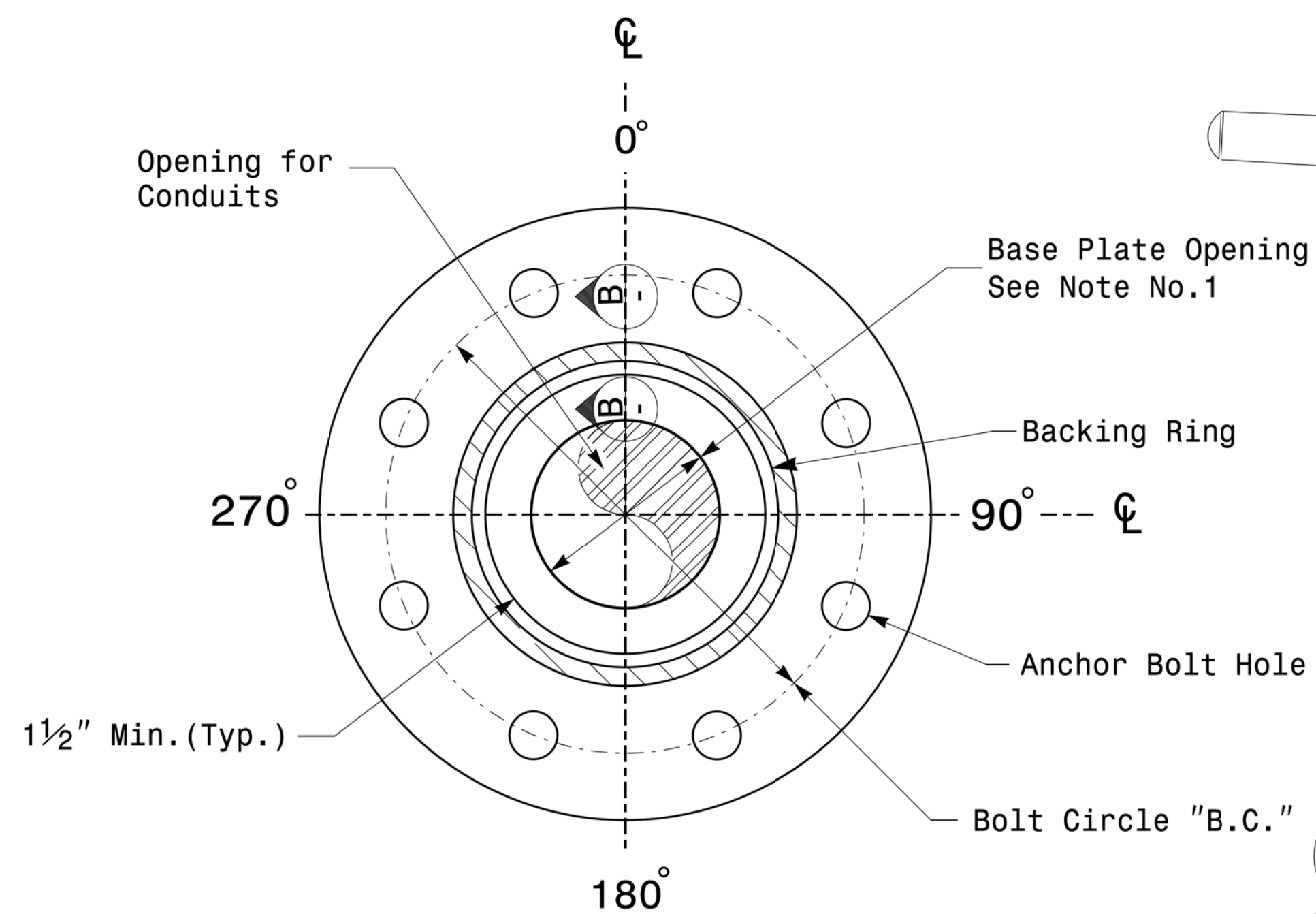


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for the convenience of the user  
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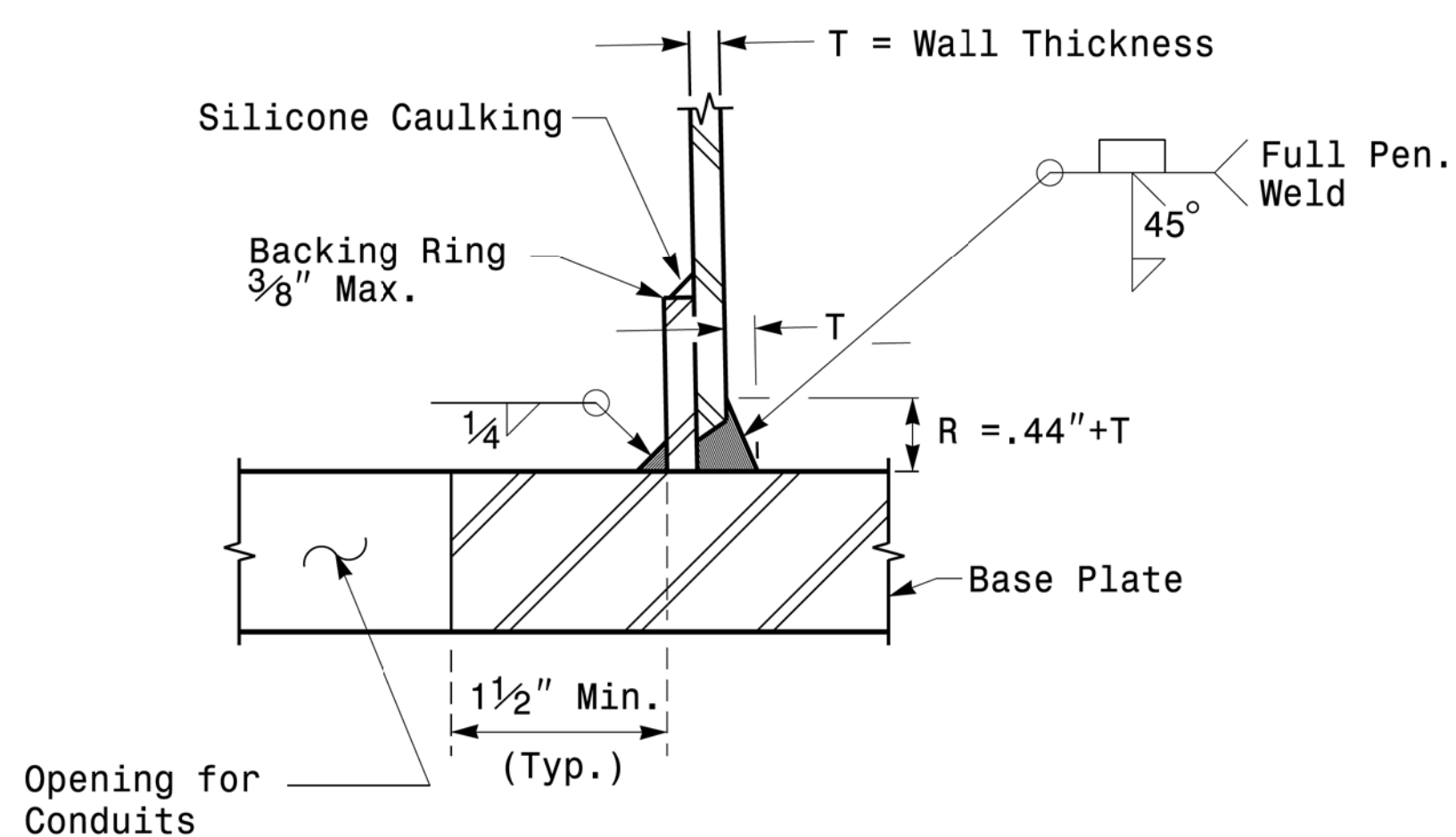
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with their signature on that page.**

**This file or an individual page  
shall not be considered a certified document.**

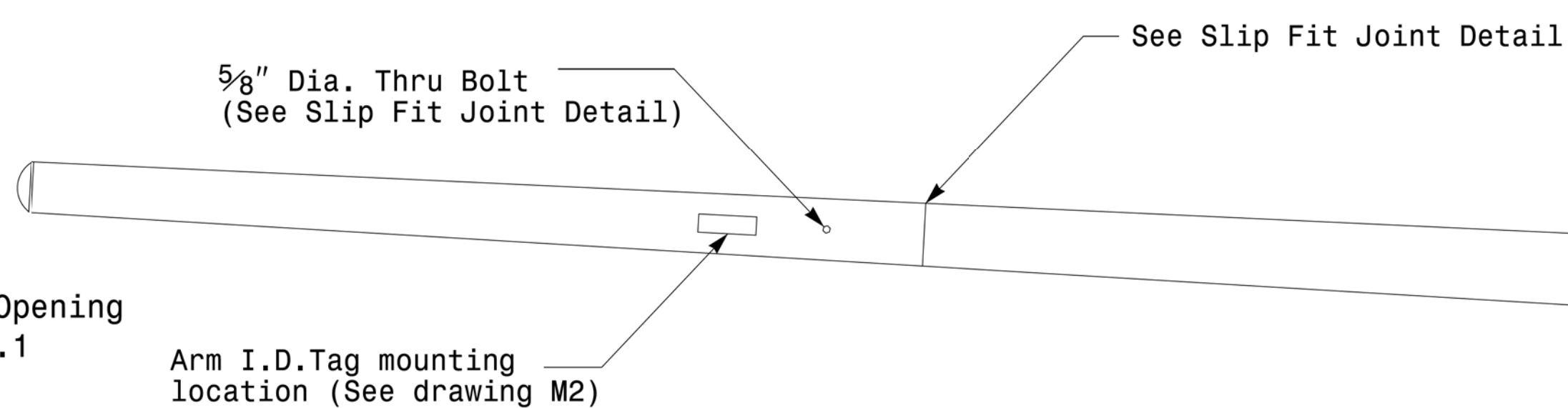
Note:  
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



**Section A-A**  
**Pole Base Plate Details**



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



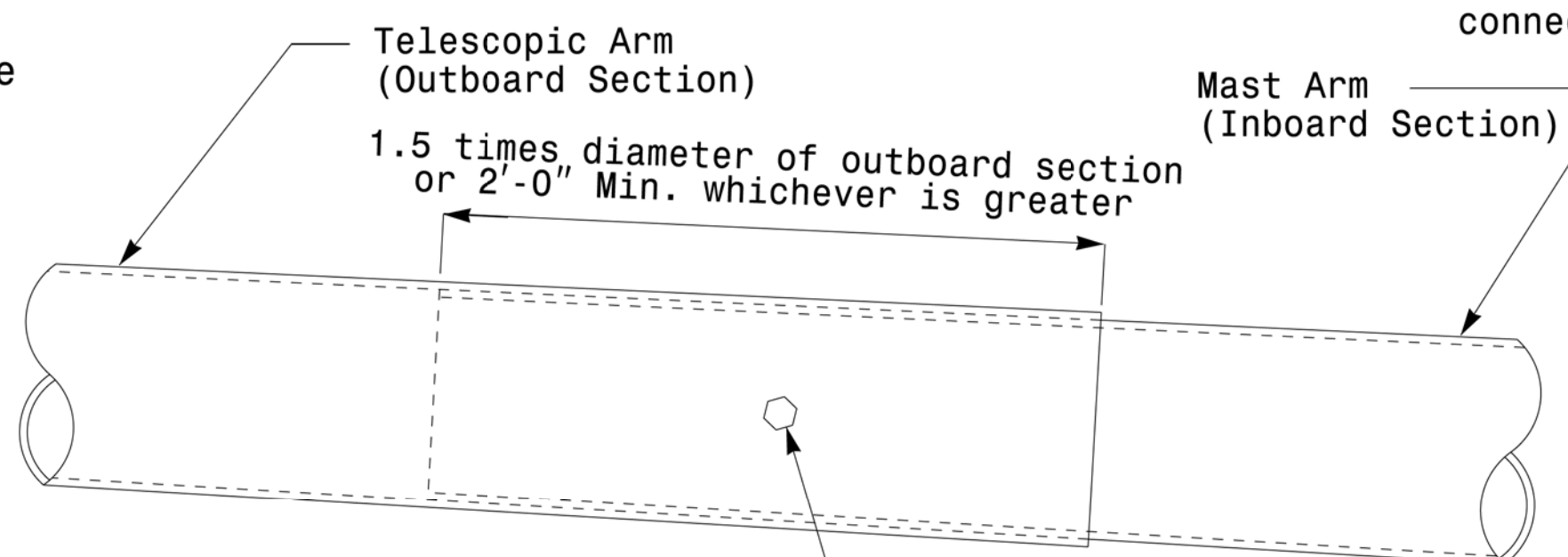
5/8" Dia. Thru Bolt  
 (See Slip Fit Joint Detail)

See Slip Fit Joint Detail

Hand Hole with cover

Arm I.D.Tag mounting location (See drawing M2)

Arm I.D.Tag mounting location (See drawing M2)



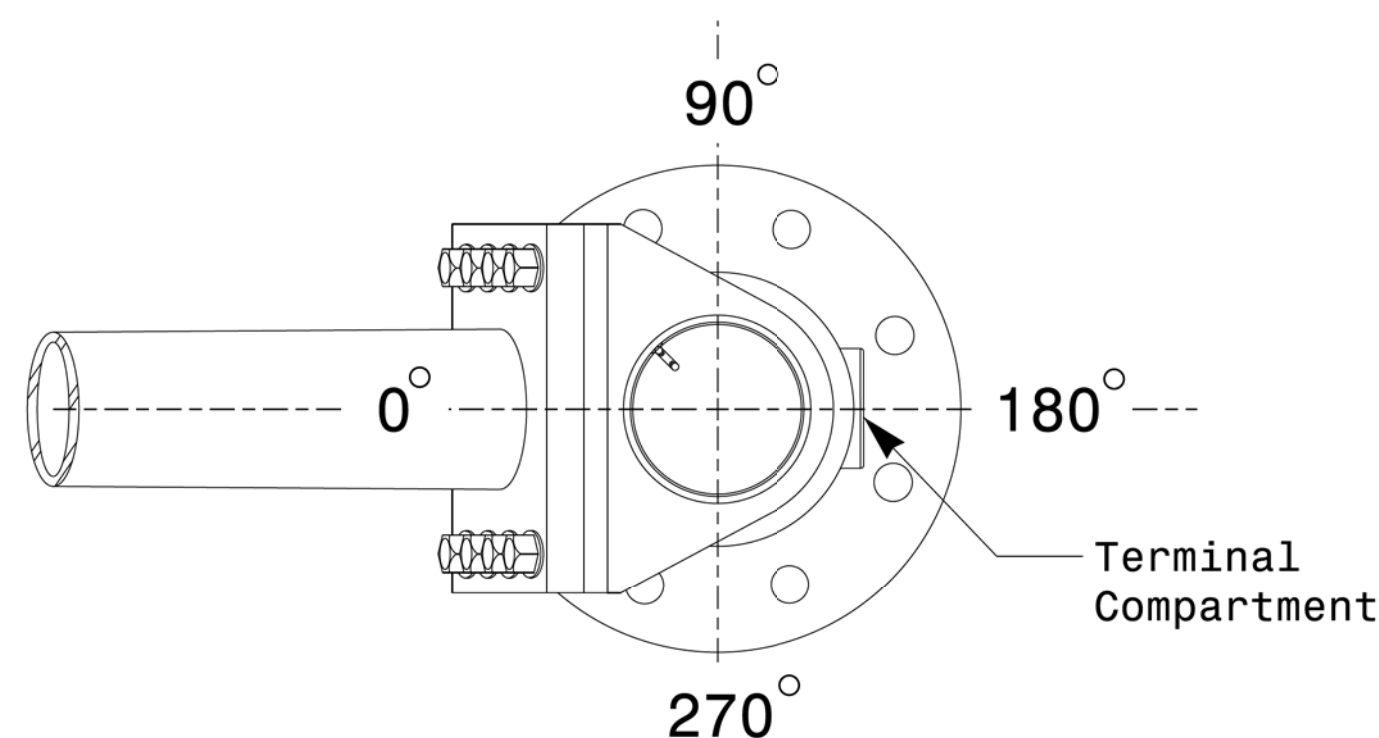
Telescopic Arm (Outboard Section)

Mast Arm (Inboard Section)

1.5 times diameter of outboard section or 2'-0" Min. whichever is greater

3/4" Factory Drilled Hole in Outboard Tube. Field Drill Inboard Tube. 5/8" Galvanized Thru Bolt with (2) Hex. Locknuts Each.

**Slip Fit Joint Detail for Mast Arm**

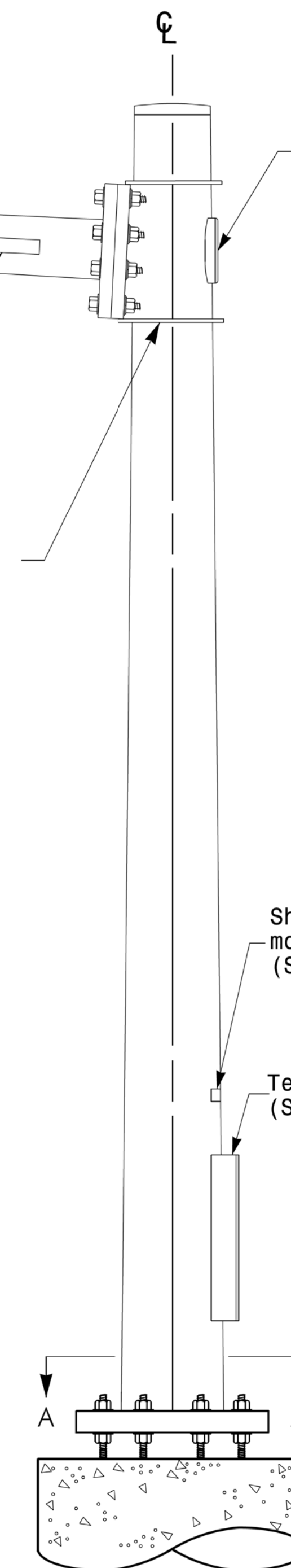


**Mast Arm Radial Orientation**

See drawing M5 for Mast Arm connection details

Shaft I.D.Tag mounting location (See drawing M2)

Terminal Compartment (See drawing M2)



**Mast Arm Pole**

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details For Mast Arm 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: Dinesh C. Sarkar

10/11/2017 DATE

11-OCT-2017 08:33  
 S:\413650\115 Signal\sig1 Design Section\Eastern Region\Sheets\2016\2014 Sig.M4 Std. Fabrication Detail Is-Mast Arm Poles.dgn  
 User: dcahar

**Fabrication Details - Mast Arm Poles**

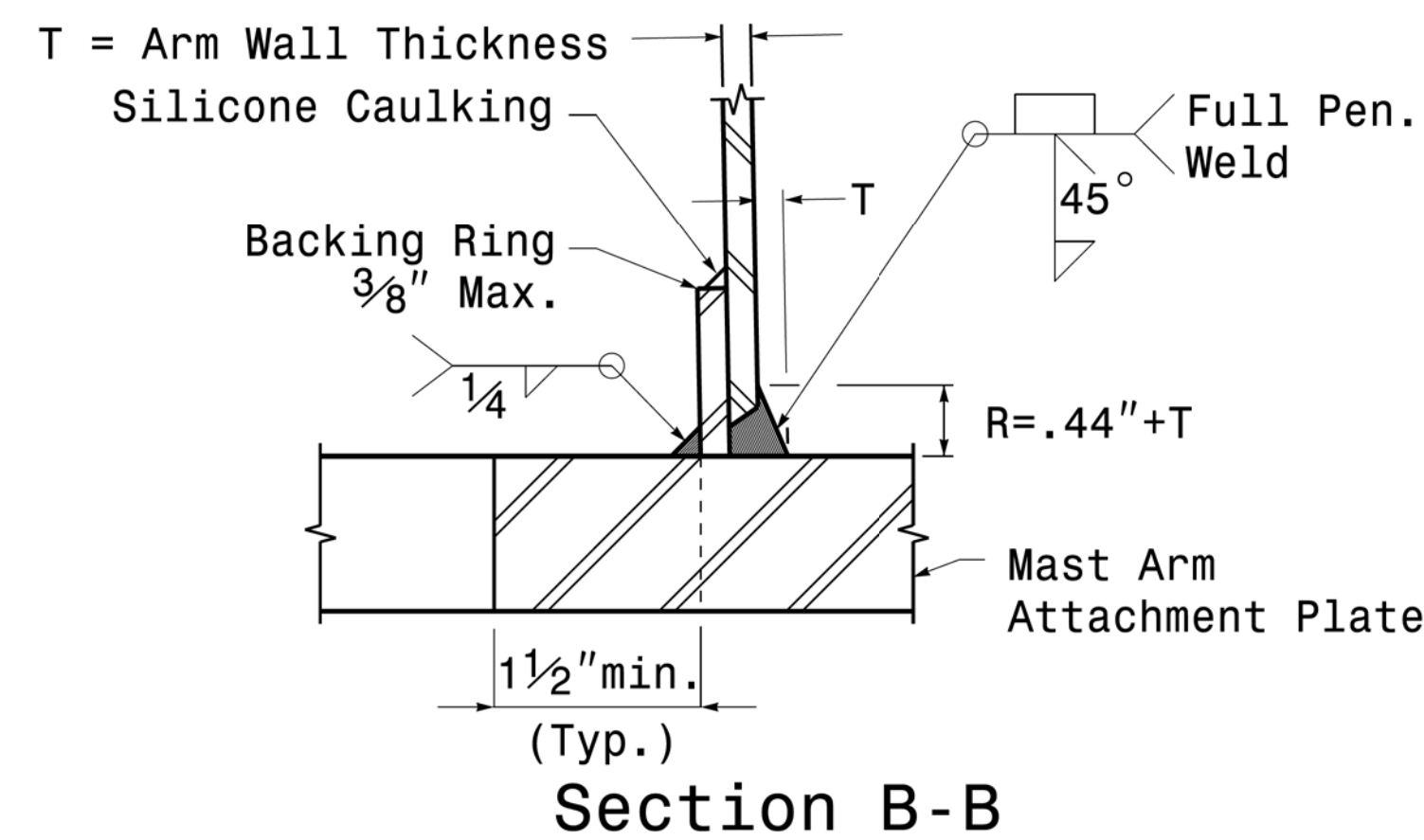
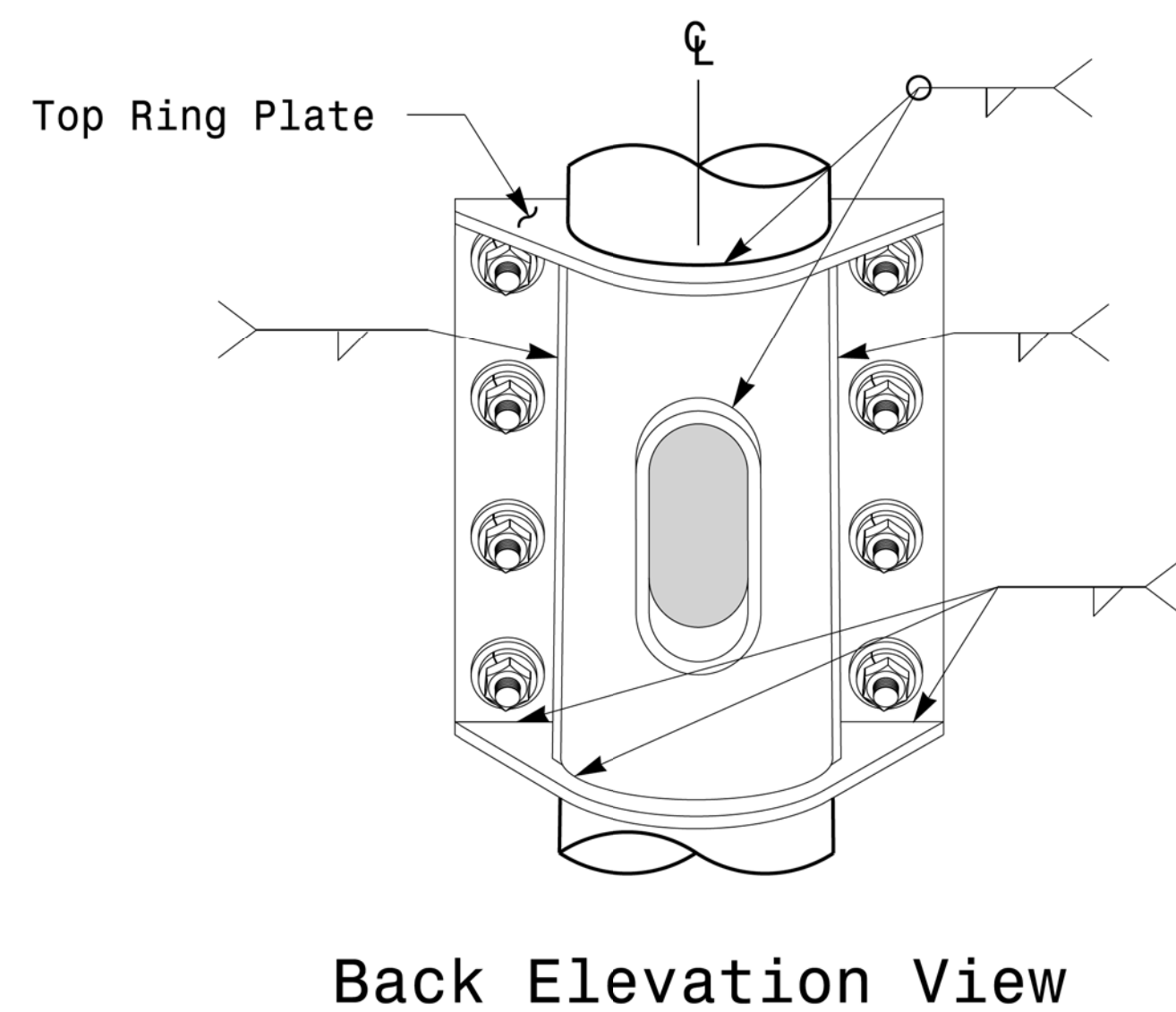
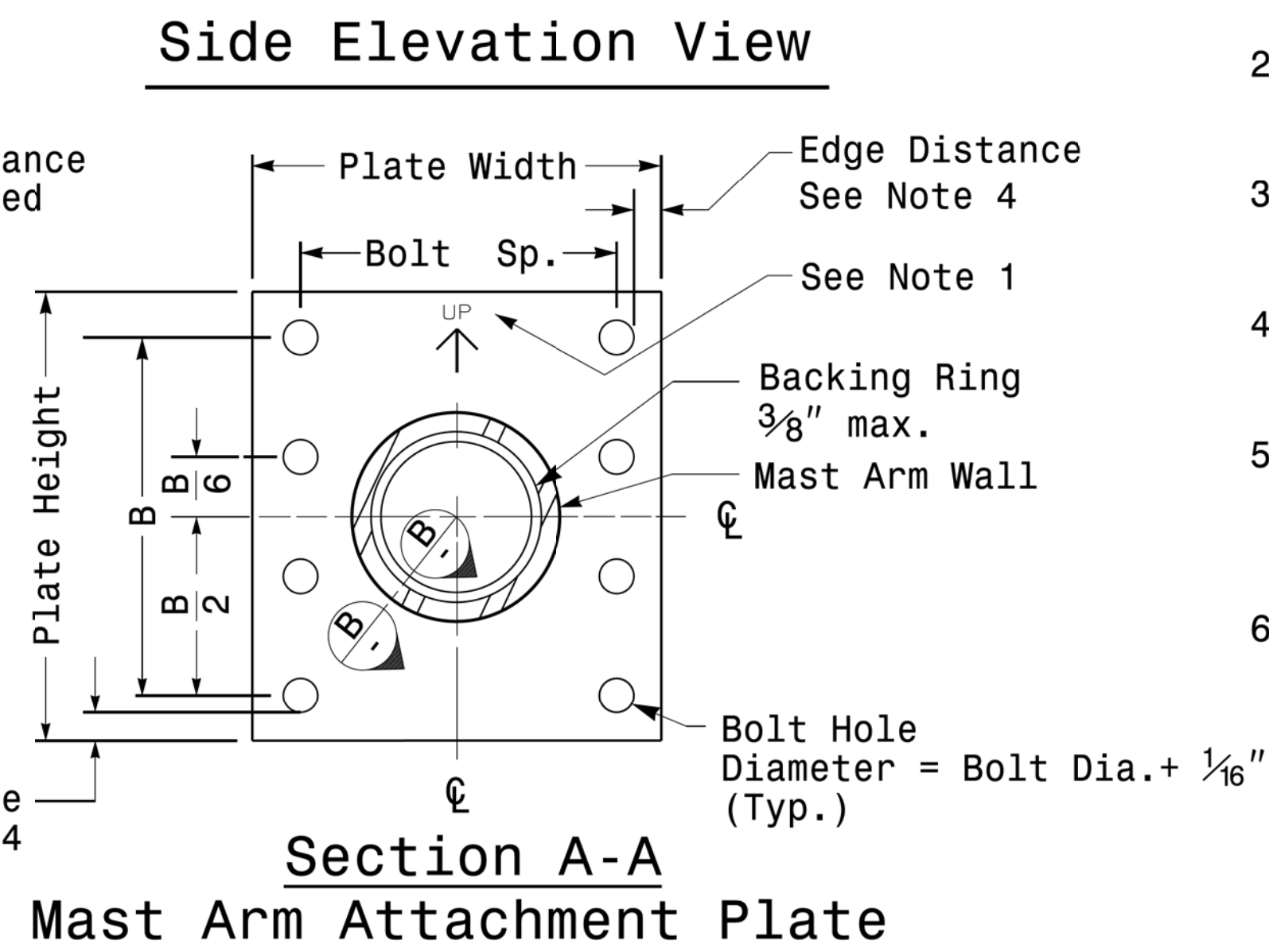
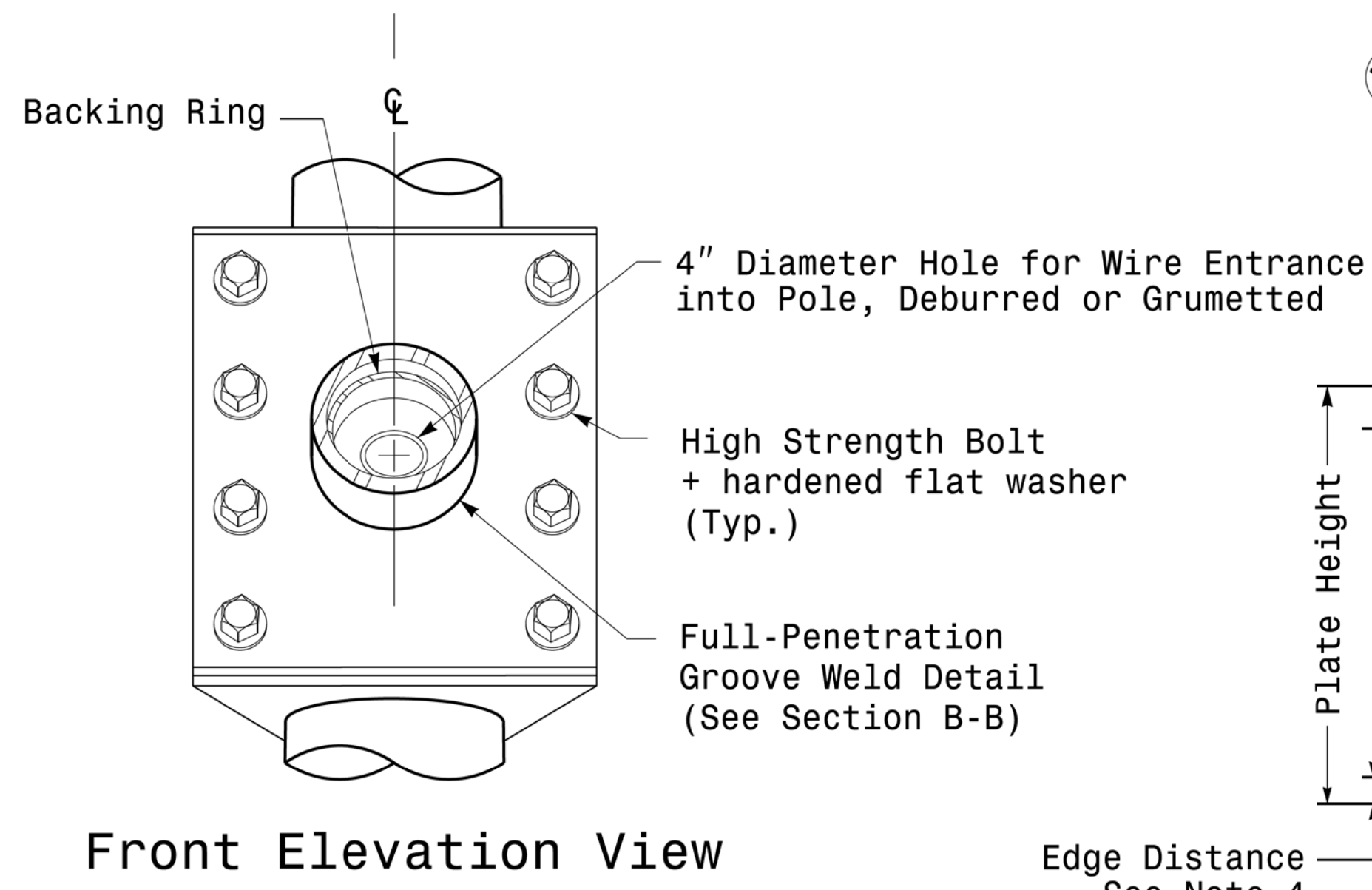
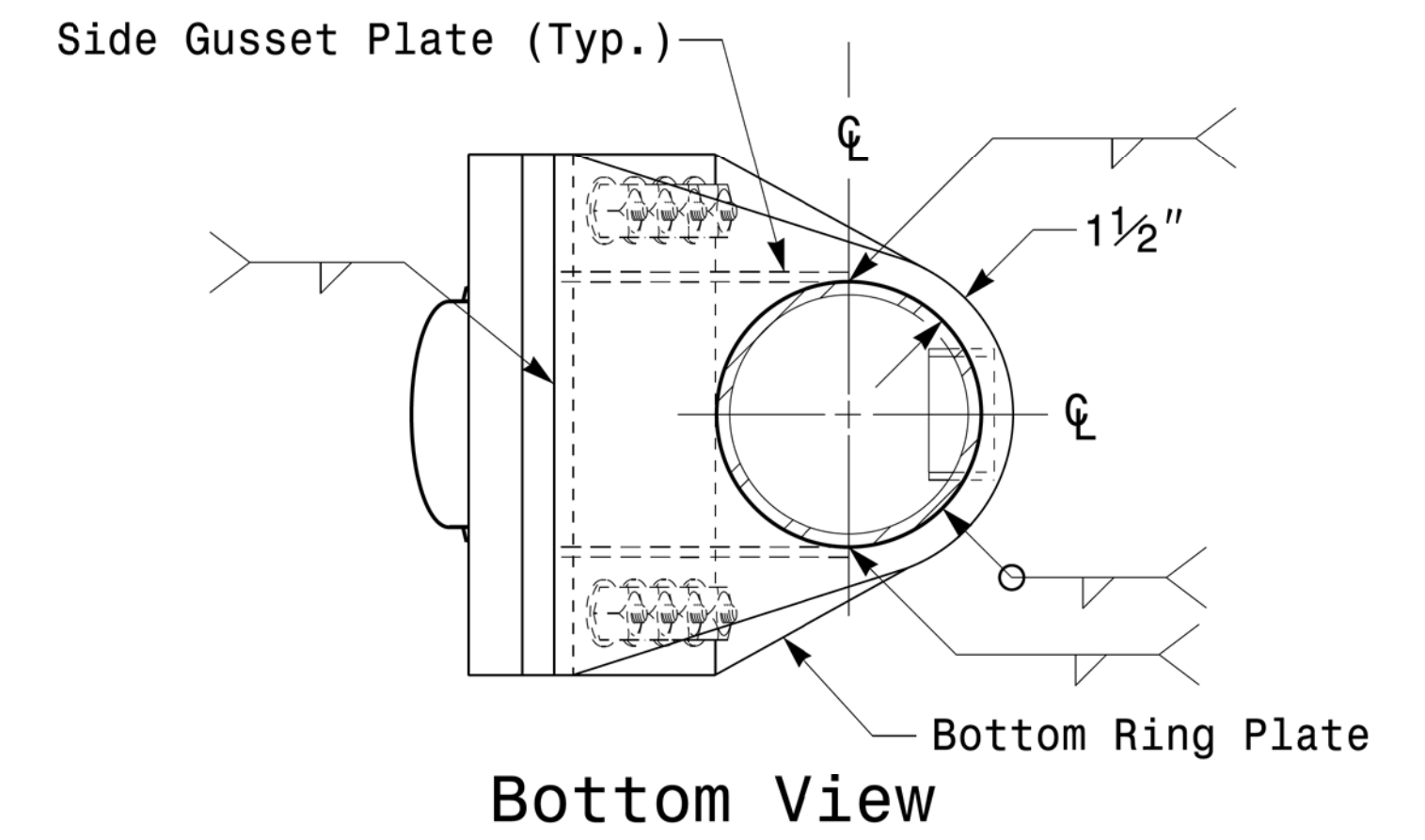
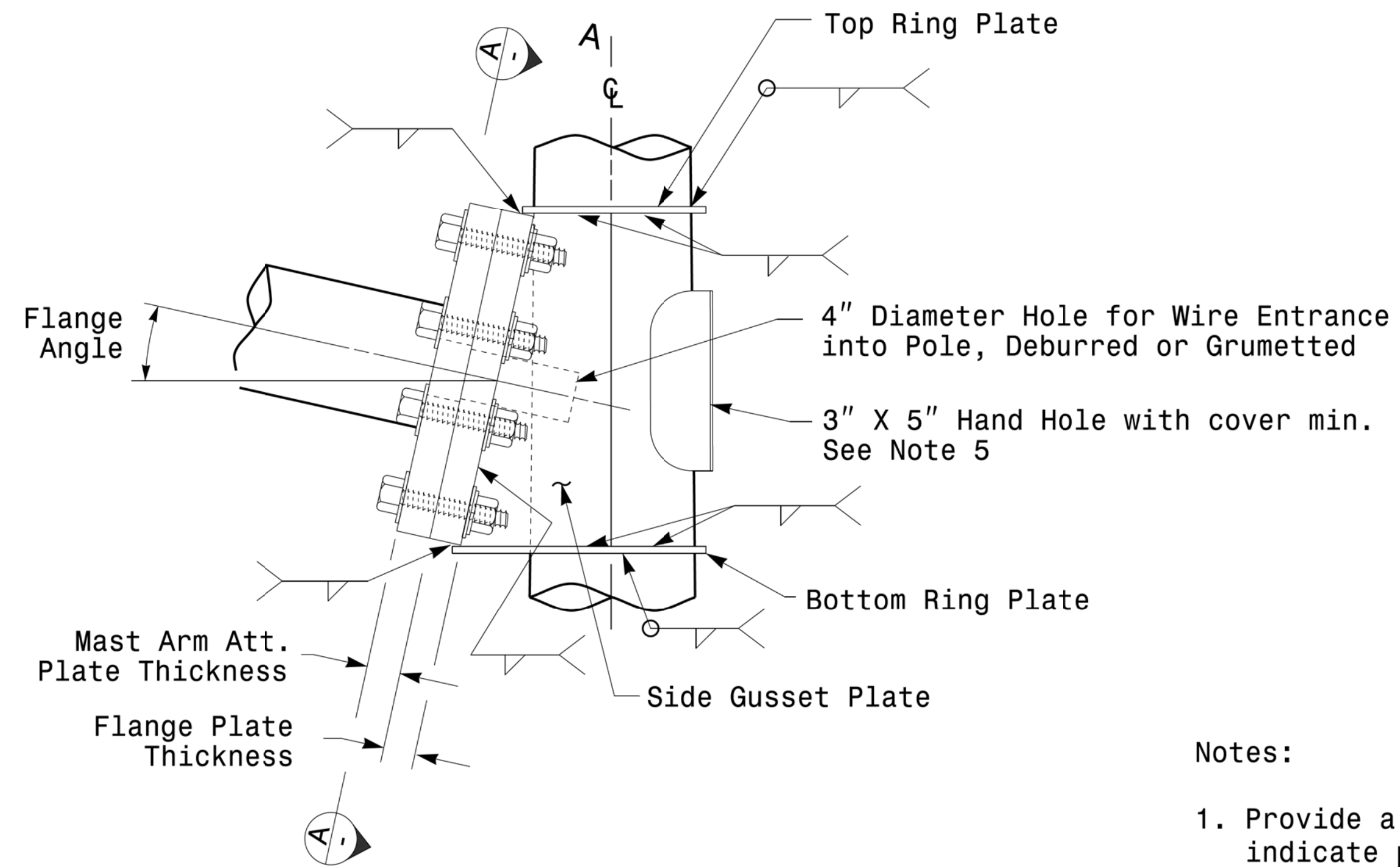
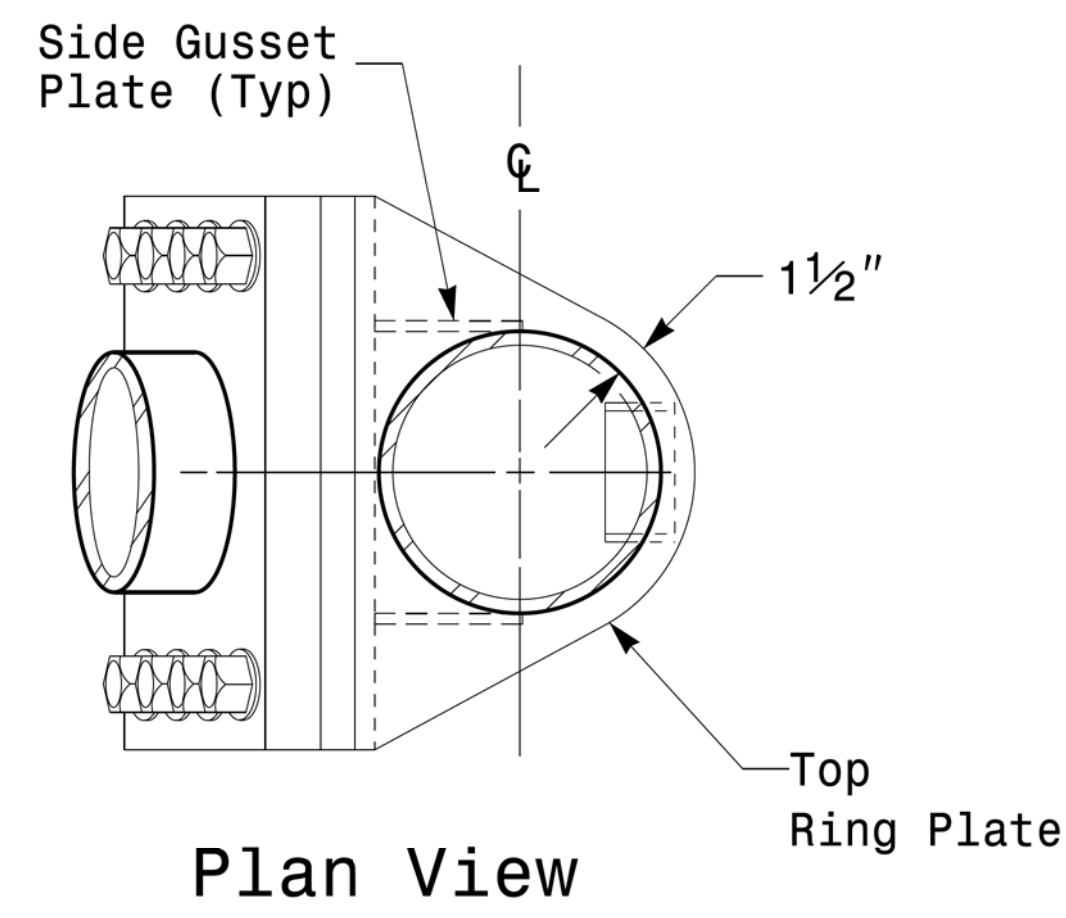
# Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.

SHEET NO.

I-5506

Sig.M5



**Notes:**

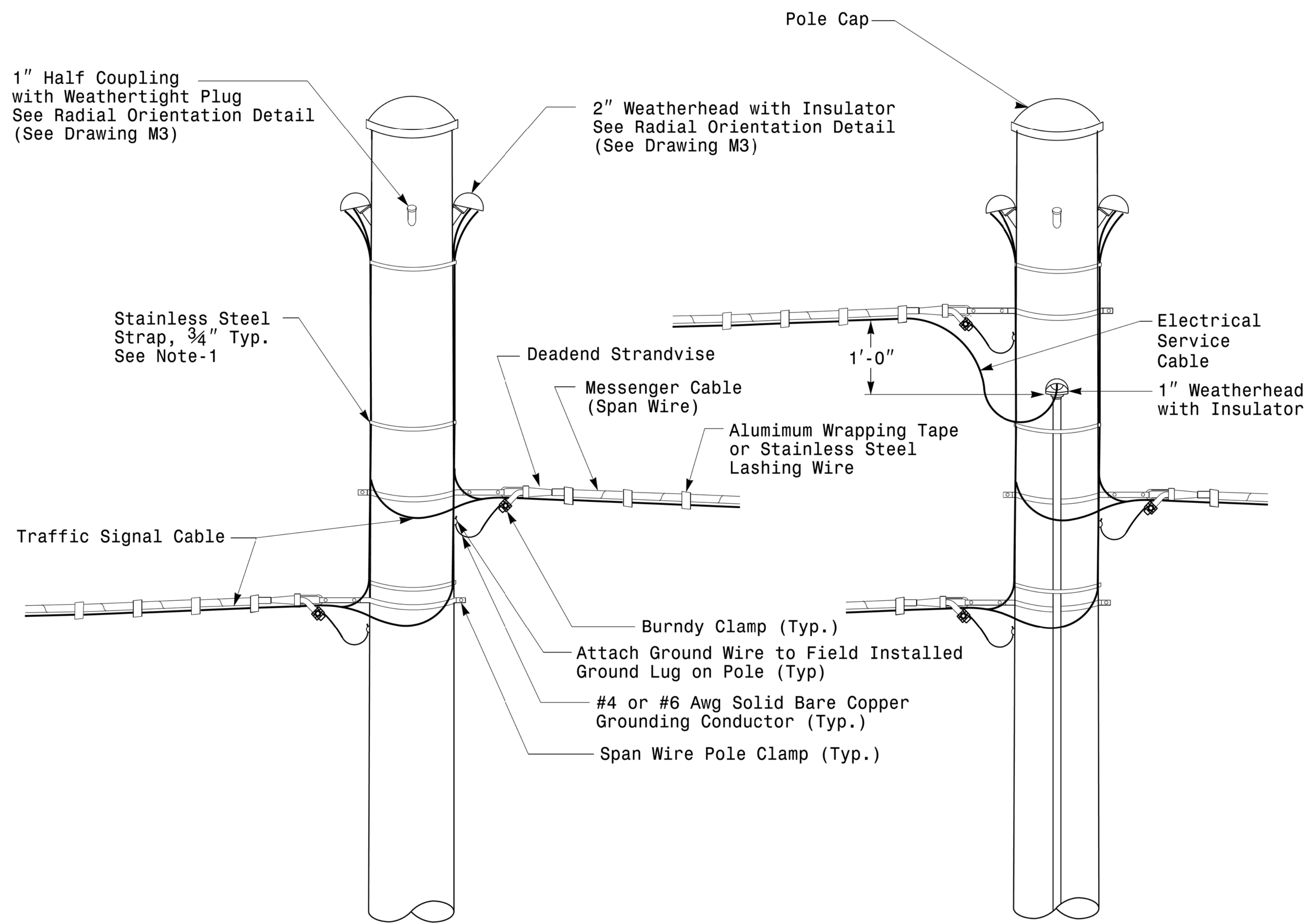
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing 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.

11-OCT-2017 08:35 52\*135504115 510nls451gn01 Design Section/Eastern Region/MS Sheets/2016/2014 Sig.M5 Std. Connection Fabricator Detail/Is-Mast Arm Poles.dgn

Fabrication Details - Mast Arm Connection

<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Mast Arm Connection To Pole</p>		<p>SEAL</p> <p>DocuSigned by: Dinesh C. Sarkar</p>
	<p>PLAN DATE: OCTOBER 2017</p> <p>PREPARED BY: N. BITTING</p> <p>SCALE: 0 NA NONE</p>	<p>DESIGNED BY: C.F. ANDREWS</p> <p>REVIEWED BY: D.C. SARKAR</p>	

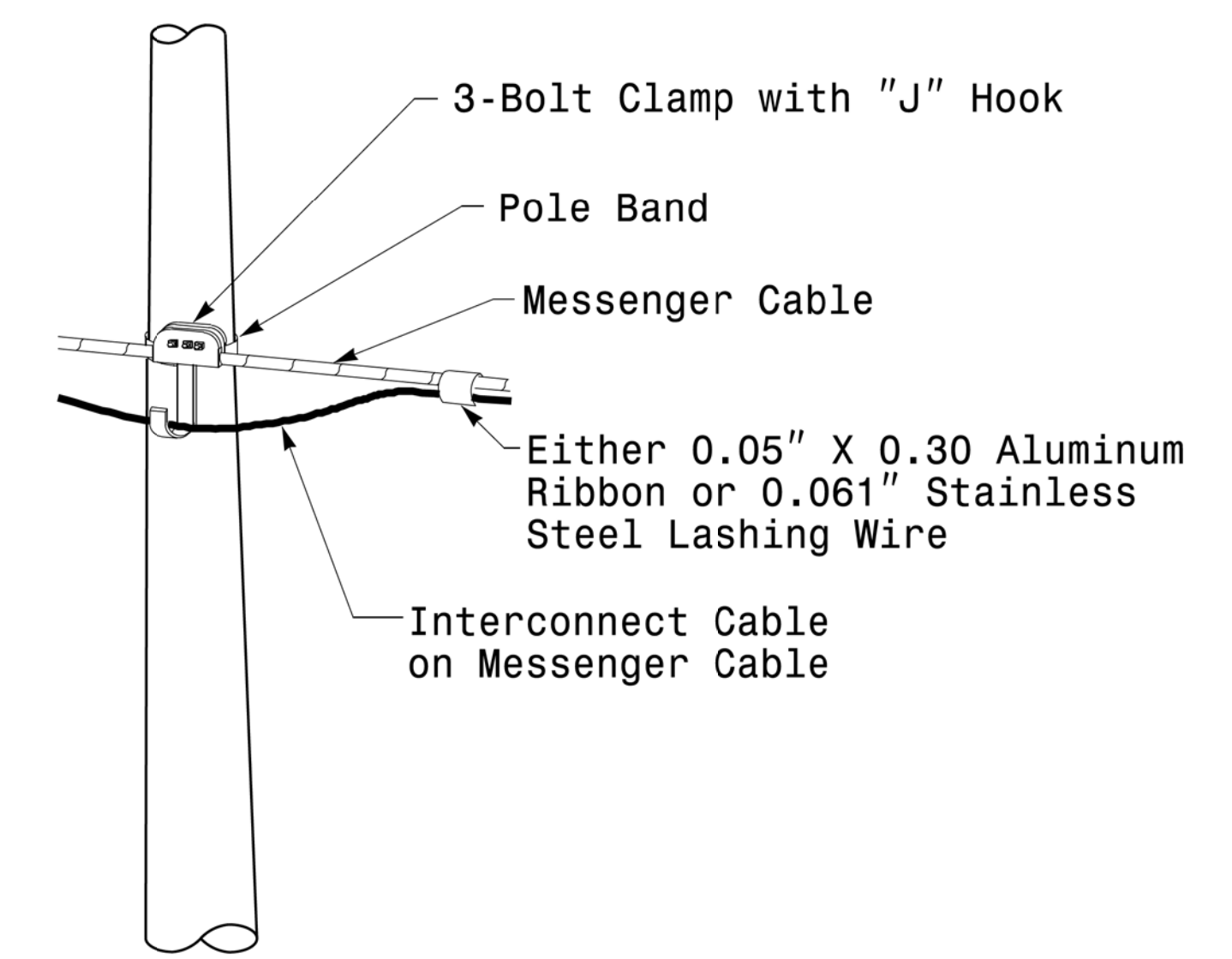
10/11/2017 DATE



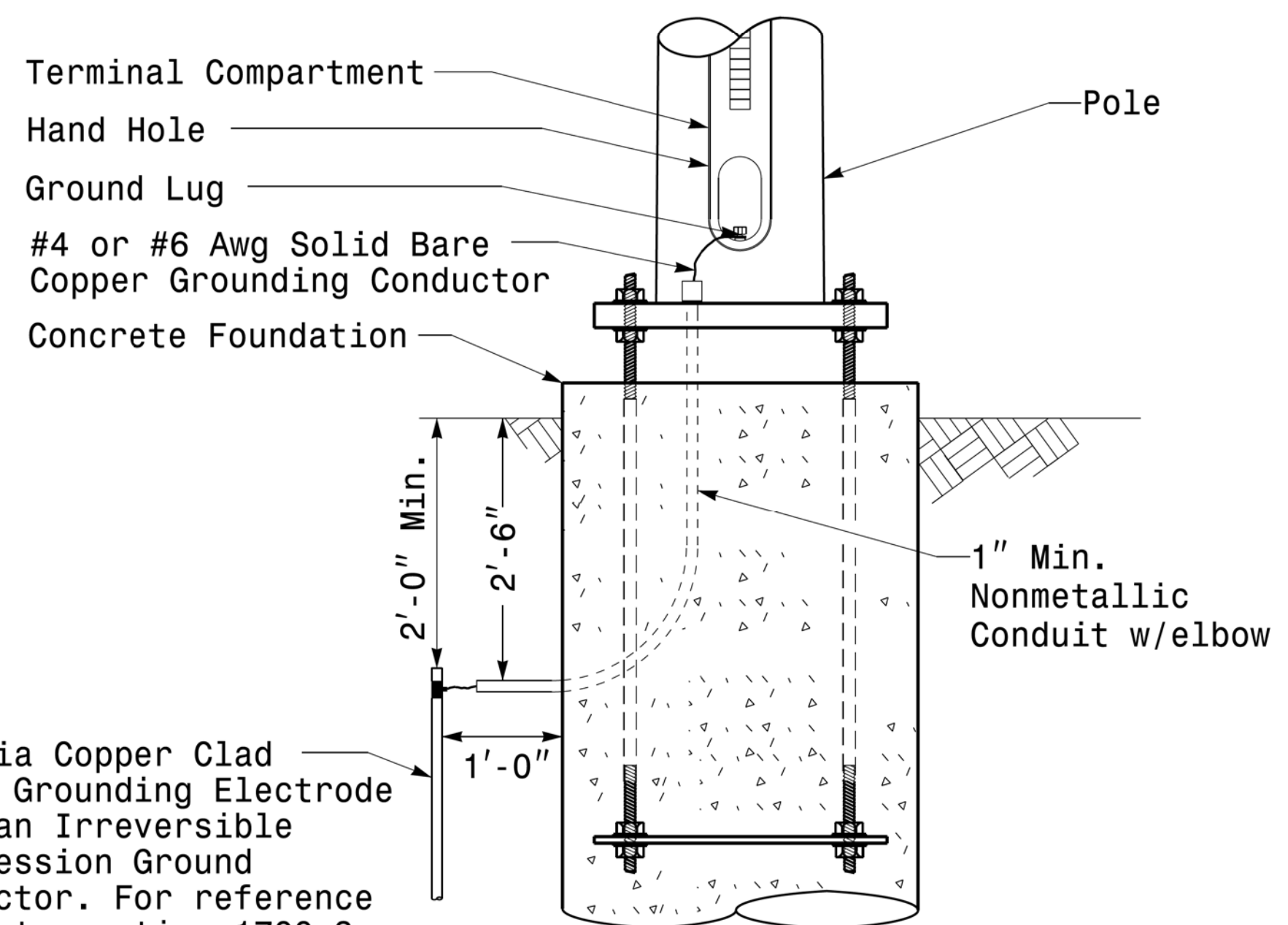
**Strain Pole Attachments**

**NOTE:**

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



**Attachment of Cable to Intermediate Metal Pole**



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

**Metal Pole Grounding Detail For Strain Pole and Mast Arm**

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

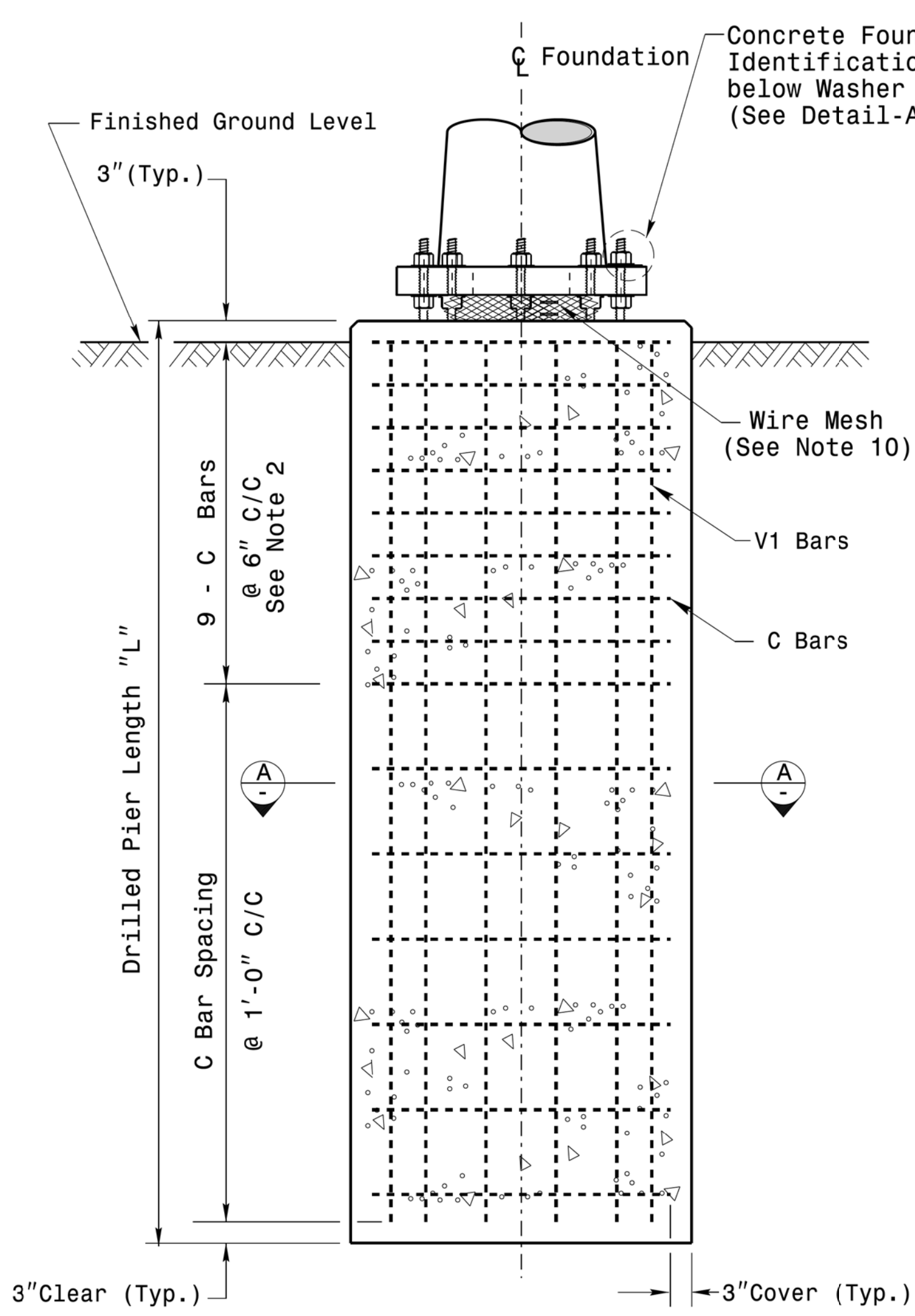
SCALE: 0 NA NONE

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

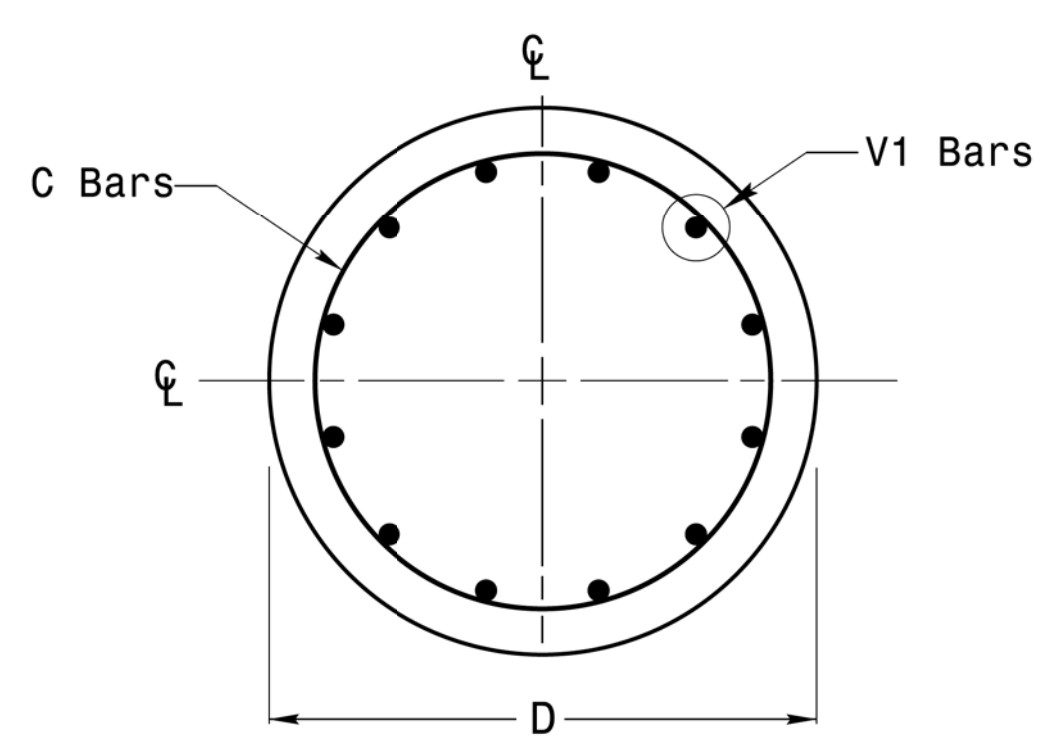
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DocuSigned by: D. C. Sarkar  
DATE: 10/11/2017

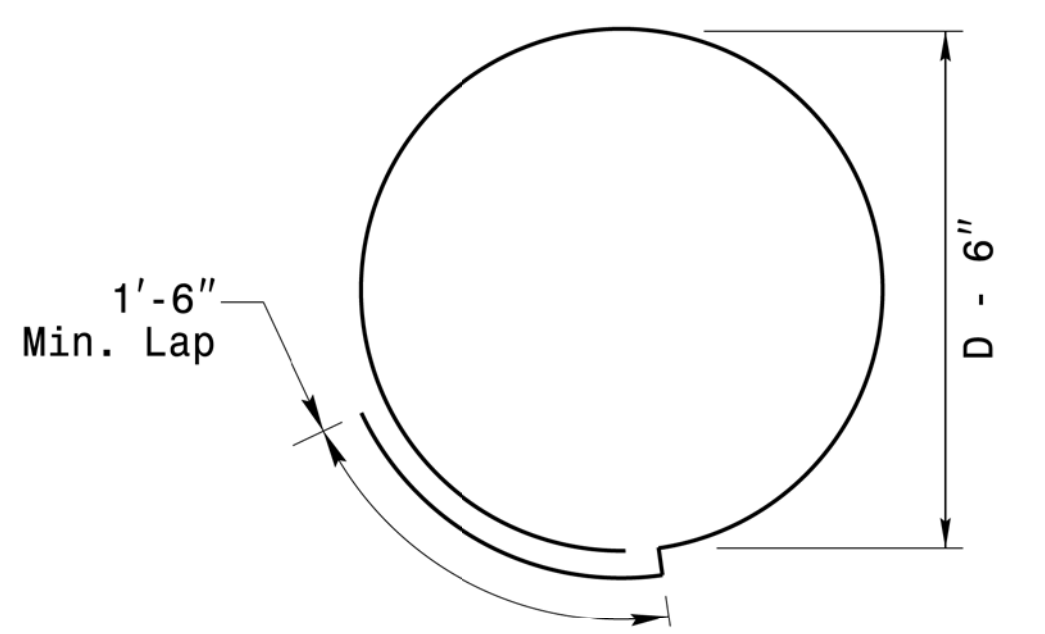
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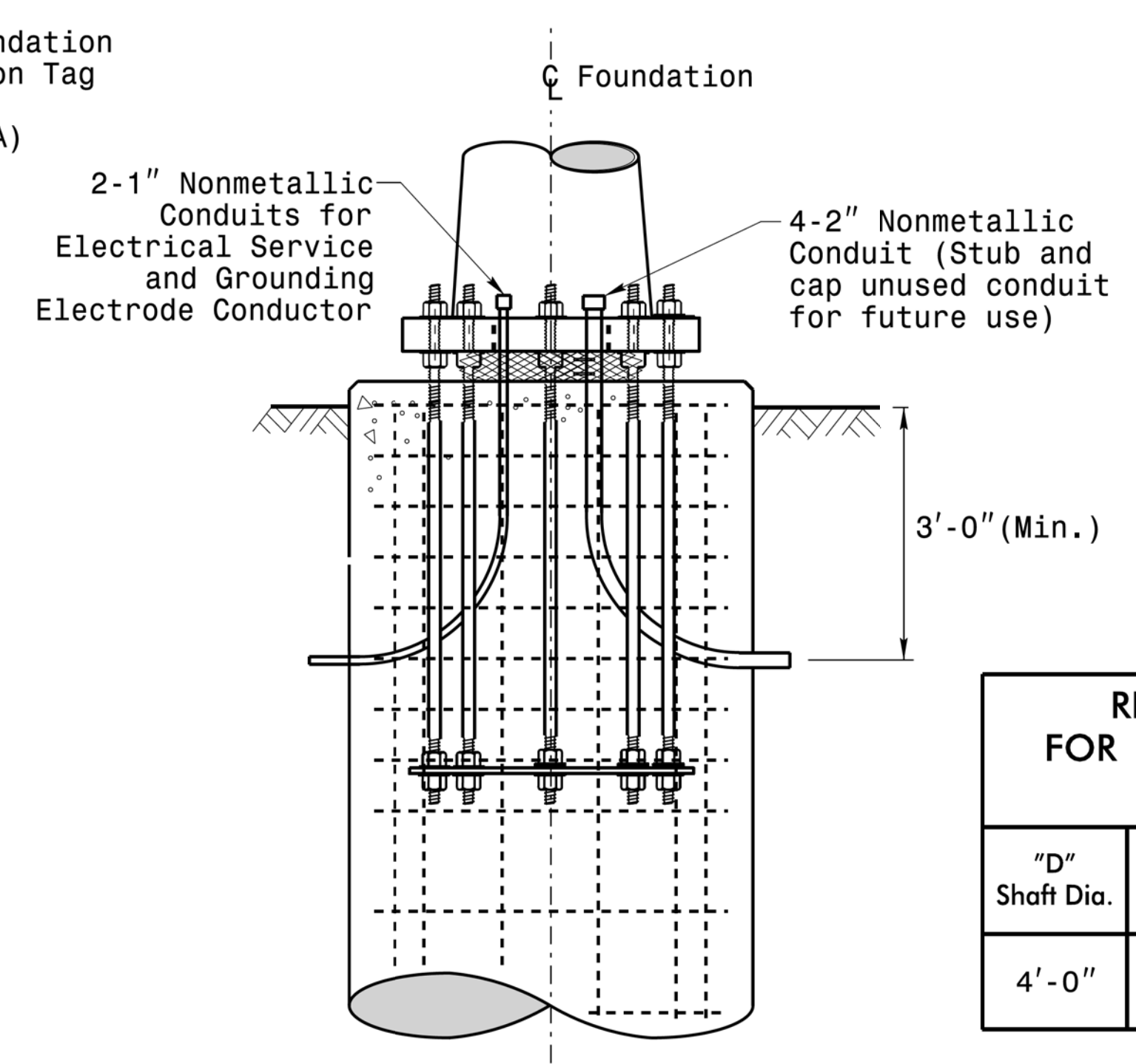
**Concrete Shaft Elevation**



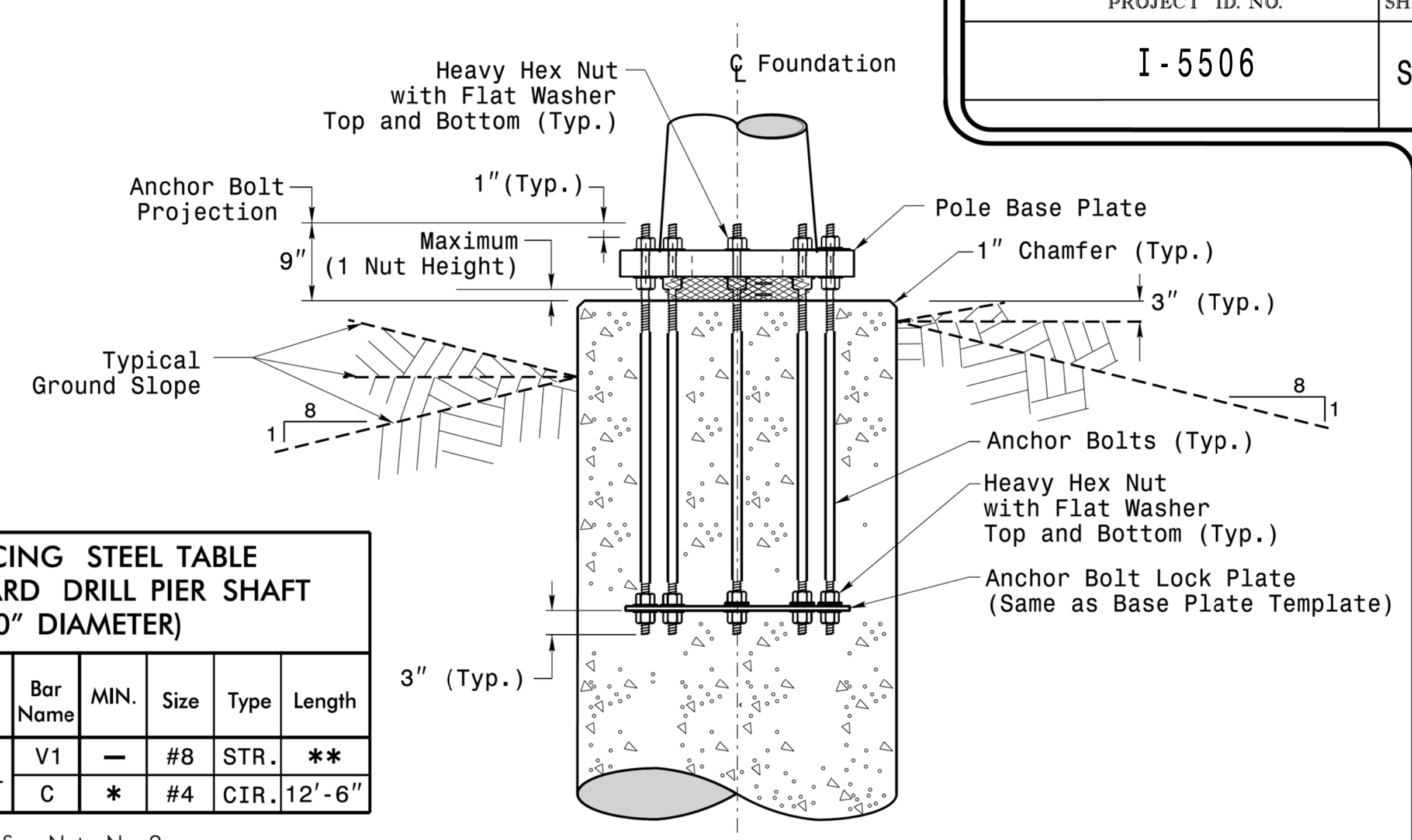
**Section A-A**



**Typical "C" Bar Detail**



**Typical Foundation Conduit Details**



**Typical Foundation Anchor Bolt Details**

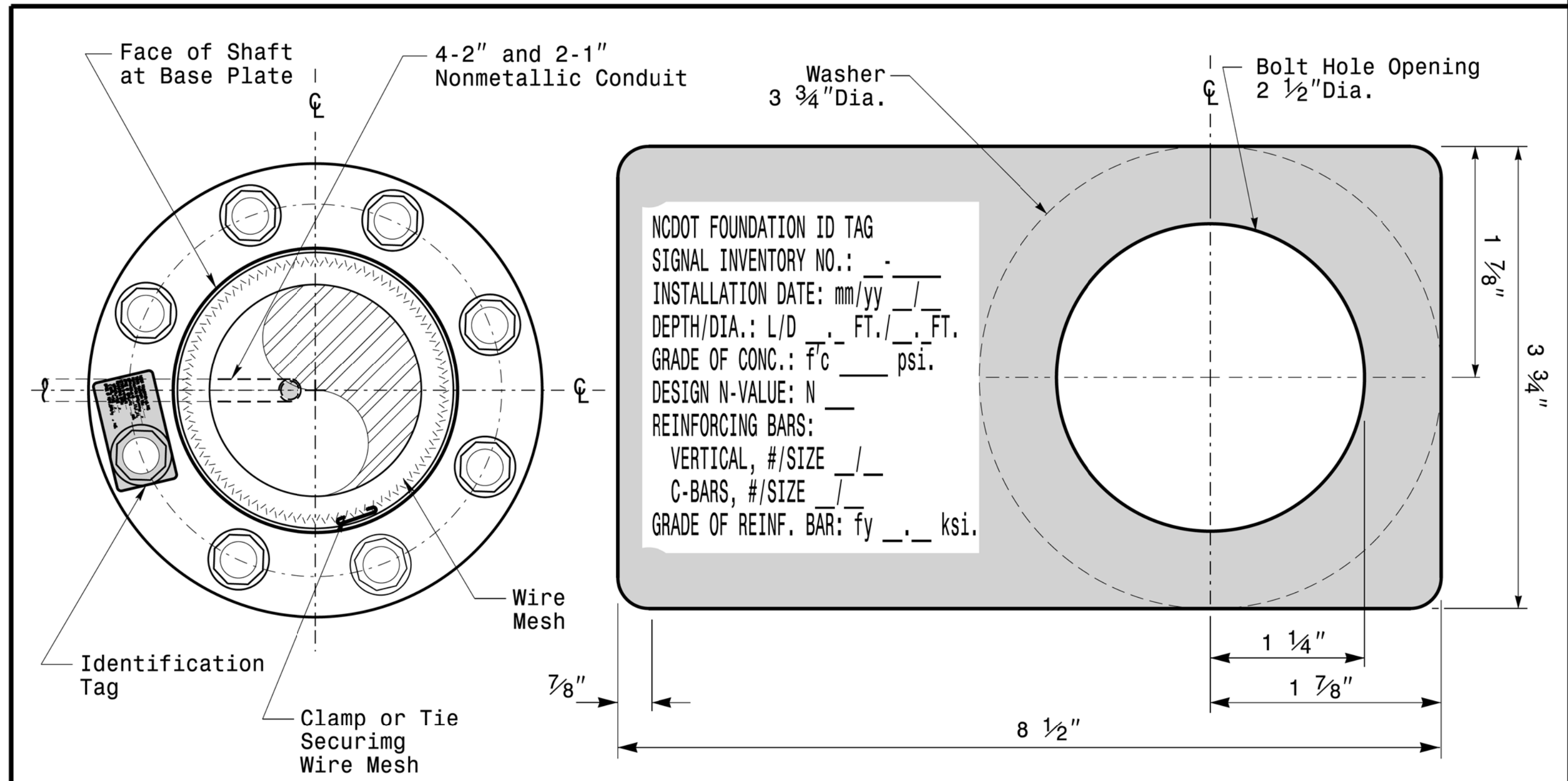
(Reinforcing Cage Not Shown for Clarity)

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

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

**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 2018 NCDOT Standard Specifications are referenced in this provision. Refer to the NCDOT Resources/Specifications page located on the Connect NCDOT website.  
<https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx>
- 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 the Identification Tag on the top of the base plate, directly above the conduit's entry point.
- Provide two layers of galvanized welded 23 gauge (0.25) 6" wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
- Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



**Concrete Foundation Identification Tag Details**

**Detail-A**

	<b>Construction Details For Foundations</b>		
	PLAN DATE: OCTOBER 2018 PREPARED BY: N. BITTING	DESIGNED BY: C. B. COGDILL REVIEWED BY: D. C. SARKAR	

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 11-001-2017-08:37  
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**Construction Details - Foundations**

# SOIL CONDITION

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

**General Notes:**


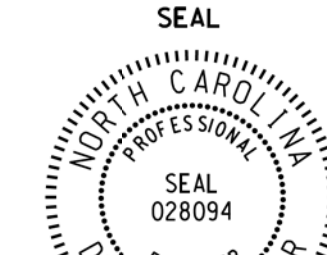
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

**Foundation Selection:**

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

**Standard Strain Pole Foundation-All Soil Condition**

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

	<p><b>Standard Strain Pole Foundation for All Soil Conditions</b></p> <p>PLAN DATE: OCTOBER 2017    DESIGNED BY: C.B. COGDELL                  PREPARED BY: N. BITTING    REVIEWED BY: D.C. SARKAR</p>									
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NO.	DATE	INIT.	DESCRIPTION							
1	7/12/2015	N.B.	Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn.							

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