X	-	-	*
6A*	6X6	300	*	*	6	-	-	X	X	-	X	-	-	*
8A*	6X40	0	*	*	8	-	-	X	-	-	X	-	-	*

* Video Detection Zone

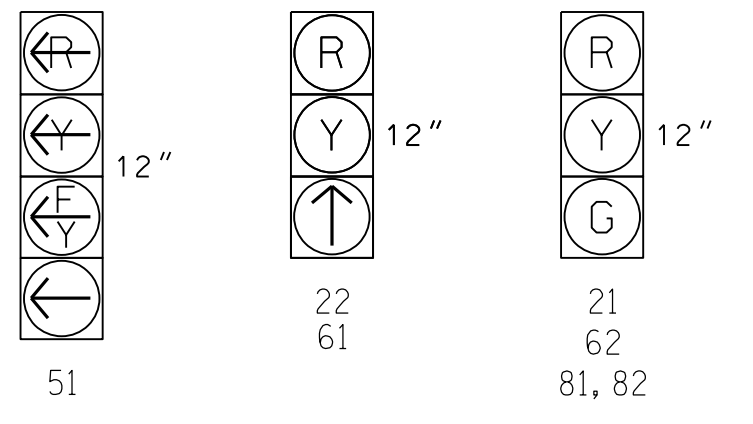
3 Phase Fully Actuated (Isolated)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Reposition existing signal heads numbered 22, 61, 62, 81, and 82.
- Reposition existing sign 6.
- Install backplates for signal heads numbered 21 and 51.
- Existing signal heads numbered 22, 61, and 62 have backplates.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

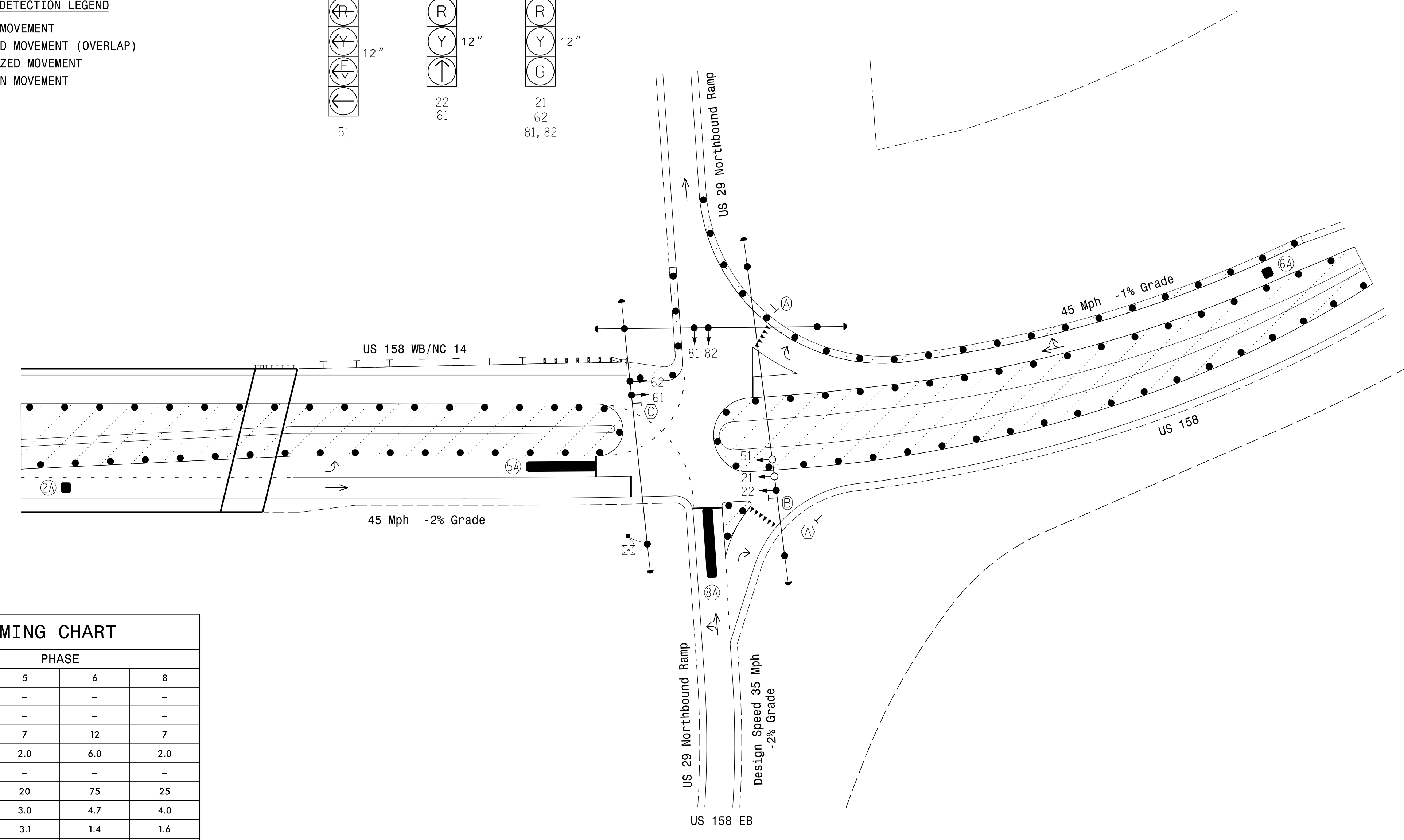
PHASING DIAGRAM DETECTION LEGEND

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



SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	5	6	8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Passage 2 *	3.0	-	-	-
Max 1 *	75	20	75	25
Yellow Change	4.7	3.0	4.7	4.0
Red Clear	1.4	3.1	1.4	1.6
Added Initial *	2.5	-	2.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	20	-	20	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	-	X	-	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	-	-	-

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

LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| ○ Traffic Signal Head | ● N/A |
| ○ Modified Signal Head | ○ N/A |
| ○ Sign | ○ N/A |
| ○ Pedestrian Signal Head With Push Button & Sign | ○ N/A |
| ○ Signal Pole with Guy | ○ N/A |
| ○ Signal Pole with Sidewalk Guy | ○ N/A |
| ○ Inductive Loop Detector | ○ N/A |
| ○ Controller & Cabinet | ○ N/A |
| ○ Junction Box | ○ N/A |
| ○ 2-in Underground Conduit | ○ N/A |
| ○ Right of Way | ○ N/A |
| ○ Directional Arrow | ○ N/A |
| ○ Construction Zone Drums | ○ N/A |
| ○ Video Detection Zone | ○ N/A |
| ○ Construction Zone | ○ N/A |
| ○ Guardrail | ○ N/A |
| ○ "YIELD" Sign (R1-2) | ○ A |
| ○ No Right Turn Sign (R3-1) | ○ B |
| ○ No U-Turn/No Left Turn Sign (R3-18) | ○ C |

Signal Upgrade - Temp Design 3 (TMP Phase III)

AECOM
 NC Firm License No.: F-0342
 5438 Wade Park Boulevard
 Suite 200 Raleigh, NC 27607
 Phone: 919-461-1100

Prepared for the Offices of:
 TRANSPORTATION MOBILITY AND SAFETY DIVISION
 DEPARTMENT OF TRANSPORTATION
 STATE OF NORTH CAROLINA
 Signal Design Section

US 158/NC 14 at US 29 Northbound Ramps
 Division 7 Rockingham County Reidsville
 PLAN DATE: Jan 2023 REVIEWED BY: H.M. Surti
 PREPARED BY: M.D. Tindal REVIEWED BY:
 REVISIONS: _____ INIT. DATE

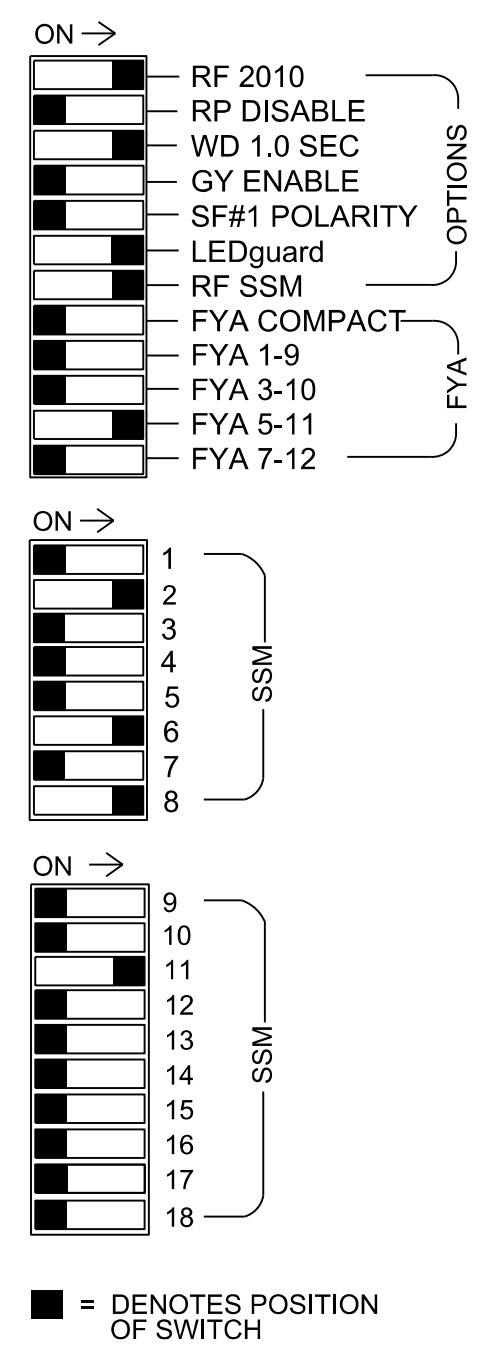
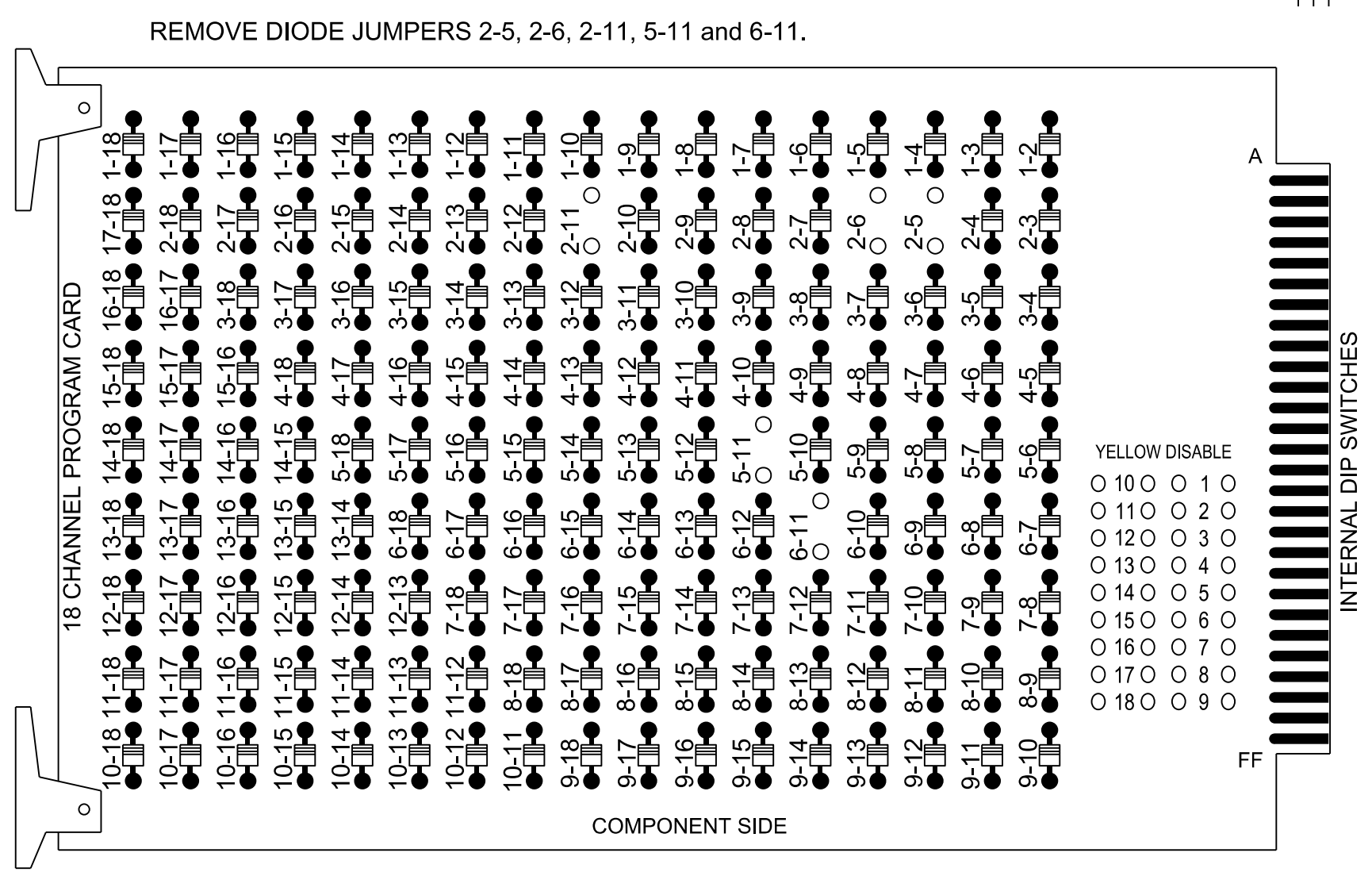
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 HEMANG M. SURTI
 PROFESSIONAL ENGINEER
 034481
 3/10/2023
 STATION: 07-1948T3

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 mchael.l.coveaugh

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that the 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.

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 plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....BASE
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S2, S7, S8, S11, AUX S4
 Phases Used.....2, 5, 6, 8
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....NOT USED

*See overlap programming detail on this sheet

SIGNAL HEAD HOOK-UP CHART

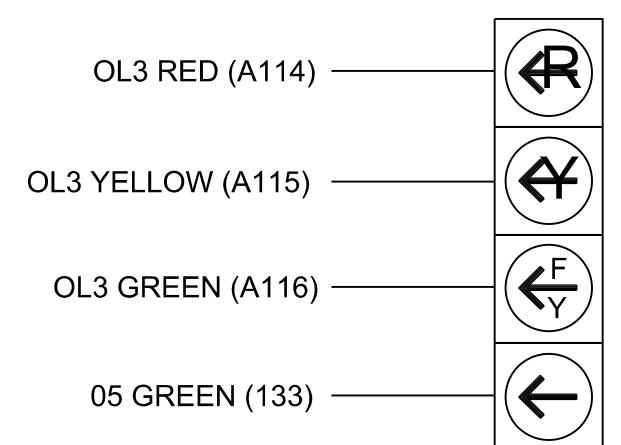
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	51	61	62	NU	NU	81,82	NU	NU	NU	51	NU	NU	
RED		128	128					134	134			107							
YELLOW		129	129				*	135	135			108							
GREEN		130							136			109							
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW			130						133	136									

NU = Not Used

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

FYA SIGNAL WIRING DETAIL

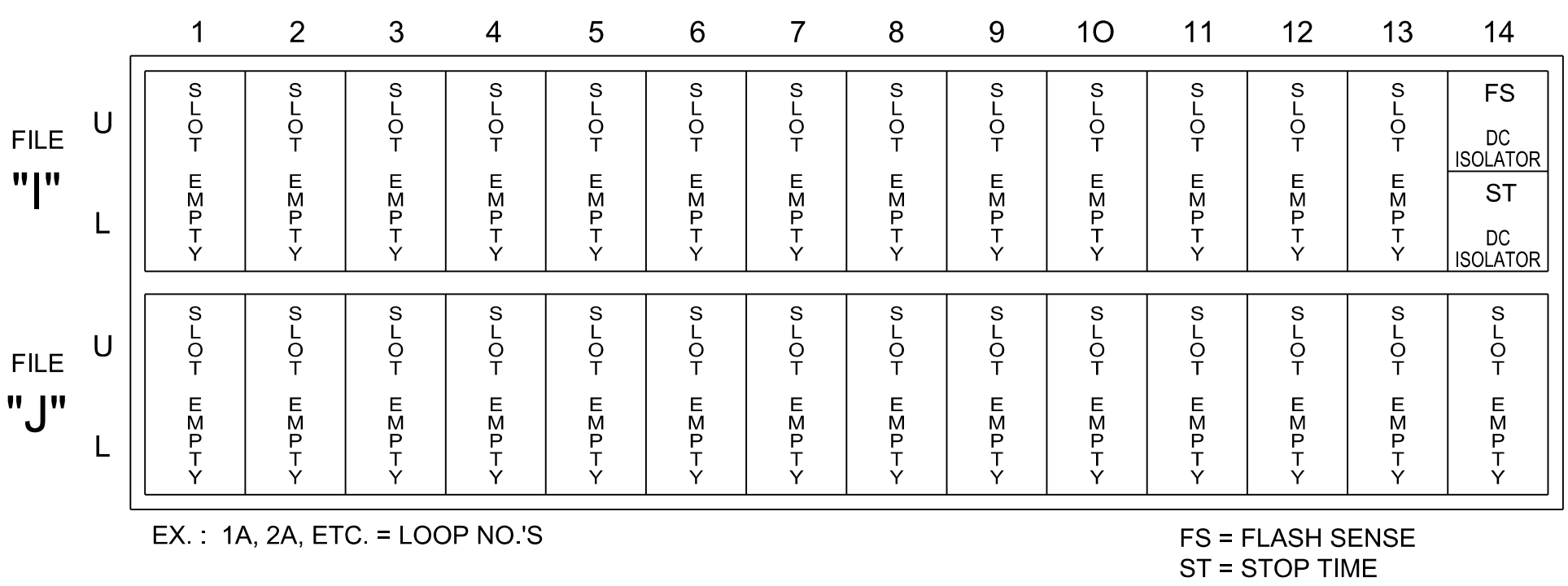
(wire signal head as shown)



51

INPUT FILE POSITION LAYOUT

(front view)

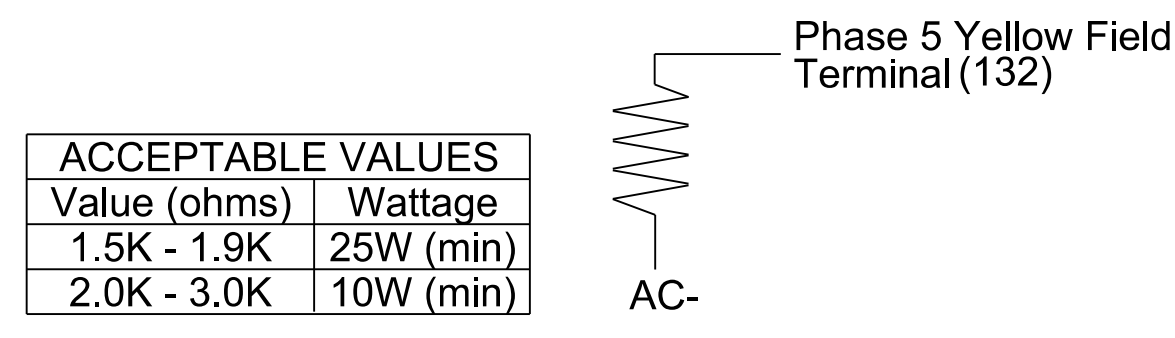


SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1948T3
 DESIGNED: Jan 2023
 SEALED: 3/10/2023
 REVISED:



Temporary Design 3 (TMP Phase III)
 Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

US 158/ NC 14 at US 29 Northbound Ramps

Division 7 Rockingham County Reidsville

PLAN DATE: January 2023 REVIEWED BY: H M Surti

PREPARED BY: A Ravipati REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: Arunang M. Surti 3/10/2023

SIG. INVENTORY NO. 07-1948T3

3/10/2023 9:47:44 AM C:\Users\paw.bent\OneDrive\Documents\60581578-NCDDT-SMU\BR-0043\300-CAD\154910-CAD\70-NCDDT-TIP\FYSIGNALS\DESIGN\EE\EE1.CAD Detail 1_2022\MAXTIME_3-10-23\4071948T3-sm.e_2022XXXX.dgn

PHASING DIAGRAM

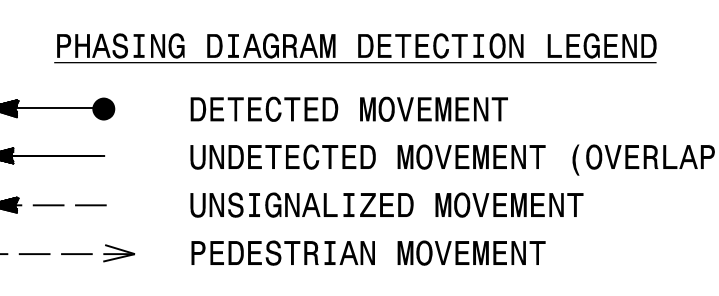
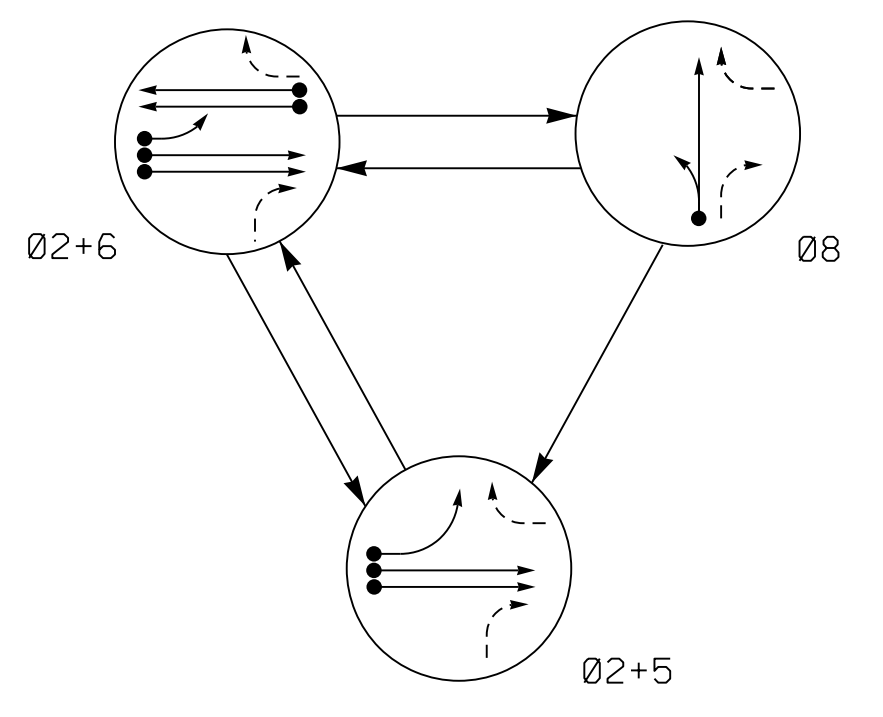
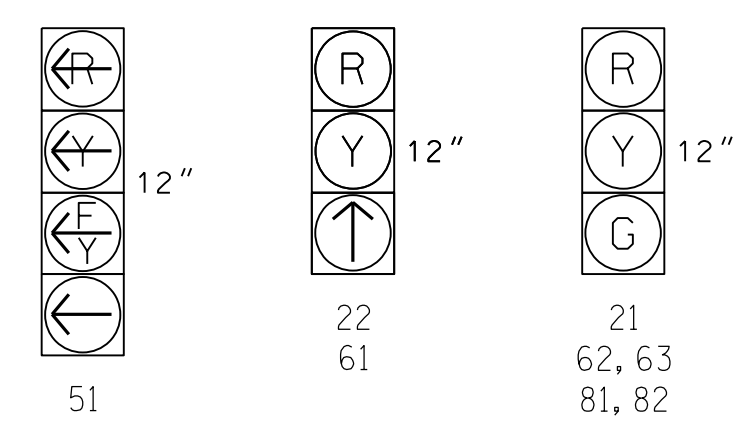


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASH
21	G	G	R	Y
22	↑	↑	R	Y
51	←	←	R	Y
61	R	↑	R	Y
62, 63	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR		PROGRAMMING												
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	QUEUE	CALL	PASSAGE 2	SYSTEM LOOP	NEW CARD
2A*	*	300	*	*	2	-	-	X	X	-	X	-	-	*
5A	6X40	0	2-4-2	X	5	15	-	X	-	-	X	X	-	X
6A	6X6	300	5	X	6	-	-	X	X	-	X	-	-	X
6B	6X6	300	5	X	6	-	-	X	X	-	X	-	-	X
8A	6X40	0	2-4-2	X	8	-	-	X	-	-	X	-	-	X

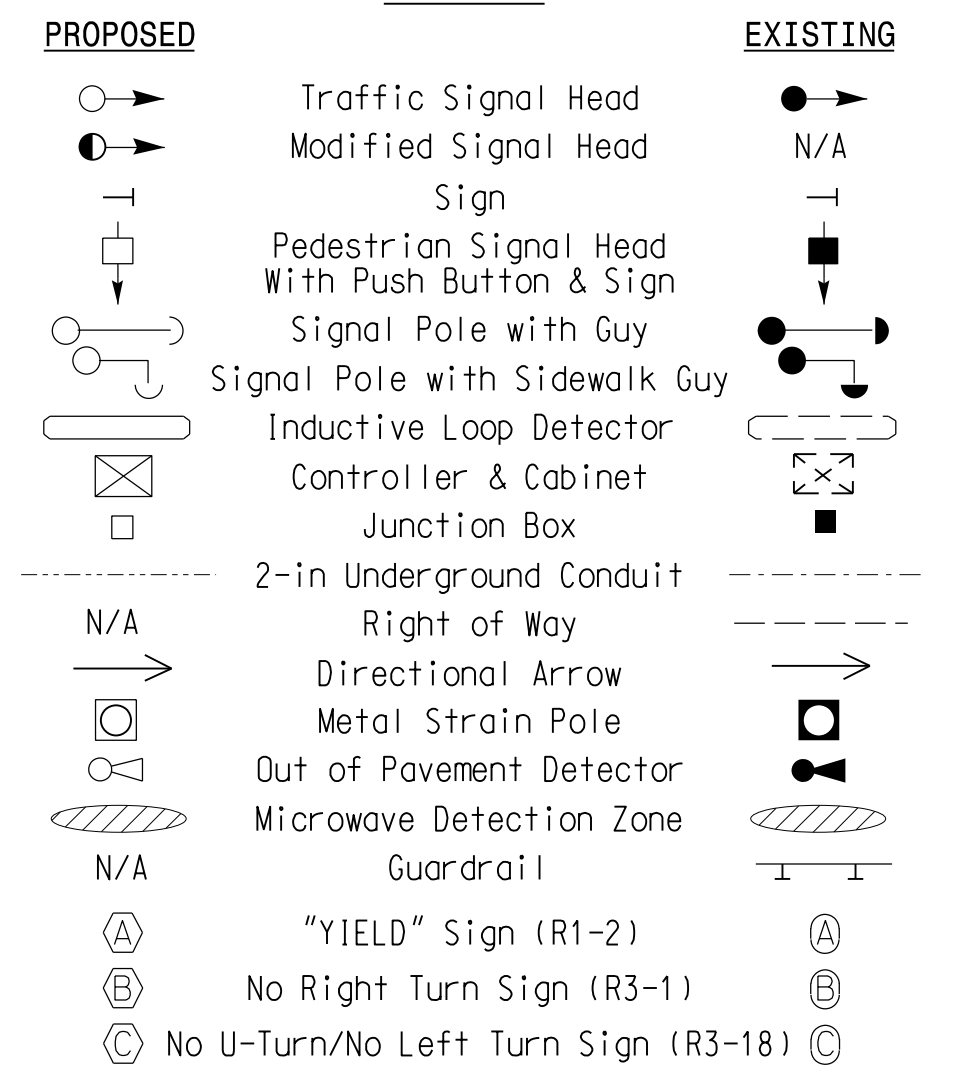
* Microwave Detection Zone

3 Phase Fully Actuated (Isolated)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Install backplates for signal heads numbered 21, 22, 51, 61, 62, and 63.
- Set all detector units to presence mode.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

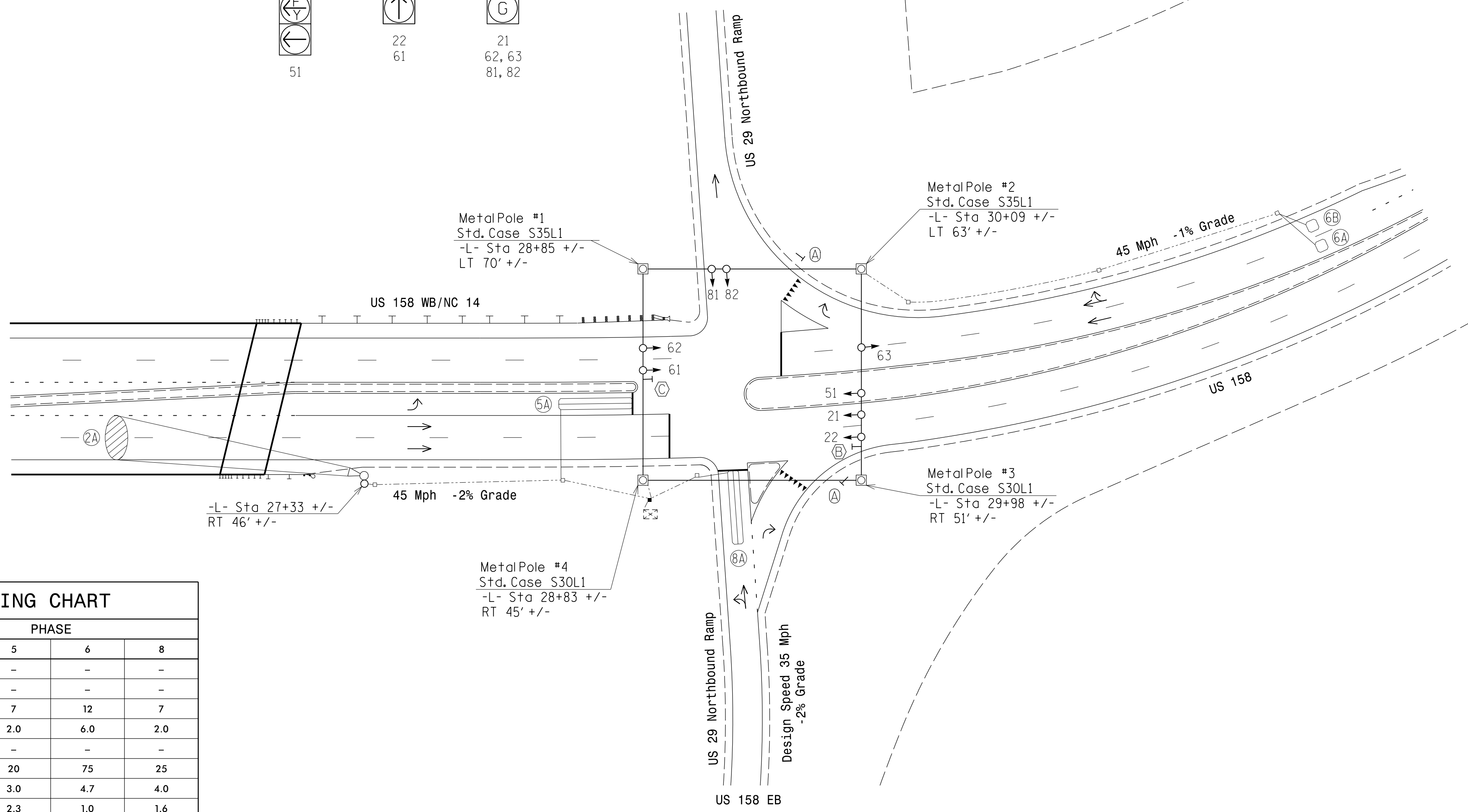
LEGEND



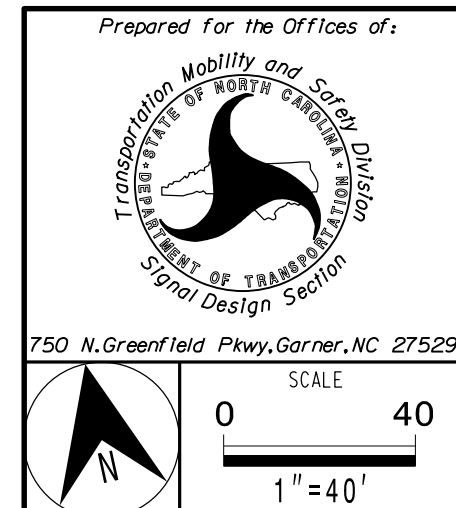
MAXTIME TIMING CHART

FEATURE	PHASE			
	2	5	6	8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Passage 2 *	3.0	-	-	-
Max 1 *	75	20	75	25
Yellow Change	4.7	3.0	4.7	4.0
Red Clear	1.0	2.3	1.0	1.6
Added Initial *	1.5	-	1.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	20	-	20	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	-	X	-	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	-	-	-

* 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 - Final Design



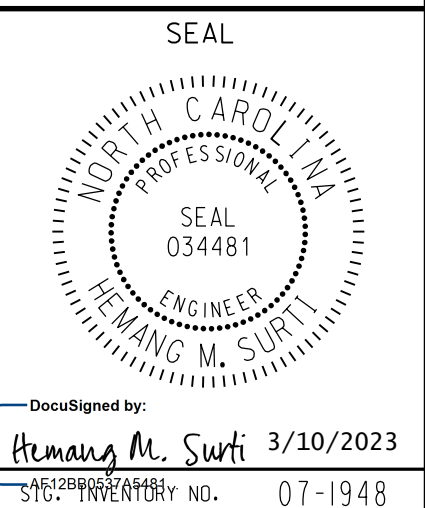
Division 7 Rockingham County Reidsville

PLAN DATE: Jan 2023 REVIEWED BY: H.M. Surti

PREPARED BY: M.D. Tindal REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

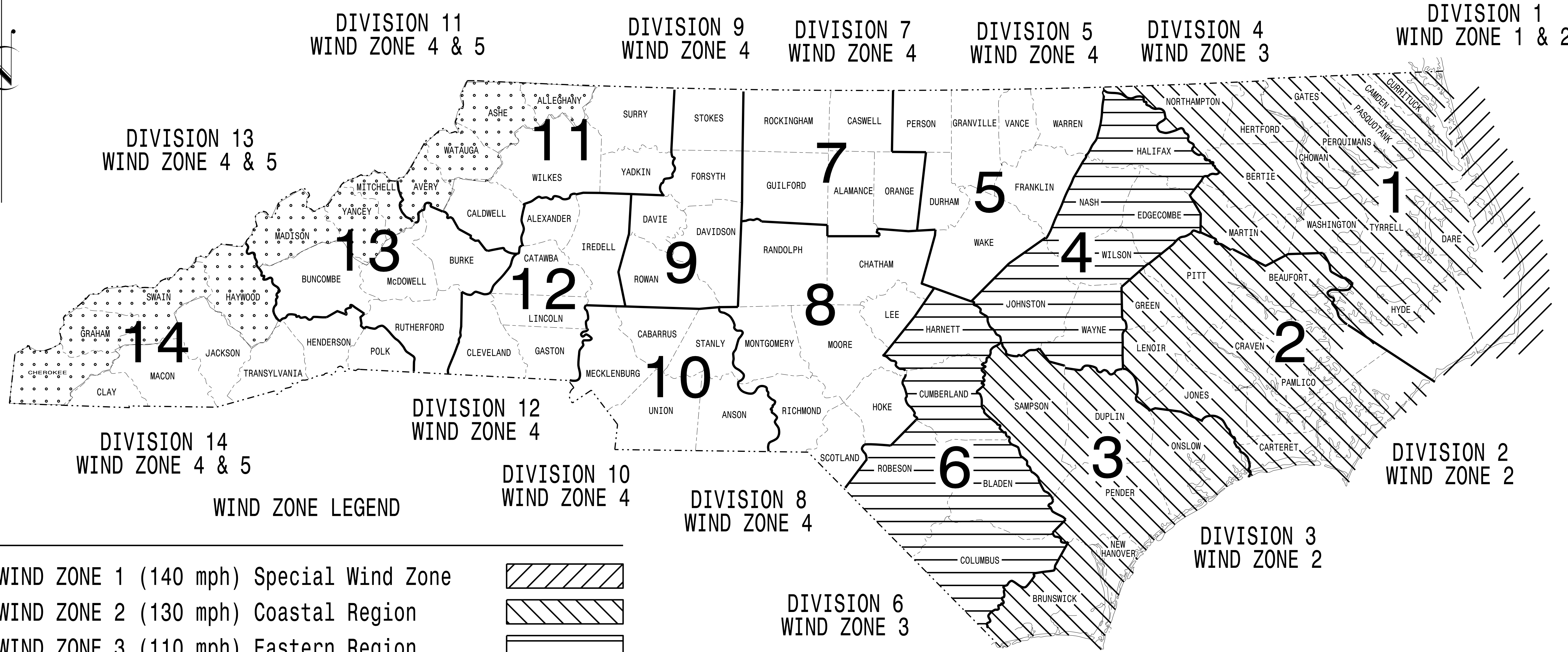


3/10/2023 10:44:00 AM C:\Users\michael.l.covenaugh\Documents\2022\2022XXXX.dgn

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO. BR-0043	SHEET NO. Sig.M1
---------------------------------	-------------------------

STANDARD DRAWINGS FOR ALL METAL POLES



WIND ZONE LEGEND

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

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

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

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

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

NC DOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

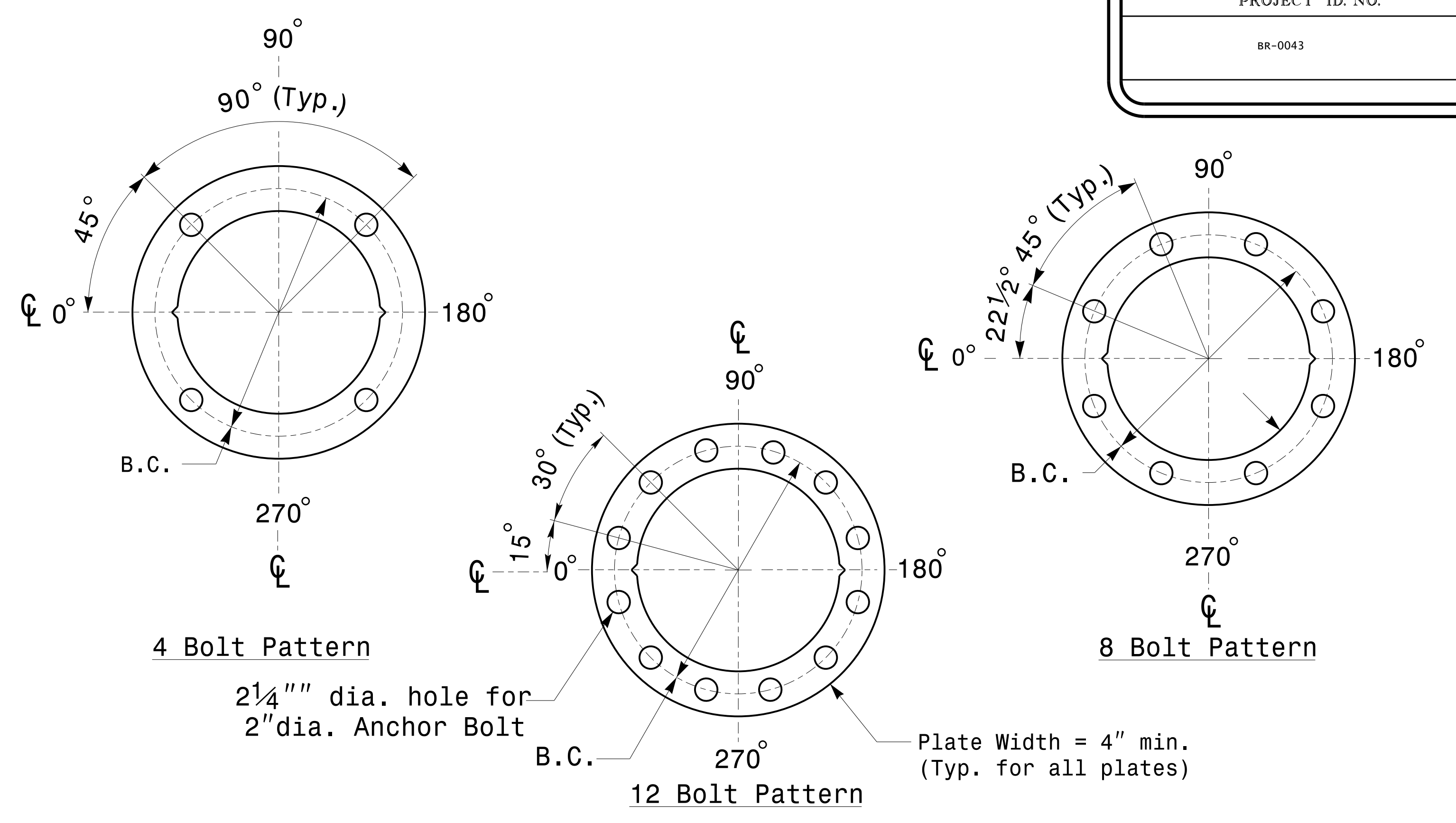
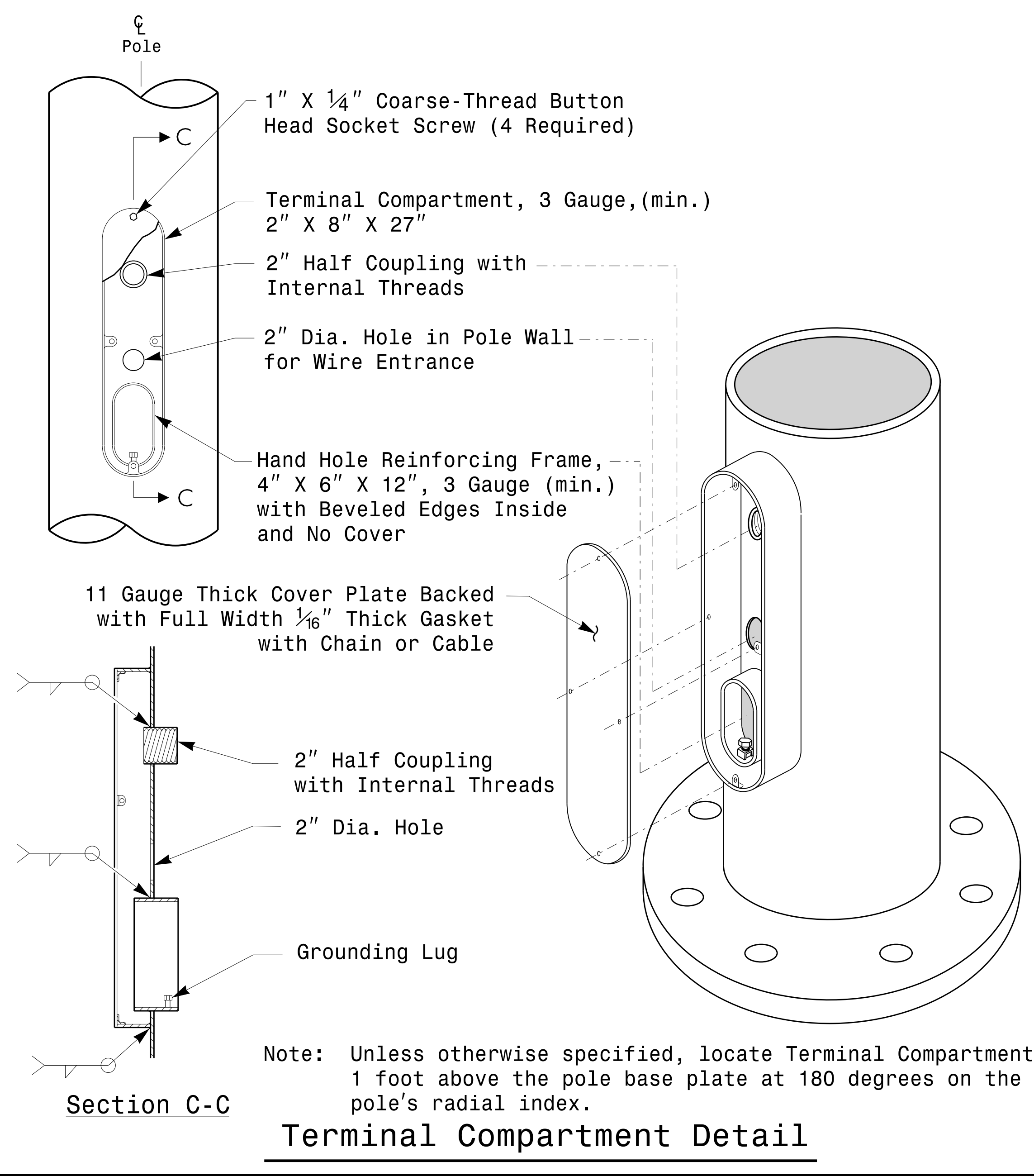
M.M. MC DIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

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
10/11/2017
DATE



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

Base Plate Template and Anchor Bolt Lock Plate Details

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

Notes:

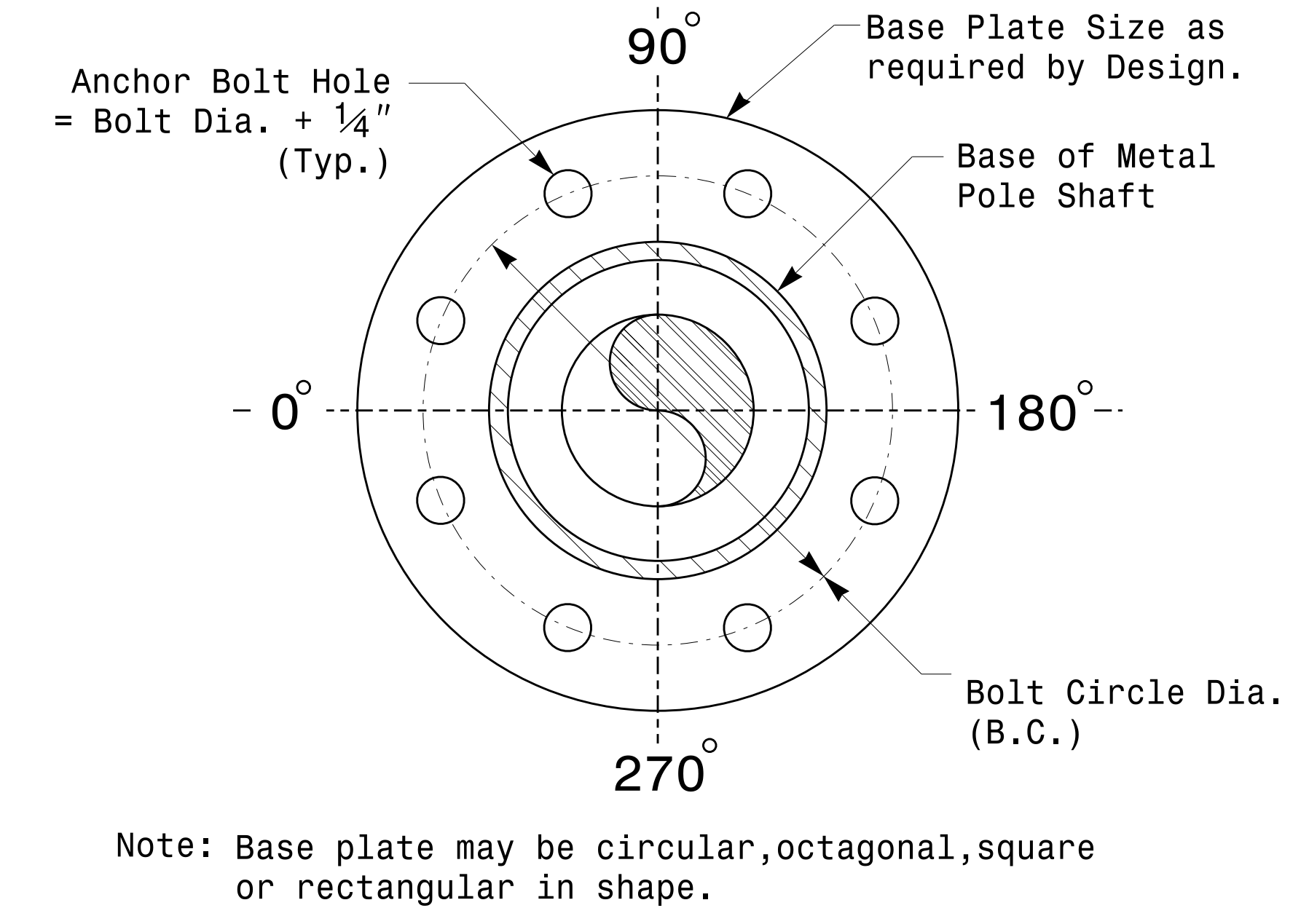
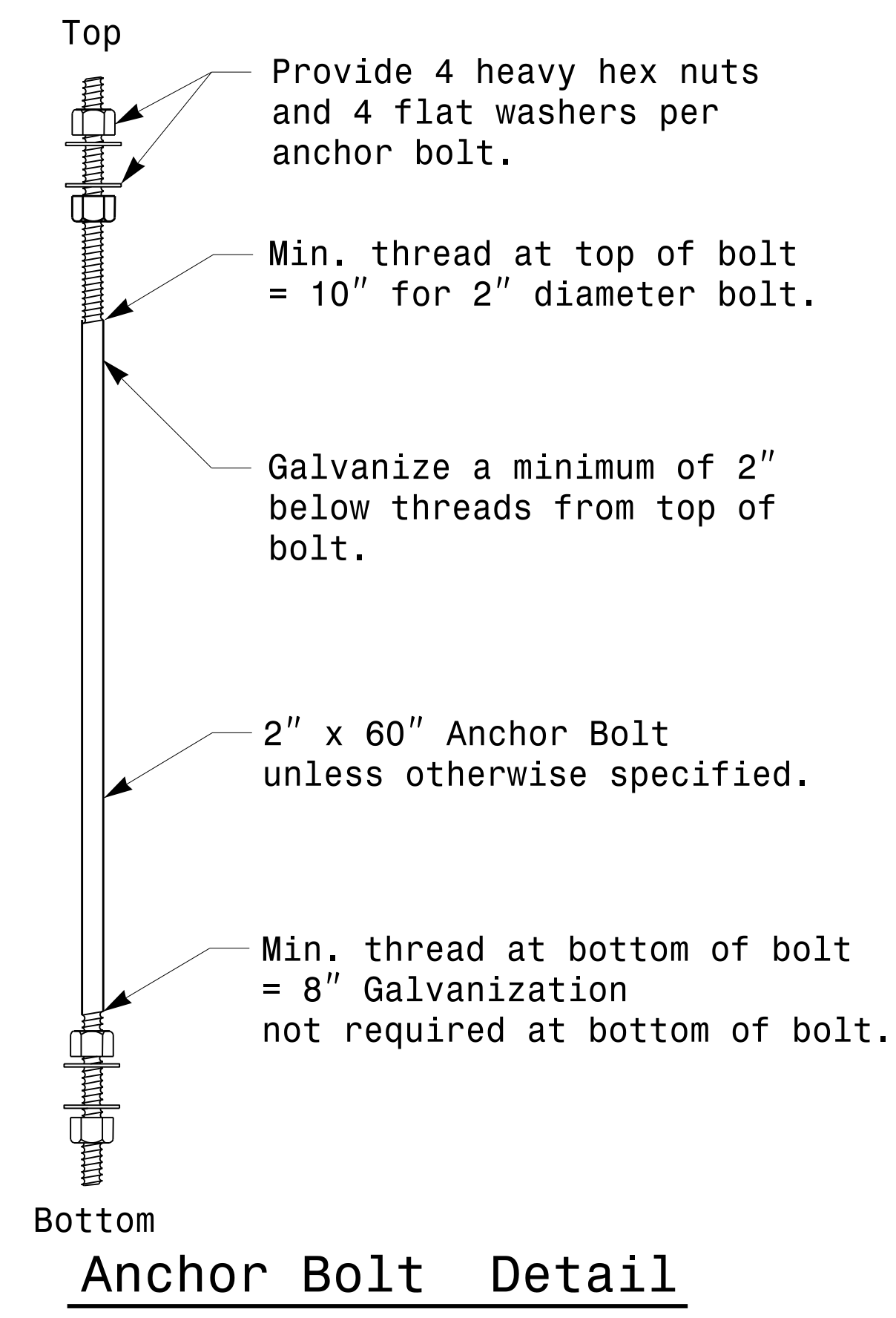
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
- 2) A.B. = Anchor Bolt
- 3) B.C. = Bolt Circle of Anchor Bolts
- 4) If Custom Design, use "NCDOT STANDARD" line for Signal Inv. Number and pole I.D. number
- 5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details

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

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

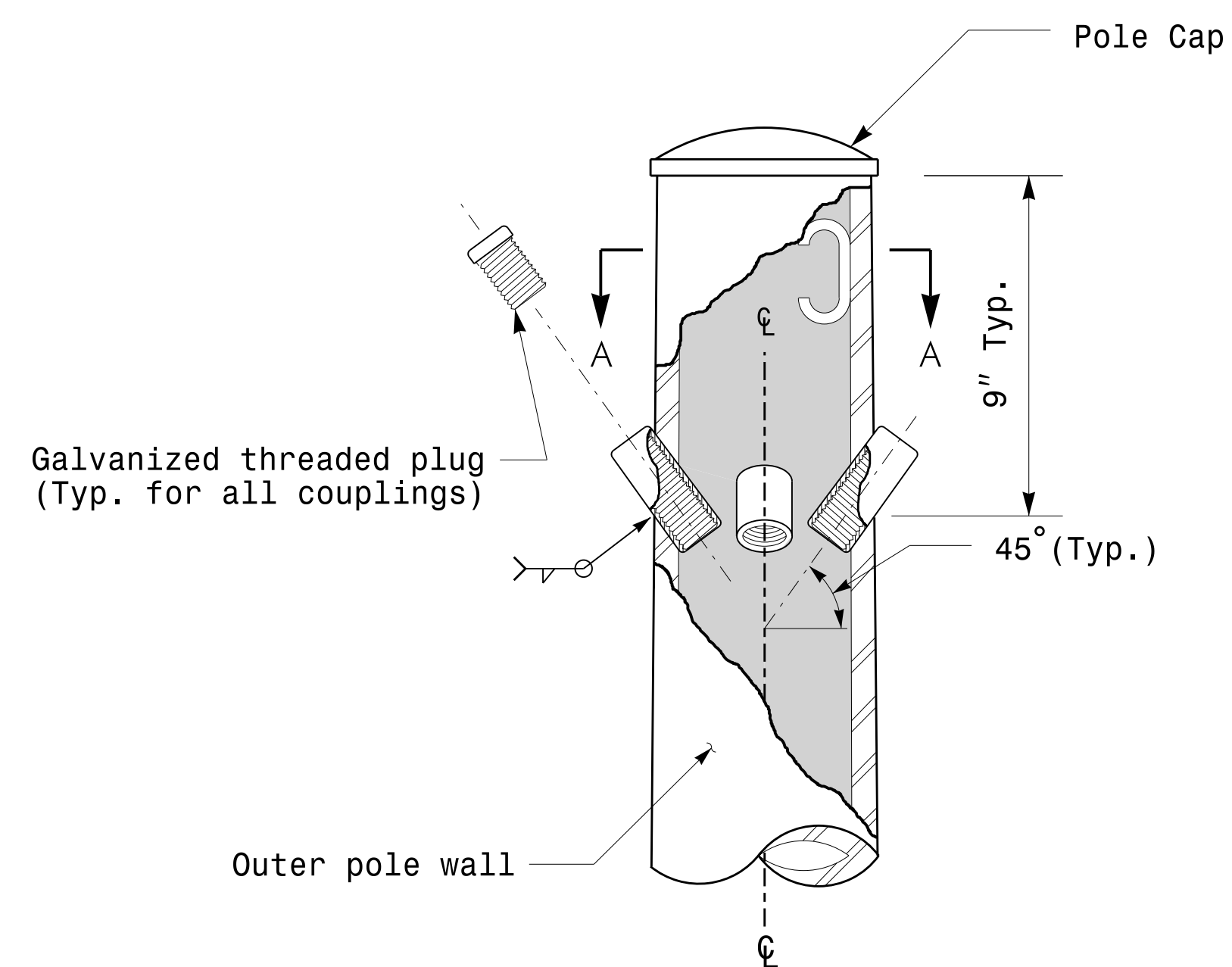
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	NCDOT SIG. INV. NO. _____
NCDOT SIG. INV. NO. _____	NCDOT POLE NO. _____



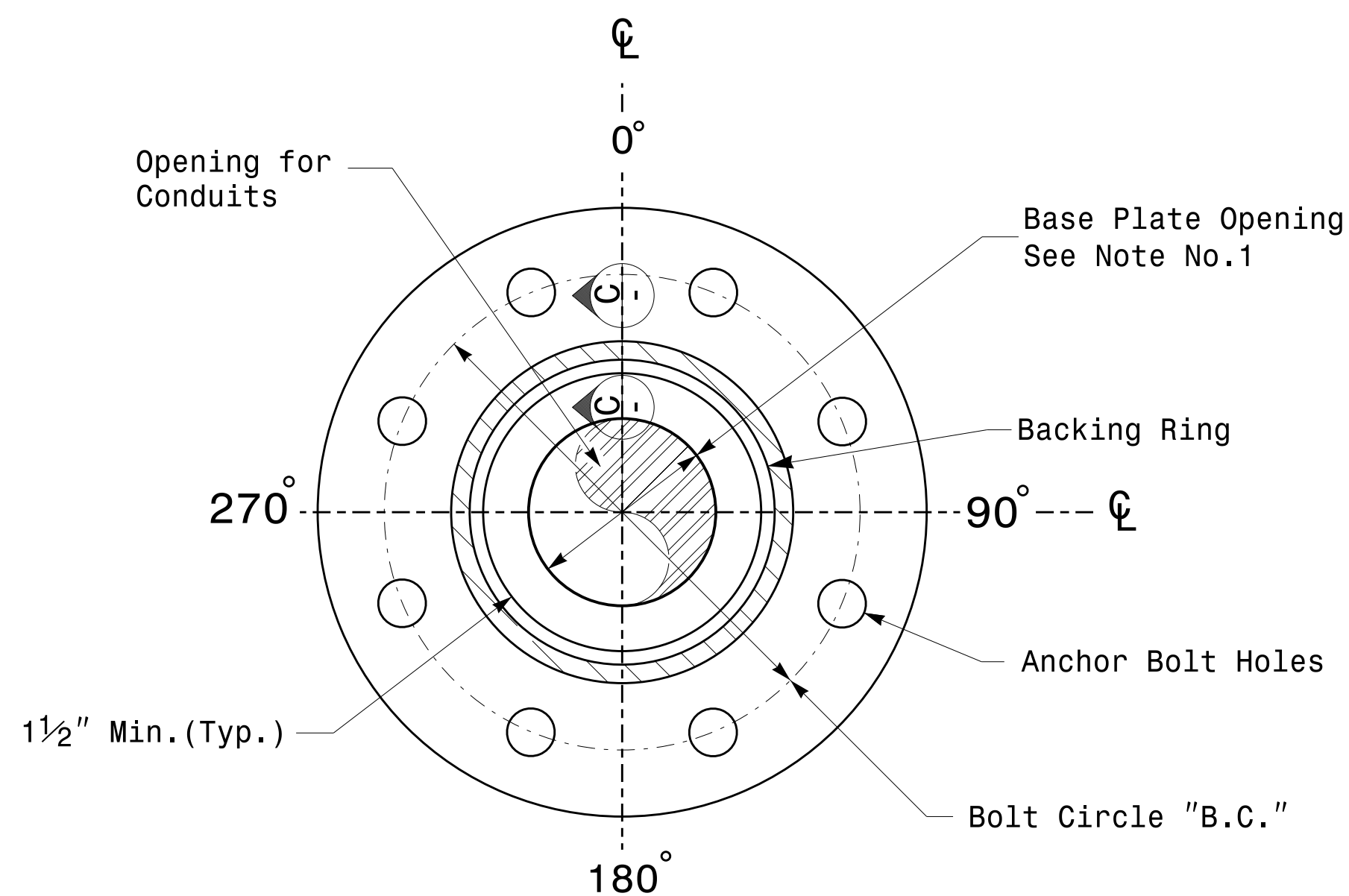
	Typical Fabrication Details For All Metal Poles	
	PLAN DATE: OCTOBER 2017 DESIGNED BY: C.F. ANDREWS	PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR
SCALE: NONE	REVISIONS:	INITI: DATE:
DocuSign by: <i>Dibesh C. Sarkar</i> 4488328 SIGNATURE	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 ENGINEER DIBESH C. SARKAR	10/11/2017 DATE

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

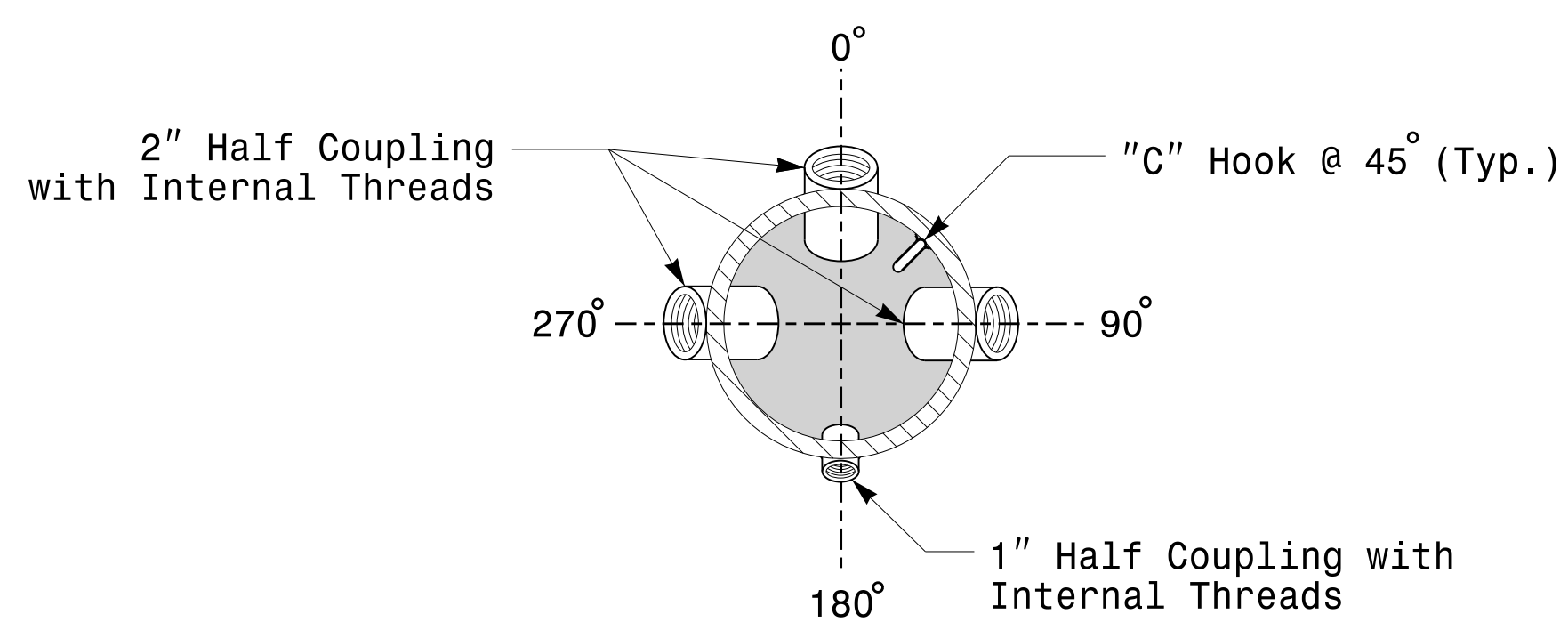
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



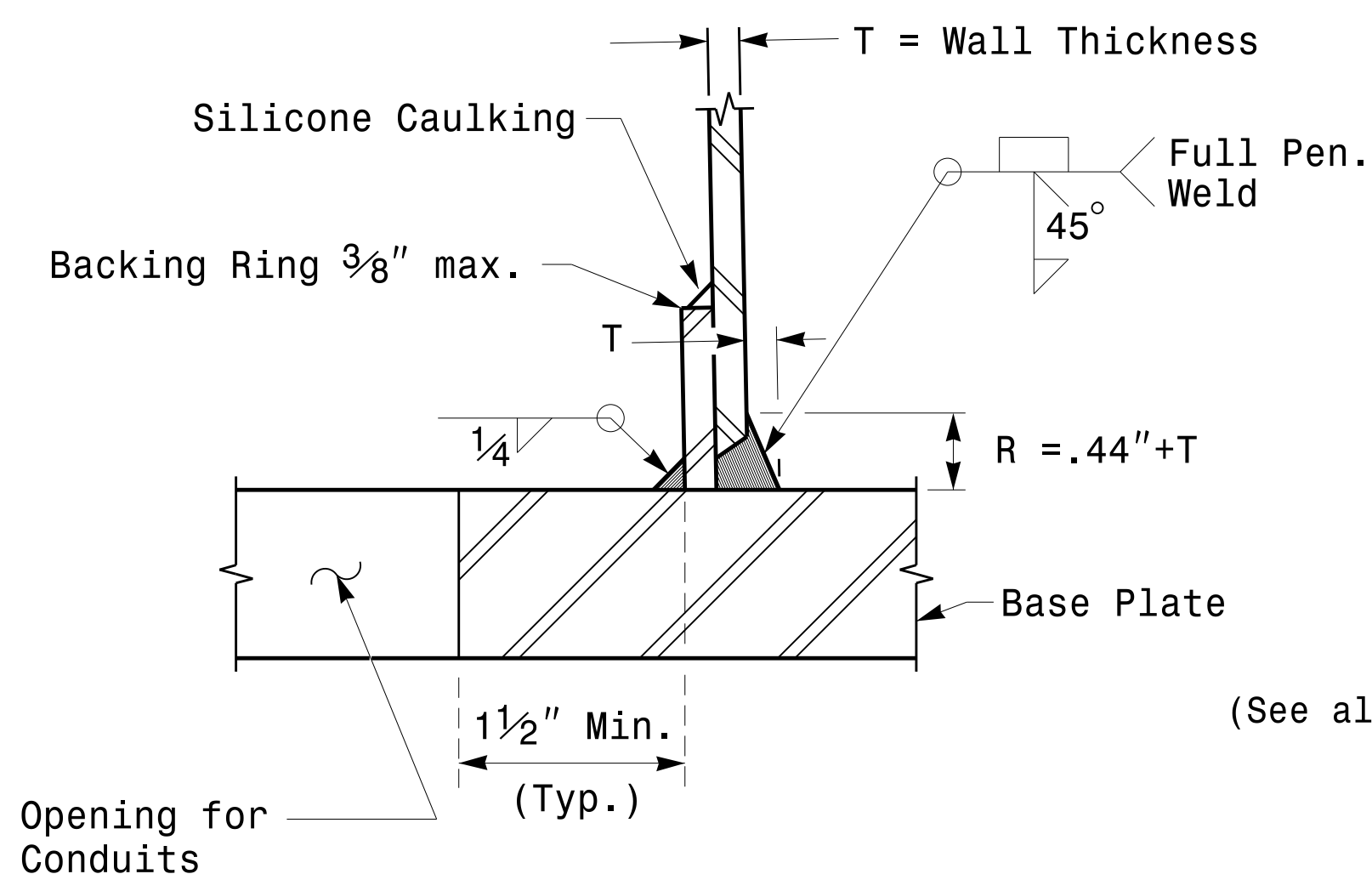
Cable Entrances at Top of Pole



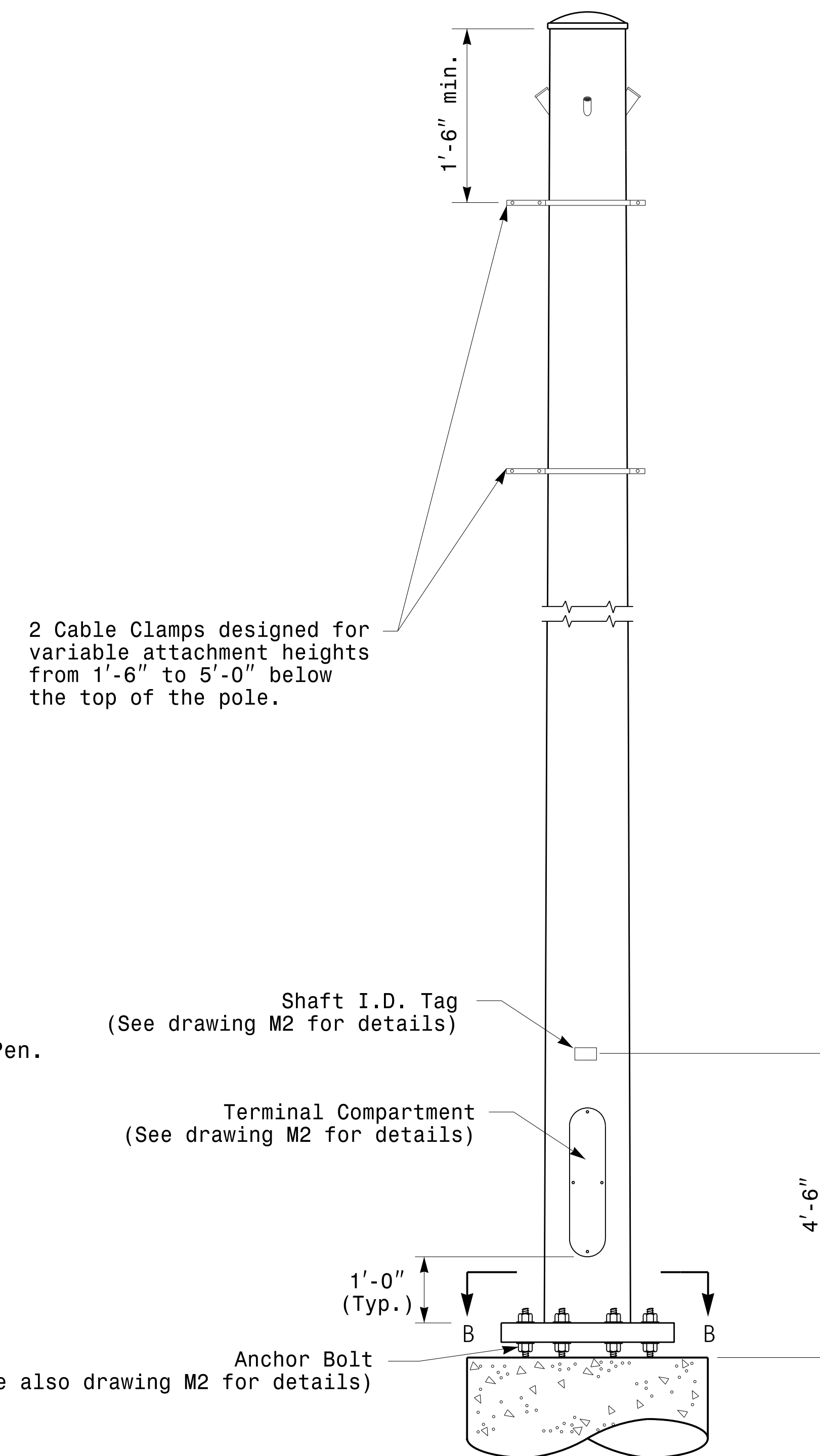
Section B-B
 Pole Base Plate Details
 (8 and 12 Bolt Pattern)



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 Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details For Strain Poles

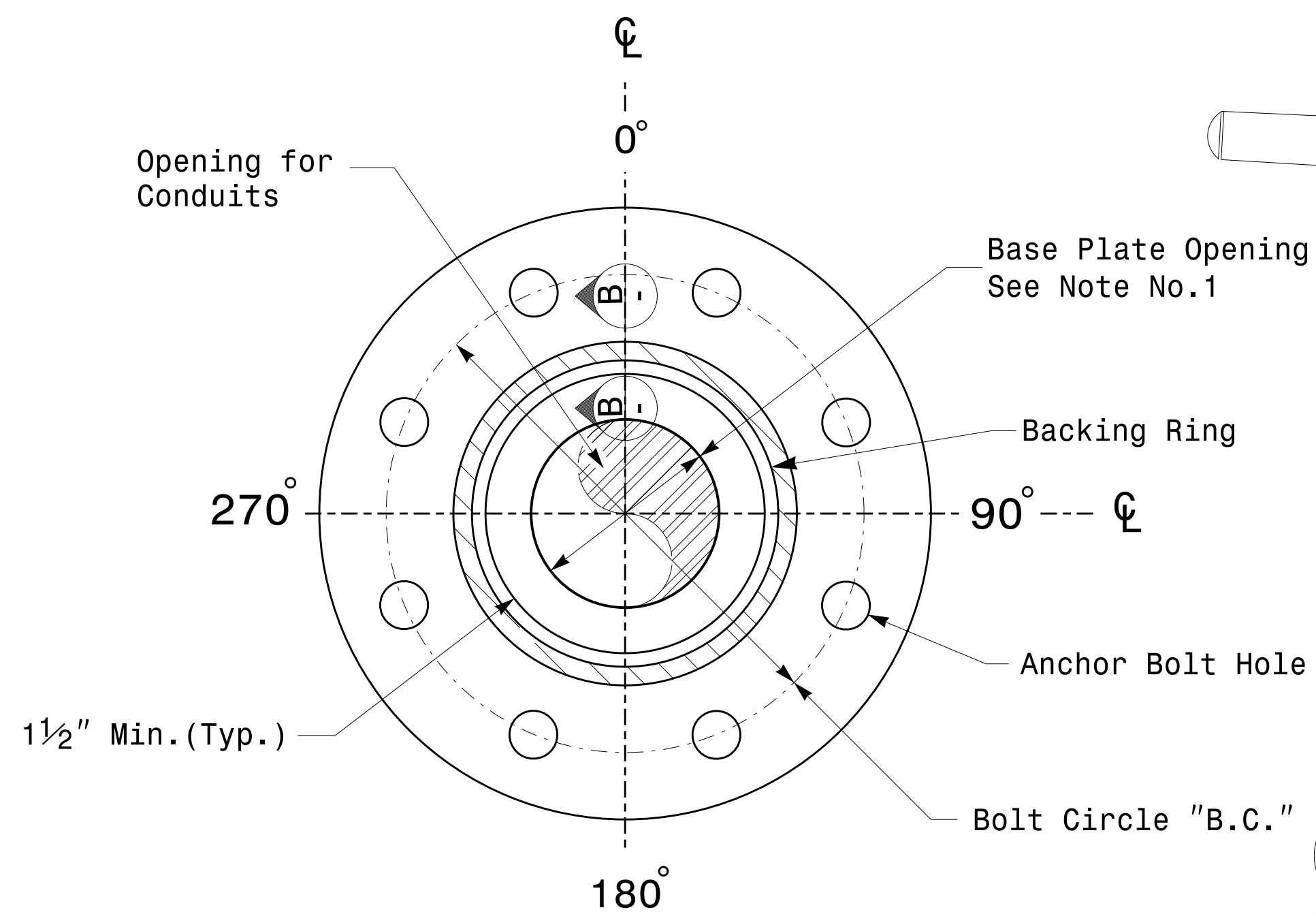
PLAN DATE: OCTOBER 2017	DESIGNED BY: K.C. DURIGON
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL

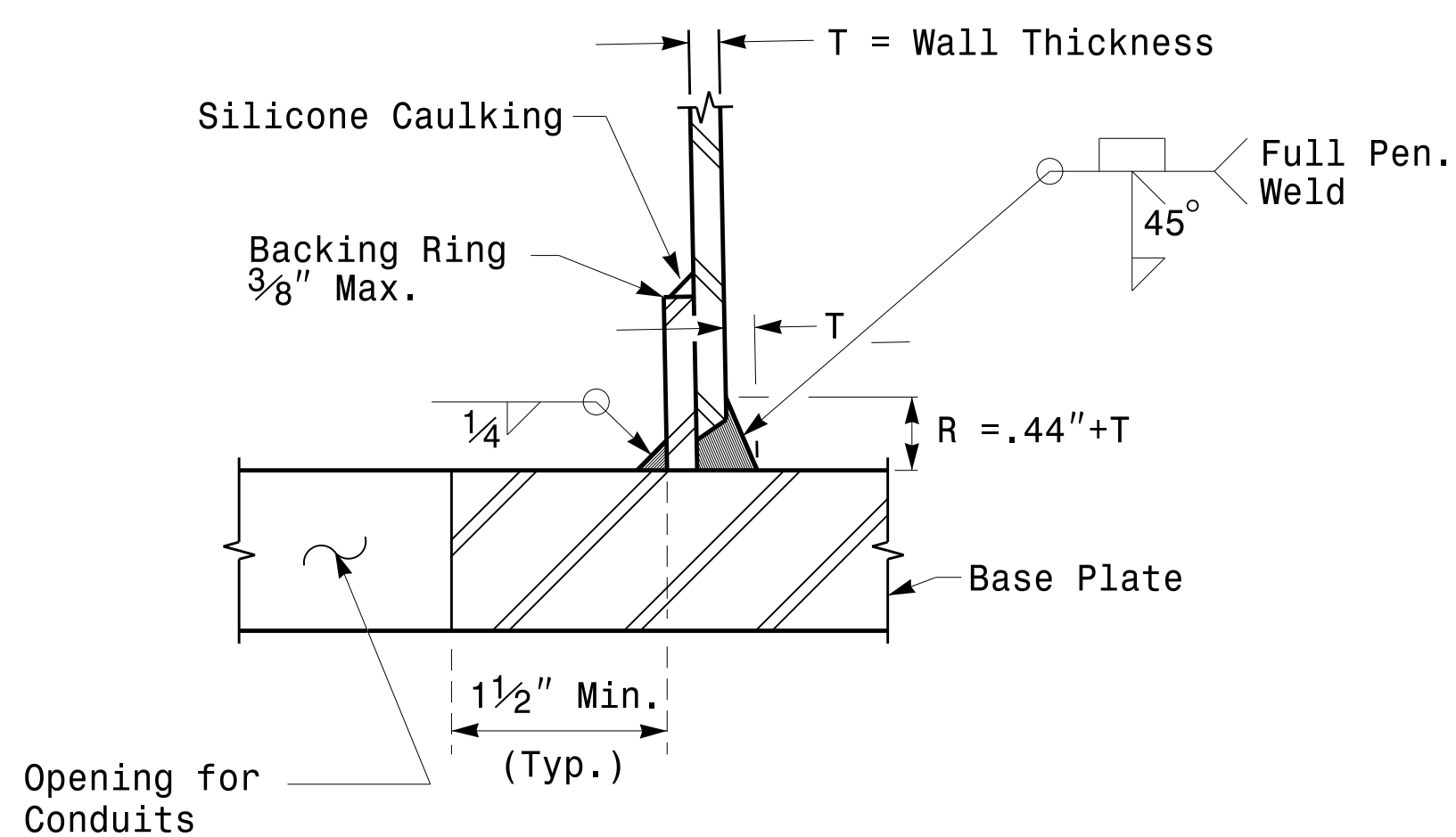
 DocuSigned by: Debesh C. Sarkar
 44EB878169A4F49E
 10/11/2017
 DATE

Fabrication Details – Strain Poles

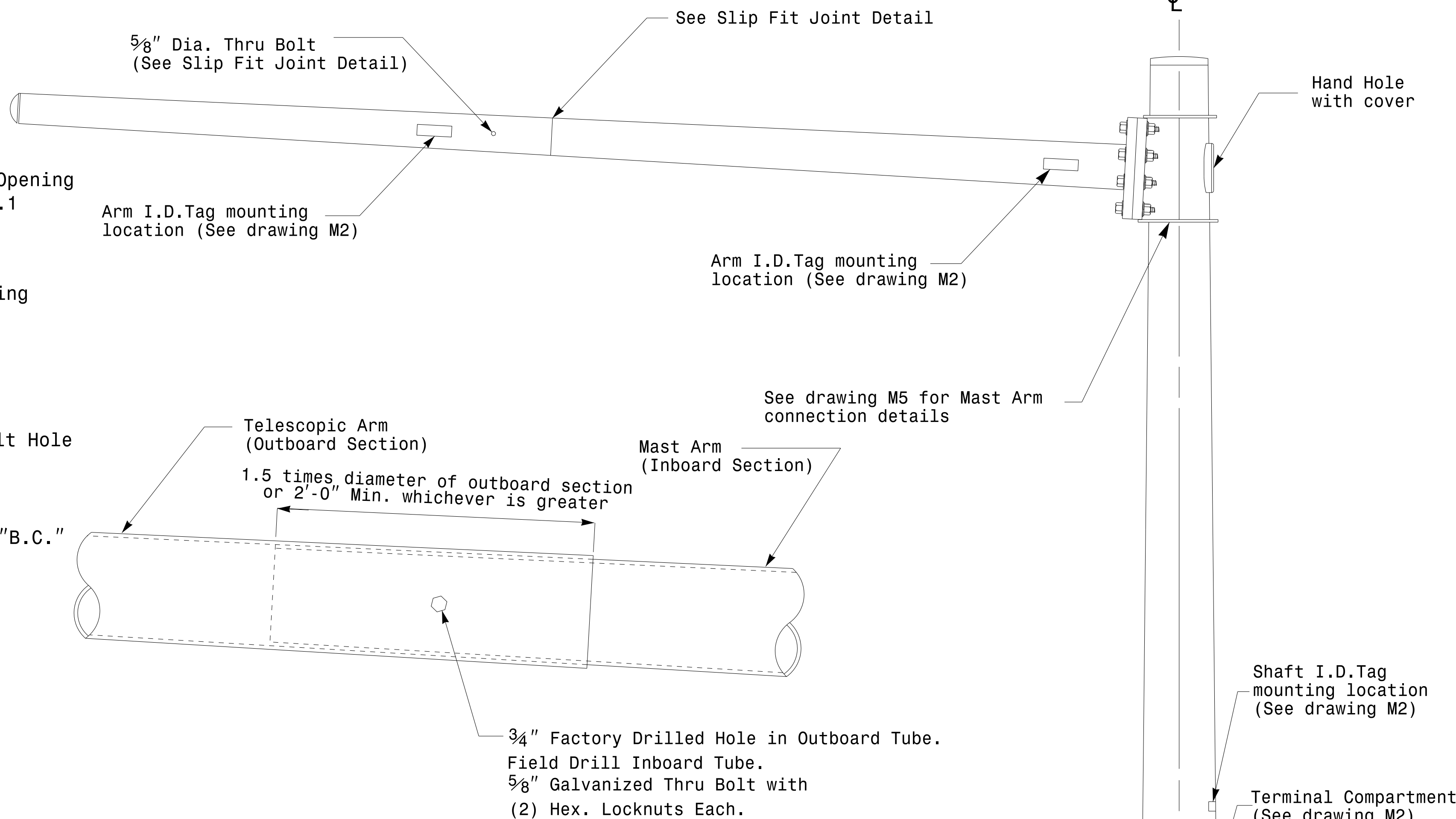
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



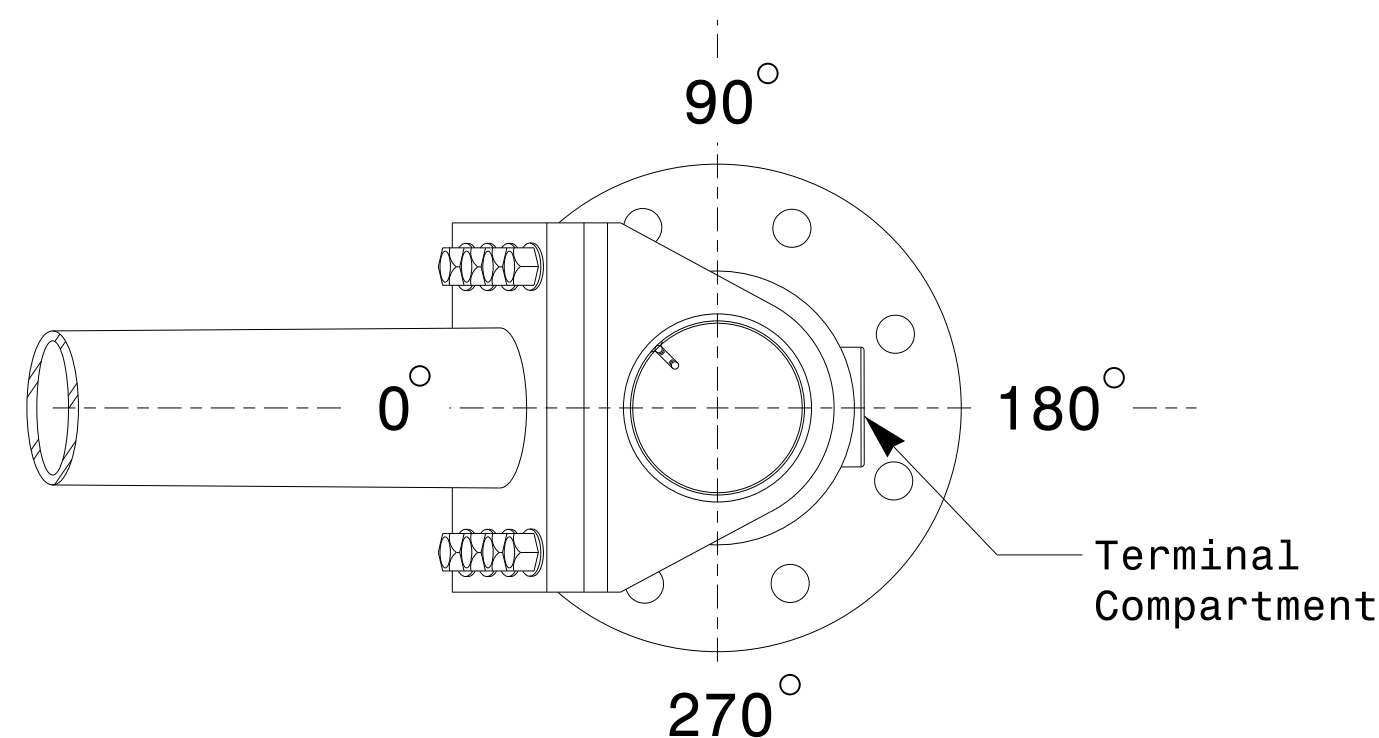
Section A-A
Pole Base Plate Details



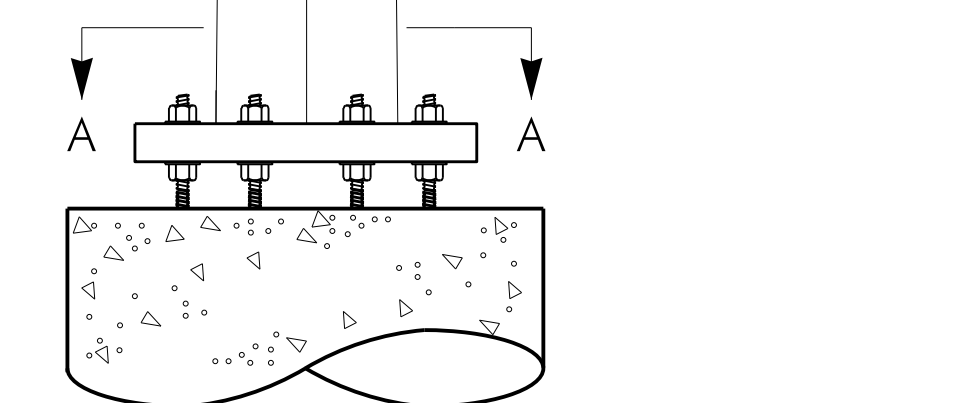
Section B-B
(Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

Fabrication Details – Mast Arm Poles

<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Mast Arm Poles</p>		<p>SEAL</p>
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: K.C. DURIGON</p>	
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>10/11/2017</p>
<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>	<p>DATE</p>

11-OCT-2017 08:33 136560415 Signal&Signal Design Section Eastern Region\m4 Sheets\2016\2014 Sig.M4 Std. Fabrication Detail-Mast Arm Poles.dgn

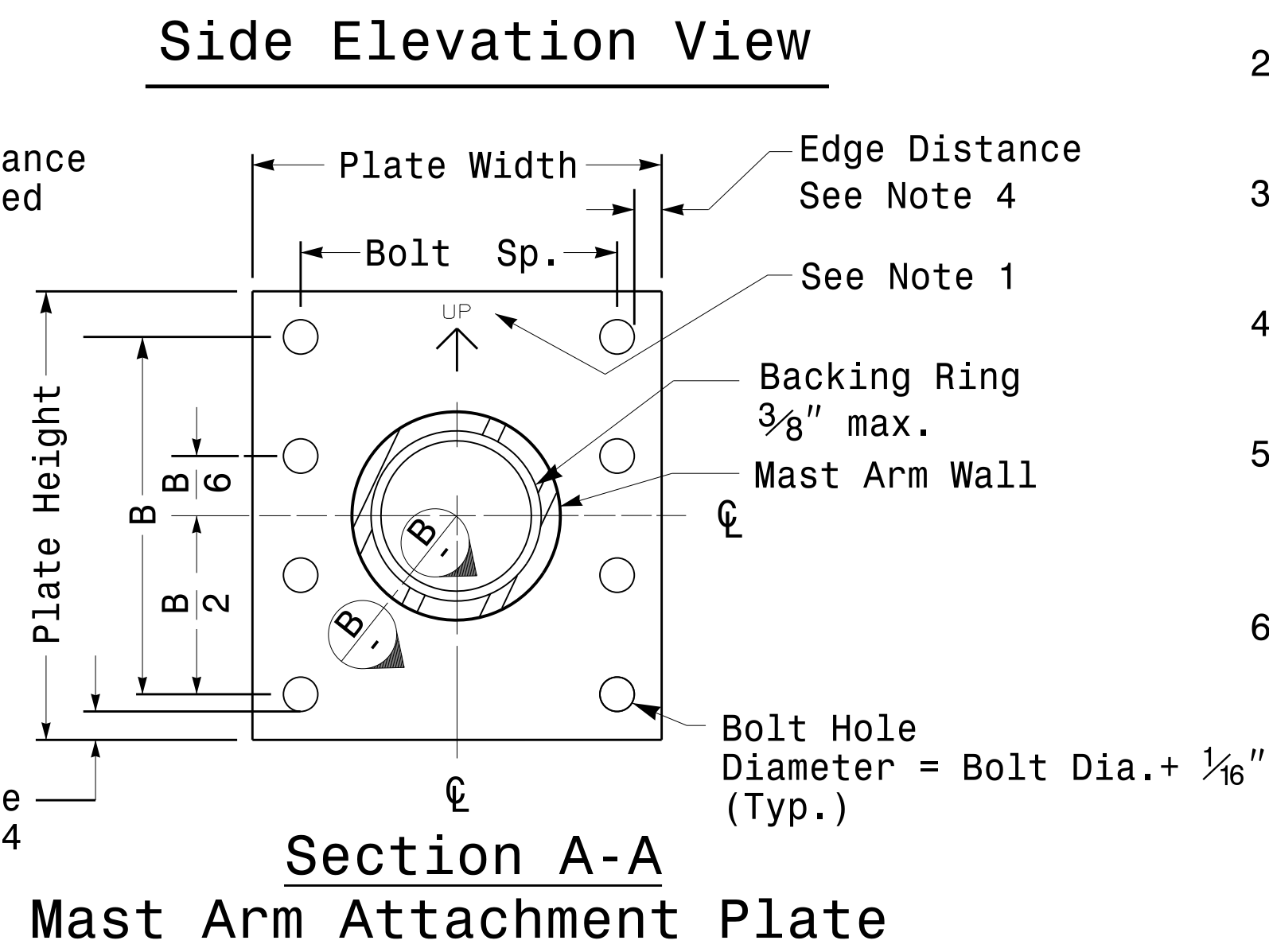
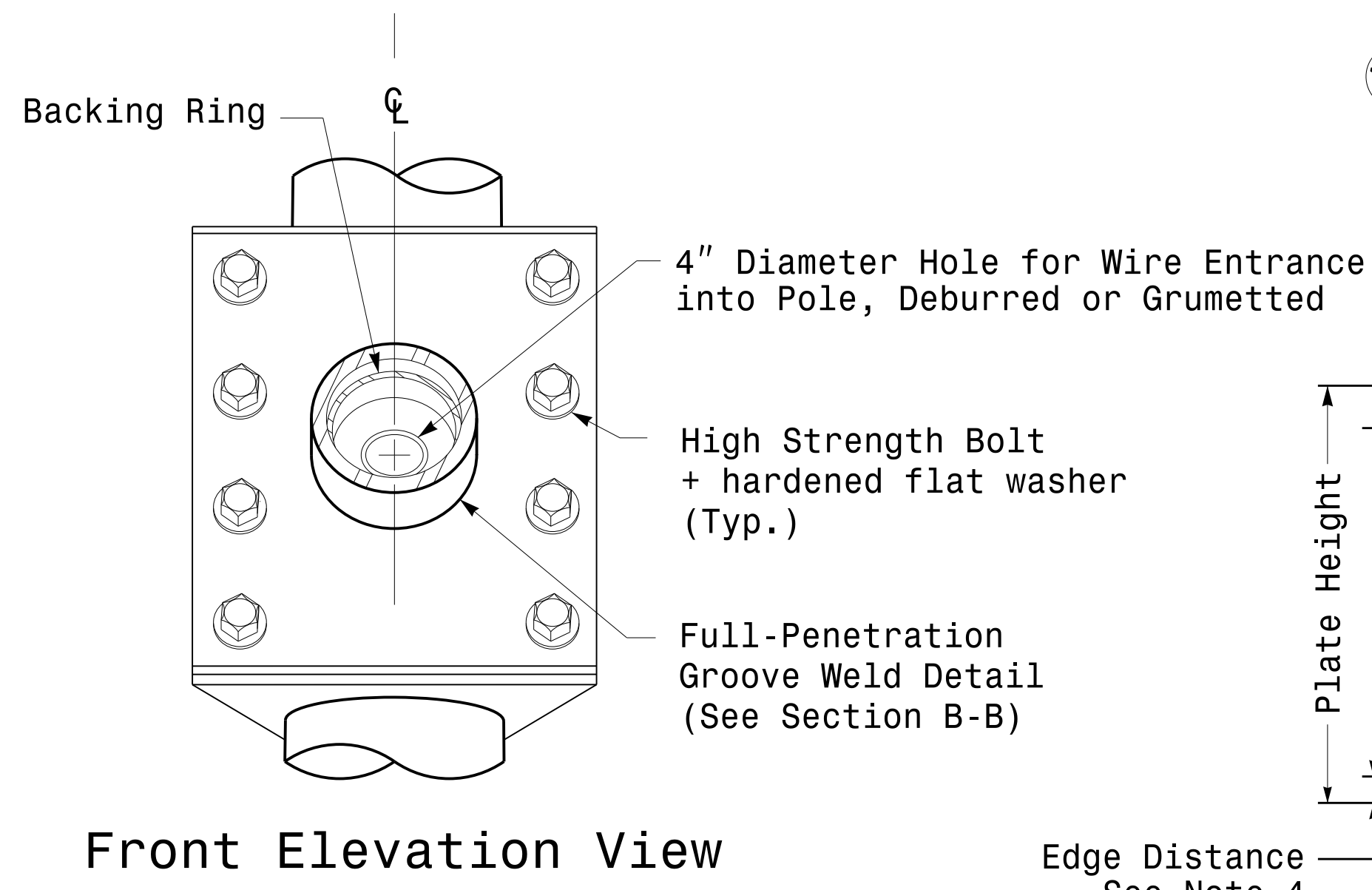
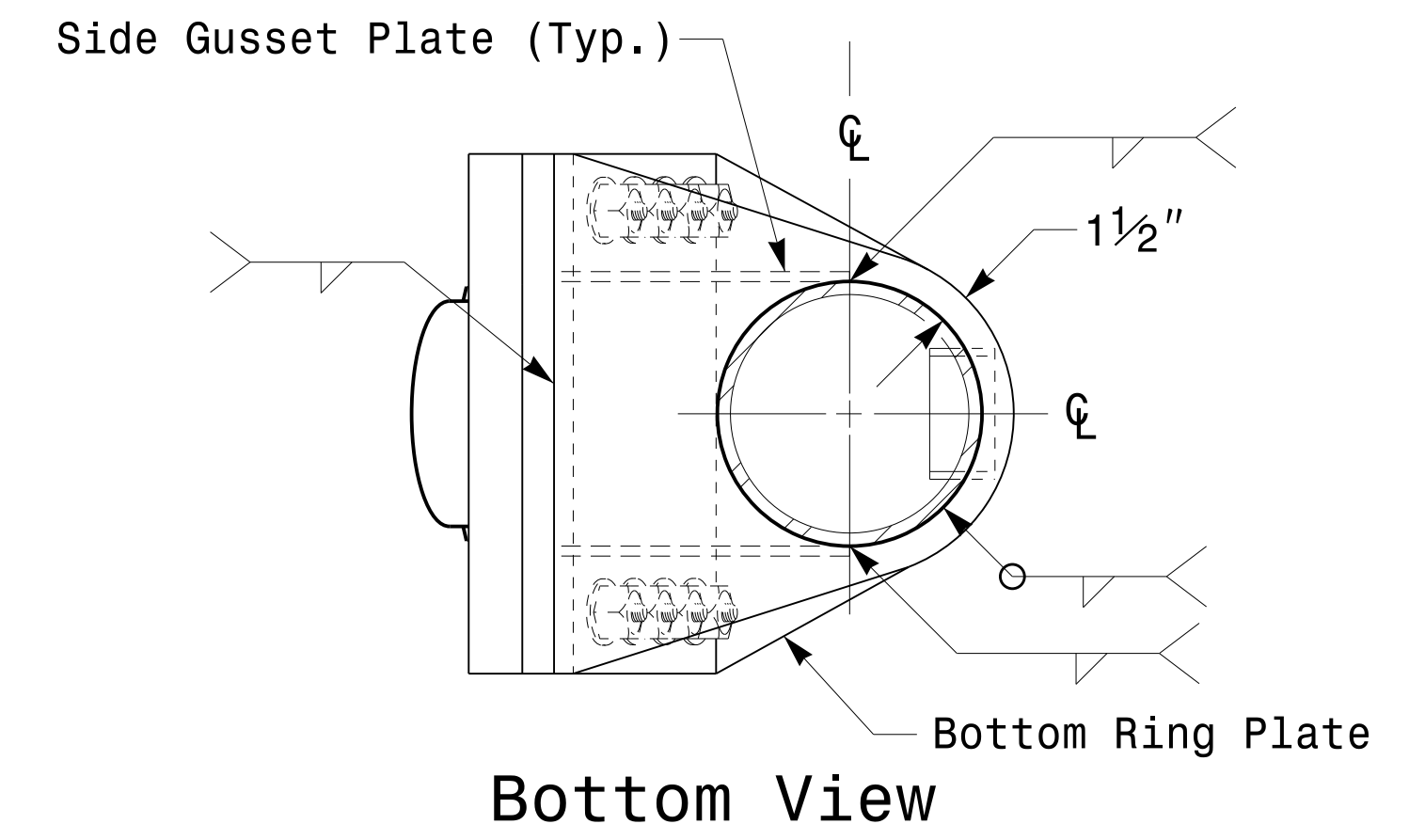
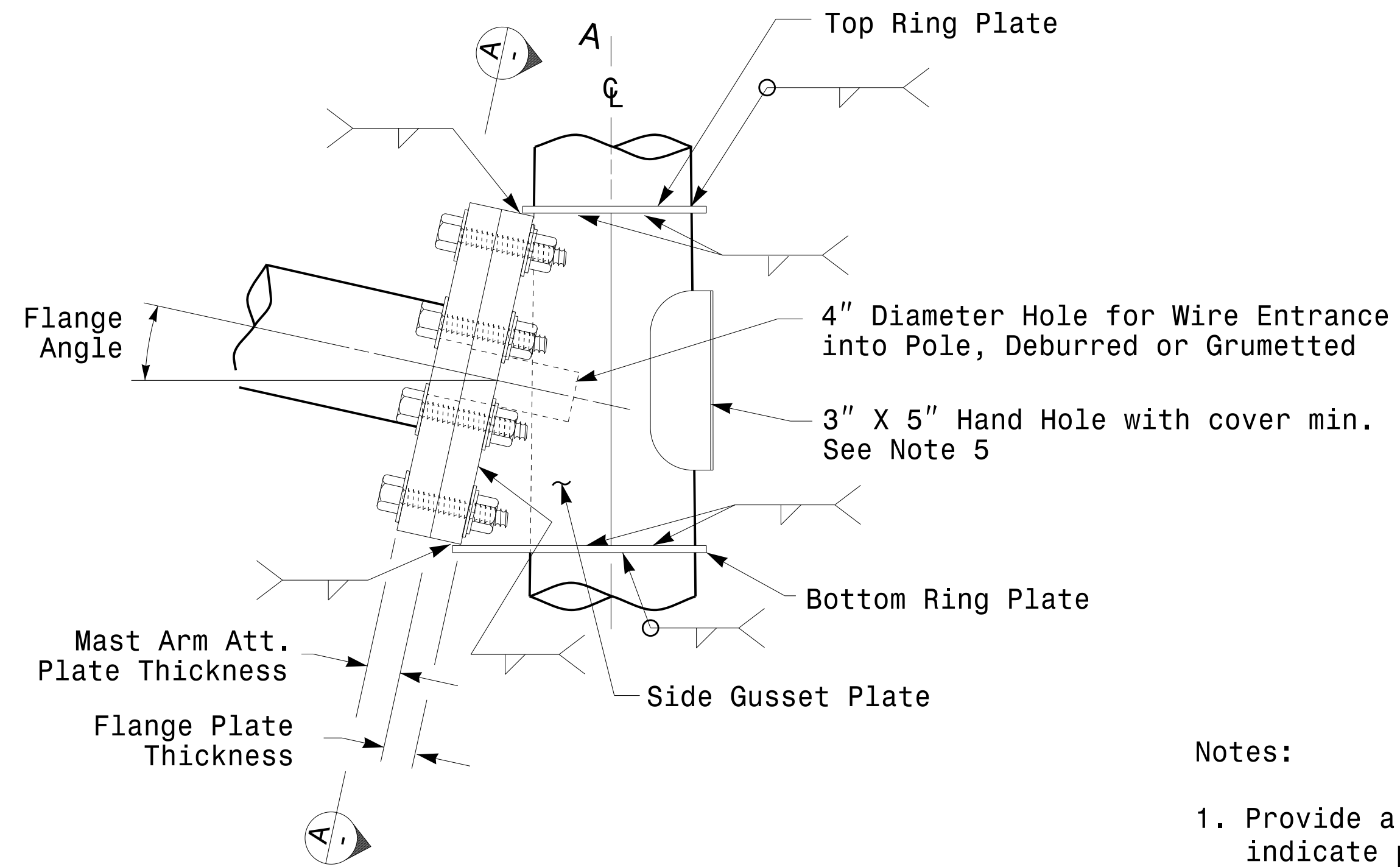
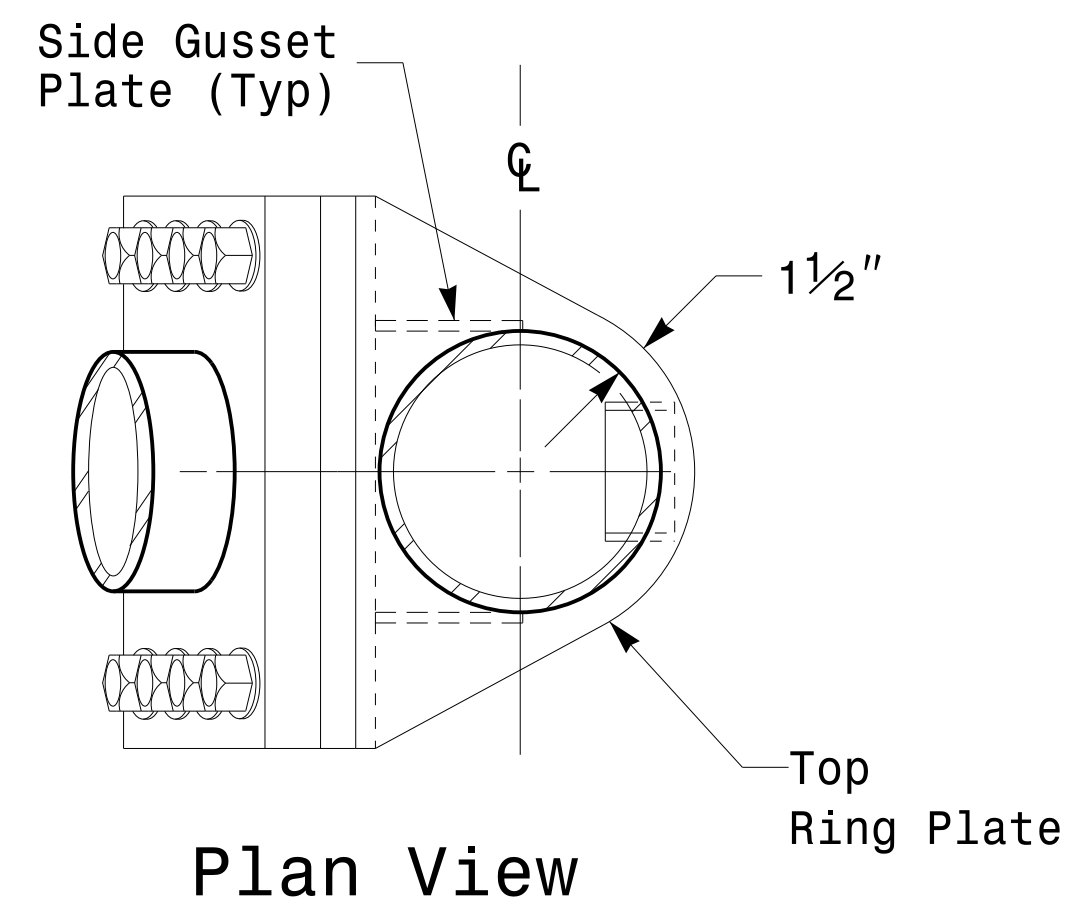
Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.

SHEET NO.

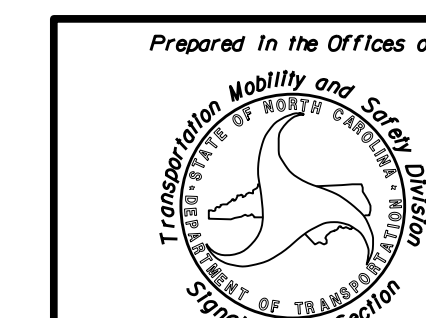
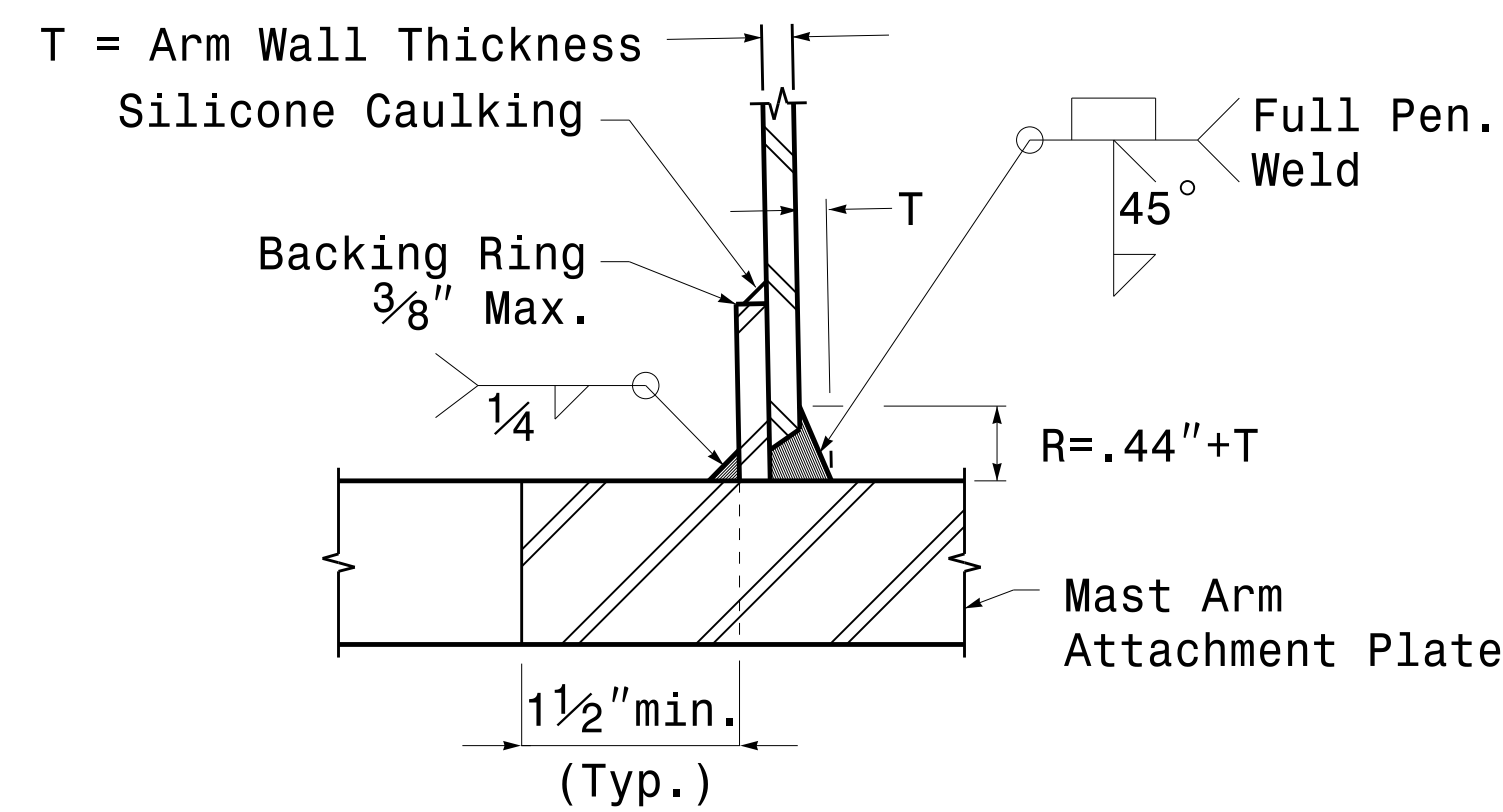
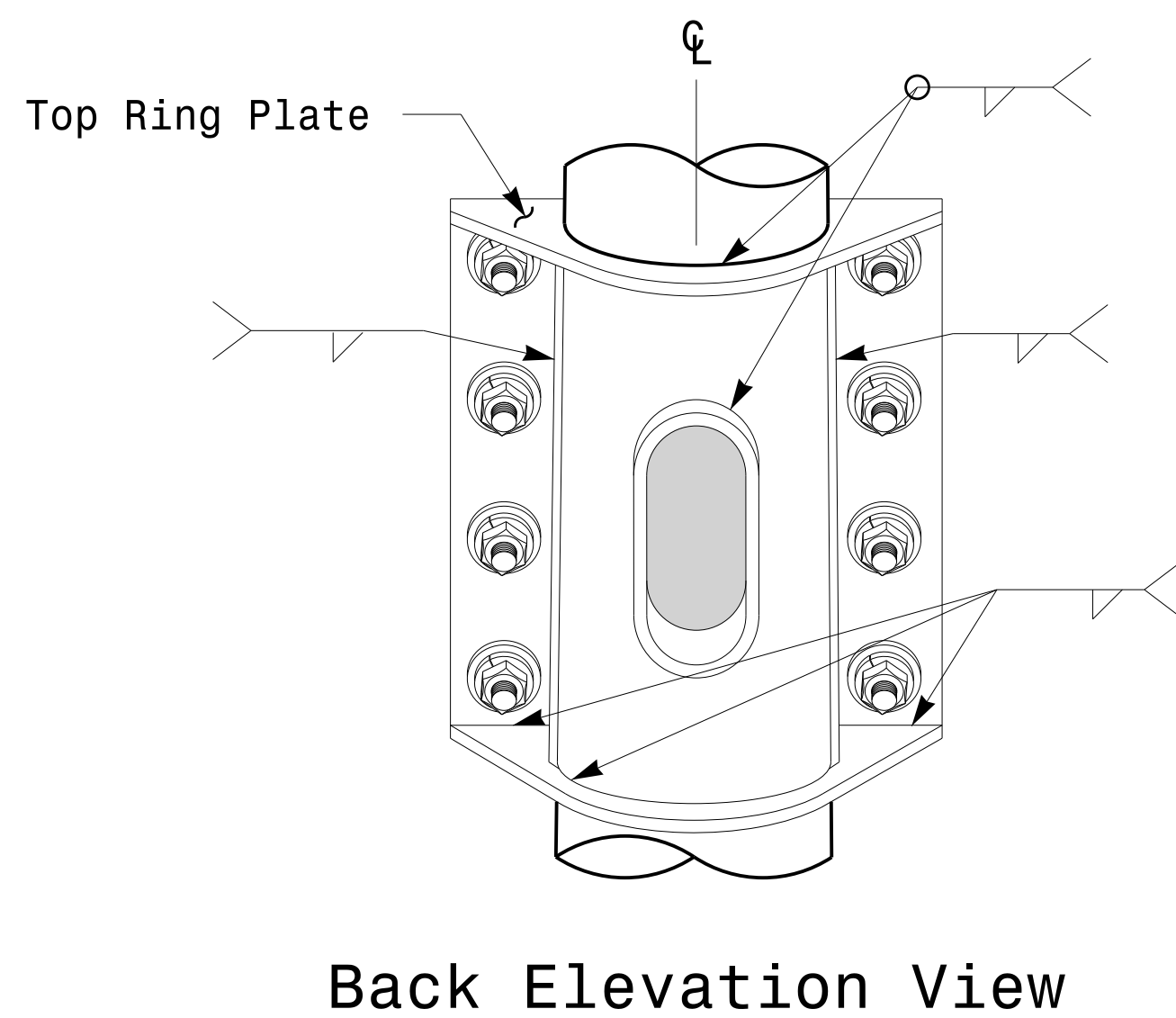
BR-0043

Sig.M5



Notes:

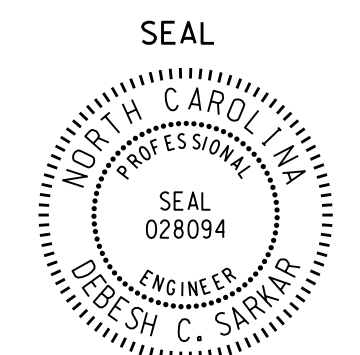
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing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



Typical Fabrication Details For Mast Arm Connection To Pole

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

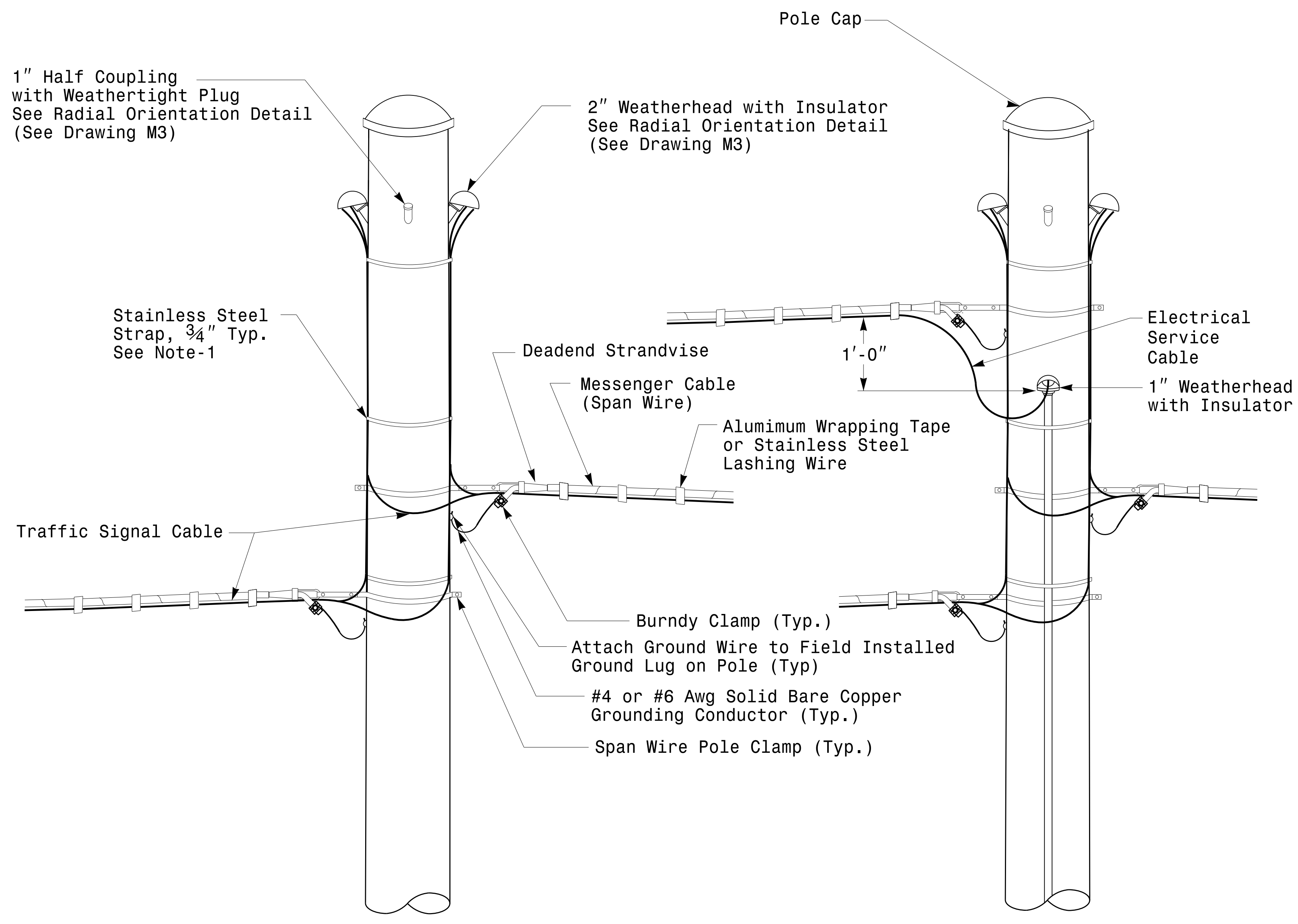
750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE: 0 NA NONE



Designed by: Debesh C. Sarkar

10/11/2017 DATE

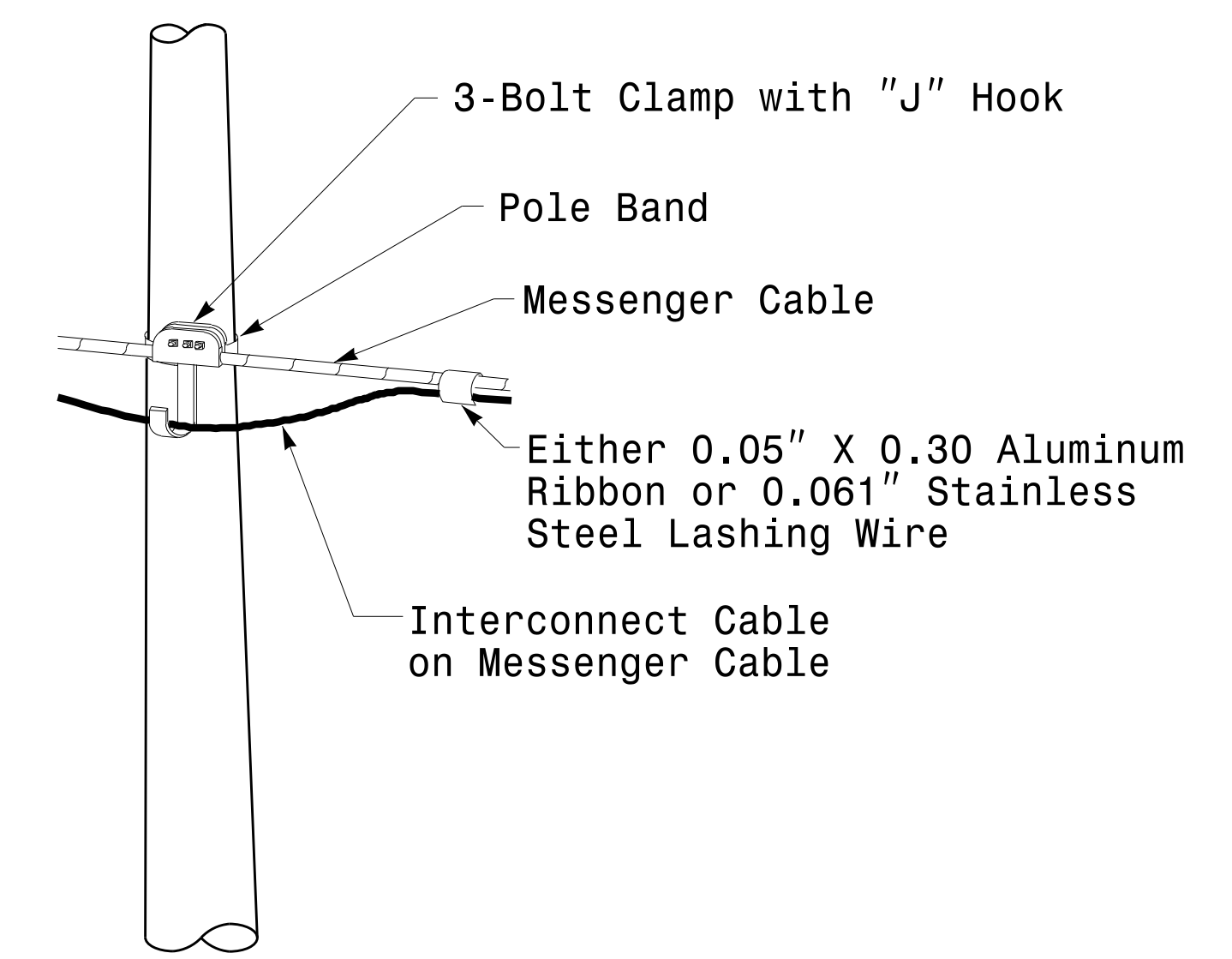
Fabrication Details - Mast Arm Connection



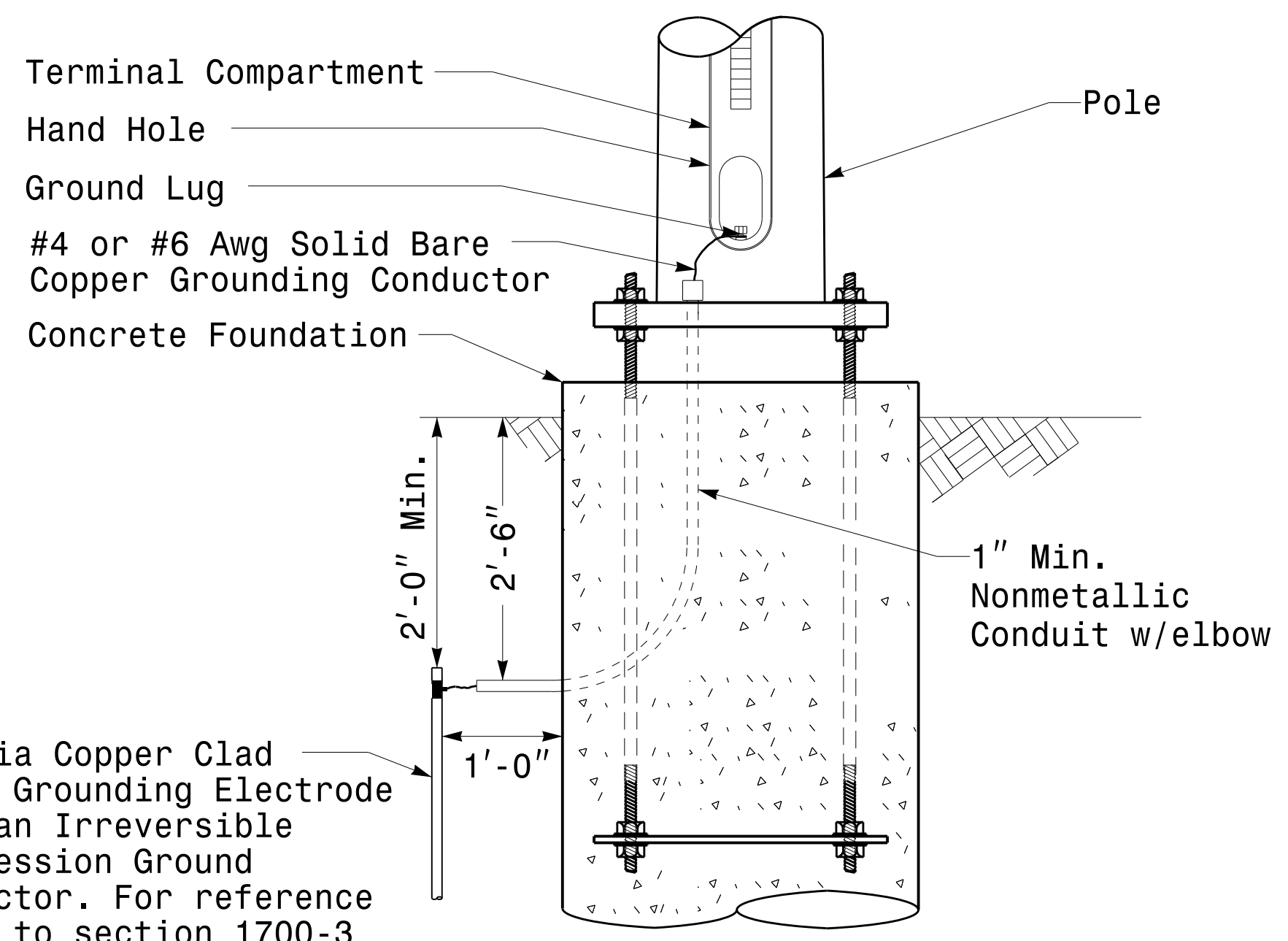
Strain Pole Attachments

NOTE:

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



Attachment of Cable to Intermediate Metal Pole



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

Metal Pole Grounding Detail For Strain Pole and Mast Arm

11-DEC-2017 08:36 136504115 StrainPole.dgn Design Section Eastern Region\m\ Sheets\2016\2014 Sig.M6 Std. Fabrication Detail-Strain Poles.dgn

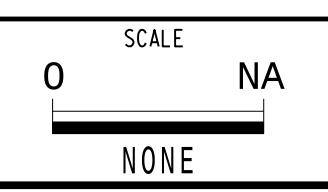
Prepared in the Offices of:

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: D. C. Sarkar
DATE: 10/11/2017



SOIL CONDITION

PROJECT ID. NO. BR-0043	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:

- 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.
- Use chairs and spacers to maintain proper clearance.
- For foundation, always use air-entrain concrete mix.

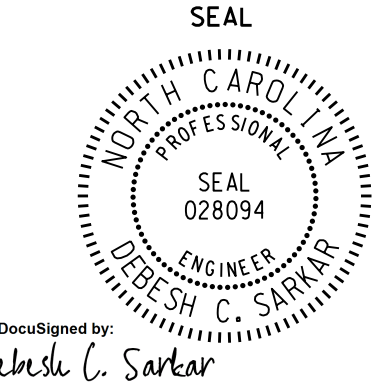
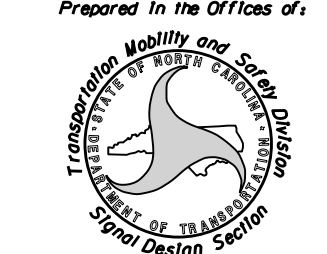
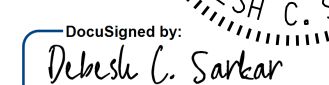
Foundation Selection:

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

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

Standard Strain Pole Foundation-All Soil Condition

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	Standard Strain Pole Foundation for All Soil Conditions	
	PLAN DATE: OCTOBER 2017 PREPARED BY: N. BITTING	DESIGNED BY: C.B. COGDILL REVIEWED BY: D.C. SARKAR
SCALE: 0 NA NONE	REVISIONS:	INIT. DATE N.B. 7/12/2015
Prepared in the Office of: 		Documented by:  DATE: 10/11/2017