Legal Department

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
AEP.com

January 19, 2022

Ms. Tanowa Troupe, Secretary
Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215-3793

Hector Garcia
Senior Counsel –
Regulatory Services
(614) 716-3410 (P)
hgarcia1@aep.com

RE: Proof of Compliance with Condition
Case No. 18-0030-EL-BTX, 19-2024-EL-BTA, and 21-0269-EL-BTA
Vigo-Pine Ridge Switch 138 kV Transmission Line Project

Dear Ms. Troupe:

In satisfaction of Condition (3) of the Staff Report for Case No. 18-0030-EL-BTX for this Project, AEP Ohio Transmission Company Inc. submits this notice and attachment to inform you that the final design has been completed for the above-referenced Project.

If you have any questions regarding this information, please do not hesitate to contact me.

Respectfully submitted,

/s/ *Hector Garcia*
Hector Garcia (0084517), Counsel of Record
Counsel for AEP Ohio Transmission Company, Inc.

cc: John Jones, Counsel OPSB Staff
Jon Pawley, OPSB Staff

Construction Book

Ross – Heppner 138kV

Section 3: Vigo – Pine Ridge

Project Description:	Vigo – Pine Ridge is considered the third section of the Ross – Heppner 138kV Rebuild; Section 1 (Ross – Ault Switch) was initially staged to be kicked off first but was pushed to the end of the project schedule by landowner issues. Overall the Ross – Heppner rebuild covers 32 miles and Vigo – Pine Ridge accounts for approximately 10.3 miles of it.This section of the project will consist of installing (61) WPE H-Frame structures and (8) Custom Deadend structures, all of which will be 3-Pole except for one (Structure 89). This section begins at Vigo Station and ends at Deadend Structure #158 which was previously installed as part of the Pine Ridge SW installation segment. The new structures will be strung with (3) 1033.5 ACSR 54/7 Curlew, (1) 7#10 Alumoweld and (1) AFL DNO-646 0.646 96 Fiber OPGW.
Construction Work Order:	T10282334 (Vigo – Pine Ridge Transco Install) 42690830 (OPCo Removal)
Original Planned Outage 1:	03/10/2022 – 03/23/2023 Berlin – Ross 69kV Circuit (Vigo - Heppner 69kV Circuit) *****TCR to confirm outage dates/circuits with outage planner*****
In-Service Date:	04/14/2023
Engineer:	Matt Schoelwer
TCR:	Kathy Fickert
Project Manager:	Robert Howard

Prepared for American Electric Power

Material Location

Storeroom Name & Address:	Biers Run 3072 Biers Run Road Chillicothe, OH 45601
Laydown Yard Address:	Biers Run 3072 Biers Run Road Chillicothe, OH 45601

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Section 1. General Project Information

A. Project Scope

Detailed Project Description:

Vigo – Pine Ridge is considered the third section of the Ross – Heppner 138kV Rebuild; Section 1 (Ross – Ault Switch) was initially staged to be kicked off first but was pushed to the end of the project schedule by landowner issues. Overall the Ross – Heppner rebuild covers 32 miles and Vigo – Pine Ridge accounts for approximately 10.3 miles of it.This section of the project will consist of installing (61) WPE H-Frame structures and (8) Custom Deadend structures, all of which will be 3-Pole except for one (Structure 89).

This section begins at Vigo Station and ends at Deadend Structure #158 which was previously installed as part of the Pine Ridge SW installation segment. The new structures will be strung with (3) 1033.5 ACSR 54/7 Curlew, (1) 7#10 Alumoweld and (1) AFL DNO-646 0.646 96 Fiber OPGW.

Key Dates:

In-Service – 4/14/2023

Steel Pole and Anchor Bolt Cage Delivery – 2/16/2022

Outages:

Please ask Outage Planner for Section 3 Outage Plan along with other circuit information.

These are originally scheduled outages. Current Outage Schedule shall be verified by the Outage Planner and TCR. AEP Transmission Dispatch will provide outage clearances to the Transmission Construction Representative (TCR) for each of the circuits.

Required Permits:

Construction on the project may not begin until the Project Manager has confirmed that all permits required have been approved and authorized the start of construction. See Section 16 for permits.

The TCR is responsible for notifying the appropriate representatives (road, railroad, etc.) and ensuring their safety and public notification procedures (signage, flagmen, etc.) are followed throughout the duration of the project.

This project is OPSB Jurisdictional. A Full Certificate has been filed. The AEP Siting Specialist is Alicia Cross. ANY changes in pole locations must be submitted to the engineer with the Shift Request Form for review and work shall stop at that location until further notice. No construction work, including clearing and access roads, shall occur without formal approval from the Project Manager and a preconstruction meeting. Please ensure that all OPSB conditions are known and followed.

Distribution Note:	Distribution underbuild present on project. Distribution is responsible for installing/transferring their wires and equipment. Distribution contact is Kyle Taylor (TRC), 513-312-1809.

Telecom Note:	Telecom is present on this project. TFS is responsible for installing OPGW. Splices will be completed by Telecom. Please contact Lindsey Gill, 614-883-7584.

B. Work Order

Work Order #:	T10282334
Task 001:	Land Purchase
Task 002:	Project Staff Services
Task 009:	Construction Material
Task 004:	Construction Labor
Task 005:	Removal/ Retirement
Task 006:	O&M

C. Project Location

Project is located in Chillicothe, OH.

D. Material Delivery Location

Biers Run Laydown Yard: 3072 Biers Run Road, Chillicothe, OH 45601

E. Special Instructions/Additional Information

No special instructions to add.

F. Project Contacts

Title	Name	Office Ph.	Cell Ph.	Email Address
Project Manager	Robert Howard	380-205-5241	614-284-9624	rshoward@aep.com
T-Line Project Engineer	Matt Schoelwer	614-552-1183	n/a	mjschoelwer@aep.com
Right of Way Agent	Matt Smith	n/a	614-619-4817	sscott@aep.com

Title	Name	Office Ph.	Cell Ph.	Email Address
Environmental	Amy Toohey	380-205-5097	n/a	ajtoohey@aep.com
Siting	Alicia Cross	380-205-5141	n/a	amcross@aep.com
Distribution Engineer	Scott Pugh	740-774-7037	n/a	sdpugh@aep.com
TCR	Kathy Fickert	n/a	740-935-3563	kfickert@aep.com
Outage Planner	Chris Farler	614-741-8722	n/a	cdfarler@aep.com

NOTE: All Technical questions regarding project shall be addressed to the Lead Project Engineer.

G. Survey

Contact the engineer 2 weeks before construction to have the structure locations and offsets staked.

Project Surveyor: SAM Inc. & 614-948-0547

H. Construction Deliverables – See Section 13 for Deliverable Timeline

1. Drilling/Excavation Plan

Provide detailed drilling/excavation plan to Project Engineer. Plan should reference applicable below grade specifications.

2. Concrete Mix Design/Backfill Specs

Provide concrete mix designs and/or backfills specifications to Project Engineer for approval.

3. Stringing Plan

Provide stringing plan to TCR or Project Engineer for review prior to start of stringing operations.

4. Access Roads/Locations

5. Ground Resistance Form

A copy of the Ground Resistance Form 82A0-2204 for each structure shall be given to the TCR after recording the ground resistance measurements. The TCR shall send this information to the Project Engineer. Note, ground resistance measurements shall be completed prior to stringing operations occur.

6. Concrete Breaks, Test Results

Provide Concrete Breaks and Test Results to the Project Engineer and TCR for review prior to setting structure.

7. Sag Checks

8. Plan and Profile

Contractor shall provide a marked up “redline” copy of the Plan and Profile package indicating all changes made during construction to the TCR. The TCR shall send this information to the Project Engineer.

9. MLSE Attestation

TCR will be responsible for signing the MLSE (Most Limiting Series Element) drawing at end of the project attesting to building the line as designed with no alterations to the facility ratings. The MLSE drawing is provided in Section 3. The signed MLSE Drawing shall be returned to the Project Engineering prior to energization.

I. Project Map

Vigo - Pine Ridge Project Map 1/15/2022 MJS

Vigo Station

Str.104

Str.134

Str.158

Vigo Station

Ray

Byer

Richland Furnace State F

Richmond Dale

Welcome Chapel Holiness Church

Superior Wil

Richland

Leo petroglyph

Jackson County Speedway

Hay Hollow Church

of God

16

213B

46

327

12

207

27

29

210

215

25

28

220

21

55

35

Section 2. Construction Notes

A. Underground Utilities

The Contractor shall be responsible for contacting the appropriate state underground protection service to request underground facility locations at least 48 hours before excavating begins.

B. Right-of-Way

1. Clearing

The right-of-way clearing shall be coordinated with the Right-of-Way agent. The right-of-way shall be free of obstructions. All trees that may fall onto the conductors or may interfere with the reliable operation of the line are to be cleared prior to beginning construction. The TCR and Project Manager shall be contacted regarding any clearing issues.

2. Gates

All new gate locations must be coordinated with the Right-of-Way Agent and approved by the company's TCR before installation. If additional gates are required for access to the right-of-way, the contractor will be responsible for installing them. The contractor will provide the fence posts and gates for any such installations required in fences along the right-of-way.

3. Restoration

All finished rights-of way including access roads must be readily passable by construction equipment and restored to a condition acceptable to both the Company and the landowner. The Contractor shall be responsible for all damages associated with this project.

C. Soil Borings

Soil borings, if taken, may not be at exact structure locations. Sub-surface soil conditions may vary from what is shown on the boring logs. Project specific soil borings, if provided, are located in Section 10.

D. Guard Structures

The Contractor is to supply adequate guard structures. Poles and materials needed for guard structures shall be furnished by the Contractor. If any conflict exists with buried or overhead facilities at the guard structure locations, the Contractor will be responsible for appropriately relocating guard structures. Any damage caused to other facilities near guard structure locations shall be repaired at the expense of the Contractor.

E. Salvage/Scrap Material

The TCR shall be contacted to determine the appropriate disposal location for all salvage and scrap material.

F. Excess Material

The TCR shall be contacted to determine the appropriate return location for all excess material.

G. Wire Reel Return

The TCR shall coordinate the return of wire reels with the appropriate wire vendor.

Section 3. Circuit Information

A. Circuit Map/Outage Plan

B. MLSE Drawings - Provided via Survey123 prior to in-service

Ginger
Eagle Twp
Jackson Twp
Richland Twp
Flatlick - Marysville 765 Circuit
Londonderry
Vigo
Jefferson Twp
Ray
Lick - Ross 69 Circuit
ckson Twp
Hamden
Clinton Twp
Coal Twp
Jackson Twp
Pine Ridge (Buckeye Co-op)
Washington Twp
Wellston
Corwin
Buckeye Co-op
Milton
Buckeye Co-op
Beaver Twp
Liberty Twp
Lick - Corwin - Lick 138 Circuit

Section 4. Right-of-Way

Please contact Matt Smith with an ROW related questions or issues.

Section 5. Structure List

Above Grade						Below Grade					General
Str. Num.	Str. Type	Str. Height Above Grade (LPOL/RPOL) or (LPOL/CPOL/RPOLE)/Class	AEP Assembly Drawing Num.	Str. Vendor Drawing Num.	Location of Valmont Dwgs (section and sheet)	Foundation Type	Foundation Depth (LPOL/RPOL) or (LPOL/CPOL/RPOLE)	Anchor Bolt Vendor Drawing Num.	AEP Foundation Drawing Number	Soil Boring Used*	Total Pole Lengths (LPOL/RPOL) or (LPOL/CPOL/RPOL)
89	Custom Steel Single Pole Deadend	100.5’/Custom	502-4213 V1	313164Z	Section 6 Sheet 1	Drilled Pier	34.0’	1096787	114-3703	Vigo Station B-02	100.5’
90	Steel H-Frame	86.0’/86.0’/H3	CS45-2472	312657Z	Section 7 Sheet 17	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
91	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
92	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
93	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
94	Steel H-Frame	95.0’/95.0’/H3	CS45-2472	312659Z	Section 7 Sheet 21	Direct Embed	15.0’/15.0’	n/a	n/a	n/a	110.0’/110.0’
95	Steel H-Frame	77.0’/77.0’/H4	CS45-2472	312661Z	Section 7 Sheet 25	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
96	Steel H-Frame	90.5’/90.5’/H3	CS45-2472	312658Z	Section 7 Sheet 19	Direct Embed	14.5’/14.5’	n/a	n/a	n/a	105.0’/105.0’
97	Steel H-Frame	86.0’/86.0’/H2	CS45-2472	312652Z	Section 7 Sheet 7	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
98	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
99	Steel H-Frame	86.0’/86.0’/H2	CS45-2472	312652Z	Section 7 Sheet 7	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
100	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
101	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
102	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
103	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’

Above Grade						Below Grade					General
Str. Num.	Str. Type	Str. Height Above Grade (LPOL/RPOL) or (LPOL/CPOL/RPOLE)/Class	AEP Assembly Drawing Num.	Str. Vendor Drawing Num.	Location of AEP Str. Dwgs (section and sheet)	Foundation Type	Foundation Depth (LPOL/RPOL) or (LPOL/CPOL/RPOLE)	Anchor Bolt Vendor Drawing Num.	AEP Foundation Drawing Number	Soil Boring Used*	Total Pole Lengths (LPOL/RPOL) or (LPOL/CPOL/RPOL)
104	Custom Steel 3-Pole Deadend	85.0’/85.0’/85.0’	502-4204	313165Z	Section 6 Sheet 3	Drilled Pier	18.0’/18.0’/18.0’	1096788	114-3703	B-01	85.0’/85.0’/85.0’
105	Steel H-Frame	86.0’/86.0’/H4	CS45-2472	312663Z	Section 7 Sheet 29	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
106	Steel H-Frame	95.0’/95.0’/H5	CS45-2472	312669Z	Section 7 Sheet 41	Direct Embed	15.0’/15.0’	n/a	n/a	n/a	110.0’/110.0’
107	Steel H-Frame	63.5’/63.5’/H2	CS45-2472	312649Z	Section 7 Sheet 1	Direct Embed	11.5’/11.5’	n/a	n/a	n/a	75.0’/75.0’
108	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
109	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
110	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
111	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
112	Custom Steel 3-Pole Deadend	85.0’/85.0’/85.0’/Custom	502-4204	313166Z	Section 6 Sheet 5	Drilled Pier	30.0’/30.0’/30.0’	1096789	114-3703	B-02	85.0’/85.0’/85.0’
113	Custom Steel 3-Pole Deadend	110.0’/110.0’/110.0’/Custom	502-5525	313167Z	Section 6 Sheet 7	Drilled Pier	26.0’/26.0’/26.0’	1096791	114-3703	B-02	110.0’/110.0’/110.0’
114	Steel H-Frame	86.0’/86.0’/H5	CS45-2472	312668Z	Section 7 Sheet 39	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
115	Steel H-Frame	63.5’/63.5’/H4	CS45-2472	312660Z	Section 7 Sheet 23	Direct Embed	11.5’/11.5’	n/a	n/a	n/a	75.0’/75.0’

Above Grade						Below Grade					General
Str. Num.	Str. Type	Str. Height Above Grade (LPOL/RPOL) or (LPOL/CPOL/RPOLE)/Class	AEP Assembly Drawing Num.	Str. Vendor Drawing Num.	Location of AEP Str. Dwgs (section and sheet)	Foundation Type	Foundation Depth (LPOL/RPOL) or (LPOL/CPOL/RPOLE)	Anchor Bolt Vendor Drawing Num.	AEP Foundation Drawing Number	Soil Boring Used*	Total Pole Lengths (LPOL/RPOL) or (LPOL/CPOL/RPOL)
116	Steel H-Frame	108.5/108.5/H4	CS45-2472	312664Z	Section 7 Sheet 31	Direct Embed	16.5’/16.5’	n/a	n/a	n/a	125.0’/125.0’
117	Custom Steel 3-Pole Deadend	85.0’/85.0’/85.0’/Custom	502-4204	313170Z	Section 6 Sheet 9	Drilled Pier	29.0’/29.0’/29.0’	1096794	114-3703	B-02	85.0’/85.0’/85.0’
118	Steel H-Frame	63.5’/63.5’/H5	CS45-2472	312665Z	Section 7 Sheet 33	Direct Embed	11.5’/11.5’	n/a	n/a	n/a	75.0’/75.0’
119	Steel H-Frame	90.5’/90.5’/H4	CS45-2472	313161Z	Section 7 Sheet 49	Direct Embed	14.5’/14.5’	n/a	n/a	n/a	105.0’/105.0’
120	Steel H-Frame	104.0’/104.0’/H6	CS45-2472	313162Z	Section 7 Sheet 51	Direct Embed	16.0’/16.0’	n/a	n/a	n/a	120.0’/120.0’
121	Steel H-Frame	77.0’/77.0’/H4	CS45-2472	312661Z	Section 7 Sheet 25	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
122	Steel H-Frame	72.5’/72.5’/H5	CS45-2472	312666Z	Section 7 Sheet 35	Direct Embed	12.5’/12.5’	n/a	n/a	n/a	85.0’/85.0’
123	Steel H-Frame	72.5’/72.5’/H3	CS45-2472	312654Z	Section 7 Sheet 11	Direct Embed	12.5’/12.5’	n/a	n/a	n/a	85.0’/85.0’
124	Steel H-Frame	81.5’/81.5’/H3	CS45-2472	312656Z	Section 7 Sheet 15	Direct Embed	13.5’/13.5’	n/a	n/a	n/a	95.0’/95.0’
125	Custom Steel 3-Pole Deadend	85.0’/85.0’/85.0’/Custom	502-4204	313171Z	Section 6 Sheet 11	Drilled Pier	36.0’/36.0’/36.0’	1096795	114-3703	B-03	85.0’/85.0’/85.0’
126	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
127	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
128	Steel H-Frame	104.0’/104.0’/H5	CS45-2472	312670Z	Section 7 Sheet 43	Direct Embed	16.0’/16.0’	n/a	n/a	n/a	120.0’/120.0’
129	Steel H-Frame	86.0’/86.0’/H6	CS45-2472	312671Z	Section 7 Sheet 45	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
130	Steel H-Frame	81.5’/81.5’/H5	CS45-2472	312667Z	Section 7 Sheet 37	Direct Embed	13.5’/13.5’	n/a	n/a	n/a	95.0’/95.0’
131	Steel H-Frame	81.5’/81.5’/H4	CS45-2472	312662Z	Section 7 Sheet 27	Direct Embed	13.5’/13.5’	n/a	n/a	n/a	95.0’/95.0’

Above Grade						Below Grade					General
Str. Num.	Str. Type	Str. Height Above Grade (LPOL/RPOL) or (LPOL/CPOL/RPOLE)/Class	AEP Assembly Drawing Num.	Str. Vendor Drawing Num.	Location of AEP Str. Dwgs (section and sheet)	Foundation Type	Foundation Depth (LPOL/RPOL) or (LPOL/CPOL/RPOLE)	Anchor Bolt Vendor Drawing Num.	AEP Foundation Drawing Number	Soil Boring Used*	Total Pole Lengths (LPOL/RPOL) or (LPOL/CPOL/RPOL)
132	Steel H-Frame	81.5’/81.5’/H4	CS45-2472	312662Z	Section 7 Sheet 27	Direct Embed	13.5’/13.5’	n/a	n/a	n/a	95.0’/95.0’
133	Custom Steel 3-Pole Deadend	85.0’/85.0’/85.0’/Custom	502-4204	313170Z	Section 6 Sheet 9	Drilled Pier	14.0’/14.0’/14.0’	1096796	114-3703	B-04	85.0’/85.0’/85.0’
134	Custom Steel 3-Pole Deadend	85.0’/85.0’/85.0’/Custom	502-4207	313172Z	Section 6 Sheet 13	Drilled Pier	14.0’/14.0’/14.0’	1097851	114-3703	B-04	85.0’/85.0’/85.0’
135	Steel H-Frame	108.5/108.5/H4	CS45-2472	312664Z	Section 7 Sheet 31	Direct Embed	16.5’/16.5’	n/a	n/a	n/a	125.0’/125.0’
136	Steel H-Frame	108.5/108.5/H4	CS45-2472	312664Z	Section 7 Sheet 31	Direct Embed	16.5’/16.5’	n/a	n/a	n/a	125.0’/125.0’
137	Steel H-Frame	86.0’/86.0’/H2	CS45-2472	312652Z	Section 7 Sheet 7	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
138	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
139	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
140	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
141	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
142	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
143	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
144	Steel H-Frame	63.5’/63.5’/H3	CS45-2472	312653Z	Section 7 Sheet 9	Direct Embed	11.5’/11.5’	n/a	n/a	n/a	75.0’/75.0’
145	Steel H-Frame	81.5’/81.5’/H2	CS45-2472	312651Z	Section 7 Sheet 5	Direct Embed	13.5’/13.5’	n/a	n/a	n/a	95.0’/95.0’
146	Steel H-Frame	77.0’/77.0’/H2	CS45-2472	312650Z	Section 7 Sheet 3	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
147	Steel H-Frame	86.0’/86.0’/H3	CS45-2472	312657Z	Section 7 Sheet 17	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’

Above Grade						Below Grade					General
Str. Num.	Str. Type	Str. Height Above Grade (LPOL/RPOL) or (LPOL/CPOL/RPOLE)/Class	AEP Assembly Drawing Num.	Str. Vendor Drawing Num.	Location of AEP Str. Dwgs (section and sheet)	Foundation Type	Foundation Depth (LPOL/RPOL) or (LPOL/CPOL/RPOLE)	Anchor Bolt Vendor Drawing Num.	AEP Foundation Drawing Number	Soil Boring Used*	Total Pole Lengths (LPOL/RPOL) or (LPOL/CPOL/RPOL)
148	Steel H-Frame	104.0’/104.0’/H7	CS45-2472	313163Z	Section 7 Sheet 53	Direct Embed	16.0’/16.0’	n/a	n/a	n/a	120.0’/120.0’
149	Steel H-Frame	104.0’/104.0’/H7	CS45-2472	313163Z	Section 7 Sheet 53	Direct Embed	16.0’/16.0’	n/a	n/a	n/a	120.0’/120.0’
150	Steel H-Frame	63.5’/63.5’/H3	CS45-2472	312653Z	Section 7 Sheet 9	Direct Embed	11.5’/11.5’	n/a	n/a	n/a	75.0’/75.0’
151	Steel H-Frame	77.0’/77.0’/H4	CS45-2472	312661Z	Section 7 Sheet 25	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
152	Steel H-Frame	86.0’/86.0’/H6	CS45-2472	312671Z	Section 7 Sheet 45	Direct Embed	14.0’/14.0’	n/a	n/a	n/a	100.0’/100.0’
153	Steel H-Frame	108.5/108.5/H6	CS45-2472	312672Z	Section 7 Sheet 47	Direct Embed	16.5’/16.5’	n/a	n/a	n/a	125.0’/125.0’
154	Steel H-Frame	77.0’/77.0’/H4	CS45-2472	312661Z	Section 7 Sheet 25	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
155	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
156	Steel H-Frame	77.0’/77.0’/H4	CS45-2472	312661Z	Section 7 Sheet 25	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’
157	Steel H-Frame	77.0’/77.0’/H3	CS45-2472	312655Z	Section 7 Sheet 13	Direct Embed	13.0’/13.0’	n/a	n/a	n/a	90.0’/90.0’

*Include all soil borings used to design foundation.

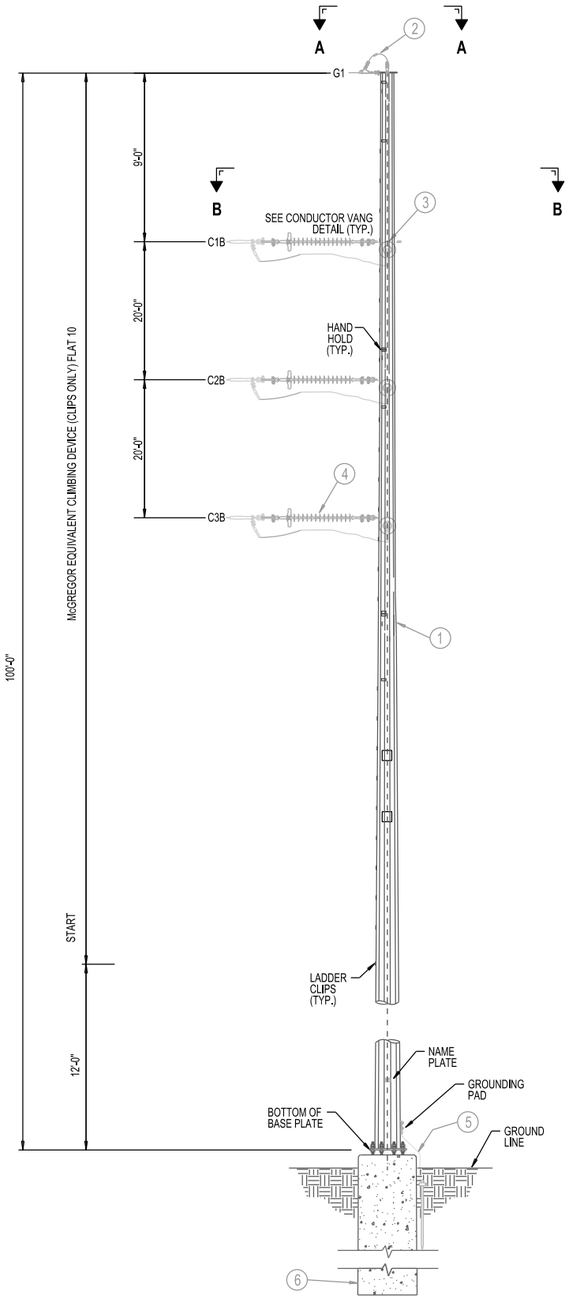
Section 6. Custom Pole Drawings

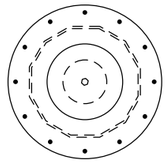
A. AEP Assembly Drawings

B. Vendor Drawings

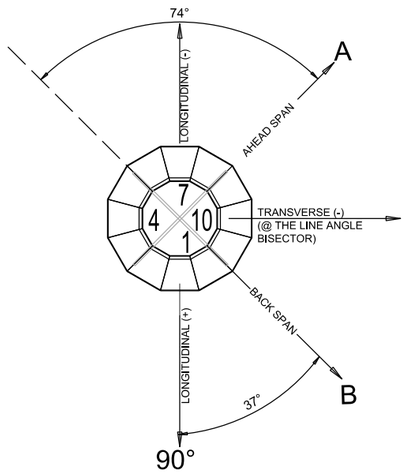
C. Jacking Instructions

Ross - Heppner Sec 3 : Structure 89

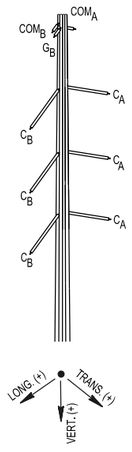




SECTION A-A
POLE CAP DETAIL C



SECTION B-B
LINE ANGLE



LOAD DIAGRAM

NO.	DESCRIPTION	WIND (psf)	ICE (in)	Temp (°F)		DEADEND (KIPS) Ground Back	Ground Ahead	Conductor Back	Conductor Ahead	Communication Back	Communication Ahead	Structure WIND PRES (psf)	Structure DEFLECTION (% OF POLE HEIGHT)
1	**Intact** NESC Heavy Rule 250B	4.00	0.50	0.0	V	0.329		1.363	0.410	0.442	0.171	10.00	10.00
					T	4.035		13.083	0.625	7.770	0.498		
					L	4.460		15.823	-0.666	9.145	-0.535		
2	**Intact** NESC Heavy Wind & Ice Rule 250D	4.00	1.00	15.0	V	0.559		1.547	0.454	0.708	0.259	4.00	10.00
					T	3.969		10.908	0.575	7.060	0.511		
					L	4.635		13.585	-0.668	8.629	-0.599		
3	**Intact** AEP Extreme Wind, 25 psf	25.00	0.00	60.0	V	0.068		0.503	0.159	0.069	0.036	25.00	10.00
					T	1.645		7.889	0.442	4.166	0.283		
					L	1.658		8.335	-0.358	4.328	-0.248		
4	**Intact** AEP Wind & Heavy Ice	6.25	1.00	0.0	V	0.559		1.547	0.454	0.708	0.259	6.25	10.00
					T	4.044		11.178	0.591	7.170	0.519		
					L	4.378		13.442	-0.635	8.358	-0.565		
5	**Intact** AEP Heavy Ice	0.00	1.25	0.0	V	0.800		1.953	0.568	0.986	0.356	0.00	10.00
					T	4.020		11.797	0.607	7.468	0.545		
					L	5.334		15.656	-0.806	9.910	-0.723		
6	**Deadend** NESC Heavy Rule 250B - Full Deadend	4.00	0.50	0.0	V	0.329		1.363		0.442		10.00	10.00
					T	4.035		13.083		7.770			
					L	4.460		15.823		9.145			
7	**Deadend** NESC Wind & Ice Rule 250D - Full Deadend, Heavy	4.00	1.00	15.0	V	0.559		1.547		0.708		4.00	10.00
					T	3.969		10.908		7.060			
					L	4.635		13.585		8.629			
8	**Deadend** AEP Extreme Wind - Full Deadend, 25 psf	25.00	0.00	60.0	V	0.068		0.503		0.069		25.00	10.00
					T	1.645		7.889		4.166			
					L	1.658		8.335		4.328			
9	**Deadend** AEP Wind & Ice - Full Deadend, Heavy	6.25	1.00	0.0	V	0.559		1.547		0.708		6.25	10.00
					T	4.044		11.178		7.170			
					L	4.378		13.442		8.358			
10	**Deadend** AEP Heavy Ice - Full Deadend	0.00	1.25	0.0	V	0.800		1.953		0.986		0.00	10.00
					T	4.020		11.797		7.468			
					L	5.334		15.656		9.910			
11	**Intact** AEP Deflection Criteria	1.00	0.00	60.0	V	0.068		0.503	0.159	0.069	0.036	1.00	2.00
					T	0.443		3.592	0.157	1.624	0.088		
					L	0.566		4.681	-0.200	2.107	-0.112		
12	**Intact** AEP Maintenance Load	2.00	0.00	60.0	V	0.271		2.012	0.633	0.272	0.141	2.00	2.00
					T	0.466		3.660	0.163	1.667	0.092		
					L	0.576		4.688	-0.197	2.116	-0.110		

	WIRE	SPAN	NESC TENSION (LBS)	RULING SPAN (FT)	VERTICAL SPAN (FT)	WIND SPAN (FT)	Azimuth (°)	Angle	
Ground	Type: 7#10 Aluminum Clad Steel 7, Name: 7#10	BACK	3300	898	275	450	53	Line	74.0
		AHEAD						Tap	0.0
Conductor	Type: 1,033,500 ACSR 54/7, Name: CURLEW	BACK	11300	898	340	450	53		
	Type: 1,033,500 ACSR 54/7, Name: CURLEW	AHEAD	500	100	96	48	307		
Communication	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	BACK	6600	898	275	450	53		
	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	AHEAD	400	100	96	48	307		

NOTES:
1. SEE 01D3-1179 FOR DESIGN NOTES
2. DESIGN LOADS: 502-4213
3. PROVIDE CONDUCTOR ATTACHMENT ON BOTH SIDES OF VANG TO ALLOW FOR 180° ROTATION

ASSEMBLY LIST

	QUANTITY	DESCRIPTION	DRAWING
①	1	POLE	
②	2	OHGW DEAD-END ASSEMBLY	30T0-1104 Sh. 1
④	6	138KV DEAD-END INSULATOR ASSEMBLY	14B6-2743
⑤	1	STEEL POLE GROUNDING ASSEMBLY	21SE-1460
⑥	1	ANCHOR BOLT ASSEMBLY	114-XXX

POLE STANDARD DETAIL	DESCRIPTION	LOCATION	REFERENCE POINT	ORIENTATION
01D4-1186	CAP PLATE [DETAIL "C"]	0.0 FT	TOP OF POLE	AS NOTED
01D5-1370	CONDUCTOR DEADEND VANG	AS NOTED	TOP OF POLE	FLATS 2 & 6
01D5-1370	MAINTENANCE VANGS	AS NOTED	BELOW CONDUCTOR ATTACH.	IN LINE WITH COND. VANG
01D4-1183	GROUND LUG	0.6 FT	TOP OF POLE	FLATS 3 & 9
01D4-1185	GROUND PAD	1.6 FT	ABOVE BASE PLATE	FLATS 3 & 9
01D4-1353	NAME PLATE DETAIL	4.0 FT	ABOVE BASE PLATE	FLAT 1
01D1-1164 - 01D1-1166	ANCHOR BOLT ASSEMBLY	AS NOTED	BASE PLATE	AS NOTED

REV	REVISION DESCRIPTION	DATE	BY
0	ISSUE FOR POLE PACKAGE.	12/2/2019	MJS

AMERICAN ELECTRIC POWER
OHIO TRANSCO

REGISTRATION No.:

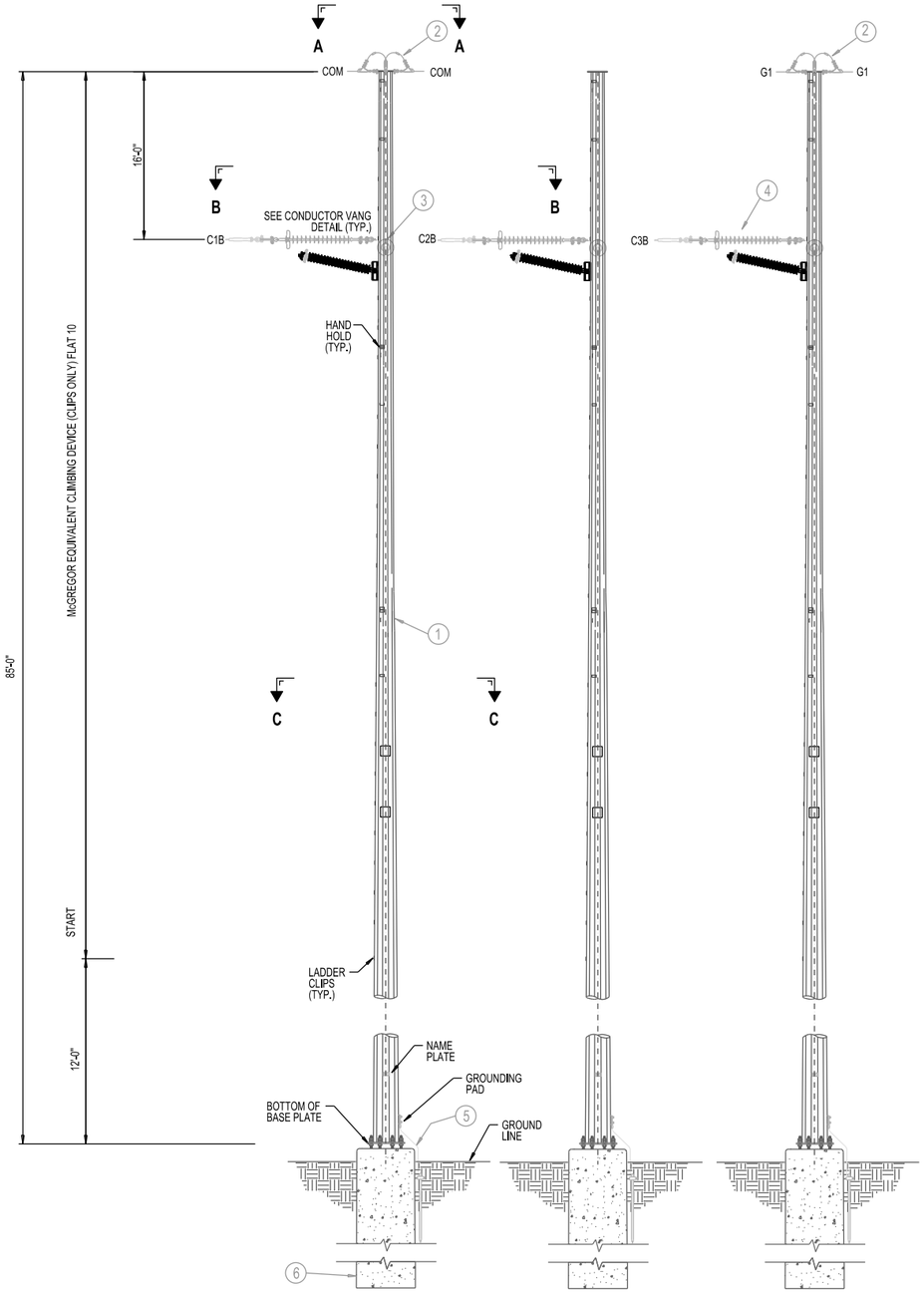
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DRN BY: MJS | DRN DATE: 12/2/2019
APP BY: | APP DATE:

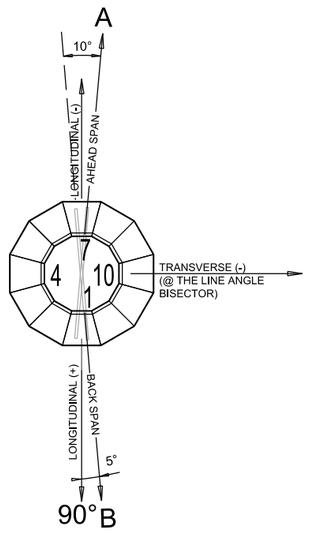
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ROSS - HEPPNER 138KV: AULT SW - VIGO STRUCTURE 89
WO: 42690519
Single Pole DE 138kV
Polymer
Curlew/7#8 Alumoweld/OPGW & Drilled Shaft

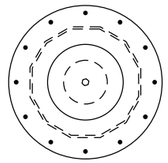
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DWG: 502-4213
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Ross - Heppner Sec 3 : Structure 104, 112, 117, 125, 133

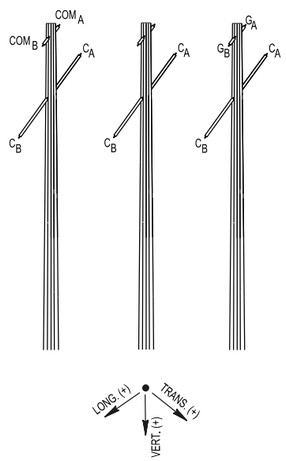




SECTION B-B
LINE ANGLE



SECTION A-A
POLE CAP DETAIL C



LOAD DIAGRAM

NO.	DESCRIPTION	WIND (psf)	ICE (in)	Temp (°F)		DEADEND (KIPS) Ground Back	Ground Ahead	Conductor Back	Conductor Ahead	Communication Back	Communication Ahead	Structure WIND PRES (psf)	Structure DEFLECTION (% OF POLE HEIGHT)
1	**Intact** NESC Heavy Rule 250B	4.00	0.50	0.0	V	0.662	0.638	2.310	1.987	0.888	0.866	10.00	10.00
					T	1.230	0.796	2.897	2.365	1.949	1.388		
					L	6.633	-5.214	20.335	-20.381	12.583	-10.810		
2	**Intact** NESC Heavy Wind & Ice Rule 250D	4.00	1.00	15.0	V	1.155	1.114	2.626	2.249	1.454	1.416	4.00	10.00
					T	1.054	0.674	2.208	1.710	1.584	1.097		
					L	6.790	-4.954	17.849	-15.695	11.965	-9.335		
3	**Intact** AEP Extreme Wind, 25 psf	25.00	0.00	60.0	V	0.123	0.119	0.852	0.737	0.123	0.119	25.00	10.00
					T	0.605	0.379	2.559	1.707	1.423	0.906		
					L	2.562	-2.061	11.547	-10.272	6.292	-5.152		
4	**Intact** AEP Wind & Heavy Ice	6.25	1.00	0.0	V	1.155	1.114	2.626	2.249	1.454	1.416	6.25	10.00
					T	1.294	0.798	2.563	1.929	1.868	1.252		
					L	6.582	-4.848	17.754	-16.032	11.737	-9.306		
5	**Intact** AEP Heavy Ice	0.00	1.25	0.0	V	1.661	1.601	3.317	2.836	2.031	1.978	0.00	10.00
					T	0.655	0.476	1.767	1.545	1.173	0.915		
					L	7.478	-5.438	20.189	-17.649	13.397	-10.445		
6	**Deadend** NESC Heavy Rule 250B - Full Deadend	4.00	0.50	0.0	V	0.662		2.310		0.888		10.00	10.00
					T	1.230		2.897		1.949			
					L	6.633		20.335		12.583			
7	**Deadend** NESC Wind & Ice Rule 250D - Full Deadend, Heavy	4.00	1.00	15.0	V	1.155		2.626		1.454		4.00	10.00
					T	1.054		2.208		1.584			
					L	6.790		17.849		11.965			
8	**Deadend** AEP Extreme Wind - Full Deadend, 25 psf	25.00	0.00	60.0	V	0.123		0.852		0.123		25.00	10.00
					T	0.605		2.559		1.423			
					L	2.562		11.547		6.292			
9	**Deadend** AEP Wind & Ice - Full Deadend, Heavy	6.25	1.00	0.0	V	1.155		2.626		1.454		6.25	10.00
					T	1.294		2.563		1.868			
					L	6.582		17.754		11.737			
10	**Deadend** AEP Heavy Ice - Full Deadend	0.00	1.25	0.0	V	1.661		3.317		2.031		0.00	10.00
					T	0.655		1.767		1.173			
					L	7.478		20.189		13.397			
11	**Intact** AEP Deflection Criteria	1.00	0.00	60.0	V	0.123	0.119	0.852	0.737	0.123	0.119	1.00	2.00
					T	0.086	0.077	0.575	0.552	0.278	0.244		
					L	0.800	-0.789	5.858	-5.934	2.772	-2.568		
12	**Intact** AEP Maintenance Load	2.00	0.00	60.0	V	0.490	0.476	3.405	2.950	0.489	0.478	2.00	2.00
					T	0.103	0.087	0.641	0.587	0.315	0.263		
					L	0.824	-0.808	5.901	-5.969	2.803	-2.592		

	WIRE	SPAN	NESC TENSION (LBS)	RULING SPAN (FT)	VERTICAL SPAN (FT)	WIND SPAN (FT)	Azimuth (°)	Angle	
Ground	Type: 7#10 Aluminum Clad Steel 7, Name: 7#10	BACK	3700	1082	578	541	85	Line	10.0
	Type: 7#10 Aluminum Clad Steel 7, Name: 7#10	AHEAD	2900	564	557	282	275	Tap	0.0
Conductor	Type: 1,033,500 ACSR 54/7, Name: CURLEW	BACK	11300	1082	578	541	85		
	Type: 1,033,500 ACSR 54/7, Name: CURLEW	AHEAD	11300	565	492	282	275		
Communication	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	BACK	7000	1082	572	541	85		
	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	AHEAD	6000	565	557	282	275		

NOTES:
1. SEE 01D3-1179 FOR DESIGN NOTES
2. DESIGN LOADS: 502-4204
3. PROVIDE CONDUCTOR ATTACHMENT ON BOTH SIDES OF VANG TO ALLOW FOR 180° ROTATION

ASSEMBLY LIST

	QUANTITY	DESCRIPTION	DRAWING
①	1	POLE	
②	2	OHGW DEAD-END ASSEMBLY	30T0-1104 Sh. 1
③	3	138KV POST INSULATOR FOR STEEL POLE	12B5-0054
④	6	138KV DEAD-END INSULATOR ASSEMBLY	14B6-2743
⑤	1	STEEL POLE GROUNDING ASSEMBLY	21SE-1460
⑥	1	ANCHOR BOLT ASSEMBLY	114-XXX

POLE STANDARD DETAIL	DESCRIPTION	LOCATION	REFERENCE POINT	ORIENTATION
01D4-1186	CAP PLATE [DETAIL "C"]	0.0 FT	TOP OF POLE	AS NOTED
01D5-1370	CONDUCTOR DEADEND VANG	AS NOTED	TOP OF POLE	FLATS 1 & 7
01D5-1370	MAINTENANCE VANGS	AS NOTED	BELOW CONDUCTOR ATTACH.	IN LINE WITH COND. VANG
01D5-1224	POST INSULATOR MOUNTING STANARD DUTY	AS NOTES	BELOW CONDUCTOR ATTACH.	FLAT 4
01D4-1183	GROUND LUG	0.6 FT	TOP OF POLE	FLATS 3 & 9
01D4-1185	GROUND PAD	1.6 FT	ABOVE BASE PLATE	FLATS 3 & 9
01D4-1353	NAME PLATE DETAIL	4.0 FT	ABOVE BASE PLATE	FLAT 1
01D1-1164 - 01D1-1166	ANCHOR BOLT ASSEMBLY	AS NOTED	BASE PLATE	AS NOTED

REV	REVISION DESCRIPTION	DATE	BY
0	ISSUE FOR POLE PACKAGE.	12/2/2019	MJS

AMERICAN ELECTRIC POWER
OHIO TRANSCO

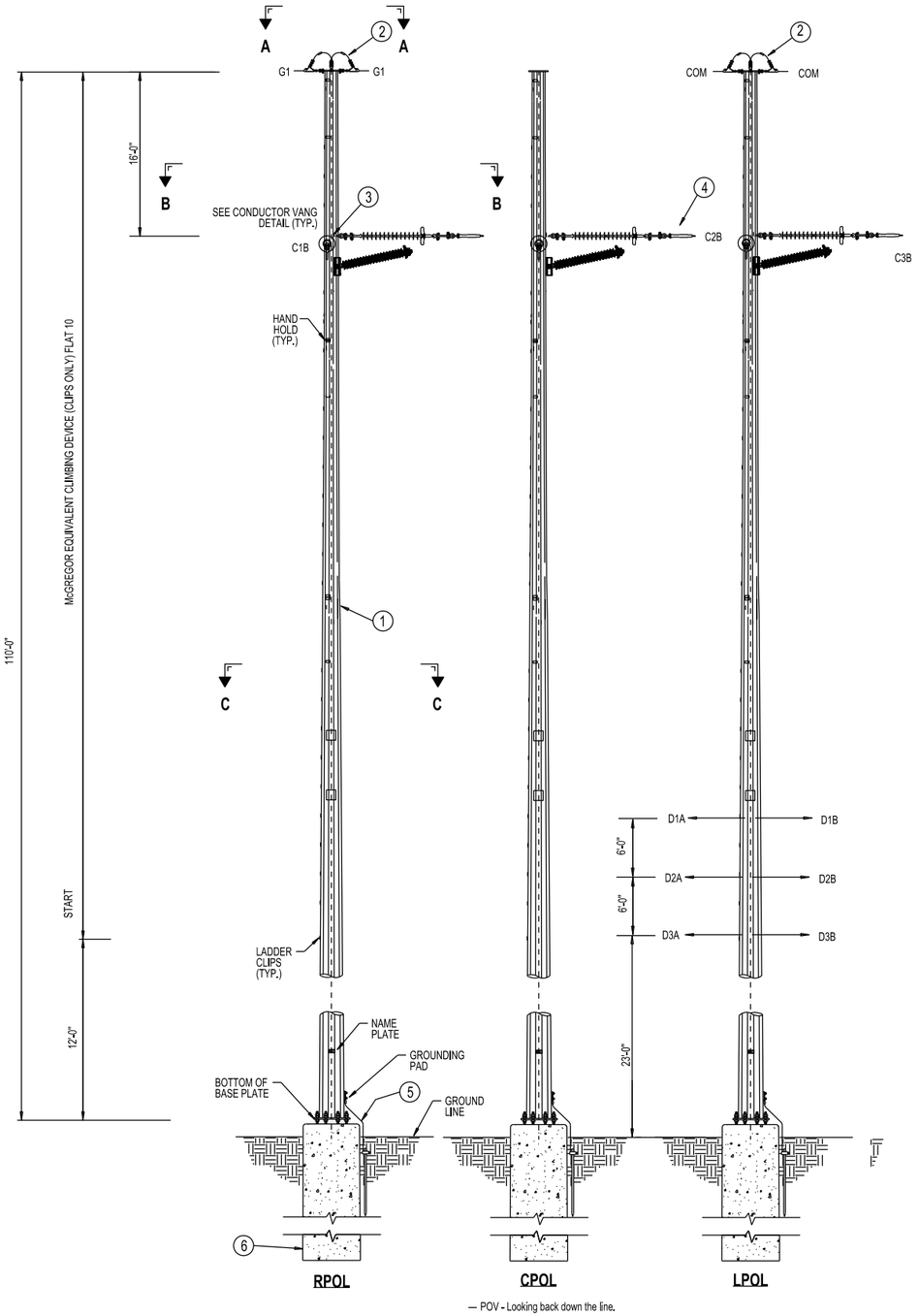
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APP BY: | APP DATE:

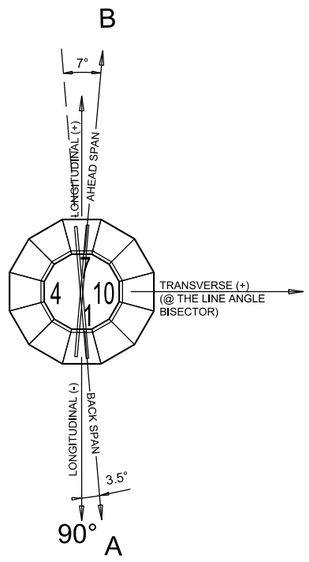
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ROSS - HEPPNER 138KV REBUILD: AULT SW - VIGO STRUCTURES 104, 112, 117, 125, 133
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Polymer
Curlew/7#8 Alumoweld/OPGW & Drilled Shaft

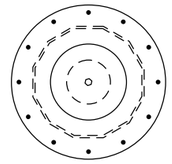
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DWG: 502-4204
SHEET: 1 REV: 0



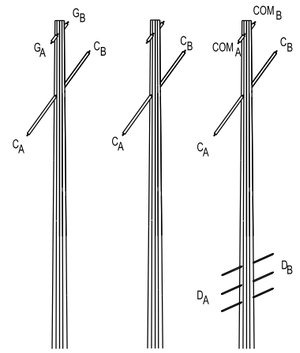
— POV - Looking back down the line.

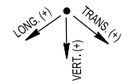


SECTION B-B
LINE ANGLE

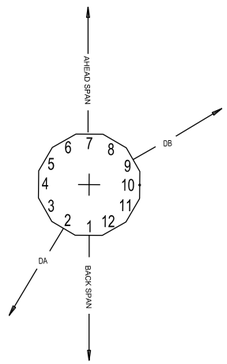


SECTION A-A
POLE CAP DETAIL C





LOAD DIAGRAM



SECTION C-C
SECTION AT UNDERBUILD

Ross- Heppner: 113

NO.	DESCRIPTION	WIND (psf)	ICE (in)	Temp (°F)		DEADEND LOAD (KIPS) Ground Back	Ground Ahead	Conductor Back	Conductor Ahead	Distribution Back	Distribution Ahead	Communication Back	Communication Ahead	Structure WIND PRES (psf)	Structure DEFLECTION (% OF POLE HEIGHT)
1	**Intact** NESC Heavy Rule 250B	4.00	0.50	0.0	V	0.550	0.027	1.819	0.226	0.049	0.285	0.744	0.027		
					T	0.032	0.227	-0.339	-0.195	-3.162	3.347	-0.170	0.015	10.00	10.00
					L	4.185	-6.378	13.617	-20.536	5.510	-5.404	8.901	-12.912		
2	**Intact** NESC Heavy Wind & Ice Rule 250D	4.00	1.00	15.0	V	0.955	0.018	2.057	0.245	0.049	0.376	1.213	0.018		
					T	-0.050	0.049	-0.411	-0.453	-2.464	2.684	-0.245	-0.207	4.00	10.00
					L	4.133	-6.343	11.387	-17.426	4.289	-4.408	7.890	-11.733		
3	**Intact** ASCE Extreme Wind, 95 mph	23.00	0.00	60.0	V	0.105	0.018	0.677	0.092	0.024	0.084	0.105	0.018		
					T	0.064	0.190	0.214	0.688	-1.268	1.532	0.112	0.390	23.50	10.00
					L	1.502	-2.359	6.826	-10.882	2.232	-2.237	4.003	-6.098		
4	**Intact** 50 mph Wind & Ice Heavy	6.25	1.00	0.0	V	0.955	0.018	2.057	0.245	0.049	0.376	1.213	0.018		
					T	0.070	0.303	-0.258	-0.108	-2.562	2.830	-0.110	0.088	6.50	10.00
					L	4.055	-6.202	11.519	-17.453	4.470	-4.525	7.882	-11.618		
5	**Intact** Heavy Ice	0.00	1.25	0.0	V	1.371	0.018	2.595	0.304	0.060	0.499	1.693	0.018		
					T	-0.279	-0.423	-0.779	-1.174	-2.779	2.893	-0.542	-0.795	0.00	10.00
					L	4.549	-6.902	12.742	-19.198	4.812	-5.010	8.843	-12.987		
6	**Deadend** NESC Heavy Rule 250B - Full Deadend	4.00	0.50	0.0	V		0.027		0.226		0.285		0.027		
					T		0.227		-0.195		3.347		0.015	10.00	10.00
					L		-6.378		-20.536		-5.404		-12.912		
7	**Deadend** ASCE Extreme Wind, 95 mph - Full Deadend	23.00	0.00	60.0	V		0.018		0.092		0.084		0.018		
					T		0.190		0.688		1.532		0.390	23.50	10.00
					L		-2.359		-10.882		-2.237		-6.098		
8	**Deadend** NESC Wind & Ice Rule 250D - Full Deadend,	4.00	1.00	15.0	V		0.018		0.245		0.376		0.018		
					T		0.049		-0.453		2.684		-0.207	4.00	10.00
					L		-6.343		-17.426		-4.408		-11.733		
9	**Deadend** 50 mph Wind & Ice Heavy - Full Deadend	6.25	1.00	0.0	V		0.018		0.245		0.376		0.018		
					T		0.303		-0.108		2.830		0.088	6.50	10.00
					L		-6.202		-17.453		-4.525		-11.618		
10	**Deadend** Heavy Ice - Full Deadend	0.00	1.25	0.0	V		0.018		0.304		0.499		0.018		
					T		-0.423		-1.174		2.893		-0.795	0.00	10.00
					L		-6.902		-19.198		-5.010		-12.987		
11	**Intact** Deflection	1.00	0.00	60.0	V	0.105	0.018	0.677	0.092	0.024	0.084	0.105	0.018		
					T	-0.025	-0.036	-0.196	-0.302	-0.506	0.526	-0.105	-0.148	1.00	2.00
					L	0.513	-0.814	3.658	-5.892	0.879	-0.893	1.952	-2.956		
12	**Intact** Maintenance	2.00	0.00	60.0	V	0.313	0.053	2.029	0.273	0.071	0.251	0.314	0.053		
					T	-0.019	-0.022	-0.171	-0.247	-0.517	0.546	-0.091	-0.117	2.00	2.00
					L	0.528	-0.840	3.690	-5.942	0.899	-0.909	1.974	-2.992		
13	**Intact** Uplift Load	0.00	0.00	0.0	V	0.105	0.018	0.677	0.092	0.024	0.084	0.105	0.018		
					T	-0.038	-0.055	-0.280	-0.418	-1.193	1.041	-0.152	-0.209	0.00	10.00
					L	0.609	-0.908	4.561	-6.826	2.065	-1.803	2.478	-3.412		

	WIRE	SPAN	NESC TENSION (LBS)	RULING SPAN (FT)	VERTICAL SPAN (FT)	WIND SPAN (FT)	Azimuth (°)	Angle	
Ground	Type: 7#10 Aluminum Clad Steel 7, Name: 7#10	BACK	2300	472	476	240	93.5	Line	-7.0
	Type: 7#10 Aluminum Clad Steel 7, Name: 7#10	AHEAD	3500	900	0	515	266.5	Tap	0.0
Conductor	Type: 1,033,500 ACSR 54/7, Name: CURLEW	BACK	7500	476	450	240	93.5		
	Type: 1,033,500 ACSR 54/7, Name: CURLEW	AHEAD	11300	900	50	515	266.5		
Distribution	Type: 556,500 AAC/1350 19, Name: DAHILA	BACK	3500	200	10	10	120		
	Type: 556,500 AAC/1350 19, Name: DAHILA	AHEAD	3500	230	115	115	300		
Communication	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	BACK	4900	476	476	240	93.5		
	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	AHEAD	7100	900	0	515	266.5		

NOTES:
1. SEE 01D3-1179 FOR DESIGN NOTES
2. DESIGN LOADS: 502-5525
3. PROVIDE CONDUCTOR ATTACHMENT ON BOTH SIDES OF VANG TO ALLOW FOR 180° ROTATION

ASSEMBLY LIST

	QUANTITY	DESCRIPTION	DRAWING
①	1	POLE	
②	2	OHGW DEAD-END ASSEMBLY	30T0-1104 Sh. 1
③	3	138KV POST INSULATOR FOR STEEL POLE	12B5-0054
④	6	138KV DEAD-END INSULATOR ASSEMBLY	14B6-2743
⑤	1	STEEL POLE GROUNDING ASSEMBLY	21SE-1460
⑥	1	ANCHOR BOLT ASSEMBLY	114-XXX

POLE STANDARD DETAIL	DESCRIPTION	LOCATION	REFERENCE POINT	ORIENTATION
01D4-1186	CAP PLATE [DETAIL "C"]	0.0 FT	TOP OF POLE	AS NOTED
01D5-1370	CONDUCTOR DEADEND VANG	AS NOTED	TOP OF POLE	FLATS 1 & 7
01D5-1370	MAINTENANCE VANGS	AS NOTED	BELOW CONDUCTOR ATTACH.	IN LINE WITH COND. VANG
01D5-1224	POST INSULATOR MOUNTING STANARD DUTY	AS NOTES	BELOW CONDUCTOR ATTACH.	FLAT 4
01D4-1183	GROUND LUG	0.6 FT	TOP OF POLE	FLATS 3 & 9
01D4-1185	GROUND PAD	1.6 FT	ABOVE BASE PLATE	FLATS 3 & 9
01D4-1353	NAME PLATE DETAIL	4.0 FT	ABOVE BASE PLATE	FLAT 1
01D1-1164 - 01D1-1166	ANCHOR BOLT ASSEMBLY	AS NOTED	BASE PLATE	AS NOTED

REV	REVISION DESCRIPTION	DATE	BY
0	ISSUE FOR POLE PACKAGE.	9/19/2021	MJS

AMERICAN ELECTRIC POWER
OHIO TRANSCO

REGISTRATION No.:

SCALE: NTS | ENG BY: MJS
DRN BY: MJS | DRN DATE: 9/19/2021
APP BY: | APP DATE:

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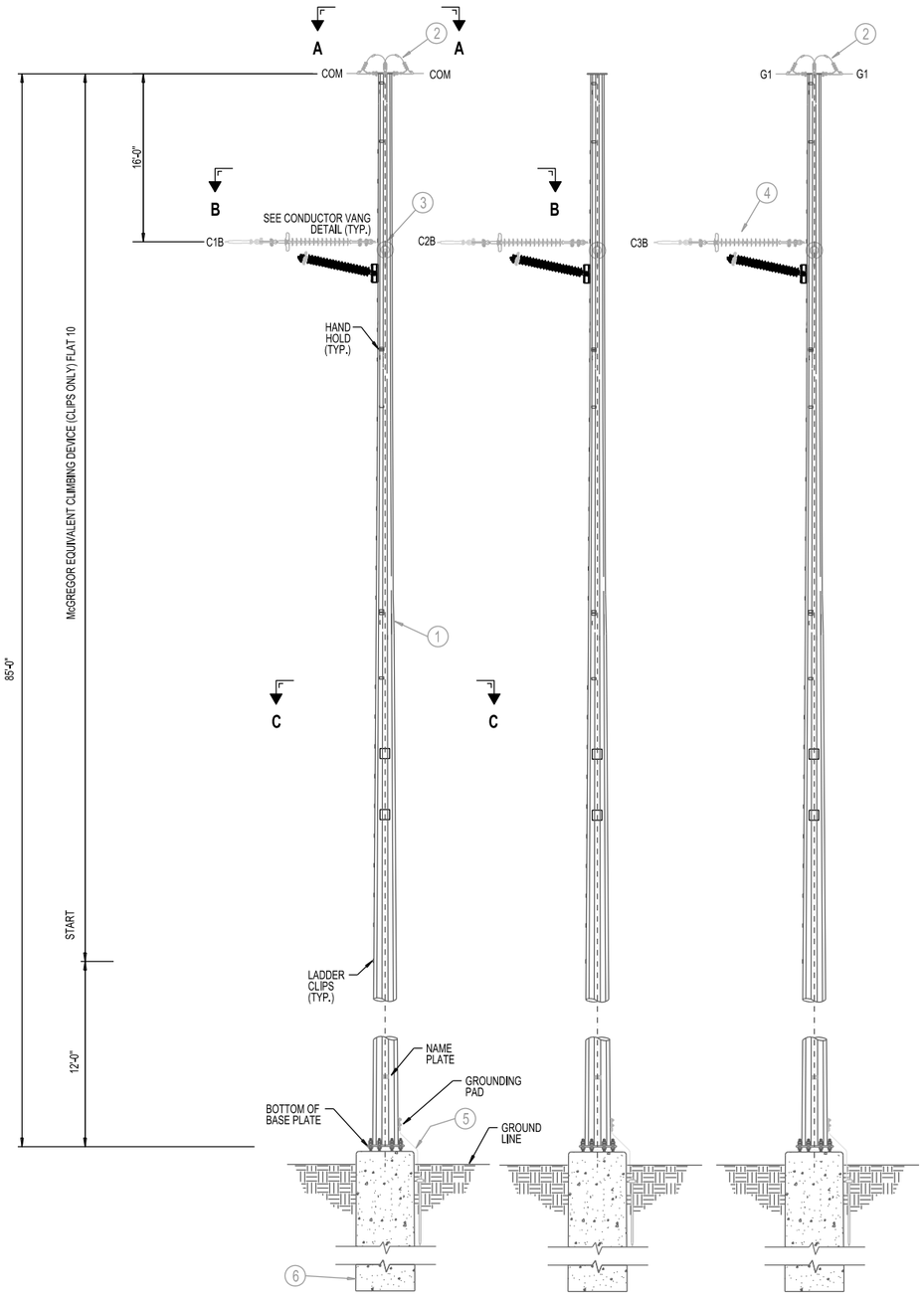
ROSS - HEPPNER 138KV REBUILD: AULT SW - VIGO STRUCTURE 113
WO: T10282334
3-Pole DE 138kV
Polymer
Curlew/7#10 Alumoweld/OPGW & Drilled Shaft

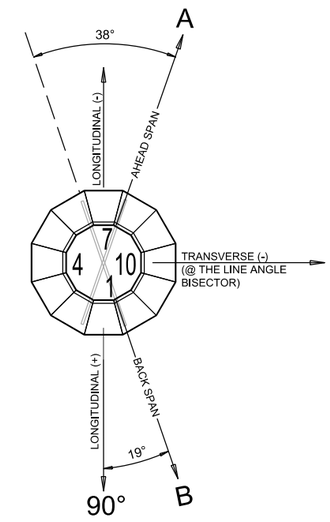
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DWG: 502-5525
SHEET: 1 REV: 0

Ross - Heppner Sec 3 : Structure 134

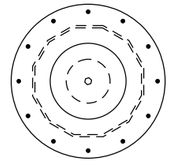
NO.	DESCRIPTION	WIND (psf)	ICE (in)	Temp (°F)		DEADEND LOAD (KIPS) Ground Back	Ground Ahead	Conductor Back	Conductor Ahead	Communication Back	Communication Ahead	Structure WIND PRES (psf)	Structure DEFLECTION (% OF POLE HEIGHT)
1	**Intact** NESC Heavy Rule 250B	4.00	0.50	0.0	V	0.365	0.472	1.271	1.656	0.489	0.637	10.00	10.00
					T	2.197	2.217	7.203	7.339	4.180	4.224		
					L	5.387	-5.188	19.212	-19.165	10.846	-10.640		
2	**Intact** NESC Heavy Wind & Ice Rule 250D	4.00	1.00	15.0	V	0.622	0.816	1.443	1.872	0.788	1.034	4.00	10.00
					T	2.054	2.051	5.722	5.742	3.629	3.622		
					L	5.263	-5.071	15.631	-15.435	9.719	-9.485		
3	**Intact** AEP Extreme Wind, 25 psf	25.00	0.00	60.0	V	0.074	0.092	0.470	0.616	0.074	0.092	25.00	10.00
					T	0.926	0.948	4.288	4.441	2.260	2.330		
					L	2.105	-2.018	10.090	-9.918	5.230	-5.089		
4	**Intact** AEP Wind & Heavy Ice	6.25	1.00	0.0	V	0.622	0.816	1.443	1.872	0.788	1.034	6.25	10.00
					T	2.134	2.165	5.932	6.032	3.747	3.780		
					L	5.103	-4.906	15.685	-15.576	9.597	-9.361		
5	**Intact** AEP Heavy Ice	0.00	1.25	0.0	V	0.890	1.170	1.822	2.361	1.098	1.444	0.00	10.00
					T	2.008	1.945	5.957	6.021	3.760	3.682		
					L	5.830	-5.647	17.298	-17.486	10.920	-10.691		
6	**Deadend** NESC Heavy Rule 250B - Full Deadend	4.00	0.50	0.0	V		0.472		1.656		0.637	10.00	10.00
					T		2.217		7.339		4.224		
					L		-5.188		-19.165		-10.640		
7	**Deadend** NESC Wind & Ice Rule 250D - Full Deadend, Heavy	4.00	1.00	15.0	V		0.816		1.872		1.034	4.00	10.00
					T		2.051		5.742		3.622		
					L		-5.071		-15.435		-9.485		
8	**Deadend** AEP Extreme Wind - Full Deadend, 25 psf	25.00	0.00	60.0	V		0.092		0.616		0.092	25.00	10.00
					T		0.948		4.441		2.330		
					L		-2.018		-9.918		-5.089		
9	**Deadend** AEP Wind & Ice - Full Deadend, Heavy	6.25	1.00	0.0	V		0.816		1.872		1.034	6.25	10.00
					T		2.165		6.032		3.780		
					L		-4.906		-15.576		-9.361		
10	**Deadend** AEP Heavy Ice - Full Deadend	0.00	1.25	0.0	V		1.170		2.361		1.444	0.00	10.00
					T		1.945		6.021		3.682		
					L		-5.647		-17.486		-10.691		
11	**Intact** AEP Deflection Criteria	1.00	0.00	60.0	V	0.074	0.092	0.470	0.616	0.074	0.092	1.00	2.00
					T	0.270	0.263	1.958	1.968	0.889	0.883		
					L	0.759	-0.734	5.592	-5.595	2.528	-2.496		
12	**Intact** AEP Maintenance Load	2.00	0.00	60.0	V	0.294	0.365	1.877	2.464	0.295	0.367	2.00	2.00
					T	0.284	0.279	2.001	2.018	0.916	0.913		
					L	0.778	-0.751	5.623	-5.623	2.551	-2.517		

	WIRE	SPAN	NESC TENSION (LBS)	RULING SPAN (FT)	VERTICAL SPAN (FT)	WIND SPAN (FT)	Azimuth (°)	Angle	
Ground	Type: 7#10 Aluminum Clad Steel 7, Name: 7#10	BACK	3200	715	307	270	71	Line	38.0
	Type: 7#10 Aluminum Clad Steel 7, Name: 7#10	AHEAD	3100	680	405	340	289	Tap	0.0
Conductor	Type: 1,033,500 ACSR 54/7, Name: CURLEW	BACK	11300	715	317	270	71		
	Type: 1,033,500 ACSR 54/7, Name: CURLEW	AHEAD	11300	680	409	340	289		
Communication	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	BACK	6400	714	307	270	71		
	Type: 96/701, OPGW, ADSS, 96 Fibers, Name: 96/701, OPGW, ADSS, 96 Fibers	AHEAD	6300	680	405	340	289		

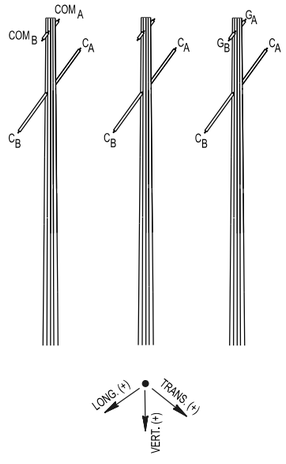




SECTION B-B
LINE ANGLE



SECTION A-A
POLE CAP DETAIL C



LOAD DIAGRAM

NOTES:
1. SEE 01D3-1179 FOR DESIGN NOTES
2. DESIGN LOADS: 502-4207
3. PROVIDE CONDUCTOR ATTACHMENT ON BOTH SIDES OF VANG TO ALLOW FOR 180° ROTATION

ASSEMBLY LIST

	QUANTITY	DESCRIPTION	DRAWING
①	1	POLE	
②	2	OHGW DEAD-END ASSEMBLY	30T0-1104 Sh. 1
③	3	138KV POST INSULATOR FOR STEEL POLE	12B5-0054
④	6	138KV DEAD-END INSULATOR ASSEMBLY	14B6-2743
⑤	1	STEEL POLE GROUNDING ASSEMBLY	21SE-1460
⑥	1	ANCHOR BOLT ASSEMBLY	114-XXX

POLE STANDARD DETAIL	DESCRIPTION	LOCATION	REFERENCE POINT	ORIENTATION
01D4-1186	CAP PLATE [DETAIL "C"]	0.0 FT	TOP OF POLE	AS NOTED
01D5-1370	CONDUCTOR DEADEND VANG	AS NOTED	TOP OF POLE	FLATS 1 & 7
01D5-1370	MAINTENANCE VANGS	AS NOTED	BELOW CONDUCTOR ATTACH.	IN LINE WITH COND. VANG
01D5-1224	POST INSULATOR MOUNTING STANARD DUTY	AS NOTES	BELOW CONDUCTOR ATTACH.	FLAT 4
01D4-1183	GROUND LUG	0.6 FT	TOP OF POLE	FLATS 3 & 9
01D4-1185	GROUND PAD	1.6 FT	ABOVE BASE PLATE	FLATS 3 & 9
01D4-1353	NAME PLATE DETAIL	4.0 FT	ABOVE BASE PLATE	FLAT 1
01D1-1164 - 01D1-1166	ANCHOR BOLT ASSEMBLY	AS NOTED	BASE PLATE	AS NOTED

REV	REVISION DESCRIPTION	DATE	BY
0	ISSUE FOR POLE PACKAGE.	12/2/2019	MJS

AMERICAN ELECTRIC POWER
OHIO TRANSCO

REGISTRATION No.:

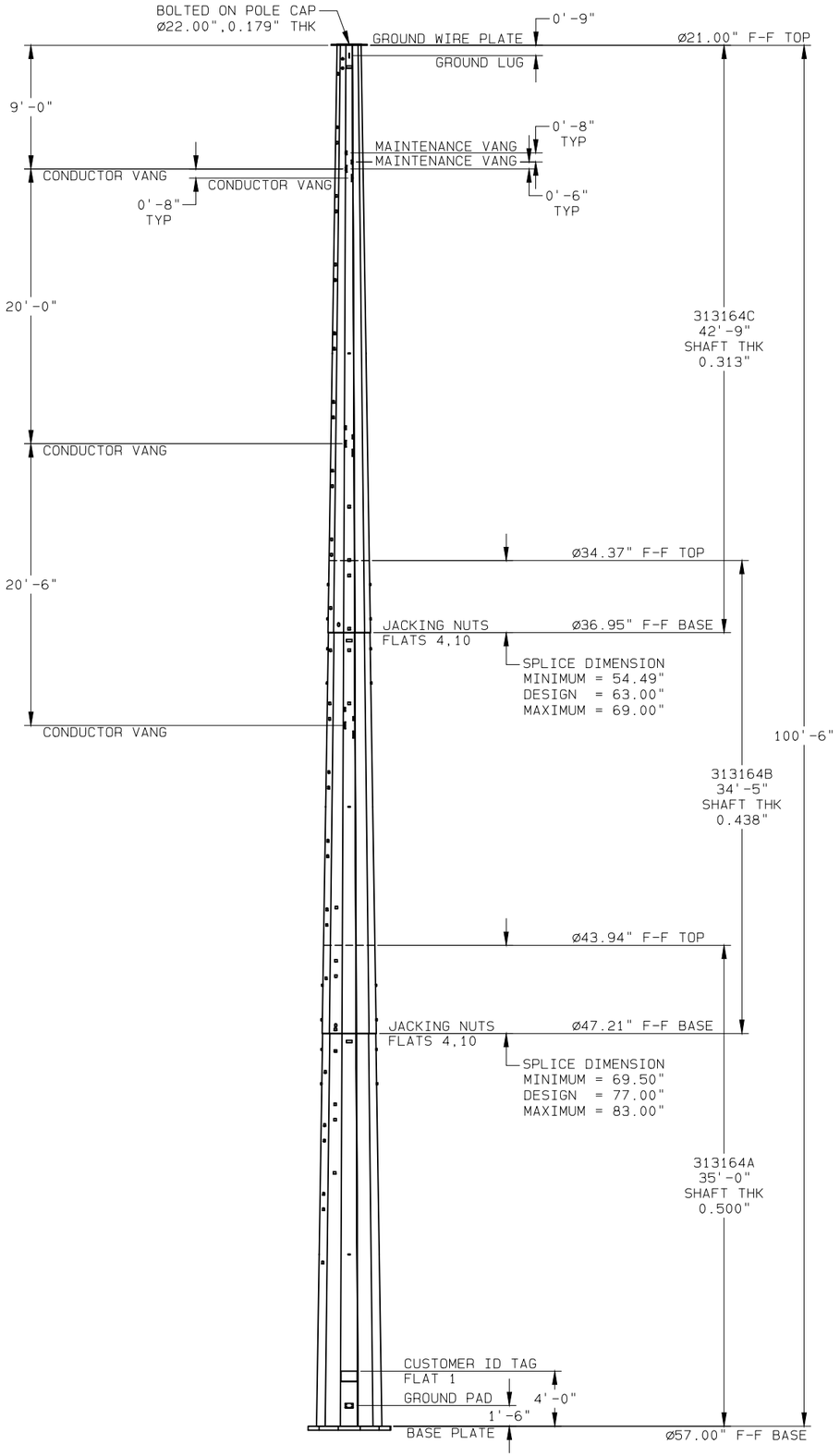
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DRN BY: MJS | DRN DATE: 12/2/2019
APP BY: | APP DATE:

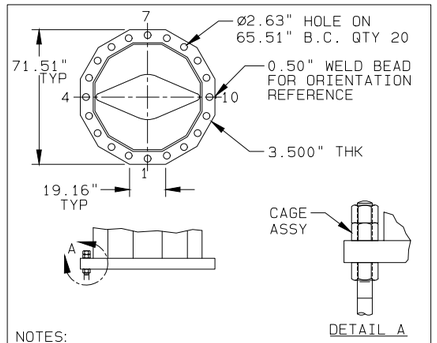
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ROSS - HEPPNER 138KV REBUILD: AULT SW - VIGO STRUCTURE 134
WO: 42690519
3-Pole DE 138kV
Polymer
Curlew/7#8 Alumoweld/OPGW & Drilled Shaft

EQUIP: TLN380:OH155
DWG: 502-4207
SHEET: 1 REV: 0

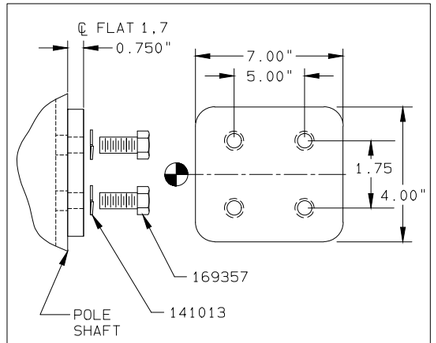
Fabrication Drawings - Valmont





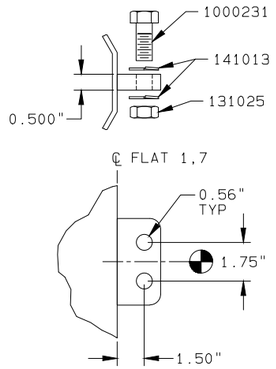
NOTES:
-A MINIMUM OF TWO FULL THREADS IS REQUIRED ABOVE TOP NUT.
-REQUIRED CAGE ASSEMBLY = 1096787

BASE PLATE CONNECTION

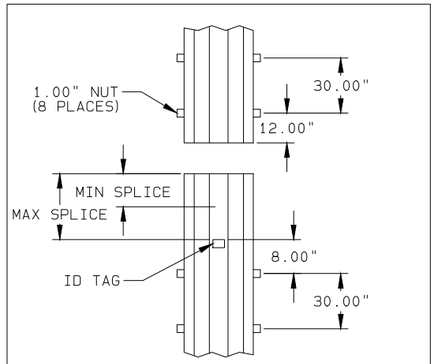


WELDED OVER 0.81" HOLES IN POLE SHAFT.

GROUND PAD



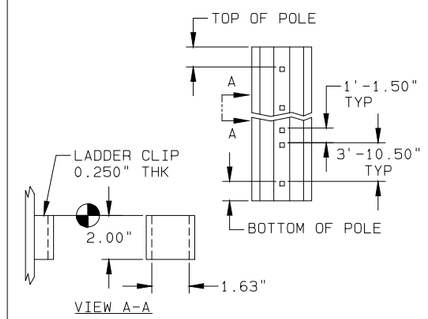
GROUND LUG



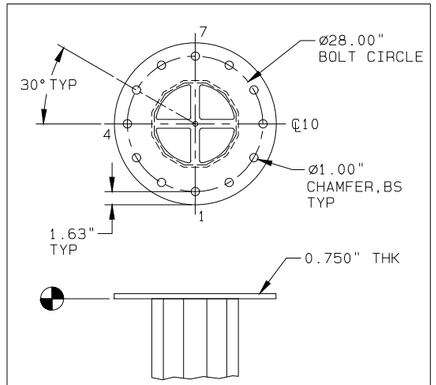
REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION BOTTOM OF POLE
3,9	2'-0.00"	12'-0.00"



CLIMBING



GROUND WIRE PLATE

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   MOMENT = 76,713 IN-KIPS
   SHEAR = 82,929 #
   VERTICAL = 35,420 #
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 35,420#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD BASE PLATE MATERIAL-ASTM A572 GRADE 50.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313164A	SECTION ASSEMBLY	12,969	1
313164B	SECTION ASSEMBLY	6,931	1
313164C	SECTION ASSEMBLY	4,714	1

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	8
1000231	0.50	1.75				HDGV	A307	4
131025			0.50			HDGV	A563	4
141013				0.50	LOCK	HDGV	-	16

ROSS - HEPPNER
AEP DWG: 502-4213 SH.1
100.5' AGH, STR# 89

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

DUPLICATE DRAWING DISTRIBUTION

PED528951100.5'_AGH,_STR_89,_SPDE_502-4_

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	11/30/21	NONE

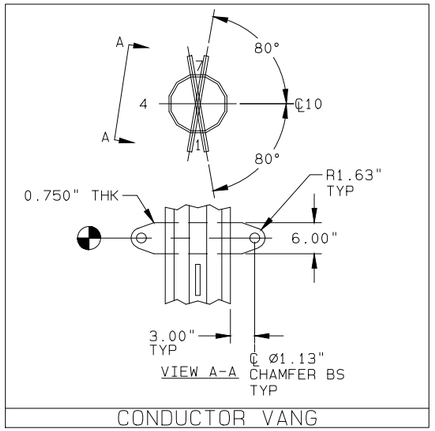
P.A. CHK: JLH11 12/02/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		24,617#

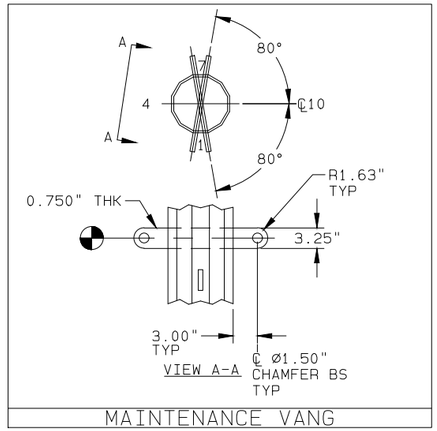
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	100.5' AGH, STR 89, SPDE 502-4	313164Z

valmont



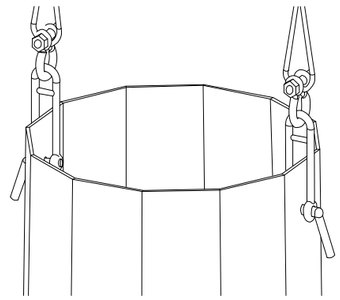
CONDUCTOR VANG



MAINTENANCE VANG

WEIGHT OF LIFT (LBS)	MIN. SHAFT MATERIAL THK. (IN)	MIN. PIN DIAMETER (IN)
<30,000#	0.1875"	1.625"
30,000# TO 60,000#	0.250"	2.25"

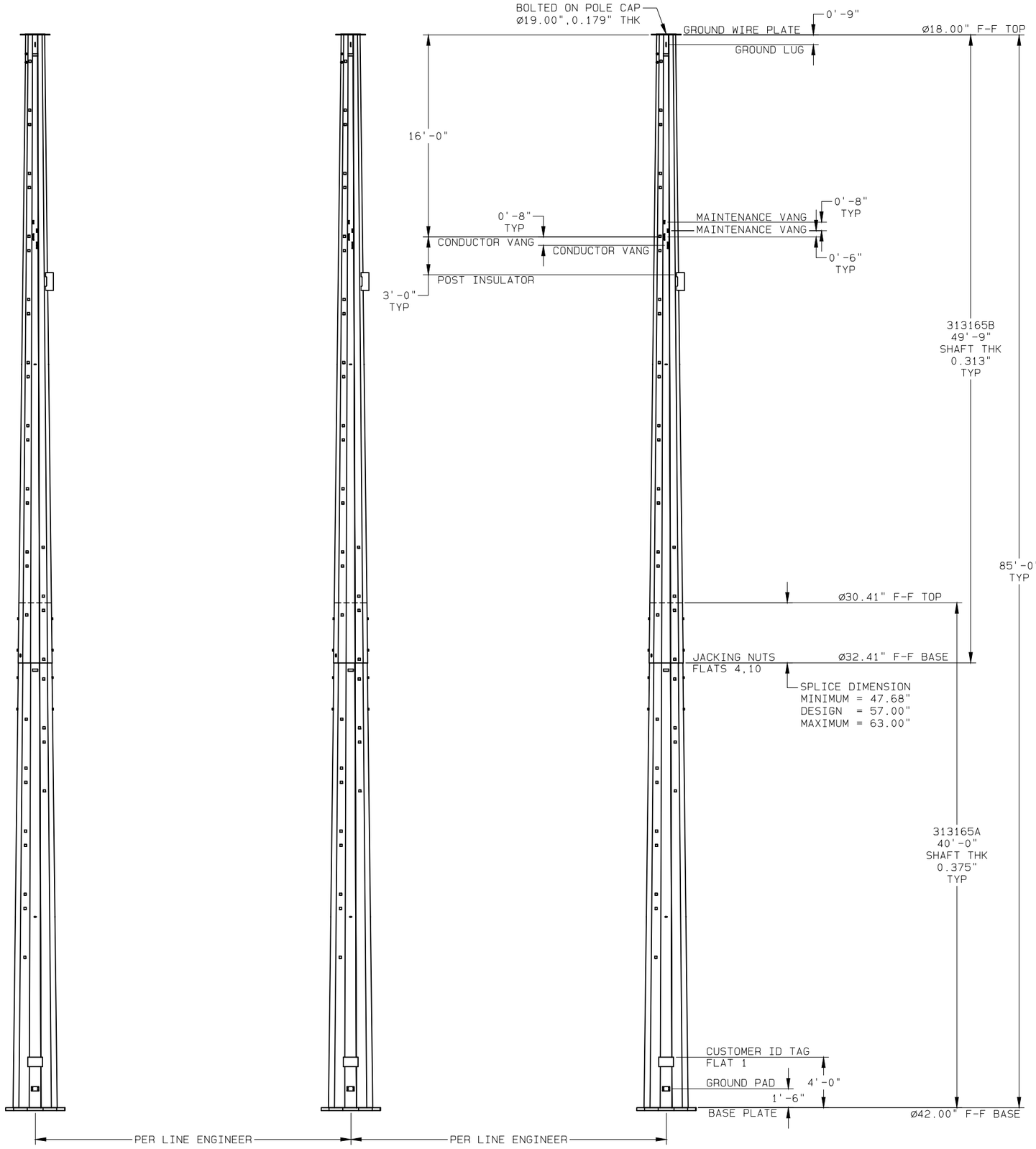
NOTES:
1) TWO POINT LIFT IS REQUIRED - ATTACHMENT POINTS TO BE 180DEG APART. SPREAD BAR REQUIRED.
2) WEIGHT OF LIFT - IF MULTIPLE SECTIONS ARE BEING LIFTED TOGETHER, THE COMBINED WEIGHT OF THE LIFT MUST BE CONSIDERED.
3) CONTRACTOR SHALL ASSURE THAT THE LIFTING SHACKLES FREELY PIVOT. IF SHACKLE BINDS, THE CONTRACTOR SHALL STOP LIFTING OPERATIONS AND READJUST THE SHACKLE TO UNSURE THE PIN DOES NOT PRY AGAINST OR BEND THE POLE SHAFT.
4) POLE FABRICATOR IS NOT RESPONSIBLE FOR CONFIRMATION OF ANY SPECIFIC LIFTING MECHANISM OR METHOD.
5) CARE DURING LIFTING AND POST LIFTING INSPECTIONS FOR LOCALIZED DEFORMATION WILL BE REQUIRED.
6) ALTHOUGH THE CHECKS CONFIRM THAT THERE SHOULD BE NO LOCAL YIELDING OF THE POLE WALL, POLE VENDER IS NOT RESPONSIBLE FOR FIT-UP/SLIP JOINT ISSUES DUE DAMAGE/LOCAL DEFORMATIONS DUE TO LIFTING.



AEP LIFTING REQUIREMENTS WHEN UTILIZING GALVANIZING HOLES

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	100.5' AGH, STR 89, SPDE 502-4	313164Z



NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   MOMENT = 31,306 IN-KIPS
   SHEAR = 35,425 #
   VERTICAL = 18,360 #

2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).

4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#

5. GALVANIZED PER ASTM A123.

6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD
   BASE PLATE MATERIAL-ASTM A572 GRADE 50.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313165A	SECTION ASSEMBLY	7,492	3
313165B	SECTION ASSEMBLY	4,629	3

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	24
1000231	0.50	1.75				HDGV	A307	12
131025			0.50			HDGV	A563	12
141013				0.50	LOCK	HDGV	-	48
1003198	0.75	2.50				HDGV	A325	12
343031			0.75		DH,LOCK	HDGV	A563	12
141390				0.75	CS,FLAT	HDGV	F436	24

ROSS - HEPPNER
AEP DWG: 502-4204 SH.1
85' AGH, STR# 104

DUPLICATE DRAWING DISTRIBUTION

PED52895185'_AGH,_STR_104,_3PDE_502-4___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

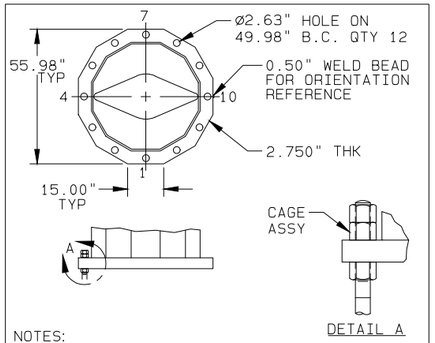
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	12/01/21	NONE

P.A. CHK: JLH11 12/02/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT 36,382#

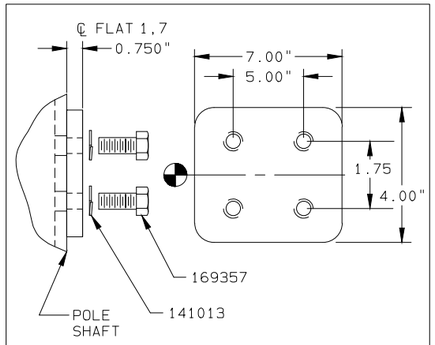
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 104, 3PDE 502-4	313165Z



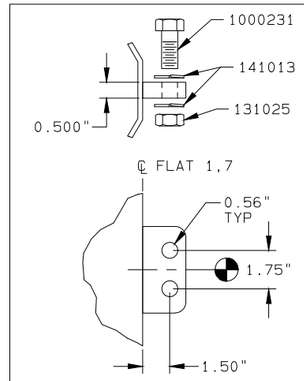
NOTES:
-A MINIMUM OF TWO FULL THREADS IS REQUIRED ABOVE TOP NUT.
-REQUIRED CAGE ASSEMBLY = 1096788

BASE PLATE CONNECTION

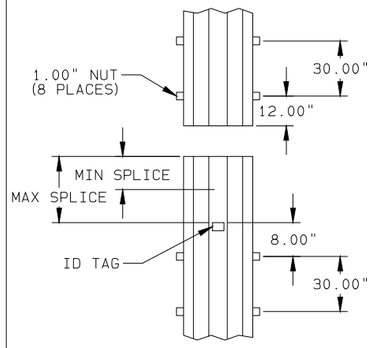


WELDED OVER 0.81" HOLES IN POLE SHAFT.

GROUND PAD



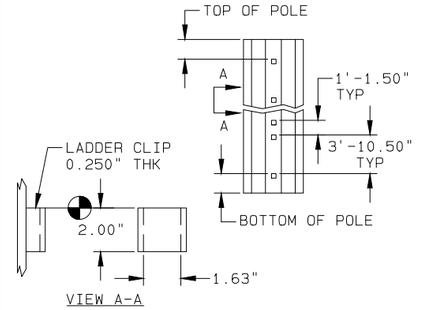
GROUND LUG



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

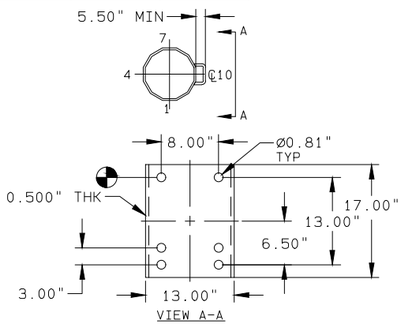
SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION BOTTOM OF POLE
2,8	2'-0.00"	12'-0.00"



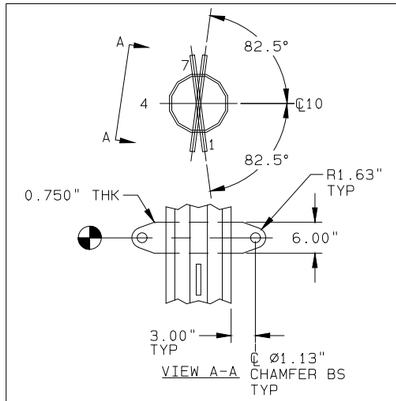
CLIMBING

BOLT #	NUT #	WASHER #
1003198	343031	141390

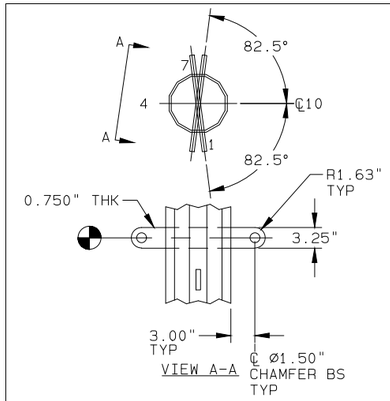


BOLT QTY/CONNECTION 4
1 NUT/BOLT, 2 WASHERS/BOLT

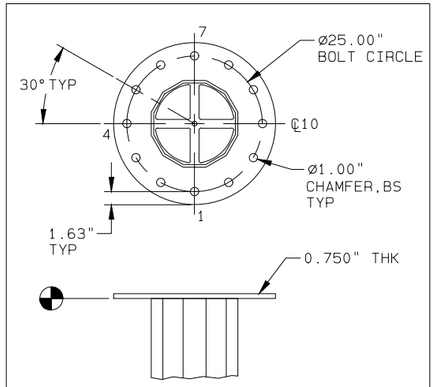
POST INSULATOR BRACKET



CONDUCTOR VANG



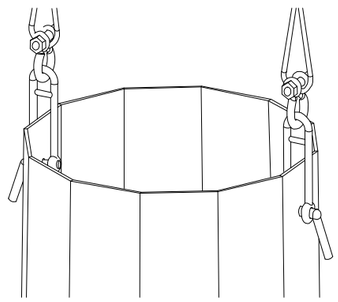
MAINTENANCE VANG



GROUND WIRE PLATE

WEIGHT OF LIFT (LBS)	MIN. SHAFT MATERIAL THK. (IN)	MIN. PIN DIAMETER (IN)
<30,000#	0.1875"	1.625"
30,000# TO 60,000#	0.250"	2.25"

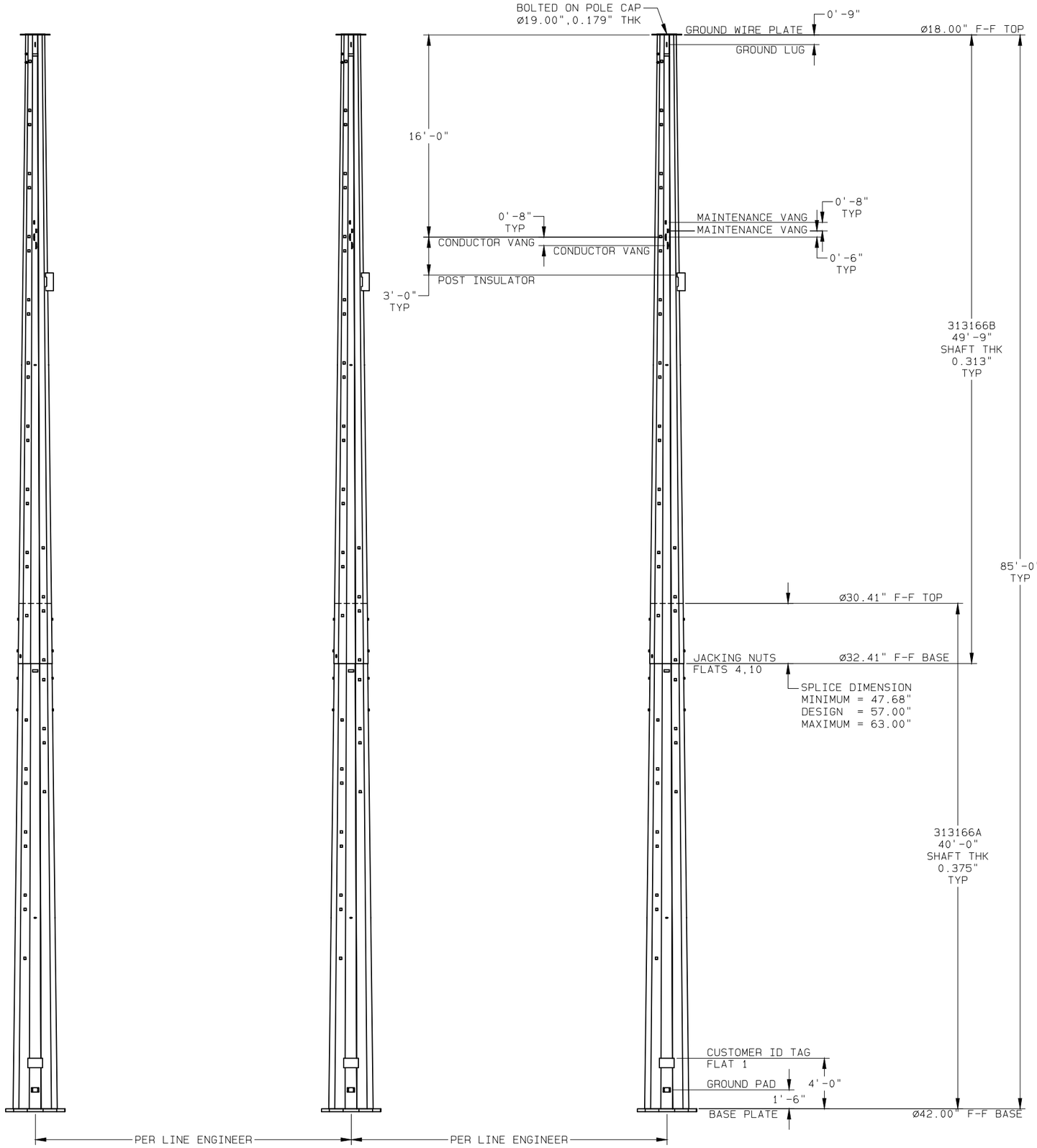
NOTES:
1) TWO POINT LIFT IS REQUIRED - ATTACHMENT POINTS TO BE 180DEG APART. SPREAD BAR REQUIRED.
2) WEIGHT OF LIFT - IF MULTIPLE SECTIONS ARE BEING LIFTED TOGETHER, THE COMBINED WEIGHT OF THE LIFT MUST BE CONSIDERED.
3) CONTRACTOR SHALL ASSURE THAT THE LIFTING SHACKLES FREELY PIVOT. IF SHACKLE BINDS, THE CONTRACTOR SHALL STOP LIFTING OPERATIONS AND READJUST THE SHACKLE TO UNSURE THE PIN DOES NOT PRY AGAINST OR BEND THE POLE SHAFT.
4) POLE FABRICATOR IS NOT RESPONSIBLE FOR CONFIRMATION OF ANY SPECIFIC LIFTING MECHANISM OR METHOD.
5) CARE DURING LIFTING AND POST LIFTING INSPECTIONS FOR LOCALIZED DEFORMATION WILL BE REQUIRED.
6) ALTHOUGH THE CHECKS CONFIRM THAT THERE SHOULD BE NO LOCAL YIELDING OF THE POLE WALL, POLE VENDER IS NOT RESPONSIBLE FOR FIT-UP/SLIP JOINT ISSUES DUE DAMAGE/LOCAL DEFORMATIONS DUE TO LIFTING.



AEP LIFTING REQUIREMENTS WHEN UTILIZING GALVANIZING HOLES

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 104, 3PDE 502-4	313165Z



NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   MOMENT = 31,305 IN-KIPS
   SHEAR = 35,425 #
   VERTICAL = 18,360 #

2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).

4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#

5. GALVANIZED PER ASTM A123.

6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD
   BASE PLATE MATERIAL-ASTM A572 GRADE 50.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313166A	SECTION ASSEMBLY	7,492	3
313166B	SECTION ASSEMBLY	4,622	3

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	24
1000231	0.50	1.75				HDGV	A307	12
131025			0.50			HDGV	A563	12
141013				0.50	LOCK	HDGV	-	48
1003198	0.75	2.50				HDGV	A325	12
343031			0.75		DH,LOCK	HDGV	A563	12
141390				0.75	CS,FLAT	HDGV	F436	24

ROSS - HEPPNER
AEP DWG: 502-4204 SH.1
85' AGH, STR# 112

DUPLICATE DRAWING DISTRIBUTION

PED52895185'_AGH,_STR_112,_3PDE_502-4___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

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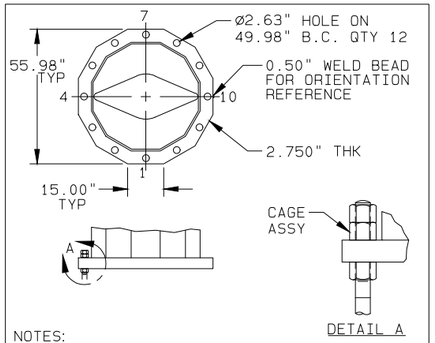
DRAWN	ENGR	DATE	SCALE
JLH11	JS70	12/01/21	NONE

P.A. CHK: JLH11 12/02/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		36,361#

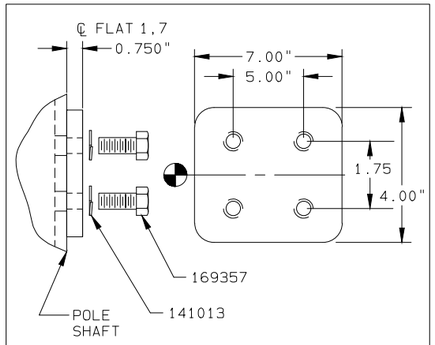
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 112, 3PDE 502-4	313166Z



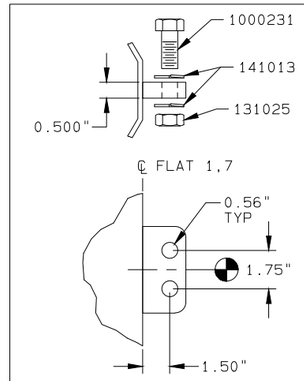
NOTES:
-A MINIMUM OF TWO FULL THREADS IS REQUIRED ABOVE TOP NUT.
-REQUIRED CAGE ASSEMBLY = 1096789

BASE PLATE CONNECTION

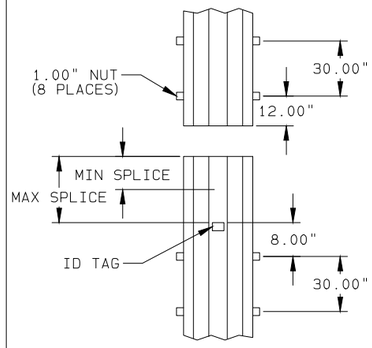


WELDED OVER 0.81" HOLES IN POLE SHAFT.

GROUND PAD



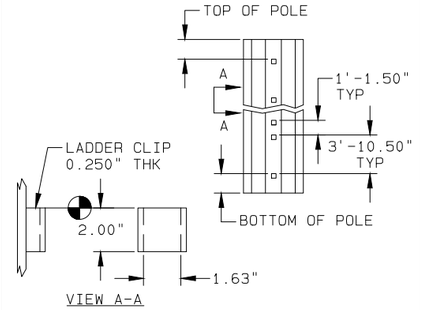
GROUND LUG



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

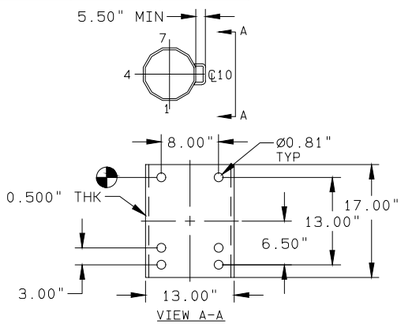
CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION BOTTOM OF POLE
2,8	2'-0.00"	12'-0.00"



VIEW A-A

CLIMBING

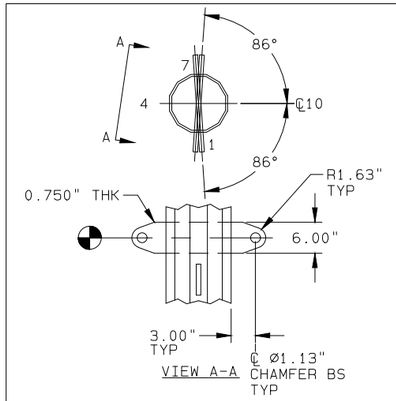
BOLT #	NUT #	WASHER #
1003198	343031	141390



VIEW A-A

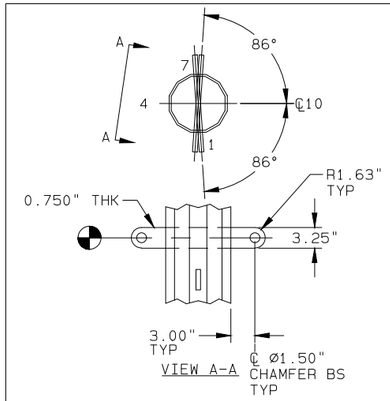
BOLT QTY/CONNECTION 4
1 NUT/BOLT, 2 WASHERS/BOLT

POST INSULATOR BRACKET



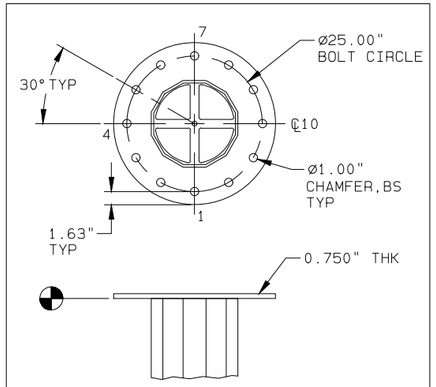
VIEW A-A

CONDUCTOR VANG



VIEW A-A

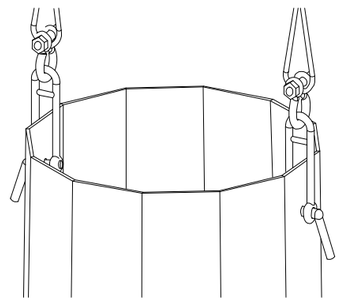
MAINTENANCE VANG



GROUND WIRE PLATE

WEIGHT OF LIFT (LBS)	MIN. SHAFT MATERIAL THK. (IN)	MIN. PIN DIAMETER (IN)
<30,000#	0.1875"	1.625"
30,000# TO 60,000#	0.250"	2.25"

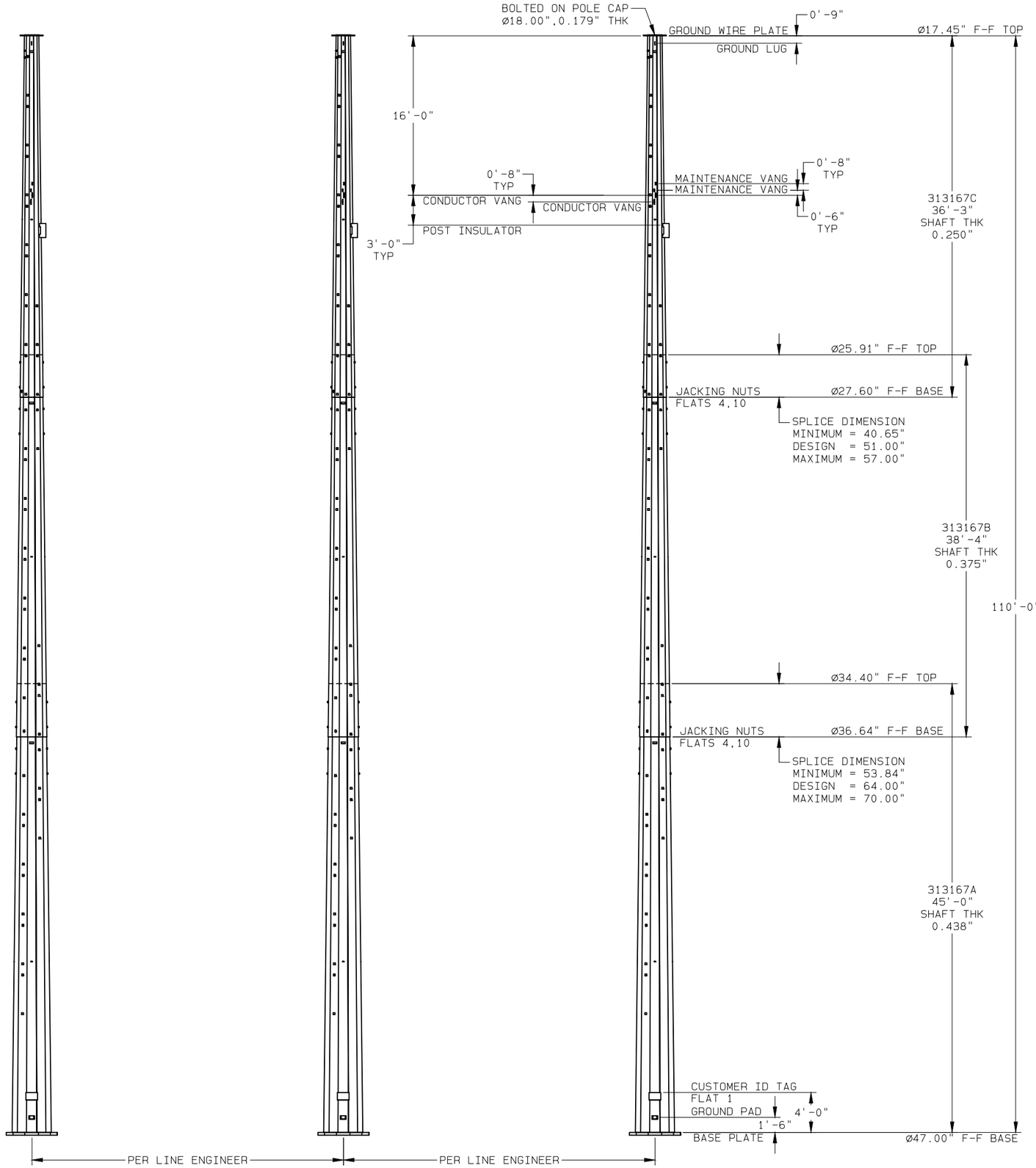
NOTES:
1) TWO POINT LIFT IS REQUIRED - ATTACHMENT POINTS TO BE 180DEG APART. SPREAD BAR REQUIRED.
2) WEIGHT OF LIFT - IF MULTIPLE SECTIONS ARE BEING LIFTED TOGETHER, THE COMBINED WEIGHT OF THE LIFT MUST BE CONSIDERED.
3) CONTRACTOR SHALL ASSURE THAT THE LIFTING SHACKLES FREELY PIVOT. IF SHACKLE BINDS, THE CONTRACTOR SHALL STOP LIFTING OPERATIONS AND READJUST THE SHACKLE TO UNSURE THE PIN DOES NOT PRY AGAINST OR BEND THE POLE SHAFT.
4) POLE FABRICATOR IS NOT RESPONSIBLE FOR CONFIRMATION OF ANY SPECIFIC LIFTING MECHANISM OR METHOD.
5) CARE DURING LIFTING AND POST LIFTING INSPECTIONS FOR LOCALIZED DEFORMATION WILL BE REQUIRED.
6) ALTHOUGH THE CHECKS CONFIRM THAT THERE SHOULD BE NO LOCAL YIELDING OF THE POLE WALL, POLE VENDER IS NOT RESPONSIBLE FOR FIT-UP/SLIP JOINT ISSUES DUE DAMAGE/LOCAL DEFORMATIONS DUE TO LIFTING.



AEP LIFTING REQUIREMENTS WHEN UTILIZING GALVANIZING HOLES

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 112, 3PDE 502-4	313166Z



NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   MOMENT = 25,131 IN-KIPS
   SHEAR = 23,486 #
   VERTICAL = 23,762 #

2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).

4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#

5. GALVANIZED PER ASTM A123.

6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD
   BASE PLATE MATERIAL-ASTM A572 GRADE 50.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313167A	SECTION ASSEMBLY	10,949	3
313167B	SECTION ASSEMBLY	4,930	3
313167C	SECTION ASSEMBLY	2,576	3

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	24
1000231	0.50	1.75				HDGV	A307	12
131025			0.50			HDGV	A563	12
141013				0.50	LOCK	HDGV	-	48
1003198	0.75	2.50				HDGV	A325	12
343031			0.75		DH,LOCK	HDGV	A563	12
141390				0.75	CS,FLAT	HDGV	F436	24

ROSS - HEPPNER
AEP DWG: 502-5525 SH.1
110' AGH, STR# 113

DUPLICATE DRAWING DISTRIBUTION

PED528951110'_AGH,_STR_#_113_TRI-POLE___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

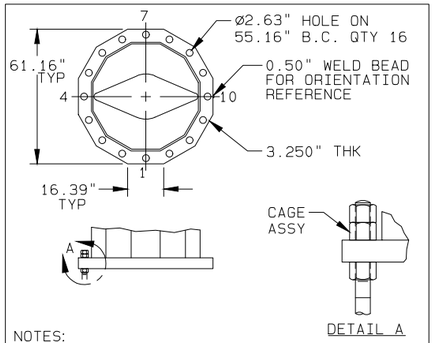
DRAWN	ENGR	DATE	SCALE
JLH11	JS70	12/02/21	NONE

P.A. CHK: JLH11 12/02/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		55,384#

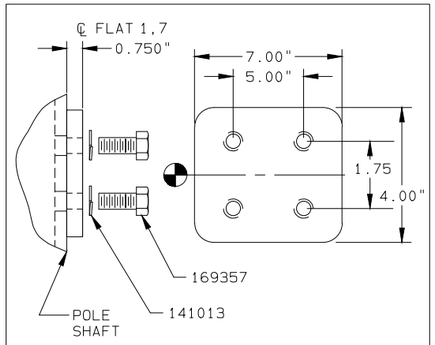
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	110' AGH, STR # 113 TRI-POLE	313167Z



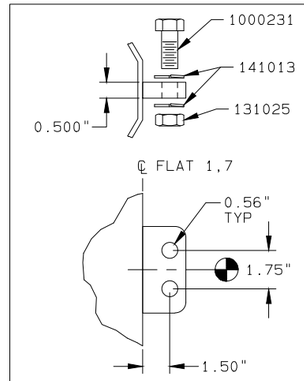
NOTES:
-A MINIMUM OF TWO FULL THREADS IS REQUIRED ABOVE TOP NUT.
-REQUIRED CAGE ASSEMBLY = 1096791

BASE PLATE CONNECTION

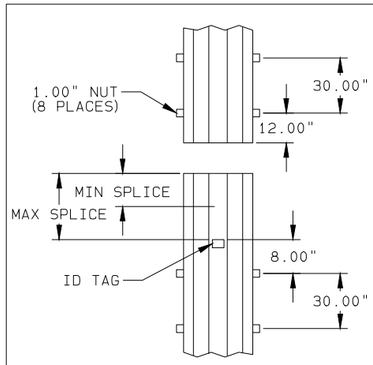


WELDED OVER 0.81" HOLES IN POLE SHAFT.

GROUND PAD



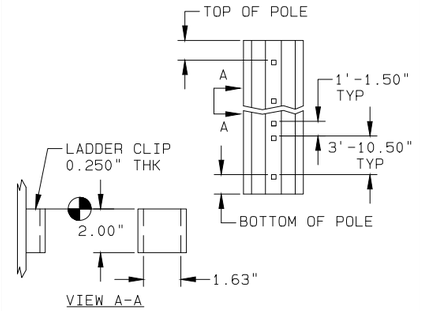
GROUND LUG



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

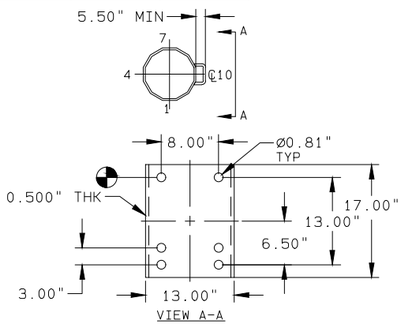
SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION BOTTOM OF POLE
2,8	2'-0.00"	12'-0.00"



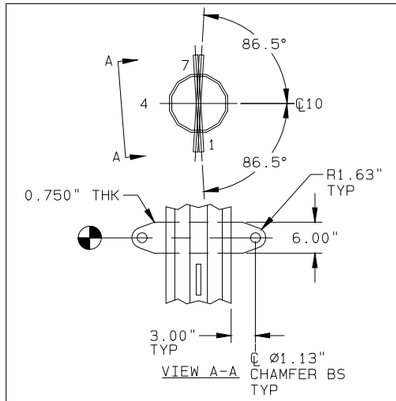
CLIMBING

BOLT #	NUT #	WASHER #
1003198	343031	141390

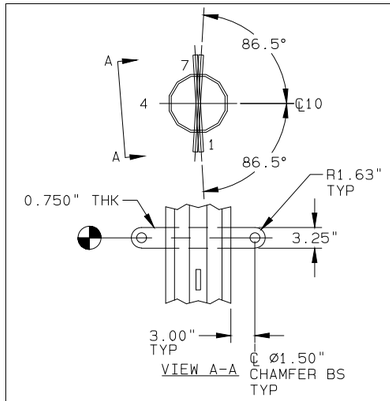


BOLT QTY/CONNECTION 4
1 NUT/BOLT, 2 WASHERS/BOLT

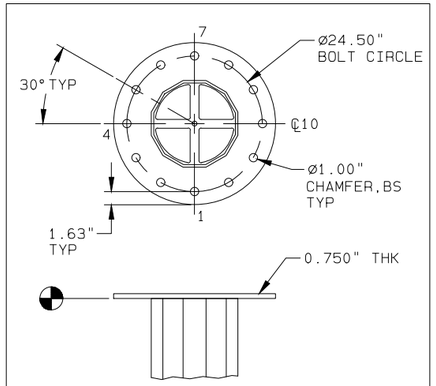
POST INSULATOR BRACKET



CONDUCTOR VANG



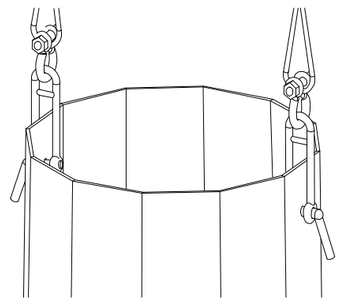
MAINTENANCE VANG



GROUND WIRE PLATE

WEIGHT OF LIFT (LBS)	MIN. SHAFT MATERIAL THK. (IN)	MIN. PIN DIAMETER (IN)
<30,000#	0.1875"	1.625"
30,000# TO 60,000#	0.250"	2.25"

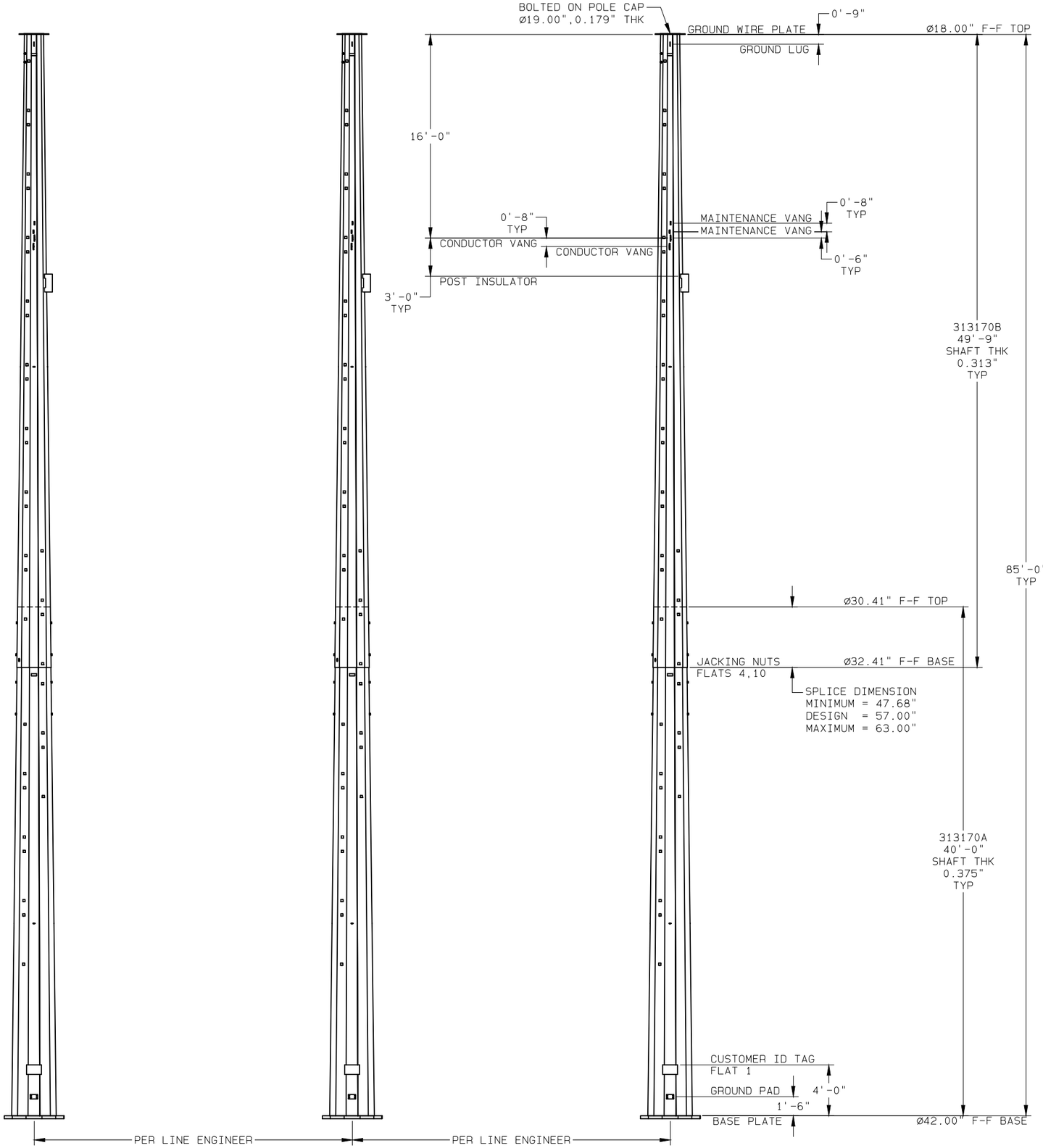
NOTES:
1) TWO POINT LIFT IS REQUIRED - ATTACHMENT POINTS TO BE 180DEG APART. SPREAD BAR REQUIRED.
2) WEIGHT OF LIFT - IF MULTIPLE SECTIONS ARE BEING LIFTED TOGETHER, THE COMBINED WEIGHT OF THE LIFT MUST BE CONSIDERED.
3) CONTRACTOR SHALL ASSURE THAT THE LIFTING SHACKLES FREELY PIVOT. IF SHACKLE BINDS, THE CONTRACTOR SHALL STOP LIFTING OPERATIONS AND READJUST THE SHACKLE TO UNSURE THE PIN DOES NOT PRY AGAINST OR BEND THE POLE SHAFT.
4) POLE FABRICATOR IS NOT RESPONSIBLE FOR CONFIRMATION OF ANY SPECIFIC LIFTING MECHANISM OR METHOD.
5) CARE DURING LIFTING AND POST LIFTING INSPECTIONS FOR LOCALIZED DEFORMATION WILL BE REQUIRED.
6) ALTHOUGH THE CHECKS CONFIRM THAT THERE SHOULD BE NO LOCAL YIELDING OF THE POLE WALL, POLE VENDER IS NOT RESPONSIBLE FOR FIT-UP/SLIP JOINT ISSUES DUE DAMAGE/LOCAL DEFORMATIONS DUE TO LIFTING.



AEP LIFTING REQUIREMENTS WHEN UTILIZING GALVANIZING HOLES

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	110' AGH, STR # 113 TRI-POLE	313167Z



NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   MOMENT = 31,305 IN-KIPS
   SHEAR = 35,425 #
   VERTICAL = 18,360 #

2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).

4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#

5. GALVANIZED PER ASTM A123.

6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD
   BASE PLATE MATERIAL-ASTM A572 GRADE 50.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313170A	SECTION ASSEMBLY	7,492	3
313170B	SECTION ASSEMBLY	4,622	3

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	24
1000231	0.50	1.75				HDGV	A307	12
131025			0.50			HDGV	A563	12
141013				0.50	LOCK	HDGV	-	48
1003198	0.75	2.50				HDGV	A325	12
343031			0.75		DH,LOCK	HDGV	A563	12
141390				0.75	CS,FLAT	HDGV	F436	24

ROSS - HEPPNER
AEP DWG: 502-4204 SH.1
85' AGH, STR# 117 & 133

DUPLICATE DRAWING DISTRIBUTION

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DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

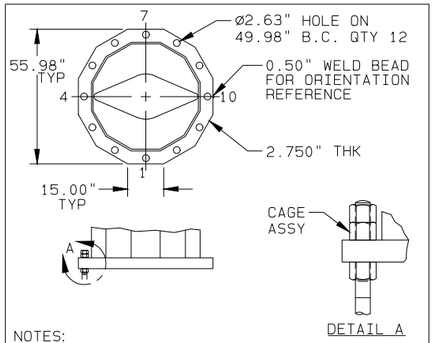
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	12/01/21	NONE

P.A. CHK: JLH11 12/02/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL:
THICKNESS:
WEIGHT: 36,361#

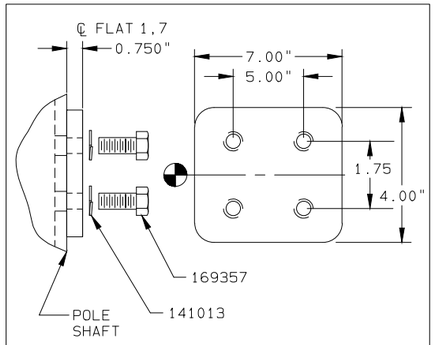
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 117, 133, 3PDE	313170Z



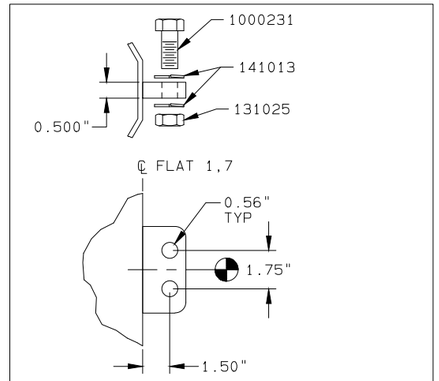
NOTES:
-A MINIMUM OF TWO FULL THREADS IS REQUIRED ABOVE TOP NUT.
-REQUIRED CAGE ASSEMBLY = 1096794

BASE PLATE CONNECTION

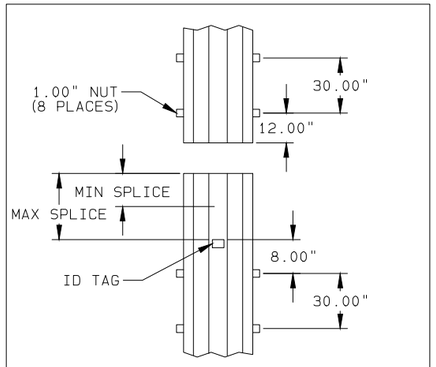


WELDED OVER 0.81" HOLES IN POLE SHAFT.

GROUND PAD



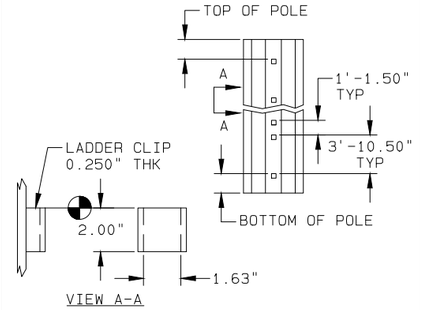
GROUND LUG



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

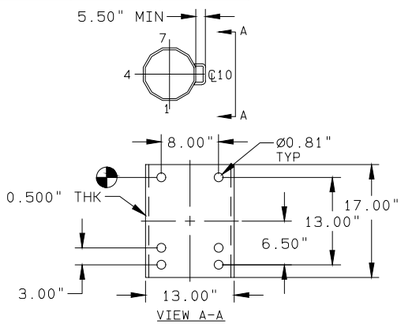
CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION BOTTOM OF POLE
2,8	2'-0.00"	12'-0.00"



VIEW A-A

CLIMBING

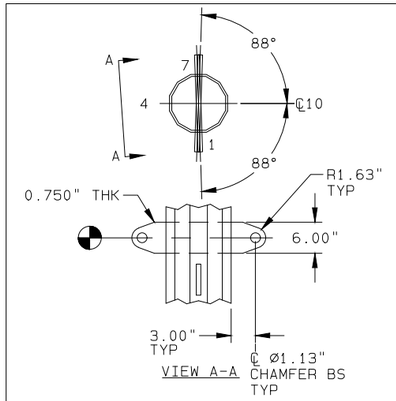
BOLT #	NUT #	WASHER #
1003198	343031	141390



VIEW A-A

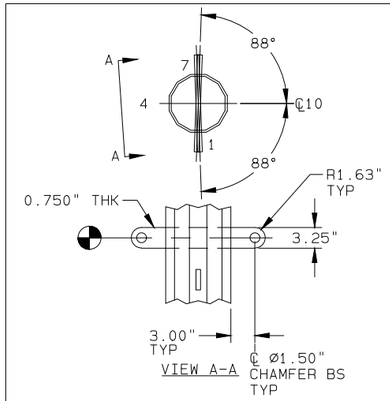
BOLT QTY/CONNECTION 4
1 NUT/BOLT, 2 WASHERS/BOLT

POST INSULATOR BRACKET



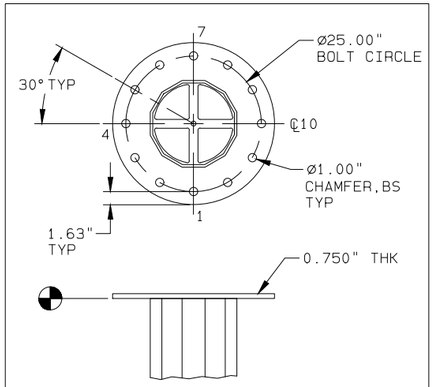
VIEW A-A

CONDUCTOR VANG



VIEW A-A

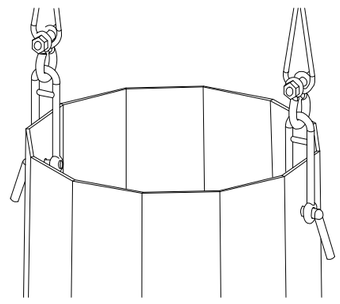
MAINTENANCE VANG



GROUND WIRE PLATE

WEIGHT OF LIFT (LBS)	MIN. SHAFT MATERIAL THK. (IN)	MIN. PIN DIAMETER (IN)
<30,000#	0.1875"	1.625"
30,000# TO 60,000#	0.250"	2.25"

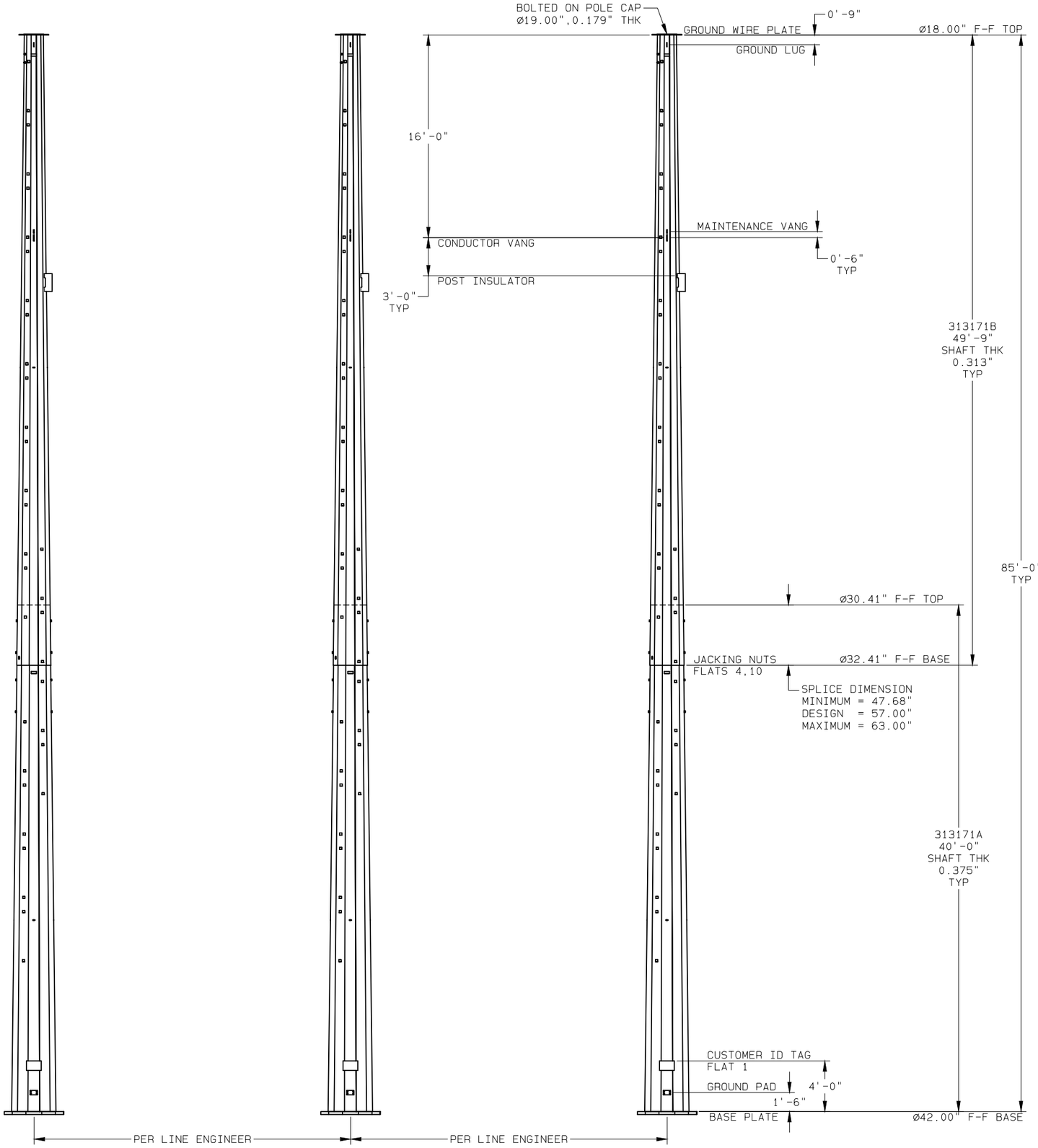
NOTES:
1) TWO POINT LIFT IS REQUIRED - ATTACHMENT POINTS TO BE 180DEG APART. SPREAD BAR REQUIRED.
2) WEIGHT OF LIFT - IF MULTIPLE SECTIONS ARE BEING LIFTED TOGETHER, THE COMBINED WEIGHT OF THE LIFT MUST BE CONSIDERED.
3) CONTRACTOR SHALL ASSURE THAT THE LIFTING SHACKLES FREELY PIVOT. IF SHACKLE BINDS, THE CONTRACTOR SHALL STOP LIFTING OPERATIONS AND READJUST THE SHACKLE TO UNSURE THE PIN DOES NOT PRY AGAINST OR BEND THE POLE SHAFT.
4) POLE FABRICATOR IS NOT RESPONSIBLE FOR CONFIRMATION OF ANY SPECIFIC LIFTING MECHANISM OR METHOD.
5) CARE DURING LIFTING AND POST LIFTING INSPECTIONS FOR LOCALIZED DEFORMATION WILL BE REQUIRED.
6) ALTHOUGH THE CHECKS CONFIRM THAT THERE SHOULD BE NO LOCAL YIELDING OF THE POLE WALL, POLE VENDER IS NOT RESPONSIBLE FOR FIT-UP/SLIP JOINT ISSUES DUE DAMAGE/LOCAL DEFORMATIONS DUE TO LIFTING.



AEP LIFTING REQUIREMENTS WHEN UTILIZING GALVANIZING HOLES

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 117, 133, 3PDE	313170Z



NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   MOMENT = 31,306 IN-KIPS
   SHEAR = 35,425 #
   VERTICAL = 18,360 #

2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).

4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#

5. GALVANIZED PER ASTM A123.

6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD
   BASE PLATE MATERIAL-ASTM A572 GRADE 50.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313171A	SECTION ASSEMBLY	7,492	3
313171B	SECTION ASSEMBLY	4,560	3

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	24
1000231	0.50	1.75				HDGV	A307	12
131025			0.50			HDGV	A563	12
141013				0.50	LOCK	HDGV	-	48
1003198	0.75	2.50				HDGV	A325	12
343031			0.75		DH,LOCK	HDGV	A563	12
141390				0.75	CS,FLAT	HDGV	F436	24

ROSS - HEPPNER
AEP DWG: 502-4204 SH.1
85' AGH, STR# 125

DUPLICATE DRAWING DISTRIBUTION

PED52895185__AGH,_STR_125,_3PDE_502-4___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

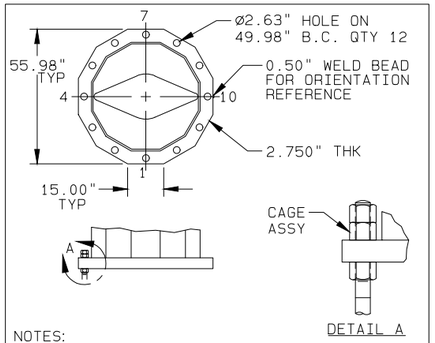
DRAWN	ENGR	DATE	SCALE
JLH11	JS70	12/01/21	NONE

P.A. CHK: JLH11 12/02/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		36,175#

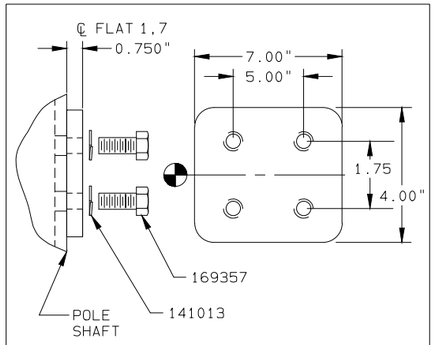
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 125, 3PDE 502-4	313171Z

valmont



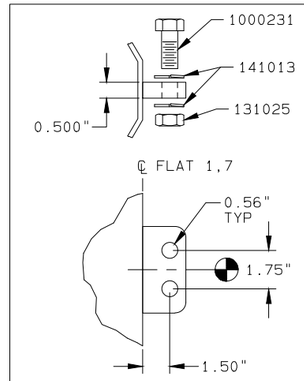
NOTES:
-A MINIMUM OF TWO FULL THREADS IS REQUIRED ABOVE TOP NUT.
-REQUIRED CAGE ASSEMBLY = 1096795

BASE PLATE CONNECTION

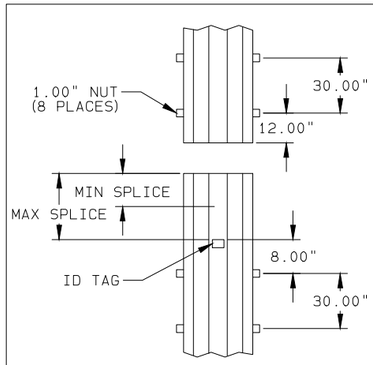


WELDED OVER 0.81" HOLES IN POLE SHAFT.

GROUND PAD



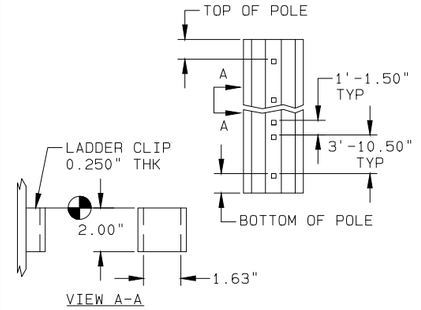
GROUND LUG



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

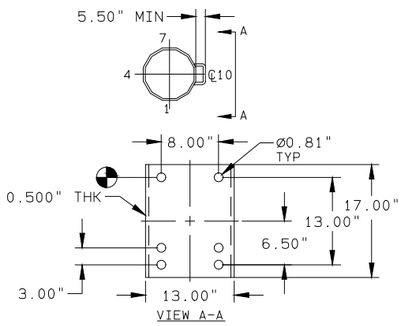
SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION BOTTOM OF POLE
2,8	2'-0.00"	12'-0.00"



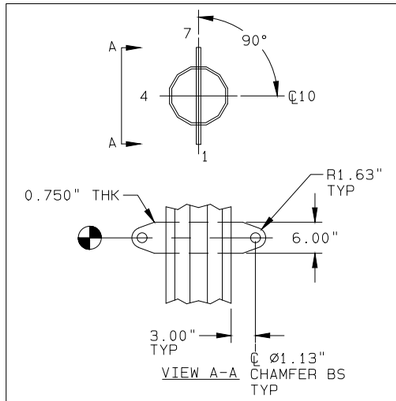
CLIMBING

BOLT #	NUT #	WASHER #
1003198	343031	141390

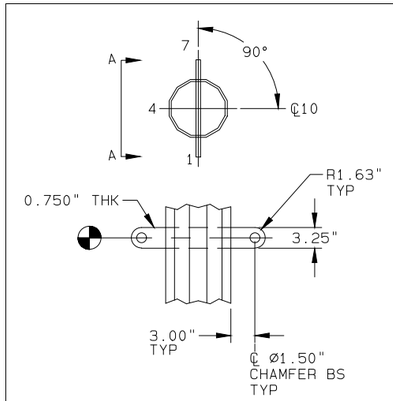


BOLT QTY/CONNECTION 4
1 NUT/BOLT, 2 WASHERS/BOLT

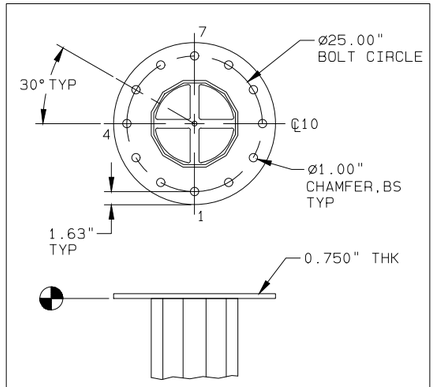
POST INSULATOR BRACKET



CONDUCTOR VANG



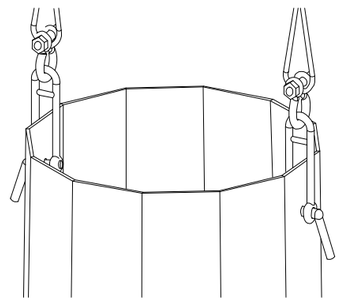
MAINTENANCE VANG



GROUND WIRE PLATE

WEIGHT OF LIFT (LBS)	MIN. SHAFT MATERIAL THK. (IN)	MIN. PIN DIAMETER (IN)
<30,000#	0.1875"	1.625"
30,000# TO 60,000#	0.250"	2.25"

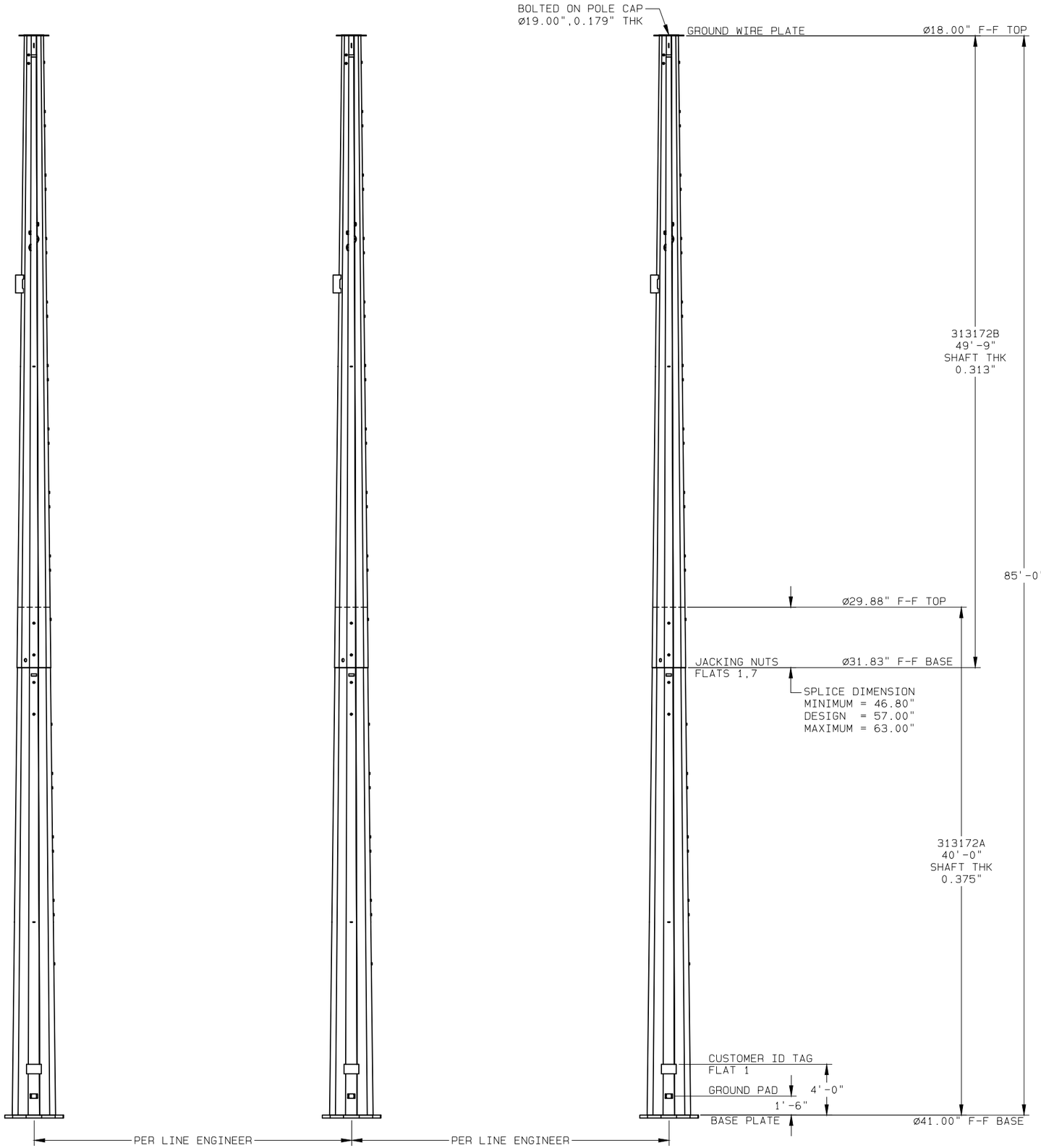
NOTES:
1) TWO POINT LIFT IS REQUIRED - ATTACHMENT POINTS TO BE 180DEG APART. SPREAD BAR REQUIRED.
2) WEIGHT OF LIFT - IF MULTIPLE SECTIONS ARE BEING LIFTED TOGETHER, THE COMBINED WEIGHT OF THE LIFT MUST BE CONSIDERED.
3) CONTRACTOR SHALL ASSURE THAT THE LIFTING SHACKLES FREELY PIVOT. IF SHACKLE BINDS, THE CONTRACTOR SHALL STOP LIFTING OPERATIONS AND READJUST THE SHACKLE TO UNSURE THE PIN DOES NOT PRY AGAINST OR BEND THE POLE SHAFT.
4) POLE FABRICATOR IS NOT RESPONSIBLE FOR CONFIRMATION OF ANY SPECIFIC LIFTING MECHANISM OR METHOD.
5) CARE DURING LIFTING AND POST LIFTING INSPECTIONS FOR LOCALIZED DEFORMATION WILL BE REQUIRED.
6) ALTHOUGH THE CHECKS CONFIRM THAT THERE SHOULD BE NO LOCAL YIELDING OF THE POLE WALL, POLE VENDER IS NOT RESPONSIBLE FOR FIT-UP/SLIP JOINT ISSUES DUE DAMAGE/LOCAL DEFORMATIONS DUE TO LIFTING.



AEP LIFTING REQUIREMENTS WHEN UTILIZING GALVANIZING HOLES

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 125, 3PDE 502-4	313171Z



NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   MOMENT = 29,907 IN-KIPS
   SHEAR = 34,069 #
   VERTICAL = 17,190 #

2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).

4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#

5. GALVANIZED PER ASTM A123.

6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD
   BASE PLATE MATERIAL-ASTM A572 GRADE 50.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313172A	SECTION ASSEMBLY	7,294	3
313172B	SECTION ASSEMBLY	4,563	3

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)							
	BOLT		NUT	WSHR	GENERAL	FINISH	ASTM SPEC	
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	24
1000231	0.50	1.75				HDGV	A307	12
131025			0.50			HDGV	A563	12
141013				0.50	LOCK	HDGV	-	48
1003198	0.75	2.50				HDGV	A325	12
343031			0.75		DH,LOCK	HDGV	A563	12
141390				0.75	CS,FLAT	HDGV	F436	24

ROSS - HEPPNER
AEP DWG: 502-4207 SH.1
85' AGH, STR# 134

DUPLICATE DRAWING DISTRIBUTION

PED52895185__AGH,_STR_134,_3PDE_502-4___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

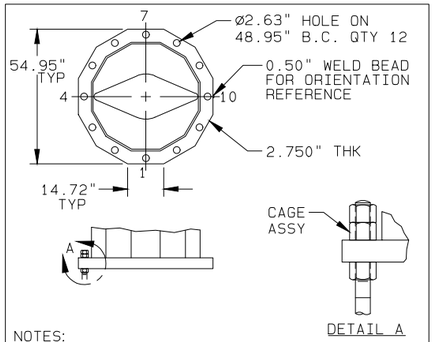
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	12/02/21	NONE

P.A. CHK: JLH11 12/02/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT: 35,590#

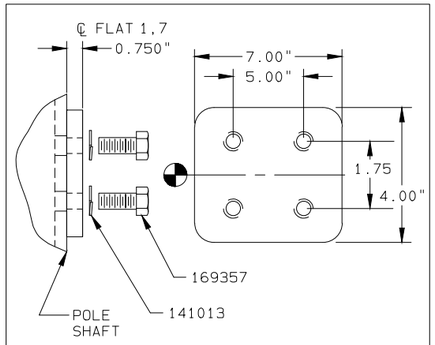
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 134, 3PDE 502-4	313172Z



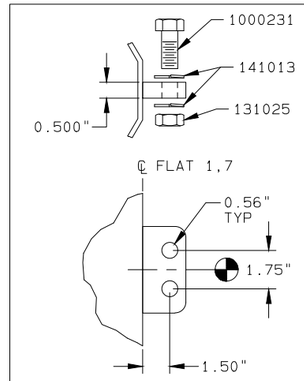
NOTES:
-A MINIMUM OF TWO FULL THREADS IS REQUIRED ABOVE TOP NUT.
-REQUIRED CAGE ASSEMBLY = 1096796

BASE PLATE CONNECTION

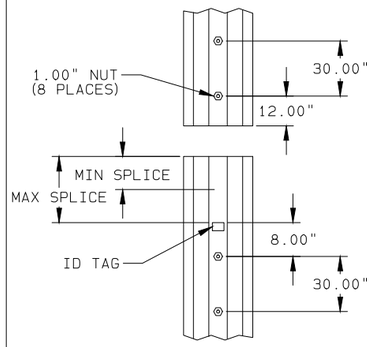


WELDED OVER 0.81" HOLES IN POLE SHAFT.

GROUND PAD



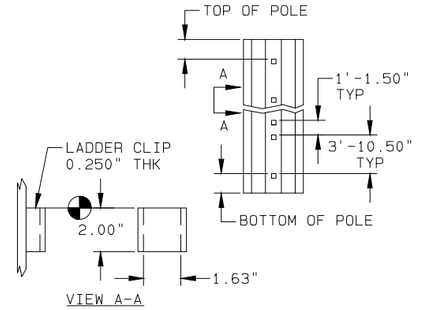
GROUND LUG



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

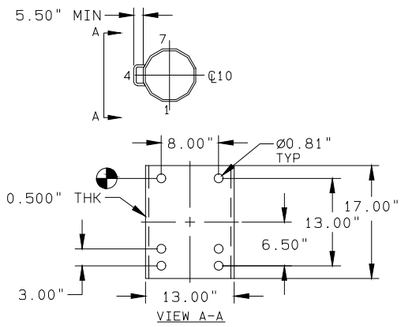
SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION BOTTOM OF POLE
10	2'-0.00"	12'-0.00"



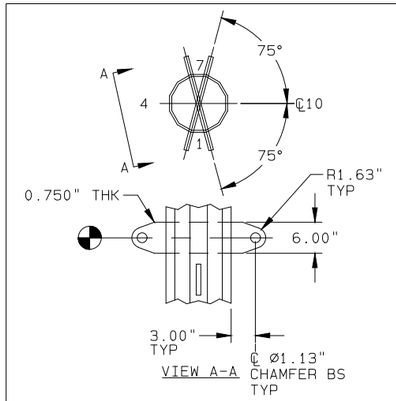
CLIMBING

BOLT #	NUT #	WASHER #
1003198	343031	141390

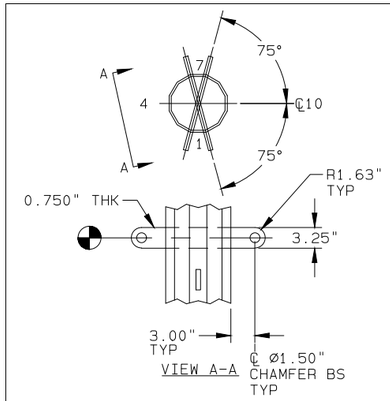


BOLT QTY/CONNECTION 4
1 NUT/BOLT, 2 WASHERS/BOLT

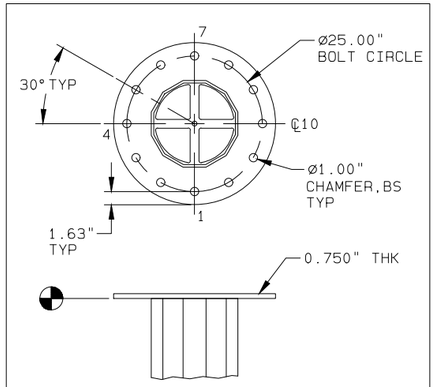
POST INSULATOR BRACKET



CONDUCTOR VANG



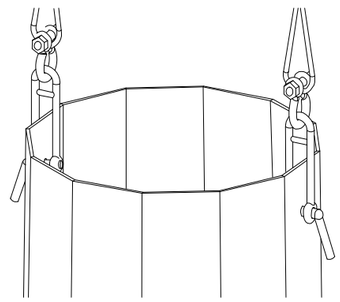
MAINTENANCE VANG



GROUND WIRE PLATE

WEIGHT OF LIFT (LBS)	MIN. SHAFT MATERIAL THK. (IN)	MIN. PIN DIAMETER (IN)
<30,000#	0.1875"	1.625"
30,000# TO 60,000#	0.250"	2.25"

NOTES:
1) TWO POINT LIFT IS REQUIRED - ATTACHMENT POINTS TO BE 180DEG APART. SPREAD BAR REQUIRED.
2) WEIGHT OF LIFT - IF MULTIPLE SECTIONS ARE BEING LIFTED TOGETHER, THE COMBINED WEIGHT OF THE LIFT MUST BE CONSIDERED.
3) CONTRACTOR SHALL ASSURE THAT THE LIFTING SHACKLES FREELY PIVOT. IF SHACKLE BINDS, THE CONTRACTOR SHALL STOP LIFTING OPERATIONS AND READJUST THE SHACKLE TO UNSURE THE PIN DOES NOT PRY AGAINST OR BEND THE POLE SHAFT.
4) POLE FABRICATOR IS NOT RESPONSIBLE FOR CONFIRMATION OF ANY SPECIFIC LIFTING MECHANISM OR METHOD.
5) CARE DURING LIFTING AND POST LIFTING INSPECTIONS FOR LOCALIZED DEFORMATION WILL BE REQUIRED.
6) ALTHOUGH THE CHECKS CONFIRM THAT THERE SHOULD BE NO LOCAL YIELDING OF THE POLE WALL, POLE VENDER IS NOT RESPONSIBLE FOR FIT-UP/SLIP JOINT ISSUES DUE DAMAGE/LOCAL DEFORMATIONS DUE TO LIFTING.



AEP LIFTING REQUIREMENTS WHEN UTILIZING GALVANIZING HOLES

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	85' AGH, STR 134, 3PDE 502-4	313172Z

Section 7. Wood or Pre-Engineered Poles

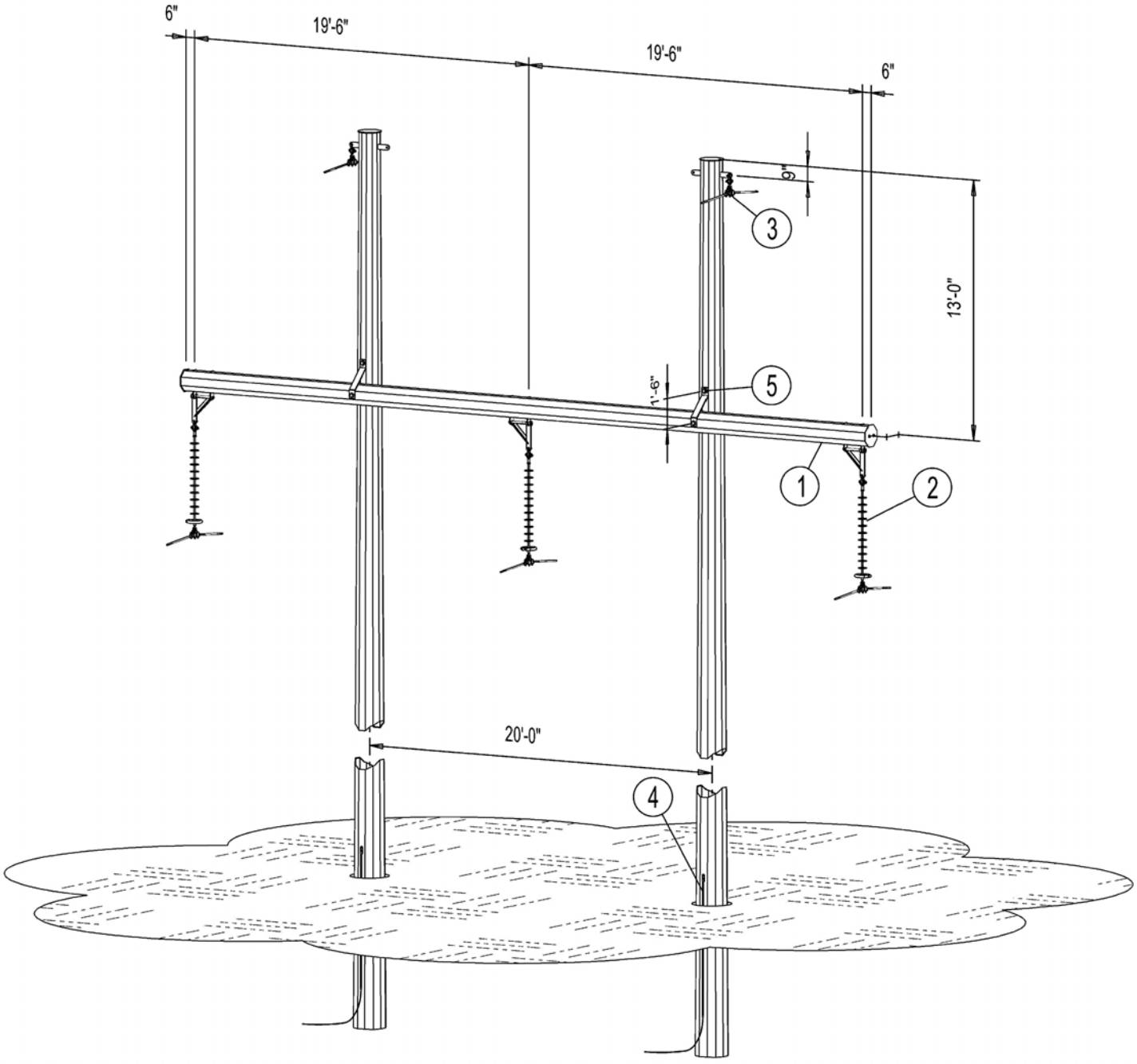
A. AEP Assembly Drawings

B. Vendor Drawings

C. Jacking Instructions

REF. DRAWINGS

ITEM	QTY.	ASSEMBLY	DESCRIPTION	
1	1	74E0-1272	ALL HEAVY SUSPENSION CROSSARM 40 FT - CONCRETE OR STEEL H-FRAME - GALVANIZED	
2	3	11B6-2722	138KV SUSPENSION INSULATOR, POLYMER, 25K, W/CORONA RING	
3	2	30T0-1102	OHGW, SUSPENSION, CONCRETE, STEEL OR WOOD POLE	
4	2	21SE-1456	GROUND ROD FOR DIRECT EMBEDDED STEEL POLE	
5	2	71A0-1971	A449 1IN - HIGH STRENGTH DOUBLE ARMING BOLT, CONCRETE OR STEEL	



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REV	DESCRIPTION	BY	DATE
1	REVISED BILL OF MATERIAL	McP	04/30/15

AEP AMERICAN ELECTRIC POWER

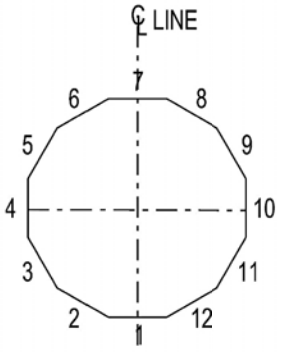
TRANSMISSION LINE STANDARDS

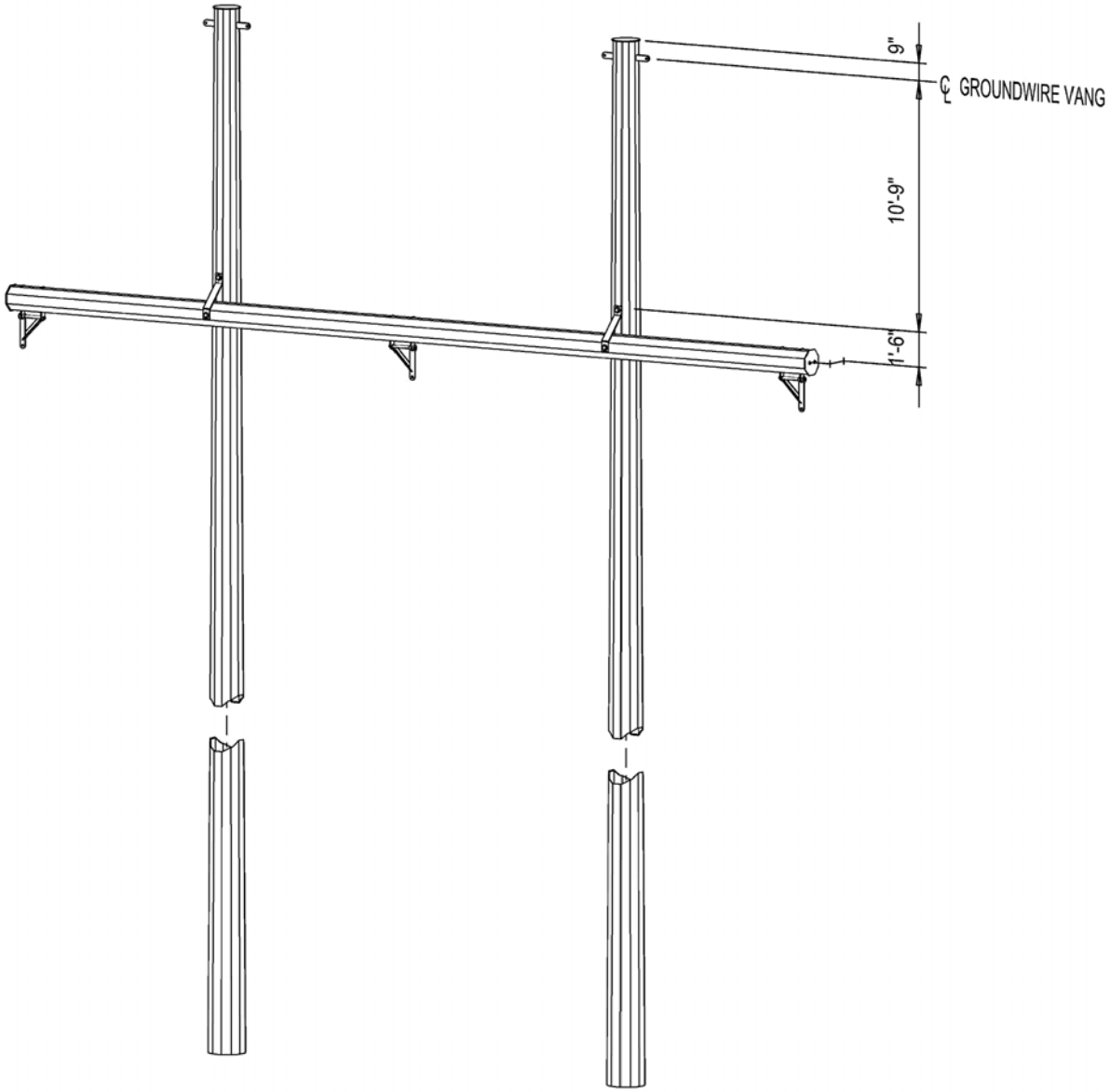
POLYMER - 138KV HEAVY SUSPENSION W/CORONA RING, H-FRAME, GALVANIZED STEEL

ENGR:	DRAWN: SAS	CHECKED: McP	APPROVED: JCN	DATE: 10/23/12

DRAWING No. CS45-2472 | SHEET No. 1 | REV. No. 1

Archive ID: 905-534





NOTES:

1. ALL HOLES SHALL BE 1 1/16"Ø UNLESS NOTED
2. ALL HOLES ON AXIS "1-7" AND VANGS ARE ON AXIS "4-10"
3. REFER TO DRAWING NO. 01D5-1225 FOR VANG DETAILS

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REV	DESCRIPTION	BY	DATE
1	REVISED BILL OF MATERIAL	McP	04/30/15

AEP AMERICAN® ELECTRIC POWER

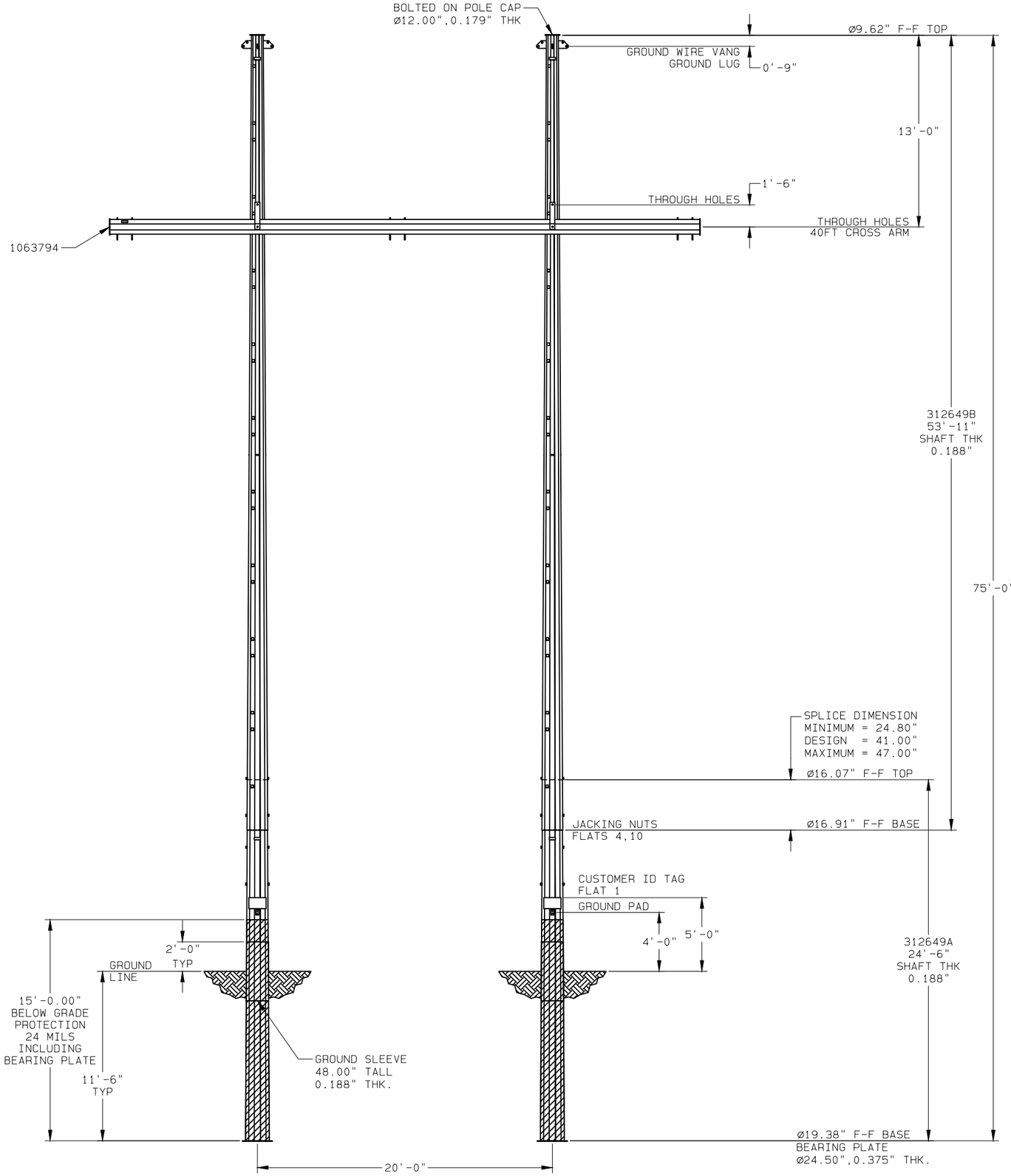
TRANSMISSION LINE STANDARDS
DRILL LOCATIONS
POLYMER - 138KV HEAVY SUSPENSION
W/CORONA RING,
H-FRAME, GALVANIZED STEEL

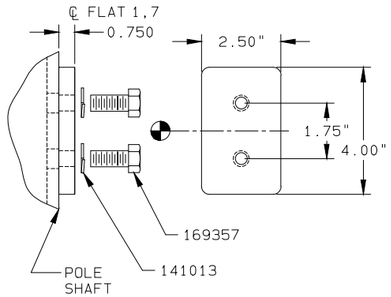
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DRAWING No. CS45-2472 | SHEET No. 2 | REV. No. 1

Archive ID: 905-534

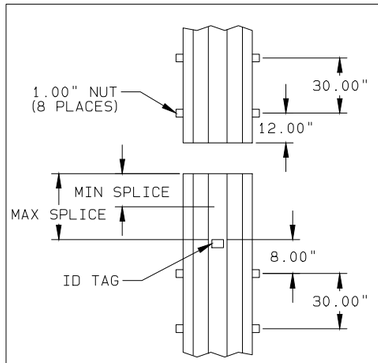
Fabrication Drawings - Valmont





WELDED OVER 0.81" HOLES IN POLE SHAFT.

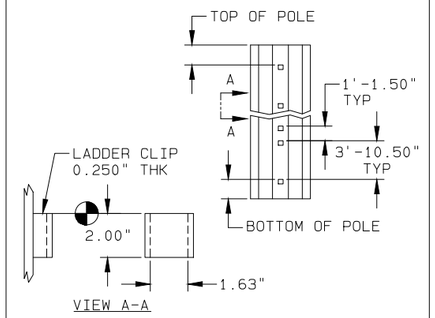
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S075-0254 75' H2
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312649A	SECTION ASSEMBLY	1,136	2
312649B	SECTION ASSEMBLY	1,556	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1003178	1.00	16.00			STUD	HDGV	A449		2
1005495	1.00	28.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
63.5' AGH, STR# 107

DUPLICATE DRAWING DISTRIBUTION

PED52895163.5'_AGH,_CS45-2472,_STR_107__

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

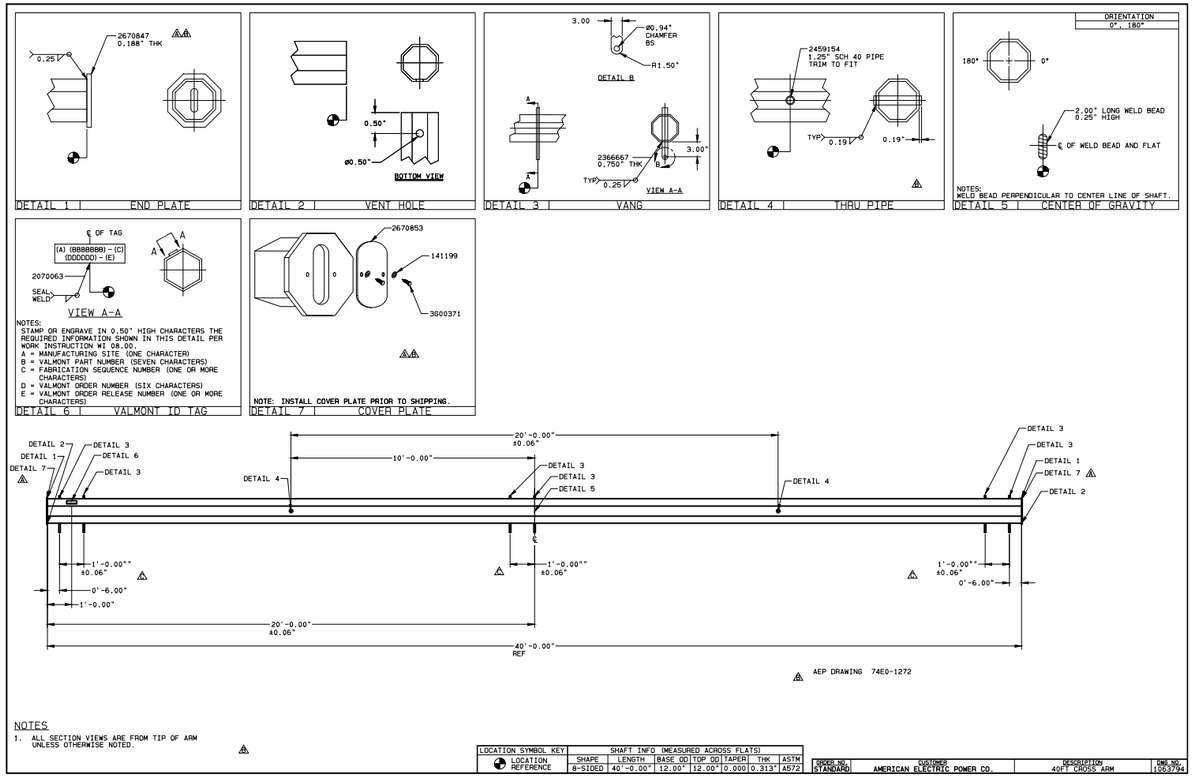
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MS7	LMR	10/25/21	NONE

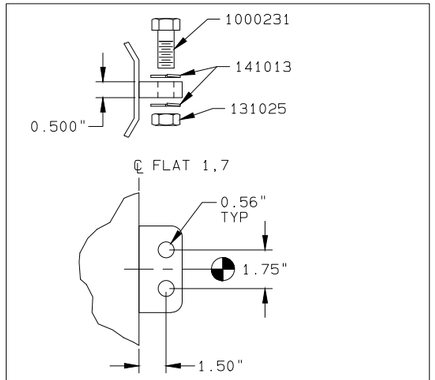
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		7,189#

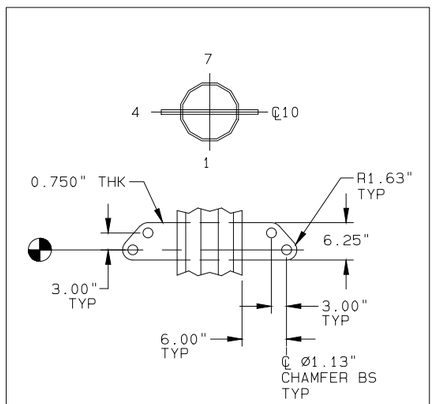
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, CS45-2472, STR 107	312649Z



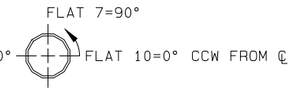


GROUND LUG



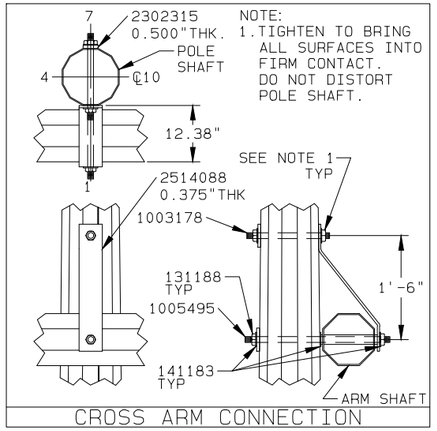
GROUND WIRE VANG

THRU-HOLE



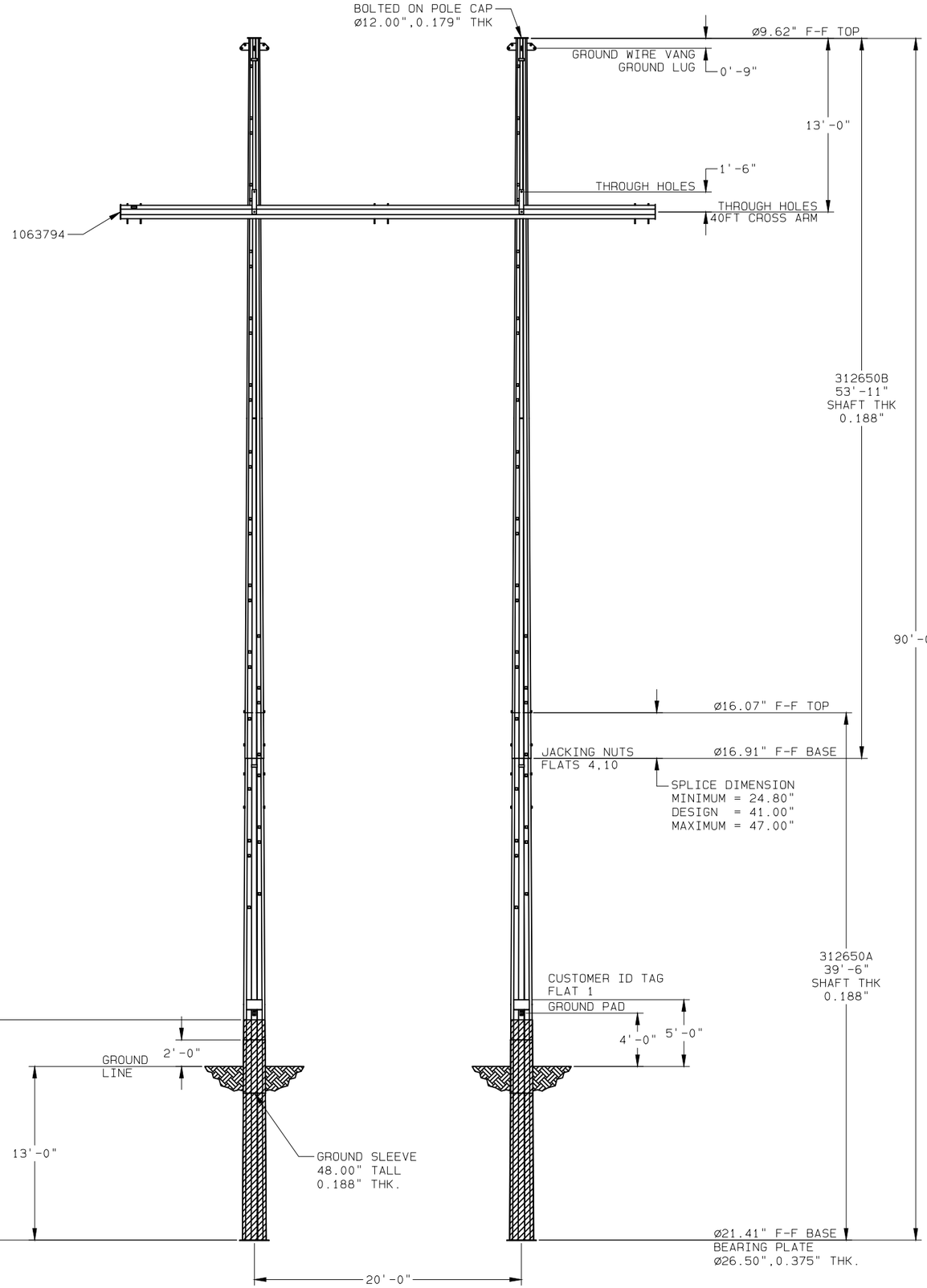
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

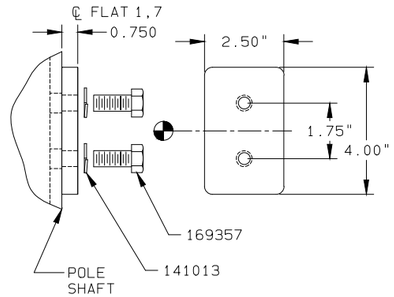
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

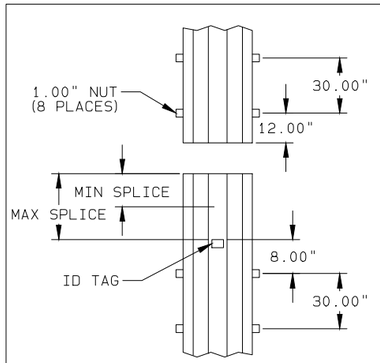
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, CS45-2472, STR 107	312649Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

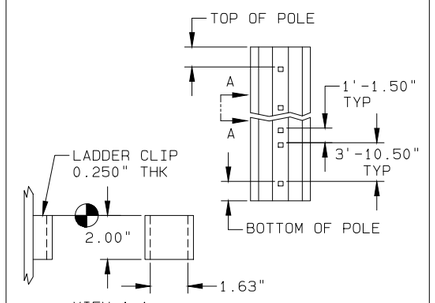
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S075-0254 75' H2
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312650A	SECTION ASSEMBLY	1,809	2
312650B	SECTION ASSEMBLY	1,564	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1003178	1.00	16.00			STUD	HDGV	A449		2
1005495	1.00	28.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
77.0' AGH, STR#93,98,100,108, 109,110,111,126,127,138,139, 140,141,142,146

DUPLICATE DRAWING DISTRIBUTION

PED52895177__AGH,_STR 93,98,100,108-111_

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/26/21	NONE

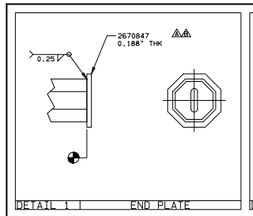
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

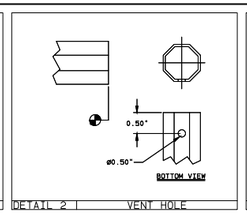
MATERIAL | THICKNESS | WEIGHT 8,551#

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	77' AGH, STR 93,98,100,108-111	312650Z

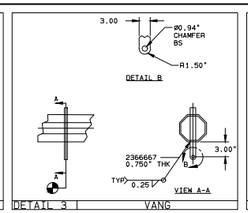
valmont



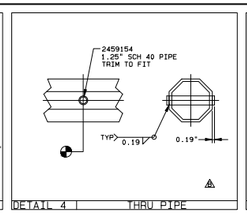
DETAIL 1 | END PLATE



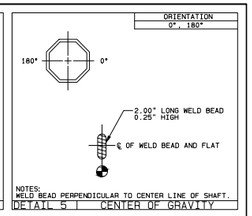
DETAIL 2 | VENT HOLE



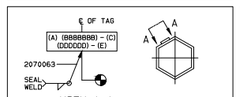
DETAIL 3 | VANG



DETAIL 4 | THRU PIPE



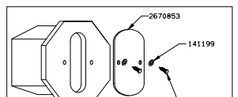
DETAIL 5 | CENTER OF GRAVITY



VIEW A-A

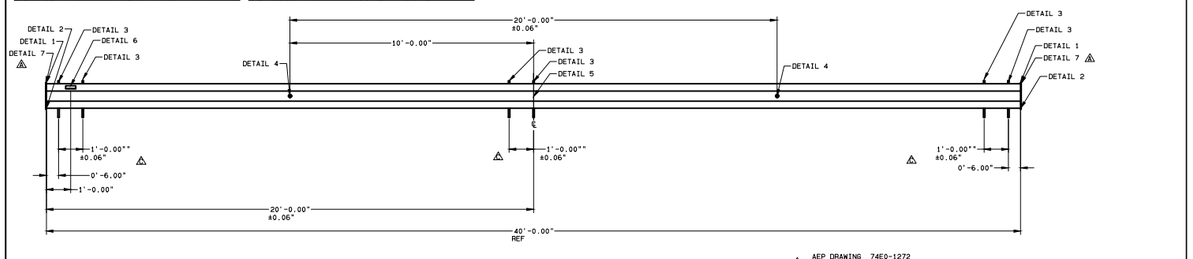
NOTES:
STAMP OR ENGRAVE IN 0.50" HIGH CHARACTERS THE REQUIRED INFORMATION SHOWN IN THIS DETAIL PER WORK INSTRUCTION WI 08.00.
A = MANUFACTURING SITE (ONE CHARACTER)
B = VALMONT PART NUMBER (SEVEN CHARACTERS)
C = FABRICATION SEQUENCE NUMBER (ONE OR MORE CHARACTERS)
D = VALMONT ORDER NUMBER (SIX CHARACTERS)
E = VALMONT ORDER RELEASE NUMBER (ONE OR MORE CHARACTERS)

DETAIL 6 | VALMONT ID TAG



NOTE: INSTALL COVER PLATE PRIOR TO SHIPPING.

DETAIL 7 | COVER PLATE

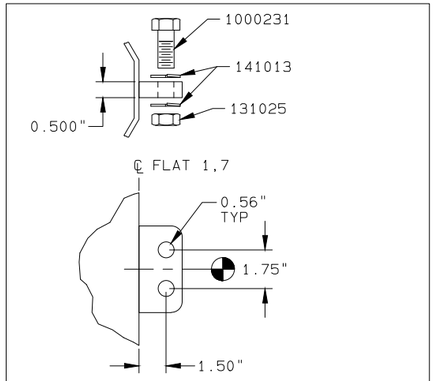


AEP DRAWING 74E0-1272

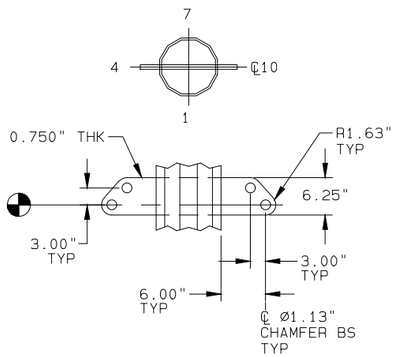
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z



GROUND LUG



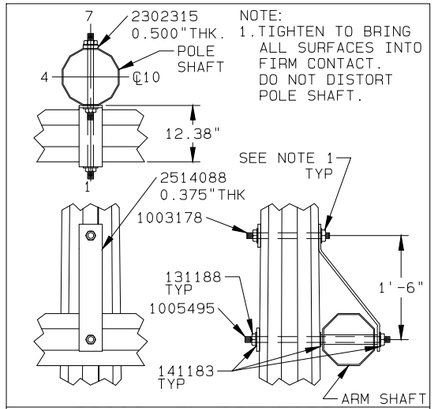
GROUND WIRE VANG

THRU-HOLE



NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

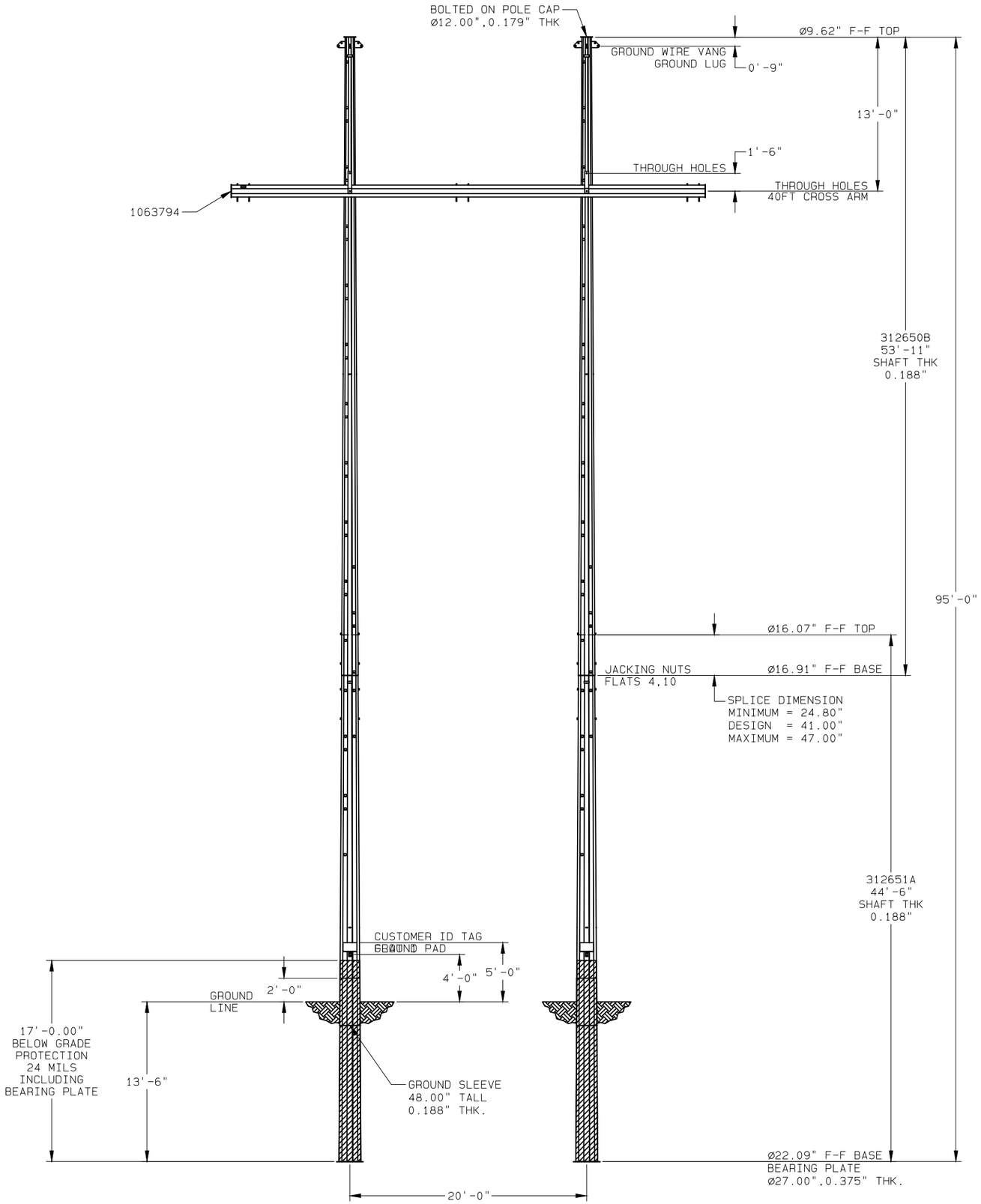
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"

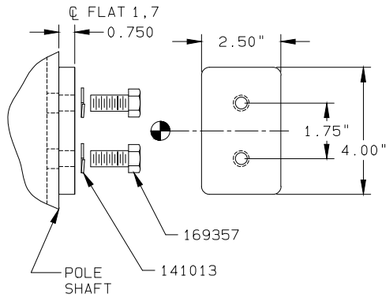


CROSS ARM CONNECTION

valmont

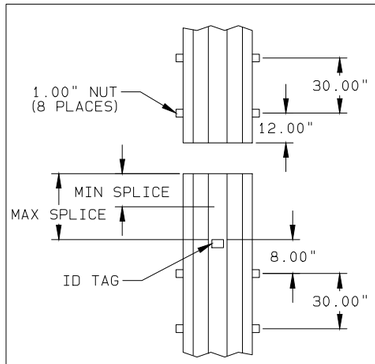
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	77' AGH, STR 93,98,100,108-111	312650Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

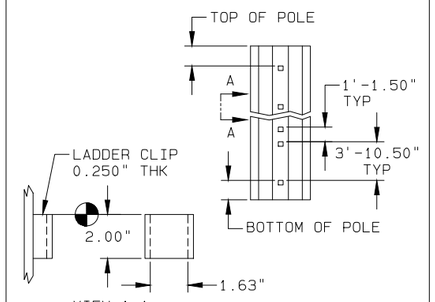
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S095-0326 95' H2
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312651A	SECTION ASSEMBLY	2,047	2
312650B	SECTION ASSEMBLY	1,564	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1003178	1.00	16.00			STUD	HDGV	A449		2
1005495	1.00	28.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
81.5' AGH, STR# 145

DUPLICATE DRAWING DISTRIBUTION

PED52895181.5'_AGH,_CS45-2472,_STR_145__

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

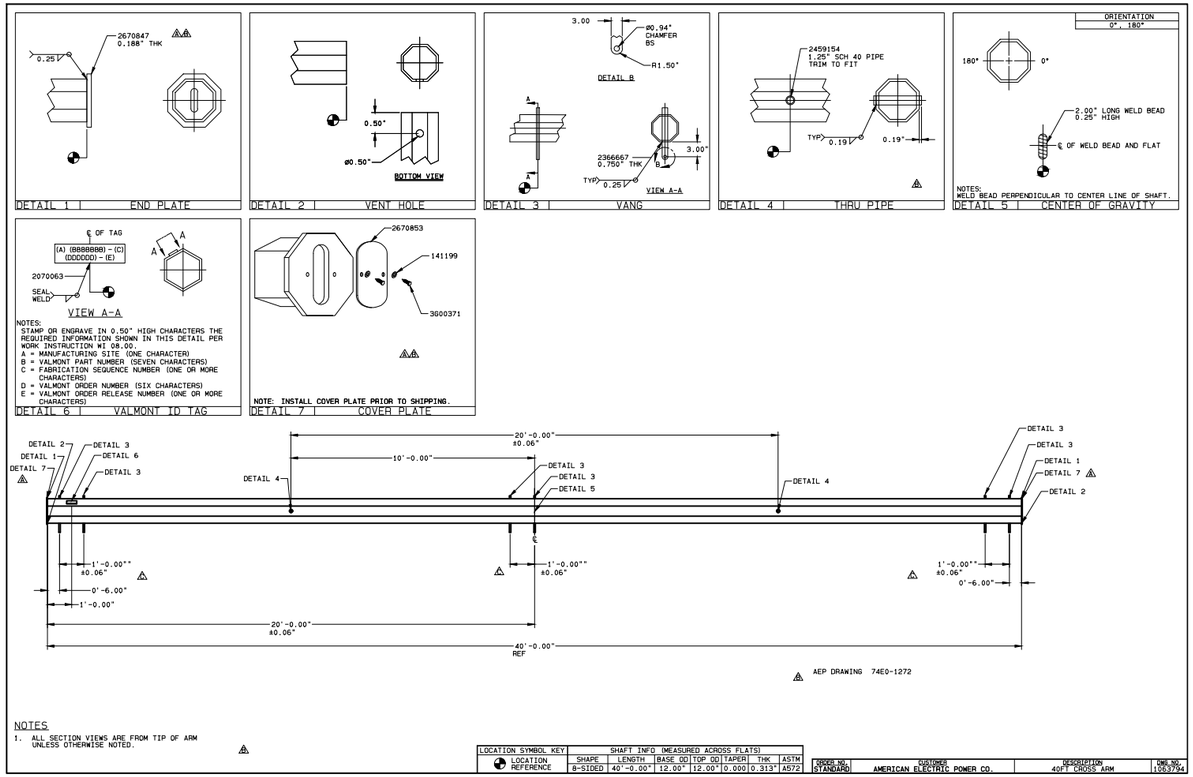
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

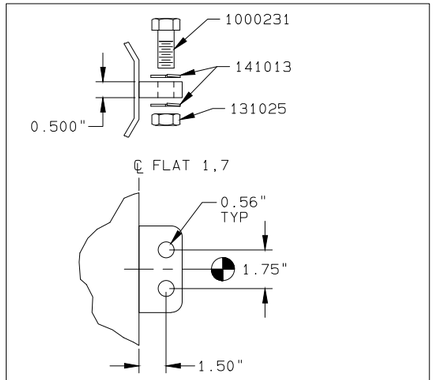
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/26/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT 9,027#

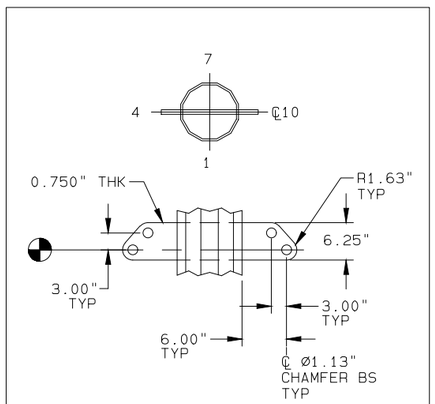
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, CS45-2472, STR 145	312651Z



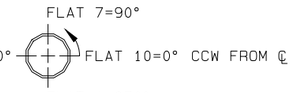


GROUND LUG



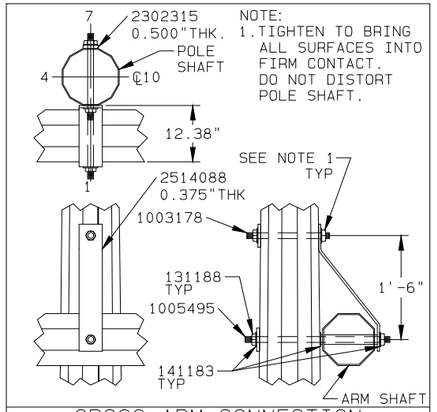
GROUND WIRE VANG

THRU-HOLE



NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

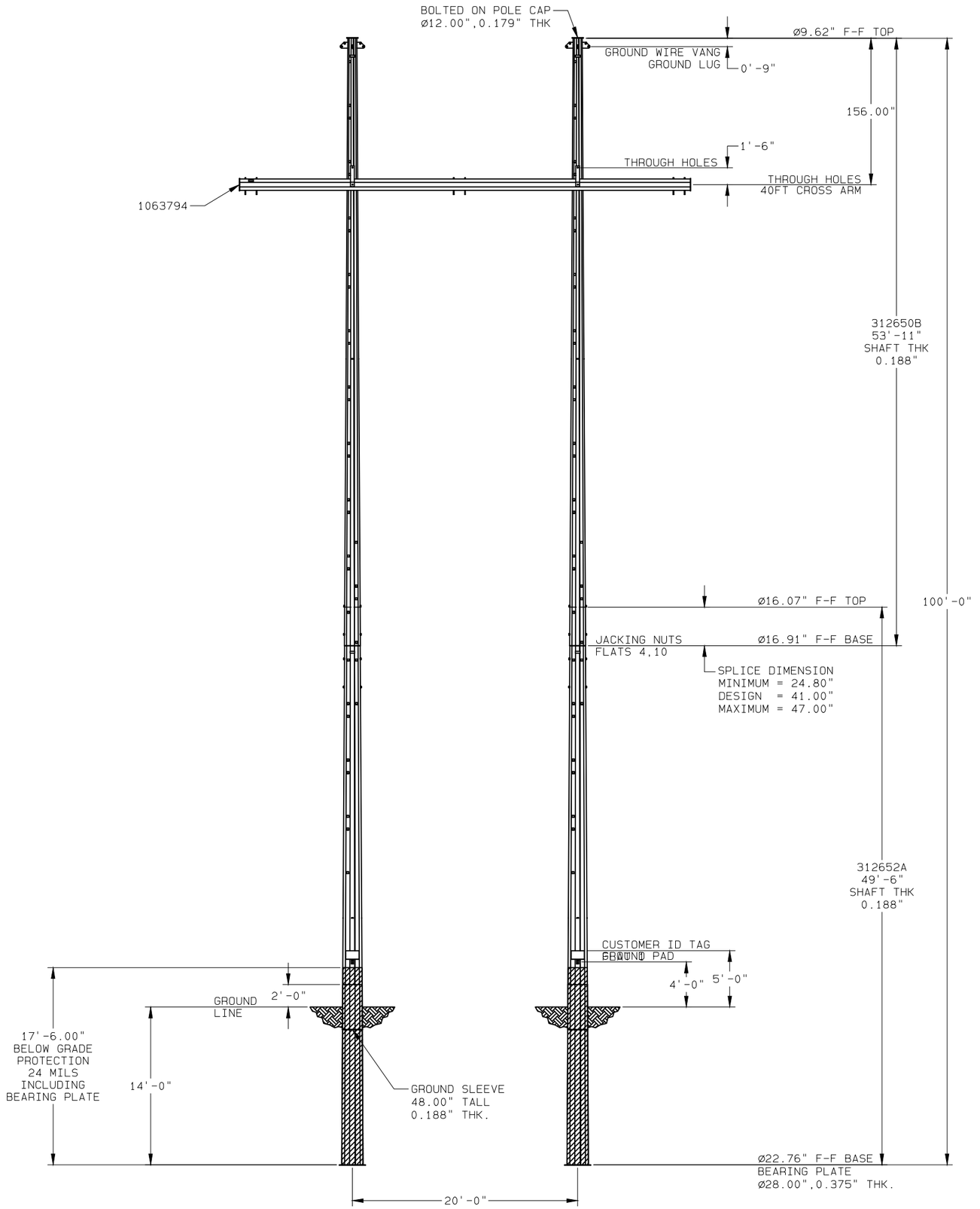
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"

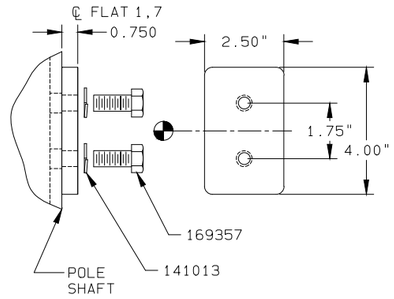


CROSS ARM CONNECTION

valmont

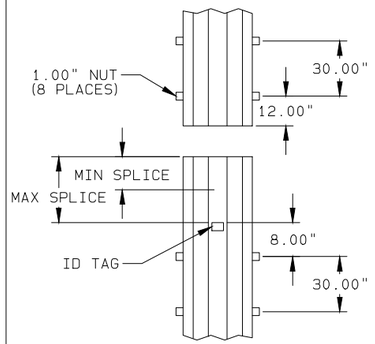
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, CS45-2472, STR 145	312651Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

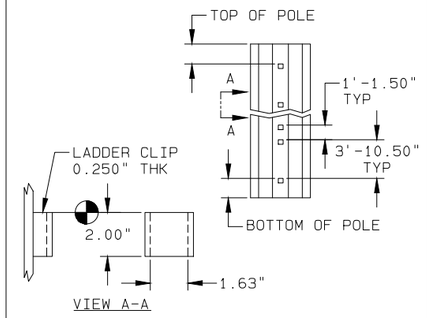
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S100-0344 100' H2
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312652A	SECTION ASSEMBLY	2,291	2
312650B	SECTION ASSEMBLY	1,564	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1003178	1.00	16.00			STUD	HDGV	A449	2
1005495	1.00	28.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
86.0' AGH, STR# 97,99,137

DUPLICATE DRAWING DISTRIBUTION

PED52895186' AGH, STR 97,99,137

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
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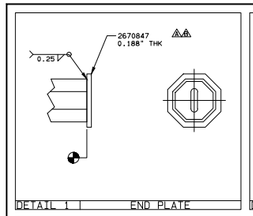
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

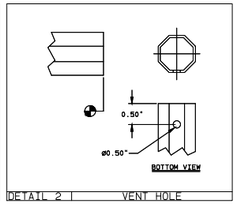
MATERIAL | THICKNESS | WEIGHT 9,515#

valmont

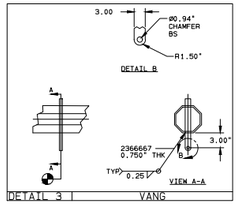
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, STR 97,99,137	312652Z



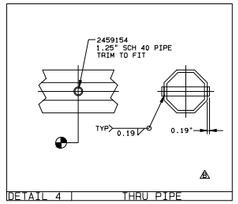
DETAIL 1 | END PLATE



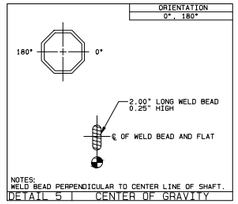
DETAIL 2 | VENT HOLE



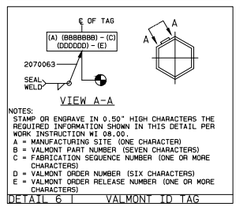
DETAIL 3 | VANG



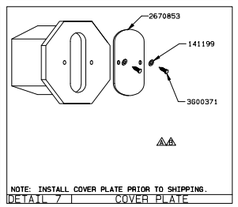
DETAIL 4 | THRU PIPE



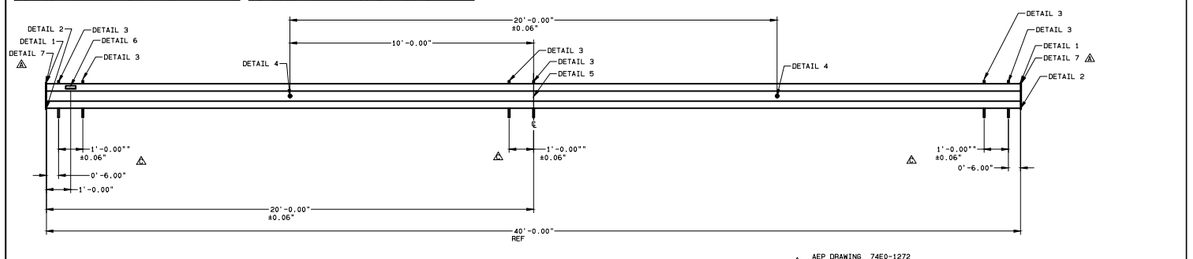
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

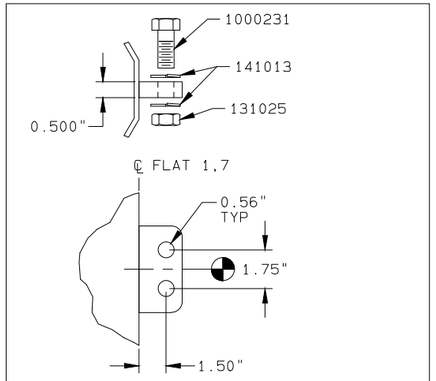


AEP DRAWING 74E0-1272

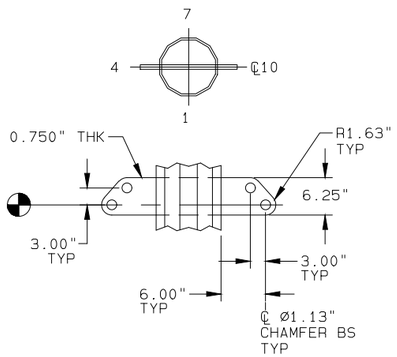
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

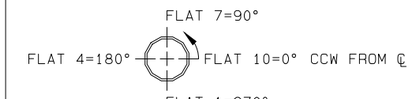


GROUND LUG



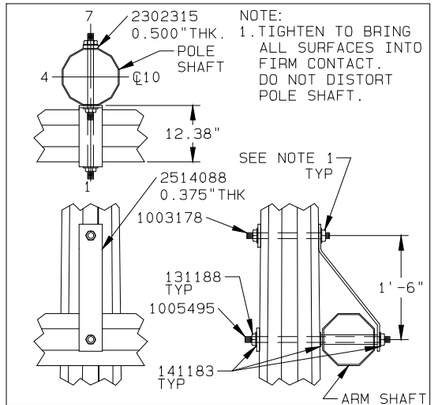
GROUND WIRE VANG

THRU-HOLE



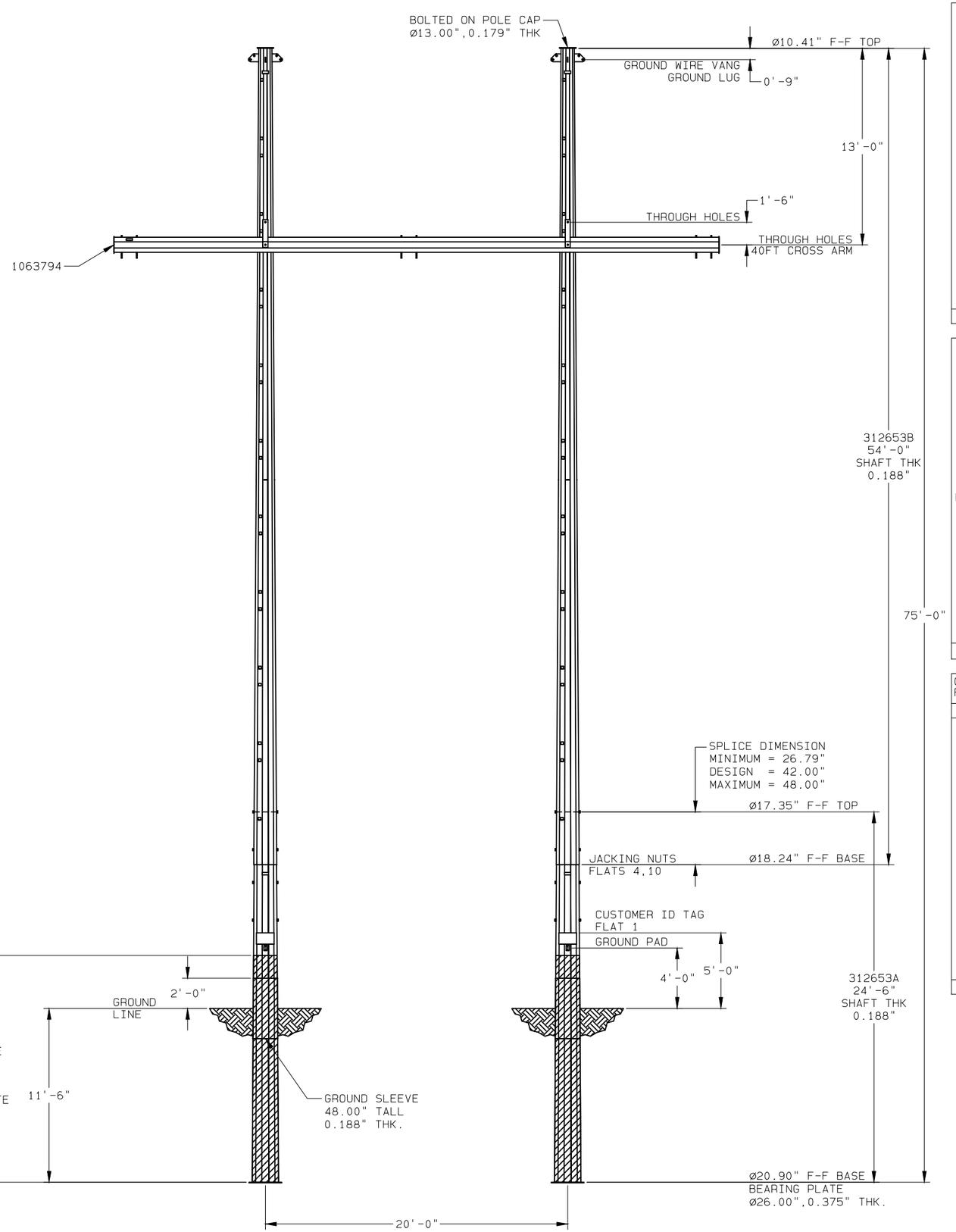
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

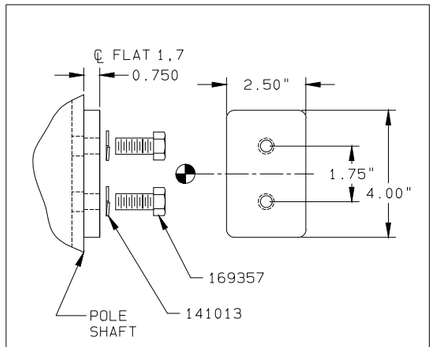
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

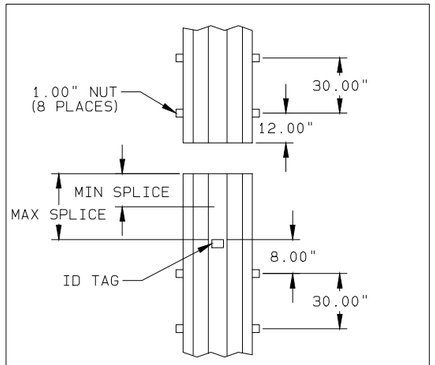
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, STR 97,99,137	312652Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

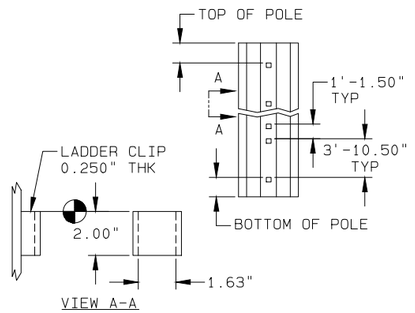
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

ROSS - HEPPNER
AEP DWG: CS45-2472
63.5' AGH, STR# 144,150

NOTES:

POLE SHAFT-GOVERNING REACTIONS.
VALMONT SW: S075-0298 75' H3

COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

A = MANUFACTURING SITE (ONE CHARACTER)
B = VALMONT PART NUMBER (SEVEN CHARACTERS)
C = VALMONT ORDER NUMBER (SIX CHARACTERS)
D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

A-BBBBBBB
CCCCCC
DDDDDDD-E

ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).

SLIP JOINT JACKING FORCE
MINIMUM = 25,000#
MAXIMUM = 90,000#

5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312653A	SECTION ASSEMBLY	1,226	2
312653B	SECTION ASSEMBLY	1,685	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005383	1.00	29.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

DUPLICATE DRAWING DISTRIBUTION

PED52895163.5' AGH, STR 144,150

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

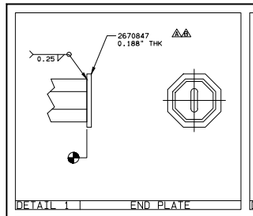
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

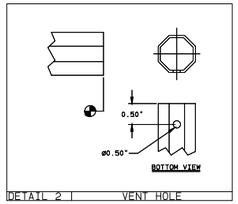
MATERIAL | THICKNESS | WEIGHT: 7,628#

valmont

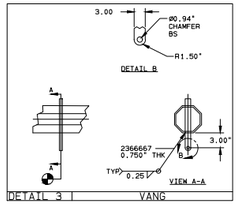
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, STR 144,150	312653Z



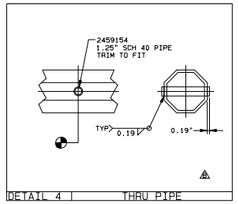
DETAIL 1 | END PLATE



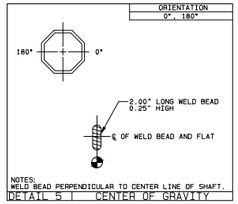
DETAIL 2 | VENT HOLE



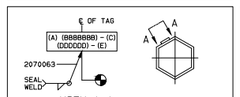
DETAIL 3 | VANG



DETAIL 4 | THRU PIPE



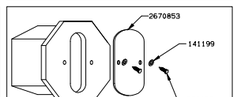
DETAIL 5 | CENTER OF GRAVITY



VIEW A-A

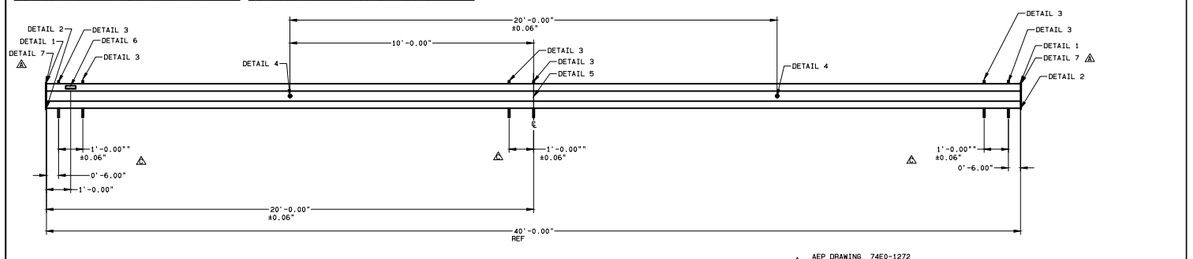
NOTES:
STAMP OR ENGRAVE IN 0.50" HIGH CHARACTERS THE REQUIRED INFORMATION SHOWN IN THIS DETAIL PER WORK INSTRUCTION WI 08.00.
A = MANUFACTURING SITE (ONE CHARACTER)
B = VALMONT PART NUMBER (SEVEN CHARACTERS)
C = FABRICATION SEQUENCE NUMBER (ONE OR MORE CHARACTERS)
D = VALMONT ORDER NUMBER (SIX CHARACTERS)
E = VALMONT ORDER RELEASE NUMBER (ONE OR MORE CHARACTERS)

DETAIL 6 | VALMONT ID TAG



NOTE: INSTALL COVER PLATE PRIOR TO SHIPPING.

DETAIL 7 | COVER PLATE

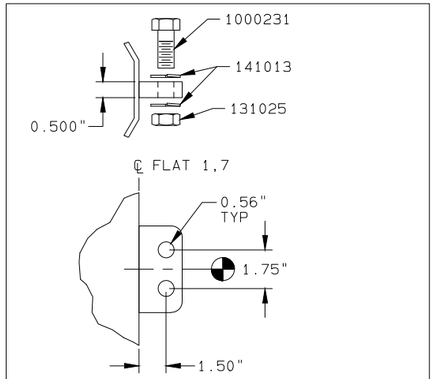


AEP DRAWING 74E0-1272

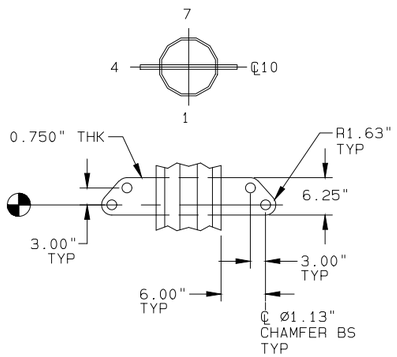
NOTES
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

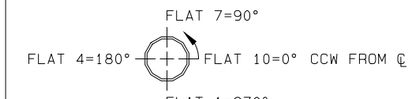


GROUND LUG



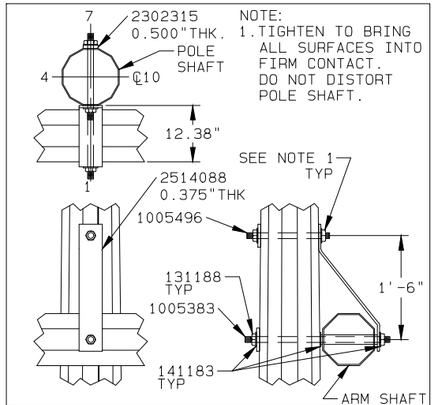
GROUND WIRE VANG

THRU-HOLE



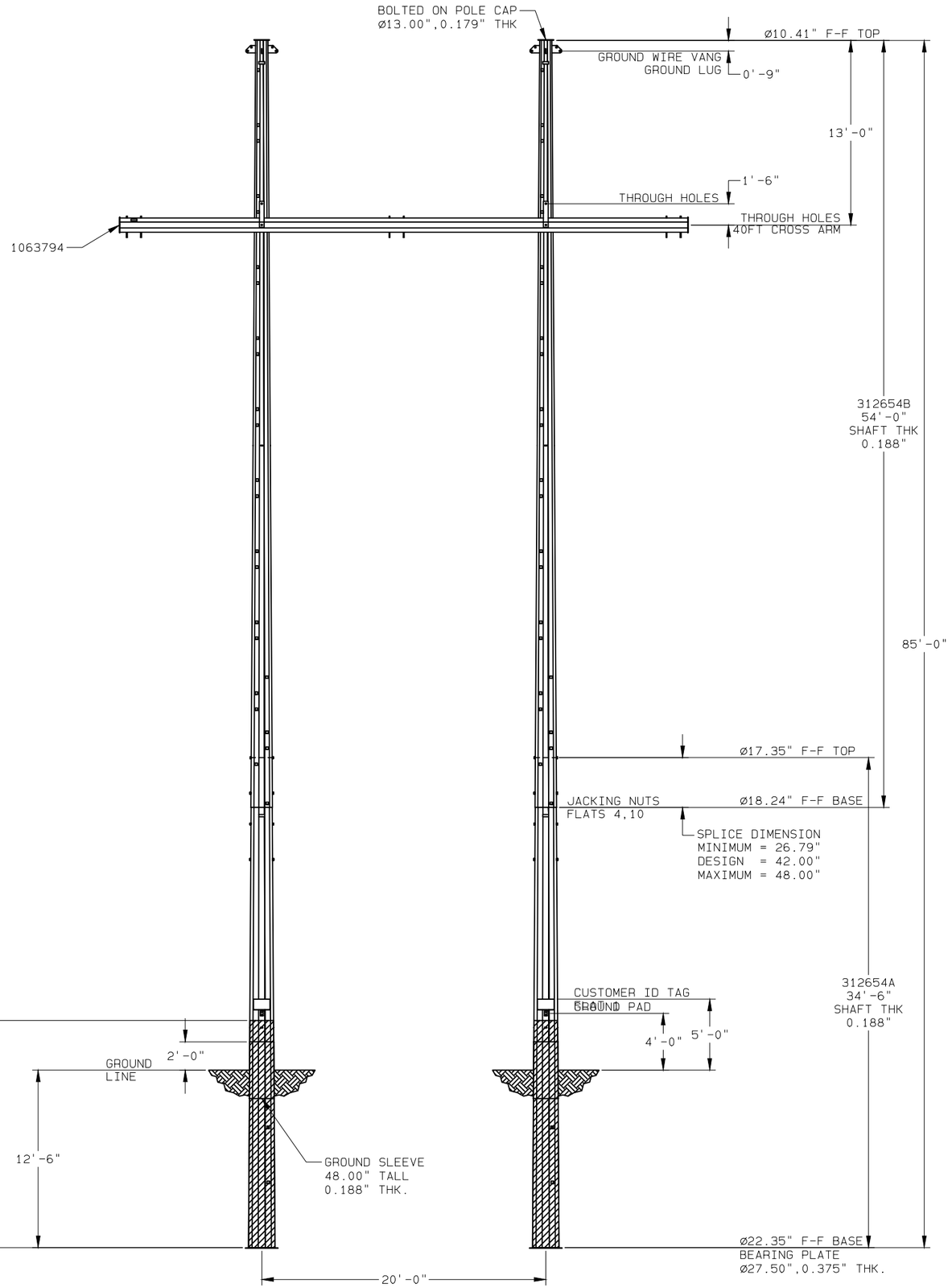
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

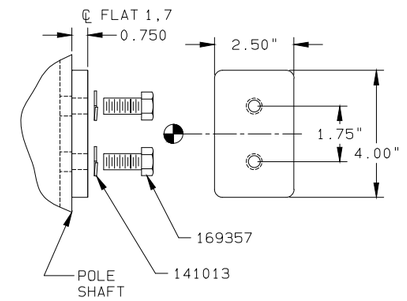
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

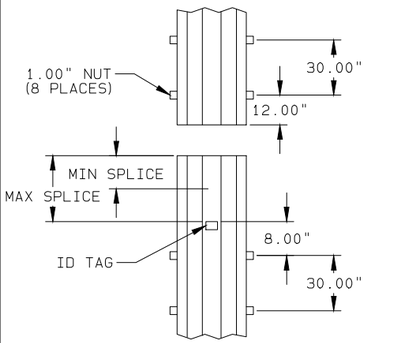
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, STR 144,150	312653Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

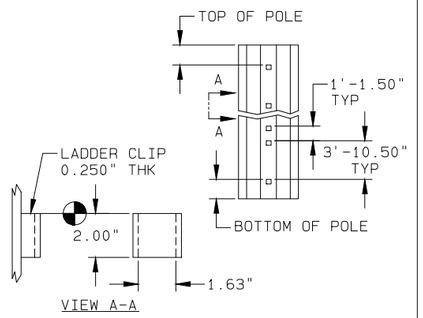
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S085-0340 85' H3
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312654A	SECTION ASSEMBLY	1,701	2
312654B	SECTION ASSEMBLY	1,689	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
72.5' AGH, STR# 123

DUPLICATE DRAWING DISTRIBUTION

PED52895172.5'_AGH,_CS45-2472,_STR_123__

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

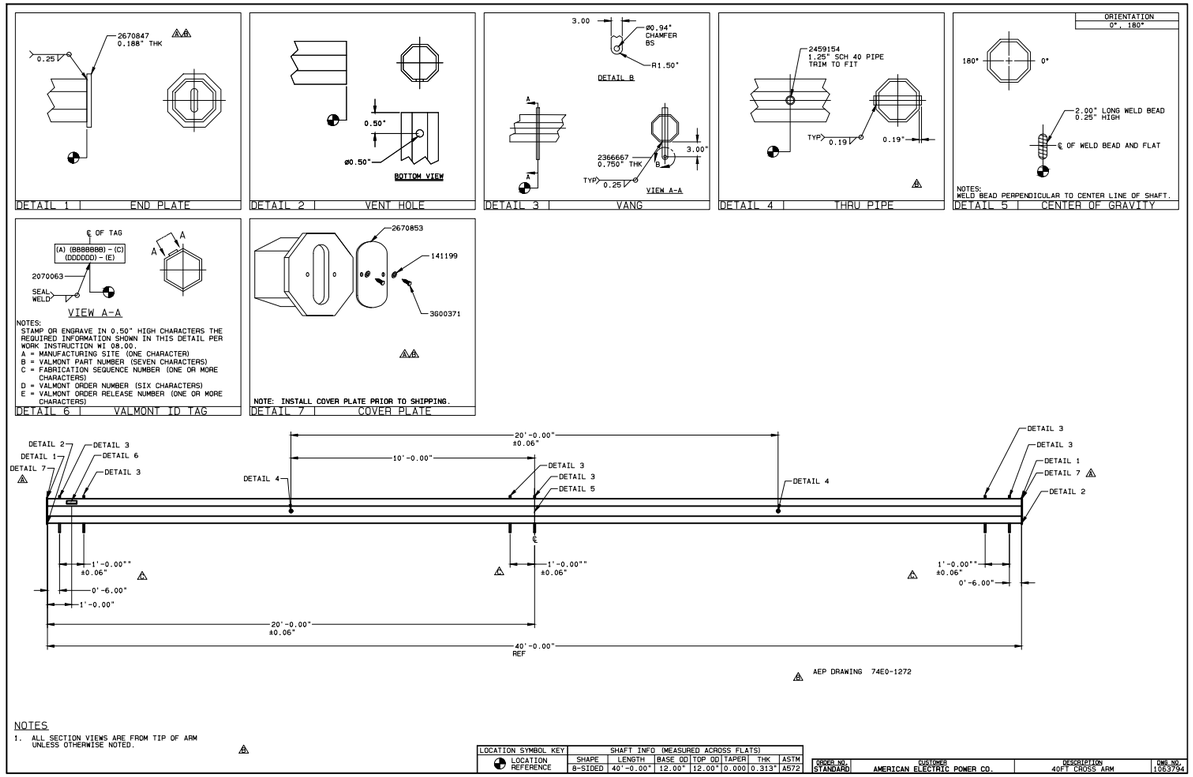
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

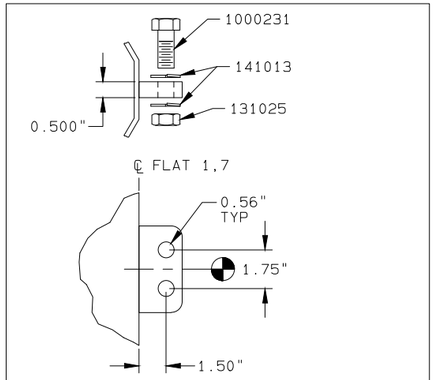
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		8,586#

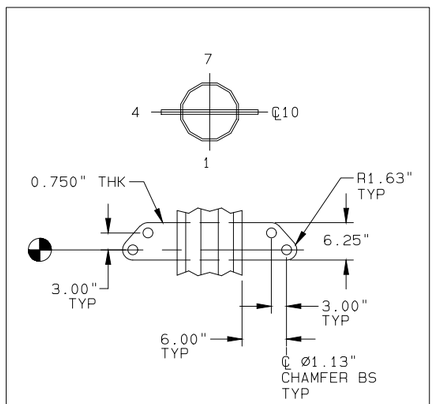
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	72.5' AGH, CS45-2472, STR 123	312654Z



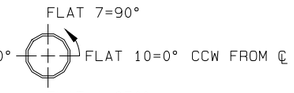


GROUND LUG



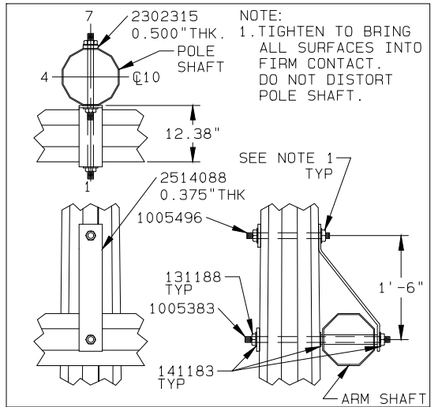
GROUND WIRE VANG

THRU-HOLE



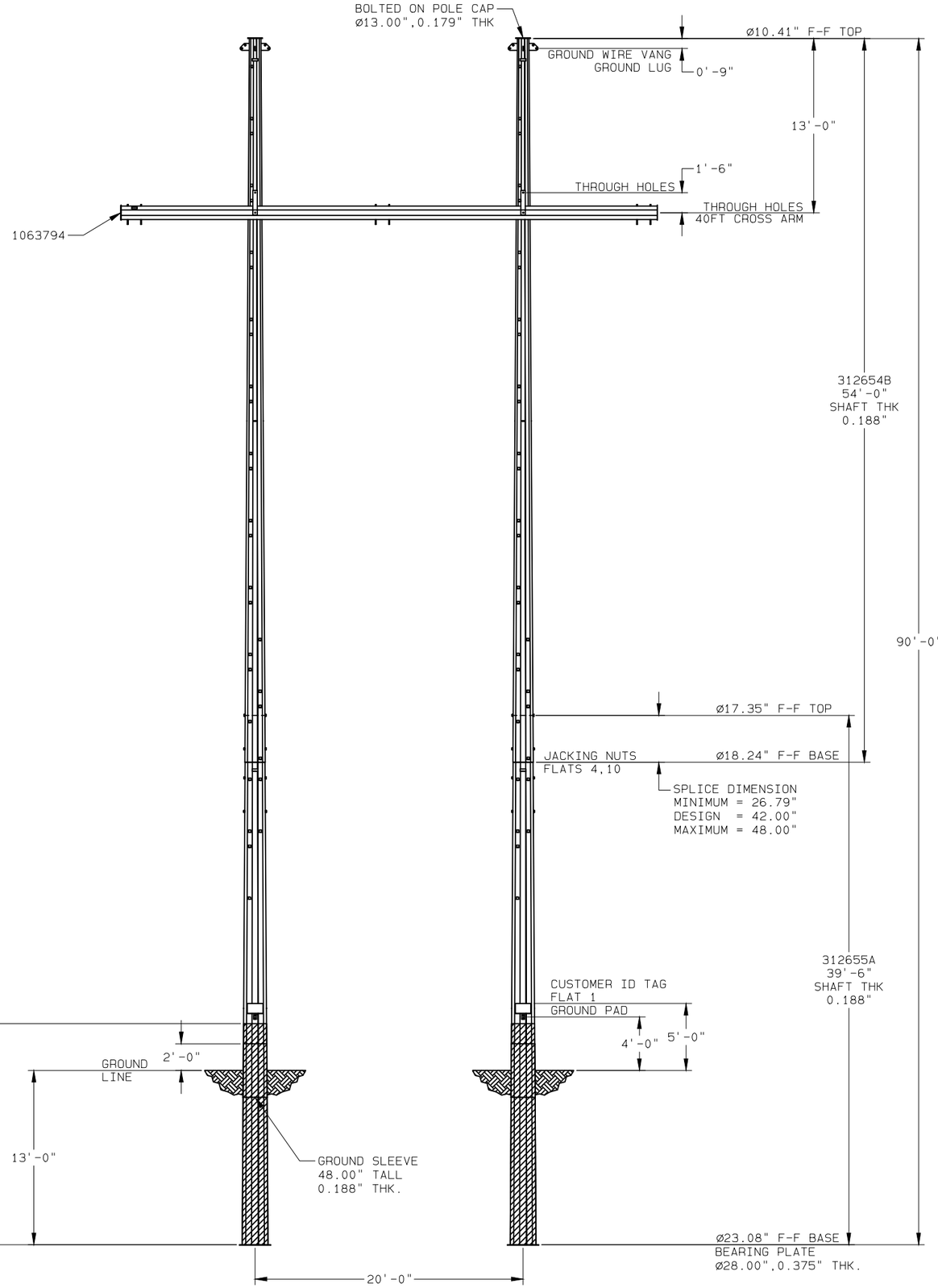
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

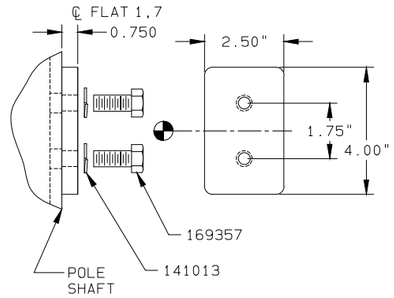
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

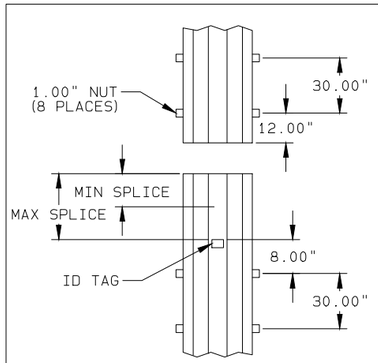
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	72.5' AGH, CS45-2472, STR 123	312654Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

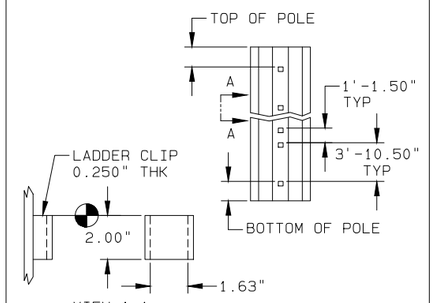
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S090- 90' H3
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY, ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312655A	SECTION ASSEMBLY	1,949	2
312654B	SECTION ASSEMBLY	1,689	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
77.0' AGH, STR# 91,92,101,102, 103,143,155,157

DUPLICATE DRAWING DISTRIBUTION

PED52895177__AGH,_STR_91,92,101-103,143_

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

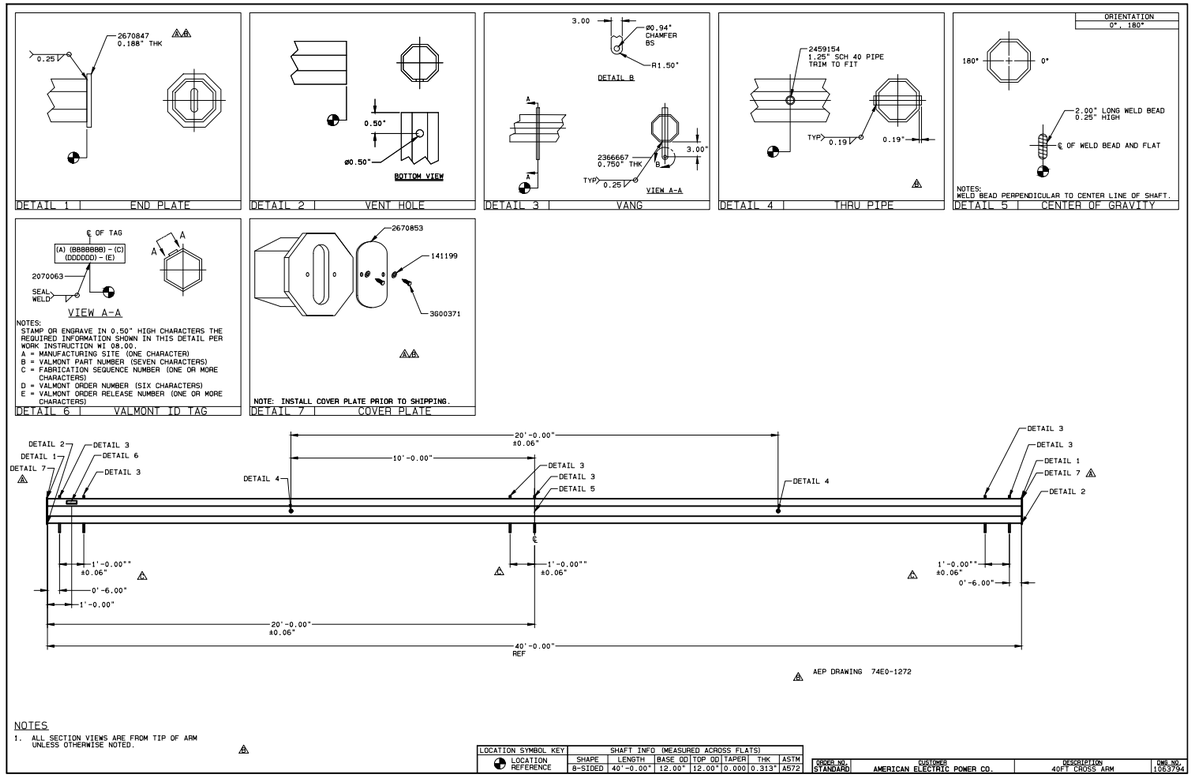
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

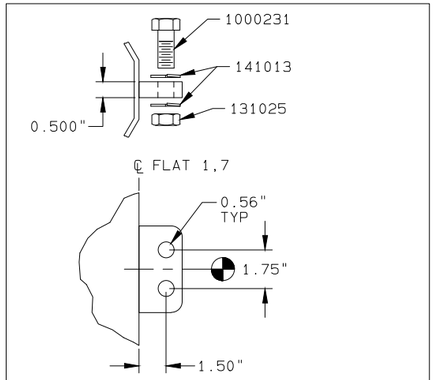
MATERIAL	THICKNESS	WEIGHT
		9,082#

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

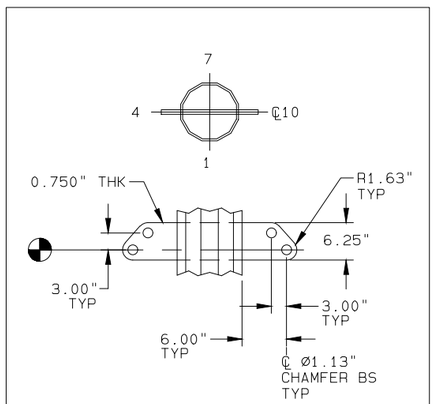
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	77' AGH, STR 91,92,101-103,143	312655Z

valmont



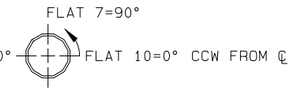


GROUND LUG



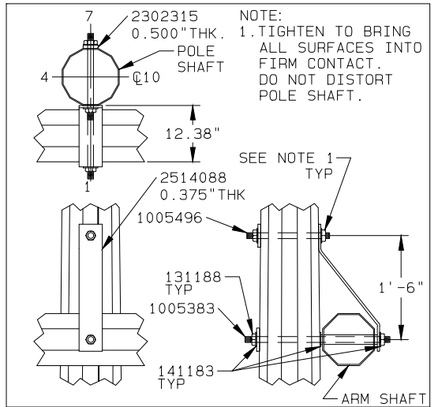
GROUND WIRE VANG

THRU-HOLE



NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

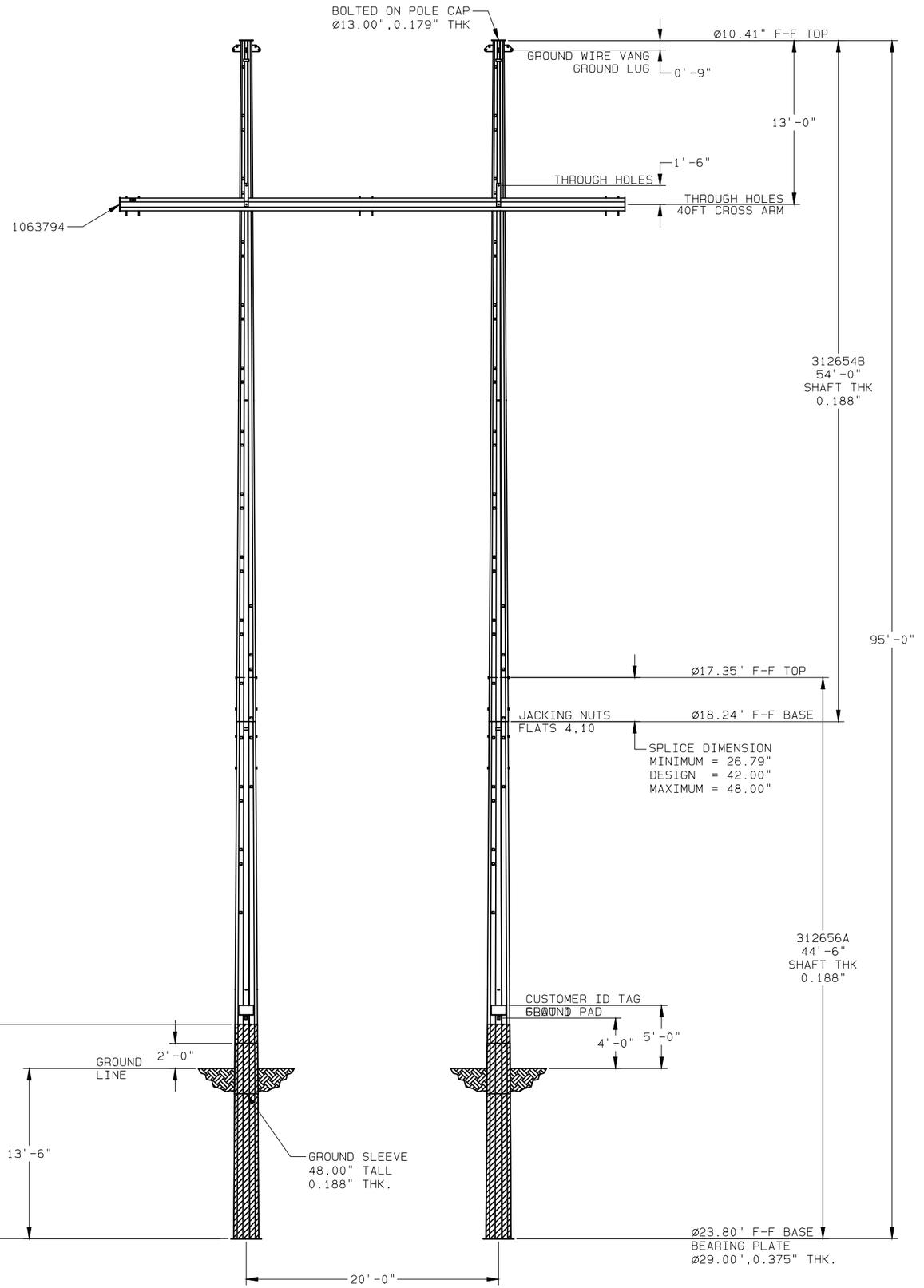
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"

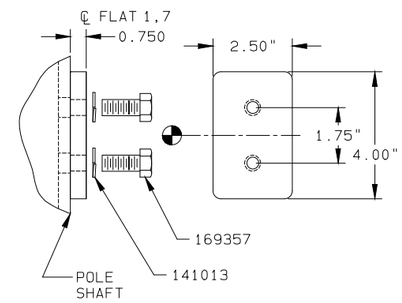


CROSS ARM CONNECTION

valmont

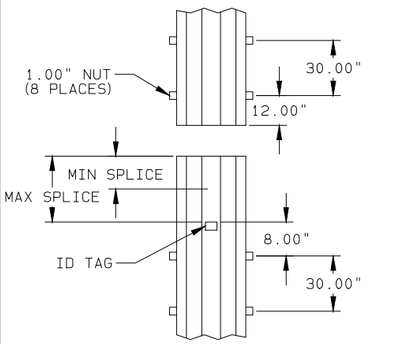
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	77' AGH, STR 91,92,101-103,143	312655Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

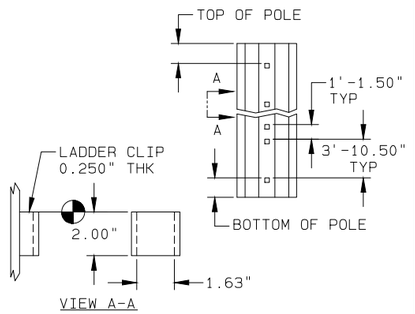
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S095-0382 95' H3
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312656A	SECTION ASSEMBLY	2,210	2
312654B	SECTION ASSEMBLY	1,689	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
81.5' AGH, STR# 124

DUPLICATE DRAWING DISTRIBUTION

PED52895181.5'_AGH,_CS45-2472,_STR_124__
DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

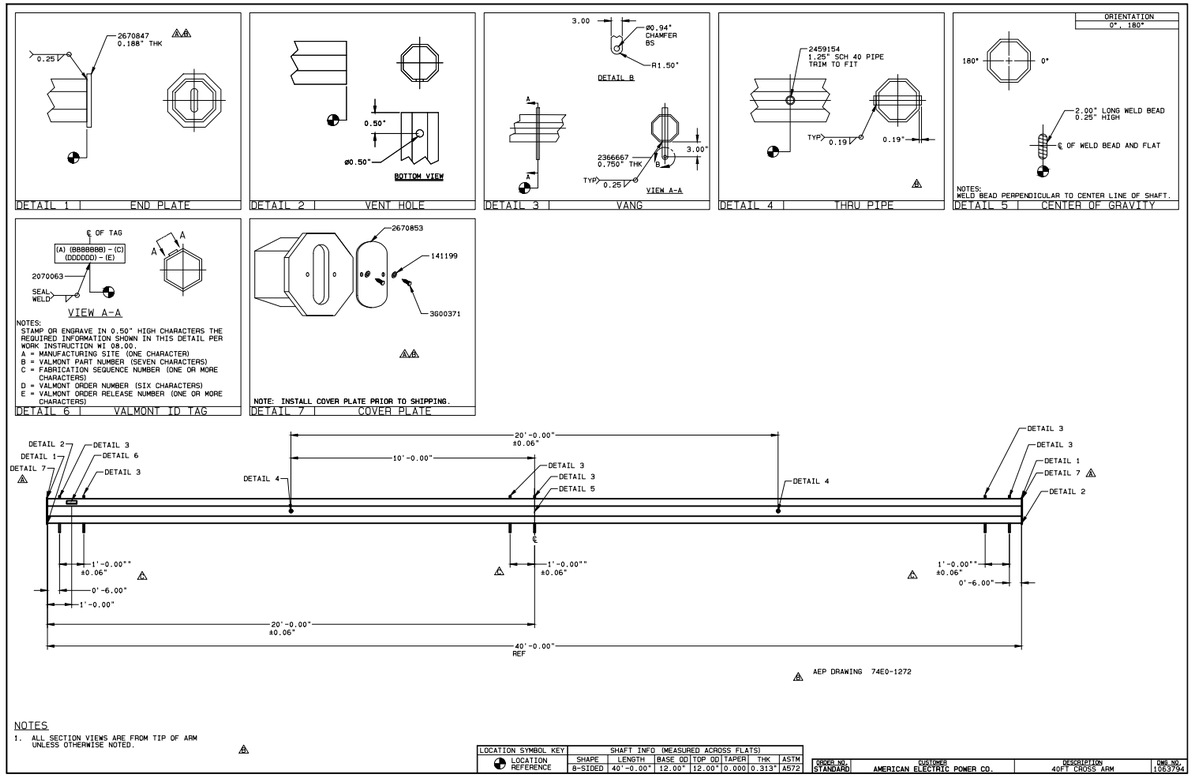
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

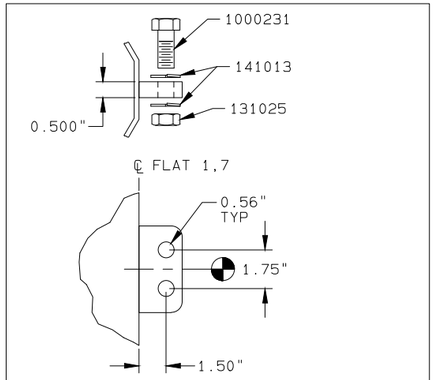
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT: 9,604#

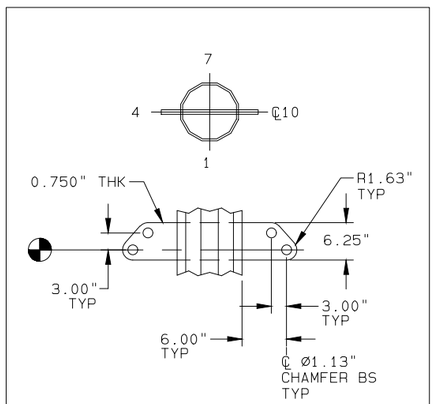
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, CS45-2472, STR 124	312656Z



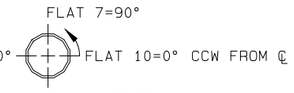


GROUND LUG



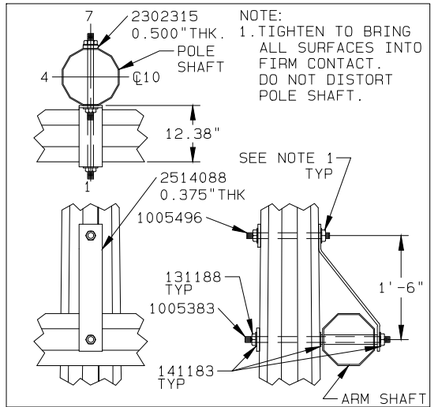
GROUND WIRE VANG

THRU-HOLE



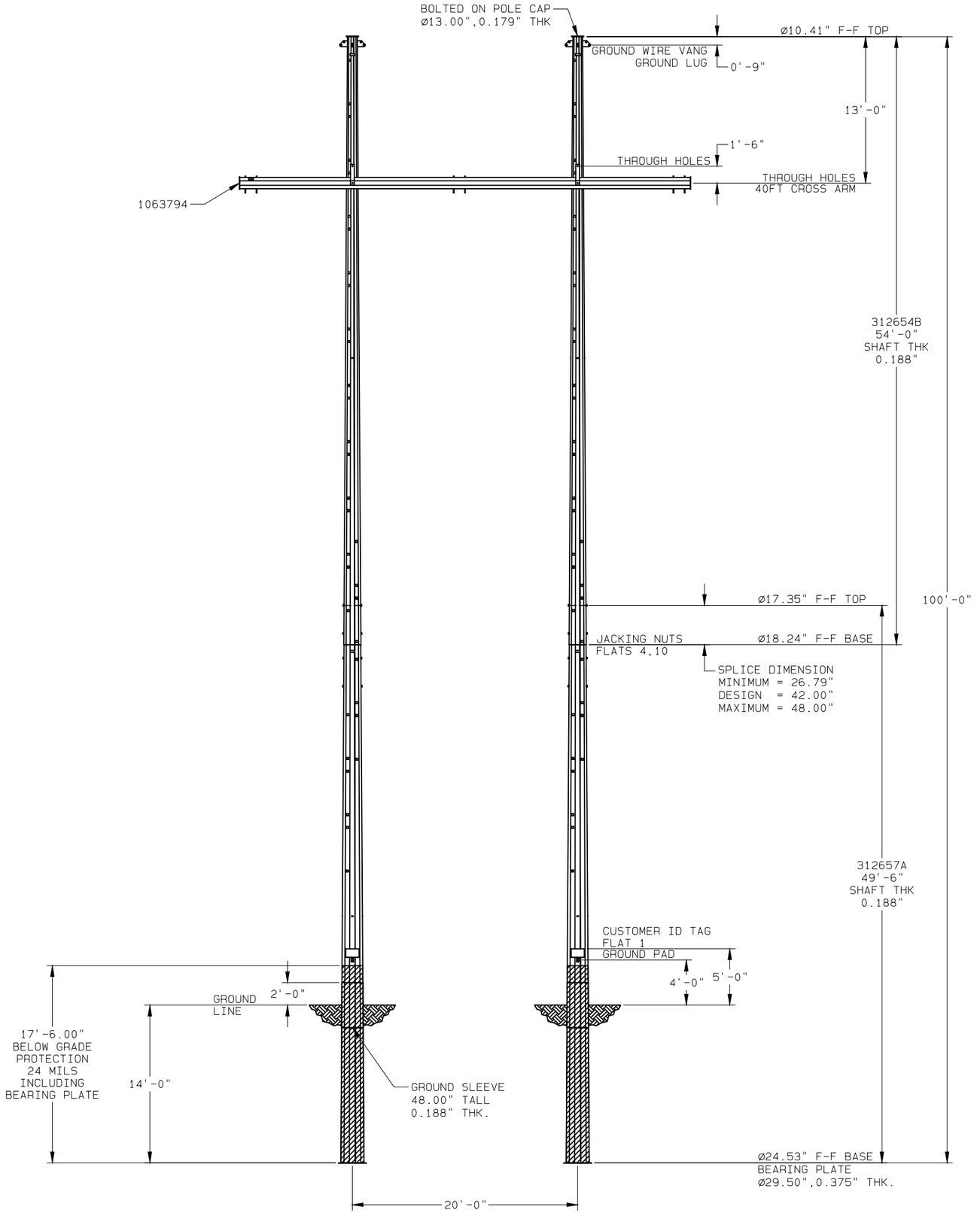
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

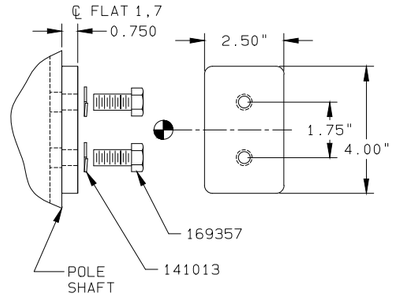
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

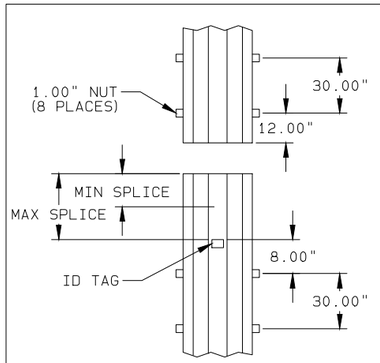
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, CS45-2472, STR 124	312656Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

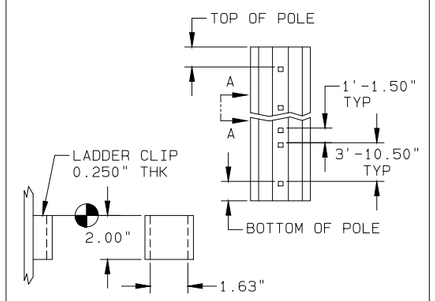
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S100-0344 100' H3
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312657A	SECTION ASSEMBLY	2,472	2
312654B	SECTION ASSEMBLY	1,689	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005383	1.00	29.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
86.0' AGH, STR# 90,147

DUPLICATE DRAWING DISTRIBUTION

PED52895186'_AGH,_SIR_90,147

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

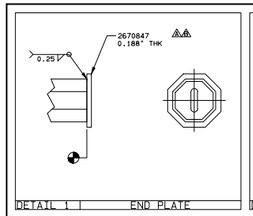
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DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

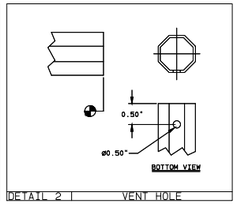
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT 10,128#

valmont

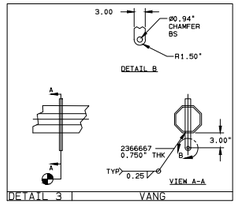
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, STR 90,147	312657Z



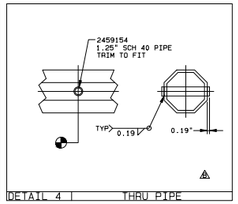
DETAIL 1 | END PLATE



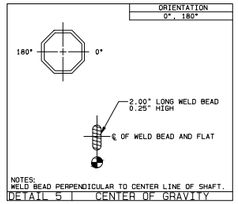
DETAIL 2 | VENT HOLE



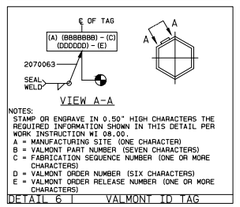
DETAIL 3 | VANG



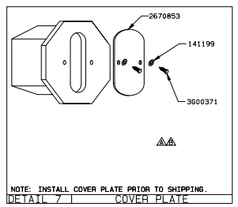
DETAIL 4 | THRU PIPE



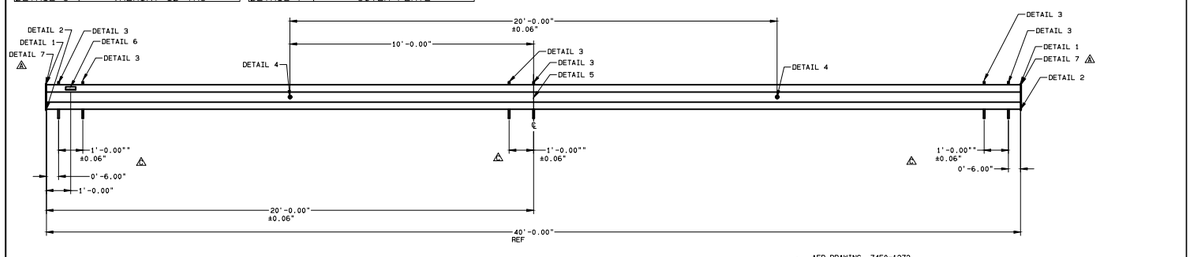
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

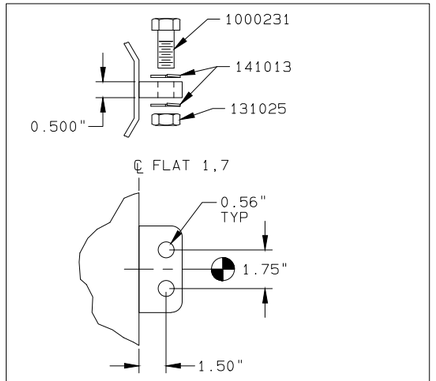


AEP DRAWING 74E0-1272

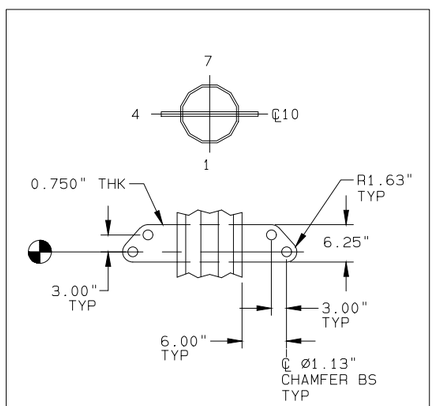
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

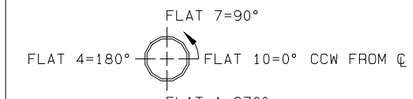


GROUND LUG



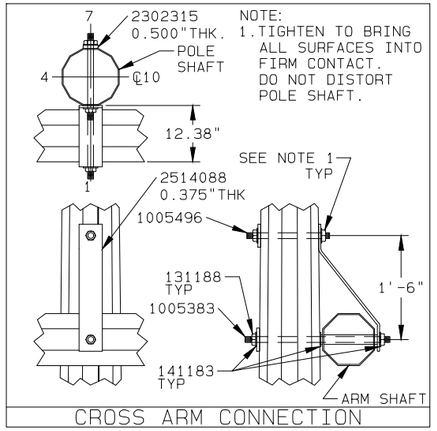
GROUND WIRE VANG

THRU-HOLE



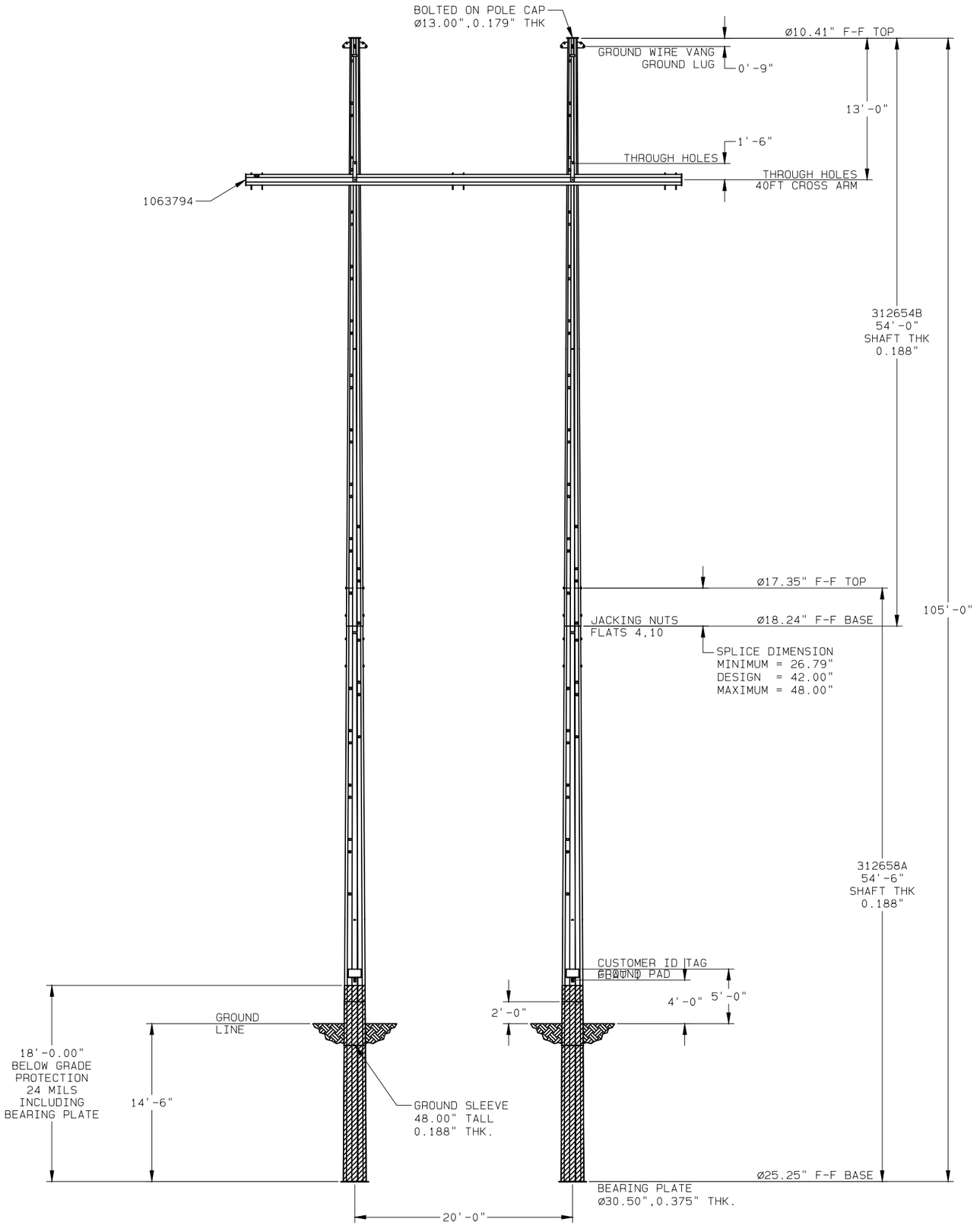
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

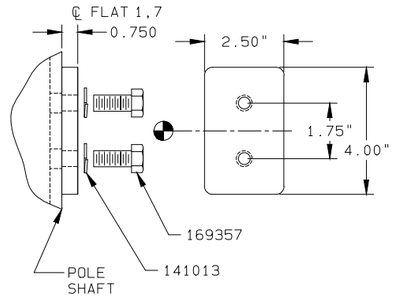
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

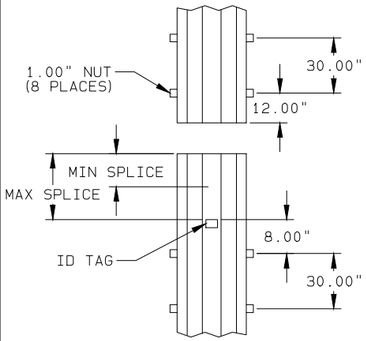
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, STR 90,147	312657Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

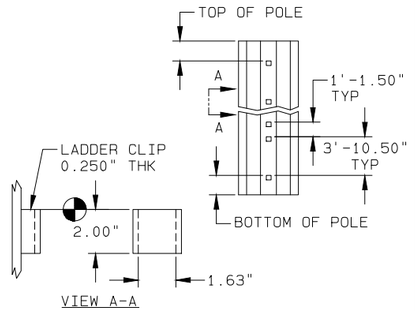
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S105-0424 105' H3
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312658A	SECTION ASSEMBLY	2,746	2
312654B	SECTION ASSEMBLY	1,689	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
90.5' AGH, STR# 96

DUPLICATE DRAWING DISTRIBUTION

PED52895190.5'_AGH,_CS45-2472,_STR_96___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
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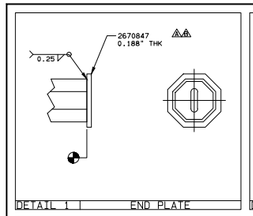
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

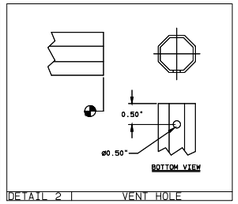
MATERIAL	THICKNESS	WEIGHT
		10,676#

valmont

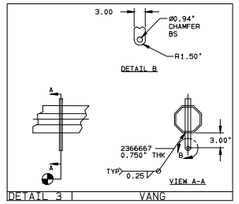
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	90.5' AGH, CS45-2472, STR 96	312658Z



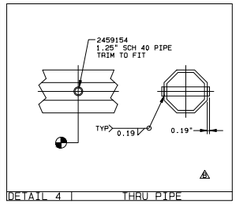
DETAIL 1 | END PLATE



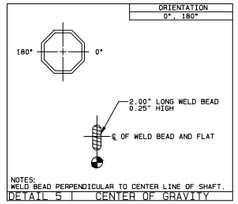
DETAIL 2 | VENT HOLE



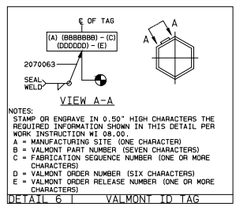
DETAIL 3 | VANG



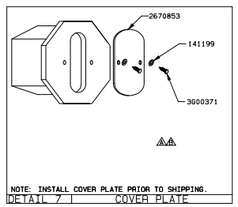
DETAIL 4 | THRU PIPE



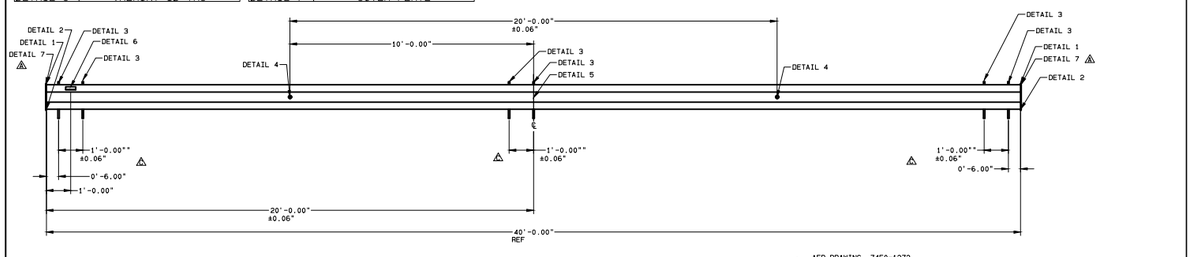
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE



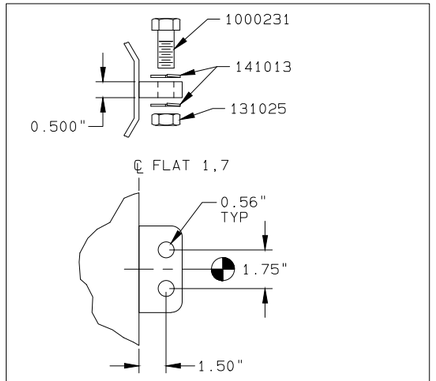
AEP DRAWING 74E0-1272

NOTES:

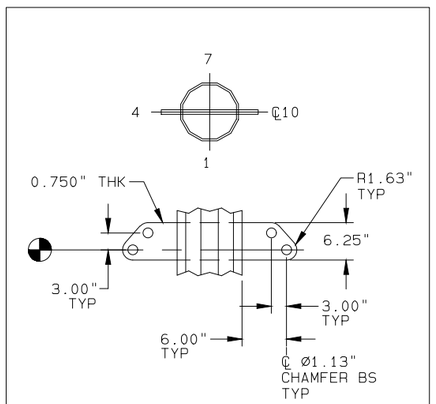
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	1063794

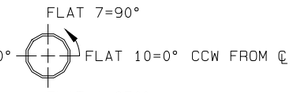


GROUND LUG



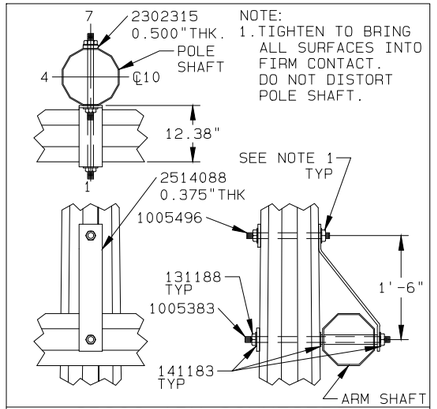
GROUND WIRE VANG

THRU-HOLE



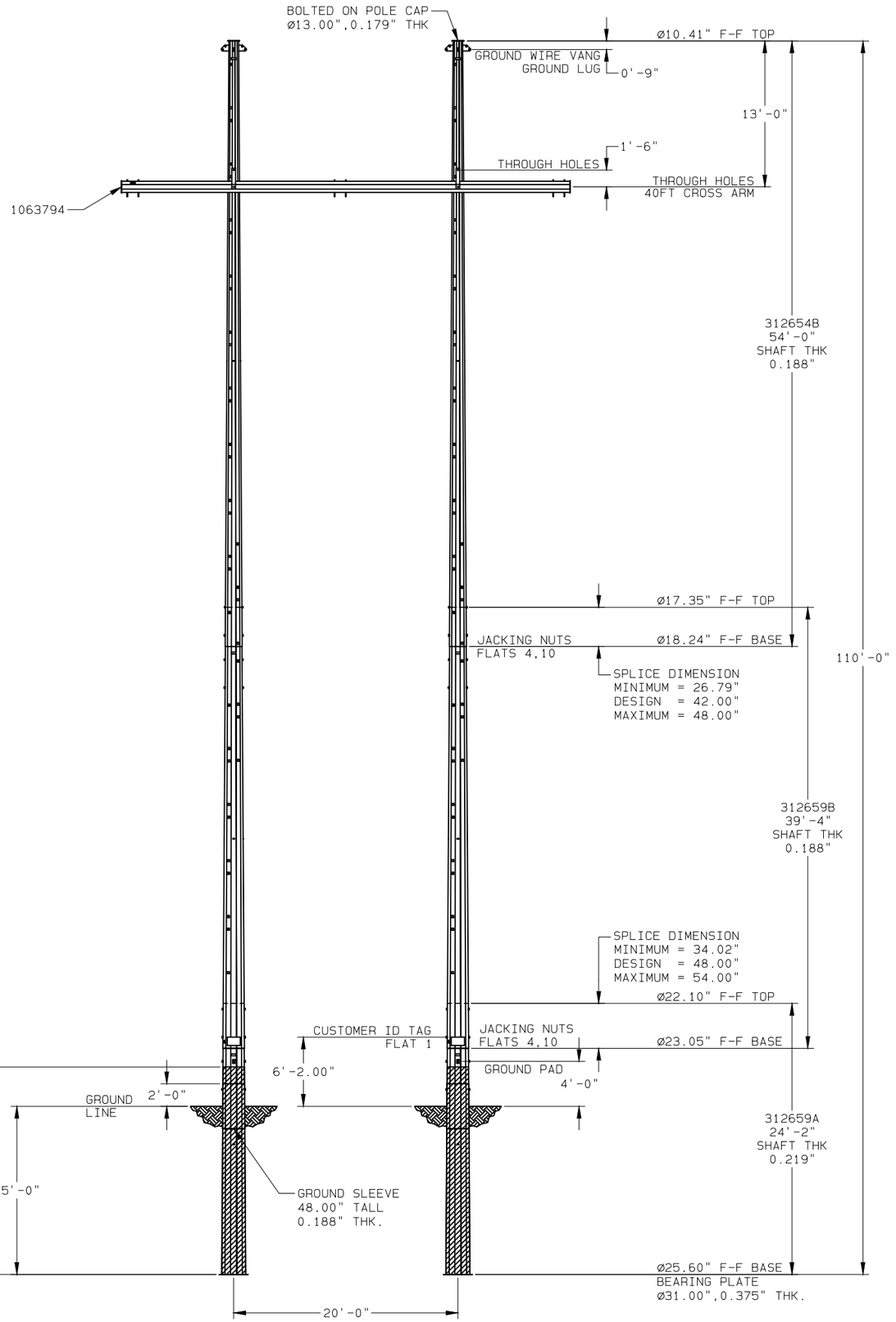
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

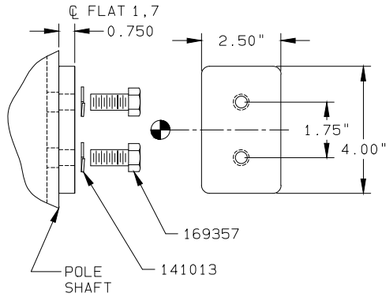
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

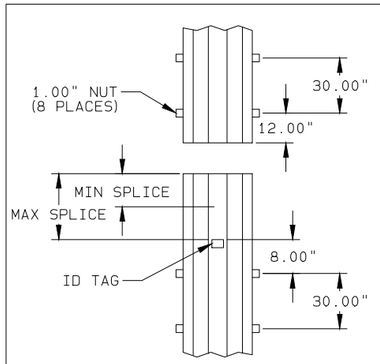
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	90.5' AGH, CS45-2472, STR 96	312658Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

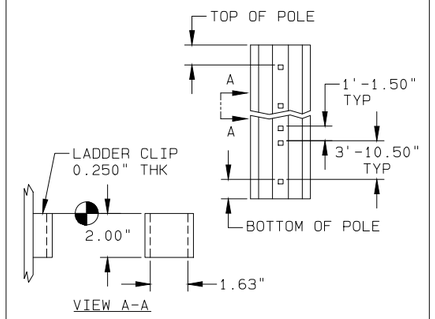
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S110-0445 110' H3
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY, ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312659A	SECTION ASSEMBLY	1,699	2
312659B	SECTION ASSEMBLY	1,691	2
312654B	SECTION ASSEMBLY	1,689	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005383	1.00	29.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
95.0' AGH, STR# 94

DUPLICATE DRAWING DISTRIBUTION

PED52895195'_AGH,_CS45-2472,_STR_94_____

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

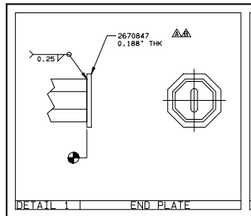
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		11,964#

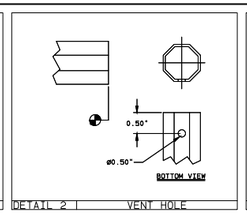
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	95' AGH, CS45-2472, STR 94	312659Z

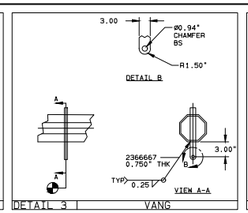
valmont



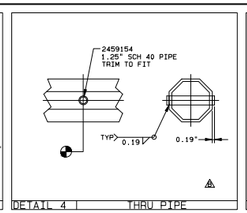
DETAIL 1 | END PLATE



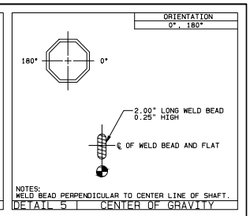
DETAIL 2 | VENT HOLE



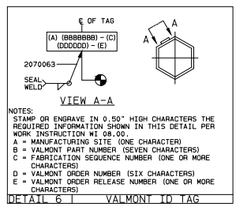
DETAIL 3 | VANG



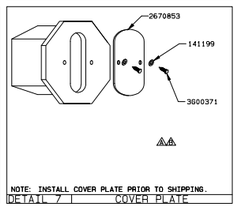
DETAIL 4 | THRU PIPE



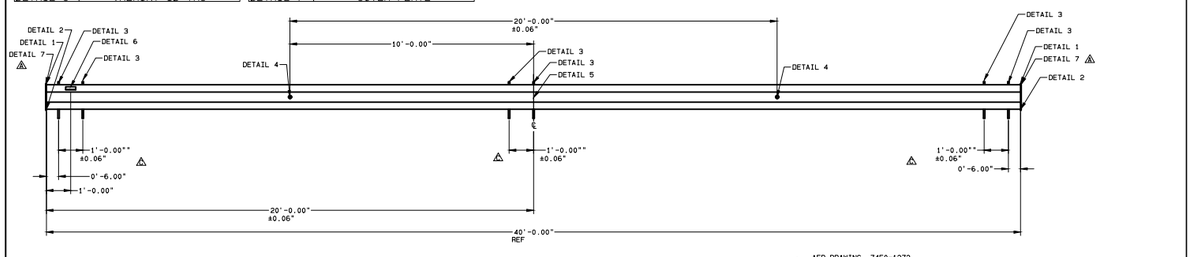
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

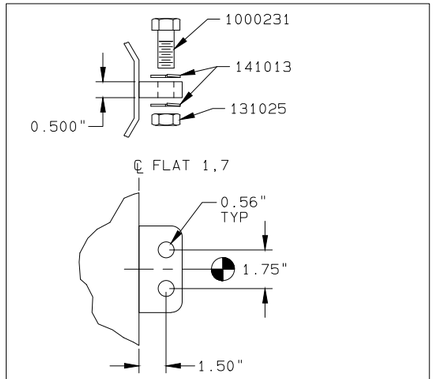


AEP DRAWING 74E0-1272

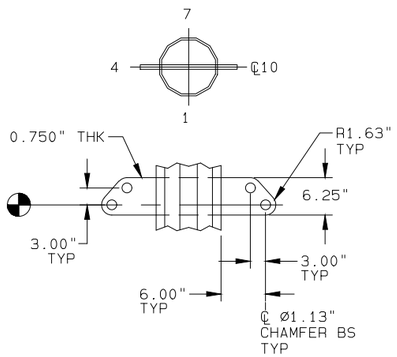
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

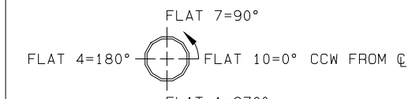


GROUND LUG



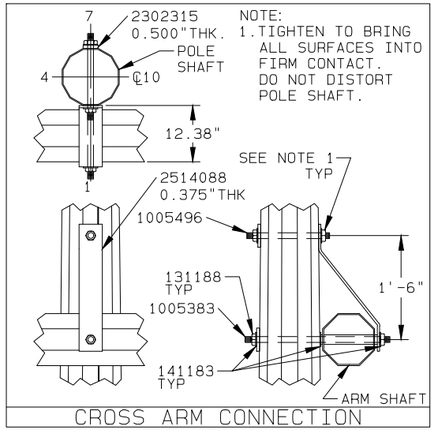
GROUND WIRE VANG

THRU-HOLE



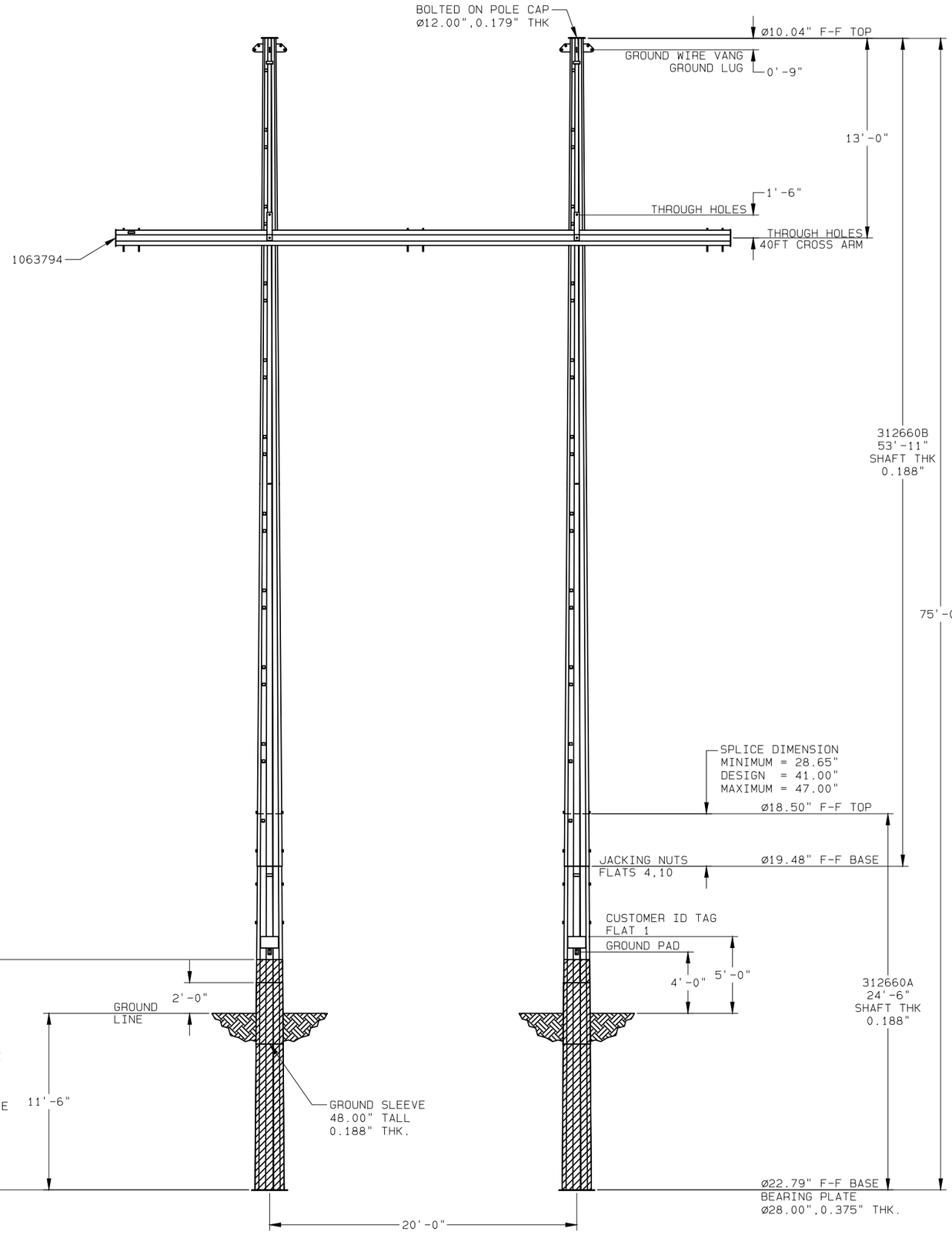
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

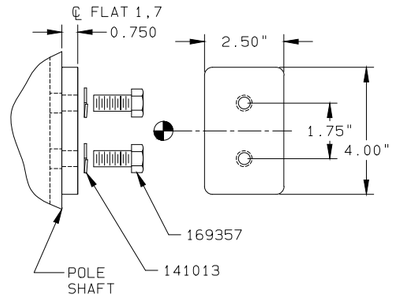
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

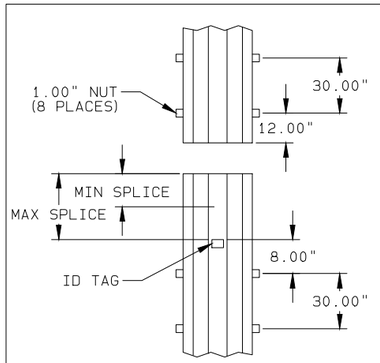
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	95' AGH, CS45-2472, STR 94	312659Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

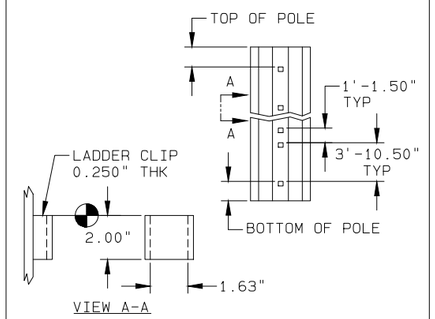
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S075-0345 75' H4
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312660A	SECTION ASSEMBLY	1,326	2
312660B	SECTION ASSEMBLY	1,727	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005383	1.00	29.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
63.5' AGH, STR# 115

DUPLICATE DRAWING DISTRIBUTION

PED52895163.5'_AGH,_CS45-2472,_STR_115__

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

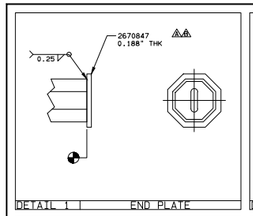
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

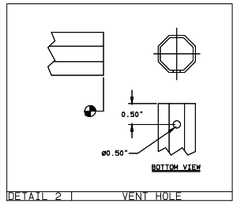
MATERIAL	THICKNESS	WEIGHT
		7,912#

valmont

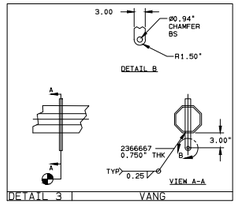
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, CS45-2472, STR 115	312660Z



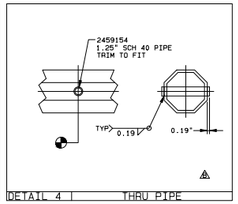
DETAIL 1 | END PLATE



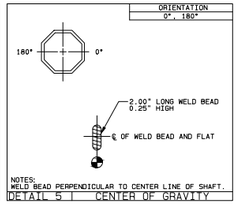
DETAIL 2 | VENT HOLE



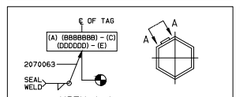
DETAIL 3 | VANG



DETAIL 4 | THRU PIPE



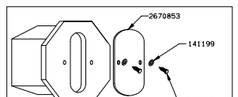
DETAIL 5 | CENTER OF GRAVITY



VIEW A-A

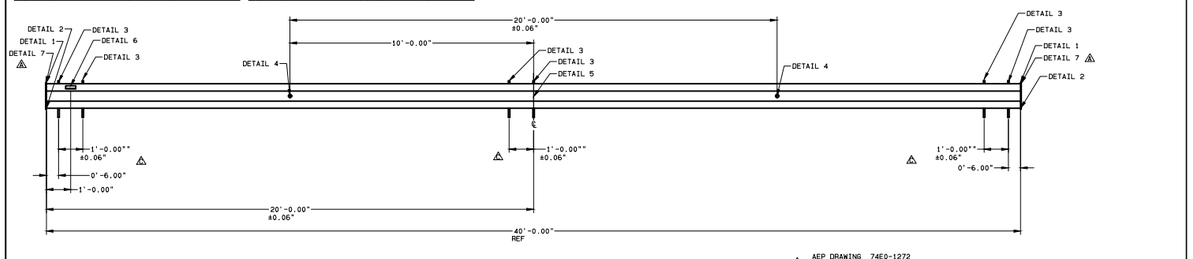
NOTES:
STAMP OR ENGRAVE IN 0.50" HIGH CHARACTERS THE REQUIRED INFORMATION SHOWN IN THIS DETAIL PER WORK INSTRUCTION WI 08.00.
A = MANUFACTURING SITE (ONE CHARACTER)
B = VALMONT PART NUMBER (SEVEN CHARACTERS)
C = FABRICATION SEQUENCE NUMBER (ONE OR MORE CHARACTERS)
D = VALMONT ORDER NUMBER (SIX CHARACTERS)
E = VALMONT ORDER RELEASE NUMBER (ONE OR MORE CHARACTERS)

DETAIL 6 | VALMONT ID TAG



NOTE: INSTALL COVER PLATE PRIOR TO SHIPPING.

DETAIL 7 | COVER PLATE

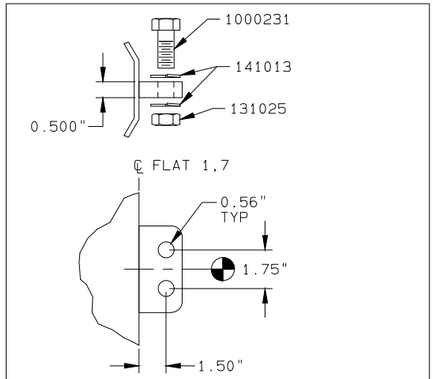


AEP DRAWING 74E0-1272

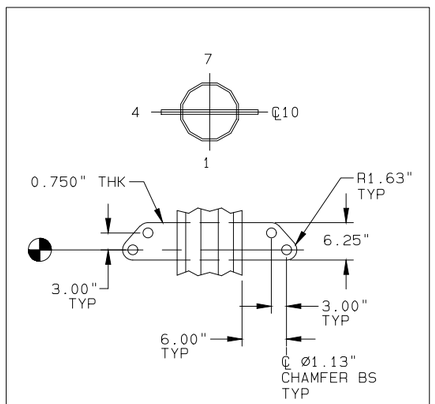
NOTES
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

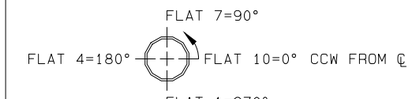


GROUND LUG



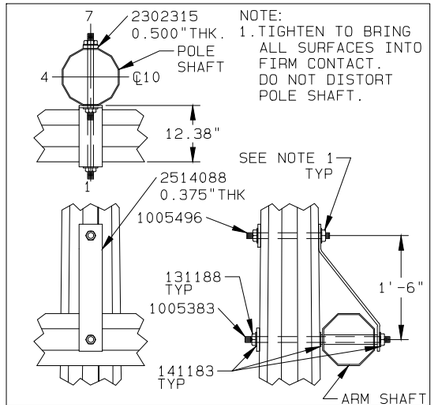
GROUND WIRE VANG

THRU-HOLE



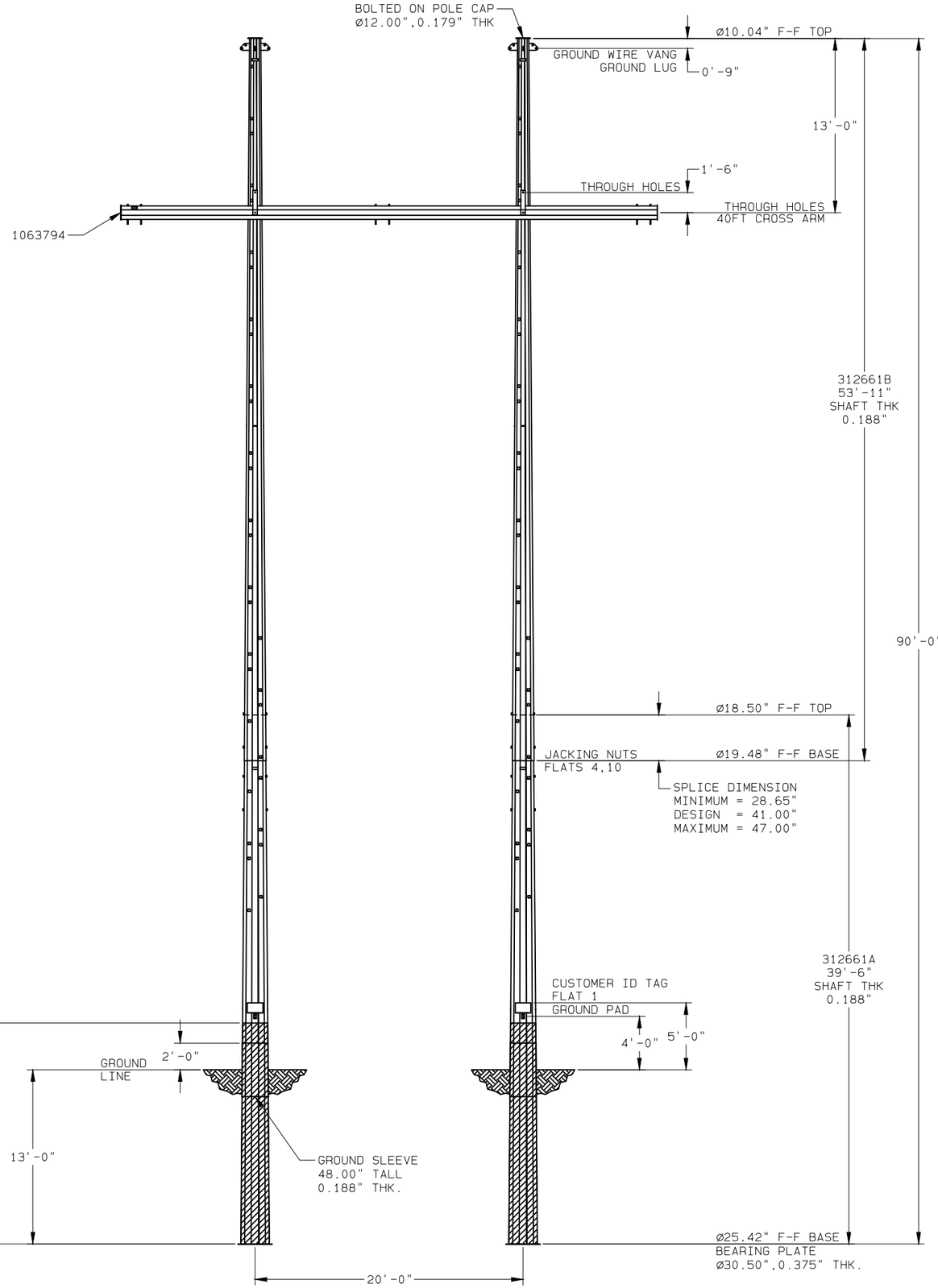
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

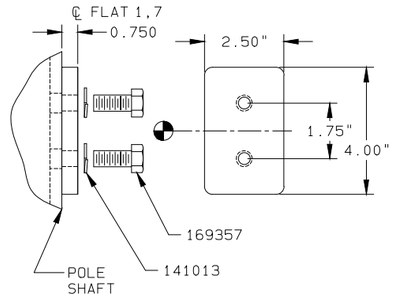
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

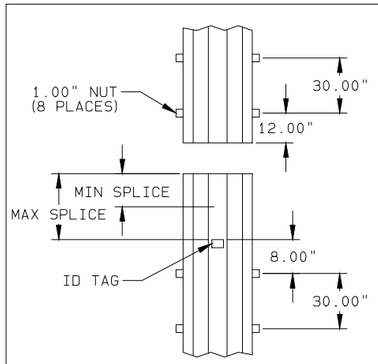
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, CS45-2472, STR 115	312660Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

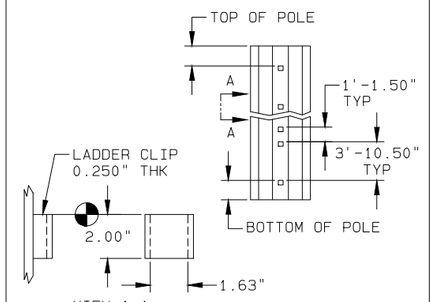
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

ROSS - HEPPNER
AEP DWG: CS45-2472
77.0' AGH, STR# 95,121,151,
154,156

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S090-0419 90' H4
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312661A	SECTION ASSEMBLY	2,126	2
312661B	SECTION ASSEMBLY	1,736	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005383	1.00	29.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

DUPLICATE DRAWING DISTRIBUTION

PED52895177__AGH,STR_95,121,151,154,156_
DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

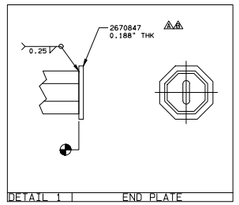
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT: 9,530#

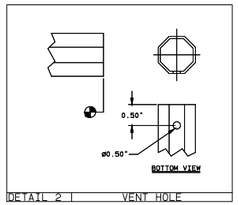
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	77' AGH,STR 95,121,151,154,156	312661Z

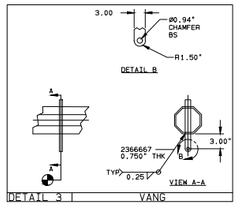
valmont



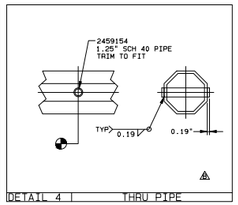
DETAIL 1 | END PLATE



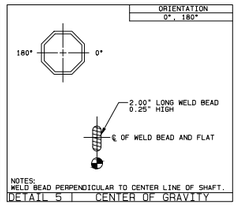
DETAIL 2 | VENT HOLE



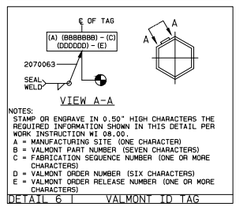
DETAIL 3 | VANG



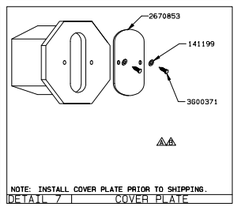
DETAIL 4 | THRU PIPE



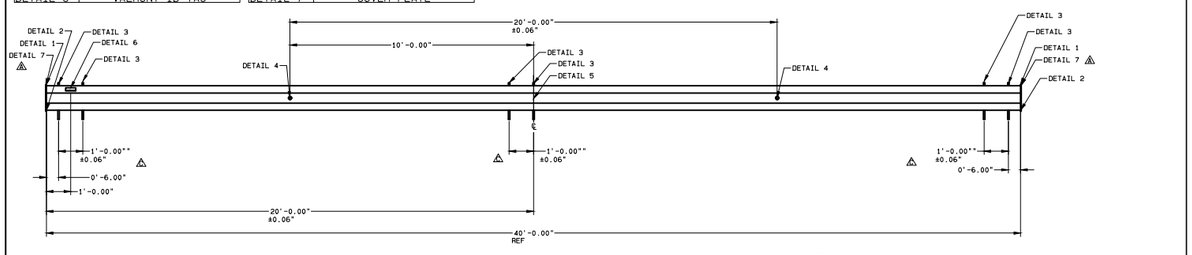
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

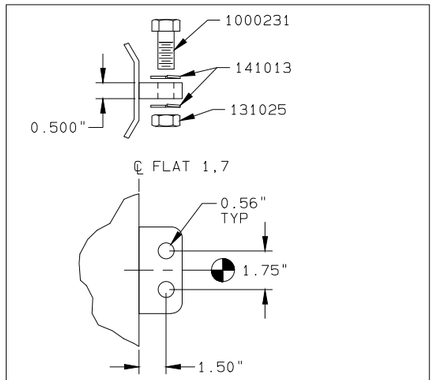


AEP DRAWING 74E0-1272

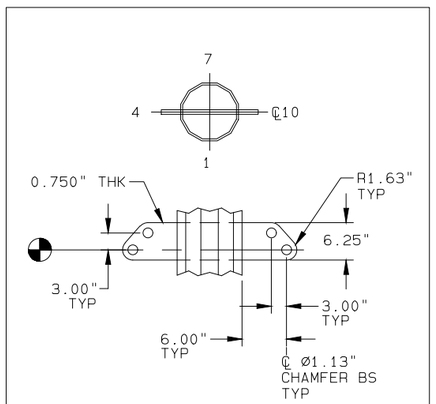
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

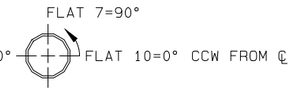


GROUND LUG



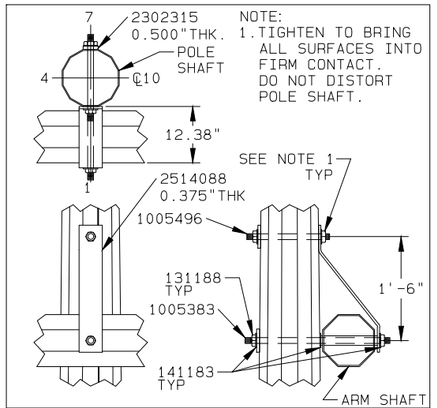
GROUND WIRE VANG

THRU-HOLE



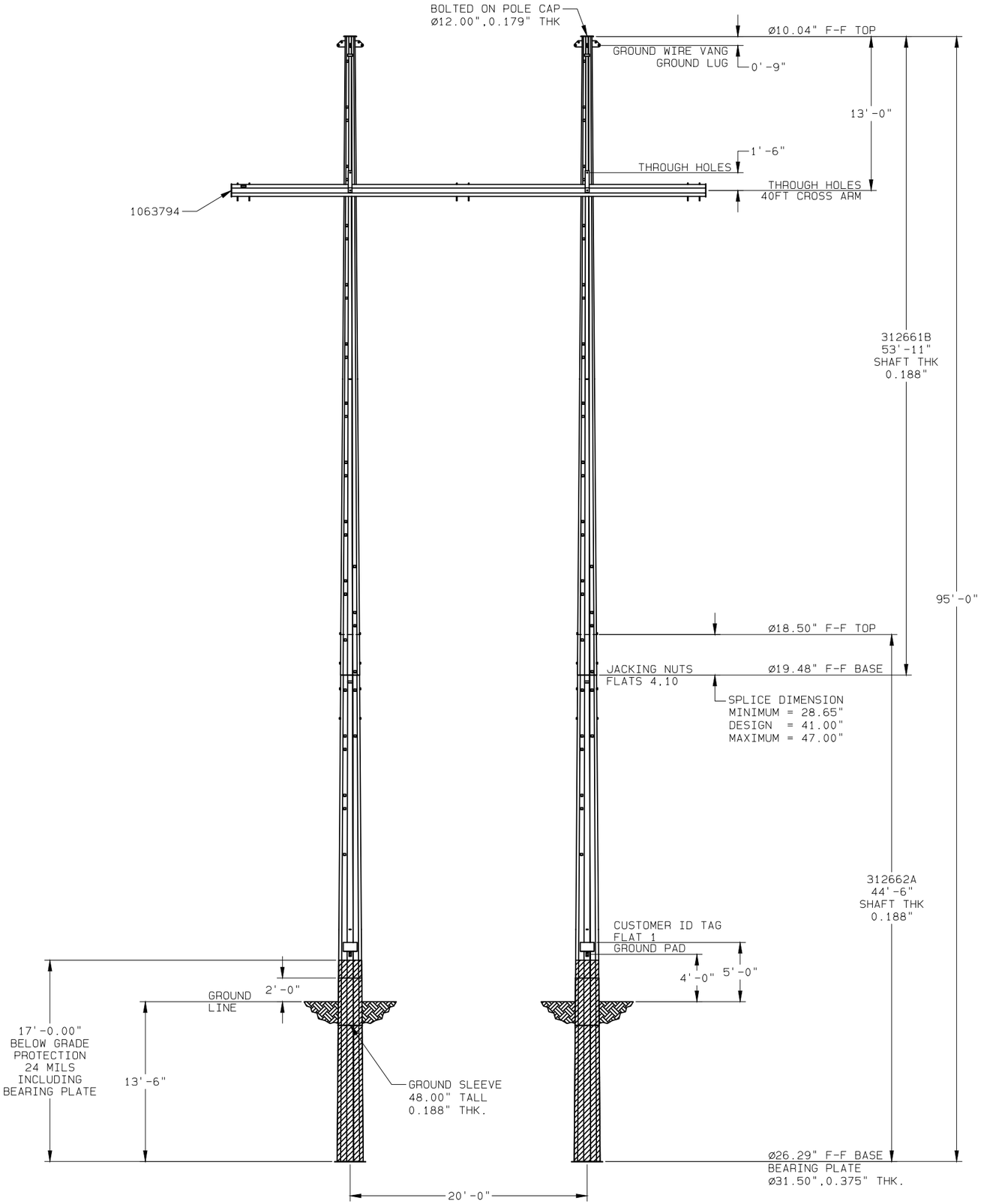
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

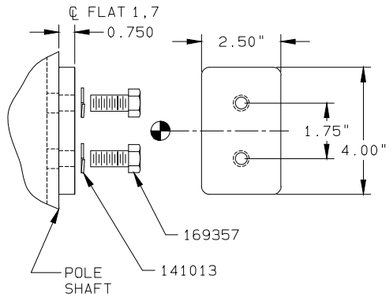
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

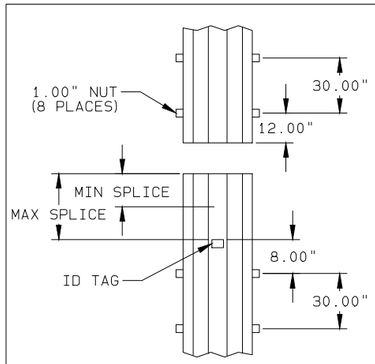
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	77' AGH,STR 95,121,151,154,156	312661Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

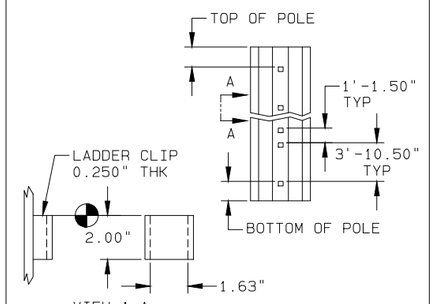
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S095-0443 95' H4
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312662A	SECTION ASSEMBLY	2,412	2
312661B	SECTION ASSEMBLY	1,736	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005383	1.00	29.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
81.5' AGH, STR# 131,132

DUPLICATE DRAWING DISTRIBUTION

PED52895181.5'_AGH,_STR_131,132_____

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

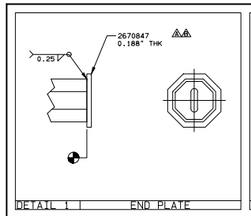
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT: 10,102#

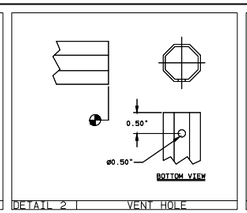
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, STR 131,132	312662Z

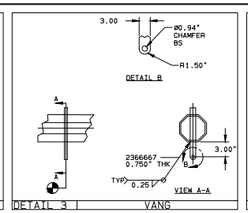
valmont



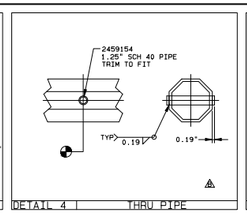
DETAIL 1 | END PLATE



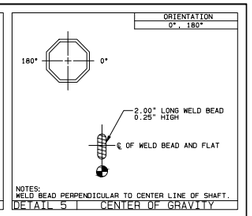
DETAIL 2 | VENT HOLE



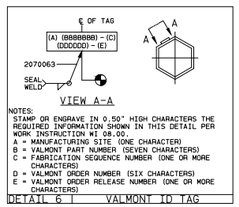
DETAIL 3 | VANG



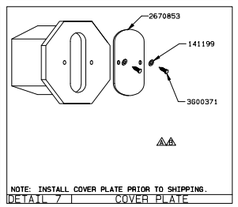
DETAIL 4 | THRU PIPE



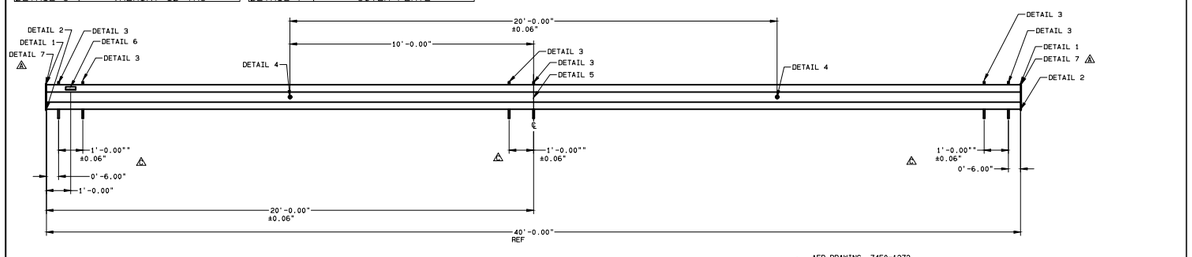
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE



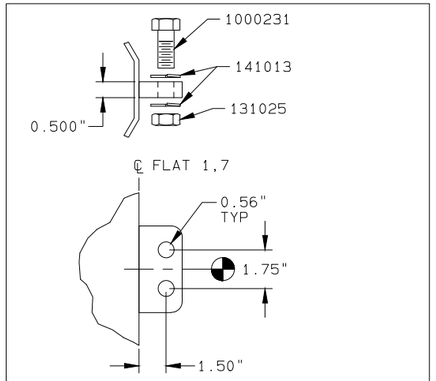
AEP DRAWING 74E0-1272

NOTES

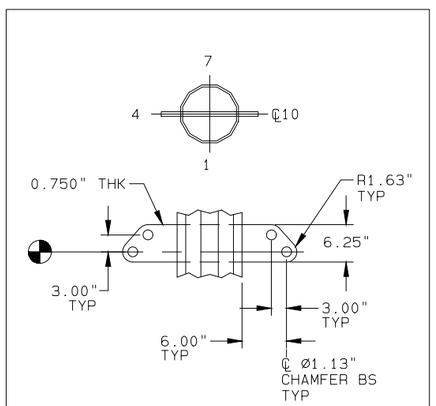
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

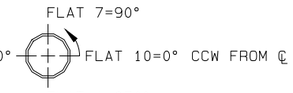


GROUND LUG



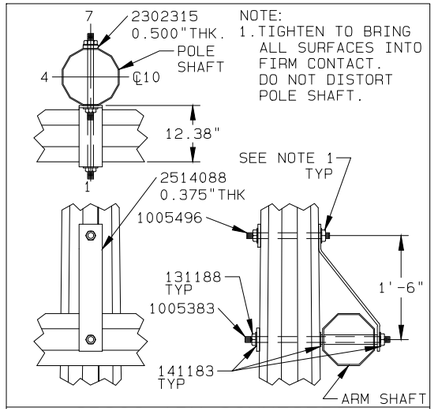
GROUND WIRE VANG

THRU-HOLE



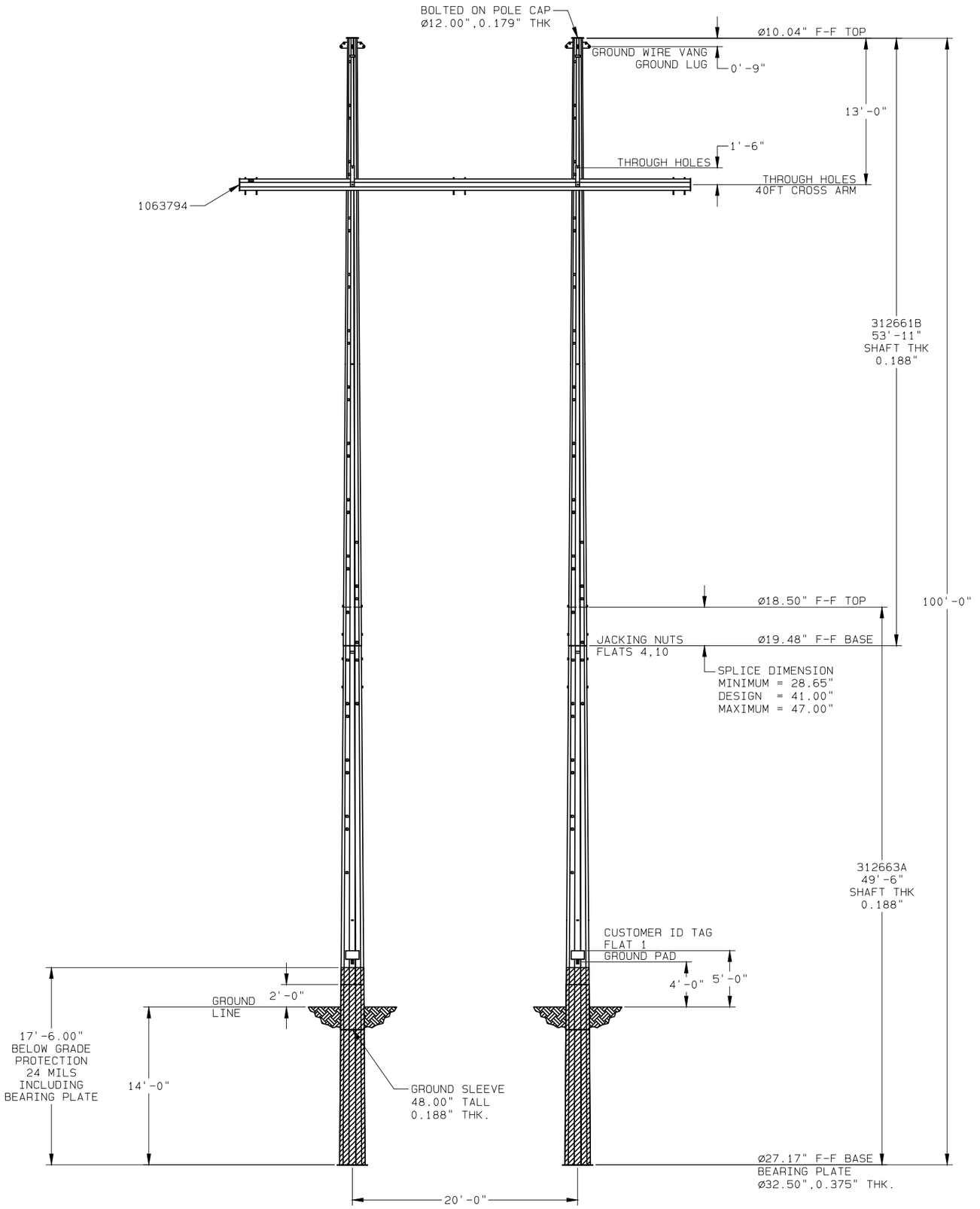
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

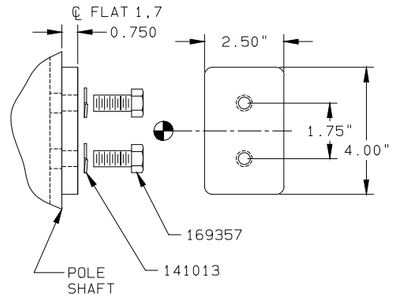
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

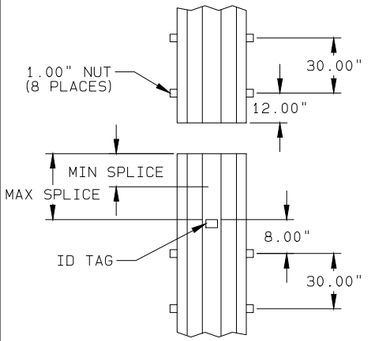
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, STR 131,132	312662Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

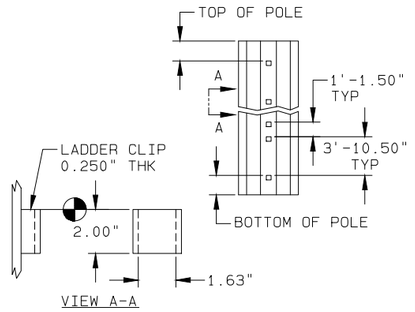
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S100-0468 100' H4
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312663A	SECTION ASSEMBLY	2,706	2
312661B	SECTION ASSEMBLY	1,736	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
86.0' AGH, STR# 105

DUPLICATE DRAWING DISTRIBUTION

PED52895186'_AGH,_CS45-2472,_STR_105___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

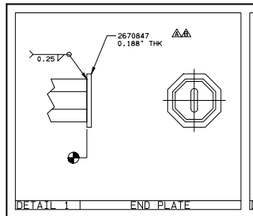
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

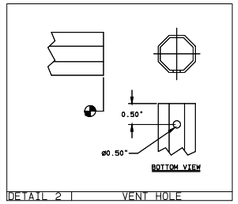
MATERIAL | THICKNESS | WEIGHT 10,690#

valmont

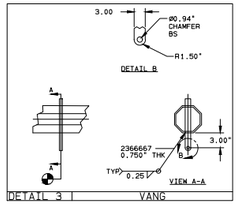
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, CS45-2472, STR 105	312663Z



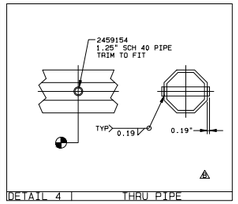
DETAIL 1 | END PLATE



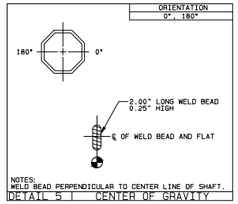
DETAIL 2 | VENT HOLE



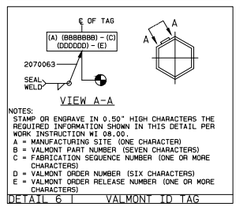
DETAIL 3 | VANG



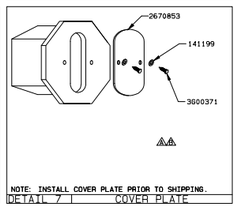
DETAIL 4 | THRU PIPE



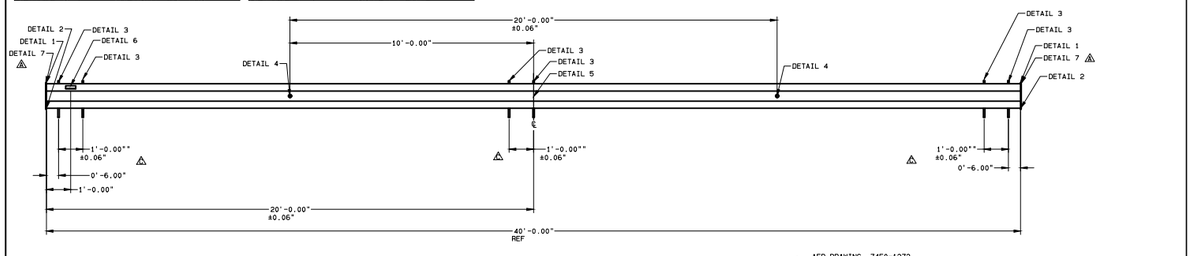
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

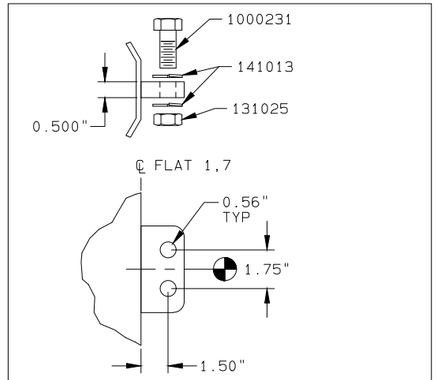


AEP DRAWING 74E0-1272

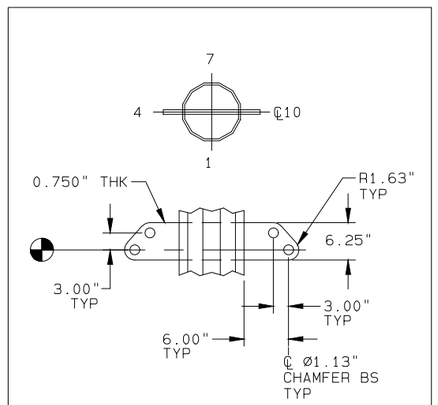
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	1063794

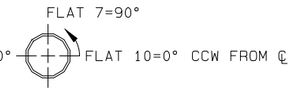


GROUND LUG



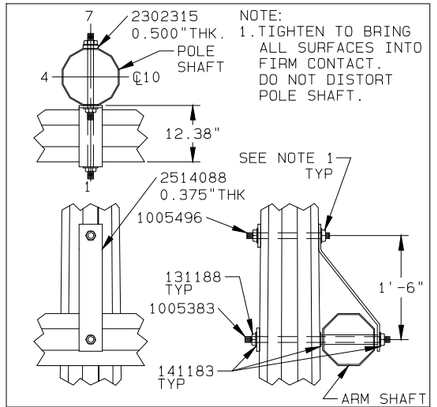
GROUND WIRE VANG

THRU-HOLE



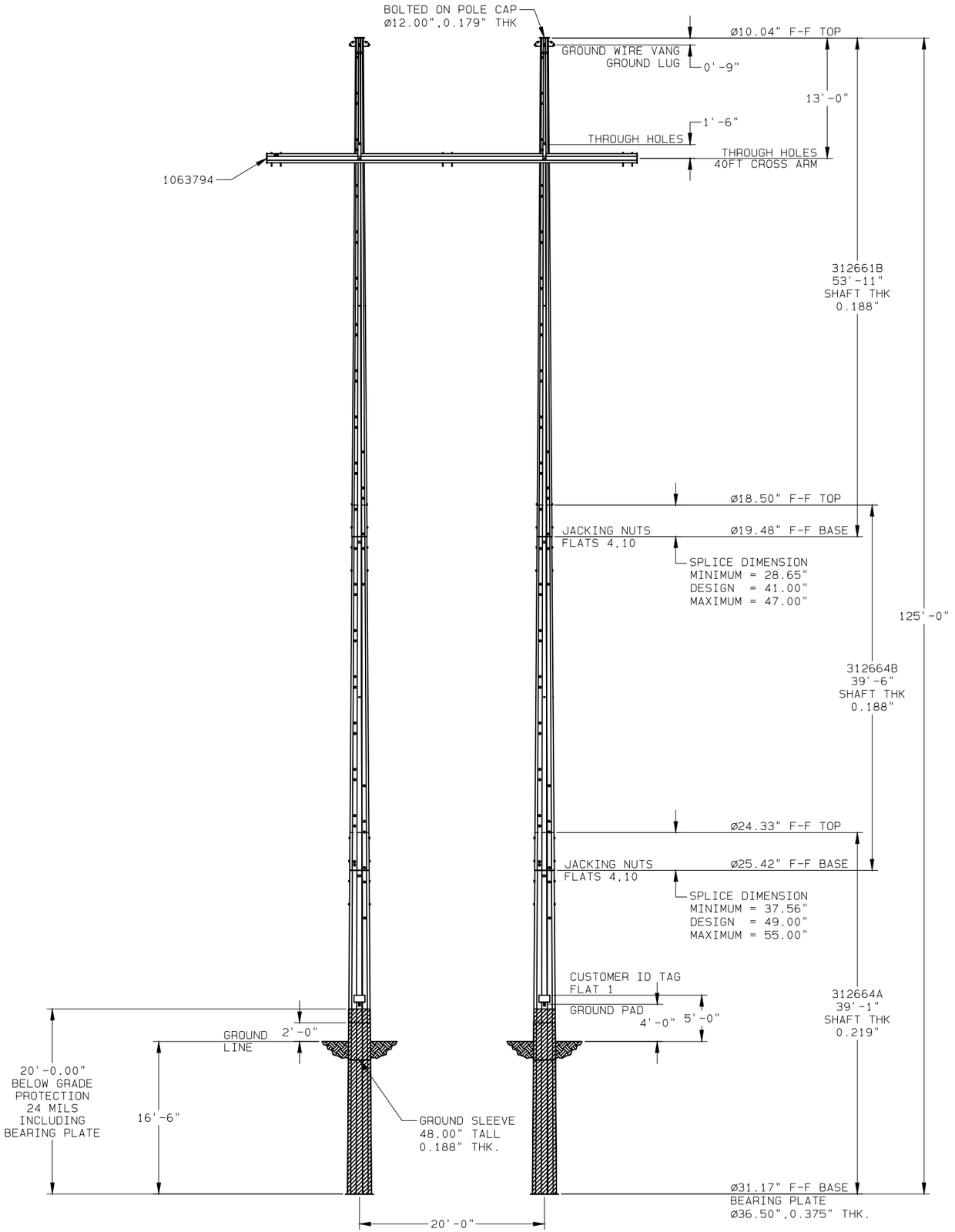
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

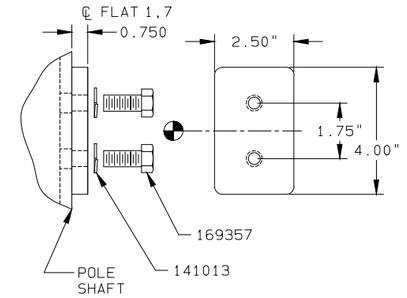
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

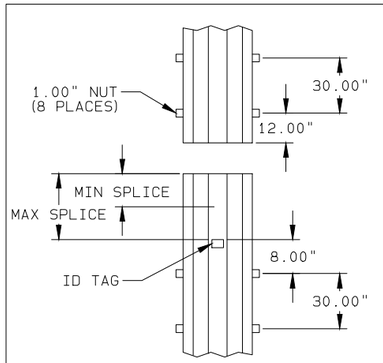
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, CS45-2472, STR 105	312663Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

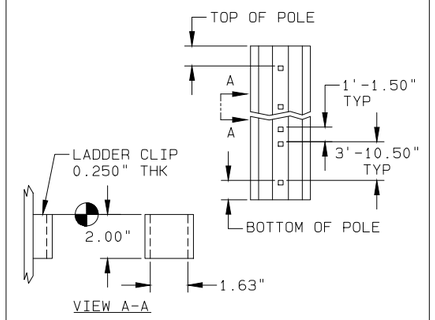
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S125-0584 125' H4
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY, ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312664A	SECTION ASSEMBLY	3,024	2
312664B	SECTION ASSEMBLY	1,844	2
312661B	SECTION ASSEMBLY	1,736	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
108.5' AGH, STR# 116,135,136

DUPLICATE DRAWING DISTRIBUTION

PED528951108.5' AGH, STR 116,135,136

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/27/21	NONE

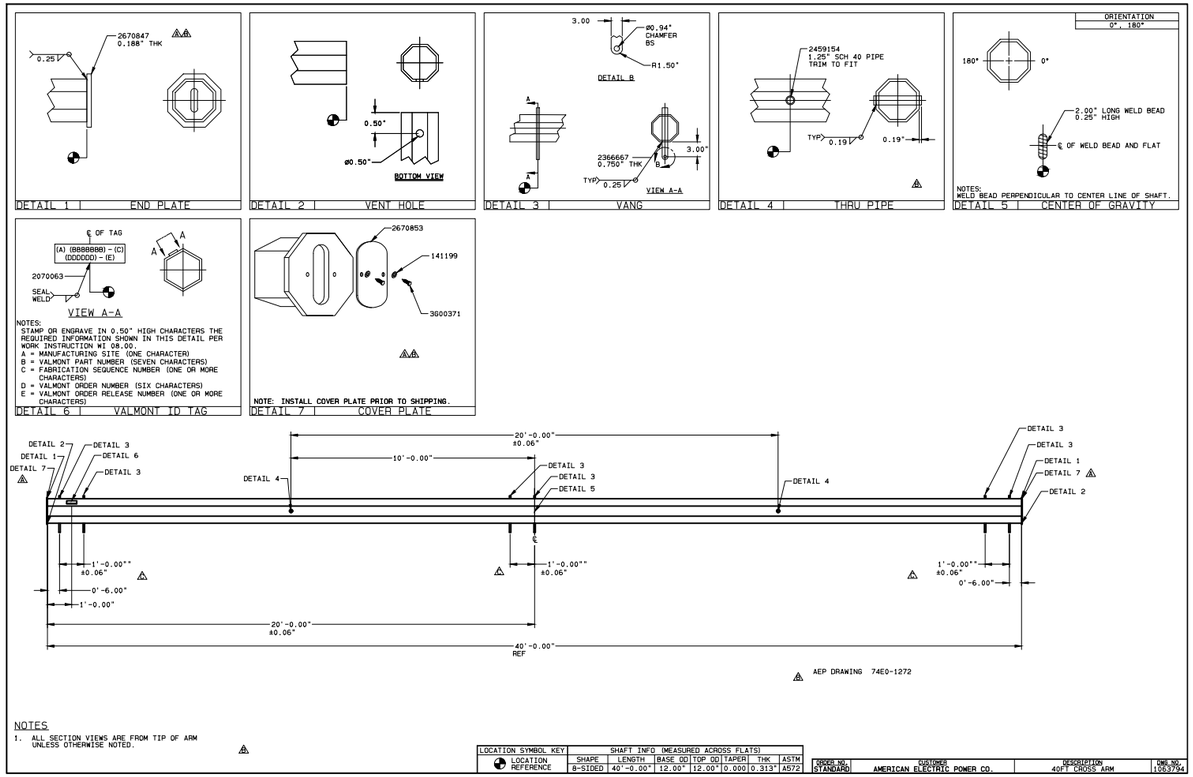
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

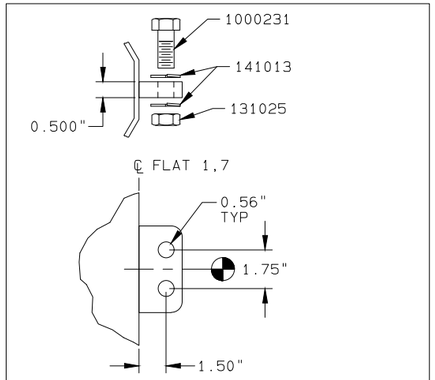
MATERIAL	THICKNESS	WEIGHT
		15,014#

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

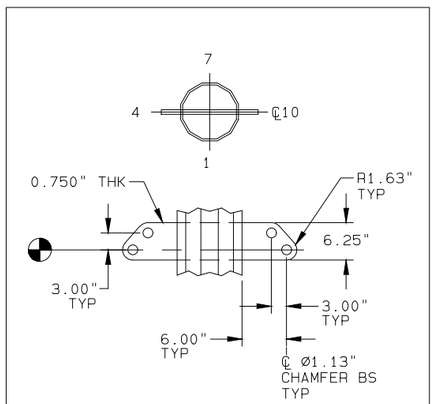
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	108.5' AGH, STR 116,135,136	312664Z

valmont



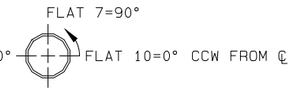


GROUND LUG



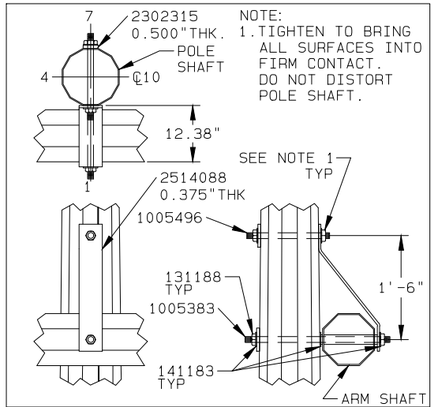
GROUND WIRE VANG

THRU-HOLE



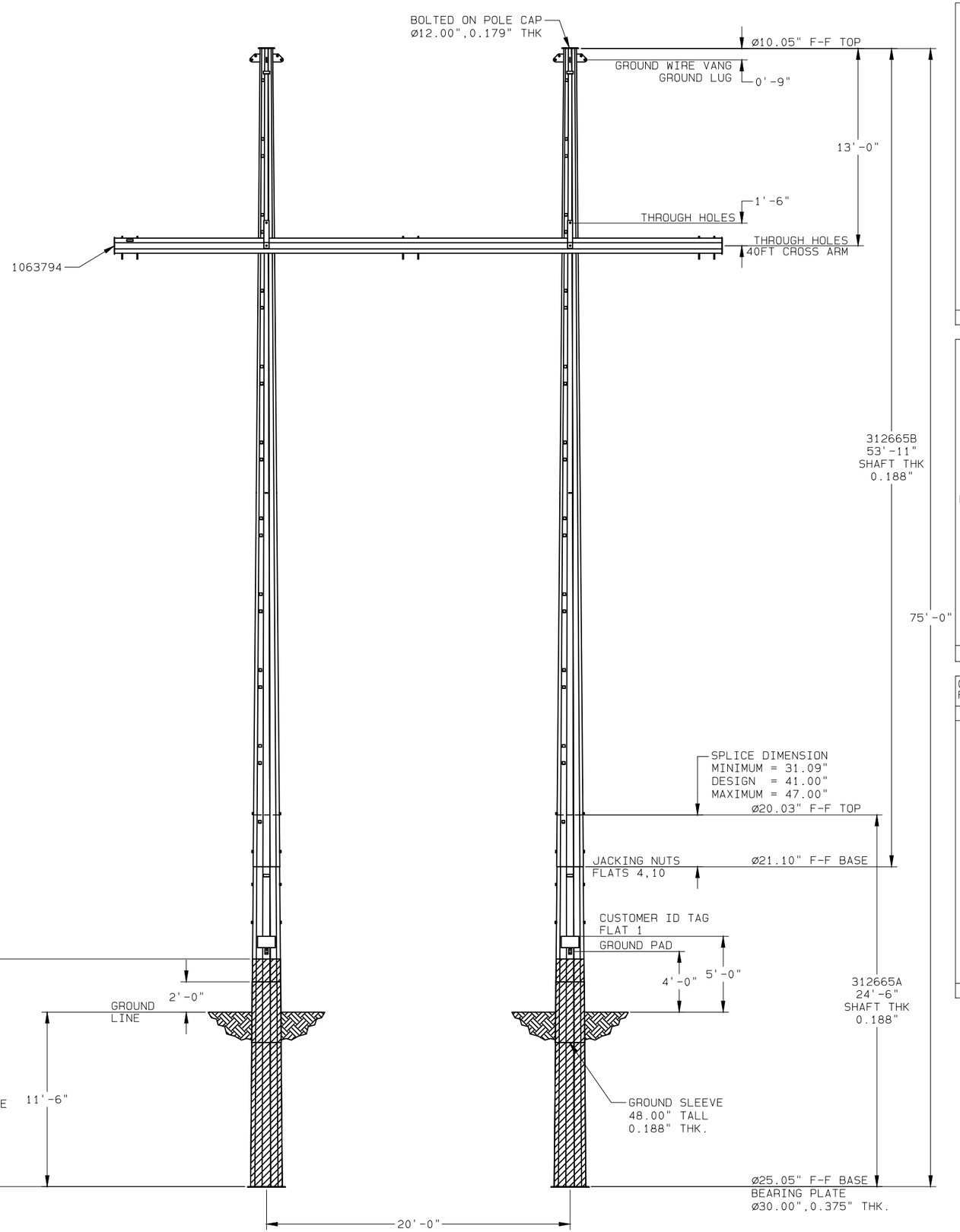
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

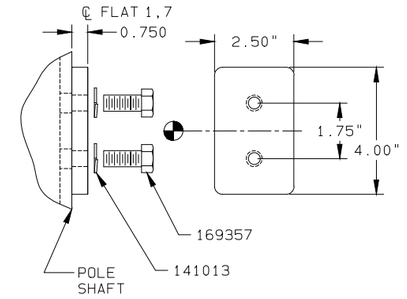
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

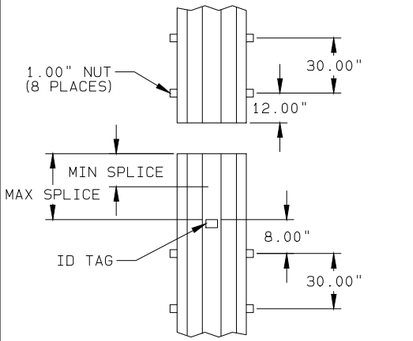
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	108.5' AGH, STR 116,135,136	312664Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

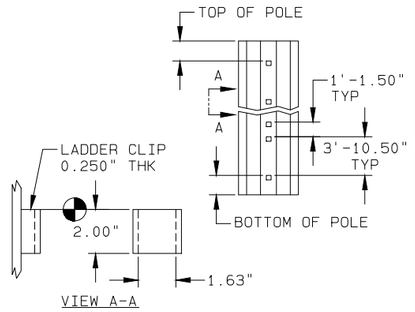
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S075-0397 75' H5
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312665A	SECTION ASSEMBLY	1,451	2
312665B	SECTION ASSEMBLY	1,827	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005390	1.00	30.00				HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
63.5' AGH, STR# 118

DUPLICATE DRAWING DISTRIBUTION

PED52895163.5'_AGH,_CS45-2472,_SIR_118__

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/28/21	NONE

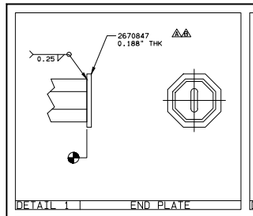
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

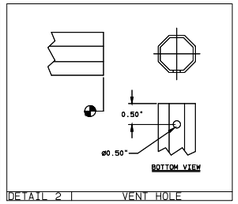
MATERIAL | THICKNESS | WEIGHT 8,363#

valmont

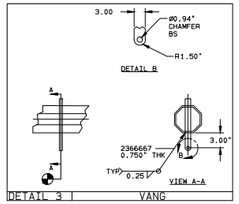
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, CS45-2472, STR 118	312665Z



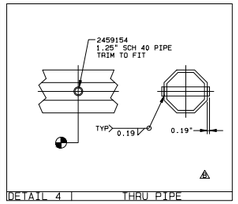
DETAIL 1 | END PLATE



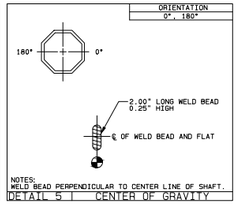
DETAIL 2 | VENT HOLE



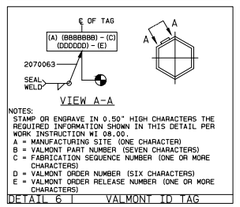
DETAIL 3 | VANG



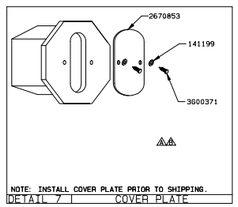
DETAIL 4 | THRU PIPE



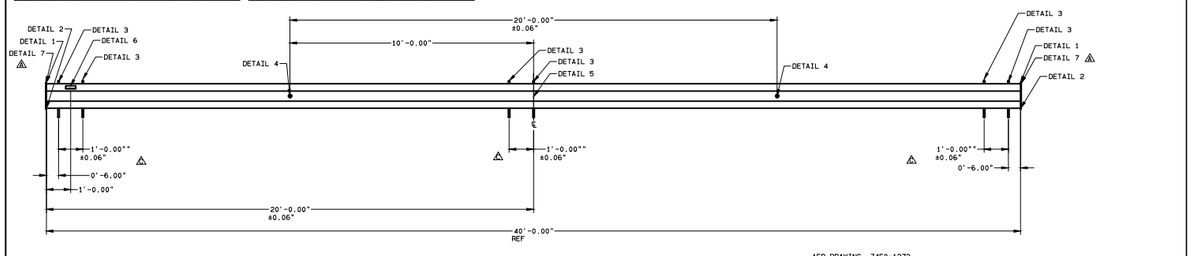
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

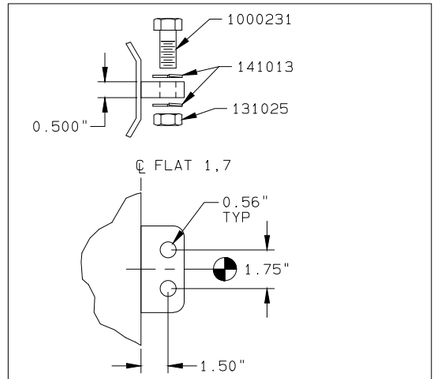


AEP DRAWING 74E0-1272

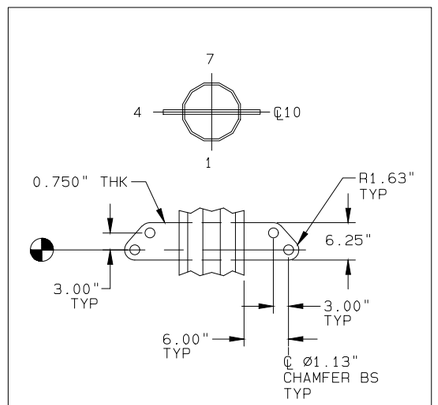
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z



GROUND LUG



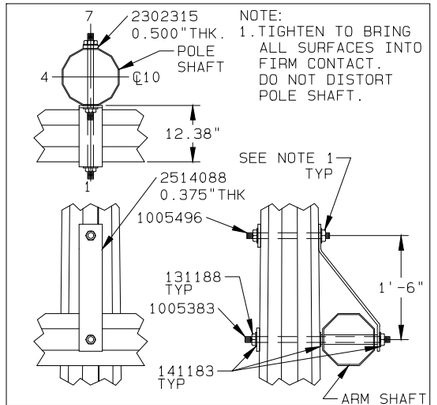
GROUND WIRE VANG

THRU-HOLE



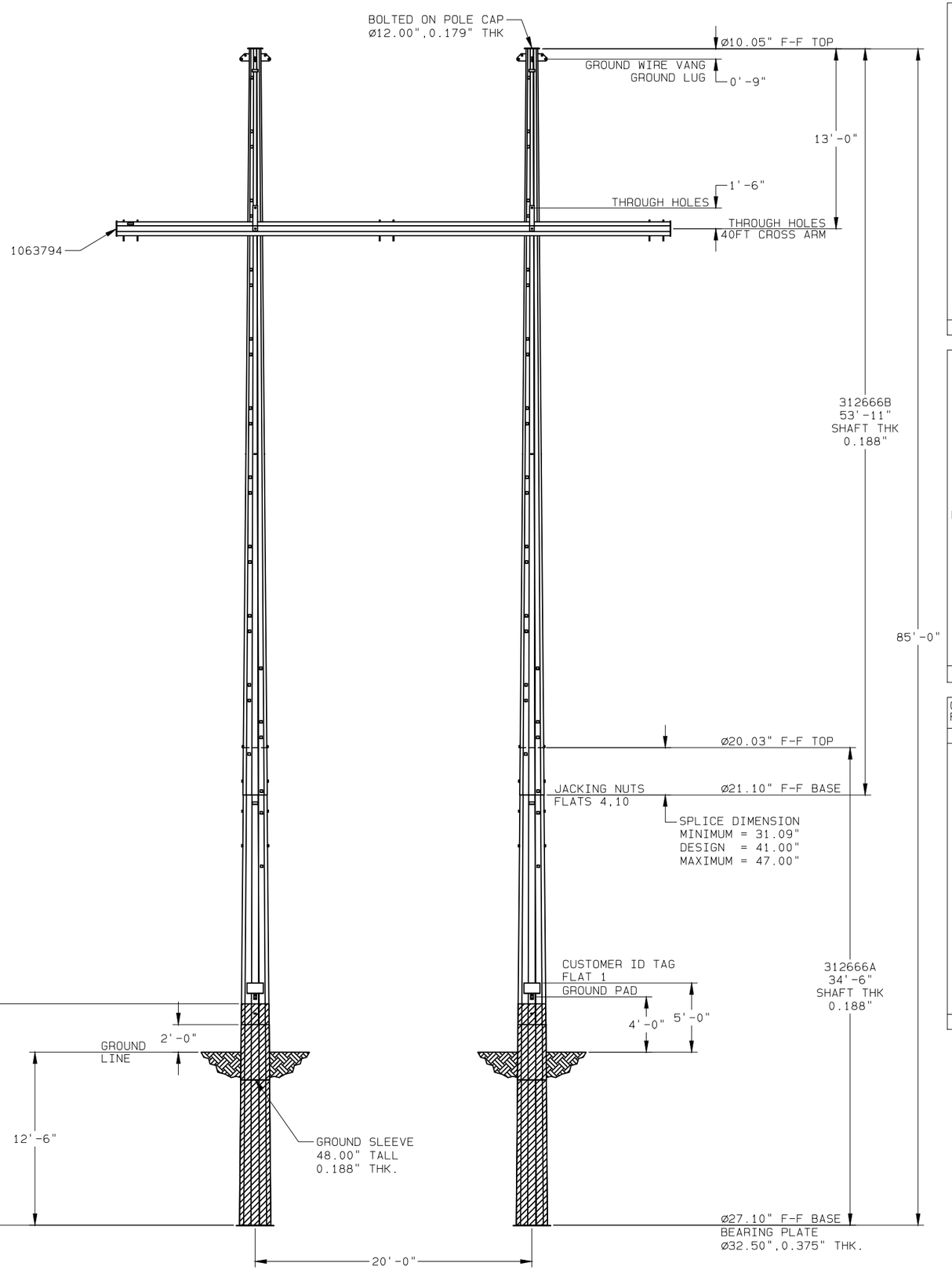
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

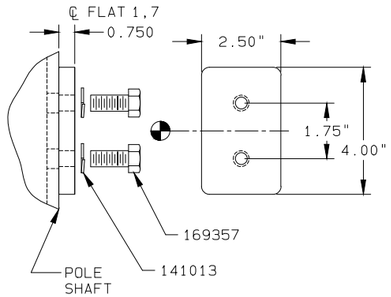
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

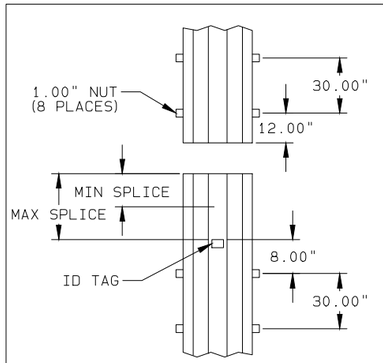
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	63.5' AGH, CS45-2472, STR 118	312665Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

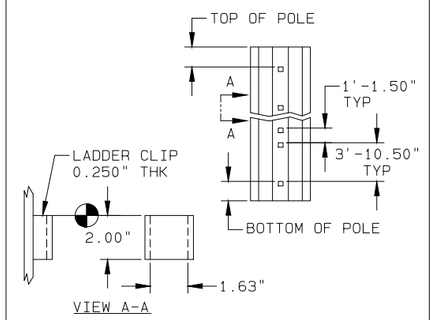
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S085-0453 85' H5
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY, ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312666A	SECTION ASSEMBLY	2,029	2
312666B	SECTION ASSEMBLY	1,830	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION: HARDWARE SIZE (IN) BOLT DIA	BOLT LONG	NUT	WSHR	GENERAL	FINISH	ASTM SPEC	QTY PER STR
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005390	1.00	30.00				HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
72.5' AGH, STR# 122

DUPLICATE DRAWING DISTRIBUTION

PED52895172.5'_AGH,_CS45-2472,_STR_122__

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

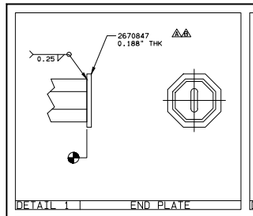
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/28/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

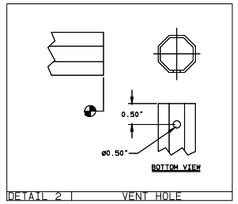
MATERIAL	THICKNESS	WEIGHT
		9,525#

valmont

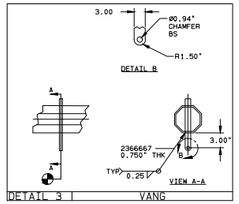
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	72.5' AGH, CS45-2472, STR 122	312666Z



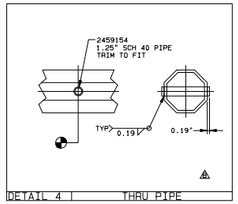
DETAIL 1 | END PLATE



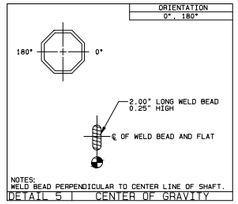
DETAIL 2 | VENT HOLE



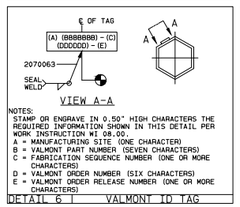
DETAIL 3 | VANG



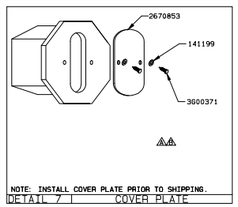
DETAIL 4 | THRU PIPE



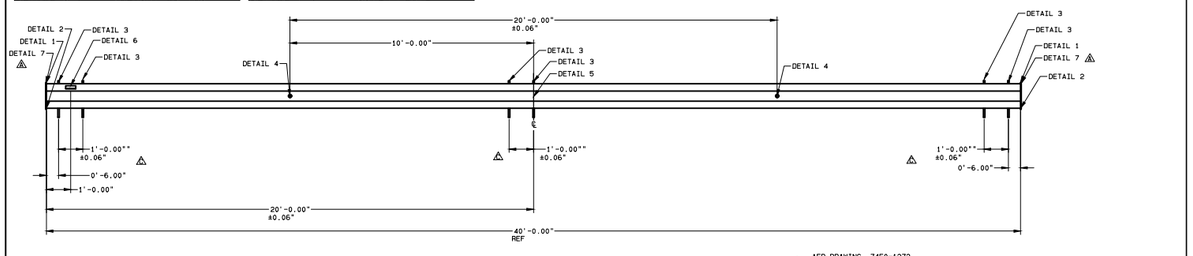
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

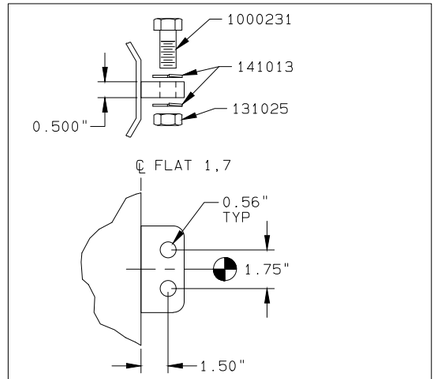


AEP DRAWING 74E0-1272

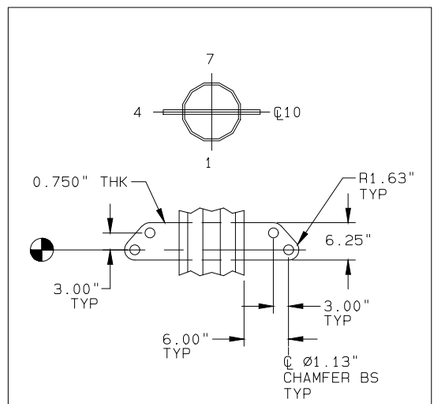
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

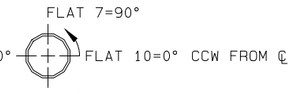


GROUND LUG



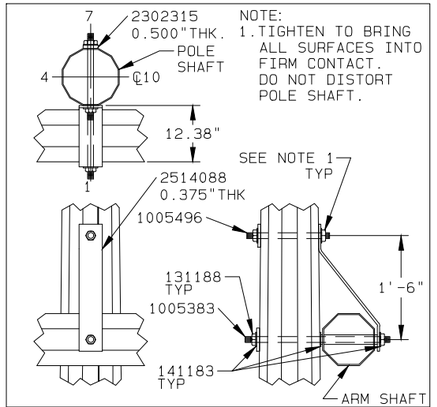
GROUND WIRE VANG

THRU-HOLE



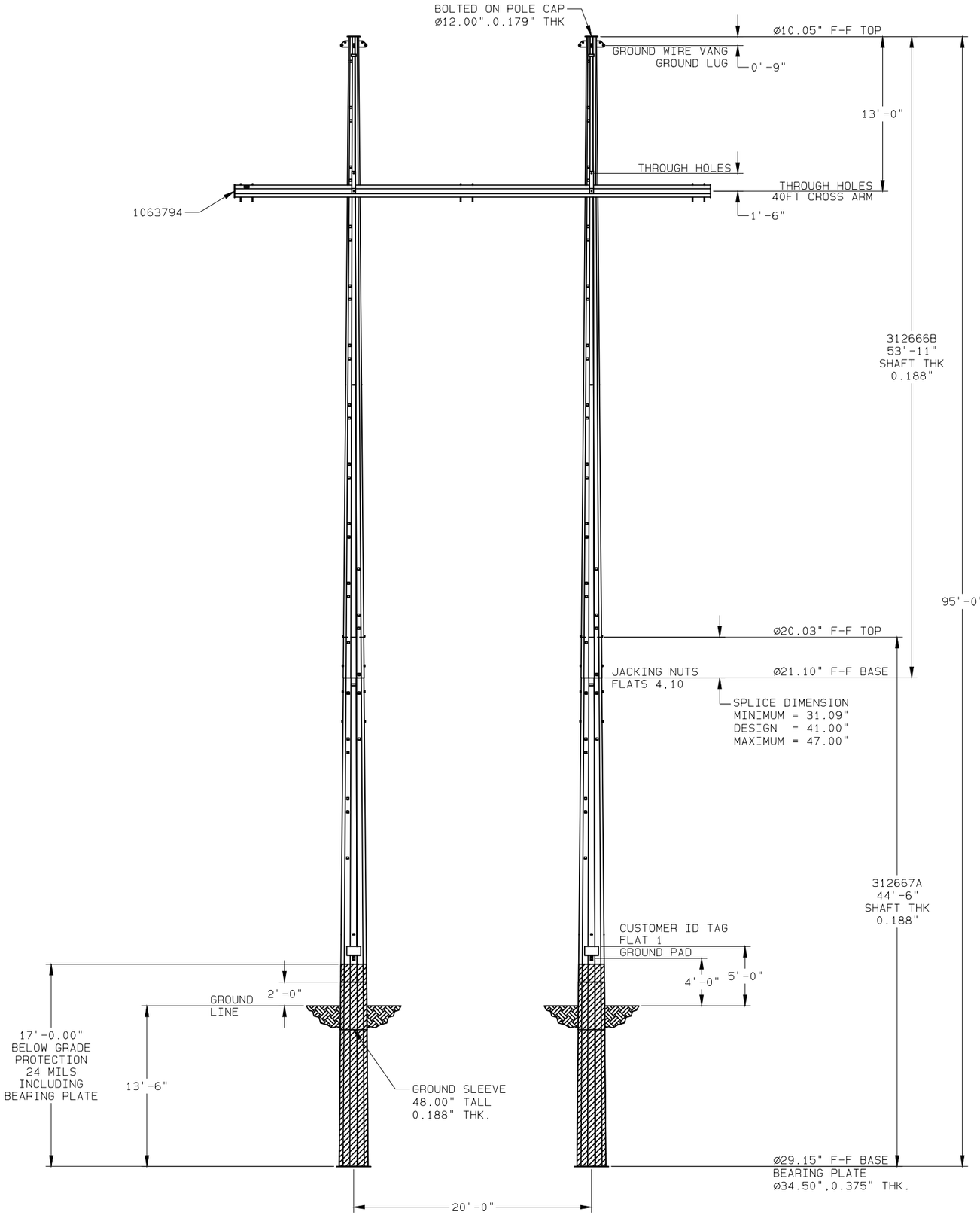
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

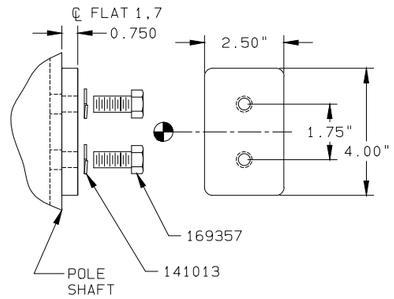
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

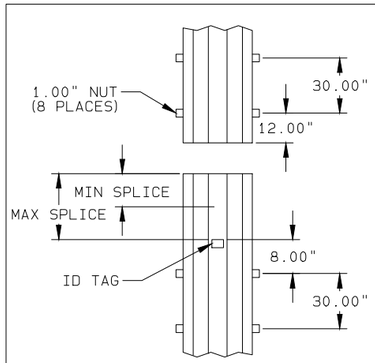
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	72.5' AGH, CS45-2472, STR 122	312666Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

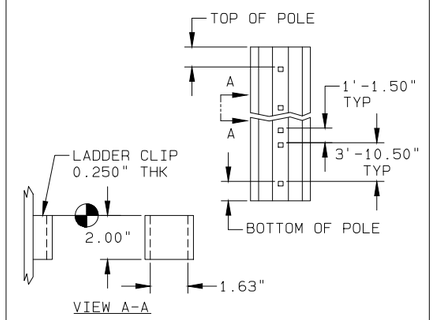
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S095-0509 95' H5
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312667A	SECTION ASSEMBLY	2,656	2
312666B	SECTION ASSEMBLY	1,830	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005390	1.00	30.00				HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
81.5' AGH, STR# 130

DUPLICATE DRAWING DISTRIBUTION

PED52895181.5'_AGH,_CS45-2472,_STR_130__
DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

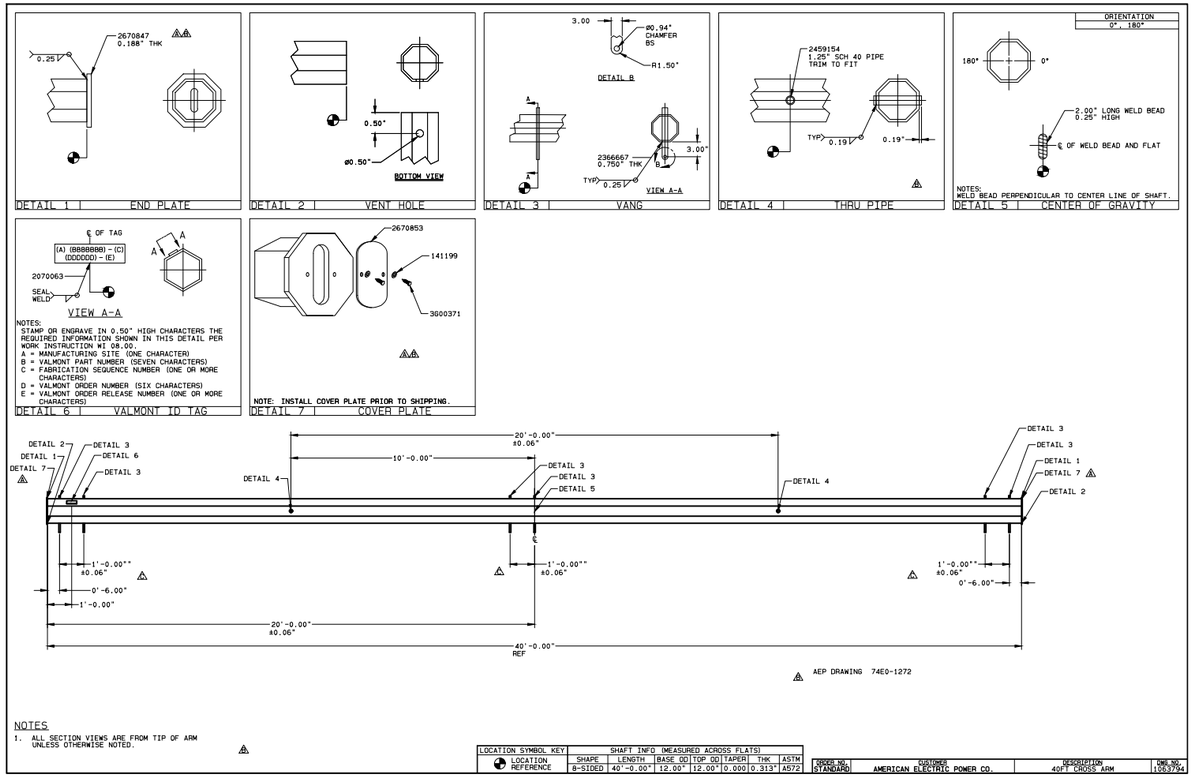
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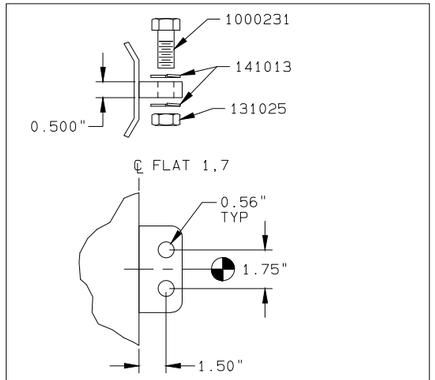
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/28/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT 10,779#

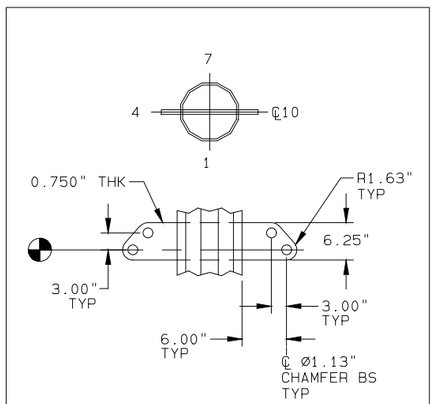
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, CS45-2472, STR 130	312667Z



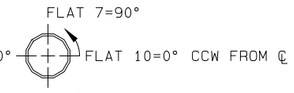


GROUND LUG



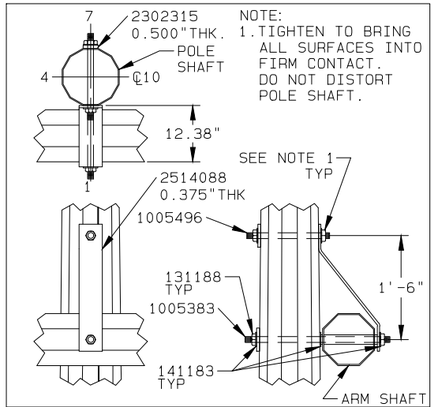
GROUND WIRE VANG

THRU-HOLE



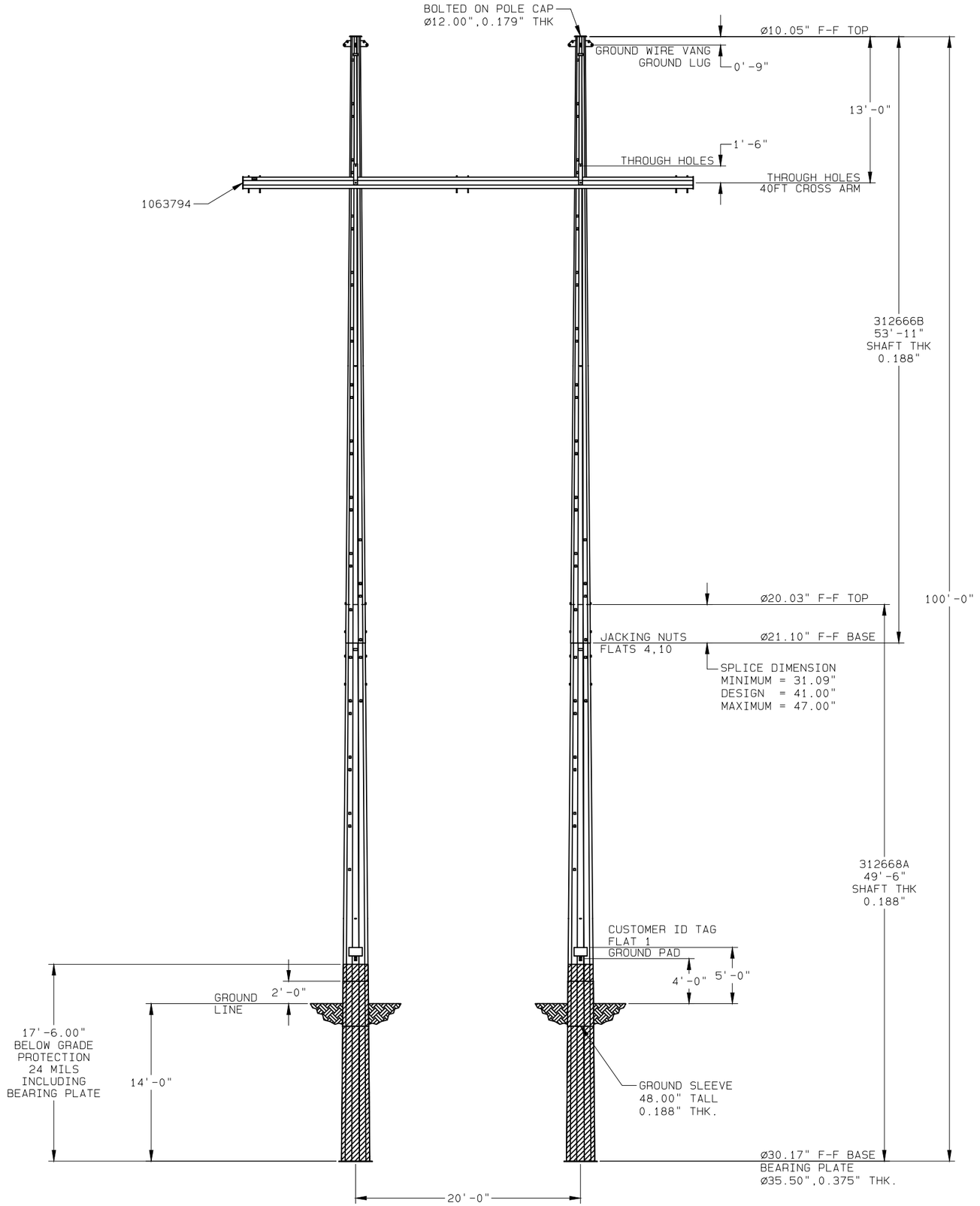
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

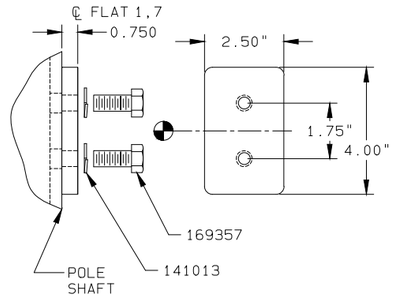
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

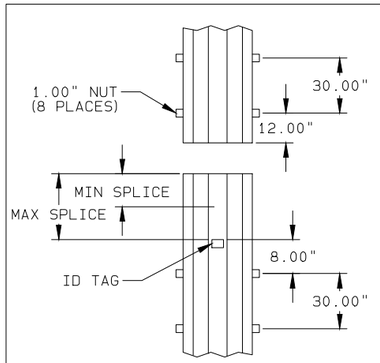
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	81.5' AGH, CS45-2472, STR 130	312667Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

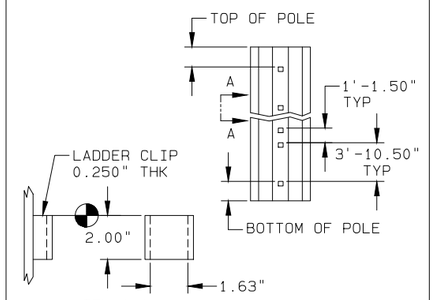
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S100-0537 100' H5
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312668A	SECTION ASSEMBLY	2,984	2
312666B	SECTION ASSEMBLY	1,830	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005390	1.00	30.00				HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
86.0' AGH, STR# 114

DUPLICATE DRAWING DISTRIBUTION

PED52895186__AGH,_CS45-2472,_STR_114____

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

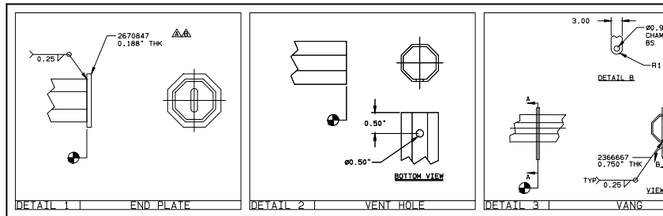
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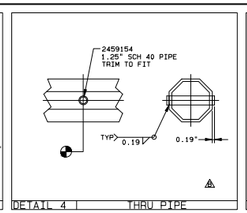
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/28/21	NONE

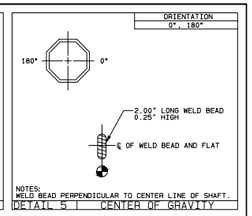
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT: 11,435#

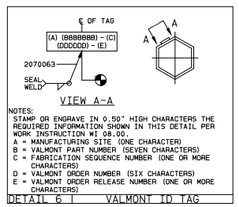
valmont

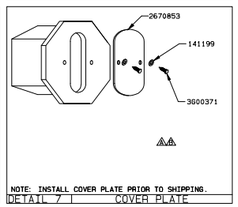
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, CS45-2472, STR 114	312668Z

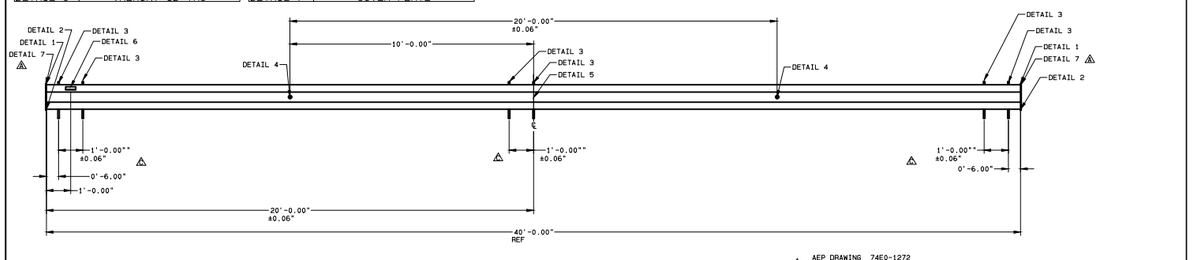








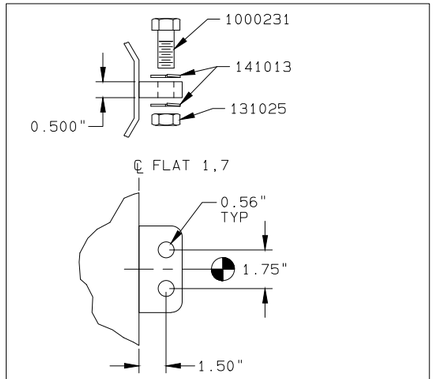




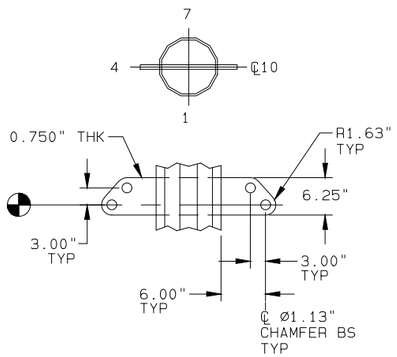
NOTES:
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	1063794

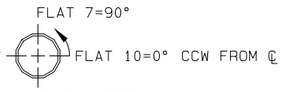


GROUND LUG



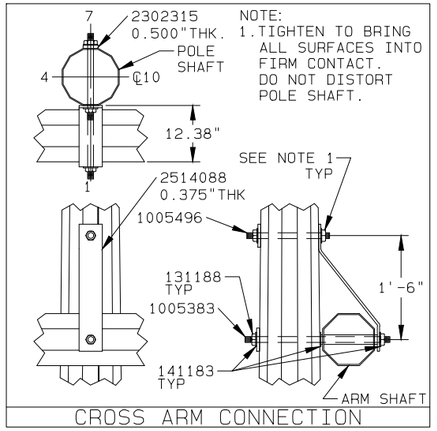
GROUND WIRE VANG

THRU-HOLE



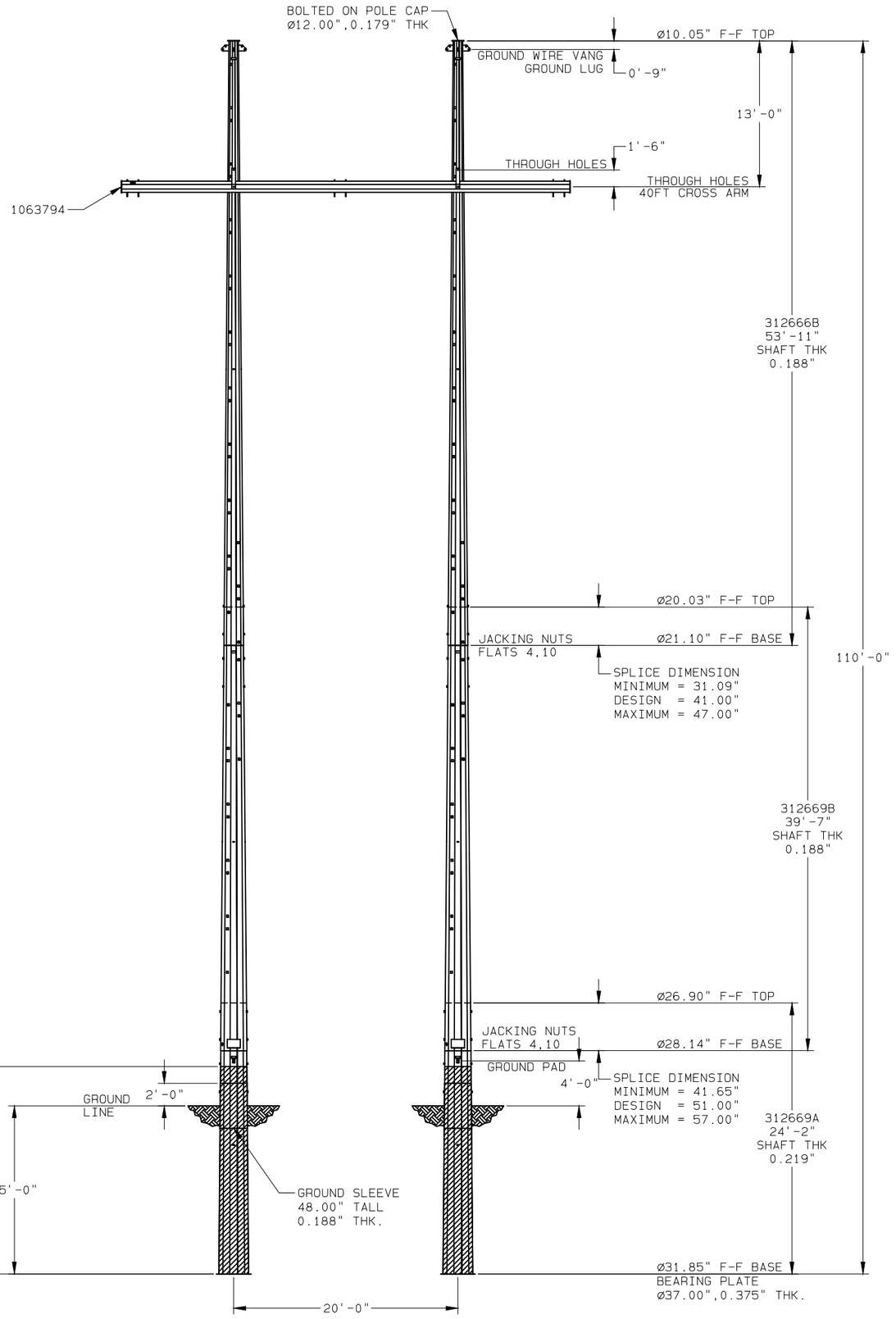
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

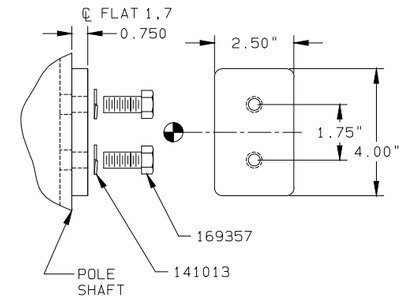
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

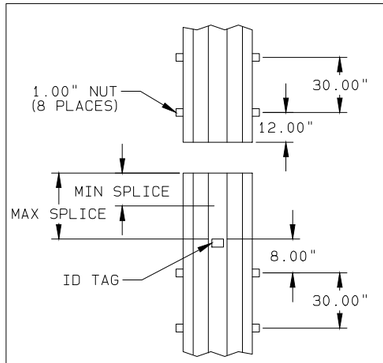
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, CS45-2472, STR 114	312668Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

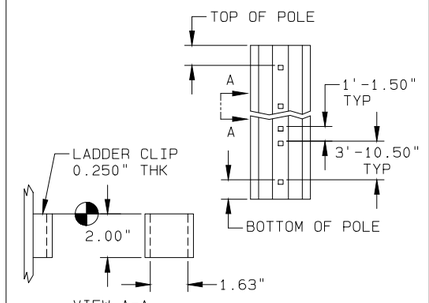
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S110-0594 110' H5
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY, ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E
3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312669A	SECTION ASSEMBLY	2,109	2
312669B	SECTION ASSEMBLY	2,028	2
312666B	SECTION ASSEMBLY	1,830	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1005496	1.00	17.00				HDGV	A449	2
1005390	1.00	30.00				HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
95' AGH, STR# 106

DUPLICATE DRAWING DISTRIBUTION

PED52895195'_AGH,_CS45-2472,_STR_106___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

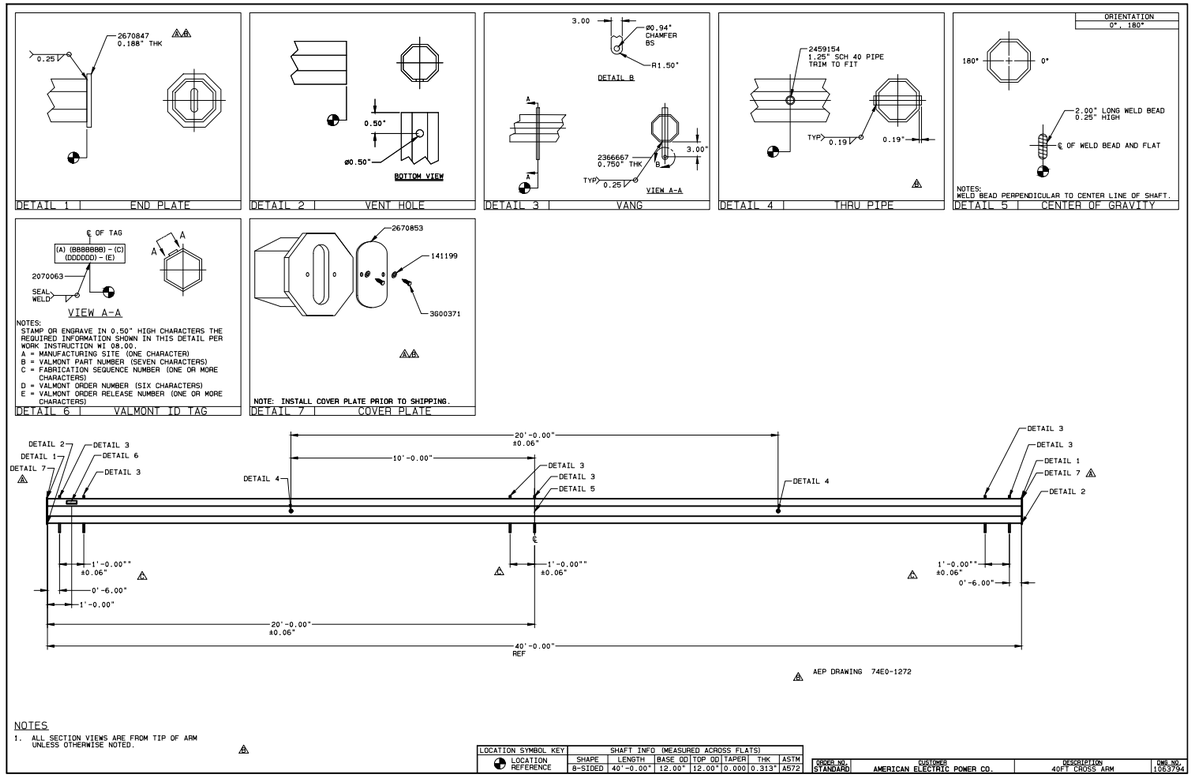
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/28/21	NONE

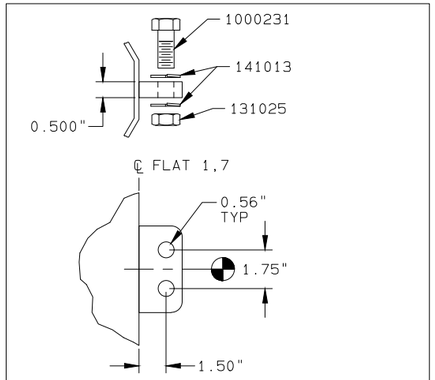
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		13,741#

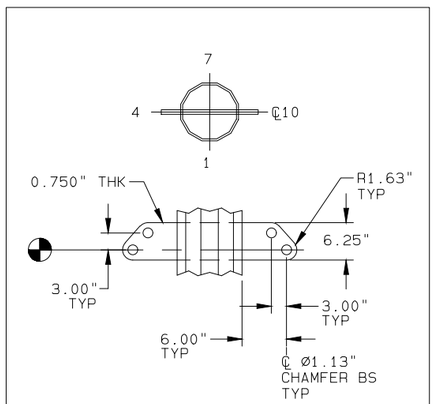
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	95' AGH, CS45-2472, STR 106	312669Z



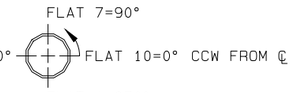


GROUND LUG



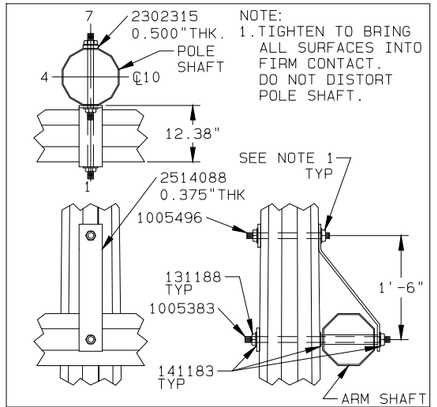
GROUND WIRE VANG

THRU-HOLE



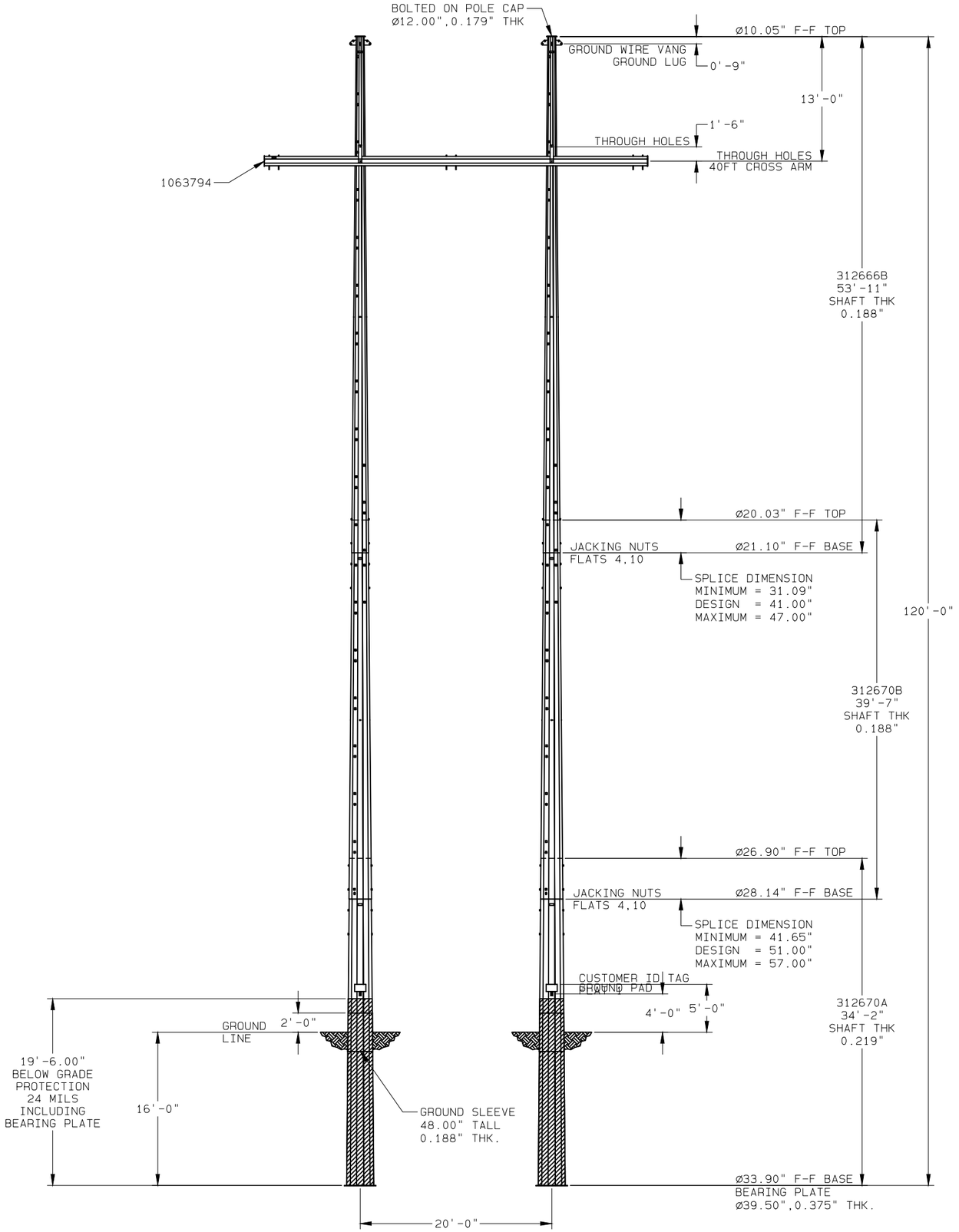
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

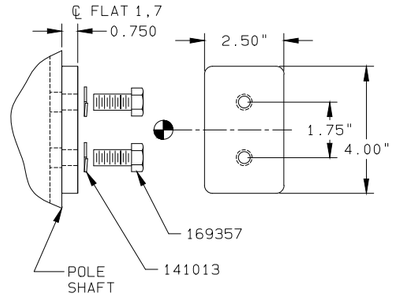
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

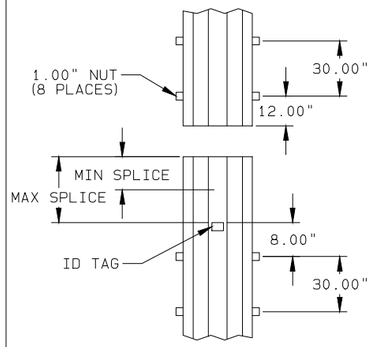
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	95' AGH, CS45-2472, STR 106	312669Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

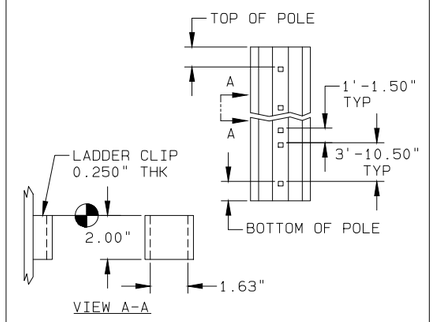
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S120-0650 120' H5
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY, ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

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   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312670A	SECTION ASSEMBLY	2,949	2
312670B	SECTION ASSEMBLY	2,023	2
312666B	SECTION ASSEMBLY	1,830	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		4
1000231	0.50	1.75				HDGV	A307		4
141013				0.50	LOCK	HDGV	-		12
131025			0.50			HDGV	A563		4
1005496	1.00	17.00				HDGV	A449		2
1005390	1.00	30.00				HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2290168				1.00	4"X4" PLT	BARE	A588		4

ROSS - HEPPNER
AEP DWG: CS45-2472
104.0' AGH, STR# 128

DUPLICATE DRAWING DISTRIBUTION

PED528951104' AGH, CS45-2472, STR 128

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/28/21	NONE

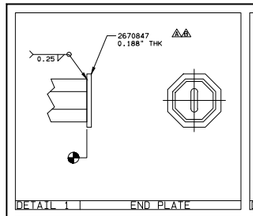
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		15,411#

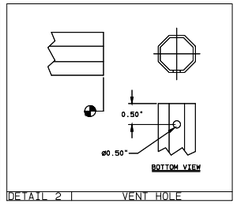
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	104' AGH, CS45-2472, STR 128	312670Z

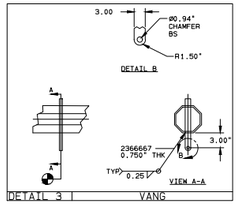
valmont



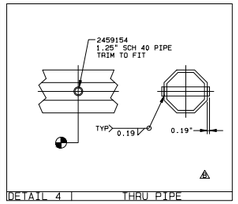
DETAIL 1 | END PLATE



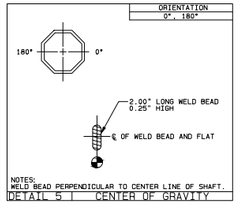
DETAIL 2 | VENT HOLE



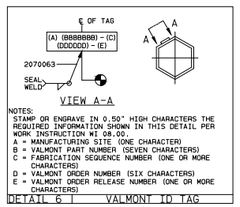
DETAIL 3 | VANG



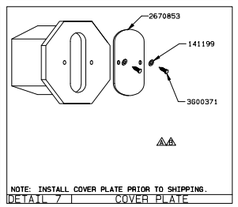
DETAIL 4 | THRU PIPE



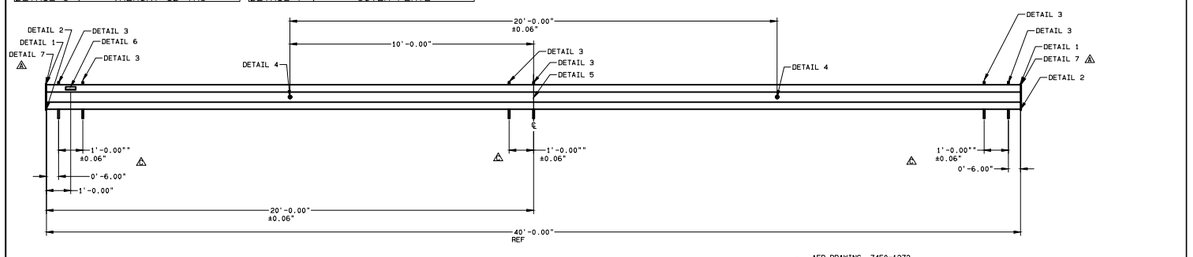
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE



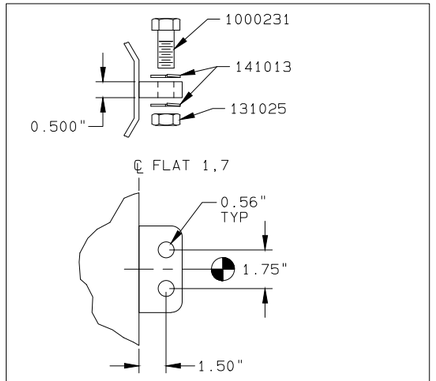
AEP DRAWING 74E0-1272

NOTES:

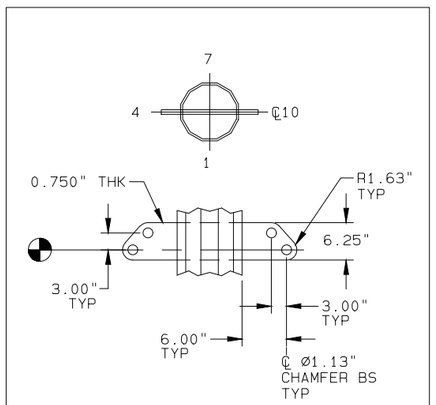
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	1063794

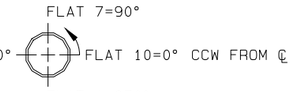


GROUND LUG



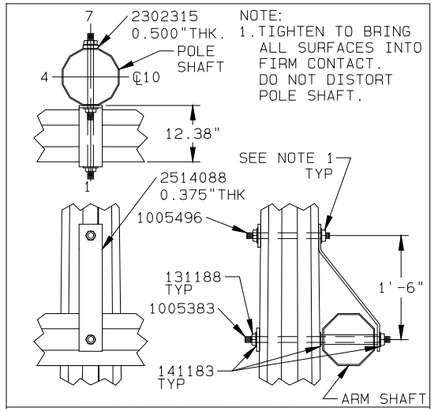
GROUND WIRE VANG

THRU-HOLE



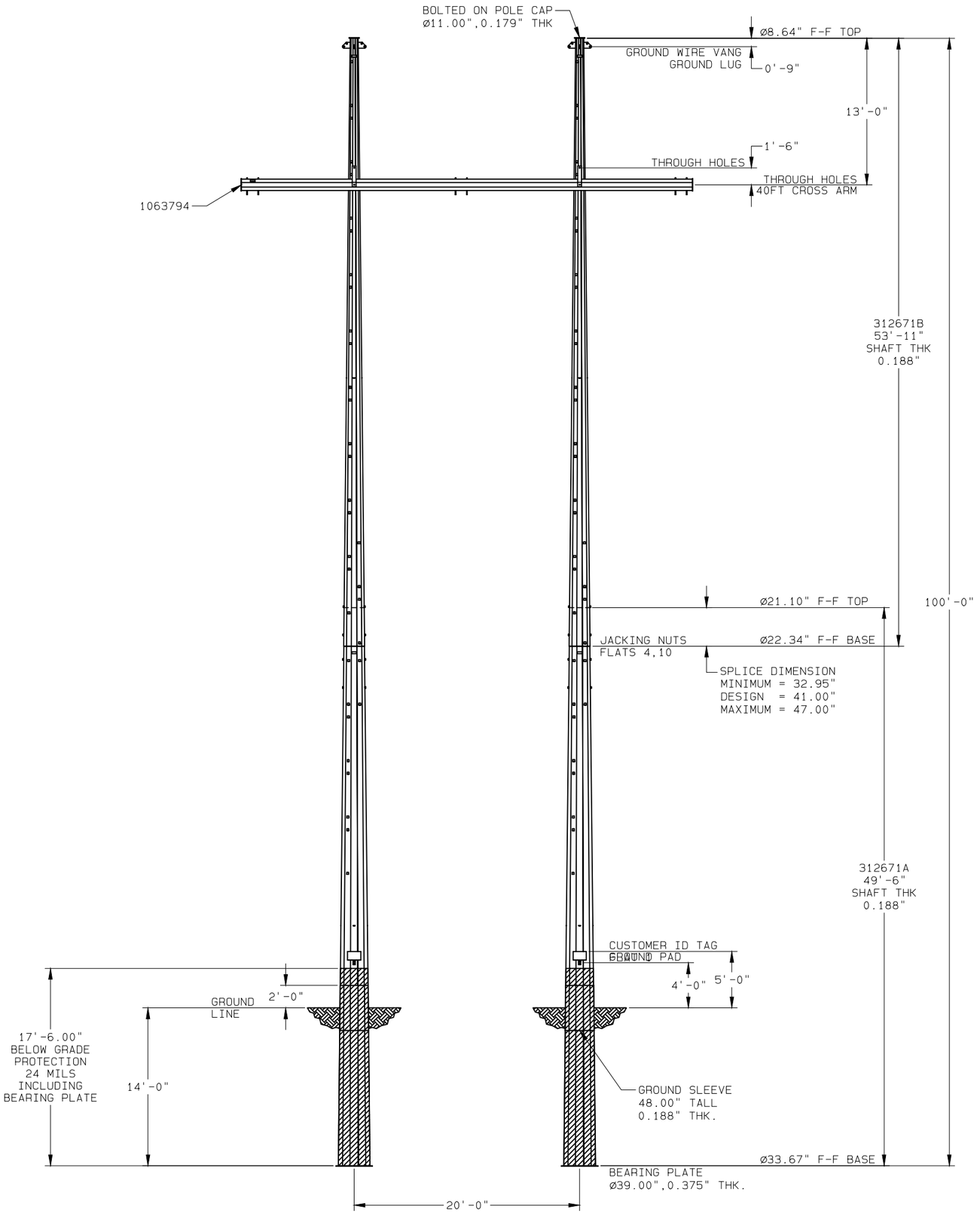
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

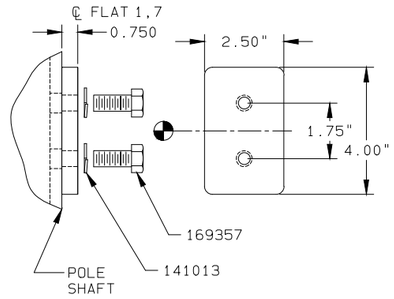
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

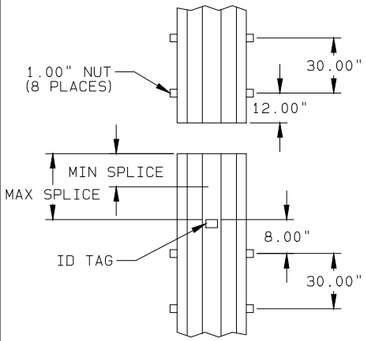
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	104' AGH, CS45-2472, STR 128	312670Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

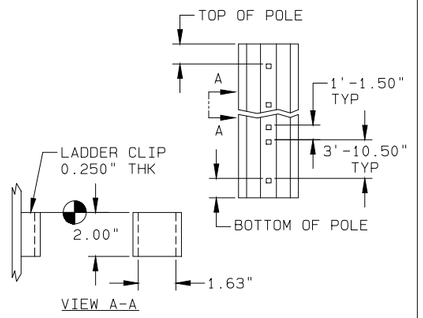
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S100-0613 100' H6
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312671A	SECTION ASSEMBLY	3,268	2
312671B	SECTION ASSEMBLY	1,814	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1003178	1.00	16.00			STUD	HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

ROSS - HEPPNER
AEP DWG: CS45-2472
86.0' AGH, STR# 129,152

DUPLICATE DRAWING DISTRIBUTION

PED52895186' AGH, STR 129,152

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/29/21	NONE

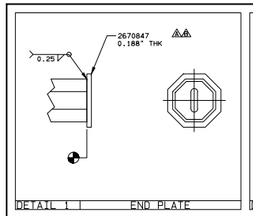
P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

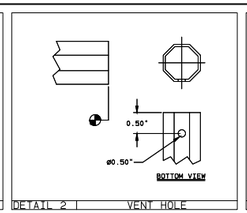
MATERIAL | THICKNESS | WEIGHT 11,970#

valmont

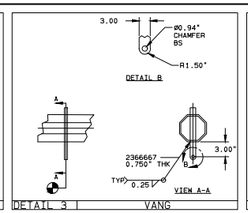
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, STR 129,152	312671Z



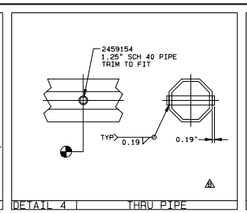
DETAIL 1 | END PLATE



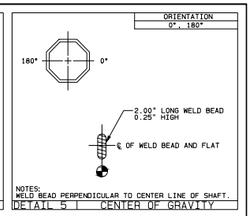
DETAIL 2 | VENT HOLE



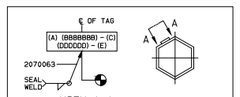
DETAIL 3 | VANG



DETAIL 4 | THRU PIPE



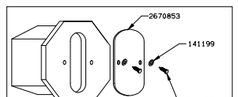
DETAIL 5 | CENTER OF GRAVITY



VIEW A-A

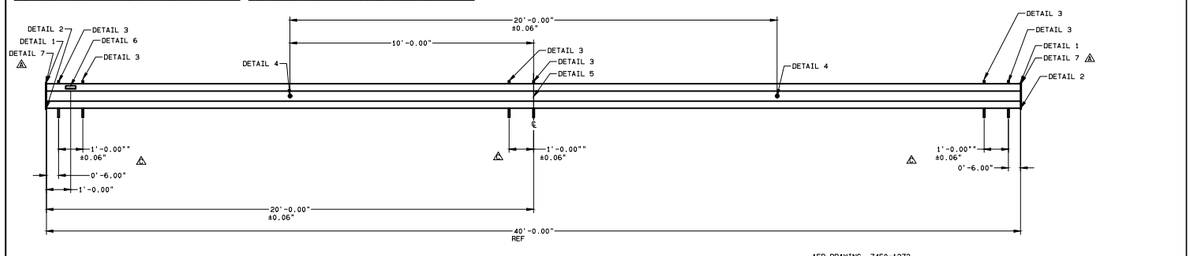
NOTES:
STAMP OR ENGRAVE IN 0.50" HIGH CHARACTERS THE REQUIRED INFORMATION SHOWN IN THIS DETAIL PER WORK INSTRUCTION WI 08.00.
A = MANUFACTURING SITE (ONE CHARACTER)
B = VALMONT PART NUMBER (SEVEN CHARACTERS)
C = FABRICATION SEQUENCE NUMBER (ONE OR MORE CHARACTERS)
D = VALMONT ORDER NUMBER (SIX CHARACTERS)
E = VALMONT ORDER RELEASE NUMBER (ONE OR MORE CHARACTERS)

DETAIL 6 | VALMONT ID TAG



NOTE: INSTALL COVER PLATE PRIOR TO SHIPPING.

DETAIL 7 | COVER PLATE

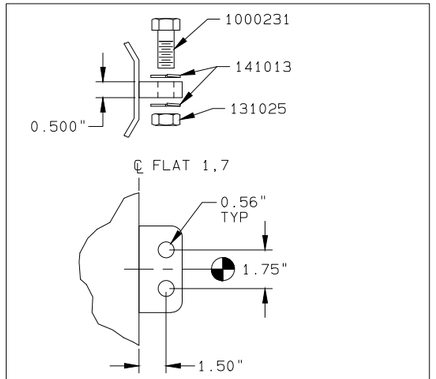


AEP DRAWING 74E0-1272

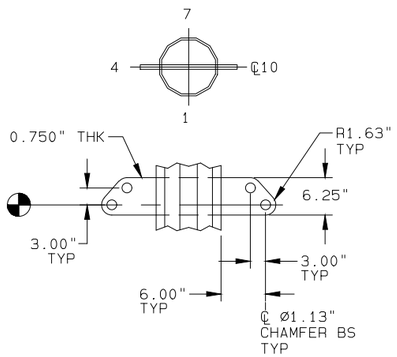
NOTES
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

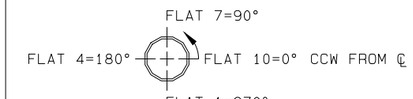


GROUND LUG



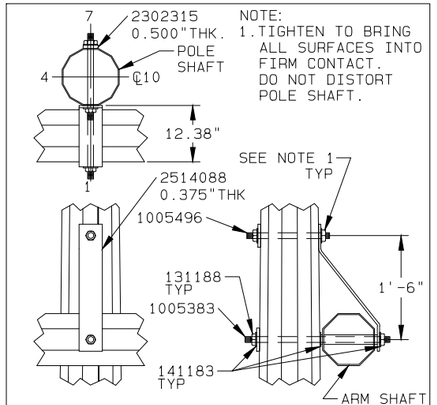
GROUND WIRE VANG

THRU-HOLE



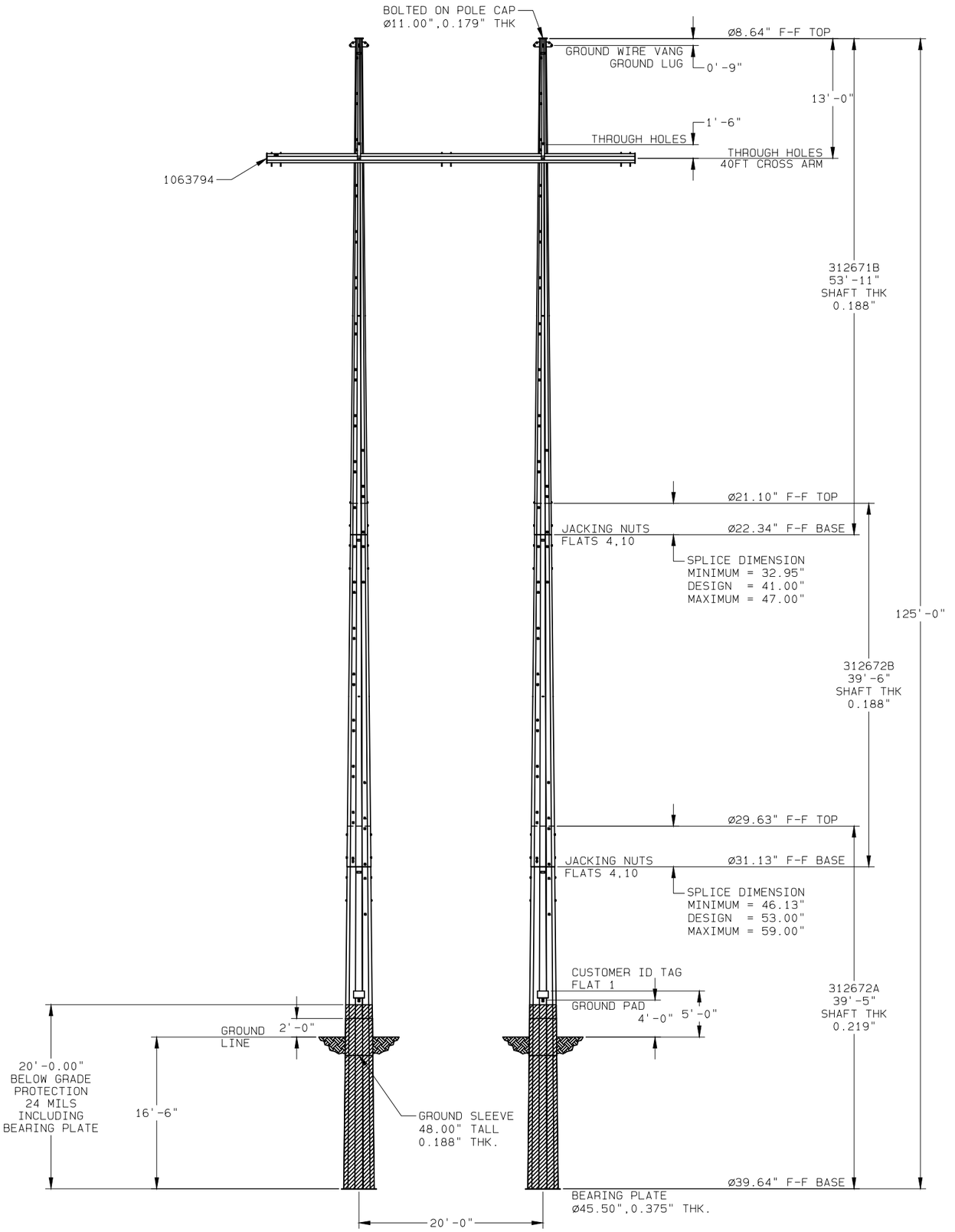
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

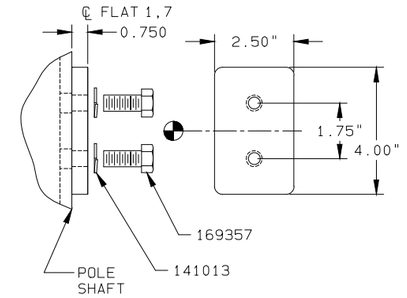
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

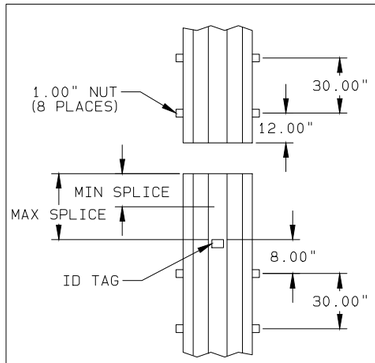
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	86' AGH, STR 129.152	312671Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

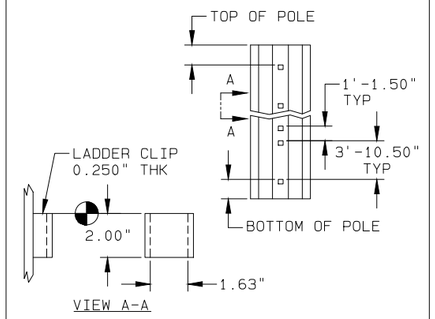
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

ROSS - HEPPNER
AEP DWG: CS45-2472
108.5' AGH, STR# 153

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S125-076 125' H6
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
312672A	SECTION ASSEMBLY	3,835	2
312672B	SECTION ASSEMBLY	2,193	2
312671B	SECTION ASSEMBLY	1,814	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	4
1000231	0.50	1.75				HDGV	A307	4
141013				0.50	LOCK	HDGV	-	12
131025			0.50			HDGV	A563	4
1003178	1.00	16.00			STUD	HDGV	A449	2
1005383	1.00	29.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2290168				1.00	4"X4" PLT	BARE	A588	4

DUPLICATE DRAWING DISTRIBUTION

PED528951108.5' AGH, CS45-2472, STR 153

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

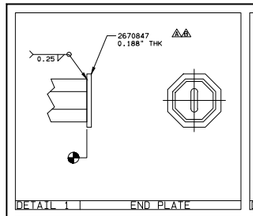
DRAWN	ENGR	DATE	SCALE
MS7	LMR	10/29/21	NONE

P.A. CHK: MS7 10/29/21
SHOP CHK:
OTHER SPECIFICATIONS

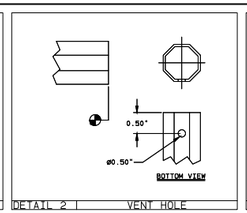
MATERIAL	THICKNESS	WEIGHT
		17,490#

valmont

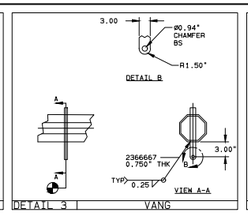
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	108.5' AGH, CS45-2472, STR 153	312672Z



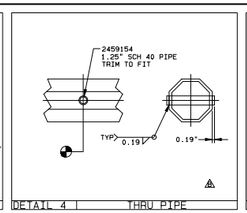
DETAIL 1 | END PLATE



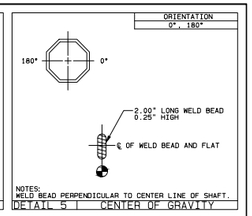
DETAIL 2 | VENT HOLE



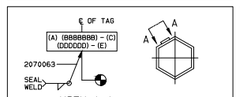
DETAIL 3 | VANG



DETAIL 4 | THRU PIPE



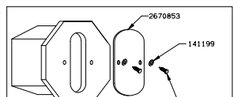
DETAIL 5 | CENTER OF GRAVITY



VIEW A-A

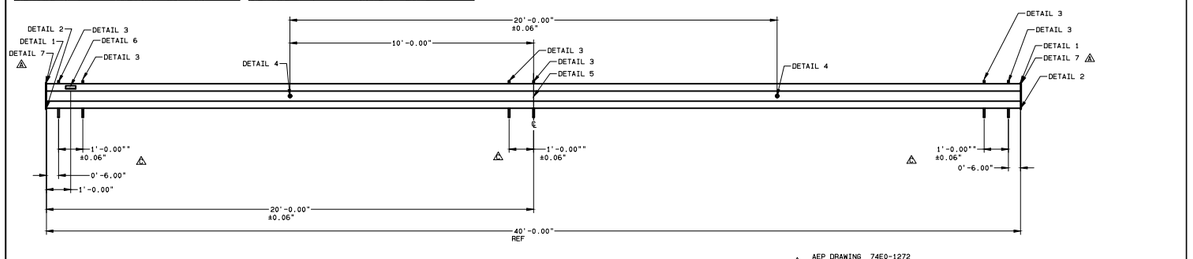
NOTES:
STAMP OR ENGRAVE IN 0.50" HIGH CHARACTERS THE REQUIRED INFORMATION SHOWN IN THIS DETAIL PER WORK INSTRUCTION WI 08.00.
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D = VALMONT ORDER NUMBER (SIX CHARACTERS)
E = VALMONT ORDER RELEASE NUMBER (ONE OR MORE CHARACTERS)

DETAIL 6 | VALMONT ID TAG



NOTE: INSTALL COVER PLATE PRIOR TO SHIPPING.

DETAIL 7 | COVER PLATE

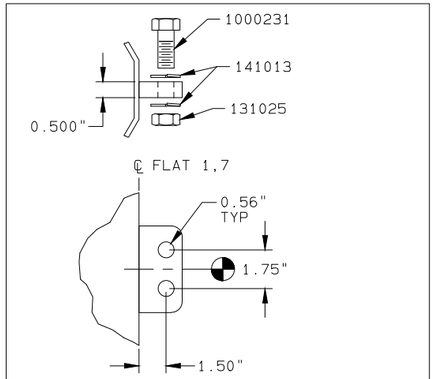


AEP DRAWING 74E0-1272

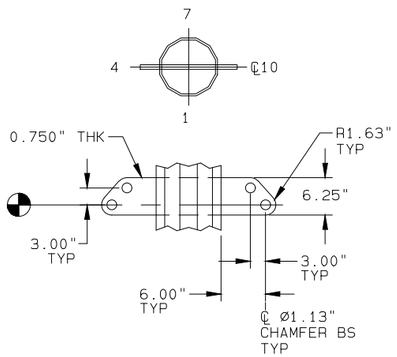
NOTES
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	106379Z

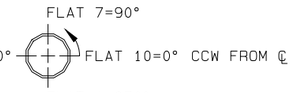


GROUND LUG



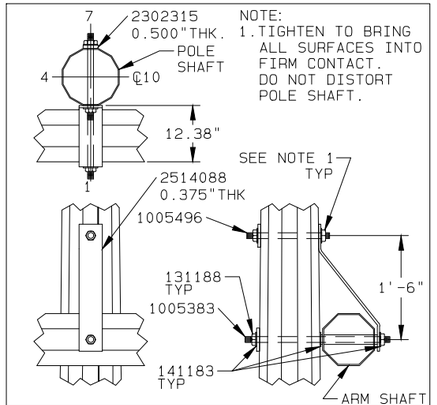
GROUND WIRE VANG

THRU-HOLE



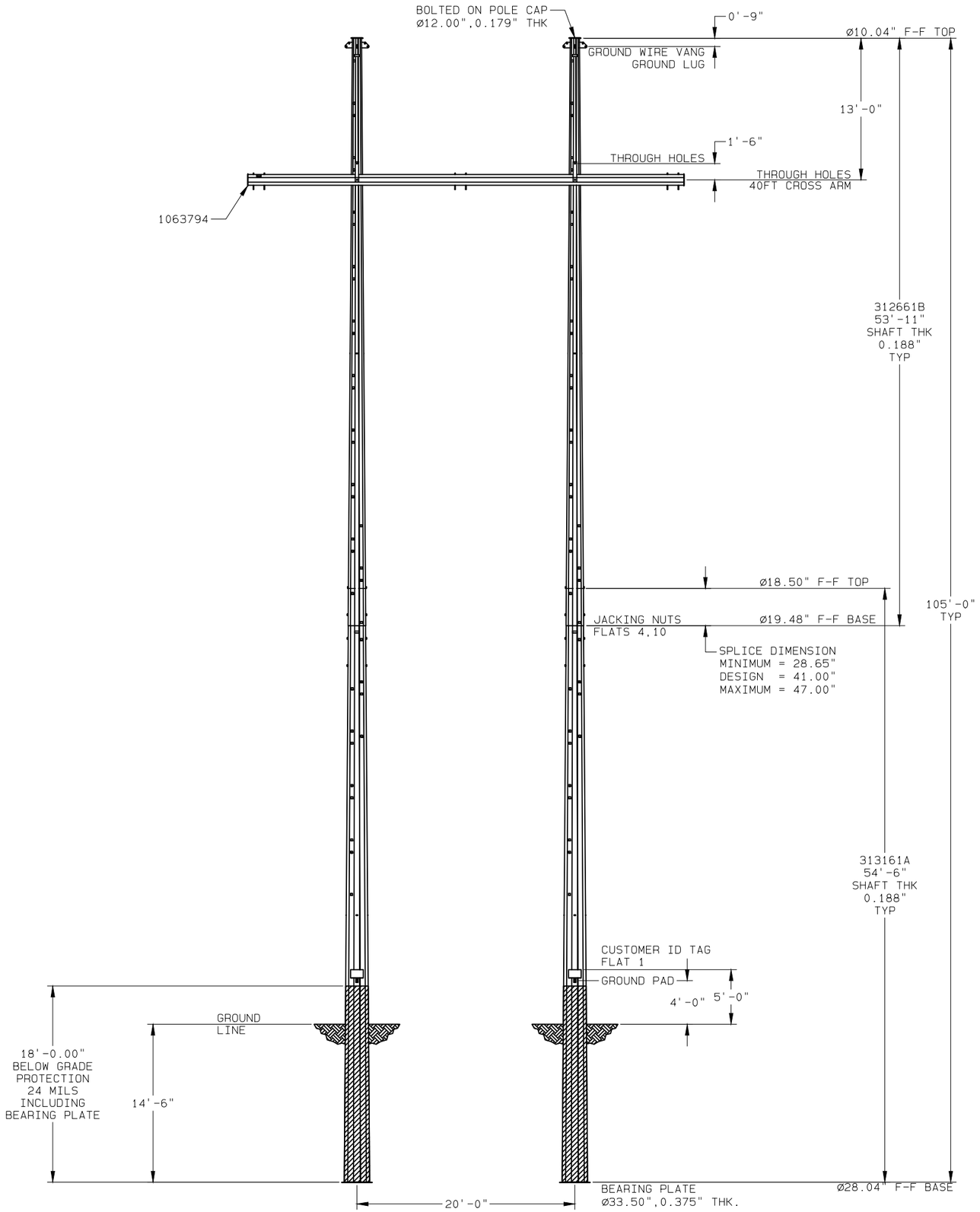
NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

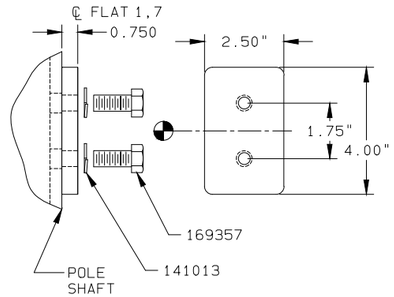
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312649B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312649B	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

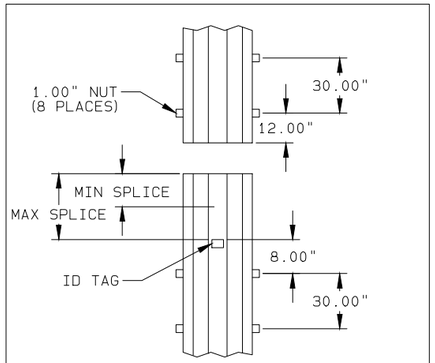
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	108.5' AGH, CS45-2472, STR 153	312672Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

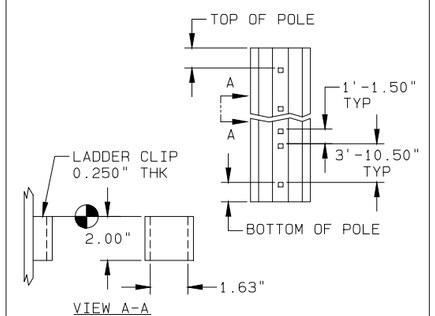
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S105-0492 105' H4
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313161A	SECTION ASSEMBLY	2,792	2
312661B	SECTION ASSEMBLY	1,736	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	8
1000231	0.50	1.75				HDGV	A307	8
141013				0.50	LOCK	HDGV	-	24
131025			0.50			HDGV	A563	8
1005496	1.00	17.00				HDGV	A449	2
1005390	1.00	30.00				HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2302315				1.00	PLATE	HDGV	A36	4

ROSS - HEPPNER
AEP DWG: CS45-2472
90.5' AGH, STR# 119

DUPLICATE DRAWING DISTRIBUTION

PED52895190.5'_AGH,_CS45-2472,_STR_119__

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

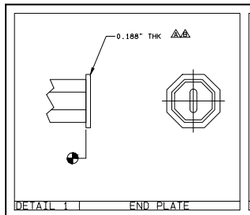
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	11/18/21	NONE

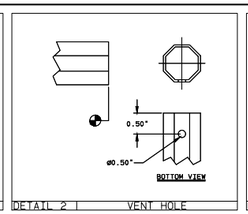
P.A. CHK: JLH11 11/18/21
SHOP CHK:
OTHER SPECIFICATIONS
MATERIAL | THICKNESS | WEIGHT 10,864#

valmont

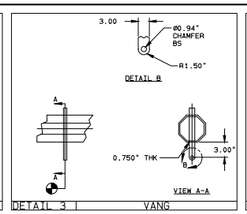
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	90.5' AGH, CS45-2472, STR 119	313161Z



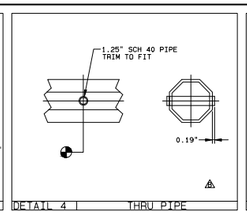
DETAIL 1 | END PLATE



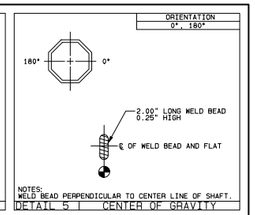
DETAIL 2 | VENT HOLE



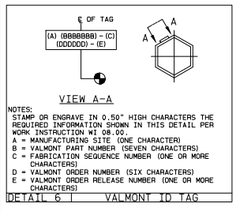
DETAIL 3 | VANG



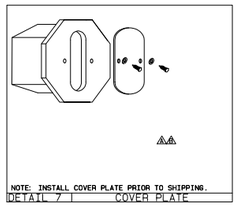
DETAIL 4 | THRU PIPE



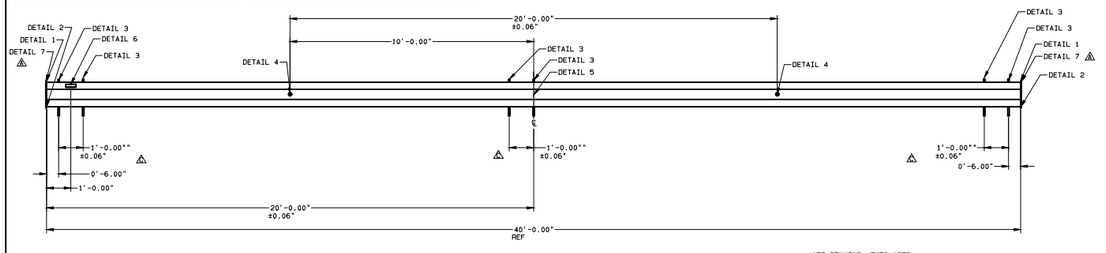
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE

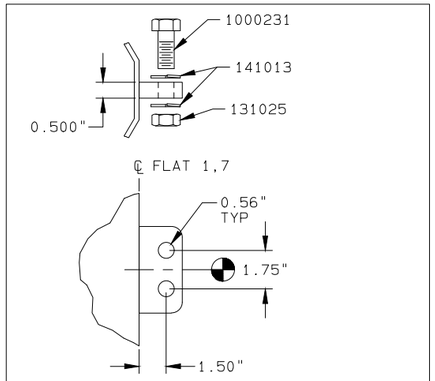


NOTES

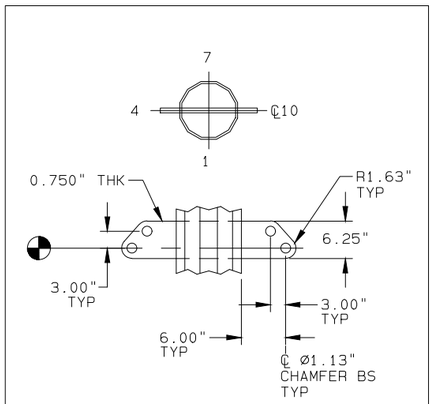
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	1063794

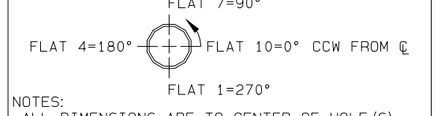


GROUND LUG



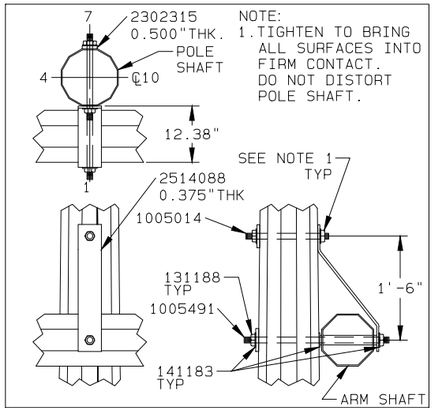
GROUND WIRE VANG

THRU-HOLE



NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

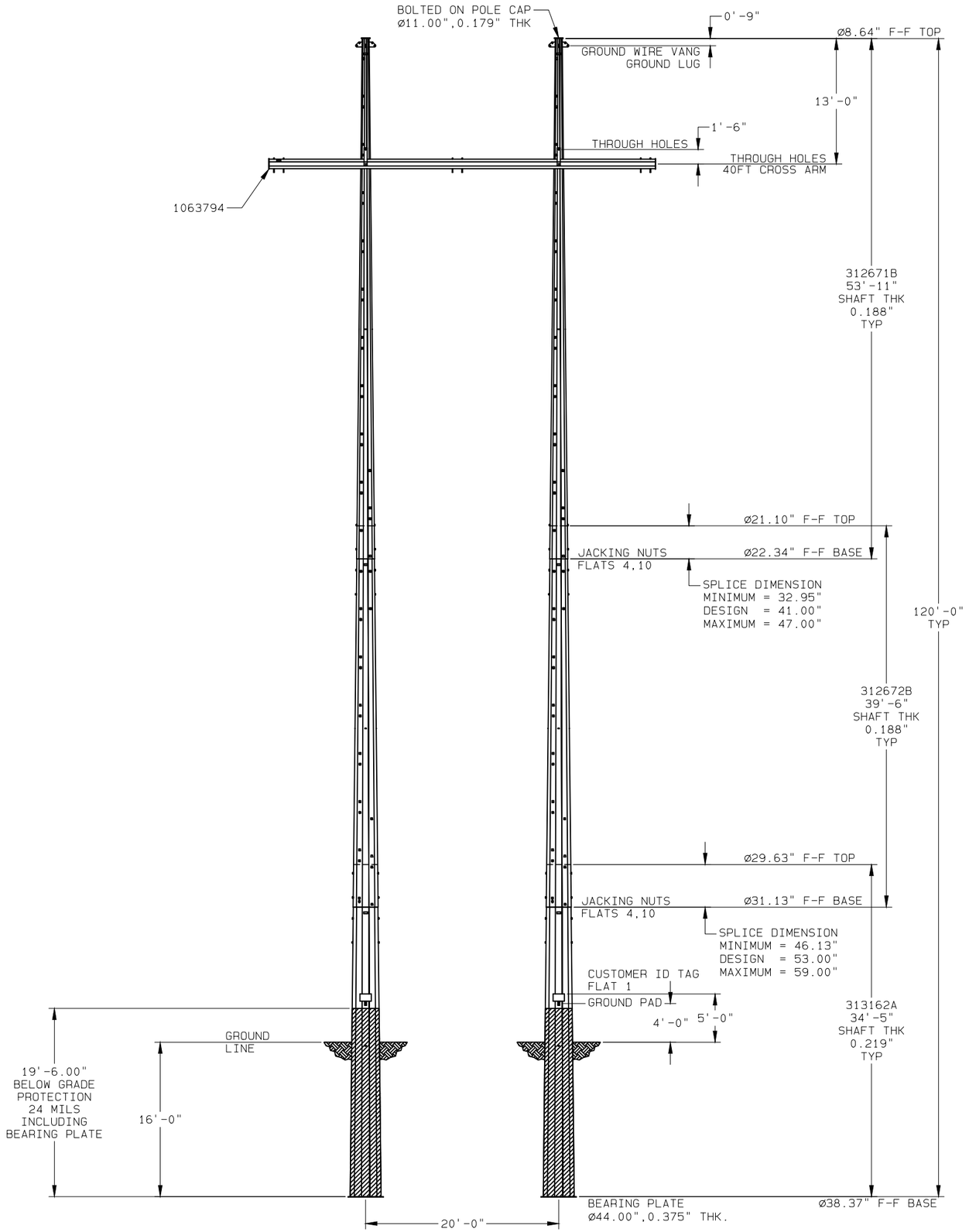
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312661B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312661B	13'- 0.00"	±0.06"	90.00	270.00	1.06"

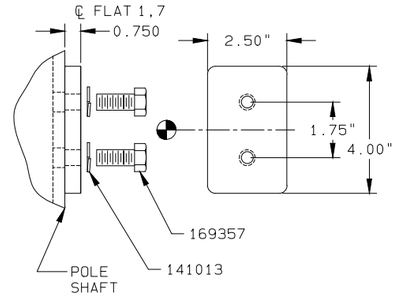


CROSS ARM CONNECTION

valmont

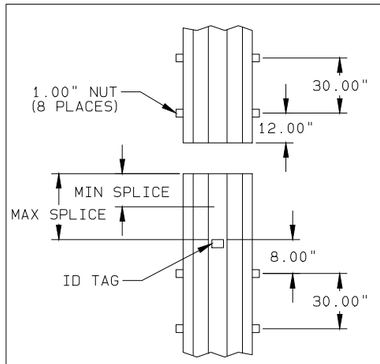
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	90.5' AGH, CS45-2472, STR 119	313161Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

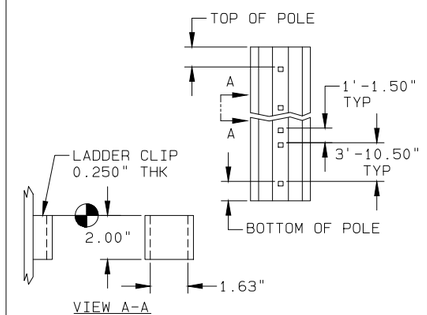
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S120-0741 120' H6
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY. ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

THESE DOCUMENTS, DRAWINGS, AND/OR CALCULATIONS AND ALL INFORMATION RELATED TO THEM ARE THE EXCLUSIVE PROPERTY AND THE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES, INC. AND ARE FURNISHED SOLELY UPON THE CONDITIONS THAT THEY WILL BE RETAINED IN STRICTEST CONFIDENCE AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE, IN ANY WAY, WITHOUT THE PRIOR WRITTEN PERMISSION OF VALMONT INDUSTRIES, INC.

BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313162A	SECTION ASSEMBLY	3,041	2
312672B	SECTION ASSEMBLY	2,193	2
312671B	SECTION ASSEMBLY	1,814	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION								QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC		
	BOLT		NUT	WSHR					
	DIA	LONG							
169357	0.50	0.75				HDGV	A307		8
1000231	0.50	1.75				HDGV	A307		8
141013				0.50	LOCK	HDGV	-		24
131025			0.50			HDGV	A563		8
1003178	1.00	16.00			STUD	HDGV	A449		2
1005383	1.00	29.00			STUD	HDGV	A449		2
141183				1.00	CS,FLAT	HDGV	F436		10
131188			1.00		DH,LOCK	HDGV	A563		8
2302315				1.00	PLATE	HDGV	A36		4

ROSS - HEPPNER
AEP DWG: CS45-2472
104' AGH, STR# 120

DUPLICATE DRAWING DISTRIBUTION

PED528951104'_AGH,_CS45-2472,_STR_120___

DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

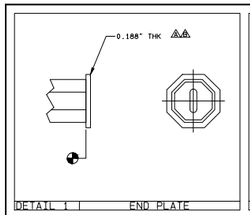
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	11/18/21	NONE

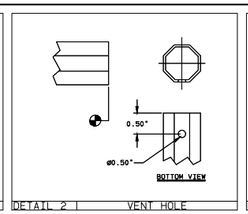
P.A. CHK: JLH11 11/18/21
SHOP CHK:
OTHER SPECIFICATIONS:
MATERIAL:
THICKNESS:
WEIGHT: 15,904#

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	104' AGH, CS45-2472, STR 120	313162Z

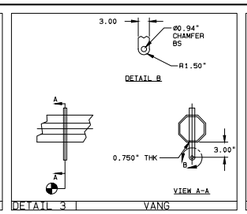
valmont



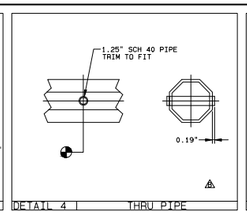
DETAIL 1 | END PLATE



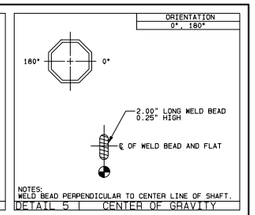
DETAIL 2 | VENT HOLE



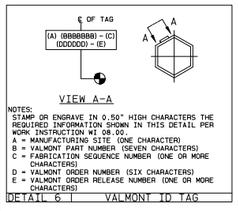
DETAIL 3 | VANG



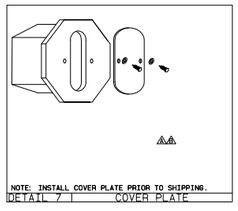
DETAIL 4 | THRU PIPE



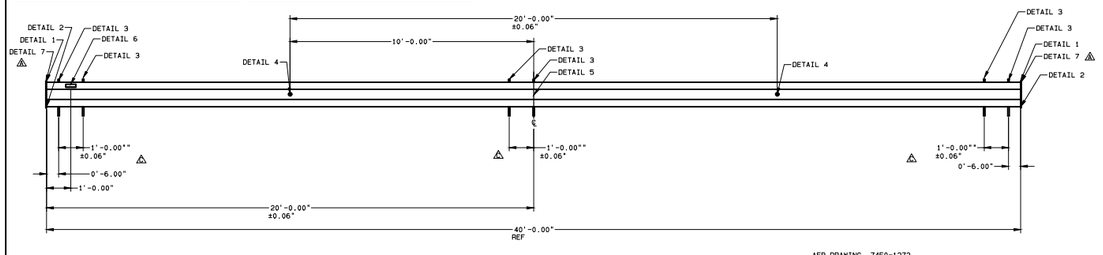
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE



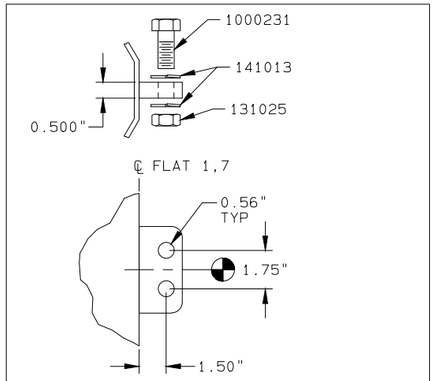
AEP DRAWING 74E0-1272

NOTES

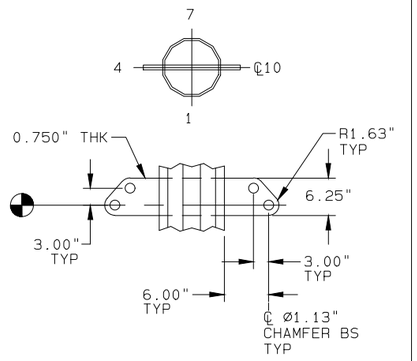
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	1063794

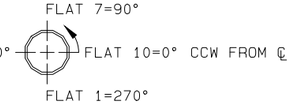


GROUND LUG



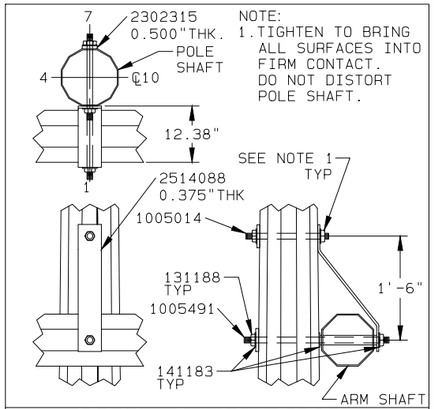
GROUND WIRE VANG

THRU-HOLE



NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

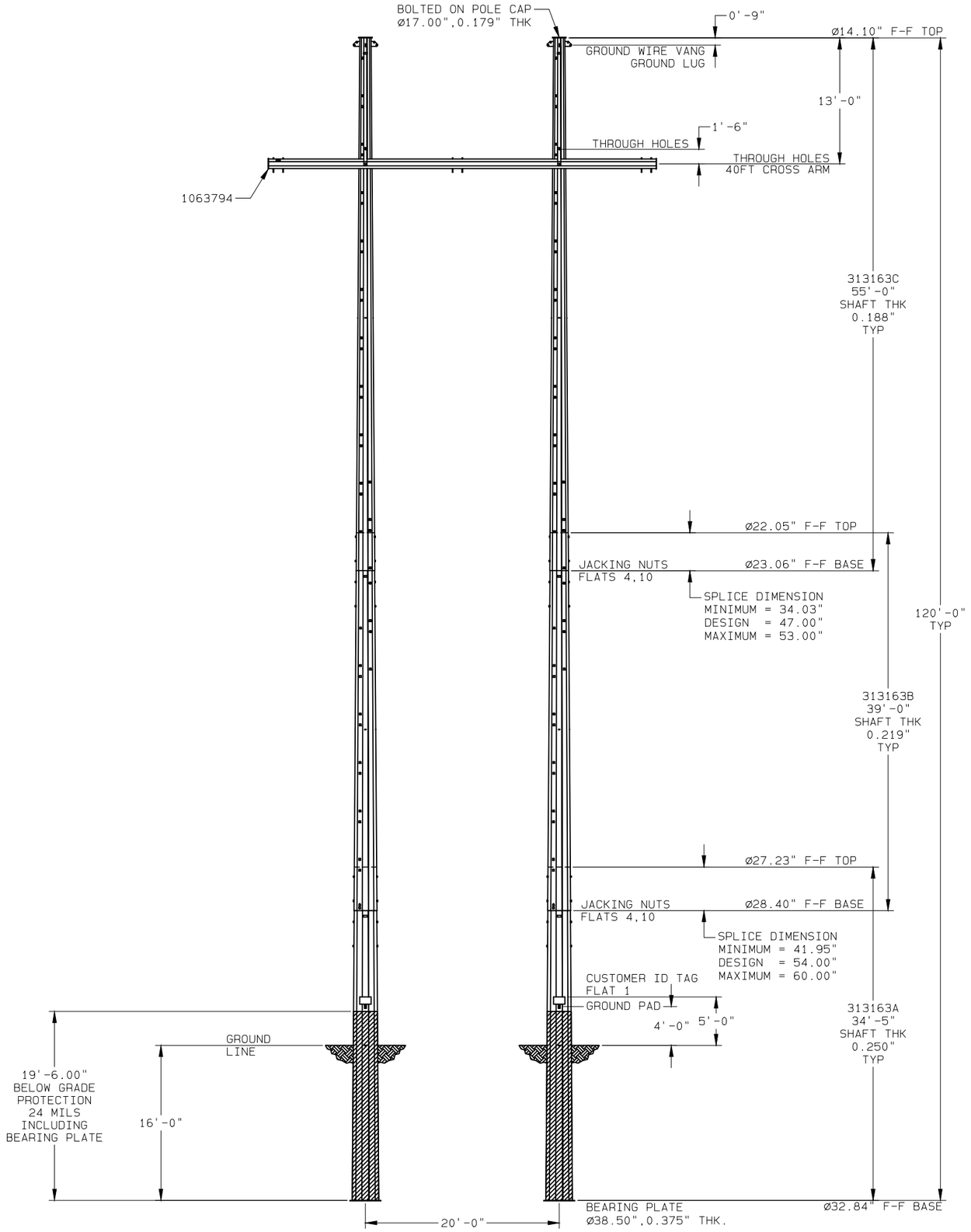
SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
312671B	11'- 6.00"	±0.06"	90.00	270.00	1.06"
312671B	13'- 0.00"	±0.06"	90.00	270.00	1.06"

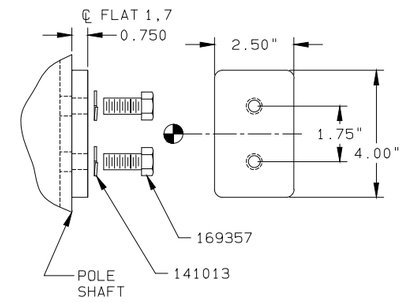


CROSS ARM CONNECTION

valmont

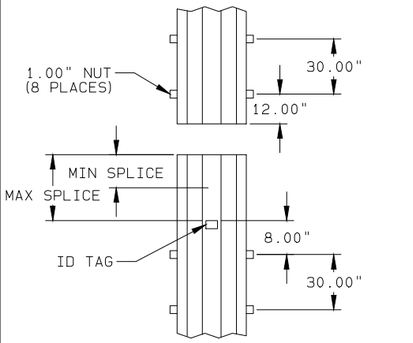
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	104' AGH, CS45-2472, STR 120	313162Z





WELDED OVER 0.81" HOLES IN POLE SHAFT.

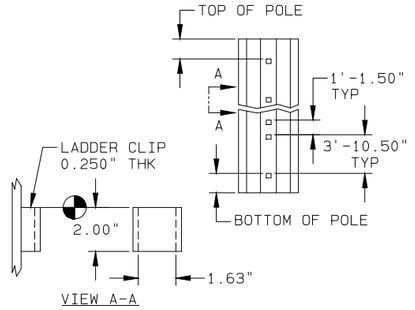
GROUND PAD



REFER TO ELEVATION VIEW FOR MINIMUM AND MAXIMUM SPLICE VALUES.

SPLICE DETAIL

CLIMBING FLAT(S)	START LOCATION TOP OF POLE	STOP LOCATION GROUND LINE
2,8	2'-0.00"	12'-0.00"



CLIMBING

NOTES:

1. POLE SHAFT-GOVERNING REACTIONS.
   VALMONT SW: S120-0839 120' H7
2. COMPONENT IDENTIFICATION: VALMONT ID TAG LOCATIONS ARE INDICATED BY CALLOUTS ON DRAWING. THE VALMONT ID TAG CONTAINS INFORMATION FOR INTERNAL TRACKING AND FIELD ASSEMBLY. ONLY THE VALMONT PART NUMBER NEEDS TO MATCH FOR FIELD ASSEMBLY, ALL OTHER IDENTIFICATION IS FOR INTERNAL USE.

   A = MANUFACTURING SITE (ONE CHARACTER)
   B = VALMONT PART NUMBER (SEVEN CHARACTERS)
   C = VALMONT ORDER NUMBER (SIX CHARACTERS)
   D = VALMONT SHOP ORDER NUMBER (SEVEN CHARACTERS)
   E = VALMONT SHOP ORDER LOT/BATCH NUMBER (ONE OR MORE CHARACTERS)

   A-BBBBBBB
   CCCCCC
   DDDDDDD-E

3. ASSEMBLY AND ERECTION GUIDELINES: SEE VALMONT TRANSMISSION INSTALLATION GUIDELINE I002 (WWW.VALMONTUTILITY.COM/I002).
4. SLIP JOINT JACKING FORCE
   MINIMUM = 25,000#
   MAXIMUM = 90,000#
5. GALVANIZED PER ASTM A123.
6. SHAFT/PIECE PART MATERIAL-ASTM A572, 65 KSI YIELD.

PROPRIETARY INFORMATION

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BILL OF MATERIAL
(SHIPPING SEQ.=1 FOR ALL)

VALMONT PART NUMBER	DESCRIPTION	UNIT WEIGHT (LBS)	QTY PER STR
313163A	SECTION ASSEMBLY	3,014	2
313163B	SECTION ASSEMBLY	2,417	2
313163C	SECTION ASSEMBLY	2,225	2
1063794	40FT CROSS ARM	1,742	1
2514088	ARM STRAP	12	2

VALMONT PART NUMBER	DESCRIPTION							QTY PER STR
	HARDWARE SIZE (IN)				GENERAL	FINISH	ASTM SPEC	
	BOLT		NUT	WSHR				
	DIA	LONG						
169357	0.50	0.75				HDGV	A307	8
1000231	0.50	1.75				HDGV	A307	8
141013				0.50	LOCK	HDGV	-	24
131025			0.50			HDGV	A563	8
1005014	1.00	21.00			STUD	HDGV	A449	2
1005491	1.00	33.00			STUD	HDGV	A449	2
141183				1.00	CS,FLAT	HDGV	F436	10
131188			1.00		DH,LOCK	HDGV	A563	8
2302315				1.00	PLATE	HDGV	A36	4

ROSS - HEPPNER
AEP DWG: CS45-2472
104' AGH, STR# 148, 149

DUPLICATE DRAWING DISTRIBUTION

PED528951104' AGH,CS45-2472,STR 148,149
DWG SIZE D CLASS CODE (1) 1 CLASS NO. (3) 450

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	11/18/21	NONE

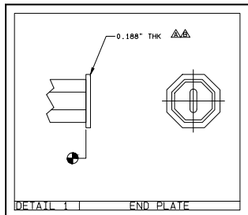
P.A. CHK: JLH11 11/18/21
SHOP CHK:
OTHER SPECIFICATIONS

MATERIAL	THICKNESS	WEIGHT
		17,124#

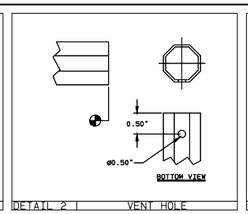
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	104' AGH,CS45-2472,STR 148,149	313163Z

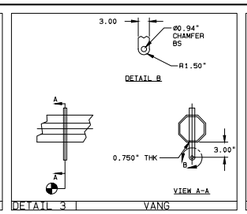
valmont



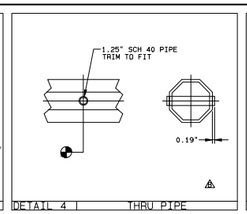
DETAIL 1 | END PLATE



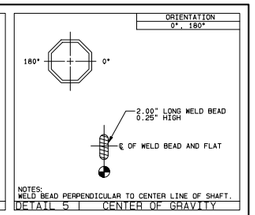
DETAIL 2 | VENT HOLE



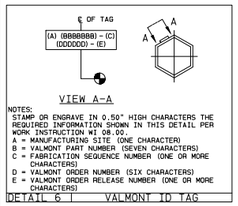
DETAIL 3 | VANG



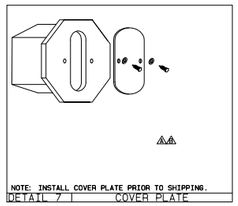
DETAIL 4 | THRU PIPE



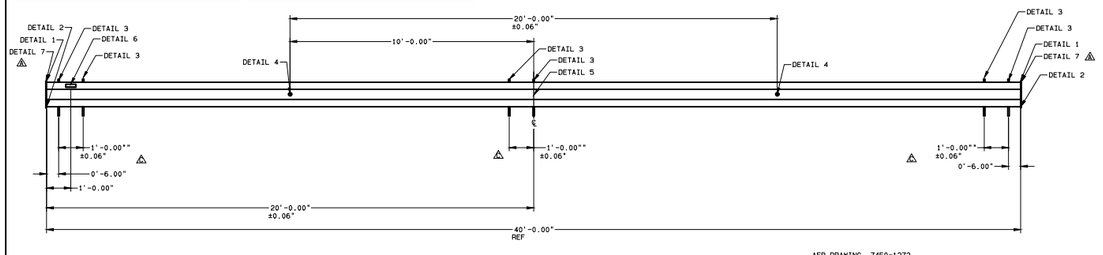
DETAIL 5 | CENTER OF GRAVITY



DETAIL 6 | VALMONT ID TAG



DETAIL 7 | COVER PLATE



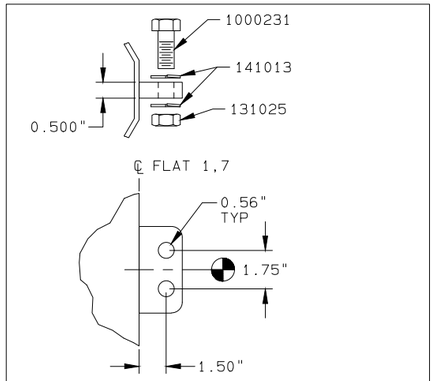
AEP DRAWING 74E0-1272

NOTES

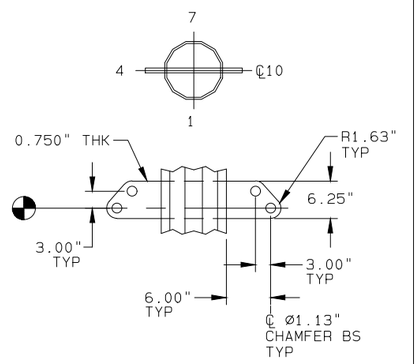
1. ALL SECTION VIEWS ARE FROM TIP OF ARM UNLESS OTHERWISE NOTED.

LOCATION SYMBOL KEY	SHAFT INFO (MEASURED ACROSS FLATS)						
LOCATION REFERENCE	SHAPE	LENGTH	BASE OD	TOP OD	TAPER	THK	ASTM
	8-SIDED	40'-0.00"	12.00"	12.00"	0.000	0.313"	A572

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
STANDARD	AMERICAN ELECTRIC POWER CO.	40FT CROSS ARM	1063794

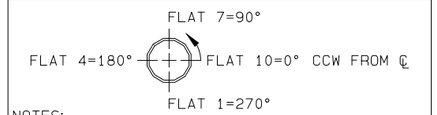


GROUND LUG



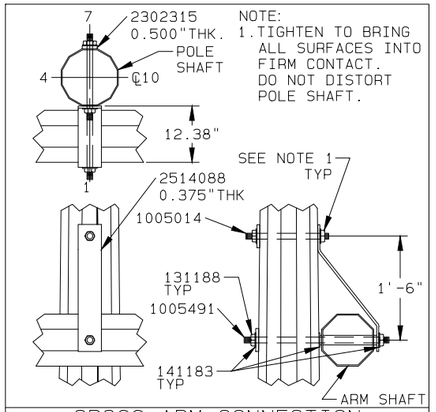
GROUND WIRE VANG

THRU-HOLE



NOTES:
ALL DIMENSIONS ARE TO CENTER OF HOLE(S).

SECTION	DIST FROM SMALL END	LOC. TOL.	ORIENTATION (DEGREES)		HOLE DIA
313163C	11'- 6.00"	±0.06"	90.00	270.00	1.06"
313163C	13'- 0.00"	±0.06"	90.00	270.00	1.06"



CROSS ARM CONNECTION

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	104' AGH,CS45-2472,STR 148,149	313163Z

Section 8. Tower Drawings

This section is not applicable to the project.

Section 9. Material

A. Bill of Materials

B. Structure Detail Report

C. Damper Placements

Bill Of Material Issue Document

Project: **Vigo Station Temp Bypass**

Storeroom No.: Storeroom Location:

Requestor:

Issued By:

Project ID:

Delivery Contact:

Contact Phone:

Received By:

Notes:

Work Order **09**

Date: 09/24/21

Date Required:

Activity:

ITEM	PART NUMBER	MATERIAL DESCRIPTION	UOM	REQUESTED QTY	ISSUE QTY	BACK ORDER	ACCOUNT	R.U.
1	0000371852	NON-TENSION SPLICE, 4/0 AWG, 6/1 STR, ALUM	EA	18				
2	0033117600	NAIL, ROOFING WIRE, 1-1/2 IN LG, HOT DIP GALV	LB	0.2				
3	0045375200	POLE, WOOD, 75 FT LG, CLASS 2, WESTERN RED CEDAR	EA	2				
4	0047002500	ADAPTER, GUY TWINEYE, 18 IN, F/1-1/2 IN SQ SCREW ANCHOR, 70K	EA	16				
5	0047053900	ANCHOR, EARTH, TRIPLE HELIX, 8 IN, 10 IN, 12 IN	EA	16				
6	0047065000	ATTACHMENT, GUY, HOOK, 15/16 IN DIAMETER BOLT HOLE	EA	10				
7	0047065200	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE	EA	16				
8	0047182600	BOLT, EYE, SHOULDER, 7/8 IN DIA, 14 IN LG, GALV	EA	12				
9	0047182700	BOLT, EYE, SHOULDER, 7/8 IN DIA, 16 IN LG, GALV	EA	12				
10	0047182800	BOLT, EYE, SHOULDER, 7/8 IN DIA, 18 IN LG, GALV	EA	12				
11	0047513000	Y-CLEVIS BALL, 30K, ANSI CLASS 52-3, 52-5	EA	4				
12	0047528200	CLEVIS Y-SOCKET, 30K, ANSI CLASS 52-3 _52-5	EA	3				
13	0047528501	CLEVIS, THIMBLE, 2-3/4 IN DIA, 36000 LB LOAD, 1-3/	EA	16				
14	0047531300	CLIP, BONDING, 3/4 IN BOLT	EA	4				
15	0047531400	CLIP, BONDING, 7/8 IN BOLT	EA	12				
16	0047544201	COUPLING, ROD, GROUND, 2 IN, THREADLESS	EA	2				
17	0047698100	LINK, EXTENSION, EYE-EYE, 31 IN LG, 40K LB, 7/8 IN	EA	3				

Bill Of Material Issue Document

Project: **Vigo Station Temp Bypass**

Storeroom No.: Storeroom Location:

Requestor:

Issued By:

Project ID:

Delivery Contact:

Contact Phone:

Received By:

Notes:

Work Order **09**

Date: 09/24/21

Date Required:

Activity:

ITEM	PART NUMBER	MATERIAL DESCRIPTION	UOM	REQUESTED QTY	ISSUE QTY	BACK ORDER	ACCOUNT	R.U.
18	0047730700	NUT, LOCK, 3/4 IN DIAMETER BOLT, GALVANIZED	EA	8				
19	0047730800	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED	EA	24				
20	0047735600	NUT, SQUARE, 3/4 IN DIAMETER BOLT, GALVANIZED	EA	4				
21	0047735800	NUT, SQUARE, 7/8 IN DIA BOLT, GALV	EA	12				
22	0047857170	ROD, GROUND, 1/2 IN DIA, 10 FT LG, COPPER CLAD STEEL, ONE END THD _6 FT CU	EA	4				
23	0047857190	DOWNLEAD, 1/2 IN DIA, THREADED COUPLER	EA	2				
24	0047858000	ROD, GROUND, 5/8 IN DIA, 8 FT LG, COPPER CLAD STEEL	EA	4				
25	0047885000	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT _COTTER PIN	EA	19				
26	0047888100	SHAFT, EXTENSION, 1-1/2 IN SQ X 5 FT LG, W/ COUPLING	EA	160				
27	0050016400	BODY, DEADEND	EA	3				
28	0050097700	CLAMP, STRAIN, ALUMINUM, 0.20-0.59 IN DIA CONDUCTOR, W/SOCKET EYE	EA	16				
29	0050177320	CLAMP, GROUNDING, U-BOLT, 2/0 AWG TO 250 MCM, 1-1/	EA	16				
30	0050651300	DEADEND, CLEVIS, COMPRESSION, STEEL, #4/0 6/1 ACSR, PENQUIN	EA	3				
31	0050714800	DEADEND, GUY WIRE GRIP, 7 #8 ALUMINUM CLAD STEEL	EA	32				
32	0050723020	NON-TENSION SPLICE, (7) #10 ALUM-CLAD	EA	2				
33	0050927400	CONNECTOR, TERMINAL, 15 DEG, 159 12/7 ACSR	EA	6				
34	0054571000	WIRE, ACSR, #4/0 AWG, 6/1 STRAND, PENGUIN	FT	1500				

Bill Of Material Issue Document

Project: **Vigo Station Temp Bypass**

Storeroom No.: Storeroom Location:

Requestor:

Issued By:

Project ID:

Delivery Contact:

Contact Phone:

Received By:

Notes:

Work Order **09**

Date: 09/24/21

Date Required:

Activity:

ITEM	PART NUMBER	MATERIAL DESCRIPTION	UOM	REQUESTED QTY	ISSUE QTY	BACK ORDER	ACCOUNT	R.U.
35	0059155800	WIRE, ALUMINUM CLAD STEEL, 7 #10 AW, 7 STRAND, 6600 FT REEL	FT	500				
36	0059161800	WIRE, ALUMINUM CLAD STEEL, 7#8 AW, REEL	FT	1520				
37	0063048300	CLAMP, GROUNDING, ROD, 5/8 IN, COPPER OR STEEL	EA	4				
38	0064134000	CLAMP, CABLE, 1/2 IN EMT	EA	20				
39	0084721000	INHIBITOR, ELECTRICAL JOINT, FILLER COMPOUND	EA	1				
40	0084722900	INHIBITOR, ELECTRICAL JOINT, FILLER COMPOUND, 8 OZ	EA	1				
41	0084746000	COATING, PRESERVATIVE, POLE TOPPER	EA	2				
42	0087124200	SCREW, LAG, 1/4 IN DIA, 2 IN LG, W/ WASHER	EA	20				
43	0087157000	CLIP, GROUND WIRE, LESS NAIL	EA	24				
44	0087168501	CONNECTOR, COMPRESSION, C-TAP, COPPER	EA	48				
45	0087444600	NAIL, WIRE, 2-1/2 LG, 1/8 IN THK, COPPER CLAD	EA	24				
46	0087843600	WIRE, COPPER, #4 SOLID, SOFT DRAWN	FT	262				
47	0500075500	POLYMER, DEAD END / SUSPENSION, 138KV, 25K, LIGHT, MPS	EA	15				

Material Detail Report (Install)

Project: Vigo Station Temp Bypass Date: 092421

Project ID: Requestor:

Project Desc: Delivery Contact: Work Order No.:

Date Required: Contact Activity:

Notes: Additional notes as required. Cost Center:

Extra Parts and Assemblies

0000371852	12	NON-TENSION SPLICE, 4/0 AWG, 6/1 STR, ALUM
0047182800	12	BOLT, EYE, SHOULDER, 7/8 IN DIA, 18 IN LG, GALV
0047182700	12	BOLT, EYE, SHOULDER, 7/8 IN DIA, 16 IN LG, GALV
0047182600	12	BOLT, EYE, SHOULDER, 7/8 IN DIA, 14 IN LG, GALV
0047065000	10	ATTACHMENT, GUY, HOOK, 15/16 IN DIAMETER BOLT HOLE
0059155800	500	WIRE, ALUMINUM CLAD STEEL, 7 #10 AW, 7 STRAND, 6600 FT REEL
0054571000	1500	WIRE, ACSR, #4/0 AWG, 6/1 STRAND, PENGUIN
14B6-2744	3	138KV DEAD END INSULATOR FOR STATION/SWITCH STRUCTURE, POLYMER W/CORONA RING, 25K
0047528200	1	CLEVIS Y-SOCKET, 30K, ANSI CLASS 52-3 _52-5
0047698100	1	LINK, EXTENSION, EYE-EYE, 31 IN LG, 40K LB, 7/8 IN
0047885000	1	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT _ COTTER PIN
0084721000	.1	INHIBITOR, ELECTRICAL JOINT, FILLER COMPOUND
0050016400	1	BODY, DEADEND
0050651300	1	DEADEND, CLEVIS, COMPRESSION, STEEL, #4/0 6/1 ACSR, PENQUIN
0084722900	.2	INHIBITOR, ELECTRICAL JOINT, FILLER COMPOUND, 8 OZ
0050927400	2	CONNECTOR, TERMINAL, 15 DEG, 159 12/7 ACSR
0500075500	1	POLYMER, DEAD END / SUSPENSION, 138KV, 25K, LIGHT, MPS

Material Detail Report (Install)

Project: Vigo Station Temp Bypass Date: 092421

Project ID: Requestor:

Project Desc: Delivery Contact: Work Order No.:

Date Required: Contact Activity:

Notes: Additional notes as required. Cost Center:

CW18-2524 Qty: 2 STR

0045375200	1	POLE, WOOD, 75 FT LG, CLASS 2, WESTERN RED CEDAR
14B6-2743	3	138KV DEAD END INSULATOR, POLYMER, 25K, W/CORONA RING
0047885000	1	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT _ COTTER PIN
0050097700	1	CLAMP, STRAIN, ALUMINUM, 0.20-0.59 IN DIA CONDUCTOR, W/SOCKET EYE
0000371852	.5	NON-TENSION SPLICE, 4/0 AWG, 6/1 STR, ALUM
0500075500	1	POLYMER, DEAD END / SUSPENSION, 138KV, 25K, LIGHT, MPS
14B6-2743	3	138KV DEAD END INSULATOR, POLYMER, 25K, W/CORONA RING
0047885000	1	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT _ COTTER PIN
0050097700	1	CLAMP, STRAIN, ALUMINUM, 0.20-0.59 IN DIA CONDUCTOR, W/SOCKET EYE
0000371852	.5	NON-TENSION SPLICE, 4/0 AWG, 6/1 STR, ALUM
0500075500	1	POLYMER, DEAD END / SUSPENSION, 138KV, 25K, LIGHT, MPS
21W1-1518	1	STRUCTURE GROUNDING FOR POLYMER, SINGLE CIRCUIT, HEAVY DEADEND, WOOD, 8L8
0047531300	2	CLIP, BONDING, 3/4 IN BOLT
0047531400	6	CLIP, BONDING, 7/8 IN BOLT
0047730700	2	NUT, LOCK, 3/4 IN DIAMETER BOLT, GALVANIZED
0047730800	6	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED
0047735600	2	NUT, SQUARE, 3/4 IN DIAMETER BOLT, GALVANIZED
0047735800	6	NUT, SQUARE, 7/8 IN DIA BOLT, GALV
0047857170	2	ROD, GROUND, 1/2 IN DIA, 10 FT LG, COPPER CLAD STEEL, ONE END THD _6 FT CU PIGTAIL
0047857190	1	DOWNLEAD, 1/2 IN DIA, THREADED COUPLER
0064134000	10	CLAMP, CABLE, 1/2 IN EMT
0087124200	10	SCREW, LAG, 1/4 IN DIA, 2 IN LG, W/ WASHER
0087157000	12	CLIP, GROUND WIRE, LESS NAIL
0087168501	24	CONNECTOR, COMPRESSION, C-TAP, COPPER
0087444600	12	NAIL, WIRE, 2-1/2 LG, 1/8 IN THK, COPPER CLAD
0087843600	111	WIRE, COPPER, #4 SOLID, SOFT DRAWN
21WE-1453	1	GROUND ROD FOR DIRECT EMBEDDED WOOD POLE
0047544201	1	COUPLING, ROD, GROUND, 2 IN, THREADLESS
0047858000	2	ROD, GROUND, 5/8 IN DIA, 8 FT LG, COPPER CLAD STEEL
0063048300	2	CLAMP, GROUNDING, ROD, 5/8 IN, COPPER OR STEEL
0087843600	20	WIRE, COPPER, #4 SOLID, SOFT DRAWN
30D0-1104	1	OHGW, DEAD-END CONCRETE, STEEL OR WOOD POLE
0047513000	1	Y-CLEVIS BALL, 30K, ANSI CLASS 52-3, 52-5
0047885000	1	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT _ COTTER PIN
0050723020	.5	NON-TENSION SPLICE, (7) #10 ALUM-CLAD
0050097700	1	CLAMP, STRAIN, ALUMINUM, 0.20-0.59 IN DIA CONDUCTOR, W/SOCKET EYE
30D0-1104	1	OHGW, DEAD-END CONCRETE, STEEL OR WOOD POLE
0047513000	1	Y-CLEVIS BALL, 30K, ANSI CLASS 52-3, 52-5
0047885000	1	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT _ COTTER PIN
0050723020	.5	NON-TENSION SPLICE, (7) #10 ALUM-CLAD
0050097700	1	CLAMP, STRAIN, ALUMINUM, 0.20-0.59 IN DIA CONDUCTOR, W/SOCKET EYE
42C0-1117	8	GUY WIRE ASSEMBLY (AW), MEDIUM (25K) CORROSIVE ZONE
0059161800	95	WIRE, ALUMINUM CLAD STEEL, 7#8 AW, REEL
0050714800	2	DEADEND, GUY WIRE GRIP, 7 #8 ALUMINUM CLAD STEEL

Material Detail Report (Install)

Project: Vigo Station Temp Bypass   Date: 092421

Project ID: Requestor:

Project Desc: Delivery Contact: Work Order No.:

Date Required: Contact   Activity:

Notes: Additional notes as required.   Cost Center:

CW18-2524 Qty: 2 STR (Cont.')

0047528501	1	CLEVIS, THIMBLE, 2-3/4 IN DIA, 36000 LB LOAD, 1-3/
0047816100	0	PROTECTOR, GUY MARKER, 8 FT, YELLOW POLYETHYLENE,
0050177320	1	CLAMP, GROUNDING, U-BOLT, 2/0 AWG TO 250 MCM, 1-1/
50A0-1106	8	SCREW ANCHOR 3 HELIX
0047002500	1	ADAPTER, GUY TWINEYE, 18 IN, F/1-1/2 IN SQ SCREW ANCHOR, 70K
0047053900	1	ANCHOR, EARTH, TRIPLE HELIX, 8 IN, 10 IN, 12 IN
0047888100	10	SHAFT, EXTENSION, 1-1/2 IN SQ X 5 FT LG, W/ COUPLING
0047888150	0	SHAFT, EXTENSION, 1-1/2 IN SQ X 7 FT LG, W/ COUPLING
71A0-1130	1	POLE TOPPER FOR WOOD POLE CONSTRUCTION
0033117600	0.1	NAIL, ROOFING WIRE, 1-1/2 IN LG, HOT DIP GALV
0084746000	1	COATING, PRESERVATIVE, POLE TOPPER
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730800	1	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730800	1	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730800	1	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730800	1	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730800	1	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730800	1	NUT, LOCK, 7/8 IN DIAMETER BOLT, GALVANIZED
71A0-1152	1	3/4 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730700	1	NUT, LOCK, 3/4 IN DIAMETER BOLT, GALVANIZED
71A0-1152	1	3/4 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
0047065200	1	ATTACHMENT, GUY, EYE, 15/16 IN DIA BOLT HOLE
0047730700	1	NUT, LOCK, 3/4 IN DIAMETER BOLT, GALVANIZED

Structure Detail Report (Install)

Project: Vigo Station Temp Bypass   Date: 092421

Project ID: Requestor:

Project Desc: Delivery Contact: Work Order No.:

Date Required: Contact   Activity:

Notes: Additional notes as required.   Cost Center:

Extra Parts and Assemblies

14B6-2744	3	138KV DEAD END INSULATOR FOR STATION/SWITCH STRUCTURE, POLYMER W/CORONA RING, 25K

CW18-2524 Qty: 2 STR

14B6-2743	3	138KV DEAD END INSULATOR, POLYMER, 25K, W/CORONA
14B6-2743	3	138KV DEAD END INSULATOR, POLYMER, 25K, W/CORONA
21W1-1518	1	STRUCTURE GROUNDING FOR POLYMER, SINGLE CIRCUIT, HEAVY DEADEND, WOOD, 8L8
21WE-1453	1	GROUND ROD FOR DIRECT EMBEDDED WOOD POLE
30D0-1104	1	OHGW, DEAD-END CONCRETE, STEEL OR WOOD POLE
30D0-1104	1	OHGW, DEAD-END CONCRETE, STEEL OR WOOD POLE
42C0-1117	8	GUY WIRE ASSEMBLY (AW), MEDIUM (25K) CORROSIVE
50A0-1106	8	SCREW ANCHOR 3 HELIX
71A0-1130	1	POLE TOPPER FOR WOOD POLE CONSTRUCTION
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
71A0-1151	1	7/8 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
71A0-1152	1	3/4 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES
71A0-1152	1	3/4 IN SHOULDER EYE BOLT W/ P139 GUY ATTACHMENT FOR WOOD POLES

Vigo - Pine Ridge SW Damper Placements

CONDUCTOR DAMPER PLACEMENT TABLE

DAMPER PLACEMENT (INCH)					Part #	STRUCTURE TYPE (S or D)
SPAN BEHIND			SPAN AHEAD			
D	B	STRUCTURE	A	C		
		89				D
	50	**90**	50		710059130	S
		91	50		710059130	S
		92	50		710059130	S
		93	50		710059130	S
		94	50		710059130	S
		95	50		710059130	S
		96	50		710059130	S
		97	50		710059130	S
		98	50		710059130	S
		99	50		710059130	S
		100	50		710059130	S
		101	50		710059130	S
		102	50		710059130	S
		103	50		710059130	S
		104				D
	50	**105**	50		710059130	S
		106	50		710059130	S
		107	50		710059130	S
		108	50		710059130	S
		109	50		710059130	S
		110	50		710059130	S
		111	50		710059130	S
		112				D
		113				D
	50	**114**	50		710059130	S
		115	50		710059130	S
		116	50		710059130	S
		117				D
	50	**118**	50		710059130	S
		119	50		710059130	S
		120	50		710059130	S
		121	50		710059130	S
		122	50		710059130	S
		123	50		710059130	S
		124	50		710059130	S
		125				D
	50	**126**	50		710059130	S
		127	50		710059130	S
		128	50		710059130	S
		129	50		710059130	S

		130	50		710059130	S
		131	50		710059130	S
		132	50		710059130	S
		133				D
		134				D
	50	**135**	50		710059130	S
		136	50		710059130	S
		137	50		710059130	S
		138	50		710059130	S
		139	50		710059130	S
		140	50		710059130	S
		141	50		710059130	S
		142	50		710059130	S
		143	50		710059130	S
		144	50		710059130	S
		145	50		710059130	S
		146	50		710059130	S
		147	50		710059130	S
		148	50		710059130	S
		149	50		710059130	S
		150	50		710059130	S
		151	50		710059130	S
		152	50		710059130	S
		153	50		710059130	S
		154	50		710059130	S
		155	50		710059130	S
		156	50		710059130	S
		157	50		710059130	S
		158				D

OPGW DAMPER PLACEMENT TABLE						
DAMPER PLACEMENT (INCH)					**Part #**	**STRUCTURE TYPE (S or D)**
SPAN BEHIND			**SPAN AHEAD**			
D	**B**	**STRUCTURE**	**A**	**C**		
		89				D
	20	**90**	20		710055121	S
		91	20		710055121	S
		92	20		710055121	S
		93	20		710055121	S
		94	20		710055121	S
		95	20		710055121	S
		96	20		710055121	S
		97	20		710055121	S
		98	20		710055121	S
		99	20		710055121	S

		100	20		710055121	S
		101	20		710055121	S
		102	20		710055121	S
		103	20		710055121	S
		104				D
	20	**105**	20		710055121	S
		106	20		710055121	S
		107	20		710055121	S
		108	20		710055121	S
		109	20		710055121	S
		110	20		710055121	S
		111	20		710055121	S
		112	20		710055121	S
		113	20		710055121	S
		114	20		710055121	S
		115	20		710055121	S
		116	20		710055121	S
		117				D
	20	**118**	20		710055121	S
		119	20		710055121	S
		120	20		710055121	S
		121	20		710055121	S
		122	20		710055121	S
		123	20		710055121	S
		124	20		710055121	S
		125	20		710055121	S
		126	20		710055121	S
		127	20		710055121	S
		128	20		710055121	S
		129	20		710055121	S
		130	20		710055121	S
		131	20		710055121	S
		132	20		710055121	S
		133	20		710055121	S
		134				D
	20	**135**	20		710055121	S
		136	20		710055121	S
		137	20		710055121	S
		138	20		710055121	S
		139	20		710055121	S
		140	20		710055121	S
		141	20		710055121	S
		142	20		710055121	S
		143	20		710055121	S
		144	20		710055121	S
		145	20		710055121	S
		146	20		710055121	S

		147	20		710055121	S
		148	20		710055121	S
		149	20		710055121	S
		150	20		710055121	S
		151	20		710055121	S
		152	20		710055121	S
		153	20		710055121	S
		154	20		710055121	S
		155	20		710055121	S
		156	20		710055121	S
		157	20		710055121	S
		158				D

SHIELDWIRE DAMPER PLACEMENT TABLE						
DAMPER PLACEMENT (INCH)					**Part #**	**STRUCTURE TYPE (S or D)**
SPAN BEHIND			**SPAN AHEAD**			
D	**B**	**STRUCTURE**	**A**	**C**		
		89				D
	11	**90**	11		50636500	S
		91	11		50636500	S
		92	11		50636500	S
		93	11		50636500	S
		94	11		50636500	S
		95	11		50636500	S
		96	11		50636500	S
		97	11		50636500	S
		98	11		50636500	S
		99	11		50636500	S
		100	11		50636500	S
		101	11		50636500	S
		102	11		50636500	S
		103	11		50636500	S
		104				D
	11	**105**	11		50636500	S
		106	11		50636500	S
		107	11		50636500	S
		108	11		50636500	S
		109	11		50636500	S
		110	11		50636500	S
		111	11		50636500	S
		112				D
		113				D
	11	**114**	11		50636500	S
		115	11		50636500	S
		116	11		50636500	S

		117				D
	11	**118**	11		50636500	S
		119	11		50636500	S
		120	11		50636500	S
		121	11		50636500	S
		122	11		50636500	S
		123	11		50636500	S
		124	11		50636500	S
		125				D
	11	**126**	11		50636500	S
		127	11		50636500	S
		128	11		50636500	S
		129	11		50636500	S
		130	11		50636500	S
		131	11		50636500	S
		132	11		50636500	S
		133				D
		134				D
	11	**135**	11		50636500	S
		136	11		50636500	S
		137	11		50636500	S
		138	11		50636500	S
		139	11		50636500	S
		140	11		50636500	S
		141	11		50636500	S
		142	11		50636500	S
		143	11		50636500	S
		144	11		50636500	S
		145	11		50636500	S
		146	11		50636500	S
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		150	11		50636500	S
		151	11		50636500	S
		152	11		50636500	S
		153	11		50636500	S
		154	11		50636500	S
		155	11		50636500	S
		156	11		50636500	S
		157	11		50636500	S
		158				D

Section 10. Foundations

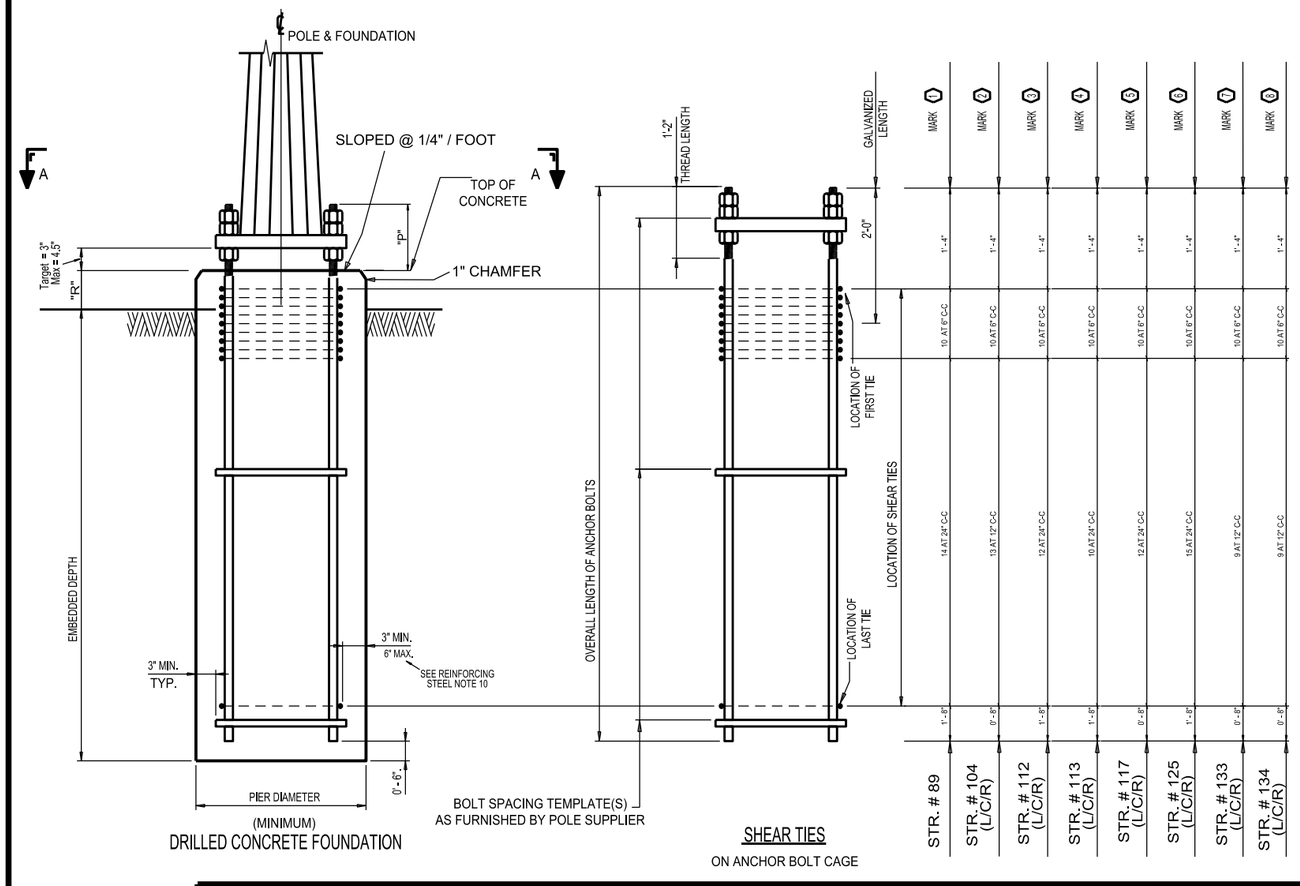
A. AEP Foundation Drawings

B. Anchor Bolt Cage Drawings—Vendor

C. Geotechnical Report (Soil Boring)

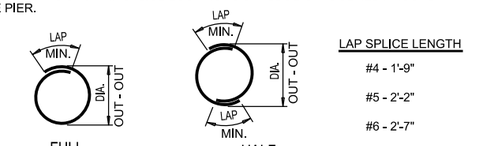
STRUCTURE						CONCRETE PIER					ANCHOR BOLT ASSEMBLY							STEEL REINFORCING FOR SHEAR TIES							FOUNDATION DESIGN REACTIONS			
STRUCTURE No.	STR. TYPE	BORING #	AEP DESIGN DRAWING No.	VENDOR DRAWING No.	LINE ANGLE Δ DEG	PIER DIAMETER (FT - IN)	REVEAL (FT -IN) "R"	EMBEDDED DEPTH (FT - IN)	CONCRETE VOLUME (CU. YDS)	TOP OF CONCRETE ELEVATION	QTY	SIZE	BOLT CIRCLE DIAMETER (IN)	AB PROJECTION (IN) "P"	OVERALL LENGTH (FT - IN)	TOTAL WEIGHT (LBS)	VENDOR REFERENCE DRAWING	QTY	MARK	SIZE	BEND TYPE	DIAMETER (OUT - OUT) (FT - IN)	LENGTH (FT - IN)	TOTAL WEIGHT (LBS)	LOAD CASE No.	AXIAL (KIPS)	SHEAR (KIPS)	MOMENT (FT-KIPS)
89	Single Pole DE	Vigo Station B-02	502-4213 V1	313164Z	20.0	6' - 6"	1' - 0"	34' - 0"	43	12" AG	20	18J	65.51	12"	35' - 6"	13235	1096787	24	1	5	Full	5'-9"	20'-3"	506	1	35.5	83	6400
104	3-Pole Full DE	B-01	502-4204	313165Z	15.0	5' - 0"	1' - 0"	18' - 0"	13.8	12" AG	12	18J	49.98	12"	19' - 6"	4140	1096788	23	2	5	Full	4'-5 1/2"	16'-2 1/2"	388	1	18.4	35.5	2610
112	3-Pole Full DE	B-02	502-4204	313166Z	8.0	5' - 0"	1' - 0"	30' - 0"	22.5	12" AG	12	18J	49.98	12"	31' - 6"	7199	1096789	22	3	5	Full	4'-5 1/2"	16'-2 1/2"	371	1	18.4	35.5	2610
113	3-Pole Full DE	B-02	502-5525	313167Z	-7.0	5' - 6"	1' - 0"	26' - 0"	23.8	12" AG	16	18J	55.16	12"	27' - 6"	7796	1096791	20	4	5	Full	4'-10 11/16"	17'-6 1/2"	366	1	23.8	23.5	2100
117	3-Pole Full DE	B-02	502-4204	313170Z	4.0	5' - 0"	1' - 0"	29' - 0"	21.8	12" AG	12	18J	49.98	12"	30' - 6"	7024	1096794	22	5	5	Full	4'-5 1/2"	16'-2 1/2"	371	1	18.4	35.5	2610
125	3-Pole Full DE	B-03	502-4204	313171Z	0.0	5' - 0"	1' - 0"	36' - 0"	26.9	12" AG	12	18J	49.98	12"	37' - 6"	8330	1096795	25	6	5	Full	4'-5 1/2"	16'-2 1/2"	422	1	18.4	35.5	2610
133	3-Pole Full DE	B-04	502-4204	313170Z	3.0	5' - 0"	1' - 0"	14' - 0"	10.9	12" AG	12	18J	49.98	12"	15' - 6"	3440	1097851	16	7	5	Full	4'-5 1/2"	16'-2 1/2"	320	1	18.4	35.5	2610
134	3-Pole Full DE	B-04	502-4207	313172Z	-30.0	5' - 0"	1' - 0"	14' - 0"	10.9	12" AG	8	18J	48.95	12"	15' - 6"	3431	1096796	16	8	5	Full	4'-4 7/16"	15'-11"	315	1	17.2	34.1	2500

*Please refer to TLCS-1302 and note sheet for construction and concrete mix specifications.



SHEAR TIES
ON ANCHOR BOLT CAGE

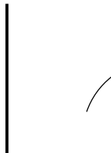
NOTES:
1. REINFORCING STEEL MATERIAL: PER ASTM A615, MIN. YIELD STRENGTH 60 KSI.
2. WELDING OF THE REINFORCING STEEL IS PROHIBITED.
3. DESIGNED PER ACI 318-14.
4. THE SHEAR TIES SHALL BE SPACED ON THE FULL LENGTH ANCHOR BOLT ASSEMBLY AS SHOWN. SPLICE LOCATIONS SHALL BE STAGGERED AROUND THE PIER.



LAP SPLICE LENGTH

#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-9"
#8	4'-4"

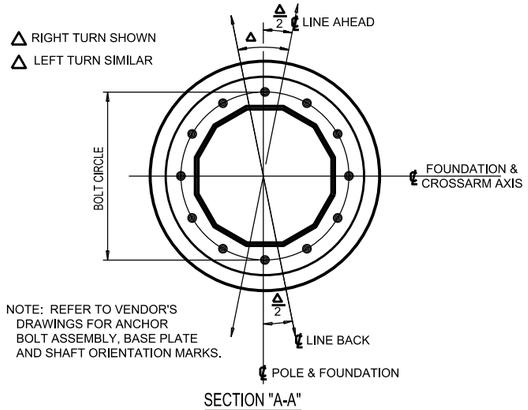
SHEAR TIE BEND DIAGRAMS



LOADS INCLUDE
1.10 FOUNDATION O.L.F.

LOADS CASE:

(PLACE LOAD CASE ABBREVATIONS HERE IF NEEDED)



NOTE: REFER TO VENDOR'S DRAWINGS FOR ANCHOR BOLT ASSEMBLY, BASE PLATE AND SHAFT ORIENTATION MARKS.

SECTION "A-A"

BASE PLATE ORIENTATION
FOR BOLT CIRCLE AND NUMBER OF ANCHOR BOLTS
SEE ABOVE TABLE

REV	REVISION DESCRIPTION	DATE	BY

AMERICAN ELECTRIC POWER

REGISTRATION No.:

ENG BY: MJS | CHKD BY: XXX
DRN BY: MJS | APP BY: XXX
DATE: 01/16/2022 | R/W MAP NO: n/a

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OHIO TRANSCO
ROSS - HEPPNER 138KV LINE
VIGO STATION - PINE RIDGE
CONCRETE PEIR FOUNDATION FOR STEEL POLES

EQUIP: TLN380:OH155
DWG: 114-3703
SHEET: 1 | REV: 1

SPLOTE05
SFLELOCATIONS

GENERAL NOTES:

1) ALL MATERIAL AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH AEP'S "SPECIFICATION FOR CONCRETE DRILLED PIER FOUNDATIONS", TLCS-1302, LATEST REVISION, "GUIDELINES FOR STABILIZATION AND LIFTING OF LARGE REBAR CAGES FOR CONCRETE DRILLED PIERS," TLDS-006, LATEST VERSION, AND OR ANY ACI DOCUMENTATION CITED IN THE AFOREMENTIONED SPECIFICATIONS. IF ANY OF THE ABOVE SPECIFICATIONS CONFLICT ONE ANOTHER THE NOTES STATED HEREIN TAKE PRECEDENCE.

2) THE FOUNDATION CONTRACTOR SHALL PROVIDE AEP WITH A DETAILED CONSTRUCTION DRILLING PLAN AT LEAST FOUR WEEKS PRIOR TO MOBILIZATION THAT SHALL ADDRESS THE FOLLOWING:
- A) OVERALL CONSTRUCTION OPERATION SEQUENCE.
- B) SITE SUPERVISOR'S AND OR DRILLER'S APPLICABLE JOB EXPERIENCE.
- C) APPROPRIATE EQUIPMENT REQUIRED
- D) EXCAVATION METHODS REQUIRED FOR THE SUBSURFACE GEOTECHNICAL CONDITIONS.
- E) METHODS TO PREVENT CAVING OR SLOUGHING OF THE DRILLED HOLE THROUGHOUT EXACATION AND CONCRETING.
- F) MIX DESIGN AS SPECIFIED UNDER CONCRETE NOTES.
- G) METHODS FOR MAINTAINING ANCHOR BOLT ORIENTATION AND PLUMBLINESS.
- H) METHODS FOR CONCRETE PLACEMENT

3) THE CONTRACTOR SHALL SUBMIT THE FOUNDATION CONCRETE MIX DESIGN TO THE DESIGN ENGINEER FOR REVIEW AT LEAST FIVE WEEKS PRIOR TO CONSTRUCTION.

4) THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION COMMENCEMENT.

5) THE CONTRACTOR SHALL SUBMIT A DETAILED PROJECT SPECIFIC SAFETY PLAN (PSSP) TO THE TCR AND REGIONAL SAFETY MANAGER PRIOR TO CONSTRUCTION.

PIER EXCAVATION NOTES:

1) THE PIER EMBEDMENT DEPTH SHOWN IN THE PROJECT DRAWINGS SHALL BE OBTAINED UNLESS OTHERWISE ACCEPTABLE BY THE DESIGN ENGINEER.

2) LOOSE MATERIAL AND FREE STANDING WATER SHALL BE REMOVED FROM THE DRILLED PIER EXCAVATION PRIOR TO CONCRETE PLACEMENT.

3) CONCRETE SHALL NOT BE PLACED WITHIN AN EXCAVATION WITH MORE THAN 3 INCHES OF FREE WATER UNLESS THE TREMIE METHOD IS UTILIZED. OTHERWISE, CONCRETE SHALL NOT BE PLACED IN WATER WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.

4) THE CONTRACTOR SHALL MAINTAIN SIDEWALL STABILITY THROUGHOUT THE EXCAVATION AND CONCRETE PLACEMENT OPERATIONS.

5) IF TEMPORARY CASING IS REQUIRED, IT SHALL FIT THE DRILLED HOLE TIGHTLY AND BE OF SUFFICIENT STRUCTURAL STRENGTH TO MAINTAIN THE EXCAVATION LINES AGAINST SOIL, WATER, VIBRATION, JACKING, OR DRIVING PRESSURES. IF TELESCOPING CASING IS USED THE BOTTOM SECTION DIAMETER SHALL NOT BE LESS THAN THE PIER DESIGN DIAMETER AS SPECIFIED HEREIN.

6) PERMANENT CASING AND/OR CORRUGATED METAL PIPE CULVERTS SHALL NOT BE USED UNLESS OTHERWISE DIRECTED BY THE DESIGN ENGINEER.

7) EXCAVATIONS FOR DRILLED PIERS SHALL NOT REMAIN OPEN FOR MORE THAN 8 HOURS UNLESS OTHERWISE AUTHORIZED BY THE OWNER'S REPRESENTATIVE. FURTHERMORE, NO EXCAVATIONS SHALL BE LEFT OPEN OVERNIGHT WITHOUT INSTALLATION OF PROPER BRACING, SHORING, CASING, BARRICADES, COVERINGS, AND SIGNAGE.

8) THE MINIMUM DISTANCE FROM AN OPEN EXCAVATION AND A RECENTLY FILLED CONCRETE PIER (LESS THAN 24 HOURS) IS 3 TIMES THE DIAMETER OF THE PIER MEASURED CENTER-TO-CENTER UNLESS OTHERWISE DIRECTED BY THE DESIGN ENGINEER.

REINFORCEMENT STEEL NOTES:

1) ALL REINFORCEMENT STEEL SHALL CONFROM TO ASTM A615, DEFORMED, GRADE 60 REINFORCEING BARS UNLESS SPECIFIED OTHERWISE WITHIN THE PROJECT DRAWINGS.

2) PRIOR TO PLACEMENT, REINFORCING BARS OF ALL METAL BAR SUPPORTS SHALL BE CLEANED OF HEAVY, FLAKY RUST; LOOSE MILL SCALE; DIRT, MUD, OIL; OR ANY OTHER FOREIGN SUBSTANCES IN ACCORDANCE WITH ACI 301. REINFORCING BARS SHALL REMAIN CLEAN UNTIL THEY ARE COMPLETELY EMBEDDED WITHIN CONCRETE.

3) REINFORCING BARS AND CAGES SHALL BE ACCURATELY PLACED AND SECURED IN POSITION SO THAT THEY WILL NOT DEVIATE FROM POSITION THROUGHOUT CONCRETING.

4) PLACEMENT OF REINFORCEMENT SHALL BE IN ACCORDINACE WITH THE REQUIREMENTS STATED WITHIN TLCS-1302, ACI 117, CRSI, AND ACI 318. IN ADDITION, LIFTING AND PLACEMENT OF REINFORCING CAGES SHALL CONFORM TO TLDS-006.

5) ALL REINFORCING STEEL SHALL MAINTAIN A MINIMUM OF 3" OF CLEAR COVER TO EXPOSED SOIL.

6) WELDING OF ANY REINFORCEMENT, ANCHOR BOLTS, OR REINFORCEMENT SPLICES IS PROHIBITED.

7) SPLICING OF ANY LONGITUDINAL BARS IS PROHIBITED WITHOUT WRITTEN APPROVAL OF THE DESIGN ENGINEER.

8) SHEAR TIE SPLICES FOR FULL & HALF BENDS SHALL BE ROTATED 180° & 90° RESPECTIVELY FROM ADJACENT SHEAR TIES.

9) REINFORCING STEEL AND OR ANCHOR BOLTS SHALL BE PLACED INTO POSITION PRIOR TO CONCRETE PLACEMENT. PUSHING OR STABBING REINFORCEMENT INTO WET CONCRETE (WET-SETTING) IS PROHIBITED.

10) CONTACT THE DESIGN ENGINEER FOR SIDE CLEAR COVER THAT EXCEEDS 6".

CONCRETE NOTES:

1) CONCRETE SHALL BE PROPORTIONED TO ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS. ALL CONCRETE MIXES SHALL BE DESIGNED IN ACCORDANCE WITH THE LATEST REVISION OF ACI 211.1, ACI 301, AND ACI 318.

2) THE MAXIMUM WATER/CEMENT RATIO SHALL NOT EXCEED 0.45.

3) SLUMP SHALL BE 4 TO 6 INCHES FOR DRILLED PIERS, 6 TO 8 INCHES FOR TEMPORARILY-CASED PLACEMENTS, AND 7 TO 9 INCHES FOR TREMIE PLACEMENTS. SLUMP SHALL BE DETERMINED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C143.

4) ADMIXTURES MAY BE ADDED TO THE CONCRETE MIX BUT IS SUBJECT TO REVIEW AND APPROVAL BY THE DESIGN ENGINEER.

5) THE AIR CONTENT WITHIN THE CONCRETE MIX SHALL MEASURE BETWEEN 4 TO 6 PERCENT. THE AIR CONTENT SHALL BE DETERMINED IN ACCORDANCE WITH ASTM C231.

6) THE CONCRETE TEMPERATURE AT THE TIME OF PLACEMENT SHALL BE BETWEEN 50 TO 95° FAHRENHEIT AND BE DETERMINED IN ACCORDANCE WITH ASTM C1064. PLACEMENT DURING HOT-WEATHER SHALL CONFORM TO THE SPECIFCATIONS WITHIN TLCS-1302 AND ACI 305.1. PLACEMENT DURING COLD-WEATHER SHALL CONFORM TO THE SPECIFCATIONS WITHIN TLCS-1302 AND ACI 306.1.

7) CONCRETE SHALL BE PLACED TO PREVENT AGGREGATE SEGREGATION AND SHALL NOT STRIKE REINFORCEMENT, CAGE STIFFNERS, ANCHOR BOLTS, OR SIDES OF THE EXCAVATION DURING PLACEMENT. CONCRETE FREE FALL IS LIMITED TO 50 FEET INTO A DRY EXCAVATION. OTHERWISE TRUNKS OR PIPES SHALL BE USED.

8) TREMIE OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH TLCS-1302 AND ACI 336.1. THE TREMIE PIPE SHALL HAVE A MINIMUM INSIDE DIAMETER OF 8 INCHES. THE CONTRACTOR IS RESPONSIBLE FOR PROPER TREMIE OPERATIONS. VIBRATION OF TREMIE-PLACED CONCRETE IS PROHIBITED EXCEPT AS NOTED WITHIN TLCS-1302.

CONCRETE NOTES CONTINUED:

9) THE FORMWORK REVEAL DIAMETER SHALL BE NO LARGER THAN THE DESIGN DIAMETER AS SPECIFIED HEREIN UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE DESIGN ENGINEER.

9) THE CONTRACTOR SHALL NOT EXCEED THE REVEAL HEIGHT SPECIFIED WITHIN THE PROJECT DRAWINGS UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE DESIGN ENGINEER.

10) THE TOP OF CONCRETE SHALL BE SLOPED AT A RATE OF 1/4 INCH PER FOOT AND SHALL BE FORMED FOR APPROPRIATE DRAINAGE. A NOMINAL ONE-INCH CHAMFER SHALL BE FORMED ON ALL EXPOSED EDGES OF PIERS.

11) THE BATCH PLANT SHALL PROVIDE CONCRETE BATCH TICKETS FOR EACH LOAD TO THE CONTRACTOR AND THE OWNER'S REPRESENTATIVE.

DRILLED PIER INSTALLATION TOLERANCES:

1) THE CENTERLINE SHALL NOT DEVIATE BY MORE THAN 3 INCHES FROM THE POSITION SHOWN ON THE CONSTRUCTION DRAWINGS.

2) PLUMBLINESS: ¼ INCH PER FOOT OF THE TOTAL DEPTH.

3) TOP OF CONCRETE: 0 TO ⅛ INCH OF THE ELEVATIONS SHOWN WITHIN THE PROJECT DRAWINGS.

ANCHOR BOLT SETTING TOLERANCES:

1) ANCHOR BOLT CAGES SHALL BE SET UTILIZING SETTING FRAMES OR TEMPLATES AS SPECIFIED WITHIN TLCS-1302.

2) FOR SETS OF ANCHOR BOLTS SUPPORTING THE SAME COLUMN LEG OR STRUCTURE, THE HORIZONTAL DISTANCE BETWEEN ADJACENT SETS OF ANCHOR BOLTS MEASURED AT THE TOP OF CONCRETE SHALL NOT EXCEED -0 TO +⅛ INCH FROM THE SPECIFIED DIMENSIONS.

3) THE HORIZONTAL DISTANCE BETWEEN DIAGONALLY OPPOSITE SETS OF ANCHOR BOLTS SHALL NOT EXCEED PLUS OR MINUS ⅜ INCH FROM THE SPECIFIED DIMENSIONS.

4) THE CENTER OF COMPLETE BOLT GROUPS FOR ANY STRUCTURE SHALL BE WITHIN ⅛ INCH OF THE SPECIFIED CENTERLINE OF THE STRUCTURE, AND ANY INDIVIDUAL GROUP SHALL BE WITHIN ⅛ INCH OF ITS SPECIFIED DIMENSIONS.

5) INDIVIDUAL ANCHOR BOLTS IN GROUPS SHALL NOT DEVIATE FROM THE SPECIFIED CENTERLINES BY MORE THAN 1/16 INCH.

6) ANCHOR BOLT PROJECTION ABOVE THE TOP OF CONCRETE SHALL BE WITHIN -0 TO +¼ INCH FROM THE SPECIFIED DIMENSIONS.

7) INDIVIDUAL ANCHOR BOLTS SHALL NOT DEVIATE BY MORE THAN 1/16 INCH PER FOOT FROM THE VERTICAL.

ERECTION NOTES:

1) AFTER CONCRETE HAS BEEN PLACED, STRUCTURE ERECTION MAY BEGIN ONCE THE CONCRETE'S ULTIMATE STRENGTH REACHES 3,000 PSI. WIRE STRINGING MAY BEGIN ONCE THE CONCRETE'S ULTIMATE STRENGTH REACHES 4,000 PSI. THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE TEST VERIFIED.

REV	REVISION DESCRIPTION	DATE	BY

AMERICAN ELECTRIC POWER

OEC LOGO

REGISTRATION No.:

ENG BY: MJS | CHKD BY: XXX

DRN BY: MJS | APP BY: XXX

DATE: 01/16/2022 | R/W MAP NO: N/A

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OHIO TRANSCO

ROSS - HEPPNER 138KV LINE

VIGO STATION - PINE RIDGE

CONCRETE PIER FOUNDATION FOR STEEL POLE

EQUIP: TLN380:OH155

DWG: 114-3703

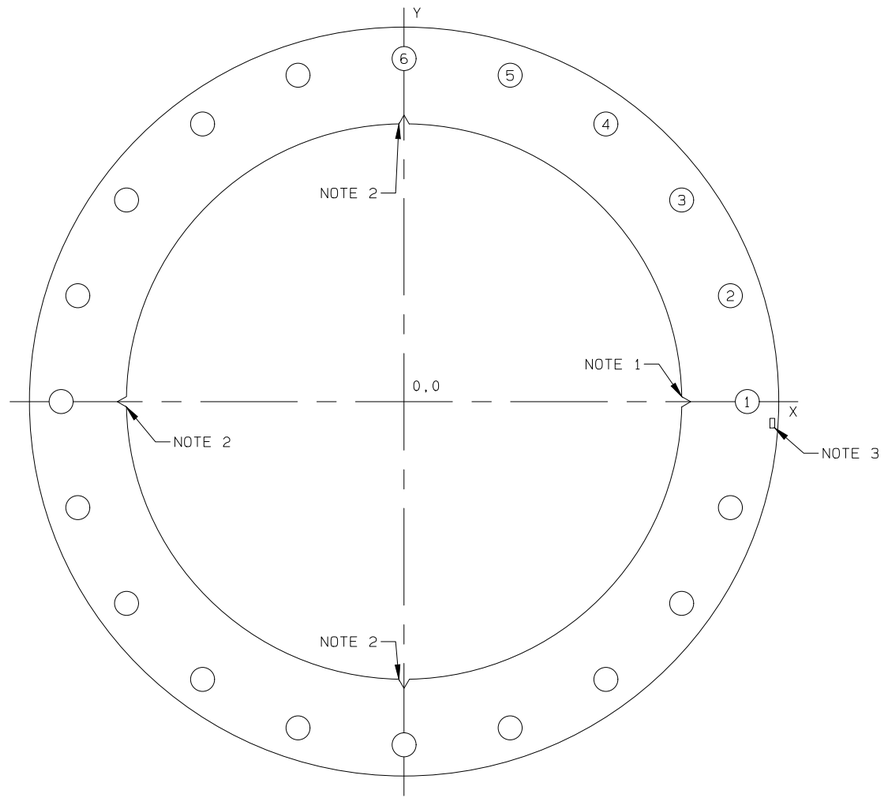
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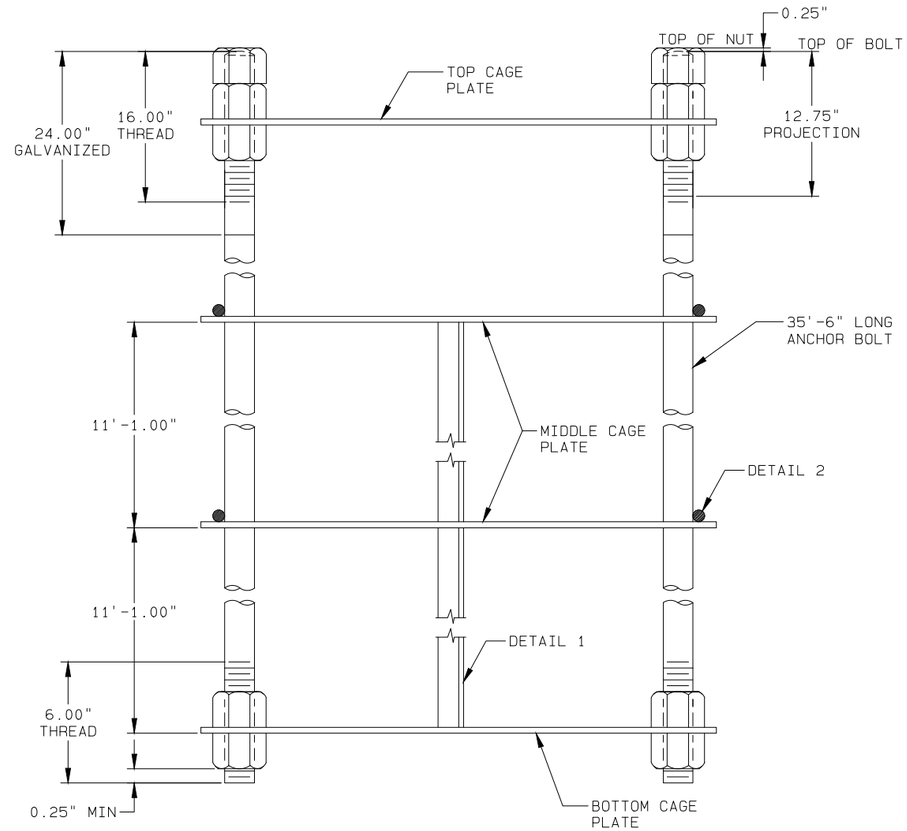
$FILEDATE

$FILELOCATION

HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	32.76	0.00
2	31.15	10.12
3	26.50	19.25
4	19.25	26.50
5	10.12	31.15
6	0.00	32.76

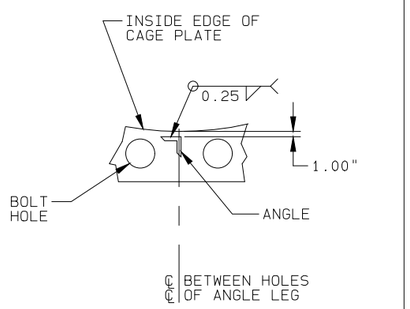
HOLE & SLOT SIZES (INCHES)
TOP TEMPLATE = Ø2.31 BOTTOM TEMPLATE = Ø2.31 MIDDLE TEMPLATE = 2.63 WIDE SLOT
BOLT CIRCLE (INCHES)
65.51



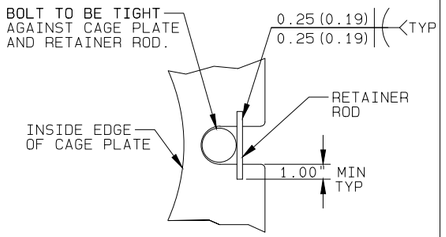


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 71.51".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 53.01".
6. CAGE PLATES - 1.000" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL (SHIP SEQ=0)		
VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2805094	TOP CAGE PLATE	1
2805095	MIDDLE CAGE PLATE	2
2805096	BOTTOM CAGE PLATE	1
2318356	2.25" BOLT	20
343036	2.25" NUT A563	100
200042C	11'-0" ANGLE	8
2005019	RETAINER ROD	40
1620194	IDENT TAG	1

100.5' AGH, STR 89, SPDE 502-4

DUPLICATE DRAWING DISTRIBUTION

TCACCAOYOY28050942318356F

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

P.A. CHK | SHOP CHK

JLH11 01/13/22

OTHER SPECIFICATIONS: M-1,W-133

MATERIAL | THICKNESS | WEIGHT: 13.125#

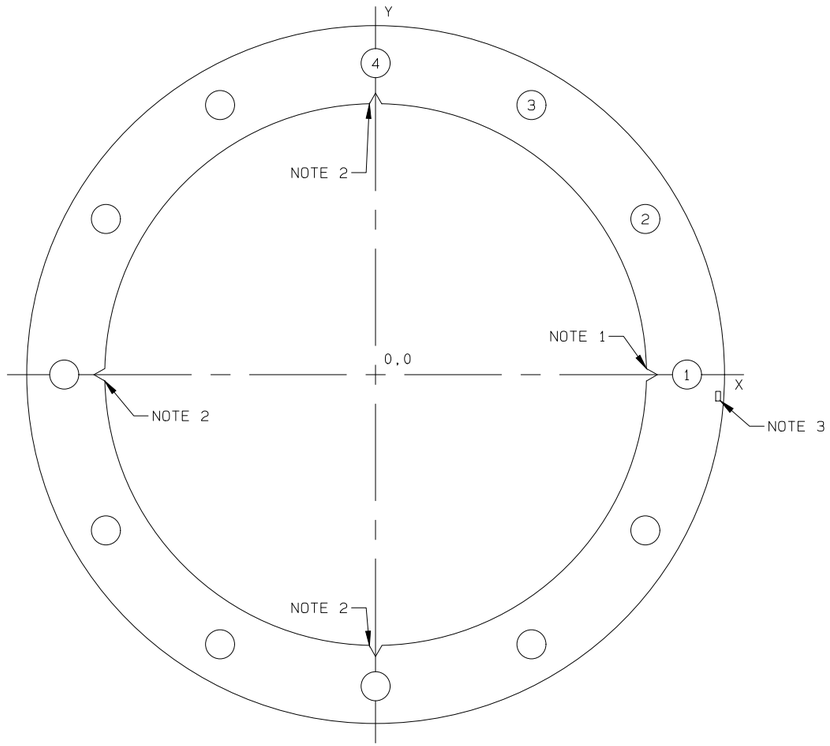
REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

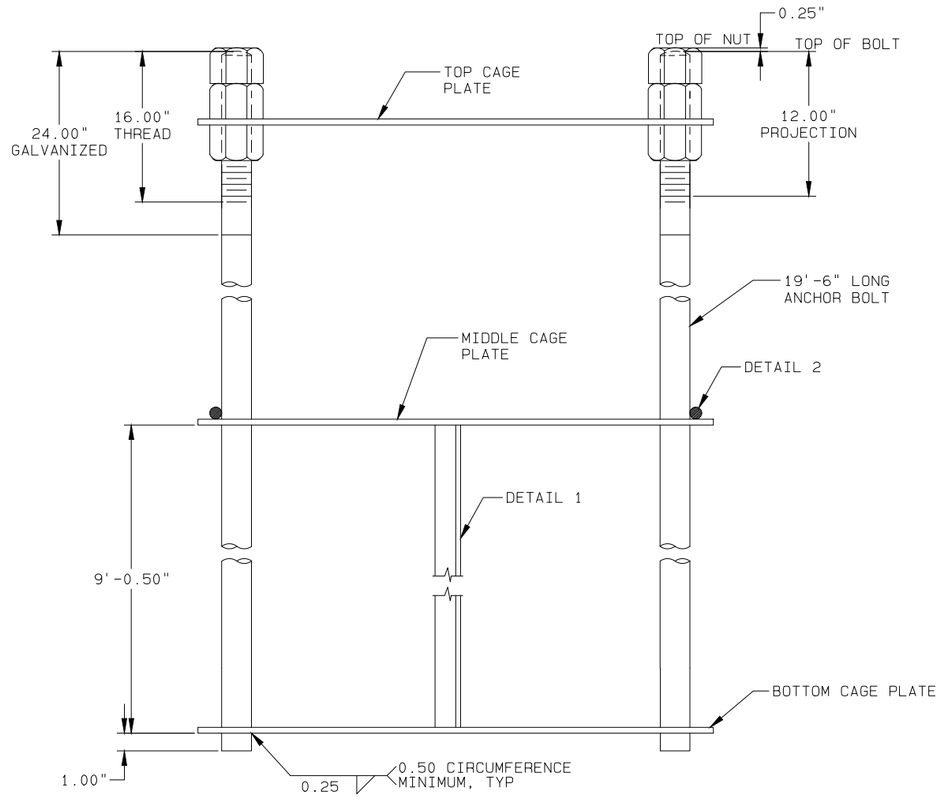
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1096787

HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	24.99	0.00
2	21.64	12.50
3	12.50	21.64
4	0.00	24.99

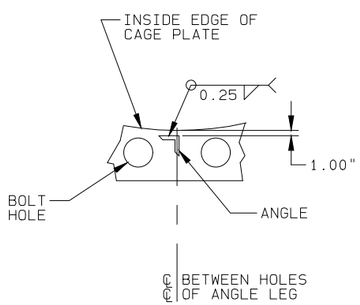
HOLE & SLOT SIZES (INCHES)
TOP TEMPLATE = Ø2.31 BOTTOM TEMPLATE = Ø2.63 MIDDLE TEMPLATE = 2.63 WIDE SLOT
BOLT CIRCLE (INCHES)
49.98



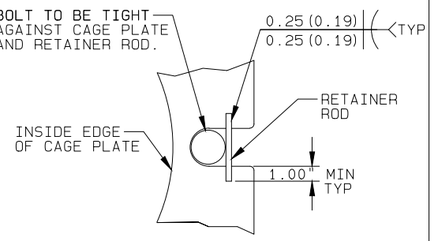


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 55.98".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 43.48".
6. CAGE PLATES - 0.500" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL (SHIP SEQ=0)		
VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2805101	TOP CAGE PLATE	1
2805102	MIDDLE CAGE PLATE	1
2805103	BOTTOM CAGE PLATE	1
203498P	2.25" BOLT	12
343036	2.25" NUT A563	36
200042B	9'-0" ANGLE	4
2005019	RETAINER ROD	12
1620194	IDENT TAG	1

85' AGH, STR 104, 3PDE 502-4

DUPLICATE DRAWING DISTRIBUTION

TCACCWOYOY2805101203498PF

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

P.A. CHK: JLH11 01/13/22

SHOP CHK:

OTHER SPECIFICATIONS: M-1,W-133

MATERIAL	THICKNESS	WEIGHT
		4,140#

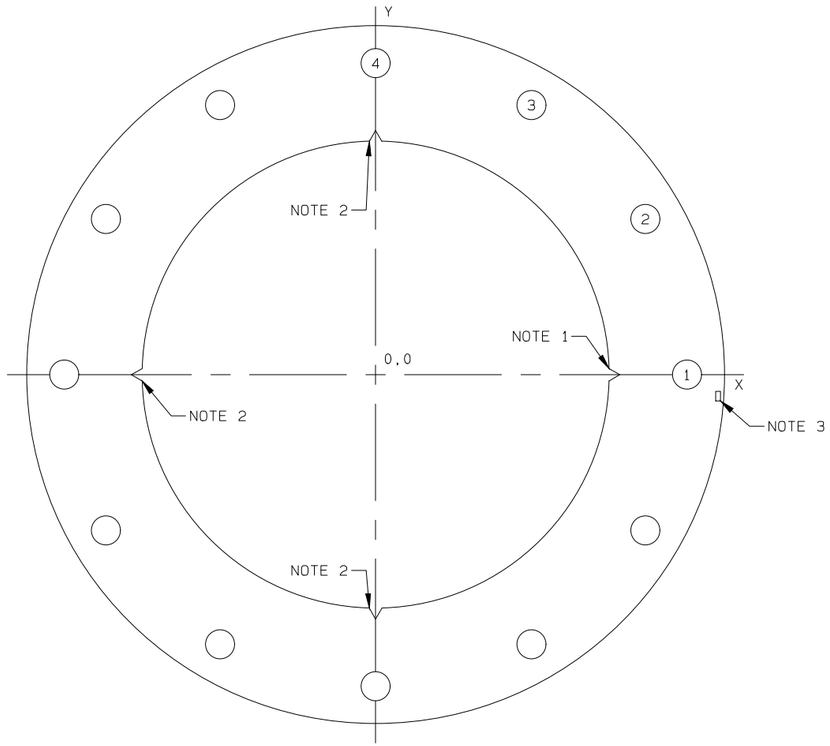
valmont

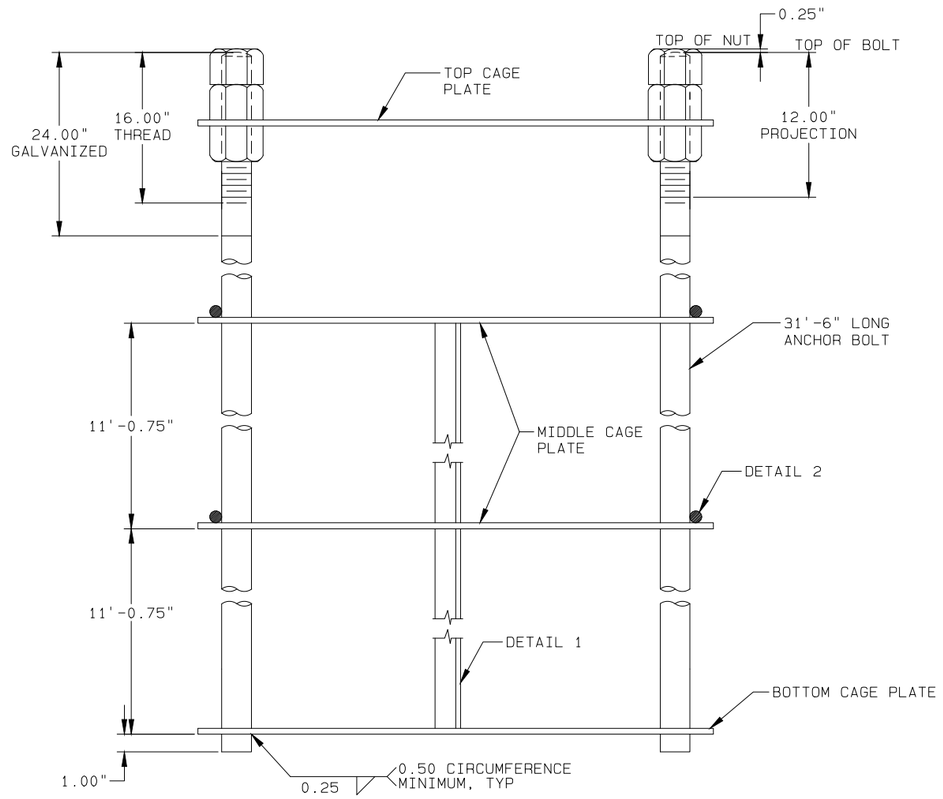
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1096788

HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	24.99	0.00
2	21.64	12.50
3	12.50	21.64
4	0.00	24.99

HOLE & SLOT SIZES (INCHES)
TOP TEMPLATE = Ø2.31 BOTTOM TEMPLATE = Ø2.63 MIDDLE TEMPLATE = 2.63 WIDE SLOT

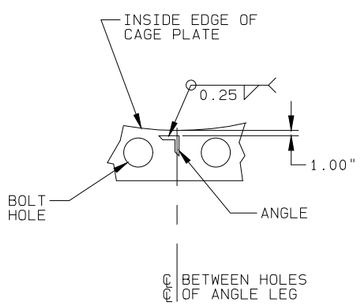
BOLT CIRCLE (INCHES)
49.98



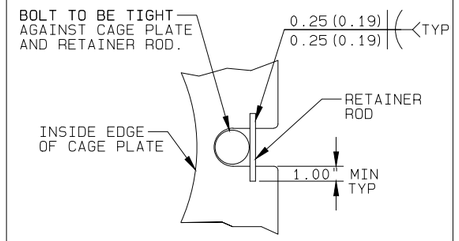


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 55.98".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 37.48".
6. CAGE PLATES - 0.750" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL
(SHIP SEQ=0)

VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2805107	TOP CAGE PLATE	1
2805108	MIDDLE CAGE PLATE	2
2805109	BOTTOM CAGE PLATE	1
2166395	2.25" BOLT	12
343036	2.25" NUT A563	36
200042C	11'-0" ANGLE	8
2005019	RETAINER ROD	24
1620194	IDENT TAG	1

85' AGH, STR 112, 3PDE 502-4

DUPLICATE DRAWING DISTRIBUTION

TCACCWOYOY28051072166395F

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

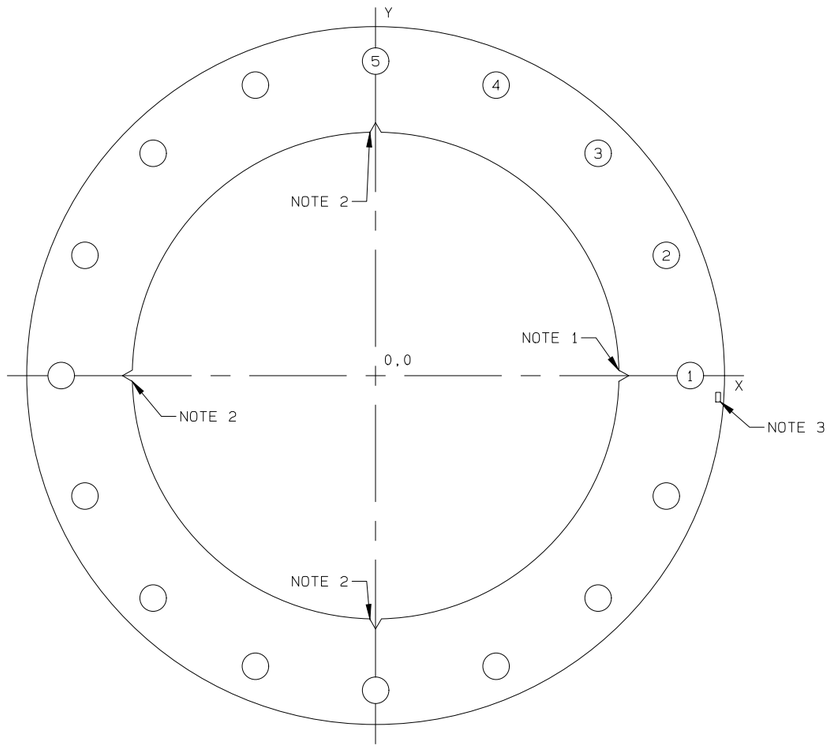
P.A. CHK: JLH11 01/13/22
SHOP CHK:
OTHER SPECIFICATIONS: M-1,W-133
MATERIAL:
THICKNESS:
WEIGHT: 7,199#

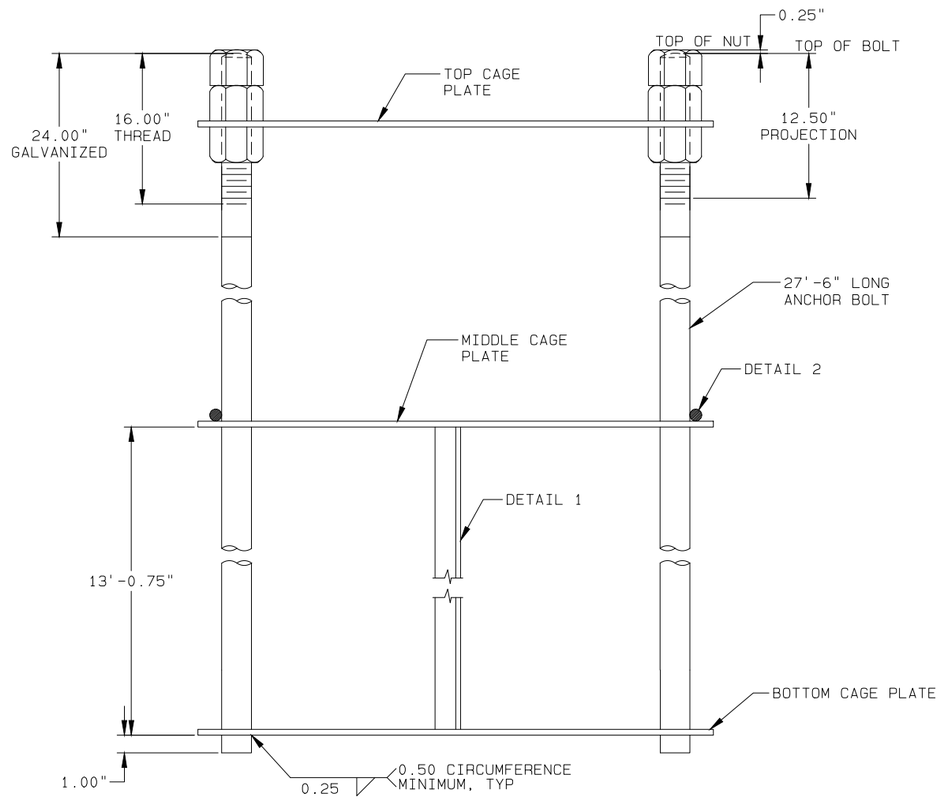
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1096789

HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	27.58	0.00
2	25.48	10.55
3	19.50	19.50
4	10.55	25.48
5	0.00	27.58

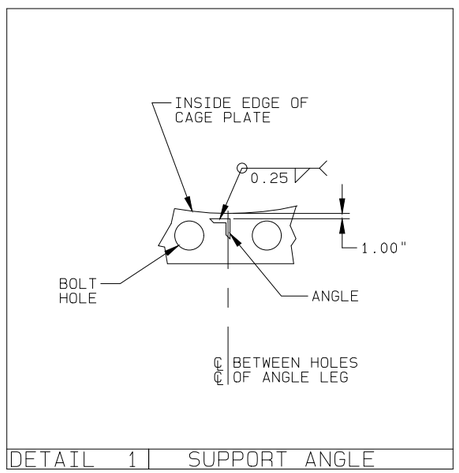
HOLE & SLOT SIZES (INCHES)
TOP TEMPLATE = Ø2.31 BOTTOM TEMPLATE = Ø2.63 MIDDLE TEMPLATE = 2.63 WIDE SLOT
BOLT CIRCLE (INCHES)
55.16



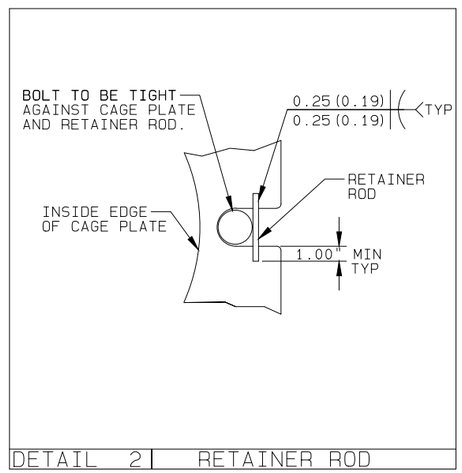


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 61.16".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 42.66".
6. CAGE PLATES - 0.750" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL (SHIP SEQ=0)		
VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2805116	TOP CAGE PLATE	1
2805117	MIDDLE CAGE PLATE	1
2805118	BOTTOM CAGE PLATE	1
203815T	2.25" BOLT	16
343036	2.25" NUT A563	48
200042A	13'-0" ANGLE	4
2005019	RETAINER ROD	16
1620194	IDENT TAG	1

110' AGH, STR # 113 TRI-POLE

DUPLICATE DRAWING DISTRIBUTION

TCACCWOYOY2805116203815TF

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

P.A. CHK: JLH11 01/13/22 SHOP CHK:

OTHER SPECIFICATIONS: M-1.W-133

MATERIAL | THICKNESS | WEIGHT: 7,796#

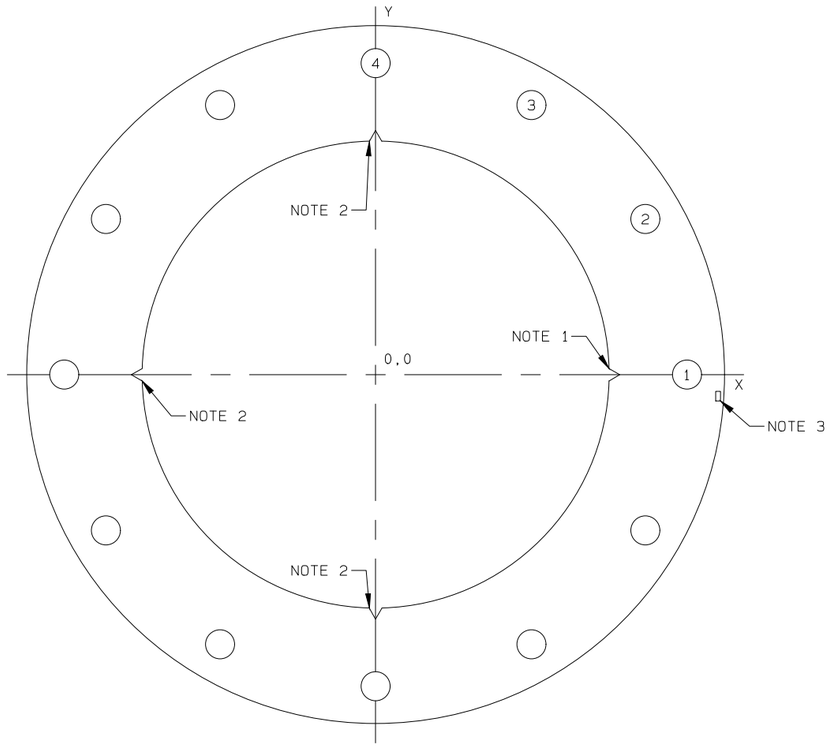
valmont

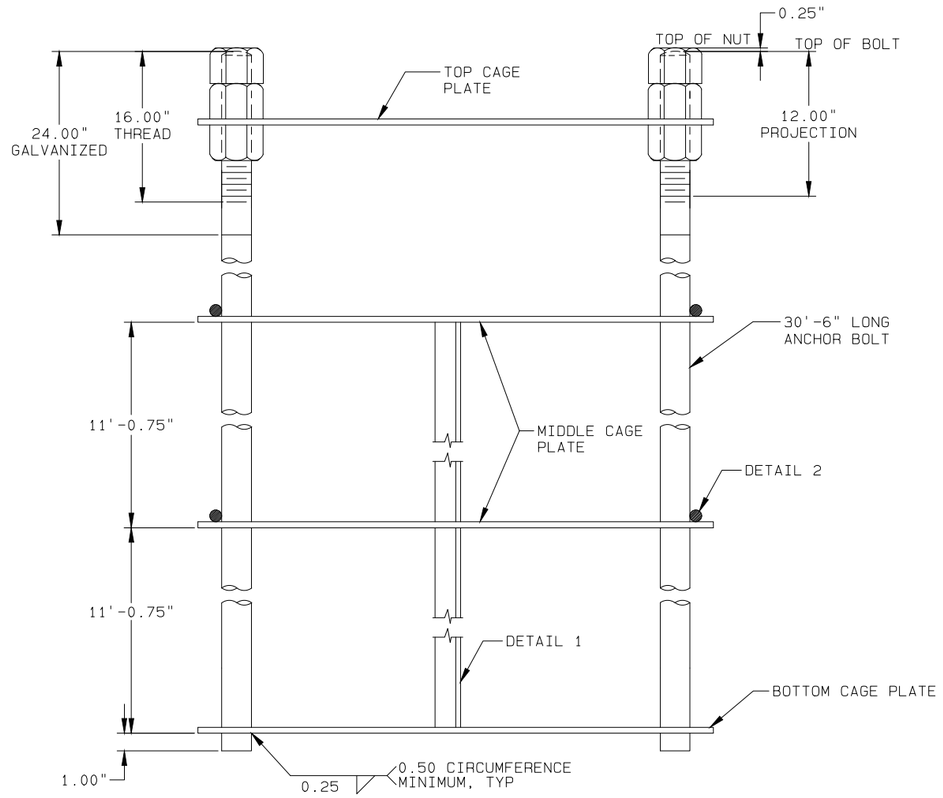
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1096791

HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	24.99	0.00
2	21.64	12.50
3	12.50	21.64
4	0.00	24.99

HOLE & SLOT SIZES (INCHES)
TOP TEMPLATE = Ø2.31 BOTTOM TEMPLATE = Ø2.63 MIDDLE TEMPLATE = 2.63 WIDE SLOT

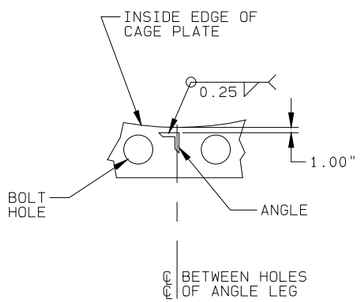
BOLT CIRCLE (INCHES)
49.98



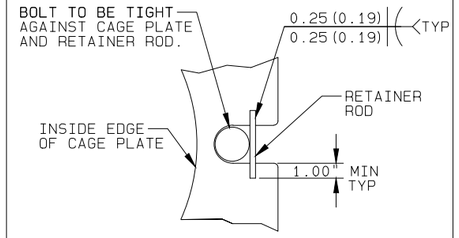


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 55.98".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 37.48".
6. CAGE PLATES - 0.750" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL
(SHIP SEQ=0)

VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2805138	TOP CAGE PLATE	1
2805139	MIDDLE CAGE PLATE	2
2805141	BOTTOM CAGE PLATE	1
2334888	2.25" BOLT	12
343036	2.25" NUT A563	36
200042C	11'-0" ANGLE	8
2005019	RETAINER ROD	24
1620194	IDENT TAG	1

85' AGH, STR 117, 3PDE

DUPLICATE DRAWING DISTRIBUTION

TCACCWOYOY2805138233488 8F

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

P.A. CHK: JLH11 01/13/22
SHOP CHK:
OTHER SPECIFICATIONS: M-1,W-133
MATERIAL:
THICKNESS:
WEIGHT: 7,024#

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1096794

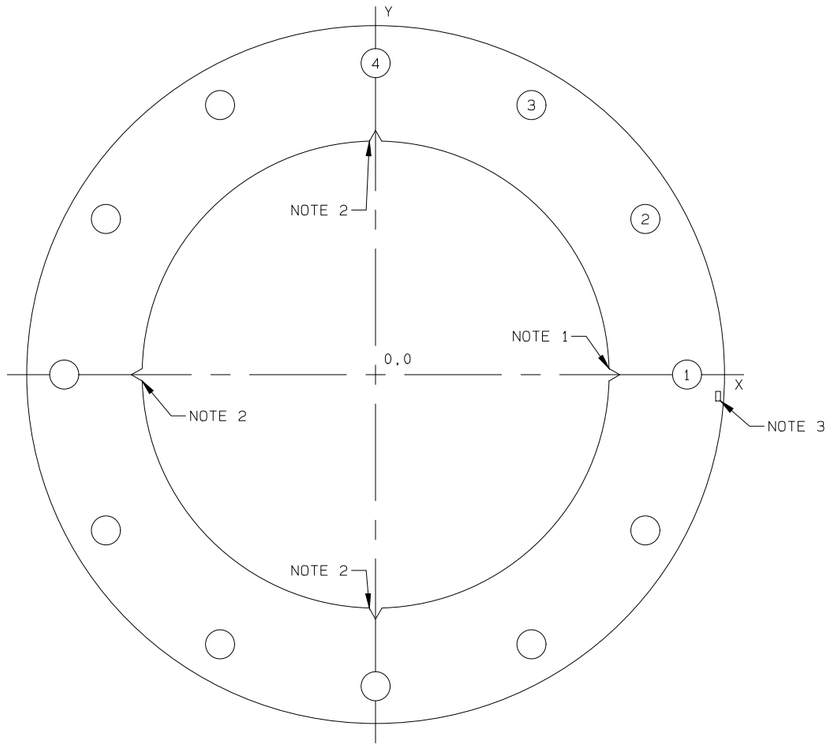
HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	24.99	0.00
2	21.64	12.50
3	12.50	21.64
4	0.00	24.99

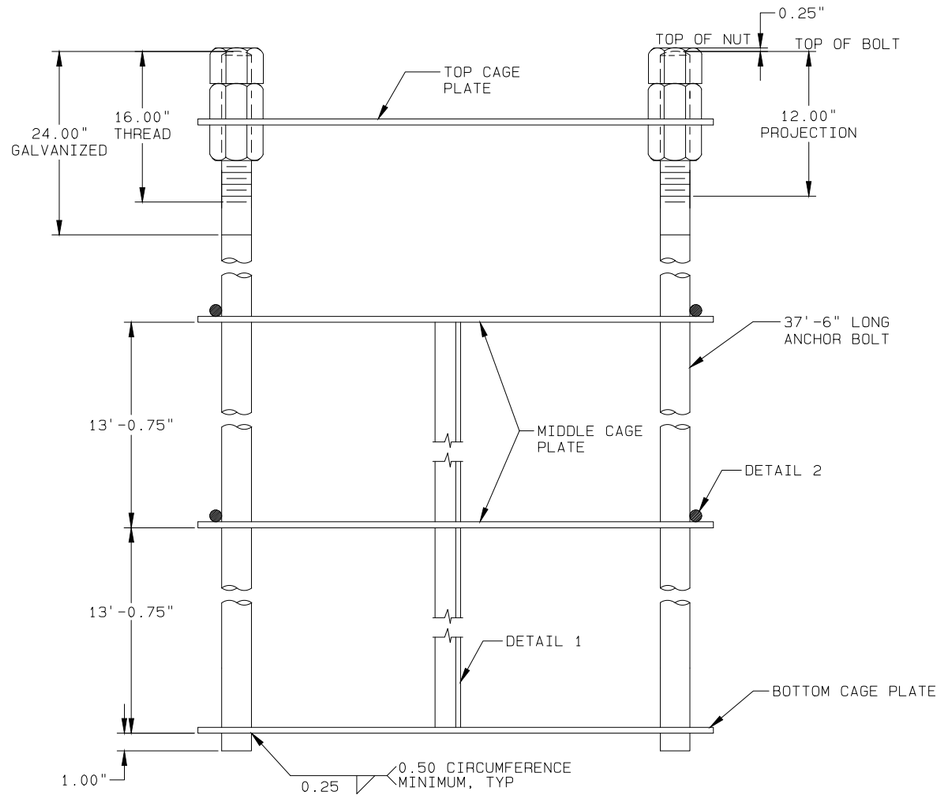
HOLE & SLOT SIZES (INCHES)

TOP TEMPLATE = Ø2.31
BOTTOM TEMPLATE = Ø2.63
MIDDLE TEMPLATE = 2.63 WIDE SLOT

BOLT CIRCLE (INCHES)

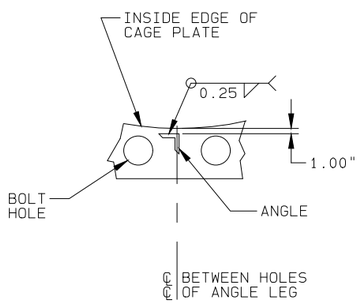
49.98



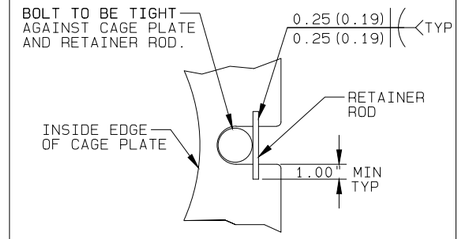


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 55.98".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 37.48".
6. CAGE PLATES - 0.750" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL
(SHIP SEQ=0)

VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2805145	TOP CAGE PLATE	1
2805146	MIDDLE CAGE PLATE	2
2805147	BOTTOM CAGE PLATE	1
203815R	2.25" BOLT	12
343036	2.25" NUT A563	36
200042A	13'-0" ANGLE	8
2005019	RETAINER ROD	24
1620194	IDENT TAG	1

85' AGH, STR 125, 3PDE 502-4

DUPLICATE DRAWING DISTRIBUTION

TCACCWOYOY2805145203815RF

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

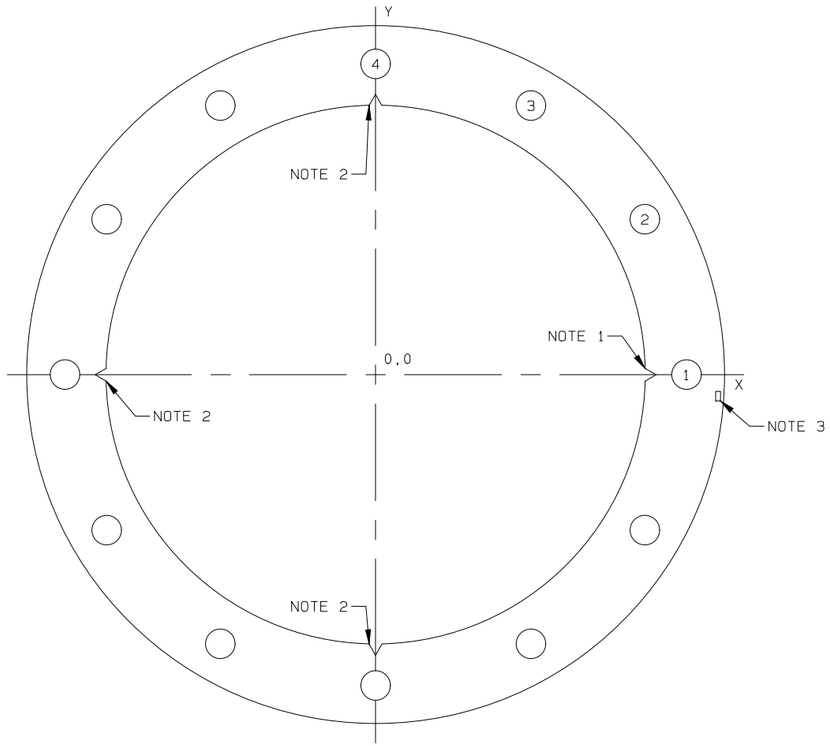
P.A. CHK: JLH11 01/13/22
SHOP CHK:
OTHER SPECIFICATIONS: M-1,W-133
MATERIAL:
THICKNESS:
WEIGHT: 8,330#

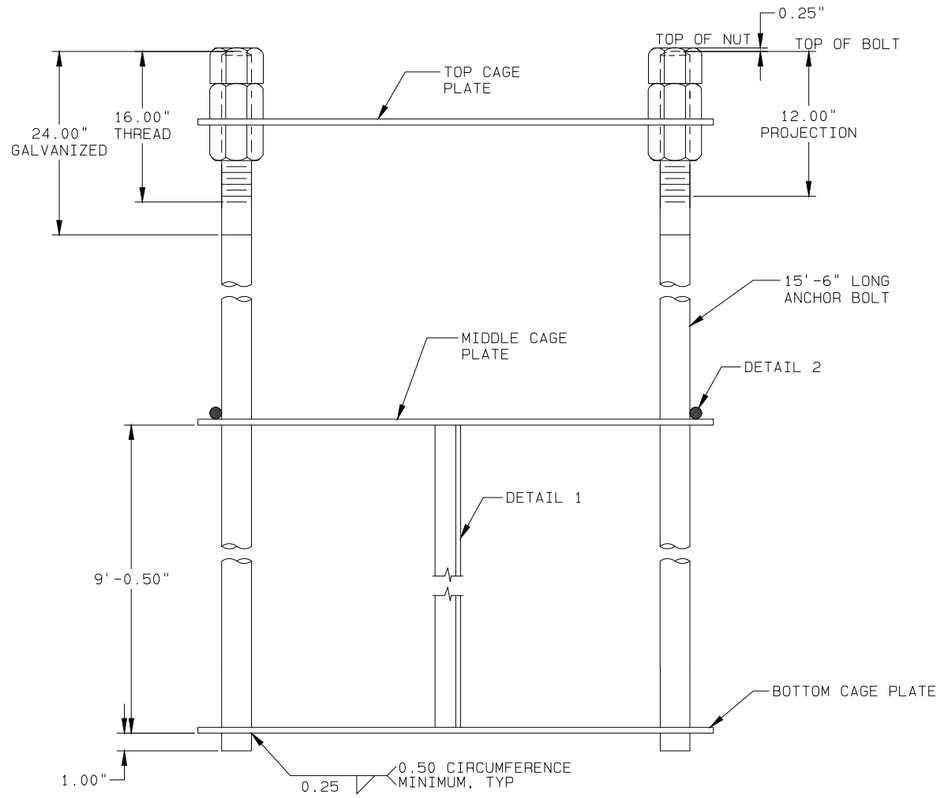
valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1096795

HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	24.47	0.00
2	21.19	12.24
3	12.24	21.19
4	0.00	24.47

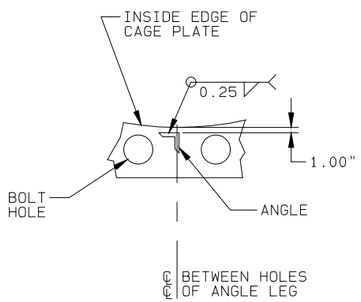
HOLE & SLOT SIZES (INCHES)
TOP TEMPLATE = Ø2.31 BOTTOM TEMPLATE = Ø2.63 MIDDLE TEMPLATE = 2.63 WIDE SLOT
BOLT CIRCLE (INCHES)
48.95



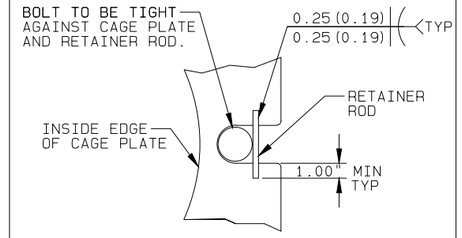


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 54.95".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 42.45".
6. CAGE PLATES - 0.500" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL
(SHIP SEQ=0)

VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2805152	TOP CAGE PLATE	1
2805153	MIDDLE CAGE PLATE	1
2805154	BOTTOM CAGE PLATE	1
2035086	2.25" BOLT	12
343036	2.25" NUT A563	36
200042B	9'-0" ANGLE	4
2005019	RETAINER ROD	12
1620194	IDENT TAG	1

85' AGH, STR 134, 3PDE 502-4

DUPLICATE DRAWING DISTRIBUTION

TCACCWOYOY2805152203508GF

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

P.A. CHK: JLH11 01/13/22
SHOP CHK:
OTHER SPECIFICATIONS: M-1,W-133
MATERIAL:
THICKNESS:
WEIGHT: 3,431#

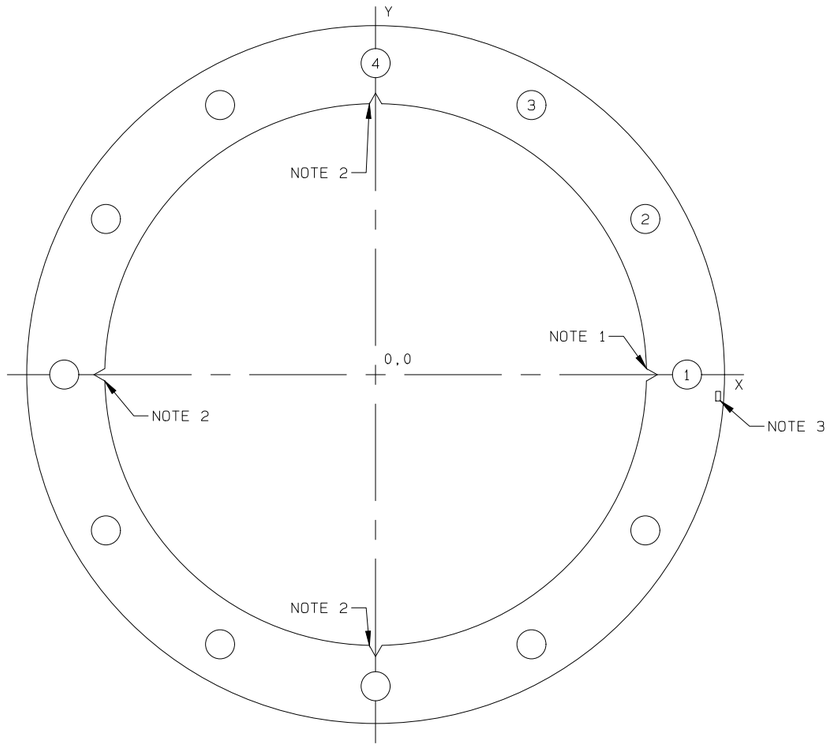
valmont

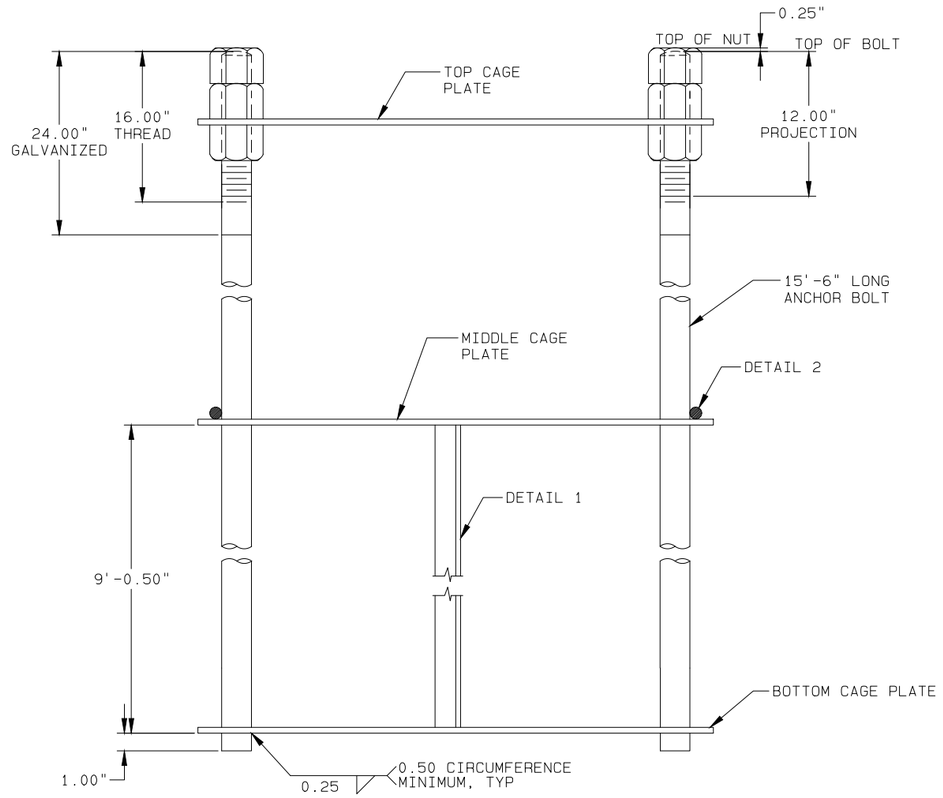
ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1096796

HOLE COORDINATES (INCHES)		
HOLE NUMBER	X-COORD	Y-COORD
1	24.99	0.00
2	21.64	12.50
3	12.50	21.64
4	0.00	24.99

HOLE & SLOT SIZES (INCHES)
TOP TEMPLATE = Ø2.31 BOTTOM TEMPLATE = Ø2.63 MIDDLE TEMPLATE = 2.63 WIDE SLOT

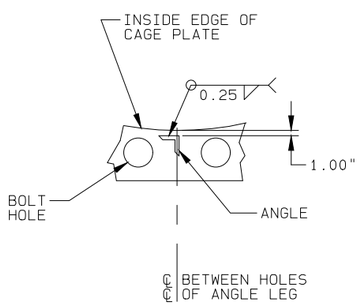
BOLT CIRCLE (INCHES)
49.98



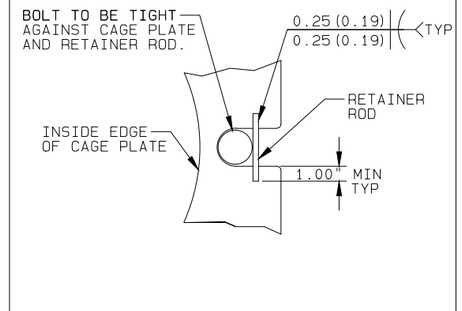


NOTES

1. V-NOTCH INDICATES BISECTOR OF THE INTERIOR LINE ANGLE
2. FOUR V-NOTCHES ARE 90° APART, STARTING FROM THE V-NOTCH INDICATED IN NOTE 1.
3. STAMP OR ENGRAVE THE DRAWING NUMBER ON 1620194 IN 0.50" CHARACTERS. SEAL WELD.
4. OUTSIDE DIAMETER OF ALL CAGE PLATES = 55.98".
5. INSIDE DIAMETER OF ALL CAGE PLATES = 43.48".
6. CAGE PLATES - 0.500" THK; A36 MATERIAL.
7. ANCHOR BOLTS - 18J BAR; A615, GRADE 75 MATERIAL.
8. ANGLE - 3.00" x 3.00" x 0.25" THK; A36 MATERIAL.
9. PLACE ANGLES IN 90° INCREMENTS AT SPECIFIED LEVELS.



DETAIL 1 | SUPPORT ANGLE



DETAIL 2 | RETAINER ROD

BILL OF MATERIAL (SHIP SEQ=0)		
VALMONT PART NO	DESCRIPTION	QTY PER ASSY
2812945	TOP CAGE PLATE	1
2812946	MIDDLE CAGE PLATE	1
2812947	BOTTOM CAGE PLATE	1
2035086	2.25" BOLT	12
343036	2.25" NUT A563	36
200042B	9'-0" ANGLE	4
2005019	RETAINER ROD	12
1620194	IDENT TAG	1

85' AGH, STR 133, 3PDE

DUPLICATE DRAWING DISTRIBUTION

TCACCWOYOY2812945203508GF

DWG SIZE D CLASS CODE (1) 4 CLASS NO. (3) 800

REV ID	DATE	REV BY	CHK BY	REVISION DESCRIPTION

DRAWN	ENGR	DATE	SCALE
JLH11	JS70	01/13/22	NONE

P.A. CHK: JLH11 01/13/22

SHOP CHK:

OTHER SPECIFICATIONS: M-1,W-133

MATERIAL	THICKNESS	WEIGHT
		3,440#

valmont

ORDER NO.	CUSTOMER	DESCRIPTION	DWG NO.
528951	AMERICAN ELECTRIC POWER CO.	ANCHOR BOLT CAGE ASSEMBLY	1097851

4960 Vulcan Avenue
Columbus, Ohio 43228
phone: 614.876.8000
fax: 614.876.0548
intertek.com/building
psiusa.com

December 28, 2021

AEP Transmission
8600 Smiths Mill Rd
New Albany, OH 43054

Attn: Mr. Matthew Schoelwer
Engineer

Re: Geotechnical Exploration Report
Berlin – Ross 138kV T-Line Section 3
Jackson County and Ross County, Ohio
AEP W.O. #: T10282334002
BPID #: A16801110
PSI Project No.: 01022028

Dear Mr. Schoelwer:

Thank you for choosing Professional Service Industries, Inc. (PSI), an Intertek company, as your consultant for the referenced project. Per AEP authorization, PSI has completed a geotechnical engineering study at four (4) locations for the referenced project. The results of the study are discussed in the accompanying report.

If you have any questions pertaining to this report, please contact our office at (614) 876-8000. PSI would be pleased to continue providing geotechnical services throughout the implementation of the project, and we look forward to working with you and your organization on this and future projects.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Kalub Kennedy, E.I.
Project Manager
EI # 04704

John Xu, P.E.
Senior Project Manager
OH, PE #60483, Exp. 12/31/23

Paul S. Hundley, P.E.
Regional Engineer/Principal Consultant
OH, PE #43741, Exp. 12/31/23

KK/JX/PSH/kk



The above Professional Engineering Seal and signature is an electronic reproduction of the original seal and signature. An original hard copy was sent to the client listed on this document. This electronic reproduction shall not be construed as an original or certified document.

Geotechnical Engineering Services Report

of

Berlin – Ross 138kV T-Line Section 3
Jackson and Ross Counties, Ohio

Prepared for

AEP Transmission
8600 Smiths Mill Rd
New Albany, OH 43054

Prepared by

Professional Service Industries, Inc.
4960 Vulcan Avenue
Columbus, Ohio, 43228

Report Date: December 28, 2021

PSI Project No. 01022028

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PROJECT INFORMATION

Project Authorization

The following table summarizes, in chronological order, the Project Authorization History for the services performed and represented in this report by Professional Service Industries, Inc. (PSI).

Document and Reference Number	Date	Requested/Provided By
Request for Proposal	09/14/2021	Matthew Schoelwer of AEP
PSI Proposal Number: 0102-354872	09/24/2021	Miles Mullins, John Xu, & Paul Hundley of PSI, Inc.
Notice to Proceed	11/04/2021	Jason Bryant of AEP

Project Description

New poles will be constructed in Jackson and Ross Counties southeast of Chillicothe, Ohio as part of the Berlin – Ross 138kV electrical power transmission line section. AEP transmission engineers requested geotechnical exploration services for this project.

Specific design information was not supplied; therefore, this report was based on the limited design information provided. Approximate site locations and test boring location plans are included in the Appendix of this report. The following table lists the material and information provided for this project:

Description of Material	Provider/Source	Date
Soil Borings .kmz file	Matthew Schoelwer of AEP	09/14/2021
Soil Boring Request .xls file	Matthew Schoelwer of AEP	09/14/2021

The geotechnical recommendations presented in this report are based on the available project information, and the subsurface materials described in this report. If any of the information noted above is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at or near proposed new or existing structures in order to prepare recommendations for the proposed transmission line tower/pole foundations. Contracted scope of services included drilling four (4) soil test borings at or near planned locations to a depth of approximately 50 feet below the ground surface, or coring 10 feet of rock, select laboratory testing, and preparation of this geotechnical report. The geotechnical exploration was planned according to the requested scope of work to provide recommendations for drilled shaft foundation design. This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- A general assessment of area geology based on our local knowledge and study of available

geological literature;

- General location, description of materials encountered in the borings which may interfere with construction progress or structure performance, including existing fills, cobbles/boulders, or organic soils;
- Identification of water levels encountered at the time of drilling;
- Design parameters required for drilled shafts;
- Recommendations with attachments including a boring location drawing, and test boring logs.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on, below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The boring sites were located in Jackson and Ross Counties southeast of Chillicothe and northwest of Jackson, Ohio. The locations of the test borings and the corresponding structure numbers are indicated in the following table. The approximate boring locations are depicted on the "Site Vicinity Map" and "Boring Location Plan" pages in the Appendix of this report.

Boring Number	Coordinates	Structure Number	Boring Depth (ft)
B-01	39.20811°N, 82.76429°W	TBD	33.0
B-02	39.19857°N, 82.76176°W	TBD	50.0
B-03	39.17156°N, 82.74879°W	TBD	48.6
B-04	39.14920°N, 82.73788°W	TBD	30.0

Site Geology

According to the Ohio Department of Natural Resources (ODNR), the test borings for the Berlin – Ross 138kV T-Line Section 3 lie in the Shawnee – Mississippian Plateau physiographic region with geology that consists of Pleistocene-age sandy outwash, Teays-age Minford clay, and silt-loam colluvium underlain by Devonian- and Mississippian-age shales, siltstones, and sandstones. ODNR states that this region has high relief (400 to 800 feet).

Information obtained from the ODNR website indicated some mining activities had been recorded within the area, but no mining activities were in the direct vicinity of the boring locations. A mine map of the site vicinity is included in the Appendix. More details on Ohio mines can be found from the following ODNR website: https://gis.ohiodnr.gov/MapViewer/?config=OhioMines.

Additionally, the "Known and Probable Karst in Ohio" map published by ODNR indicated that no karst activity had been recorded in the vicinity of the project site. The ODNR karst map is included in the Appendix.

PSI conducted preliminary research on the 100-year flooding levels using the FEMA NFHL overlay on the Google Earth Pro mapping software. FEMA flood maps are included in the Appendix of this report. According to the FEMA information boring location B-03 is in a 1% annual chance flood hazard zone with a flooding elevation between approximately 603 and 604 feet. The remaining boring locations are in areas of minimal flood hazard.

Subsurface Conditions

The subsurface conditions of the site were explored with four (4) soil test borings on November 29th, 30th, and December 10th, 2021. The termination depths of the test borings are listed in the table above. The boring locations were selected by AEP and located in the field by PSI field staff prior to PSI's field exploration, through use of a handheld GPS device. The approximate boring locations are depicted on the "Boring Location Plan" pages in the Appendix. The surface elevations at the boring locations were not provided to PSI, and PSI estimated surface elevations using Google Earth Pro mapping software. PSI recommends that boring elevation and position be surveyed and determined by a licensed surveyor if needed.

The borings were advanced utilizing 3¼ inch inside diameter, hollow stem auger drilling methods. Soil sampling and testing were performed continuously to a depth of 10.5 feet and at 5-foot intervals thereafter until adequate depth was achieved. Select soil samples were later tested in the laboratory to obtain soil material properties for the foundations. Drilling, sampling, and laboratory testing were performed in general accordance with ASTM standards.

All soil and rock samples obtained during the field exploration were transported to PSI's materials testing facility in Columbus, Ohio where they were visually examined and classified by a geotechnical engineer in accordance with the Unified Soil Classification System (USCS, ASTM D 2487). A description of the classification system is presented on a table included in the Appendix. Laboratory tests were performed on selected soil and rock samples in order to properly classify the various soil/rock types.

TOPSOIL:
Topsoil, present at the surface of the boring locations, ranged in thickness from approximately 5 to 10 inches. Topsoil thicknesses are for informational purposes only and should not be used for quantitative or bidding purposes.

FINE GRAINED SOIL:
Fine grained soil layers were predominantly encountered at the test boring locations. The fine grained soil layers were classified as Fat Clay (CH), Lean Clay (CL), Lean Clay with Sand (CL), Sandy Lean Clay (CL), Silt (ML), Silt with Sand (ML), and Sandy Silt (ML). The Standard Penetration Test N_{60} values for these layers ranged from 3 blows per foot (bpf) to 50 blows per 5 inches, indicating consistencies of "soft" to "very hard." The moisture contents of selected samples ranged from 15 to 48 percent.

GRANULAR SOIL:
Granular soil layers were encountered at boring locations B-03 and B-04, above bedrock. The granular soil layers encountered were classified as Silty Sand (SM). The Standard Penetration Test N_{60} values for these layers ranged from 14 blows per foot (bpf) to 50 blows per 2 inches, indicating consistencies of "medium dense" to "extremely dense." The moisture contents of selected samples ranged from 7 to 15 percent.

BEDROCK:
Bedrock was encountered at three (3) of the four (4) boring locations with top of bedrock depths that ranged from 6.0 to 35.0 feet, below existing grades. Rock coring procedures were performed to obtain rock core samples at these boring locations. Rock samples were classified as shale, siltstone, and sandstone with weathering that ranged from highly weathered to slightly weathered. Rock Quality Designation (RQD) values of the rock core samples ranged from 70 to 82 percent and recovery values ranged from 93 to 98 percent.

Please refer to the boring logs and laboratory data sheets in the Appendix for more specific information.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for specific information at the individual boring locations. These records include soil descriptions, stratifications, penetration resistances, and locations of the samples and laboratory test data. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations are also shown on these boring logs. The samples that were not altered by laboratory testing will be disposed of after 90 days of the delivery of this report.

Water Level Measurements

Groundwater was encountered while drilling at boring location B-03 at a depth of 7.5 feet, below existing grade. Caving depths of boring locations ranged from 10.3 to 48.2 feet, below existing grades. Water level readings taken after boring completion were influenced by added water during rock core procedures, where rock coring was performed.

Water levels were obtained during the test boring operations. They are noted on the test boring logs presented in the Appendix. In relatively pervious soil, such as sandy soils, the indicated depths are usually reliable groundwater levels. In relatively impervious soils, a suitable estimate of the groundwater depth may not be possible, even after several days of observation. Seasonal variations, temperature, land-use, proximity to a river, canal, or large body of water and recent rainfall conditions may influence the depths to the groundwater. Volumes of water will largely depend on the permeability of the soils. In fine-grained soils, the depth of the soil color change from brown to gray can be an indicator of the prevailing groundwater level.

The groundwater level at the site, as well as perched water levels and volumes, will fluctuate based on variations in rainfall, snowmelt, evaporation, surface run-off and other related hydrogeologic factors. The water level measurements presented in this report are the levels that were measured at the time of PSI's field activities. Please note that in the foundation calculation, PSI may or may not use the groundwater level from the field measurement. PSI may select the groundwater level for the foundation calculation based on the field exploration, FEMA flood map, soil profile, or other factors.

Laboratory Test Results

Laboratory tests were performed on representative split-spoon, Shelby tube, and rock core samples obtained during drilling operations. The laboratory tests included natural moisture content (ASTM D2216), grain size analysis (ASTM D422), Atterberg limits (ASTM D4318), unconfined compressive strength of cohesive soils (ASTM D2166), and unconfined compressive strength of intact rock core specimens (ASTM D7012C). Based on results of Atterberg limits, grain size analyses, and visual classifications, subgrade soils were classified in accordance with the Unified Soil Classification System (USCS, ASTM D 2487). Atterberg Limits, moisture content, compressive strength of soil/rock results, and USCS classifications are summarized in the table on the following page and in the Appendix of this report.

Summary of Laboratory Test Results

Sample Location	Sample Depth (ft)	Moisture Content (%)	Percent Fines (%)	Atterberg Limits			USCS Soil Classification
				LL	PL	PI	
B-01	6.0 – 7.5	23	98.4	43	23	20	CL
B-01	9.0 – 10.5	23	51.9	25	16	9	CL
B-02	7.5 – 9.0	27	71.6	NP	NP	NP	ML
B-02	18.5 – 20.0	31	99.6	40	23	17	CL
B-02	28.5 – 30.0	24	65.8	36	21	15	CL
B-02	43.5 – 45.0	18	58.5	NP	NP	NP	ML
B-03	9.0 – 10.5	26	61.0	22	20	2	ML
B-03	18.5 – 20.0	48	89.3	53	33	20	CH
B-03	28.5 – 30.0	28	89.1	30	23	7	ML
B-04	13.5 – 15.0	6	17.6	NP	NP	NP	SM

Unconfined Compressive Strength of Cohesive Soils			
Sample Location	**Sample Depth (ft)**	**Dry Unit Weight (pcf)**	**Compressive Strength (psf)**
B-02	11.5 – 13.5	101.7	2,627
B-03	16.5 – 18.5	120.2	1,540

Unconfined Compressive Strength of Rock			
Sample Location	**Sample Depth (ft)**	**Rock Type**	**Compressive Strength (psi)**
B-01	26.0	Sandstone	11,616
B-01	30.5	Siltstone	3,222
B-03	41.5	Shale	4,842
B-03	45.5	Sandstone	10,343
B-04	20.5	Sandstone	2,351
B-04	29.0	Sandstone	5,398

GEOTECHNICAL EVALUATION

Geotechnical Discussion

The project structure design information was not available to PSI at the time this report was prepared. This report will include PSI's recommendations developed based on general subsurface exploration findings.

According to the FEMA information, boring location B-03 was in a 1% annual chance flood hazard zone with a flooding elevation between 603 and 604 feet. The remaining boring locations were in areas of minimal flood hazard. **Design groundwater elevations between approximately 603 and 858 feet** were estimated by PSI for this project. The recommended design water levels are included on pages 9 through 12 based on depths below the existing grade. Due to the unstable sand layers that were encountered at various depths during the field exploration, it is anticipated that the "wet" method and/or use of steel casing may be required during drilled shaft construction for this project.

Based on PSI's geotechnical exploration, proposed drilled shafts or poles will be constructed in various soil and rock types for this project. Please see the individual boring logs for more information.

GEOTECHNICAL RECOMMENDATIONS

The following geotechnical related recommendations have been developed on the basis of the subsurface conditions encountered and PSI's understanding of the new tower construction project. Should changes in the project criteria occur, a review must be made by PSI to determine if modifications to our recommendations will be required.

Drilled Shaft Foundations

Because of the potential frost penetration depth of approximately thirty-six (36) inches in the region, the upper three (3) feet of the subgrade soils will most likely not develop reliable friction resistance to the drilled shaft. Therefore, it is not necessary to remove the soil in the upper thirty-six (36) inches of the subgrade before drilled shaft installation.

The lateral loads on the drilled shaft can be calculated with the parameters given in the tables on the following pages. These parameters are for the MFAD program which will analyze both the applied lateral load verses strain resistance of the soil and the deflection of the structural element. **The parameters given are ultimate values.** In general, the upper five (5) feet below grade of the drilled shaft should be ignored in the lateral and axial capacity. Bedrock was encountered at a depth less than 15 feet at one (1) or more boring locations for this project. At locations where bedrock is less than 15 feet below existing grades, PSI recommends constructing drilled shafts directly into bedrock and use bedrock strengths only, especially for drilled shafts or poles that carry heavy compression and lateral loads. If bedrock strengths are greater than that of concrete, concrete strengths may govern design.

PSI has provided the following parameters for preliminary design purposes. Actual drilled shafts must be designed by the project structural engineer.

When uplift is a concern for a deep foundation, the pier design is typically controlled by the uplift forces applied to the sides of the foundation. Uplift capacity is equal to the combination of the side resistance and the weight of the pier. The effective weight of the pier concrete (145 pcf above groundwater, and 82 pcf below the groundwater) should be included in the uplift calculations.

To facilitate drilled shaft construction, concrete should be on site and ready for placement as the pier excavation is completed.

PSI estimated the ultimate unit end bearing resistance for drilled shaft design in soil for this project based on the drilled shafts being installed at a minimum base depth of four (4) shaft diameters below grade. Estimated ultimate unit end-bearing values are included in the tables on the following pages.

Loose materials on the bearing surface must be removed prior to concrete placement. To reduce the lateral movement of the pier, the contractor must place the pier concrete in intimate contact with undisturbed natural soil. The contractor must fill voids or enlargements in the pier shaft excavation with concrete at the time of concrete placement.

Shaft construction should follow applicable sections of ACI 336.1 – *Specifications for the Construction of Drilled Piers*. If the soils at the various tower sites contain saturated sandy soils, the drilling for a shaft will not be stable and could cave when these sandy soil formations are encountered. If a straight drilled shaft will need to be installed under these conditions, use of temporary steel casing and/or drilling fluid will be required. If the temporary casing used to construct the shaft does not effect a watertight seal; where drilling fluid is used to stabilize the shaft excavation; or where the end bearing stratum is sand, the "wet method" of concrete placement will be required.

Concrete slumps ranging from seven (7) to nine (9) inches are recommended for drilled pier construction. Concrete with slumps in this range will usually fill irregularities along the sides and bottom of the hole. Where a watertight seal is achieved, concrete should be placed into the drilled hole through a centering chute at the surface to prevent contact with the sides of the hole and reinforcing steel. This procedure will reduce the potential of side flow and segregation. The wet method of concrete placement will require a tremie pipe lowered to the bottom of the shaft and concrete placed after the ground water stabilizes to its natural level. The sequence of operations should be scheduled so that each pier is drilled, reinforcing steel is placed, and concrete is placed in a continuous, rapid, and orderly manner to reduce the time the excavation is open.

PSI should be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. PSI cannot accept responsibility for conditions that deviate from those described in this report, nor for the performance of the foundation system if not engaged to also provide construction observation and testing for this project.

The following tables were prepared for your deep foundation design needs.

Recommended Soil/Rock Parameters for Drilled Shaft Design (MFAD Design Method)

Soil / Rock Layer No.	Typical Subgrade Material and Soil / Rock Classification	Simplified Soil / Rock Type	Top of Soil Layer Depth (ft)	Bottom of Soil Layer Depth (ft)	Average SPT N Value (blows/ft)/RQD	Below Estimated Design Water Table	Total Unit Weight, Y' (pcf)	Effective Unit Weight, Y' (pcf)	Soil Undrain Shear Strength or Cohesion, C (ksf)	Effective Cohesion of the Rock Mass C' (ksf)	Soil Internal Angle of Friction, φ (Deg)	Effective Friction Angle of the Rock Mass, φ' (Deg)	Modulus of Deformation, E_D (ksi)	Downward Average Unit Side Resistance for Soil* (ksf)	Uplift Average Unit Side Resistance for Soil* (ksf)	Rock / Concrete Bond Stress for (ksf)	Average Unit End Bearing Resistance (ksf)
	B-01 (Berlin - Ross 138kV T-Line)																
1	Medium Stiff to Very Stiff, Lean Clay (CL)	Clay	0	9	13	-	126	126.0	1.5	-	-	-	0.90	0.83	0.75	-	-
2	Medium Stiff , Sandy Lean Clay (CL)	Clay	9	11	6	-	119	119.0	0.7	-	-	-	0.45	0.39	0.35	-	-
3	Highly to Moderately Weathered Shale	Rock	11	19.5	50+	Yes	135	72.6	-	2.0	-	28	150.0	-	-	4.3	35.0
4	Moderately to Slightly Weathered Siltstone	Rock	19.5	33	-	Yes	140	77.6	-	4.0	-	39	1575.0	-	-	11.5	50.0

Note: The table was prepared using simplified soil/rock profiles. Some adjustments may be necessary by design engineers. Neglect side resistance in top **5 feet** and the bottom **X feet** in soil (X=diameter of the shaft) for shaft design. Minimum recommended drilled shaft length of four (4) times the shaft diameter (see *Geotechnical Recommendations* section).

"*" Unit Side Friction was estimated for a CONCRETE SHAFT against soil. Contact PSI if permanent casing will be used for construction.

Rock Mass Shear Strength parameters (Effective Values) are estimated based on RMR_{76}

Estimated Design Groundwater Table: **11** ft below the existing grade (or at **elevation 619 ft**).

Unit resistance values above are **Ultimate Values.**

RMR_{76} Rock Rating

Rock Type	Rock Depth (ft)		Rating Parameter						Total Rating Value	RMR_{76} Rating Description	Effective Cohesion of the Rock Mass C' (ksf)	Effective Friction Angle of the Rock Mass, ϕ' (Deg)	Deformation Modulus, E_D (ksi)
	Top	Bottom	Strength	RQD	Spacing of Joint	Condition of Joints	Ground-Water Condition	Adjustm. for Joints Orientation					
Moderately to Slightly Weathered Siltstone	19.5	33	4	17	20	12	7	-2	58	Fair Rock	3.1-4.2	35-40	1600

Recommended Soil/Rock Parameters for Drilled Shaft Design (MFAD Design Method)																	
Soil / Rock Layer No.	Typical Subgrade Material and Soil / Rock Classification	Simplified Soil / Rock Type	Top of Soil Layer Depth (ft)	Bottom of Soil Layer Depth (ft)	Average SPT N Value (blows/ft)/RQD	Below Estimated Design Water Table	Total Unit Weight, Y' (pcf)	Effective Unit Weight, Y' (pcf)	Soil Undrain Shear Strength or Cohesion, C (ksf)	Effective Cohesion of the Rock Mass C' (ksf)	Soil Internal Angle of Friction, φ (Deg)	Effective Friction Angle of the Rock Mass, φ' (Deg)	Modulus of Deformation, E_D (ksi)	Downward Average Unit Side Resistance for Soil* (ksf)	Uplift Average Unit Side Resistance for Soil* (ksf)	Rock / Concrete Bond Stress for (ksf)	Average Unit End Bearing Resistance (ksf)
	B-02 (Berlin - Ross 138kV T-Line)																
1	Stiff to Very Stiff, Lean Clay with Sand (CL)	Clay	0	7	14	-	127	127.0	1.6	-	-	-	1.10	0.83	0.75	-	-
2	Stiff , Silt with Sand (ML)	Sand	7	10	10	-	109	109.0	-	-	20	-	0.55	0.39	0.27	-	10.0
3	Medium Stiff to Stiff, Lean Clay (CL)	Clay	10	28	9	Yes	122	59.6	1.0	-	-	-	0.65	1.39	1.25	-	7.0
4	Stiff to Very Stiff, Sandy Lean Clay (CL)	Clay	28	43	12	Yes	124	61.6	1.4	-	-	-	0.80	2.39	2.15	-	10.0
5	Hard to Very Hard, Sandy Silt (ML)	Sand	43	50	45	Yes	125	62.6	-	-	28	-	2.50	3.39	2.37	-	30.0

Note: The table was prepared using simplified soil/rock profiles. Some adjustments may be necessary by design engineers. Neglect side resistance in top **5 feet** and the bottom **X feet** in soil (X=diameter of the shaft) for shaft design. Minimum recommended drilled shaft length of four (4) times the shaft diameter (see *Geotechnical Recommendations* section).

"*" Unit Side Friction was estimated for a CONCRETE SHAFT against soil. Contact PSI if permanent casing will be used for construction.

Rock Mass Shear Strength parameters (Effective Values) are estimated based on RMR_{76}

Estimated Design Groundwater Table: **10** ft below the existing grade (or at **elevation 611 ft**).

Unit resistance values above are **Ultimate Values.**

Recommended Soil/Rock Parameters for Drilled Shaft Design (MFAD Design Method)

Soil / Rock Layer No.	Typical Subgrade Material and Soil / Rock Classification	Simplified Soil / Rock Type	Top of Soil Layer Depth (ft)	Bottom of Soil Layer Depth (ft)	Average SPT N Value (blows/ft)/RQD	Below Estimated Design Water Table	Total Unit Weight, Y' (pcf)	Effective Unit Weight, Y' (pcf)	Soil Undrain Shear Strength or Cohesion, C (ksf)	Effective Cohesion of the Rock Mass C' (ksf)	Soil Internal Angle of Friction, φ (Deg)	Effective Friction Angle of the Rock Mass, φ' (Deg)	Modulus of Deformation, E_D (ksi)	Downward Average Unit Side Resistance for Soil* (ksf)	Uplift Average Unit Side Resistance for Soil* (ksf)	Rock / Concrete Bond Stress for (ksf)	Average Unit End Bearing Resistance (ksf)
	B-03 (Berlin - Ross 138kV T-Line)																
1	Medium Stiff to Stiff, Sandy Lean Clay (CL)	Clay	0	7.5	9	Yes	122	59.6	1.0	-	-	-	0.65	0.55	0.50	-	-
2	Soft to Medium Stiff , Sandy Silt (ML)	Sand	7.5	13	4	Yes	92	29.6	-	-	20	-	0.23	0.15	0.11	-	-
3	Soft, Fat Clay (CH)	Clay	13	23	3	Yes	115	52.6	0.3	-	-	-	0.25	0.17	0.15	-	-
4	Medium Stiff to Stiff, Silt (ML)	Sand	23	31	8	Yes	104	41.6	-	-	20	-	0.45	0.55	0.39	-	-
5	Medium Dense to Dense, Silty Sand (SM)	Sand	31	35	35	Yes	124	61.6	-	-	34	-	3.15	1.15	0.81	-	30.0
6	Moderately to Slightly Weathered Shale	Rock	35	44.8	-	Yes	135	72.6	-	3.5	-	36	1100.0	-	-	4.3	40.0
7	Slightly Weathered to Unweathered Sandstone	Rock	44.8	46.5	-	Yes	145	82.6	-	4.3	-	40	3475.0	-	-	17.3	50.0
8	Slightly Weathered Siltstone	Rock	46.5	48.6	-	Yes	140	77.6	-	3.8	-	38	1375.0	-	-	11.5	50.0

Note: The table was prepared using simplified soil/rock profiles. Some adjustments may be necessary by design engineers. Neglect side resistance in top **5 feet** and the bottom **X feet** in soil (X=diameter of the shaft) for shaft design. Minimum recommended drilled shaft length of four (4) times the shaft diameter (see *Geotechnical Recommendations* section).

"*" Unit Side Friction was estimated for a CONCRETE SHAFT against soil. Contact PSI if permanent casing will be used for construction.

Rock Mass Shear Strength parameters (Effective Values) are estimated based on RMR_{76}

Estimated Design Groundwater Table: **0** ft below the existing grade (or at **elevation 603 ft**).

Unit resistance values above are **Ultimate Values.**

RMR_{76} Rock Rating

Rock Type	Rock Depth (ft)		Rating Parameter						Total Rating Value	RMR_{76} Rating Description	Effective Cohesion of the Rock Mass C' (ksf)	Effective Friction Angle of the Rock Mass, ϕ' (Deg)	Deformation Modulus, E_D (ksi)
	Top	Bottom	Strength	RQD	Spacing of Joint	Condition of Joints	Ground-Water Condition	Adjustm. for Joints Orientation					
Moderately to Slightly Weathered Shale	35	44.8	4	17	10	12	7	-2	48	Fair Rock	3.1-4.2	35-40	1104
Slightly Weathered to Unweathered Sandstone	44.8	46.5	7	20	10	20	7	-2	62	Good Rock	4.2-6.3	40-45	3480
Slightly Weathered Siltstone	46.5	48.6	4	13	20	12	7	-2	54	Fair Rock	3.1-4.2	35-40	1391

Recommended Soil/Rock Parameters for Drilled Shaft Design (MFAD Design Method)

Soil / Rock Layer No.	Typical Subgrade Material and Soil / Rock Classification	Simplified Soil / Rock Type	Top of Soil Layer Depth (ft)	Bottom of Soil Layer Depth (ft)	Average SPT N Value (blows/ft)/RQD	Below Estimated Design Water Table	Total Unit Weight, Y' (pcf)	Effective Unit Weight, Y' (pcf)	Soil Undrain Shear Strength or Cohesion, C (ksf)	Effective Cohesion of the Rock Mass C' (ksf)	Soil Internal Angle of Friction, φ (Deg)	Effective Friction Angle of the Rock Mass, φ' (Deg)	Modulus of Deformation, E_D (ksi)	Downward Average Unit Side Resistance for Soil* (ksf)	Uplift Average Unit Side Resistance for Soil* (ksf)	Rock / Concrete Bond Stress for (ksf)	Average Unit End Bearing Resistance (ksf)
	B-04 (Berlin - Ross 138kV T-Line)																
1	Extremely Dense, Silty Sand (SM)	Sand	0	6	50+	-	135	135.0	-	-	35	-	4.80	0.49	0.34	-	-
2	Highly Weathered to Moderately Weathered Sandstone	Rock	6	20	50+	Yes	145	82.6	-	2.8	-	33	575.0	-	-	14.4	45.0
3	Moderately Weathered Sandstone	Rock	20	30	-	Yes	145	82.6	-	4.3	-	40	3475.0	-	-	17.3	50.0

Note: The table was prepared using simplified soil/rock profiles. Some adjustments may be necessary by design engineers. Neglect side resistance in top **5 feet** and the bottom **X feet** in soil (X=diameter of the shaft) for shaft design. Minimum recommended drilled shaft length of four (4) times the shaft diameter (see *Geotechnical Recommendations* section).

"*" Unit Side Friction was estimated for a CONCRETE SHAFT against soil. Contact PSI if permanent casing will be used for construction.

Rock Mass Shear Strength parameters (Effective Values) are estimated based on RMR_{76}

Estimated Design Groundwater Table: **5** ft below the existing grade (or at **elevation 858 ft**).

Unit resistance values above are **Ultimate Values.**

RMR_{76} Rock Rating

Rock Type	Rock Depth (ft)		Rating Parameter						Total Rating Value	RMR_{76} Rating Description	Effective Cohesion of the Rock Mass C' (ksf)	Effective Friction Angle of the Rock Mass, ϕ' (Deg)	Deformation Modulus, E_D (ksi)
	Top	Bottom	Strength	RQD	Spacing of Joint	Condition of Joints	Ground-Water Condition	Adjustm. for Joints Orientation					
Moderately Weathered Sandstone	20	30	4	13	20	20	7	-2	62	Good Rock	4.2-6.3	40-45	3480

GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding section constitutes PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

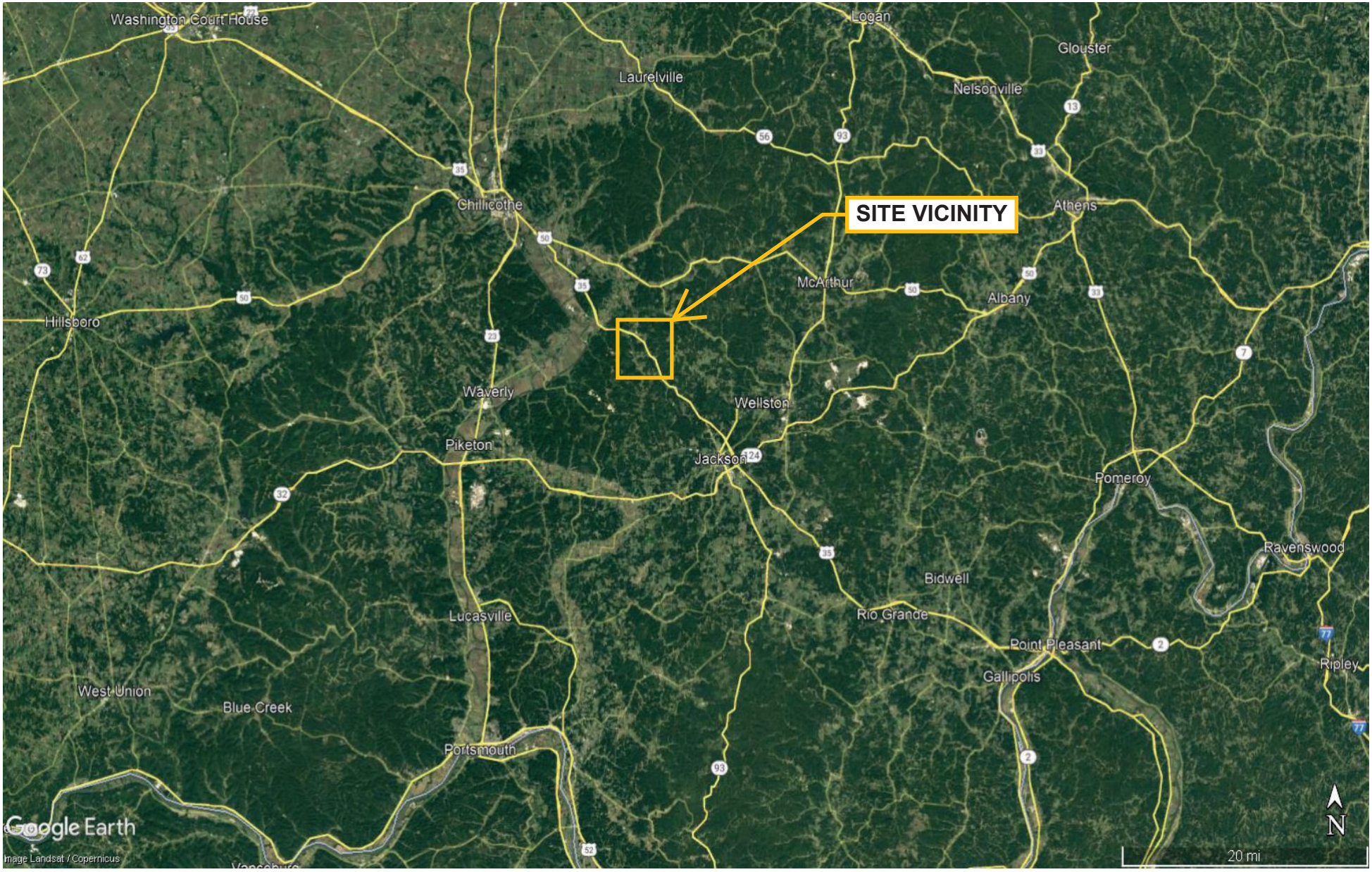
REPORT LIMITATIONS

The recommendations submitted are based on the available subsurface information obtained by PSI and design details furnished by AEP. If there are revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of AEP (the project owner) for the specific application to the Berlin – Ross 138kV T-Line Section 3 project located in Jackson and Ross Counties, Ohio.

Appendix



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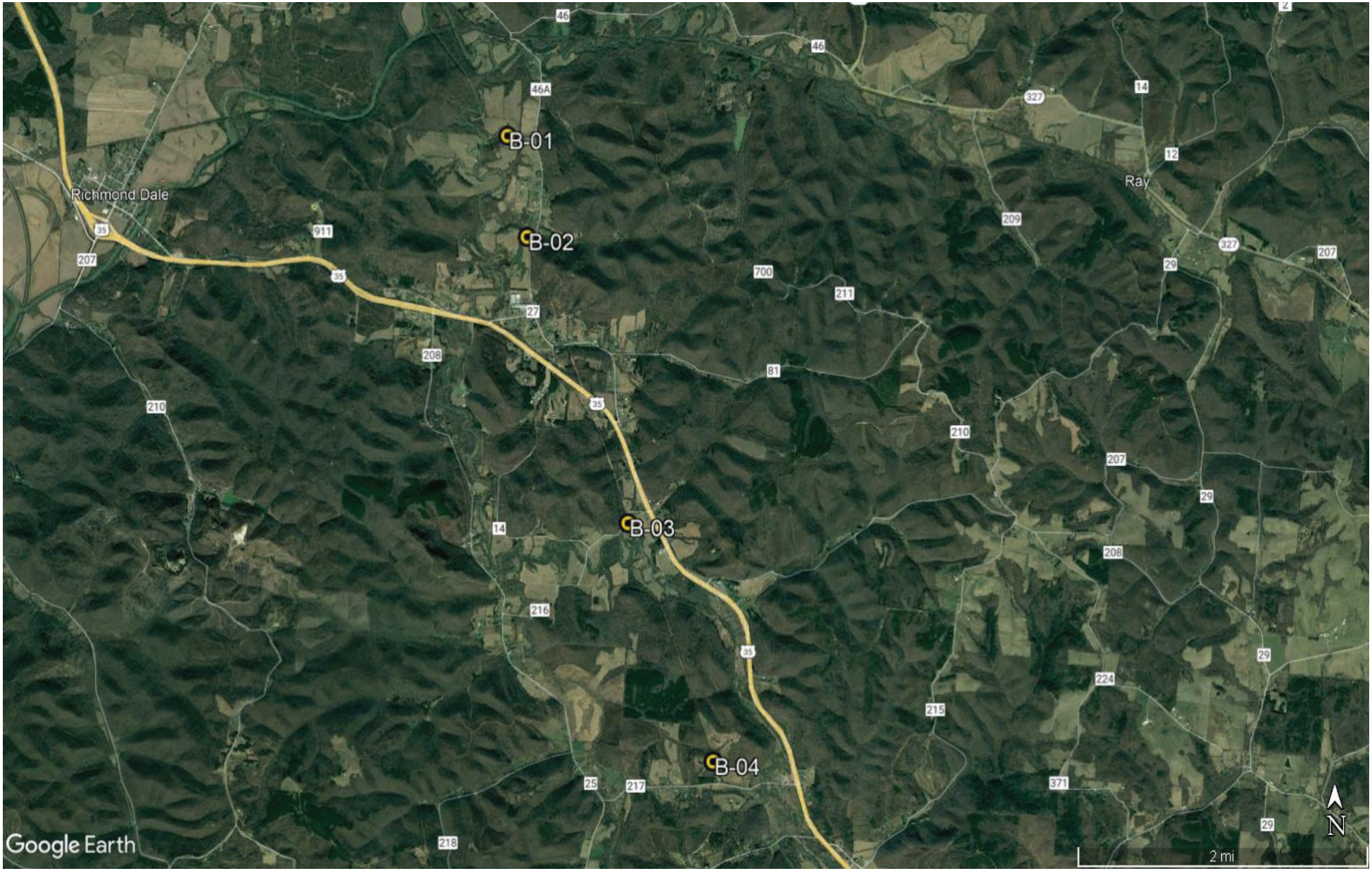
Professional Services Industries, Inc.
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Columbus, OH 43228
Telephone: (614) 876-8000

Site Vicinity Map

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

PSI Project No.: 01022028



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Boring Location Plan 1

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

PSI Project No.: 01022028



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Boring Location Plan 2

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

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Boring Location Plan 3

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

PSI Project No.: 01022028



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Boring Location Plan 4

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

PSI Project No.: 01022028



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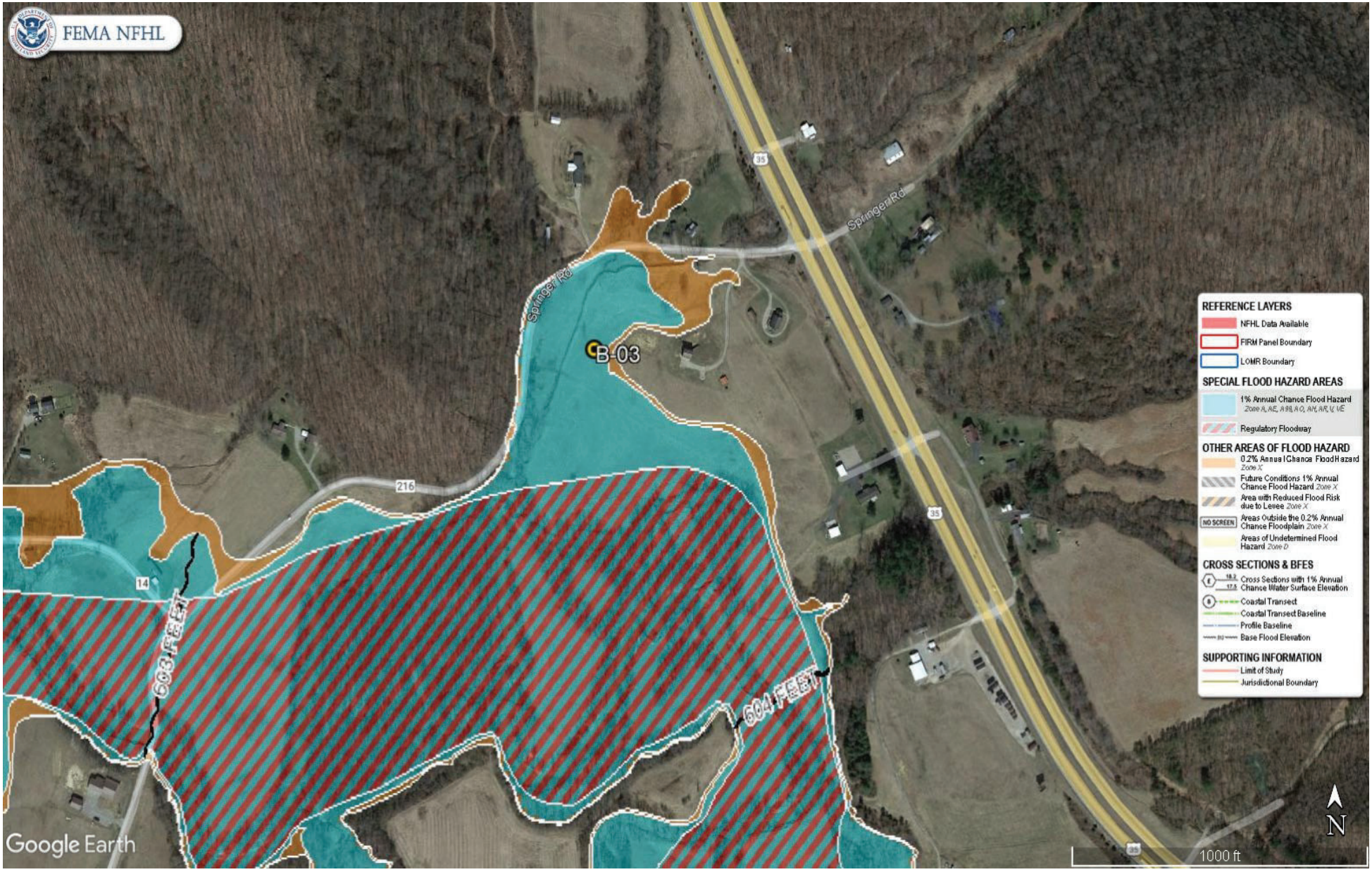
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FEMA Flood Map 1

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

PSI Project No.: 01022028



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FEMA Flood Map 2

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

PSI Project No.: 01022028



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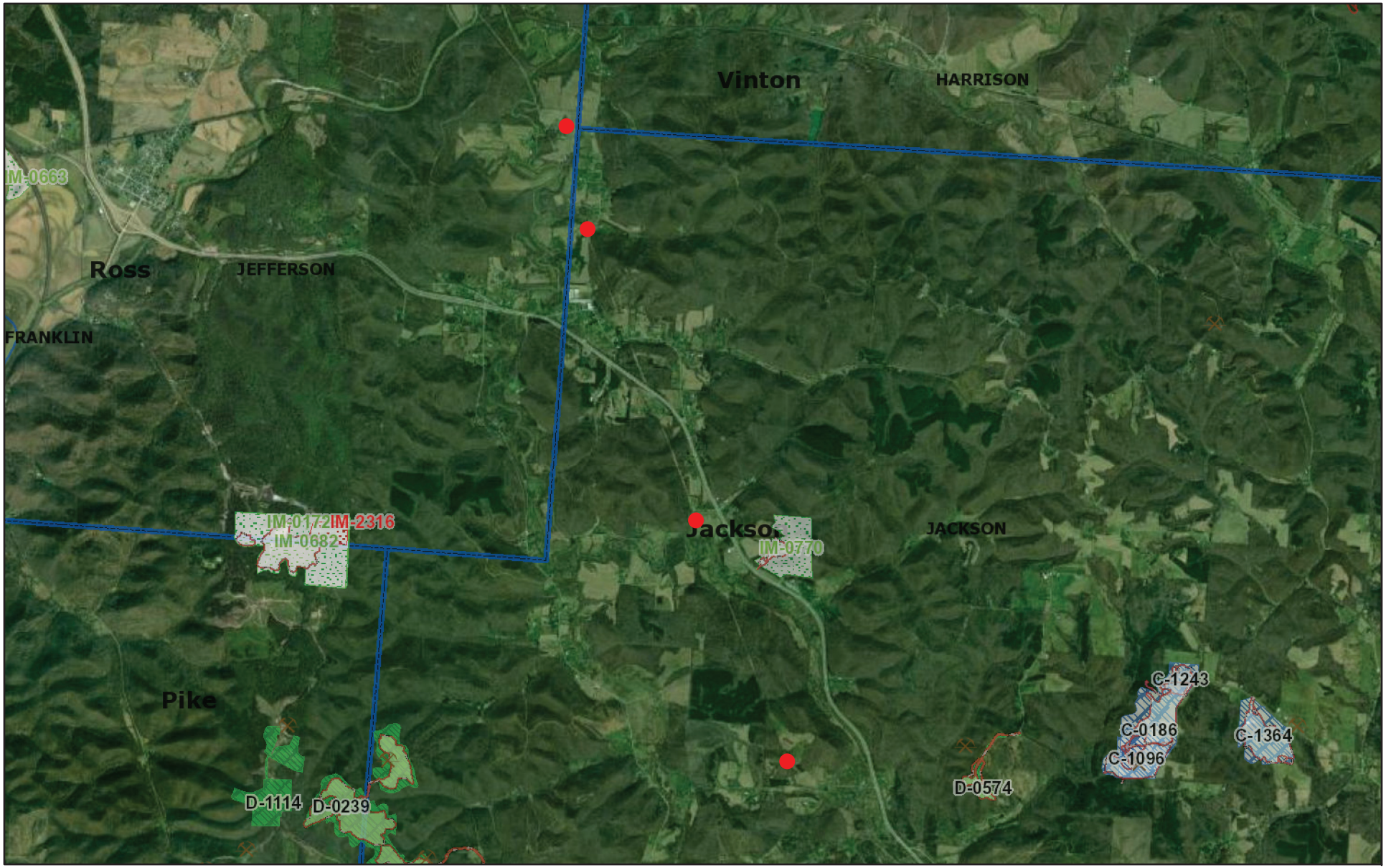
FEMA Flood Map 3

Berlin—Ross 138kV T-Line Section 3

Jackson and Ross Counties, Ohio

PSI Project No.: 01022028

Mines of Ohio - Berlin - Ross 138kV T-Line Section 3



December 27, 2021

Abandoned before 1977
Past
Current

Proposed
Original Application
Adjacent Area Application

Historic - From Geology Maps
Past
Current

Proposed
Original Application
Adjacent Area Application

1:72,224

0 0.5 1 2 mi
0 0.75 1.5 3 km

Earthstar Geographics

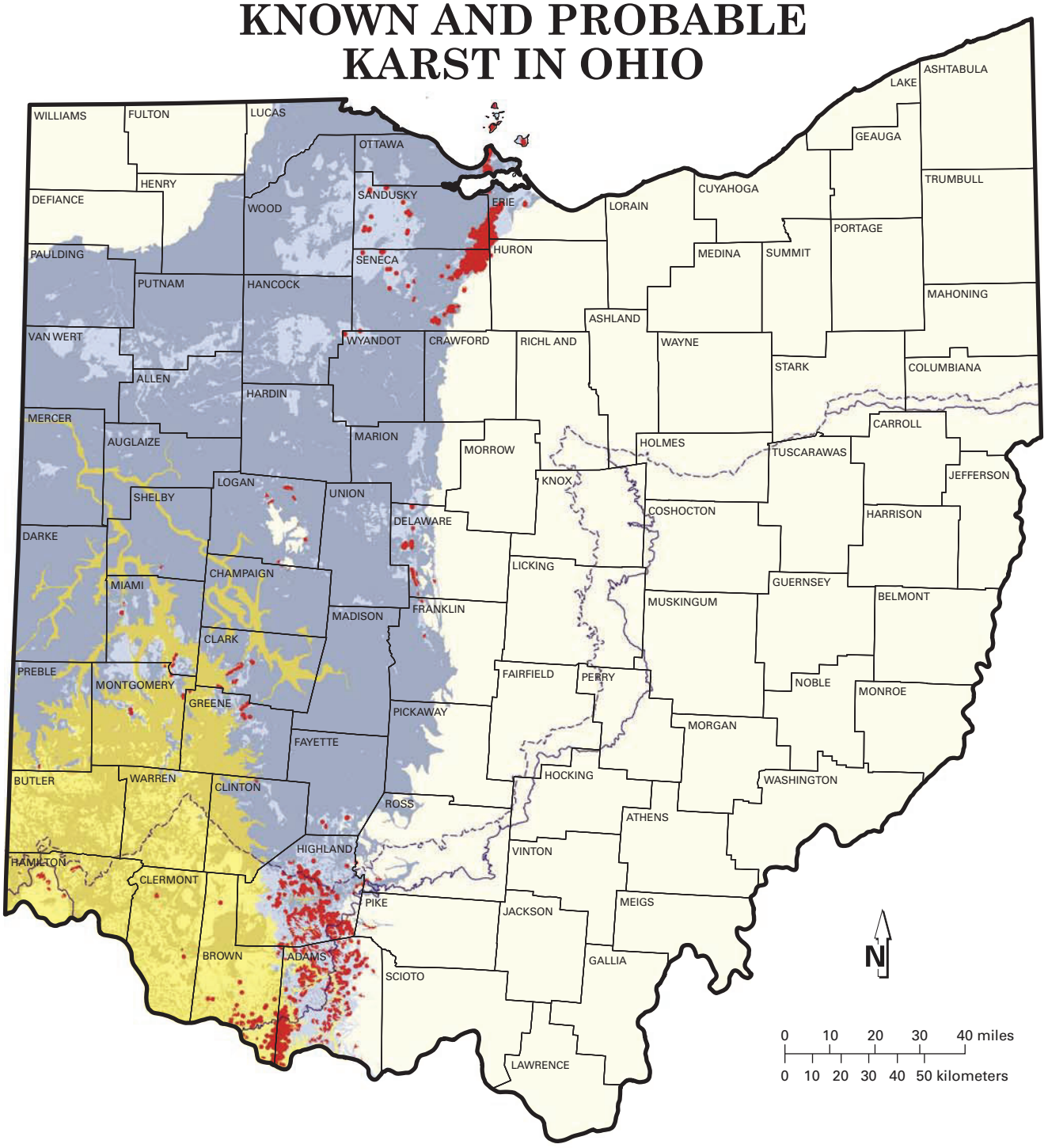
Ohio Dept. of Natural Resources

STATE OF OHIO
Ted Strickland, Governor

DEPARTMENT OF NATURAL RESOURCES
Sean D. Logan, Director

DIVISION OF GEOLOGICAL SURVEY
Larry Wickstrom, Chief

KNOWN AND PROBABLE KARST IN OHIO



EXPLANATION

- Silurian- and Devonian-age carbonate bedrock overlain by less than 20 feet of glacial drift and/or alluvium
- Silurian- and Devonian-age carbonate bedrock overlain by more than 20 feet of glacial drift and/or alluvium
- Interbedded Ordovician-age limestone and shale overlain by less than 20 feet of glacial drift and/or alluvium
- Interbedded Ordovician-age limestone and shale overlain by more than 20 feet of glacial drift and/or alluvium
- Probable karst areas
- Area not known to contain karst features
- Wisconsinan Glacial Margin
- Illinoian Glacial Margin

Recommended citation: Ohio Division of Geological Survey, 1999 (rev. 2002, 2006), Known and probable karst in Ohio: Ohio Department of Natural Resources, Division of Geological Survey Map EG-1, generalized page-size version with text, 2 p., scale 1:2,000,000.

OHIO KARST AREAS

Karst is a landform that develops on or in limestone, dolomite, or gypsum by dissolution and that is characterized by the presence of characteristic features such as sinkholes, underground (or internal) drainage through solution-enlarged fractures (joints), and caves. While karst landforms and features are commonly striking in appearance and host to some of Ohio's rarest fauna, they also can be a significant geologic hazard. Sudden collapse of an underground cavern or opening of a sinkhole can cause surface subsidence that can severely damage or destroy any overlying structure such as a building, bridge, or highway. Improperly backfilled sinkholes are prone to both gradual and sudden subsidence, and similarly threaten overlying structures. Sewage, animal wastes, and agricultural, industrial, and ice-control chemicals entering sinkholes as surface drainage are conducted directly and quickly into the ground-water system, thereby posing a severe threat to potable water supplies. Because of such risks, many of the nation's state geological surveys, and the U.S. Geological Survey, are actively mapping and characterizing the nation's karst regions.

The five most significant Ohio karst regions are described below.

BELLEVUE-CASTALIA KARST PLAIN

The Bellevue-Castalia Karst Plain occupies portions of northeastern Seneca County, northwestern Huron County, southeastern Sandusky County, and western Erie County. Adjacent karst terrain in portions of Ottawa County, including the Marblehead Peninsula, Catawba Island, and the Bass Islands, is related in geologic origin to the Bellevue-Castalia Karst Plain. The area is underlain by up to 175 feet of Devonian carbonates (Delaware Limestone, Columbus Limestone, Lucas Dolomite, and Amherstburg Dolomite) overlying Silurian dolomite, anhydrite, and gypsum of the Bass Islands Dolomite and Salina Group.

The Bellevue-Castalia Karst Plain is believed to contain more sinkholes than any of Ohio's other karst regions. Huge, irregularly shaped, closed depressions up to 270 acres in size and commonly enclosing smaller, circular-closed depressions 5 to 80 feet in diameter pockmark the land between the village of Flat Rock in northeastern Seneca County and Castalia in western Erie County. Surface drainage on the plain is very limited, and many of the streams which are present disappear into sinkholes called swallow holes.

Karst in the Bellevue-Castalia and Lake Erie islands region is due to collapse of overlying carbonate rocks into voids created by the dissolution and removal of underlying gypsum beds. According to Verber and Stansbery (1953, Ohio Journal of Science), ground water is introduced into Salina Group anhydrite ($CaSO_4$) through pores and fractures in the overlying carbonates. The anhydrite chemically reacts with the water to form gypsum ($CaSO_4 \cdot 2H_2O$), undergoing a 33 to 62 percent increase in volume in the process. This swelling lifts overlying strata, thereby opening fractures and creating massive passageways for conduction of greater volumes of ground water through the Silurian Bass Islands Dolomite and into underlying Salina Group strata. Gypsum, being readily soluble in water, is dissolved, creating huge voids. Overlying carbonates then collapse or break down, leaving surface depressions similar to those resulting from roof failure of an underground mine.

DISSECTED NIAGARA ESCARPMENT

The dissected Niagara Escarpment of southwestern Ohio includes the largest single area of karst terrain in the state and the greatest number of surveyed caves. It also is estimated to include the second-largest number of sinkholes in the state. The area is underlain by Silurian rocks of the Peebles Dolomite, Lilley Formation, Bisher Formation, Estill Shale, and Noland Formation in Adams, Highland, and Clinton Counties and the Cedarville Dolomite, Springfield Dolomite, Euphemia Dolomite, Massie Shale, Laurel Dolomite, Osgood Shale, and Dayton Formation in Greene, Clark, Miami, Montgomery, and Preble Counties. The Peebles-Lilley-Bisher sequence and the Cedarville-Springfield-Euphemia sequence constitute the Lockport Group.

Most karst features along the Niagara Escarpment in southwestern Ohio are developed in Lockport Group strata. More than 100 sinkholes and caves developed in the Lockport have been documented in the field, and more than 1,000 probable sinkholes in the Lockport have been identified on aerial photographs, soils maps, and topographic maps. As with most karst terrain, sinkholes developed on the Niagara Escarpment commonly show linear orientations aligned with prevailing joint trends in the area. The greatest concentration of sinkholes on the escarpment is south of the Wisconsinan glacial border in southern Highland and Adams Counties, where highly dissected ridges capped by Silurian carbonate rocks rise 150 to 200 feet above surrounding drainage. Illinoian till in these areas is thin to absent, and soils are completely leached with respect to calcium and calcium-magnesium carbonate. Such geologic settings are ideal for active karst processes, as downward-percolating, naturally acidic rain water is not buffered until it has dissolved some of the underlying carbonate bedrock. Other significant karst features of the Niagara Escarpment include small caves in escarpment re-entrants created by the valleys of the Great Miami and Stillwater Rivers in Miami County.

BELLEFONTAINE OUTLIER

The Bellefontaine Outlier in Logan and northern Champaign Counties is an erosionally resistant "island" of Devonian carbonates capped by Ohio Shale and surrounded by a "sea" of Silurian strata. Though completely glaciated, the outlier was such an impediment to Ice Age glaciers that it repeatedly separated advancing ice sheets into two glacial lobes—the Miami Lobe on the west and the Scioto Lobe on the east. Most Ohioans recognize the outlier as the location of Campbell Hill—the highest point in the state at an elevation of 1,549 feet above mean sea level.

Although it is not known for having an especially well-developed karst terrain, the outlier is the location of Ohio's largest known cave, Ohio Caverns. The greatest sinkhole concentrations are present in McArthur and Rushcreek Townships of Logan County, where the density of sinkholes in some areas approaches 30 per square mile. Sinkholes here typically occur in upland areas of Devonian Lucas Dolomite or Columbus Limestone that are 30 to 50 feet or more above surrounding drainage and are covered by less than 20 feet of glacial drift and/or Ohio Shale.

SCIOTO AND OLENTANGY RIVER GORGES

The uplands adjacent to the gorges of the Scioto and Olentangy Rivers in northern Franklin and southern Delaware Counties include areas of well--developed, active karst terrain. These uplands also are among the most rapidly developing areas of the state, which means karst should be a consideration in site assessments for commercial and residential construction projects.

The Scioto River in this area has been incised to a depth of 50 to 100 feet into underlying bedrock, creating a shallow gorge. The floor, walls, and adjacent uplands of the gorge consist of Devonian Delaware and Columbus Limestones mantled by up to 20 feet of Wisconsinan till. Sinkhole concentrations up to 1 sinkhole per acre are not uncommon in Concord, Scioto, and Radnor Townships of Delaware County. The sinkholes range in diameter from about 10 to 100 feet and commonly are aligned linearly along major joint systems.

The Olentangy River is approximately 5 miles east of the Scioto River in southern Delaware County and occupies a gorge that is narrower and up to 50 feet deeper than the Scioto River gorge. The floor and the lower half of the walls along the Olentangy gorge are composed of Delaware and Columbus Limestones, the upper half of the walls is composed of Devonian Ohio and Olentangy Shales mantled by a thin veneer of glacial drift. Karst terrain has developed along portions of the gorge in a manner similar to karst terrain along the Scioto River.

ORDOVICIAN UPLANDS

The Ordovician uplands of southwestern Ohio are the location of surprisingly well-developed karst terrain despite the large component of shale in local bedrock. Numerous sinkholes are present in Ordovician rocks of Adams, Brown, Clermont, and Hamilton Counties.

The carbonate-rich members of the Grant Lake Formation (Bellevue and Mount Auburn), Grant Lake Limestone (Bellevue and Straight Creek), and the upper portion of the Arnheim formation are the Ordovician units most prone to karstification; however, the shale-rich (70 percent shale, 30 percent limestone) Waynesville Formation also has been subjected to a surprising amount of karst development in southeastern Brown and southwestern Adams Counties, just north of the Ohio River.

ACKNOWLEDGMENT

The Division of Geological Survey gratefully acknowledges the Ohio Low-Level Radioactive-Waste Facility Development Authority for its financial support for mapping Ohio karst terrain.

BORING B-01

DATE STARTED:	11/29/21	**DRILL COMPANY:**	PSI
DATE COMPLETED:	11/29/21	**DRILLER:** J.E.	**LOGGED BY:** J.P.
COMPLETION DEPTH	33.0 ft	**DRILL RIG:**	CME 45C
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	630 ft	**SAMPLING METHOD:**	2-in SS1.874-in Core
LATITUDE:	39.20811°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-82.76429°	**EFFICIENCY**	87%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K.K.

Water

While Drilling	- feet
Upon Completion	7.5 feet
Caved	25.0 feet

BORING LOCATION:

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633. Soil Symbol in "( )" = Visual Classification

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS) RQD & Recovery % (NX)	Moisture, %	Additional Remarks
	0			**TOPSOIL** - 9 (IN)				
		1	4	MEDIUM STIFF TO VERY STIFF, MOTTLED BROWN AND GRAY, **LEAN CLAY**, TRACE SAND, WET		1-1-4 N_{60}=7	25	
		2	10			2-3-4 N_{60}=10	25	
		3	14			2-5-6 N_{60}=16	25	
625	5	4	16		CL	3-5-6 N_{60}=16	26	
		5	15	Lean Clay (CL)		4-6-6 N_{60}=17	23	LL = 43 PL = 23 Fines=98.4%
		6	12			3-4-5 N_{60}=13	26	
620	10	7	8	MEDIUM STIFF, BROWN, **SANDY LEAN CLAY**, WET Sandy Lean Clay (CL)	CL	2-2-2 N_{60}=6	23	LL = 25 PL = 16 Fines=51.9%
				SHALE, GRAY, HIGHLY WEATHERED, VERY SOFT TO SOFT, TRACE SANDSTONE FRAGMENTS				
		8	16			7-13-38 N_{60}=74	15	>>
615	15							
				SHALE, GRAY, HIGHLY WEATHERED TO MODERATELY WEATHERED, SOFT TO MEDIUM HARD				
		9	3			50/4"	6	>>
610	20							
				SILTSTONE, GRAY, MODERATELY TO SLIGHTLY WEATHERED, MEDIUM HARD TO MODERATELY HARD, THICK BEDDED, SOME MECHANICAL FRACTURES 10 (IN) Sandstone layer at 25.8 FT				
605	25							
		10	118			RQD=82 Rec=98%		>>
600	30							
				END OF BORING AT 33.0 FT				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

intertek psi
Professional Service Industries, Inc.
4960 Vulcan Ave, Suite C
Columbus, OH 43228
Telephone: (614) 876-8000

PROJECT NO.: 01022028
PROJECT: Berlin - Ross 138kV T-Line
LOCATION: Jackson County and Ross County, Ohio

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-02

DATE STARTED:	11/29/21	**DRILL COMPANY:**	PSI
DATE COMPLETED:	11/29/21	**DRILLER:** J.E.	**LOGGED BY:** J.P.
COMPLETION DEPTH	50.0 ft	**DRILL RIG:**	CME 45C
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	621 ft	**SAMPLING METHOD:**	2-in SS/3-in ST
LATITUDE:	39.19857°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-82.76176°	**EFFICIENCY**	87%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K.K.

Water

While Drilling	- feet
Upon Completion	27.3 feet
Caved	48.2 feet

BORING LOCATION:

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633. Soil Symbol in "( )" = Visual Classification

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS) Push Pressure (ST)	Moisture, %	Additional Remarks
620	0	1	12	**TOPSOIL** - 9 (IN)		1-3-4 N_{60}=10	20	
		2	17	STIFF TO VERY STIFF, MOTTLED BROWN AND GRAY, **LEAN CLAY WITH SAND**, WET		2-3-4 N_{60}=10	25	
		3	17		(CL)	3-6-8 N_{60}=20	24	
615	5	4	18			4-5-7 N_{60}=17	21	
		5	11			3-4-4 N_{60}=12	32	
		6	16	STIFF, BROWN, **SILT WITH SAND**, TRACE CLAY, WET Silt with Sand (ML)	ML	2-3-3 N_{60}=9	27	Non-Plastic Fines=71.6%
610	10	7	16			2-3-5 N_{60}=12	26	
		8	22	MEDIUM STIFF TO STIFF, GRAY, **LEAN CLAY**, WET Shelby Tube pushed from 11.5 to 13.5 FT Unconfined Compressive Strength = 2,627psf		700 psi	25	DD = 102 pcf
605	15	9	17			3-4-6 N_{60}=14	28	
		10	18	Lean Clay (CL)	CL	2-2-3 N_{60}=7	31	LL = 40 PL = 23 Fines=99.6%
600	20							
		11	16			0-2-2 N_{60}=6	21	
595	25							
		12	18	STIFF TO VERY STIFF, GRAY, **SANDY LEAN CLAY**, TRACE GRAVEL AND ROCK FRAGMENTS, MOIST TO WET Sandy Lean Clay (CL)	CL	0-2-4 N_{60}=9	24	LL = 36 PL = 21 Fines=65.8%
590	30							
		13	13			7-7-6 N_{60}=19	16	>>✳
585	35							

Continued Next Page

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Professional Service Industries, Inc.
4960 Vulcan Ave, Suite C
Columbus, OH 43228
Telephone: (614) 876-8000

PROJECT NO.: 01022028
PROJECT: Berlin - Ross 138kV T-Line
LOCATION: Jackson County and Ross County, Ohio

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-02

DATE STARTED:	11/29/21	**DRILL COMPANY:**	PSI
DATE COMPLETED:	11/29/21	**DRILLER:** J.E.	**LOGGED BY:** J.P.
COMPLETION DEPTH	50.0 ft	**DRILL RIG:**	CME 45C
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	621 ft	**SAMPLING METHOD:**	2-in SS/3-in ST
LATITUDE:	39.19857°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-82.76176°	**EFFICIENCY**	87%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K.K.

Water

While Drilling	- feet
Upon Completion	27.3 feet
Caved	48.2 feet

BORING LOCATION:

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633. Soil Symbol in "( )" = Visual Classification

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS) Push Pressure (ST)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
						STIFF TO VERY STIFF, GRAY, **SANDY LEAN CLAY**, TRACE GRAVEL AND ROCK FRAGMENTS, MOIST TO WET					
	40			14	18		CL	3-3-4 N_{60}=10	18		
580											
						HARD TO VERY HARD, GRAY, **SANDY SILT**, TRACE CLAY, MOIST TO WET Sandy Silt (ML)					
	45			15	18			17-15-11 N_{60}=38	18		Non-Plastic Fines=58.5%
575							ML				
				16	4			50/5"	22		>>◎
	50					END OF BORING AT 50.0 FT					

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PROJECT NO.: 01022028
PROJECT: Berlin - Ross 138kV T-Line
LOCATION: Jackson County and Ross County, Ohio

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BORING B-03

DATE STARTED:	11/30/21	**DRILL COMPANY:**	PSI
DATE COMPLETED:	11/30/21	**DRILLER:** J.E.	**LOGGED BY:** J.P.
COMPLETION DEPTH	48.6 ft	**DRILL RIG:**	CME 45C
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	603 ft	**SAMPLING METHOD:**	2-in SS/3-in ST/1.874-in Core
LATITUDE:	39.17156°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-82.74879°	**EFFICIENCY**	87%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K.K.

Water

While Drilling	7.5	feet
Upon Completion	4.0	feet
Caved	10.3	feet

BORING LOCATION:

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633. Soil Symbol in "( )" = Visual Classification

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS) Push Pressure (ST) RQD & Recovery % (NX)	Moisture, %	Additional Remarks
	0			**TOPSOIL** - 10 (IN)				
		1	10	MEDIUM STIFF TO STIFF, MOTTLED BROWN AND GRAY, **SANDY LEAN CLAY**, WET		1-2-3 N_{60}=7	22	
		2	13			2-2-4 N_{60}=9	23	
600		3	16		(CL)	3-3-3 N_{60}=9	23	
	5	4	12			2-3-4 N_{60}=10	21	
		5	16			3-3-4 N_{60}=10	21	
595		6	18	SOFT TO MEDIUM STIFF, GRAY, **SANDY SILT**, TRACE CLAY, WET		2-2-2 N_{60}=6	19	
	10	7	12	Sandy Silt (ML)	ML	0-1-1 N_{60}=3	26	LL = 22 PL = 20 Fines=61.0%
590		8	16	SOFT, GRAY, **FAT CLAY**, TRACE SAND, WET		0-0-2 N_{60}=3	37	
	15	9	24	Shelby Tube pushed from 16.5 to 18.5 FT Unconfined Compressive Strength = 1,540psf	CH	300 psi	33	DD = 90 pcf
585		10	18	Fat Clay (CH)		0-0-2 N_{60}=3	48	LL = 53 PL = 33 Fines=89.3%
580	20							
		11	10	MEDIUM STIFF TO STIFF, GRAY, **SILT**, TRACE CLAY, TRACE SAND, WET		1-2-3 N_{60}=7	23	
	25				ML			
575		12	15	Silt (ML)		2-3-3 N_{60}=9	28	LL = 30 PL = 23 Fines=89.1%
	30							
570		13	10	MEDIUM DENSE TO DENSE, GRAY, **SILTY SAND**, TRACE ROCK FRAGMENTS, MOIST	(SM)	13-14-10 N_{60}=35	15	
	35							

Continued Next Page

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
Moisture × PL ◪ LL ✚
0 25 50
STRENGTH, tsf
Qu ▲ Qp ✳
0 2.0 4.0

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PROJECT NO.: 01022028
PROJECT: Berlin - Ross 138kV T-Line
LOCATION: Jackson County and Ross County, Ohio

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-03

DATE STARTED:	11/30/21	**DRILL COMPANY:**	PSI
DATE COMPLETED:	11/30/21	**DRILLER:** J.E.	**LOGGED BY:** J.P.
COMPLETION DEPTH	48.6 ft	**DRILL RIG:**	CME 45C
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	603 ft	**SAMPLING METHOD:**	2-in SS/3-in ST/1.874-in Core
LATITUDE:	39.17156°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-82.74879°	**EFFICIENCY**	87%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K.K.

Water

While Drilling	7.5 feet
Upon Completion	4.0 feet
Caved	10.3 feet

BORING LOCATION:

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633. Soil Symbol in "( )" = Visual Classification

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS) Push Pressure (ST) RQD & Recovery % (NX)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
565	40			14	1	**SHALE**, GRAY, MODERATELY TO SLIGHTLY WEATHERED, SOFT TO MEDIUM HARD, THICK BEDDED, SOME MECHANICAL FRACTURES		50/1"	11	>>◎	
560				15	118			RQD=82 Rec=98%		>>◎	
	45					**SANDSTONE**, GRAY, COARSE GRAINED, SLIGHTLY WEATHERED TO UNWEATHERED, MODERATELY HARD, MEDIUM THICK					
555						**SILTSTONE**, GRAY, SLIGHTLY WEATHERED, SOFT TO MEDIUM HARD, THICK BEDDED, SOME MECHANICAL FRACTURES					
						END OF BORING AT 48.6 FT					

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PROJECT: Berlin - Ross 138kV T-Line
LOCATION: Jackson County and Ross County, Ohio

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BORING B-04

DATE STARTED:	12/10/21	**DRILL COMPANY:**	PSI
DATE COMPLETED:	12/10/21	**DRILLER:** J.E.	**LOGGED BY:** I.R.
COMPLETION DEPTH	30.0 ft	**DRILL RIG:**	CME 45C
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	863 ft	**SAMPLING METHOD:**	2-in SS1.874-in Core
LATITUDE:	39.1492°	**HAMMER TYPE:**	Automatic
LONGITUDE:	-82.73788°	**EFFICIENCY**	87%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K.K.

Water

While Drilling	- feet
Upon Completion	5.0 feet
Caved	19.5 feet

BORING LOCATION:

REMARKS: N_{60} denotes the normalization to 60% efficiency as described in ASTM D4633. Soil Symbol in "( )" = Visual Classification

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS) RQD & Recovery % (NX)	Moisture, %	Additional Remarks
860	0	1	14	**TOPSOIL** - 5 (IN) EXTREMELY DENSE, BROWN AND GRAY, **SILTY SAND**, FROM DECOMPOSED SANDSTONE, TRACE ROCK FRAGMENTS, DAMP TO MOIST	(SM)	2-3-7 N_{60}=14	9	
		2	6			50/6"	8	
		3	12			27-50/6"	7	
	5	4	8			40-50/2"	9	
		5	4	**SANDSTONE**, BROWN AND GRAY, FINE GRAINED, HIGHLY WEATHERED TO MODERATELY WEATHERED, VERY SOFT TO SOFT		50/4"	11	
855		6	2			50/2"	8	
		7	3			50/3"	10	
	10							
850		8	3	Silty Sand (SM)		50/3"	6	Non-Plastic Fines=17.6%
	15							
845		9	2			50/2"	10	
	20			**SANDSTONE**, REDDISH BROWN AND GRAY, FINE GRAINED, MODERATELY WEATHERED, SOFT TO MEDIUM HARD, MEDIUM BEDDED, SOME MECHANICAL FRACTURES				
840								
	25	10	111			RQD=70 Rec=93%		
835								
	30			END OF BORING AT 30.0 FT				

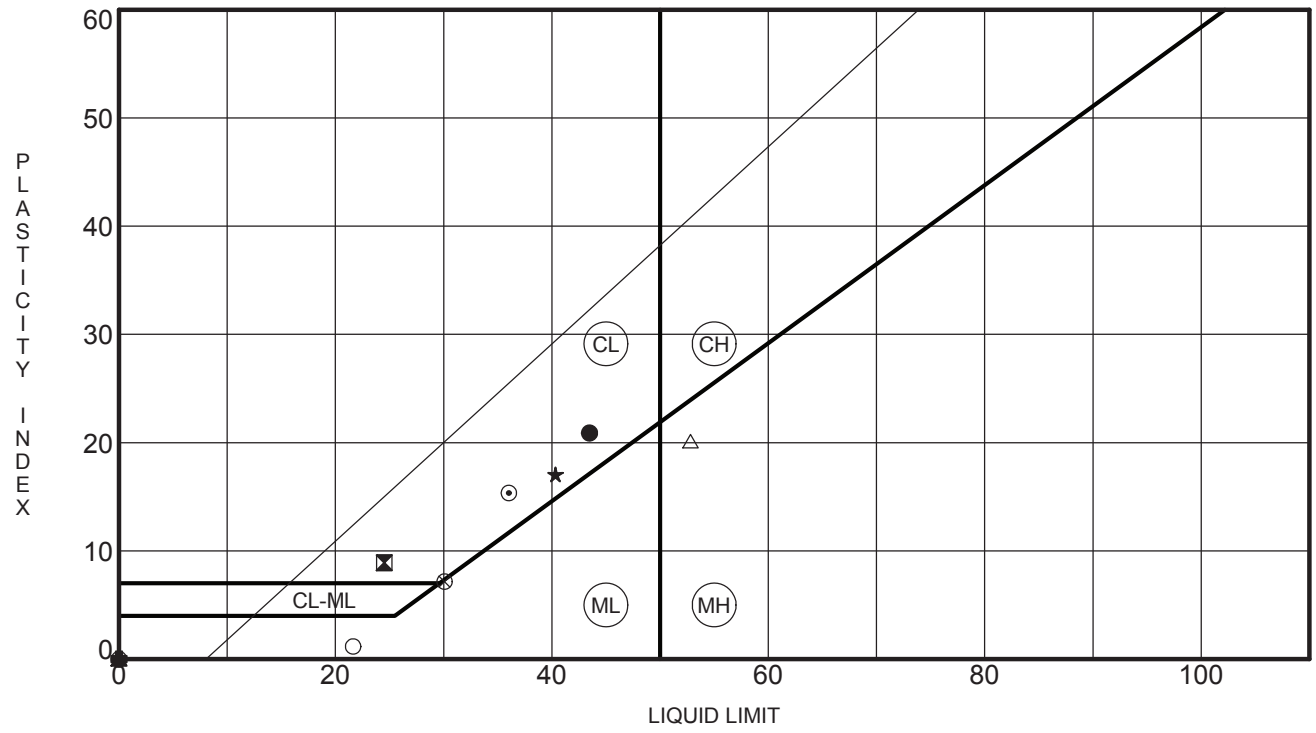
STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

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PROJECT NO.: 01022028
PROJECT: Berlin - Ross 138kV T-Line
LOCATION: Jackson County and Ross County, Ohio

The stratification lines represent approximate boundaries. The transition may be gradual.

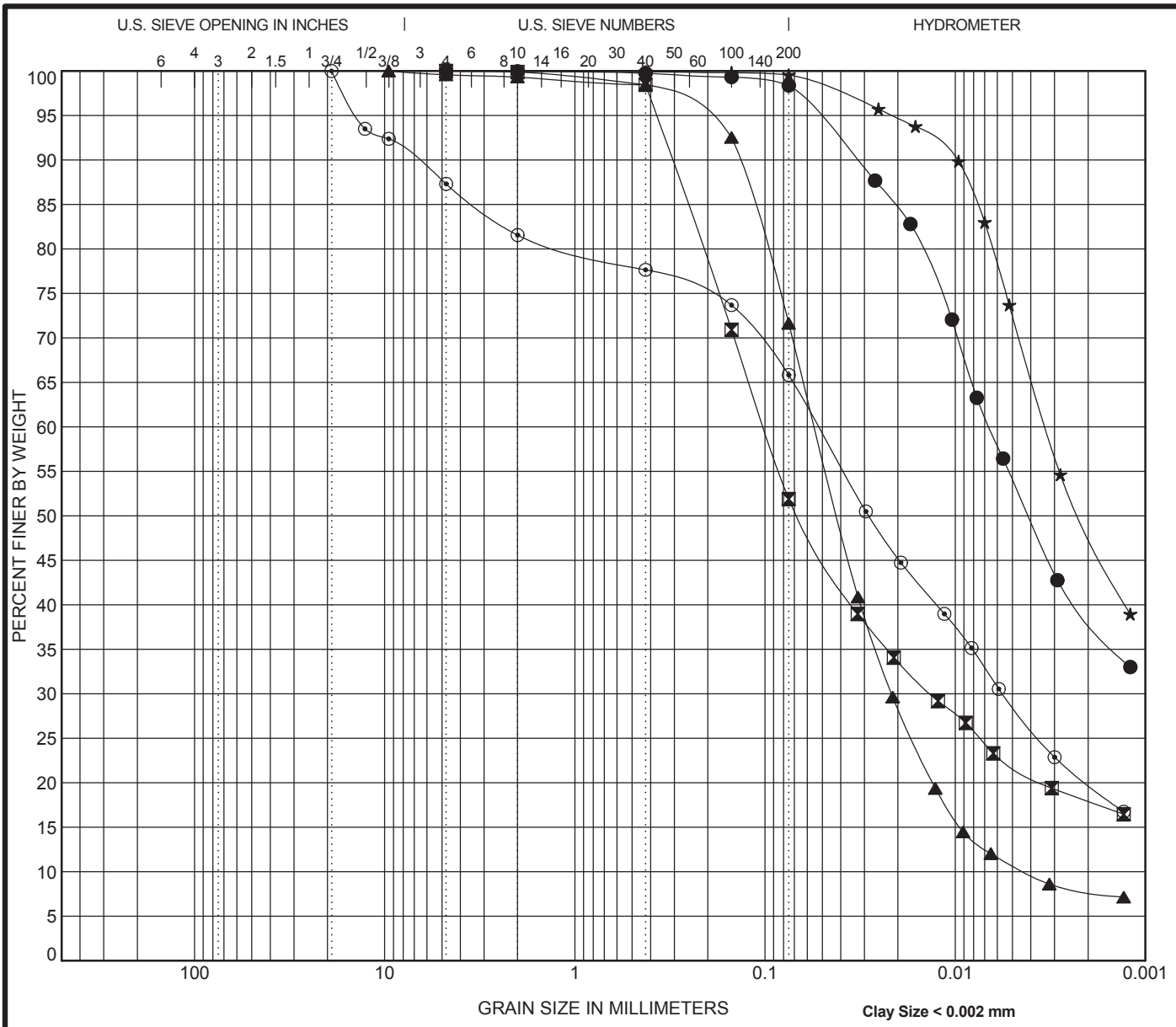


	Boring	Depth (ft)	LL	PL	PI	Fines	Classification (*Visual)
●	B-01	6.8	43	23	20	98.4	Lean Clay (CL)
⊠	B-01	9.8	25	16	9	51.9	Sandy Lean Clay (CL)
▲	B-02	8.3	NP	NP	NP	71.6	Silt with Sand (ML)
★	B-02	19.3	40	23	17	99.6	Lean Clay (CL)
⊙	B-02	29.3	36	21	15	65.8	Sandy Lean Clay (CL)
✿	B-02	44.3	NP	NP	NP	58.5	Sandy Silt (ML)
○	B-03	9.8	22	20	2	61.0	Sandy Silt (ML)
△	B-03	19.3	53	33	20	89.3	Fat Clay (CH)
⊗	B-03	29.3	30	23	7	89.1	Silt (ML)
⊕	B-04	14.3	NP	NP	NP	17.6	Silty Sand (SM)

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ATTERBERG LIMIT RESULTS

PSI Job No.: 01022028
Project: Berlin - Ross 138kV T-Line
Location: Jackson County and Ross County, Ohio



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

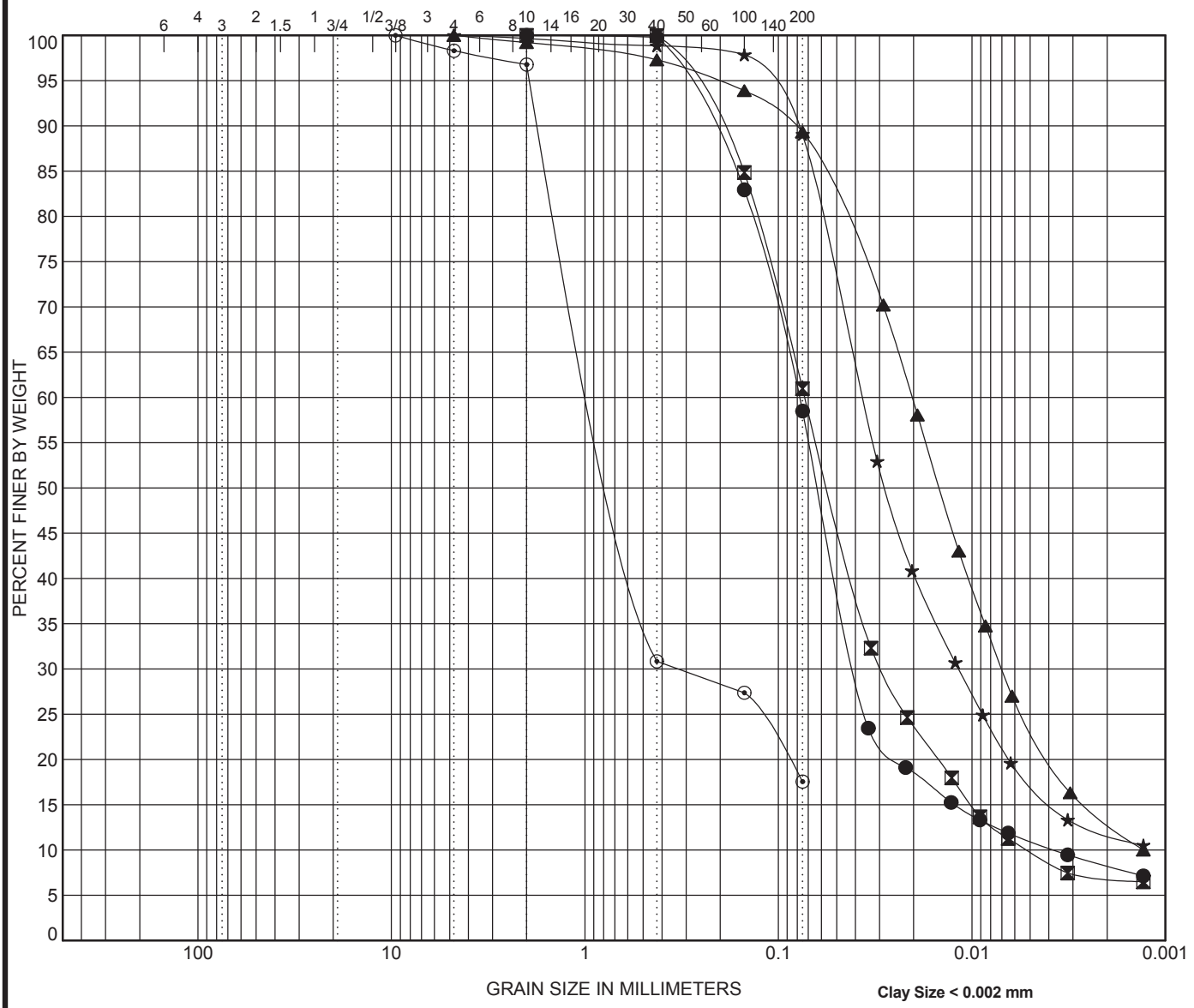
	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-01	6.8	Lean Clay (CL)	43	23	20		
⊠	B-01	9.8	Sandy Lean Clay (CL)	25	16	9		
▲	B-02	8.3	Silt with Sand (ML)	NP	NP	NP	2.00	12.77
★	B-02	19.3	Lean Clay (CL)	40	23	17		
⊙	B-02	29.3	Sandy Lean Clay (CL)	36	21	15		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	6.8	4.75	0.007			0.0	1.6	59.7	38.7
⊠	B-01	9.8	4.75	0.101	0.013		0.0	48.1	34.0	17.9
▲	B-02	8.3	9.525	0.055	0.022	0.004	0.4	27.9	63.8	7.8
★	B-02	19.3	2	0.003			0.0	0.4	51.2	48.4
⊙	B-02	29.3	19.05	0.053	0.006		12.7	21.5	45.9	19.9

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GRAIN SIZE DISTRIBUTION

Project: Berlin - Ross 138kV T-Line
PSI Job No.: 01022028
Location: Jackson County and Ross County, Ohio



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

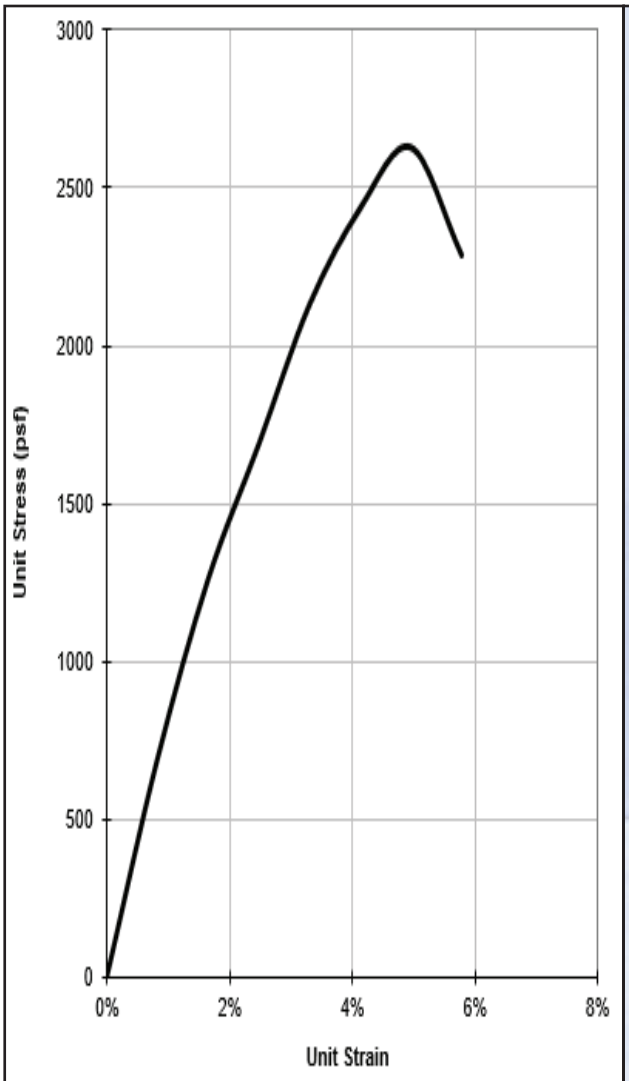
	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-02	44.3	Sandy Silt (ML)	NP	NP	NP	5.37	20.89
⊠	B-03	9.8	Sandy Silt (ML)	22	20	2	2.27	14.22
▲	B-03	19.3	Fat Clay (CH)	53	33	20		
★	B-03	29.3	Silt (ML)	30	23	7		
⊙	B-04	14.3	Silty Sand (SM)	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-02	44.3	2	0.078	0.04	0.004	0.0	41.5	50.2	8.3
⊠	B-03	9.8	2	0.073	0.029	0.005	0.0	39.0	54.0	7.0
▲	B-03	19.3	4.75	0.02	0.007		0.0	10.7	76.2	13.1
★	B-03	29.3	4.75	0.037	0.012		0.0	10.9	77.2	11.9
⊙	B-04	14.3	9.525	0.843	0.33		1.7	80.8	17.6	

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GRAIN SIZE DISTRIBUTION

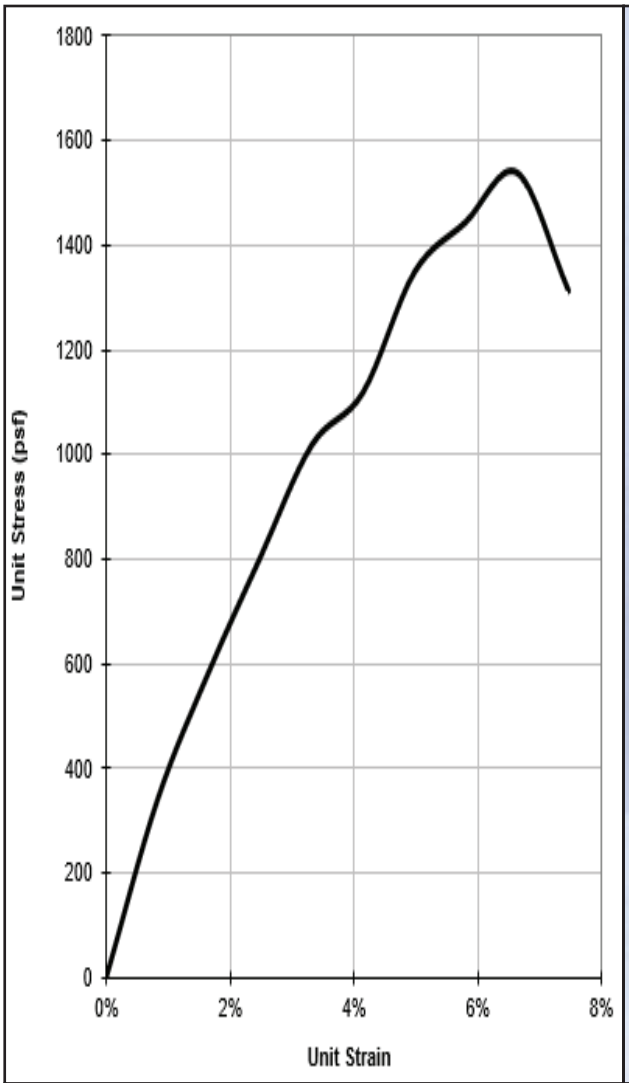
Project: Berlin - Ross 138kV T-Line
PSI Job No.: 01022028
Location: Jackson County and Ross County, Ohio





Strain-Stress Relationship		Sample Picture	
Unconfined Compressive Strength (psf) :	2,627	Average Specimen Diameter :	72.55 mm
Axial Strain at Failure (%) :	4.96	Average Specimen Length :	153.48 mm
Average Strain Rate (%) :	0.83	Length to Diameter Ratio :	2.12
Wet Density (pcf) :	128.6	Notes :	
Dry Density (pcf) :	101.7		
Moisture Content (%) :	24.7		

intertek psi	Berlin-Ross 138kV T-Line Project Number : 01022028 Boring Number : B-02 Depth : 11.5' to 13.5'	Unconfined Compressive Strength of Cohesive Soil ASTM D2166





Strain-Stress Relationship		Sample Picture	
Unconfined Compressive Strength (psf) :	1,540	Average Specimen Diameter :	71.86 mm
Axial Strain at Failure (%) :	6.63	Average Specimen Length :	153.14 mm
Average Strain Rate (%) :	0.83	Length to Diameter Ratio :	2.13
Wet Density (pcf) :	120.2	Notes :	
Dry Density (pcf) :	90.5		
Moisture Content (%) :	32.8		

intertek psi

Berlin-Ross 138kV T-Line
Project Number : 01022028
Boring Number : B-03
Depth : 16.5’ to 18.5’

Unconfined Compressive Strength of Cohesive Soil

ASTM D2166

Unconfined Compressive Strength of Intact Rock Core Specimens

ASTM D7012C

Project Name: Berlin - Ross 138kV T-Line

Project Number: 01022028

Boring Number	Sample Depth (ft)	Elevation (ft)	Average Core Diameter (in)	Average Core Length (in)	Core L/D Ratio	Average Cross-Section Area (in^2)	Failure Load (lb)	Compressive Strength (psi)	Rock Type
B-01	26.0	604.0	1.984	4.072	2.1	3.090	35,900	**11,616**	Sandstone
B-01	30.5	599.5	1.972	4.070	2.1	3.054	9,840	**3,222**	Siltstone
B-03	41.5	579.5	1.965	4.029	2.1	3.034	14,690	**4,842**	Shale
B-03	45.5	575.5	1.977	4.010	2.0	3.071	31,760	**10,343**	Sandstone
B-04	20.5	842.5	1.958	4.059	2.1	3.012	7,080	**2,351**	Sandstone
B-04	29.0	834.0	1.964	3.991	2.0	3.031	16,360	**5,398**	Sandstone

intertek psi

Tested By : Wes Johnson

Test Date : 12/21/2021



Standard Color Chart

Boring ID: B-01

Run 1: 23’ - 33’

Rec: 98% RQD: 82%



Color Chart taken with core photo

23’



33’

intertek psi	**Rock Core Plate**	**Berlin—Ross 138kV T-Line Section 3** Jackson and Ross Counties, Ohio PSI Project No.: 01022028



Standard Color Chart

Boring ID: B-03

Run 1: 38.6’ - 48.6’

Rec: 98% RQD: 82%



Color Chart taken with core photo

38.6’



48.6’

intertek psi	**Rock Core Plate**	**Berlin—Ross 138kV T-Line Section 3** Jackson and Ross Counties, Ohio PSI Project No.: 01022028



Standard Color Chart

Boring ID: B-04

Run 1: 20’ - 30’

Rec: 93% RQD: 70%

Color Chart taken with core photo



20’



30’

intertek psi	**Rock Core Plate**	**Berlin—Ross 138kV T-Line Section 3** Jackson and Ross Counties, Ohio PSI Project No.: 01022028

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,⧩ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.002 mm to 0.075 mm
Clay:	<0.002mm to <0.005 mm depending on agency

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

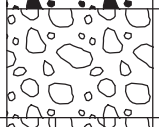
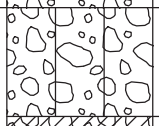
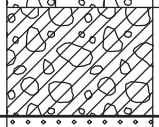
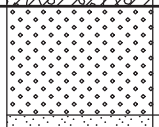
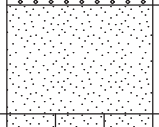
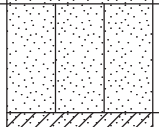
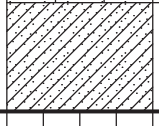
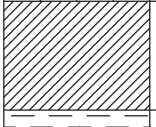
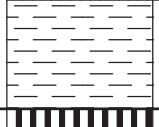
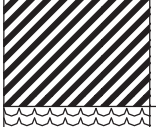
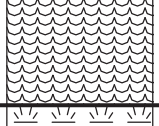
Slightly Weathered: Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.

Weathered: Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.

Highly Weathered: Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

intertek psi

Section 11. Detail Drawings

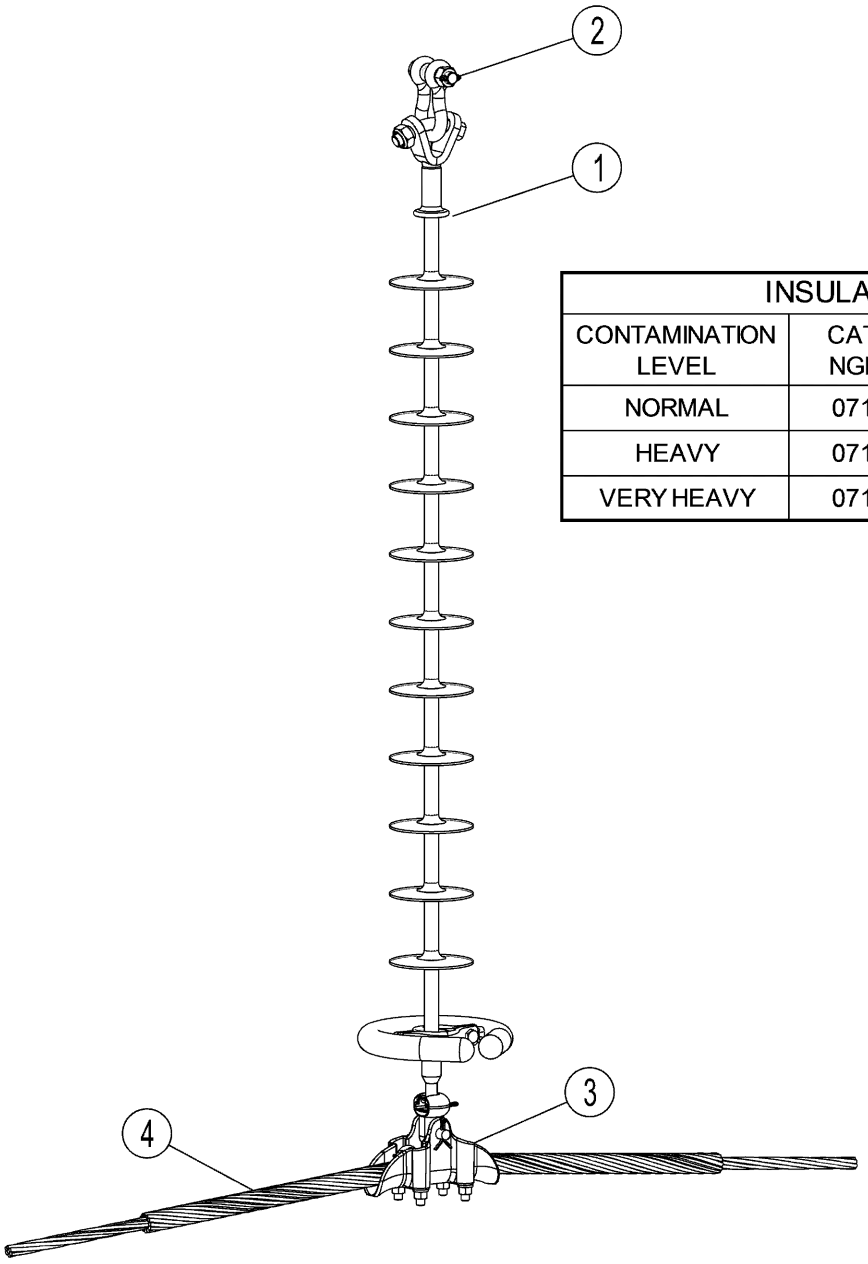
A. Miscellaneous Details

B. Wire Detail Sheets

C. Vendor Installation Drawings

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	POLYMER DEAD END / SUSPENSION INSULATOR W/CORONA RING 138KV - 25K	1	EA	POLY-DE/SUS-CR-138-25
2	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT & COTTER PIN	1	EA	0047885000
3	CLAMP, SUSPENSION, VARIABLE SIZE	1	EA	CLAMP-SUS
4	ARMOR ROD, VARIABLE SIZE	1	EA	ARMOR-ROD



INSULATOR TABLE		
CONTAMINATION LEVEL	CATALOG ID NGK-LOCKE	CATALOG ID MPS
NORMAL	0710056346	0500075500
HEAVY	0710056347	0500075501
VERY HEAVY	0710056348	0500075502

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REV	DESCRIPTION	BY	DATE
2	REVISED INSULATOR CATALOG NUMBERS -SES	McP	10/11/17

AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS

138KV SUSPENSION INSULATOR, POLYMER, 25K, W/CORONA RING

ENGR:	DRAWN: SAS	CHECKED: McP	APPROVED: JCN	DATE: 10/18/12

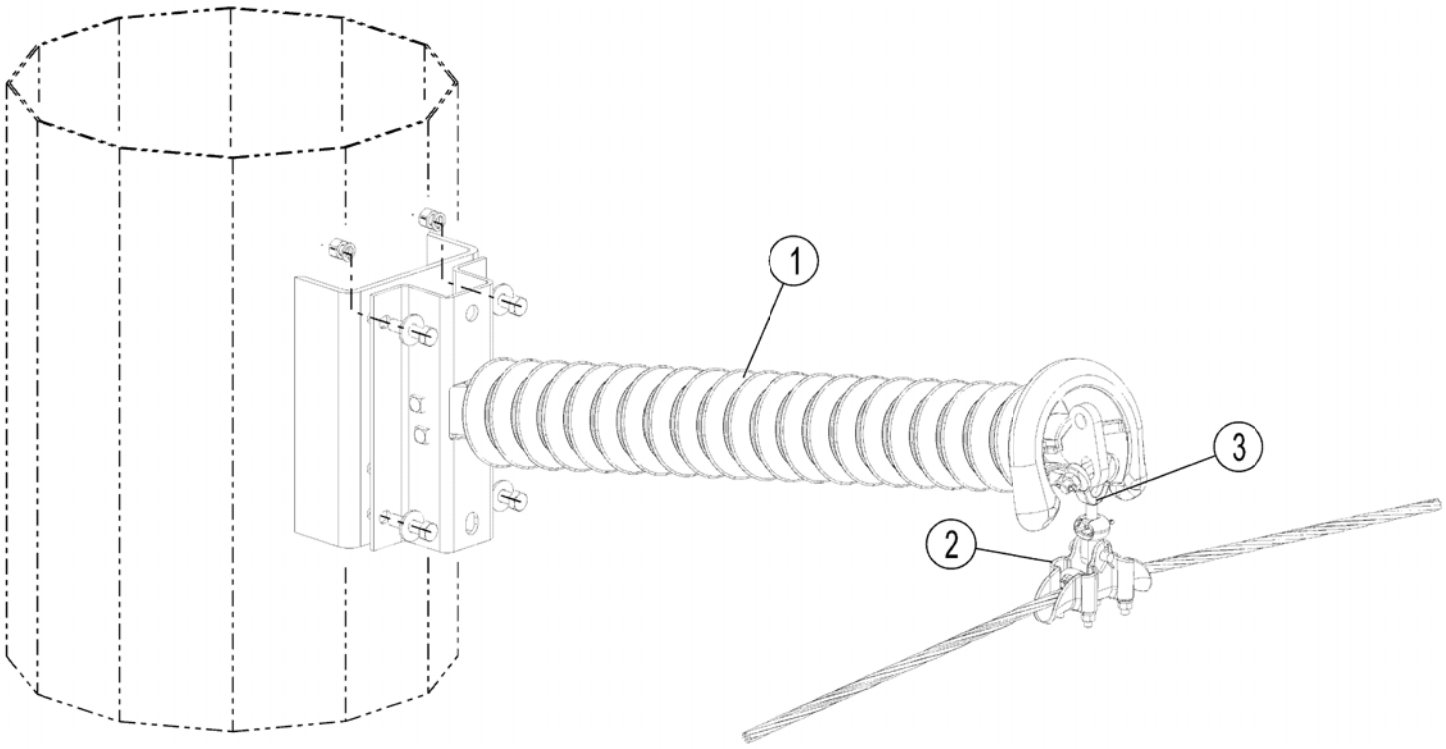
DRAWING No. 11B6-2722 | SHEET No. 3 | REV. No. 0

Archive ID: 906-372

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	POLYMER HORIZONTAL POST INSULATOR W/CORONA RING 138KV, FLAT BASE FOR STEEL POLE	1	EA	POLY-HPOST-FB-CR-138
2	CLAMP, SUSPENSION, VARIABLE SIZE	1	EA	CLAMP-SUS
3	Y-CLEVIS BALL, 30K, ANSI CLASS 52-3, 52-5	1	EA	0047513000

INSULATOR TABLE		
CONTAMINATION LEVEL	CATALOG ID NGK-LOCKE	CATALOG ID MPS
NORMAL	0710056324	050075578
HEAVY	0710056324	050075578
VERY HEAVY	0710056328	0500075582



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REV	DESCRIPTION	BY	DATE
2	UPDATED INSULATOR TABLE	BDG	10/10/17

AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS
138KV INSULATOR,POLYMER, HORIZONTAL POST, SUSPENSION, W/CORONA RING, FLAT BASE FOR STEEL POLE

ENGR:	DRAWN: SAS	CHECKED: McP	APPROVED: JCN	DATE: 10/09/13

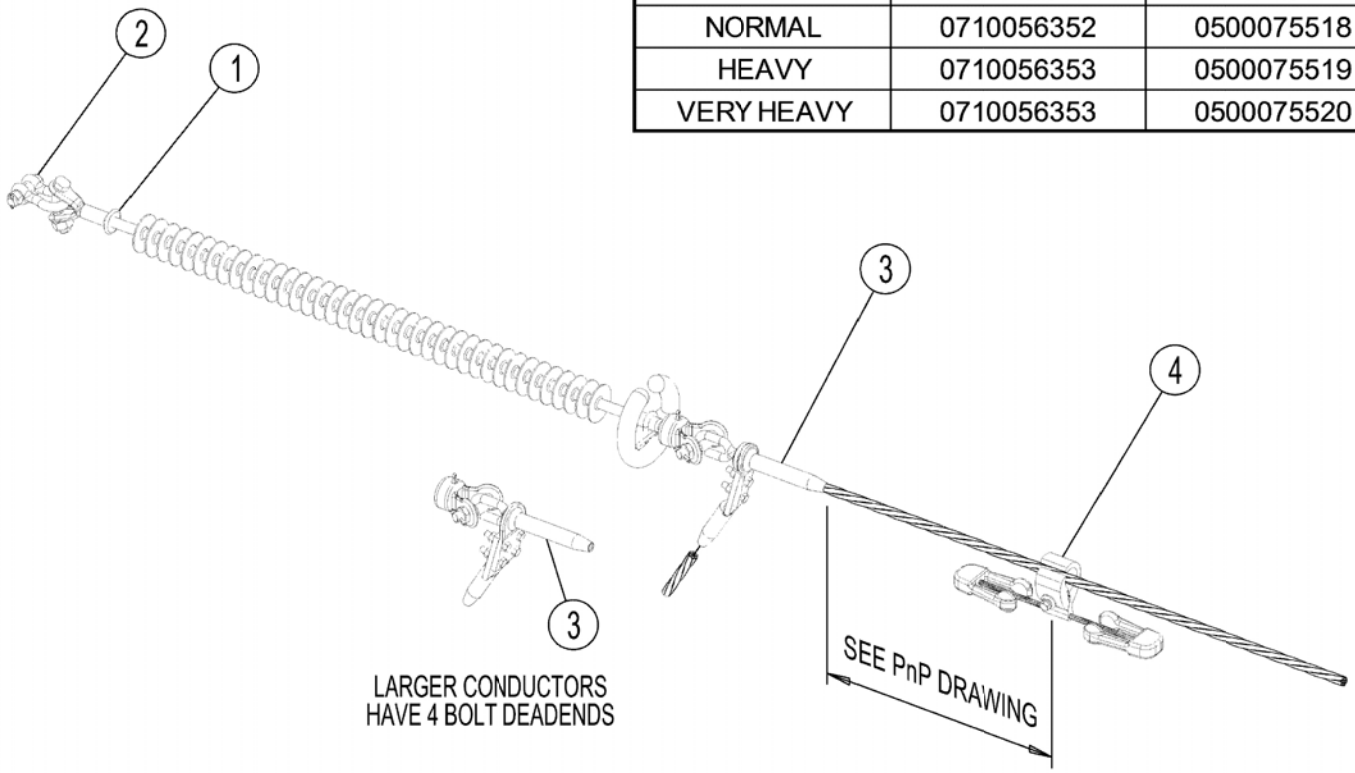
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Archive ID: 906-397

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	POLYMER DEAD END / SUSPENSION INSULATOR W/CORONA RING 138KV - 50K	1	EA	POLY-DE/SUS-CR-138-50
2	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT & COTTER PIN	1	EA	0047885000
3	DEADEND, VARIABLE SIZE WIRE, BOLTED OR COMPRESSION	1	EA	CLAMP-DE
4	VIBRATION DAMPER, VARIABLE SIZE	1	EA	DAMPER

INSULATOR TABLE		
CONTAMINATION LEVEL	CATALOG ID NGK-LOCKE	CATALOG ID MPS
NORMAL	0710056352	0500075518
HEAVY	0710056353	0500075519
VERY HEAVY	0710056353	0500075520



LARGER CONDUCTORS
HAVE 4 BOLT DEADENDS

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REV	DESCRIPTION	BY	DATE
2	REVISED INSULATOR CATALOG NUMBERS -SES	McP	10/18/17

AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS

138KV DEAD END INSULATOR, POLYMER, 50K, W/CORONA RING

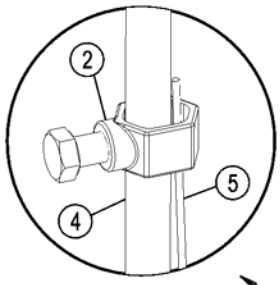
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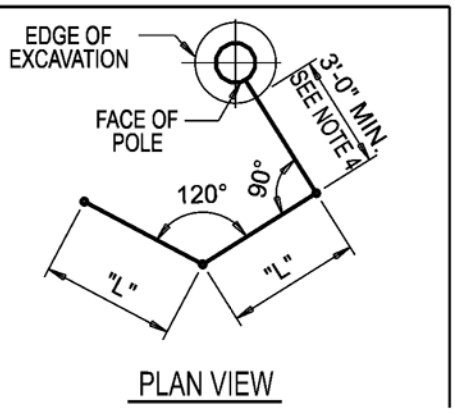
DRAWING No. 14B7-2746 | SHEET No. 6 | REV. No. 2

Archive ID: 906-426

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	ROD, GROUND, 5/8 IN DIA, 8 FT LG, COPPER CLAD STEEL	2	EA	0047858000
2	CLAMP, GROUNDING, ROD, 5/8 IN, COPPER OR STEEL	2	EA	0063048300
3	COUPLING, ROD, GROUND, 2 IN, THREADLESS	1	EA	0047544201
4	ROD, GROUND, 1/2 IN DIA, 5 FT LG, COPPER CLAD STEEL WITH TWO (2) HOLES NEMA PAD	1	EA	0047857120
5	WIRE, COPPER, #4 SOLID, SOFT DRAWN	20	FT	0087843600





PLAN VIEW

1. THE TARGET TFR FOR ALL STRUCTURES IS 20 Ohms MEASURED USING THE PROCEDURE IN TLES-32.
2. TFR READING SHALL BE TAKEN AFTER INSTALLATION OF THE FIRST GROUND ROD. UNLESS BLOCKED BY SUBSURFACE OBSTRUCTION, A MAXIMUM OF TWO ADDITIONAL GROUND RODS SHALL BE DRIVEN IN SERIES WITH THE FIRST GROUND ROD UNTIL THE TARGET TFR IS REACHED. IF OBSTRUCTED, UP TO 2 ADDITIONAL GROUND RODS SHALL BE DRIVEN IN PARALLEL USING THE CONFIGURATION SHOWN IN THE PLAN VIEW ON THIS DRAWING UNTIL THE TARGET TFR IS REACHED.
3. A TFR GREATER THAN THE TARGET VALUE IS ACCEPTABLE IF BOTH ADJACENT STRUCTURES MEASURE WITHIN THE TARGET TFR VALUE. IF THESE CONDITIONS CANNOT BE MET, CALL THE PROJECT ENGINEER FOR GUIDANCE.
4. IF THE EXCAVATION IS BACKFILLED WITH NATIVE SOIL, THE INSTALLED DISTANCE TO THE INITIAL ROD MAY BE MEASURED FROM THE FACE OF THE POLE.
5. THE TOPS OF ALL GROUND RODS SHALL MAINTAIN A MINIMUM DEPTH OF 24 INCHES BELOW GRADE.
6. RECORD ACTUAL TFR VALUES ON TABLES ON DRAWING 82A0-2204 (REFER TO TLES-32 FOR PROCEDURE).

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REV	DESCRIPTION	BY	DATE
4	REVISED NOTES	McP	03/11/19

AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS

GROUND ROD FOR DIRECT EMBEDDED STEEL POLE

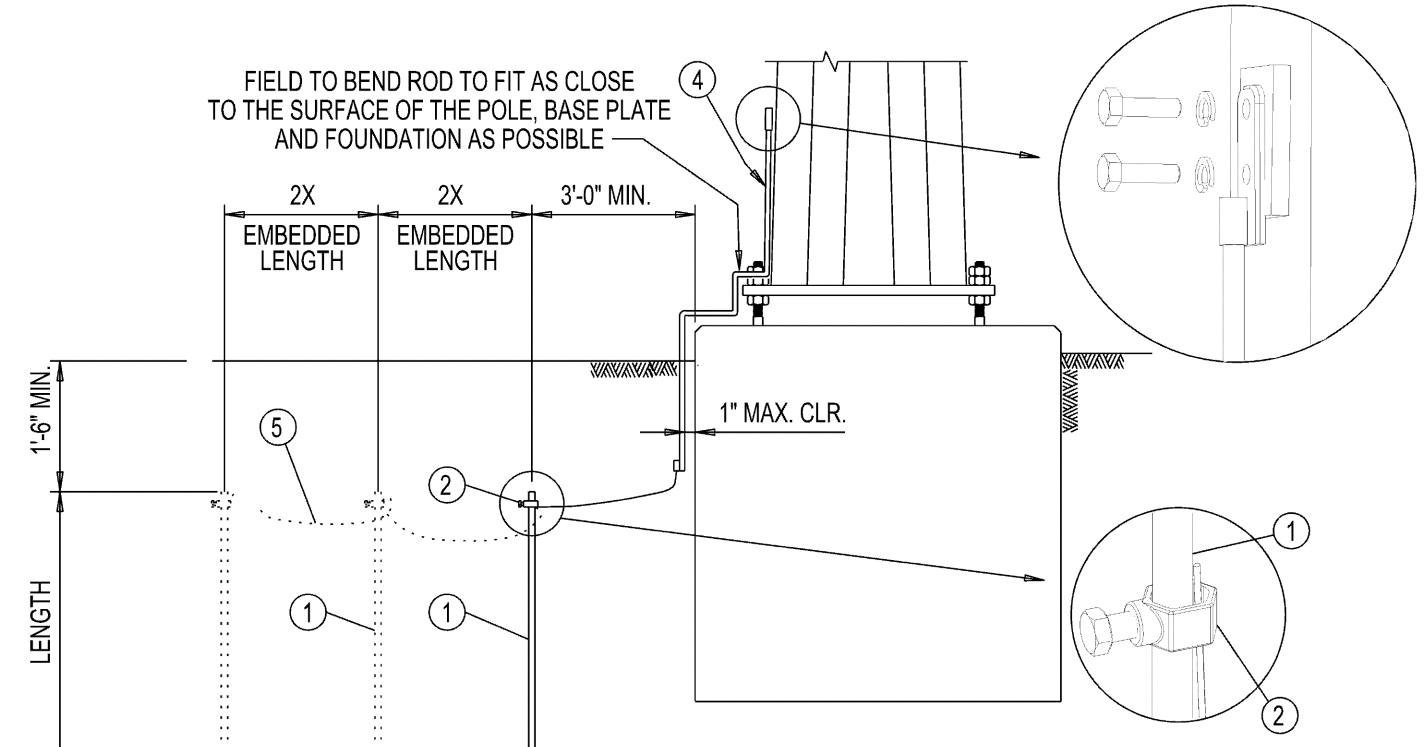
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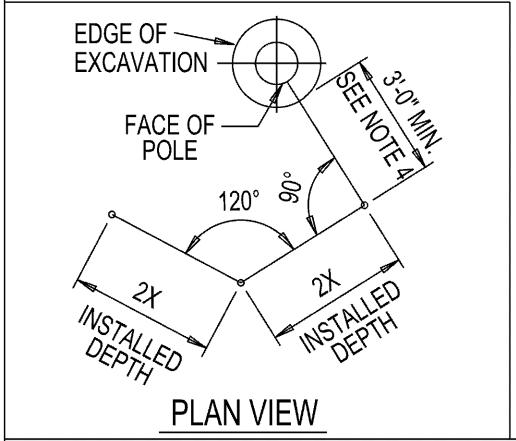
DRAWING No. 21SE-1456 | SHEET No. 1 | REV. No. 4

Archive ID: 906-775

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	ROD, GROUND, 5/8 IN DIA, 8 FT LG, COPPER CLAD STEEL	2	EA	0047858000
2	CLAMP, GROUNDING, ROD, 5/8 IN, COPPER OR STEEL	2	EA	0063048300
3	COUPLING, ROD, GROUND, 2 IN, THREADLESS	1	EA	0047544201
4	ROD, GROUND, 1/2 IN DIA, 6 FT 6 IN LG, COPPER CLAD	1	EA	0047857150
5	WIRE, COPPER, #4 SOLID, SOFT DRAWN	20	FT	0087843600





PLAN VIEW

1. THE TARGET TFR FOR ALL STRUCTURES IS 20 Ohms MEASURED USING THE PROCEDURE IN TLES-32.
2. TFR READING SHALL BE TAKEN AFTER INSTALLATION OF THE FIRST GROUND ROD. UNLESS BLOCKED BY SUBSURFACE OBSTRUCTION, A MAXIMUM OF TWO ADDITIONAL GROUND RODS SHALL BE DRIVEN IN SERIES WITH THE FIRST GROUND ROD UNTIL THE TARGET TFR IS REACHED. IF OBSTRUCTED, UP TO 2 ADDITIONAL GROUND RODS SHALL BE DRIVEN IN PARALLEL USING THE CONFIGURATION SHOWN IN THE PLAN VIEW ON THIS DRAWING UNTIL THE TARGET TFR IS REACHED.
3. A TFR GREATER THAN THE TARGET VALUE IS ACCEPTABLE IF BOTH ADJACENT STRUCTURES MEASURE WITHIN THE TARGET TFR VALUE. IF THESE CONDITIONS CANNOT BE MET, CALL THE PROJECT ENGINEER FOR GUIDANCE.
4. IF THE EXCAVATION IS BACKFILLED WITH NATIVE SOIL, THE INSTALLED DISTANCE TO THE INITIAL ROD MAY BE MEASURED FROM THE FACE OF THE POLE.
5. THE TOPS OF ALL GROUND RODS SHALL BE CUT AS NEEDED TO MAINTAIN A MINIMUM DEPTH OF 18 INCHES BELOW GRADE.
6. RECORD ACTUAL TFR VALUES ON TABLES ON DRAWING 82A0-2204 (REFER TO TLES-32 FOR PROCEDURE).

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REV	DESCRIPTION	BY	DATE
1	REVISED GROUND ROD DETAIL & CHANGED NOTE. - SAS	McP JCN	03/19/14

AEP AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS

GROUND ROD FOR STEEL POLE ON CONCRETE PIER FOUNDATION

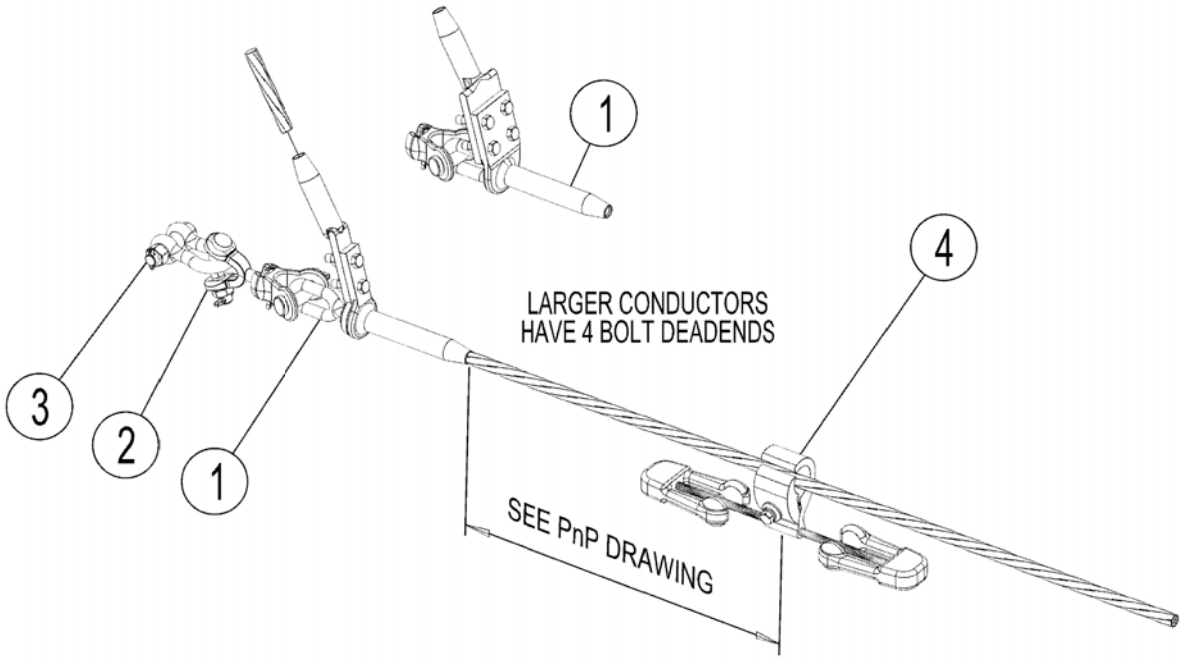
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DRAWING No. 21SE-1460 | SHEET No. 1 | REV. No. 1

Archive ID: 905-455

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	DEADEND, VARIABLE SIZE WIRE, BOLTED OR COMPRESSION	1	EA	CLAMP-DE
2	CLEVIS-Y BALL, 30K	1	EA	0047513000
3	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT	1	EA	0047885000
4	VIBRATION DAMPER, VARIABLE SIZE	1	EA	DAMPER



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STANDARD REFERENCE

AEP AMERICAN ELECTRIC POWER

TRANSMISSION LINE ENGINEERING

OHGW, DEAD-END CONCRETE, STEEL OR WOOD POLE

DESCRIPTION	APPR	DATE
REDRAWN - SAS	DJO	08/16/10

APPROVED BY: JCN DATE: 01/27/06

DRAWN BY: McP SCALE: NONE

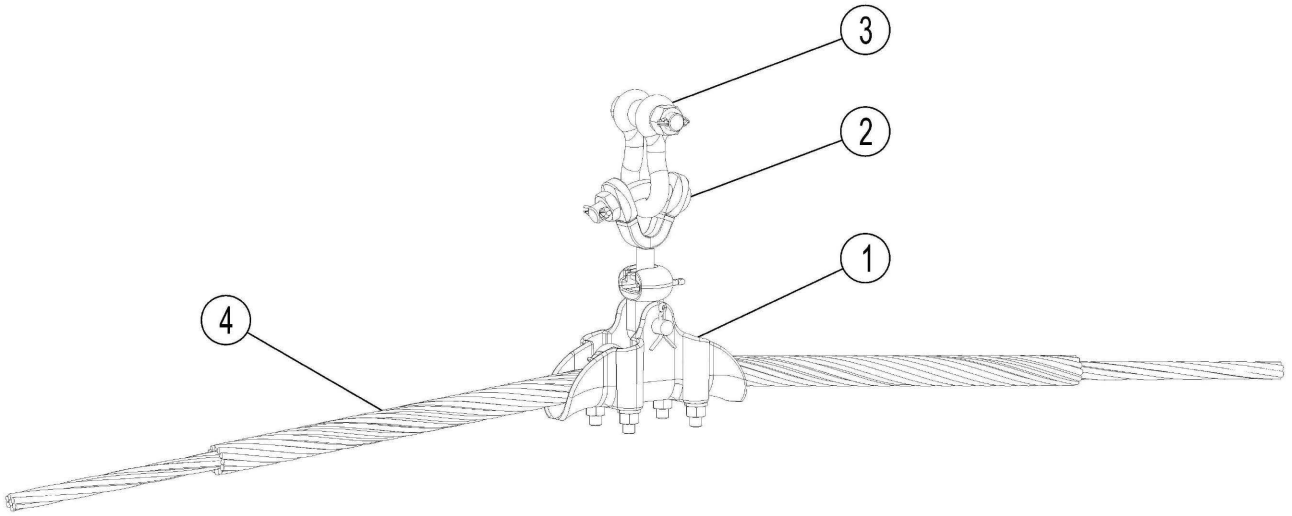
DRAWING No. 30D0-1104 SHEET No. 6 REV. No. 6

Archive ID: 903-177

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BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	CLAMP, SUSPENSION, VARIABLE SIZE	1	EA	CLAMP-SUS
2	Y-CLEVIS BALL, 30K, ANSI CLASS 52-3, 52-5	1	EA	0047513000
3	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT & COTTER PIN	1	EA	0047885000
4	ARMOR ROD, VARIABLE SIZE	1	EA	ARMOR-ROD



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REV	DESCRIPTION	BY	DATE
3	REMOVED RUST INHIBITOR, REVISED BILL O MATERIAL	McP	04/25/17

AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS

OHGW, SUSPENSION, CONCRETE, STEEL OR WOOD POLE

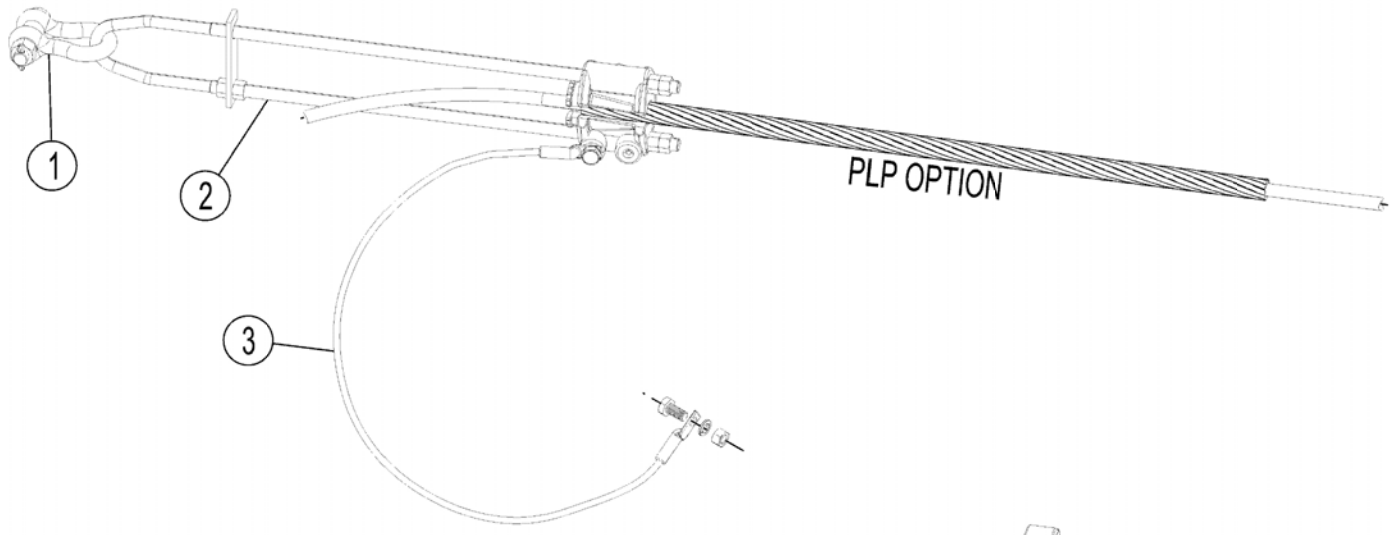
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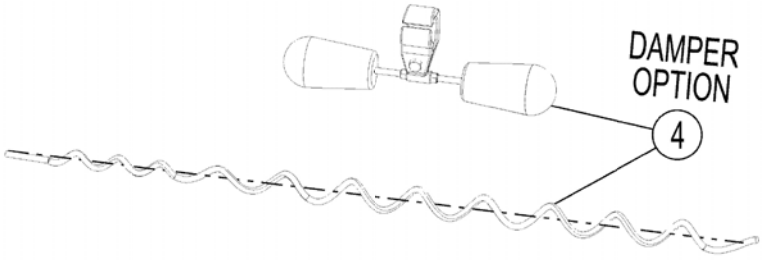
DRAWING No. 30T0-1102 | SHEET No. 3 | REV. No. 3

Archive ID: 906-332

BILL OF MATERIAL

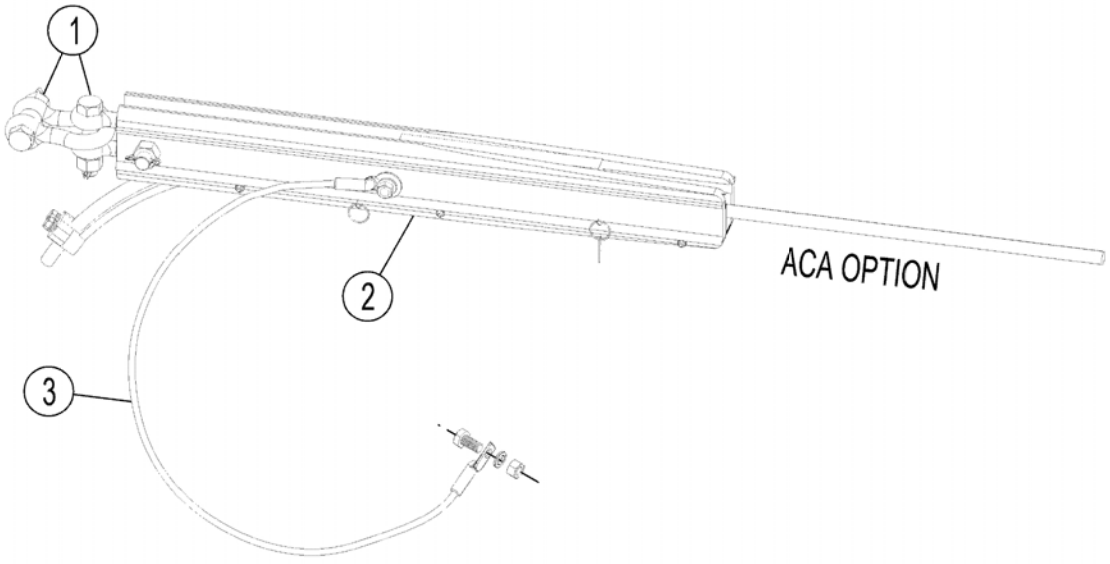
ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	SHACKLE, ANCHOR, 60K, 3/4 IN BOLT, 7/8 IN THROAT, W/ BOLT, NUT & COTTER PIN	2	EA	0047885000
2	CLAMP, STRAIN, DEADEND, OPGW, VARIABLE SIZE WIRE, VAR MANUF.	1	EA	CLAMP-DE-OPGW
3	STRAP, BONDING WIRE ASSEMBLY, F/ OPGW, 4/0 19 STR, 5 FT LG	1	EA	0062940055
4	VIBRATION DAMPER, VARIABLE SIZE	1	EA	DAMPER





CLAMP TABLE

WIRE SIZE	Cat. ID PLP	Cat. ID ACA
0.646 DIA.	0062939497	0500070735
-	-	-
-	-	-



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REV	DESCRIPTION	BY	DATE
4	REVISED BILL OF MATERIAL	McP JCN	03/30/15

AEP AMERICAN® ELECTRIC POWER

TRANSMISSION LINE STANDARDS

DEAD-END ASSEMBLY FOR OPGW WIRE

ENGR:	DRAWN: McP	CHECKED:	APPROVED:	DATE: 08/30/07

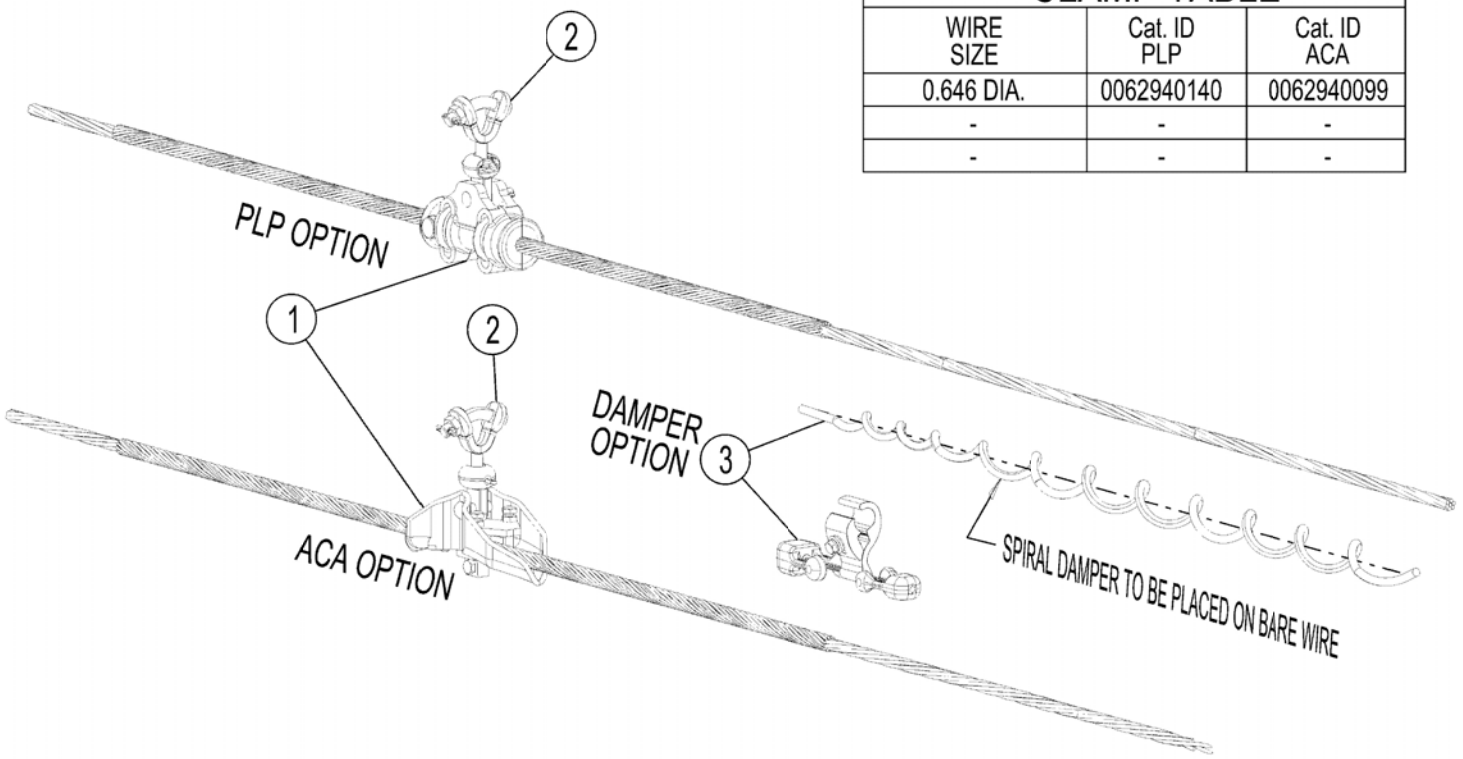
DRAWING No. 31D0-1265 | SHEET No. 1 | REV. No. 4

Archive ID: 905-456

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	CLAMP, SUSPENSION, OPGW, VARIABLE SIZE WIRE, VAR MANUF.	1	EA	CLAMP-SUS-OPGW
2	Y-CLEVIS BALL, 30K, ANSI CLASS 52-3, 52-5	1	EA	0047513000
3	VIBRATION DAMPER, VARIABLE SIZE	1	EA	DAMPER

CLAMP TABLE		
WIRE SIZE	Cat. ID PLP	Cat. ID ACA
0.646 DIA.	0062940140	0062940099
-	-	-
-	-	-



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REV	DESCRIPTION	BY	DATE
6	ADDED VENDOR OPTIONS	McP	03/18/14

AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS

SUSPENSION ASSEMBLY FOR OPGW WIRE

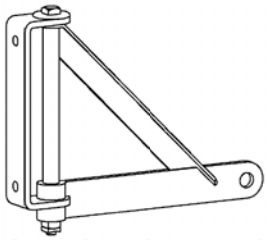
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DRAWING No. 31S0-1264 | SHEET No. 1 | REV. No. 6

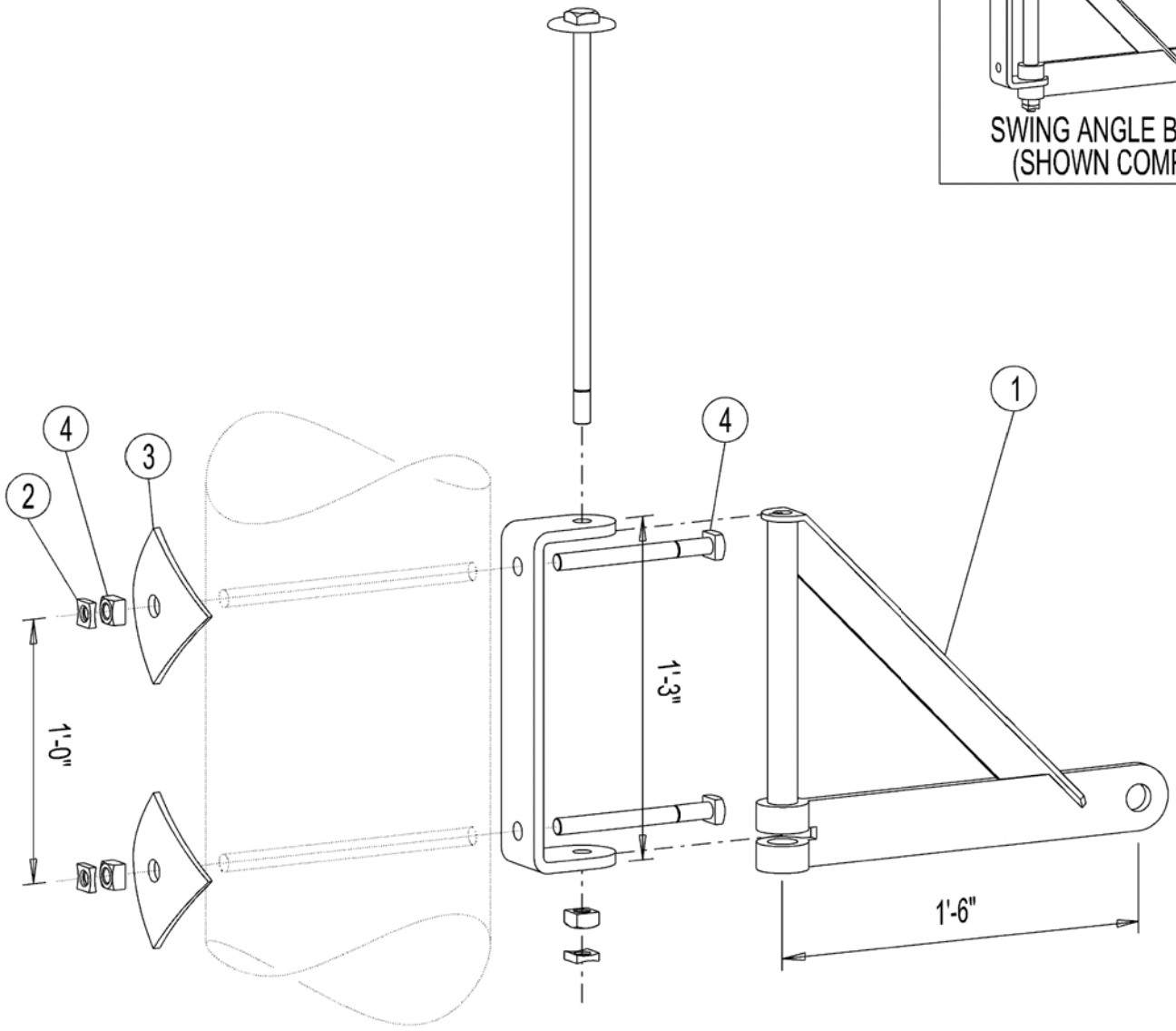
Archive ID: 905-373

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	INDUS No.
1	BRACKET, SWINGING ANGLE, 18 IN LONG, 12 IN SPACING	1	EA	0047365000
2	NUT, LOCK, 3/4 IN DIA BOLT, GALVANIZED	2	EA	0047730700
3	WASHER, VARIABLE (FLAT OR CURVED), 3/4 IN. BOLT, 4 IN SQUARE	2	EA	WASHER-3/4
4	BOLT, MACHINE, 3/4 IN X VARIABLE LENGTH, GALVANIZED, WITH SQUARE NUT	2	EA	BLT-MCH-3/4-GLV



SWING ANGLE BRACKET
(SHOWN COMPLETE)



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STANDARD REFERENCE

AEP AMERICAN® ELECTRIC POWER

TRANSMISSION LINE ENGINEERING

SWINGING ANGLE BRACKET

DESCRIPTION	APPR	DATE
REDRAWN - SAS	McP	08/12/10

APPROVED BY: DATE: 12/20/05

DRAWN BY: McP SCALE: NONE

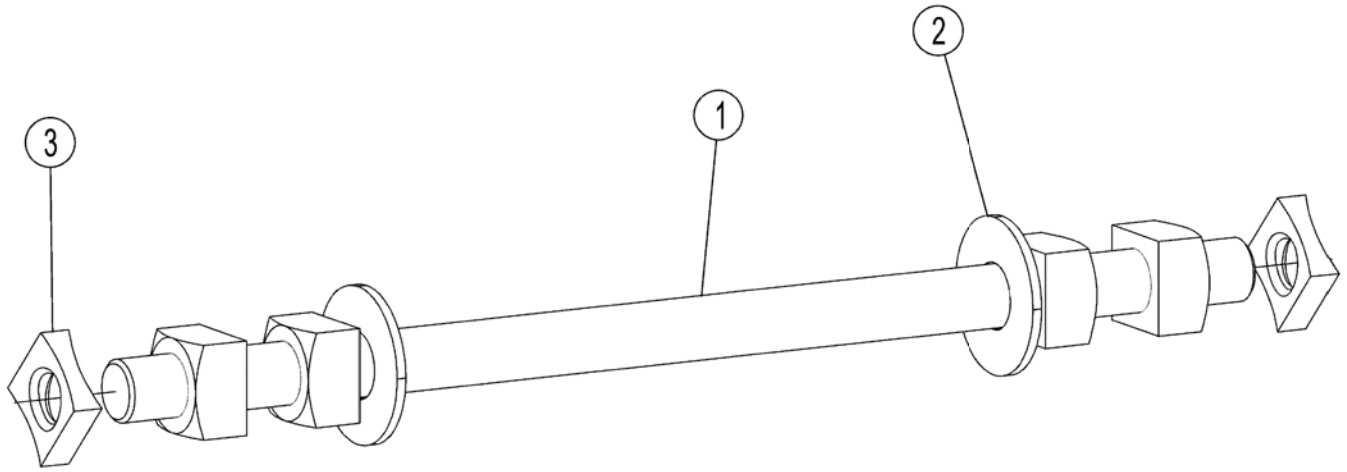
DRAWING No. 71A0-1133 SHEET No. 1 REV. No. 3

Archive ID: 903-154

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BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	BOLT, DOUBLE ARMING, 1 IN X VAR. LENGTH, GLV, HIGH STRENGTH A449, W/ 4 SQUARE NUTS	1	EA	BLT-DA-1/1-A449
2	ROUND WASHER, 1 IN BOLT DIA, GALVANIZED	2	EA	0087132803
3	NUT, LOCK, 1 IN DIAMETER BOLT, GALVANIZED	2	EA	0047731200



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REV	DESCRIPTION	BY	DATE

AEP AMERICAN ELECTRIC POWER

TRANSMISSION LINE STANDARDS

A449 1IN - HIGH STRENGTH DOUBLE ARMING BOLT, CONCRETE OR STEEL H-FRAME

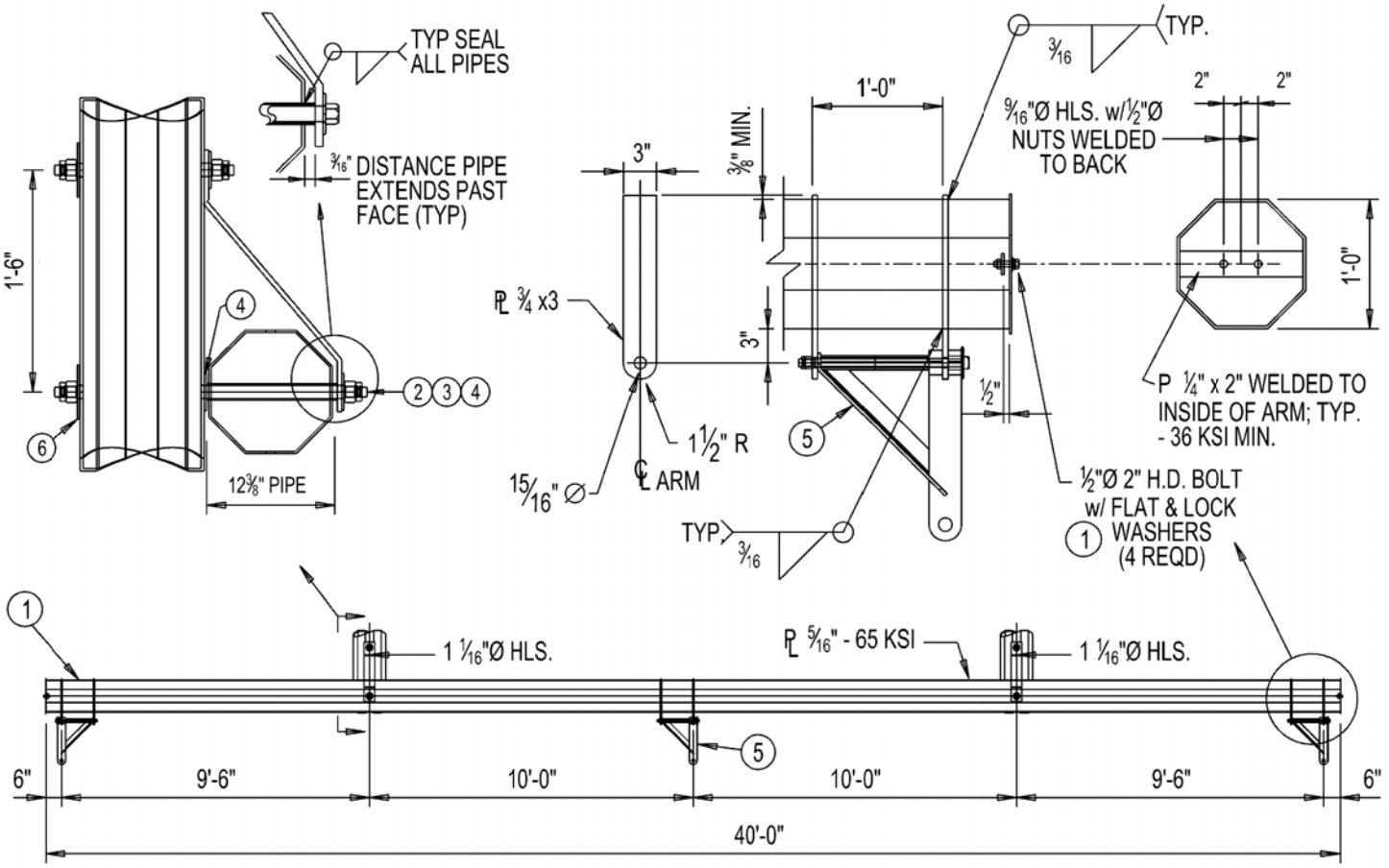
ENGR:	DRAWN: McP	CHECKED:	APPROVED: JCN	DATE: 04/21/15

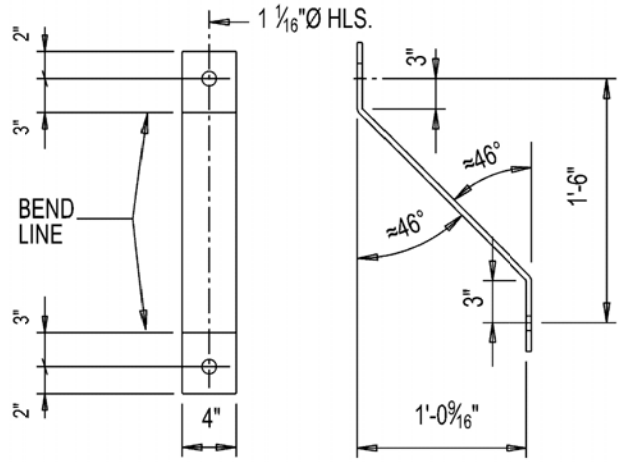
DRAWING No. 71A0-1971 | SHEET No. 1 | REV. No. 0

Archive ID: 905-492

BILL OF MATERIAL

ITEM	DESCRIPTION	QTY.	UNIT	Cat. No.
1	CROSSARM, KIT F/ STEEL OR CONCRETE H-FRAME, ALL, 40 FT, GALV.	1	KT	0074341060
2	BOLT, DOUBLE ARMING, 1 IN X VAR. LENGTH, GLV, HIGH STRENGTH A449, W/ 4 SQUARE NUTS	2	EA	BLT-DA-1/1-A449
3	NUT, LOCK, 1 IN DIAMETER BOLT, GALVANIZED	4	EA	0047731200
4	ROUND WASHER, 1 IN BOLT DIA, GALVANIZED	4	EA	0087132803
5	BRACKET, SWINGING ANGLE, 15 IN LG, 12 IN SPACING	3	EA	0047362300
6	WASHER, VARIABLE (FLAT OR CURVED), 1 IN. BOLT, 4 IN SQUARE	4	EA	WASHER-1

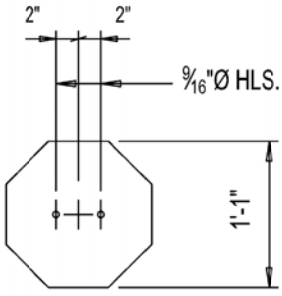




FLAT VIEW

(1) MOUNTING STRAP - (2 REQ'D)

3/8" PLATE - 65 KSI STEEL



(1) END CAP - (2 REQ'D)

PL 3/16" - 36 KSI MIN.

REFERENCE DRAWINGS:

01D3-1179 - DESIGN NOTES FOR GALVANIZED STEEL POLES

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REV	DESCRIPTION	BY	DATE
6	ADDED PIPE DETAIL AND REVISED MOUNTING STRAP	McP DJO	04/29/15

AEP AMERICAN® ELECTRIC POWER

TRANSMISSION LINE STANDARDS

ALL HEAVY SUSPENSION CROSSARM 40 FT - CONCRETE OR STEEL H-FRAME - GALVANIZED

ENGR:	DRAWN: McP	CHECKED:	APPROVED: X	DATE: 10/15/2007	DRAWING No. 74E0-1272	SHEET No. 1	REV. No. 6

Archive ID: 905-497

Hardware _Wire Details For 1,033,500 CM, 54/7 STR : CURLEW

ISSUED

Armor-Rod	Suspension Clamp with Armor Rod	Post Insulator Clamp with Armor Rod	Full Tension Splice
0050825900	**0050147300**	**0050064700**	**0050725690**
AFL TELE : AAR307 DULMISON : AAR-3070 HELICAL : AAR-548 HUBBELL : AP8144 PLP : AR-0144...	HUBBELL : HAS-204-S MACLEAN : LS-9-S LINDSEY : 1348-S	HUBBELL : TSC-200 MACLEAN : ACTS-200 LAPP INS : 47115	ALCOA IN : 33052

Suspension Clamp without Armor Rod	Post Insulator Clamp without Armor Rod	Non Tension Splice
0050143000	**0050064500**	**0000411868**
HUBBELL : HAS-139-S MACLEAN : LS-4-S LINDSEY : 1340-S	HUBBELL : TSC-150 MACLEAN : ACTS-150 LAPP INS : 47114	ALCOA IN : 5034.134

Repair Sleeve	Tee Tap	Strain Clamp with Socket Eye(52-5)	Strain Clamp without Socket Eye
0050866300	**0050554500**	**0050110010**	**0050110400**
ALCOA IN : 5234.3	ALCOA IN : 5334.3 HUBBELL : ORT2114	HUBBELL : SD-130S LINDSEY : 1710-S MACLEAN : ADE-2526-S	HUBBELL : SD-130-N MACLEAN : ADE-26-N

Compression Clamp

Compression Assembly	Single Tongue Body	Steel Eye	Jumper Terminal
0050010088	**0050006100**	**0050691700**	**0050950800**
ALCOA IN : E33154	ALCOA IN : 8134.134	ALCOA IN : 9414.432	ALCOA IN : 5134.134

Filler Compound	Joint Compound	Double Tongue Body
0084722900		**0050006200**
AFL TELE : ALNOX10T HUBBELL : VS8-HTJC		ALCOA IN : 8234.134

Conductor - ACSR

Remarks:

Over-All Diameter (Inches)	1.245	Wire Catalog ID:	**0054652900**
Over-All Diameter w/A Rod (Inches)	1.975	Ultimate Tension (lbs.)	36,600
Bare Weight (lbs./ft.)	1.330	40% Ultimate Tension (lbs.)	14,640
Length (ft./lbs.)	0.752		

Max Operating Temp 138kV+ (°F): See TP-000786

Hardware _Wire Details For 7#10, (7) STR, Alumoweld : 7#10 AW

ISSUED

Armor-Rod	Suspension Clamp with Armor Rod	Post Insulator Clamp with Armor Rod	Full Tension Splice
0050828900	**0050133000**	**0050063000**	**0050886995**
AFL TELE : AWAR075 DULMISON : AWAR-0750 HELICAL : AWAR-521 PLP : AR-2124	HUBBELL : HAS-104-S MACLEAN : LS-2-S LINDSEY : 1334-S	MACLEAN : ACTS-084 HUBBELL : TSC-86 LAPP INS : 47112	ALCOA IN : 4912.330

Suspension Clamp without Armor Rod	Post Insulator Clamp without Armor Rod	Non Tension Splice
0050126700	**0050062100**	**0050723020**
HUBBELL : HAS-62-S MACLEAN : LS-0-S LINDSEY : 1328-S	HUBBELL : TSC-57 LAPP INS : 47111 MACLEAN : ACTS-057	ALCOA IN : 5009.344

Repair Sleeve	Tee Tap	Strain Clamp with Socket Eye(52-5)	
WARNING 4	**WARNING 4**	**0050097700**	**Not Applicable**
		HUBBELL : SD-57-S MACLEAN : ADE-21-S LINDSEY : 1700-S	

Compression Clamp

Compression Assembly	Single Tongue Body	Steel Eye	Jumper Terminal
0050009300		**0050688700**	**0050925600**
ALCOA IN : E4512.710T		ALCOA IN : 9112.332	ALCOA IN : 5106.344

Filler Compound	Joint Compound	Double Tongue Body
0084722900		
AFL TELE : ALNOX10T HUBBELL : VS8-HTJC		

Remarks:

Over-All Diameter (Inches)	0.306	Wire Catalog ID:	**0059155800**
Over-All Diameter w/A Rod (Inches)	0.534	Ultimate Tension (lbs.)	10,020
Bare Weight (lbs./ft.)	0.165	40% Ultimate Tension (lbs.)	4,008
Length (ft./lbs.)	6.061		

Max Operating Temp 138kV+ (°F): See TP-000786

Shield Wire

Hardware _Wire Details For 0.646" 96 Fiber OPGW : 646-96F AFL

ISSUED

Armor-Rod	Suspension Clamp with Armor Rod	Post Insulator Clamp with Armor Rod	Full Tension Splice
	Suspension Clamp without Armor Rod	Post Insulator Clamp without Armor Rod	Non Tension Splice
Repair Sleeve	Tee Tap	Strain Clamp with Socket Eye(52-5)	

Compression Clamp

Compression Assembly	Single Tongue Body	Steel Eye	Jumper Terminal
Filler Compound	Joint Compound	Double Tongue Body	

Remarks:

Over-All Diameter (Inches)	0.646	Wire Catalog ID:	**0500069818**
Over-All Diameter w/A Rod (Inches)	0.000	Ultimate Tension (lbs.)	0,000
Bare Weight (lbs./ft.)	0.557	40% Ultimate Tension (lbs.)	0,000
Length (ft./lbs.)	1.797		

Max Operating Temp 138kV+ (°F): See TP-000786

Shield Wire

Section 12. Sag Data/Stringing Charts

A. Conductor

B. Shield Wire

C. OPGW

Conductor Stringing Table

Section 1										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
Vigo Bay	1033 KCM ACSR 54/7 Curlew	89	1900	263.01	266.77	45.31	0	13.51	891	10.99
							10	13.64	882.8	11.04
							20	13.78	873.82	11.1
							30	13.89	866.93	11.15
							40	13.98	861.15	11.18
							50	14.1	854.06	11.23
							60	14.21	847.7	11.27
							70	14.31	841.34	11.32
							80	14.41	835.68	11.35
							90	14.52	829.29	11.4
							100	14.64	822.85	11.44

Section 2										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
89	1033 KCM ACSR 54/7 Curlew	90	11300	784.18	715.06	-12.99	0	11.4	7458.52	10.1
							10	11.81	7200.7	10.28
							20	12.23	6953.5	10.46
							30	12.65	6722.17	10.64
							40	13.08	6502.27	10.82
							50	13.5	6299.11	10.99
							60	13.94	6103.13	11.17
							70	14.36	5924.64	11.33
							80	14.78	5753.91	11.5
							90	15.22	5591.14	11.67
							100	15.63	5441.68	11.83
90	1033 KCM ACSR 54/7 Curlew	91	11300	784.18	487.19	-10.28	0	5.29	7458.52	6.88
							10	5.48	7200.7	7
							20	5.68	6953.5	7.13
							30	5.87	6722.17	7.25
							40	6.07	6502.27	7.37
							50	6.27	6299.11	7.49
							60	6.47	6103.13	7.61
							70	6.66	5924.64	7.72
							80	6.86	5753.91	7.83
							90	7.06	5591.14	7.95
							100	7.26	5441.68	8.06
91	1033 KCM ACSR 54/7 Curlew	92	11300	784.18	877.07	2.32	0	17.16	7458.52	12.39
							10	17.77	7200.7	12.61
							20	18.4	6953.5	12.83
							30	19.04	6722.17	13.05
							40	19.68	6502.27	13.27
							50	20.32	6299.11	13.48
							60	20.97	6103.13	13.7
							70	21.6	5924.64	13.9
							80	22.25	5753.91	14.11
							90	22.89	5591.14	14.31
							100	23.52	5441.68	14.51
92	1033 KCM ACSR 54/7 Curlew	93	11300	784.18	482.81	-4.63	0	5.2	7458.52	6.82
							10	5.38	7200.7	6.94
							20	5.57	6953.5	7.06
							30	5.77	6722.17	7.18
							40	5.96	6502.27	7.3
							50	6.15	6299.11	7.42
							60	6.35	6103.13	7.54
							70	6.54	5924.64	7.65
							80	6.74	5753.91	7.76
							90	6.93	5591.14	7.88
							100	7.12	5441.68	7.98
93	1033 KCM ACSR 54/7 Curlew	94	11300	784.18	733.01	16.76	0	11.98	7458.52	10.35
							10	12.41	7200.7	10.54
							20	12.85	6953.5	10.72
							30	13.3	6722.17	10.91
							40	13.75	6502.27	11.09
							50	14.19	6299.11	11.27
							60	14.65	6103.13	11.45
							70	15.09	5924.64	11.62
							80	15.54	5753.91	11.79
							90	15.99	5591.14	11.96
							100	16.43	5441.68	12.12
94	1033 KCM ACSR 54/7 Curlew	95	11300	784.18	521.67	29.73	0	6.08	7458.52	7.37
							10	6.29	7200.7	7.5
							20	6.52	6953.5	7.64
							30	6.74	6722.17	7.77
							40	6.97	6502.27	7.9
							50	7.2	6299.11	8.02
							60	7.43	6103.13	8.15
							70	7.65	5924.64	8.27
							80	7.88	5753.91	8.39
							90	8.11	5591.14	8.52
							100	8.33	5441.68	8.63
95	1033 KCM ACSR 54/7 Curlew	96	11300	784.18	937.11	-57.31	0	19.62	7458.52	13.25
							10	20.33	7200.7	13.48
							20	21.05	6953.5	13.72
							30	21.77	6722.17	13.96
							40	22.51	6502.27	14.19
							50	23.24	6299.11	14.42
							60	23.99	6103.13	14.65
							70	24.71	5924.64	14.87
							80	25.45	5753.91	15.09
							90	26.19	5591.14	15.3
							100	26.91	5441.68	15.51

96	1033 KCM ACSR 54/7 Curlew	97	11300	784.18	454.37	4.09	0	4.6	7458.52	6.42
							10	4.77	7200.7	6.53
							20	4.94	6953.5	6.65
							30	5.11	6722.17	6.76
							40	5.28	6502.27	6.87
							50	5.45	6299.11	6.98
							60	5.63	6103.13	7.09
							70	5.79	5924.64	7.2
							80	5.97	5753.91	7.31
							90	6.14	5591.14	7.41
							100	6.31	5441.68	7.51
97	1033 KCM ACSR 54/7 Curlew	98	11300	784.18	338.95	-9.97	0	2.56	7458.52	4.79
							10	2.65	7200.7	4.87
							20	2.75	6953.5	4.96
							30	2.84	6722.17	5.04
							40	2.94	6502.27	5.13
							50	3.03	6299.11	5.21
							60	3.13	6103.13	5.29
							70	3.23	5924.64	5.37
							80	3.32	5753.91	5.45
							90	3.42	5591.14	5.53
							100	3.51	5441.68	5.6
98	1033 KCM ACSR 54/7 Curlew	99	11300	784.18	929.12	-6.04	0	19.25	7458.52	13.12
							10	19.94	7200.7	13.36
							20	20.65	6953.5	13.59
							30	21.37	6722.17	13.82
							40	22.09	6502.27	14.06
							50	22.8	6299.11	14.28
							60	23.54	6103.13	14.51
							70	24.25	5924.64	14.73
							80	24.97	5753.91	14.94
							90	25.7	5591.14	15.16
							100	26.4	5441.68	15.37
99	1033 KCM ACSR 54/7 Curlew	100	11300	784.18	348.05	-9.25	0	2.7	7458.52	4.92
							10	2.8	7200.7	5
							20	2.9	6953.5	5.09
							30	3	6722.17	5.18
							40	3.1	6502.27	5.26
							50	3.2	6299.11	5.35
							60	3.3	6103.13	5.43
							70	3.4	5924.64	5.52
							80	3.5	5753.91	5.6
							90	3.6	5591.14	5.68
							100	3.7	5441.68	5.75
100	1033 KCM ACSR 54/7 Curlew	101	11300	784.18	577.45	-1.93	0	7.43	7458.52	8.15
							10	7.7	7200.7	8.3
							20	7.97	6953.5	8.45
							30	8.25	6722.17	8.59
							40	8.53	6502.27	8.73
							50	8.8	6299.11	8.87
							60	9.09	6103.13	9.02
							70	9.36	5924.64	9.15
							80	9.64	5753.91	9.28
							90	9.92	5591.14	9.42
							100	10.19	5441.68	9.55
101	1033 KCM ACSR 54/7 Curlew	102	11300	784.18	1034.32	85.91	0	23.94	7458.52	14.63
							10	24.8	7200.7	14.89
							20	25.69	6953.5	15.16
							30	26.57	6722.17	15.42
							40	27.47	6502.27	15.68
							50	28.36	6299.11	15.93
							60	29.27	6103.13	16.18
							70	30.16	5924.64	16.42
							80	31.05	5753.91	16.67
							90	31.96	5591.14	16.91
							100	32.84	5441.68	17.14
102	1033 KCM ACSR 54/7 Curlew	103	11300	784.18	575.1	24.49	0	7.38	7458.52	8.12
							10	7.64	7200.7	8.27
							20	7.92	6953.5	8.41
							30	8.19	6722.17	8.56
							40	8.47	6502.27	8.7
							50	8.74	6299.11	8.84
							60	9.02	6103.13	8.98
							70	9.29	5924.64	9.12
							80	9.57	5753.91	9.25
							90	9.85	5591.14	9.38
							100	10.12	5441.68	9.51
103	1033 KCM ACSR 54/7 Curlew	104	11300	784.18	1029.81	24.48	0	23.66	7458.52	14.55
							10	24.51	7200.7	14.81
							20	25.38	6953.5	15.07
							30	26.26	6722.17	15.33
							40	27.15	6502.27	15.58
							50	28.03	6299.11	15.83
							60	28.93	6103.13	16.09
							70	29.8	5924.64	16.33
							80	30.69	5753.91	16.57
							90	31.58	5591.14	16.81
							100	32.45	5441.68	17.04

Section 3										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
104	1033 KCM ACSR 54/7 Curlew	105	11300	872.94	1374.63	-94.99	0	44.81	7036.4	20.02
							10	46.16	6832.55	20.32
							20	47.53	6635.53	20.62
							30	48.9	6450.48	20.91
							40	50.25	6277.71	21.2
							50	51.61	6112.55	21.49

	Curlew						60	52.96	5957.72	21.76
							70	54.3	5810.93	22.04
							80	55.66	5669.83	22.31
							90	56.97	5539.67	22.57
							100	58.31	5412.97	22.84
							0	11.52	7036.4	10.15
							10	11.87	6832.55	10.3
							20	12.22	6635.53	10.45
							30	12.57	6450.48	10.6
105	1033 KCM ACSR 54/7 Curlew	106	11300	872.94	698.17	11.28	40	12.92	6277.71	10.75
							50	13.27	6112.55	10.89
							60	13.61	5957.72	11.03
							70	13.95	5810.93	11.17
							80	14.3	5669.83	11.31
							90	14.64	5539.67	11.44
							100	14.98	5412.97	11.58
							0	5.79	7036.4	7.2
							10	5.96	6832.55	7.3
							20	6.14	6635.53	7.41
							30	6.32	6450.48	7.52
106	1033 KCM ACSR 54/7 Curlew	107	11300	872.94	494.89	18.22	40	6.49	6277.71	7.62
							50	6.67	6112.55	7.72
							60	6.84	5957.72	7.82
							70	7.01	5810.93	7.92
							80	7.19	5669.83	8.02
							90	7.36	5539.67	8.11
							100	7.53	5412.97	8.21
							0	13.15	7036.4	10.84
							10	13.54	6832.55	11
							20	13.94	6635.53	11.17
							30	14.34	6450.48	11.33
107	1033 KCM ACSR 54/7 Curlew	108	11300	872.94	745.29	-38.16	40	14.74	6277.71	11.48
							50	15.14	6112.55	11.64
							60	15.53	5957.72	11.79
							70	15.92	5810.93	11.93
							80	16.32	5669.83	12.08
							90	16.7	5539.67	12.22
							100	17.09	5412.97	12.37
							0	8.62	7036.4	8.78
							10	8.88	6832.55	8.91
							20	9.14	6635.53	9.04
							30	9.41	6450.48	9.17
108	1033 KCM ACSR 54/7 Curlew	109	11300	872.94	604.02	1.33	40	9.67	6277.71	9.3
							50	9.93	6112.55	9.42
							60	10.18	5957.72	9.54
							70	10.44	5810.93	9.66
							80	10.7	5669.83	9.78
							90	10.95	5539.67	9.9
							100	11.21	5412.97	10.01
							0	8.7	7036.4	8.82
							10	8.96	6832.55	8.95
							20	9.22	6635.53	9.08
							30	9.49	6450.48	9.21
109	1033 KCM ACSR 54/7 Curlew	110	11300	872.94	606.57	6.2	40	9.75	6277.71	9.34
							50	10.01	6112.55	9.46
							60	10.27	5957.72	9.58
							70	10.53	5810.93	9.71
							80	10.79	5669.83	9.83
							90	11.05	5539.67	9.94
							100	11.31	5412.97	10.06
							0	4.37	7036.4	6.25
							10	4.5	6832.55	6.34
							20	4.63	6635.53	6.44
							30	4.77	6450.48	6.53
110	1033 KCM ACSR 54/7 Curlew	111	11300	872.94	429.98	-1.04	40	4.9	6277.71	6.62
							50	5.03	6112.55	6.71
							60	5.16	5957.72	6.79
							70	5.29	5810.93	6.88
							80	5.42	5669.83	6.96
							90	5.55	5539.67	7.05
							100	5.68	5412.97	7.13
							0	10.56	7036.4	9.72
							10	10.88	6832.55	9.86
							20	11.2	6635.53	10.01
							30	11.52	6450.48	10.15
111	1033 KCM ACSR 54/7 Curlew	112	11300	872.94	668.37	13	40	11.84	6277.71	10.29
							50	12.16	6112.55	10.43
							60	12.47	5957.72	10.56
							70	12.79	5810.93	10.7
							80	13.11	5669.83	10.83
							90	13.42	5539.67	10.95
							100	13.73	5412.97	11.08

Section 4										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
							0	8.39	4474.96	8.66
							10	8.76	4283.11	8.85
							20	9.13	4109.17	9.04
							30	9.5	3948.44	9.22
112	1033 KCM ACSR 54/7 Curlew	113	7500	472.64	474.21	38.6	40	9.87	3803.81	9.39
							50	10.23	3667.83	9.57
							60	10.58	3545.92	9.73
							70	10.94	3430.48	9.89
							80	11.29	3325.59	10.05
							90	11.63	3227.47	10.2
							100	11.96	3137.57	10.34

Section 5										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
113	1033 KCM ACSR 54/7 Curlew	114	11300	887.15	1034.18	138.69	0	25.71	6983.25	15.16
							10	26.47	6783.79	15.39
							20	27.22	6596.12	15.6
							30	27.98	6418.13	15.82
							40	28.73	6250.06	16.03
							50	29.49	6089.68	16.24
							60	30.24	5939.7	16.45
							70	30.98	5797.83	16.65
							80	31.72	5661.72	16.84
							90	32.46	5534.06	17.04
							100	33.19	5412.46	17.23
114	1033 KCM ACSR 54/7 Curlew	115	11300	887.15	1025.14	-22.27	0	25.04	6983.25	14.97
							10	25.78	6783.79	15.19
							20	26.52	6596.12	15.4
							30	27.25	6418.13	15.61
							40	27.99	6250.06	15.82
							50	28.73	6089.68	16.03
							60	29.45	5939.7	16.23
							70	30.18	5797.83	16.43
							80	30.9	5661.72	16.63
							90	31.62	5534.06	16.82
							100	32.33	5412.46	17.01
115	1033 KCM ACSR 54/7 Curlew	116	11300	887.15	504.99	-62.6	0	6.12	6983.25	7.4
							10	6.3	6783.79	7.51
							20	6.48	6596.12	7.61
							30	6.66	6418.13	7.72
							40	6.84	6250.06	7.82
							50	7.02	6089.68	7.92
							60	7.19	5939.7	8.02
							70	7.37	5797.83	8.12
							80	7.55	5661.72	8.22
							90	7.72	5534.06	8.31
							100	7.9	5412.46	8.4
116	1033 KCM ACSR 54/7 Curlew	117	11300	887.15	552.84	-80.3	0	7.35	6983.25	8.11
							10	7.57	6783.79	8.23
							20	7.79	6596.12	8.35
							30	8	6418.13	8.46
							40	8.22	6250.06	8.57
							50	8.43	6089.68	8.69
							60	8.65	5939.7	8.79
							70	8.86	5797.83	8.9
							80	9.07	5661.72	9.01
							90	9.28	5534.06	9.11
							100	9.49	5412.46	9.21

Section 6										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
117	1033 KCM ACSR 54/7 Curlew	118	11300	950.25	1073.83	51.97	0	28.44	6755.27	15.95
							10	29.16	6587.93	16.15
							20	29.9	6425.61	16.35
							30	30.63	6273.4	16.55
							40	31.35	6129.04	16.75
							50	32.06	5992.75	16.94
							60	32.79	5860.92	17.12
							70	33.49	5737.47	17.31
							80	34.2	5618.75	17.49
							90	34.91	5506.15	17.67
							100	35.6	5398.51	17.85
118	1033 KCM ACSR 54/7 Curlew	119	11300	950.25	907.62	25.13	0	20.29	6755.27	13.47
							10	20.81	6587.93	13.64
							20	21.34	6425.61	13.81
							30	21.86	6273.4	13.98
							40	22.37	6129.04	14.15
							50	22.88	5992.75	14.31
							60	23.4	5860.92	14.47
							70	23.9	5737.47	14.62
							80	24.41	5618.75	14.78
							90	24.91	5506.15	14.93
							100	25.4	5398.51	15.07
119	1033 KCM ACSR 54/7 Curlew	120	11300	950.25	1088.41	9.36	0	29.18	6755.27	16.16
							10	29.93	6587.93	16.36
							20	30.68	6425.61	16.57
							30	31.43	6273.4	16.77
							40	32.17	6129.04	16.96
							50	32.91	5992.75	17.16
							60	33.65	5860.92	17.35
							70	34.37	5737.47	17.53
							80	35.1	5618.75	17.72
							90	35.82	5506.15	17.9
							100	36.54	5398.51	18.08
120	1033 KCM ACSR 54/7 Curlew	121	11300	950.25	680.74	93.23	0	11.52	6755.27	10.15
							10	11.81	6587.93	10.28
							20	12.11	6425.61	10.41
							30	12.4	6273.4	10.53
							40	12.69	6129.04	10.66
							50	12.98	5992.75	10.78
							60	13.27	5860.92	10.9
							70	13.56	5737.47	11.01
							80	13.85	5618.75	11.13
							90	14.13	5506.15	11.24
							100	14.41	5398.51	11.35
							0	19.66	6755.27	13.26
							10	20.16	6587.93	13.43
							20	20.67	6425.61	13.6

121	1033 KCM ACSR 54/7 Curlew	122	11300	950.25	893.33	30.43	30	21.18	6273.4	13.76
							40	21.68	6129.04	13.92
							50	22.17	5992.75	14.08
							60	22.67	5860.92	14.24
							70	23.16	5737.47	14.39
							80	23.65	5618.75	14.54
							90	24.13	5506.15	14.69
							100	24.62	5398.51	14.84
122	1033 KCM ACSR 54/7 Curlew	123	11300	950.25	1100.16	-154.58	0	30.11	6755.27	16.41
							10	30.87	6587.93	16.62
							20	31.66	6425.61	16.83
							30	32.43	6273.4	17.03
							40	33.19	6129.04	17.23
							50	33.95	5992.75	17.43
							60	34.71	5860.92	17.62
							70	35.46	5737.47	17.81
							80	36.21	5618.75	18
							90	36.96	5506.15	18.18
							100	37.7	5398.51	18.36
123	1033 KCM ACSR 54/7 Curlew	124	11300	950.25	672.67	-62.75	0	11.19	6755.27	10
							10	11.47	6587.93	10.13
							20	11.76	6425.61	10.26
							30	12.05	6273.4	10.38
							40	12.33	6129.04	10.5
							50	12.61	5992.75	10.62
							60	12.9	5860.92	10.74
							70	13.17	5737.47	10.86
							80	13.45	5618.75	10.97
							90	13.73	5506.15	11.08
							100	14	5398.51	11.19
124	1033 KCM ACSR 54/7 Curlew	125	11300	950.25	885.44	-25.14	0	19.31	6755.27	13.14
							10	19.81	6587.93	13.31
							20	20.31	6425.61	13.48
							30	20.8	6273.4	13.64
							40	21.29	6129.04	13.8
							50	21.78	5992.75	13.96
							60	22.27	5860.92	14.11
							70	22.75	5737.47	14.26
							80	23.23	5618.75	14.41
							90	23.7	5506.15	14.56
							100	24.18	5398.51	14.71

Section 7										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
125	1033 KCM ACSR 54/7 Curlew	126	11300	1095.53	565.69	-14.65	0	8.35	6374.91	8.64
							10	8.51	6256.04	8.72
							20	8.67	6140.48	8.81
							30	8.83	6030.78	8.89
							40	8.99	5924.59	8.97
							50	9.14	5824.49	9.04
							60	9.29	5728.08	9.12
							70	9.45	5634.16	9.19
							80	9.6	5544.08	9.27
							90	9.75	5459.18	9.34
							100	9.9	5375.69	9.41
126	1033 KCM ACSR 54/7 Curlew	127	11300	1095.53	829.25	0.76	0	17.94	6374.91	12.67
							10	18.29	6256.04	12.79
							20	18.63	6140.48	12.91
							30	18.97	6030.78	13.03
							40	19.31	5924.59	13.14
							50	19.64	5824.49	13.25
							60	19.97	5728.08	13.37
							70	20.31	5634.16	13.48
							80	20.64	5544.08	13.59
							90	20.96	5459.18	13.69
							100	21.29	5375.69	13.8
127	1033 KCM ACSR 54/7 Curlew	128	11300	1095.53	641.37	25.66	0	10.74	6374.91	9.8
							10	10.94	6256.04	9.89
							20	11.15	6140.48	9.99
							30	11.35	6030.78	10.08
							40	11.56	5924.59	10.17
							50	11.76	5824.49	10.25
							60	11.95	5728.08	10.34
							70	12.15	5634.16	10.43
							80	12.35	5544.08	10.51
							90	12.54	5459.18	10.59
							100	12.74	5375.69	10.67
128	1033 KCM ACSR 54/7 Curlew	129	11300	1095.53	1396.75	111.99	0	51.13	6374.91	21.39
							10	52.11	6256.04	21.59
							20	53.09	6140.48	21.79
							30	54.06	6030.78	21.99
							40	55.03	5924.59	22.19
							50	55.98	5824.49	22.38
							60	56.93	5728.08	22.57
							70	57.88	5634.16	22.75
							80	58.83	5544.08	22.94
							90	59.74	5459.18	23.12
							100	60.68	5375.69	23.3
129	1033 KCM ACSR 54/7 Curlew	130	11300	1095.53	1344.5	151.97	0	47.52	6374.91	20.62
							10	48.42	6256.04	20.81
							20	49.34	6140.48	21.01
							30	50.24	6030.78	21.2
							40	51.14	5924.59	21.39
							50	52.03	5824.49	21.57
							60	52.9	5728.08	21.75
							70	53.79	5634.16	21.93
							80	54.67	5544.08	22.11

							90	55.52	5459.18	22.28
							100	56.39	5375.69	22.46
130	1033 KCM ACSR 54/7 Curlew	131	11300	1095.53	769.68	-37.62	0	15.48	6374.91	11.77
							10	15.77	6256.04	11.88
							20	16.07	6140.48	11.99
							30	16.36	6030.78	12.1
							40	16.65	5924.59	12.2
							50	16.94	5824.49	12.31
							60	17.23	5728.08	12.41
							70	17.51	5634.16	12.52
							80	17.8	5544.08	12.62
							90	18.08	5459.18	12.72
							100	18.36	5375.69	12.81
131	1033 KCM ACSR 54/7 Curlew	132	11300	1095.53	1276.95	-11.55	0	42.59	6374.91	19.52
							10	43.4	6256.04	19.7
							20	44.22	6140.48	19.89
							30	45.03	6030.78	20.07
							40	45.84	5924.59	20.25
							50	46.63	5824.49	20.42
							60	47.41	5728.08	20.59
							70	48.21	5634.16	20.77
							80	48.99	5544.08	20.93
							90	49.76	5459.18	21.1
							100	50.54	5375.69	21.26
132	1033 KCM ACSR 54/7 Curlew	133	11300	1095.53	758.53	39	0	15.03	6374.91	11.6
							10	15.32	6256.04	11.71
							20	15.61	6140.48	11.82
							30	15.89	6030.78	11.92
							40	16.18	5924.59	12.03
							50	16.45	5824.49	12.13
							60	16.73	5728.08	12.23
							70	17.01	5634.16	12.34
							80	17.29	5544.08	12.44
							90	17.56	5459.18	12.53
							100	17.83	5375.69	12.63

Section 8

Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
133	1033 KCM ACSR 54/7 Curlew	134	11300	921.31	921.34	-7.75	0	20.6	6854.91	13.57
							10	21.17	6671.36	13.76
							20	21.73	6499.9	13.94
							30	22.29	6335.92	14.12
							40	22.85	6182.09	14.3
							50	23.41	6033.69	14.47
							60	23.96	5895.86	14.64
							70	24.51	5763.8	14.81
							80	25.06	5637.62	14.97
							90	25.61	5517.48	15.13
							100	26.15	5403.48	15.29

Section 9

Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
134	1033 KCM ACSR 54/7 Curlew	135	11300	917.67	595.69	-126.04	0	8.78	6867.05	8.86
							10	9.02	6686.02	8.98
							20	9.27	6509.78	9.1
							30	9.5	6345.88	9.22
							40	9.74	6189.65	9.34
							50	9.98	6041.3	9.45
							60	10.22	5901.01	9.56
							70	10.46	5766.45	9.67
							80	10.69	5640.3	9.78
							90	10.93	5520.17	9.89
							100	11.16	5406.19	9.99
135	1033 KCM ACSR 54/7 Curlew	136	11300	917.67	727.84	-89.55	0	12.93	6867.05	10.75
							10	13.28	6686.02	10.9
							20	13.64	6509.78	11.04
							30	13.99	6345.88	11.19
							40	14.34	6189.65	11.33
							50	14.7	6041.3	11.46
							60	15.05	5901.01	11.6
							70	15.4	5766.45	11.74
							80	15.74	5640.3	11.87
							90	16.08	5520.17	11.99
							100	16.42	5406.19	12.12
136	1033 KCM ACSR 54/7 Curlew	137	11300	917.67	743.95	-38.35	0	13.42	6867.05	10.96
							10	13.79	6686.02	11.1
							20	14.16	6509.78	11.25
							30	14.53	6345.88	11.4
							40	14.89	6189.65	11.54
							50	15.26	6041.3	11.68
							60	15.62	5901.01	11.82
							70	15.99	5766.45	11.96
							80	16.35	5640.3	12.09
							90	16.7	5520.17	12.22
							100	17.05	5406.19	12.35
137	1033 KCM ACSR 54/7 Curlew	138	11300	917.67	485.83	-10.18	0	5.72	6867.05	7.15
							10	5.87	6686.02	7.25
							20	6.03	6509.78	7.34
							30	6.19	6345.88	7.44
							40	6.34	6189.65	7.53
							50	6.5	6041.3	7.62
							60	6.65	5901.01	7.71
							70	6.81	5766.45	7.8
							80	6.96	5640.3	7.89
							90	7.11	5520.17	7.98
							100	7.26	5406.19	8.06

138	1033 KCM ACSR 54/7 Curlew	139	11300	917.67	449.38	0.98	0	4.89	6867.05	6.61
							10	5.02	6686.02	6.7
							20	5.16	6509.78	6.79
							30	5.29	6345.88	6.88
							40	5.43	6189.65	6.97
							50	5.56	6041.3	7.05
							60	5.69	5901.01	7.13
							70	5.82	5766.45	7.22
							80	5.95	5640.3	7.3
							90	6.08	5520.17	7.38
							100	6.21	5406.19	7.45
139	1033 KCM ACSR 54/7 Curlew	140	11300	917.67	761.51	-0.72	0	14.05	6867.05	11.21
							10	14.43	6686.02	11.36
							20	14.82	6509.78	11.51
							30	15.2	6345.88	11.66
							40	15.58	6189.65	11.81
							50	15.97	6041.3	11.95
							60	16.35	5901.01	12.09
							70	16.73	5766.45	12.23
							80	17.1	5640.3	12.37
							90	17.48	5520.17	12.5
							100	17.85	5406.19	12.63
140	1033 KCM ACSR 54/7 Curlew	141	11300	917.67	552.16	0.6	0	7.38	6867.05	8.13
							10	7.58	6686.02	8.24
							20	7.79	6509.78	8.35
							30	7.99	6345.88	8.45
							40	8.19	6189.65	8.56
							50	8.39	6041.3	8.66
							60	8.59	5901.01	8.77
							70	8.79	5766.45	8.87
							80	8.99	5640.3	8.97
							90	9.19	5520.17	9.06
							100	9.38	5406.19	9.16
141	1033 KCM ACSR 54/7 Curlew	142	11300	917.67	688.52	-0.62	0	11.48	6867.05	10.13
							10	11.79	6686.02	10.27
							20	12.11	6509.78	10.41
							30	12.42	6345.88	10.54
							40	12.74	6189.65	10.67
							50	13.05	6041.3	10.8
							60	13.36	5901.01	10.93
							70	13.67	5766.45	11.06
							80	13.98	5640.3	11.18
							90	14.29	5520.17	11.3
							100	14.59	5406.19	11.42
142	1033 KCM ACSR 54/7 Curlew	143	11300	917.67	669.5	1.08	0	10.86	6867.05	9.85
							10	11.15	6686.02	9.99
							20	11.45	6509.78	10.12
							30	11.75	6345.88	10.25
							40	12.04	6189.65	10.38
							50	12.34	6041.3	10.51
							60	12.63	5901.01	10.63
							70	12.93	5766.45	10.75
							80	13.22	5640.3	10.87
							90	13.51	5520.17	10.99
							100	13.79	5406.19	11.11
143	1033 KCM ACSR 54/7 Curlew	144	11300	917.67	938.75	56.15	0	21.39	6867.05	13.83
							10	21.97	6686.02	14.02
							20	22.56	6509.78	14.21
							30	23.15	6345.88	14.39
							40	23.73	6189.65	14.57
							50	24.32	6041.3	14.75
							60	24.89	5901.01	14.92
							70	25.48	5766.45	15.1
							80	26.05	5640.3	15.26
							90	26.62	5520.17	15.43
							100	27.18	5406.19	15.59
144	1033 KCM ACSR 54/7 Curlew	145	11300	917.67	698.09	-49.93	0	11.83	6867.05	10.29
							10	12.15	6686.02	10.43
							20	12.48	6509.78	10.57
							30	12.81	6345.88	10.7
							40	13.13	6189.65	10.84
							50	13.45	6041.3	10.97
							60	13.77	5901.01	11.1
							70	14.09	5766.45	11.23
							80	14.41	5640.3	11.35
							90	14.72	5520.17	11.48
							100	15.03	5406.19	11.6
145	1033 KCM ACSR 54/7 Curlew	146	11300	917.67	676.01	-2.2	0	11.07	6867.05	9.95
							10	11.37	6686.02	10.08
							20	11.68	6509.78	10.22
							30	11.98	6345.88	10.35
							40	12.28	6189.65	10.48
							50	12.58	6041.3	10.61
							60	12.88	5901.01	10.73
							70	13.18	5766.45	10.86
							80	13.48	5640.3	10.98
							90	13.77	5520.17	11.1
							100	14.06	5406.19	11.21
146	1033 KCM ACSR 54/7 Curlew	147	11300	917.67	800.46	7.42	0	15.52	6867.05	11.78
							10	15.94	6686.02	11.94
							20	16.37	6509.78	12.1
							30	16.8	6345.88	12.26
							40	17.22	6189.65	12.41
							50	17.64	6041.3	12.56
							60	18.06	5901.01	12.71
							70	18.49	5766.45	12.86
							80	18.9	5640.3	13
							90	19.31	5520.17	13.14

							100	19.72	5406.19	13.28
147	1033 KCM ACSR 54/7 Curlew	148	11300	917.67	568.71	19.9	0	7.84	6867.05	8.37
							10	8.05	6686.02	8.49
							20	8.27	6509.78	8.6
							30	8.48	6345.88	8.71
							40	8.7	6189.65	8.82
							50	8.91	6041.3	8.93
							60	9.12	5901.01	9.03
							70	9.33	5766.45	9.14
							80	9.54	5640.3	9.24
							90	9.75	5520.17	9.34
							100	9.96	5406.19	9.44
148	1033 KCM ACSR 54/7 Curlew	149	11300	917.67	1102.45	95.18	0	29.56	6867.05	16.26
							10	30.36	6686.02	16.48
							20	31.19	6509.78	16.7
							30	31.99	6345.88	16.92
							40	32.8	6189.65	17.13
							50	33.61	6041.3	17.34
							60	34.41	5901.01	17.54
							70	35.22	5766.45	17.75
							80	36.01	5640.3	17.95
							90	36.79	5520.17	18.14
							100	37.57	5406.19	18.33
149	1033 KCM ACSR 54/7 Curlew	150	11300	917.67	556.11	47.84	0	7.52	6867.05	8.2
							10	7.72	6686.02	8.31
							20	7.93	6509.78	8.42
							30	8.13	6345.88	8.53
							40	8.34	6189.65	8.64
							50	8.54	6041.3	8.74
							60	8.75	5901.01	8.85
							70	8.95	5766.45	8.95
							80	9.15	5640.3	9.05
							90	9.35	5520.17	9.15
							100	9.55	5406.19	9.24
150	1033 KCM ACSR 54/7 Curlew	151	11300	917.67	1028.17	11.83	0	25.62	6867.05	15.14
							10	26.31	6686.02	15.34
							20	27.02	6509.78	15.55
							30	27.72	6345.88	15.75
							40	28.42	6189.65	15.94
							50	29.12	6041.3	16.14
							60	29.82	5901.01	16.33
							70	30.52	5766.45	16.52
							80	31.2	5640.3	16.71
							90	31.88	5520.17	16.89
							100	32.55	5406.19	17.06
151	1033 KCM ACSR 54/7 Curlew	152	11300	917.67	1049.8	34.91	0	26.72	6867.05	15.46
							10	27.44	6686.02	15.67
							20	28.19	6509.78	15.88
							30	28.92	6345.88	16.08
							40	29.65	6189.65	16.28
							50	30.38	6041.3	16.48
							60	31.1	5901.01	16.68
							70	31.83	5766.45	16.87
							80	32.54	5640.3	17.06
							90	33.25	5520.17	17.25
							100	33.96	5406.19	17.43
152	1033 KCM ACSR 54/7 Curlew	153	11300	917.67	1496.86	-179.93	0	54.73	6867.05	22.12
							10	56.21	6686.02	22.42
							20	57.74	6509.78	22.73
							30	59.24	6345.88	23.02
							40	60.74	6189.65	23.31
							50	62.24	6041.3	23.59
							60	63.73	5901.01	23.87
							70	65.22	5766.45	24.15
							80	66.69	5640.3	24.42
							90	68.14	5520.17	24.69
							100	69.59	5406.19	24.95
153	1033 KCM ACSR 54/7 Curlew	154	11300	917.67	1310.14	105.57	0	41.74	6867.05	19.32
							10	42.88	6686.02	19.58
							20	44.04	6509.78	19.85
							30	45.18	6345.88	20.1
							40	46.33	6189.65	20.36
							50	47.47	6041.3	20.61
							60	48.6	5901.01	20.85
							70	49.74	5766.45	21.09
							80	50.86	5640.3	21.33
							90	51.97	5520.17	21.56
							100	53.07	5406.19	21.79
154	1033 KCM ACSR 54/7 Curlew	155	11300	917.67	873.9	52.44	0	18.53	6867.05	12.88
							10	19.04	6686.02	13.05
							20	19.55	6509.78	13.22
							30	20.06	6345.88	13.39
							40	20.56	6189.65	13.56
							50	21.07	6041.3	13.73
							60	21.57	5901.01	13.89
							70	22.08	5766.45	14.05
							80	22.57	5640.3	14.21
							90	23.06	5520.17	14.36
							100	23.55	5406.19	14.51
155	1033 KCM ACSR 54/7 Curlew	156	11300	917.67	887.76	13.09	0	19.09	6867.05	13.07
							10	19.61	6686.02	13.24
							20	20.14	6509.78	13.42
							30	20.66	6345.88	13.6
							40	21.19	6189.65	13.77
							50	21.71	6041.3	13.93
							60	22.22	5901.01	14.1
							70	22.74	5766.45	14.26

							80	23.25	5640.3	14.42
							90	23.76	5520.17	14.58
							100	24.26	5406.19	14.73
156	1033 KCM ACSR 54/7 Curlew	157	11300	917.67	542.9	1.43	0	7.14	6867.05	7.99
							10	7.33	6686.02	8.1
							20	7.53	6509.78	8.21
							30	7.72	6345.88	8.31
							40	7.92	6189.65	8.42
							50	8.11	6041.3	8.52
							60	8.31	5901.01	8.62
							70	8.5	5766.45	8.72
							80	8.69	5640.3	8.82
							90	8.88	5520.17	8.91
							100	9.07	5406.19	9.01
157	1033 KCM ACSR 54/7 Curlew	158	11300	917.67	858.92	-16.65	0	17.87	6867.05	12.64
							10	18.36	6686.02	12.81
							20	18.86	6509.78	12.99
							30	19.34	6345.88	13.15
							40	19.83	6189.65	13.32
							50	20.32	6041.3	13.48
							60	20.8	5901.01	13.64
							70	21.29	5766.45	13.8
							80	21.77	5640.3	13.95
							90	22.24	5520.17	14.1
							100	22.71	5406.19	14.25

SW Stringing Table

Section 1 (Facing Bay Right-Side Attachment)										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
Vigo Bay	7#10 Alumoweld	89	900	265.1	271.46	59.83	0	10.96	142.01	9.9
							10	11.06	140.76	9.95
							20	11.15	139.62	9.99
							30	11.25	138.36	10.03
							40	11.35	137.11	10.08
							50	11.44	136.07	10.12
							60	11.54	134.93	10.16
							70	11.64	133.78	10.2
							80	11.73	132.75	10.24
							90	11.82	131.71	10.28
							100	11.91	130.68	10.32

Section 2 (Facing Bay Left-Side Attachment)										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
Vigo Bay	7#10 Alumoweld	89	900	264.88	271.42	60.66	0	10.95	142.13	9.9
							10	11.05	140.87	9.94
							20	11.15	139.62	9.99
							30	11.25	138.36	10.03
							40	11.35	137.22	10.07
							50	11.44	136.07	10.12
							60	11.53	135.04	10.16
							70	11.64	133.78	10.2
							80	11.73	132.75	10.24
							90	11.82	131.72	10.28
							100	11.92	130.68	10.32

Section 3										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
89	7#10 Alumoweld	90	3500	783.9	715.26	-17.29	0	9.01	1169.45	8.98
							10	9.34	1128.02	9.14
							20	9.68	1088.53	9.31
							30	10.02	1051.92	9.47
							40	10.36	1017.23	9.63
							50	10.7	984.47	9.79
							60	11.05	954.09	9.94
							70	11.39	925.62	10.09
							80	11.73	898.59	10.24
							90	12.08	872.53	10.39
							100	12.42	848.83	10.54
90	7#10 Alumoweld	91	3500	783.9	487.25	-10.28	0	4.18	1169.45	6.12
							10	4.33	1128.02	6.23
							20	4.49	1088.53	6.34
							30	4.65	1051.92	6.45
							40	4.81	1017.23	6.56
							50	4.97	984.47	6.67
							60	5.12	954.09	6.77
							70	5.28	925.62	6.87
							80	5.44	898.59	6.98
							90	5.6	872.53	7.08
							100	5.76	848.83	7.18
91	7#10 Alumoweld	92	3500	783.9	877.18	2.32	0	13.55	1169.45	11.01
							10	14.05	1128.02	11.21
							20	14.56	1088.53	11.41
							30	15.07	1051.92	11.61
							40	15.58	1017.23	11.8
							50	16.1	984.47	12
							60	16.61	954.09	12.19
							70	17.12	925.62	12.38
							80	17.64	898.59	12.56
							90	18.17	872.53	12.75
							100	18.67	848.83	12.92
92	7#10 Alumoweld	93	3500	783.9	482.75	-4.63	0	4.1	1169.45	6.06
							10	4.25	1128.02	6.17
							20	4.41	1088.53	6.28
							30	4.56	1051.92	6.39
							40	4.72	1017.23	6.5
							50	4.87	984.47	6.6
							60	5.03	954.09	6.71
							70	5.18	925.62	6.81
							80	5.34	898.59	6.91
							90	5.5	872.53	7.01
							100	5.65	848.83	7.11
93	7#10 Alumoweld	94	3500	783.9	733.01	16.76	0	9.46	1169.45	9.2
							10	9.81	1128.02	9.37
							20	10.17	1088.53	9.54
							30	10.52	1051.92	9.7
							40	10.88	1017.23	9.86
							50	11.24	984.47	10.03
							60	11.6	954.09	10.19
							70	11.96	925.62	10.34
							80	12.32	898.59	10.5
							90	12.69	872.53	10.65
							100	13.04	848.83	10.8
							0	4.8	1169.45	6.55

94	7#10 Alumoweld	95	3500	783.9	521.67	29.73	10	4.98	1128.02	6.67
							20	5.16	1088.53	6.79
							30	5.34	1051.92	6.91
							40	5.52	1017.23	7.02
							50	5.7	984.47	7.14
							60	5.88	954.09	7.25
							70	6.06	925.62	7.36
							80	6.25	898.59	7.47
							90	6.43	872.53	7.59
							100	6.61	848.83	7.69
95	7#10 Alumoweld	96	3500	783.9	937.11	-57.31	0	15.49	1169.45	11.77
							10	16.06	1128.02	11.99
							20	16.65	1088.53	12.2
							30	17.23	1051.92	12.41
							40	17.81	1017.23	12.62
							50	18.41	984.47	12.83
							60	19	954.09	13.03
							70	19.58	925.62	13.23
							80	20.17	898.59	13.43
							90	20.77	872.53	13.63
							100	21.35	848.83	13.82
96	7#10 Alumoweld	97	3500	783.9	454.37	4.09	0	3.63	1169.45	5.7
							10	3.77	1128.02	5.81
							20	3.91	1088.53	5.91
							30	4.04	1051.92	6.01
							40	4.18	1017.23	6.11
							50	4.32	984.47	6.21
							60	4.46	954.09	6.31
							70	4.59	925.62	6.41
							80	4.73	898.59	6.5
							90	4.87	872.53	6.6
							100	5.01	848.83	6.69
97	7#10 Alumoweld	98	3500	783.9	338.95	-9.97	0	2.02	1169.45	4.25
							10	2.1	1128.02	4.33
							20	2.17	1088.53	4.41
							30	2.25	1051.92	4.49
							40	2.33	1017.23	4.56
							50	2.4	984.47	4.64
							60	2.48	954.09	4.71
							70	2.56	925.62	4.78
							80	2.63	898.59	4.85
							90	2.71	872.53	4.93
							100	2.79	848.83	4.99
98	7#10 Alumoweld	99	3500	783.9	929.12	-6.04	0	15.2	1169.45	11.66
							10	15.76	1128.02	11.87
							20	16.33	1088.53	12.09
							30	16.9	1051.92	12.3
							40	17.48	1017.23	12.5
							50	18.06	984.47	12.71
							60	18.64	954.09	12.91
							70	19.21	925.62	13.11
							80	19.79	898.59	13.3
							90	20.38	872.53	13.5
							100	20.95	848.83	13.69
99	7#10 Alumoweld	100	3500	783.9	348.05	-9.25	0	2.13	1169.45	4.37
							10	2.21	1128.02	4.45
							20	2.29	1088.53	4.53
							30	2.37	1051.92	4.61
							40	2.45	1017.23	4.68
							50	2.53	984.47	4.76
							60	2.62	954.09	4.84
							70	2.7	925.62	4.91
							80	2.78	898.59	4.98
							90	2.86	872.53	5.06
							100	2.94	848.83	5.13
100	7#10 Alumoweld	101	3500	783.9	577.45	-1.93	0	5.87	1169.45	7.25
							10	6.09	1128.02	7.38
							20	6.31	1088.53	7.51
							30	6.53	1051.92	7.64
							40	6.75	1017.23	7.77
							50	6.97	984.47	7.9
							60	7.2	954.09	8.02
							70	7.42	925.62	8.15
							80	7.64	898.59	8.27
							90	7.87	872.53	8.39
							100	8.09	848.83	8.51
101	7#10 Alumoweld	102	3500	783.9	1034.32	85.91	0	18.91	1169.45	13
							10	19.6	1128.02	13.24
							20	20.31	1088.53	13.48
							30	21.02	1051.92	13.71
							40	21.74	1017.23	13.94
							50	22.46	984.47	14.17
							60	23.18	954.09	14.4
							70	23.89	925.62	14.62
							80	24.61	898.59	14.84
							90	25.35	872.53	15.06
							100	26.06	848.83	15.27
							0	5.83	1169.45	7.22
							10	6.04	1128.02	7.35
							20	6.26	1088.53	7.48
							30	6.48	1051.92	7.61

102	7#10 Alumoweld	103	3500	783.9	575.1	24.49	40	6.7	1017.23	7.74
							50	6.92	984.47	7.87
							60	7.14	954.09	7.99
							70	7.36	925.62	8.12
							80	7.59	898.59	8.24
							90	7.81	872.53	8.36
							100	8.03	848.83	8.48
103	7#10 Alumoweld	104	3500	783.9	1027.96	20.79	0	18.61	1169.45	12.9
							10	19.3	1128.02	13.14
							20	20	1088.53	13.37
							30	20.7	1051.92	13.61
							40	21.4	1017.23	13.84
							50	22.12	984.47	14.06
							60	22.82	954.09	14.29
							70	23.52	925.62	14.51
							80	24.23	898.59	14.72
							90	24.96	872.53	14.94
							100	25.66	848.83	15.15

Section 4										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
104	7#10 Alumoweld	105	3500	872.03	1372.78	-91.31	0	40.55	959.98	19.04
							10	41.65	934.77	19.3
							20	42.74	910.99	19.55
							30	43.84	888.17	19.8
							40	44.92	866.78	20.05
							50	45.99	846.8	20.28
							60	47.05	827.78	20.51
							70	48.13	809.24	20.75
							80	49.17	792.11	20.97
							90	50.2	775.92	21.19
							100	51.24	760.22	21.41
105	7#10 Alumoweld	106	3500	872.03	698.03	11.28	0	10.45	959.98	9.67
							10	10.74	934.77	9.8
							20	11.02	910.99	9.93
							30	11.3	888.17	10.05
							40	11.58	866.78	10.18
							50	11.85	846.8	10.3
							60	12.12	827.78	10.41
							70	12.4	809.24	10.53
							80	12.67	792.11	10.65
							90	12.94	775.92	10.76
							100	13.2	760.22	10.87
106	7#10 Alumoweld	107	3500	872.03	494.75	18.22	0	5.25	959.98	6.86
							10	5.4	934.77	6.95
							20	5.54	910.99	7.04
							30	5.68	888.17	7.13
							40	5.82	866.78	7.21
							50	5.96	846.8	7.3
							60	6.09	827.78	7.38
							70	6.23	809.24	7.47
							80	6.37	792.11	7.55
							90	6.5	775.92	7.63
							100	6.64	760.22	7.7
107	7#10 Alumoweld	108	3500	872.03	745.29	-38.16	0	11.93	959.98	10.33
							10	12.25	934.77	10.47
							20	12.57	910.99	10.6
							30	12.9	888.17	10.74
							40	13.22	866.78	10.87
							50	13.53	846.8	11
							60	13.84	827.78	11.13
							70	14.16	809.24	11.25
							80	14.46	792.11	11.37
							90	14.76	775.92	11.49
							100	15.07	760.22	11.61
108	7#10 Alumoweld	109	3500	872.03	604.02	1.33	0	7.83	959.98	8.37
							10	8.04	934.77	8.48
							20	8.25	910.99	8.59
							30	8.46	888.17	8.7
							40	8.67	866.78	8.81
							50	8.87	846.8	8.91
							60	9.08	827.78	9.01
							70	9.28	809.24	9.11
							80	9.49	792.11	9.21
							90	9.68	775.92	9.31
							100	9.88	760.22	9.4
109	7#10 Alumoweld	110	3500	872.03	606.57	6.2	0	7.89	959.98	8.4
							10	8.11	934.77	8.51
							20	8.32	910.99	8.63
							30	8.53	888.17	8.74
							40	8.74	866.78	8.84
							50	8.95	846.8	8.95
							60	9.15	827.78	9.05
							70	9.36	809.24	9.15
							80	9.57	792.11	9.25
							90	9.77	775.92	9.35
							100	9.97	760.22	9.44
							0	3.97	959.98	5.96
							10	4.07	934.77	6.04

110	7#10 Alumoweld	111	3500	872.03	429.98	-1.04	20	4.18	910.99	6.11
							30	4.29	888.17	6.19
							40	4.39	866.78	6.27
							50	4.5	846.8	6.34
							60	4.6	827.78	6.41
							70	4.7	809.24	6.49
							80	4.81	792.11	6.56
							90	4.91	775.92	6.62
							100	5.01	760.22	6.69
111	7#10 Alumoweld	112	3500	872.03	667.53	9.32	0	9.56	959.98	9.25
							10	9.82	934.77	9.37
							20	10.07	910.99	9.49
							30	10.33	888.17	9.61
							40	10.59	866.78	9.73
							50	10.84	846.8	9.85
							60	11.09	827.78	9.96
							70	11.34	809.24	10.07
							80	11.59	792.11	10.18
							90	11.83	775.92	10.29
							100	12.07	760.22	10.39

Section 5

Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
112	7#10 Alumoweld	113	2300	472.92	474.48	38.6	0	7.71	603.64	8.3
							10	8	581.73	8.46
							20	8.28	561.68	8.61
							30	8.57	543.03	8.75
							40	8.85	525.78	8.9
							50	9.13	509.45	9.04
							60	9.4	494.97	9.17
							70	9.67	480.96	9.3
							80	9.94	468.09	9.43
							90	10.2	456.15	9.55
							100	10.46	444.66	9.67

Section 6

Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
113	7#10 Alumoweld	114	3500	887.44	1035.33	142.38	0	23.88	933.25	14.62
							10	24.5	909.93	14.8
							20	25.1	888.05	14.98
							30	25.71	867.12	15.16
							40	26.3	847.61	15.34
							50	26.89	829.05	15.51
							60	27.49	810.97	15.68
							70	28.07	794.31	15.85
							80	28.65	778.12	16.01
							90	29.23	762.87	16.17
							100	29.79	748.57	16.32
114	7#10 Alumoweld	115	3500	887.44	1025.32	-22.27	0	23.21	933.25	14.41
							10	23.81	909.93	14.59
							20	24.4	888.05	14.77
							30	24.99	867.12	14.95
							40	25.56	847.61	15.12
							50	26.13	829.05	15.29
							60	26.72	810.97	15.46
							70	27.28	794.31	15.62
							80	27.85	778.12	15.78
							90	28.41	762.87	15.94
							100	28.95	748.57	16.09
115	7#10 Alumoweld	116	3500	887.44	505.16	-62.6	0	5.67	933.25	7.12
							10	5.82	909.93	7.21
							20	5.96	888.05	7.3
							30	6.11	867.12	7.39
							40	6.25	847.61	7.47
							50	6.39	829.05	7.56
							60	6.53	810.97	7.64
							70	6.67	794.31	7.72
							80	6.81	778.12	7.8
							90	6.94	762.87	7.88
							100	7.07	748.57	7.95
116	7#10 Alumoweld	117	3500	887.44	552.45	-83.98	0	6.81	933.25	7.81
							10	6.99	909.93	7.9
							20	7.16	888.05	8
							30	7.33	867.12	8.1
							40	7.5	847.61	8.19
							50	7.67	829.05	8.28
							60	7.84	810.97	8.37
							70	8	794.31	8.46
							80	8.17	778.12	8.55
							90	8.33	762.87	8.63
							100	8.49	748.57	8.72

Section 7

Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
							0	25.52	933.04	15.11

117	7#10 Alumoweld	118	3600	950.32	1074.37	55.66	10	26.11	912.06	15.28
							20	26.7	892.03	15.45
							30	27.27	873.43	15.62
							40	27.85	855.3	15.78
							50	28.42	838.13	15.94
							60	28.98	821.9	16.1
							70	29.55	806.15	16.26
							80	30.1	791.34	16.41
							90	30.66	777.01	16.56
							100	31.21	763.38	16.71
118	7#10 Alumoweld	119	3600	950.32	907.44	25.13	0	18.19	933.04	12.75
							10	18.61	912.06	12.9
							20	19.02	892.03	13.04
							30	19.43	873.43	13.18
							40	19.84	855.3	13.32
							50	20.25	838.13	13.46
							60	20.65	821.9	13.59
							70	21.05	806.15	13.72
							80	21.45	791.34	13.85
							90	21.84	777.01	13.98
							100	22.23	763.38	14.1
119	7#10 Alumoweld	120	3600	950.32	1088.41	9.36	0	26.16	933.04	15.3
							10	26.76	912.06	15.47
							20	27.36	892.03	15.64
							30	27.95	873.43	15.81
							40	28.54	855.3	15.98
							50	29.13	838.13	16.14
							60	29.7	821.9	16.3
							70	30.29	806.15	16.46
							80	30.85	791.34	16.61
							90	31.42	777.01	16.77
							100	31.99	763.38	16.91
120	7#10 Alumoweld	121	3600	950.32	680.8	93.23	0	10.33	933.04	9.61
							10	10.56	912.06	9.72
							20	10.8	892.03	9.83
							30	11.03	873.43	9.93
							40	11.26	855.3	10.04
							50	11.5	838.13	10.14
							60	11.72	821.9	10.24
							70	11.95	806.15	10.34
							80	12.18	791.34	10.44
							90	12.4	777.01	10.53
							100	12.62	763.38	10.63
121	7#10 Alumoweld	122	3600	950.32	893.39	30.43	0	17.63	933.04	12.56
							10	18.04	912.06	12.7
							20	18.44	892.03	12.84
							30	18.84	873.43	12.98
							40	19.23	855.3	13.12
							50	19.63	838.13	13.25
							60	20.02	821.9	13.38
							70	20.41	806.15	13.51
							80	20.79	791.34	13.64
							90	21.18	777.01	13.76
							100	21.55	763.38	13.88
122	7#10 Alumoweld	123	3600	950.32	1100.16	-154.58	0	26.99	933.04	15.54
							10	27.61	912.06	15.72
							20	28.23	892.03	15.89
							30	28.83	873.43	16.06
							40	29.45	855.3	16.23
							50	30.05	838.13	16.39
							60	30.65	821.9	16.56
							70	31.25	806.15	16.72
							80	31.83	791.34	16.87
							90	32.42	777.01	17.03
							100	33	763.38	17.18
123	7#10 Alumoweld	124	3600	950.32	672.67	-62.75	0	10.03	933.04	9.47
							10	10.26	912.06	9.58
							20	10.49	892.03	9.69
							30	10.72	873.43	9.79
							40	10.94	855.3	9.89
							50	11.17	838.13	9.99
							60	11.39	821.9	10.09
							70	11.61	806.15	10.19
							80	11.83	791.34	10.29
							90	12.05	777.01	10.38
							100	12.26	763.38	10.47
124	7#10 Alumoweld	125	3600	950.32	885.65	-28.83	0	17.33	933.04	12.45
							10	17.72	912.06	12.59
							20	18.12	892.03	12.73
							30	18.51	873.43	12.87
							40	18.9	855.3	13
							50	19.29	838.13	13.14
							60	19.67	821.9	13.26
							70	20.06	806.15	13.39
							80	20.43	791.34	13.52
							90	20.81	777.01	13.64
							100	21.18	763.38	13.76

Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
125	7#10 Alumoweld	126	3700	1095.54	565.88	-10.96	0	7.74	851.64	8.32
							10	7.87	838.19	8.39
							20	7.99	825.21	8.46
							30	8.12	812.7	8.52
							40	8.24	800.67	8.58
							50	8.36	789.1	8.65
							60	8.48	778.01	8.71
							70	8.6	767.16	8.77
							80	8.72	756.78	8.83
							90	8.83	746.87	8.89
							100	8.95	737.2	8.95
126	7#10 Alumoweld	127	3700	1095.54	829.25	0.76	0	16.63	851.64	12.2
							10	16.9	838.19	12.29
							20	17.17	825.21	12.39
							30	17.43	812.7	12.49
							40	17.69	800.67	12.58
							50	17.95	789.1	12.67
							60	18.21	778.01	12.76
							70	18.47	767.16	12.85
							80	18.72	756.78	12.94
							90	18.97	746.87	13.03
							100	19.22	737.2	13.11
127	7#10 Alumoweld	128	3700	1095.54	641.37	25.66	0	9.96	851.64	9.44
							10	10.12	838.19	9.51
							20	10.27	825.21	9.59
							30	10.43	812.7	9.66
							40	10.59	800.67	9.73
							50	10.74	789.1	9.8
							60	10.9	778.01	9.87
							70	11.05	767.16	9.94
							80	11.2	756.78	10.01
							90	11.35	746.87	10.08
							100	11.5	737.2	10.14
128	7#10 Alumoweld	129	3700	1095.54	1396.75	111.99	0	47.38	851.64	20.59
							10	48.15	838.19	20.75
							20	48.91	825.21	20.91
							30	49.66	812.7	21.08
							40	50.41	800.67	21.23
							50	51.15	789.1	21.39
							60	51.88	778.01	21.54
							70	52.62	767.16	21.69
							80	53.34	756.78	21.84
							90	54.06	746.87	21.99
							100	54.77	737.2	22.13
129	7#10 Alumoweld	130	3700	1095.54	1344.5	151.97	0	44.04	851.64	19.85
							10	44.75	838.19	20.01
							20	45.45	825.21	20.16
							30	46.15	812.7	20.32
							40	46.85	800.67	20.47
							50	47.54	789.1	20.62
							60	48.22	778.01	20.77
							70	48.9	767.16	20.91
							80	49.58	756.78	21.06
							90	50.24	746.87	21.2
							100	50.9	737.2	21.34
130	7#10 Alumoweld	131	3700	1095.54	769.68	-37.62	0	14.34	851.64	11.33
							10	14.57	838.19	11.42
							20	14.8	825.21	11.51
							30	15.03	812.7	11.6
							40	15.26	800.67	11.68
							50	15.48	789.1	11.77
							60	15.7	778.01	11.85
							70	15.93	767.16	11.93
							80	16.14	756.78	12.02
							90	16.36	746.87	12.1
							100	16.57	737.2	12.18
131	7#10 Alumoweld	132	3700	1095.54	1276.95	-11.55	0	39.47	851.64	18.79
							10	40.1	838.19	18.94
							20	40.74	825.21	19.09
							30	41.37	812.7	19.24
							40	41.99	800.67	19.38
							50	42.61	789.1	19.52
							60	43.22	778.01	19.66
							70	43.83	767.16	19.8
							80	44.43	756.78	19.94
							90	45.02	746.87	20.07
							100	45.62	737.2	20.2
132	7#10 Alumoweld	133	3700	1095.54	758.29	35.32	0	13.92	851.64	11.16
							10	14.15	838.19	11.25
							20	14.37	825.21	11.34
							30	14.59	812.7	11.42
							40	14.81	800.67	11.51
							50	15.03	789.1	11.59
							60	15.24	778.01	11.68
							70	15.46	767.16	11.76
							80	15.67	756.78	11.84
							90	15.88	746.87	11.92
							100	16.09	737.2	11.99

Section 9										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
133	7#10 Alumoweld	134	3500	925.18	925.21	-7.75	0	20.08	878.45	13.4
							10	20.52	859.39	13.55
							20	20.96	841.28	13.69
							30	21.4	824.12	13.84
							40	21.84	807.67	13.98
							50	22.26	792.17	14.11
							60	22.7	777.14	14.25
							70	23.12	763.05	14.38
							80	23.54	749.2	14.51
							90	23.96	736.3	14.64
							100	24.37	723.86	14.76

Section 10										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
134	7#10 Alumoweld	135	3500	917.73	599.83	-122.36	0	8.5	889.21	8.72
							10	8.69	869.68	8.82
							20	8.89	850.63	8.92
							30	9.08	832.53	9.01
							40	9.27	815.84	9.11
							50	9.46	799.63	9.2
							60	9.65	783.9	9.29
							70	9.83	769.34	9.38
							80	10.01	755.26	9.46
							90	10.19	741.89	9.55
							100	10.37	728.98	9.63
135	7#10 Alumoweld	136	3500	917.73	727.84	-89.55	0	12.36	889.21	10.52
							10	12.64	869.68	10.63
							20	12.92	850.63	10.75
							30	13.2	832.53	10.87
							40	13.47	815.84	10.98
							50	13.75	799.63	11.09
							60	14.02	783.9	11.2
							70	14.29	769.34	11.31
							80	14.56	755.26	11.41
							90	14.82	741.89	11.51
							100	15.08	728.98	11.61
136	7#10 Alumoweld	137	3500	917.73	743.95	-38.35	0	12.84	889.21	10.72
							10	13.12	869.68	10.83
							20	13.42	850.63	10.96
							30	13.71	832.53	11.07
							40	13.99	815.84	11.19
							50	14.28	799.63	11.3
							60	14.56	783.9	11.41
							70	14.84	769.34	11.52
							80	15.12	755.26	11.63
							90	15.39	741.89	11.73
							100	15.66	728.98	11.84
137	7#10 Alumoweld	138	3500	917.73	485.83	-10.18	0	5.47	889.21	6.99
							10	5.59	869.68	7.07
							20	5.71	850.63	7.15
							30	5.84	832.53	7.23
							40	5.96	815.84	7.3
							50	6.08	799.63	7.37
							60	6.2	783.9	7.45
							70	6.32	769.34	7.52
							80	6.44	755.26	7.59
							90	6.55	741.89	7.66
							100	6.67	728.98	7.72
138	7#10 Alumoweld	139	3500	917.73	449.38	0.98	0	4.68	889.21	6.47
							10	4.78	869.68	6.54
							20	4.89	850.63	6.61
							30	4.99	832.53	6.68
							40	5.1	815.84	6.75
							50	5.2	799.63	6.82
							60	5.3	783.9	6.89
							70	5.4	769.34	6.95
							80	5.51	755.26	7.02
							90	5.61	741.89	7.08
							100	5.7	728.98	7.14
139	7#10 Alumoweld	140	3500	917.73	761.51	-0.72	0	13.43	889.21	10.96
							10	13.73	869.68	11.08
							20	14.04	850.63	11.21
							30	14.35	832.53	11.33
							40	14.64	815.84	11.44
							50	14.94	799.63	11.56
							60	15.24	783.9	11.67
							70	15.53	769.34	11.78
							80	15.82	755.26	11.89
							90	16.1	741.89	12
							100	16.39	728.98	12.11
140	7#10 Alumoweld	141	3500	917.73	552.16	0.6	0	7.06	889.21	7.95
							10	7.22	869.68	8.04
							20	7.38	850.63	8.13
							30	7.54	832.53	8.21
							40	7.7	815.84	8.3
							50	7.85	799.63	8.38

							60	8.01	783.9	8.46
							70	8.16	769.34	8.54
							80	8.31	755.26	8.62
							90	8.46	741.89	8.7
							100	8.61	728.98	8.78
							0	10.98	889.21	9.91
							10	11.23	869.68	10.02
							20	11.48	850.63	10.13
							30	11.73	832.53	10.24
							40	11.97	815.84	10.35
141	7#10 Alumoweld	142	3500	917.73	688.52	-0.62	50	12.21	799.63	10.45
							60	12.46	783.9	10.55
							70	12.69	769.34	10.65
							80	12.93	755.26	10.75
							90	13.16	741.89	10.85
							100	13.39	728.98	10.95
							0	10.38	889.21	9.64
							10	10.61	869.68	9.74
							20	10.85	850.63	9.85
							30	11.09	832.53	9.96
							40	11.32	815.84	10.06
142	7#10 Alumoweld	143	3500	917.73	669.5	1.08	50	11.54	799.63	10.16
							60	11.78	783.9	10.26
							70	12	769.34	10.36
							80	12.22	755.26	10.46
							90	12.44	741.89	10.55
							100	12.66	728.98	10.64
							0	20.45	889.21	13.53
							10	20.91	869.68	13.68
							20	21.38	850.63	13.83
							30	21.85	832.53	13.98
							40	22.29	815.84	14.12
143	7#10 Alumoweld	144	3500	917.73	938.75	56.15	50	22.75	799.63	14.26
							60	23.2	783.9	14.41
							70	23.64	769.34	14.54
							80	24.09	755.26	14.68
							90	24.52	741.89	14.81
							100	24.96	728.98	14.94
							0	11.32	889.21	10.06
							10	11.57	869.68	10.17
							20	11.83	850.63	10.29
							30	12.09	832.53	10.4
							40	12.33	815.84	10.5
144	7#10 Alumoweld	145	3500	917.73	698.09	-49.93	50	12.58	799.63	10.61
							60	12.84	783.9	10.72
							70	13.08	769.34	10.82
							80	13.32	755.26	10.92
							90	13.56	741.89	11.01
							100	13.8	728.98	11.11
							0	10.58	889.21	9.73
							10	10.82	869.68	9.84
							20	11.06	850.63	9.95
							30	11.31	832.53	10.06
							40	11.54	815.84	10.16
145	7#10 Alumoweld	146	3500	917.73	676.01	-2.2	50	11.77	799.63	10.26
							60	12.01	783.9	10.36
							70	12.23	769.34	10.46
							80	12.46	755.26	10.56
							90	12.69	741.89	10.65
							100	12.91	728.98	10.75
							0	14.84	889.21	11.52
							10	15.18	869.68	11.65
							20	15.52	850.63	11.78
							30	15.85	832.53	11.91
							40	16.18	815.84	12.03
146	7#10 Alumoweld	147	3500	917.73	800.46	7.42	50	16.51	799.63	12.15
							60	16.84	783.9	12.27
							70	17.16	769.34	12.39
							80	17.48	755.26	12.5
							90	17.79	741.89	12.62
							100	18.11	728.98	12.73
							0	7.5	889.21	8.19
							10	7.67	869.68	8.28
							20	7.84	850.63	8.38
							30	8.01	832.53	8.47
							40	8.18	815.84	8.55
147	7#10 Alumoweld	148	3500	917.73	568.97	19.9	50	8.34	799.63	8.64
							60	8.51	783.9	8.72
							70	8.67	769.34	8.81
							80	8.83	755.26	8.89
							90	8.99	741.89	8.97
							100	9.15	728.98	9.05
							0	28.27	889.21	15.9
							10	28.9	869.68	16.08
							20	29.55	850.63	16.26
							30	30.2	832.53	16.43
							40	30.82	815.84	16.6
148	7#10 Alumoweld	149	3500	917.73	1102.45	95.18	50	31.44	799.63	16.77
							60	32.07	783.9	16.94
							70	32.68	769.34	17.1
							80	33.29	755.26	17.26

							90	33.89	741.89	17.41
							100	34.5	728.98	17.57
							0	7.18	889.21	8.01
							10	7.34	869.68	8.1
							20	7.51	850.63	8.19
							30	7.67	832.53	8.28
							40	7.83	815.84	8.37
149	7#10 Alumoweld	150	3500	917.73	555.84	47.84	50	7.99	799.63	8.45
							60	8.15	783.9	8.54
							70	8.3	769.34	8.62
							80	8.46	755.26	8.7
							90	8.61	741.89	8.77
							100	8.76	728.98	8.85
							0	24.5	889.21	14.8
							10	25.05	869.68	14.97
							20	25.61	850.63	15.13
							30	26.17	832.53	15.3
							40	26.7	815.84	15.45
150	7#10 Alumoweld	151	3500	917.73	1028.17	11.83	50	27.24	799.63	15.61
							60	27.79	783.9	15.77
							70	28.32	769.34	15.92
							80	28.85	755.26	16.06
							90	29.37	741.89	16.21
							100	29.89	728.98	16.35
							0	25.55	889.21	15.12
							10	26.13	869.68	15.29
							20	26.71	850.63	15.46
							30	27.29	832.53	15.62
							40	27.85	815.84	15.78
151	7#10 Alumoweld	152	3500	917.73	1049.8	34.91	50	28.42	799.63	15.94
							60	28.99	783.9	16.1
							70	29.54	769.34	16.25
							80	30.09	755.26	16.41
							90	30.63	741.89	16.55
							100	31.18	728.98	16.7
							0	52.33	889.21	21.63
							10	53.51	869.68	21.88
							20	54.71	850.63	22.12
							30	55.91	832.53	22.36
							40	57.05	815.84	22.59
152	7#10 Alumoweld	153	3500	917.73	1496.86	-179.93	50	58.21	799.63	22.82
							60	59.39	783.9	23.05
							70	60.52	769.34	23.27
							80	61.65	755.26	23.48
							90	62.76	741.89	23.69
							100	63.88	728.98	23.9
							0	39.92	889.21	18.9
							10	40.82	869.68	19.11
							20	41.73	850.63	19.32
							30	42.64	832.53	19.53
							40	43.52	815.84	19.73
153	7#10 Alumoweld	154	3500	917.73	1310.14	105.57	50	44.4	799.63	19.93
							60	45.3	783.9	20.13
							70	46.16	769.34	20.32
							80	47.02	755.26	20.51
							90	47.87	741.89	20.69
							100	48.72	728.98	20.88
							0	17.72	889.21	12.59
							10	18.12	869.68	12.73
							20	18.53	850.63	12.87
							30	18.93	832.53	13.01
							40	19.32	815.84	13.15
154	7#10 Alumoweld	155	3500	917.73	873.9	52.44	50	19.71	799.63	13.28
							60	20.11	783.9	13.41
							70	20.49	769.34	13.54
							80	20.87	755.26	13.66
							90	21.25	741.89	13.79
							100	21.62	728.98	13.91
							0	18.25	889.21	12.78
							10	18.66	869.68	12.92
							20	19.08	850.63	13.06
							30	19.5	832.53	13.21
							40	19.9	815.84	13.34
155	7#10 Alumoweld	156	3500	917.73	887.61	13.09	50	20.3	799.63	13.48
							60	20.71	783.9	13.61
							70	21.1	769.34	13.74
							80	21.5	755.26	13.87
							90	21.88	741.89	13.99
							100	22.27	728.98	14.11
							0	6.82	889.21	7.81
							10	6.98	869.68	7.9
							20	7.13	850.63	7.99
							30	7.29	832.53	8.07
							40	7.44	815.84	8.16
156	7#10 Alumoweld	157	3500	917.73	542.76	1.43	50	7.59	799.63	8.24
							60	7.74	783.9	8.32
							70	7.89	769.34	8.4
							80	8.03	755.26	8.48
							90	8.18	741.89	8.55
							100	8.32	728.98	8.63
							0	17.1	889.21	12.37

157	7#10 Alumoweld	158	3500	917.73	859.24	-13.6	10	17.49	869.68	12.51
							20	17.88	850.63	12.65
							30	18.27	832.53	12.78
							40	18.64	815.84	12.91
							50	19.02	799.63	13.04
							60	19.41	783.9	13.17
							70	19.77	769.34	13.3
							80	20.14	755.26	13.42
							90	20.51	741.89	13.54
							100	20.87	728.98	13.66

OPGW Stringing Table

Section 1										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
89	AFL 0.646" 96 Fiber OPGW	90	7300	784.56	715.5	-17.29	0	9.26	3848.09	9.1
							10	9.63	3700.79	9.28
							20	9.99	3566.53	9.45
							30	10.37	3438.68	9.63
							40	10.75	3317.29	9.8
							50	11.12	3205.74	9.97
							60	11.5	3100.71	10.14
							70	11.86	3005.61	10.3
							80	12.23	2913.74	10.46
							90	12.6	2828.48	10.62
							100	12.97	2748.18	10.77
90	AFL 0.646" 96 Fiber OPGW	91	7300	784.56	487.13	-10.28	0	4.29	3848.09	6.2
							10	4.46	3700.79	6.32
							20	4.63	3566.53	6.44
							30	4.8	3438.68	6.55
							40	4.98	3317.29	6.67
							50	5.15	3205.74	6.79
							60	5.33	3100.71	6.9
							70	5.5	3005.61	7.01
							80	5.67	2913.74	7.12
							90	5.84	2828.48	7.23
							100	6.01	2748.18	7.33
91	AFL 0.646" 96 Fiber OPGW	92	7300	784.56	876.96	2.32	0	13.91	3848.09	11.16
							10	14.47	3700.79	11.38
							20	15.01	3566.53	11.59
							30	15.57	3438.68	11.8
							40	16.14	3317.29	12.02
							50	16.7	3205.74	12.22
							60	17.27	3100.71	12.43
							70	17.82	3005.61	12.62
							80	18.38	2913.74	12.82
							90	18.93	2828.48	13.01
							100	19.49	2748.18	13.2
92	AFL 0.646" 96 Fiber OPGW	93	7300	784.56	482.87	-4.63	0	4.22	3848.09	6.14
							10	4.39	3700.79	6.26
							20	4.55	3566.53	6.38
							30	4.72	3438.68	6.5
							40	4.89	3317.29	6.61
							50	5.06	3205.74	6.73
							60	5.23	3100.71	6.84
							70	5.4	3005.61	6.95
							80	5.57	2913.74	7.06
							90	5.74	2828.48	7.16
							100	5.91	2748.18	7.27
93	AFL 0.646" 96 Fiber OPGW	94	7300	784.56	733.01	16.76	0	9.72	3848.09	9.32
							10	10.11	3700.79	9.51
							20	10.49	3566.53	9.69
							30	10.88	3438.68	9.86
							40	11.28	3317.29	10.04
							50	11.67	3205.74	10.22
							60	12.07	3100.71	10.39
							70	12.45	3005.61	10.55
							80	12.84	2913.74	10.72
							90	13.23	2828.48	10.88
							100	13.62	2748.18	11.04
94	AFL 0.646" 96 Fiber OPGW	95	7300	784.56	521.67	29.73	0	4.93	3848.09	6.64
							10	5.13	3700.79	6.77
							20	5.32	3566.53	6.9
							30	5.52	3438.68	7.02
							40	5.72	3317.29	7.15
							50	5.92	3205.74	7.28
							60	6.12	3100.71	7.4
							70	6.31	3005.61	7.51
							80	6.51	2913.74	7.63
							90	6.71	2828.48	7.75
							100	6.9	2748.18	7.86
95	AFL 0.646" 96 Fiber OPGW	96	7300	784.56	937.11	-57.31	0	15.92	3848.09	11.93
							10	16.55	3700.79	12.17
							20	17.17	3566.53	12.39
							30	17.81	3438.68	12.62
							40	18.47	3317.29	12.85
							50	19.11	3205.74	13.07
							60	19.76	3100.71	13.29
							70	20.38	3005.61	13.5
							80	21.03	2913.74	13.71
							90	21.66	2828.48	13.92
							100	22.29	2748.18	14.12
96	AFL 0.646" 96 Fiber OPGW	97	7300	784.56	454.37	4.09	0	3.73	3848.09	5.78
							10	3.88	3700.79	5.89
							20	4.03	3566.53	6
							30	4.18	3438.68	6.11
							40	4.33	3317.29	6.22
							50	4.48	3205.74	6.33
							60	4.63	3100.71	6.44

							70	4.78	3005.61	6.54
							80	4.93	2913.74	6.64
							90	5.08	2828.48	6.74
							100	5.23	2748.18	6.84
							0	2.08	3848.09	4.31
							10	2.16	3700.79	4.4
							20	2.24	3566.53	4.48
							30	2.33	3438.68	4.56
97	AFL 0.646" 96 Fiber OPGW	98	7300	784.56	338.95	-9.97	40	2.41	3317.29	4.64
							50	2.5	3205.74	4.72
							60	2.58	3100.71	4.8
							70	2.66	3005.61	4.88
							80	2.75	2913.74	4.96
							90	2.83	2828.48	5.03
							100	2.91	2748.18	5.1
							0	15.62	3848.09	11.82
							10	16.24	3700.79	12.05
							20	16.85	3566.53	12.28
							30	17.48	3438.68	12.5
98	AFL 0.646" 96 Fiber OPGW	99	7300	784.56	929.12	-6.04	40	18.12	3317.29	12.73
							50	18.75	3205.74	12.95
							60	19.39	3100.71	13.17
							70	20	3005.61	13.37
							80	20.63	2913.74	13.58
							90	21.25	2828.48	13.79
							100	21.88	2748.18	13.99
							0	2.19	3848.09	4.43
							10	2.28	3700.79	4.51
							20	2.36	3566.53	4.6
							30	2.45	3438.68	4.68
99	AFL 0.646" 96 Fiber OPGW	100	7300	784.56	348.05	-9.25	40	2.54	3317.29	4.77
							50	2.63	3205.74	4.85
							60	2.72	3100.71	4.93
							70	2.81	3005.61	5.01
							80	2.89	2913.74	5.09
							90	2.98	2828.48	5.16
							100	3.07	2748.18	5.24
							0	6.03	3848.09	7.34
							10	6.27	3700.79	7.49
							20	6.51	3566.53	7.63
							30	6.75	3438.68	7.77
100	AFL 0.646" 96 Fiber OPGW	101	7300	784.56	577.45	-1.93	40	7	3317.29	7.91
							50	7.24	3205.74	8.05
							60	7.49	3100.71	8.18
							70	7.72	3005.61	8.31
							80	7.97	2913.74	8.44
							90	8.21	2828.48	8.57
							100	8.45	2748.18	8.69
							0	19.42	3848.09	13.18
							10	20.2	3700.79	13.44
							20	20.96	3566.53	13.69
							30	21.74	3438.68	13.94
101	AFL 0.646" 96 Fiber OPGW	102	7300	784.56	1034.32	85.91	40	22.53	3317.29	14.2
							50	23.32	3205.74	14.44
							60	24.11	3100.71	14.68
							70	24.87	3005.61	14.92
							80	25.66	2913.74	15.15
							90	26.43	2828.48	15.38
							100	27.21	2748.18	15.6
							0	5.99	3848.09	7.32
							10	6.23	3700.79	7.46
							20	6.46	3566.53	7.6
							30	6.7	3438.68	7.74
102	AFL 0.646" 96 Fiber OPGW	103	7300	784.56	575.1	24.49	40	6.95	3317.29	7.88
							50	7.19	3205.74	8.02
							60	7.43	3100.71	8.15
							70	7.67	3005.61	8.28
							80	7.91	2913.74	8.41
							90	8.15	2828.48	8.54
							100	8.38	2748.18	8.66
							0	19.27	3848.09	13.13
							10	20.04	3700.79	13.39
							20	20.8	3566.53	13.64
							30	21.57	3438.68	13.89
103	AFL 0.646" 96 Fiber OPGW	104	7300	784.56	1032.05	20.79	40	22.36	3317.29	14.14
							50	23.14	3205.74	14.39
							60	23.93	3100.71	14.63
							70	24.68	3005.61	14.86
							80	25.46	2913.74	15.09
							90	26.23	2828.48	15.32
							100	27	2748.18	15.54

Section 2										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
							0	40.01	3308.37	18.92
							10	41.21	3211.88	19.2
							20	42.4	3121.96	19.47

104	AFL 0.646" 96 Fiber OPGW	105	7100	874.21	1376.87	-91.31	30	43.59	3036.96	19.75
							40	44.77	2956.9	20.01
							50	45.95	2881.8	20.27
							60	47.12	2809.98	20.53
							70	48.27	2743.15	20.78
							80	49.39	2681.32	21.02
							90	50.53	2621.12	21.26
							100	51.65	2564.24	21.49
105	AFL 0.646" 96 Fiber OPGW	106	7100	874.21	698.31	11.28	0	10.26	3308.37	9.58
							10	10.57	3211.88	9.72
							20	10.87	3121.96	9.86
							30	11.18	3036.96	10
							40	11.48	2956.9	10.13
							50	11.78	2881.8	10.27
							60	12.08	2809.98	10.4
							70	12.38	2743.15	10.52
							80	12.66	2681.32	10.64
							90	12.95	2621.12	10.76
							100	13.24	2564.24	10.88
106	AFL 0.646" 96 Fiber OPGW	107	7100	874.21	495.03	18.22	0	5.16	3308.37	6.79
							10	5.31	3211.88	6.89
							20	5.47	3121.96	6.99
							30	5.62	3036.96	7.09
							40	5.77	2956.9	7.19
							50	5.92	2881.8	7.28
							60	6.07	2809.98	7.37
							70	6.22	2743.15	7.46
							80	6.37	2681.32	7.55
							90	6.51	2621.12	7.63
							100	6.66	2564.24	7.72
107	AFL 0.646" 96 Fiber OPGW	108	7100	874.21	745.29	-38.16	0	11.7	3308.37	10.23
							10	12.05	3211.88	10.38
							20	12.4	3121.96	10.53
							30	12.75	3036.96	10.68
							40	13.09	2956.9	10.82
							50	13.44	2881.8	10.96
							60	13.78	2809.98	11.1
							70	14.12	2743.15	11.24
							80	14.44	2681.32	11.37
							90	14.77	2621.12	11.5
							100	15.1	2564.24	11.62
108	AFL 0.646" 96 Fiber OPGW	109	7100	874.21	604.02	1.33	0	7.68	3308.37	8.29
							10	7.91	3211.88	8.41
							20	8.13	3121.96	8.53
							30	8.36	3036.96	8.65
							40	8.59	2956.9	8.76
							50	8.81	2881.8	8.88
							60	9.04	2809.98	8.99
							70	9.26	2743.15	9.1
							80	9.47	2681.32	9.2
							90	9.69	2621.12	9.31
							100	9.9	2564.24	9.41
109	AFL 0.646" 96 Fiber OPGW	110	7100	874.21	606.57	6.2	0	7.74	3308.37	8.32
							10	7.97	3211.88	8.45
							20	8.2	3121.96	8.57
							30	8.43	3036.96	8.68
							40	8.66	2956.9	8.8
							50	8.89	2881.8	8.92
							60	9.11	2809.98	9.03
							70	9.34	2743.15	9.14
							80	9.55	2681.32	9.24
							90	9.77	2621.12	9.35
							100	9.99	2564.24	9.45
110	AFL 0.646" 96 Fiber OPGW	111	7100	874.21	429.98	-1.04	0	3.89	3308.37	5.9
							10	4.01	3211.88	5.99
							20	4.12	3121.96	6.07
							30	4.24	3036.96	6.16
							40	4.35	2956.9	6.24
							50	4.47	2881.8	6.32
							60	4.58	2809.98	6.4
							70	4.69	2743.15	6.48
							80	4.8	2681.32	6.55
							90	4.91	2621.12	6.63
							100	5.02	2564.24	6.7
111	AFL 0.646" 96 Fiber OPGW	112	7100	874.21	669.62	9.32	0	9.43	3308.37	9.19
							10	9.72	3211.88	9.32
							20	10	3121.96	9.46
							30	10.28	3036.96	9.59
							40	10.56	2956.9	9.72
							50	10.83	2881.8	9.84
							60	11.11	2809.98	9.97
							70	11.38	2743.15	10.09
							80	11.64	2681.32	10.2
							90	11.91	2621.12	10.32
							100	12.17	2564.24	10.44

Section 3										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)

112	AFL 0.646" 96 Fiber OPGW	113	4900	473.1	474.66	38.6	0	6.59	2385.98	7.68
							10	6.92	2272.84	7.87
							20	7.24	2173.12	8.05
							30	7.56	2080.06	8.23
							40	7.89	1993.69	8.4
							50	8.21	1917.46	8.57
							60	8.52	1847.98	8.73
							70	8.83	1781.85	8.89
							80	9.13	1723.37	9.04
							90	9.43	1668.27	9.19
							100	9.73	1618.27	9.33

Section 4										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
113	AFL 0.646" 96 Fiber OPGW	114	7100	886.49	1033.42	142.38	0	22.93	3273.05	14.32
							10	23.59	3181.54	14.53
							20	24.26	3094.93	14.73
							30	24.91	3013.26	14.93
							40	25.57	2936.54	15.12
							50	26.21	2864.78	15.31
							60	26.85	2796.32	15.5
							70	27.49	2731.16	15.68
							80	28.13	2669.31	15.86
							90	28.75	2611.64	16.04
							100	29.36	2557.3	16.21
114	AFL 0.646" 96 Fiber OPGW	115	7100	886.49	1024.97	-22.27	0	22.36	3273.05	14.14
							10	23	3181.54	14.34
							20	23.64	3094.93	14.54
							30	24.29	3013.26	14.74
							40	24.92	2936.54	14.93
							50	25.55	2864.78	15.12
							60	26.17	2796.32	15.3
							70	26.8	2731.16	15.48
							80	27.42	2669.31	15.66
							90	28.03	2611.64	15.83
							100	28.62	2557.3	16
115	AFL 0.646" 96 Fiber OPGW	116	7100	886.49	504.81	-62.6	0	5.46	3273.05	6.99
							10	5.62	3181.54	7.09
							20	5.77	3094.93	7.19
							30	5.93	3013.26	7.28
							40	6.09	2936.54	7.38
							50	6.24	2864.78	7.47
							60	6.39	2796.32	7.56
							70	6.54	2731.16	7.65
							80	6.7	2669.31	7.74
							90	6.84	2611.64	7.82
							100	6.99	2557.3	7.91
116	AFL 0.646" 96 Fiber OPGW	117	7100	886.49	553.65	-83.98	0	6.59	3273.05	7.68
							10	6.78	3181.54	7.79
							20	6.97	3094.93	7.9
							30	7.16	3013.26	8
							40	7.35	2936.54	8.11
							50	7.53	2864.78	8.21
							60	7.72	2796.32	8.31
							70	7.9	2731.16	8.41
							80	8.08	2669.31	8.5
							90	8.26	2611.64	8.6
							100	8.44	2557.3	8.69

Section 5										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
117	AFL 0.646" 96 Fiber OPGW	118	7100	950.22	1073.69	55.66	0	25.81	3114.54	15.19
							10	26.45	3039.61	15.38
							20	27.07	2969.64	15.56
							30	27.7	2902.97	15.74
							40	28.31	2839.59	15.91
							50	28.93	2779.54	16.09
							60	29.54	2721.95	16.25
							70	30.14	2667.7	16.42
							80	30.74	2615.94	16.58
							90	31.33	2566.68	16.74
							100	31.91	2519.92	16.9
118	AFL 0.646" 96 Fiber OPGW	119	7100	950.22	907.79	25.13	0	18.43	3114.54	12.84
							10	18.88	3039.61	13
							20	19.33	2969.64	13.15
							30	19.77	2902.97	13.3
							40	20.22	2839.59	13.45
							50	20.65	2779.54	13.59
							60	21.09	2721.95	13.73
							70	21.52	2667.7	13.87
							80	21.95	2615.94	14.01
							90	22.37	2566.68	14.14
							100	22.78	2519.92	14.28
							0	26.49	3114.54	15.39
							10	27.14	3039.61	15.58

119	AFL 0.646" 96 Fiber OPGW	120	7100	950.22	1088.41	9.36	20	27.78	2969.64	15.76
							30	28.42	2902.97	15.94
							40	29.06	2839.59	16.12
							50	29.69	2779.54	16.3
							60	30.32	2721.95	16.47
							70	30.94	2667.7	16.63
							80	31.55	2615.94	16.8
							90	32.16	2566.68	16.96
							100	32.75	2519.92	17.12
120	AFL 0.646" 96 Fiber OPGW	121	7100	950.22	680.69	93.23	0	10.45	3114.54	9.67
							10	10.71	3039.61	9.79
							20	10.96	2969.64	9.9
							30	11.21	2902.97	10.02
							40	11.46	2839.59	10.13
							50	11.71	2779.54	10.24
							60	11.96	2721.95	10.34
							70	12.2	2667.7	10.45
							80	12.45	2615.94	10.55
							90	12.68	2566.68	10.65
							100	12.92	2519.92	10.75
121	AFL 0.646" 96 Fiber OPGW	122	7100	950.22	893.28	30.43	0	17.85	3114.54	12.63
							10	18.29	3039.61	12.79
							20	18.72	2969.64	12.94
							30	19.15	2902.97	13.09
							40	19.58	2839.59	13.23
							50	20	2779.54	13.38
							60	20.43	2721.95	13.52
							70	20.84	2667.7	13.65
							80	21.25	2615.94	13.79
							90	21.66	2566.68	13.92
							100	22.07	2519.92	14.05
122	AFL 0.646" 96 Fiber OPGW	123	7100	950.22	1100.16	-154.58	0	27.33	3114.54	15.63
							10	28	3039.61	15.83
							20	28.67	2969.64	16.01
							30	29.32	2902.97	16.2
							40	29.98	2839.59	16.38
							50	30.63	2779.54	16.55
							60	31.28	2721.95	16.73
							70	31.92	2667.7	16.9
							80	32.55	2615.94	17.06
							90	33.18	2566.68	17.23
							100	33.79	2519.92	17.39
123	AFL 0.646" 96 Fiber OPGW	124	7100	950.22	672.67	-62.75	0	10.16	3114.54	9.53
							10	10.41	3039.61	9.65
							20	10.65	2969.64	9.76
							30	10.9	2902.97	9.87
							40	11.14	2839.59	9.98
							50	11.38	2779.54	10.09
							60	11.62	2721.95	10.2
							70	11.86	2667.7	10.3
							80	12.09	2615.94	10.4
							90	12.33	2566.68	10.5
							100	12.56	2519.92	10.6
124	AFL 0.646" 96 Fiber OPGW	125	7100	950.22	885.62	-28.83	0	17.54	3114.54	12.53
							10	17.98	3039.61	12.68
							20	18.4	2969.64	12.83
							30	18.82	2902.97	12.98
							40	19.24	2839.59	13.12
							50	19.66	2779.54	13.26
							60	20.08	2721.95	13.4
							70	20.48	2667.7	13.54
							80	20.89	2615.94	13.67
							90	21.29	2566.68	13.8
							100	21.69	2519.92	13.93

Section 6										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
125	AFL 0.646" 96 Fiber OPGW	126	7200	1095.57	565.91	-10.96	0	7.46	2989.79	8.17
							10	7.59	2935.74	8.24
							20	7.73	2884.19	8.32
							30	7.86	2835.12	8.39
							40	8	2786.85	8.46
							50	8.13	2741.93	8.53
							60	8.26	2698.67	8.6
							70	8.39	2656.22	8.66
							80	8.52	2616.29	8.73
							90	8.65	2577.17	8.8
							100	8.78	2540.58	8.86
126	AFL 0.646" 96 Fiber OPGW	127	7200	1095.57	829.25	0.76	0	16.01	2989.79	11.97
							10	16.31	2935.74	12.08
							20	16.6	2884.19	12.19
							30	16.89	2835.12	12.29
							40	17.18	2786.85	12.4
							50	17.46	2741.93	12.5
							60	17.74	2698.67	12.6
							70	18.03	2656.22	12.7
							80	18.3	2616.29	12.79

							90	18.58	2577.17	12.89
							100	18.85	2540.58	12.98
127	AFL 0.646" 96 Fiber OPGW	128	7200	1095.57	641.37	25.66	0	9.58	2989.79	9.26
							10	9.76	2935.74	9.34
							20	9.94	2884.19	9.43
							30	10.11	2835.12	9.51
							40	10.28	2786.85	9.59
							50	10.45	2741.93	9.67
							60	10.62	2698.67	9.75
							70	10.79	2656.22	9.82
							80	10.95	2616.29	9.9
							90	11.12	2577.17	9.97
							100	11.28	2540.58	10.04
128	AFL 0.646" 96 Fiber OPGW	129	7200	1095.57	1396.75	111.99	0	45.62	2989.79	20.2
							10	46.46	2935.74	20.38
							20	47.29	2884.19	20.57
							30	48.11	2835.12	20.74
							40	48.95	2786.85	20.92
							50	49.75	2741.93	21.1
							60	50.55	2698.67	21.26
							70	51.36	2656.22	21.43
							80	52.15	2616.29	21.6
							90	52.95	2577.17	21.76
							100	53.71	2540.58	21.92
129	AFL 0.646" 96 Fiber OPGW	130	7200	1095.57	1344.5	151.97	0	42.4	2989.79	19.47
							10	43.18	2935.74	19.65
							20	43.95	2884.19	19.83
							30	44.72	2835.12	20
							40	45.49	2786.85	20.17
							50	46.24	2741.93	20.34
							60	46.98	2698.67	20.5
							70	47.74	2656.22	20.66
							80	48.47	2616.29	20.82
							90	49.21	2577.17	20.98
							100	49.92	2540.58	21.13
130	AFL 0.646" 96 Fiber OPGW	131	7200	1095.57	769.68	-37.62	0	13.81	2989.79	11.11
							10	14.06	2935.74	11.22
							20	14.32	2884.19	11.32
							30	14.56	2835.12	11.41
							40	14.82	2786.85	11.51
							50	15.06	2741.93	11.61
							60	15.3	2698.67	11.7
							70	15.55	2656.22	11.79
							80	15.78	2616.29	11.88
							90	16.02	2577.17	11.97
							100	16.26	2540.58	12.06
131	AFL 0.646" 96 Fiber OPGW	132	7200	1095.57	1276.95	-11.55	0	38	2989.79	18.44
							10	38.7	2935.74	18.6
							20	39.39	2884.19	18.77
							30	40.08	2835.12	18.93
							40	40.77	2786.85	19.1
							50	41.44	2741.93	19.25
							60	42.11	2698.67	19.41
							70	42.78	2656.22	19.56
							80	43.44	2616.29	19.71
							90	44.1	2577.17	19.86
							100	44.74	2540.58	20
132	AFL 0.646" 96 Fiber OPGW	133	7200	1095.57	759.17	35.32	0	13.43	2989.79	10.96
							10	13.68	2935.74	11.06
							20	13.93	2884.19	11.16
							30	14.17	2835.12	11.26
							40	14.41	2786.85	11.35
							50	14.65	2741.93	11.45
							60	14.88	2698.67	11.54
							70	15.12	2656.22	11.63
							80	15.35	2616.29	11.72
							90	15.59	2577.17	11.81
							100	15.81	2540.58	11.89

Section 7										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)
133	AFL 0.646" 96 Fiber OPGW	134	6900	918.13	918.17	-7.75	0	19.34	3035.87	13.15
							10	19.83	2960.85	13.32
							20	20.31	2890.8	13.48
							30	20.79	2824.04	13.64
							40	21.25	2762.29	13.79
							50	21.73	2702.16	13.94
							60	22.18	2647.05	14.09
							70	22.65	2592.73	14.23
							80	23.1	2541.76	14.37
							90	23.55	2493.29	14.51
							100	23.99	2447.32	14.65

Section 8										
Span From Str.	Conductor Type	Span To Str.	NESC HVY Tension	Ruling Span (ft)	Span Length (ft)	Span Vert. Proj. (ft)	Temp. (deg F)	Mid Span Sag (ft)	Horz. Tension (lbs)	Wave Time (Sec)

134	AFL 0.646" 96 Fiber OPGW	135	6900	917.69	591.9	-122.36	0	8.2	3035.87	8.57
							10	8.41	2960.85	8.67
							20	8.61	2890.8	8.78
							30	8.81	2825.74	8.88
							40	9.01	2762.29	8.98
							50	9.22	2702.16	9.08
							60	9.41	2647.05	9.17
							70	9.6	2592.74	9.27
							80	9.8	2541.76	9.36
							90	9.99	2493.29	9.45
							100	10.18	2447.33	9.54
135	AFL 0.646" 96 Fiber OPGW	136	6900	917.69	727.84	-89.55	0	12.24	3035.87	10.46
							10	12.55	2960.85	10.59
							20	12.85	2890.8	10.72
							30	13.15	2825.74	10.85
							40	13.45	2762.29	10.97
							50	13.75	2702.16	11.09
							60	14.04	2647.05	11.21
							70	14.33	2592.74	11.32
							80	14.62	2541.76	11.44
							90	14.9	2493.29	11.55
							100	15.19	2447.33	11.65
136	AFL 0.646" 96 Fiber OPGW	137	6900	917.69	743.95	-38.35	0	12.71	3035.87	10.66
							10	13.03	2960.85	10.8
							20	13.35	2890.8	10.93
							30	13.65	2825.74	11.05
							40	13.97	2762.29	11.18
							50	14.28	2702.16	11.3
							60	14.58	2647.05	11.42
							70	14.88	2592.74	11.54
							80	15.18	2541.76	11.65
							90	15.48	2493.29	11.77
							100	15.77	2447.33	11.88
137	AFL 0.646" 96 Fiber OPGW	138	6900	917.69	485.83	-10.18	0	5.41	3035.87	6.96
							10	5.55	2960.85	7.05
							20	5.68	2890.8	7.13
							30	5.81	2825.74	7.21
							40	5.95	2762.29	7.29
							50	6.08	2702.16	7.37
							60	6.21	2647.05	7.45
							70	6.34	2592.74	7.53
							80	6.46	2541.76	7.6
							90	6.59	2493.29	7.68
							100	6.71	2447.33	7.75
138	AFL 0.646" 96 Fiber OPGW	139	6900	917.69	449.38	0.98	0	4.63	3035.87	6.43
							10	4.75	2960.85	6.52
							20	4.86	2890.8	6.59
							30	4.97	2825.74	6.67
							40	5.09	2762.29	6.75
							50	5.2	2702.16	6.82
							60	5.31	2647.05	6.89
							70	5.42	2592.74	6.96
							80	5.53	2541.76	7.03
							90	5.64	2493.29	7.1
							100	5.74	2447.33	7.17
139	AFL 0.646" 96 Fiber OPGW	140	6900	917.69	761.51	-0.72	0	13.3	3035.87	10.91
							10	13.63	2960.85	11.04
							20	13.97	2890.8	11.18
							30	14.29	2825.74	11.3
							40	14.62	2762.29	11.43
							50	14.94	2702.16	11.56
							60	15.25	2647.05	11.68
							70	15.57	2592.74	11.8
							80	15.89	2541.76	11.92
							90	16.19	2493.29	12.04
							100	16.5	2447.33	12.15
140	AFL 0.646" 96 Fiber OPGW	141	6900	917.69	552.16	0.6	0	6.99	3035.87	7.91
							10	7.17	2960.85	8.01
							20	7.34	2890.8	8.1
							30	7.51	2825.74	8.2
							40	7.68	2762.29	8.29
							50	7.85	2702.16	8.38
							60	8.02	2647.05	8.47
							70	8.19	2592.74	8.56
							80	8.35	2541.76	8.64
							90	8.51	2493.29	8.73
							100	8.67	2447.33	8.81
141	AFL 0.646" 96 Fiber OPGW	142	6900	917.69	688.52	-0.62	0	10.87	3035.87	9.86
							10	11.15	2960.85	9.98
							20	11.42	2890.8	10.1
							30	11.68	2825.74	10.22
							40	11.95	2762.29	10.34
							50	12.21	2702.16	10.45
							60	12.47	2647.05	10.56
							70	12.73	2592.74	10.67
							80	12.98	2541.76	10.78
							90	13.24	2493.29	10.88
							100	13.49	2447.33	10.98
							0	10.28	3035.87	9.59
							10	10.54	2960.85	9.71

142	AFL 0.646" 96 Fiber OPGW	143	6900	917.69	669.5	1.08	20	10.79	2890.8	9.83
							30	11.04	2825.74	9.94
							40	11.3	2762.29	10.05
							50	11.55	2702.16	10.16
							60	11.79	2647.05	10.27
							70	12.04	2592.74	10.38
							80	12.28	2541.76	10.48
							90	12.52	2493.29	10.58
							100	12.75	2447.33	10.68
143	AFL 0.646" 96 Fiber OPGW	144	6900	917.69	938.75	56.15	0	20.25	3035.87	13.46
							10	20.76	2960.85	13.63
							20	21.27	2890.8	13.79
							30	21.76	2825.74	13.95
							40	22.26	2762.29	14.11
							50	22.75	2702.16	14.27
							60	23.23	2647.05	14.41
							70	23.71	2592.74	14.56
							80	24.19	2541.76	14.71
							90	24.66	2493.29	14.85
							100	25.13	2447.33	14.99
144	AFL 0.646" 96 Fiber OPGW	145	6900	917.69	698.09	-49.93	0	11.2	3035.87	10.01
							10	11.49	2960.85	10.14
							20	11.77	2890.8	10.26
							30	12.04	2825.74	10.38
							40	12.31	2762.29	10.49
							50	12.59	2702.16	10.61
							60	12.85	2647.05	10.72
							70	13.12	2592.74	10.83
							80	13.38	2541.76	10.94
							90	13.64	2493.29	11.05
							100	13.9	2447.33	11.15
145	AFL 0.646" 96 Fiber OPGW	146	6900	917.69	676.01	-2.2	0	10.48	3035.87	9.68
							10	10.74	2960.85	9.8
							20	11	2890.8	9.92
							30	11.26	2825.74	10.03
							40	11.52	2762.29	10.15
							50	11.77	2702.16	10.26
							60	12.02	2647.05	10.37
							70	12.27	2592.74	10.48
							80	12.52	2541.76	10.58
							90	12.76	2493.29	10.68
							100	13	2447.33	10.78
146	AFL 0.646" 96 Fiber OPGW	147	6900	917.69	800.46	7.42	0	14.69	3035.87	11.46
							10	15.07	2960.85	11.61
							20	15.43	2890.8	11.75
							30	15.79	2825.74	11.88
							40	16.15	2762.29	12.02
							50	16.51	2702.16	12.15
							60	16.85	2647.05	12.28
							70	17.21	2592.74	12.41
							80	17.55	2541.76	12.53
							90	17.9	2493.29	12.65
							100	18.23	2447.33	12.77
147	AFL 0.646" 96 Fiber OPGW	148	6900	917.69	568.45	19.9	0	7.41	3035.87	8.14
							10	7.6	2960.85	8.25
							20	7.79	2890.8	8.34
							30	7.96	2825.74	8.44
							40	8.15	2762.29	8.54
							50	8.33	2702.16	8.63
							60	8.5	2647.05	8.72
							70	8.68	2592.74	8.81
							80	8.86	2541.76	8.9
							90	9.03	2493.29	8.99
							100	9.2	2447.33	9.07
148	AFL 0.646" 96 Fiber OPGW	149	6900	917.69	1102.46	95.18	0	27.99	3035.87	15.82
							10	28.7	2960.85	16.02
							20	29.39	2890.8	16.21
							30	30.07	2825.74	16.4
							40	30.76	2762.29	16.59
							50	31.45	2702.16	16.77
							60	32.11	2647.05	16.95
							70	32.78	2592.74	17.12
							80	33.44	2541.76	17.29
							90	34.09	2493.29	17.46
							100	34.73	2447.33	17.63
149	AFL 0.646" 96 Fiber OPGW	150	6900	917.69	556.38	47.84	0	7.12	3035.87	7.98
							10	7.3	2960.85	8.08
							20	7.48	2890.8	8.18
							30	7.65	2825.74	8.27
							40	7.83	2762.29	8.37
							50	8	2702.16	8.46
							60	8.17	2647.05	8.55
							70	8.34	2592.74	8.64
							80	8.51	2541.76	8.72
							90	8.67	2493.29	8.81
							100	8.84	2447.33	8.89
							0	24.25	3035.87	14.73
							10	24.87	2960.85	14.91
							20	25.47	2890.8	15.09
							30	26.06	2825.74	15.27

150	AFL 0.646" 96 Fiber OPGW	151	6900	917.69	1028.17	11.83	40	26.66	2762.29	15.44
							50	27.25	2702.16	15.61
							60	27.82	2647.05	15.77
							70	28.4	2592.74	15.94
							80	28.97	2541.76	16.1
							90	29.54	2493.29	16.25
							100	30.09	2447.33	16.41
151	AFL 0.646" 96 Fiber OPGW	152	6900	917.69	1049.8	34.91	0	25.3	3035.87	15.04
							10	25.94	2960.85	15.23
							20	26.57	2890.8	15.41
							30	27.18	2825.74	15.59
							40	27.8	2762.29	15.77
							50	28.42	2702.16	15.94
							60	29.02	2647.05	16.11
							70	29.63	2592.74	16.28
							80	30.22	2541.76	16.44
							90	30.81	2493.29	16.6
							100	31.39	2447.33	16.76
152	AFL 0.646" 96 Fiber OPGW	153	6900	917.69	1496.86	-179.93	0	51.81	3035.87	21.53
							10	53.12	2960.85	21.8
							20	54.42	2890.8	22.06
							30	55.67	2825.74	22.31
							40	56.96	2762.29	22.57
							50	58.23	2702.16	22.82
							60	59.45	2647.05	23.06
							70	60.7	2592.74	23.3
							80	61.92	2541.76	23.53
							90	63.13	2493.29	23.76
							100	64.32	2447.33	23.99
153	AFL 0.646" 96 Fiber OPGW	154	6900	917.69	1310.14	105.57	0	39.52	3035.87	18.8
							10	40.52	2960.85	19.04
							20	41.51	2890.8	19.27
							30	42.47	2825.74	19.49
							40	43.44	2762.29	19.71
							50	44.41	2702.16	19.93
							60	45.34	2647.05	20.14
							70	46.29	2592.74	20.35
							80	47.22	2541.76	20.55
							90	48.15	2493.29	20.75
							100	49.05	2447.33	20.95
154	AFL 0.646" 96 Fiber OPGW	155	6900	917.69	873.9	52.44	0	17.55	3035.87	12.53
							10	17.99	2960.85	12.69
							20	18.43	2890.8	12.84
							30	18.85	2825.74	12.99
							40	19.29	2762.29	13.13
							50	19.72	2702.16	13.28
							60	20.13	2647.05	13.42
							70	20.55	2592.74	13.56
							80	20.96	2541.76	13.69
							90	21.37	2493.29	13.83
							100	21.77	2447.33	13.95
155	AFL 0.646" 96 Fiber OPGW	156	6900	917.69	887.91	13.09	0	18.08	3035.87	12.72
							10	18.54	2960.85	12.88
							20	18.99	2890.8	13.03
							30	19.43	2825.74	13.18
							40	19.88	2762.29	13.33
							50	20.32	2702.16	13.48
							60	20.74	2647.05	13.62
							70	21.18	2592.74	13.76
							80	21.6	2541.76	13.9
							90	22.02	2493.29	14.04
							100	22.44	2447.33	14.17
156	AFL 0.646" 96 Fiber OPGW	157	6900	917.69	543.05	1.43	0	6.76	3035.87	7.78
							10	6.93	2960.85	7.87
							20	7.1	2890.8	7.97
							30	7.26	2825.74	8.06
							40	7.43	2762.29	8.15
							50	7.6	2702.16	8.24
							60	7.75	2647.05	8.33
							70	7.92	2592.74	8.42
							80	8.08	2541.76	8.5
							90	8.23	2493.29	8.58
							100	8.39	2447.33	8.66
157	AFL 0.646" 96 Fiber OPGW	158	6900	917.69	859.24	-13.6	0	16.93	3035.87	12.31
							10	17.36	2960.85	12.46
							20	17.78	2890.8	12.61
							30	18.19	2825.74	12.76
							40	18.61	2762.29	12.9
							50	19.03	2702.16	13.05
							60	19.42	2647.05	13.18
							70	19.83	2592.74	13.32
							80	20.23	2541.76	13.45
							90	20.62	2493.29	13.58
							100	21.01	2447.33	13.71

Section 13. Construction Deliverables

A. Pre-Construction Deliverables

1. Drilling/Excavation Plan- TLCS-1302 Appendix A
2. Concrete Mix Design/Backfill Specs- TLCS-1302 Appendix B and C
3. Stringing Plan- TLCS- 1601

B. During Construction Deliverables

1. TLPD-005- Change Request Form Request Log
2. Concrete Breaks, Test Results- TLCS-1402
3. TFR Requirements (TLES-032 Forms)
   a) Tower Footing Resistance (TFR) Table—Grounding Resistance (Dwg.82A0-2204) [Required for all projects]
   b) Attachment “B”—Form 1: Fall of Potential Method TFR Resistance Readings
   c) Attachment “B”—Form 2: Clamp-on Method TFR Resistance Readings
   d) Attachment “B”—Form 3: Wenner Method—Soil Resistivity Test
4. Sag Checks

C. Pre-energization Deliverables

1. MLSE Drawing Attestation (TCR Requirement)

Drawings are located in Section 3.

D. Post-Construction Deliverables

1. Field Marked Prints: TLPD-005

Section 14. Removal Information

A. Existing Structure List

B. Existing Structure Drawings

C. Existing P&P

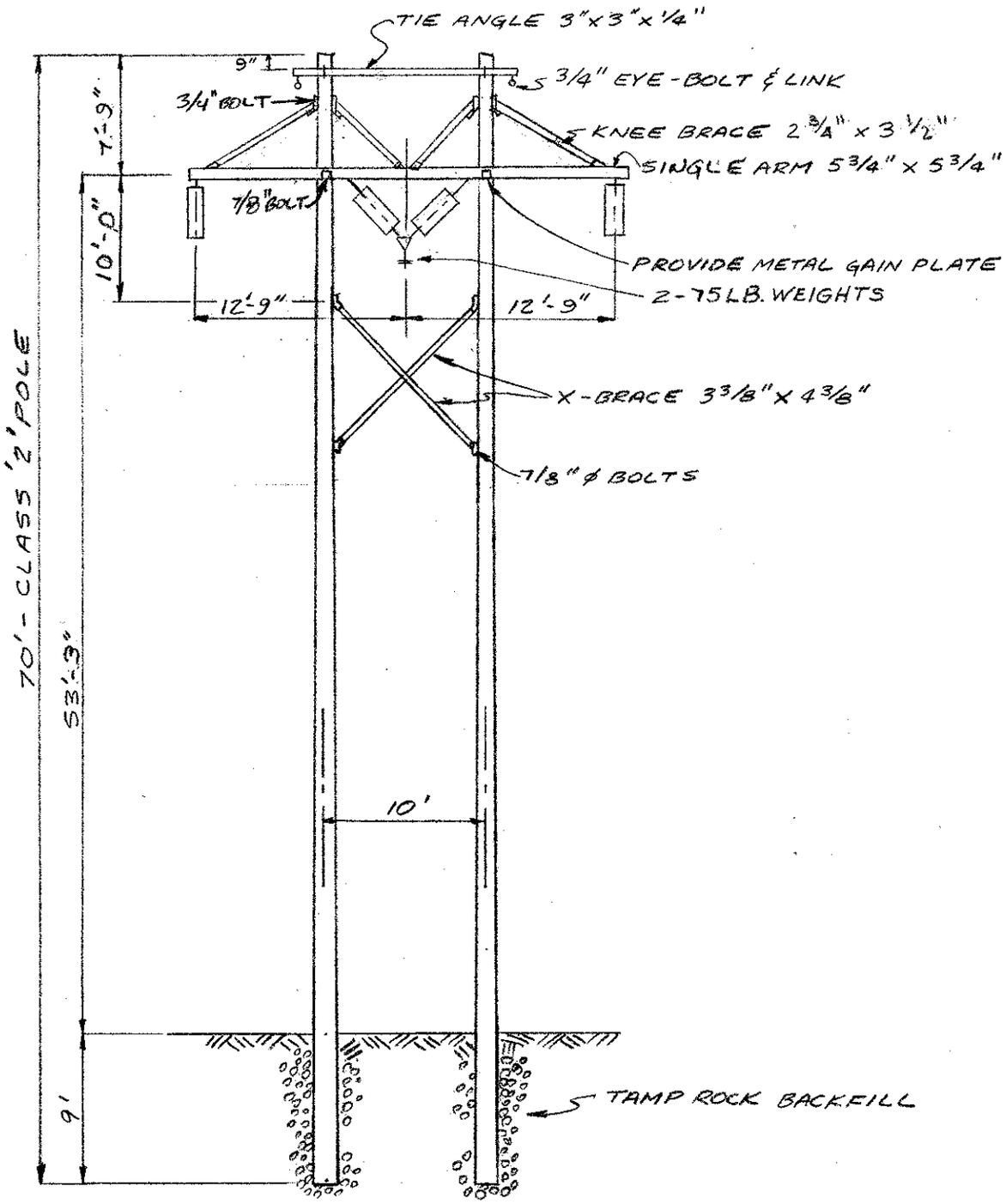
A. Existing Structure List

Structure #	Type/ Standard	Structure Height/ Class	Comments
77	HITI	50'/2	H-Frame; both poles the same
78	HITI	60'/2	H-Frame; both poles the same
79	HITI	55'/2	H-Frame; both poles the same
80	HITI	55'/2 & 50'/2	H-Frame; different poles
81	HITI	70'/2	3-Pole; all poles the same
82	HITI	60'/2	H-Frame; both poles the same
83	HITI	50'/2	H-Frame; both poles the same
84	HITI	50'/2	H-Frame; both poles the same
85	HITI	50'/2	H-Frame; both poles the same
86	HITI	60'/2 & 65'/2	H-Frame; different poles
87	HITI	60'/2 & 55'/2	H-Frame; different poles
88	HITI	70'/2	H-Frame; both poles the same
89	HITI	75'/2	H-Frame; both poles the same
91	HITI	75'/2	H-Frame; both poles the same
92	HITI	55'/2	H-Frame; both poles the same
93	HITI	50'/2 & 60'/2	H-Frame; different poles
94	HITB	75'/2	H-Frame; both poles the same

96	HITB	65’/2	H-Frame; both poles the same
97	HITI	50’/2	H-Frame; both poles the same
98	HITI	55’/2	H-Frame; both poles the same
99	HITI	60’/2	H-Frame; both poles the same
100	HITI	50’/2	H-Frame; both poles the same
101	HITB	65’/2	H-Frame; both poles the same
102	HITB	70’/2	H-Frame; both poles the same
103	HITB	70’/2 & 65’/2	H-Frame; different poles
104	MOWA	65’/2	3-Pole; all poles the same
105	HITB	60’/2	H-Frame; both poles the same
106	HITB	65’/2	H-Frame; both poles the same
107	HITB	70’/2 & 65’/2	H-Frame; different poles
108	HITB	70’/2 & 65’/2	H-Frame; different poles
109	HITB	80’/2 & 85’/2	H-Frame; different poles
111	HITB	75’/2	H-Frame; both poles the same
112	HITB	65’/2	H-Frame; both poles the same
113	HITB	70’/2	H-Frame; both poles the same
114	HITB	70’/2	H-Frame; both poles the same
115	HITB	70’/2	H-Frame; both poles the same

116	HITB	60’/2 & 65’/2	H-Frame; different poles
117	HIXB	70’/2	H-Frame; both poles the same
118	HITB	60’/2 & 70’/2	H-Frame; different poles
119	HITB	70’/2	H-Frame; both poles the same
120	HITB	70’/2	H-Frame; both poles the same
121	HIUB	70’/2	H-Frame; both poles the same
122	HITI	60’/2	H-Frame; both poles the same
123	HITI	60’/2 & 65’/2	H-Frame; different poles
124	HITI	90’/2 & 85’/2	H-Frame; different poles
125	HITI	95’/2	H-Frame; both poles the same
126	HITB	70’/2	H-Frame; both poles the same
127	HITB	60’/2	H-Frame; both poles the same
128	HITB	60’/2	H-Frame; both poles the same
129	HITB	65’/2	H-Frame; both poles the same
130	HITI	55’/2	H-Frame; both poles the same
131	HITI	55’/2	H-Frame; both poles the same
132	HITI	70’/2	H-Frame; both poles the same
133	HITI	60’/2	H-Frame; both poles the same
134	MOWA	75’/2	3-Pole; all poles the same

135	HITB	65’/2 & 70’/2	H-Frame; different poles
136	HITB	70’/2	H-Frame; both poles the same
137	HITB	85’/2	H-Frame; both poles the same
138	HITI	55’/2	H-Frame; both poles the same
139	HITB	65’/2	H-Frame; both poles the same
140	HITI	50’/2	H-Frame; both poles the same
141	HITI	50’/2	H-Frame; both poles the same
142	HITI	50’/2	H-Frame; both poles the same
143	HITB	70’/2	H-Frame; both poles the same
144	HITI	55’/2	H-Frame; both poles the same
145	HITI	55’/2	H-Frame; both poles the same
146	HITI	55’/2	H-Frame; both poles the same
147	HITI	60’/2 & 50’/2	H-Frame; different poles
148	HITB	65’/2	H-Frame; both poles the same
149	HITB	55’/2	H-Frame; both poles the same
149A	Unknown	90’/1	DE Structure for Shieldwire per PnP
MOAB	MOAB	60’/Unknown	
149B	AW18-0379	70’/2	



SCALE: 1" = 10'

AEP
Scanned On: APR.04
Archive ID: 102-702

REV 1 1/2/80 L.L.

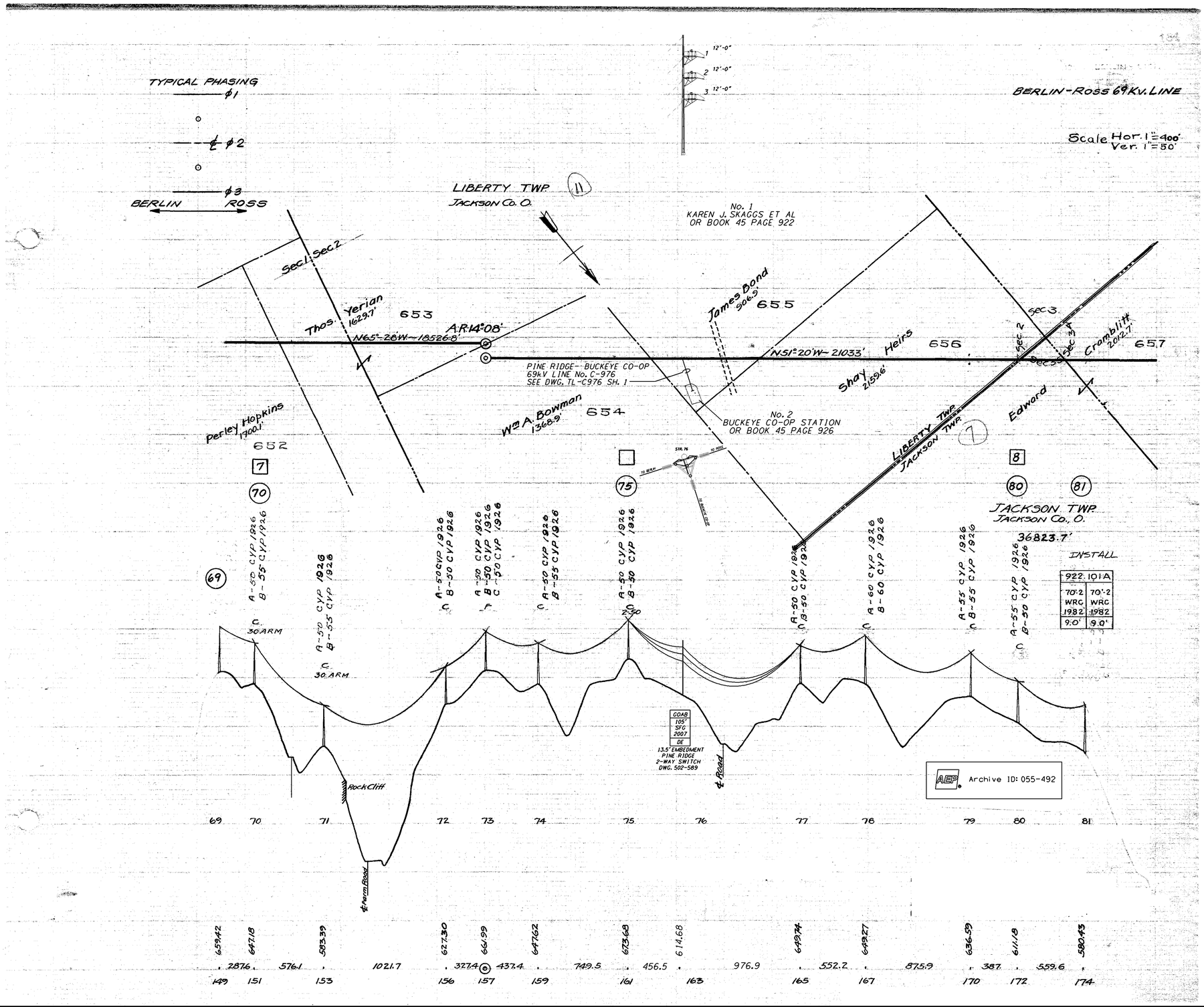
AMERICAN ELECTRIC POWER SERVICE CORP.
TRANSMISSION SECTION

BLUEFIELD - S. BLUEFIELD 138-KV
STR. #8
TYPE H1T1 (MODIFIED)

DRAWN BY: RAM CHECKED BY

DATE: 12/12/79 DWG. NO. A-334-1688

REV A GENERAL REVISION 11 6 58 DCR
REV B- GENERAL REVISION 10-20 59, MEB
REV C- REMOVED DEION GAPS-2-2-62, CWM
REV D- RM/SS-2-60-2. RM/LS-2-60-2. R.J.S 6-6-7C
REV E- CHG'D LINE NO 11-8-72 CLW
REV F- CHG'D SH 8 TO SH NO 17 7 13 77 RHS
REV G-INSTALL AERIAL NO'S, 6-4-99, DLA
REV G REPLACED STR 81 7 22 82 RHS
REV H RE-NUMBER LINE & SHTS, 4-14-98, LEL
REV. I -REPLACED STR. 76 WITH GOAB, 5/06/2008, EAR



STR. 70 TO STR. 81

SHEET 9 OF 26 SHEETS
REVISION DATE: 5/06/2008

FORMERLY ROSS-BERLIN-LICK SH.19
FORMERLY TL-69-4-404.09 SH.17

BERLIN-ROSS 69kV LINE No. C-914
DWG. No. TL-C-914

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REV. A - GENERAL REVISION 11-5-58 ABE
REV. B - GENERAL REV. 10-20-59, MEB.
REV. C - REMOVED DEION GAPS 2-2-62, CWM.
REV. D - CHG'D LINE NO. 11-3-72 C.L.W.
REV. E - CHG'D SH. NO. 9 TO SH. NO. 16 R.H.S. 7-13-77
REV. F - REPLACED STR. 81 7-20-82 R.H.S.
REV. G - REPLACED STR. 86 4-5-83 HCL.
REV. H - RE-NUMBER LINE & SATS, 4-14-98, CEL
REV. I - REBUILD, 6-4-99, DLA
REV. 10 - REVISED SHEET PER AS BUILT, 7/24/2008, EAR

BERLIN - ROSS 69KV. LINE

Scale Hor. 1" = 400'
Ver. 1" = 50'

TYPICAL PHASING
φ1
℄ φ2
φ3
BERLIN ROSS

JACKSON TWP.
JACKSON CO. O.
36823.7'

658 Thurman E. Green 49.7'
659 Johnathan Hill 550'
660 Dabney Rogland 1737.8' Bethe Cosby
661 Andrew Perkins 1222.2
662 Wm Cosby 1656.3
663 Alfonso Cosby 1357.9'
663 Alfonso Cosby 1357.9'

Little Salt Creek
Little Salt Creek
N 51° 20' W ~ 21033'
Sec 33
Sec 34
Sec 28
Sec 27

922.101A	
70'-2	70'-2
WRC	WRC
1982	1982
9.0°	9.0°

922.101	
60-2	65-2
WRC	WRC
1983	1983
6.5	6.0
ROCK	ROCK

HITB	
70/2 CHAP 99	70/2 CHAP 99
5	
188350	

HITB	
75/2 CHAP 99	75/2 CHAP 99
5	

HITB	
75/2 CHAP 99	75/2 CHAP 99
5	

A-50 CYP 1926 B-50 CYP 1926 C 30' ARM
A-50 CYP 1926 B-50 CYP 1926 C-50 CYP 1926 D-50 CYP 1926 4-POLE 30' ARMS
A-50 CYP 1926 B-50 CYP 1926 C 30' ARM
A-60 CYP 1926 B-55 CYP 1926 C 30' ARM
A-60 CYP 1926 B-60 CYP 1926 C 30' ARM
A-55 CYP 1926 B-55 CYP 1926 C

TYPICAL HITB LOOKING TOWARD ROSS
φ1 φ2 φ3 5'-15"

℄ Road
℄ Road

81	82	83	84	85	86	87	88	89	91	92
580.43	447.00	624.00	650.00	625.90	627.23	544.96	440.35		452.85	442.50
174	1245.1		1419.2	230.9	1035.6	1033	514.8	1140.5	711.4	686.3	728.9	
	177+230			180+20	181+25	185	189	191	193+40	197	200+40	

FORMERLY ROSS-BERLIN-LICK SH. 18
FORMERLY TL-69-4-404.09 SH. 16

REVISION DATE: 7/24/2008

STR'S. 81-92
SH. 10
TL-C-914

Archive ID: 055-575

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REV.A - GENERAL REVISION 11-5-58 BCA.
REV.B - GENERAL REV. 10-20-59, MDJ.
REV. C - REMOVED DEION GAPS 2-2-62.
REV. D - CHG'D LINE NO. 11-382 CKT, CMM.
REV. E - REFL. POLE 99A 7-12-73 RGH
REV. F - CHG'D SH. NO. 10 TO NO. 15 7-13-77
REV. G - REARRANGED LINE ~~SECTION~~ AS-BUILT R.H.S.
REV.H - REBUILD, 6-7-95, DEA
REV.9 - REVISED SHEET PER AS BUILT, 7/24/2008, EAR

BERLIN - ROSS 69 Kv. LINE

TYPICAL PHASING
φ1
φ2
φ3
BERLIN ROSS

Scale Hor. 1" = 400'
Ver. 1" = 5'0"

JACKSON TWP
JACKSON CO. O.
36823.7

Thurman E. Green
414.3'
658

Old Cr Bed
Salt Creek
N51°20'W - 21033'

664

Lucinda S. Ott
1520.3'

Chas. Brohard
417'
665

Sec. 29 / Sec. 20
AR 26°38'

15' SPACING
φ1 φ2 φ3
104 LOOKING TOWARD ROSS

Sec. 28 / Sec. 29

φ1 φ2 φ3
5' 5'
TYPICAL HIT/ LOOKING TOWARD ROSS

94	96	100	HITB	HITB	HITB
94	96	100	65/2 CFPD 99 / 65/2 CFPD 99	65/2 CFPD 99 / 65/2 CFPD 99	70/2 CFPD 99 / 65/2 CFPD 99
			5	5	5
HITB	HITB	HITB	188350		188350
75/2 CFPD 99 / 75/2 CFPD 99	65/2 CFPD 99 / 65/2 CFPD 99	70/2 CFPD 99 / 70/2 CFPD 99			
5	5	5			
188350					

MOWA
65/2 CFPD 99 / 65/2 CFPD 99 / 65/2 CFPD 99
5
198030

92 A-55 CYP 1926 / B-55 CYP 1926
93 A-50 CYP 1926 / B-60 CYP 1926
94 A-50 CYP 1926 / B-50 CYP 1926
96 A-35 CYP 1926 / B-55 CYP 1926
97 A-60 CYP 1973 / B-60 CYP 1926
98 A-50 CYP 1926 / B-50 CYP 1926
99 102 103 104

℄ Road ℄ Road

92	93	94	96	97	98	99	100	101	102	103	104
442.50	482.57		442.67	439.98	440.70	438.25	439.00	440.00	453.72	557.46	689.24
716.3	850.6	853.6	564.3	453.3	763.5	589.6	442.6	749.1	729.6	550.1	
200-140	201	204	205+100	207+10	209+15	211	215	217+95	220+12	223	224+30	226

FORMERLY ROSS-BERLIN-LICK SH. 17
FORMERLY TL-69-4-404.09 SH. 15
~~THIS LINE FORMERLY TL-74~~

STR'S. 92-104

TL-C-914 SH. 11

REVISION DATE: 7/24/2008

Archive ID: 055-572

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REV. A- GENERAL REVISION - 11-5-38 BCH.
REV. B- GENERAL REVISION-10-20-59, MEB.
REV. C- REMOVED DEION GAPS - 2-2-62, CWM.
REV. D-REPLACED STR. 109 , 3-26-66, MB
REV. E- CHG'D LINE NO. 11-3-72 C.L.W.
REV. F- CHG'D SH. NO.11 TO NO.14 7-13-77 R.H.S.
REV. G- REPLACED STR. 106 7-22-82 R.H.S.
REV. H - REPLACE ~~INSERT OF STR.108~~ 4-5-83
REPLACE STR. 108 H.C.L.
REV. J- RE-NUMBER LINE & SAT. 4-14-98, CEL
REV.K-REBUILD, 6-4-99, DZA
REV. 11- REVISED SHEET PER AS BUILT, 7/24/2008, EAR

BERLIN-ROSS 69 Kv. LINE

Scale Hor 1"= 400'
Ver. 1"= 50'

TYPICAL PHASING
ϕ1
ϕ2
ϕ3
BERLIN ROSS

JACKSON TWP.
JACKSON CO., O.
36823.7'

Ernest Fitzpatrick 1254'

Joseph Finch 1116.3'

669

N 24°42'W - 10968.9'

A.R. 26°38'

35'

(1) T#10 ALUMO. DOUBLE GUY DBL. HELIX ANC. 538250 (5 SHEAR PINS)

1- 5' EXT.

15' SPACING

Chas. Brohard 411'

665

666

668

Sylva Landrum 208'

Emma Wiles 367.3'

Old Red Salt Creek

E.H. Willis 670

Edmond H. Willis 4115.5' 670

922.101	
70-2	65-2
WRC	WRC
1983	1983
9.0	8.5

15' SPACING

HITB	
66'-2	65'-2
WRC	WRC
1982	1982
8.5'	8.5'

188350

HITB 188350

MOWA		
65/2 CFAPP 99	65/2 CFAPP 99	65/2 CFAPP 99
S		

198030

HITB	
66/2 CFAPP 99	66/2 CFAPP 99
S	

188350

HITB	
70/2 CFAPP 99	65/2 CFAPP 99
S	

HITB	
80/2 CFAPP 99	83½ CFAPP 99
S	

HITB	
75/2 CFAPP 99	75/2 CFAPP 99
S	

HITB	
65/2 CFAPP 99	65/2 CFAPP 99
S	

HITB	
70/2 CFAPP 99	70/2 CFAPP 99
S	

HITB	
70/2 CFAPP 99	70/2 CFAPP 99
S	

188350

104 105 106 107 108 109 111 112 113 114

109 111 114

#1 #2 #3
10' 4'-6" 5'-6"
LOOKING TOWARD ROSS

#1 #2 #3
5'-5"
TYPICAL H1T1 LOOKING TOWARD ROSS

689.24 698.23 669.50 680.50 719.44 559.20 431.81 433.99 431.65 433.00

226 229 233 238-30 242 245 249 250 252 254-175

890.1 790.9 1277.9 77.1 1343.2 1203.1 610.3 746.7 695.5

FORMERLY ROSS-BERLIN-LICK SH. 16

FORMERLY TL-69-4-404.09 SH. 14

STR'S. 104-114

TL-C-914 SH. 12

REVISION DATE: 7/24/2008

AEP Archive ID: 055-569

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REV. J-CHG. POLES STR. 123 9-18-75 TPR.
REV. H-REPL. POLES 114B9115 B 7-12-73 RGH
REV. G-REPLACED POLE A STR. 120, REBUILT STR. 121 5-16-67 TFM
REV. F- REPLACED STR. 117, 3-26-66, MB
REV. A-GENERAL REVISON-11-6-58 BCR.
REV. B- GENERAL REVISION-10-20-59, MCH.
REV. C-REPLACED POLE - 8-12-60 MB
REV. D-REMOVED DEION GAPS 2-2-62, EWM.
REV. E - REPLACED POLE T4-12.0 B 10-30-64 MB
REV. F-CHG'D LINE NO. 11-3-72 C.L.W.
REV. K-CHG'D SH. NO. 12 TO NO 13 7-13-77 R.H.S.
REV. L-RE-NUMBER LINE & SHT., 4-14-98, CEL
REV. M-REBUILD, 6-4-99, DLA
REV. 14- REVISED SHEET PER AS BUILT, 7/24/2008, EAR

TYPICAL PHASING
ϕ1
℄ ϕ2
ϕ3
BERLIN ROSS

STR. 117
LOOKING TOWARD ROSS

JACKSON T.WP.
JACKSON CO., O.
36823.7'

BERLIN-ROSS 69 KV. LINE

Scale Hor. 1"=400'
Ver. 1"=50'

669
Joseph Finch 1533.9'
671
H.A. Leasure 2975.9'
672
James Kight 1786.9'
Jennie L. Guyton
Thos Leach Heirs 682.
673
674
Chillicothe Road
Dorsey Wills 819.1'
675
Carl Leach 1072.9'

N 24°-42' W - 10968.9'
A.L. 0°-42'
N 25°-24' W - 13769.7'
Tel. Line

(1) 7 #10 ALUMO. SINGLE GUY DBL. HELIX ANC. 528100 (5 SHEAR PINS)
5'
35'

TYPICAL HITI LOOKING TOWARD ROSS
5'

LOOKING TOWARD ROSS
6'1 6'

Sec 18
Sec 7
Sec 17
Sec 8

1 | 2
120
123
115
114

REPLACED BY D.R. MORGAN 1996

HITB 70/2 CFPP 96 | 70/2 CFPP 96 | S
HITB 70/2 CFPP 96 | 70/2 CFPP 96 | S
HIUB 70/2 CFPP 99 | 70/2 CFPP 99 | S
188230
HITB 60/2 CFPP 99 | 65/2 CFPP 99 | S
HITB 70/2 CFPP 99 | 70/2 CFPP 99 | S
HITB 70/2 CFPP 99 | 70/2 CFPP 99 | S
188350
HIXB 70/2 CFPP 99 | 70/2 CFPP 99 | S
188250
HITB 60/2 CFPP 99 | 70/2 CFPP 99 | S

A-60-CYP 1926
B-60 CYP 1926
C-D
30' ARMS
A-65'-CYP 1975
B-60'-CYP 1975
30' ARMS

115 116 117 118 119 120 121 122 123
114
℄ Road
-800.3 ℄ Tel. Line
℄ Road

433.00 961.1 479.50 596.4 540.18 1088.7 694.67 861.3 662.57 725.7 538.7 1087.2 544.20 880.9 545.86 1605.5 531.00 504.9 636.49
254-175 256+75 258 262 265 267 270 273 277+95

FORMERLY ROSS-BERLIN-LICK SH. 15
FORMERLY TL-69-4-404.09 SH. 13

STR'S. 114-123
TL-C-914 SH. 13

REVISION DATE: 7/24/2008

Archive ID: 055-570

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REV.Q-REBUILD, 6-4-99, DLA
REV. P-RE-NUMBER LINE & SHTS, 4-14-98 ; CEL
REV. N - INSTALL NEW STRS 124,125 9-1-82 RHS
REV. M - REPL POLE ON STR. 132 5-19-82 RHS
REV. L - CHG'D SH NO. 13 TO NO. 12 7-13-77 RHS.
REV. A - GENERAL REVISION - 11-6-58 ACK.
REV. B - GENERAL REVISION - 10-20-59, MLB.
REV. C - REMOVED PEION GAPS - 2-2-62, CWM.
REV. D - ADDED DETAIL 'A' 1-18-63 RVB
REV. E - GENERAL REVISION - 2-6-67 - CWC
REV. F - GENERAL REVISION - 6-27-63 JE
REV. G - REMOVED 4 PEC STRINGLINE #131 4-9-65 JK
REV. H - REPLACED POLE 126A, 5-27-65 HRD
REV. J - RP POLES 134-A & 134-B 12-12-67 JE
REV. K - CHG'D LINE NO. 11-3-72 C.L.W.
REV. L - CHG. POLES 578.127 10-6-93 ADK
REV. 17 - REVISED SHEET PER AS BUILT, 7/24/2008, EAR

179

BERLIN - ROSS 69 KV. LINE

Scale Hor. 1" = 400'
Ver. 1" = 50'

TYPICAL PHASING
ϕ1
ϕ2
ϕ3
BERLIN — ROSS

PAST. PAST.
CONFIGURATION "C"
T4-133
N25°24'W 40'
CULTIVATED
(IVA JENKINS ET AL) (353/1)
DETAIL 'A'

JEFFERSON TWP.
ROSS CO., O.
16737.3'

Sec 7 Sec 6
A.W. Wills 4213.7'
C.H. Clark 1223.9'
678
Geo. M. Wills Jr. 54'
680
Salt Creek
SEE DETAIL 'A'
677
(INSTALL) NEW STR. 124
(REMOVE) EXISTING STR 126
(REMOVE) EXIST. STR. 125
(INSTALL) NEW STR. 126 (SEE DETAIL 'B')
75'
Geo. Springer 1965.5'
676
NO HELICOPTER SPRAYING OF R/W PERMITTED ON THIS PROPERTY 9-82
N 25°-24' W - 13769.7'
Barn
Lane
R.L. 17721'
Stone
Chas E. Jenkins 2291.7'
679
C.H. Clark 1223.9'
678
Clyde Simpson 2221.3'
681
JACKSON COUNTY
JACKSON TWP.
ROSS COUNTY
JEFFERSON TWP.
Sec 36
Sec 6
VINTON COUNTY
HARRISON TWP.

JACKSON TWP.
JACKSON CO., O.
36823.7'

ϕ1 ϕ2 ϕ3
5'-5'
TYPICAL HITI LOOKING TOWARD ROSS

3'
STR. 125
℄ 69-4
ROAD

MOWA
75/2 CPPP 99 | 75/2 CPPP 99 | 75/2 CPPP 99
5
198030

(123) (134)

INSTALL 124
922.101
90'-2 FIR 1982 10.5' | 85'-2 FIR 1982 10.5'

A-65 CYP 1975
B-60 CYP 1975
D
30 ARMS

(125)
HITB 70/2 CPPP 99 | 70/2 CPPP 99
5
188350

INSTALL 125
922.104
95'-2 FIR 1982 11.0' | 95'-2 FIR 1982 12.8'

DETAIL 'B'
HITB 60/2 CPPP 99 | 60/2 CPPP 99
5
HITB 60/2 CPPP 99 | 60/2 CPPP 99
5
HITB 65/2 CPPP 99 | 65/2 CPPP 99
5
188350

1 | 3
(130)

A-55 CYP 1926
B-55 CYP 1926
C
922.101
A-55 CYP 1965
B-55 CYP 1965
A-70-WREC. CLASS 2 1982
B-70-WREC. CLASS 2 1982
D
A-60 CYP 1963
B-60 CYP 1963
C
SEE DETAIL "A"

℄ Road
℄ Lane ℄ Lane ℄ Lane

123	124	125	126	127	128	129	130	131	132	133	134
636.49	637.8	470.09	456.53	455.84	456.62	453.85	448.33	523.37	451.02	450.65	535.06
1035.70'	1030.35'	530.05'	627.9'	426'	582.5'	468.2'	789.3'	520'	715.8'	1376.7'	
280	284	286	286	290+2.5	293	294-6	295	297	299	301	305-3	309

FORMERLY ROSS-BERLIN-LICK SH. 14
FORMERLY TL-69-4-404.09 SH. 12
~~THIS LINE FORMERLY TL-T4~~
STR'S. 123-134

TL-C-914 SH. 14

REVISION DATE: 7/24/2008

AEP Archive ID: 055-571

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REV. A- GENERAL REVISION- 11-6-58 BCK
REV. B- GENERAL REVISION- 10-20-59, MBB.
REV. C- REMOVED DEION GAPS, 2-2-62, CWM.
REV. D- REBUILT STR. 143, 5-16-67 lrm
REV. E- RP POLES 142-A & 142-B 12-12-67, MB
REV. F- CHG.D LINE NO 11-3-72 C.L.W.
REV. G RP POLES 138A & 138B 7-21-76 JEN
REV. H- CHG'D. SH. NO. 14 TO SH. 11 7-13-77 R.H.S.
REV. I RP STR 145 5-8-87
REV. J- RE-NUMBER LINE 1 SHTS. 4-14-98 CEL
REV. K- REBUILD, 6-4-99, DLA
REV. L- REPL. STR. 137, 11-30-01, DLA
REV. 13- REVISED SHEET PER AS BUILT, 7/24/2008, EAR

178

BERLIN-ROSS 69 Kv. LINE

Scale Hor. 1"= 400'
Ver. 1"= 50'

TYPICAL PHASING
φ1
φ2
φ3
BERLIN ROSS

JEFFERSON TWP.
ROSS Co., O.
16737.3'

Jackson Sand Mng Co.
1282'

Orley W. Miller
2919'

685

683

682

N42°45'W - 12275.6'

Mrs. V.O. Clark & Son
98.8'

Jackson Sand Mining Co.

Big Salt Creek

Salt Creek (branch)

Lone

Chorin

Martha Francis
1743.3'

687

Willis C. Cutright
594
688

A.L. 17°-21'

5'-6"
4'-6"
10'

(1) 7#10 ALUMO. DOUBLE GUY
USED EXISTING ANCHOR 50'
538250

TYPICAL HITI LOOKING TOWARD ROSS

LOOKING TOWARD ROSS

HITB 65/2 CFPP 99 | 65/2 CFPP 99 | S
HITB 70/2 CFPP 1999 | 70/2 CFPP 1999 | S
188350

MOWA 75/2 CFPP 99 | 75/2 CFPP 99 | 75/2 CFPP 99 | S
198030

HITB 65/2 CFPP 99 | 70/2 CFPP 99 | S
188350

HITB 70/2 CFPP 99 | 70/2 CFPP 99 | S

HITB 85/2 CFPP 2001 | 85/2 CFPP 2001 | S
188350

DID NOT REPLACE CROSSARM

A-65' DF 1978
B-65' DF 1978
C

A-50' CYP 1926
B-50' CYP 1926
C

A-50-2 CYP 1967
B-50-2 CYP 1967
C

A-55' CYP 1926
B-55' CYP 1926
C

A-55'-5 CYP 1981
B-55'-5 CYP 1981
C

A-55'-CYP 1926
B-55'-CYP 1926
C

72A75

134 135 136 138 139 140 141 142 143 144 145 146

533.06 515.00 492.50 425.81 419.91 435.92 436.01 427.14 498.59 445.09 452.80 457.75

1049.3 579.8 764.0' (+3,-3) 863.6' (+3,-3) 599.1 580.1 408 487.4 914 620.3 622 486.5

309 313-65 315+10 320 322+4 324 325 327 330 333-5 334 336-8

FORMERLY ROSS-BERLIN-LICK SH. 13

FORMERLY TL-69-4-404.09 SH. 11

STR'S. 134-146

TL-C-914 SH. 15

REVISION DATE: 7/24/2008

AEP Archive ID: 055-576

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(1) 7#10 ALUMOWELD DOUBLE GUY DBL. HELIX ANC. 538230 (5 SHEAR PINS)

INSTALL: G.W. (1) 7#10 ALUMOWELD @ 500# N.E.S.C. H.L.
TRANSFER: COND. (3) 1/0 A.C.S/R. @ 500# N.E.S.C. H.L.

INSTALL: SAME AS ABOVE
COND. & G.W. BOTH @ 2,000# N.E.S.C. H.L.

ROSS CO. O 16737.3

JEFFERSON TWP

H.H. & GRACE BURT TRACT 4 VOL. 218, PAGE 407

VIGO SUB. 187

TYPICAL PHASING
ϕ1
ϕ2
ϕ3

BERLIN ROSS

SEE LINE C-914 SHEET 16A FOR DETAIL OF VIGO SUB

N42°45'W- 12775.6'

VIGO SUB

JEFFERSON TWP.
LIBERTY TWP.

Sec 26 Sec 27 Sec 23 Sec 22

N.29°05W-15196.8'

A.R. 13°40'

Horvey & Thornton Lulu 1 7076'

Carl Mingus 70.1 694

Joseph & Mary Pecher 693

Pecher 1670.2

Oscar

Mrs. Beniaum & Daughter 254.3'

689 690 691 692 695

Albert Tweed 2516.3'

Claire DUBBS 1857.9'

(1) 7#10 ALUMOWELD DOUBLE GUY DBL. HELIX ANC. 538250 (5 SHEAR PINS)
1- 5' EXT.

G.W. (2) 7#10 ALUMOWELD @ 4,000# N.E.S.C. H.L.
60°K=3982 (USE 1282)
COND. (3) 4/0 A.C.S.R.

NO G.W.
COND. 3) 4/0 A.C.S.R. (6/1) @ 4,210# N.E.S.C.H.L.

(6/1) @ 4,210# N.E.S.C. H.L.
120°K=3158 (USE 1030)

STR. 228 TO VIGO SWITCH

15' SPACING

LIBERTY TWP.
ROSS CO. O.
25637.1'

VIGO

TO VIGO
G.W.
50'
G.W.
G.W.
50'
(2) 7#10 ALUMOWELD SINGLE GUYS DBL. HELIX ANC. 528100 (5 SHEAR PINS)
1-5' EXT EACH

149A
(2) G.W.'s
ϕ1
ϕ2
ϕ3
D.E. STR. FOR G.W.'S
VIGO SWITCH STR.

STR. & GUYING DETAIL OF VIGO SWITCH AND G.W. D.E. STR.
NOT TO SCALE

146
A-55 CYP 1926
B-60 CYP 1926
C

147
A-55 CYP 1926
B-60 CYP 1926
C

STR 148
922-101
65/2 WRC 1983
65/2 WRC 1983
8.5 8.5

STR 149A
90'/1 CFPP 1999
D

STR 149C AW12-0342M
75/2 CFPP 2008 DE MOD

STR 150 POHAM
75'/2 CFPP 1999
HP

STR 151 HITI
75/2 CFPP 99
75/2 CFPP 99
S

MOAB
60' STL. 2006
D

VIGO SWITCH 3-WAY.
7' CONC. FOUNDATION

STR. 149A D.E. STR. FOR G.W.'S

STR 149 C 55' CYP 1926 55' CYP 1926 S

72A75

LOOKING TOWARD ROSS

TYPICAL HITI LOOKING TOWARD ROSS

L&R
R

HITI 65/2 65/2 CFPP 99 99 S

MOWA 70/2 70/2 CFPP 70/2 CFPP 99 99 99 S

HITI 70/2 70/2 CFPP 99 99 S

HITI 65/2 70/2 CFPP 99 99 S

HITI 70/2 70/2 CFPP 99 99 S

HITI 75/2 75/2 CFPP 99 99 S 138260

36 6900 Vol. 13

146 147 148 149 150 151 152 153 154 155 156 157 158

457.75 433.33 456.90 456.95 456.77 509.39 511.50 512.76 519.50 525.26 626.18 671.86 685.00

877.9 486.4 527.7 457.5' 60' 114.5' 757.3' 513.8' 505.6' 756.3' 898.5' 388.4' 1029.2' 556.2'

335+8 339 341 344 346+11.5 349 351+95 353 355+48.5 359 361 367+7 368+26.9

STR. 149A
MOAB
GW
STR 149A
GW

STR. 150
STR. 149C
STR. 150
MOAB
GUY BREAKER
2 SHIELD WIRES
1- 5' EXT. 5 SHEAR PINS
ϕ1
ϕ2
ϕ3
HP INSUL
30°
STR. 150

FORMERLY ROSS-BERLIN-LICK SH.12
FORMERLY TL-69-4-404.09 SH.10

REV	REVISION DESCRIPTION	DATE	BY
0	REVISED PER AS BUILT; NO CHANGES PER AS BUILT (JCC) ADOPTED 2009 CAD STANDARDS; CHANGED DRAWING NUMBER. THIS DRAWING SUPERSEDES TL-C-914 SH 16 REV 12	09/24/2009	EAR

SCALE: 1" = 400' HORIZONTAL, 1" = 50' VERTICAL

STATE OF OHIO
ROSS COUNTY
T.8N., R.20W.

ENGR: -	R/W DWG: -
DRAWN: -	R/W MAP: -
CHECKED: -	ISSUED FOR CONSTRUCTION: -
APPROVED: -	

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AMERICAN ELECTRIC POWER

COLUMBUS SOUTHERN POWER
BERLIN - ROSS 69kV LINE

SHEET LENGTH: 7,926.3'
STR RANGE: STR. 146 TO STR. 158

LINE:	C-914
DWG:	D3P016
EQUIP:	TLN130:0C914
SHEET:	16 OF 26
REV	0

AEP Archive ID: 058-095

W:\CSPC\C_914\Pn\TL-C-914.16.dgn

PLOTTED: 03-MAR-YYYY AT PHAM TLPE GAHANNA

STR.149C - 149D
COND.:3) 1/0 AWG 8/1 ACSR (Raven), MAX. TEN. 500 LBS. NESC H.L.
S.W.:1) 7#10, MAX. TEN. 500 LBS. NESC H.L.

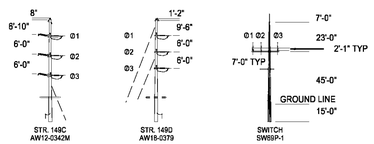
149D - MOBILE SWITCH
COND.:3) 1/0 AWG 6/1 ACSR (Raven), MAX. TEN. 102 LBS. NESC H.L.
S.W.:1) 7#10, MAX. TEN. 102 LBS. NESC H.L.

MOAB - STR.149B
COND.:3) 1/0 AWG 8/1 ACSR (Raven), MAX. TEN. 500 LBS. NESC H.L.

STR.149B - FOB
COND.:3) 1/0 AWG 8/1 ACSR (Raven), MAX. TEN. 100 LBS. NESC H.L.

STR. 149C - STR. 149A
S.W.:1) 7#10, MAX. TEN. 500 LBS. NESC H.L.

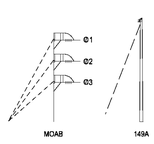
STR. 149A - FOB
S.W.:1) 7#10, MAX. TEN. 100 LBS. NESC H.L.



STR. 149C
AW12-0342M

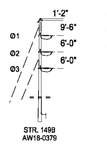
STR. 149D
AW18-0379

SWITCH
SW69P-1

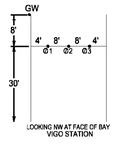


MOAB

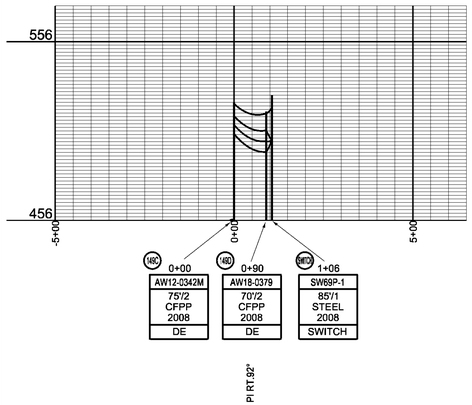
149A

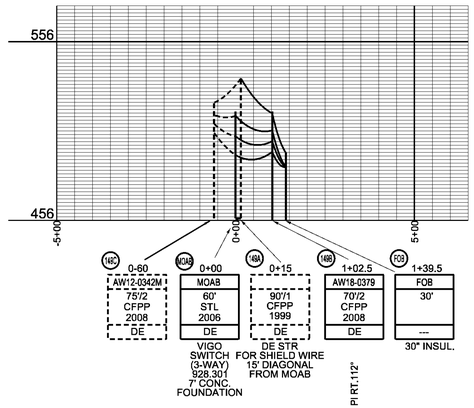


STR. 149B
AW18-0379

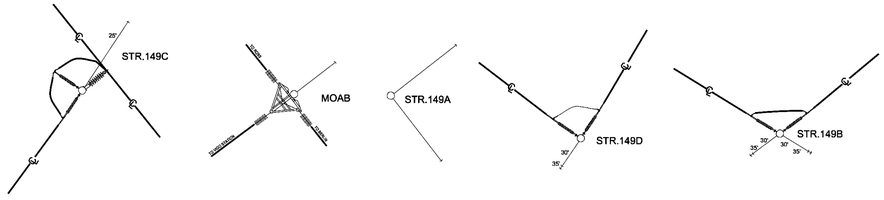


LOOKING NW AT FACE OF BAY
VIGO STATION





VIGO STATION



REV	REVISION DESCRIPTION	DATE	BY
0	REVISED PER AS BUILT; NO CHANGES PER AS BUILT (JCC) ADOPTED 2009 CAD STANDARDS; CHANGED DRAWING NUMBER. THIS DRAWING SUPERSEDES TL-C-914 SH 16A REV 0	09/24/2008	EAR

SCALE:
1" = 200' HORIZONTAL
1" = 40' VERTICAL

STATE OF OHIO
ROSS COUNTY
JEFFERSON TOWNSHIP
T.8N., R.20W.

ENGR:	J. COOKMAN	R/W DWG:	-
DRAWN:	A. RIDHIBHINYO	R/W MAP:	-
CHECKED:	J. COOKMAN	ISSUED FOR CONSTRUCTION:	-
APPROVED:	J. COOKMAN		

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COLUMBUS SOUTHERN POWER
BERLIN - ROSS 69kV LINE
STR RANGE: MOAB TO FOB & STR. 149C TO SWITCH

LINE:	C-914
DWG:	D3P016A
EQUIP:	TLN130:0C914
SHEET:	16A OF 26
REV	0

PLOTTED D3-WMAYYYY A1 PENM TLPE GAHANA

AEP Archive ID: 058-096

W:\CSPCDC_914\Pri\C914-D3P016A.dgn

Section 15. Permits

A. Highway Crossing Permits (Provided by ROW/Siting)

B. Railroad Crossing Permits (Provided by ROW/Siting)

C. SWPPP (to be provided by Environmental)

D. Project is OPSB jurisdictional.

1. **OPSB Project Conditions**
2. **Internal Shift Request Form for OPSB Certified Centerline or Substation Fence Line.**

Section 16. Plan and Profile Package

Appendix A. Construction Specifications List

Document #	Title	Rev. #	Applicable Specifications (X)
TLCS-1301	*Specification for the Installation of a Steel Grillage Foundation*		
TLCS-1302	*Specification for Concrete Drilled Pier Foundations*		x
TLCS-1303	*Specification for the Installation of Guy Anchors*		x
TLCS-1304	*Specification for the Installation of Vibratory Caissons and Driven Pile Foundations*		
TLCS-1306	*Specification for the Installation of Grouted Strand Rock Anchors*		
TLCS-1401	*Specification for the Installation of Wood Poles*		
TLCS-1402	*Specification for the Installation of Steel Poles*		x
TLCS-1403	*Specification for the Installation of Concrete Poles*		
TLCS-1404	*Specification for the Assembly and Erection of Latticed Towers*		
TLCS-1501	*Specification for the Installation of Ceramic, Toughened Glass, and Non-Ceramic Insulators*		x
TLCS-1503	*Specification for the Installation of Guy Wires and Strand*		x
TLCS-1601	*Specification for the Installation of Conductor and Conventional Shield Wire*		x
TLDS-005	*Steel Pole Handling Guide*		x
TLDS-006 /SS-260002	*Guidelines for Stabilization and Lifting of Large Rebar Cages for Concrete Drilled Piers*		x
TLDS-007	*Grounding Principles and Practices for AEP Transmission Lines*		x
TLDS-019	*Steel Pole Jacking Guide*		x
TLDS-022	*Transmission Line Damper Application Guidelines*		x
TLDS-024	*Structure Signs Guide for AEP Transmission Lines*		x
TLDS-051	*Climbing, Fall Protection, and Working Guidelines for Transmission Latticed Tower Construction and Maintenance Activities*		
TLES-032	*Standard Test Procedures for Determining Tower Footing Resistance and Soil Resistivity*		

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1/19/2022 12:53:18 PM

in

Case No(s). 18-0030-EL-BTX, 19-2024-EL-BTA, 21-0269-EL-BTA

Summary: Notice Proof of Compliance with Condition electronically filed by Hector Garcia-Santana on behalf of AEP Ohio Transmission Company, Inc.