

LUMA THIRD-PARTY ATTACHMENTS (TPA) ENGINEERING STANDARDS

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Approver

Ricardo Castro Gómez, PE Lic. 12135
Manager, Distribution Standards and Materials

Signature and Date:

03/27/2026

Approver

Reinaldo J. Baretty Huertas, PE Lic. 16712
Director, System Standards and Records

Signature and Date:

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Name, Position

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Include the applicable document, section, or reference "[add link here](#)".

Version History

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PART I: GENERAL

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, pursuant to the T&D OMA, LUMA has the duty to exercise all of the rights and perform the responsibilities of PREPA in providing the O&M Services. Also, LUMA has the authority 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 “*LUMA Third-Party Attachments (TPA) Engineering Standards*” (Standards).

Unless otherwise expressly indicated, these Standards supersede any other technical documents 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 these Standards is to provide updated technical requirements for the installation and maintenance of third-party attachments on PREPA's overhead electrical system poles in Puerto Rico (Utility Poles). These requirements aim to improve efficiency, resilience and modernize the Puerto Rico electrical and telecommunications systems.

Given the increasing and evolving demands placed on Utility Poles by communications providers in Puerto Rico, LUMA has adopted these Standards to govern access to and use of Utility Poles. These Standards apply to all telecommunications providers seeking to attach telecommunications facilities and are intended to ensure a non-discriminatory, consistent, and streamlined framework for accessing and using Utility Poles in support of the wide range of telecommunications services offered today.

These Standards also reflect Puerto Rico's unique circumstances, including its exposure to severe weather conditions, ongoing island-wide pole replacement and infrastructure-hardening initiatives, and fiscal constraints. Accordingly, certain policies, practices, and technical requirements set forth herein may be more stringent than, or differ from, generally applicable national standards. Given the evolving operational, regulatory, and environmental conditions affecting the electric system, these Standards may be revised or updated from time to time as LUMA deems necessary.

1.3. Applicability

These Standards shall apply to PREPA, LUMA and their contractors in connection with the design and construction of any overhead electrical system infrastructure and to all third parties, including telecommunications service providers that attach or install facilities or any

type of equipment on Utility Poles. The installation, maintenance, or operation of any facility, equipment or attachment on Utility Poles constitutes acceptance of, and agreement with, these Standards. The design, construction and installation of overhead telecommunications system infrastructure shall also comply with all applicable laws and regulations in force.

1.4. Effectiveness

These Standards, including the construction standards set forth in it, will be effective as of the date of publication and shall apply to all new third-party attachment installation approval requested to be installed on Utility Poles from that date forward. Existing third-party attachments that were duly authorized prior to the publication of these Standards and that complied with the applicable standards in effect at the time of installation are not required to be modified. Any existing attachments installed prior to the publication of these Standards without proper authorization shall be subject to these Standards.

LUMA, as agent of PREPA, may, from time to time, issue procedural guidelines, user manuals, and other documents to facilitate the application of these Standards. All TPA companies shall comply with such guidelines and materials as they may be revised or updated by LUMA and published on LUMA's website or otherwise made available to TPA companies.

1.5. Safety

These Standards shall be supplemented by the current versions of the LUMA safety rules, and all industry applicable safety codes and ruling. Safety shall take priority over all other requirements. If any specification or standard included is considered inadequate or incorrect from a safety point of view, it should be brought to the attention of LUMA Third-Party Attachments Program 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 compliance with these Standards and other applicable laws, regulations, codes, or standards.

1.6. Applicable Legal Provisions and Codes

1.6.1. Industry Codes, Standards and Reference Documents

The design and construction of the overhead electrical and telecommunications systems infrastructure shall comply with the current following codes, among others:

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

It should also take into consideration industry's best practices, and the unique environmental conditions on the island.

1.6.2. Applicable Laws and Regulations

The design and construction of the overhead electrical and telecommunications systems infrastructure shall comply with all applicable federal, Commonwealth of Puerto Rico and local laws, regulations, and codes, including, but not limited to:

- *Puerto Rico Telecommunications Act* (Act 213-1996), as amended
- *Act to Promote Fair Competition in Telecommunications, Information, and Pay Television Services in Puerto Rico* (Act 80-2017), as amended
- *Puerto Rico Permit Process Reform Act* (Act 161-2009), as amended
- *Regulation to Access Public Property for Telecommunication Services, Information and Television for Payment*, Regulation No. 9090 (2019) of the Telecommunications Bureau of Puerto Rico (TBPR)
- *Puerto Rico Joint Permits Regulation for the Evaluation and Issuance of Permits Related to Development, Land Use and Business Operation* (Joint Regulation), Regulation No. 9473 (2023) of the Puerto Rico Planning Board
- *Regulation for the Management of Infrastructure in Public Space*, Regulation No. 22 (1992) of the Puerto Rico Planning Board
- Any applicable regulations from other agencies or public instrumentalities

PART II: THIRD-PARTY ATTACHMENTS CONSTRUCTION REQUIREMENTS

2. Telecommunications Lines and Equipment

2.1. Pole Joint Use (Third-Party Attachments)

2.1.1. Description

The attachment equipment owned by third parties, such as telecommunications facilities, small cell antennas systems, gunshot detection systems, surveillance cameras and wireless communication equipment, shall be assessed and tracked to ensure that the additions to Utility Poles do not exceed the design strength limits of the poles. Any third-party attachment shall require 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. The owner of the third-party attachment (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.

2.1.2. Construction Requirements for Pole Joint Use on Utility Poles

For existing overhead lines, third-party cables and equipment must be installed in the communication space approved by LUMA, ensuring compliance with, at least, the NESC required clearances.

Prior to installation or modification of a third-party attachment, LUMA requires coordination with its Third Party Attachment Department and 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. The wind speed required to be considered in the PLA shall be 160 mph for poles manufactured starting in 2022, as shown on its nameplates, or 145 mph for previously existing

poles, both up to 100% pole utilization factor. Refer to the *TPA Application Process* document for additional information.

Appropriate hardware shall be used to install the third-party attachments complying with the applicable industry and LUMA standards.

The following LUMA's construction standards specify the type of third-party attachments that can be installed on Utility Poles:

- Neutral, secondary and pole joint use: ASSY-1506 and ASSY-1507
- Surveillance cameras, gunshot detection systems and wireless communication equipment: CAMVIG-01 and CAMVIG-02
- Small cell antennas systems: ANT-01 and ANT-02
- Telecommunications systems enclosures: COMM-01 and COMM-02

Any exception or deviation from these Standards shall be requested to LUMA for evaluation and approval. The request will be sent to usomancomunado@lumapr.com with the subject: Request for TPA Exception or Deviation Evaluation. It should clearly outline the need for the exception and the specific issue, providing detailed justification for why the exception is requested. The Third-Party Attachments Program Department shall evaluate the request within 30 labor days and provide a written resolution on whether the exception will be approved.

All owners and installers of a third-party attachments shall comply with the following applicable construction requirements when installing attachments on Utility Poles:

- A. Telecommunications attachments are only allowed on distribution and sub-transmission poles with no gang-operated air breakers installed. Joint use is not allowed on poles or structures with 115 kV or 230 kV electrical lines.
- B. Surveillance cameras, gunshot detection systems, wireless communication, and small cell antennas and their equipment are allowed on streetlight, distribution, and sub-transmission poles. Telecommunications cables are not allowed on poles used

exclusively for street lighting. Refer to the *Street Lighting System Design and Construction Manual* for additional installation requirements and information.

- C. Drilling of any additional holes into concrete, metal or composite poles is prohibited.
- D. Telecommunications cable attachments must be firmly secured with clamps or metal rings unless pre-drilled holes are available for use in the communication space.

E. Solar Panels:

The installation of solar panels on Utility Poles for powering telecommunications equipment is not allowed.

- F. The cost of pole upgrades or modifications required solely to accommodate new attachments is the responsibility of the TPA company through the make-ready process. Please refer to the process described in the *Make-Ready Process for Pole Attachments* document.

G. Clearance requirements:

- 1) A minimum clearance of 42 inches shall be maintained below an existing or future secondary line to the highest position of the communication space. However, in Utility Poles where there is no secondary line, there is currently a minimum 6'-6" clearance requirement between the neutral and the communication space to allow for future secondary installations. LUMA implemented the following two exceptions to this requirement:

- i. If the secondary line, for the location's service requirements, is underground and has sufficient capacity, the minimum clearance between the neutral and the communication space may remain at 42 inches.
- ii. For existing TPAs that do not meet the 6'-6" clearance requirement, a minimum of 42 inches worker safety zone clearance is still required. This reduced clearance may be allowed if there is a documented record of prior approval for the attachment with reduced clearance. If no such record exists, the attachment will be considered noncompliant and will require immediate remediation from the TPA company.

- 2) Cables, antennas, cameras, and other third-party devices can be installed in the communication space on Utility Poles, including metal attachment clamps and bolts, metal crossarm supports, bolts and other equipment, but they shall be attached so as to maintain the required 42 inches minimum clearance between electrical supply facilities and telecommunications attachments, as specified in the included LUMA construction standards no. ASSY-1506, ASSY-1507, ANT-01, ANT-02, CAMVIG-01, CAMVIG-02, COMM-01, COMM-02, M-5-D, and others that LUMA may have.
- 3) At pole support, a separation of 12 inches must be maintained between third-party attachments and any other telecommunications connection or attachment. As an exception established by the NESC, the vertical spacing at the pole between messengers supporting telecommunications cables may be reduced to a minimum of 6 inches, subject to compliance with the pole load analysis (PLA) prior to installation, along with a written agreement between all the telecommunications companies attached to the specific pole, including PREPA as the pole owner. Additionally, the vertical clearance between the cables of one telecommunications utility and those of another, anywhere in the span, may be less than 4 inches. The number of telecommunications cables allowed in the communication space, as approved by LUMA, and the spacing between them will be established in the joint pole agreement or *Memorandum of Understanding (MOU)* between LUMA and the telecommunications companies.

H. 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. Minimum clearances between conductors and vertical clearance to ground shall comply with LUMA construction standards M-5, M-5-B and M-5-C of the *Overhead Electrical Distribution System Manual*.

At midspan, a minimum of 32 inches of separation must be maintained between the upper telecommunications conductor and the lower electrical conductor, and 12 inches between each telecommunications conductor, as per Rule 235.C.2.b.(1) of the NESC.

I. Identification:

Third-party conductors shall be identified at each pole with a color tag, as agreed with LUMA, placed within 12 inches from the pole where they are attached. The tag shall include at least the following: company or attaching entity name, emergency contact number and conductor type. Tags shall be placed in such a way as to permit identification of the attaching entity by observation from the ground.

J. Grounding and bonding:

The electrical supply and telecommunications systems shall be grounded together via a single grounding conductor. The minimum required grounding connections for the telecommunications system to the pole grounding conductor, when used jointly with the electrical supply system, shall include connections at the first and last poles of the line segment, along with any additional connections required by the NESC. A bare stranded copper pigtail with a minimum gauge of #2 AWG, intended for connecting to the pole's single grounding conductor, shall be left in the communication space by the first telecommunications company requesting installation, enabling LUMA to perform the necessary connections.

K. 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 the *Overhead Electrical Distribution System Manual* for requirements applicable to concrete bases.

L. Guys:

Owners and installers of third-party attachments are responsible for having a structural analysis of any existing Utility 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 telecommunications lines. Refer to section 4.3.3 of the *Overhead Electrical Distribution System Manual* for guys requirements.

M. Climbing Space:

A clear climbing space must always be maintained on Utility Poles. All attachments must be placed to allow and maintain a proper climbing space on one side of the pole. All third-party companies' cable attachments shall be placed on the same side of the pole facing the roadway. All companies' risers shall be placed on the pole's field side. Refer to NESC, Part 2, Section 236, for climbing spaces on poles that have both electrical supply and telecommunications lines.

N. TPA Risers:

- 1) The installation of TPA risers shall be limited to the field side (side opposite to the roadway) of the pole. If electrical risers exist on the field side of the pole, the telecommunications company shall consult LUMA whether the TPA riser may be attached to a different side of the pole.
- 2) Only one duct per telecommunications company shall be installed, up to a maximum of four TPA risers per pole. Each riser's duct shall be identified with information of its owner.
- 3) Ducts with a maximum diameter of 1 ½ inches shall be installed for TPA risers.
- 4) TPA risers shall be secured using strut channel supports, with the first support installed at a maximum height of 2 feet, and the next one at 10 feet above finish grade.
- 5) Concrete encasing of TPA risers will not be permitted.
- 6) Telecommunications risers shall not be installed in poles with a concrete base.

O. 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.

P. Slack storage management:

Approved slack storage solutions, such as splice trays, fiber organizers, integrated compartments within splice closures, or external devices like “sno-shoes” shall be used to manage excess fiber during splicing and operational reserve loops. Unsecured conductor slack loops shall not remain suspended in any part of the installation, as they may interfere with adjacent utility attachments and violate clearance standards. All additional or excess fiber installed in the spans must be considered in the PLA. Final customer service loops shall not exceed 6 inches in diameter and must be positioned to avoid interference with other attachments.

PART III: OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM WITH TPA STANDARDS

The following standards were developed to maintain safety and reliability of the overhead electrical and telecommunications systems installed on the electrical system’s poles. These standards include the bill of materials and construction details. They shall be followed without deviation for all new constructions and installations.

INDEX		
STANDARD NO.	DOCUMENT NO.	TITLE
ASSY-1506	4301.072	NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY
ASSY-1507	4301.073	NEUTRAL, SECONDARY, AND POLE JOINT USE TANGENT ASSEMBLY
ANT-01	4301.064	OVERHEAD FED ANTENNA
ANT-02	4301.065	UNDERGROUND FED ANTENNA
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
COMM-01	4301.141	OVERHEAD FED COMMUNICATIONS SYSTEM ENCLOSURE
COMM-02	4301.142	UNDERGROUND FED COMMUNICATIONS SYSTEM ENCLOSURE



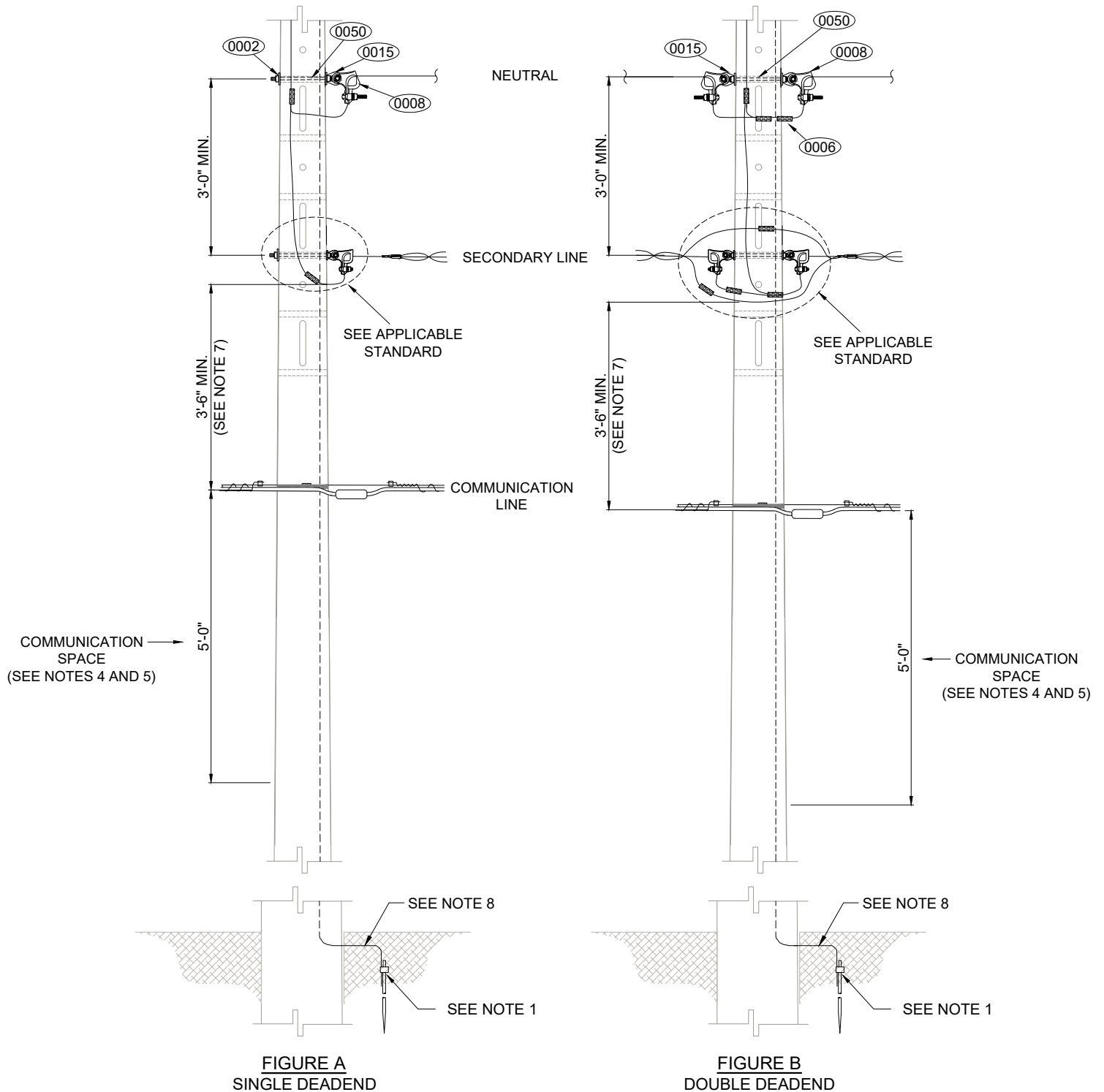
DISTRIBUTION ENGINEERING

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
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: NEUTRAL, SECONDARY, AND POLE JOINT USE DEADEND ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV NOTES AND BILL OF MATERIAL	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>
	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.
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 (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:

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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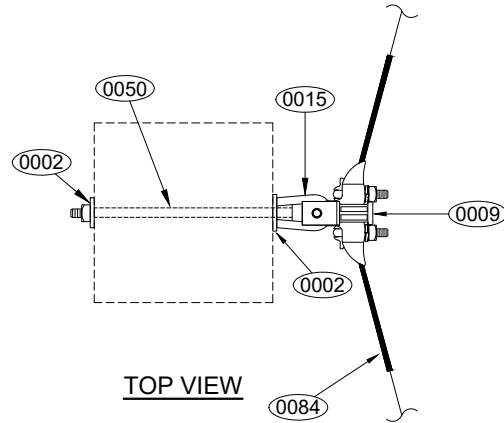
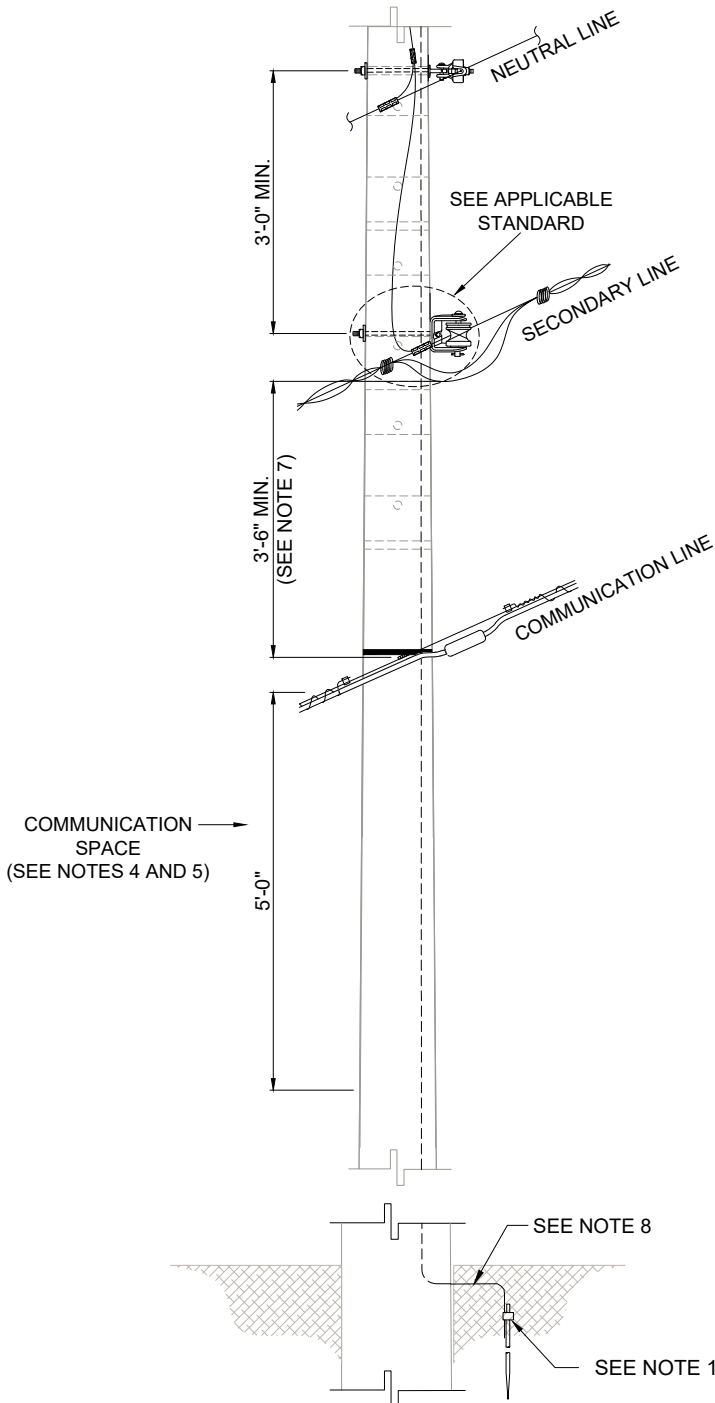


FIGURE A
SINGLE DEADEND



DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

NEUTRAL, SECONDARY, AND POLE JOINT USE
TANGENT ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV
NOTES AND BILL OF MATERIAL

ASSEMBLY NO. ASSY-1507 VERSION 5
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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
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 (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.
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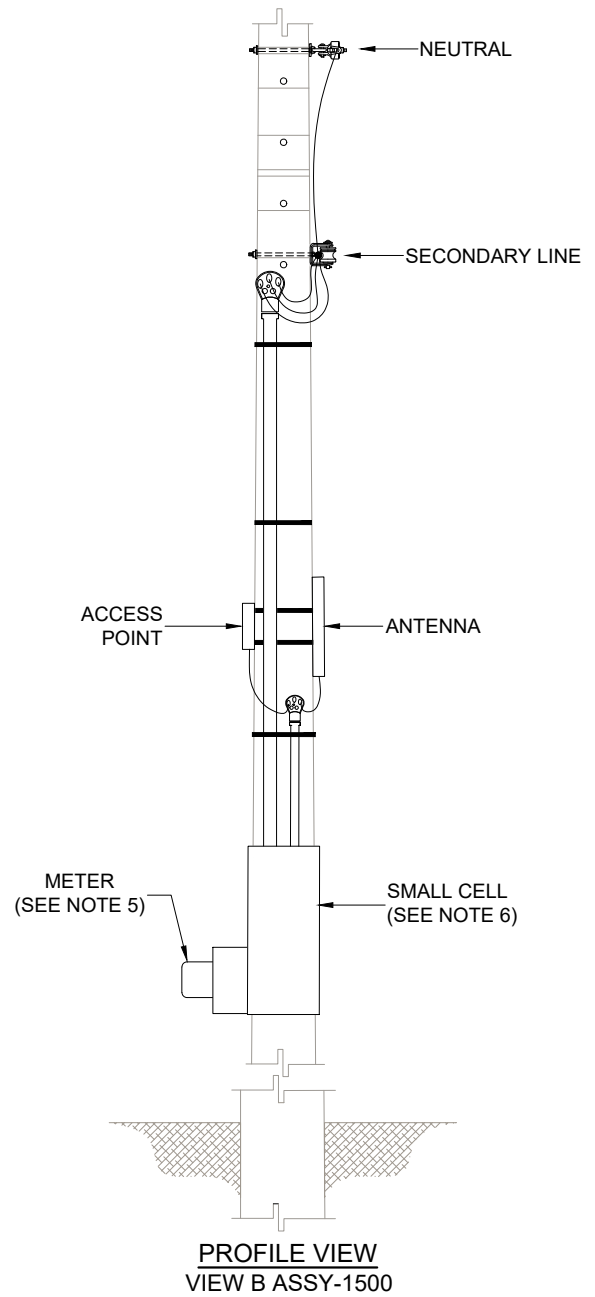
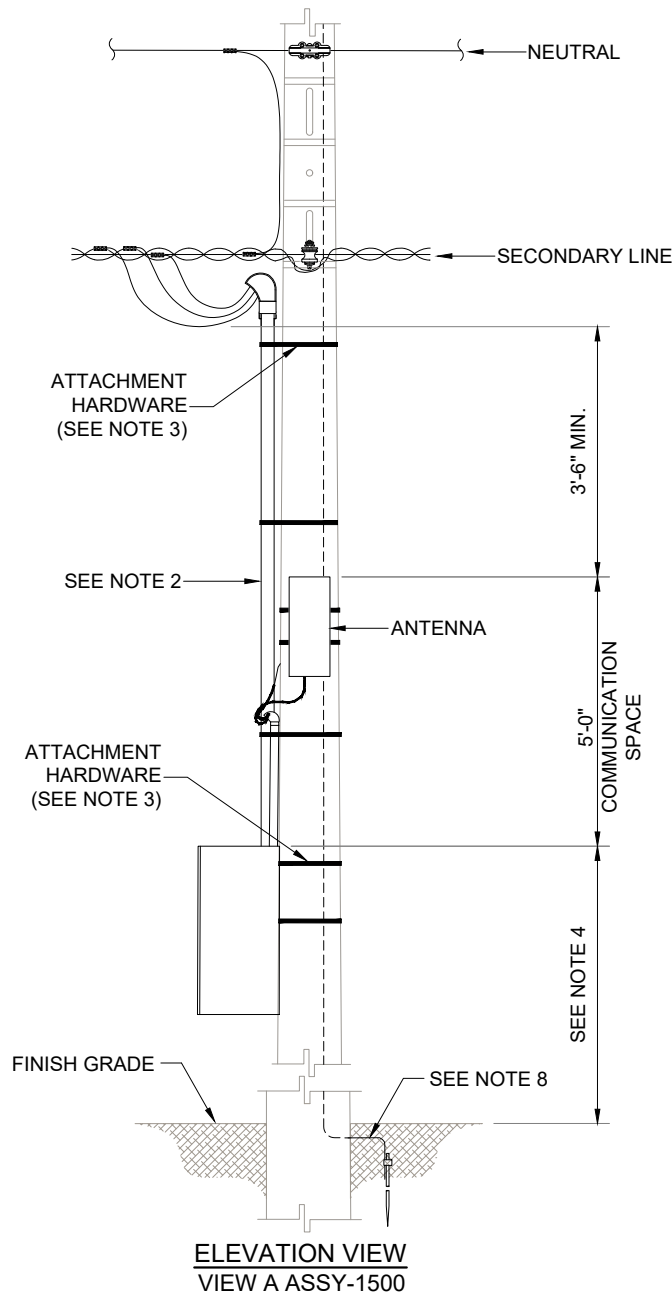
DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

OVERHEAD FED ANTENNA
MAXIMUM VOLTAGE: 240 V

STANDARD NO. ANT-01 VERSION 4
DOCUMENT NO. 4301.064
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DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

OVERHEAD FED ANTENNA
MAXIMUM VOLTAGE: 240 V
NOTES

STANDARD NO.	ANT-01	VERSION	4
DOCUMENT NO.	4301.064		
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DIGITIZED	EMILIO CUADRADO LIC. 3000		
	VICTOR R. FEBRES LIC. 3412		

NOTES:

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4. VERTICAL CLEARANCE OF THE CABINET SHALL COMPLY WITH CURRENT NATIONAL ELECTRICAL SAFETY CODE (NEC). THE TOP OF THE CABINET 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".



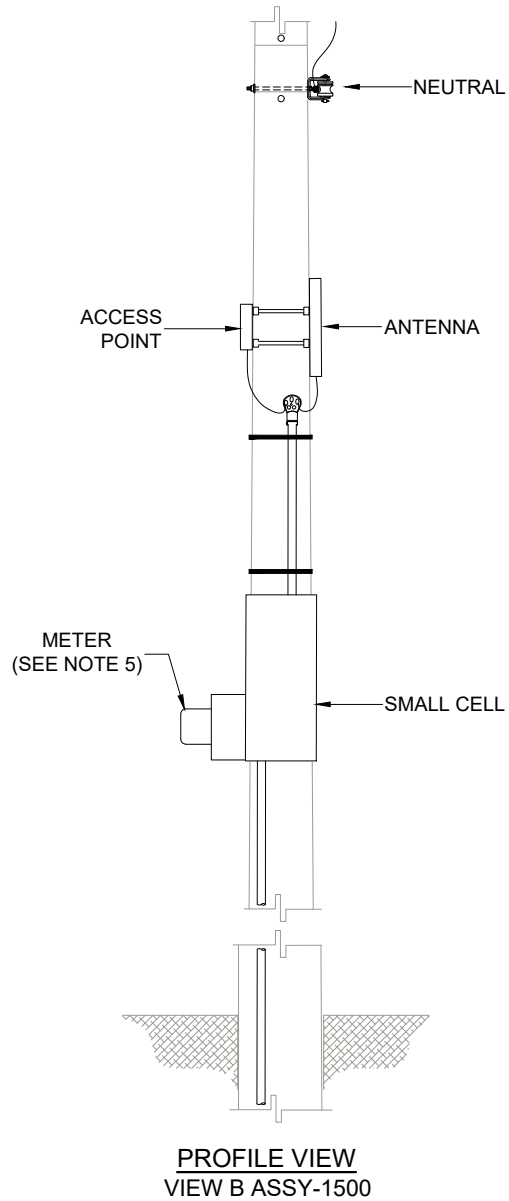
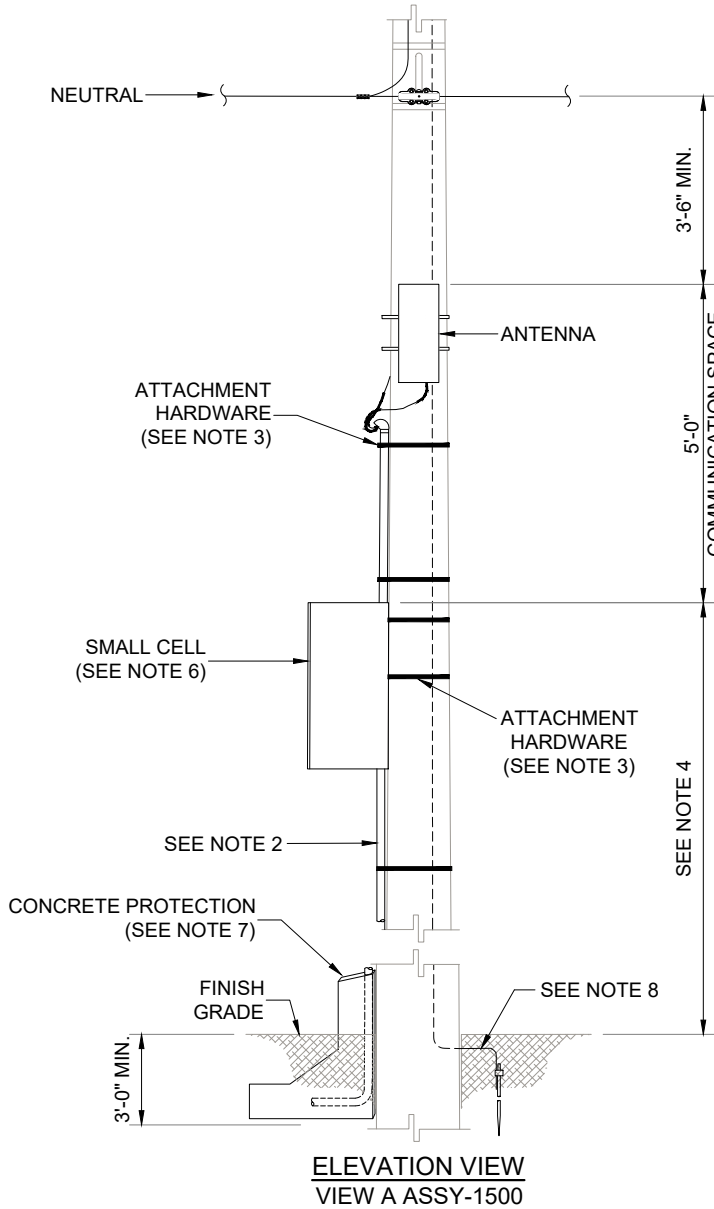
DISTRIBUTION ENGINEERING

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
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000
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		
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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.
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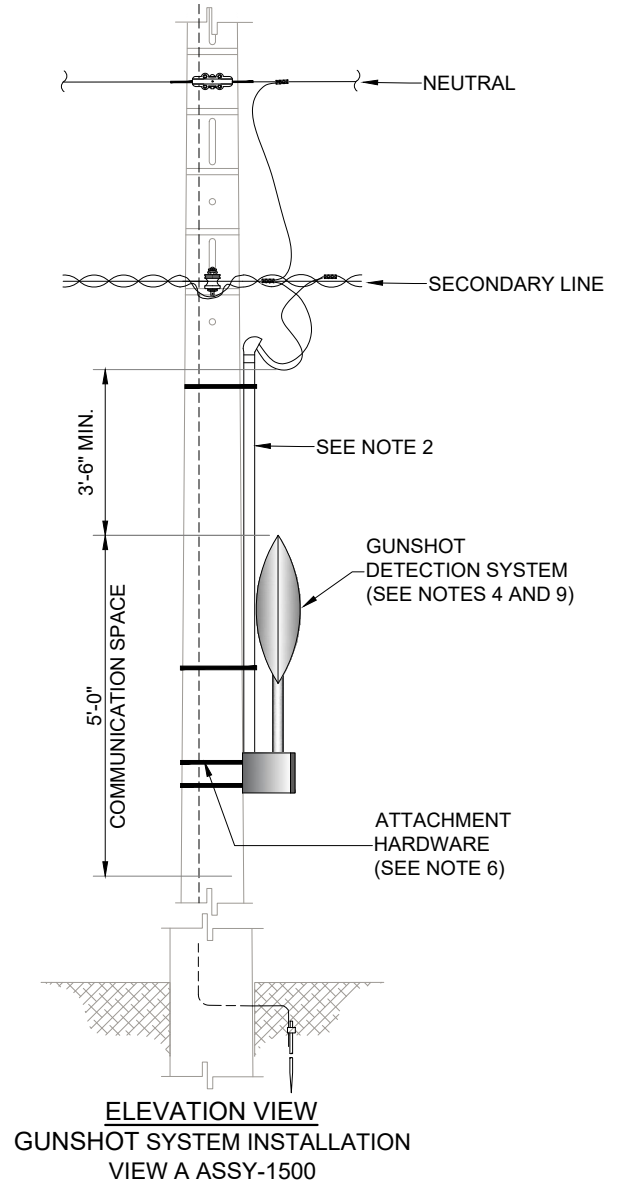
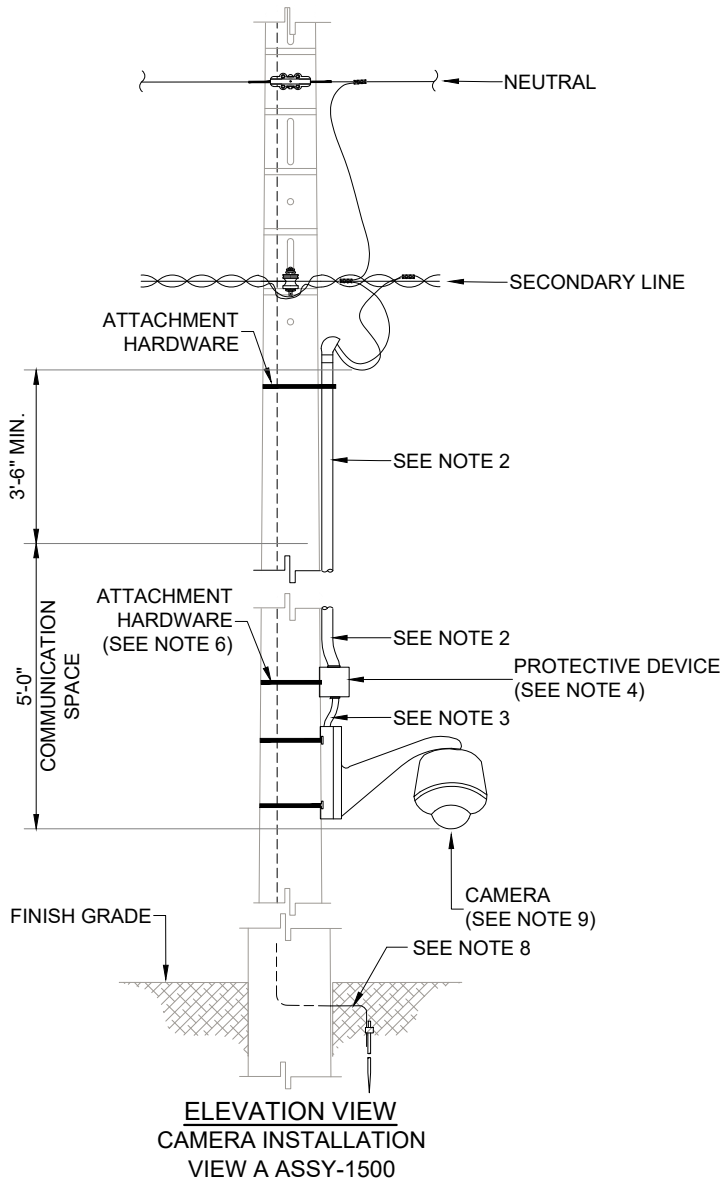
DISTRIBUTION ENGINEERING

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: <p style="text-align: center;">OVERHEAD FED SURVEILLANCE CAMERA, GUNSHOT DETECTION SYSTEM AND WIRELESS COMMUNICATION EQUIPMENT MAXIMUM VOLTAGE: 240 V NOTES</p>	STANDARD NO. <u>CAMVIG-01</u> VERSION <u>4</u> DOCUMENT NO. <u>4301.080</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>
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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.
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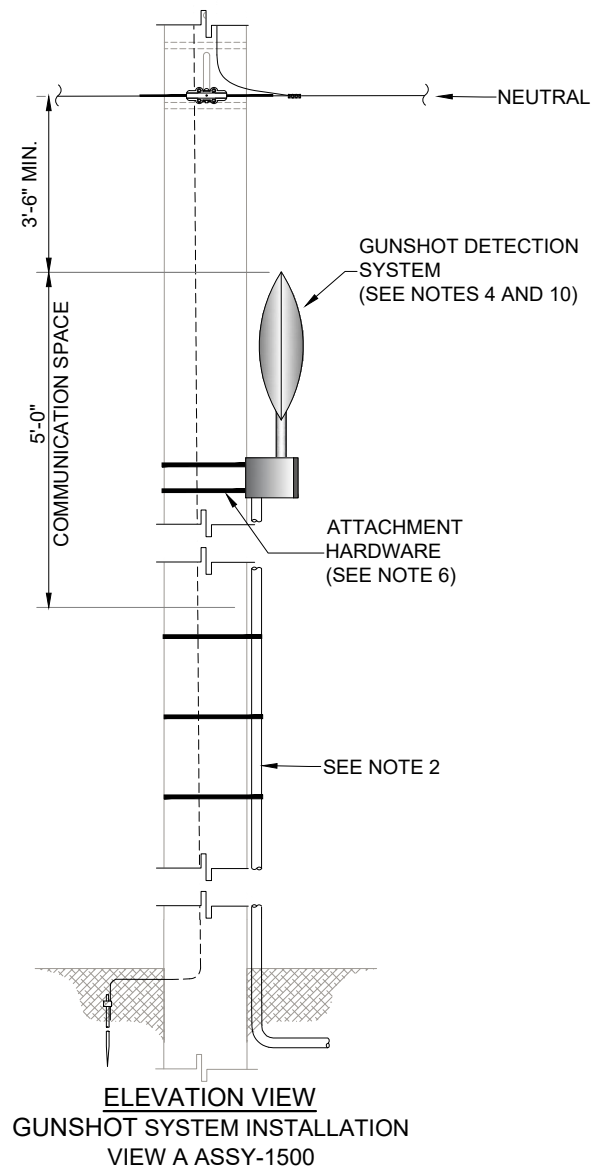
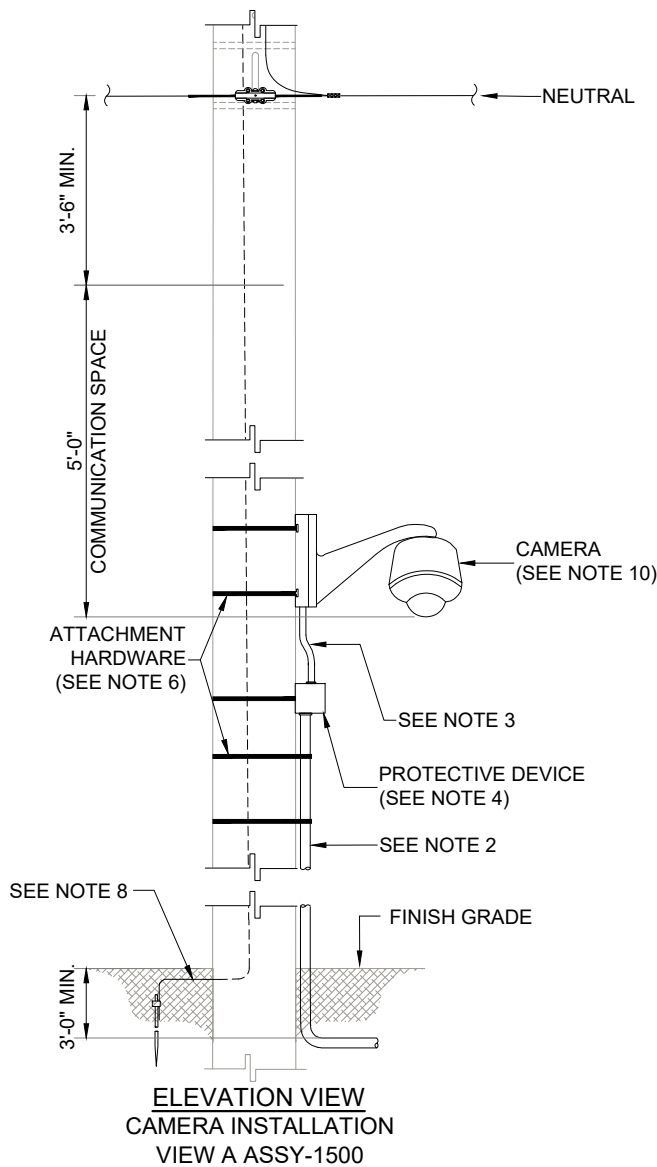
DISTRIBUTION ENGINEERING

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>TITLE:</p> <p style="text-align: center;">UNDERGROUND FED SURVEILLANCE CAMERA, GUNSHOT DETECTION SYSTEM AND WIRELESS COMMUNICATION EQUIPMENT</p> <p style="text-align: center;">MAXIMUM VOLTAGE: 240 V</p> <p style="text-align: center;">NOTES</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</u> OF <u>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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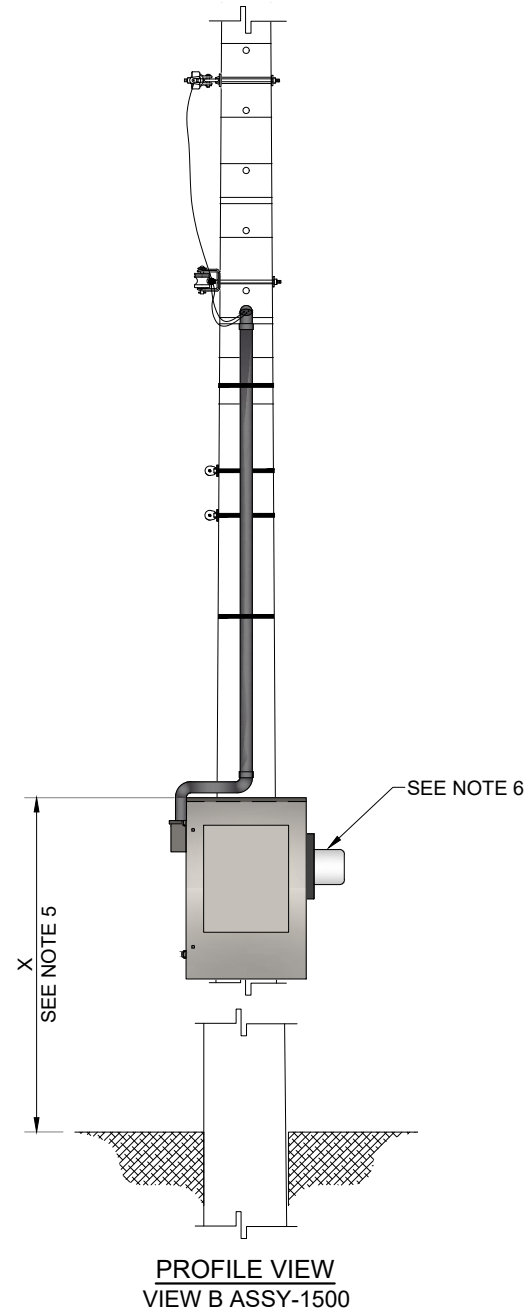
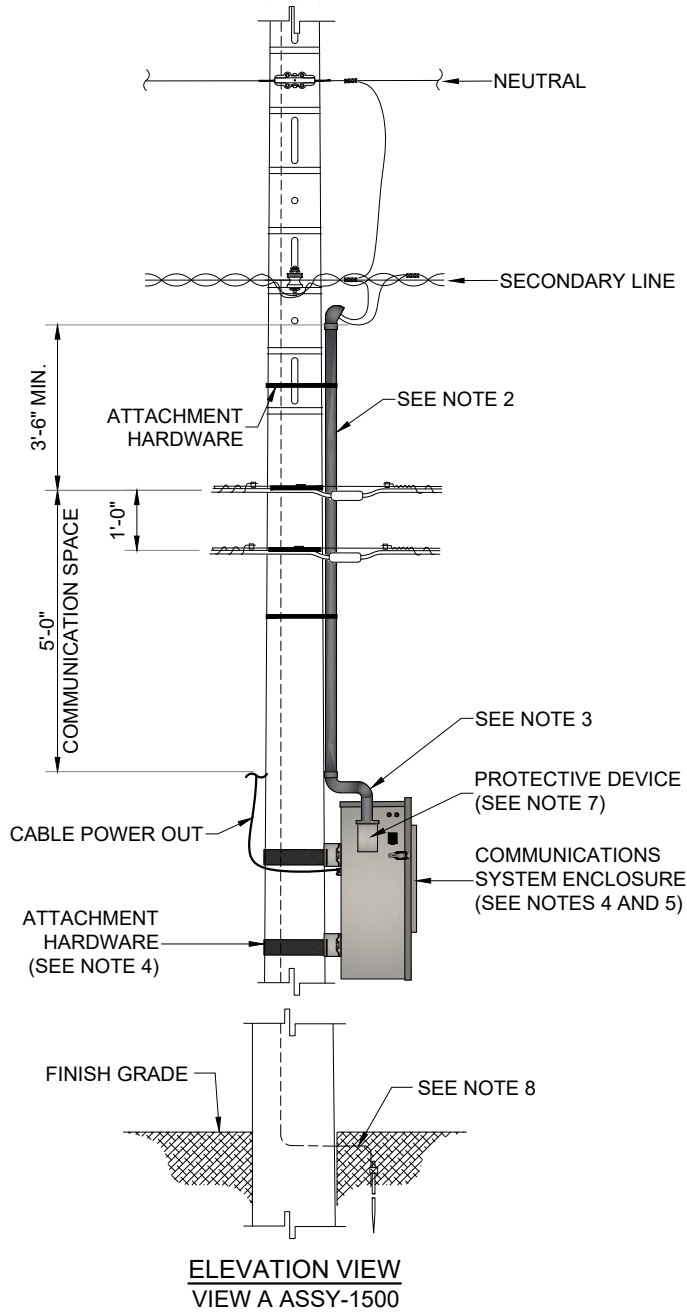
DISTRIBUTION ENGINEERING

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
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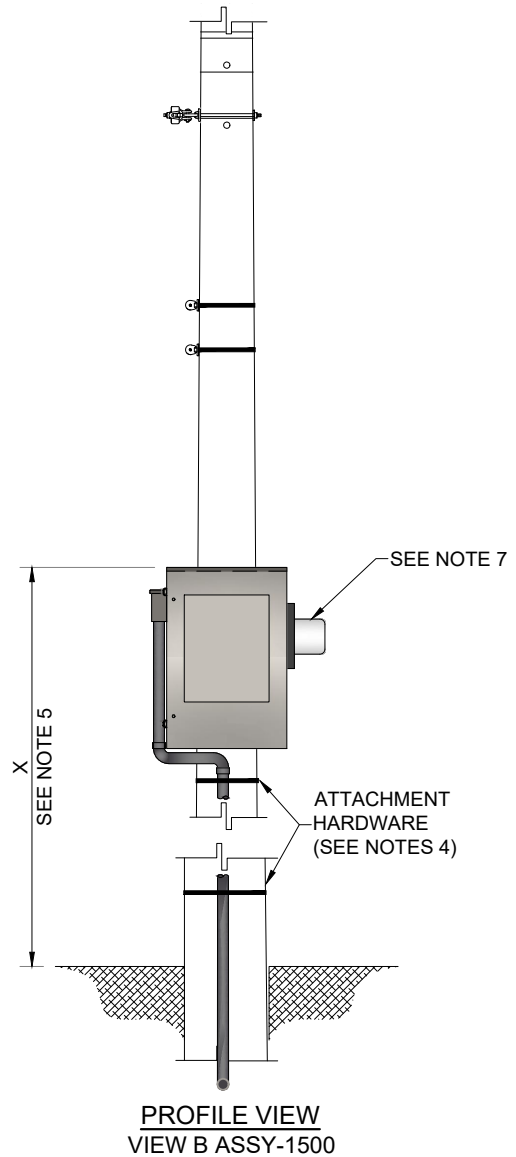
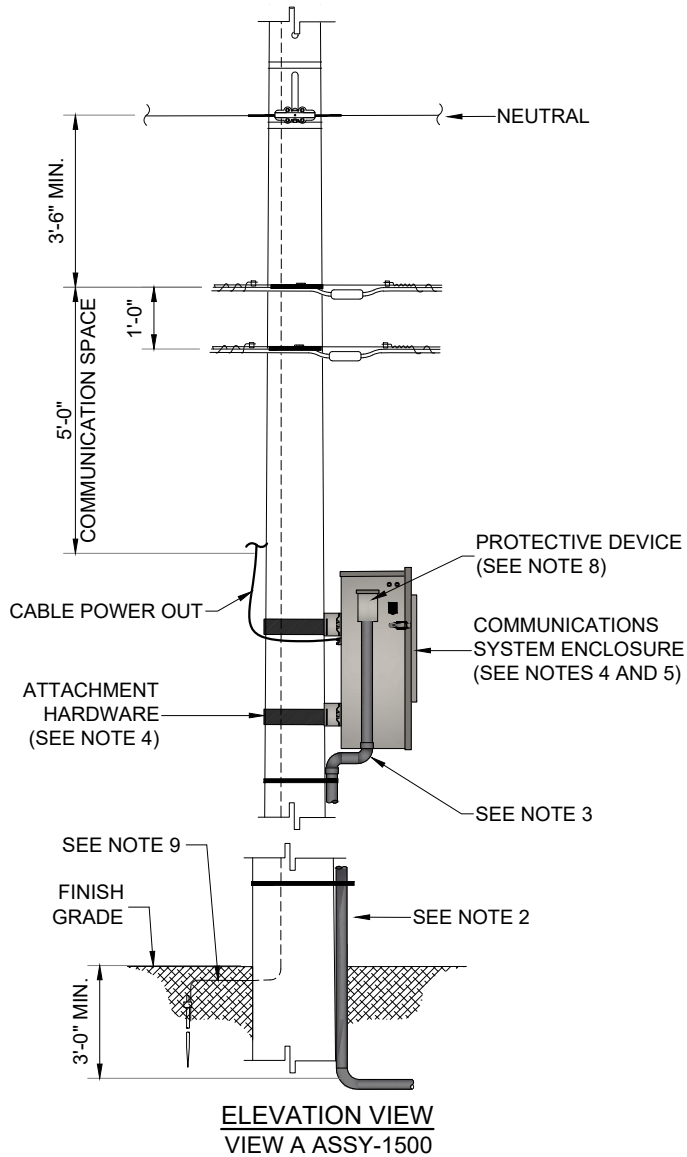
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OVERHEAD DISTRIBUTION STANDARDS

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
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UNDERGROUND FED COMMUNICATIONS
SYSTEM ENCLOSURE
MAXIMUM VOLTAGE: 240 V
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4400.02.001 TPA Engineering Standards

Final Audit Report

2026-03-27

Created:	2026-03-27
By:	Kary Gonzalez (kary.gonzalezmonzon@lumapr.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAAnPZ91k7Kvoi_35lueKVg0ZEU4NMnEjtp

"4400.02.001 TPA Engineering Standards" History

-  Document created by Kary Gonzalez (kary.gonzalezmonzon@lumapr.com)
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