



Customer Guide for Electric Service – NJ

June 2024

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SUMMARY OF MAJOR CHANGES TO THIS GUIDE
(October 2023)

This document supersedes the FirstEnergy “*Customer Guide for Electrical Service – NJ document*” dated October 2018

Significant changes to the text from the last published version are identified in this document by a vertical bar in the left-hand margin (refer to the example for this paragraph). Additionally, significant changes to the text (listed by section) and to the exhibits (listed by exhibit number) are summarized in the table below:

Section	Changes
General	To be consistent with other FE State operation, FEOC (Ohio) will no longer be responsible for supplying 400-Amp meter socket to the customer. Due to FE organizational changes “ <i>regional</i> ” offices are now called “ <i>local</i> ” offices.
1.0	Revised 7 th paragraph on how to access the current copy of the on-line version CGES from the Corporate website. Added paragraph 8 about identifying significant changes within this document. Revised last paragraph to update department name and address on where to send comments or changes.
2.0 (Definitions)	Added new definitions: <i>Backfeed, Backfill, CGES, Developer, Harmonic, Meter Socket, Combination, Power Factor, Primary, Private Right-of-Way, Qualified Person, Secondary/Secondary Main, and Watt-hour</i> . Revised the definitions of: <i>ATSI, Approved, Distribution Lines, FAA, Final Grade, Line Extension, Meter Socket, Mobile Home, NEC, Select Backfill, Tariff, and Temporary Service</i> .
3.1	Third paragraph is new.
3.2	Revised the necessary steps to access the current on-line copy of <i>Application Builder Install Request Form 1046</i> . Added a 24-week lead time for large developments. Added reference Developer Drawing Specifications, Appendix 2.
3.3	Added 3 rd paragraph and beyond to define residential dwelling and mobile/manufactured home.
3.8	Added 2 nd paragraph prohibiting 5 th grounding conductor in pad-mounted transformers.
3.11	Added exceptions to allow for meter collar devices to be installed by approved electricians
3.12	Reworded for clarity.
3.13	Entire section was revised to add clarity concerning the One-Call process. .
3.16	Add “ <i>to & Painting of</i> ” to section Header.
3.17	Revised 2 nd bulleted item for both “ <i>Trees & Transmission Rights-of-Way</i> ” and “ <i>Trees & Distribution Lines</i> ” for revised steps to access information links.
3.18	3 rd paragraph: add the following new text “ <i>Company personnel are not permitted to climb onto the customer’s roof. Therefore, all connections and other Company work shall be accessible from a ladder or bucket truck on a suitable surface for the equipment</i> ”
5.3	New 2 nd paragraph: Added the requirement: “ <i>Meter poles shall be a minimum of five feet away from the structure.</i> ”
6.1	Revised UG Riser requirements 4 th paragraph: Removed text: “direct buried cables and”. In (6 th paragraph): Added “ <i>The customer shall coordinate the installation with the Company</i> ”.
6.2	Changed header. Added new paragraphs 3 and 4. .
6.3	Changed header. Last paragraph added: “ <i>Note: Approved self-contained meter sockets are limited to a maximum conductor size of 600 kcmil</i> ”.
6.4	Changed header. Split paragraph 2 into 2 paragraphs.

6.6	Added “ <i>transformer foundations</i> ” to paragraphs 2 & 3.
Section	Changes
7.1	paragraph ,, second bulleted item add “ <i>on a single-phase or three-phase 480-Volt self-contained metering installation</i> ” Added 3rd paragraph: “ <i>When emergency disconnects are required by the NEC, they shall be located on the load-side of the metering</i> ”.
7.5	The Minimum Requirements Table was separated into 2 table. In the first table after the 11 th bulleted item most of the table was revised. Table 2 is all (including format).
7.6	Added guidelines around meter collar devices.
7.8	Added 2 nd paragraph the requirement that services less 400 amps be self-contained metering and evaluated when service is changed or upgraded.
7.9	Added the requirement to consult the Company before beginning any installation requiring instrument transformers. Removed requirement for telephone service.
7.10	Revised the entire section including the “CT Enclosure Approved Manufacturers
8.4	Changed cooking to electrical cooking for clarity. Added Electric Vehicle Charging information. Split the section into 2 paragraphs.
8.6	Revised the process steps to access to “ <i>Generator Interconnection</i> ” on the corporate website.
Exhibit	Changes
1	Updated Company/Customer requirements. Added Notes 2 & 3. Reworded Note 4. Added Note 7, requirement that customer supplies and installs all UG conduit. Added Note 8 metering disconnect.
2	Revised title. Added clearances for services above decks and railings plus other minor changes. Add 30” clearance between meter socket and any door or window
3	Added (Max 75’) to service drop by Company on drawing. and “structure shall be accessible from a bucket truck.” Added through bolts required for attaching equipment to pole. Minor revisions to drawing. Remove old Note 8 (external ground rods) then renumber Notes.
4	Added through bolts required for attaching equipment to pole. Remove old Note 8 (external ground rods) then renumber Notes.
5	Added Customer to title. Add main disconnect to the drawing
6	Revised Note 2. Connections shall be accessible from a ladder. Company personnel are not permitted to climb on customer’s roof. Revised Note 3 (remove external ground rods). Revised Note 3. Added main disconnect to the drawing.
7	Added Typical to title. Minor word changes,
8	Moved the slip-joint to below the top clamp on drawing. Change drawing to depict preferred cable in conduit option. Remove old Note 4 (external ground rods) then renumber Notes. Added main disconnect to the drawing. Add new Note 6 reducer.
10B	Change 3 notes on the drawing. Added drawing notes Company-owned pole and Company-provided handhole/pedestal.
11	Revised Note 5 : Added that the pole shall be new when installed. Added Note 6. Removed CT option drawing from the Exhibit.
12	Revised the title. Revised minimum size support posts to 2 ½ inch. Replace Note 5 (external ground rods) with old Note 6. Added new Note 6: ground movement protection.
13	Added that the pole shall be new when installed. Revised minimum size of support posts to 2 ½ inch. Added new Note 2. Removed old Note 9 (external ground rods), renumber Notes, then add a new Note 11 (ground movement protection).

14	Added that the pole shall be new, 30 ft when installed. Revised minimum size of support posts to 2 ½ inch. Remove old Note 6 (external ground rods), renumber Notes, then add a new Note 10 (ground movement protection).
16	Changed title. Reviser for bottom drawing.
Exhibit	Changes
17	Revised the entire Exhibit. Added drawings of common 1φ self-contained meter sockets. Replaced all Notes.
18	Revised the entire Exhibit. Added drawings of common 1φ self-contained meter sockets. Replaced all Notes.
19	Revised drawing to better show the current transformer configuration and wiring. Remove old Note 7 (telephone link requirement), renumber Notes, then add a new Note 10. Note 10 – Do not run a separate grounding conductor from current transformer cabinet to main disconnect. Removed telephone link requirement. Add Note to require load side and source side labels in the CT cabinet.
20	Remove old Note 4 (telephone link requirement), renumber Notes, then added new Note 8.
21	Revised minimum size support posts to 2 ½ inch. Remove old Note 9 (telephone link requirement), renumber Notes.
22	Added labels to the drawings (window, fire hydrant pad-mounted equipment). Move old Note 9 to Note 1 and renumber Notes. Added decks and steps to Note 3. Added or high-pressure natural gas lines to Note 5, Added “at mature growth” to Note 9. Added Note 10.
23	Changed the title and other minor word changes.
24	Changed title. Added more detail to drawing. Limit elbow to max. 6” out of ground. Removed references to direct buried cables on drawing. Warning tape added to bottom 2 drawing. Notes were revised extensively and expanded.
25	Minor revisions to drawing (page 1). Expanded Pre-cast Concrete Foundation table to add transformer voltage details (page 2). Added Notes 3, 6, & 7 (page 3). Added page 4 and Notes 10,11, & 12.
26 & 27	On drawing changed “crushed stone or gravel” to “#57 AASHTO crushed stone,” Added Note 1 and renumbered, Deleted old Note 5 (requirement for a telephone line conduit).
28	The following Notes were revised 3, 5, 11, 14, & 15.
29	Revised title. Added drawing (top right) illustrating acceptable conduit locations. Notes were revised renumbered and expanded.
30	Revised title. Added info on top drawing concerning the removable posts.
31	New Exhibit. Typical Underground Service - Traffic Signal, CATV, or Communication Stand-Alone Equipment.
Appendix	Changes
2	Added new appendix.

1.0 INTRODUCTION

This Guide is published to provide pertinent specifications, information, and guidance to assist customers and their architects, engineers, builders, and contractors in planning for and obtaining a safe and prompt electric service.

The information and exhibits contained herein convey general knowledge and do not provide every detail or every requirement. Furthermore, this information is supplementary to, and does not intentionally conflict with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the Company's current applicable tariffs (as defined in Section 2.0), or such state and municipal laws and ordinances as may be in force and applicable within the cities, towns, or communities in which the Company furnishes electric service. It is always necessary for customers and contractors to comply with state statutes, local ordinances, and the Company's rules, regulations, and tariffs on file with the New Jersey Board of Public Utilities (NJ BPU). To the extent that any information included in this guide contradicts any terms in the Company's current applicable tariff, the tariff provision shall govern.

The Company shall have the right to refuse to connect any wiring or installation that does not fully meet the aforementioned requirements, regulations, and rules. The Company shall also have the right to disconnect the wiring or installation of any customer violating any such requirements, regulations, or rules. This action is not intended to imply that the Company undertakes any obligations to inspect the customer's wiring and electrical facilities, to assume any obligations, or to make any representations concerning their adequacy, safety, fitness for purpose, or other qualification. Nothing in the aforementioned requirements, regulations, rules, or in this Guide shall be construed as imposing or undertaking such obligations or representations.

All inquiries regarding service requirements shall be directed to the Company's local Engineering Services Section. Inquiries regarding specific meter related requirements can be directed to the Company's local Metering Services Section. Any inquiries regarding the NEC or local codes shall be directed to the local or state inspection authority.

Mandatory rules of this document are those that identify actions that are specifically required or prohibited and are characterized by the terms **shall** or **shall not**.

This Guide is subject to periodic revision and will be reissued as needed. It is the responsibility of the user to obtain the current version of the Guide before using it. The current edition of this Guide supersedes all previous versions.

The current edition of this guide is always available on the FirstEnergy Corporate website at www.firstenergycorp.com. From the home page, page down to the "**Do Business With Us**." Then select "**Customer Guides**." Then click on the plus sign besides "**Customer Guides for Electric Service**." Finally, click on the desired state version that you want.

Significant changes to the text from the last published version are identified in this document by a vertical bar in the left-hand margin (see example in the left-hand margin of this paragraph). Major changes to the text and to the exhibits will be listed in the "*Summary of Significant Changes to This Guide*" Section of this Guide.

Comments, corrections, and suggestions regarding this document should be submitted in writing to the Director, Distribution Engineering Support at FirstEnergy Service Company, 2800 Pottsville Pike Reading, PA 19612.

2.0 DEFINITIONS

Terms frequently used in this Guide are defined below (for additional definitions, refer to the latest edition of the National Electrical Code):

- **American National Standards Institute (ANSI):** ANSI is an independent administrator and coordinator of voluntary industry standards (www.ansi.org).
- **Ampacity:** Ampacity is the maximum current, in amperes (amps), that a conductor or equipment can carry continuously under the conditions of use without exceeding its temperature rating.
- **Application for Service:** Application for service is a formal request submitted by the customer or their agent to the Company stating their desire to obtain electric service at a certain time and location. Applications may be processed by e-mail, telephone, or fax through the Company's Customer Service Center.
- **Approved:** Work, equipment, or material that is acceptable to the FirstEnergy Operating Company or to the Authority Having Jurisdiction (e.g., the electrical inspector).
- **Authority Having Jurisdiction (AHJ):** An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure (e.g., the electrical inspector).
- **Backfeed:** Backfeed is to energize a section of a power network that is supplied from a source other than its normal source. This may be a safety hazard (e.g., a customer's improperly installed backup generator).
- **Backfill:** Backfill is clean soil, free of large rocks (i.e., greater than two (2) inch diameter), sharp rocks, perishable material, or other debris. Also see "select backfill."
- **Buried Underground Distribution (BUD):** BUD is the electrical system in which the distribution lines and service conductors, with minor exceptions, shall be placed in underground conduits.
- **Central Business District (CBD) Network:** A CBD is a specialized electrical underground system that serves a defined area commonly located in the heart of the city (a.k.a. downtown) that is typified with a high concentration of multistory commercial, retail, and office buildings.
- **Class of Service:** The characteristics of electric service described in terms of voltage, phase, frequency, (i.e., 60 Hertz), and the number of service wires (i.e., 3- or 4-wire).
- **Clearance:** Clearance is a specified minimum distance between two objects (measured surface-to-surface) to assure adequate space for safety, security, or access.
- **Code:** The National Electrical Code (NEC), National Electrical Safety Code (NESC), or other electrical codes or regulations that are in effect and applicable in the area served.
- **Company:** In this Guide, Company refers to the FirstEnergy Operating Company (FEOC) that operate in New Jersey – Jersey Central Power and Light (JCP&L).
- **Current Transformer (CT):** A current transformer is a transformer whose secondary current is a precise fraction of its primary current. CTs are often referred to as an instrument transformer and are typically used for revenue metering.
- **Customer:** Any person, partnership, association, corporation, or agency of municipal, county, state, or federal government receiving any service rendered by the Company at a contract location. This includes the party using the Company's service, or in applicable cases, the property owner, developer, or any party working on behalf of the customer such as an engineer, builder, contractor, or developer.
- **Customer's Installation (Electrical):** All wiring, conduit, meter socket, service disconnecting devices, appliances, lighting, and other equipment installed and/or owned by the customer on the customer's premises for the customer's use. The installation of the customer's electrical equipment is typically governed by the NEC as well as other local rules.
- **Department of Environmental Protection (NJDEP):** Refer to www.state.nj.us/de/p/.

- **Customer Guide for Electric Service (CGES):** The CGES is a FirstEnergy document detailing the Company's minimum requirements by state for electric service to individual locations including information on service laterals, meter installations (less than 600 V), and customer equipment.
- **Developer:** The individual, company, or organization responsible for the construction of the planned project of residential, commercial, and/or industrial recorded plot plan requiring multiple electric services from the Company.
- **Development:** A planned project, which is developed by a developer/applicant, for electric service set out in a recorded plot plan for the construction of single-family residences, detached or otherwise, mobile homes or apartment houses, all of which are intended for year-around occupancy, if electric service to the lots necessitates extending the utility's existing distribution lines.

In New Jersey, Underground Residential Developments (URD) are mandatory for residential subdivisions consisting of three or more building lots.
- **Distribution Lines:** Company electrical lines of medium voltage and below typically located in the public rights-of-way in/or along streets, alleys, highways, or on private property used for general distribution of electric service to retail customers. The electrical distribution system collectively includes the primary, secondary, and services.
- **Environmental Protection Agency (EPA):** The EPA is an [agency](#) of the [U.S. federal government](#) that protects human health and the environment by writing and enforcing regulations based on laws passed by Congress ([www.epa.gov](#)).
- **Federal Aviation Administration (FAA):** The Federal Aviation Administration is the national aviation authority of the United States. FAA is agency of the United States Department of Transportation and has the authority to regulate and oversee all aspects of American civil aviation ([www.faa.gov](#)). FAA requires notification when working near aviation facilities and may impose pole placement or pole height restrictions to maintain aviation safety.
- **Final Grade:** Final grade is the eventual permanent ground level after all finished grading, paving, and landscaping is completed. Final grade shall be used when determining minimum clearances for overhead or minimum depth for underground facilities.
- **Harmonic:** Harmonic is a sinusoidal component of a periodic voltage or current wave or quantity having a frequency that is an integral multiple of the fundamental frequency (60 Hertz). Note: For example, a component, the frequency of which is twice the fundamental frequency, is called a second harmonic. Harmonic frequencies are produced from use of non-linear loads. Harmonics are important consideration in power quality discussions.
- **High-Leg:** On a four-wire, delta-connected system where the midpoint of one phase winding is grounded to supply lighting and similar loads, the conductor or busbar having the higher phase voltage to ground shall be durably and permanently marked by an outer finish that is orange in color or by other effective means. Such identification shall be placed at each point on the system where a connection is made if the grounded conductor is also present. (Reference NEC Articles 110.15 and 230.56).
- **Instrument Transformer:** An instrument transformer is a high-quality transformer that accurately reproduces in its secondary circuit, a current (CT) or a voltage (VT) in proportion to the current or voltage in the primary circuit, respectively. Instrument transformers are typically used for revenue metering or protection schemes.
- **Institute of Electrical and Electronics Engineers (IEEE):** IEEE is an organization composed of engineers, scientists, and students. IEEE is best known for developing standards for the computer, electrical, and electronics industries ([www.ieee.org](#)).
- **Line Extension:** The extension of the Company's electrical facilities (including but not limited to poles, fixtures, transformers, wires, cables, vaults, foundations, and appurtenances) necessary for delivering electrical energy from the point where a line extension connects with and receives energy from an existing transmission or distribution source, which is the nearest and suitable source, to the new service line, which will provide electric service to the customer. Line extension rules and costs are further defined in each Operating Company's tariff on file with the state.

- **Listed:** Equipment, materials, or services included in a list published or are marked by an organization (e.g., “UL Listed”) that is acceptable to the Authority Having Jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that the equipment, material, or services either meets appropriate designated standards or has been tested and found suitable for their specified purpose.
- **Meter (Electrical):** Meter is a device for accurately measuring the electric power and energy consumed by a customer. The Company supplies, installs, and maintains the meter.
- **Meter Socket:** A meter socket is a mounting device consisting of meter jaws, connectors, and enclosure for receiving a socket-type meter. They come in two basic types – self-contained or transformer-rated. A self-contained meter socket provides for a self-contained meter to be installed in series with the customer’s electrical service, whereby all the load current passes directly through and is measured by the meter itself and requires no additional equipment. Self-contained meters and sockets are rated by their continuous ampacity, such as 200 amp or 320 amp.

When the load current is expected to exceed the ampacity rating of a self-contained meter equipment, or when the service voltage is greater than 480 volts, transformer-rated metering is required. Transformer-rated meter sockets are enclosures with meter jaws, connectors, and a test switch. It is interconnected to current and voltage transformers (if used). These transformers reduce the actual load current and/or service voltage being supplied to and measured by the transformer-rated meter. When billing occurs, a precise multiplier is applied to a transformer-rated meter to indicate the actual customer usage.

- **Meter Socket, Combination:** A combination meter socket generally consists of a single enclosure having multiple internal compartments. One compartment is to receive a socket-type meter, and other compartments may be occupied with disconnects, main breakers, fuses, etc.
- **Mobile Home:** A mobile home is a manufactured home that complies with the mobile home definition in the NEC. In this Guide, a mobile home is a unit with a permanent chassis that is designed to be used as a dwelling without a permanent foundation. It shall be supplied service under the provisions of Exhibits 13 and 14 and the NEC.
- **National Electrical Code [NFPA 70] (NEC):** The NEC is a set of national regulations that govern the installation of electrical equipment located on the customer’s side of the point of service. All NEC references refer to the latest state adopted version of the NEC (<https://www.nfpa.org/NEC/>). Each state defines when and what codes (or parts of codes) are applicable.
- **National Electrical Safety Code [IEEE C2] (NESC):** The NESC is a set of national regulations that govern the installation, operation, and maintenance of the electric supply and communication lines. NESC applies to equipment located on the electric utility’s side of the point of service. All NESC references refer to the latest adopted version of the NESC.
- **National Fire Protection Association (NFPA):** The NFPA is a United States trade association, albeit with some international members, that creates and maintains private, copyrighted, standards and codes for usage and adoption by local governments (www.nfpa.org). See the NEC.
- **New Jersey Board of Public Utilities (NJ BPU):** The NJ BPU (<https://www.nj.gov/bpu/>) is the state regulatory agency that has jurisdiction over the New Jersey electric utilities, including JCP&L.
- **Notification or Design Request (DR) Number:** DR is a unique number assigned by the Company used for designing, tracking, constructing, and billing of a specific job by the Company Contact Center. This number should be used in any communication with the Company.
- **Occupational Safety and Health Administration (OSHA):** OSHA is a federal government agency in the Department of Labor that adopts and enforces regulations to maintain a safe and healthy work environment (www.osha.gov).

- **Point of Service:** Point of service is that point where the Company's electrical equipment or conductors connect to the customer's electrical conductors or equipment of the facility. The "point of service" is also known as the "point of delivery."
- **Power Factor:** The ratio of Watts to Volt-Amps. The difference between the two is caused by reactance in the circuit and represents power that does no useful work. Typically, power factor is expressed as a percentage. Refer to Section 8.2.
- **Primary:** Company-owned conductors (cables) connected to low-side of a distribution substation transformer that provide medium voltage power to high-side of distribution transformers located near the customer's premises. Typically defined by the Company as voltage ranging between 2.4 kV to 34.5 kV.
- **Private Right-of-Way:** – The right-of-way or easement for electric facilities on, over, under, across and/or through property owned by an individual or entity which is not a governmental, municipal, or other public body to provide service.
- **Qualified Person (Electrical):** A person who has skills and knowledge related to the construction, operation, and maintenance of electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.
- **Raceway:** A raceway is an enclosed channel used for holding wires or cables.
- **Secondary/Secondary Main:** Company-owned conductors (cables) connected to the secondaries of distribution transformers from which customer services are supplied (less than 600 V).
- **Select Backfill:** Select backfill is graded sand, stone dust, limestone dust, earth, or topsoil that is free from large or sharp objects, rocks, scrap building material, or corrosive material. Materials that "set up" such as fly ash, culm, and foundry waste are not acceptable. It is used to backfill a trench for buried conduit and is used to ensure the future integrity of the conduit and buried electrical cables.
- **Service:** Delivering electric energy from the Company's distribution system to a single point of connection at a customer's premises.
- **Service Drop:** A service drop is a Company-owned set of overhead conductors (including the connectors) that extend from the last pole or other aerial support to the customer-owned service entrance conductors at the building or other structure.
- **Service-Entrance Conductors, Overhead System:** The service entrance for an overhead system is the group of service conductors running between the terminals of the service equipment and a point usually outside the building, clear of building walls, where joined by tap or splice to the service drop.
- **Service-Entrance Conductors, Underground System:** The service entrance for an underground system is the group of service conductors running between the terminals of the customer-owned service equipment and the point of connection to the Service Lateral.
- **Service Equipment:** Service equipment is the necessary customer-owned electrical equipment, usually consisting of circuit breakers or switches and fuses, and their accessories, located near the point of entrance of supply conductors to a building, and intended to constitute the main control and means of cutoff for the electrical supply to that structure.
- **Service Lateral:** A set of underground service conductors extending from the Company's electric distribution facilities, including any risers at a pole or other structure or from transformers, handholes, or pedestals to the first point of connection to the service entrance conductors in a terminal box, meter, or other enclosure with adequate space, inside or outside the building wall.
- **Service Territory (Electric):** Service territory is a defined area in which a given electric utility can legally provide service. The area is governed by a set of agreements and maps on file with the NJ BPU.
- **Tariff:** Tariffs are a set of rate schedules and riders, rules, and regulations for providing electric service throughout each Operating Company's defined service territory. The applicable Company Tariffs are filed with and approved by the NJ BPU.
- **Temporary Service (Electrical):** A service line, meter, and/or other work supplied by the Company to the customer for electric service for construction purposes or for a limited duration, typically no longer than one year, and delivered to a single point through one meter.

- **Underwriters Laboratories (UL):** Underwriters Laboratories is an independent product testing and certification organization (ulstandards.ul.com).
- **Uninterruptible Power Supply (UPS):** An uninterruptible power supply (e.g., battery or flywheel backup) is an electrical apparatus that provides emergency power to a load when the input power source is not available.
- **Voltage Flicker:** Voltage flicker is defined as a sudden fluctuation in system voltage, which can result in objectionable changes in the light output of electric lamps.
- **Voltage Transformers (VT) (a.k.a. Potential Transformers (PT):** A VT is a parallel-connected type of instrument transformer, used for metering of customer's load. VTs are designed to present negligible load to the supply being measured and to have an accurate voltage ratio to enable accurate metering.
- **Watt-hour (Wh):** A Watt-hour is a unit of measure of electrical energy equal to one watt of power supplied to, or taken from, an electric circuit steadily for one hour.
 - = (3.412) x (Btu (thermal))
 - = (2,655) x (ft lbs (force))

3.0 GENERAL INFORMATION

3.1 Availability & Character of Service

The information contained in this Guide refers predominately to service requirements at the usual voltages for residential and general service installations. Service installations greater than 600 volts are not covered in this Guide. The customer shall contact the Company with any questions regarding service at voltages greater than 600 volts. The Company's rules, regulations, and tariffs as filed with the NJ BPU, shall apply to the installation and use of the service furnished.

The customer shall consult the Company to determine whether the desired service is available at a specified location. This request should be made well in advance of the date actual service connection is required. If service is available, determine its exact character; that is, the voltage (such as 120/240 V, 208Y/120 V, or 480Y/277 V), single-phase, three-phase, etc., since these characteristics may vary by locations. These characteristics are especially important for the proper operation of motors and other major equipment. Normally, this information will be provided in writing from authorized Company personnel to avoid possible misunderstanding.

The Company may, if requested, advise, and assist existing or prospective customers in the selection of electrical equipment, facilities, capacitors, and protective coordination. When requested, the Company will provide information concerning its rates.

3.2 Application for Service

The customer shall make applications for each class of service for new, upgraded, or relocated, permanent or temporary service or when the customer identity changes. Before service is supplied by the Company, the customer shall complete the application process. Application may be submitted via the telephone, fax, or the Internet to a Company business office. The application should be submitted **well in advance** of the date, actual service is required. The appropriate telephone and fax numbers and Internet address are listed below:

Company	Telephone Number	Fax Number
Jersey Central Power & Light	800-662-3115	877-289-3674

A copy of the *Fax Application Builder Install Request Form 1046* can be found in Appendix 1. Application for electric service can found online at www.firstenergycorp.com. From the home page, page down to the “**Do Business With Us.**” Then select “**Customer Guides.**” Then click on the plus sign besides “**Establish Electrical Service Online – Upgrades, New Construction, Temp.**” Next click on “**New Construction / Upgrade / Temporary.**” Finally, select the “Type of Work” required.

After the necessary customer information is received and all customer requirements are met, the typical minimum lead-time to complete Company work is as follows:

Type of Extension	Lead-Time
Residential Service Drop / Lateral	4 weeks
Residential Line Extension	8 weeks
Commercial/Industrial Drop / Lateral	6 weeks
Commercial/Industrial Line Extension	16 weeks
Residential/Commercial/Industrial Development	16 weeks
Large Residential / Commercial / Industrial Development (i.e., 20 or greater lots)	24 weeks

Upon request, your Company representative will provide additional information on service details, work scope, and timelines. Timelines may be impacted by equipment lead times, influx of new service requests, outage restoration, and other unforeseen circumstances.

The following information is required from the customer. The Company cannot begin work until all the necessary information is provided and all customer requirements are met:

1. Service address (including nearest intersecting roads),
2. Lot number (and block number where applicable) and subdivision name,
3. County/Tax District name,
4. Contact persons (developer/architect, electrical contractor, etc.) names, addresses, mailing addresses, e-mail addresses, and their telephone/fax numbers,
5. Owner name, address, mailing address, e-mail addresses, and telephone/fax numbers,
6. Person to be billed (including their Tax ID or Social Security Number) and their mailing address,
7. Type of electric service desired – overhead (OH) or underground (UG),
8. Service voltage desired (e.g., 120/240 V single-phase, 208Y/120 V three-phase, or 480Y/277 V three-phase),
9. Amp rating of the main disconnecting means,
10. If Residential: Determine heating fuel (oil, gas, electric, etc.), water heater type and fuel, electric range, air conditioning (size, if yes), total square feet, preferred electric meter location, and number of services. Also, determine if any other large or special electric loads (e.g., welder, electric vehicle charging, or kiln) will be used.
11. If General Service (Commercial/Industrial): Electric one-line, load information (nameplate data) for all single-phase motors larger than five hp, three-phase motors larger than ten hp, tons of air conditioning, kW process heat, kW lighting, kW computers, presses, welders, x-ray machines, and other equipment having an in-rush current or other potentially disturbing characteristic, as well as other unusual loads.
12. For Developments: An approved plot plan, meeting the requirements laid out in the *Developer Drawings Specifications* document found in the appendix, drawn to scale showing crossroads, proposed structures, wells, septic, decks, drives/parking areas, pools, ponds, preferred service route, planned major landscape changes and future development areas, and any other known or proposed obstructions that may interfere with the Company supplying electric service. Electrical loading information will be required for the design. The customer/developer shall provide an executed and recorded Company standard blanket utility easement for their developments prior to individual lots being sold or the installation of any Company electrical facilities.
13. Date that the electric service is wanted.
14. For interconnected generation (solar, wind, etc.), refer to Section 8.6.

The customer/developer shall provide the Company with a copy of the customer plot plan, meeting the requirements laid out in the *Developer Drawings Specifications* document found in Appendix 2, showing the locations of buildings, lot numbers, property lines, streets, parking lots (if applicable), easements, underground facilities, obstructions, or utilities (if known), as well as proposed electric service entrances and metering locations. When requested, the customer/developer shall stake the locations of all proposed buildings, the lot lines, underground facilities or obstructions, driveways, and parking areas so that the Company can decide where to install its facilities.

The Company may refuse to provide electric service, consistent with New Jersey law and the Company's filed tariffs.

3.3 Line Extensions

To avoid delay, customers desiring service beyond the existing electric distribution lines of the Company shall contact the Company regarding the conditions under which service will be extended and make the necessary arrangements before wiring installations are commenced. Depending on the situation and the nature of the facilities desired or required, the customer may be responsible for some of the preparation and clearing of the property to remove trees, vegetation, and obstacles or to provide the following items: access for Company vehicles and

personnel, acquisition of recorded rights-of-way, easements, or permits, construction costs, and, for underground extensions, trenching, conduit, and backfilling. Note: difficulties in obtaining private rights-of-way and governmental permits (e.g., FAA, Army Corp of Engineers, or EPA permits) may result in significant delays to the construction.

Cost contributions are defined in the applicable Company's Tariff. The Company can provide the terms and conditions of extending its facilities to supply service upon request.

For an electrical service to be considered as residential, the dwelling should include the following attributes. (Note: The Company is the final arbiter.)

Masonry or Wood Structure ("stick built" or Modular) Type Home:

- Directly connected to a public water system, water well, or other reasonable source of potable water meeting all applicable local requirements,
- Directly connected to an approved septic system, a public sewage system, or an alternate sewage method meeting all applicable local requirements,
- Containing a living area, kitchen, and bathroom,
- Located on a permanent foundation.

Mobile or Manufactured Home:

- Directly connected to a public water system, water well, or other reasonable source of potable water meeting all applicable local requirements,
- Directly connected to an approved septic system, a public sewage system, or an alternate sewage method meeting all applicable local requirements,
- Wheels and axles removed,
- Underpinnings or some type of permanent connection (anchoring).

Vehicle-type units primarily intended as temporary living quarters, to include, but not limited to, recreational vehicles ("RV's"), motor homes, travel trailers, truck campers, park trailers and camping trailers shall not be considered as permanent. Mobile or manufactured homes for the purpose other than as a dwelling unit (i.e., on-site offices, mobile dressing rooms, banks, clinics, stores, or mobile displays) shall not be considered as permanent.

3.4 Number of Services & Meters

The Company will connect only one set of service conductors to each separate dwelling (single or part of a multiple unit), apartment, farm, commercial or industrial establishment as one customer through one meter or one unified set of meters for each class of service. Therefore, customers will typically be served at one voltage at either single-phase or three-phase, but not both. If the service location is occupied by several customers, each customer may have one meter for each class of service rendered. All customer installations shall conform to the NEC and local codes. Parallel runs of service cable extending from Company-owned equipment to multi-position meter centers should be avoided and require prior Company approval.

Upon request and if Company approved, a second service may be permitted based on the exceptions listed in NEC Article 230.2. A permanent plaque or directory shall be installed at each service drop or lateral, or at each service equipment location. It shall denote all other services on or in that building or structure, and the area served by each.

3.5 Use of Service by the Customer

Customer-owned wiring and electrical equipment shall be sufficiently sized (per NEC) and listed for its intended application.

The customer's wiring and equipment including the self-contained meter socket shall be installed and maintained by the customer, at the customer's expense, and in the condition required by the insurance providers, governmental authorities having jurisdiction, and Company requirements.

It is necessary for the protection of the customer that all the customer's electrical work, wiring, and apparatus be installed and maintained by a qualified electrician. A qualified electrician is one who has the skills and knowledge related to the construction and operation of the electrical equipment, systems, and installations and has received safety training to recognize and avoid the hazards involved.

The Company-owned facilities, which are used to provide electrical service, have limited capacity, and may be damaged if they are overloaded. Therefore, the customer shall notify the Company prior to increasing their energy usage or altering their service equipment so that Company facilities of proper capacity may be provided. Failure to properly notify the Company of such additional requirements may result in an extended outage or in damage to the customer's and/or Company's equipment. The customer shall be responsible for all expenses and/or damages to the customer's and/or Company's facilities resulting from failure to give proper notification. The customer may also be subject to charges by the Company for work required to meet the customer's alterations. The customer should contact the Company for information concerning charges for such work in advance of undertaking such work.

Additionally, for a customer-owned and installed underground service lateral, if a customer increases the service lateral length or load, the customer shall be responsible to verify that ampacity, voltage drop, and voltage flicker limitations are suitable to serve the increased total load. If load is being added, the customer shall advise the Company (in advance of undertaking such work) so that the Company can ensure all Company associated facilities are adequate to serve the increased load.

The service shall not be used in any manner that disturbs or impairs the operation of the Company's system or that will interfere with service to other customers. If such interference does occur, due to the use of apparatus installed upon a customer's premises, such customer shall either discontinue the use of such apparatus or make the necessary revisions to the apparatus, including additional equipment that may be required to alleviate such conditions, or the Company shall have the right to discontinue the offending service.

For proper service, the wiring on all single- or three-phase installations shall be arranged so that the load, to the extent possible, is balanced among each phase-wire. For three-phase services, the load imbalance between phases shall not be greater than 15 percent of the customer's peak load.

3.6 Interruption & Liability*

The Company will endeavor, but does not guarantee, to furnish a continuous supply of electric energy and to maintain voltage and frequency within reasonable limits. The Company shall not be liable for any loss, cost, damage, or expense that the customer may sustain by reason of damage to or destruction of any property, including the loss of use thereof, arising out of, or in any manner connected with, interruptions in service, variations in service characteristics, high or low voltage, phase failure, phase reversal, the use of electrical appliances, or the presence of the Company's property on the customer's premises, whether such damages are caused by or involve any fault or failure of the Company or otherwise except such damages that are caused by or due to the willful and wanton misconduct of the Company. The Company shall not be liable for damage to any customer or to third persons resulting from the use of the service on the customer's premises or from the presence of the Company's appliances or equipment on the customer's premises.

3.7 Final Connections

Residential/Commercial - All final connections for temporary or permanent service, between the Company's facilities and the customer's wiring, shall be made by the Company. Refer to Exhibit 1 to determine party responsible for supplying connectors.

* To the extent this provision contradicts any terms in the Company's current applicable tariff, the tariff provision shall govern.

The Company shall assume no responsibility for changing the location of its service drop attachments if an improper location is chosen without consultation with the Company, or if the Company's designated location is not utilized.

If it becomes necessary for the Company to change the location of its facilities or the character of the electrical service to comply with the requirements of governmental agencies, codes, or other causes beyond the Company's control, the customer shall, at the customer's expense, change its facilities (e.g., customer's wiring, service entrance, and utilization equipment) to accommodate the Company changes. (Reimbursements by governmental agencies may apply in certain cases involving roadway improvement projects.)

Service entrance equipment interrupting capacity shall meet or exceed the maximum available fault current. If necessary, the customer shall contact the Company to determine the estimated available fault current and subsequently determine the minimum required equipment rating.

3.8 Grounding/Bonding

The customer shall install the service entrance so that all applicable NEC grounding/bonding requirements are met or exceeded. The customer's service entrance shall have a minimum of two driven ground rods (8 feet minimum length) separated by at least six (6) feet. The grounding electrode conductor shall be continuous from the service entrance main disconnect to both driven ground rods. Refer to Exhibit 5 as well as other various exhibits throughout the Guide.

For three-phase, four-wire customer-owned service laterals to a pad-mounted transformer, the customer shall not install a fifth grounding conductor into the pad-mounted transformer. In both single-phase and three-phase current transformer cabinets, the cabinet shall be bonded to the neutral bus. Do not install a fifth grounding conductor into the cabinet.

3.9 Electrical Inspection

In addition to complying with the NEC, the customer's service entrance shall be in accordance with the requirements of the Company and such state and local inspection requirements as may be in force at the time such installation is made.

Before a new, temporary, upgraded, modified, or repaired customer's service entrance is energized, the Company should verify that the installation of the customer's meter socket and associated equipment:

1. Has been inspected and approved by the local or state electrical inspection authority, or
2. In any area where there is no local or state inspection authority, has been inspected by a licensed electrician. The licensed electrician shall provide the Company with a signed letter on the electrician's company letterhead stating that the service has been inspected and is approved. Three-phase services require inspection by state electrical inspectors.

When the Company deems that a potentially hazardous condition exists, it may refuse to energize the customer's service until the customer remedies any deficiencies.

Service Restoration - Fire or Flood: If the meter or service entrance equipment has been subjected to fire or flood conditions, an inspection from the above referenced authorities, and a release, when applicable, from a Fire Marshall or equivalent authority is required before service will be restored.

Service Restoration – Disconnected Services: If the meter has been blocked/removed or the service has been disconnected/removed for twelve (12) months or more, a new inspection by the local or state inspection authority is required before the service will be reconnected. In any area where there is no local or state inspection authority, or the local or state electrical inspection authority will not perform the inspection for whatever reason, a licensed electrician shall perform the inspection. The licensed electrician shall provide the Company with a signed letter on the electrician's company letterhead stating that the service has been inspected and is approved.

3.10 Meter & Seal Tampering

Tampering means to interfere with, damage, or bypass a utility meter, conductor, or attachment with the intent to impede the correct registration of a meter or the proper functions of a conductor or attachment as far as to reduce the amount of utility service that is registered by the meter. Tampering includes the unauthorized reconnection of a utility meter, conductor, or attachment that has been disconnected by the utility.

In the event of tampering, or theft of service by the customer, consumer, or other person, the Company shall comply with the provisions of New Jersey law and Company tariffs. Services that have been disconnected due to tampering may require an electrical inspection before reconnection.

Breaking of meter seals and/or removal of meters by customers, electrical contractors, or other unauthorized personnel, without prior Company permission (e.g., by notification to the Company's Call Center), is prohibited and may be subject to penalties.

3.11 Meter Attachments

No attachments by the customer or the customer's agent are permitted to Company-owned meters, meter circuits, or ancillary meter devices, except when using a Company approved meter collar device. Meter collar devices are only permitted on residential services. This includes grounds attached to meter sockets from the telephone or CATV company.

The following are considered **un-authorized** connections when not made, installed, or performed by a FirstEnergy employee or an authorized representative of FirstEnergy:

- Any adapter placed between the revenue meter and meter socket, except when using a Company approved meter collar device.
- Attachments or connections to the potential or current circuits of transformer rated revenue meters.
- Any connection inside the meter socket.

Qualified electricians may be permitted to remove/install meters on services 200 A and below on both overhead and underground services to install meter collar devices with local Company approval.

Upon request by a customer, the Company will supply kilowatt-hour (kWh) pulses (refer to the Company website for more details) from a Company-owned meter for demand control purposes. The cost for this service shall be assessed to the customer in accordance with specific Company charges for this connection.

3.12 Disconnect/Reconnect of Existing Service (Upgrades/Maintenance)

When upgrading, adding load, changing attachment point, or performing maintenance on an existing overhead service entrance, the customer shall first contact the Company's Customer Contact Center for guidance and applicable fees. Qualified electricians may be permitted to disconnect/reconnect overhead single-phase 400-amp or less service drops at the weatherhead with local Company approval. The qualified electrician shall contact the Company to determine which connectors are approved. Electricians are not permitted to disconnect/reconnect underground service laterals; however, reference an exception in 3.11 for UG meter removal/install for meter collar devices. All overhead and underground electrical upgrades shall be inspected prior to reconnection (refer to Section 3.9).

The Company has an "Agreement for Temporary Uninspected Service," which is only applicable for single-phase overhead services 200 amps or less. This form provides a means by which a service can be re-energized before it has been inspected. This waiver cannot be utilized in conjunction with new, temporary, underground, 400 amp or greater services, three-phase services or for service restoration following a building fire.

The Company reserves the right to update meter and service locations at the time of upgrade for the purposes of applying current clearance requirements and meter location guidelines. Service equipment installed without approval or incorrectly located shall be subject to change or relocation.

3.13 Locating Underground Electric Facilities

By state law before any excavation begins (including driving ground rods) the customers/contractors are required to follow their state's One-Call procedure. First, the customer/excavator needs to familiarize themselves with the requirements of the procedure. Next, they need to mark all trench lines and proposed excavations sites with white paint/chalk, white flags, or white stakes and then notify the state One-Call Agency.

Next, trained contractors will locate and mark the various underground facilities (including electrical, communication, gas, sewer, water, etc.) at the requested location.

To simplify the "*Call before You Dig*" calling process, **811** has been designated by the FCC as a nationwide telephone number. Dialing **811** transfers a caller to the appropriate state One-Call system. You may also contact the appropriate One-Call agency online at www.call811.com/state-specific.aspx.

For projects in New Jersey (JCP&L) - Call the New Jersey One-Call System or use ITIC (Internet Ticket processing tool and free service for professional excavations) at least three (3) full working days but not more than ten (10) working days before digging at 811 or (800) 272-1000 to request that a location be marked. The One-Call Center is open 24 hours/day and 365 days/year. Additional information can be obtained at www.nj1-call.org. Requests for locate tickets may also be entered through the website.

3.14 Required Clearance from Markout for Digging in the Vicinity of Company Underground Electric Facilities

After the underground facilities have been located (refer to Section 3.13), hand digging is required within a tolerance zone, which is 24 inches from all sides of the markout stake, flag, or hash mark and the closest edge of any parallel trench dug by another party adjacent to the Company's underground facilities.

3.15 Buildings/Structures & Swimming Pools/Spas/Hot Tubs near Electric Lines

Buildings and structures (including signs, flagpoles, light standards, antennas, or aerials) shall not be installed under, over, or in such proximity to electric lines where they could be raised into or fall onto such electrical lines or when they cannot be safely maintained. Antennas, aerials, or any device shall not be attached to a Company pole or any pole supplying electric service to the customer without specific written Company authorization. NESC/NEC clearances shall be maintained. The customer shall consult the Company for specific clearance requirements and possible easement restrictions.

The Company does not allow placing a swimming pool, spa, or hot tub under their new or existing service drop or other electrical conductors. Specifically, a swimming pool shall not be located within a minimum of twenty-five (25) feet of the Company's overhead conductors measured horizontally from the edge of the pool. The clearance between the Company's underground cables (primary and secondary) and the edge of the pool or its auxiliary equipment shall not be less than five (5) feet (measured horizontally).

3.16 Attachments to & Painting of Company-Owned Facilities

Under no conditions shall the customer's facilities or other equipment such as signs, posters, banners, or notices be installed on the Company's poles, equipment, or other property unless special arrangements have been made with the Company prior to installation. The customer/requestor shall contact the Company for details. The Company does not permit painting of Company-owned equipment by the customer.

3.17 Clearance of Trees from Power Lines

Trees & Transmission Rights-of-Way

- In New Jersey, the Company's long distance, high voltage transmission lines provide power to thousands of our customers and are vital reliability links with other utilities across the country. Keeping our transmission rights-of-way free of unwanted trees and other vegetation is important to providing reliable and safe electric service.
- All vegetation on or adjacent to the right-of-way shall be low-growing, compatible species. Additional information on making the correct tree selection is available at www.firstenergycorp.com/trees. Then click on "**Maintaining Transmission Rights-of-Way**" from the bulleted items located on the bottom, left side of the page.

Trees & Distribution Lines

- Tree related incidents are a major cause of electrical outages. Therefore, care shall be exercised when planting trees to make certain that they will not interfere with distribution power lines, even when the trees reach full, mature growth. Trees that grow more than 25-feet tall should not be planted within 20 feet of distribution power lines.
- Additional information on making the correct tree selection can be found at www.firstenergycorp.com/trees. Then click on "**Selecting the Right Tree for the Location**" from the Quick Links on the top, right side of the page.

3.18 Access to Customer's Premises

The customer or, if applicable, the property owner, shall grant the Company's employees and its authorized agents access to the customer's premises at all reasonable hours for the purposes necessary in connection with supplying and maintaining service, and upon termination of service, to remove all Company facilities. In the event of an emergency, the Company's employees and authorized agents shall have access to customer's premises at any time. Authorized Company employees are furnished with a photo identification badge with the Company logo. This badge is available upon request when Company employees are visiting the customer's premises.

The customer shall not block access to Company equipment by installing any obstructions (including vegetation, fences, walls, large rocks, etc.) that prohibit access to Company equipment. The customer shall be responsible for all expenses and/or damages for blocking access to any Company equipment. The customer shall contact the Company for details.

Note: Company personnel are not permitted to climb onto the customer's roof. Therefore, all connections and other Company work shall be accessible from a ladder or bucket truck on a suitable surface for the equipment.

If a customer or property owner fails to grant the Company access for reasons described above, and legal action is necessary to secure such access, the Company may collect from the customer or the property owner all costs incurred to secure such access.

3.19 Company's Equipment on Customer's Premises

The customer shall provide without cost to the Company, satisfactory recorded rights-of-way, and a suitable location for the placement of the Company's equipment necessary for supplying service to the customer on the premises owned or leased by the customer.

The customer shall provide truck access to all poles, transformers, and other equipment installations designated by the Company. The truck access drive shall be a minimum of twelve (12) feet in width, installed to withstand a 40,000-pound line truck and associated equipment for lifting or hauling (e.g., cranes, flatbed trailers, etc.) including the weight of the piece of equipment, and be located within ten (10) feet of the designated piece of equipment. All access drives shall be permanent, continual, maintained, and visible for all-season access. The customer shall contact the Company for details.

3.20 Requested Protection for Persons Working Near Company Facilities

The customer or contractor shall provide reasonable advance notification to the Company when proposed work is to be performed within such distance of the Company's facilities that may be hazardous to the person(s) performing the work or may otherwise be in violation of federal (e.g., OSHA, NESC) or state regulations. Upon request by the customer or contractor, the Company may cover, de-energize, or temporarily move its facilities in the work area, as it deems appropriate. The Company may bill the notifying customer or contractor for the total cost of performing such work. If circumstances require the Company to work outside the normal work hours, costs for the overtime period will be computed and billed at overtime rates. The customer or contractor will be required to sign an Acknowledgement/Indemnification Agreement. The customer should contact the Company in advance for details.

4.0 TEMPORARY SERVICE

When requested by the customer, the Company may provide a temporary overhead or underground service. The service entrance, meter, and other wiring on temporary indoor or outdoor installations are installed in the same manner as for permanent installations. When no building is available for the installation of service conductors and service equipment, the customer shall consult the Company's local office for recommendations as to suitable support for the service drop or termination of service lateral, meter, and weatherproof housing for the service equipment. Refer to Exhibit 3 (overhead) and Exhibit 4 (underground) for typical requirements for temporary service structures. Overhead structures shall be truck accessible unless prior approval is given from engineering. In this scenario the conductor lead shall be long enough to make connections while standing on the ground.

An application for service is required for any temporary service. Refer to "Application for Service" Section 3.2 for additional information regarding temporary service.

Temporary electric service installations should not exceed one year.

Per the Company Tariffs, the service drop (overhead) or service lateral (underground) shall be extended from the existing overhead secondary, pad-mounted transformer, pedestal, or handhole. The customer shall contact the Company for details, applicable fees, and limitations.

5.0 PERMANENT SERVICE – OVERHEAD

5.1 General

The customer, architect, or contractor shall contact the Company prior to the start of construction to ascertain the point of attachment for the service drop, type of metering facilities, costs, and other information relative to the customer's service installation. Where overhead distribution facilities are available, the Company will install a suitable overhead service drop to a point of attachment on the customer's premises as designated by the Company. The point of attachment will be located to provide the least cost and shortest practicable service drop distance to the Company's facilities. The point of service is the connection of the overhead service drop to the customer's service entrance conductors/equipment. The Company shall provide, own, install, and maintain the service drop conductors from the overhead distribution system to the point of service.

The customer shall provide and maintain a safe, substantial support for the Company's overhead service conductors. The service drop support shall be installed in such a manner to maintain the clearances specified in Section 5.2 and Exhibit 2. The customer shall furnish, install, and maintain the service bracket necessary for the attachment of the Company's service drop conductors (refer to Exhibit 7). In cases where a service mast is required, only power service-drop conductors shall be attached to the service mast.

In general, service entrance conductors should be installed on the outside of the building to be served.

When the customer's load necessitates parallel service entrance conductors, the customer shall furnish and install suitable equipment (Company approved) to allow the Company to connect the service drop with a single set of attachments. The customer shall minimize the number of conductors to reduce both the electrical connections and the complexities inherent in such installations.

Refer to Section 3.8 and Exhibit 5 for grounding requirements.

Refer to Exhibits 1, 2, 5, 6, 7, 11, and 14, for typical installations.

5.2 Service Drop Clearances

The point of attachment of the service drop to the building shall be such that the drip loop shall not be less than ten (10) feet above the ground. In addition, the point of attachment shall be located to allow the both the customer and the Company to comply with NESC/NEC clearance requirements. The attachment should not be more than 24 feet above ground unless a greater height is necessary for proper clearances.

The service drop should not be installed over buildings or swimming pools, spas, or hot tubs.

Some of the more common NESC/NEC minimum clearance requirements are listed below and most are illustrated on Exhibit 2. Note: Other required clearances may not be listed below.

- Twelve (12) feet for a multiplex service or twelve feet-six inches (12.5) for an open wire service above sidewalks and spaces accessible to pedestrians,
- Eighteen (18) feet above roads, streets, alleys, driveways, and other areas subject to truck traffic,
- Two (2) feet above communication lines (e.g., telephone, CATV) at any point of crossing, and one (1) foot at the point of attachment to the building,
- Three (3) feet between service drop conductors (attached to the buildings) and windows, doors, porches, and fire escapes,
- Five (5) feet between service drop conductors (not attached to the buildings) adjacent to windows, awnings, fire escapes and other building projections,
- Three and one-half (3.5) feet between the service drop conductors and the roofs of projections that are not accessible to pedestrians.

The service drop shall not cross over property other than that of the customer to be served unless the Company has received executed rights-of-way agreements or permits from the owners of such properties.

5.3 Mobile Homes or Mobile Home Parks

The Company has an established policy for extending electric service to mobile homes and may assist in planning the installation of mobile home parks. The Company's tariffs, as filed with the State of New Jersey shall apply to the installation and use of the service furnished.

Meter poles shall be located a minimum of five feet from the structure.

Meter and service facilities for a mobile home or mobile home parks will be determined on a case-by-case basis.

For non-subdivision type mobile home parks, the Company recommends a group meter arrangement (Refer to Exhibit 14 for typical installations). Mobile home park operators shall be responsible for the effective grounding of all mobile homes. Additional information is available upon request from the Company.

5.4 Travel Trailer or RV Parks

Typically, electric service requirements for travel trailer or recreational vehicle (RV) parks will be served through one metering point (refer to Section 3.4). The customer should contact the Company for additional information.

5.5 Central Pole Distribution Metering Service

A farm or commercial operation with specific load requirements may have service from a customer-owned central distribution service drop. The customer shall furnish, install, and own a pole centrally located with respect to the various buildings to be served. The central distribution pole in each case shall be a dead-end pole, as far as the Company lines are concerned, without any unmetered service extending beyond it.

If it is impractical to serve all farm buildings from a centrally located pole due to distance between buildings or the necessity of crossing public roadways, the Company will provide services and meters for separate accounts for each building, as conditions require.

For details, refer to Exhibit 11 for overhead and Exhibit 12 for underground central distribution service installations.

6.0 PERMANENT SERVICE – UNDERGROUND

6.1 General

The customer, architect, or contractor shall contact the Company, prior to the start of construction to ascertain from the Company the point of attachment for the customer-owned service lateral. The Company will designate a location, as close as practical, for the point of service.

Based on an engineering evaluation, a Company representative will determine the pole, transformer, handhole, pedestal, or manhole location to which an underground service lateral may be extended. Refer to Exhibit 1 for specific customer and Company installation/ownership responsibilities for each item associated with the service and for determination of the point of service. The Company retains ownership of conductors and equipment it supplies. In special situations, if the point of service varies from Exhibit 1, the customer's installation documents will clearly designate the equipment ownership and the exact point of service. Point of service is to be determined solely by the Company.

The contractor, developer, or customer shall provide all trenching, conduit, and backfilling as well as a clear, graded path for its installation. The customer shall be responsible for installing the service-lateral cables and conduit. All service lateral facilities shall be installed and maintained per the NEC and the Company specifications.

Before excavating, refer to Sections 3.13 and 3.14 for locating and marking underground facilities. Refer to Exhibit 24 for general trench details for installations of cables in conduit. Since the actual trench dimensions may vary by changes to final grade, soil condition, location, and other factors, it is necessary to confirm specific trench dimensions with the Company representative.

The customer shall provide a trench that is well tamped. Settlement and frost heave of trench backfill can result in damage to service cable, meter sockets, and house siding. The customer shall install ground movement protection per NEC 300.5 (J). The Company recommends a slip-joint conduit product, available from several vendors and suppliers (refer to Exhibit 8). Additionally, the customer shall provide ample cable slack to allow for cable movement without stressing cable terminations.

The customer shall coordinate the installation of customer-owned service laterals with the Company. The customer installed underground service conductors shall be of sufficient length to allow the Company to complete the final electrical connections. The qualified electrical contractor

shall run the service lateral to within 18 inches of the designated Company pad-mounted transformer or pedestal/handhole and leave enough coiled cable (consult the Company) to complete the termination of the cables by the Company. Minimum additional cable lengths shall be five (5) feet for pedestals or handholes or ten (10) feet for pad-mounted transformers. For vertical risers, the qualified electrical contractor shall install the underground portion of the customer-owned service lateral and leave a sufficient length (consult the Company) of coiled cable, to allow the termination of the cables by the Company at the point of service. The customer/electrician shall contact the Company before installing any facilities on the Company-owned pole. Customer shall coordinate the installation with the Company. The customer shall contact the Company for network installations. Note: The customer may be required to supply the standoff brackets per Exhibit 1.

The customer shall be responsible for connecting all service entrance conductors to any form of customer-owned disconnecting devices or equipment. The Company will be responsible for providing all connectors and making all connections to its power transformers, metering cabinets, manholes, handholes, and pedestals regardless of whether involved conductors are Company or customer owned.

Refer to Section 3.8 and Exhibit 5 for grounding requirements.

Additionally, for a customer installed and owned underground service lateral, if a customer increases the service lateral length or load, the customer is responsible to verify that ampacity, voltage drop, and voltage flicker limitations are suitable to serve the increased load. If load is being added, the customer shall advise the Company so that the Company can verify that all Company-owned facilities are adequate to serve the increased load.

No fence, guardrail, wall, rocks, or other obstruction shall be placed near pad-mounted equipment (e.g., transformers, handholes, pedestals, or switchgear) that would limit the Company from performing operation, maintenance, or repair of the equipment. This includes any tree, shrub, bush, or other vegetation that would have to be removed to operate, maintain, or replace equipment. The minimum clearance is three (3) feet from the back and sides, and ten (10) feet from the front of all pad-mounted equipment or any side with a door. Refer to Exhibits 22 and 23. Additionally, a customer shall not cover (even partially) any of these devices with plants, mulch, dirt, rocks, artificial rocks, or other landscaping as this prevents them from being quickly located, safely operated, as well as accelerating their corrosion. Company shall not be responsible for replacing shrubs, plants, fences, wall screenings, or other obstructions that need to be removed for maintenance or restoration work.

6.2 Underground Residential Services from Overhead Sources

Refer to Exhibits 8, 9, 10A, and 10B for typical installations.

When it becomes necessary for the Company to replace a pole, upon which a customer-owned underground service lateral terminates, the necessary changes to the underground service conductors shall be made by the customer at the customer's expense or cost causer (pole joint use). (Reimbursements by governmental agencies may apply in certain cases involving roadway improvement or widening projects.)

For services 400 amps or less, multiple, or parallel sets of cables are acceptable if approved by the Company.

Note: Approved self-contained meter sockets are limited to a maximum conductor size of 600 kcmil.

6.3 Underground Residential Services from Underground Sources

For single-phase customer-owned underground services at 400 amps or less, the customer shall install only one set of service cables sized for the expected load. Multiple or parallel sets of cables are not acceptable for services at 400 amps or less. Refer to Exhibit 1 and Exhibit 8.

For services greater than 400 amps, the customer shall consult the Company as soon as possible during the building design stage to discuss the multiple or parallel cable service requirements.

Due to connector physical limitations, cable size shall be limited to 750 kcmil when terminating in a handhole, pedestal, or in a single-phase pad-mounted transformer. Note: Approved self-contained meter sockets are limited to a maximum conductor size of 600 kcmil.

6.4 Underground Commercial Services from Overhead or Underground Sources

The customer shall provide the Company with suitable space at all locations designated by the Company to accommodate the necessary transformation and switching equipment required to supply the customer's load. Space requirements may vary depending on the customer's load and service requirements, as well as the availability of Company facilities in the area. It is therefore imperative that the customer contacts the Company as soon as practical in the customer's electrical design/planning stage to ensure that appropriate accommodations can be made for the required Company facilities.

When no suitable outdoor location is available, other options may be considered. Those options will require written approval from the local Manager of Engineering Services. The Company's equipment shall always be accessible to the Company. Limited design requirements shall be adhered to so that the appropriate safety, maintenance, and operating conditions can be satisfied. As soon as possible during the building design stage, the customer shall consult the Company to discuss any special needs and design specifications (Company, OSHA, NESC, NFPA, NEC, etc.).

Due to connector physical limitations, cable size shall be limited to 750 kcmil when terminating in a handhole, pedestal, or in a single-phase pad-mounted transformer and limited to 1000 kcmil (maximum 8 conductors per phase) or 750 kcmil (maximum 16 conductors per phase) when terminating in a three-phase pad-mounted transformer.

For underground services at 400 amps or less, the customer shall own and install only one set of service cables sized for the expected load. Multiple or parallel sets of cables are not acceptable, unless prior written agreement is made with the Company. Note: Approved self-contained meter sockets are limited to a maximum conductor size of 600 kcmil. For services greater than 400 amps, the customer shall consult the Company as soon as possible during the building design stage to discuss the multiple or parallel cable service requirements.

Where a service raceway or duct enters from an underground distribution system, the customer shall seal the end within the building with suitable compound to prevent the entrance of moisture (water) or gases. Spare or unused ducts shall also be sealed.

Refer to Exhibits 15, 16, 18, 19, 20, and 21 for typical installations.

6.5 Underground Services in Central Business District Network Areas

The customer should contact the Company for specific network requirements. All services shall originate from manholes or handholes. No service shall be energized directly from a transformer vault (exception – spot networks at 480Y/277 V).

6.6 Transformer Foundations & Vaults

The customer shall provide a suitable above ground external site to accommodate a pad-mounted transformer. The site shall have compact, level ground, and not subject to flooding or pooling water. The area selected should avoid high contamination areas and areas subject to vehicle

damage (e.g., delivery trucks, garbage trucks, snowplows, large farm equipment, etc.). The provided area shall be sufficiently sized to accommodate the installation, removal, maintenance, and upgrades in a safe manner.

Per Exhibit 1, for single-phase transformer foundations, the customer shall provide the excavation, and provide and install the foundation base material (per Exhibit 29). The Company shall provide the foundations and the customer/developer shall install them.

Per Exhibit 1, for three-phase transformer foundations, the customer shall provide the excavation and provide and install the base material, grounds, ground rods, and a pre-cast vault or concrete flat pad in accordance with Exhibits 25, 26, 27, and 28.

If such a site is not available, alternate options will be evaluated and approved by the local Manager of Engineering Services. If a transformer vault is the only option available, the vault shall be furnished and maintained by the customer on the customer's premises at the customer's expense, in accordance with national, local, and Company requirements.

Transformer vaults may contain only the supply transformers and associated primary equipment and, where necessary, customer-owned secondary bus. Under no conditions are service-meters, customer-owned fuses, switches, or other customer-owned equipment to be installed therein. Secondary devices and service meters, however, should be installed as near the transformer vault as practicable, but not in it.

For certain high usage customers, current and voltage instrument transformers constitute a part of the Company's metering equipment. For distribution secondary voltages, they are usually installed in instrument transformer enclosures. For vaults in buildings, these enclosures are located outside the transformer vault, preferably on the vault wall, unless some other more desirable location is approved by the Company. Refer to Exhibits 19 and 20 for a typical metering installation with current transformers.

6.7 Mobile Homes or Mobile Home Parks

Refer to Exhibits 13 and 14 for typical installations.

7.0 METER INSTALLATIONS

7.1 General

Meters and meter testing devices are furnished, installed, and maintained by the Company. These devices are Company-owned and shall not be moved, or the connections changed by any person other than authorized employees of the Company (refer to Section 3.10 for exceptions).

All metering shall be installed on the line-side of the customer's main disconnecting means except for the following:

- A 480Y/277-Volt metering installation,
- Where the Company requires a non-fusible meter disconnect ahead of the meter on a single-phase or three-phase 480-Volt self-contained metering installation (refer to Exhibit 15),
- Where the NEC requires a main disconnect ahead of a group of more than six (6) meters (refer to Exhibit 16).

When emergency disconnects are required by the NEC, they shall be located on the load-side of the metering.

The customer shall consult the Company prior to purchasing or installing equipment.

Meter sockets, metering transformer cabinets, and all other enclosures and switch boxes installed on the line side of the meter shall be equipped with provisions to accept a Company meter seal before connection will be made by the Company. Meter sockets, transformer cabinets, and other meter service enclosures shall not be used by the customer as junction boxes - only service entrance conductors are permitted. Metered and unmetered conductors shall not be installed in the same conduit, enclosure, or raceway. All energized meter sockets shall always be covered especially if the meter has been removed. Meter sockets and service conduits shall not be recessed into the wall. Unmetered service entrance cables or service entrance conduits on buildings, poles, or structures shall not be concealed or recessed.

Meter installations that have the meter socket as part of a pedestal, multi-metered equipment, or attached to an integral part of the customer-owned service equipment shall be approved by the Company prior to purchase and installation by the customer.

The Company, in accordance with the rate schedule selected and the type of service supplied, determines the capacity and type of meter installation to accommodate the customer's load.

7.2 Meter Locations

The customer shall provide space for the installation of the Company's meters and equipment at an outside location designated by the Company. Outdoor meter locations are required for all meters except where the Company gives written approval otherwise.

Outdoor

All new outdoor meter installations shall be located on the building at the nearest practical point from Company facilities and readily accessible to authorized Company representatives. If the nearest point is not feasible due to physical obstructions, such as garage doors or windows, the Company shall choose an alternate location closest to its service facilities.

The meter socket shall be installed by the customer so that the center of the socket is approximately five feet above the finished grade. Exceptions to this requirement to avoid obstacles or maintain safety shall be approved prior to installation. Meter socket height for pedestals, multi-meter equipment, or meter sockets attached to, or an integral part of customer-owned service equipment shall be approved in writing by the Company. For installing meter sockets in FEMA floor zones, refer to Exhibit 31.

Clearance in front of and to the sides of meter sockets and metering equipment shall be maintained per NEC Article 110.26 (30-inch width and 36 inches in front of the meter and extend from the grade, floor, or platform to a height of 6.5 feet or the height of the equipment, whichever is greater). The above clearances shall be maintained regardless of structural changes of the building. The location shall not be subject to severe vibration. Meters and metering equipment shall not be installed in dangerous locations or locations where the meter readers or service personnel may inadvertently damage flowerbeds or shrubbery or where it will be necessary for them to climb over fences or other obstructions (e.g., HVAC equipment, trash containers, and dumpsters) to perform their work. The meter socket shall not be installed in carports, open porches, or other areas that may be enclosed by walls or screens. Additionally, they shall not be installed in locations where they may be accidentally damaged, such as on buildings where they will extend unguarded into alleys, driveways, drive-throughs, or where they will cause inconvenience to the customer or the Company. Building exhaust fans or furnace vents shall not be vented on or near metering equipment.

A meter may be located on a customer-owned pole with prior Company approval. This pole shall be yellow pine, cedar, or equivalent, pressure-treated and provide sufficient clearances (refer to Exhibit 2). Before installing the pole, the customer should consult the Company for minimum size (length and class) and setting depth. Any metering installation on a Company-owned pole shall have the specific written approval of the Company.

The customer shall install steel concrete filled barrier posts to protect metering equipment where vehicle traffic may interfere with or damage such equipment. Refer to Exhibit 30.

Meters shall not be located closer than three (3) feet to any natural gas equipment. For locations near tanks containing flammable gas or liquid (e.g., propane, gasoline, or oxygen) meters shall be no closer than fifteen (15) feet (refer to Exhibit 22).

In areas where the municipality requires the meter to be installed above flood stage, a metering deck will be required. Refer to Exhibit 31.

Indoor

Indoor installations shall be preapproved by the local Metering Services Section.

Where an indoor installation is required, the meters should be located on the first floor or in the basement where they shall be readily accessible to authorized Company representatives. The location shall not be subject to severe vibration, excessive dampness, high magnetic fields, or excessive heat and shall be installed in accordance with the NEC.

7.3 Group Meter Installations

In multiple occupancy (two or more occupancies) buildings, where several floors, apartments, stores, etc., are rented separately, meters and service equipment shall be located preferably all together. In high-rise buildings, it may be necessary to have several meter locations, possibly every other floor or every third floor as may be necessary.

The meter room or space shall be readily accessible to all tenants and Company representatives at hours specified in accordance with the filed rates, rules, and regulations. This room shall be for the sole purpose intended and shall meet local fire codes as well as the NEC. This room shall not be used for the storage of materials or equipment.

Refer to Exhibit 16 for typical indoor/outdoor installation for multiple occupants.

7.4 Meter Relocations

When alterations or additions to a building or its wiring require a change in the meter location, the customer shall notify the Company before proceeding with any work. The customer may be responsible for the Company's cost for facility modifications. The customer shall be responsible for all costs incurred in the moving the meter socket and wiring.

7.5 Minimum Meter Sockets Requirements

<p>All self-contained meter sockets are supplied and installed by the customer. See Exhibit 1 for customer/Company responsibilities. All customer supplied meter sockets shall meet the minimum requirements as defined below. For Services 400 amps and greater, the customer should consult the Company for the appropriate metering equipment.</p>	
<p>Minimum Requirements for All Meter Sockets</p>	
<ul style="list-style-type: none"> • Shall be UL listed and labeled, • Meter socket jaws shall be tin-plated copper and spring supported, • Lugs shall be extruded aluminum tin plated, • Sockets shall be 5th terminal adaptable (at the 9 o'clock position), • Sockets shall be ringless type with clasp and slot closure • Sockets shall have ¼-inch ground wire knockout, • Cardboard or plastic protector, • Triple ground lug (triplex), • Shall accept blanking plate, • Meter sockets designed for underground service connections shall be side wired, • Dual use meter sockets designed for both overhead and underground service connections shall be side wired, • Combination meter sockets (w/main breaker) shall be side-wired or have line-side terminations that are bused downward, • Socket components and connection points shall be designed, located, and adequate space provided, such that the use of horn bypass jumpers, service savers, cable pullers, and other standard electric restoration and maintenance equipment can be safely and effectively utilized by the utility. 	
<p>Single-Phase Meter Sockets Rated 200 A Continuous & Below</p>	<p>All Meter Sockets Rated 320 A Continuous & All Three-Phase Meter Sockets</p>
<ul style="list-style-type: none"> • Shall have horn-type bypass. • Lever bypass with jaw tension release is also acceptable 	<ul style="list-style-type: none"> ▪ Shall have lever bypass with jaw tension release and bypass rated for 100% continuous duty (excludes single-phase temporary services).
<p>Additional Requirements for Specific Socket Types</p>	
<p>Multi-Position Ganged Sockets:</p>	
<ul style="list-style-type: none"> • Maximum height to center of top socket 72 inches, • Minimum height to center of bottom socket 24 inches (indoor) or 30 inches (outdoor), • Minimum spacing between meters eight (8) inches, • A 5th jaw in the 9-o'clock position is required for 120/208 V three-wire Network applications), • 320-A units approved on a case-by-case basis, • A hasp for a padlock may be provided in place of barrel lock, • 480-V units shall have disconnecting means on source side of each socket with provisions for meter seal and/or padlock. 	

Refer to *Meter Socket Requirements Table* on the next page.

Meter Socket Requirements

Socket Type	Service Entrance Type / Additional Equipment	Lug Size Required Per Socket Ampere Rating			Horn Bypass ³	Lever Bypass w/Jaw Release ⁴	Hub Opening	Line-side KO	Side Wired ⁵
		100 A - 125 A	200 A	320 A					
1-Ph, 1 Position, 4/5 Jaw	OH only	#6 - 2/0 AWG	#2 - 350 kcmil		X		Small	2 1/2"	
1-Ph, 1 Position, 4/5 Jaw	OH only			3/8" Stud,		X	Large	3"	
1-Ph, 1 Position, 4/5 Jaw	UG only		#2 - 350 kcmil		X		n/a	3"	X
1-Ph, 1 Position, 4/5 Jaw	UG only			3/8" Stud,		X	n/a	4"	X
1-Ph, 1 Position, 4/5 Jaw, Combo ¹	UG, equipped with load-side series main breaker		#2 - 350 kcmil		X		n/a	3"	X
1-Ph, 1 Position, 4/5 Jaw, Combo ¹	UG, equipped with load-side series main breaker			3/8" Stud		X	n/a	3"	X
1-Ph, 1 or 2 Position, 4/5 Jaw, Pedestal ²	UG, equipped with load-side series main breaker		#2 - 350 kcmil		X		n/a	3"	X
1-Ph, 2 - 6 Position, 4/5 Jaw	OH/UG	#6 - 2/0 AWG (load) #4 AWG - 350 kcmil (line)			X		Small	3"	X
1-Ph, 2 - 6 Position, 4/5 Jaw	OH/UG		#2 - 350 kcmil(load) 1/0 AWG - 600 kcmil (line)		X		Large	3"	X
3-Ph, 1 Position, 7 Jaw	OH	#6 - 2/0 AWG				X	Small	3"	
3-Ph, 1 Position, 7 Jaw	OH		#6 - 350 kcmil			X	Large	3"	
3-Ph, 1 Position, 7 Jaw	UG		#6 - 350 kcmil			X	n/a	4"	X
3-Ph, 1 Position, 7 Jaw	OH/UG			3/8" Stud		X	Large	4"	X
Footnotes:									
1: Combo Socket - Acceptable combo sockets shall have a sufficient wireway to lay-in the line-side conductors specified. Sharp edges shall be protected with guard. Each line-side connection including the neutral connection shall be side wired and easily identified. Load-side main breaker shall be mounted in an area of the socket that is separate from the meter mounting compartment.									
2: Pedestal - Socket shall be equipped with stabilizing base or foot that extends at least 24" below grade as required by manufacturer's instructions.									
3: Horn Bypass - Self-contained sockets not requiring a lever bypass, shall have horn bypasses. Each horn bypass tab shall be mounted and positioned directly adjacent to its corresponding jaw.									
4: Lever Bypass - Lever bypass shall be equipped with jaw tension release. Lever Bypass shall have a minimum rating equal to 100% of the socket continuous ampacity rating.									
5: Side Wired - Acceptable side wired sockets shall have each of the line-side energized connections including the neutral 'bused' to the side of the meter mounting location. The terminal connections shall be easily identified visually. The bus assembly shall be supported in a manner that can tolerate the normal downward forces on the line-side conductors.									

7.6 Metering Equipment Installation Guideline Summary

- The Company shall approve all metering equipment locations.
- The meter socket shall be mounted level.
- Mount the meter socket on a solid part of the structure.
- Use corrosion inhibited mounting hardware.
- Do not mount the meter socket with nails.
- Meter socket shall be surface mounted. Do not build-in or enclose the meter socket or meter within the structure.
- Do not recess the meter socket in brick, masonry, or siding.
- The installation shall meet the requirements set forth by the NEC and any local, state, or federal codes that apply to the installation. For installations that require electrical inspection, the inspection is required before the installation is connected to the Company's system.
- It is recommended that a qualified electrical contractor perform all work on customer facilities.
- Customer's meters, auxiliary devices, relays, etc., shall normally not be connected to the Company's metering circuits, except when using a Company approved meter collar device.
- Approved meter collar devices will be documented on Company website in the same location as the CGES.
- Only one meter collar device is allowed per socket.
- Meter collar devices may require a brief outage for any future work involving the meter.
- The Company shall furnish the metering facilities required in accordance with its standard rate schedules.
- After an installation is made, changes in location of meters for the convenience of the customer will be at the customer's expense, after the necessary service entrance wiring to the new location has been completed by the customer.
- Only service entrance conductors may run through meter sockets or meter connection boxes.
- Meter sockets/enclosures shall not be used as junction boxes.
- All equipment furnished by the Company (excluding self-contained meter sockets) shall remain its exclusive property and the Company shall have the right to remove the same after termination of service for any reason whatsoever.
- For identification purposes, wherever two or more meters are grouped at one location, all sockets/metering equipment (inside and out) and breakers **shall be plainly and permanently marked to designate the specific apartments, suites or offices served** (e.g., Apt 1A). Likewise, the apartment or suite entrance(s) shall be identified accordingly (e.g., APT 1A). Tags shall be used marking entrance equipment or service or service conductors, whereas sockets or meter connection boxes may be marked by neat stencils with paint as well as using permanent tags (label maker tags are not acceptable). These identification markings shall be located as follows:
 - ✓ Inside main disconnect electrical panel in the apartment or suite,
 - ✓ Inside the meter socket near the jaw assembly, or
 - ✓ On the cover of both main disconnect panel and meter socket.

- For multi-meter installations, any unmetered positions shall have the cardboard shipping covers replaced by plastic protectors.
- Metered and unmetered conductors shall not be in the same trough, conduit, or wireway.
- For typical installations, refer to Exhibits 6, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, and 21. In unusual cases, the customer should contact the Company.

7.7 Minimum Size Meter Socket - 480-Volt Services

The smallest permissible size meter socket on 480Y/277-volt three-phase four-wire services is 200 amps.

7.8 Installations Requiring 320 Amperes & Less of Continuous Load Current

Typically, on new installations or on existing installations where the service entrance conductors, service entrance panel, or main disconnect switch are rearranged, the meters shall be installed outdoors. If an indoor installation is required, the customer shall consult the Company before starting the installation.

All services requiring 320 amperes and less shall utilize self-contained metering. During service upgrades or reconfigurations, it is recommended that the existing metering be evaluated. If instrument transformers were utilized, the Company reserves the right to require the customer update their metering to self-contained at the time of upgrade. Additionally, if a service has been inactive the Company reserves the right to have customer update metering to self-contained.

7.9 Installations Requiring Over 320 Amperes of Continuous Load Current.

Instrument transformers are required for installations having more than 320 amps of continuous load current. Before beginning any installation requiring instrument transformers, the customer shall consult the Company regarding the instrument transformers, meter location, and facilities required.

The local Metering Services Section shall determine in each case (either new or to be rebuilt) the type of meter installation to be made.

Instrument transformers are required for these installations having more than 400 amps of load current. In most situations, the Company shall supply, and the customer shall install a current transformer cabinet or mounting facility in accordance with Company requirements. Refer to Exhibits 19 and 20. These instrument transformer cabinets shall not be used as junction boxes or raceways (troughs). Other alternative current transformer locations (e.g., in pad-mounted transformer secondary compartment), as determined by the local Metering Services Section, may be applicable as per Exhibit 21. All instrument transformer locations shall be readily accessible to authorized Company representatives for checking and testing. However, before such an installation is made, the Company shall be consulted regarding the meter location and facilities required.

When the space above the instrument transformer cabinet is intended as the location for the meter or meters, it is necessary that adequate space be reserved for this purpose.

Where the instrument transformer and/or service conductors are of such size that it is not practical to use instrument transformer cabinets, the current transformers may be mounted, at the customer's expense, in a bus structure. The current transformer compartment shall have a hinged lockable door. However, before such an installation is made, the Company shall be consulted regarding the meter location and facilities required.

For services exceeding 2400 amperes or when the service conductor size/quantity is not compatible with a CT enclosure, the customer shall provide a switchgear enclosure for metering. Switchgear compartments meeting IEEE C57.12.28 shall be a minimum of 36-inches high by 30-inches wide by 20-inches deep with a bus separation of at least 10.5 inches on center, 7.5-inch minimum separation from the enclosure sides, and located on the supply-side of any protective equipment except when otherwise required by local Metering Services. The bus dimension shall be a maximum of five (5) inches to allow for window type current transformers. The neutral connection is required to be in the front of the enclosure. The customer shall provide conduit or raceway for metering cables. The customer shall contact the local Metering Services Section early in the planning stage to determine specific details and if the proposed installation allows for an alternative metering arrangement.

7.10 Approved Current Transformer Cabinets

General Requirements:

- Current transformer installations are to be employed when customer loading is expected to exceed the limitations of self-contained metering equipment – which is 320 amps of continuous current.
- Customer is required to provide an approved unit or an equivalent unit that meets requirements below. Equivalent cabinets shall be preapproved by the local Meter Services section.
- Current transformer cabinets are not to be utilized as a junction box, trough, or raceway.
- Before a CT enclosure installation is initiated, consult the company to determine a suitable mounting location.
- CT enclosures shall be readily accessible to company employees for inspection and testing.
- The CT enclosure shall be located on the supply side of any protective equipment.

Additional Requirements:

- Shall be constructed in accordance with UL50 and shall be Type 3R.
- Pad-mounted enclosure equipment shall meet ANSI C57.12.28.
- Bus spacing shall be approximately 11 inches phase to phase, and 7.5 inch from phase-to-nearest grounded component.
- Shall be 14 gauge electroplated galvanized or equivalent gray painted steel (or aluminum with equivalent physical strength and corrosion resistance).
- Outdoor enclosures shall have a NEMA 3R rating.
- Double door is preferred with stainless steel hinges (or equivalent hinges for aluminum cabinet).
- Pad lockable handle (for Company lock) on door with internal mechanism for three points of latching: top of door, bottom of door, and handle area.
- Each door shall be equipped with a non-detachable door stop for holding it in a fixed open position.
- Typical minimum current transformer enclosure dimensions:
 - (a) 400 amps to 800 amps; 36-inch wide, 36-inch high, and 10-inch deep.
 - (b) 1000 amps to 2400 amps; 42-inch wide, 60-inch high, and 20-inch deep.
 - (c) Above 2400 amps; dimensions can vary considerably depending on configuration and purpose.

- For 400-amp to 800-amp enclosures, in lieu of window style current transformers, removing bus link shall permit installation of bar-type current transformers having NEMA standard 1.75-inch 2-bolt hole spacing.
- For all ampere ratings, a removable bus link on each phase will permit installation of oval or round window-type current transformers (Company can provide transformer specification upon request).
- Each bus bar shall be drilled and tapped on both ends with a 10-32 screw to facilitate connection of meter potential wires.
- Both horizontal and vertical bus bar mounting configurations are acceptable.
- Vertically oriented bus must include support platform for each current transformer to rest on.
- Voltage transformer mounting provisions are not required for services 480 volts or less.
- Metering transformers are typically located on the source side of any customer owned protective equipment.

The enclosure models below are preapproved for use. Approval can be requested for other enclosure model that meet FE requirements but are not listed below.

The short-circuit current ratings that will be labeled on the current transformer cabinets are included next to the catalog numbers listed below. This information is being provided so that the customer can select a unit with a short-circuit current rating equal to or greater than the available short-circuit current at the cabinet as may be required by the local or state inspection authority.

CT Enclosure Approved Manufacturer / Catalog Numbers (as of 9/1/2023)		
Manufacturer	Catalog Number	Short-Circuit Current Rating
Ampacity 800 amps		
East Coast Panelboard	CTJ-800-R-A-G	*50,000 amps
Erickson Electrical	CT-84-FECD	100,000 amps
Hoffman	A800HCT1R	50,000 amps
Lake Shore Electric	UTMC-HD-484812-08M-3A-FEC-00	50,000 amps
Brooks Meter Devices	507U7591-1	10,000 amps
Milbank	U5990-O	50,000 amps
# Milbank	CP3F-L	200,000 amps
Durham Company	1011245	*50,000 amps
Nav-Tech	CT-800R	*50,000 amps
Ampacity 1,000 amps		
East Coast Panelboard	CTJ-1000R-A	*50,000 amps
Erickson Electrical	CT-124-FECD	85,000 amps
Ampacity 1,200 amps		
East Coast Panelboard	CTJ-1200R-A	50,000 amps
Erickson Electrical	CT-124-FECD	85,000 amps
@ Erickson Electrical	PMCT-124-FECD	85,000 amps
Lake Shore Electric	UTMC-HD-484812-12M-3A-FEC-00	100,000 amps
Milbank	FEM-1234UGBX	85,000 amps
# Milbank	CP3H-B	200,000 amps
Ampacity 1,600 amps		

East Coast Panelboard	CTJ-1600R-A	50,000 amps
Erickson Electrical	CT-164-FECD	85,000 amps
@ Erickson Electrical	PMCT-164-FECD	85,000 amps
Milbank	FEM-1634UGBX	85,000 amps

Manufacturer	Catalog Number	Short-Circuit Current Rating
Ampacity 2,000 amps		
East Coast Panelboard	CTJ-2000R-A	50,000 amps
Erickson Electrical	CT-204-FECD	85,000 amps
@ Erickson Electrical	PMCT-204-FECD	85,000 amps
Lake Shore Electric	UTMC-HD-845224-20M-3A-FEC-00	50,000 amps
Milbank	FEM-2034UGBX	85,000 amps
# Milbank	CP3H-C	200,000 amps
Ampacity 2,500 amps		
Erickson Electrical	CT254-FECD	85,000 amps
@ Erickson Electrical	PMCT254-FECD	85,000 amps
Milbank	FEM-2534UGBX	85,000 amps
Ampacity 3,000 amps		
East Coast Panelboard	CTJ-3000SWR	65,000 amps
Erickson Electrical	CT304-FECD	85,000 amps
@ Erickson Electrical	PMCT304-FECD	85,000 amps
Lake Shore Electric	UTMC-HD-845224-30M-3A-FEC-00	50,000 amps
Ampacity 4,000 amps		
East Coast Panelboard	CTJ-4000SWR	65,000 amps
Erickson Electrical	CT404-FECD	85,000 amps
@ Erickson Electrical	PMCT404-FECD	85,000 amps
Lake Shore Electric	UTMC-HD-845224-40M-3A-FEC-00	100,000 amps
* - To achieve short circuit ampere rating, customer shall wrap line cable together and load cables together with nylon rope per manufacturers instruction.		
# - The Milbank CP3F-L, CP3H-B, and CP3H-C are pedestal mounted power distribution cabinets having a current transformer compartment.		
@ - These Erickson enclosures are designed to be pad-mounted.		

7.11 Service at Voltages Greater Than 600 Volts

Service at primary distribution, subtransmission, or transmission voltage level may be available dependent upon the size of the load served, location of the facility, and other economic factors and may be provided at the discretion of the Company. The customer shall contact the local Engineering Services Section well in advance of the time such service will be required so that the customer/s and the Company's engineering, design, and construction work may be properly coordinated, and equipment made available. The customer shall contact the Company well in advance of the time such service will be required so that the customer's and the Company's engineering, design, and construction work may be properly coordinated, and equipment made available. Finally, the customer shall contact the local Engineering Services Section for additional information needed.

7.12 Disconnect Requirements

Central Business District Network Areas

The customer shall provide a lockable (for Company padlock or expendable lock) disconnecting means with overcurrent protection (fuses) before entering the metering equipment on all underground services in Central Business District network systems.

Multiple Meter Installations

Disconnect requirements on installations with multiple meters vary dependent upon the nature of the installation and level of load served. For disconnect (main and/or individual meter) requirements, the customer shall contact the local Metering Services Section.

480-Volt Self-Contained Meter Installations

For all single-phase and three-phase 480-volt services with self-contained metering, a non-fused disconnecting means is required on the source side of the meter socket. (If the fault current is greater than 10 kA, a fused disconnect is permitted). The disconnecting means shall be installed, owned, and maintained by the customer. The disconnecting means shall have provisions for a Company meter seal and/or padlock. Refer to Exhibit 15 for details. If additional information is needed, the customer should contact the local Engineering Services Section.

For 480-volt multiple metering units (i.e., gang sockets), a disconnecting means is required on the source side of each socket as specified above for single meter installations. This requirement also applies to 480-volt multiple metering units having a main disconnect. Refer to Exhibit 16 for details.

The customer shall contact the Company's local Metering Services Section during the electrical design stage to discuss the 480-volt meter disconnect requirements and to obtain approval for the proposed installation.

8.0 CUSTOMER EQUIPMENT

8.1 Motors (Inrush Limitations & Motor Protection)

Single-Phase Motors

1. All single-phase motors with ratings of one hp and larger should be connected for supply at 240 volts whenever it is practical, to minimize voltage fluctuation in the wiring system. Where service is supplied from a 208Y/120-volt system, these motors should be purchased for operation at 208 volts.
2. Motor installations for air conditioning equipment, farm applications, and heat pumps in ratings of one to seven and one-half (7-1/2) hp should be of the capacitor start-capacitor run design. The Company shall be notified of each installation of five hp or more. In addition, the customer shall notify the Company before installing central air conditioning or heat pumps.
3. Per the NEC, overload protection shall be provided for all motor circuits.
4. The use of automatic time-delay circuit breakers for circuit protection is strongly recommended and where fuses are used, they should always be of the time-delay type. In many instances, this time-delay will prevent unnecessary shutdowns due to the tripping of an instantaneous type of circuit breaker or blowing of ordinary short-time fuses by large currents resulting from motor starting, temporary overloads, or temporary low-voltage conditions.

Three-Phase Motors

1. Before any three-phase motors are installed, the Company shall be consulted to determine the character and adequacy of the available service.
2. The customer shall provide nameplate information for all motors 10 hp or greater to the Company. The Company will provide the maximum permissible inrush current for the location and for the conditions of that installation.
3. The use of reverse phase relays, phase failure relays, and low voltage relays, preferably of the adjustable time-delay type, with circuit breakers or equivalent devices, is highly recommended. These devices are desirable to disconnect motors automatically that cannot be safely reversed or would be damaged by a phase or voltage failure. Such devices shall be furnished, installed, and maintained by the customer at the customer's expense (refer to Section 8.8).

Starting Currents – General

1. Motor starts can produce voltage fluctuations resulting in objectionable flicker on lighting supplied by the same or nearby circuits.
2. Starting of large three-phase motors and operation of furnaces and welders requires special consideration of the power supply and wiring. The Company may assist the customer in planning these installations; and in every case, the Company shall be notified so that adequacy of the service facilities may be determined, and changes may be made if necessary.

Starting Currents - Frequently Started Motors

Frequently started (i.e., more than four starts per hour) single-phase motors for routine use, such as for refrigerators, oil burners, water pumps, and similar devices, should have a locked rotor current not exceeding 20 amperes for operation at 120 volts and 25 amperes for operation at 240 volts. These motors are permissible on the system.

Starting Currents - Intermittent Started Motors

1. Single-phase motors for installations such as heat pumps, central air conditioners, grain dryers, etc., with locked rotor currents not exceeding 175 amperes served at nominal 120/240 volts or network 120/208Y volts, may be connected to the single-phase service furnished through one meter.
2. Motors that have starting currents exceeding the limits stated in "Starting Currents - Frequently Started Motors" and in item (1.) of Intermittent Started Motors above shall not be installed without the consent of the Company.
3. The maximum permissible motor starting currents, as indicated in item (5.) below, shall apply to the application of manually or infrequently started motors. These values are based on not more than four starts per hour with prolonged periods of continuous operation under maximum load conditions.
4. Where equipment ratings or inrush characteristics other than those covered in this section are being considered, the Company shall be consulted. The starting currents permitted will depend upon the frequency of start of the motor, the size, and character of the customer's load, and the capacity of the Company's system in the area. The maximum allowable starting current will be that value which in the Company's opinion can be supplied without causing undue interference with service to other customers.

5. Maximum Permissible Motor Starting Currents.

a. Equipment with motors rated in horsepower (hp):

<u>Equipment Rated at:</u>	<u>Total Locked Rotor Current not to Exceed:</u>
120 volts, single-phase	50 amps
<u>208 or 240 volts, single-phase</u>	
2 hp or less	60 amps
2 hp to 6.5 hp	60 amps plus 20 amps/hp over 2 hp
Over 6.5 hp	Consult the Company
<u>208 or 240 volts, three-phase</u>	
2 hp or less	50 amps
2 hp to 19.9 hp	50 amps plus 14 amps/ hp over 2 hp
Over 19.9 hp	Consult the Company

b. Room and unitary air conditioning or heat pump equipment rated in Btu per hour (Btu/h). Note: 12,000 Btu/h equals one ton.

<u>Equipment Rated at:</u>	<u>Total Locked Rotor Current not to Exceed:</u>
120 volts, single-phase	50 amps
<u>208 or 240 volts, single-phase</u>	
20,000 Btu/h or less	60 amps
20,000 Btu/h to 43,333 Btu/h	60 amps plus 3 amps/1000 Btu/h more than 20,000 Btu/h
Over 43,333 Btu/h	Consult the Company
<u>208 or 240 volts, three-phase</u>	
20,000 Btu/h or less	50 amps
20,000 Btu/h to 50,000 Btu/h	50 amps plus 2.5 amps/1000 Btu/h more than 20,000 Btu/h
Over 50,000 Btu/h	Consult the Company

6. Definitions & Notes for Motor Starting Requirements

- a. Total locked rotor current is defined as the steady state current taken from the supply line with the motor rotor or rotors locked, with all other power-consuming components including a current-reducing starter if used connected in the starting position, and with rated voltage and frequency applied.
- b. Where the equipment contains more than one motor and some motors are arranged for sequence starting, locked rotor current applies to that combination of power-consuming components simultaneously started that produces a higher draw of starting current than any other combination. In such sequence arrangements, the subsequent motor(s) shall not be started for a minimum of 1/2 second after the preceding motor(s) have completed their starting mode.
- c. Where the design of the equipment is such that unequal currents appear in the supply wires (i.e., auxiliary motors on single-phase equipment or single-phase auxiliary motors on three-phase equipment), locked rotor current applies to the supply wire carrying the largest current.
- d. For three-phase motors and equipment rated at voltages other than 240 volts, the locked rotor currents specified shall be multiplied by the inverse ratio of the

voltages [For example, for a 480-volt motor, the locked rotor current would be the value in the table in item (5) above multiplied times the ratio 240/480 (0.5)].

8.2 Power Factor

It is desirable to maintain the power factor of any load as near to unity as possible.

The Company shall not be obligated to furnish service when the power factor is not maintained at or above the level specified in the tariff. In general, the customer shall maintain a power factor in the range of 87% to 100% coincident with the customer's maximum on-peak monthly demand. If power factor corrective equipment is necessary, it, together with required switching equipment, shall be provided and maintained by the customer at the customer's sole expense.

In general, capacitors shall be applied more carefully than most types of electrical equipment in order that satisfactory operation and maintenance will result. The customer should consult with the Company before any installations of this type of equipment are made.

8.3 Welders & Industrial Furnaces

The Company may assist its customers in planning installations of electric welders and industrial type furnaces. To have ample time to determine the electrical supply requirements, the customer shall consult the Company when such installations are being planned and before the customer commits to the purchase of the equipment.

8.4 Electrical Cooking, Space Heating, Water Heating, Ice/Snow Melting, & Electric Vehicle Charging

In some instances, installations of electrical cooking, space heating, water heating (including tank-less), ice and snow melting, electric vehicle charging, and similar equipment require additional service capacities for satisfactory operation. The customer shall contact the Company before any such installations are made.

The customer shall contact the Company before installing an electric water heating load (including tank-less) of more than a total of 5,500 watts.

8.5 Low-Voltage Surge Arresters (600 Volts or Less)

When low-voltage surge arresters are installed by the customer, they shall not be connected to the service drop conductors, to the service entrance conductors, or installed in the meter socket. Where installed to protect utilization equipment, low-voltage surge arresters may be either inside or outside the enclosure containing the equipment to be protected or installed at the service equipment. These arresters should never be considered as taking the place of the bond between the neutral or grounded conductor and the metallic systems at ground potential such as: metallic siding, water, waste lines, central heating, television towers and antennas, and sometimes lightning rods, but only as devices which may help to reduce appliance failures.

8.6 UPS, Cogeneration, Back-up Generation, & Interconnected Generation

The customer shall consult with the Company before considering or commencing design of any back up power supply or generation (e.g., UPS, cogeneration, back-up generator, or interconnected generation system), due to the potential safety hazard involved. In addition, if generation can run in parallel with the Company supply system; the customer shall obtain additional information on interconnection requirements from the Company's

local Engineering Services Section. It is specifically prohibited to operate generation in parallel with Company facilities unless the Company has approved the interconnection design.

When installing emergency generators, customers shall employ a switch that will prevent electrical backfeed onto Company facilities when the generator is in operation.

Retail Interconnection applies to current retail customers who add generation to their side of the utility meter and interconnect to the electric grid to reduce the energy delivered by their electric utility. Retail interconnections are governed by the rules and regulations identified in the retail service tariffs, which are filed with and approved by the State's regulatory commission. Additional information on interconnected generation can be found at www.firstenergycorp.com. "From the home page, page down to the **"Do Business With Us."** Then select **"Generator Interconnection."** Then click on the desired State followed by the topic of interest (e.g., Retail, Wholesale, Virtual Meter Aggregation, Frequently Asked Question, Interconnection Guide (Single-Phase or Three-Phase), Retail Interconnection Portal, and Whole Interconnection, etc.).

8.7 Harmonic Producing Equipment

Customers shall meet the requirements of IEEE Standard 519 Section 10, Recommended Practices for Individual Customers. Typical examples of harmonic producing equipment are rectifiers, Silicon-Controlled Rectifier (SCR) drives, power supplies, inverters, arc-furnaces, welders, etc.

8.8 Protective Devices

When requested, the Company will provide the necessary information regarding the required interrupting capacity of protective devices to be installed at the customer's point of service. Where service is supplied from high short-circuit current systems, special power fuses, or breakers of high interrupting capacity shall be used. This is important to determine where protective devices are to be installed in underground secondary network Central Business District. While the Company will endeavor, where possible, to anticipate system changes, which may affect these values, it does not assume responsibility or liability with respect to such protective devices, nor guarantee their continuing adequacy against increased interrupting capacity requirements resulting from system changes.

The service equipment installed, irrespective of type, should be of such capacity as to permit the full utilization of the capacity of the service entrance conductors installed at the time of the original installation. Circuit breaker type service equipment is preferable in all cases, and its use is strongly recommended. However, fused type equipment is also acceptable.

Protection against loss of voltage, voltage unbalance, undervoltage transient, sustained overvoltage, phase reversal, loss of synchronism, overcurrent, short circuit, and single phasing is highly recommended for three-phase equipment and is the responsibility of the customer. Reverse phase relays shall be provided on three-phase motors for elevators, cranes, hoists, or any other equipment requiring constant direction of rotation, where reversal of power would result in damage to the equipment or personal injury.

As indicated in Section 3.6, the Company shall not be responsible in any way for damage to the customer-owned equipment that is due to failure of the customer to provide adequate protection.

8.9 Special Equipment

It is also necessary that the installation of any special equipment not covered in this section shall be referred to the Company for advice before any commitments for purchase or installation are made. Such special equipment shall include X-ray, induction and dielectric heating equipment, sign flashers, compressors or radio transmission rectifiers, and other similar devices.

Overhead Service

Material	Supplied By	Installed By
Service Drop (OH cables) w/ Connectors	Company	Company
Service Entrance (including Weatherhead)	Customer	Customer
Self-Contained Meter Socket (400 Amp or Less)	Customer	Customer (Exhibits 17 & 18)
Connectors @ Self-Contained Meter Socket ³	Customer	Customer
Connectors @ CT Cabinets (If used) ⁴	Customer	Customer
480-Volt Meter Disconnecting Means ¹	Customer	Customer
Current Transformer Cabinet ^{5, 8}	Customer	Customer (Exhibit 19)
Current Transformers ^{5, 8}	Company	Company
Metering Conduit	Customer	Customer
Metering Conductors	Company	Company
Transformer-Rated Meter Socket	Company	Customer
Meter	Company	Company

Underground Service

Material	Supplied By	Installed By
Service Lateral (UG Cable) ^{2, 3, 4} Residential Commercial	See Note 9 Customer	See Note 9 Customer
Trench / Base / Conduit / Backfill ^{2, 7}	Customer	Customer
Service Entrance	Customer	Customer
Riser - Pole Material Residential Commercial	See Notes 9 & 10 Customer/Company	See Notes 9 & 10 Customer/Company
Transformer Foundation Single-Phase Three-Phase	Company Customer	Customer (Exhibit 29) Customer (Exhibit 26 – 28)
Connectors @ Source ⁴ Transformer, Pedestal, or Handhole	Company	Customer
Self-Contained Meter Socket (400 Amp or Less) ⁵	Customer	Customer
Connectors @ Self-Contained Meter Socket ³	Customer	Customer
Connectors @ CT Cabinets (If used) ⁴	Customer	Customer
480-Volt Meter Disconnecting Means ¹	Customer	Customer
Current Transformer Cabinet ^{4, 5, 8}	Customer	Customer
Current Transformers ^{4, 5}	Company	Company
Metering Conduit	Customer	Customer
Metering Conductors	Company	Company
Transformer-Rated Meter Socket	Company	Customer ⁴
Meter	Company	Company

Notes:

- For all single-phase and three-phase 480-volt services with self-contained metering, a disconnect is required on the source side of the meter socket (see Exhibit 15 for details).
- For UG services, the contractor, developer, or customer shall provide all trenching, conduit, base material for equipment foundations, and backfilling as well as a clear, graded path for the installation of underground facilities. Additionally, the customer shall be responsible for providing, installing, and maintaining their own service-lateral cables.
- Note: Approved self-contained meter sockets are limited to a maximum conductor size of 600 kcmil.

Service Material Guideline for New Jersey Operating Company

FirstEnergy

Service Guide

EXHIBIT 1

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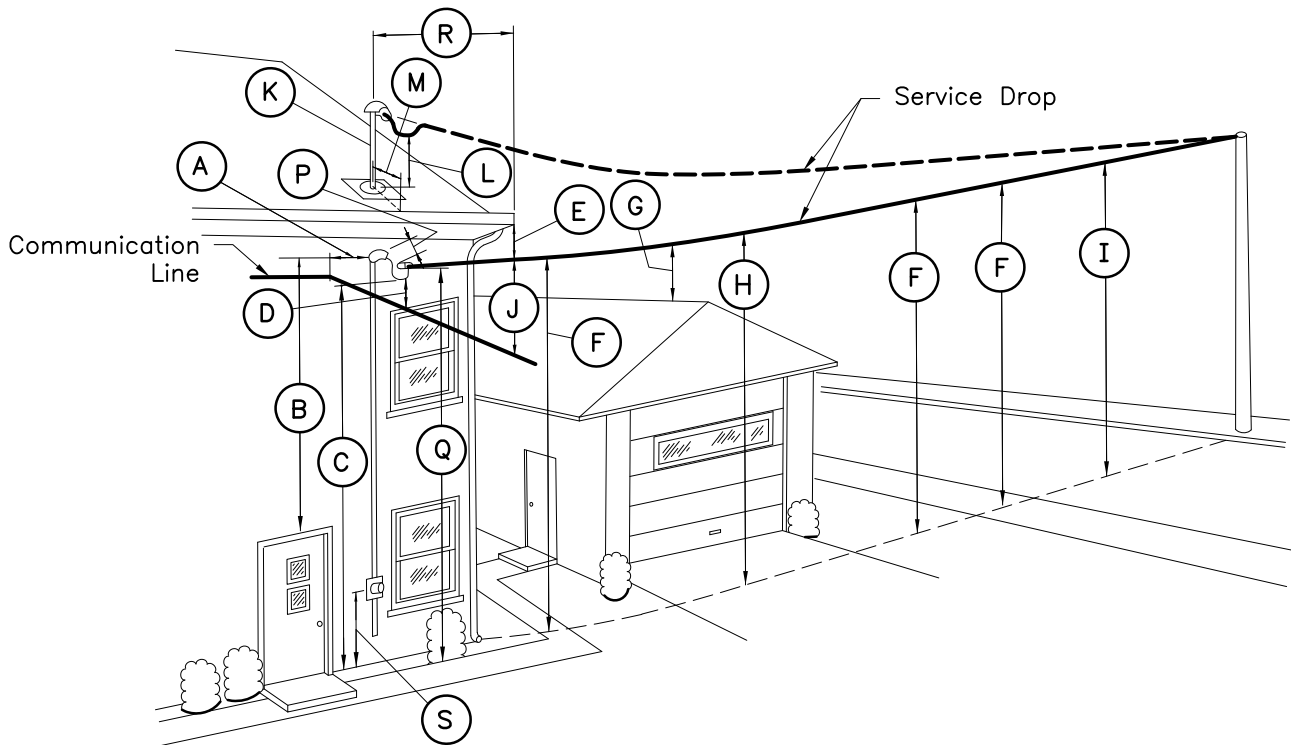
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Notes:

4. For UG service lateral connections at overhead transformer riser installations or underground pedestals, handholes, and single-phase pad-mounted transformers, the cable size is limited to 750 kcmil. For connections at three-phase pad-mounted transformers, the cable size is limited to 16 parallel conductors of 750 kcmil per phase or 8 parallel conductors of 1000 kcmil per phase.
5. For services greater than 400 amps, metering requires the use a current transformer cabinet or current transformers installed in the pad-mounted transformer. Customer shall contact the Company for details.
6. Customer shall contact the Company for network applications.
7. All new and upgraded underground services laterals should be installed in conduit (minimum 3-inch Schedule 40 PVC electrical grade). The conduit should run the entire length of the trench and shall have a 1/4-inch nylon or polypropylene pull line installed inside the conduit.
8. A metering disconnect may need to be installed by the customer on the supply-side of the current transformer cabinet on multiple services served off of a single overhead or pad-mounted transformer. Customer shall contact local Metering Services.
9. An individual residential customer, who is not located in a development, may elect to install the underground service lateral in conduit at their cost and expense in accordance with the Company's specifications. At the customer's option, the Company will install and connect the underground service lateral, upon the customer making a non-refundable contribution. In either case, the Company will assume ownership and responsibility for maintenance (per tariff - Part II, Section 8.03). If an existing residential customer chooses to relinquish ownership of the customer-owned service which was built prior to January 17, 2007, the customer shall contact the Company for details and conditions.
10. Company supplies riser material when U-Guard is used. Customer supplies riser material when conduit is used. Conduit should only be used when multiple risers would impede climbing space. Consult Company when multiple risers are needed.
11. For customers who are rebuilding or elevating homes located in coastal areas identified as FEMA flood zones, refer to the JCP&L meter connection guidelines in Exhibit 31.



NESC/NEC Minimum Clearances

A	Communication lines (e.g., telephone, CATV) at point of attachment	1 ft
B	Doors, porches, fire escapes, and similar locations	3 ft
C	Lowest point of the drip loop: Multiplex (< 150 V to ground) Open wire (< 300 V to ground - not shown)	10 ft 12 ft
D	Windows: Beside or below Above a window	3 ft 4 inches
E	Gutters and downspouts	3 inches
F	Sidewalks and final grade: Multiplex (< 150 V to ground) Open-wire (< 300 V to ground - not shown)	12 ft 12.5 ft
G	Refer to Section 3.15 for conductors not attached to, but crossing over buildings	-
H	Residential driveways	16 ft
I	Public street, alley, public parking lot, and areas subject to truck traffic	18 ft
J	Communication line drop at crossing	2 ft
K	Optional method by use of mast: Conduit coupling shall be located near meter socket (Only power service drop conductors shall be attached to the mast.)	-
L	Overhanging roof: (Roof slope not less than 4" in 12"	If service overhang "R" is 6 feet or less and "M" is 4 feet or less 18 inches If service overhang "R" is greater than 6 feet, the vertical clearance above the roof for the remainder of horizontal distance 3 ft
M	Distance from service mast to edge of the roof (see dimension "L")	-
P	Point of attachment shall not be higher than the weatherhead	-
Q	Electrical service drop attachment	12 ft
R	Length of electrical service overhanging roof (see dimension "L")	-
S	Height of centerline of meter socket (approximately) Clearance between meter socket any door or window	60 inches 30 inches

Notes:

Service (including drip loop) shall be a minimum of 10 feet above decks and patios, and 3 feet above a deck railing.

Minimum Clearances for Overhead Service Drops – Under 600 Volts

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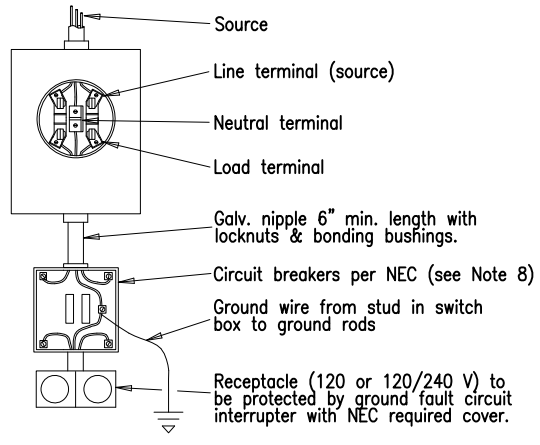
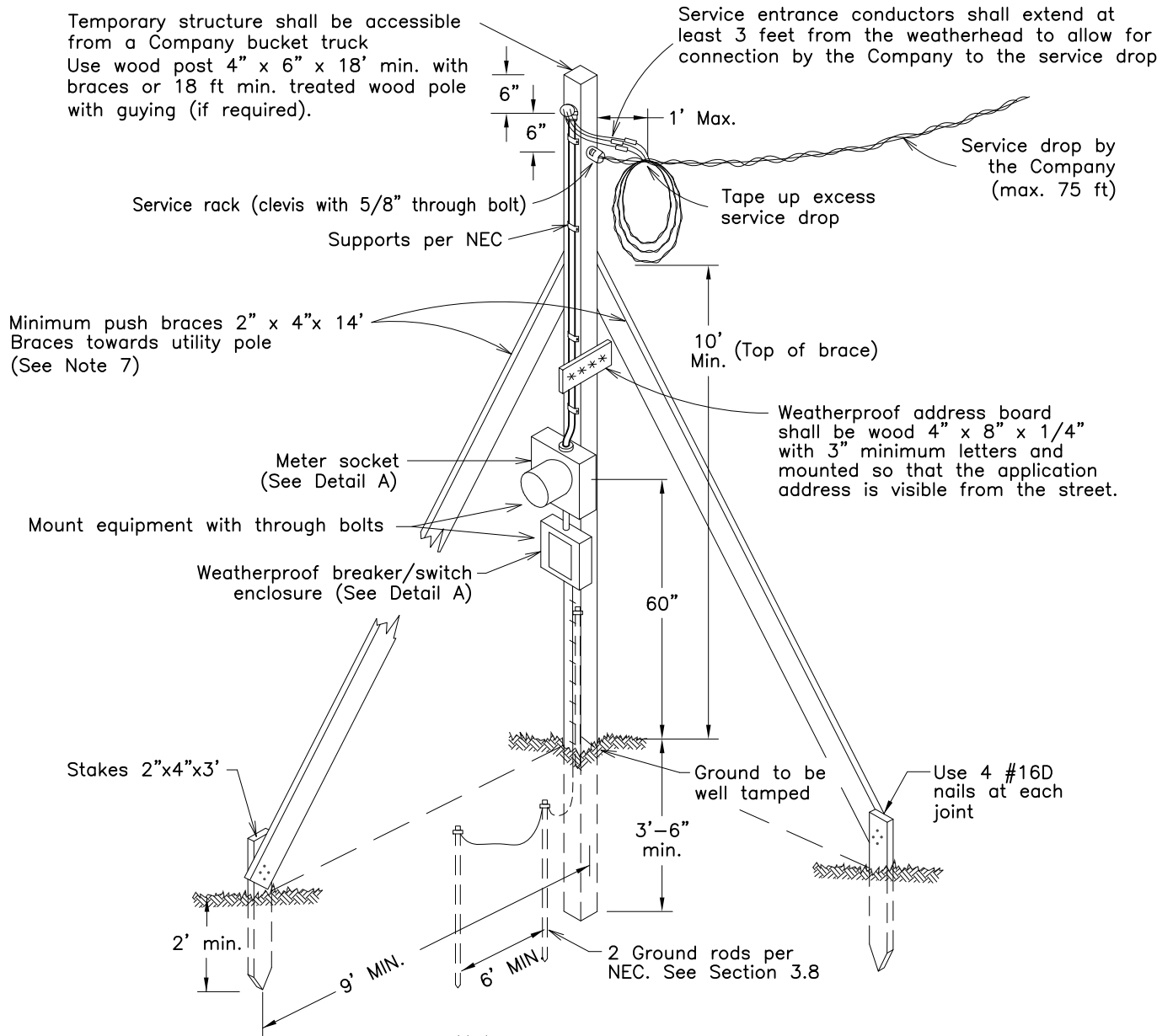
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Temporary structure shall be accessible from a Company bucket truck
 Use wood post 4" x 6" x 18' min. with braces or 18 ft min. treated wood pole with guying (if required).

Service entrance conductors shall extend at least 3 feet from the weatherhead to allow for connection by the Company to the service drop



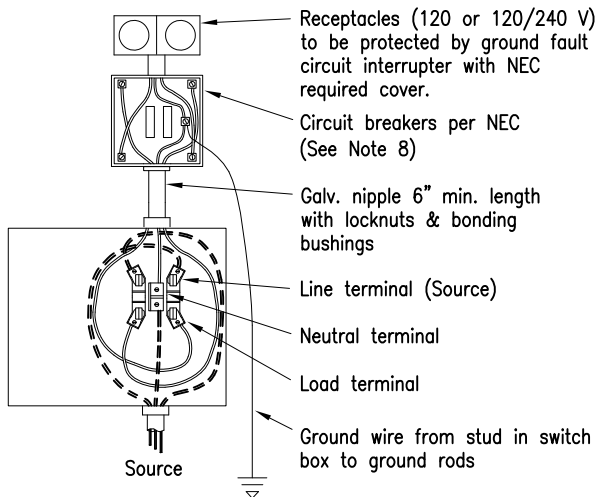
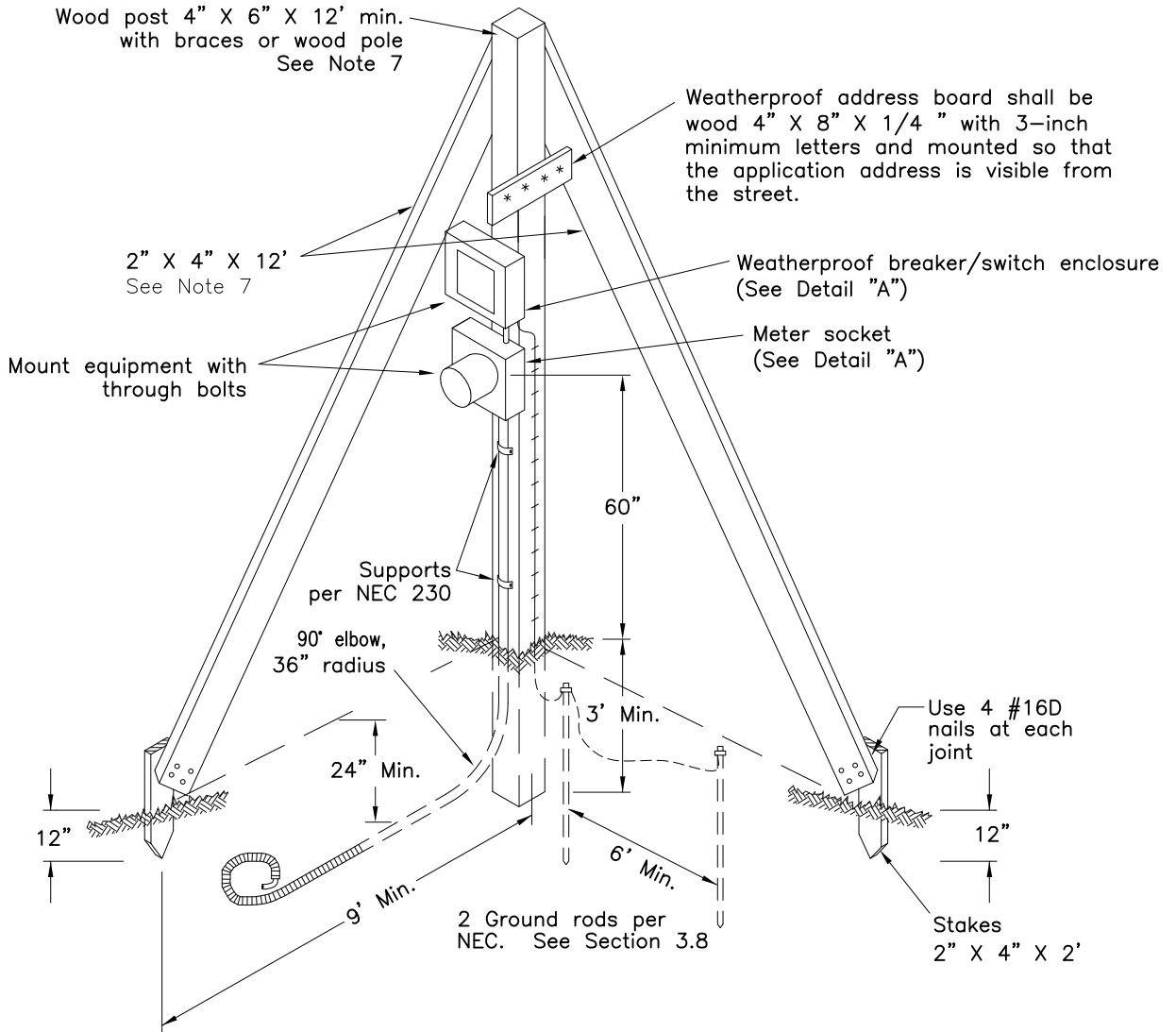
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Pole and temporary service placement shall be approved by the Company.
3. This structure is for typical temporary service of short duration only (see Section 4.0).
4. Service drop clearance above all driveways, alleys, parking lots, and areas subject to truck traffic, shall be in accordance with the NESC (see Exhibit 2). Minimum ground clearance of 10 ft to the bottom of the drip loop is required per NEC.
5. Ground fault protection shall meet NEC Article 305.
6. Company shall connect service upon receipt of the fee and inspection release.
7. All wood products shall be pressure treated.
8. For installations within 30 ft of a 50 kVA or larger transformer, contact the Company representative for the available fault current.
9. Call state One-Call Agency 3 days (min.) before construction. Refer to Sections 3.13 & 3.14.

Typical Temporary Service Overhead Installation

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EXHIBIT 3	2
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3-Wire 120/240 volt Connection diagram

Detail "A"

Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Pole and temporary placement shall be approved by the Company.
3. This structure is for typical temporary service of short duration only (see Section 4.0).
4. Base of temporary pole shall be a minimum of 3 ft from any building foundation or permanent structure.
5. Contractor shall run service lateral cables to the Company pedestal, handhole, or transformer. Contractor to leave 5-ft coil of cable for hookup at a pedestal/handhole or 10-ft coil at a transformer. Cable shall be either 3-conductor with a ground or a 2-conductor with ground cable with the white wire permanently marked as hot per NEC 310 and 200. "Tape is not approved" for marking 2-conductor cable.
6. Ground fault protection shall meet NEC Article 305.
7. All wood products shall be pressure treated. For installation within 30 ft of a 50 kVA or larger transformer contact Company representative for available fault current to determine breaker rating.
8. Call state One-Call agency 3 days before construction. Refer to Sections 3.13 & 3.14.

Typical Temporary Service Underground Installation

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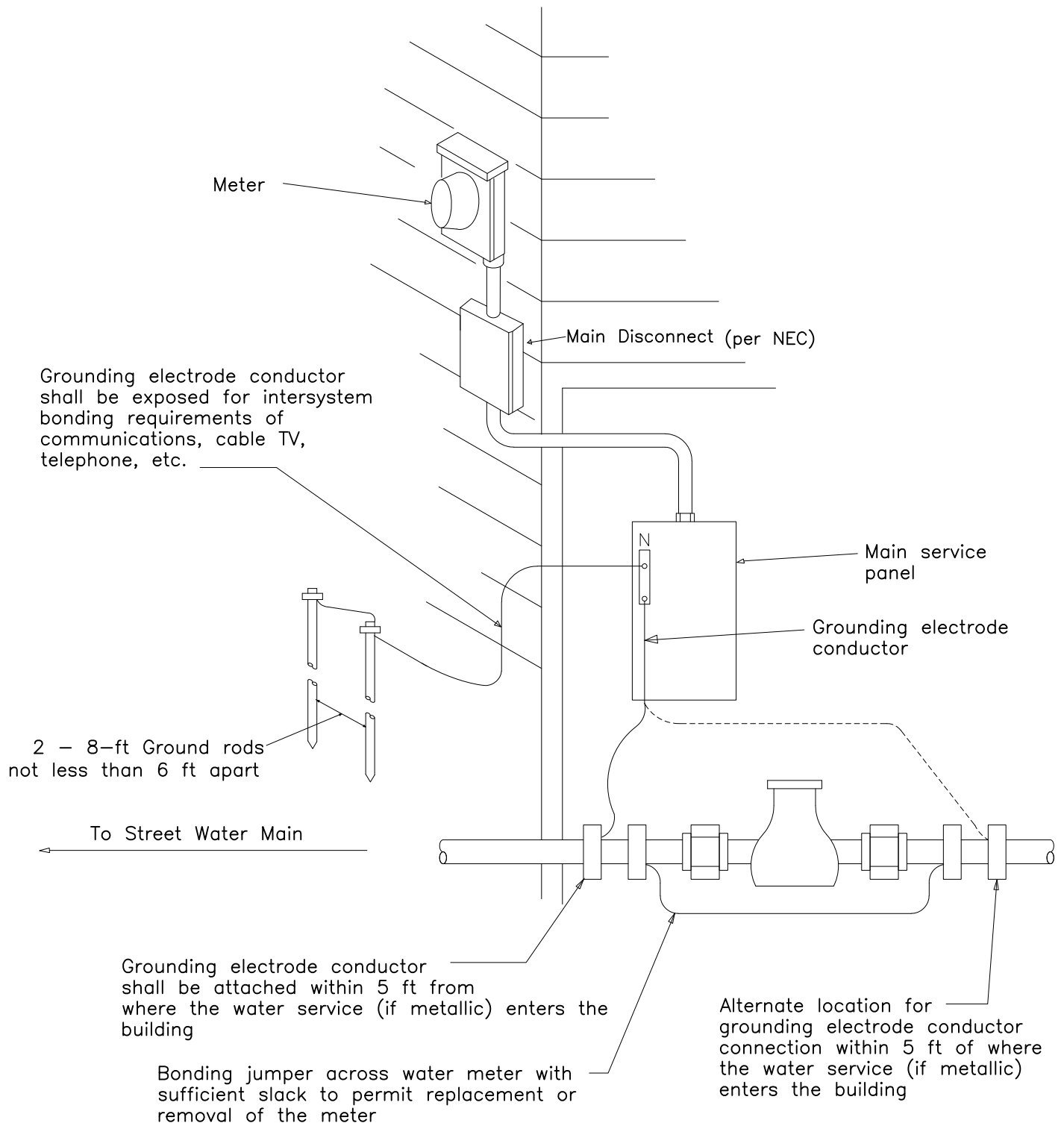
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EXHIBIT 4

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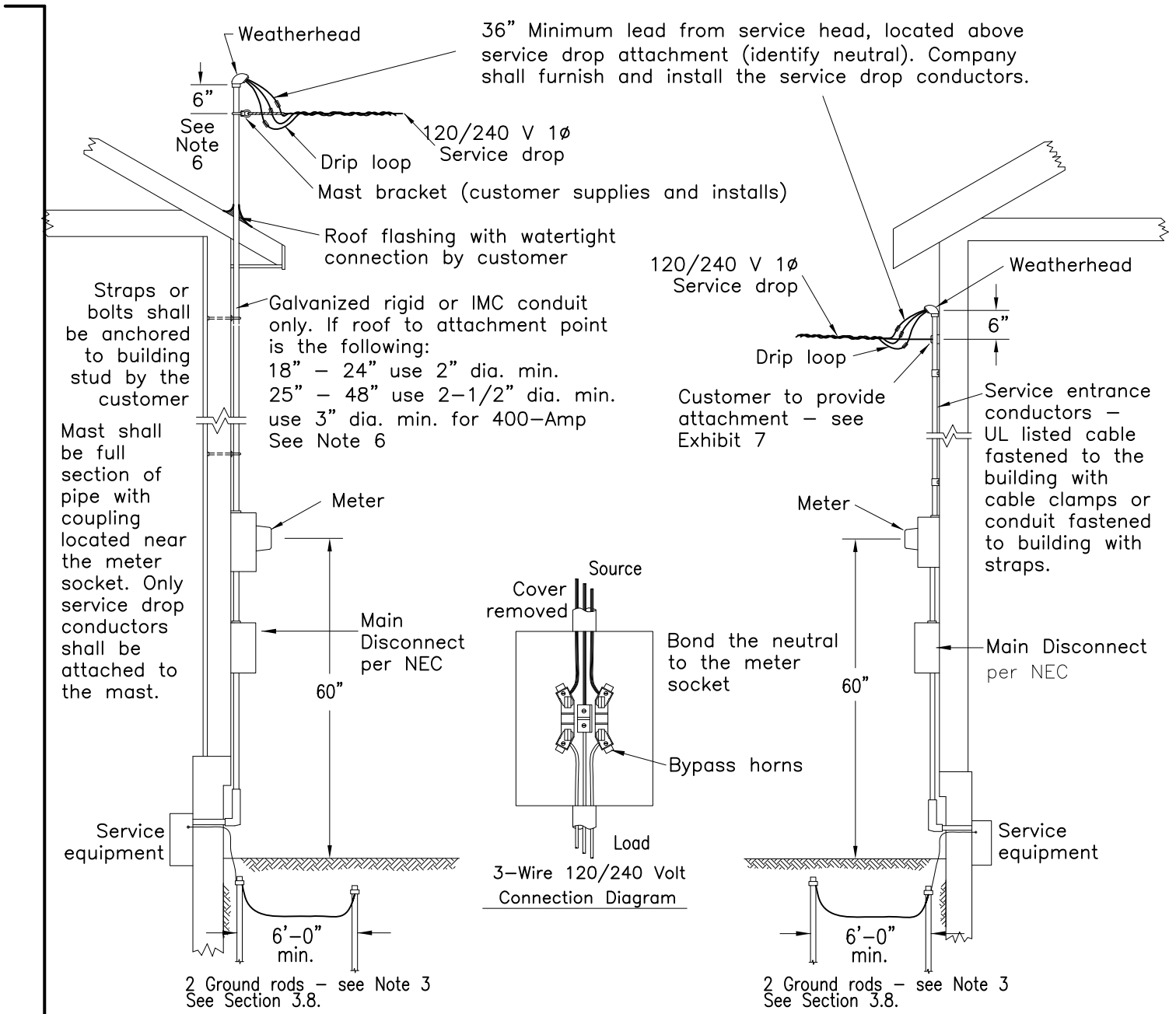
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Typical Customer Grounding Details

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	DATE
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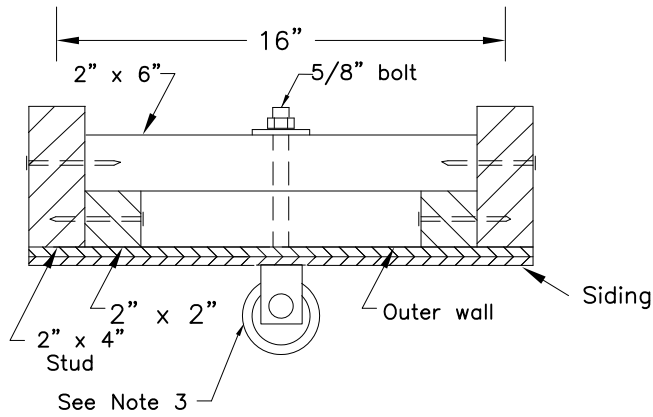
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Customer shall consult the Company for the point of attachment and meter socket location. See Exhibit 2 for service drop clearance requirements. Connections shall be accessible from a ladder. Company personnel are not permitted to climb onto the customer's roof.
3. Two 8-ft ground rods required - spaced a minimum of 6 ft apart (see Section 3.8).
4. See Section 7.0, for meter socket details.
5. Inhibitor compound shall be used on all aluminum wire terminations.
6. Guying may be required for a service mast over 36 inches or long service drops. Customer shall contact the Company for mast heights above 48 inches.

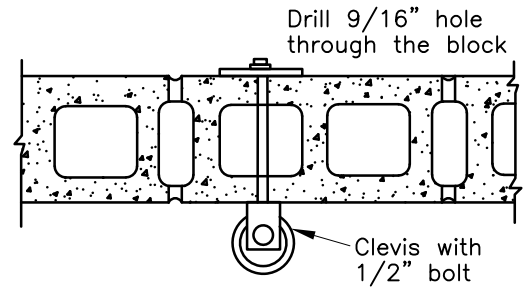
**Typical Overhead Single-Phase
Service Entrance Installation
400 Amp or Less**

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EXHIBIT 6	DATE
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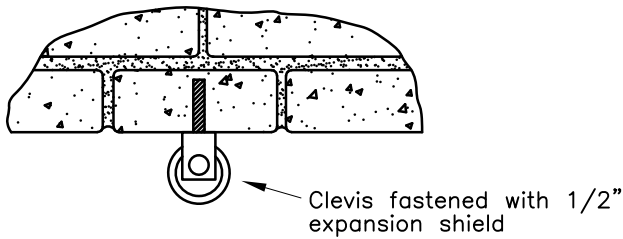


Wood, Aluminum, or Composition Siding



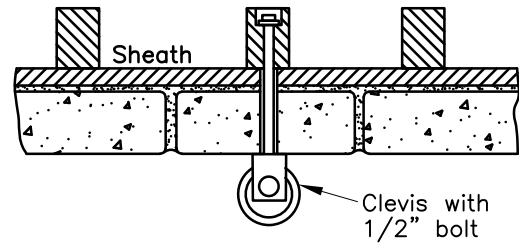
Cinder or Cement Block

To be installed in the brick or poured cement only, not in the brick mortar



Solid Brick or Concrete Masonry

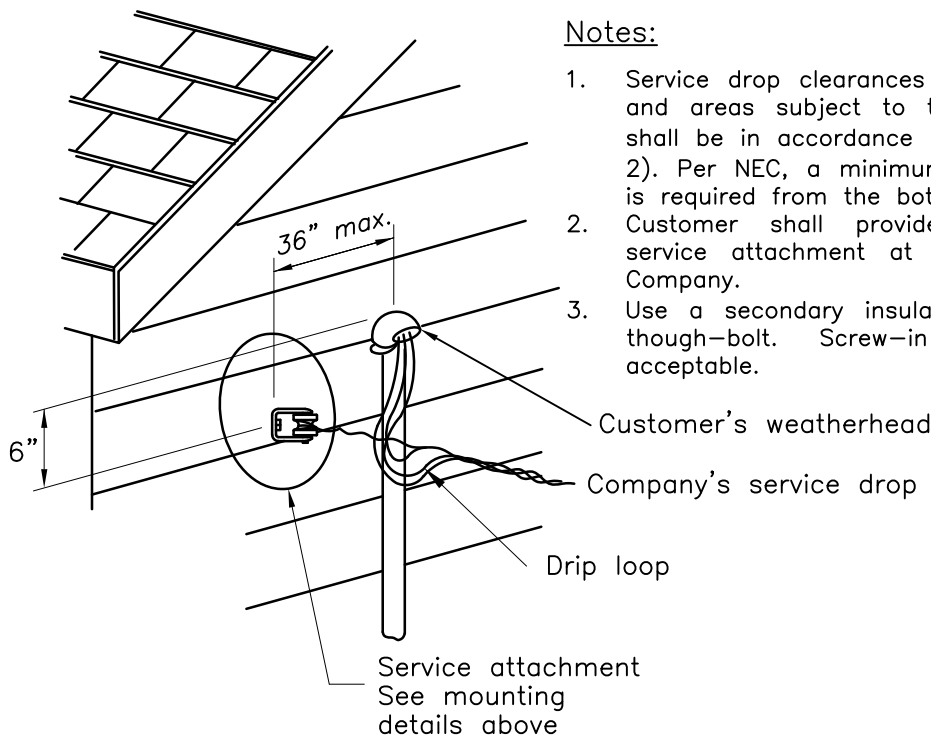
Drill 9/16" hole in stud and countersink bolt head Bolt shall be installed before brickwork is started.



Brick Veneer

Notes:

1. Service drop clearances above grade, alleys, driveways, and areas subject to truck use, as well as windows shall be in accordance with the NESC/NEC (see Exhibit 2). Per NEC, a minimum ground clearance of 10 feet is required from the bottom of the drip loop.
2. Customer shall provide, install, and maintain the service attachment at the location approved by the Company.
3. Use a secondary insulator with a clevis and a 5/8" though-bolt. Screw-in type insulators are not acceptable.



**Typical Overhead
Service Drop Attachment**

FirstEnergy.

Service Guide

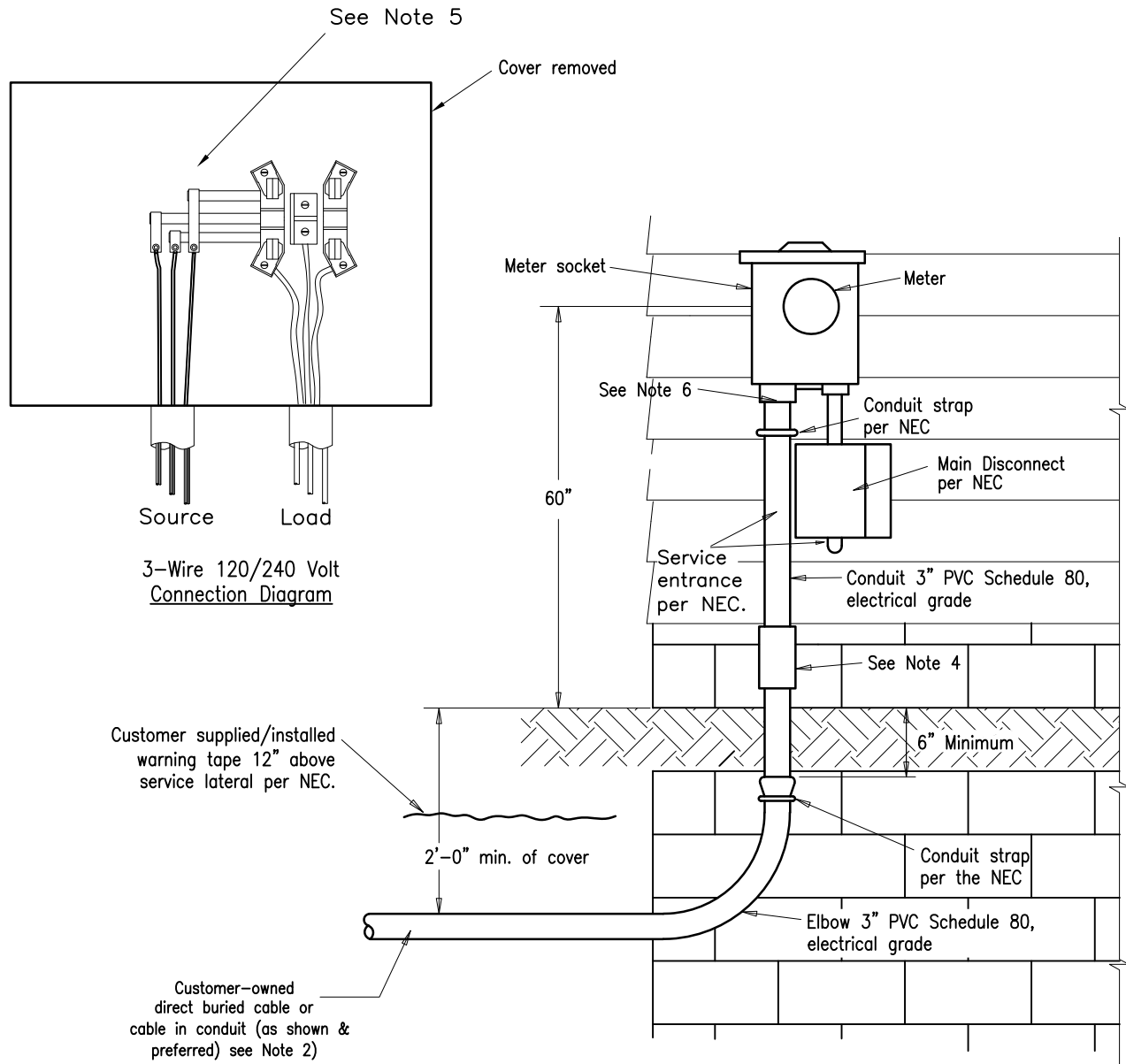
REV.

1

EXHIBIT 7

DATE

11/23



Notes:

1. For customer/Company responsibilities, see Exhibit 1. Customer shall furnish the meter socket. The customer shall install meter socket (side-bussed), 3" Sched 80 conduit riser, conduit straps, and 3" 90° Sched 80 elbow.
2. For trenching, conduit, and backfilling details, see Exhibit 24. The customer shall provide a well tamped and firm trench.
3. See Section 6.0 for underground service details.
4. The customer shall provide ground movement protection per NEC 300.5(J) to prevent damage due to settlement or frost heaves. The Company recommends that the customer use a slip-joint conduit product.
5. Use side-bussed meter socket only.
6. A reducer is required if conduit is larger than meter socket knockout.

**Typical Underground Single-Phase
Service Lateral Installation
400 Amp or Less**

FirstEnergy.

Service Guide

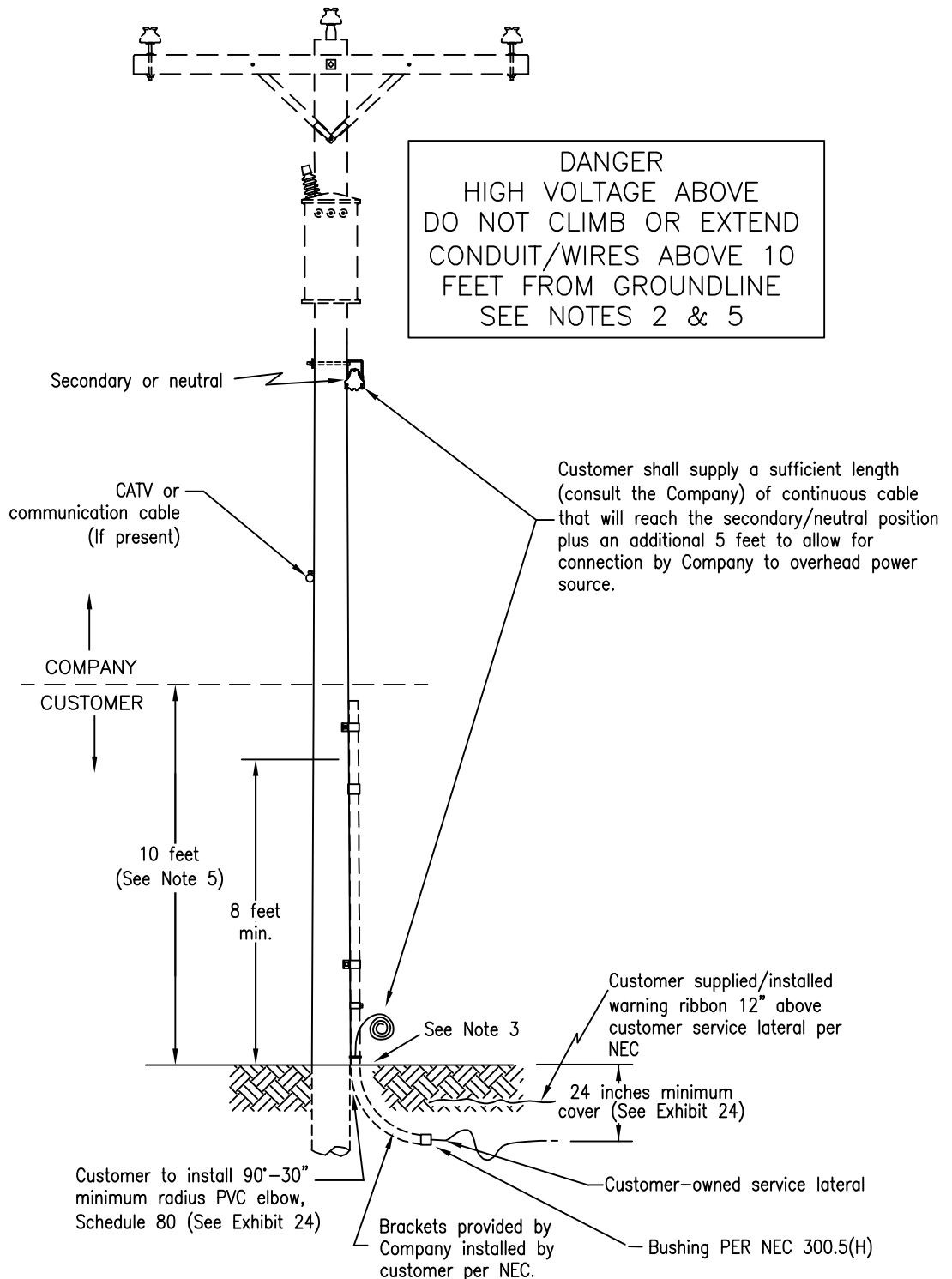
REV.

2

EXHIBIT 8

DATE

11/23



Notes:

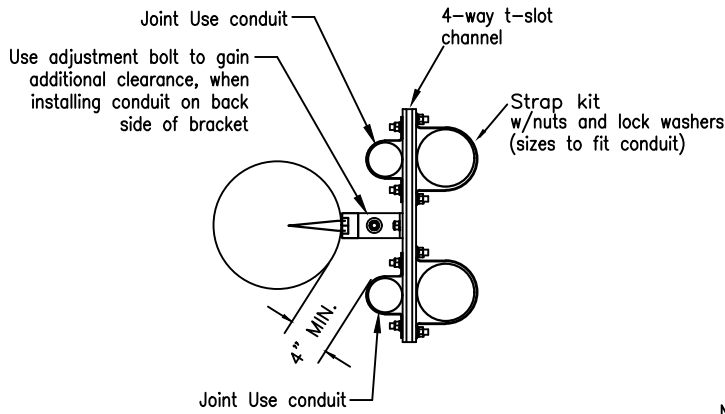
1. For customer/Company responsibilities, see Exhibit 1.
2. CAUTION: Only qualified personnel are permitted to install electrical equipment in the vicinity of energized electrical lines as described in OSHA 1910 Subpart R. & S.
3. Company shall determine the location/position of vertical risers on the pole based on traffic flow and location of CATV, or Telephone Co. attachments.
4. All service installations shall meet NEC, state, and local codes and regulations.
5. Customer shall provide a sufficient length of continuous cable, plus an additional five (5) feet, coiled, at the base of the pole, to connect with overhead source. Company will complete the installation in U-Guard. In high theft areas, Customer may run cable ten feet up pole.
6. Conduit size is limited to 4" dia. conduit size. For conduit diameter greater than 4", see Exhibit 10A.

Direct Attachment of Customer-Owned Underground
Secondary Service Lateral(s) on New Jersey
Operating Company's Poles

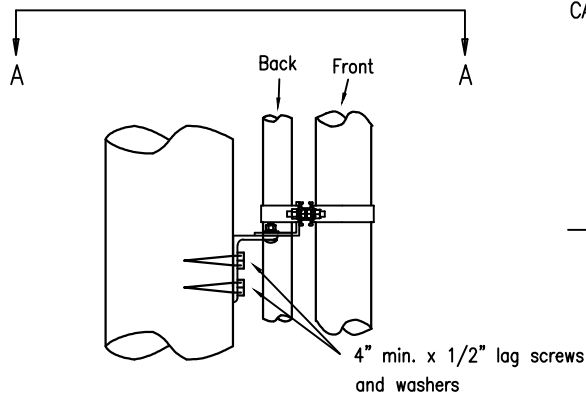
FirstEnergy.

Service Guide	REV.
EXHIBIT 9	2
	DATE
	11/23

DANGER: HIGH VOLTAGE ABOVE. DO NOT CLIMB OR EXTEND CONDUIT/WIRES ABOVE 10 FEET FROM GROUNDLINE. SEE NOTES 2 & 5.

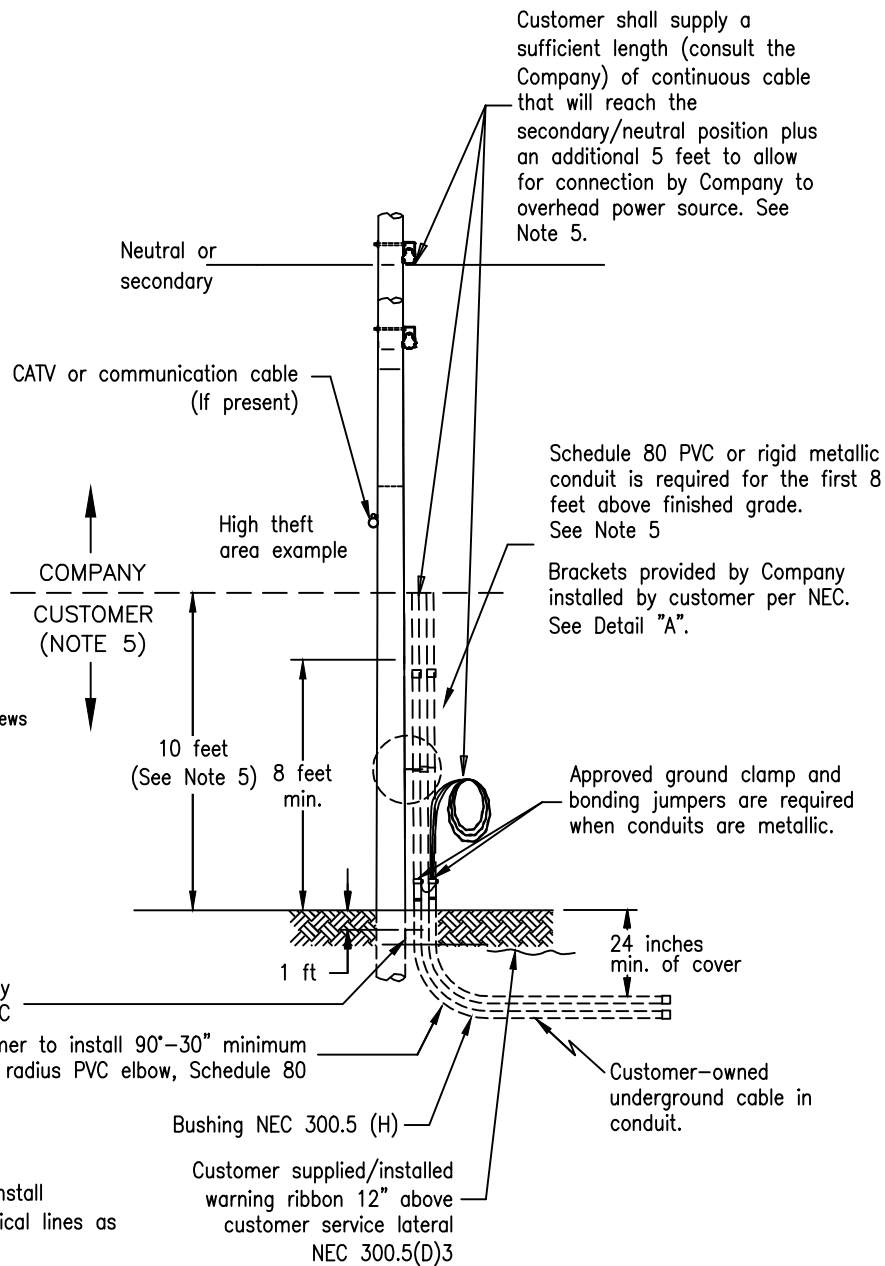


Section "A-A"
N.T.S.



Detail "A"
N.T.S.

MANUFACTURED ASSEMBLY



Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. CAUTION: Only qualified personnel are permitted to install electrical equipment in the vicinity of energized electrical lines as described in OSHA 1910 Subparts R. & S.
3. Company shall determine the location/position of vertical risers on the pole based on traffic flow and location of CATV or Telephone Co. attachments. Conduit shall maintain a minimum clearance of 6" below the secondary or neutral.
4. All service installations shall meet NEC, state, and local codes and regulations.
5. Customer shall provide a sufficient length of cable to connect to the overhead source. It should be coiled at the base of the pole, except in high theft areas it may be coiled and temporarily attached on the pole, ten (10) feet above ground. Company will complete the installation.

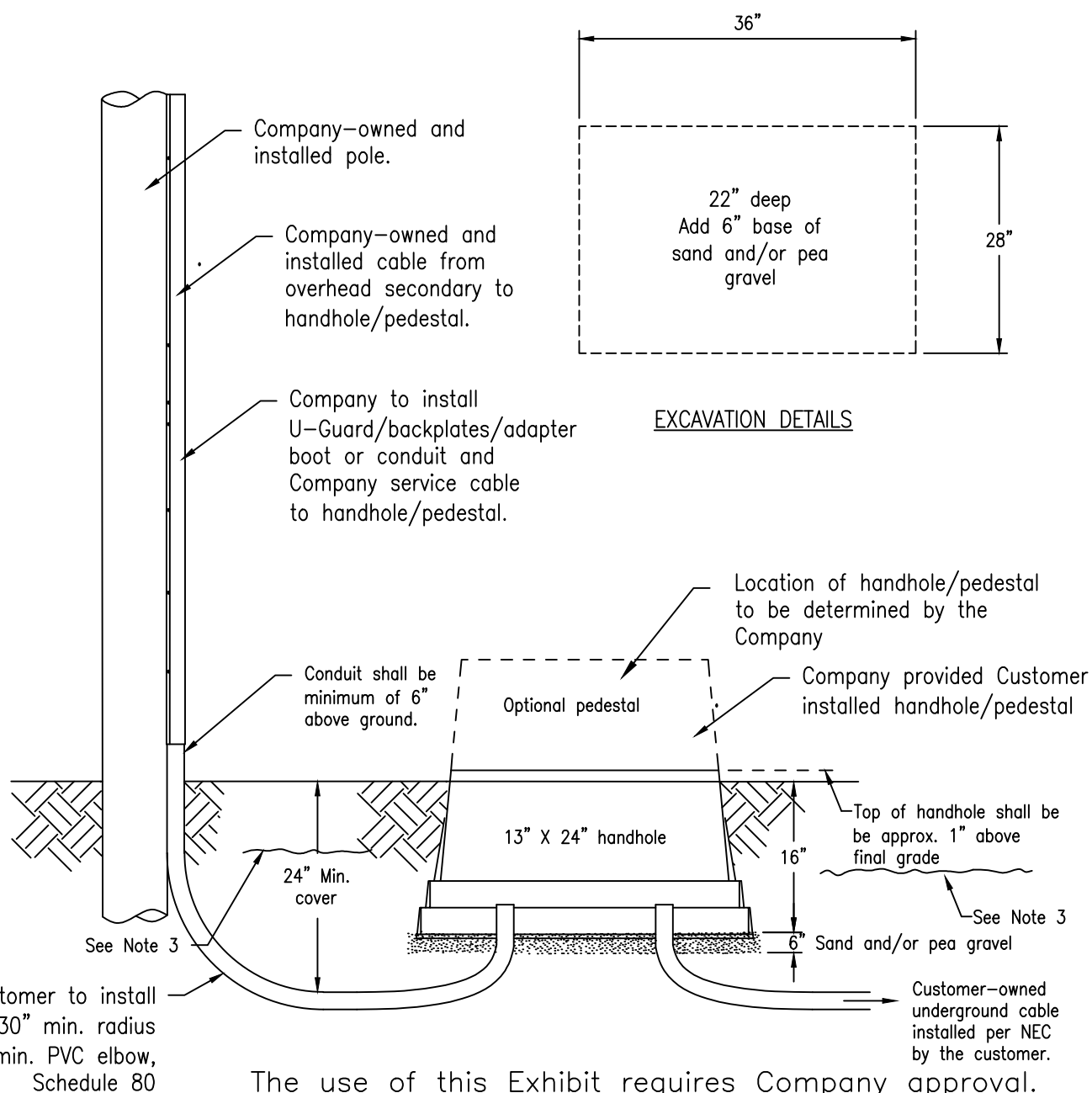
The use of this Exhibit requires Company approval.

The preferred method is in exhibit 9 with U-guard, unless multiple U-guards will impede climbing space.

Standoff Attachment of Multiple Customer-Owned Underground Secondary Service Laterals on New Jersey Operating Company's Pole

FirstEnergy

Service Guide	REV.
EXHIBIT 10A	2
	DATE
	11/23



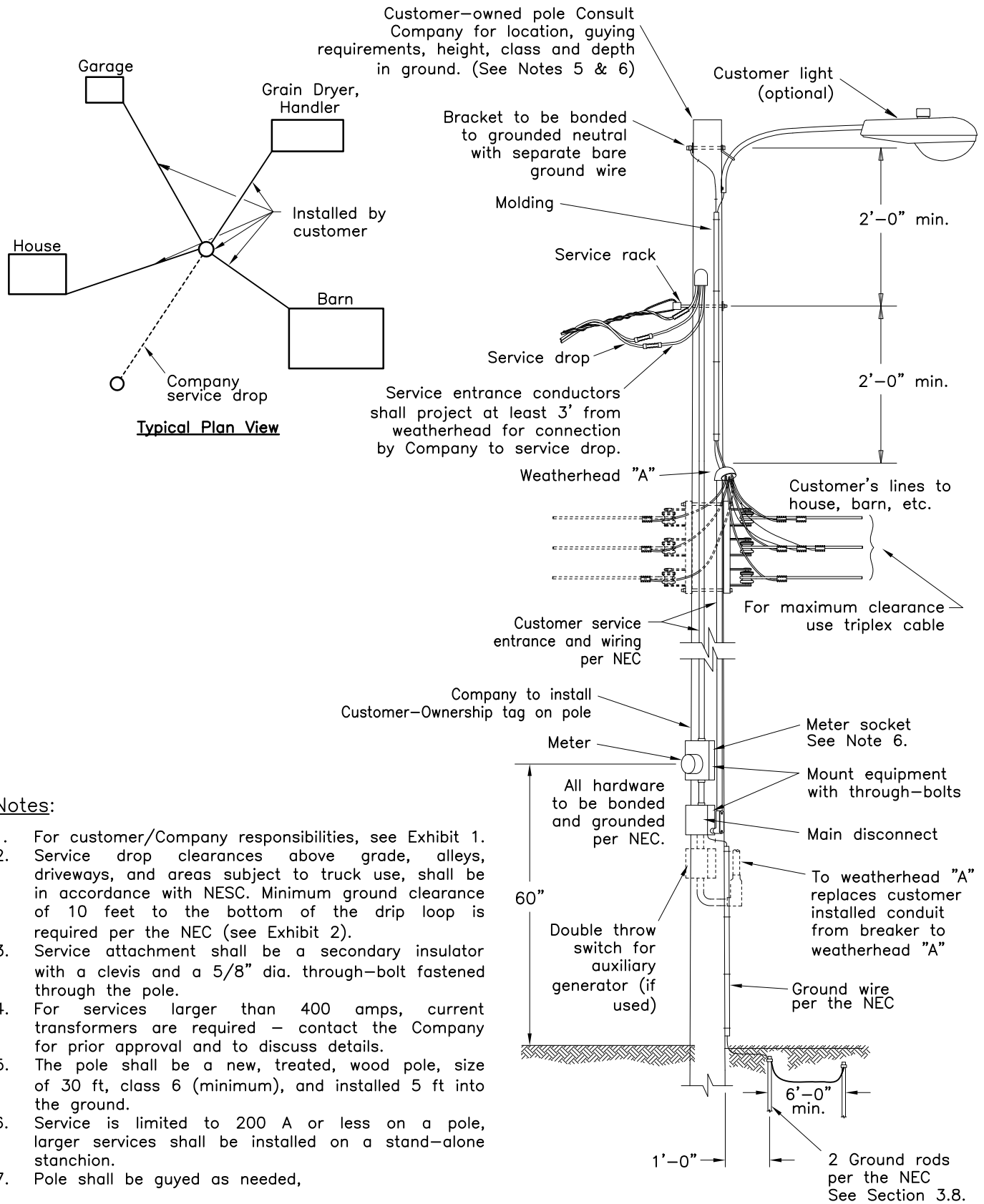
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Customer to excavate for handhole and provide and install conduit on load-side of the handhole. Company to provide and customer to install handhole and make connections to customer's service lateral conductors.
3. Customer supplied/installed red electrical warning tape 12" above buried service conduit per the NEC.
4. Customer-owned cables shall not be located in the road right-of-way.

Customer-Owned Underground
Secondary Service Lateral to
Handhole / Pedestal

FirstEnergy.

Service Guide	REV.
EXHIBIT 10B	2
	DATE
	5/24



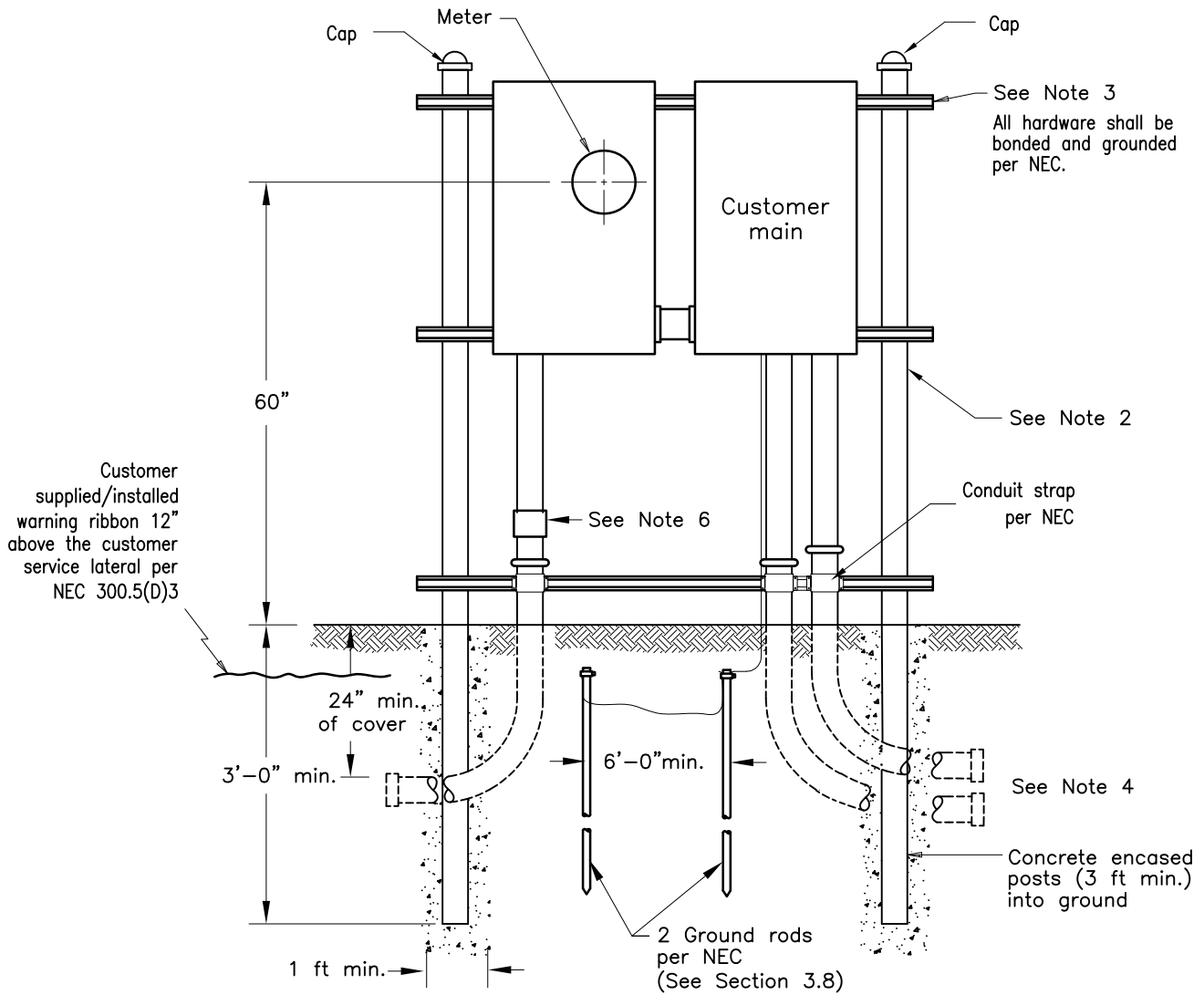
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Service drop clearances above grade, alleys, driveways, and areas subject to truck use, shall be in accordance with NESC. Minimum ground clearance of 10 feet to the bottom of the drip loop is required per the NEC (see Exhibit 2).
3. Service attachment shall be a secondary insulator with a clevis and a 5/8" dia. through-bolt fastened through the pole.
4. For services larger than 400 amps, current transformers are required – contact the Company for prior approval and to discuss details.
5. The pole shall be a new, treated, wood pole, size of 30 ft, class 6 (minimum), and installed 5 ft into the ground.
6. Service is limited to 200 A or less on a pole, larger services shall be installed on a stand-alone stanchion.
7. Pole shall be guyed as needed,

**Typical Overhead Service
Central Distribution Installation**

FirstEnergy

Service Guide	REV.
EXHIBIT 11	1
	DATE
	11/23



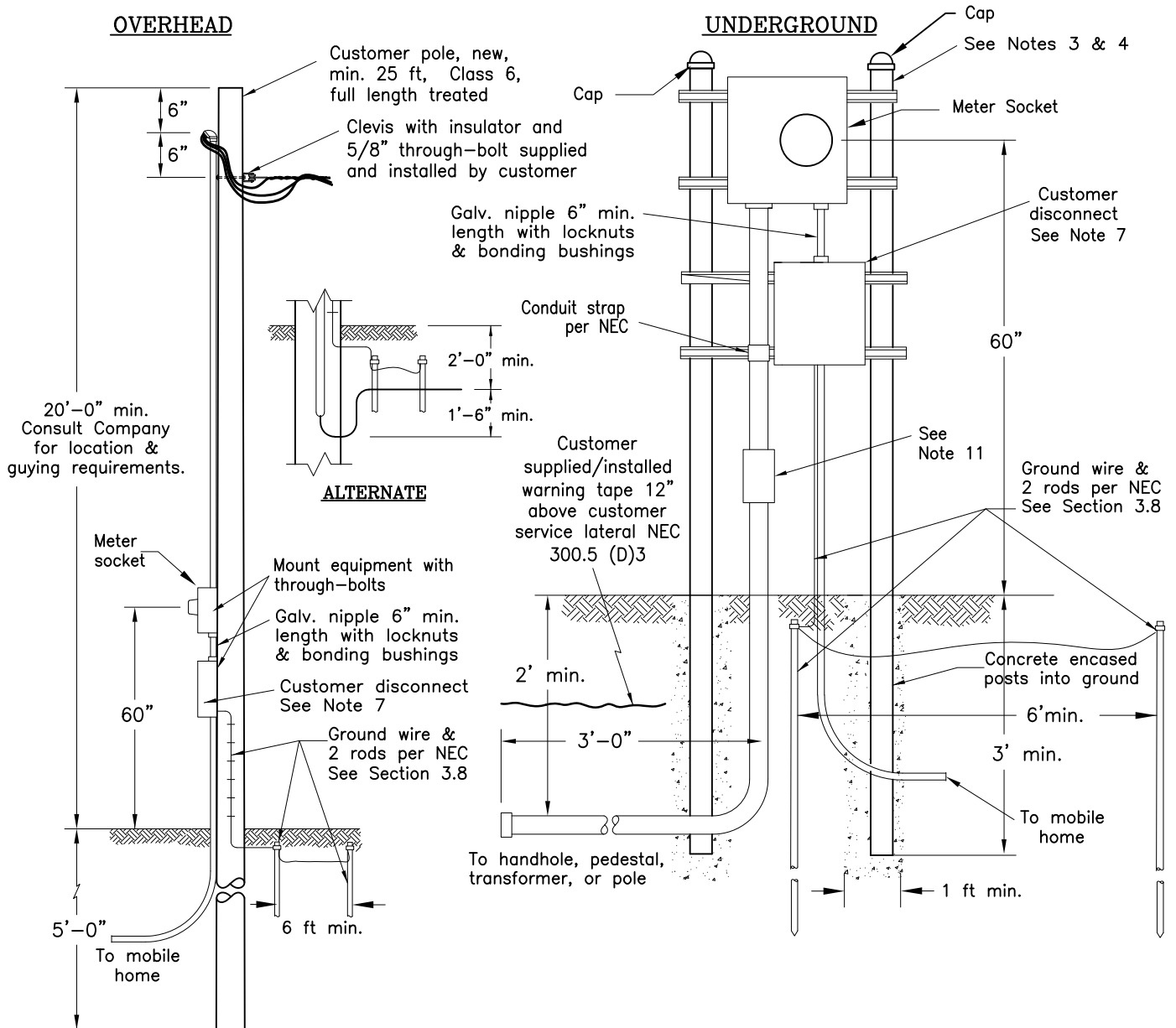
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Support post (customer-owned): use two 2-1/2" min. galvanized rigid metal conduit (RMC) – steel (min. 0.205" thick) capped and concrete encased in the ground. Note, a third support post should be added if the structure length exceeds six (6) feet.
3. Minimum mounting hardware: use three 12 gauge 1-5/8" x 1-5/8" continuous slot hot dipped galvanized channel (e.g., Unistrut) complete with 1-1/4" x 5/16" dia. 13 thd. spring nut (2 per channel), 5/16" hex nut, and lock washer securely mounted to support posts. The selected hardware shall be capable of supporting the load without sagging or deflection.
4. Supply-side conduit shall be rigid galvanized or IMC steel, or Schedule 80 PVC (electrical grade).
5. The customer shall have ground movement protection per NEC 300.5(J) to prevent damage due to settling.
6. This exhibit can also be used for stand-alone, self-contained metering or transformer-rated metering installation. Customer to contact local Metering Services for details.

**Typical Underground Service
Central Distribution Installation
/ Stand-Alone Metering**

FirstEnergy.

Service Guide	REV.
	2
EXHIBIT 12	DATE
	11/23



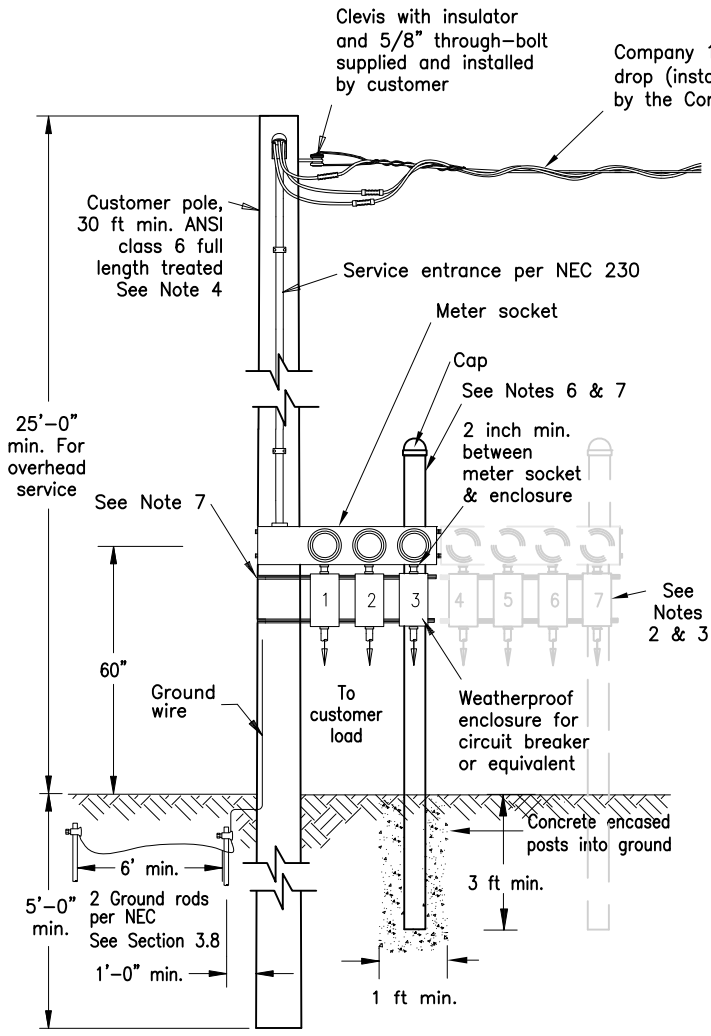
Notes:

1. For customer/Company responsibilities, see Exhibit 1
2. Meter and pole shall be a minimum of 5 feet from the structure.
3. Support post (customer-owned): use two 2-1/2-inch min. galvanized rigid metal conduit (RMC) – steel (min. 0.205" thick) capped and concrete encased in ground.
4. Minimum mounting hardware: use four 12 gauge 1-5/8" x 1-5/8" continuous slot hot dipped galvanized channels (e.g., Unistrut) complete with 1-1/4" x 5/16" dia. 13 thd. spring nut (2 per channel), 5/16" hex nut, and lock washer securely mounted to support posts. The selected hardware shall be capable of supporting the load without sagging or deflection.
5. Prefabricated meter pedestal may be substituted for 2 & 3 above. Contact local Metering Services.
6. When using customer-owned direct burial cable, refer to the "alternate drawing."
7. Customer disconnect per NEC (located within sight of and within 30 feet of the mobile home).
8. Customer security light may be installed on the pole if a clearance of 2'-0" min. above or below the weatherhead is maintained and Company approval is obtained.
9. For identification purposes, the socket (inside & out) and breaker shall be permanently and plainly marked to designate the address number being served.
10. See trenching, conduit, and backfilling details Exhibit 24. Supply-side conduit shall be rigid galvanized or IMC steel, or Schedule 80 PVC (electrical grade).
11. The customer shall provide ground movement protection per NEC 300.5 (J) to prevent damage from settling.

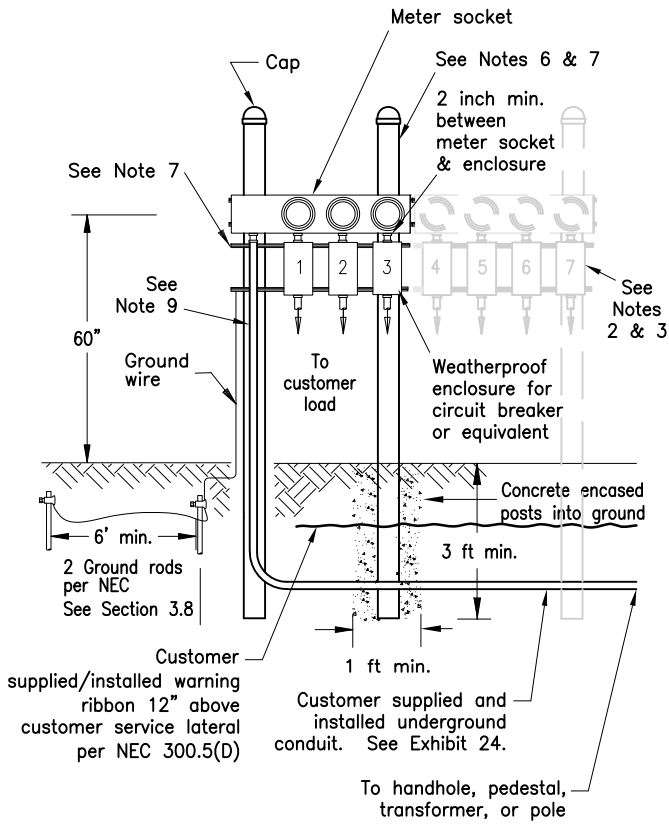
**Typical Single Mobile Home Service
Overhead & Underground**

FirstEnergy

Service Guide	REV.
EXHIBIT 13	2
	DATE
	11/23



OVERHEAD



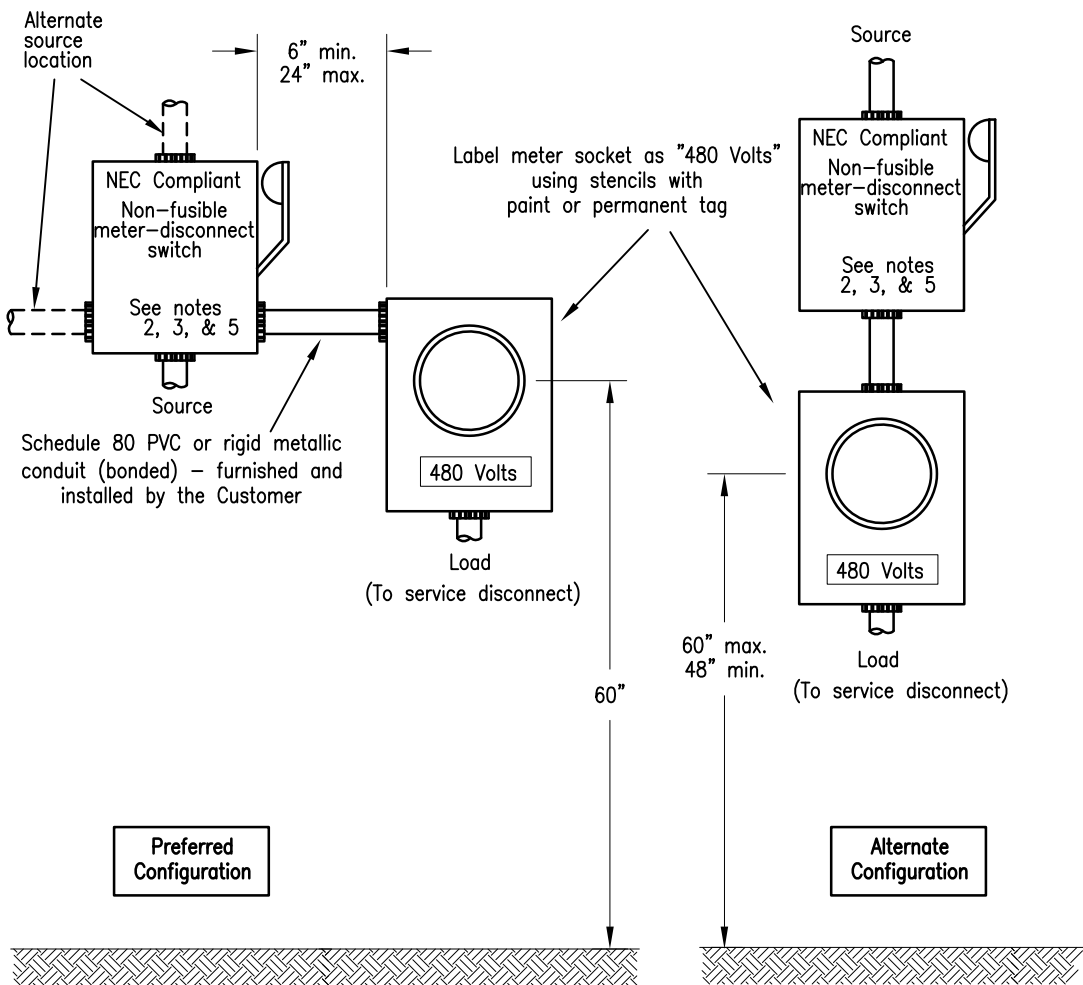
UNDERGROUND

Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. All meter sockets (internally & externally) and breakers shall be permanently and plainly marked to designate the particular unit served.
3. If more than six meters require a main disconnect per NEC.
4. Wood poles shall be new, pressure treated, 30 ft min., Class 6 pole.
5. All hardware shall be bonded and grounded per NEC.
6. Support post (customer-owned): use 2-1/2-inch min. galvanized rigid metal conduit (RMC) steel (min. 0.205" thick) capped and concrete encased in the ground for three or more meters. Note, a third support post should be added if the structure length exceeds six (6) feet.
7. Minimum mounting hardware: use four 12 gauge 1-5/8" x 1-5/8" continuous slot hot dipped galvanized channels (e.g., Unistrut) complete with 1-1/4" x 5/16" dia. 13 thd. spring nut (2 per channel), 5/16" hex nut, and lock washer securely mounted to support posts. The selected hardware shall be capable of supporting the load without sagging or deflection. Use through-bolts to mount channels to wood poles.
8. Prefabricated meter pedestal may be substituted for Notes 7 & 8 above. Contact the local Metering Services for details.
9. The supply-side conduit riser shall be rigid galvanized steel, IMC steel, or Schedule 80 PVC (electrical grade).
10. The customer shall provide ground movement protection per NEC 300.5(J) to prevent damage due to settling.

**Metering & Service Facilities
for Mobile Home & Travel Trailer Parks
Multiple Meters**

FirstEnergy	
Service Guide	REV.
	2
EXHIBIT 14	DATE
	11/23



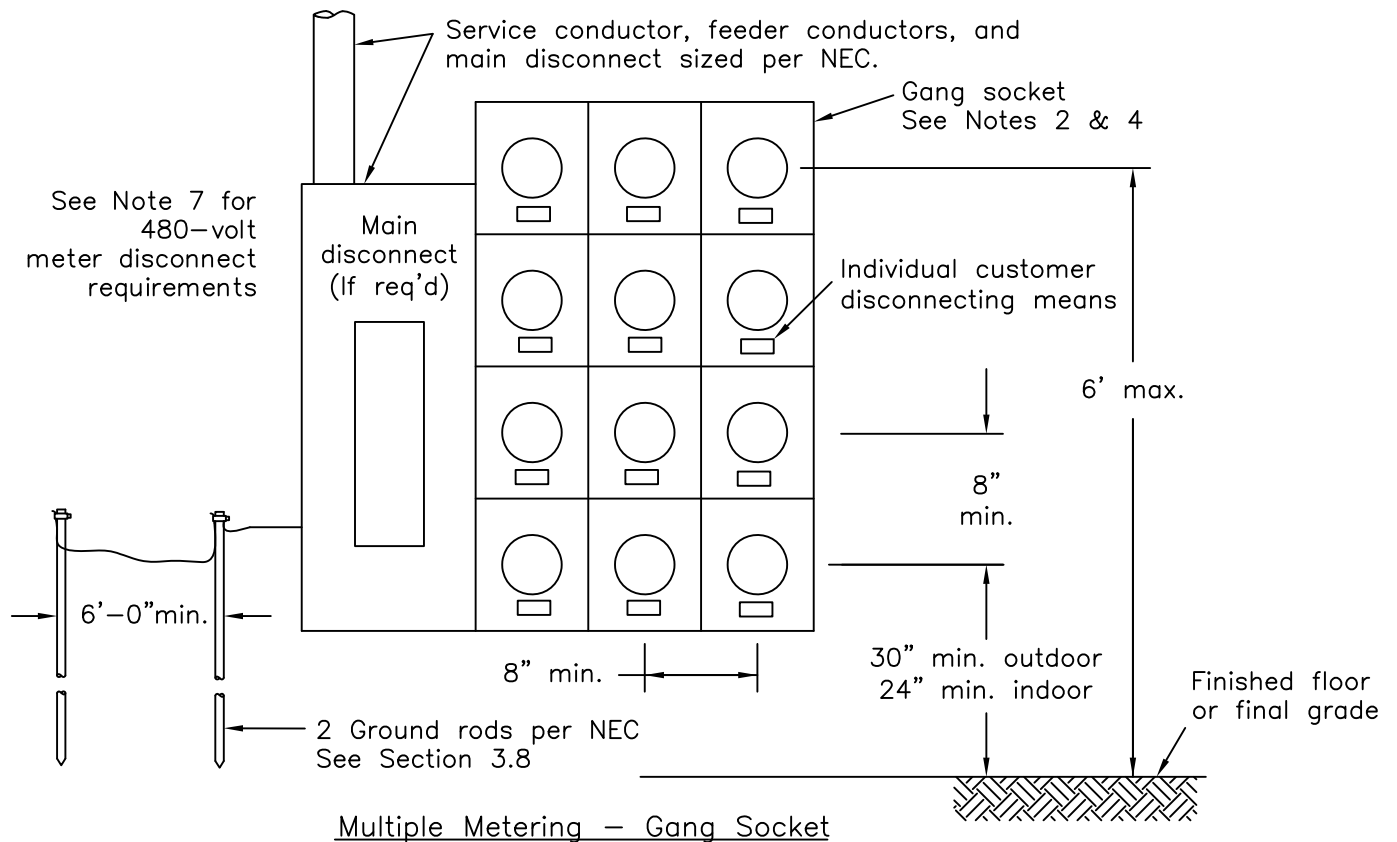
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. NEC compliant non-fusible meter disconnect switch shall be supplied, installed, and maintained by the customer for both temporary and permanent services on the source side of the meter socket. Contact the Company's local Metering Services Section for details regarding the requirements and to obtain approval for the proposed installation.
3. The non-fusible meter disconnect switch shall be lockable in the open and closed positions. The switch enclosure shall have provisions for a Company seal and/or padlock.
4. See Exhibit 16, for 480-volt gang- and multiple-socket unit installations.
5. For fault current greater than 10 kA, a fusible disconnect is permitted. Customer shall contact the Company for details.

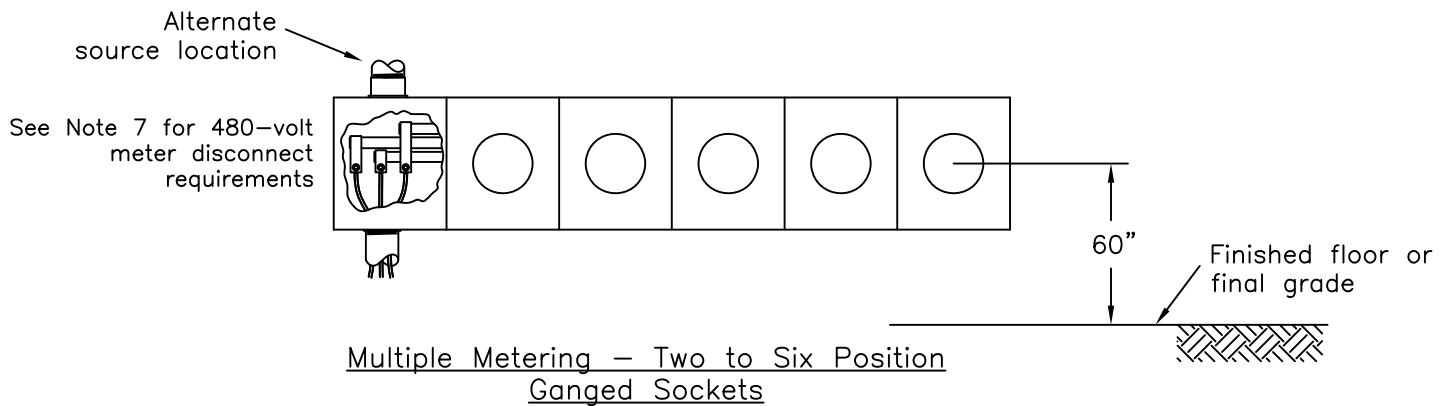
**Metering Installation Single-Phase & Three-Phase 480-Volt
Self-Contained Meter with Source-Side Disconnect
320 Amp or Less**

FirstEnergy.

Service Guide	REV.
	2
EXHIBIT 15	DATE
	11/23



Multiple Metering - Gang Socket



Notes:

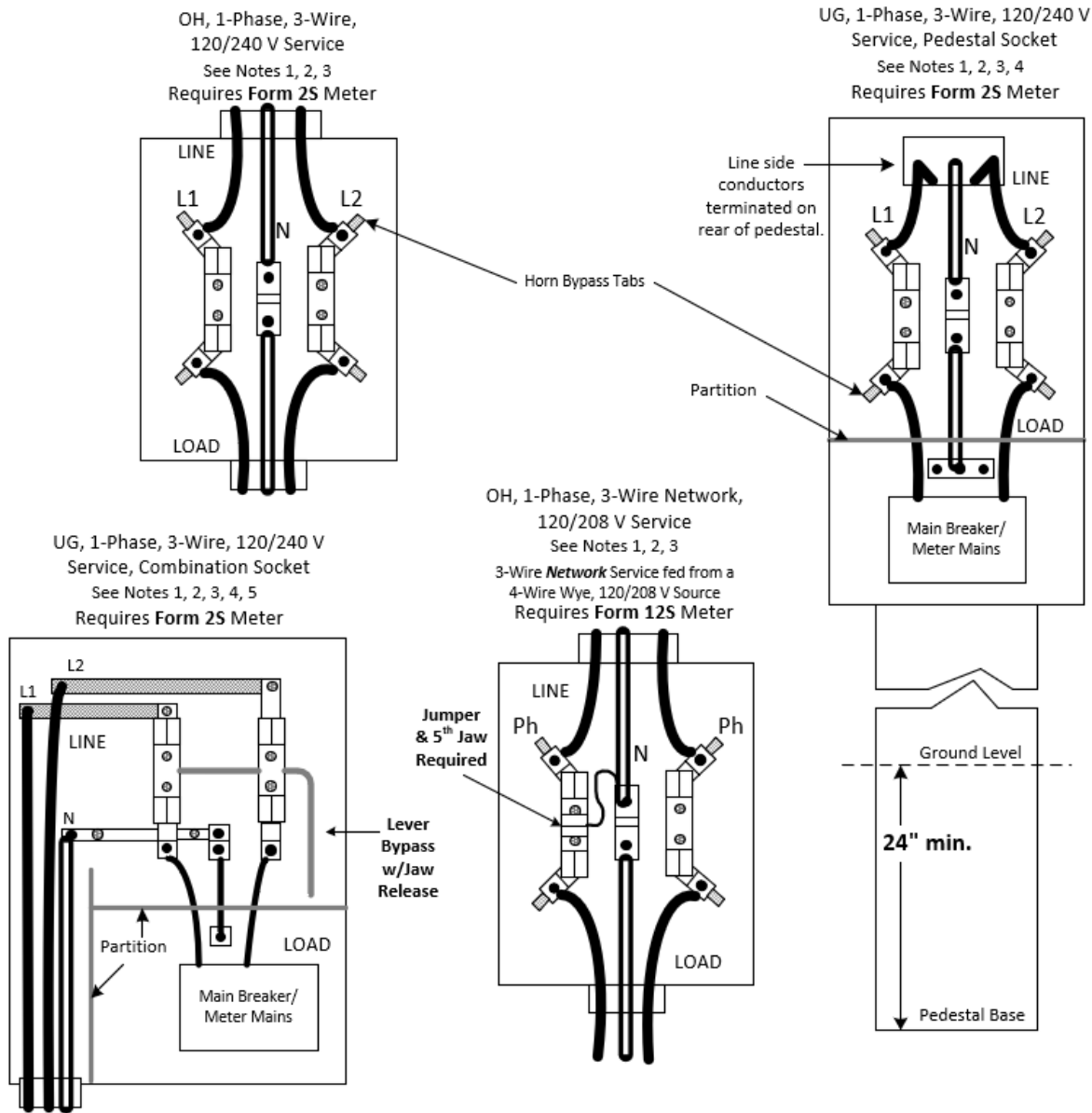
1. For customer/Company responsibilities, see Exhibit 1.
2. Contact the local Metering Services Section before installation of ganged sockets.
3. Main disconnecting means not required for six meters or less.
4. Height shall not exceed 4-meter positions.
5. All sockets (inside and out) and breakers shall be permanently and plainly marked to designate the specific unit served.
6. If installation contains poly-phase or 480-volt meter sockets, these shall be plainly marked.
7. For 480-Volt services, a disconnecting means is required on the source-side of each meter socket (see Exhibit 15 for details).
8. Multiple meter (ganged) installations are required for condominiums or apartments. Individual homes and town houses require individual services.

Multiple Meter Installation
Self-Contained Metering
320 Amp or Less

FirstEnergy.

Service Guide	REV.
	2
EXHIBIT 16	DATE
	11/23

Example Socket Connections For 1-Phase, 3-Wire, 120/240 V and 120/208 V Network Services.
 Required meter Form is indicated for each connection shown below.



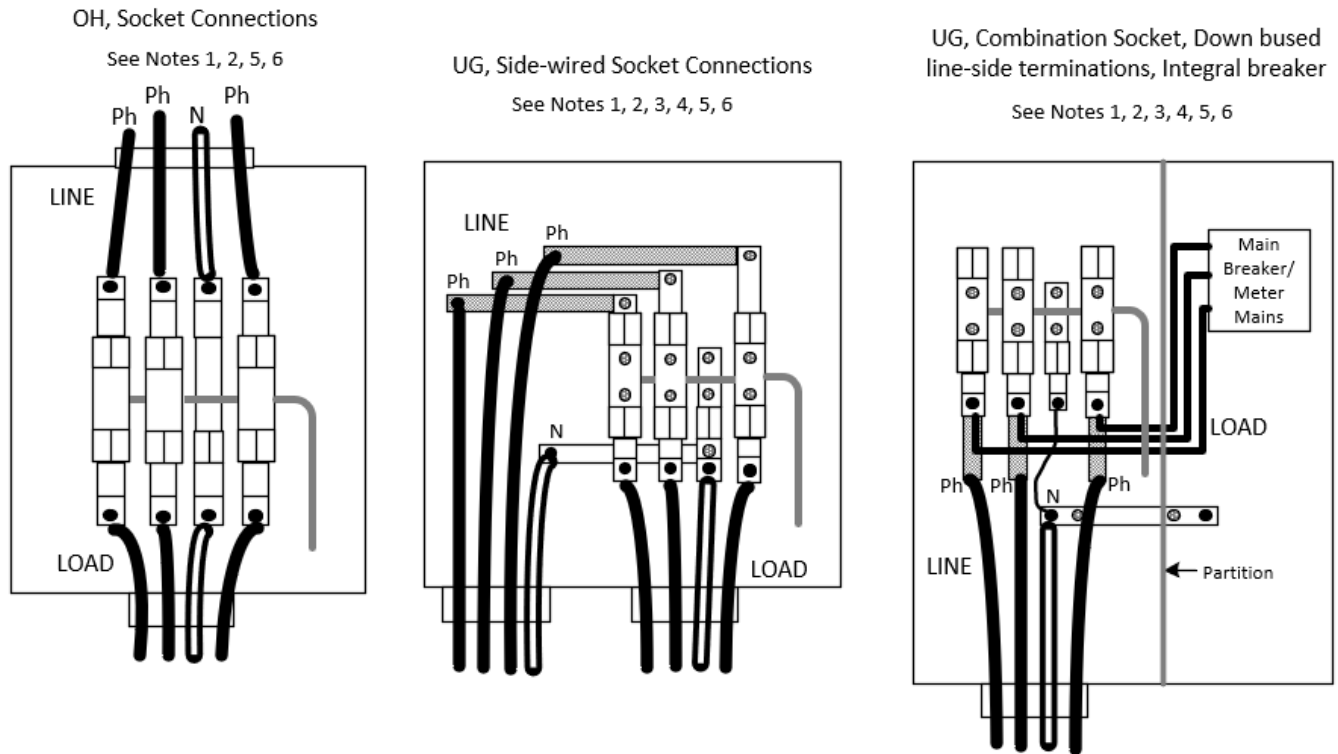
Notes:

- 1) See **Section 7.2** for acceptable meter socket locations. See table in **Section 7.5** for more detailed meter socket guidelines. Refer to **Exhibit 1** for customer/Company responsibilities.
- 2) Single-phase commercial sockets rated at 200 A and below shall be equipped with horn bypasses. Single-phase commercial sockets rated for greater than 200 A shall be equipped with a lever arm bypass with jaw tension release.
- 3) Horn bypass tabs shall be located directly adjacent to their corresponding socket jaw.
- 4) Sockets intended for permanent UG service shall be side bused. Sockets having down bused line-side terminations are acceptable (see Combination Socket on Exhibit 18). Pedestal sockets having a line-side wireway on the back of the pedestal are not required to be side-bused.
- 5) A partitioned line-side wireway shall be large enough to accommodate the largest conductor size specified. The wireway shall be void of sharp edges or points.

**Metering Installation – Self-Contained
 Single-Phase 320 Amp or Less**

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EXHIBIT 17	Date 11/23

Example Socket Connections For 3-Phase, 4-Wire, 120/240 V Delta, 120/208 V Wye, and 277/480 V Wye Services.
Connections shown on this page require a Form 16S meter.



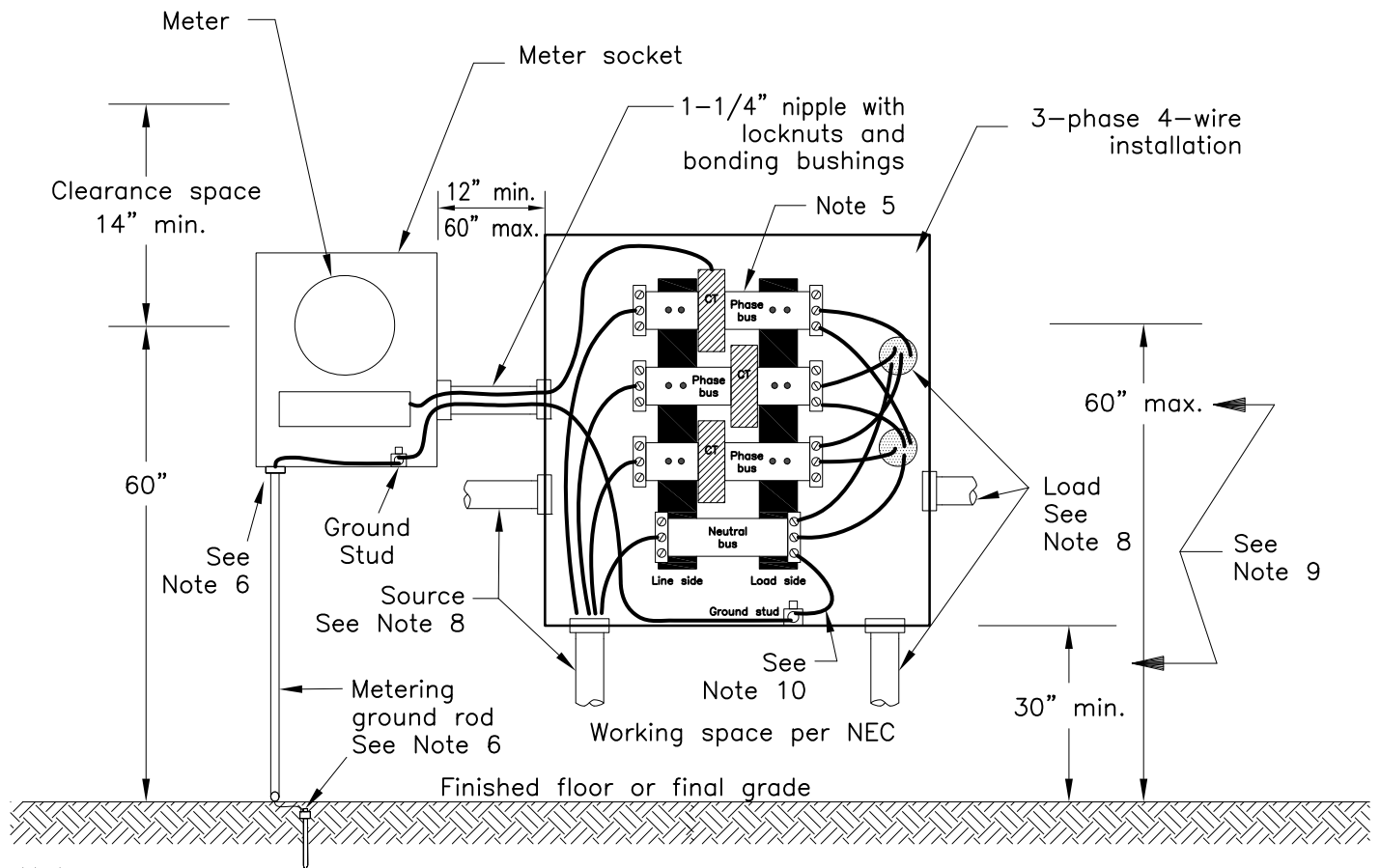
Notes:

- 1) See table in **Section 7.5** for more detailed meter socket guidelines. See **Section 7.2** for acceptable meter socket locations. Refer to **Exhibit 1** for customer/Company responsibilities.
- 2) Three-phase sockets shall be equipped with a lever arm bypass w/jaw tension release capability.
- 3) Sockets intended for UG service shall be side-based. Sockets having down based line-side terminations are acceptable (see Combination Socket above right). Pedestal sockets having a line-side wireway on the back of the pedestal are not required to be side based.
- 4) If socket is equipped with a partitioned line-side wireway, the wireway shall be large enough to accommodate the largest conductor size specified. The wireway must be void of sharp edges or points.
- 5) **If the service has a high leg (3-ph, 4-wire 120/240 V Delta), the high leg (208 V to GND) shall be terminated to the top right-side terminal of the meter socket and shall be color-coded orange.**
- 6) If service is 4-wire 277/480 V Wye or 3-wire 480 V, a source-side disconnect is required. See Exhibit 15 for details.

**Metering Installation – Self-Contained
Three-Phase 320 Amp or Less**

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EXHIBIT 18	Date 11/23



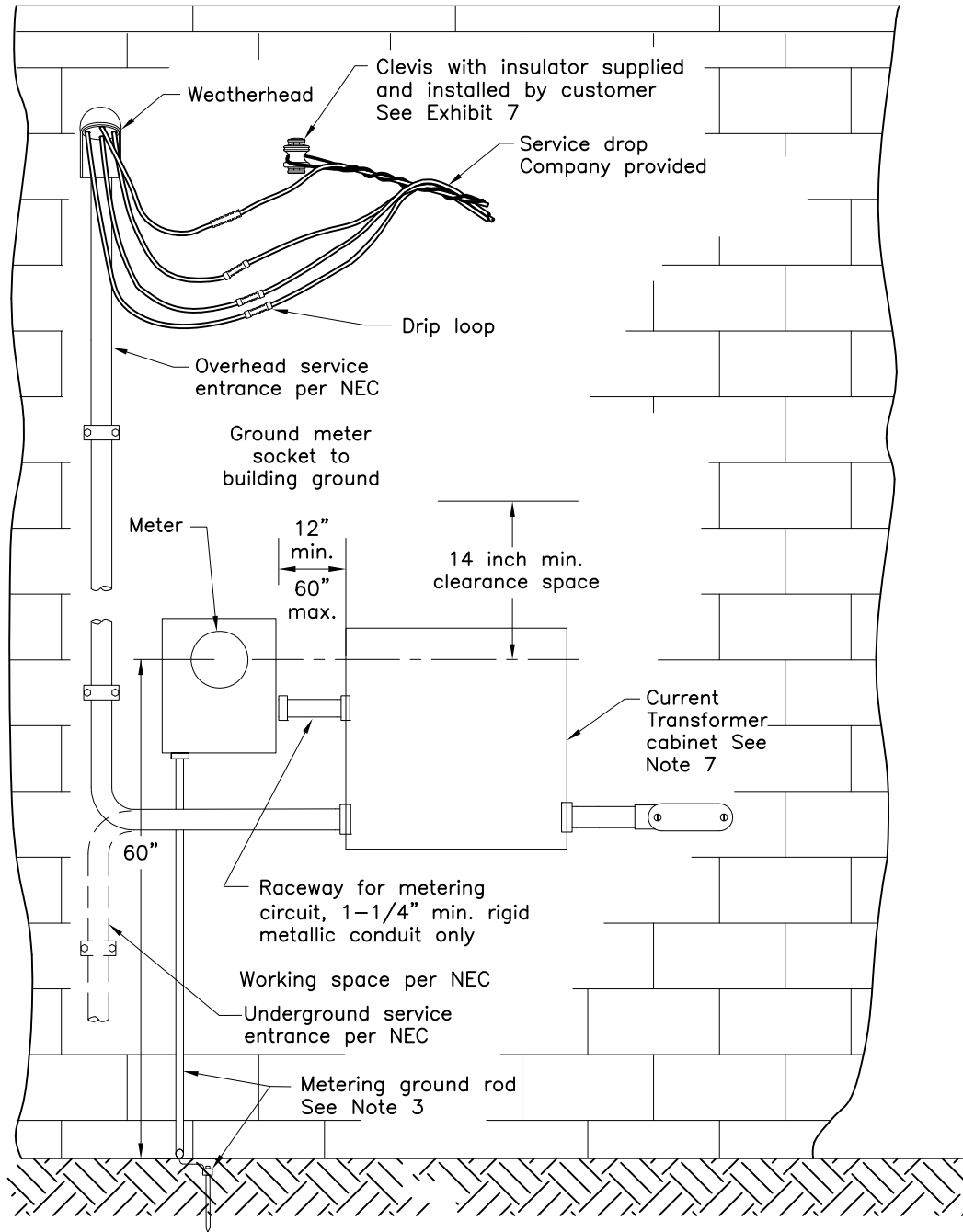
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. See Section 7.10 for approved CT cabinets.
3. The customer shall provide bonding, grounding, and working space per the NEC.
4. Mount H₁ towards the source.
5. Arrange the bus phases 1-2-3-N top-to-bottom (shown above) or left-to-right for three-phase four-wire Wye installations. For four-wire delta installations, the high leg shall be located on the top bus location and marked per the NEC.
6. The customer shall provide and install a 5/8-inch x 8-foot ground rod with a #6 AWG copper ground wire connected to the meter socket ground stud. Protect the wire with non-metallic conduit. Customer shall maintain 6' clearance between this ground and other driven grounds.
7. Current Transformer (CT) cabinet shall be installed on the exterior building wall, unless approved by the local Metering Services Section. Label the line and load sides within the CT cabinet.
8. Conduits shall enter the CT cabinet from the side, bottom, or back. Conduits shall not enter the top of CT cabinet without obtaining Company approval.
9. The mounting height of any CT above final grade or floor shall be 30 inch min. and 60 inch max. Refer to Exhibit 20 for mounting details.
10. The neutral bus shall be bonded to ground stud in the CT cabinet per the NEC table 250.102(C)(1). Do not run a separate grounding conductor from the CT cabinet to the main disconnect.

**Metering Installation Outdoor –
Metering Cabinet with Current
Transformers Details**

FirstEnergy.

Service Guide	REV.
EXHIBIT 19	2
	DATE
	11/23



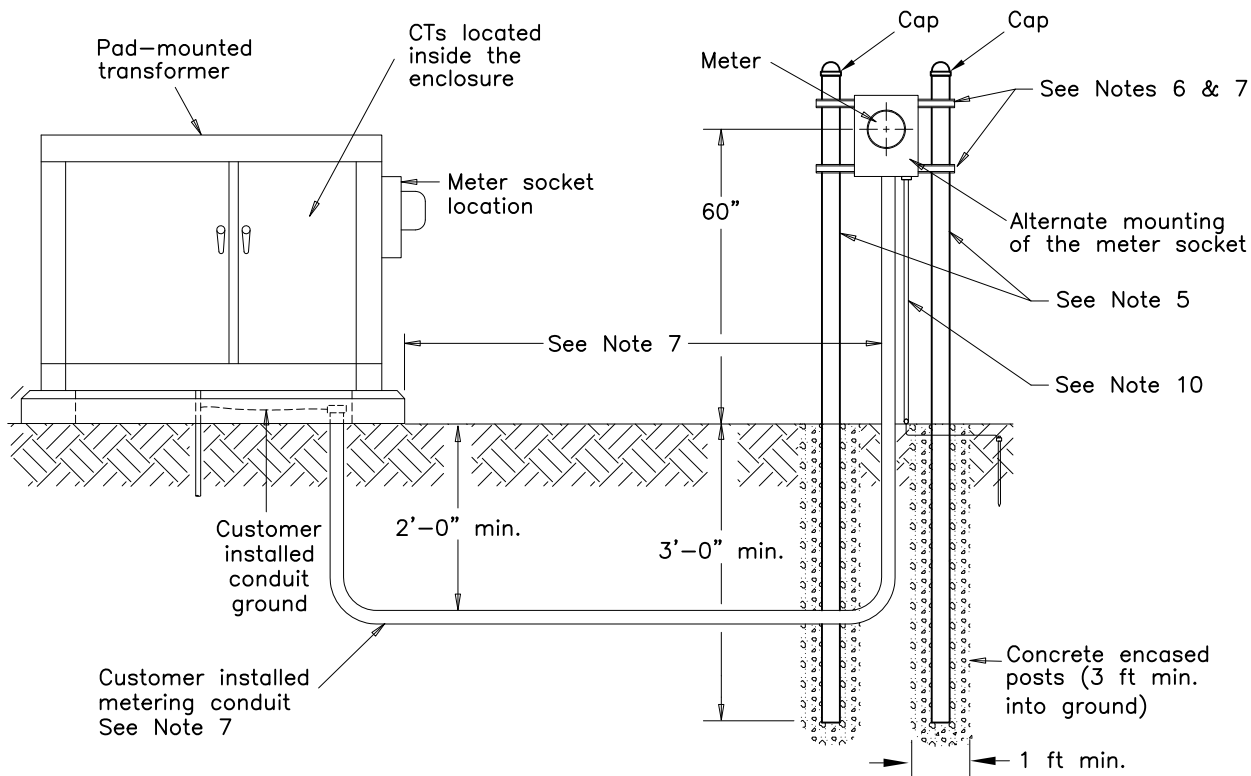
Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Customer shall provide bonding, grounding, and working space per NEC.
3. Customer to furnish and install a 5/8-inch diameter x 8-foot ground rod with a #6 copper ground wire connected to the meter socket ground lug. Protect the wire with non-metallic conduit. Customer shall maintain 6' (minimum) clearance between the meter socket ground and other nearby driven grounds.
4. Where meter is exposed to vehicle traffic, customer shall install protective barrier posts 36" from meter. Posts shall be 6" rigid galvanized steel pipe filled with concrete, capped, and painted bright yellow (see Exhibit 30).
5. Current transformer (CT) cabinet to be installed on exterior building wall. (For indoor CT cabinet installations, contact the local Metering Services Section.)
6. Conduits shall enter CT cabinet from the side, bottom, or back. Conduit shall not enter the top of CT cabinet without obtaining Company approval.
7. See Exhibit 19 for CT cabinet mounting, installation, and information.

Metering Installation Outdoor Current Transformer Cabinet Mounted on a Building

FirstEnergy.

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EXHIBIT 20	DATE
	11/23



The use of this Exhibit requires Company approval.

Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Customer shall consult the Company for the trench termination point and length of additional service cable to be provided to allow for final connection by the Company.
3. If approved by the local Metering Services, the meter socket may be mounted on the transformer cabinet (installed by the Company). If this is not allowed, approval shall be obtained from the local Metering Services to use a stand-alone meter installation as described on this exhibit.
4. All dimensions not defined are variable to accommodate the metering apparatus.
5. Support post (customer-owned): use two 2-1/2-inch min. galvanized rigid metal conduits (RMC) – steel (min. 0.205" thick) capped and concrete encased in the ground.
6. Minimum mounting hardware: use two 12-gauge 1-5/8" x 1-5/8" continuous slot hot dipped galvanized channels (e.g., Unistrut) complete with 1-1/4" x 5/16" dia. 13 thd. spring nut (2 per channel), 5/16" hex nut, and lock washer securely mounted to support posts. The selected hardware shall be capable of supporting the load without sagging or deflection.
7. Metering conduit: use 1-1/4" min. galvanized rigid metallic conduit with all threaded joints and insulated bonding bushings on both ends. Total length shall not exceed 50 feet. Conduit shall be grounded at the transformer.
8. When mounted on the transformer cabinet, the meter socket (installed by the Company) shall be located 6 inches from top of the cabinet and 6 inches from the front edge.
9. Where meter is exposed to vehicle traffic, customer shall install protective bumper posts 36 inches from the meter. Posts shall be 6-inch rigid galvanized steel pipe filled with concrete, capped, and painted bright yellow. Refer to Exhibit 30 for details.
10. Customer to furnish and install a 5/8-inch x 8-foot ground rod with a #6 AWG copper ground wire connected to the meter socket ground lug. Customer shall protect the wire with non-metallic conduit.

**Underground Secondary Service in
Three-Phase Pad-Mounted Transformer
with Current Transformers**

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Service Guide

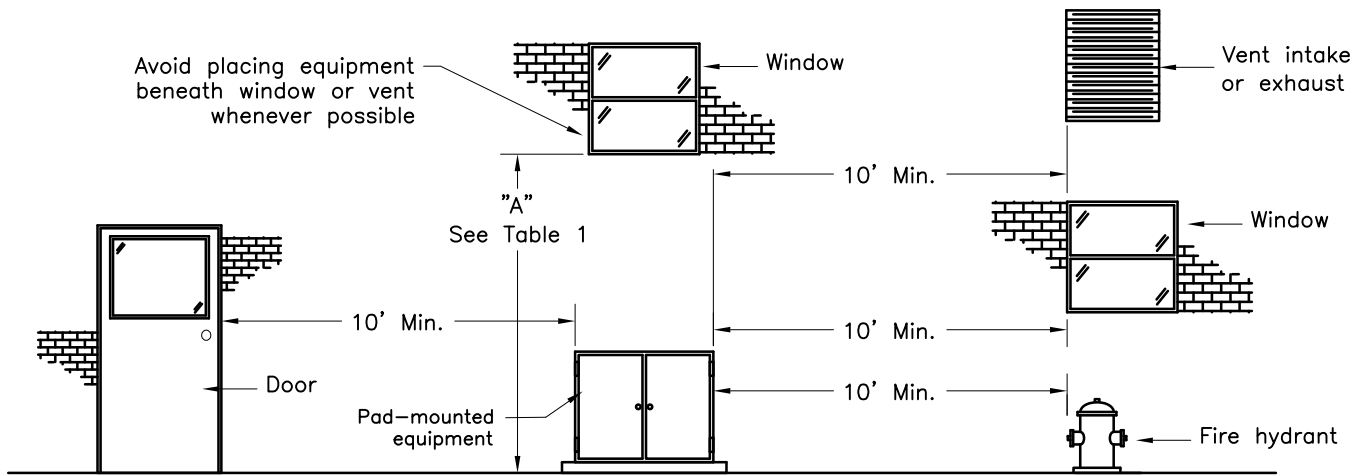
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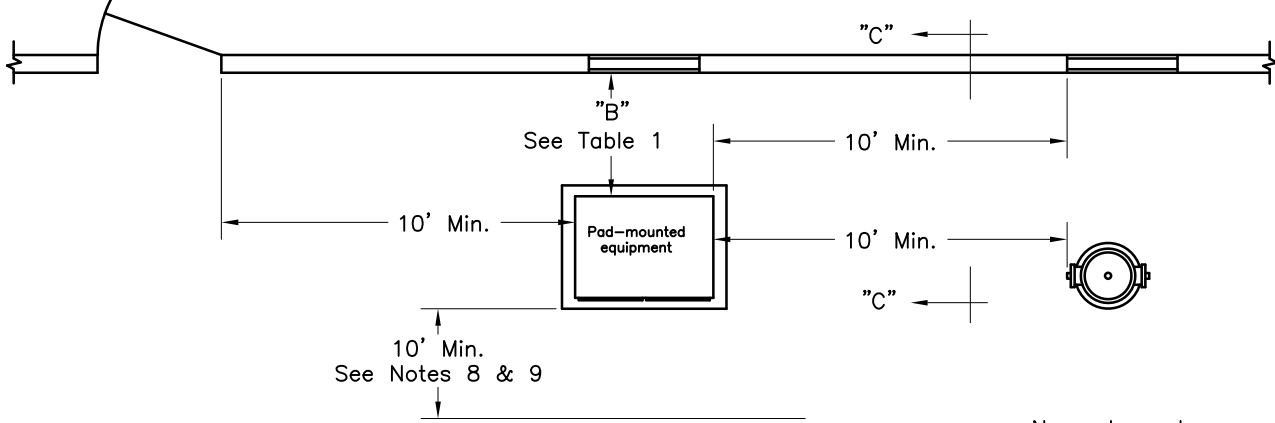
EXHIBIT 21

DATE

11/23

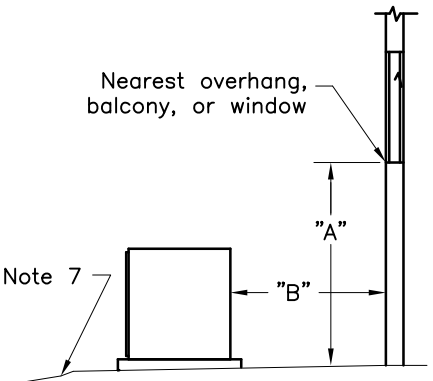


ELEVATION VIEW



PLAN VIEW

Building Surface Type	Minimum Distance "B" in feet to building vertical surface	
	"A" > 18 ft	"A" ≤ 18 ft
Steel or masonry *	4 ft	10 ft
Wood, vinyl, or aluminum	10 ft	10 ft



A = vertical distance in feet to nearest overhang, balcony, or window.
 * 2-hour fire rating (minimum)

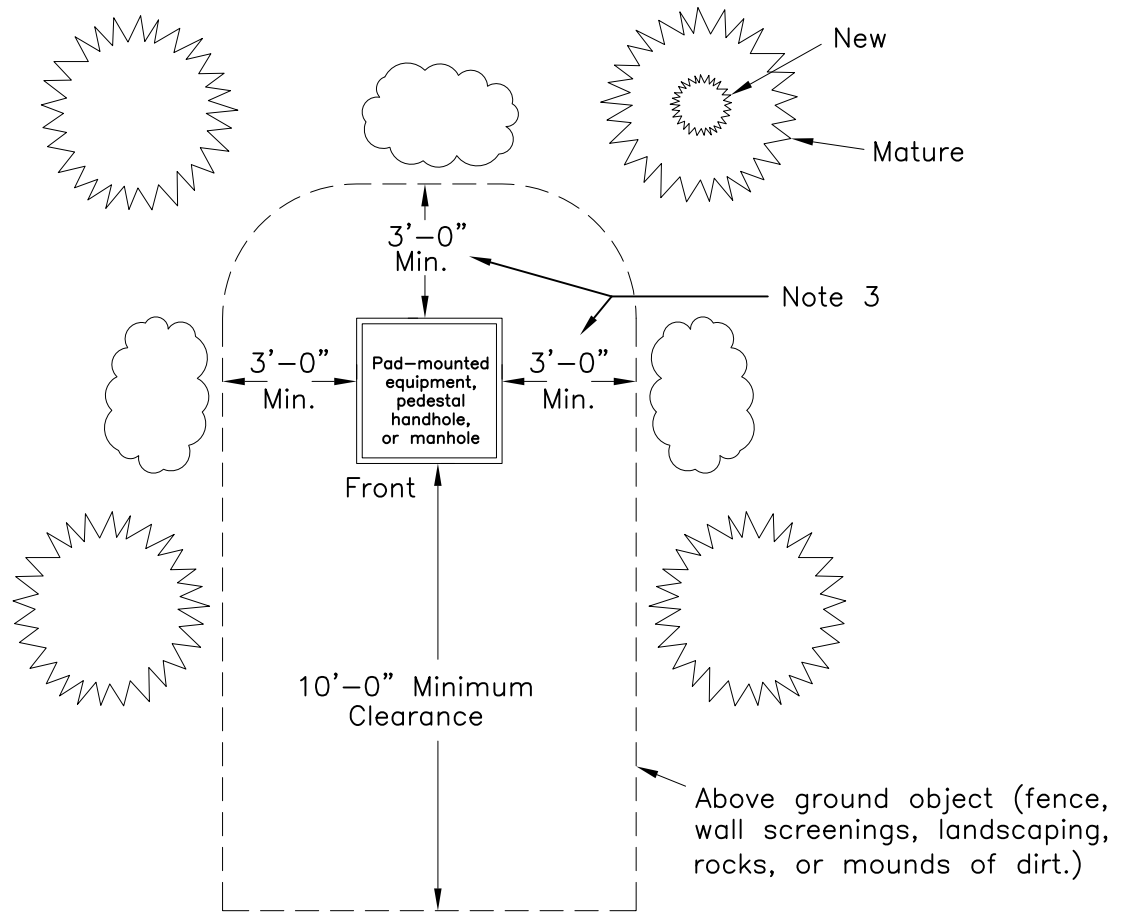
Notes:

1. Customer is responsible to comply with any and all building codes, local ordinances, and insurance regulations associated with the equipment installation.
2. Adequate access shall be provided to accommodate line trucks or other necessary lifting equipment for maintenance or replacement.
3. Building overhangs, decks, steps, or balconies shall not extend over the top of pad-mounted equipment.
4. Minimum clearance of 3 ft to gas meter.
5. Minimum clearance of 10 ft to fire hydrants, fire escapes, sprinkler valves, standpipes, doorways, open stairways, or high pressure natural gas lines.
6. Minimum clearance of 15 ft to storage tanks containing flammable liquids or gases (e.g., propane, gasoline, or oxygen).
7. Area around pad-mounted equipment shall slope away from the building or be curbed to confine oil from a ruptured tank.
8. The front of the pad-mounted equipment shall face away from the building or other impediment. If equipment must face a building, 10 ft minimum clearance shall be maintained.
9. No vegetation at mature growth (e.g., shrubs), fences, or other permanent objects shall be set within 3 ft from the sides and back or 10 ft from the front or any side with an access door of any pad-mounted equipment (refer to Exhibit 23).
10. If Table 1 minimum clearances cannot be met, the customer shall construct a fire resistant barrier.

Minimum Clearances from Structures for Oil-Filled Pad-Mounted Equipment

FirstEnergy

Service Guide	REV.
	2
EXHIBIT 22	DATE
	11/23

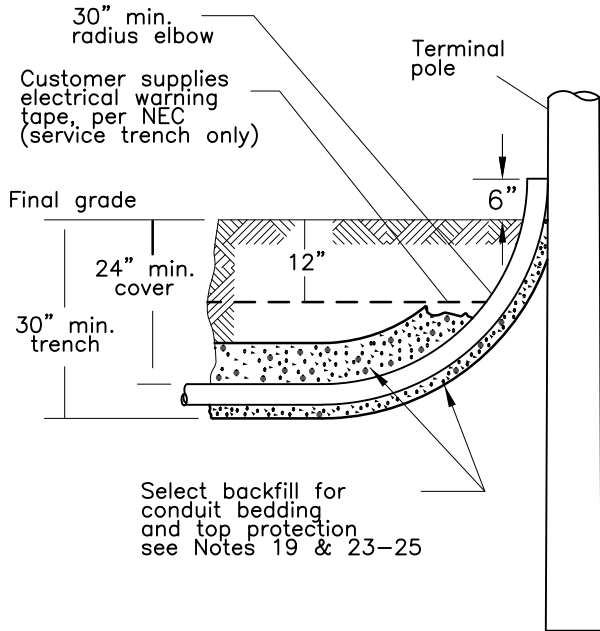


Notes:

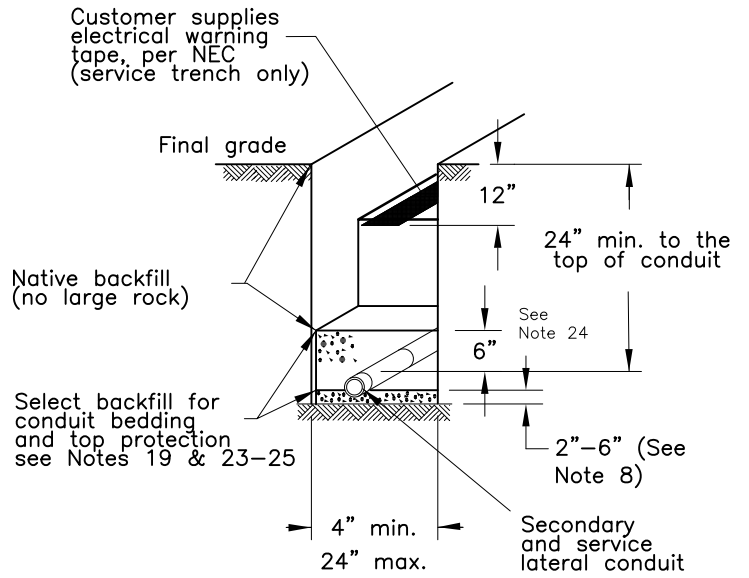
1. **Warning:** Pad-mounted transformers and pad-mounted equipment have underground electric cables entering and exiting them below grade. When it is decided to install plants or objects around a pad, call the appropriate state One-Call agency found in Section 3.13 before digging so that underground cable locations can be marked.
2. Three (3) feet minimum clearance shall be maintained even after all plants have reached their maturity. **To allow future growth, plant vegetation should be placed at least seven (7) feet from the back and side of the pad-mounted device, pedestal, or hardware.** Avoid planting shrubs or setting posts directly over cables. Avoid vegetation with thorns or spines.
3. If pad-mounted equipment is a switch or other similar device with front, side, or rear doors, the minimum 3-foot clearance shall be increased to 10 feet.
4. Minimum safety clearances to gas meters shall be three (3) feet and to tanks containing flammable liquids or gases (e.g., propane, gasoline, oxygen) fifteen (15) feet.
5. For minimum clearances to buildings or structures – see Exhibit 22.
6. Company shall not be responsible for replacing shrubs, plants, fences, wall screenings, and other obstructions that need to be removed for maintenance or restoration work.

Clearances of Pad-Mounted Equipment, Pedestals, Handholes, or Manholes from Shrubs, Plants, Fences, Wall Screenings, & Other Obstructions	FirstEnergy.	
	Service Guide	REV.
	2	
	EXHIBIT 23	
		DATE
		11/23

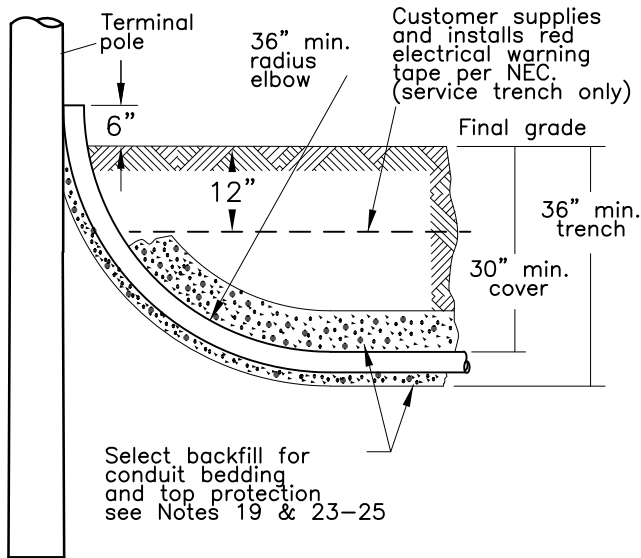
Secondary/Service Conduit at Pole



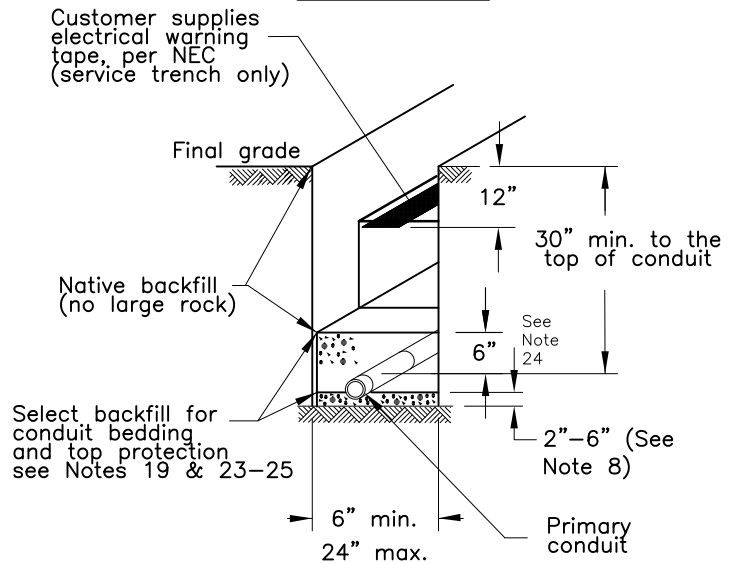
Secondary/Service Lateral Trench



Primary Conduit at Pole



Primary Trench



Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Detailed notes for trench, conduit, and backfill requirements are provided in Exhibit 24, pages 2, 3, & 4.
3. See Exhibit 24, page 2, Notes 5 & 6, for joint-use trenches.

Notes:

1. Customer shall provide trenching, base material, conduit, and backfill to Company requirements.
2. Customer/contractor shall contact the Company for placement of both Company and customer electrical facilities and the approved trench route for connecting them.
3. The customer shall not deviate from the Company's approved trench route unless expressly approved in writing by the Company's engineering group representative. It shall be the customer's responsibility to notify the Company of any conflicts that the proposed electrical design creates with obstacles, other facilities, or easements. Changes requested following the design acceptance by the customer may require the Company to be compensated if facilities need to be relocated or project delays.
4. Before excavation begins, the excavator shall mark the proposed facilities (in white) and then notify the appropriate state One-Call agency to mark other underground facilities (refer to Sections 3.13 and 3.14). The trench customer/contractor shall be responsible for any damage caused by the excavator.
5. The customer shall also coordinate the installation of all other buried utilities that are installing their facilities nearby, jointly occupying the trench (with Company approval), or crossing the electrical supply trench.
6. Below are the Company's required minimum clearances between electric supply lines and the following utility lines:
 - Steam or cryogenic lines - six (6) feet (use of an approved thermal barrier may reduce this clearance).
 - Fuel lines: four (4) feet for low-pressure natural gas, oil, propane, or other like fuels or ten (10) feet for gas lines that are high-pressure lines or are greater than four (4) inches in diameter.
 - Water, sewer, and telecommunication (i.e., telephone & CATV) lines - one (1) foot.
 - Clearances from telephone and CATV lines may be reduced to zero (0) feet or no deliberate separation (a.k.a. – random lay) if all involved parties agree and NESC [2023] Rule 354 is met.
 - Other utility companies (e.g., local steam, water, communication, sewer, and fuel companies) may require greater clearances than the minimums stated above.
 - If required clearances cannot be met (e.g., trenching through solid rock), clearances may be reduced to one (1) foot minimum if all involved parties agree.
 - Other facilities are prohibited from running above/below and parallel to the electrical cable without specific Company's approval.
7. The Company's minimum cover requirements for the primary (> 600 V) and secondary (< 600 V) conduits are based on providing adequate cover per NESC Code (depth). It shall be the responsibility of the customer to ensure that the minimum required coverages over the conduits are always maintained. Any necessary corrections to the depth of cover or required mechanical protection to prevent damage to the conduits from surface activity shall be the responsibility of the customer. Minimum cover over the conduits shall be maintained until all stages of the construction are completed.

Minimum Cover - Code Requirements

VoltageV (Φ- Φ)	Minimum Cover Over Conduit(s)
< 600 V	24 inches
> 600 V to 50 kV	30 inches

Notes:

8. Minimum Trench Depth

Minimum Trench Depth (Inches)

Minimum Cover & Trench Depth (inches)					
Voltage (Ø- Ø)	Minimum Cover (NESC)	Select Bedding ¹	Conduit Dia. ²	Extra Trench Depth ³	Total Trench Depth ⁴
0 to 600 V	24	2	3 to 6	Up to 6	35-38
> 600 V to 22 kV	30	2	3 to 6	Up to 6	41-46
1. In areas other than sandy soil, the customer shall place a 2-inch layer of select bedding in the bottom of the trench before installing the conduit.					
2. Primary/secondary largest conduit diameter (varies – consult the Company for conduit sizing).					
3. Company may recommend up to six inches of trench depth to allow for variations of final grade.					
4. The minimum trench depth includes Code minimum cover, plus select bedding depth (2”), plus the diameter of the largest conduit (at any given level), plus any extra depth (up to six inches) to allow for variations of final grade.					

9. Railroads - Typically, underground cables need to be installed in galvanized conduit* or concrete-encased duct. Most railroads companies require a minimum cover from bottom of the rail to the top of conduit to be 48 inches and 36 inches below ditch bottoms. The NESC requires the top of the conduit system to be 50 inches below top of the rails. Depth, pulling pits, signage, and methods for installing underground cable are all subject to the requirements of the specific railroad. Note: railroad-crossing permits may be required.
10. In solid rock, the NEC allows for lesser depths if cables are installed in suitable conduit and covered with a minimum two (2) inches of concrete.
11. When primary (> 600 V to 50 kV) and secondary (< 600 V) conduits share the same trench and are located side-by-side, the depth of cover for both conduits shall be to the primary conduit requirement with a minimum of two (2) inches of separation. If the conduits are stacked, the primary conduit(s) shall be on the bottom at the required primary depth. The secondary/service conduit(s) shall be on top of the primary conduit(s) with a minimum separation of two (2) inches between the conduits.
12. See Exhibit 24, page 1 for details on the trench dimensions (width and depth requirements). Customer shall contact the Company representative if the trench must be more than four (4) feet deep so OSHA requirements can be met.
13. The customer shall clear the cable route of trees, tree stumps, boulders, or other obstructions at and below grade. The excavator shall grade the trench route to final grade level. The customer shall be responsible for any damage caused by the excavator. This includes damage to any tree whose root system is subsequently damaged from the trenching operations.
14. Because of changing weather conditions and possibility of cave-ins, the excavator should not open the trench any more than 24 hours before Company scheduled work. If a cave-in occurs, it is the customer/contractor responsibility and expense to retrench before the Company can do its work.
15. Customer/contractor shall not use power-excavating equipment within 18 inches of any existing buried cables or other electrical or communications facilities.
16. Excavated material (“spoils”) should be placed on the field side of the trench (unless directed by the Company otherwise), two (2) feet from the edge of excavations (per OSHA Standard 1926.651(j) (2)).

*The railroad company determine these requirements.

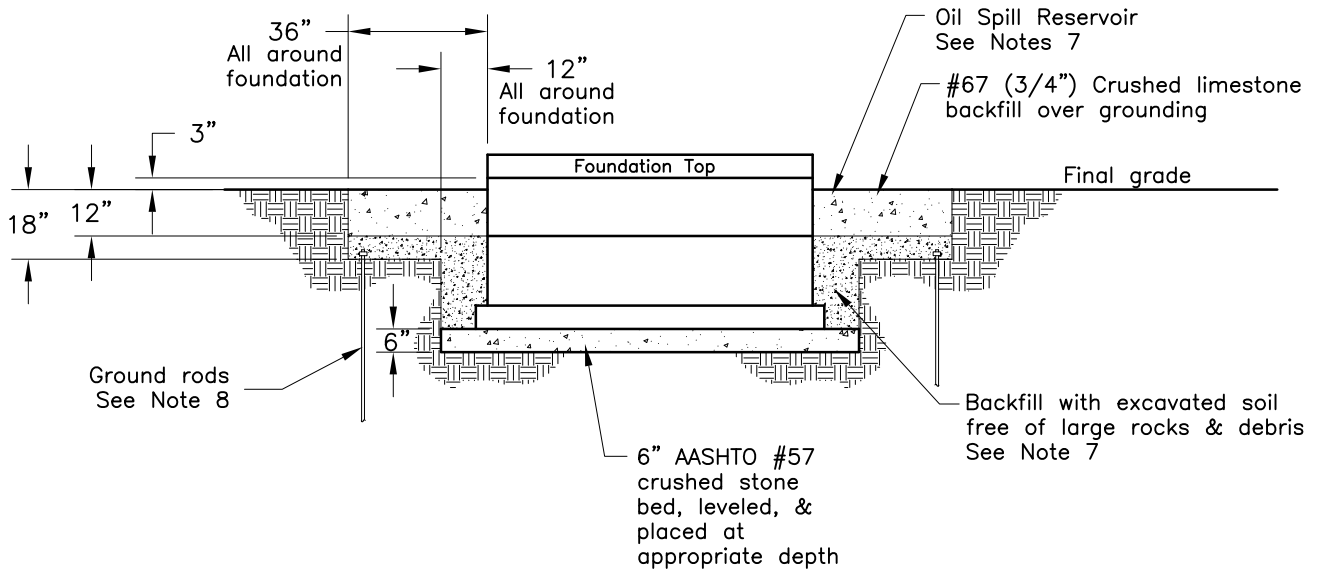
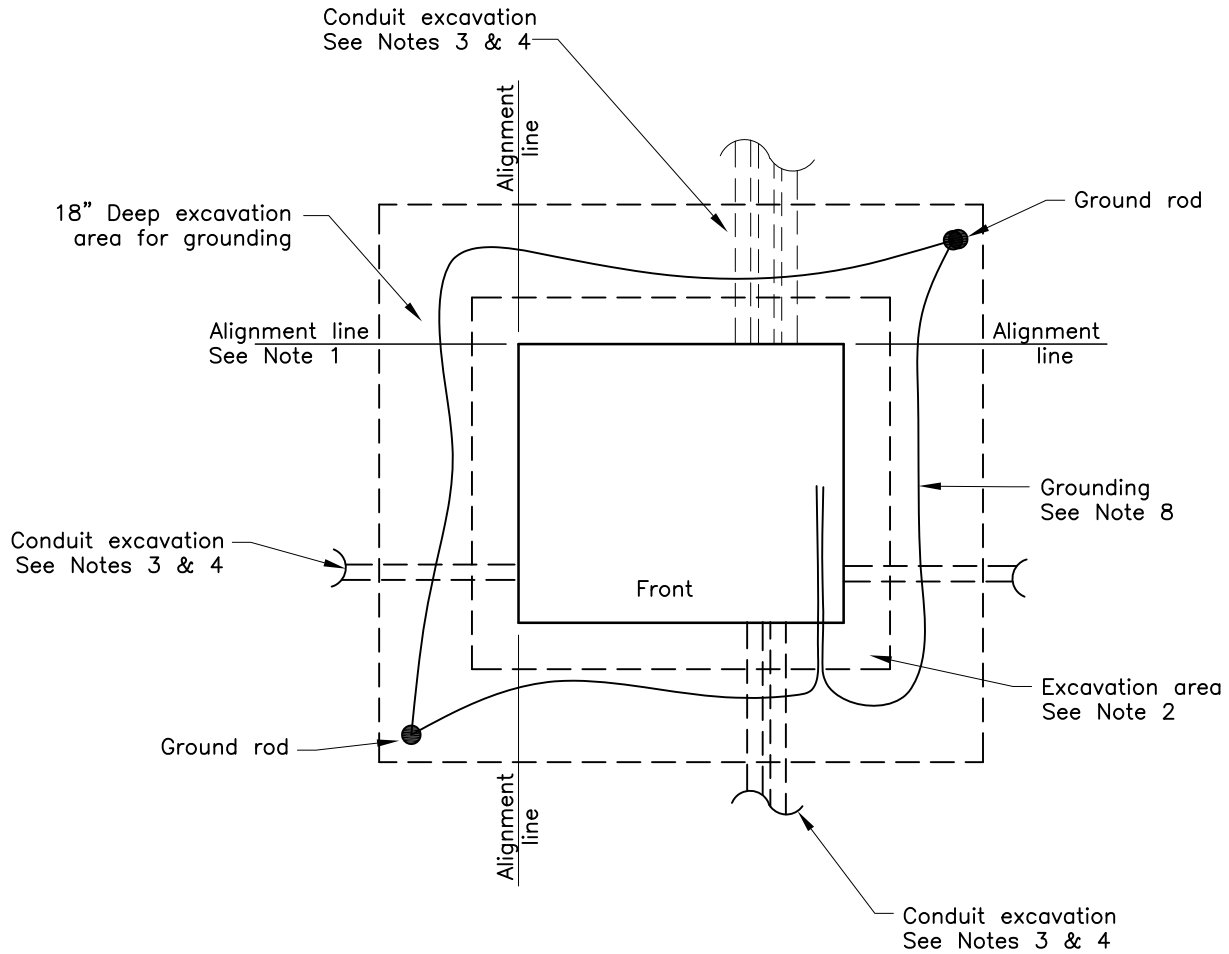
Notes:

- 17. Standing water in the trench should be removed by pumping or draining (per OSHA Standard 1926.651(h)).
- 18. The bottom of the trench shall be relatively smooth, undisturbed earth, sand, or well-tamped earth which is free of rock, cinders, or sharp objects. Trench excavations in rocky soil may require a two-inch layer of select backfill on the bottom of the trench as determined by the Company.
- 19. Buried conduits shall be rigid PVC, heavy wall, sunlight resistant, listed and labeled, Schedule 40 conduit per NEMA TC2 (i.e., electrical grade). Additional requirements, such as concrete encasement of elbows or galvanized steel elbows, may be specified by the Company based on the specific design parameters of the conduit system and will be detailed in the electrical layout drawing. Customer shall contact the Company for the proper minimum conduit diameters.

Conduit Requirements

Conduit Size	Conduit Type	Conduit Bend Radius
6" – 8"	Sch 40 PVC	48"
3" – 5"	Sch 40 PVC	36"
1-1/2" or 2"	Sch 40 PVC	18"

- 20. Customer-owned service lateral conduits (if used) shall be sized per NEC. Those conduits shall be supplied, installed, and maintained by the customer. Conduit for service laterals shall be a minimum of 3-inch diameter conduit.
- 21. Secondary/service conduit elbows shall have a minimum radius of 30 inches. Service riser conduit shall be rigid PVC, heavy wall, sunlight resistant, listed and labeled, Schedule 80 conduit per NEMA TC2. Primary conduit elbows shall have a minimum radius of 36 inches for sizes from 3" to 5". For conduits 6 inch and larger, the elbows shall have a minimum radius of 48 inches.
- 22. All joints shall be glued together. Conduit shall be cleaned and confirmed with a mandrel 1/2 inch smaller than the conduit inside diameter. Unused conduits shall be plugged at each end to keep water and dirt out. When conduit runs are greater than twenty (20) feet, a 1/4-inch unbroken nylon or polypropylene pulling rope shall be installed in each conduit. If the Company cannot pull conductors through the conduit run, or if the pulling rope is broken or unusable because it is glued to the conduit, the customer shall make the necessary repairs.
- 23. Before backfilling, the customer shall verify that the Company and local electrical inspector have completed all required inspections of the trench and conduit. In addition, the customer shall verify other utilities that were approved to use joint trench have completed their work.
- 24. The customer shall backfill around all conduits with six (6) inches of select backfill. Select backfill shall be graded sand, stone dust, limestone dust, rock free earth or topsoil. Materials that "set up" such as fly ash, culm, and foundry waste are not acceptable. The remainder of the trench shall be backfilled with native soil and not contain large rocks (greater than two (2) inch diameter), rocks with sharp edges or other debris. An additional six (6) inches of mounded backfill is recommended to allow for settling.
- 25. Backfill should be compacted in six-inch layers by hand or by using a pneumatic or vibrating tamping equipment to lessen the effects of settling. Note: machine compaction should not be used within six inches of the conduit (per NESC Rule 353A). Do not run wheels or tracks of equipment along the trench to compact the backfill as this could damage the conduits.
- 26. The customer shall provide and bury a red "electrical" warning tape at least three (3) inches wide directly above all conduits twelve (12) inches below final grade as shown in Exhibit 24 (refer to NEC 300.5(D)(3)).



For dimensions see Exhibit 25 page 2 of 4.
For Notes see Exhibit 25 pages 3 & 4.

Three-Phase Transformer Pre-Cast Concrete Foundation / Vault (Installation Details)

FirstEnergy

Service Guide

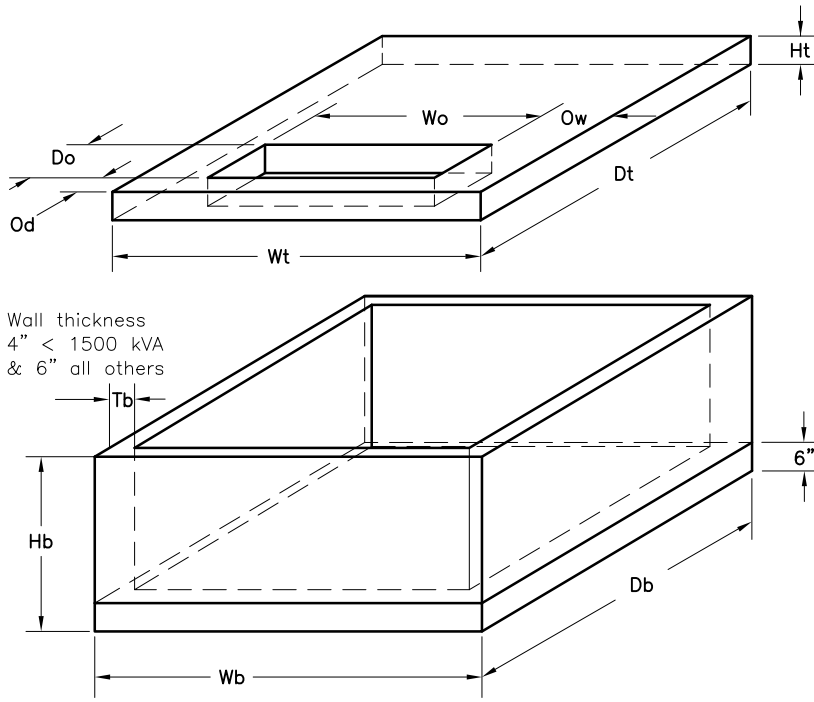
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EXHIBIT 25

DATE

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Pre-Cast Concrete Transformer Foundation Dimensions														
Transformer Size (kVA)	Found. Code	Base					Top				Opening in Top			
		Wb	Db	Hb	Tb	WT.	Wt	Dt	Ht	WT.	Wo	Do	Ow	Od
22,940 GrdY/14,400 Volt & Below														
45 - 150	J1	72"	54"	42"	4"	4,275#	72"	54"	6"	1,725#	55"	14"	8.5"	6"
225 - 1000	J2	78"	66"	42"	4"	8,000#	78"	66"	6"	2,400#	60"	19"	9"	6"
1500 - 2500	J3	96"	96"	42"	6"	12,000#	96"	96"	9"	6,400#	60"	19"	18"	9"
1500 - 2500 (Note 7)	J4	96"	96"	54"	6"	14,000#	96"	96"	9"	6,400#	60"	19"	18"	9"
34,500 GrdY/19,920 Volt														
1500 - 2500	J3	96"	96"	42"	6"	12,000#	96"	96"	9"	6,400#	60"	19"	18"	9"
1500 - 2500 (Note 7)	J4	96"	96"	54"	6"	14,000#	96"	96"	9"	6,400#	60"	19"	18"	9"
34,500 Delta Volt Live-Front (Includes CEI 36 kV System)														
All Sizes (Note 8)	J5	138"	120"	54"	6"	24,655#	138"	120"	9"	10,270#	102"	36"	18"	18"

Pre-Cast Concrete Transformer Foundation - Excavation Dimensions					
Transformer Size (kVA)	Found. Code	Width	Depth	Height	Stone Base
22,940 GrdY/14,400 Volt & Below					
45 - 150	J1	96"	78"	45"	6"
225 - 1000	J2	102"	90"	45"	6"
1500 - 2500	J3	120"	120"	45"	6"
1500 - 2500 (Note 7)	J4	120"	120"	57"	6"
34,500 GrdY/19,920 Volt					
1500 - 2500	J3	120"	120"	45"	6"
1500 - 2500 (Note 7)	J4	120"	120"	57"	6"
34,500 Delta Volt Live-Front (Includes CEI 36 kV System)					
All Sizes (Note 8)	J5	162"	144"	57"	6"

**Three-Phase Transformer Pre-Cast
Concrete Foundation / Vault
(Fabrication Details)**



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General Notes:

1. The customer shall contact the Company prior to beginning work to discuss the details of the transformer foundation such as position, orientation, working clearances, barrier protection, construction specifications, and inspection procedures. The customer is responsible for purchasing, owning, installing, and maintaining the pre-cast transformer foundation and associated secondary rack equipment (if needed). The contractor/developer shall coordinate site preparations with the desired delivery date. The customer shall provide a clear and firm (e.g., concrete, asphalt, or grasscrete) approach to within ten (10) feet of the point of delivery and keep the area clear of obstructions that may block the use of delivery vehicles or Company vehicles (e.g., crane access to the transformer).
2. The customer/contractor is responsible for the excavation to install the transformer foundation and for backfilling afterward. The excavation shall be two (2) feet wider than the vault dimensions (shown Exhibit 25, page 2). The excavation depth shall be 45-inches deep for 42-inch-high foundations bases or 57-inches deep for 54-inch-high foundation bases. Six (6) inches of AASHTO #57 crushed stone shall be leveled and compacted in the bottom of the excavation as a base. Pavement (concrete, asphalt, or grass-crete) shall be provided to within ten (10) feet of the installation for Company trucks. The customer should provide three (3) pieces of 4" X 4" X 8' lumber off to the side for temporarily unloading the foundation top at delivery time.
3. Conduits shall enter near the corners of the foundation (refer to Exhibit 25, page 1) through knockouts to provide for proper cable bending radius and pulling set-up and to facilitate cable racking (when needed). Conduits shall have end bells and shall be terminated flush with the inside surface of the foundation. The customer/contractor shall re-mortar the knockout area around the conduit penetration into transformer foundation to prevent water/dirt migration.
4. Customer/contractor shall provide, install, and seal a minimum five (5) foot section of PVC conduit through the wall of the foundation base (sloping away from the foundation) for Company primary cable at the Company designated location.
5. Excavation for customer conduits can be done at the same time as the foundation.
6. The customer shall seal around the service cables inside the conduits (with approved foam) to prevent migration of water or gases. All unused ducts shall also be capped.
7. Backfill on all sides up to finish grade with 6" minimum of AASHTO #57 crushed stone to form a reservoir to contain the transformer oil in case of a leak.
8. The developer shall install a continuous loop of #2 bare, seven (7) strand, soft drawn copper ground wire connected to two (2) 5/8" X 8' ground rods installed in opposite corners of the vault excavation in undisturbed earth (refer to Exhibit 25, page 1). Both ends of the ground wire shall enter the foundation through a one (1) inch diameter hole to be drilled or chiseled in the upper right-hand corner of the knockout panel. Each ground wire tail shall extend fifteen (15) feet inside the vault beyond the knockout point.
9. The decision to open the sump drainage or leave it closed will be made by the Company based on field conditions. The developer is responsible for taking corrective action (improve drainage, sump pump, etc.) for a foundation that fills with water and water is leaking through service conduits into the customer's building. The area surrounding the foundation shall be graded so that ground water will not collect.

**Three-Phase Transformer
Pre-Cast Concrete Foundation / Vault
(General Notes)**

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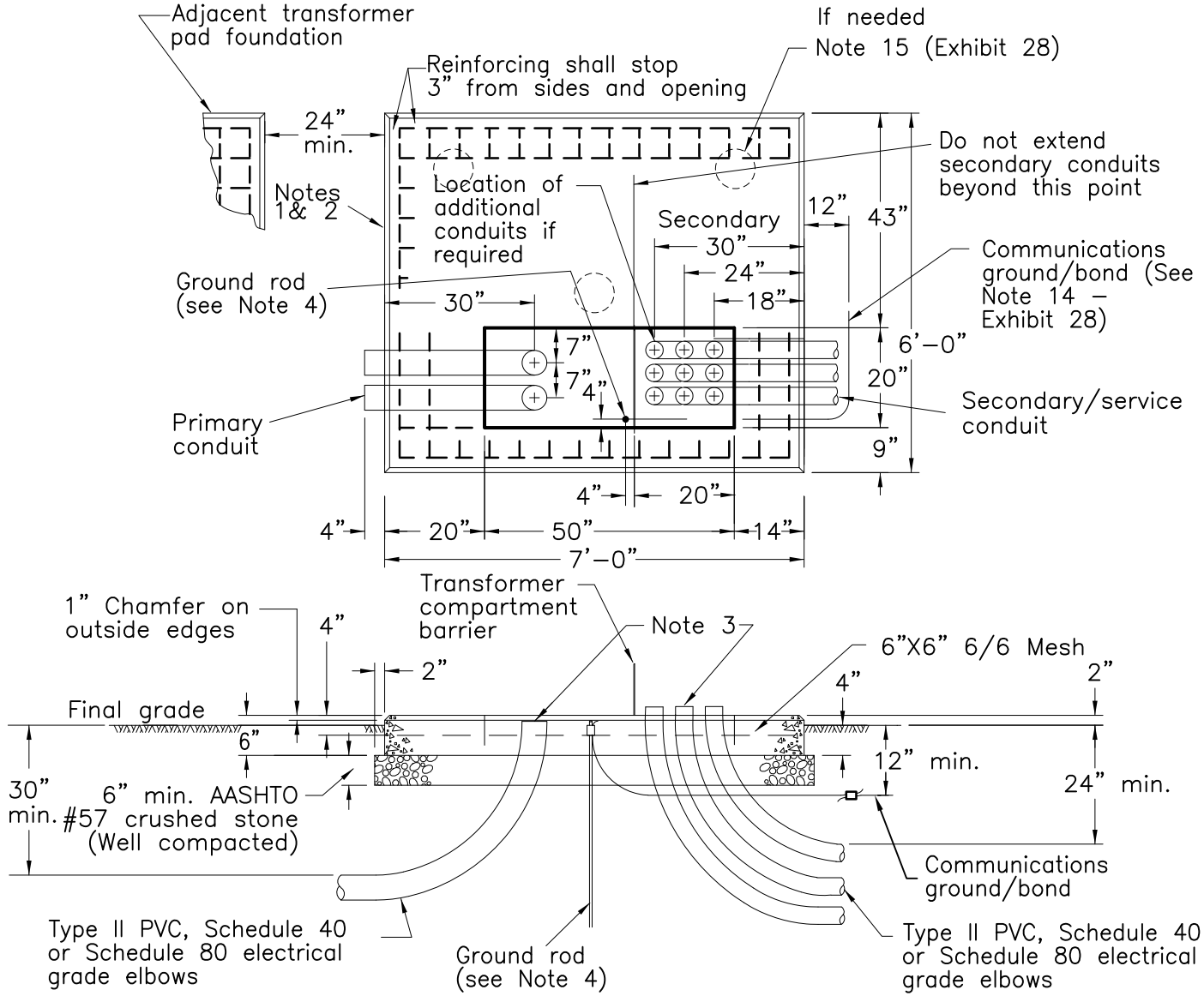
EXHIBIT 25

Date

11/23

General Notes:

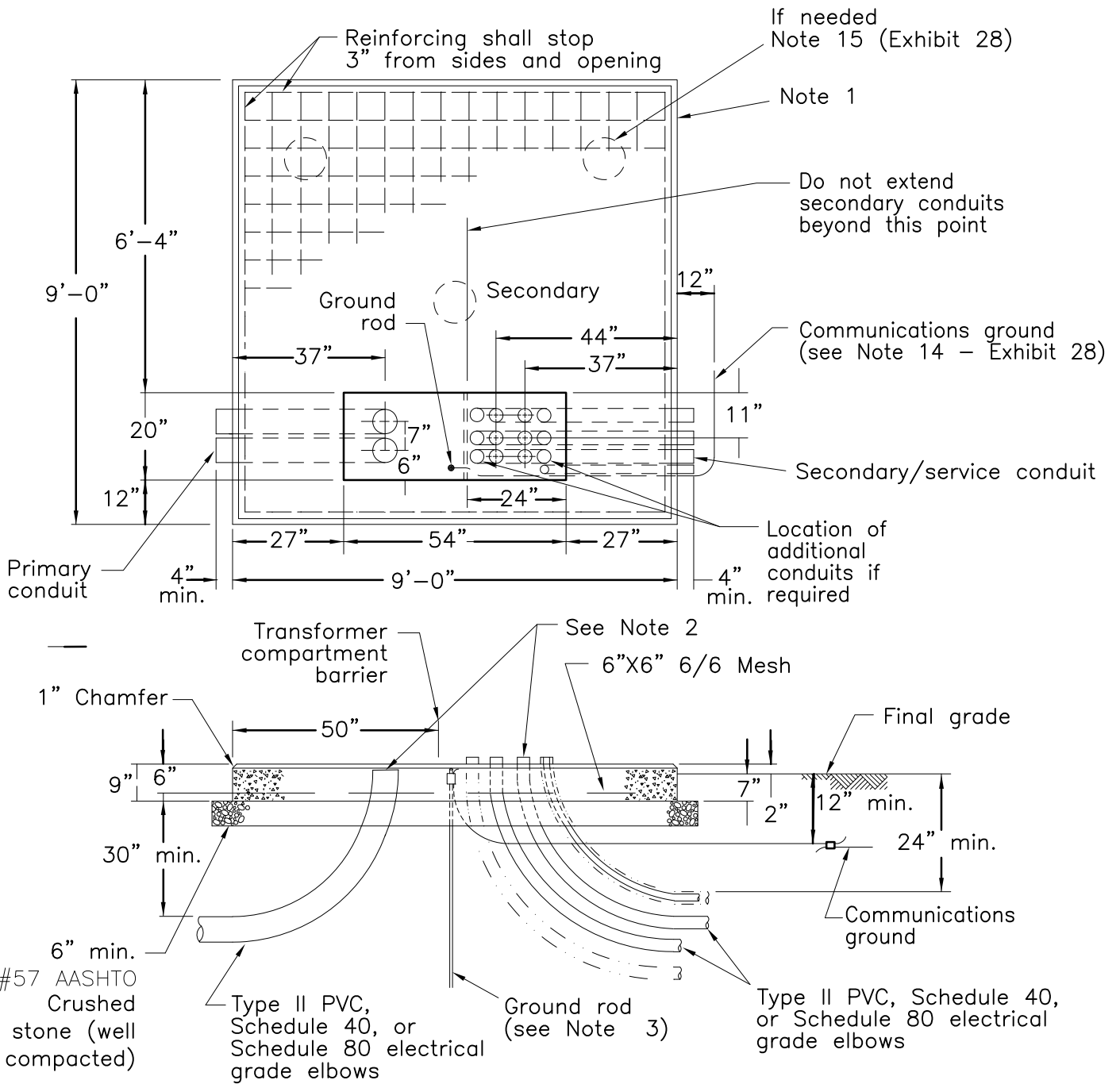
10. The customer shall install protective barriers when the transformer is in an area exposed to vehicular traffic (refer to Exhibit 30), consult the Company for details.
11. The deeper base for the 1500-2000 kVA transformer is used when secondary conduit configuration requires a deeper wall to maintain NEC/NESC minimum cover over the conduit.
12. Foundation for 34.5 kV live-front transformer includes a six-inch thick dividing wall between the high voltage and the low voltage compartments centered 55-1/2" from the inside edge of the low voltage compartment side wall.



Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Reference Exhibit 28 for concrete pad foundation, pad-mounted transformer General Notes.
3. Secondary conduits should not extend more than 2 inches (maximum) above the top of foundation. Primary conduits should be cut off 2 inches below the top of foundation to allow for terminating the cables.
4. Customer shall furnish and install one 5/8-inch diameter x 8-foot ground rod, grounding connections, and #6 AWG copper communications ground/bond wire (minimum wire required - 7 1/2 feet).
5. See Exhibit 22 for clearance from the building wall or other parts of the building.

Concrete Flat-Pad Foundation for Pad-Mounted Transformer 75 to 500 kVA Three-Phase, 34.5 kV & Below (High-Side)		FirstEnergy.	
Service Guide		REV.	
EXHIBIT 26		1	
		DATE	
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Notes:

1. Refer to Exhibit 28 for concrete flat-pad foundation, pad-mounted transformer general notes.
2. Secondary conduits should not extend more than 2 inches (maximum) above the top of foundation. Primary conduits should be cut off 2 inches below the top of foundation to allow for terminating the cables.
3. Customer shall furnish and install one 5/8-inch diameter x 8-foot ground rod, grounding connections, and #6 AWG copper communications ground wire (minimum length of wire required - 8-1/2 feet).
4. See Exhibit 22 for clearance from building wall or other parts of the building.

**Concrete Flat-Pad Foundation for
Pad-Mounted Transformer 750 to 2500 kVA,
Three-Phase, 34.5 KV & Below (High-Side)**

FirstEnergy

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EXHIBIT 27	DATE
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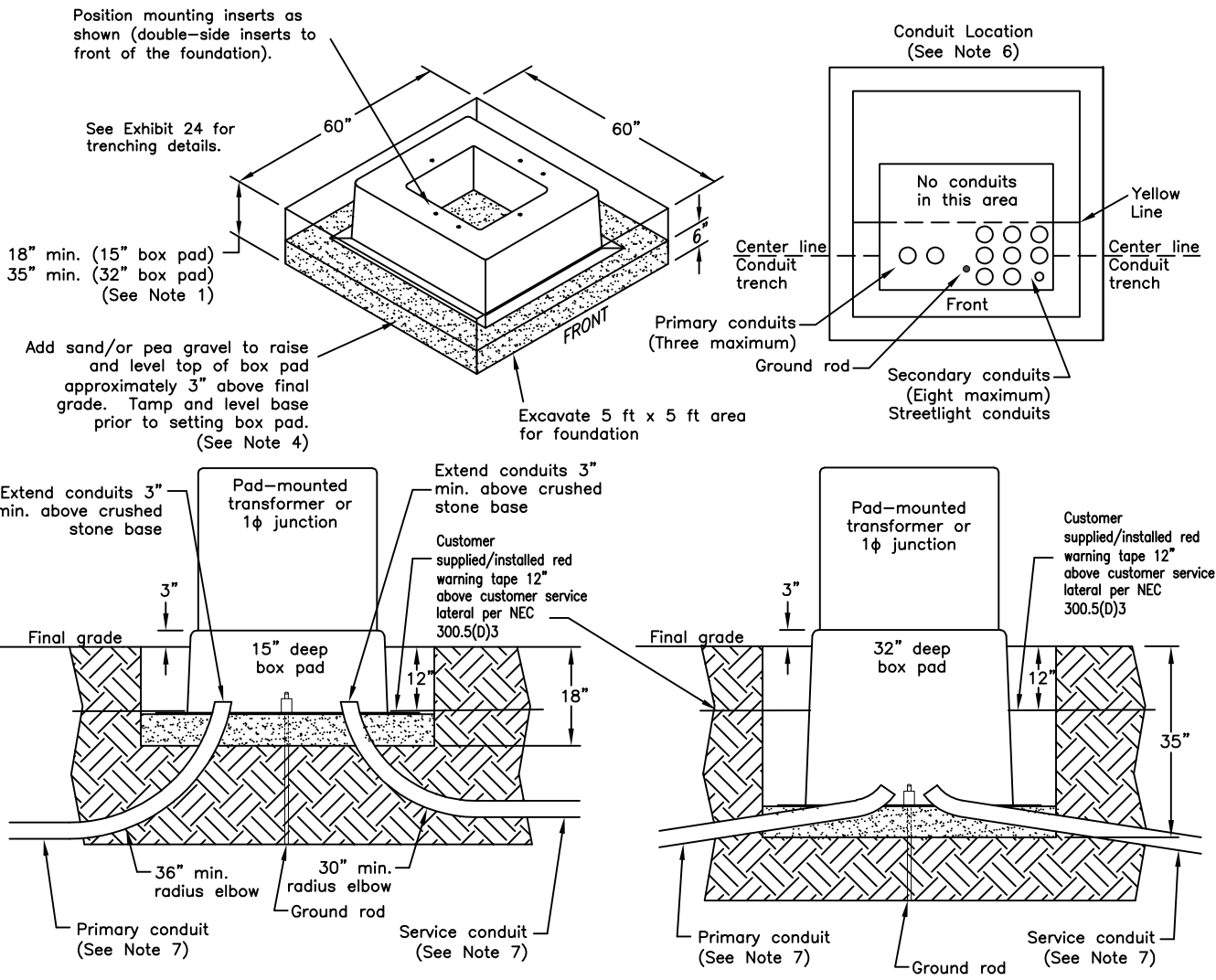
Notes:

1. The customer shall contact the Company prior to beginning work to discuss the details of the transformer foundation position and orientation, working clearances, barrier protection, constructions specifications, and inspection procedures. The customer is responsible for installing, owning, and maintaining the transformer foundation. The customer/developer shall provide a clear and firm approach to the transformer foundation and keep the area above the foundation clear of obstructions that may block the use of Company vehicles (e.g., crane access to the transformer).
2. Customer shall install all conduits before placing the pad. Conduits shall not be placed under sections of the pad supporting the transformer so that the original ground will not be disturbed.
3. The conduit shall be rigid, electrical grade, Schedule 40, or Schedule 80 PVC. See Exhibit 24 for trenching, conduit, and backfilling details.
4. Backfill shall be clean soil, free of large stones (greater than two (2) inch diameter) and any perishable materials. All backfill shall be spread and compacted in maximum layers of six (6) inches.
5. The customer shall thoroughly level and compact the six (6) inch AASHTO #57 crushed stone base.
6. Concrete pad may be poured-in-place or may be pre-cast (4000 min. psi concrete).
7. To prevent water migration from concrete when pouring, place a waterproof membrane on the crush stone base before pouring the concrete.
8. The reinforcing wire mesh shall conform to ASTM designation A185.
9. Cement to be 1 or 1-A and meet ASTM designations C-150 and C-175, respectively.
10. Poured pad concrete to develop minimum 4000 psi at 28 days age, contain 5.5 bags of cement per cubic yard and a maximum of six (6) gallons of water per 94-pound bags of cement and conform to ASTM designation C-94. Fourteen (14) day minimum drying time before transformer is set. For Exhibit 26, the volume of concrete is approximately 0.7 cubic yards or for Exhibit 27, the volume of concrete is approximately 1.7 cubic yards.
11. The customer shall seal all openings around conduits with grout; cap all spare conduits to prevent entry of dirt, rodents, and animals into the transformer compartment.
12. If conduit extends into a building, they shall be sealed with approved foam (per NEC) at the building end to prevent gas from entering building through the conduit.
13. Where damage to transformer by vehicles is possible, transformer shall be protected by appropriate barriers. (See Exhibit 30 for details). Consult with the Company for details.
14. Per NESC, all communications equipment (telephone, CATV, etc.) that are within six (6) feet of the pad-mounted equipment shall be grounded/bonded. Connection for communications ground shall be minimum #6 AWG solid copper wire that is attached directly to the ground rod and extends twelve (12) inches beyond the edge of the concrete pad foundation (minimum wire required: Exhibit 26 - 7.5 feet or Exhibit 27 – 8.5 feet).
15. In areas where settling may occur, install three (3) concrete piers eight (8) inch minimum diameter, 36 inches deep, in a triangular configuration (one in front and two in back) under the foundation. (See Exhibits 26 and 27.) The customer shall contact the Company for details.

**Concrete Flat-pad Foundation for
Pad-Mounted Transformer
General Notes**

FirstEnergy

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EXHIBIT 28	Date 11/23



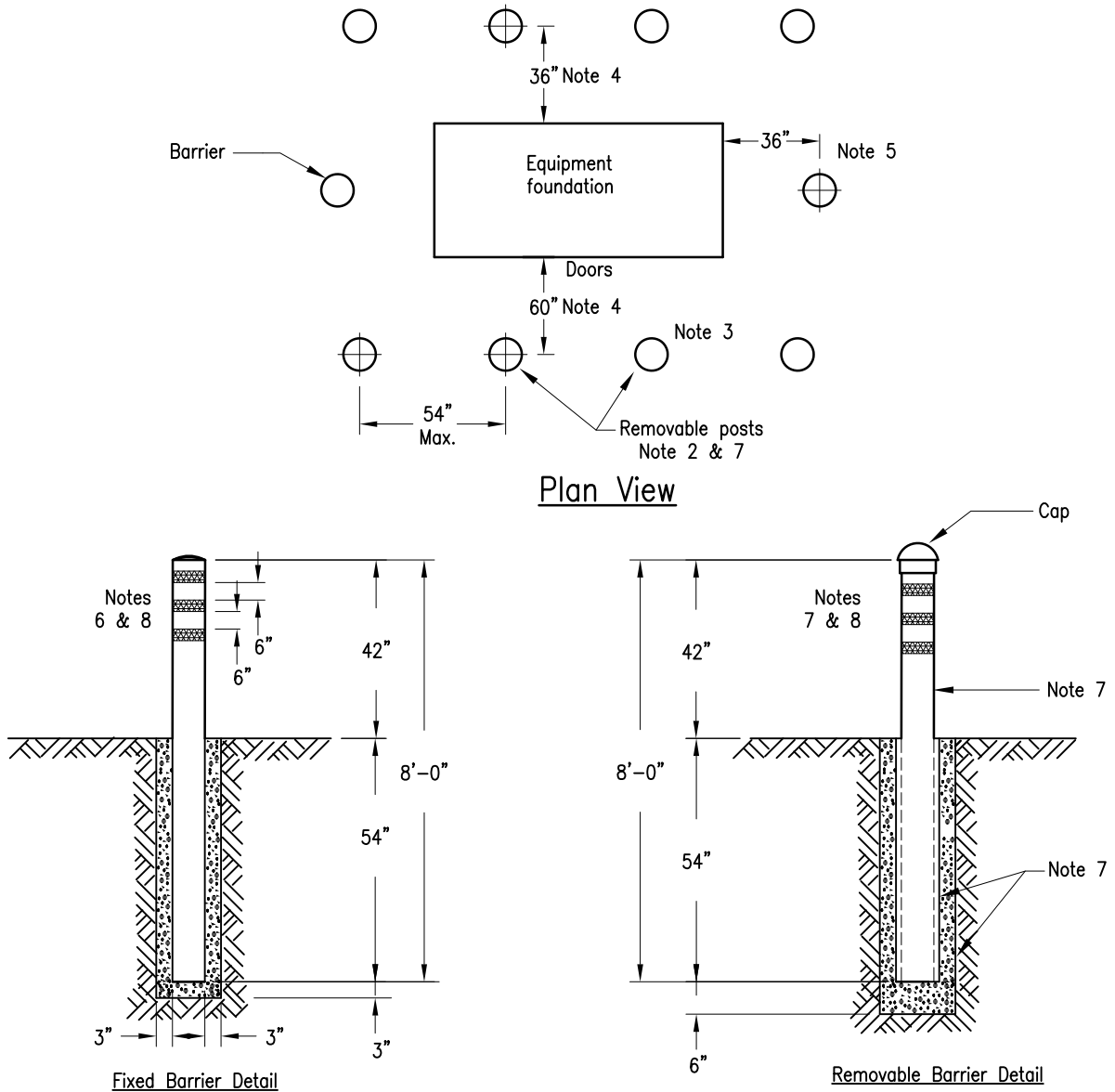
Notes:

1. Customer shall contact the Company before excavating to determine the location and orientation of the box pad. The Company shall specify and supply a 15" or a 32" deep fiberglass box pad foundation.
2. Use the "FRONT" label on the top of the foundation to determine orientation.
3. Customer shall notify the state One-Call agency 3 days before construction. Refer to Sections 3.13 & 3.14.
4. Install the box pad foundation on a base of six (6) inches of leveled and well tamped sand or pea gravel. Backfill after the foundation is installed with native soil containing no large rocks (greater than two inches), sharp rocks, or other debris.
5. For Company-owned services 350 kcmil or less, use 3" PVC electrical-grade conduit. For customer-owned services follow NEC requirements.
6. Primary conduits shall be placed in front of the yellow line on the box pad on the left side of the opening. Secondary and streetlight conduits shall be placed in front of the yellow line on the right side of the opening.
7. Cut off the conduit elbows three (3) inches above the compacted base. Install 1/4-inch unbroken nylon or polypropylene pulling rope in each conduit.
8. Customer shall furnish and install one 5/8" X 8" ground rod driven at least 7'6" into the ground in the front-center of the box pad opening as shown.
9. Transformers on delta/ungrounded wye systems require additional ground rod on secondary side separated by 20' from ground rod for tank/equipment.

Typical Single-Phase Box Pad
Foundation Installation
(1φ Transformer or 1φ Junction)

FirstEnergy

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EXHIBIT 29	DATE 11/23



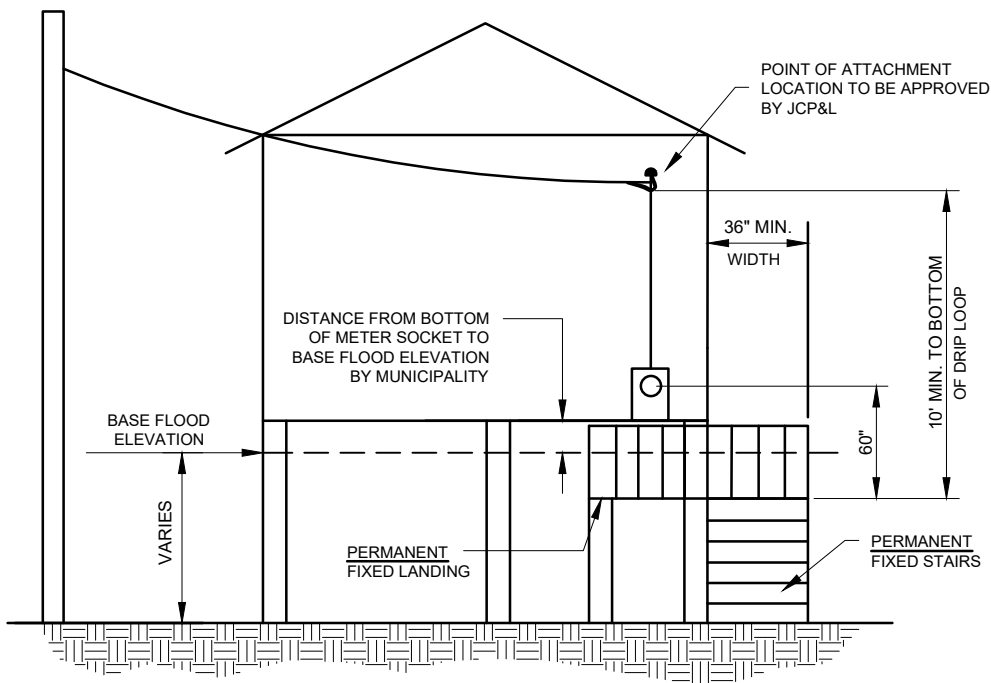
Notes:

1. Use barriers to protect equipment or poles from possible damage from vehicles. Customer shall contact Company for placement.
2. Provide clearance for the operation, removal, or replacement of equipment when overhead obstacles prevent removal of equipment, one barrier shall be removable.
3. When necessary, height of barrier above ground may be increased to prevent large vehicles from striking pad-mounted equipment.
4. Position barriers 60" from equipment foundation on all sides where equipment doors will be located. Removable barriers shall not be installed as a means of providing clearance to open equipment doors.
5. With the Company approval this distance may be reduced to 24 inches provided clearances are maintained for items such as transformer radiators and metering.
6. For fixed vehicle barrier, use 6-inch diameter rigid galvanized steel conduit, cut to 8 feet and fill with concrete. Encase in 3 inches of concrete, as shown. Power installed bumper posts (minimum size: 84 inches long, 3-1/2-inch diameter, 8-inch helix) are also approved.
7. For removable vehicle barriers, use 6-inch diameter PVC Schedule 40 conduit, cut to 54 inches and encased in concrete. Insert 8 feet of 5-inch diameter galvanized steel conduit (do not fill with concrete), with cap, into PVC conduit. Use 6 inches of compacted stone or gravel for sump.
8. Vehicle barriers shall be painted yellow with three strips of 3-inch wide white reflective tape.
9. The customer shall notify state One-Call agency before excavation for posts.

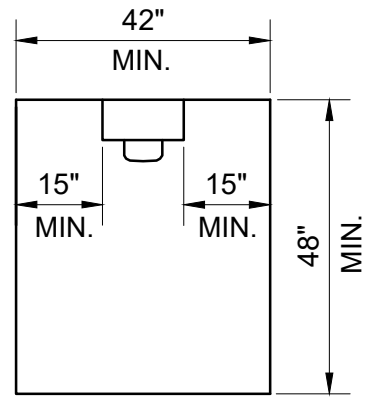
Vehicular Barrier for Pad-Mounted Equipment & Poles

FirstEnergy

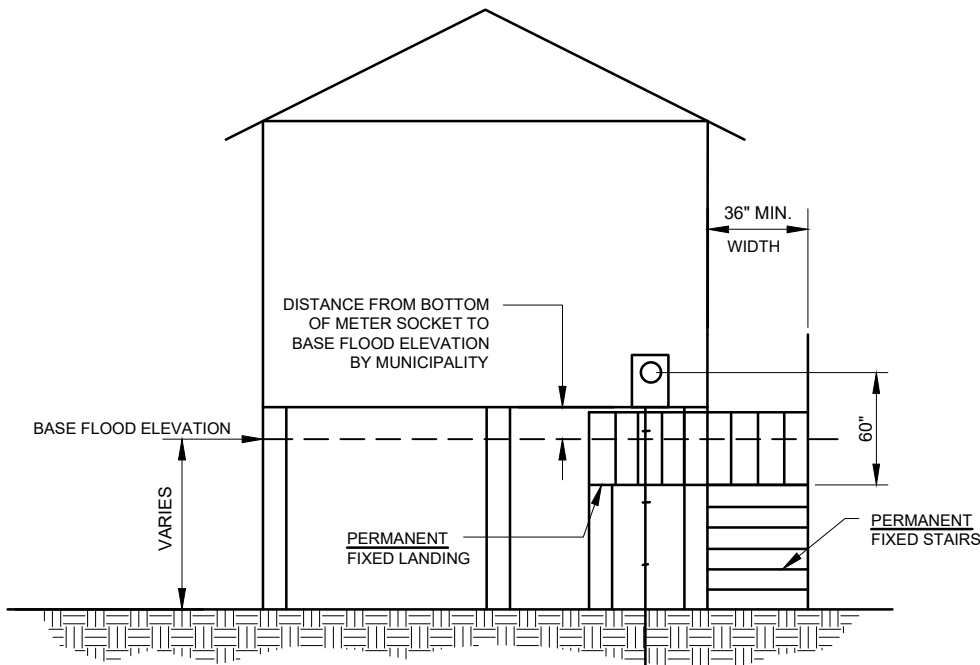
Service Guide	REV.
EXHIBIT 30	2
	DATE
	11/23



OVERHEAD SERVICE



LANDING PLAN
(MINIMUM CLEARANCES)



UNDERGROUND SERVICE

TO COMPANY DESIGNATED CONNECTION POINT

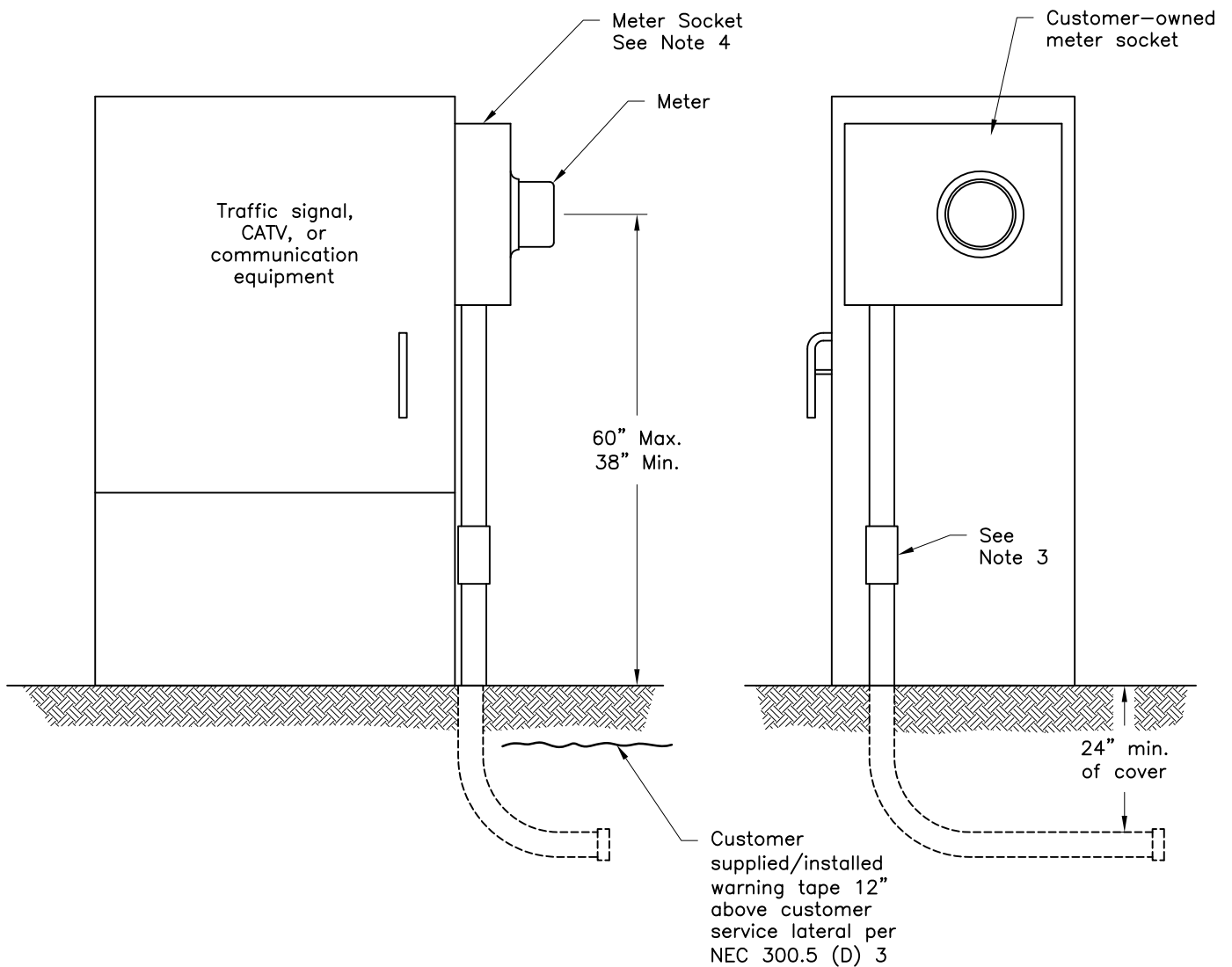
Notes:

1. Contact THE Company for additional information.
2. Stairs, railing, and landing must be maintained by the owner and meet all applicable building and safety code requirements.
3. Additional information can be found at www.firstenergycorp.com – Our Electric Companies – Jersey Central Power & Light – "Guidance on Rebuilding in Designated Flood Zone".

Meter Landing Detail
FEMA Flood Zones – NJ Coastal Areas

FirstEnergy

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EXHIBIT 31	1
	DATE
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Notes:

1. For customer/Company responsibilities, see Exhibit 1.
2. Supply-side conduit shall be rigid galvanized or IMC steel, or Schedule 80 PVC (electrical grade).
3. The customer shall provide ground movement protection per NEC 300.5 (J) to prevent damage due to settling.
4. Meter socket shall be surface mounted. Do not build-in or enclose the meter socket or meter within the structure.

**Typical Underground Service
Traffic Signal, CATV, or Communication
Stand-Alone Equipment**

FirstEnergy.

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EXHIBIT 32	1
	DATE
	11/23



Ohio Edison • The Illuminating Company • Toledo Edison
 Met-Ed • Penelec • Penn Power • Jersey Central Power & Light
 West Penn Power • Mon Power • Potomac Edison

BUILDER INSTALL REQUEST

Please Type or Print

Check the Appropriate Boxes Below

FORM 1046 (REV. 03-14)

OPERATING COMPANY

<input type="checkbox"/> OHIO EDISON PHONE 1-800-633-4766 FAX 1-877-289-3674	<input type="checkbox"/> THE ILLUMINATING CO. PHONE 1-800-589-3101 FAX 1-877-289-3674	<input type="checkbox"/> TOLEDO EDISON PHONE 1-800-447-3333 FAX 1-877-289-3674	<input type="checkbox"/> PENN POWER PHONE 1-800-720-3600 FAX 1-877-289-3674	<input type="checkbox"/> POTOMAC EDISON PHONE 1-800-686-0011 FAX 1-877-289-3674
<input type="checkbox"/> MET-ED PHONE 1-800-545-7741 FAX 1-877-289-3674	<input type="checkbox"/> PENELEC PHONE 1-800-545-7741 FAX 1-877-289-3674	<input type="checkbox"/> JCP&L PHONE 1-800-662-3115 FAX 1-877-289-3674	<input type="checkbox"/> MON POWER PHONE 1-800-686-0022 FAX 1-877-289-3674	<input type="checkbox"/> WEST PENN POWER PHONE 1-800-686-0021 FAX 1-877-289-3674

DETAILS OF SERVICE REQUIREMENTS

TEMPORARY ONLY (Fee Will Be Assessed) PERMANENT TEMP TO PERM (Fee May Be Assessed)

BUILDER INFORMATION

REQUESTED BY	BUILDING COMPANY NAME	COMPANY PHONE NO.
CONTACT PERSON	CONTACT PHONE NO.	FAX NO.

* If service application is in the "builder's "name, the "buyer" must contact us when it is time to transfer service.

BILLING NAME AND MAILING INFORMATION

NAME OF PARTY RESPONSIBLE FOR THE ELECTRIC BILL	SOCIAL SECURITY NO./TAX ID	CONTACT PHONE NO.
E-MAIL ADDRESS		
STREET ADDRESS (MAILING)	CITY	STATE ZIP CODE

LOCATION WHERE SERVICE IS NEEDED

NAME OF DEVELOPMENT OR ALLOTMENT	LOT NO.	
BUILDING NO.	FLOOR NO.	ROOM/APARTMENT/UNIT NO.
STREET ADDRESS	CITY	STATE ZIP CODE
COUNTY/TOWNSHIP/BOROUGH/TAX DISTRICT	NEAREST CROSS STREET/POLE NO.	

CONNECTION TYPE

<input type="checkbox"/> UNDERGROUND	SQ. FT. OF STRUCTURE	SET BACK FROM ROAD (In Feet)
<input type="checkbox"/> OVERHEAD		

PREMISE TYPE

Is this application for a multi-tenant structure? YES NO If yes, how many units? _____
Please attach a separate page with the list of street addresses and lot numbers.

RESIDENTIAL
 HOUSE MOBILE HOME APARTMENT DUPLEX TOWNHOUSE OTHER _____

NON-RESIDENTIAL
 COMMERCIAL INDUSTRIAL CABLE COMPANY EQUIPMENT TYPE OF STRUCTURE/SITE USE _____

SERVICE ENTRANCE

AMPERAGE <input type="checkbox"/> 100 <input type="checkbox"/> 200 <input type="checkbox"/> OTHER _____	VOLTAGE <input type="checkbox"/> 120/240 <input type="checkbox"/> 120/208 <input type="checkbox"/> 277/480 <input type="checkbox"/> OTHER _____	PHASE <input type="checkbox"/> SINGLE PHASE <input type="checkbox"/> THREE PHASE
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DETAILS REGARDING STRUCTURE

HEATING SYSTEM	HEAT SOURCE	HEAT TYPE
	<input type="checkbox"/> ELECTRIC <input type="checkbox"/> PROPANE <input type="checkbox"/> OIL <input type="checkbox"/> KEROSENE <input type="checkbox"/> GAS <input type="checkbox"/> UNKNOWN <input type="checkbox"/> OTHER (DESCRIBE) _____	<input type="checkbox"/> GEOTHERMAL HEAT PUMP <input type="checkbox"/> HOT WATER/STEAM <input type="checkbox"/> BASEBOARD <input type="checkbox"/> ADD-ON HEAT PUMP <input type="checkbox"/> HOT AIR/ELECTRIC FURNACE <input type="checkbox"/> UNKNOWN <input type="checkbox"/> OTHER (DESCRIBE) _____

WATER HEATER	HOT WATER SOURCE	HOT WATER TYPE
	<input type="checkbox"/> ELECTRIC <input type="checkbox"/> GAS <input type="checkbox"/> OIL <input type="checkbox"/> PROPANE	<input type="checkbox"/> STORAGE TANK <input type="checkbox"/> OTHER _____ <input type="checkbox"/> TANK LESS <input type="checkbox"/> SIZE IN GALLONS _____

AIR CONDITIONER <input type="checkbox"/> YES <input type="checkbox"/> NO TONS _____	COOLING TYPE <input type="checkbox"/> CENTRAL AIR <input type="checkbox"/> HEAT PUMP <input type="checkbox"/> WINDOW/WALL	WELL PUMP <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
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OTHER HIGH USAGE APPLIANCES/EQUIPMENT:

NAME OF ELECTRICIAN:	PHONE NO.:
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STAGE OF CONSTRUCTION STAKED FOUNDATION FRAMED UNDER ROOF OTHER _____

DIRECTIONS/COMMENTS

Appendix 2 - Developer Drawings Specifications

All Customer CAD Files submitted by the Customer shall be according to the following requirements:

1. File shall be saved as a .dwg file in AutoCad Version 2018.
2. File shall not be reliant on cross-reference files contained in other drawing files.
3. The file shall be drawn to scale.
4. File shall be georeferenced and have UCS setting to "World."
 - a. The preferred coordinate System is UTM 17 NAD 1983 Zone 17.
 - b. If the file is not georeferenced to the preferred coordinate system, a reference to the nearest FEOC Pole(s) with at least one intersection (two preferred).
 - c. If possible, have at least one FEOC pole referenced on the drawing.
5. All required objects shall be in model space using point or linear features, polygons are not acceptable.
6. Files should include individual layers for:
 - a. Utility easements as linear features with easement width or with ingress/egress lines.
 - b. Rights-of-Way as linear features.
 - c. Street centerlines as linear features.
 - i. Street names shall be provided in an attribute titled STREET_NAME.
 - ii. The city the development will be located in shall also be provided in an attribute titled TOWN_NAME.
 - d. Lot/property lines as linear features – in a homogenized way (a dashed line style using a lighter line weight for contrast).
 - e. Lot numbers/addresses as point features shall be annotated using the attribute titled NAME.
 - f. A separate layer for any of the following features as necessary:
 - i. Crossroads as linear features.
 - ii. Proposed building outlines as linear features.

Building numbers in a multi-building development, similar to lot numbers shall be annotated using the attribute titled NAME.
 - iii. Proposed electric service entrances and metering locations as point features.
 - iv. Preferred service route as a linear feature.
 - v. Established or proposed underground facilities as linear features on separate layers as necessary.
 - vi. Proposed wells, septic, decks, driveways/parking areas, pools, ponds, planned major landscape changes, future development areas, or other proposed obstructions that may interfere with FirstEnergy supplying electric service as linear features.
 - vii. If the land base has proposed plats, make sure there is a distinction or not shown at all.