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# OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL

4301.001 V05: APRIL 4, 2024




<b>Title</b>	<b>OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL</b>
<b>Version</b>	<b>05</b>
<b>Issue Date</b>	<b>APRIL 4, 2024</b>
<b>Document Number</b>	<b>4301.001</b>

**APPROVAL:**

<b><u>Reviewer</u></b> Luis R. Soto Vega, PE Senior Engineer, Distribution Standards	Signature and Date  April 4, 2024
<b><u>Reviewer</u></b> Ivette Denisse Sánchez Medina, PE Supervisor, Distribution Standards	Signature and Date  April 4, 2024
<b><u>Approver</u></b> Ricardo Castro Gómez, PE Manager, Distribution Standards and Materials	Signature and Date  April 4, 2024

**MANAGEMENT APPROVAL:**

<b><u>Approver</u></b> Patrick Arns Vice President, Quality and System Standards	Signature and Date  April 4, 2024
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**VERSION HISTORY:**

Version	Date	Description	Document Tracking
01	06/14/2022	Original version	4301.001
02	12/12/2022	Revision	4301.001
03	01/10/2023	Revision	4301.001
04	04/05/2023	Revision	4301.001
05	04/04/24	Revision	4301.001





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<b>OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL REVISION LOG - V05</b>						
<b>Standard No., Assembly No. or Section</b>	<b>Document No.</b>	<b>Previous Approval Date</b>	<b>Previous Version</b>	<b>Current Approval Date</b>	<b>Current Version</b>	<b>Changes</b>
Theory	---	04/05/23	4	04/04/24	5	Changes were made in accordance with Regulatory recommendations throughout the document.
Material List	---	04/05/23	4	04/04/24	5	Changes in material names and inclusion of additional material.
ABS-3-VERT	4301.049	03/27/23	6	02/26/24	7	Changes in title, drawings, notes, and bill of material.
ABS-3-XARM	4301.048	03/03/23	6	02/20/24	7	Changes in title, drawings, notes, and bill of material.
ANT-01	4301.064	04/19/22	3	02/02/24	4	Changes in drawings and notes.
ANT-02	4301.065	04/19/22	3	02/02/24	4	Changes in drawings and notes.
ASSY-1500	4301.066	09/25/23	4	01/23/24	5	Changes in title, drawings, and table.
ASSY-1501	4301.067	08/09/23	4	01/23/24	5	Changes in drawings, notes, and bill of material to add C-channel base.
ASSY-1502	4301.068	03/02/23	5	01/23/24	6	Changes in title, drawings, notes, and bill of material.
ASSY-1503	4301.069	12/01/22	4	01/23/24	5	Changes in title, drawings, notes, and bill of material.
ASSY-1504	4301.070	03/17/23	3	02/20/24	4	Changes in title, drawings, notes, and bill of material.
ASSY-1505	4301.071	03/17/23	4	02/02/24	5	Changes in title, drawings, notes, and bill of material.
ASSY-1506	4301.072	03/02/23	5	02/02/24	6	Changes in title, drawings, and notes.
ASSY-1507	4301.073	12/01/22	4	02/02/24	5	Changes in title, drawings, and notes.
ASSY-1509	4301.075	11/29/22	3	02/14/24	4	Changes in title, notes, and bill of material.
ASSY-1510	4301.076	03/02/23	4	02/16/24	5	Changes in notes, and bill of material.
ASSY-1511	4301.077	03/16/23	4	02/02/24	5	Changes in drawings, notes, and bill of material.



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ASSY-1512	4301.078	03/03/23	6	02/07/24	7	Changes in drawings, notes, and bill of material.
ASSY-1513	4301.079	04/07/22	2	02/05/24	3	Changes in title, drawings, notes, and bill of material.
ASSY-1514	4301.084	03/02/23	2	02/20/24	3	Changes in drawings, notes, and bill of material.
CAMVIG-01	4301.080	04/13/22	3	02/02/24	4	Changes in drawings and notes.
CAMVIG-02	4301.081	04/13/22	3	02/02/24	4	Changes in drawings and notes.
CN-1	4301.082	03/17/22	3	02/26/24	4	Change in header.
COMM-01	4301.141	--	--	02/02/24	1	New standard for overhead fed communications system enclosure.
COMM-02	4301.142	--	--	02/02/24	1	New standard for underground fed communications system enclosure.
CP-A1	4301.005	04/05/22	5	02/14/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, bill of material and notes.
CP-A2	4301.006	04/05/22	5	02/16/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-A3	4301.007	11/29/22	6	02/16/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-A4	4301.008	04/07/22	5	02/16/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-A5	4301.009	03/27/23	6	02/22/24	7	Changes in drawings, notes, and bill of material.



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CP-A6	4301.010	05/02/22	5	02/22/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-A7	4301.011	05/07/22	6	02/23/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
CP-A7-1	4301.012	03/27/23	6	02/23/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
CP-A7-2	4301.144	01/03/24	1	02/16/24	2	New standard for single phase primary construction with double deadend and tap-off. Changes in drawings, notes, and bill of material.
CP-A12	4301.145	01/04/24	1	02/22/24	2	New standard for single phase primary construction with single deadend and tap-off.
CP-A13	4301.013	04/07/22	3	02/19/24	4	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-A14	4301.014	03/21/23	4	02/23/24	5	Changes in title, drawings, notes, and bill of material.
CP-B1	4301.015	04/11/22	5	02/14/24	6	Changes in drawings, notes, and bill of material.
CP-B2	4301.016	04/07/22	5	02/16/24	6	Changes in drawings, notes, and bill of material.
CP-B3	4301.017	04/11/22	5	02/19/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.



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CP-B4	4301.018	03/20/23	6	02/19/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-B5	4301.019	04/27/22	5	02/20/24	6	Changes in drawings, notes, and bill of material.
CP-B5-XARM	4301.020	04/28/22	4	02/21/24	5	Changes in drawings, notes, and bill of material.
CP-B6	4301.021	03/20/23	7	02/22/24	8	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-B6-XARM	4301.115	11/29/22	4	02/23/24	5	Changes in drawings, notes, and bill of material.
CP-B7	4301.022	04/21/22	6	02/26/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
CP-B7-1	4301.023	03/27/23	6	02/22/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
CP-B7-VERT	4301.143	01/03/24	2	02/16/24	3	New standard for two phase primary vertical construction with double deadend and tap-off. Changes in drawings, notes, and bill of material.
CP-B12-VERT	4301.146	01/04/24	1	02/21/24	2	New standard for two phase primary vertical construction with single deadend and tap-off. Changes in drawings, notes, and bill of material.



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CP-B12-XARM	4301.147	01/04/24	1	02/22/24	2	New standard for two phase primary construction in crossarm with single deadend and tap-off. Changes in drawings, notes, and bill of material.
CP-B13	4301.024	04/20/22	3	02/19/24	4	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-B14	4301.041	03/22/23	5	02/22/24	6	Changes in title, drawings, notes, and bill of material.
CP-C1	4301.025	04/14/22	5	02/23/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C1-VERT	4301.026	04/19/22	5	02/15/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C1-VERT-1	4301.148	01/03/24	1	02/19/24	2	New standard for three phase primary vertical construction with 0° - 5° angle tangent double circuit. Changes in drawings, title, and bill of material.
CP-C2	4301.027	04/19/22	5	02/23/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C2-VERT	4301.028	04/19/22	3	02/15/24	4	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.





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CP-C3-VERT	4301.029	04/26/22	5	02/16/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C3-XARM	4301.039	04/25/22	3	02/23/24	4	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C4-VERT	4301.031	04/22/22	5	02/16/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C5-VERT	4301.032	04/22/22	3	02/22/24	4	Changes in drawings, notes, and bill of material.
CP-C5-XARM	4301.033	03/20/23	6	02/22/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C6-VERT	4301.034	04/22/22	3	02/23/24	4	Changes in drawings, notes, and bill of material.
CP-C6-VERT-1	4301.149	01/17/24	1	02/19/24	2	New standard for three phase primary vertical construction with double deadend dole circuit. Changes in drawings, notes, and bill of material.
CP-C6-XARM	4301.040	04/22/22	5	02/23/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.



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CP-C7	4301.126	03/27/23	4	04/03/24	5	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway and to include all applicable standards over the open-wire tap-off. Changes in title, drawings, notes, and bill of material.
CP-C7-VERT	4301.035	03/20/23	5	02/19/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
CP-C7-1	4301.036	03/21/23	5	02/22/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
CP-C12-VERT	4301.037	03/21/23	5	02/23/24	6	Changes in title, drawings, notes, and bill of material.
CP-C12-XARM	4301.132	03/23/23	1	02/23/24	2	Changes in title, drawings, notes, and bill of material.
CP-C13	4301.038	04/28/22	3	02/22/24	4	Changes in drawings, notes, and bill of material.
CP-C14	4301.042	03/22/23	4	02/23/24	5	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
E-1-2-3	4301.083	04/29/22	4	01/23/24	5	Changes in title, drawings, notes, and bill of material.
E-2-1	4301.085	04/29/22	2	01/23/24	3	Changes in title, drawings, notes, and bill of material.
E-5	4301.086	05/10/22	3	11/02/23	4	Changes in notes.
F-1-3	4301.087	03/29/23	4	01/18/24	5	Changes in title, drawings, notes, and bill of material.
F-4-1	4301.089	03/29/23	5	01/23/24	6	Changes in title, drawings, notes, and bill of material.
F-4-2	4301.088	03/29/23	5	01/24/24	6	Changes in drawings, notes, and bill of material.



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F-5-1	4301.090	05/03/22	3	01/22/24	4	Changes in drawings, notes, and bill of material.
F-6-1	4301.091	11/29/22	4	01/24/24	5	Changes in drawings, notes, and bill of material.
K-1	4301.057	05/06/22	2	02/06/24	3	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
K-2	4301.058	05/06/22	2	02/07/24	3	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
K-4	4301.061	05/06/22	2	02/05/24	3	Changes in title, drawings, notes, and bill of material.
K-5	4301.101	05/06/22	2	02/06/24	3	Changes in title, drawings, notes, and bill of material.
K-6	4301.102	05/06/22	2	02/06/24	3	Changes in title, drawings, notes, and bill of material.
K-7	4301.092	11/29/22	4	02/07/24	5	Changes in title, drawings, notes, and bill of material.
K-7-1	4301.093	03/09/23	5	02/07/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
K-7-2	4301.094	11/29/22	4	02/06/24	5	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
K-7-3-1	4301.095	11/29/22	6	02/07/24	7	Changes in title, drawings, notes, and bill of material.
K-7-4	4301.096	11/29/22	2	02/07/24	3	Changes in title, drawings, notes, and bill of material.
M-5	4301.097	05/03/22	7	12/19/23	8	Changes in notes.
M-5-A	4301.098	05/03/22	7	12/19/23	8	Changes in drawings and notes.
M-5-B	4301.099	05/03/22	3	12/19/23	4	Changes in notes.



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M-5-C	4301.119	05/03/22	1	12/19/23	2	Changes in notes.
M-5-D	4301.122	03/16/23	4	12/19/23	5	Changes in notes.
M-7	4301.100	05/03/22	3	02/26/24	4	Change in header.
M-10	4301.103	05/17/22	3	03/25/24	4	Change in header.
M-12-2	4301.105	06/03/22	3	02/26/24	4	Change in header.
M-12-6	4301.161	--	--	03/19/24	1	New standard for schematic diagram for three phase transformer's delta – open delta connection for 240/120 V service.
PMU-1	4301.133	--	--	04/01/24	1	New standard for phasor measurement unit (PMU) system.
REC-1	4301.121	03/06/23	5	02/27/24	6	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
REC-2	4301.123	10/02/23	6	02/26/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
REC-2-1	4301.124	10/03/23	6	02/26/24	7	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
REC-2-2	4301.128	10/04/23	3	02/26/24	4	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
REC-3-A	4301.120	03/24/23	4	02/27/24	5	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.



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REC-3-B	4301.136	03/24/23	1	02/27/24	2	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
REC-3-C	4301.134	03/24/23	1	02/27/24	2	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in title, drawings, notes, and bill of material.
REC-3-C-VERT	4301.131	03/24/23	1	04/02/24	2	Changes in title, drawings, notes, and bill of material.
REC-4-A	4301.125	03/24/23	3	02/27/24	4	Changes in title, notes, and bill of material.
REC-4-B	4301.137	03/24/23	3	02/27/24	4	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Modification of Detail A. Changes in title, drawings, notes and bill of material.
REC-4-C	4301.135	03/24/23	1	02/27/24	2	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Modification of Detail A. Changes in title, drawings, and notes.
S-ABS-3	4301.151	01/10/24	1	02/20/24	2	New standard for spacer construction with air break switches. Changes in drawings, notes, and bill of material.
S-1	4301.043	04/27/22	4	02/08/24	5	Changes in drawings, notes, and bill of material.
S-1-1	4301.044	04/27/22	4	02/08/24	5	Changes in drawings, notes, and bill of material.
S-3	4301.045	04/28/22	4	02/08/24	5	Changes in drawings, notes, and bill of material.
S-3-1	4301.118	05/04/22	3	02/08/24	4	Changes in title, drawings, notes, and bill of material.





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S-3-XARM	4301.140	09/15/23	2	02/08/24	3	New standard for spacer construction in crossarm with 6°- 60° angle. Changes in drawings, notes, and bill of material.
S-4-VERT	4301.139	09/15/23	2	02/08/24	3	New standard for spacer vertical construction with 61°- 90° angle. Changes in drawings, notes, and bill of material.
S-4-XARM	4301.138	09/15/23	2	02/08/24	3	New standard for spacer construction in crossarm with 61°- 90° angle. Changes in drawings, notes, and bill of material.
S-5	4301.046	03/17/23	7	02/20/24	8	Changes in drawings, notes, and bill of material.
S-6	4301.047	03/20/23	7	02/20/24	8	Changes in drawings, notes, and bill of material.
S-6-2	4301.030	03/20/23	7	02/20/24	8	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
S-7-1	4301.156	--	--	04/03/24	1	New standard for spacer cable tap-off.
S-12	4301.150	01/09/24	1	02/20/24	2	New standard for spacer construction with single deadend and tap-off. Changes in drawings, notes, and bill of material.
T-1	4301.050	01/09/23	7	02/26/24	8	Changes in drawings, notes, and bill of material.
T-2	4301.051	01/09/23	7	02/26/24	8	Changes in drawings, notes, and bill of material.
T-3	4301.052	01/09/23	7	02/26/24	8	Changes in drawings for the 8" spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.



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T-3-1	4301.053	01/09/23	6	02/26/24	7	Changes in title, drawings, notes, and bill of material.
T-3-3	4301.155	--	--	03/19/24	1	New standard for three phase transformer bank with delta – open delta connection.
T-4	4301.054	03/10/23	10	02/26/24	11	Changes in drawings for the 8” spacing hole pattern face be oriented to the roadway. Modification of Detail A. Changes in title, drawings, notes, and bill of material.
T-5	4301.055	03/10/23	10	02/26/24	11	Changes in drawings for the 8” spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
T-8	4301.056	03/16/23	5	02/26/24	6	Changes in drawings for the 8” spacing hole pattern face be oriented to the roadway. Modification of Detail A. Changes in drawings, notes, and bill of material.
T-10-1	4301.059	03/16/23	7	02/26/24	8	Changes in drawings for the 8” spacing hole pattern face be oriented to the roadway. Changes in drawing, notes, and bill of material.
T-12	4301.060	01/10/23	6	02/27/24	7	Changes in drawings for the 8” spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
T-12-1	4301.127	01/10/23	2	02/26/24	3	Changes in drawings for the 8” spacing hole pattern face be oriented to the roadway. Changes in drawings, notes, and bill of material.
T-13	4301.062	05/02/22	3	02/26/24	4	Changes in title and notes.



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**OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL REVISION LOG - V05**

<b>Standard No., Assembly No. or Section</b>	<b>Document No.</b>	<b>Previous Approval Date</b>	<b>Previous Version</b>	<b>Current Approval Date</b>	<b>Current Version</b>	<b>Changes</b>
T-14	4301.063	04/29/22	3	02/26/24	4	Change in title.
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## Acronyms and Abbreviations

<b>Term</b>	<b>Definition</b>
AA	Aluminum Association
AAAC	All Aluminum Alloy Conductor
AC	Alternating Current
ACSR	Aluminum Conductor Steel-Reinforced
ACSS	Aluminum Conductor Steel-Supported
ANSI	American National Standard Institute
AWG	American Wire Gauge
BIL	Basic Insulation Level
DC	Direct Current
DCD	Design Criteria Document
DOE	U.S. Department of Energy
FCC	Federal Communications Commission
FCI	fault current indicator
IEEE	Institute of Electrical and Electronics Engineers
kilo	k represents kilo for 1,000
kV	kiloVolt
kVA	kiloVolt-Ampere, total power in a system
kVAR	kiloVar
kW	kiloWatts
LUMA	LUMA Energy, LLC, LUMA Energy Servco, LLC
MCOV	maximum continuous operating voltage
NEC	National Electrical Code
NESC	National Electrical Safety Code
OH	overhead
OHGW	overhead ground wire
OSHA	Occupational Safety and Health Administration
OGPe	Permits Management Office
PCB	Polychlorinated Biphenyl
psi	pound-force per square inch
PVC	polyvinyl chloride
RUS	Rural Utilities Service



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## **PART I: GENERAL APPLICATION**

### **1. Overview**

#### **1.1 LUMA’s Authorities**

Pursuant to the Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement executed among LUMA Energy, LLC, LUMA Energy Servco, LLC (the latter two jointly “LUMA”), the Puerto Rico Electric Power Authority (“PREPA”) and the Puerto Rico Public-Private Partnerships Authority dated as of June 22, 2020 (“T&D OMA”), LUMA is responsible, on behalf of or as agent of PREPA, for (i) providing management, operation, maintenance, repair, restoration and replacement and other related services for PREPA’s transmission and distribution system and related facilities, equipment and other assets related to the transmission and distribution system (“T&D System”), in each case that are customary and appropriate for a utility transmission and distribution system service provider and (ii) establishing policies, programs and procedures with respect thereto (collectively, the “O&M Services”). Therefore, LUMA is entitled to exercise all of the rights and perform the responsibilities of PREPA in providing the O&M Services. Also, LUMA has the autonomy and responsibility to operate and maintain the T&D System and establish the related plans, policies, procedures, and programs with respect thereto. As part of the O&M Services, LUMA is responsible for all engineering activities related to the operation of the T&D System, including, but not limited to: analyses related to maintenance of records and standards for design and engineering, design standards, construction standards, system performance, system reliability, equipment ratings, and the improvement of existing, or development of additional/new, and the on-going maintenance of revisions to, all T&D System drawings, specifications, construction manuals, equipment diagrams and other technical documentation. Pursuant to these rights and responsibilities, LUMA has developed this “Overhead Electrical Distribution System Manual” (this Manual).

Unless otherwise expressly indicated, this Manual supersedes any other technical documents or manuals issued by PREPA or LUMA prior to the effective date of this document. All actions taken by LUMA described in this document are taken on behalf of or as agent of PREPA pursuant to the T&D OMA.

#### **1.2 Purpose**

The purpose of this Manual is to provide updated technical requirements for the design and construction of the electrical overhead distribution system in Puerto Rico. These requirements aim to improve resilience and modernize the Puerto Rico electrical system.

#### **1.3 Applicability**

These standards shall apply to PREPA, LUMA and their contractors in connection with the design and construction of any overhead electrical distribution system infrastructure and to any



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third-parties that design or build overhead electrical distribution system infrastructure to be transferred to PREPA. This Manual shall also apply to the interconnection of private systems to the PREPA overhead electrical distribution system and third-party attachments to be installed on PREPA poles. Exceptions or deviations from the requirements or standards in this Manual shall be requested by writing to the LUMA Standards and Materials Department. The request will be sent to [DISTSTANDANDMAT@LUMAPR.COM](mailto:DISTSTANDANDMAT@LUMAPR.COM) with the subject: Request for Exception or Deviation Evaluation. It should clearly outline the need for the exception and the specific issue, providing a detailed justification for why the exception is necessary. The Standards and Materials Department shall evaluate the request within 15 labor days and provide a written resolution on whether the exception will be approved. The design and construction of overhead electrical distribution system infrastructure shall also comply with all applicable laws and regulations in force.

This Manual shall be used in harmony with the current LUMA Distribution Design Criteria Document (DCD), PREPA Public Policy for the Construction of Electrical Systems, *Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios* from the Puerto Rico Planning Board (Joint Regulation), the *Reglamento de Ordenación de la Infraestructura en el Espacio Público* (Regulation for the Ordainment of the Infrastructure in Public Space, Puerto Rico Planning Board Regulation No. 22, Regulation 4861 (as may be amended, Planning Board Regulation No. 22), and Acts No. 17 of August 11, 2019, No. 139 of August 9, 2002, and No. 47 of June 26, 1987, as amended, and all other applicable laws.

## **1.4 Effectiveness**

This Manual, including the standards set forth in it, will be effective as of the date of publication and shall apply to all new designs received for endorsement from that date forward.

## **1.5 Safety**

The standards in this Manual shall be supplemented by the current versions of the LUMA safety rules, the National Electrical Code (NEC), the National Electrical Safety Code (NESC), and the latest version of the Puerto Rico Codes (PR Codes) approved by the Permits Management Office (OGPe, by its Spanish acronym) of the Department of Economic Development and Commerce (as may be amended). Safety shall take priority over all other requirements. If any specification or standard in this Manual is considered inadequate or incorrect from a safety point of view, it should be brought to the attention of LUMA Standards and Materials Department for clarification or correction in the application of said specification or standard. LUMA reserves the right to require any modifications or impose additional requirements or conditions, to ensure, safety considerations, technological improvements, and or compliance with this Manual and other applicable laws, regulations, codes, or standards.



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## **2. Applicable Legal Provisions and Codes**

### **2.1 Industry Codes, Standards and Reference Documents**

The design and construction of overhead electrical distribution system infrastructure shall comply with the following codes:

- National Electrical Code (NEC)
- National Electrical Safety Code (NESC)
- Puerto Rico Codes (PR Codes)

### **2.2 Other Codes and Standards**

The design and construction of the overhead electrical distribution system infrastructure shall comply with applicable industry codes and standards. Some of the organizations whose industry codes and standards shall apply, as applicable, include, but are not limited to:

- Aluminum Association (AA)
- American Concrete Institute (ACI)
- American Institute of Steel Construction (AISC)
- American National Standards Institute (ANSI)
- American Society of Civil Engineers (ASCE)
- Association of Edison Illuminating Companies (AEIC)
- ASTM International (ASTM)
- Avian Power Line Interaction Committee (APLIC)
- Illuminating Engineering Society (IES)
- Institute of Electrical and Electronics Engineers (IEEE)
- International Code Council (ICC)
- International Electrotechnical Commission (IEC)
- Insulated Cable Engineers Association (ICEA)
- National Fire Protection Association (NFPA)
- National Electrical Manufacturer’s Association (NEMA)
- Rural Utilities Service (RUS)
- Telecommunications Industry Association (TIA)

The design and construction of the overhead electrical distribution infrastructure shall also take into consideration industry best practices and the unique environmental conditions on the island.



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### 2.3 Applicable Laws and Regulations

The design and construction of the overhead electrical distribution system infrastructure shall comply with all applicable federal, Commonwealth of Puerto Rico and local laws, regulations, and codes, including, but not limited to, Act 161-2009, as amended, the Joint Regulation, Planning Board Regulation No. 22, and including regulations from the following agencies or public instrumentalities:

- Federal Aviation Administration (FAA)
- Occupational Safety and Health Administration (OSHA)
- Puerto Rico Energy Bureau (PREB)
- Puerto Rico Electric Power Authority (PREPA)
- Puerto Rico Permits Management Office (Oficina de Gerencia de Permisos OGPe)
- Puerto Rico Planning Board (Junta de Planificación “JP” by its Spanish acronym)
- Puerto Rico Bureau of the Firefighters Corps (“PRBFC”)

## **PART II: OVERHEAD ELECTRICAL SYSTEM CONSTRUCTION REQUIREMENTS**

### 3. General

The overhead electrical distribution system consists of:

- A. Primary feeders
  - a. Poles, guys, anchors, insulators, conductors, disconnecting devices, line hardware
  - b. Surge arresters
  - c. Transformers, their equipment, and protection devices
  - d. Grounding
- B. Secondary lines
- C. Pole joint use attachments

Overhead electrical systems will have the capacity to resist loads of longitudinal imbalance for the intact load condition. These imbalances may occur due to different wind loads in adjacent spans, uneven strains on the conductor, uneven spans, and extreme temperatures, among others.

The designer of the proposed overhead electrical distribution system infrastructure will include in the design to be delivered to LUMA the loading conditions with their description and wind speed used and must indicate what loading conditions apply for the different types of structures used in the design.





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Design load factors and wind pressure computations must also be submitted to LUMA. Line design computations should be done by an experienced registered licensed engineer on the design of overhead electrical systems, and they must be delivered to LUMA along with plans for evaluation.

The maximum recommended length of any span for new open-wire line construction under full tension in urban settings should not exceed 150 feet. For rural areas, the appropriate span length relies on site topography. Therefore, the suitable span length should be confirmed based on engineering design criteria and computations with the aid of pole analysis software tools. Existing spans will remain the same length even when the structures are replaced, except if the design needs modification. The maximum span for reduced tension installations shall be 75 feet.

### 3.1 Clearances

The minimum vertical and horizontal clearances from overhead power lines to structures, land, water bodies, railways, highways, and roads are illustrated in standards no. M-5, M-5-A, M-5-B and M-5-C in this Manual. Every development project that includes overhead power lines to be transferred to PREPA or will be installed in public areas, must comply with the clearances established in said standards, under the conditions and design criteria corresponding to the final sag of the conductors to be installed. The construction of the electrical system lines of PREPA or to be transferred to PREPA is not allowed over structures such as, but not limited to, residences, buildings, or swimming pools.

The vertical clearance between phases of the same circuit shall be at a minimum of 3 feet. Vertical clearances between different circuits shall be at a minimum of 4 feet (see standard **no. M-5-D in this Manual**).

The sag is the vertical distance between the conductor and the horizontal line between the two support points, measured at the midpoint of the span (midspan). When there is a difference in elevation at the support points, the sag must be measured at the lowest point of the conductor in the span. The final sag of a conductor is determined under specific conditions of wind and temperature load, after being subjected for a considerable period to the load prescribed for Puerto Rico, and it includes the effect of inelastic deformation.

Construction of all lines shall include a vegetation buffer with a clearance margin of 12 feet for primary lines and 5 feet for secondary lines of airspace between the distribution conductors and surrounding vegetation, provided that the conditions in the field so allow. The vegetation buffer shall be maintained regardless of whether is covered, insulated or bare conductors. The installation of infrastructure, equipment, or other object of a third-party is not allowed within a radius of 3 feet from PREPA poles. If maintaining a minimum radius of 3 feet is not possible, the third-party shall contact LUMA to obtain written approval for the proposed placement, which approval shall be at LUMA's discretion.



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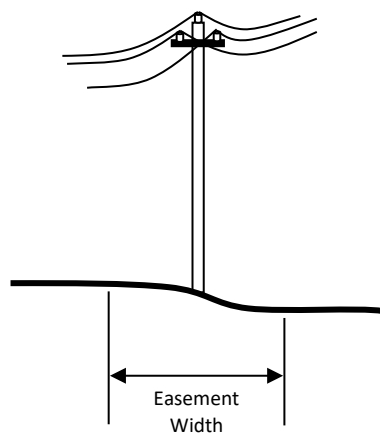
The design and construction shall consider applicable NESC and OSHA codes or regulations to determine the required clearance between a worker and his equipment to an energized line.

PREPA easements are established with the purpose of providing PREPA/LUMA reasonable access to PREPA's facilities, in order to maintain, repair, improve, operate, and expand these facilities, among other things. The term easement should not be confused with clearance. Easements are established over portions of land where PREPA's facilities or equipment are or will be located, such as: lines, poles, towers, and attachments. PREPA's easements are subject to the requirements set forth in the PREPA's *Reglamento de Servidumbres para la Autoridad de Energía Eléctrica*, approved on December 13, 2005 (as amended, "Regulation 7282"), Act 143 of June 20, 1971, as amended, and the Puerto Rico Civil Code of 2020, and other applicable laws and regulations governing public easements, as may be amended or superseded. Any PREPA easement discussed in this Manual must comply with these requirements.

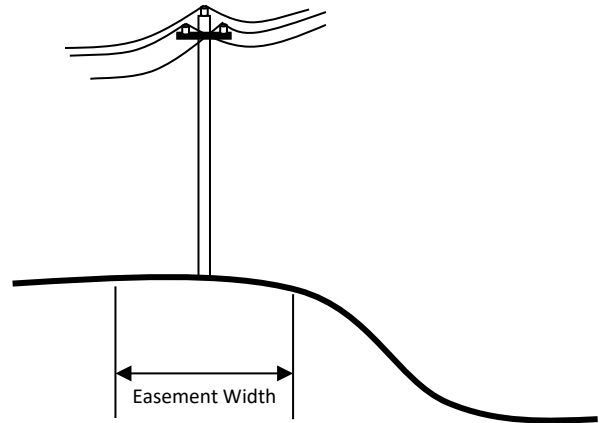
The minimum width of easements for overhead sub-transmission and distribution lines are as follows:

- 38 kV sub-transmission lines:
  - 25 feet for urban areas
  - 50 feet for rural areas
- Primary and secondary distribution lines:
  - 10 feet

Unless not permitted by field conditions, pole installation should be made at the center of the easement width. The easement shall be established on land with a difference in elevation that is less than or equal to 1 foot (see Figure 1). If the difference in elevation is more than 1 foot, the easement boundary will be at the edge of the slope (see Figure 2).



**Figure 1**



**Figure 2**



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The easement for guys shall have a minimum width of 10 feet, extending 5 feet on each side of the centerline of the guys. The length of this easement is equal to the distance between the pole and the anchor end under the ground for the guy, as determined in the structural design of the guy system (see standard no. E-5 in this Manual).

A 10 feet wide easement must be established when the service drop crosses over a property that is not the one for which the referred service is installed, even though that property belongs to the service owner. During the construction of the electrical system, any installation must be within the established easement.

## **4. Primary Feeders**

### **4.1 General**

#### **4.1.1 Voltage**

The primary feeder system will be a three-phase distribution line, four-wire, multi-grounded system. Depending on the connection point assigned by LUMA, the voltage level will be 4160, 7200, 8320, 13,200 volts or any other voltage required by LUMA. Primary feeders will be designed and built with provisions for interconnection with other feeders in the loop for protection. The designer will coordinate with LUMA the arrangement to be used in each particular project.

### **4.2 Ampacity and Conductor Selection**

Aluminum Conductor Steel Reinforced (ACSR) type conductors shall be used for the construction of overhead lines located more than 1 mile from saltwater bodies or non-contaminated areas.

Copper conductors or All Aluminum Alloy Conductors (AAAC) shall be used for lines in contaminated areas or areas located within 1 mile of saltwater bodies.

Where higher ampacity up to 900 A is required, 556.5 MCM Aluminum Conductor Aluminum-Clad Steel Supported (ACSS/AW) shall be used, except for overhead lines located in contaminated areas or areas located within 1 mile of saltwater bodies, where 927.2 MCM All Aluminum Alloy Conductor (AAAC) shall be used.

For installations with spacers in electrical distribution systems, a 7/16 inches Aluminum-Clad type aluminum conductor is used to provide mechanical support to cables, which is known as a messenger.



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#### 4.2.1 Conductors

Conductors are selected in incremental steps based on their capacity to provide a substantive increase in ampacity and minimize the overall number of conductor types used and inventory of various conductor sizes.

Distribution conductors shall be selected to provide the required ampacity and to limit the allowable voltage drop during normal and contingency operation, as well as consider load growth. The neutral conductor must be rated to the full capacity of the feeder. Conductor selection should consider:

- A. Voltage class (per section 4.1.1)
- B. Ampacity (per sections 4.2 and 4.2.1, and Table 4-1)
- C. Economic criteria
- D. Sag design
- E. Location (contaminated or non-contaminated areas, coastal or non-coastal areas)

Where conductors of different materials are to be connected, aluminum conductors shall be installed above copper conductors to avoid galvanic corrosion.

**Table 4-1. Common Overhead Primary Distribution Conductor Data**

<b>Name</b>	<b>Size</b>	<b>Ampacity Rating (A)</b>	<b>Stranding</b>	<b>Rated Strength (lbf)</b>	<b>OD Diameter (in)</b>	<b>Weight (lbs/1000ft)</b>
-	195.7 MCM AAAC Spacer	342	7	6111	0.832	334
-	394.5 MCM AAAC Spacer	532	19	11970	1.050	568
-	652.4 MCM AAAC Spacer	729	19	19710	1.267	894
-	927.2 MCM AAAC Spacer	908	37	27450	1.468	1183
-	#2 AWG CU Bare	230	7	3000	0.292	204
-	1/0 AWG CU Bare	310	7	4725	0.373	325
-	4/0 AWG CU Bare	480	19	9612	0.528	653



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<b>Name</b>	<b>Size</b>	<b>Ampacity Rating (A)</b>	<b>Stranding</b>	<b>Rated Strength (lbf)</b>	<b>OD Diameter (in)</b>	<b>Weight (lbs/1000ft)</b>
-	300 MCM CU Bare	590	37	13500	0.630	926
-	7/16" Messenger	200	7	19060	0.417	330
Raven	1/0 AWG ACSR/GA	242	6/1	4380	0.398	145
Pigeon	3/0 AWG ACSR/GA	315	6/1	6620	0.502	230
Partridge	266.8 MCM ACSR/GA	475	26/7	11240	0.642	367
Parakeet	556.5 MCM ACSR/GA	721	24/7	19800	0.914	716
Azusa	123.3 MCM AAAC	256	7	4460	0.398	115
Amherst	195.7 MCM AAAC	342	7	6790	0.502	183
Canton	394.5 MCM AAAC	532	19	13300	0.721	370
Cairo	465.4 MCM AAAC	590	19	15600	0.783	436
Elgin	652.4 MCM AAAC	729	19	21900	0.927	612
Greeley	927.2 MCM AAAC	908	38	30000	1.108	864
Parakeet	556.5 MCM ACSS/AW	1323	24/7	14600	0.914	687

### 4.3 Construction Type

Distribution framing and structure drawings for typical structures shall comply with LUMA construction standards set forth in Part V of this Manual and complemented by RUS guidelines. The structures shall be selected to optimize the overall sustainability of material and improve grid resiliency.

#### 4.3.1 Poles

Concrete or metal poles approved by LUMA shall be installed in any new project for PREPA infrastructure or for developments where the electrical distribution system is going to be transferred to PREPA. Fiber reinforced composite poles approved by LUMA can be used as an alternative in those projects.

A minimum height for poles is established in this Manual with the main purpose of complying with the clearance distances required between components of electrical systems, in accordance

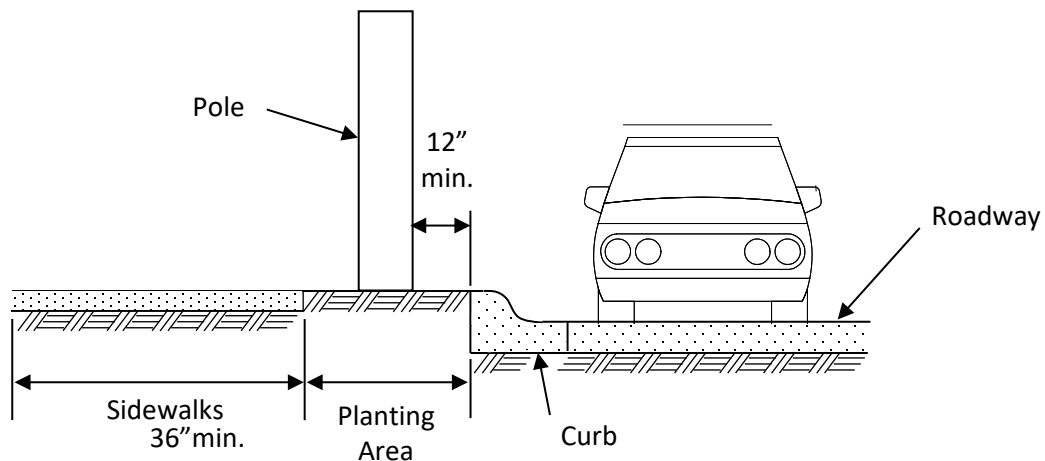


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with the National Electrical Safety Code (NESC) in force, a standard promulgated by the Institute of Electrical and Electronics Engineers (IEEE) and adopted in Puerto Rico. For construction of new lines or line extensions, or reconstruction of complete lines, the minimum pole height shall be 50 feet for single circuit three-phase distribution lines, and 60 feet for double circuit three-phase distribution lines. No more than two distribution lines are allowed per pole. For rural areas with limited customer expansion, where no transformer, recloser, or other similar equipment would be installed, pole height may be reduced provided it meets the required pole load analysis (PLA), standards, and clearances. The minimum pole height will be 35 feet exclusively for attaching secondary lines and their hardware.

The required pole height will depend on the equipment to be installed and compliance with safety clearances. Consideration will be given to the possible future installation of communication facilities when determining pole height. Metal poles with steps shall be used if it is necessary to install poles taller than 65 feet. Taller poles (70 or 75 feet) will only be used for the electrical distribution system in special circumstances, in prior coordination with LUMA. The size of consecutive poles shall not differ by more than 5 feet, unless necessary due to the site's topography.

In urbanization projects and urban areas where there are sidewalks, planting areas and curbs, the poles shall be installed in the planting area, at a minimum distance of 12 inches from the curb limit. When the project is a simple land subdivision or segregation, in which there are no sidewalks, planting area or curbs, the poles shall be located on the border of the lots adjoining a public area. If there is a curb, the poles will be installed in the public area, at a distance of 12 inches from the curb limit. (See Figure 3-A)

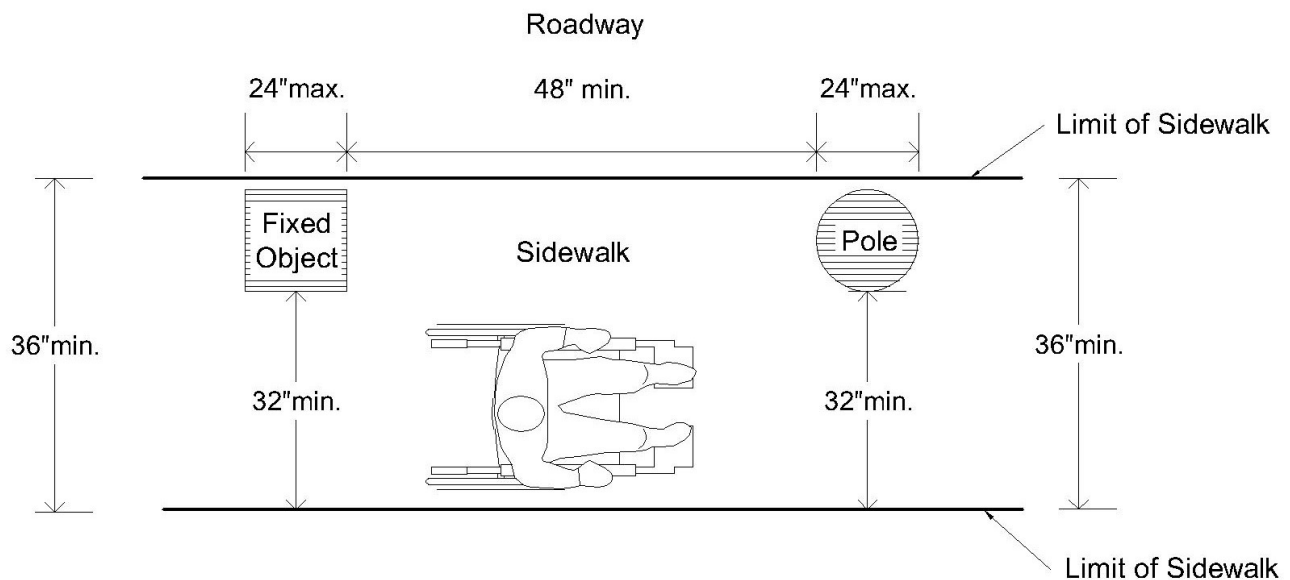


**Figure 3-A**



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Walking surfaces shall provide a 36 inches minimum width clear space, as established by federal standards established pursuant to the Americans with Disabilities Act (ADA). These federal standards permit, as an exception, that the clear space width be reduced to a minimum of 32 inches for a maximum length of 24 inches, provided that reduced segments are separated by segments that are a minimum of 48 inches long and a minimum of 36 inches wide. These clear spaces requirements are applicable to sidewalks where there is no planting area, so poles are installed in the walking surface, as shown in Figure 3-B.



**Figure 3-B**

Poles shall be installed in locations where they are less likely to be impacted by vehicles. In areas where the roadway has multiple curves, poles shall be installed on the inside of curves whenever possible. Poles shall not be installed in roadways, sidewalks, curbs, or places where they may interfere with vehicle or pedestrian passage or access.

Poles of 45 feet or less in height shall be installed at a depth of 10% of the total pole length plus 2 feet, while poles of 50 feet or more in height shall be installed at a depth of 14% of the total pole length, regardless of whether they are installed directly in the ground or in a concrete base. If the pole installation is directly in the ground, it is necessary to adequately tamp the soil in the hole around the pole. If the pole is installed in a concrete base and the depth of the base's hole is greater than the depth at which the pole will be buried, the hole should be backfilled as specified in section 4.3.2.



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Concrete, metal, and fiber reinforced composite poles shall have their holes and slots drilled at the factory per LUMA’s pole specifications. The pole hole pattern or boring is shown in the assembly no. ASSY-1500 in this Manual. Poles shall be installed with the 8 inches spacing face and pole nameplate oriented to the roadway. Field pole drilling will not be allowed.

#### 4.3.2 Concrete Bases for Poles

LUMA requires evidence of the Pole Load Analysis (PLA), performed with a software application approved by LUMA’s Distribution Engineering and Compliance Department, to determine if a concrete base is required for concrete, metal, or composite poles. If, based on the PLA, it is determined that the concrete base is not required, at least one of every five poles shall have a concrete base and a higher pole classification, to prevent the poles from experience a domino effect if the poles fall in case of a force majeure event. Other alternatives to avoid the domino effect can be presented for evaluation and approval by LUMA’s Distribution Engineering and Compliance Department. Where the soil classification is class 6 to 8, per 1724 E-153 RUS bulletin, the use of a concrete base for the poles shall be required- a situation typically found in areas near a body of water or wetland. Precast concrete bases with epoxy coated reinforcing steel rebars shall be used for installations in any heavily corrosive environment.

All concrete bases shall have two 4 or 6-inch diameter riser vacant ducts. 60-inch diameter vacant ducts shall be installed on at least one pole of every five poles when a concrete base is required for all poles on the project. 4-inch diameter vacant ducts will be installed for the remaining concrete bases.

Where concrete bases are occasionally installed or when they are installed at street and avenue intersections, 6 inches diameter vacant ducts shall be installed. Within residential projects where no future expansion is expected, 4-inch diameter vacant ducts may be installed.

Concrete bases may be constructed in place as designed by the engineer. The concrete base design must be submitted to LUMA's Distribution Standards and Materials Department for evaluation and approval. The construction of concrete bases may be performed using 60 grade reinforced steel or 70 grade welded wire mesh, type 4x4 (D9xD9). The 28-day compressive strength of the concrete shall be a minimum of 4,500 psi. The interior of the concrete base, to create the space to install the pole, can be:

- A. Wooden or metal frame that is removable when the concrete is cured
- B. N12-ST high density polyethylene rainwater pipe, soil tight, non-perforated, with a smooth interior and corrugated exterior
- C. Corrugated pipe in 16 grade galvanized steel

For both N12-ST storm pipe and corrugated galvanized steel pipe, the diameter shall be chosen in accordance with the pole dimensions. 2 inches or more shall be provided between the inside frame and the maximum outside diameter of the pole or any corner of it. This total distance of 4 inches will allow for leveling the pole at the time of installation. The total length of the inside





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frames shall be equal to or greater than the depth to which the pole will be installed. This depth shall be 10% of the total length of the pole plus 2 feet for 45-foot or smaller poles, and 14% of the total pole length for 50-foot or taller poles. If the base hole is deeper than the depth at which the pole will be buried, it shall be backfilled with all-purpose sand as per ASTM C33 standard to the proper depth.

LUMA permits the use of approved pre-cast concrete bases for the installation of type FRCP8.5, FRCP13, H6, H8, S8.5, S10 and S13 poles. Approved bases are constructed of concrete with a minimum compressive strength of 4500 psi. The reinforced steel used in the construction of the base must be 60 grade.

The required size of pre-cast bases for pole installation is presented in Table 4-2.

**Table 4-2. Pre-Cast Base Size**

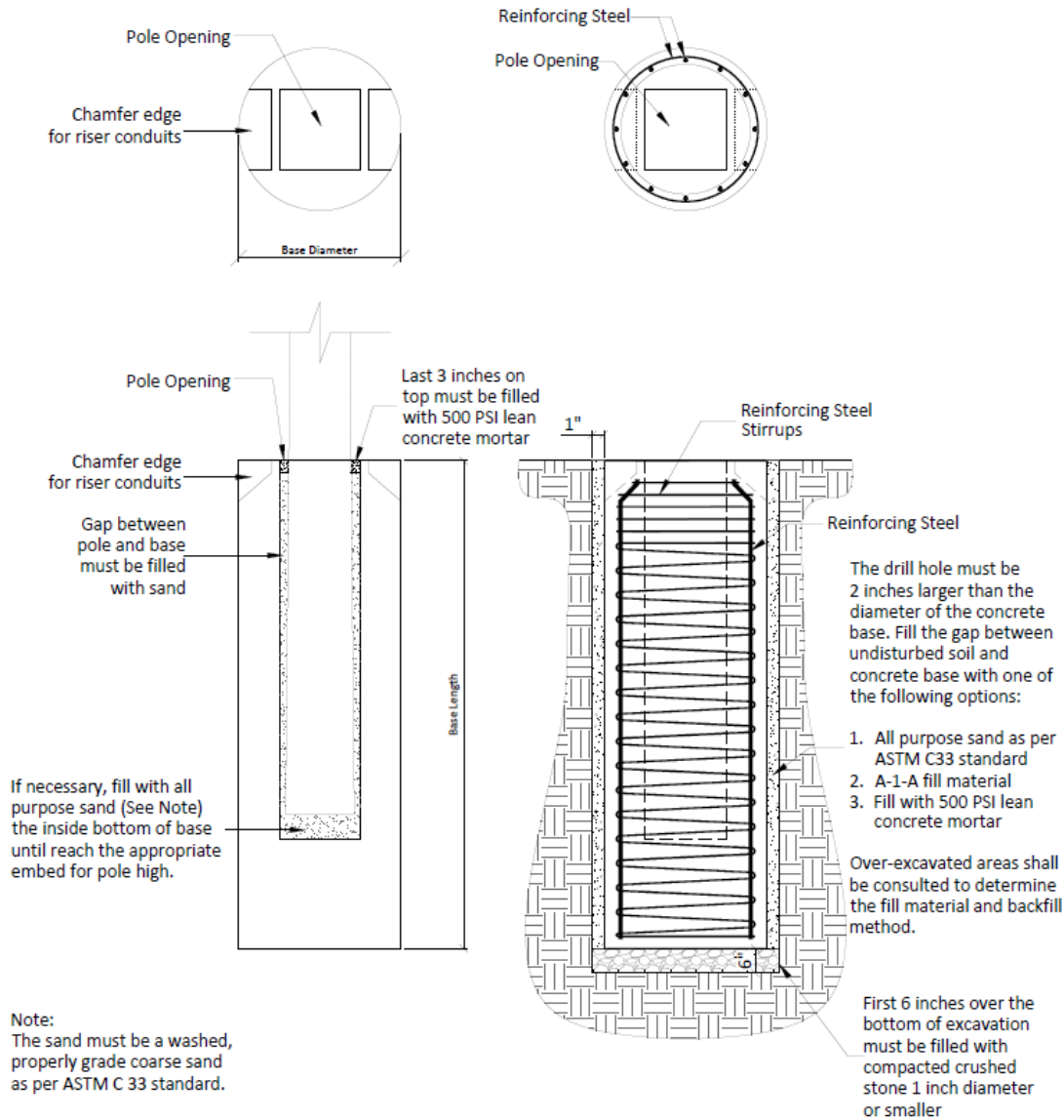
<b>Pole Class</b>	<b>Base Diameter</b>	<b>Total Length of Base</b>
FRCP8.5 Composite (50')	3'-4"	14'-6"
FRCP13 Composite (60')	4'	16'
H6 Concrete (from 50' to 65')	3'-4"	14'-6"
H8 Concrete (from 50' to 65')	4'	16'
S8.5 Metal (from 50' to 65')	3'-4"	14'-6"
S10 Metal (from 50' to 65')	4'	16'
S13 Metal (60')	4'	16'

Excavation for the pre-cast base installation shall be performed using a 42-inch or 50-inch diameter drill, as needed. The drill must be kept vertically leveled during excavation. In case of excavation in rock, a diamond-tipped drill of the same diameter shall be used. The excavation shall be at least 6 inches longer than the total length of the base. Once installed, the base will be set and leveled (see Figure 4).

Before installing the pole, the amount of sand to be deposited inside the base must be determined in order to have the appropriate depth according to the height of the pole. On all concrete pole bases, the space between the pole and the base shall be filled with all-purpose sand as per ASTM C33 standard. The last 3 inches between the pole and the base to reach the natural ground shall be finished using low density flowable concrete with a minimum compressive strength of 500 psi. The base will be kept fixed until the concrete setting process is complete. Pre-cast concrete bases must be installed on firm ground. Installation in areas of unstable ground, such as sand or swamp, will not be accepted. LUMA reserves the right to request soil studies for the specific area where the base will be installed.



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### 4.3.3 Guys

Guys are an indispensable element for the structural strength of the pole. When necessary, the installation of guys on the poles to support the loads imposed by wind, conductors and other equipment may be required.

Guys shall be used when loads imposed on the pole are greater than the pole can support on its own, as well as to provide sufficient strength in those poles where the loads are considerably unbalanced (for example, when angles are formed in the line, line terminals, and when the spans adjacent to the pole are of different lengths). The guy shall be installed at the point on the pole closest to the center of the load from the conductors. Where communications attachments are



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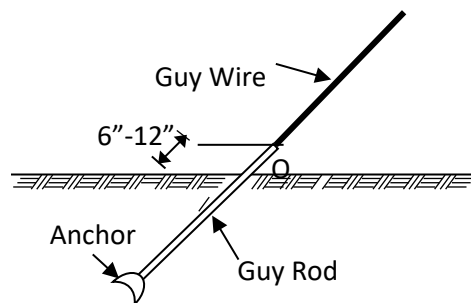
present, the communication companies are responsible for the installation of a second guy closest to the center of the load from the communication lines.

A guy wire marker shall be installed on all guys. The guy marker shall be PVC and yellow, with an approximate length of 8 feet and an approximate diameter of 2 inches, as established in LUMA's standard no. E-1-2-3 in this Manual. Guys located in parking areas must also have mechanical protection from vehicle impact, which may be some type of barrier. Guys shall not be installed on roadways.

The guy wire shall be galvanized steel with a ½ inch diameter. A guy grip of the appropriate size shall be used to attach the wire to the other elements of the guy.

Fiberglass insulators shall be installed on guys at a lower height than the lowest primary electrical circuit, but at a higher height than those for third-party attachments. Its location will make it possible that no voltage is transferred to other facilities in the pole, in the event that a guy comes in contact with any energized part.

To install the guy, a 10-foot long and 1 inch diameter galvanized steel rod, with an eye to hold the guy wire, shall be used. This rod shall be installed in a straight line with the guy when in tension; unless it will be installed in rocky terrain, when this condition is not required. The rod for the guy shall be installed so that the eye of the rod is 6 to 12 inches above ground (see Figure 5).



**Figure 5**



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Location of guys according to the orientation of the line:

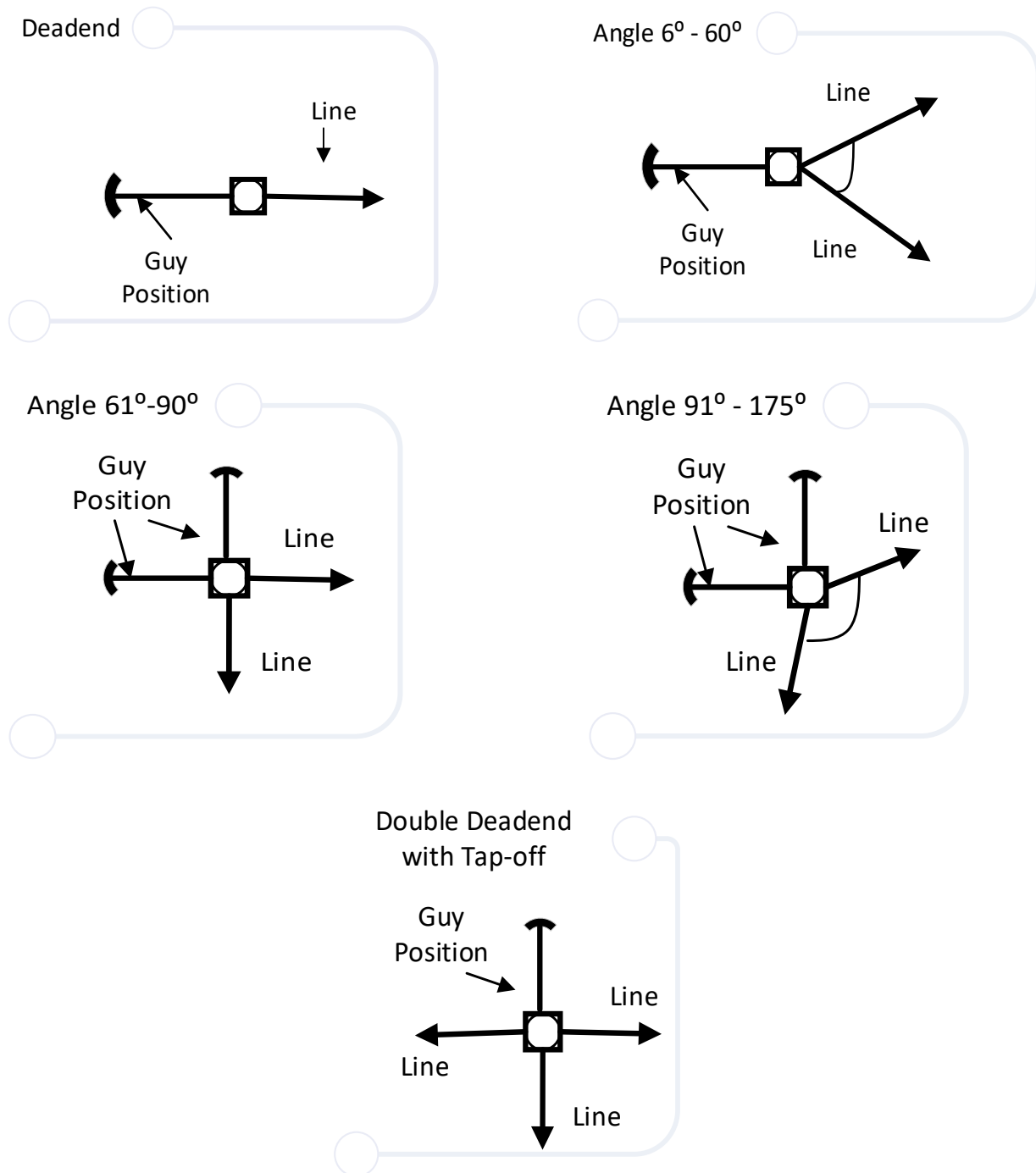


Figure 6



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#### 4.3.4 Anchors

Metal expansion bell anchors and below ground concrete dome anchors attached to the guy rod shall be used.

Other types of rods and anchors will also be used for guy installation, such as screw type anchors and helix type anchors. The type of rod and anchor to be used will depend on the type of terrain where the installation of the guy will be made (see standards no. F-1-3, F-4-1, F-4-2, F-5-1, and F-6-1 in this Manual).

Tables 4-3 and 4-4 show the type of anchor that shall be used in each type of terrain and their maximum tension.

**Table 4-3. Anchors**

Terrain Type	Type
Soil	Expansion Anchor / Screw Anchor
Sand	Helix Anchor
Swamp	Concrete Dome
Rock	Rock Anchor

**Table 4-4. Guys and Anchors Maximum Tension**

Equipment	Warehouse Item No.	Lbs.
Guy strand ½"	046-00219	26,700
Anchor 8-way 12" expanding	002-13546	36,000
Screw type anchor kit (square shaft, multi-helix)	002-82194	70,000
Helix anchor assembly	002-82193	23,000
Fiberglass guy strain insulator	014-00720	30,000
Concrete anchor dome/ 12' Transmission guy system	002-14544/ 002-13835	75,000



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### 4.3.5 Insulators

LUMA uses silicon rubber insulators with an insulation level for 25 kV and 150 kV BIL.

For the construction of electrical distribution lines silicone rubber insulation shall be used for the following equipment: fuse cutouts, surge arresters, suspension insulators, pin type insulator, vertical line post insulator and horizontal line post insulators, among others.

### 4.3.6 Line Hardware

The distribution line hardware shall be determined for the specific voltage application and conductor being used. It shall exceed the conductor breaking strength and be designed to ease the constructability of the line. Stainless steel or thermal diffusion galvanizing (TDG) shall be used within 1 mile of saltwater bodies unless the hardware does not exist in that material.

## 4.4 Sectionalizing Devices

Refer to LUMA's standards in this Manual for the type and configuration of the interrupting equipment applicable for the particular condition, such as fuse cutouts, line switches, smart type reclosers and integration with an automated distribution system. Per results of coordination studies, protective equipment should be installed to:

- Recognize and clear downstream faults during normal and contingency operations
- Minimize the number of customers affected by an outage

The required interrupting equipment is the following:

- A. Line reclosers
- B. Fuse cutouts - Refer to the Distribution Equipment and Primary Line Fusing Guideline (document no. 4300.003) for details on available fuse types and sizes.
- C. Line switches

Sectionalizing devices' capacity shall be from 100 A up to 900 A. The capacity of the distribution primary feeder riser switches from substation breakers shall be 900 A. Refer to LUMA's standards and material specifications for more information.

## 4.5 Line Voltage Controlling Equipment

Per the results of power flow studies, fixed capacitor banks, switched capacitor banks and voltage regulators shall be installed at the appropriate locations to maintain adequate service voltage and minimize losses during peak and light load conditions per ANSI requirements. Refer to LUMA's standards no. T-8, T-10-1, T-12, T-12-1, T-13, and T-14, in this Manual.



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## 4.6 Surge Arresters

Surge arresters shall be installed on the electrical distribution system in appropriate locations to protect transformers, capacitor banks, risers, voltage regulators, voltage converters, line reclosers and other equipment from lightning induced and other over-voltage surges. For maximum protection, surge arresters shall be installed as close to the equipment to be protected as possible.

In addition, surge arresters shall be installed on each phase at 600 feet intervals, if feasible, on overhead electrical distribution lines to help protect the line from excessive trips. Surge arresters installed for equipment protection can also serve as line protection, if installed on all phases coincident with, or one span less, than the required 600 feet interval. Surge arresters are added to remaining unprotected phases at the equipment pole or when the construction configuration does not allow one span less than the required 600 feet interval.

Surge arresters made of metal oxide, gapless, with polymer insulation, shall be used to protect conductors and distribution equipment. Surge arresters to be installed in PREPA’s electrical system must comply with the characteristics and locations shown in Tables 4-5 and 4-6.

**Table 4-5. Surge Arrester Characteristics**

<b>System Application (line voltage)</b>	<b>Nominal Voltage (rated duty cycle voltage)</b>	<b>Max. Continuous Operating Voltage (MCOV)</b>
13.2 kV	10 kV	8.4 kV
7.2 / 8.32 kV	6 kV	5.1 kV
4.16 kV	3 kV	2.55 kV

Surge arresters shall be effectively grounded as indicated in Section 6 – Grounding and Bonding System.



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**Table 4-6. Surge Arrester Location**

<b>Equipment</b>	<b>Use</b>
Distribution transformer	One surge arrester per phase shall be installed in the transformer tank according to the following table.
Voltage converter	Two surge arresters per phase shall be installed, one on the source side and one on the load side.
Voltage regulator	Two surge arresters per phase shall be installed, one on the source side and one on the load side, on the regulator tank.
Air break switch	Normally closed operation - One surge arrester per phase shall be installed at the input or output of the air break switch.  Normally open operation - Two surge arresters per phase shall be installed, one at the input and one at the output of the air break switch.
Line recloser	Single-phase - One surge arrester per phase shall be installed at the input.  Three-phase - Two surge arresters per phase shall be installed, one at the input and one at the output of the recloser on the enclosure.
Capacitor bank	One surge arrester per phase shall be installed, preferably on the source side.
Fused taps	One surge arrester per phase shall be installed, preferably on the source side.
Primary feeder	One surge arrester per phase shall be installed along the primary feeder, on every deadend.

#### **4.7 Fault Current Indicators**

Fault current indicators (FCI) shall be used in their electrical distribution systems. Designers must specify FCI approved by LUMA on their designs. Fault current indicators shall be installed at some locations in the feeder to facilitate troubleshooting of faults, for example, at air break switches, deadends with risers and air break switches and at the overhead backbone, as required (see standards no. ABS-3-VERT, ABS-3-XARM, ABS-4, ABS-4-XARM, and S-ABS-3 in this Manual, and URD-3 and URD-3-B from the Underground Electrical Distribution System Manual). Installation





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and location of FCI shall be coordinated with LUMA’s Reliability Department. The material list included with the construction standards in Part V of this Manual shows all FCI approved by LUMA.

## 5. Transformers

United States Department of Energy (DOE) regulations, which establish energy conservation standards, including efficiency standards for transformers in the electrical distribution system, shall be met. The efficiency levels established for oil-insulated transformers are shown in the specifications for these transformers.

The transformers to be installed in PREPA’s electrical distribution system, in projects where the electrical system will be transferred to PREPA or in private substations with secondary metering, shall comply with the minimum efficiency established in the specifications. In private substation projects with primary metering, a tolerance level as authorized by DOE may be allowed.

In compliance with the regulations established by the Environmental Protection Agency (EPA), every transformer to be installed in the PREPA electrical system and in private systems must be free of contamination from Polychlorinated Biphenyls (PCB) as defined in EPA applicable regulations. Every transformer to be energized in the PREPA electrical system must be labeled with an indication that it contains no PCB.

LUMA requires transformers constructed of stainless steel 304. This requirement includes installations in electrical systems to be transferred to PREPA and in electrical systems that are to remain private when installed within 1 mile of saltwater bodies. This requirement is mandatory even if the transformers are installed in transformer vaults or translosures.

For private substations, a maximum capacity of 100 kVA for a single transformer, and up to three 100 kVA transformers for a maximum capacity of 300 kVA for three-phase substations, are allowed in the overhead electrical distribution system. The designer is responsible to determine the height and class of the pole to be used according to the applicable codes and standards in force and the required pole load analysis (PLA).

The capacity and operation voltage of approved distribution transformers to be transferred to PREPA are included in Tables 5-1 and 5-2.

**Table 5-1. Single-Phase Transformers Capacity**

<b>Approved Transformers Capacity (kVA)</b>				
15	25	37.5	50	75



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**Table 5-2. Transformers Voltage Ratings**

Transformer Nameplate Primary Voltage (V)	System Operational Voltages	
	Line-to-Line Voltage (V)	Line-to-Neutral Voltage (V)
2400/4160Y	No	2400
2400/4160Y x 4800/8320Y	No	2400 x 4800
4160/7200Y	4160	4160
4800/8320Y	No	4800
7200/12470Y	7200	No
7620/13200Y	No	7620
8320/14400Y	8320	No
13200/22860Y	13200	No

Designers shall include the future energy consumption of at least one electric vehicle per dwelling unit or property in the project’s load calculations.

The transformer primary voltage will be determined by LUMA after performing a field evaluation of the primary feeders available in the area to assign the project’s connection point. LUMA may request dual voltage transformers for new projects with primary voltage different to 13.2 kV. The secondary voltage, in general, will be 120/240 V, three wires, according to LUMA’s standards.

Transformers installed or transferred to PREPA shall have four 2.5% taps, two leads over and two under primary voltage. The transformer nameplate must show the taps with their position and corresponding voltage.

Transformer connections approved for PREPA’s distribution system is described in standards no. M-10, M-12-2, and M-12-6 in this Manual. Transformers shall be installed in the same direction as the lines whenever possible.



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## 6. Grounding and Bonding System

The purpose of grounding is to safeguard employees and the public from injuries that may be caused by electrical potential. Grounding and bonding should not be taken for granted.

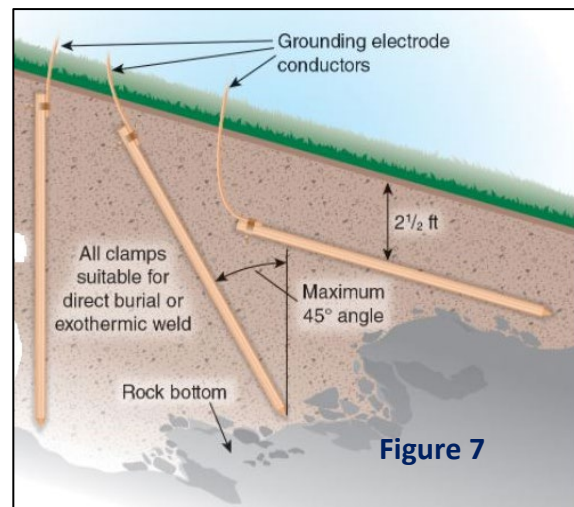
The grounding system on a pole is composed of the following parts:

- A. Ground rod buried next to the pole
- B. Electrical grounding conductor (concrete pole) – copper conductor that is installed inside along the pole and shall be connected to the ground rod
- C. Copper conductor used for the connection between the grounding concrete pole conductor and the equipment's, or devices installed on the pole (bonding).

Grounding rods will be installed on all poles 18 inches below the finish grade. Grounding rods shall be copper-clad steel, with  $\frac{5}{8}$  inches diameter and 8 feet long. The rod shall never be covered with wire coils or any other material.

The ground rod may never be cut or altered at the time of installation. Where rock bottom is encountered, the ground rod must be either driven at not more than a 45° angle or buried in a 2½ feet deep trench.

Driving the rod at an angle is permitted only as an exception if it is not possible to drive the rod vertically to obtain at least 8 feet of earth contact. Burying the ground rod is permitted only as an exception, if driving the rod vertically or at an angle is not possible. Figure 7 shows the installation requirements for ground rods. The ground wire from the pole to the rod must never be exposed.



The electrical grounding copper conductor minimum gauge shall be #2 AWG. The equipment and device grounding copper conductor minimum gauge shall be #2 AWG.

Clamp type connectors with hexagonal head bolt shall be used to connect the grounding copper conductor to the grounding rod, and compression connectors shall be used to connect the electrical grounding copper conductor to the equipment grounding conductor.

The grounding system on metal poles consist of connecting the pole frame to the ground rod. In this case, there is no need for an electrical grounding conductor to connect it to ground since the metal pole performs this function. The pole will have a ground connector at its base to connect the conductor coming from the ground rod. This conductor shall be copper with a minimum gauge of #2 AWG.



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Refer to assemblies no. ASSY-1511, for grounding, and ASSY-1512, for overhead electrical equipment bonding, in this Manual for details on the grounding system on poles.

The grounding copper conductor for surge arresters shall be as short as possible. Excessive length of jumpers connected to the feeder and from the surge arrester to the grounding copper conductor, as well as too large separation between the surge arrester and the equipment to be protected, can reduce, or eliminate the effectiveness of the surge arrester. The grounding copper conductor of the surge arrester shall not have sharp bends (equal or close to 90°) because the transient signals in the power system see them as an open circuit and consequently their magnitudes are amplified.

Grounding shall be tested on all poles where transformers, converters, voltage regulators, line reclosing equipment, switches, capacitor banks, line surge arresters, metering and control equipment are installed. The ground connection on poles shall have a footing resistance of 5 to 10 ohms or less.

The footing resistance is measured by one of the following methods:

- A. Clamp-on Resistance Meter
- B. Wenner's Three Point Method (Fall of Potential)

If the measured resistance is greater than the maximum value, it is necessary to continue adding ground rods to the configuration until an accepted footing resistance value is reached.

## 7. Wildlife Protection

Understanding that the uncontrollable external impact of wildlife is responsible for a far greater proportion of unplanned outages, the use of wildlife and avian protection is required to reduce those outages.

- A. Animal guards shall be installed on all exposed equipment bushings, such as: transformer, capacitor, voltage regulator, recloser, etc.
- B. All equipment and line jumpers should be insulated to help resist flashover from small animal contact
- C. Animal guards shall be installed on all surge arresters
- D. In protected areas, such as bird sanctuaries, bird flight diverters shall be installed (see assembly no. ASSY-1513)

## 8. Secondary Lines

Secondary distribution lines are single-phase, three-wire circuits with a voltage rating of 120/240 volts. All secondary distribution lines shall be constructed on poles with a minimum height of 35 feet. The secondary line conductors shall provide sufficient capacity to serve the



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project’s load. Also, the overhead electrical service drop conductors shall provide sufficient capacity to serve the customer’s load. The minimum size of secondary lines shall be 1/0 AWG Aluminum Triplex, 600 V, or its copper equivalent. Service drops shall have a minimum size of #2 AWG Aluminum Triplex, 600 V, or its copper equivalent. For contaminated areas or areas located 1 mile or less from saltwater bodies copper conductors shall be used. Table 8-1 shows the different types of conductors that LUMA uses and approves for secondary lines that are going to be transferred to PREPA.

The size of secondary lines and service drops shall be selected so that the maximum voltage drop is 3% of the rated secondary voltage at the service drop farthest from the transformer.

The conductors connected to the secondary terminals of distribution transformers for a single-phase system shall have a continuous current rating equal to or greater than the line current of the transformer. The preferred conductor material is copper. Table 8-2 shows the minimum gauge required by LUMA for these conductors.

**Table 8-1. Existing Overhead Secondary Lines and Service Conductor Data (600 V)**

Name	Size	Ampacity Rating (A)	Phase Conductor Stranding	Neutral Conductor Stranding	Rated Strength (lbf)	Phase Conductor Insulation Thickness (mls)	Weight (lb/1000ft)
Voluta	#6 AWG AL Triplex	70	7	6/1	1190	45	120
Periwinkle	#4 AWG AL Triplex	115	7	6/1	1860	45	176
Conch	#2 AWG AL Triplex	150	7	6/1	2850	45	267
Neritina	1/0 AWG AL Triplex	205	7	6/1	4380	60	530
Cherrystone	3/0 AWG AL Triplex	250	7	6/1	6620	60	656
Gothic	#6 AWG CU Triplex	90	7	7	1228	45	263
Caslon	#4 AWG CU Triplex	145	7	7	1938	45	432
Century	#2 AWG CU Triplex	195	7	7	3050	45	674
Corinthian	1/0 AWG CU Triplex	265	19	7	4752	60	1073



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**Table 8-2. Conductors for the Secondary Bushings of Distribution Transformers  
(Line Voltage: 240 V)**

Transformer Capacity (kVA)	Line Current (A)	600 V Insulated Conductor Minimum Gauge Required by LUMA (AWG)	
		CU	AL
15	62.50	#2	1/0
25	104.17	#2	1/0
37.5	156.25	#2	1/0
50	208.33	1/0	3/0
75	312.50	4/0	N/A
100	416.67	500	N/A

Through LUMA, PREPA provides, at no cost to the client, the overhead service drop for residential and commercial services with a load less than 50 kVA, single-phase or three-phase, as long as they do not request exclusive services.

In existing distribution systems, with prior coordination with LUMA, the connection of a maximum of two service drops directly to the secondary line between two poles will be allowed, as long as the service drops are connected in pairs at the same point and extend in opposite directions. A single service drop may be allowed if its length does not exceed 35 feet. In new development projects, service drops will be connected from poles.

A concrete column containing the meter will be allowed as a point of delivery of electricity where the overhead service drop does not exceed a length of 50 feet. The column will be located within the owner’s land in the front boundary and may be part of the fence. The front of the meter must be facing the street. The column must meet the minimum clearances required by the NESC Section 23 and comply with LUMA’s construction standard no. K-7-3-1 in this Manual.

The length of the service drop shall not exceed 75 feet from the pole to the bracket. When the connection point to PREPA’s facilities is greater than 75 feet, or to prevent the service from crossing a third-party’s property, the owner shall install intermediate poles and secondary lines as necessary to provide electrical service. If the owner prefers LUMA to build these facilities,



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they must pay the costs thereof. LUMA may request that the owner provide, or obtain and transfer, to PREPA those facilities and the necessary easement in accordance with Regulation 7282. An easement for PREPA must be established when the service drop crosses over a property that is not the one for which the referred service is installed, even if that property belongs to the same owner. When it is inevitable that the service passes over the property of a third-party (but never over the roofs of buildings or houses), the official representative of LUMA's Land and Permits Department will provide the easement form for granting permission authorized by signature of the owner of the property on which an easement is required. In no case will a service drop crossing railroad tracks, water, or irrigation channels, or other similar will be allowed.

It is strictly forbidden to use the walls of a building or house as a point of support to divert from obstacles, for a service drop to serve another building or house. In these cases, it is necessary for the owner to supply a pole, in accordance with the standards established by LUMA.

It is strictly prohibited to extend a service drop from a building or house to serve another building or house. Each one must have an independent service drop. All service drops must start from PREPA's distribution poles, directly to the support that is anchored in the wall of the building or house of the applicant for electrical service.

The service point in overhead service is defined as the point where the service drop connects to the customer's installation, generally in a bracket secured to the building or in the service entrance. This point is understood to be where the PREPA service drop ends.

The customer will provide at the service point a support or bracket appropriately fixed to the wall. The supports must be visible from the street. They cannot be installed directly on roofs of any kind. When it is necessary to use metal supports, tubes, etc., they must be grounded. The service drop's bracket must be installed in the corner of the building that is closest to PREPA's pole. The bracket must be located in such a position that the service drop does not pass over any roof or part of the roof of any other building. It can be installed on the sides of the building, as long as they are visible from the front, but the meter base shall be installed on the front.

Brackets shall not be installed in such a position that service conductors can be easily reached by people, especially on balconies and roofs, or trip over windows, doors, etc., or pass over third-party property, unless an easement is obtained.

The service point supports or brackets will not be allowed to be attached to trees or other support points that are subject to change or oscillation. The use of live vegetation such as trees is not allowed to be used as support for sections of overhead conductors.

In tall buildings, the supports should not be installed at a higher level than the level of the secondary lines, in order to prevent the service drop from interfering with the primary lines and street lighting lines.





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Rigid galvanized steel duct supports for overhead service shall have a minimum diameter of 2 inches to withstand the stress of the service drop without bending. These tubes must be secured by suitable clamps, with through bolts to some members of the structure in wooden houses, and firmly to the concrete walls by means of clamps with expansion caps in the wall. The supports or brackets for the wires shall be secured to the tube by means of suitable clamps. The bracket or support insulator must be secured in such a way as to prevent the service drop from falling down in case of breakage of the insulator. The service entrance conductors shall be no more than 12 inches from the bracket.

The minimum gauge for service entrance conductors in overhead electrical systems shall be #2 AWG copper or 1/0 AWG aluminum for secondary voltage (600 volts or less). Service entrance conductors must be continuous from the service point to the meter socket. Conductors shall not pass through any junction box or condulets. Aluminum may be used in areas outside 1 mile from saltwater bodies. It is an essential requirement that enough length of the service entrance conductors be left at the exit of the outlet that they can be bent into a “U” shape that serves to drain the water and prevent it from entering the tube. No intermediate supports are allowed between the service point and the service entrance outlet.

Refer to construction standards no. M-5, M-5-A, M-5-B and M-5-C in this Manual for minimum vertical clearance of lines over public roads (highways, streets, alleys, paths, driveways, etc.), over pedestrian-only alleyways, over water and over railroad crossings, respectively.

## **9. Communication Lines and Equipment**

### **9.1 Pole Joint Use (Third-Party Attachments)**

#### **9.1.1 Description**

The attachment equipment owned by third parties, such as communications facilities, small cell systems, gunshot detection system, surveillance cameras and wireless communication equipment, to PREPA poles, shall be assessed and tracked to ensure that the additions do not exceed the design strength limits of the poles. Any third-party attachments shall have a previously signed agreement between the owner of such attachment and PREPA (with LUMA acting as agent) addressing, among others, the engineering and legal requirements for pole joint use, including the payment of charges for use of the poles. The owner of the third-party (be it a municipality, telecommunications company, governmental entity, or homeowner association, among others) is responsible for the full cost of and make-ready work required to provide sufficient pole strength or clearance to meet LUMA and industry standards.





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### 9.1.2 Pole Joint Use Agreements

There are various types of pole joint use agreements to address the third-party attachments:

- A. Communication lines and equipment
- B. Surveillance cameras, gunshot detection system, and wireless communication equipment
- C. Small cell antenna system

### 9.1.3 Construction Requirements for Pole Joint Use on PREPA Poles

Prior to installation or modification of a third-party attachment, LUMA requires evidence of a Pole Load Analysis (PLA) performed with a software application approved by LUMA, to determine: (i) if the structural integrity of existing poles is not compromised with a proposed third-party attachment and (ii) the conditions or requirements to be met to allow installation of a third-party attachment in each pole. Appropriate hardware shall be used to install the third-party attachment complying with the applicable industry standards.

The following LUMA's standards in this Manual specify the type of third-party attachments that can be installed on PREPA poles:

- A. Neutral, secondary and pole joint use: ASSY-1506 and ASSY-1507
- B. Surveillance cameras and wireless communication equipment: CAMVIG-01 and CAMVIG-02
- C. Small cell antennas systems: ANT-01 and ANT-02
- D. Communication system enclosures: COMM-01 and COMM-02

All owners and installers of a third-party attachments shall comply with the following applicable construction requirements when making attachments to PREPA poles:

- A. Communication attachments are only allowed on distribution and sub-transmission poles. Joint use is not allowed on poles or structures with 115 kV or 230 kV electrical lines.
- B. Surveillance cameras, gunshot detection system, wireless communication, and small cell antennas and their equipment are allowed on streetlight, distribution, and sub-transmission poles. Refer to the Street Lighting System Design and Construction Manual for installation requirements.
- C. Drilling of any additional holes into concrete or metal poles is prohibited.
- D. Communication conductors' attachments must be firmly secured with clamps or metal rings unless pre-drilled holes are available for use.
- E. Third-party conductors shall be identified with a color tag, as agreed with LUMA, within 12 inches of each attachment. The tag shall include at least the following: company or



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attaching entity name and conductor type. Tags shall be placed in such a way as to permit identification of the attaching entity by observation from the ground.

- F. The electrical supply and communication systems shall be grounded together via a single grounding conductor. The minimum required grounding connections for the communication system to the pole grounding conductor, when used jointly with the electrical supply system, shall include connections at the first and last poles, along with any additional connections required by the NESC. A pigtail intended for connecting to the pole's single grounding conductor should be left in the communication space by the first communication company requesting installation, enabling LUMA to perform the necessary connections.
- G. The installation of solar panels on PREPA poles for powering communication equipment is not allowed.
- H. Concrete bases for poles: Owners and installers of third-party attachments are responsible for having a structural analysis of any PREPA existing pole where a third-party attachment is proposed to determine whether there is a need to install a new pole with concrete base prior to the installation of a third-party attachment. Refer to section 4.3.2 of this Manual for requirements applicable to concrete bases.
- I. Guys: Owners and installers of third-party attachments are responsible for having a structural analysis of any existing PREPA pole where a third-party attachment is proposed to determine whether there is a need to install guys prior to the installation of a third-party attachment. Required guys shall be installed closest to the center of the load from the communication lines. Refer to section 4.3.3 of this Manual for guys requirements.
- J. Attachment and Conductor Clearances: Cables, antennas, cameras, and other third-party devices can be installed in the 5 feet space reserved on PREPA poles for communication attachments. Third-party attachments on PREPA poles, including metal attachment clamps and bolts, metal crossarm supports, bolts and other equipment, including small cell antennas, must be attached so as to maintain the required 42 inches minimum clearance and separation between electrical supply and communication attachments, as specified in the LUMA construction standards no. ASSY-1506, ASSY-1507, ANT-01, ANT-02, CAMVIG-01, CAMVIG-02, COMM-01, COMM-02, M-5-D, in this Manual, and others that LUMA may have. At pole support, a separation of 12 inches must be maintained between third-party attachments and any other communications connection or attachment. Vertical clearance to ground shall comply with LUMA construction standards M-5, M-5-B, M-5-C, in this Manual, or current NESC.
- K. Sag and Midspan Clearances: Owners and installers of third-party attachments must comply with proper design sag and tension in their lines and conductors. A dynamometer shall be used to measure conductors' applied tension. Minimum clearances from power line conductors and other type of conductors must be observed at poles located on both ends of the span and retained throughout the span (see standards no. M-5, M-5-B and M-5-C in this Manual). At midspan, a minimum of 32 inches of separation must be



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maintained between the upper communication conductor and the lower electrical conductor, and 12 inches between each communication conductor, as per Rule 235.C.2.b.(1) of the NESC.

- L. Climbing Space: A clear climbing space must always be maintained on the face of PREPA poles. All attachments must be placed to allow and maintain a clear and proper climbing space on the back side of the pole. Third-party conductor/wire attachments shall be placed on the same side of the pole as those of other attaching entities. All other attachments and risers should be placed on the pole field face quarter section.
- M. Pedestals and Enclosures: Every effort should be made to install third-party pedestals, vaults, and enclosures at a minimum of 3 feet from poles or other PREPA facilities. If a minimum of 3 feet is not possible, the owner or installer of these devices shall contact LUMA to obtain written approval for the proposed placement.

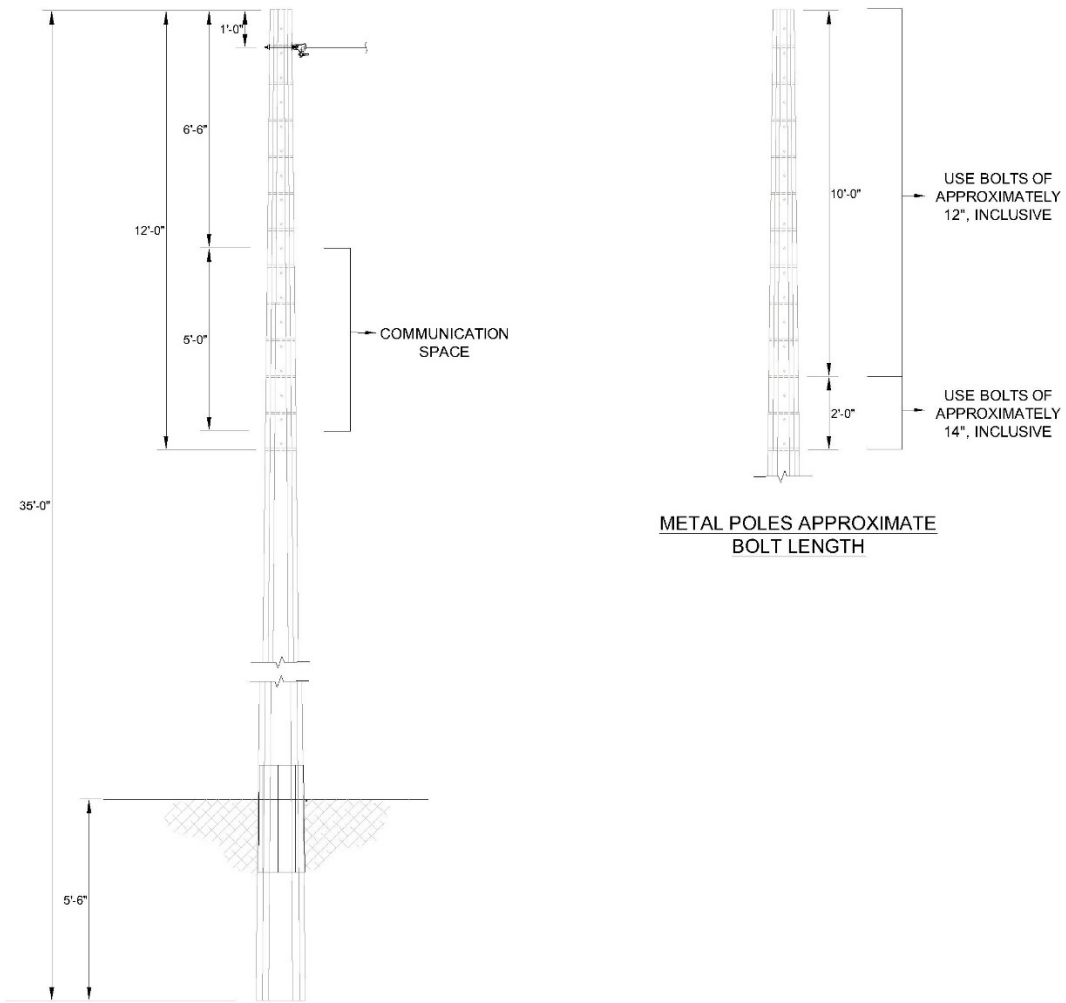
### **PART III: POLE MAXIMUM CONFIGURATIONS**

Following are the possible configurations with the maximum number of circuits and equipment that should be installed on poles to avoid exceeding their structural capacity.



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**35' DISTRIBUTION POLES  
MAXIMUM CONFIGURATION AND BOLT LENGTH**



**METAL POLES  
MAXIMUM POLE CONFIGURATION  
(METAL POLE SHOWN)**

• 1 SECONDARY LINE

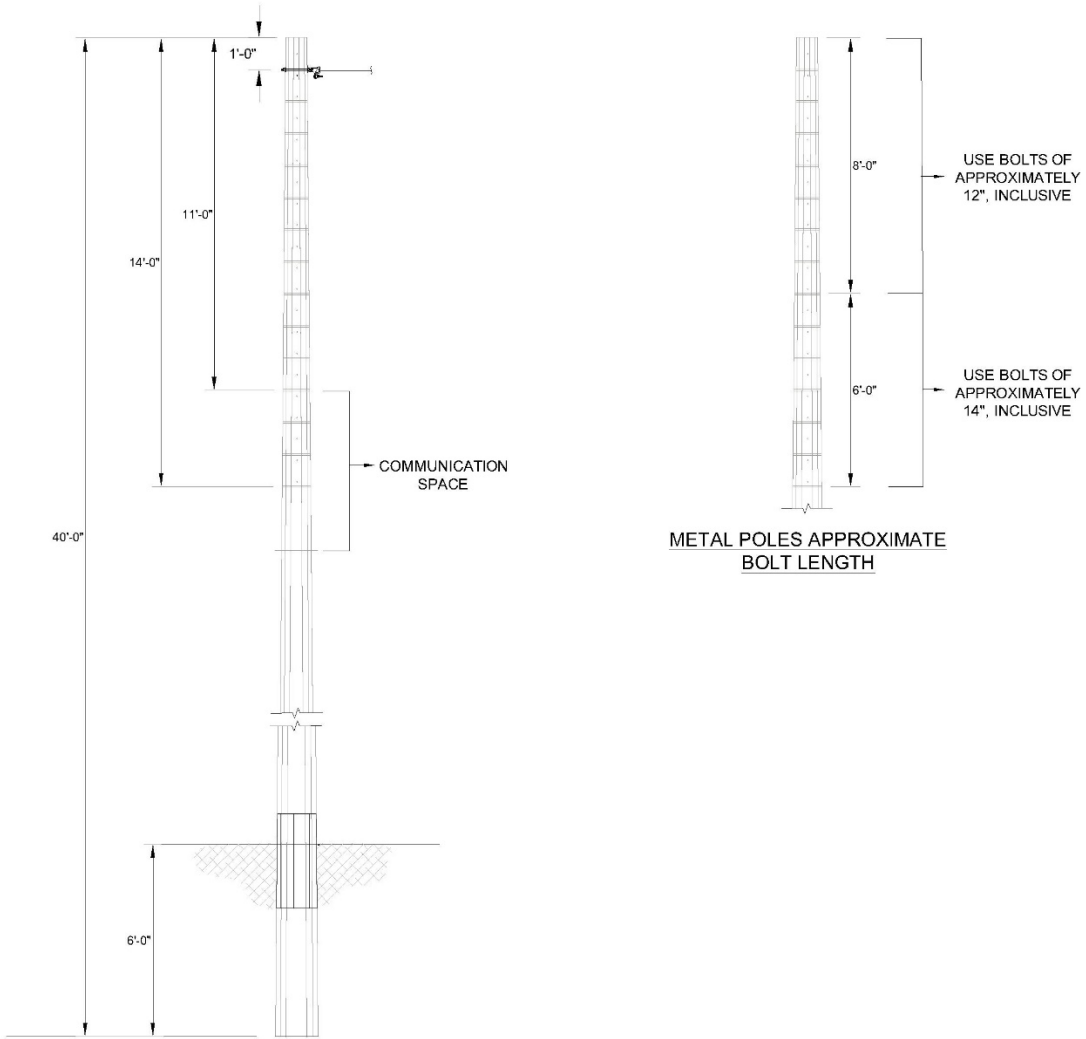
**NOTES:**

1. THE BOLT LENGTH IS APPROXIMATE. IT IS BASED ON THE DIMENSION OF THE POLE AT DIFFERENT HEIGHTS AND THE USE OF NUTS, FLAT WASHERS, C-CHANNEL, AND INSTALLATION OF EQUIPMENT WITH A MAXIMUM THICKNESS OF 1/2".
2. A DOUBLE ARMING BOLT AND EYE NUT SHOULD BE USED IF THE REQUIRED EYE BOLT LENGTH IS NOT AVAILABLE.



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40' DISTRIBUTION POLES  
 MAXIMUM CONFIGURATION AND BOLT LENGTH



METAL POLES  
 MAXIMUM POLE CONFIGURATION  
 (METAL POLE SHOWN)

- 1 SECONDARY LINE

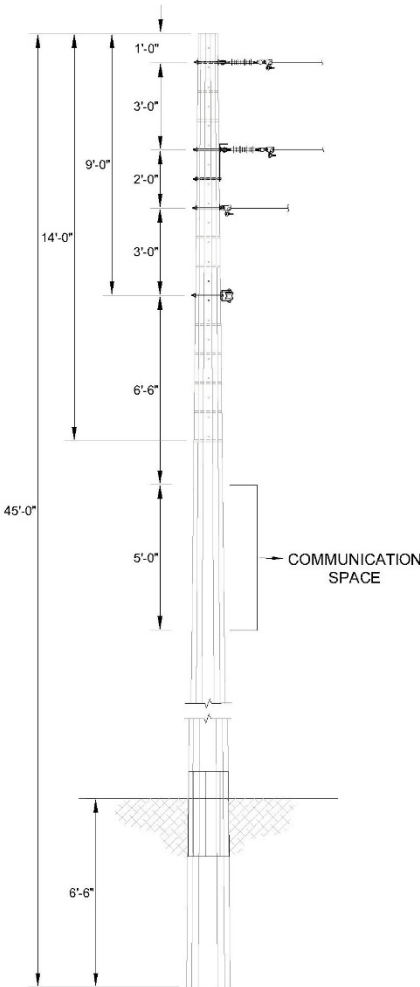
NOTES:

1. THE BOLT LENGTH IS APPROXIMATE. IT IS BASED ON THE DIMENSION OF THE POLE AT DIFFERENT HEIGHTS AND THE USE OF NUTS, FLAT WASHERS, C-CHANNEL, AND INSTALLATION OF EQUIPMENT WITH A MAXIMUM THICKNESS OF 1/2".
2. A DOUBLE ARMING BOLT AND EYE NUT SHOULD BE USED IF THE REQUIRED EYE BOLT LENGTH IS NOT AVAILABLE.

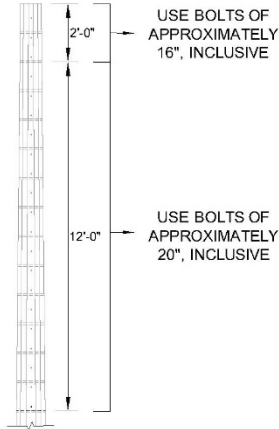


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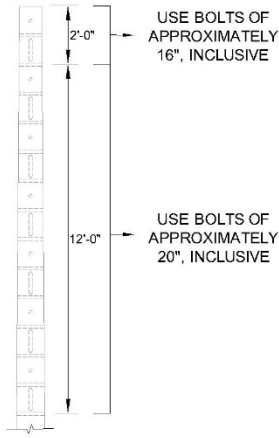
**45' DISTRIBUTION POLES  
MAXIMUM CONFIGURATION AND BOLT LENGTH**



**MAXIMUM POLE CONFIGURATION  
(METAL POLE SHOWN)**



**METAL POLES APPROXIMATE  
BOLT LENGTH**



**CONCRETE POLES APPROXIMATE  
BOLT LENGTH**

- 1 CIRCUIT (DELTA)
- 1 NEUTRAL
- 1 SECONDARY LINE

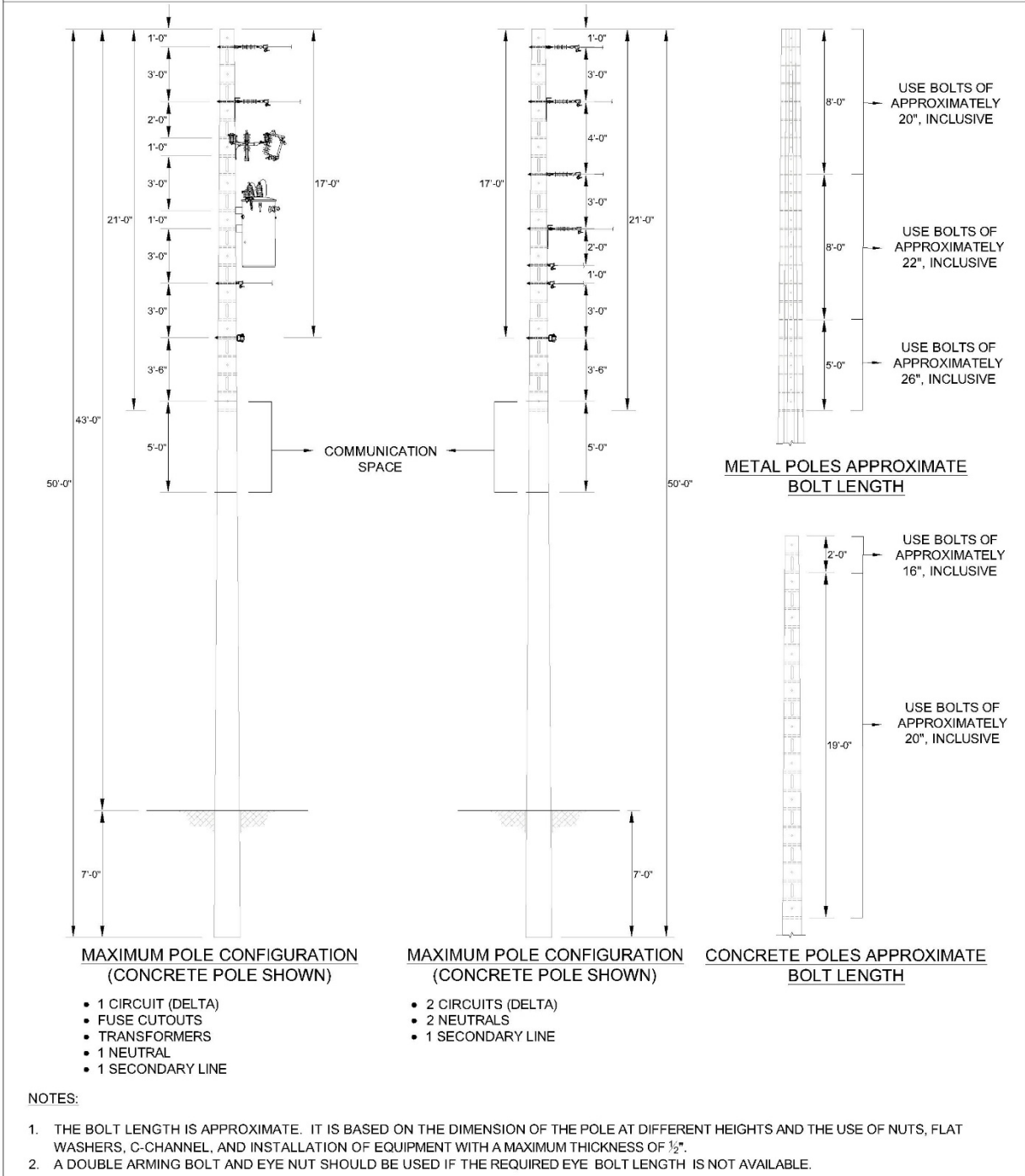
**NOTES:**

1. THE BOLT LENGTH IS APPROXIMATE. IT IS BASED ON THE DIMENSION OF THE POLE AT DIFFERENT HEIGHTS AND THE USE OF NUTS, FLAT WASHERS, C-CHANNEL, AND INSTALLATION OF EQUIPMENT WITH A MAXIMUM THICKNESS OF 1/2".
2. A DOUBLE ARMING BOLT AND EYE NUT SHOULD BE USED IF THE REQUIRED EYE BOLT LENGTH IS NOT AVAILABLE.



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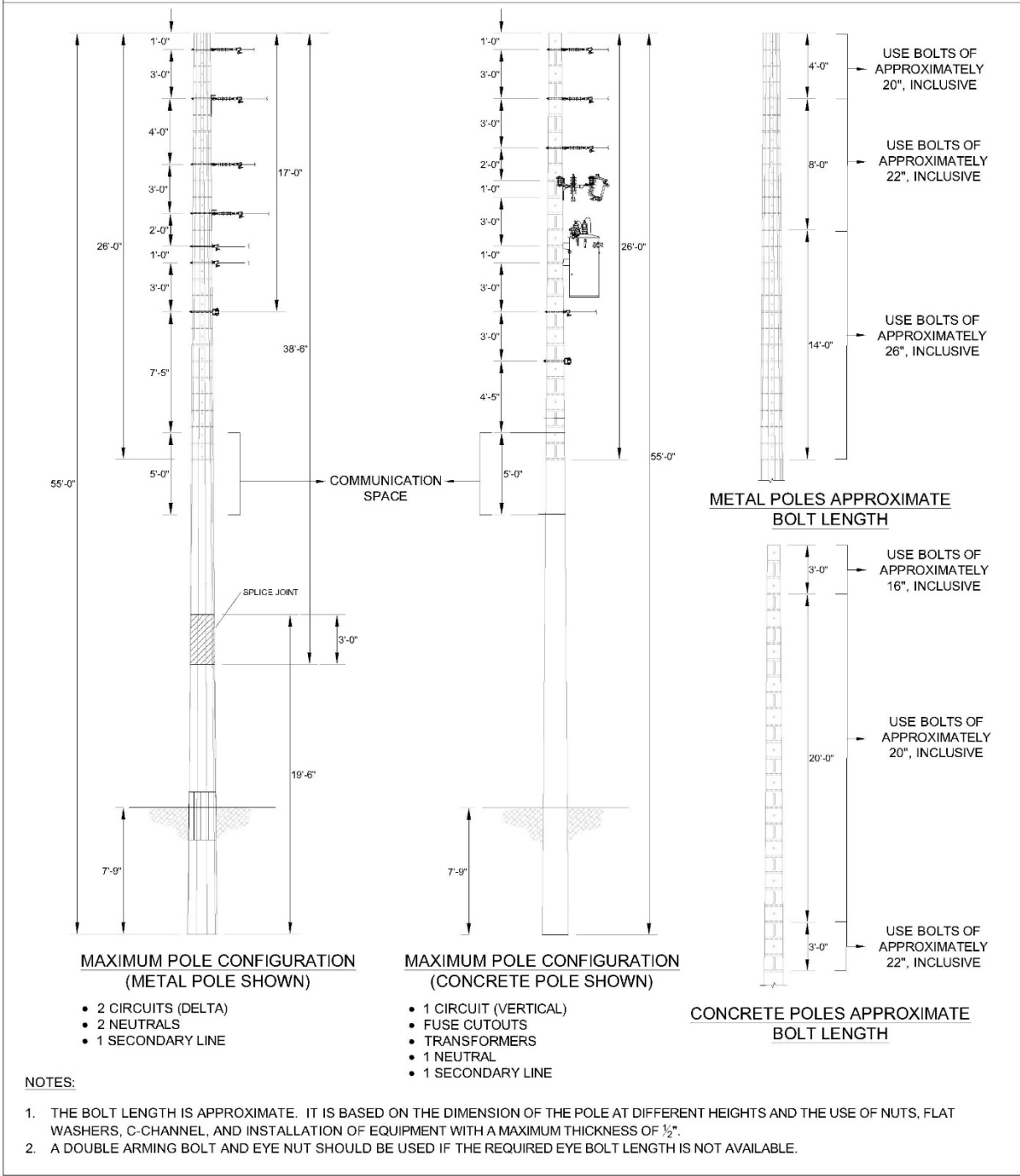
### 50' DISTRIBUTION POLES MAXIMUM CONFIGURATION AND BOLT LENGTH





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### 55' DISTRIBUTION POLES MAXIMUM CONFIGURATION AND BOLT LENGTH

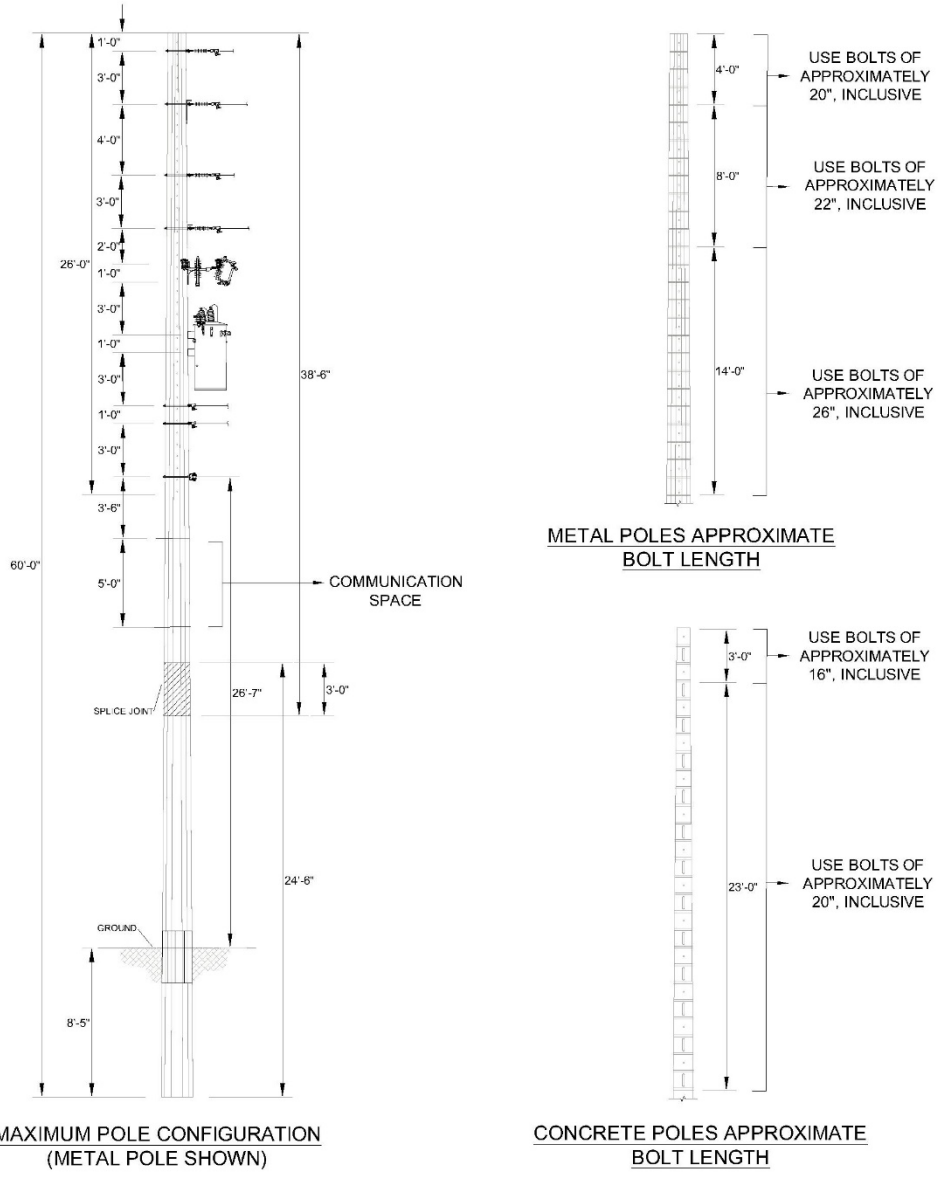






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**60' DISTRIBUTION POLES  
MAXIMUM CONFIGURATION AND BOLT LENGTH**



- 2 CIRCUITS (DELTA)
- FUSE CUTOUPS
- TRANSFORMERS
- 2 NEUTRALS
- 1 SECONDARY LINE

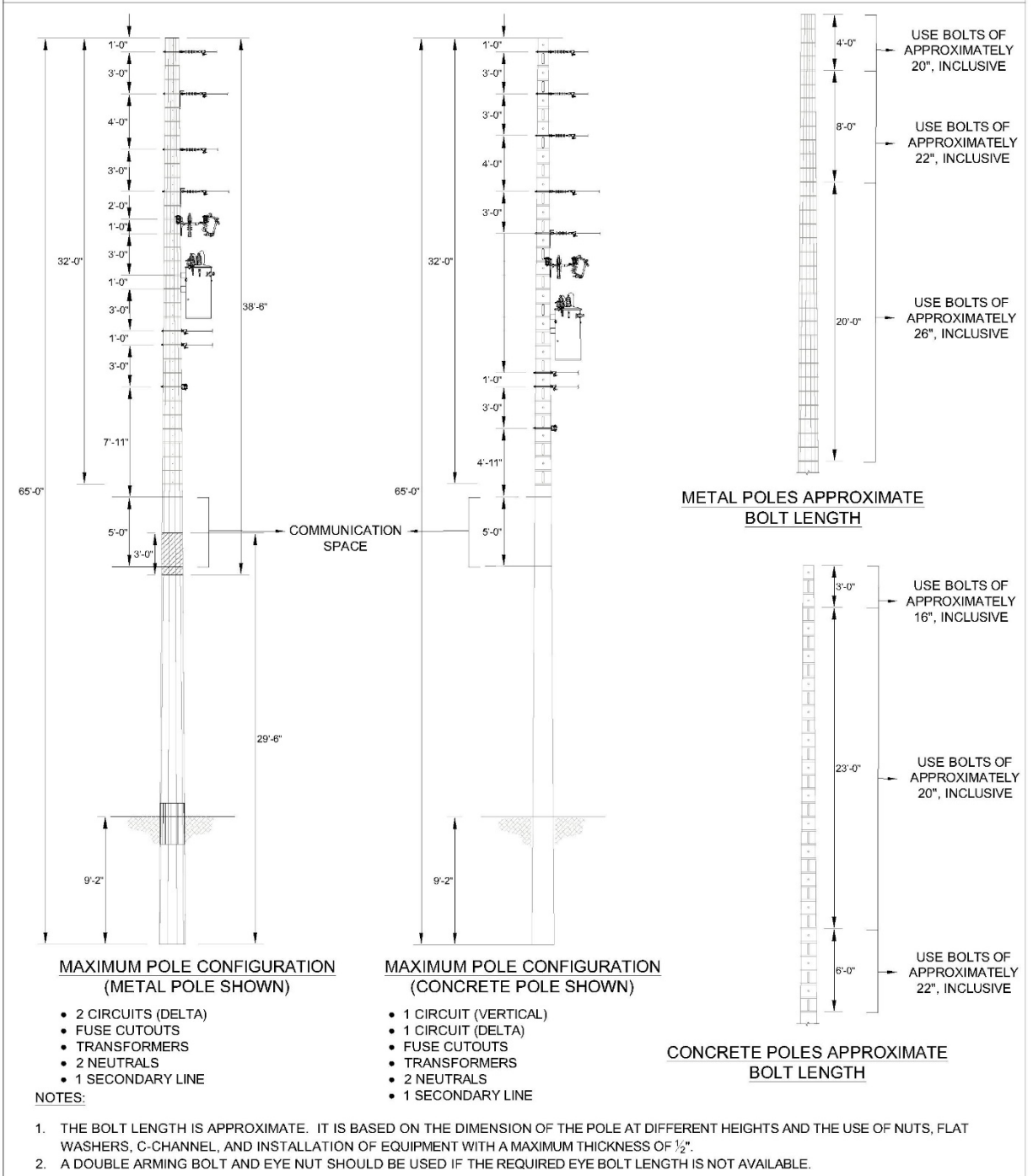
**NOTES:**

1. THE BOLT LENGTH IS APPROXIMATE. IT IS BASED ON THE DIMENSION OF THE POLE AT DIFFERENT HEIGHTS AND THE USE OF NUTS, FLAT WASHERS, C-CHANNEL, AND INSTALLATION OF EQUIPMENT WITH A MAXIMUM THICKNESS OF 1/2".
2. A DOUBLE ARMING BOLT AND EYE NUT SHOULD BE USED IF THE REQUIRED EYE BOLT LENGTH IS NOT AVAILABLE.



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### 65' DISTRIBUTION POLES MAXIMUM CONFIGURATION AND BOLT LENGTH





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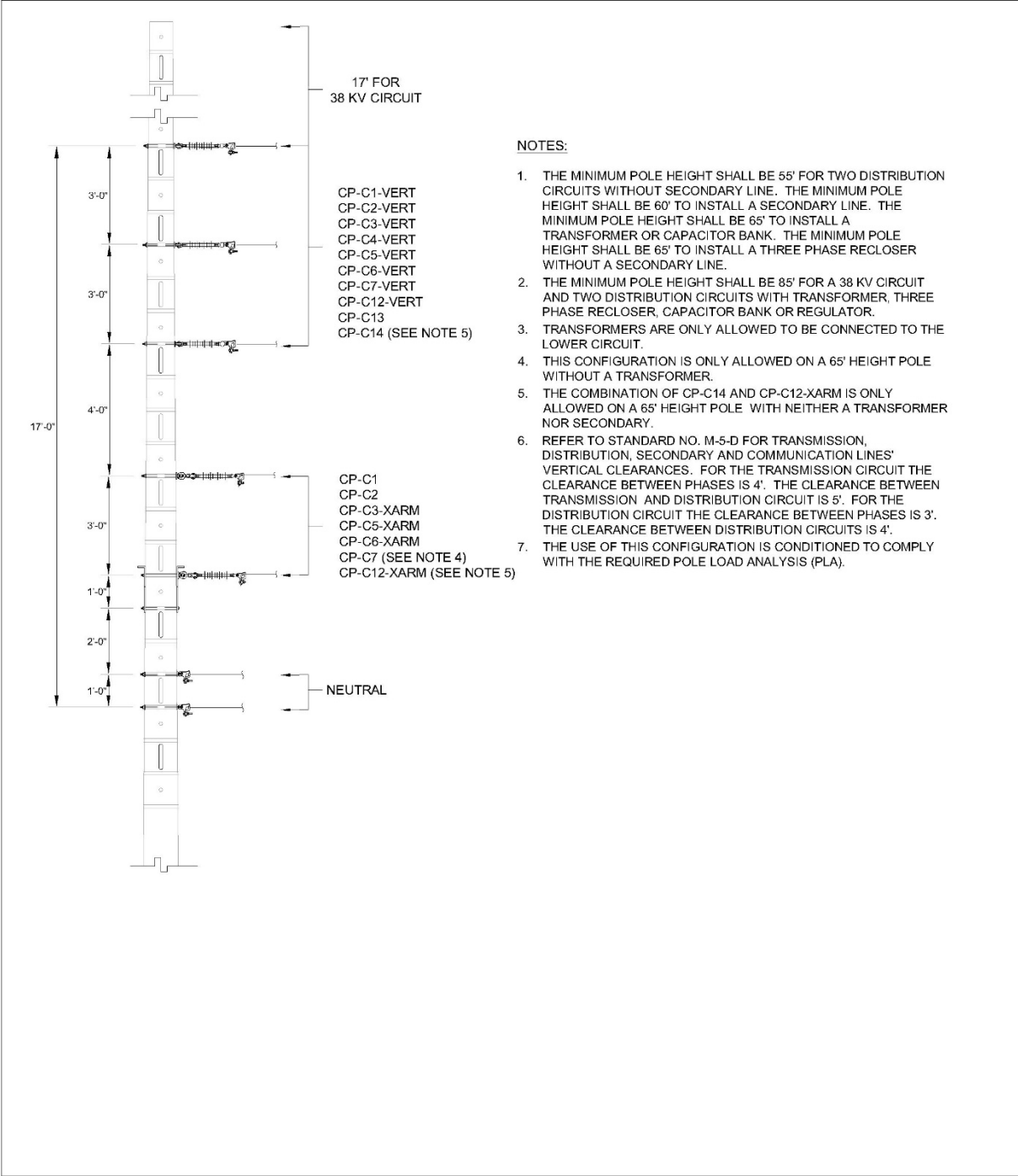
## **PART IV: DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATIONS**

Following are the possible combinations to install two distribution circuits vertically arranged on a pole, meeting the required clearances, and avoiding exceeding their structural capacity.



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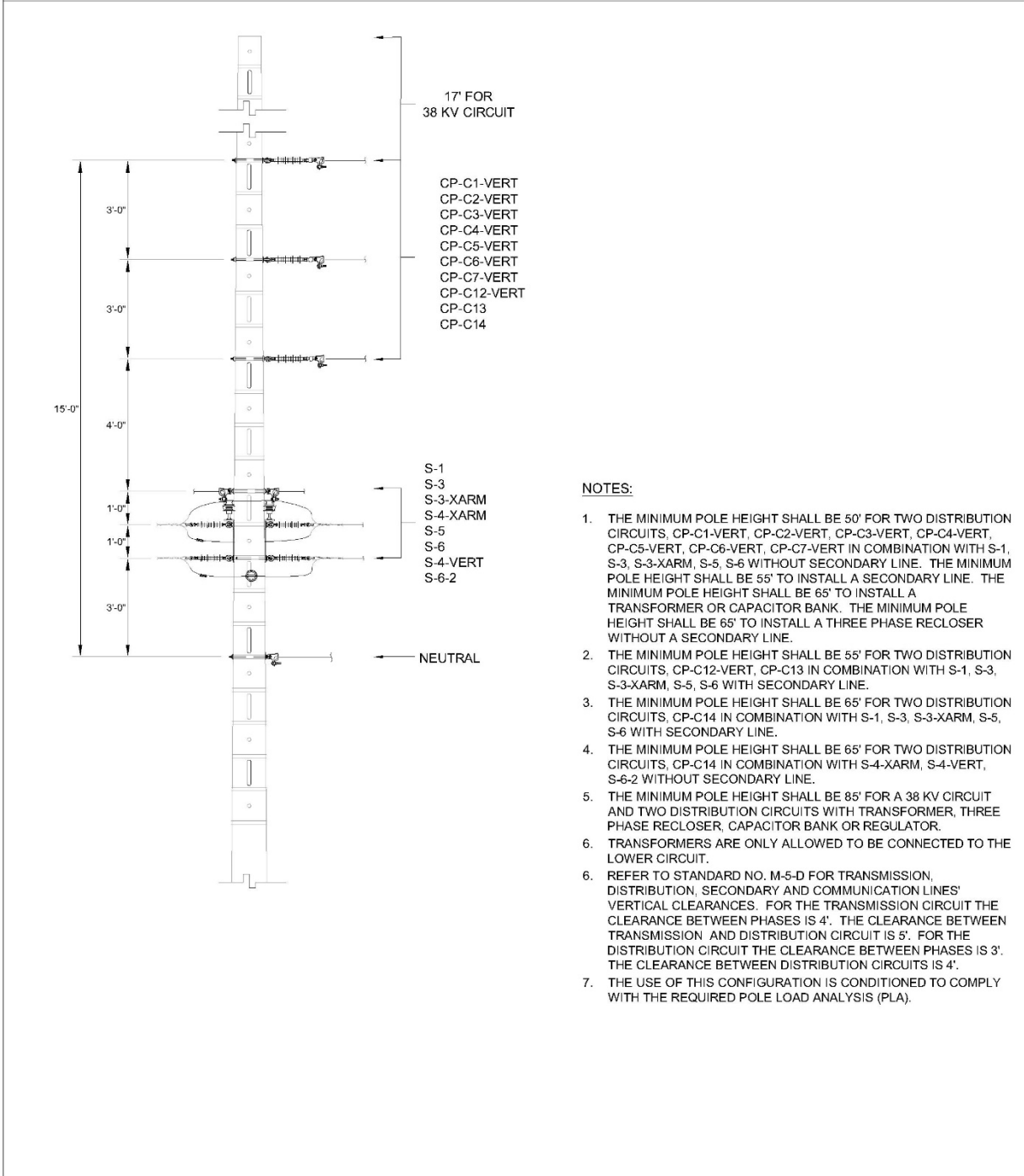
### DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATION





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### DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATION

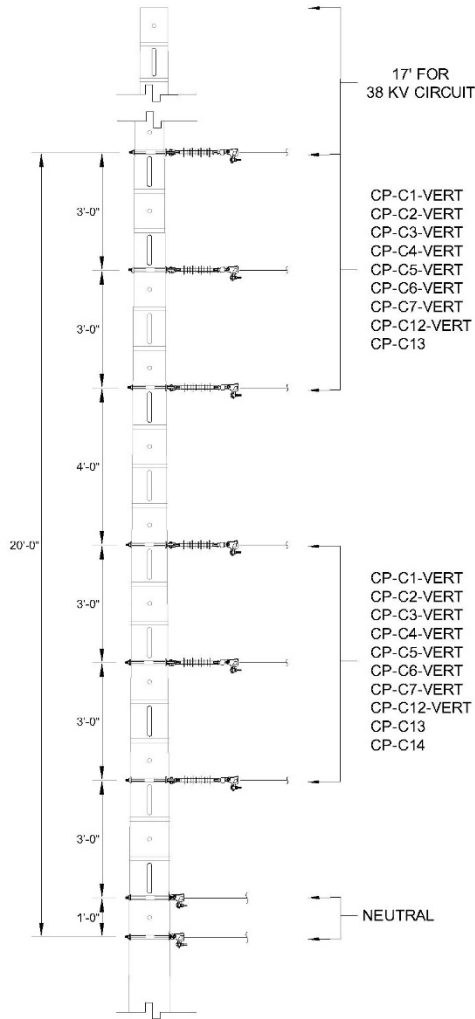


- NOTES:**
1. THE MINIMUM POLE HEIGHT SHALL BE 50' FOR TWO DISTRIBUTION CIRCUITS, CP-C1-VERT, CP-C2-VERT, CP-C3-VERT, CP-C4-VERT, CP-C5-VERT, CP-C6-VERT, CP-C7-VERT IN COMBINATION WITH S-1, S-3, S-3-XARM, S-5, S-6 WITHOUT SECONDARY LINE. THE MINIMUM POLE HEIGHT SHALL BE 55' TO INSTALL A SECONDARY LINE. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A TRANSFORMER OR CAPACITOR BANK. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A THREE PHASE RECLOSER WITHOUT A SECONDARY LINE.
  2. THE MINIMUM POLE HEIGHT SHALL BE 55' FOR TWO DISTRIBUTION CIRCUITS, CP-C12-VERT, CP-C13 IN COMBINATION WITH S-1, S-3, S-3-XARM, S-5, S-6 WITH SECONDARY LINE.
  3. THE MINIMUM POLE HEIGHT SHALL BE 65' FOR TWO DISTRIBUTION CIRCUITS, CP-C14 IN COMBINATION WITH S-1, S-3, S-3-XARM, S-5, S-6 WITH SECONDARY LINE.
  4. THE MINIMUM POLE HEIGHT SHALL BE 65' FOR TWO DISTRIBUTION CIRCUITS, CP-C14 IN COMBINATION WITH S-4-XARM, S-4-VERT, S-6-2 WITHOUT SECONDARY LINE.
  5. THE MINIMUM POLE HEIGHT SHALL BE 85' FOR A 38 KV CIRCUIT AND TWO DISTRIBUTION CIRCUITS WITH TRANSFORMER, THREE PHASE RECLOSER, CAPACITOR BANK OR REGULATOR.
  6. TRANSFORMERS ARE ONLY ALLOWED TO BE CONNECTED TO THE LOWER CIRCUIT.
  6. REFER TO STANDARD NO. M-5-D FOR TRANSMISSION, DISTRIBUTION, SECONDARY AND COMMUNICATION LINES' VERTICAL CLEARANCES. FOR THE TRANSMISSION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 4'. THE CLEARANCE BETWEEN TRANSMISSION AND DISTRIBUTION CIRCUIT IS 5'. FOR THE DISTRIBUTION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 3'. THE CLEARANCE BETWEEN DISTRIBUTION CIRCUITS IS 4'.
  7. THE USE OF THIS CONFIGURATION IS CONDITIONED TO COMPLY WITH THE REQUIRED POLE LOAD ANALYSIS (PLA).



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### DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATION



**NOTES:**

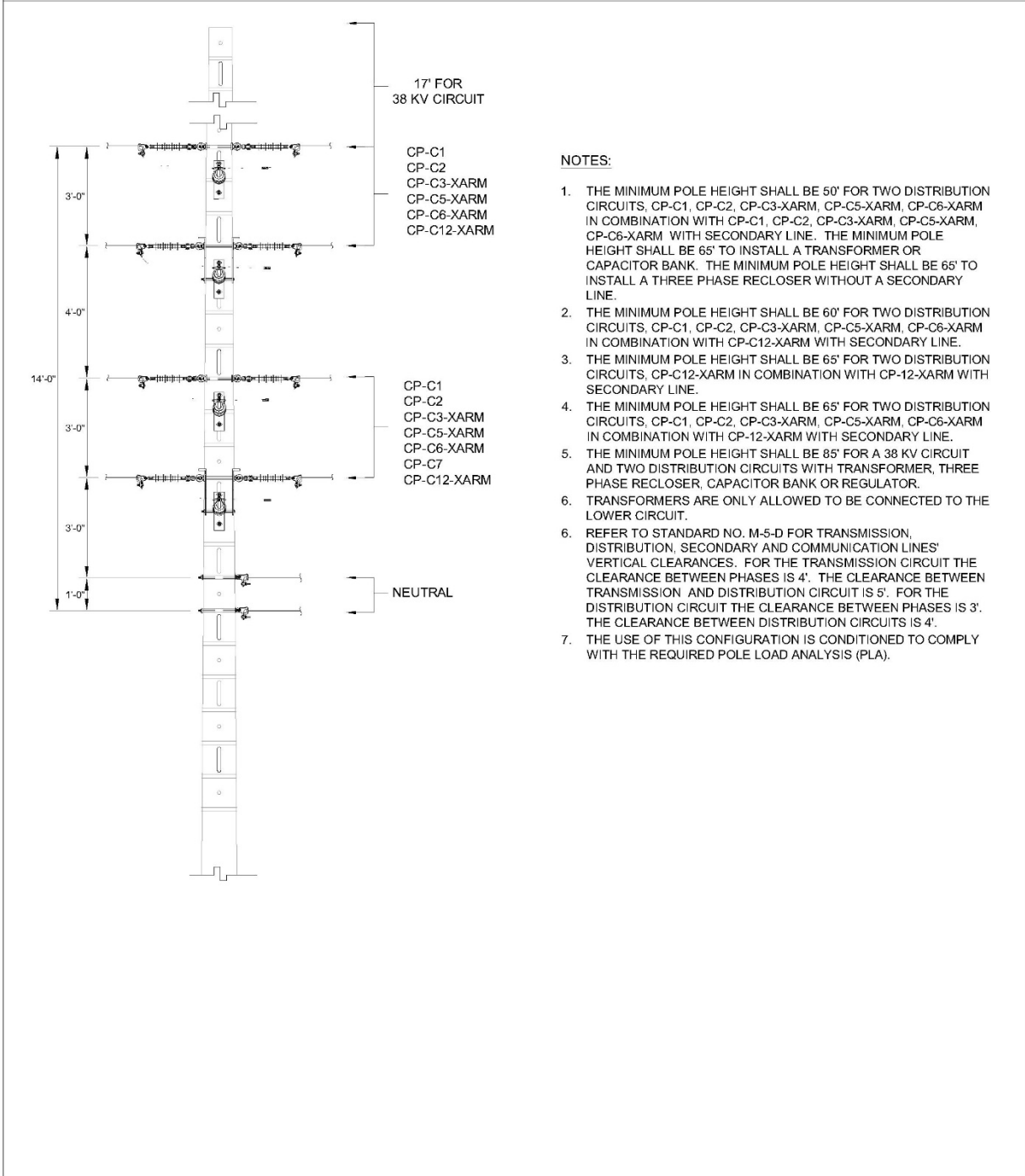
1. THE MINIMUM POLE HEIGHT SHALL BE 60' FOR TWO DISTRIBUTION CIRCUITS, CP-C1-VERT, CP-C2-VERT, CP-C3-VERT, CP-C4-VERT, CP-C5-VERT, CP-C6-VERT, CP-C7-VERT IN COMBINATION WITH CP-C1-VERT, CP-C2-VERT, CP-C3-VERT, CP-C4-VERT, CP-C5-VERT, CP-C6-VERT, CP-C7-VERT WITH SECONDARY LINE.
2. THE MINIMUM POLE HEIGHT SHALL BE 65' FOR TWO DISTRIBUTION CIRCUITS, CP-C12-VERT IN COMBINATION WITH CP-C12-VERT WITH SECONDARY LINE.
3. THE MINIMUM POLE HEIGHT SHALL BE 65' FOR TWO DISTRIBUTION CIRCUITS, CP-C14 IN COMBINATION WITH CP-C1-VERT, CP-C2-VERT, CP-C3-VERT, CP-C4-VERT, CP-C5-VERT, CP-C6-VERT, CP-C7-VERT WITHOUT SECONDARY LINE.
4. THE MINIMUM POLE HEIGHT SHALL BE 85' FOR A 38 KV CIRCUIT AND TWO DISTRIBUTION CIRCUITS WITH TRANSFORMER, THREE PHASE RECLOSER, CAPACITOR BANK OR REGULATOR.
5. REFER TO STANDARD NO. M-5-D FOR TRANSMISSION, DISTRIBUTION, SECONDARY AND COMMUNICATION LINES' VERTICAL CLEARANCES. FOR THE TRANSMISSION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 4'. THE CLEARANCE BETWEEN TRANSMISSION AND DISTRIBUTION CIRCUIT IS 5'. FOR THE DISTRIBUTION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 3'. THE CLEARANCE BETWEEN DISTRIBUTION CIRCUITS IS 4'.
6. THE USE OF THIS CONFIGURATION IS CONDITIONED TO COMPLY WITH THE REQUIRED POLE LOAD ANALYSIS (PLA).

POLE MINIMUM HEIGHT 60'  
FOR DISTRIBUTION CIRCUIT ONLY  
OR  
70' POLE FOR DISTRIBUTION AND ONE 38KV CIRCUIT



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### DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATION



**NOTES:**

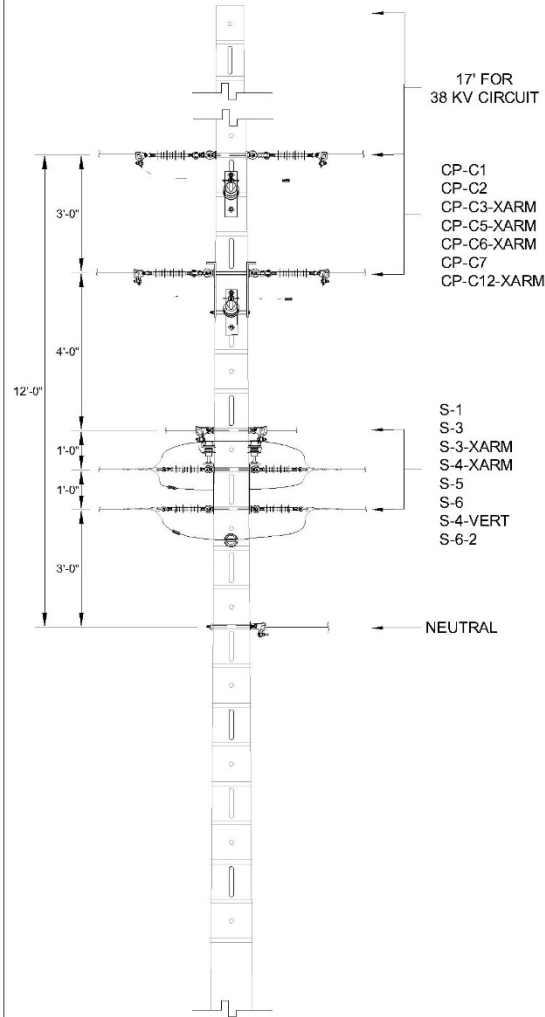
1. THE MINIMUM POLE HEIGHT SHALL BE 50' FOR TWO DISTRIBUTION CIRCUITS, CP-C1, CP-C2, CP-C3-XARM, CP-C5-XARM, CP-C6-XARM IN COMBINATION WITH CP-C1, CP-C2, CP-C3-XARM, CP-C5-XARM, CP-C6-XARM WITH SECONDARY LINE. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A TRANSFORMER OR CAPACITOR BANK. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A THREE PHASE RECLOSER WITHOUT A SECONDARY LINE.
2. THE MINIMUM POLE HEIGHT SHALL BE 60' FOR TWO DISTRIBUTION CIRCUITS, CP-C1, CP-C2, CP-C3-XARM, CP-C5-XARM, CP-C6-XARM IN COMBINATION WITH CP-C12-XARM WITH SECONDARY LINE.
3. THE MINIMUM POLE HEIGHT SHALL BE 65' FOR TWO DISTRIBUTION CIRCUITS, CP-C12-XARM IN COMBINATION WITH CP-12-XARM WITH SECONDARY LINE.
4. THE MINIMUM POLE HEIGHT SHALL BE 65' FOR TWO DISTRIBUTION CIRCUITS, CP-C1, CP-C2, CP-C3-XARM, CP-C5-XARM, CP-C6-XARM IN COMBINATION WITH CP-12-XARM WITH SECONDARY LINE.
5. THE MINIMUM POLE HEIGHT SHALL BE 85' FOR A 38 KV CIRCUIT AND TWO DISTRIBUTION CIRCUITS WITH TRANSFORMER, THREE PHASE RECLOSER, CAPACITOR BANK OR REGULATOR.
6. TRANSFORMERS ARE ONLY ALLOWED TO BE CONNECTED TO THE LOWER CIRCUIT.
7. REFER TO STANDARD NO. M-5-D FOR TRANSMISSION, DISTRIBUTION, SECONDARY AND COMMUNICATION LINES' VERTICAL CLEARANCES. FOR THE TRANSMISSION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 4'. THE CLEARANCE BETWEEN TRANSMISSION AND DISTRIBUTION CIRCUIT IS 5'. FOR THE DISTRIBUTION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 3'. THE CLEARANCE BETWEEN DISTRIBUTION CIRCUITS IS 4'.
7. THE USE OF THIS CONFIGURATION IS CONDITIONED TO COMPLY WITH THE REQUIRED POLE LOAD ANALYSIS (PLA).





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### DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATION



**NOTES:**

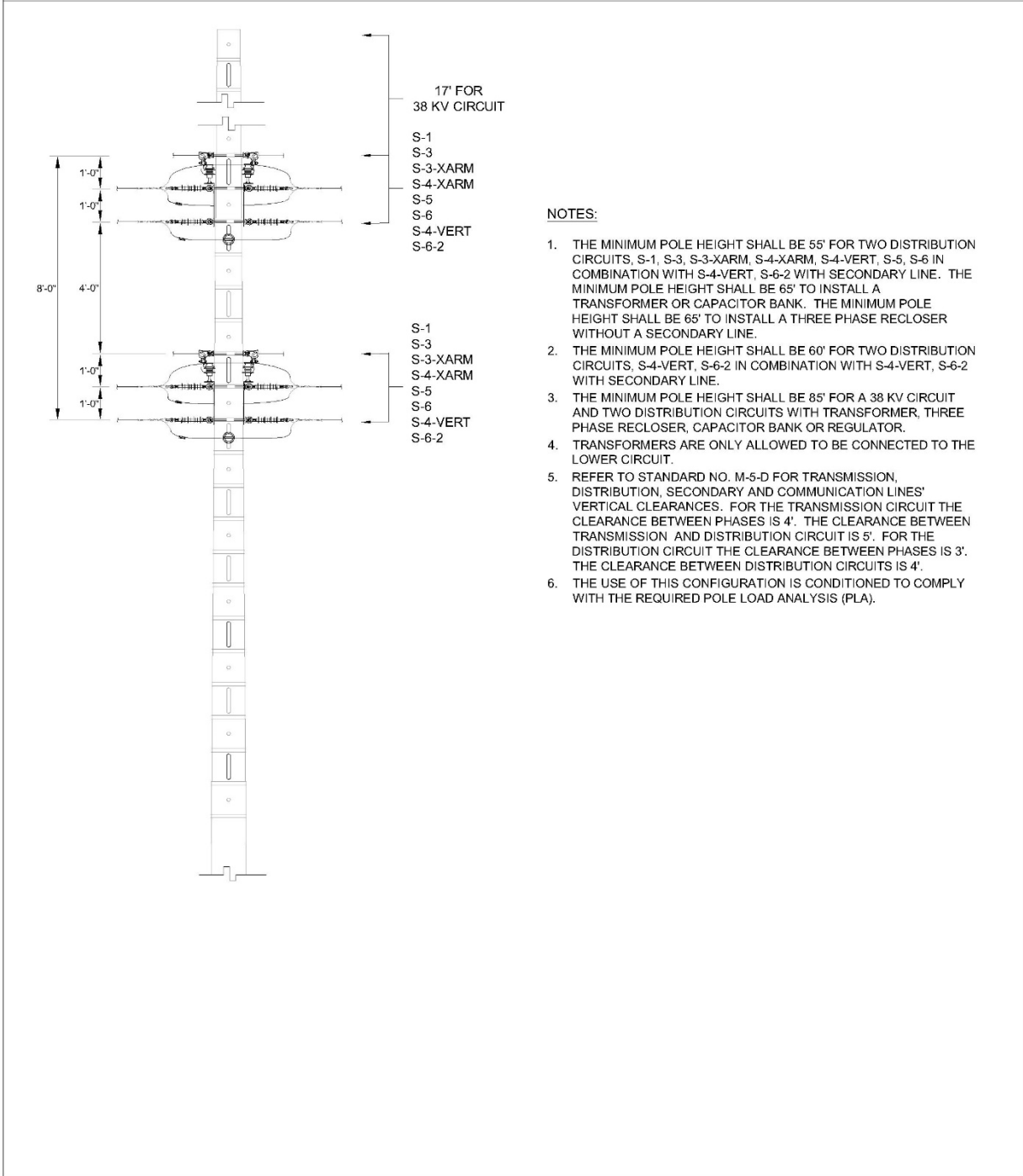
1. THE MINIMUM POLE HEIGHT SHALL BE 55' FOR TWO DISTRIBUTION CIRCUITS, CP-C1, CP-C2, CP-C3-XARM, CP-C5-XARM, CP-C6-XARM, CP-C12-XARM IN COMBINATION WITH S-1, S-3, S-3-XARM, S-4-XARM S-5, S-6 WITH SECONDARY LINE. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A TRANSFORMER OR CAPACITOR BANK. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A THREE PHASE RECLOSER WITHOUT A SECONDARY LINE.
2. THE MINIMUM POLE HEIGHT SHALL BE 60' FOR TWO DISTRIBUTION CIRCUITS, CP-C12-XARM IN COMBINATION WITH S-4-VERT, S-6-2 WITH SECONDARY LINE.
3. THE MINIMUM POLE HEIGHT SHALL BE 65' FOR TWO DISTRIBUTION CIRCUITS, CP-C7 IN COMBINATION WITH S-1, S-3, S-3-XARM, S-4-XARM, S-4-VERT, S-5, S-6, S-6-2 WITH SECONDARY LINE.
4. THE MINIMUM POLE HEIGHT SHALL BE 85' FOR A 38 KV CIRCUIT AND TWO DISTRIBUTION CIRCUITS WITH TRANSFORMER, THREE PHASE RECLOSER, CAPACITOR BANK OR REGULATOR.
5. TRANSFORMERS ARE ONLY ALLOWED TO BE CONNECTED TO THE LOWER CIRCUIT.
6. REFER TO STANDARD NO. M-5-D FOR TRANSMISSION, DISTRIBUTION, SECONDARY AND COMMUNICATION LINES' VERTICAL CLEARANCES. FOR THE TRANSMISSION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 4'. THE CLEARANCE BETWEEN TRANSMISSION AND DISTRIBUTION CIRCUIT IS 5'. FOR THE DISTRIBUTION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 3'. THE CLEARANCE BETWEEN DISTRIBUTION CIRCUITS IS 4'.
7. THE USE OF THIS CONFIGURATION IS CONDITIONED TO COMPLY WITH THE REQUIRED POLE LOAD ANALYSIS (PLA).





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DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATION



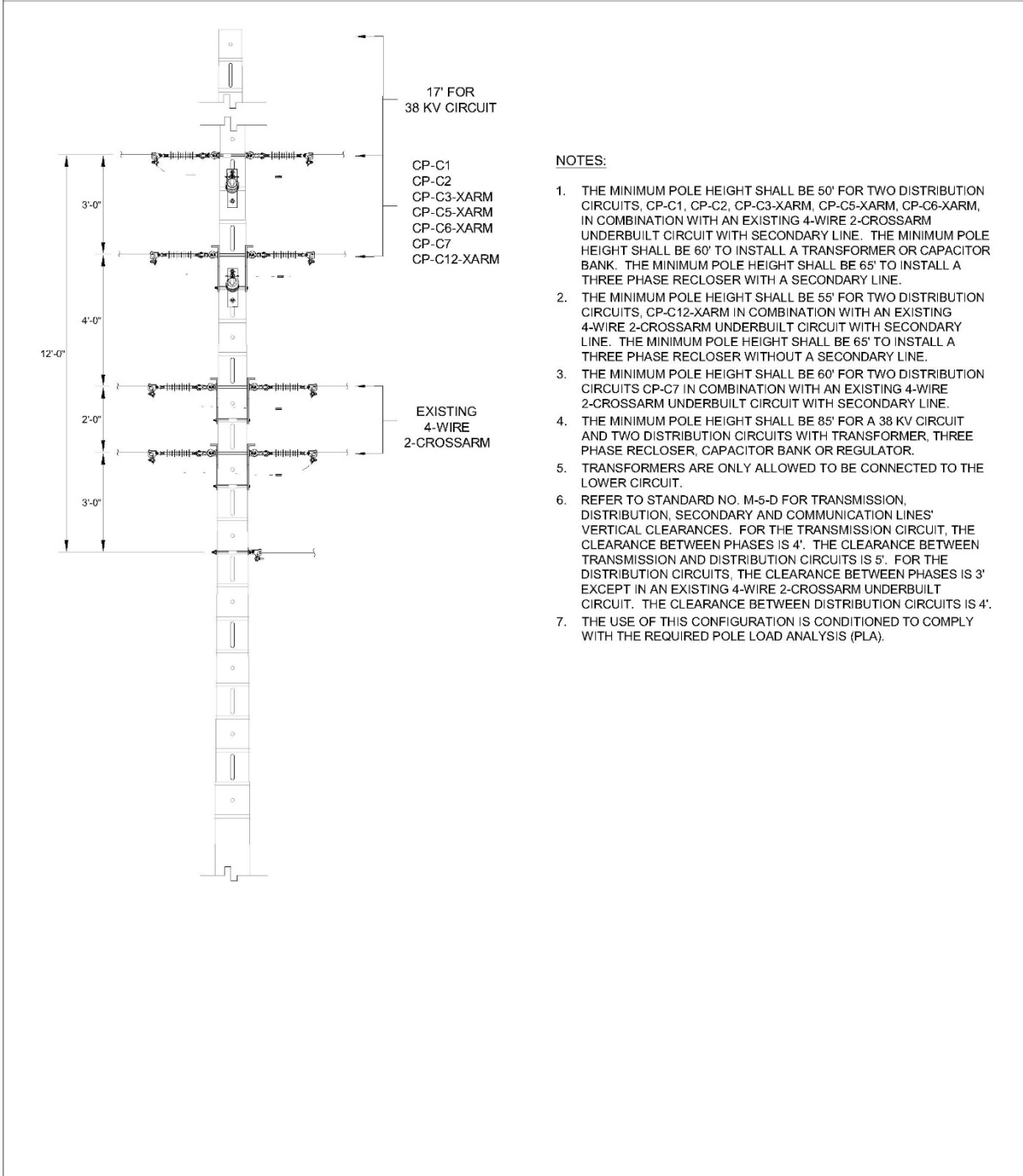
NOTES:

1. THE MINIMUM POLE HEIGHT SHALL BE 55' FOR TWO DISTRIBUTION CIRCUITS, S-1, S-3, S-3-XARM, S-4-XARM, S-4-VERT, S-5, S-6 IN COMBINATION WITH S-4-VERT, S-6-2 WITH SECONDARY LINE. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A TRANSFORMER OR CAPACITOR BANK. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A THREE PHASE RECLOSER WITHOUT A SECONDARY LINE.
2. THE MINIMUM POLE HEIGHT SHALL BE 60' FOR TWO DISTRIBUTION CIRCUITS, S-4-VERT, S-6-2 IN COMBINATION WITH S-4-VERT, S-6-2 WITH SECONDARY LINE.
3. THE MINIMUM POLE HEIGHT SHALL BE 85' FOR A 38 KV CIRCUIT AND TWO DISTRIBUTION CIRCUITS WITH TRANSFORMER, THREE PHASE RECLOSER, CAPACITOR BANK OR REGULATOR.
4. TRANSFORMERS ARE ONLY ALLOWED TO BE CONNECTED TO THE LOWER CIRCUIT.
5. REFER TO STANDARD NO. M-5-D FOR TRANSMISSION, DISTRIBUTION, SECONDARY AND COMMUNICATION LINES' VERTICAL CLEARANCES. FOR THE TRANSMISSION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 4'. THE CLEARANCE BETWEEN TRANSMISSION AND DISTRIBUTION CIRCUIT IS 5'. FOR THE DISTRIBUTION CIRCUIT THE CLEARANCE BETWEEN PHASES IS 3'. THE CLEARANCE BETWEEN DISTRIBUTION CIRCUITS IS 4'.
6. THE USE OF THIS CONFIGURATION IS CONDITIONED TO COMPLY WITH THE REQUIRED POLE LOAD ANALYSIS (PLA).



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### DOUBLE DISTRIBUTION CIRCUITS POSSIBLE CONFIGURATION



- NOTES:**
1. THE MINIMUM POLE HEIGHT SHALL BE 50' FOR TWO DISTRIBUTION CIRCUITS, CP-C1, CP-C2, CP-C3-XARM, CP-C5-XARM, CP-C6-XARM, IN COMBINATION WITH AN EXISTING 4-WIRE 2-CROSSARM UNDERBUILT CIRCUIT WITH SECONDARY LINE. THE MINIMUM POLE HEIGHT SHALL BE 60' TO INSTALL A TRANSFORMER OR CAPACITOR BANK. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A THREE PHASE RECLOSER WITH A SECONDARY LINE.
  2. THE MINIMUM POLE HEIGHT SHALL BE 55' FOR TWO DISTRIBUTION CIRCUITS, CP-C12-XARM IN COMBINATION WITH AN EXISTING 4-WIRE 2-CROSSARM UNDERBUILT CIRCUIT WITH SECONDARY LINE. THE MINIMUM POLE HEIGHT SHALL BE 65' TO INSTALL A THREE PHASE RECLOSER WITHOUT A SECONDARY LINE.
  3. THE MINIMUM POLE HEIGHT SHALL BE 60' FOR TWO DISTRIBUTION CIRCUITS CP-C7 IN COMBINATION WITH AN EXISTING 4-WIRE 2-CROSSARM UNDERBUILT CIRCUIT WITH SECONDARY LINE.
  4. THE MINIMUM POLE HEIGHT SHALL BE 85' FOR A 38 KV CIRCUIT AND TWO DISTRIBUTION CIRCUITS WITH TRANSFORMER, THREE PHASE RECLOSER, CAPACITOR BANK OR REGULATOR.
  5. TRANSFORMERS ARE ONLY ALLOWED TO BE CONNECTED TO THE LOWER CIRCUIT.
  6. REFER TO STANDARD NO. M-5-D FOR TRANSMISSION, DISTRIBUTION, SECONDARY AND COMMUNICATION LINES' VERTICAL CLEARANCES. FOR THE TRANSMISSION CIRCUIT, THE CLEARANCE BETWEEN PHASES IS 4'. THE CLEARANCE BETWEEN TRANSMISSION AND DISTRIBUTION CIRCUITS IS 5'. FOR THE DISTRIBUTION CIRCUITS, THE CLEARANCE BETWEEN PHASES IS 3' EXCEPT IN AN EXISTING 4-WIRE 2-CROSSARM UNDERBUILT CIRCUIT. THE CLEARANCE BETWEEN DISTRIBUTION CIRCUITS IS 4'.
  7. THE USE OF THIS CONFIGURATION IS CONDITIONED TO COMPLY WITH THE REQUIRED POLE LOAD ANALYSIS (PLA).



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## **PART V: OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM STANDARDS**

The following standards were developed to maintain safety and reliability of the overhead electrical distribution system. These standards include the bill of materials and construction details. They shall be followed without deviation for all new constructions.

<b>INDEX</b>		
<b>STANDARD NO.</b>	<b>DOCUMENT NO.</b>	<b>TITLE</b>
---	4301.004	OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST
ABS-3-VERT	4301.049	THREE PHASE PRIMARY CONSTRUCTION VERTICAL WITH AIR BREAK SWITCHES
ABS-3-XARM	4301.048	THREE PHASE PRIMARY CONSTRUCTION CROSSARM WITH AIR BREAK SWITCHES
ANT-01	4301.064	OVERHEAD FED ANTENNA
ANT-02	4301.065	UNDERGROUND FED ANTENNA
ASSY-1500	4301.066	POLE HOLE PATTERN
ASSY-1501	4301.067	SIDE POST INSULATOR ASSEMBLY
ASSY-1502	4301.068	POLE SLOT PRIMARY LINE DEADEND ASSEMBLY
ASSY-1503	4301.069	PRIMARY LINE ANGLE ASSEMBLY
ASSY-1504	4301.070	PRIMARY LINE DEADEND ASSEMBLY
ASSY-1505	4301.071	FIBERGLASS STAND-OFF BRACKET ASSEMBLY
ASSY-1506	4301.072	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY
ASSY-1507	4301.073	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY
ASSY-1509	4301.075	FUSE CUTOFF ASSEMBLY
ASSY-1510	4301.076	SURGE ARRESTER ASSEMBLY
ASSY-1511	4301.077	POLE GROUND ASSEMBLY
ASSY-1512	4301.078	EQUIPMENT BONDING TO GROUND ASSEMBLY
ASSY-1513	4301.079	WILDLIFE PROTECTION EQUIPMENT
ASSY-1514	4301.084	PIN TYPE POLYMER INSULATOR ASSEMBLY
CAMVIG-01	4301.080	OVERHEAD FED SURVEILLANCE CAMERA, GUNSHOT DETECTION SYSTEM AND WIRELESS COMMUNICATION EQUIPMENT
CAMVIG-02	4301.081	UNDERGROUND FED SURVEILLANCE CAMERA, GUNSHOT DETECTION SYSTEM AND WIRELESS COMMUNICATION EQUIPMENT
CN-1	4301.082	SCHEMATIC DIAGRAM FOR THE NEUTRAL SYSTEM
COMM-01	4301.141	OVERHEAD FED COMMUNICATIONS SYSTEM ENCLOSURE
COMM-02	4301.142	UNDERGROUND FED COMMUNICATIONS SYSTEM ENCLOSURE
CP-A1	4301.005	SINGLE PHASE PRIMARY CONSTRUCTION 0° - 5° ANGLE TANGENT
CP-A2	4301.006	SINGLE PHASE PRIMARY CONSTRUCTION 6° - 20° ANGLE TANGENT
CP-A3	4301.007	SINGLE PHASE PRIMARY CONSTRUCTION 21° - 60° ANGLE TANGENT
CP-A4	4301.008	SINGLE PHASE PRIMARY CONSTRUCTION 61° - 90° ANGLE TANGENT
CP-A5	4301.009	SINGLE PHASE PRIMARY CONSTRUCTION SINGLE DEADEND
CP-A6	4301.010	SINGLE PHASE PRIMARY CONSTRUCTION DOUBLE DEADEND
CP-A7	4301.011	SINGLE PHASE PRIMARY CONSTRUCTION TANGENT TAP-OFF



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CP-A7-1	4301.012	SINGLE PHASE PRIMARY CONSTRUCTION TANGENT REDUCED TENSION SPAN TAP-OFF
CP-A7-2	4301.144	SINGLE PHASE PRIMARY CONSTRUCTION DOUBLE DEADEND TAP-OFF
CP-A12	4301.145	SINGLE PHASE PRIMARY CONSTRUCTION SINGLE DEADEND TAP-OFF
CP-A13	4301.013	SINGLE PHASE PRIMARY CONSTRUCTION TANGENT LINE JUNCTION
CP-A14	4301.014	SINGLE PHASE PRIMARY CONSTRUCTION DEADEND LINE JUNCTION
CP-B1	4301.015	TWO PHASE PRIMARY CONSTRUCTION 0° - 5° ANGLE TANGENT
CP-B2	4301.016	TWO PHASE PRIMARY CONSTRUCTION 6° - 20° ANGLE TANGENT
CP-B3	4301.017	TWO PHASE PRIMARY CONSTRUCTION 21° - 60° ANGLE TANGENT
CP-B4	4301.018	TWO PHASE PRIMARY CONSTRUCTION 61° - 90° ANGLE TANGENT
CP-B5	4301.019	TWO PHASE PRIMARY CONSTRUCTION VERTICAL SINGLE DEADEND
CP-B5-XARM	4301.020	TWO PHASE PRIMARY CONSTRUCTION CROSSARM SINGLE DEADEND
CP-B6	4301.021	TWO PHASE PRIMARY CONSTRUCTION VERTICAL DOUBLE DEADEND
CP-B6-XARM	4301.115	TWO PHASE PRIMARY CONSTRUCTION CROSSARM DOUBLE DEADEND
CP-B7	4301.022	TWO PHASE PRIMARY CONSTRUCTION TANGENT TAP-OFF
CP-B7-1	4301.023	TWO PHASE PRIMARY CONSTRUCTION VERTICAL TANGENT REDUCED TENSION SPAN TAP-OFF
CP-B7-VERT	4301.143	TWO PHASE PRIMARY CONSTRUCTION VERTICAL DOUBLE DEADEND TAP-OFF
CP-B12-VERT	4301.146	TWO PHASE PRIMARY CONSTRUCTION VERTICAL SINGLE DEADEND TAP-OFF
CP-B12-XARM	4301.147	TWO PHASE PRIMARY CONSTRUCTION CROSSARM SINGLE DEADEND TAP-OFF
CP-B13	4301.024	TWO PHASE PRIMARY CONSTRUCTION TANGENT LINE JUNCTION
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CP-C1-VERT	4301.026	THREE PHASE PRIMARY CONSTRUCTION VERTICAL 0° - 5° ANGLE TANGENT
CP-C1-VERT-1	4301.148	THREE PHASE PRIMARY CONSTRUCTION DOUBLE CIRCUIT VERTICAL 0° - 5° ANGLE TANGENT
CP-C2	4301.027	THREE PHASE PRIMARY CONSTRUCTION 6° - 20° ANGLE TANGENT
CP-C2-VERT	4301.028	THREE PHASE PRIMARY CONSTRUCTION VERTICAL 6° - 20° ANGLE TANGENT
CP-C3-VERT	4301.029	THREE PHASE PRIMARY CONSTRUCTION VERTICAL 21° - 60° ANGLE TANGENT
CP-C3-XARM	4301.039	THREE-PHASE PRIMARY CONSTRUCTION CROSSARM 6° - 60° ANGLE DOUBLE DEADEND
CP-C4-VERT	4301.031	THREE PHASE PRIMARY CONSTRUCTION VERTICAL 61° - 90° ANGLE
CP-C5-VERT	4301.032	THREE PHASE PRIMARY CONSTRUCTION VERTICAL SINGLE DEADEND
CP-C5-XARM	4301.033	THREE PHASE PRIMARY CONSTRUCTION CROSSARM SINGLE DEADEND
CP-C6-VERT	4301.034	THREE PHASE PRIMARY CONSTRUCTION VERTICAL 0° - 5° ANGLE DOUBLE DEADEND
CP-C6-VERT-1	4301.149	THREE PHASE PRIMARY CONSTRUCTION DOUBLE CIRCUIT VERTICAL DOUBLE DEADEND
CP-C6 -XARM	4301.040	THREE-PHASE PRIMARY CONSTRUCTION CROSSARM DOUBLE DEADEND
CP-C7	4301.126	THREE PHASE PRIMARY CONSTRUCTION WITH OPEN-WIRE TAP-OFF
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CP-C12-XARM	4301.132	THREE PHASE PRIMARY CONSTRUCTION CROSSARM SINGLE DEADEND TAP-OFF
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E-2-1	4301.085	SPAN GUY INSTALLATION
E-5	4301.086	GUY SELECTION TABLES FOR GRADE B CONSTRUCTION
F-1-3	4301.087	EXPANSION ANCHOR
F-4-1	4301.089	HELIX TYPE ANCHOR
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F-5-1	4301.090	ROCK ANCHOR
F-6-1	4301.091	SWAMP ANCHOR
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K-2	4301.058	SECONDARY TRIPLEX CABLE 11° - 60° ANGLE TANGENT
K-4	4301.061	SECONDARY TRIPLEX CABLE 60° - 90° ANGLE
K-5	4301.101	SECONDARY TRIPLEX CABLE SINGLE DEADEND
K-6	4301.102	SECONDARY TRIPLEX CABLE DOUBLE DEADEND
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K-7-1	4301.093	SECONDARY TRIPLEX CABLE MIDSPAN SERVICE DROP
K-7-2	4301.094	SECONDARY TRIPLEX CABLE TANGENT AND SERVICE CONNECTION
K-7-3-1	4301.095	CONNECTION OF SECONDARY TRIPLEX CABLE SERVICE DROP TO CUSTOMER'S CONCRETE COLUMN
K-7-4	4301.096	SECONDARY TRIPLEX CABLE AND MULTIPLE SERVICE DROP
M-5	4301.097	MINIMUM VERTICAL CLEARANCES REQUIRED FOR POWER LINES ABOVE GROUND OR ROADWAY
M-5-A	4301.098	MINIMUM CLEARANCES REQUIRED BETWEEN POWER LINES AND STRUCTURES
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M-5-C	4301.119	MINIMUM VERTICAL CLEARANCES REQUIRED FOR POWER LINE ABOVE RAILROAD CROSSING
M-5-D	4301.122	MINIMUM VERTICAL CLEARANCES REQUIRED BETWEEN CIRCUITS
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REC-4-B	4301.137	TWO PHASE PRIMARY CONSTRUCTION 400 A POLE MOUNTED SINGLE PHASE RECLOSER
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S-1-1	4301.044	SPACER CONSTRUCTION DOUBLE CIRCUIT 0° - 5° ANGLE
S-3	4301.045	SPACER CONSTRUCTION 6° - 60° ANGLE TANGENT
S-3-1	4301.118	SPACER CONSTRUCTION 6° - 60° ANGLE TANGENT DOUBLE CIRCUIT
S-3-XARM	4301.140	SPACER CONSTRUCTION 6° - 60° ANGLE WITH CROSSARM
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S-6-2	4301.030	SPACER CONSTRUCTION DOUBLE TERMINAL TO OPEN-WIRE TRANSITION
S-7-1	4301.156	SPACER CABLE TAP-OFF
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T-3	4301.052	THREE PHASE TRANSFORMER BANK
T-3-1	4301.053	THREE PHASE UNDERGROUND FED TRANSFORMER BANK
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T-4	4301.054	THREE PHASE TRANSFORMER BANK WITH METERING INSTRUMENT TRANSFORMERS
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T-12	4301.060	POLE MOUNTED FIXED CAPACITOR BANK
T-12-1	4301.127	POLE MOUNTED CONTROLLED CAPACITOR BANK
T-13	4301.062	CONNECTION DIAGRAMS OF CAPACITORS IN THREE PHASE DELTA AND WYE CONFIGURATIONS



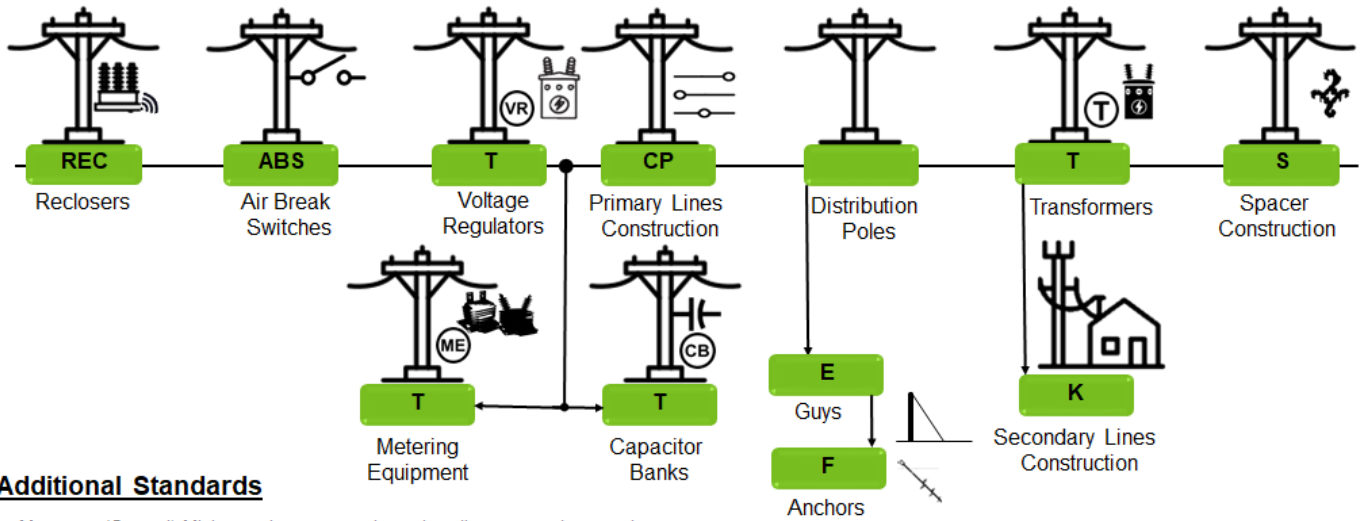
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## OVERHEAD DISTRIBUTION SYSTEM TYPICAL REPRESENTATION AND STANDARDS



### Additional Standards

- M: (General) Minimum clearances, schematics, diagrams, and connections
- CN: Neutral conductor connections
- ANT: Antenna attachments connection
- CAMVIG: Surveillance cameras, gunshot detection, and wireless communication attachments connection
- COMM: Communication system enclosure
- ASSY: Assemblies to be referred from all standards
- PMU Phasor measurement unit
























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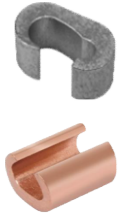
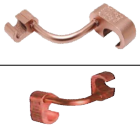

ABS	ANT	ASSY	CAMVIG	CN	COMM	CP-A	CP-B	CP-C
AIR BREAK SWITCHES 	ANTENNAS 	ASSEMBLIES 	SURVEILLANCE CAMERA, GUN SHOT DETECTION, AND WIRELESS COMMUNICATION EQUIPMENT 	NEUTRAL CONDUCTOR 	COMMUNICATION SYSTEM ENCLOSURE 	PRIMARY SINGLE-PHASE LINES CONSTRUCTION 	PRIMARY TWO-PHASE LINES CONSTRUCTION 	PRIMARY THREE-PHASE LINES CONSTRUCTION 
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		ASSY-1502				CP-A3	CP-B3	CP-C1-VERT-1
		ASSY-1503				CP-A4	CP-B4	CP-C2
		ASSY-1504				CP-A5	CP-B5	CP-C2-VERT
		ASSY-1505				CP-A6	CP-B5-XARM	CP-C3-VERT
		ASSY-1506				CP-A7	CP-B6	CP-C3-XARM
		ASSY-1507				CP-A7-1	CP-B6-XARM	CP-C4-VERT
		ASSY-1509				CP-A7-2	CP-B7	CP-C5-VERT
		ASSY-1510				CP-A12	CP-B7-1	CP-C5-XARM
		ASSY-1511				CP-A13	CP-B7-VERT	CP-C6-VERT
		ASSY-1512				CP-A14	CP-B12-VERT	CP-C6-VERT-1
		ASSY-1513					CP-B12-XARM	CP-C6-XARM
		ASSY-1514					CP-B13	CP-C7
							CP-B14	CP-C7-VERT
								CP-C7-1
								CP-C12-VERT
								CP-C12-XARM
								CP-C13
								CP-C14










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<b>E</b>	<b>F</b>	<b>K</b>	<b>M</b>	<b>PMU</b>	<b>REC</b>	<b>S</b>	<b>T</b>
<b>GUYS</b> 	<b>ANCHORS</b> 	<b>SECONDARY LINES CONSTRUCTION</b> 	<b>MINIMUM CLEARANCES, SCHEMATICS, DIAGRAMS, ETC.</b> 	<b>PHASOR MEASUREMENT UNIT</b> 	<b>RECLOSERS</b> 	<b>SPACER CONSTRUCTION</b> 	<b>TRANSFORMERS, VOLTAGE REGULATORS, CAPACITOR BANKS, AND METERING EQUIPMENT</b>    
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E-5	F-4-2	K-4	M-5-B		REC-2-1	S-1-1	T-3 (T)
	F-5-1	K-5	M-5-C		REC-2-2	S-3	T-3-1 (T)
	F-6-1	K-6	M-5-D		REC-3-A	S-3-1	T-3-3 (T)
		K-7	M-7		REC-3-B	S-3-XARM	T-4 (ME, T)
		K-7-1	M-10		REC-3-C	S-4-VERT	T-5 (ME, T)
		K-7-2	M-12-2		REC-3-C-VERT	S-4-XARM	T-8 (VR)
		K-7-3-1	M-12-6		REC-4-A	S-5	T-10-1 (VR)
		K-7-4			REC-4-B	S-6	T-12 (CB)
					REC-4-C	S-6-2	T-12-1 (CB)
						S-7-1	T-13 (CB)
						S-12	T-14 (CB)
							T-15 (ME)

DISTRIBUTION SYSTEM MATERIAL LIST								
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS		
<b>OVERHEAD MATERIAL LIST</b>								
0001	THROUGH BOLT	4350.072	54343	002-01483	3/8" DIAMETER, 8" L - HDG			
			82642	002-82642	3/8" DIAMETER, 10" L - HDG			
			54344	002-01525	3/8" DIAMETER, 12" L - HDG			
			54345	002-01541	3/8" DIAMETER, 14" L - HDG			
			54346	002-01566	3/8" DIAMETER, 16" L - HDG			
			82411	002-82411	3/8" DIAMETER, 8" L - HDG			
			82641	002-82641	3/8" DIAMETER, 10" L - HDG			
			82412	002-82412	3/8" DIAMETER, 12" L - HDG			
			59056	002-59056	3/8" DIAMETER, 14" L - HDG			
			82413	002-82413	3/8" DIAMETER, 16" L - HDG			
			82918	002-82918	1/2" DIAMETER, 8" L - HDG			
			82919	002-82919	1/2" DIAMETER, 10" L - HDG			
			82920	002-82920	1/2" DIAMETER, 12" L - HDG			
			82921	002-82921	1/2" DIAMETER, 14" L - HDG			
			82922	002-82922	1/2" DIAMETER, 16" L - HDG			
		4350.073	57697	002-13637	3/8" DIAMETER, 8" L - SS AND TDG			
			82643	002-82643	3/8" DIAMETER, 10" L - SS AND TDG			
			57698	002-13645	3/8" DIAMETER, 12" L - SS AND TDG			
			57700	002-13660	3/8" DIAMETER, 14" L - SS AND TDG			
			57701	002-13678	3/8" DIAMETER, 16" L - SS AND TDG			
			82405	002-82405	3/8" DIAMETER, 8" L - SS AND TDG			
			82644	002-82644	3/8" DIAMETER, 10" L - SS AND TDG			
			82406	002-82406	3/8" DIAMETER, 12" L - SS AND TDG			
			82407	002-82407	3/8" DIAMETER, 14" L - SS AND TDG			
			82408	002-82408	3/8" DIAMETER, 16" L - SS AND TDG			
			82409	002-82409	3/8" DIAMETER, 18" L - SS AND TDG			
			82410	002-82410	3/8" DIAMETER, 20" L - SS AND TDG			
			82923	002-82923	1/2" DIAMETER, 10" L - SS AND TDG			
			82924	002-82924	1/2" DIAMETER, 16" L - SS AND TDG			
			0002	FLAT SQUARE WASHER	4350.120		57585	002-06946
82656	002-82656	2 1/4" x 2 1/4" x 3/16" HOLE 11/16" - HDG						
57586	002-06961	4" x 4" x 3/4" HOLE 11/16" - HDG						
82657	002-82657	4" x 4" x 3/4" HOLE 7/8" - HDG						
57703	002-13702	2 1/4" x 2 1/4" x 3/16" HOLE 11/16" - SS OR TDG						
4350.121	82660	002-82660		2 1/4" x 2 1/4" x 3/16" HOLE 13/16" - SS OR TDG				
	82661	002-82661		4" x 4" x 3/4" HOLE 11/16" - SS OR TDG				
	82662	002-82662		4" x 4" x 3/4" HOLE 3/4" - SS OR TDG				
	FLAT ROUND WASHER	4350.111		82932	002-82932	1/2" - HDG		
				84870	002-84870	3/8" - SS		
30378			002-82041	1/2" - SS				
4350.112	83339	002-83339	5/8" - SS					
	84533	002-84533	3/4" - SS					
	SPLIT LOCK WASHER	4350.109	82931	002-82931	1/2" - HDG			
82930			002-82930	1/2" - SS				
84576			002-84576	3/4" - SS				
84869	002-84869	3/8" - SS						
0003	CLEVIS	4350.099	55839	002-13488	3/4" X 1 1/2" STEEL BAR HOT DIP GALVANIZED PRIMARY			
0005	TIE WIRE	4350.027	82035	002-82035	TIE WIRE, BARE ALUMINUM, #4 SOL			
0006	COMPRESSION SPLICES SINGLE SLEEVE FULL TENSION	4350.091	82678	002-82678	556.5 ACSR TO 556.5 ACSR, 652.4 AAAC			
			55430	002-04446	BARE COPPER CONDUCTOR #2			
			55892	002-09965	BARE COPPER CONDUCTOR 1/0			
			55893	002-09981	BARE COPPER CONDUCTOR 4/0			
			55838	002-13454	BARE COPPER CONDUCTOR 300 MCM			
	COMPRESSION SPLICES TWO SLEEVE FULL TENSION ACSR	4350.092	54260	002-08678	1/0 (6/1)			
			54261	002-08686	3/0 (6/1)			
			83031	002-83031	4/0 (6/1)			
			56679	002-09601	266.8 (26-7)			
			55995	002-11458	336.4 (18-1)			
			57692	002-13587	556.5 (24-7) MCM			
			83032	002-83032	795.0 (26-7) ACSR 927.2 (37) AAAC			
	COMPRESSION CONNECTORS FIGURE 3 SHAPE - ALUMINUM	4350.093	55897	002-10039	#6-#4, #6-#4 STRANDED, #6-#4, #6-#4 ACSR			
			54248	002-08363	#2-2/0, #6-#2 STRANDED, #2-1/0, #6-#2 ACSR			
			54249	002-08371	1/0-2/0, 1/0-2/0 STRANDED, 1/0, 1/0 ACSR			
			54250	002-08389	2/0-3/0, #2 STRANDED, 1/0-2/0, #2-#4 ACSR			
			56676	002-09569	4/0, 1/0-2/0 STRANDED, 3/0-4/0, 1/0-2/0 ACSR			
			83025	002-83025	2/0-3/0, 1/0-2/0 STRANDED, 2/0, #1-2/0 ACSR			
83026	002-83026	4/0, #4-#2 STRANDED, 3/0-4/0, #4-#2 ACSR						

DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
0006	COMPRESSION CONNECTORS FIGURE 6 SHAPE - ALUMINUM	4350.164	54253	002-08439	#6-#2 RUN, #14 SOL-#8 TAP STRANDED AL/CU #6-#4 RUN, #14 SOL-#8 TAP ACSR AL/CU	
			83028	002-83028	#1-3/0 RUN, #14 SOL - #8 TAP STRANDED AL/CU #2-3/0 RUN, #14 SOL - #8 ACSR AL/CU	
			83027	002-83027	3/0-4/0 RUN, #6-#3 TAP STRANDED AL/CU 3/0-4/0 RUN, #6-#3 TAP STRANDED AL/CU	
			54251	002-08413	3/0-4/0 RUN, 2/0-4/0 TAP STRANDED AL/CU 3/0-4/0 RUN, 3/0-4/0 TAP ACSR AL/CU	
			55917	002-10658	250-400 MCM RUN, 6 SOL-2/0 TAP STRANDED AL/CU 266.8 (18/1)- 397.5 (18/1) RUN, #6-1/0 TAP ACSR	
			56704	002-10666	250 - 477 MCM RUN, 2/0-4/0 TAP STRANDED AL/CU 266.8 (18/1) - 397.5 (18/1) RUN, 2/0-4/0 TAP ACSR	
			56705	002-10674	250-400 MCM RUN, 250-400 MCM TAP STRANDED 266.8 (18/1)- 397.5 (18/1) RUN, 266.8 (18/1)- 397.5 (18/1) TAP ACSR	
			56710	002-10799	477-600 MCM RUN, 2/0-400 MCM TAP STRANDED AL/CU 397.5 (18/1)-556.5 (18-1) RUN, #6-1/0 TAP ACSR	
			56585	002-12217	600 - 800 MCM RUN, 2/0-400 MCM TAP STRANDED AL/CU 556.5 (18-1)- 927.2 (37) RUN, 2/0-397.5 (18/1) TAP ACSR	
			56586	002-12225	600 - 800 MCM RUN, 397.5-600 MCM TAP STRANDED AL/CU 556.5 (18-1)-927.2 (37) RUN, 336.4 (26/7)-556.5 (18/1) TAP ACSR	
56587	002-12233	600 - 954 MCM RUN, 600-954 MCM TAP STRANDED AL/CU 556.5 (18-1)-927 (37) RUN, 556.5 (18-1)-927.2 (37) TAP ACSR				
0006	COMPRESSION JUMPER SLEEVE SPLICES (ACSR & AAAC CONDUCTORS)	4350.165	83690	002-83690	#6 (6/1)	
			83691	002-83691	#4 (6/1)	
			83034	002-83034	#2 (6/1) (7/1) ACSR	
			83035	002-83035	1/0 (6/1) ACSR	
			54365	002-09429	3/0 (6/1) ACSR	
			83632	002-09460	4/0 (6/1) ACSR	
			83633	002-09886	266.8 (26/7) ACSR	
			55450	002-05450	366.4 (18/1) ACSR	
			54366	002-09478	556.5 (24/7) ACSR 652.4 (19) AAAC	
			83634	002-09502	795.0 (26/7) ACSR 927.2 (37) AAAC	
0006	COMPRESSION C-SHAPE TYPE CONNECTORS - COPPER	4350.199	58181	002-03893	6 SOL - 4 STR. RUN, 6 SOL - 6 STR. TAP	
			55420	002-03919	6 SOL - 4 STR. RUN, 6 SOL - 4 STR. TAP	
			56167	002-08793	4 SOL - 2 STR. RUN, 8 SOL - 4 STR. TAP	
			54265	002-08785	2 SOL - 2 STR. RUN, 2 SOL - 2 STR. TAP	
			54369	002-09544	3/0 SOL - 4/0 STR. RUN, 3/0 SOL - 4 STR. TAP	
			83016	002-83016	8 SOL - 8 STR. RUN, 10 SOL - 8 STR. TAP	
			83017	002-83017	1/0 STR - 2/0 STR. RUN, 8 SOL - 2 STR. TAP	
			83018	002-83018	1/0 STR - 2/0 STR. RUN, 1/0 STR - 2/0 STR. TAP	
			83019	002-83019	3/0 SOL - 4/0 STR. RUN, 6 SOL - 2 STR. TAP	
			83020	002-83020	3/0 SOL - 4/0 STR. RUN, 1/0 STR - 2/0 STR. TAP	
			83022	002-83022	4/0 - 500 MCM RUN, 4/0 - 500 MCM TAP	
			83023	002-83023	4/0 - 500 MCM, #2 - 250 MCM TAP	
			83024	002-83024	4/0 - 500 MCM, #6 SOL - #6 STR. TAP	
0006	COMPRESSION CROSS GROUND GRID CONNECTOR	4350.170	59063	002-14460	GROUND CROSS GRID CONNECTOR #2 AWG (STR) - 250 MCM	
			83499	002-83499	GROUND CROSS GRID CONNECTOR 250 MCM - 500 MCM	
0006	ALUMINUM PRIMARY T-TAP CONNECTOR	4350.244	55977	002-11052	556.5 (24/7)	
			83030	002-83030	795.0 (26/7) ACSR 927.2 (37) AAAC	







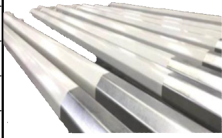

DISTRIBUTION SYSTEM MATERIAL LIST							
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS	
<b>OVERHEAD MATERIAL LIST</b>							
0006	WEDGE CONNECTOR ACSR & ALUMINUM TO COPPER	4350.295	84238	002-84238	#2 AWG - 1/0 AWG RUN , 2 AWG - 1/0 AWG TAP		
			84239	002-84239	1/0 - 4/0 AWG RUN, #2 - 2/0 AWG TAP		
			84240	002-84240	1/0 - 4/0 AWG RUN, 2/0 - 4/0 AWG TAP		
			84283	002-84283	2/0 - 4/0 AWG RUN, #2 - 3/0 AWG TAP		
			84284	002-84284	1/0 - 4/0 AWG RUN, 1/0 - 4/0 AWG TAP		
			84242	002-84242	4/0 - 450 MCM RUN, #2 - 1/0 AWG TAP		
			84285	002-84285	4/0 - 450 MCM RUN, 1/0 - 250 MCM TAP		
			84286	002-84286	4/0 - 450 MCM RUN, 1/0 - 300 MCM TAP		
			84241	002-84241	4/0 - 450 MCM RUN, 4/0 - 450 MCM TAP		
			81959	002-81959	450 - 700 MCM RUN, 450 - 700 MCM TAP		
			84287	002-84287	350 - 700 MCM RUN, 336.4 - 700 MCM TAP		
			84288	002-84288	350 - 556.5 MCM RUN - 4/0 - 450 MCM TAP		
			81961	002-81961	336.4 - 700 MCM RUN, 2/0 - 300 MCM TAP		
			84289	002-84289	336.4 - 700 MCM RUN, 1/0 - 250 MCM TAP		
			84292	002-84292	336.4 - 700 MCM RUN, 1/0 - 250 MCM TAP		
			84243	002-84243	300 - 700 MCM RUN, #2 - 1/0 AWG TAP		
			84294	002-84294	556.5 - 1000 MCM RUN - 1/0 - 300 MCM TAP		
			84244	002-84244	556.5 - 1000 MCM RUN - #2 - 2/0 AWG TAP		
			77922	002-77922	600 - 1000 MCM RUN, 650 - 1272.2 MCM TAP		
84295	002-84295	556.5 - 1000 MCM RUN, 250 - 450 MCM TAP					
84272	002-84272	556.5 - 1000 MCM RUN, 1/0 - 266.8 MCM TAP					
0007	EYE BOLT	4350.074	08371	002-00428	3/4" x 8" L - HDG		
			08372	002-00444	3/4" x 10" L - HDG		
			08373	002-00469	3/4" x 12" L - HDG		
			08375	002-00501	3/4" x 14" L - HDG		
		4350.075	57695	002-13611	3/4" x 10" L - SS AND TDG		
			57699	002-13652	3/4" x 12" L - SS AND TDG		
0008	TENSION CLAMP	4350.084	55911	002-10393	TENSION DEADEND STRAIN CLAMP (ACSR / AL CONDUCTOR) #6 @ 3/0 AWG (0.18" - 0.52")		
			54349	002-09239	TENSION DEADEND STRAIN CLAMP (ACSR / AL CONDUCTOR) 3/0 AWG - 556.6 MCM (0.475" - 0.886")		
			57704	002-13710	TENSION DEADEND STRAIN CLAMP (ACSR / AL CONDUCTOR) 336.4 - 1192.5 MCM (0.710" - 1.318")		
		4350.085	55362	002-02366	TENSION CLAMP DEADEND STRAIN CLAMP (CU CONDUCTOR) #6 @ 4/0 AWG (0.18" - 0.52")		
			83037	002-83037	TENSION CLAMP DEADEND STRAIN CLAMP (CU CONDUCTOR) 2/0 AWG - 500 MCM (0.36" - 0.84")		
		4350.086	83038	002-83038	TENSION CLAMP DEADEND STRAIGHT LINE CLAMP (ACSR / AL CONDUCTOR) #2 AWG - 900 MCM (0.31" - 1.16")		
			59055	002-14387	TENSION CLAMP DEADEND STRAIGHT LINE CLAMP (ACSR / AL CONDUCTOR) 336.4 - 1590 MCM (0.72" - 1.55")		
		4350.087	83040	002-83040	TENSION CLAMP DEADEND STRAIGHT LINE CLAMP (CU CONDUCTOR) 6 SOLID - 2/0 STRANDED (0.16" - 0.46")		
			83041	002-83041	TENSION CLAMP DEADEND STRAIGHT LINE CLAMP (CU CONDUCTOR) 2-300 STRANDED (0.25" - 0.73")		
		0009	SUSPENSION CLAMP	4350.083	58155		002-03059
54258	002-08579				#2 AWG - 266 MCM (0.40" @ 1.05") ACSR/AL		
83039	002-83039				4/0 AWG - 336 MCM (0.87" @ 1.37") ACSR/AL		
84095	002-84095				556.6 - 795 MCM ACSR / 652.4 - 927.2 AAAC (1.25" @ 1.92")		
TRUNNION TYPE CLAMP FOR LINE POST INSULATOR (CU CONDUCTOR)	4350.168		82667	002-82667	#2 - 4/0 AWG (0.25" @ 0.57")		
			56577	002-11953	#3/0 AWG - 650 MCM (0.50" @ 1.06")		
TRUNNION TYPE CLAMP FOR LINE POST INSULATOR (ACSR/AL CONDUCTOR WITH ARMOR ROD)	4350.169		55999	002-11664	#4 AWG (0.25" @ 0.57")		
			82526	002-82526	#2 AWG - 266 MCM (0.50" @ 1.06")		
			57705	002-13728	4/0 AWG - 556.6 MCM (1.0" @ 1.5")		
			83015	002-83015	556.6 - 795 MCM (1.5" @ 2.0")		






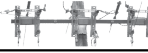

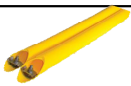


DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
OVERHEAD MATERIAL LIST						
0011	PIN ADAPTER	4350.088	08365	002-00253		
0015	EYE NUT	4350.070	55433	002-04495	3/4" EYE NUT	
			85566	002-85566	3/4" EYE NUT	
0023	1/2" GUY GRIP	4350.126	59008	002-13736	1/2" X 49" GUY GRIP, COATED, 7W PREFORMED LOOP DEAD-END	
	3/8" GUY GRIP		55426	002-04214	3/8" X 35" GUY GRIP, COATED, 7W PREFORMED LOOP DEAD-END	
0028	ALUMINUM SPACER CABLE	4350.315	84857	042-84857	195.7 MCM AAAC, 15 KV (CONTAMINATED AREAS)	
			84858	042-84858	394.5 MCM AAAC, 15 KV (CONTAMINATED AREAS)	
			84859	042-84859	652.4 MCM AAAC, 15 KV (CONTAMINATED AREAS)	
			84860	042-84860	927.2 MCM AAAC, 15 KV (CONTAMINATED AREAS)	
0033	1/2" GUY WIRE	4350.127	53700	046-00219	1/2" GALVANIZED GUY WIRE / STATIC WIRE	
0036	1" X 10' THREADED THIMBLE-EYE GALVANIZED ANCHOR ROD	4752.177	59014	002-13801	1" X 10'	
0037	3/8" GROUND ROD	4350.089	55365	002-02465	3/8" X 8' L	
			83238	002-83238	3/8" X 4' L	
	THREADED COUPLING FOR COPPER GROUND ROD		83223	002-83223	THREADED COUPLING FOR COPPER GROUND ROD	
	THREADED DRIVE HEAD FOR COPPER GROUND ROD		83224	002-83224	THREADED DRIVE HEAD FOR COPPER GROUND ROD	
	UNTHREADED COUPLING FOR COPPER GROUND ROD		83239	002-83239	UNTHREADED COUPLING FOR COPPER GROUND ROD	
	UNTHREADED DRIVE HEAD FOR COPPER GROUND ROD		83240	002-83240	UNTHREADED DRIVE HEAD FOR COPPER GROUND ROD	
0038	TRANSFORMER GROUND CONNECTOR	4350.090	58175	002-03679	COPPER OR BRONZE FOR #8 TO #2 AWG COPPER CONDUCTORS	
0040	SPAN TAP CONNECTOR	4350.096	58176	002-03695	ONE PHASE SPAN TAP CONNECTOR RUN #2 STR - 4/0 CU/AL AWG TAP #6 SOL - 1/0 STR CU/AL AWG	
0041	15 KV SPACER	4350.076	56180	002-08991	SPACER 15 KV 3 CONDUCTORS AND MESSENGER	
0050	DOUBLE ARMING BOLT	4350.102	54336	002-01129	3/8" X 16" L - HOT DIP GALVANIZED	
			54337	002-01160	3/8" X 20" L - HOT DIP GALVANIZED	
			54338	002-01186	3/8" X 22" L - HOT DIP GALVANIZED	
			54340	002-01228	3/8" X 26" L - HOT DIP GALVANIZED	
			54341	002-01269	3/8" X 30" L - HOT DIP GALVANIZED	
		4350.103	57694	002-13603	3/8" X 16" L - STAINLESS STEEL / TDG	
			82663	002-82663	3/8" X 20" L - STAINLESS STEEL / TDG	
			82664	002-82664	3/8" X 22" L - STAINLESS STEEL / TDG	
			82665	002-82665	3/8" X 26" L - STAINLESS STEEL / TDG	
			82666	002-82666	3/8" X 30" L - STAINLESS STEEL / TDG	
0054	SPACER CORNER BRACKET	4350.046	55350	002-01939	THREE PHASE CORNER BRACKET FOR SPACED AERIAL CABLES 6" - 60" (MOUNTING 8")	


DISTRIBUTION SYSTEM MATERIAL LIST						
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<b>OVERHEAD MATERIAL LIST</b>						
0055	SPOOL TYPE INSULATOR	4350.098	37118	014-00696	4" PORCELAIN INSULATOR, ANSI CLASS 53-5 SPOOL-TYPE LOW VOLTAGE	
0056	BRACKET FOR SPACER CABLE SYSTEM SUPPORT	4350.077	56181	002-09015	BRACKET FOR SPACER MESSENGER CABLE (MOUNTING 8")	
0058	SUSPENSION INSULATOR	4350.066	57665	014-01942	SUSPENSION INSULATOR, 25 KV, SML COMPOSITE, DISTRIBUTION SYSTEM	
0059	PIN FOR PIN TYPE INSULATOR	4350.104	57603	002-07837	SHORT SHANK PIN FOR 1½" PIN TYPE INSULATOR	
			55434	002-55434	LONG SHANK PIN FOR 5¼" PIN TYPE INSULATOR	
0066	CONNECTOR FOR ½" GROUND ROD	4350.089	57693	002-13595	CONNECTOR FOR ½" GROUND ROD	
0068	VERTICAL LINE POST INSULATOR	4350.065	83048	014-83048	25 KV VERTICAL LINE POST INSULATOR	
0069	HORIZONTAL LINE POST INSULATOR		57666	014-01959	25 KV HORIZONTAL LINE POST INSULATOR	
0070	PIN TYPE POLYMER INSULATOR	4350.079	57671	014-02023	25 KV POLYMER INSULATOR	
0074	GUY ATTACHMENT	4350.125	08368	002-00303	5" DUCTILE IRON HOOK	
0076	CURVED WASHER	4350.122	82655	002-82655	2¼" x 2¼" x 3/16" HOLE 11/16", HOT DIP GALVANIZED	
			57588	002-07027	3" x 3" x ¼" HOLE 13/16", HOT DIP GALVANIZED	
		4350.201	82658	002-82658	2¼" x 2¼" x 3/16" HOLE 11/16", STAINLESS STEEL / TDG	
			82659	002-82659	3" x 3" x ¼" HOLE 13/16", STAINLESS STEEL / TDG	
0077	VINYL INSULATING TAPE	4350.130	55005	038-01248	VINYL INSULATING TAPE (33) ¾" X 7 MILS RATED 600 V	
			82085	038-82085	VINYL INSULATING TAPE (88) ¾" X 8.5 MILS RATED 600 V	
			85324	038-85324	VINYL INSULATING TAPE (88) 1½" X 8.5 MILS RATED 600 V	
			85325	038-85325	VINYL INSULATING TAPE (88) 2" X 8.5 MILS RATED 600 V	
0078	HOT LINE CLAMP	4350.097	22046	072-00330	#3/0 - 636.0 (30/19) ACSR RUN / ACSR #6 (6/1) - 266.8 (26/7), CU #4 SOL - 350 MCM TAP	
			22047	072-00348	#6 (6/1) - 397.5 (18/1) ACSR RUN / ACSR #6 (6/1) - 3/0 (6/1), CU #6 SOL - 4/0 STR. TAP	
			83812	072-83812	#6 SOL - 400 CU RUN / #6 SOL - 4/0 CU STR	
0080	COPPER BARE CONDUCTOR	4350.055	82621	006-82621	#2 AWG	
			56082	006-01534	1/0 AWG	
			56081	006-01526	4/0 AWG	
			59361	006-01609	300 MCM	
0084	ARMOR ROD	4350.030	82348	002-82348	1/0 AWG (ACSR / AL CONDUCTORS)	
			82349	002-82349	3/0 AWG (ACSR / AL CONDUCTORS)	
			82350	002-82350	266.8 MCM (ACSR / AL CONDUCTORS)	
			82351	002-82351	556.5 MCM ACSR / 652.4 MCM AAAC	
			83036	002-83036	795 MCM / 927.2 MCM (ACSR / AL CONDUCTORS / AAAC)	













DISTRIBUTION SYSTEM MATERIAL LIST							
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS	
<b>OVERHEAD MATERIAL LIST</b>							
0085	FUSE CUTOUT	4350.011	76584	010-76584	100 A - 150 KV BIL POLYMER		
			76585	010-76585	200 A - 150 KV BIL POLYMER		
0086	SURGE ARRESTER	4350.010	48193	004-00028	3 KV MOV, 2.55 KV MCOV, HEAVY-DUTY		
			48195	004-00044	6 KV MOV, 5.1 KV MCOV, HEAVY-DUTY		
			53994	004-00143	10 KV MOV, 8.4 KV MCOV, HEAVY-DUTY		
0087	15 KV UNDERGROUND CABLE TAPE SHIELDED	4350.050	56890	006-00783	#2 AWG		
			56889	006-00767	2/0 AWG		
			56896	006-01005	4/0 AWG		
			56893	006-00866	500 MCM		
			56894	006-00874	750 MCM		
	15 KV UNDERGROUND CABLE JACKETED CONCENTRIC NEUTRAL	4350.160	82624	006-82624	#2 AWG		
			82625	006-82625	2/0 AWG		
			82626	006-82626	4/0 AWG		
			82627	006-82627	500 MCM		
			82628	006-82628	750 MCM		
0089	BALL CLEVIS CONNECTOR	4350.128	56588	002-12241	BALL CLEVIS CONNECTOR FOR SUSPENSION INSULATOR		
0090	SOCKET EYE CONNECTOR	4350.129	56589	002-12258	SOCKET EYE CONNECTOR		
0092	8-WAY 12" EXPANSION ANCHOR	4350.131	57691	002-13546	8 WAY 12" UNEXPANDED		
0100	MESSENGER WIRE	4350.064	37634	042-00903	7/16" ALUMINUM-CLAD MESSENGER WIRE		
0103	TRANSFORMER CLUSTER MOUNT	4350.095	55835	002-13413	MOUNT FOR (3) DIST. TRANSFORMERS FROM 15 KVA TO 167 KVA (MOUNTING 8" AND 12")		
0104	CURRENT TRANSFORMER	PER REQUEST	PER REQUEST	PER REQUEST	REFER TO METERING DEPARTMENT		
0105	VOLTAGE TRANSFORMER	PER REQUEST	PER REQUEST	PER REQUEST	REFER TO METERING DEPARTMENT		
0106	ALUMINUM BARE CONDUCTOR ACSR/GA	4350.062	56725	042-00937	1/0 AWG - RAVEN		
			56728	042-00960	3/0 AWG - PIGEON		
			56726	042-00945	266.8 MCM - PARTRIDGE		
			56727	042-00952	556.5 MCM - PARAKEET		
	ALUMINUM BARE CONDUCTOR AAAC	4350.059	84580	042-84580	123.3 MCM - AZUSA (CONTAMINATED AREAS)		
			84581	042-84581	195.7 MCM - AMHERST (CONTAMINATED AREAS)		
			84582	042-84582	394.5 MCM - CANTON (CONTAMINATED AREAS)		
			84583	042-84583	465.4 MCM - CAIRO (CONTAMINATED AREAS)		
			53689	042-01018	652.4 MCM - ELGIN (CONTAMINATED AREAS)		
	52171	042-52171	927.2 MCM - GREELEY (CONTAMINATED AREAS)				
ALUMINUM BARE CONDUCTOR ACSS/AW	4350.067	53694	042-01075	556.5 MCM - PARAKEET (CONTAMINATED AREAS)			
0119	TRIPLEX CABLE ALUMINUM	4350.061	37631	042-00788	#6 AWG 600 V - VOLUTA		
			37627	042-00408	#4 AWG 600 V - PERIWINKLE		
			56731	042-00994	#2 AWG 600 V - CONCH		
			37629	042-00440	1/0 AWG 600 V - NERITINA		
			37632	042-00804	3/0 AWG 600 V - CHERRYSTONE		
	TRIPLEX CABLE COPPER	4350.051	54016	006-00056	#6 AWG 600 V - GOTHIC (CONTAMINATED AREAS)		
54015	006-00031	#4 AWG 600 V - CASLON (CONTAMINATED AREAS)					
54023	006-00635	#2 AWG 600 V - CENTURY (CONTAMINATED AREAS)					
56079	006-01435	1/0 AWG 600 V - CORINTHIAN (CONTAMINATED AREAS)					
0119	TRIPLEX CABLE ALUMINUM	4350.061	37631	042-00788	#6 AWG 600 V - VOLUTA		
			37627	042-00408	#4 AWG 600 V - PERIWINKLE		
			56731	042-00994	#2 AWG 600 V - CONCH		
			37629	042-00440	1/0 AWG 600 V - NERITINA		
			37632	042-00804	3/0 AWG 600 V - CHERRYSTONE		
TRIPLEX CABLE COPPER	4350.051	54016	006-00056	#6 AWG 600 V - GOTHIC (CONTAMINATED AREAS)			
54015	006-00031	#4 AWG 600 V - CASLON (CONTAMINATED AREAS)					
54023	006-00635	#2 AWG 600 V - CENTURY (CONTAMINATED AREAS)					
56079	006-01435	1/0 AWG 600 V - CORINTHIAN (CONTAMINATED AREAS)					














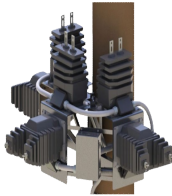







DISTRIBUTION SYSTEM MATERIAL LIST										
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS				
<b>OVERHEAD MATERIAL LIST</b>										
0128	AIR BREAK SWITCH	4350.071	82825	032-82825	27.0 KV, 600 A DISCONNECT AIR-BREAK SWITCH (MAX. MOUNTING APROX. 22")					
			55417	032-02785	27.0 KV, 900 A DISCONNECT AIR-BREAK SWITCH (MAX. MOUNTING APROX. 22")					
0141	CROSSARM	4350.002	27511	008-00680	STAINLESS STEEL - 42" (3.5')					
			4350.005	59342	008-00714		HOT DIP GALVANIZED - 72" (6')			
			4350.155	82814	008-82814		FIBERGLASS - 60" (5')			
				82815	008-82815		FIBERGLASS - 96" (8')			
0144	STIRRUP	4350.080	76635	002-14593	1/0 @ 4/0 ACSR					
			76636	002-14601	336.4 @ 556.5 MCM					
0145	DOUBLE EYE TERMINAL CONNECTOR (ALUMINUM) FOR OVERHEAD SYSTEM (ACSR, AAAC AND CU CONDUCTORS)	4350.208	85352	002-85352	1/0 (6/1) ACSR, 1/0 STR (7) CU					
			85353	002-85353	3/0 (6/1) ACSR					
			55978	002-11060	4/0 (6/1) ACSR, 4/0 STD (19) CU					
			55979	002-11086	266.8 (26/7) ACSR, 300 MCM (37) CU					
			55980	002-11094	336.4 (18/1) ACSR, 394.5 (19) AAAC					
			56718	002-10948	556.5 (24/7) ACSR, 652.4 (19) AAAC					
			83029	002-83029	795 (26/7) ACSR, 927.2 (27) AAAC					
	DOUBLE EYE TERMINAL CONNECTOR FOR UNDERGROUND SYSTEM	4350.132	56696	002-09833	#2 AWG					
			81460	038-81460	1/0 AWG					
			54678	038-00786	4/0 AWG					
			56912	038-01487	500 MCM					
			54677	038-00778	750 MCM					
			0146	INSTRUMENT TRANSFORMER SUPPORT	N/A		PER REQUEST	PER REQUEST	REFER TO METERING DEPARTMENT	
			0147	CONCRETE POLE	4350.043		84158	026-84158	SQUARE PRESTRESSED 35'-0" - H4 (5900 LBS)	
84159	026-84159	SQUARE PRESTRESSED 40'-0" - H4 (5900 LBS)								
55940	026-00294	SQUARE PRESTRESSED 45'-0" - H4 (5900 LBS)								
56194	026-00369	SQUARE PRESTRESSED 45'-0" - H6 (7700 LBS)								
56192	026-00302	SQUARE PRESTRESSED 50'-0" - H4 (5900 LBS)								
56193	026-00328	SQUARE PRESTRESSED 50'-0" - H6 (7700 LBS)								
82880	026-82880	SQUARE PRESTRESSED 50'-0" - H8 (9400 LBS)								
55937	026-00211	SQUARE PRESTRESSED 55'-0" - H6 (7700 LBS)								
82881	026-82881	SQUARE PRESTRESSED 55'-0" - H8 (9400 LBS)								
55938	026-00229	SQUARE PRESTRESSED 60'-0" - H6 (7700 LBS)								
57613	026-01094	SQUARE PRESTRESSED 60'-0" - H8 (9400 LBS)								
55939	026-00237	SQUARE PRESTRESSED 65'-0" - H6 (7700 LBS)								
82882	026-82882	SQUARE PRESTRESSED 65'-0" - H8 (9400 LBS)								
0148	GALVANIZED STEEL POLE	4350.042	83045	026-83045	DODECAGONAL 35'-0"- S3.5 (3500 LBS)					
			82858	026-82858	DODECAGONAL 40'-0"- S5.7 (5700 LBS)					
			82859	026-82859	DODECAGONAL 45'-0"- S5.7 (5700 LBS)					
			57611	026-01078	DODECAGONAL 50'-0"- S8.5 (8500 LBS)					
			85446	026-85446	DODECAGONAL 50'-0"-S10 (10000 LBS)					
			82860	026-82860	DODECAGONAL 55'-0"- S8.5 (8500 LBS)					
			85447	026-85447	DODECAGONAL 55'-0"-S10 (10000 LBS)					
			57609	026-01052	DODECAGONAL 60'-0"- S8.5 (8500 LBS)					
			82861	026-82861	DODECAGONAL 60'-0"- S10 (10000 LBS)					
			83608	026-83608	DODECAGONAL 60'-0"- S13 (13000 LBS)					
			82862	026-82862	DODECAGONAL 65'-0"- S8.5 (8500 LBS)					
			82863	026-82863	DODECAGONAL 65'-0"- S10 (10000 LBS)					
			FIBER REINFORCED COMPOSITE	4350.239	84143		026-84143	35'-0" - FRP3.5 (3500 LBS)		
	84034	026-84034			40'-0" - FRP5.7 (5700 LBS)					
	84035	026-84035			50'-0" - FRP8.5 (8500 LBS)					
	84036	026-84036			60'-0" - FRP13 (13000 LBS)					

DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	4350.016	56986	012-04817	15 KVA, 2.4/4.16 KV TO 120/240 V - SS	
			56988	012-04833	25 KVA, 2.4/4.16 KV TO 120/240 V - SS	
			56990	012-04858	37.5 KVA, 2.4/4.16 KV TO 120/240 V - SS	
			59322	012-04874	50 KVA, 2.4/4.16 KV TO 120/240 V - SS	
			59324	012-04890	75 KVA, 2.4/4.16 KV TO 120/240 V - SS	
			59326	012-04916	100 KVA, 2.4/4.16 KV TO 120/240 V - SS	
			59338	012-05111	15 KVA, 4.16/7.2 KV TO 120/240 V - SS	
			59340	012-05137	25 KVA, 4.16/7.2 KV TO 120/240 V - SS	
			56933	012-05152	37.5 KVA, 4.16/7.2 KV TO 120/240 V - SS	
			56935	012-05178	50 KVA, 4.16/7.2 KV TO 120/240 V - SS	
			56937	012-05194	75 KVA, 4.16/7.2 KV TO 120/240 V - SS	
			56939	012-05210	100 KVA, 4.16/7.2 KV TO 120/240 V - SS	
			56946	012-05293	15 KVA, 4.8/8.32 KV TO 120/240 V - SS	
			56948	012-05319	25 KVA, 4.8/8.32 KV TO 120/240 V - SS	
			59202	012-05335	37.5 KVA, 4.8/8.32 KV TO 120/240 V - SS	
			59204	012-05350	50 KVA, 4.8/8.32 KV TO 120/240 V - SS	
			59206	012-05376	75 KVA, 4.8/8.32 KV TO 120/240 V - SS	
			59209	012-05400	100 KVA, 4.8/8.32 KV TO 120/240 V - SS	
			59227	012-05665	15 KVA, 7.62/13.2 KV TO 120/240 V - SS	
			59229	012-05681	25 KVA, 7.62/13.2 KV TO 120/240 V - SS	
			57328	012-05707	37.5 KVA, 7.62/13.2 KV TO 120/240 V - SS	
			57330	012-05723	50 KVA, 7.62/13.2 KV TO 120/240 V - SS	
			57332	012-05749	75 KVA, 7.62/13.2 KV TO 120/240 V - SS	
			57334	012-05764	100 KVA, 7.62/13.2 KV TO 120/240 V - SS	
			59213	012-05483	15 KVA, 7.20/12.47 KV TO 120/240 V - SS	
			59215	012-05509	25 KVA, 7.20/12.47 KV TO 120/240 V - SS	
			56940	012-05225	37.5 KVA, 7.20/12.47 KV TO 120/240 V - SS	
			59218	012-05541	50 KVA, 7.20/12.47 KV TO 120/240 V - SS	
			59220	012-05566	75 KVA, 7.20/12.47 KV TO 120/240 V - SS	
			59222	012-05582	100 KVA, 7.20/12.47 KV TO 120/240 V - SS	
			57338	012-05848	15 KVA, 8.32/14.4 KV TO 120/240 V - SS	
			57340	012-05863	25 KVA, 8.32/14.4 KV TO 120/240 V - SS	
			57342	012-05889	37.5 KVA, 8.32/14.4 KV TO 120/240 V - SS	
			57344	012-05905	50 KVA, 8.32/14.4 KV TO 120/240 V - SS	
58992	012-05921	75 KVA, 8.32/14.4 KV TO 120/240 V - SS				
58994	012-05947	100 KVA, 8.32/14.4 KV TO 120/240 V - SS				
58996	012-05962	167 KVA, 8.32/14.4 KV TO 120/240 V - SS				
58999	012-06028	15 KVA, 13.2/22.86 KV TO 120/240 V - SS				
59001	012-06044	25 KVA, 13.2/22.86 KV TO 120/240 V - SS				
59003	012-06069	37.5 KVA, 13.2/22.86 KV TO 120/240 V - SS				
59005	012-06085	50 KVA, 13.2/22.86 KV TO 120/240 V - SS				
59007	012-06101	75 KVA, 13.2/22.86 KV TO 120/240 V - SS				
58094	012-06127	100 KVA, 13.2/22.86 KV TO 120/240 V - SS				
0150	FIBERGLASS STAND-OFF SINGLE PHASE BRACKET	4350.019	82332	008-82332	SINGLE PHASE DOUBLE POSITION (MOUNTING 8")	
0151	FIBERGLASS STAND-OFF THREE PHASE BRACKET	4350.020	82333	008-82333	THREE PHASE DOUBLE POSITION (MOUNTING 8")	
0152	CLAMP	4350.082	08378	002-00725	6" CLAMP FOR GUY WITH THREE 3/8" BOLT	
0153	AIR BREAK BYPASS DISCONNECTING SWITCH	4350.031	82357	032-82357	SINGLE PHASE	
			82358	032-82358	THREE PHASE	
0154	FIBERGLASS GUY STRAIN INSULATOR	4350.037	37119	014-00720	GUY STRAIN INSULATOR 54"	
0156	GUY WIRE MARKER	4350.142	58146	002-02598	LONG YELLOW PVC FULL ROUND GUY Φ = 2" X 8' LONG	
0159	ANTI-SWAY BRACKET	4350.029	82339	002-82339	TO STABILIZE THE SPACER CABLE, HELPS TO ELIMINATE EXCESSIVE SWINGING	
0160	CONDUCTOR DEADEND GRIP	4350.028	82341	002-82341	3/0 AWG FOR AL CABLE / 32"	
			82342	002-82342	336.4 MCM FOR AL CABLE / 39"	
			82343	002-82343	556.5 MCM FOR AL CABLE / 55"	
			83572	002-83572	795 MCM FOR AL CABLE / 70" 927.2 MCM (37) AAAC	


DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
0161	SCREW TYPE ANCHOR KIT	4350.014	82194	002-82194	SET OF: LEAD SECTION 7" X 1½" 10", 12" AND 14" HELIX TYPE ANCHOR, EXTENSION SQUARE SHAFT 5' X 1½" & TRIPLE-EYE GUY ADAPTER	
0162	HELIX TYPE ANCHOR KIT	4350.015	82193	002-82193	SET OF: HELIX, ROD & TRIPLE EYE-NUT ASSEMBLY	
			83586	002-83586	3' - 6" ROD EXTENSION WITH COUPLING	
			83587	002-83587	7' ROD EXTENSION WITH COUPLING	
0163	3' CONCRETE DOME ANCHOR	4350.138	59071	002-14544	3' CONCRETE DOME ANCHOR	
0164	U-BOLT	4350.137	59021	002-13900	U-BOLT 1½" X 5¼"	
0165	ANCHOR SHACKLE	4350.026	82318	002-82318	ANCHOR SHACKLE	
0166	SINGLE PHASE RECLOSER	4350.039	84510	032-84510	1Ø - 200 A, PRE-CONFIGURED CURVE 40K	 200 A
			82383	032-82383	1Ø - 200 A, PRE-CONFIGURED CURVE 65K	
			84121	032-84121	1Ø - 200 A, PRE-CONFIGURED CURVE 100K	
		4350.040	82813	032-82813	1Ø - 400 A	 400 A
0167	APPLICATOR RING TOOL FOR BIRD DIVERTER	4350.036	82373	072-82373	WILDLIFE PROTECTION APPLICATOR RING TOOL	
0168	SURGE ARRESTER GUARD FOR WILDLIFE PROTECTION	4350.034	82376	072-82376	WILDLIFE PROTECTION SURGE ARRESTER GUARD	
0169	TRANSFORMER BUSHING GUARD FOR WILDLIFE PROTECTION	4350.032	82416	072-82416	WILDLIFE PROTECTION TRANSFORMER BUSHING	
0170	SMALL BIRD DIVERTER	4350.035	82417	072-82417	1/0 AWG 123.3 KCMIL AAAC	
			82418	072-82418	3/0 AWG 195.7 KCMIL AAAC	
			82419	072-82419	266.8 MCM 394.5 KCMIL AAAC	
			82420	072-82420	556.5 ACSR 652.4 KCMIL AAAC	
0171	CONDUCTOR COVER GUARD FOR WILDLIFE PROTECTION	4350.033	82377	072-82377	1/0 AWG 123.3 KCMIL AAAC	
			82378	072-82378	3/0 AWG 195.7 KCMIL AAAC	
			82379	072-82379	266.8 MCM 394.5 KCMIL AAAC	
			82380	072-82380	556.5 ACSR 652.4 KCMIL AAAC	
0172	FUSE CUTOUT GUARD FOR WILDLIFE PROTECTION	4350.009	82414	072-82414	WILDLIFE PROTECTION FUSE CUTOUT COVER	
0173	BRONZE FEMALE SERVICE POST CONNECTOR	4350.117	82669	002-82669	CONNECTION IN THE GROUNDING STUD A ARRESTERS CONDUCTOR RANGE: ONE (1) OR TWO (2) STRANDED CABLE #8 - #2 AWG	
0174	GROUND / BOND WIRE CLAMP	4350.081	82539	002-82539	¾", #8 - #2 AWG STRD	
			82540	002-82540	¾", #6 - 1/0 AWG STRD	

DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
0177	VOLTAGE REGULATOR	4350.018	83460	032-83460	VOLTAGE REGULATOR	
0178	ROCK ANCHOR	4350.008	71831	002-71831	ROCK ANCHOR 2 3/4" EXPANSION FOR RODS 4'-5" x 3/4"	
0179	SPAN CLAMP	4350.287	83735	002-83735	MID SPAN CLAMP TO USE ON MIDSPANS SERVICE DROP	
0180	HORIZONTAL RECLOSER	4350.001	82490	032-82490	3Ø - 4.16 KV (MOUNTING 24") 800 A	
			82491	032-82491	3Ø - 7.20 KV (MOUNTING 24") 800 A	
			82492	032-82492	3Ø - 8.32 KV (MOUNTING 24") 800 A	
			82382	032-82382	3Ø - 13.2 KV (MOUNTING 24") 800 A	
	HORIZONTAL RECLOSER WITH LOOP RESTORATION	4350.003	82291	032-82291	3Ø - 4.16 KV (MOUNTING 24") 800 A	
			82292	032-82292	3Ø - 7.20 KV (MOUNTING 24") 800 A	
			82293	032-82293	3Ø - 8.32 KV (MOUNTING 24") 800 A	
			82294	032-82294	3Ø - 13.2 KV (MOUNTING 24") 800 A	
0181	PRECAST CONCRETE FOUNDATION FOR PRE-STRESSED CONCRETE POLE	4350.101	82595	026-82595	PRECAST CONCRETE BASE FOR CONCRETE POLE H6 TYPE 45', 50', 55', 60' AND 65' (14.5' X 40")	
			82596	026-82596	EPOXY COATED REINFORCING STEEL PRECAST CONCRETE BASE FOR CONCRETE POLE H6 TYPE 45', 50', 55', 60' AND 65' (14.5' X 40")	
			82597	026-82597	PRECAST CONCRETE BASE FOR CONCRETE POLE H8 TYPE 50', 55', 60' AND 65' (16' X 48")	
			82598	026-82598	EPOXY COATED REINFORCING STEEL PRECAST CONCRETE BASE FOR CONCRETE POLE H8 TYPE 50', 55', 60' AND 65' (16' X 48")	
	PRECAST CONCRETE FOUNDATION FOR GALVANIZED STEEL OR COMPOSITE POLE	4350.198	82691	026-82691	PRECAST CONCRETE BASE FOR GALVANIZED STEEL POLE S8.5 TYPE 50', 55', 60' AND 65' AND COMPOSITE POLE FRP8.5 TYPE 50'	
			82692	026-82692	EPOXY COATED REINFORCING STEEL PRECAST CONCRETE BASE FOR GALVANIZED STEEL POLE S8.5 TYPE 50', 55', 60' AND 65' AND COMPOSITE POLE FRP8.5 TYPE 50'	
			85469	026-85469	PRECAST CONCRETE BASE FOR GALVANIZED STEEL POLE S10 TYPE 50', 55', 60' AND 65', S13 TYPE 60' AND COMPOSITE POLE FRCP13 TYPE 60'	
			85470	026-85470	EPOXY COATED REINFORCING STEEL PRECAST CONCRETE BASE FOR GALVANIZED STEEL POLE S10 TYPE 50', 55', 60' AND 65', S13 TYPE 60' AND COMPOSITE POLE FRP13 TYPE 60'	
0182	FIXING BAND	4350.038	14486	107-04344	BAND, 3/4" X 0.025" X 200 FT/ROLL, 304 SS.	
			84298	107-84298	FIXING BAND INSTALLATION TOOL	
0183	BUCKLE FOR FIXING BAND		08023	107-03031	3/4", ALUMINUM	
0185	CONTROL POWER OVERHEAD TRANSFORMER	4350.196	83172	012-83172	4.16 KV - 2.4 KV AND 7.62KV, 120 V (DUAL VOLT)	
			83173	012-83173	7.2 KV - 4.16 KV AND 7.62KV, 120 V (DUAL VOLT)	
			83174	012-83174	8.32 KV - 4.8 KV AND 7.62KV, 120 V (DUAL VOLT)	
			83175	012-83175	13.2 KV - 7.62 KV, 120 V	
0186	POLE MOUNTED CONTROLLED CAPACITOR BANK	4350.185	83893	032-83893	CONTROLLED CAPACITOR BANK 2.40 KV, BANK 450 KVAR (MOUNTING 8", 12" OR 24")	
			83894	032-83894	CONTROLLED CAPACITOR BANK 4.16 KV, BANK 450 KVAR (MOUNTING 8", 12" OR 24")	
			83895	032-83895	CONTROLLED CAPACITOR BANK 4.80 KV, BANK 450 KVAR (MOUNTING 8", 12" OR 24")	
			83896	032-83896	CONTROLLED CAPACITOR BANK 7.62 KV, BANK 450 KVAR (MOUNTING 8", 12" OR 24")	
			83897	032-83897	CONTROLLED CAPACITOR BANK 7.62 KV, BANK 900 KVAR (MOUNTING 8", 12" OR 24")	



DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
0187	C-CHANNEL TYPE BASE	4350.065	83736	014-83736	ALUMINUM BASE ADAPTER FOR 8" AND 12" HOLE SPACING • LINE POST INSULATORS • FIBERGLASS STAND-OFF BRACKET	
		4350.302	84530	002-84530	ALUMINUM BASE ADAPTER FOR 12" AND 24" HOLE SPACING • CAPACITOR BANK • STATCOM PLATFORM • BRACKET FOR SPACER CABLE SUPPORT • PRIMARY METERING ASSEMBLY	
0188	SERRATED COLLAR BOLT	4350.065	84297	014-84297	3/8" X 1 1/2" LINE POST STUD	
			83737	014-83737	3/8" X 7" LINE POST STUD	
			83738	014-83738	3/8" X 10" LINE POST STUD	
			83740	014-83740	3/8" X 12" LINE POST STUD	
			83741	014-83741	3/8" X 14" LINE POST STUD	
0189	ALUMINUM DEADEND WEDGE	4350.286	81948	002-81948	ORANGE - #6 - #2 AWG ACSR - RIGID BAIL	
			81949	002-81949	ORANGE - #6 - #2 AWG ACSR - FLEXIBLE BAIL	
			81950	002-81950	BLUE - #4 - 1/0 AWG ACSR - RIGID BAIL	
			81951	002-81951	BLUE - #4 - 1/0 AWG ACSR - FLEXIBLE BAIL	
0190	POLE MOUNTED FIXED CAPACITOR BANK	4350.175	83461	032-83461	2.40 KV, 150 KVAR	
			83462	032-83462	2.40 KV, 300 KVAR	
			83463	032-83463	2.40 KV, 450 KVAR	
			83466	032-83466	2.40 KV, 600 KVAR	
			83467	032-83467	4.16 KV, 150 KVAR	
			83468	032-83468	4.16 KV, 300 KVAR	
			83469	032-83469	4.16 KV, 450 KVAR	
			83470	032-83470	4.16 KV, 600 KVAR	
			83471	032-83471	4.80 KV, 150 KVAR	
			83472	032-83472	4.80 KV, 300 KVAR	
			83473	032-83473	4.80 KV, 450 KVAR	
			83474	032-83474	4.80 KV, 600 KVAR	
			83475	032-83475	7.62 KV, 150 KVAR	
			83476	032-83476	7.62 KV, 300 KVAR	
			83477	032-83477	7.62 KV, 450 KVAR	
			83478	032-83478	7.62 KV, 600 KVAR	
83479	032-83479	7.62 KV, 900 KVAR				
83480	032-83480	7.62 KV, 1200 KVAR				
0191	BANDING BRACKET	4350.038	83908	107-83908	SECURE ATTACHMENT OF FIXING BAND TO EQUIPMENT	
0192	SERVICE ENTRANCE CABLE #12-3	4350.291	83906	006-83906	USED FOR RECLOSERS CONTROL CONNECTION INDOOR AND OUTDOOR USAGE	
0193	CABLE GRIP		83907	002-83907	1/2" MALE THREAD CABLE GRIP	
0195	FLEXIBLE LIQUID TIGHT CONDUIT	4350.300	84861	002-84861	1" LFNC-B CONDUIT	
			84300	002-84300	2" LFNC-B CONDUIT	
0196	FLEXIBLE LIQUID TIGHT FITTING	4350.300	84862	002-84862	1" STRAIGHT CONNECTOR	
			84301	002-84301	2" STRAIGHT CONNECTOR	
0198	FIGURE 8 LINK	4350.316	84876	002-84876	FIGURE 8 GEOMETRY, FORGED STEEL, 0.875" x 1.125" DOUBLE OPENING x 0.563" THICK	

DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
0199	OVERHEAD PRIMARY METERING ASSEMBLY (PMA)	4350.317	84879	012-84879	PRIMARY VOLTAGE L-L (KV) 13.2, VOLTAGE RATIO: 63.5:1, CURRENT RATIO: 150/5, RF=3 (MOUNTING 12")	
			84880	012-84880	PRIMARY VOLTAGE L-L (KV) 8.32, VOLTAGE RATIO: 40:1, CURRENT RATIO: 150/5, RF=3 (MOUNTING 12")	
			84881	012-84881	PRIMARY VOLTAGE L-L (KV) 7.2, VOLTAGE RATIO: 35:1, CURRENT RATIO: 150/5, RF=3 (MOUNTING 12")	
			84882	012-84882	PRIMARY VOLTAGE L-L (KV) 4.16, VOLTAGE RATIO: 20:1, CURRENT RATIO: 150/5, RF=3 (MOUNTING 12")	
			84883	012-84883	PRIMARY VOLTAGE L-L (KV) 13.2, VOLTAGE RATIO: 63.5:1, CURRENT RATIO: 600/5, RF=2 (MOUNTING 12")	
			84884	012-84884	PRIMARY VOLTAGE L-L (KV) 8.32, VOLTAGE RATIO: 40:1, CURRENT RATIO: 600/5, RF=2 (MOUNTING 12")	
			84885	0212-84885	PRIMARY VOLTAGE L-L (KV) 7.2, VOLTAGE RATIO: 35:1, CURRENT RATIO: 600/5, RF=2 (MOUNTING 12")	
			84886	012-84886	PRIMARY VOLTAGE L-L (KV) 4.16, VOLTAGE RATIO: 20:1, CURRENT RATIO: 600/5, RF=2 (MOUNTING 12")	
			8487	012-84887	VT'S - PRIMARY VOLTAGE L-L (KV) 13.2, PRIMARY VOLTAGE L-N (KV) 7.62, VOLTAGE RATIO: 63.5:1 (MOUNTING 12")	
			84888	012-84888	VT'S - PRIMARY VOLTAGE L-L (KV) 8.32, PRIMARY VOLTAGE L-N (KV) 4.8, VOLTAGE RATIO: 40:1 (MOUNTING 12")	
			84889	012-84889	VT'S - PRIMARY VOLTAGE L-L (KV) 7.2, PRIMARY VOLTAGE L-N (KV) 4.16, VOLTAGE RATIO: 35:1 (MOUNTING 12")	
			84890	012-84890	VT'S - PRIMARY VOLTAGE L-L (KV) 4.16, PRIMARY VOLTAGE L-N (KV) 2.4, VOLTAGE RATIO: 20:1 (MOUNTING 12")	
			84891	012-84891	CT'S - VOLTAGE CLASS (KV) 15, VOLTAGE RATIO: 150/5 (MOUNTING 12")	
			84892	012-84892	CT'S - VOLTAGE CLASS (KV) 15, VOLTAGE RATIO: 600/5 (MOUNTING 12")	
0200	PHASOR MEASUREMENT UNIT (PMU)	4350.313	84788	018-84788	PHASOR MEASUREMENT UNIT WITH GPS CLOCK, COMMUNICATION MODULE, COMMUNICATION CABLES, CONFIGURATION, AND REPORTING SOFTWARE. ALL DEVICES FACTORY INSTALLED AND PREWIRED IN N4X ENCLOSURE	
0204	SURGE ARRESTER MOUNTING BRACKET	4350.318	84914	002-84914	BRACKET FOR TRANSFORMER MOUNT	
			84983	002-84983	BRACKET FOR CROSSARM MOUNT	
0206	FUSE BLADE	4350.179	85362	010-85362	FUSE BLADE 300 A, 27 KV	
0500	TRANSMISSION GUY ANCHOR SYSTEM	4752.191A	59015	002-13835	12' LENGTH	
0501	GUY THIMBLE CLEVIS	4752.195	79041	002-79041	GUY THIMBLE CLEVIS 80,000 LBS. 1" BOLT DIAMETER	
2001	OUTDOOR CABLE TERMINATION STRESS CONE	4350.135	55871	038-01461	#2 AWG CU, 15 KV	
			55870	038-01453	2/0 AWG CU, 15 KV	
			55868	038-01438	4/0 AWG CU, 15 KV	
			55869	038-01446	500 MCM CU, 15 KV	
			55872	038-01479	750 MCM CU, 15 KV	

DISTRIBUTION SYSTEM MATERIAL LIST								
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS		
<b>OVERHEAD MATERIAL LIST</b>								
2002	CABLE AND STRESS CONE SUPPORT BRACKET	4350.136	82668	038-82668	#2 AWG - 1/0 AWG CU, 15KV			
			77377	038-77377	2/0 AWG - 4/0 AWG CU, 15KV			
			77378	038-77378	500 MCM - 750 MCM CU, 15KV			
2003	PIN TERMINAL CONNECTOR	4350.044	56690	002-09742	#2 AWG CU, 15 KV			
			82937	002-82937	2/0 AWG CU, 15 KV			
			82939	002-82939	4/0 AWG CU, 15 KV			
			82940	002-82940	500 MCM CU, 15 KV			
			82941	002-82941	750 MCM CU, 15 KV			
2004	FAULT CURRENT INDICATOR	4350.006	56917	038-01545	1Ø - SINGLE PHASE FAULT CURRENT INDICATOR WITH LED REMOTE INDICATION 20FT			
			83874	038-83874	1Ø - SINGLE PHASE FAULT CURRENT INDICATOR WITH INTEGRATED TARGET DISPLAY			
		4350.007	82528	032-82528	FCI - 3A WITHOUT COMMUNICATION AUTOMATIC RESET FAULTED CIRCUIT INDICATORS (FCI) FOR USE ON 60 HRTZ WYE CONNECTED MULTI-GROUNDED IN RANGE OF 4.16 TO 13.2 KV (PHASE TO PHASE)			
			82529	032-82529	FCI - 3A WITH COMMUNICATION AUTOMATIC RESET FAULTED CIRCUIT INDICATORS (FCI) FOR USE ON THE 60 HERTZ WYE CONNECTED MULTI-GROUNDED IN RANGE OF 4.16 TO 13.2 KV (PHASE TO PHASE)			
		2005	STRANDED COPPER CABLE, 600 V, XHHW-2	4350.054	56892	006-00833		#2 AWG CU, 600 V, XHHW-2
					82622	006-82622	1/0 AWG CU, 600 V, XHHW-2	
82623	006-82623				2/0 AWG CU, 600 V, XHHW-2			
82753	006-82753				3/0 AWG CU, 600 V, XHHW-2			
56891	006-00809				4/0 AWG CU, 600 V, XHHW-2			
59358	006-01575				500 MCM CU, 600 V, XHHW-2			
2006	1½" STRUT CHANNEL	4350.105	83135	038-83135	1½" X 1½" 12 GAUGE - HDG			
		4350.106	83136	038-83136	1½" X 1½" 12 GAUGE - SS			
2008	½" FULLY THREADED ROD	4350.107	82933	002-82933	½" DIAMETER X 6' L - HDG			
		4350.108	82929	002-82929	½" DIAMETER X 6' L - SS			
2009	HEXAGONAL NUT	4350.113	82928	002-82928	½" DIAMETER - HDG			
		4350.114	82038	002-82038	½" DIAMETER - SS			
			84574	002-84574	¾" DIAMETER - SS			
			84575	002-84575	¾" DIAMETER - SS			
			84871	002-84871	¾" DIAMETER - SS			
2012	BRONZE MALE SERVICE POST CONNECTOR	4350.118	82925	002-82925	½" BRONZE MALE SERVICE POST CONNECTOR #2 AWG TO 1/0 AWG CU - BRZ			
			83411	002-83411	¾" BRONZE MALE SERVICE POST CONNECTOR #1 AWG TO 350 MCM CU - BRZ			
2014	DUCT SEALING COMPOUND	4350.190	48058	003-02935	DUCT SEALING COMPOUND			
2026	CABLE TIE	4350.211	83155	038-83155	24" L CABLE TIE WEATHER RESISTANT			
2039	PVC SCH-80 DUCT	4350.236	84893	038-84893	¾" - SCH-80			
			83314	038-83314	2" - SCH-80			
			83315	038-83315	3" - SCH-80			
			83316	038-83316	4" - SCH-80			
			83317	038-83317	6" - SCH-80			

DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
2040	PVC SCH-40 DUCT	4350.235	83422	038-83422	¾" - SCH-40	
			83424	038-83424	1" - SCH-40	
			59318	038-01867	2" - SCH-40	
			83182	038-83182	3" - SCH-40	
			59311	038-01792	4" - SCH-40	
			56927	038-01727	6" - SCH-40	
			56920	038-01651	8" - SCH-40	
2041	90° PVC ELBOW	4350.235	83425	038-83425	¾" - SCH-40 - STANDARD RADIUS	
			83427	038-83427	1" - SCH-40 - STANDARD RADIUS	
			59319	038-01875	2" - SCH-40 - STANDARD RADIUS	
			82927	038-82927	3" - SCH-40 - STANDARD RADIUS	
			59312	038-01800	4" - SCH-40 - STANDARD RADIUS	
			56928	038-01735	6" - SCH-40 - STANDARD RADIUS	
			56921	038-01669	8" - SCH-40 - STANDARD RADIUS	
			84331	038-84331	2" - SCH-40 - SPECIAL RADIUS	
			84332	038-84332	3" - SCH-40 - SPECIAL RADIUS	
			84333	038-84333	4" - SCH-40 - SPECIAL RADIUS	
			84334	038-84334	6" - SCH-40 - SPECIAL RADIUS	
2042	PVC END CAP	4350.235	85650	038-85650	1" - SCH-40	
			59320	038-01883	2" - SCH-40	
			83194	038-83194	3" - SCH-40	
			59313	038-01818	4" - SCH-40	
			56929	038-01743	6" - SCH-40	
			56922	038-01677	8" - SCH-40	
2043	PVC COUPLING	4350.235	83428	038-83428	¾" - SCH-40	
			83429	038-83429	1" - SCH-40	
			58486	038-01909	2" - SCH-40	
			83198	038-83198	3" - SCH-40	
			59315	038-01834	4" - SCH-40	
			56931	038-01762	6" - SCH-40	
			56924	038-01693	8" - SCH-40	
2044	PVC FEMALE ADAPTER	4350.235	85651	038-85651	1" - SCH-40	
			83202	038-83202	2" - SCH-40	
			83203	038-83203	3" - SCH-40	
			83204	038-83204	4" - SCH-40	
			83205	038-83205	6" - SCH-40	
2045	PVC END BELL	4350.235	84894	038-84894	¾" - SCH-40	
			59321	038-01891	2" - SCH-40	
			83201	038-83201	3" - SCH-40	
			59314	038-01826	4" - SCH-40	
			56930	038-01750	6" - SCH-40	
			56923	038-01685	8" - SCH-40	
2048	HEX HEAD BOLT	4350.209	83212	038-83212	½" DIAMETER X 2" L BOLT - SS	
			83218	038-83218	½" DIAMETER X 1½" L BOLT - SS	
			83413	038-83413	¾" DIAMETER X 1" L BOLT - SS	
		4350.306	84534	002-84534	¾" DIAMETER X 2½" - SS	
			84535	002-84535	¾" DIAMETER X 3" - SS	
2049	A-2-4 BACKFILL MATERIAL	4350.205	83207	038-83207	A-2-4 MATERIAL AS PER ASTM D3282, LATEST EDITION (CU.MT. OR m³)	
2050	#67 CRUSHED STONE OR GRAVEL	4350.223	83208	038-83208	¾" AND SMALLER CRUSHED STONE (CU. MT. OR m³)	



DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	ILLUSTRATIONS
<b>OVERHEAD MATERIAL LIST</b>						
2086	STRANDED COPPER CABLE, 600 V, THHN / THWN-2	4350.056	58516	040-00774	#12 AWG CU, 600 V, THHN, GREEN	
			54271	040-00931	#12 AWG CU, 600 V, THHN, WHITE	
			54270	040-00899	#12 AWG CU, 600 V, THHN, BLACK	
			54269	040-00873	#12 AWG CU, 600 V, THHN, RED	
			54268	040-00857	#12 AWG CU, 600 V, THHN, ORANGE	
			54267	040-00816	#12 AWGCU, 600 V, THHN, BLUE	
			54266	040-00790	#12 AWG CU, 600 V, THHN, YELLOW	
			54273	040-01293	#12 AWG CU, 600 V, THHN, BROWN	
			56897	006-01070	#10 AWG CU, 600 V, THHN, BLACK - SOLID	
			83458	006-83458	#10 AWG CU, 600 V, THHN, GREEN	
			83459	006-83459	#10 AWG CU, 600 V, THHN, WHITE	
			84642	006-84642	#10 AWG CU, 600 V, THHN, BLACK	
2102	STRUT CHANNEL NUT	4350.298	84270	002-84270	½" – 13 UNC (SPRING NUT)	
			84271	002-84271	¾" – 16 UNC (SPRING NUT)	



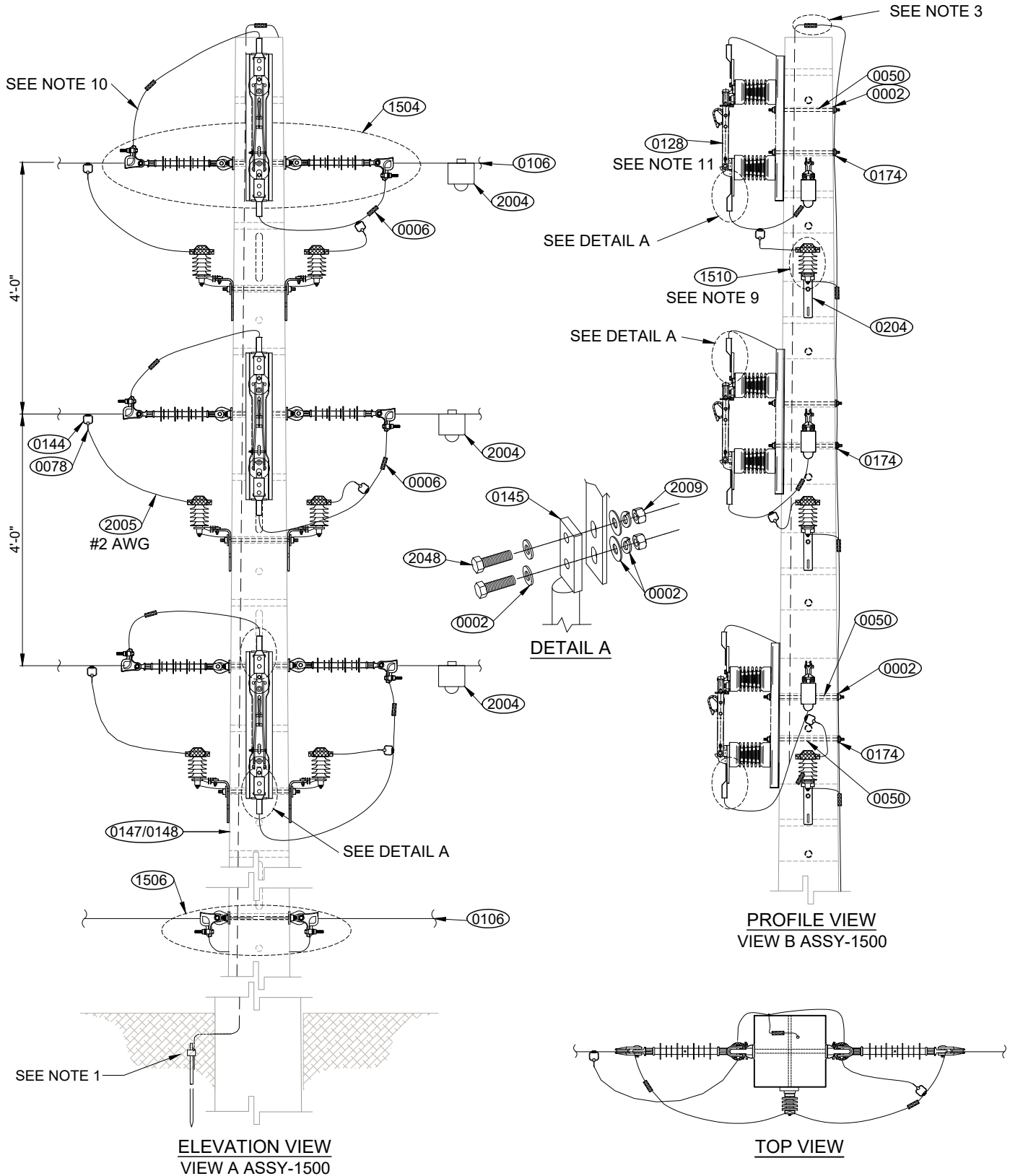
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL WITH AIR BREAK SWITCHES  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	ABS-3-VERT	VERSION	7
DOCUMENT NO.	4301.049		
PAGE	1 OF 3	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL WITH AIR BREAK SWITCHES          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>ABS-3-VERT</u> VERSION <u>7</u>
		DOCUMENT NO. <u>4301.049</u>
		PAGE <u>2</u> OF <u>3</u> DATE <u>FEB 26, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- THE INSTALLATION OF NORMALLY OPEN (N/O) SWITCHES (ITEM 0128) REQUIRES THAT SURGE ARRESTERS BE INSTALLED BEFORE AND AFTER THE N/O SWITCH. IF THERE IS NOT ENOUGH SPACE FOR THEIR INSTALLATION, THEY ARE REQUIRED TO BE INSTALLED ON THE PREVIOUS OR POSTERIOR POLES.
- THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED, TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM NUMBER OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
- THE AIR BREAK SWITCHES MAY BE INSTALLED ON DIFFERENT POLE SIDES, PROVIDED THEY COMPLY WITH THE REQUIRED CLEARANCES AND ALLOW FOR THEIR PROPER OPERATION. IF THE LINE CONSTRUCTION IS NOT IN STRAIGHT LINE, REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- THE QUANTITY AND LOCATION OF THE FAULT CURRENT INDICATORS (ITEM 2004) SHALL BE DETERMINED BY THE ENGINEER TO FACILITATE THE TROUBLESHOOTING OF FAULTS.

### MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	12
	FLAT ROUND WASHER	VARIES	24
	SPLIT LOCK WASHER	VARIES	12
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	9
0078	HOT LINE CLAMP	VARIES	3
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0128	AIR BREAK SWITCH	VARIES	3
0144	STIRRUP	VARIES	3
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	6



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL WITH AIR BREAK SWITCHES          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</b>	STANDARD NO. <u>ABS-3-VERT</u> VERSION <u>7</u> DOCUMENT NO. <u>4301.049</u> PAGE <u>3</u> OF <u>3</u> DATE <u>FEB 26, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND / BOND WIRE CLAMP	002-82539	3
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	6
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
2004	FAULT CURRENT INDICATOR	VARIES	AS REQ.
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
2009	HEXAGONAL NUT	002-82038	12
2048	HEX HEAD BOLT	038-83218	12



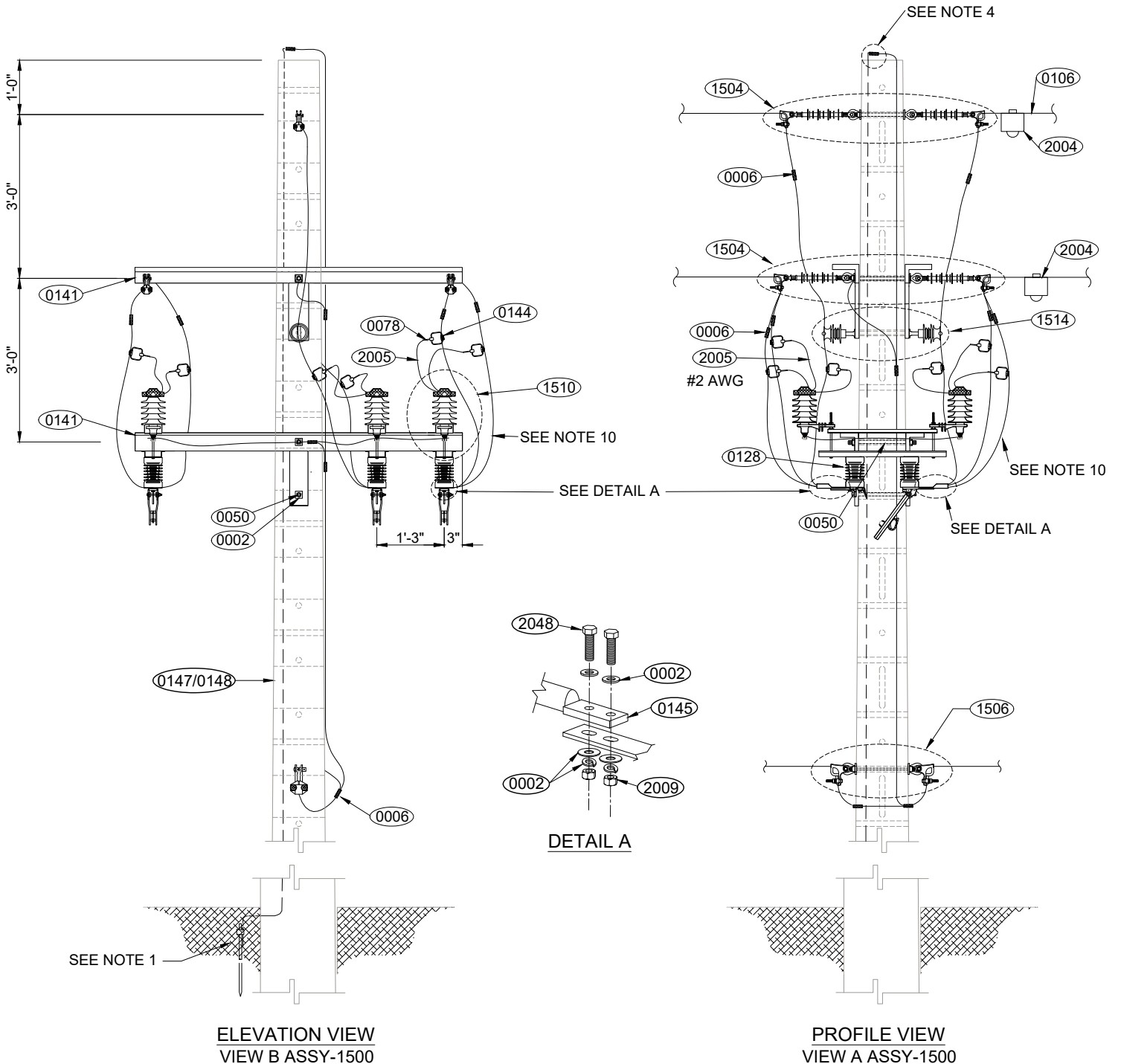
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
CROSSARM WITH AIR BREAK SWITCHES  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. ABS-3-XARM VERSION 7  
DOCUMENT NO. 4301.048  
PAGE 1 OF 3 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION CROSSARM WITH AIR BREAK SWITCHES MAXIMUM VOLTAGE: 13.2 KV NOTES</b>	STANDARD NO. <u>ABS-3-XARM</u> VERSION <u>7</u> DOCUMENT NO. <u>4301.048</u> PAGE <u>2 OF 3</u> DATE <u>FEB 20, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM NUMBER OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
12. THE QUANTITY AND LOCATION OF THE FAULT CURRENT INDICATORS (ITEM 2004) SHALL BE DETERMINED BY THE ENGINEER TO FACILITATE THE TROUBLESHOOTING OF FAULTS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>THREE PHASE PRIMARY CONSTRUCTION          CROSSARM WITH AIR BREAK SWITCHES          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</b>	STANDARD NO. <u>ABS-3-XARM</u> VERSION <u>7</u> DOCUMENT NO. <u>4301.048</u> PAGE <u>3</u> OF <u>3</u> DATE <u>FEB 20, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
	FLAT ROUND WASHER	VARIES	24
	SPLIT LOCK WASHER	VARIES	12
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	3
0078	HOT LINE CLAMP	VARIES	6
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0128	AIR BREAK SWITCH	VARIES	3
0141	CROSSARM	VARIES	4
0144	STIRRUP	VARIES	6
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE C, 1-FIGURE D	3
1514	PIN TYPE POLYMER INSULATOR ASEMBLY	ASSY-1514 FIGURE B	1
2004	FAULT CURRENT INDICATOR	VARIES	AS REQ.
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	12
2048	HEX HEAD BOLT	038-83218	12



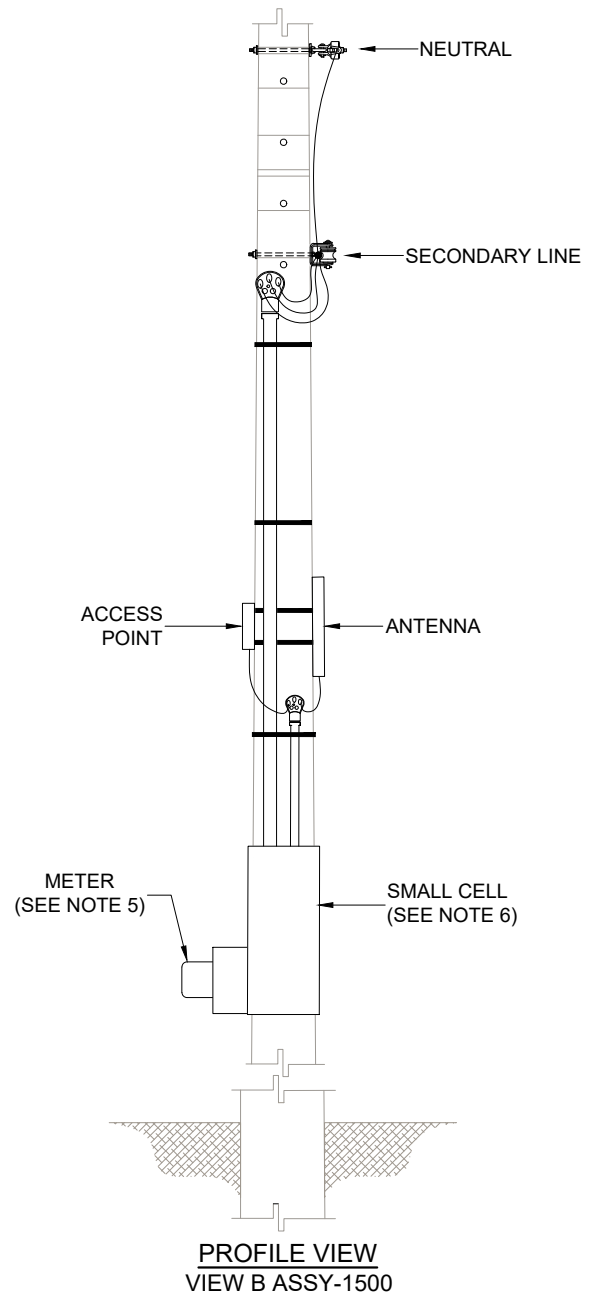
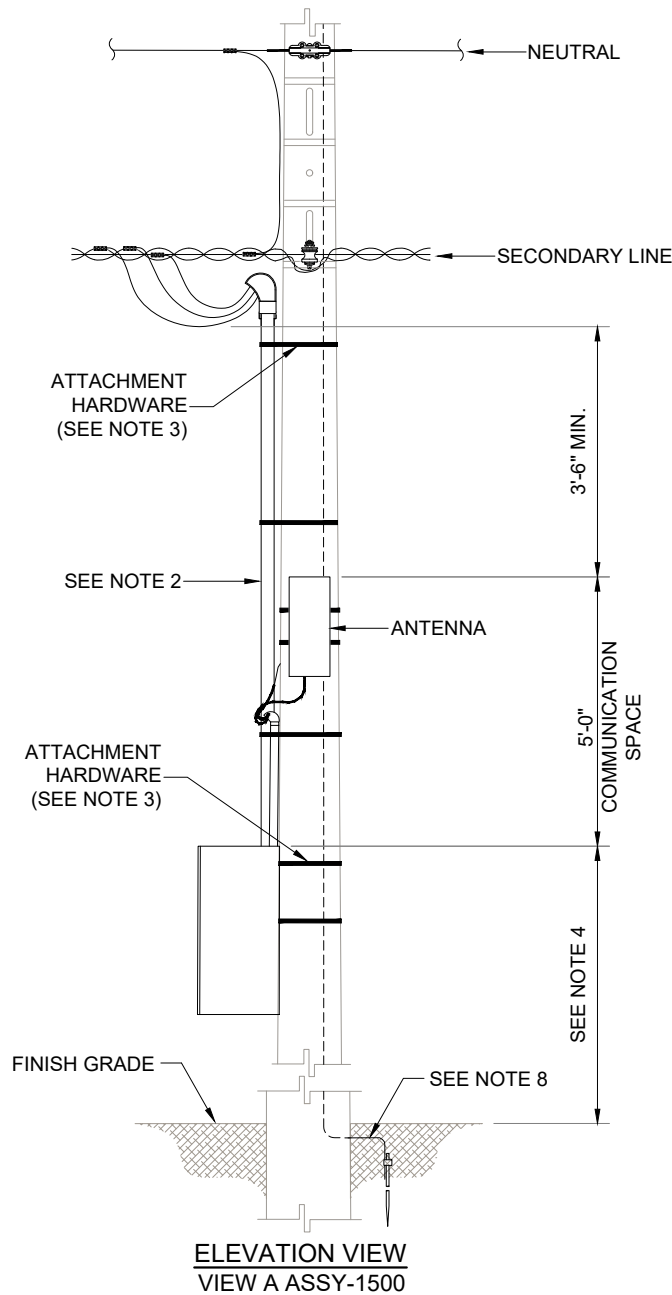
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

OVERHEAD FED ANTENNA  
MAXIMUM VOLTAGE: 240 V

STANDARD NO. ANT-01 VERSION 4  
DOCUMENT NO. 4301.064  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

OVERHEAD FED ANTENNA  
MAXIMUM VOLTAGE: 240 V  
NOTES

STANDARD NO.	ANT-01	VERSION	4
DOCUMENT NO.	4301.064		
PAGE	2 OF 2	DATE	FEB 2, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		

NOTES:

1. THIS STANDARD IS FOR THE EXCLUSIVE USE OF PRIVATE OR PUBLIC ENTITIES WITH A CURRENT LUMA'S THIRD-PARTY ATTACHMENT AGREEMENT.
2. 3/4" MINIMUM DIAMETER PVC SCH-80 DUCT SHALL BE USED.
3. THE ANTENNA ATTACHMENT, CABINET AND RISER MUST BE HOLD TO THE POLE WITH THE APPROPRIATE ATTACHMENT HARDWARE, RATED TO SUPPORT THE EQUIPMENT AND COMPLYING WITH THE APPLICABLE INDUSTRY STANDARDS. FIELD DRILLING OF POLE IS NOT ALLOWED.
4. VERTICAL CLEARANCE OF THE CABINET SHALL COMPLY WITH CURRENT NATIONAL ELECTRICAL SAFETY CODE (NEC). AND ITS TOP SHALL NEVER BE HIGHER THAN 18'-0" FROM THE FINISH GRADE.
5. IF INSTALLATION OF A METER IS REQUIRED, IT SHALL BE INSTALLED IN THE COMMUNICATION EQUIPMENT CABINET. IF THE SIZE OF THE CABINET IS NOT SUFFICIENT TO INSTALL THE METER, OTHER ALTERNATIVES SHOULD BE EVALUATED AND APPROVED BY LUMA.
6. THE COMMUNICATION EQUIPMENT SHALL INCLUDE A PROTECTIVE DEVICE.
7. THE ELECTRICAL SUPPLY AND COMMUNICATION SYSTEMS SHALL BE GROUNDED TOGETHER VIA A SINGLE GROUNDING CONDUCTOR. THE MINIMUM REQUIRED GROUNDING CONNECTIONS FOR THE COMMUNICATION SYSTEM TO THE POLE GROUNDING CONDUCTOR, WHEN USED JOINTLY WITH THE ELECTRICAL SUPPLY SYSTEM, SHALL INCLUDE CONNECTIONS AT THE FIRST AND LAST POLES, ALONG WITH ANY ADDITIONAL CONNECTIONS REQUIRED BY THE NEC. A MINIMUM OF #2 AWG STRANDED COPPER PIGTAIL INTENDED FOR CONNECTING TO THE POLE'S SINGLE GROUNDING CONDUCTOR SHOULD BE LEFT IN THE COMMUNICATION SPACE BY THE FIRST COMMUNICATION COMPANY REQUESTING INSTALLATION, ENABLING LUMA TO PERFORM THE NECESSARY CONNECTIONS.
8. THE INSTALLATION OF SOLAR PANELS ON PREPA POLES FOR POWERING COMMUNICATION EQUIPMENT IS NOT ALLOWED.
9. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".



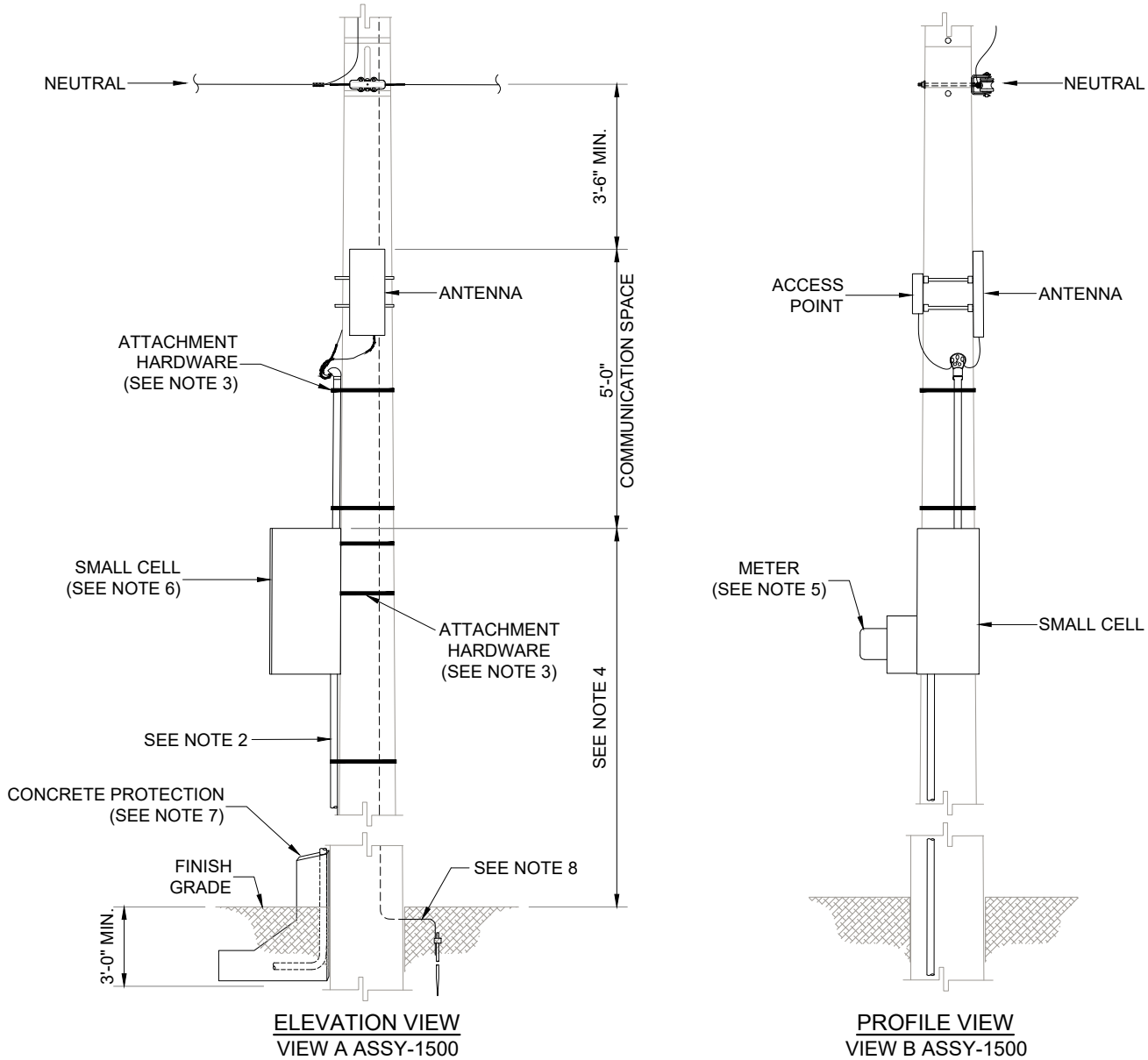
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## UNDERGROUND FED ANTENNA MAXIMUM VOLTAGE: 240 V

STANDARD NO. ANT-02 VERSION 4  
DOCUMENT NO. 4301.065  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND  
FED ANTENNA  
MAXIMUM VOLTAGE: 240 V  
NOTES

STANDARD NO.	ANT-02	VERSION	4
DOCUMENT NO.	4301.065		
PAGE	2 OF 2	DATE	FEB 2, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		

NOTES:

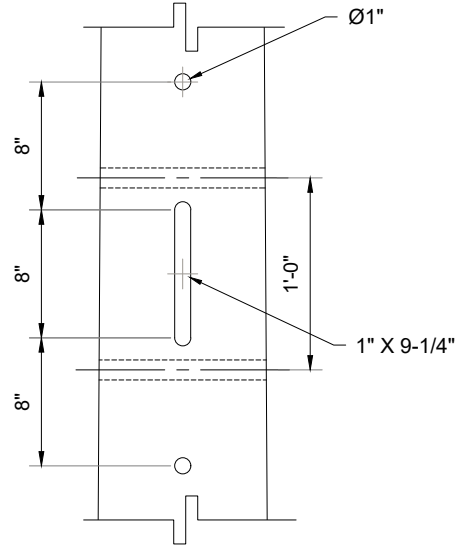
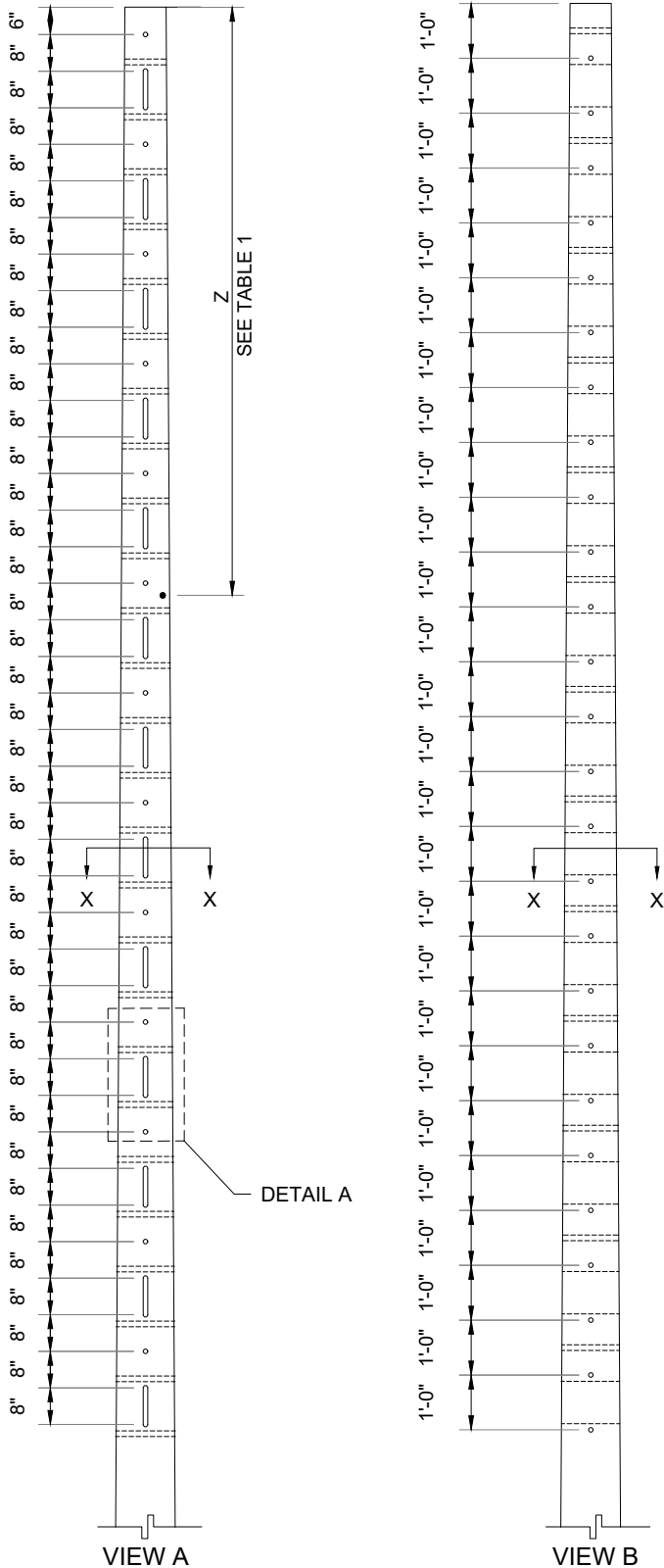
1. THIS STANDARD IS FOR THE EXCLUSIVE USE OF PRIVATE OR PUBLIC ENTITIES WITH A CURRENT LUMA'S THIRD-PARTY ATTACHMENT AGREEMENT.
2. 3/4" MINIMUM DIAMETER PVC SCH-80 DUCT SHALL BE USED.
3. THE ANTENNA ATTACHMENT, CABINET AND RISER MUST BE HOLD TO THE POLE WITH THE APPROPRIATE ATTACHMENT HARDWARE, RATED TO SUPPORT THE EQUIPMENT AND COMPLYING WITH THE APPLICABLE INDUSTRY STANDARDS. FIELD DRILLING OF POLES IS NOT ALLOWED.
4. VERTICAL CLEARANCE OF THE CABINET SHALL COMPLY WITH CURRENT NATIONAL ELECTRICAL SAFETY CODE (NESC). AND ITS TOP SHALL NEVER BE HIGHER THAN 18'-0" FROM THE FINISH GRADE.
5. IF INSTALLATION OF A METER IS REQUIRED, IT SHALL BE INSTALLED IN THE COMMUNICATION EQUIPMENT CABINET. IF THE SIZE OF THE CABINET IS NOT SUFFICIENT TO INSTALL THE METER, OTHER ALTERNATIVES SHOULD BE EVALUATED AND APPROVED BY LUMA.
6. THE COMMUNICATION EQUIPMENT SHALL INCLUDE A PROTECTIVE DEVICE.
7. FOR DETAILS OF THE RISER'S CONCRETE BASE SUPPORT, SEE STANDARDS NO. URD-4 AND URD-4-A OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
8. THE ELECTRICAL SUPPLY AND COMMUNICATION SYSTEMS SHALL BE GROUNDED TOGETHER VIA A SINGLE GROUNDING CONDUCTOR. THE MINIMUM REQUIRED GROUNDING CONNECTIONS FOR THE COMMUNICATION SYSTEM TO THE POLE GROUNDING CONDUCTOR, WHEN USED JOINTLY WITH THE ELECTRICAL SUPPLY SYSTEM, SHALL INCLUDE CONNECTIONS AT THE FIRST AND LAST POLES, ALONG WITH ANY ADDITIONAL CONNECTIONS REQUIRED BY THE NESC. A MINIMUM OF #2 AWG STRANDED COPPER PIGTAIL INTENDED FOR CONNECTING TO THE POLE'S SINGLE GROUNDING CONDUCTOR SHOULD BE LEFT IN THE COMMUNICATION SPACE BY THE FIRST COMMUNICATION COMPANY REQUESTING INSTALLATION, ENABLING LUMA TO PERFORM THE NECESSARY CONNECTIONS.
9. THE INSTALLATION OF SOLAR PANELS ON PREPA POLES FOR POWERING COMMUNICATION EQUIPMENT IS NOT ALLOWED.
10. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".

TITLE:

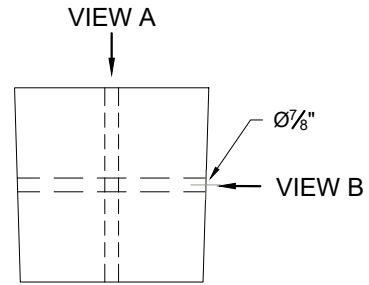
### POLE HOLE PATTERN

STANDARD NO. ASSY-1500 VERSION 5  
 DOCUMENT NO. 4301.066  
 PAGE 1 OF 3 DATE JAN 23, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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### CONCRETE POLE



DETAIL A



SECTION X-X

TABLE 1:  
CONCRETE POLES

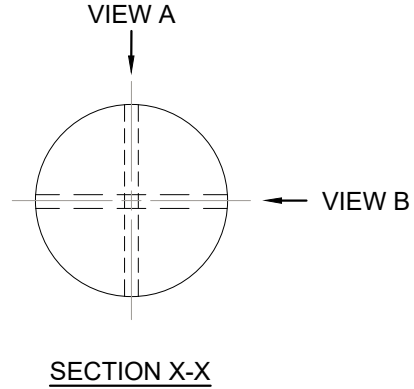
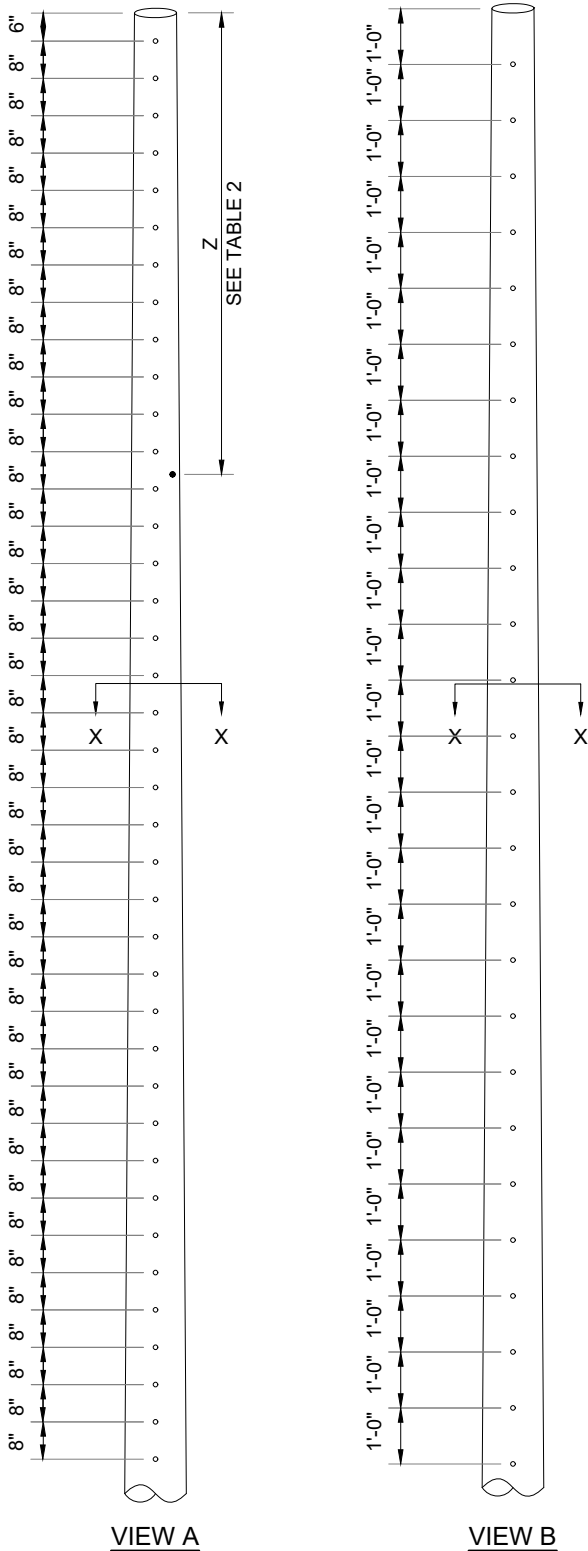
HEIGHT	EMBEDMENT DEPTH	HOLE QTY. VIEW B	GROUNDING TERMINALS' LOCATION FROM THE TOP (Z)		
			0'-0"	8'-9"	31'-0"
35'-0"	5'-6"	12	0'-0"	8'-9"	31'-0"
40'-0"	6'-0"	14	0'-0"	8'-9"	35'-6"
45'-0"	6'-6"	14	0'-0"	10'-9"	40'-0"
50'-0"	7'-0"	21	0'-0"	14'-3"	44'-6"
55'-0"	7'-9"	26	0'-0"	16'-9"	48'-9"
60'-0"	8'-5"	26	0'-0"	20'-9"	53'-9"
65'-0"	9'-1"	32	0'-0"	24'-3"	57'-4"

TITLE:

### POLE HOLE PATTERN

STANDARD NO. ASSY-1500 VERSION 5  
 DOCUMENT NO. 4301.066  
 PAGE 2 OF 3 DATE JAN 23, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
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### GALVANIZED STEEL POLE



HEIGHT	EMBEDMENT DEPTH	HOLE QTY. VIEW B	GROUNDING TERMINALS' LOCATION FROM THE TOP (Z)			
35'-0"	5'-6"	12	8'-7"		30'-6"	
40'-0"	6'-0"	14	8'-7"		35'-0"	
45'-0"	6'-6"	14	12'-6"		39'-6"	
50'-0"	7'-0"	21	6'-6"	17'-7"	24'-6"	44'-0"
55'-0"	7'-9"	26	7'-11"	16'-11"	25'-11"	48'-3"
60'-0"	8'-5"	26	1'-2"	18'-1"	26'-1"	52'-7"
65'-0"	9'-1"	32	2'-1"	9'-0"	27'-0"	56'-10"

**NOTE:**

- ON POLES 50' OR HIGHER, THE HOLE DIAMETER IS  $\frac{13}{16}$ ", WHILE FOR POLES OF LOWER HEIGHT, IT IS  $\frac{1}{16}$ ".

TITLE:

### POLE HOLE PATTERN

STANDARD NO. ASSY-1500 VERSION 5  
 DOCUMENT NO. 4301.066  
 PAGE 3 OF 3 DATE JAN 23, 2024  
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### FIBER REINFORCED COMPOSITE POLE

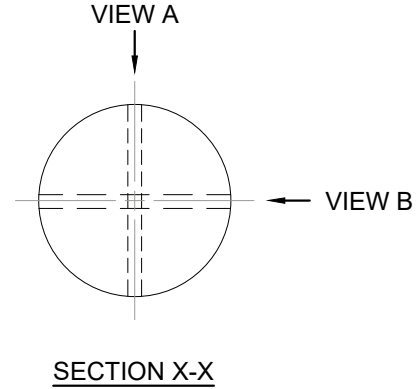
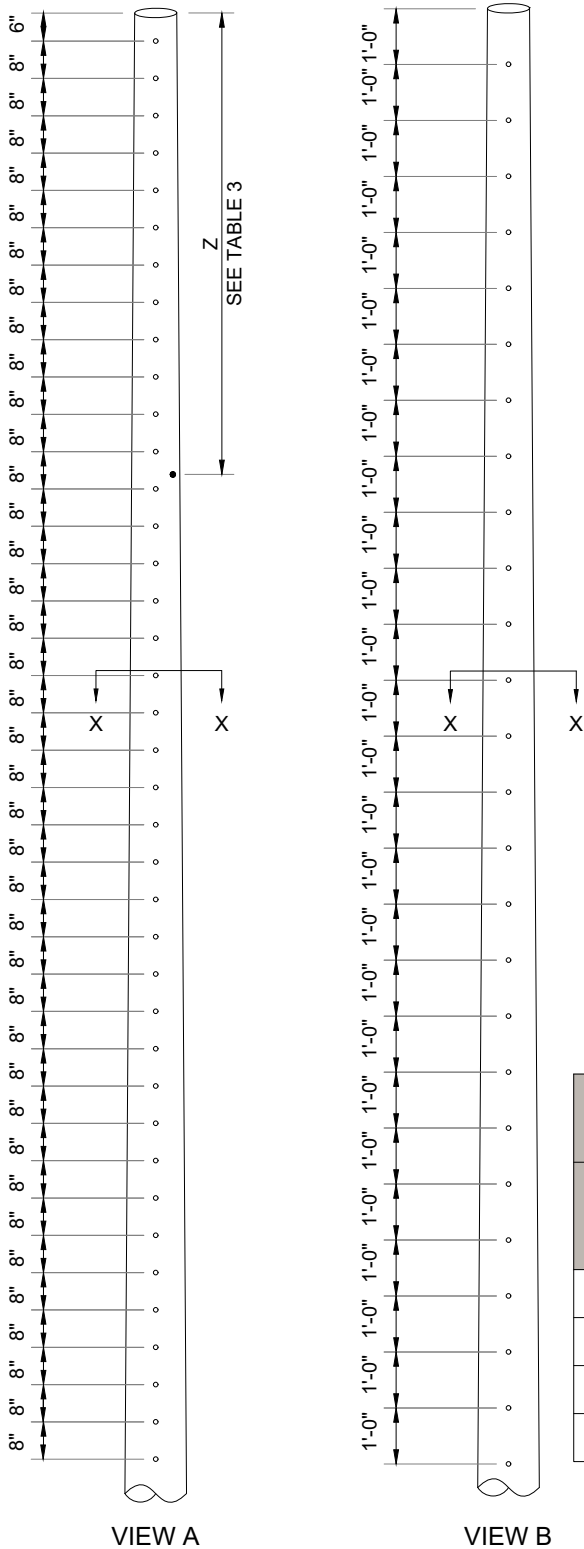


TABLE 3: FIBER REINFORCED COMPOSITE POLES						
HEIGHT	EMBEDMENT DEPTH	HOLE QTY. VIEW B	GROUNDING INTERCONNECTION HOLES LOCATION FROM THE TOP (Z)			
35'-0"	5'-6"	12	8'-7"			30'-6"
40'-0"	6'-0"	14	8'-7"			35'-0"
50'-0"	7'-0"	21	6'-6"	17'-7"	24'-6"	44'-0"
60'-0"	8'-5"	26	1'-2"	18'-1"	26'-1"	52'-7"



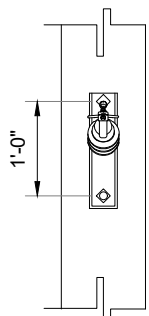
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OVERHEAD DISTRIBUTION STANDARDS

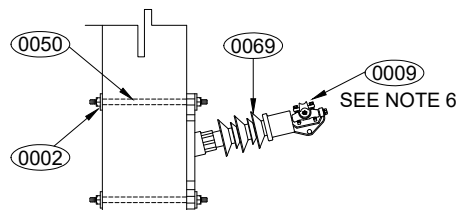
TITLE:

**SIDE POST INSULATOR ASSEMBLY**  
**MAXIMUM VOLTAGE: 13.2 KV**

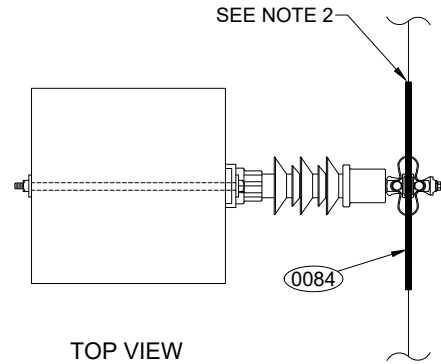
STANDARD NO. ASSY-1501 VERSION 5  
 DOCUMENT NO. 4301.067  
 PAGE 1 OF 4 DATE JAN 23, 2024  
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VICTOR R. FEBRES LIC. 3412



FRONT VIEW

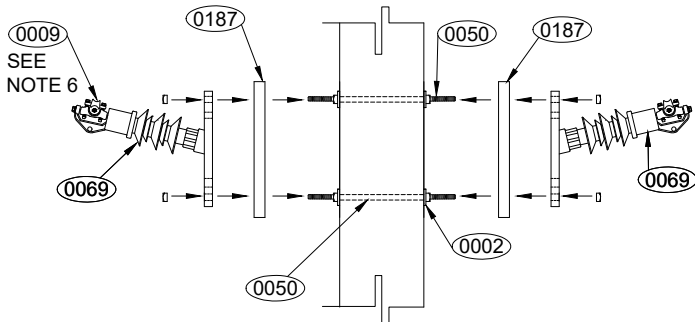


SIDE VIEW

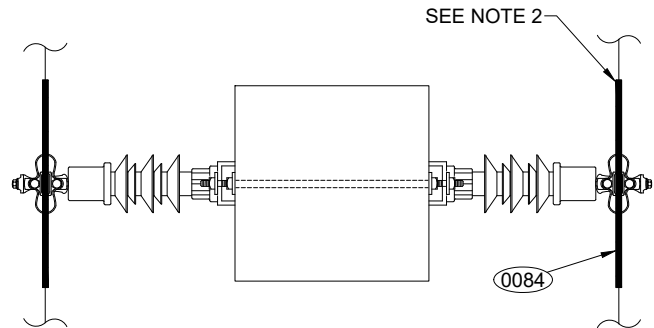


TOP VIEW

**FIGURE A**  
**SINGLE PHASE / INSULATOR**  
**WITH BASE (SEE NOTE 4)**



SIDE VIEW



TOP VIEW

**FIGURE B**  
**TWO PHASE / INSULATOR**  
**WITH BASE INSTALLED ON C-CHANNEL**  
**TYPE BASE (SEE NOTE 5)**

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.
0002	FLAT SQUARE WASHER	VARIES	2	4
0009	TRUNNION TYPE CLAMP FOR LINE POST INSULATOR	VARIES	AS REQ.	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2	2
0069	HORIZONTAL LINE POST INSULATOR	014-01959	1	2
0084	ARMOR ROD	VARIES	1	2
0187	C-CHANNEL TYPE BASE	014-83736	-	2



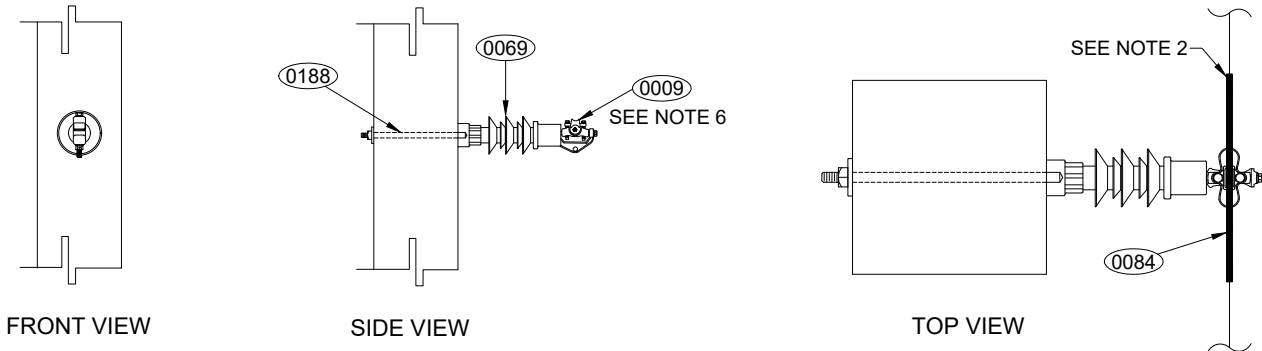
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OVERHEAD DISTRIBUTION STANDARDS

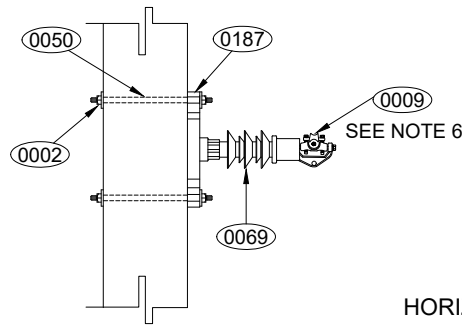
TITLE:

**SIDE POST INSULATOR ASSEMBLY**  
**MAXIMUM VOLTAGE: 13.2 KV**

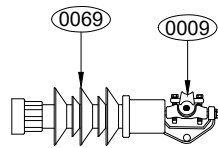
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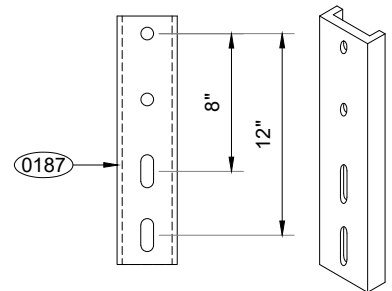
**FIGURE C**  
 SINGLE PHASE / INSULATOR  
 WITHOUT BASE (SEE NOTE 4)



**FIGURE D**  
 ROUND POLE (SEE NOTE 3)



**FIGURE E**  
 HORIZONTAL LINE POST INSULATOR  
 WITHOUT BASE (SEE NOTE 3)



**FIGURE F**  
 C-CHANNEL TYPE BASE (SEE NOTE 3)

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"C" QTY.	"D" QTY.
0002	FLAT SQUARE WASHER	VARIES	-	2
0009	TRUNNION TYPE CLAMP FOR LINE POST INSULATOR	VARIES	AS REQ.	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	-	2
0069	HORIZONTAL LINE POST INSULATOR	014-01959	1	1
0084	ARMOR ROD	VARIES	1	1
0187	C-CHANNEL TYPE BASE	014-83736	-	1
0188	SERRATED COLLAR BOLT	VARIES	1	-





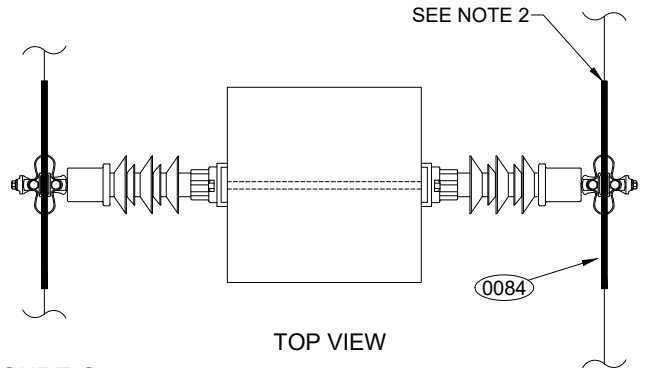
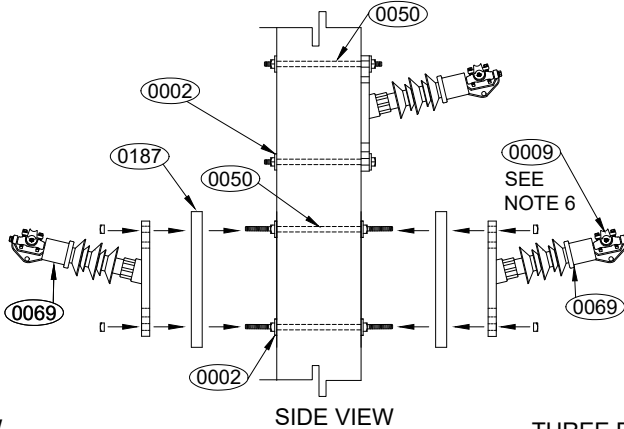
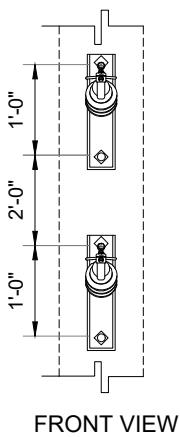
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OVERHEAD DISTRIBUTION STANDARDS

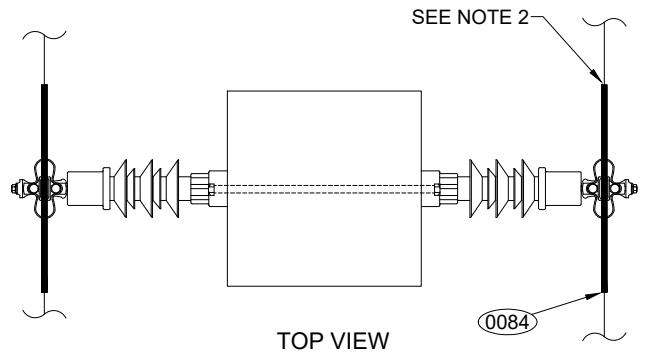
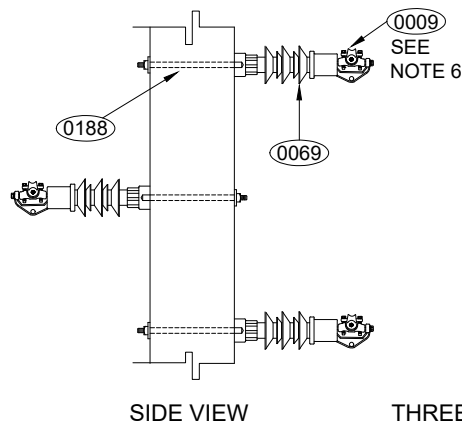
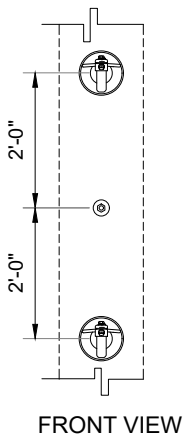
TITLE:

## SIDE POST INSULATOR ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. ASSY-1501 VERSION 5  
 DOCUMENT NO. 4301.067  
 PAGE 3 OF 4 DATE JAN 23, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



**FIGURE G**  
THREE PHASE / INSULATOR  
WITH BASE (SEE NOTE 5)



**FIGURE H**  
THREE PHASE / INSULATOR  
WITHOUT BASE (SEE NOTE 5)

### MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"G" QTY.	"H" QTY.
0002	FLAT SQUARE WASHER	VARIES	6	-
0009	TRUNNION TYPE CLAMP FOR LINE POST INSULATOR	VARIES	AS REQ.	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	4	-
0069	HORIZONTAL LINE POST INSULATOR	VARIES	3	3
0084	ARMOR ROD	VARIES	3	3
0187	C-CHANNEL TYPE BASE	014-83736	2	-
0188	SERRATED COLLAR BOLT	VARIES	-	3



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SIDE POST INSULATOR ASSEMBLY  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES**

STANDARD NO. ASSY-1501 VERSION 5  
DOCUMENT NO. 4301.067  
PAGE 4 OF 4 DATE JAN 23, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412

NOTES:

1. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
2. THE ARMOR ROD WILL NOT BE REQUIRED FOR PRIMARY JUMPERS.
3. HORIZONTAL LINE POST INSULATORS THAT DO NOT INCLUDE A BASE (FIGURE E) MUST USE THE BASE SHOWN IN FIGURE F AND SERRATED COLLAR BOLT INCLUDED FOR INSTALLATION ON ROUND POLES (FIGURE D).
4. FOR THE CONSTRUCTION OF SINGLE PHASE ELECTRICAL SYSTEMS, IF THE HORIZONTAL LINE POST INSULATOR (ITEM 0069) HAS A BASE, IT SHALL BE INSTALLED USING THE CONFIGURATION SHOWN IN FIGURE A. IF THE HORIZONTAL LINE POST INSULATOR DOES NOT HAVE A BASE, IT CAN BE INSTALLED DIRECTLY TO THE POLE WITH A SERRATED COLLAR BOLT (ITEM 0188), USING THE CONFIGURATION SHOWN IN FIGURE C.
5. FOR THE CONSTRUCTION OF TWO OR THREE PHASE ELECTRICAL SYSTEMS, IF THE HORIZONTAL LINE POST INSULATOR (ITEM 0069) HAS A BASE, IT SHALL BE INSTALLED USING THE CONFIGURATION SHOWN IN FIGURE B OR G. IF THE HORIZONTAL LINE POST INSULATOR (ITEM 0069) DOES NOT HAVE A BASE, IT CAN BE INSTALLED DIRECTLY TO THE POLE WITH A SERRATED COLLAR BOLT (ITEM 0188), USING THE CONFIGURATION SHOWN IN FIGURE H. IF THE HORIZONTAL LINE POST INSULATOR (ITEM 0069) HAS A C-CHANNEL TYPE BASE IT SHALL BE INSTALLED DIRECTLY TO THE POLE USING THE CONFIGURATION SHOWN IN FIGURE B OR G.
6. HORIZONTAL LINE POST INSULATOR (ITEM 0069) INCLUDES A TRUNNION TYPE CLAMP (ITEM 0009) WITH A CLAMPING RANGE SUITABLE FOR ALUMINUM CONDUCTOR PLUS ARMOR ROD (ITEM 0084) OVERALL DIAMETER FROM 0.50" TO 1.06". FOR A DIAMETER OUTSIDE THIS RANGE OR FOR COPPER CONDUCTORS, THE CORRESPONDING TRUNNION TYPE CLAMP SHALL BE USED.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

POLE SLOT PRIMARY LINE DEADEND ASSEMBLY  
CONCRETE POLES  
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-1502 VERSION 6

DOCUMENT NO. 4301.068

PAGE 1 OF 2 DATE JAN 23, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

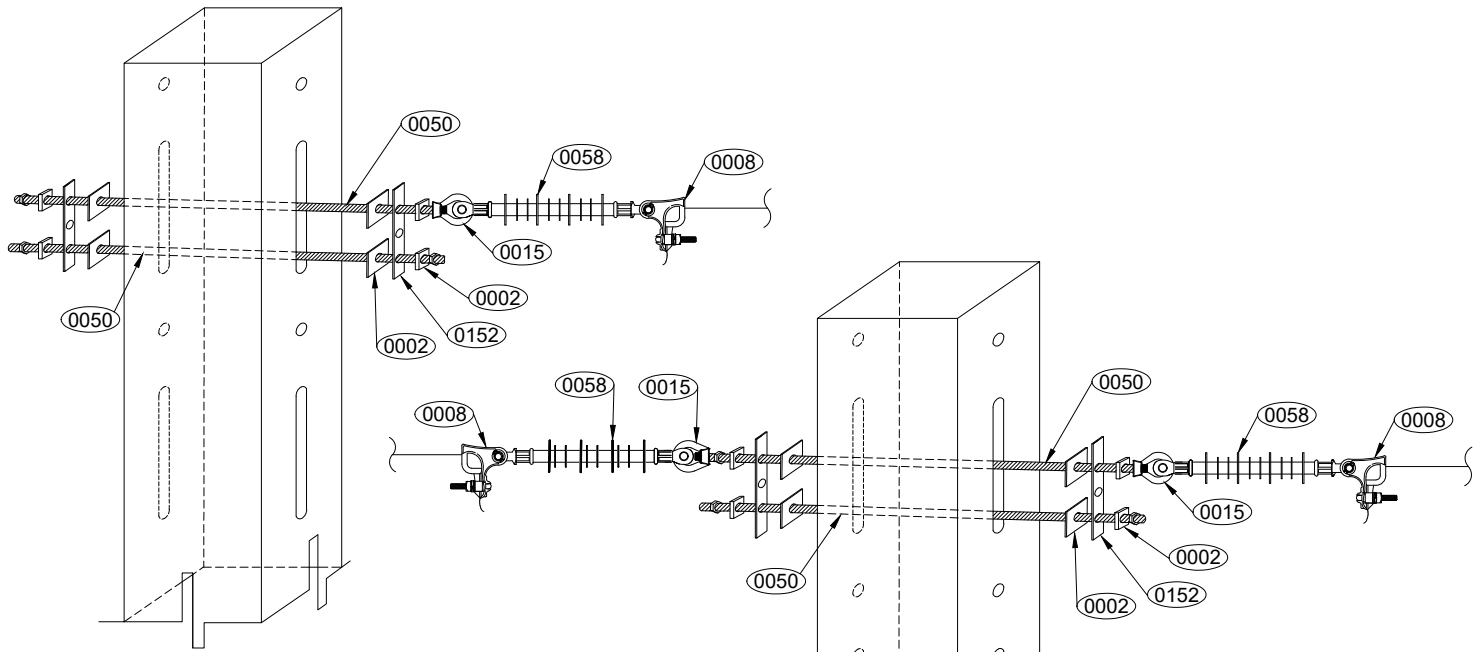


FIGURE A  
SINGLE DEADEND

FIGURE B  
DOUBLE DEADEND



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE: POLE SLOT PRIMARY LINE DEADEND ASSEMBLY  
 CONCRETE POLES  
 MAXIMUM VOLTAGE: 13.2 KV  
 NOTES AND BILL OF MATERIAL

ASSEMBLY NO. ASSY-1502 VERSION 6  
 DOCUMENT NO. 4301.068  
 PAGE 2 OF 2 DATE JAN 23, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS				
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.
0002	FLAT SQUARE WASHER	VARIES	8	8
0008	TENSION CLAMP	VARIES	1	2
0015	EYE NUT	002-04495	1	2
0050	DOUBLE ARMING BOLT	VARIES	2	2
0058	SUSPENSION INSULATOR	014-01942	1	2
0152	CLAMP	002-00725	2	2

NOTE:

1. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



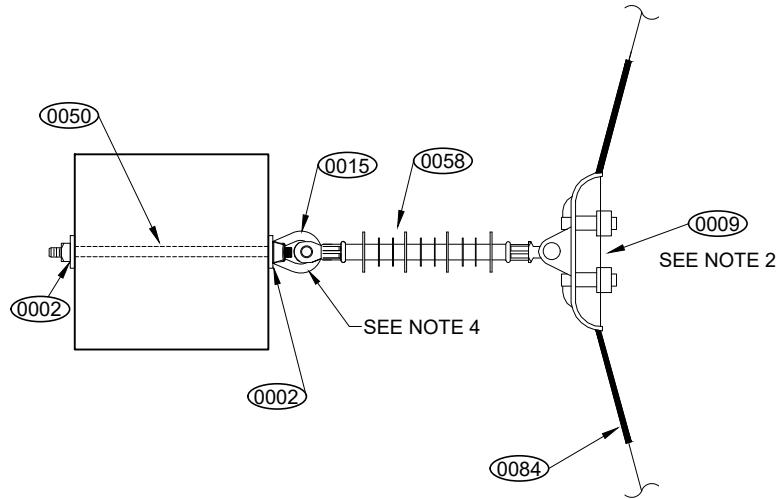
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**PRIMARY LINE ANGLE ASSEMBLY**  
**MAXIMUM VOLTAGE: 13.2 KV**

ASSEMBLY NO. ASSY-1503 VERSION 5  
 DOCUMENT NO. 4301.069  
 PAGE 1 OF 1 DATE JAN 23, 2024  
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## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0009	SUSPENSION CLAMP	VARIES	1
0015	EYE NUT	002-04495	1
0050	DOUBLE ARMING BOLT	VARIES	1
0058	SUSPENSION INSULATOR	014-01942	1
0084	ARMOR ROD	VARIES	1
0089	BALL CLEVIS CONNETOR	002-12241	AS REQ.
0090	SOCKET EYE CONNECTOR	002-12258	AS REQ.

**NOTES:**

- 1 - STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- 2 - REQUIRED CLAMP SHALL BE BASED UPON CONDUCTOR SIZE AND TYPE.
- 3 - REFER TO STANDARD NO. E-1-2-3 FOR GUYING SPECIFICATIONS.
- 4 - IF THERE IS A CHANGE IN THE LINE ORIENTATION AND IT IS NOT SUPPORTED BY THE AVAILABLE MATERIALS, IT WILL BE NECESSARY TO ADD A BALL CLEVIS CONNECTOR (ITEM 0089) AND A SOCKET EYE CONNECTOR (ITEM 0090).



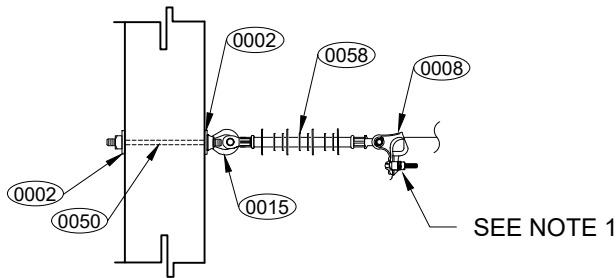
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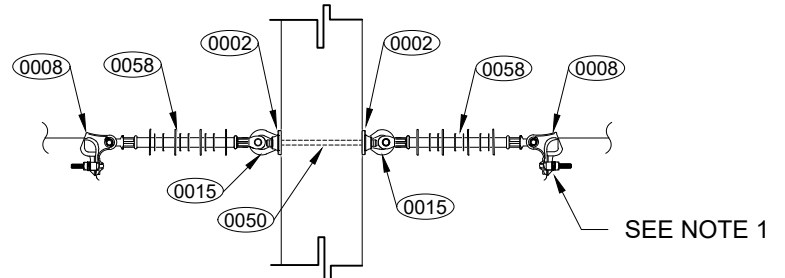
TITLE:

## PRIMARY LINE DEADEND ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

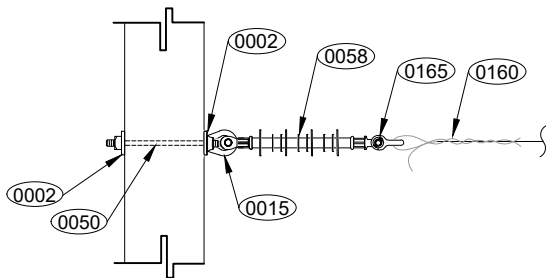
ASSEMBLY NO. ASSY-1504 VERSION 4  
DOCUMENT NO. 4301.070  
PAGE 1 OF 1 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
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APPROVED RICARDO CASTRO LIC. 12135  
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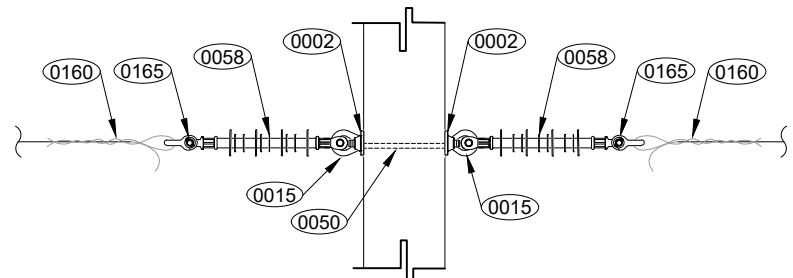
**FIGURE A**  
SINGLE DEADEND  
OPEN WIRE CONSTRUCTION



**FIGURE B**  
DOUBLE DEADEND  
OPEN WIRE CONSTRUCTION



**FIGURE C**  
SINGLE DEADEND  
SPACER CONSTRUCTION



**FIGURE D**  
DOUBLE DEADEND  
SPACER CONSTRUCTION

### MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.	"C" QTY.	"D" QTY.
0002	FLAT SQUARE WASHER	VARIES	2	2	2	2
0008	TENSION CLAMP	VARIES	1	2	-	-
0015	EYE NUT	002-04495	1	2	1	2
0050	DOUBLE ARMING BOLT	VARIES	1	1	1	1
0058	SUSPENSION INSULATOR	014-01942	1	2	1	2
0160	CONDUCTOR DEADEND GRIP	VARIES	-	-	1	2
0165	ANCHOR SHACKLE	002-82318	-	-	1	2

### NOTES:

1. THE TENSION CLAMP (ITEM 0008) SHALL BE COMPATIBLE WITH THE MATERIAL OF THE CONDUCTOR TO BE INSTALLED.
2. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
3. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION.
4. IF THE SUSPENSION INSULATOR (ITEM 0058) IS INSTALLED ON CONCRETE POLES' SLOT, USE ASSEMBLY NO. ASSY-1502 INSTEAD OF ASSEMBLY NO. ASSY-1504.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

FIBERGLASS STAND-OFF BRACKET ASSEMBLY  
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-1505 VERSION 5

DOCUMENT NO. 4301.071

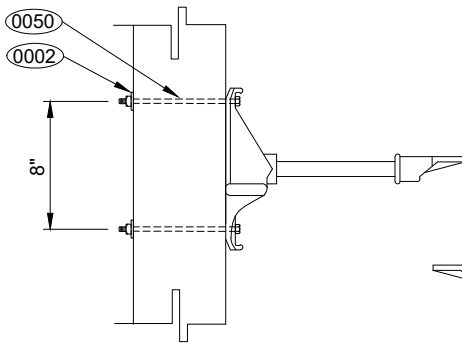
PAGE 1 OF 2 DATE FEB 2, 2024

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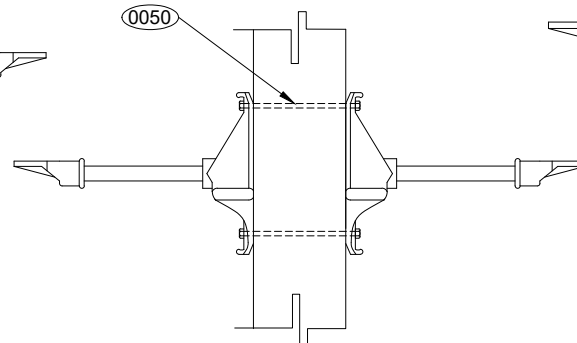
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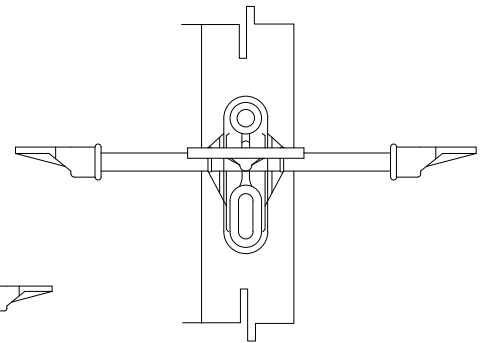
DIGITIZED EMILIO CUADRADO LIC. 3000



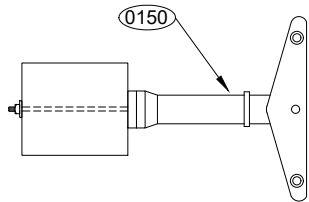
SIDE VIEW



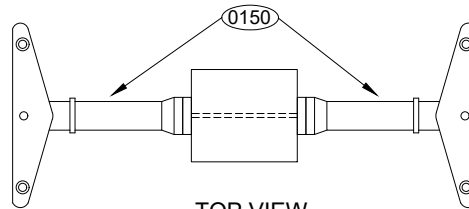
SIDE VIEW



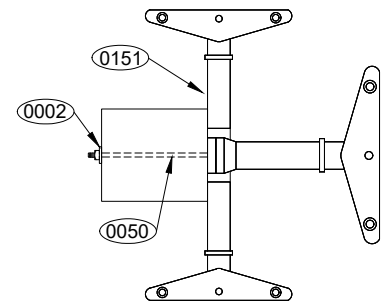
FRONT VIEW



TOP VIEW



TOP VIEW



TOP VIEW

FIGURE A  
SINGLE PHASE  
(SEE NOTE 1)

FIGURE B  
TWO PHASE  
(SEE NOTE 2)

FIGURE C  
THREE PHASE  
(SEE NOTE 1)

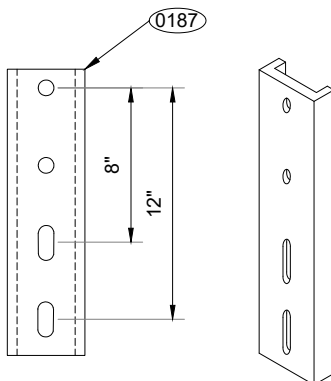


FIGURE D  
C-CHANNEL TYPE BASE

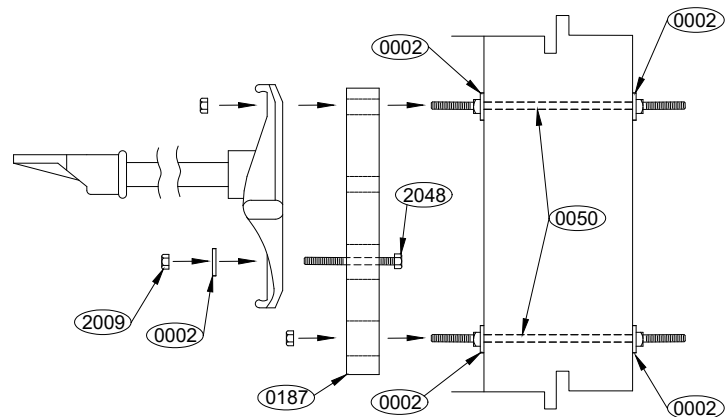


FIGURE E  
FIBERGLASS STAND-OFF BRACKET  
WITH C-CHANNEL TYPE BASE SINGLE INSTALLATION DETAIL



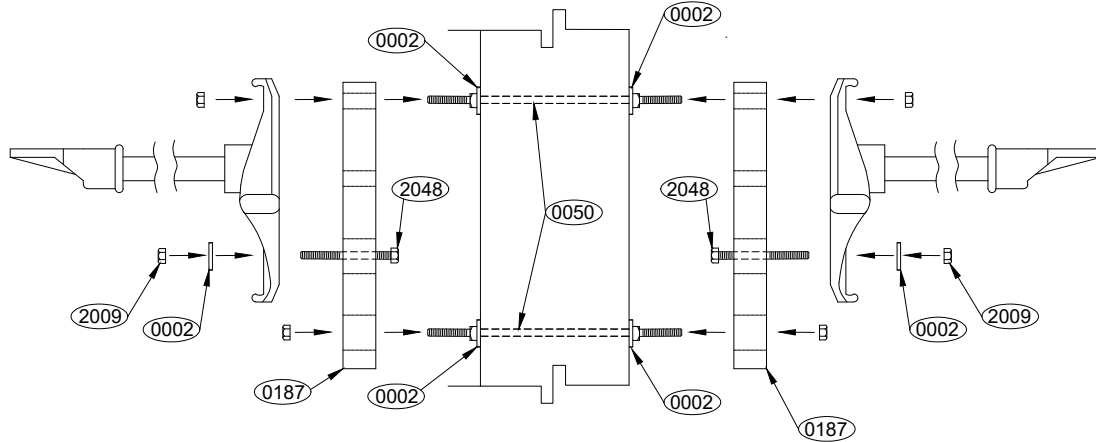
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

FIBERGLASS STAND-OFF BRACKET ASSEMBLY  
 MAXIMUM VOLTAGE: 13.2 KV  
 NOTES AND BILL OF MATERIAL

ASSEMBLY NO. ASSY-1505 VERSION 5  
 DOCUMENT NO. 4301.071  
 PAGE 2 OF 2 DATE FEB 2, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11648  
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**FIGURE F**  
 FIBERGLASS STAND-OFF BRACKET  
 WITH C-CHANNEL TYPE BASE DOUBLE INSTALLATION DETAIL

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.	"C" QTY.	"E" QTY.	"F" QTY.
0002	FLAT SQUARE WASHER	VARIES	2	-	2	5	6
0050	DOUBLE ARMING BOLT	VARIES	2	2	2	2	2
0150	FIBERGLASS STAND-OFF BRACKET SINGLE PHASE BRACKET	008-82332	1	2	-	1	2
0151	FIBERGLASS STAND-OFF BRACKET THREE PHASE BRACKET	008-82333	-	-	1	-	-
0187	C-CHANNEL TYPE BASE	014-83736	AS REQ.	-	AS REQ.	1	2
2009	HEXAGONAL NUT	002-82038	AS REQ.	AS REQ.	AS REQ.	1	2
2048	HEX HEAD BOLT	038-83212	AS REQ.	AS REQ.	AS REQ.	1	2

**NOTES:**

- FOR THE INSTALLATION OF A FIBERGLASS STAND-OFF BRACKET ON A POLE WHERE HOLE SPACING IS 12", BASE SHOWN IN FIGURE D MUST BE USED. SEE FIGURE E FOR INSTALLATION DETAIL AND MATERIALS.
- FOR DOUBLE SIDE INSTALLATION ON A POLE WHERE HOLE SPACING IS 12". BASE SHOWN IN FIGURE D MUST BE USED. SEE FIGURE F FOR INSTALLATION DETAIL AND MATERIALS.
- STAINLESS STEEL MATERIALS SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





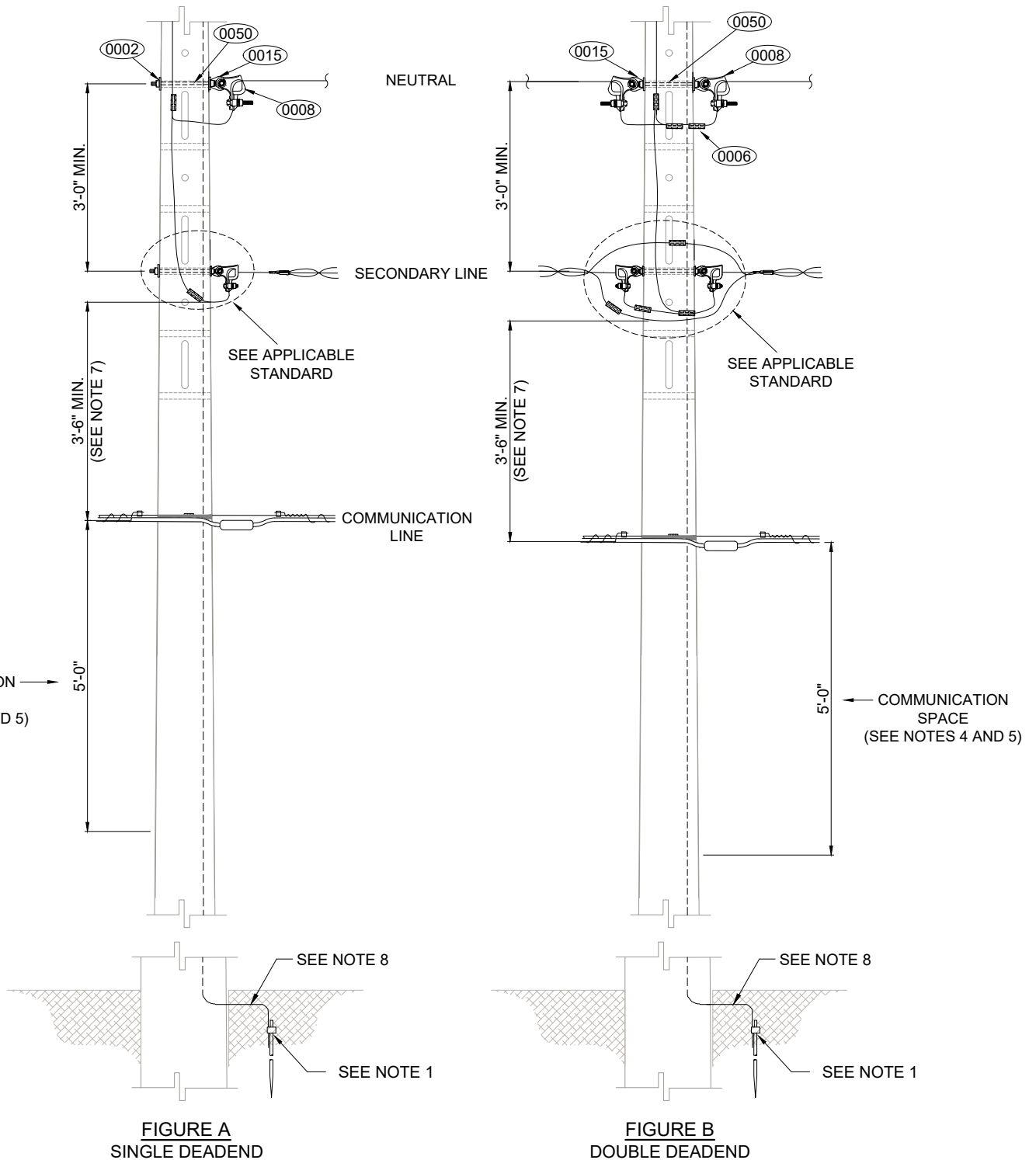
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

NEUTRAL, SECONDARY AND POLE JOINT USE  
DEADEND ASSEMBLY  
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-1506 VERSION 6  
DOCUMENT NO. 4301.072  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
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VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>NEUTRAL, SECONDARY AND POLE JOINT USE  DEADEND ASSEMBLY  MAXIMUM VOLTAGE: 13.2 KV  NOTES AND BILL OF MATERIAL</b>	ASSEMBLY NO. <u>ASSY-1506</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.072</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 2, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
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	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

MATERIALS				
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.
0002	FLAT SQUARE WASHER	VARIES	2	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	-	1
0008	TENSION CLAMP	VARIES	1	2
0015	EYE NUT	002-04495	1	2
0050	DOUBLE ARMING BOLT	VARIES	1	1

**NOTES:**

1. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
3. REQUIRED CLAMP (ITEM 0008) SHALL BE BASED ON CONDUCTOR SIZE AND TYPE.
4. COMMUNICATION LINES, ANTENNAS, CAMERAS, AND OTHER THIRD-PARTY DEVICES SHALL BE INSTALLED IN THE 5'-0" SPACE RESERVED FOR COMMUNICATIONS ATTACHMENTS, WITH 1'-0" CLEARANCE BETWEEN THEM. APPROPRIATE HARDWARE SHALL BE USED, COMPLYING WITH THE APPLICABLE INDUSTRY STANDARDS.
5. VERTICAL CLEARANCE TO GROUND SHALL COMPLY WITH CURRENT NATIONAL ELECTRICAL SAFETY CODE (NESC).
6. FIELD DRILLING OF POLES IS NOT ALLOWED.
7. A 3'-6" MINIMUM VERTICAL CLEARANCE AT THE POLE SHALL BE MAINTAINED FROM FROM THE LOWEST CONDUCTOR OF THE SUPPLY SPACE TO THE COMMUNICATION SPACE.
8. THE ELECTRICAL SUPPLY AND COMMUNICATION SYSTEMS SHALL BE GROUNDED TOGETHER VIA A SINGLE GROUNDING CONDUCTOR. THE MINIMUM REQUIRED GROUNDING CONNECTIONS FOR THE COMMUNICATION SYSTEM TO THE POLE GROUNDING CONDUCTOR, WHEN USED JOINTLY WITH THE ELECTRICAL SUPPLY SYSTEM, SHALL INCLUDE CONNECTIONS AT THE FIRST AND LAST POLES, ALONG WITH ANY ADDITIONAL CONNECTIONS REQUIRED BY THE NESC. A MINIMUM OF #2 AWG STRANDED COPPER PIGTAIL INTENDED FOR CONNECTING TO THE POLE'S SINGLE GROUNDING CONDUCTOR SHOULD BE LEFT IN THE COMMUNICATION SPACE BY THE FIRST COMMUNICATION COMPANY REQUESTING INSTALLATION, ENABLING LUMA TO PERFORM THE NECESSARY CONNECTIONS.
9. THE INSTALLATION OF SOLAR PANELS ON PREPA POLES FOR POWERING COMMUNICATION EQUIPMENT IS NOT ALLOWED.
10. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

NEUTRAL, SECONDARY AND POLE JOINT USE  
TANGENT ASSEMBLY  
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-1507 VERSION 5

DOCUMENT NO. 4301.073

PAGE 1 OF 2 DATE FEB 2, 2024

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VICTOR R. FEBRES LIC. 3412

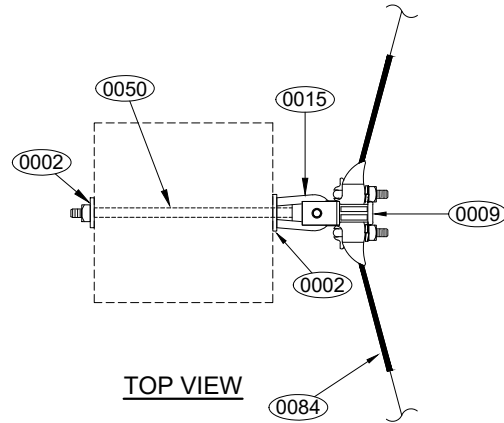
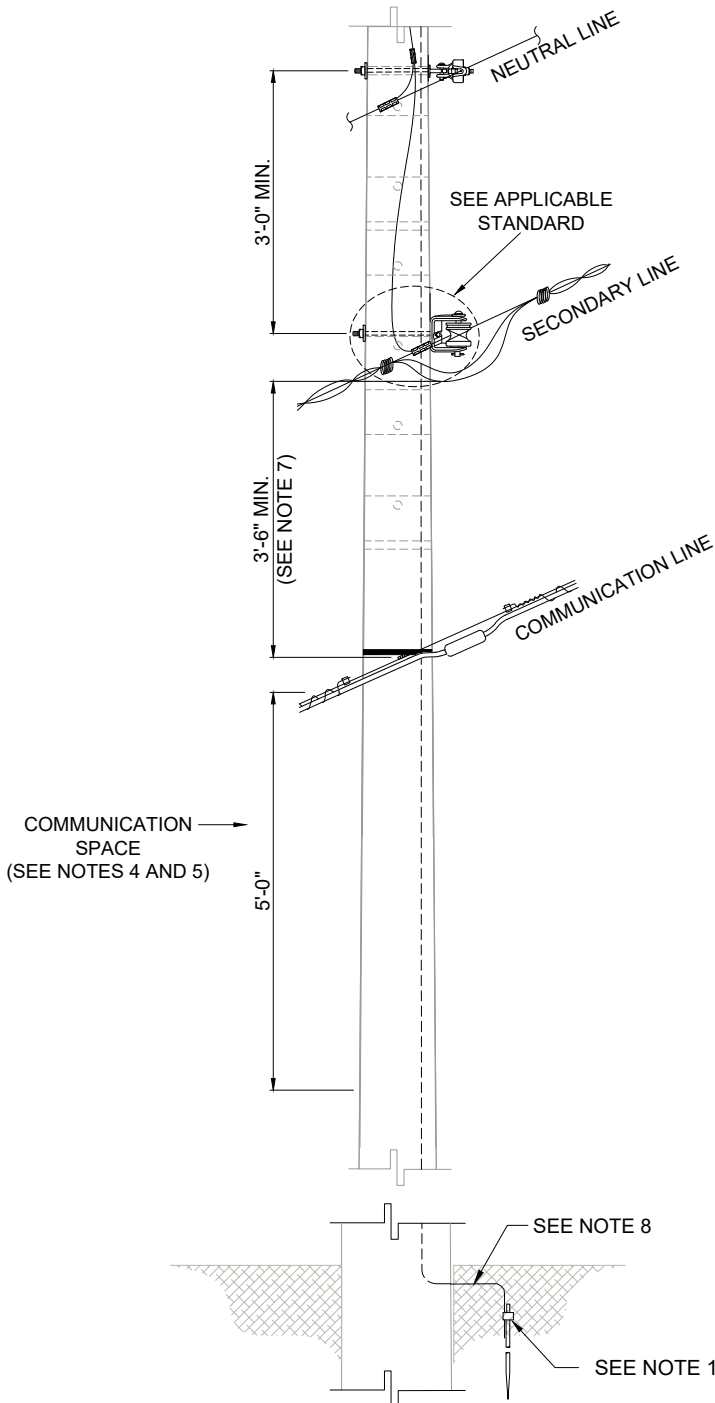


FIGURE A  
SINGLE DEADEND



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;"><b>NEUTRAL, SECONDARY AND POLE JOINT USE TANGENT ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b></p>	ASSEMBLY NO. <u>ASSY-1507</u> VERSION <u>5</u> DOCUMENT NO. <u>4301.073</u> PAGE <u>2 OF 2</u> DATE <u>FEB 2, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u> <u>VICTOR R. FEBRES LIC. 3412</u>
---	--

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0009	SUSPENSION CLAMP	VARIES	1
0015	EYE NUT	002-04495	1
0050	DOUBLE ARMING BOLT	VARIES	1
0084	ARMOR ROD	VARIES	1

**NOTES:**

1. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
3. REQUIRED CLAMP (ITEM 0009) SHALL BE BASED ON CONDUCTOR SIZE AND TYPE.
4. COMMUNICATION LINES, ANTENNAS, CAMERAS, AND OTHER THIRD-PARTY DEVICES SHALL BE INSTALLED IN THE 5'-0" SPACE RESERVED FOR COMMUNICATIONS ATTACHMENTS, WITH 1'-0" CLEARANCE BETWEEN THEM. APPROPRIATE HARDWARE SHALL BE USED, COMPLYING WITH THE APPLICABLE INDUSTRY STANDARDS.
5. VERTICAL CLEARANCE TO GROUND SHALL COMPLY WITH CURRENT NATIONAL ELECTRICAL SAFETY CODE (NEC).
6. FIELD DRILLING OF POLES IS NOT ALLOWED.
7. A 3'-6" MINIMUM VERTICAL CLEARANCE AT THE POLE SHALL BE MAINTAINED FROM FROM THE LOWEST CONDUCTOR OF THE SUPPLY SPACE TO THE COMMUNICATION SPACE.
8. THE ELECTRICAL SUPPLY AND COMMUNICATION SYSTEMS SHALL BE GROUNDED TOGETHER VIA A SINGLE GROUNDING CONDUCTOR. THE MINIMUM REQUIRED GROUNDING CONNECTIONS FOR THE COMMUNICATION SYSTEM TO THE POLE GROUNDING CONDUCTOR, WHEN USED JOINTLY WITH THE ELECTRICAL SUPPLY SYSTEM, SHALL INCLUDE CONNECTIONS AT THE FIRST AND LAST POLES, ALONG WITH ANY ADDITIONAL CONNECTIONS REQUIRED BY THE NEC. A MINIMUM OF #2 AWG STRANDED COPPER PIGTAIL INTENDED FOR CONNECTING TO THE POLE'S SINGLE GROUNDING CONDUCTOR SHOULD BE LEFT IN THE COMMUNICATION SPACE BY THE FIRST COMMUNICATION COMPANY REQUESTING INSTALLATION, ENABLING LUMA TO PERFORM THE NECESSARY CONNECTIONS.
9. THE INSTALLATION OF SOLAR PANELS ON PREPA POLES FOR POWERING COMMUNICATION EQUIPMENT IS NOT ALLOWED.
10. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".



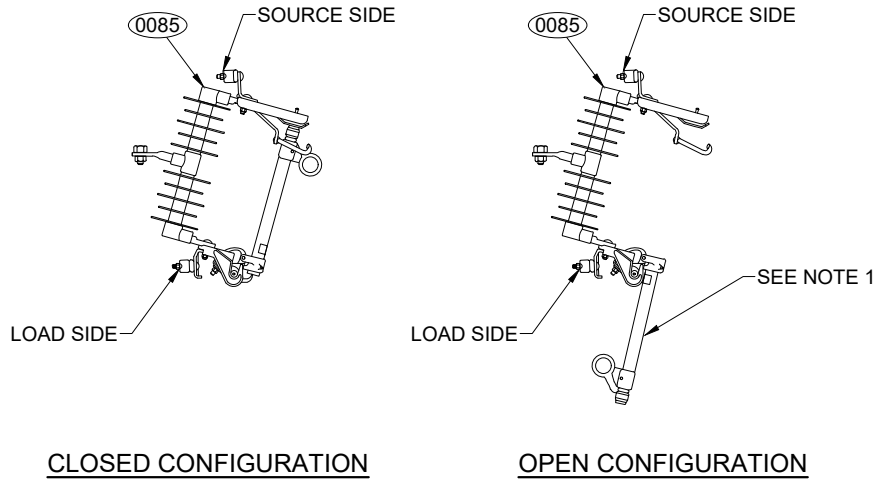
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

FUSE CUTOUT ASSEMBLY  
 MAXIMUM RATING: 200 A  
 MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. ASSY-1509 VERSION 4  
 DOCUMENT NO. 4301.075  
 PAGE 1 OF 1 DATE FEB 14, 2024  
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 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0085	100 A FUSE CUTOUT	010-76584	AS REQ.
	200 A FUSE CUTOUT	010-76585	AS REQ.
0206	FUSE BLADE	010-85362	AS REQ.

NOTES:

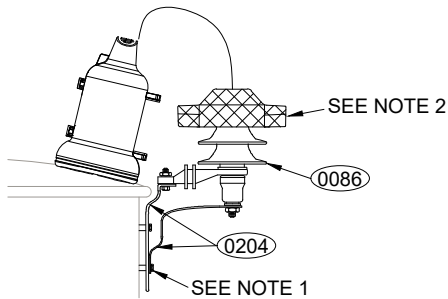
1. TO ENSURE PROPER COORDINATION WITH RECLOSERS, THE USE OF A FUSE CUTOUT WITH A FUSE BLADE SHALL BE DETERMINED BY THE ENGINEERS, BASED ON THE 'FUSE-SAVING' PHILOSOPHY.
2. FOR FUSE SIZES, REFER TO THE DISTRIBUTION EQUIPMENT AND PRIMARY LINE FUSING GUIDELINE DOC. NO. (4300.003).
3. ENGINEERS WILL BE RESPONSIBLE FOR PROPERLY SELECTING THE FUSE SIZING FOR LATERAL FUSE COORDINATION.
4. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES. FOR ADDED WILDLIFE PROTECTION, INSULATED CONDUCTORS SHALL BE USED.



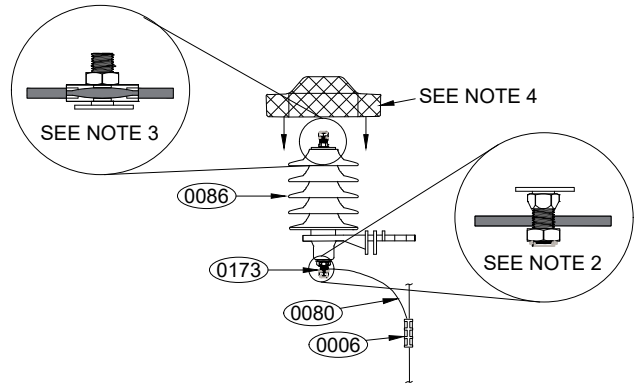
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;"><b>SURGE ARRESTER ASSEMBLY</b>  <b>MAXIMUM VOLTAGE: 13.2 KV</b></p>	STANDARD NO. <u>ASSY-1510</u> VERSION <u>5</u>
	DOCUMENT NO. <u>4301.076</u>
	PAGE <u>1</u> OF <u>1</u> DATE <u>FEB 16, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
	DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u> <u>VICTOR R. FEBRES LIC. 3412</u>



**FIGURE A**  
SURGE ARRESTER ON TRANSFORMER



**FIGURE B**  
SURGE ARRESTER CONNECTION

**NOTES FIGURE A:**

1. THE METALLIC TAPE (GROUND STRAP) OF THE SURGE ARRESTER MUST BE EFFECTIVELY BONDED TO THE BOTTOM SCREW OF THE BRACKET ON THE TANK.
2. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.

**NOTES FIGURE B:**

1. THE SURGE ARRESTER MUST BE EFFECTIVELY CONNECTED TO THE GROUNDING SYSTEM (SEE ASSEMBLY NO. ASSY-1511).
2. THE SERVICE BRONZE FEMALE POST CONNECTOR (ITEM 0173) SHALL BE USED FOR GROUND CONNECTION INSTEAD OF THE WIRE CLAMP PROVIDED WITH THE SURGE ARRESTER.
3. THE CONNECTION OF THE PRIMARY LINE TO THE HIGH VOLTAGE TERMINAL OF THE SURGE ARRESTER SHALL BE DONE USING TWO WIRE CLAMPS. ONE OF THEM IS THE CLAMP THAT WAS REMOVED FROM THE GROUNDING TERMINAL AND NOT USED.
4. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	-	1
0080	COPPER BARE CONDUCTOR	006-82621	-	AS REQ.
0086	3 KV HEAVY DUTY SURGE ARRESTER FOR 4.16 KV LINES	004-00028	AS REQ.	AS REQ.
	6 KV HEAVY DUTY SURGE ARRESTER FOR 7.2 AND 8.32 KV LINES	004-00044	AS REQ.	AS REQ.
	10 KV HEAVY DUTY SURGE ARRESTER FOR 13.2 KV LINES	004-00143	AS REQ.	AS REQ.
0173	BRONZE FEMALE SERVICE POST CONNECTOR	002-82669	-	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84914	1	-



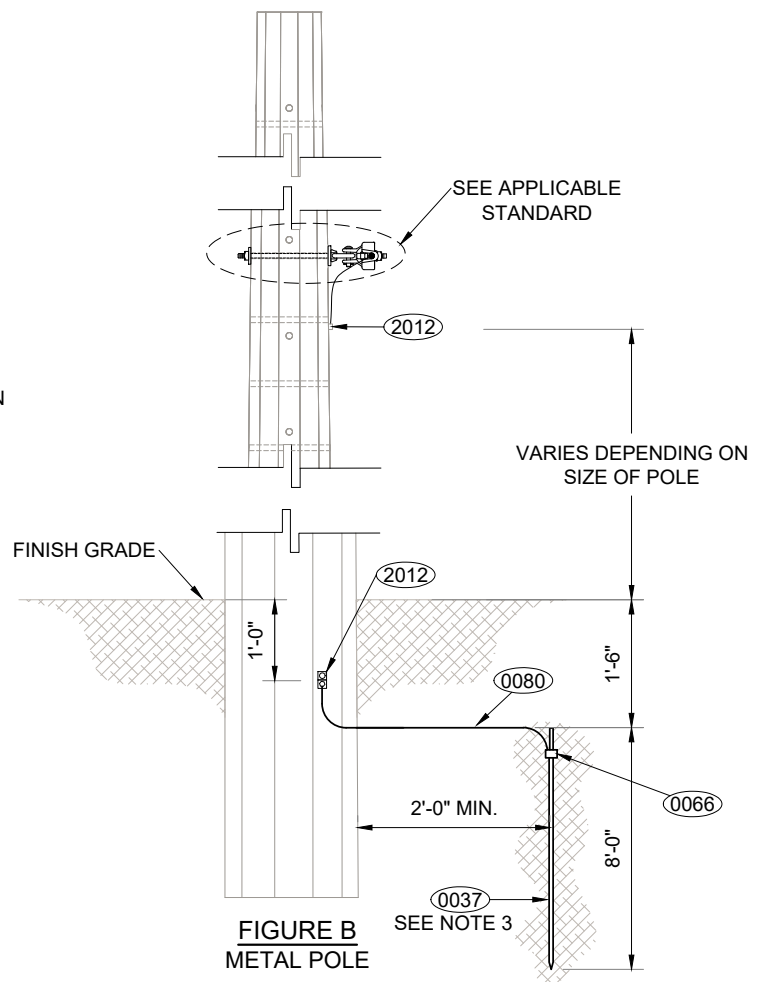
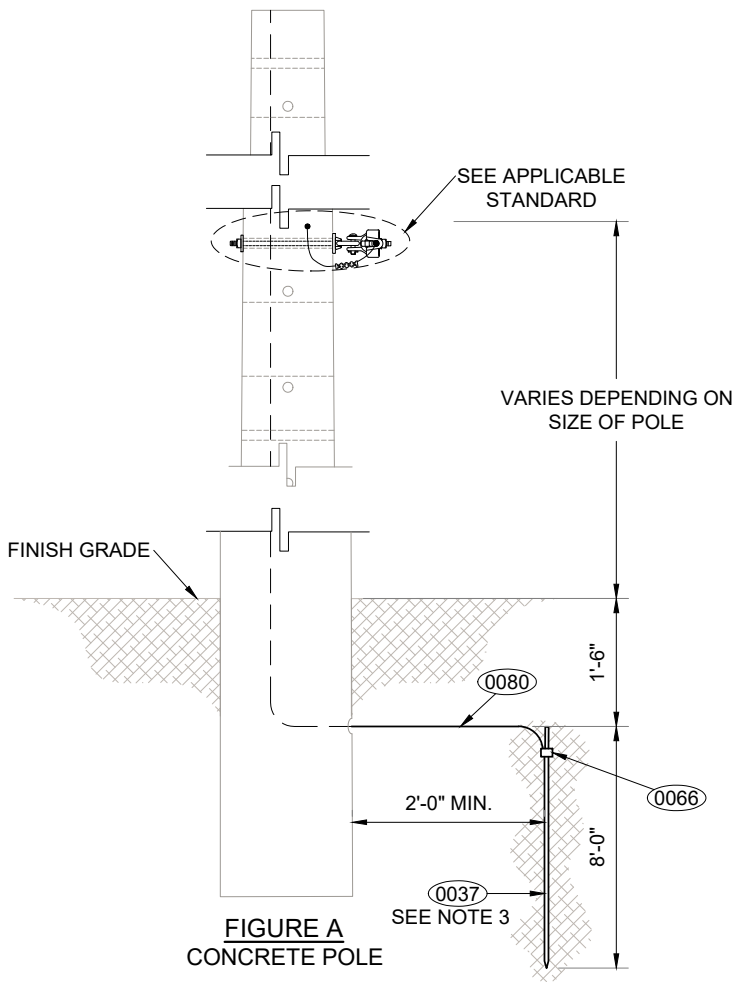
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

POLE GROUND ASSEMBLY  
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-1511 VERSION 5  
DOCUMENT NO. 4301.077  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412





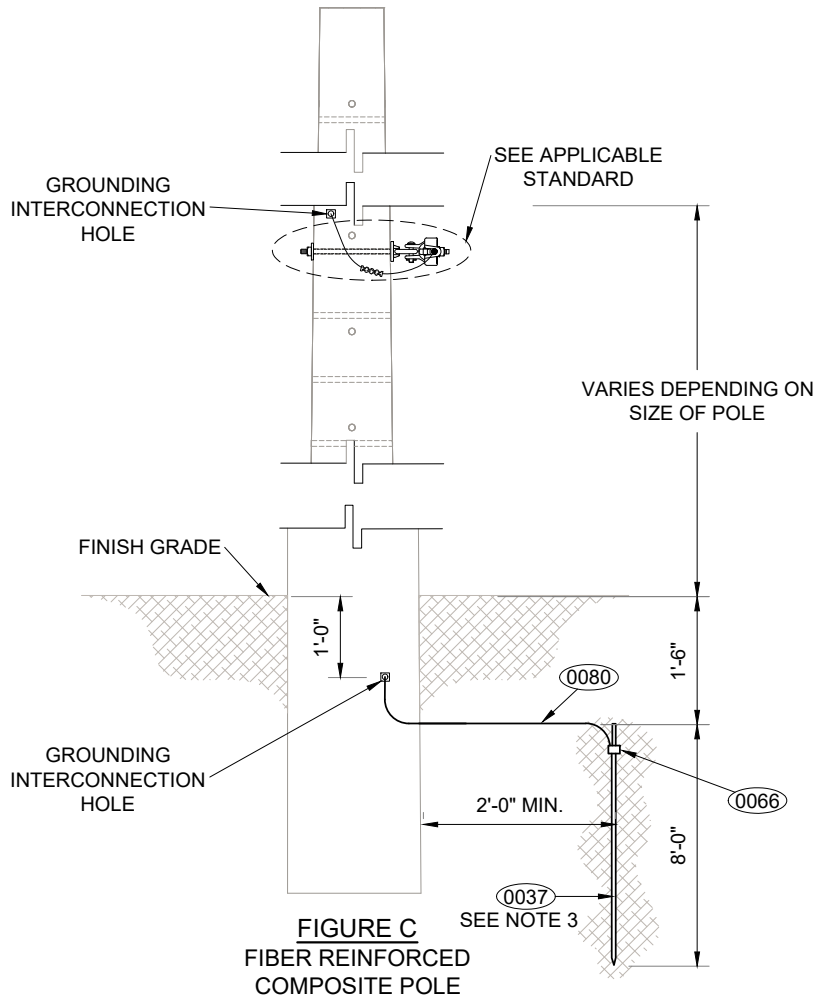
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**POLE GROUND ASSEMBLY**  
**MAXIMUM VOLTAGE: 13.2 KV**  
**NOTES AND BILL OF MATERIAL**

ASSEMBLY NO. ASSY-1511 VERSION 5  
 DOCUMENT NO. 4301.077  
 PAGE 2 OF 2 DATE FEB 2, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.	"C" QTY.
0037	5/8" GROUND ROD	VARIABLES	AS REQ.	AS REQ.	AS REQ.
0066	CONNECTOR FOR 5/8" GROUND ROD	002-13595	1	1	1
0080	COPPER BARE CONDUCTOR	VARIABLES	AS REQ.	AS REQ.	AS REQ.
2012	BRONZE MALE SERVICE POST CONNECTOR	002-82925	-	AS REQ.	-

**NOTES:**

1. A MINIMUM OF #2 AWG STRANDED COPPER BARE CONDUCTOR SHALL BE PROVIDED FOR POLE GROUNDING CONNECTION AT 18" BELOW FINISH GRADE.
2. THE STRUCTURE'S RESISTANCE TO GROUND SHALL BE BETWEEN 5 AND 10 OHMS OR LESS. ADDITIONAL RODS CAN BE USED AS NECESSARY WITH GUIDANCE, OF THE DESIGNING ENGINEER.
3. GROUND RODS WITH A MINIMUM LENGTH OF 8'-0" SHALL BE USED FOR THE GROUNDING SYSTEM. TWO OR MORE SECTIONS OF 4'-0" LONG GROUND RODS JOINED TOGETHER CAN ALSO BE USED.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## EQUIPMENT BONDING TO GROUND ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. ASSY-1512 VERSION 7

DOCUMENT NO. 4301.078

PAGE 1 OF 2 DATE FEB 07, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

VICTOR R. FEBRES LIC. 3412

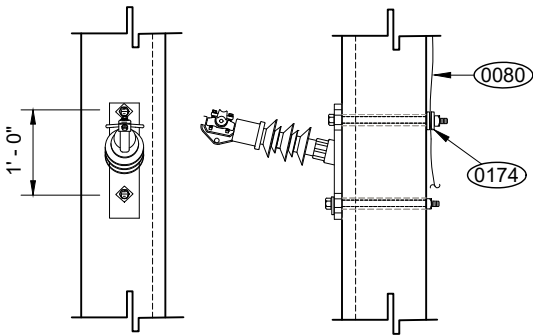


FIGURE A  
HORIZONTAL POST INSULATOR  
BONDING

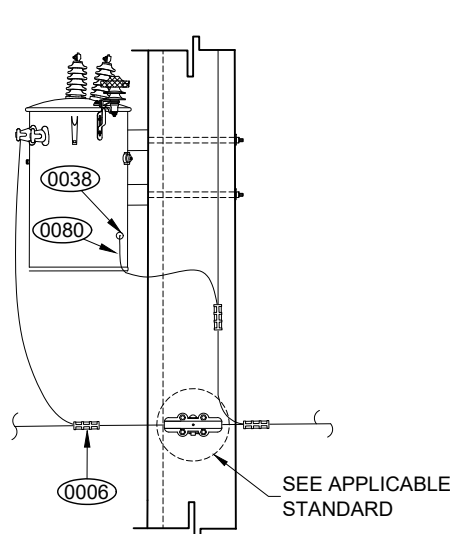


FIGURE B  
TRANSFORMER BONDING

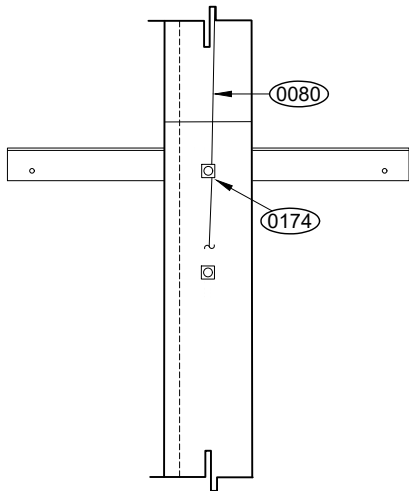


FIGURE C  
CROSSARM BONDING

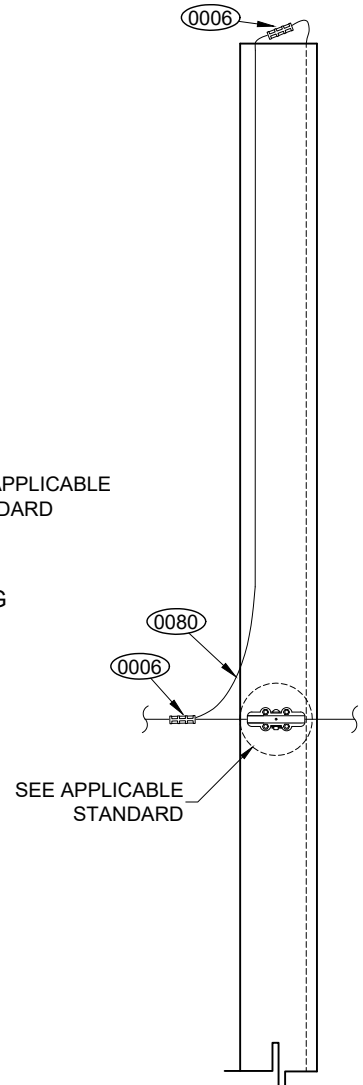


FIGURE D  
POLE AND PRIMARY OR  
SECONDARY NEUTRAL  
BONDING

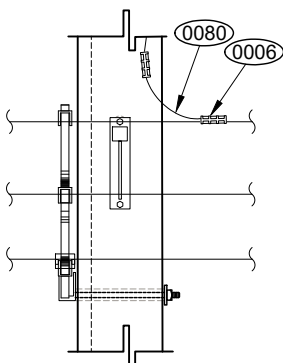


FIGURE E  
SPACER BRACKET BONDING

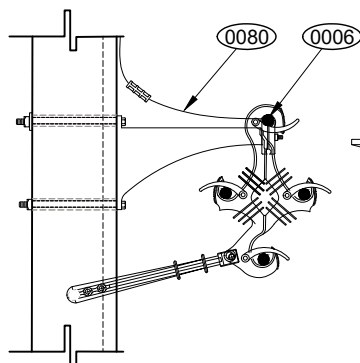
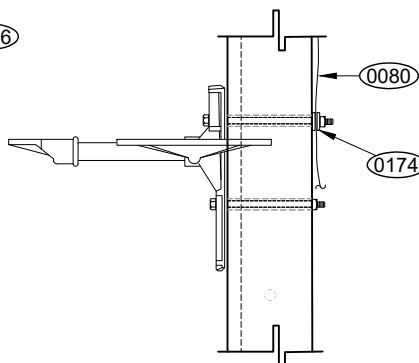


FIGURE F  
FIBERGLASS STAND-OFF BRACKET  
BONDING





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>EQUIPMENT BONDING TO GROUND ASSEMBLY</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>ASSY-1512</u> VERSION <u>7</u>
	DOCUMENT NO. <u>4301.078</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 07, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.	"C" QTY.	"D" QTY.	"E" QTY.	"F" QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	-	2	-	2	1	-
0038	TRANSFORMER GROUND CONNECTOR	002-03679	-	1	-	-	-	-
0080	COPPER BARE CONDUCTOR	006-00833	AS REQ.	AS REQ.	AS REQ.	AS REQ.	AS REQ.	AS REQ.
0174	GROUND / BOND WIRE CLAMP	VARIES	AS REQ.	-	AS REQ.	-	AS REQ.	AS REQ.

### NOTES:

1. THE GROUNDING CONDUCTOR SHOULD BE LOCATED ON THE SAME SIDE AS THE NEUTRAL CONDUCTOR AND IN THE OPPOSITE QUADRANT USED FOR CLIMBING THE POLE.
2. THE GROUNDING CONDUCTOR SHOULD BE ATTACHED WITH GROUND / BOND WIRE CLAMPS (ITEM 0174) AS NEEDED.
3. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
4. IN METAL POLE, THE POLE ITSELF FUNCTIONS AS A GROUNDING AND BONDING CONDUCTOR. THEREFORE, EQUIPMENT THAT IS NOT DIRECTLY CONNECTED TO THE POLE SHALL BE BONDED TO GROUND WITH A BRONZE MALE SERVICE POST CONNECTOR (ITEM 2012) AT THE NEAREST POLE GROUNDING NUT.



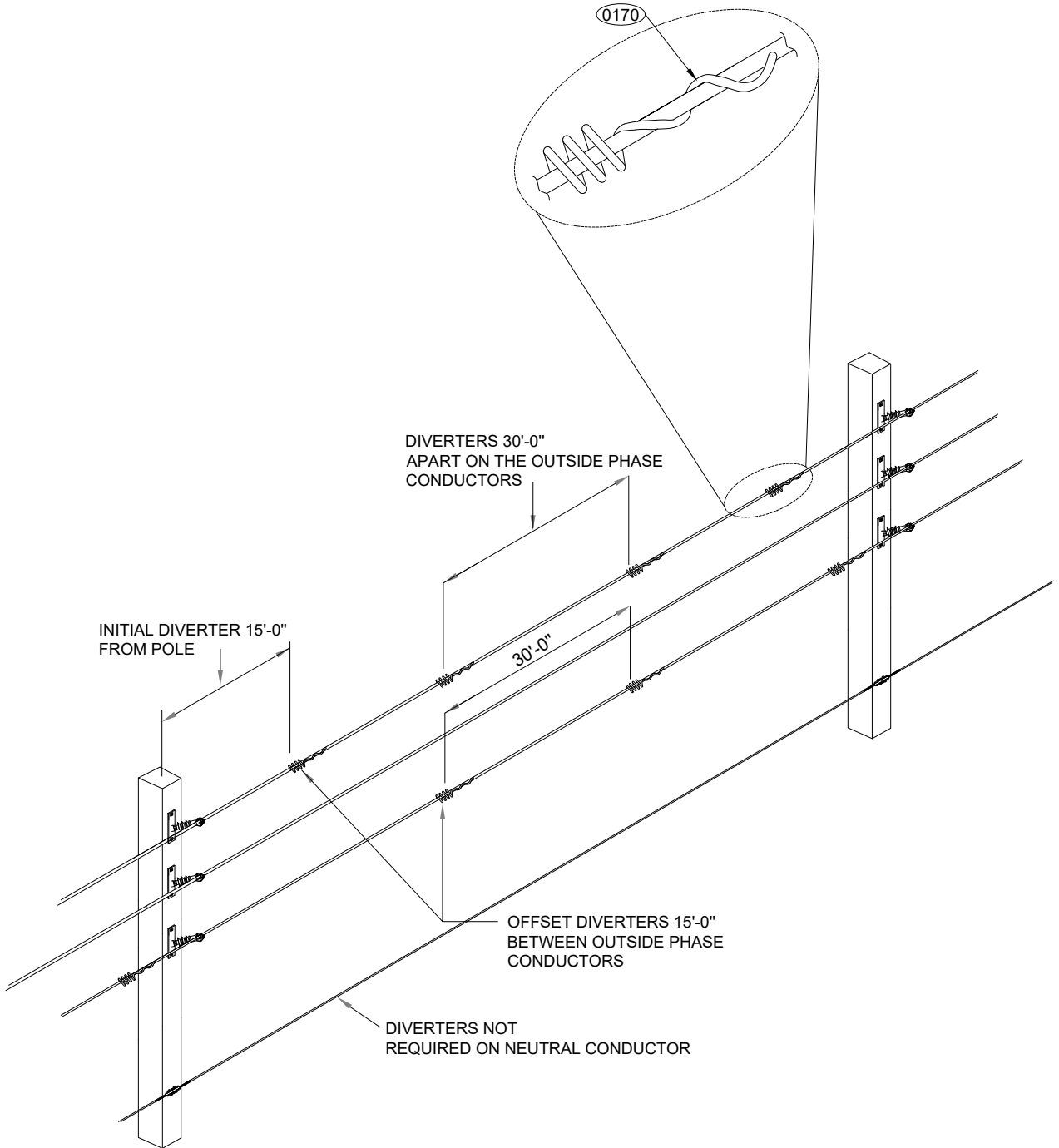
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

WILDLIFE PROTECTION EQUIPMENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. ASSY-1513 VERSION 3  
DOCUMENT NO. 4301.079  
PAGE 1 OF 3 DATE FEB 05, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

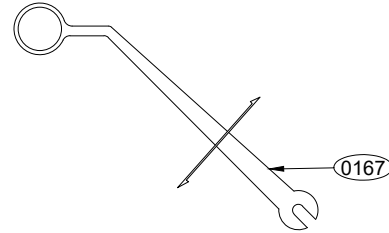
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**MAXIMUM VOLTAGE: 13.2 KV**

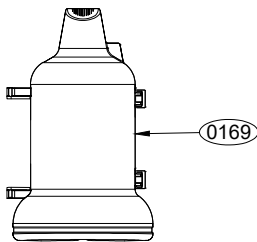
STANDARD NO. ASSY-1513 VERSION 3  
DOCUMENT NO. 4301.079  
PAGE 2 OF 3 DATE FEB 05, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
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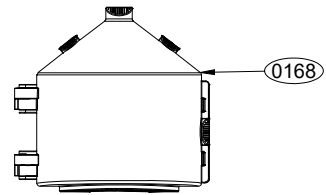
SMALL BIRD DIVERTER



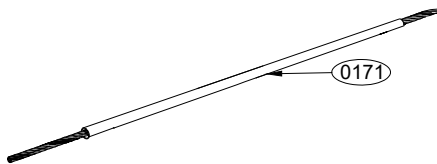
APPLICATOR RING TOOL FOR BIRD DIVERTER



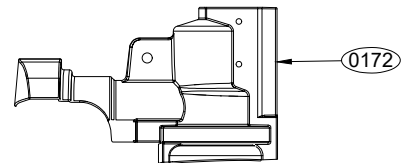
TRANSFORMER BUSHING GUARD FOR WILD LIFE PROTECTION



SURGE ARRESTER GUARD FOR WILDLIFE PROTECTION



CONDUCTOR COVER GUARD FOR WILD LIFE PROTECTION



FUSE CUTOUT GUARD FOR WILDLIFE PROTECTION



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

WILDLIFE PROTECTION EQUIPMENT  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL

STANDARD NO. ASSY-1513 VERSION 3  
DOCUMENT NO. 4301.079  
PAGE 3 OF 3 DATE FEB 05, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0167	APPLICATOR RING TOOL FOR BIRD DIVERTER	072-82373	AS REQ.
0168	SURGE ARRESTER GUARD FOR WILDLIFE PROTECTION	072-82376	AS REQ.
0169	TRANSFORMER BUSHING GUARD FOR WILDLIFE PROTECTION	072-82416	AS REQ.
0170	SMALL BIRD DIVERTER	VARIES	AS REQ.
0171	CONDUCTOR COVER GUARD FOR WILDLIFE PROTECTION	VARIES	AS REQ.
0172	FUSE CUTOUT GUARD FOR WILDLIFE PROTECTION	072-82414	AS REQ.



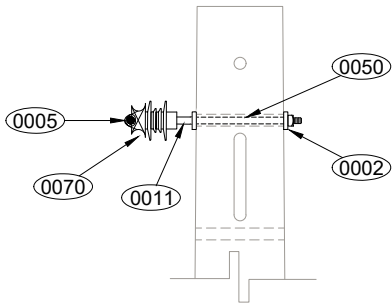
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

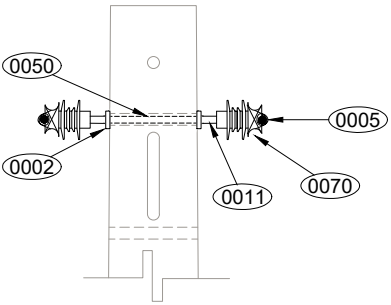
TITLE:

## PIN TYPE POLYMER INSULATOR ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

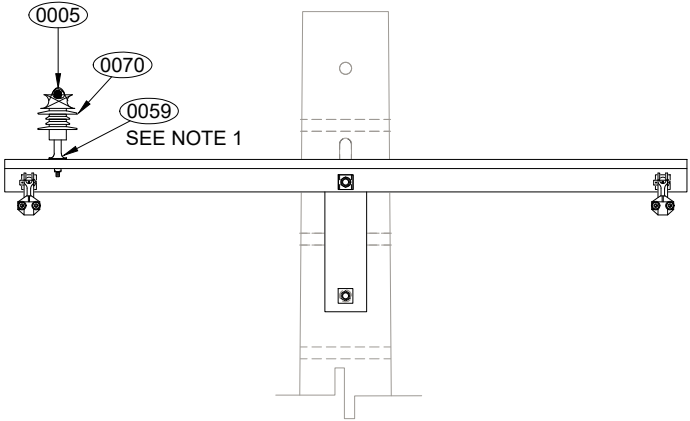
ASSEMBLY NO. ASSY-1514 VERSION 3  
DOCUMENT NO. 4301.084  
PAGE 1 OF 2 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



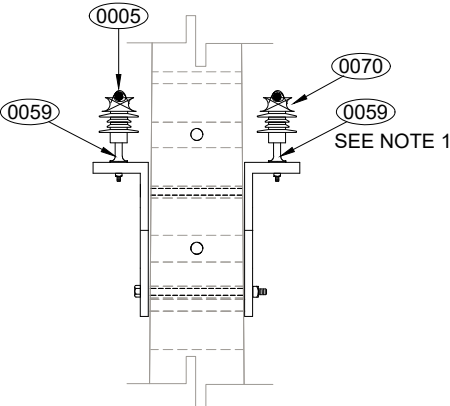
**FIGURE A**  
ONE PIN TYPE POLYMER INSULATOR  
POLE ASSEMBLY



**FIGURE B**  
TWO PIN TYPE POLYMER INSULATOR  
POLE ASSEMBLY



**FIGURE C**  
PIN TYPE POLYMER INSULATOR  
CROSSARM ASSEMBLY



**FIGURE D**  
PIN TYPE POLYMER INSULATOR  
DOUBLE CROSSARM ASSEMBLY



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  PIN TYPE POLYMER INSULATOR ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV	ASSEMBLY NO. <u>ASSY-1514</u> VERSION <u>3</u>
	DOCUMENT NO. <u>4301.084</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 20, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
	DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
	VICTOR R. FEBRES LIC. 3412

### MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.	"C" QTY.	"D" QTY.
0002	FLAT SQUARE WASHER	VARIES	2	2	-	-
0005	TIE WIRE	002-82035	1	2	1	2
0011	PIN ADAPTER	002-00253	1	2	-	-
0050	DOBLE ARMING BOLT	VARIES	1	1	-	-
0059	PIN FOR PIN TYPE INSULATOR	VARIES	-	-	1	2
0070	PIN TYPE POLYMER INSULATOR	014-02023	1	2	1	2

**NOTES:**

- 1. THE LONG SHANK PIN SHALL BE USED TO INSTALL THE PIN TYPE INSULATOR (ITEM 0070) ON FIBERGLASS CROSSARMS.
- 2. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



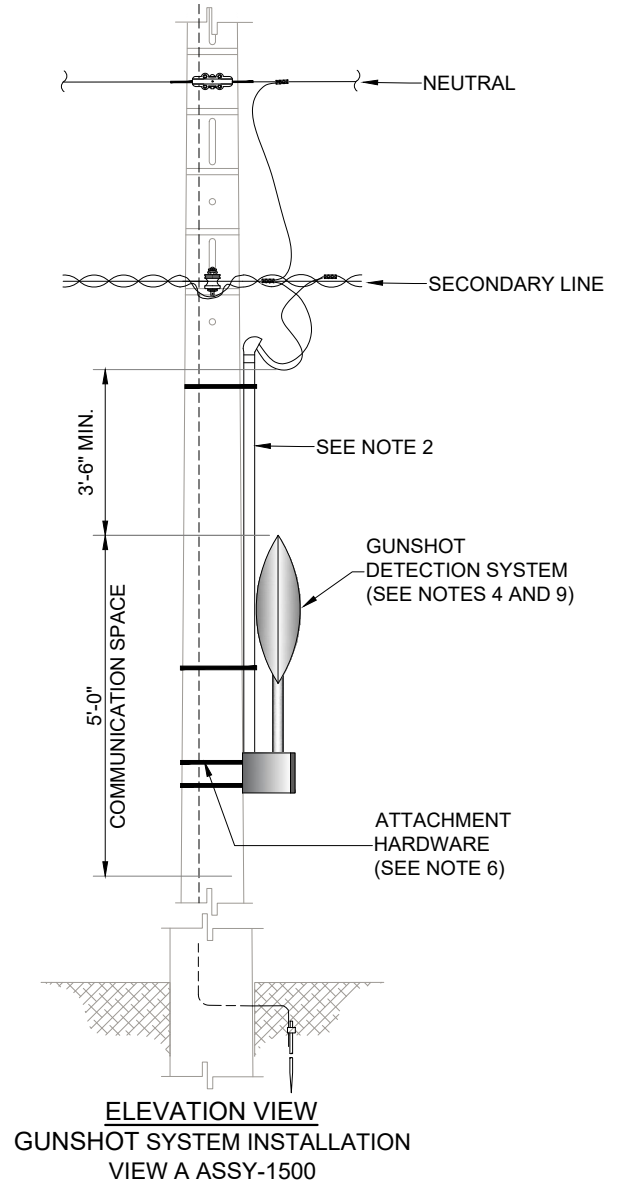
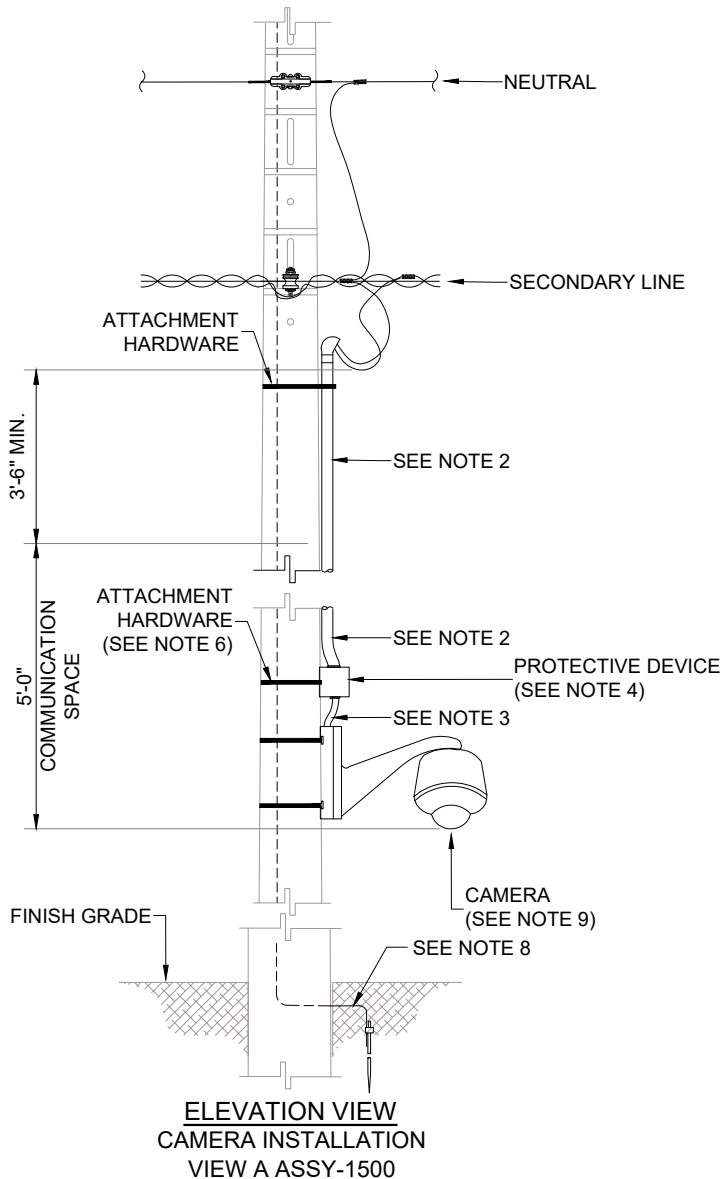
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

OVERHEAD FED SURVEILLANCE CAMERA,  
GUNSHOT DETECTION SYSTEM AND  
WIRELESS COMMUNICATION EQUIPMENT  
MAXIMUM VOLTAGE: 240 V

STANDARD NO. CAMVIG-01 VERSION 4  
DOCUMENT NO. 4301.080  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE: OVERHEAD FED SURVEILLANCE CAMERA,  
 GUNSHOT DETECTION SYSTEM AND  
 WIRELESS COMMUNICATION EQUIPMENT  
 MAXIMUM VOLTAGE: 240 V  
 NOTES

STANDARD NO. CAMVIG-01 VERSION 4  
 DOCUMENT NO. 4301.080  
 PAGE 2 OF 2 DATE FEB 2, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412

NOTES:

1. THIS STANDARD IS FOR THE EXCLUSIVE USE OF PRIVATE OR PUBLIC ENTITIES WITH A CURRENT LUMA'S THIRD-PARTY ATTACHMENT AGREEMENT.
2. 3/4" MINIMUM DIAMETER PVC SCH-80 DUCT SHALL BE USED.
3. LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC) SHALL BE USED.
4. THIS COMMUNICATION EQUIPMENT SHALL INCLUDE A PROTECTIVE DEVICE.
5. A SURVEILLANCE CAMERA CAN BE INSTALLED WIRELESSLY OR CONNECTED TO THE EXISTING COMMUNICATION LINE.
6. THE CAMERA ATTACHMENT, GUNSHOT DETECTION SYSTEM AND RISER MUST BE HOLD TO THE POLE WITH THE APPROPRIATE ATTACHMENT HARDWARE COMPLYING WITH THE APPLICABLE INDUSTRY STANDARDS. FIELD DRILLING OF POLES IS NOT ALLOWED.
7. FOR INSTALLATION OF SURVEILLANCE CAMERAS OR GUNSHOTS ON EXCLUSIVELY STREET LIGHTING POLES REFER TO STREET LIGHTING SYSTEM DESIGN AND CONSTRUCTION MANUAL.
8. CAMERA OWNERS SHALL PROVIDE ADDITIONAL SPECIFICATION DETAILS PRIOR TO INSTALLATION, IF REQUIRED.
9. CAMERAS AND GUNSHOT DETECTION SYSTEM MUST BE INSTALLED WITHIN THE COMMUNICATION SPACE ON THE POLE. NO PART OF THIS EQUIPMENT MAY BE OUTSIDE THE COMMUNICATION SPACE.
10. THE ELECTRICAL SUPPLY AND COMMUNICATION SYSTEMS SHALL BE GROUNDED TOGETHER VIA A SINGLE GROUNDING CONDUCTOR. THE MINIMUM REQUIRED GROUNDING CONNECTIONS FOR THE COMMUNICATION SYSTEM TO THE POLE GROUNDING CONDUCTOR, WHEN USED JOINTLY WITH THE ELECTRICAL SUPPLY SYSTEM, SHALL INCLUDE CONNECTIONS AT THE FIRST AND LAST POLES, ALONG WITH ANY ADDITIONAL CONNECTIONS REQUIRED BY THE NESC. A MINIMUM OF #2 AWG STRANDED COPPER PIGTAIL INTENDED FOR CONNECTING TO THE POLE'S SINGLE GROUNDING CONDUCTOR SHOULD BE LEFT IN THE COMMUNICATION SPACE BY THE FIRST COMMUNICATION COMPANY REQUESTING INSTALLATION, ENABLING LUMA TO PERFORM THE NECESSARY CONNECTIONS.
11. THE INSTALLATION OF SOLAR PANELS ON PREPA POLES FOR POWERING COMMUNICATION EQUIPMENT IS NOT ALLOWED.
12. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".



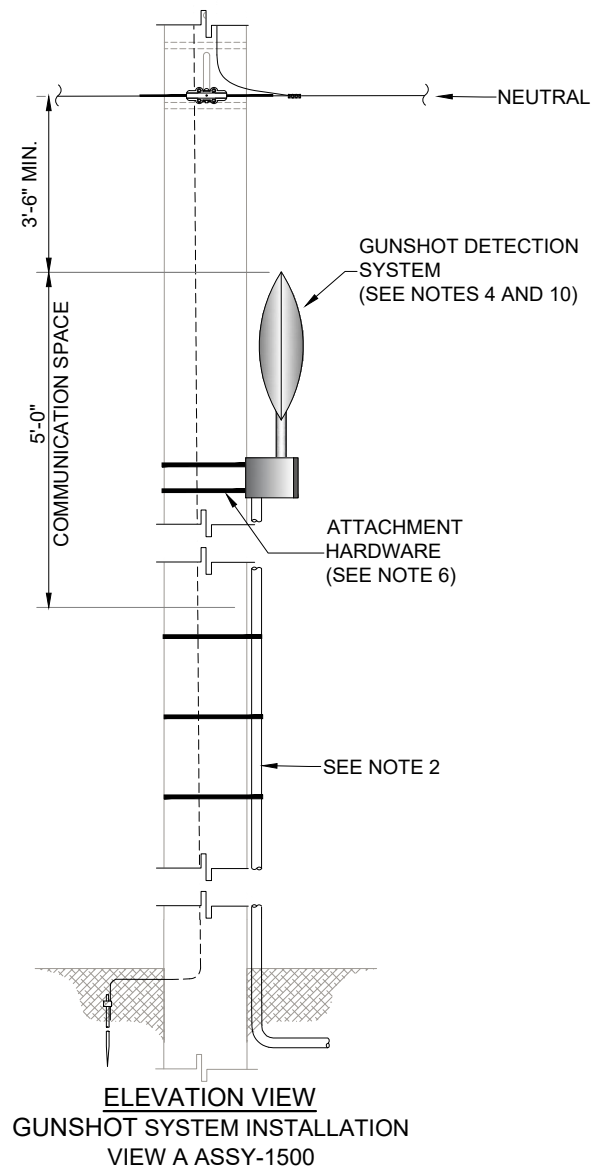
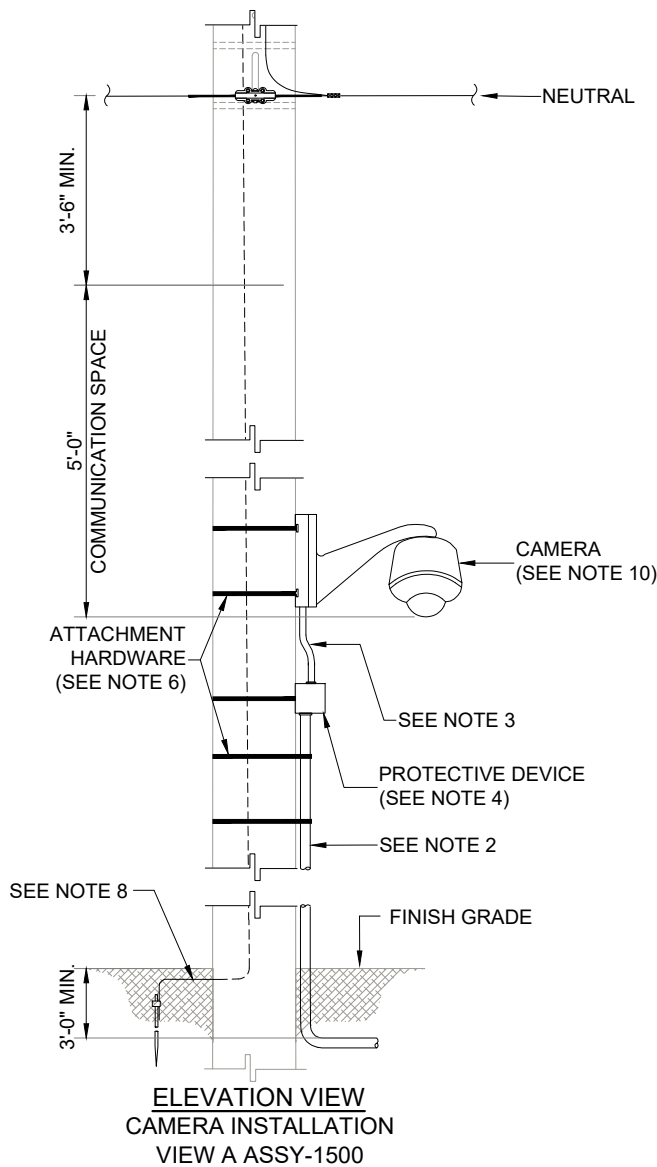
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND FED SURVEILLANCE  
CAMERA, GUNSHOT DETECTION SYSTEM AND  
WIRELESS COMMUNICATION EQUIPMENT  
MAXIMUM VOLTAGE: 240 V

STANDARD NO. CAMVIG-02 VERSION 4  
DOCUMENT NO. 4301.081  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<p><b>TITLE:</b></p> <p style="text-align: center;"><b>UNDERGROUND FED SURVEILLANCE CAMERA, GUNSHOT DETECTION SYSTEM AND WIRELESS COMMUNICATION EQUIPMENT MAXIMUM VOLTAGE: 240 V NOTES</b></p>	<p>STANDARD NO. <u>CAMVIG-02</u> VERSION <u>4</u></p> <p>DOCUMENT NO. <u>4301.081</u></p> <p>PAGE <u>2 OF 2</u> DATE <u>FEB 2, 2024</u></p> <p>SUBMITTED <u>LUIS R. SOTO LIC. 11658</u></p> <p>REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u></p> <p>APPROVED <u>RICARDO CASTRO LIC. 12135</u> <u>EMILIO CUADRADO LIC. 3000</u> <u>VICTOR R. FEBRES LIC. 3412</u></p>
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NOTES:

1. THIS STANDARD IS FOR THE EXCLUSIVE USE OF PRIVATE OR PUBLIC ENTITIES WITH A CURRENT LUMA'S THIRD-PARTY ATTACHMENT AGREEMENT.
2. 3/4" MINIMUM DIAMETER PVC SCH-80 DUCT SHALL BE USED.
3. LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC) SHALL BE USED.
4. THIS COMMUNICATION EQUIPMENT SHALL INCLUDE A PROTECTIVE DEVICE.
5. A SURVEILLANCE CAMERA CAN BE INSTALLED WIRELESSLY OR CONNECTED TO THE EXISTING COMMUNICATION LINE.
6. THE CAMERA ATTACHMENT, GUNSHOT DETECTION SYSTEM AND RISER MUST BE HOLD TO THE POLE WITH THE APPROPRIATE ATTACHMENT HARDWARE COMPLYING WITH THE APPLICABLE INDUSTRY STANDARDS. FIELD DRILLING OF POLES IS NOT ALLOWED.
7. THE SERVICE SOURCE CAN BE AN UNDERGROUND SECONDARY PEDESTAL OR PADMOUNTED TRANSFORMER.
8. FOR INSTALLATION OF SURVEILLANCE CAMERAS OR GUNSHOTS ON EXCLUSIVELY STREET LIGHTING POLES REFER TO STREET LIGHTING SYSTEM DESIGN AND CONSTRUCTION MANUAL.
9. CAMERA OWNERS SHALL PROVIDE ADDITIONAL SPECIFICATION DETAILS PRIOR TO INSTALLATION, IF REQUIRED.
10. CAMERAS AND GUNSHOT DETECTION SYSTEM MUST BE INSTALLED WITHIN THE COMMUNICATION SPACE ON THE POLE. NO PART OF THIS EQUIPMENT MAY BE OUTSIDE THE COMMUNICATION SPACE.
11. THE ELECTRICAL SUPPLY AND COMMUNICATION SYSTEMS SHALL BE GROUNDED TOGETHER VIA A SINGLE GROUNDING CONDUCTOR. THE MINIMUM REQUIRED GROUNDING CONNECTIONS FOR THE COMMUNICATION SYSTEM TO THE POLE GROUNDING CONDUCTOR, WHEN USED JOINTLY WITH THE ELECTRICAL SUPPLY SYSTEM, SHALL INCLUDE CONNECTIONS AT THE FIRST AND LAST POLES, ALONG WITH ANY ADDITIONAL CONNECTIONS REQUIRED BY THE NESC. A MINIMUM OF #2 AWG STRANDED COPPER PIGTAIL INTENDED FOR CONNECTING TO THE POLE'S SINGLE GROUNDING CONDUCTOR SHOULD BE LEFT IN THE COMMUNICATION SPACE BY
12. THE FIRST COMMUNICATION COMPANY REQUESTING INSTALLATION, ENABLING LUMA TO PERFORM THE NECESSARY CONNECTIONS.
13. THE INSTALLATION OF SOLAR PANELS ON PREPA POLES FOR POWERING COMMUNICATION EQUIPMENT IS NOT ALLOWED.
14. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".



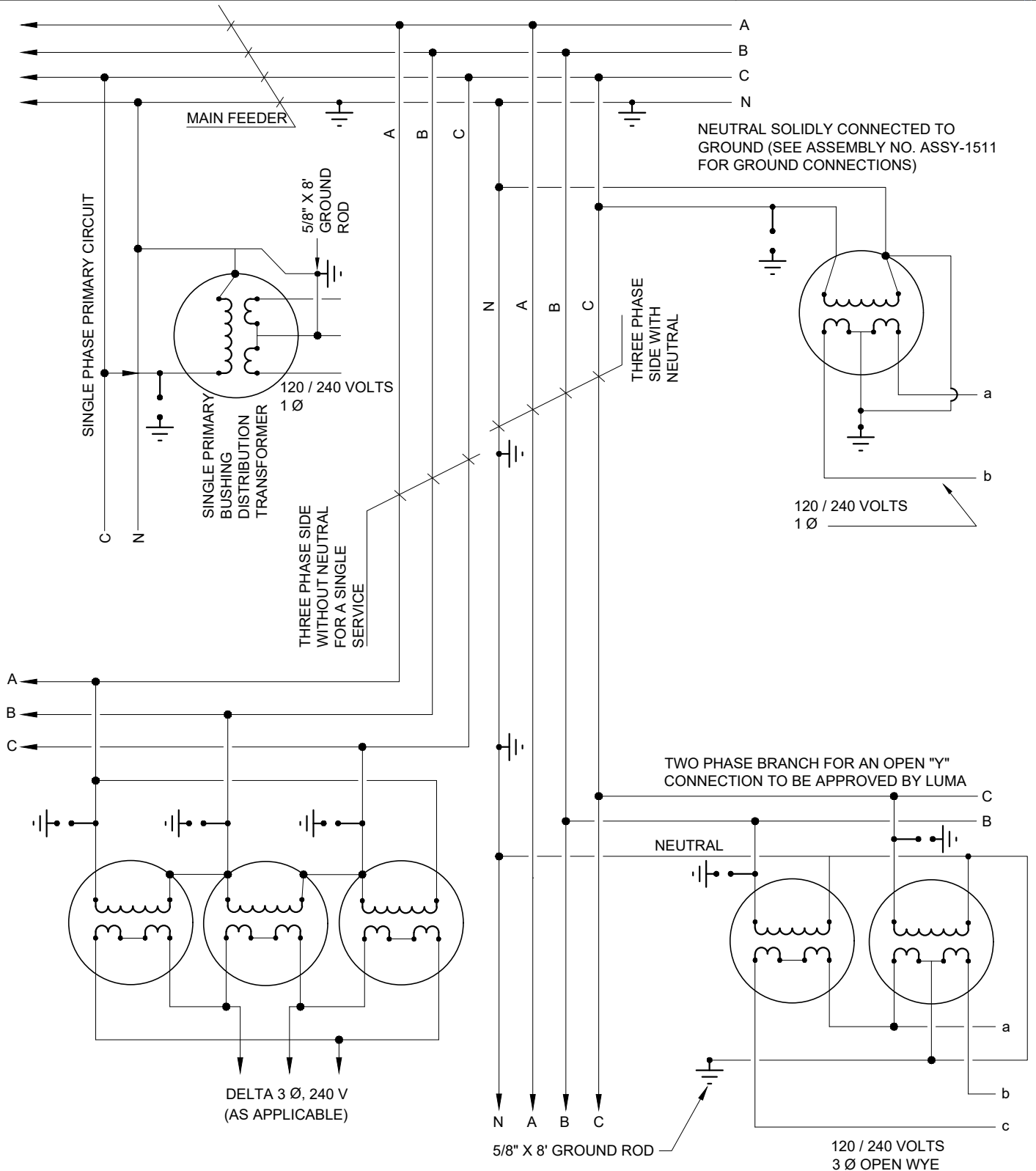
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## SCHEMATIC DIAGRAM FOR THE NEUTRAL SYSTEM MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CN-1 VERSION 4  
 DOCUMENT NO. 4301.082  
 PAGE 1 OF 1 DATE FEB 26, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412





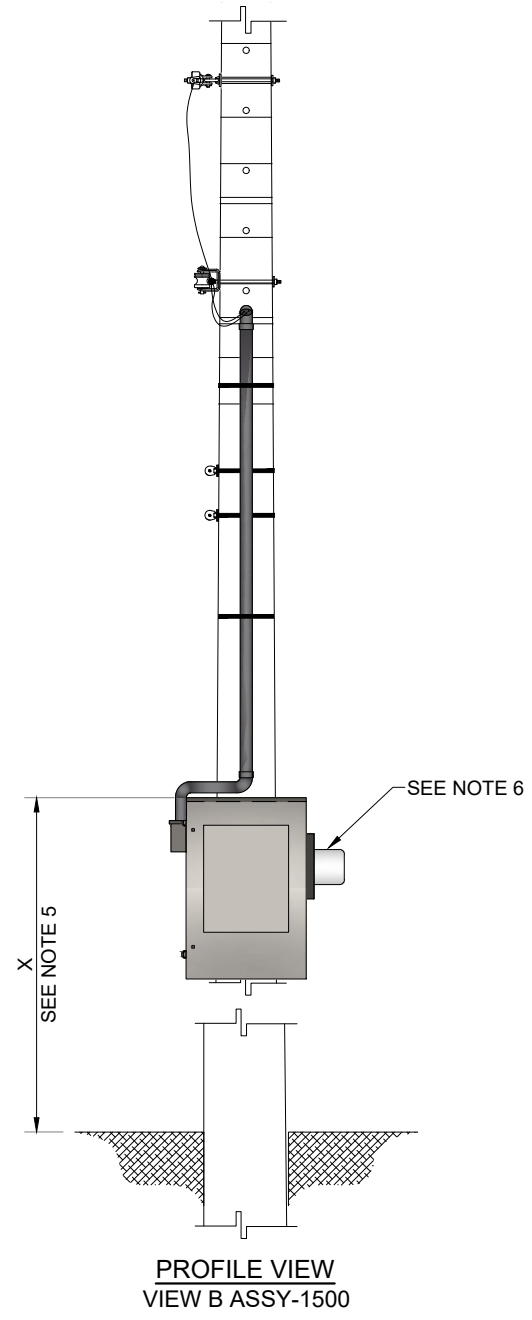
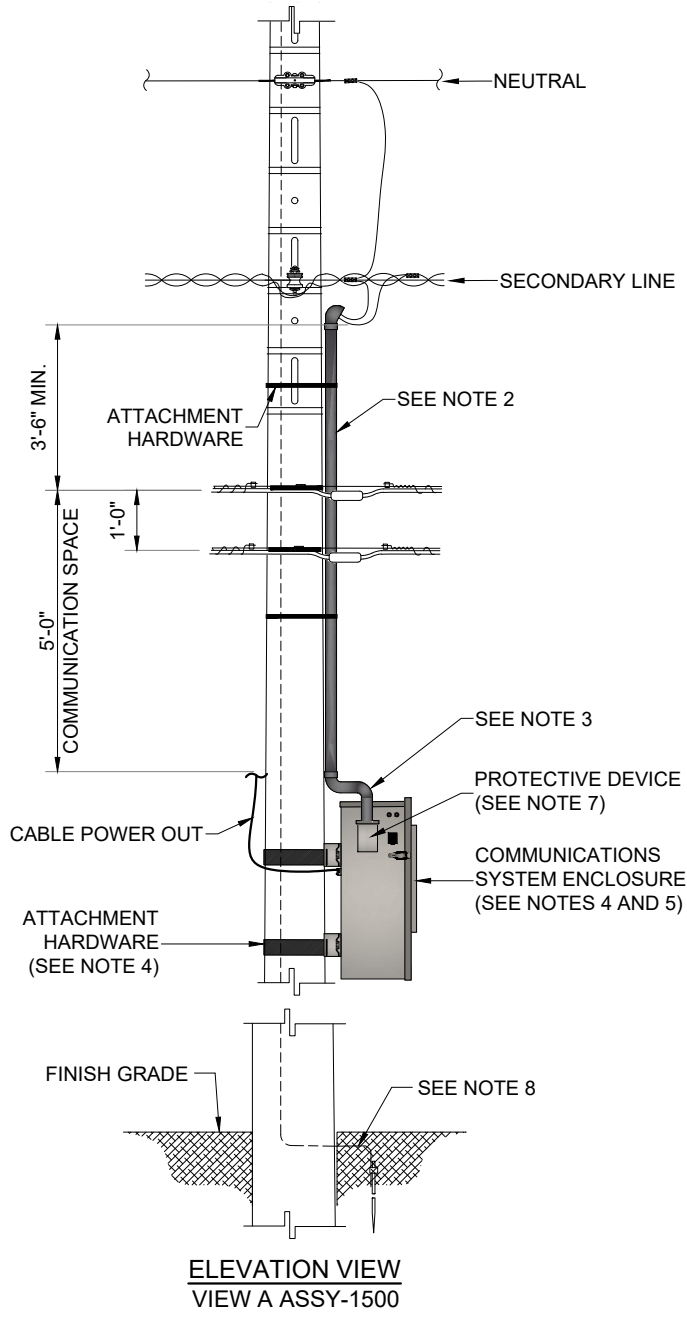
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## OVERHEAD FED COMMUNICATIONS SYSTEM ENCLOSURE MAXIMUM VOLTAGE: 240 V

STANDARD NO. COMM-01 VERSION 1  
DOCUMENT NO. 4301.141  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

OVERHEAD FED COMMUNICATIONS  
SYSTEM ENCLOSURE  
MAXIMUM VOLTAGE: 240 V  
NOTES

STANDARD NO. COMM-01 VERSION 1  
DOCUMENT NO. 4301.141  
PAGE 2 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

NOTES:

1. THIS STANDARD IS FOR THE EXCLUSIVE USE OF PRIVATE OR PUBLIC ENTITIES WITH A CURRENT LUMA'S THIRD-PARTY ATTACHMENT AGREEMENT.
2. 3/4" MINIMUM DIAMETER PVC SCH-80 DUCT SHALL BE USED.
3. LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC) SHALL BE USED.
4. THE COMMUNICATION SYSTEM ENCLOSURE AND THE RISER MUST BE HOLD TO THE POLE WITH THE APPROPRIATE ATTACHMENT HARDWARE, RATED TO SUPPORT THE EQUIPMENT, AND COMPLYING WITH THE APPLICABLE INDUSTRY STANDARDS. FIELD DRILLING OF POLES IS NOT ALLOWED.
5. VERTICAL CLEARANCE OF THE COMMUNICATION SYSTEM ENCLOSURE SHALL COMPLY WITH CURRENT NATIONAL ELECTRICAL SAFETY CODE (NEC). AND ITS TOP SHALL NEVER BE HIGHER THAN 18'-0" FROM THE FINISH GRADE.
6. IF INSTALLATION OF A METER IS REQUIRED, IT SHALL BE INSTALLED IN THE COMMUNICATION EQUIPMENT ENCLOSURE. IF THE SIZE OF THE ENCLOSURE IS NOT SUFFICIENT TO INSTALL THE METER, OTHER ALTERNATIVES SHOULD BE EVALUATED AND APPROVED BY LUMA.
7. THIS COMMUNICATION EQUIPMENT SHALL INCLUDE A PROTECTIVE DEVICE.
8. THE ELECTRICAL SUPPLY AND COMMUNICATION SYSTEMS SHALL BE GROUNDED TOGETHER VIA A SINGLE GROUNDING CONDUCTOR. THE MINIMUM REQUIRED GROUNDING CONNECTIONS FOR THE COMMUNICATION SYSTEM TO THE POLE GROUNDING CONDUCTOR, WHEN USED JOINTLY WITH THE ELECTRICAL SUPPLY SYSTEM, SHALL INCLUDE CONNECTIONS AT THE FIRST AND LAST POLES, ALONG WITH ANY ADDITIONAL CONNECTIONS REQUIRED BY THE NEC. A MINIMUM OF #2 AWG STRANDED COPPER PIGTAIL INTENDED FOR CONNECTING TO THE POLE'S SINGLE GROUNDING CONDUCTOR SHOULD BE LEFT IN THE COMMUNICATION SPACE BY THE FIRST COMMUNICATION COMPANY REQUESTING INSTALLATION, ENABLING LUMA TO PERFORM THE NECESSARY CONNECTIONS.
9. THE INSTALLATION OF SOLAR PANELS ON PREPA POLES FOR POWERING COMMUNICATION EQUIPMENT IS NOT ALLOWED.
10. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".



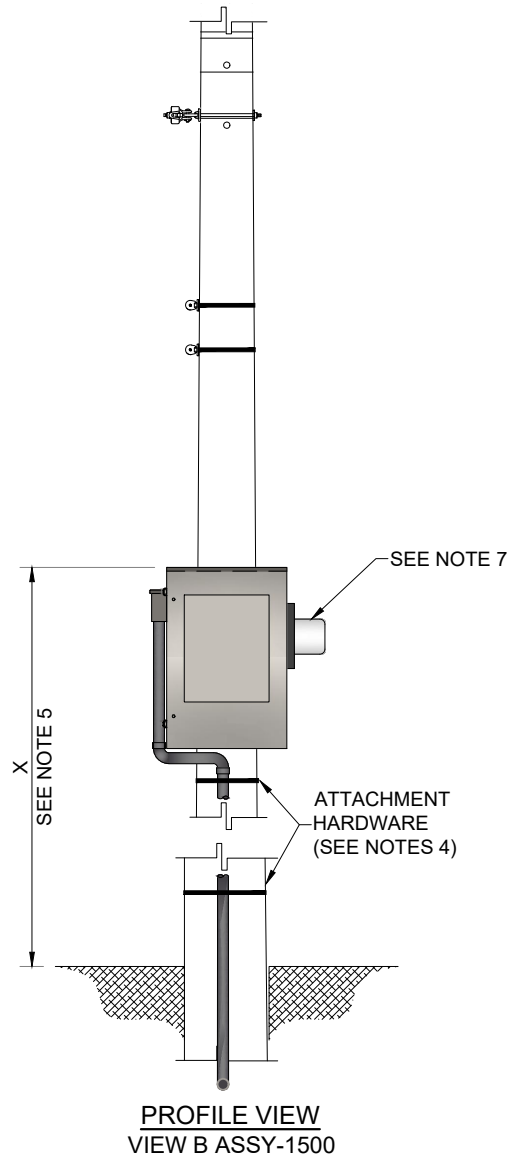
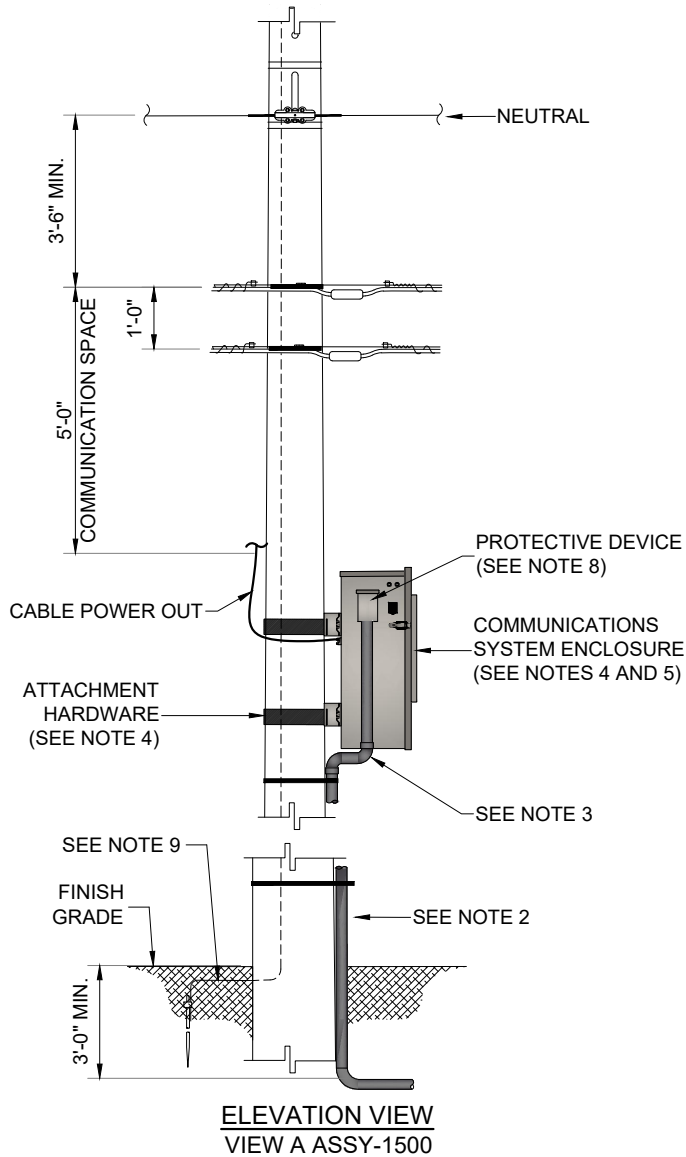
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## UNDERGROUND FED COMMUNICATIONS SYSTEM ENCLOSURE MAXIMUM VOLTAGE: 240 V

STANDARD NO. COMM-02 VERSION 1  
DOCUMENT NO. 4301.142  
PAGE 1 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND FED COMMUNICATIONS  
SYSTEM ENCLOSURE  
MAXIMUM VOLTAGE: 240 V  
NOTES

STANDARD NO. COMM-02 VERSION 1  
DOCUMENT NO. 4301.142  
PAGE 2 OF 2 DATE FEB 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412

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6. THE SERVICE SOURCE CAN BE AN UNDERGROUND SECONDARY PEDESTAL OR PAD-MOUNTED TRANSFORMER.
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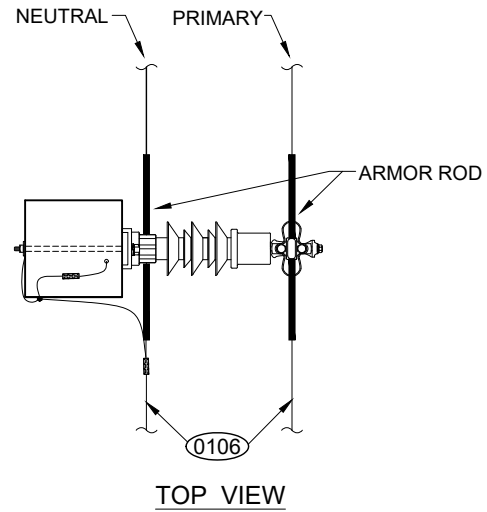
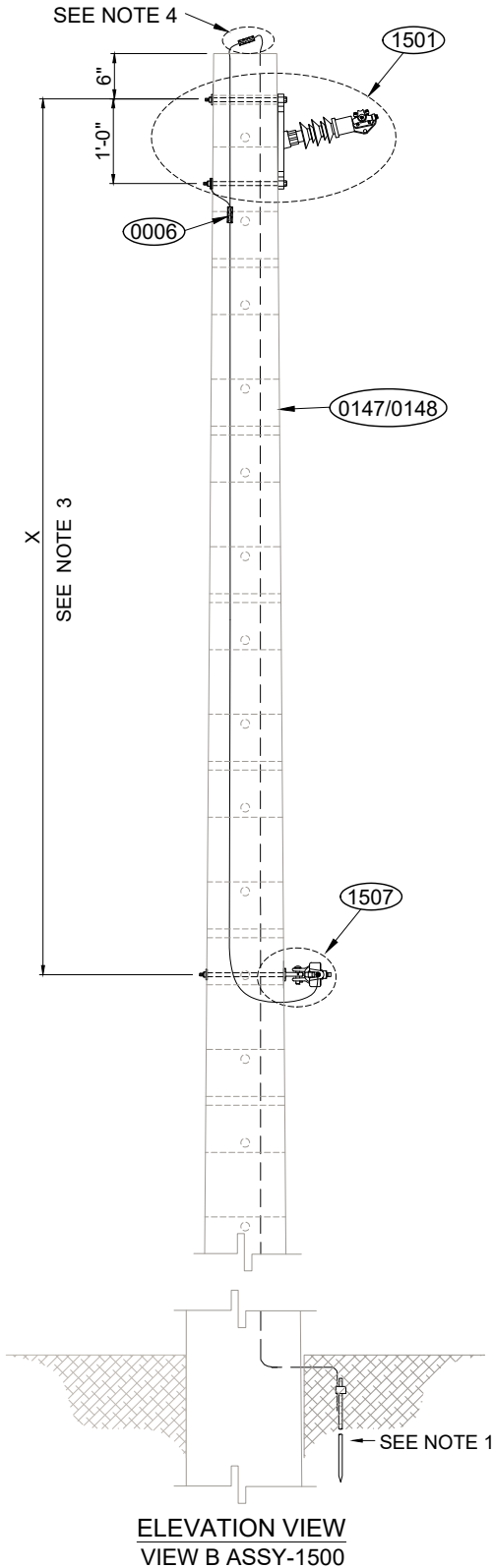
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE PRIMARY CONSTRUCTION  
0° - 5° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-A1 VERSION 6  
DOCUMENT NO. 4301.005  
PAGE 1 OF 2 DATE FEB 14, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**

**SINGLE PHASE PRIMARY CONSTRUCTION  
0° - 5° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL**

STANDARD NO. CP-A1 VERSION 6  
DOCUMENT NO. 4301.005  
PAGE 2 OF 2 DATE FEB 14, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONECTORS	VARIES	1
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 1-FIGURE D	2

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
10. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



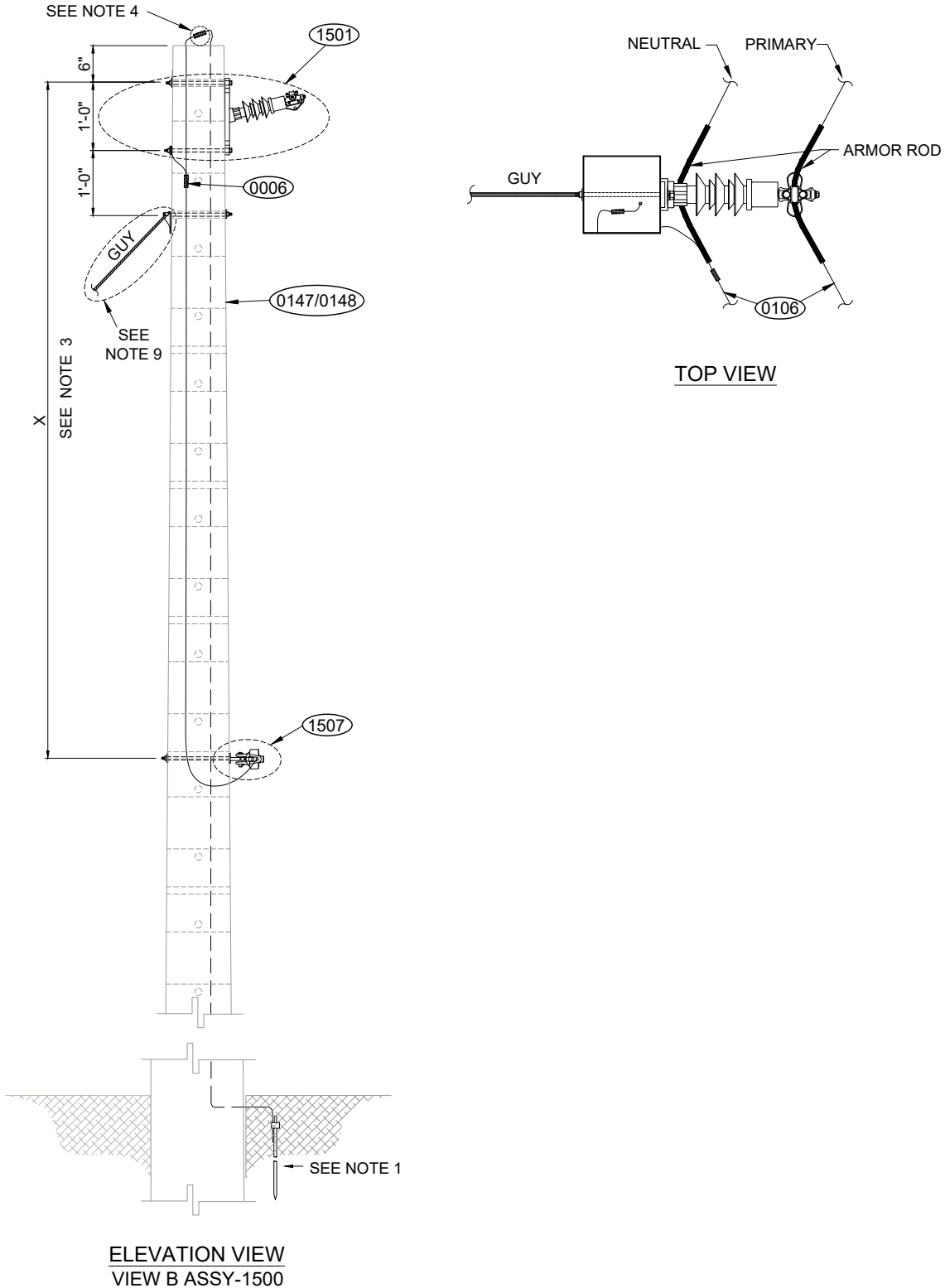
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE PRIMARY CONSTRUCTION  
6° - 20° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-A2 VERSION 6  
DOCUMENT NO. 4301.006  
PAGE 1 OF 2 DATE FEB 16, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>SINGLE PHASE PRIMARY CONSTRUCTION</b> <b>6° - 20° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-A2</u> VERSION <u>6</u>
		DOCUMENT NO. <u>4301.006</u>
		PAGE <u>2 OF 2</u> DATE <u>FEB 16, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>		
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>		

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 1-FIGURE D	2
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



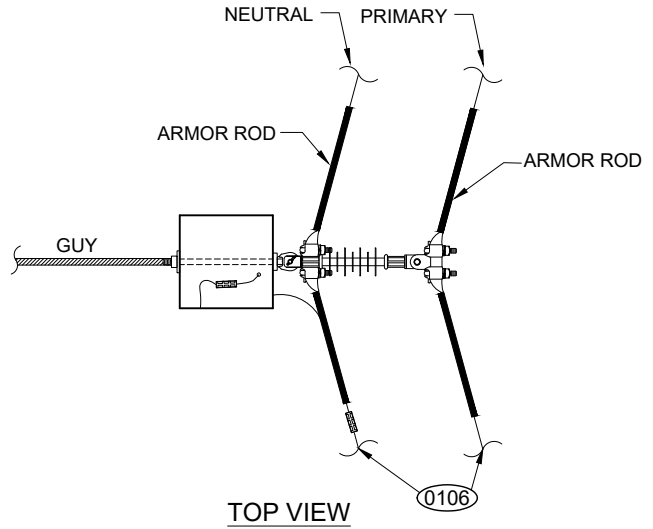
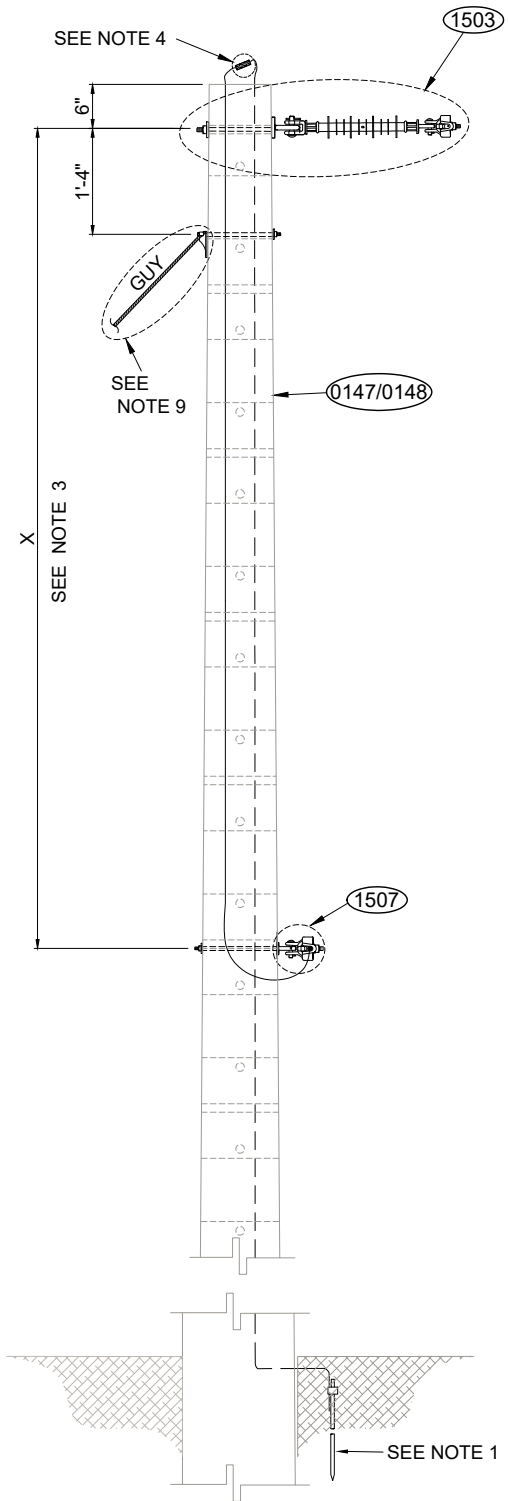
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION**  
**21° - 60° ANGLE TANGENT**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A3 VERSION 7  
DOCUMENT NO. 4301.007  
PAGE 1 OF 2 DATE FEB 16, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p align="center"> <b>SINGLE PHASE PRIMARY CONSTRUCTION</b>  <b>21° - 60° ANGLE TANGENT</b>  <b>MAXIMUM VOLTAGE: 13.2 KV</b>  <b>NOTES AND BILL OF MATERIAL</b> </p>	STANDARD NO. <u>CP-A3</u> VERSION <u>7</u>
		DOCUMENT NO. <u>4301.007</u>
		PAGE <u>2 OF 2</u> DATE <u>FEB 16, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>		
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>		

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1503	PRIMARY LINE ANGLE ASSEMBLY	ASSY-1503	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



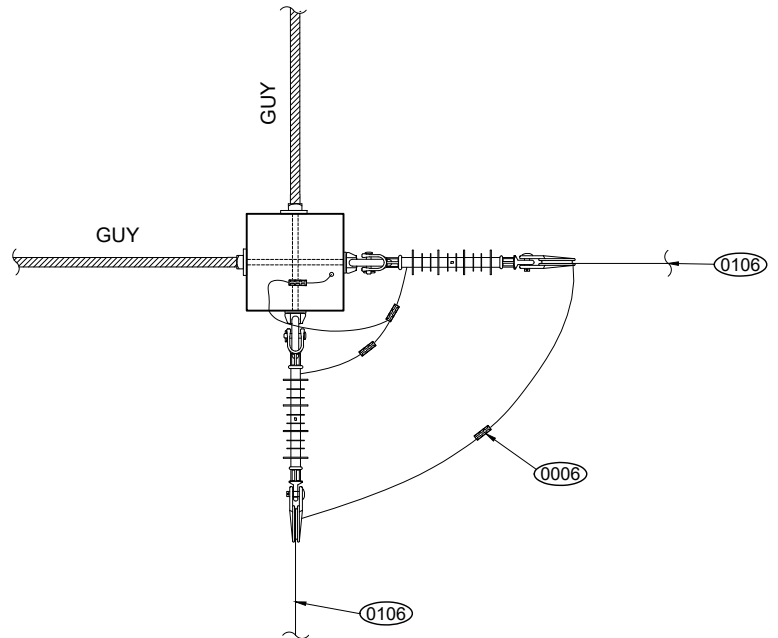
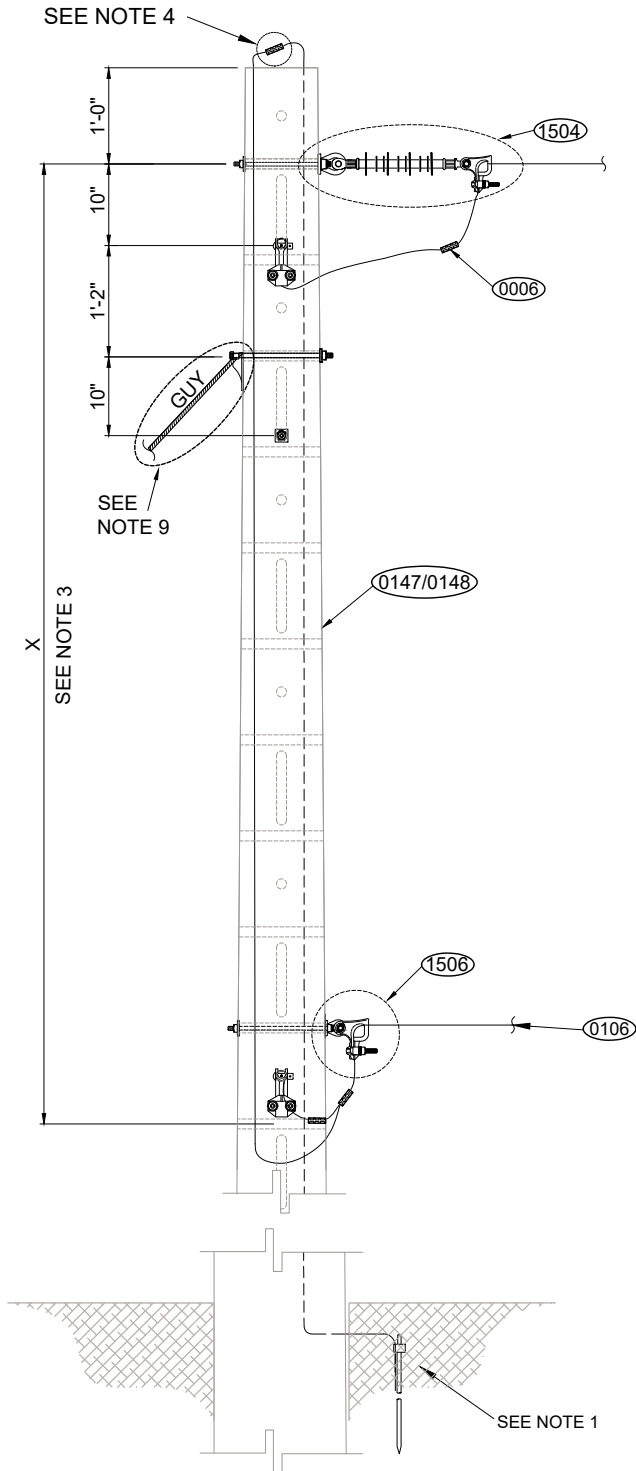
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
61°- 90° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A4 VERSION 6  
DOCUMENT NO. 4301.008  
PAGE 1 OF 2 DATE FEB 16, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000



TOP VIEW



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>SINGLE PHASE PRIMARY CONSTRUCTION</b> <b>61°- 90° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-A4</u> VERSION <u>6</u>
		DOCUMENT NO. <u>4301.008</u>
		PAGE <u>2 OF 2</u> DATE <u>FEB 16, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

### NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





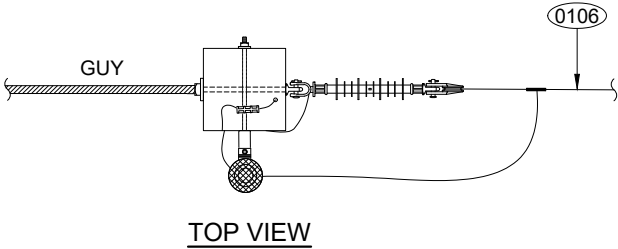
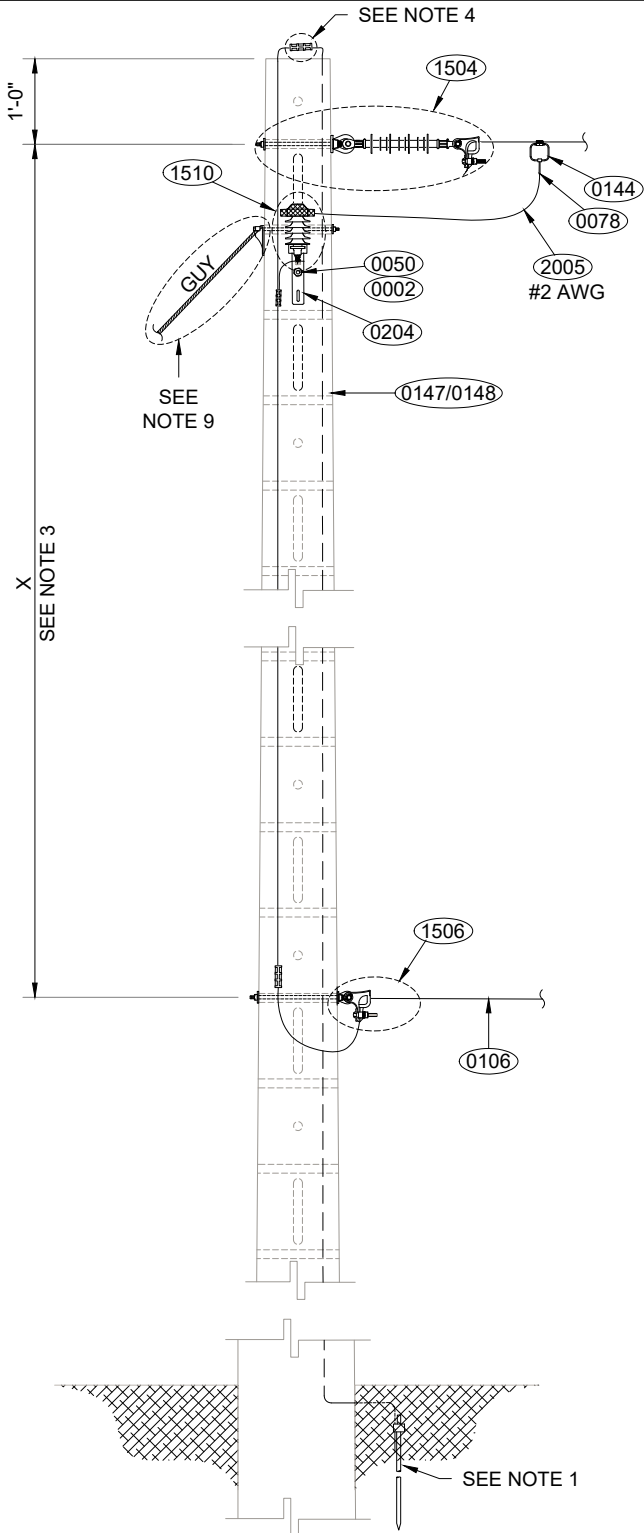
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A5 VERSION 7  
DOCUMENT NO. 4301.009  
PAGE 1 OF 2 DATE FEB 22, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



**ELEVATION VIEW  
VIEW A ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL**

STANDARD NO.	CP-A5	VERSION	7
DOCUMENT NO.	4301.009		
PAGE	2 OF 2	DATE	FEB 22, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	1
0050	DOUBLE ARMING BOLT	VARIES	1
0078	HOT LINE CLAMP	VARIES	1
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	1
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



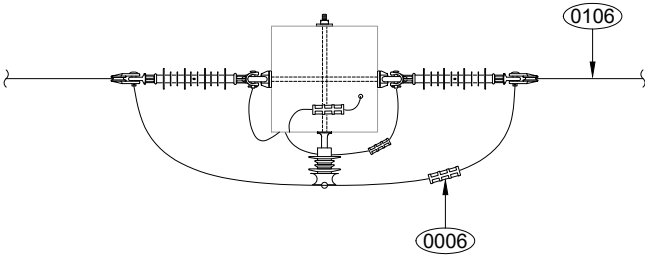
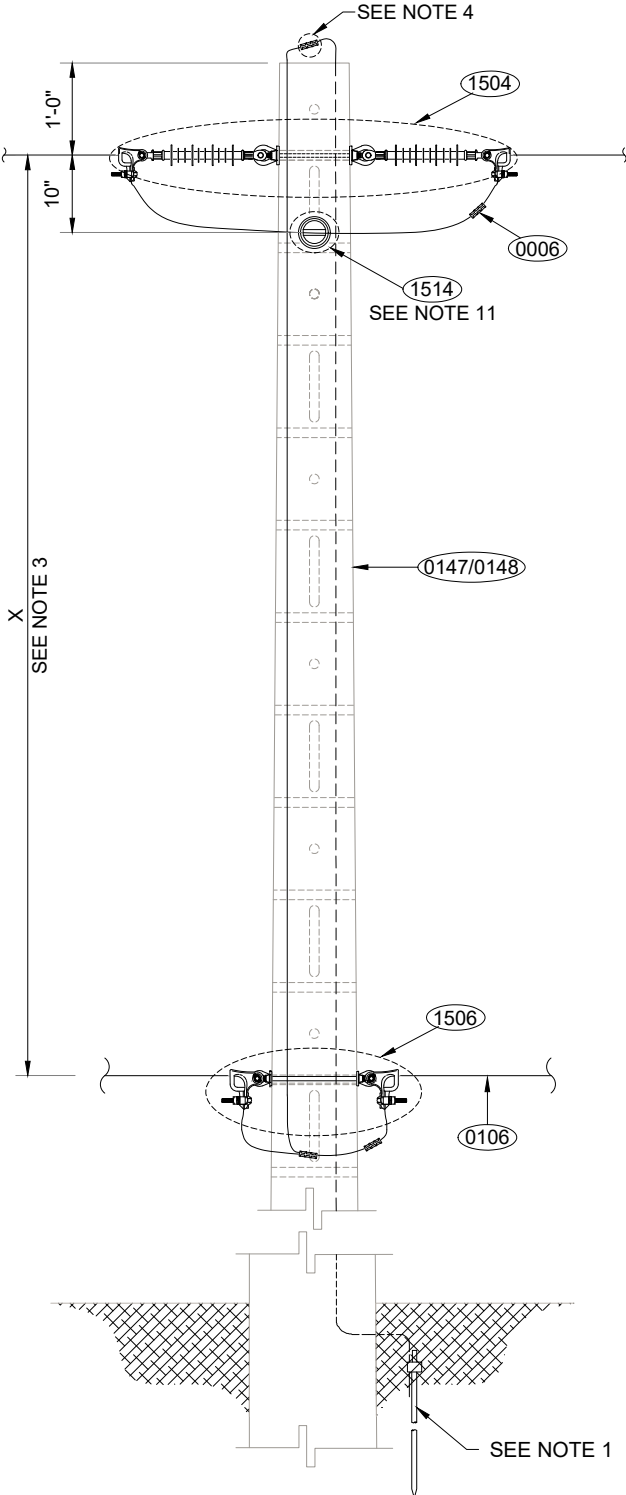
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A6 VERSION 6  
DOCUMENT NO. 4301.010  
PAGE 1 OF 2 DATE FEB 22, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



TOP VIEW

ELEVATION VIEW  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>SINGLE PHASE PRIMARY CONSTRUCTION  DOUBLE DEADEND  MAXIMUM VOLTAGE: 13.2 KV  NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-A6</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.010</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 22, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u> <u>VICTOR R. FEBRES LIC. 3412</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.



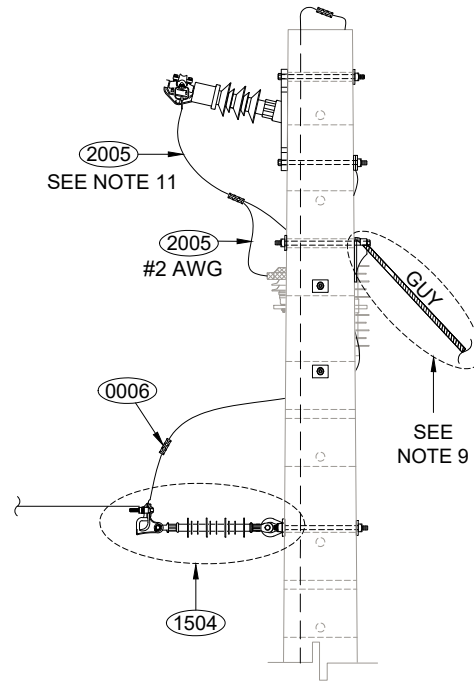
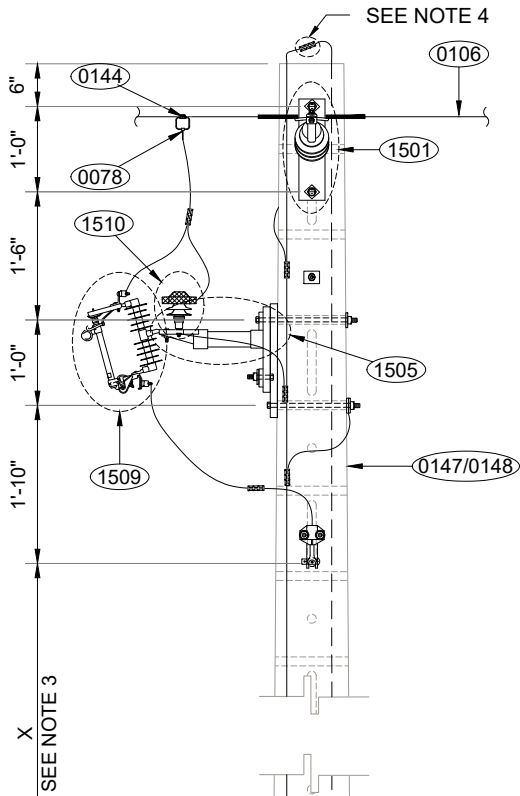
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

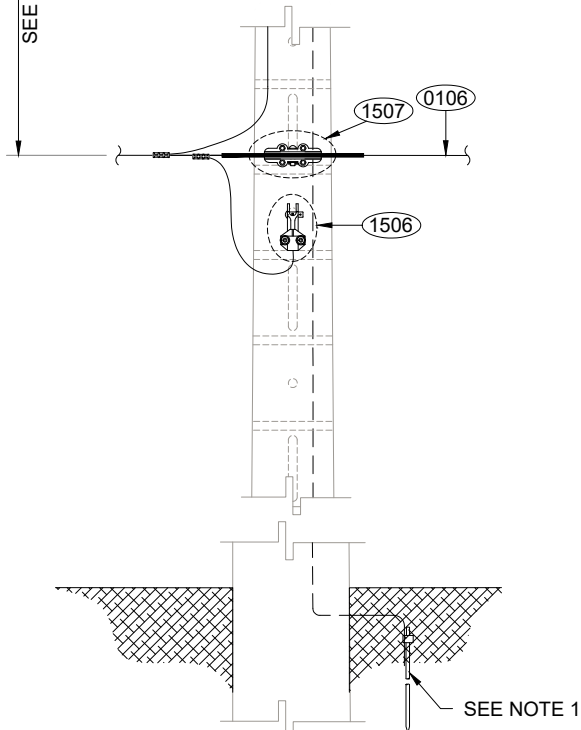
TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
TANGENT TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-A7	VERSION	7
DOCUMENT NO.	4301.011		
PAGE	1 OF 3	DATE	FEB 23, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		



PROFILE VIEW



ELEVATION VIEW  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  SINGLE PHASE PRIMARY CONSTRUCTION TANGENT TAP-OFF MAXIMUM RATING: 200 A MAXIMUM VOLTAGE: 13.2 KV NOTES	STANDARD NO. <u>CP-A7</u> VERSION <u>7</u>
	DOCUMENT NO. <u>4301.011</u>
	PAGE <u>2 OF 3</u> DATE <u>FEB 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 AND ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
12. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  SINGLE PHASE PRIMARY CONSTRUCTION TANGENT TAP-OFF MAXIMUM RATING: 200 A MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL	STANDARD NO. <u>CP-A7</u> VERSION <u>7</u>
	DOCUMENT NO. <u>4301.011</u>
	PAGE <u>3 OF 3</u> DATE <u>FEB 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	1
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	1
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1509	FUSE CUTOFF ASSEMBLY	ASSY-1509	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 1-FIGURE A 1-FIGURE F	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.



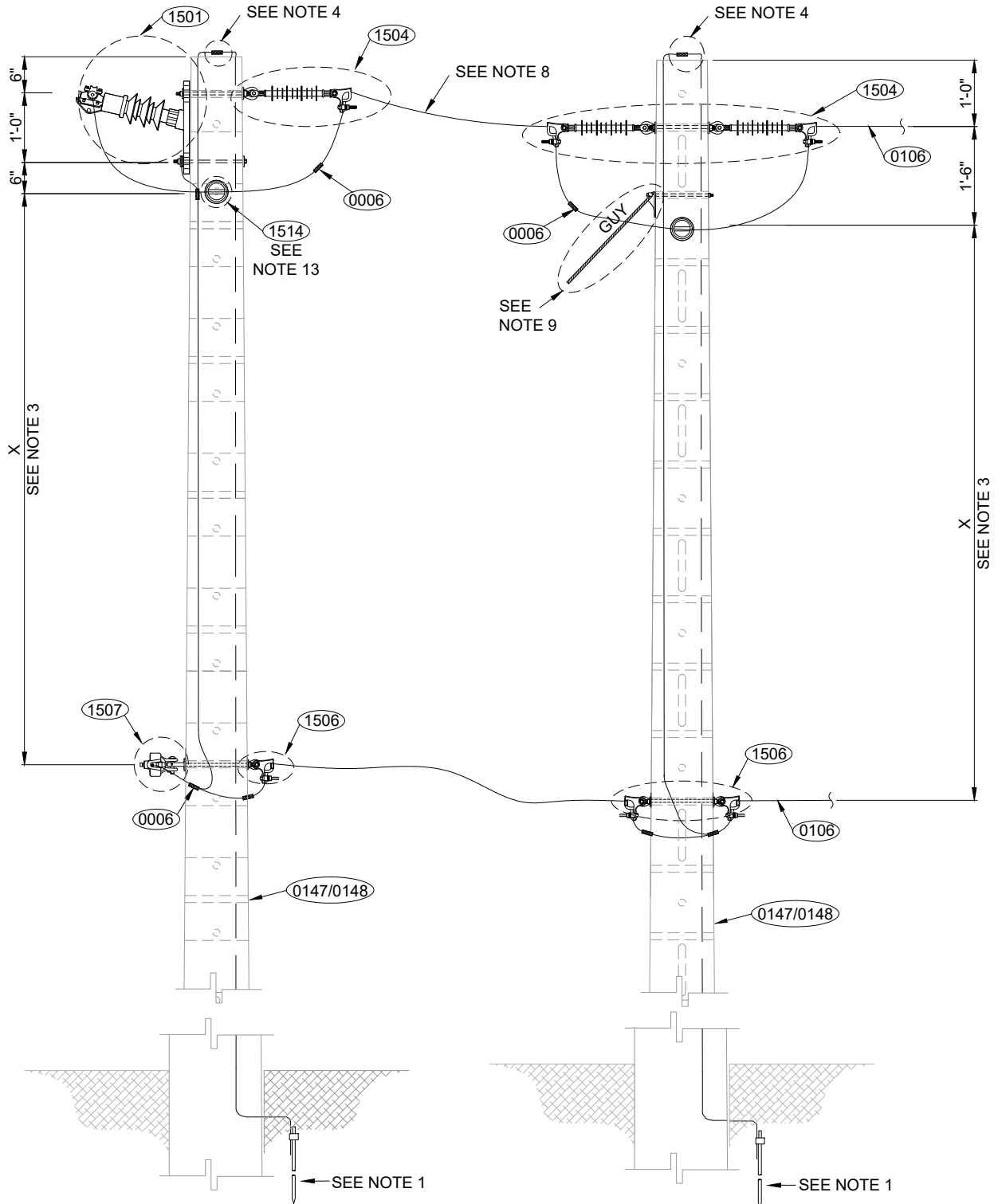
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
TANGENT REDUCED TENSION SPAN TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-A7-1	VERSION	7
DOCUMENT NO.	4301.012		
PAGE	1 OF 3	DATE	FEB 23, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW  
VIEW B ASSY-1500**

**ELEVATION VIEW  
VIEW A ASSY-1500**





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE PRIMARY CONSTRUCTION  
TANGENT REDUCED TENSION SPAN TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES

STANDARD NO. CP-A7-1 VERSION 7

DOCUMENT NO. 4301.012

PAGE 2 OF 3 DATE FEB 23, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 AND ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. THE MAXIMUM REDUCED TENSION SPAN SHALL BE 75'-0".
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
11. IF CUTOUT IS NOT REQUIRED BY DESIGN, ITEMS 0078 AND 0144, AND ASSEMBLIES NO. ASSY-1505, ASSY-1509 AND ASSY-1510, SHOULD NOT BE INCLUDED.
12. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
13. IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE PRIMARY CONSTRUCTION  
TANGENT REDUCED TENSION SPAN TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL

STANDARD NO. CP-A7-1 VERSION 7

DOCUMENT NO. 4301.012

PAGE 3 OF 3 DATE FEB 23, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	2
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 1-FIGURE A, 1-FIGURE B	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 1-FIGURE A, 1-FIGURE B	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	2
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 2-FIGURE D	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.



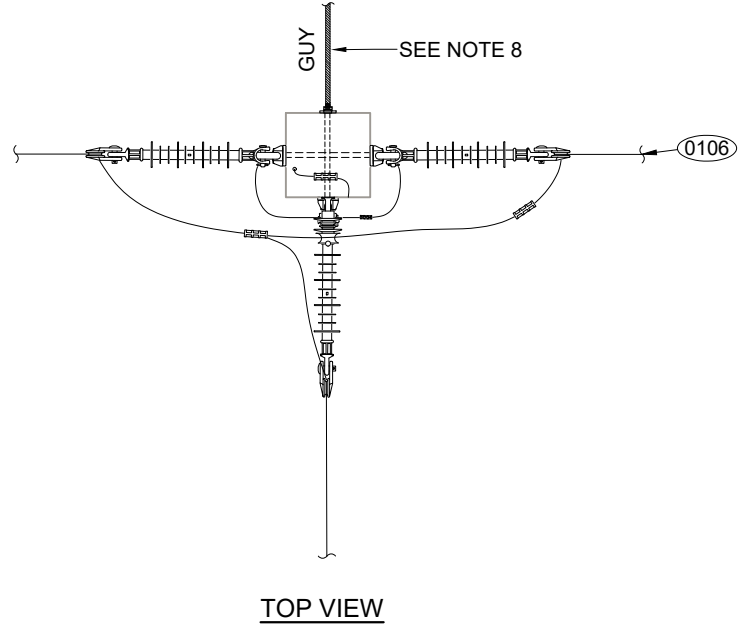
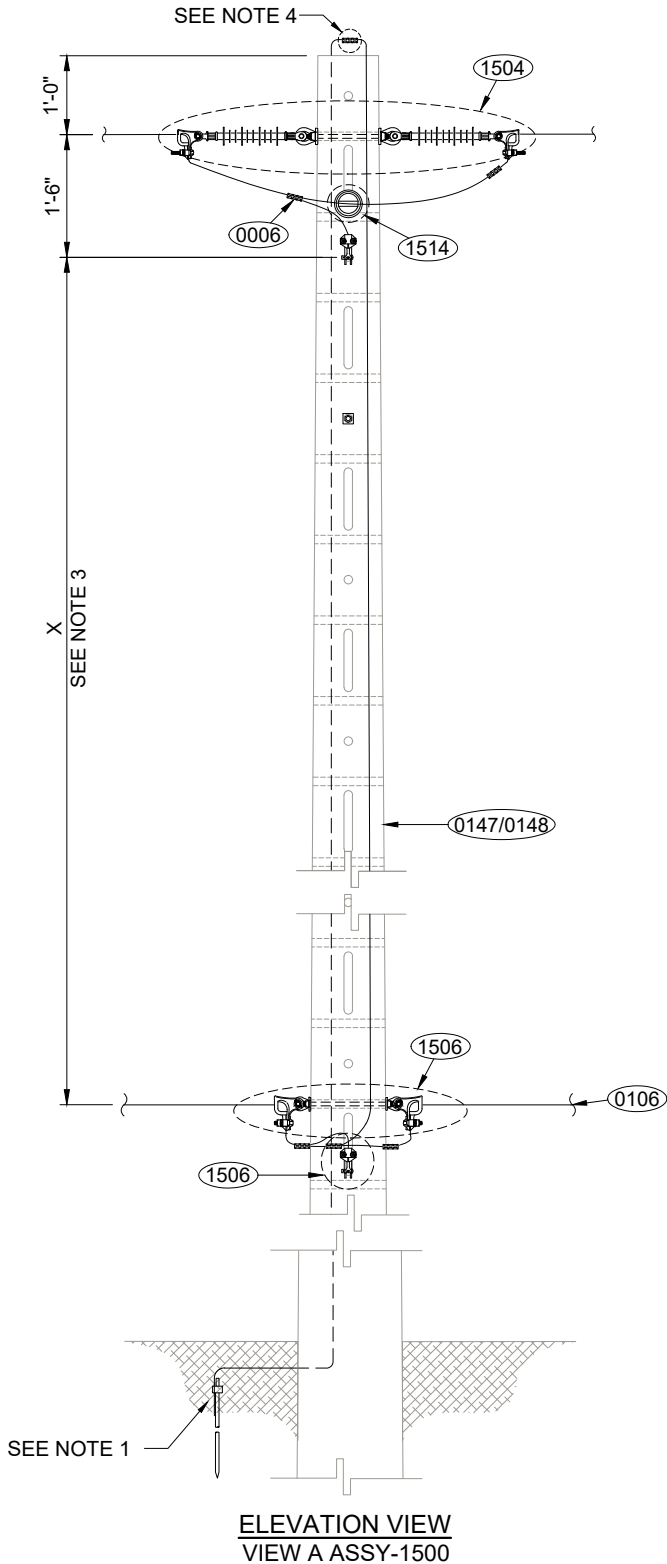
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
DOUBLE DEADEND TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A7-2 VERSION 2  
DOCUMENT NO. 4301.144  
PAGE 1 OF 2 DATE FEB 16, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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DIGITIZED EMILIO CUADRADO LIC.3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>SINGLE PHASE PRIMARY CONSTRUCTION          DOUBLE DEADEND TAP-OFF          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-A7-2</u> VERSION <u>2</u>
	DOCUMENT NO. <u>4301.144</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 16, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
	DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 1-FIGURE A, 1-FIGURE B	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 1-FIGURE A, 1-FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- IF IT IS NECESSARY TO INSTALL FUSE CUTOUTS (ITEM 0085), USE STANDARD NO. CP-A12 AT THE TAP-OFF ON THE NEXT DEADEND POLE.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
SINGLE DEADEND TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A12 VERSION 2

DOCUMENT NO. 4301.145

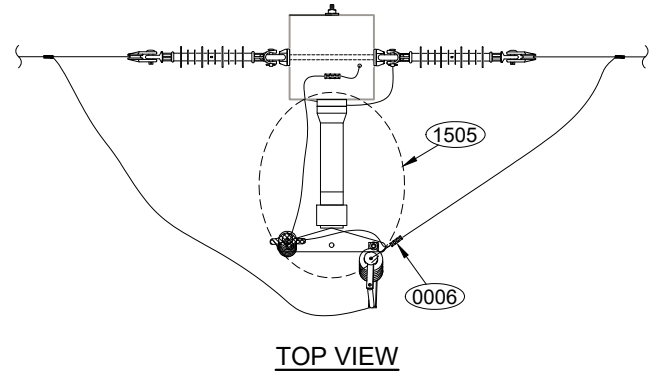
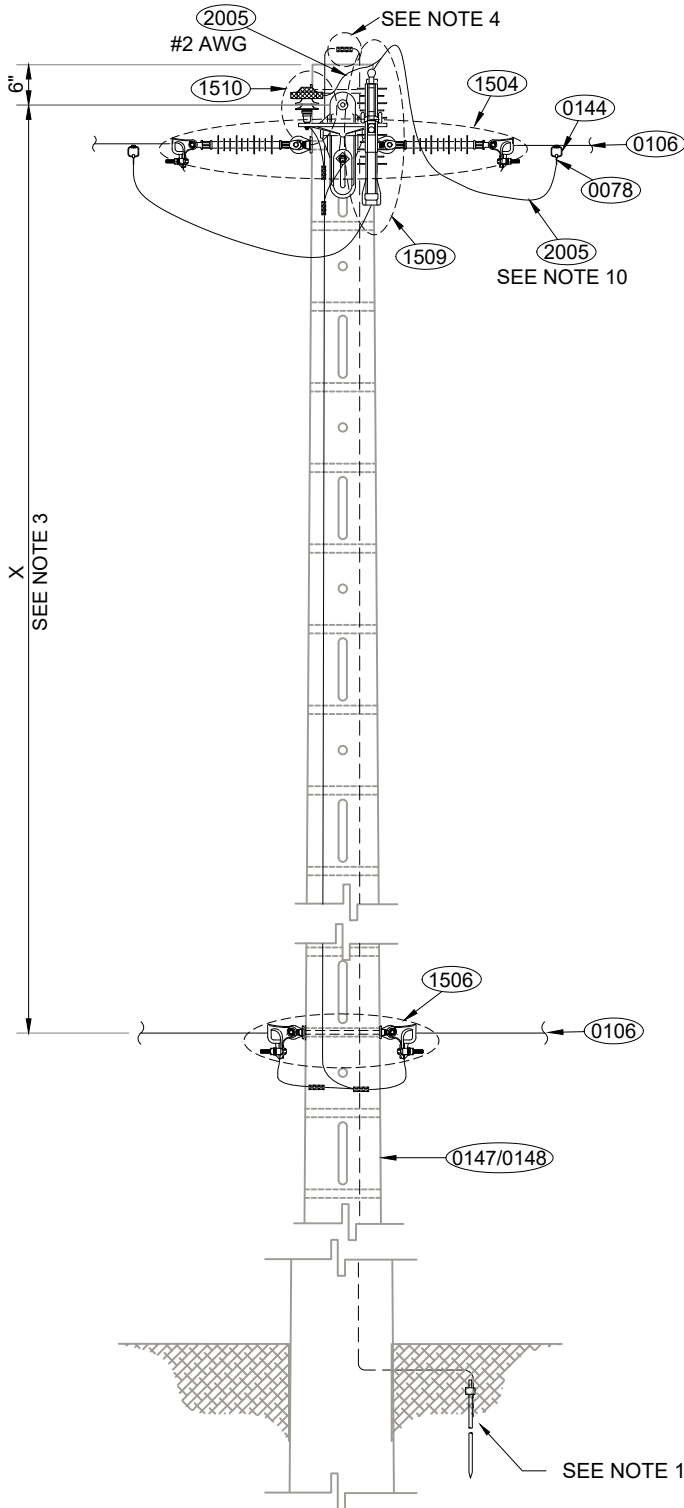
PAGE 1 OF 2 DATE FEB 22, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW  
VIEW A ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>SINGLE PHASE PRIMARY CONSTRUCTION</b> <b>SINGLE DEADEND TAP-OFF</b> <b>MAXIMUM RATING: 200 A</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-A12</u> VERSION <u>2</u>
		DOCUMENT NO. <u>4301.145</u>
		PAGE <u>2 OF 2</u> DATE <u>FEB 22, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>		
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>		

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 1-FIGURE F	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTERS INSTALLATION DETAILS.
- #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
TANGENT LINE JUNCTION  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A13 VERSION 4

DOCUMENT NO. 4301.013

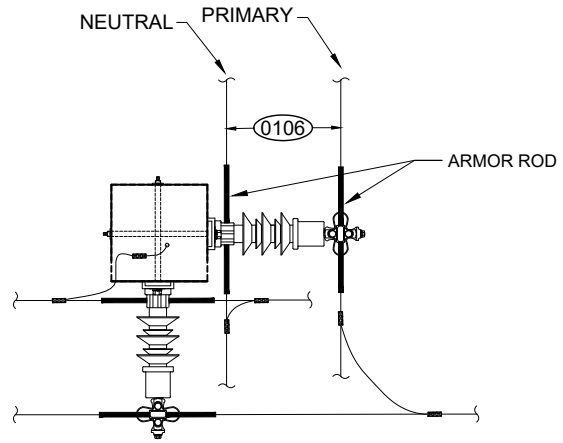
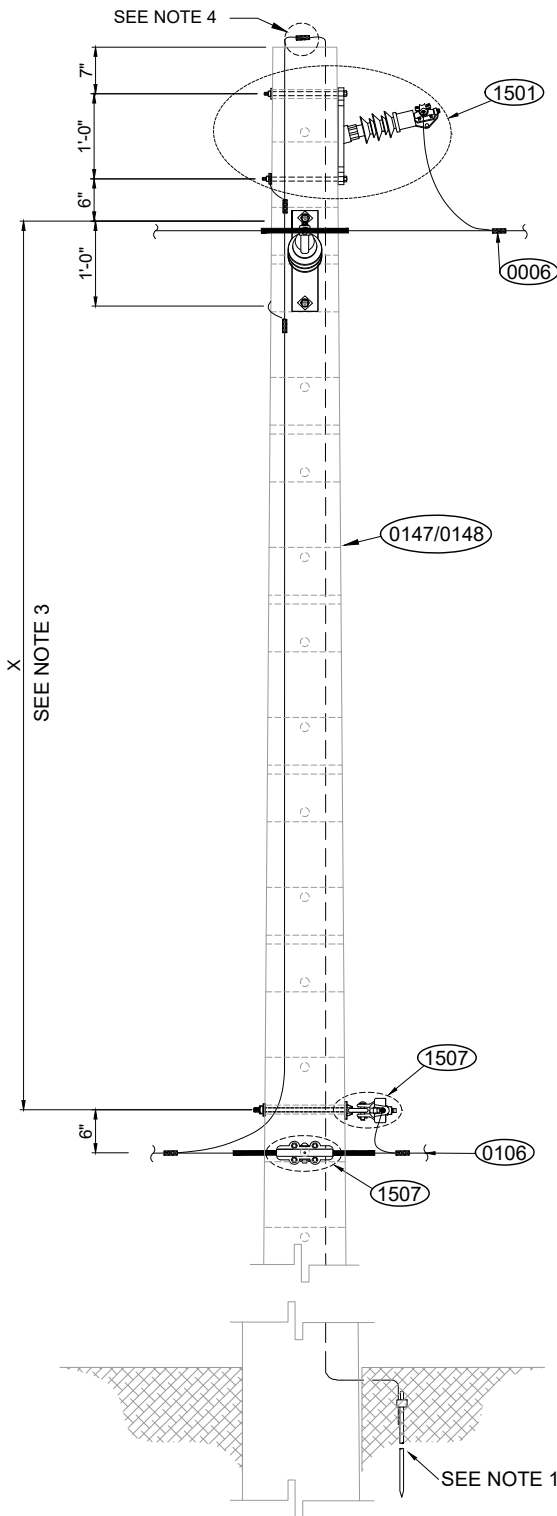
PAGE 1 OF 2 DATE FEB 19, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



TOP VIEW

ELEVATION VIEW  
VIEW B ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p style="text-align: center;">SINGLE PHASE PRIMARY CONSTRUCTION TANGENT LINE JUNCTION MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</p>	STANDARD NO. <u>CP-A13</u> VERSION <u>4</u>
		DOCUMENT NO. <u>4301.013</u>
		PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 19, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE A, 1-FIGURE D	3

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
10. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
DEADEND LINE JUNCTION  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-A14 VERSION 5

DOCUMENT NO. 4301.014

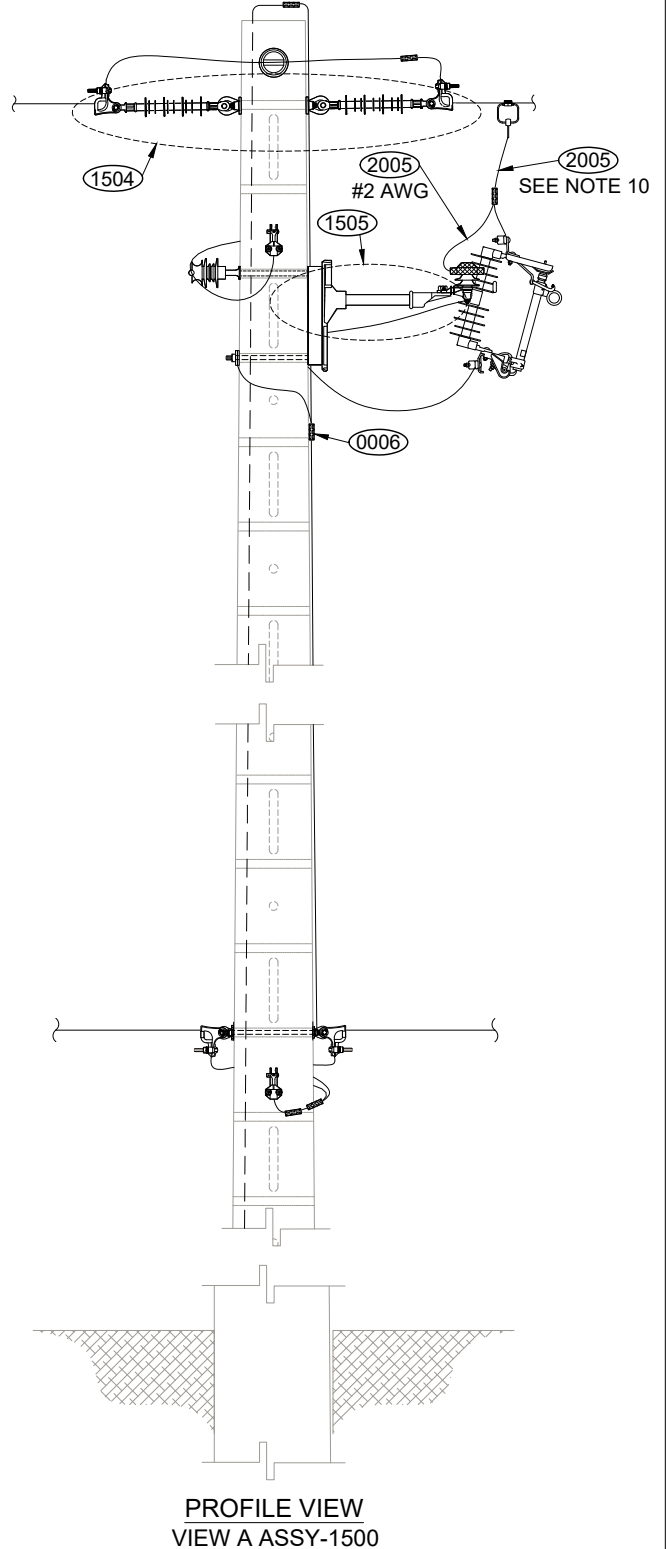
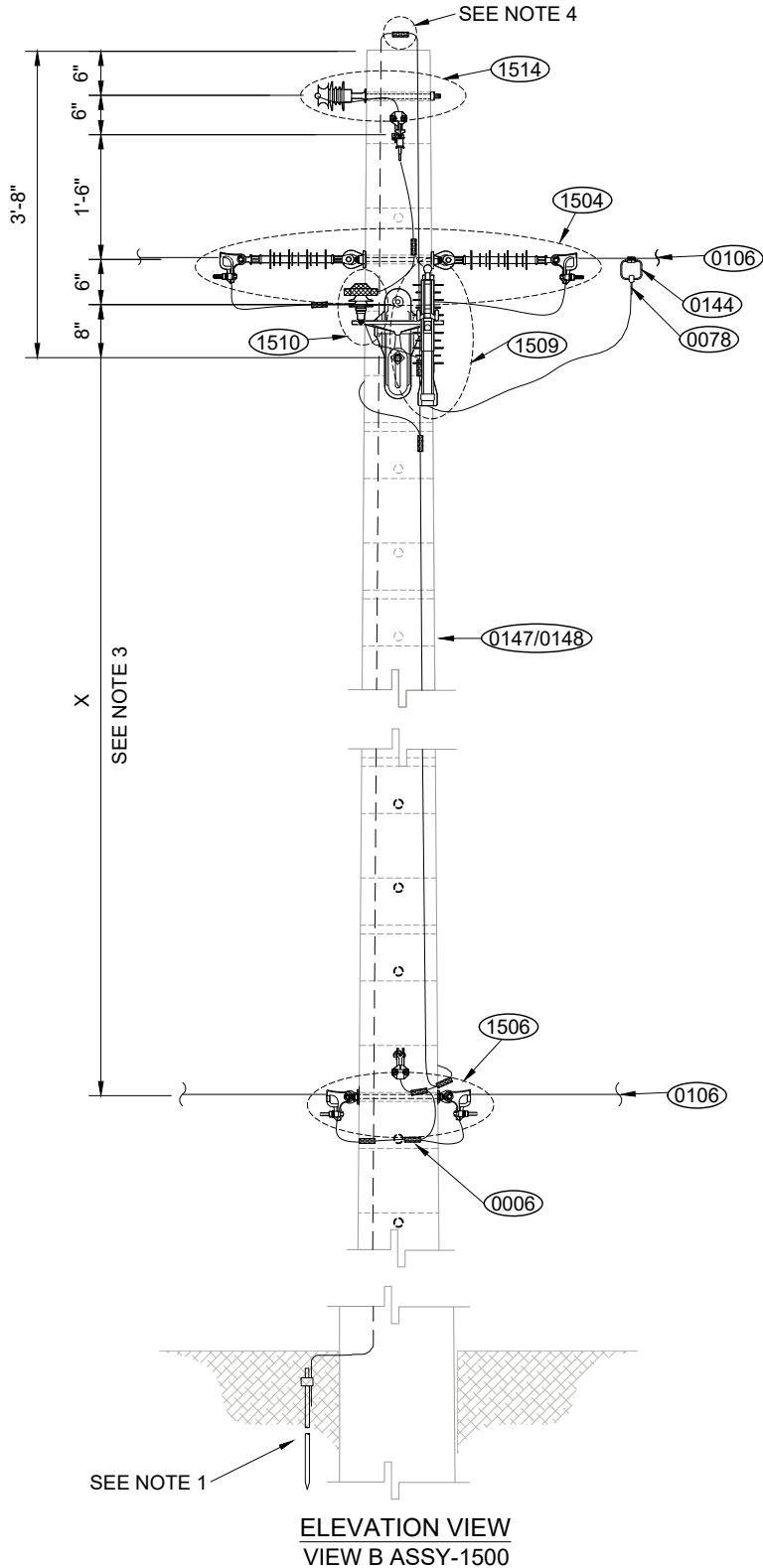
PAGE 1 OF 2 DATE FEB 23, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:** SINGLE PHASE PRIMARY CONSTRUCTION  
 DEADEND LINE JUNCTION  
 MAXIMUM RATING: 200 A  
 MAXIMUM VOLTAGE: 13.2 KV  
 NOTES AND BILL OF MATERIAL

STANDARD NO. CP-A14 VERSION 5  
 DOCUMENT NO. 4301.014  
 PAGE 2 OF 2 DATE FEB 23, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	2
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	2
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 1-FIGURE F	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



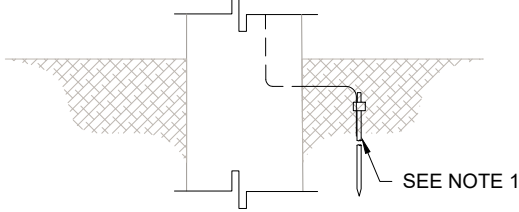
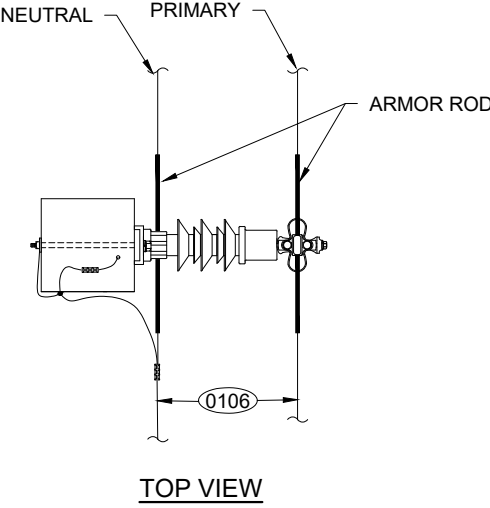
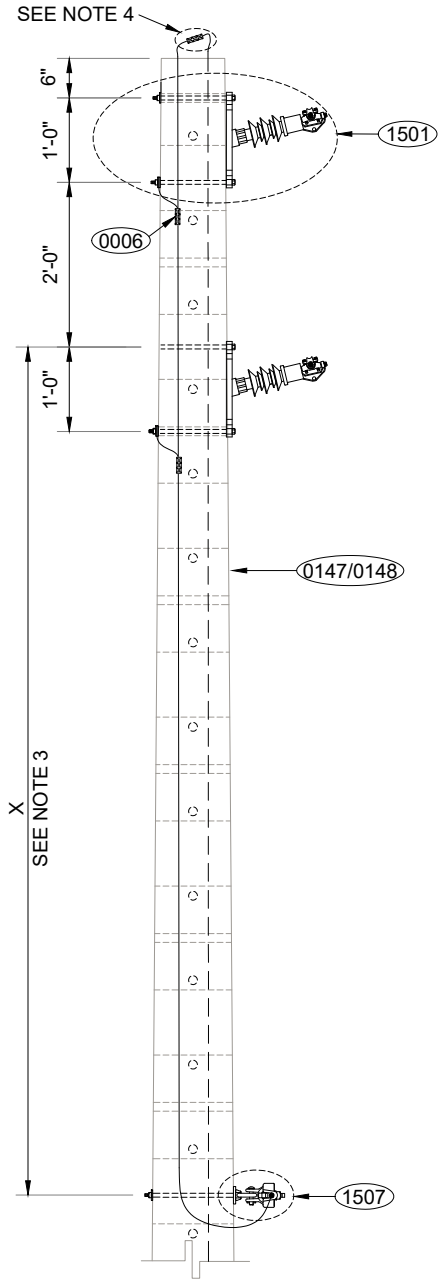
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION**  
**0°- 5° ANGLE TANGENT**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-B1	VERSION	6
DOCUMENT NO.	4301.015		
PAGE	1 OF 2	DATE	FEB 14, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW**  
**VIEW B ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>TWO PHASE PRIMARY CONSTRUCTION</b> <b>0°- 5° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B1</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.015</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 14, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	1
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE A 1-FIGURE D	3

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



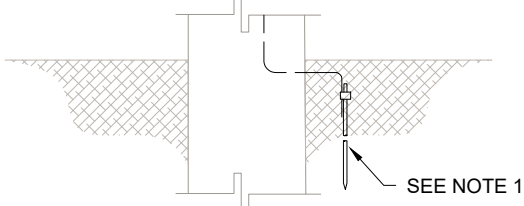
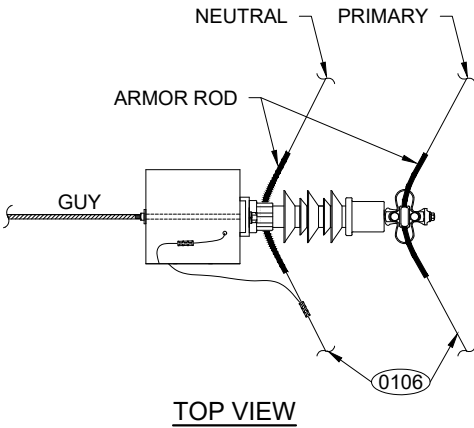
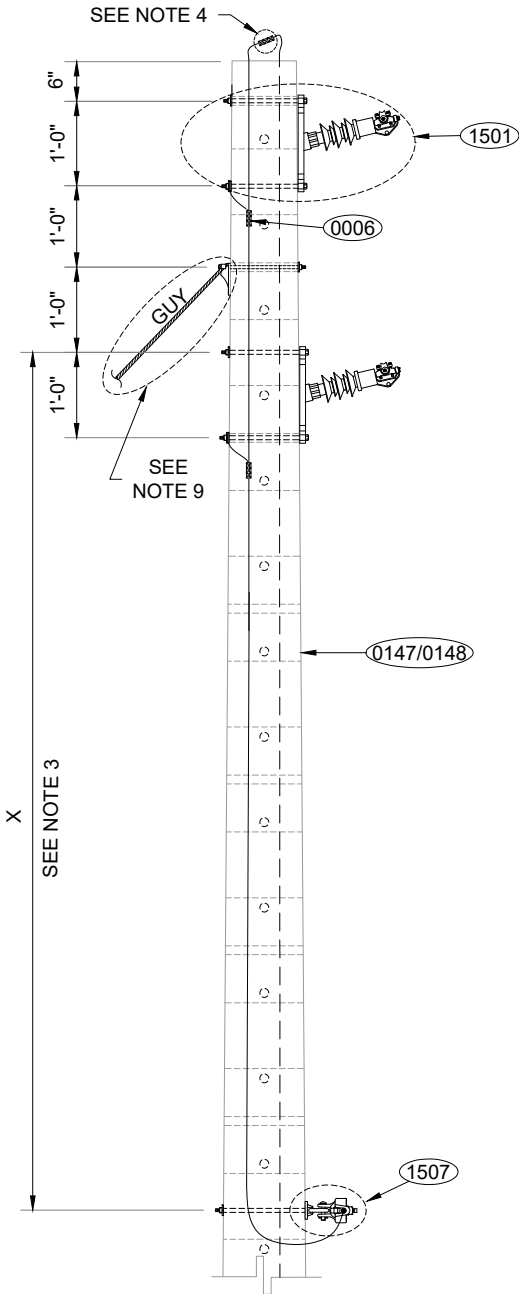
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION**  
**6°- 20° ANGLE TANGENT**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-B2	VERSION	6
DOCUMENT NO.	4301.016		
PAGE	1 OF 2	DATE	FEB 16, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW**  
**VIEW B ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>TWO PHASE PRIMARY CONSTRUCTION</b> <b>6°- 20° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B2</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.016</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 16, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE A, 1-FIGURE D	3
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

TWO PHASE PRIMARY CONSTRUCTION  
21° - 60° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-B3 VERSION 6

DOCUMENT NO. 4301.017

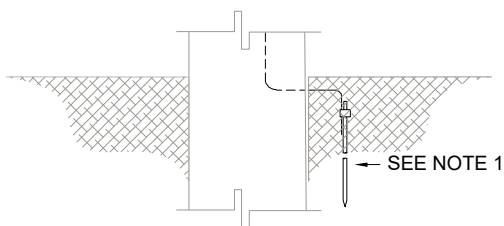
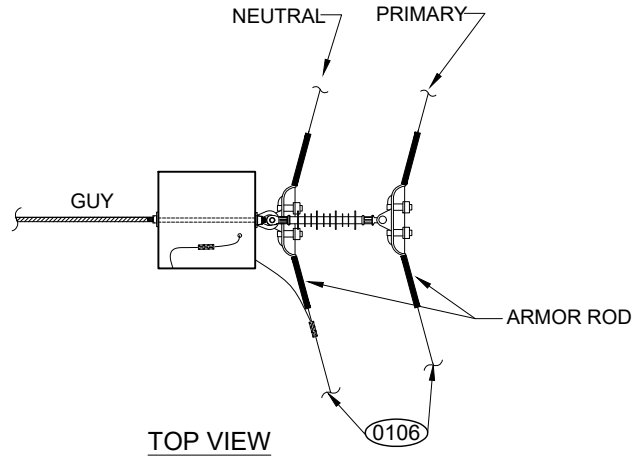
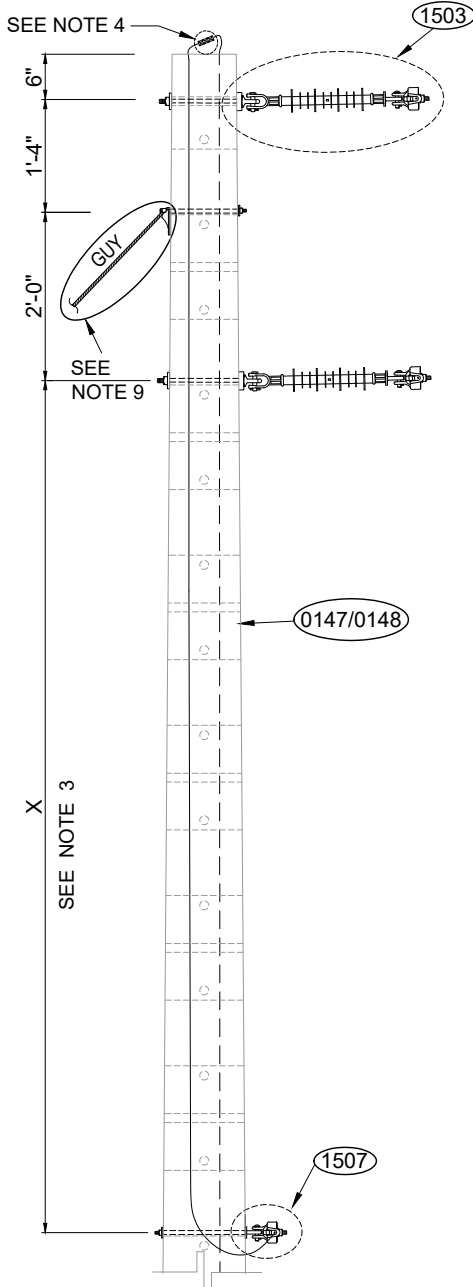
PAGE 1 OF 2 DATE FEB 19, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



ELEVATION VIEW  
VIEW B ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>TWO PHASE PRIMARY CONSTRUCTION</b> <b>21°- 60° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B3</u> VERSION <u>6</u>
		DOCUMENT NO. <u>4301.017</u>
		PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 19, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1503	PRIMARY LINE ANGLE ASSEMBLY	ASSY-1503	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





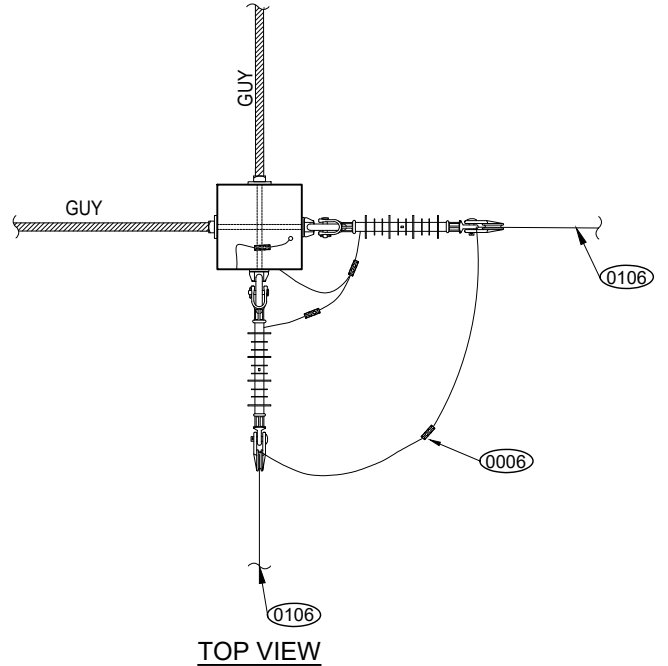
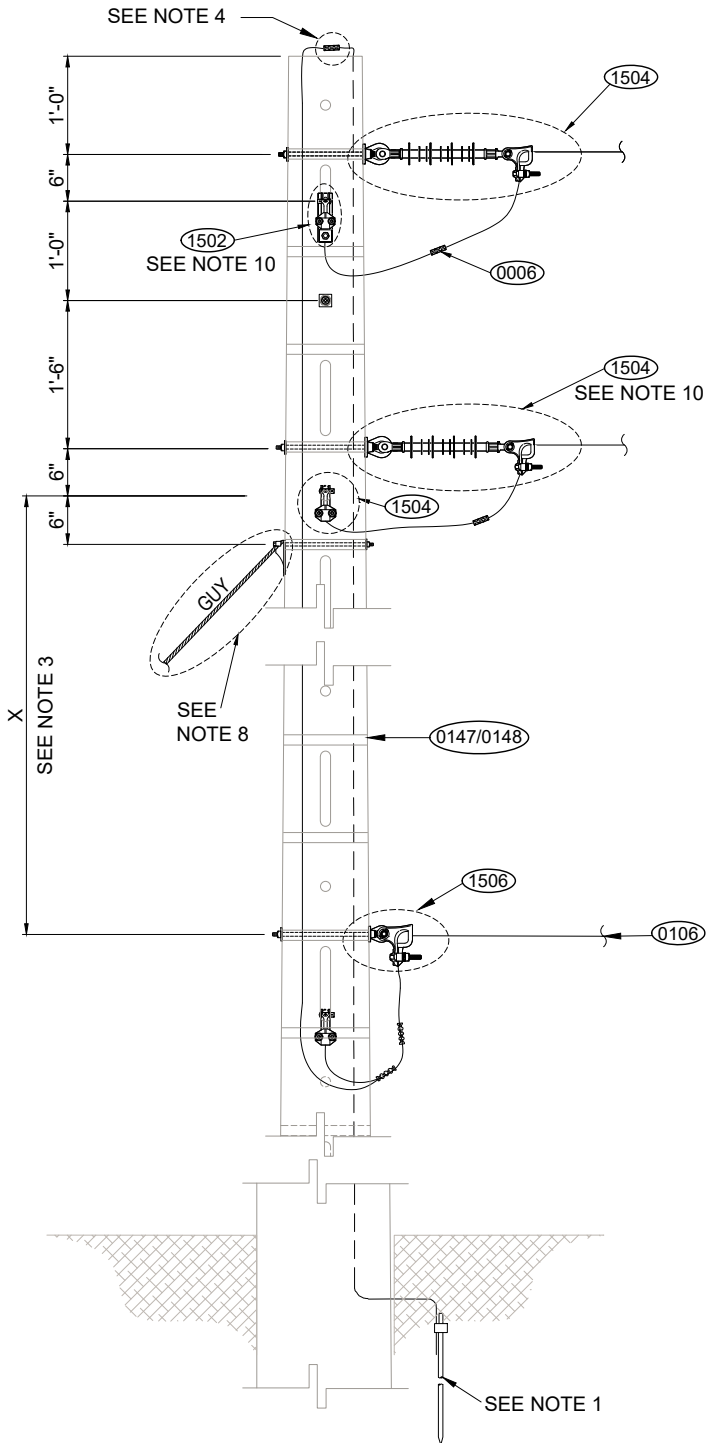
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

TWO PHASE PRIMARY CONSTRUCTION  
61° - 90° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-B4 VERSION 7  
DOCUMENT NO. 4301.018  
PAGE 1 OF 2 DATE FEB 19, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000



ELEVATION VIEW  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>TWO PHASE PRIMARY CONSTRUCTION</b> <b>61°- 90° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B4</u> VERSION <u>7</u>
		DOCUMENT NO. <u>4301.018</u>
		PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 19, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1502	POLE SLOT PRIMARY LINE DEADEND ASSEMBLY	ASSY-1502 FIGURE A	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
8. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
9. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
10. FOR ROUND POLES, USE ASSEMBLY NO. ASSY-1504 INSTEAD OF ASSEMBLY NO. ASSY-1502.
11. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
12. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
VERTICAL SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-B5 VERSION 6

DOCUMENT NO. 4301.019

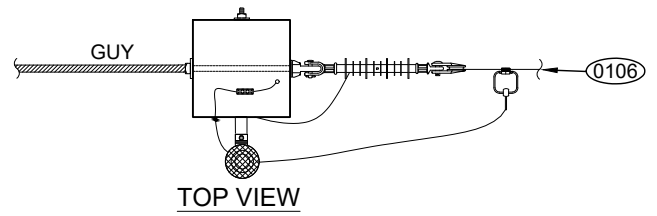
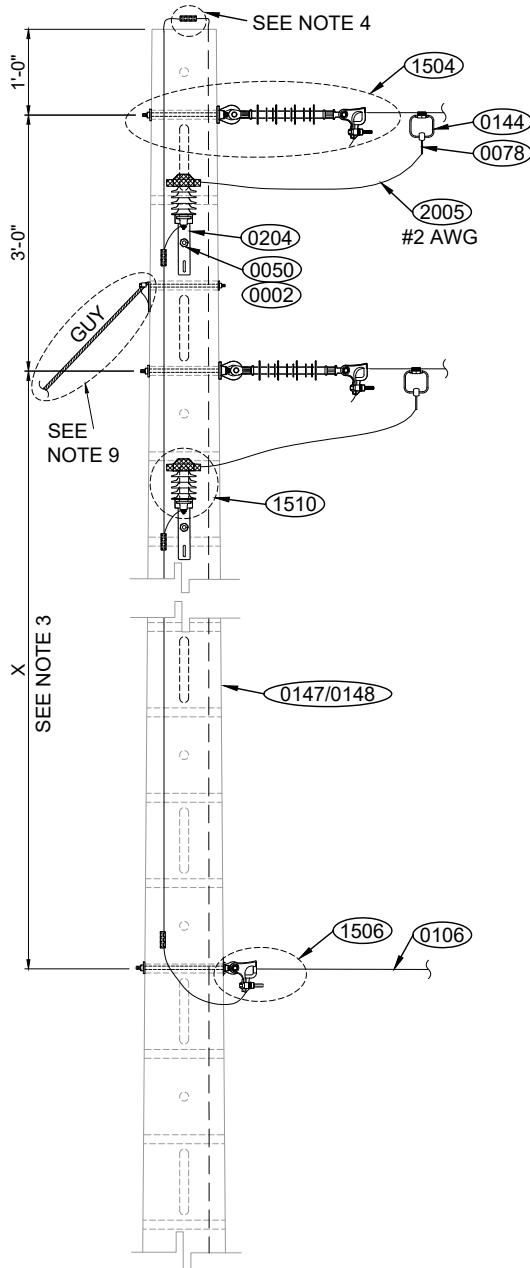
PAGE 1 OF 2 DATE FEB 20, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW  
VIEW A ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>TWO PHASE PRIMARY CONSTRUCTION          VERTICAL SINGLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B5</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.019</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 20, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	2
1502	POLE SLOT PRIMARY LINE DEADEND ASSEMBLY	ASSY-1502 FIGURE A	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	4
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	2
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
2005	STRANDED COPPER CABLE, 600 V, XHHN-2	006-00833	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



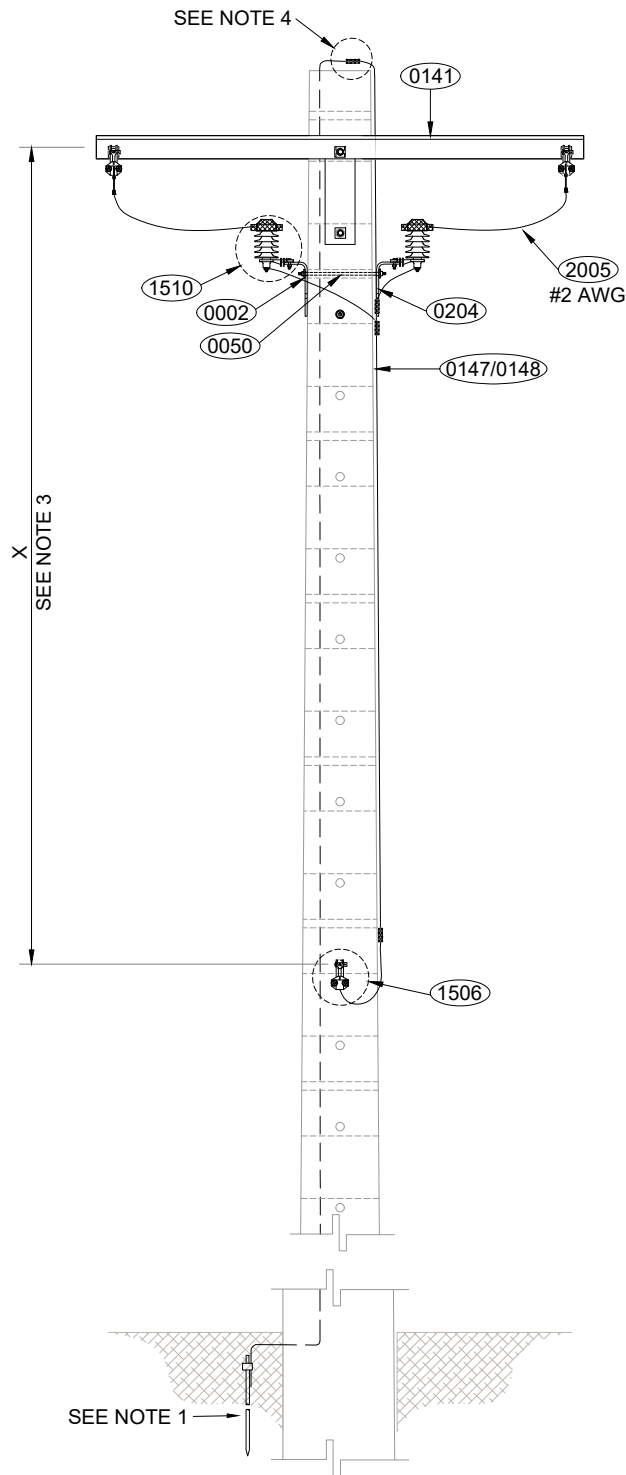
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

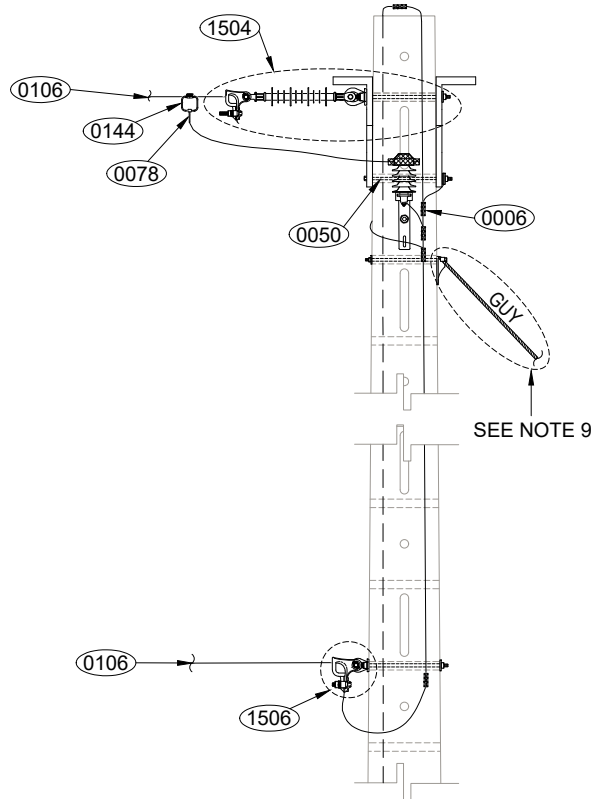
TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
CROSSARM SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV**

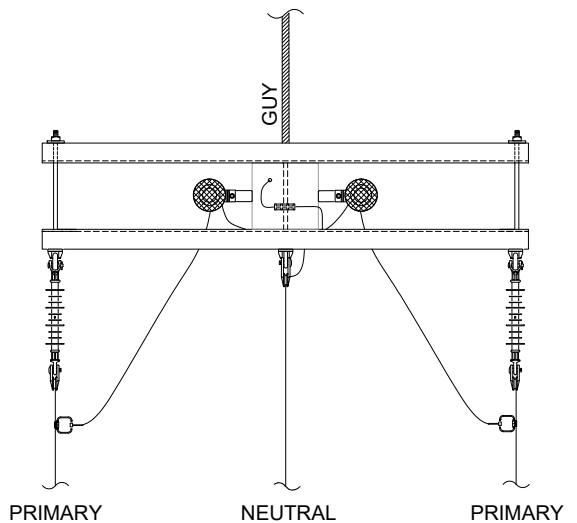
STANDARD NO. CP-B5-XARM VERSION 5  
DOCUMENT NO. 4301.020  
PAGE 1 OF 2 DATE FEB 21, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



**ELEVATION VIEW  
VIEW B ASSY-1500**



**PROFILE VIEW**



**TOP VIEW**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;"><b>TWO PHASE PRIMARY CONSTRUCTION CROSSARM SINGLE DEADEND MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b></p>	STANDARD NO. <u>CP-B5-XARM</u> VERSION <u>5</u> DOCUMENT NO. <u>4301.020</u> PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 21, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	3
0078	HOT LINE CLAMP	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
VERTICAL DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-B6 VERSION 8

DOCUMENT NO. 4301.021

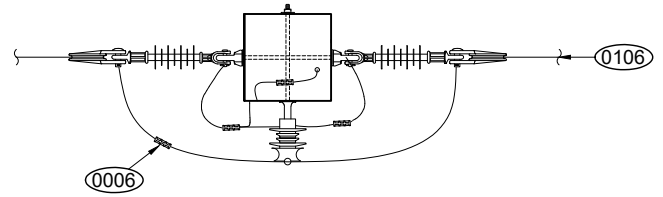
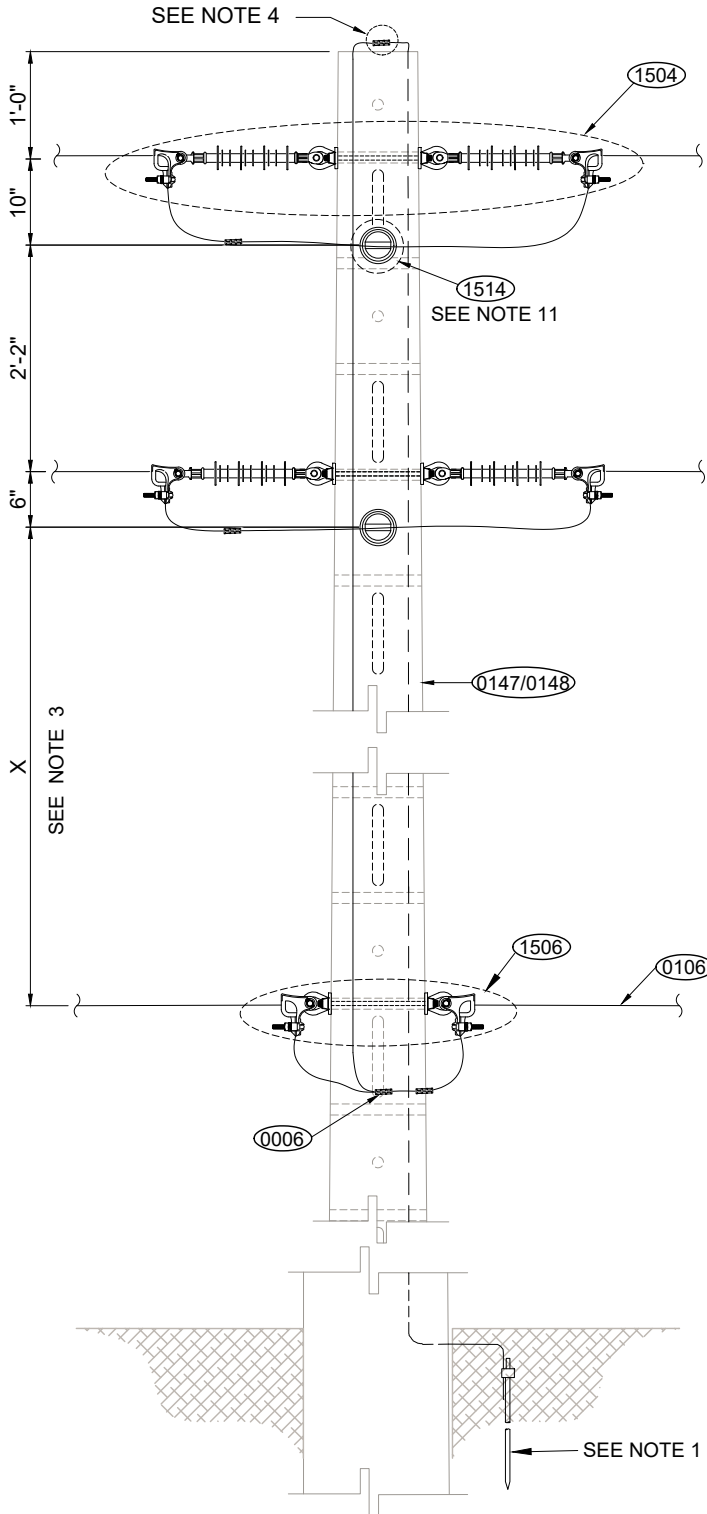
PAGE 1 OF 2 DATE FEB 22, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

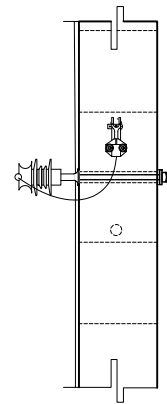
REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



TOP VIEW



PROFILE VIEW

ELEVATION VIEW  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>TWO PHASE PRIMARY CONSTRUCTION          VERTICAL DOUBLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B6</u> VERSION <u>8</u>
		DOCUMENT NO. <u>4301.021</u>
		PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 22, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
8. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
9. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
10. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
11. IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.





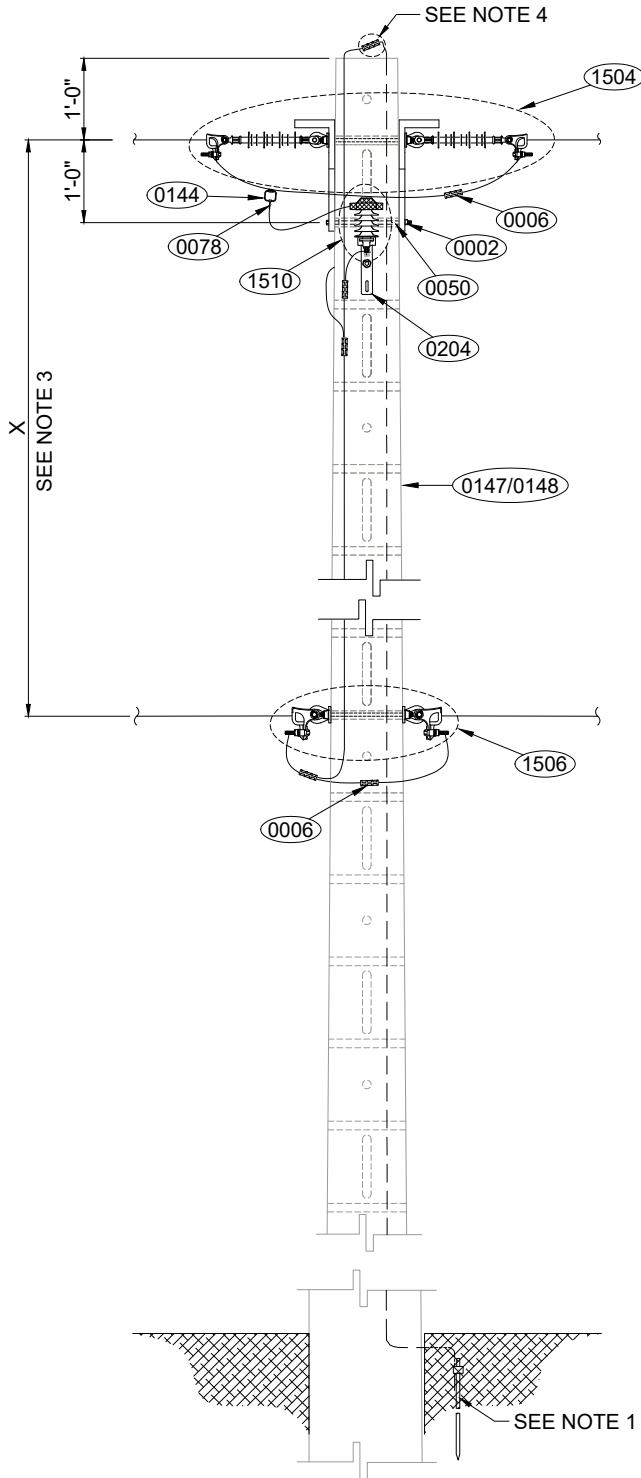
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

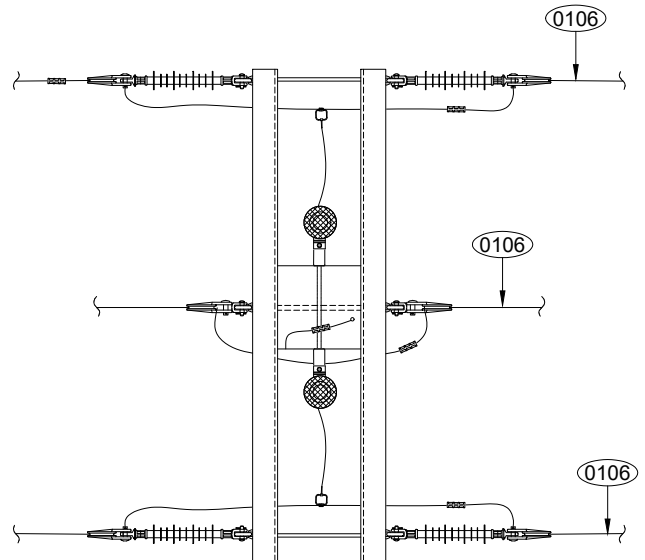
TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
CROSSARM DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV**

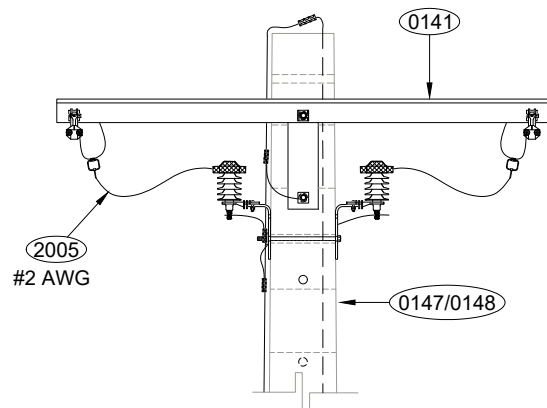
STANDARD NO.	CP-B6-XARM	VERSION	5
DOCUMENT NO.	4301.115		
PAGE	1 OF 2	DATE	FEB 23, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		
	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW  
VIEW A ASSY-1500**



**TOP VIEW**



**PROFILE VIEW**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>TWO PHASE PRIMARY CONSTRUCTION          CROSSARM DOUBLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B6-XARM</u> VERSION <u>5</u>
	DOCUMENT NO. <u>4301.115</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	3
0078	HOT LINE CLAMP	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>TWO PHASE PRIMARY CONSTRUCTION</b> <b>TANGENT TAP-OFF</b> <b>MAXIMUM RATING: 200 A</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES</b>	STANDARD NO. <u>CP-B7</u> VERSION <u>7</u>
	DOCUMENT NO. <u>4301.022</u>
	PAGE <u>2 OF 3</u> DATE <u>FEB 26, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 AND ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
12. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>TWO PHASE PRIMARY CONSTRUCTION TANGENT TAP-OFF MAXIMUM RATING: 200 A MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B7</u> VERSION <u>7</u>
		DOCUMENT NO. <u>4301.022</u>
		PAGE <u>3 OF 3</u> DATE <u>FEB 26, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>		
		<u>VICTOR R. FEBRES LIC. 3412</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE B	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	2
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE B	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	2
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	4
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.



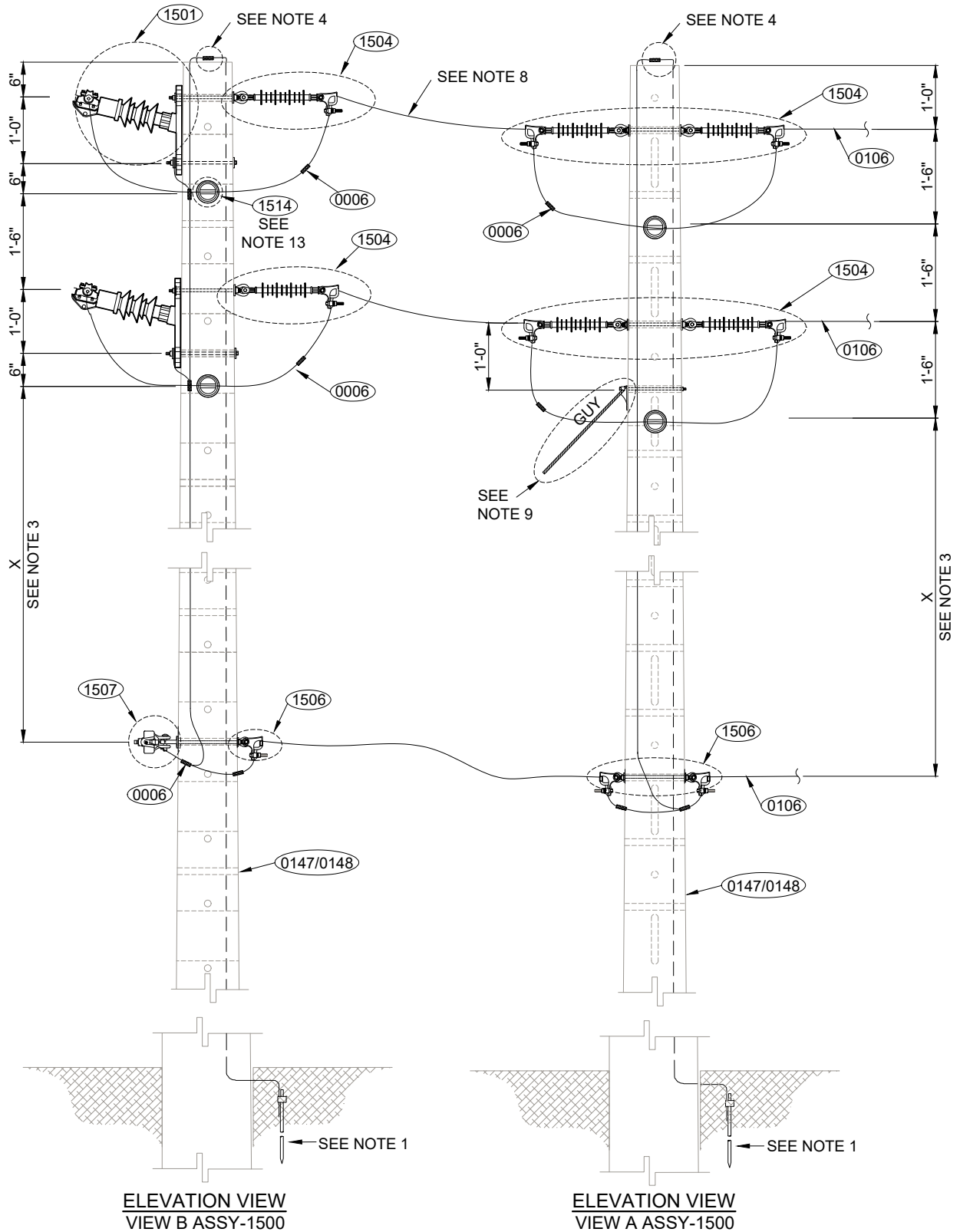
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
VERTICAL TANGENT REDUCED TENSION SPAN TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-B7-1	VERSION	7
DOCUMENT NO.	4301.023		
PAGE	1 OF 2	DATE	FEB 22, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**

**TWO PHASE PRIMARY CONSTRUCTION  
VERTICAL TANGENT REDUCED TENSION SPAN TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL**

STANDARD NO. CP-B7-1 VERSION 7  
 DOCUMENT NO. 4301.023  
 PAGE 2 OF 2 DATE FEB 22, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	2
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 2-FIGURE A, 2-FIGURE B	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 1-FIGURE A, 1-FIGURE B	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	2
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE A, 2-FIGURE D	4
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	4
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 AND ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. THE MAXIMUM REDUCED TENSION SPAN SHALL BE 75'-0".
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
11. IF THE INSTALLATION OF FUSE CUTOUPS (ITEM 0085) IS NECESSARY, REFER TO STANDARD NO. CP-B12-VERT.
12. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
13. IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.



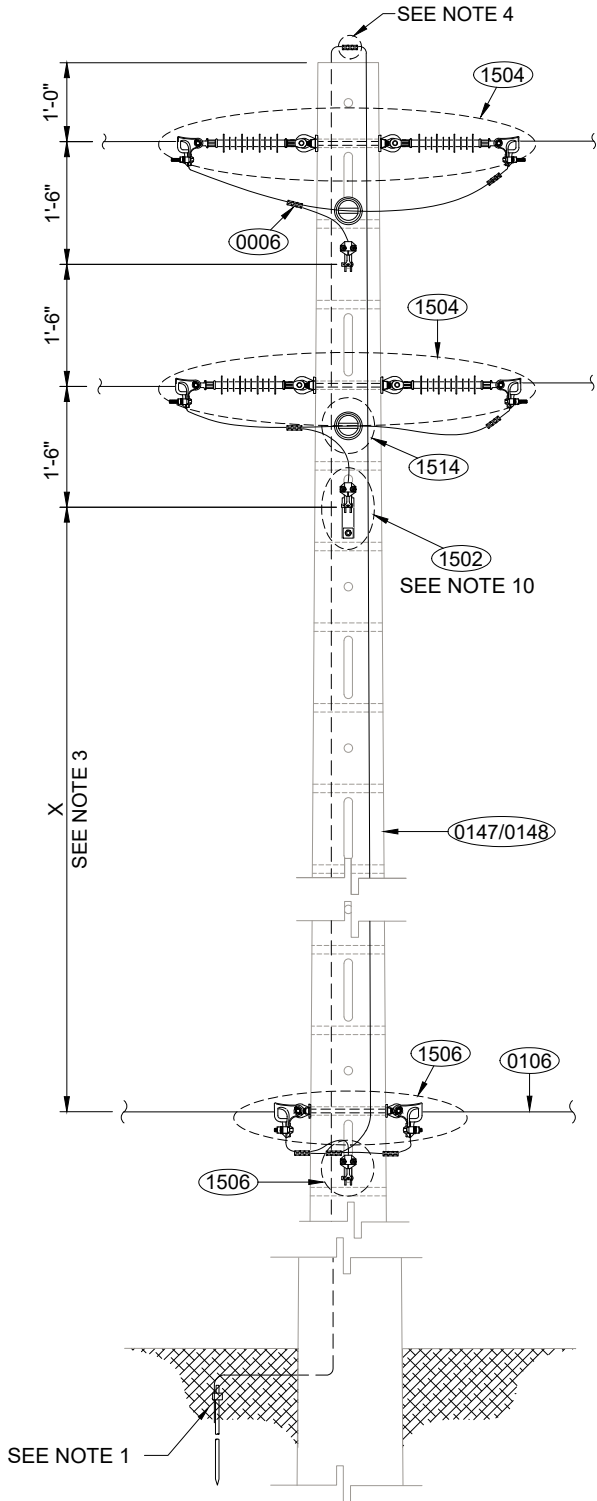
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

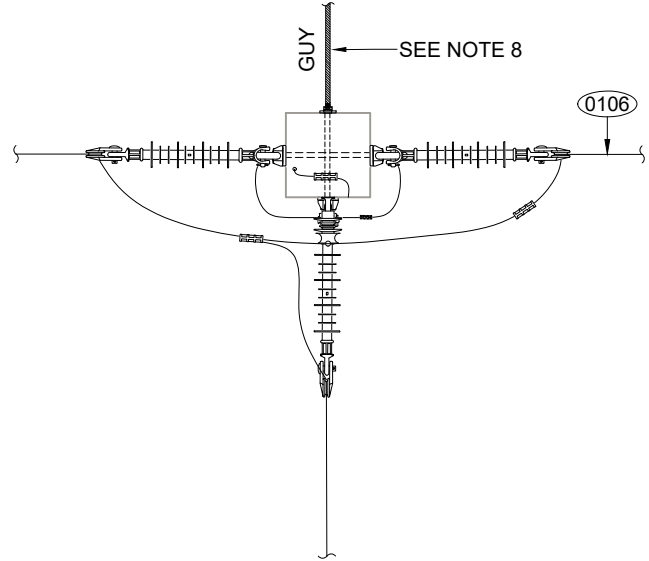
TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
VERTICAL DOUBLE DEADEND TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-B7-VERT VERSION 3  
DOCUMENT NO. 4301.143  
PAGE 1 OF 2 DATE FEB 16, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412



**ELEVATION VIEW  
VIEW A ASSY-1500**



**TOP VIEW**





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>TWO PHASE PRIMARY CONSTRUCTION          VERTICAL DOUBLE DEADEND TAP-OFF          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B7-VERT</u> VERSION <u>3</u>
	DOCUMENT NO. <u>4301.143</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 16, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1502	POLE SLOT PRIMARY LINE DEADEND ASSEMBLY	ASSY-1502 FIGURE A	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 2-FIGURE A, 2-FIGURE B	4
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 1-FIGURE A, 1-FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- IF IT IS NECESSARY TO INSTALL FUSE CUTOUTS (ITEM 0085), USE STANDARD NO. CP-B12-VERT AT THE TAP-OFF ON THE NEXT DEADEND POLE.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- FOR ROUND POLES, USE ASSEMBLY NO. ASSY-1504 INSTEAD OF ASSEMBLY NO. ASSY-1502.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
VERTICAL SINGLE DEADEND TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-B12-VERT VERSION 2

DOCUMENT NO. 4301.146

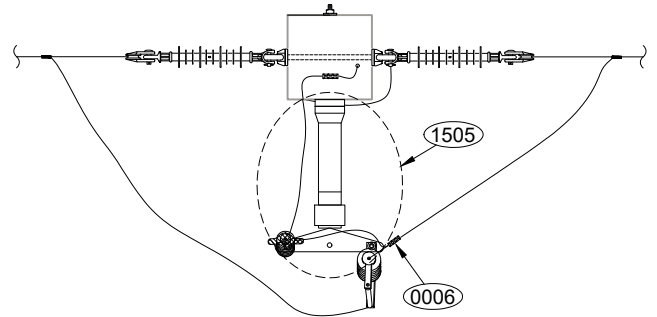
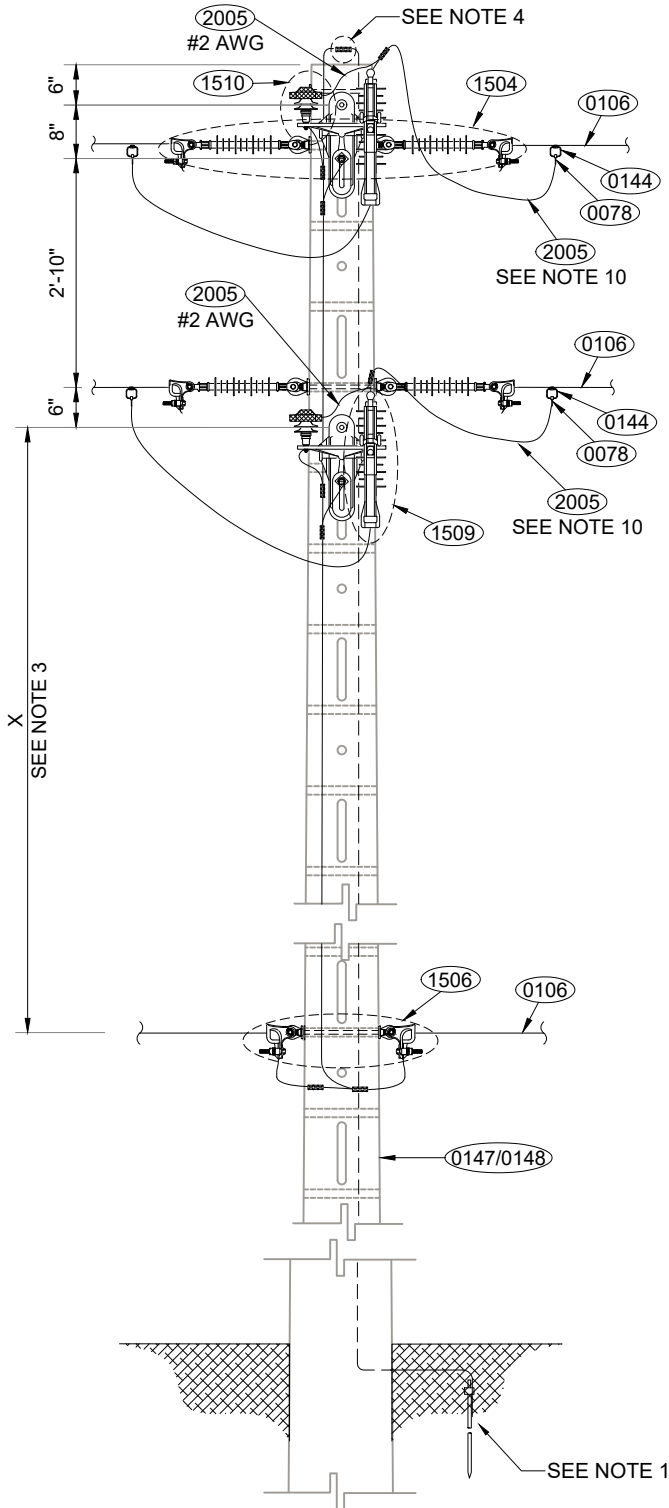
PAGE 1 OF 2 DATE FEB 21, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



TOP VIEW

ELEVATION VIEW  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p style="text-align: center;"> <b>TWO PHASE PRIMARY CONSTRUCTION</b>  <b>VERTICAL SINGLE DEADEND TAP-OFF</b>  <b>MAXIMUM RATING: 200 A</b>  <b>MAXIMUM VOLTAGE: 13.2 KV</b>  <b>NOTES AND BILL OF MATERIAL</b> </p>	STANDARD NO. <u>CP-B12-VERT</u> VERSION <u>2</u>
		DOCUMENT NO. <u>4301.146</u>
		PAGE <u>2 OF 2</u> DATE <u>FEB 21, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>		
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>		

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	4
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	4
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	2
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	2
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 2-FIGURE F	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
CROSSARM SINGLE DEADEND TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-B12-XARM VERSION 2

DOCUMENT NO. 4301.147

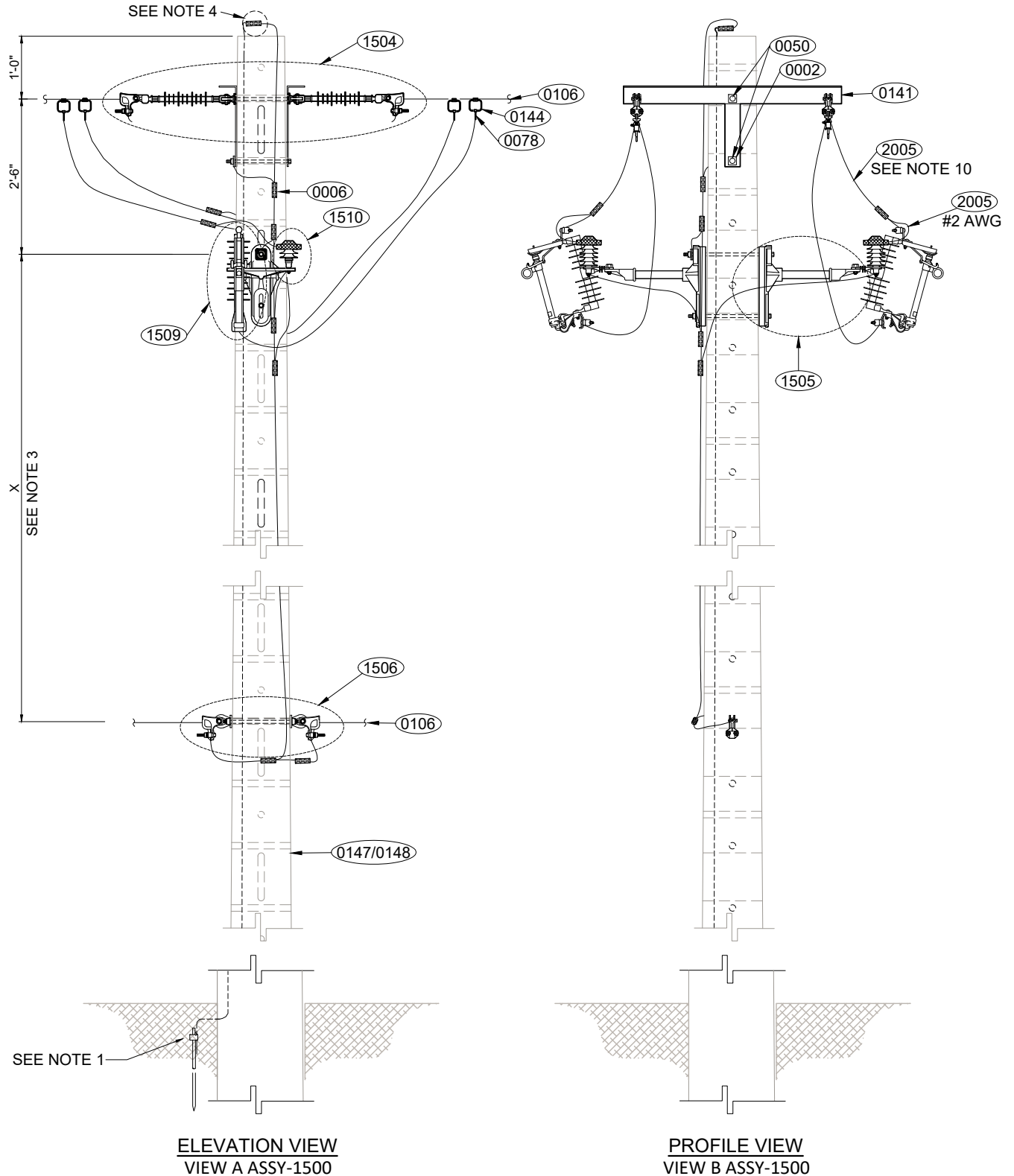
PAGE 1 OF 2 DATE FEB 22, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>	<b>TWO PHASE PRIMARY CONSTRUCTION          CROSSARM SINGLE DEADEND TAP-OFF          MAXIMUM RATING: 200 A          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B12-XARM</u> VERSION <u>2</u> DOCUMENT NO. <u>4301.147</u> PAGE <u>2 OF 2</u> DATE <u>FEB 22, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	4
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	4
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	2
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE B	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	2
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
2005	STRANDED COPPER CABLE, 600 V XHHW-2	VARIES	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
TANGENT LINE JUNCTION  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-B13 VERSION 4

DOCUMENT NO. 4301.024

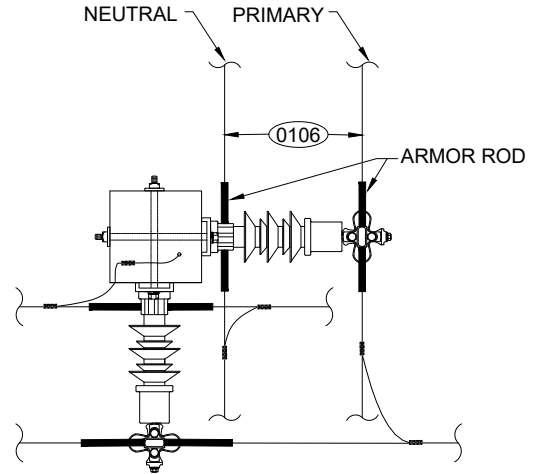
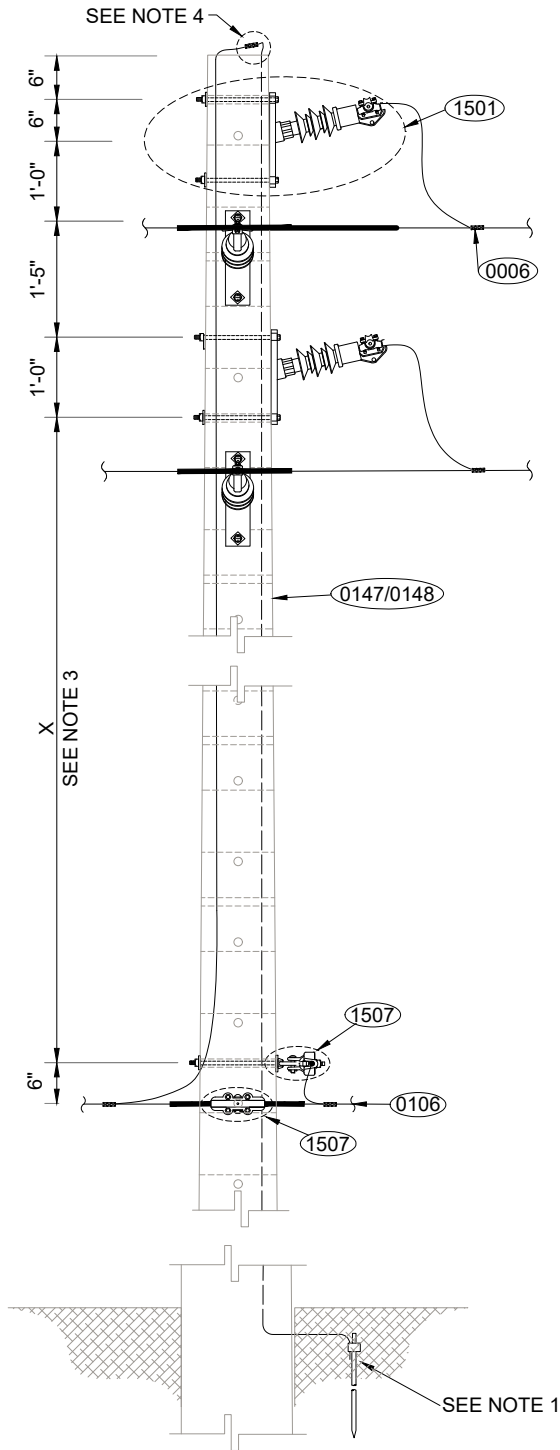
PAGE 1 OF 2 DATE FEB 19, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



TOP VIEW

ELEVATION VIEW  
VIEW B ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE: TWO PHASE PRIMARY CONSTRUCTION  
 TANGENT LINE JUNCTION  
 MAXIMUM VOLTAGE: 13.2 KV  
 NOTES AND BILL OF MATERIAL

STANDARD NO. CP-B13 VERSION 4  
 DOCUMENT NO. 4301.024  
 PAGE 2 OF 2 DATE FEB 19, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	4
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 4-FIGURE A, 1- FIGURE D	5

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



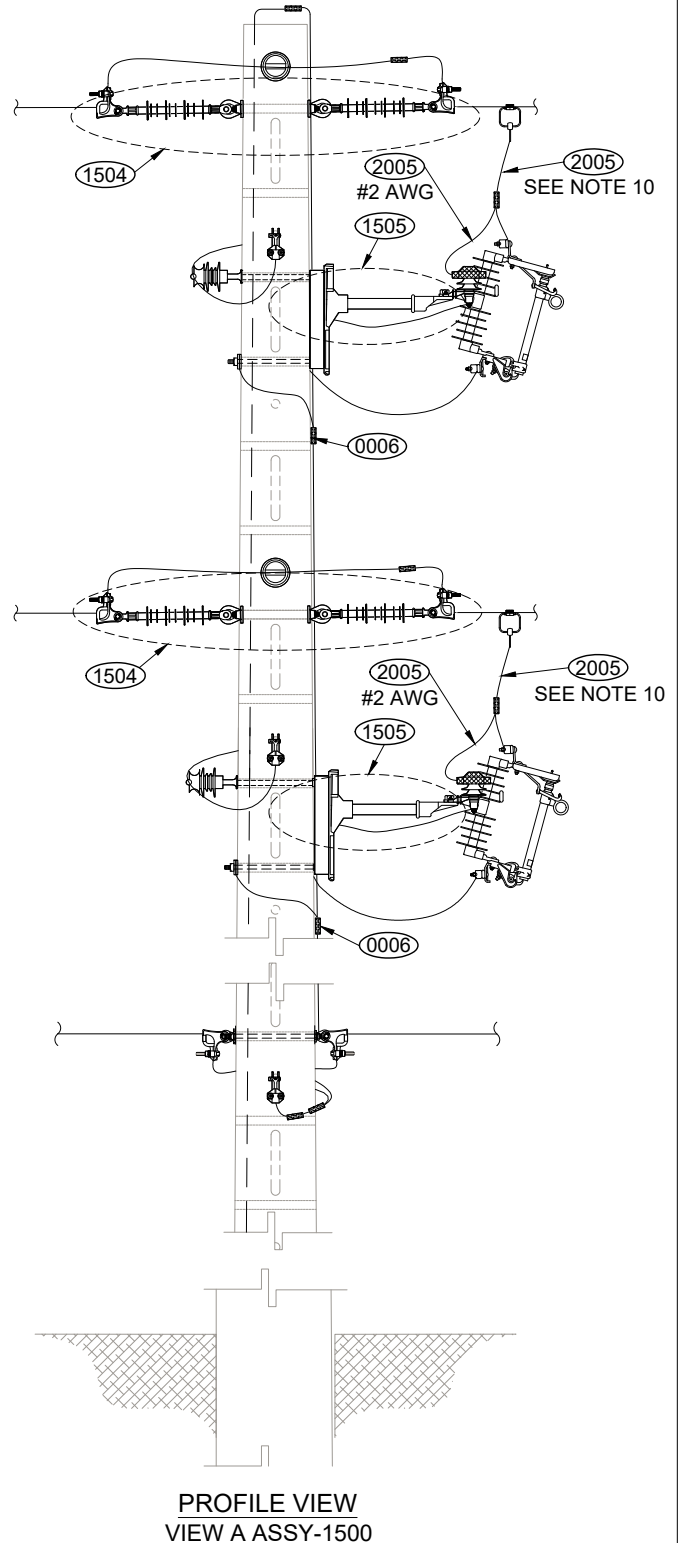
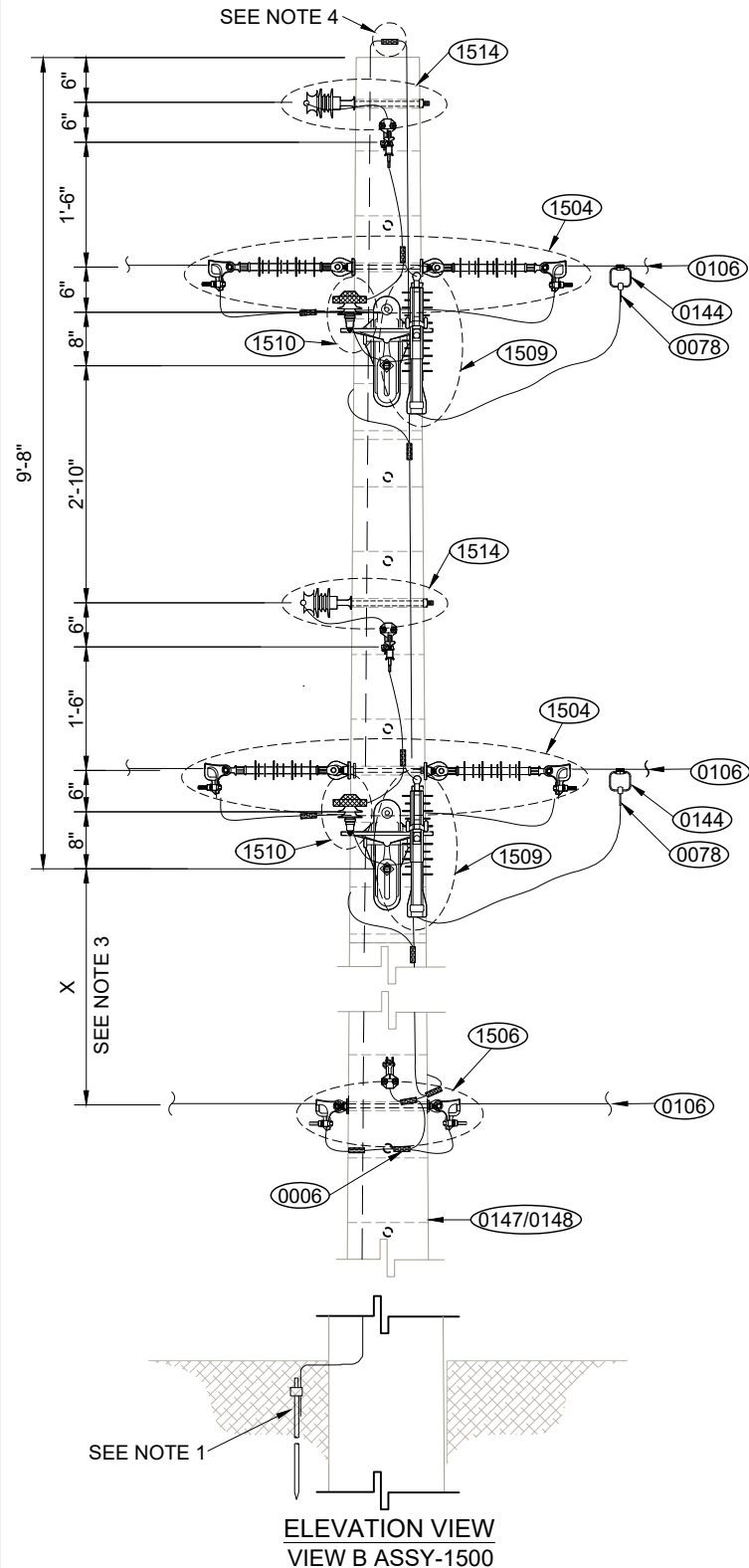
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
DEADEND LINE JUNCTION  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-B14	VERSION	6
DOCUMENT NO.	4301.041		
PAGE	1 OF 2	DATE	FEB 22, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>TWO PHASE PRIMARY CONSTRUCTION</b> <b>DEADEND LINE JUNCTION</b> <b>MAXIMUM RATING: 200 A</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-B14</u> VERSION <u>6</u> DOCUMENT NO. <u>4301.041</u> PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 22, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	4
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	4
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	4
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	2
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	2
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	2
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 2-FIGURE F	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	4
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



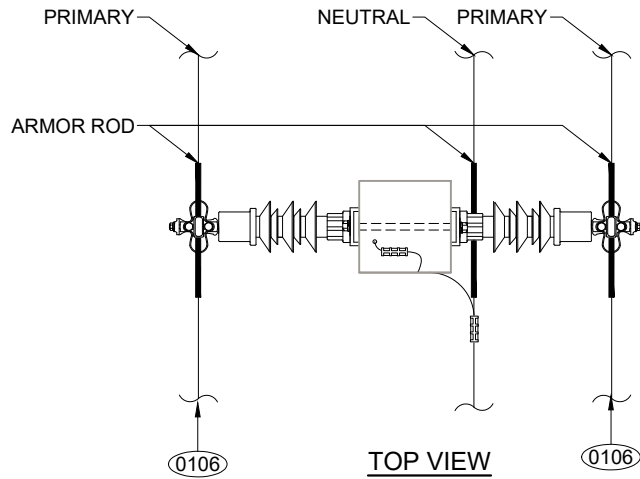
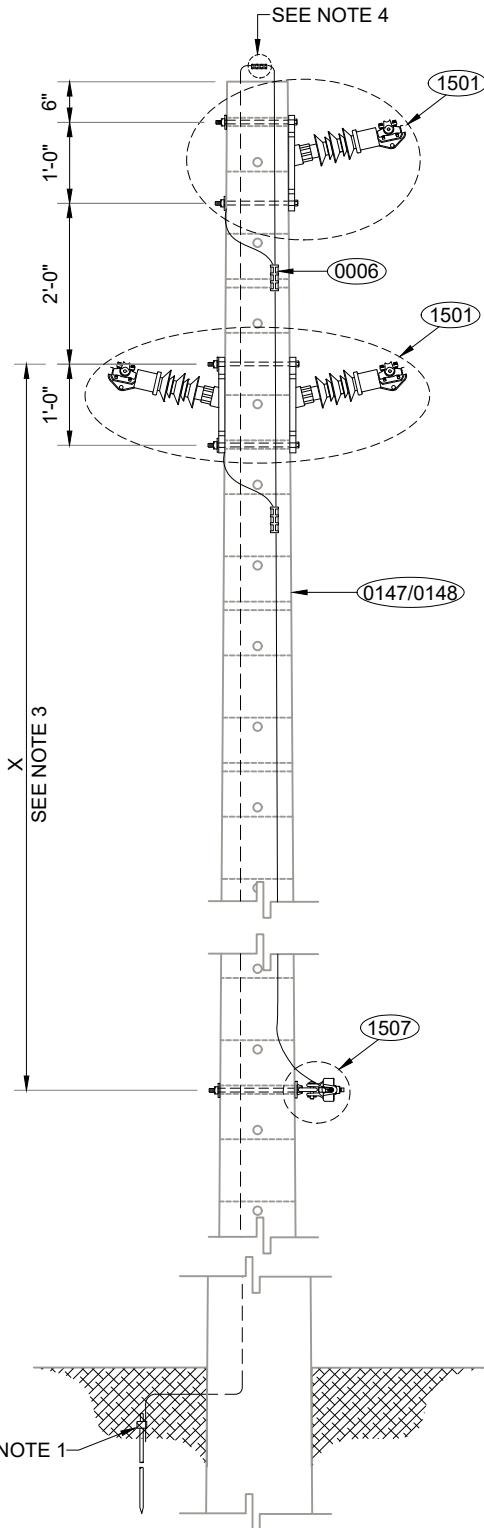
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
0° - 5° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C1 VERSION 6  
DOCUMENT NO. 4301.025  
PAGE 1 OF 2 DATE FEB 23, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412



**ELEVATION VIEW**  
**VIEW B ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;">THREE PHASE PRIMARY CONSTRUCTION  0° - 5° ANGLE TANGENT  MAXIMUM VOLTAGE: 13.2 KV  NOTES AND BILL OF MATERIAL</p>	STANDARD NO. <u>CP-C1</u> VERSION <u>6</u> DOCUMENT NO. <u>4301.025</u> PAGE <u>2 OF 2</u> DATE <u>FEB 23, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 1-FIGURE A, 1-FIGURE B	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE A, 1-FIGURE D	3

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
10. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
11. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL 0° - 5° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C1-VERT, VERSION 6

DOCUMENT NO. 4301.026

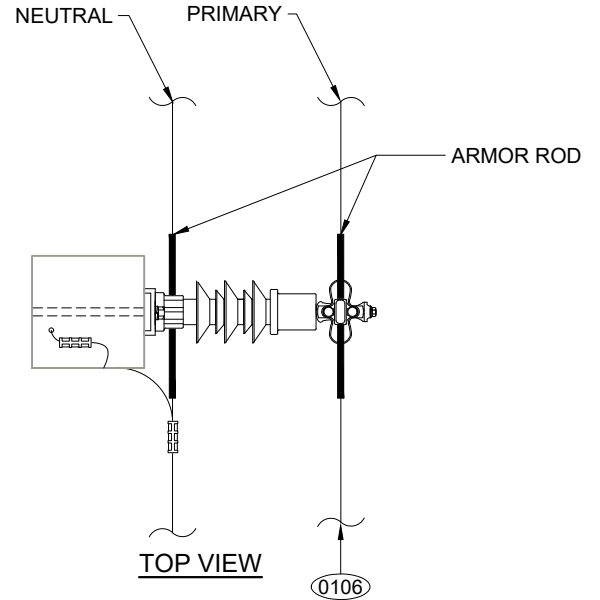
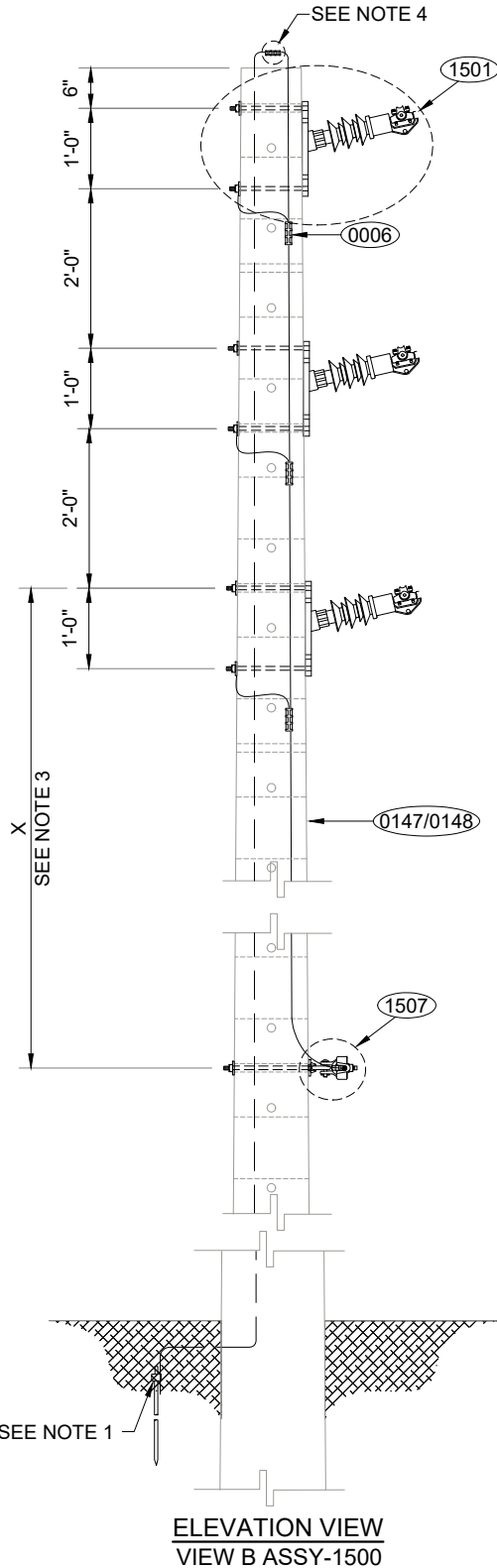
PAGE 1 OF 2 DATE FEB 15, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION</b> <b>VERTICAL 0° - 5° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. CP-C1-VERT VERSION <u>6</u>
	DOCUMENT NO. <u>4301.026</u>
	PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 15, 2024</u>
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	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR AAAC	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	3
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE A, 1-FIGURE D	4

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION</b> <b>DOUBLE CIRCUIT VERTICAL 0° - 5° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C1-VERT-1</u> VERSION <u>2</u>
	DOCUMENT NO. <u>4301.148</u>
	PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 19, 2024</u>
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	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE B	3
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE A, 2-FIGURE D	5

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



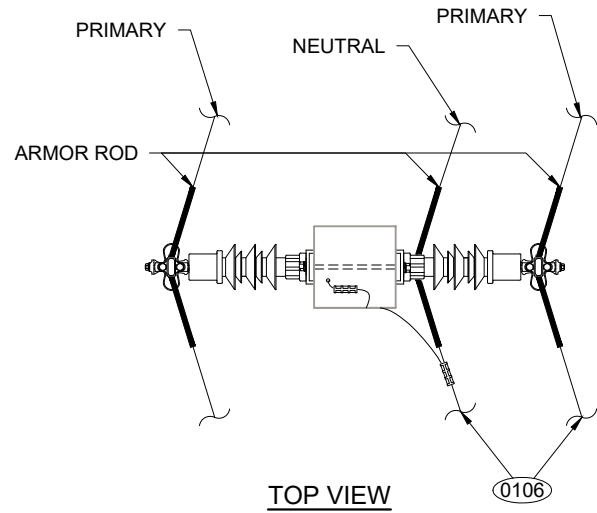
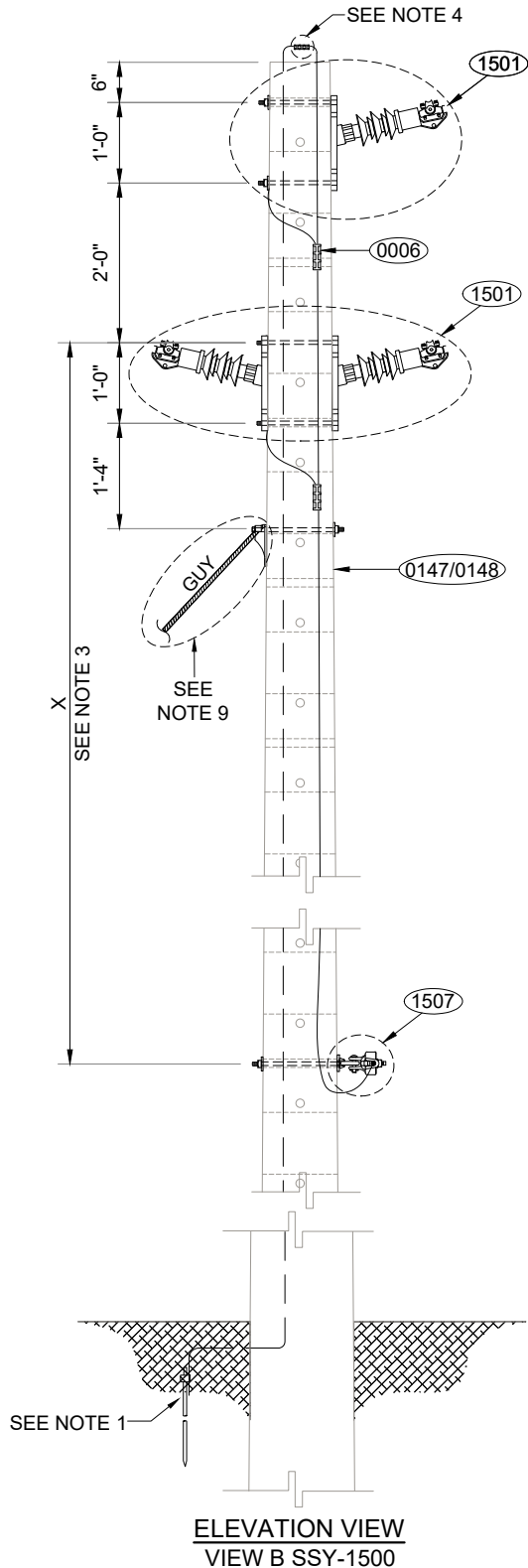
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
6° - 20° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C2 VERSION 6  
DOCUMENT NO. 4301.027  
PAGE 1 OF 2 DATE FEB 23, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION</b> <b>6° - 20° ANGLE TANGENT</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C2</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.027</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	
	<u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 1-FIGURE A, 1-FIGURE B	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE A, 1-FIGURE D	3
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



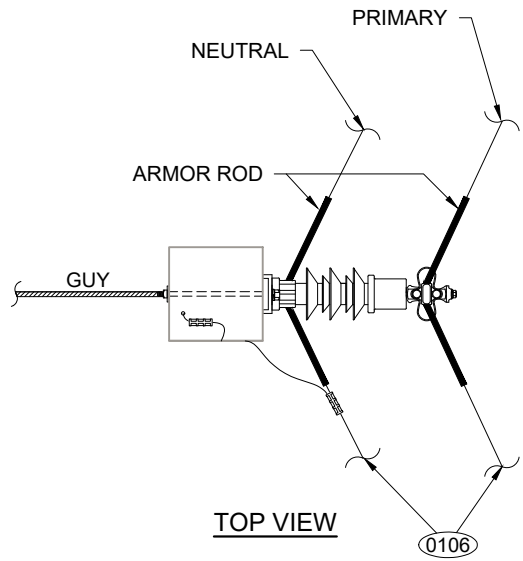
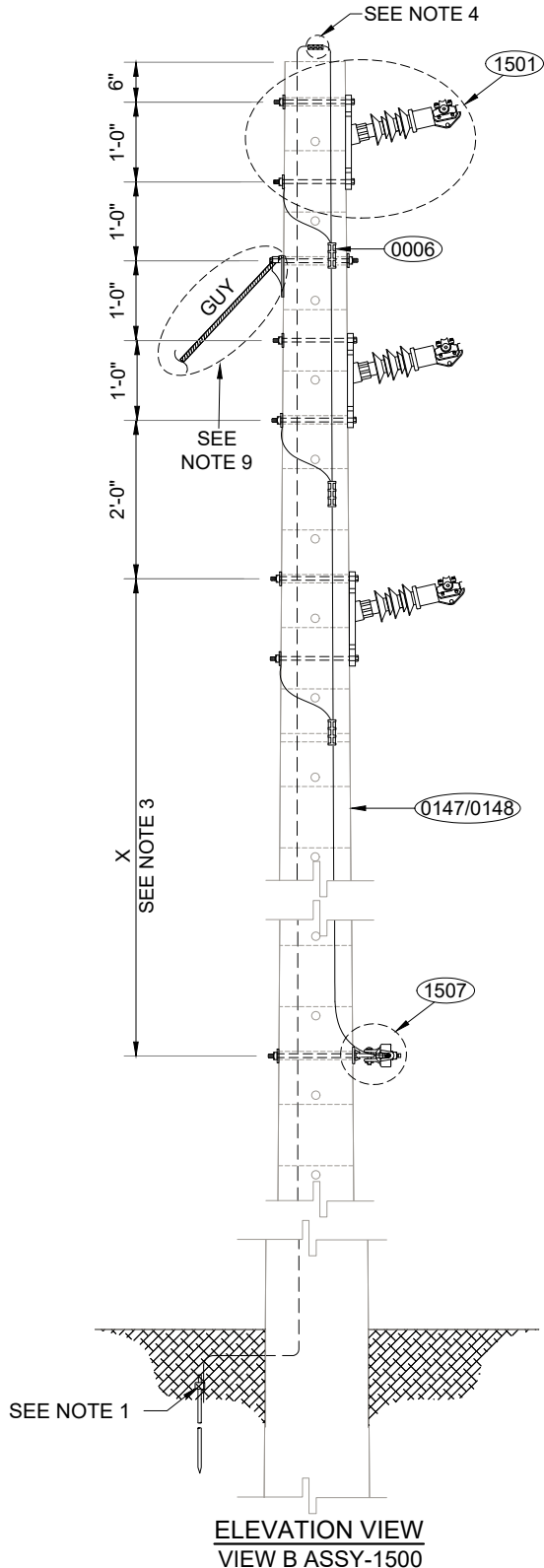
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL 6°- 20° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	CP-C2-VERT	VERSION	4
DOCUMENT NO.	4301.028		
PAGE	1 OF 2	DATE	FEB 15, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
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APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		
	EMILIO CUADRADO LIC. 3000		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL 6°- 20° ANGLE TANGENT          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C2-VERT</u> VERSION <u>4</u>
	DOCUMENT NO. <u>4301.028</u>
	PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 15, 2024</u>
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	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	3
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE A, 1-FIGURE D	4
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



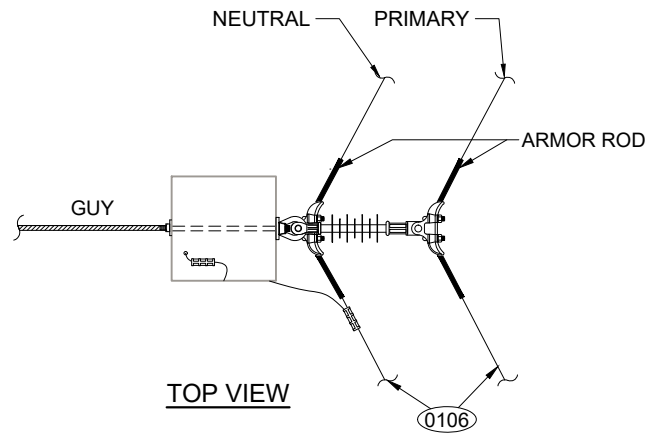
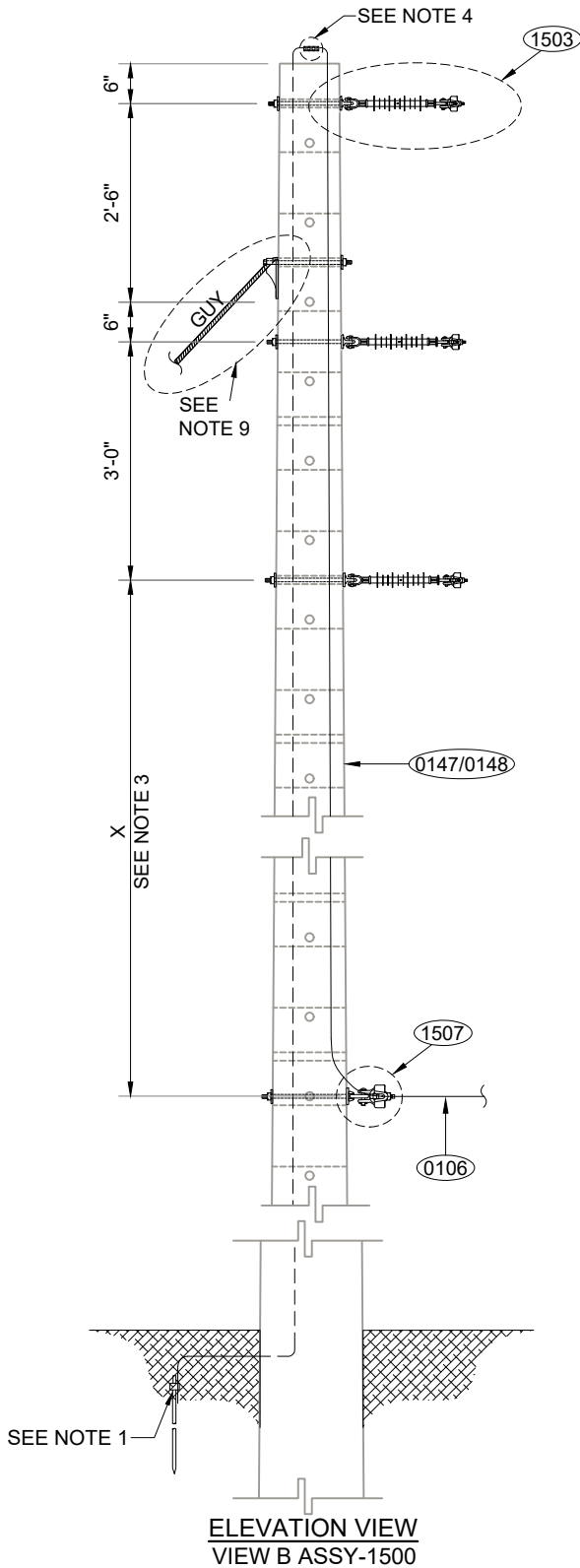
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL 21°- 60° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C3-VERT VERSION 6  
DOCUMENT NO. 4301.029  
PAGE 1 OF 2 DATE FEB 16, 2024  
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EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL 21°- 60° ANGLE TANGENT          MAXIMUM VOLTAGE: 13.2 KV          NOTE AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C3-VERT</u> VERSION <u>6</u> DOCUMENT NO. <u>4301.029</u> PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 16, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1503	PRIMARY LINE ANGLE ASSEMBLY	ASSY-1503	3
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



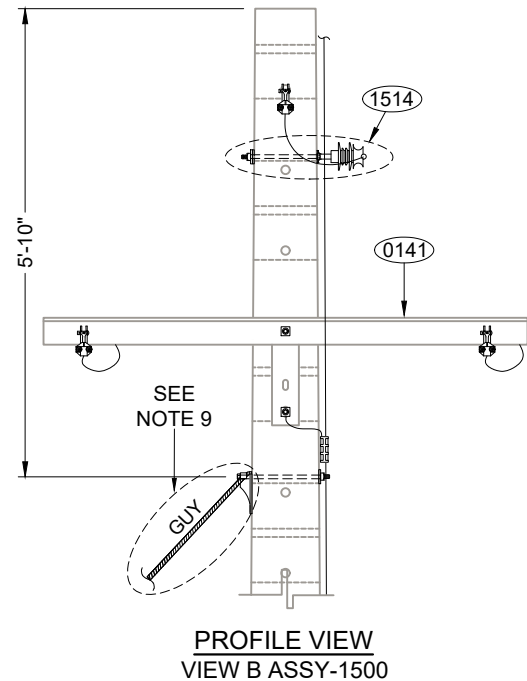
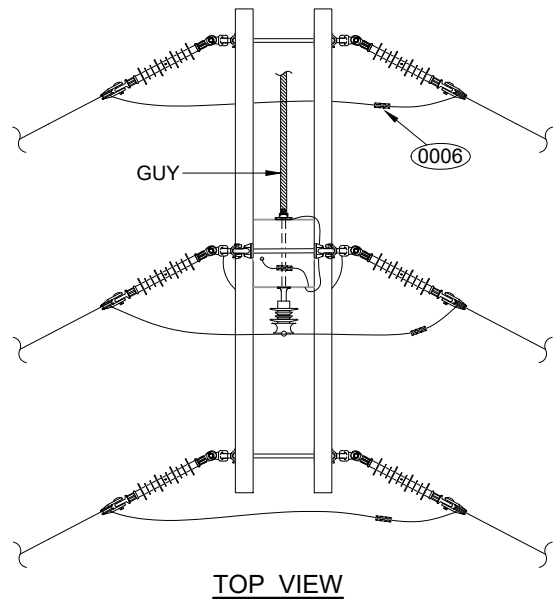
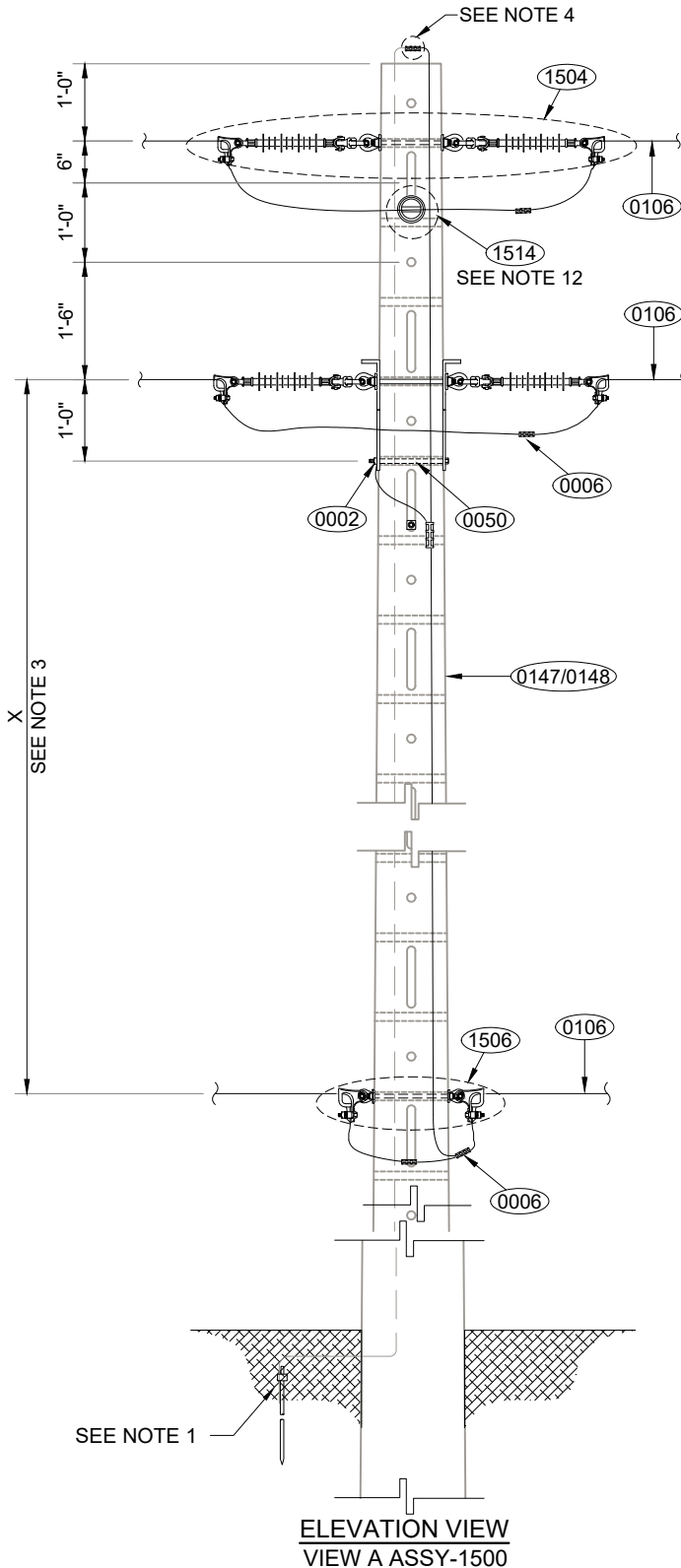
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
CROSSARM 6° - 60° ANGLE DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	CP-C3-XARM	VERSION	4
DOCUMENT NO.	4301.039		
PAGE	1 OF 2	DATE	FEB 23, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		
	EMILIO CUADRADO LIC. 3000		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION          CROSSARM 6° - 60° ANGLE DOUBLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C3-XARM</u> VERSION <u>4</u>
	DOCUMENT NO. <u>4301.039</u>
	PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	
	<u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



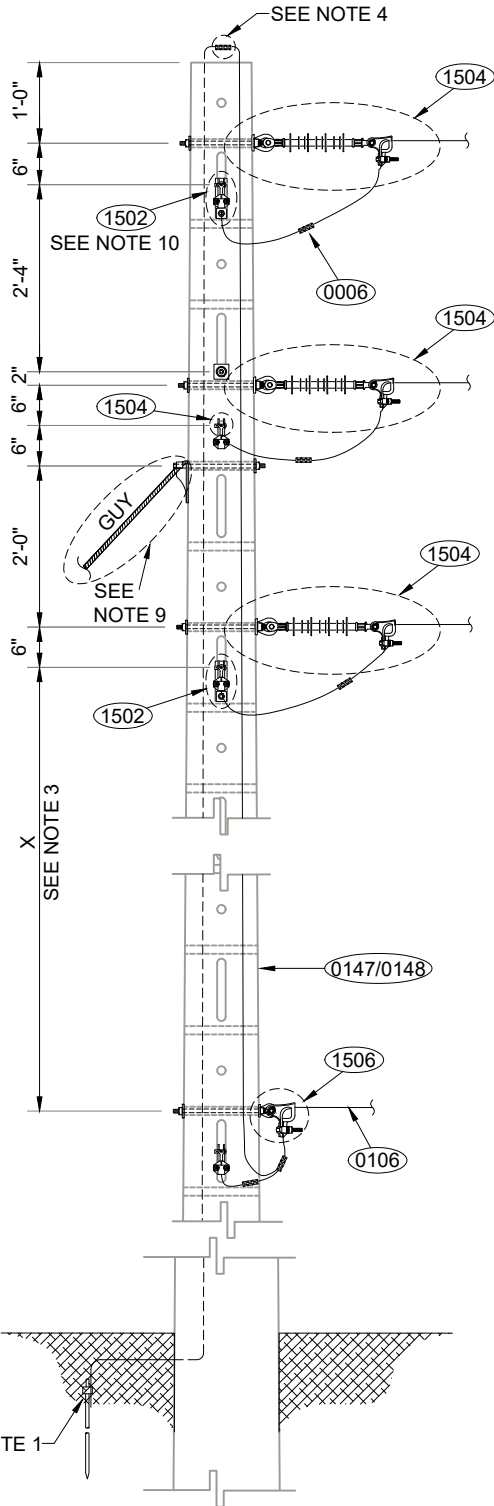
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

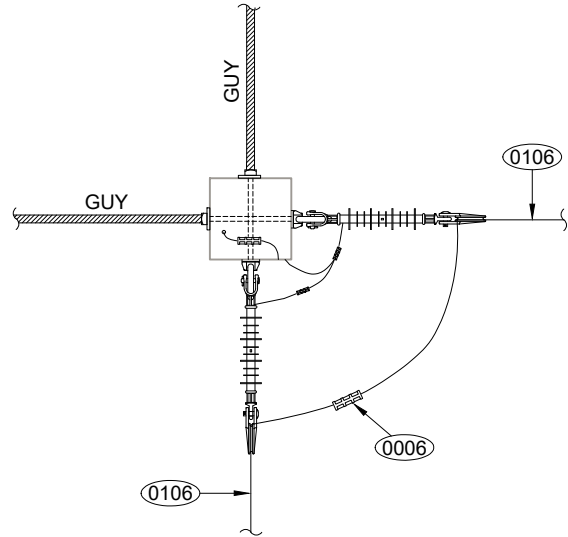
TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL 61°- 90° ANGLE  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	CP-C4-VERT	VERSION	6
DOCUMENT NO.	4301.031		
PAGE	1 OF 2	DATE	FEB 16, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		
	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW**  
VIEW A ASSY-1500



**TOP VIEW**

SEE NOTE 1





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	THREE PHASE PRIMARY CONSTRUCTION VERTICAL 61°- 90° ANGLE MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL	STANDARD NO. <u>CP-C4-VERT</u> VERSION <u>6</u>
		DOCUMENT NO. <u>4301.031</u>
		PAGE <u>2 OF 2</u> DATE <u>FEB 16, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>
		<u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1502	POLE SLOT PRIMARY LINE DEADEND ASSEMBLY	ASSY-1502 FIGURE A	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	4
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- FOR ROUND POLES, USE ASSEMBLY NO. ASSY-1504 INSTEAD OF ASSEMBLY NO. ASSY-1502.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C5-VERT VERSION 4

DOCUMENT NO. 4301.032

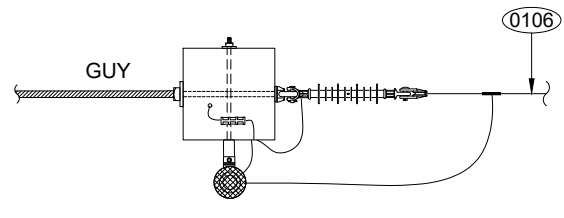
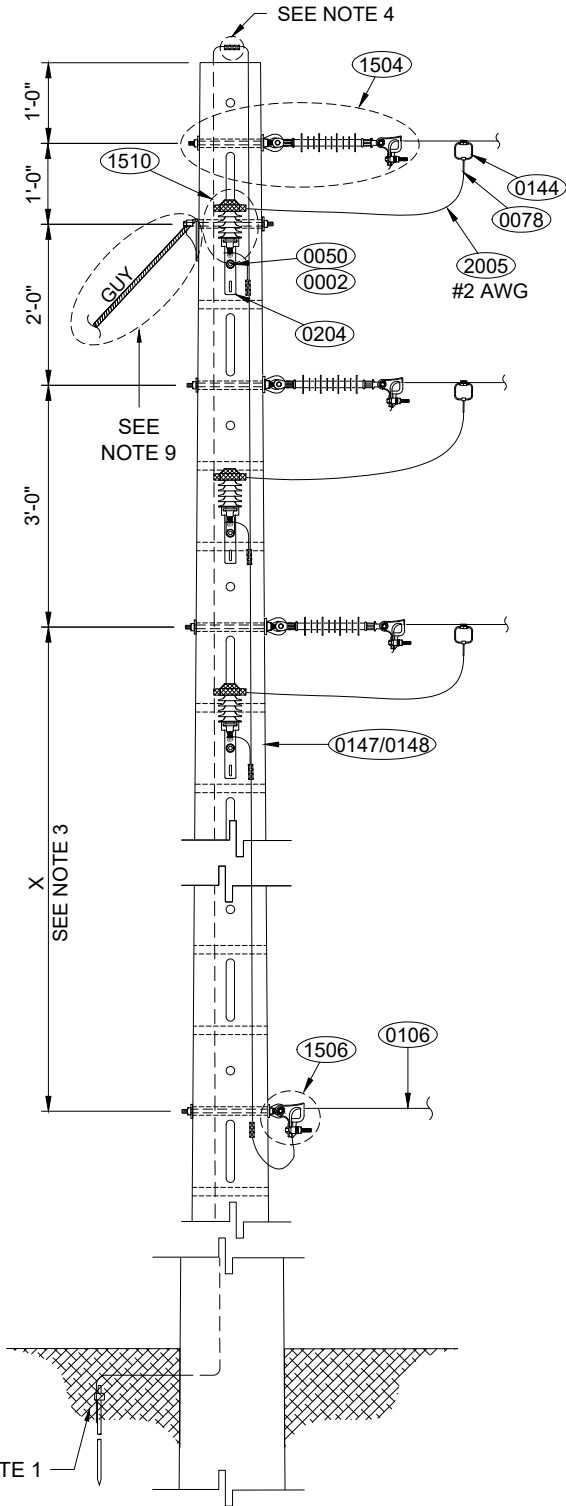
PAGE 1 OF 2 DATE FEB 22, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED VICTOR R. FEBRES LIC. 3412



TOP VIEW

ELEVATION VIEW  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL SINGLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C5-VERT</u> VERSION <u>4</u>
	DOCUMENT NO. <u>4301.032</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 22, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	3
0050	DOUBLE ARMING BOLT	VARIES	3
0078	HOT LINE CLAMP	VARIES	3
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	3
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



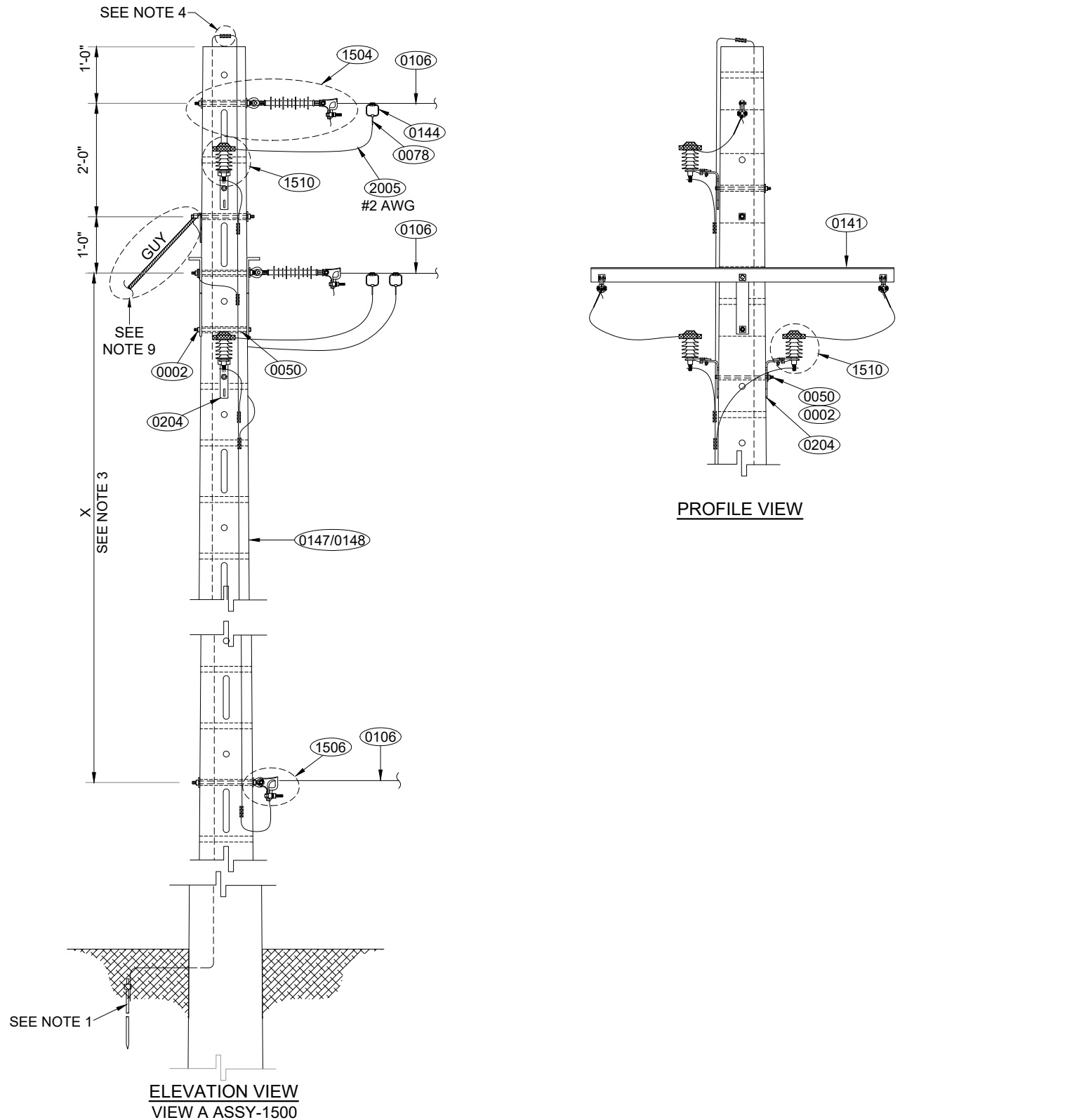
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
CROSSARM SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	CP-C5-XARM	VERSION	7
DOCUMENT NO.	4301.033		
PAGE	1 OF 2	DATE	FEB 22, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		
	EMILIO CUADRADO LIC. 3000		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION          CROSSARM SINGLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C5-XARM</u> VERSION <u>7</u>
	DOCUMENT NO. <u>4301.033</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 22, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	
	<u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	3
0050	DOUBLE ARMING BOLT	VARIES	4
0078	HOT LINE CLAMP	VARIES	3
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	3
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL 0° - 5° ANGLE DOUBLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C6-VERT</u> VERSION <u>4</u>
	DOCUMENT NO. <u>4301.034</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	2
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	3

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
DOUBLE CIRCUIT VERTICAL DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C6-VERT-1 VERSION 2

DOCUMENT NO. 4301.149

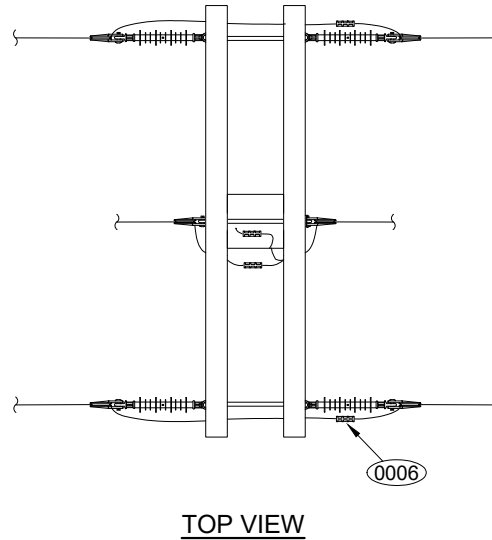
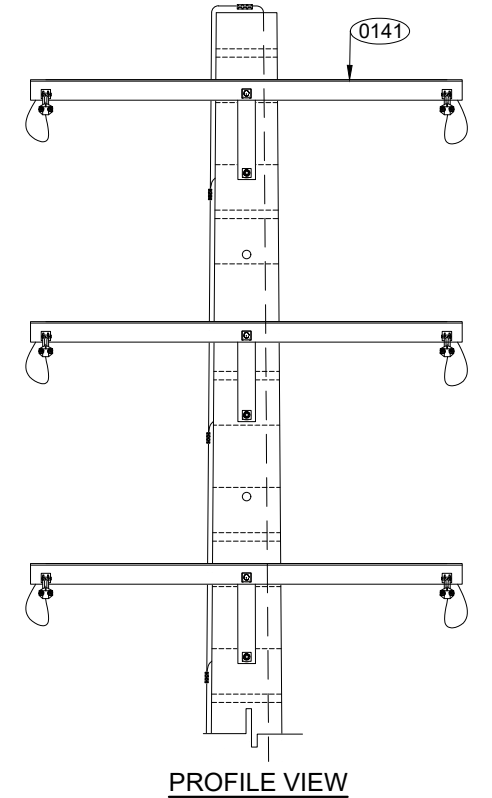
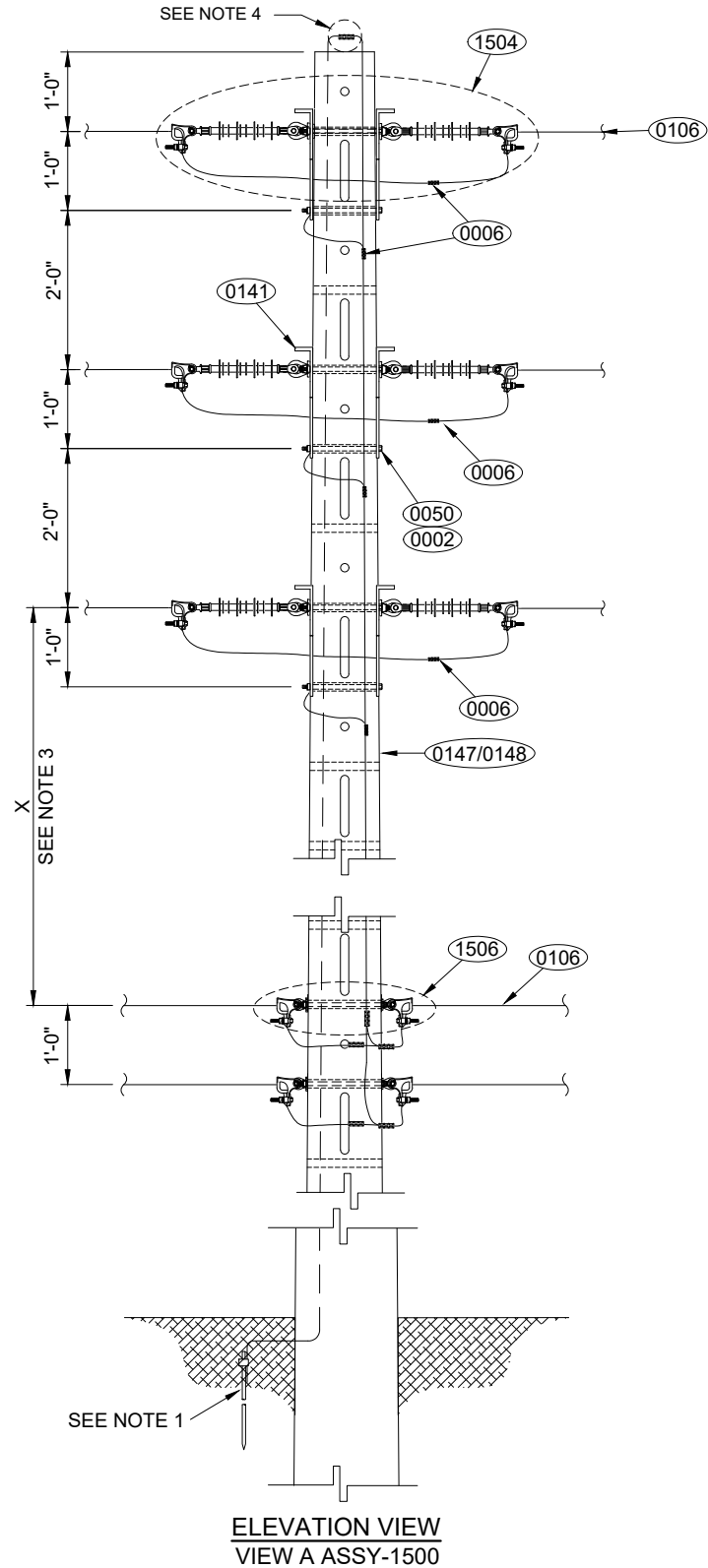
PAGE 1 OF 2 DATE FEB 19, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
DOUBLE CIRCUIT VERTICAL DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL

STANDARD NO. CP-C6-VERT-1 VERSION 2  
DOCUMENT NO. 4301.149  
PAGE 2 OF 2 DATE FEB 19, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	6
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	6
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	6
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE C, 2-FIGURE D	5

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



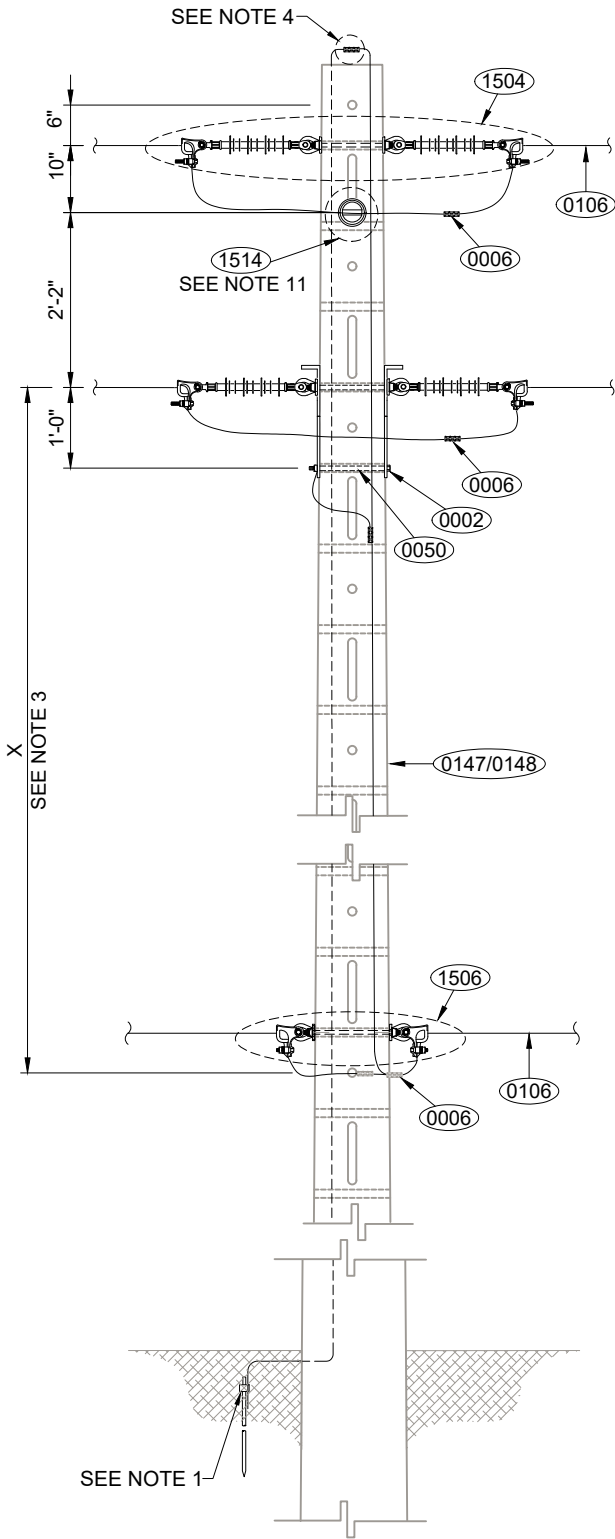
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

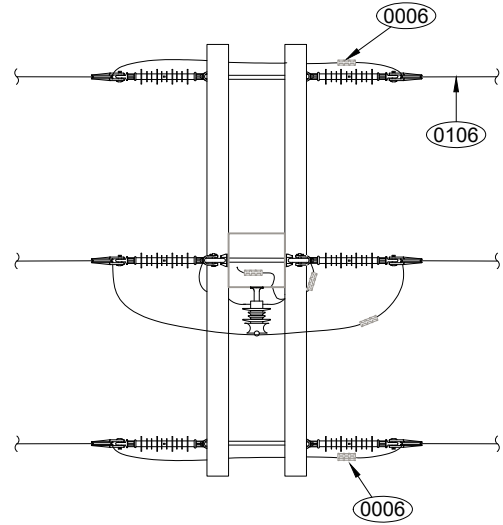
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THREE PHASE PRIMARY CONSTRUCTION  
CROSSARM 0° - 5° ANGLE DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV

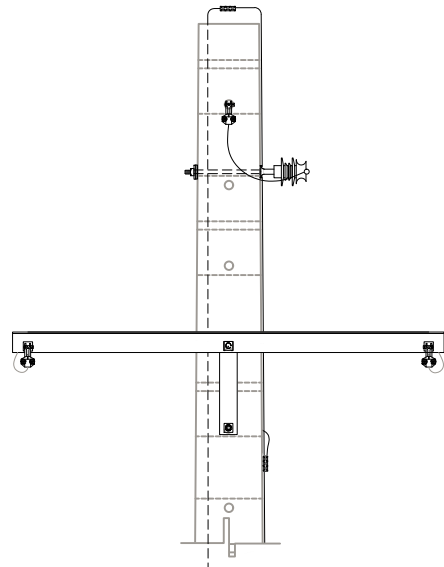
STANDARD NO.	CP-C6-XARM	VERSION	6
DOCUMENT NO.	4301.040		
PAGE	1 OF 2	DATE	FEB 23, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		
	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW**  
VIEW A ASSY-1500



**TOP VIEW**



**PROFILE VIEW**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
CROSSARM 0° - 5° ANGLE DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL

STANDARD NO. CP-C6-XARM VERSION 6  
DOCUMENT NO. 4301.040  
PAGE 2 OF 2 DATE FEB 23, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



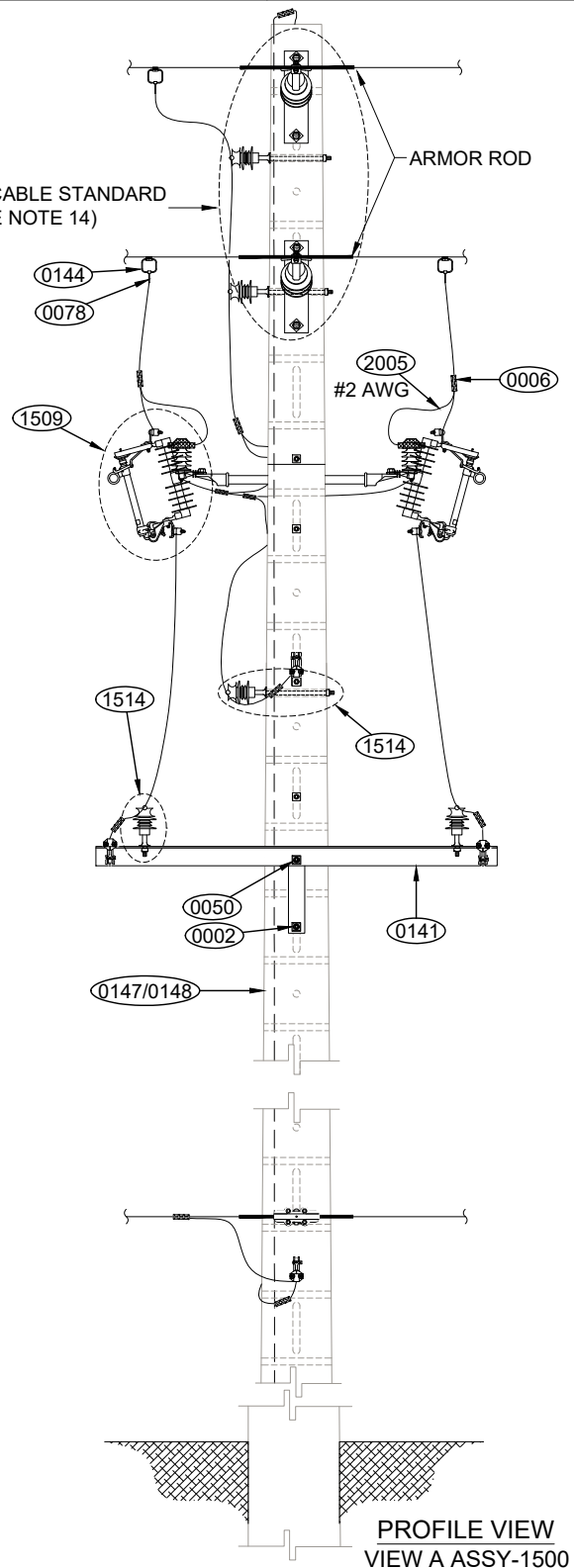
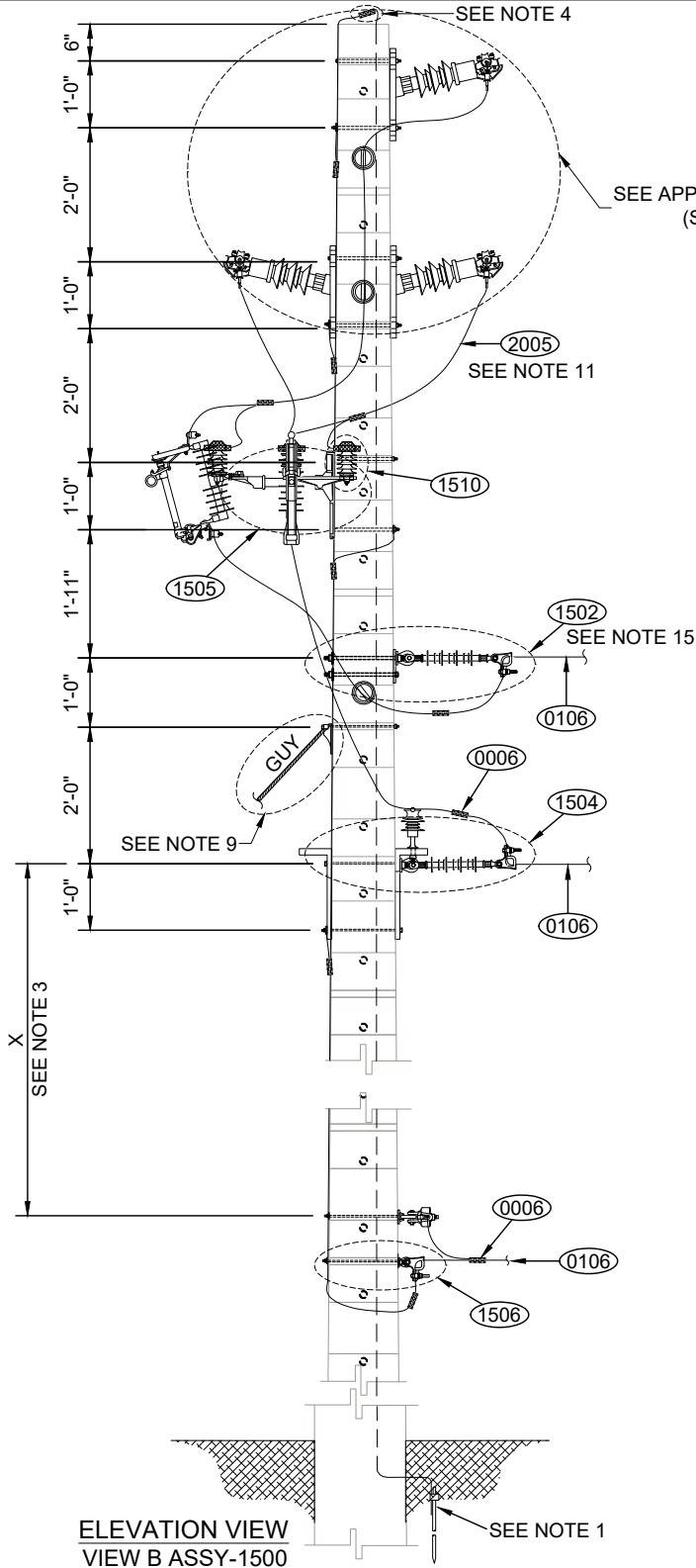
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**THREE PHASE PRIMARY CONSTRUCTION  
WITH OPEN WIRE TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-C7	VERSION	5
DOCUMENT NO.	4301.126		
PAGE	1 OF 6	DATE	ABR 03, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		





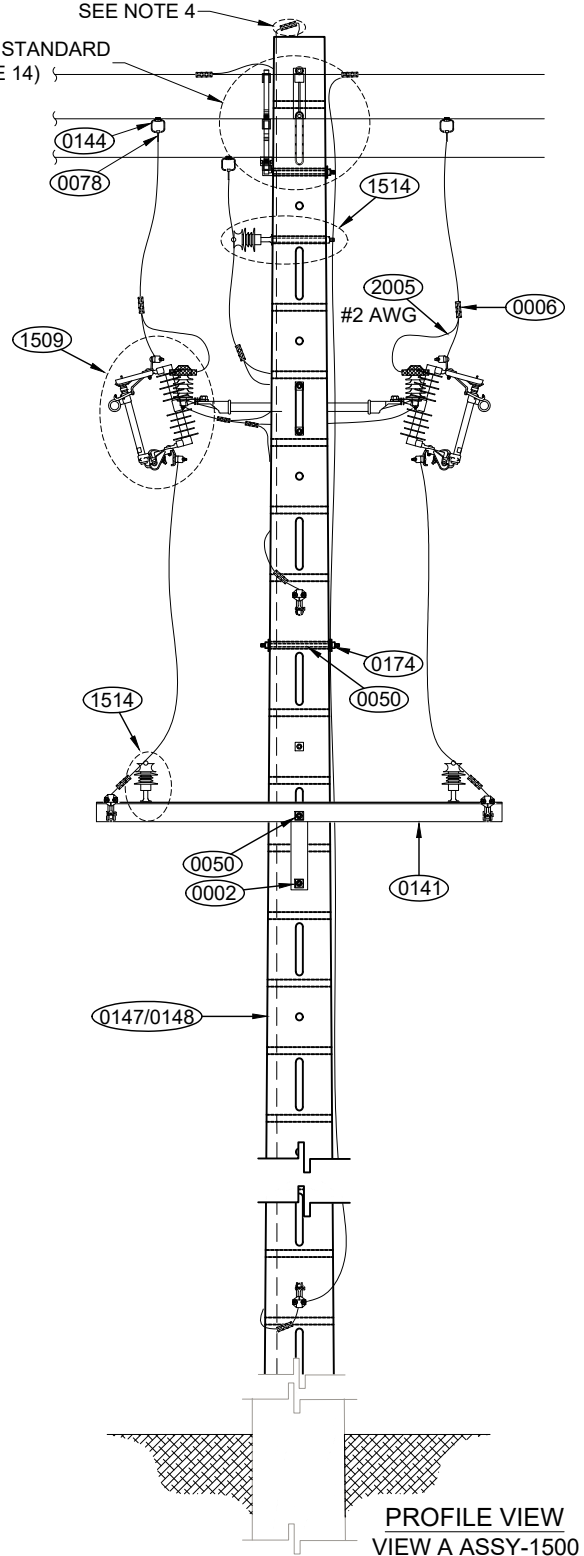
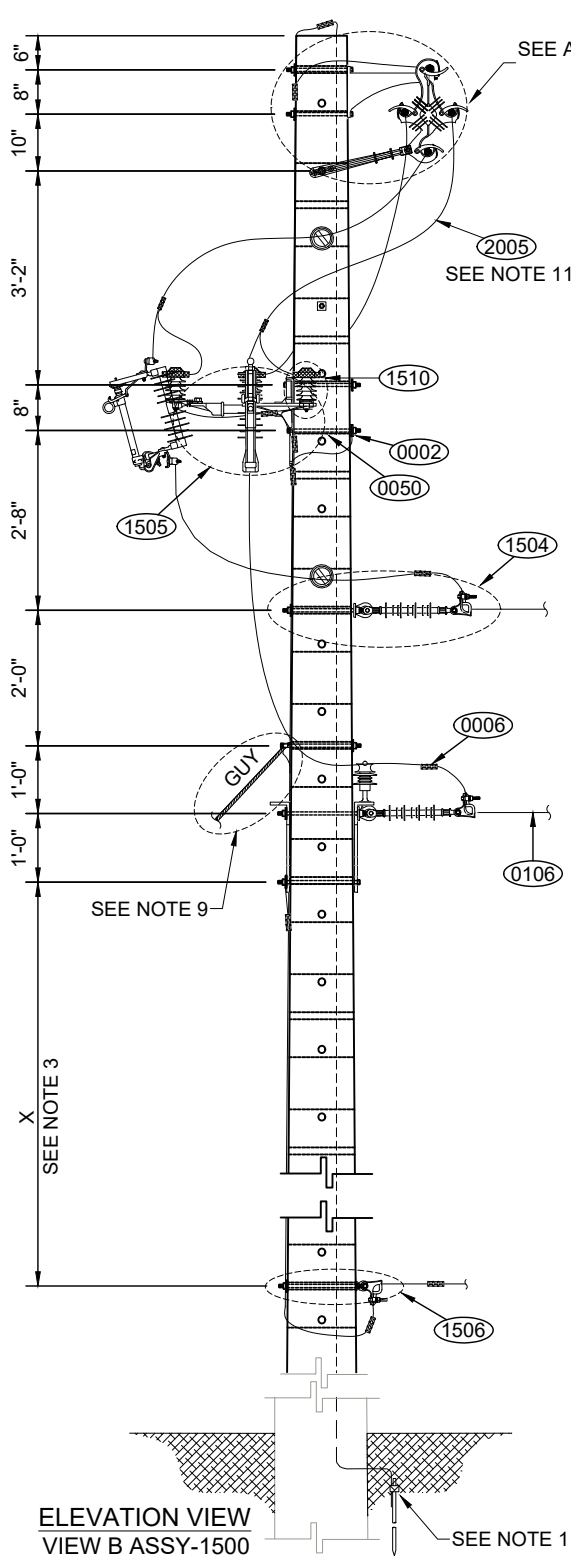
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OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
WITH OPEN WIRE TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	CP-C7	VERSION	5
DOCUMENT NO.	4301.126		
PAGE	2 OF 6	DATE	ABR 03, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		





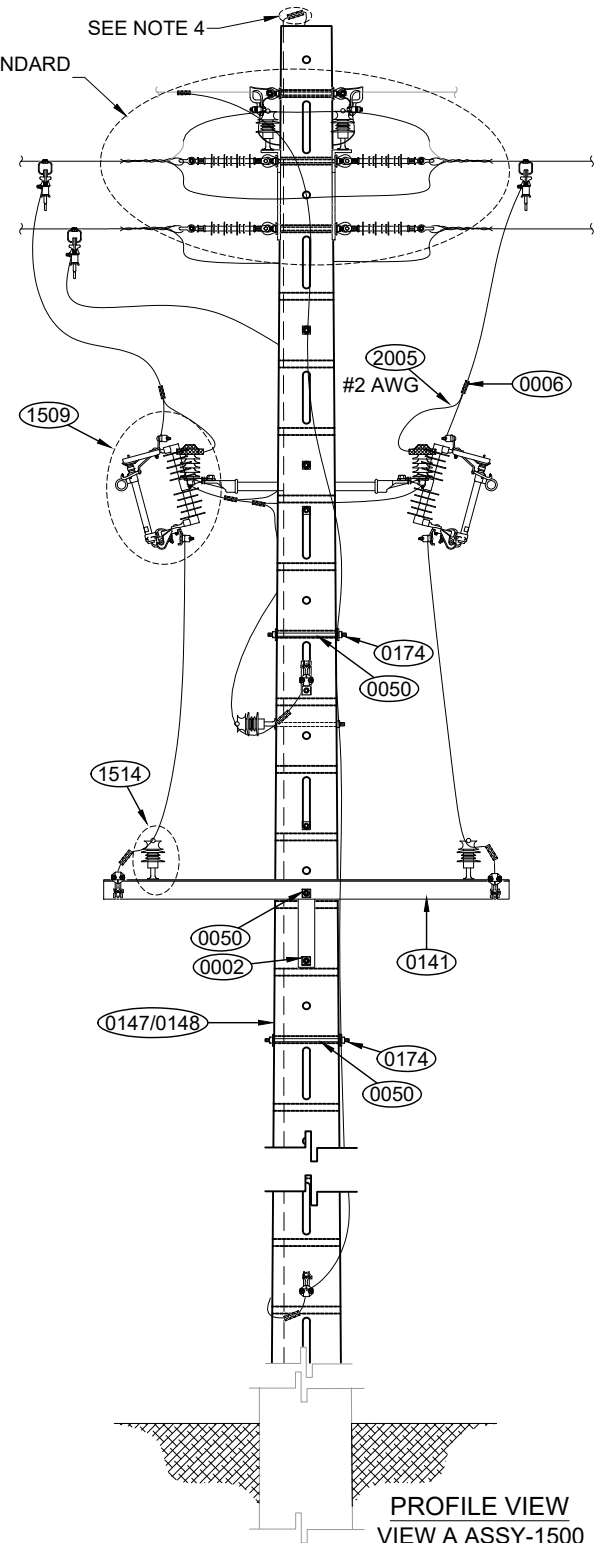
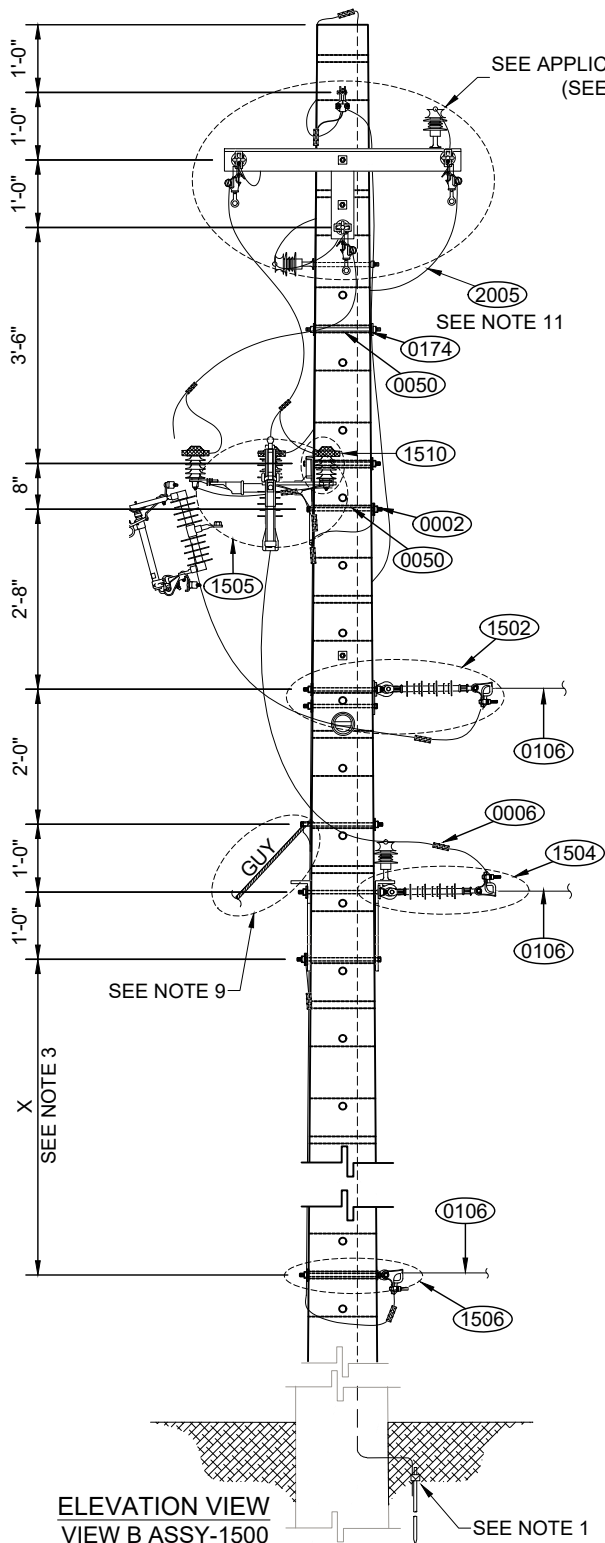
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**THREE PHASE PRIMARY CONSTRUCTION  
WITH OPEN WIRE TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	CP-C7	VERSION	5
DOCUMENT NO.	4301.126		
PAGE	3 OF 6	DATE	ABR 03, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		





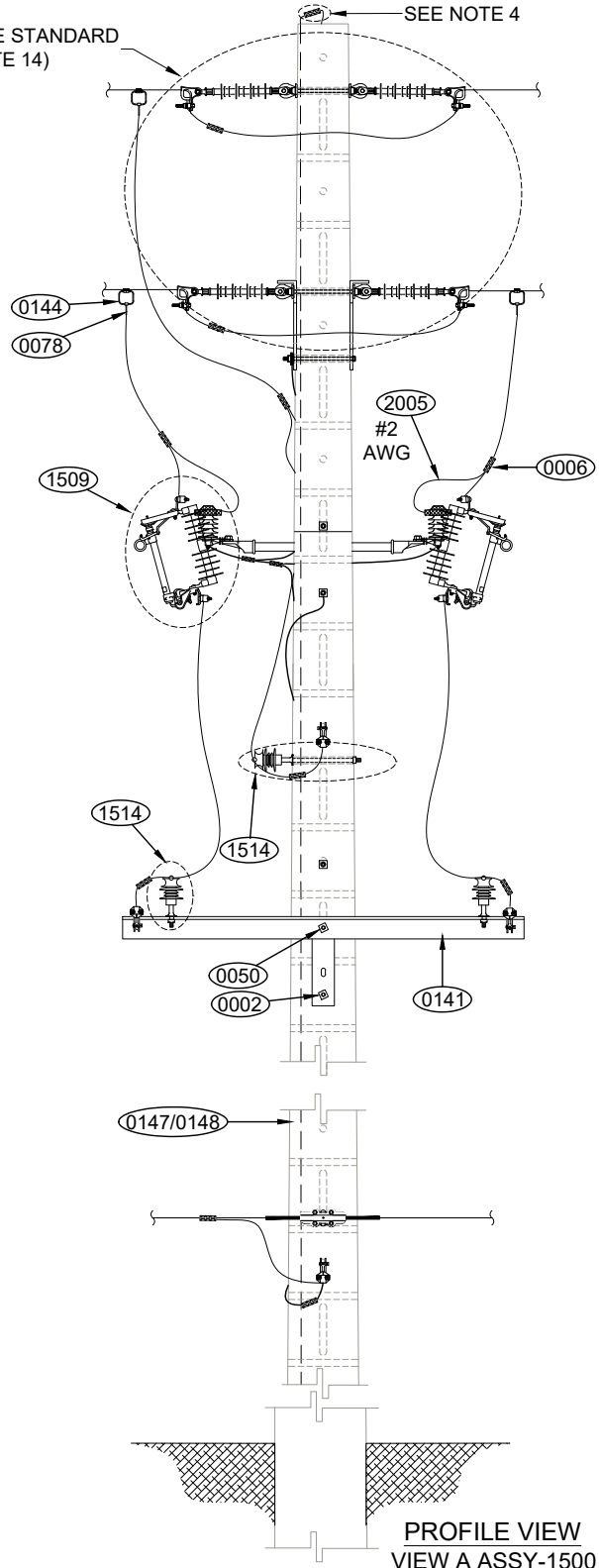
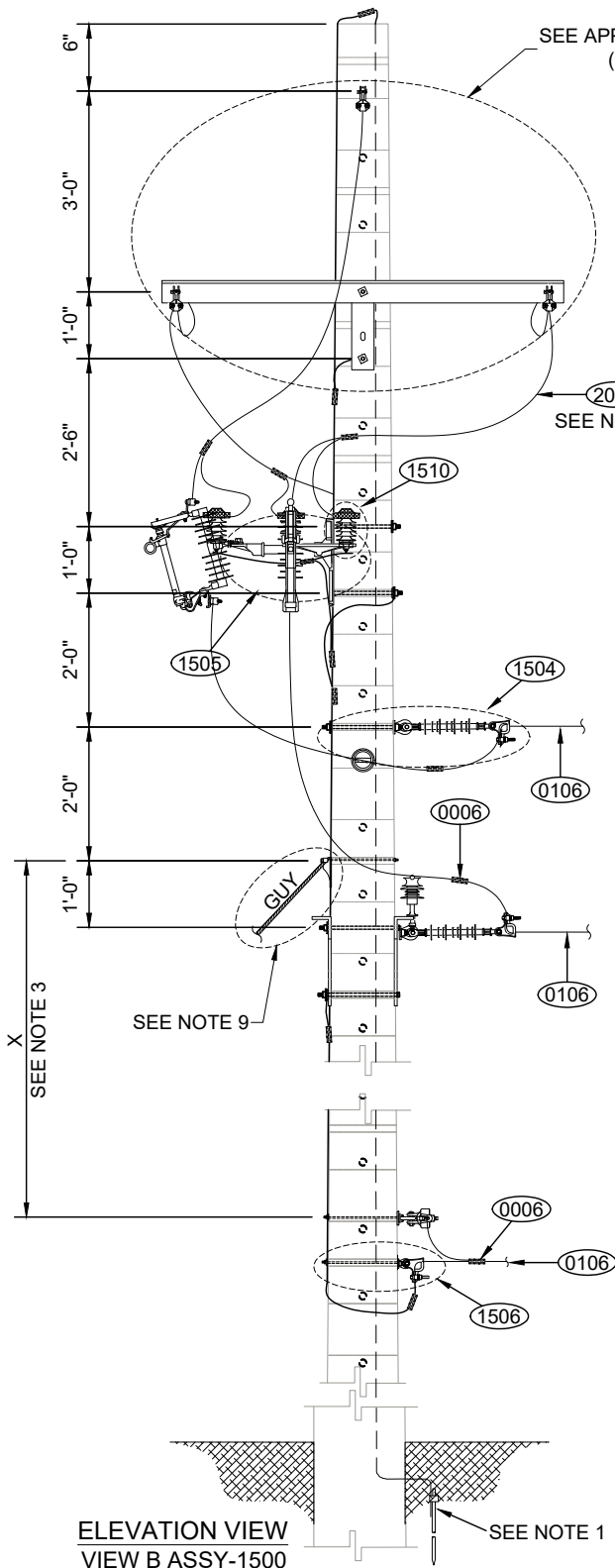
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**THREE PHASE PRIMARY CONSTRUCTION  
WITH OPEN WIRE TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-C7 VERSION 5  
 DOCUMENT NO. 4301.126  
 PAGE 4 OF 6 DATE ABR 03, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>THREE PHASE PRIMARY CONSTRUCTION</b> <b>WITH OPEN WIRE TAP-OFF</b> <b>MAXIMUM RATING: 200 A</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES</b>	STANDARD NO. <u>CP-C7</u> VERSION <u>5</u>
	DOCUMENT NO. <u>4301.126</u>
	PAGE <u>5 OF 6</u> DATE <u>ABR 03, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
12. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
13. FOR INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.
14. FOR TANGENT PRIMARY CONSTRUCTION, THE APPLICABLE STANDARDS MAY BE CP-C1, CP-C2, S-1, S-1-1, OR S-3. FOR DOUBLE DEADEND CONSTRUCTION, THE APPLICABLE STANDARDS MAY BE ABS-3-XARM, CP-C3-XARM, CP-C6-XARM, CP-C12, S-3-XARM, S-6, S-6-2, OR S-12.
15. FOR ROUND POLES, USE ASSEMBLY NO. ASSY-1504 INSTEAD OF ASSEMBLY NO. ASSY-1502.
16. IF THE TAP-OFF IS TO BE INSTALLED UNDER AN AIR BREAK SWITCH (ABS) OR FUSE CUTOUT, CONNECT TAP-OFF TO SOURCE SIDE. A MINIMUM CLEARANCE OF 3'-0" MUST BE MAINTAINED TO AVOID INTERFERING WITH THE OPERATION OF THE ABS OR FUSE CUTOUTS.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <p style="text-align: center;"> <b>THREE PHASE PRIMARY CONSTRUCTION              WITH OPEN WIRE TAP-OFF              MAXIMUM RATING: 200 A              MAXIMUM VOLTAGE: 13.2 KV              BILL OF MATERIAL</b> </p>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: small;">STANDARD NO.</td> <td style="font-size: small;">CP-C7</td> <td style="font-size: small;">VERSION</td> <td style="font-size: small;">5</td> </tr> <tr> <td style="font-size: small;">DOCUMENT NO.</td> <td colspan="3" style="font-size: small;">4301.126</td> </tr> <tr> <td style="font-size: small;">PAGE</td> <td style="font-size: small;">6 OF 6</td> <td style="font-size: small;">DATE</td> <td style="font-size: small;">ABR 03, 2024</td> </tr> <tr> <td style="font-size: small;">SUBMITTED</td> <td colspan="3" style="font-size: small;">LUIS R. SOTO LIC. 11658</td> </tr> <tr> <td style="font-size: small;">REVIEWED</td> <td colspan="3" style="font-size: small;">IVETTE D. SANCHEZ LIC. 13837</td> </tr> <tr> <td style="font-size: small;">APPROVED</td> <td colspan="3" style="font-size: small;">RICARDO CASTRO LIC. 12135</td> </tr> <tr> <td style="font-size: small;">DIGITIZED</td> <td colspan="3" style="font-size: small;">EMILIO CUADRADO LIC. 3000</td> </tr> <tr> <td></td> <td colspan="3" style="font-size: small;">VICTOR R. FEBRES LIC. 3412</td> </tr> </table>	STANDARD NO.	CP-C7	VERSION	5	DOCUMENT NO.	4301.126			PAGE	6 OF 6	DATE	ABR 03, 2024	SUBMITTED	LUIS R. SOTO LIC. 11658			REVIEWED	IVETTE D. SANCHEZ LIC. 13837			APPROVED	RICARDO CASTRO LIC. 12135			DIGITIZED	EMILIO CUADRADO LIC. 3000				VICTOR R. FEBRES LIC. 3412		
STANDARD NO.	CP-C7	VERSION	5																														
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SUBMITTED	LUIS R. SOTO LIC. 11658																																
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DIGITIZED	EMILIO CUADRADO LIC. 3000																																
	VICTOR R. FEBRES LIC. 3412																																

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	3
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND / BOND WIRE CLAMP	VARIES	AS REQ.
1502	POLE SLOT PRIMARY LINE DEADEND ASSEMBLY	ASSY-1502 FIGURE A	AS REQ.
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE A	AS REQ.
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	AS REQ.
		ASSY-1514 FIGURE C	2
2005	STRANDED COPPER CABLE, 600V, XHHW-2	VARIES	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.



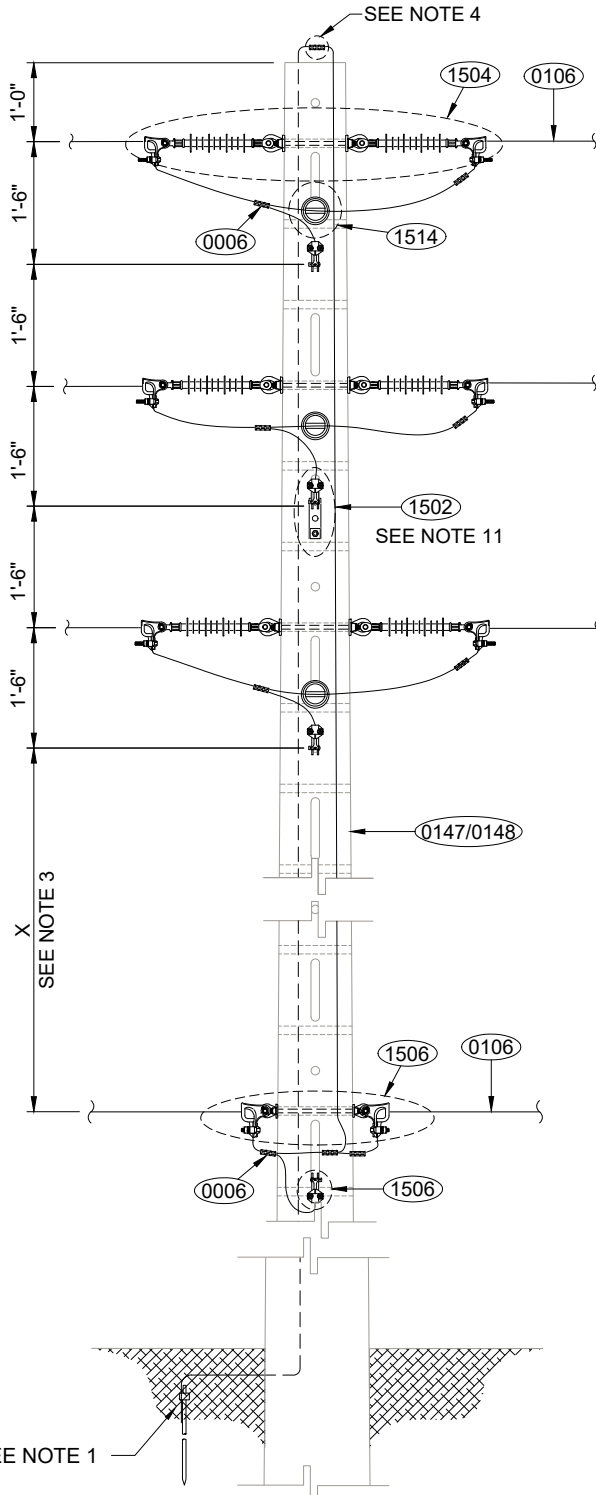
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

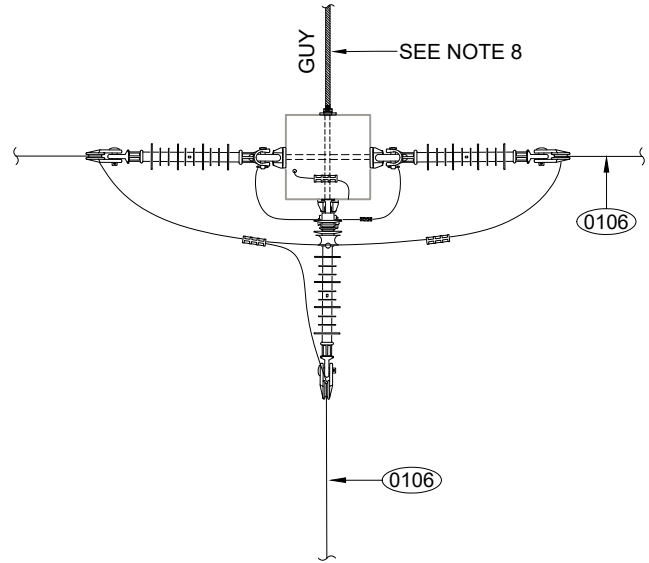
TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL DOUBLE DEADEND TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C7-VERT VERSION 6  
 DOCUMENT NO. 4301.035  
 PAGE 1 OF 2 DATE FEB 19, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



**ELEVATION VIEW**  
VIEW A ASSY-1500



**TOP VIEW**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL DOUBLE DEADEND TAP-OFF          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C7-VERT</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.035</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 19, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1502	POLE SLOT PRIMARY LINE DEADEND ASSEMBLY	ASSY-1502 FIGURE A	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 2-FIGURE A, 3-FIGURE B	5
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 1-FIGURE A, 1-FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	3
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- IF IT IS NECESSARY TO INSTALL FUSE CUTOUTS (ITEM 0085), USE STANDARD NO. CP-C12-VERT AT THE TAP-OFF ON THE NEXT DEADEND POLE.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- FOR ROUND POLES, USE ASSEMBLY NO. ASSY-1504 INSTEAD OF ASSEMBLY NO. ASSY-1502.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL TANGENT REDUCED TENSION SPAN TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL

STANDARD NO. CP-C7-1 VERSION 6  
DOCUMENT NO. 4301.036  
PAGE 2 OF 2 DATE FEB 22, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	2
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	3
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 3-FIGURE A, 3-FIGURE B	6
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 1-FIGURE A, 1-FIGURE B	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	2
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE A, 2-FIGURE D	5
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	6
E-1-2-3	POLE GUY INSTALLATION	VARIES	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 AND ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- THE MAXIMUM REDUCED TENSION SPAN SHALL BE 75'-0".
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- IF THE INSTALLATION OF FUSE CUTOUTS (ITEM 0085) IS NECESSARY, REFER TO STANDARD NO. CP-C12-VERT.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- IF ADDITIONAL CLEARANCE IS REQUIRED, USE ASSEMBLY NO. ASSY-1501 INSTEAD OF ASSY-1514.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
VERTICAL SINGLE DEADEND TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C12-VERT VERSION 6

DOCUMENT NO. 4301.037

PAGE 1 OF 2 DATE FEB 23, 2024

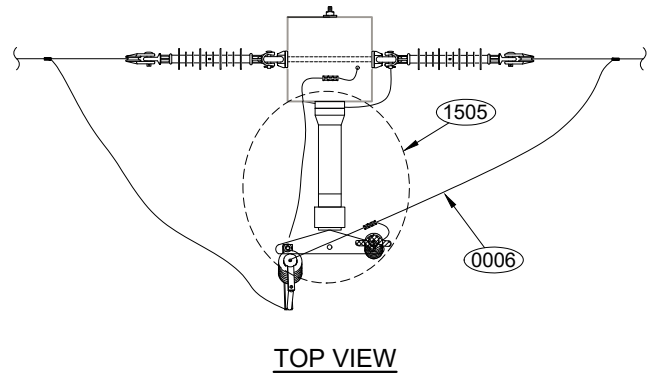
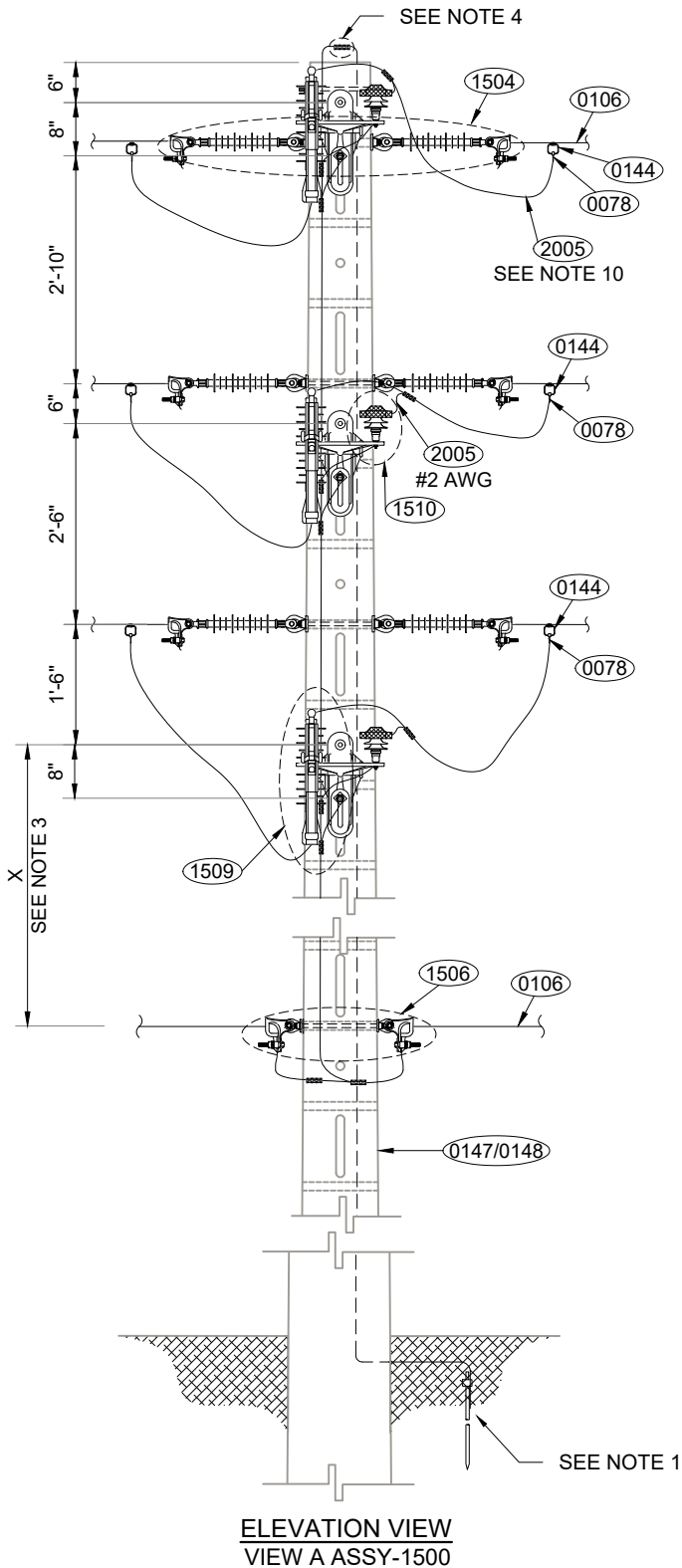
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DIGITIZED EMILIO CUADRADO LIC. 3000

VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>THREE PHASE PRIMARY CONSTRUCTION          VERTICAL SINGLE DEADEND TAP-OFF          MAXIMUM RATING: 200 A          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C12-VERT</u> VERSION <u>6</u>
		DOCUMENT NO. <u>4301.037</u>
		PAGE <u>2 OF 2</u> DATE <u>FEB 23, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
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		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
		<u>VICTOR R. FEBRES LIC. 3412</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	6
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUNDING ASSEMBLY	ASSY-1512 1-FIGURE D, 3-FIGURE F	4
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**THREE PHASE PRIMARY CONSTRUCTION  
CROSSARM SINGLE DEADEND TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. CP-C12-XARM VERSION 2

DOCUMENT NO. 4301.132

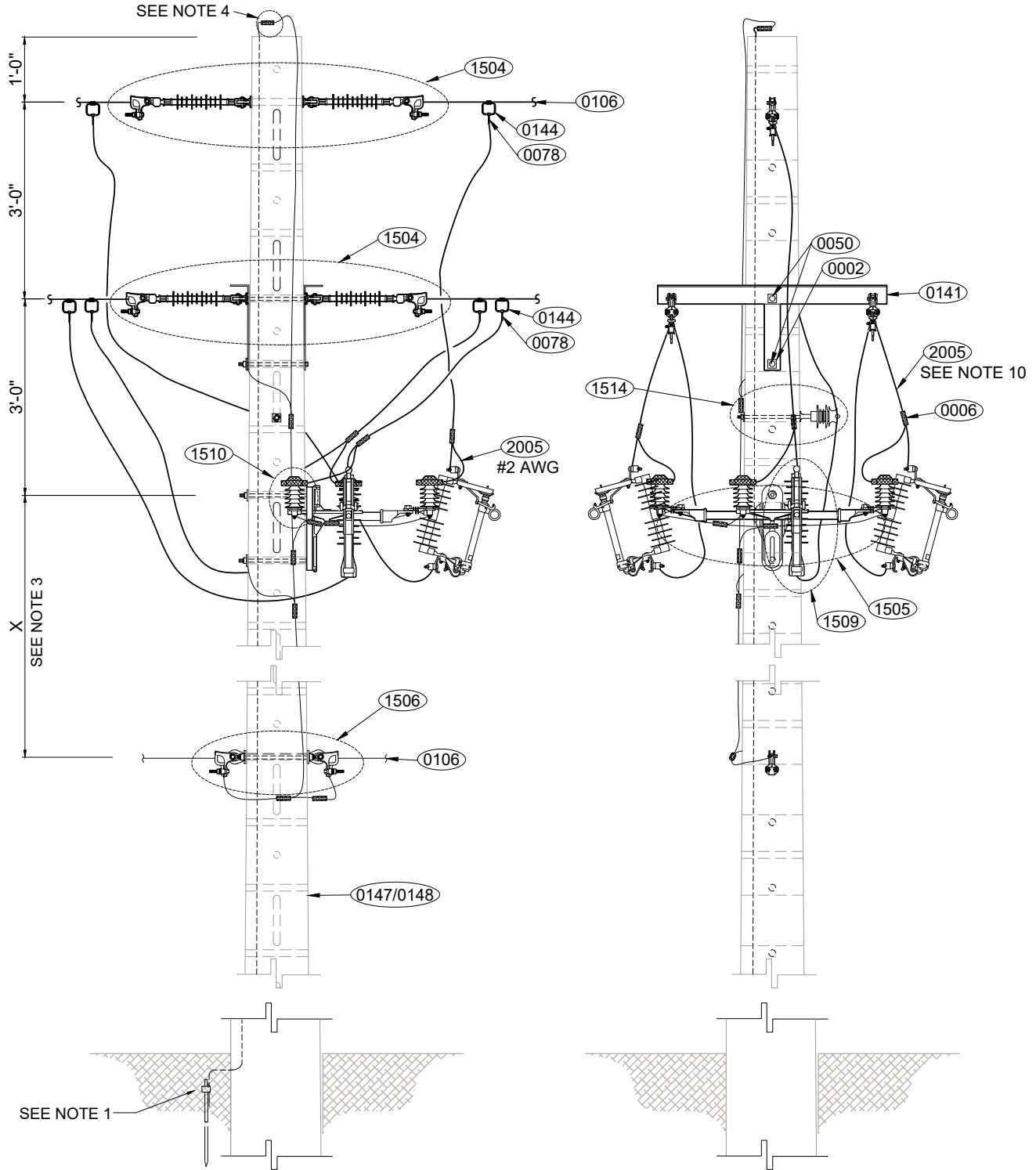
PAGE 1 OF 3 DATE FEB 23, 2024

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APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW  
VIEW A ASSY-1500**

**PROFILE VIEW  
VIEW B ASSY-1500**





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  <b>THREE PHASE PRIMARY CONSTRUCTION CROSSARM SINGLE DEADEND TAP-OFF MAXIMUM RATING: 200 A MAXIMUM VOLTAGE: 13.2 KV NOTES</b>	STANDARD NO. <u>CP-C12-XARM</u> VERSION <u>2</u>
	DOCUMENT NO. <u>4301.132</u>
	PAGE <u>2</u> OF <u>3</u> DATE <u>FEB 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
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APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
12. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>	<b>THREE PHASE PRIMARY CONSTRUCTION          CROSSARM SINGLE DEADEND TAP-OFF          MAXIMUM RATING: 200 A          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C12-XARM</u> VERSION <u>2</u> DOCUMENT NO. <u>4301.132</u> PAGE <u>3 OF 3</u> DATE <u>FEB 23, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	6
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1509	FUSE CUTOFF ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.



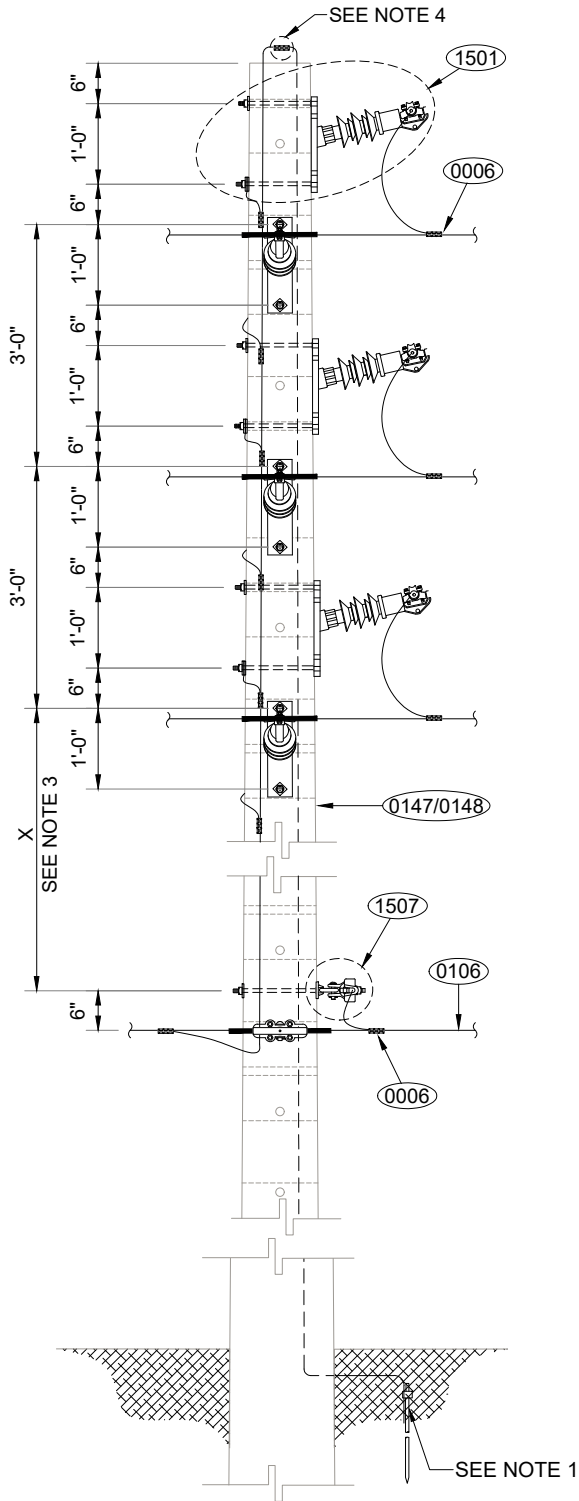
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OVERHEAD DISTRIBUTION STANDARDS

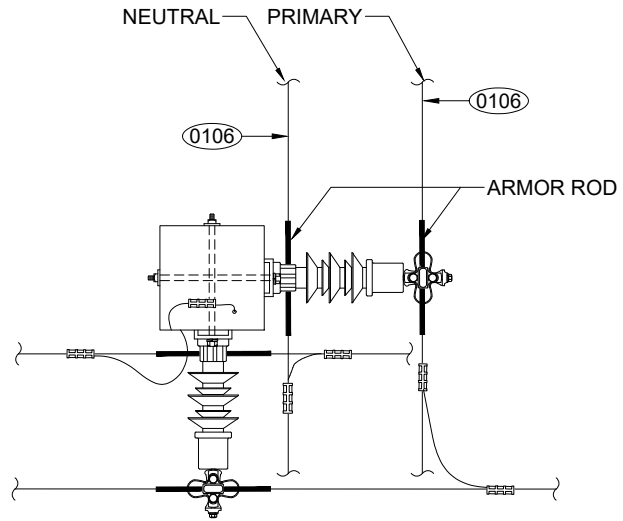
TITLE:

## THREE PHASE PRIMARY CONSTRUCTION TANGENT LINE JUNCTION MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. CP-C13 VERSION 4  
DOCUMENT NO. 4301.038  
PAGE 1 OF 2 DATE FEB 22, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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**ELEVATION VIEW**  
VIEW B ASSY-1500



**TOP VIEW**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION TANGENT LINE JUNCTION MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>CP-C13</u> VERSION <u>4</u>
	DOCUMENT NO. <u>4301.038</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 22, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
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	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	6
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 6-FIGURE A, 1-FIGURE D	7

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



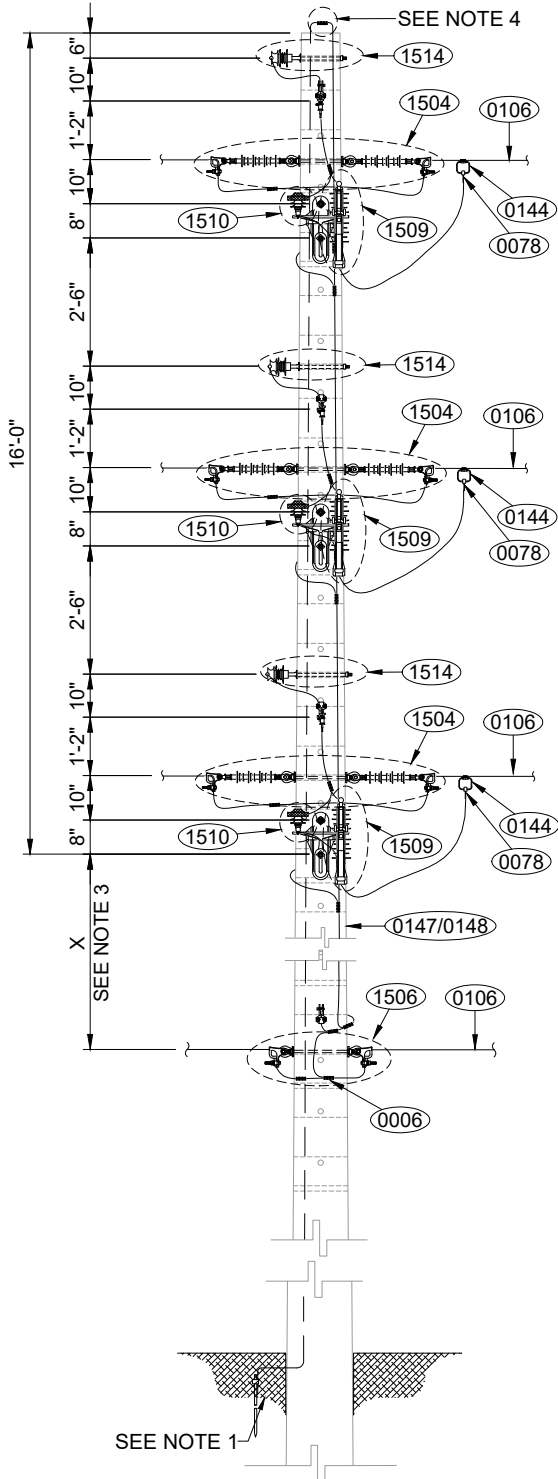
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OVERHEAD DISTRIBUTION STANDARDS

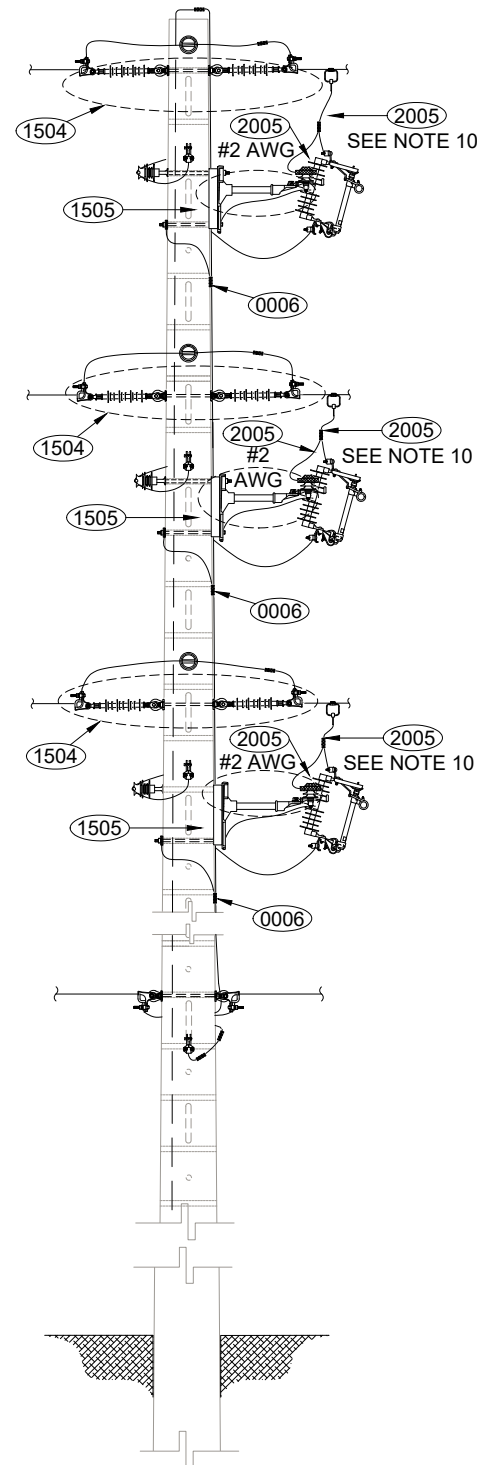
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THREE PHASE PRIMARY CONSTRUCTION  
DEADEND LINE JUNCTION  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	CP-C14	VERSION	5
DOCUMENT NO.	4301.042		
PAGE	1 OF 2	DATE	FEB 23, 2024
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REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR FEBRES LIC. 3412		
	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW**  
VIEW B ASSY-1500



**PROFILE VIEW**  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p style="text-align: center;"><b>THREE PHASE PRIMARY CONSTRUCTION DEADEND LINE JUNCTION MAXIMUM RATING: 200 A MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b></p>	STANDARD NO. <u>CP-C14</u> VERSION <u>5</u>
		DOCUMENT NO. <u>4301.042</u> PAGE <u>2 OF 2</u> DATE <u>FEB 23, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>VICTOR FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	6
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	6
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	2
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 3-FIGURE F	4
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	6
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
12. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



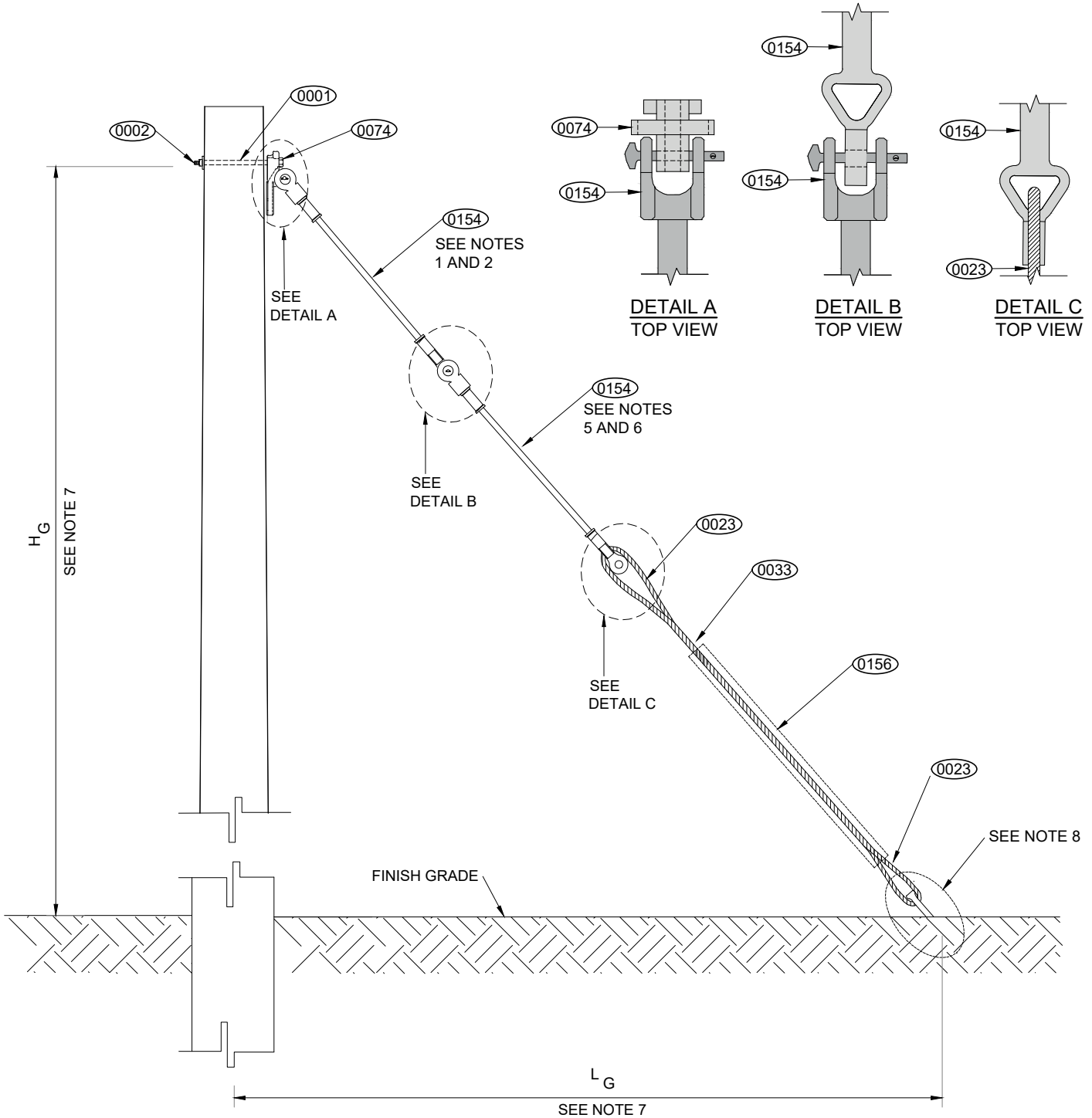
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

POLE GUY INSTALLATION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. E-1-2-3 VERSION 5  
DOCUMENT NO. 4301.083  
PAGE 1 OF 5 DATE JAN 23, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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DIGITIZED EMILIO CUADRADO LIC. 3000



**FIGURE 1**  
INSTALLATION BY GUY ATTACHMENT CLEVIS HOLE



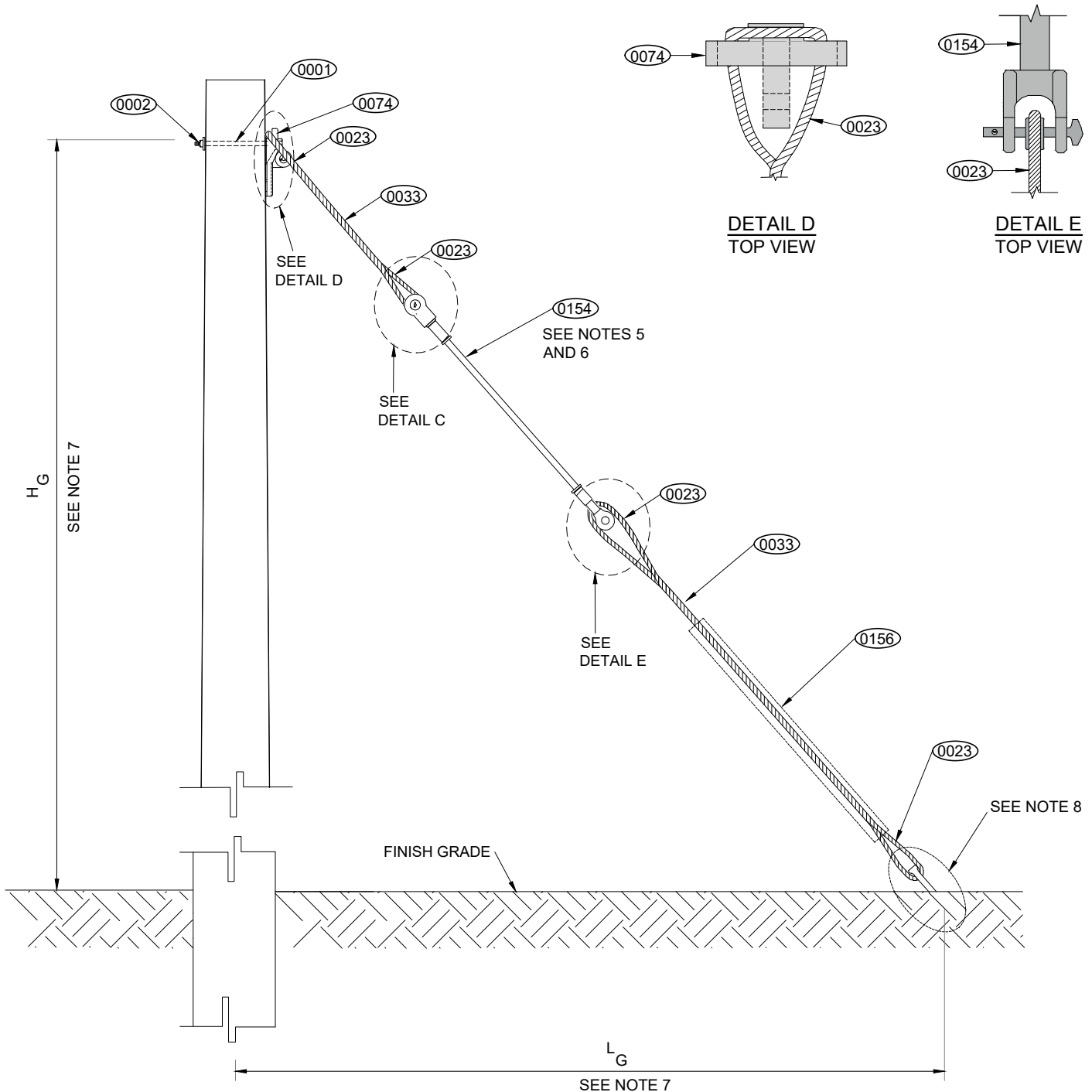
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

POLE GUY INSTALLATION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. E-1-2-3 VERSION 5  
DOCUMENT NO. 4301.083  
PAGE 2 OF 5 DATE JAN 23, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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**FIGURE 2**  
INSTALLATION BY GUY ATTACHMENT GUY-HOOK





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

POLE GUY INSTALLATION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. E-1-2-3 VERSION 5

DOCUMENT NO. 4301.083

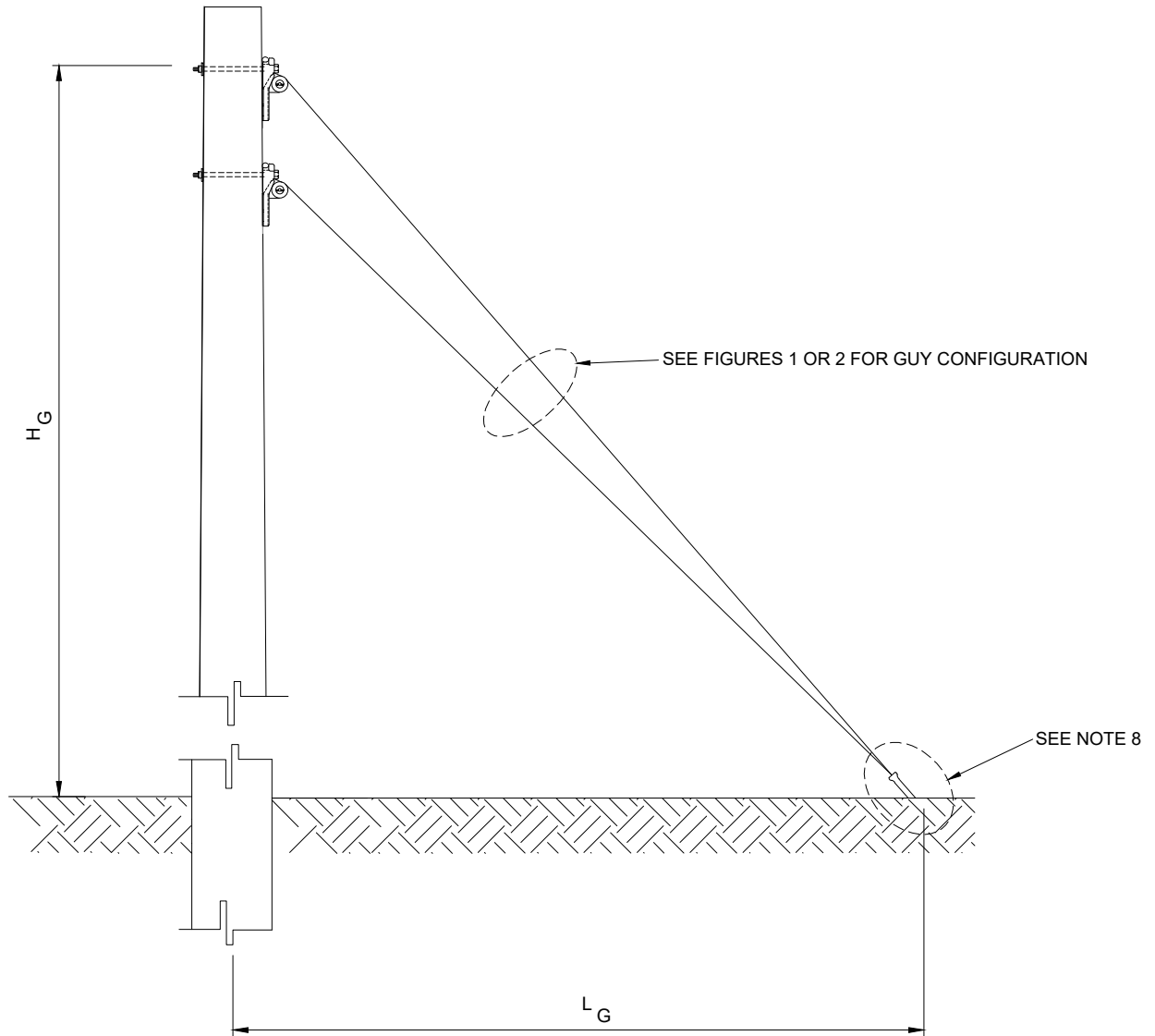
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**FIGURE 3**  
MULTIPLE GUYS ATTACHED TO A SINGLE ANCHOR



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

POLE GUY INSTALLATION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. E-1-2-3 VERSION 5

DOCUMENT NO. 4301.083

PAGE 4 OF 5 DATE JAN 23, 2024

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APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

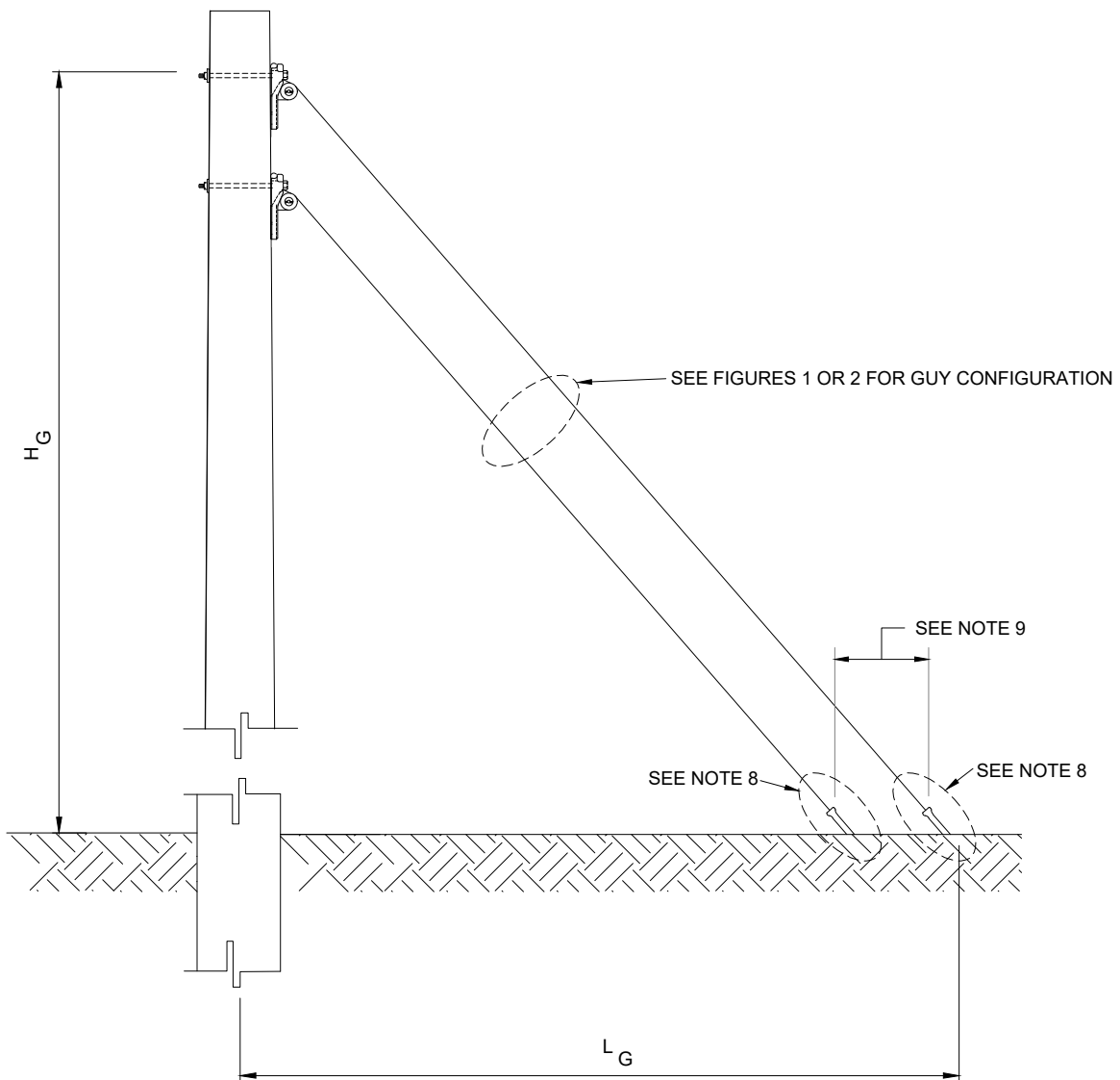


FIGURE 4  
MULTIPLE GUYS ATTACHED TO INDIVIDUAL ANCHORS



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>POLE GUY INSTALLATION</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>E-1-2-3</u> VERSION <u>5</u>
	DOCUMENT NO. <u>4301.083</u>
	PAGE <u>5 OF 5</u> DATE <u>JAN 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0001	THROUGH BOLT	VARIES	AS REQ.
0002	FLAT SQUARE WASHER	VARIES	AS REQ.
0023	½" GUY GRIP	002-13736	AS REQ.
0033	½" GUY WIRE	046-00219	AS REQ.
0074	GUY ATTACHMENT	002-00303	AS REQ.
0154	FIBERGLASS GUY STRAIN INSULATOR	014-00720	AS REQ.
0156	GUY WIRE MARKER	002-02598	AS REQ.

**NOTES:**

- CALCULATIONS SHALL BE SUBMITTED FOR EACH GUY WIRE WHEN  $L_G < H_G$ .
- THE QUANTITY OF FIBERGLASS GUY STRAIN INSULATORS TO CLEAR ENERGIZED EQUIPMENT SHALL BE DETERMINED BY THE ENGINEERS.
- DO NOT LOAD BEYOND 90% OF THE GUY WIRE BREAKING STRENGTH (½" DIAMETER GUY WIRE RATED BREAKING STRENGTH IS 26,900 LBS, SO IT SHALL NOT BE LOADED BEYOND 24,210 LBS).
- ON POLES 50' OR HIGHER, A ¾" DIAMETER BOLT MUST BE USED TO ATTACH THE GUY TO THE POLE. FOR POLES OF LOWER HEIGHT, A ½" DIAMETER BOLT MUST BE USED.
- GUY STRAIN INSULATOR SHALL BE INSTALLED SO THAT IF THE GUY WIRE SLACKENS OR BREAKS, NO PART OF THE GUY WIRE UP TO A HEIGHT OF 8'-0" ABOVE THE FINISH GRADE CAN BECOME ENERGIZED.
- INSULATED GUY ASSEMBLIES SHOULD BE USED WHEN SUPPORTING TENSION FROM PRIMARY AND SECONDARY WIRES. MULTIPLE FIBERGLASS STRAIN INSULATORS, IN VARIOUS SIZES, ARE REQUIRED WHEN GUYS ARE INSTALLED ABOVE SECONDARY ATTACHMENTS. WHEN GUYS ARE INSTALLED AT A HEIGHT BELOW SECONDARY ATTACHMENTS, A SINGLE FIBERGLASS STRAIN INSULATOR (54" MIN.) SHOULD BE SUFFICIENT. GROUNDING SHOULD BE CONSIDERED ONLY WHEN SUPPORTING THE TENSION OF A SYSTEM WITH STATIC WIRES.
- REFER TO STANDARD NO. E-5 FOR SPECIFIC GUYING DETAILS.
- REFER TO STANDARDS NO. F-1-3, F-4-1, F-4-2, F-5-1 OR F-6-1 FOR GUY ANCHORING. FOR MULTIPLE GUY ATTACHED TO A SINGLE ANCHOR, REFER TO STANDARDS NO. F-4-1, F-4-2 OR F-5-1.
- FOR MULTIPLE GUY ANCHORS, THE DISTANCE BETWEEN THE GUY ANCHORS SHOULD BE DETERMINED BY ENGINEERS. THE MINIMUM RECOMMENDED SEPARATION BETWEEN GUY ANCHORS SHOULD BE 5'-0" IN SOIL AND 2'-0" IN ROCK, IN ACCORDANCE WITH ACCEPTED INDUSTRY GOOD PRACTICE.



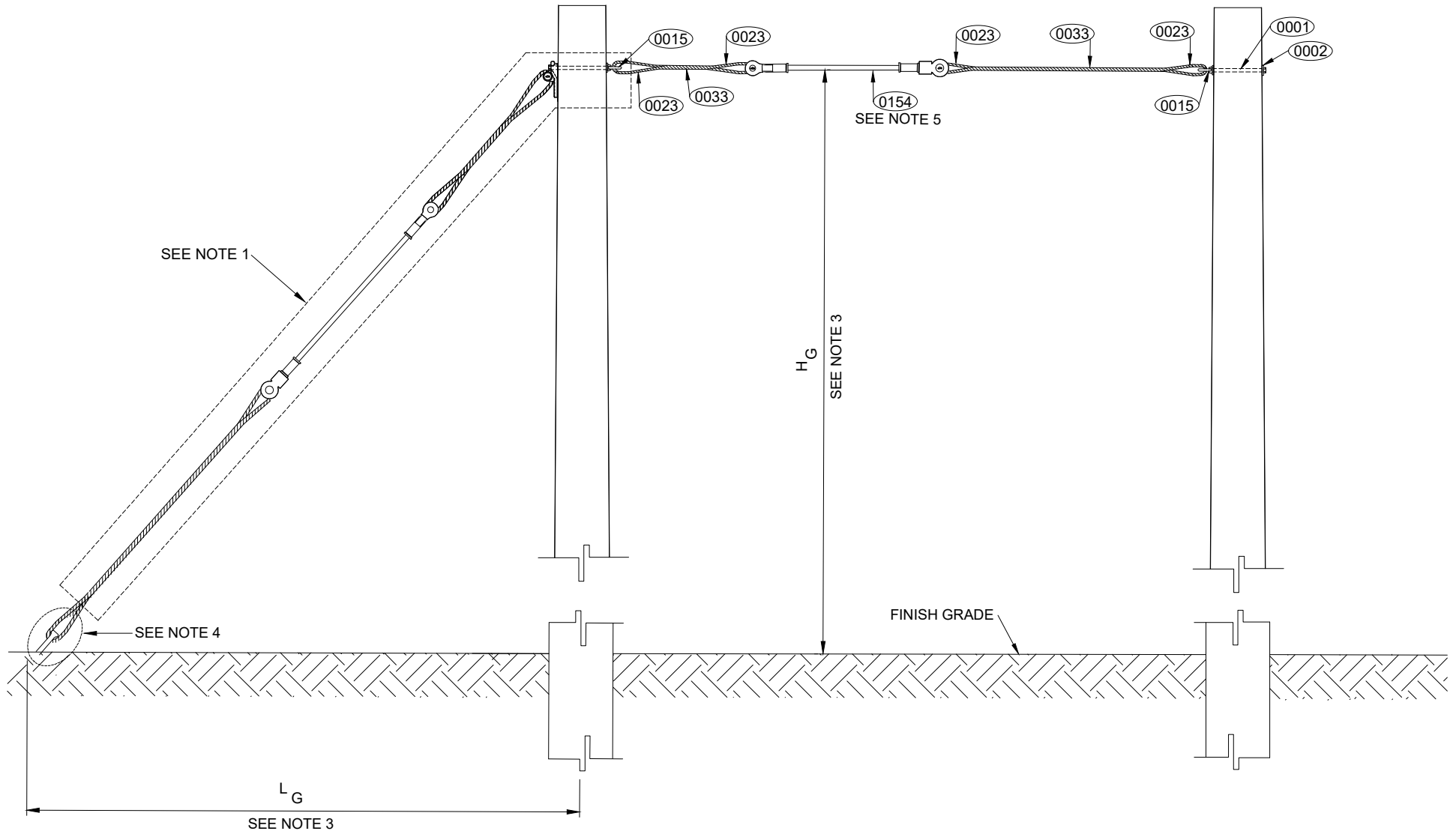
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPAN GUY INSTALLATION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. E-2-1 VERSION 3  
DOCUMENT NO. 4301.085  
PAGE 1 OF 2 DATE JAN 23, 2024  
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REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPAN GUY INSTALLATION  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL

STANDARD NO. E-2-1 VERSION 3  
DOCUMENT NO. 4301.085  
PAGE 2 OF 2 DATE JAN 23, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
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APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0001	THROUGH BOLT	VARIES	1
0002	FLAT SQUARE WASHER	VARIES	2
0015	EYE NUT	VARIES	2
0023	½" GUY GRIP	002-13736	4
0033	½" GUY WIRE	046-00219	AS REQ.
0154	FIBERGLASS GUY STRAIN INSULATOR	014-00720	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- 1 - REFER TO STANDARD NO. E-1-2-3 FOR GUYING SPECIFICATIONS, INSTALLATION, AND MATERIALS.
- 2 - THE QUANTITY OF FIBERGLASS GUY STRAIN INSULATORS TO CLEAR ENERGIZED EQUIPMENT SHALL BE DETERMINED BY THE ENGINEERS.
- 3 - REFER TO STANDARD NO. E-5 FOR SPECIFIC GUYING DETAILS.
- 4 - REFER TO STANDARDS NO. F-1-3, F-4-1, F-4-2, F-5-1 OR F-6-1 FOR GUY ANCHORING.
- 5 - GUY STRAIN INSULATOR SHALL BE INSTALLED SO THAT IF THE GUY WIRE SLACKENS OR BREAKS, NO PART OF THE GUY WIRE UP TO A HEIGHT OF 8'-0" ABOVE THE FINISH GRADE CAN BECOME ENERGIZED.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## GUY SELECTION TABLES FOR GRADE B CONSTRUCTION MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	E-5	VERSION	4
DOCUMENT NO.	4301.086		
PAGE	1 OF 5	DATE	NOV 2, 2023
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		

### GENERAL

SOME APPROXIMATIONS HAVE BEEN MADE IN THE FOLLOWING CALCULATIONS TO SIMPLIFY THE PROCESS. THIS METHOD IS ADEQUATE FOR MOST APPLICATIONS. IF IT BECOME NECESSARY TO PERFORM A MORE PRECISE CALCULATION, PLEASE REFER TO RUS BULLETIN 1724E-153: ELECTRIC DISTRIBUTION LINE GUYS AND ANCHORS.

### GUYING CALCULATION

#### 1. GUYING LOAD

THE TOTAL GUYING LOAD IS THE SUM OF THE MAXIMUM DESIGN FORCES FOR EACH CONDUCTOR. THE MAXIMUM DESIGN FORCES DEPEND ON CONDUCTOR TYPE, RULING SPAN, NESC OVERLOAD FACTOR, AND OTHER FACTORS AND SHOULD BE CALCULATED BY THE ENGINEER. SEE PAGES 2 AND 3 FOR DETAILED METHOD TO CALCULATE RULING SPAN.

#### 2. POLE HEIGHT

THE GUY ATTACHMENT HEIGHT IS DETERMINED BY THE CONSTRUCTION STANDARD AND POLE LENGTH. THE POLE LENGTH MUST BE ADEQUATE TO COMPLY WITH THE MINIMUM VERTICAL CLEARANCE REQUIREMENTS OF LUMA STANDARDS M-5, M-5-A, M-5-B AND M-5-C. THE POLE HEIGHT IS THE POLE LENGTH MINUS THE SETTING DEPTH. (REFER TO LUMA STANDARDS NO. M-16, M-16-4-A, M-16-4-B AND M-16-5).

#### 3. GUY LEAD LENGTH

GUY LEAD IS THE DISTANCE FROM THE POLE TO THE ANCHOR ROD. WHENEVER POSSIBLE, USE A GUY LEAD EQUAL TO THE GUY ATTACHMENT HEIGHT. IT IS PREFERRED TO HAVE A 1:1 RATIO BETWEEN THE LEAD LENGTH AND GUY ATTACHMENT HEIGHT. MINIMUM OF 1:2 RATIO CAN BE USED WHEN THERE ARE SPACE LIMITATIONS. GUY LEADS LESS THAN 1/3 OF THE ATTACHMENT HEIGHT SHOULD BE AVOIDED. DO NOT USE A GUY LEAD SHORTER THAN 10 FEET.

#### 4. GUY TENSION

DETERMINE THE TENSION FACTOR FOR EACH GUY FROM TABLE A SHOWN ON PAGE 4. THE TABLE DEPICTS COMMON GUY LEAD LENGTHS, GUY ATTACHMENT HEIGHTS, AND TENSION FACTORS. USE EQUATION BELOW TABLE IF TENSION FACTOR NEEDS TO BE CALCULATED.

TO CALCULATE THE GUY TENSION:

$$GUY\ TENSION = \frac{TOTAL\ GUYING\ LOAD\ (SEE\ STEP\ 1)}{TENSION\ FACTOR\ (SEE\ TABLE\ A,\ PAGE\ 4)}$$

APPLY GRADE B SAFETY FACTOR:

LONGITUDINAL LOADS AT DEADENDS = 1.65 LOAD FACTOR (SEE 2017 NESC TABLE 253-1 - LOAD FACTORS)

APPLYING GRADE B STRENGTH FACTOR FOR GUY WIRE + 0.9 (SEE 2017 NESC TABLE 261-1 - STRENGTH FACTORS)

THE 1/2" GUY WIRE IS RATED AT 26,700 LBS. TABLE B - GUY WIRE STRENGTH DATA SHOWS ADDITIONAL DETAILS. IF GUY TENSION IS GREATER THAN 26,700 LBS, LENGTHEN THE GUY WIRE.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

GUY SELECTION TABLES FOR GRADE B CONSTRUCTION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	E-5	VERSION	4
DOCUMENT NO.	4301.086		
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### RULING SPAN CALCULATION

THE RULING SPAN, FOR ANY CONTINUOUS SERIES OF SPAN LENGTHS, IS A SPAN LENGTH FOR WHICH THE CONDUCTOR TENSION BEST REPRESENTS THE AVERAGE TENSION IN THE CONDUCTOR FOR A SECTION OF LINE BETWEEN DEADENDS.

$$\text{RULING SPAN} = \sqrt{\frac{S_1^3 + S_2^3 + S_n^3 + \dots S_n^3}{S_1 + S_2 + S_n + \dots S_n}}$$

WHERE THE SUCCESSIVE "S" VALUES ARE SPAN LENGTHS IN FEET. THE RULING SPAN IS SOMEWHAT LONGER THAN THE AVERAGE SPAN.

### EXAMPLE A

DETERMINE THE RULING SPAN FOR A SECTION OF LINE BETWEEN DEADENDS CONSISTING OF EIGHT (8) SPANS: 110', 150', 175', 200', 150', 124', 135', AND 140'. (SEE RULING SPAN SAMPLE LINE ON PAGE 3)

THE CALCULATION OF THE RULING SPAN SHALL BE AS FOLLOWS:

SPAN	SPAN <sup>3</sup>
110	1,331,000
150	3,375,000
175	5,359,375
200	8,000,000
150	3,375,000
124	1,906,624
135	2,460,375
+ 140	+ 2,744,000
1,184	28,551,374

$$\text{AVERAGE SPAN} = 1184/8 = 148 \text{ FT}$$

$$\text{RULING SPAN} = \sqrt{(28,551,374/1184)} = \sqrt{24114}$$

$$\text{RULING SPAN} = 155 \text{ FT}$$



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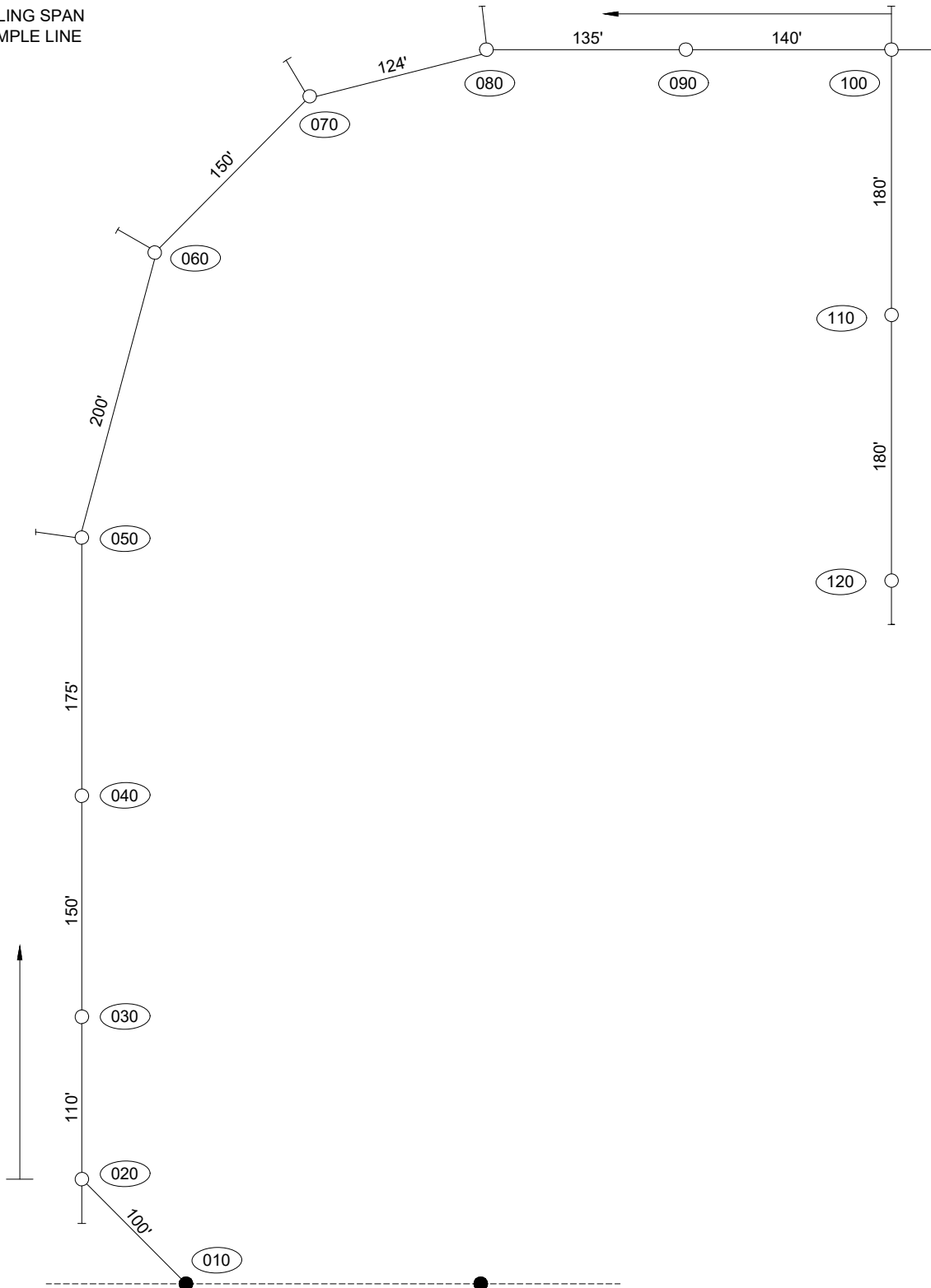
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TITLE:

GUY SELECTION TABLES FOR GRADE B CONSTRUCTION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. E-5 VERSION 4  
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← RULING SPAN  
SAMPLE LINE







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**GUY SELECTION TABLES FOR GRADE B CONSTRUCTION  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. E-5 VERSION 4  
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**TABLE A: TENSION FACTOR**

		GUY ATTACHMENT HEIGHT (FT)																	
		16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
GUY LEAD OR DISTANCE FROM POLE TO GUY ANCHOR (FT)	4	0.24	0.2	0.2	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.1	0.1	0.09	0.1	0.09	0.08	0.08
	6	0.35	0.3	0.29	0.26	0.24	0.22	0.21	0.2	0.18	0.17	0.16	0.16	0.1	0.14	0.1	0.13	0.12	0.12
	8	0.45	0.4	0.37	0.34	0.32	0.29	0.27	0.26	0.24	0.23	0.22	0.21	0.2	0.19	0.2	0.17	0.16	0.16
	10	0.53	0.5	0.45	0.41	0.38	0.36	0.34	0.32	0.3	0.28	0.27	0.25	0.2	0.23	0.2	0.21	0.2	0.2
	12	0.6	0.6	0.51	0.48	0.45	0.42	0.39	0.37	0.35	0.33	0.32	0.3	0.3	0.27	0.3	0.25	0.24	0.23
	14	0.66	0.6	0.57	0.54	0.5	0.47	0.45	0.42	0.4	0.38	0.36	0.35	0.3	0.32	0.3	0.29	0.28	0.27
	16	0.71	0.7	0.62	0.59	0.55	0.52	0.5	0.47	0.45	0.43	0.41	0.39	0.4	0.36	0.3	0.33	0.32	0.3
	18	0.75	0.7	0.67	0.63	0.6	0.57	0.54	0.51	0.49	0.47	0.45	0.43	0.4	0.39	0.4	0.36	0.35	0.34
	20	0.78	0.7	0.71	0.67	0.64	0.61	0.58	0.55	0.53	0.51	0.49	0.47	0.4	0.43	0.4	0.4	0.38	0.37
	22	0.81	0.8	0.74	0.71	0.68	0.65	0.62	0.59	0.57	0.54	0.52	0.5	0.5	0.46	0.4	0.43	0.42	0.4
	24	0.83	0.8	0.77	0.74	0.71	0.68	0.65	0.62	0.6	0.58	0.55	0.53	0.5	0.5	0.5	0.46	0.45	0.43
	26	0.85	0.8	0.79	0.76	0.73	0.71	0.68	0.65	0.63	0.61	0.59	0.56	0.5	0.53	0.5	0.49	0.48	0.46
	28	0.87	0.8	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.61	0.59	0.6	0.55	0.5	0.52	0.5	0.49
	30	0.88	0.9	0.83	0.81	0.78	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.6	0.58	0.6	0.55	0.53	0.51
	32	0.89	0.9	0.85	0.82	0.8	0.78	0.75	0.73	0.71	0.69	0.66	0.64	0.6	0.61	0.6	0.57	0.55	0.54
	34	0.9	0.9	0.86	0.84	0.82	0.79	0.77	0.75	0.73	0.71	0.69	0.67	0.6	0.63	0.6	0.59	0.58	0.56
	36	0.91	0.9	0.87	0.85	0.83	0.81	0.79	0.77	0.75	0.73	0.71	0.69	0.7	0.65	0.6	0.62	0.6	0.58
	38	0.92	0.9	0.88	0.87	0.85	0.83	0.81	0.78	0.76	0.75	0.73	0.71	0.7	0.67	0.7	0.64	0.62	0.61
	40	0.93	0.9	0.89	0.88	0.86	0.84	0.82	0.8	0.78	0.76	0.74	0.72	0.7	0.69	0.7	0.66	0.64	0.62
	42	0.93	0.9	0.9	0.89	0.87	0.85	0.83	0.81	0.8	0.78	0.76	0.74	0.7	0.71	0.7	0.67	0.66	0.64
44	0.94	0.9	0.91	0.89	0.88	0.86	0.84	0.83	0.81	0.79	0.77	0.76	0.7	0.72	0.7	0.69	0.68	0.66	
46	0.94	0.9	0.92	0.9	0.89	0.87	0.85	0.84	0.82	0.8	0.79	0.77	0.8	0.74	0.7	0.71	0.69	0.68	
48	0.95	0.9	0.92	0.91	0.89	0.88	0.86	0.85	0.83	0.82	0.8	0.78	0.8	0.75	0.7	0.72	0.71	0.69	
50	0.95	0.9	0.93	0.92	0.9	0.89	0.87	0.86	0.84	0.83	0.81	0.8	0.8	0.77	0.8	0.74	0.72	0.71	

TENSION FACTOR = SIN [TAN<sup>-1</sup> (L/H)]

L = GUY LEAD OR DISTANCE FROM POLE TO GUY ANCHOR (FT)

H = GUY ATTACHEMENT HEIGHT (FT)

**TABLE B: GUY WIRE STRENGTH DATA**

TYPE STRAND	SIZE	BREAKING STRENGTH (LBS)	PERMITTED LOAD (0.9 x RATED STRAND BREAKING STRENGTH) (LBS)
HIGH STRENGTH STEEL	½ IN	26,700	24,030

TABLE B: ILLUSTRATES DETAILS OF GUY WIRE USED BY LUMA FOR GUYING CONDUCTORS ON DISTRIBUTION LINES. THE LAST COLUMN OF THE TABLE SHOWS THE MAXIMUM LOAD PERMITTED ON A GUY WIRE, THAT IS 90% OF ITS RATED BREAKING STRENGTH FOR GRADE B CONSTRUCTION, AS SPECIFIED IN TABLE 261-1 OF THE 2017 EDITION OF THE NATIONAL ELECTRICAL SAFETY CODE (NEC).



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  
**GUY SELECTION TABLES FOR GRADE B CONSTRUCTION**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. E-5 VERSION 4  
 DOCUMENT NO. 4301.086  
 PAGE 5 OF 5 DATE NOV 2, 2023  
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 APPROVED RICARDO CASTRO LIC. 12135  
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**TABLE C: GUYING ASSEMBLY UNITS - LOAD ALLOWED**

GUYING ASSEMBLY TYPE	LUMA STD	LOAD ALLOWED (LBS) *	
		HORIZONTAL	@ 45 DEGREES
½" SINGLE GUY	E-1-2-3	5,000	7,100
½" SPAN GUY	E-2-1	6,600	--

TABLE C: ILLUSTRATES THE PERMITTED LOADS APPLIED TO THE GUYING ASSEMBLY

\* PERMITTED LOAD IS THE LESSER OF LOADS SHOWN OR PERMITTED LOAD OF GUY WIRE (SEE TABLE B: GUY WIRE STRENGTH DATA).  
 PERMITTED LOADS ARE DESIGNATED CAPACITIES MULTIPLIED BY 0.85 OF THE 2017 NESC STRENGTH FACTOR.  
 GREATER PERMITTED LOADS (STRENGTHS) ARE REQUIRED FOR GUY ANGLES LESS THAN 45 DEGREES.

**TABLE D: OVERLOAD FACTORS FOR POLES, GUYS, ANCHORS, ETC.**

	OVERLOAD FACTORS
	GRADE B
<b>RULE 250B LOADS</b>	
VERTICAL LOADS	1.50
<b>TRANSVERSE LOADS</b>	
WIND	2.50
WIRE TENSION	1.65
<b>LONGITUDINAL LOADS</b>	
IN GENERAL	1.10
AT DEADENDS	1.65
AT DEADENDS (FOR GUYS)	1.65

TABLE D: ILLUSTRATES THE OVERLOAD FACTORS ADAPTED FROM THE 2017 NESC, TABLE 253-1. (USE WITH NESC TABLE 261-1: STRENGTH FACTORS)

**TABLE D: STANDARD WASHERS - LOAD ALLOWED**

WASHER SIZE AND TYPE	APPROXIMATE AREA (SQUARE INCHES)	LOAD ALLOWED ABUTTING POLE (LBS)
2-¼ IN. FLAT SQUARE	4.6	4,200

TABLE D: ILLUSTRATES LUMA'S AVAILABLE STANDARD WASHER SIZE AND MAXIMUM LOAD APPLIED AT EACH WASHER



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

EXPANSION ANCHOR  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. F-1-3 VERSION 5

DOCUMENT NO. 4301.087

PAGE 1 OF 2 DATE JAN 18, 2024

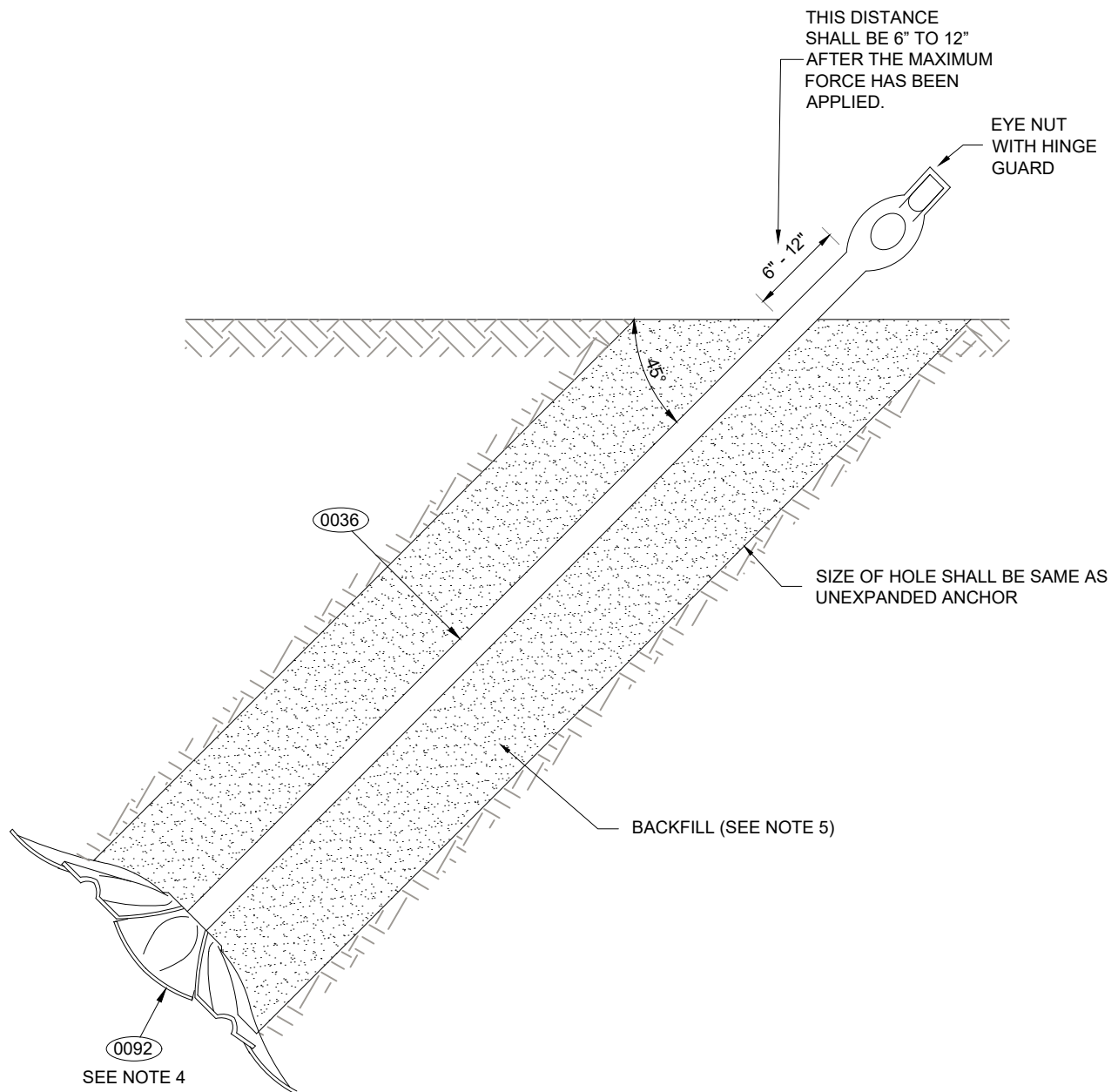
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DIGITIZED EMILIO CUADRADO LIC. 3000

VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>EXPANSION ANCHOR</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>F-1-3</u> VERSION <u>5</u>
	DOCUMENT NO. <u>4301.087</u>
	PAGE <u>2 OF 2</u> DATE <u>JAN 18, 2024</u>
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	DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u> <u>VICTOR R. FEBRES LIC. 3412</u>

SOIL CLASSIFICATIONS		
CLASS	GENERAL DESCRIPTION	MAX. TENSION FORCE
3	DENSE CLAYED SAND, SAND, GRAVEL; VERY STIFF TO HARD SILTS AND CLAYS	36,000 LBF
4	MEDIUM DENSE SANDY GRAVEL; VERY STIFF TO HARD SILTS AND CLAYS	34,000 LBF
5	MEDIUM DENSE COARSE SAND AND SANDY GRAVELS; STIFF TO VERY STIFF SILTS AND CLAYS	26,500 LBF
6	LOOSE TO MEDIUM DENSE FINE TO COARSE SAND; FIRM TO STIFF CLAYS AND SILTS	21,500 LBF
7	LOOSE TO FINE SAND; ALLUVIUM; LOESS; SOFT-FIRM CLAYS; VARVED CLAYS; FILL	16,000 LBF

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0036	1" X 10' THREADED THIMBLE-EYE GALVANIZED ANCHOR ROD	002-13801	1
0092	8-WAY 12" EXPANSION ANCHOR	002-13546	1

**NOTES:**

1. GUYS SHALL NOT BE CONNECTED TO THE POLE GROUND, SINCE THIS CREATES A GALVANIC CIRCUIT PATH WHICH CAN LEAD TO CORROSION OF THE ANCHOR.
2. SEE STANDARD NO. E-1-2-3 FOR DETAILS OF THE CONNECTION BETWEEN GUY WIRE AND ROD.
3. MAXIMUM TENSION FORCE BY SOIL CLASSIFICATION IS REFERENCED FROM RUS TECHNICAL BULLETIN 1724E-153.
4. AFTER INSERTING AN EXPANSION ANCHOR TO PROPER DEPTH, IT SHALL BE COMPLETELY EXPANDED WITH A DRIVER OR TAMPING BAR. THE BACKFILL SHALL BE THOROUGHLY TAMPED.
5. SELECTED MATERIAL FOR BACKFILL COULD BE THE MATERIAL TAKEN FROM THE EXCAVATION IF IT IS FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER, OR A-2-4 MATERIAL. BACKFILL SHALL BE COMPACTED EVERY 6" LAYERS.
6. THE ROD SHALL BE ALIGNED WITHIN 5° WITH THE GUY LOAD.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

HELIX TYPE ANCHOR  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. F-4-1 VERSION 6

DOCUMENT NO. 4301.089

PAGE 1 OF 2 DATE JAN 23, 2024

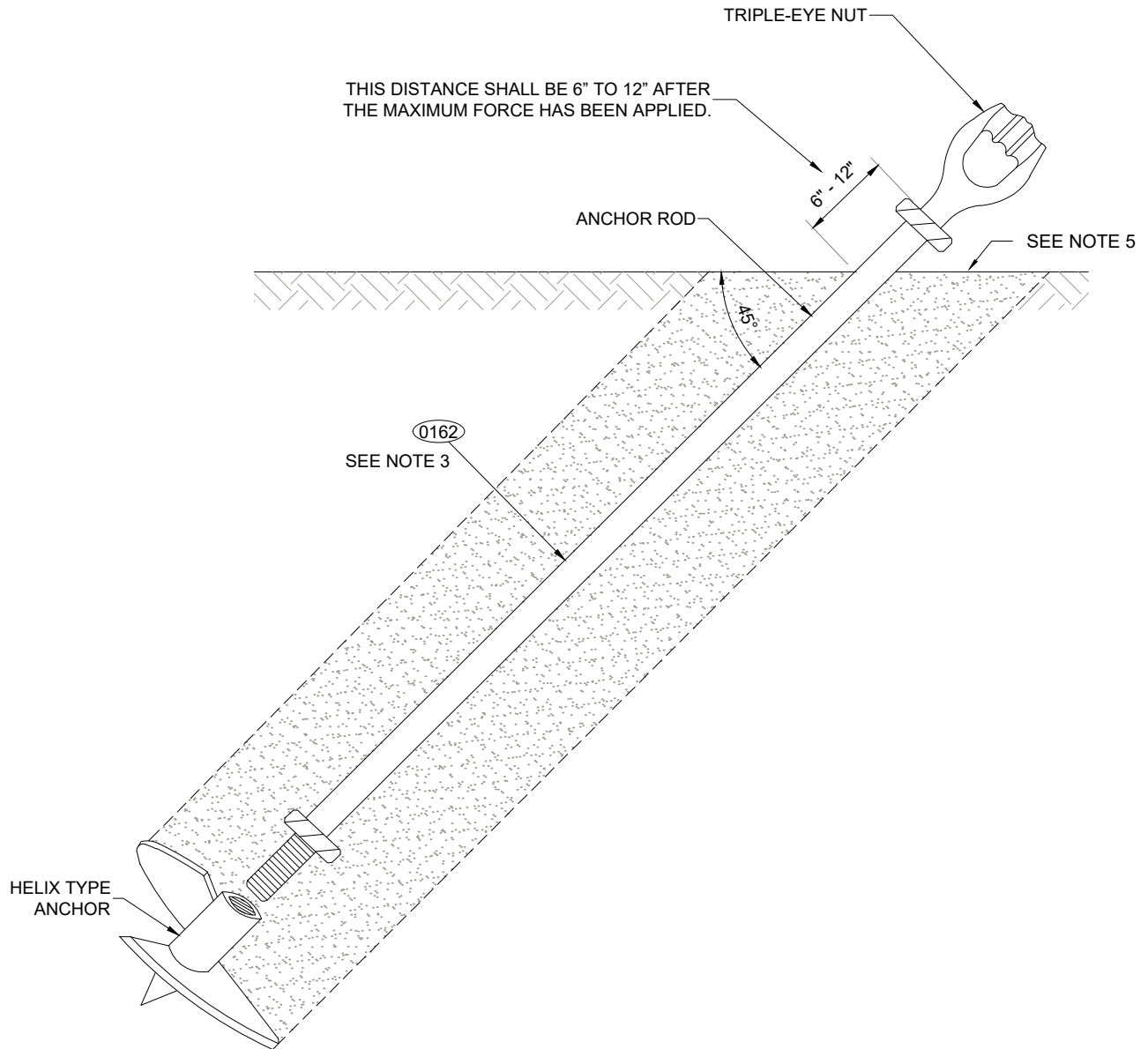
SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>HELIX TYPE ANCHOR</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>F-4-1</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.089</u>
	PAGE <u>2 OF 2</u> DATE <u>JAN 23, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	
	<u>VICTOR R. FEBRES LIC. 3412</u>

SOIL CLASSIFICATION		
CLASS	GENERAL DESCRIPTION	MAX. TENSION FORCE
5	MEDIUM DENSE COARSE SAND AND SANDY GRAVELS; STIFF TO VERY STIFF SILTS AND CLAYS	24,000 LBF
6	LOOSE TO MEDIUM DENSE FINE TO COARSE SAND; FIRM TO STIFF CLAYS AND SILTS	15,000 LBF
7	LOOSE TO FINE SAND; ALLUVIUM; LOESS; SOFT-FIRM CLAYS; VARVED CLAYS; FILL	17,000 LBF

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0162	HELIX TYPE ANCHOR KIT	002-82193	1
	3'-6" ROD EXTENSION WITH COUPLING	002-83586	AS REQ.
	7' ROD EXTENSION WITH COUPLING	002-83587	AS REQ.

**NOTES:**

1. GUYS SHALL NOT BE CONNECTED TO THE POLE GROUND, SINCE THIS CREATES A GALVANIC CIRCUIT PATH WHICH CAN LEAD TO CORROSION OF THE ANCHOR.
2. SEE STANDARD NO. E-1-2-3 FOR DETAILS OF THE CONNECTION BETWEEN GUY WIRE AND ROD.
3. WHEN A GREATER DEPTH IS NEEDED TO OBTAIN THE REQUIRED HOLDING STRENGTH, ADD ADDITIONAL ROD EXTENSIONS. COUPLING ARE REQUIRED BETWEEN ROD EXTENSIONS.
4. MAXIMUM TENSION FORCE BY SOIL CLASSIFICATION IS REFERENCED FROM RUS TECHNICAL BULLETIN 1724E-153.
5. IT IS REQUIRED TO ADEQUATELY TAMP THE SOIL SURFACE AFTER ANCHOR INSTALLATION.



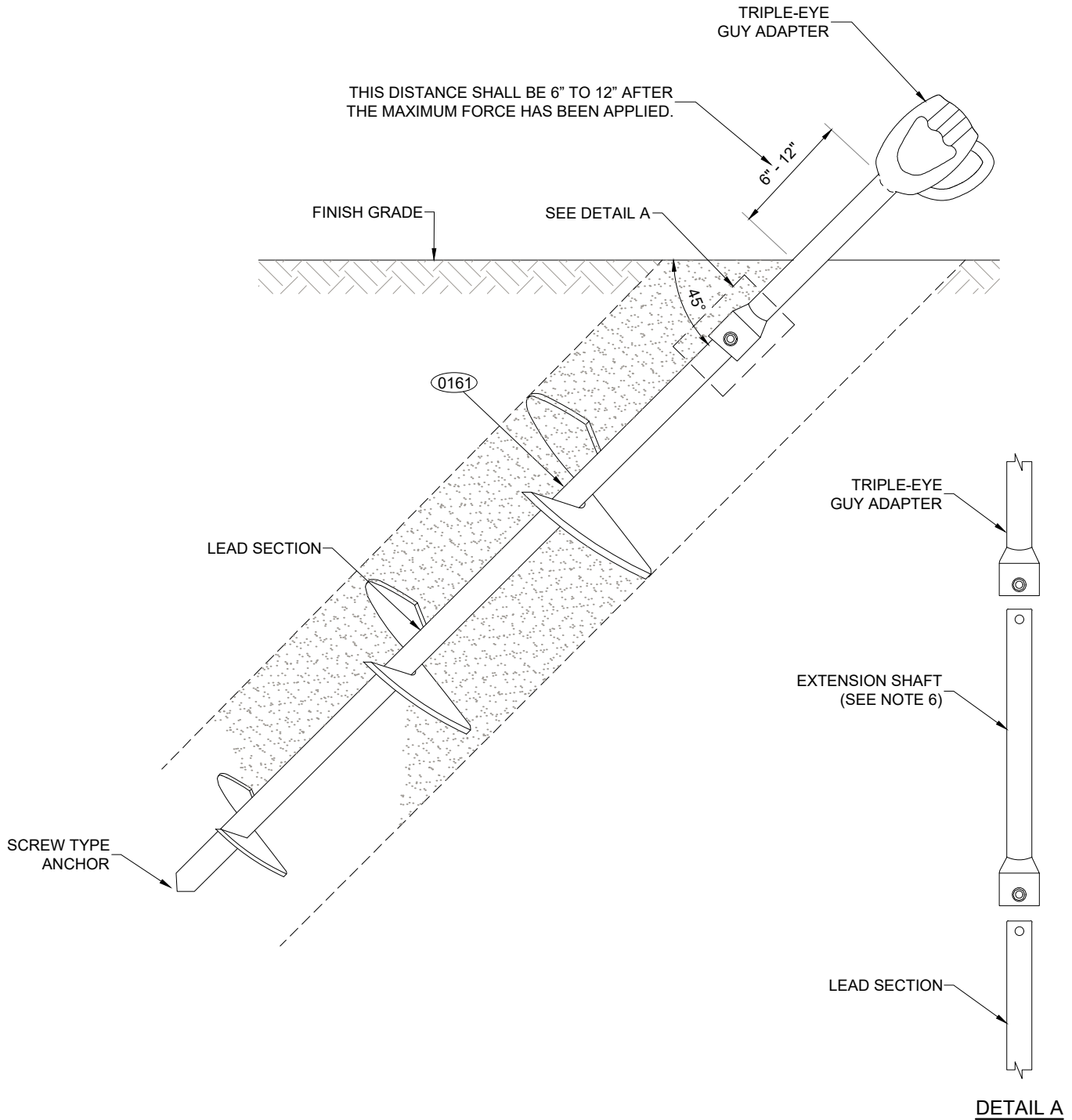
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SCREW TYPE ANCHOR  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. F-4-2 VERSION 6  
DOCUMENT NO. 4301.088  
PAGE 1 OF 2 DATE JAN 24, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SCREW TYPE ANCHOR  
MAXIMUM VOLTAGE : 13.2 KV  
NOTES AND BILL OF MATERIAL

STANDARD NO. F-42 VERSION 6  
DOCUMENT NO. 4301.088  
PAGE 2 OF 2 DATE JAN 24, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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VICTOR R. FEBRES LIC. 3412

SOIL CLASSIFICATION		
CLASS	GENERAL DESCRIPTION	MAX. TENSION FORCE
2	DENSE FINE SAND; VERY HARD SILTS AND CLAYS	69,000 LBF
3	DENSE CLAYED SAND, SAND, GRAVEL; VERY STIFF TO HARD SILTS AND CLAYS	61,000 LBF
4	MEDIUM DENSE SANDY GRAVEL; VERY STIFF TO HARD SILTS AND CLAYS	53,000 LBF
5	MEDIUM DENSE COARSE SAND AND SANDY GRAVELS; STIFF TO VERY STIFF SILTS AND CLAYS	45,000 LBF
6	LOOSE TO MEDIUM DENSE FINE TO COARSE SAND; FIRM TO STIFF CLAYS AND SILTS	37,000 LBF
7	LOOSE TO FINE SAND; ALLUVIUM; LOESS; SOFT-FIRM CLAYS; VARVED CLAYS; FILL	29,000 LBF

MATERIAL			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0161	SCREW TYPE ANCHOR KIT	002-82194	1

**NOTES:**

1. THE DIAGRAM CONSISTS OF LEAD SECTION, EXTENSION SHAFT AND A TRIPLE-EYE GUY ADAPTER, ACCORDING TO THE REQUIRED DEPTH.
2. GUYS SHALL NOT BE CONNECTED TO THE POLE GROUND, SINCE THIS CREATES A GALVANIC CIRCUIT PATH WHICH CAN LEAD TO CORROSION OF THE ANCHOR.
3. MANUAL OR POWER INSTALLATIONS MAY BE USED.
4. SEE STANDARD NO. E-1-2-3 FOR DETAILS OF THE CONNECTION BETWEEN GUY WIRE AND ROD.
5. MAXIMUM TENSION FORCE BY SOIL CLASSIFICATION IS REFERENCED FROM RUS TECHNICAL BULLETIN 1724E-153.
6. WHEN A GREATER DEPTH IS NEEDED TO OBTAIN THE REQUIRED HOLDING STRENGTH ADD AN EXTENSION SHAFT BETWEEN THE LEAD SECTION AND GUY TRIPLE-EYE ADAPTER.
7. IT IS REQUIRED TO ADEQUATELY TAMP THE SOIL ON THE SURFACE AFTER ANCHOR INSTALLATION.





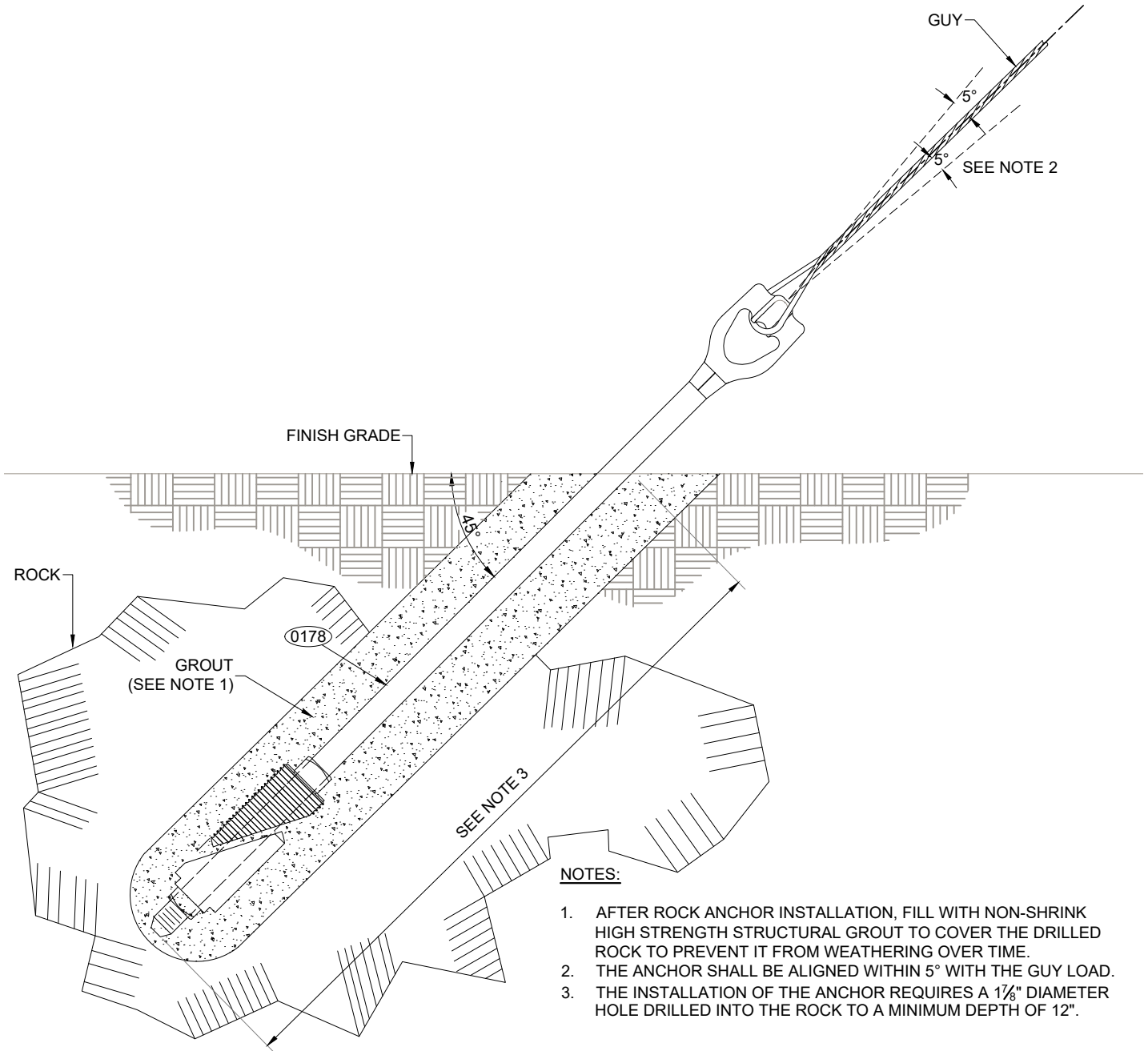
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**ROCK ANCHOR**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. F-5-1 VERSION 4  
 DOCUMENT NO. 4301.090  
 PAGE 1 OF 1 DATE JAN 22, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



**NOTES:**

1. AFTER ROCK ANCHOR INSTALLATION, FILL WITH NON-SHRINK HIGH STRENGTH STRUCTURAL GROUT TO COVER THE DRILLED ROCK TO PREVENT IT FROM WEATHERING OVER TIME.
2. THE ANCHOR SHALL BE ALIGNED WITHIN 5° WITH THE GUY LOAD.
3. THE INSTALLATION OF THE ANCHOR REQUIRES A 1 1/8" DIAMETER HOLE DRILLED INTO THE ROCK TO A MINIMUM DEPTH OF 12".

**MATERIAL**

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0178	ROCK ANCHOR	002-71831	1



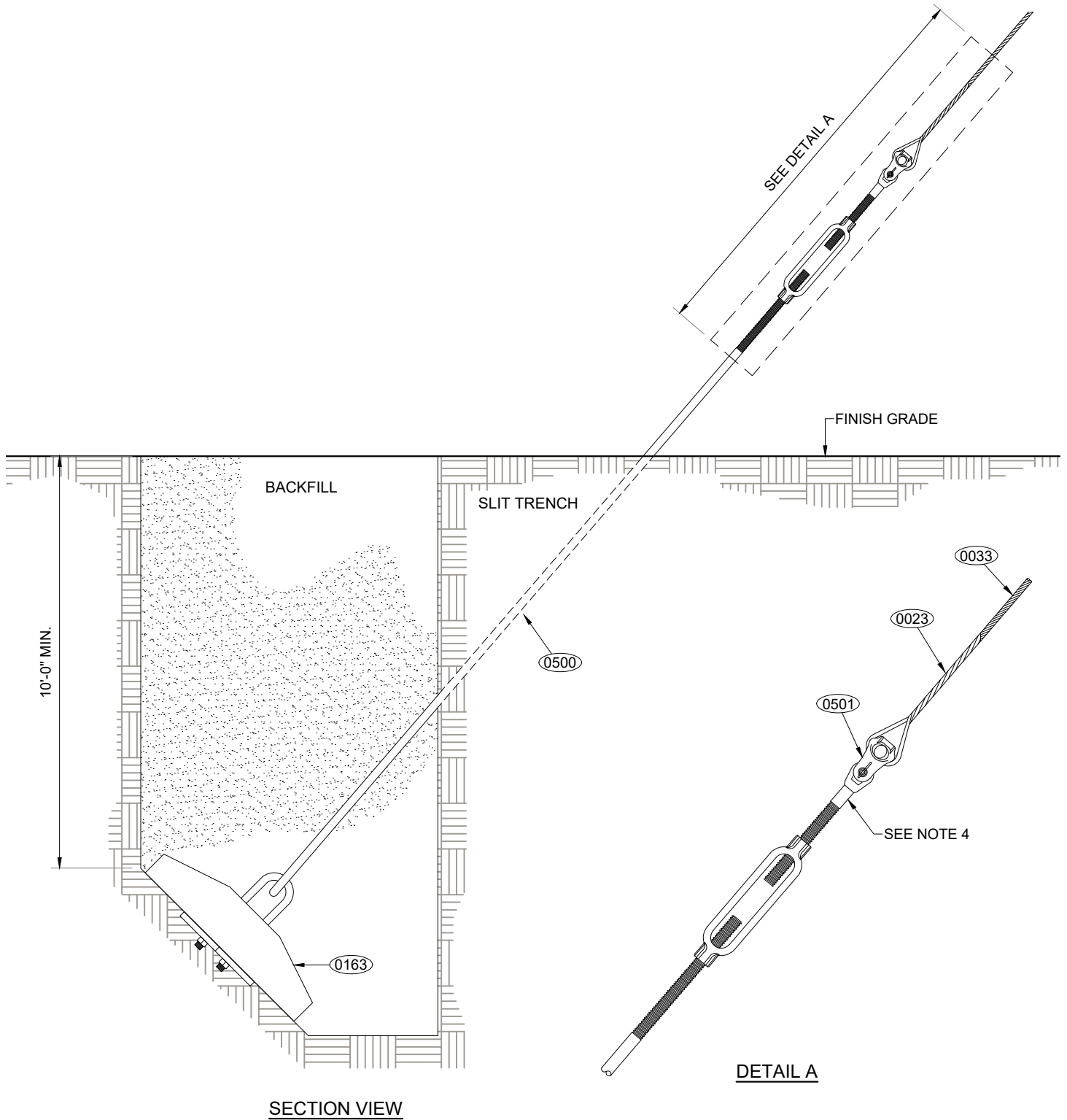
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SWAMP ANCHOR  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. F-6-1 VERSION 5  
DOCUMENT NO. 4301.091  
PAGE 1 OF 2 DATE JAN 24, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412





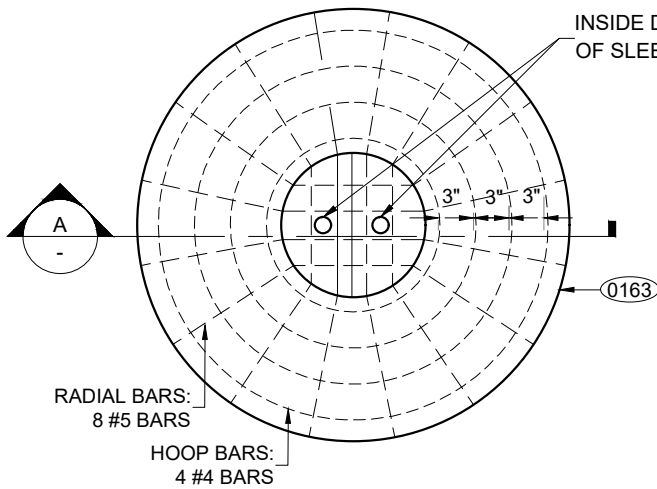
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OVERHEAD DISTRIBUTION STANDARDS

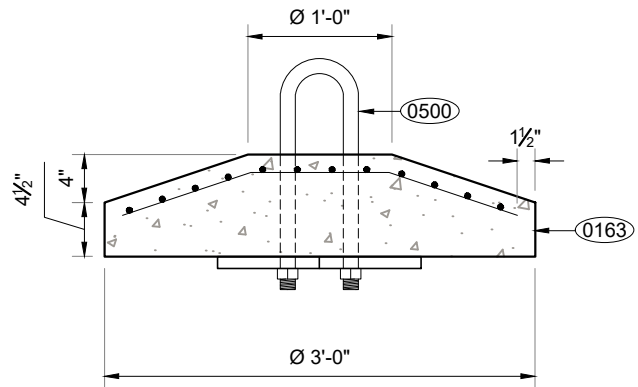
TITLE:

**SWAMP ANCHOR**  
**MAXIMUM VOLTAGE: 13.2 KV**  
**NOTES AND BILL OF MATERIAL**

STANDARD NO. F-6-1 VERSION 5  
 DOCUMENT NO. 4301.091  
 PAGE 2 OF 2 DATE JAN 24, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED VICTOR R. FEBRES LIC. 3412



TOP VIEW



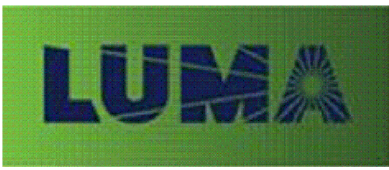
SECTION A

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0023	1/2" GUY GRIP	002-13736	1
0033	1/2" GUY WIRE	046-00219	AS REQ.
0163	3' CONCRETE DOME ANCHOR	002-14544	1
0500	TRANSMISSION GUY ANCHOR SYSTEM	002-13835	1
0501	GUY THIMBLE CLEVIS	002-79041	1

### NOTES:

1. THE ANCHOR ROD MUST BE LONG ENOUGH, SO THAT IT GOES DEEPLY INTO THE FIRM LAYER OF GROUND (SOIL CLASSIFICATIONS 5, 6, OR 7).
2. GUYS SHALL NOT BE CONNECTED TO THE POLE GROUND, SINCE THIS CREATES A GALVANIC CIRCUIT PATH THAT CAN LEAD TO CORROSION OF THE ANCHOR.
3. THE DEPTH OF EXCAVATION VARIES ACCORDING TO THE FINISHED GRADE.
4. USE WELD, LOCKNUT OR EQUIVALENT METHOD TO PREVENT ROTATION OF THE OVAL EYE ROD.
5. SELECTED MATERIAL FOR BACKFILL COULD BE THE MATERIAL TAKEN FROM THE EXCAVATION IF IT IS FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER, OR A-2-4 MATERIAL. BACKFILL SHALL BE COMPACTED EVERY 6" LAYERS.



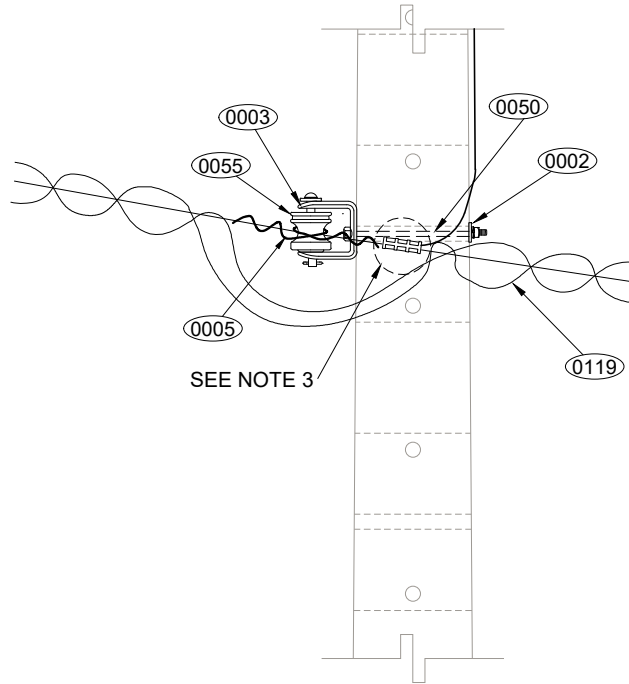
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SECONDARY TRIPLEX CABLE  
0° - 10° ANGLE TANGENT  
MAXIMUM VOLTAGE: 480 V**

STANDARD NO. K-1 VERSION 3  
DOCUMENT NO. 4301.057  
PAGE 1 OF 1 DATE FEB 06, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412



## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	1
0003	CLEVIS	002-13488	1
0005	TIE WIRE	002-82035	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	1
0055	SPOOL TYPE INSULATOR	014-00696	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR 35' POLES, USE A THROUGH BOLT (ITEM 0001) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.



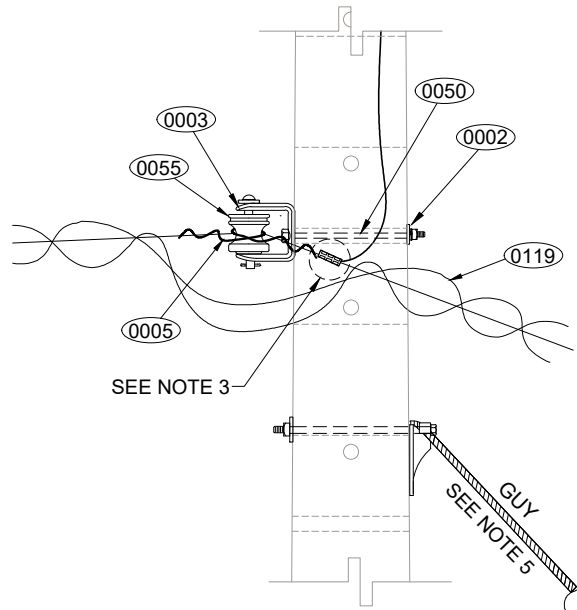
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SECONDARY TRIPLEX CABLE  
11° - 60° ANGLE TANGENT  
MAXIMUM VOLTAGE: 480 V**

STANDARD NO.   K-2   VERSION   3    
DOCUMENT NO.   4301.058    
PAGE   1 OF 1   DATE   FEB 07, 2024    
SUBMITTED   LUIS R. SOTO LIC. 11658    
REVIEWED   IVETTE D. SANCHEZ LIC. 13837    
APPROVED   RICARDO CASTRO LIC. 12135    
DIGITIZED   VICTOR R. FEBRES LIC. 3412  

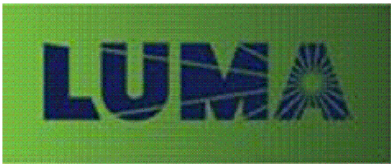


## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	1
0003	CLEVIS	002-13488	1
0005	TIE WIRE	002-82035	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	1
0055	SPOOL TYPE INSULATOR	014-00696	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR 35' POLES, USE A THROUGH BOLT (ITEM 0001) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.



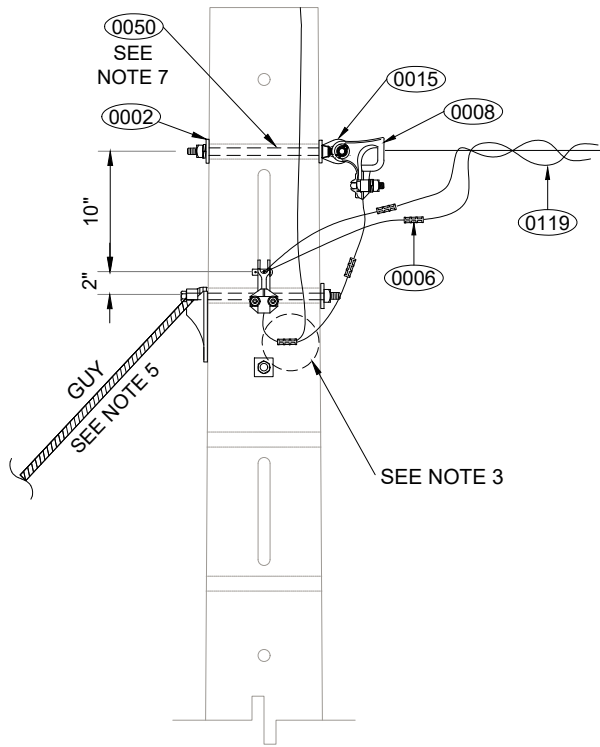
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

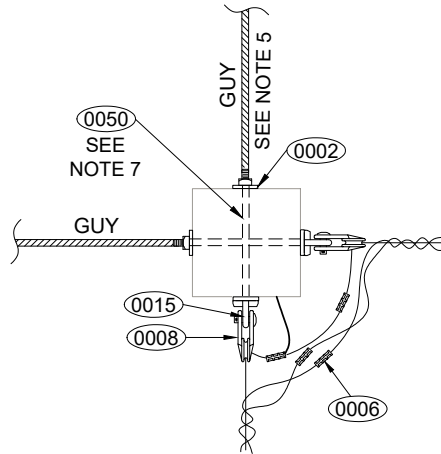
TITLE:

SECONDARY TRIPLEX CABLE  
60° - 90° ANGLE  
MAXIMUM VOLTAGE: 480 V

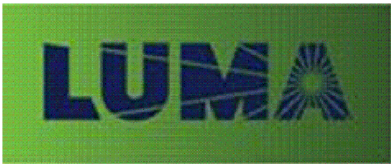
STANDARD NO.     K-4     VERSION     3      
DOCUMENT NO.     4301.061      
PAGE     1 OF 2     DATE     FEB 5, 2024      
SUBMITTED     LUIS R. SOTO LIC. 11658      
REVIEWED     IVETTE D. SANCHEZ LIC. 13837      
APPROVED     RICARDO CASTRO LIC. 12135      
DIGITIZED     VICTOR R. FEBRES LIC. 3412      
    EMILIO CUADRADO LIC. 3000    



ELEVATION VIEW  
VIEW A ASSY-1500



TOP VIEW



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SECONDARY TRIPLEX CABLE  
60° - 90° ANGLE  
MAXIMUM VOLTAGE: 480 V  
NOTES AND BILL OF MATERIAL

STANDARD NO. K-4 VERSION 3  
DOCUMENT NO. 4301.061  
PAGE 2 OF 2 DATE FEB 5, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	3
0008	TENSION CLAMP	VARIES	2
0015	EYE NUT	002-04495	2
0050	DOUBLE ARMING BOLT	VARIES	2
0119	TRIPLEX CABLE	VARIES	AS REQ.
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR 35' POLES, USE AN EYE BOLT (ITEM 0007) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050) AND EYE NUT (ITEM 0015).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.



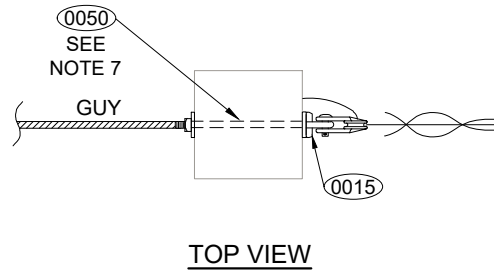
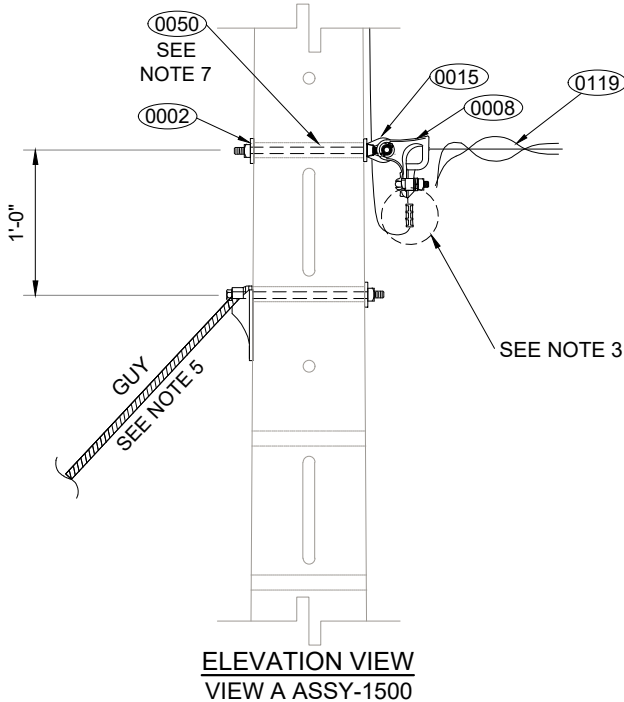
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SECONDARY TRIPLEX CABLE  
SINGLE DEADEND  
MAXIMUM VOLTAGE: 480 V**

STANDARD NO.     K-5     VERSION     3      
DOCUMENT NO.     4301.101      
PAGE     1 OF 1     DATE     FEB 6, 2024      
SUBMITTED     LUIS R. SOTO LIC. 11658      
REVIEWED     IVETTE D. SANCHEZ LIC. 13837      
APPROVED     RICARDO CASTRO LIC. 12135      
DIGITIZED     VICTOR R. FEBRES LIC. 3412      
    EMILIO CUADRADO LIC. 3000    



**ELEVATION VIEW  
VIEW A ASSY-1500**

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0008	TENSION CLAMP	VARIES	1
0015	EYE NUT	002-04495	1
0050	DOUBLE ARMING BOLT	VARIES	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR 35' POLES, USE AN EYE BOLT (ITEM 0007) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050) AND EYE NUT (ITEM 0015).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.





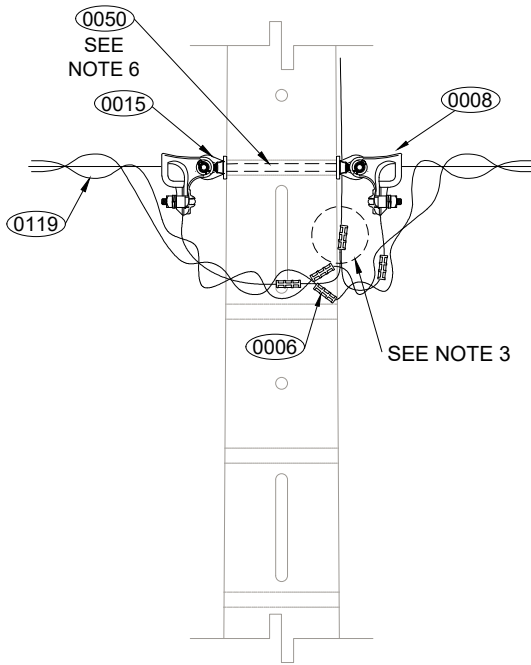
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

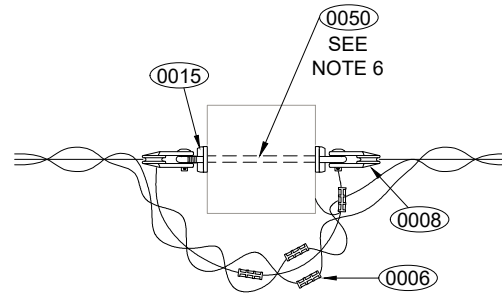
TITLE:

**SECONDARY TRIPLEX CABLE  
DOUBLE DEADEND  
MAXIMUM VOLTAGE: 480 V**

STANDARD NO.     K-6     VERSION     3      
 DOCUMENT NO.     4301.102      
 PAGE     1 OF 1     DATE     FEB 6, 2024      
 SUBMITTED     LUIS R. SOTO LIC. 11658      
 REVIEWED     IVETTE D. SANCHEZ LIC. 13837      
 APPROVED     RICARDO CASTRO LIC. 12135      
 DIGITIZED     VICTOR R. FEBRES LIC. 3412      
    EMILIO CUADRADO LIC. 3000    



**ELEVATION VIEW  
VIEW A ASSY-1500**



**TOP VIEW**

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTOR	VARIES	3
0008	TENSION CLAMP	VARIES	2
0015	EYE NUT	002-04495	2
0050	DOUBLE ARMING BOLT	VARIES	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR 35' POLES, USE AN EYE BOLT (ITEM 0007) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050) AND EYE NUT (ITEM 0015).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.



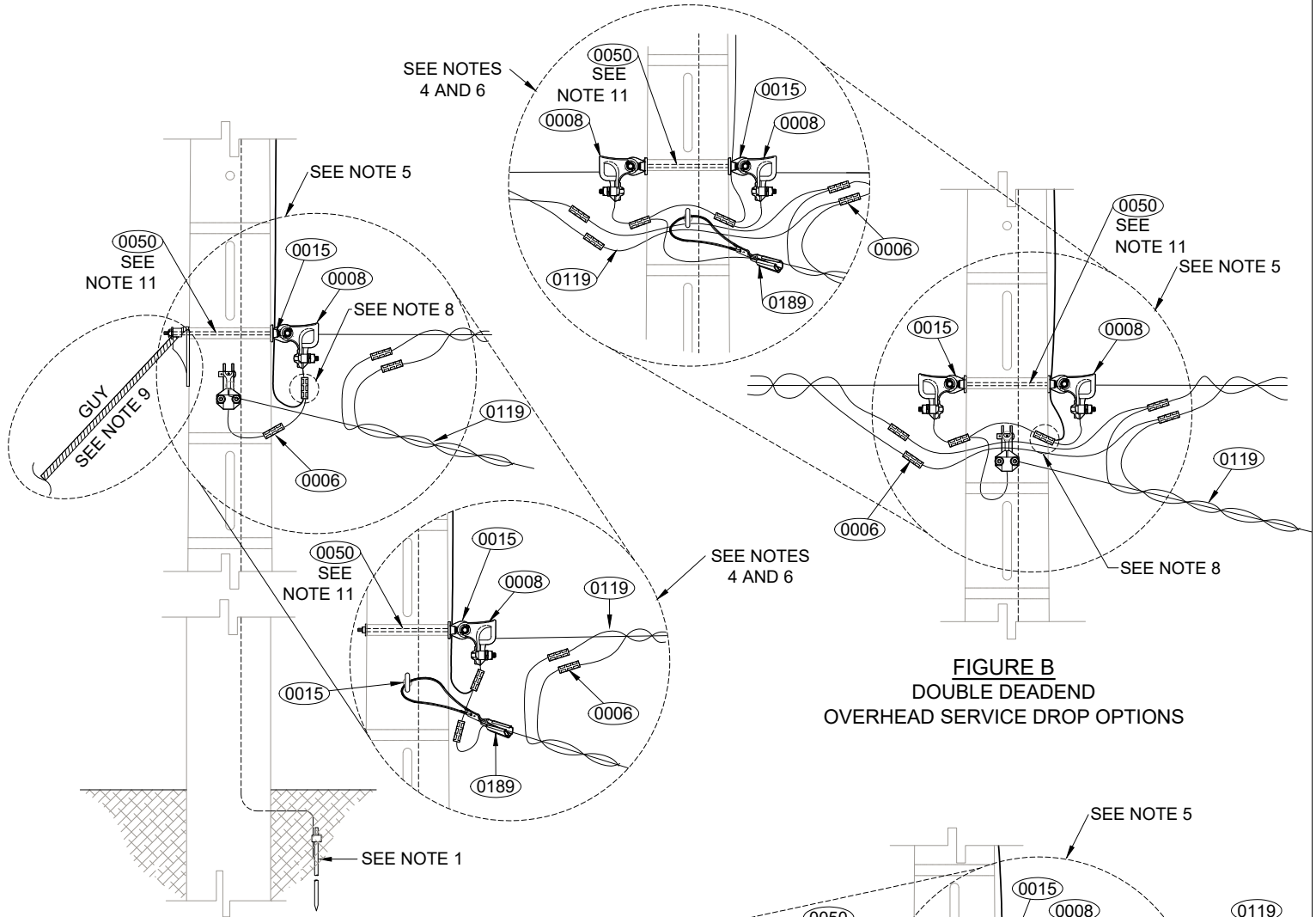
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

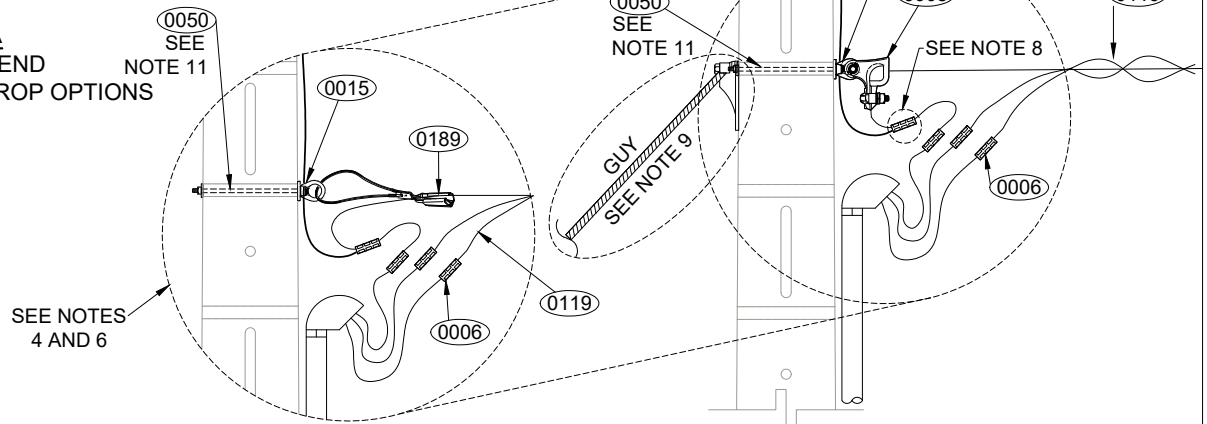
**SECONDARY TRIPLEX CABLE DEADEND AND SERVICE CONNECTION**  
MAXIMUM VOLTAGE: 480 V

STANDARD NO.	K-7	VERSION	5
DOCUMENT NO.	4301.092		
PAGE	1 OF 2	DATE	FEB 07, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		



**FIGURE B**  
DOUBLE DEADEND  
OVERHEAD SERVICE DROP OPTIONS

**FIGURE A**  
SINGLE DEADEND  
OVERHEAD SERVICE DROP OPTIONS



**FIGURE C**  
SINGLE DEADEND  
UNDERGROUND SERVICE LATERAL OPTIONS



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**  
**SECONDARY TRIPLEX CABLE DEADEND AND SERVICE CONNECTION**  
**MAXIMUM VOLTAGE: 480 V**  
**NOTES AND BILL OF MATERIAL**

STANDARD NO.     K-7     VERSION     5      
DOCUMENT NO.     4301.092      
PAGE     2 OF 2     DATE     FEB 07, 2024      
SUBMITTED     LUIS R. SOTO LIC. 11658      
REVIEWED     IVETTE D. SANCHEZ LIC. 13837      
APPROVED     RICARDO CASTRO LIC. 12135      
DIGITIZED     EMILIO CUADRADO LIC. 3000      
    VICTOR R. FEBRES LIC. 3412    

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.	"C" QTY.
0002	FLAT ROUND WASHER	VARIES	4	4	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	3	6	3
0008	TENSION CLAMP	006-00833	AS REQ.	AS REQ.	AS REQ.
0015	EYE NUT	002-04495	2	3	1
0050	DOUBLE ARMING BOLT	VARIES	2	2	1
0077	VINYL INSULATING TAPE	VARIES	AS REQ.	AS REQ.	AS REQ.
0119	TRIPLEX CABLE	VARIES	AS REQ.	AS REQ.	AS REQ.
189	ALUMINUM DEADEND WEDGE	VARIES	AS REQ.	AS REQ.	AS REQ.
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1	1	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.	AS REQ.	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- USE VINYL INSULATING TAPE (ITEM 0077) ON CONNECTORS (ITEM 0006).
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR ALUMINUM CONDUCTOR SERVICE DROP INSTALLATION, USE A DEADEND WEDGE (ITEM 0189) TO ATTACH THE BARE NEUTRAL CONDUCTOR TO THE EYE NUT (ITEM 0015).
- FOR COPPER CONDUCTOR, IT IS REQUIRED TO ATTACH THE BARE NEUTRAL CONDUCTOR DIRECTLY TO A TENSION CLAMP (ITEM 0008).
- DEADEND WEDGE CAN HAVE A RIGID BAIL OR FLEXIBLE BAIL. THE RIGID BAIL IS TO BE USED WITH HOOKS AND INSULATORS LARGER THAN 1½" IN DIAMETER. THE FLEXIBLE BAIL IS TO BE USED WITH HOOKS AND SMALL EYES.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- REFER TO ASSEMBLY NO ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- FOR 35' POLES, USE A THROUGH BOLT (ITEM 0001) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.



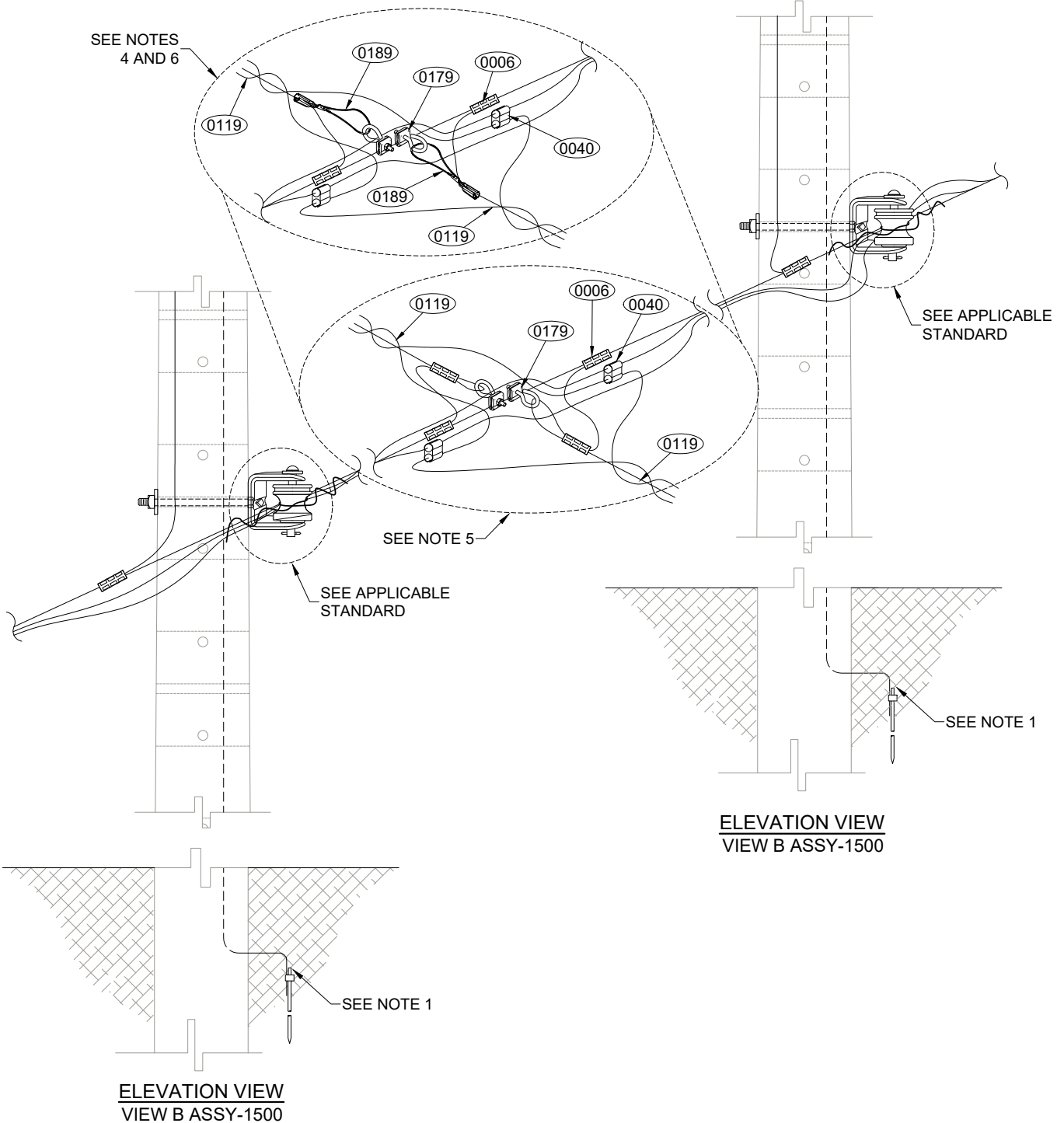
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## SECONDARY TRIPLEX CABLE MIDSPAN SERVICE DROP MAXIMUM VOLTAGE: 480 V

STANDARD NO. K-7-1 VERSION 6  
DOCUMENT NO. 4301.093  
PAGE 1 OF 2 DATE FEB 07, 2024  
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DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

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<b>TITLE:</b>  <b>SECONDARY TRIPLEX CABLE MIDSPAN SERVICE DROP</b> <b>MAXIMUM VOLTAGE: 480 V</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>  K-7-1  </u> VERSION <u>  6  </u>
	DOCUMENT NO. <u>  4301.093  </u>
	PAGE <u>  2 OF 2  </u> DATE <u>  FEB 07, 2024  </u>
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	DIGITIZED <u>  EMILIO CUADRADO LIC. 3000  </u> <u>  VICTOR R. FEBRES LIC. 3412  </u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0040	SPAN TAP CONNECTOR	002-03695	AS REQ.
0119	TRIPLEX CONDUCTOR	VARIES	AS REQ.
0179	SPAN CLAMP	002-83735	AS REQ.
0189	ALUMINUM DEADEND WEDGE	VARIES	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- USE OF MIDSPAN SERVICE DROP IS NOT PREFERRED.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR ALUMINUM CONDUCTOR SERVICE DROP INSTALLATION, USE A DEADEND WEDGE (ITEM 0189) TO ATTACH THE BARE NEUTRAL CONDUCTOR TO THE EYE NUT (ITEM 0007).
- FOR COPPER CONDUCTOR, IT IS REQUIRED TO ATTACH THE BARE NEUTRAL CONDUCTOR DIRECTLY TO THE SPAN CLAMP.
- DEADEND WEDGE CAN HAVE A RIGID BAIL OR FLEXIBLE BAIL. THE RIGID BAIL IS TO BE USED WITH EYE HOOKS AND INSULATORS LARGER THAN 1½" IN DIAMETER. THE FLEXIBLE BAIL IS TO BE USED WITH HOOKS AND SMALL EYES.



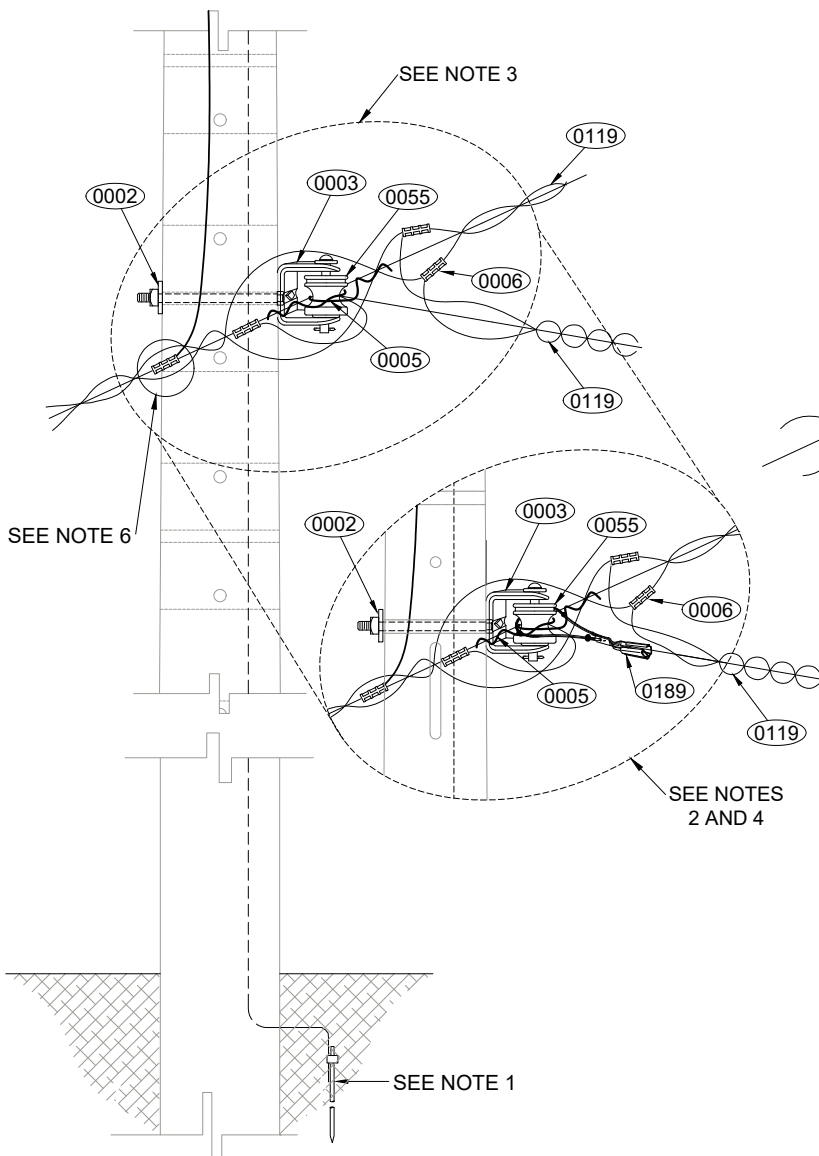
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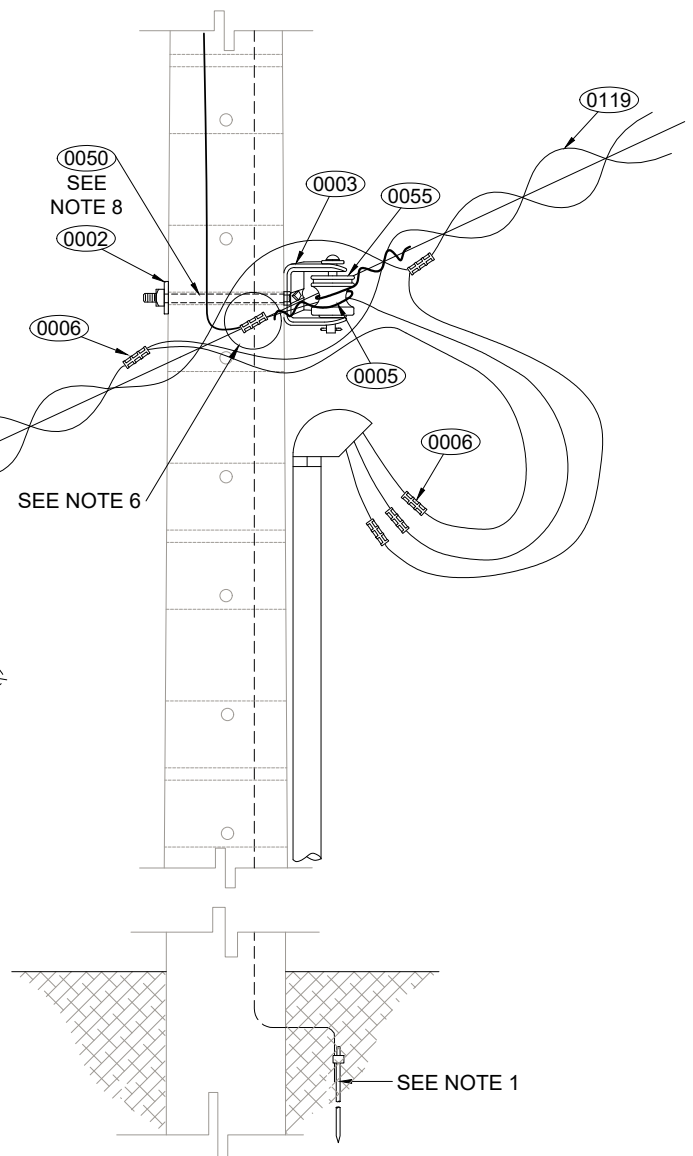
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**SECONDARY TRIPLEX CABLE TANGENT AND SERVICE CONNECTION**  
**MAXIMUM VOLTAGE: 480 V**

STANDARD NO. K-7-2 VERSION 5  
DOCUMENT NO. 4301.094  
PAGE 1 OF 2 DATE FEB 6, 2024  
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REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



**FIGURE A**  
**TANGENT**  
**OVERHEAD SERVICE DROP OPTIONS**



**FIGURE B**  
**TANGENT**  
**UNDERGROUND SERVICE LATERAL**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  
**SECONDARY TRIPLEX CABLE TANGENT AND SERVICE CONNECTION**  
**MAXIMUM VOLTAGE: 480 V**  
**NOTES AND BILL OF MATERIAL**

STANDARD NO. K-7-2 VERSION 5  
DOCUMENT NO. 4301.094  
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APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.
0002	FLAT SQUARE WASHER	VARIES	2	2
0003	CLEVIS	002-13488	1	1
0005	TIE WIRE	002-82035	AS REQ.	AS REQ.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	3	6
0050	DOUBLE ARMING BOLT	VARIES	1	1
0055	SPOOL TYPE INSULATOR	014-00696	1	1
0077	VINYL INSULATING TAPE	VARIES	AS REQ.	AS REQ.
0119	TRIPLEX CABLE	VARIES	AS REQ.	AS REQ.
0189	ALUMINUM DEADEND WEDGE	VARIES	AS REQ.	-
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1	1

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- FOR ALUMINUM CONDUCTOR SERVICE DROP INSTALLATION, USE A DEADEND WEDGE (ITEM 0189) TO ATTACH THE BARE NEUTRAL CONDUCTOR TO THE SPOOL TYPE INSULATOR (ITEM 0055).
- FOR COPPER CONDUCTOR, IT IS REQUIRED TO ATTACH THE BARE NEUTRAL CONDUCTOR DIRECTLY TO A SPOOL TYPE INSULATOR.
- DEADEND WEDGE CAN HAVE A RIGID BAIL OR FLEXIBLE BAIL. THE RIGID BAIL IS TO BE USED WITH EYE HOOKS AND INSULATORS LARGER THAN 1½" IN DIAMETER. THE FLEXIBLE BAIL IS TO BE USED WITH HOOKS AND SMALL EYES.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- FOR 35' POLES, USE THROUGH BOLT (ITEM 0001) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050).
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND, NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- USE VINYL INSULATING TAPE (ITEM 0077) ON CONNECTORS (ITEM 0006).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**

**CONNECTION OF SECONDARY TRIPLEX CABLE SERVICE DROP TO  
CUSTOMER'S CONCRETE COLUMN  
MAXIMUM VOLTAGE: 480 V**

STANDARD NO. K-7-3-1 VERSION 7

DOCUMENT NO. 4301.095

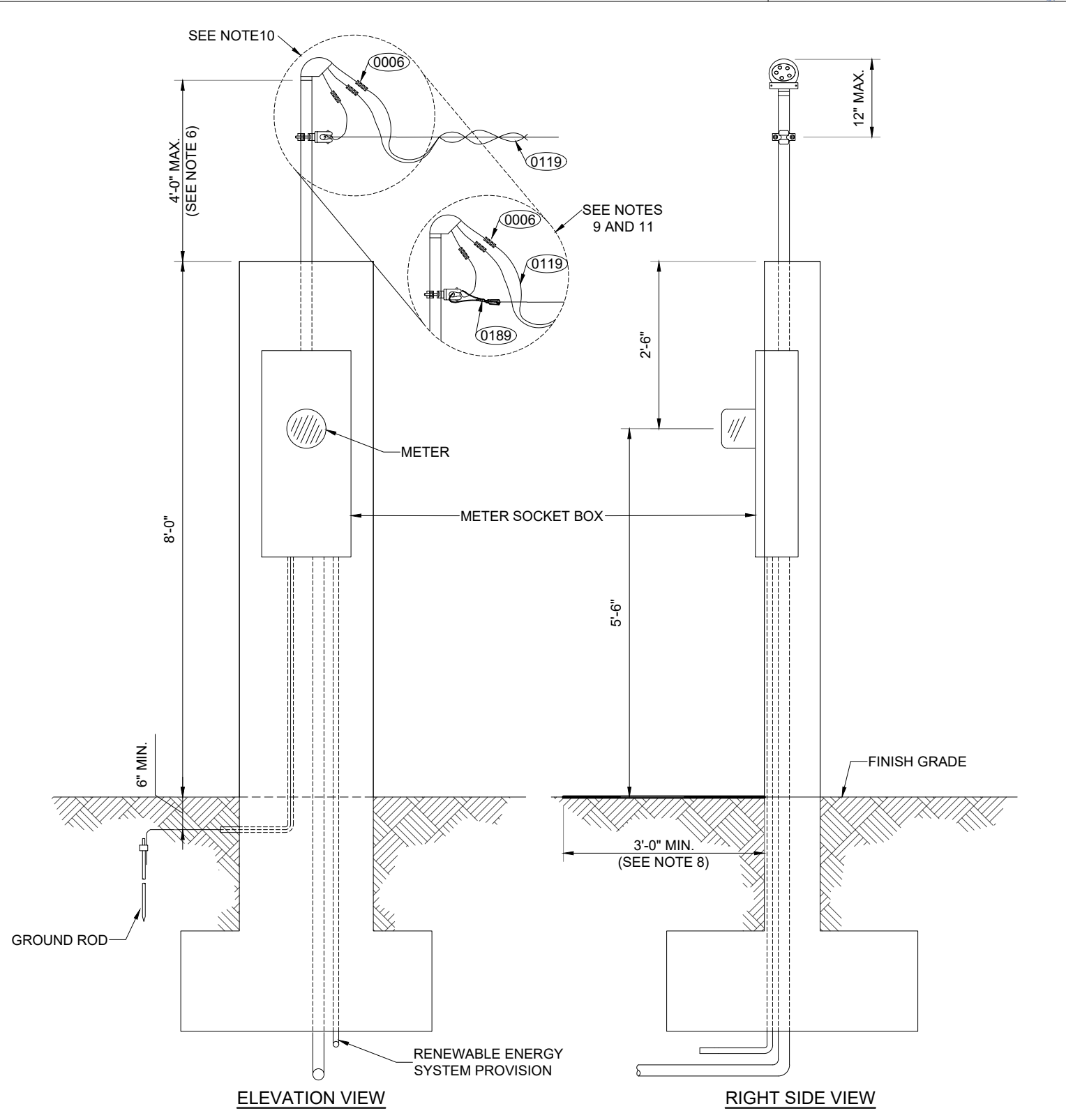
PAGE 1 OF 5 DATE FEB 7, 2024

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REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

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VICTOR R. FEBRES LIC. 3412







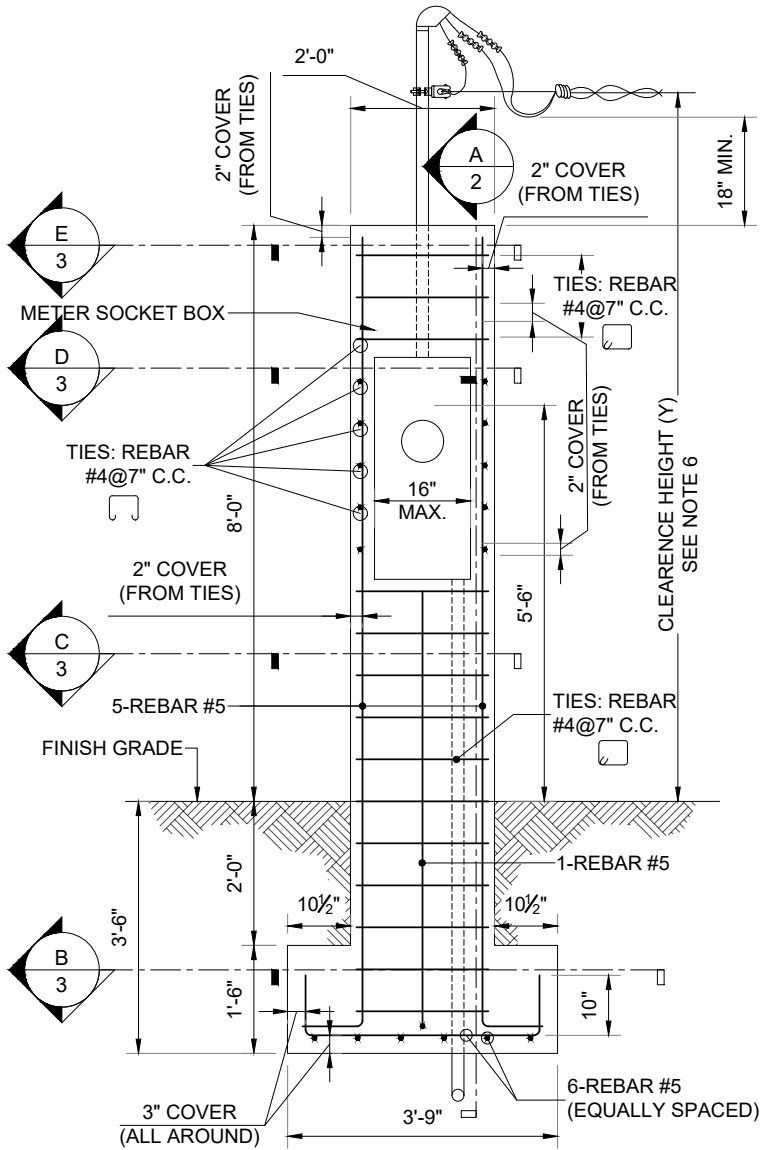
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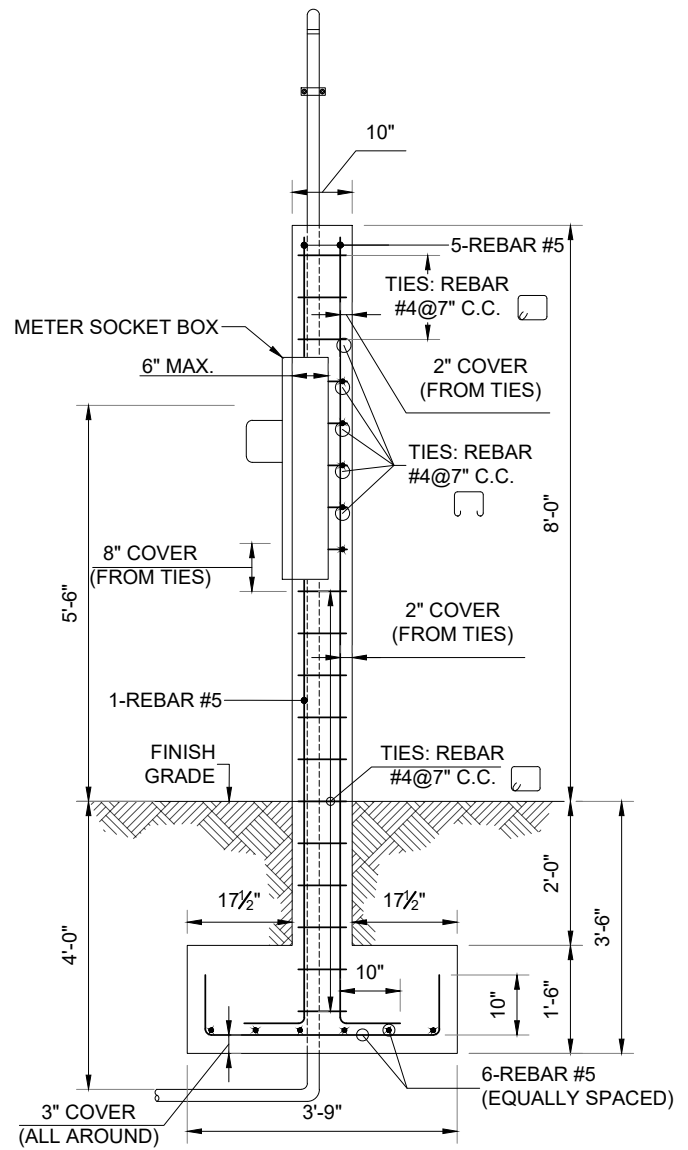
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**CONNECTION OF SECONDARY TRIPLEX CABLE SERVICE DROP TO  
CUSTOMER'S CONCRETE COLUMN  
MAXIMUM VOLTAGE: 480 V**

STANDARD NO. K-7-3-1 VERSION 7  
DOCUMENT NO. 4301.095  
PAGE 2 OF 5 DATE FEB 7, 2024  
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**FRONT VIEW**

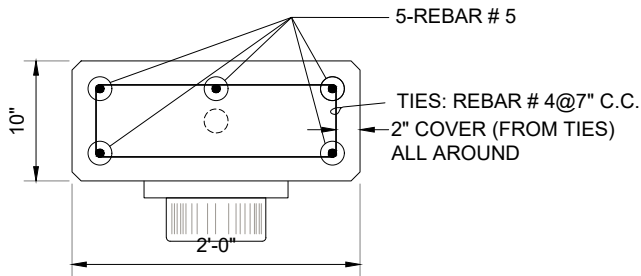


**SECTION A**

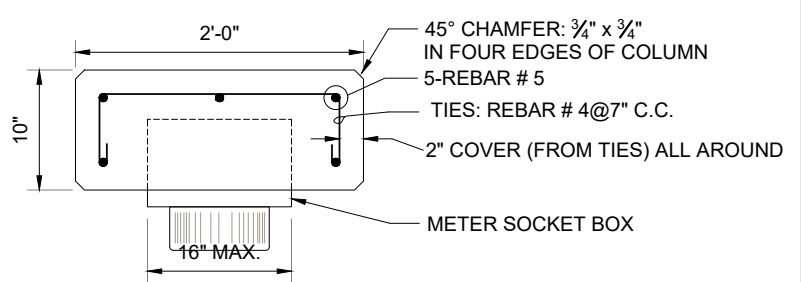
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CUSTOMER'S CONCRETE COLUMN  
MAXIMUM VOLTAGE: 480 V**

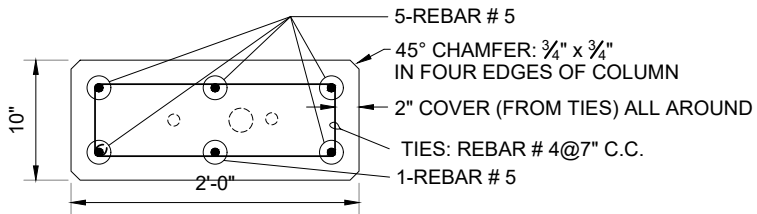
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DOCUMENT NO.	4301.095		
PAGE	3 OF 5	DATE	FEB 7, 2024
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APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		



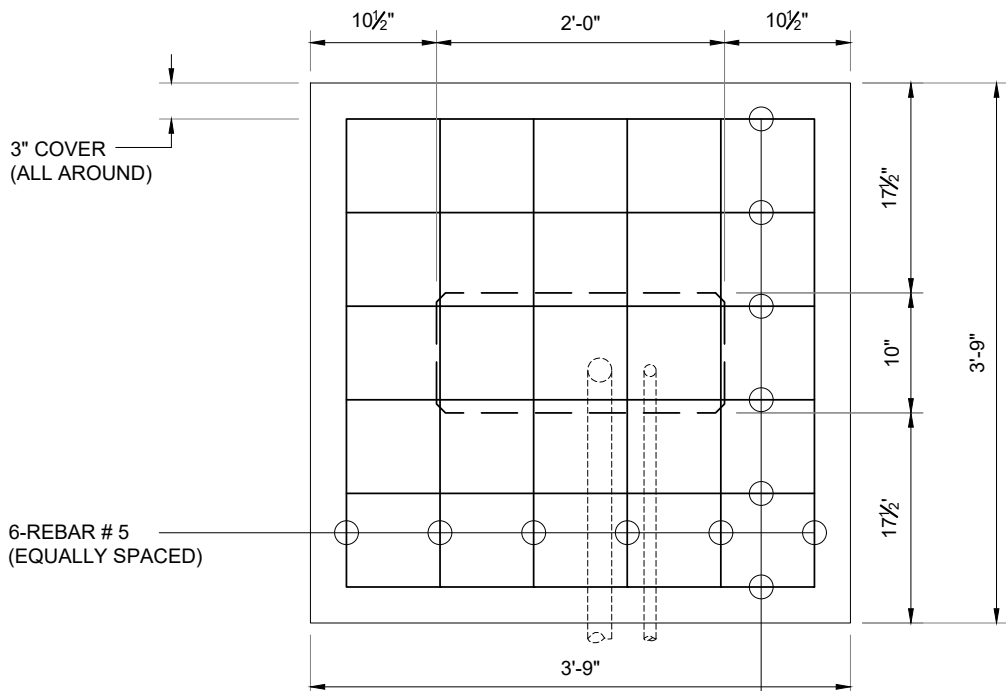
COLUMN PLAN **E**



COLUMN PLAN **D**



COLUMN PLAN **C**



FOOTING PLAN **B**

6-REBAR # 5  
(EQUALLY SPACED)



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**

CONNECTION OF SECONDARY TRIPLEX CABLE SERVICE DROP TO  
CUSTOMER'S CONCRETE COLUMN  
MAXIMUM VOLTAGE: 480 V

STANDARD NO. K-7-3-1 VERSION 7

DOCUMENT NO. 4301.095

PAGE 4 OF 5 DATE FEB 7, 2024

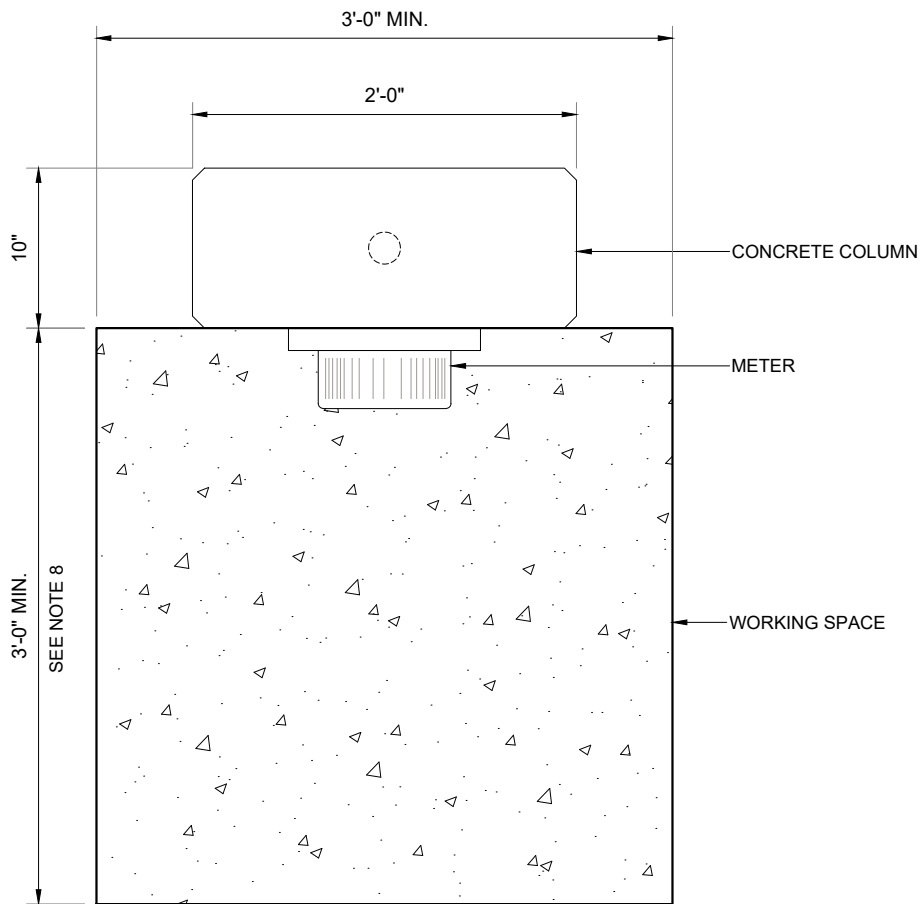
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VICTOR R. FEBRES LIC. 3412



PLAN VIEW  
WORKING SPACE



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**

CONNECTION OF SECONDARY TRIPLEX CABLE SERVICE DROP TO  
CUSTOMER'S CONCRETE COLUMN  
MAXIMUM VOLTAGE: 480 V  
NOTES AND BILL OF MATERIAL

STANDARD NO. K-7-3-1 VERSION 7  
DOCUMENT NO. 4301.095  
PAGE 5 OF 5 DATE FEB 7, 2024  
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APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	3
0077	VINYL INSULATING TAPE	VARIES	AS REQ.
0119	TRIPLEX CABLE	VARIES	AS REQ.
0189	ALUMINUM DEADEND WEDGE	VARIES	AS REQ.

NOTES:

- THE CUSTOMER SHALL ASSUME FULL RESPONSIBILITY FOR ANY CHANGE TO THE DETAILS, DESIGN CRITERIA, AND MATERIALS USED FOR THE CONCRETE COLUMN.
- THE REINFORCING STEEL SHALL BE NEW DEFORMED BAR AND GRADE 60.
- THE WATER AND ALL AGGREGATES FOR THE CONCRETE MIX SHALL BE CLEAN AND FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER.
- THE EXISTING GROUND AT THE BOTTOM OF THE EXCAVATION SHALL BE WELL COMPACTED BEFORE CONSTRUCTION OF FOOTING AND COLUMN.
- THE BACKFILL SHALL BE PLACED IN LAYERS NOT TO EXCEED 6" AND SHALL BE WELL COMPACTED. THE BACKFILL SHOULD BE HOMOGENEOUS MATERIAL AND SHALL BE FREE OF ORGANIC MATTER OR OTHER DELETERIOUS MATTER.
- CLEARANCE HEIGHT SHALL BE ACCORDING TO THE MINIMUM VERTICAL CLEARANCES OF STANDARD NO. M-5-A.
- DESIGN CRITERIA:
  - UNIT WEIGHT OF SOIL = 110 POUNDS PER CUBIC FEET (DRY)
  - UNIT WEIGHT OF CONCRETE = 150 POUNDS PER CUBIC FEET
  - MINIMUM ALLOWABLE BEARING CAPACITY,  $q_a = 2,500$  POUNDS PER SQUARE FEET
  - THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE,  $f_c = 3,000$  POUNDS PER SQUARE INCHES AT 28 DAYS
  - THE MINIMUM YIELD STRENGTH OF REINFORCING STEEL,  $f_y = 60,000$  POUNDS PER SQUARE INCHES
- TO GUARANTEE A SAFE OPERATION FOR LUMA'S PERSONNEL, A WORKING SPACE OF 3'-0" X 3'-0" MINIMUM, WITH A MAXIMUM SLOPE OF 2% WILL BE PREPARED IN FRONT OF THE CONCRETE COLUMN'S FACE WITH THE METER. LUMA RESERVES THE RIGHT TO DECLINE A COLUMN OR REQUIRE ADDITIONAL SAFETY FEATURES IN AREAS WITH UNEVEN SURFACES OR INSUFFICIENT CLEARANCES.
- FOR ALUMINUM CONDUCTOR SERVICE DROP INSTALLATION, USE A DEADEND WEDGE (ITEM 0189) TO ATTACH THE BARE NEUTRAL CONDUCTOR TO THE INSULATOR AT THE SERVICE ENTRANCE RIGID STEEL DUCT.
- FOR COPPER CONDUCTOR, IT IS REQUIRED TO ATTACH THE BARE NEUTRAL CONDUCTOR DIRECTLY TO THE INSULATOR AT THE SERVICE ENTRANCE RIGID STEEL DUCT.
- DEADEND WEDGE CAN HAVE A RIGID BAIL OR FLEXIBLE BAIL. THE RIGID BAIL IS TO BE USED WITH EYE HOOKS AND INSULATORS LARGER THAN 1½" IN DIAMETER. THE FLEXIBLE BAIL IS TO BE USED WITH HOOKS AND SMALL EYES.
- USE VINYL INSULATING TAPE (ITEM 0077) ON CONNECTORS (ITEM 0006).
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



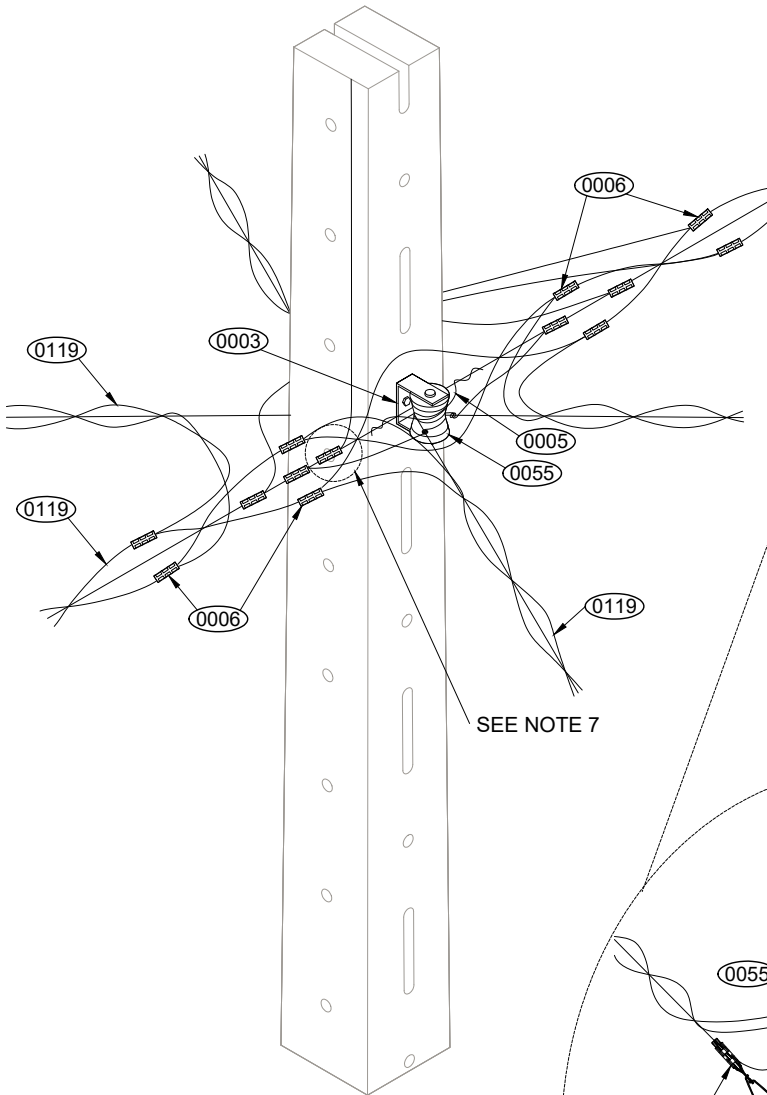
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SECONDARY TRIPLEX CABLE AND MULTIPLE SERVICE DROP  
MAXIMUM VOLTAGE: 480 V

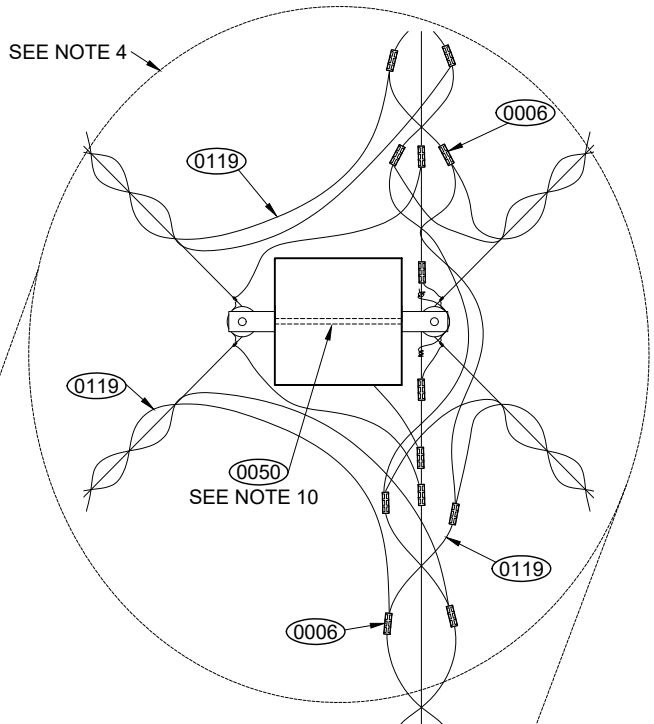
STANDARD NO. K-7-4 VERSION 3  
DOCUMENT NO. 4301.096  
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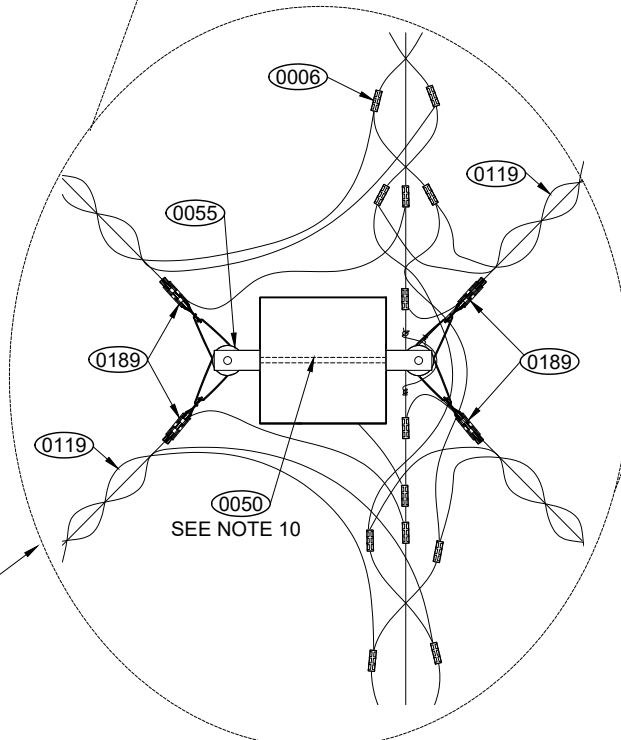
ISOMETRIC VIEW

SEE NOTE 4

### SERVICE DROP OPTIONS



SEE NOTES  
3 AND 5



TOP VIEW



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>SECONDARY TRIPLEX CABLE AND MULTIPLE SERVICE DROP</b> <b>MAXIMUM VOLTAGE: 480 V</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>  K-7-4  </u> VERSION <u>  3  </u>
	DOCUMENT NO. <u>  4301.096  </u>
	PAGE <u>  2 OF 2  </u> DATE <u>  FEB 7, 2024  </u>
	SUBMITTED <u>  LUIS R. SOTO LIC. 11658  </u>
	REVIEWED <u>  IVETTE D. SANCHEZ LIC. 13837  </u>
	DIGITIZED <u>  EMILIO CUADRADO LIC. 3000  </u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0003	CLEVIS	002-13488	2
0005	TIE WIRE	002-82035	AS REQ.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	12
0050	DOUBLE ARMING BOLT	VARIES	1
0055	SPOOL TYPE INSULATOR	014-00696	2
0077	VINYL INSULATING TAPE	VARIES	AS REQ.
0119	TRIPLEX CABLE	VARIES	AS REQ.
0189	ALUMINUM DEADEND WEDGE	VARIES	AS REQ.
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- USE VINYL INSULATING TAPE (0077) ON CONNECTORS (ITEM 0006).
- FOR ALUMINUM CONDUCTOR SERVICE DROP INSTALLATION, USE A DEADEND WEDGE (ITEM 0189) TO ATTACH THE BARE NEUTRAL CONDUCTOR TO THE SPOOL TYPE INSULATOR (ITEM 0055).
- FOR COPPER CONDUCTOR, IT IS REQUIRED TO ATTACH THE BARE NEUTRAL CONDUCTOR DIRECTLY TO A SPOOL TYPE INSULATOR.
- DEADEND WEDGE CAN HAVE A RIGID BAIL OR FLEXIBLE BAIL. THE RIGID BAIL IS TO BE USED WITH EYE HOOKS AND INSULATORS LARGER THAN 1½" IN DIAMETER. THE FLEXIBLE BAIL IS TO BE USED WITH HOOKS AND SMALL EYES.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- FOR 35' POLES, USE THROUGH BOLT (ITEM 0001) INSTEAD OF A DOUBLE ARMING BOLT (ITEM 0050).
- FOR POLES WHERE ONLY SECONDARY LINES ARE INSTALLED, THE POLE TO BE USED (ITEM 0147 OR 0148) SHALL BE INCLUDED TO THE BILL OF MATERIAL.



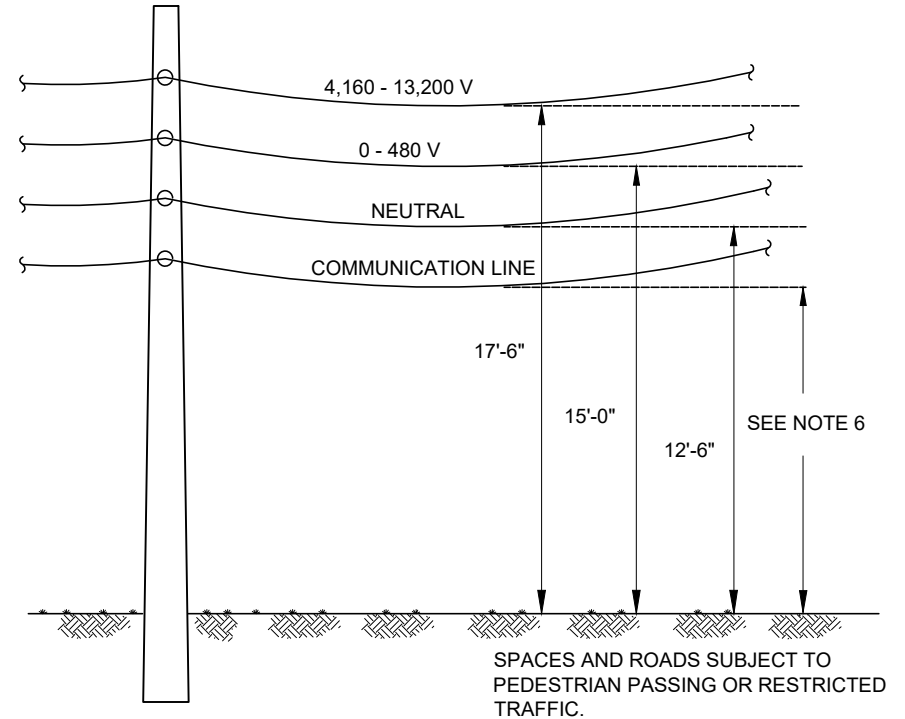
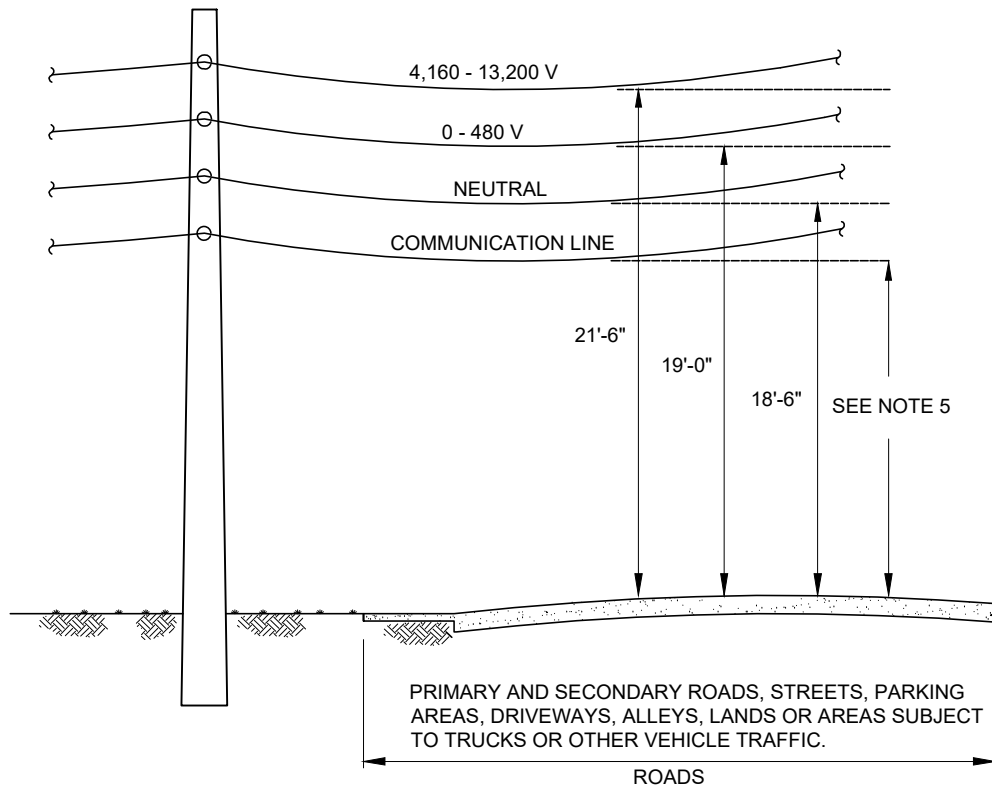
# DISTRIBUTION ENGINEERING

## OVERHEAD DISTRIBUTION STANDARDS

TITLE:

### MINIMUM VERTICAL CLEARANCES REQUIRED FOR POWER LINES ABOVE GROUND OR ROADWAY

STANDARD NO.	M-5	VERSION	8
DOCUMENT NO.	4301.097		
PAGE	1 OF 1	DATE	DEC 19, 2023
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**NOTES:**

1. THE VOLTAGES DISPLAYED ARE LINE TO LINE. THE ESTABLISHED MINIMUM CLEARANCES ALSO APPLY TO THEIR CORRESPONDING LINE TO GROUND VOLTAGES.
2. MINIMUM CLEARANCES ARE REQUIRED FOR BOTH SIDES OF THE STREETS AND HIGHWAY AREA.
3. ALL CLEARANCES ARE BASED ON NESC TABLE 232-1 (INCLUDING A 3'-0" VERTICAL BUFFER FOR POWER LINES).
4. FOR TRANSMISSION LEVEL VOLTAGE CLEARANCES, SEE TRANSMISSION DESIGN CRITERIA DOCUMENT(DCD).
5. COMMUNICATION LINES CLEARANCE TO PRIMARY AND SECONDARY ROADS, STREETS, PARKING AREAS, DRIVEWAYS, ALLEYS, LANDS OR AREAS SUBJECT TO TRUCKS OR OTHER VEHICLE TRAFFIC SHALL BE 16'-0" FOR NON-INSULATED CONDUCTOR OR 15'-6" FOR INSULATED CONDUCTOR, AS PER 2023 NESC, OR AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION ON COMMUNICATION SYSTEMS IN PUERTO RICO.
6. COMMUNICATION LINES CLEARANCE TO SPACES AND ROADS SUBJECT TO PEDESTRIAN PASSING OR RESTRICTED TRAFFIC SHALL BE 12'-0" FOR NON-INSULATED CONDUCTOR OR 9'-6" FOR INSULATED CONDUCTOR, AS PER 2023 NESC, OR AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION ON COMMUNICATION SYSTEMS IN PUERTO RICO.



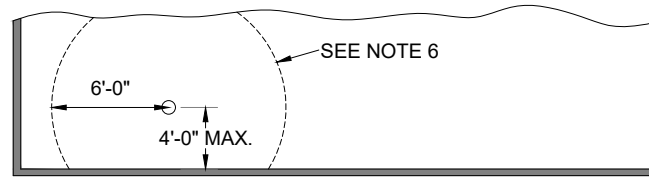
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

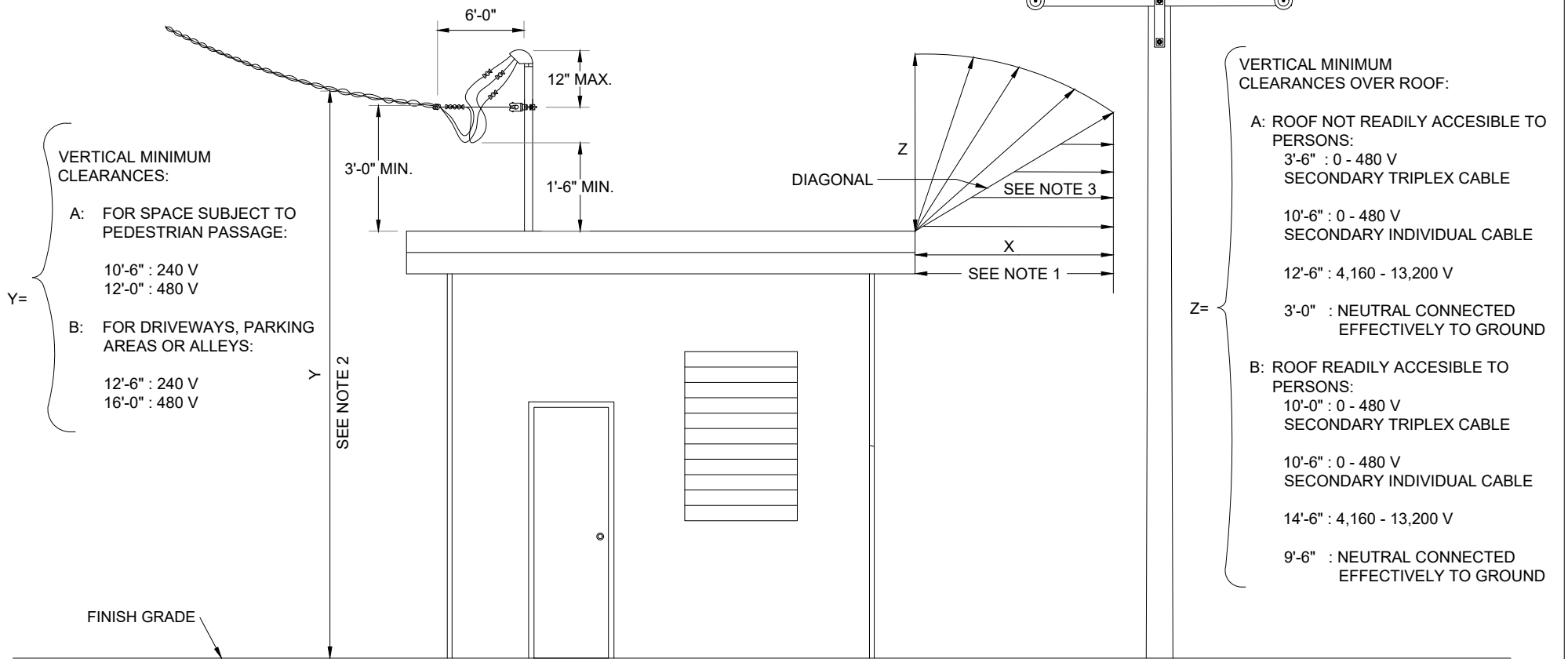
TITLE:

## MINIMUM CLEARANCES REQUIRED BETWEEN POWER LINES AND STRUCTURES

STANDARD NO.	M-5-A	VERSION	8
DOCUMENT NO.	4301.098		
PAGE	1 OF 2	DATE	DEC 19, 2023
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



ROOF PLAN VIEW



ELEVATION VIEW

VERTICAL MINIMUM CLEARANCES:

A: FOR SPACE SUBJECT TO PEDESTRIAN PASSAGE:

10'-6" : 240 V  
12'-0" : 480 V

B: FOR DRIVEWAYS, PARKING AREAS OR ALLEYS:

12'-6" : 240 V  
16'-0" : 480 V

Y=

SEE NOTE 2

HORIZONTAL MINIMUM CLEARANCES:

7'-6" : 4,160 - 13,200 V

5'-0" : 0 - 480 V

4'-6" : NEUTRAL CONNECTED EFFECTIVELY TO GROUND

X=

VERTICAL MINIMUM CLEARANCES OVER ROOF:

A: ROOF NOT READILY ACCESSIBLE TO PERSONS:

3'-6" : 0 - 480 V  
SECONDARY TRIPLEX CABLE

10'-6" : 0 - 480 V  
SECONDARY INDIVIDUAL CABLE

12'-6" : 4,160 - 13,200 V

3'-0" : NEUTRAL CONNECTED EFFECTIVELY TO GROUND

B: ROOF READILY ACCESSIBLE TO PERSONS:

10'-0" : 0 - 480 V  
SECONDARY TRIPLEX CABLE

10'-6" : 0 - 480 V  
SECONDARY INDIVIDUAL CABLE

14'-6" : 4,160 - 13,200 V

9'-6" : NEUTRAL CONNECTED EFFECTIVELY TO GROUND

Z=

FINISH GRADE





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## MINIMUM CLEARANCES REQUIRED BETWEEN POWER LINES AND STRUCTURES NOTES

STANDARD NO.	M-5-A	VERSION	8
DOCUMENT NO.	4301.098		
PAGE	2 OF 2	DATE	DEC 19, 2023
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		

### NOTES:

1. THESE DESIGN HORIZONTAL CLEARANCES ARE MEASURED FROM THE ENERGIZED PART CLOSEST TO THE BUILDING AND WITH CONDUCTORS AT REST. THE DESIGN CLEARANCES ARE BASED ON NESC TABLE 234-1. ADD A 2'-0" HORIZONTAL BUFFER WHEN POSSIBLE FOR ADDITIONAL CLEARANCE. FOR OTHERS TYPE OF STRUCTURES AND FOR CLEARANCES WITH WIND DISPLACEMENT, SEE NESC RULE 234.
2. THESE MINIMUM VERTICAL CLEARANCES WILL BE ALLOWED ONLY FOR RESIDENTIAL SERVICE DROPS WHERE THE HEIGHT OF THE STRUCTURE OR ADJACENT INSTALLATION DOES NOT ALLOW THE MINIMUM CLEARANCES REQUIRED IN THE M-5 STANDARD TO BE MET. THESE CLEARANCES ARE THE MINIMUM PER NESC TABLE 232-1 WITH NO BUFFERS INCLUDED.
3. THE HORIZONTAL CLEARANCE GOVERNS ABOVE THE LEVEL OF THE ROOF OR TOP OF AN INSTALLATION TO THE POINT WHERE THE DIAGONAL EQUALS THE VERTICAL CLEARANCE REQUIREMENTS. PASSING OF ELECTRICAL LINES OVER STRUCTURES IS NOT ALLOWED.
4. THE VOLTAGES DISPLAYED ARE LINE TO LINE. THE ESTABLISHED MINIMUM CLEARANCES ALSO APPLY TO THEIR CORRESPONDING LINE TO GROUND VOLTAGES.
5. VEGETATION CLEARANCE OF 12'-0" FOR PRIMARY LINES AND 5'-0" FOR SECONDARY LINES OF AIRESPACE IS REQUIRED BETWEEN DISTRIBUTION CONDUCTORS AND THE SURROUNDING VEGETATION.
6. CLEARANCE OF SERVICE DROP TERMINATING ON SUPPORT MAST OVER ROOF NOT READILY ACCESIBLE:
  - A. NOT LESS THAN 3'-0" VERTICAL CLEARANCE ABOVE ROOF OUTSIDE OF 6'-0" RADIUS FROM THE SERVICE MAST.
  - B. NOT LESS THAN 1'-6" VERTICAL CLEARANCE ABOVE ROOF WITHIN 6'-0" RADIUS FROM THE SERVICE MAST.
 IF THE ROOF IS READILY ACCESSIBLE, A CLEARANCE OF NOT LESS THAN 10'-0" VERTICAL CLEARANCE FOR THE SERVICE DROP INCLUDING THE DROP LOOP.



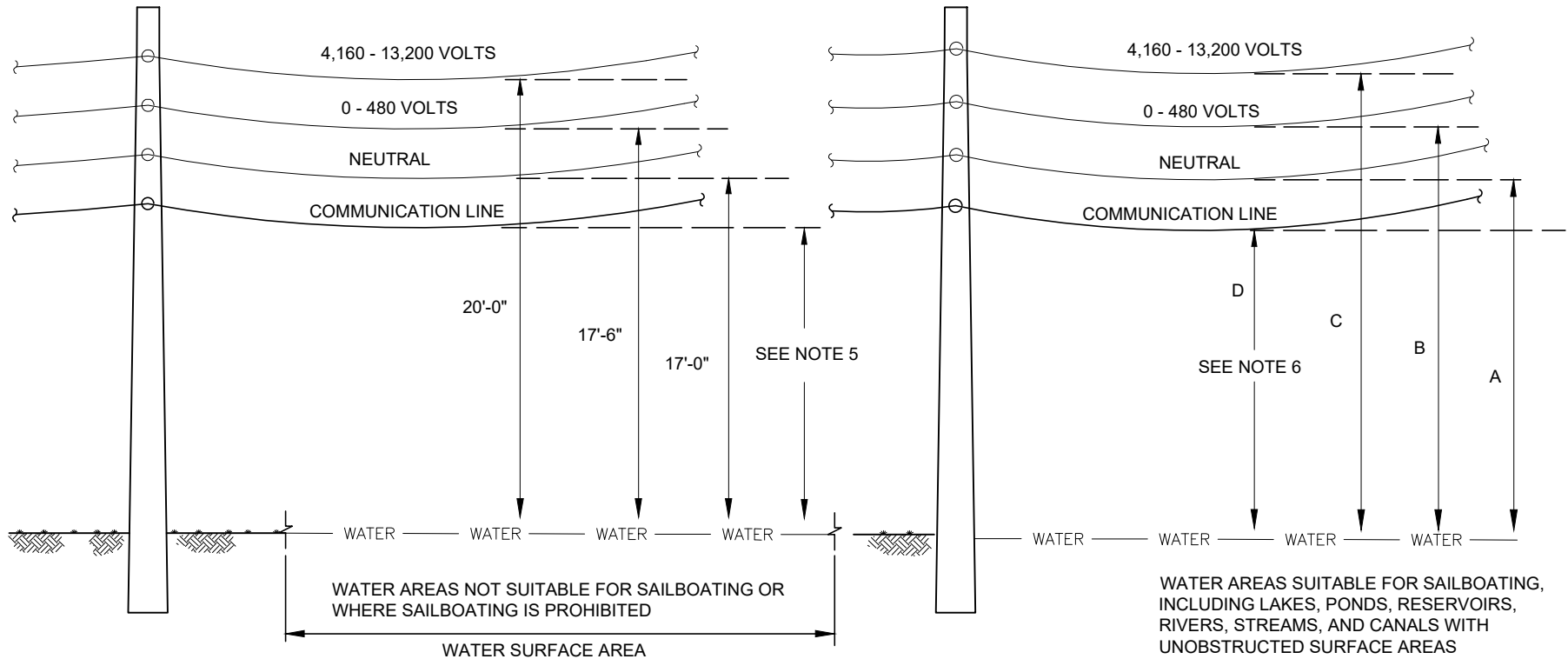
# DISTRIBUTION ENGINEERING

## OVERHEAD DISTRIBUTION STANDARDS

TITLE:

### MINIMUM VERTICAL CLEARANCES REQUIRED FOR POWER LINES ABOVE WATER SURFACE

STANDARD NO.	M-5-B	VERSION	4
DOCUMENT NO.	4301.099		
PAGE	1 OF 1	DATE	DEC 19, 2023
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**NOTES:**

- ALL CLEARANCES ARE BASED ON NESC TABLE 232-1 (INCLUDING A 3'-0" VERTICAL BUFFER FOR POWER LINES).
- FOR TRANSMISSION LEVEL VOLTAGE CLEARANCES, SEE TRANSMISSION DESIGN CRITERIA DOCUMENT (DCD).
- FOR UNCONTROLLED WATER FLOW AREAS, THE SURFACE AREA SHALL BE ENCLOSED BY ITS ANNUAL HIGH-WATER MARK. CLEARANCES SHALL BE BASED ON THE NORMAL FLOOD LEVEL. IF AVAILABLE, THE 10-YEAR FLOOD LEVEL MAY BE ASSUMED AS THE NORMAL FLOOD LEVEL.
- PASSING OF ELECTRICAL LINES OVER SWIMMING POOLS IS NOT ALLOWED.
- COMMUNICATION LINES CLEARANCE ABOVE WATER SURFACE SHALL BE 14'-6" FOR NON-INSULATED CONDUCTOR OR 14'-0" FOR INSULATED CONDUCTOR, AS PER CURRENT 2023 NESC, OR AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION ON COMMUNICATION SYSTEMS IN PUERTO RICO.
- THESE CLEARANCES SHALL BE REQUIRED AS PER CURRENT 2023 NESC, OR AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION ON COMMUNICATION SYSTEMS IN PUERTO RICO.

	WATER SURFACE				
	A	B	C	D	
				INSULATED	NON-INSULATED
LESS THAN 20 ACRES	20'-6"	21'-0"	23'-6"	17'-6"	18'-0"
20 TO 200 ACRES	28'-6"	29'-0"	31'-6"	25'-6"	26'-0"
200 TO 2000 ACRES	34'-6"	35'-0"	37'-6"	31'-6"	32'-0"
OVER 2000 ACRES	40'-6"	41'-0"	43'-6"	37'-6"	38'-0"



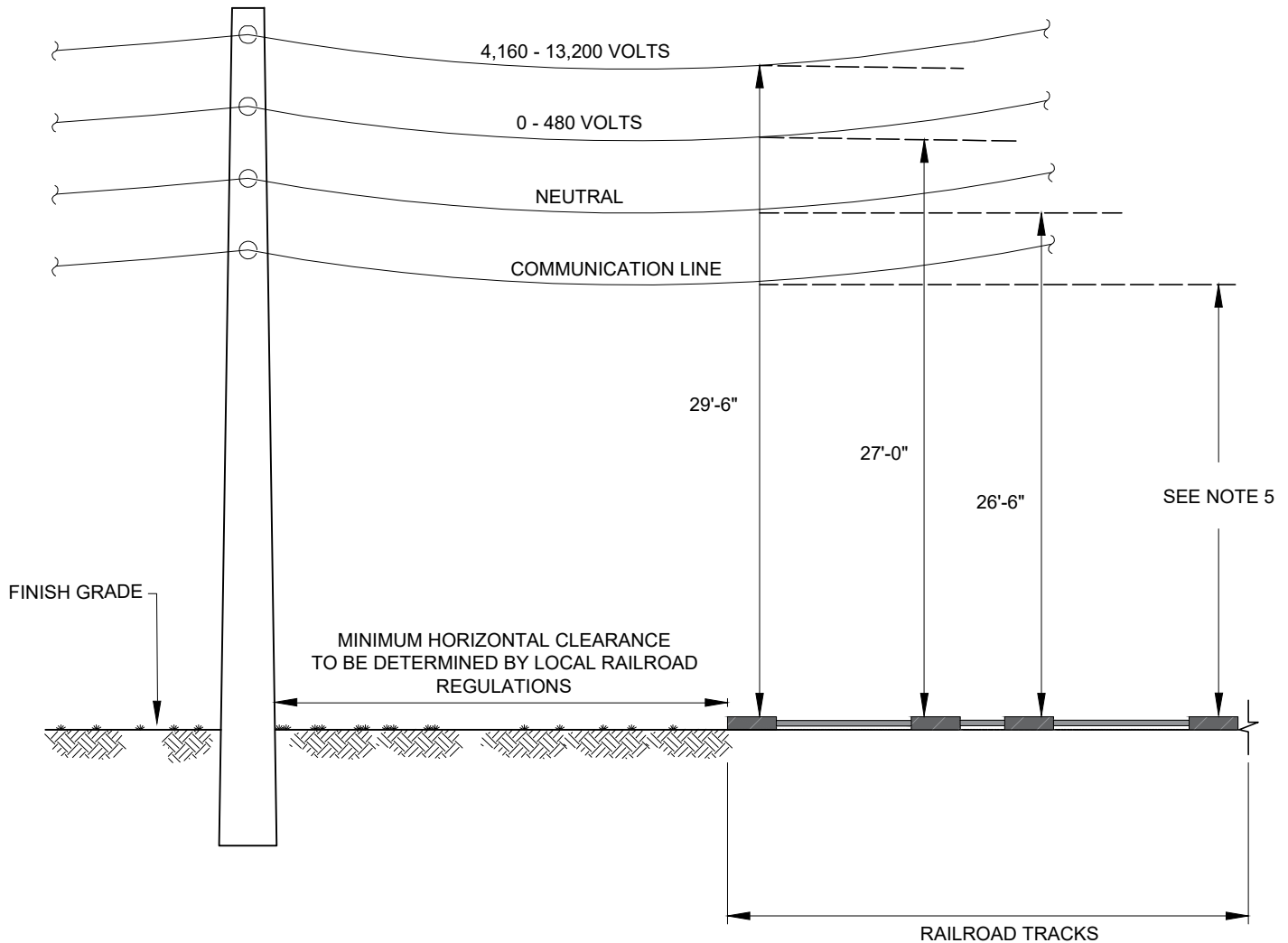
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## MINIMUM VERTICAL CLEARANCES REQUIRED FOR POWER LINE ABOVE RAILROAD CROSSING

STANDARD NO. M-5-C VERSION 2  
DOCUMENT NO. 4301.119  
PAGE 1 OF 1 DATE DEC 19, 2023  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000



### NOTES:

1. ANY POWER LINE CONSTRUCTION OVER RAILROAD TRACKS MUST BE PREVIOUSLY APPROVED BY LUMA.
2. ALL CLEARANCE HEIGHTS ARE IN REFERENCE TO TOP OF RAILS.
3. ALL CLEARANCES ARE BASED ON NESC TABLE 232-1 (INCLUDING A 3'-0" VERTICAL BUFFER FOR POWER LINES).
4. FOR TRANSMISSION LEVEL VOLTAGE CLEARANCES, SEE TRANSMISSION DESIGN CRITERIA DOCUMENT (DCD).
5. COMMUNICATION LINES CLEARANCE TO RAILROAD CROSSINGS SHALL BE 24'-0" FOR NON-INSULATED CONDUCTOR OR 23'-6" FOR INSULATED CONDUCTOR, AS PER CURRENT 2023 NESC, OR AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION ON COMMUNICATION SYSTEMS IN PUERTO RICO.



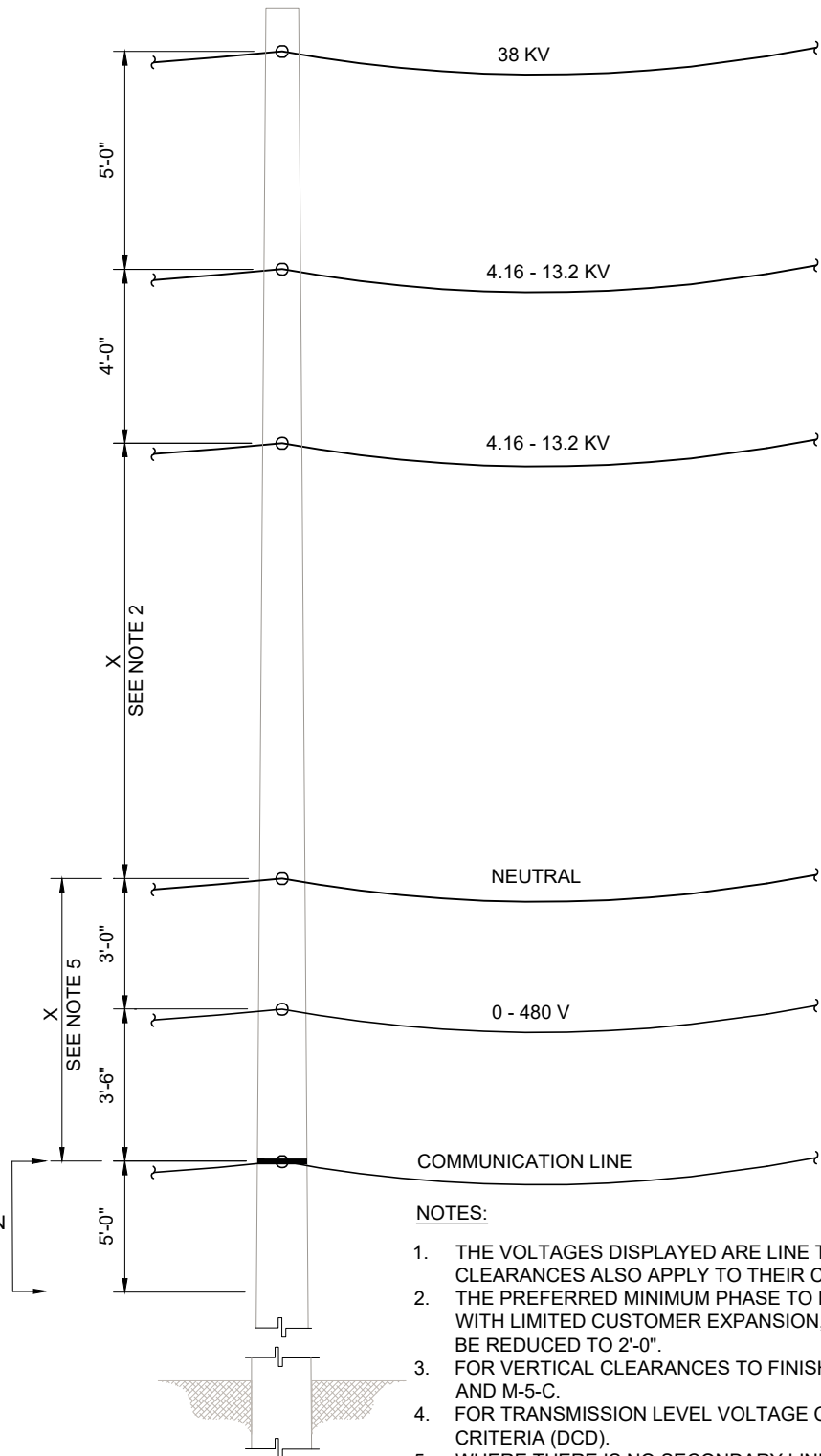
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## MINIMUM VERTICAL CLEARANCES REQUIRED BETWEEN CIRCUITS

STANDARD NO. M-5-D VERSION 5  
 DOCUMENT NO. 4301.122  
 PAGE 1 OF 1 DATE DEC 19, 2023  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000



**NOTES:**

1. THE VOLTAGES DISPLAYED ARE LINE TO LINE. THE ESTABLISHED MINIMUM CLEARANCES ALSO APPLY TO THEIR CORRESPONDING LINE TO GROUND VOLTAGES.
2. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
3. FOR VERTICAL CLEARANCES TO FINISH GRADE, REFER TO STANDARDS M-5, M-5-B AND M-5-C.
4. FOR TRANSMISSION LEVEL VOLTAGE CLEARANCES, SEE TRANSMISSION DESIGN CRITERIA (DCD).
5. WHERE THERE IS NO SECONDARY LINE, A MINIMUM CLEARANCE OF 6'-6" BETWEEN THE NEUTRAL AND COMMUNICATION LINES IS REQUIRED TO ALLOW FOR THE FUTURE INSTALLATION OF THE SECONDARY LINE, EXCEPT IN AREAS WITH LIMITED CUSTOMER EXPANSION OR WHERE THE SECONDARY LINE IS UNDERGROUND, IN WHICH CASE THE REQUIRED MINIMUM CLEARANCE WOULD BE ONLY 3'-6".

ELEVATION VIEW



# DISTRIBUTION ENGINEERING

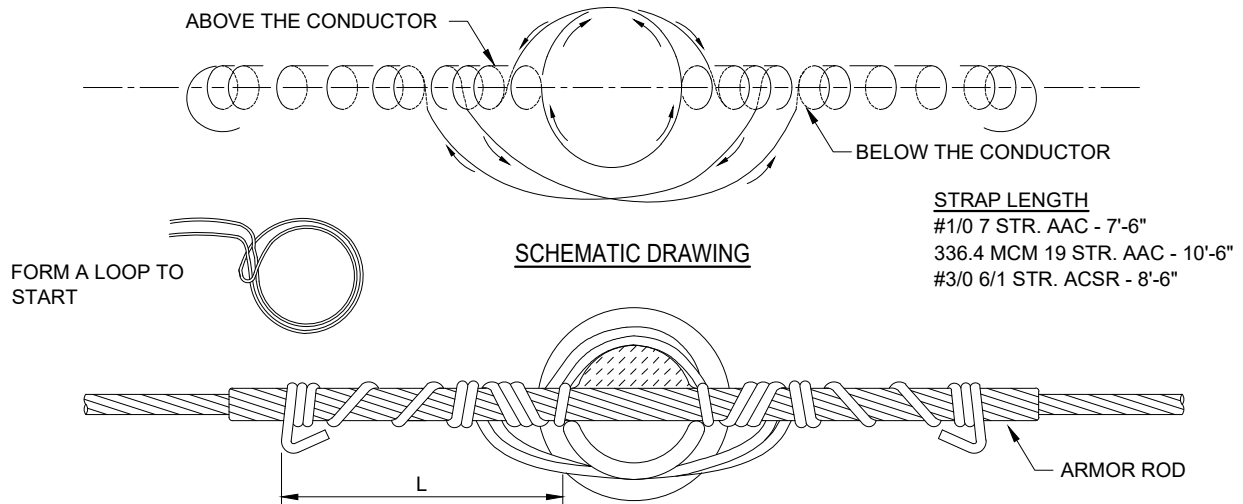
OVERHEAD DISTRIBUTION STANDARDS

TITLE:

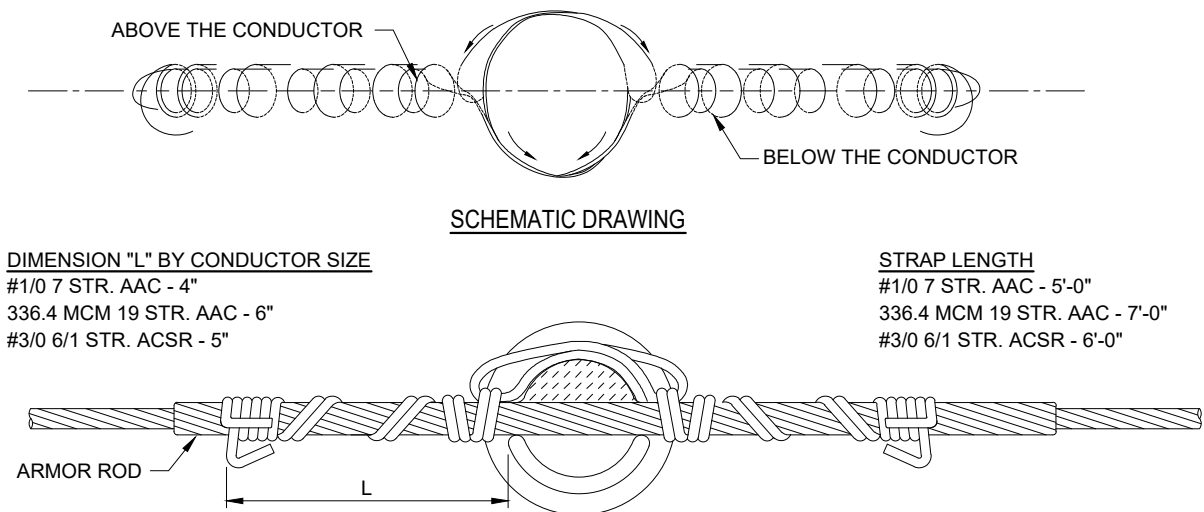
## GUIDE FOR FIELD INSTALLATION OF TIE WIRE

STANDARD NO.	M-7	VERSION	4
DOCUMENT NO.	4301.100		
PAGE	1 OF 1	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11568		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		

### SINGLE INSULATOR - SIDE HANDMADE TIE



### SINGLE INSULATOR - TOP BINDING FOR HANDMADE TIES



#### NOTES:

1. THE LOOPS SHOULD BE FORMED ON THE TIE WIRE AROUND THE INSULATOR BEFORE PLACING THE CONDUCTOR IN THE INSULATOR SLOT.
2. TIES SHOULD BE AS TIGHT AND FIRM AS POSSIBLE. THE TERMINALS SHOULD BE IN CONTACT WITH THE LINE.



# DISTRIBUTION ENGINEERING

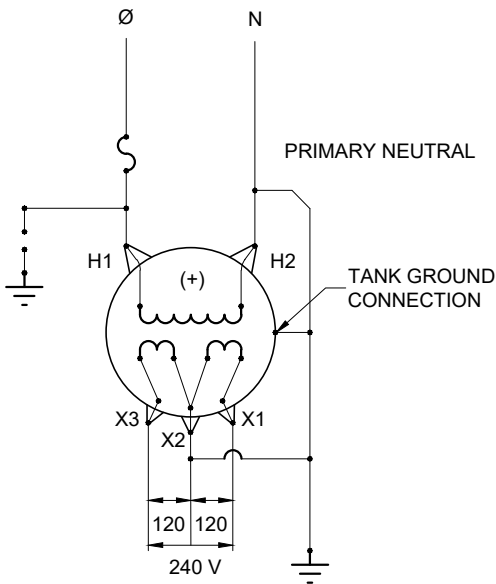
OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE DISTRIBUTION  
TRANSFORMER CONNECTIONS DIAGRAM  
ADDITIVE POLARITY TRANSFORMER  
MAXIMUM VOLTAGE: 13.2 KV**

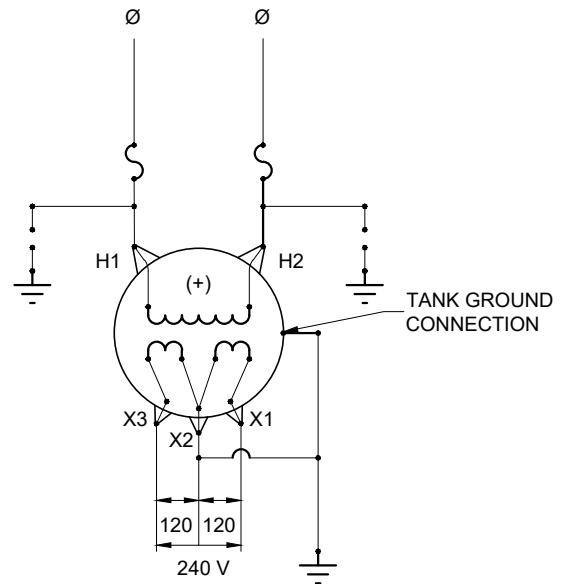
STANDARD NO. M-10 VERSION 4  
DOCUMENT NO. 4301.103  
PAGE 1 OF 1 DATE MAR 25, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

2.4, 4.8, OR 7.6 KV PRIMARY CONNECTION  
PHASE TO NEUTRAL:



CONVENTIONAL TRANSFORMER  
3 SECONDARY WIRES  
120/240 VOLTS

4.16, 8.32, OR 13.2 KV PRIMARY CONNECTION  
PHASE TO PHASE:



CONVENTIONAL TRANSFORMER  
3 SECONDARY WIRES  
120/240 VOLTS

LEGEND:

- Ø - PHASE
- N - NEUTRAL
- S - FUSE CUTOUT
- ⚡ - SURGE ARRESTER

NOTES:

1. POLARITY IS SUBTRACTIVE FOR TRANSFORMERS 200 KVA AND SMALLER HAVING HIGH-VOLTAGE WINDINGS ABOVE 8660 VOLTS, AND FOR ALL TRANSFORMERS LARGER THAN 200 KVA.



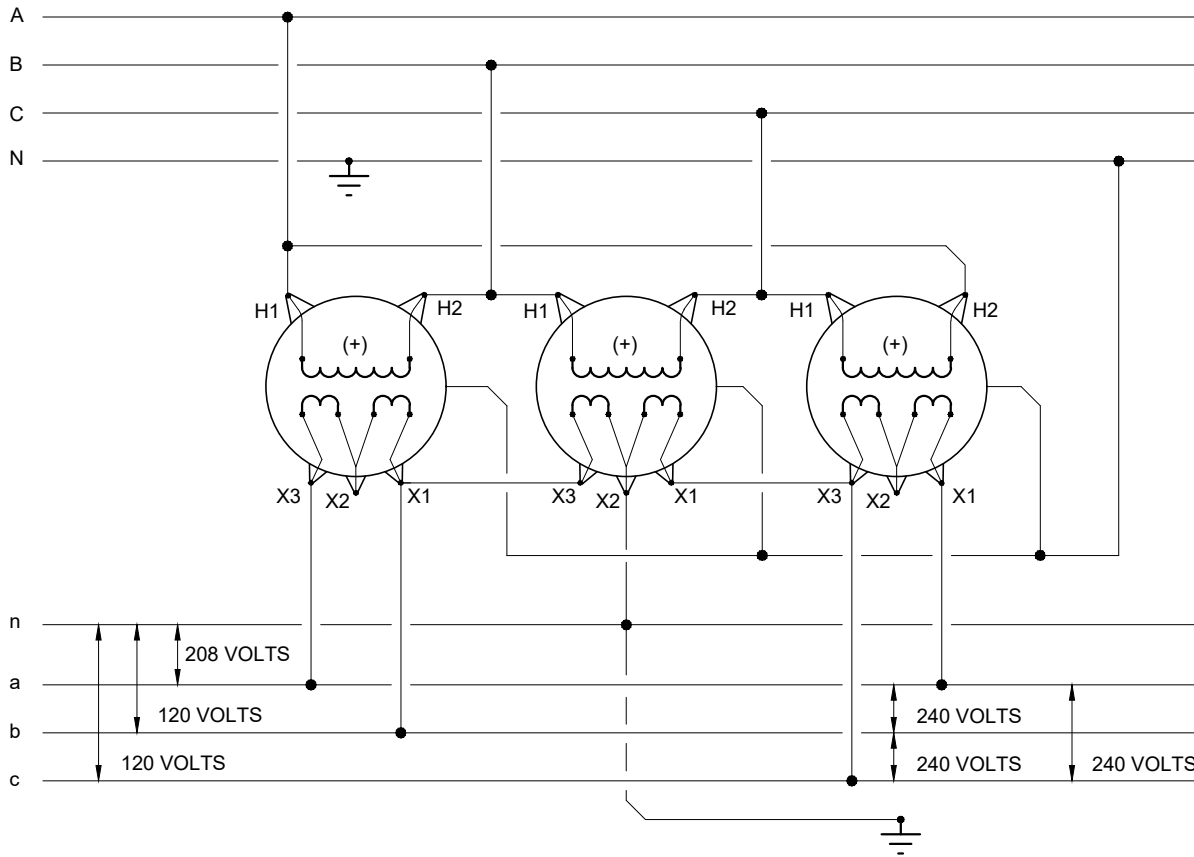
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

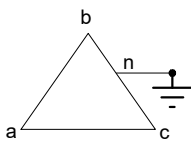
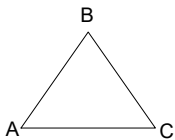
TITLE:

**SCHEMATIC DIAGRAM FOR  
THREE PHASE DELTA - DELTA  
CONNECTION FOR 240 / 120 V SERVICE  
(ADDITIVE POLARITY TRANSFORMERS)  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. M-12-2 VERSION 4  
DOCUMENT NO. 4301.105  
PAGE 1 OF 1 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000  
VICTOR R. FEBRES LIC. 3412



TYPICAL  
VECTOR DIAGRAM



NOTES:

- 1 - THE TRANSFORMERS MUST HAVE THE SAME IMPEDANCE, VOLTAGE RATIO AND TAP POSITION. IF NOT, EXCESSIVE CIRCULATORY CURRENTS WILL BE PRODUCED AND THE TRANSFORMERS WILL OVERHEAT OR BURN.
- 2 - WHEN THERE IS A DIFFERENCE IN THE TRANSFORMATION RATIO, IT CAN PRODUCE LARGE CURRENTS, WHICH ARE NOT REFLECTED ON THE SECONDARY LINE AND CANNOT BE MEASURED. THE BANK OF TRANSFORMERS MAY APPEAR THAT IT IS LIGHT IN LOAD, HOWEVER, WHEN ADDING THE CIRCULATING CURRENT, IT MAY BE OVERLOADED. SAME CONDITION HAPPENS WITH THREE IDENTICAL TRANSFORMERS, BUT IN DIFFERENT TAPS.
- 3 - POLARITY IS SUBTRACTIVE FOR TRANSFORMERS 200 KVA AND SMALLER HAVING HIGH-VOLTAGE WINDINGS ABOVE 8660 VOLTS, AND FOR ALL TRANSFORMERS LARGER THAN 200 KVA.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SCHEMATIC DIAGRAM FOR  
THREE PHASE DELTA - OPEN DELTA  
CONNECTION FOR 240 / 120 V SERVICE  
(ADDITIVE POLARITY TRANSFORMERS)  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. M-12-6 VERSION 1

DOCUMENT NO. 4301.161

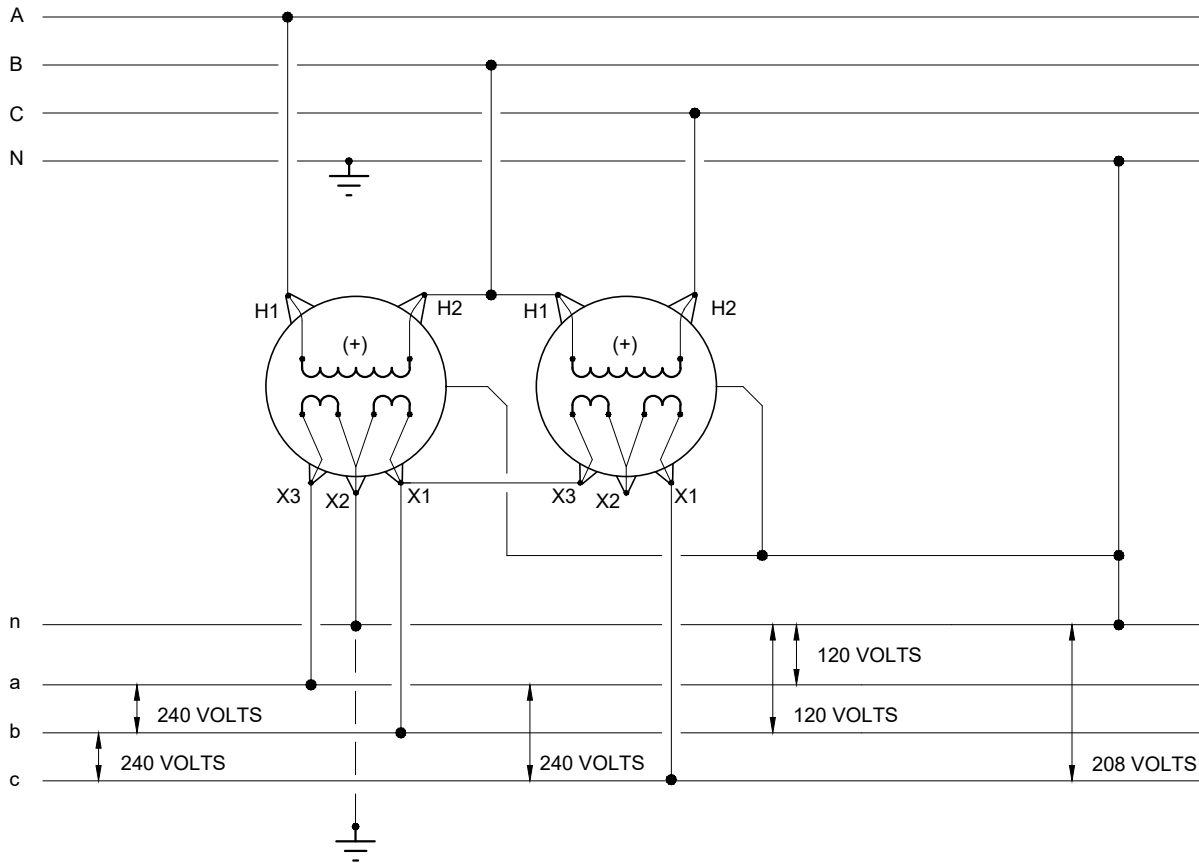
PAGE 1 OF 1 DATE MAR 19, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

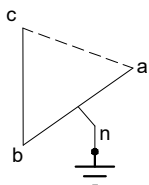
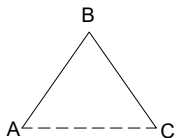
REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



TYPICAL  
VECTOR DIAGRAM



NOTES:

1. THIS CONNECTION IS USED WHEN A THREE PHASE SERVICE IS REQUIRED, BUT THE THREE PHASE LOAD IS SMALLER COMPARED TO THE SINGLE PHASE LOAD.
2. POLARITY IS SUBTRACTIVE FOR TRANSFORMERS 200 KVA AND SMALLER HAVING HIGH-VOLTAGE WINDINGS ABOVE 8660 VOLTS, AND FOR ALL TRANSFORMERS LARGER THAN 200 KVA.
3. THE VOLTAGE FROM PHASE C TO GROUND IS 208 V; THEREFORE, IT CANNOT BE USED ON THE 120/240 V CIRCUITS.







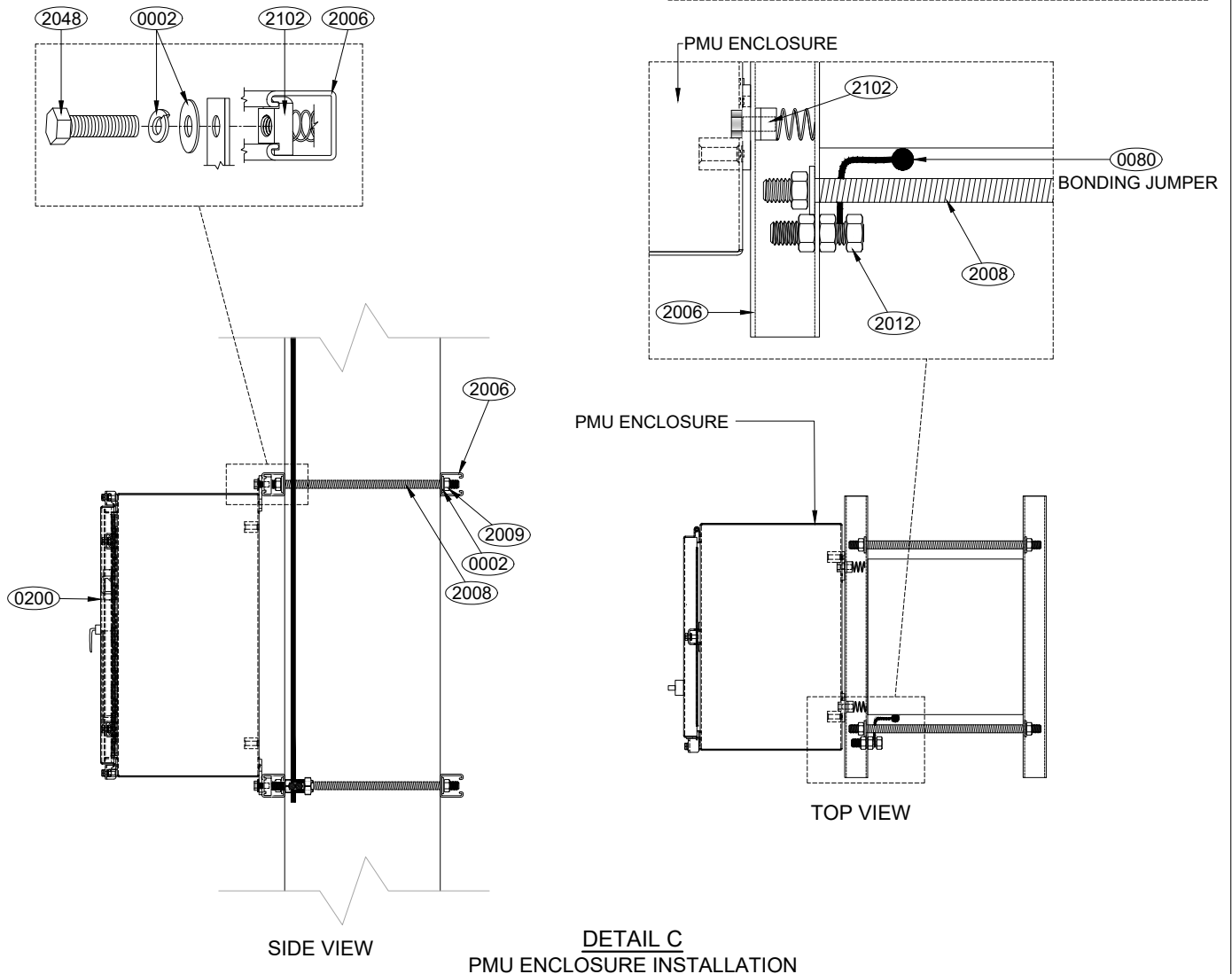
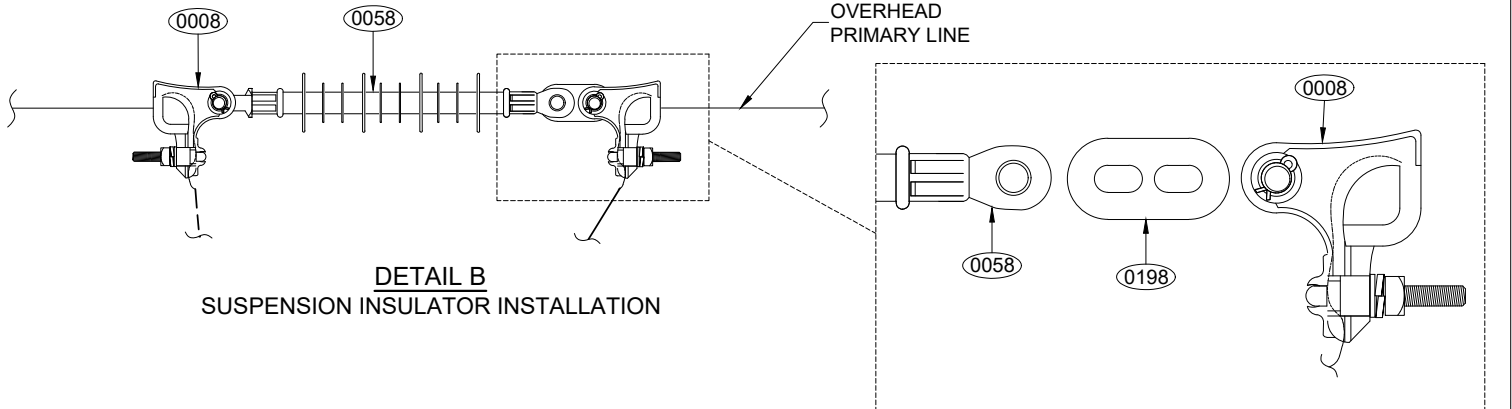
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## PHASOR MEASUREMENT UNIT (PMU) MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. PMU-1 VERSION 1  
DOCUMENT NO. 4301.133  
PAGE 2 OF 7 DATE APR 1, 2024  
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## PHASOR MEASUREMENT UNIT (PMU) MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO.	PMU-1	VERSION	1
DOCUMENT NO.	4301.133		
PAGE	4 OF 7	DATE	APR 1, 2024
SUBMITTED	ALEX J. RODRIGUEZ LIC. 24174 <i>AR</i>		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837 <i>IS</i>		
APPROVED	RICARDO CASTRO LIC. 12135 <i>RC</i>		
DIGITIZED	VICTOR R. FEBRES LIC. 3412 <i>VF</i> EMILIO CUADRADO LIC. 3000 <i>EC</i>		

NOTES:

1. THIS STANDARD APPLIES TO THE INSTALLATION OF A PHASOR MEASUREMENT UNIT (PMU) WITH AN OVERHEAD PRIMARY MEASUREMENT ASSEMBLY (PMA) IN THE ELECTRICAL DISTRIBUTION SYSTEM. INSTALLERS MUST STRICTLY FOLLOW THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND ANY SUPPLEMENTARY DOCUMENTATION ACCOMPANYING THE EQUIPMENT.
2. EXTREME CAUTION MUST BE EXERCISED WHEN WORKING WITH CURRENT TRANSFORMER-BASED METERS. THE SECONDARY WINDING OF CURRENT TRANSFORMERS (CT) MUST NEVER BE OPEN WHILE THEIR PRIMARY WINDING IS ENERGIZED. AN OPEN CIRCUIT CONDITION IN THE SECONDARY TERMINALS OF THE CT CAN RESULT IN A DANGEROUS OVERVOLTAGE STATE THAT CAN PUT WORKERS AT RISK AND MAY DESTROY THE EQUIPMENT.
3. NO ADDITIONAL EQUIPMENT WILL BE ALLOWED ON POLES WHERE A PMU IS INSTALLED.
4. DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED, AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
5. IF GUYS ARE REQUIRED, REFER TO STANDARD NO. E-1-2-3 FOR GUYING SPECIFICATIONS, PLACEMENT, SIZE, AND NUMBER OF GUYS BASED ON LOAD AND SPACE LIMITATIONS.
6. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
7. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
8. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
9. THE VERTICAL CLEARANCE OF THE ENCLOSURE SHALL COMPLY WITH THE NESC, AND ITS TOP SHALL NEVER BE HIGHER THAN 18'-0" FROM THE FINISH GRADE.
10. THE PHASOR MEASUREMENT UNIT (ITEM 0200) SHALL BE FACTORY ASSEMBLED AND PRE-WIRED IN A FULLY SEALED NEMA 4X ENCLOSURE. THE PMU MUST CONTAIN A POWER QUALITY METER, TEST SWITCH, POWER SUPPLY, SATELLITE-SYNCHRONIZED CLOCK, COMMUNICATION INTERFACE, AND TERMINAL BLOCKS.
11. REFER TO ASSEMBLY NO. ASSY-2501 OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR RISER SUPPORT ASSEMBLY INSTALLATION.
12. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
13. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
14. PMA LOW VOLTAGE OUTPUT WIRING AND SIGNAL CABLES MUST ENTER THE BOTTOM OF THE PMU ENCLOSURE TO AVOID WATER ENTRANCE AND ENSURE PROPER PROTECTION OF THE INTERNAL COMPONENTS. PMA LOW VOLTAGE OUTPUT WIRING SHOULD BE ROUTED THROUGH A 1" DIAMETER CONDUIT FROM THE PMA JUNCTION BOX TO THE PMU ENCLOSURE.
15. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THIS REQUIREMENT.
16. SURGE ARRESTERS SHOULD BE USED AT BOTH SOURCE AND LOAD SIDES OF THE LINES. A MAIN GROUND WIRE MUST BE USED TO CONNECT ALL SURGE ARRESTERS' GROUND TERMINALS. THIS CONDUCTOR SHOULD BE ROUTED ALONG THE CROSSARM AND CONNECTED TO THE POLE GROUNDING CONDUCTOR. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
17. THE OVERHEAD PRIMARY METERING ASSEMBLY (ITEM 0199) MUST BE SELECTED BASED ON THE FEEDER VOLTAGE AND CURRENT CAPACITY.
18. CURRENT AND VOLTAGE TRANSFORMERS ON THE PMA MUST BE COMPATIBLE WITH THE PMU FORM 9, INPUT SIGNAL CONNECTION FOR A 4-WIRE WYE CONFIGURATION.
19. CURRENT TRANSFORMERS (CT) ARE POLARIZED AND MUST BE FITTED THE CORRECT WAY TO ENSURE ACCURATE METERING AND MONITORING OF THE ELECTRICAL SYSTEM. THE INSTALLER MUST VERIFY THE CT POLARITY AND CONFIGURATION ON THE PMA BEFORE ENERGIZING THE EQUIPMENT.
20. ONE OF THE THREE VOLTAGE TRANSFORMERS (PTS) WILL SUPPLY POWER FOR THE PMU, SO THE PT OUTPUT SHALL BE CONNECTED TO THE PMU POWER SUPPLY INPUT TERMINAL. THE INSTALLER MUST VERIFY THE PT OUTPUT VOLTAGE AND THE PMU POWER SUPPLY INPUT VOLTAGE RANGE.
21. IF THE COMMUNICATION CABLE IS NOT PRESENT, THE PVC END BELL (ITEM 2045) SHALL BE REPLACED WITH A PVC END CAP (ITEM 2042).
22. USE CABLE TIES (ITEM 2026) TO ORGANIZE ALL STRANDED COPPER CABLES (ITEM 2086).
23. VERTICAL LINE POST INSULATOR (ITEM 0068) INCLUDES A TRUNNION TYPE CLAMP (ITEM 0009) WITH A CLAMPING RANGE SUITABLE FOR THE ALUMINUM CONDUCTOR PLUS ARMOR ROD (ITEM 0084) OVERALL DIAMETER FROM 0.50" TO 1.06". FOR A DIAMETER OUTSIDE THIS RANGE OR FOR COPPER CONDUCTORS, THE CORRESPONDING TRUNNION TYPE CLAMP SHALL BE USED.
24. FOR INSTALLATION OF AN OVERHEAD POWER METERING ASSEMBLY (ITEM 0199) ON THE 8" HOLE SPACING POLE SIDE, A C-CHANNEL TYPE BASE (ITEM 0187) MUST BE USED.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<p><b>TITLE:</b></p> <p style="text-align: center;"><b>PHASOR MEASUREMENT UNIT (PMU) MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL</b></p>	<p>STANDARD NO. <u>PMU-1</u> VERSION <u>1</u>  DOCUMENT NO. <u>4301.133</u>  PAGE <u>5</u> OF <u>7</u> DATE <u>APR 1, 2024</u>  SUBMITTED <u>ALEX J. RODRIGUEZ LIC. 24174</u>  REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>  APPROVED <u>RICARDO CASTRO LIC. 12135</u>  DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>  <u>EMILIO CUADRADO LIC. 3000</u></p>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	10
	FLAT ROUND WASHER	VARIES	84
	SPLIT LOCK WASHER	VARIES	40
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0008	TENSION CLAMP	VARIES	6
0009	TRUNION CLAMP FOR LINE POST INSULATOR	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	8
0058	SUSPENSION INSULATOR	014-01942	3
0068	VERTICAL LINE POST INSULATOR	014-83048	2
0078	HOT LINE CLAMP	VARIES	6
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	008-82815	2
0144	STIRRUP	VARIES	6
0145	DOUBLE TERMINAL EYE CONNECTOR	VARIES	18
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0153	AIR BREAK BYPASS DISCONNECTING SWITCH	032-82358	1
0174	GROUND / BOND WIRE CLAMP	002-82539	4
0187	C-CHANNEL TYPE BASE	002-84530	AS REQ.
0188	SERRATED COLLAR BOLT	014-83737	2



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

PHASOR MEASUREMENT UNIT (PMU)  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL

STANDARD NO. PMU-1 VERSION 1  
DOCUMENT NO. 4301.133  
PAGE 6 OF 7 DATE APR 1, 2024  
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0195	FLEXIBLE LIQUID TIGHT CONDUIT	002-84861	AS REQ.
0196	FLEXIBLE LIQUID TIGHT FITTING	002-84862	6
0198	FIGURE 8 LINK	002-84876	3
0199	OVERHEAD PRIMARY METERING ASSEMBLY (PMA)	VARIES	1
0200	PHASOR MEASUREMENT UNIT (PMU)	018-84788	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	6
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 2-FIGURE C, 1-FIGURE D	4
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2006	1 $\frac{5}{8}$ " STRUT CHANNEL	VARIES	AS REQ.
2008	$\frac{1}{2}$ " FULLY THREADED ROD	002-82929	AS REQ.
2009	HEXAGONAL NUT	002-82038	48
2012	BRONZE MALE SERVICE POST CONNECTOR	002-82925	2
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2026	CABLE TIE	038-83155	AS REQ.
2040	1" PVC SCH-40 DUCT	038-83424	AS REQ.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

PHASOR MEASUREMENT UNIT (PMU)  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL

STANDARD NO. PMU-1 VERSION 1  
DOCUMENT NO. 4301.133  
PAGE 7 OF 7 DATE APR 1, 2024  
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
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DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2042	1" PVC ENDCAP	038-85650	AS REQ.
2044	1" PVC FEMALE ADAPTER	038-85651	3
2045	1" PVC END BELL	VARIES	AS REQ.
2048	HEX HEAD BOLT	038-83212	40
2086	STRANDED COPPER CABLE, 600 V, THHN / THWN-2	VARIES	AS REQ.
2102	STRUT CHANNEL NUT	002-84270	4
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.









# DISTRIBUTION ENGINEERING

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<b>TITLE:</b>  <b>HORIZONTAL RECLOSER WITH BYPASS SWITCH MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>REC-1</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.121</u>
	PAGE <u>2 OF 3</u> DATE <u>FEB 27, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
- THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
- THE RECLOSER SHOULD BE INSTALLED IN LINES WITH AN ANGLE DEVIATION EQUAL TO OR LESS THAN 5°. IF THE ANGLE IS GREATER THAN 5°, REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. THE PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- THE RECLOSER SHALL ALWAYS BE INSTALLED ON THE LOAD SIDE OF THE POLE.
- THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
- NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WITH RECLOSERS INSTALLED.
- THE VERTICAL CLEARANCE OF THE RECLOSER CONTROL'S ENCLOSURE SHALL COMPLY WITH THE NESC, AND ITS TOP SHALL NEVER BE HIGHER THAN 18'-0" FROM THE FINISH GRADE.
- THE RECLOSER'S SURGE ARRESTERS SHALL BE CONNECTED WITH THE CABLE AND EYE TERMINAL CONNECTOR THAT COME INSTALLED FROM THE FACTORY. THESE SURGE ARRESTERS MUST BE VERIFIED TO BE COMPATIBLE WITH THE CIRCUIT VOLTAGE. IF THEY ARE NOT, REPLACE THEM WITH THE APPROPRIATE ONES FOLLOWING TABLE 4-5 OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
- IF THE CONTROL POWER TRANSFORMER HAS PROVISION FOR THE SURGE ARRESTER INSTALLATION, IT WILL BE INSTALLED ON THE TRANSFORMER WITH THE SURGE ARRESTER MOUNTING BRACKET (ITEM 0204).
- THE CONTROL POWER TRANSFORMER'S NAMEPLATE SHALL BE VERIFIED FOR PROPER CONNECTION OF THE TRANSFORMER'S SECONDARY BUSHINGS TO OBTAIN THE 120 V VOLTAGE TO SERVE THE RECLOSER'S EXTERNAL POWER SUPPLY.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	6
	FLAT ROUND WASHER	VARIES	72
	SPLIT LOCK WASHER	VARIES	36
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	9
0050	DOUBLE ARMING BOLT	VARIES	6
0078	HOT LINE CLAMP	VARIES	7
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	7
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	18
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>HORIZONTAL RECLOSER WITH BYPASS SWITCH MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL</b>	STANDARD NO. <u>REC-1</u> VERSION <u>6</u>
		DOCUMENT NO. <u>4301.121</u>
		PAGE <u>3</u> OF <u>3</u> DATE <u>FEB 27, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>		
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>		

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0153	AIR BREAK BYPASS DISCONNECTING SWITCH	032-82358	1
0174	GROUND / BOND WIRE CLAMP	VARIES	2
0180	HORIZONTAL RECLOSER	VARIES	1
0182	FIXING BAND	107-04344	AS REQ.
0183	BUCKLE FOR FIXING BAND	107-03031	AS REQ.
0185	CONTROL POWER OVERHEAD TRANSFORMER	VARIES	AS REQ.
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	36
2048	HEX HEAD BOLT	038-83218	36

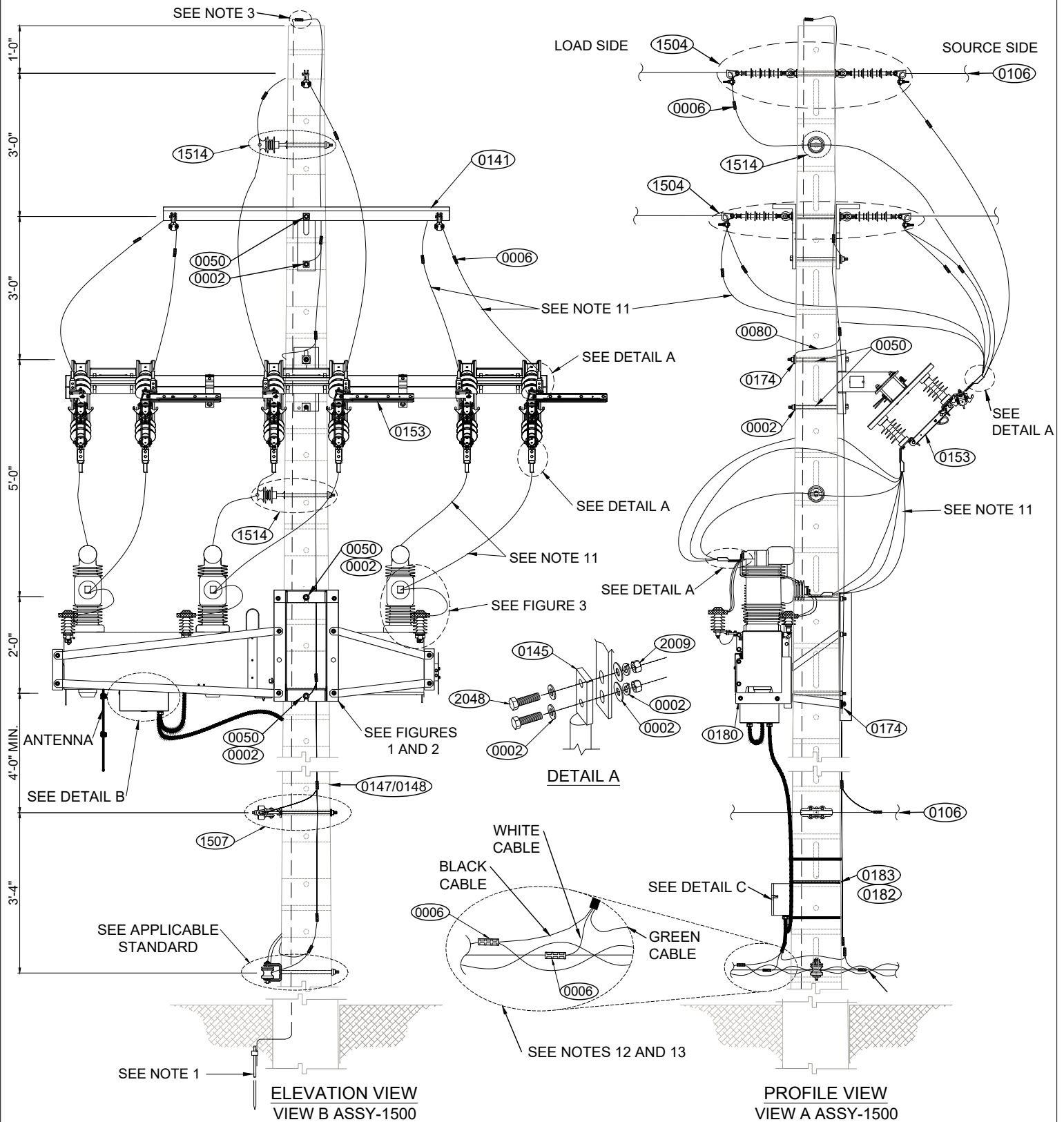


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OVERHEAD DISTRIBUTION STANDARDS

## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH MAXIMUM VOLTAGE: 13.2 KV

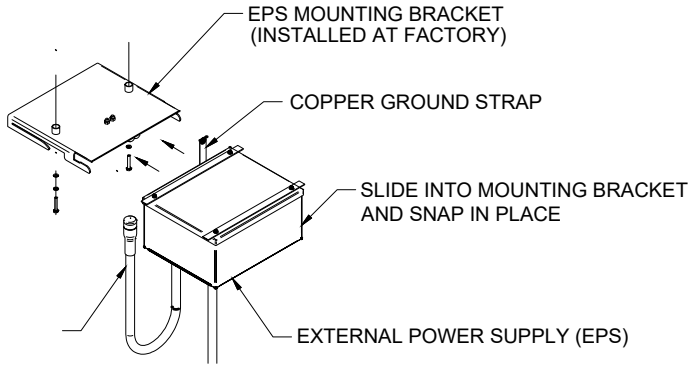
STANDARD NO. REC-2 VERSION 7  
 DOCUMENT NO. 4301.123  
 PAGE 1 OF 8 DATE FEB 26, 2024  
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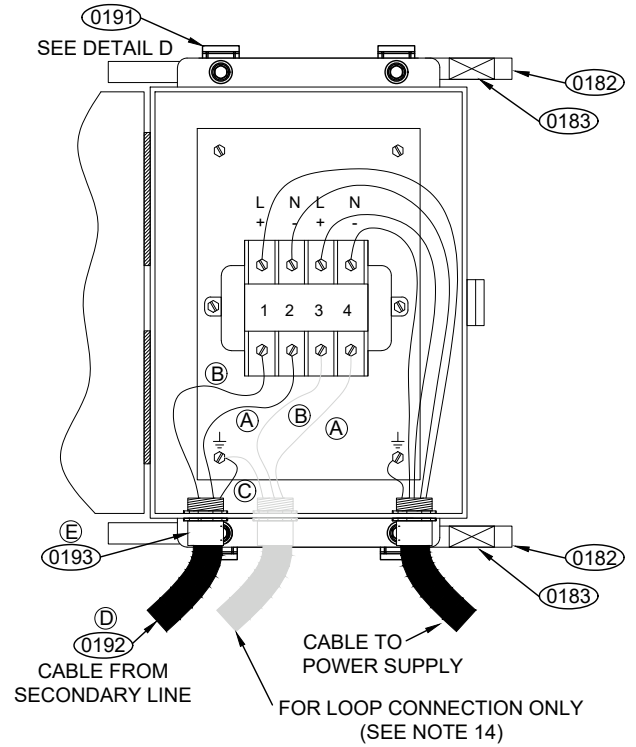
## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. REC-2 VERSION 7  
DOCUMENT NO. 4301.123  
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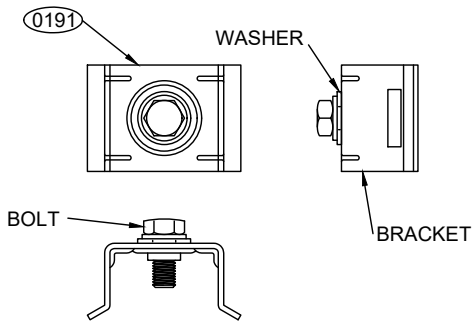


**DETAIL B**

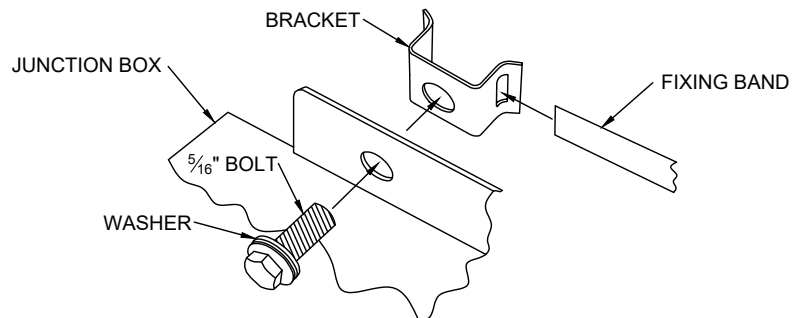
LEGEND	
(A)	#12 WHITE NEUTRAL CABLE
(B)	#12 BLACK LINE CABLE
(C)	#12 GREEN GROUND CABLE
(D)	SERVICE ENTRANCE CABLE #12-3
(E)	1/2" CABLE GRIP



**DETAIL C**  
JUNCTION BOX POWER INPUT CONNECTIONS



**FIXING BAND BRACKET**



**DETAIL D**  
FIXING BAND AND BRACKET ASSEMBLY



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. REC-2 VERSION 7

DOCUMENT NO. 4301.123

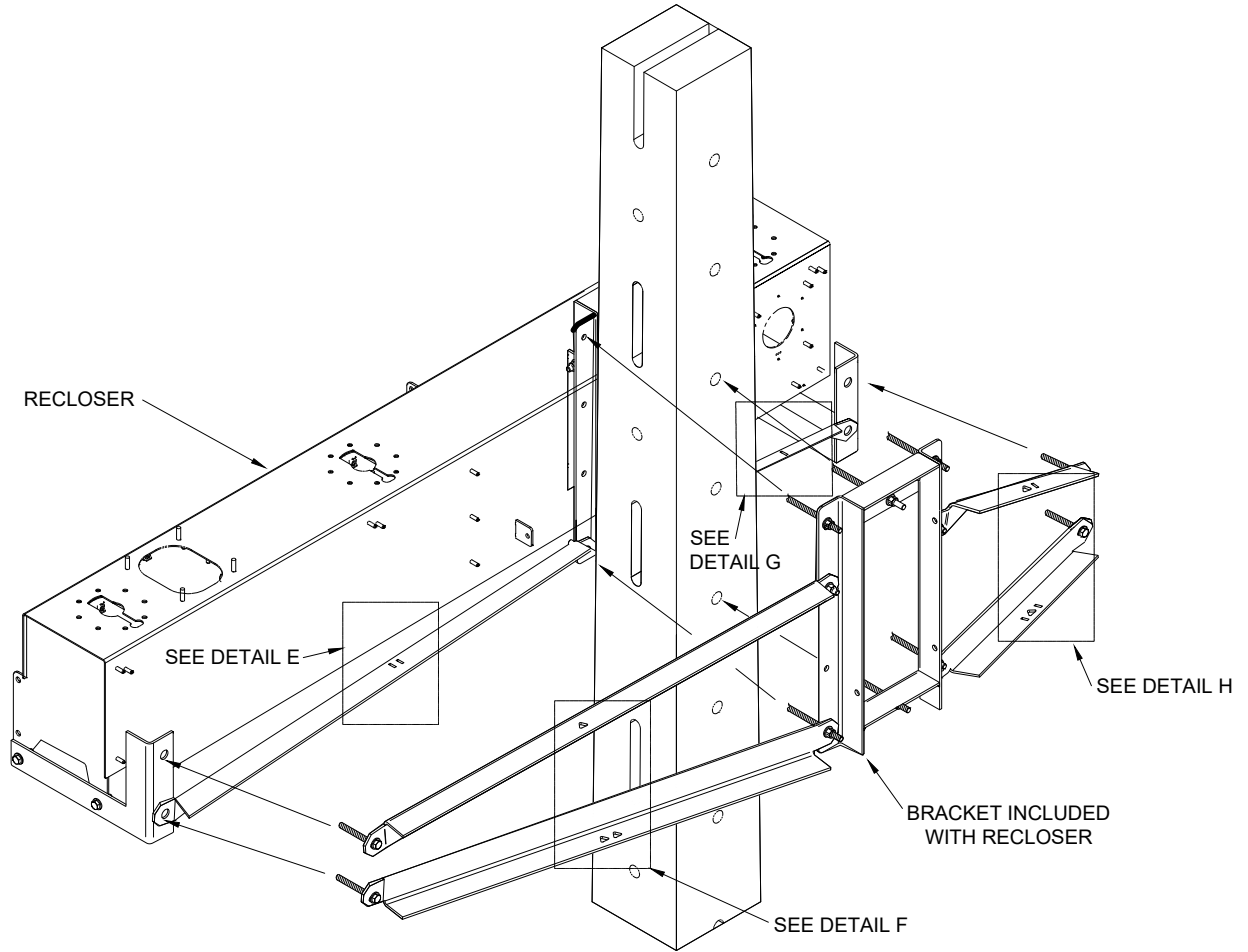
PAGE 4 OF 8 DATE FEB 26, 2024

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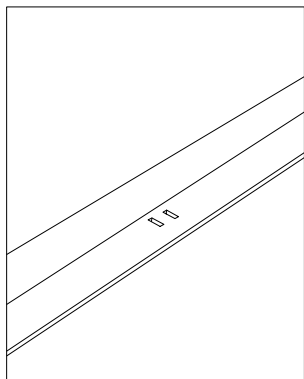
REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

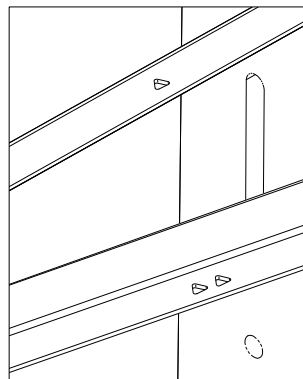
DIGITIZED EMILIO CUADRADO LIC. 3000



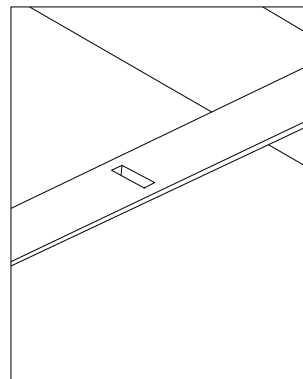
**FIGURE 1**  
BRACKET MOUNTING ON CONCRETE POLE



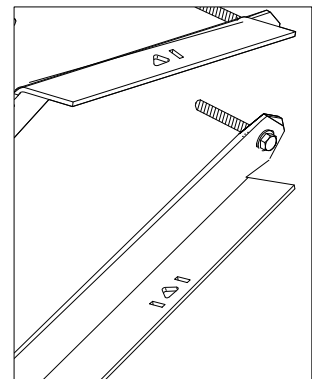
DETAIL E



DETAIL F



DETAIL G



DETAIL H



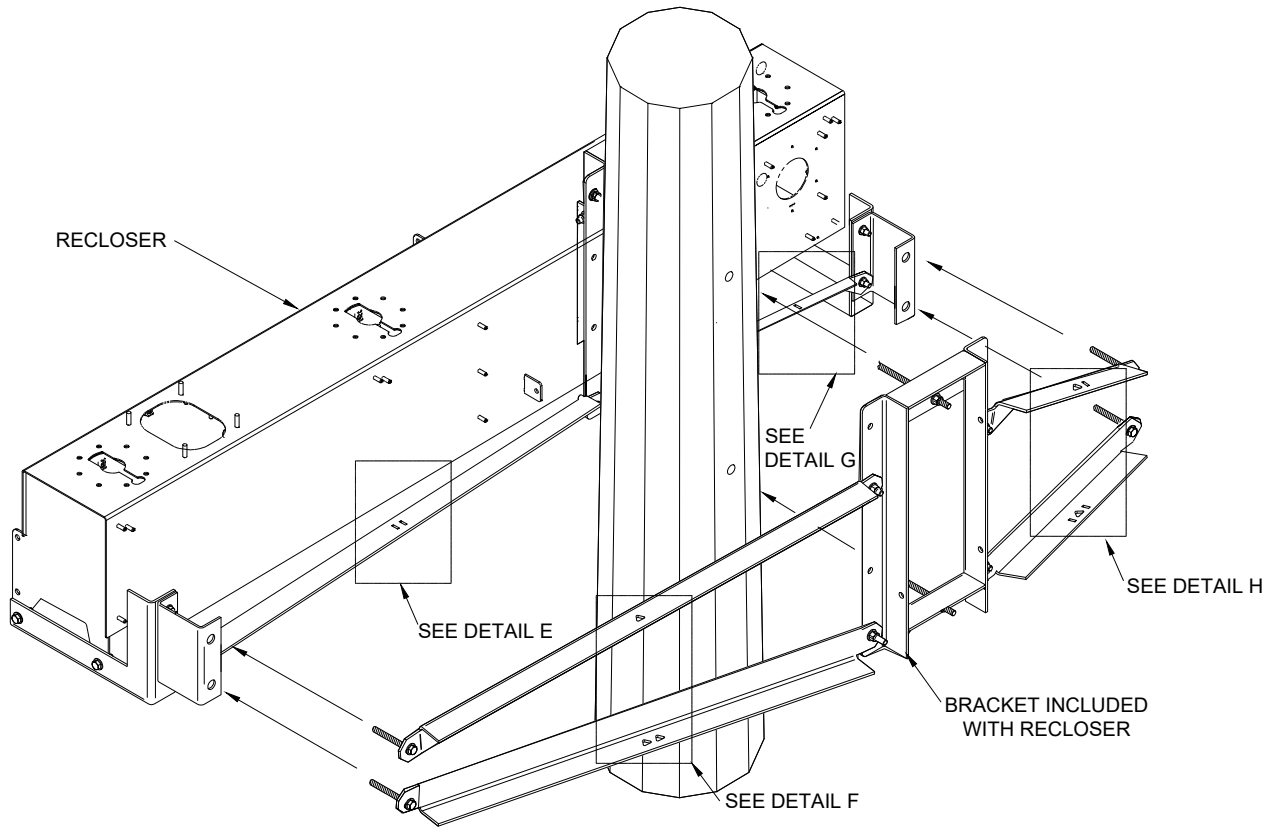


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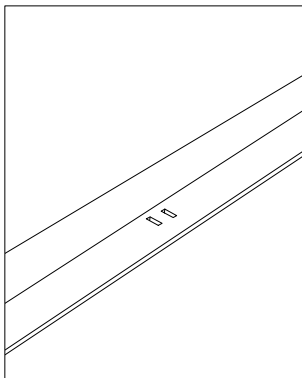
OVERHEAD DISTRIBUTION STANDARDS

## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH MAXIMUM VOLTAGE: 13.2 KV

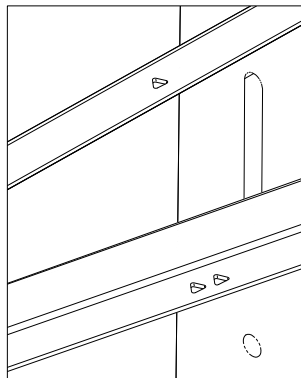
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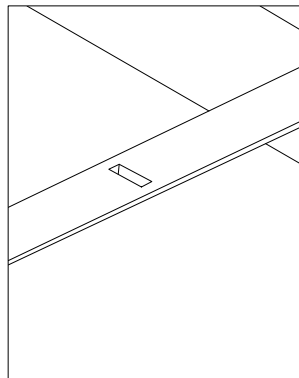
**FIGURE 2**  
BRACKET MOUNTING ON ROUND POLE



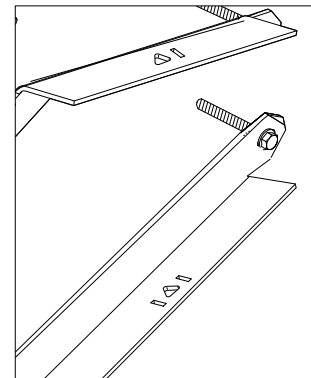
**DETAIL E**



**DETAIL F**



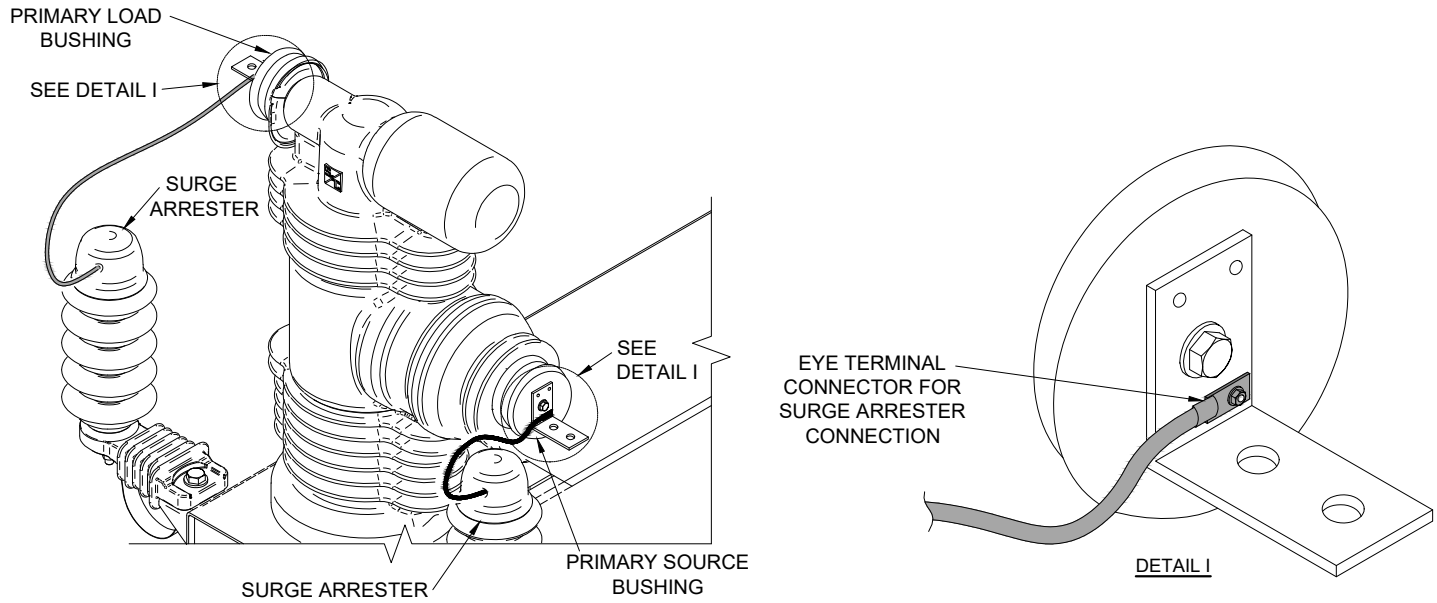
**DETAIL G**



**DETAIL H**

**LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES**

STANDARD NO.	REC-2	VERSION	7
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SUBMITTED	LUIS R. SOTO LIC. 11658		
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DIGITIZED	EMILIO CUADRADO LIC. 3000		



**FIGURE 3**  
**RECLOSER'S SURGE ARRESTERS CONNECTION**  
(SEE NOTE 14)

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
7. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
8. THE RECLOSER SHOULD BE INSTALLED IN LINES WITH AN ANGLE DEVIATION EQUAL TO OR LESS THAN 5°. IF THE ANGLE IS GREATER THAN 5°, REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. THE PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
9. THE RECLOSER SHALL ALWAYS BE INSTALLED ON THE LOAD SIDE OF THE POLE.
10. NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WITH RECLOSERS INSTALLED.
11. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
12. RADIAL CIRCUIT INSTALLATION: THIS INSTALLATION REQUIRES THAT A 120V SECONDARY VOLTAGE BE AVAILABLE AT THE POLE TO SERVE THE RECLOSER'S EXTERNAL POWER SUPPLY. IF A SECONDARY LINE IS NOT AVAILABLE, IT CAN BE EXTENDED FROM A NEARBY TRANSFORMER. THE TRANSFORMER SUPPLYING THE SECONDARY VOLTAGE SHALL BE FED FROM THE SOURCE SIDE WITHIN THE SAME CIRCUIT AS THE RECLOSER.
13. LOOP CIRCUIT INSTALLATION: THIS INSTALLATION REQUIRES TWO 120V SECONDARY LINES SUPPLIED FROM DIFFERENT TRANSFORMERS AT BOTH SIDES OF THE RECLOSER TO SERVE ITS EXTERNAL POWER SUPPLY. IF A SECONDARY LINE IS NOT AVAILABLE, IT CAN BE EXTENDED FROM A NEARBY TRANSFORMER. BOTH TRANSFORMERS SUPPLYING THE SECONDARY VOLTAGE SHALL BE CONNECTED FROM THE SAME CIRCUIT AS THE RECLOSER AT BOTH SIDES.
14. THE RECLOSER'S SURGE ARRESTERS SHALL BE CONNECTED WITH THE CABLE AND EYE TERMINAL CONNECTOR THAT COME INSTALLED FROM THE FACTORY. THESE SURGE ARRESTERS MUST BE VERIFIED TO BE COMPATIBLE WITH THE CIRCUIT VOLTAGE. IF THEY ARE NOT, REPLACED THEM WITH THE APPROPRIATE ONES FOLLOWING TABLE 4-5 OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
15. THE OPENING DIRECTION OF THE BYPASS BLADE SHOULD ONLY BE SWAPPED IN THIS SINGLE BYPASS DISCONNECTING SWITCH.
16. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL**

STANDARD NO. REC-2 VERSION 7  
DOCUMENT NO. 4301.123  
PAGE 7 OF 8 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	6
	FLAT ROUND WASHER	VARIES	72
	SPLIT LOCK WASHER	VARIES	36
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	6
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	18
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0153 *	AIR BREAK BYPASS DISCONNECTING SWITCH	032-82358	1
0174	GROUND / BOND WIRE CLAMP	002-82539	2
0180	HORIZONTAL RECLOSER WITH LOOP RESTORATION	VARIES	1
0182	FIXING BAND	107-04344	AS REQ.
0183	BUCKLE FOR FIXING BAND	107-03031	AS REQ.
0191	BANDING BRACKET	107-83908	4
0192	SERVICE ENTRANCE CABLE #12-3	006-83906	AS REQ.
0193	CABLE GRIP	002-83907	AS REQ.
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL

STANDARD NO. REC-2 VERSION 7  
DOCUMENT NO. 4301.123  
PAGE 8 OF 8 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2009	HEXAGONAL NUT	002-82038	36
2048	HEX HEAD BOLT	038-83218	36

**\* NOTE:**

IF THE THREE PHASE AIR BREAK BYPASS DISCONNECTING SWITCH (ITEM 0153) WITH WAREHOUSE ITEM NO. 032-82358 IS NOT AVAILABLE, IT CAN BE REPLACED WITH THE FOLLOWING ALTERNATE MATERIALS. SEE ALTERNATE BYPASS INSTALLATION ON PAGE 2 .

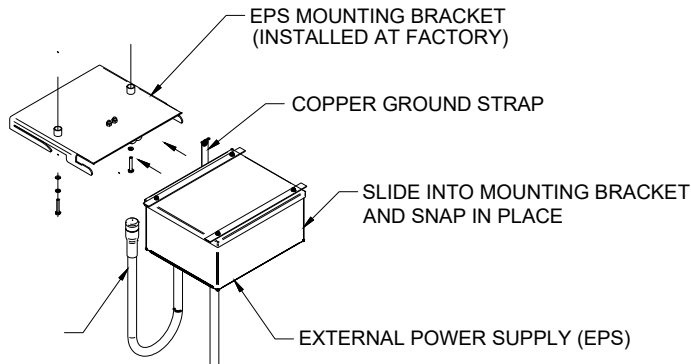
## ALTERNATE MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0153	AIR BREAK BYPASS DISCONNECTING SWITCH	032-82357	3



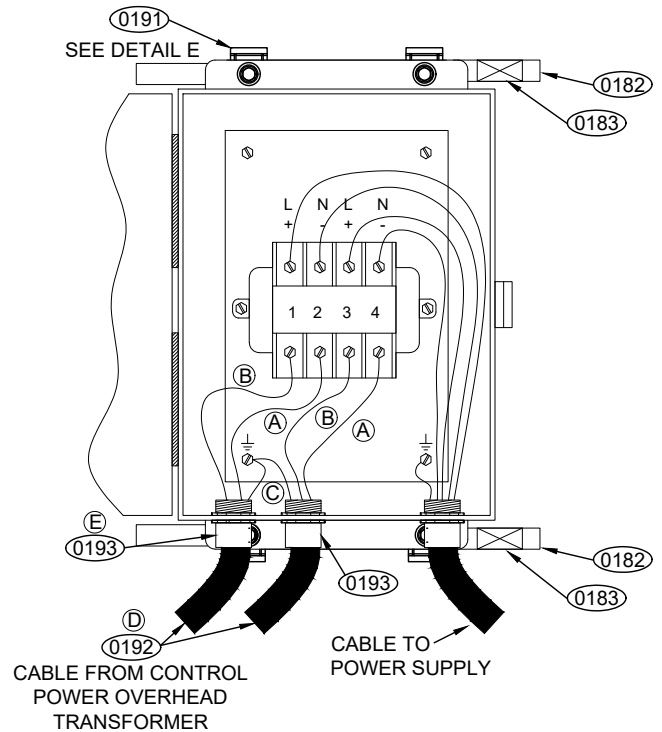
## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH AND CONTROL TRANSFORMERS MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. REC-2-1 VERSION 7  
DOCUMENT NO. 4301.124  
PAGE 2 OF 7 DATE FEB 26, 2024  
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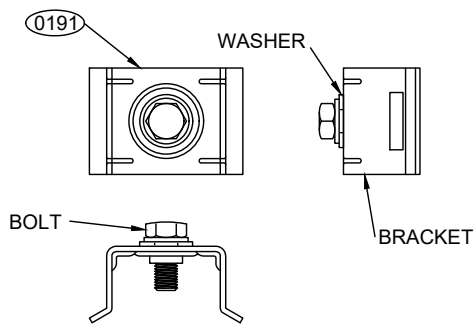


**DETAIL C**

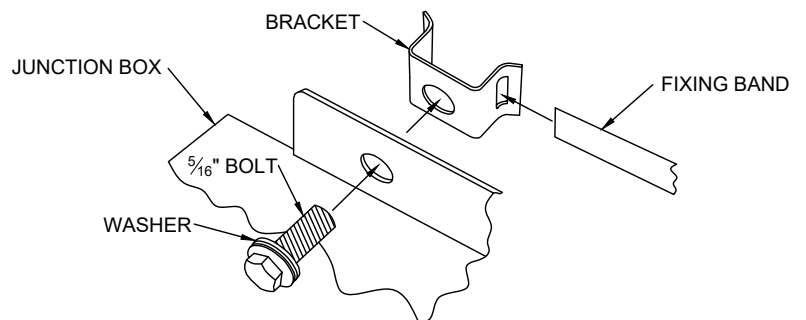
LEGEND	
(A)	#12 WHITE NEUTRAL CABLE
(B)	#12 BLACK LINE CABLE
(C)	#12 GREEN GROUND CABLE
(D)	SERVICE ENTRANCE CABLE #12-3
(E)	1/2" CABLE GRIP



**DETAIL D**  
JUNCTION BOX POWER INPUT CONNECTIONS



**FIXING BAND BRACKET**



**DETAIL E**  
FIXING BAND AND BRACKET ASSEMBLY

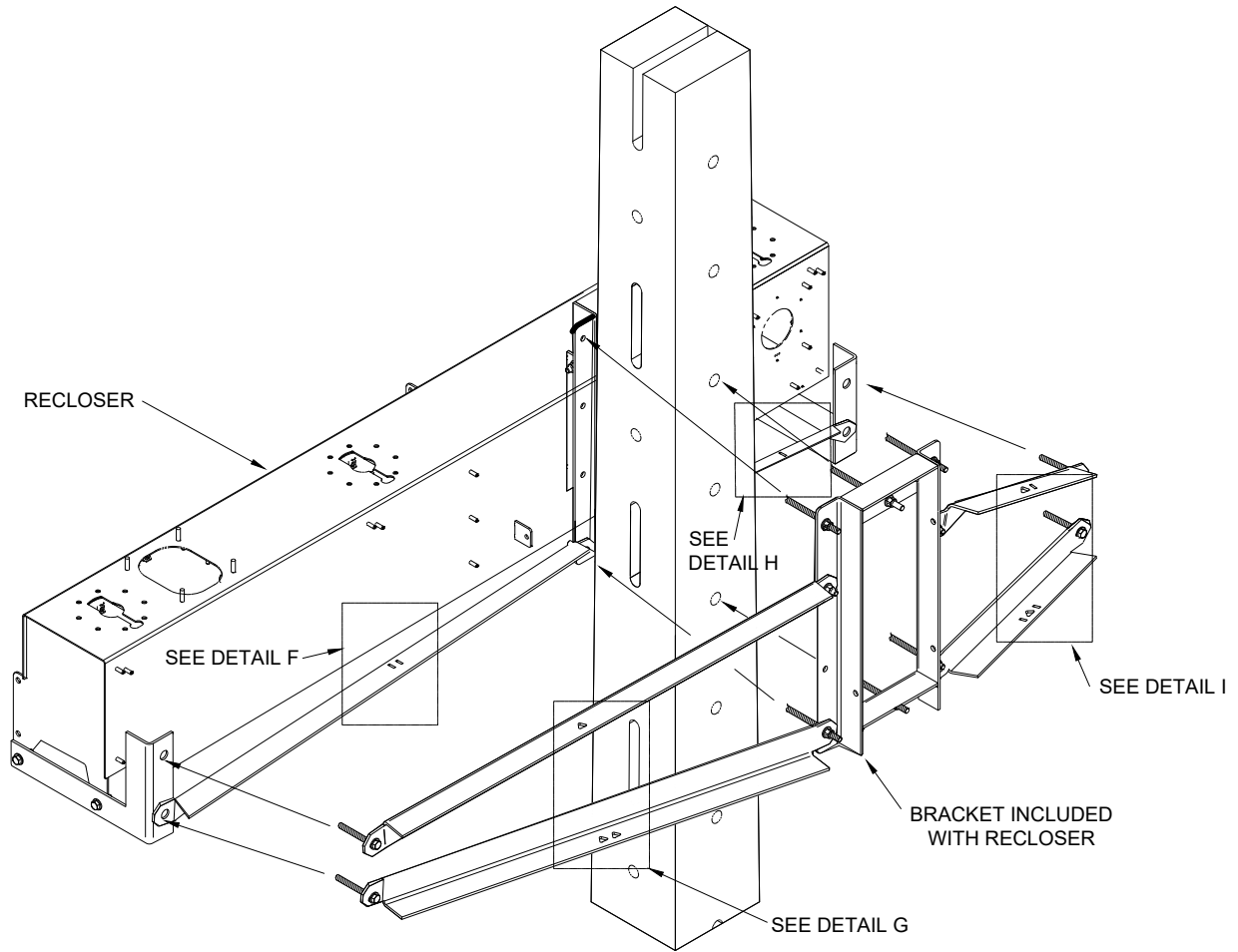


# DISTRIBUTION ENGINEERING

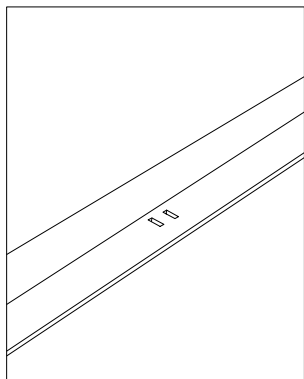
OVERHEAD DISTRIBUTION STANDARDS

## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH AND CONTROL TRANSFORMERS MAXIMUM VOLTAGE: 13.2 KV

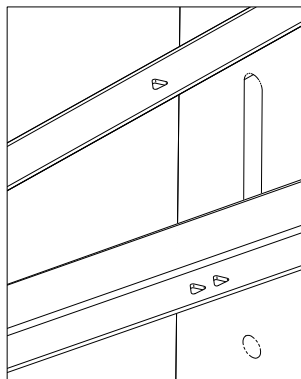
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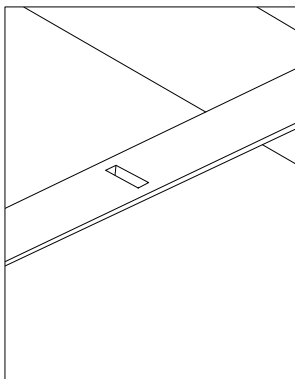
**FIGURE 1**  
BRACKET MOUNTING ON CONCRETE POLE



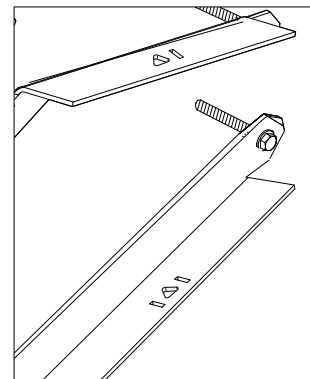
DETAIL F



DETAIL G



DETAIL H



DETAIL I

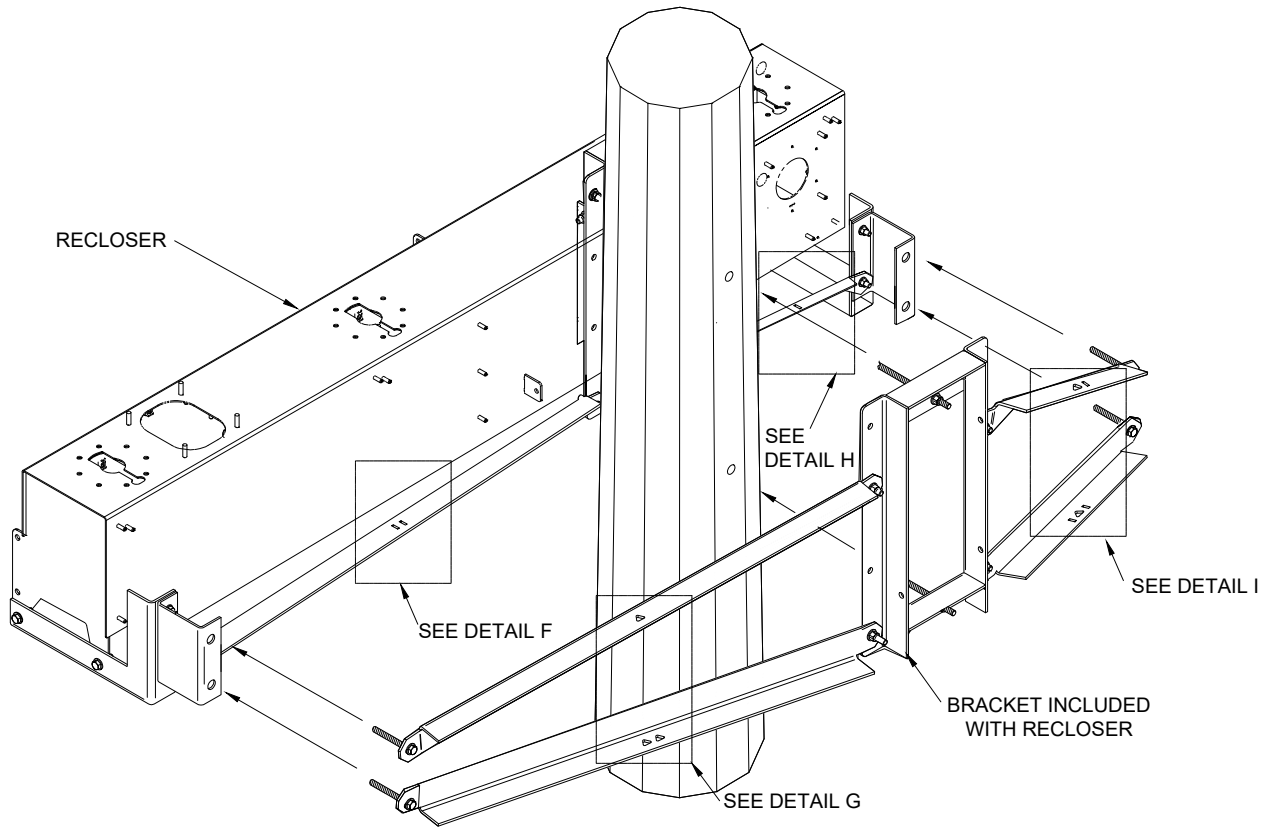


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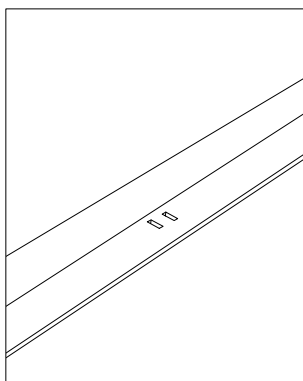
OVERHEAD DISTRIBUTION STANDARDS

## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH AND CONTROL TRANSFORMERS MAXIMUM VOLTAGE: 13.2 KV

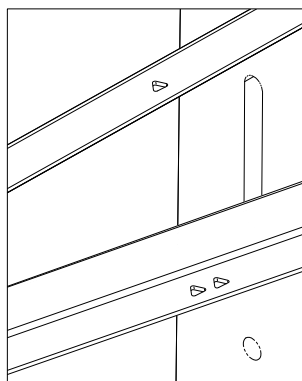
STANDARD NO. REC-2-1 VERSION 7  
DOCUMENT NO. 4301.124  
PAGE 4 OF 7 DATE FEB 26, 2024  
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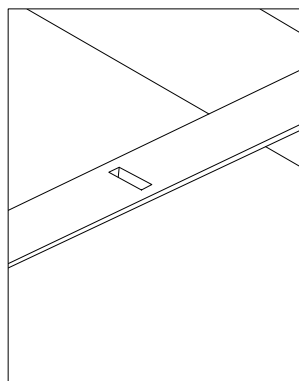
**FIGURE 2**  
BRACKET MOUNTING ON ROUND POLE



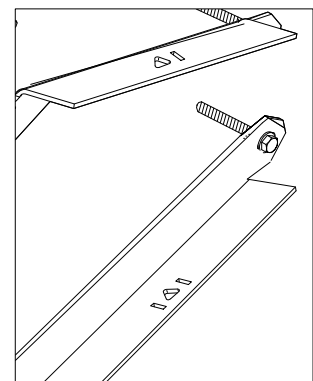
**DETAIL F**



**DETAIL G**



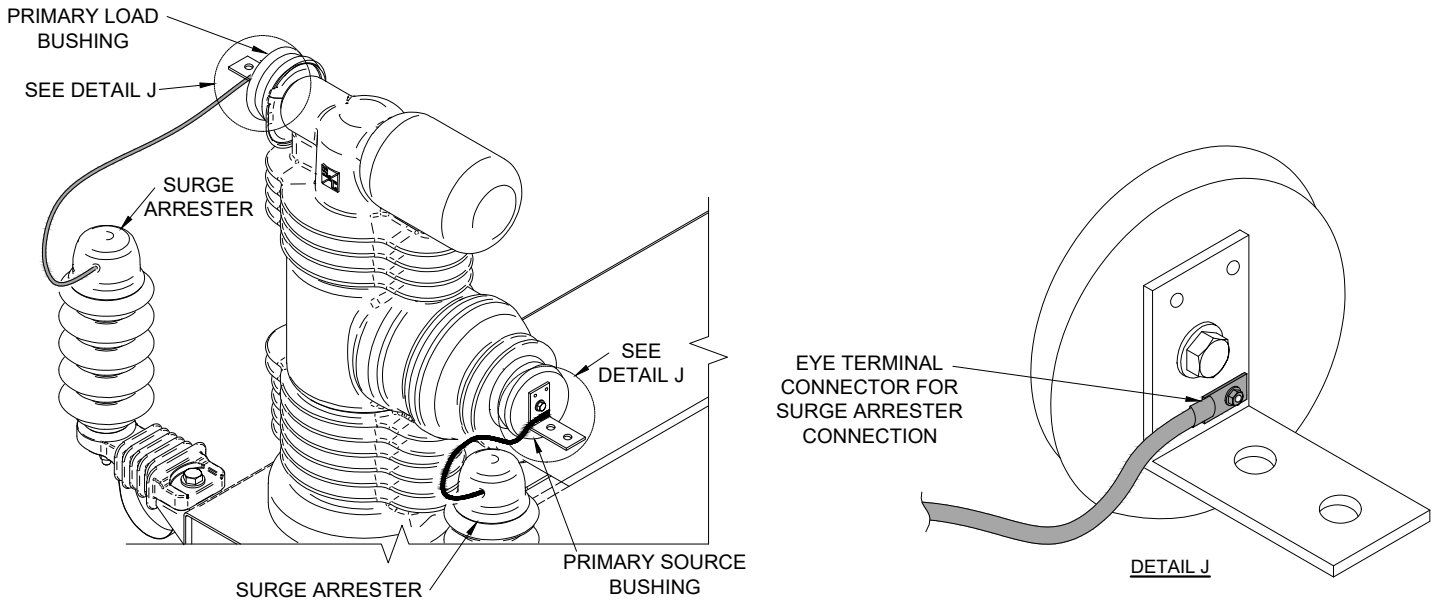
**DETAIL H**



**DETAIL I**

**LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES**

STANDARD NO. REC-2-1 VERSION 7  
DOCUMENT NO. 4301.124  
PAGE 5 OF 7 DATE FEB 26, 2024  
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DIGITIZED EMILIO CUADRADO LIC. 3000



**FIGURE 3  
RECLOSER'S SURGE ARRESTERS CONNECTION  
(SEE NOTE 13)**

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
7. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
8. THE RECLOSER SHOULD BE INSTALLED IN LINES WITH AN ANGLE DEVIATION EQUAL TO OR LESS THAN 5°. IF THE ANGLE IS GREATER THAN 5°, REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. THE PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
9. THE RECLOSER SHALL ALWAYS BE INSTALLED ON THE LOAD SIDE OF THE POLE.
10. NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WITH RECLOSERS INSTALLED.
11. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
12. IF THE FEEDER IS RADIAL, ONLY ONE CONTROL POWER OVERHEAD TRANSFORMER (ITEM 0185) INSTALLED DIRECTLY TO THE POLE, ONE HOT LINE CLAMP (ITEM 0078), AND ONE STIRRUP (ITEM 0144) WILL BE REQUIRED.
13. THE RECLOSER'S SURGE ARRESTERS SHALL BE CONNECTED WITH THE CABLE AND EYE TERMINAL CONNECTOR THAT COME INSTALLED FROM THE FACTORY. THESE SURGE ARRESTERS MUST BE VERIFIED TO BE COMPATIBLE WITH THE CIRCUIT VOLTAGE. IF THEY ARE NOT, REPLACE THEM WITH THE APPROPRIATE ONES FOLLOWING TABLE 4-5 OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
14. IF THE CONTROL POWER TRANSFORMER HAS PROVISION FOR THE SURGE ARRESTER INSTALLATION, IT WILL BE INSTALLED ON THE TRANSFORMER WITH THE SURGE ARRESTER MOUNTING BRACKET (ITEM 0204).
15. THE CONTROL POWER TRANSFORMER'S NAMEPLATE SHALL BE VERIFIED FOR PROPER CONNECTION OF THE TRANSFORMER'S SECONDARY BUSHINGS TO OBTAIN THE 120 V VOLTAGE TO SERVE THE RECLOSER'S EXTERNAL POWER SUPPLY.
16. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:** LOOP RESTORATION HORIZONTAL RECLOSER  
 WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
 MAXIMUM VOLTAGE: 13.2 KV  
 BILL OF MATERIAL

STANDARD NO. REC-2-1 VERSION 7  
 DOCUMENT NO. 4301.124  
 PAGE 6 OF 7 DATE FEB 26, 2024  
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 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	10
	FLAT ROUND WASHER	VARIES	72
	SPLIT LOCK WASHER	VARIES	36
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	002-13603	7
0078	HOT LINE CLAMP	VARIES	AS REQ.
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0141	CROSSARM	VARIES	3
0144	STIRRUP	VARIES	AS REQ.
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	18
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0153	AIR BREAK BYPASS DISCONNECTING SWITCH	032-82358	1
0174	GROUND / BOND WIRE CLAMP	002-82539	2
0180	HORIZONTAL RECLOSER WITH LOOP RESTORATION	VARIES	1
0182	FIXING BAND	107-04344	AS REQ.
0183	BUCKLE FOR FIXING BAND	107-03031	AS REQ.
0185	CONTROL POWER OVERHEAD TRANSFORMER	VARIES	AS REQ.
0191	BANDING BRACKET	107-83908	4
0192	SERVICE ENTRANCE CABLE #12-3	006-83906	AS REQ.
0193	CABLE GRIP	002-83907	AS REQ.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**            **LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL**

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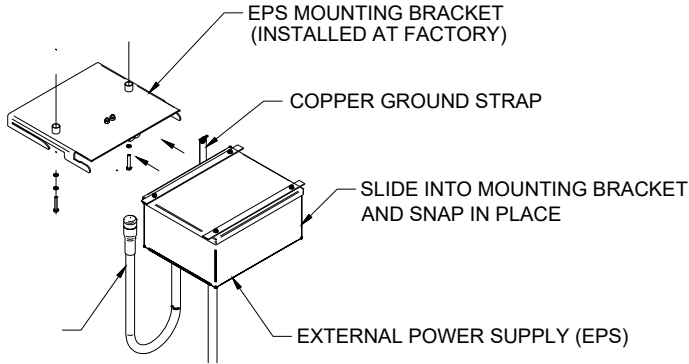
## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	AS REQ.
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	36
2048	HEX HEAD BOLT	038-83218	36



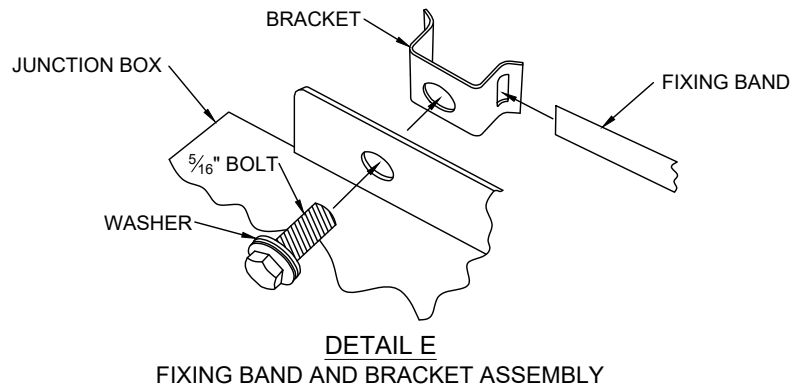
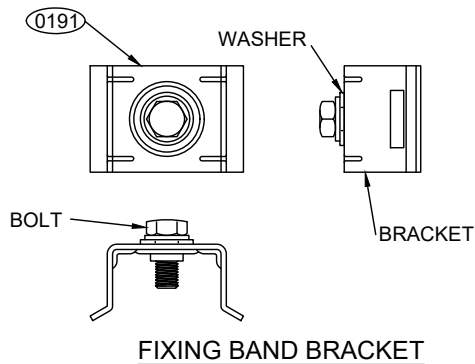
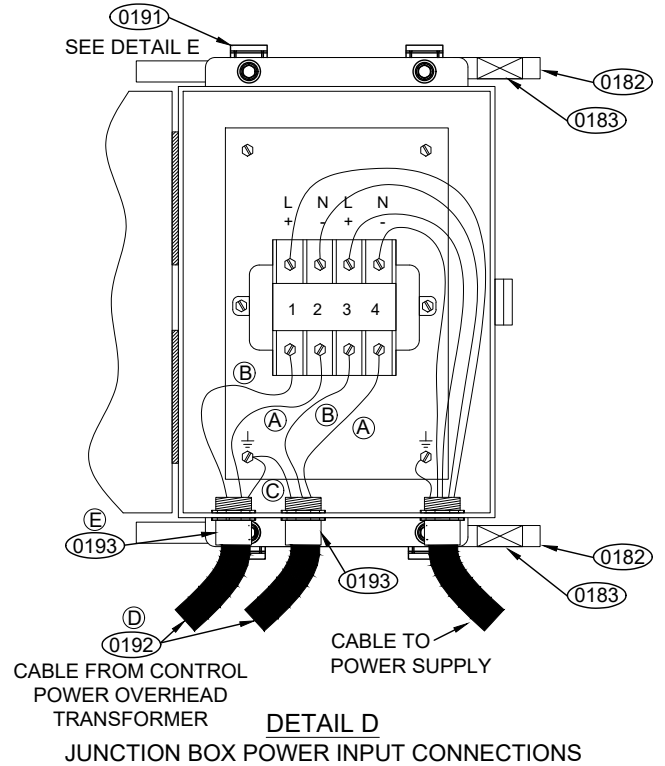
**LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
SPACER CONSTRUCTION  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. REC-2-2 VERSION 4  
DOCUMENT NO. 4301.128  
PAGE 2 OF 7 DATE FEB 26, 2024  
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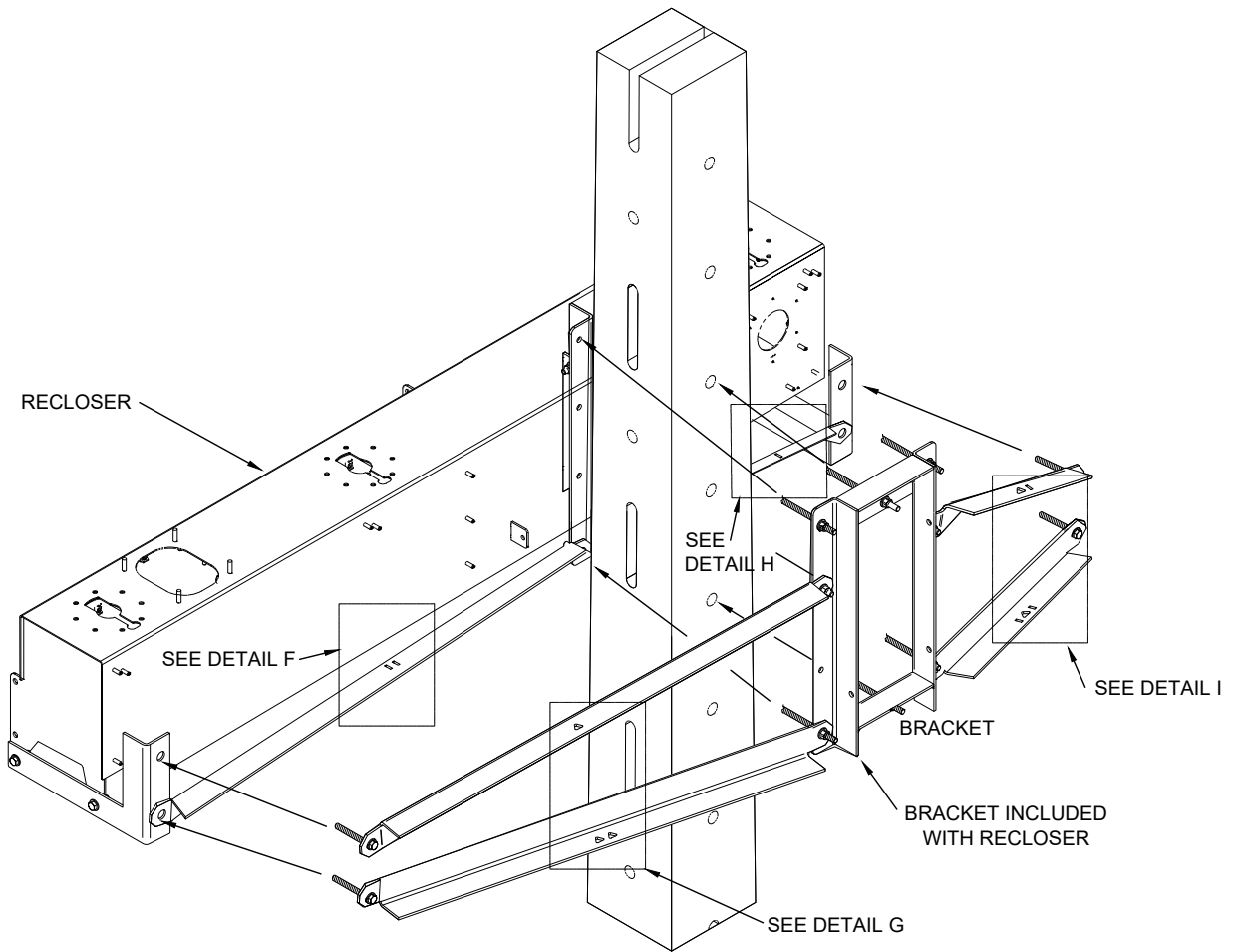
**DETAIL C**

LEGEND	
(A)	#12 WHITE NEUTRAL CABLE
(B)	#12 BLACK LINE CABLE
(C)	#12 GREEN GROUND CABLE
(D)	SERVICE ENTRANCE CABLE #12-3
(E)	1/2" CABLE GRIP

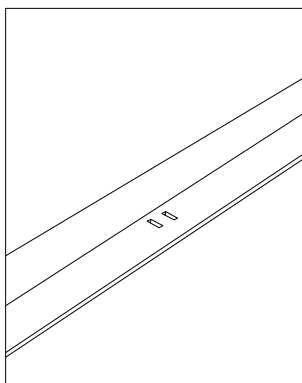


LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
SPACER CONSTRUCTION  
MAXIMUM VOLTAGE: 13.2 KV

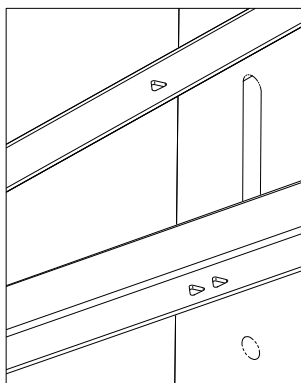
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PAGE 3 OF 7 DATE FEB 26, 2024  
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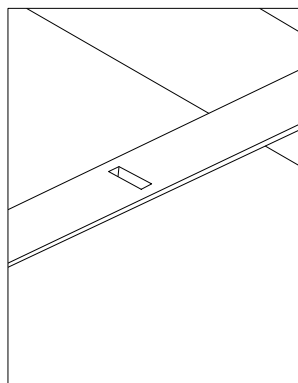
**FIGURE 1**  
BRACKET MOUNTING ON CONCRETE POLE



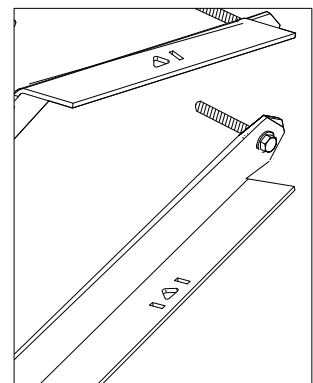
DETAIL F



DETAIL G



DETAIL H



DETAIL I



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

## LOOP RESTORATION HORIZONTAL RECLOSER WITH BYPASS SWITCH AND CONTROL TRANSFORMERS SPACER CONSTRUCTION MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. REC-2-2 VERSION 4  
DOCUMENT NO. 4301.128  
PAGE 4 OF 7 DATE FEB 26, 2024  
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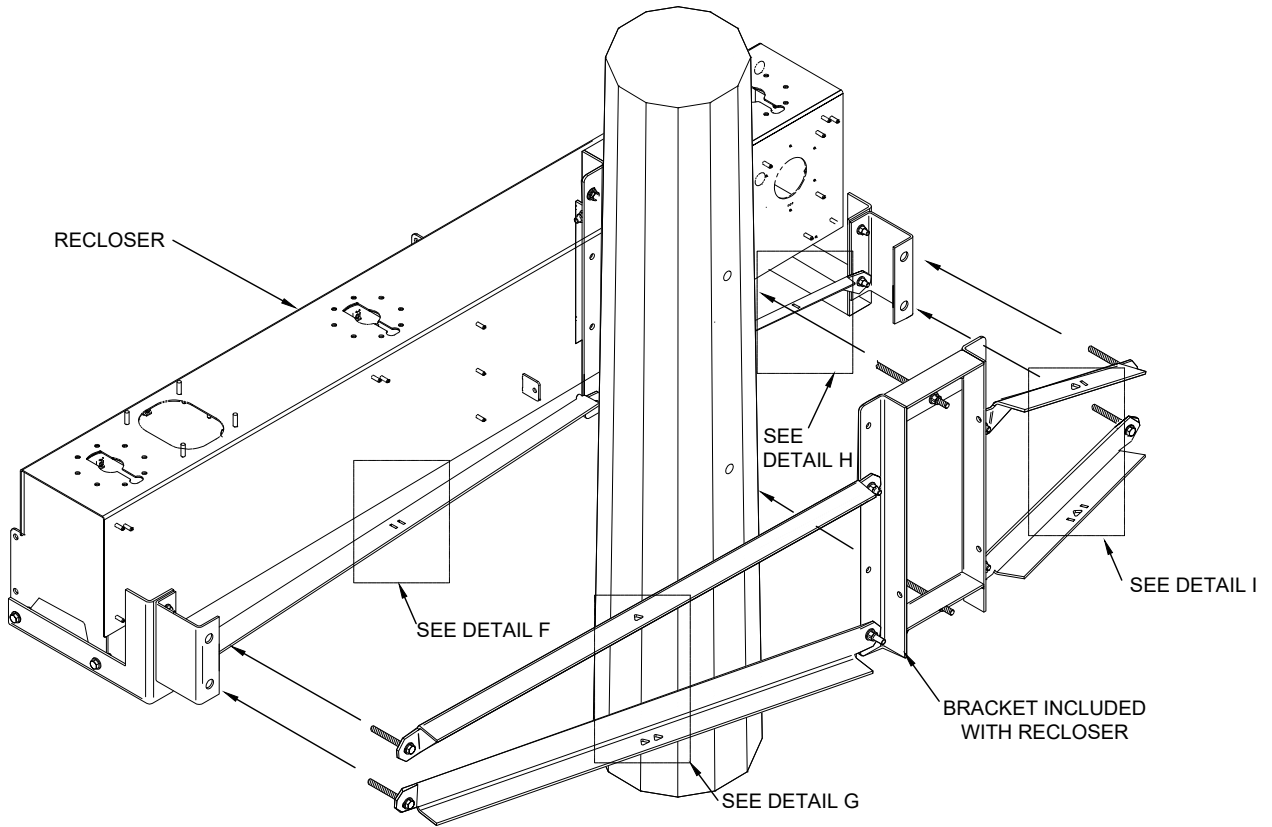
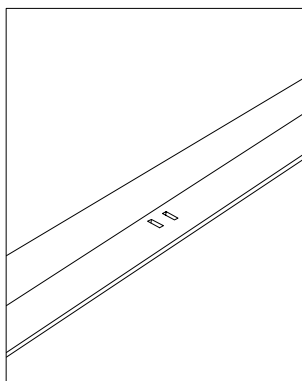
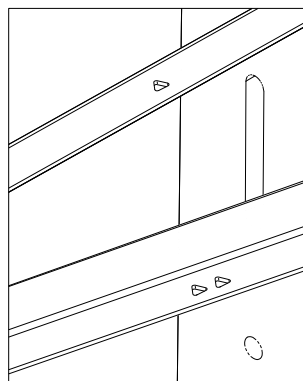


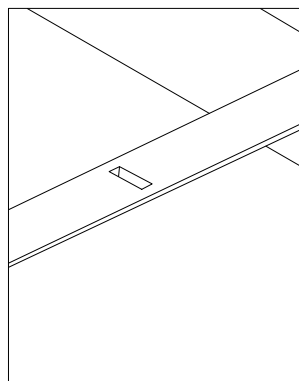
FIGURE 2  
BRACKET MOUNTING ON ROUND POLE



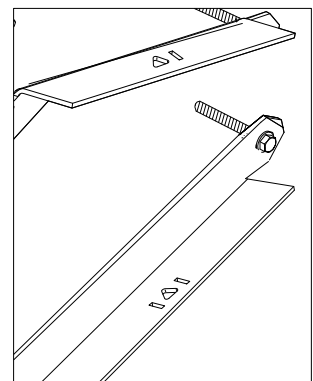
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DETAIL G



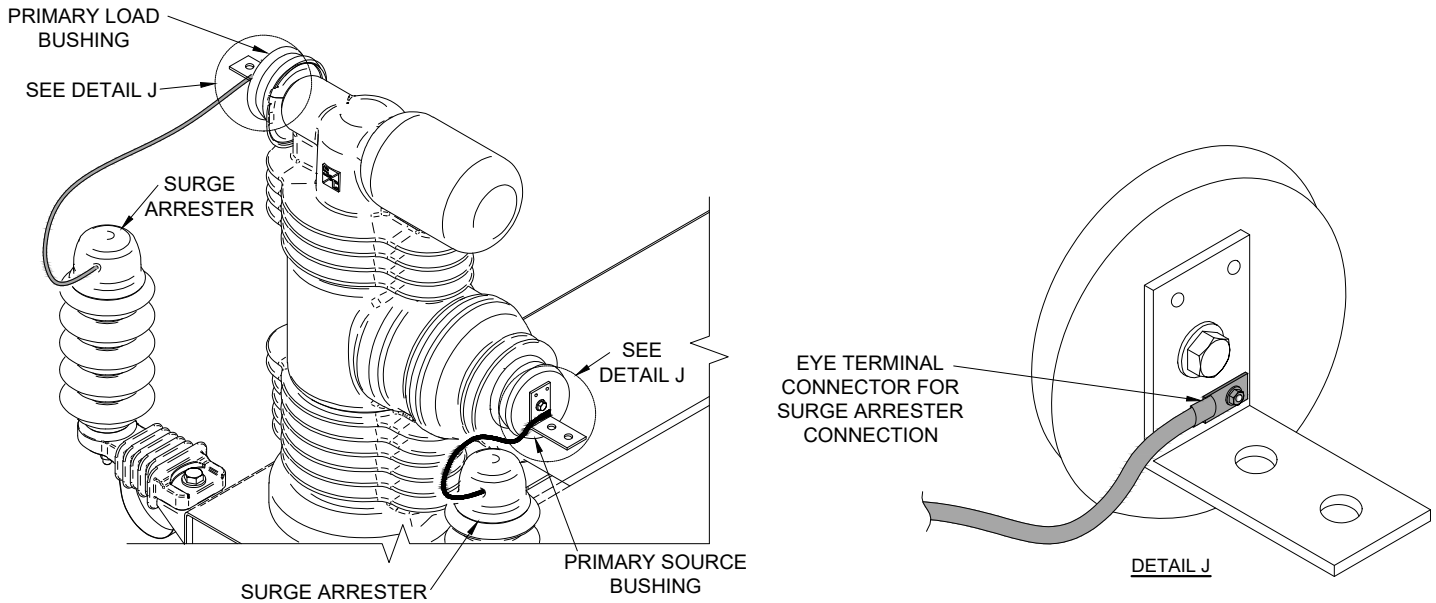
DETAIL H



DETAIL I

**LOOP RESTORATION HORIZONTAL RECLOSER  
 WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
 SPACER CONSTRUCTION  
 MAXIMUM VOLTAGE: 13.2 KV  
 NOTES**

STANDARD NO. REC-2-2 VERSION 4  
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 DIGITIZED EMILIO CUADRADO LIC. 3000



**FIGURE 3**  
**RECLOSER'S SURGE ARRESTERS CONNECTION**  
 (SEE NOTE 13)

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
7. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
8. THE RECLOSER SHOULD BE INSTALLED IN LINES WITH AN ANGLE DEVIATION EQUAL TO OR LESS THAN 5°. IF THE ANGLE IS GREATER THAN 5°, REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. THE PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
9. THE RECLOSER SHALL ALWAYS BE INSTALLED ON THE LOAD SIDE OF THE POLE.
10. NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WITH RECLOSERS INSTALLED.
11. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
12. IF THE FEEDER IS RADIAL, ONLY ONE CONTROL POWER OVERHEAD TRANSFORMER (ITEM 0185) INSTALLED DIRECTLY TO THE POLE, ONE HOT LINE CLAMP (ITEM 0078), AND ONE STIRRUP (ITEM 0144) WILL BE REQUIRED.
13. THE RECLOSER'S SURGE ARRESTERS SHALL BE CONNECTED WITH THE CABLE AND EYE TERMINAL CONNECTOR THAT COME INSTALLED FROM THE FACTORY. THESE SURGE ARRESTERS MUST BE VERIFIED TO BE COMPATIBLE WITH THE CIRCUIT VOLTAGE. IF THEY ARE NOT, REPLACE THEM WITH THE APPROPRIATE ONES FOLLOWING TABLE 4-5 OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
14. IF THE CONTROL POWER TRANSFORMER HAS PROVISION FOR THE SURGE ARRESTER INSTALLATION, IT WILL BE INSTALLED ON THE TRANSFORMER WITH THE SURGE ARRESTER MOUNTING BRACKET (ITEM 0204).
15. THE CONTROL POWER TRANSFORMER'S NAMEPLATE SHALL BE VERIFIED FOR PROPER CONNECTION OF THE TRANSFORMER'S SECONDARY BUSHINGS TO OBTAIN THE 120 V VOLTAGE TO SERVE THE RECLOSER'S EXTERNAL POWER SUPPLY.
16. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
SPACER CONSTRUCTION  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL

STANDARD NO. REC-2-2 VERSION 4  
DOCUMENT NO. 4301.128  
PAGE 6 OF 7 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	9
	FLAT ROUND WASHER	VARIES	72
	SPLIT LOCK WASHER	VARIES	36
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	002-13603	6
0078	HOT LINE CLAMP	VARIES	AS REQ.
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0141	CROSSARM	VARIES	3
0144	STIRRUP	VARIES	AS REQ.
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	18
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0153	AIR BREAK BYPASS DISCONNECTING SWITCH	032-82358	1
0174	GROUND / BOND WIRE CLAMP	002-82539	2
0180	HORIZONTAL RECLOSER WITH LOOP RESTORATION	VARIES	1
0182	FIXING BAND	107-04344	AS REQ.
0183	BUCKLE FOR FIXING BAND	107-03031	AS REQ.
0185	CONTROL POWER OVERHEAD TRANSFORMER	VARIES	AS REQ.
0191	BANDING BRACKET	107-83908	4
0192	SERVICE ENTRANCE CABLE #12-3	006-83906	AS REQ.
0193	CABLE GRIP	002-83907	AS REQ.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**LOOP RESTORATION HORIZONTAL RECLOSER  
WITH BYPASS SWITCH AND CONTROL TRANSFORMERS  
SPACER CONSTRUCTION  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. REC-2-2 VERSION 4  
DOCUMENT NO. 4301.128  
PAGE 7 OF 7 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE D	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	36
2048	HEX HEAD BOLT	038-83218	36





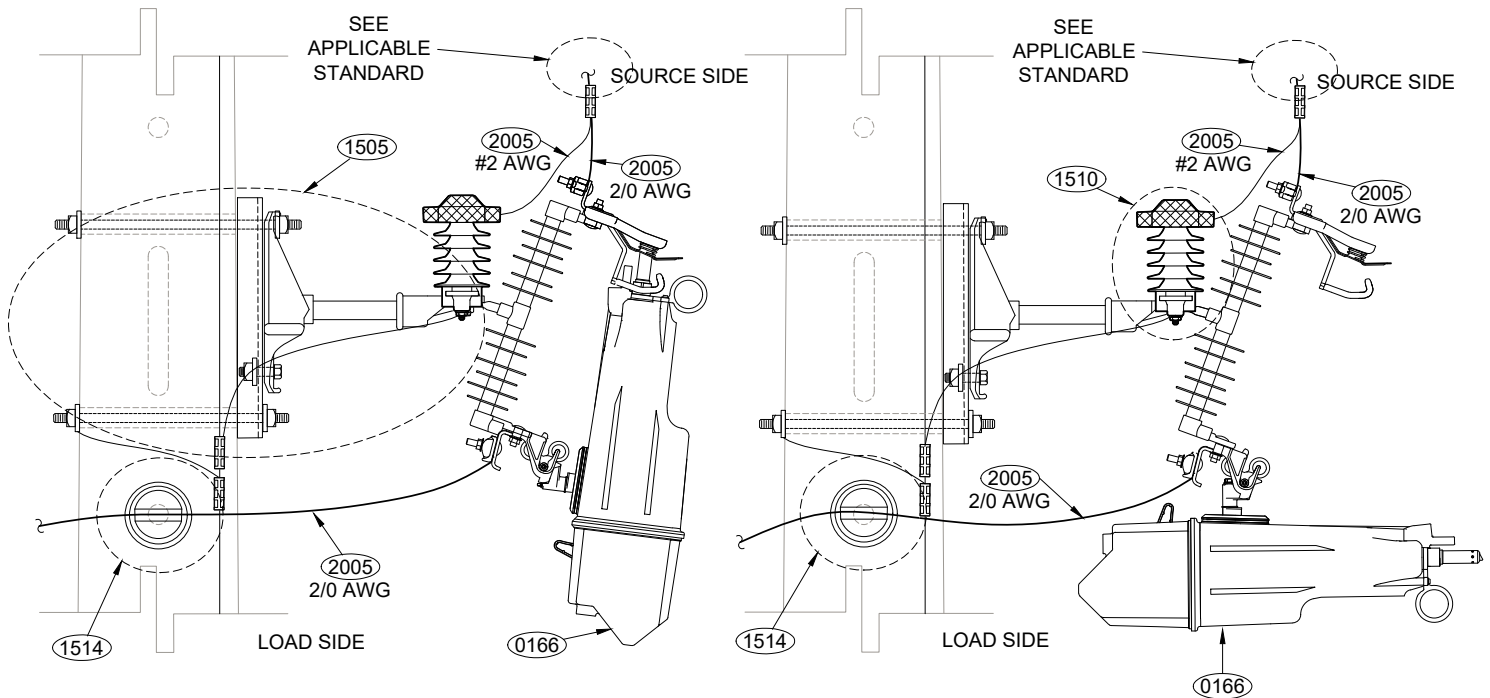
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OVERHEAD DISTRIBUTION STANDARDS

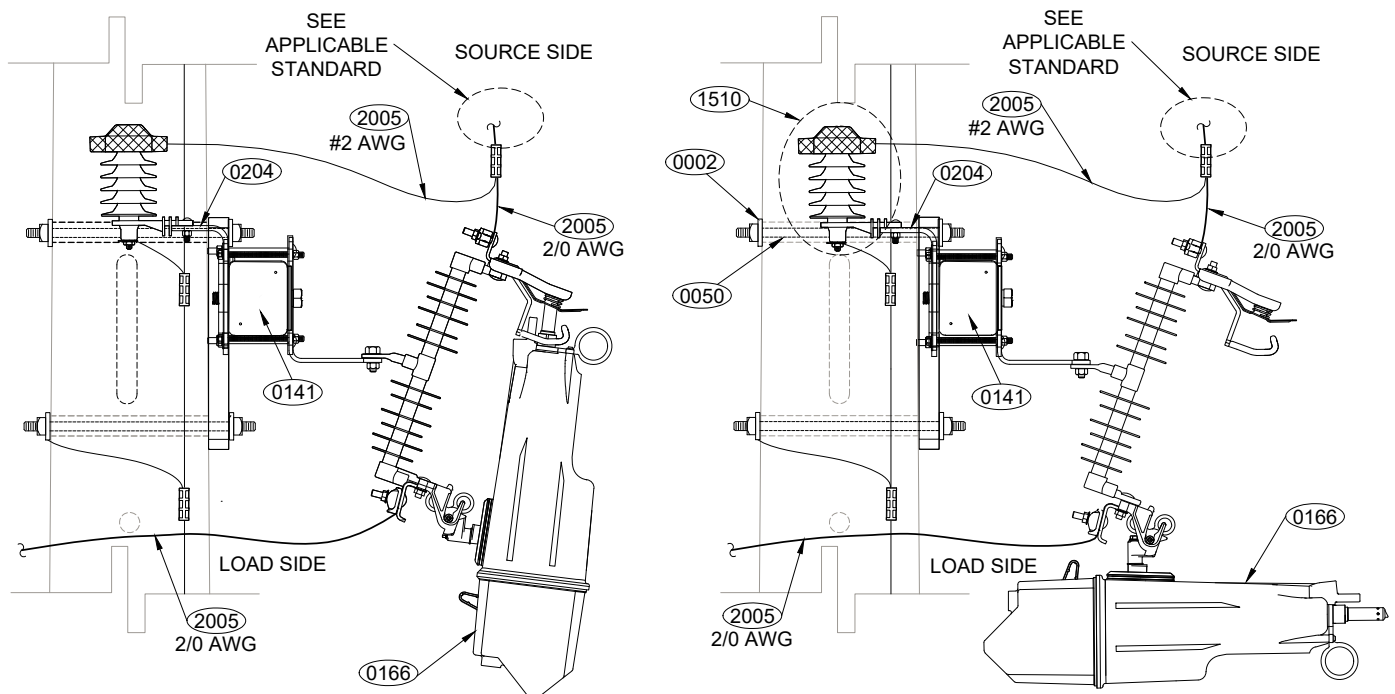
TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
200 A POLE MOUNTED SINGLE PHASE RECLOSER  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. REC-3-A VERSION 5  
DOCUMENT NO. 4301.120  
PAGE 1 OF 2 DATE FEB 27, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
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**FIGURE A  
BRACKET MOUNTING**



**FIGURE B  
CROSSARM MOUNTING**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <p style="text-align: center;"> <b>SINGLE PHASE PRIMARY CONSTRUCTION</b>  <b>200 A POLE MOUNTED SINGLE PHASE RECLOSER</b>  <b>MAXIMUM VOLTAGE: 13.2 KV</b>  <b>NOTES AND BILL OF MATERIAL</b> </p>	STANDARD NO. <u>REC-3-A</u> VERSION <u>5</u> DOCUMENT NO. <u>4301.120</u> PAGE <u>2</u> OF <u>2</u> DATE <u>FEB 27, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS				
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.
0002	FLAT SQUARE WASHER	VARIES	-	2
0050	DOUBLE ARMING BOLT	VARIES	-	2
0141	CROSSARM	008-82814	-	1
0166	SINGLE PHASE RECLOSER	VARIES	1	1
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	-	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	1	-
1510	SURGE ARRESTER ASSEMBLY	ASSY 1510 FIGURE B	1	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512	1 FIGURE F	1 FIGURE C
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1	-
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
7. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
8. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
200 A POLE MOUNTED SINGLE PHASE RECLOSER  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. REC-3-B VERSION 2

DOCUMENT NO. 4301.136

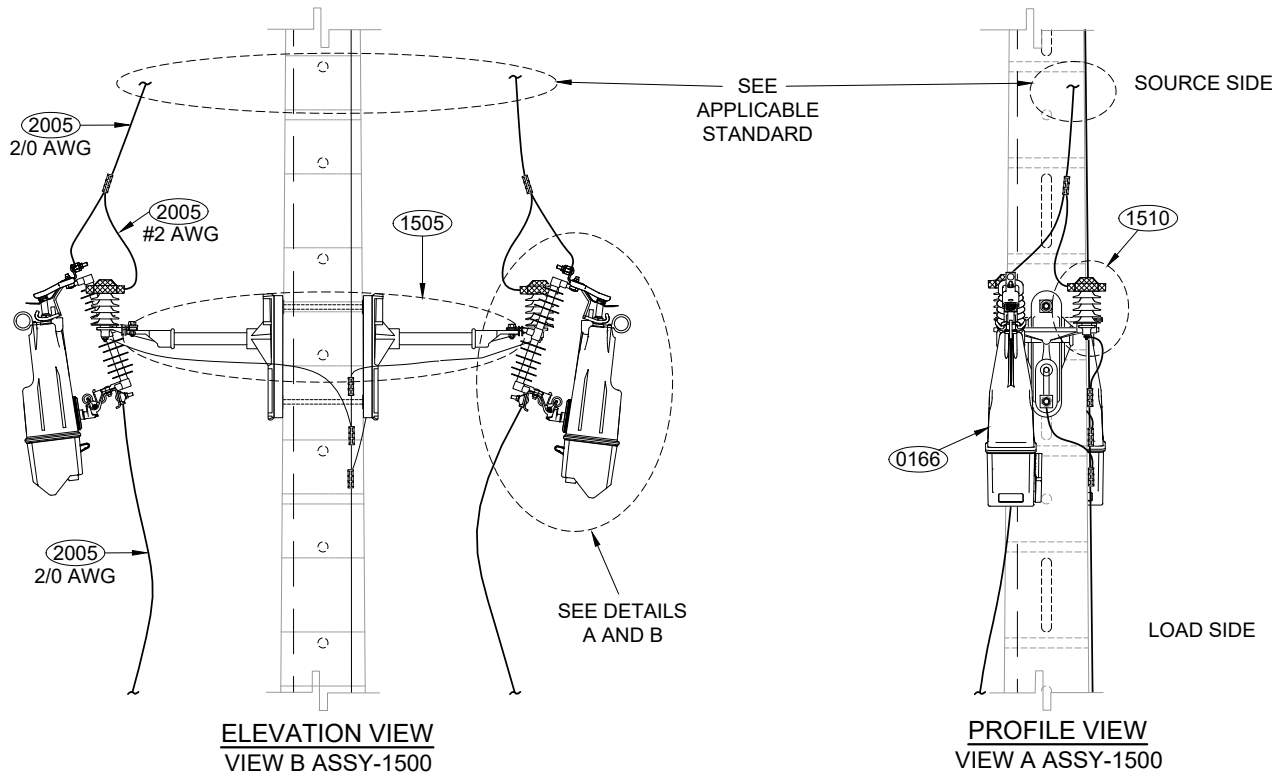
PAGE 1 OF 3 DATE FEB 27, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

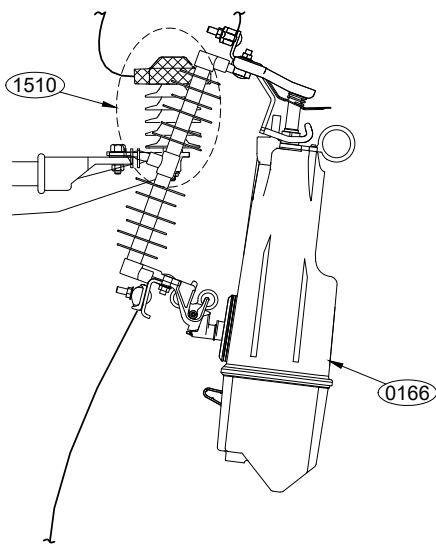
REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

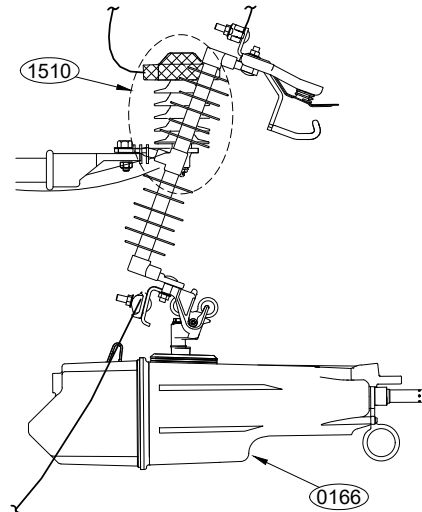
DIGITIZED EMILIO CUADRADO LIC. 3000



**FIGURE A  
BRACKET MOUNTING**



**DETAIL A  
CLOSE POSITION VIEW**



**DETAIL B  
OPEN POSITION VIEW**



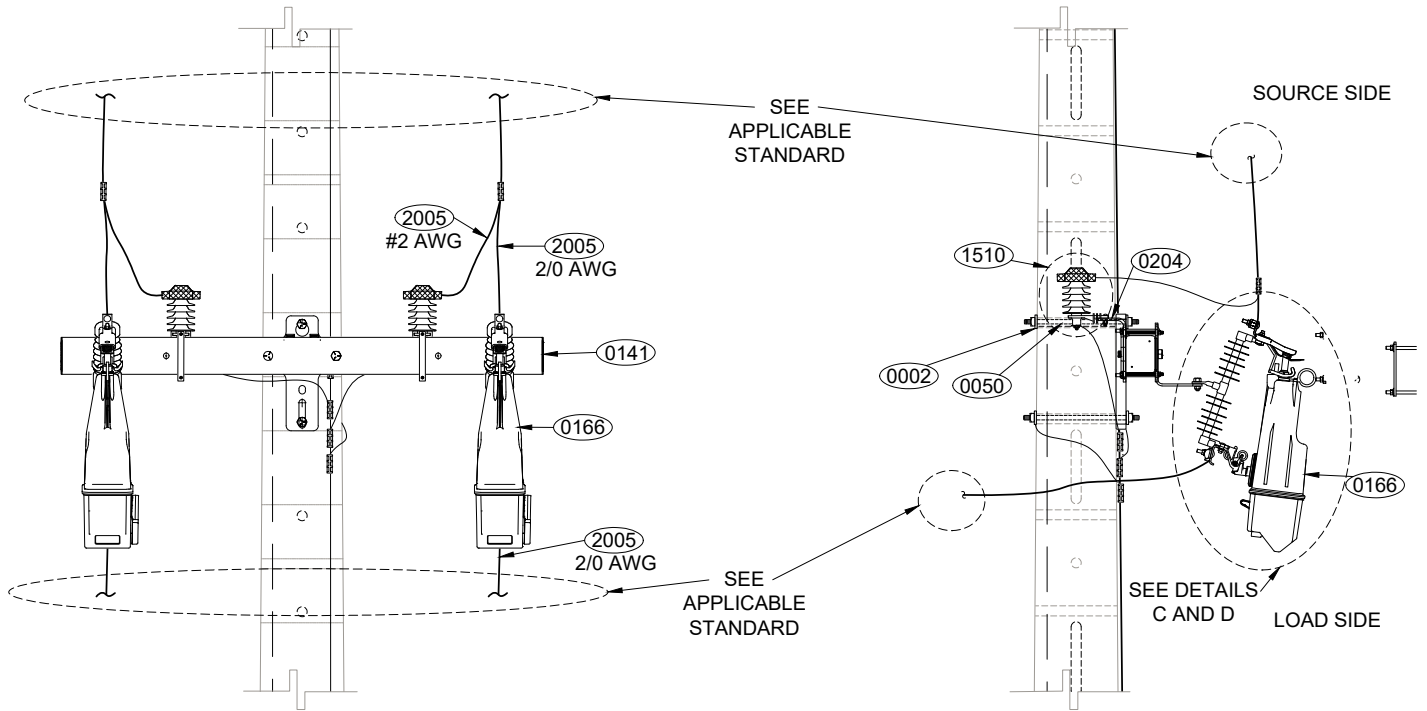
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200 A POLE MOUNTED SINGLE PHASE RECLOSER  
MAXIMUM VOLTAGE: 13.2 KV**

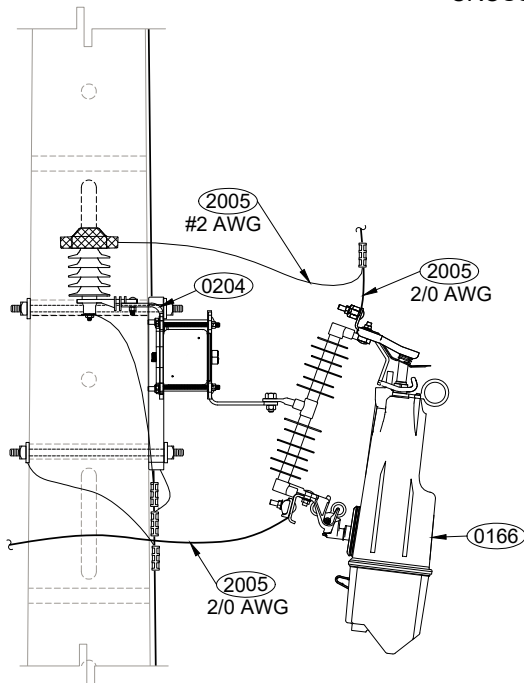
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DOCUMENT NO. 4301.136  
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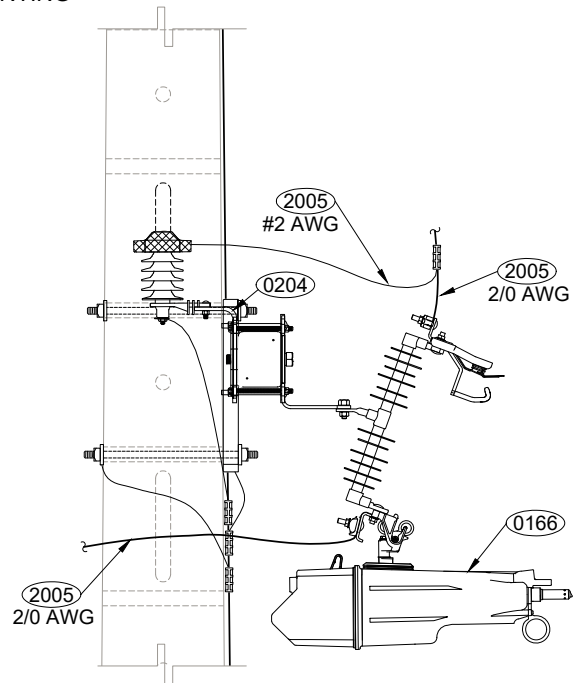
**ELEVATION VIEW  
VIEW B ASSY-1500**

**PROFILE VIEW  
VIEW A ASSY-1500**

**FIGURE B  
CROSSARM MOUNTING**



**DETAIL C  
CLOSE POSITION VIEW**



**DETAIL D  
OPEN POSITION VIEW**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>TWO PHASE PRIMARY CONSTRUCTION</b> <b>200 A POLE MOUNTED SINGLE PHASE RECLOSER</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>REC-3-B</u> VERSION <u>2</u>
	DOCUMENT NO. <u>4301.136</u>
	PAGE <u>3 OF 3</u> DATE <u>FEB 27, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS				
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	"A" QTY.	"B" QTY.
0002	FLAT SQUARE WASHER	VARIES	-	2
0050	DOUBLE ARMING BOLT	VARIES	-	2
0141	CROSSARM	008-82814	-	1
0166	SINGLE PHASE RECLOSER	VARIES	2	2
0204	SURGE ARRESTER MOUNTING BRACKET	002-84983	-	2
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE B	1	-
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2	2
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512	1 FIGURE F	1 FIGURE C
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- THERE SHALL BE A MINIMUM SPACING OF 24 INCHES BETWEEN RECLOSERS MEASURED CENTER TO CENTER.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
- THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



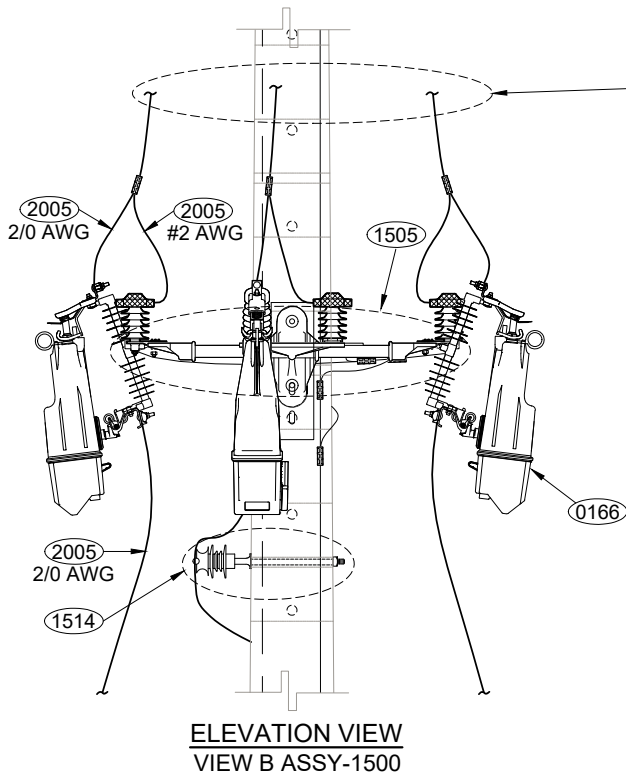
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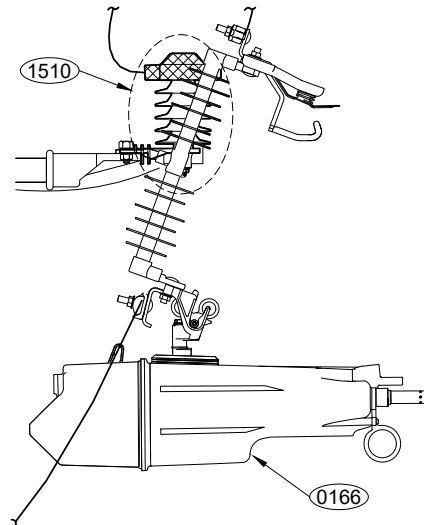
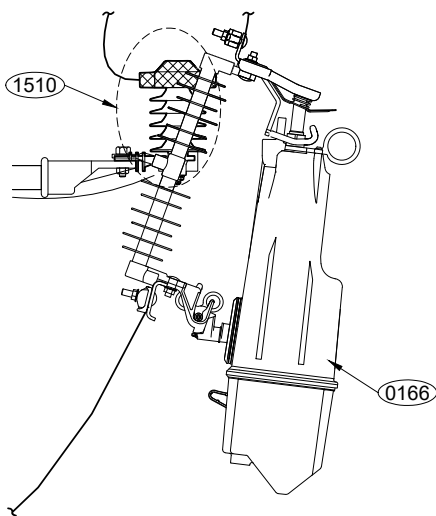
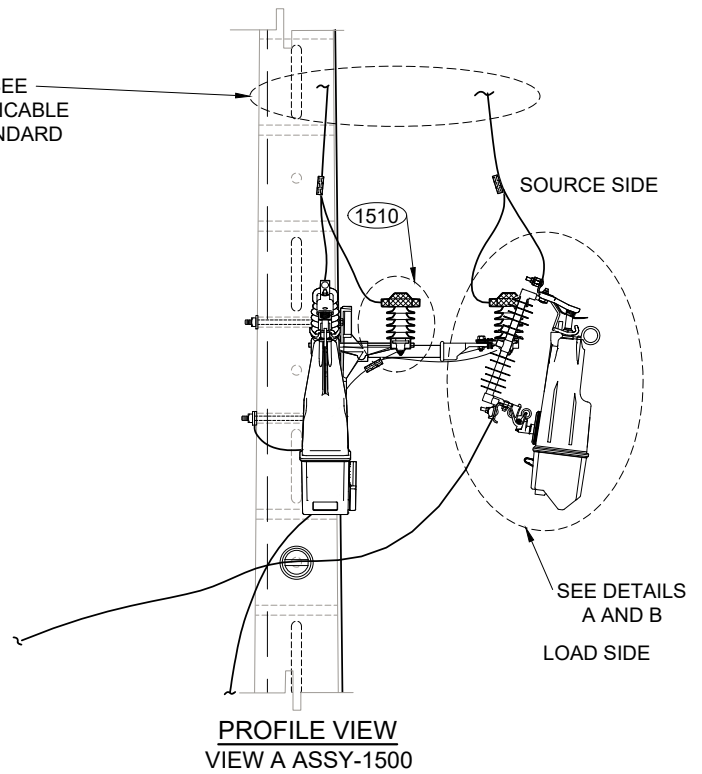
TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
200 A POLE MOUNTED SINGLE PHASE RECLOSER  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. REC-3-C VERSION 2  
DOCUMENT NO. 4301.134  
PAGE 1 OF 2 DATE FEB 27, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000



SEE  
APPLICABLE  
STANDARD





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE PRIMARY CONSTRUCTION</b> <b>200 A POLE MOUNTED SINGLE PHASE RECLOSER</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>REC-3-C</u> VERSION <u>2</u>
	DOCUMENT NO. <u>4301.134</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 27, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
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	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0166	SINGLE PHASE RECLOSER	VARIES	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE F	1
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. THERE SHALL BE A MINIMUM SPACING OF 24 INCHES BETWEEN RECLOSERS MEASURED CENTER TO CENTER.
5. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
6. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
7. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
8. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
9. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





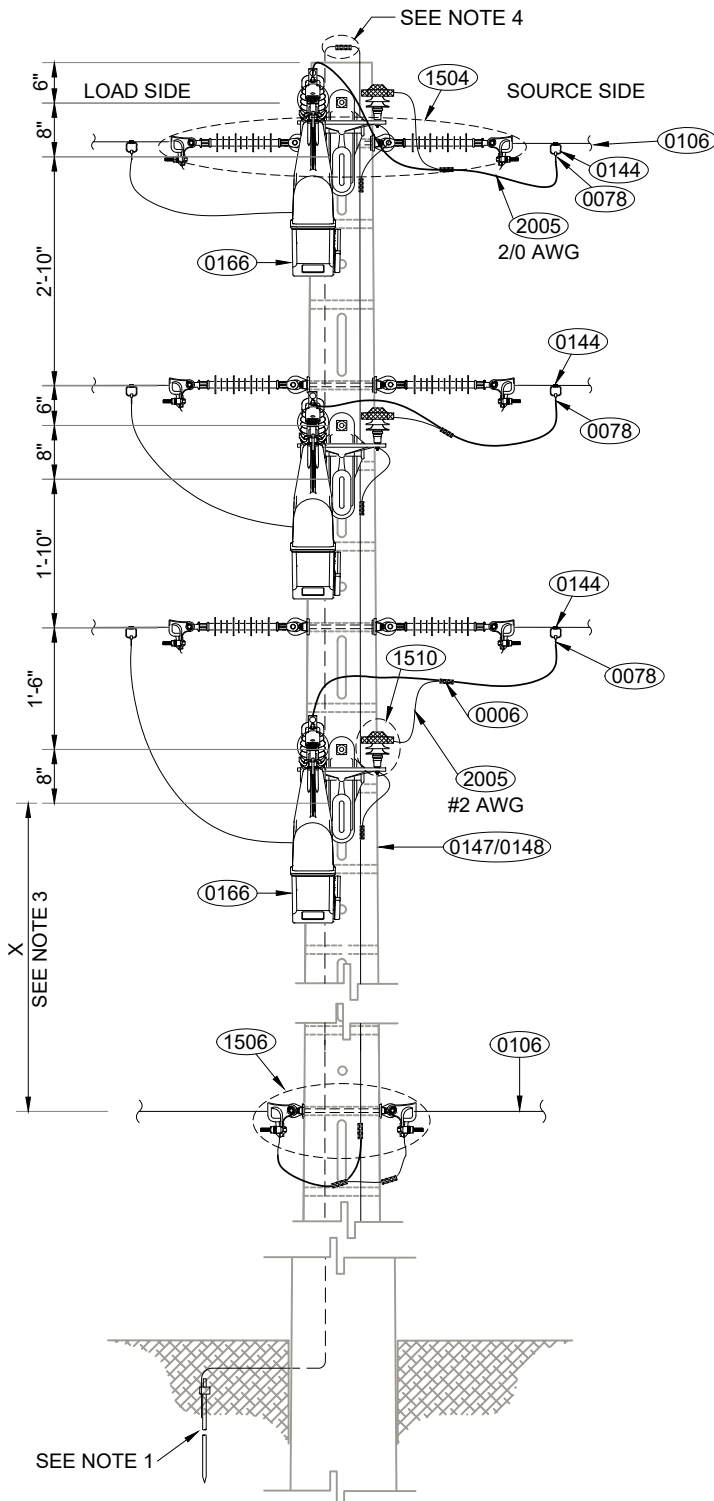
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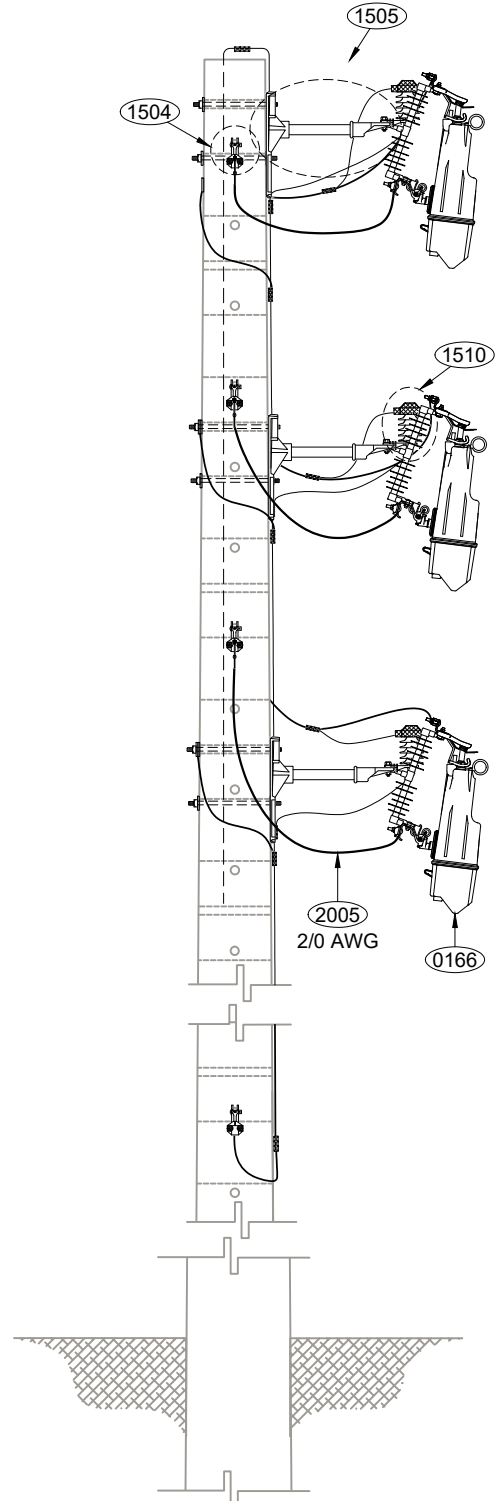
TITLE:

THREE PHASE PRIMARY CONSTRUCTION VERTICAL  
200 A POLE MOUNTED SINGLE PHASE RECLOSER  
SINGLE DEADEND TAP-OFF  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. REC-3-C-VERT VERSION 2  
DOCUMENT NO. 4301.131  
PAGE 1 OF 2 DATE APR 2, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW**  
VIEW A ASSY-1500



**PROFILE VIEW**  
VIEW B ASSY-1500





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>THREE PHASE PRIMARY CONSTRUCTION VERTICAL          200 A POLE MOUNTED SINGLE PHASE RECLOSER          SINGLE DEADEND TAP-OFF          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL AND NOTES</b>	STANDARD NO. REC-3-C-VERT VERSION <u>2</u>
		DOCUMENT NO. <u>4301.131</u> PAGE <u>2</u> OF <u>2</u> DATE <u>APR 2, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	6
0144	STIRRUP	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0166	SINGLE PHASE RECLOSER	VARIES	3
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1 FIGURE D, 3 FIGURE E	4
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- THERE SHALL BE A MINIMUM SPACING OF 24 INCHES BETWEEN RECLOSERS MEASURED CENTER TO CENTER.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
- THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE PRIMARY CONSTRUCTION  
400 A POLE MOUNTED SINGLE PHASE RECLOSER  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. REC-4-A VERSION 4

DOCUMENT NO. 4301.125

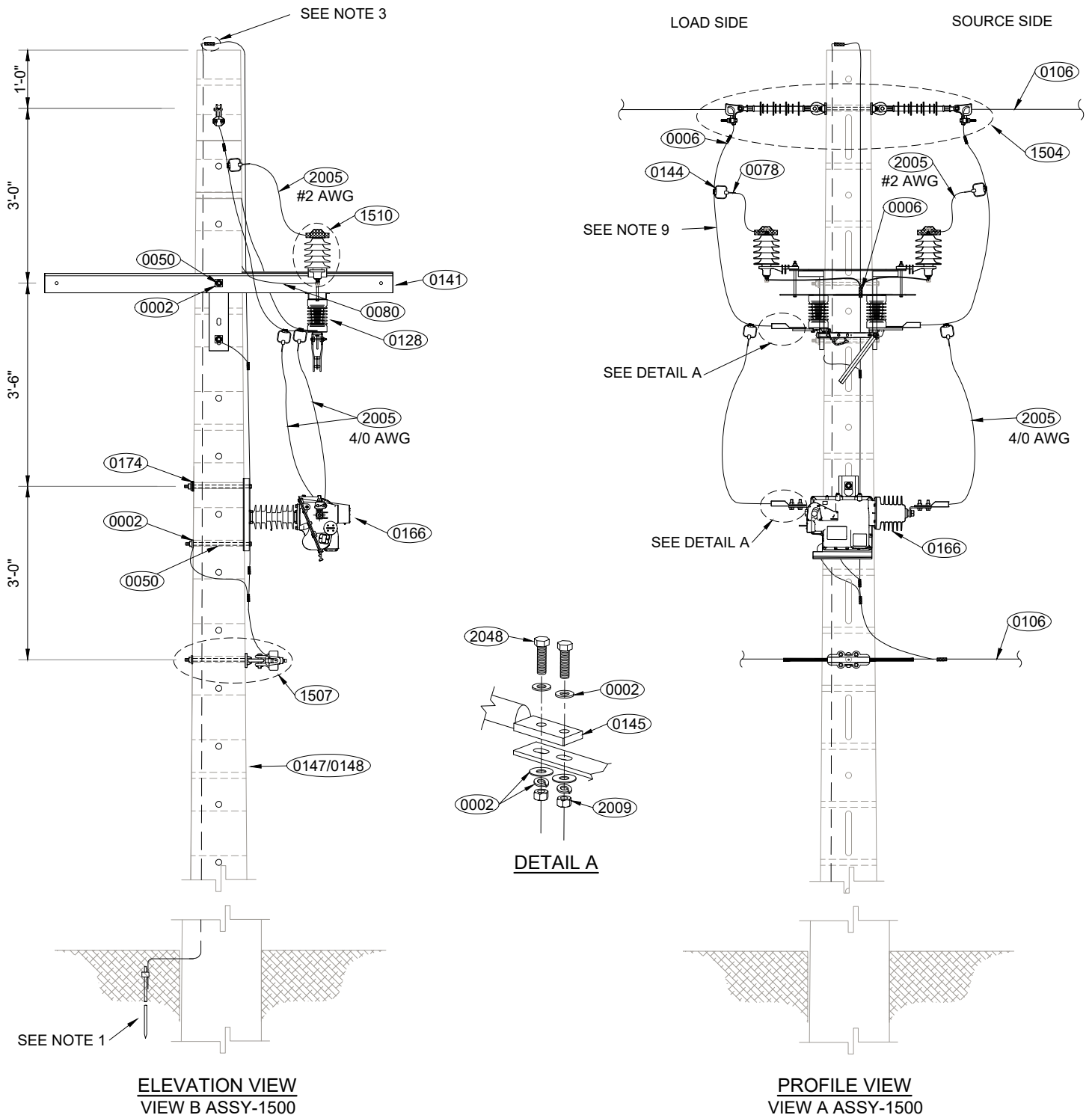
PAGE 1 OF 3 DATE FEB 27, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW  
VIEW B ASSY-1500**

**PROFILE VIEW  
VIEW A ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>SINGLE PHASE PRIMARY CONSTRUCTION</b> <b>400 A POLE MOUNT SINGLE PHASE RECLOSER</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>REC-4-A</u> VERSION <u>4</u> DOCUMENT NO. <u>4301.125</u> PAGE <u>2 OF 3</u> DATE <u>FEB 27, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY AND POLE JOINT USE ATTACHMENTS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
7. NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WITH RECLOSERS INSTALLED.
8. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
9. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
10. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
11. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
12. THE 400 A SINGLE PHASE RECLOSER (ITEM 0166) CAN BE ENERGIZED IN BOTH DIRECTIONS.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
	FLAT ROUND WASHER	VARIES	16
	SPLIT LOCK WASHER	VARIES	8
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	4
0078	HOT LINE CLAMP	VARIES	4
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0128	AIR BREAK SWITCH	032-82825	1
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	4



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> SINGLE PHASE PRIMARY CONSTRUCTION 400 A POLE MOUNT SINGLE PHASE RECLOSER MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL	STANDARD NO. <u>REC-4-A</u> VERSION <u>4</u>
	DOCUMENT NO. <u>4301.125</u>
	PAGE <u>3 OF 3</u> DATE <u>FEB 27, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	4
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0166	SINGLE PHASE RECLOSER	032-82813	1
0174	GROUND / BOND WIRE CLAMP	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	VARIES	8
2048	HEX HEAD BOLT	038-83218	8



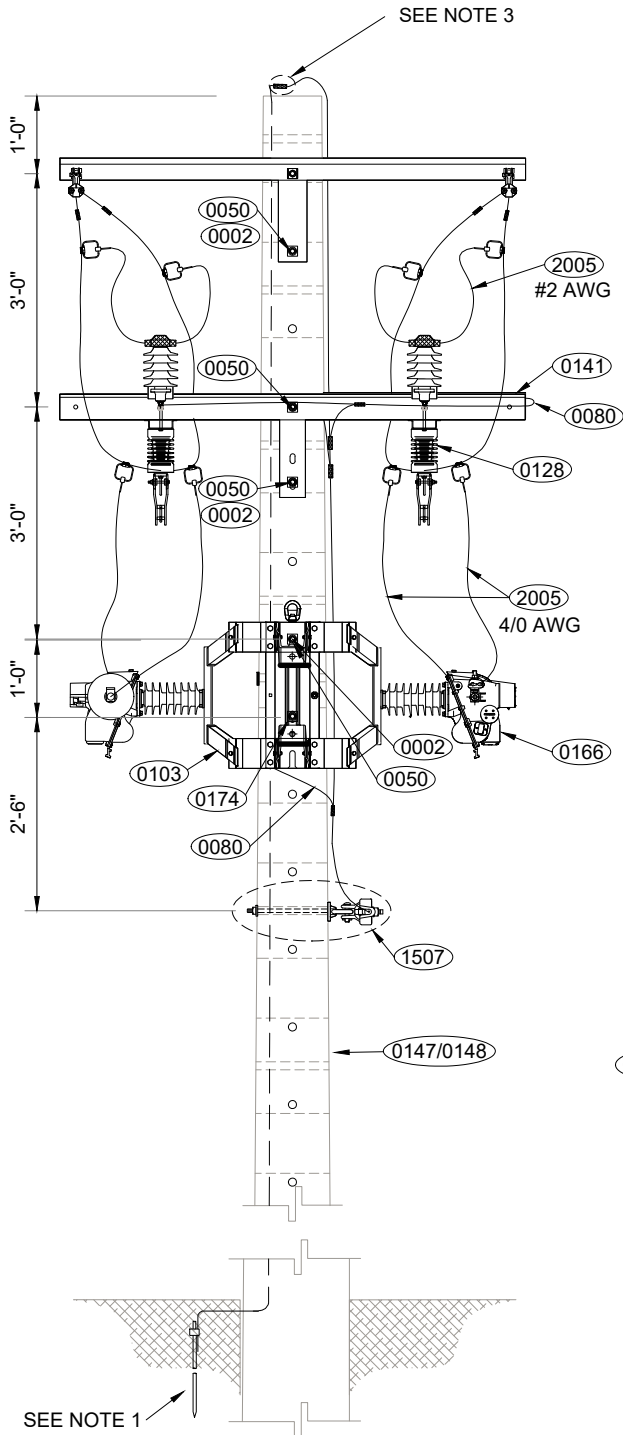
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

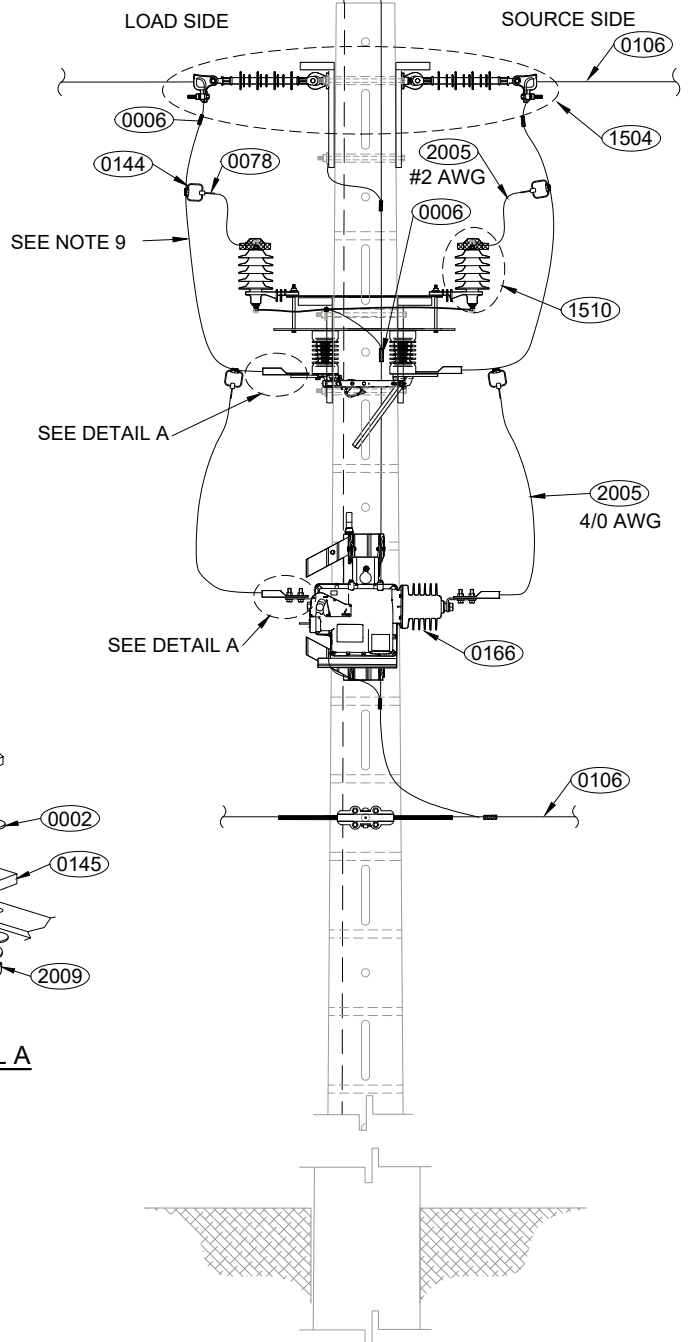
TITLE:

**TWO PHASE PRIMARY CONSTRUCTION  
400 A POLE MOUNTED SINGLE PHASE RECLOSER  
MAXIMUM VOLTAGE: 13.2 KV**

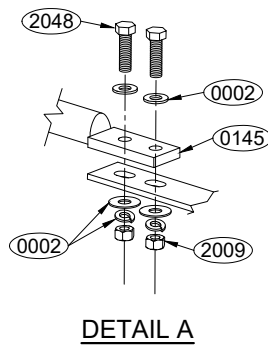
STANDARD NO.	REC-4-B	VERSION	4
DOCUMENT NO.	4301.137		
PAGE	1 OF 3	DATE	FEB 27, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW  
VIEW B ASSY-1500**



**PROFILE VIEW  
VIEW A ASSY-1500**





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;"><b>TWO PHASE PRIMARY CONSTRUCTION 400 A POLE MOUNTED SINGLE PHASE RECLOSER MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b></p>	<table border="1"> <tr> <td>STANDARD NO.</td> <td>REC-4-B</td> <td>VERSION</td> <td>4</td> </tr> <tr> <td>DOCUMENT NO.</td> <td colspan="3">4301.137</td> </tr> <tr> <td>PAGE</td> <td>2 OF 3</td> <td>DATE</td> <td>FEB 27, 2024</td> </tr> <tr> <td>SUBMITTED</td> <td colspan="3">LUIS R. SOTO LIC. 11658</td> </tr> <tr> <td>REVIEWED</td> <td colspan="3">IVETTE D. SANCHEZ LIC. 13837</td> </tr> <tr> <td>APPROVED</td> <td colspan="3">RICARDO CASTRO LIC. 12135</td> </tr> <tr> <td>DIGITIZED</td> <td colspan="3">EMILIO CUADRADO LIC. 3000</td> </tr> </table>	STANDARD NO.	REC-4-B	VERSION	4	DOCUMENT NO.	4301.137			PAGE	2 OF 3	DATE	FEB 27, 2024	SUBMITTED	LUIS R. SOTO LIC. 11658			REVIEWED	IVETTE D. SANCHEZ LIC. 13837			APPROVED	RICARDO CASTRO LIC. 12135			DIGITIZED	EMILIO CUADRADO LIC. 3000		
STANDARD NO.	REC-4-B	VERSION	4																										
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SUBMITTED	LUIS R. SOTO LIC. 11658																												
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DIGITIZED	EMILIO CUADRADO LIC. 3000																												

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
7. NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WITH RECLOSERS INSTALLED.
8. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
9. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
10. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
11. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
12. THE 400 A SINGLE PHASE RECLOSER (ITEM 0166) CAN BE ENERGIZED IN BOTH DIRECTIONS.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	7
	FLAT ROUND WASHER	VARIES	32
	SPLIT LOCK WASHER	VARIES	16
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	6
0078	HOT LINE CLAMP	VARIES	8
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0128	AIR BREAK SWITCH	032-82825	2
0141	CROSSARM	VARIES	4
0144	STIRRUP	VARIES	8



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <p style="text-align: center;"> <b>TWO PHASE PRIMARY CONSTRUCTION</b>  <b>400 A POLE MOUNTED SINGLE PHASE RECLOSER</b>  <b>MAXIMUM VOLTAGE: 13.2 KV</b>  <b>BILL OF MATERIAL</b> </p>	STANDARD NO. <u>REC-4-B</u> VERSION <u>4</u> DOCUMENT NO. <u>4301.137</u> PAGE <u>3 OF 3</u> DATE <u>FEB 27, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	8
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0166	SINGLE PHASE RECLOSER	032-82813	2
0174	GROUND / BOND WIRE CLAMP	VARIES	2
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	2
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	4
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE C, 1-FIGURE D	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	VARIES	16
2048	HEX HEAD BOLT	038-83218	16





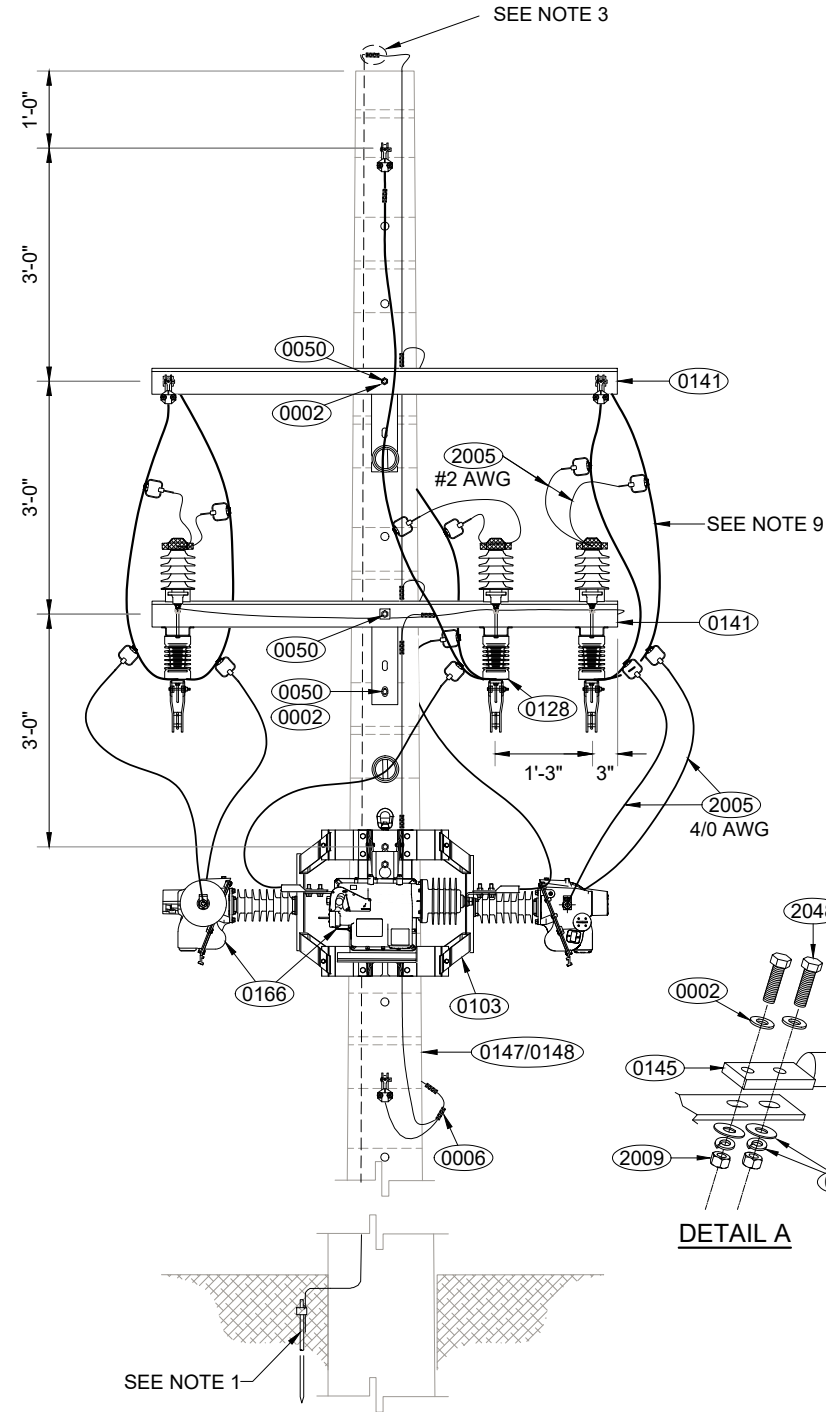
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

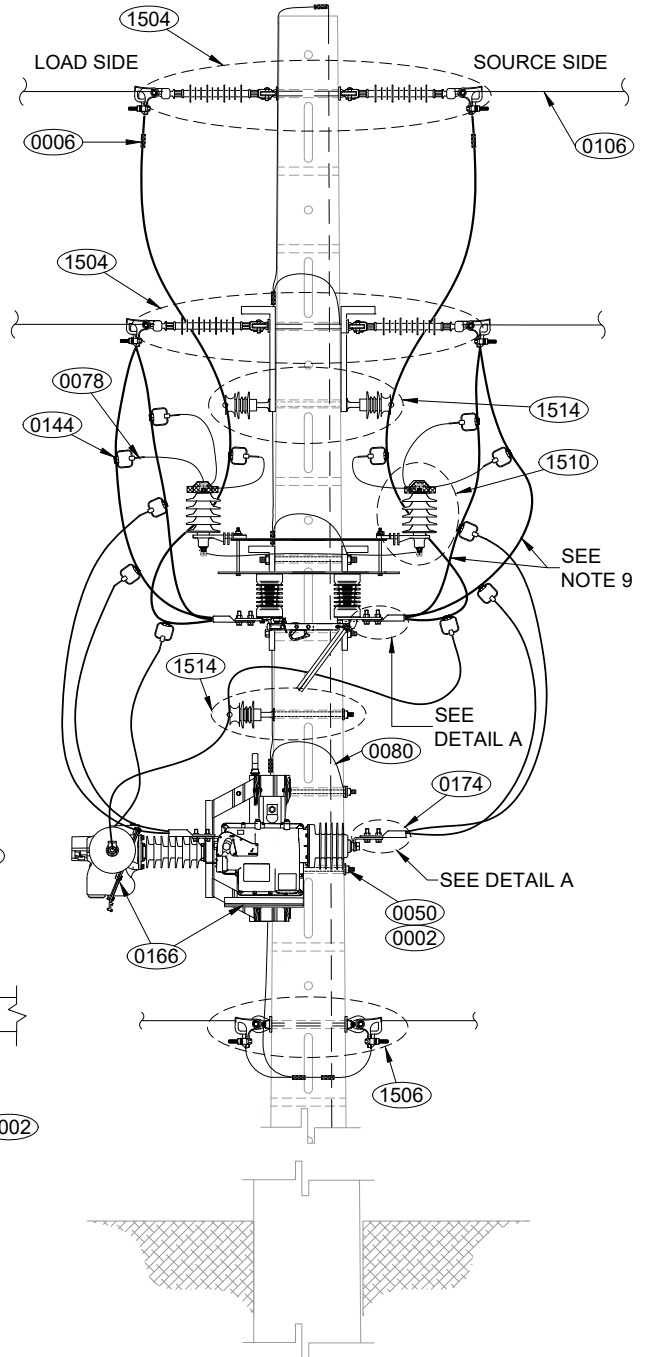
TITLE:

THREE PHASE PRIMARY CONSTRUCTION  
400 A POLE MOUNTED SINGLE PHASE RECLOSER  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	REC-4-C	VERSION	2
DOCUMENT NO.	4301.135		
PAGE	1 OF 3	DATE	FEB 27, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		



**ELEVATION VIEW**  
VIEW B ASSY-1500



**PROFILE VIEW**  
VIEW A ASSY-1500





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>THREE PHASE PRIMARY CONSTRUCTION</b> <b>400 A POLE MOUNTED SINGLE PHASE RECLOSER</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES</b>	STANDARD NO. <u>REC-4-C</u> VERSION <u>2</u> DOCUMENT NO. <u>4301.135</u> PAGE <u>2 OF 3</u> DATE <u>FEB 27, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>
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**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. THE MAXIMUM RECOMMENDED SPAN LENGTH IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN LENGTH DEPENDS ON SITE TOPOGRAPHY.
7. NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WITH RECLOSERS INSTALLED.
8. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
9. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
10. THE DESIGNER MUST PERFORM A POLE LOAD ANALYSIS TO DETERMINE THE POLE CLASS TO BE USED AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
11. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
12. THE 400 A SINGLE PHASE RECLOSER (ITEM 0166) CAN BE ENERGIZED IN BOTH DIRECTIONS.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	6
	FLAT ROUND WASHER	VARIES	48
	SPLIT LOCK WASHER	VARIES	24
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	5
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	12
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0128	AIR BREAK SWITCH	VARIES	3
0141	CROSSARM	VARIES	4



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;"><b>THREE PHASE PRIMARY CONSTRUCTION 400 A POLE MOUNTED SINGLE PHASE RECLOSER MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL</b></p>	STANDARD NO. <u>REC-4-C</u> VERSION <u>2</u> DOCUMENT NO. <u>4301.135</u> PAGE <u>3</u> OF <u>3</u> DATE <u>FEB 27, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0144	STIRRUP	VARIES	12
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	12
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0166	SINGLE PHASE RECLOSER	032-82813	3
0174	GROUND / BOND WIRE CLAMP	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE C, 1-FIGURE D	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 1-FIGURE A, 1-FIGURE B	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	VARIES	24
2048	HEX HEAD BOLT	VARIES	24



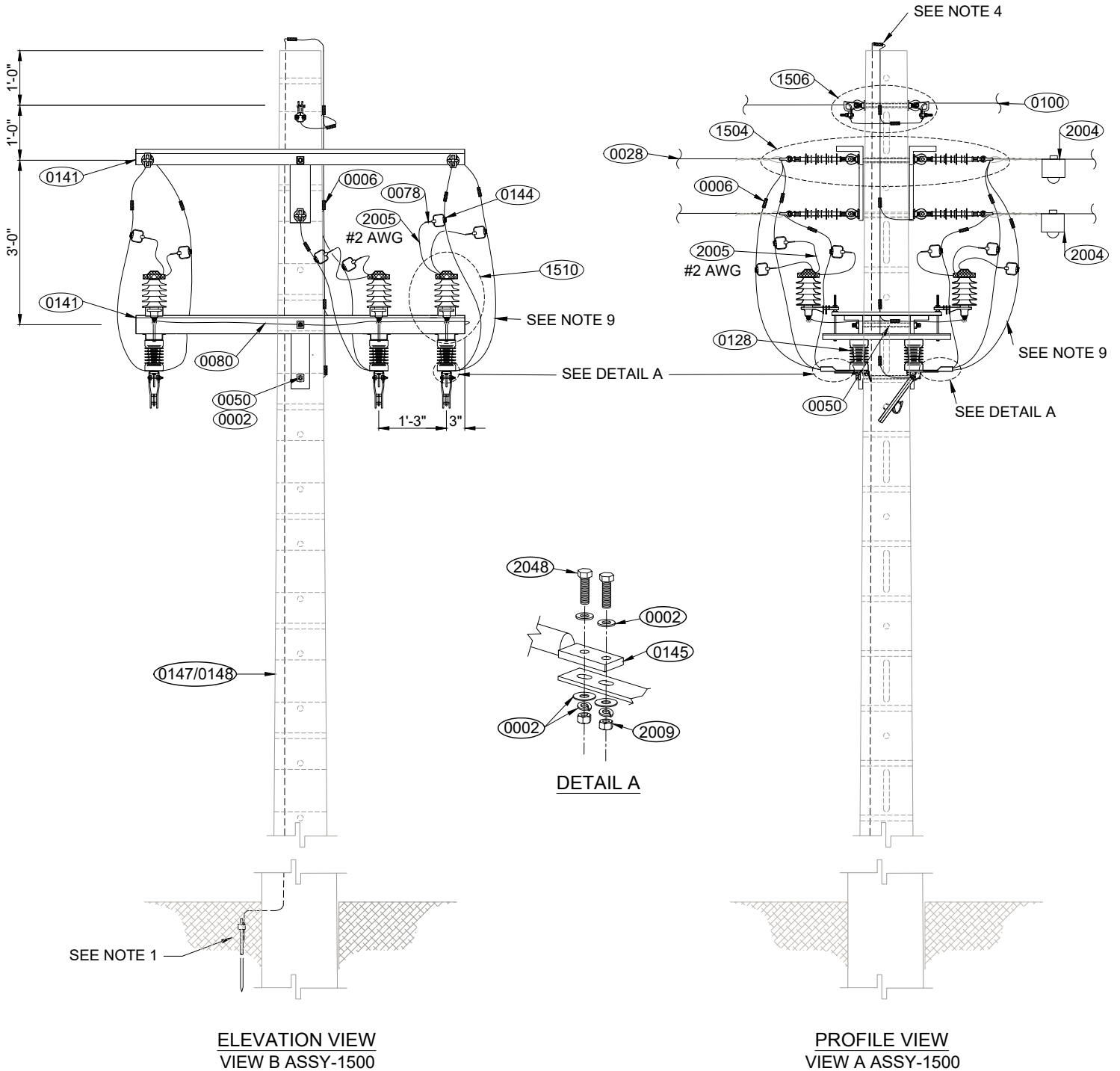
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
AIR BREAK SWITCHES  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	S-ABS-3	VERSION	2
DOCUMENT NO.	4301.151		
PAGE	1 OF 3	DATE	FEB 20, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <p style="text-align: center;"><b>SPACER CONSTRUCTION          AIR BREAK SWITCHES          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b></p>	STANDARD NO. <u>S-ABS-3</u> VERSION <u>2</u> DOCUMENT NO. <u>4301.151</u> PAGE <u>2 OF 3</u> DATE <u>FEB 20, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED, TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM NUMBER OF THE JUMPER TO BE USED ACCORDING TO THESE REQUIREMENTS.
11. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED APPROXIMATELY 12'-0" FROM THE POLES, AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATION.
12. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
13. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
14. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
15. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
16. THE QUANTITY AND LOCATION OF THE FAULT CURRENT INDICATORS (ITEM 2004) SHALL BE DETERMINED BY THE ENGINEER TO FACILITATE THE TROUBLESHOOTING OF FAULTS.

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
	FLAT ROUND WASHER	VARIES	24
	SPLIT LOCK WASHER	VARIES	12
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	3
0078	HOT LINE CLAMP	VARIES	6
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0100	MESSENGER WIRE	042-00903	AS REQ.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <p style="text-align: center;">SPACER CONSTRUCTION          AIR BREAK SWITCHES          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</p>	STANDARD NO. <u>S-ABS-3</u> VERSION <u>2</u> DOCUMENT NO. <u>4301.151</u> PAGE <u>3 OF 3</u> DATE <u>FEB 20, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0128	AIR BREAK SWITCH	VARIES	3
0141	CROSSARM	VARIES	4
0144	STIRRUP	VARIES	6
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE D	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE C, 1-FIGURE D	3
2004	FAULT CURRENT INDICATOR	VARIES	AS REQ.
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	12
2048	HEX HEAD BOLT	038-83218	12



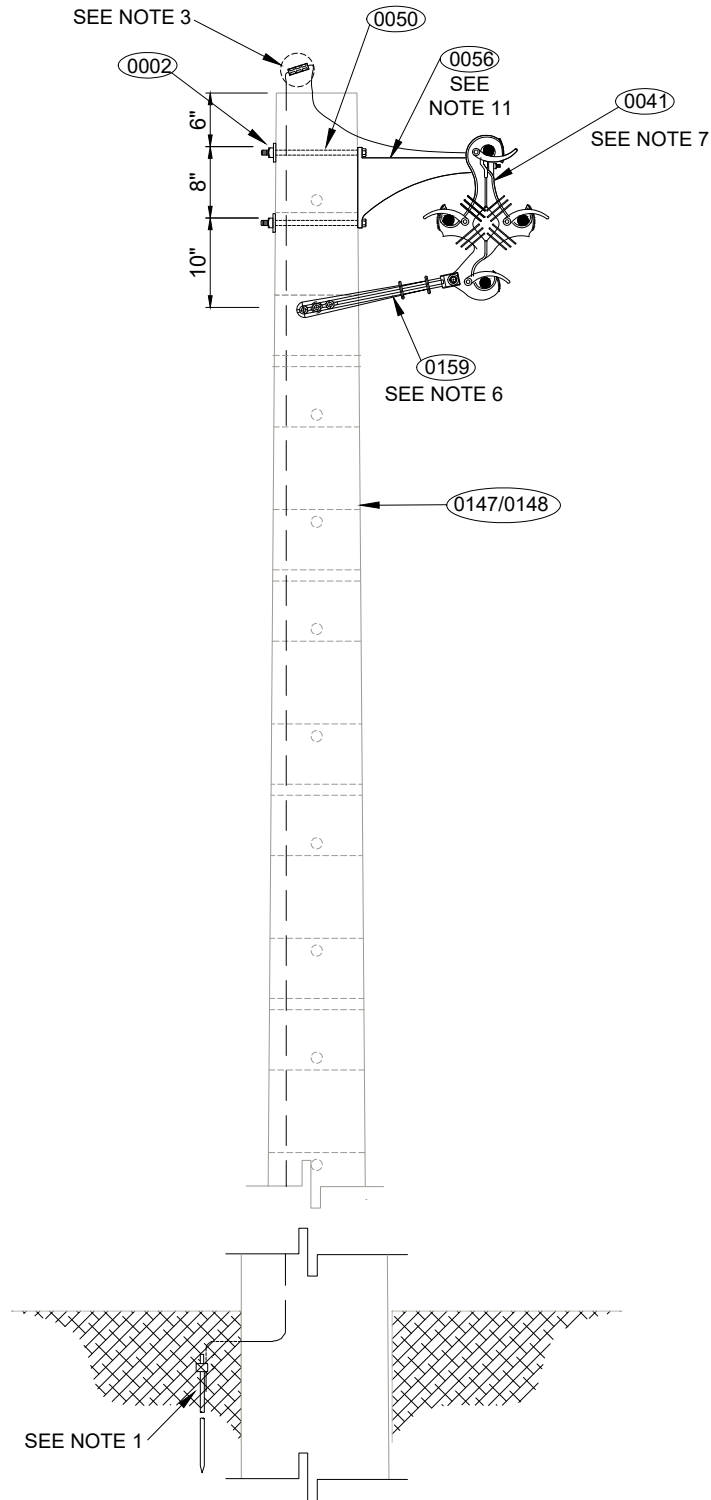
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

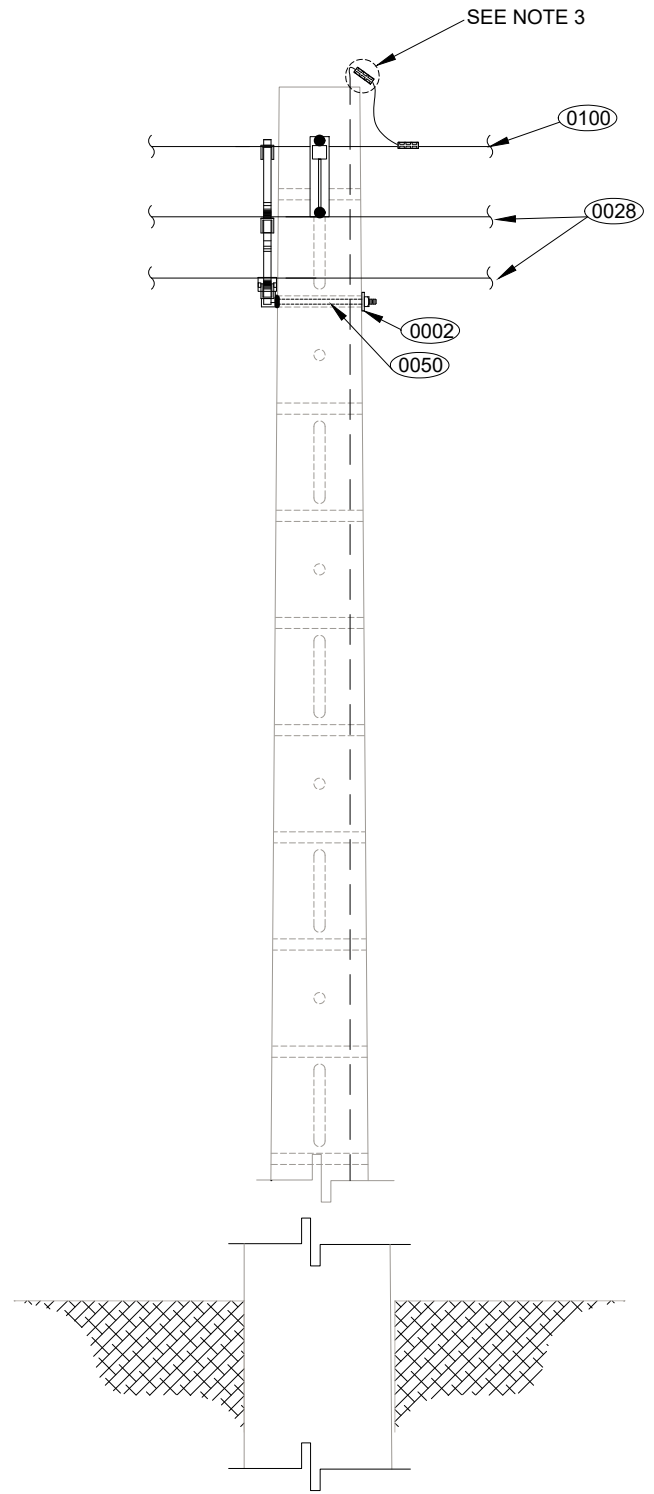
TITLE:

SPACER CONSTRUCTION  
0° - 5° ANGLE  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-1 VERSION 5  
DOCUMENT NO. 4301.043  
PAGE 1 OF 2 DATE FEB 8, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC 3000



ELEVATION VIEW  
VIEW B ASSY-1500



PROFILE VIEW  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  SPACER CONSTRUCTION 0° - 5° ANGLE MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL	STANDARD NO. <u>S-1</u> VERSION <u>5</u>
	DOCUMENT NO. <u>4301.043</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 8, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	3
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	3
0056	BRACKET FOR SPACER CABLE SYSTEM SUPPORT	002-09015	1
0100	MESSENGER WIRE	042-00903	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0159	ANTI-SWAY BRACKET	002-82339	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 1-FIGURE E	2

**NOTES:**

- 1 - REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- 2 - ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- 3 - REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- 4 - REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- 5 - MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- 6 - ANTI-SWAY BRACKETS CAN BE USED IF A HOLE IS AVAILABLE.
- 7 - THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12'-0" FROM THE ONES ON THE POLES AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
- 8 - AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
- 9 - REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- 10 - TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
- 11 - FOR THE INSTALLATION OF A BRACKET FOR SPACER CABLE SYSTEM SUPPORT ON A POLE WHERE HOLE SPACING IS 12", A C-CHANNEL TYPE BASE (ITEM 0187) MUST BE USED.
- 12 - IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
- 13 - STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- 14 - FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
DOUBLE CIRCUIT 0° - 5° ANGLE  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-1-1 VERSION 5

DOCUMENT NO. 4301.044

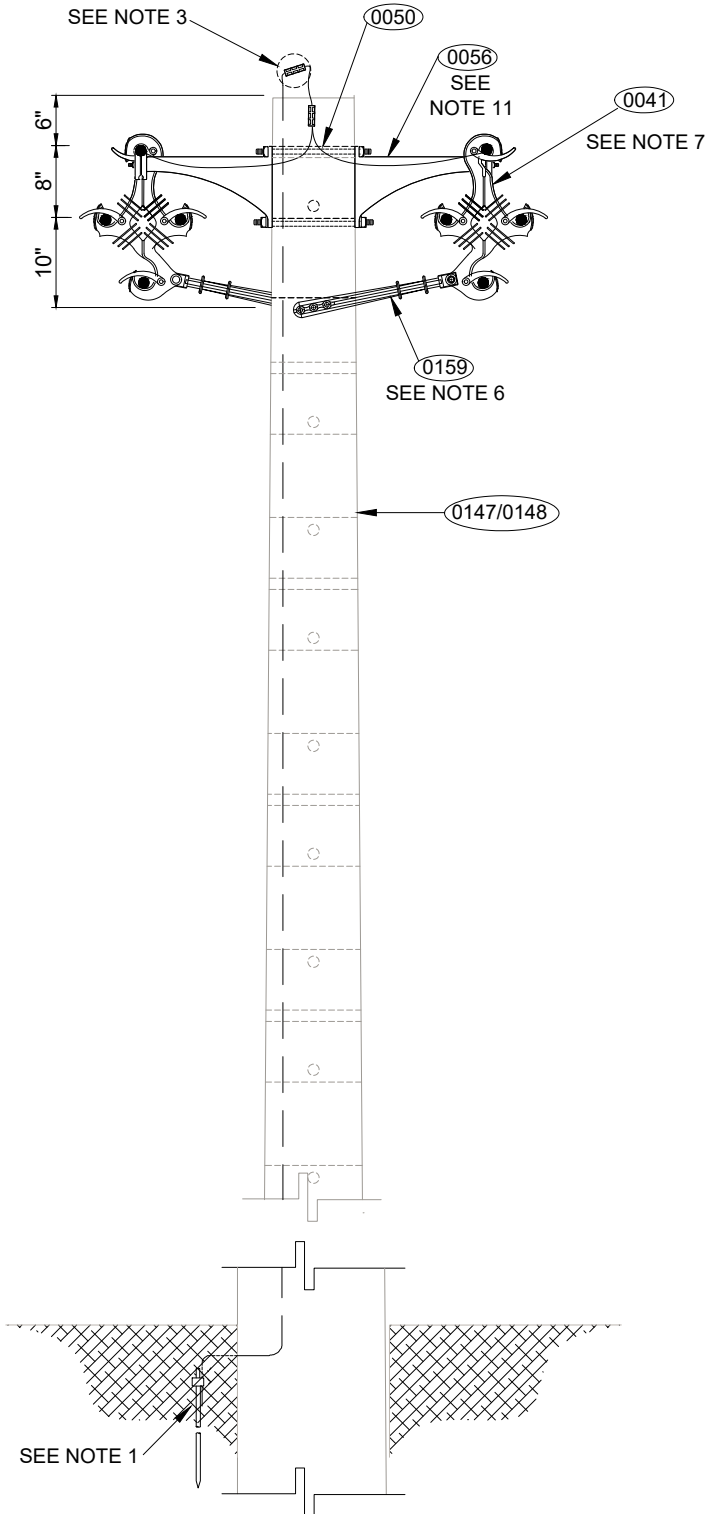
PAGE 1 OF 2 DATE FEB 8, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

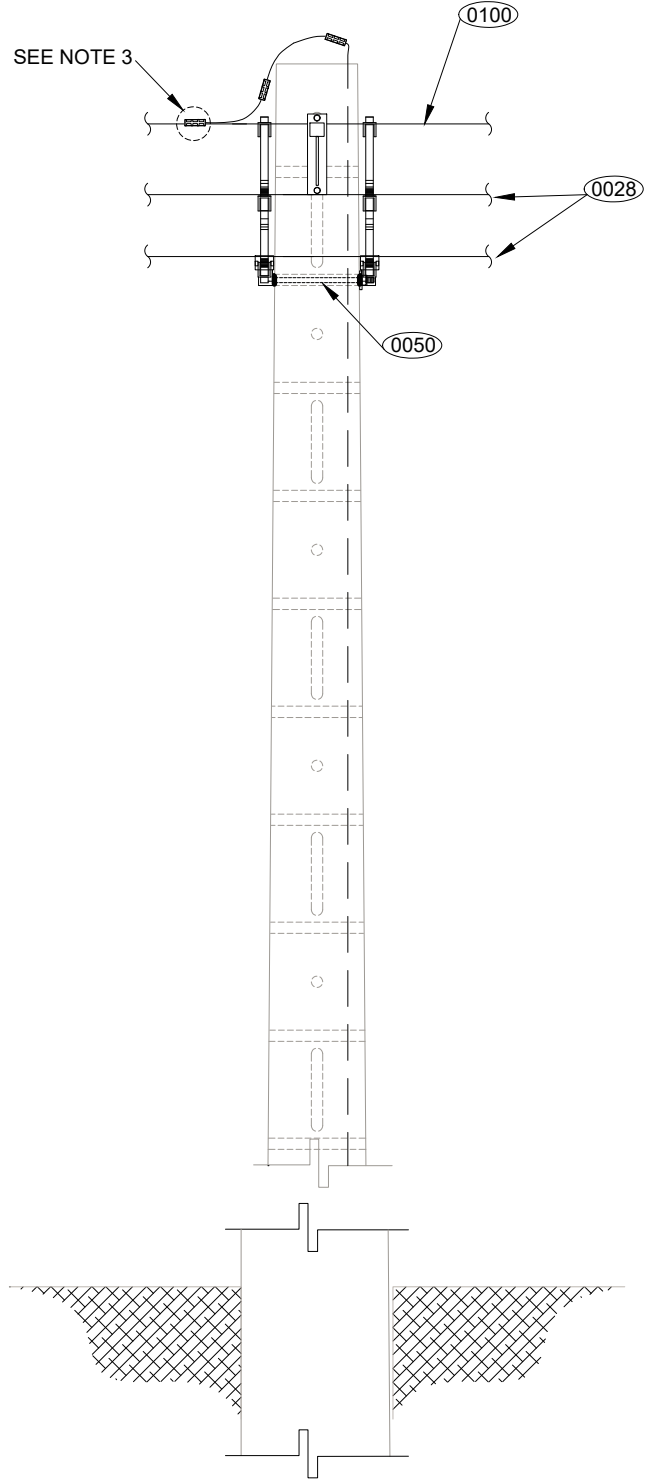
REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC 3000



**ELEVATION VIEW**  
VIEW B ASSY-1500



**PROFILE VIEW**  
VIEW A ASSY-1500





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  SPACER CONSTRUCTION DOUBLE CIRCUIT 0° - 5° ANGLE MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL	STANDARD NO. <u>S-1-1</u> VERSION <u>5</u>
	DOCUMENT NO. <u>4301.044</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 8, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	3
0056	BRACKET FOR SPACER CABLE SYSTEM SUPPORT	002-09015	2
0100	MESSENGER WIRE	042-00903	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0159	ANTI-SWAY BRACKET	002-82339	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 2-FIGURE E	3

NOTES:

- 1- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- 2- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- 3- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- 4- REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- 5- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- 6- ANTI-SWAY BRACKETS CAN BE USED IF A HOLE IS AVAILABLE.
- 7- THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12' FROM THE ONES ON THE POLES AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
- 8- AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
- 9- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- 10- TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
- 11- FOR THE INSTALLATION OF A BRACKET FOR SPACER CABLE SYSTEM SUPPORT ON A POLE WHERE HOLE SPACING IS 12", A C-CHANNEL TYPE BASE (ITEM 0187) MUST BE USED.
- 12- IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
- 13- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
6° - 60° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-3 VERSION 5

DOCUMENT NO. 4301.045

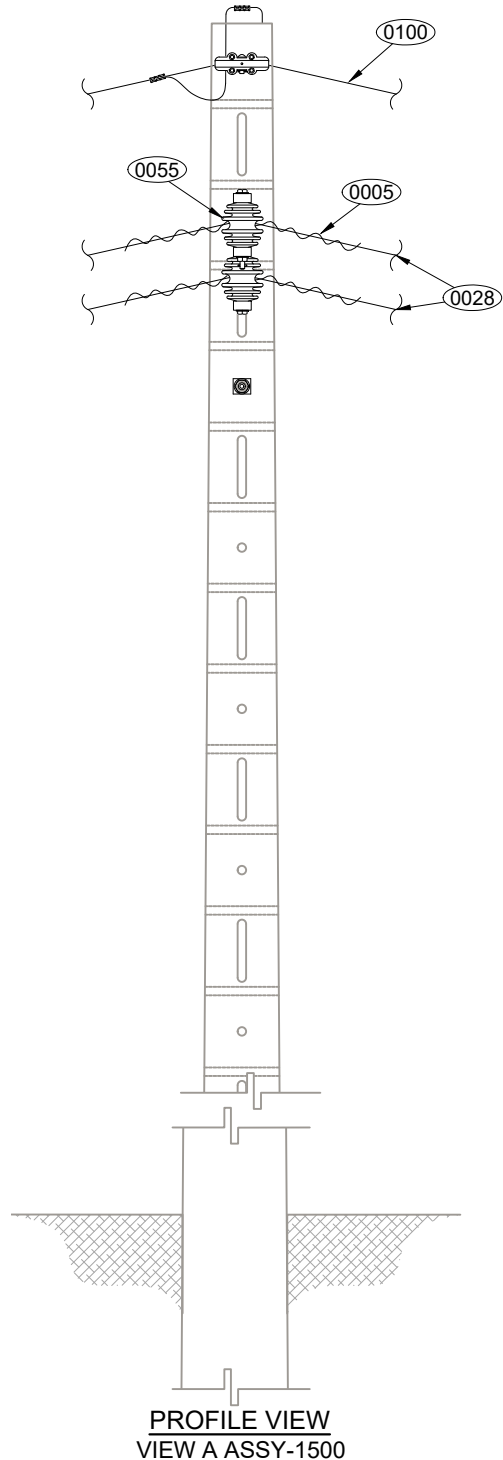
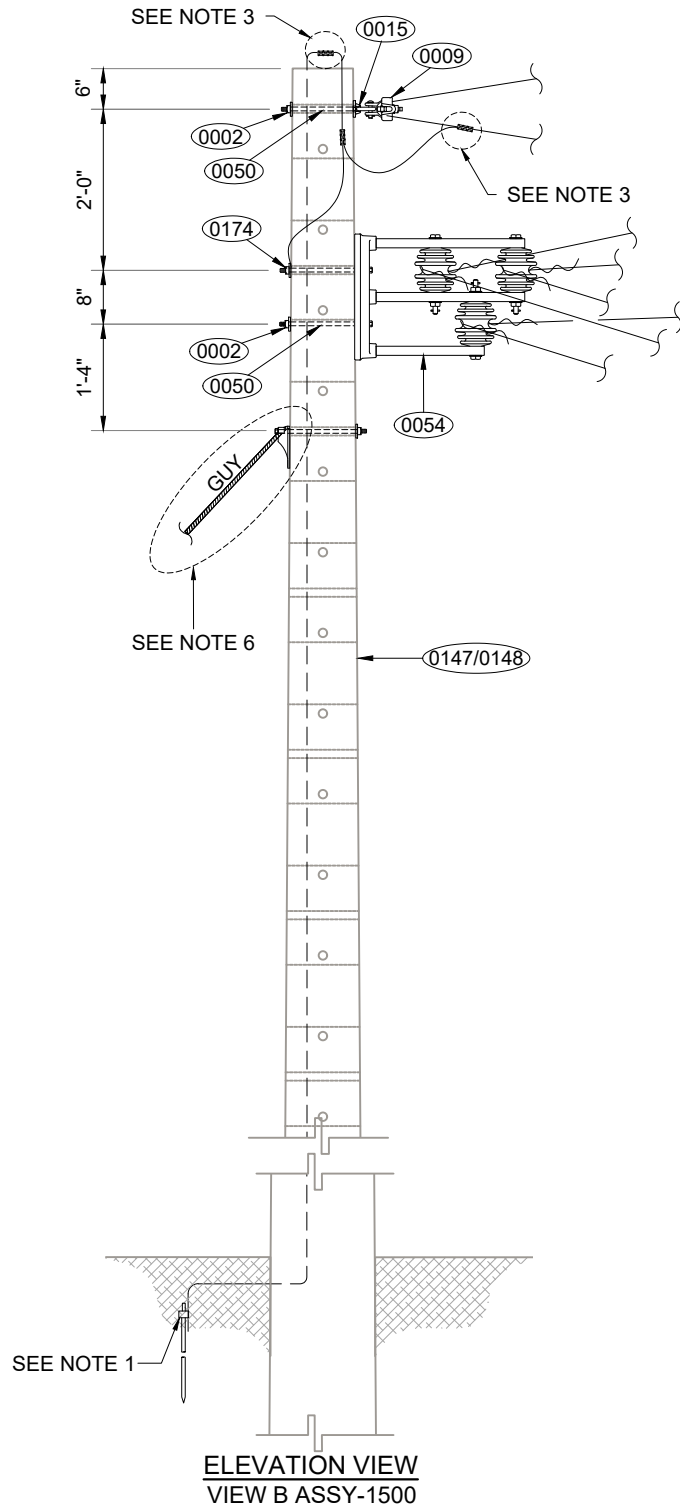
PAGE 1 OF 3 DATE FEB 08, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
6° - 60° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES

STANDARD NO. S-3 VERSION 5  
DOCUMENT NO. 4301.045  
PAGE 2 OF 3 DATE FEB 08, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
5. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
6. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
7. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12'-0" FROM THE SPACER CORNER BRACKET (ITEM 0054), AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
8. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
9. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
10. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
11. FOR THE INSTALLATION OF A BRACKET FOR THE SPACER CABLE SYSTEM SUPPORT ON POLE WIRE HOLE SPACING IS 12", A C-CHANNEL TYPE BASE (ITEM 0187) MUST BE USED.
12. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
14. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
6° - 60° ANGLE TANGENT  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL

STANDARD NO. S-3 VERSION 5  
DOCUMENT NO. 4301.045  
PAGE 3 OF 3 DATE FEB 08, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
0005	TIE WIRE	002-82035	AS REQ.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	1
0009	SUSPENSION CLAMP	002-08579	1
0015	EYE NUT	002-04495	1
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	3
0054	SPACER CORNER BRACKET	002-01939	1
0055	SPOOL TYPE INSULATOR	014-00696	3
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0100	MESSENGER WIRE	042-00903	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND / BOND WIRE CLAMP	002-82539	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.



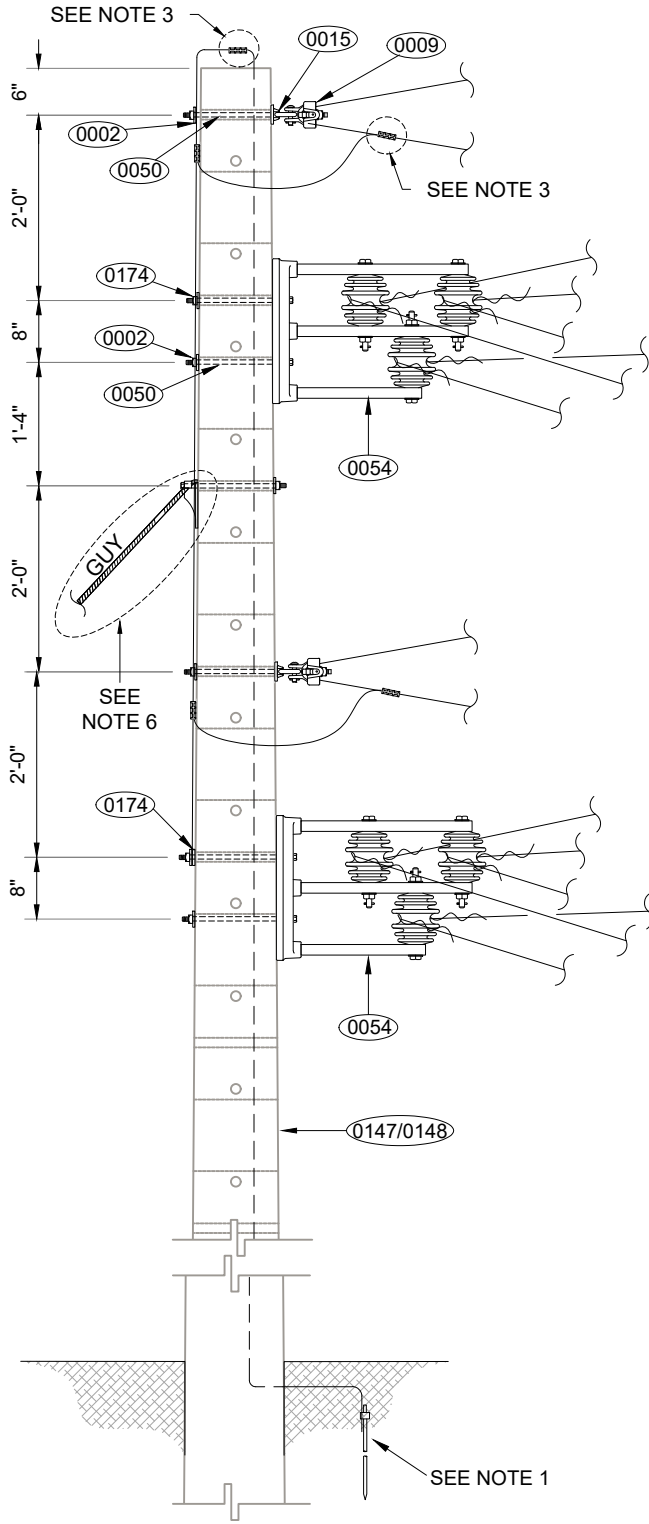
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

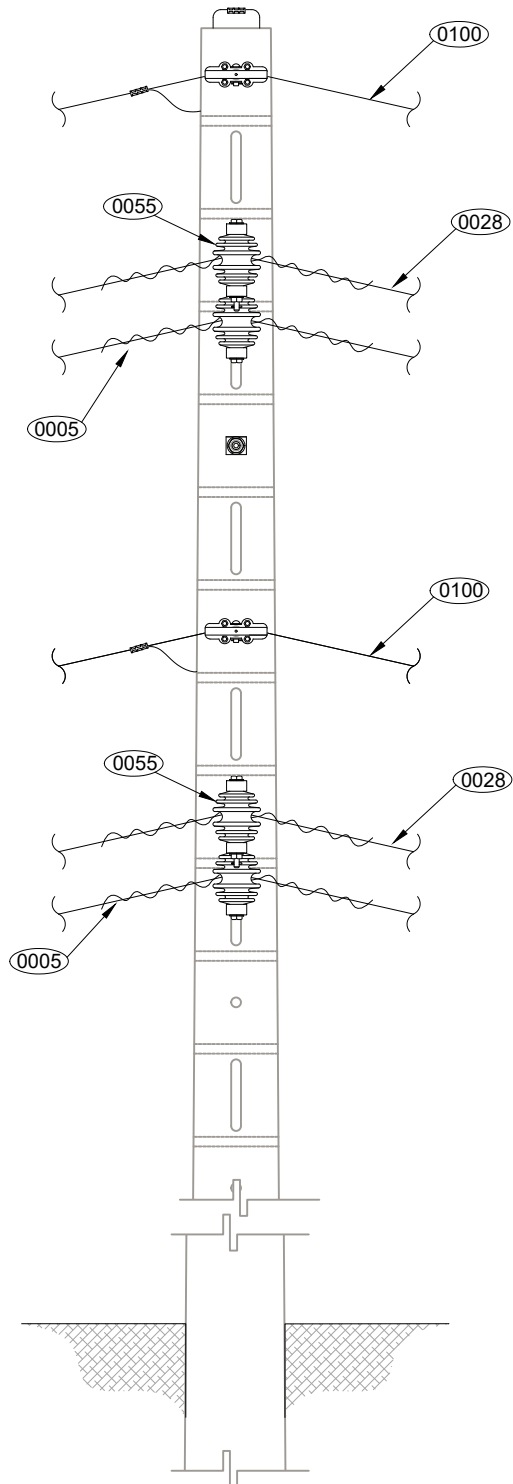
TITLE:

**SPACER CONSTRUCTION**  
**6° - 60° ANGLE TANGENT**  
**DOUBLE CIRCUIT**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. S-3-1 VERSION 4  
DOCUMENT NO. 4301.118  
PAGE 1 OF 3 DATE FEB 08, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW**  
**VIEW B ASSY-1500**



**PROFILE VIEW**  
**VIEW A ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p style="text-align: center;">SPACER CONSTRUCTION          6° - 60° ANGLE TANGENT          DOUBLE CIRCUIT          MAXIMUM VOLTAGE: 13.2 KV          NOTES</p>	STANDARD NO. <u>S-3-1</u> VERSION <u>4</u>
		DOCUMENT NO. <u>4301.118</u>
		PAGE <u>2 OF 3</u> DATE <u>FEB 08, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>
		<u>EMILIO CUADRADO LIC. 3000</u>

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
5. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
6. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
7. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12'-0" FROM THE SPACER CORNER BRACKET (ITEM 0054), AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
8. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
9. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
10. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
11. FOR THE INSTALLATION OF A BRACKET FOR THE SPACER CABLE SYSTEM SUPPORT ON POLE WIRE HOLE SPACING IS 12", A C-CHANNEL TYPE BASE (ITEM 0187) MUST BE USED.
12. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p>SPACER CONSTRUCTION          6° - 60° ANGLE TANGENT          DOUBLE CIRCUIT          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</p>	STANDARD NO. <u>S-3-1</u> VERSION <u>4</u>
		DOCUMENT NO. <u>4301.118</u>
		PAGE <u>3 OF 3</u> DATE <u>FEB 08, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	8
0005	TIE WIRE	002-82035	AS REQ.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	1
0009	SUSPENSION CLAMP	002-08579	2
0015	EYE NUT	002-04495	2
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	6
0054	SPACER CORNER BRACKET	002-01939	2
0055	SPOOL TYPE INSULATOR	014-00696	6
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0100	MESSENGER WIRE	042-00903	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND / BOND WIRE CLAMP	002-82539	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	2
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
6° - 60° ANGLE WITH CROSSARM  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-3-XARM VERSION 3

DOCUMENT NO. 4301.140

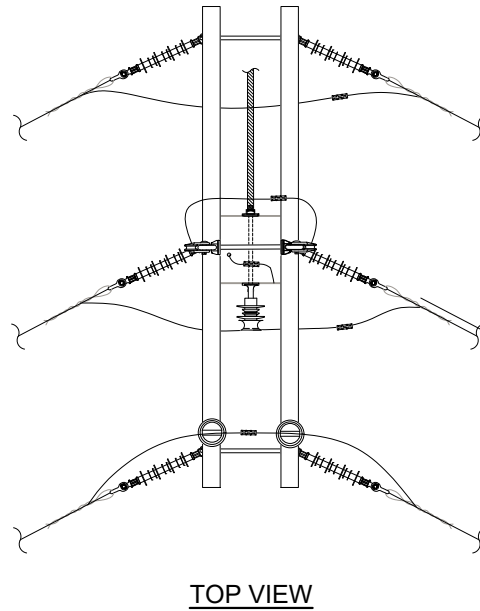
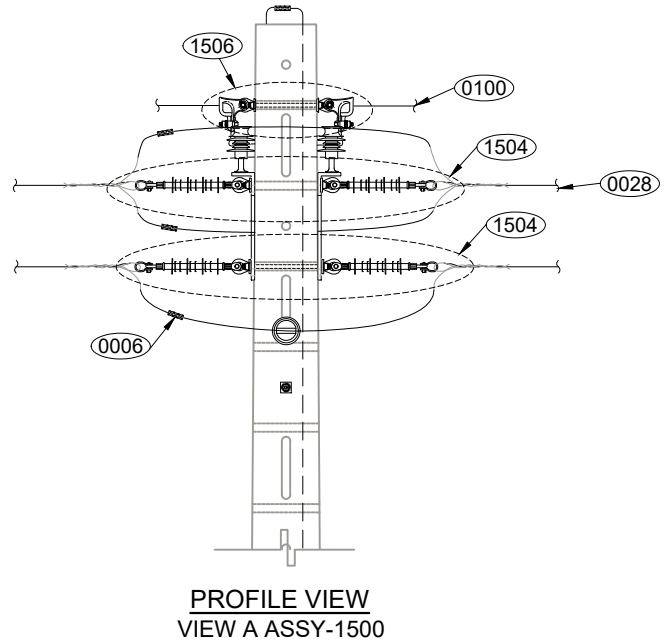
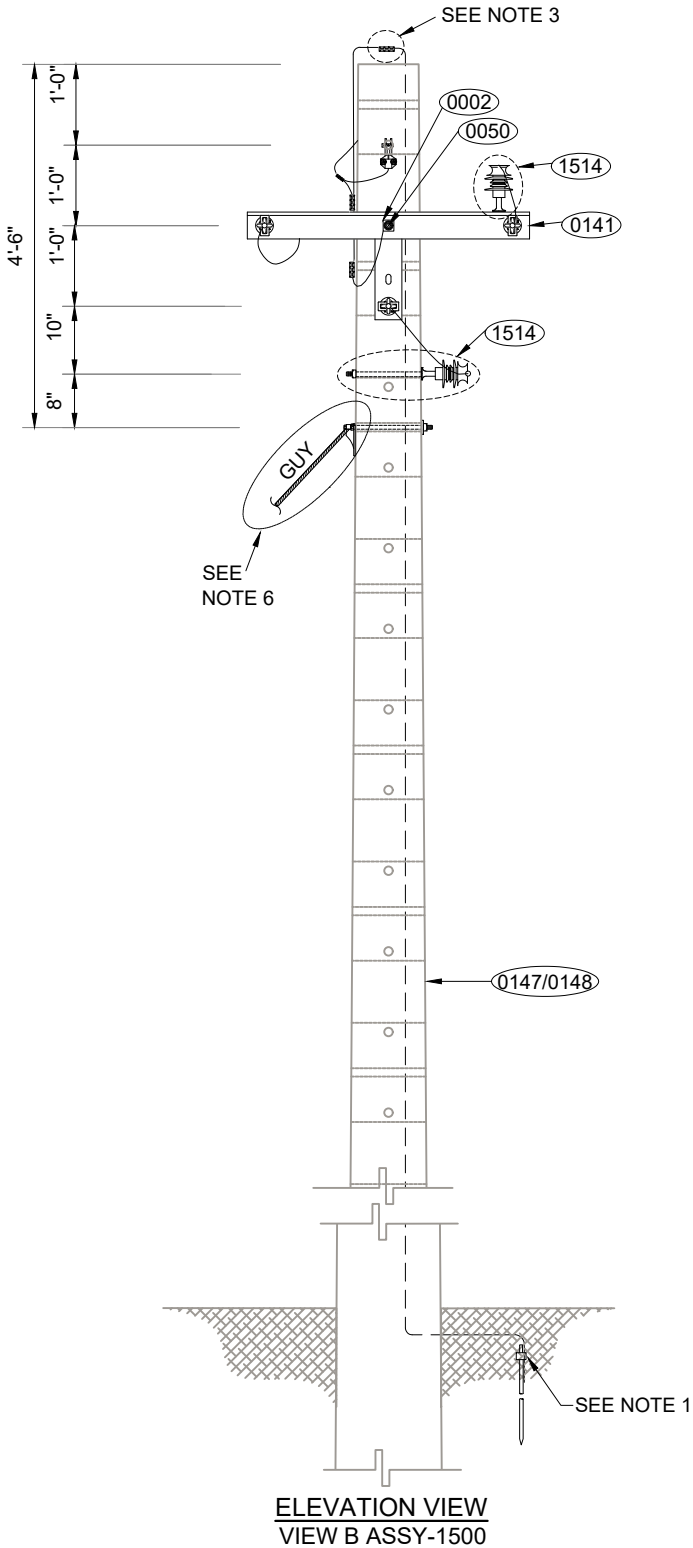
PAGE 1 OF 2 DATE FEB 8, 2024

SUBMITTED LUIS R. SOTO LIC. 11648

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;"><b>SPACER CONSTRUCTION 6° - 60° ANGLE WITH CROSSARM MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b></p>	STANDARD NO. <u>S-3-XARM</u> VERSION <u>3</u> DOCUMENT NO. <u>4301.140</u> PAGE <u>2 OF 2</u> DATE <u>FEB 8, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11648</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	1
0100	MESSENGER WIRE	042-00903	AS REQ.
0141	CROSSARM	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE D	3
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 1-FIGURE A, 1-FIGURE D	2
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
5. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
6. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
7. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12'-0" FROM THE ONES ON THE POLES AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
8. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
9. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
10. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
11. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
12. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
14. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



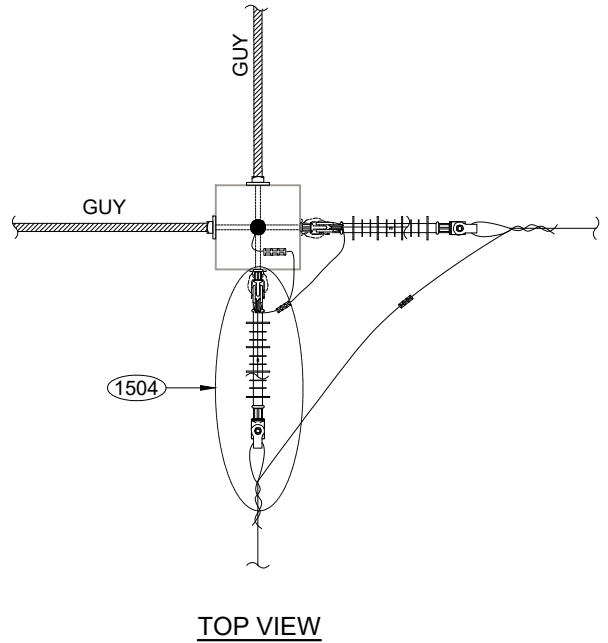
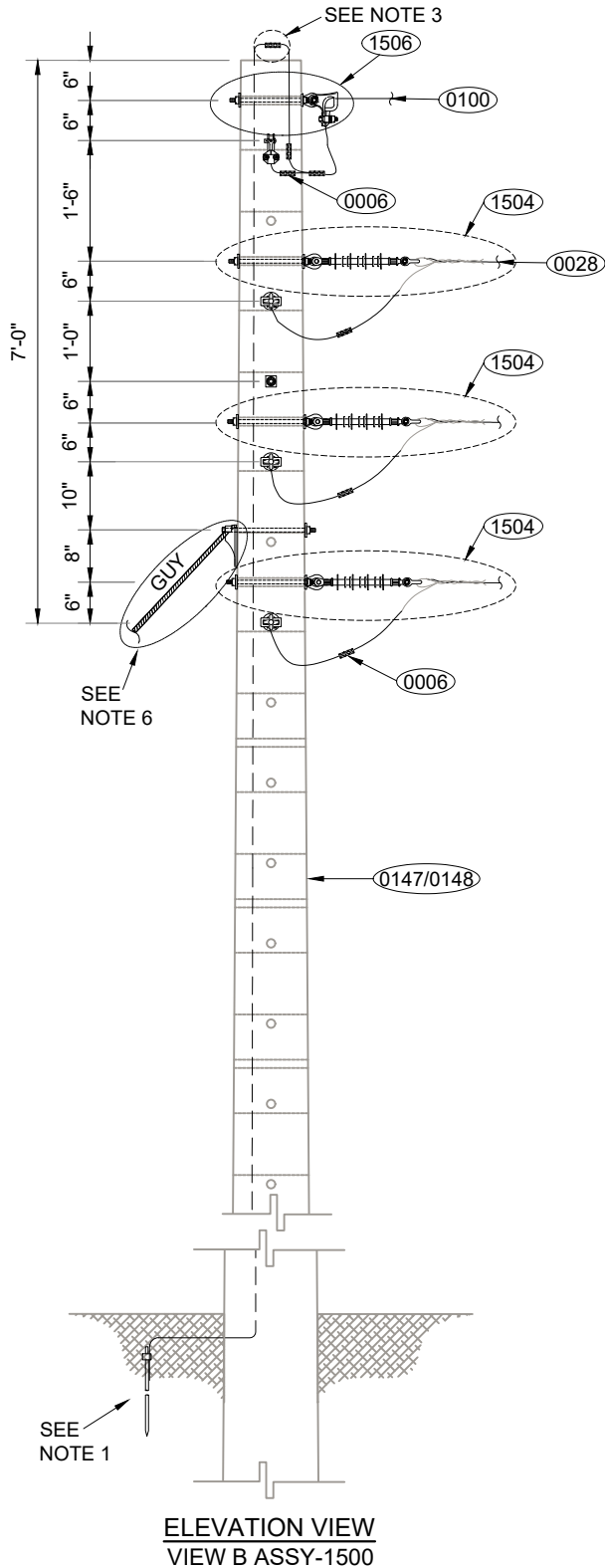
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
VERTICAL 61°- 90° ANGLE  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-4-VERT VERSION 3  
DOCUMENT NO. 4301.139  
PAGE 1 OF 2 DATE FEB 8, 2024  
SUBMITTED LUIS R. SOTO LIC. 11648  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  SPACER CONSTRUCTION VERTICAL 61°- 90° ANGLE MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL	STANDARD NO. <u>S-4-VERT</u> VERSION <u>3</u>
	DOCUMENT NO. <u>4301.139</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 8, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11648</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0100	MESSENGER WIRE	042-00903	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE C	6
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 FIGURE D	1
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
- THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12'-0" FROM THE ONES ON THE POLES AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
- AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
- TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
- REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
- IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
- FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SPACER CONSTRUCTION**  
**61° - 90° ANGLE WITH CROSSARM**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. S-4-XARM VERSION 3

DOCUMENT NO. 4301.138

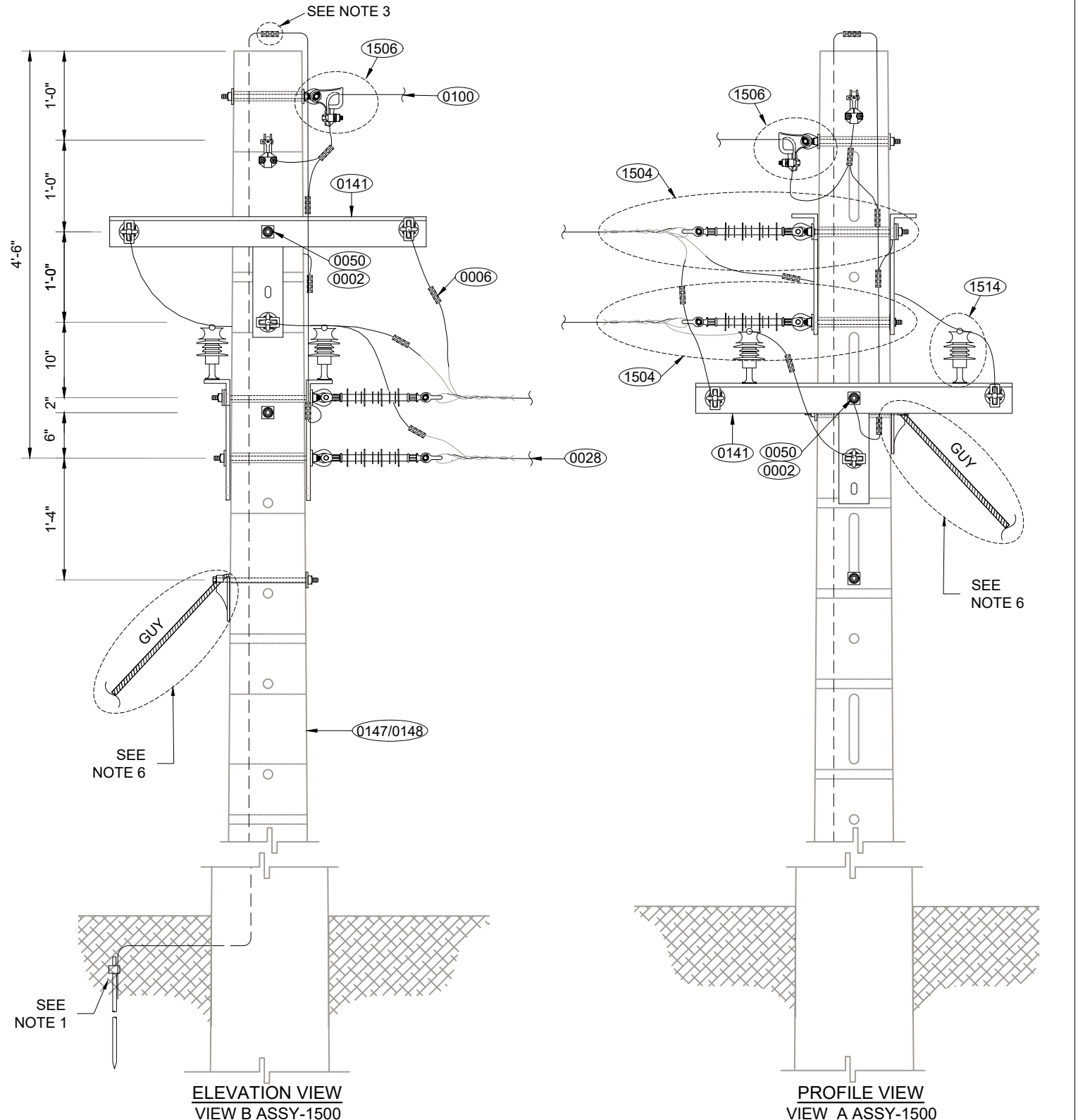
PAGE 1 OF 2 DATE FEB 8, 2024

SUBMITTED LUIS R. SOTO LIC. 11648

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <p style="text-align: center;"><b>SPACER CONSTRUCTION</b>  <b>61° - 90° ANGLE WITH CROSSARM</b>  <b>MAXIMUM VOLTAGE: 13.2 KV</b>  <b>NOTES AND BILL OF MATERIAL</b></p>	STANDARD NO. <u>S-4-XARM</u> VERSION <u>3</u> DOCUMENT NO. <u>4301.138</u> PAGE <u>2 OF 2</u> DATE <u>FEB 8, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11648</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0100	MESSENGER WIRE	042-00903	AS REQ.
0141	CROSSARM	VARIES	4
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE C	6
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE C, 1-FIGURE D,	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 1-FIGURE C, 1-FIGURE D	2
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
5. MAXIMUM RECOMMENDED SPAN IS 150' IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
6. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
7. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12' FROM THE ONES ON THE POLES AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25' TO 30'. TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
8. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
9. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
10. REFER TO ASSEMBLY NO. ASSY-1506 FOR NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS CLEARANCES.
11. REFER TO ASSEMBLY NO. ASSY-1510 WHEN SURGE ARRESTERS ARE REQUIRED BY DESIGN.
12. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
14. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



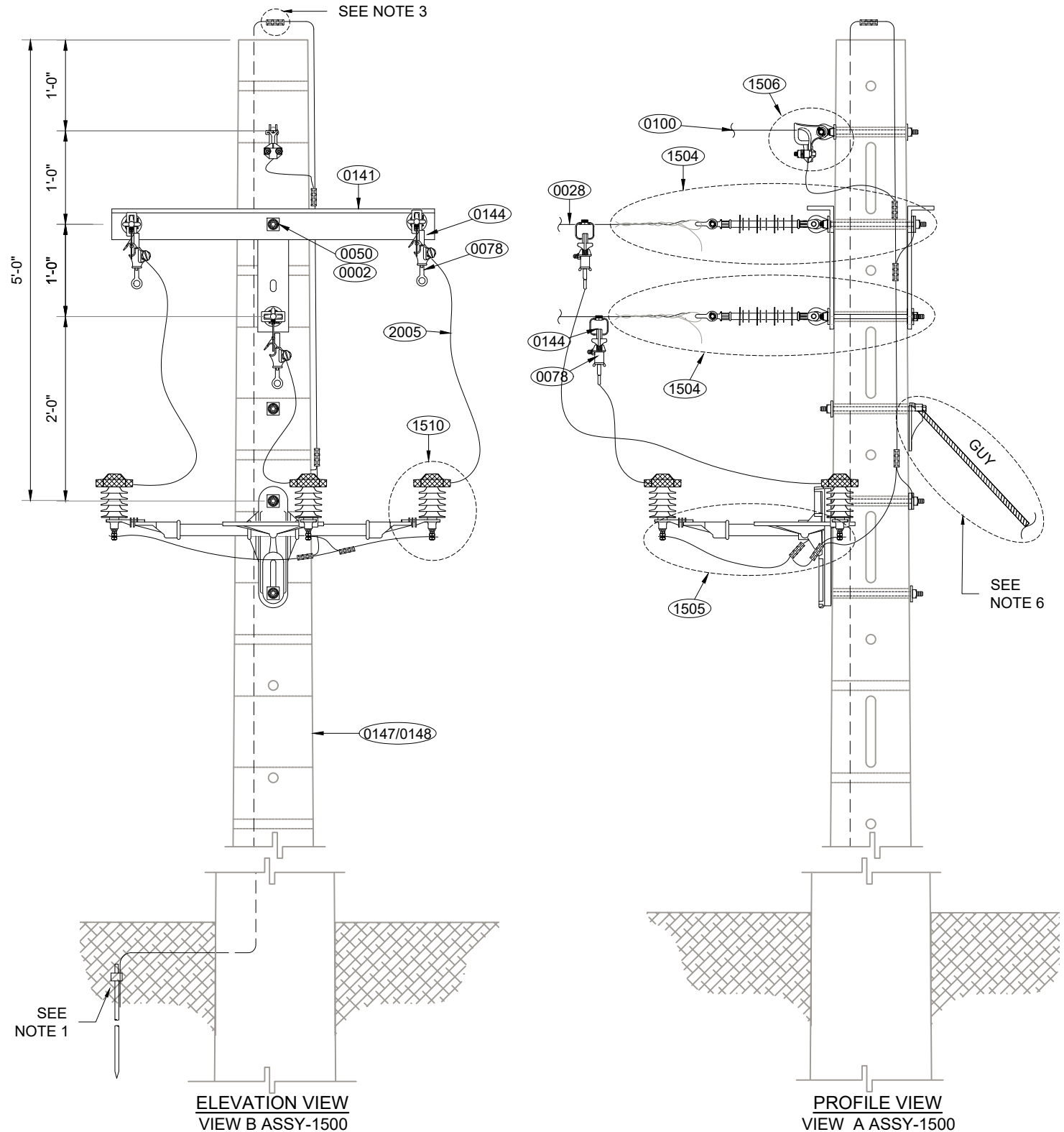
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-5 VERSION 8  
DOCUMENT NO. 4301.046  
PAGE 1 OF 3 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
SINGLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES

STANDARD NO. S-5 VERSION 8  
DOCUMENT NO. 4301.046  
PAGE 2 OF 3 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
5. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
6. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
7. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED APPROXIMATELY 12'-0" FROM THE POLES, AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
8. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CONDUCTOR CABLE.
9. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
12. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
13. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
14. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
15. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<p><b>TITLE:</b></p> <p style="text-align: center;"><b>SPACER CONSTRUCTION SINGLE DEADEND MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL</b></p>	<p>STANDARD NO. <u>S-5</u> VERSION <u>8</u>  DOCUMENT NO. <u>4301.046</u>  PAGE <u>3 OF 3</u> DATE <u>FEB 20, 2024</u>  SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>  REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>  APPROVED <u>RICARDO CASTRO LIC. 12135</u>  DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>  <u>EMILIO CUADRADO LIC. 3000</u></p>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0001	THROUGH BOLT	VARIES	1
0002	FLAT SQUARE WASHER	VARIES	1
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	1
0078	HOT LINE CLAMP	VARIES	3
0100	MESSENGER WIRE	042-00903	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE C	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-6 VERSION 8

DOCUMENT NO. 4301.047

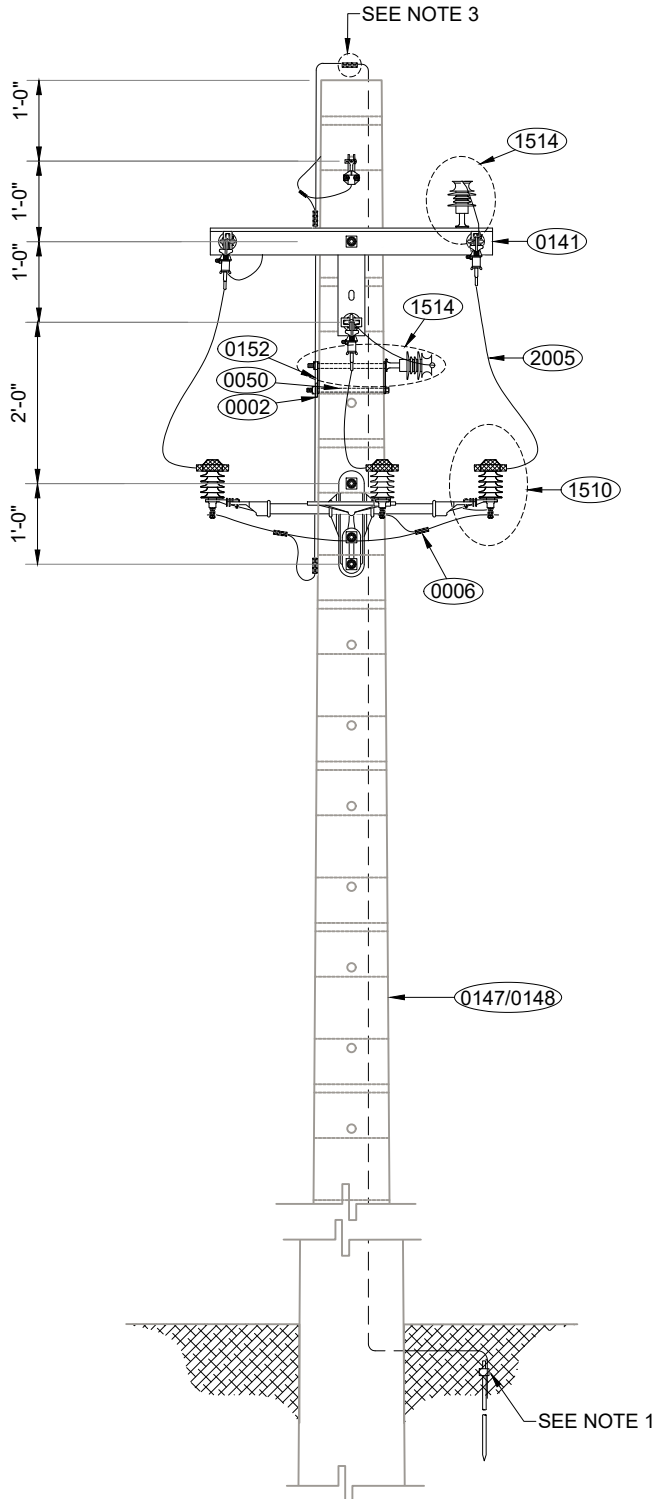
PAGE 1 OF 3 DATE FEB 20, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

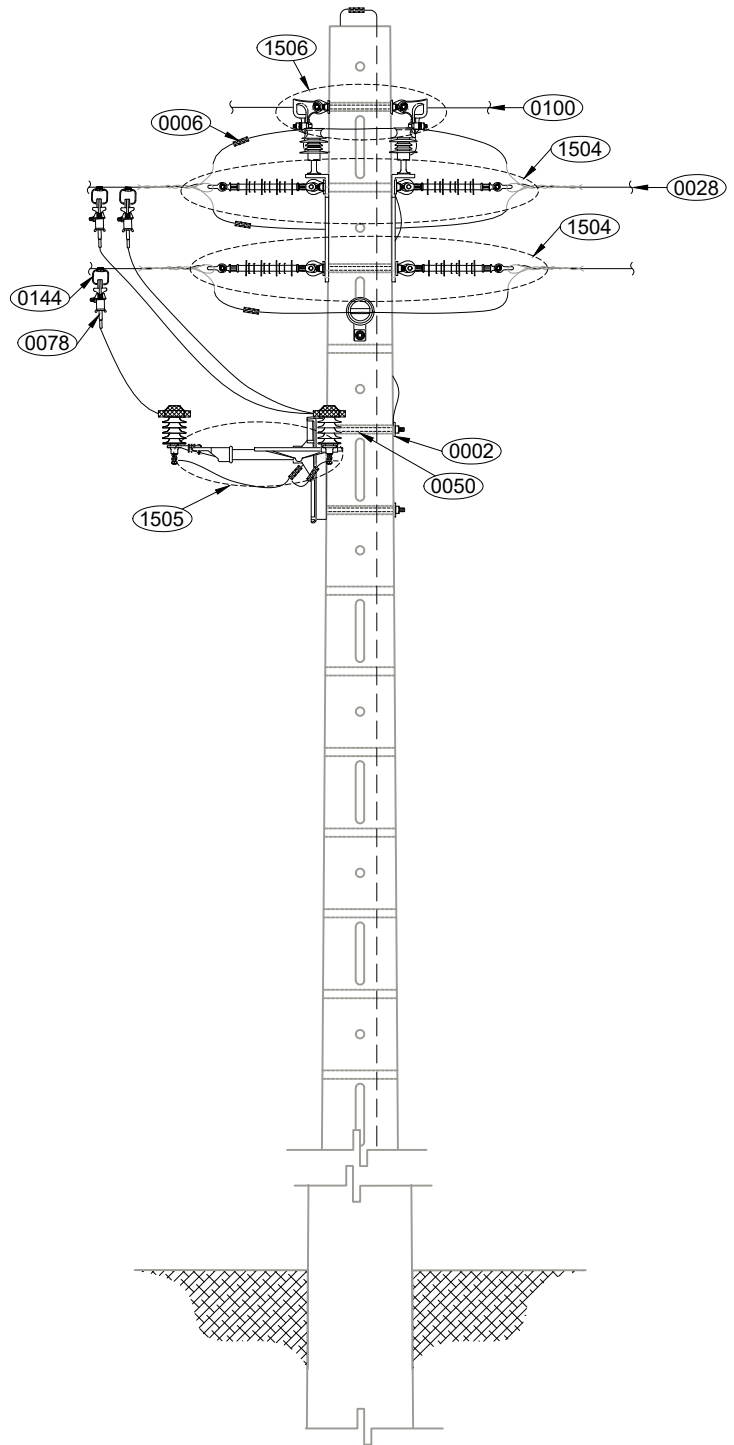
REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW**  
VIEW B ASSY-1500



**PROFILE VIEW**  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
DOUBLE DEADEND  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES

STANDARD NO. S-6 VERSION 8  
DOCUMENT NO. 4301.047  
PAGE 2 OF 3 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO STREET LIGHTING STANDARDS FOR STREET LIGHTING INSTALLATION.
5. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
6. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED APPROXIMATELY 12'-0" FROM THE POLES, AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
7. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
8. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
11. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
12. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
14. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>SPACER CONSTRUCTION          DOUBLE DEADEND          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</b>	STANDARD NO. <u>S-6</u> VERSION <u>8</u>
	DOCUMENT NO. <u>4301.047</u>
	PAGE <u>3 OF 3</u> DATE <u>FEB 20, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	8
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	3
0100	MESSENGER WIRE	042-00903	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0152	CLAMP	002-00725	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE D	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 1-FIGURE A, 1-FIGURE D	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.



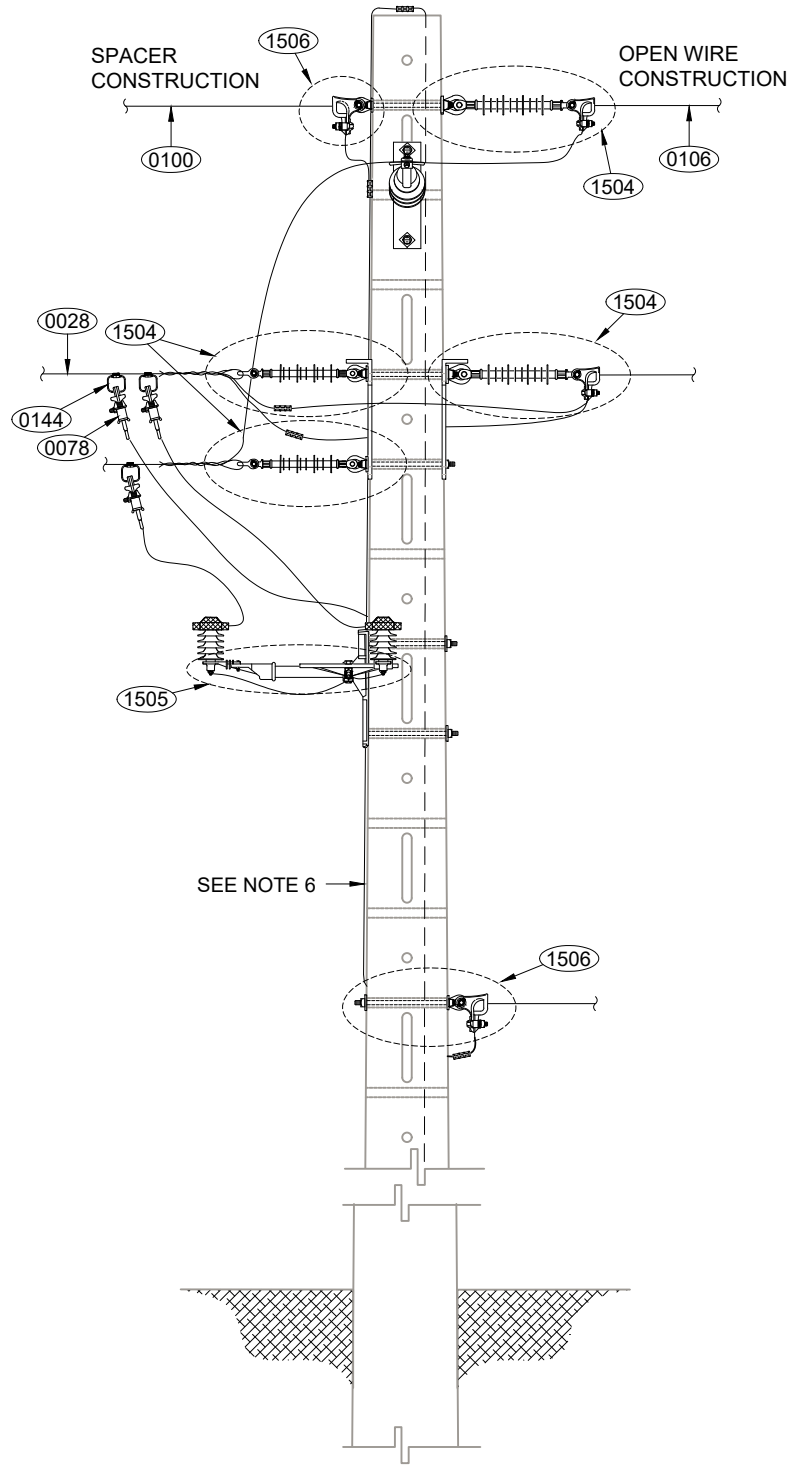
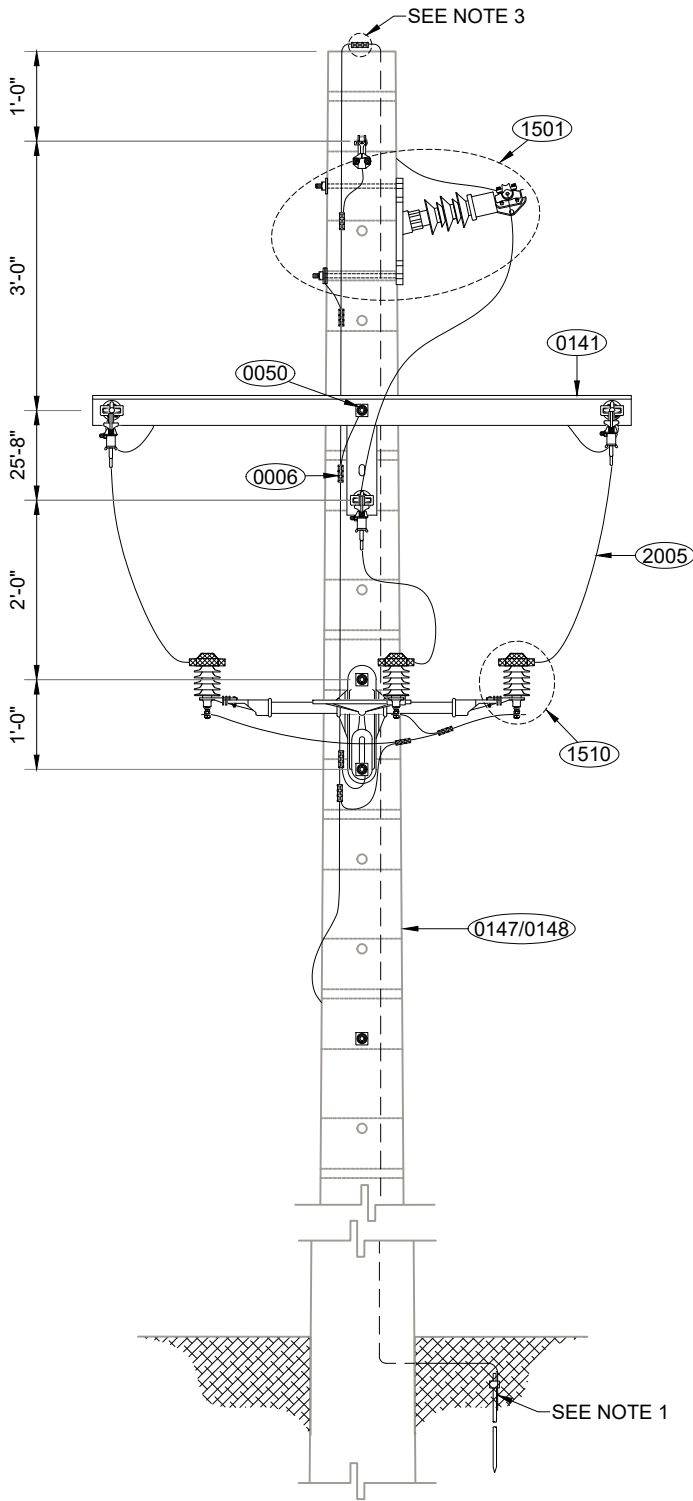
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
DOUBLE TERMINAL  
TO OPEN WIRE TRANSITION  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-6-2 VERSION 8  
DOCUMENT NO. 4301.030  
PAGE 1 OF 3 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412  
EMILIO CUADRADO LIC. 3000





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  <b>SPACER CONSTRUCTION DOUBLE TERMINAL TO OPEN WIRE TRANSITION MAXIMUM VOLTAGE: 13.2 KV NOTES</b>	STANDARD NO. <u>S-6-2</u> VERSION <u>8</u>
	DOCUMENT NO. <u>4301.030</u>
	PAGE <u>2</u> OF 3 DATE <u>FEB 20, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	
	<u>EMILIO CUADRADO LIC. 3000</u>

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
5. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
6. NEUTRAL CONDUCTOR MUST BE RATED TO PHASE CONDUCTOR FULL CAPACITY.
7. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED APPROXIMATELY 12'-0" FROM THE POLES, AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
8. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
9. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
12. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
13. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
14. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
15. FOR THE INSTALLATION OF TWO DISTRIBUTION CIRCUITS, REFER TO SECTION IV OF THIS MANUAL FOR THE POSSIBLE CONFIGURATIONS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p style="text-align: center;">SPACER CONSTRUCTION DOUBLE TERMINAL TO OPEN WIRE TRANSITION MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL</p>	STANDARD NO. <u>S-6-2</u> VERSION <u>8</u>
		DOCUMENT NO. <u>4301.030</u>
		PAGE <u>3 OF 3</u> DATE <u>FEB 20, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u> <u>EMILIO CUADRADO LIC. 3000</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	1
0078	HOT LINE CLAMP	VARIES	3
0100	MESSENGER WIRE	042-00903	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 3-FIGURE A, 3-FIGURE C	6
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	2
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	4
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.



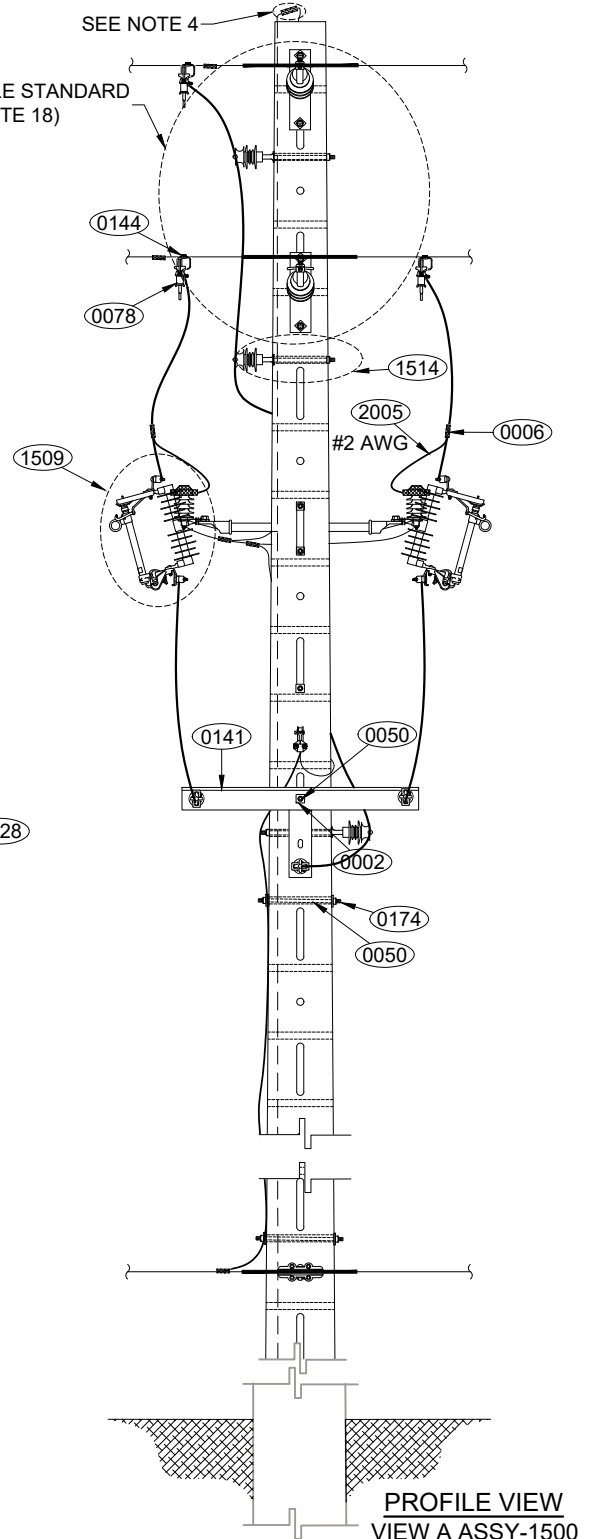
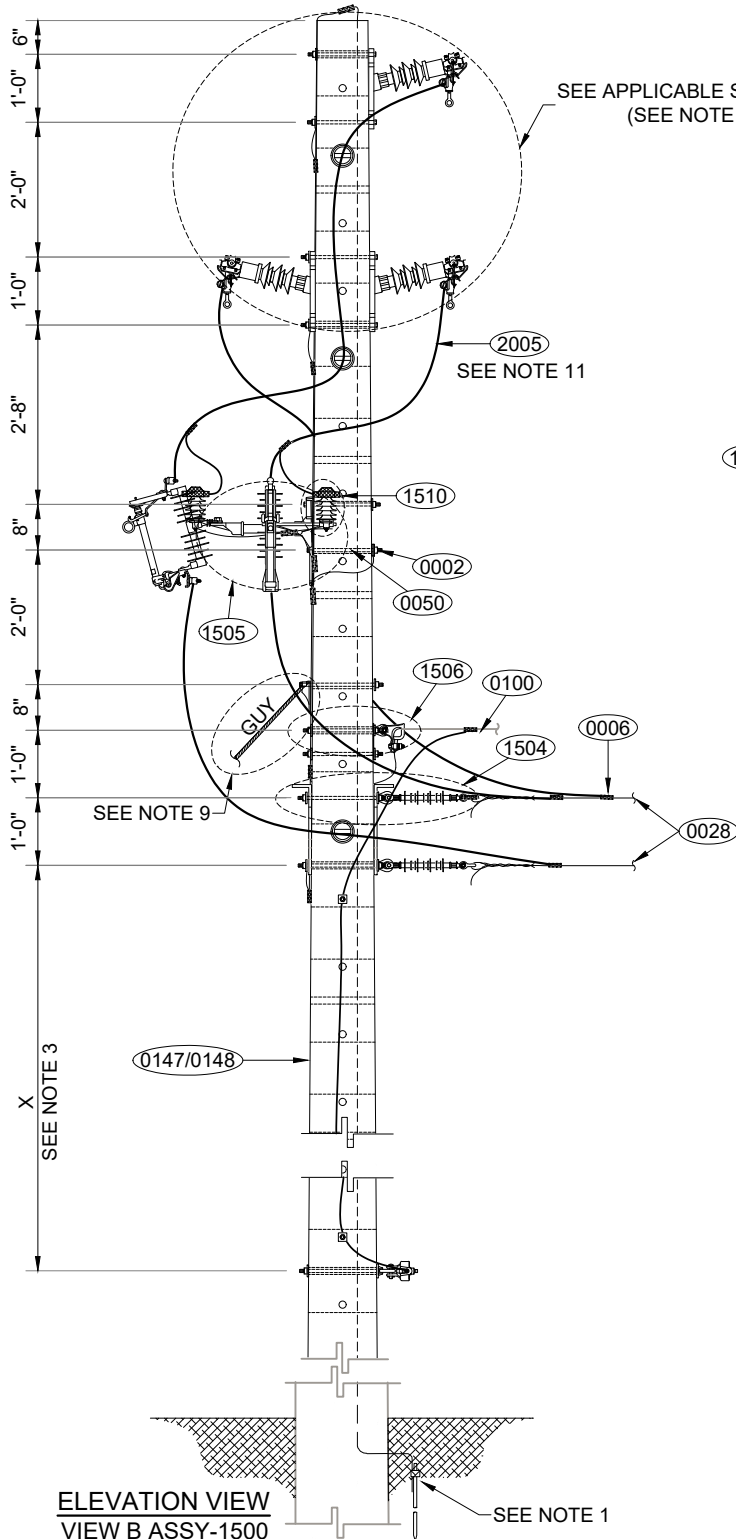
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SPACER CABLE TAP-OFF**  
**MAXIMUM RATING: 200 A**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. S-7-1 VERSION 1  
 DOCUMENT NO. 4301.156  
 PAGE 1 OF 6 DATE ABR 03, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
VICTOR R. FEBRES LIC. 3412





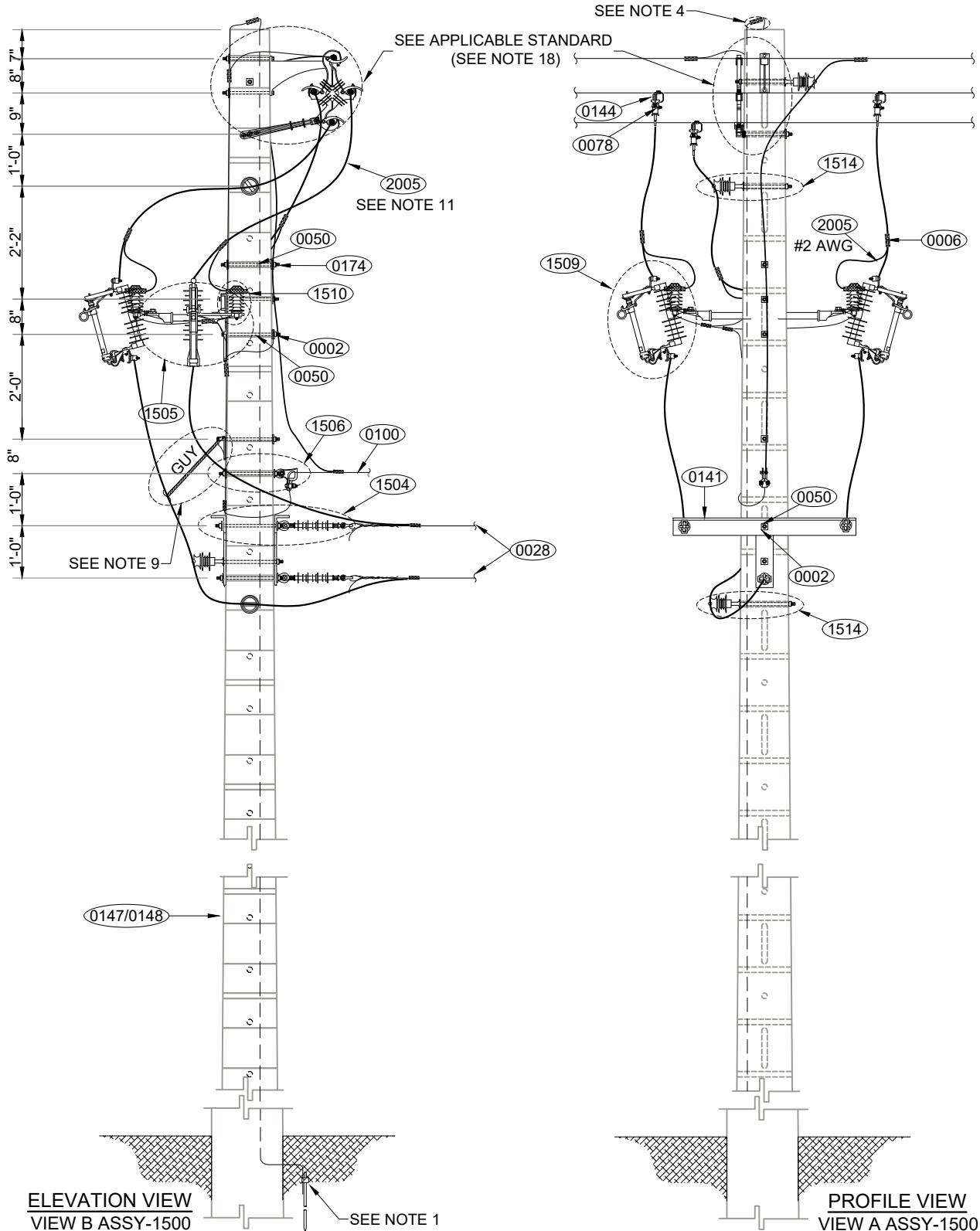
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SPACER CABLE TAP-OFF**  
**MAXIMUM RATING: 200 A**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	S-7-1	VERSION	1
DOCUMENT NO.	4301.156		
PAGE	2 OF 6	DATE	ABR 03, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
	VICTOR R. FEBRES LIC. 3412		







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SPACER CABLE TAP-OFF**  
**MAXIMUM RATING: 200 A**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. S-7-1 VERSION 1

DOCUMENT NO. 4301.156

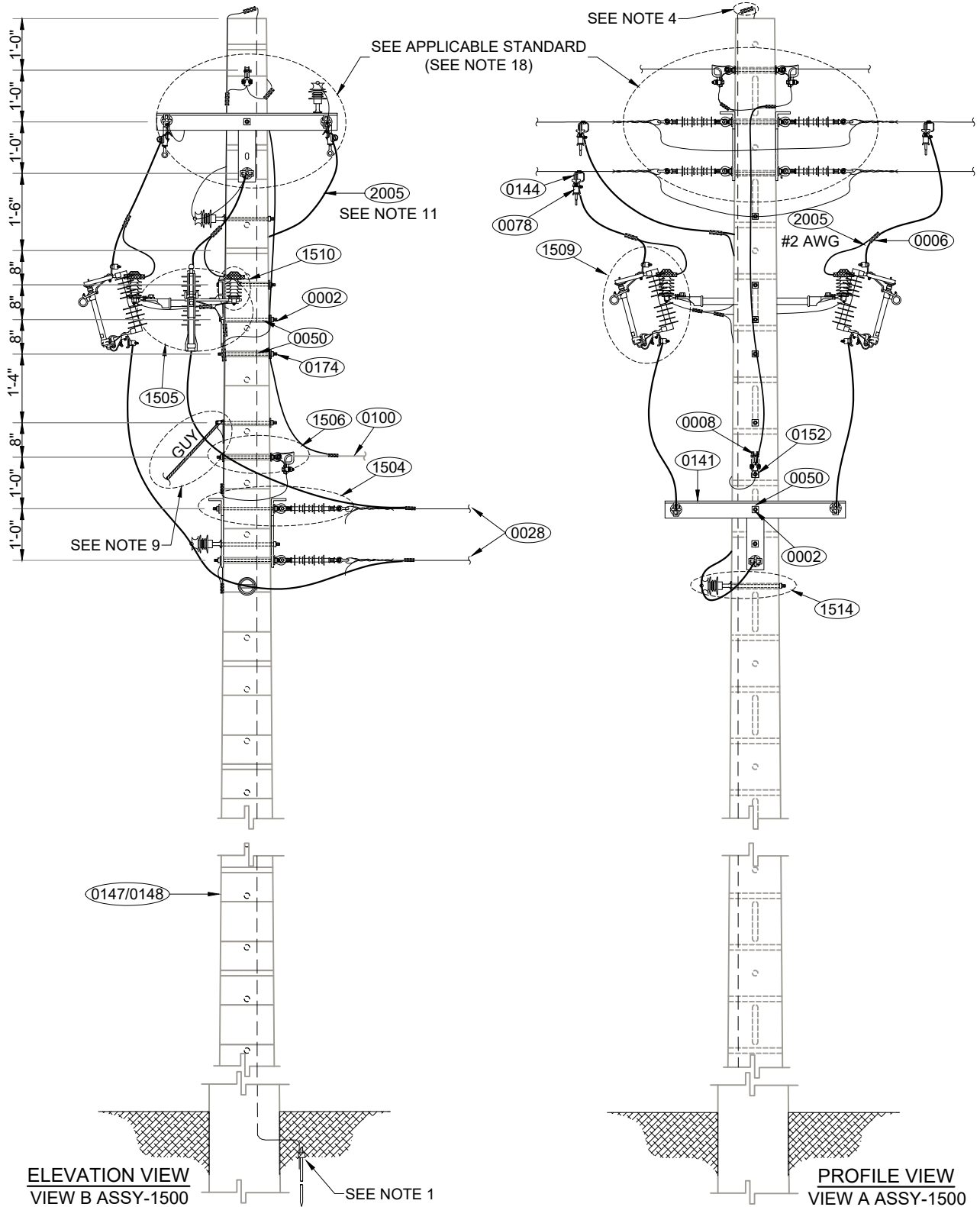
PAGE 3 OF 6 DATE ABR 03, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

VICTOR R. FEBRES LIC. 3412





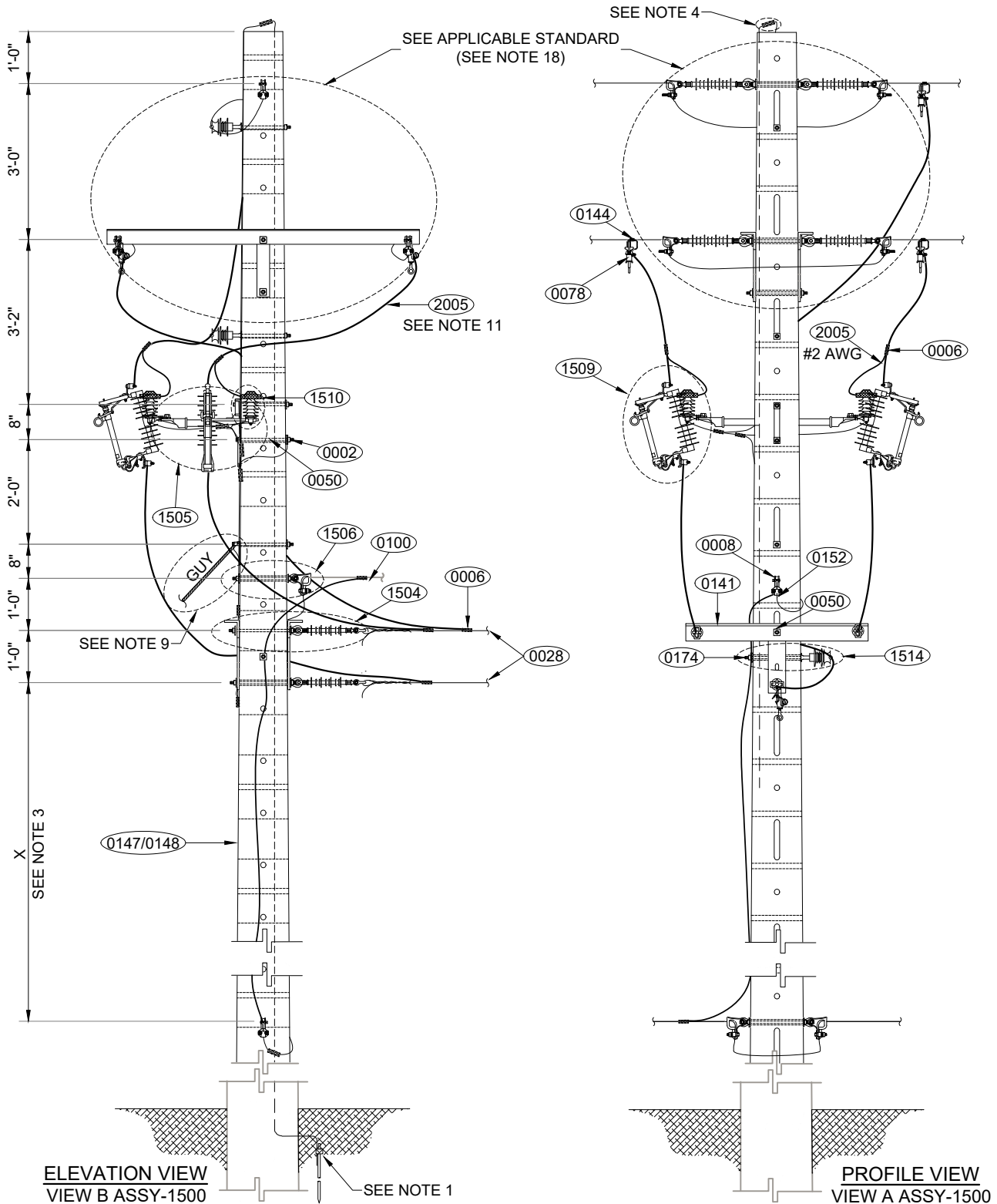
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SPACER CABLE TAP-OFF**  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	S-7-1	VERSION	1
DOCUMENT NO.	4301.156		
PAGE	4 OF 6	DATE	ABR 03, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
	VICTOR R. FEBRES LIC. 3412		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**

**SPACER CABLE TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES**

STANDARD NO.	<u>S-7-1</u>	VERSION	<u>1</u>
DOCUMENT NO.	<u>4301.156</u>		
PAGE	<u>5 OF 6</u>	DATE	<u>ABR 03, 2024</u>
SUBMITTED	<u>LUIS R. SOTO LIC. 11658</u>		
REVIEWED	<u>IVETTE D. SANCHEZ LIC. 13837</u>		
APPROVED	<u>RICARDO CASTRO LIC. 12135</u>		
	<u>VICTOR R. FEBRES LIC. 3412</u>		

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. THE PREFERRED MINIMUM PHASE TO NEUTRAL SPACING IS 10'-0". IN RURAL AREAS WITH LIMITED CUSTOMER EXPANSION, THE MINIMUM PHASE TO NEUTRAL SPACING CAN BE REDUCED TO 2'-0".
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO THE STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOFF CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOFF CONNECTIONS.
12. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
13. FOR THE INSTALLATION OF A BRACKET FOR SPACER CABLE SYSTEM SUPPORT ON A POLE FACE WHERE HOLE PATTERN SPACING IS 12", A C-CHANNEL TYPE BASE (ITEM 0187) MUST BE USED.
14. ANTI-SWAY BRACKETS CAN BE USED IF A HOLE IS AVAILABLE.
15. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED 12'-0" FROM THE ONES ON THE POLES AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
16. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
17. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.
18. FOR TANGENT PRIMARY CONSTRUCTION, THE APPLICABLE STANDARDS MAY BE CP-C1, CP-C2, S-1, S-1-1, OR S-3. FOR DOUBLE DEADEND CONSTRUCTION, THE APPLICABLE STANDARDS MAY BE ABS-3-XARM, CP-C3-XARM, CP-C6-XARM, CP-C12, S-3-XARM, S-6, S-6-2, OR S-12.
19. IF THE TAP-OFF IS TO BE INSTALLED UNDER AN AIR BREAK SWITCH (ABS) OR FUSE CUTOFF, CONNECT TAP-OFF TO SOURCE SIDE. A MINIMUM CLEARANCE OF 3'-0" MUST BE MAINTAINED TO AVOID INTERFERING WITH THE OPERATION OF THE ABS OR FUSE CUTOFFS.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CABLE TAP-OFF  
 MAXIMUM RATING: 200 A  
 MAXIMUM VOLTAGE: 13.2 KV  
 BILL OF MATERIAL

STANDARD NO. S-7-1 VERSION 1  
 DOCUMENT NO. 4301.156  
 PAGE 6 OF 6 DATE ABR 03, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
VICTOR R. FEBRES LIC. 3412

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	3
0100	MESSENGER WIRE	042-00903	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND / BOND WIRE CLAMP	VARIES	AS REQ.
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE C	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE A	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	AS REQ.
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
E-1-2-3	POLE GUY INSTALLATION	E-1-2-3	AS REQ.



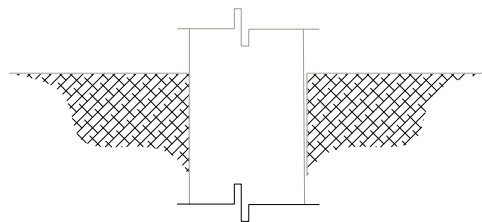
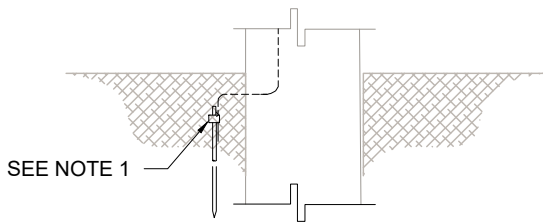
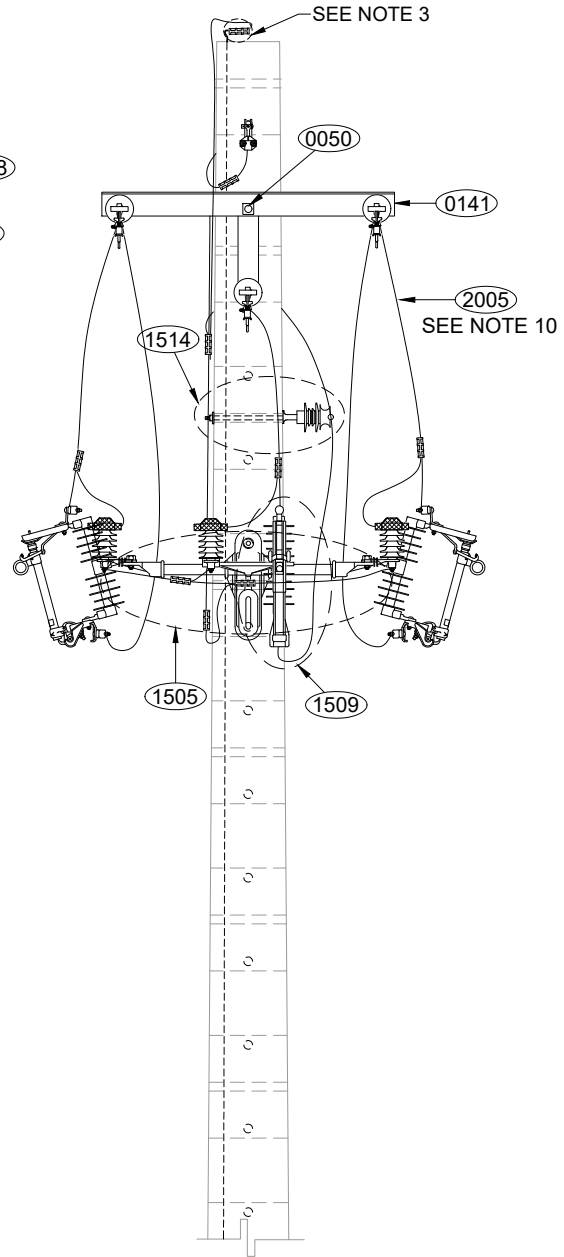
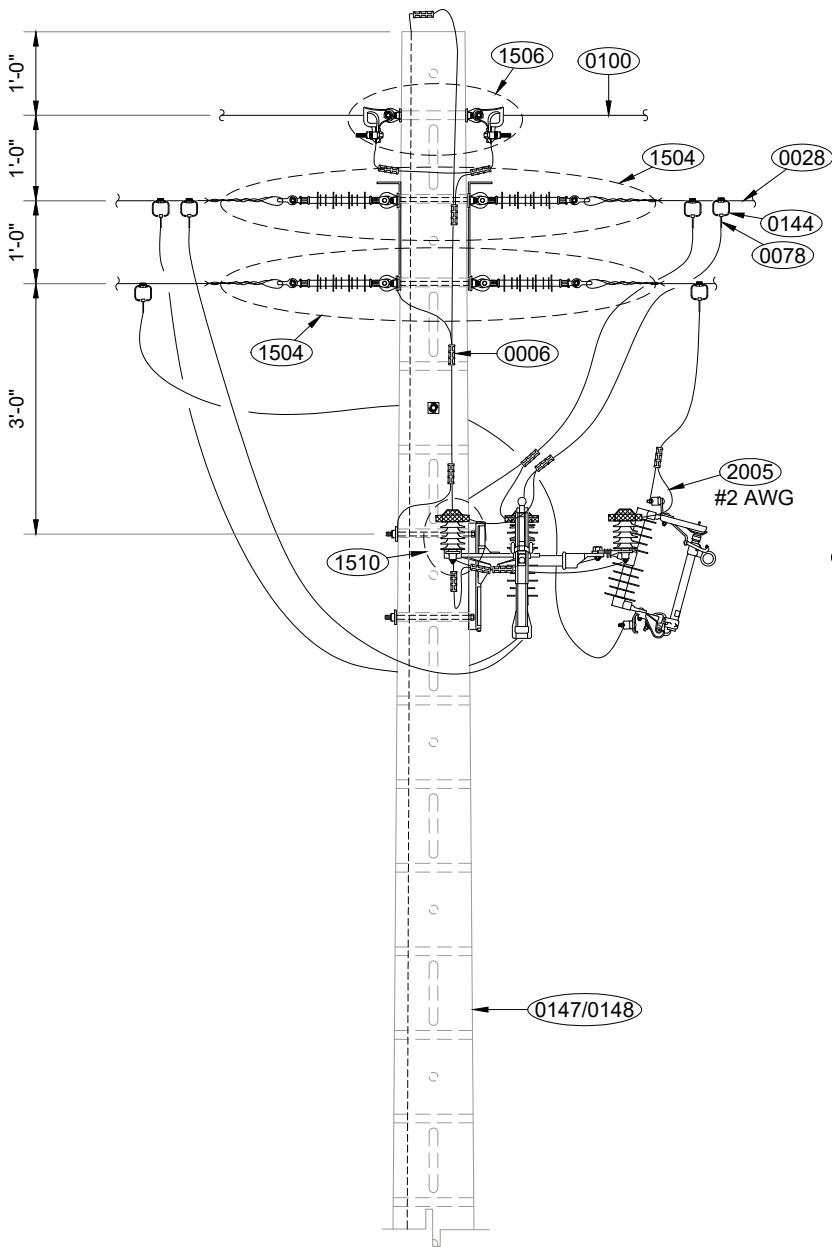
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SPACER CONSTRUCTION  
SINGLE DEADEND TAP-OFF  
MAXIMUM RATING: 200 A  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. S-12 VERSION 2  
DOCUMENT NO. 4301.150  
PAGE 1 OF 3 DATE FEB 20, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412



**ELEVATION VIEW**  
VIEW A ASSY-1500

**PROFILE VIEW**  
VIEW B ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	SPACER CONSTRUCTION	STANDARD NO. <u>S-12</u> VERSION <u>2</u>
	SINGLE DEADEND TAP-OFF	DOCUMENT NO. <u>4301.150</u>
	MAXIMUM RATING: 200 A	PAGE <u>2 OF 3</u> DATE <u>FEB 20, 2024</u>
	MAXIMUM VOLTAGE: 13.2 KV	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	NOTES	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
6. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
7. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
8. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. #2 COPPER CABLE SHALL BE USED FOR A 100 A FUSE CUTOUT CONNECTION, OR 1/0 AWG COPPER CABLE SHALL BE USED FOR A 200 A FUSE CUTOUT CONNECTION.
11. THE SPACERS (ITEM 0041) ON THE LINE WILL BE INSTALLED APPROXIMATELY 12'-0" FROM THE POLES, AND THE OTHERS EVENLY DISTRIBUTED ALONG THE SPAN EVERY 25'-0" TO 30'-0". TO INCREASE THE ESTABLISHED SPACING, THE DESIGNER SHALL VALIDATE THE PROPOSED SPACING BASED ON LOAD AND CAPACITY LIMITATIONS.
12. AUTOMATIC SPLICES CANNOT BE USED ON SPACER CABLE.
13. TO WORK ON THE SPACER SYSTEM AT 13.2 KV, IT MUST BE DE-ENERGIZED.
14. IF THE SPACER CONSTRUCTION IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEM 0147 OR 0148) FROM THE BILL OF MATERIAL.
15. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<p>SPACER CONSTRUCTION          SINGLE DEADEND TAP-OFF          MAXIMUM RATING: 200 A          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</p>	STANDARD NO. <u>S-12</u> VERSION <u>2</u>
		DOCUMENT NO. <u>4301.150</u>
		PAGE <u>3 OF 3</u> DATE <u>FEB 20, 2024</u>
		SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
		REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
		APPROVED <u>RICARDO CASTRO LIC. 12135</u>
		DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0028	ALUMINUM SPACER CABLE	VARIES	AS REQ.
0041	15 KV SPACER	002-08991	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	6
0100	MESSENGER WIRE	042-00903	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE D	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 1-FIGURE A, 1-FIGURE D	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.



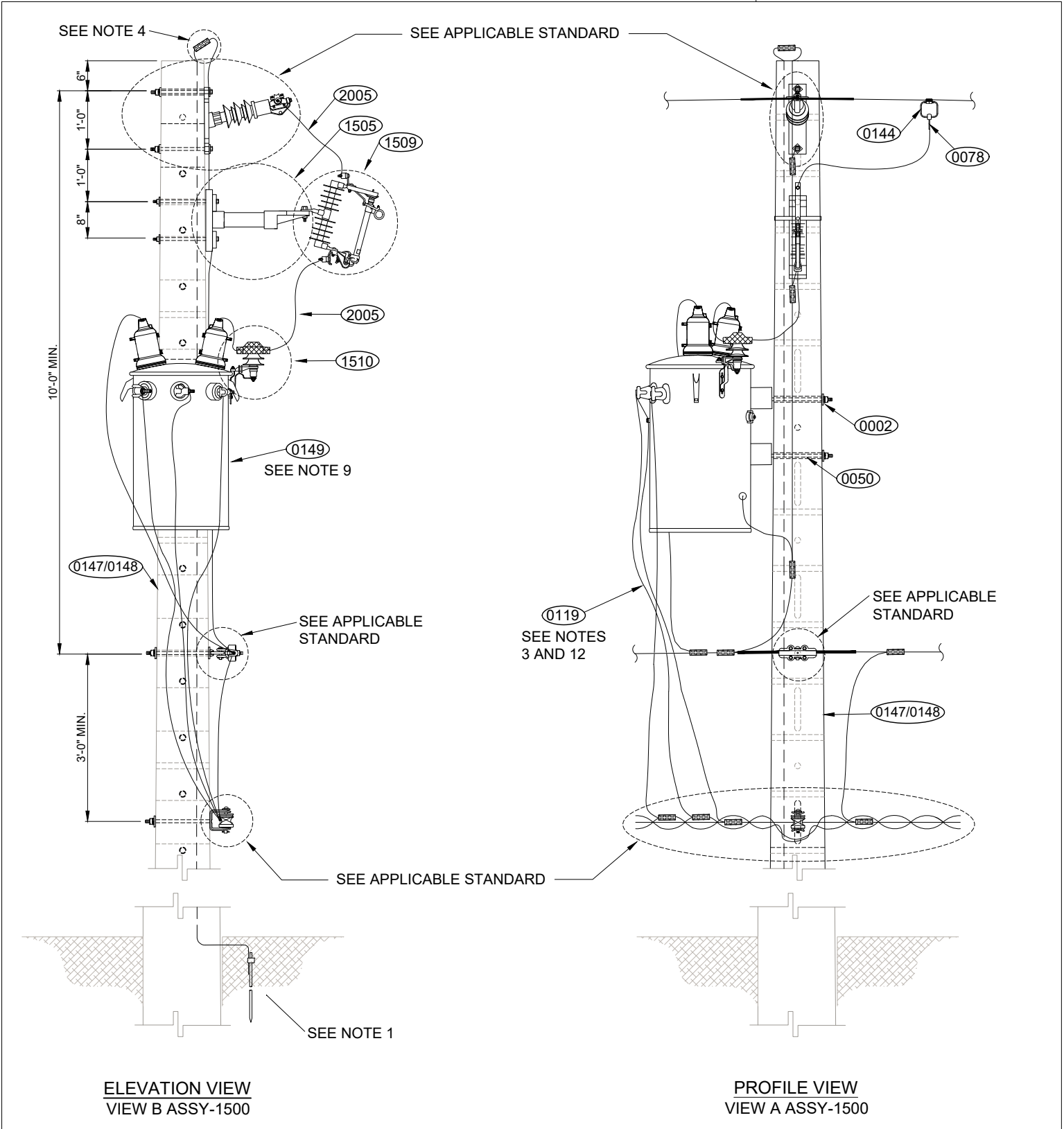
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE TRANSFORMER  
PHASE TO NEUTRAL  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. T-1 VERSION 8  
DOCUMENT NO. 4301.050  
PAGE 1 OF 2 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000







# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  <b>SINGLE TRANSFORMER PHASE TO NEUTRAL MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>T-1</u> VERSION <u>8</u>
	DOCUMENT NO. <u>4301.050</u>
	PAGE <u>2 OF 2</u> DATE <u>FEB 26, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
0144	STIRRUP	VARIES	1
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	VARIES	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	1
1509	FUSE CUTOFF ASSEMBLY	ASSY-1509	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE A	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE B, 1-FIGURE D, 1-FIGURE F	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- SERVICE TRIPLEX CABLE (ITEM 0119) SHALL BE PROPERLY RATED AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS AND THE TRANSFORMER RATING (KVA). THE SERVICE DROP SHALL BE A MINIMUM OF #2 AWG ALUMINUM TRIPLEX CABLE 600 V OR ITS COPPER EQUIVALENT.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1506 OR ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- THE MAXIMUM SIZE OF THE TRANSFORMER ALLOWED IS 100 KVA, UNLESS IT IS BEING TRANSFERRED TO LUMA, WHERE THE LIMIT IS REDUCED TO 75 KVA.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- REFER TO STANDARD NO. M-10 FOR TRANSFORMER CONNECTION DETAILS.
- FOR THE SECONDARY BUSHING OF TRANSFORMERS, STRANDED COPPER CABLE TYPE XHHW-2 (ITEM 2005) WITH VOLTAGE RATING OF 600 V CAN BE USED INSTEAD OF TRIPLEX CABLE (ITEM 0119). THIS TYPE OF CABLE SHALL BE USED FOR 75 KVA AND 100 KVA TRANSFORMERS.
- IF A TRANSFORMER WILL BE INSTALLED ON AN EXISTING POLE (ITEM 0147 OR 0148), THIS ITEM SHOULD NOT BE INCLUDED IN THE BILL OF MATERIAL.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



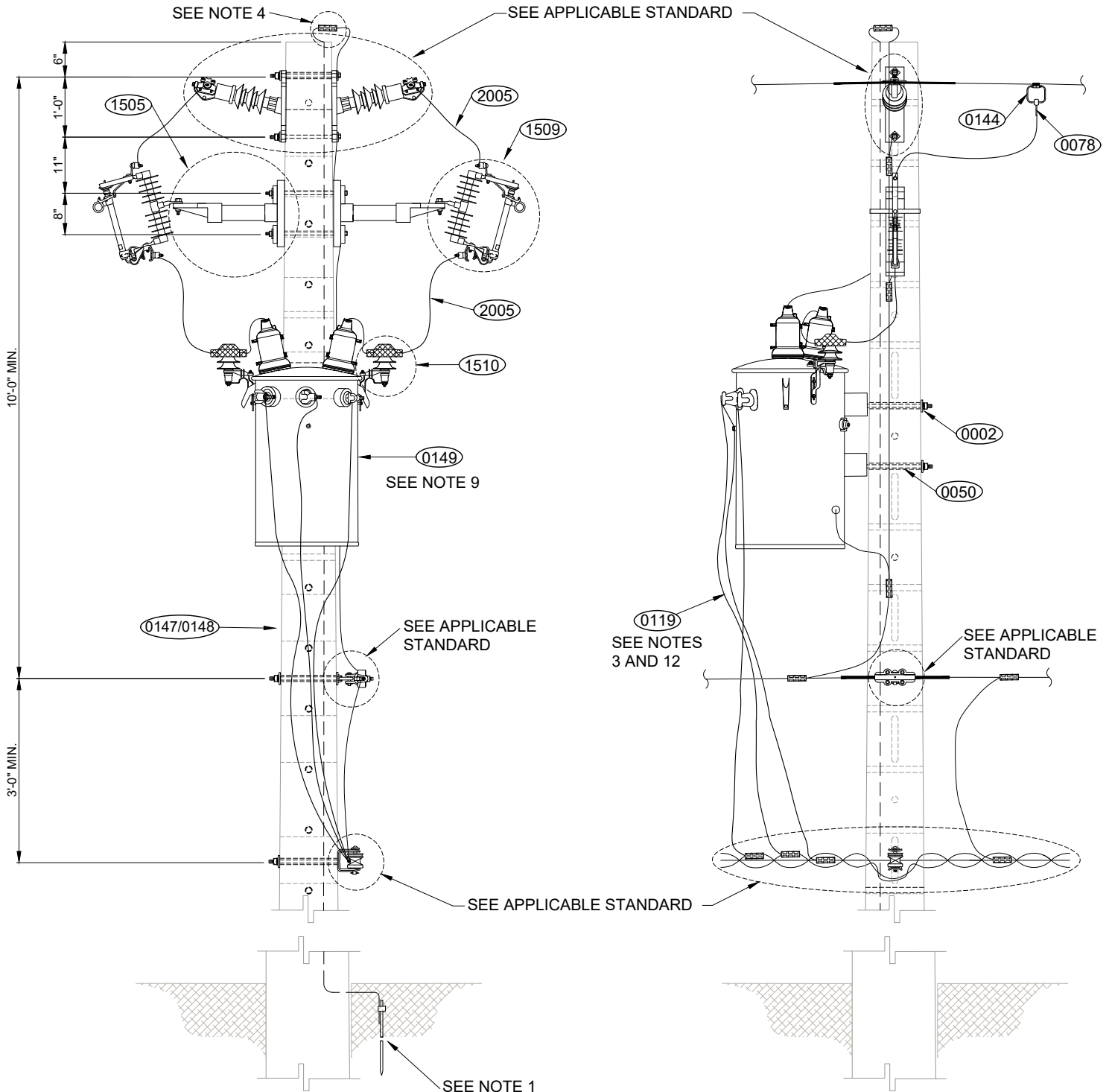
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## SINGLE TRANSFORMER PHASE TO PHASE MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. T-2 VERSION 8  
DOCUMENT NO. 4301.051  
PAGE 1 OF 2 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000



**ELEVATION VIEW**  
VIEW B ASSY-1500

**PROFILE VIEW**  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:	<b>SINGLE TRANSFORMER          PHASE TO PHASE          MAXIMUM VOLTAGE: 13.2 KV          NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>  T-2  </u> VERSION <u>  8  </u>
		DOCUMENT NO. <u>  4301.051  </u>
		PAGE <u>  2  </u> OF <u>  2  </u> DATE <u>  FEB 26, 2024  </u>
		SUBMITTED <u>  LUIS R. SOTO LIC. 11658  </u>
		REVIEWED <u>  IVETTE D. SANCHEZ LIC. 13837  </u>
		APPROVED <u>  RICARDO CASTRO LIC. 12135  </u>
		DIGITIZED <u>  EMILIO CUADRADO LIC. 3000  </u>

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	2
0119	TRIPLEX CABLE	VARIES	AS REQ.
0144	STIRRUP	VARIES	2
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	VARIES	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE B	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	2
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE A	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE B, 1-FIGURE D, 1-FIGURE F	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. SERVICE TRIPLEX CABLE (ITEM 0119) SHALL BE PROPERLY RATED AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS AND THE TRANSFORMER RATING (KVA). THE SERVICE DROP SHALL BE A MINIMUM OF #2 AWG ALUMINUM TRIPLEX CABLE 600 V OR ITS COPPER EQUIVALENT.
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 OR ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. THE MAXIMUM SIZE OF THE TRANSFORMER ALLOWED IS 100 KVA, UNLESS IT IS BEING TRANSFERRED TO LUMA, WHERE THE LIMIT IS REDUCED TO 75 KVA.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. REFER TO STANDARD NO. M-10 FOR TRANSFORMER CONNECTION DETAILS.
12. FOR THE SECONDARY BUSHING OF TRANSFORMERS, STRANDED COPPER CABLE TYPE XHHW-2 (ITEM 2005) WITH VOLTAGE RATING OF 600 V CAN BE USED INSTEAD OF TRIPLEX CABLE (ITEM 0119). THIS TYPE OF CABLE SHALL BE USED FOR 75 KVA AND 100 KVA TRANSFORMERS.
13. IF A TRANSFORMER WILL BE INSTALLED ON AN EXISTING POLE (ITEM 0147 OR 0148), THIS ITEM SHOULD NOT BE INCLUDED IN THE BILL OF MATERIAL.
14. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



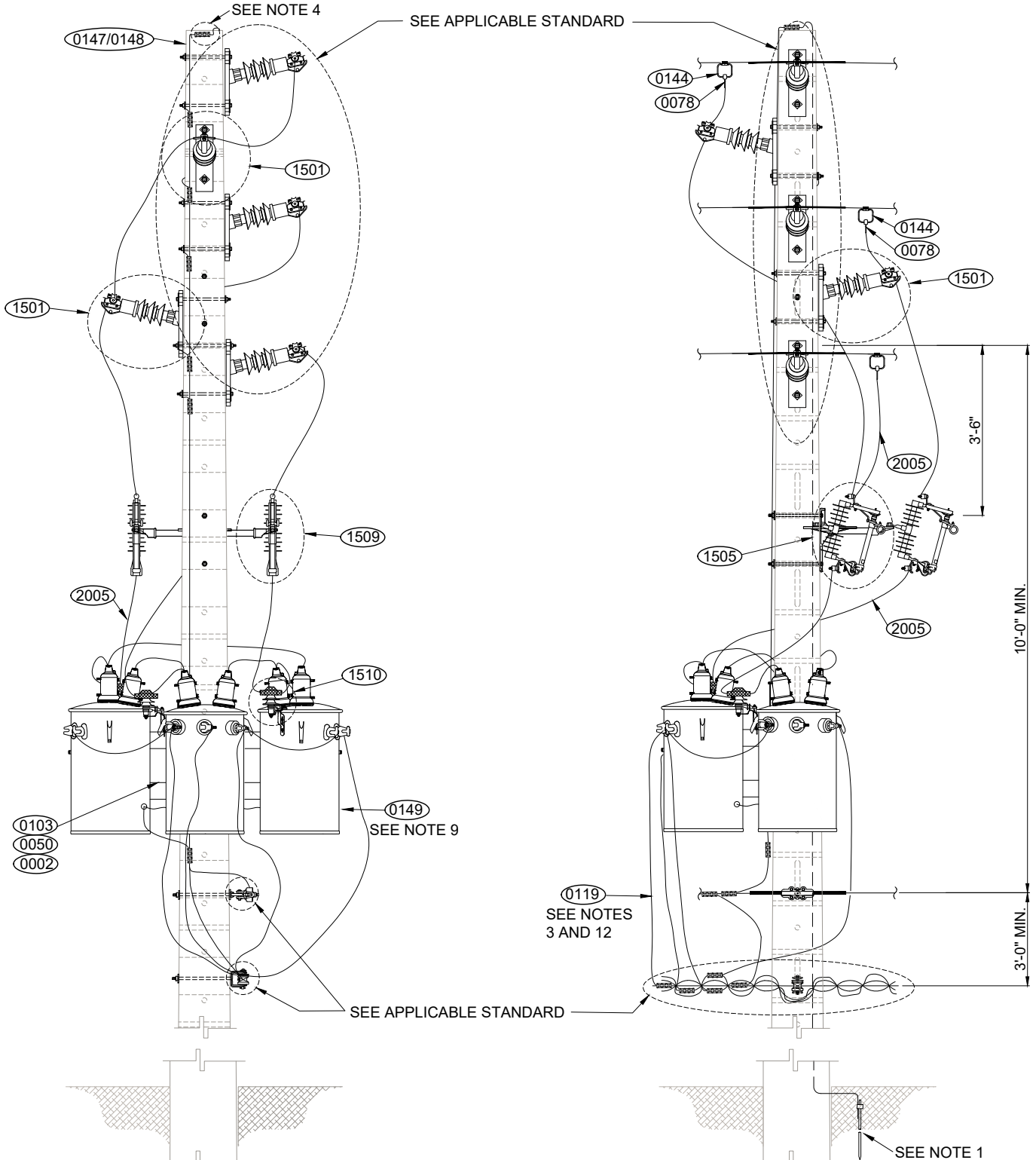
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## THREE PHASE TRANSFORMER BANK MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	T-3	VERSION	8
DOCUMENT NO.	4301.052		
PAGE	1 OF 2	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW**  
VIEW B ASSY-1500

**PROFILE VIEW**  
VIEW A ASSY-1500



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>THREE PHASE TRANSFORMER BANK</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>T-3</u> VERSION <u>8</u> DOCUMENT NO. <u>4301.052</u> PAGE <u>2 OF 2</u> DATE <u>FEB 26, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
--	--

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	3
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	VARIES	3
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	AS REQ.
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE A	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE A, 3-FIGURE B, 1-FIGURE D, 1-FIGURE F	8
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. SERVICE TRIPLEX CABLE (ITEM 0119) SHALL BE PROPERLY RATED AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS AND THE TRANSFORMER RATING (KVA). THE SERVICE DROP SHALL BE A MINIMUM OF #2 AWG ALUMINUM TRIPLEX CABLE 600 V OR ITS COPPER EQUIVALENT.
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO ASSEMBLY NO. ASSY-1506 OR ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
6. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
7. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. THE MAXIMUM SIZE OF THE TRANSFORMER ALLOWED IS 100 KVA, UNLESS IT IS BEING TRANSFERRED TO LUMA, WHERE THE LIMIT IS REDUCED TO 75 KVA.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. REFER TO STANDARD NO. M-12-2 FOR TRANSFORMER CONNECTION DETAILS.
12. FOR THE SECONDARY BUSHING OF TRANSFORMERS, STRANDED COPPER CABLE TYPE XHHW-2 (ITEM 2005) WITH VOLTAGE RATING OF 600 V CAN BE USED INSTEAD OF TRIPLEX CABLE (ITEM 0119). THIS TYPE OF CABLE SHALL BE USED FOR 75 KVA AND 100 KVA TRANSFORMERS.
13. IF A TRANSFORMER WILL BE INSTALLED ON AN EXISTING POLE (ITEM 0147 OR 0148), THIS ITEM SHOULD NOT BE INCLUDED IN THE BILL OF MATERIAL.
14. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



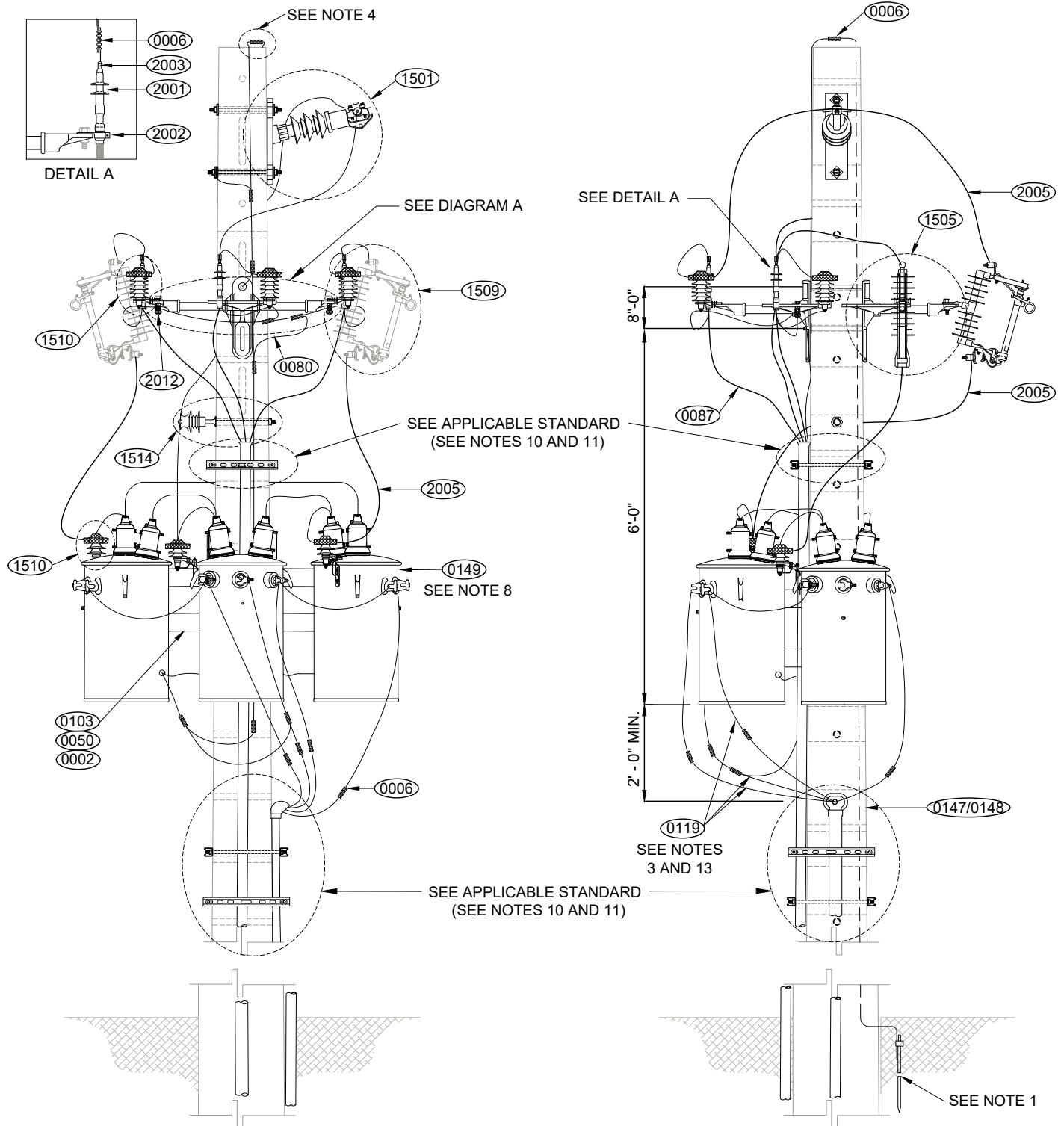
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE UNDERGROUND FED TRANSFORMER BANK  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	T-3-1	VERSION	7
DOCUMENT NO.	4301.053		
PAGE	1 OF 3	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



ELEVATION VIEW  
VIEW A ASSY-1500

PROFILE VIEW  
VIEW B ASSY-1500





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE UNDERGROUND FED TRANSFORMER BANK  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES

STANDARD NO. T-3-1 VERSION 7

DOCUMENT NO. 4301.053

PAGE 2 OF 3 DATE FEB 26, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

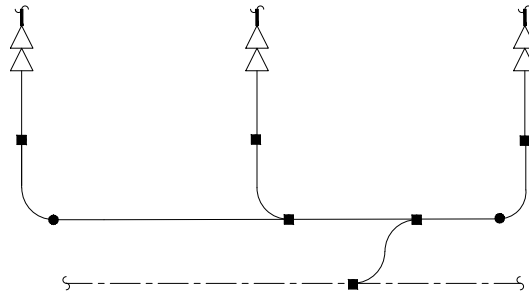


DIAGRAM A  
BONDING CONNECTION - ONE LINE DIAGRAM

LEGEND:



CABLE TERMINATION



BRONZE MALE SERVICE POST  
CONNECTOR (ITEM 2012)



CONNECTOR  
(ITEM 0006)



ELECTRICAL  
COMPONENT  
GROUND TERMINAL



POLE GROUND  
CONDUCTOR

NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- SERVICE TRIPLEX CABLE (ITEM 0119) SHALL BE PROPERLY RATED AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS AND THE TRANSFORMER RATING (KVA). THE SERVICE DROP SHALL BE A MINIMUM OF #2 AWG ALUMINUM TRIPLEX CABLE 600 V OR ITS COPPER EQUIVALENT.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- THE MAXIMUM SIZE OF THE TRANSFORMER ALLOWED IS 100 KVA, UNLESS IT IS BEING TRANSFERRED TO LUMA, WHERE THE LIMIT IS REDUCED TO 75 KVA.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- REFER TO STANDARD NO. URD-4 OR URD-4-A OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS OF THE PRIMARY AND SECONDARY RISERS SHOWN IN THIS STANDARD.
- REFER TO ASSEMBLY NO ASSY-2501 OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS NECESSARY TO ATTACH THE PRIMARY AND SECONDARY RISERS SHOWN IN THIS STANDARD TO THE POLE.
- REFER TO STANDARD NO. M-12-2 FOR TRANSFORMER CONNECTION DETAILS.
- FOR THE SECONDARY BUSHING OF TRANSFORMERS, STRANDED COPPER CABLE TYPE XHHW-2 (ITEM 2005) WITH VOLTAGE RATING OF 600 V CAN BE USED INSTEAD OF TRIPLEX CABLE (ITEM 0119). THIS TYPE OF CABLE SHALL BE USED FOR 75 KVA AND 100 KVA TRANSFORMERS.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**THREE PHASE UNDERGROUND FED TRANSFORMER BANK  
 MAXIMUM VOLTAGE: 13.2 KV  
 BILL OF MATERIAL**

STANDARD NO. T-3-1 VERSION 7

DOCUMENT NO. 4301.053

PAGE 3 OF 3 DATE FEB 26, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	VARIES	3
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	2
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 3-FIGURE A, 3-FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 3-FIGURE B, 1-FIGURE D, 1-FIGURE F	6
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
2001	OUTDOOR CABLE TERMINATION STRESS CONE	VARIES	3
2002	CABLE AND STRESS CONE SUPPORT BRACKET	VARIES	3
2003	PIN TERMINAL CONNECTOR	VARIES	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2012	BRONZE MALE SERVICE POST CONNECTOR	VARIES	2
URD-4	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER	URD-4	AS REQ.
URD-4A	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION	URD-4A	AS REQ.





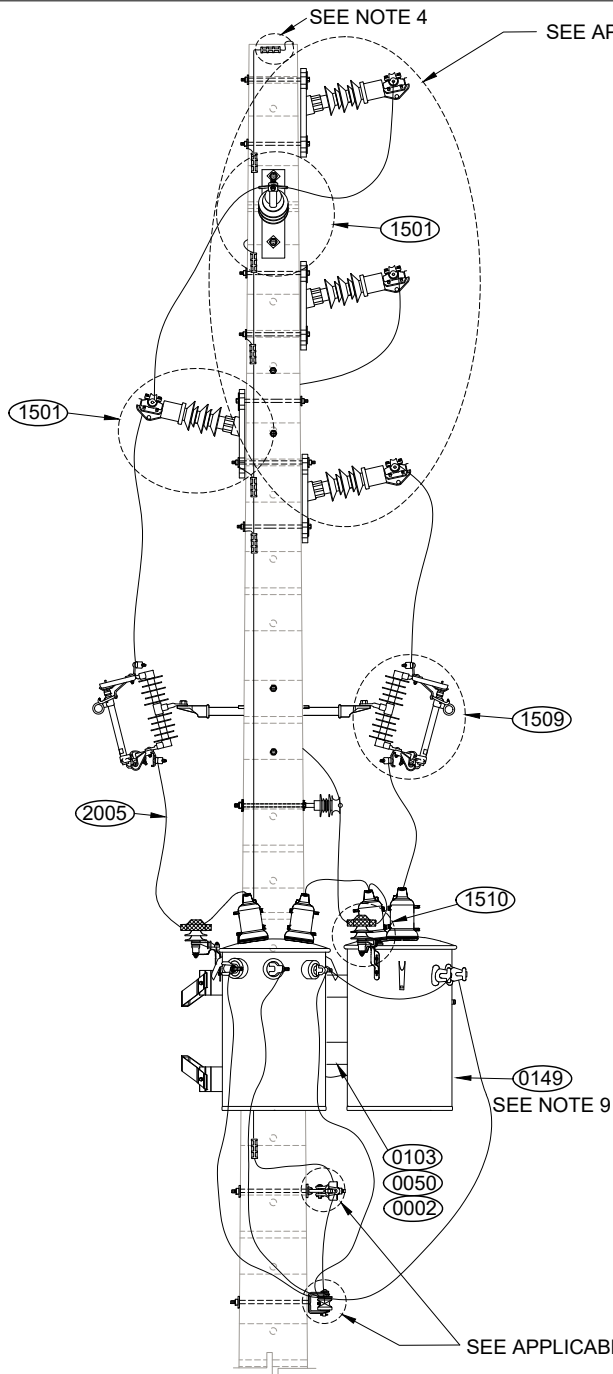
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

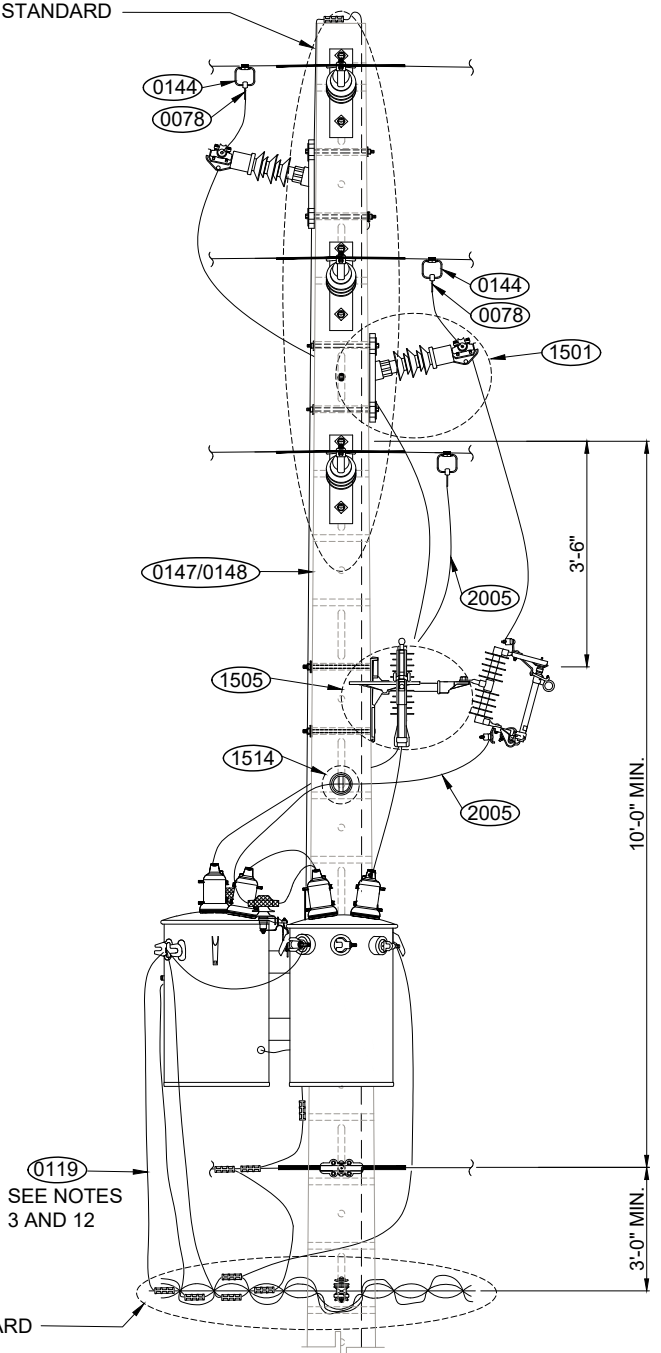
TITLE:

**THREE PHASE TRANSFORMER BANK  
DELTA - OPEN DELTA  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	T-3-3	VERSION	1
DOCUMENT NO.	4301.155		
PAGE	1 OF 2	DATE	MAR 19, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



**ELEVATION VIEW  
VIEW B ASSY-1500**



**PROFILE VIEW  
VIEW A ASSY-1500**



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>THREE PHASE TRANSFORMER BANK</b> <b>DELTA - OPEN DELTA</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>T-3-3</u> VERSION <u>1</u>
	DOCUMENT NO. <u>4301.155</u>
	PAGE <u>2 OF 2</u> DATE <u>MAR 19, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	3
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0119	TRIPLEX CABLE	VARIES	AS REQ.
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	VARIES	2
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	AS REQ.
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE A	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE A, 2-FIGURE B, 1-FIGURE D, 1-FIGURE F	7
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.

- NOTES:**
- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
  - ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
  - SERVICE TRIPLEX CABLE (ITEM 0119) SHALL BE PROPERLY RATED AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS AND THE TRANSFORMER RATING (KVA). THE SERVICE DROP SHALL BE A MINIMUM OF #2 AWG ALUMINUM TRIPLEX CABLE 600 V OR ITS COPPER EQUIVALENT.
  - REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
  - REFER TO ASSEMBLY NO. ASSY-1506 OR ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
  - REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
  - REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
  - MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
  - THE MAXIMUM SIZE OF THE TRANSFORMER ALLOWED IS 100 KVA, UNLESS IT IS BEING TRANSFERRED TO LUMA, WHERE THE LIMIT IS REDUCED TO 75 KVA.
  - REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
  - REFER TO STANDARD NO. M-12-6 FOR TRANSFORMER CONNECTION DETAILS.
  - FOR THE SECONDARY BUSHING OF TRANSFORMERS, STRANDED COPPER CABLE TYPE XHHW-2 (ITEM 2005) WITH VOLTAGE RATING OF 600 V CAN BE USED INSTEAD OF TRIPLEX CABLE (ITEM 0119). THIS TYPE OF CABLE SHALL BE USED FOR 75 KVA AND 100 KVA TRANSFORMERS.
  - IF A TRANSFORMER WILL BE INSTALLED ON AN EXISTING POLE (ITEM 0147 OR 0148), THIS ITEM SHOULD NOT BE INCLUDED IN THE BILL OF MATERIAL.
  - STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>THREE PHASE TRANSFORMER BANK  WITH METERING INSTRUMENT TRANSFORMERS  MAXIMUM VOLTAGE: 13.2 KV  NOTES AND BILL OF MATERIAL</b>	STANDARD NO. <u>T-4</u> VERSION <u>11</u>
	DOCUMENT NO. <u>4301.054</u>
	PAGE <u>2 OF 3</u> DATE <u>FEB 26, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

- NOTES:**
- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
  - ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
  - SERVICE TRIPLEX CABLE (ITEM 0119) SHALL BE PROPERLY RATED AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS AND THE TRANSFORMER RATING (KVA). THE SERVICE DROP SHALL BE A MINIMUM OF #2 AWG ALUMINUM TRIPLEX CABLE 600 V OR ITS COPPER EQUIVALENT.
  - REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
  - REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
  - REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
  - REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
  - MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
  - THE MAXIMUM SIZE OF THE TRANSFORMER ALLOWED IS 100 KVA.
  - REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
  - REFER TO ASSEMBLY NO. ASSY-2501 OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS NECESSARY TO ATTACH THE PRIMARY AND SECONDARY RISERS SHOWN IN THIS STANDARD TO THE POLE.
  - THIS STANDARD IS ONLY FOR PRIVATE SUBSTATIONS.
  - FOR THE SECONDARY BUSHING OF TRANSFORMERS, STRANDED COPPER CABLE TYPE XHHW-2 (ITEM 2005) WITH VOLTAGE RATING OF 600 V CAN BE USED INSTEAD OF TRIPLEX CABLE (ITEM 0119). THIS TYPE OF CABLE SHALL BE USED FOR 75 KVA AND 100 KVA TRANSFORMERS.
  - REFER TO STANDARD NO. URD-4 OR URD-4-A OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS OF THE PRIMARY AND SECONDARY RISERS SHOWN IN THIS STANDARD.
  - REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
  - STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
	FLAT ROUND WASHER	VARIES	32
	SPLIT LOCK WASHER	VARIES	16
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	4
0078	HOT LINE CLAMP	VARIES	3
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0104	CURRENT TRANSFORMER	VARIES	2
0105	VOLTAGE TRANSFORMER	VARIES	2



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:  <b>THREE PHASE TRANSFORMER BANK WITH METERING INSTRUMENT TRANSFORMERS MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL</b>	STANDARD NO. <u>T-4</u> VERSION <u>11</u>
	DOCUMENT NO. <u>4301.054</u>
	PAGE <u>3 OF 3</u> DATE <u>FEB 26, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
APPROVED <u>RICARDO CASTRO LIC. 12135</u>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>	

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0119	TRIPLEX CABLE	VARIES	AS REQ.
0144	STIRRUP	VARIES	3
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	8
0146	INSTRUMENT TRANSFORMER SUPPORT	VARIES	1
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	VARIES	3
0174	GROUND / BOND WIRE CLAMP	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	2
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1509	FUSE CUTOFF ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 3-FIGURE A, 3-FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 2-FIGURE A, 3-FIGURE B 1-FIGURE D, 1-FIGURE F	7
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	16
2048	HEX HEAD BOLT	038-83218	16



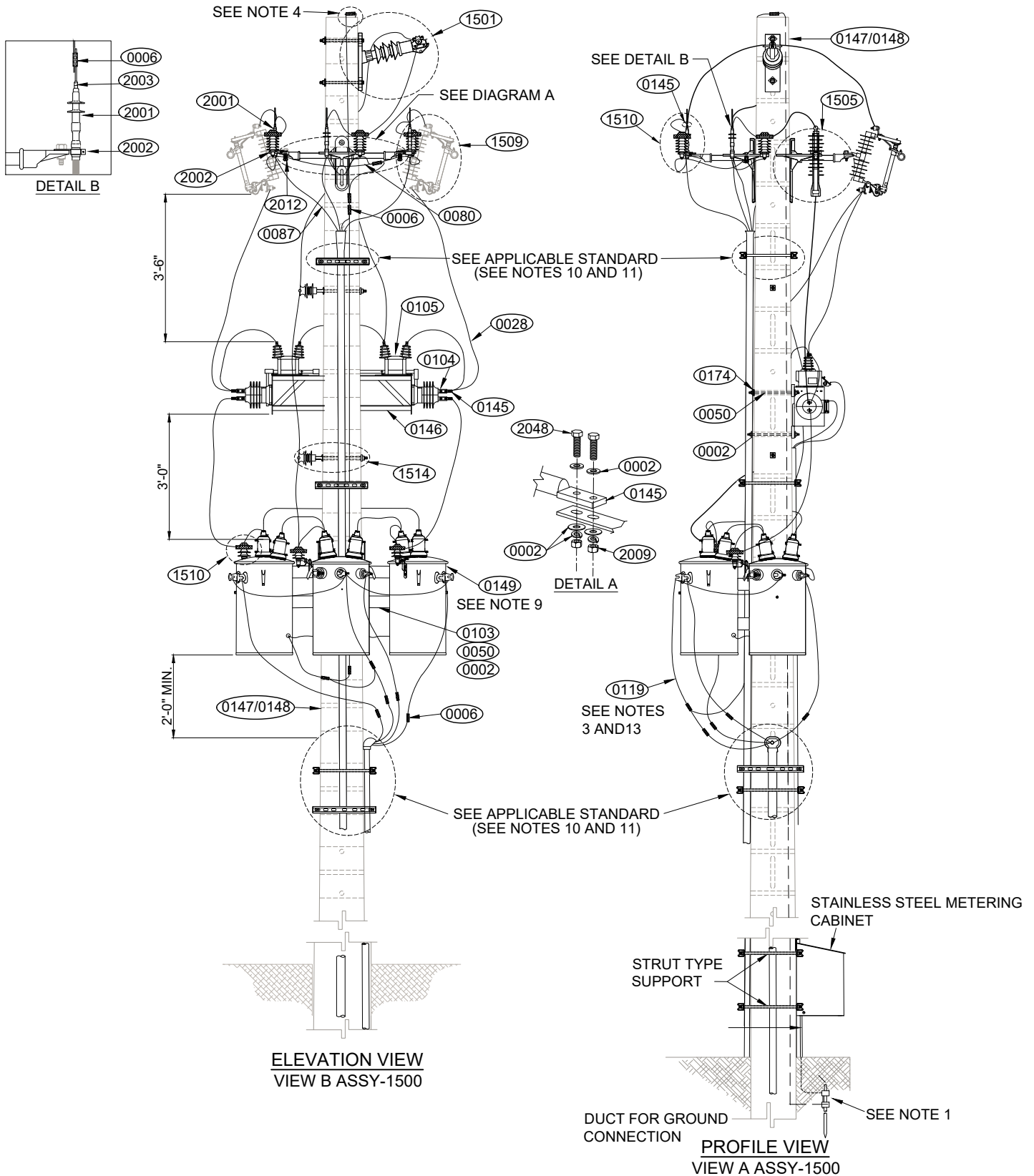
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

THREE PHASE UNDERGROUND FED TRANSFORMER BANK  
WITH METERING INSTRUMENT TRANSFORMERS  
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	T-5	VERSION	11
DOCUMENT NO.	4301.055		
PAGE	1 OF 4	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		





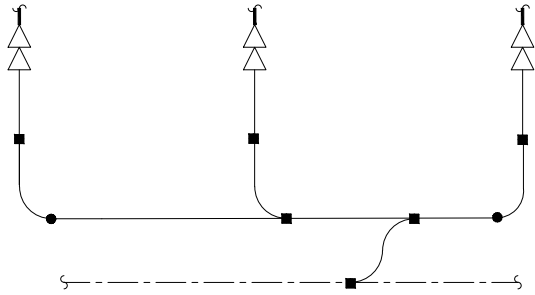


# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS






**TITLE:**  
**THREE PHASE UNDERGROUND FED TRANSFORMER BANK  
 WITH METERING INSTRUMENT TRANSFORMERS**  
**MAXIMUM VOLTAGE: 13.2 KV**  
**NOTES**

STANDARD NO.       T-5       VERSION   11    
 DOCUMENT NO.   4301.055    
 PAGE   2   OF   4   DATE   FEB 26, 2024    
 SUBMITTED   LUIS R. SOTO LIC. 11658    
 REVIEWED   IVETTE D. SANCHEZ LIC. 13837    
 APPROVED   RICARDO CASTRO LIC. 12135    
 DIGITIZED   EMILIO CUADRADO LIC. 3000  



**DIAGRAM A**  
**BONDING CONNECTION - ONE LINE DIAGRAM**

**LEGEND:**

-  CABLE TERMINATION
-  CONNECTOR (ITEM 0006)
-  POLE GROUND CONDUCTOR
-  BRONZE MALE SERVICE POST CONNECTOR (ITEM 2012)
-  ELECTRICAL COMPONENT GROUND TERMINAL

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. SERVICE TRIPLEX CABLE (ITEM 0119) SHALL BE PROPERLY RATED AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS AND THE TRANSFORMER RATING (KVA). THE SERVICE DROP SHALL BE A MINIMUM OF #2 AWG ALUMINUM TRIPLEX CABLE 600 V OR ITS COPPER EQUIVALENT.
4. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
5. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
6. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
7. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
8. THE MAXIMUM SIZE OF THE TRANSFORMER ALLOWED IS 100 KVA.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. REFER TO STANDARD NO. URD-4 OR URD-4-A OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS OF THE PRIMARY AND SECONDARY RISERS SHOWN IN THIS STANDARD.
11. REFER TO ASSEMBLY NO ASSY-2501 OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS NECESSARY TO ATTACH THE PRIMARY AND SECONDARY RISERS SHOWN IN THIS STANDARD TO THE POLE.
12. THIS STANDARD IS ONLY FOR PRIVATE SUBSTATIONS.
13. FOR THE SECONDARY BUSHING OF TRANSFORMERS, STRANDED COPPER CABLE TYPE XHHW-2 (ITEM 2005) WITH VOLTAGE RATING OF 600 V CAN BE USED INSTEAD OF TRIPLEX CABLE (ITEM 0119). THIS TYPE OF CABLE SHALL BE USED FOR 75 KVA AND 100 KVA TRANSFORMERS.
14. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**  
**THREE PHASE UNDERGROUND FED TRANSFORMER BANK  
 WITH METERING INSTRUMENT TRANSFORMERS  
 MAXIMUM VOLTAGE: 13.2 KV  
 BILL OF MATERIAL**

STANDARD NO. T-5 VERSION 11  
 DOCUMENT NO. 4301.055  
 PAGE 3 OF 4 DATE FEB 26, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
	FLAT ROUND WASHER	VARIES	32
	SPLIT LOCK WASHER	VARIES	16
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	4
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
0103	TRANSFORMER CLUSTER MOUNT	002-13413	1
0104	CURRENT TRANSFORMER	VARIES	2
0105	VOLTAGE TRANSFORMER	VARIES	2
0119	TRIPLEX CABLE	VARIES	AS REQ.
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	8
0146	INSTRUMENT TRANSFORMER SUPPORT	VARIES	1
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0149	POLE MOUNTED DISTRIBUTION TRANSFORMER	VARIES	3
0174	GROUND / BOND WIRE CLAMP	VARIES	1
1501	SIDE POST INSULATOR ASSEMBLY	ASSY-1501 FIGURE A	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	2
1509	FUSE CUTOFF ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 3-FIGURE A, 3-FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE A, 3-FIGURE B, 1-FIGURE D, 1-FIGURE F	6





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**  
**THREE PHASE UNDERGROUND FED TRANSFORMER BANK  
 WITH METERING INSTRUMENT TRANSFORMERS  
 MAXIMUM VOLTAGE: 13.2 KV  
 BILL OF MATERIAL**

STANDARD NO.     T-5     VERSION   11    
 DOCUMENT NO.   4301.055    
 PAGE   4   OF   4   DATE   FEB 26, 2024    
 SUBMITTED   LUIS R. SOTO LIC. 11658    
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 APPROVED   RICARDO CASTRO LIC. 12135    
 DIGITIZED   EMILIO CUADRADO LIC. 3000  

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	2
2001	OUTDOOR CABLE TERMINATION STRESS CONE	VARIES	3
2002	CABLE AND STRESS CONE SUPPORT BRACKET	VARIES	3
2003	PIN TERMINAL CONNECTOR	VARIES	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	16
2012	BRONZE MALE SERVICE POST CONNECTOR	VARIES	2
2048	HEX HEAD BOLT	038-83218	16
URD-4	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER	URD-4	AS REQ.
URD-4A	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION	URD-4A	AS REQ.



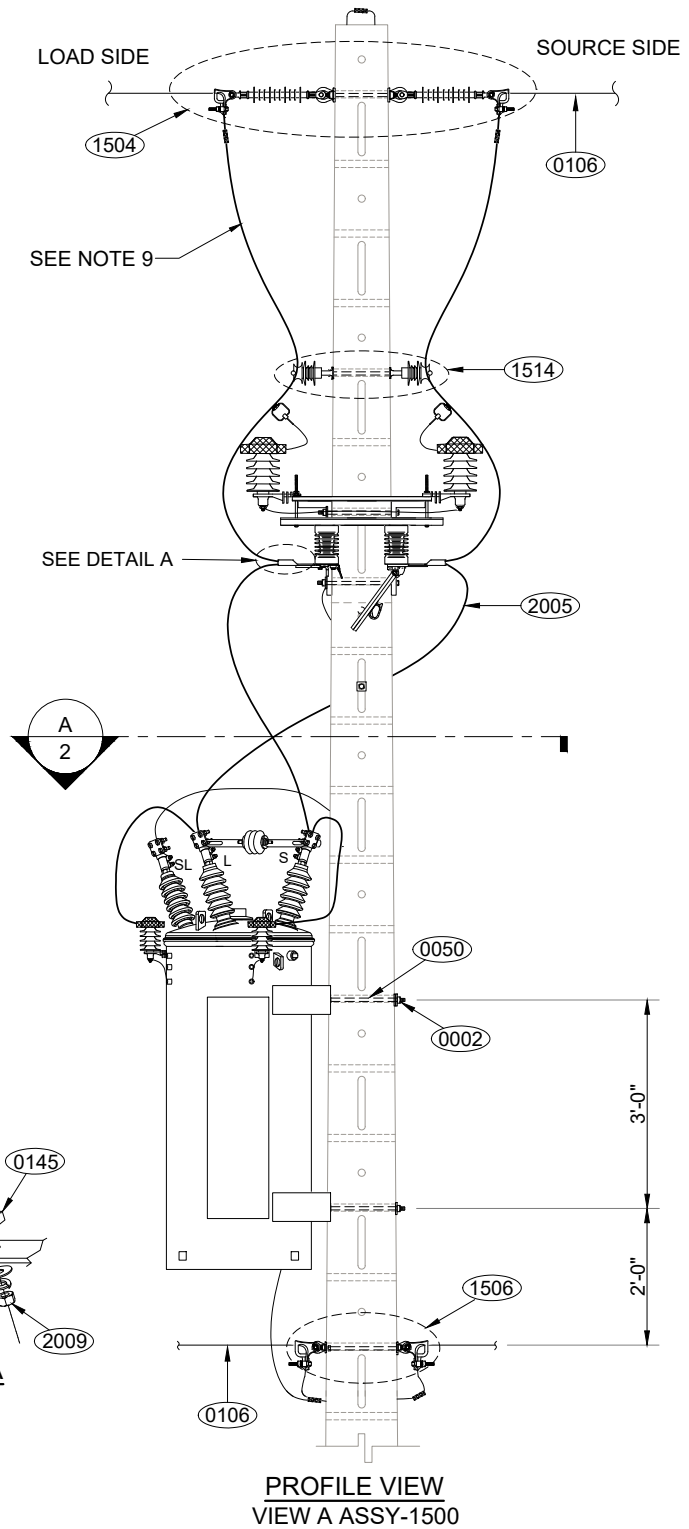
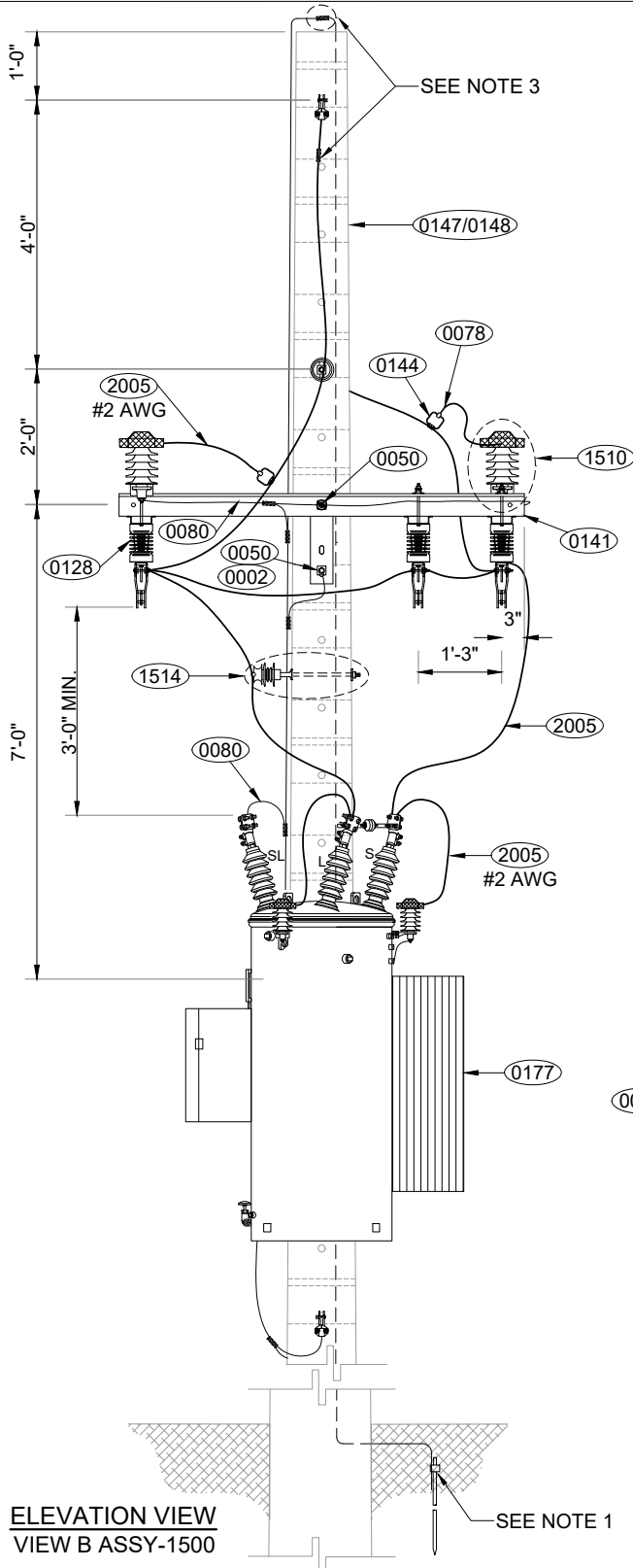
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## SINGLE PHASE VOLTAGE REGULATOR INSTALLATION AT POLE MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	T-8	VERSION	6
DOCUMENT NO.	4301.056		
PAGE	1 OF 3	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	VICTOR R. FEBRES LIC. 3412		





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**SINGLE PHASE VOLTAGE REGULATOR  
INSTALLATION AT POLE  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL**

STANDARD NO. T-8 VERSION 6

DOCUMENT NO. 4301.056

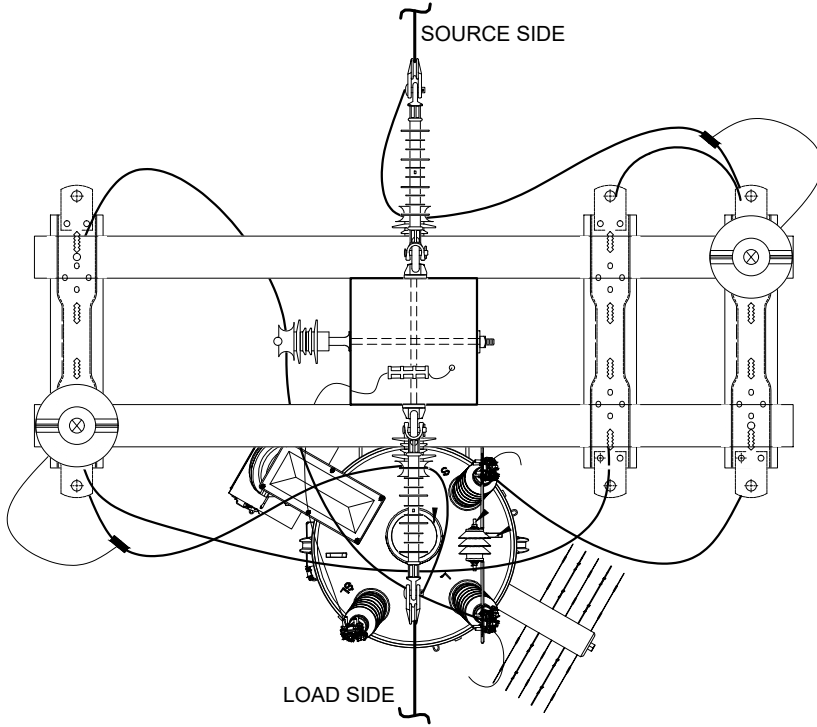
PAGE 2 OF 3 DATE FEB 26, 2024

SUBMITTED LUIS R. SOTO LIC. 11658

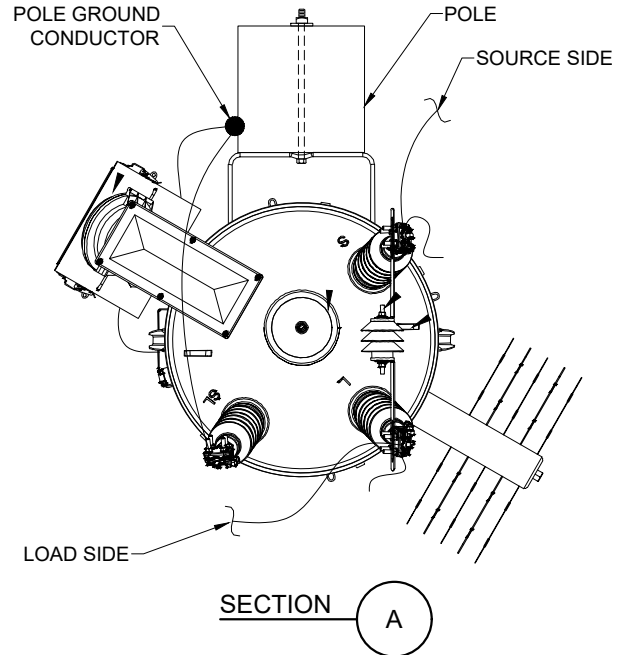
REVIEWED IVETTE D. SANCHEZ LIC. 13837

APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED VICTOR R. FEBRES LIC. 3412



TOP VIEW



SECTION A

NOTES:

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
6. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
7. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
8. DESIGNER MUST PERFORM A POLE LOAD ANALYSIS (PLA) TO DETERMINE THE POLE CLASS TO BE USED, AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
9. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED, TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM NUMBER OF THE CONDUCTOR TO BE USED ACCORDING TO THE REQUIREMENTS ESTABLISHED ABOVE.
10. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
11. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.

**MATERIALS**

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	4
	FLAT ROUND WASHER	VARIES	24
	SPLIT ROUND WASHER	VARIES	12



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>SINGLE PHASE VOLTAGE REGULATOR          INSTALLATION AT POLE          MAXIMUM VOLTAGE: 13.2 KV          BILL OF MATERIAL</b>	STANDARD NO. <u>T-8</u> VERSION <u>6</u>
	DOCUMENT NO. <u>4301.056</u>
	PAGE <u>3 OF 3</u> DATE <u>FEB 26, 2024</u>
	SUBMITTED <u>LUIS R. SOTO LIC. 11658</u>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u>
	APPROVED <u>RICARDO CASTRO LIC. 12135</u>
DIGITIZED <u>VICTOR R. FEBRES LIC. 3412</u>	

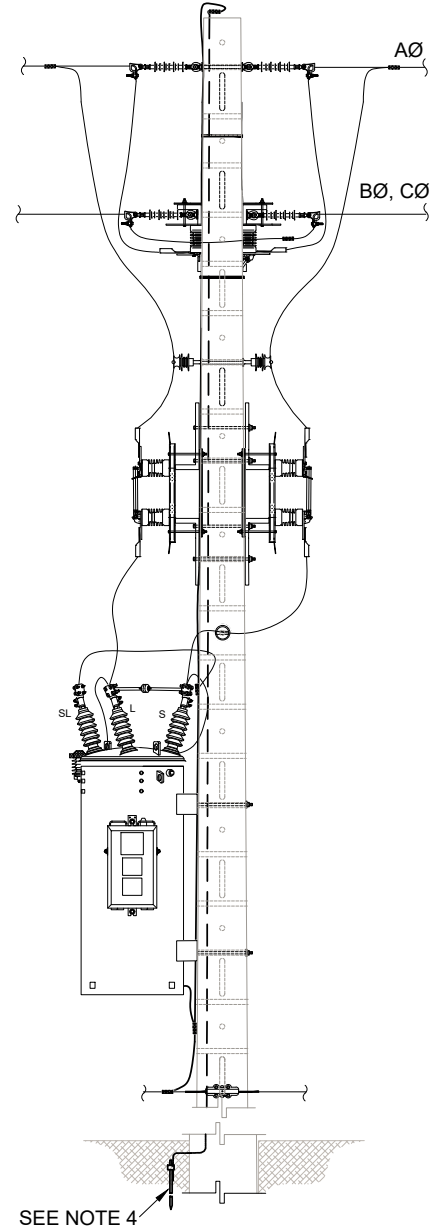
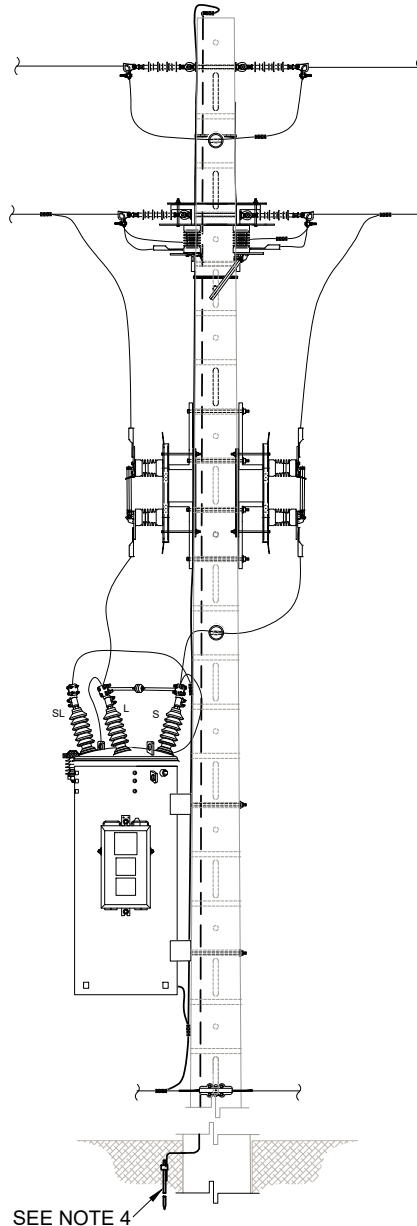
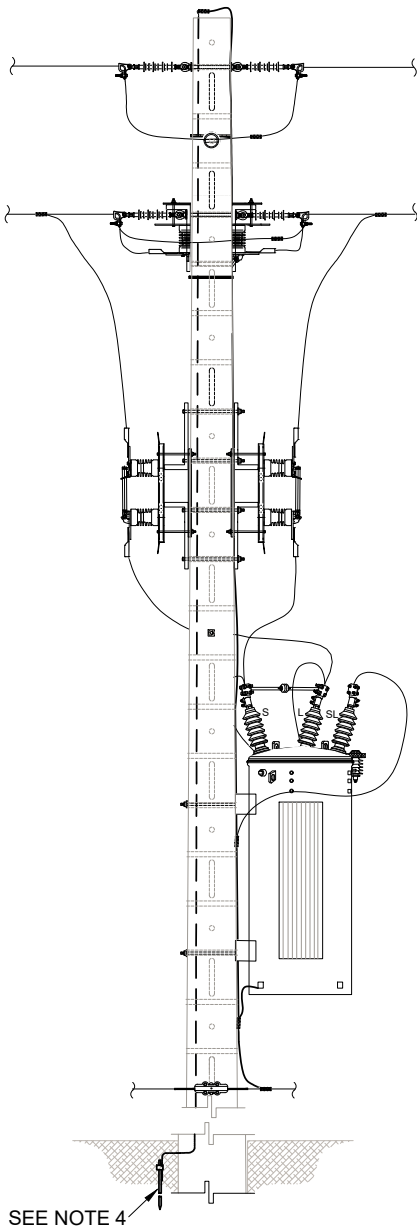
MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	4
0078	HOT LINE CLAMP	VARIES	2
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0128	AIR BREAK SWITCH	VARIES	3
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	2
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	6
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0177	VOLTAGE REGULATOR	VARIES	1
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	1
1506	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY	ASSY-1506 FIGURE B	1
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	2
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE B, 1-FIGURE C, 1-FIGURE D	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 1-FIGURE A, 1-FIGURE B	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	12
2048	HEX HEAD BOLT	038-83218	12

**THREE PHASE VOLTAGE REGULATOR  
INSTALLATION ON INDEPENDENT POLES  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. T-10-1 VERSION 8  
 DOCUMENT NO. 4301.059  
 PAGE 1 OF 6 DATE FEB 26, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000

LOAD SIDE

SOURCE SIDE



**REGULATOR 1**

**REGULATOR 2**

**REGULATOR 3**

**ELEVATION VIEW  
VIEW A ASSY-1500**

**ELEVATION VIEW  
VIEW A ASSY-1500**

**ELEVATION VIEW  
VIEW A ASSY-1500**

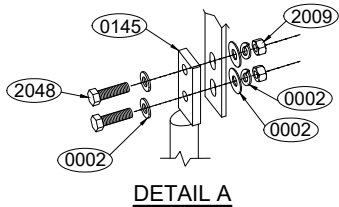
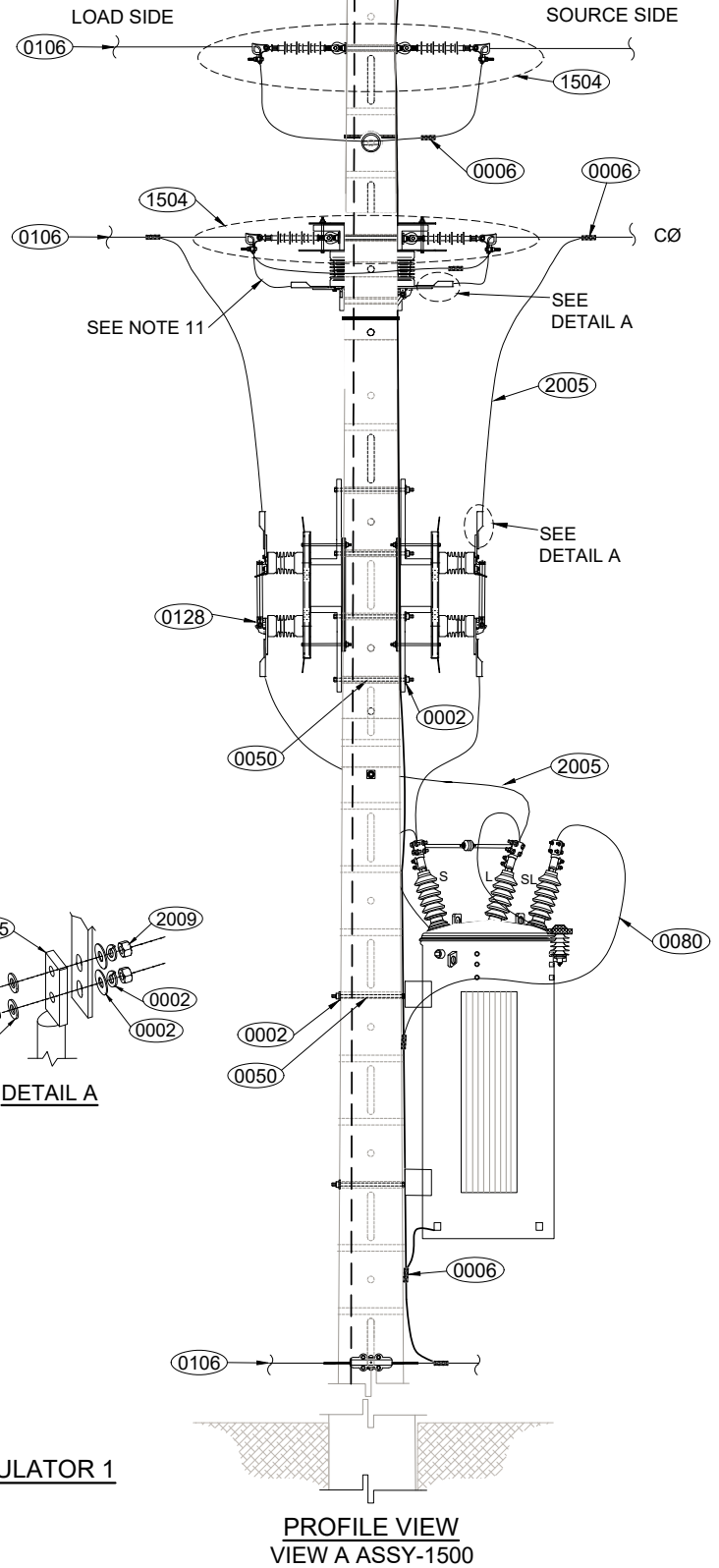
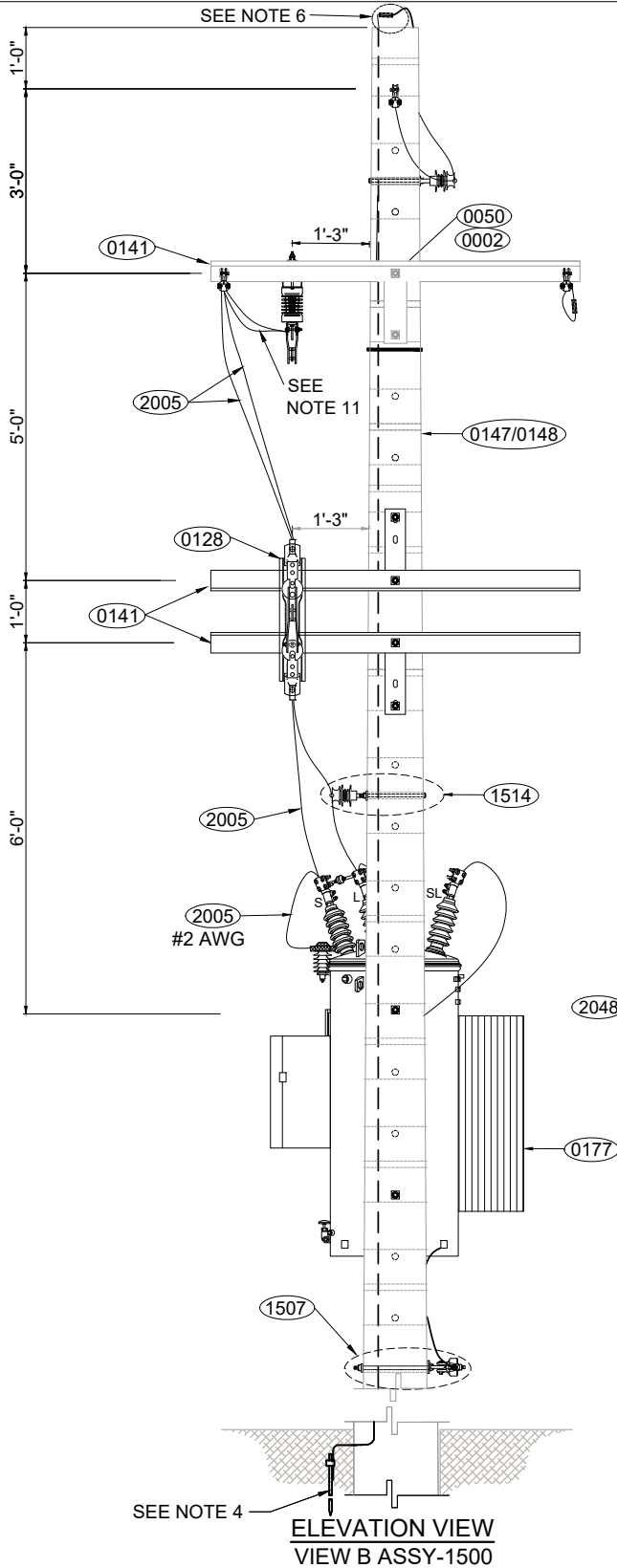


# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION OPERATIONAL STANDARDS

## THREE PHASE VOLTAGE REGULATOR INSTALLATION ON INDEPENDENT POLES MAXIMUM VOLTAGE: 13.2 KV

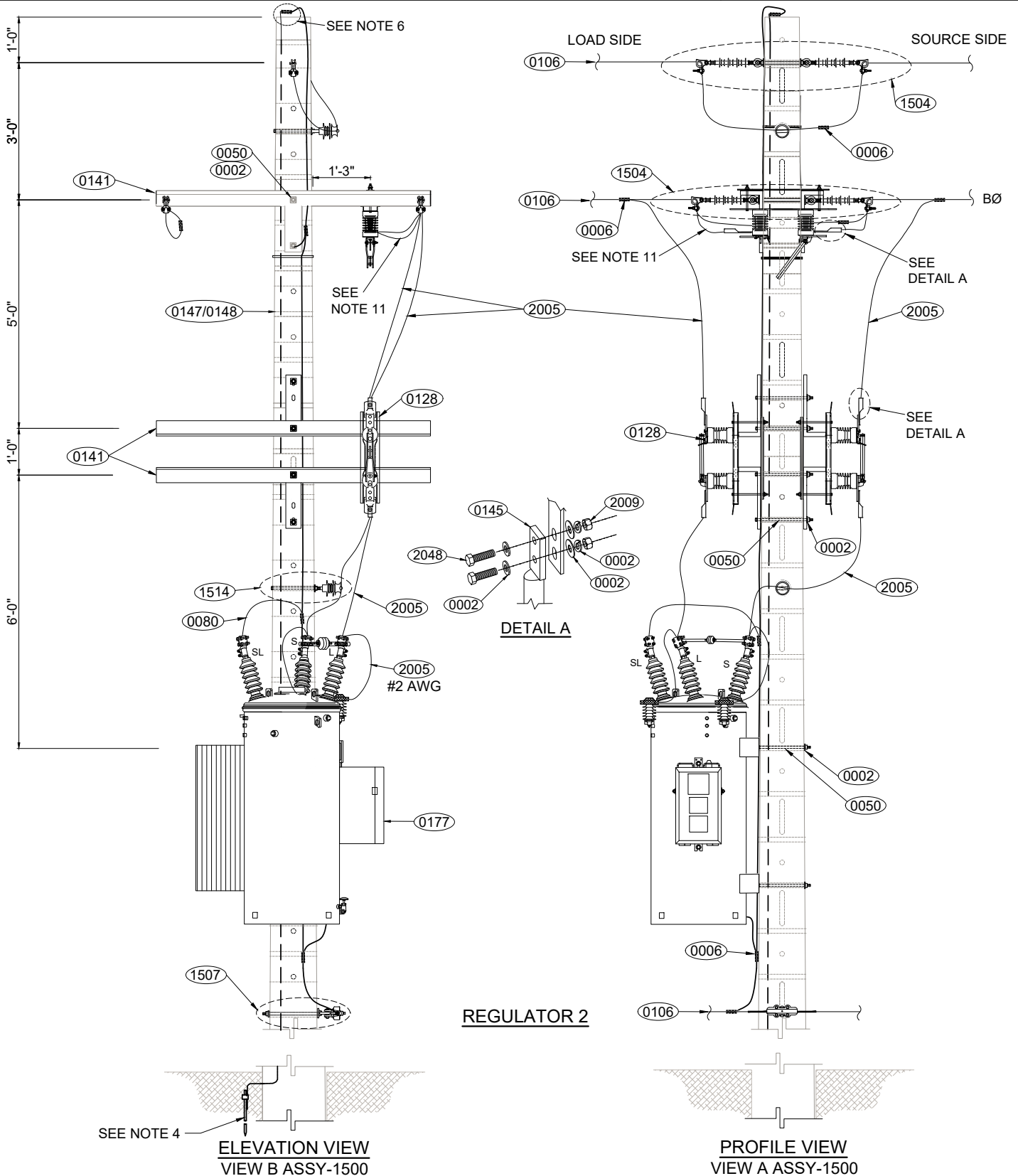
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 APPROVED RICARDO CASTRO LIC. 12135  
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**REGULATOR 1**

### THREE PHASE VOLTAGE REGULATOR INSTALLATION ON INDEPENDENT POLES MAXIMUM VOLTAGE: 13.2 KV

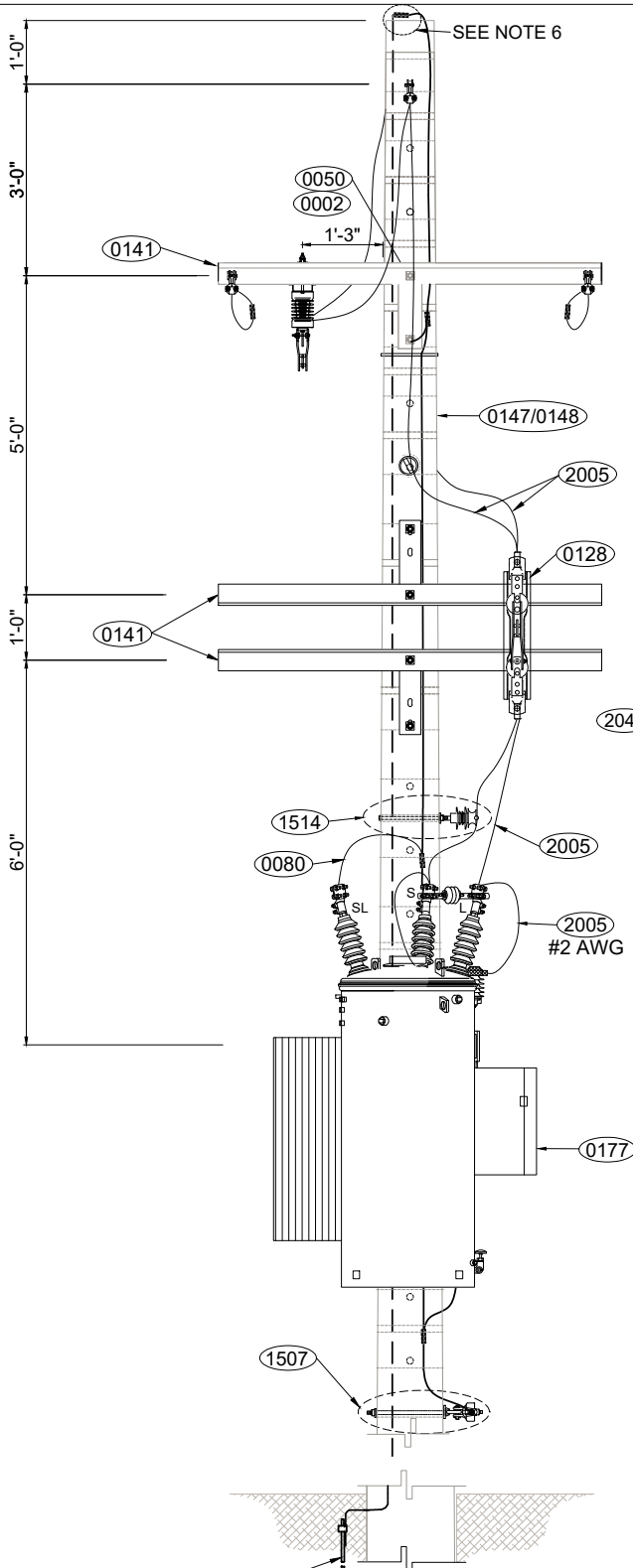
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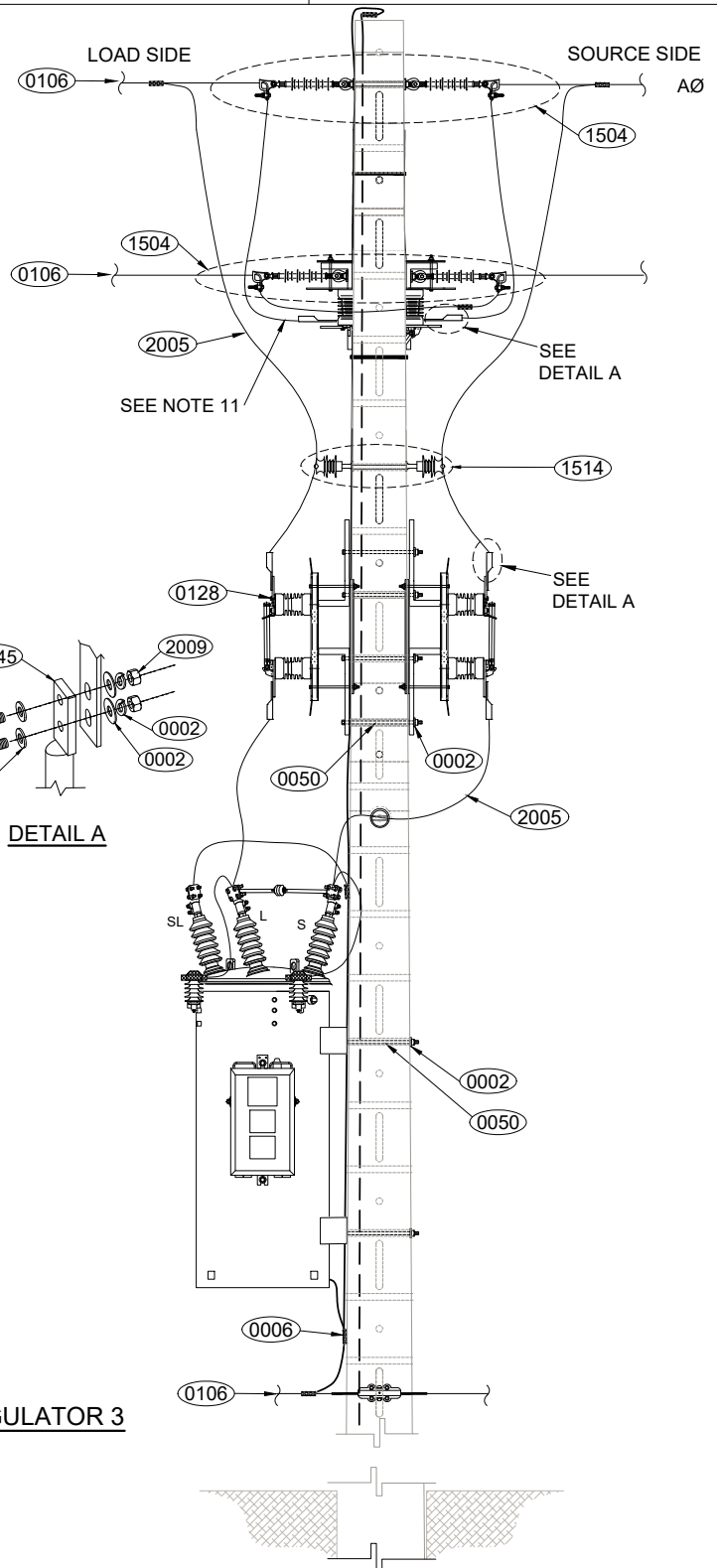


### THREE PHASE VOLTAGE REGULATOR INSTALLATION ON INDEPENDENT POLES MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. T-10-1 VERSION 8  
 DOCUMENT NO. 4301.059  
 PAGE 4 OF 6 DATE FEB 26, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
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**ELEVATION VIEW**  
VIEW B ASSY-1500



**PROFILE VIEW**  
VIEW A ASSY-1500

**REGULATOR 3**

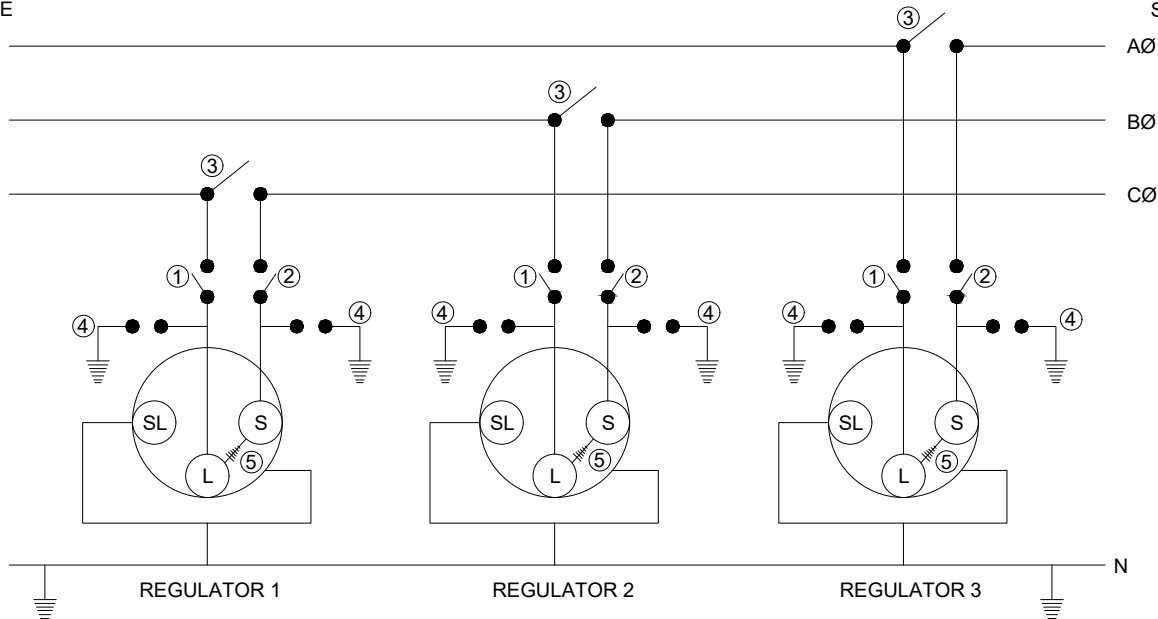


**THREE PHASE VOLTAGE REGULATOR  
INSTALLATION ON INDEPENDENT POLES  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES**

STANDARD NO.	T-10-1	VERSION	8
DOCUMENT NO.	4301.059		
PAGE	5 OF 6	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		

LOAD SIDE

SOURCE SIDE



ONE LINE DIAGRAM

**LEGEND:**

- ① LOAD SWITCH
- ② SOURCE SWITCH
- ③ BYPASS SWITCH
- ④ SURGE ARRESTER
- ⑤ SERIES ARRESTER

**NOTES:**

1. THIS STANDARD SHOWS A THREE PHASE VOLTAGE REGULATOR INSTALLED USING SINGLE PHASE VOLTAGE REGULATORS ON THREE SEPARATE POLES.
2. DESIGNER MUST PERFORM A POLE LOAD ANALYSIS (PLA) TO DETERMINE THE POLE CLASS TO BE USED, AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
3. SINGLE PHASE VOLTAGE REGULATORS USED IN MULTIPHASE APPLICATIONS AND INSTALLED ON SEPARATE POLES SHOULD BE LOCATED PREFERABLY ON CONSECUTIVE POLES. IF THIS IS NOT POSSIBLE, THEY MAY BE LOCATED NOT MORE THAN TWO SPANS APART. IN THIS CASE, BRANCHES OR CUSTOMERS WITH TWO OR THREE PHASE SERVICES CANNOT BE CONNECTED BETWEEN VOLTAGE REGULATORS.
4. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
5. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
6. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
7. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
8. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
9. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
10. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
11. THE CONDUCTOR USED AS A JUMPER SHALL HAVE THE SAME CAPACITY AS THE CONDUCTOR TO WHICH IT WILL BE CONNECTED, TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE ARE NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST TO DETERMINE THE WAREHOUSE ITEM NUMBER OF THE CONDUCTOR TO BE USED ACCORDING TO THESE REQUIREMENTS.
12. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION OPERATIONAL STANDARDS

**THREE PHASE VOLTAGE REGULATOR  
INSTALLATION ON INDEPENDENT POLES  
MAXIMUM VOLTAGE: 13.2 KV  
BILL OF MATERIAL**

STANDARD NO. T-10-1 VERSION 8  
DOCUMENT NO. 4301.059  
PAGE 6 OF 6 DATE FEB 26, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	24
	FLAT ROUND WASHER	VARIES	72
	SPLIT LOCK WASHER	VARIES	36
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	24
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0128	AIR BREAK SWITCH	VARIES	9
0141	CROSSARM	VARIES	18
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	18
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	3
0177	VOLTAGE REGULATOR	VARIES	3
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	9
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	3
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 3-FIGURE B, 9-FIGURE C 3-FIGURE D	15
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 5-FIGURE A, 1-FIGURE B	6
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	36
2048	HEX HEAD BOLT	038-83218	36



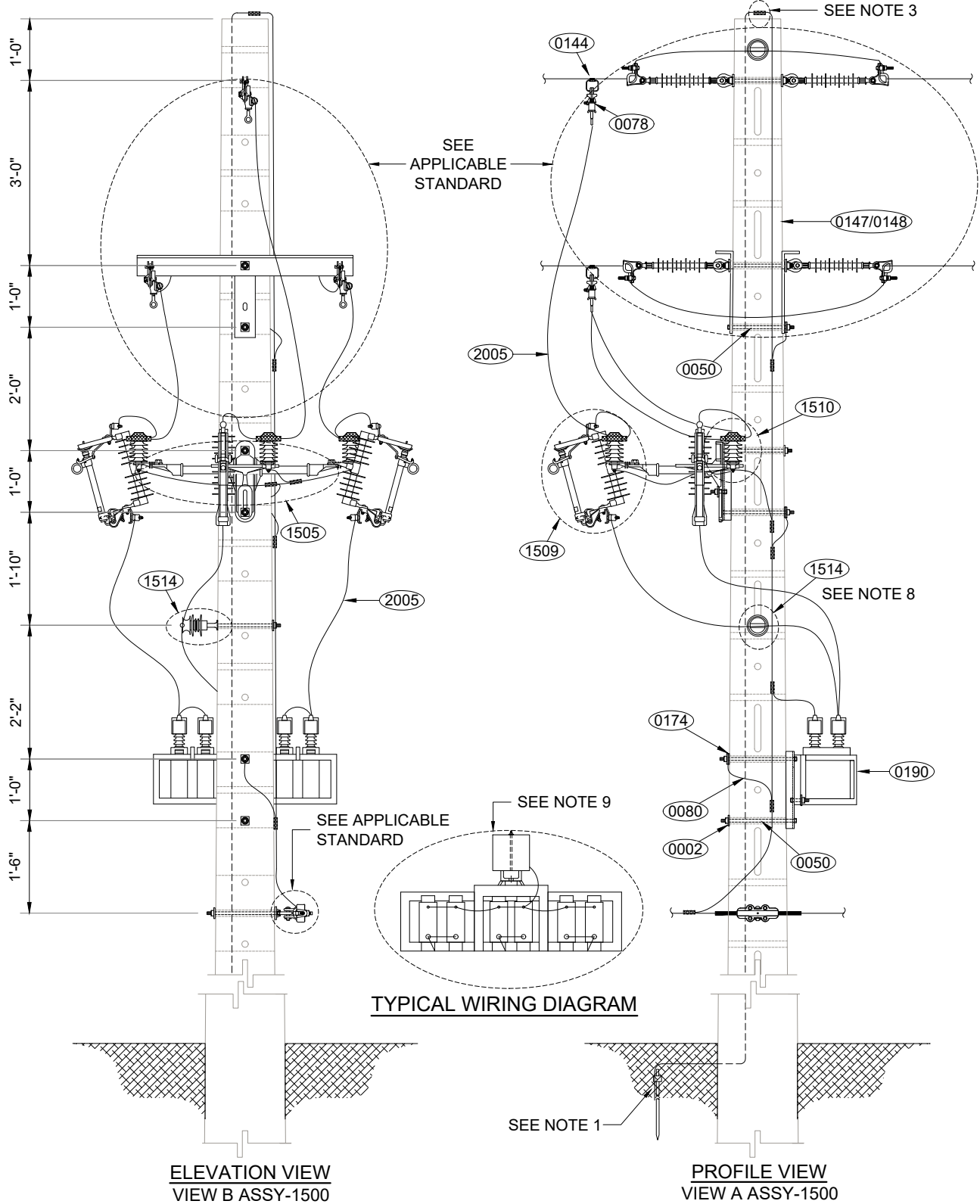
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## POLE MOUNTED FIXED CAPACITOR BANK MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. T-12 VERSION 7  
 DOCUMENT NO. 4301.060  
 PAGE 1 OF 2 DATE FEB 27, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED VICTOR R. FEBRES LIC. 3412





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**POLE MOUNTED FIXED CAPACITOR BANK  
MAXIMUM VOLTAGE: 13.2 KV  
NOTES AND BILL OF MATERIAL**

STANDARD NO. T-12 VERSION 7  
DOCUMENT NO. 4301.060  
PAGE 2 OF 2 DATE FEB 27, 2024  
SUBMITTED LUIS R. SOTO LIC. 11658  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED VICTOR R. FEBRES LIC. 3412

## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	3
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0144	STIRRUP	VARIES	3
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND / BOND WIRE CLAMP	VARIES	AS-REQ
0190	POLE MOUNTED FIXED CAPACITOR BANK	VARIES	AS REQ.
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 1-FIGURE F	2
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.

### NOTES:

- REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
- ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
- REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
- REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
- REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
- REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
- MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
- IF ADDITIONAL CLEARANCE IS REQUIRED, ASSEMBLY NO. ASSY-1501 SHALL BE USED INSTEAD OF ASSY-1514.
- REFER TO STANDARDS NO. T-13 AND T-14 FOR CONNECTION DIAGRAMS.
- REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
- NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WHERE A FIXED CAPACITOR BANK IS INSTALLED.
- BEFORE WORKING ON THE FIXED CAPACITOR BANK, IT IS IMPORTANT TO DISCONNECT IT FROM THE POWER SOURCE, AND WAIT AT LEAST 5 MINUTES FOR THE CAPACITOR UNITS TO SELF-DISCHARGE BEFORE CONNECTING ALL UNITS' TERMINALS TO GROUND.
- SURGE ARRESTERS SHOULD BE INSTALLED IN THE FIXED CAPACITOR BANK FRAME WHENEVER FEASIBLE.
- STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.









# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## POLE MOUNTED CONTROLLED CAPACITOR BANK MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. T-12-1 VERSION 3

DOCUMENT NO. 4301.127

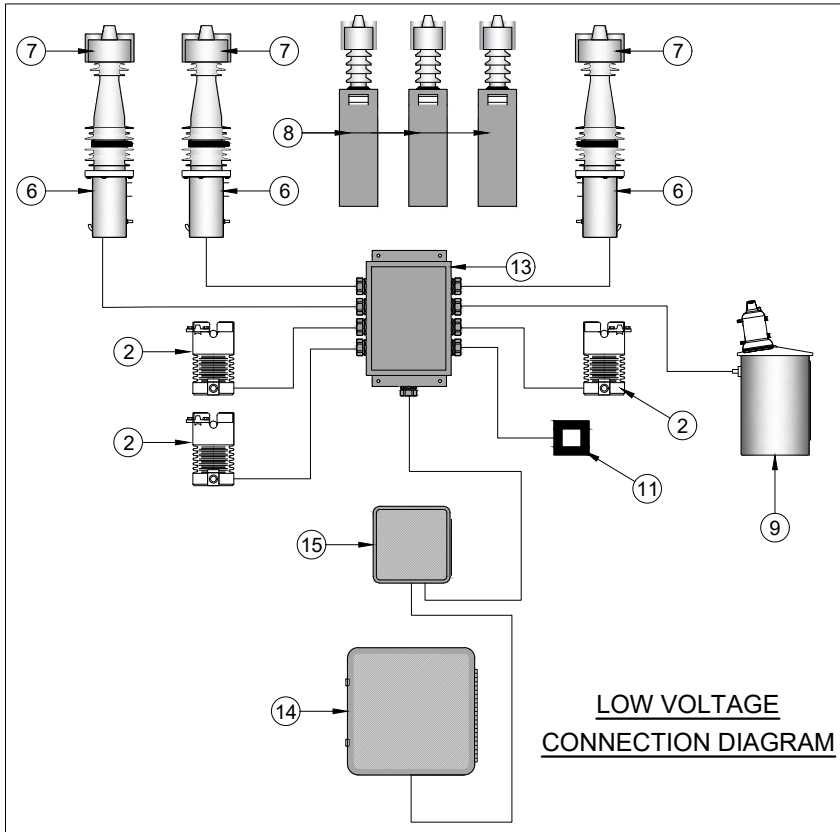
PAGE 3 OF 5 DATE FEB 26, 2024

SUBMITTED ALEX J. RODRIGUEZ LIC. 24174

REVIEWED IVETTE D. SANCHEZ LIC. 13837

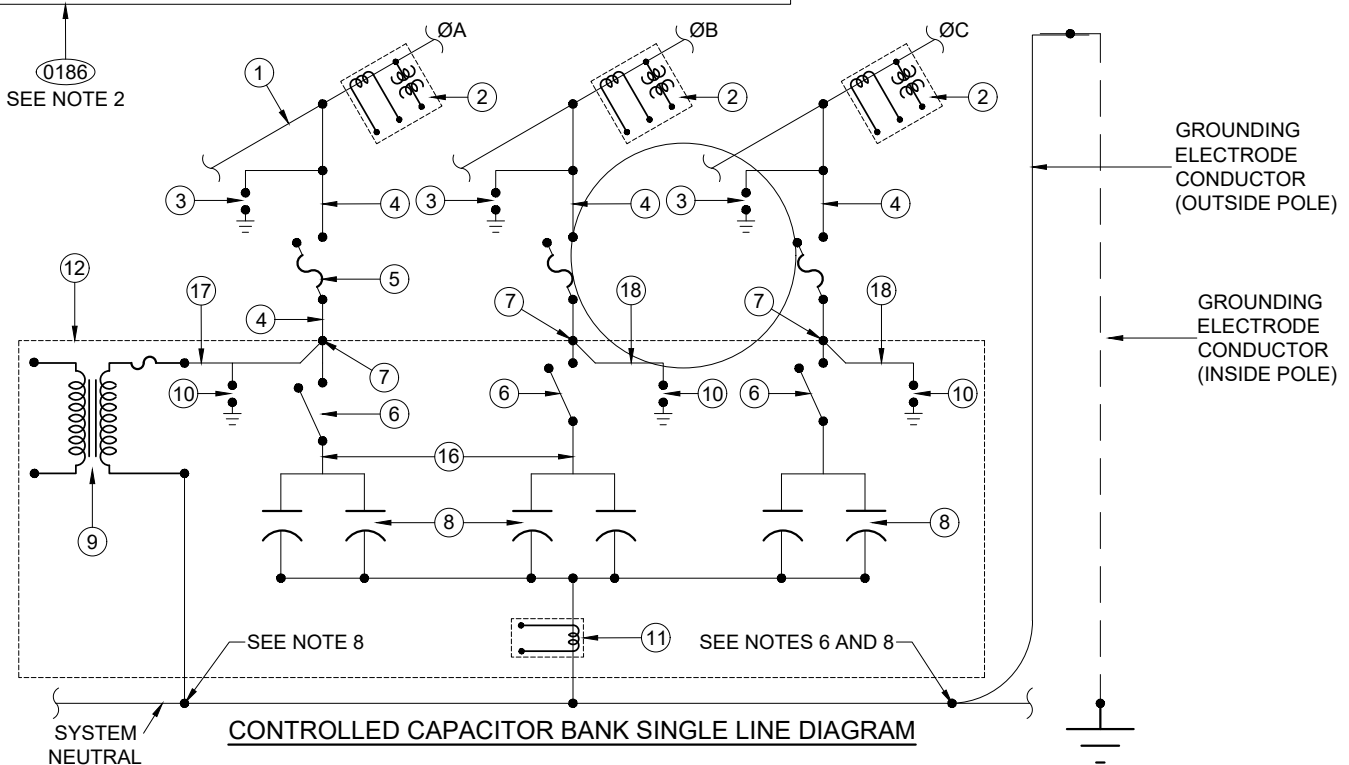
APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED EMILIO CUADRADO LIC. 3000



**LEGEND:**

- ① OVERHEAD PRIMARY LINE - JUMPER LOOP
- ② MULTICORE CURRENT AND VOLTAGE SENSOR
- ③ SURGE ARRESTER, HEAVY DUTY
- ④ 1C - #2 AWG
- ⑤ 100 A FUSE CUTOUT
- ⑥ CAPACITOR SWITCH
- ⑦ CAPACITOR SWITCH TOP TERMINAL CONNECTOR WITH WILDLIFE PROTECTION
- ⑧ CAPACITOR UNIT
- ⑨ CONTROL POWER TRANSFORMER WITH PRIMARY WEAK LINK FUSE.
- ⑩ SURGE ARRESTER, HEAVY DUTY
- ⑪ NEUTRAL CURRENT SENSOR
- ⑫ CONTROLLED CAPACITOR BANK
- ⑬ CAPACITOR BANK MAIN JUNCTION BOX
- ⑭ CAPACITOR BANK CONTROL
- ⑮ ZERO VOLTAGE CLOSING CONTROL
- ⑯ FACTORY WIRE FROM SWITCH TO CAPACITOR. IF NOT, USE 1C - #2 AWG.
- ⑰ FACTORY WIRE FROM CAPACITOR SWITCH TOP TERMINAL CONNECTOR TO TRANSFORMER H1 TERMINAL THROUGH SURGE ARRESTER TOP TERMINAL. IF NOT, USE 1C - #2 AWG.
- ⑱ FACTORY WIRE FROM CAPACITOR SWITCH TOP TERMINAL CONNECTOR TO SURGE ARRESTER. IF NOT, USE 1C - #2 AWG.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

## POLE MOUNTED CONTROLLED CAPACITOR BANK MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. T-12-1 VERSION 3  
DOCUMENT NO. 4301.127  
PAGE 4 OF 5 DATE FEB 26, 2024  
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174  
REVIEWED IVETTE D. SANCHEZ LIC. 13837  
APPROVED RICARDO CASTRO LIC. 12135  
DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

1. THIS STANDARD APPLIES TO THE INSTALLATION OF SWITCHED CAPACITOR BANKS FOR CONTROLLED OPERATION IN THE ELECTRICAL DISTRIBUTION SYSTEM. THE INSTALLER MUST ALSO FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS AND ANY OTHER DOCUMENTS SUPPLIED WITH THE EQUIPMENT.
2. CONTROLLED CAPACITOR BANK PACKAGE INCLUDES: A) 6 CAPACITOR UNIT RACK, B) SINGLE PHASE CAPACITOR UNITS, C) CAPACITOR SWITCHES, D) CONTROL POWER TRANSFORMER, E) CONTROL JUNCTION BOX, F) SURGE ARRESTERS, G) CAPACITOR BANK CONTROL WITH ZERO VOLTAGE CLOSING, H) WILDLIFE PROTECTION, I) MULTICOIL CURRENT AND VOLTAGE SENSORS FOR THREE-PHASE SENSING, J) NEUTRAL CURRENT SENSOR, K) RECEPTACLES, AND L) CONTROL CABLES.
3. CONTROLLED CAPACITOR BANKS ARE FULLY ASSEMBLED AND PRE-WIRED FROM FACTORY WITH ACCESSORIES AND TERMINAL BUSHINGS EQUIPPED WITH WILDLIFE PROTECTION.
4. EACH CONTROLLED CAPACITOR BANK INCLUDES 3 DOUBLE BUSHING CAPACITOR UNITS OF 150 KVAR EACH FOR A 450 KVAR BANK, OR 6 DOUBLE BUSHING CAPACITOR UNITS OF 150 KVAR EACH FOR A 900 KVAR BANK. THE CAPACITOR BANK UNITS COME INTERCONNECTED FROM THE FACTORY IN A GROUNDED-WYE CONFIGURATION, AS SHOWN IN THIS STANDARD. REFER TO STANDARDS NO. T-13 AND T-14 FOR ADDITIONAL CAPACITOR UNIT CONFIGURATIONS.
5. BEFORE WORKING ON THE CONTROLLED CAPACITOR BANK, IT IS IMPORTANT TO DISCONNECT IT FROM THE POWER SOURCE, AND WAIT AT LEAST 5 MINUTES FOR THE CAPACITOR UNITS TO SELF-DISCHARGE BEFORE CONNECTING ALL UNITS' TERMINALS TO GROUND.
6. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
7. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
8. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
9. REFER TO ASSEMBLY NO. ASSY-1507 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
10. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
11. THE CONTROL BOX SHOULD BE INSTALLED A MINIMUM OF 10'-0" ABOVE THE FINISH GRADE LEVEL.
12. NO ADDITIONAL ELECTRICAL EQUIPMENT WILL BE ALLOWED ON POLES WHERE A CONTROLLED CAPACITOR BANK IS INSTALLED.
13. DESIGNER MUST PERFORM A POLE LOAD ANALYSIS (PLA) TO DETERMINE THE POLE CLASS TO BE USED, AND WHETHER A PRECAST CONCRETE FOUNDATION AND INSTALLATION OF GUYS ARE NEEDED.
14. LOW VOLTAGE WIRING SHALL BE ATTACHED TO THE POLE USING DOUBLE ARMING BOLT (ITEM 0050), FLAT SQUARE WASHER (ITEM 0002), AND GROUND/BOND WIRE CLAMP (ITEM 0174). ATTACHMENTS MUST BE SPACED AT A MAXIMUM DISTANCE OF 2'-0".
15. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
16. IF THE CONTROLLED CAPACITOR BANK IS TO BE INSTALLED WITH OTHER PRIMARY LINES, EXCLUDE THE POLE (ITEMS 0147 OR 0148) FROM THE BILL OF MATERIAL.
17. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.





# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b>  <b>POLE MOUNTED CONTROLLED CAPACITOR BANK</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>BILL OF MATERIAL</b>	STANDARD NO. <u>T-12-1</u> VERSION <u>3</u>
	DOCUMENT NO. <u>4301.127</u>
	PAGE <u>5 OF 5</u> DATE <u>FEB 26, 2024</u>
	SUBMITTED <u>ALEX J. RODRIGUEZ LIC. 24174</u> <i>raj</i>
	REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> <i>IS</i>
APPROVED <u>RICARDO CASTRO LIC. 12135</u> <i>RC</i>	
DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u> <i>EC</i>	

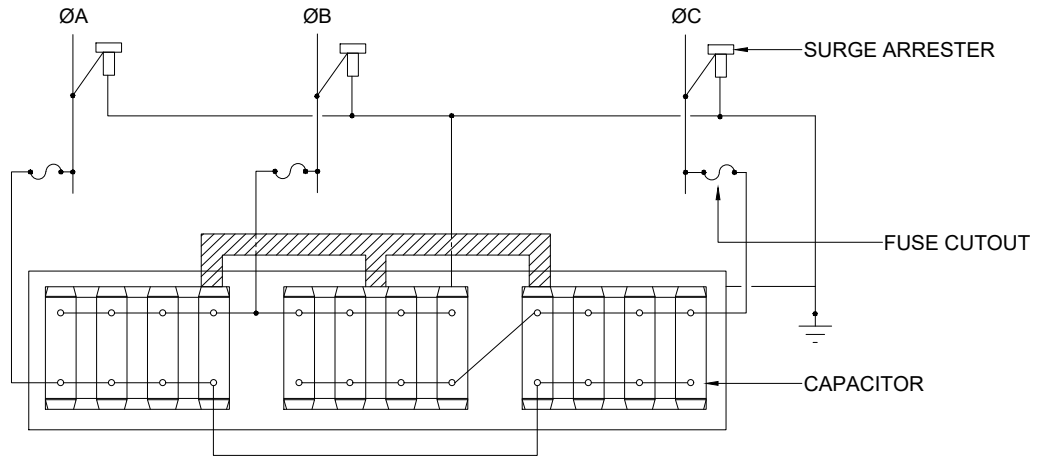
## MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	AS REQ.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	AS REQ.
0078	HOT LINE CLAMP	VARIES	3
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	VARIES	AS REQ.
0141	CROSSARM	VARIES	2
0144	STIRRUP	VARIES	3
0147 / 0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND/BOND WIRE CLAMP	VARIES	AS REQ.
0182	FIXING BAND	107-04344	AS REQ.
0183	BUCKLE FOR FIXING BAND	107-03031	AS REQ.
0186	POLE MOUNTED CONTROLLED CAPACITOR BANK	VARIES	1
0188	SERRATED COLLAR BOLT	VARIES	3
1504	PRIMARY LINE DEADEND ASSEMBLY	ASSY-1504 FIGURE B	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1507	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY	ASSY-1507	1
1509	FUSE CUTOFF ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE C, 1-FIGURE D, 1-FIGURE F	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
2040	PVC SCH-40 DUCT	038-01867	AS REQ.
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.

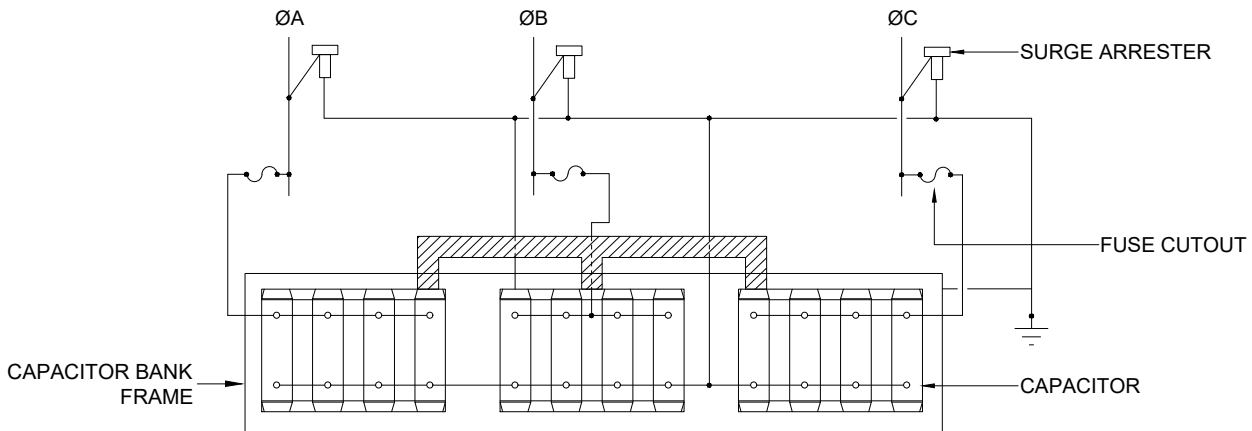
TITLE:

**CONNECTION DIAGRAMS OF CAPACITORS IN THREE  
PHASE DELTA AND WYE CONFIGURATIONS  
MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO. T-13 VERSION 4  
 DOCUMENT NO. 4301.062  
 PAGE 1 OF 1 DATE FEB 26, 2024  
 SUBMITTED LUIS R. SOTO LIC. 11658  
 REVIEWED IVETTE D. SANCHEZ LIC. 13837  
 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED VICTOR R. FEBRES LIC. 3412



**THREE PHASE DELTA SYSTEM**



**THREE PHASE WYE SYSTEM**

TITLE:

**CONNECTION DIAGRAMS OF  
FUSES FOR CAPACITORS  
MAXIMUM VOLTAGE: 13.2 KV**

APPENDIX NO: T-14 VERSION 4

DOCUMENT NO. 4301.063

PAGE 1 OF 1 DATE FEB 26, 2024

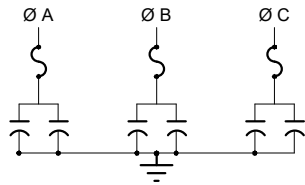
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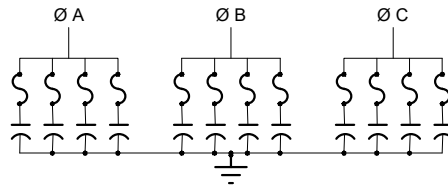
APPROVED RICARDO CASTRO LIC. 12135

DIGITIZED VICTOR R. FEBRES LIC. 3412

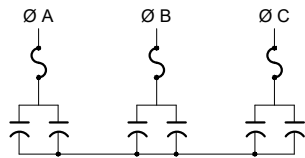
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GROUNDED WYE  
(PREFERRED)



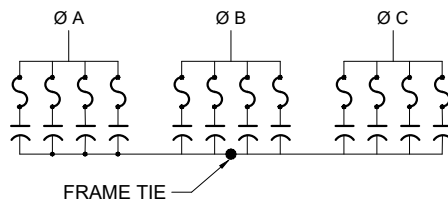
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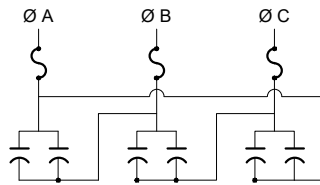
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UNGROUND WYE



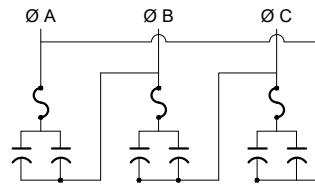
(D)  
INDIVIDUALLY FUSED  
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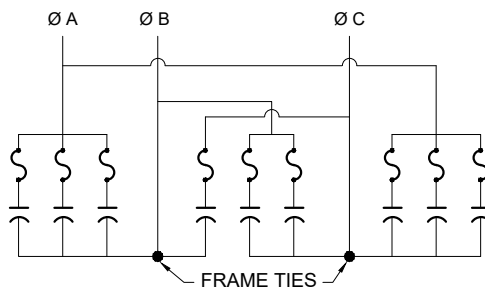
(E)  
LINE GROUP FUSED DELTA



(F)  
BRANCH GROUP FUSED  
DELTA



(G)  
INDIVIDUALLY FUSED  
DELTA





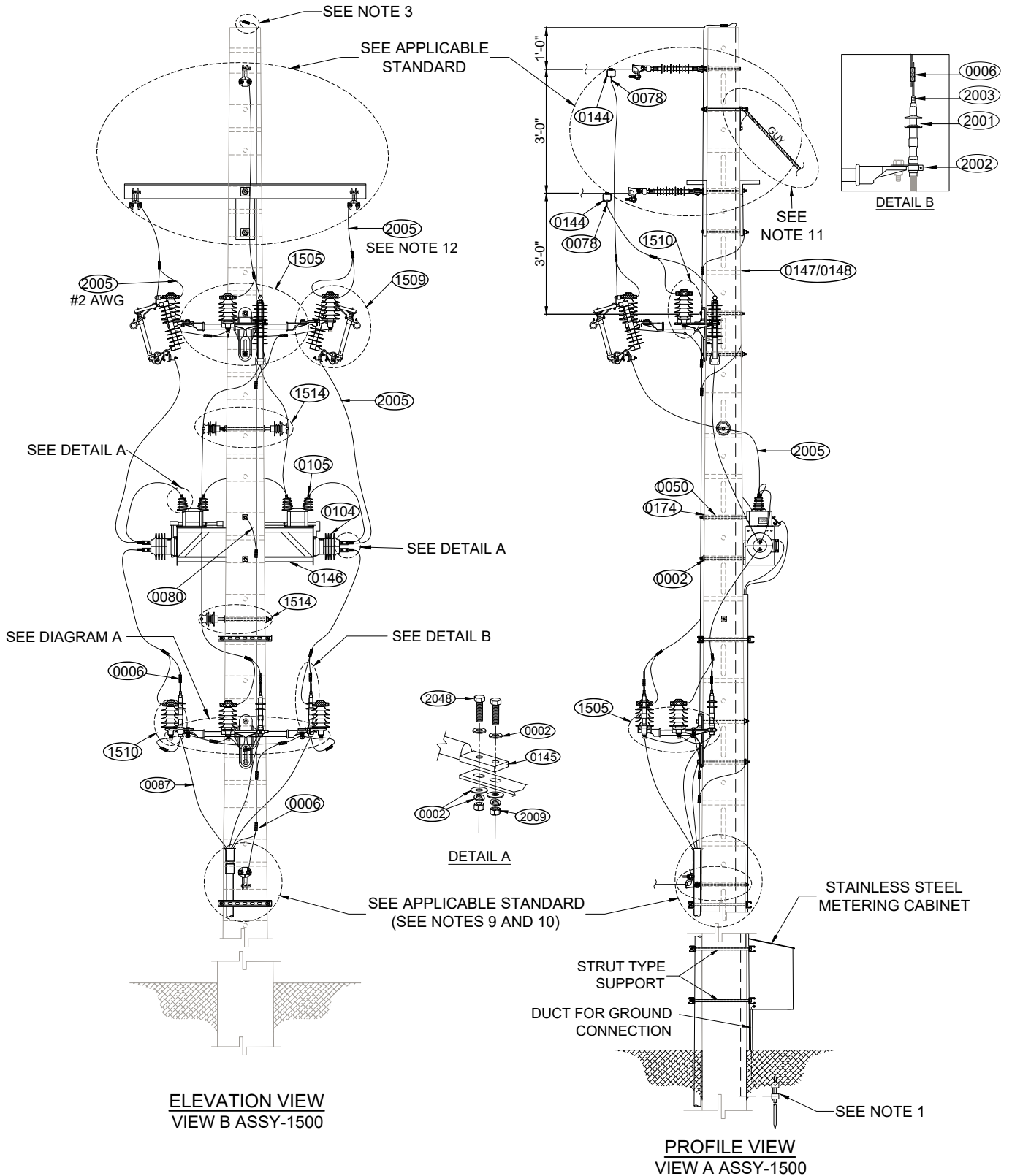
# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

**INTERCONNECTION WITH OVERHEAD METERING INSTRUMENT TRANSFORMERS FOR PRIMARY UNDERGROUND SERVICE**  
**MAXIMUM VOLTAGE: 13.2 KV**

STANDARD NO.	T-15	VERSION	5
DOCUMENT NO.	4301.117		
PAGE	1 OF 3	DATE	FEB 26, 2024
SUBMITTED	LUIS R. SOTO LIC. 11658		
REVIEWED	IVETTE D. SANCHEZ LIC. 13837		
APPROVED	RICARDO CASTRO LIC. 12135		
DIGITIZED	EMILIO CUADRADO LIC. 3000		



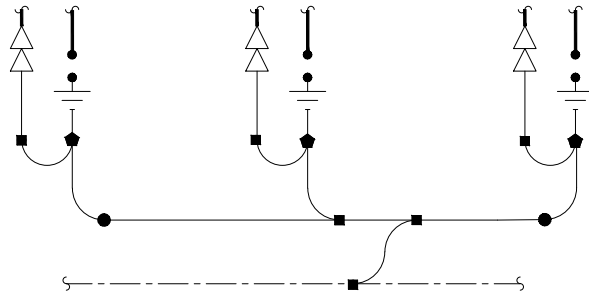


# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

**TITLE:**  
**INTERCONNECTION WITH OVERHEAD METERING INSTRUMENT TRANSFORMERS FOR PRIMARY UNDERGROUND SERVICE**  
**MAXIMUM VOLTAGE: 13.2 KV**  
**NOTES AND BILL OF MATERIAL**

STANDARD NO. T-15 VERSION 5  
 DOCUMENT NO. 4301.117  
 PAGE 2 OF 3 DATE FEB 26, 2024  
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 APPROVED RICARDO CASTRO LIC. 12135  
 DIGITIZED EMILIO CUADRADO LIC. 3000



**DIAGRAM A**  
**BONDING CONNECTION - ONE LINE DIAGRAM**

**LEGEND:**

- CABLE TERMINATION
- SURGE ARRESTER
- CONNECTOR (ITEM 0006)
- ELECTRICAL COMPONENT GROUND TERMINAL
- POLE GROUND CONDUCTOR
- BRONZE MALE SERVICE POST CONNECTOR (ITEM 2012)
- BRONZE FEMALE SERVICE POST CONNECTOR (ITEM 0173)

**NOTES:**

1. REFER TO ASSEMBLY NO. ASSY-1511 FOR POLE GROUND INSTALLATION. THE NEUTRAL CONDUCTOR SHALL BE EFFECTIVELY BONDED TO THE GROUNDING SYSTEM.
2. ALL MINIMUM VERTICAL CLEARANCES BETWEEN CONDUCTORS AT THE POLE ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1512 FOR POLE BONDING CONNECTION.
4. REFER TO ASSEMBLY NO. ASSY-1506 FOR CLEARANCES OF NEUTRAL, SECONDARY, AND POLE JOINT USE ATTACHMENTS.
5. REFER TO STREET LIGHTING STANDARDS FOR STREETLIGHT INSTALLATION.
6. REFER TO ASSEMBLY NO. ASSY-1513 FOR AVIAN AND ANIMAL PROTECTION GUIDELINES.
7. MAXIMUM RECOMMENDED SPAN IS 150'-0" IN URBAN AREAS. FOR RURAL AREAS, THE SPAN DEPENDS ON SITE TOPOGRAPHY.
8. REFER TO ASSEMBLY NO. ASSY-1510 FOR SURGE ARRESTER INSTALLATION DETAILS.
9. REFER TO STANDARD NO. URD-4 OR URD-4-A OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS OF THE PRIMARY AND SECONDARY RISERS SHOWN IN THIS STANDARD.
10. REFER TO ASSEMBLY NO. ASSY-2501 OF THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MANUAL FOR INSTALLATION DETAILS AND MATERIALS NECESSARY TO ATTACH THE PRIMARY RISER SHOWN IN THIS STANDARD TO THE POLE.
11. REFER TO STANDARD NO. E-1-2-3 FOR POLE GUYS INSTALLATION. PLACEMENT, SIZE, AND NUMBER OF GUYS SHALL BE DETERMINED BY THE ENGINEER BASED ON LOAD AND SPACE LIMITATIONS.
12. #2 AWG COPPER CABLE SHALL BE USED FOR 100 A FUSE CUTOUT CONNECTIONS OR 1/0 AWG COPPER CABLE FOR 200 A FUSE CUTOUT CONNECTIONS.
13. STAINLESS STEEL MATERIAL SHALL BE USED WITHIN 1 MILE OF SALTWATER BODIES.

**MATERIALS**

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT SQUARE WASHER	VARIES	2
	FLAT ROUND WASHER	VARIES	32
	SPLIT ROUND WASHER	VARIES	16
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0050	DOUBLE ARMING BOLT	VARIES	2
0078	HOT LINE CLAMP	VARIES	3
0104	CURRENT TRANSFORMER	VARIES	2
0105	VOLTAGE TRANSFORMER	VARIES	2
0144	STIRRUP	VARIES	3



# DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

<b>TITLE:</b> <b>INTERCONNECTION WITH OVERHEAD METERING INSTRUMENT TRANSFORMERS FOR PRIMARY UNDERGROUND SERVICE</b> <b>MAXIMUM VOLTAGE: 13.2 KV</b> <b>BILL OF MATERIAL</b>	STANDARD NO. <u>T-15</u> VERSION <u>5</u> DOCUMENT NO. <u>4301.117</u> PAGE <u>3</u> OF <u>3</u> DATE <u>FEB 26, 2024</u> SUBMITTED <u>LUIS R. SOTO LIC. 11658</u> REVIEWED <u>IVETTE D. SANCHEZ LIC. 13837</u> APPROVED <u>RICARDO CASTRO LIC. 12135</u> DIGITIZED <u>EMILIO CUADRADO LIC. 3000</u>
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	8
0146	INSTRUMENT TRANSFORMER SUPPORT	VARIES	1
0147/0148	CONCRETE, METAL OR COMPOSITE POLE	VARIES	1
0174	GROUND / BOND WIRE CLAMP	VARIES	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	2
1509	FUSE CUTOFF ASSEMBLY	ASSY-1509	3
1510	SURGE ARRESTER ASSEMBLY	ASSY-1510 FIGURE B	6
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	EQUIPMENT BONDING TO GROUND ASSEMBLY	ASSY-1512 1-FIGURE D, 2-FIGURE F	3
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 1-FIGURE A, 1-FIGURE B	2
2001	OUTDOOR CABLE TERMINATION STRESS CONE	VARIES	3
2002	CABLE AND STRESS CONE SUPPORT BRACKET	VARIES	3
2003	PIN TERMINAL CONNECTOR	VARIES	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2009	HEXAGONAL NUT	002-82038	16
2012	BRONZE MALE SERVICE POST CONNECTOR	VARIES	2
2048	HEX HEAD BOLT	038-83218	16
URD-4	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER	URD-4	AS REQ.
URD-4-A	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION	URD-4--A	AS REQ.