



Commonwealth of Pennsylvania - Department of Transportation

Construction and Materials Division
New Products & Innovations Section
81 Lab Lane
Harrisburg PA 17110-2543
Phone: (717) 425-5816 Fax: (717) 783-5955

October 01, 2021

Final Product Evaluation Determination Report

PEQ#: 2021171 **Status:** Approved

Approval Date: 10/01/2021

Company Name: Maico Industries, Inc

Representative: Jeff T Landon

Phone Number: (785) 472-5390 **Ext:**

Email Address: Jeff.Landon@maicoind.com

Corporate Address: 936 Highway 14 P.O. Box 24 Ellsworth, KS 67439

Manufacturing Address: 936 Highway 14 P.O. Box 24 Ellsworth, KS 67439

Supplier Code: MAICO 15

Product: Traffic Signal Structural Support Fabricator - Steel

Product(s) Name:

This fabrication approval will be listed in both Section 951.2(c) Structural Supports for contracts let on after October 8, 2021 per Pub 408/2020 Change No. 3 and Section 1104.02 Traffic Signal Supports (Steel) for contracts let before October 8, 2021.

We are pleased to notify Maico Industries, Inc that the product(s) listed above has been **APPROVED** for listing in the Bulletin 15 "Qualified Products List for Construction" and will be added as shown below.

Section 951: Traffic Signal Supports

951.2(c) Structural Supports

Steel Products Procurement Act applies. [Publication 148 Traffic Standards - Signals \(TC-8800 Series\)](#)

* Note: These fabricators are also listed in Section 1104.02 Traffic Signal Support (Steel).

Product	Name	Ref. No.
MAICO 15	Maico Industries, Inc, 936 Highway 14, P.O. Box 24, Ellsworth, KS 67439 http://www.maicoind.com/	
	Traffic Signal Structural Support Fabricator - Steel	2021-171Q

This report may be used as confirmation of approval until your facility update appears in Bulletin 15.

It is mandatory that a "Certificate of Compliance", Form CS-4171, be accurately completed and distributed as directed for all approved products/services shipped to PennDOT projects. See Pub 408, Section 106.03(b)3 for more detailed information regarding CS-4171 responsibilities.

[CS-4171 Form](#)

All products/services approved by the Pennsylvania Department of Transportation are subject to periodic quality assurance inspections by department staff, including inspections of the manufacturing facility itself. Any potential changes relative to the supplied product/service, such as company name, plant location, material suppliers, manufacturing process, etc. must be reported to this office within ten (10) days. If changes are not reported within the required time, your product will be subject to removal from Bulletin 15

October 01, 2021

If you have any questions, please contact Mr. Rodney Klopp, P.E., New Products and Innovations Section at (717) 787-7287 or via email rklopp@pa.gov, and refer to PEQ# 2021 - 171Q.

*This report is authorized by Duane Brown, under the direction of
Matthew Briggs, Chief of New Products & Innovations
This report may only be reproduced in full.*

Engineered Pole Structures, LLC

2332 NE 30TH COURT • Lighthouse Point, FL 33064 • Telephone 724-910-8575

October 25, 2021

Mr. Steve Gault

Chief, TSMO Arterials & Planning Section, PennDOT Bureau of Maintenance and Operations

400 North Street

Harrisburg, PA 17120-0064

RE: PennDOT Traffic Signal Poles

Approval No. 2021171-PE, Maico Industries/Engineered Pole Structures

Dear Mr. Gault:

Attached are the following approved drawings connected with the above Approval No. 2021171-PEQ, on file in ECAMMS:

*MAST ARM Drawing Nos. M-PA-MAST ARM POLE-01 THRU 08, R3

*STRAIN POLE Drawing Nos. M-PA-STRAIN POLE-01 THRU 02, R2

*PED POLE DRAWING No. PA-PED POLE-01

Per your original direction, I worked with Ben Flanagan on the design calculations and drawing submittals for this PEQ project. Upon approval from BOPD, I informed our Bulletin15 approved partner, Maico Industries, of the technical approval. Maico Industries (Jeff Landon) then contacted Anthony Chiodo, to get Approval 2021171-PEQ loaded up onto ECAMMS. On 10-1-21, Robert Peterson, PennDOT Construction and Materials Division, confirmed the Approval 2021171 PEQ to Jeff Landon and myself for Maico Supplier Code 15, for Section 951, 951.2c : Traffic Signal Supports.

On 10-21-21, Anthony Chiodo requested to Jeff Landon and me, to write a cover letter to you directly, formally transmitting the attached approved drawings, to post up onto PennDOT's Traffic Signal Portal.

Let me know if anything further is required on the Approval 2021171 PEQ.

Maico and EPS are thankful and excited to participate as a quality traffic signal pole supplier to PennDOT.

Sincerely,

Anthony J. DiSimone

Anthony J. DiSimone P.E., President

Engineered Pole Structures, LLC

CC Maico Dave Cox, Jeff Landon

CC Anthony Chiodo, PennDOT

Gault, Steve

From: Anthony DiSimone <tdisimone@epstructures.com>
Sent: Wednesday, December 30, 2020 4:26 PM
To: Gault, Steve
Subject: [External] PennDOT Traffic Signal Pole QPL
Attachments: PennDOT QPL - Mast Arm Combined Calculations (EPS 2020).pdf

ATTENTION: This email message is from an external sender. Do not open links or attachments from unknown sources. To report suspicious email, forward the message as an attachment to CWOPA_SPAM@pa.gov.

Steve:
Thanks for your time yesterday.

Pursuant to our discussion yesterday, I request PennDOT's consideration to submit our PennDOT QPL designs and drawings for approval, based on my engineering/sales company, Engineered Pole Structures, LLC (EPS). EPS has already performed all required calculations and produced drawings for approval for the Mast Arms, Strain Poles and Ped Poles. These pole products would be produced in a Bulletin 15 Approved shop, such as Maico Industries, Summit Manufacturing, and also CHM Industries, currently in the process of obtaining PennDOT Bulletin 15 approval. Of course, all these pole producers are AISC Simple Bridge, and/or Component Certified, as required by PennDOT. They would all work under my technical supervision.

The calculations and drawings are in 100% compliance to PennDOT current specifications, and performed under my PA P.E. stamps, and professional insurance. As discussed. I have been designing, manufacturing/supplying PennDOT traffic signal supports since 1972, and therefore have in-depth experience with AASHTO/PennDOT technical requirements.

Because of file sizes, I am e-mailing you 3 times, to get all of the drawings and calculation files to you.

Please click back to me on receipt of each of the 3 e-mails. Of course, call or e-mail me at any time on our request. Thanks for this consideration. Per our discussion, if my request is approved, the entry of up to 3 shops would ensure faster deliveries and lower costs to PennDOT, in completing signalized intersection projects.

This is e-mail 1 of 3 for MAST ARM STRUCTURE CALCULATIONS.

Regards,

Anthony J. DiSimone, P.E.
Engineered Pole Structures, LLC
Phone: 724-910-8575
tdisimone@epstructures.com

***NOTICE: ENGINEERED POLE STRUCTURES, LLC IS NOT AFFILIATED WITH VSI SALES, LLC OR STRUCTURES USA, LLC**. ELECTRONIC SUBMISSIONS WILL NOT BE FOLLOWED UP WITH A HARD COPY UNLESS OTHERWISE REQUESTED. THE INFORMATION CONTAINED IN THIS TRANSMISSION IS PRIVILEGED AND CONFIDENTIAL INFORMATION INTENDED FOR USE BY ONLY SPECIFIC INDIVIDUALS OR ENTITIES. IF THE READER OF THIS MESSAGE IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS TRANSMISSION IN ERROR, DO NOT READ IT. PLEASE IMMEDIATELY REPLY TO THE SENDER THAT YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR. THEN DESTROY THE E-MAIL AND ANY ATTACHMENTS OR COPIES. THANK YOU.



P.O. Box 24 / 936 Highway 14
Ellsworth, KS 67439

(P) 785.472.5390
www.maicoind.com

January 21, 2021

To: Anthony DiSimone, President, Engineered Pole Structures (EPS)

From: David Cox, General Manager, Maico Industries, Inc., PennDOT Bulletin 15 Approved Shop

RE: PennDOT QPL Approval Traffic Signal Pole Product Approval

Confirming our numerous conversations, we are pleased to confirm our agreement for EPS to present your design calculations and drawings to PennDOT for the QPL Approval, for Mast Arms, Strain Poles, and Pedestal Poles.

It is understood that your design calculation and drawings are in complete requirement to PennDOT/AASHTO specifications and details, for Maico constructability.

We look forward to working with you to obtain approval from PennDOT, to manufacture the subject traffic signal poles in our PennDOT Bulletin 15 approved facility, in Ellsworth, Kansas.

Anthony DiSimone, P.E.

Engineered Pole Structures, LLC

David Cox, General Manager

Maico Industries, Inc.

NOTES:

1. POLE & ARM TUBES - ASTM A572, GR. 65 MIN. (65 ksi YIELD STRENGTH)
2. BASE PLATE - ASTM A709, GR. 50 OR A572, GR. 50.
3. HANDHOLE FRAME - ASTM A709, GR. 36 MIN. OR A36 MIN.
4. HANDHOLE COVER - ASTM A709, GR. 36 MIN. OR A36 MIN.
5. MISC. PLATES, SHAPES AND BARS - ASTM A992 OR A36 MIN.
6. ALL MAIN LOAD CARRYING TENSION MEMBERS THICKER THAN 1/2 " TO BE CVN TESTED TO ZONE 2 (NON-FRACTURE CRITICAL).
7. ANCHOR BOLTS - ASTM F1554, GR. 55, H.D. GALVANIZED TO ASTM A153.
8. ANCHOR NUTS - ASTM A563, GR. DH HEAVY HEX. NUTS, H.D GALVANIZED TO ASTM A153.
9. ANCHOR WASHERS - ASTM F436, TYPE 1, H.D. GALVANIZED TO ASTM A153.
10. ARM CONNECTION BOLTS ASTM A325, MECHANICALLY GALVANIZED TO ASTM B695.
11. ARM CONNECTION NUTS - ASTM A563, GR. DH OR A194, GR. 2H HEAVY HEX. NUTS MECHANICALLY GALVANIZED TO ASTM B695.
12. ARM CONNECTION WASHERS - ASTM F436, TYPE 1, MECHANICALLY GALVANIZED TO ASTM B695.
13. MISC. HARDWARE - ASTM A307 OR B18-8 STAINLESS STEEL.
14. WELDING - ALL WELDING TO CONFORM TO ANSI/AASHTO/AWS D1.5 2015 EDITION STRUCTURAL STEEL WELDING CODE. USE ANSI/AASHTO/AWS D1.1 LATEST VERSION FOR WELDING NOT COVERED BY ANSI/AASHTO/AWS D1.5. D1.5 TO BE SPECIFIED IF OPEN ENDED SHAPES ARE USED.
15. STRUCTURE FINISH - H.D. GALVANIZED TO ASTM A123.

DESIGN NOTES:

DESIGNED IN ACCORDANCE WITH AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 2001 EDITION , INCLUDING 2002, 2003 AND 2006 INTERIMS. PER APPENDIX C: ALTERNATE METHOD FOR WIND PRESSURES FOR 80 mph WIND ZONE, PUBLICATION 148M "TRAFFIC STANDARDS - SIGNALS" (DEC. 2011), PUBLICATION 149 "TRAFFIC SIGNAL DESIGN BOOK" (OCT. 2010 WITH UPDATES) AND PUBLICATION 408 SPECIFICATION.

FABRICATION NOTE:

ALL FABRICATION SHALL BE PERFORMED IN A PENNDOT BULLETIN 15 APPROVED SHOP.

30' 0"
LUMINAIRE ARM MOUNTING HEIGHT

OVERALL POLE HEIGHT (WITH LUMINAIRE ARM)

POLE LENGTH (WITH LUMINAIRE ARM)
12-SIDED FORMED TUBE - FLAT TO FLAT

OVERALL POLE HEIGHT (WITHOUT LUMINAIRE ARM)

POLE LENGTH (WITHOUT LUMINAIRE ARM)
12-SIDED FORMED TUBE - FLAT TO FLAT

MAST ARM MOUNTING HEIGHT (UPPER TWIN ARM)

MAST ARM MOUNTING HEIGHT (SINGLE ARM OR LOWER TWIN ARM)

8'-0" MIN.
15'-0" MAX.

7'-0"

4'-6"

LUMINAIRE ARM (IF REQUIRED)
(SEE DRAWING NO. PA-LUM 15-01)

(SEE DRAWING NO. PA-LUM15-01)

(SEE DRAWING NO. PA-MAST ARM-04)

POLE TOP
WITH LUMINAIRE

POLE TOP
WITHOUT
LUMINAIRE

UPPER TWIN
MAST ARMS

HANDHOLE

SIGNAL (3-2)
WEIGHT = 123 LBS
PROJ. AREA = 8.82 sq.ft.

SIGN
30"W x 36"H
WEIGHT = 39 LBS
PROJ. AREA = 7.48 sq.ft.

CABINET
2'-6"W x 4'-3"H x 1'-10"D
WEIGHT = 281 LBS
PROJ. AREA = 10.63 sq.ft.

HANDHOLE

BASEPLATE

UPRIGHT ASSEMBLY



Engineer/Designer:

E. P. STRUCTURES

Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

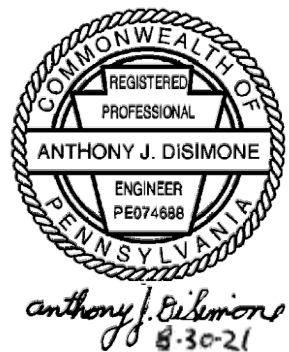
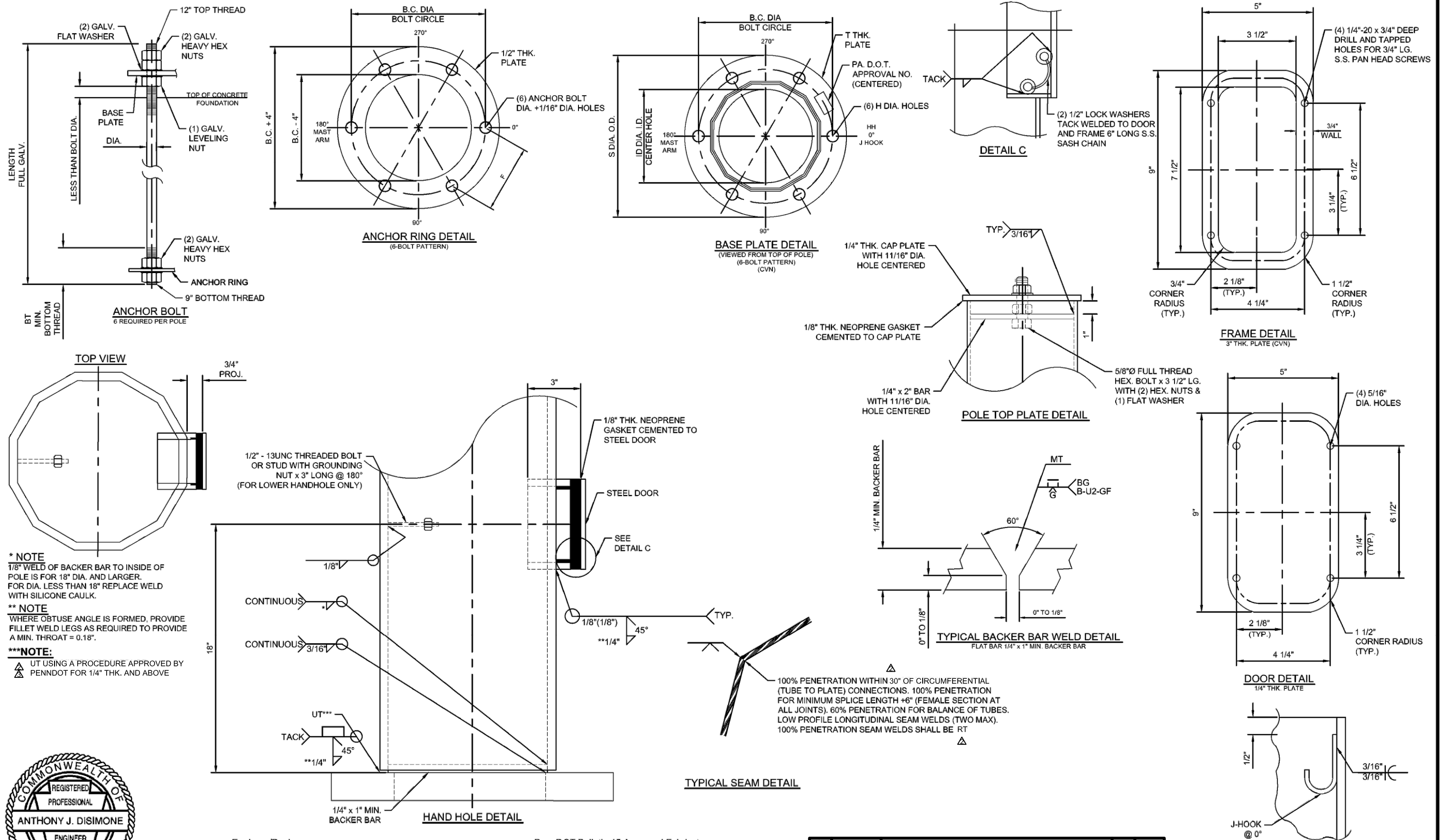
PennDOT Bulletin 15 Approved Fabricator:

Maico Industries, Inc.

936 Highway 14
Ellsworth, KS 67439
785-472-5390

Δ	8-30-21	NO CHANGE	JJD	AJD
Δ	7-15-21	PER REVIEWERS COMMENTS	JJD	LRM
Δ	4-26-21	NO CHANGE	JJD	LRM
REV	DATE	REVISION	BY	CHK'D
DRAWN BY:	FJF	CHECKED BY:	LRM	
DATE:	1-4-2021	SCALE:	N.T.S.	
DRAWING NO:	M-PA-MAST ARM-01	MASTER NO.:		
		SHEET:	1 OF 8	

SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS



Engineer/Designer:

E. P. STRUCTURES

Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

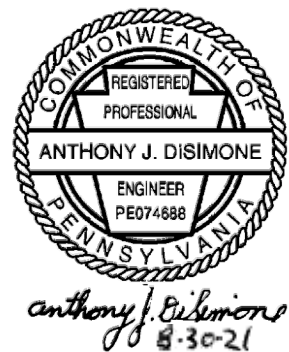
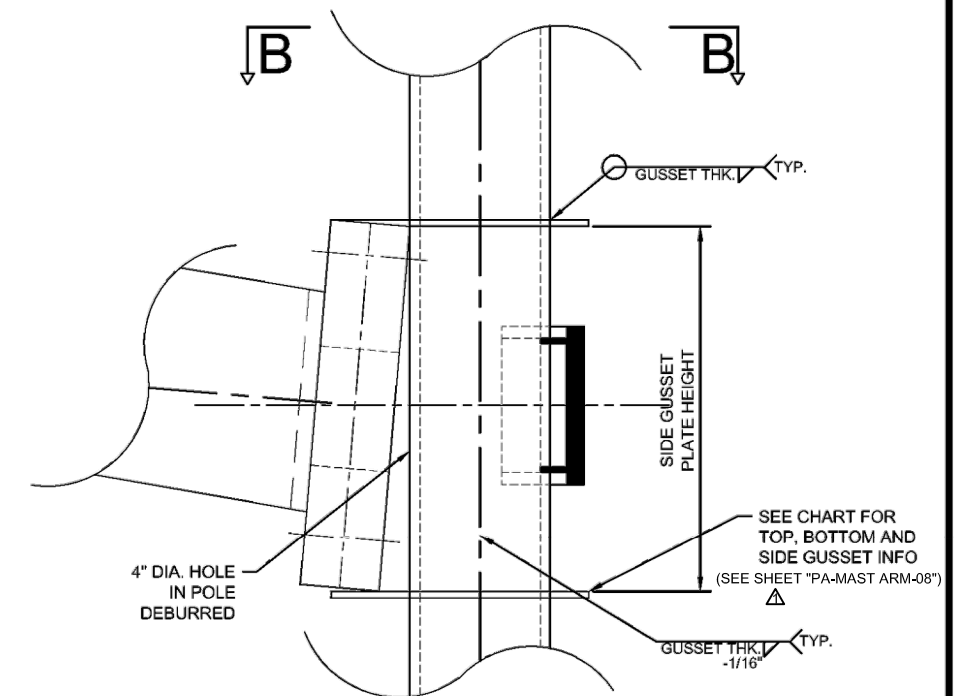
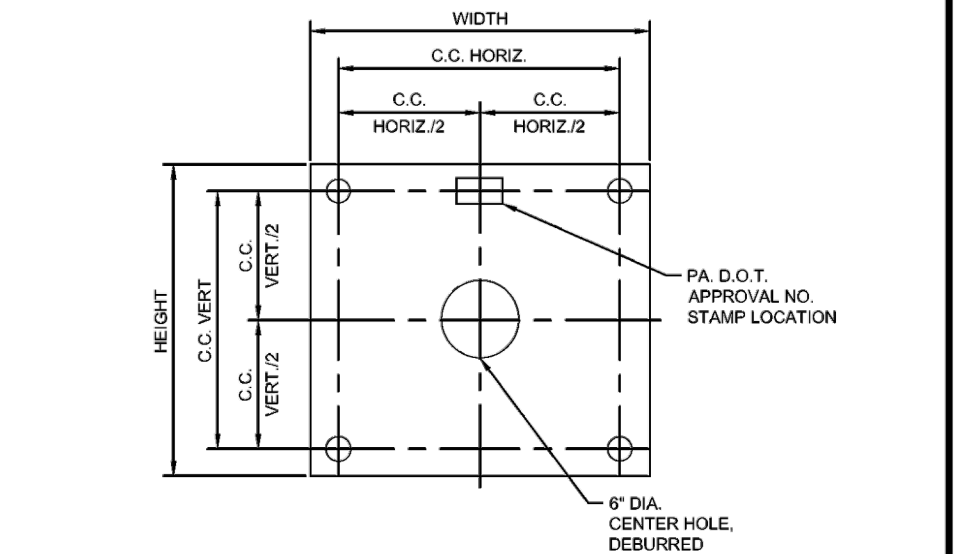
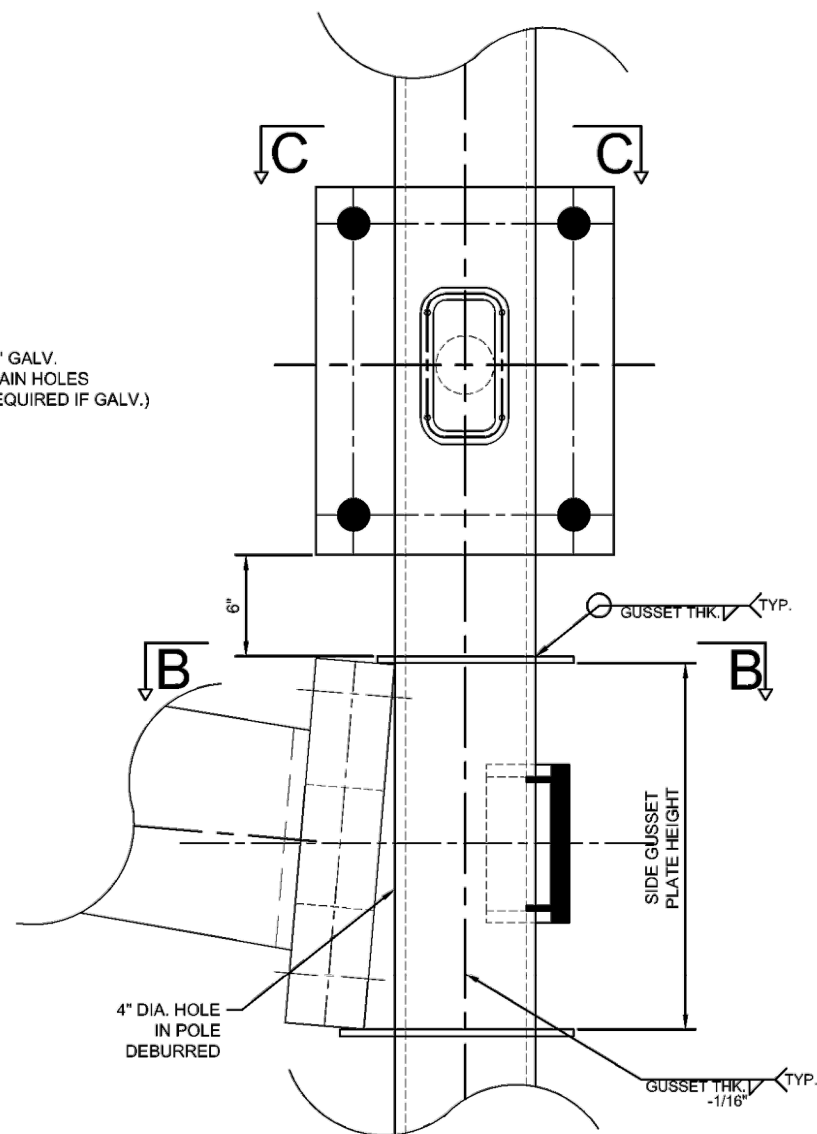
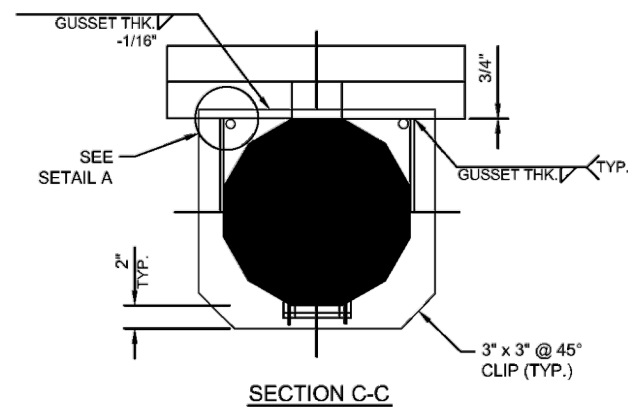
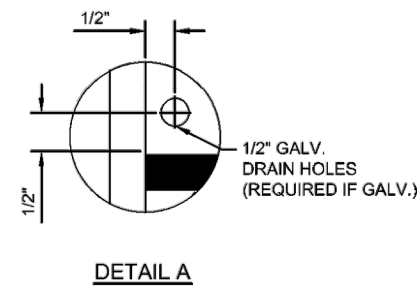
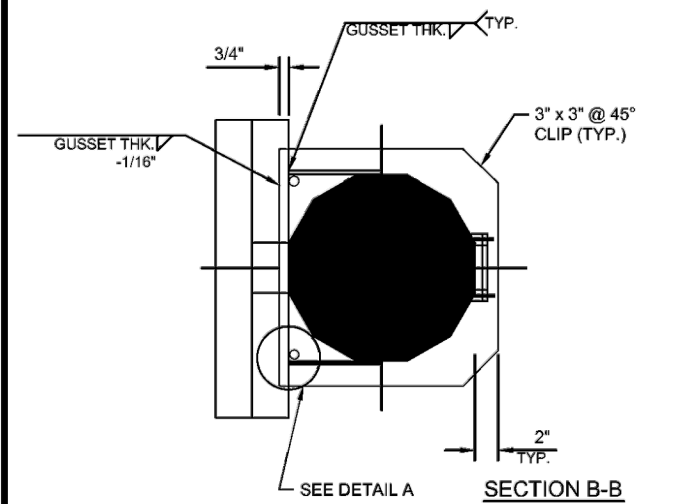
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4-26-21	NO CHANGE	JJD	LRM
REV. DATE	REVISION	BY	CHKD
DRAWN BY: FJF	CHECKED BY: LRM		
DATE: 1-4-2021	SCALE: N.T.S.		
DRAWING NO.: PA-MAST ARM-02	MASTER NO.:		
	SHEET: 2 OF 8		

SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS



Engineer/Designer:

E. P. STRUCTURES

Engineered Pole Structures, LLC
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724-910-8575

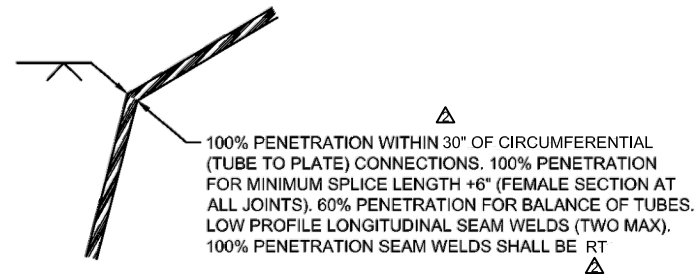
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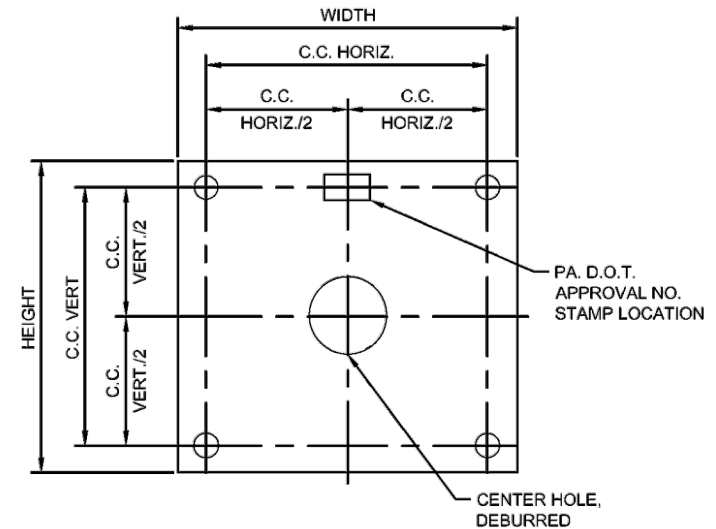
936 Highway 14
Ellsworth, KS 67439
785-472-5390

8-30-21	NO CHANGE	JJD	AJD
7-15-21	NO CHANGE	JJD	LRM
4-26-21	AS NOTED PER REVIEWERS COMMENTS	JJD	LRM
REV.	DATE	REVISION	BY
DRAWN BY:	FJF	CHECKED BY:	LRM
DATE:	1-4-2021	SCALE:	N.T.S.
DRAWING NO.:	M-PA-MAST ARM-03	MASTER NO.:	
		SHEET:	3 OF 8

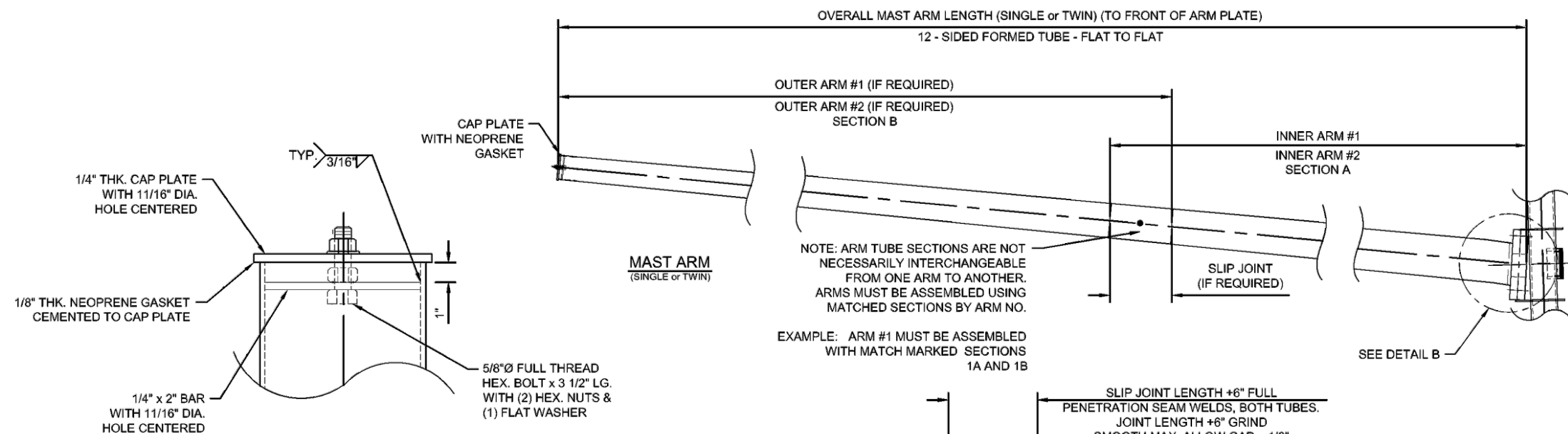
SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS



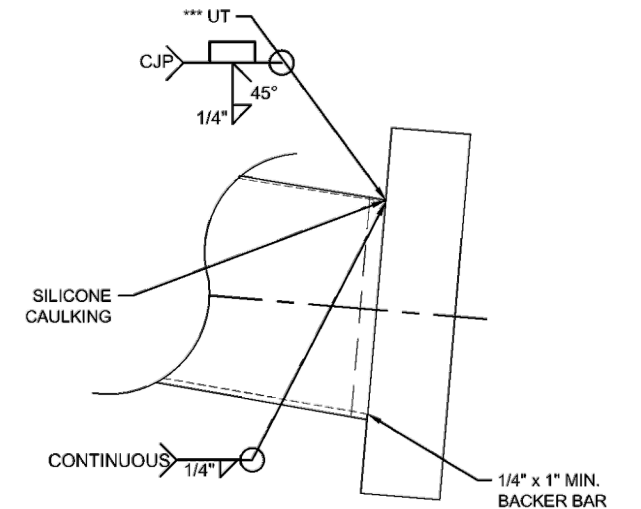
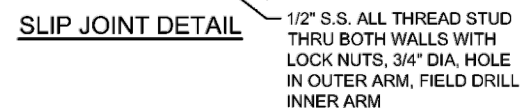
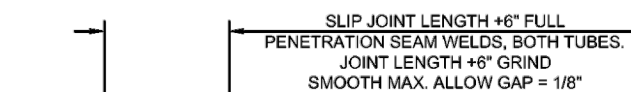
TYPICAL SEAM DETAIL



ARM PLATE DETAIL
SEE CHART FOR THICKNESS (CVN)
(SEE SHEET "PA-MAST ARM-08")

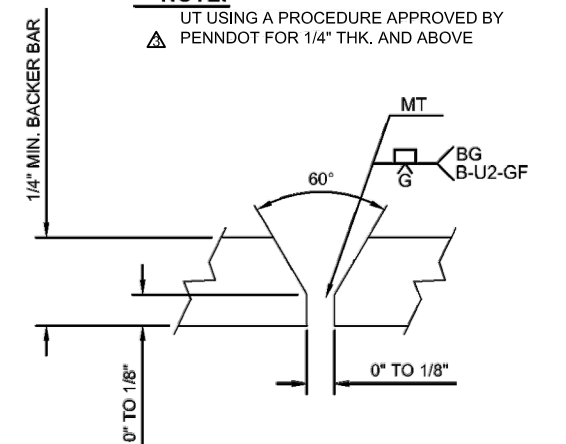


ARM CAP DETAIL



DETAIL B

***NOTE:
UT USING A PROCEDURE APPROVED BY
PENNDOT FOR 1/4" THK. AND ABOVE



TYPICAL BACKER BAR WELD DETAIL
FLAT BAR 1/4" x 1" MIN. BACKER BAR



Engineer/Designer:

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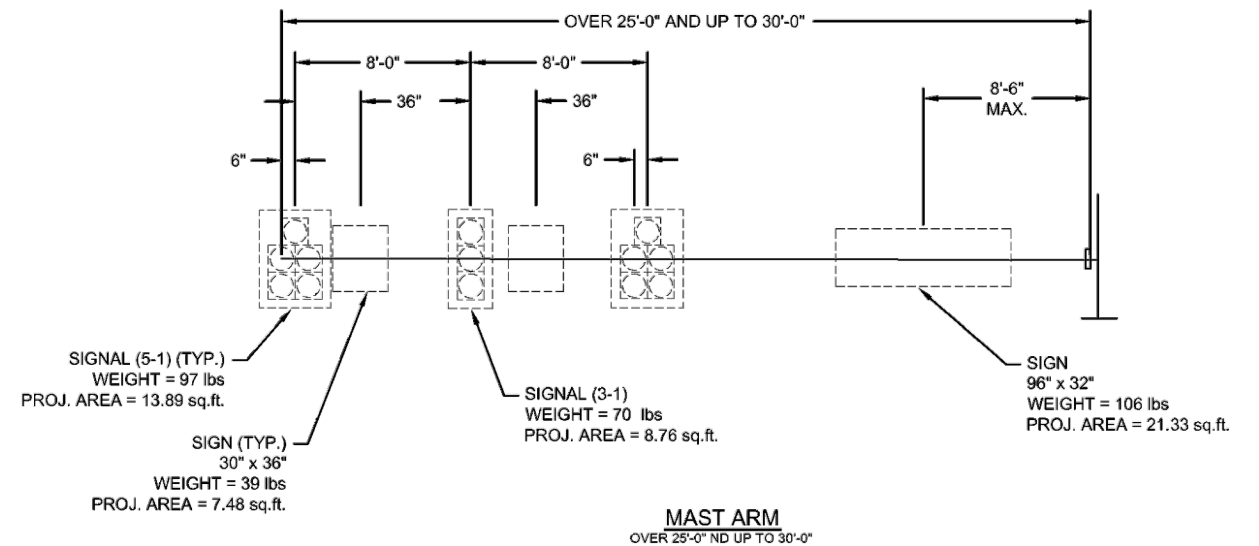
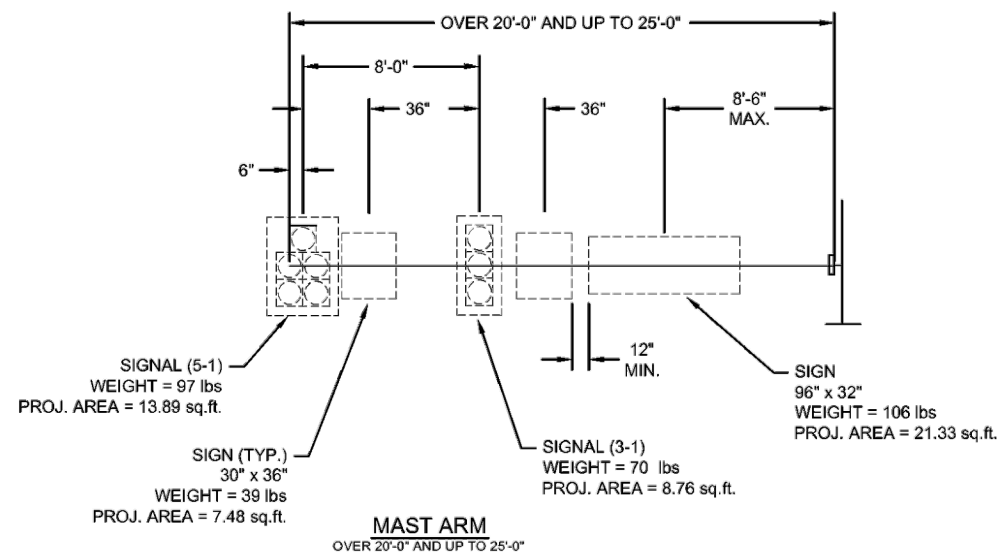
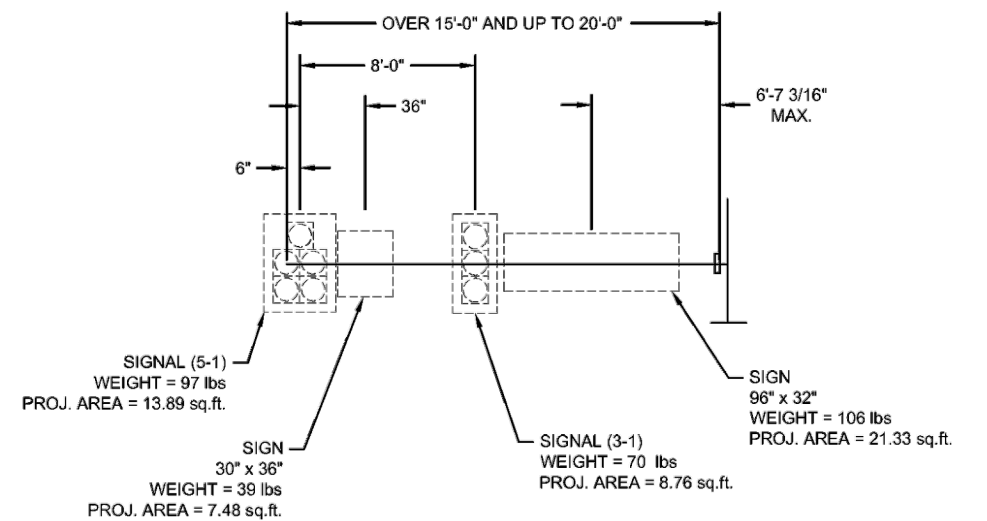
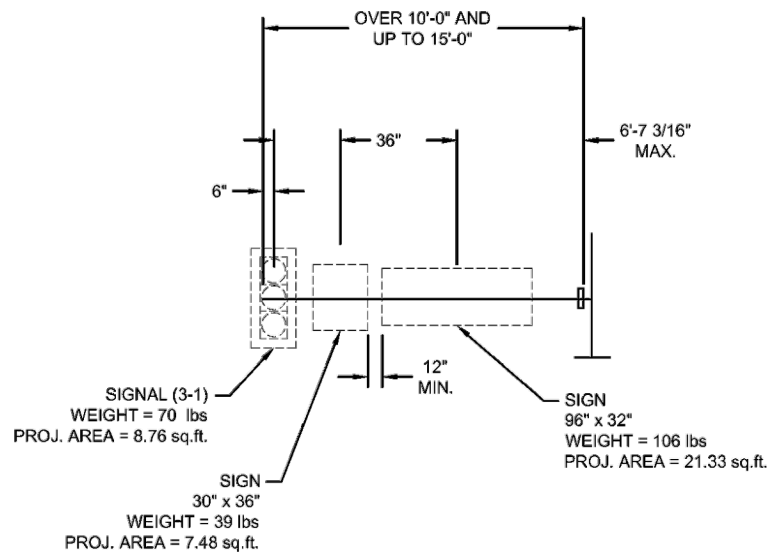
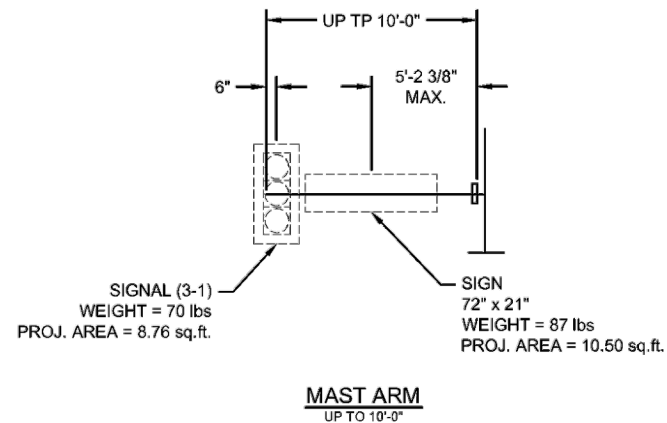
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DRAWING NO.:	M-PA-MAST ARM-04	MASTER NO.:	
		SHEET:	4 OF 8

SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS



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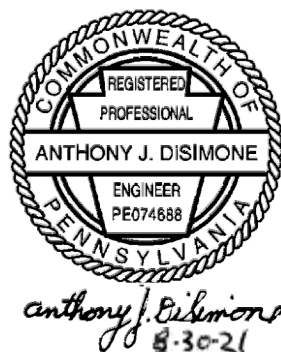
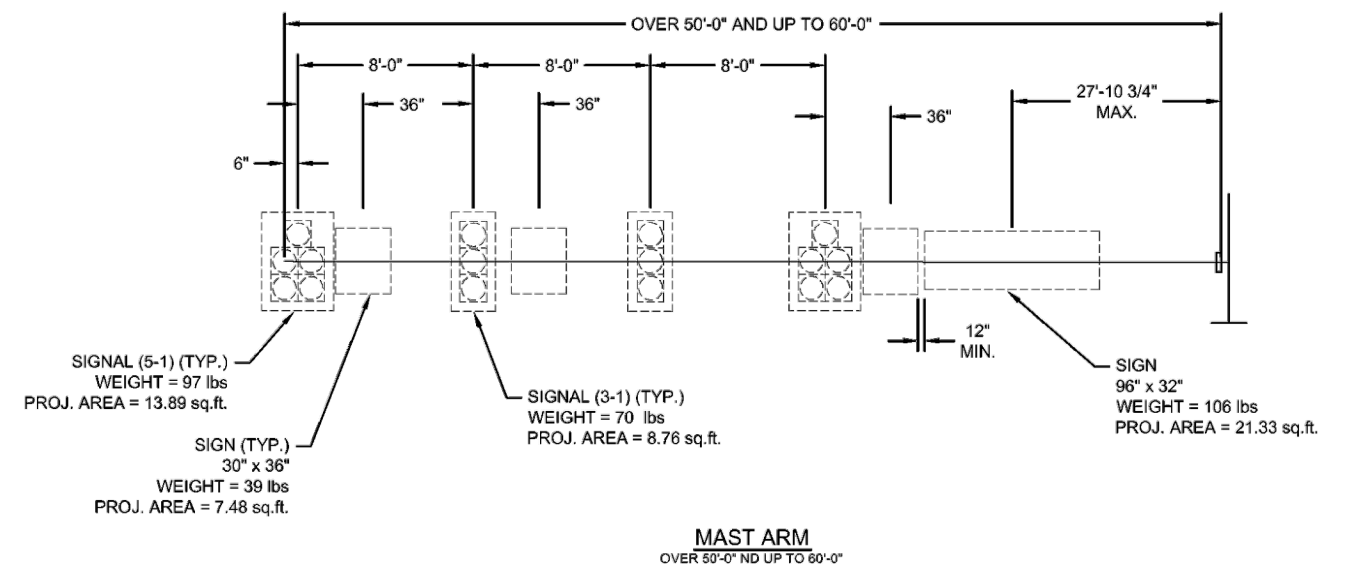
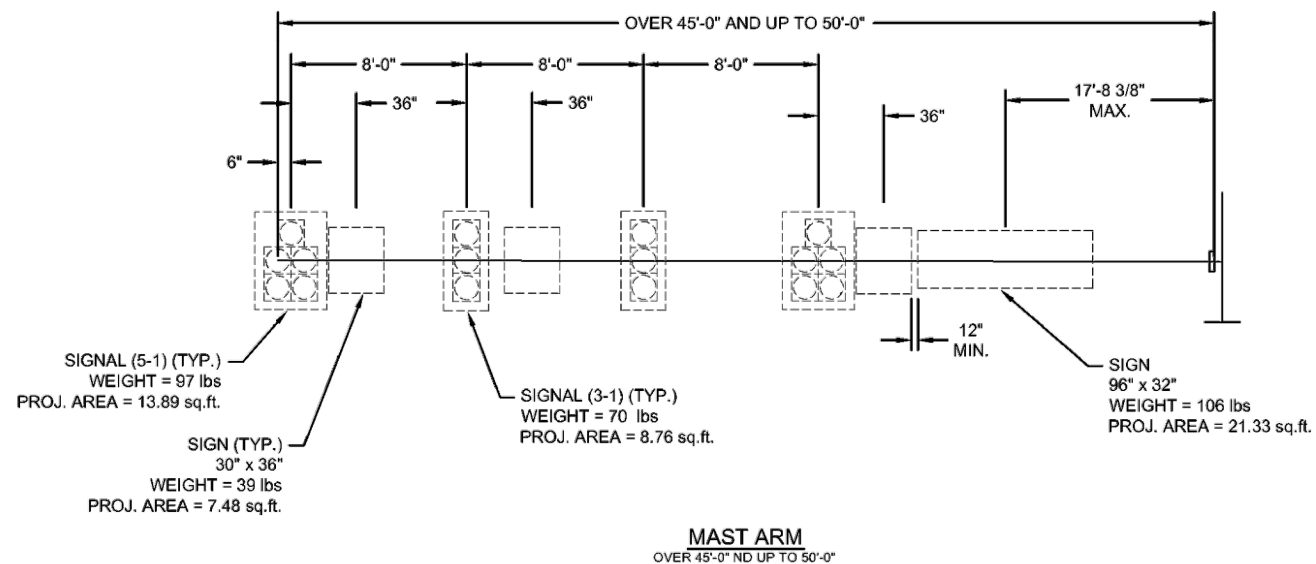
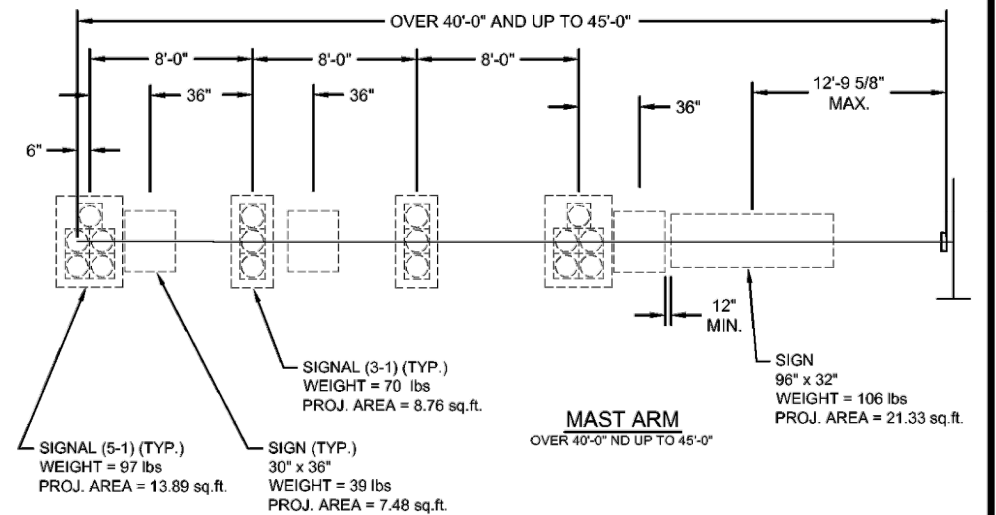
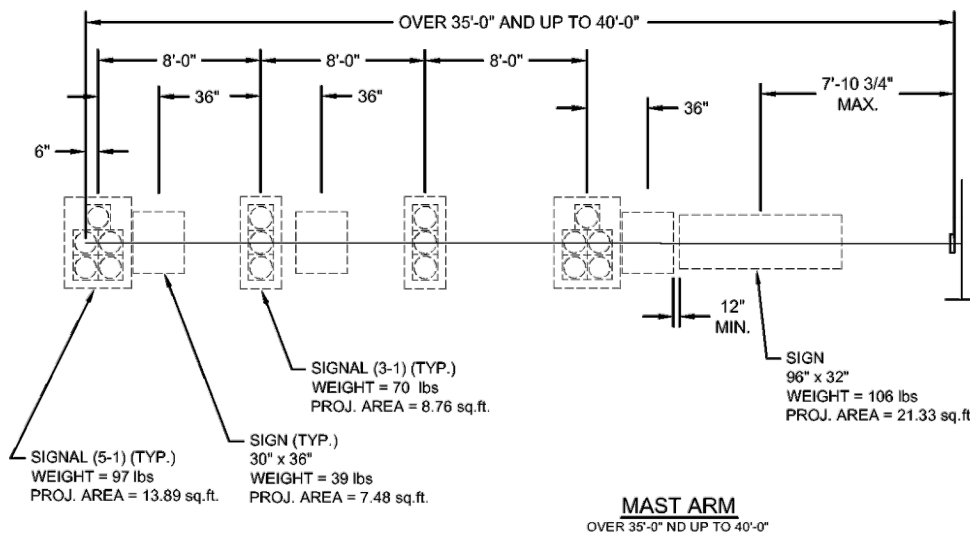
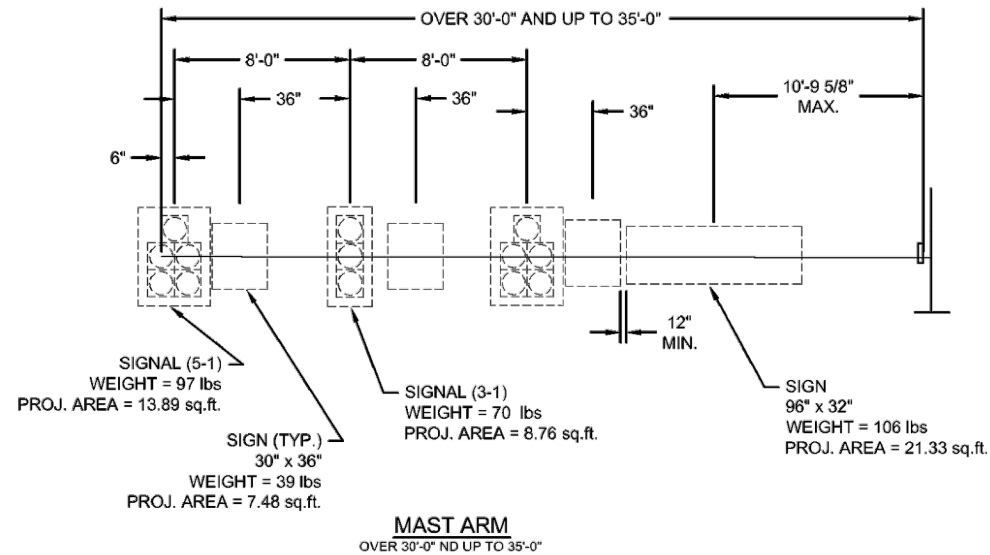
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REV.	DATE	REVISION	BY
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DATE:	1-4-2021	SCALE:	N.T.S.
DRAWING NO.:	M-PA-MAST ARM-05	MASTER NO.:	
		SHEET:	5 OF 8

SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS



Engineer/Designer:

E. P. STRUCTURES

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DRAWN BY:	FJF	CHECKED BY:	LRM
DATE:	1-4-2021	SCALE:	N.T.S.
DRAWING NO.:	M-PA-MAST ARM-06	MASTER NO.:	
		SHEET:	6 OF 8

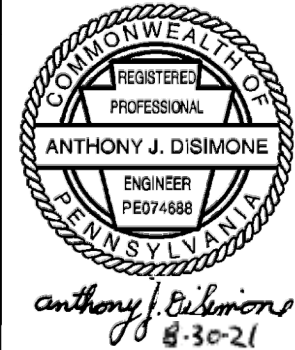
SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS

Post Dimensions											Base Plate Dimensions						Anchor Bolt Dimensions		
Design #	Overall Post Height (ft)	Upright Dimensions						M.A. #1 Maximum Mount Height (ft)	M.A. #2 Maximum Mount Height (ft)	Lumin Mount Height (ft)	# Holes/ Bolts	"S" Base Plate Dia. (in)	"T" Base Plate Thk. (in)	"ID" BP Center Hole ID (in)	"BC" Bolt Circle Dia. (in)	"H" Bolt Hole Dia. (in)	Bolt Dia. (in)	Min. Anchor Bolt Embed. (in)	Min. Anchor Bolt Length (in)
		# Sides	Bottom Dia. (in)	Top Dia. (in)	Post Height (ft)	Wall Thk. (in)	Taper Rate (in/ft)												
SL10	28	12	9.50	6.00	27.83	0.250	0.13	20		30	6	22.00	2.0	6.50	18	2.00	1.75	35	48
SL15	28	12	11.00	7.00	27.83	0.250	0.14	20		30	6	22.00	2.0	8.00	18	2.00	1.75	35	48
SL20	28	12	12.00	8.75	27.83	0.250	0.12	20		30	6	22.00	2.0	9.00	18	2.00	1.75	35	48
SL25	28	12	12.75	9.50	27.83	0.250	0.12	20		30	6	22.00	2.0	9.75	18	2.00	1.75	35	48
SL30	28	12	13.75	9.75	27.79	0.250	0.14	20		30	6	25.00	2.5	10.75	21	2.00	1.75	35	48
SL35	28	12	14.75	11.50	27.79	0.250	0.12	20		30	6	25.00	2.5	11.75	21	2.00	1.75	35	48
SL40	28	12	15.75	12.50	27.79	0.250	0.12	20		30	6	28.25	2.5	12.75	24	2.25	2	40	54
SL45	28	12	15.75	13.00	27.79	0.250	0.10	20		30	6	28.25	2.5	12.75	24	2.25	2	40	54
SL50	28	12	16.25	14.25	27.79	0.250	0.07	20		30	6	28.25	2.5	13.25	24	2.25	2	40	54
SL55	28	12	17.50	15.50	27.79	0.250	0.07	20		30	6	28.25	2.5	14.50	24	2.25	2	40	54
SL60	28	12	18.75	16.75	27.79	0.250	0.07	20		30	6	28.25	2.5	15.75	24	2.25	2	40	54
SN10	23	12	8.50	6.00	22.83	0.250	0.11	20			6	22.00	2.0	6.25	18	2.00	1.75	35	48
SN15	23	12	10.25	7.00	22.83	0.250	0.14	20			6	22.00	2.0	7.25	18	2.00	1.75	35	48
SN20	23	12	11.25	8.00	22.83	0.250	0.14	20			6	22.00	2.0	8.25	18	2.00	1.75	35	48
SN25	23	12	12.00	8.75	22.83	0.250	0.14	20			6	22.00	2.0	9.00	18	2.00	1.75	35	48
SN30	23	12	13.00	9.75	22.83	0.250	0.14	20			6	25.00	2.0	10.00	21	2.00	1.75	35	48
SN35	23	12	13.75	10.50	22.79	0.250	0.14	20			6	25.00	2.5	10.75	21	2.00	1.75	35	48
SN40	23	12	15.00	11.75	22.79	0.250	0.14	20			6	28.25	2.5	12.00	24	2.25	2	40	54
SN45	23	12	15.00	12.75	22.79	0.250	0.10	20			6	28.25	2.5	12.00	24	2.25	2	40	54
SN50	23	12	15.75	14.25	22.79	0.250	0.07	20			6	28.25	2.5	12.75	24	2.25	2	40	54
SN55	23	12	17.25	15.75	22.79	0.250	0.07	20			6	28.25	2.5	14.25	24	2.25	2	40	54
SN60	23	12	18.25	16.75	22.79	0.250	0.07	20			6	28.25	2.5	15.25	24	2.25	2	40	54
DL10	28	12	9.50	6.00	27.83	0.250	0.13	18.5	20.25	30	6	22.00	2.0	6.50	18	2.00	1.75	35	48
DL15	28	12	11.00	7.00	27.83	0.250	0.14	18.5	20.25	30	6	22.00	2.0	8.00	18	2.00	1.75	35	48
DL20	28	12	12.00	8.75	27.83	0.250	0.12	18.5	20.29	30	6	22.00	2.0	9.00	18	2.00	1.75	35	48
DL25	28	12	13.00	9.50	27.83	0.250	0.13	18.5	20.46	30	6	22.00	2.0	10.00	18	2.00	1.75	35	48
DL30	28	12	13.75	9.75	27.79	0.250	0.14	18.5	20.58	30	6	25.00	2.5	10.75	21	2.00	1.75	35	48
DL35	28	12	15.00	11.00	27.79	0.250	0.14	18.5	20.75	30	6	25.00	2.5	12.00	21	2.00	1.75	35	48
DL40	28	12	15.75	12.50	27.79	0.250	0.12	18.5	20.92	30	6	28.25	2.5	12.75	24	2.25	2	40	54
DL45	28	12	16.00	14.00	27.79	0.250	0.07	18.5	21.08	30	6	28.25	2.5	13.00	24	2.25	2	40	54
DL50	28	12	17.50	15.00	27.79	0.250	0.09	18.5	21.21	30	6	28.25	2.5	14.50	24	2.25	2	40	54
DL55	28	12	17.00	15.00	27.79	0.3125	0.07	18.5	21.25	30	6	28.25	2.5	14.00	24	2.25	2	40	54
DL60	28	12	18.25	16.00	27.79	0.3125	0.08	18.5	21.38	30	6	28.25	2.5	15.25	24	2.25	2	40	54
DN10	23.25	12	8.50	6.00	23.08	0.250	0.11	18.5	20.25		6	22.00	2.0	6.25	18	2.00	1.75	35	48
DN15	23.25	12	10.25	7.00	23.08	0.250	0.14	18.5	20.25		6	22.00	2.0	7.25	18	2.00	1.75	35	48
DN20	23.29	12	11.25	8.00	23.13	0.250	0.14	18.5	20.29		6	22.00	2.0	8.25	18	2.00	1.75	35	48
DN25	23.46	12	12.25	9.00	23.29	0.250	0.14	18.5	20.46		6	22.00	2.0	9.25	18	2.00	1.75	35	48
DN30	23.58	12	13.25	10.00	23.38	0.250	0.14	18.5	20.58		6	25.00	2.5	10.25	21	2.00	1.75	35	48
DN35	23.75	12	14.25	11.00	23.54	0.250	0.14	18.5	20.75		6	25.00	2.5	11.25	21	2.00	1.75	35	48
DN40	23.92	12	15.25	12.00	23.71	0.250	0.14	18.5	20.92		6	28.25	2.5	12.25	24	2.25	2	40	54
DN45	24.08	12	15.75	13.75	23.88	0.250	0.08	18.5	21.08		6	28.25	2.5	12.75	24	2.25	2	40	54
DN50	24.21	12	17.00	15.25	24.00	0.250	0.07	18.5	21.21		6	28.25	2.5	14.00	24	2.25	2	40	54
DN55	24.25	12	16.75	15.00	24.04	0.3125	0.07	18.5	21.25		6	28.25	2.5	13.75	24	2.25	2	40	54
DN60	24.38	12	18.00	16.25	24.17	0.3125	0.07	18.5	21.38		6	28.25	2.5	15.00	24	2.25	2	40	54

15.25

NOTES:
DIRECTIONS FOR USING MEMBER SIZE TABLES FOR DUAL ARM STRUCTURES

FOR DUAL MAST ARM STRUCTURES WITH DIFFERING ARM LENGTHS, SELECT POLE SIZE BASED ON THE LENGTH OF THE LONGER ARM. THE MAST ARM CONNECTION PLATES AND BOLT DATA WILL BE THE SAME FOR BOTH ARMS AND SHOULD BE BASED ON THE LENGTH OF THE LONGER ARM. ARM CENTER HOLE AND ARM DIMENSIONS FOR EACH ARM WILL BE BASED ON THE OVERALL LENGTH OF THAT ARM.



Engineer/Designer:

E. P. STRUCTURES

Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

PennDOT Bulletin 15 Approved Fabricator:

Maico Industries, Inc.

936 Highway 14
Ellsworth, KS 67439
785-472-5390

8-30-21	NO CHANGE	JJD	AJD
7-15-21	NO CHANGE	JJD	LRM
4-26-21	AS NOTED PER REVIEWERS COMMENTS	JJD	LRM
REV. DATE	REVISION	BY	CHKD
DRAWN BY:	FJF	CHECKED BY:	LRM
DATE:	1-4-2021	SCALE:	N.T.S.
DRAWING NO.:	M-PA-MAST ARM-07	MASTER NO.:	
		SHEET:	7 OF 8

SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS

LEGEND FOR DESIGN # NOTATION

FOUR CHARACTER DESIGN NUMBERS

XXXX
LAST TWO CHARACTERS DESIGNATE ARM LENGTH IN FEET

FIRST TWO CHARACTERS DESIGNATE

STRUCTURE TYPE AS FOLLOWS:

- SN = FOR SINGLE ARM / NO LUMINAIRE
- SL = FOR SINGLE ARM /WITH LUMINAIRE
- DN = FOR DOUBLE ARMS / NO LUMINAIRE
- DL = FOR DOUBLE ARMS /WITH LUMINAIRE

Mast Arm Dimensions													
Overall Length	Inner Arm						Slip Joint Length	Outer Arm (If Required)					Mast Arm Mfg. Rise
	# Sides	Bottom Dia.	Tip Dia.	Arm Length	Wall Thk.	Taper Rate		# Sides	Bottom Dia.	Tip Dia.	Arm Length	Wall Thk.	
(ft)		(in)	(in)	(ft)	(in)	(in/ft)	(ft)		(in)	(in)	(ft)	(in)	(degrees)
10	12	6.75	6.00	10	0.2500	0.08							2.5
15	12	7.00	6.00	15	0.2500	0.07							2.5
20	12	7.50	6.00	20	0.2500	0.08							2.5
25	12	8.75	6.00	25	0.2500	0.11							3.0
30	12	10.50	6.25	30	0.2500	0.14							3.0
35	12	12.25	7.25	35	0.2500	0.14							3.5
40	12	13.50	7.75	40	0.2500	0.14							3.5
45	12	15.50	9.25	45	0.2500	0.14							4.0
50	12	17.25	10.25	50.0	0.2500	0.14							4.0
55	12	16.50	9.00	55.0	0.3125	0.14							4.5
60	12	17.75	13.49	31.0	0.3125	0.14	2	12	14.51	10.25	31.0	0.3125	4.5

NOTES:
DIRECTIONS FOR USING MEMBER SIZE TABLES FOR DUAL ARM STRUCTURES

FOR DUAL MAST ARM STRUCTURES WITH DIFFERING ARM LENGTHS, SELECT POLE SIZE BASED ON THE LENGTH OF THE LONGER ARM. THE MAST ARM CONNECTION PLATES AND BOLT DATA WILL BE THE SAME FOR BOTH ARMS AND SHOULD BE BASED ON THE LENGTH OF THE LONGER ARM. ARM CENTER HOLE AND ARM DIMENSIONS FOR EACH ARM WILL BE BASED ON THE OVERALL LENGTH OF THAT ARM.

Mast Arm Connections													
Design #	Pole/MA Plate Thk. (in)	Pole/MA Plate Width (in)	Pole/MA Plate Height (in)	Arm Center Hole ID (in)	Bolt Horiz. Spacing (in)	Bolt Vert. Spacing (in)	# Holes	Hole Dia. (in)	Bolt Dia. (in)	Bolt Length (in)	Gusset Plate Thk. (in)	Side Plate Height (in)	
SL10	2.0	16.00	15.00	4.00	12.00	11.00	4	1.0625	1.000	5.50	0.250	15.00	
SL15	2.0	17.50	15.00	4.00	13.50	11.00	4	1.0625	1.000	5.50	0.250	15.00	
SL20	2.0	19.00	15.50	4.50	15.00	11.50	4	1.0625	1.000	5.50	0.250	15.50	
SL25	2.0	20.00	17.50	5.75	15.50	13.00	4	1.1875	1.125	5.75	0.250	17.50	
SL30	2.0	20.50	19.00	7.50	16.00	14.50	4	1.1875	1.125	5.75	0.250	19.00	
SL35	2.5	22.00	21.00	9.25	17.50	16.50	4	1.1875	1.125	6.75	0.250	21.00	
SL40	2.5	24.50	23.00	10.50	19.50	18.00	4	1.3125	1.250	6.75	0.375	23.00	
SL45	2.5	24.50	25.00	12.50	19.50	20.00	4	1.3125	1.250	6.75	0.375	25.00	
SL50	2.5	25.50	26.50	14.25	20.50	21.50	4	1.3125	1.250	6.75	0.375	26.50	
SL55	2.5	28.00	27.00	13.50	22.50	21.50	4	1.5625	1.500	7.00	0.375	27.00	
SL60	2.5	29.50	28.50	14.75	24.00	23.00	4	1.5625	1.500	7.00	0.375	28.50	
SN10	2.0	15.50	15.00	4.00	11.50	11.00	4	1.0625	1.000	5.50	0.250	15.00	
SN15	2.0	16.50	15.00	4.00	12.50	11.00	4	1.0625	1.000	5.50	0.250	15.00	
SN20	2.0	17.50	15.50	4.50	13.50	11.50	4	1.0625	1.000	5.50	0.250	15.50	
SN25	2.0	19.00	17.50	5.75	14.50	13.00	4	1.1875	1.125	5.75	0.250	17.50	
SN30	2.0	20.00	19.00	7.50	15.50	14.50	4	1.1875	1.125	5.75	0.250	19.00	
SN35	2.5	20.50	21.00	9.25	16.00	16.50	4	1.1875	1.125	6.75	0.250	21.00	
SN40	2.5	23.00	23.00	10.50	18.00	18.00	4	1.3125	1.250	6.75	0.375	23.00	
SN45	2.5	24.00	25.00	12.50	19.00	20.00	4	1.3125	1.250	6.75	0.375	25.00	
SN50	2.5	25.50	26.50	14.25	20.50	21.50	4	1.3125	1.250	6.75	0.375	26.50	
SN55	2.5	28.00	27.00	13.50	22.50	21.50	4	1.5625	1.500	7.00	0.375	27.00	
SN60	2.5	29.00	28.50	14.75	23.50	23.00	4	1.5625	1.500	7.00	0.375	28.50	
DL10	2.0	16.50	15.00	4.00	12.50	11.00	4	1.0625	1.000	5.50	0.250	15.00	
DL15	2.0	17.50	15.00	4.00	13.50	11.00	4	1.0625	1.000	5.50	0.250	15.00	
DL20	2.0	19.00	15.50	4.50	15.00	11.50	4	1.0625	1.000	5.50	0.250	15.50	
DL25	2.0	20.50	17.50	5.75	16.00	13.00	4	1.1875	1.125	5.75	0.250	17.50	
DL30	2.0	20.50	19.00	7.50	16.00	14.50	4	1.1875	1.125	5.75	0.250	19.00	
DL35	2.5	22.00	21.00	9.25	17.50	16.50	4	1.1875	1.125	6.75	0.250	21.00	
DL40	2.5	24.50	23.00	10.50	19.50	18.00	4	1.3125	1.250	6.75	0.375	23.00	
DL45	2.5	25.50	25.00	12.50	20.50	20.00	4	1.3125	1.250	6.75	0.375	25.00	
DL50	2.5	27.00	26.50	14.25	22.00	21.50	4	1.3125	1.250	6.75	0.375	26.50	
DL55	2.5	28.00	27.00	13.50	22.50	21.50	4	1.5625	1.500	7.00	0.375	27.00	
DL60	2.5	29.00	28.50	14.75	23.50	23.00	4	1.5625	1.500	7.00	0.375	28.50	
DN10	2.0	15.50	15.00	4.00	11.50	11.00	4	1.0625	1.000	5.50	0.250	15.00	
DN15	2.0	17.00	15.00	4.00	13.00	11.00	4	1.0625	1.000	5.50	0.250	15.00	
DN20	2.0	18.00	15.50	4.50	14.00	11.50	4	1.0625	1.000	5.50	0.250	15.50	
DN25	2.0	19.50	17.50	5.75	15.00	13.00	4	1.1875	1.125	5.75	0.250	17.50	
DN30	2.0	20.50	19.00	7.50	16.00	14.50	4	1.1875	1.125	5.75	0.250	19.00	
DN35	2.5	21.50	21.00	9.25	17.00	16.50	4	1.1875	1.125	6.75	0.250	21.00	
DN40	2.5	23.50	23.00	10.50	18.50	18.00	4	1.3125	1.250	6.75	0.375	23.00	
DN45	2.5	25.00	25.00	12.50	20.00	20.00	4	1.3125	1.250	6.75	0.375	25.00	
DN50	2.5	26.50	26.50	14.25	21.50	21.50	4	1.3125	1.250	6.75	0.375	26.50	
DN55	2.5	29.50	27.00	13.50	24.00	21.50	4	1.5625	1.500	7.00	0.375	27.00	
DN60	2.5	28.50	28.50	14.75	23.00	23.00	4	1.5625	1.500	7.00	0.375	28.50	



Engineer/Designer:

E. P. STRUCTURES

Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

PennDOT Bulletin 15 Approved Fabricator:

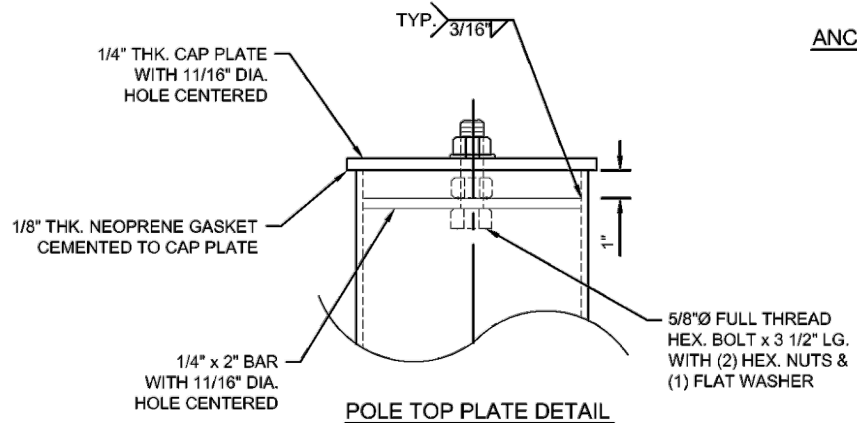
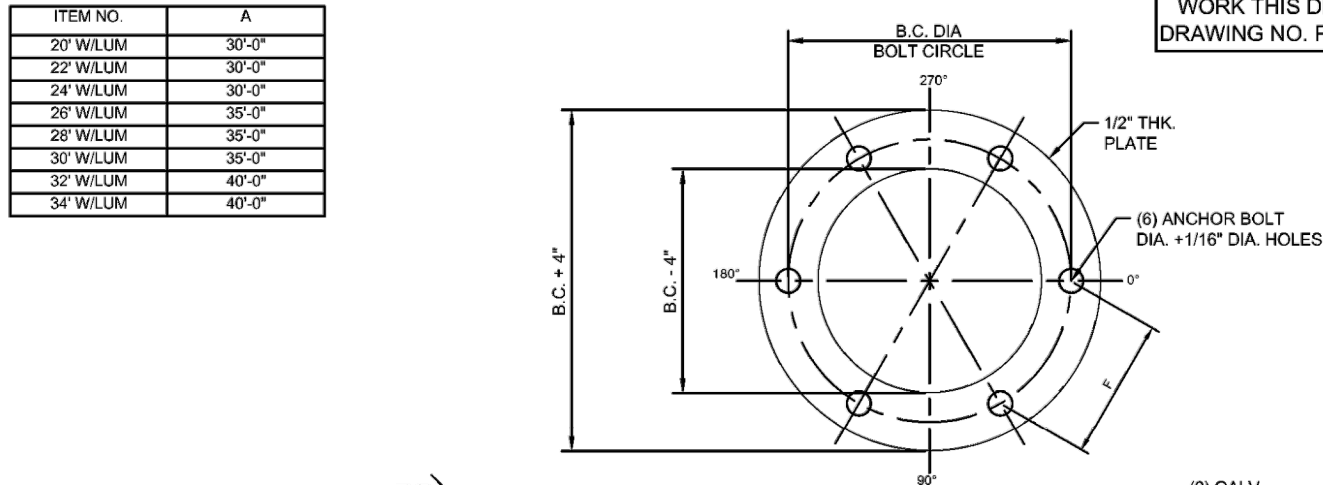
Maico Industries, Inc.

936 Highway 14
Ellsworth, KS 67439
785-472-5390

8-30-21	NO CHANGE	JJD	AJD
7-15-21	NO CHANGE	JJD	LRM
4-26-21	NO CHANGE	JJD	LRM
REV	DATE	REVISION	BY
DRAWN BY:	FJF	CHECKED BY:	LRM
DATE:	1-4-2021	SCALE:	N.T.S.
DRAWING NO.:	M-PA-MAST ARM-08	MASTER NO.:	
		SHEET:	8 OF 8

SCHEDULED STEEL MAST ARM POLE (SINGLE or TWIN)
WITH DETAILS

ITEM NO.	A
20' W/LUM	30'-0"
22' W/LUM	30'-0"
24' W/LUM	30'-0"
26' W/LUM	35'-0"
28' W/LUM	35'-0"
30' W/LUM	35'-0"
32' W/LUM	40'-0"
34' W/LUM	40'-0"



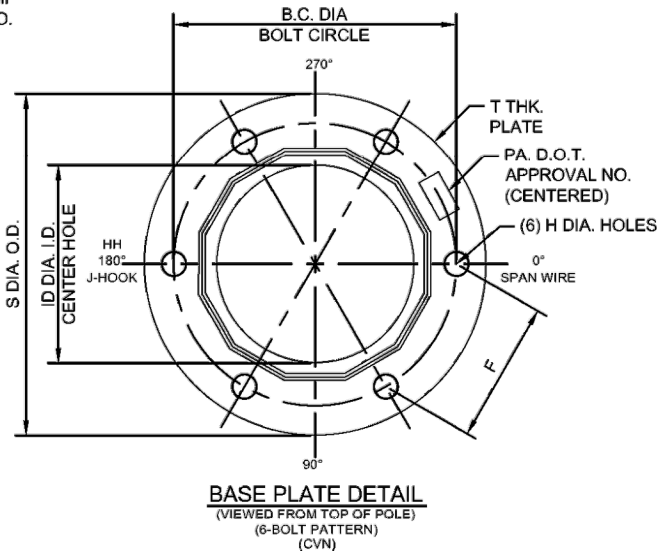
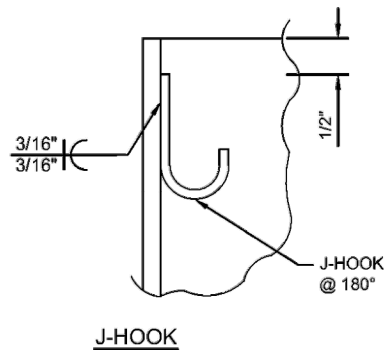
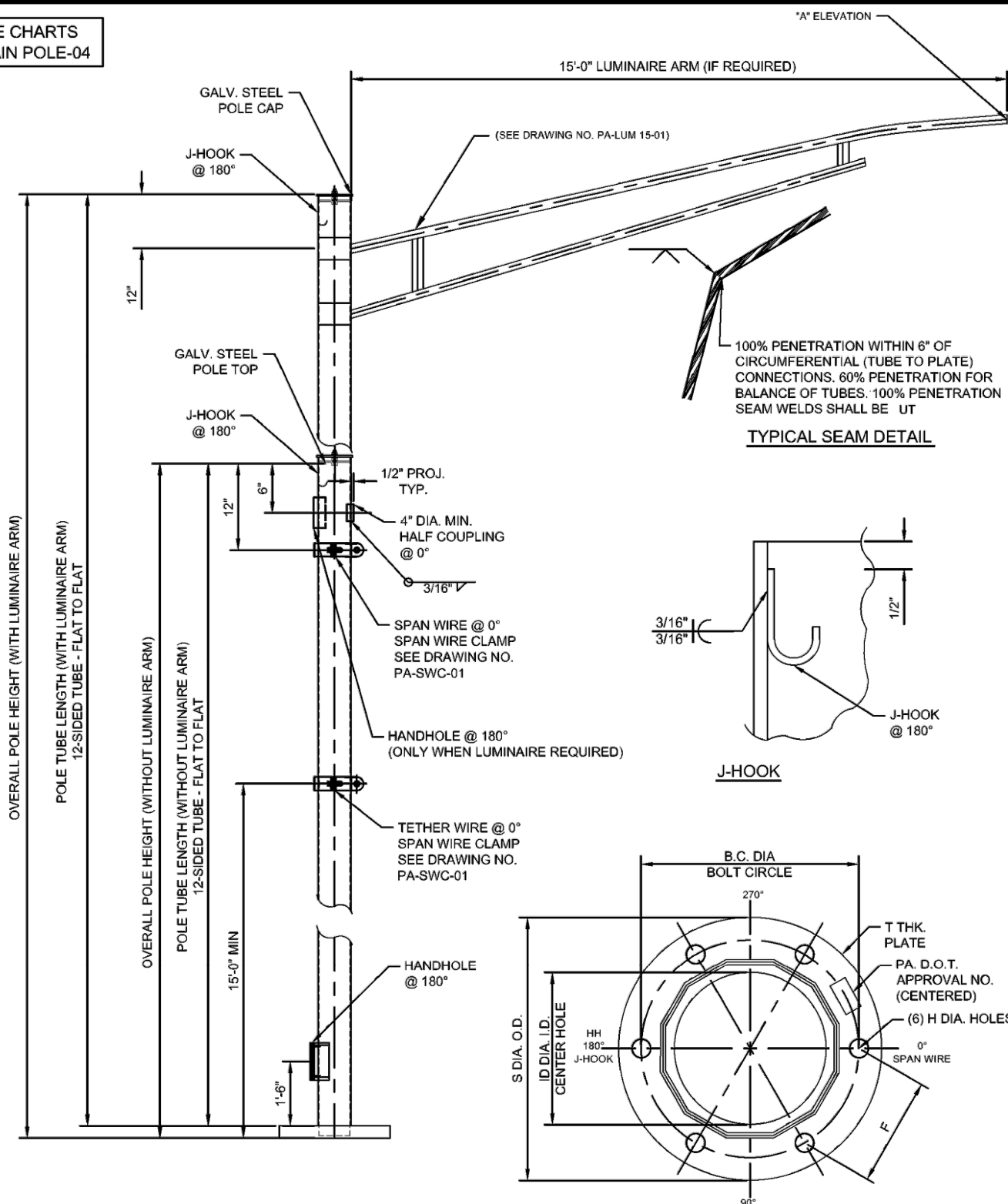
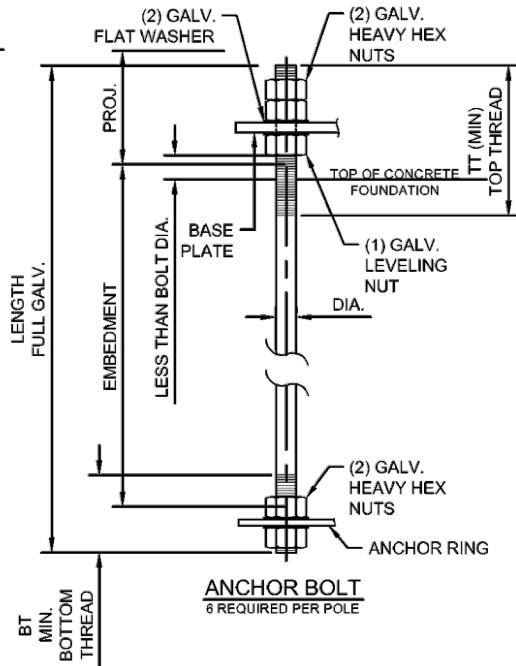
NOTES:

- POLE TUBES - ASTM A572, GR. 65 (65 ksi YIELD STRENGTH)
- BASE PLATE - ASTM A709, GR. 50 OR A572, GR. 50.
- HANDHOLE FRAME - ASTM A709, GR. 36 MIN. OR A36 MIN.
- HANDHOLE COVER - ASTM A709, GR. 36 MIN. OR A36 MIN.
- MISC. PLATES, SHAPES AND BARS - ASTM A992 OR A36 MIN.
- PIPES AND COUPLING - ASTM A53, TYPE E OR S.
- ALL MAIN LOAD CARRYING TENSION MEMBERS THICKER THAN 1/2" TO BE CVN TESTED TO ZONE 2 (NON-FRACTURE CRITICAL).
- ANCHOR BOLTS - ASTM F1554, GR. 55, H.D. GALVANIZED TO ASTM A153.
- ANCHOR NUTS - ASTM A563, GR. DH HEAVY HEX. NUTS, H.D GALVANIZED TO ASTM A153.
- ANCHOR WASHERS - ASTM F436, TYPE 1, H.D. GALVANIZED TO ASTM A153.
- MISC. HARDWARE - ASTM A307 OR B18-8 STAINLESS STEEL.
- WELDING - ALL WELDING TO CONFORM TO ANSI/AASHTO/AWS D1.5 2008 EDITION STRUCTURAL STEEL WELDING CODE. USE ANSI/AASHTO/AWS D1.1 LATEST VERSION FOR WELDING NOT COVERED BY ANSI/AASHTO/AWS D1.5. D1.5 TO BE SPECIFIED IF OPEN ENDED SHAPES ARE USED.
- STRUCTURE FINISH - H.D. GALVANIZED TO ASTM A123.

DESIGN NOTES:

DESIGNED IN ACCORDANCE WITH AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 2001 EDITION, INCLUDING 2002, 2003 AND 2006 INTERIMS. PER APPENDIX C: ALTERNATE METHOD FOR WIND PRESSURES FOR 80 mph WIND ZONE, PUBLICATION 148M "TRAFFIC STANDARDS - SIGNALS" (DEC. 2011), PUBLICATION 149 "TRAFFIC SIGNAL DESIGN BOOK" (OCT. 2010 WITH UPDATES) AND PUBLICATION 408 SPECIFICATION.

WORK THIS DRAWING WITH THE APPROPRIATE CHARTS
DRAWING NO. PA-STRAIN POLE-03 AND PA-STRAIN POLE-04



Engineer/Designer:

E. P. STRUCTURES

Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

PennDOT Bulletin 15 Approved Fabricator:

Maico Industries, Inc.

936 Highway 14
Ellsworth, KS 67439
785-472-5390

REV	DATE	REVISION	BY	CHK'D
1	8-30-21	NO CHANGE	JJD	AJD
2	4-26-21	NO CHANGE	JJD	LRM
3	1-4-2021	NO CHANGE	JJD	LRM
4	1-4-2021	NO CHANGE	JJD	LRM
5	1-4-2021	NO CHANGE	JJD	LRM
6	1-4-2021	NO CHANGE	JJD	LRM
7	1-4-2021	NO CHANGE	JJD	LRM
8	1-4-2021	NO CHANGE	JJD	LRM
9	1-4-2021	NO CHANGE	JJD	LRM
10	1-4-2021	NO CHANGE	JJD	LRM
11	1-4-2021	NO CHANGE	JJD	LRM
12	1-4-2021	NO CHANGE	JJD	LRM
13	1-4-2021	NO CHANGE	JJD	LRM
14	1-4-2021	NO CHANGE	JJD	LRM
15	1-4-2021	NO CHANGE	JJD	LRM
16	1-4-2021	NO CHANGE	JJD	LRM
17	1-4-2021	NO CHANGE	JJD	LRM
18	1-4-2021	NO CHANGE	JJD	LRM
19	1-4-2021	NO CHANGE	JJD	LRM
20	1-4-2021	NO CHANGE	JJD	LRM
21	1-4-2021	NO CHANGE	JJD	LRM
22	1-4-2021	NO CHANGE	JJD	LRM
23	1-4-2021	NO CHANGE	JJD	LRM
24	1-4-2021	NO CHANGE	JJD	LRM
25	1-4-2021	NO CHANGE	JJD	LRM
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27	1-4-2021	NO CHANGE	JJD	LRM
28	1-4-2021	NO CHANGE	JJD	LRM
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99	1-4-2021	NO CHANGE	JJD	LRM
100	1-4-2021	NO CHANGE	JJD	LRM

M-PA-STRAIN POLE-01

CHECKED BY: LRM
SCALE: N.T.S.
MASTER NO.:
SHEET: 1 OF 4

SCHEDULED STEEL STRAIN POLE
WITH DETAILS



WHERE OBTUSE ANGLE IS FORMED, PROVIDE
FILLET WELD LEGS AS REQUIRED TO PROVIDE
A MIN. THROAT = 0.18".

*****NOTE:**
 UT USING A PROCEDURE APPROVED BY PENNDOT FOR 1/4" THK. AND ABOVE

*** NOTE**
1/8" WELD OF BACKER BAR TO INSIDE OF
POLE IS FOR 18" DIA. AND LARGER.
FOR DIA. LESS THAN 18" REPLACE WELD
WITH SILICONE CAULK.



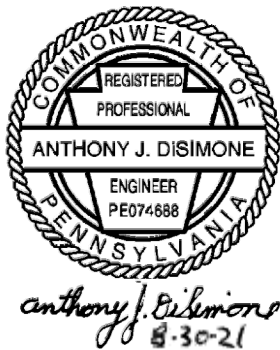
Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

PennDOT Bulletin 15 Approved Fabricator:

936 Highway 14
Ellsworth, KS 67439
785-472-5390

	8-30-21	REVISED PER REVIEWERS COMMENTS	JJD	AJD
	4-26-21	NO CHANGE	JJD	LRM
REV. DATE	REVISION		BY	CHK'D
DRAWN BY:	FJF	CHECKED BY:	LRM	
DATE:	1-4-2021	SCALE:	N.T.S.	
DRAWING NO:	MASTER NO.:			
M-PA-STRAIN POLE-02		SHEET:	2 OF 4	

**SCHEDULED STEEL STRAIN POLE
WITH DETAILS**



Engineer/Designer:

PennDOT Bulletin 15 Approved Fabricator:

E. P. STRUCTURES

Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

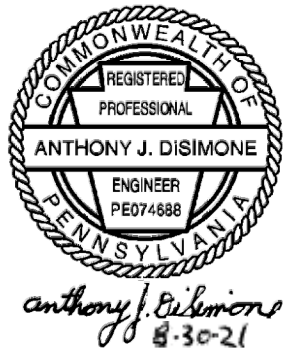
Maico Industries, Inc.

936 Highway 14
Ellisworth, KS 67439
785-472-5390

⚠ 8-30-21	NO CHANGE	JJD	AJD
⚠ 4-26-21	AS NOTED PER UPDATED CALCULATIONS	JJD	LRM
REV. DATE	REVISION	BY	CHK'D
DRAWN BY:	FJF	CHECKED BY:	LRM
DATE:	1-4-2021	SCALE:	N.T.S.
DRAWING NO.	M-PA-STRAIN POLE-03	MASTER NO.:	
		SHEET:	3 OF 4

SCHEDULED STEEL STRAIN POLE
WITHOUT LUMINAIRE ARM

Item No.	NOM. DESIGN HEIGHT	Design Tension	POLE DIMENSIONS							BASE PLATE DIMENSIONS							ANCHOR BOLTS														
			Overall Pole Height	No. of Sides	Bottom Dia.	Top Dia.	Pole Tube Height	Wall Thk.	Taper Rate	No. of Holes	S		T		ID		BC		F		H		No. of Bolts	Dia.	Overall Length	Embedment	TT		BT		P
											Plate Dia. OD	Plate Thk.	Plate Dia. ID	Bolt Circle	Bolt to Bolt	Hole Dia.	Top Thread	Bottom Thread	Proj.												
		LBS	FT		IN	IN	FT	IN	IN/FT		IN	IN	IN	IN	IN	IN															
20' WO/LUM	20'	1000	20	12	7.50	6.10	19.83	1/4	0.07	6	23.00	2	5.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
20' WO/LUM	20'	2000	20	12	8.50	7.10	19.83	1/4	0.07	6	23.00	2	6.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
20' WO/LUM	20'	3000	20	12	10.75	9.35	19.83	1/4	0.07	6	23.00	2	8.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
20' WO/LUM	20'	4000	20	12	10.75	9.35	19.83	Δ 5/16	0.07	6	23.00	2	8.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
20' WO/LUM	20'	5000	20	12	12.00	10.60	19.83	5/16	0.07	6	23.00	2	9.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
20' WO/LUM	20'	6000	20	12	13.50	12.10	19.79	5/16	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
20' WO/LUM	20'	7000	20	12	14.50	13.10	19.79	5/16	0.07	6	23.50	2.5	11.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
20' WO/LUM	20'	8000	20	12	13.25	11.85	19.79	3/8	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
20' WO/LUM	20'	9000	20	12	14.25	12.85	19.79	3/8	0.07	6	23.50	2.5	11.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
20' WO/LUM	20'	10000	20	12	12.50	11.10	19.83	7/16	0.07	6	23.50	2	9.50	18	9	2.5	6	2.25	60	45	13.75	7	10.75								
22' WO/LUM	22'	1000	22	12	7.75	6.21	21.83	1/4	0.07	6	23.00	2	5.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
22' WO/LUM	22'	2000	22	12	9.25	7.71	21.83	1/4	0.07	6	23.00	2	6.50	18	9	2	6	1.75	48	35	12.25	7	9.25								
22' WO/LUM	22'	3000	22	12	11.50	9.96	21.83	1/4	0.07	6	23.00	2	9.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
22' WO/LUM	22'	4000	22	12	11.50	9.96	21.83	Δ 5/16	0.07	6	23.00	2	9.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
22' WO/LUM	22'	5000	22	12	12.75	11.21	21.83	5/16	0.07	6	23.00	2	10.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
22' WO/LUM	22'	6000	22	12	14.50	12.96	21.79	5/16	0.07	6	23.50	2.5	11.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
22' WO/LUM	22'	7000	22	12	13.25	11.71	21.79	3/8	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
22' WO/LUM	22'	8000	22	12	14.25	12.71	21.79	3/8	0.07	6	23.50	2.5	11.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
22' WO/LUM	22'	9000	22	12	12.50	10.96	21.83	7/16	0.07	6	23.50	2	9.50	18	9	2.5	6	2.25	60	45	13.75	7	10.75								
22' WO/LUM	22'	10000	22	12	13.50	11.96	21.79	7/16	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
24' WO/LUM	24'	1000	24	12	7.75	6.07	23.83	1/4	0.07	6	23.00	2	5.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
24' WO/LUM	24'	2000	24	12	9.75	8.07	23.83	1/4	0.07	6	23.00	2	7.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
24' WO/LUM	24'	3000	24	12	12.50	10.82	23.83	1/4	0.07	6	23.00	2	10.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
24' WO/LUM	24'	4000	24	12	12.50	10.82	23.83	Δ 5/16	0.07	6	23.00	2	10.00	18	9	2	6	1.75	48	35	12.25	7	9.25								
24' WO/LUM	24'	5000	24	12	13.50	11.82	23.79	5/16	0.07	6	23.00	2.5	10.50	18	9	2	6	1.75	49	35	12.75	7	9.75								
24' WO/LUM	24'	6000	24	12	13.00	11.32	23.83	3/8	0.07	6	23.50	2	10.00	18	9	2.5	6	2.25	60	45	13.75	7	10.75								
24' WO/LUM	24'	7000	24	12	14.00	12.32	23.79	3/8	0.07	6	23.50	2.5	11.00	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
24' WO/LUM	24'	8000	24	12	12.50	10.82	23.83	7/16	0.07	6	23.50	2	9.50	18	9	2.5	6	2.25	60	45	13.75	7	10.75								
24' WO/LUM	24'	9000	24	12	13.25	11.57	23.79	7/16	0.07	6	23.50	2.5	10.00	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
24' WO/LUM	24'	10000	24	12	13.25	11.57	23.79	1/2	0.07	6	23.50	2.5	10.00	18	9	2.5	6	2.25	60	45	14.25	7	11.25								
26' WO/LUM	26'	1000	26	12	8.00	6.18	25.83	1/4	0.07	6	23.25	2	5.50	18	9	2.25	6	2	54	40	13	7	10								
26' WO/LUM	26'	2000	26	12	10.25	8.43	25.83	1/4	0.07	6	23.25	2	7.50	18	9	2.25	6	2	54	40	13	7	10								
26' WO/LUM	26'	3000	26	12	13.25	11.43	25.79	1/4	0.07	6	23.25	2.5	10.50	18	9	2.25	6	2	54	40	13.5	7	10.5								
26' WO/LUM	26'	4000	26	12	13.25	11.43	25.79	Δ 5/16	0.07	6	23.25	2.5	10.50	18	9	2.25	6	2	54	40	13.5	7	10.5								
26' WO/LUM	26'	5000	26	12	14.50	12.68	25.79	5/16	0.07	6	23.25	2.5	11.50	18	9	2.25	6	2	54	40	13.5	7	10.5								
26' WO/LUM	26'	6000	26	12	16.50	14.68	25.79	5/16	0.07	6	26.50	2.5	13.50	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25								
26' WO/LUM	26'	7000	26	12	14.75	12.93	25.79	3/8	0.07	6	26.50	2.5	12.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25								
26' WO/LUM	26'	8000	26	12	16.00	14.18	25.79	3/8	0.07	6	26.50	2.5	13.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25								
26' WO/LUM	26'	9000	26	12	15.00	13.18	25.79	7/16	0.07	6	26.50	2.5	12.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25								
26' WO/LUM	26'	10000	26	12	16.00	14.18	25.79	7/16	0.07	6	26.50	2.5	13.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25								
28' WO/LUM	28'	1000	28	12	8.00	6.04	27.83	1/4	0.07	6	23.25	2	5.50	18	9	2.25	6	2	54	40	13	7	10								
28' WO/LUM	28'	2000	28	12	11.00	9.04	27.83	1/4	0.07	6	23.25	2	8.50	18	9	2.25	6	2	54	40	13	7	10								
28' WO/LUM	28'	3000	28	12	14.25	12.29	27.79	1/4	0.07	6	23.25	2.5	11.50	18	9	2.25	6	2	54	40	13.5	7	10.5								
28' WO/LUM	28'	4000	28	12	14.25	12.29	27.79	Δ 5/16	0.07	6	23.25	2.5	11.50	18	9	2.25	6	2	54	40	13.5	7	10.5								
28' WO/LUM	28'	5000	28	12	13.00	11.04	27.83	3/8	0.07	6	23.25	2	10.00	18	9	2.25	6	2	54	40	13	7	10								
28' WO/LUM	28'	6000	28	12	17.50	15.54																									



Engineer/Designer:

E. P. STRUCTURES

Engineered Pole Structures, LLC
Lighthouse Point, Florida
724-910-8575

PennDOT Bulletin 15 Approved Fabricator:

Maico Industries, Inc.

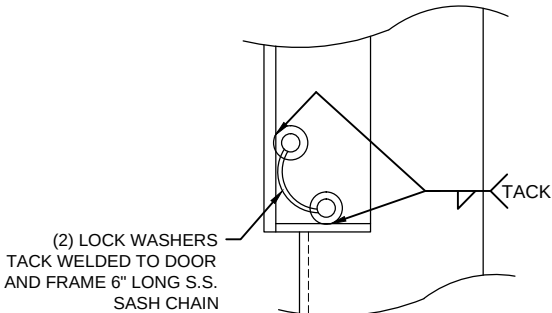
936 Highway 14
Ellisworth, KS 67439
785-472-5390

8-30-21	NO CHANGE	JJD	AJD
4-26-21	NO CHANGE	JJD	LRM
REV	DATE	REVISION	BY
DRAWN BY:	FJF	CHECKED BY:	LRM
DATE:	1-4-2021	SCALE:	N.T.S.
DRAWING NO.	M-PA-STRAIN POLE-04	MASTER NO.:	
		SHEET:	4 OF 4

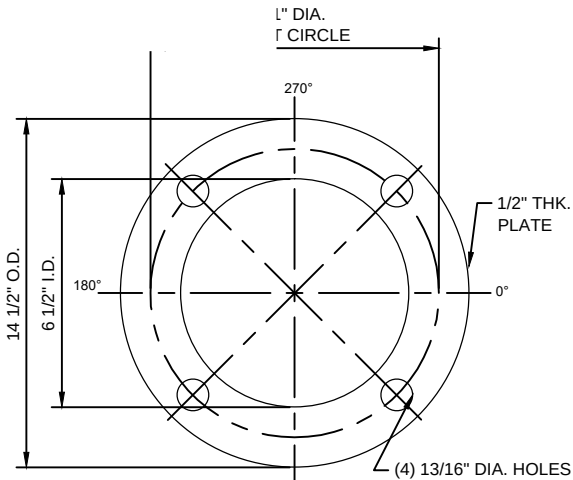
SCHEDULED STEEL STRAIN POLE
WITH LUMINAIRE ARM

Item No.	NOM. DESIGN HEIGHT	Design Tension	POLE DIMENSIONS								BASE PLATE DIMENSIONS						ANCHOR BOLTS						
			Overall Pole Height	No. of Sides	Bottom Dia.	Top Dia.	Pole Tube Height	Wall Thk.	Taper Rate	No. of Holes	S	T	ID	BC	F	H	No. of Bolts	Dia.	Overall Length	Embedment	TT	BT	P
											Plate Dia. OD	Plate Thk.	Plate Dia. ID	Bolt Circle	Bolt to Bolt	Hole Dia.					Top Thread	Bottom Thread	Proj.
20' W/LUM	20'	1000	28	12	8.00	6.04	27.83	1/4	0.07	6	IN	IN	IN	IN	IN	IN	6	IN	IN	IN	IN	IN	IN
20' W/LUM	20'	2000	28	12	9.25	6.73	27.83	1/4	0.09	6	23.00	2	6.50	18	9	2	6	1.75	48	35	12.25	7	9.25
20' W/LUM	20'	3000	28	12	11.50	8.70	27.83	1/4	0.10	6	23.00	2	9.00	18	9	2	6	1.75	48	35	12.25	7	9.25
20' W/LUM	20'	4000	28	12	14.75	10.83	27.79	1/4	0.14	6	23.00	2.5	12.00	18	9	2	6	1.75	49	35	12.75	7	9.75
20' W/LUM	20'	5000	28	12	12.00	10.04	27.83	5/16	0.07	6	23.00	2	9.00	18	9	2	6	1.75	48	35	12.25	7	9.25
20' W/LUM	20'	6000	28	12	13.50	11.54	27.79	5/16	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25
20' W/LUM	20'	7000	28	12	12.50	10.54	27.83	3/8	0.07	6	23.50	2	9.50	18	9	2.5	6	2.25	60	45	13.75	7	10.75
20' W/LUM	20'	8000	28	12	13.50	11.54	27.79	3/8	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25
20' W/LUM	20'	9000	28	12	14.50	12.54	27.79	3/8	0.07	6	23.50	2.5	11.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25
20' W/LUM	20'	10000	28	12	12.75	10.79	27.83	7/16	0.07	6	23.50	2	9.50	18	9	2.5	6	2.25	60	45	13.75	7	10.75
22' W/LUM	22'	1000	28	12	8.00	6.04	27.83	1/4	0.07	6	23.00	2	5.50	18	9	2	6	1.75	48	35	12.25	7	9.25
22' W/LUM	22'	2000	28	12	9.75	7.23	27.83	1/4	0.09	6	23.00	2	7.00	18	9	2	6	1.75	48	35	12.25	7	9.25
22' W/LUM	22'	3000	28	12	12.25	9.73	27.83	1/4	0.09	6	23.00	2	9.50	18	9	2	6	1.75	48	35	12.25	7	9.25
22' W/LUM	22'	4000	28	12	11.50	9.54	27.83	5/16	0.07	6	23.00	2	8.50	18	9	2	6	1.75	48	35	12.25	7	9.25
22' W/LUM	22'	5000	28	12	12.75	10.79	27.83	5/16	0.07	6	23.00	2	10.00	18	9	2	6	1.75	48	35	12.25	7	9.25
22' W/LUM	22'	6000	28	12	14.50	12.54	27.79	5/16	0.07	6	23.50	2.5	11.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25
22' W/LUM	22'	7000	28	12	13.25	11.29	27.79	3/8	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25
22' W/LUM	22'	8000	28	12	14.25	12.29	27.79	3/8	0.07	6	23.50	2.5	11.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25
22' W/LUM	22'	9000	28	12	12.75	10.79	27.83	7/16	0.07	6	23.50	2	9.50	18	9	2.5	6	2.25	60	45	13.75	7	10.75
22' W/LUM	22'	10000	28	12	14.00	12.04	27.79	7/16	0.07	6	23.50	2.5	11.00	18	9	2.5	6	2.25	60	45	14.25	7	11.25
24' W/LUM	24'	1000	28	12	8.00	6.04	27.83	1/4	0.07	6	23.00	2	5.50	18	9	2	6	1.75	48	35	12.25	7	9.25
24' W/LUM	24'	2000	28	12	10.00	8.04	27.83	1/4	0.07	6	23.00	2	7.50	18	9	2	6	1.75	48	35	12.25	7	9.25
24' W/LUM	24'	3000	28	12	13.00	10.48	27.83	1/4	0.09	6	23.00	2	10.50	18	9	2	6	1.75	48	35	12.25	7	9.25
24' W/LUM	24'	4000	28	12	12.00	10.04	27.83	5/16	0.07	6	23.00	2	9.00	18	9	2	6	1.75	48	35	12.25	7	9.25
24' W/LUM	24'	5000	28	12	13.50	11.54	27.79	5/16	0.07	6	23.00	2.5	10.50	18	9	2	6	1.75	49	35	12.75	7	9.75
24' W/LUM	24'	6000	28	12	13.00	11.04	27.83	3/8	0.07	6	23.50	2	10.00	18	9	2.5	6	2.25	60	45	13.75	7	10.75
24' W/LUM	24'	7000	28	12	14.00	12.04	27.79	3/8	0.07	6	23.50	2.5	11.00	18	9	2.5	6	2.25	60	45	14.25	7	11.25
24' W/LUM	24'	8000	28	12	12.50	10.54	27.83	7/16	0.07	6	23.50	2	9.50	18	9	2.5	6	2.25	60	45	13.75	7	10.75
24' W/LUM	24'	9000	28	12	13.75	11.79	27.79	7/16	0.07	6	23.50	2.5	10.50	18	9	2.5	6	2.25	60	45	14.25	7	11.25
24' W/LUM	24'	10000	28	12	13.25	11.29	27.79	1/2	0.07	6	23.50	2.5	10.00	18	9	2.5	6	2.25	60	45	14.25	7	11.25
26' W/LUM	26'	1000	33	12	8.50	6.19	32.83	1/4	0.07	6	23.25	2	6.00	18	9	2.25	6	2	54	40	13	7	10
26' W/LUM	26'	2000	33	12	11.25	8.28	32.83	1/4	0.09	6	23.25	2	8.50	18	9	2.25	6	2	54	40	13	7	10
26' W/LUM	26'	3000	33	12	11.00	8.69	32.83	5/16	0.07	6	23.25	2	8.00	18	9	2.25	6	2	54	40	13	7	10
26' W/LUM	26'	4000	33	12	13.00	10.69	32.83	5/16	0.07	6	23.25	2	10.00	18	9	2.25	6	2	54	40	13	7	10
26' W/LUM	26'	5000	33	12	15.00	12.69	32.79	5/16	0.07	6	23.25	2.5	12.00	18	9	2.25	6	2	54	40	13.5	7	10.5
26' W/LUM	26'	6000	33	12	17.50	15.19	32.79	5/16	0.07	6	26.50	2.5	14.50	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
26' W/LUM	26'	7000	33	12	15.00	12.69	32.79	3/8	0.07	6	26.50	2.5	12.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
26' W/LUM	26'	8000	33	12	16.50	14.19	32.79	3/8	0.07	6	26.50	2.5	13.50	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
26' W/LUM	26'	9000	33	12	15.25	12.94	32.79	7/16	0.07	6	26.50	2.5	12.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
26' W/LUM	26'	10000	33	12	16.00	13.69	32.79	7/16	0.07	6	26.50	2.5	13.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
28' W/LUM	28'	1000	33	12	8.50	6.19	32.83	1/4	0.07	6	23.25	2	6.00	18	9	2.25	6	2	54	40	13	7	10
28' W/LUM	28'	2000	33	12	11.75	8.78	32.83	1/4	0.09	6	23.25	2	9.00	18	9	2.25	6	2	54	40	13	7	10
28' W/LUM	28'	3000	33	12	11.50	9.19	32.83	5/16	0.07	6	23.25	2	8.50	18	9	2.25	6	2	54	40	13	7	10
28' W/LUM	28'	4000	33	12	13.50	11.19	32.79	5/16	0.07	6	23.25	2.5	10.50	18	9	2.25	6	2	54	40	13.5	7	10.5
28' W/LUM	28'	5000	33	12	13.00	10.69	32.83	3/8	0.07	6	23.25	2	10.00	18	9	2.25	6	2	54	40	13	7	10
28' W/LUM	28'	6000	33	12	14.50	12.19	32.79	3/8	0.07	6	26.50	2.5	11.50	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
28' W/LUM	28'	7000	33	12	15.75	13.44	32.79	3/8	0.07	6	26.50	2.5	13.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
28' W/LUM	28'	8000	33	12	17.25	14.94	32.79	3/8	0.07	6	26.50	2.5	14.50	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
28' W/LUM	28'	9000	33	12	16.00	13.69	32.79	7/16	0.07	6	26.50	2.5	13.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
28' W/LUM	28'	10000	33	12	17.00	14.69	32.79	7/16	0.07	6	26.50	2.5	14.00	21	10.5	2.5	6	2.25	60	45	14.25	7	11.25
30' W/LUM	30'	1000	33	12	8.75	6.11	32.83	1/4	0.08	6	23.25	2	6.00	18	9	2.25	6	2	54	40	13	7	10
30' W/LUM	30'	2000	33	12	12.25	9.28	32.83	1/4	0.09	6	23.25	2	9.50	18	9	2.25	6	2	54	40	13	7	10
30' W/LUM	30'	3000	33	12	12.00	9.69	32.83	5/16	0.07	6	23.25	2	9.00	18	9	2.25	6	2	54	40	13	7	10
30' W/LUM	30'	4000	33	12	14.25	11.94	32.79	5/16	0.07	6	23.25	2.5	11.5										

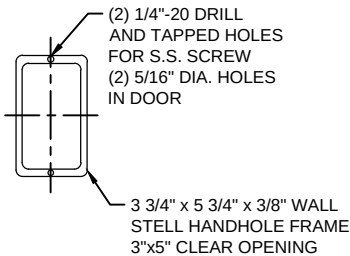
ITEM NO.	QTY.	POLE HEIGHT
0951-4006		6'-0"
0951-4007		7'-0"
0951-4008		8'-0"
0951-4009		9'-0"
0951-4010		10'-0"
0951-4011		11'-0"
0951-4012		12'-0"
0951-4013		13'-0"
0951-4014		14'-0"



DETAIL E



ANCHOR RING DETAIL



NOTES:

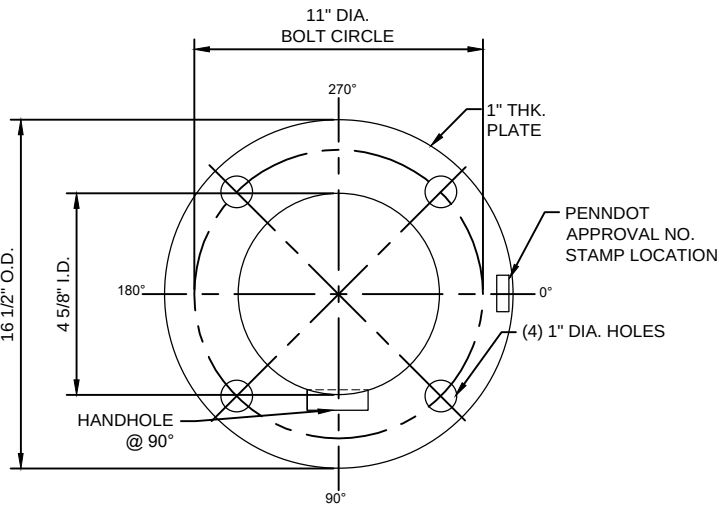
- POLE - ASTM A53, GR. B, TYPE E or S
- PLATES - ASTM A709, GR. 36 MIN.
- HANDHOLE FRAME - ASTM A36 MIN.
- HANDHOLE COVER - ASTM A36 MIN.
- ANCHOR BOLTS - ASTM A449, H.D. GALVANIZED TO ASTM A153.
- ANCHOR NUTS - ASTM A563, GR. DH H.D. GALVANIZED TO ASTM A153.
- WASHERS - ASTM F436, TYPE 1, HD GALVANIZED TO ASTM A153.
- MISC. PLATES - ASTM A36 MIN.
- MISC. HARDWARE - ASTM A307 OR B18-8 STAINLESS STEEL
- WELDING - ALL WELDING TO CONFORM TO ANSI/AASHTO/AWS D1.5 2008 EDITION STRUCTURAL STEEL WELDING CODE. USE ANSI/AASHTO/AWS D1.1 LATEST VERSION FOR WELDING NOT COVERED BY ANSI/AASHTO/AWS D1.5. D1.5 TO BE SPECIFIED IF OPEN ENDED SHAPES ARE USED.
- FINISH - H.D. GALVANIZED TO ASTM A123.

FABRICATION NOTE:

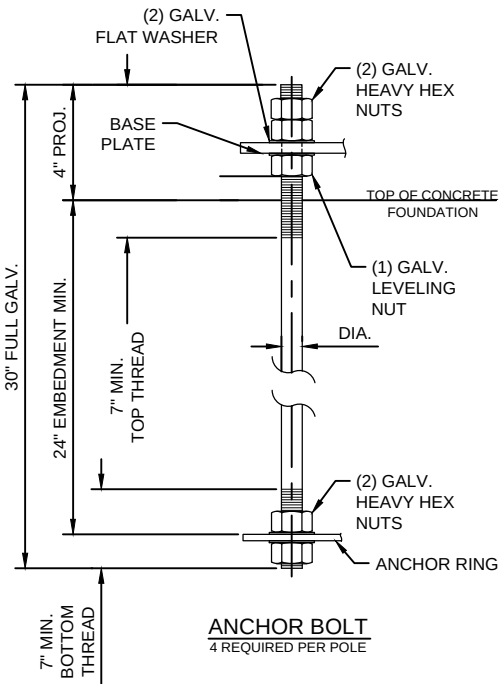
ALL FABRICATION SHALL BE PERFORMED IN A PENNDOT BULLETIN 15 APPROVED SHOP.

STATE:	PENNSYLVANIA	ITEM:	
TOWN:		P.O. NUMBER:	
PROJECT:	D.O.T. STANDARD	CUSTOMER NUMBER:	
LOCATION:		EPS NUMBER:	

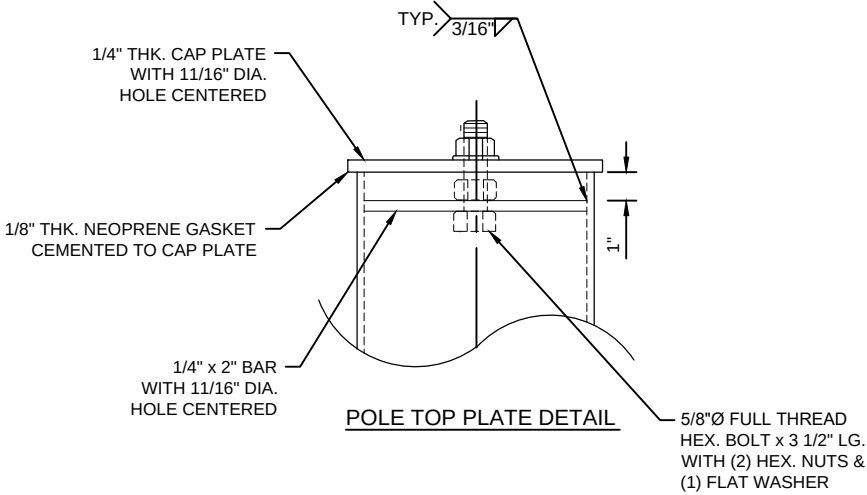
ENGINEERED POLE STRUCTURES, LLC
2332 NE 30th COURT
LIGHTHOUSE PT, FL 33064
PHONE: 724-910-8575



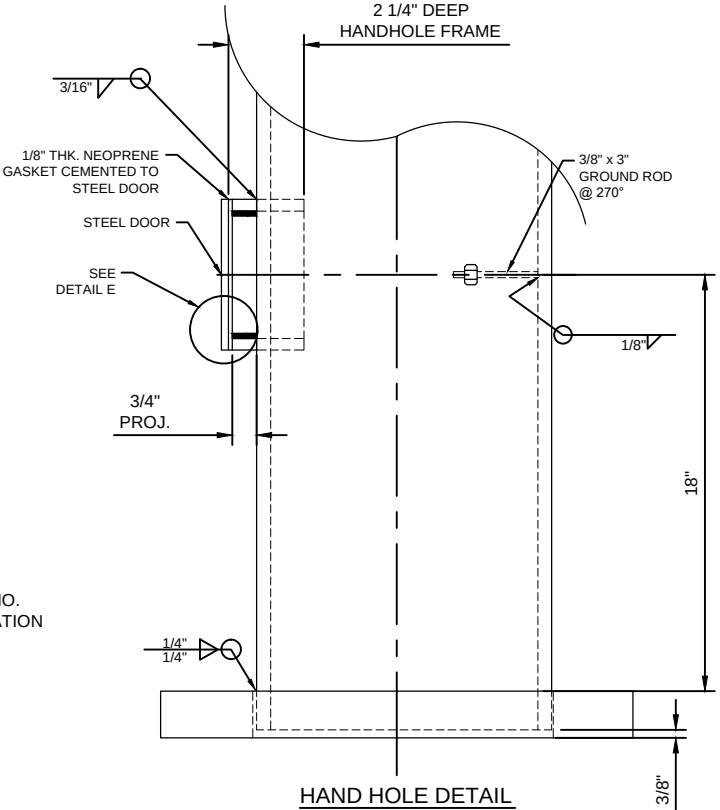
SECTION A-A
BASE PLATE DETAIL



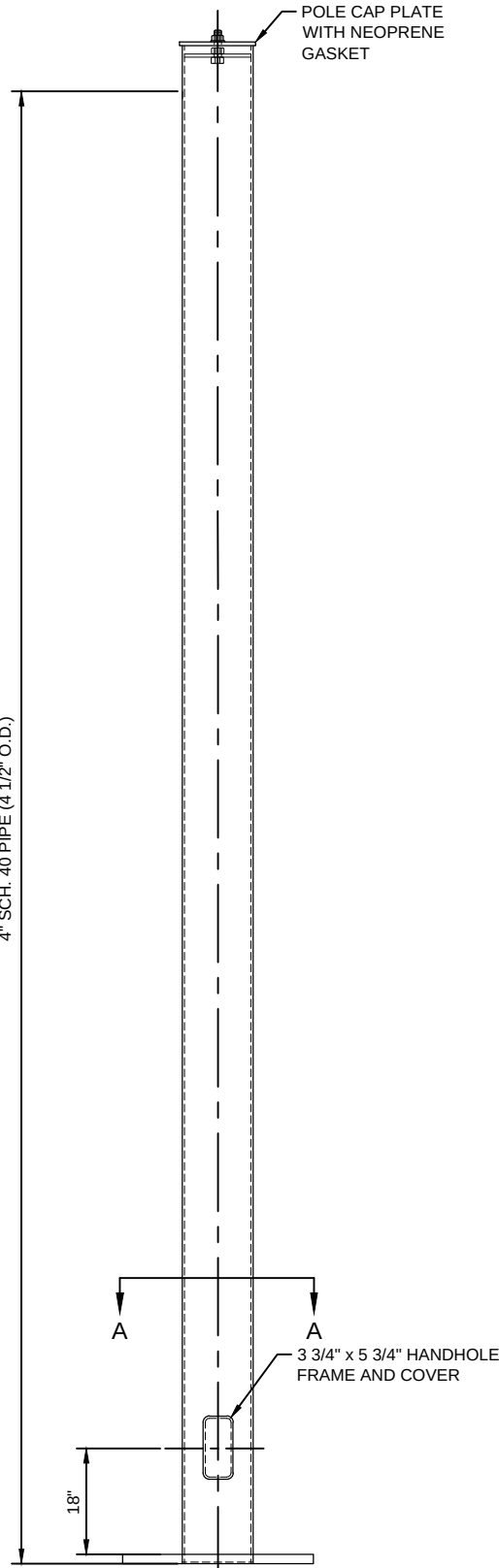
ANCHOR BOLT
4 REQUIRED PER POLE



POLE TOP PLATE DETAIL



HAND HOLE DETAIL



STEEL PEDESTAL POLES
WITH DETAILS

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