

Project: 49218.26

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

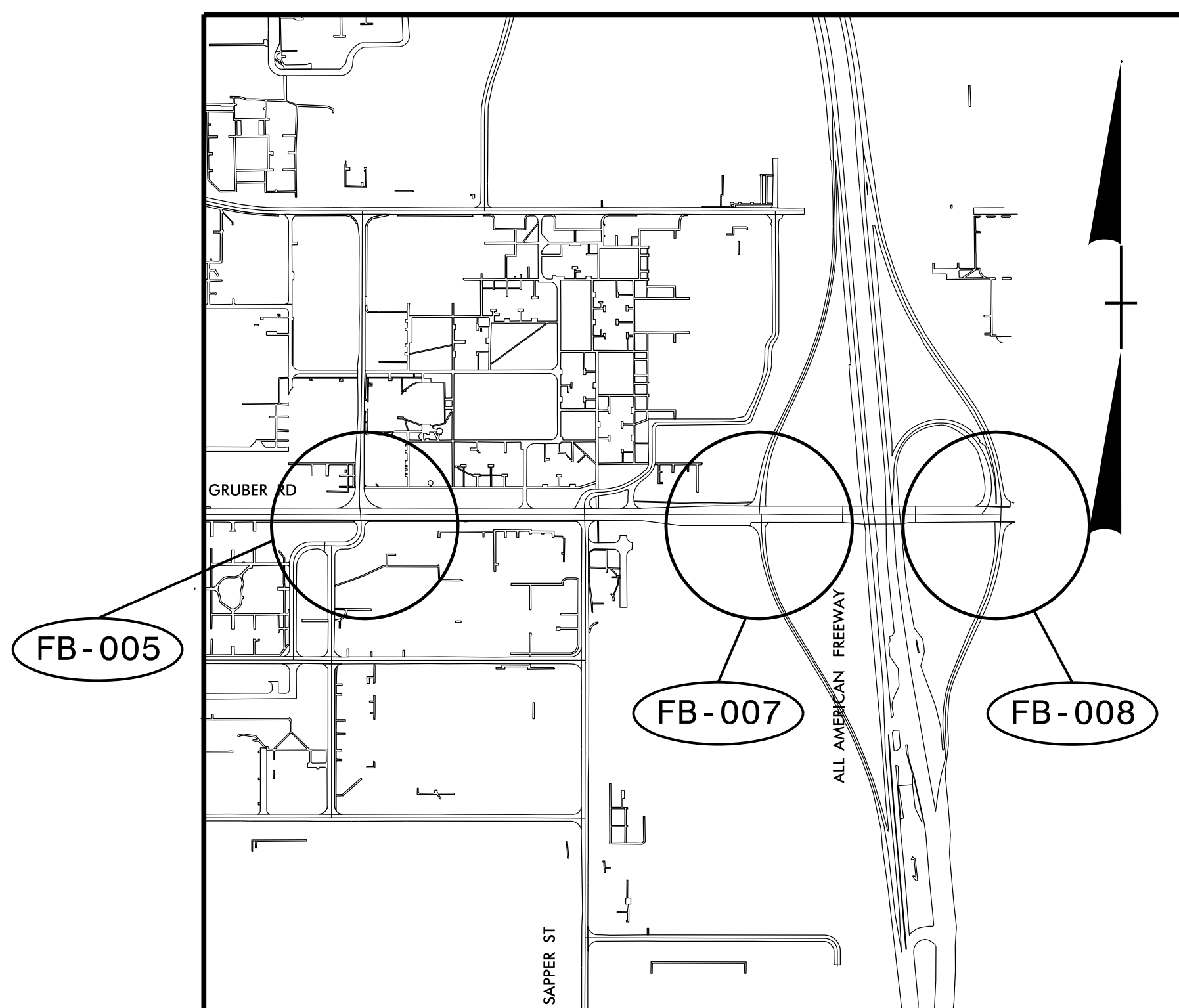
Project No.	Sheet No.
49218.26	Sig. 1.0

CUMBERLAND COUNTY

**LOCATION: GRUBER ROAD BRIDGE
OVER ALL AMERICAN EXPRESSWAY
ON FORT BRAGG**

TYPE OF WORK: SIGNALS

Vicinity



LEGEND:

(XX-XXXX) = SIGNAL INVENTORY #

M M
MOTT
MACDONALD
MOTT MACDONALD 14, E.L.L.C.
930 Main Campus Drive
Suite 200
RALEIGH, NC 27608
License No. 140069

Refer to "Roadway Standard Drawings
NCDOT" dated January 2024 and
"Standard Specifications for Roads
and Structures" dated January 2024.

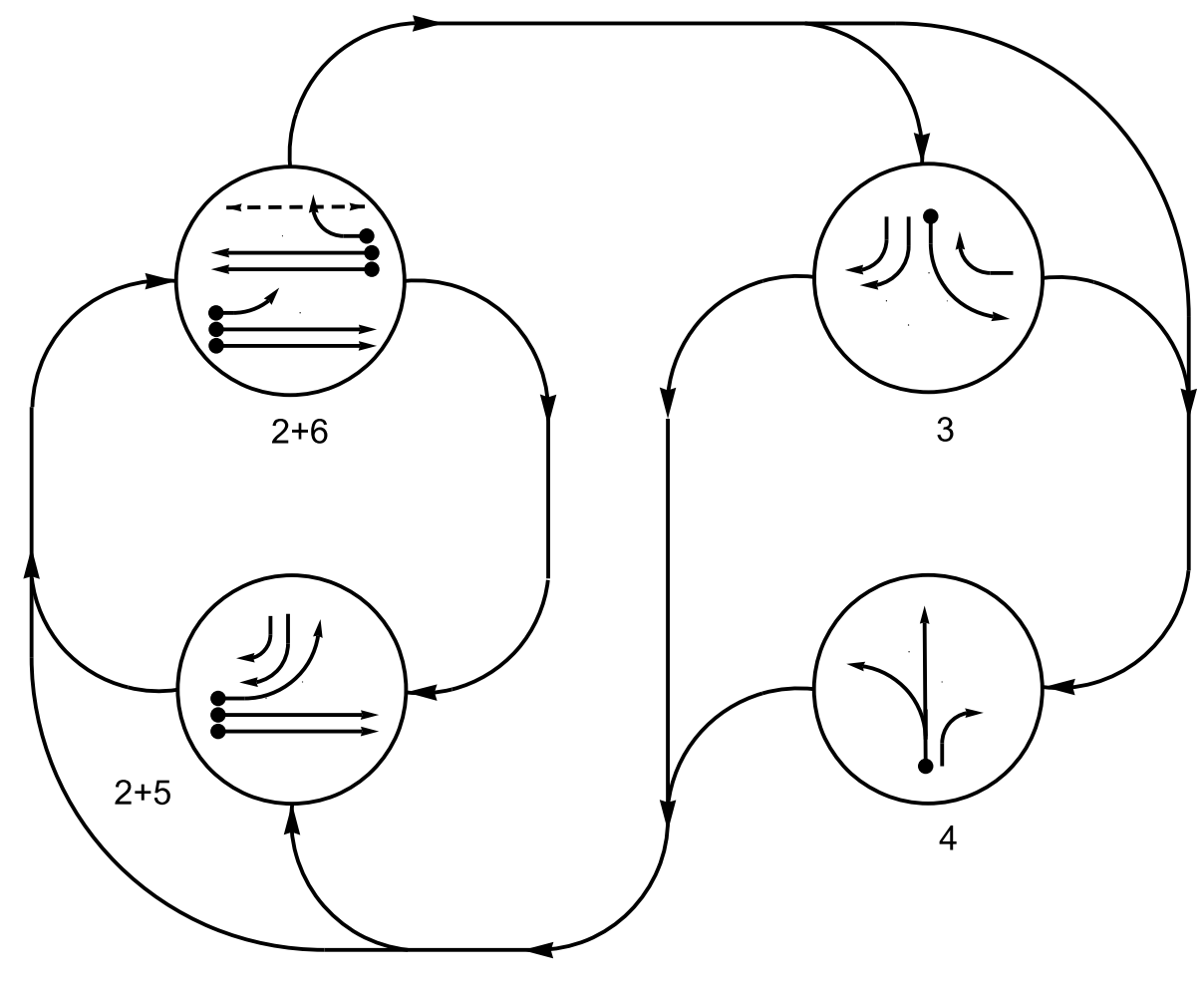
Sheet #	Reference #	Index of Plans	Location/Description
Sig. 1.0		Title Sheet	
Sig. 2.0-2.2	FB-005	Gruber Road at Essayons Street	
Sig. 3.0-3.4	FB-007	Gruber Road at SB All-American Expressway Off-Ramp	
Sig. 4.0-4.4	FB-008	Gruber Road at NB All-American Expressway Off-Ramp	
Sig. M1A-M9		Metal Pole Details	
Sig. L1		Mast Arm Luminaire Conduit Detail	
ITS 1-2		Gruber Road at NB All-American Expressway Grabber Gate	

NCDOT Contact:
Christy Huff

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



PHASING DIAGRAM



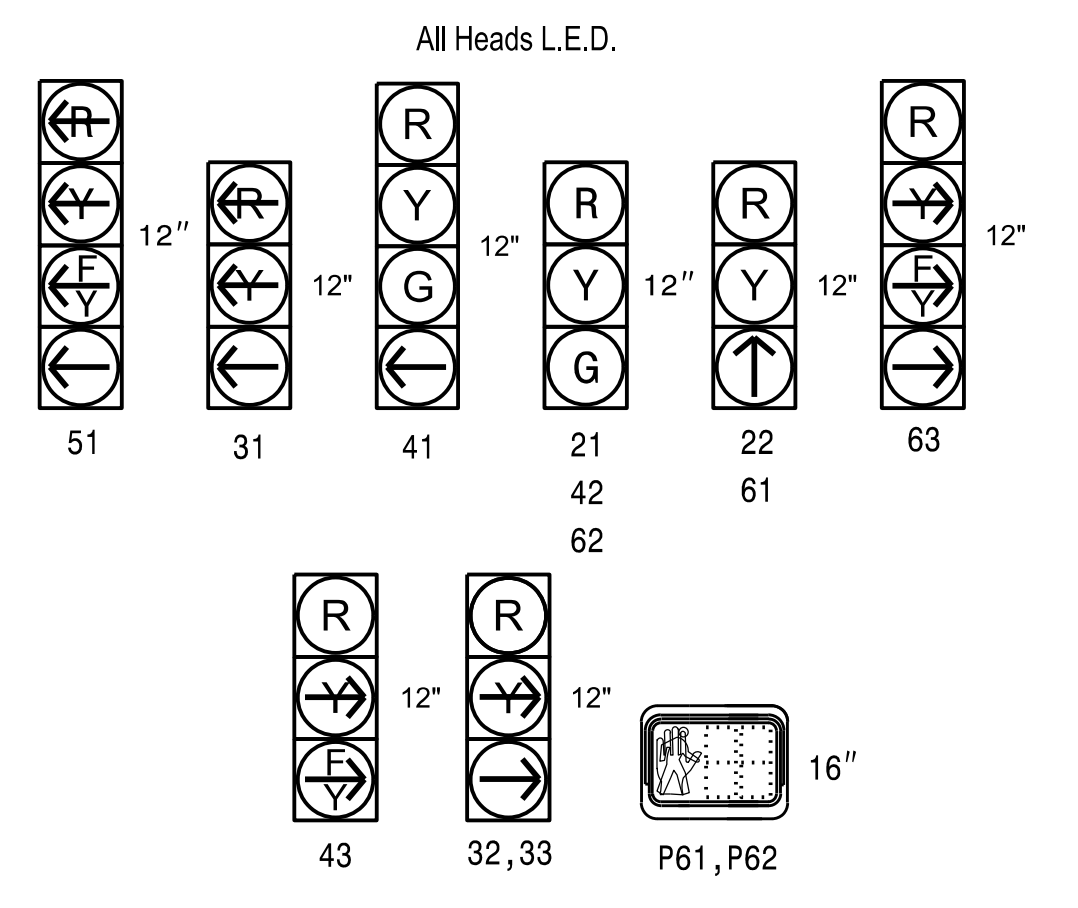
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				FLASH
	2+5	2+6	3	4	
21	G	G	R	R	R
22			R	R	R
31	←	←	←	←	←
32,33	←	←	←	←	←
41	R	R	R	G	R
42	R	R	R	G	R
43	R	R	R	G	R
51	←	←	←	←	←
61	R		R	R	R
62	R	G	R	R	R
63	R	←	←	←	←
P61,P62	DW	W	DW	DW	DRK

SIGNAL FACE I.D.



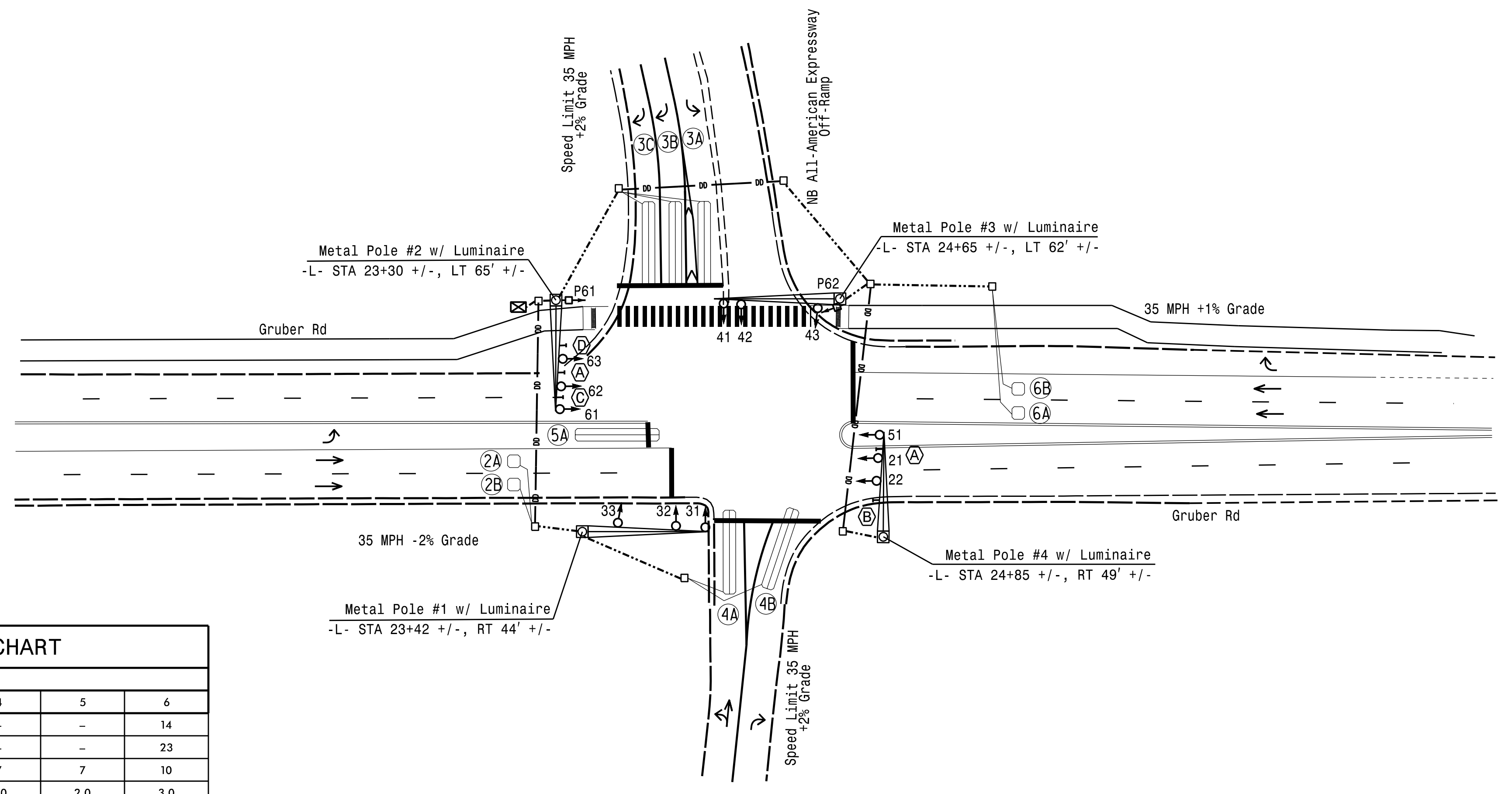
MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING						
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	70	4	X	2	-	-	X	X	X	X
2B	6X6	70	4	X	2	-	-	X	X	X	X
3A	6X40	0	2-4-2	X	3	-	-	X	X	X	X
3B	6X40	0	2-4-2	X	3	10.0	-	X	X	X	X
3C	6X40	0	2-4-2	X	3	10.0	-	X	X	X	X
4A	6X40	+5	2-4-2	X	4	-	-	X	X	X	X
4B	6X40	+5	2-4-2	X	4	15.0	-	X	X	X	X
5A	6X40	+5	2-4-2	X	5	15.0	-	X	X	X	X
6A	6X6	70	4	X	6	-	-	X	X	X	X
6B	6X6	70	4	X	6	-	-	X	X	X	X

4 Phase Fully Actuated Fort Bragg Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and Standard Specifications for Roads and Structures" dated January 2024 and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <https://connect.ncdot.gov/resources/safety/Pages/TSMO-Design-Resources.aspx>
- 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.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- See Final Pavement Markings Plans for pavement markings.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- To provide a leading pedestrian interval on phase 6, program FYA heads numbered 51 and 63 to delay for 7 seconds after the start of the phase 6 walk interval. See Electrical Details for Programming.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



MAXTIME TIMING CHART

FEATURE	PHASE			
	2	3	4	6
Walk *	-	-	-	14
Ped Clear *	-	-	-	23
Min Green *	10	7	7	10
Passage *	3.0	2.0	2.0	3.0
Max I *	60	30	25	15
Yellow Change	4.0	3.0	3.7	3.0
Red Clear	2.3	3.4	1.9	2.6
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	**
Non Lock Detector	-	X	X	X
Vehicle Recall	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-

* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.
 ** See note 9.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → 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
○ Type II Signal Pedestal	○ Type II Signal Pedestal
⊠ Metal Pole with Mastarm	⊠ Metal Pole with Mastarm
--- Directional Drill	--- Directional Drill
⊠ Street Name Sign	⊠ Street Name Sign
⊠ No Right turn Sign (R3-1)	⊠ No Right turn Sign (R3-1)
⊠ No Left Turn Sign (R3-2)	⊠ No Left Turn Sign (R3-2)
⊠ "RIGHT TURN SIGNAL" Sign (R10-10R)	⊠ "RIGHT TURN SIGNAL" Sign (R10-10R)

Signal Upgrade - Final Design

MOTT MACDONALD
 MOTT MACDONALD I & E, LLC
 930 Main Campus Drive
 Suite 200
 RALEIGH, NC 27606
 License No. F-0669

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE: 0 40
 1" = 40'

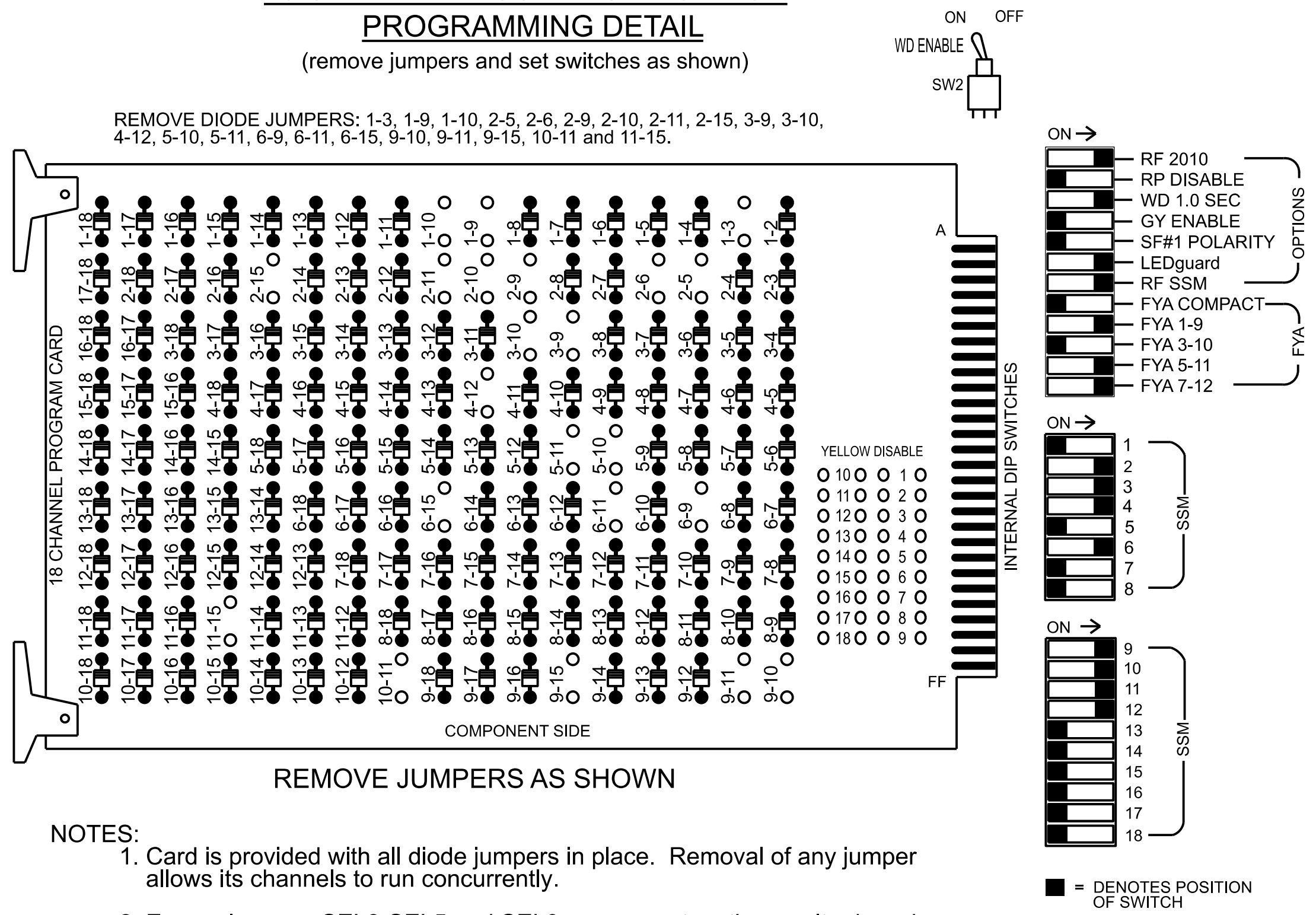
Gruber Road at NB All-American Expressway Off-Ramp
 Division 6 Cumberland County Fort Bragg
 PLAN DATE: June 2025 REVIEWED BY: LD Stouchko
 PREPARED BY: S O'Farrell REVIEWED BY:
 REVISIONS: INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 SARAH O'FARRELL
 PROFESSIONAL ENGINEER
 058922
 SIGNATURE: Sarah O'Farrell DATE: Mar-2026
 SIG. INVENTORY NO. FB-008

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all 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.
- The cabinet and controller are part of the Fort Bragg System.

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.....S1, S2, S4, S5, S7, S8, S9,
 AUX S1, AUX S2, AUX S4, AUX S5

Phases Used.....2, 3, 4, 5, 6, 6PED
 Overlap "1".....*
 Overlap "2".....*
 Overlap "3".....*
 Overlap "4".....*
 Overlap "5".....Not Used
 Overlap "6".....Not Used
 Overlap "7".....*

*See overlap programming detail on sheet 2

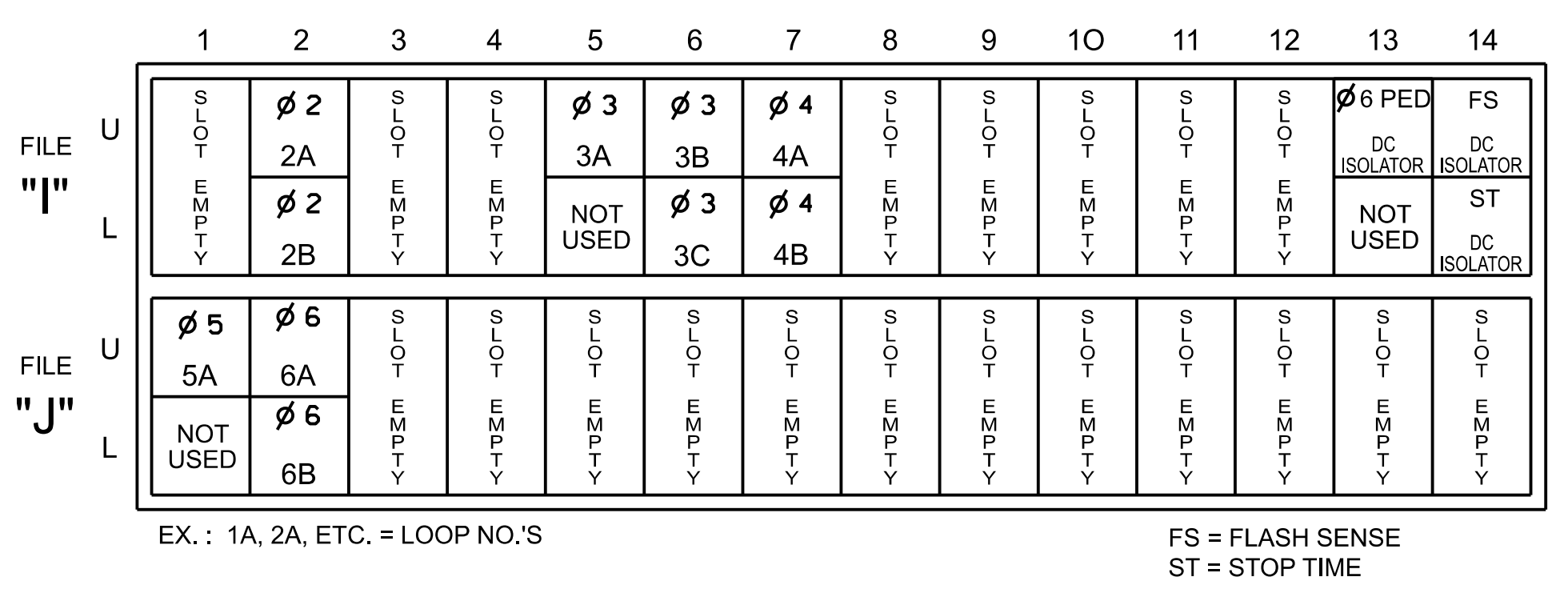
SIGNAL HEAD HOOK-UP CHART

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	OL7	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	63*	21	22	31	41	42	51*	61	62	P61, P62	71	81	63*	32,33	51*	43*	NU	NU
RED		128	128		101	101		134	134				A121	A124			A101	
YELLOW	*	129	129		102	102	*	135	135									
GREEN		130			103	103			136									
RED ARROW				116													A114	
YELLOW ARROW				117									A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123			A116	A103	
GREEN ARROW	127	130		118	103		133	136						A126				
Hand										119								
Walking Person										121								

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

INPUT FILE POSITION LAYOUT

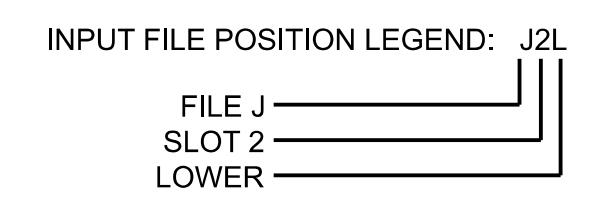
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

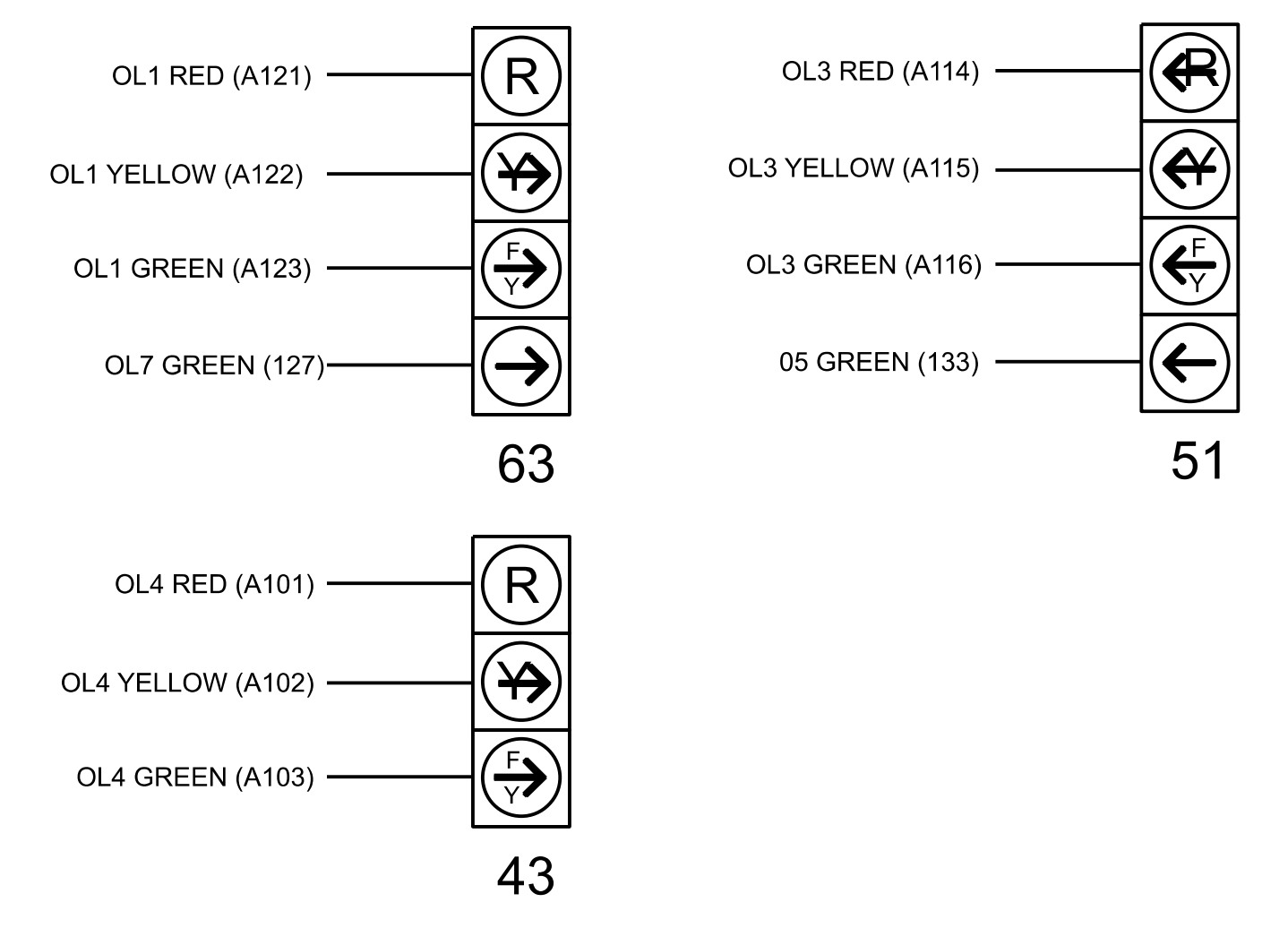
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X		X	
2B	TB2-7,8	I2L	43	5	3	2			X		X	
3A	TB4-5,6	I6U	58	20	7	3			X		X	
3B	TB4-9,10	I6U	41	3	8	3	10.0		X		X	
3C	TB4-11,12	I6L	45	7	9	3	10.0		X		X	
4A	TB4-9,10	I7U	65	31	10	4			X		X	
4B	TB6-3,4	I7L	78	44	11	4	15.0		X		X	
5A	TB3-1,2	J1U	55	17	15	5	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
6B	TB3-7,8	J2L	44	6	17	6			X		X	
PED PUSH BUTTONS												
P61,P62	TB8-7,9	I13U	68	34	6	6PED						

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.



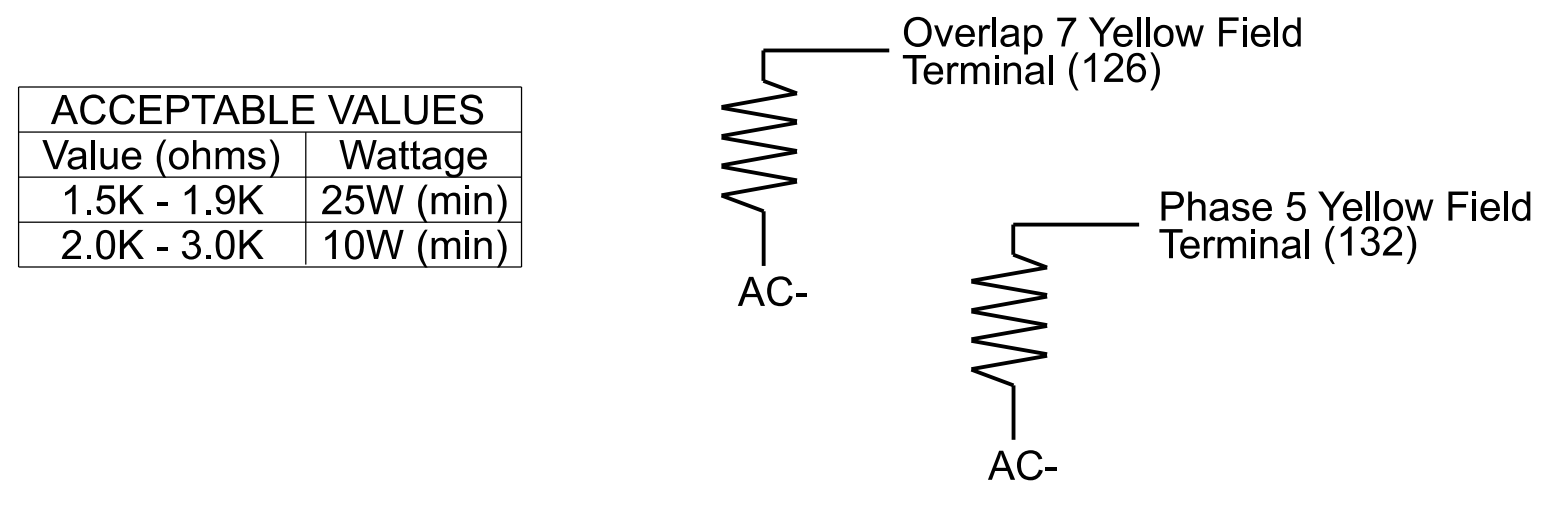
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



THIS ELECTRICAL DETAIL IS FOR

THE SIGNAL DESIGN: FB-008
 DESIGNED: June 2025
 SEALED: 03/09/2026
 REVISED: N/A

Electrical Detail - Sheet 1 of 2 - Final Design

Document Not Considered Final Unless All Signatures Completed

Electrical and Programming Details For: Gruber Road at NB All-American Expressway Off-Ramp

Division 6 Cumberland County Fort Bragg

PLAN DATE: June 2025 REVIEWED BY: LD Stouchko
 PREPARED BY: S O'Farrell REVIEWED BY:

REVISIONS: INIT. DATE

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 930 Main Campus Drive
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 RALEIGH, NC 27606
 License No. F-0669

750 N. Greenfield Pkwy, Correr, NC 27529

Seal: Sarah O'Farrell, Professional Engineer, License No. 058922, State of North Carolina

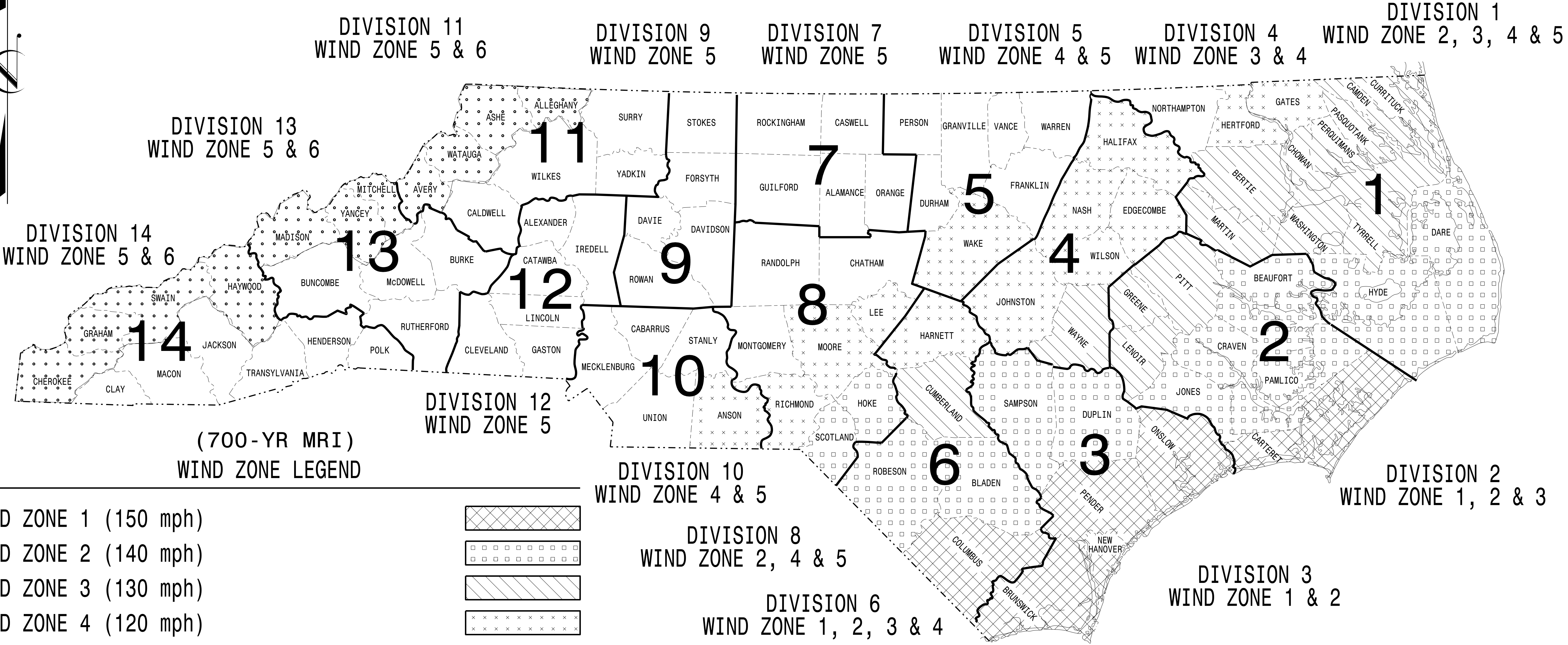
Signed by: Sarah O'Farrell, 09-Mar-2026

SIGNATURE DATE

SIG. INVENTORY NO. FB-008

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)



(700-YR MRI)
WIND ZONE LEGEND

WIND ZONE 1 (150 mph)	
WIND ZONE 2 (140 mph)	
WIND ZONE 3 (130 mph)	
WIND ZONE 4 (120 mph)	
WIND ZONE 5 (110 mph)	
WIND ZONE 6 (135 mph) Special Wind Zone	

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

NC DOT METAL POLE STANDARDS

03-001-2023 1P-07
S:\IT\AS\11\11\Sig\Drawings\Drawings\2024\Metal Pole Standard 411 Metal Pole (700-yr MRI).cdm
Kdurigon

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

Designed in conformance
with the latest
2020 Interim to the
1st Edition 2015
**AASHTO
LRFD**
Standard Specifications for
Highway Signs, Luminaires,
and Traffic Signals

DRAWING NUMBER	INDEX OF PLANS DESCRIPTION
Sig. M 1A	Statewide Wind Zone Map (700-yr MRI)
Sig. M 1B	Statewide Wind Zone Map (10-yr MRI)
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
Sig. M 9	Typical Fabrication Details-CCTV Camera Poles

**MOBILITY AND SAFETY DIVISION -
TRANSPORTATION SYSTEMS MANAGEMENT
AND OPERATIONS UNIT**

D.Y. ISHAK - STATE SIGNALS ENGINEER
K. DURIGON, P.E. - ITS AND SIGNALS STRUCTURAL ENGINEER
B. WALKER, P.E. - ITS AND SIGNALS STRUCTURAL ENGINEER

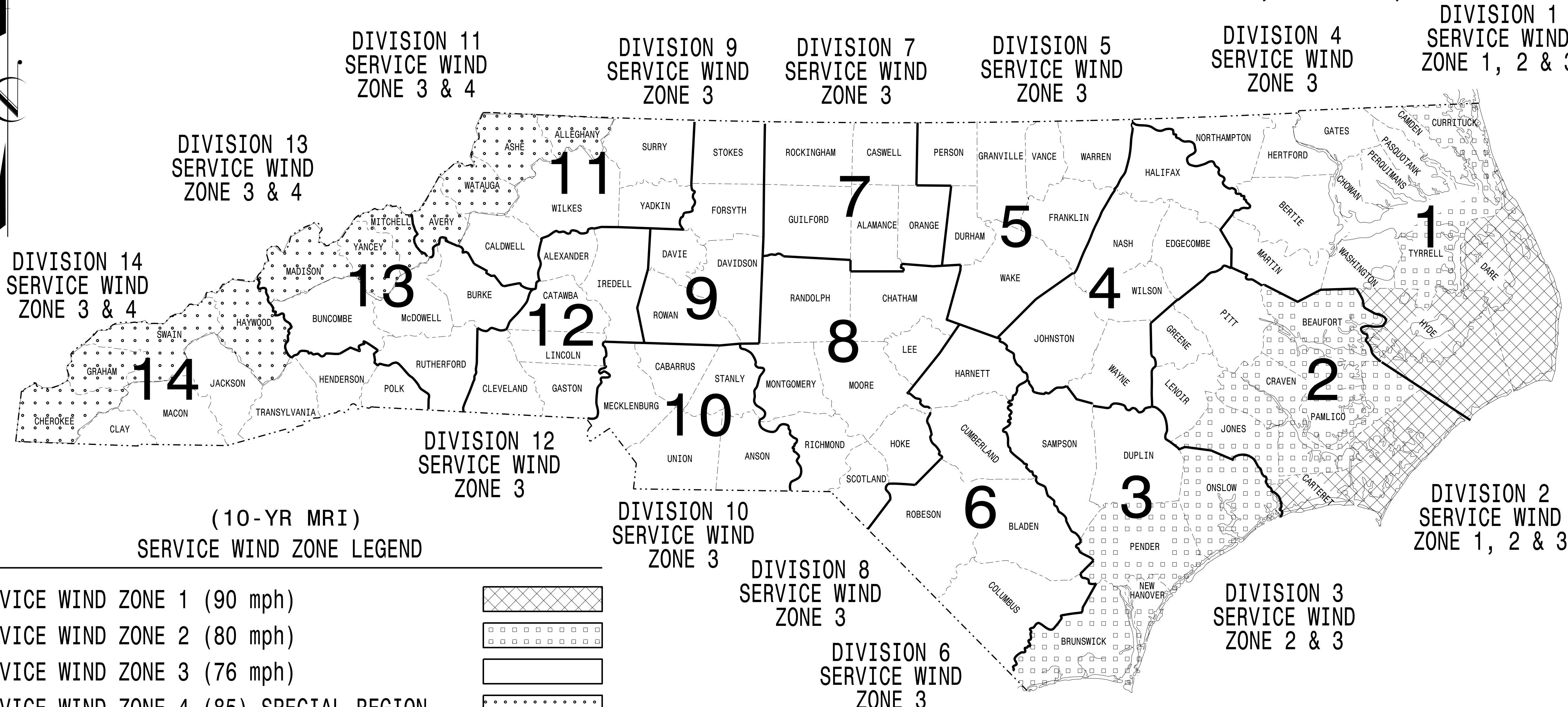
SEAL

DocuSigned by:
Kevin Durigon
SIGNATURE
4823DC79B3764DA

09/21/2023
DATE

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)



(10-YR MRI)
SERVICE WIND ZONE LEGEND

SERVICE WIND ZONE 1 (90 mph)	
SERVICE WIND ZONE 2 (80 mph)	
SERVICE WIND ZONE 3 (76 mph)	
SERVICE WIND ZONE 4 (85) SPECIAL REGION	

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

NC DOT METAL POLE STANDARDS

03-OCT-2023 10:51 S:\IT\AS\14\15\Sig\Drawings\Drawings\2024\Metal Pole (10-yr MRI).dgn

Prepared in the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

Designed in conformance with the latest 2020 Interim to the 1st Edition 2015

AASHTO LRFD

Standard Specifications for Highway Signs, Luminaires, and Traffic Signals

DRAWING NUMBER	INDEX OF PLANS DESCRIPTION
Sig. M 1A	Statewide Wind Zone Map (700-yr MRI)
Sig. M 1B	Statewide Wind Zone Map (10-yr MRI)
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
Sig. M 9	Typical Fabrication Details-CCTV Camera Poles

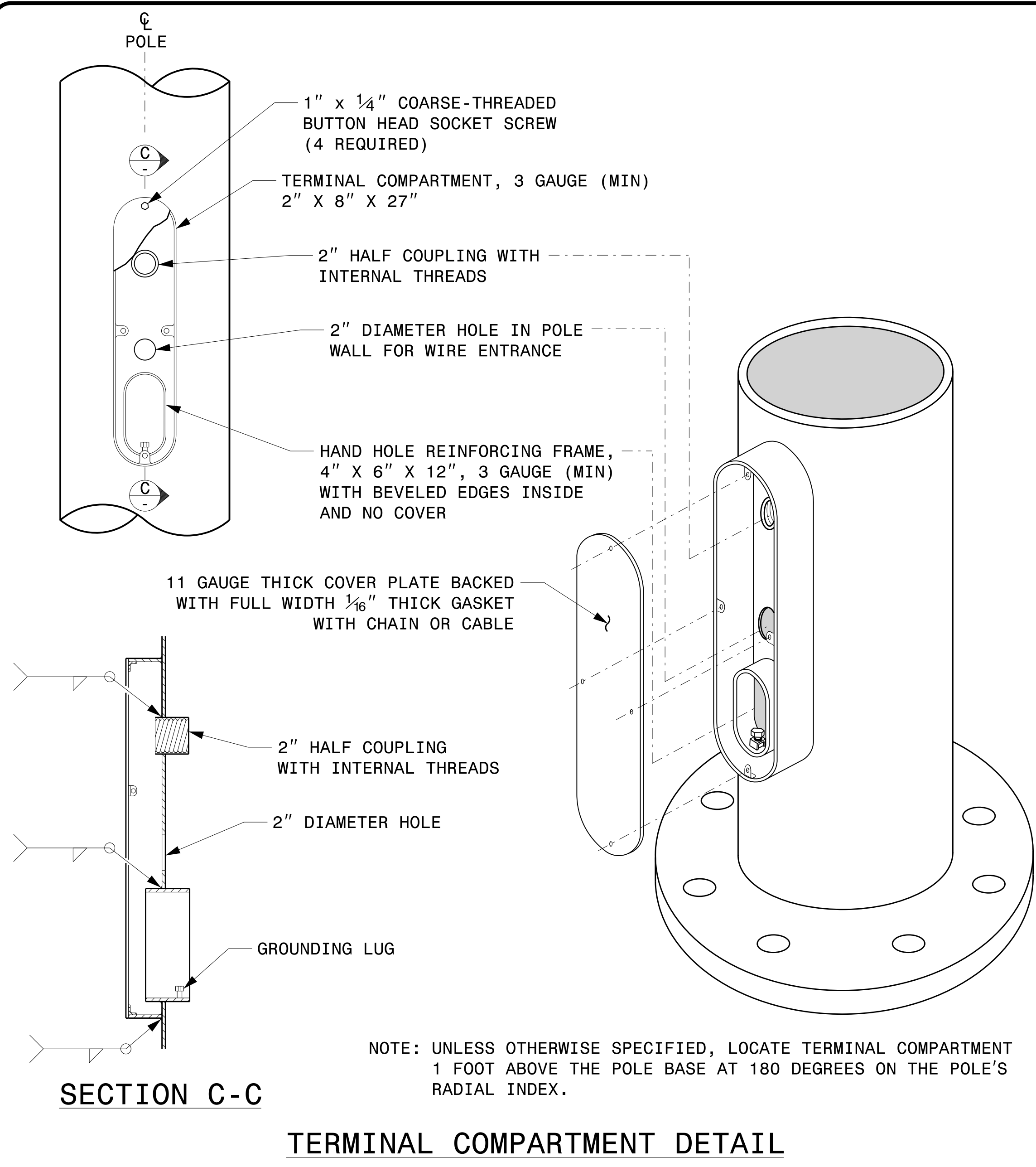
NCDOT CONTACTS:
MOBILITY AND SAFETY DIVISION -
TRANSPORTATION SYSTEMS MANAGEMENT
AND OPERATIONS UNIT

D.Y. ISHAK - STATE SIGNALS ENGINEER
K. DURIGON, P.E. - ITS AND SIGNALS STRUCTURAL ENGINEER
B. WALKER, P.E. - ITS AND SIGNALS STRUCTURAL ENGINEER

SEAL

DocuSigned by:
Kevin Durigon
4B23DC78B3784DA

09/21/2023
DATE



SECTION C-C

TERMINAL COMPARTMENT DETAIL

NOTE: UNLESS OTHERWISE SPECIFIED, LOCATE TERMINAL COMPARTMENT 1 FOOT ABOVE THE POLE BASE AT 180 DEGREES ON THE POLE'S RADIAL INDEX.

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. _____	

SHAFT I.D. TAG
(PROVIDE ON SHAFT OF STRAIN POLES AND MAST ARM POLE SHAFT)

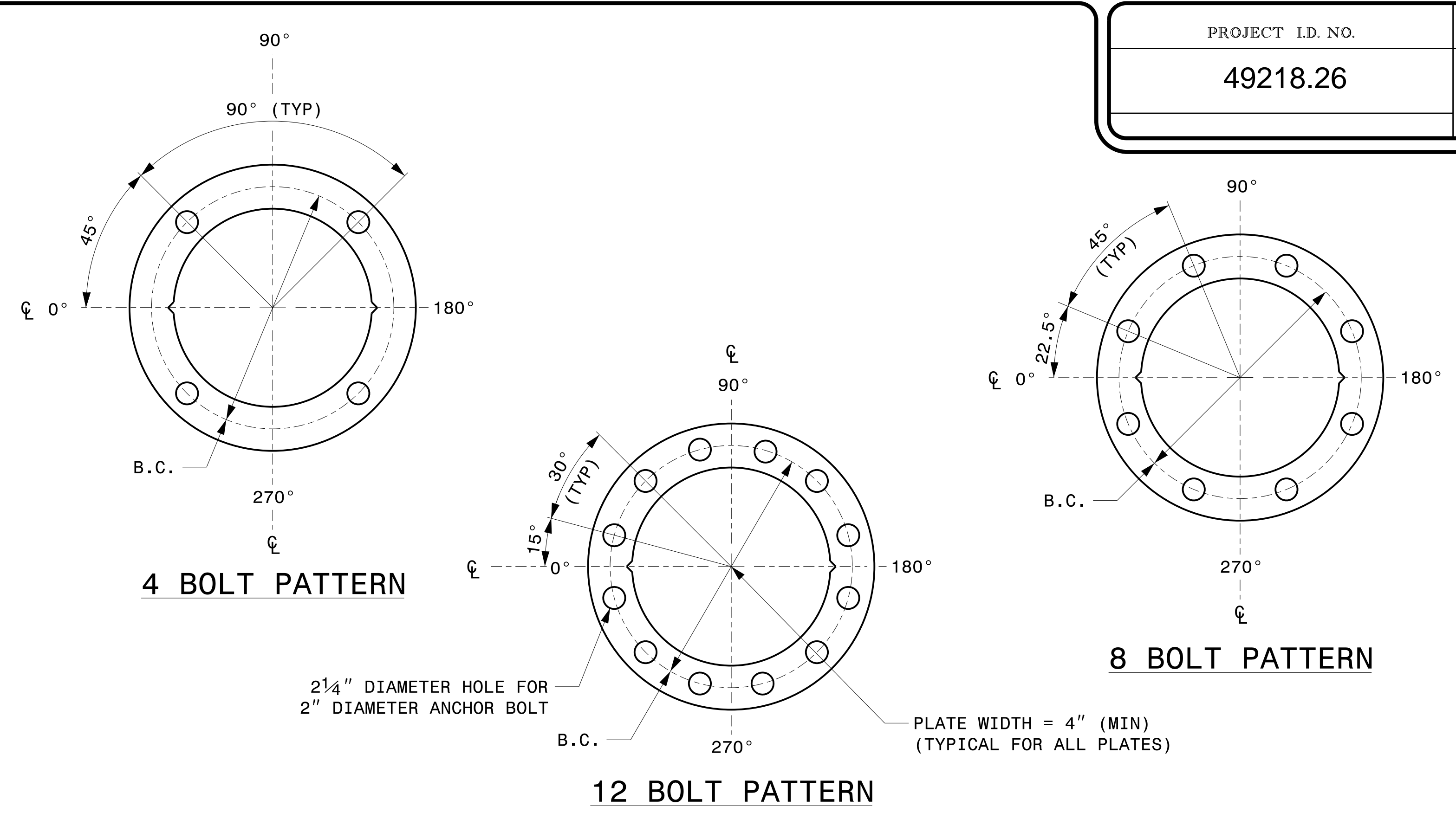
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT SIG. INV. NO. _____	
NCDOT POLE NO. _____	

ARM I.D. TAG
(PROVIDE ON EACH SECTION OF A MULTI-SECTION MAST ARM)

NOTES:

- D = DIAMETER, T = THICKNESS, L = LENGTH, Y = YIELD STRENGTH
- A.B. = ANCHOR BOLT
- B.C. = BOLT CIRCLE OF ANCHOR BOLTS
- IF STANDARD DESIGN, INCLUDE CASE NUMBER IN ADDITION TO POLE NUMBER ON "NCDOT POLE NO." LINE.
- SIGNAL INV. NUMBER AND POLE I.D. NUMBER. SEE DRAWING M3 AND M4 FOR MOUNTING POSITIONS OF I.D. TAGS.

IDENTIFICATION TAG DETAILS



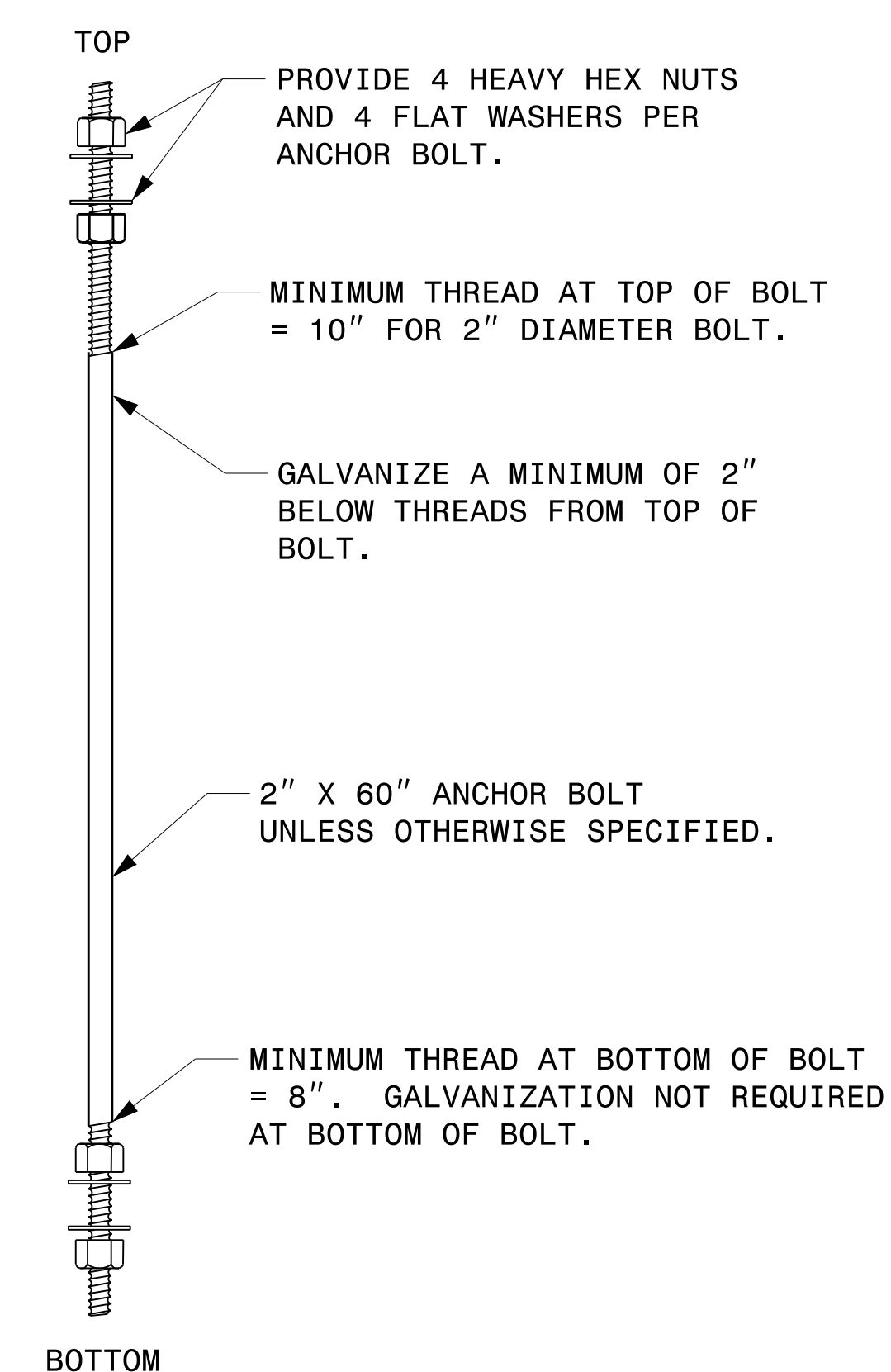
4 BOLT PATTERN

8 BOLT PATTERN

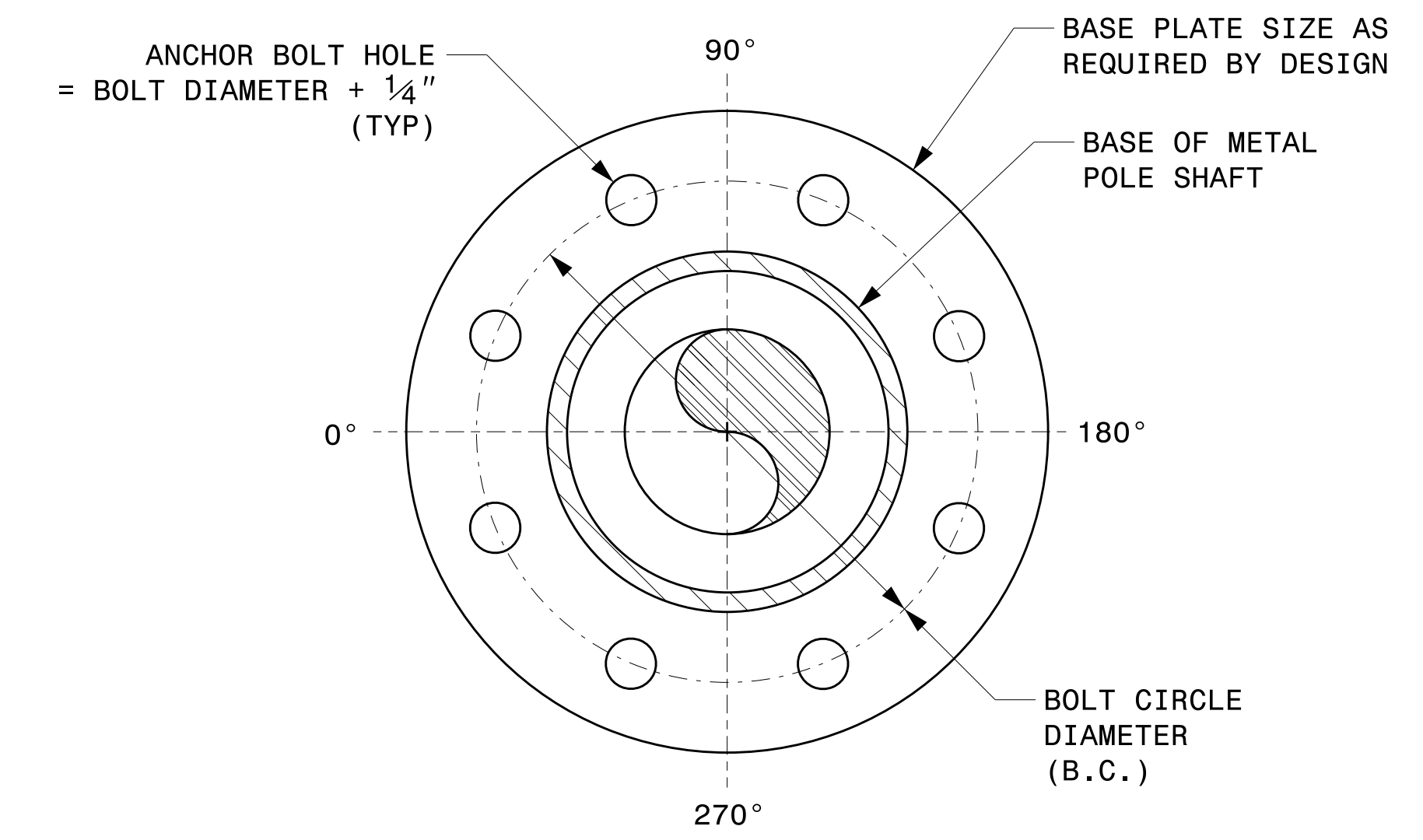
12 BOLT PATTERN

CONSTRUCT TEMPLATES AND PLATES FROM 1/4" (MIN) THICK STEEL. GALVANIZING IS NOT REQUIRED.

BASE PLATE TEMPLATE AND ANCHOR BOLT LOCK PLATE DETAILS

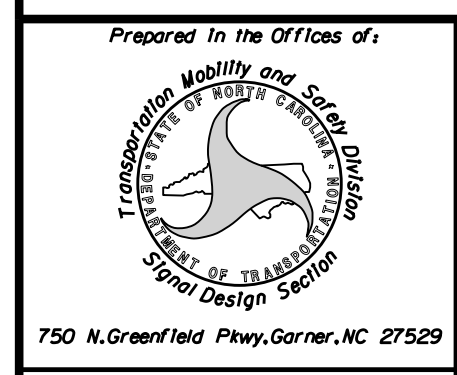


ANCHOR BOLT DETAIL

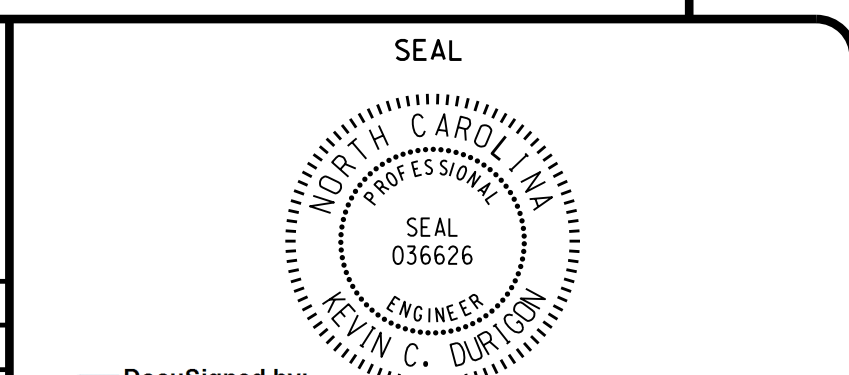


NOTE: BASE PLATE MAY BE CIRCULAR, OCTAGONAL, SQUARE OR RECTANGULAR IN SHAPE.

TYPICAL BASE PLATE DETAIL



Prepared in the Offices of:	
Typical Fabrication Details For All Metal Poles	
PLAN DATE: SEPTEMBER 2023	DESIGNED BY: C.F. ANDREWS
PREPARED BY: K.C. DURIGON	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE



DocuSigned by:
Kevin Durigon
4P23DC79B3784DA

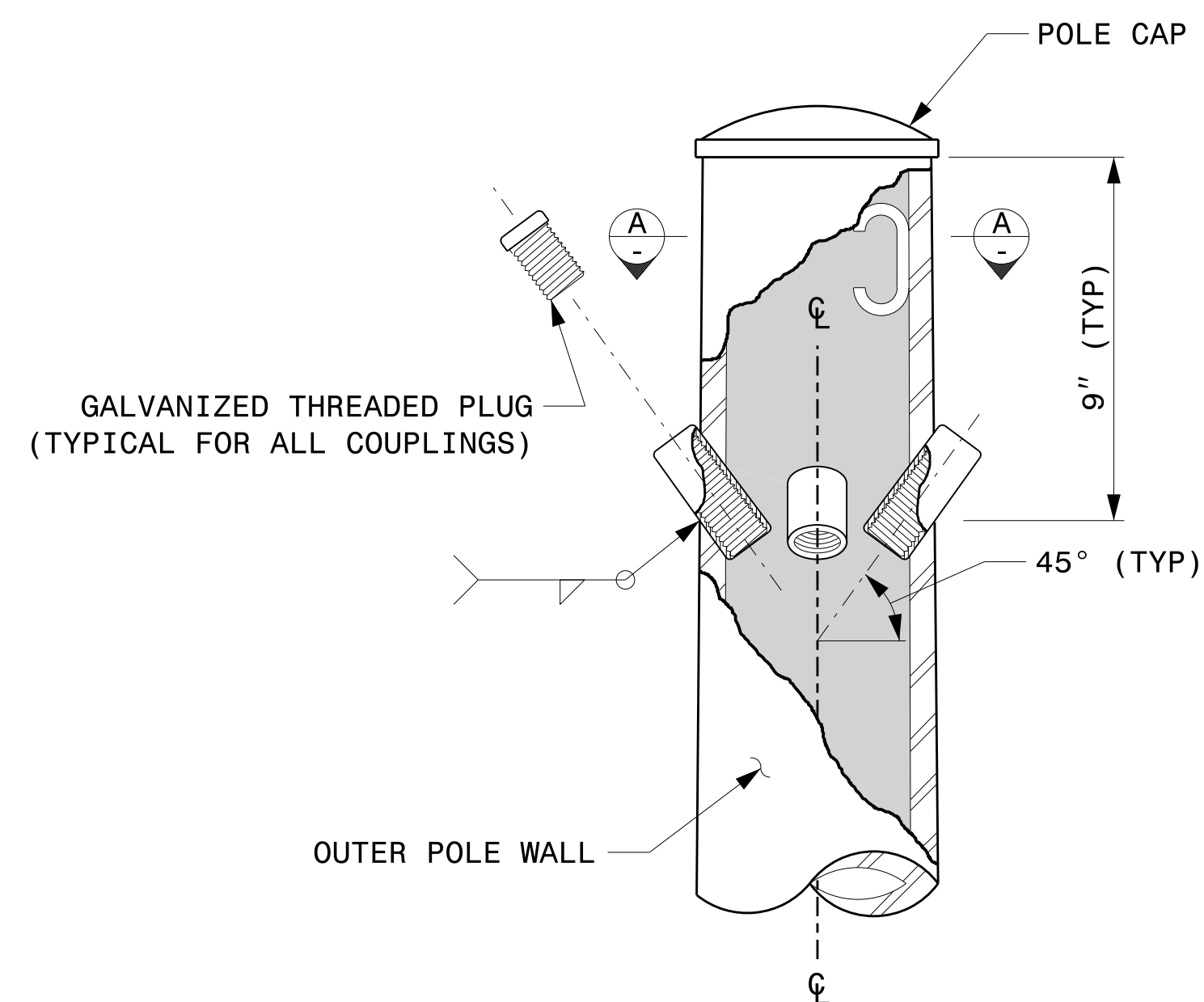
09/21/2023
DATE

04_dpt_2023_10.dwg
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Kedar Figon

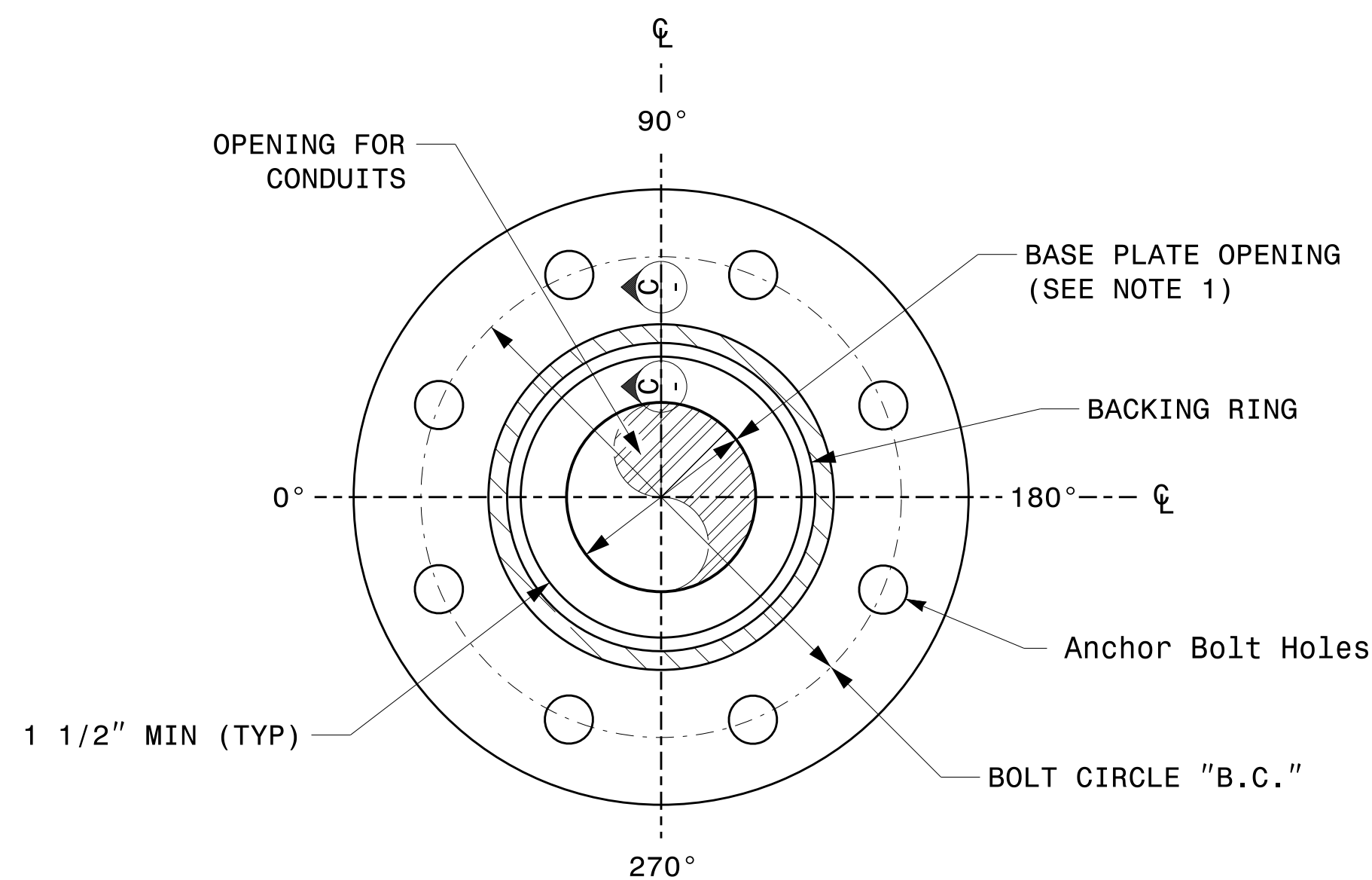
Fabrication Details – All Metal Poles

NOTE:

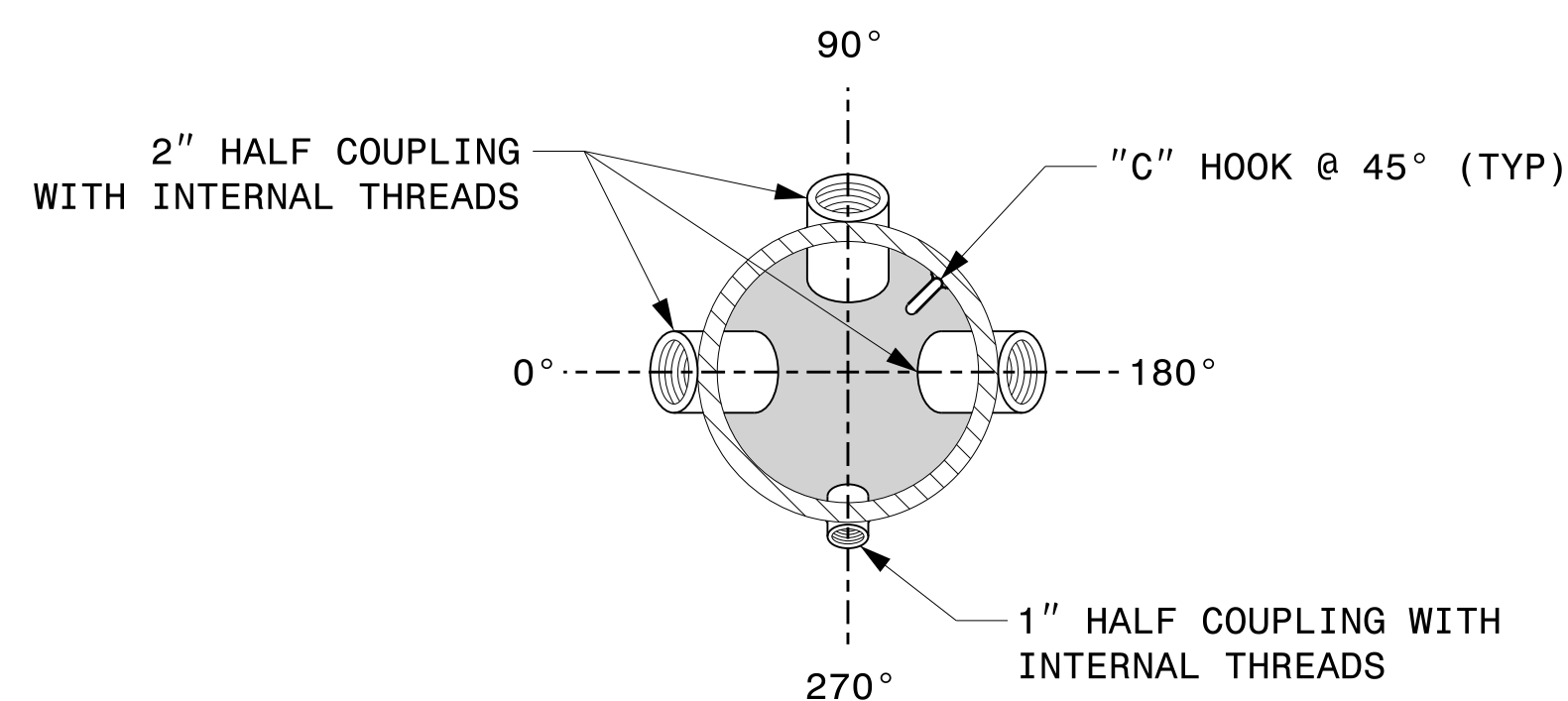
1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS $3\frac{1}{2}$ " BUT SHALL NOT BE LESS THAN $8\frac{1}{2}$ ".



CABLE ENTRANCES AT TOP OF POLE

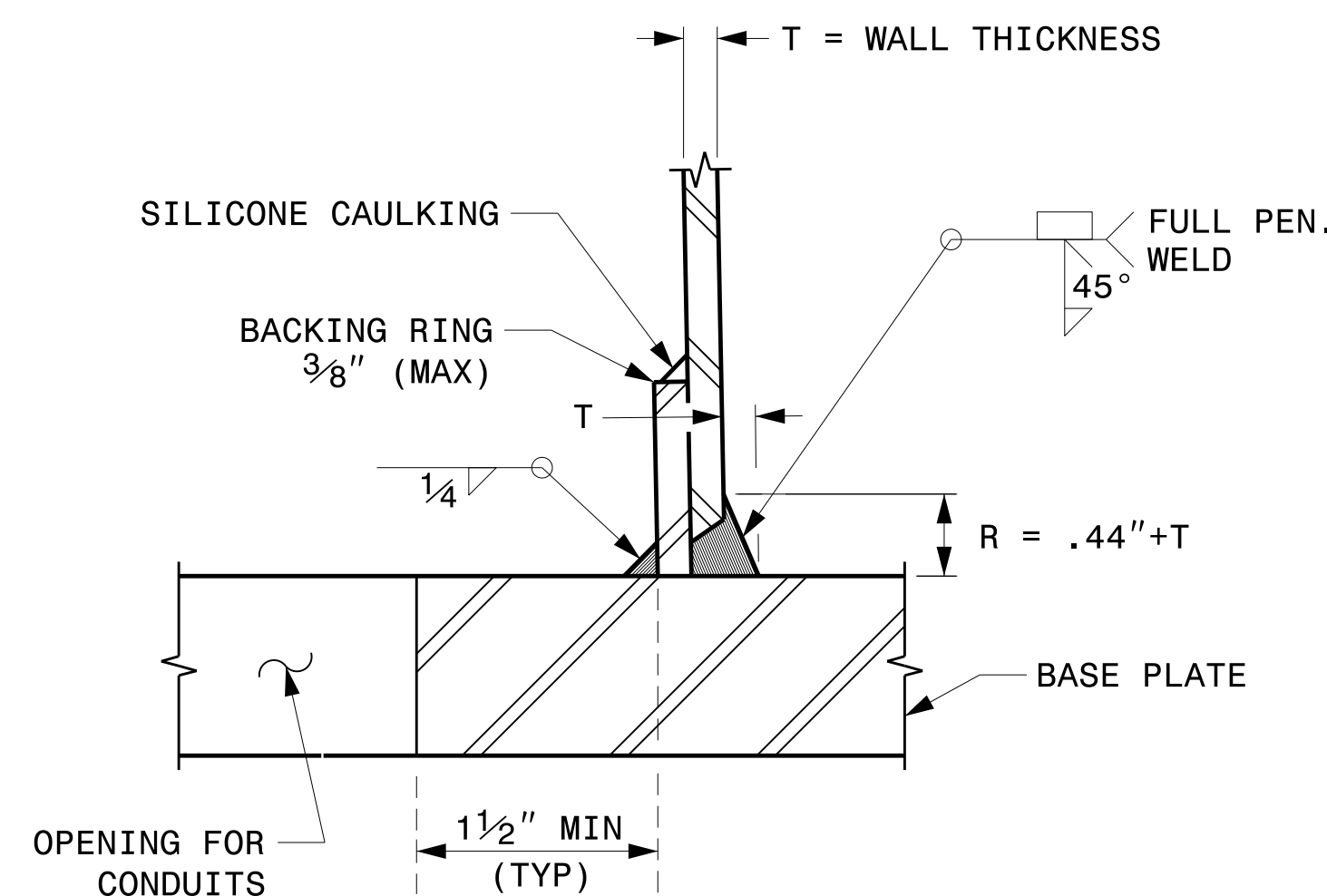


SECTION B-B
POLE BASE PLATE DETAILS
(8 AND 12 BOLT PATTERN)

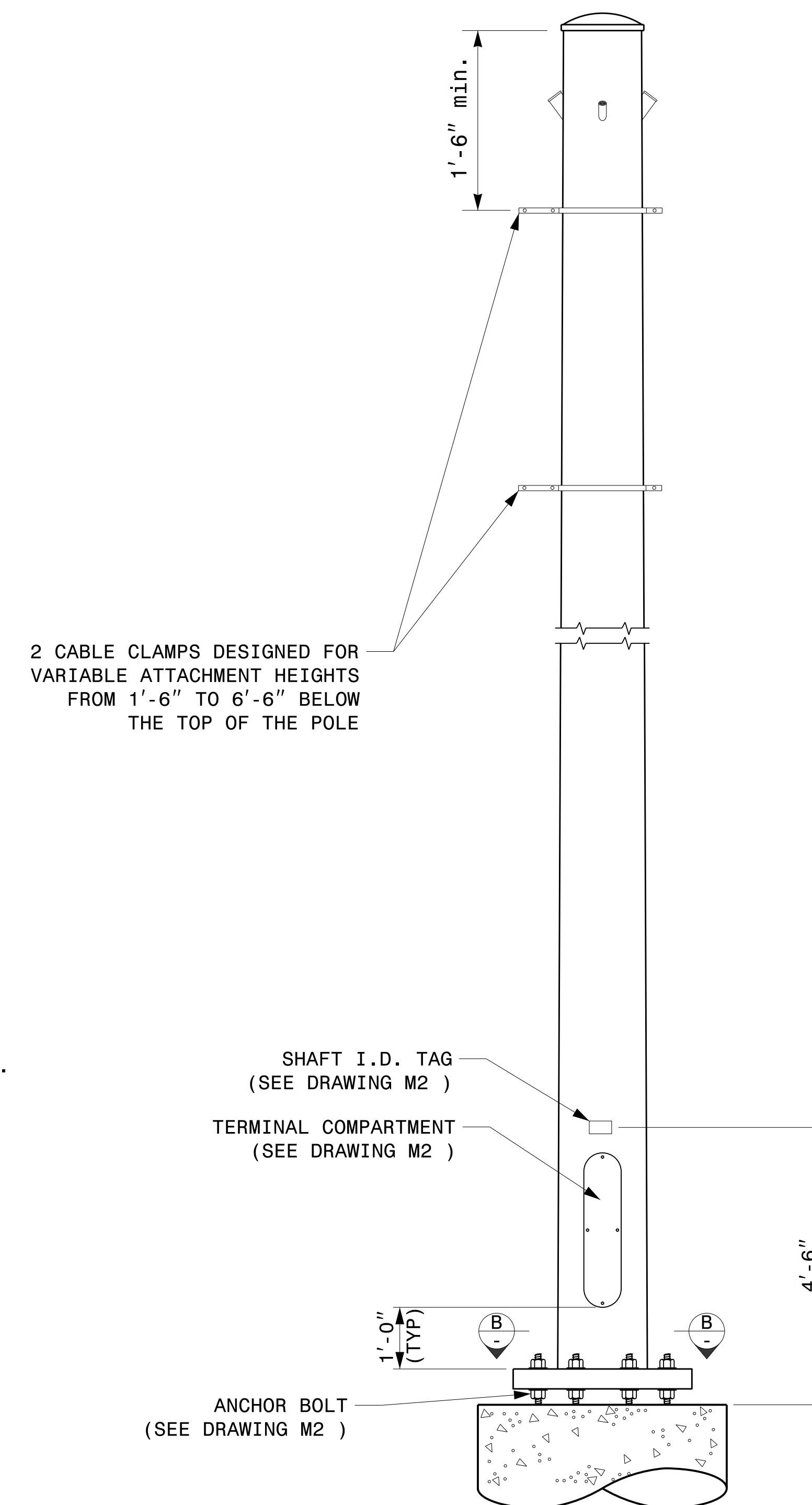


SECTION A-A

RADIAL ORIENTATION OF 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

Typical Fabrication Details For Strain Poles	
PLAN DATE: SEPTEMBER 2023	DESIGNED BY: K.C. DURIGON
PREPARED BY: K.C. DURIGON	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL

DocuSigned by:
Kevin Durigon
SIGNATURE

09/23/2023
DATE

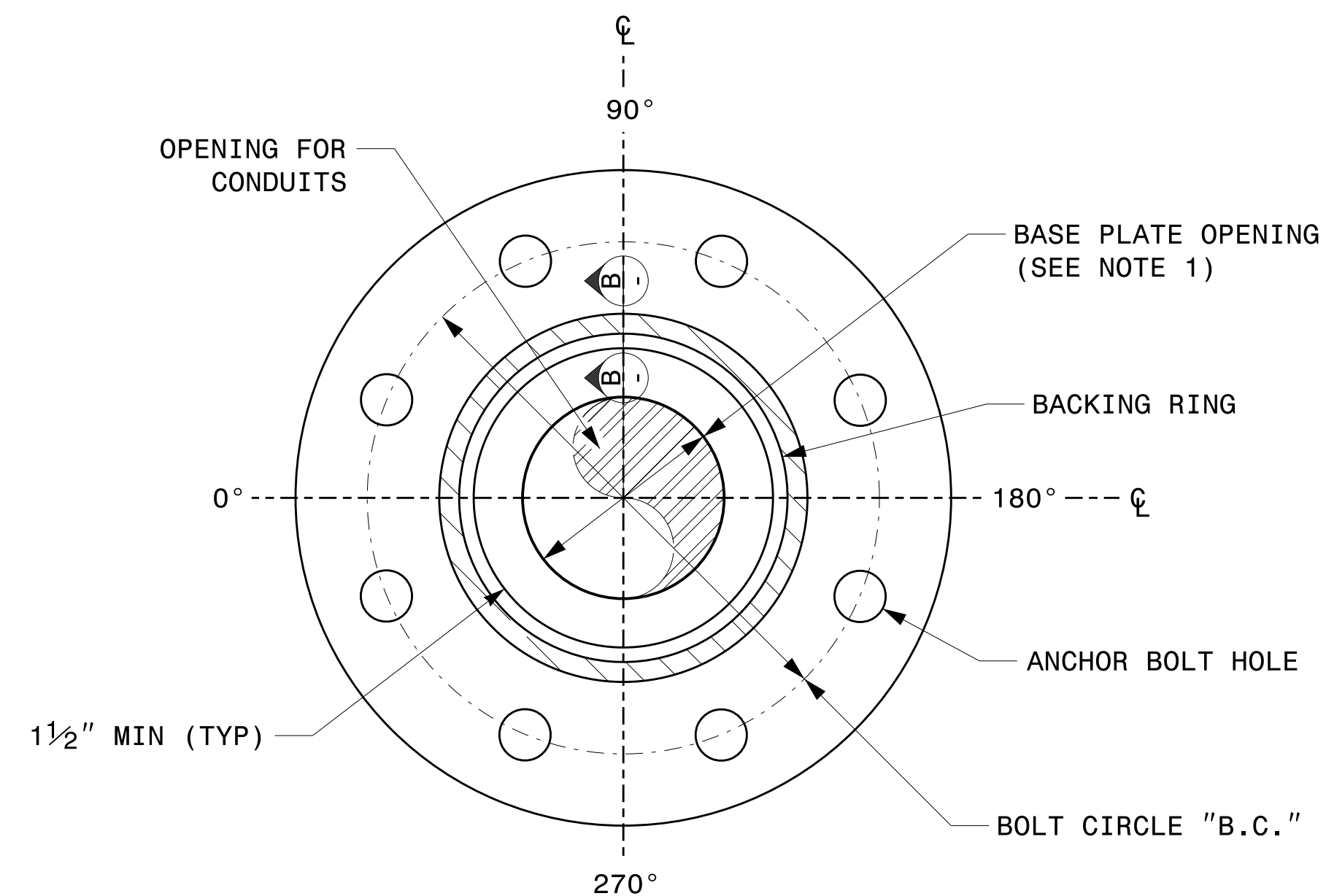
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08-dt-2023-10-31
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Kedar Durigon

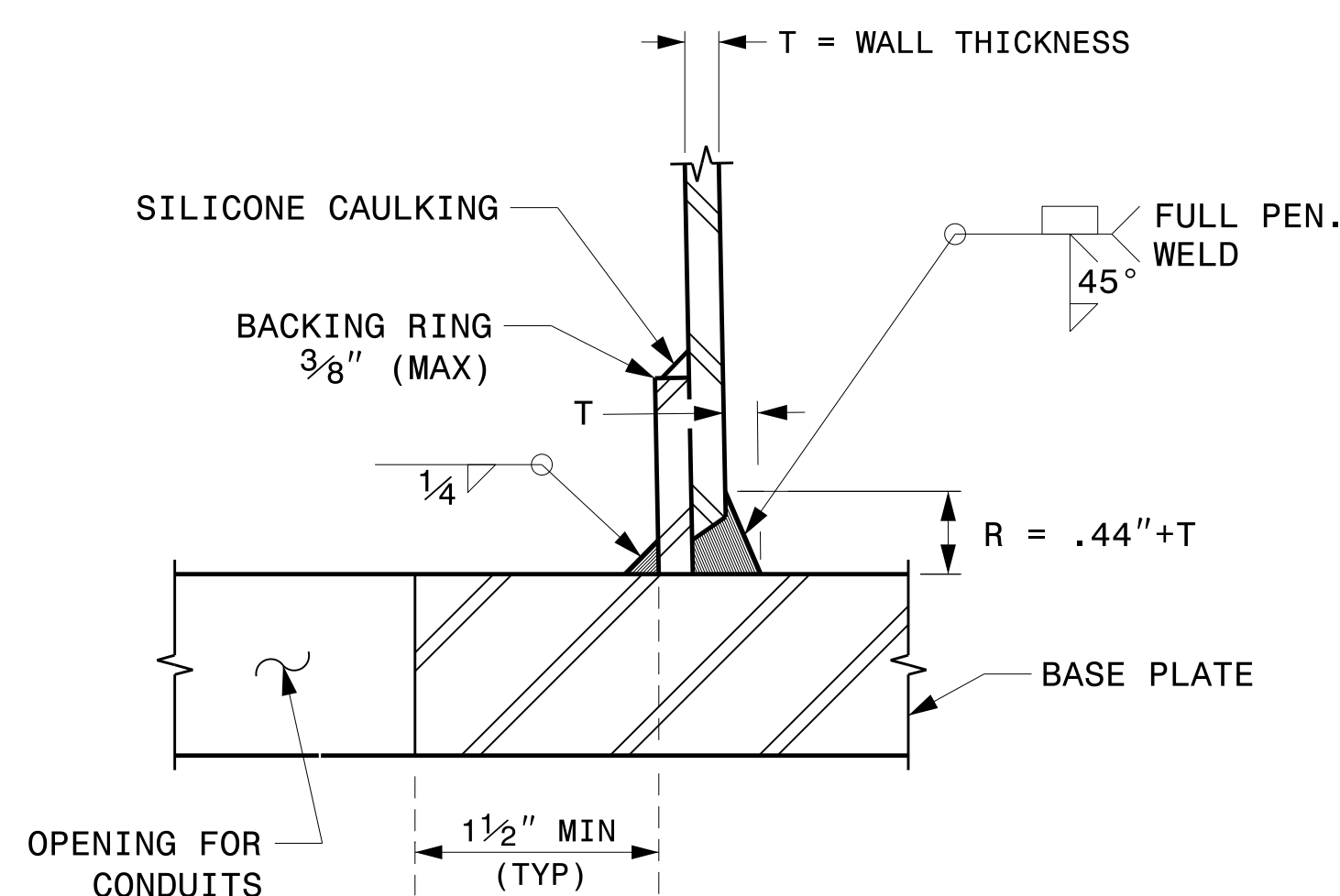
Fabrication Details – Strain Poles

NOTE:

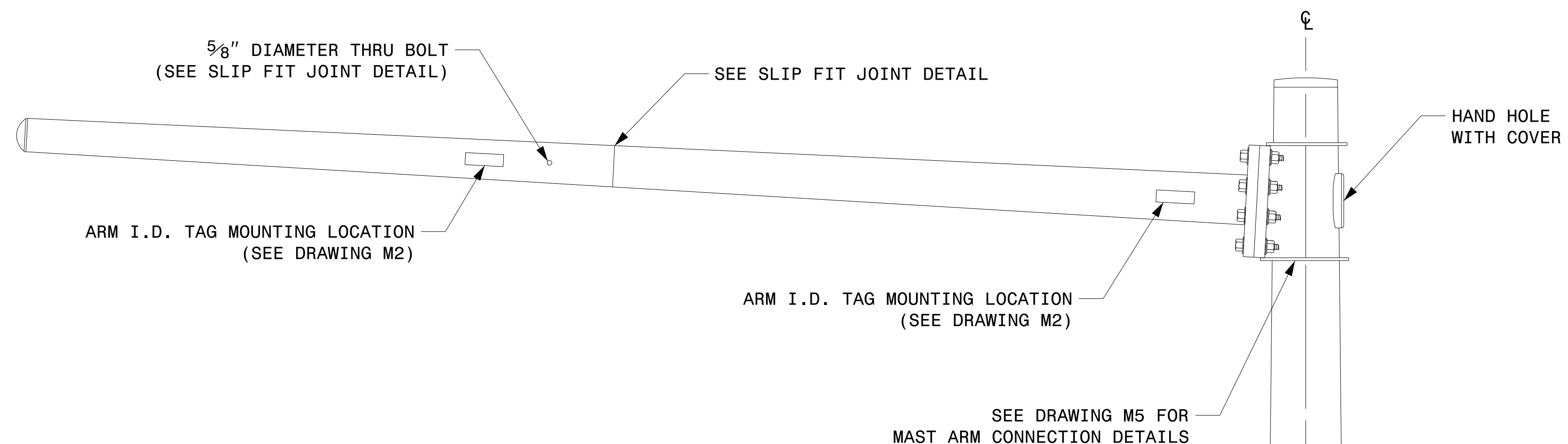
1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3 1/2" BUT SHALL NOT BE LESS THAN 8 1/2".



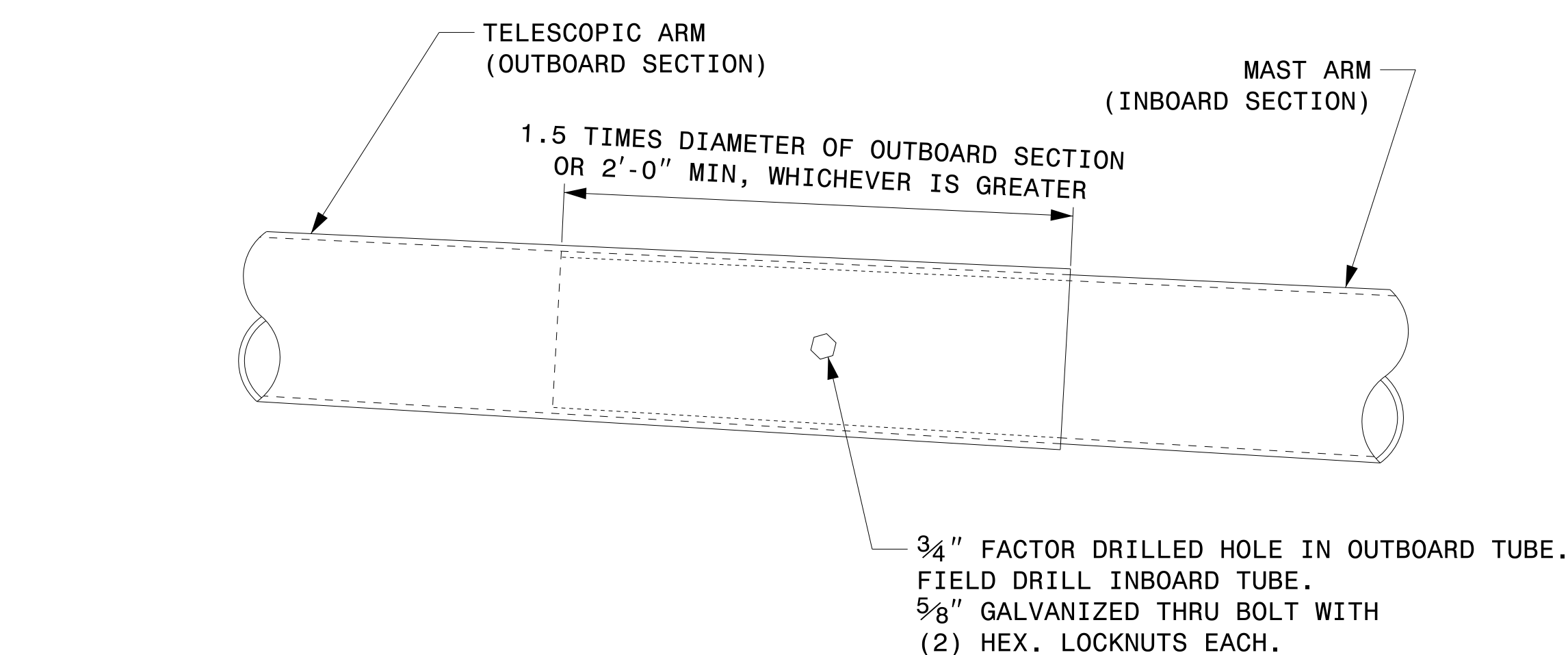
SECTION A-A
POLE BASE PLATE DETAILS



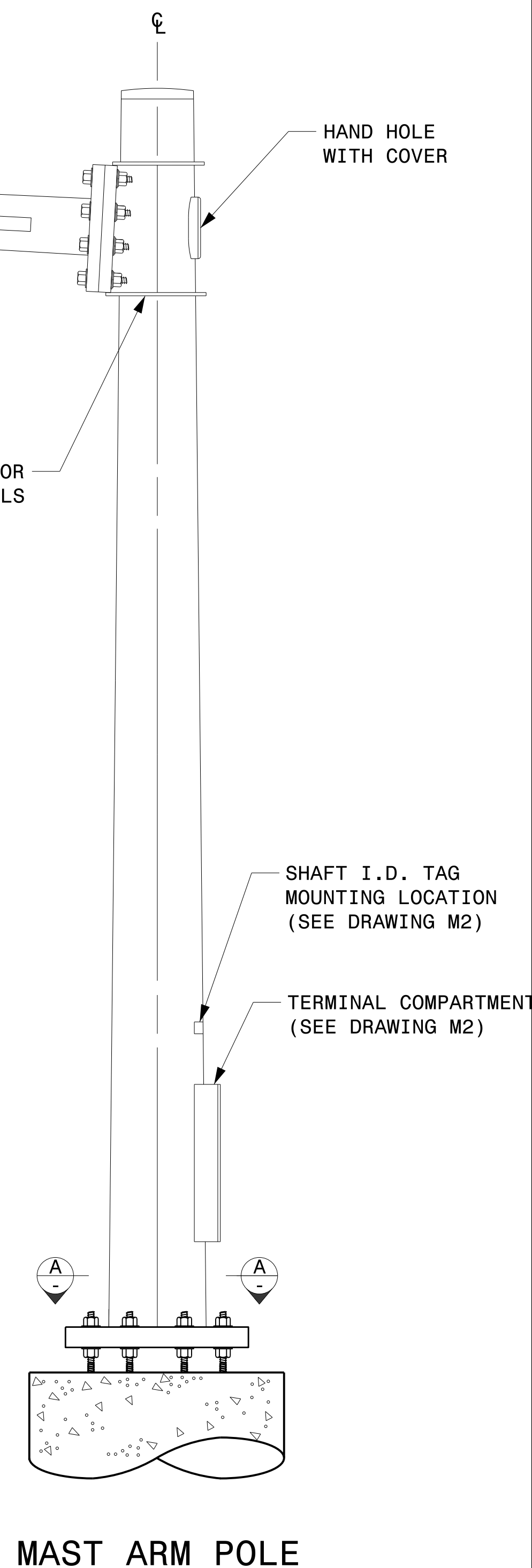
SECTION B-B
(POLE ATTACHMENT TO BASE PLATE)
FULL-PENETRATION
GROOVE WELD DETAIL



SLIP FIT JOINT DETAIL FOR MAST ARM



MAST ARM RADIAL ORIENTATION



MAST ARM POLE

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: NA
NONE

Typical Fabrication Details For Mast Arm Poles			
PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	K.C. DURIGON
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR
REVISIONS	INIT.	DATE	

SEAL

DocuSigned by:
Kevin Durigon
SIGNATURE

09/21/2023
DATE

09-drt-2023-10-31E
S:\155504115\Sig.M4\15\Sig.M4 Stru. Fabrication Details-Mast Arm Poles.dgn
Kedar Durigon

Fabrication Details – Mast Arm Poles

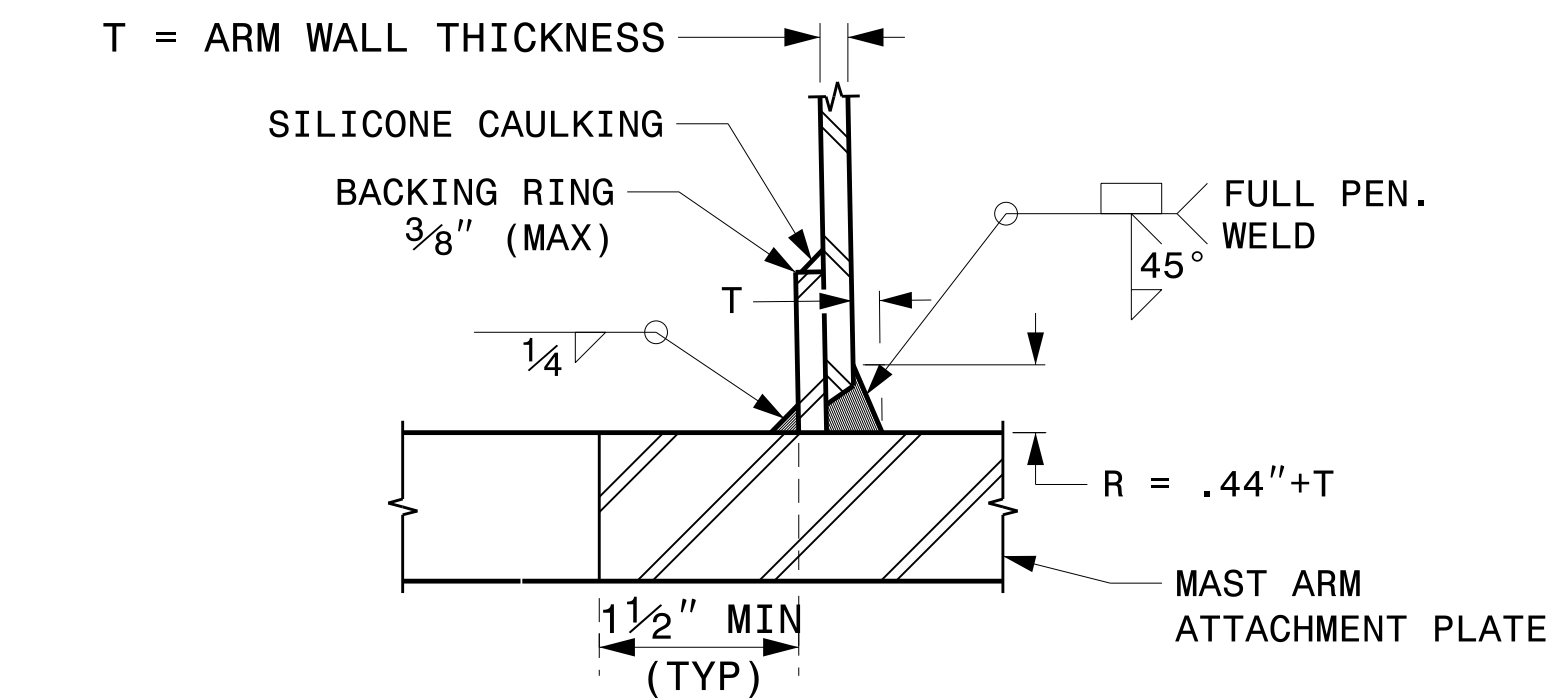
WELDED RING STIFFENED MAST ARM CONNECTION

PROJECT I.D. NO.

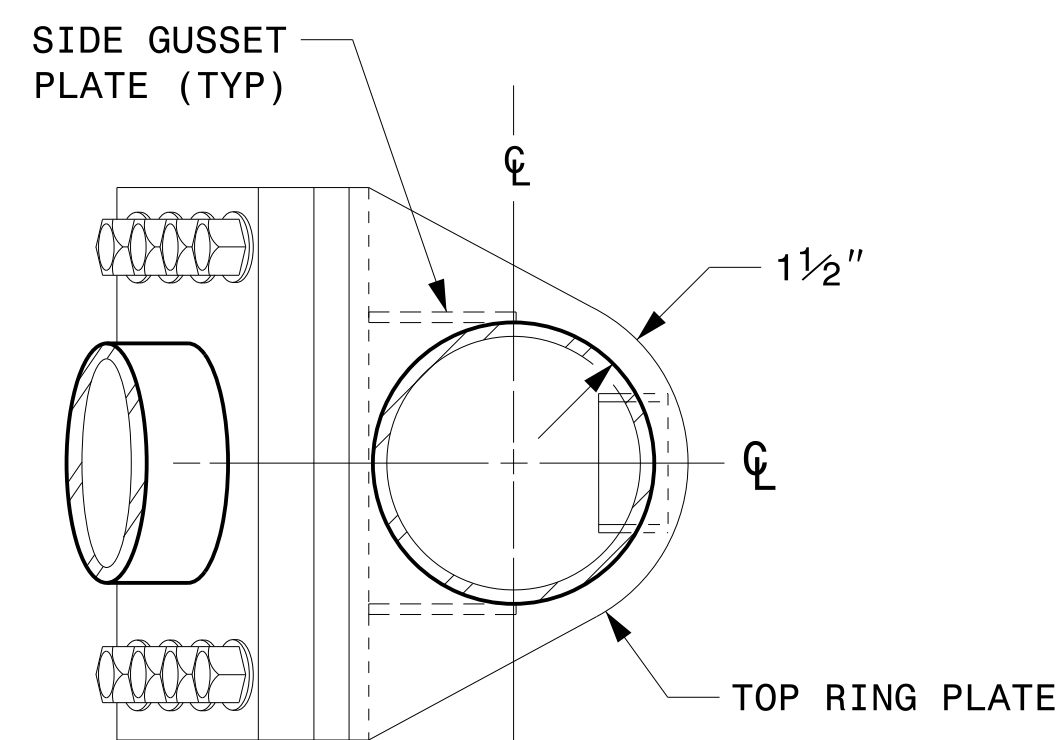
SHEET NO.

49218.26

Sig.M5



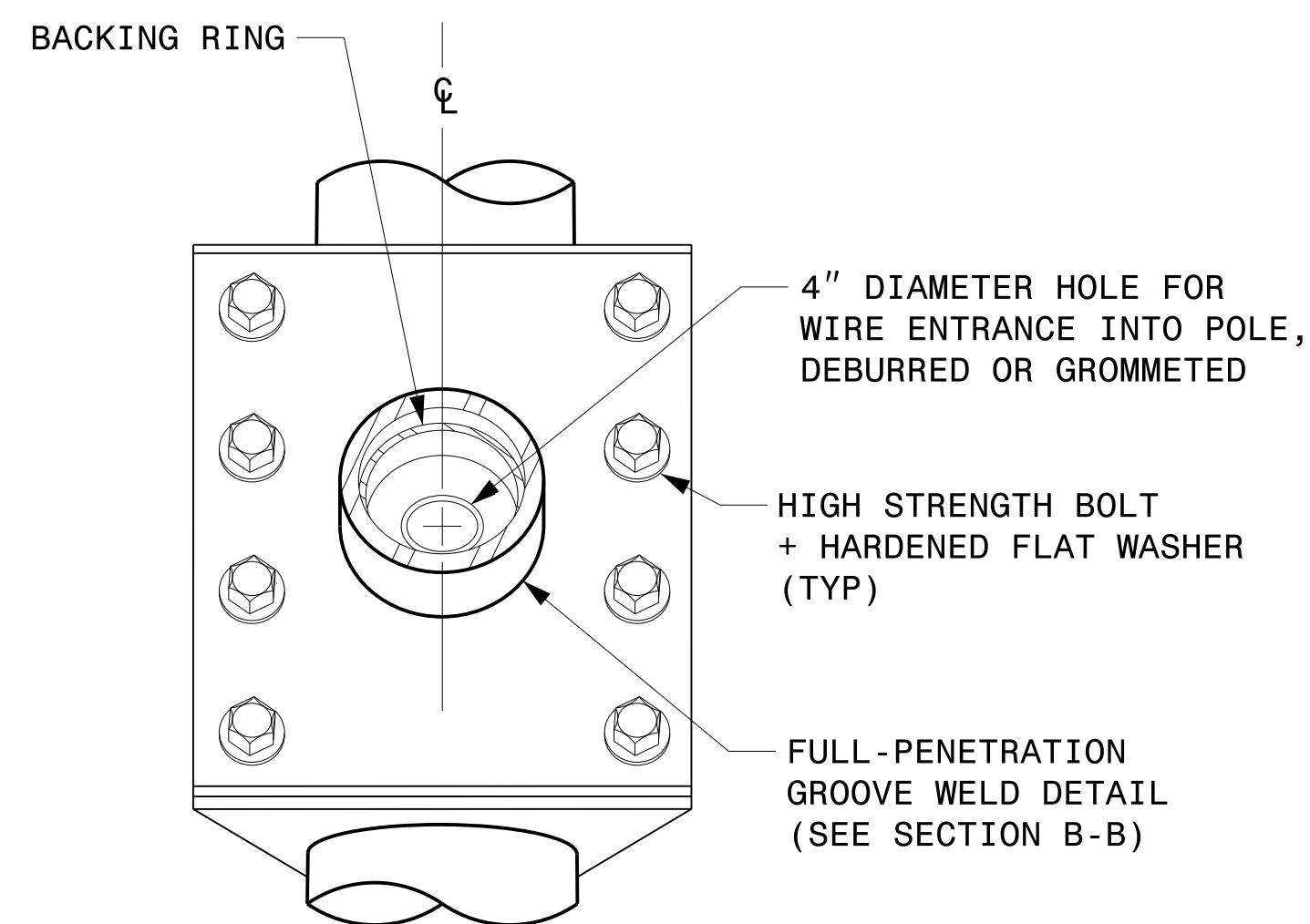
**SECTION B-B
FULL-PENETRATION GROOVE WELD DETAIL**



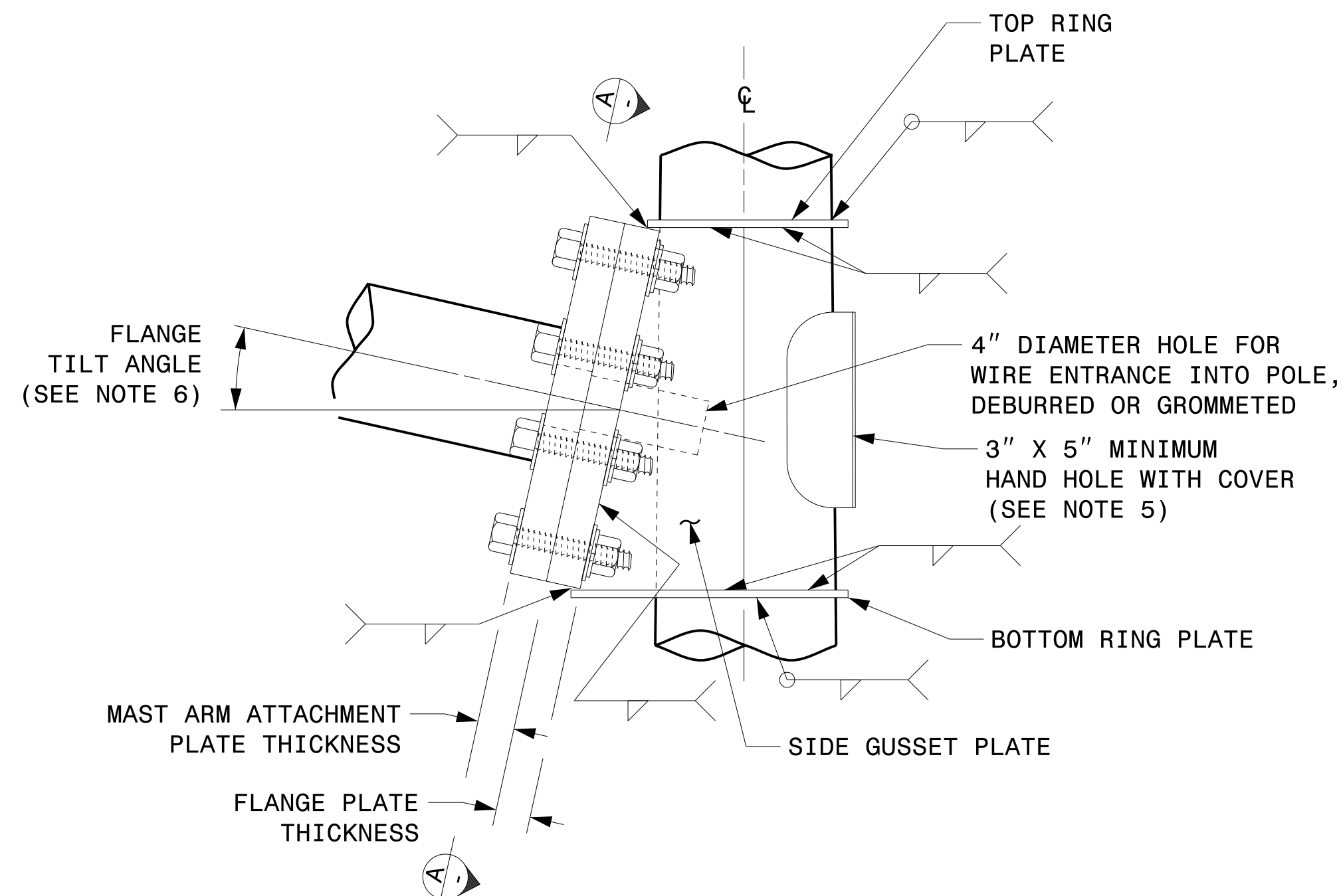
PLAN VIEW

NOTES:

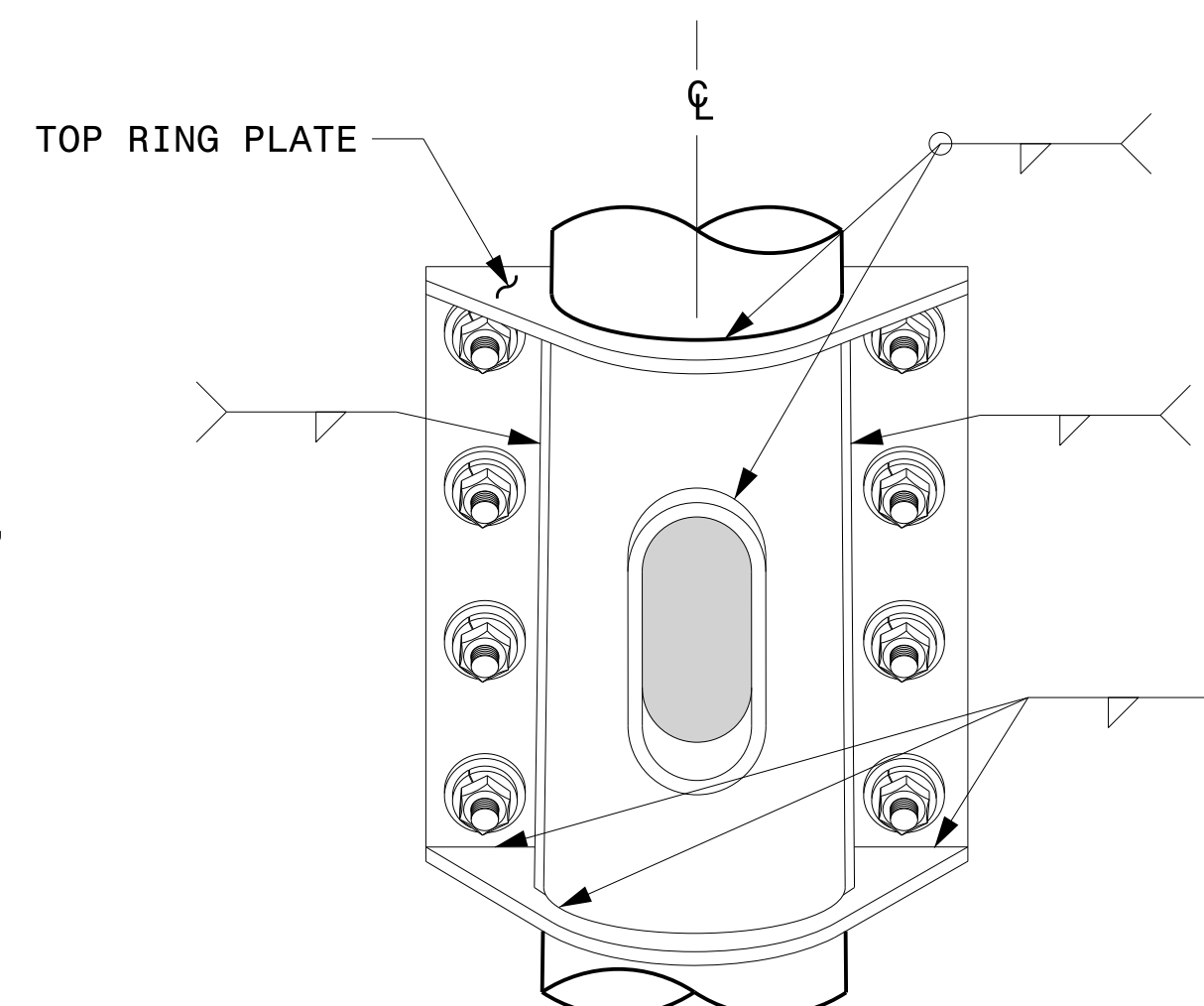
1. PROVIDE A PERMANENT MEANS OF IDENTIFICATION ABOVE THE MAST ARM TO INDICATE PROPER ATTACHMENT ORIENTATION OF THE MAST ARM.
2. DESIGNER WILL DETERMINE THE SIZE OF ALL STRUCTURAL COMPONENTS, PLATES, FASTENERS, AND WELDS SHOWN UNLESS THEY ARE ALREADY SPECIFIED.
3. FABRICATOR IS RESPONSIBLE FOR PROVIDING APPROPRIATE HOLES AT DRAINAGE POINTS TO DRAIN GALVANIZING MATERIALS.
4. FOR MINIMUM EDGE DISTANCE AND NOMINAL BOLT HOLE SIZE, FOLLOW THE LATEST AISC STEEL CONSTRUCTION MANUAL.
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.



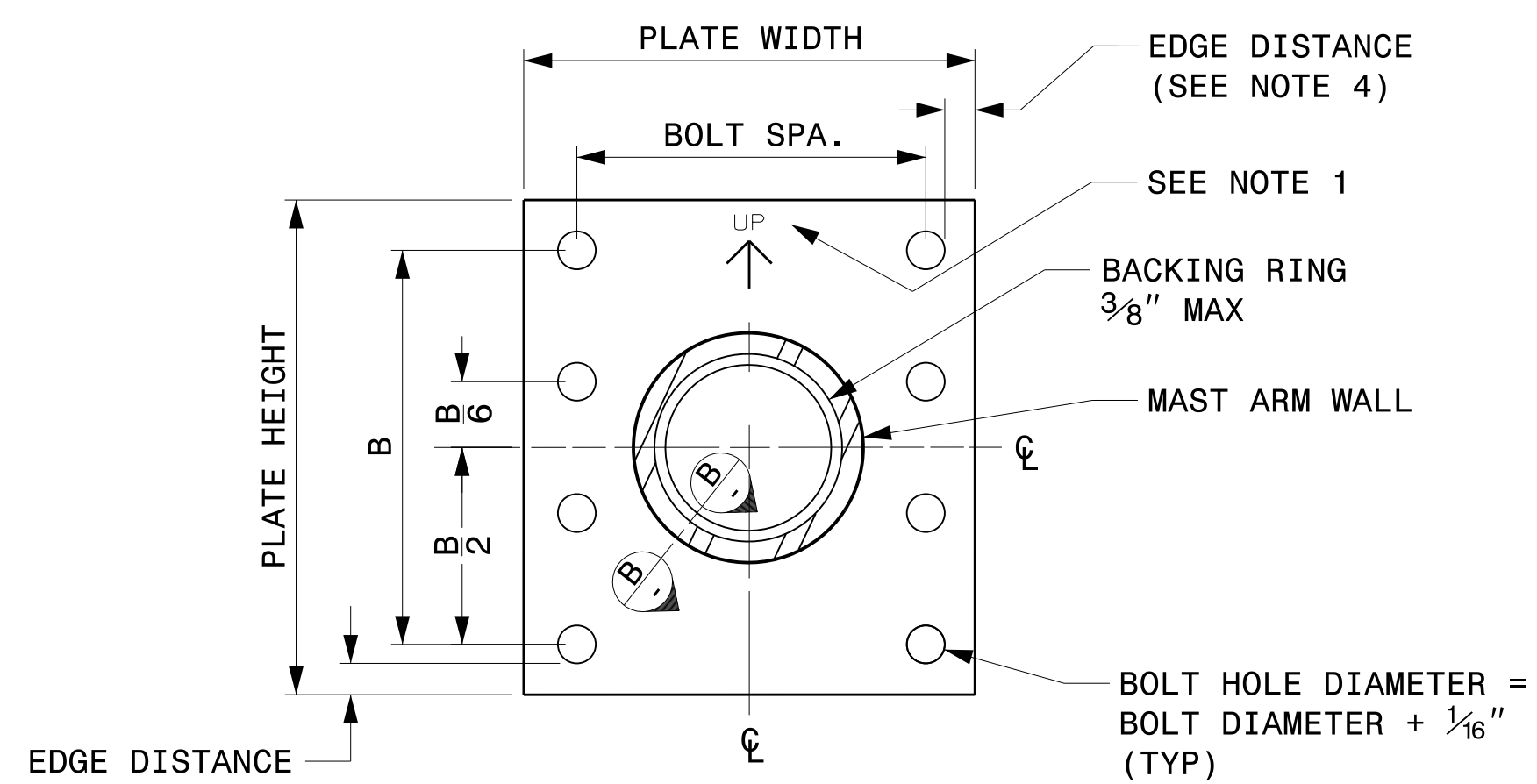
FRONT ELEVATION VIEW



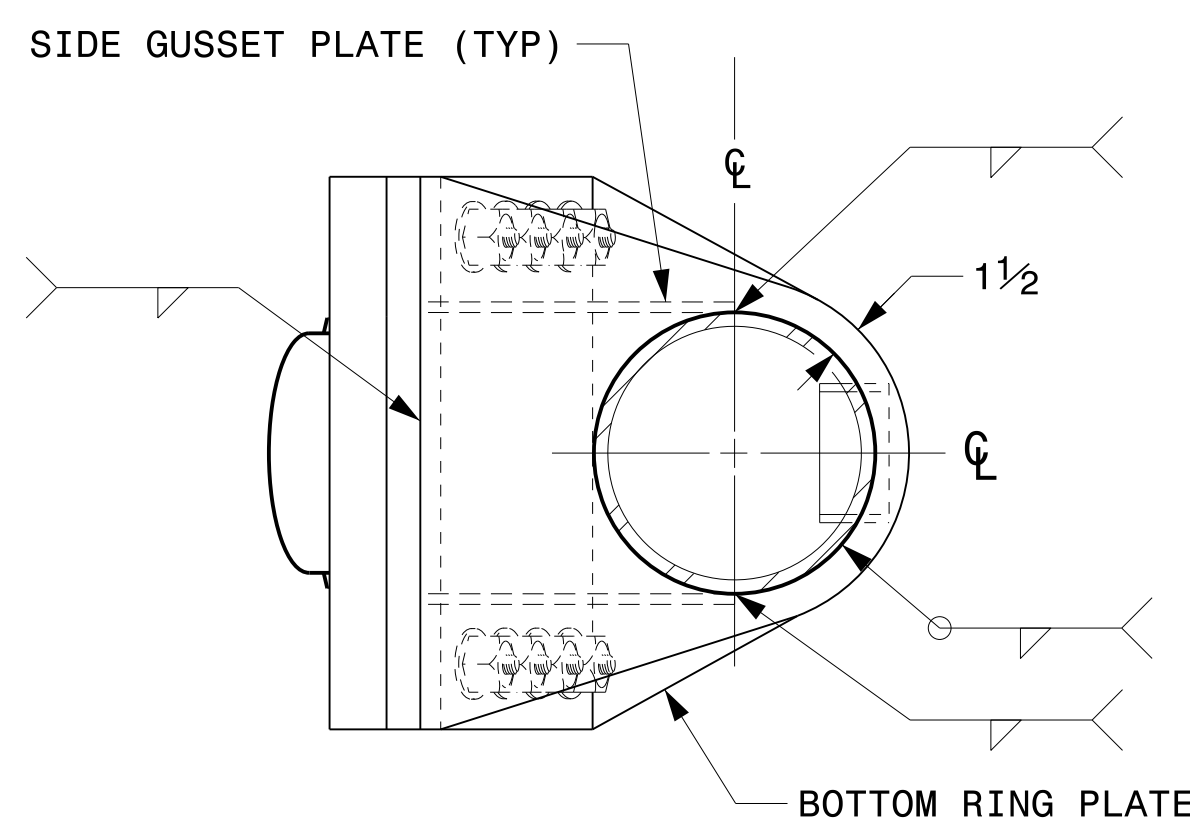
SIDE ELEVATION VIEW



BACK ELEVATION VIEW



**SECTION A-A
MAST ARM ATTACHMENT PLATE**



BOTTOM VIEW

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: NA
NONE

Typical Fabrication Details For Mast Arm Connection To Pole	
PLAN DATE: SEPTEMBER 2023	DESIGNED BY: C.F. ANDREWS
PREPARED BY: K.C. DURIGON	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL

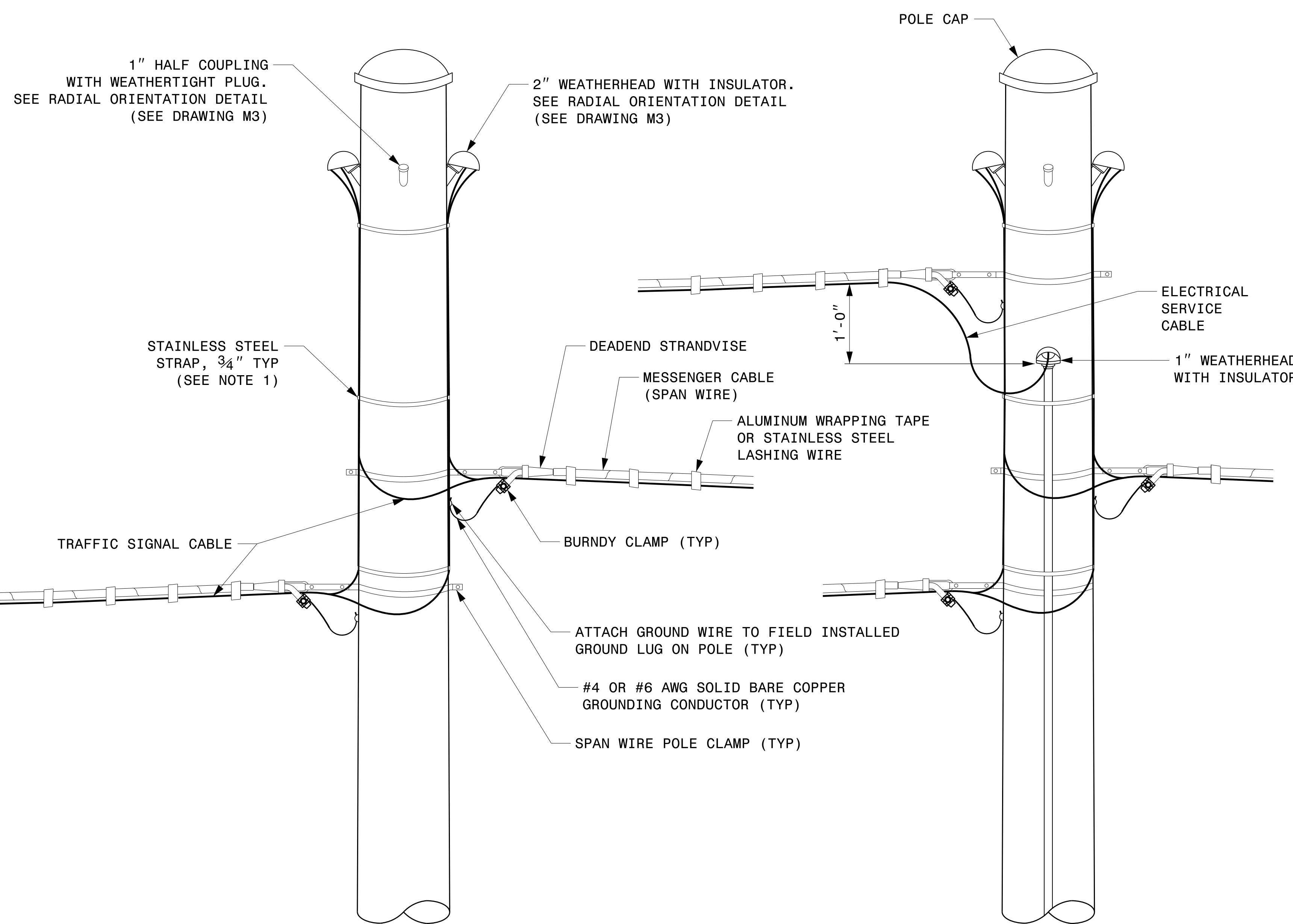
DocuSigned by:
Kevin Durigon
SIGNATURE

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09/21/2023
DATE

03-dwt-2023-10-30
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Kedar Tagon

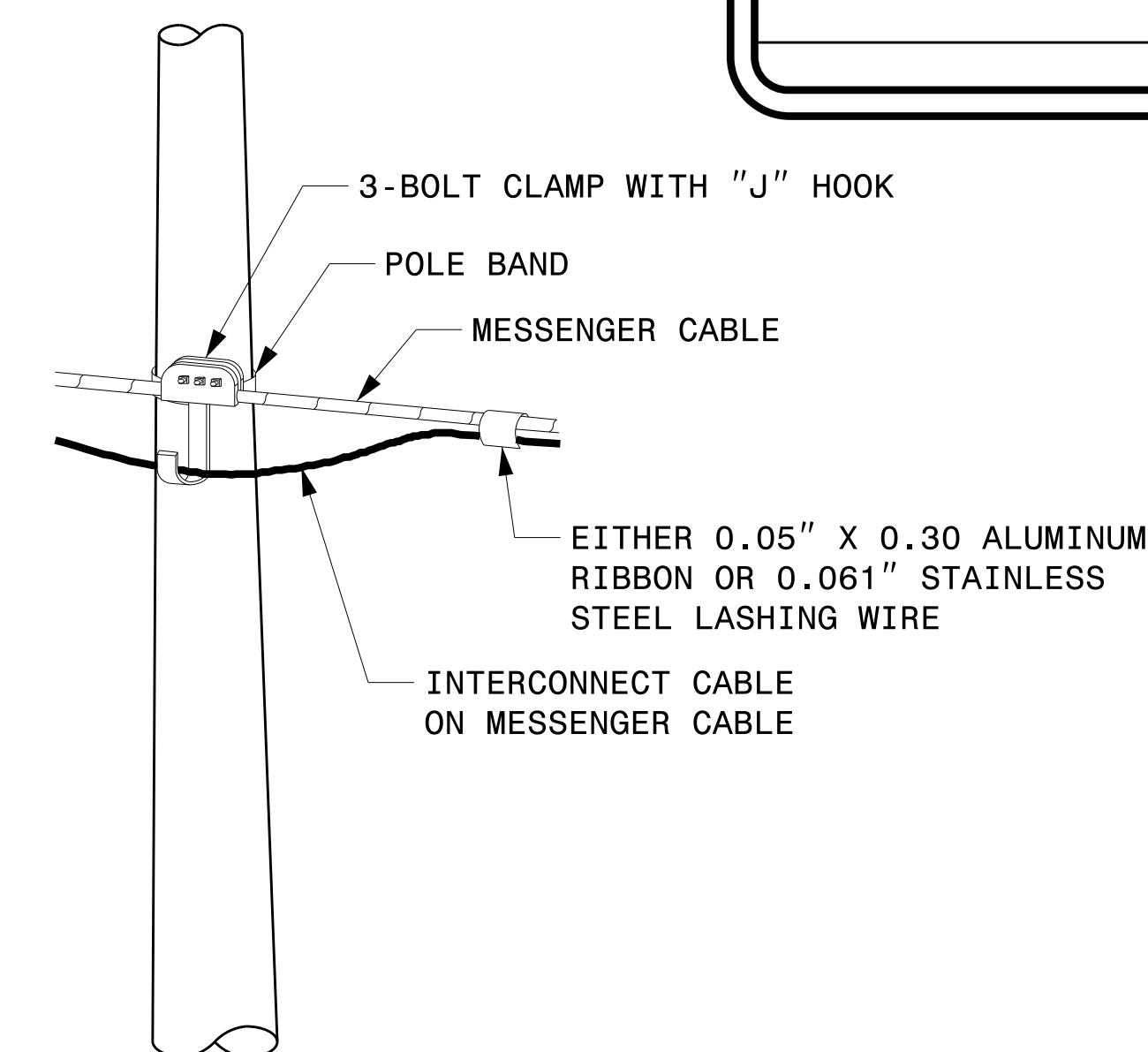
Fabrication Details – Mast Arm Connection



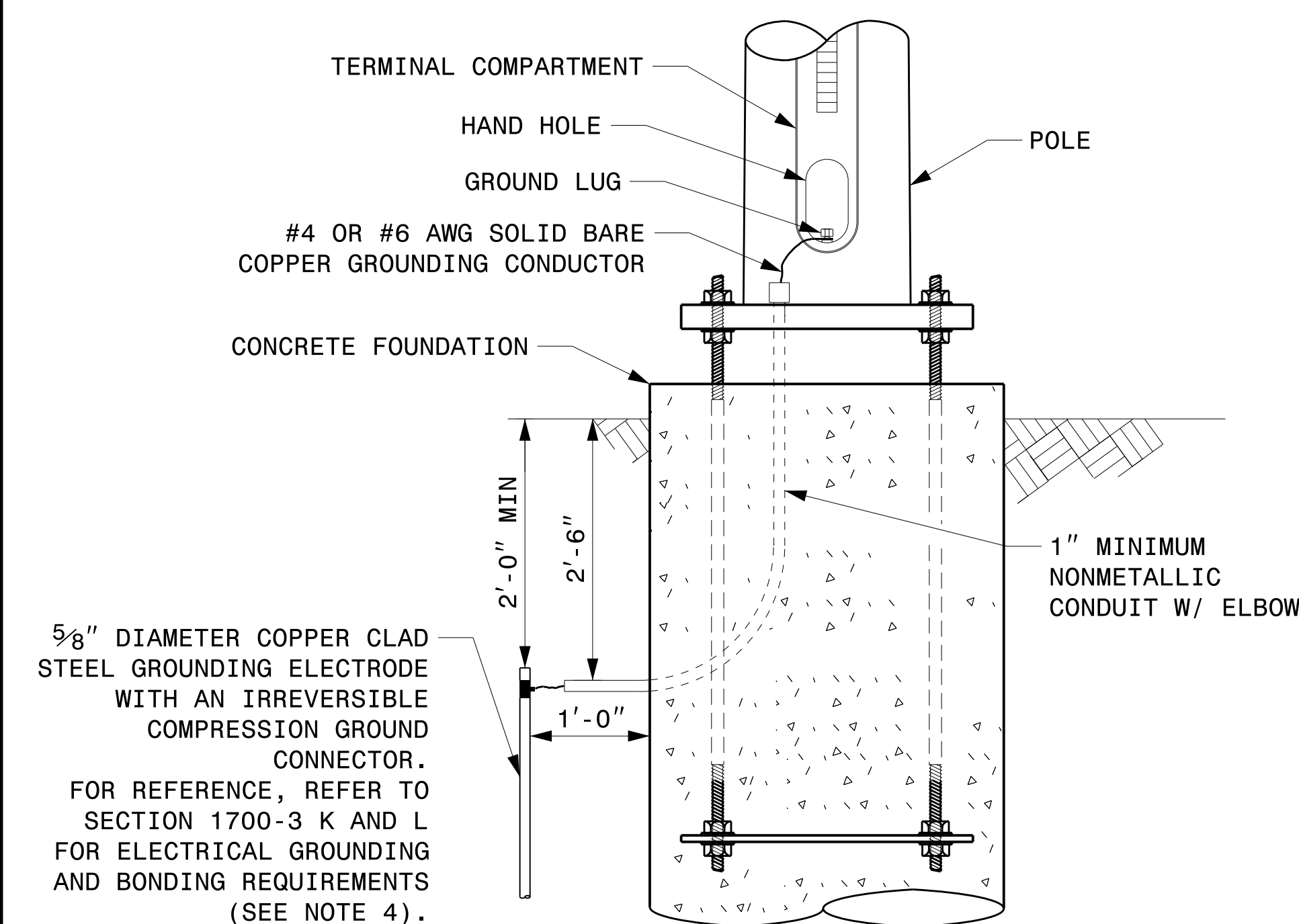
STRAIN POLE ATTACHMENTS

NOTES:

1. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WITH 3/4" STAINLESS STEEL STRAPS WHEN THE DISTANCE BETWEEN SPAN WIRE ATTACHMENT CLAMP AND WEATHERHEADS EXCEEDS 3'-0".
2. PROVIDE MINIMUM TWO SPAN WIRE 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 2024.



ATTACHMENT OF CABLE TO INTERMEDIATE METAL POLE



METAL POLE GROUNDING DETAIL FOR STRAIN POLE AND MAST ARM

08-dpt-2023-10-11
S:\ISSUES\415 Signal\Signal Design\Structures\Drawings\2024 Metal Pole Str. Fabrication Details-Strain Poles.dgn
Kedar Tigon

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details For Strain Pole Attachments

PLAN DATE: SEPTEMBER 2023 DESIGNED BY: C.F. ANDREWS

PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE

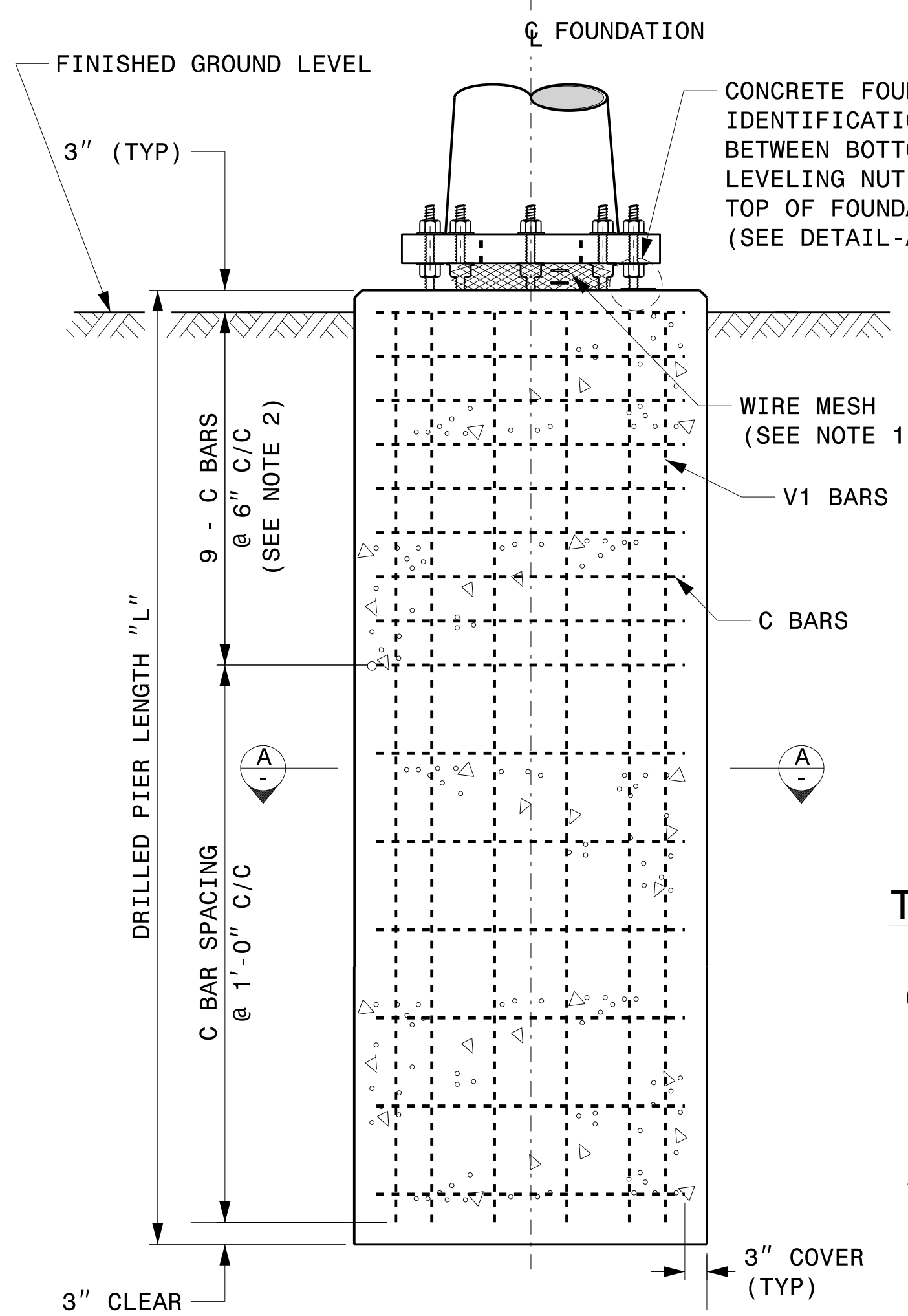
SEAL

DocuSigned by: Kevin Durigon

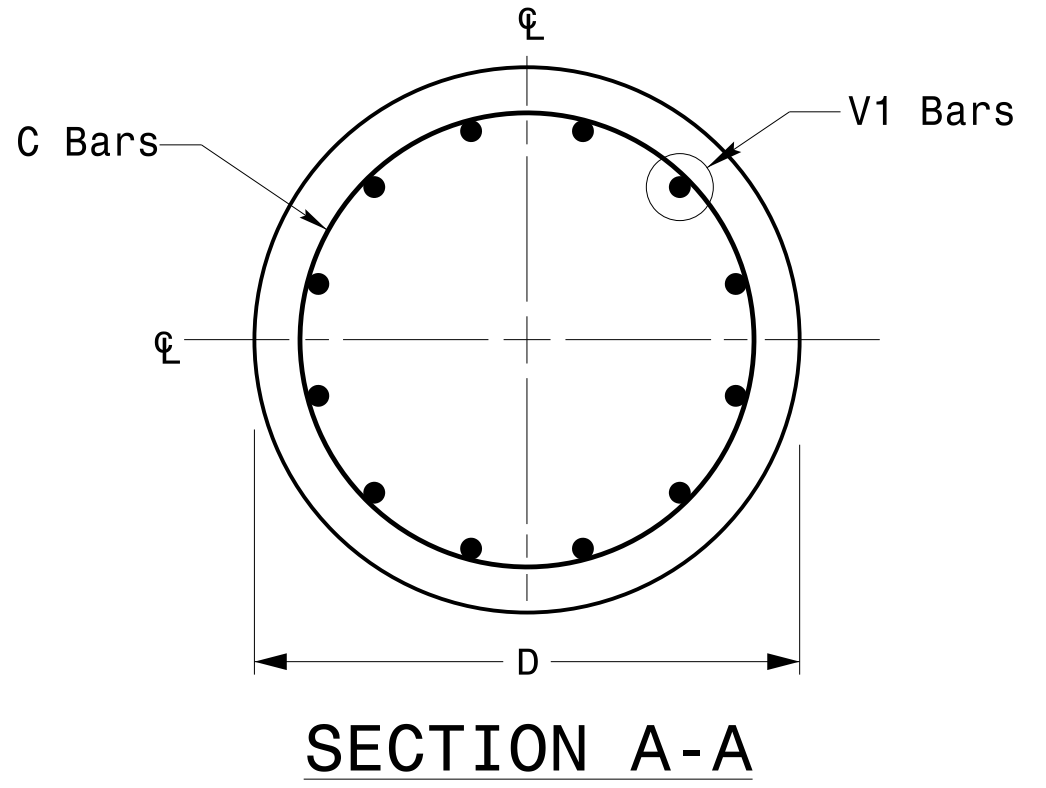
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09/21/2023 DATE

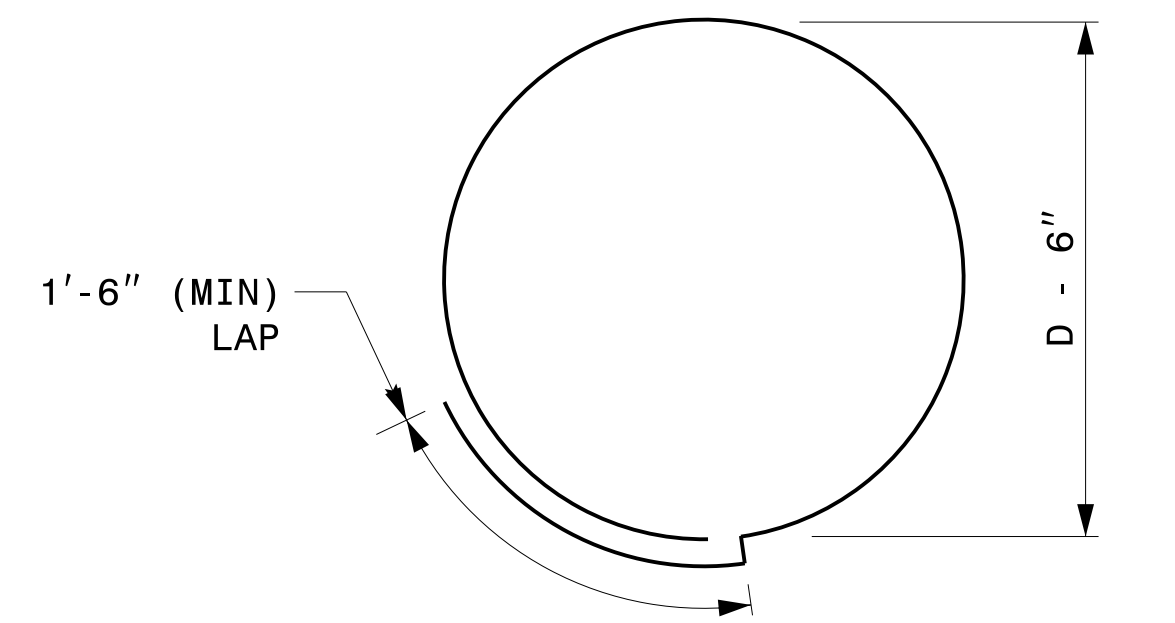
Fabrication Details - Strain Pole Attachments



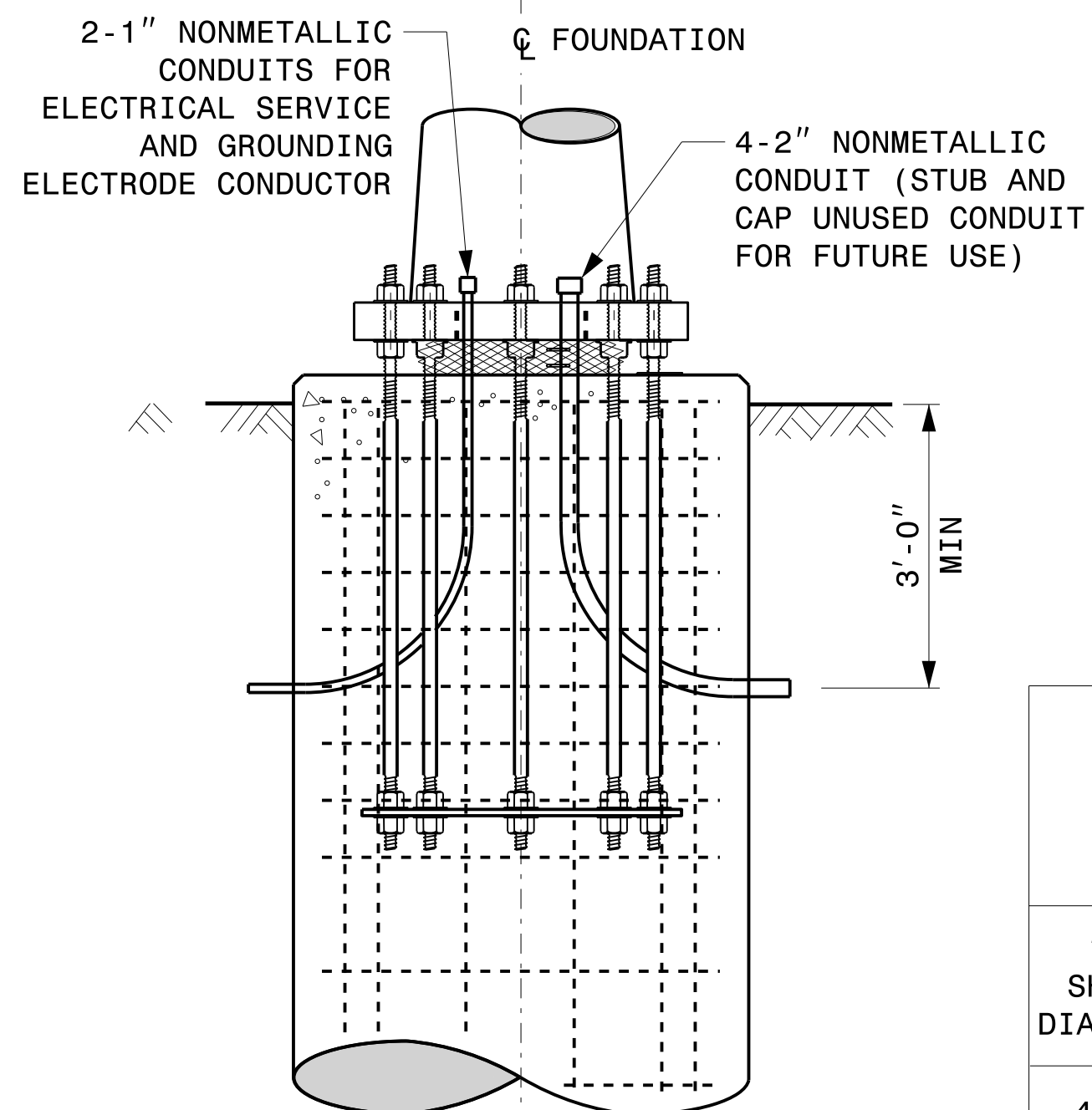
CONCRETE SHAFT ELEVATION



SECTION A-A



TYPICAL "C" BAR DETAIL



TYPICAL FOUNDATION CONDUIT DETAILS

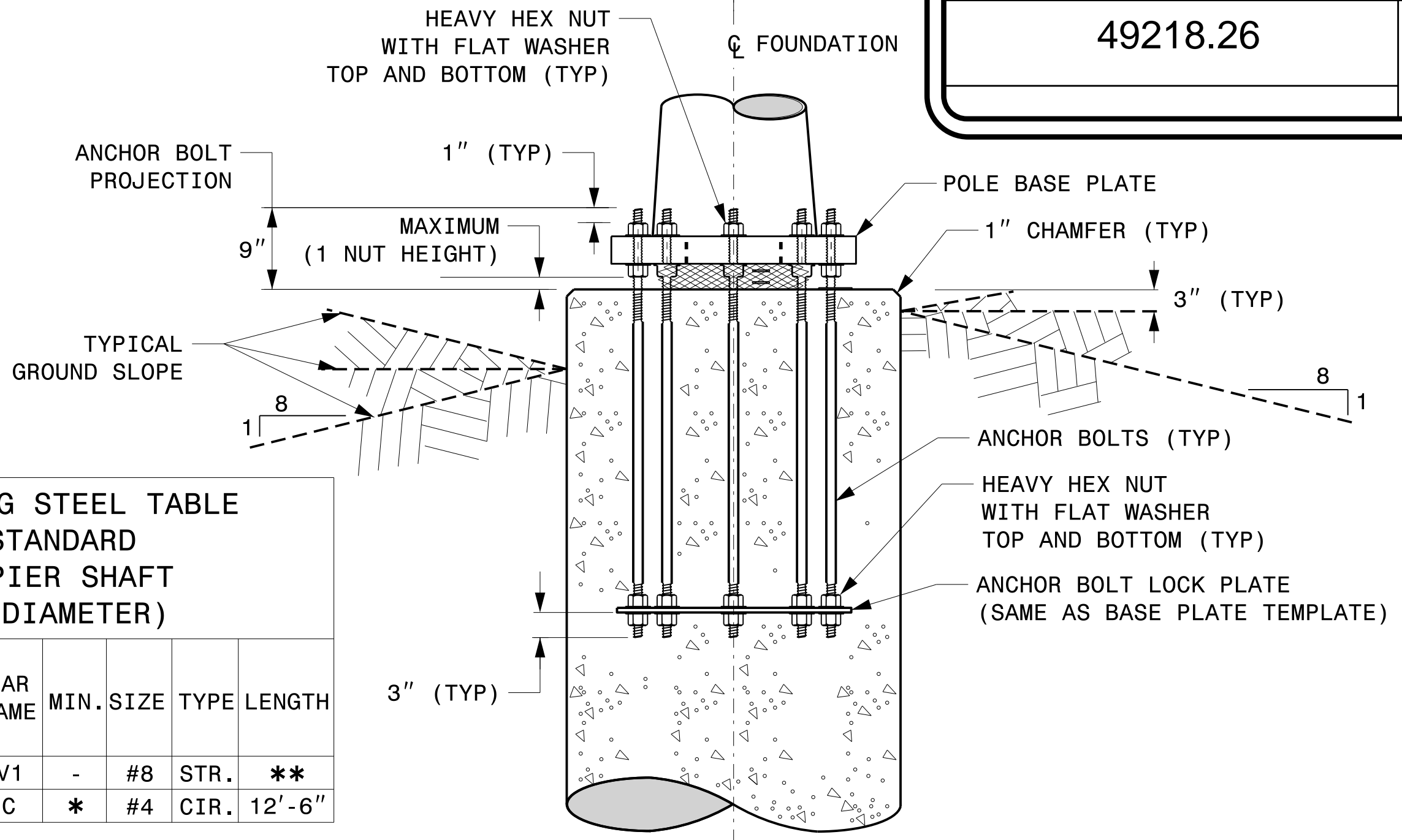
GENERAL NOTES:

- IF ACTUAL SUBSURFACE CONDITIONS DIFFER SIGNIFICANTLY FROM BORING DATA, CONTACT THE ENGINEER BEFORE EXCAVATING OR PLACING CONCRETE.
- 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.
- 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.
- PROVIDE 2" TO 5" FOUNDATION PROJECTION ABOVE GROUND LEVEL, DEPENDING ON THE GROUND SLOPE.
- 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.
- CONSTRUCT FOUNDATIONS IN ACCORDANCE WITH NCDOT STANDARD PROVISIONS SP09 R005- FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES. ALL APPLICABLE 2024 NCDOT STANDARD SPECIFICATIONS ARE REFERENCED IN THIS PROVISION. REFER TO THE NCDOT RESOURCES/SPECIFICATIONS PAGE LOCATED ON THE CONNECT NCDOT WEBSITE.
[https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx](https://connect.ncdot.gov/resources/Specifications%20and%20Special%20Provisions.aspx)
- USE AIR ENTRAINED AA CONCRETE MIX WITH A COMPRESSION STRENGTH OF f'c=4500 psi (MIN) AFTER 28 DAYS.
- USE ASTM A615 GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL. MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
- LOCATE IDENTIFICATION TAG ON TOP OF THE FOUNDATION, DIRECTLY ABOVE THE CONDUIT'S ENTRY POINT.
- PROVIDE TWO LAYERS OF 4 MESH GALVANIZED WELDED 23 GAUGE (0.025) 6" WIDE AROUND PIPES UNDER THE BASE PLATE AND SECURE IT WITH TIES IF NECESSARY.
- PREFERRED LOCATION FOR THE I.D. TAG IS AS SHOWN IN DETAIL-A: DIRECTLY ABOVE THE CONDUIT ENTERING THE FOUNDATION.

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4'-0" DIAMETER)

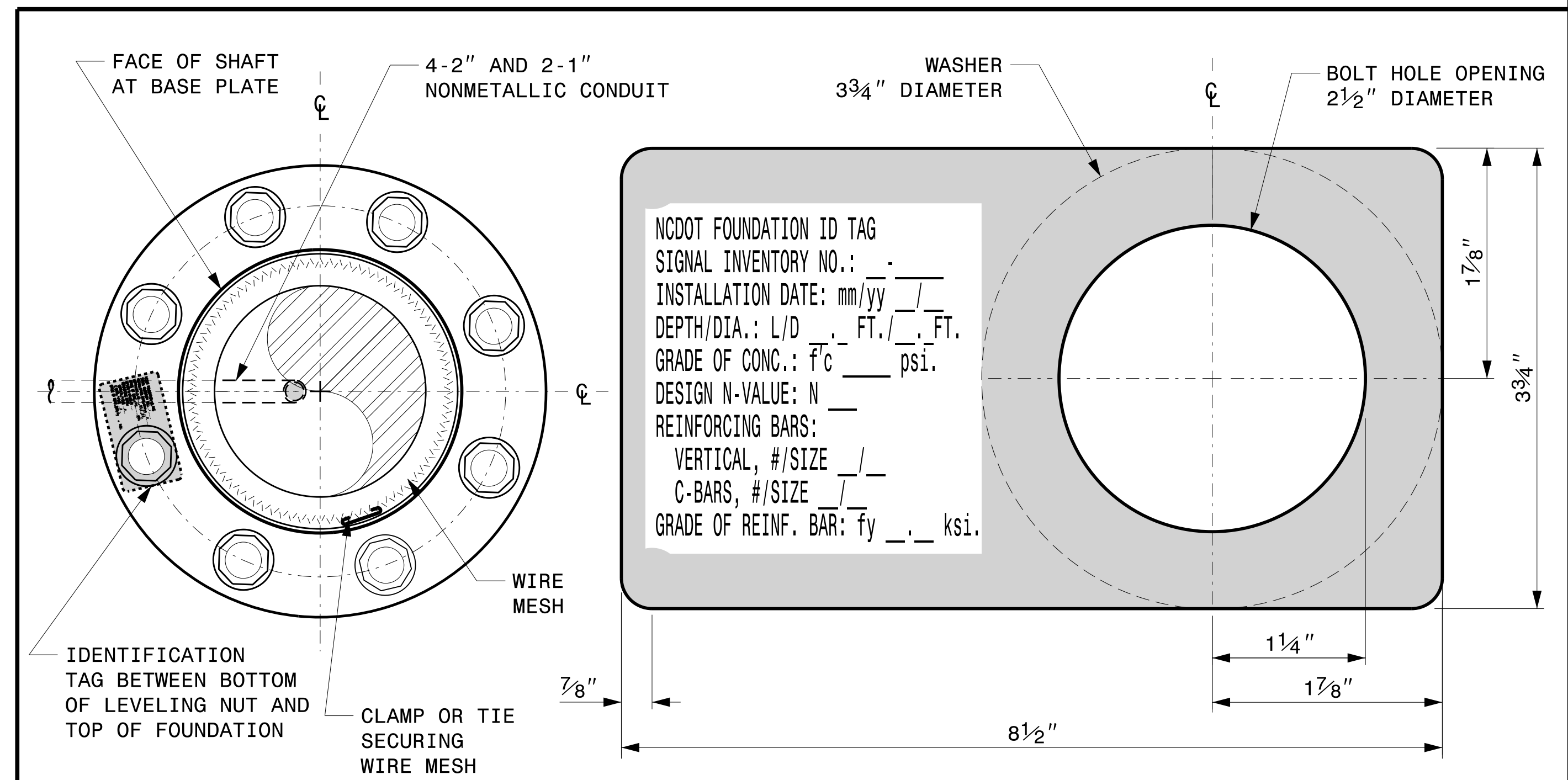
"D" SHAFT DIAMETER	CONCRETE VOLUME (CU. YDS)	BAR NAME	MIN. SIZE	TYPE	LENGTH
4'-0"	.465 X L	V1	-	#8 STR.	**
		C	*	#4 CIR.	12'-6"

* SEE NOTE 2
** SEE NOTE 3



TYPICAL FOUNDATION ANCHOR BOLT DETAILS

(REINFORCING CAGE NOT SHOWN FOR CLARITY)



CONCRETE FOUNDATION IDENTIFICATION TAG DETAILS

D = DIAMETER
L = LENGTH / DEPTH
mm = MONTH
yy = YEAR

DETAIL-A

Prepared in the Offices of:

Construction Details For Foundations

PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON
PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR

DocuSigned by: Kevin Durigon
4923DC78F3784DA

09/23/2023 DATE

03-dt-2023-10-4f S:\SS\0415\SIGNAL\Signal Design\Structures\Drawings\2024 Metal Pole Std Drawings for LRF\0204_Sig.M7_Std_Construction_Details_Strain_Poles.dgn Kedar Tigon

Construction Details - Foundations

SOIL CONDITION

PROJECT I.D. NO. SHEET NO.

49218.26 Sig.M8

STANDARD STRAIN POLES						STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) – Feet							Reinforcement			
Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
			Axial (kip)	Shear (kip)	Moment (ft-kip)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Bar Size (#)	Quantity (ea.)	Bar Size (#)	Spacing (in.)
S26L1	26	22	2	9	210	19.5	12.5	9	6.5	15.5	14.5	13	8	12	4	12
S26L2	26	23	2	10	240	19.5	12	9	6.5	15.5	14.5	13	8	12	4	12
S26L3	26	25	2	11	260	20.5	12	10	8	16	15	13	8	12	4	12
S30L1	30	22	2	9	230	19	11	9	7	15.5	14	12.5	8	12	4	12
S30L2	30	23	2	10	270	20	12	10	8	16	14.5	13	8	12	4	12
S30L3	30	25	2	11	290	21	12	10	8	17	15	13.5	8	12	4	12
S30H1	30	25	3	13	355	23	13	11	9	18	16.5	14.5	8	12	4	12
S30H2	30	29	3	15	405	25	14	11	9	19	17.5	15.5	8	14	4	12
S30H3	30	29	3	16	430	26	15	12	9	20	18	16	8	14	4	6
S35L1	35	22	3	8	260	19.5	12	10	8	15.5	14.5	13	8	12	4	12
S35L2	35	23	3	10	300	21	12	10	8	16.5	15	13.5	8	12	4	12
S35L3	35	25	3	10	320	21.5	13	10	8	17	15.5	14	8	12	4	12
S35H1	35	25	3	12	390	23.5	14	11	9	18	17	15	8	14	4	12
S35H2	35	29	4	14	460	26	15	12	9	20	18	16	8	14	4	6
S35H3	35	29	4	16	495	28.5	15	13.5	10	21.5	19	17	8	14	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 COMBINED FORCE RATIO (CFR) OF 1.00.
2. USE CHAIRS AND SPACERS TO MAINTAIN PROPER CLEARANCE.
3. FOR FOUNDATION, ALWAYS USE AIR-ENTRAINED CONCRETE MIX.

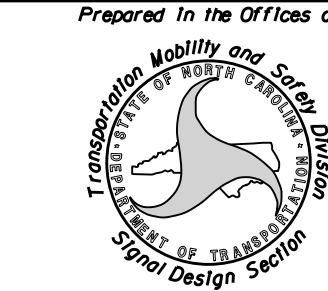
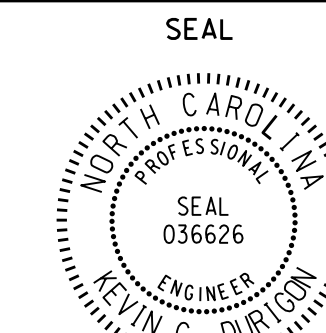
FOUNDATION SELECTION:

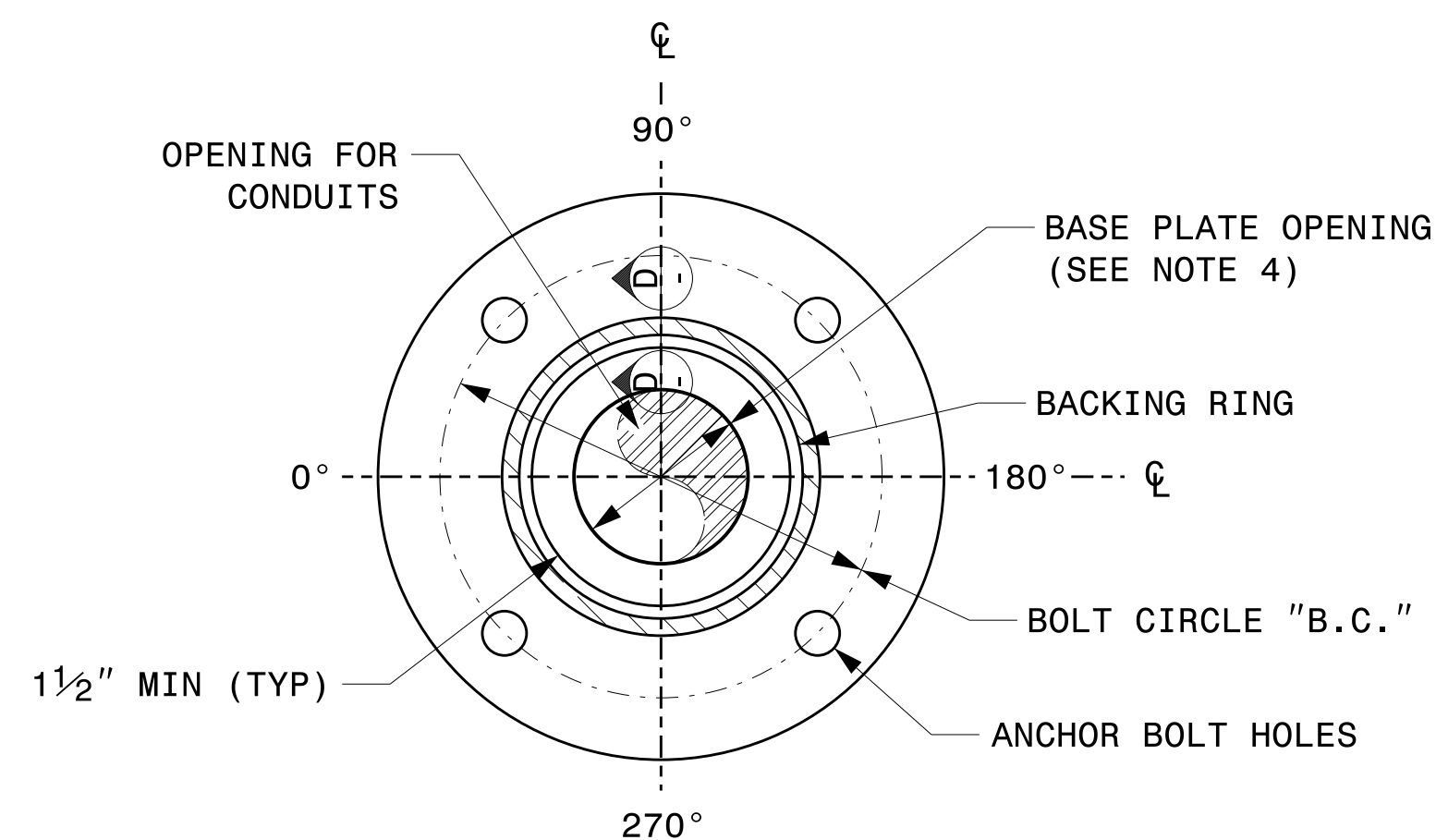
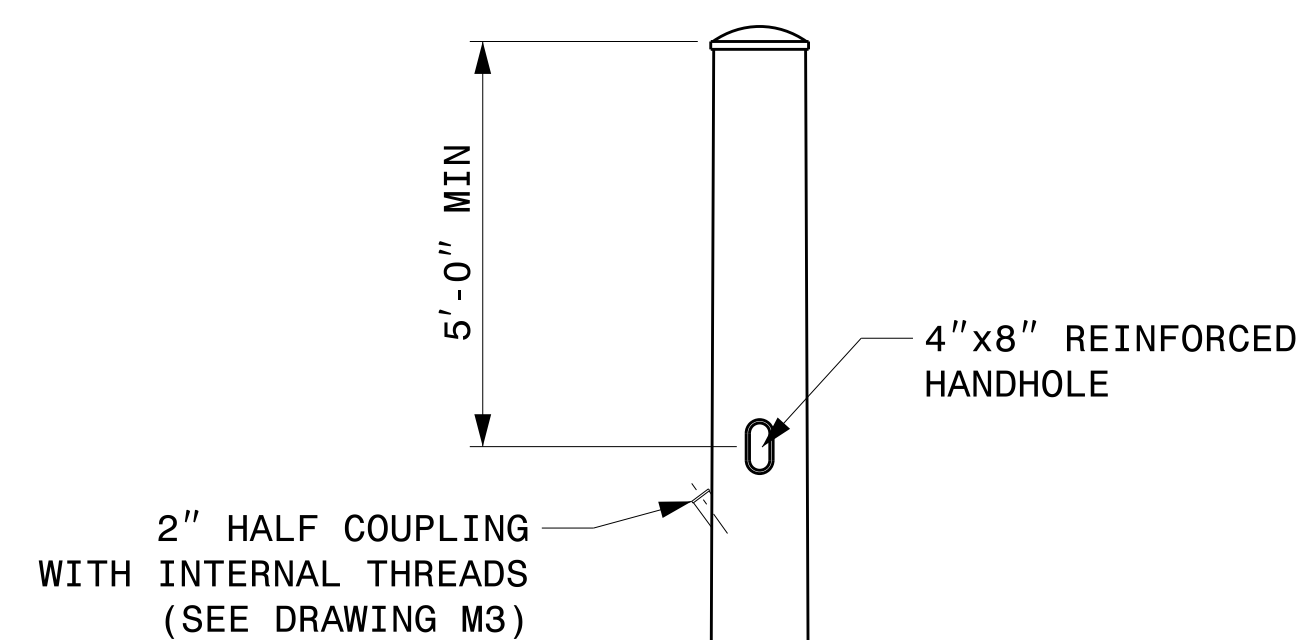
1. PERFORM A STANDARD PENETRATION TEST AT EACH PROPOSED FOUNDATION SITE TO DETERMINE "N" VALUE.
2. SELECT THE APPROPRIATE WIND ZONE FROM M1 DRAWING.
3. SELECT THE SOIL TYPE (CLAY OR SAND) THAT BEST DESCRIBES THE SOIL CHARACTERISTICS.
4. GET THE APPROPRIATE STANDARD POLE CASE NUMBER FROM THE PLANS OR 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 MANUAL FOR DRILLED SHAFTS.

48" DIAMETER FOUNDATION CONCRETE VOLUME (CUBIC YARDS) = (0.465) x DRILLED PIER LENGTH

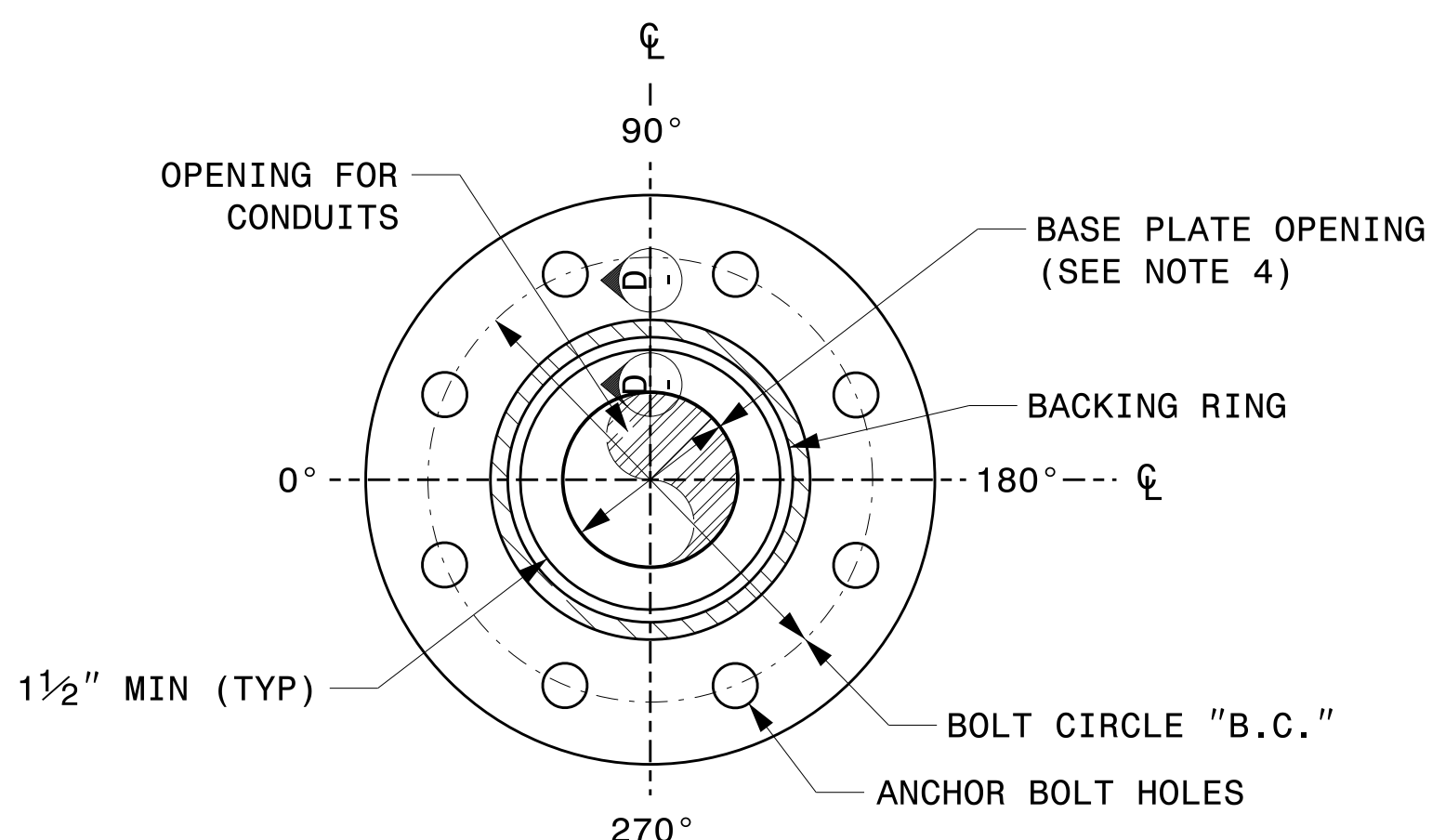
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Standard Strain Pole Foundation – All Soil Conditions

 <p style="font-size: 8px;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<h3 style="margin: 0;">Standard Strain Pole Foundation for All Soil Conditions</h3> <p style="font-size: 8px;">PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR</p>	<p style="font-size: 8px;">SEAL</p> 	<p style="font-size: 8px;">DocuSigned by:</p> <p style="font-size: 8px;"><i>Kevin Durigon</i></p> <p style="font-size: 8px;">4B23DC79B3784DA</p>						
<p style="font-size: 8px;">SCALE</p> <p style="font-size: 8px;">0 NA</p> <p style="font-size: 8px;">NONE</p>	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE				<p style="font-size: 8px;">DATE</p> <p style="font-size: 8px;">09/21/2023</p>	<p style="font-size: 8px;">DATE</p>
REVISIONS	INIT.	DATE							

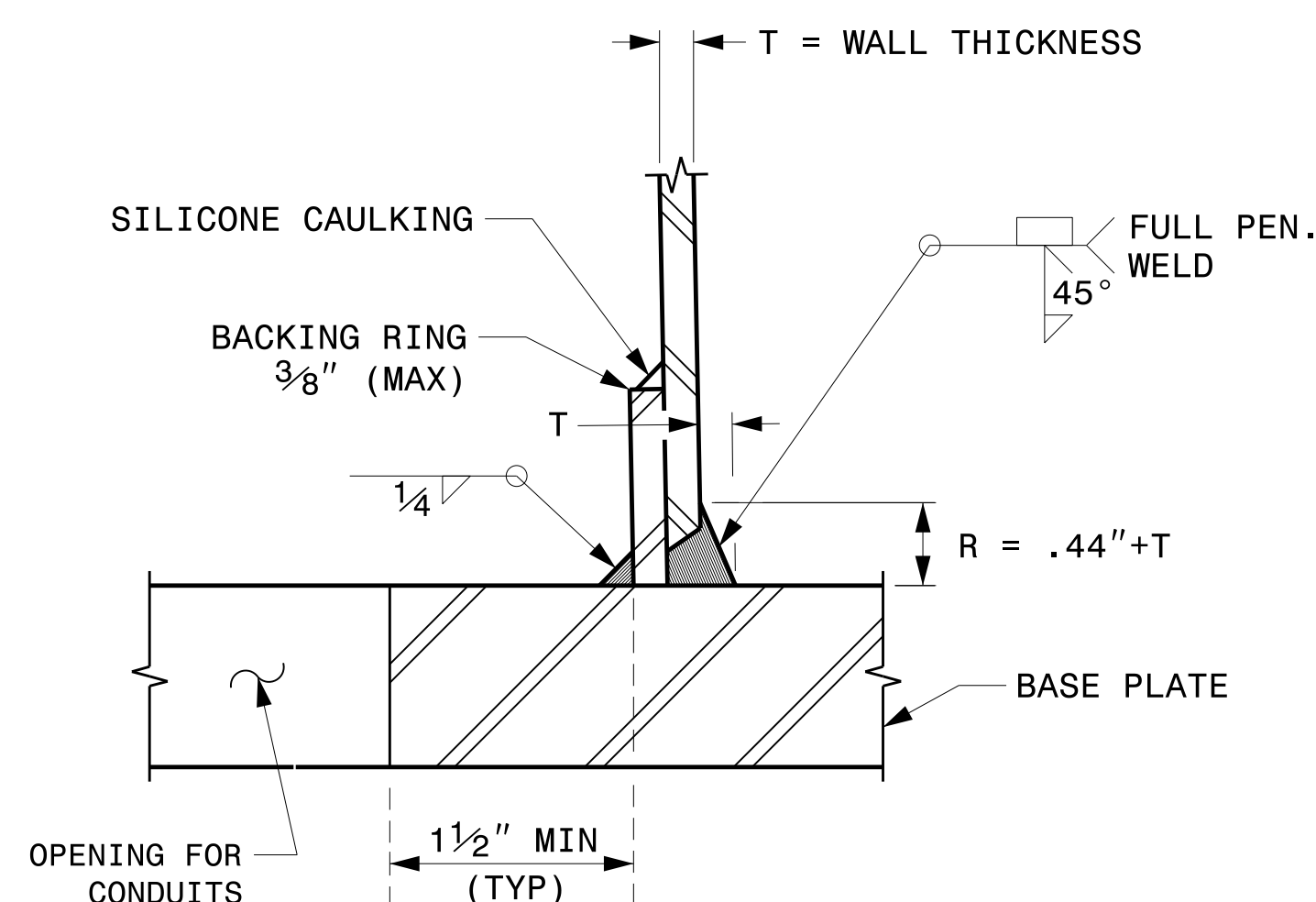


4 BOLT PATTERN FOR POLES UP TO 40'

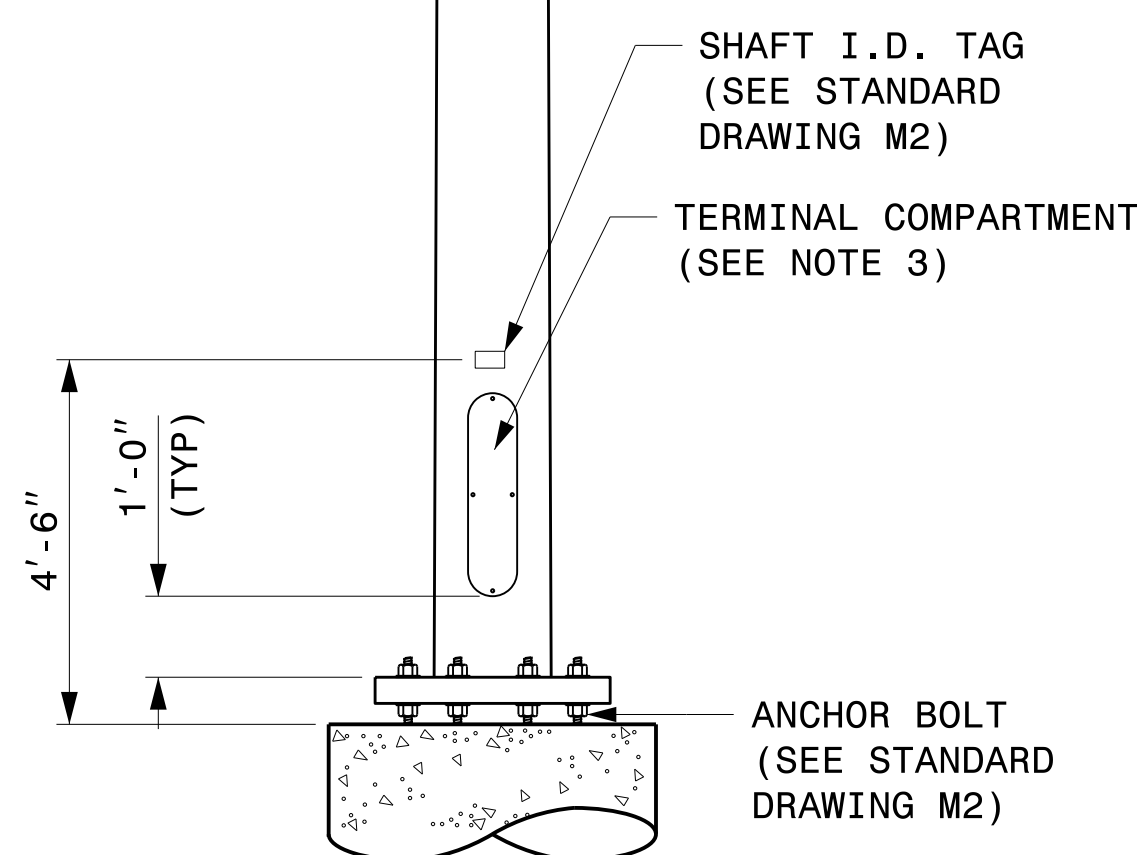


8 BOLT PATTERN FOR POLES TALLER THAN 40'

BASE PLATE DETAILS



SECTION D-D (POLE ATTACHMENT TO BASE PLATE) FULL - PENETRATION GROOVE WELD DETAIL



CCTV CAMERA POLE (NOT TO SCALE)

NOTES:

1. THIS DRAWING PROVIDES BASIC DETAILS FOR CCTV POLES. PROJECT REQUIREMENTS MAY REQUIRE SPECIAL FACTORY PREPS THAT ARE NOT SHOWN ON THESE DETAILS.
2. DETAILS FOR INTERNAL CAMERA LOWERING SYSTEMS ARE NOT SHOWN.
3. POLE MOUNTED CABINETS MAY REQUIRE MODIFICATIONS TO THE LOWER HANDHOLE OPENING TO MOUNT CABINETS. 4" X 8" REINFORCED HANDHOLES ARE ACCEPTABLE OPTIONS, AND MAY BE PREFERRED.
4. OPENING IN POLE BASE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3 1/2" BUT SHALL NOT BE LESS THAN 8 1/2".
5. USE COMPACT SECTION CRITERIA D/T RATIO PER AASHTO LTS-LRFD 1ST EDITION SECTION 5.7.2.

02-dct-2023-10-15-1
S:\ISSUES\415 Signal\Signal Design\Structures\Drawings\2024 Merit Pole Std Drawings for LRF\2024 Sig.M9 Fabrication Details - CCTV Poles.dgn
Kedar Tigon

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

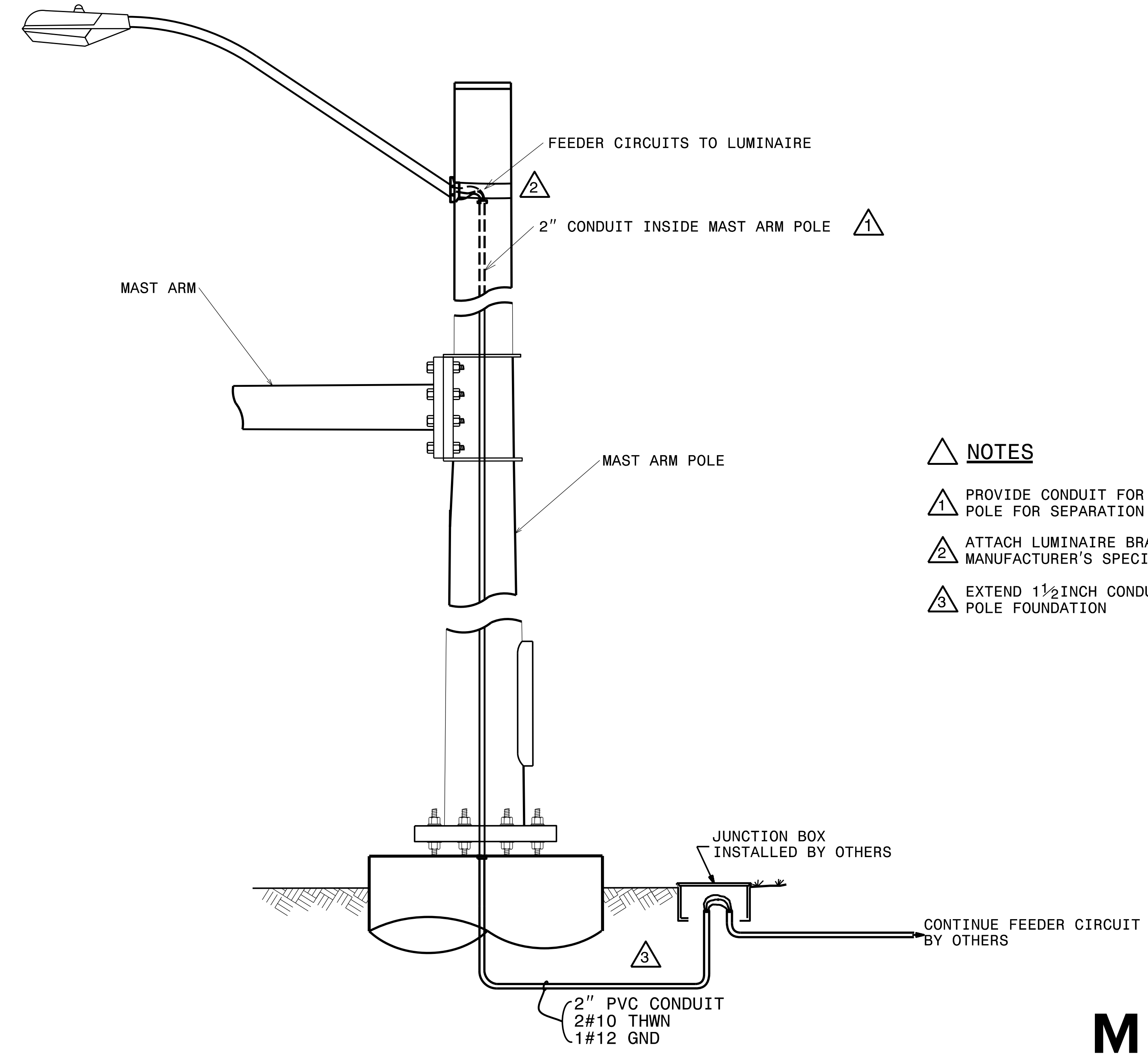
Typical Fabrication Details For CCTV Poles	
PLAN DATE: SEPTEMBER 2023	DESIGNED BY: K.C. DURIGON
PREPARED BY: K.C. DURIGON	REVIEWED BY: C.F. ANDREWS
REVISIONS	INIT. DATE

SEAL

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA

09/23/2023
DATE

USE FOR LIGHTING CONSTRUCTION ONLY



NOTES

- 1 PROVIDE CONDUIT FOR LIGHTING CONDUCTORS INSIDE POLE FOR SEPARATION OF SERVICES.
- 2 ATTACH LUMINAIRE BRACKET IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
- 3 EXTEND 1½ INCH CONDUIT TO 5 FEET FROM BASE OF POLE FOUNDATION

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$SERIAL\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$

M M
MOTT MACDONALD
 MOTT MACDONALD I & E, LLC
 930 Main Campus Drive
 Suite 200
 RALEIGH, NC 27606
 License No. F-0669

Prepared for the Offices of:

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

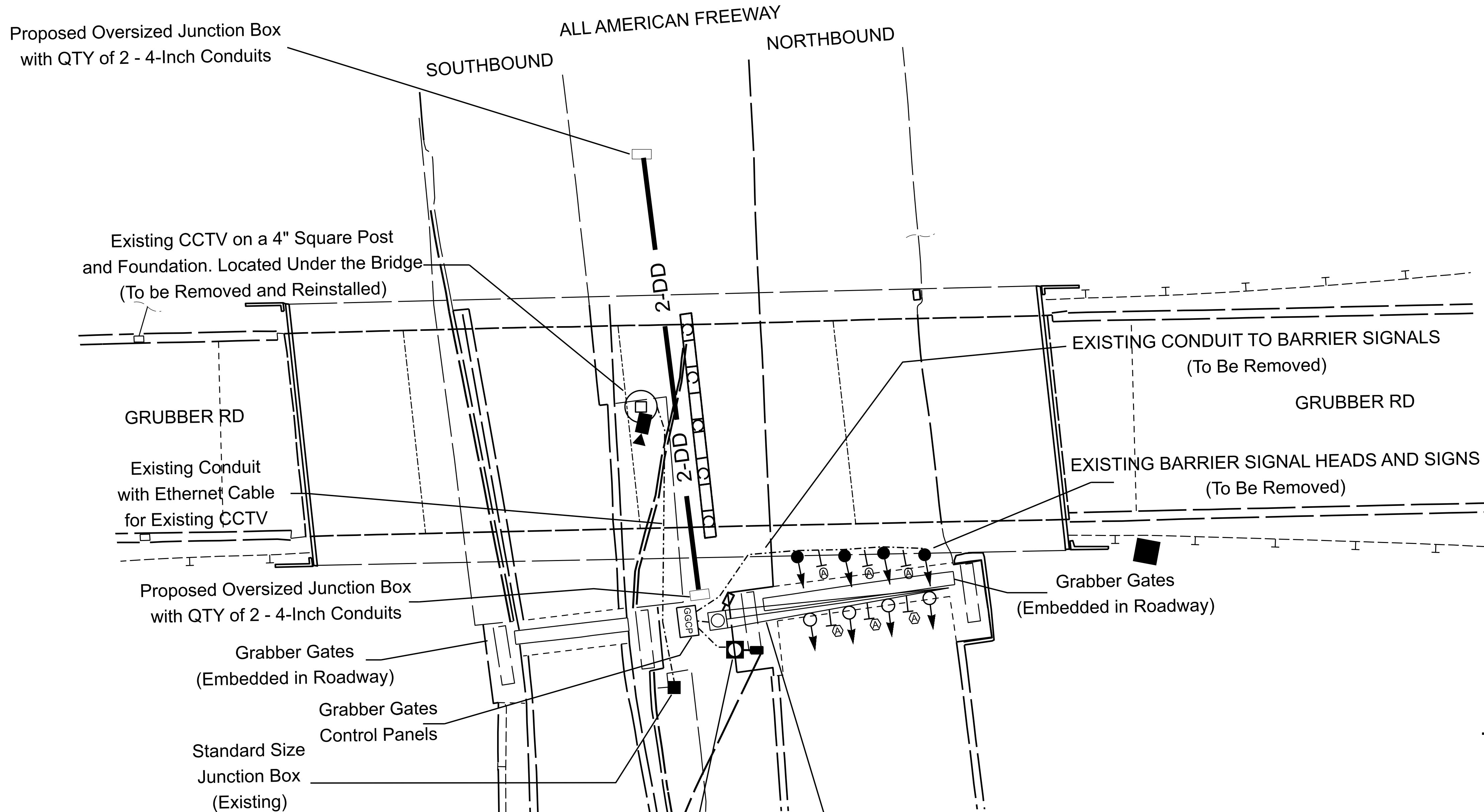
Mast Arm Luminaire Conduit Detail	
Division 6	Cumberland County
Fort Bragg	
PLAN DATE: January 2026	REVIEWED BY: LD Stouchko
PREPARED BY: S O'Farrell	REVIEWED BY:
REVISIONS	INT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Sarah O'Farrell
 ENGINEER
 STATE OF NORTH CAROLINA
 License No. 058922
 Mar-2026

SIGNATURE DATE



LEGEND	
	NEW MAST ARM AND AERIAL STREET LIGHT
	NEW 3 SECTION SIGNAL HEAD
	EXISTING SIGNAL HEAD
	EXISTING METAL POLE WITH LUMINAIRE
	EXISTING CCTV CAMERA ON METAL POST
	NEW JUNCTION BOX (OVERSIZED)
	EXISTING JUNCTION BOX (STANDARD SIZE)
	GRABBER GATE CONTROL PANEL
	SIGN
	REINSTALL SIGN MESSAGE "BARRIER SIGNAL"
	EXISTING SIGN MESSAGE "BARRIER SIGNAL"
	DIRECTIONAL DRILL QTY - 2; 4-INCH, UL HDPE CONDUITS
	EXISTING CONDUIT

GENERAL FOR EXISTING ELECTRICAL SYSTEMS:

- 1) DPW will be Responsible for Shutting Power Off to all Electrical Circuits Once All American Freeway is Shut Down to Traffic. This will Include the Grabber Gate Control Panels, Luminaire Lighting along All American Freeway, and Electrical Circuits Passing Through the Area.

NOTES FOR MAST ARM, SIGNALS AND EXISTING METAL POLE WITH LUMINAIRE:

- 1) Back Pull Existing Feeder Wiring from Luminaire Street Light (LSL 1) to Grabber Gate Control Panel and discard.
- 2) Remove Existing Luminaire Street Light (LSL 1), Including Foundation From Service
- 3) Remove Barrier Signals, and Conduit and Signal Cable Feeding Existing Bridge Mounted Barrier Signal Heads. Remove Existing Signs "A = Barrier Signal" and Store for Reinstallation on the New Metal Mast Arm Pole.
- 4) Install Proposed Metal Mast Arm with Luminaire, New Signal Heads and Reinstall Signs "A = Barrier Signal" (See Sheet ITS 2). Install New Feeder Conductors between Grabber Gate Control Panel and Luminaire.
- 5) Install New Signal Cable from Barrier Signals to the Existing Grabber Gate Control Panel. Contact Jim McCracken (Perimeter Security Partners) at (919 - 356 8336) or "jim.McCracken@perimetersecuritypartners.com" to Complete Wiring inside the Grabber Gate Control Panel.

NOTES FOR EXISTING CCTV CAMERA:

- 1) Locate, Remove, and Store Existing CCTV Camera and Support Post from Under Bridge (South Bound Side).
- 2) Back Pull and Store the Existing Cat5e Cable in the nearest Junction Box for Re-Installation as Noted in Note 3 Below. Protect the Cable from the Ingress of Water and Debris.
- 3) After the New Bridge is Constructed and at the Direction of the Engineer, Re-install the Support Post and CCTV Camera. Re-Pull Cat5e Cable to CCTV Camera.

NOTES FOR GENERAL PROTECTION OF EXISTING EQUIPMENT:

- 1) Prior to any Work, Install Jersey Barrier Around the Grabber Gate Control Panels, Grabber Gates, and Other Equipment for Protection During Construction Activities.

NOTES FOR INSTALLING FUTURE CONDUIT FOR DPW USE:

- 1) After the New Bridge is Constructed and at the Direction of the Engineer, Install Two (2) New Oversized Junction Boxes as Shown on the Plans.
- 2) Install Two (2) 4-Inch UL Listed, HDPE Conduits Between the Oversized Junction Boxes. Cap and Seal the Conduits and Leave for Future use by DPW.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 MOTT MACDONALD 930 Main Campus Drive Suite 200 RALEIGH, NC 27606 License No. F-0669	Plans Prepared for:	ITS PLAN FOR METAL MAST ARM, LUMINAIRE, CONDUIT AND JUNCTION BOXES		 Sarah O'Farrell - Mar-2026 SIGNATURE DATE
	FORT BRAGG	DIVISION 06 CUMBERLAND COUNTY FORT BRAGG PLAN DATE: February 2026 REVIEWED BY: S. O'Farrell PREPARED BY: N. Avery REVIEWED BY: LD Stouchko	REVISIONS INIT. DATE	

