Introduction

The information contained in this Electrical Service Requirements Manual is intended to provide electrical contractors, architects, building contractors, engineers, and other customers with the information needed for determining acceptable methods of receiving electrical service from the District.

These requirements are based on District Policies and Standards as well as National, State and Local Electrical Codes. Their use is intended to promote a safe, efficient manner for receiving electrical service.

It is the responsibility of the customer to conform with the District's requirements, as well as pertinent National, State and Local Electrical Codes.

It is the responsibility of each user to ensure the latest publications and bulletins are being utilized. Any static (PDF, print, etc) should be considered valid only for the time it was made. You will not be notified when changes and updates are made to the Electrical Service Requirements

These definitions are presented to establish a common understanding since some words have more than one meaning. All definitions are to provide clarity of meaning and to establish the intent of a word's usage in relationship to this manual.

A

aac

All Aluminum Conductor

Access

A clear access to customer premises free from danger or the risk of bodily harm or injury; capable of being reached quickly for meter reading, maintenance, repairs, testing, installation or removal of the District's property per WAC 480-100-168 and WAC 480-100-308; without the need to make prior arrangements or notification; not guarded by dogs; not blocked by obstacles; not requiring those to whom safe access is a requisite to climb over, move or remove obstacles or resort to portable ladders, chairs, etc. Must have minimum working clearance for equipment involved per NEC, WAC and/or the ESR.

Accessible

(Readily Accessible). A clear access to customer premises free from danger or the risk of bodily harm or injury; capable of being reached quickly for meter reading, maintenance, repairs, testing, installation or removal of the District's property per WAC 480-100-168 and WAC 480-100-308; without the need to make prior arrangements or notification; not guarded by dogs; not blocked by obstacles, locked doors, elevation or other means; not requiring those to whom safe access is a requisite to climb over, move or remove obstacles or resort to portable ladders, chairs, etc. Must have minimum working clearance for equipment involved per NEC, WAC and/or the ESR. A room, balcony, porch or attached deck is considered readily accessible to pedestrians if it can be casually accessed through a doorway, window, ramp, stairway or permanently mounted ladder by a person, on foot, who neither exerts extraordinary physical effort nor employs tools or devices to gain entry. A permanently mounted ladder is not considered a means of access if its bottom rung is 2.45 m (8 ft.) or more from the ground or other permanently installed surface. NESC 243.C.3.d.(1)b.

Accessible by Climbing

To be accessible by climbing, pole mounted equipment shall be mounted so that it can be reached with an extendable hotstick while qualified personnel maintain the minimum approach clearance from all energized primary. Climbable poles must conform to T&D Guideline 4-4-8.0.

Accessible by Manlift Truck

To be accessible by a manlift truck, pole mounted equipment shall be installed within reach of a manlift bucket. Flagging may or may not be required, depending on location and duration of work. Refer to Figure 4 for the vertical reach capacity of a typical manlift truck.

Accessible by Service Truck

To be accessible by a service truck, pole mounted equipment shall be installed within reach of a service truck bucket while the service truck is setup so that flagging is not required. Refer to Figure 2 for the vertical reach capacity of a typical service truck.

Accessible from Ground Level

To be accessible from ground level, pole mounted equipment controls shall be mounted no higher than 10' above final grade. The operating area shall be level and stable and shall be free of all obstructions that would interfere with equipment operation. Underground equipment shall provide enough free space for operations and maintenance

and shall be free of obstructions that would interfere with equipment operation. Refer to T&D Guidelines 4-4-3.3, 4-4-3.6 & 4-4-3.7 for specific clearance requirements for underground equipment.

acsr
Aluminum Conductor, Steel Reinforced

administrative authority
The governmental authority exercising jurisdiction over application of this Code.

aeic
Association of Edison Illuminating Companies

Amp
The unit of current strength or rate of flow of electricity, represented by the letter “I”.

Ampacity
The current in amperes a conductor and/or equipment can carry continuously under the conditions of use without exceeding its temperature rating.

Ampere
The unit of current strength or rate of flow of electricity, represented by the letter “I”.

Amphere
The unit of current strength or rate of flow of electricity, represented by the letter “I”.

anchorage
A secure point of attachment to which the fall protection system is connected.

ansi
American National Standards Institute

Appropriate Room
A suitable space free of obstruction, accessible for safe working conditions on all electrical equipment.

Approved
Acceptable to the authority having jurisdiction.

asqc
American Society for Quality Control

Associated Equipment
As related to metering equipment—the meter socket, instrument enclosure, test switch, etc.

astm
American Society for Testing and Materials

authorized person
A person who has been authorized by the controlling utility or its designated representative to perform specified duties in, on, or in the vicinity of utility facilities, as applicable.

awg
American Wire Gauge

awpa
American Wood-Preserver's Association

Azure Devops
Microsoft's product to help teams work together on Devops projects.

Azure Websites
Microsoft's Web Server platform. IT handle's the maintenance, we just connect with Git to send the output files

B

backfill
Materials such as sand, crushed stone, or soil, that are placed to fill an excavation.

Backfill
Select backfill shall be defined as; selected natural earth soil containing no rocks or other naturally occurring object larger than an averaged sized thumb nail. Backfill shall not contain crushed rock or other sharp objects which could cause damage to a conductor's insulation or to a conduit's integrity.

backfilled
Materials such as sand, crushed stone, or soil, that are placed to fill an excavation.

bare conductor
A metallic conductor without a covering.

bare conductors
A metallic conductor without a covering.

bonded
The electrical interconnecting of conductive parts, designed to maintain a common electrical potential.

bonding
The electrical interconnecting of conductive parts, designed to maintain a common electrical potential.

Bonding
The permanent joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to conduct safely any current likely to be imposed.

Branch (Git)
A separately tracked group of files in Git outside of the main (sometimes called maste) branch. This won't be used often unless a bunch of documents need changing.

Building
A structure which stands alone or which is cut off from adjoining structures by fire walls with all openings therein protected by approved fire doors.

bundled conductor
An assembly of two or more conductors used as a single conductor and employing spacers to maintain a predetermined configuration. The individual conductors of this assembly are called subconductors.

bundled conductors
An assembly of two or more conductors used as a single conductor and employing spacers to maintain a predetermined configuration. The individual conductors of this assembly are called subconductors.

C

Cabinet
An enclosure designed for surface or flush mounting, and provided with a frame, mat or trim on which swinging doors are hung.

cable
A conductor with insulation, or a stranded conductor with or without insulation and other coverings (single-conductor cable), or a combination of conductors insulated from one another (multiple-conductor cable).

cable jacket
A protective covering over the insulation, core, or sheath of a cable.

cable sheath
A conductive protective covering applied to cables.

cable terminal
A device that provides insulated egress for the conductors. Syn: termination.

cdf
Controlled Density Fill

circuit
A conductor or system of conductors through which an electric current is intended to flow.

circuit breaker
A switching device capable of making, carrying, and breaking currents under normal circuit conditions and also making, carrying for a specified time, and breaking currents under specified abnormal conditions such as those of short circuit.

circuits
A conductor or system of conductors through which an electric current is intended to flow.

clearance
The clear distance between two objects measured surface to surface, and usually filled with a gas such as air.

climbing
The vertical movement (ascending and descending) and horizontal movement to access or depart the worksite.

Clone (Git)
Cloning is the initial download of a Git repository on your local computer.

Commit
An entry in the Git log outlining the changes made to the files since the last commit. These are performed locally and then pushed to the Git server.

Common Ground Point
The conductor used to connect the grounding electrode to the equipment grounding conductor and/or to the grounded conductor of the circuit at the service.

common use
Simultaneous use by two or more utilities of the same kind. Example: Shared use of a power pole by electric utility and telecommunications company

Communications Space
The vertical space on a pole below the 40” separation space which is occupied by communications lines (as defined by the NESC, communication lines include, but are not limited to telephone, CATV, and other rental attachments including fiber optic cables and FCC license-exempt antennas).

Concealed
Rendered inaccessible by the structure or finish of the building. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them.

Conductor
Bare: A conductor having no covering or electrical insulation whatsoever. Insulated: A conductor encased within material of composition and thickness as defined by NEC Code as electrical insulation.

conductor shielding
An envelope that encloses the conductor of a cable and provides an equipotential surface in contact with the cable insulation.

conduit
A structure containing one or more ducts.

Conduit
A listed or approved wireway with a smooth interior surface so as to permit easy pulling of the electrical conductors. A conduit may be either metallic or non-metallic depending on its usage in accordance with NEC Code and District Standards.

conduit system
Any combination of duct, conduit, conduits, manholes, handholes, and/or vaults joined to form an integrated whole.

Controlled Exposure
Persons occupationally exposed to RF emissions as defined by the FCC.

Convenience Pole
A service drop support/attachment pole specifically for the benefit of the customer, paid for by the customer, installed, owned, and maintained by the District.

covered conductor
A conductor covered with a dielectric having no rated insulating strength or having a rated insulating strength less than the voltage of the circuit in which the conductor is used.

covered conductors
A conductor covered with a dielectric having no rated insulating strength or having a rated insulating strength less than the voltage of the circuit in which the conductor is used.

current carrying part
A conducting part intended to be connected in an electric circuit to a source of voltage. Non-current-carrying parts are those not intended to be so connected.

Current Transformer Enclosure
(Commonly called a CT Can) This is an enclosure used to house metering current transformers. These enclosures shall conform to the requirements of Section 5.K.5 on page 5-26.

Customer
Any person, firm or corporation who requests, contracts for, or uses electrical energy from the District's facilities.

Customer Engineer
The designated representative of the District who is responsible for providing effective design and/or coordination of new or revised services to District customers and providing accurate responses to inquiries on policies, standards, practices, rates and energy utilization.

D
de-energized
Disconnected from all sources of electrical supply by open switches, disconnectors, jumpers, taps, or other means. NOTE: De-energized conductors or equipment could be electrically charged or energized through various means, such as induction from energized circuits, portable generators, lightning, etc.

delivery point
The point at which one utility delivers energy or signals to another utility.

Demand
The maximum average kilowatt load used by the customer for a specific period of time during the billing period.

Destination
Flare: A location where the output can be sent after being created. This can be a Git repo, a folder, website, etc.

Developer
The person, firm or corporation who requests and contracts for the District's electrical service for the intent of developing some subdivision, trailer park, commercial and/or industrial structure for sale, rent or lease to others.

Devops
Development - Operations. At one point there were developers who developed and system administrators who handled the server operations. Today with modern software/tools and software being continuously updated, the roles have been merged and is referred to as Devops.

Direct Burial
The installation of appropriate electrical conductors in a trench without the use of conduit.

Disconnect
A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

Disconnects
A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

District
Public Utility District No. 1 of Snohomish County.

District Service Policy
Used in reference to and in place of the Customer Electric Service Policies.

E

ecc
Energy Control Center, also called "Station 1"

effective ground
Bonded to an effectively grounded neutral conductor or to a grounding system designed to minimize hazard to personnel and having resistances to ground low enough to permit prompt operation of circuit protective devices.

effectively grounded
Bonded to an effectively grounded neutral conductor or to a grounding system designed to minimize hazard to personnel and having resistances to ground low enough to permit prompt operation of circuit protective devices.

Effectively Grounded
Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to limit the buildup of voltages to levels below that which may result in undue hazard to persons or to connected equipment. See Section 9 of the National Electric Safety Code

effectively grounded neutral conductor
A conductor that is intentionally connected to the source transformer neutral directly or through an impedance to limit phase-to-ground fault current and has not less than four grounds in each 1.6 km (1.0 mi) of line. The conductor shall be of sufficient size to carry the available fault current and permit prompt operation of circuit protective devices.

Electrical Inspector
The qualified representative of the District, City of Everett, City of Lynnwood, City of Mountlake Terrace or the State of Washington Department of Labor and Industries who has been authorized by these governmental agencies to inspect electrical service installations on their behalf.

Electrical Service
The supply of electrical energy from the District’s electrical facilities to that of the customer.

enclosed
Surrounded by case, cage, or fence designed to protect the contained equipment and limit the likelihood, under normal conditions, of dangerous approach or accidental contact by persons or objects.

Enclosure
The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, and/or to protect the equipment from physical damage.

energized
Electrically connected to a source of potential difference, or electrically charged so as to have a potential significantly different from that of earth in the vicinity. Syn: live.

Engineer
(1) The designated representative of the District who designs and/or causes to be designed, construction drawings (work sketches) for the purpose of expanding and/or improving the District's electrical system. (2) The designated representative of the District who, because of his or her training, is assigned engineering responsibilities.

epr
Ethylene propylene rubber

equipment
A general term including fittings, devices, appliances, fixtures, apparatus, and similar terms used as part of or in connection with an electric supply or communications system.

EUSERC
Electric Utility Service Equipment Requirements Committee

exclusive control
Generally covers installation, ownership, restricted access, operation, and maintenance by qualified and authorized persons.

exposed
Not isolated or guarded.

F

FCC License-Exempt
Transmitters that comply with the requirements of FCC Title 47 CFR Part 15.

ftb
Fluidized Thermal Backfill

G

Gain
The ratio (typically in dBi) of signal power referenced to an isotropic radiator.

Git
Merriam-Webster: British: A foolish or worthless person The tool was created to not be "smart" or do things for the user.

Ground

As used in context with the neutral system shall refer to that conducting connection whether intentional or accidental between an electrical circuit or equipment and earth, or to some conducting body which serves in place of the earth.

Ground Rod

(1) A rod that is driven into the ground to serve as a ground terminal, such as a copper-clad rod, solid copper rod, galvanized iron rod or galvanized pipe. (2) A conducting rod serving as an electrical connection with the ground. (Note: The District requires 5/8" x 8' copper-clad steel ground rods on it's system).

grounded

Connected to or in contact with earth or connected to some extended conductive body that serves instead of the earth.

grounded conductor

A conductor that is intentionally grounded, either solidly or through a noninterrupting current-limiting device.

grounded conductors

A conductor that is intentionally grounded, either solidly or through a noninterrupting current-limiting device.

grounding conductor

A conductor that is used to connect the equipment or the wiring system with a grounding electrode or electrodes.

grounding conductors

A conductor that is used to connect the equipment or the wiring system with a grounding electrode or electrodes.

Grounding Electrode Conductor

The conductor used to connect the grounding electrode to the equipment grounding conductor and/or to the grounded conductor of the circuit at the service.

Group Installation

More than one electrical device such as panels, meters, motors, etc., connected together by a common electric circuit.

Grout

Cement mortar used for patching and for filling holes on and in concrete vaults and handholes.

guarded

Covered, fenced, enclosed, or otherwise protected, by means of suitable covers or casings, barrier rails or screens, mats or platforms, designed to limit the likelihood, under normal conditions, of dangerous approach or accidental contact by persons or objects. NOTE: Wires that are insulated but not otherwise protected are not normally considered to be guarded. See EXCEPTIONs under applicable rules.

Guying Facility

Cables or braces used to relieve the strain on masts and poles due to overhead conductors.

H

handhole

An access opening, provided in equipment or in a below-the-surface enclosure in connection with underground lines, into which personnel reach but do not enter, for the purpose of installing, operating, or maintaining equipment

or cable or both.

Handhole
Below grade enclosure for conductor termination. A handhole is typically prefabricated of concrete or polymer materials.

hdpe
High density polyethylene

Hertz
Cycles per second, referring to the frequency of alternating current (60 Hz).

High Leg
The phase leg that is at higher potential than any other two phase legs to ground (High, Wild, Odd). This leg shall be color coded “Orange”.

Hz
Cycles per second, referring to the frequency of alternating current (60 Hz).

I
icea
Insulated Cable Engineers Association

in service
Lines and equipment are considered in service when connected to the system and intended to be capable of delivering energy or communication signals, regardless of whether electric loads or signaling apparatus are presently being served from such facilities.

Inspecting Authority
The District’s Representative shall have the authority to inspect the customer’s wiring before or during the time service is supplied. The District’s Inspecting Representative has the authority to see that all service entrance equipment, customer provided transformer pad sites, trenching, conduits and meter poles are in compliance with all District Policies and the Electrical Service Requirements. Other Inspecting Authorities have the obligation and authority to inspect a customer’s wiring and service entrance equipment to see that they are in compliance with the local authority’s requirements.

Instrument Transformer
Current and/or potential (voltage) transformers used in connection with metering equipment to monitor high current loads and/or high voltage potentials.

insulated
Separated from other conducting surfaces by a dielectric (including air space) offering a high resistance to the passage of current. NOTE: When any object is said to be insulated, it is understood to be insulated for the conditions to which it is normally subjected. Otherwise, it is, within the purpose of these rules, uninsulated.

insulated conductor
A conductor covered with a dielectric (other than air) having a rated insulating strength equal to or greater than the voltage of the circuit in which it is used.

insulated shielding
An envelope that encloses the insulation of a cable and provides an equipotential surface in contact with the cable insulation.

insulator
Insulating material in a form designed to support a conductor physically and electrically separate it from another conductor or object

iso
International Organization for Standardization

isolated
Not readily accessible to persons unless special means for access are used.

J

jacket
A protective covering over the insulation, core, or sheath of a cable.

jacketted
A protective covering over the insulation, core, or sheath of a cable.

Joint Ownership
Refers to poles which are jointly owned by the District and Northwest Fiber, LLC, d/b/a Ziply Fiber (“Ziply Fiber”).

joint use
Simultaneous use by two or more utilities of the same kind. Example: Shared use of a power pole by electric utility and telecommunications company

K

kcmil
Thousands of Circular Mills. A circular mil is a unit of area, equal to the area of a circle with a diameter of one mil (one thousandth of an inch).

Kilowatt
One thousand watts expressed in kW, equal to 1.341 Horsepower also equal to 56.92 BTU's/minute, or 1 kilowatt-hour equals 3413 BTU’s (British Thermal Units).

L

lateral conductor
A wire or cable entirely supported on one structure and extending in a general horizontal, vertical, or diagonal direction to make connections to line conductors, service drops, equipment, or other facilities supported on the same structure. Lateral conductors may be attached directly to the structure or supported away from the structure.

line conductor
(Overhead supply or communication lines.) A wire or cable intended to carry electric currents, extending along the route of the line, supported by poles, towers, or other structures, but not including vertical or lateral conductors.

Listed
Equipment or material included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

Load Center
Necessary equipment usually consisting of circuit breakers, fuses or switches located near the entrance of the supply conductors intended to constitute the main control and means to disconnect the customer's electric service.

Locked Rotor Current
The steady-state current taken from the line with the rotor locked and with rated voltage (and rated frequency in case of alternating-current motors) applied to the motor.

M

manhole
A subsurface enclosure that personnel may enter used for the purpose of installing, operating, and maintaining submersible equipment and cable.

Manlift Truck
Single or double axle manlift truck equipped with outriggers. Typical maximum vertical reach is 50 feet. Manlift trucks require a 30' x 15' work area.

Maximum Potential Exposure
The exposure limits defined by the FCC for power density, electric and magnetic field strength in "controlled" and "uncontrolled" situations.

mdcl
Minimum Design Cantelever Load

mdpe
Medium Density Polyethylene

mdtl
Minimum Design Tensile Load

Meter Equipment
Any equipment associated with measuring electric energy.

Meter Pole
The pole which supports the metering equipment, which is paid for, owned and maintained by the customer. The District may provide and install the meter pole for a fee to the customer.

Meter Socket
Any receptacle in which an electric meter may be installed.

Metering Room
A permanently dedicated readily accessible, secured room with an exterior door entrance, used for the installation and maintenance of the customer's electrical metering equipment.

minimum approach distance
The closest distance a qualified employee is permitted to approach either an energized or a grounded object, as applicable for the work method being used.

Motor Protective Device
A device which protects the motor against dangerous overheating due to overload, failure to start, or single-phasing in the case of a three phase motor.

Motor Starting Limitations
Limits placed by the District on maximum starting current for 60 Hz motor.

N

NEC
The National Electrical Code, current edition at the time of reference, as adopted and administered by the Public Utility District No. 1 of Snohomish County or other jurisdictional agency. (Refer to State of Washington addendum to NEC).

nema
Association of Electrical Equipment and Medical Imaging Manufacturers

NEMA
National Electrical Manufacturers Association.

NESC
National Electrical Safety Code.

Neutral Conductors
neutral conductors are effectively grounded throughout their length. All equipment, such as transformers, regulators, capacitors, protective devices and padmounted switchgear are also considered to be effectively grounded. Effectively grounded conductors, equipment and all dielectric self-supporting (ADSS) fiber-optic cable shall have the same clearances as guys and messengers.

Non-Inductive Load
A resistive load being either capacitive or resistive.

O

Off-Road Parking
Parking completely off the traveled roadway and within the vehicles' reach of the equipment to be operated. Parking area shall be level and stable. Depending on the type of roadway and the duration of work, flagging may or may not be required.

Ohm
A unit of electrical resistance or impedance.

On-Road Parking
Parking partially or completely on the traveled roadway within the vehicles' reach of the equipment to be operated. Depending on the type of roadway and the duration of work, flagging may or may not be required.

Open Supply Conductors
bare or insulated conductors without a grounded shielding, individually supported at the structure will be referred to as open conductor.

Open Supply Line Conductors
bare or insulated conductors without a grounded shielding, individually supported at the structure will be referred to as open conductor.

OSHA
Occupational Safety and Health Administration.

out of service
Lines and equipment are considered out of service when disconnected from the system and when not intended to be capable of delivering energy or communications signals.

Overhead
Single Family, Duplex, Commercial, Multiple-Occupancy and Mixed Use Buildings: Customer installed service entrance conductors and equipment shall be grouped at one location and installed in compliance with the District's Electrical Service Requirements and in such a manner so as to enable a single District installed service drop to supply and connect to all sets of service entrance conductors at a single location. (continued on page 1-10)

overhead ground wire
A wire or wires, which may or may not be grounded, strung parallel to and above phase conductors to protect the power system from lightning strikes.

Overhead Line Equipment
Includes but not limited to transmission switches, distribution switches, cutout switches, transformers, regulators, reclosers and capacitor banks.

Oxide Inhibitor
A compound used to retard oxidation of electrical connections.

P

Pad
A reinforced concrete slab, sized to support particular electrical equipment, e.g., transformers and switchgear.

pcb
Polychlorinated Biphenyls

Pedestal
A below grade plastic or concrete enclosure for termination of underground secondary service conductors.

Permanent
Lasting or intended to last indefinitely or for a long time.

Point of Connection
The point at which the District’s secondary conductors are attached to the customer’s or the customer's conductors/equipment. Overhead Residential or Commercial – at the customer's service entrance mast. Underground Residential – at the metering point (meter base or current transformer). Underground Temporary Residential or

Commercial, at the pedestal, pad-mounted transformer or the secondary termination enclosure. Underground Commercial Secondary Metered - at the pedestal, pad-mounted transformer or the secondary termination enclosure. Underground Commercial Primary Metered - District Owned Transformer - at the transformer, secondary pedestal or secondary termination enclosure. Underground Commercial Primary Metered - Secondary voltage customer's responsibility

Point of Service
Refer to Point of Connection.

Pole Face
The side or half of the pole that contains the pole gain.

Pole Gain
The notch in the pole that contains the pole manufacturing information.

Primary
The District’s voltage and phase configuration used to transmit or distribute voltage to the high side of the transformation equipment. Normally greater than 600 volts.

Private Property
Land owned in fee-simple title by an individual, individuals or corporations.

Private Right-of-Way
Lands set aside and designated for use by private individuals, and public or private utilities.

Public Right-of-Way
Land acquired by/or dedicated to a governmental agency for public use and for general public access and utilities, such as streets, alleys, boulevards and walkways.

Pull (Git)
Download the latest Git repo from the remote server

Push (Git)
Send committed repo to the server

pvc
Polyvinyl chloride

R
RCW
Revised Code of Washington.

Readily
(Readily Accessible). A clear access to customer premises free from danger or the risk of bodily harm or injury; capable of being reached quickly for meter reading, maintenance, repairs, testing, installation or removal of the District's property per WAC 480-100-168 and WAC 480-100-308; without the need to make prior arrangements or notification; not guarded by dogs; not blocked by obstacles, locked doors, elevation or other means; not requiring those to whom safe access is a requisite to climb over, move or remove obstacles or resort to portable ladders, chairs, etc. Must have minimum working clearance for equipment involved per NEC, WAC and/or the ESR. A room,

balcony, porch or attached deck is considered readily accessible to pedestrians if it can be casually accessed through a doorway, window, ramp, stairway or permanently mounted ladder by a person, on foot, who neither exerts extraordinary physical effort nor employs tools or devices to gain entry. A permanently mounted ladder is not considered a means of access if its bottom rung is 2.45 m (8 ft.) or more from the ground or other permanently installed surface. NESC 243.C.3.d.(1)b.

Readily Accessible

(Readily Accessible). A clear access to customer premises free from danger or the risk of bodily harm or injury; capable of being reached quickly for meter reading, maintenance, repairs, testing, installation or removal of the District's property per WAC 480-100-168 and WAC 480-100-308; without the need to make prior arrangements or notification; not guarded by dogs; not blocked by obstacles, locked doors, elevation or other means; not requiring those to whom safe access is a requisite to climb over, move or remove obstacles or resort to portable ladders, chairs, etc. Must have minimum working clearance for equipment involved per NEC, WAC and/or the ESR. A room, balcony, porch or attached deck is considered readily accessible to pedestrians if it can be casually accessed through a doorway, window, ramp, stairway or permanently mounted ladder by a person, on foot, who neither exerts extraordinary physical effort nor employs tools or devices to gain entry. A permanently mounted ladder is not considered a means of access if its bottom rung is 2.45 m (8 ft.) or more from the ground or other permanently installed surface. NESC 243.C.3.d.(1)b.

Repository (Repo)

A folder with files being tracked by Git. There are two kinds: Local: The repository on your computer Remote: The repository on the Git server

Representative

Any employee of the District authorized to act for the District in its behalf.

Residence

A space for a single-family dwelling.

Ruling Span

the design span used to calculate average conductor tension for a series of non-uniform spans between deadends. The ruling span formula is presented in T&D Guideline 4-8-4.0.

S

Safe

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Safe Access

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scada
Supervisory Control and Data Acquisition

Seal
The locking device used to secure meter and/or service entrance equipment to assure safety and security for the unit.

Sealing
The use of a putty or sealant product to seal a conduit end, service conduit or associated equipment to prevent entry of moisture or contaminants.

Secondary
The lower voltage after transformation used to supply the customer with electrical energy. Normally less than 600 volts.

Separation Space
The vertical space (40” per WAC 296-44-21287 and NESC 235) on a pole separating the supply space and the communications space. This space is intended to provide a safe working clearance for workers in the communication space.

Service
The conductors and equipment for delivering energy from the electric supply system to the wiring system of the premises served.

Service-Entrance Conductors, Overhead System
The service conductors between the terminals of the service equipment and a point usually outside the building, clear of building walls, where connected by tap or splice to the service drop.

Service-Entrance Conductors, Underground System
The service conductors between the terminals of the service equipment and the point of connection to the service lateral.

Service Attachment Device
An approved mechanical and electrical insulator termination for the overhead service conductor termination of the District’s system at the customer’s point of attachment.

Service Conductors
The supply conductors that extend from the street main or from transformers to the service equipment of the premises supplied.

service drop
The overhead conductors between the electric supply or communication line and the building or structure being served.

Service Drop
The overhead conductors from the last pole or other aerial support to and including the splices, if any, connecting to the service-entrance conductors at the building or other structure.

Service Equipment

The necessary equipment, usually consisting of a meter socket, circuit breaker or switch and fuses, and their accessories, located near the point of entrance of supply conductors to a building or other structure, or an otherwise defined area, and intended to constitute the main control and means of cutoff of the supply.

Service Mast

The conduit above the meter used to provide mechanical protection for the service conductors and support for the overhead service drop from the District's system.

Service Point

The point of connection between the facilities of the serving utility and the premises wiring.

Service Pole

A service drop support/attachment pole necessary to provide adequate clearance and support of the service conductor, installed, owned, and maintained by the District.

Service Riser

The conduit below the meter used to provide mechanical protection for the service conductors and support for the underground service drop from the District's system.

Service Truck

Single axle manlift truck without outriggers. Typical maximum vertical reach is 42 feet. Service trucks require a 9' x 24' work area.

shield wire

A wire or wires, which may or may not be grounded, strung parallel to and above phase conductors to protect the power system from lightning strikes.

Single Service

Overhead Single Family, Duplex, Commercial, Multiple-Occupancy and Mixed Use Buildings: Customer installed service entrance conductors and equipment shall be grouped at one location and installed in compliance with the District's Electrical Service Requirements and in such a manner so as to enable a single District installed service drop to supply and connect to all sets of service entrance conductors at a single location. (continued on page 1-10) Underground Single Family and Duplex Dwellings: Customer provided metering and service entrance equipment shall be located and configured per the District's Electrical Service Requirements so as to enable one set of District owned service conductors to supply and connect to service conductors at a single location. Commercial, Multiple-Occupancy and Mixed Use Buildings: Customer owned and supplied service conductors shall be installed in compliance with the District's Electrical Service Requirements, connected together at the District's supply end, and connected together at the load end in a single enclosure (on a common bus) at the customer's metering or service equipment. Additional service or metering enclosures (busses) may be allowed by special permission.

spacer cable

A type of electric supply-line construction consisting of an assembly of one or more covered conductors, separated from each other and supported from a messenger by insulating spacers.

Span

The length of conductors between two supporting structures.

SSH Key

Secure Shell Key. SSH uses assymetrical (public/private key) cryptography. The keys can be used to authenticate with the Git server instead of a username and password.

Standards

The authorized or accepted design principles as they apply to engineering, construction, and operation of the District's electrical facilities. Standards may be either pictorial or written.

static wire

A wire or wires, which may or may not be grounded, strung parallel to and above phase conductors to protect the power system from lightning strikes.

Supply Cable

multiple conductor, insulated, nonshielded, supported on and cabled together with an effectively grounded bare neutral (service drop) will be referred to as cable

Supply Cables

multiple conductor, insulated, nonshielded, supported on and cabled together with an effectively grounded bare neutral (service drop) will be referred to as cable

Supply Space

The vertical space on a pole that is occupied by the electric supply conductors and/or hardware. The bottom of the supply space is the bottom of the lowest District conductor or attachment, excluding street light mast arms.

supported facility

Any component of an overhead line system that is supported on, but is not intended to provide structural strength to, the supporting structure or mechanical support system. NOTE: Examples of supported facilities include, but are not limited to, components such as conductors, line hardware, equipment hanger brackets, and switches.

supporting structure

The main supporting unit (usually a pole or tower) used to support supply and/or communication conductors, cables, and equipment.

T

Target

Flare: A specific type of output. Can be HTML, Word, PDF, etc.

Temporary Service

An electrical service installed by the District to provide power on a temporary basis to a customer, for a maximum period of 18 months.

Temporary Service Equipment

The necessary equipment, usually consisting of a meter socket, circuit breaker or switch and fuses, and their accessories, on an approved temporary structure, intended to constitute the main control and means of cutoff of the supply.

termination

A device that provides insulated egress for the conductors. Syn: termination.

Third Party
Any company with attachment to a wholly/jointly owned pole including but not limited to telecommunication and wireless companies' attachments.

tree wire
A type of electric supply-line construction consisting of an assembly of one or more covered conductors, separated from each other and supported from a messenger by insulating spacers.

trxlpe
Tree-Retardant Crosslinked Polyethylene

U
UL
Underwriters Laboratories Inc., a nationally recognized not for profit, independent organization which tests devices, systems and materials for public safety. UL produces directories which list products, systems and devices which have demonstrated the ability to meet its requirements.

Uncontrolled Exposure
The exposure to RF emissions by the general population as defined by the FCC.

Underground
Single Family and Duplex Dwellings: Customer provided metering and service entrance equipment shall be located and configured per the District's Electrical Service Requirements so as to enable one set of District owned service conductors to supply and connect to service conductors at a single location.

Underground Line Equipment
Includes but not limited to vaults, padmounted and submersible distribution switches, risers, j-boxes, padmounted and submersible transformers, secondary vaults and pedestals, padmounted reclosers, padmounted capacitor banks and customer owned vault rooms.

Underground Residential
A residential area supplied by an underground electrical distribution system.

Underwriters Laboratories Inc
Underwriters Laboratories Inc., a nationally recognized not for profit, independent organization which tests devices, systems and materials for public safety. UL produces directories which list products, systems and devices which have demonstrated the ability to meet its requirements.

V
Vault
A District-approved chamber used for mounting electrical equipment therein. A vault is typically prefabricated of steel-reinforced concrete.

vertical conductor
Either a wire or cable riser attached to a pole or a vertical portion of a lateral conductor.

Volt
A unit of electro-motive force, electrical pressure, or difference of potential, represented by the letter “E”.

W

WAC

Washington Administrative Code.

Watt

Unit of Electrical Power: 1 Watt = 1 Ampere x 1 Volt

wclib

West Coast Lumber Inspection Bureau

Weatherhead

Mast conduit top fitting for supporting conductors and to prevent rain/water from entering the conduit and/or related service equipment.

Working Files

These are the Flare Project files that the user will edit in Flare and changes will be tracked with Git.

Working Platform

A safe, clean unobstructed floor area with safe access to all electrical equipment. The access and railing shall meet OSHA Regulations.

Working Space

An area free of obstruction in front of the meters, service panels and electric equipment which provides safe access to all electric equipment and metering.

X

xlpe

Cross-linked Polyethylene

Section 2 General Requirements

Revised: Jun 15, 2022

A. Scope

1. This **Electrical Service Requirements** Manual contains policies, standards and general requirements for providing overhead and underground service to District customers. Manuals and contents are the property of the District and are to be cared for by the person to whom assigned. Revisions and additions will be issued periodically and it is the responsibility of the manual holder to insert this material so an up-to-date manual is maintained. Manual holders are responsible for notifying the District of name or address changes using the postage paid reply card in the front of the manual.
2. Service entrance equipment and installation to all new customers, or existing customers altering their electrical service, must comply with the District's Electrical Service Requirements (ESR).
3. Nothing in this manual shall be so interpreted as to conflict with the regulations of the State of Washington or other regulatory bodies having jurisdiction.

B. Availability of Service

1. The owner, the owner's agent, or the electrical contractor making the installation must consult the serving utility regarding the utility's service entrance requirements for equipment location and meter equipment requirements **before installing the service and equipment.** Provisions for a meter and related equipment, an attachment of a service drop, or an underground service lateral must be made at a location acceptable to the serving utility. The point of contact for a service drop must permit the clearances required by the NEC (WAC 296-46B-230). ***Any wiring installed without first contacting the District to determine the service entrance location is done at the risk of having to change the service location to conform with these requirements.***
2. Any customer who desires electrical service from the District's facilities for new and/or additional load shall contact the District as much in advance as possible to determine the availability of electric service facilities. The District reserves the right to determine availability of voltage and phase of service as well as service route and service equipment location.
3. For single family or duplex residential, not more than one service of like voltage will be allowed to any one building. The service entrance shall be located so that no more than one set of service wire attachments to the building will be required.
4. For single-family residential zero-lot-line town-homes, an individual service run and individual meter base/socket will be allowed for each unit. All service wire and meter base/socket installations will be owned and maintained by the customer. A meter base/ socket must be placed on the front wall of each town-home individual living unit or, with prior District approval, in another location accessible to District representatives.
5. For commercial service one service of like voltage to any one building is preferred, however, additional services may be permitted for different voltages, phases or rate schedules (for example, a commercial unit and a residential unit in the same building). Determination of whether to allow such additional services shall depend on the District's ability to connect to existing facilities. **Contact the District for evaluation prior to design and installation.** All service entrance locations and meters shall be installed in one location on the building.

All underground commercial service conductors shall be customer installed, owned and maintained and permanently labeled at the connection point as "Customer Owned" along with the service address and unit numbers.

C. Application of Service

1. Each customer desiring new or altered electrical service must complete a New Service Questionnaire and may also be required to sign an application for service before service is supplied.
2. In Snohomish County each customer is required to consult with Snohomish County Planning and Development Services for compliance with County Code Chapter 30.62, Critical Area Regulations prior to requesting new service or alterations to an existing service. Customers in Island County are recommended to check with that county for similar requirements. All customers are recommended to check with local jurisdictions for these or other requirements.
3. Acceptance of service shall be subject to compliance with the requirements of Snohomish County Critical Area Regulations or other agencies as required, the District's Electrical Service Regulations, Customer Service Regulations and applicable rate schedule or schedules in effect at the time of application.
4. Customers shall provide the District with accurate connected load data and accurate plot plans showing the location of necessary property corners, property lines, roads and location of other buried utilities, as required when applying for service.

D. Service Entrance and Meter Location

1. The owner, the owner's agent, or the electrical contractor making the installation must consult the serving utility regarding the utility's service entrance requirements for equipment location and meter equipment requirements **before installing the service and equipment**. Provisions for a meter and related equipment, an attachment of a service drop, or an underground service lateral must be made at a location acceptable to the serving utility. The point of contact for a service drop must permit the clearances required by the NEC (WAC 296-46B-230). ***Any wiring installed without first contacting the District to determine the service entrance location is done at the risk of having to change the service location to conform with these requirements.***

Note: Any deviation from the **District's Electrical Service Requirements** due to unusual electrical needs or circumstance should be presented to the District in the design/planning stage and **must be submitted to the District for consideration in advance of commencing construction**. This Variance may require various District departmental review and therefore require additional time prior to notification of approval/denial determination. Refer to Variance Application at the end of this section.

E. Point of Connection

The point of connection is the point at which the secondary conductors are attached to the customers or the customer's conductors/equipment. The District is responsible to maintain acceptable voltage on District installed secondary conductors to the point of connection. The customer is responsible to maintain acceptable voltage on all customer installed secondary conductors to the point of connection.

OH Residential And Commercial

At the customer's service entrance mast.

UG Residential

At the metering point (meter base or current transformer).

UG Temporary Residential Or Commercial

At the pedestal, pad-mounted transformer or the secondary termination enclosure.

UG Commercial Secondary Metered

At the pedestal, pad-mounted transformer or the secondary termination enclosure.

UG Commercial Primary Metered

District Owned Transformer - at the transformer, pedestal or the secondary termination enclosure.

UG Commercial Primary Metered

Secondary voltage customer responsibility.

If the District disconnects the secondary service at the customers request for repairs, it will not be reconnected unless there's an *approved* electrical permit from the appropriate governmental agency on the site. If emergency repairs are done during normal working hours an electrical permit must be on site, or in the case of emergency repairs during other than normal working hours, arrangements may be made. Notify the District in advance as soon as possible.

Any concerns regarding this practice should be directed to the State Department of Labor and Industries, or governing authority.

F. Service Identification Meter Labeling

1. Before service is energized and a meter can be installed, the customer must obtain a valid service address from the proper agency. When the meter is installed and sealed, it is designated in the District's official record as the meter serving that premise. Apartment unit or space number are considered part of the valid address.
2. It is the responsibility of the owner or manager of multi-unit complexes to notify the District of any changes in numbering so that the District's Meter Department can verify metering circuits. Such notice must be given in writing immediately to Customer Service, to permit re-designation of meters serving the premise. The customer shall be responsible for renumbering both the premises and meter sockets prior to dispatch of the Meter Department.
3. Each meter position and each service switch or breaker shall be clearly and permanently identified by the customer to indicate the particular location supplied by it. The relation of the meter socket, breaker and location served must be easy to identify. *Meters will not be installed nor service energized until marking is complete*.
4. Markings shall be legible for the period of occupancy. Clear identification means an apartment/store space letter or number, or street address/number. The store name may be included; however, it does not constitute a clear designation in itself.
5. Permanent Identification shall be described as properly installed phenolic labeling for those pieces of equipment that correspond to the premise being served.
6. Multi-unit meter base installations and other areas such as commercial buildings with meters and equipment installed on building walls in an alley or on the back walls of a strip mall, where there may be confusion of which premise is served by which meter, must be permanently identified with phenolic labeling in compliance with the following requirements. The account will remain in the owner's name until the units have been verified: (Also refer to Section 5-E)

Material and Format of Labels

- Engraved phenolic labels shall be used.
- Labels shall have plain block letters or numbers with a contrasting background.

Information on Labels

- Labels shall clearly indicate corresponding unit served by each meter.

Placement of Labels

- Labels will not be placed such that they obscure any information printed or labeled on the equipment.
- Position the label so that it is readily visible and that it is obvious what equipment the label describes.

Attachment of Labels

- Labels shall be smoothly attached to the device with no overlaps, protrusions or sharp edges and corners.
- Labels shall be applied in a craftperson-like manner and never applied over existing phenolic labels.
- Labels may have self-adhesive backs to aid in installation, but each label shall have at least 2 holes (larger labels shall have at least 4) and be secured to the equipment with appropriate sized pop-rivets to keep the label from being unintentionally removed. All labels shall be installed and secured with pop-rivets or screws (use caution when drilling and installing pop-rivets) before they will be accepted by the District.

G. Types of Service

1. Non-Permanent Service
    1. Services, which in the District's opinion shall not be in continuous use for at least five years, shall be considered non-permanent.
    2. These services shall meet all requirements for temporary service, secondary service and/or primary service, whichever applies.
    3. Special customer charges will apply in accordance with the District's Customer Service Regulations.
2. Temporary Construction Service
    1. Temporary service, either overhead or underground, shall be limited to a maximum of eighteen months.
    2. Phase and voltage limits shall be the same as for permanent services.
3. Permanent Single Phase Service
    1. The District will supply to a single customer 120/240V single phase up to a maximum service entrance equipment rating of 1,000 amperes.
    2. The District will serve motor loads of up to and including 5 HP single phase.
    3. Any requirement in excess of a. and b. above shall be by three phase service.
4. Permanent Three Phase Service
    1. The availability of service for three phase equipment to be used shall first be determined at any District office before proceeding with the wiring.
    2. The three phase service entrance equipment shall be installed at a location designated by the District.
    3. Motors larger than 5 HP will be served three phase.
    4. Three phase service shall be a 4-wire configuration.

H. Voltages and Phasing

1. The District's primary distribution voltages may differ at various locations. Consult Customer Engineering for the high voltage classification. Secondary single phase voltage of 120/240V is normally all that is available in residential areas.
2. The District will endeavor to provide electrical service within plus or minus 5% of nominal voltages. Delivery voltages and phases will be those available at the point service is desired; and if other phases or voltages are necessary, they may be made available by the District in accordance with the provisions of its Electrical Service Requirements Manual and Rate Schedules then in effect. The District reserves the right to refuse a new three phase service at a particular voltage if the proposed new load can be served from an existing three phase transformer bank.

3. Nominal secondary delivery voltages supplied by the District are:
    1. Overhead and underground secondary services from an overhead primary system.
        1. 120/240 volt - single phase
        2. 240/480 volt - single phase
        3. 120/208 volt - single/three phase wye (network metering)
        4. 277/480 volt - three phase wye
        5. Open Delta three phase is available in certain cases. Contact the District Customer Engineer for determination.
    2. Underground secondary service from an underground primary system.
        1. 120/240 volt - single phase
        2. 240/480 volt - single phase (from 15 kVA and 100 kVA transformers only)
        3. 120/208 volt - single/three phase wye (network metering)
        4. 277/480 volt - three phase wye
4. The customer/contractor shall identify parallel conductors.
5. Service Voltages Supplied by the District in Excess of 600 Volts
    1. Where service voltages are in excess of 600 volts between conductors, contact the District for its primary metering requirements.
    2. For primary metered service to three phase padmounted transformers or three phase overhead transformer banks connected to the District's primary distribution system voltage (12.47kV L-L), those transformer winding configurations shall be wye-grounded on the primary, with no windings connected in delta (including any buried delta windings). The transformer primary neutral shall be connected to the PUD's 12.47kV system neutral, and also directly grounded at the transformer location.

I. Cost of Service

1. The cost of providing electrical service to all customers is governed by the District's **Customer Service Regulations** currently in effect.
2. The District will charge the customer for any special costs incurred in obtaining permits, easements or other documents required in order to provide the customer with electrical service.

J. Possible Delays

1. The District may not have a sufficient stock of materials to complete a job once the service application has been completed.
2. The District will not order any special equipment or materials to complete any particular job until certain requirements have been met. The purchase of special materials such as transformers and conductors can require several months to obtain.
3. Any wiring performed without first checking with the District is done so at the risk of having to change the service entrance equipment and/or location of the equipment.
4. In many cases, easements may be required for facilities located on private property. Line construction will not begin until the necessary easements have been obtained.

K. Electrical Wiring Permit

1. An electrical permit is required prior to start of wiring installation.
2. This permit is available from the cities of Everett, Lynnwood, Marysville and Mountlake Terrace at their respective city offices. For all other areas within Snohomish County and Camano Island, this permit is available at any State of Washington Department of Labor and Industries office.
3. The permit must be filled out completely, concisely, legibly and signed and placed in the service panel for inspections.

4. If the District disconnects the secondary service for repairs, it will not be reconnected unless there's an approved electrical permit on the site. If emergency repairs are done during normal working hours an electrical permit must be on site, or in the case of emergency repairs during other than normal working hours, other arrangements may be made. Notify the District in advance as soon as possible. Any concerns regarding this practice should be directed to the State Department of Labor and Industries, or governing authority.

L. Inspection and Connection

1. It is the customer's responsibility to have all inspections performed by representatives of the governmental agencies having jurisdiction over said inspections.
2. The customer must have on site an *approved* permit for service from the appropriate governmental agency for service before a service can be energized. In the unincorporated areas of Snohomish or Island county, the State of Washington Department of Labor and Industries would be the appropriate agency. Inside the cities of Everett, Lynnwood and Mountlake Terrace the City Electrical Department would be the appropriate agency.
3. The District's inspector has the right, but not the obligation, to inspect the customer's wiring or equipment before or during the time service is supplied.
4. The District's inspecting representative is authorized by the District to make sure the customer's service entrance equipment is in compliance with these requirements and the District's policies.
5. Energizing The Service: When a PUD representative arrives to initially connect a new service, they must have access to the main disconnect in order for service to be energized.

M. Service Entrance Equipment

1. The customer will be responsible for providing and installing service entrance equipment and wiring to conform with all applicable National and State codes and the requirements contained in this manual.
2. Multiple Service.
   Customers shall not tie the District's primary feeders together through their services at any time.
   Refer to ESR Section 6, Generation Interconnection, for more details regarding standby generation and other requirements that may apply.
3. 600 Volts or Under
   Only UL listed or approved service entrance equipment of the proper rating may be installed.
4. Over 600 Volts
   At the District’s option, service entrance equipment that is not UL listed or approved may be used, provided listed or approved equipment is not available and the District has been given adequate time to examine equipment and approve its use.
5. Grounding Service Equipment
   1. All service equipment shall be grounded to meet the national, state and local utility rules as outlined in these Electrical Service Requirements.
   2. The use of water pipe fittings will not be permitted as a single point ground.
6. Switchboxes
   Service switches and allied equipment exposed to the weather shall be of a rain-tight type and shall be factory built for the purpose.

7. Service Entrance Wires and Cables
    a. The size of service entrance conductors shall be determined from the connected load and must not be less than the minimum size conductors as determined by the National Electrical Code.
    b. All individual three phase service installations require a neutral (fourth) wire to be provided. The secondary neutral wire shall be bonded (via the neutral lug/bus) to the customer's equipment or common ground connection.
    c. All individual three phase service installations require a neutral (fourth) wire to be provided and installed in the service conduit and to extend a minimum of 18" beyond the weatherhead for connection to a neutral conductor from the District's supply transformer bank ground. It must meet the minimum size as set out in the National Electrical Code, Table 250-94 and be color coded “white”.
    d. The high (wild) leg conductor of a 240 or 480 volt three phase four wire delta service shall be color coded “orange”.
    e. The District will not extend service conductor more than 15 feet inside any building lines (WAC 296-46).
    f. When aluminum conductors are used, the service panel must be UL listed or approved and clearly marked by the manufacturer that it is acceptable for aluminum conductors. The customer shall supply and install oxide inhibitor on all aluminum conductors used in conjunction with the electrical wiring terminations.
    g. Parallel conductors shall be identified.

N. Weatherheads, Conduits and Fittings

1. The District will allow a maximum of six conductors single phase and eight conductors three phase per conduit. Only three conduits per service entrance shall be used with overhead service, unless written permission is obtained from the District by using the District’s Variance Application. Refer to Section 2-U, Form 2-1, Variance Application.
2. The size of conduit necessary is dependent upon the size of conductors and upon the number of conductors in the conduit. Refer to NEC Chapter 9 for overhead requirements or Section 4-E for District owned underground service.
3. Flexible conduit shall not be used.
4. Limit of one LB per conduit run, which shall be outside and exposed at all times.
5. No Customer owned equipment may be installed between the meter-mounting equipment and a District meter.

O. Access/Right-of-Way/Easements

1. Easements are required for all extensions of the District’s primary facilities on private property as well as secondary services as required. The customer or developer shall provide the District with a legal description of the building site or proposed development and an acceptable easement covering the facilities located on their property.
2. No structures of any kind shall be constructed or permitted to be constructed within, over, or upon the easement area without written approval of the Manager of the District.
3. Any surveying necessary for the location of property corners shall be provided by the customer.
4. Authorized representatives of the District have the right to enter a customer’s property during reasonable hours to perform necessary functions such as meter reading, maintenance, repairs, testing, installation, or removal of the utility’s property. Utilities must provide photo identification to utility representatives who are authorized to enter customers’ premises. Customers have the right to see the utility-provided identification of electric utility representatives before allowing entry to the customer’s property (WAC 480-100-168).
5. In order for the District to access its facilities during reasonable hours, without the need for the District to make special arrangements, where the District’s meters are located in a designated electrical or meter room all customers must comply with the District’s ESR which requires the installation of a BEST Access locking system as defined in the ESR Section 5. Customers who have installed or are installing gates with padlocks must allow the installation of a District furnished locking device to adjoin the customer’s lock. Customers installing electronic access gate(s) must install a BEST Access keyed switch locking system keyed to the District’s “P” key for access. Customer Service Regulations 2.3(c).

6. The customer shall provide and maintain a minimum of a 10 foot wide gravel road with an adequate base to support the heavy equipment required for the installation, maintenance and removal of the District's distribution facilities. This road shall be not more than 15 feet from the District's electrical service facilities. Exception:
   A. safe walking access shall be provided at all times for District personnel to the meter and service drop location.
7. Construction will not begin until adequate easements have been obtained. Legal descriptions of easements areas will be determined by the District.

P. Interference with Quality of Service

1. The customer's use of the District's electrical facilities shall not result in any interference with the quality of his own service or that of another customer. In the case of devices in which large blocks of load are recurrently switched on and off, such as electric boilers, welders, heaters, motors, non-linear loads, or where the customer desires voltage control within unusually close limits, the District may require the customer to provide, at his own expense, special or additional equipment. To minimize all interference with the quality of his own service or that of other customers, the District requires the customer's electrical facility to meet the power quality standards presented in Section 10. Recommended Practices for Individual Customers of the latest IEEE Std. 519, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems, in addition to requirements in other parts of this Electrical Service Requirements Manual.
2. Plug-in Hybrid Electric Vehicles (PHEV), Battery Electric Vehicles (BEV) and energy efficient devices:
   The District encourages PHEV's and BEV's as well as energy efficient devices such as heat pumps and others as determined by the District. This policy does not apply to commercial/industrial applications. The following requirements will be fulfilled when integrating such equipment/devices into the District's electrical distribution system:
   1. Customers that will not incur District cost.
      Customers installing energy efficient devices (heat pumps up to 4 tons and other equipment) with less than 127 amps of starting current (LRC) to their existing electrical service panels will not be charged for system (transformer and/or wire) upgrades. All heat pumps require soft start or assisted starts.
      Customers installing heat pumps over 4 tons to their existing electrical service panels will be allowed up to 140 amps of starting current (LRC). All heat pumps require soft start or assisted starts.
      Customers adding non-motor loads to their existing panels will not be charged for system upgrades and/or secondary wire upgrades. This includes Plug in Hybrid Electric Vehicles (PHEV), Battery Electric Vehicles (BEV) and other such devices.
   2. Customers that will incur District costs:
      Customers increasing their panel capacity for added load will be charged a Meter and Transformer Fee and increased wire fee.
      Customers whose load causes LRC greater than 127 amps or, for Heat Pumps over 4 tons and greater than 140 amps will be charged for system upgrades.
      Customers requesting 480 volt single phase (will need city/county approval) will be charged for system upgrades.
      Customers requiring the system be upgraded from single phase to three phase will be required to pay all charges and fees associated with the upgrade (will need city/county approval).
   3. Should the added load for energy efficient devices affect the primary distribution system, the District will upgrade the system as necessary up to the 3MW load beyond which the District's New Load Policy will apply.
   4. Cities/Counties are required to notify the District on the application of PHEV's and BEV's in their service territory and include this notification as part of their electrical service application process.

3. Starting Limitations (Motors)
    1. Single phase motors, up to and including 5 HP may be served by single phase at 240 volts. Special written approval by the District is required for single phase motors larger than 5 HP.
    2. All single phase motors shall not exceed the maximum locked rotor currents listed in the following table, unless approved in writing by the District

    Single Phase Motor Maximum Allowable Locked Rotor Currents
    (Derived from NEMA Standards)

Rated Size	at 120 Volts	at 208 or 240 Volts
2 HP or less	80 amperes	57 amperes
3 HP		83 amperes
4 - 5 HP		140 amperes

    3. All heat pumps require soft start or assisted starts.
    4. In certain cases, Open Delta three phase (240 Volt) service is available to serve three phase motors up to 15 HP. Special written approval by the District is required for three phase delta motors larger than 15 HP. Contact the District Customer Engineering Department for determination.
4. Special Load Limitation (Commercial and Industrial)
    1. Where non-inducting loads are energized from the District's secondary system and are to be switched on and off more frequently than once each hour, the maximum increased load shall not be greater than 100 kilowatts three-phase, or 30 kilowatts 240 volt single phase without written permission of the District.
    2. Loads in excess of these amounts may require the customer to furnish and install special switching equipment to reduce the magnitude of the unit load to be cycled on and off.
    3. Inquiries as to the necessity of special equipment should be directed to Customer Engineering.

Q. Minimum Power Factor Limitation

Unless otherwise specifically agreed, the District shall not be obligated to deliver electric energy to the Customer at any time at a power factor below 75% (refers to average overall power factor for each individually metered service).

R. Protective Devices

It shall be the responsibility of the customer to provide suitable protective apparatus on all motor installations including adequate protection against single phasing (loss of one single phase with two still energized), on three phase motors.

S. Upgrading or Conversion of Service

All upgrading, rewiring or conversion shall be in compliance with District policies and procedures in effect at the time of the upgrading, rewiring or conversion. Refer to District Policy CUS-PL-1.

T. Hazardous Electrical Service

1. Whenever the modification or installation of any service entrance equipment or wiring is in such a condition as to be dangerous to life or property, the person, firm, partnership, corporation or other entity owning, using or operating as determined by the District, the District shall immediately disconnect the electrical service. The District shall notify the customer of the repairs to be made. The District shall not reconnect the service until such repairs and changes as required to remove the danger to life or property are made to the satisfaction of the District.
2. Whenever the modification or installation of any service entrance equipment or wiring is not in accordance with the Districts **Electrical Service Requirements**, except for conditions in paragraph 1 above, the person, firm, partnership or other entity owning, using or operating it shall be notified by the District and shall **within ten working days** or such further reasonable time as may upon request be granted, make such repairs to conform to the Districts **Electrical Service Requirements** and National Electrical Code (NEC).
3. **The District reserves the right to discontinue service to any customer who fails to make repairs and/or changes required to remove the danger to life or property.**
4. Disconnection of service shall continue until hazardous conductors and/or equipment are put in a safe and secure condition.
5. If the District disconnects the secondary service for repairs, it will not be reconnected unless there is a new approved electrical permit on site when it is required from the State of Washington Department of Labor and Industries or the appropriate governmental agency. If emergency repairs are done during normal working hours an electrical permit must be on site, or in the case of emergency repairs during other than normal working hours, other arrangements may be made. Notify the District in advance as soon as possible.
   Any concerns regarding electrical permit and inspection requirements should be directed to the State of Washington Department of Labor and Industries or the appropriate governmental agency.

U. Generation-Permanent/Temporary/Portable

This Section covers backup Generation not connected parallel to the District's system only. For generation systems in parallel with the District's system refer to Section 6 Generation Interconnection Requirements.
When any of the types of generation systems defined below are used, they must be totally isolated from the metered service to prevent serious danger to District linemen.

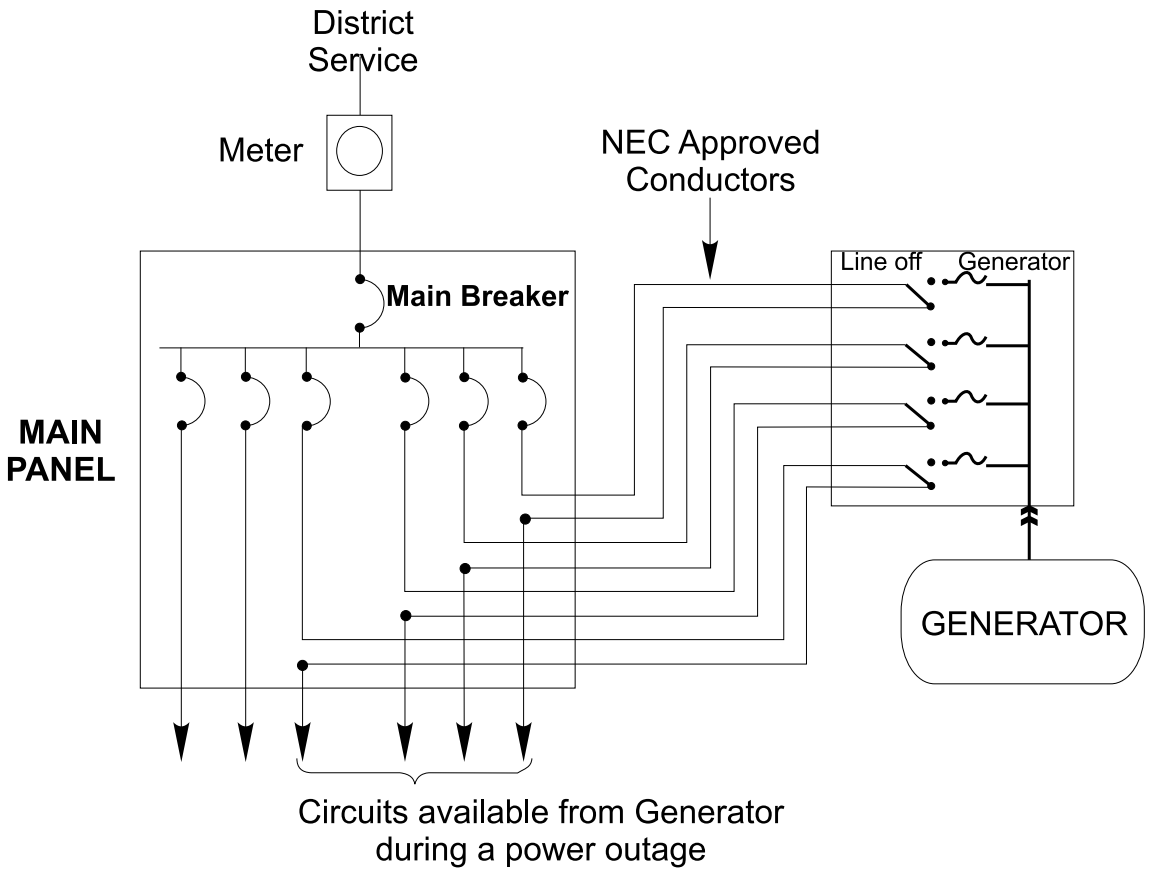
1. Permanent Generation
    1. In commercial or industrial applications a Transfer Switch/Generator Connection Cabinet must be installed. Preferably, the Transfer Switch/Generator Cabinet shall be located on the exterior of the building adjacent to the service entrance near the meter. The Transfer Switch/ Generator Cabinet shall have provisions for a visible lockout/tagout.
    2. The methods shown in Figure 2-1 and Figure 2-2, with switches that disconnect the loads from the line side before those same loads are connected to the generator are acceptable methods of installing a stand-by/emergency generator.
    3. Installation of the Transfer Switch/Generator Connection Cabinet shown in Figure 2-1 and Figure 2-2 must be approved by the appropriate Governmental Agency and the Snohomish County Public Utility District.

2. Portable Generation
    1. This temporary, moveable generating system is often used by individual customers during temporary outages.

    2. To assure the safety of District linemen and to avoid potential damage to customer devices when portable generators are used all electrically operated devices shall be connected directly to the portable generator.
    3. Portable generators shall not be plugged directly into a building outlet receptacle creating back feed safety hazard for the District and potential damage to customer equipment.
    4. All nonessential lighting and appliance circuits should be turned off before connecting a generator.
    5. Damage to house wiring, appliances and the generator may result from exceeding the capacity of the generator (this capacity is provided on the generator nameplate, usually in watts).
    6. The method shown in Figure 2-3 is an acceptable method of installing a standby/emergency generator.
3. Emergency Generation
   A generating system permanently installed, legally required and classified as emergency by Municipal, State, Federal or other codes, or by any governmental agency having jurisdiction. This system is intended to automatically supply illumination and or power to designated areas and equipment in the event of failure of the normal supply when safety to human life is involved, as indicated in Article 700-1 of the NEC.
4. Legally Required Standby Generating System
   A permanently installed system required and so classified as legally required standby by Municipal, State, Federal or other codes or by any governmental agency having jurisdiction. This system is intended to automatically supply power to selected loads (other than those classified as emergency systems) in the event of failure of the normal supply as indicated in Article 701 of the NEC.
5. Optional Standby
   A system permanently installed in its entirety which is designed to protect private business or property, where safety to human life does not depend on the performance of the system. The system can be automatic or manual as indicated in Article 702 of the NEC.
   It must be noted that a single circuit breaker in the main panel does not meet the requirements of 702-6 which says: “702-6 Transfer Equipment. Transfer Equipment shall be suitable for the intended use and so designed and installed as to prevent the inadvertent interconnection of normal and alternate sources of supply in any operation of the transfer equipment".

Co-generation: Refer to Section 6 Generation Interconnection Requirements if operated in parallel with the District's system. The sequential generation of electric energy and useful heat from the same primary source of fuel for industrial, commercial, heating or cooling purposes.

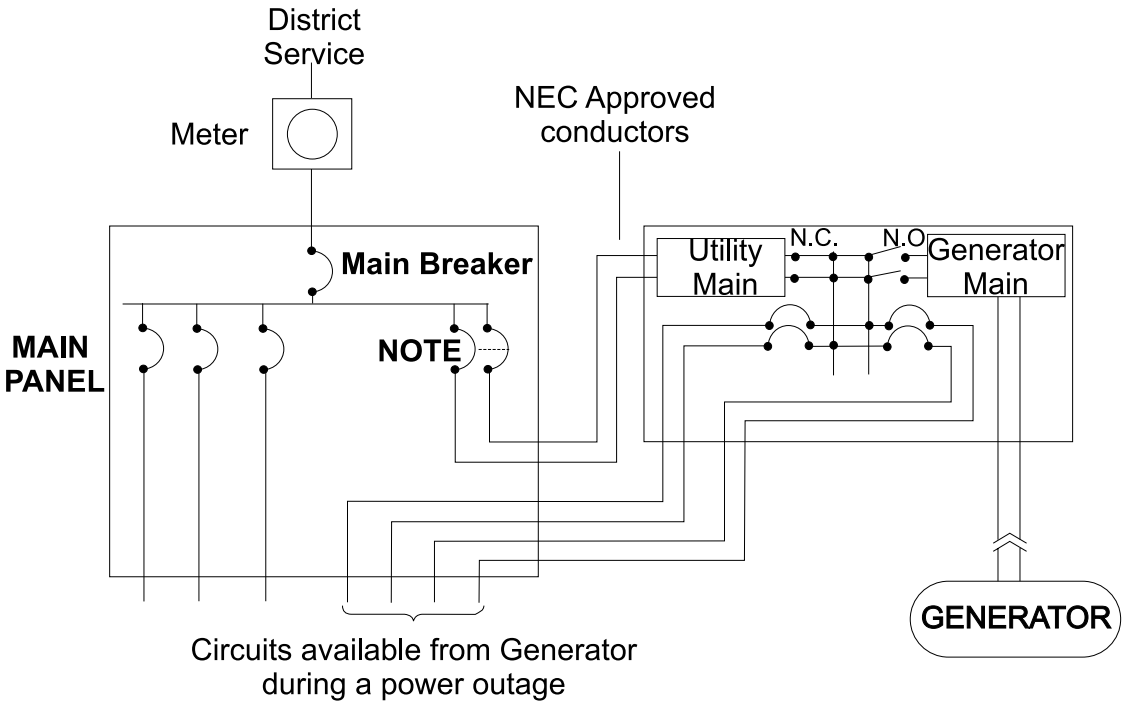
Figure 2-1: Generator Transfer Switch/Connection Cabinet Side Tap



Note:

- Preferred location for commercial/industrial installations on the exterior of the building adjacent to the service entrance near the meter.

Figure 2-2: Generator Transfer Switch/Connection Cabinet Feed Through

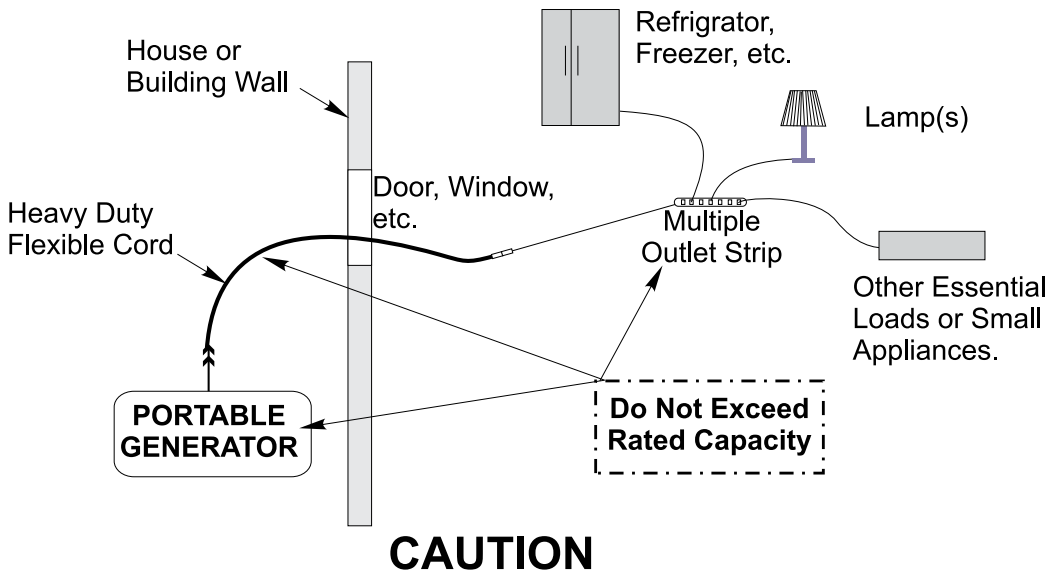


NOTE: This breaker shall be the same size as the Utility/Generator mains.

Notes:

- Preferred location for commercial/industrial installations on the exterior of the building adjacent to the service entrance near the meter
- This breaker shall be the same size as the Utility/Generator mains.

Figure 2-3: Generator Connection Extension Cord



Notes:

- To assure safety of District linemen and to avoid potential damage to customer devices when portable generators are used all electrically operated devices shall be connected directly to the portable generator.
- Portable generators Shall Not be plugged directly into any building outlet receptacle creating a backfeed safety hazard for the District and potential damage to customer equipment.
- Damage to the house wiring, appliances, heavy duty flexible cord, and/or multiple outlet strip may result from exceeding their rated capacity. Damage to the generator may also result from exceed the rating of the generator. This capacity is usally given on the generator nameplate in watts.

Section 3 General Overhead Requirements

Revised: Jan 31, 2023

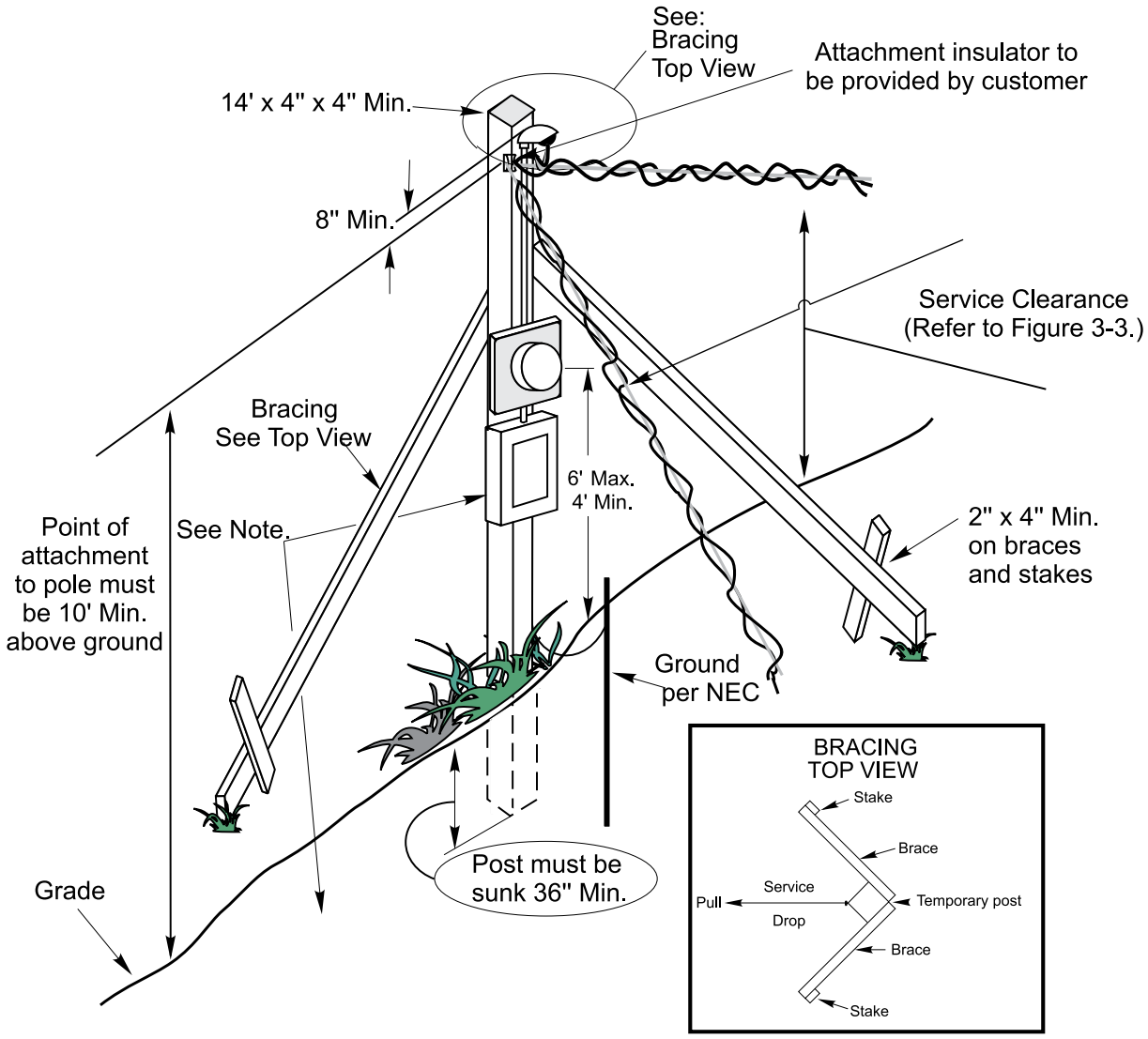
A. General

1. All conditions for service application, availability of service, type of service, inspection, right-of-way, easements, etc., are covered in Section 2, General Requirements.
2. The District will determine when it will extend its overhead distribution facilities to serve permanent residential or commercial customers.
3. The customer shall do all tree trimming on private property necessary for safe construction and operation of the District's electrical facilities, prior to construction.

B. Temporary Construction Service

1. When a service is determined by the District to be temporary, the customer is required to pay charges in accordance with the District's **Customer Service Regulations.**
2. Temporary service installations shall be on private property.
3. Temporary services are limited to 18 months.
4. Access must be provided by the customer between the service attachment and the District's facilities.
5. Temporary service conductors include a maximum of 150' of District supplied #6 aluminum secondary service conductor.
6. The preferred location of a temporary service shall be accessible by a District service truck within 15 feet of a drivable surface.
7. The service equipment shall include a suitable support post and bracing with an approved attachment insulator spool, UL listed or approved conduit and weatherhead, meter socket, weatherproof disconnect switch and receptacle box with #4 copper ground wire, clamp and ground rod.
8. A minimum of a 4" x 4" timber 14' in length will be accepted if braced a minimum of two ways. Refer to Figure 3-1. **Temporary service equipment on trees or the District's distribution, transmission or street light poles is not acceptable.**
9. The meter socket shall be an approved type, meeting the requirements of the National Electrical Code and the District's requirements. Water pipe or water pipe fittings are not acceptable. Service entrance cable may be used where permitted by state or city regulations.
10. The neutral wire between the weatherhead and switchbox shall be bonded to the meter socket using the grounding screw or bonding terminal.
11. If temporary is accessible by a District service truck (within 15 feet of a drive-able surface) a minimum of 18 inches of line side wire shall be left for connection at the weatherhead. If temporary is not accessible by a District service truck the customer shall attach the line side wire to the attachment insulator spool and leave enough line size wire to reach the ground for attachment to the District provided service wire.
12. The service conductors shall be coded and the neutral conductor shall be identified by the color white or light gray. The ground wire shall be a minimum of #8 AWG copper.
13. The point of attachment shall be high enough above the ground to provide the proper clearances. Refer to Figure 3-3.
14. Service entrance equipment shall include proper provisions for grounding portable tools and equipment in accordance with the National Electrical Code and such equipment shall be of factory built, rain-tight construction when exposed to the weather.
15. The District will provide the service drop, make appropriate connections and install the meter(s).
16. The District will not energize service until the installation is approved by the appropriate electrical inspector.

Figure 3-1: Temporary Construction



Notes:

1. Customer owned line side conductor - 18" Min. if accessible by service truck (within 15" of a driveable surface). If not accessible by service truck attach conductor to insulator and provide enough conductor to reach the ground.
2. Approved service equipment provided by customer includes a suitable support post and bracing with an approved attachment insulator spool, UL listed and approved conduit and weatherhead, meter socket, weatherproof disconnect switch and receptacle box with ground wire, clamp and ground rod per NEC.

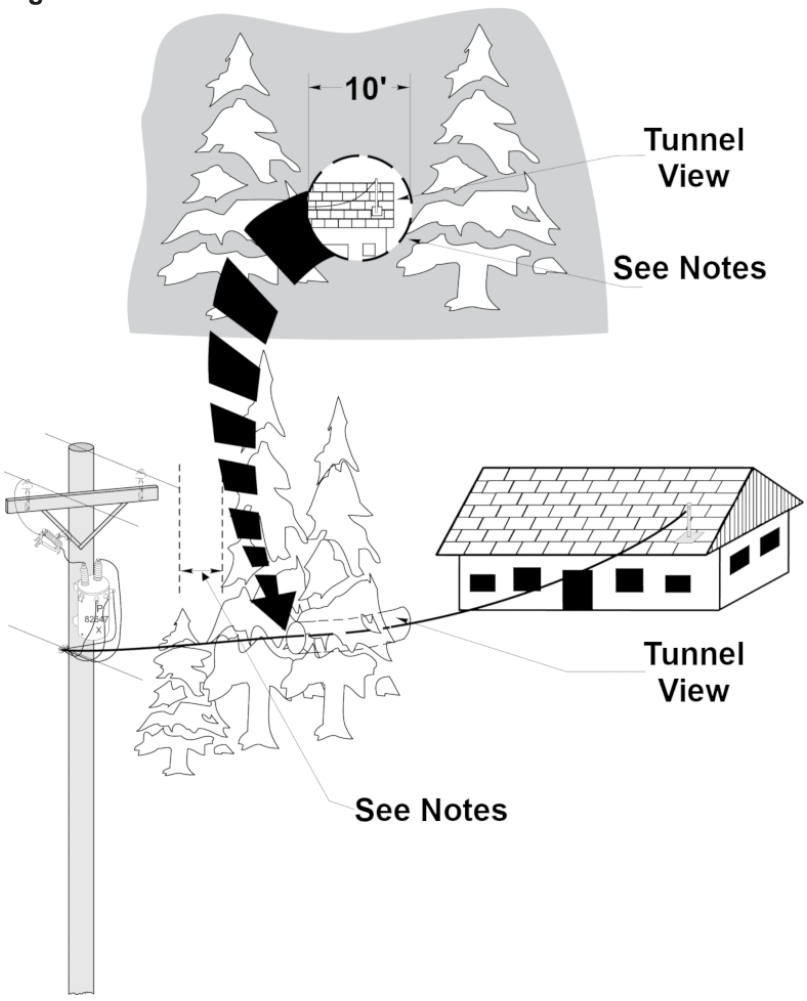
C. Secondary Service (600 Volts and Under)

1. Service drop conductors will not be installed until all electrical inspections have been completed and approved by the District and the governmental agency having jurisdiction.

2. The service entrance shall be located so that only one set of service wire attachments (of like voltage) will be required.
3. The District will designate the point of attachment for all service drop conductors and the location of the service entrance equipment. When a pole is required for the customer's convenience, the cost and condition shall be in accordance with the District's **Customer Service Regulations**.

4. Service Clearing
   a. Remove trees and limbs a minimum of 5 feet on all sides of proposed service drop route. This is to be maintained by the customer, contact Customer Engineering for possible assistance. The District will trim the first 10' nearest it's Primary High Voltage Line(s). Refer to Figure 3-2.
   b. Remove leaning trees beyond the 5 feet minimum on each side which constitute a potential hazard to the proposed line.
   c. It is recommended that any trees that may present a future hazard to the service wire (i.e., rotting, dead, or leaning trees that may fall or be blown down) should be removed.
   d. Should it be necessary to run a service drop through a more congested area than described above, it is the customer's responsibility to top or remove all trees or obstacles taller than 12-1/2 feet within the service drop area
   Exception: Very large Evergreen (i.e., Fir and Cedar) may be left if mutually agreed upon by the customer and the District representative. No variance form required. Side trimming is required.

Figure 3-2: Service Clearance

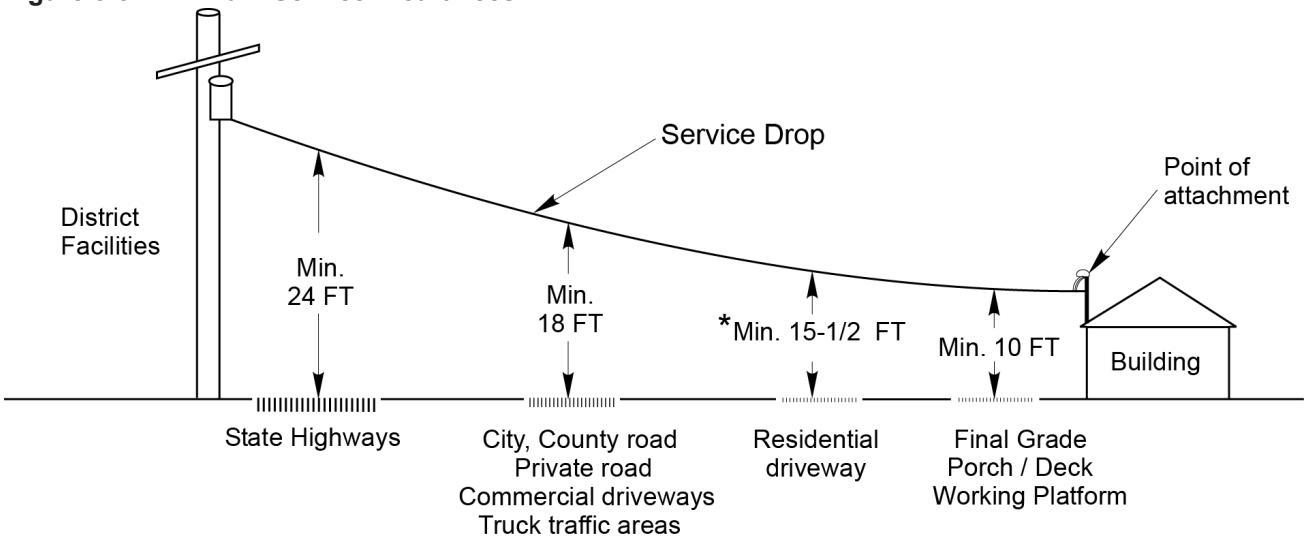


Notes:

- The customer shall maintain a clearance of 5' on all sides of a service drop (10' diameter)
- The District will trim the first 10' nearest its primary high-voltage lines(s).

5. Minimum Service Clearances
   a. Where the roof is readily accessible and the service voltage is 120/240V the service drop conductors shall have a clearance of not less than 10 feet from the highest point of the roof over which it passes. Where the roof is or is not readily accessible and the service voltage is 277/480V the service drop conductors shall have a clearance of not less than 10 feet from the highest point of the roof over which it passes. NESC 234.C.3.d.(1). However, the clearance may not be less than 3 feet where the voltage between conductors does not exceed 300 volts and the roof is not readily accessible or cannot be readily walked upon. These clearances shall be maintained except within 4 feet of the point of attachment. Reference NESC 234 .C.3.d.(1).
   b. The service attachment bracket shall be a minimum of 10 feet above the ground at the point of attachment and high enough to maintain a service conductor clearance of 10 feet over a finished grade or working platform, 15-1/2 feet over residential driveways*, 18 feet over city, county or private roads, streets, alleys and all driveways other than residential, and 24 feet over State highways. The point of attachment shall not be more than 17 feet above the grade unless specifically approved by the District. Refer to Figure 3-3 and Figure 3-12. **EXCEPTION:** Where the height of attachment to a building or other installation does not permit 15-1/2 feet of clearance, clearances over residential driveways may be reduced to 12 feet for supply service drops limited to 150 volts to ground (NESC 232-1).

Figure 3-3: Minimum Service Clearances



6. The customer shall furnish and install all required service brackets for wall or mast mounting. When the circumstance is such that the District must run larger than 1/0 service wires, the customer shall install a heavy-duty service rack. Refer to Figure 3-7.

Figure 3-4: Service Mast Bracket (Trunnell)

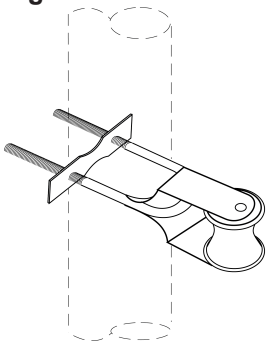


Figure 3-5: Deadend Plate Bracket (Strike Plate)

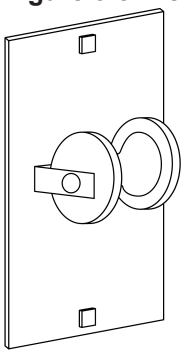


Figure 3-6: Kindorf/Unistrut Bracket

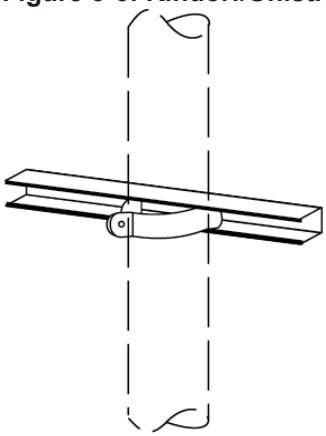
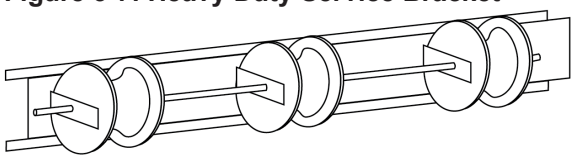


Figure 3-7: Heavy Duty Service Bracket



Approved Brand	Model Number
Florida Wire and Cable	FW768 w/ 3 - FW151
McGraw (Cooper)	DR1F8
AB Chance	C207-0052 w/ 3 - C909-1032
Porcelain Products	4038

7. The service mast shall consist of a minimum 2 inch rigid galvanized steel conduit and must have a lead ring or neoprene type flashing at the roof line. Two “U” bolts spaced at least 2 feet apart shall be required to attach all mast services. If a coupling is used, it must be located at least 3 feet below the wall plate and “U” bolts must be installed near the wall plate and as close to the top of the coupling or reducer as possible. There shall be no couplings above the plate unless the distance between the lower couplings and weatherhead exceeds 10 feet. In such situations, an additional guy attached immediately above the coupling shall be required. Refer to Figure 3-8, Figure 3-9 and Figure 3-10.
Note: Refer to State of Washington, Department of Labor and Industries, Electrical Inspection Division, Rules and Regulations for specifics on service mast installations, WAC 296-46B-230.

Figure 3-8: Surface Mount

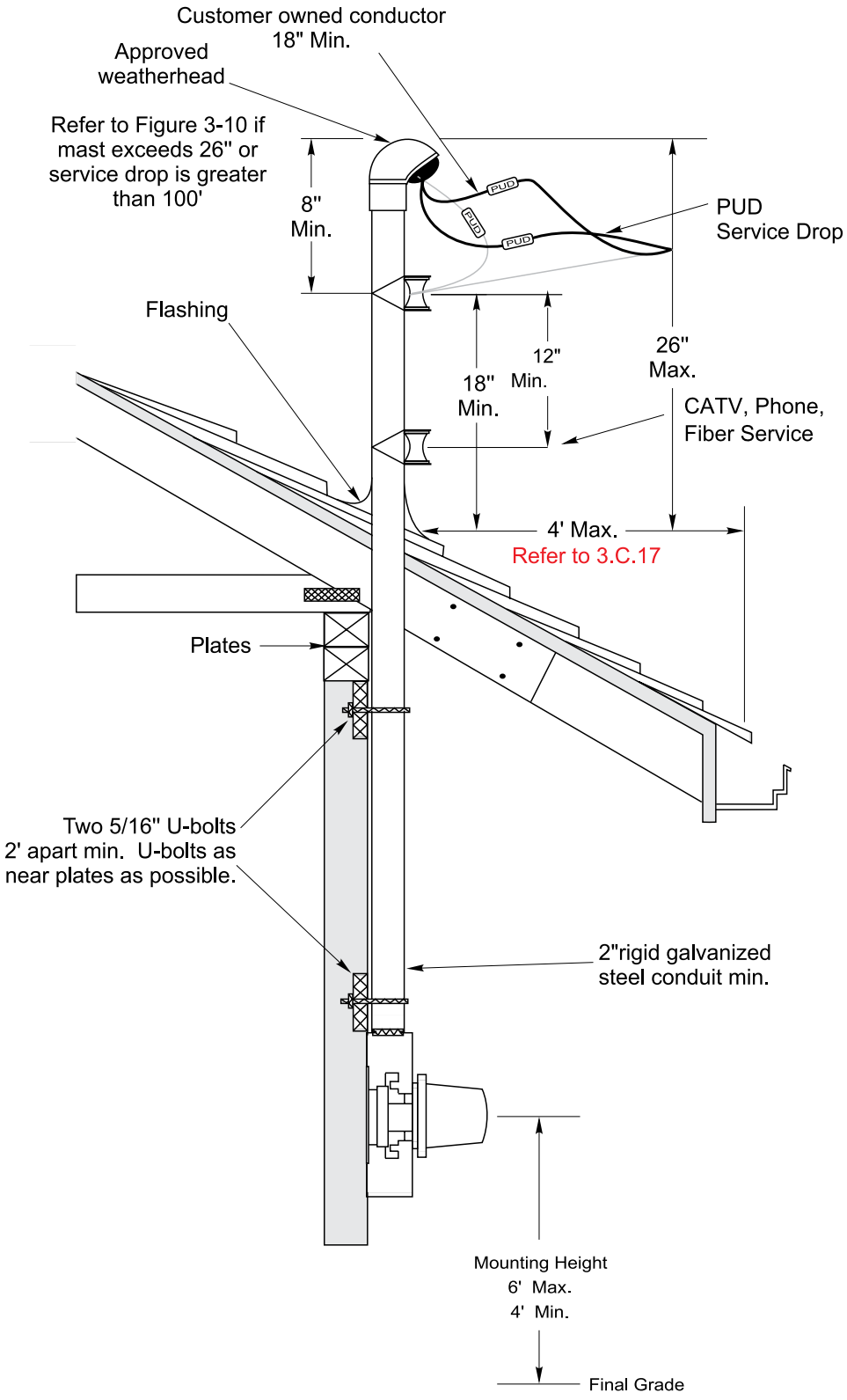
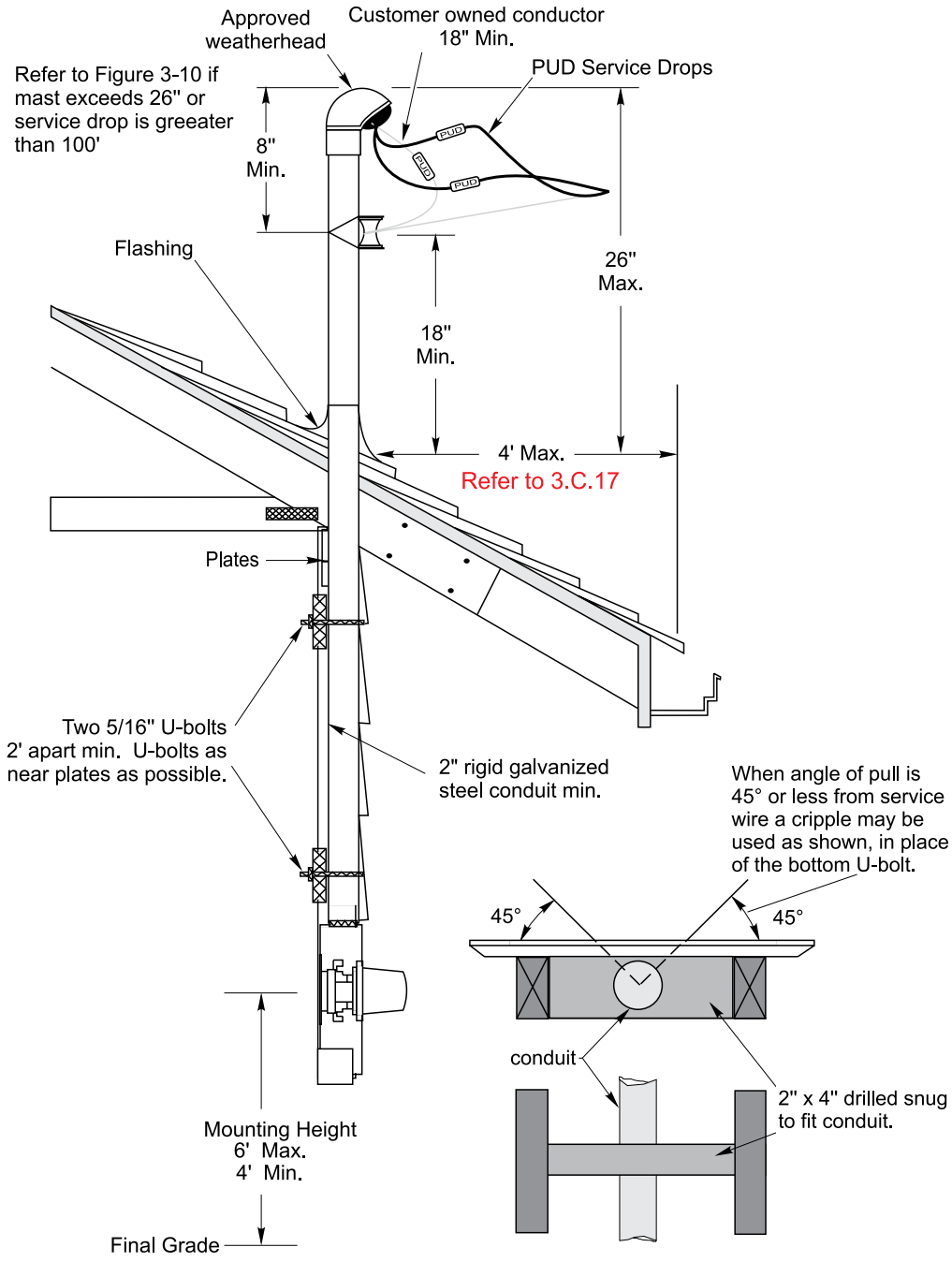

Customer owned conductor
18" Min.
Approved weatherhead
Refer to Figure 3-10 if mast exceeds 26" or service drop is greater than 100'
8" Min.
PUD
PUD
PUD
PUD Service Drop
Flashing
18" Min.
12" Min.
26" Max.
CATV, Phone, Fiber Service
4' Max.
Refer to 3.C.17
Plates
Two 5/16" U-bolts 2' apart min. U-bolts as near plates as possible.
2"rigid galvanized steel conduit min.
Mounting Height
6' Max.
4' Min.
Final Grade

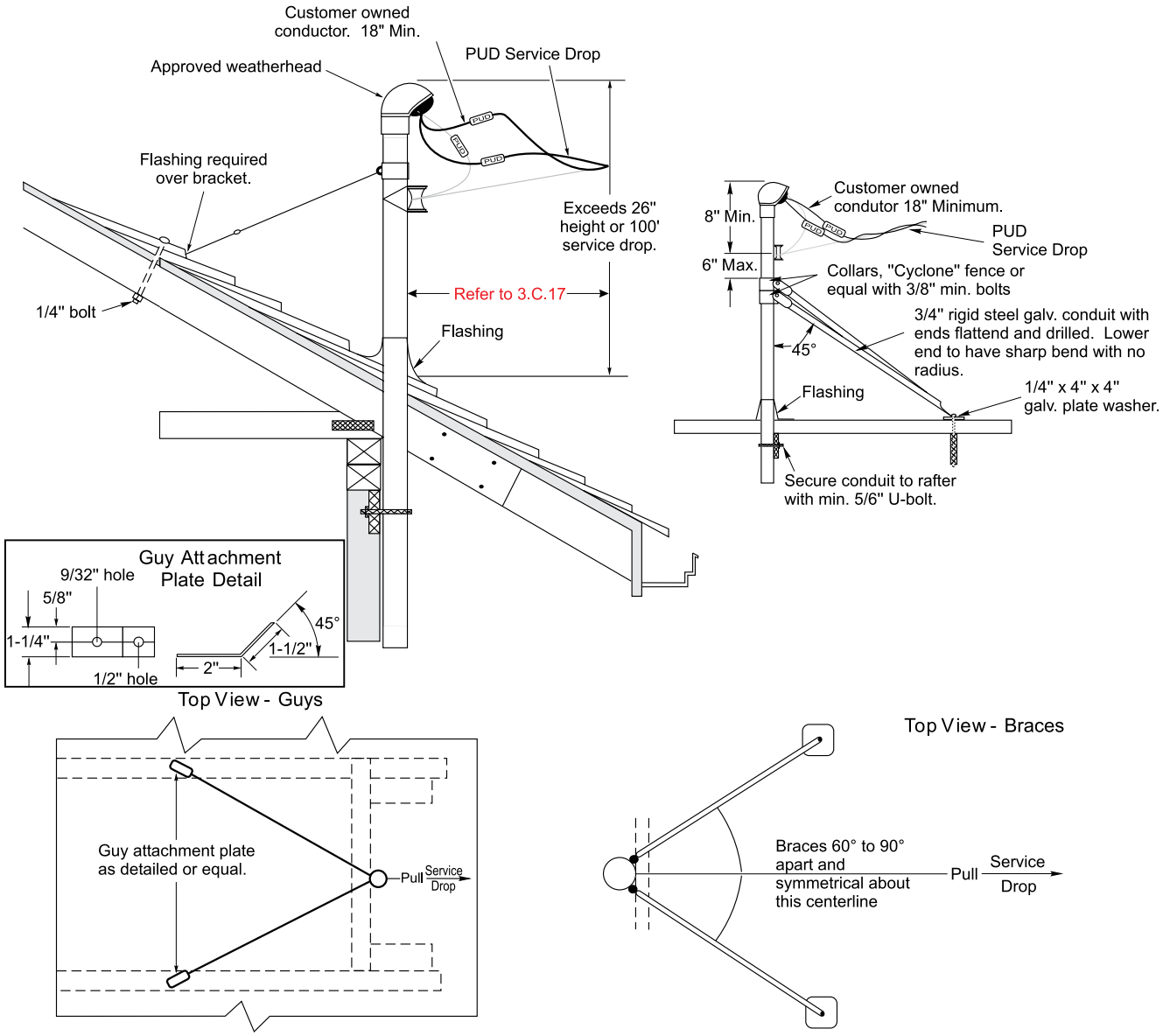
Figure 3-9: Overhead Service Bracing



Notes:

Mast guying or bracing is required *if the mast exceeds 26 inches* above the roof line or *if the service drop is longer than 100 feet*. WAC 296-46B-230.

Figure 3-10: Guying/Bracing



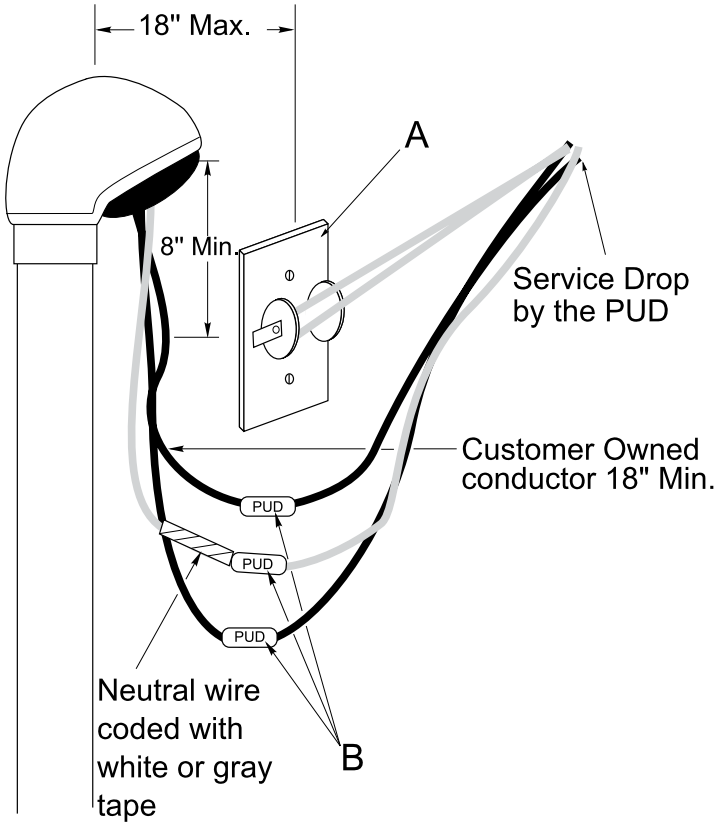
Notes:

Mast guying or bracing is required *if the mast exceeds 26 inches* above the roof line or *if the service drop is longer than 100 feet*. WAC 296-46B-230.

8. Non-metallic conduit may be used for service entrance conductors where the service bracket or other point of attachment for service drop conductors is not attached to the conduit and is on the outside lines of the building. Refer to Figure 3-11.
9. Where there is no problem with roof clearances, mast type services must have a minimum height of 18 inches extending above the roof to the point of attachment.

10. Approved metal strike plate, complete with insulator attached, shall have corrosion-resistant carriage bolts of not less then 3/8 inch diameter. Refer to Figure 3-11.

Figure 3-11: Masthead Wall Mounting



A. Customer to attach strike plate with deadend spool to wall by mounting 3/8" corrosion resistent carriage bolts through 2" x 4" scab nailed between wall studs and using fender washers and nuts to fasten the strike plate to the carriage bolts. As an alternate use 3/8" x 4" lag screws anchored into a wall stud. Coat back side of plate with caulk.
B. PUD to make connections on all three wires. Secondary wires min 18" long and 10' above grade.

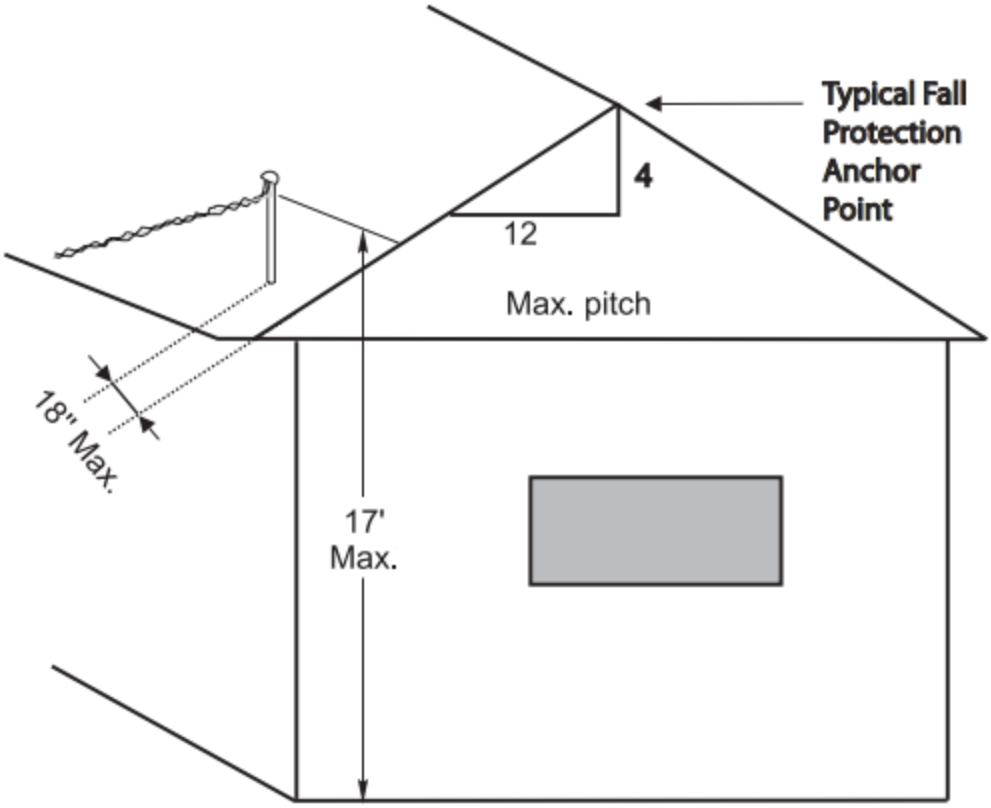
11. For a duplex or larger building where only one strike to the building is permitted but more than one weatherhead is desired, the weather heads must terminate within 18 inches of each other.
12. Only three conduits per service entrance shall be used unless written permission is obtained from the District by using the District's Variance Application. Refer to Section 2. Two of the masts shall be within 18 inches of the central mast attachment point.
13. Weatherheads are required on all overhead service conduits.
14. The practice of attaching a strike plate to the barge board and fanning the conductors above the edge of the roof to connect to a service mast will not be permitted. Strike plate attached directly to the roof is not acceptable.
15. Unfused service conductors within a building or structure shall be installed in metallic raceways, other than electrical metallic tubing, permitted in Section 230-43 of the NEC or in schedule 80 rigid non-metallic conduit. The raceway shall extend no more than 15 feet inside the building or structure. Reference WAC 296-46. Install conduit per NEC 300-4 requirements.
16. The District will run the secondary service and make permanent service connections, furnish and install meters.

17. Service masts, weatherheads and strike plates must be permanently and safely accessible. If a service mast cannot be reached by a District service truck then it must be located:
    a. 17 feet or less above the ground or ladder base and less than 18 inches from the edge of the roof (refer to Figure 3-12),
    Note: If a ladder is to be used there must be a firm, level surface and enough clearance at the base of the ladder to allow a ratio of 4:1 (1 foot out from the top support or wall for every 4 foot in working length or height) or a 75-degree pitch for ladder safety.
    Where the service insulator is 4 feet from the edge of the roof and 18 inches above the roof or 3 feet from the edge of the roof and not higher than 4 feet above the roof it may be worked from a ladder

    or

    b. The service insulator can not exceed 6 feet above the roof and the roof must be able to be walked on and worked on safely. Roofs not acceptable to the District are roofs with pitches 4:12 or greater and roofing that may be easily damaged like soft tile, metal, glass or fiberglass. Also, any roof that the District inspector considers unsafe, deteriorated or not structurally sound is unacceptable.

Figure 3-12: Mast Location /Accessibility



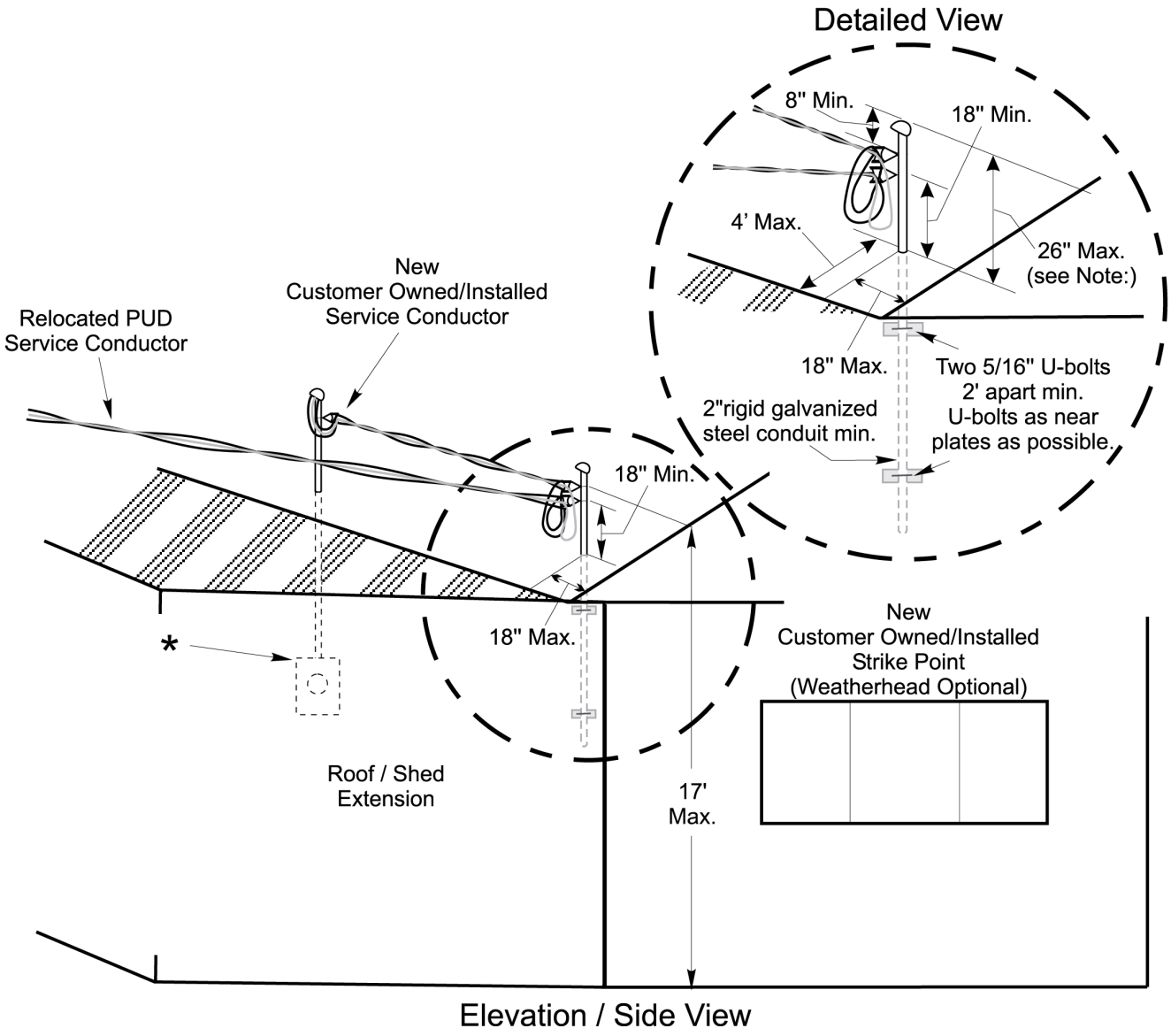
Notes:

If service mast can not be reached with a District service truck refer to 3.C.17.a. for ladder requirements.

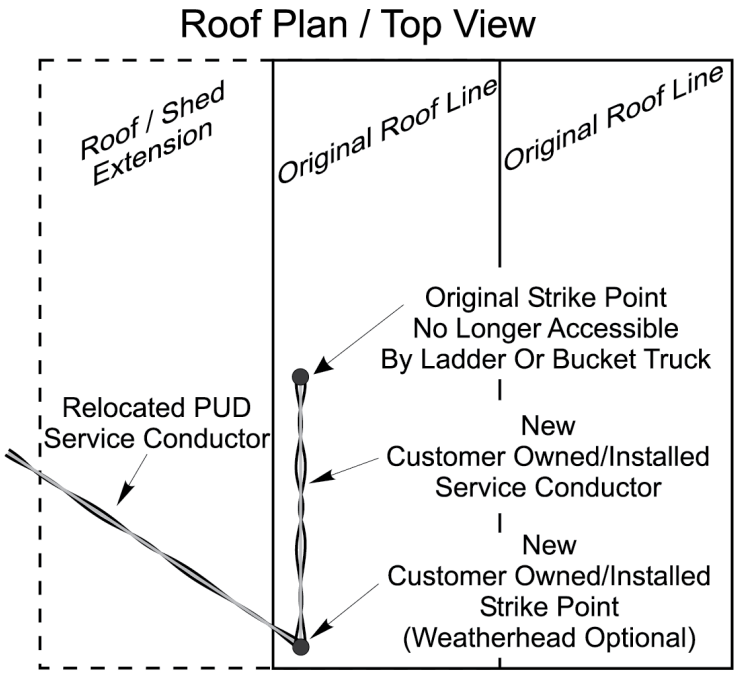
18. WAC 296-880 requires employees exposed to a hazard of falling from a location 4 feet or more in height to be protected by fall restraint, fall arrest systems or positioning device systems.
Due to the above requirement, in some cases, such as when a roof or shed extension has been added and the District can not reach the strike point either by ladder in compliance with current strike requirements, or by bucket truck, it will be necessary for the customer to either install an ANSI Z359 approved fall protection anchor or install a new strike point and new conductor to allow the District to reach the location in compliance with current regulations and requirements. The customer will also need to secure an electrical inspection and approval of the work done from the appropriate jurisdiction before the District can make permanent connections at the new strike location. Refer to Figure 3-13.

When possible, and safety is not an issue, such as in the case of partial power, the District will temporarily leave the service energized to avoid disconnecting the service to the customer. However in some instances where a safety hazard exists, for example, a bad neutral, the District will need to immediately disconnect the service until such time as the customer has completed the necessary repairs and obtained the required approvals to reconnect the service. Coordination of the transfer of service or the connection of the new service will need to be arranged through the District's Customer Engineering Department.

Figure 3-13: Alternate Mast Strike Location

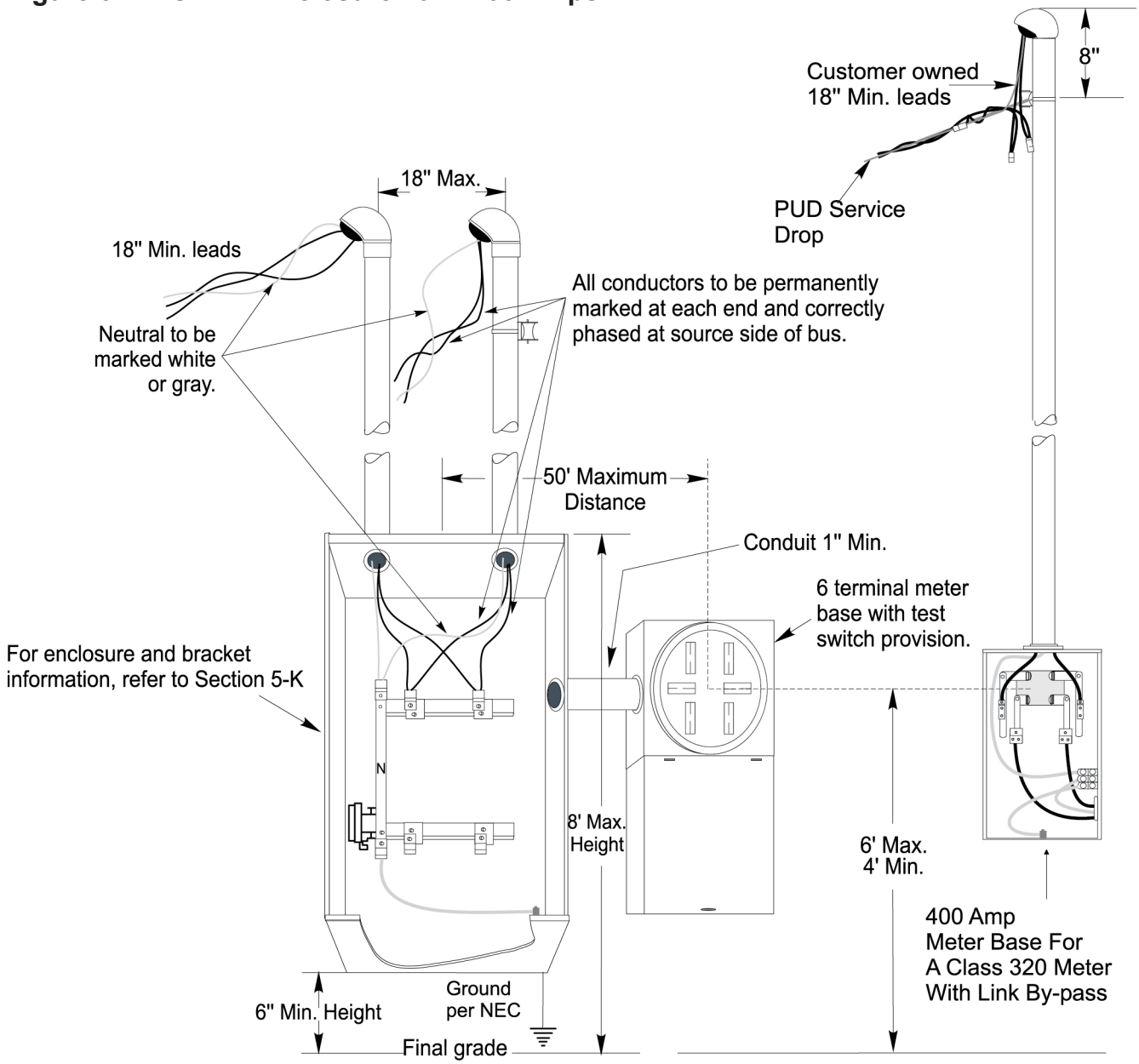


*Note: If the meter base is enclosed and not accessible due to roof/shed extension, then it must be relocated to an outside wall in compliance with the District's Electrical Service Requirements.
Note: Refer to Figure 3-10 if mast exceeds 26" or service drop is greater than 100'



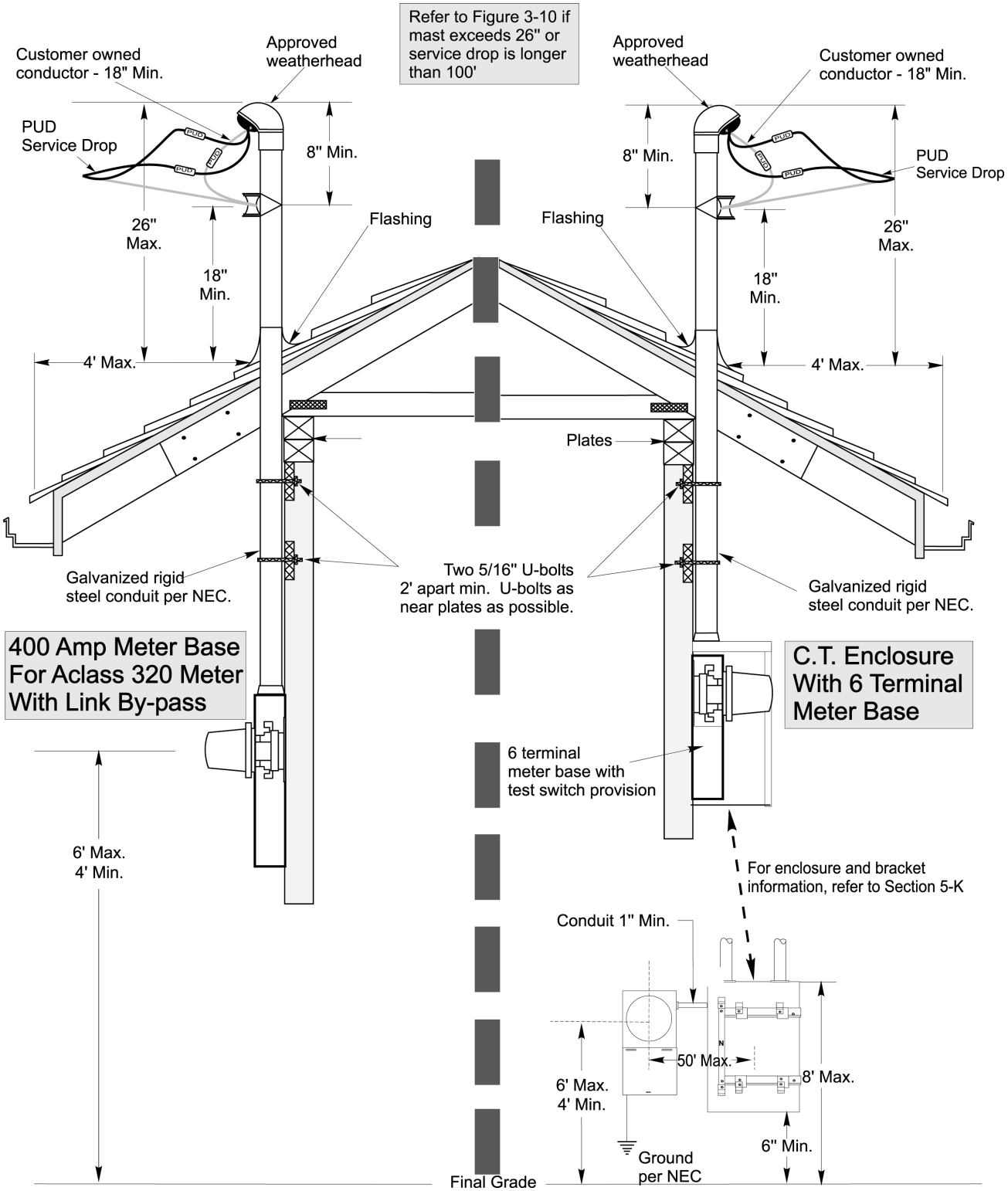
19. For single phase services 201 to 400 amperes, a 400 ampere meter base for a class 320 meter with link by-pass is preferred. When current transformer enclosures are used, the following requirements apply:
    a. The current transformers shall be mounted in a rain tight enclosure on the outside of the building. Refer to Figure 3-14 and Figure 3-15.
    b. Indoor type current transformers are furnished and installed by the District.
    c. Mast mounted current transformers are no longer allowed for new installations. Any major alterations on existing services using this type of metering shall be rebuilt utilizing an outdoor enclosure.
    d. Wall mounted current transformers are no longer allowed for new installations. Any major alterations on existing services using this type of metering shall be rebuilt utilizing an outdoor enclosure.
    e. For detailed requirements refer to Section 5-L.

Figure 3-14: OH CT Enclosure 201 - 400 Amps



Note: The District will furnish, install and wire the current transformers. The District will also make metering connection and final service connection at the weatherhead. For 400 Amp 480 Volt single phase, the District will install a potential transformer.

Figure 3-15: OH Mast Surface Mounting 201 - 400 Amps

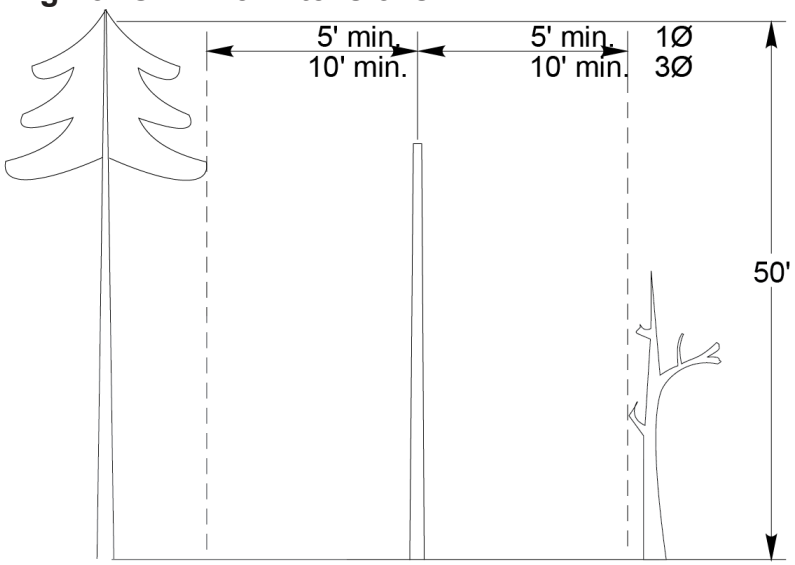


D. Primary Service - Individual Residence

(Refer Also to Section 2- N)

1. The plot plan provided by the customer will show the desired location for the service entrance and metering equipment (to be approved by the District prior to construction) and any special conditions affecting pole or wire locations. This includes objects such as wells, pools, hot tubs, utilities, buildings and driveways.
2. The District will design and install the complete overhead distribution system.
3. Clearing for Primary Lines on Private Property
    a. The customer will provide and permanently maintain a road with adequate base and size to support the heavy equipment required for line construction and maintenance, adjacent to the poles, prior to construction.
    b. The customer will remove all trees a minimum of 5 feet on each side of a proposed single phase line location or 10 feet on each side of a proposed three phase line, as staked by the District's engineer. Refer to Figure 3–16.
    c. The customer will remove or top below the wire height leaning trees which the District representative constitutes as a potential hazard to the proposed line.
    d. The customer will remove or top below the wire height all overhanging branches.
    e. The customer will remove low growing trees, which by their location could in the future constitute a hazard to the proposed line.
    f. The customer will remove debris that is hazardous to construction personnel.
4. The District will maintain tree trimming for existing primary lines.

Figure 3-16: Clearing For OH Line Extensions



Before preparation for line extension.

After preparation for line extension.

E. Residential Plat and Subdivision - Line Extension

1. The customer will advance cost of the line, including any special costs incurred in obtaining permits, easements or other documents, clearing or other special costs.
2. The District will design, install, own and maintain the complete overhead distribution system.

F. Convenience Poles

1. When requested by the customer for their specific benefit, the District may furnish and install a 35' convenience pole, with or without guying and anchoring, at the customer's expense.
2. Poles longer than 35 feet may be provided on an individual cost basis.
3. The customer shall advance the required fees prior to final engineering and construction.
4. The District shall install, own and maintain convenience poles.

G. Service Poles

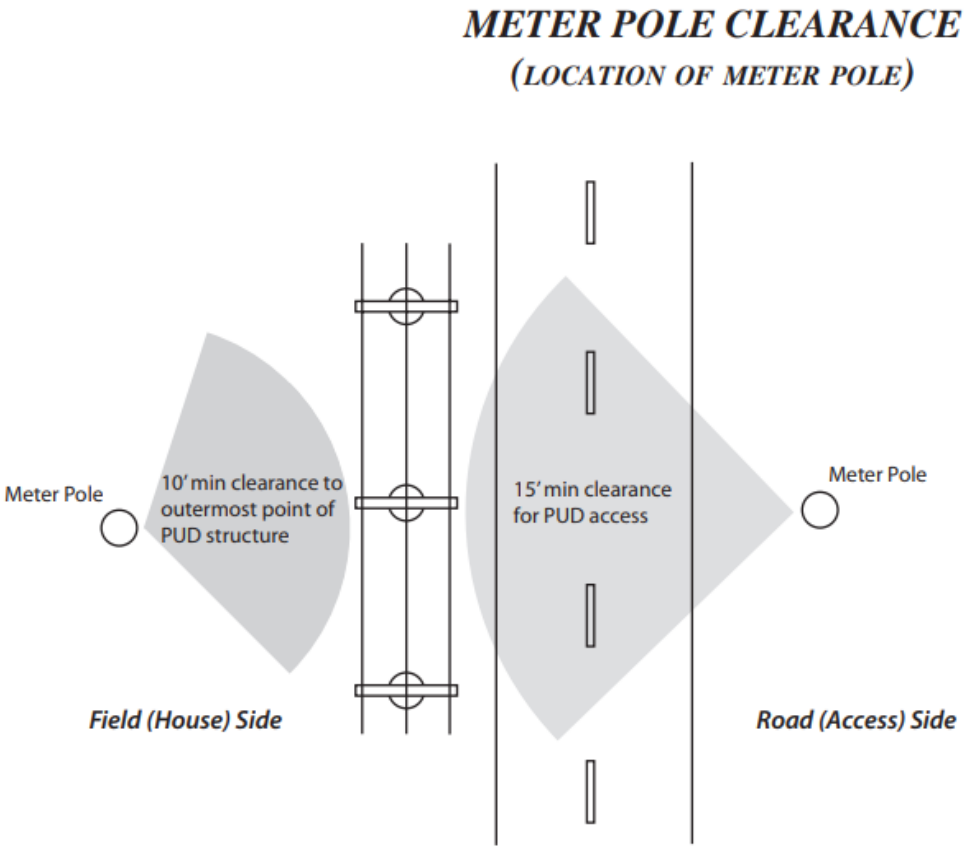
1. The District shall install, own and maintain service poles as necessary to provide adequate clearance and support of the service conductors.

H. Meter Poles

1. When requested by the customer, the District may furnish and install a 35' meter pole, with or without guying and anchoring, at the customer's expense.
    a. The customer shall provide an adequate road-like surface for the District's heavy equipment required for the installation of the pole.
    b. The customer shall be liable for personnel injuries, vehicle damage and crew time loss caused by an inadequate access.
2. The meter pole will be the property of the customer.
3. The meter pole location shall have a minimum 10' horizontal clearance from the outermost point of any District equipment on the field (house) side. A minimum 15' clearance shall be provided on the road (access) side to allow for District vehicle access. See Figure 3-17 for an example of meter pole clearances.
4. When the meter pole is to be replaced, the customer shall, at his or her expense, transfer all customer-owned service entrance equipment to the new pole.
5. Permanent safe walking access shall be provided and maintained by the customer to meter poles that have District equipment on them, e.g., meter and service wires. Refer to Section 2-N.
6. ***Neither trees nor the District's distribution or transmission poles shall be used as meter poles.***

7. When a pole is used as a metering point and central distribution center and the conductors beyond the metering point are subject to contact with machinery, the customer is required to install a main disconnect switch on that pole.

Figure 3-17: Meter Pole Clearance (Joint Occupancy)



8. Meter poles shall be installed and sized to provide the clearances as detailed in Figure 3-3, Figure 3-17, and Figure 3-18.
9. Meter poles meeting District requirements may be customer furnished and installed.
10. Either cedar or fir poles may be used, provided fir poles are full length pressure treated, and cedar poles are butt treated in accordance with American Wood-Preservers' Association Standards.

11. Outer bark must be completely removed from all meter poles. The pole, with minimum requirements as listed below, shall be set at the proper depth and back filled with rocks and soil. Backfill shall be tamped to provide a sound installation.

Table 1

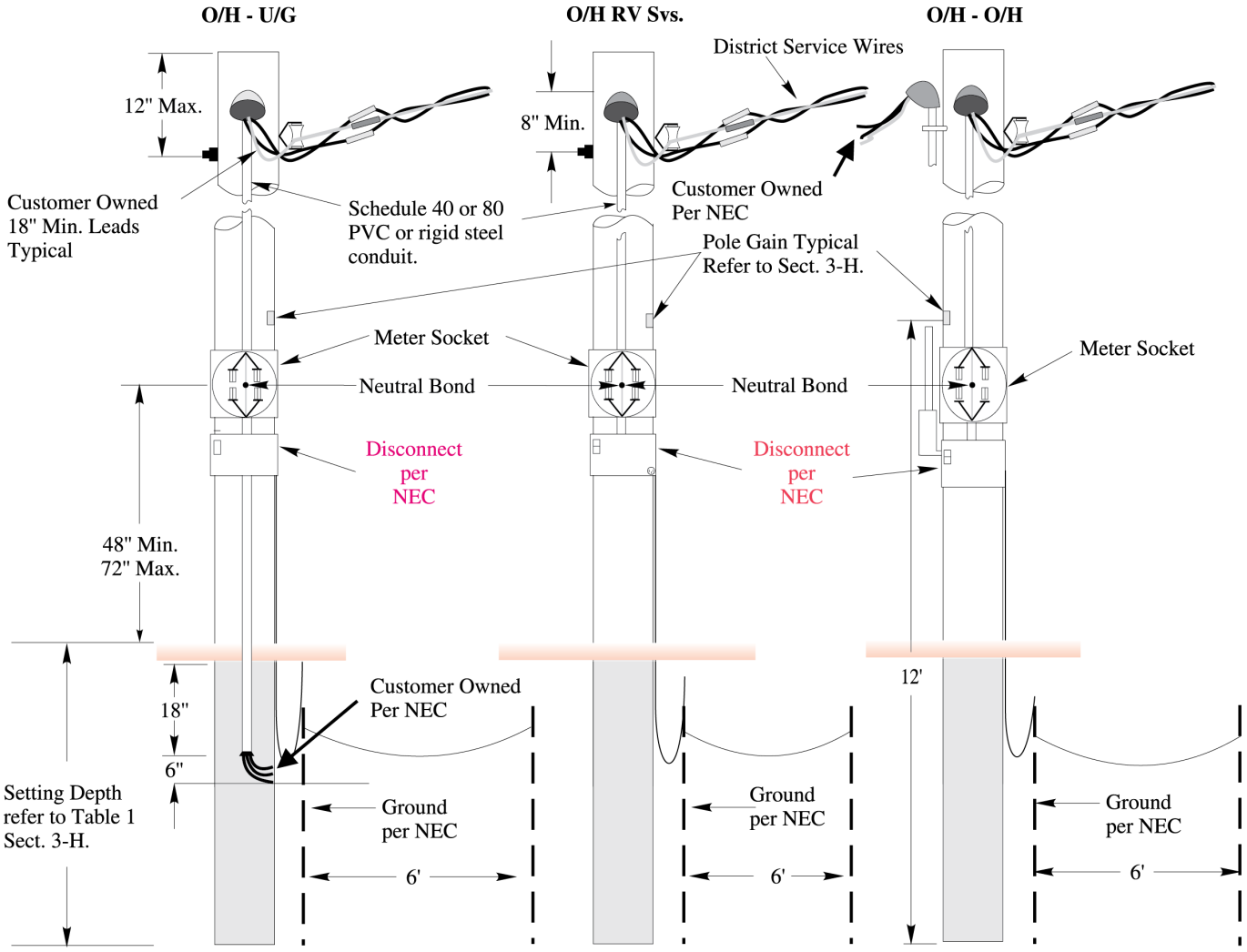
Meter Pole Specifications and Setting Depth

Pole Length	Pole Class	Setting Depth	Minimum Circumference 6' from Butt		Minimum Circumference at Top
		(Firm Soil)	Fir	Cedar	
20ft	4	4'	25'	27'	21'
25ft	4	5'	27.5'	30'	21'
30ft	4	5'	29.5'	32.5'	21'

12. All wood meter poles shall have a 2" wide, 1/2" deep gain 12' up from bottom of pole.
13. Other than wood poles will be considered and evaluated on an individual basis. These poles shall have a gain identification mark or tag at 12' up from bottom of pole or as designated by the District.
14. Location and inspection of the meter pole shall be approved by a District representative prior to installation.
15. **The customer is responsible for having the pole hole inspected by the District for proper depth. This inspection shall be made prior to setting the pole, after the hole is prepared and the meter pole is on site.**
16. **The District will not connect to any customer-installed meter pole that has not been inspected and accepted by the District.**
17. The customer shall be responsible for anchoring/guying of a customer installed meter pole, to withstand the pull imposed by the District's service conductors. A District Engineer will inform the customer if the pole requires anchoring and guying. An anchor and guy will typically be required for services over 125' or with an angle of 15° or more in the service run. The District will not connect to any meter pole that is unstable or in any way does not conform to this Standard.
18. The thru-bolt type insulator bracket installed by the customer shall be located 8" below and 45° from the weatherhead, facing the point of attachment to the District facilities. The insulator shall be mounted high enough above ground to provide adequate conductor to ground clearances for the District's service drop. Refer to Figure 3-3 and Figure 3-18.

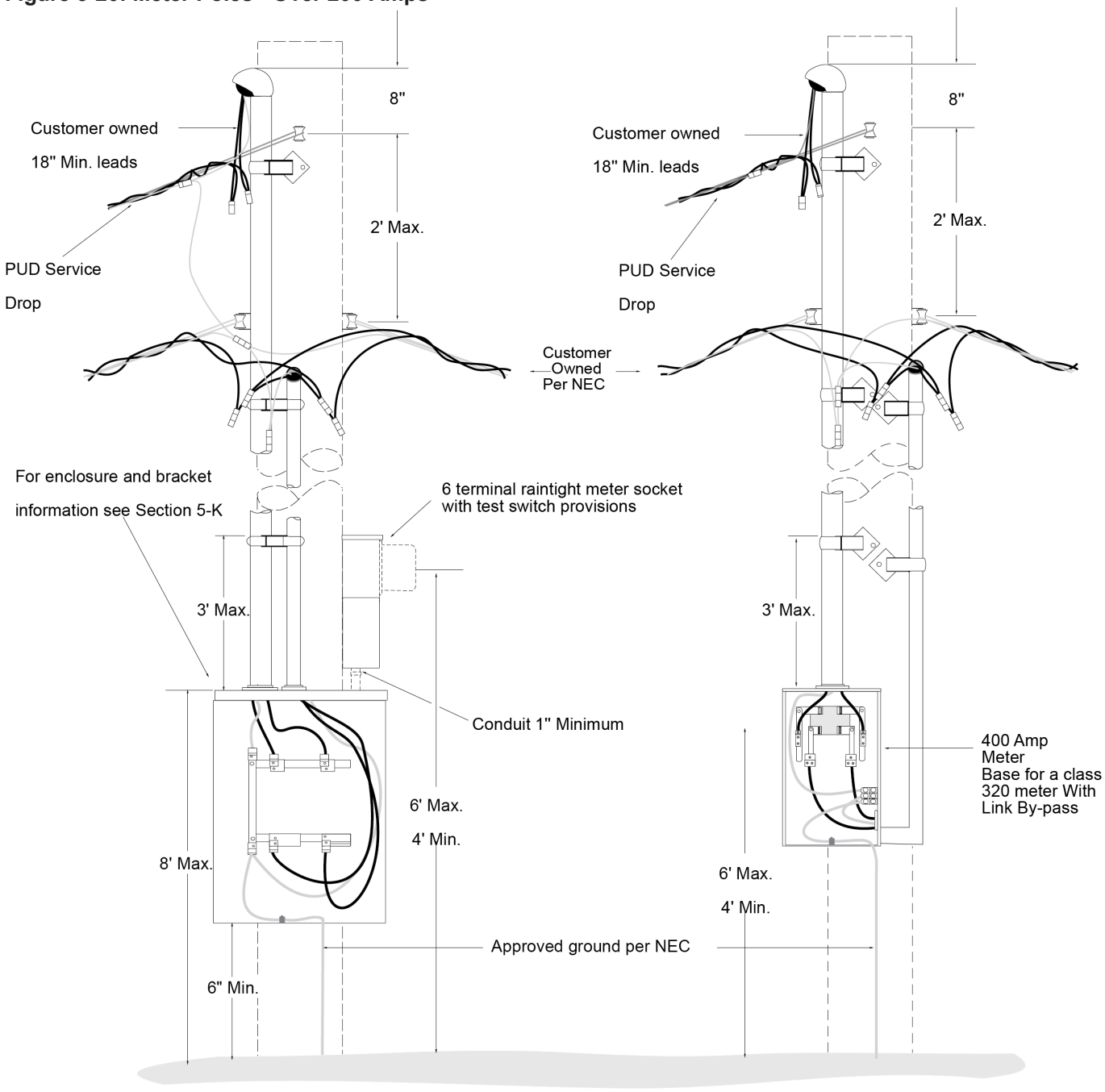
19. Relocations of the meter pole may be done at the customer's request on an individual cost basis.

Figure 3-19: Typical Meter Pole Installations



20. Pole mounted current transformers are not allowed for new installations. Any major alterations on existing services using this type of metering shall be rebuilt utilizing a 400 amp rated meter socket for a class 320 meter or outdoor current transformer enclosure. Refer to Figure 3-19.

Figure 3-20: Meter Poles - Over 200 Amps

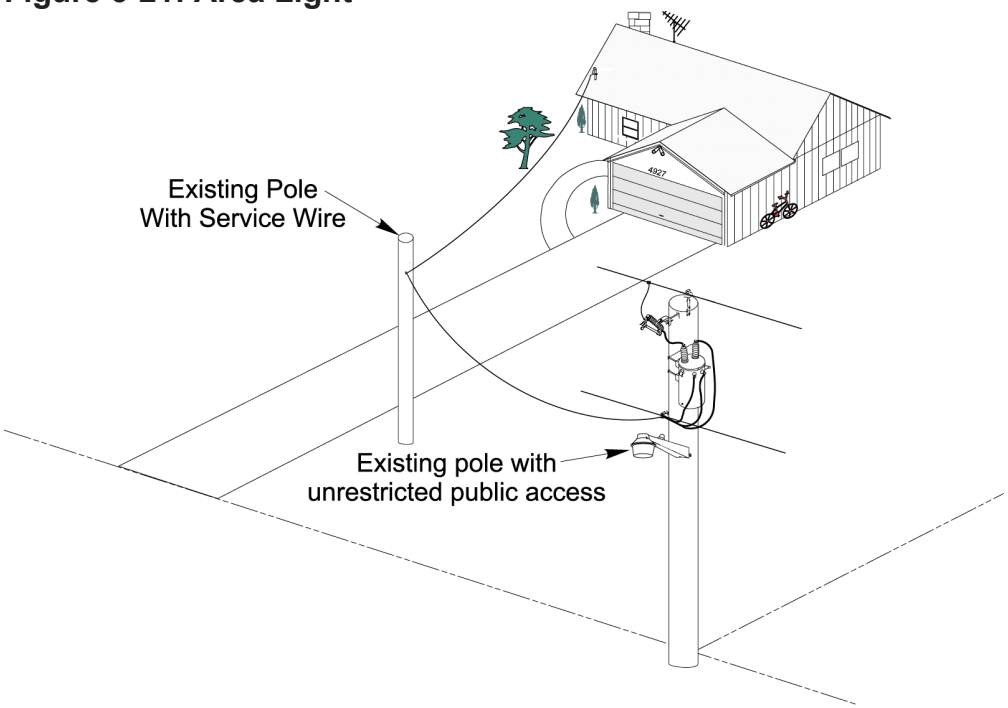


When a pole is used as a metering point/central distribution center and the overhead conductors beyond the metering point are subject to contact with machery, the customer is required by the State to install a main disconnect switch on the pole.

I. Area Light - Overhead Feed - Residential

1. District Responsibilities:
   a. Determine availability of service and coordinate the location of the area light with the customer.
   b. There must be an existing transformer available to serve the light. If there is no existing transformer the District can install a transformer at the customer's expense.
   c. Light will be placed on existing District wood poles only.
   d. Poles may be set in areas of unrestricted public access, contact the District for information.
2. Customer Responsibilities:
   a. Meet with District representative to determine availability of service and location of the area light.
   b. Complete and sign (property owner only) Application to Contract with the District for Area Lighting Service Form No. 1008.
   c. Provide access for the District's equipment for installation and maintenance.

Figure 3-21: Area Light



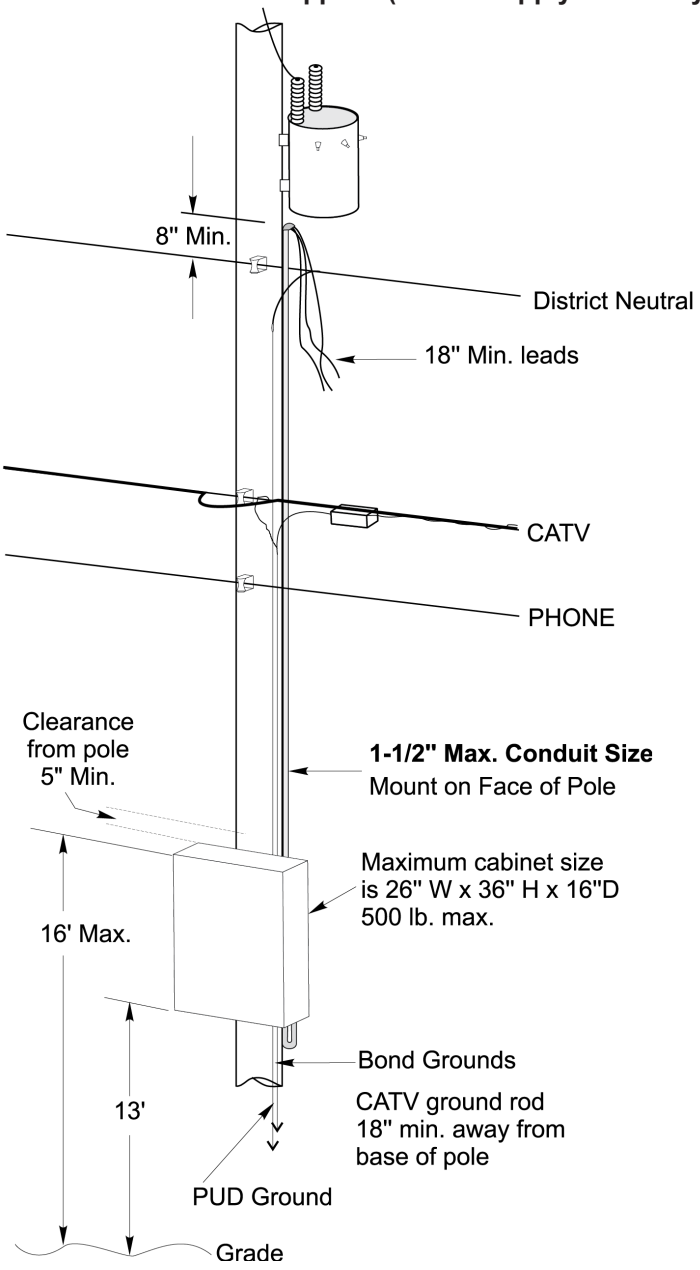
J. Miscellaneous Pole Attachments

1. Pole Attachments prohibited for Utility Poles
   RCW: 70.54.090 provides that:
   "It shall be unlawful to attach to utility poles any of the following: Advertising signs, posters, vending machines, or any similar object which presents a hazard to, or endangers the lives of, electrical workers. Any attachment to utility poles shall only be made with the permission of the utility involved, and shall be placed not less than twelve feet above the surface of the ground."
   a. The types of unlawful attachments shall include, but are not limited to neighborhood watch signage, lost pet signage, information or regulatory signage, banners, flags, mailboxes, basketball hoops or any similar objects.
   b. It is the District's practice not to permit attachments to utility poles.

2. CATV - Power Supplies
    a. Maximum size cabinet shall be 26" wide x 36" high x 16" deep and weigh 500 pounds or less. The cabinet shall be 14 gauge metal painted to resist exposure and to prevent rust.
    b. Battery pack auxiliary power supplies shall have batteries in the assembly which have flame arrester vent caps and shall be protected from electrical spark by having separate metal containers. The battery containers and the cabinet shall be well vented.
    c. The unit shall be designed to operate from connection to a 120 volt single phase District secondary. Its circuitry shall include a 15 amp 120 volt rated breaker and back-feed voltage protection to prevent power from the unit being routed into the District's system.
    d. The battery pack auxiliary power supply unit shall be stand-off mounted such that it is situated in-line with the lead of the pole line. There shall be a minimum 5 inches clearance between the power supply housing and the pole to which it is mounted.
    e. The battery pack auxiliary power supply housing shall be effectively grounded to a grounding system installed by the cable company. Ground rod(s) shall be installed a minimum 18 inches from the base of the pole on which the power supply unit is mounted.
    f. The Schedule 40 PVC service conduit, capped with a weatherhead, shall be mounted on face of pole and shall terminate 8 inches above the level of the District's overhead secondary attachment or neutral position. ***"Maximum conduit size is 1-1/2".***
    g. For standard mounting height, refer to Figure 3-21. Submittal of an "Application for Variance" is required.
    h. Only qualified District employees or District contractors shall connect auxiliary power supply unit service wires to the District secondary power lines.
    i. In the event that it is necessary to replace or relocate a pole on which an auxiliary power supply unit is mounted, the cable vision company shall transfer or relocate the unit at no cost to the District.

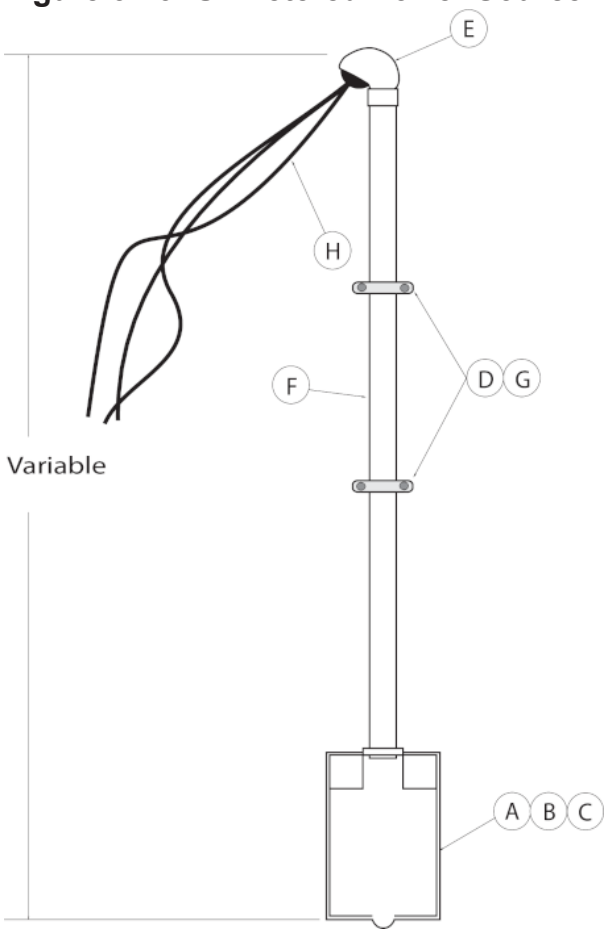
j. In addition to the standard attachment fee, the cable vision company shall pay the District a flat rate to cover the cost of providing electrical service to the auxiliary power supply unit.

Figure 3-22: CATV Power Supplies (Power Supply or Battery Pack Type Auxiliary Power Supply)



3. Unmetered Power Source - refer to Figure 3-22 for materials.
   Refer to the District's Rate Schedule 23 for limited availability. This schedule is available for non-metered service to television cable amplifiers, air traffic warning lights, and other such applications where metering is deemed impractical by the District.
   a. Contact the District for approval prior to installation.
   b. The District must evaluate location, materials and equipment prior to installation.
   c. Only one power source is allowed per pole.
   d. Maximum power source shall be nominal 120 volt 20 amp GFCI protected double receptacle outlet.
   e. Power source materials shall be evaluated prior to installation. All materials shall be UL approved for outdoor use.
   f. The customer will provide an approved power source receptacle and District crews will install and provide power at customer's expense.
   g. Weatherhead shall be 8" above District's neutral/secondary position and receptacle shall not be mounted lower than 12' above the ground.

Figure 3-23: Unmetered Power Source Materials



Materials:

A. Single Entrance PVC molded outlet box, type FSE.
B. Weatherproof PVC receptacle cover and gasket
C. GFCI (Ground Fault Current Interrupter) 20 Amp receptacle
D. 3/4" PVC conduit straps, two required.
E. Service entrance weatherhead, PVC.
F. Maximum 3/4" PVC
G. Galvanized Steel Nails or Scres
H. Three No. 12 cu. THW or better wire. 1-black, 1-white, and 1-green. 18" minimum length extended from weatherhead.

Section 4 Underground Service

Revised: Jan 2, 2025

A. General

1. All conditions for service application, availability of service, type of service, electrical wiring permit, inspection, right-of-way, easements, etc., are covered in Section 2.
2. Availability and location of District facilities for providing underground service shall be determined at the District's office before proceeding with the wiring. Only one service strike will be allowed per building with the exception of single-family residential zero-lot-line townhomes [units that share common wall(s)]. For these townhomes, a separate individual service run and meter base/socket will be allowed for each unit. Plans, specifications, load data, grades and stakes Form #1373 for all underground services shall be submitted to the District as much in advance as possible prior to any construction.
3. The District will design, install, own and maintain the complete primary underground electric distribution system and all associated secondary distribution in the public right-of-way.
4. Underground service installation requiring a special voltage or more than 30 feet of road boring will require individual consideration for feasibility and charges required.
5. The customer shall notify Utilities Underground Location Center by calling 811 or **1-800-424-5555** not less than two-business days or more than ten business days before the commencement of excavation or trenching to allow for location of existing underground utilities by their representatives (RCW 19.122.030).

B. Primary Service - Residential Systems on Private property

1. The customer shall prepare the vault site, provide easements, trenching, conduits, pull ropes, and related equipment on private property.
2. The District will install, own and maintain the vault, grounds, secondary handhole and secondary service conductors.

C. Primary Service - Commercial Systems on Private Property

1. The customer shall provide easements, trenching, conduits, pull ropes, vaults, handholes, grounds, secondary service conductors and related equipment on private property.
2. Transformer vaults, pulling/switching handholes and other equipment vaults shall be located in accordance with the requirements listed in Section 4-K of this section. Refer also to Figures 4-22 and 4-23 for specifics on various vaults, pads and handholes required for each individual project as determined by the District.

Note: Acceptable precast concrete products are locally available from three companies:

Oldcastle Precast, Inc.
Auburn, WA
Phone - 800-892-1538

CUZ Concrete Products
Arlington, WA
Phone - 800-659-1941

Granite Precasting and Concrete, Inc.
Bellingham, WA
Phone - 800-808-2251

3. Systems on Private Property
   The District will design, install, own and maintain the primary underground cable, transformers and switch cabinets as required for distribution systems on private property.
   Exception: The District shall not normally provide this service beyond primary metering if the system is customer owned.

D. Trenching

1. For primary and secondary service trenching requirements refer to Figure 4-1 , Figure 4-2 and Figure 4-3.
   a. The minimum cover depth for secondary service shall be 24 inches and the maximum trench depth shall be 47 inches.
   b. The minimum cover required for primary, 36". The maximum trench depth for secondary or primary conductor shall be 47". Refer to Figure 4-1.
2. All secondary service conductors are to be installed in continuous conduit from the meter base or CT can to the District's point of service.
3. In general, all trenching, backfilling and restoration work on private property shall be done by the customer.
4. Minimum depth requirements may be reduced where unusual soil conditions dictate. Contact the District for specific requirements for these cases.
5. Gas lines shall be staked every 10' as required to maintain separation.
6. For minimum separation between electric lines and other utilities refer to Figure 4-1.
7. The bottom of the trench should be undisturbed, tamped, or relatively smooth earth. Where the excavation is in rock, the conduit should be laid on a protective layer of clean tamped backfill. Backfill within 6" of the electrical conduit should be free of solid material greater than 4" maximum or sharp edges likely to damage it. The balance of backfill should be free of solid material greater than 8" in maximum dimension. All backfill should be free of materials that may damage the conduit system (large rock or paving material, cinders, large or sharply angular substance, or corrosive material). Refer to NESC 321. Sand shall be required if select backfill[1] material is not available. Select backfill or sand shall provide a 3" bedding below the conduit and a minimum cover of 3". Backfill material should be adequately compacted.
   Note: *The District must inspect and approve all conduit installations prior to backfilling.*
8. The customer shall trench all the way to the District pedestal or point of service.
9. Within 24 hours after the District's inspection of the ditch and conduit and prior to the District installing the service and meter the customer shall prepare a work area leveled and cleared of all debris and obstructions at the metering point to provide the service conductors to be safely installed by the District. This work area shall be 5 feet x 5 feet minimum centered around the meter base, backfilled and compacted to within 4 inches of final grade.

[1]Select backfill shall be defined as; selected natural earth soil containing no rocks or other naturally occurring object larger than an averaged sized thumb nail. Backfill shall not contain crushed rock or other sharp objects which could cause damage to a conductor's insulation or to a conduit's integrity.

Figure 4-1: Primary Distribution Trench With Joint Utilities

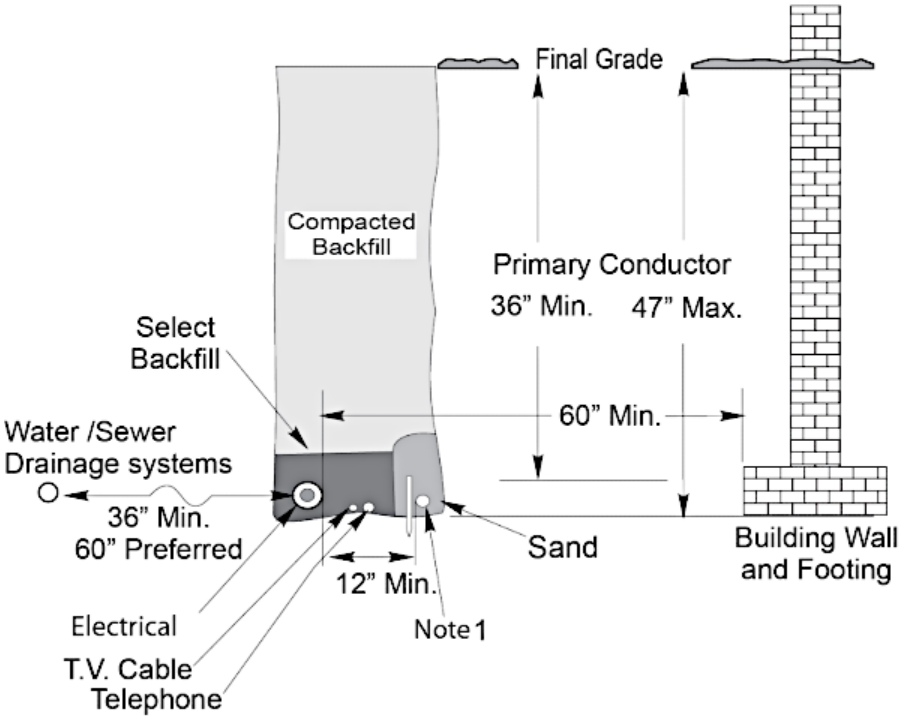
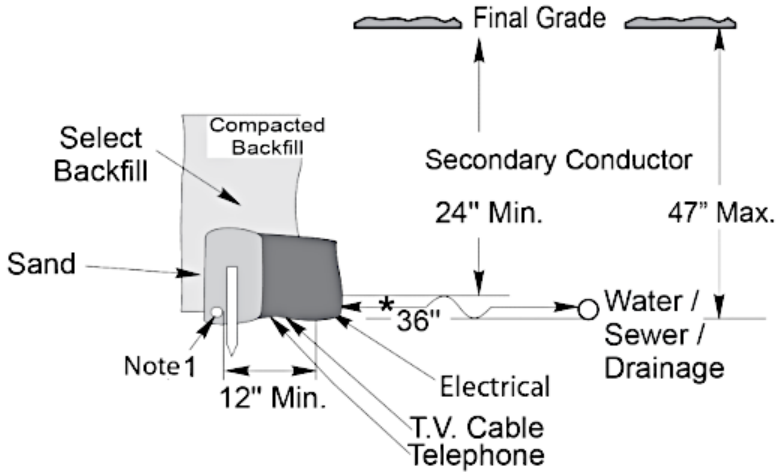


Figure 4-1: Secondary Distribution Trench With Joint Utilities



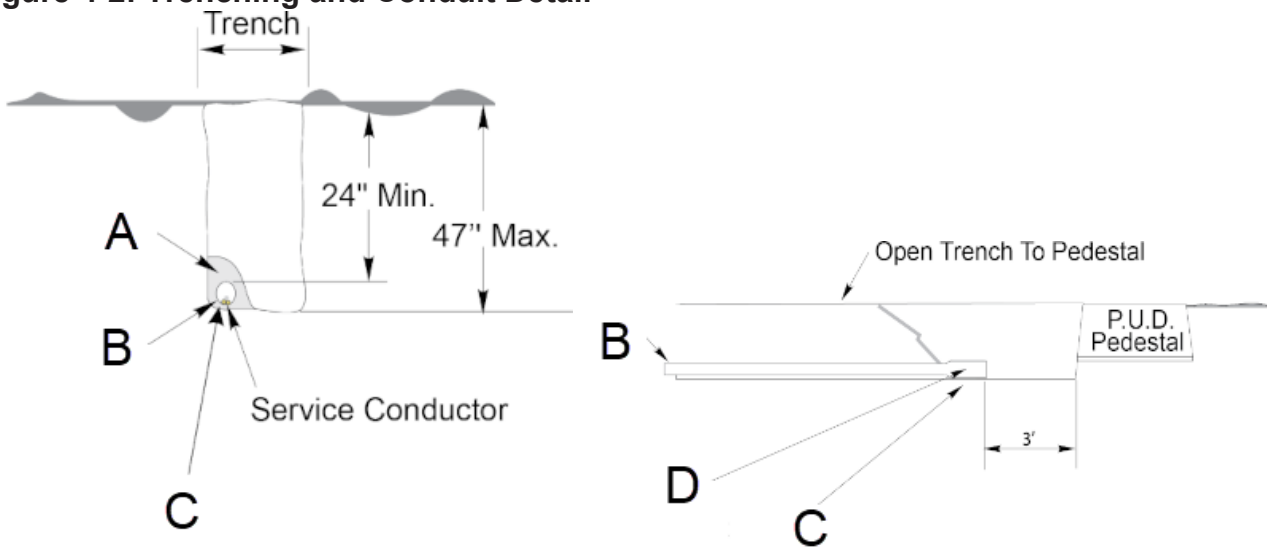
Note 1: Natural Gas staked every 10' as required to maintain separation. The gas line shall have a minimum of 3" sand bed below and on each side of gas line and 12" minimum of sand above gas line. The inspecting authority shall be the gas company.
Note 2: The customer shall notify Utilities Underground Location Center by calling 811 or 1-800-424-5555 not less than two business days or more than ten business days before the commencement of excavation or trenching to allow for location of existing underground utilities by their representatives (RCW 19.122.030).

Table 2

Minimum Clearances from District Underground Lines in Conduit

Type of Utility Line	Vertical Separations (Crossings)			Horizontal Separations		
	Electric Primary	Electric Secondary Main	Electric Secondary Service (300V Max.)	Electric Primary	Electric Secondary Main	Electric Secondary Service (300V Max.)
Communication	6"	6"	6"	0"	0"	0"
Communication Service	3"	3"	3"	0"	0"	0"
High Pressure Gas	12"	12"	12"	36" (60" pre-ferred)	36" (60" pre-ferred)	36" (60" pre-ferred)
Low Pressure Gas	6"	6"	6"	12"	12"	12"
Gas Service	"6"	6"	6"	12"	12"	12"
Sewer Main and Lateral	12"	12"	12"	36" (60" pre-ferred)	36" (60" pre-ferred)	36" (60" pre-ferred)
Sewer Service	12"	12"	6"	36"	36"	12"
Water Main and Lateral	12"	12"	12"	36" (60" pre-ferred)	36" (60" pre-ferred)	36" (60" preferred)
Water Service	12"	12"	6"	36"	36"	12"
Storm and Roof Drains	12"	12"	6"	36" (60" pre-ferred)	36" (60" pre-ferred)	36" (60" preferred)
Lighting and Electric Supply	6"	6"	6"	0"	0"	0"

Figure 4-2: Trenching and Conduit Detail

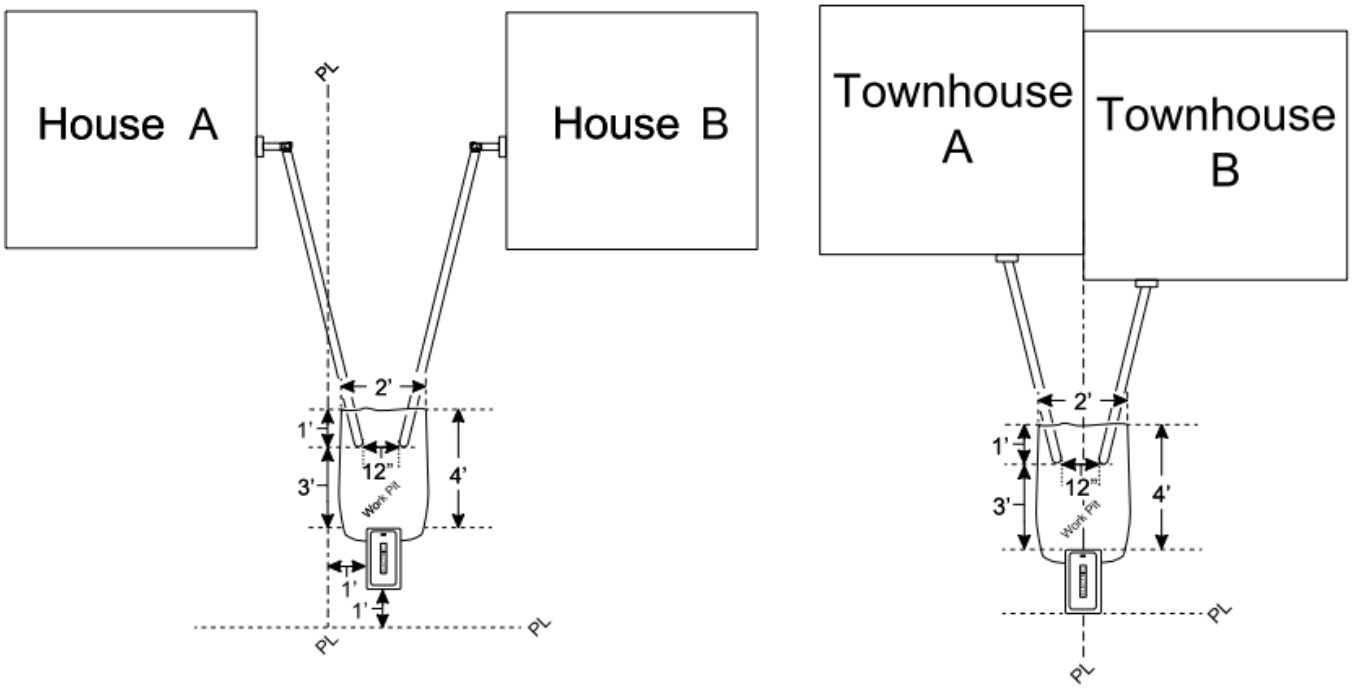


A. Select Backfill: Builders sand or material which will pass through a 1/2" screen
B. Continuous Secondary Conduit. Refer to Section 4.E.
C. Install a poly duct plug to keep out dirt. Install 1/4" pull rope. Refer to Section 4.E.
D. Integrally formed deep socket couppling may point towards or away from pedestal

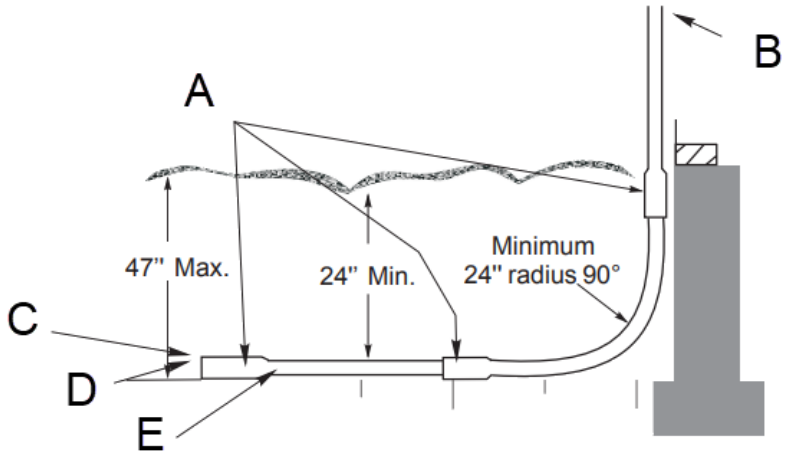
Note:

- The customer shall notify Utilities Underground Location Center by calling 811 or 1-800-424-5555 not less than two business days or more than ten business days before the commencement of excavation or trenching to allow for location of existing underground utilities by their representatives (RCW 19.122.030).

Figure 4-3: Trenching and Conduit Layout



- PVC to stop 3' short of the pedestal.
- 2' x 4' work pit to be dug out by customer, leaving 1' of PVC exposed.
- Must be 1' of separation between electrical conduit PVCs.



A. Integrally formed deep socket coupling
B. Install 1/4" pull rope. Refer to Section 4.E
C. Install a poly duct plug to keep out dirt. Refer to Section 4.E
D. Continuous conduit to pedestal location. Refer to Section 4.E

Notes:

1. The customer shall notify Utilities Underground Location Center by calling 811 or 1-800-424-5555 not less than two business days or more than ten business days before the commencement of excavation or trenching to allow for location of existing underground utilities by their representatives (RCW 19.122.030).
2. No entities other that the District are allowed in or around the pedestal within a 12" radius.
3. If a pedestal serves multiple customers the District's engineer shall determine if an easement is required.
4. Only townhouse services should have pedestals that straddle their property line.
5. For services to two single family homes fed from one pedestal, the pedestal should be installed 1 ft. over and 1 ft. in from the property corners, and an easement should be provided for the pedestal and any appropriate area for services.
6. For the scenario above where customer A's service wire would cross Customer B's property, and the pedestal serving both customers was installed on Customer B's property, where no easement can be provided, then the District shall either:
    a. Install a second pedestal for Customer A, on Customer A's property (preferred) or,
    b. Install the pedestal just outside the property lines in the road right-of-way.

E. Conduit and Fittings for District Installed Conductors

1. All nonmetallic PVC conduit and fittings shall be pigmented gray in color and must be manufactured by a currently approved District manufacturer in addition to meeting the following requirements
    a. The following information shall be imprinted on all PVC conduit:
        1. Manufacturer's name or trademark
        2. Nominal size
        3. Material (PVC)
        4. Standard designation (for example, NEMA TC-2)
        5. Type (for example, Schedule 40)
        6. Maximum 90° wire, Max. 90°C wire or equivalent phraseology
        7. Date code or month and year of manufacture
    b. 1", 2", 2-1/2" and 3" PVC conduit shall be gray and shall meet or exceed the requirements of the following standards
        1. NEMA TC-2 (Schedule 40 or 80)
        2. District Material Standard No. 250027.1
    c. 4" and 6" PVC shall be gray and shall meet or exceed the requirements of District Material Standard No. 250027.1 and any one of the following standards
        1. NEMA TC-6 DB-60
        2. NEMA TC-8 DB-120
        3. NEMA TC-2 (Schedule 40 or 80)
        4. ASTM F-512 DB-60
    d. Schedule 40 or 80 gray PVC conduit is required for service riser according to NEC 300-5d. and NEMA Standard TC-2 for applications listed below:

Type III - Designed for normal-duty applications above ground (Sch 40)
Type IV - Designed for heavy-duty applications above ground (Sch 80)
(Hazardous areas, e.g., next to driveways)

    e. 45 degree and 90 degree primary conduit bends shall be heavy wall fiberglass or hot-dip galvanized rigid steel electrical conduit. 11.25 degree and 22.5 degree bends may be PVC, heavy wall fiberglass, or hot-dip galvanized rigid steel. Note: stacking small angle bends shall not be used to avoid the use of fiberglass or rigid steel. For example stacking (2) 22.5 degree PVC bends is not an acceptable alternative to a 45 degree heavy wall fiberglass or galvanized rigid steel bend.
    f. All conduit bends shall be long radius type.

Conduit Diameter Minimum Radius	Conduit Diameter Minimum Radius
2", 2-1/2", 3"	24"
4"	48"
6"	60"

    g. Each PVC conduit joint must be permanently assembled using a PVC solvent cement appropriate for the application.

h. The District accepts smooth-wall coilable polyethylene electrical plastic conduit, also known as high density polyethylene (HDPE) conduit or poly pipe, for directional bore applications only. Poly pipe must meet the following requirements:
   1. *District Material Standard 250027.2 High Density Polyethylene Conduit*

   2.

Trade Size	Type	Reference Standard
2", 2-1/2", 3"	EPEC Schedule 40	NEMA TC 7
4", 6"	SDR 13.5	ASTM D 3035

   3. ***Color***
      The conduit material shall conform to any one of the following three color alternatives. The order of the District's preference is a., b. and c.
      a. Solid black compound which is UV stabilized for outdoor use per ASTM D 3350 with three continuous red stripes co-extruded longitudinally into the black compound. The red stripes shall be spaced 120° apart. The red color compound shall be compatible with the black compound, and shall also be UV stabilized. The red stripes shall be a minimum of 1/4" wide.
      b. Solid red compound UV stabilized for outdoor use per ASTM D 3350.
      c. Solid gray compound UV stabilized for outdoor use per ASTM D3350.
   4. ***Identification***
      The following permanent identification markings (items a. - e.) are required and shall be provided at intervals of not more than 5 feet. The information may be listed on the conduit in the order preferred by the manufacturer.
      a. Manufacturer's name or trademark
      b. Trade size (in inches)
      c. Wall thickness, schedule or dimension ratio (DR)
      d. Date code or month and year of manufacture
      e. HDPE
      f. NEMA TC 7 (for conduit sizes 2", 2-1/2", 3") and ASTM D 3035 (for conduit sizes 4" and 6")
      g. Other markings are acceptable if they do not conflict with and cannot be confused with the required markings.
   5. Couplings
      The customer shall provide deep socket mechanical deep socket couplings designed for joining PVC conduit to each end of the poly pipe without the use of adhesive compounds. The customer shall install the couplings on the poly pipe only if directed to do so by the District. The poly pipe ends shall be made round to enable proper installation of couplings.

i. Deep Socket Couplers - All conduit couplers shall be deep socket couplers.

2. Secondary Conduit Requirements
    a. Continuous conduit from the customer's service entrance to the District's point of service must be used for all underground secondary service cable installations.
    b. Schedule 40 PVC shall be used as a minimum.
    c. Conduits shall stop 3 feet from the point of service as provided by the District.
    d. The formed deep socket coupling (large flared end) of the conduit may be pointed in either direction.
    e. A continuous length of knot-free 1/4 inch polypropylene pull rope, or Herculine P1250W 1/2" polyester pull tape, shall be installed by the customer with a 2 foot tail at each end for all secondary conduit(s), including future conduit(s), regardless of length of run.
    f. All bends shall be Schedule 40 PVC long radius (Refer to Section 4-E.1.f.). Factory made bends, including "pronto" type bends are acceptable. PVC conduit shall not be mechanically heated in the field to form any sweep (bend).
    g. Per the NEC bends above final grade shall be so made that the conduit will not be damaged and the internal diameter of the conduit will not be effectively reduced. Field bends shall be made only with identified bending equipment.
    h. A bell end shall not be installed on the end of the conduit, however, a tapered manufactured poly conduit plug (no duct tape) shall be installed on all conduit ends to seal exposed ends of conduits, including future conduit (s), to keep out dirt and foreign objects prior to the District installing the conductors. If requested, the District may furnish the customer with the plug(s).
    i. The District will extend the conduit into the pedestal or riser pole with a manufactured elbow, rigid, or flex conduit when service is installed.
    j. The maximum continuous service conduit run shall be 250 feet in length, dependent on flicker/voltage drop, from the meter base to the point of service.
    k. Secondary conduit shall be allowed a maximum total aggregate of 270° of total bends including the riser. All bends shall be long radius type (24 inch minimum).
    l. Refer to Table 3 for conduit fill requirements.
    m. Refer to Table 3 for conduit fill requirements.

n. Refer to Table 3 for conduit fill requirements.

Table 3

Minimum Conduit Size
Triplex and Quadruplex Secondary Conductors

600V XLP Insulated Conductors		Triplex		Quadruplex	
Phase	**Neutral**	**One Run**	**Two Runs**	**One Run**	**Two Runs**
4/0	2/0	3"	3"	3"	4"
350 kcmil	4/0	3"	4"	3"	4"
500 kcmil	250 kcmil	4"	(2) 4" or 6"	4"	6"
500 kcmil	300 kcmil	4"	(2) 4" or 6"	4"	6"
500 kcmil	350 kcmil	4"	(2) 4" or 6"	4"	6"
750 kcmil	400 kcmil	4"	6"	4"	6"
750 kcmil	500 kcmil	4"	6"	4"	6"
1000 kcmil	500 kcmil	4"	6"	4"	6"

Notes:

1. Conduit sizes in Table 1 apply to 3” Schedule 40 and 4” and 6” DB-60.
2. Table 1 assumes proper alignment of conduit and proper cable installation where the length of the pull and the number and size of conduit bends are within reasonable limits.
3. The minimum conduit size for a 200 amp residential service riser shall be 3” for 4/0-2/0 triplex cable.
4. Five inch conduit is unacceptable as it is not a District standard. Customers must use conduit sizes compatible with District standards to enable the District to repair or extend customer installed conduit in the future, if necessary.

3. Primary Conduits in Trenches
   a. Conduit is required for all primary conductors on private property. All bends shall be long radius fiberglass or rigid steel electrical conduit. A maximum of 180° of bends shall be allowed.
   Exception: Naturally formed long sweeps of PVC conduit of 1° to 90° will be allowed.
      1. All bends shall be Schedule 40 PVC long radius (refer to Section 4-E.1.f.). Factory made bends, including "pronto" type bends are acceptable. PVC conduit shall not be mechanically heated in the field to form any sweep (bend).
      2. Conduit shall not be placed in the trench to form a long sweep prior to the setup of cement in all joints involved. Cement setup time shall be per the manufacturers recommendations.
   b. There shall be a 60-inch minimum separation between a primary conduit and a building wall.
   c. Minimum primary conduit sizes shall be 2 inches for single phase and 4 inches for three phase. Larger backbone feeder conduits shall be specified and required on an individual project design basis.
   d. The customer shall install a continuous length of knot-free 1/4 inch polypropylene pull rope, or Herculine P1250W 1/2" polyester pull tape, (with a 2 foot tail at each end) and a tapered, manufactured poly conduit plug (no duct tape) at each end for all primary conduit(s), including future conduit(s), regardless of length of run.

4. Under Buildings
   The District will only allow powerlines to be installed under a building when it is absolutely unavoidable and is approved by the District Manager or his designer prior to installation.
   a. The required conduit(s) shall be paralleled by an equal spare conduit(s) from the pole to the vault or between vaults.
   b. Conduits shall not pass through or conflict with the building's foundation walls.
   c. Conduits shall be encased in concrete. Minimum encasement shall be 2 inches thick on all sides of the conduits.

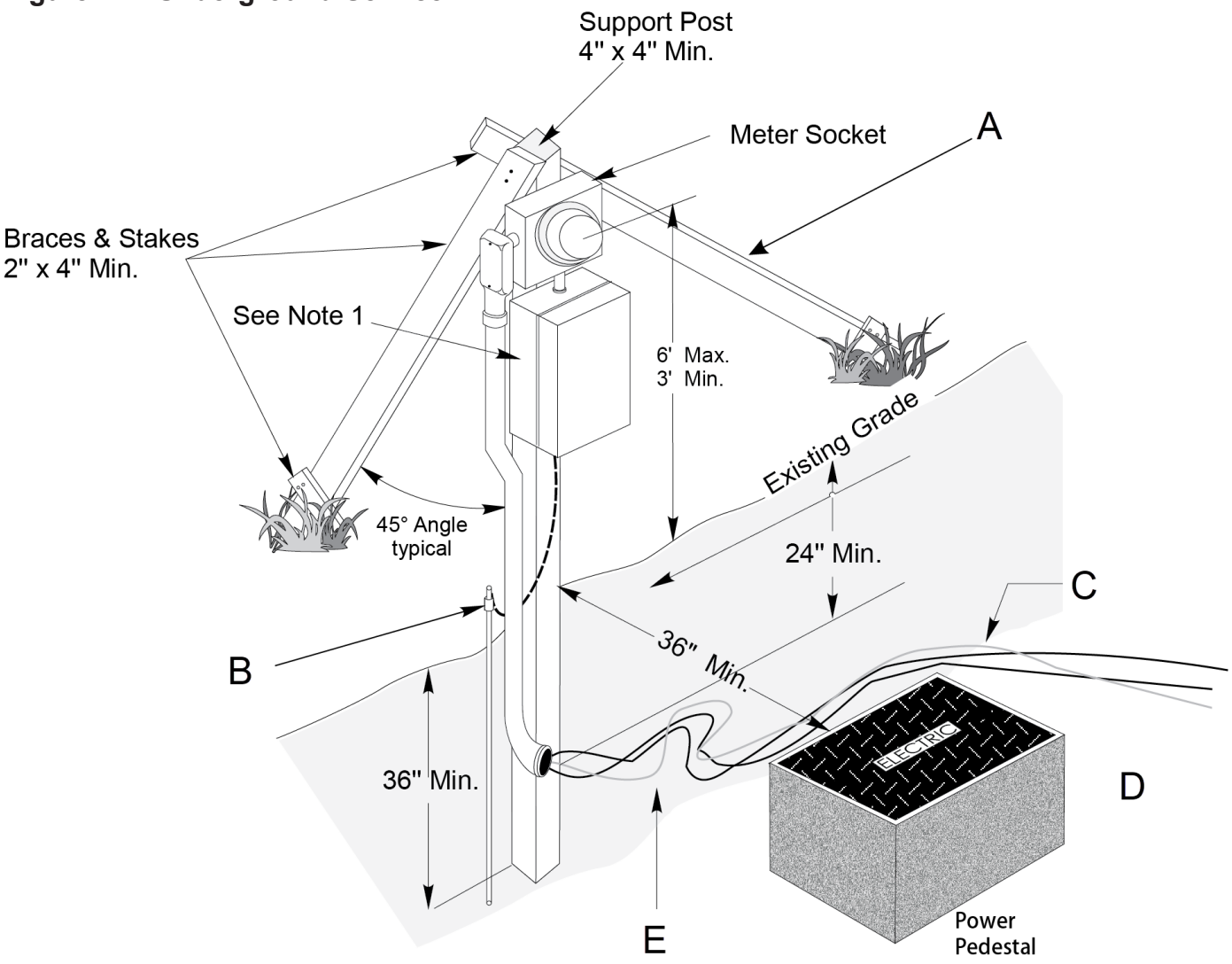
   Exception: The concrete encasement requirement can be waived if the building will have a minimum 4 inch thick concrete slab first floor and no basement.
   d. A Hold Harmless Clause will be added to and become part of the power line easement.
5. Conduits terminating in a handhole or vault shall have protective bushings on steel conduits. PVC conduit shall extend 5 inches into the vault and be temporarily sealed with a tapered, manufactured poly conduit plug. The District will install all bell ends on PVC conduit entering vaults, for primary conductors.

F. Temporary Construction Service

1. The customer shall furnish and install all required equipment.
2. Approved service equipment provided by customer includes support post and bracing, conduit, meter socket, ground rod, conductors, weatherproof disconnect switch and receptacle box.
3. The District Point of Connection shall be at the pedestal or transformer for both residential and commercial temporary installations. The customer shall be responsible for voltage drop between the point of connection and the meter.
4. Temporary post and bracing to be clear of the pedestal and/or transformer with at least a 3 foot minimum distance from the nearest source of power. Refer to Figure 4-4.
5. All temporary installations shall be on private property.
6. The District will not energize service until the installation is approved by the appropriate electrical inspector.
7. The customer shall provide select backfill for the District to use in shading the service conductors after energizing them. Sand shall be required if select backfill material is not available. The select backfill or sand shall provide a 3" bedding below conductors and a minimum cover of 3" above conductors. Refer to Section 1, Backfill definition[1]. The customer shall backfill the entire temporary service excavation within 24 hours after the District has energized and shaded the service conductors.

[1]Select backfill shall be defined as; selected natural earth soil containing no rocks or other naturally occurring object larger than an averaged sized thumb nail. Backfill shall not contain crushed rock or other sharp objects which could cause damage to a conductor's insulation or to a conduit's integrity.

Figure 4-4: Underground Service



A. All bracing shall be located so that it does not go over the top of the workpit and out of the way of workers.
B. Locate ground rod on the back side of the temporary post out of the workpit and not in the way of workers. Ground rod, wire and clamp provided by customer per NEC.
C. Leave enough wire for connection in 4' min 5' max from bottom of ditch at pedestal end. Do not enter pedestal.
D. Locate temporary on either side of the pedestal (longest sides). Do not locate temporary on fron tor back side of pedestal (shortest sides).
E. Coil or lay conductor to maintain a 24" depth or excess conductor will be cut off by the District.

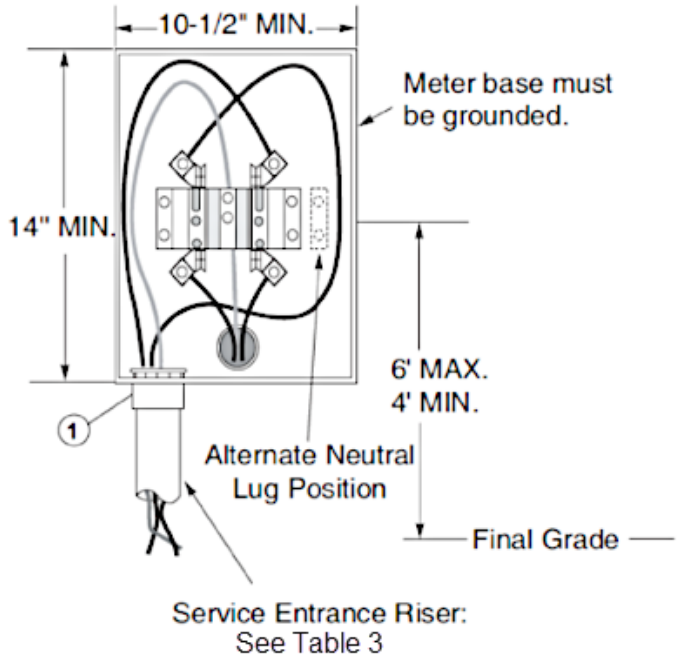
Note: It is the responsiblity of the developer to maintain the wtructural integrity of the temporary meter installation. This includes keeping the post and braces upright.

G. Residential Service Equipment

1. A meter socket with a minimum capacity of 125 amps is required. Sockets shall be listed for use with aluminum/copper conductors. An above ground 3" to 2-1/2" reducer may be needed to adapt 3" conduits to meter bases that only have knockouts for 2-1/2" conduit. The customer's wiring entrance into the meter socket shall be offset from the District's so as not to physically block the source lugs. An oxide inhibitor is required on stranded aluminum conductors of #8 AWG or larger for terminal connectors (State of Washington Electric Code requirements).

   Note: Meter socket may be surface mount or flush mount.

Figure 4-5: Typical 200 Amp Underground Meter Socket



Notes:

1. Requires double lock nuts and protective bushing on rigid steel conduit
   PVC plastic conduit requires threaded terminal coupling, one lock nut and protective bushing.
2. Underground service sockets must have a minimum enclosure depth of four inches (4").

2. For single phase service 201 to 400 amps, a 320 amp meter base with link by-pass is preferred. Refer to Figure 4-7. When current transformer enclosures are used, they shall be installed on the outside of the building and will be those specified in Section 5, Metering requirements.
3. For PVC specifications refer to Section 4-E.1.d
4. Secure riser conduit with galvanized pipe straps and lag bolts, a maximum 5 foot spacing.
5. It shall be the customer's responsibility to mount the meter base and riser securely to the building studs or other structural members to provide a solid base for cable pulling.
6. Service riser conduit shall not enter at the center of the bottom of the meter-base but shall be offset to one side.
7. All secondary main and secondary service cable installations shall be installed in continuous Schedule 40 PVC conduit.
8. All bends shall be Schedule 40 PVC long radius (refer to Section 4-E.1.f.). Factory made bends, including "pronto" type bends are acceptable. PVC conduit shall not be mechanically heated in the field to form any sweep (bend).

9. Secondary conduit shall be allowed a maximum total aggregate of 270° of total bends including the riser. All bends shall be long radius type (24 inch minimum).
10. The maximum a continuous service conduit run shall be 250 feet in length, dependent on flicker/voltage drop, from the meter base to the point of service. Secondary conduit shall be allowed a maximum total aggregate of 270° of total bends including the riser. All bends shall be long radius (Section 4-E.1.f.).
11. The customer shall trench all the way to the District pedestal.
12. Install ground per NEC Requirements.
    Note: *The District must inspect and approve all conduit installations prior to backfilling.*

Figure 4-6: Typical 200 Amp Underground Riser, 3" Minimum

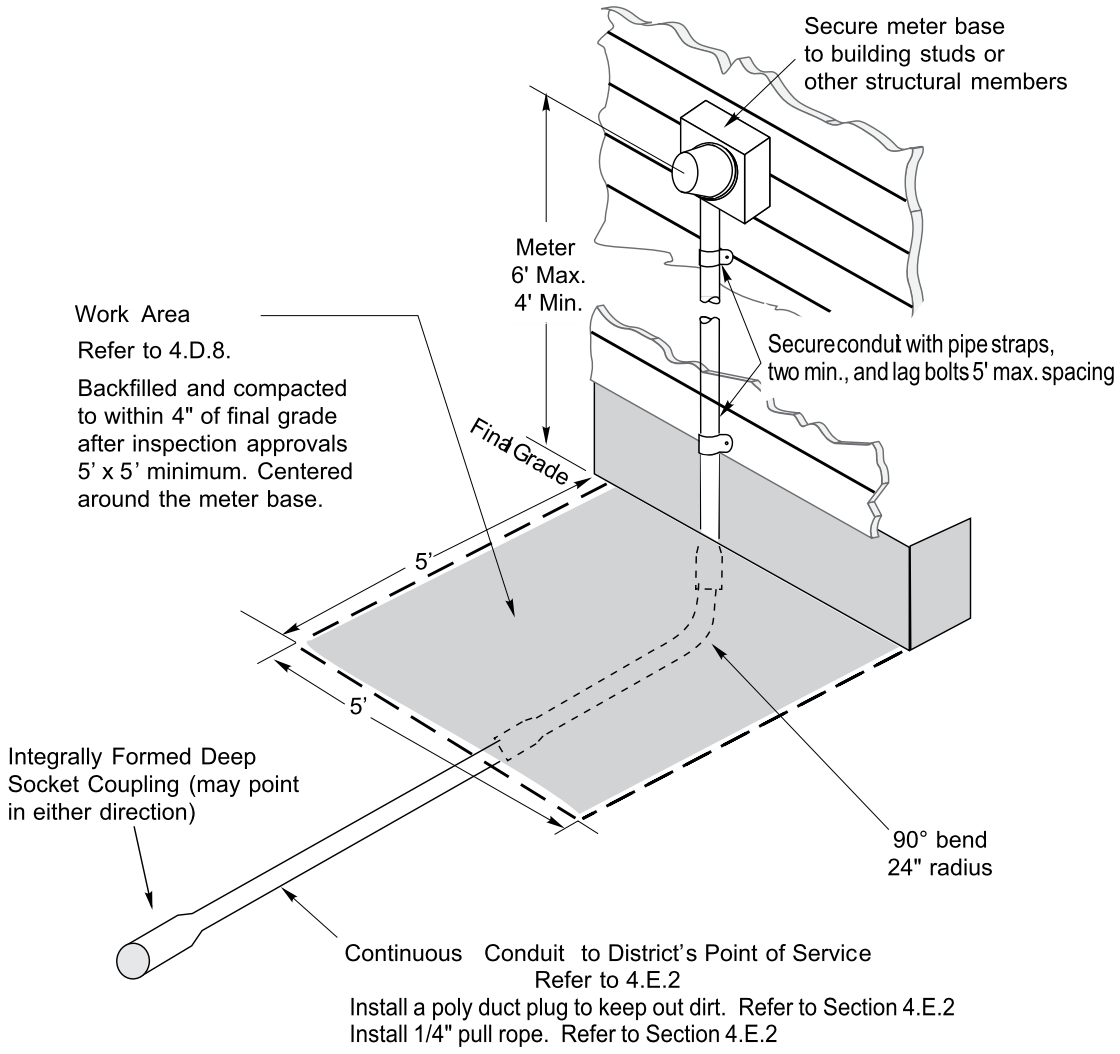


Figure 4-7: Typical 400 Amp Self-Contained Meter Socket For Use With A Class 320 Meter

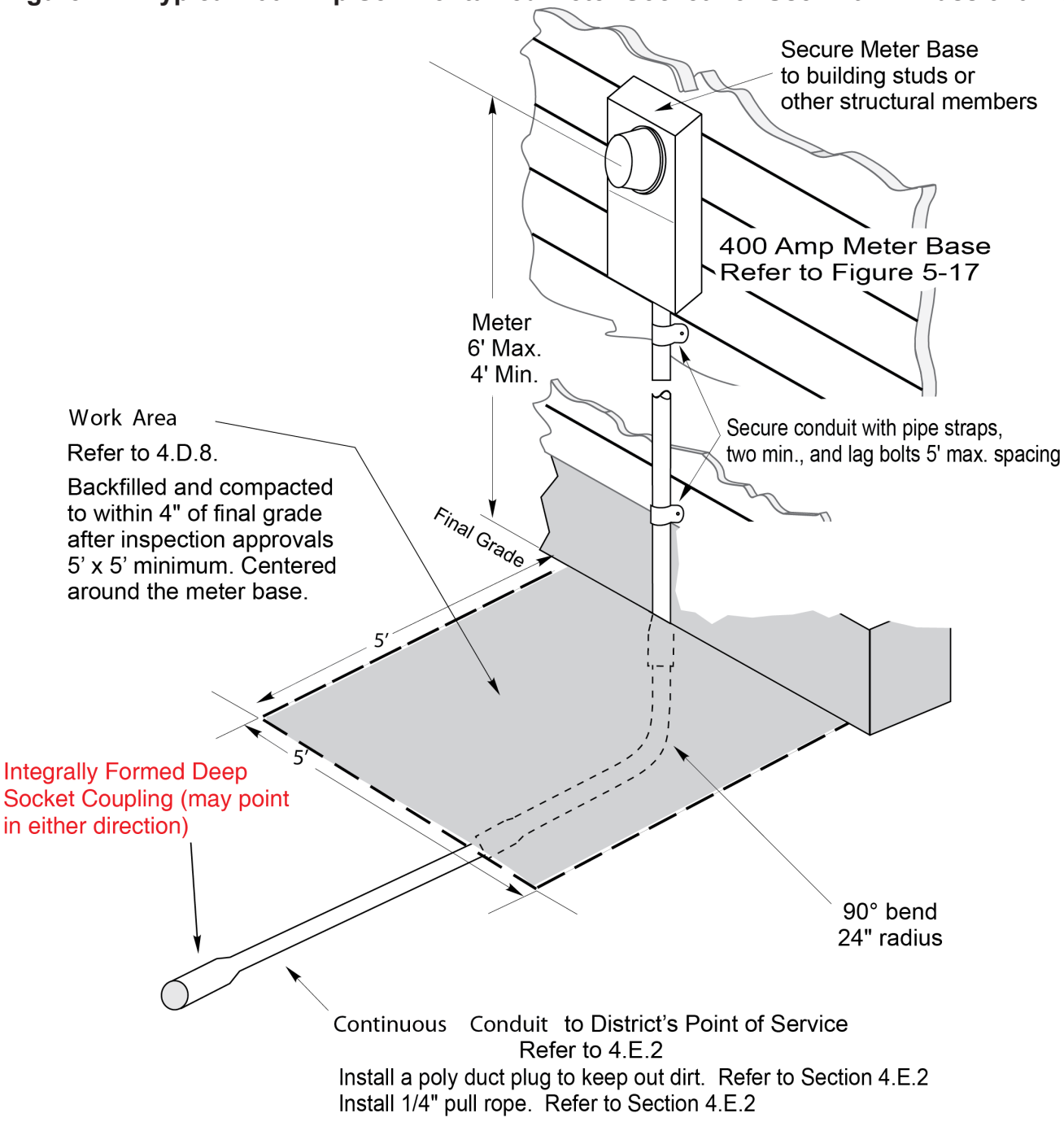


Figure 4-8: Typical 201 - 400 Amp Current Transformer Enclosure, 3" Service Riser Minimum

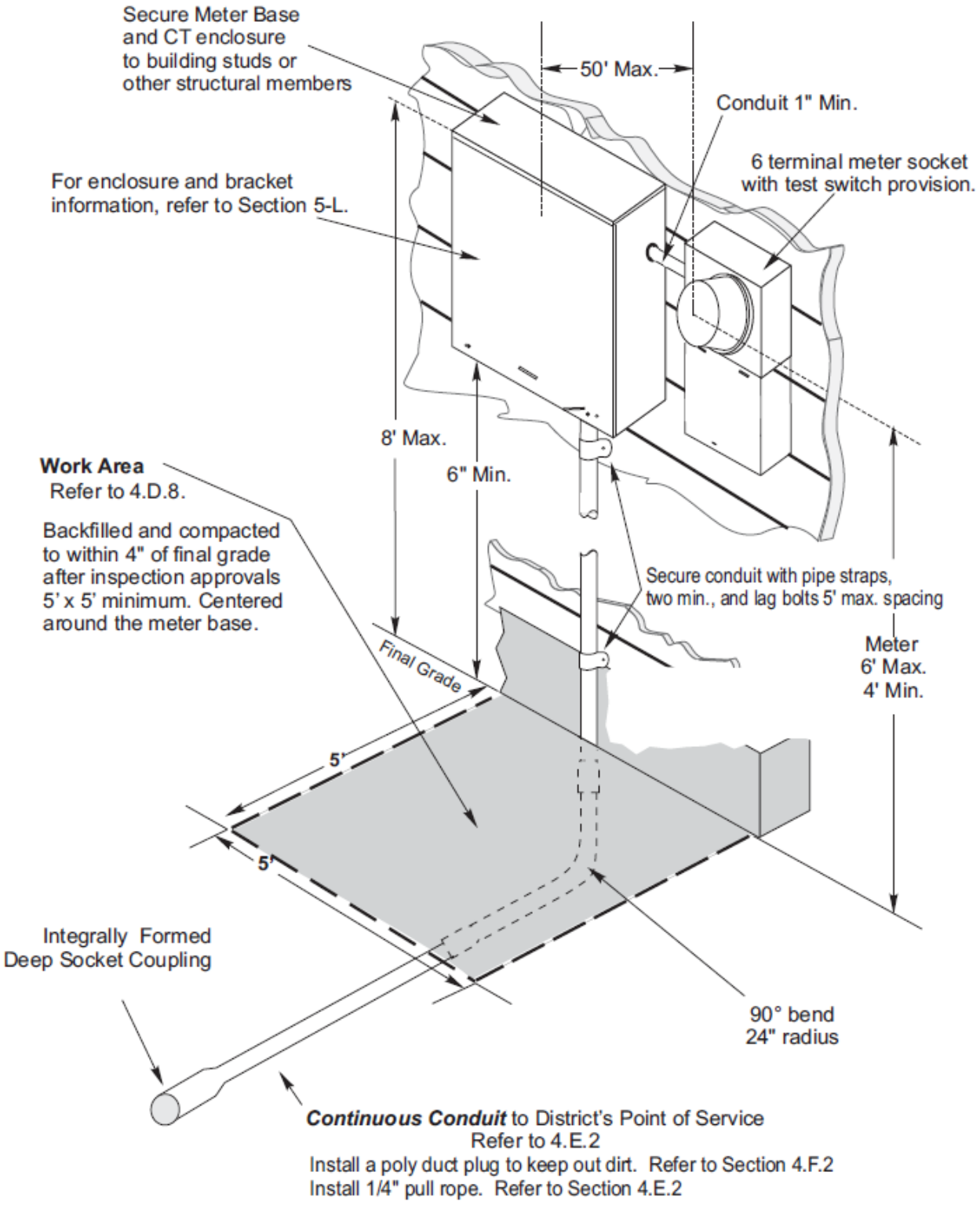
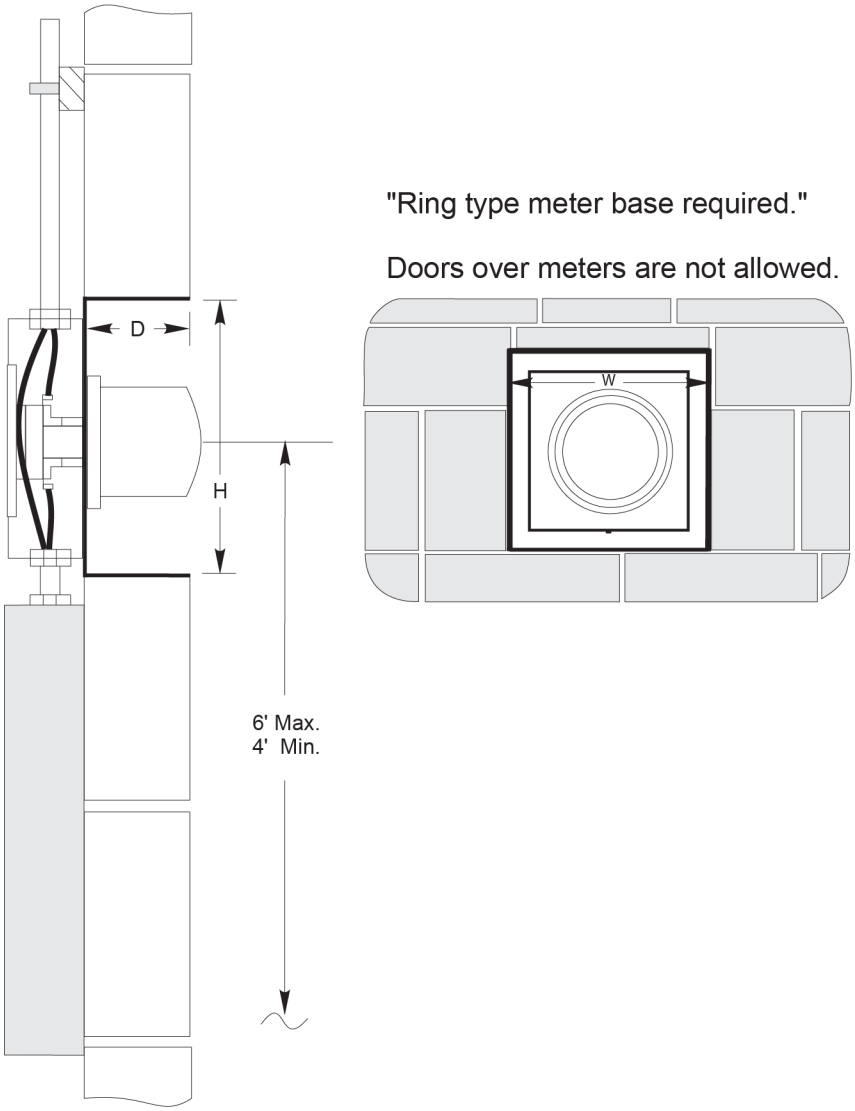


Figure 4-9: Typical Current Transformer Enclosure, 3" Service Riser Minimum



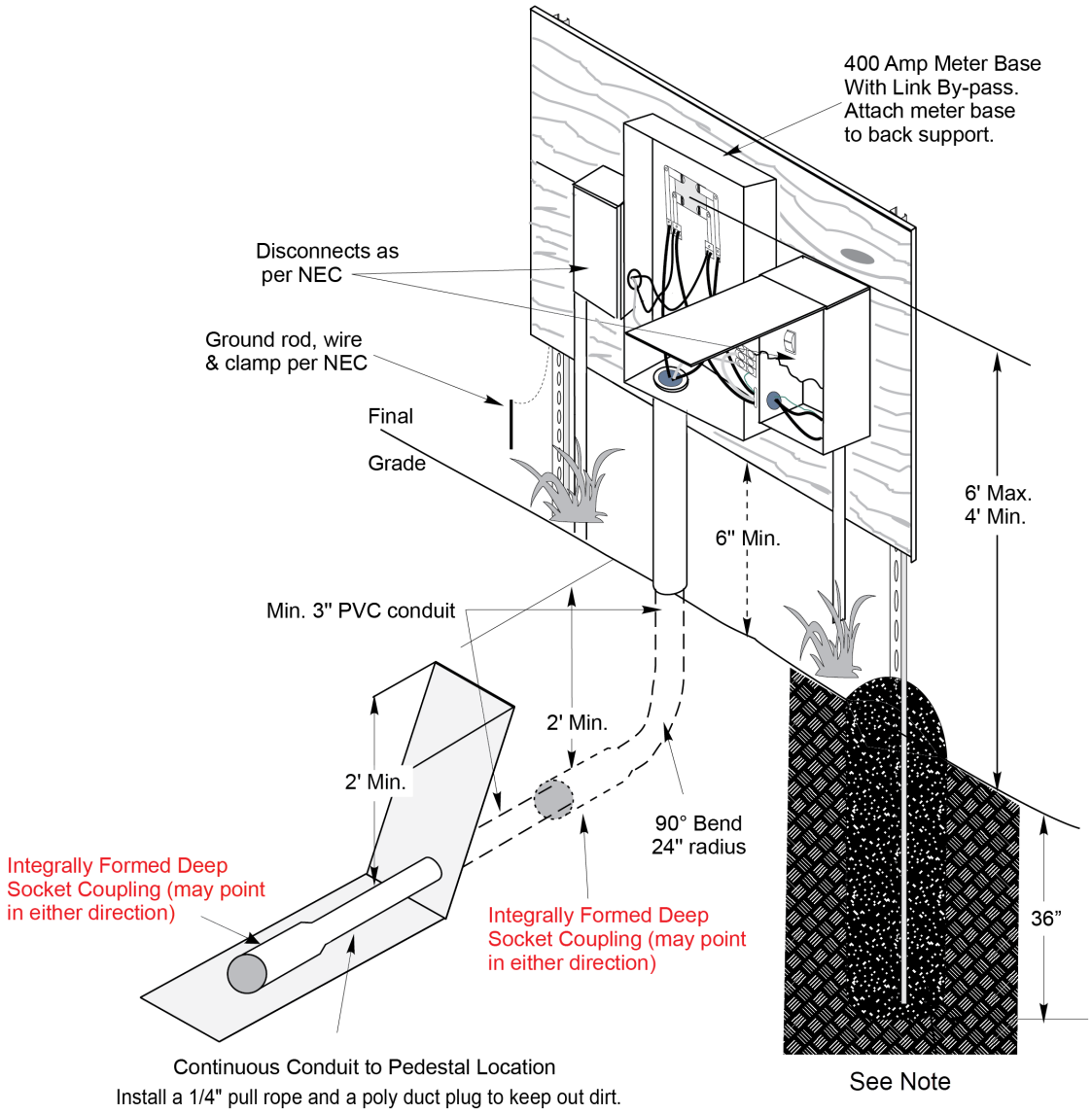
Note: All meters shall be readily removable i.e., not plastered in or built in, and if installed in a recessed opening, the socket shall be tough type. The meter recessed opening shall be as follows with the socket centered therein.

Phase	Metered Voltage	Height (H)	Width (W)	Depth in Front of Socket (D)
Single	240	16"	16"	7"
Poly	240	22"	16"	11"
Poly or Max Demand	480	22"	24"	11"

H. Meter Pedestal - 200 AMP and 400 AMP Meter Socket

1. A factory assembled pedestal must be UL listed and approved or District approved and accepted. It must be set a minimum of 2’ in the ground with a concrete pad of 2’ x 2’ x 3-1/2” poured in place around the pedestal for support. Refer to Figure 4-12, Exhibit A.
2. An on-the-job assembled meter pedestal, which is composed of listed or approved meter socket and conduit or raceways, must be supported by one of several methods. The preferred installation is by using two pieces of Unistrut channel embedded in a 12” diameter poured concrete footing 36” deep. Minimum Unistrut channel acceptable shall be hot dip galvanized 12 gauge steel 1-5/8” x 1-5/8”, or District approved equivalent. Also acceptable is using two pieces of 2” hot dip galvanized steel angle iron or 2” hot dip galvanized rigid steel pipe with a 2” hot dip galvanized steel cap embedded in a 12” diameter poured concrete footing 36” deep. The concrete footing should not encase the service riser conduits. Refer to Figure 4-12, Exhibit B and Figure 4-12, Exhibit C. Alternately, the District will accept a fully pressure treated 6” x 6” x 10’ wood post set a minimum of 36” deep, however, it is the least desired method since it may not last as long as the other methods. The wood post shall not be encased in concrete, but shall be backfilled with gravel to facilitate drainage.
3. The customer shall install the poured concrete footing, backfill and compact prior to inspection approval and service installation.
4. When the District installs or is to own the service, the conduit shall be 3” minimum for 200-400 amp.
5. Secondary meter pedestals may be used provided they meet the minimum requirements of Section 5. Refer to Figure 4-10, Figure 4-11 and Figure 4-12.
6. If a disconnect is required per the NEC, the disconnect shall be located on the customer side of the meter.

Figure 4-10: Typical Meter Pedestal For A 201 - 400 Amp Self-contained Meter Socket For Use With A Class 320 Meter, Riser 3" Minimum



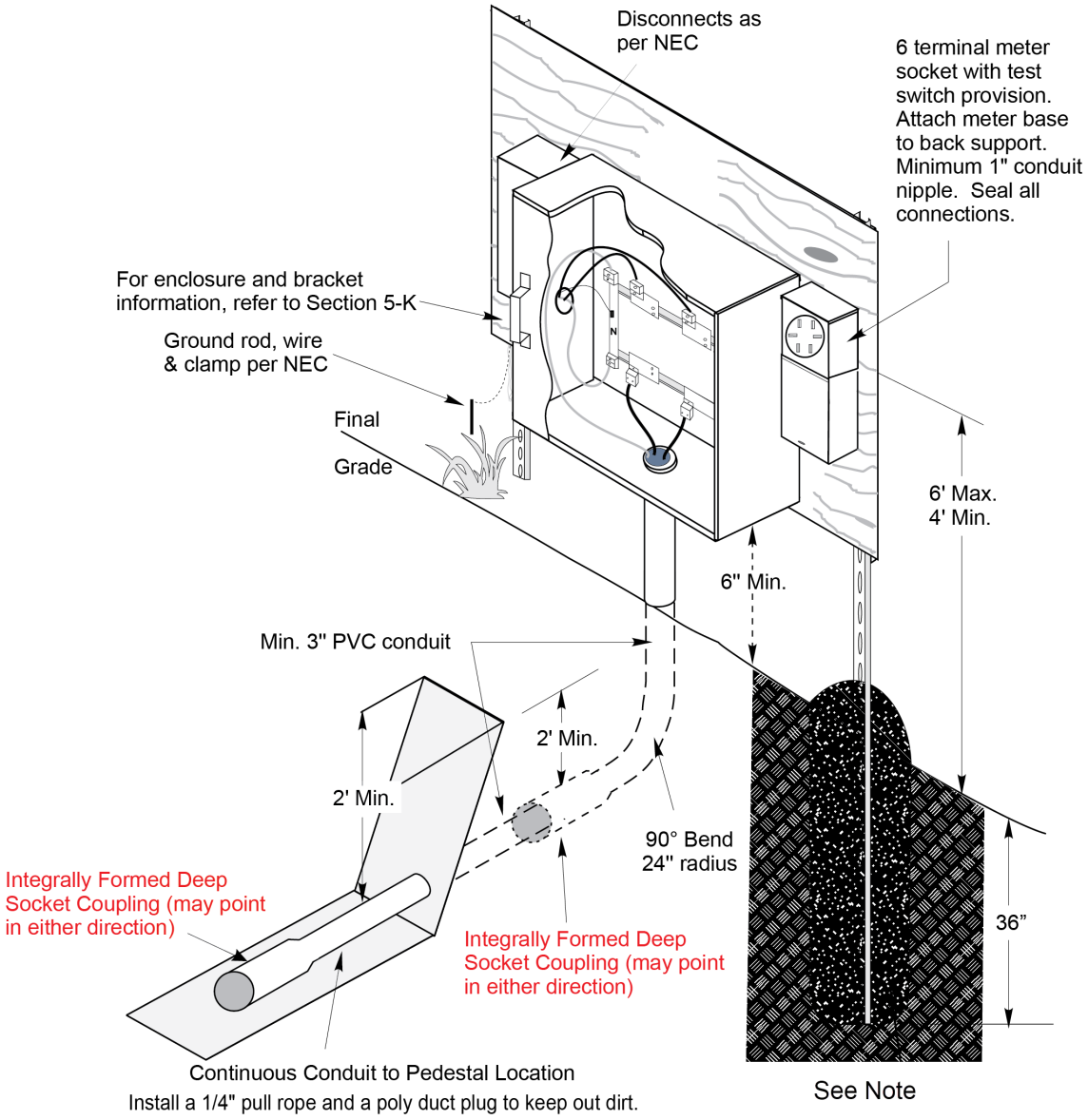
Preferred Construction: Bolt service entrance equipment to Unistrut channels with two pieces of Unistrut crossmembers, two 2" x 6" fully pressure treated crossbeams or 3/4" min. exterior grade plywood. Extend each Unistrut leg 36" min. below grade and embed each leg in a 12" diameter poured concrete footing. The concrete should not encase the service entrance conduit.

Minimum Unistrut channel acceptable shall be hot dip galvanized 12 gauge steel 1-5/8"x1-5/8" or District approved equivalent

Alternate Construction: 2" hot dip galvanized steel angle iron or 2” hot dip galvanized rigid steel pipe with a hot dip galvanized pipe cap embedded in a 12” diameter poured concrete footing, or two fully pressure treated 6” x 6” x 10’ wood post set 36” min below grade and backfilled with gravel to facilitate drainage.

Note: Poured concrete footing 12" in diameter. Crown footing above final grade and slope taper away from Unistrut channel. Concrete footing should not encase service conduit.

Figure 4-11: Typical Meter Pedestal For A 201 - 400 Amp Current Transformer Enclosure Installation, Riser 3" Minimum



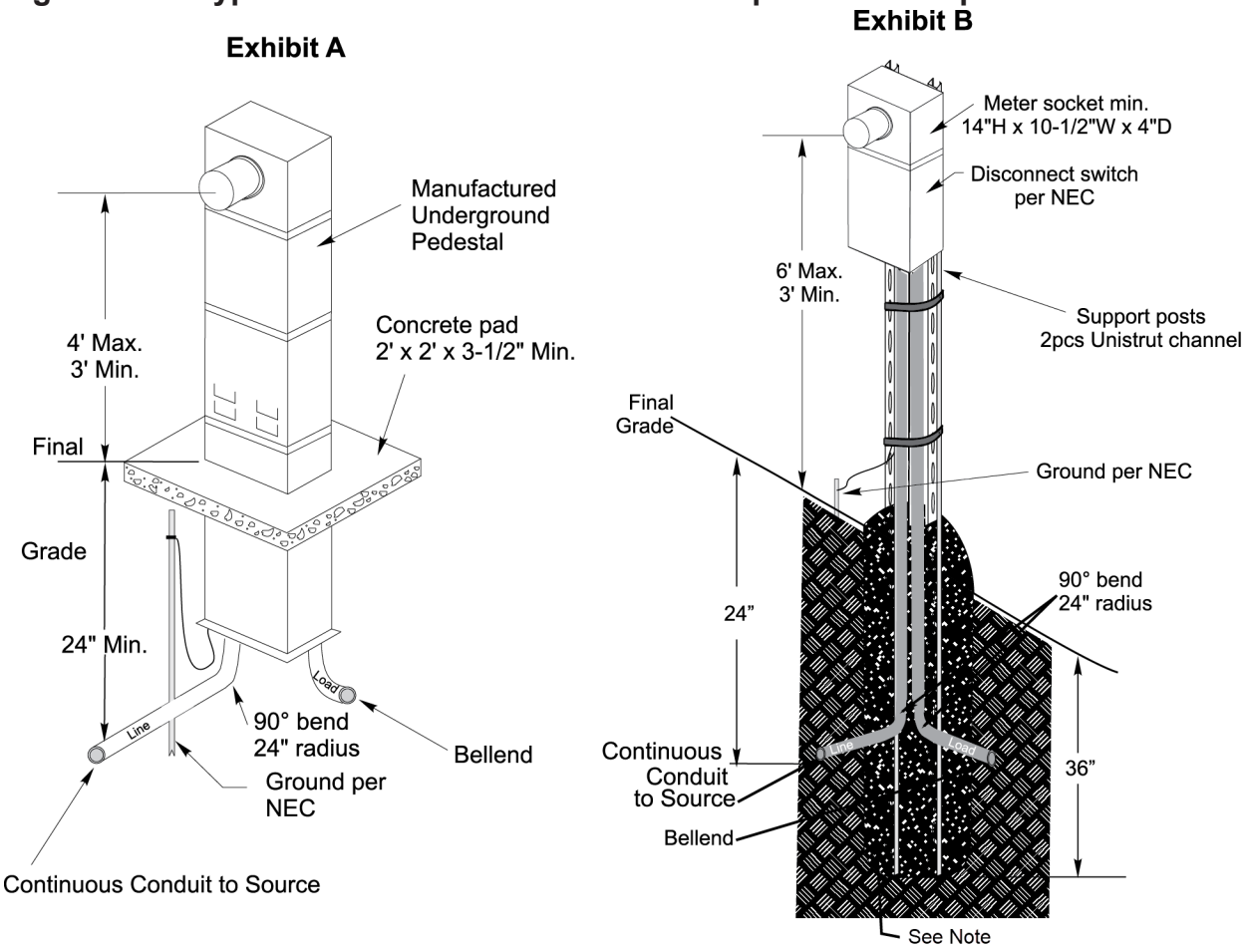
Preferred Construction: Bolt service entrance equipment to Unistrut channels with two pieces of Unistrut crossmembers, two 2" x 6" fully pressure treated crossbeams or 3/4" min. exterior grade plywood. Extend each Unistrut leg 36" min. below grade and embed each leg in a 12" diameter poured concrete footing. The concrete should not encase the service entrance conduit.

Minimum Unistrut channel acceptable shall be hot dip galvanized 12 gauge steel 1-5/8"x1-5/8" or District approved equivalent

Alternate Construction: 2" hot dip galvanized steel angle iron or 2” hot dip galvanized rigid steel pipe with a hot dip galvanized pipe cap embedded in a 12” diameter poured concrete footing, or two fully pressure treated 6” x 6” x 10’ wood post set 36” min below grade and backfilled with gravel to facilitate drainage.

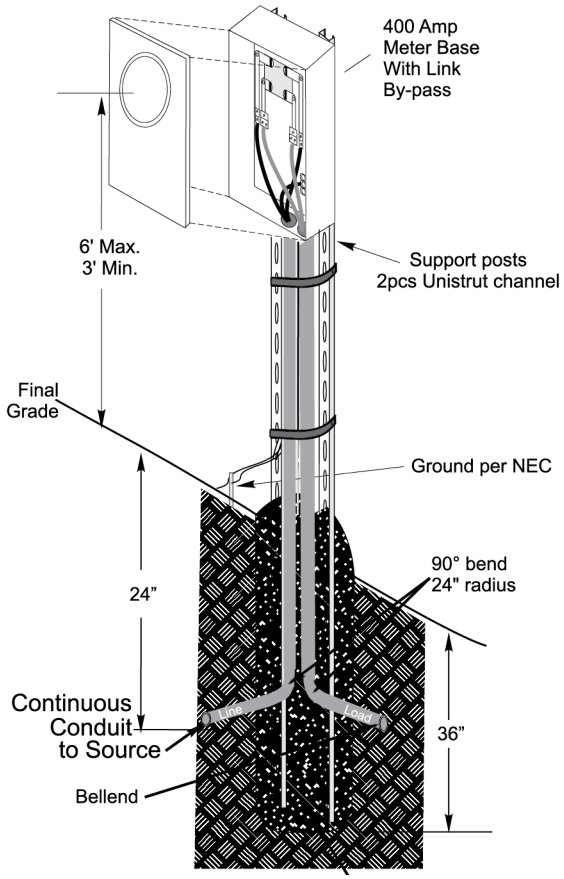
Note: Poured concrete footing 12" in diameter. Crown footing above final grade and slope taper away from Unistrut channel. Concrete footing should not encase service conduit.

Figure 4-12: Typical Meter Pedestal For A 200 Amp and 400 Amp Class 320 Meter



Note: Poured concrete footing 12" in diameter. Crown footing above final grade and slope taper away from unistrut channel. Concrete footing should not encase service conduit.

Exhibit C



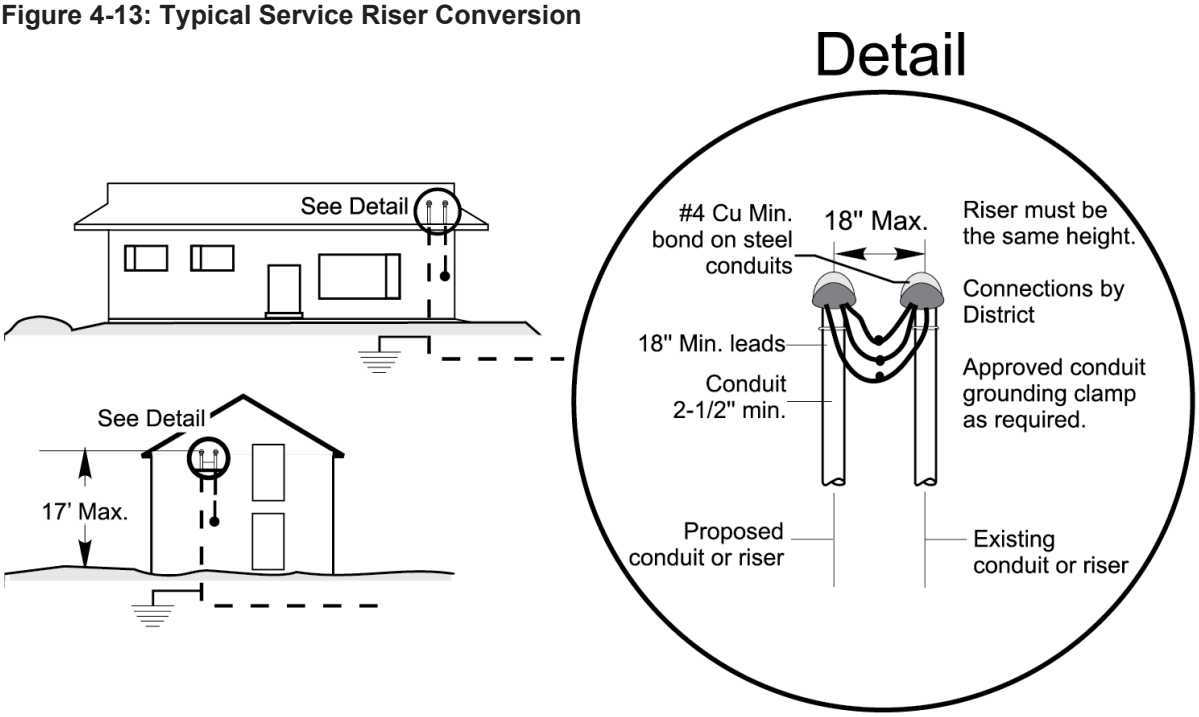
Note: Poured concrete footing 12" in diameter. Crown footing above final grade and slope taper away from unistrut channel. Concrete footing should not encase service conduit.

I. Conversion, O/H to U/G

1. In general, overhead to underground service conversions require individual attention on specific requirements. **Note:** The NEC requires that, where necessary, existing breakers, switches, panels, etc. must be upgraded to present requirements. Contact the State of Washington Department of Labor and Industries or the appropriate governmental agency for specifics.

2. The underground service equipment installation shall comply with District requirements for a new service.
   a. An underground riser conduit may be extended up to match the height of the existing overhead mast. This new riser must be within 18 inches of the existing mast. Refer to Figure 4-13.

Figure 4-13: Typical Service Riser Conversion



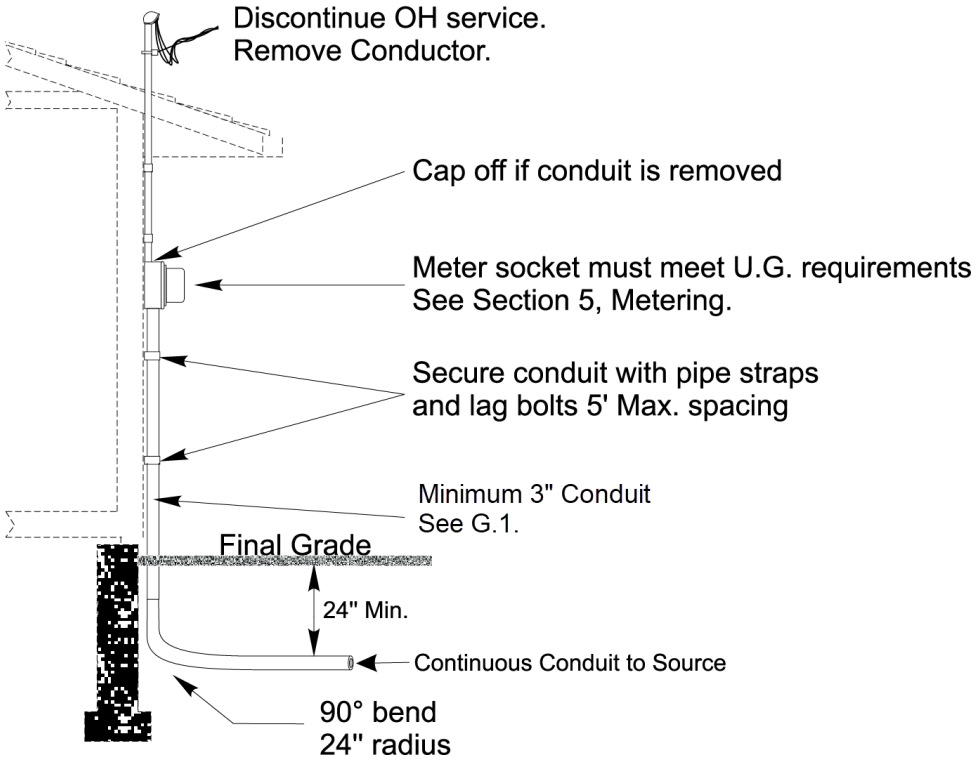
   b. Existing 200 amp surface-mounted meter bases, may be converted by installing an underground service riser conduit into the bottom of the meter base for installation of new underground service conductors. Refer to Figure 4-14.

Exceptions:

The following conditions must apply:

1. Conduit must enter to one side of the bottom, not the center.
2. Meter base must be a minimum size of 10-1/2" wide, 14" tall and 4" deep.

Figure 4-14: Typical Meter Base Conversion
Coordinate with the District



J. Commercial/Apartment Secondary Pedestals

1. The District shall install, own and maintain a pedestal on private property (normally at a property corner) as a source of secondary service to commercial or apartment buildings.
2. The customer may be required to install an additional vault for secondaries to terminate in non-standard installations.
3. The customer shall install, own and maintain all secondary service conductors on private property.
4. The District will make all secondary connections in the pedestal, provided that the customer-installed conductors are compatible with the District's stock connectors.
5. A maximum number of secondary connections per phase shall be coordinated with the District.
6. Allowable conductor sizes shall be:

   Aluminum or Copper: #2 to 750 kcmil

7. If, through variance, other conductor sizes are allowed the customer shall be responsible for providing the required connectors, their installation and any future maintenance. Refer to Section 2, Variance Application.
8. The District will determine when the quantity and/or size of the secondary service conductors exceeds the practicality of a pedestal-type installation.

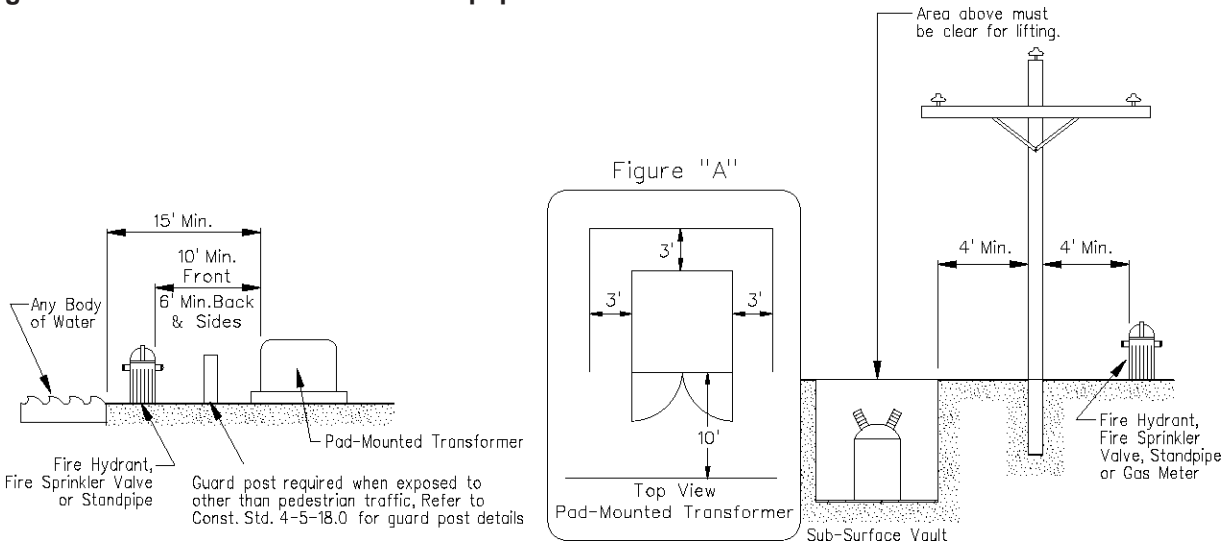
K. Padmount Transformer Equipment, Clearance

1. The customer shall be responsible for maintaining access to and clearance around all District-Owned padmount equipment. Refer to Section 2-O for access and Figure 4-15 for clearances.

2. Guard posts shall be furnished and installed by the customer when padmount equipment is located within an area of vehicular traffic (WAC 296-46B-450). The District shall determine the number and location of all guard posts. Refer to Figure 4-16.

Obstacle	Facility	Minimum Horizontal Clearance (ft)
Non-Inhabited building/structure (garage, etc.)	Pad-Mount or Sub-Surface Vaults	3'
Building/structure with non-combustible surface(s) - no doors, windows or other openings within 8ft of a pad-mounted transformer	Pad-Mount or Sub-Surface Vaults	3'
Building/structure with non-combustible surface(s) - with doors, windows, etc. (including fire escape)	Pad-Mount or Sub-Surface Vaults	8'
Building/structure with combustible surface(s) - (Single Story) with roof overhang	Pad-Mount or Sub-Surface Vaults	8'
Building/Structure with combustible surface(s) - with doors, windows, etc.	Pad-Mount or Sub-Surface Vaults	8'
Fire Hydrant, Fire Sprinkler, Valve, Standpipe or Gas Meter	Utility Pole	4'
Fire Hydrant, Fire Sprinkler, Valve, Standpipe or Gas Meter	Pad-Mount or Sub-Surface Vaults	10' to front 6' to back and sides
Pad-Mount or Sub-Surface Vaults	Utility Pole	4'
Any Body of Water	Pad-Mount or Sub-Surface Vaults	15'

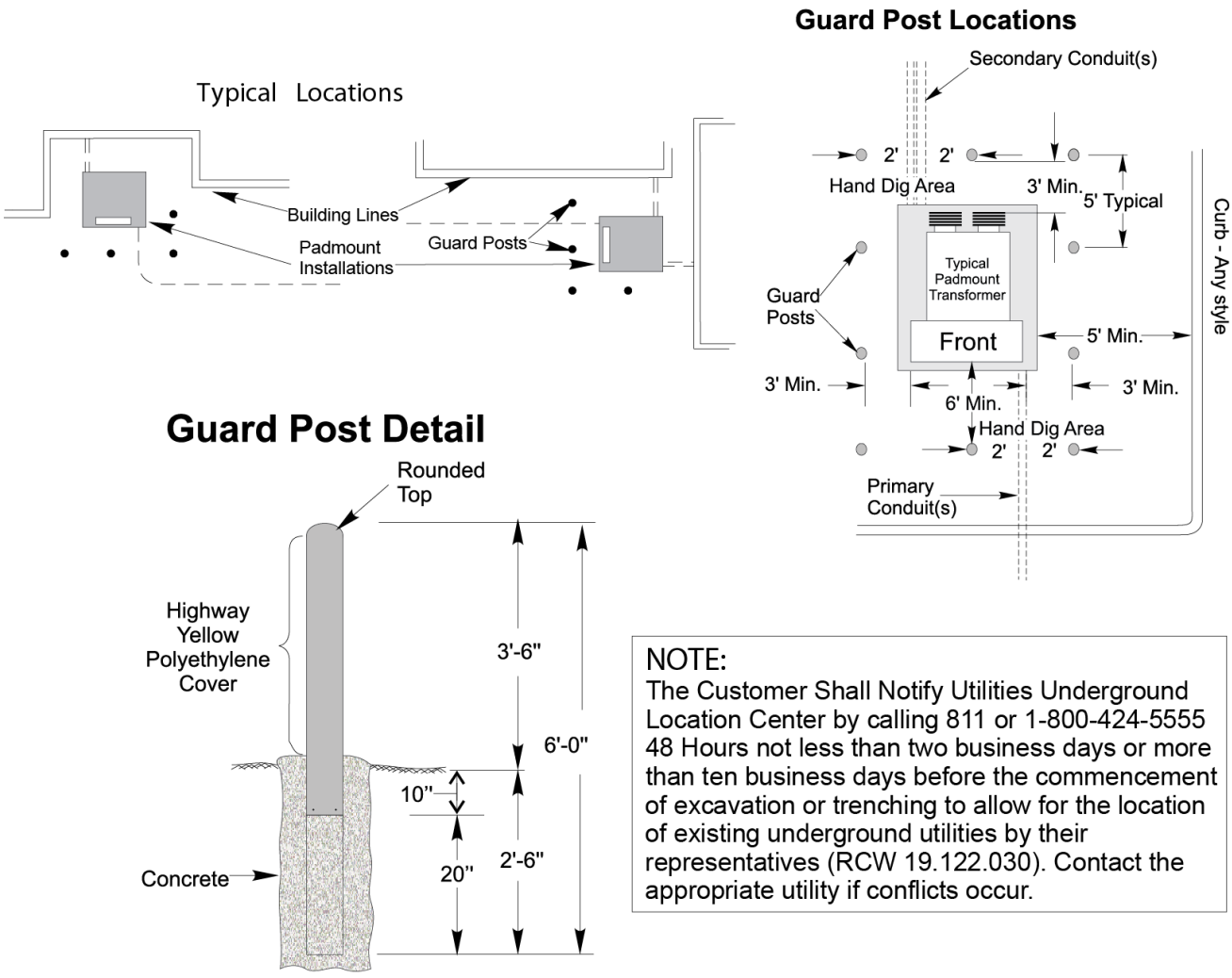
Figure 4-15: Padmount Transformer Equipment Clearance



Notes:

1. All measurements are from the nearest metal part of the transformer.
2. For variations and reduced clearance options, consult Engineering Standards.
3. References: WAC 296-46B-450 and NESC 127.
4. Some examples of non-combustible building/structure surfaces are brick, concrete, steel, stone and fiber-cement siding material that complies with ASTM E136, such as Hardiplank®.
5. A 3 ft minimum clearance is required between transformers and natural gas connections, valves, gauges or meters.
6. Transformers shall not be located within 20 ft of fuel storage tanks or fueling points for highly combustible liquids or gases (e.g., service station gasoline pumps and tanks, propane bulk dispensing tanks, etc.).
7. Transformers shall not be located within 10 ft of self-contained emergency diesel generators, or diesel fuel storage tanks or fueling points for emergency generators.
8. Enclosures for total underground mineral oil filled transformers, e.g., sub-surface vaults, must not be located within 8 ft of a doorway, operable window, stairway or fire escape. Adequate space must be maintained above the enclosure so that a boom may be used to lift the transformer from the enclosure.
9. Location of pad-mounted equipment shall not be more than 15 ft from access road or driveway.
10. Finish grade at the transformer location must be such that leaking oil will flow away from the building.
11. A clear and level working area shall be maintained in front of the transformer.
12. Refer to Figure "A" for minimum working space requirements around pad-mounted transformers located in areas with obstructions such as fences, walls, trees and shrubs. Landscaping which does not interfere with the installation, removal, operation and maintenance of the transformer may be allowed within the working space.

Figure 4-16: Transformer Guard Post Locations



- Guard posts are required by the State of Washington Electrical Inspection Division (WAC 296-46B-450) when transformers are located where exposed to vehicular traffic or other mobile type machinery.
- Guard posts shall be furnished, installed and maintained by the contractor/customer at no expense to the District. The District shall determine the number and establish the locations of all guard posts. The exposed portion of the post shall be painted highway yellow or have a highway yellow thermoplastic polyethylene bumper post sleeve securely installed over the post.
- Two types of guard posts are accepted by the District. One type is a 6"x6'0" steel pipe set in and filled with concrete. Another type is a 6”x6’0” or a 9"x6'0" precast steel reinforced concrete post set in concrete.
- Reinforced concrete posts can be purchased from Cuz Concrete, Arlington, WA or Utility Vault Company, Auburn, WA.
  Bumper post sleeves can be purchased from Ideal Shield, 888-308-7290, or online at www.idealshield.com.
- Refer to figure 4-16 above for clearances to padmount equipment.

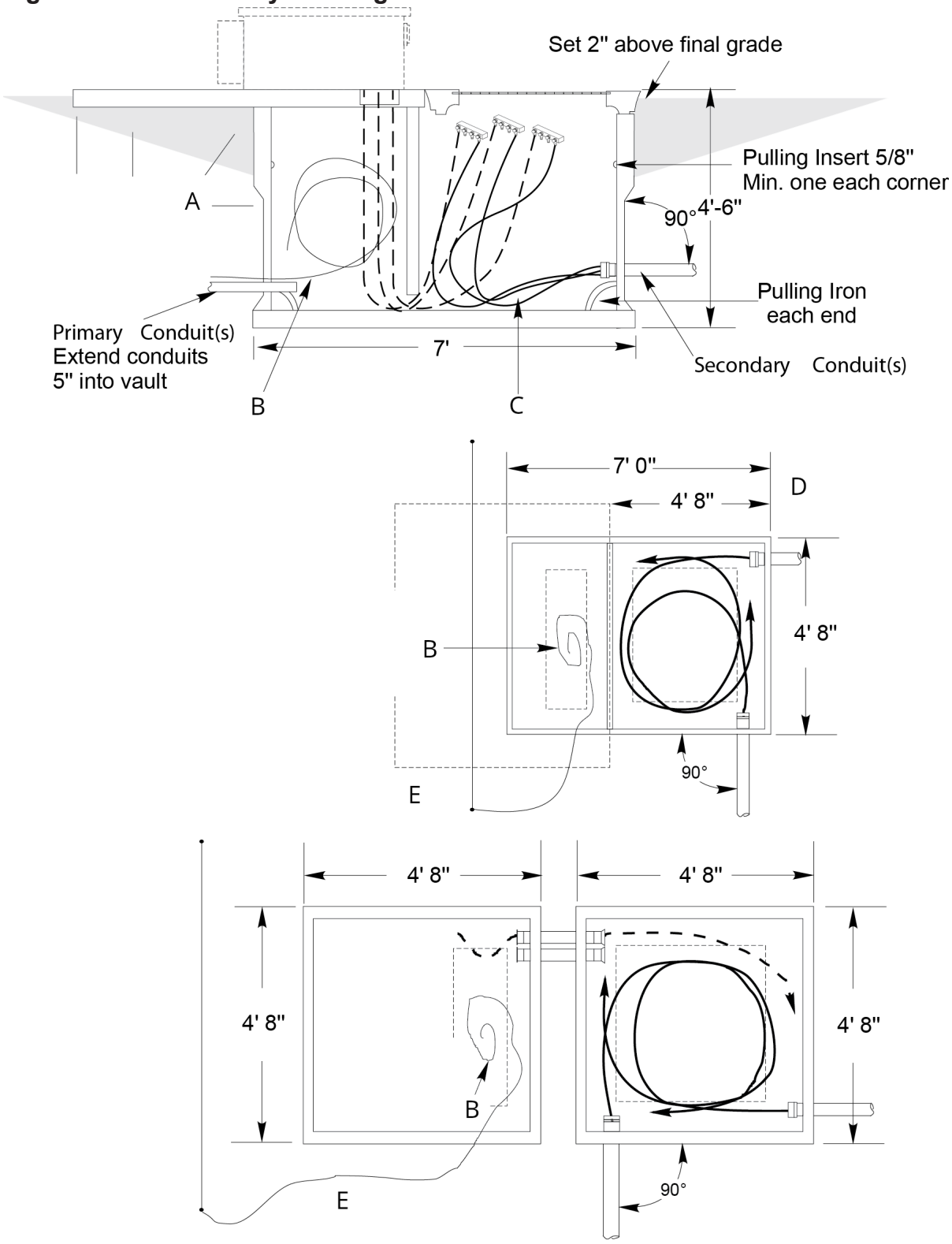
L. Connection to Padmount Transformers, Secondary Cabinet, Secondary Handholes or Secondary Pedestals:

1. Under no circumstance shall the Customer penetrate the wall of an existing energized vault with either conduit or conductor. Only District personnel are authorized to penetrate into an existing energized vault.
2. The District shall make all primary and secondary connections on District owned transformers, secondary cabinets or secondary pedestals.
3. For commercial installations the customer shall install, own and maintain all secondary conductors from the service location to the secondary termination handhole. A minimum length of 1 loop around the inside bottom of the vault plus 4 feet shall be provided inside the vault, sealed and identified.
   For a Single or Duplex family residence, after the customer provides the conduit(s), trench and backfilling the District will own and maintain the secondary service conductors. In some installations these conductors may be provided and installed by the District or by the customer.
4. The District's engineer shall determine if J-boxes are required for a particular job. If J-boxes are needed, in addition to the vault requirements identified below, the customer shall provide a 4'8" x 7'0" x 4'0" deep vault with a 4'8" x 7'0" diamond plate lid to house the J-boxes.
5. Acceptable conductor sizes:

Commercial:	Aluminum or Copper:	#2 to 750 kcmil
Residential:	Aluminum Triplex:	4/0 AWG or 350 kcmil

6. Acceptable conductor type:
   600V XLP Type USE-2: Cable with ruggedized insulation is not acceptable
7. In certain cases it may be acceptable to connect single customer-owned service conductors directly to the low voltage terminals of a padmount transformer. Consult with the District's engineer to determine allowable cases. The vault option(s) and maximum number of secondary connections allowed per leg shall be as follows in Table 3. Consult with the District's engineer for acceptable vault option(s) prior to proceeding.
8. For commercial installations the customer shall install, own and maintain a secondary handhole adjacent to the transformer vault. The District will install conductors from the transformer to the secondary handhole and make all of the connections in that handhole.
9. For residential installations the secondary conductors from the transformer vault to the secondary terminations pedestal shall be installed, owned and maintained by the District.
10. The customer shall furnish and install the required conduit(s) between the transformer vault and secondary handhole (s).
11. All secondary conductors shall enter a vault at the correct corner to lie in the same direction, either clockwise or counter-clockwise without conflicting with each other. Refer to Figure 4-17 for typical samples.

Figure 4-17: Secondary Training in Vaults



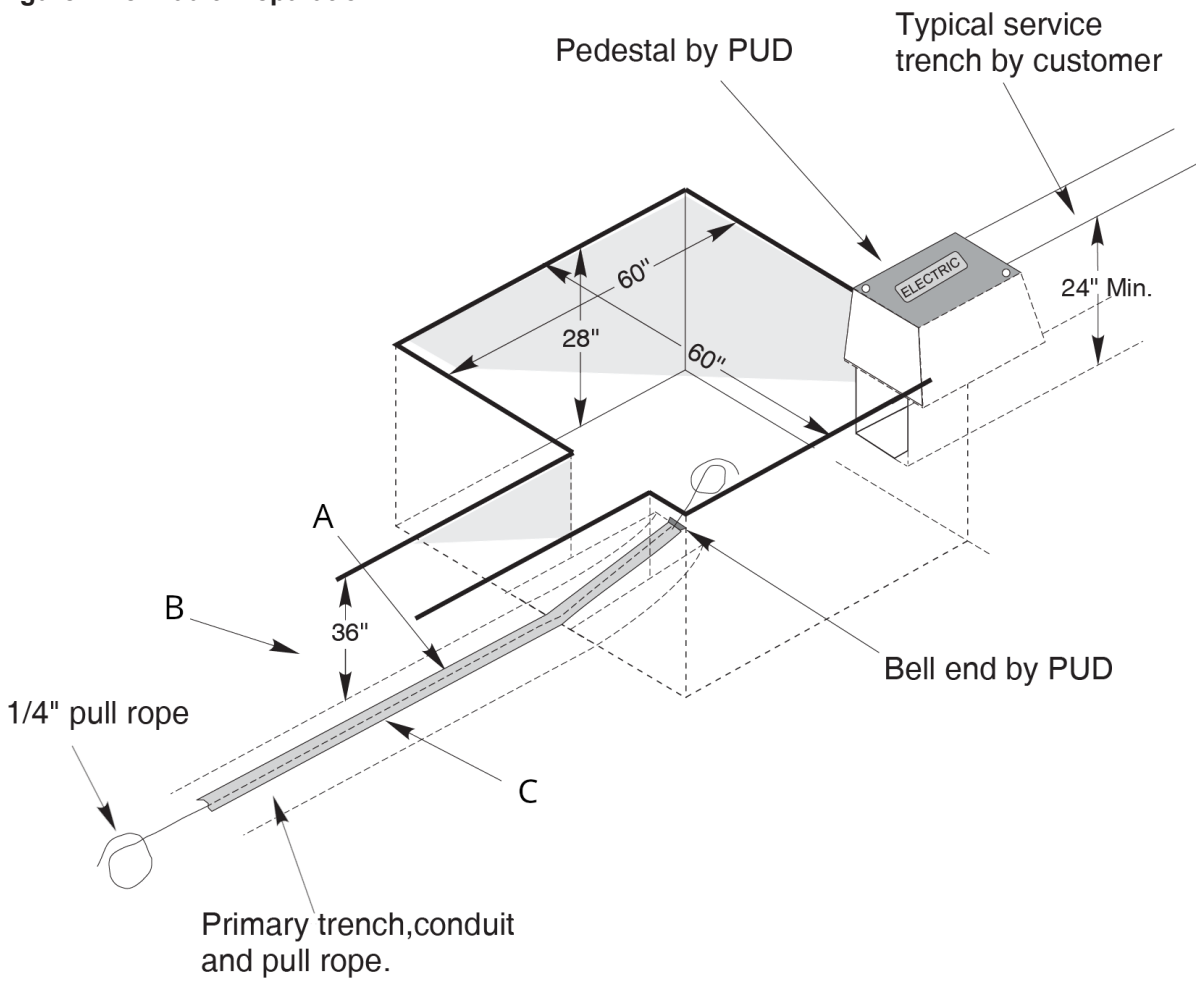
A. Compacted backfill required under pad overhanging
B. Minimum 15' of #2 bare (solid or stranded) soft drawn copper ground wire coiled inside the vault.
C. Minimum length of 15' of secondary cables per leg for 4'-8" x 4'-8"
   Minimum length of 25' of secondary cables per leg for vault sizes greater than 4'-8" x 4'-8"
   Conductors shall be identified and sealed to prevent moisture
D. All secondary conductors shall enter and lie in the same direction either clockwise or counter-clockwise and enter vault at proper corner as shown
E. 5/8" x 8' copper clad ground rods. Refer to grounding Section 4.M.

M. Concrete Vaults, Pads and Handholes

When a vault is installed in areas where it may be exposed to pedestrian foot traffic a slip-resistant SlipNot type coating is required on the vault cover.

1. Residential customer vault site preparation.
   a. The customer shall prepare the vault site in accordance with Figure 4-18.
   b. The District will provide and install the vault, ground rods, ground wire and secondary service pedestal.
   c. The vault hole shall be plumb, level and square with a 6" deep bed of 5/8" gravel in the bottom.
   d. The customer shall install the primary and the secondary conduits and pull ropes. The customer shall seal all ends with tapered, manufactured poly conduit plugs to keep out dirt prior to the installation of conductors.
   e. After inspection and approval, the customer shall backfill the trenches prior to the installation of the electrical system.

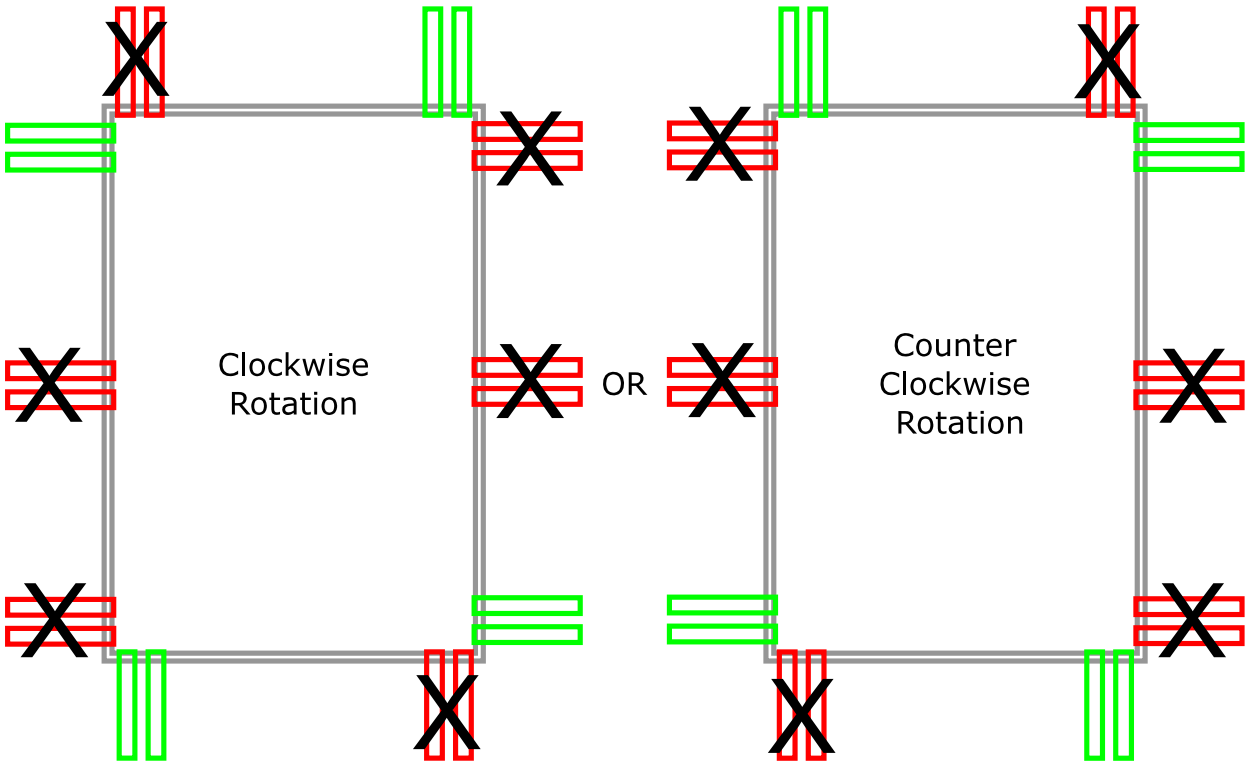
Figure 4-18: Vault Preparation



A. Conduit to rise 8" in last 5' and terminate at center of vault hole. Temporarily seal ends of conduit prior to installation of conductor.
B. After inspection approval backfill to within 5' of hole.
C. Continuous 2" duct to property line as directed by PUD engineer.

Note: Primary trench and conduit to enter front of vault site and off center to allow alignment of conduit with mouse holes in vault.

2. Commercial Vault Installation Requirements
    a. Specific job requirements will be determined by the District's engineer.
    b. There shall be no express circuits allowed through vaults.
    c. All vaults shall be designed and installed in a manner such that water from the vault will drain into an acceptable outlet. Water shall be all that is drained or pumped from vaults into acceptable outlets. Unacceptable outlets are salmon streams and storm drains. Vault drains shall not connect to storm drains, nor shall storm drains empty into a vault.
    d. All vaults shall be installed to allow for the following minimum safe working clearances:
        - Padmount Transformer Vault: 10' in front and 3' on the rear or either side.
        - Secondary Cabinet Vault: 4' on all sides.
    e. All transformer and switch cabinet vaults shall be on a minimum 6" deep bed of 5/8" gravel and set so that their lids are 2 inches above final grade. Switching vaults and secondary handholes may be set at final grade.
    f. Two ground rods with 1/0 stranded bare copper wire installed a minimum of 6' apart are required at all secondary cabinet vaults.
    g. Two ground rods shall be required if installation is at the end of a lateral. They shall be installed a minimum of 6 feet apart.
    h. Fifteen feet of copper ground wire (solid or stranded) shall be left coiled inside the vault.
    i. All secondary conductors entering the handhole shall be protected at minimum by a piece of PVC conduit. This conduit shall be permanently sealed around its exterior and interior with cement grout.
    j. All secondary conductors shall be labeled as to what they serve.
    k. All secondary conductors shall extend a minimum length of 1 loop around the inside bottom of the vault plus 4 feet. They shall be identified and sealed to prevent moisture.
    l. Conduit shall enter the vault perpendicular to the vault walls which they are entering, and in a manner that ensures that all conductors can be trained to lay in the same direction (clockwise or counter-clockwise) and also in such a way as not to interfere with other conduit entrances. Refer to Figure 4-17.
    m. Conductor rotation shall always be the same direction inside a vault. See figure below to see how conduits can be plumbed to maintain rotation.

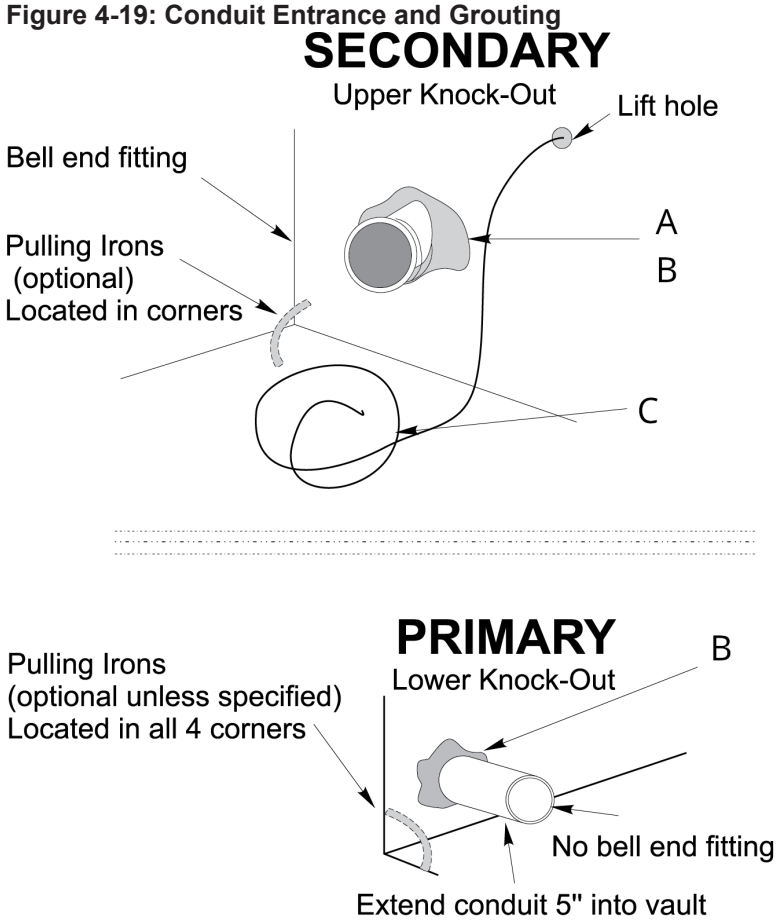


n. Typically, conduit for primary conductor shall use lower knockout only, conduit for secondary conductors shall use upper knockout only, however, multiple conduit requirements shall use both upper and lower knockouts.
o. Conduit for secondary jumpers shall be installed by the contractor between the transformer vault and the secondary handhole. The size and quantity will be determined by the District's engineer.
p. Cement grout is required to seal all holes and around all conduits. Refer to Figure 4–19.
q. Padmount cover specifications vary with the size of the padmount transformer or switch cabinet to be used. The District's engineer will specify cover size, access hole size and location.
r. When a handhole is used as a primary switching vault, a lid with a diamond plate access cover is required. Access opening size will be specified by the District's engineer.
s. Vaults and covers shall be located and oriented so that proper door clearance from buildings/obstructions may be maintained. Refer to Section 4-K.
t. Split vaults with removable divider walls shall have unistrut channel installed (9" ± 1" from top of wall to center line of channel) on each wall and on one side of the removable divider wall as shown in Figure 4-25 and Figure 4-26. In addition, removable divider wall shall have two (2) 5/8" diameter lifting inserts. The removable divider wall will be positioned so that the side with the unistrut channel will be installed facing the 41" section of the vault.
u. Bell ends are required on all commercial secondary conduits. The length of the conduit shall protrude into the vault just long enough to accommodate the bell end. The District will install the bell ends on the primary conduits.
v. Pulling irons, one at each corner, are optional for secondary vaults.
w. Pulling irons, one at each corner, are acceptable but not required in primary vaults unless specified by the District for a particular situation. Refer to Figure 4-19.

Exception: Pulling facilities are not required on J-Box or Open Bottom vaults. Refer to Figure 4-22 and Figure 4-23.

3. Identification
   To identify their function, the word POWER, or ELECTRIC, shall be neatly and permanently marked in plain upper-case letters on the covers of subsurface electrical vaults and handholes that do not have pad-mounted equipment mounted on them. Letters shall be a minimum of 2” and a maximum of 3” in height. Letters shall be inscribed in the concrete cover or embossed on the metal door (where applicable). The identifying word shall be squarely in alignment with a vault edge for a neat appearance and shall be placed in a consistent location from one cover to the next. Where practical, the identifying word shall be aligned so that it can be read from the front of the vault, that is, from the side of the vault where the door latch or vault tag is located.

Figure 4-19: Conduit Entrance and Grouting



   A. Extend conduit just long enough in the vault to accommodate the bell end
   B. Cement grout required to seal all holes and around all conduits
   C. 12' of #2 bare soft drawn copper (solid or stranded)

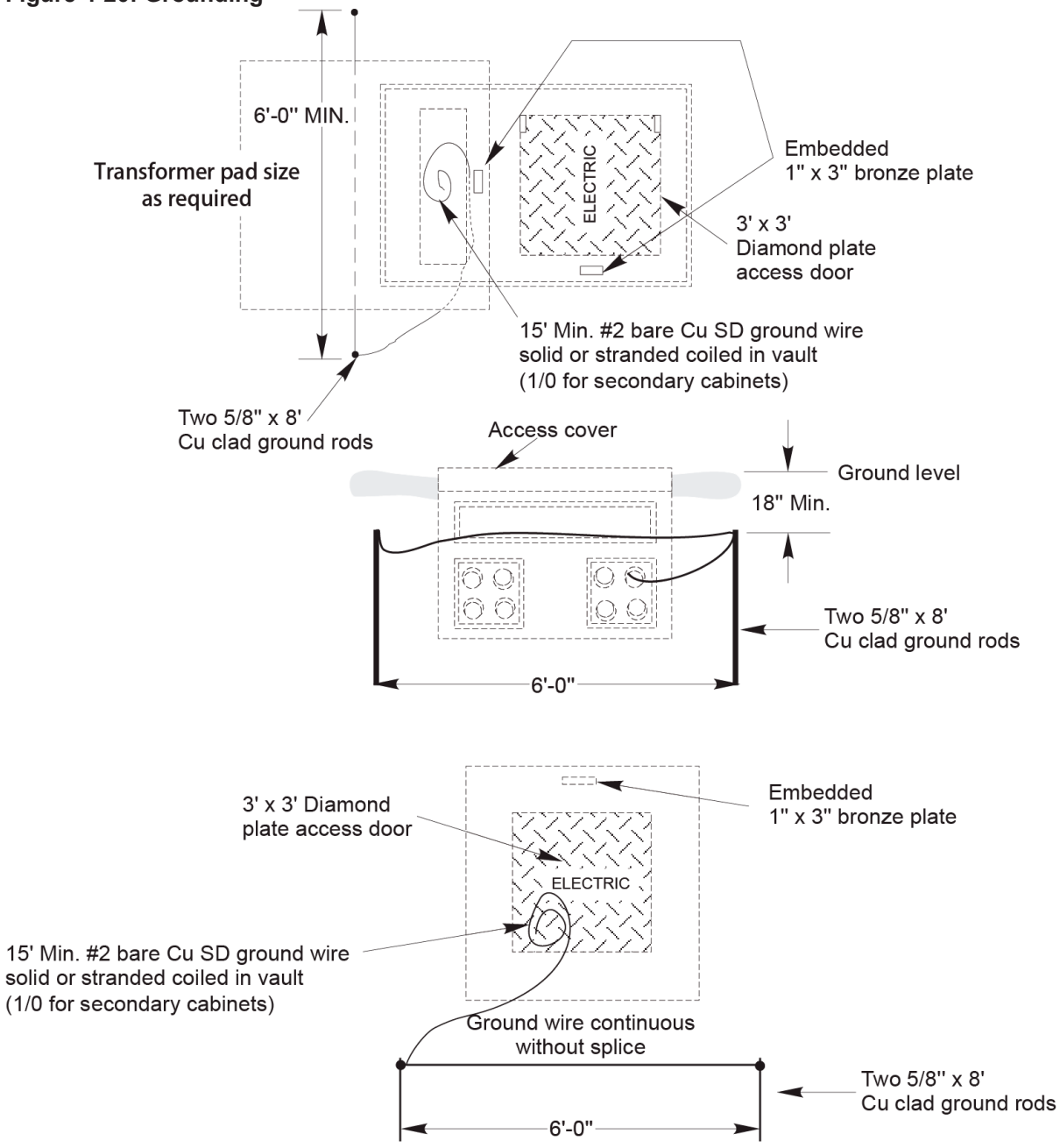
   Note: Only District personnel are authorized to penetrate into an existing energized vault. Under no circumstances shall the customer/contractor penetrate the wall of an existing energized vault with either conduit or a conductor.

N. Grounding

1. Only one ground rod with #2 bare copper ground wire is required at each transformer vault when there is more then one vault in succession.
2. Two ground rods are required if installation is at the end of a lateral (the end vault). They shall be installed a minimum of 6 feet apart.

3. Two ground rods are required at all j-box vaults. They shall be installed a minimum of 6 feet apart. Refer to Figure 4-20.
4. Four ground rods are required at all feeder switch cabinet vaults and splice vaults. Refer to Compatible Unit N0321 for grounding details.
5. Two ground rods with 1/0 stranded bare copper wire are required at all secondary cabinet vaults. They shall be installed a minimum of 6 feet apart.

Figure 4-20: Grounding



O. Vault Rooms

Customer-furnished transformer vault rooms shall be submitted to and approved by the District **prior to construction**, in full compliance with NEC Article 450.41 through 450.48, for each individual installation and in accordance with the minimum requirements listed below:

1. The size of the transformer(s) shall determine the size of the vault, size of oil entrapment sill or sump, access size and amount of ventilation required.
2. A floor drain or sump shall be provided if there is a possibility of water entering the vault. Such drainage shall be located so that oil spillage cannot enter it.
3. The vault walls, floor and ceiling shall be solid concrete.
4. The room shall be illuminated by a minimum of 3 permanent fixtures and positioned so that all sides of the transformers are illuminated and arranged so that qualified individuals may change lamps or make repairs without violating the 2 foot minimum clearance requirement from energized primary conductors and equipment. Fixtures shall use T5 or T8 fluorescent lamps or long life LED lamps and a light switch inside next to the latch side of the door. There shall be a minimum of 10 foot candles per square foot. Two duplex outlets with GFI protection shall also be installed on opposite ends of the vault walls.
5. Permanent transformer lifting eyes in the ceiling shall be provided.
6. Vault Rooms shall be secured according to the following requirements
    a. Doors: 3-hour fire door(s) shall be provided in accordance with NEC 450.43. The door shall open towards egress of the room. Doors shall include a latch guard plate.
    b. Knobset: Heavy duty BEST knobset (Series #83K7D4D_ 626 SPN, or Series #93K7D15D_ 626LM) from BEST Access Systems.
    Note: The use of a key box is not acceptable.
    c. Panic Bar: a heavy duty panic bar exit device (5100 or 5200 series in 603, 703A or 808A trim) and heavy duty automatic door closure (Stanley No. HD8016 or Stanley QDC211 F 689) is required.
    Note: Panic bar and automatic door closures from alternate manufacturers are not acceptable.
    d. Locking System: After the installation of knobset or panic bar, a locking system shall be furnished BEST Access Systems construction core on the outside of the door which will accept the District's master key. When the vault room is ready to be energized, the District will furnish and change the construction core out to a District's "P" tumbler series which will then accept only the District's master "P" series key. The locking system shall limit access to qualified District employees only and not allow access to unqualified individuals (WAC 296-30736230).
    e. For locking system contact:

Everett Safe and Lock & A-1 Mobile Lock and Key
5108 Evergreen Way, Ste 3
Everett, WA 98203
pudlocks@everettsafeandlock.com
Phone: 425-258-1422

Puget Sound Hardware
4710 B St NW, Ste 105
Auburn, WA 98001
Attn: Niki Eklof
800-464-4801 Ext 102

7. The owner and his/her agents and/or the homeowners association of the building shall be responsible to install, retain and maintain the District's required BEST knobset, panic bar exit device and automatic door closure for the life of the service to the premises or the electrical service to the building will be subject to disconnection. Should any maintenance or replacement of this customer owned equipment be necessary an authorized District employee shall assist the customer with the work.
8. The District shall furnish and install a sign on the exterior door stating "Electrical Vault Room". In multiple unit complexes, the customer shall provide building identification signage.
9. It is the customer's responsibility to insulate transformer vault rooms so that sound or transmitted vibration to other areas of the building are minimal. Transformer vault rooms must meet or exceed requirements of the applicable laws and noise ordinances of the Washington Administrative Code.
10. Foreign pipes and ducts shall not enter or pass through transformer vaults (NEC 450-47).

P. Maintenance

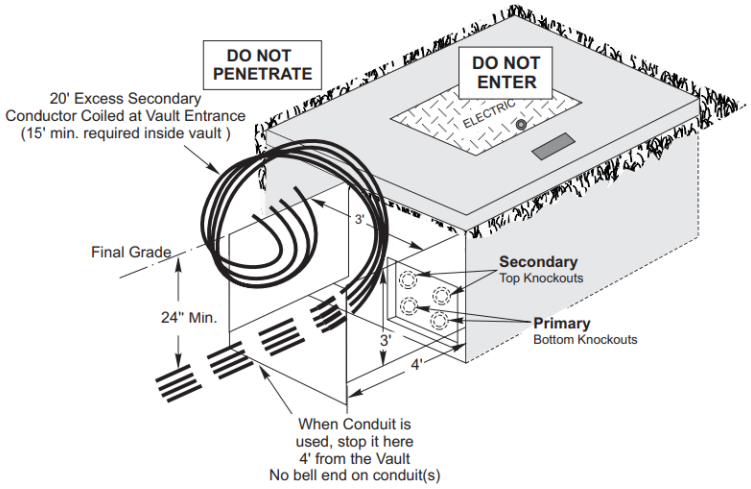
Maintenance of District-Owned Underground Service Conductors:

The District will not charge for normal maintenance of underground service. If a fault occurs in a conductor as a result of improper backfill or dig-in damage caused by a customer or contractor, charges for repair will be determined by the District's Claims Department and billed to the responsible party.

Q. Increasing Capacity - Existing Vault Location

1. When adding secondary feeds to an existing energized padmount transformer, secondary handhole or pedestal, stop outside the vault and provide 20' of excess conductor and a work hole 3 foot wide x 3 foot deep x 4 foot back from vault for **District personnel to penetrate the vault, extend the conductors and/or conduit(s) and make the connections.**
2. Any costs associated with damage and repair to the existing primary, secondary(s) or ground wires are the responsibility of the customer/contractor.
3. **Under no circumstance shall the Customer penetrate the wall of an existing energized vault with either conduit or conductor. Only District personnel are authorized to penetrate into an existing energized vault.**
4. Contact engineering to determine which corner of an existing vault is available for the service to enter.

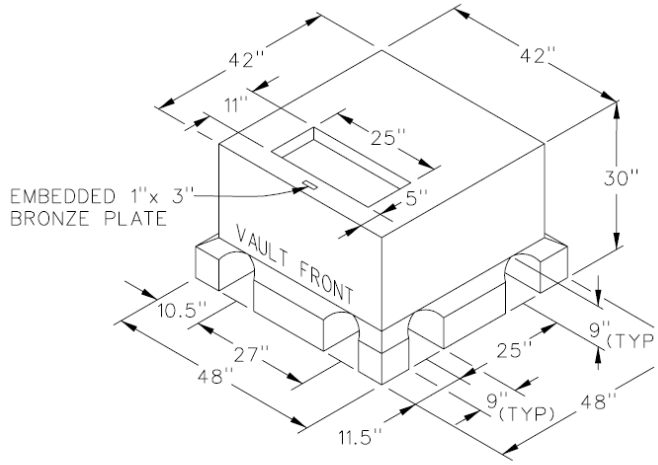
Figure 4-21: Typical Existing Energized Vault



R. 1Ø Transformer Vault Selection Criteria

1. 1Ø Junction Vaults

Figure 4-43: 1Ø Open Bottom J-Box Vault

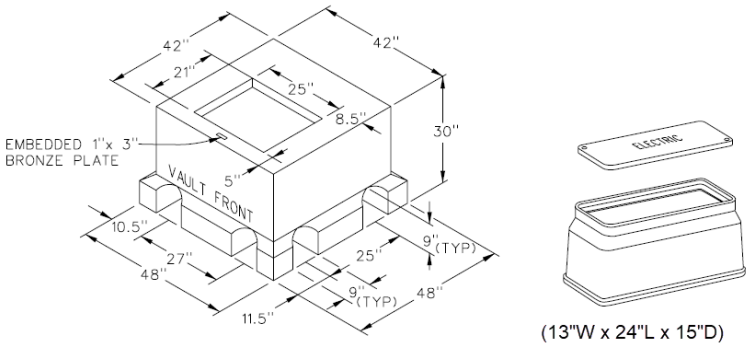


District Material ID 766214

This vault is used to support a junction box for single family residential and small commercial services. In small commercial applications the customer shall furnish and install the concrete vault, two ground rods, clamps and ground wire. Refer to Grounding, Section 4-N.

2. Residential
   a. Single Family

Figure 4-44: 1Ø Open Bottom Vault with Transformer



District Material ID 766206

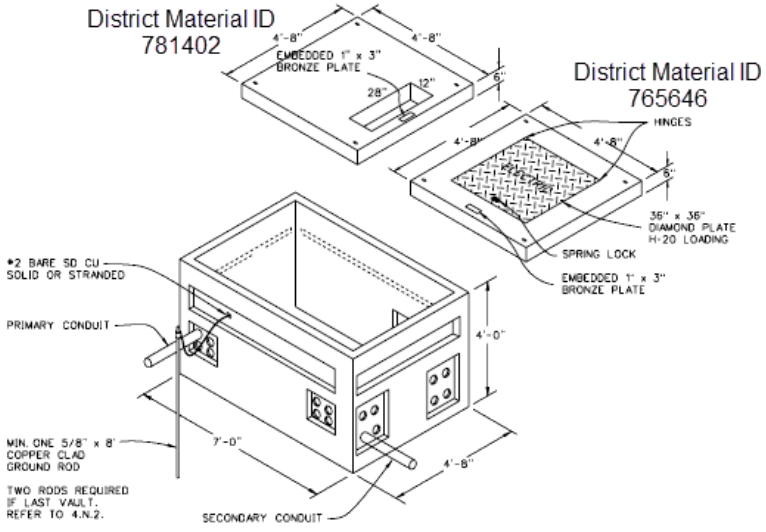
(13"W x 24"L x 15"D)
District Material ID 776015

Maximum of 4 conductors per leg.
Service conductors *may or may not connected directly to transformer*.
Pedestal - 13"W x 24"L x 15"D
Maximum number and size of cables allowed: 1-Set of 350/4/0 Triplex and 2-Sets of 4/0-2/0 Triplex

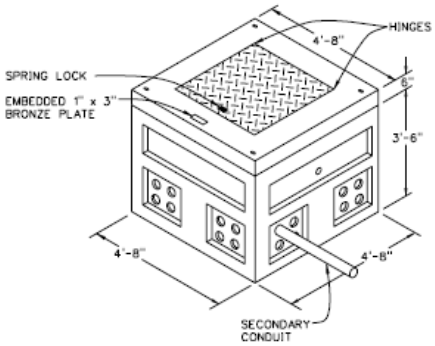
Note: This vault and pedestal combination is used for single family residential and small commercial services. In small commercial applications the customer shall furnish and install the concrete vault, two ground rods, clamps, and ground wire. Refer to Grounding, Section 4-N.

   b. High Density Single Family, Townhomes

Figure 4-45: 1Ø Transformer Vault and Secondary Connection Vault



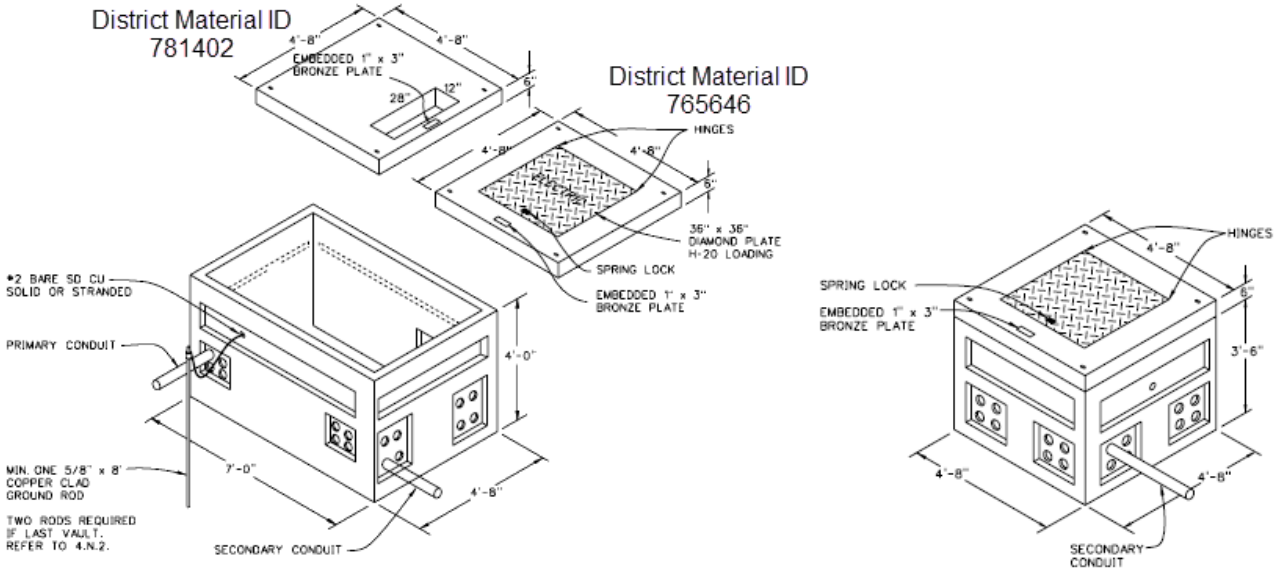
District Material ID 1001608



District Material ID 766397

3. Commercial

Figure 4-45: 1Ø Transformer Vault and Secondary Connection Vault



District Material ID 1001608

District Material ID 766397

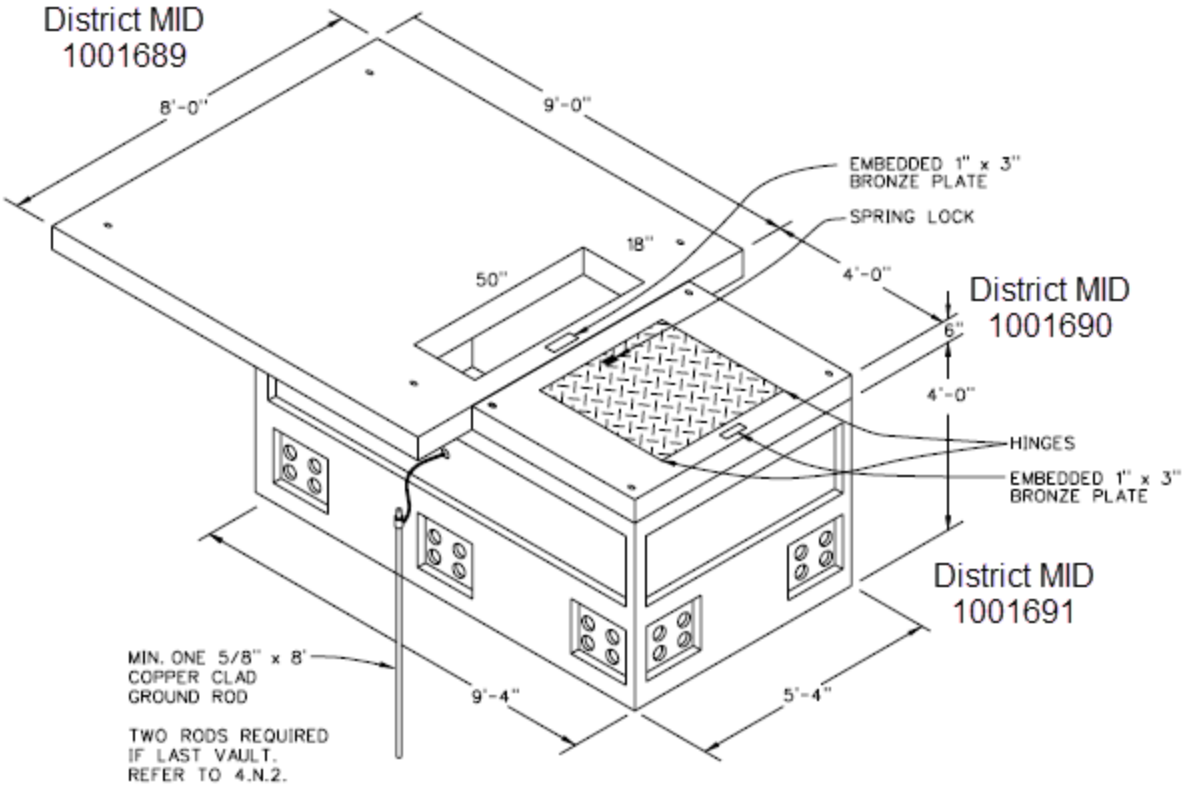
Notes:

- When multiple service connections are installed on one transformer, a secondary connection vault MID 766397 is required.
- Maximum number of conductors allowed equals the total number of District and customer conductors.
- Consult with District engineer to determine how many customer conductors are allowed for a given transformer size.

S. 3Ø Transformer Vault Selection Criteria

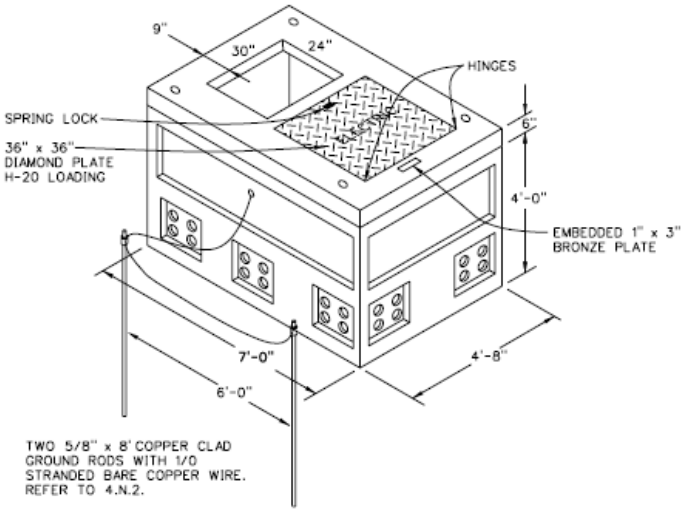
1. Single Customer

Figure 4-46: 3Ø Transformer Vault (Maximum 10 conductors per leg)



2. Multiple Customers
When multiple customers are connected to a single transformer, the secondary cabinet and vaults shall be provided along with Figure 4-46.

Figure 4-47: Small Secondary Vault and Cabinet (Maximum 12 conductors per leg (including District conductors)

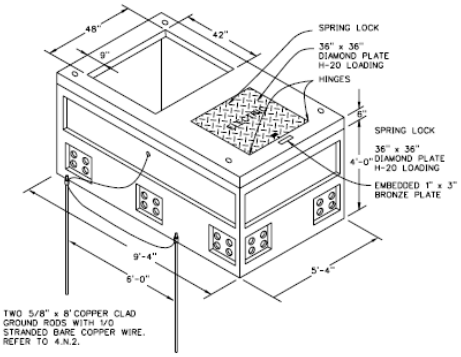


District Material ID 1000746

District Material ID 1000746

Refer to 4.M.2.d. for vault spacing requirements.

Figure 4-48: Large Secondary Cabinet (Maximum 16 conductors per leg (including District conductors)



District Material ID 1000747

District Material ID 1000210

Refer to 4.M.2.d. for vault spacing requirements.

Section 5 Meters and Service Entrance Equipment

Revised: Jan 2, 2025

A. General

1. The customer shall be required to supply, install and maintain meter mounting equipment of a type acceptable to the District.
2. The District must approve all meter locations prior to installation (WAC 296-46B-230).
3. Where multiple meter bases serving the same address or where confusion could exist which meter serves what, such as apartment houses, commercial businesses, solar generation and other situations all meter bases shall be permanently labeled as specified in Section 5-F.
4. Metering shall not be mounted on District poles, District padmount transformers or transclosures.
5. No customer owned equipment may be installed between the meter-mounting equipment and a District meter.
6. In the case of a meter room or switchgear in an electrical room unmetered service conductors are only allowed to enter the building once, at the metering point.
7. The District will furnish meters, meter retaining rings, current transformers and associated metering equipment, exclusive of mounting brackets, hardware or enclosures.
8. The customer shall provide sufficient space and exercise proper care to protect District property on his premises. In the event of loss or damage to District property on the customer's premises arising from neglect, carelessness or misuse, the cost of necessary repairs or replacement will be billed to the customer.
9. Energizing The Service:

When a PUD representative arrives to initially connect a new service, they must have access to the main disconnect in order for service to be energized.

10. Meter Seals
    a. At the time of installation, the meter base (socket), enclosures and or raceways containing unmetered conductors or bus bars shall be sealed and shall not be tampered with nor shall the seal be broken by anyone without prior authorization from the District. Any tampering with the meter or unauthorized breaking of seals shall be considered an evidence of fraud (RCW 80.28.240).
    b. "All District seals shall be readily visible without having to open or remove any covers or panels" (See Figure 5-1 for seal types and uses).
11. All current transformer metered services 801 amps and above shall be installed in switchboards. Refer to Section 5-O.
12. The customer or his contractor shall connect their equipment to keep the load, under normal operating conditions, balanced within plus or minus 10% of the average load across the phase wires.
13. Service entrance equipment shall be arranged such that metered circuit conductors or bus bar do not enter or pass through the conduits, raceways or enclosures containing unmetered circuit conductors or bus bar.
    Exception: That portion of service load side conductors or bus bars exiting the meter socket or current transformer enclosure.
14. Power conductors are not allowed in current transformer metering wire conduits.
15. Devices installed on the District side of the meter are prohibited. This includes between the meter and meter base. Examples include, but are not limited to: Electric vehicle chargers, backup generation transfer switches, emergency disconnects and surge protectors.

B. Meter Totalizing

a. As a general practice the District will not totalize meters for billing purposes. Meters will not be totalized to aggregate loads in an attempt to seek advantage of District rate schedules. If it is determined by the District that totalizing meters for billing is beneficial in order for the District to serve customer loads the District would consider only for services requiring transformation greater than 2500 kVA and/or, due to customer load requirements. The customer's electrical design will not be a determining factor when considering totalizing.
b. In all above applications the preferred method of service to accommodate the above mentioned requirements will be from a 12,470 kV primary metered service. Otherwise, when multiple meters are used for one service, individual billing will be issued for each meter.
c. Any consideration for meter totalizing must be reviewed by District management through the variance process currently established by the District. Refer to Section 2-U.

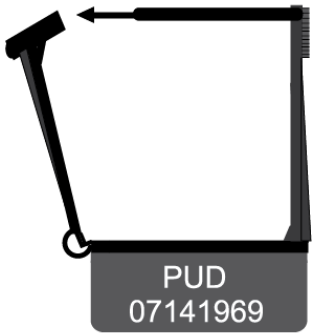
C. Sequence of Service Entrance Equipment

1. Self-contained service equipment 200 amps or less
   The sequence of service equipment for services metered with a socket type meter, and not requiring current transformers, shall be meter - switch, fuse or circuit breaker - load; refer to Figure 5-2, Figure 5-3, Figure 5-4 and Figure 5-5. See Section 5.A.15 for a list of prohibited devices.

2. Over 600 volts - primary metered.
   For requirements, contact the District.
3. Instrument metered service equipment 201 to 800 amps
   The sequence of service equipment for services metered with current transformers and/or potential transformers shall be instrument transformers with associated meter-switch-fuse-load except on switchboards designed with a main circuit breaker with sub-feed breakers to more than one customer. Refer to Figure 5-6 , Figure 5-7 and Figure 5-8.

District Meter Seals

Demand Meter Reset Seal

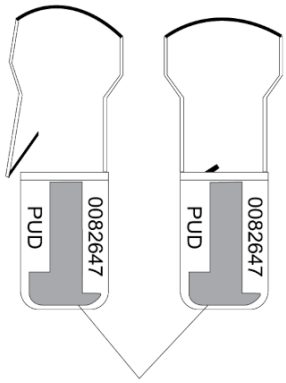


Black plastic meter seal used after resetting demand metering.

Note:

- Each plastic seal has a unique serial number.

Figure 5-1: Plastic Seals



Clear plastic edge with Green, Orange or Yellow coloring.

Seals are color coded to distinguish self contained meters, (a) where load side is dead when meter is removed from the metering socket and instrument metering, (b) when the load side is hot when meter is removed from the metering socket.

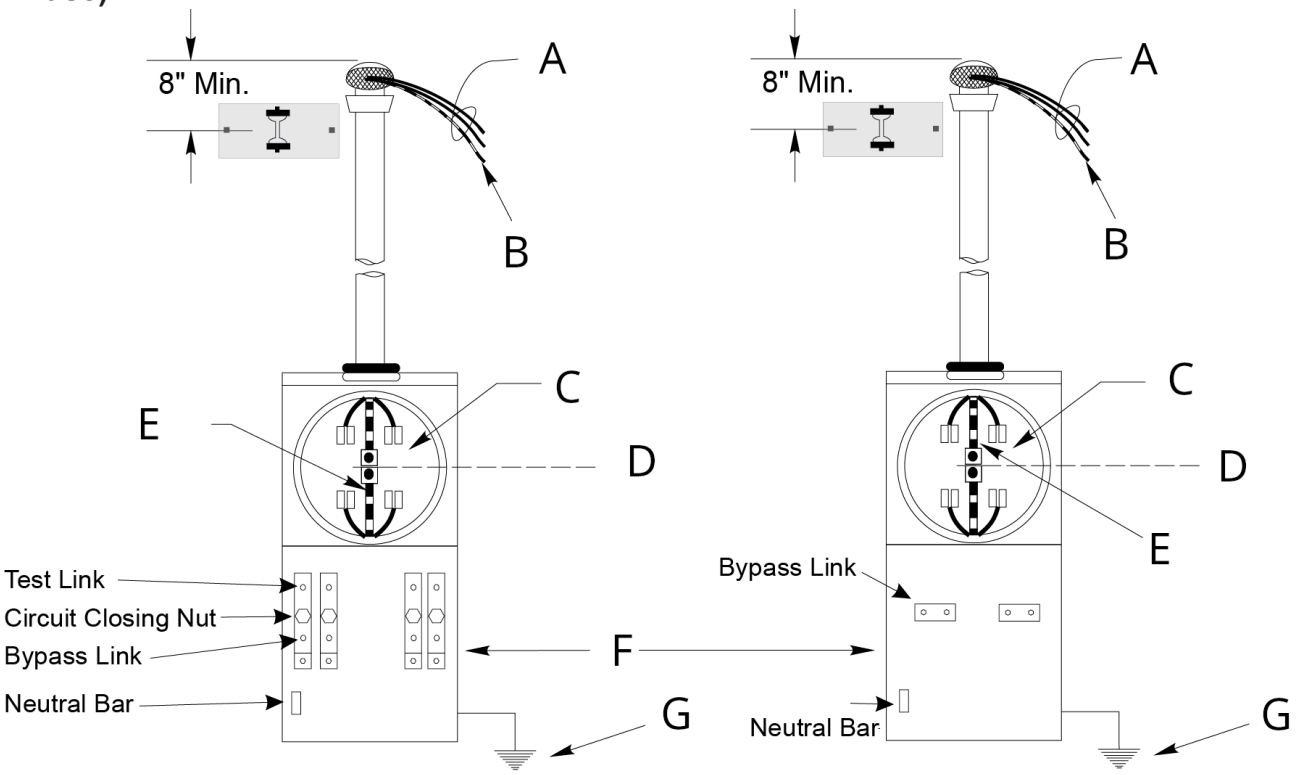
Color Code:

- Clear/Green - Self contained metering. Service active and normal.
- Clear/Orange - Instrument Metering. Service active and normal.
- Clear/Yellow - Meter disconnected.

Note:

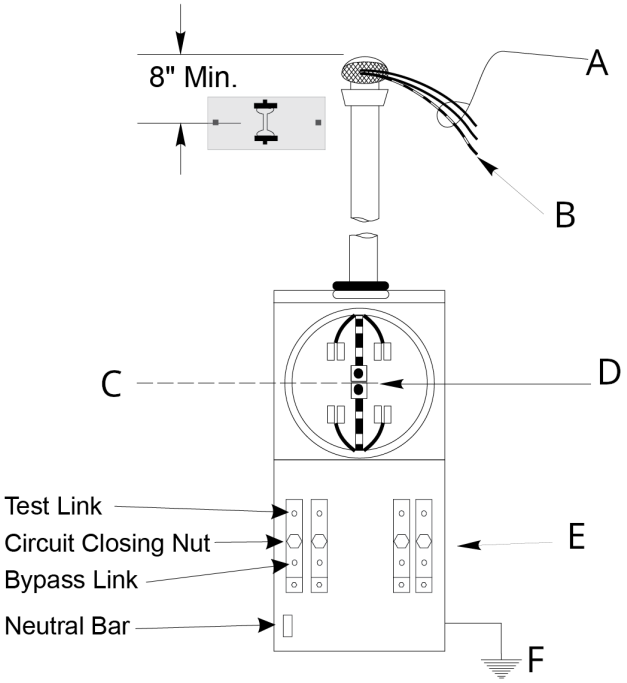
- Each plastic seal has a unique serial number.

Figure 5-2: 1Ø Service Entrance Equipment Self-Contained (240/120 Volt 3-Wire Single Phase)



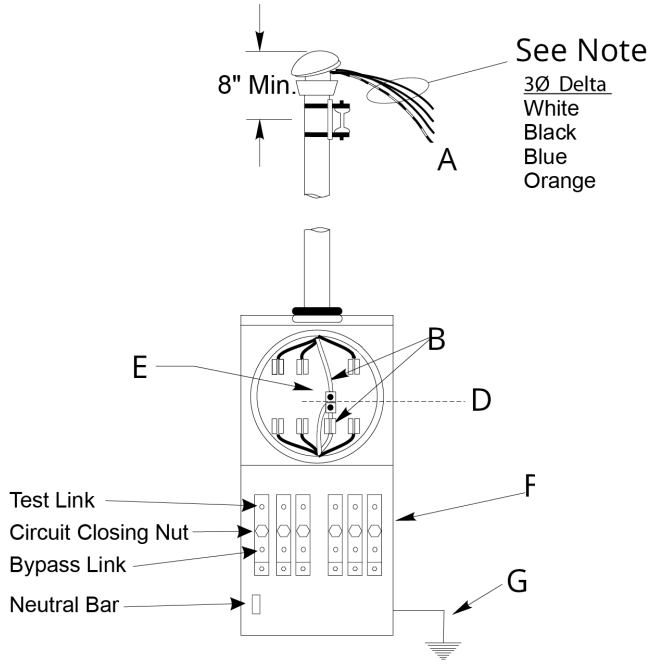
A. 18" Leads Minimum
B. Neutral shall be identified with white or gray tape
C. 4 terminal meter socket
D. Mounting Height 4' minimum to 6' maximum
E. Neutral bonded in meter socket Code white or gray
F. Commercial installations require safety socket or link by-pass
G. Ground per NEC

Figure 5-3: 480 Volt 3-Wire 1Ø



A. 18" Leads Minimum
B. Neutral shall be identified with white or gray tape
C. Mounting Height 4' minimum to 6' maximum
D. Neutral bonded in meter socket Code white or gray
E. Commercial installations require safety socket
F. Ground per NEC

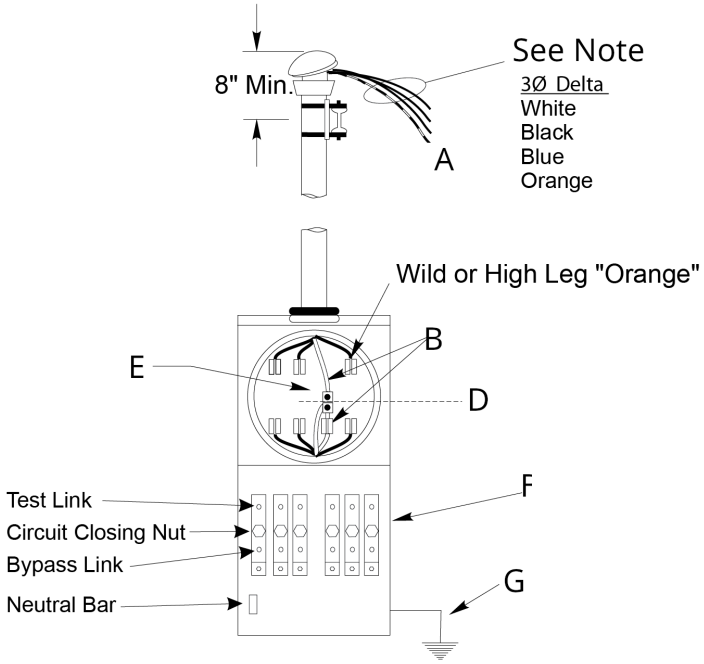
Figure 5-4: 3Ø Service Entrance Equipment Self-Contained - Wye
208/120 Volt 4-Wire 3Ø Wye
480/277 Volt 4-Wire 3Ø Wye



Note - Conductor Color Coding: Each service conductor shall be durably and permanently marked by an outer finish at each termination or junction point as follows. 3Ø Wye: White, Blue, Black, Red

A. 18" Leads Minimum. 3/0 Cu or 4/0 Aluminum Minimum
B. Neutral shall be identified with white or gray tape
C. 7 terminal meter socket
D. Mounting Height 4' minimum to 6' maximum
E. Neutral bonded in meter socket Code white or gray
F. All installations require safety socket
G. Ground per NEC

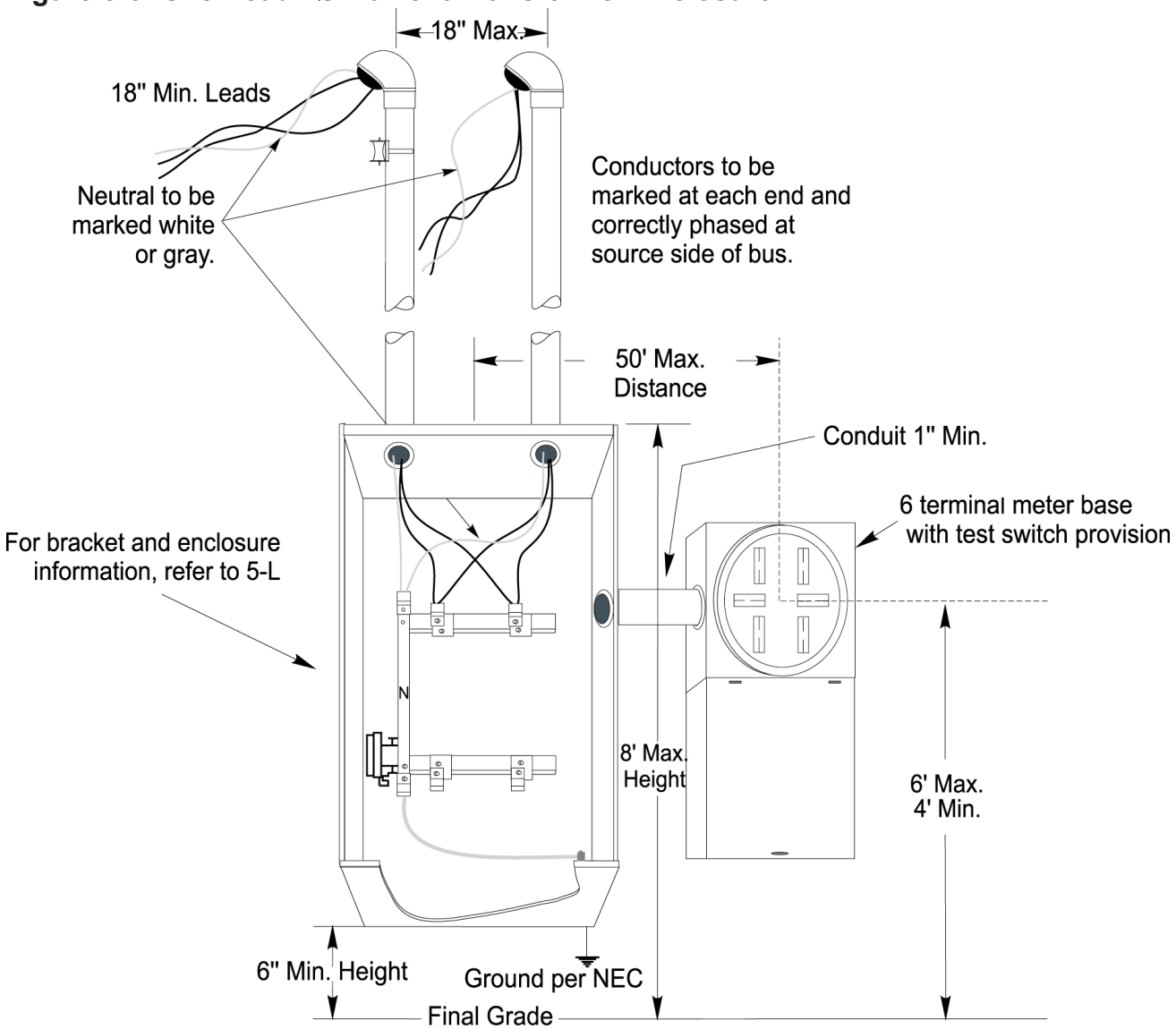
Figure 5-5: 3Ø Service Entrance Equipment Self-Contained - Delta
120/240 Volt 4-Wire 3Ø Delta
240/480 Volt 4-Wire 3Ø Delta



Note - Conductor Color Coding: Each service conductor shall be durably and permanently marked by an outer finish at each termination or junction point as follows. 3Ø Wye: White, Blue, Black, Red

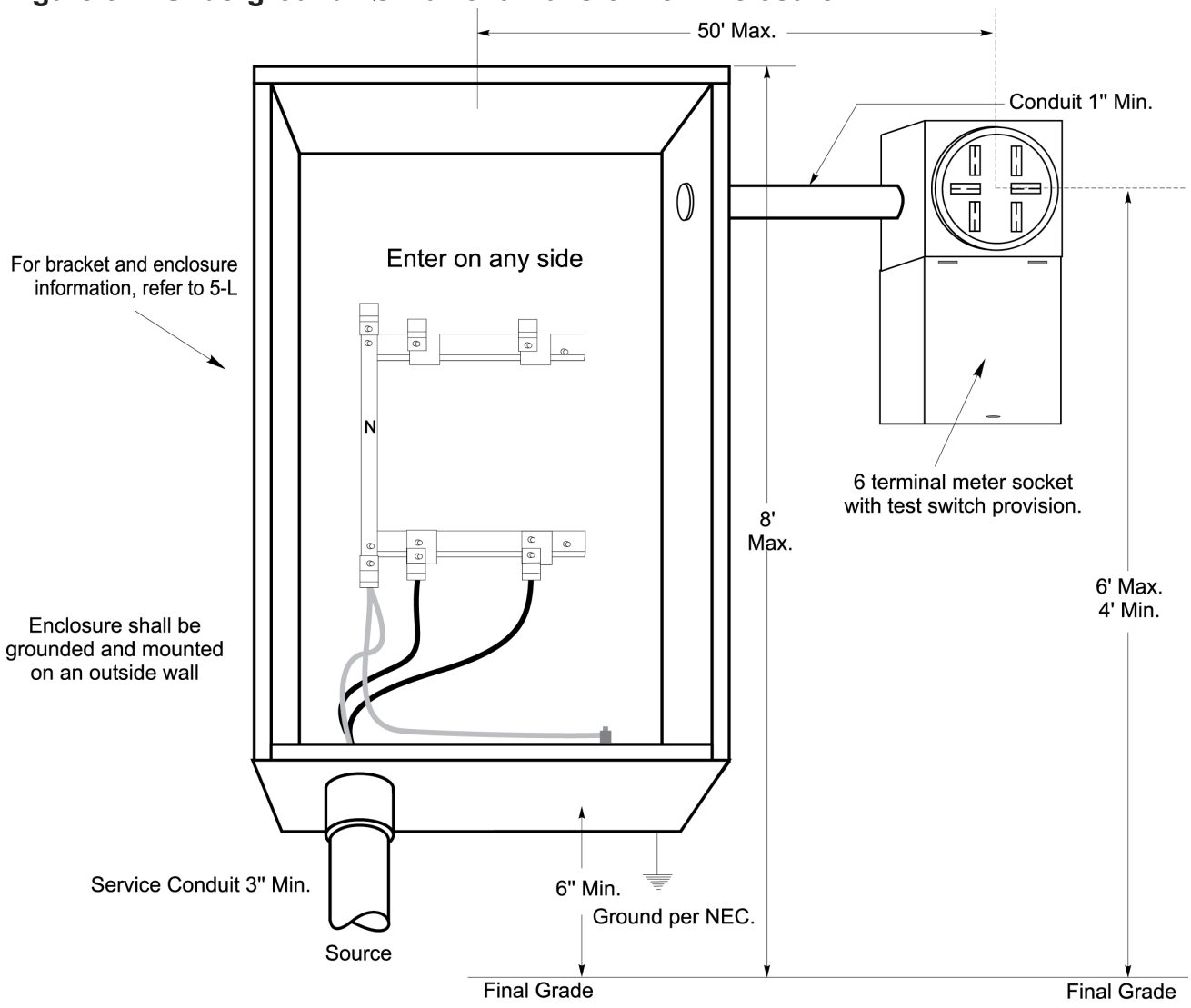
A. 18" Leads Minimum
B. Neutral shall be identified with white or gray tape
C. 7 terminal meter socket
D. Mounting Height 4' minimum to 6' maximum
E. Neutral bonded in meter socket Code white or gray
F. All installations require safety socket
G. Ground per NEC

Figure 5-6: Overhead 1Ø Current Transformer Enclosure



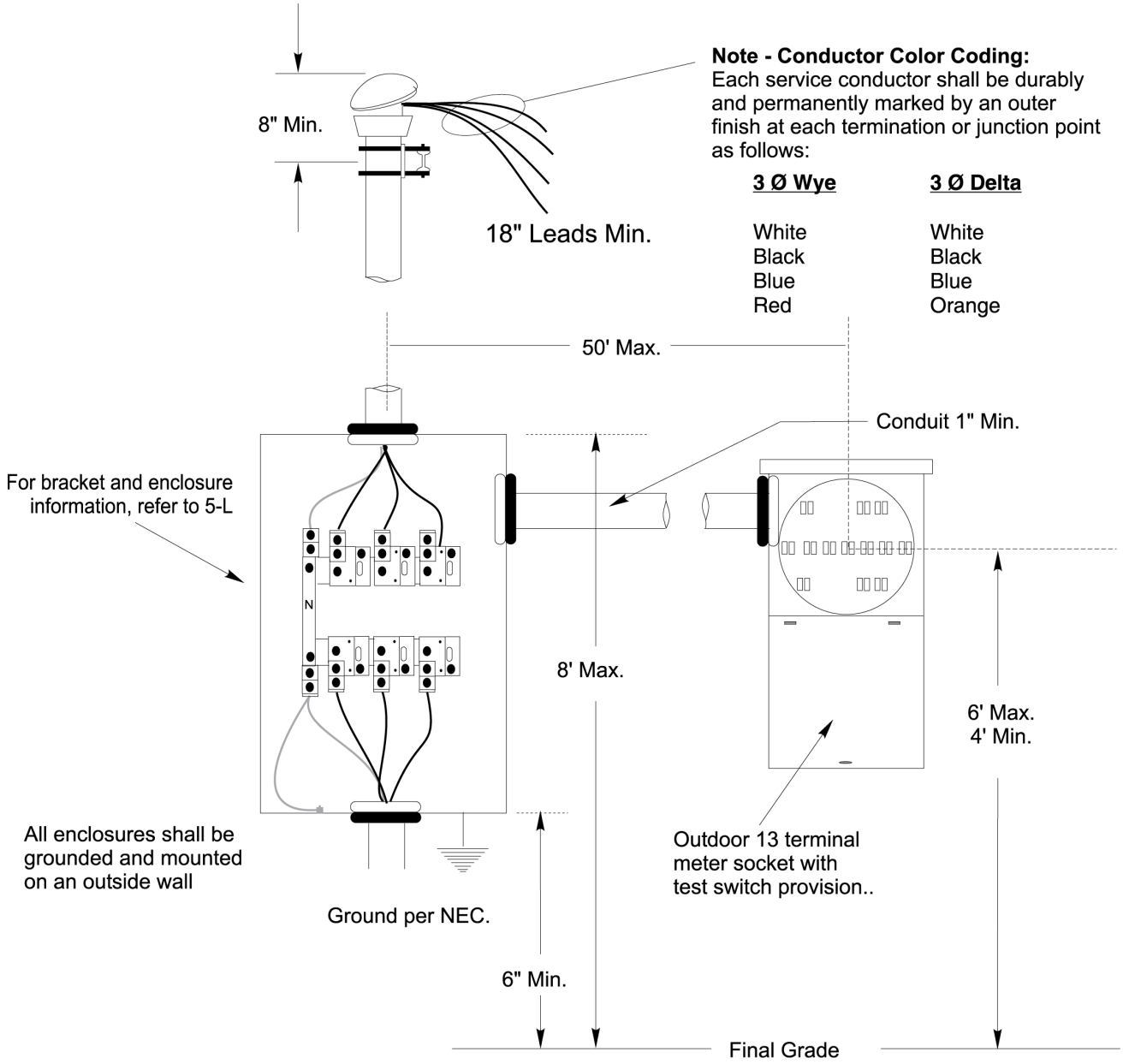
Note: The District will furnish, install and wire the current transformers. The District will also make metering connection and final service connection at the weatherhead. For current transformer rated 480V single phase, the District may install a voltage transformer.

Figure 5-7: Underground 1Ø Current Transformer Enclosure



Note: The District will furnish, install and wire the current transformers. The District will also make metering connection and final service connection at the weatherhead. For current transformer rated 480V single phase, the District may install a voltage transformer.

Figure 5-8: Overhead 3Ø Current Transformer Enclosure (3Ø Wye or 3Ø Delta)



Note: The District will furnish, install and wire the current transformers. The District will also make metering connection and final service connection at the weatherhead. For current transformer rated 480V single phase, the District may install a voltage transformer.

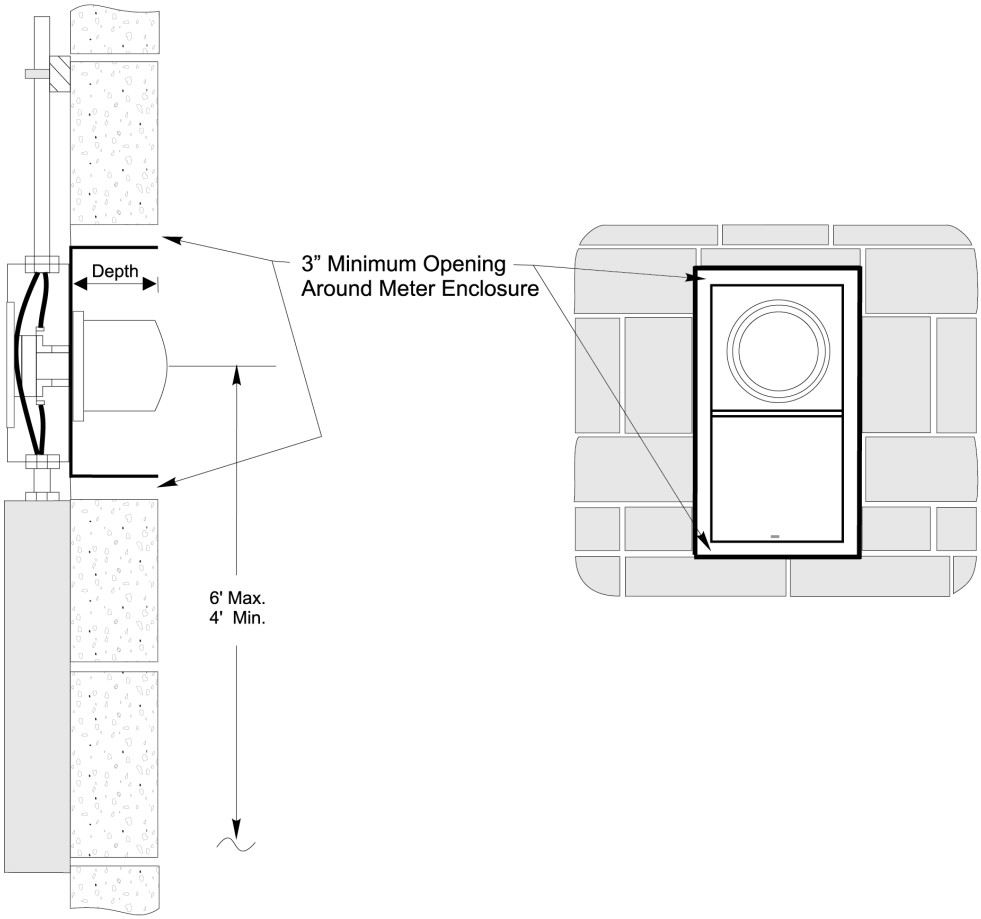
D. Meter Locations

1. The number of meter locations on any single structure will be determined by the number of service strike locations to the structure. Refer to Section 2-B.4.

2. Where there is more than one service point location permitted (by any exception), a permanent plaque or directory shall be installed at each service drop or lateral or at each service-equipment location denoting all other services on or in that building or structure and the area served by each.
3. The customer shall furnish a single location on the outside lines of a building with direct and safe access acceptable to the District, readily accessible without risk of bodily harm to District employees, free from vibration, corrosive atmosphere and abnormal temperatures in which to install the metering equipment. The equipment shall be protected from damage (WAC 296-46B-230). A 36-inch minimum clearance must be maintained from gas meters, propane tanks or piping.
4. Meters shall not be located in carports, breezeways, porches or similar locations. Meters shall not be located where it is required to access the meter by going through interior lines of a building such as breezeways, carports, parking garages etc.
5. The preferred location of any metered service shall be at a distance greater than 25 feet from railroad tracks.
6. Service locations – Mobile Home / Recreational Vehicle
    a. Permanent safe walking access shall be provided and maintained by the customer to meter poles or meter pedestals that have District equipment on them, i.e. meter and service wires. Refer to Section 2-O.
    b. When a meter pedestal is located in a parking area, it must be located and protected so that parked vehicles will not restrict meter accessibility or allow the pedestal to be damaged by vehicular traffic. Guard posts may be required for protection. Refer to Figure 4-15.
    c. Disconnect shall be located per approving authority.
7. Installation of six meters or less shall be on the outside lines of a building and shall be grouped in such a manner that a single service run will serve all meters.
8. Meters shall not be installed in commercial buildings above the first level or below the first basement level without prior District approval.
9. The number of meter centers in multiple floor buildings shall not exceed "one" for three floors, without District approval.
10. Installation of seven meters or more may be inside the lines of a structure provided the location is a dedicated metering room accessible to the District in accordance with the definition in the Glossary, in compliance with Section 5-D and with reference to Figure 5-11.

11. A meter installed in an alley, driveway, or walkway must be recessed in the wall (Refer to Figure 5-9) or protected adequately with guard posts to prevent damage from vehicular traffic, or impede pedestrian traffic.

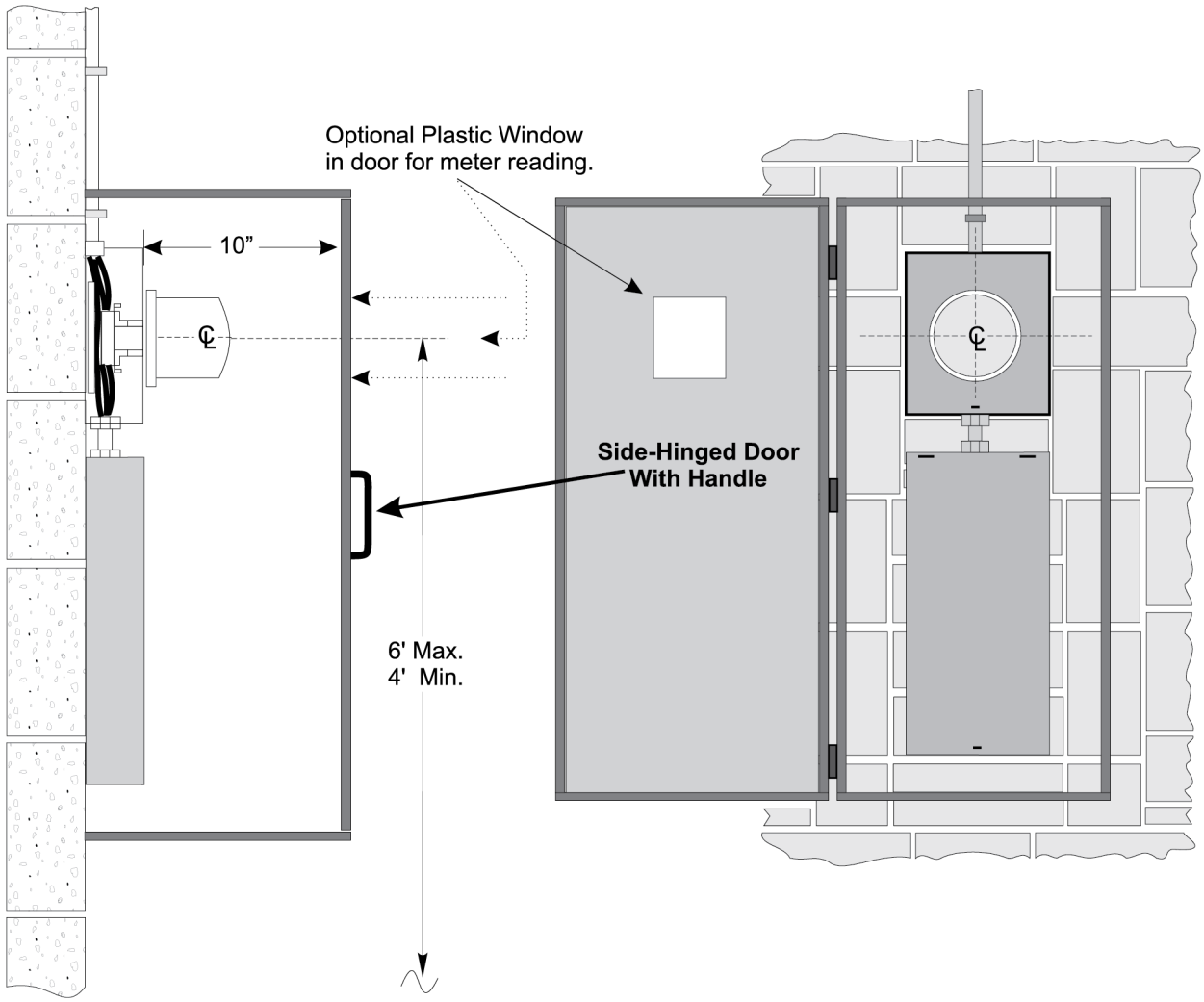
Figure 5-9 Recessed Meter Clearances



Notes:

1. Opening must extend a minimum of 3' around the meter enclosure
2. Depth must not exceed 9"
3. All meters shall be readily removable, i.e. not plastered in or built in
4. The meter recessed opening shall be as shown with the socket centered therein
5. "Ring type meter base required"
6. Doors over meters are not allowed

Figure 5-10: Meter Cabinet Enclosure



Notes:

1. Opening must extend a minimum of 3" around the meter enclosure
2. Depth must not exceed 10"
3. Access door and cabinet shall be maintained by the Customer
4. Access door shall...
    - be side-hinged
    - open at least 90 degrees
    - remain unlocked by Customer to allow access at all times
    - be permanently labeled "ELECTRIC METER"

E. Meter Rooms

1. A minimum of seven or more active metered services are required before a meter room will be allowed.
2. The required BEST lockset must be installed on the meter room door and a unit verification be completed before the billing of the meters will be taken out of the owner/contractors name.
3. Permanent labeling of service identification is required. Refer to Sections 2-F. and Section 5-F.

4. ***When a metering room is requested, a floor plan shall be submitted to the District for approval in the design stage and prior to any construction or wiring*** (WAC 296-46B-230).
5. The meter room shall be dedicated and secured for electrical equipment and never used for storage.
6. The meter room shall not be installed above or below the ground level of the building and shall be accessible through a single exterior door on the exterior lines of the building.
7. Safe access must be provided to the exterior door without having to enter or go through such areas as parking garages, hallways, breezeways, stairways or other such interior building lines.
   Exception: When reviewed and approved in advance of final design and construction, a meter room may be allowed on the ground floor in the parking garage of a large commercial structure such as an apartment building or condominium if it complies with the following requirements:
   a. The egress into the parking garage is at the ground level elevation through an exterior man-door or roll up door, and the required BEST knobset or BEST electromechanical switch is located on or near the access door keyed with a different “SP” tumbler series core than used for the Meter Room door.
   b. There is a phenolic sign in accordance with Section 5.F. permanently attached to or next to the exterior entrance indicating “PUD Electrical Room Inside”.
   c. The meter room door is in compliance with 5.E.8. (below) and that the “SP” core shall have a different tumbler series core than the exterior access door with a limited amount of keys so that tenants do not have the ability to enter the meter room.
   d. Access by District employees to all other interior areas of the building, including elevators and interior stairways, is restricted by use of locking knobsets or electronic card key passage.
8. Meter Rooms shall be secured according to the following requirements:
   a. Location: The access to the Meter Room shall be from the exterior ground level lines of the building via a minimum 2’8" x 6’8" solid core or steel door. Doors shall include a latch guard plate.
   b. Knobset: Heavy duty BEST knobset (*Series **#83K7D4D_ 626 SPN**, or Series **#93K7D15D _ 626LM***) from BEST Access Systems.
      Note: *The use of a key box is not acceptable.*
   c. Panic Bar: In the event a panic bar device and/or a door closure is installed a heavy duty panic bar exit device (***Precision 5100 or 5200 series in 603, 703A or 808A trim***) and heavy duty automatic door closure **(Stanley No. HD8016 or Stanley QDC211 F 689)** is required.
      Note: *Panic bar and automatic door closures from alternate manufacturers are not acceptable.*
   d. Locking System: After the installation of knobset or panic bar, a locking system shall be furnished and keyed with an "SP" tumbler series core which will accept the District's master key. The locking system shall not allow common access to unauthorized individuals. To purchase the required locking system, please contact:

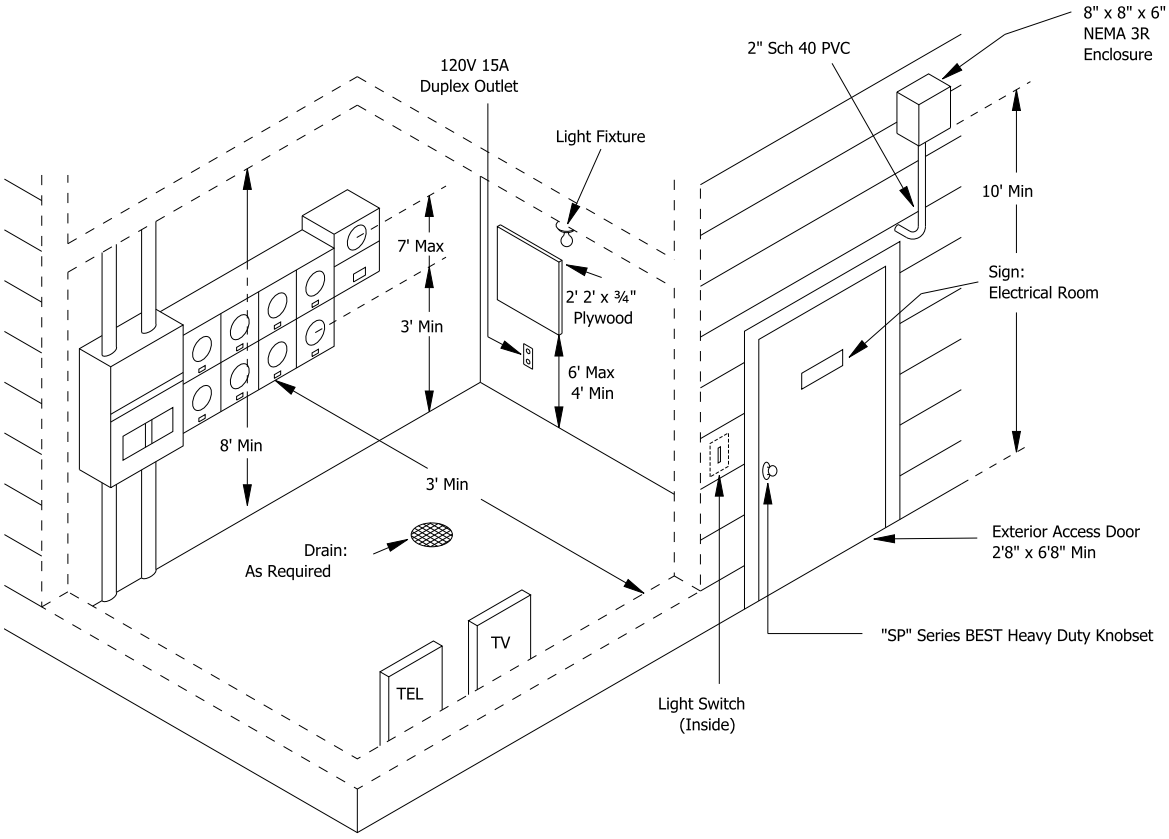
      Everett Safe and Lock & A-1 Mobile Lock and Key
      5108 Evergreen Way, Ste 3
      Everett, WA 98203
      pudlocks@everettsafeandlock.com
      Phone: 425-258-1422

      Puget Sound Hardware
      4710 B St NW, Ste 105
      Auburn, WA 98001
      Attn: Niki Eklof
      800-464-4801 Ext 102

9. The owner and his/her agents and/or the homeowners association of the building shall be responsible to install, retain and maintain the District's required BEST knobset and passage key system for the life of the service to the premises or the electrical service to the building will be subject to disconnection.
10. The customer/owner shall furnish and install and maintain a permanent sign on the exterior door stating **"Electrical Room"** and provide building identification in multiple unit complexes.

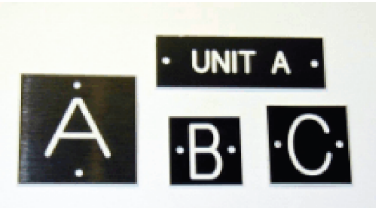
11. The customer/owner shall agree to allow the District to furnish and install an "Electrical Room" sign on the interior surface of the Meter Room door and shall further agree to allow this sign to remain clearly legible without removing, covering or painting over the sign for the life of the service to the premises.
12. Telephone and Cablevision terminal equipment may occupy this room provided they do not interfere with the electrical equipment, and each shall have its own provision for access.
13. The room shall be illuminated by permanent fixture(s) with a switch inside next to the latch side of the door, with a minimum of 10 foot candles per square foot.
14. The access door shall be installed such that it will not make contact with the meters or other electrical equipment.
15. Water, gas, sewer and drain pipes shall not terminate or pass through this room (sprinkler systems required by building codes are exempt).
16. Proper drainage will be required when there is a possibility of standing water.
17. The room shall have a 2' x 2' 3/4" sheet of plywood installed on the wall for the exclusive use of District equipment. The plywood shall be permanently labeled "PUD Use Only". The plywood shall be mounted a minimum of 4' and a maximum of 6' above the floor. There shall be a 120V 15A duplex outlet below the plywood for use in powering District equipment.
18. There shall be a 8"x8"x6" NEMA 3R enclosure with 4 screw cover mounted a minimum of 10' and maximum of 40' above the ground on the exterior of the building with bucket truck access. The specific location of the enclosure shall be reviewed and approved by the District. A minimum #6 copper (solid or stranded) grounding conductor shall be installed up to the NEMA enclosure for grounding antenna equipment.
19. A continuous 2" Schedule 40 PVC conduit shall run from inside the meter room into the external NEMA 3R enclosure. Length of the conduit shall be limited to 75 feet with a maximum of 360 degrees of bends. A nylon pull string shall be installed at the time that the PVC is installed. A minimum #6 copper (solid or stranded) grounding conductor shall be installed on the inside of the exterior wall in which the 2" conduit enters the building for grounding coax cables.
20. Refer to Figure 5-11 for illustration of a “Typical Meter Room”.

Figure 5-11: Typical Meter Room



F. Service Identification/Meter Labeling

Permanent identification shall be described as properly installed phenolic labeling for those pieces of equipment that correspond to the premise being served. (see examples below).



Businesses that can supply phenolic labels may be listed in your phone book yellow pages under the classifications “Engraving”, “Trophies” or “Plaques” or located by performing an internet search.

Unit Identification Examples

Multi-unit meter base installations, and other areas such as commercial buildings with meters and equipment installed on building walls in an alley or on the back walls of a strip mall, where there may be confusion of which premise is served by which meter must be permanently identified with phenolic labeling in compliance with the following requirements, the account will remain in the owner's name until the units have been verified by the appropriated District personnel.

Material and Format of Labels

- Engraved phenolic labels shall be used.
- Labels shall have plain block letters or numbers with a contrasting background.
- Block letters shall be at least 1/2" (12.70mm) minimum in height unless specifically required to be larger by the District.

Information on Labels

- Labels shall clearly indicate corresponding unit served by each meter.

Placement of Labels

- Labels will not be placed such that they obscure any information printed or labeled on the equipment.
- Position the label so that it is readily visible and that it is obvious what equipment the label describes.

Attachment of Labels

- Labels shall be smoothly attached to the metering equipment with no overlaps, protrusions or sharp edges and corners.
- Labels shall be applied in a craftperson-like manner and never applied over existing phenolic labels.
- Labels may have self-adhesive backs to aid in installation but each label shall have at least 2 holes (larger labels shall have at least 4) and be secured to the piece of equipment with appropriate sized pop-rivets or screws to keep the label from being unintentionally removed. All labels shall be installed and secured with pop-rivets or screws before they will be accepted by the District. Use caution when drilling and installing pop rivets or screws to avoid accidental contact with conductors.

G. Clearances

1. All meter enclosures shall be readily accessible, i.e., not plastered in or built in. If installed in a recessed opening, the socket shall be arranged so that the minimum vertical distance between socket centers is 10 inches and the minimum horizontal distance is 8 inches. Refer also to Figure 5-9 for recessed meter clearances.
2. Working space in front of meters or metering equipment shall not be less than 36 inches, measured from the front of meter glass. The height clearance of this area shall not be less than 7 feet above the finished grade, floor or working platform. The platform must be safely accessible via a permanent stairway. The platform, railing and stairway shall conform to all local building codes and regulations. The platform must be submitted and approved prior to and after actual construction by using the District's Variance Request form in Section 2. Refer to Figure 5-12 through Figure 5-14 for an example of an approved platform.
3. Electric meters shall be installed a minimum of three (3) feet from Natural Gas Meters, measurement shall be from edge to edge. In accordance with the requirements from:

   National Electrical Safety Code, (NESC) IEEE C2-1997.
   National Electrical Code (NEC) NFPA 70-1996
   Flammable and Combustible Liquids Code, NFPA 30-1996
   Standard for the Production, Storage and Handling of Liquefied Natural Gas, NFPA 59A-1994.

4. Working spaces in back of a freestanding switchboard shall not be less than 36 inches from the panel to the rear wall with provisions for safe exit.

H. Equipment Height

1. The meter height shall not be more than 6 feet nor less than 4 feet above the finished grade or floor below the meter with the reference point being the center of the meter.
   Exception A:
   When multiple meters (seven or more) are located inside buildings in an approved meter room, the meter socket center shall not be higher than 7 feet and not lower than 3 feet above finished grade or floor immediately below the socket.
   Exception B:
   Pedestal meter height shall not be less than 3 feet or greater than 6 feet from finished grade with the reference point being the center of the meter.
2. The maximum height to the top of a current transformer enclosure is 8 feet. The minimum height to the bottom of the enclosure is 6 inches above final grade.

I. Meter Platform Landing Example (Figure 5-12)

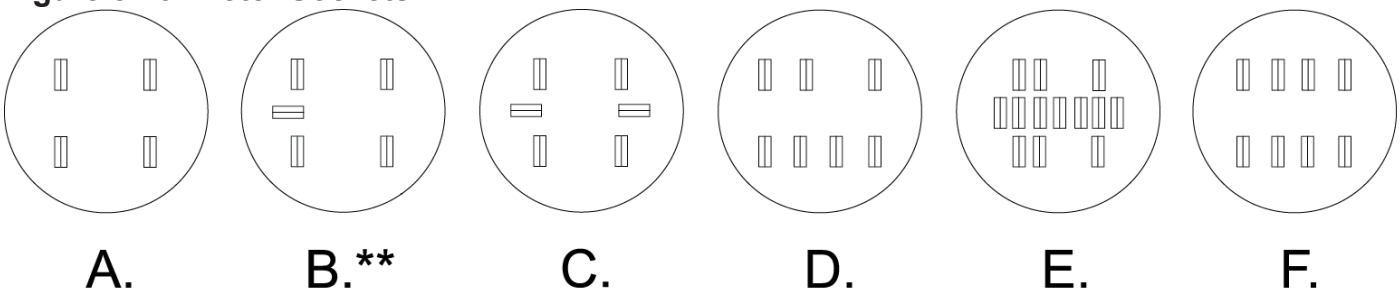
J. Meter Sockets

1. All single phase commercial services rated 60, 100 or 200 amperes with phase to phase voltage of 300 volts or greater shall be safety socket type. Phase to phase voltage under 300 volts shall be safety socket type or have link-type manual by-pass.
    a. Ring type meter sockets only.
    b. Slide-link and lever-type by-passes **are not allowed**.
    c. Meter bases with automatic circuit closing devices are prohibited.
2. Arrangement of Meter Sockets
    a. Sockets and socket enclosures shall be designed in accordance with the latest revisions of ANSI C.12.7 standards for watt-hour meter sockets, EEI Publication MSJ-7 and with Underwriters Laboratories Standard For Meter Socket UL 414.
    b. Socket forms or arrangements to provide correct metering for the various systems used in the District are illustrated in Figure 5-12 through Figure 5-14.
3. Meter bases shall be mounted plumb and be securely fastened to the structure to withstand forces of the installation or removal of the meter.
4. Unused threaded openings and knockouts in trough type enclosures must be fitted with approved plug locked in place from the inside.
5. Meter bases with automatic circuit closing devices are prohibited.
6. Taps are not allowed in meter sockets or enclosures.
7. Meter socket enclosures are not to be used as a raceway.
8. The line supply conductors to a socket shall be connected to the top terminals and the load supply conductors shall be connected to the bottom terminals.
9. Meter Sockets for Residential Underground Service:
    a. Services shall use listed or approved sockets that are 200 or 400 ampere rated.
    b. Minimum socket dimensions shall be 4 inches in depth, 10-1/2 inches in width and 14 inches in height. Exceptions to this ruling shall be made only by submitting a Variance Form for approval before wiring has begun.
    c. Conduit shall not enter the center of the bottom of the meter base, but shall be off to one side to provide conductor clearance.
10. A three-wire 120/208 or a 277/480 volt service rated 200 amps or less requires a five terminal socket. The fifth terminal shall be in the nine o'clock position. A #10 insulated white wire from the neutral grounded conductor shall be connected to the fifth terminal. Refer to Figure 5-13 for terminal arrangements.
11. Three phase four-wire services require a seven terminal safety socket. The neutral tap must be connected to the terminal second from the right on the bottom or load side. Refer to Figure 5-13 for terminal arrangements.
12. When aluminum conductors are used, the meter socket must be listed or approved and clearly marked by the manufacturer that it is acceptable for aluminum conductor.
13. The neutral service conductor shall be bonded to the meter base using the grounding screw or bonding terminal. The neutral service conductor may be continuous from the weatherhead through the meter socket to the service panel or disconnect provided a neutral tap for metering is not required. All neutral taps must be in the meter enclosure.

Table 4
Meter Socket Terminal Arrangements

Self-Contained		***Voltage***	***Instrument Transformer Metered***		
No. of Terminals	Socket		No. of CT's	No. of Terminals	Socket
Single Phase			**Single Phase**		
4	A	120/240	2	6	C (w/ Test Switch Provisions)
4	A*	120/240			
4	A	240/480	2	6	C (w/ Test Switch Provisions)
Three Phase 3 Wire Network			**Three Phase 3 Wire Network**		
5	B**	120/208	2	8	F (w/ Test Switch Provisions)
5	B**	277/480	2	8	F (w/ Test Switch Provisions)
Three Phase 4 Wire			**Three Phase 4 Wire**		
7	D	120/208	3	13	E (w/ Test Switch Provisions)
7	D	120/240	3	13	E (w/ Test Switch Provisions)
7	D	240/480	3	13	E (w/ Test Switch Provisions)
7	D	277/480	3	13	E (w/ Test Switch Provisions)

Figure 5-13: Meter Sockets

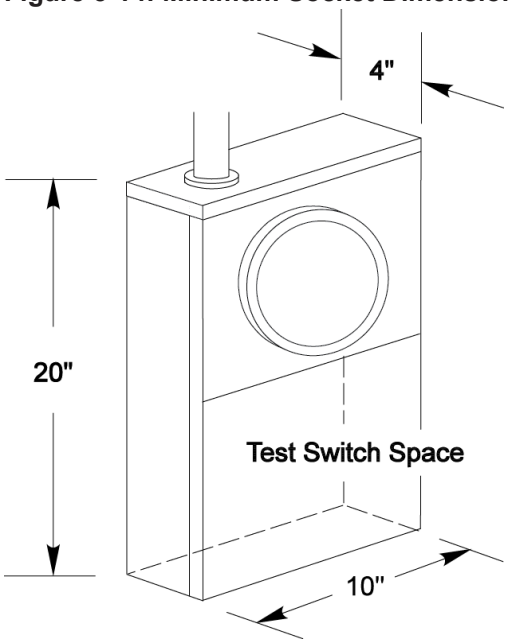


* 320 Amp Meter Socket with Link Bypass
*Fifth meter terminal shall be installed in the 9 o'clock position
Three phase services metered with current transformers, the customer shall provide a meter socket with test switch provisions. These meter bases shall be a minimum of 20" x 10" x 4". Refer to figure 5-14

14. Potential taps, including the neutral tap, shall be located behind a sealed panel.

15. A meter socket with test switch provisions shall be installed by the customer on all metering using current transformers. Refer to Figure 5-16 for minimum socket dimensions for single phase, three phase and Network Metering.

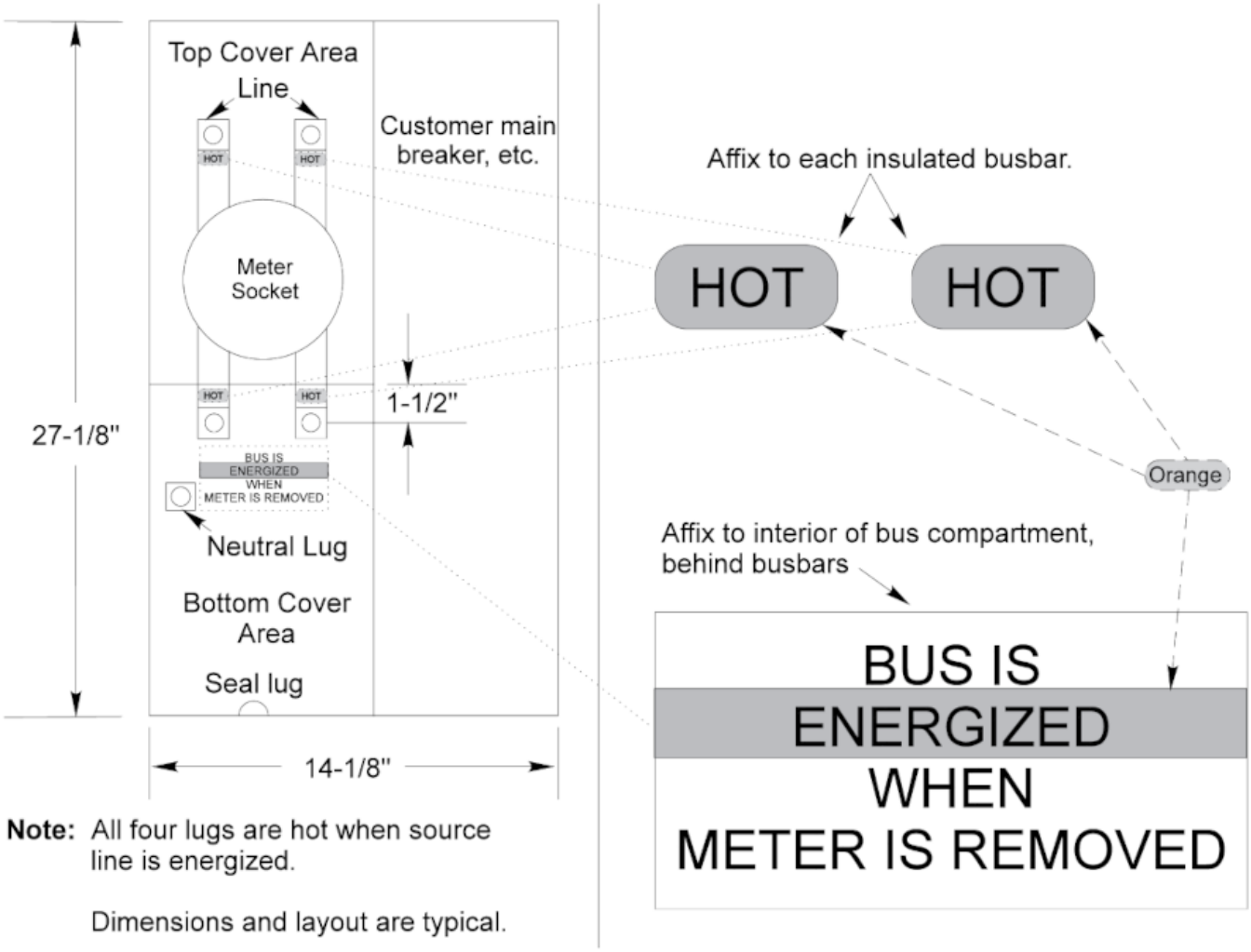
Figure 5-14: Minimum Socket Dimensions



16. Feed-Through Bus
    a. On overhead services when a feed through bus style meter socket which has lower bus energized at all times, the following procedures will be accomplished by the customer or his contractor prior to acceptance by the District. Refer to Figure 5-17.
        - **The lower line bus shall be insulated.**
        - **The lower line bus shall be labeled as " Energized".**
        - **The lower line bus shall be tagged as "HOT".**

       Examples of the label and tags are shown below.
    b. The unit will then be energized and a barrel bolt lock on the lower left-hand panel will be installed by the District.
    c. Known units of this type are:
       Cutler Hammer Cat. No. CMBE88B200BTS and Cat. No. BR MBE48B200BTS.

Figure 5-15: Meter Socket With Feed Through Bus



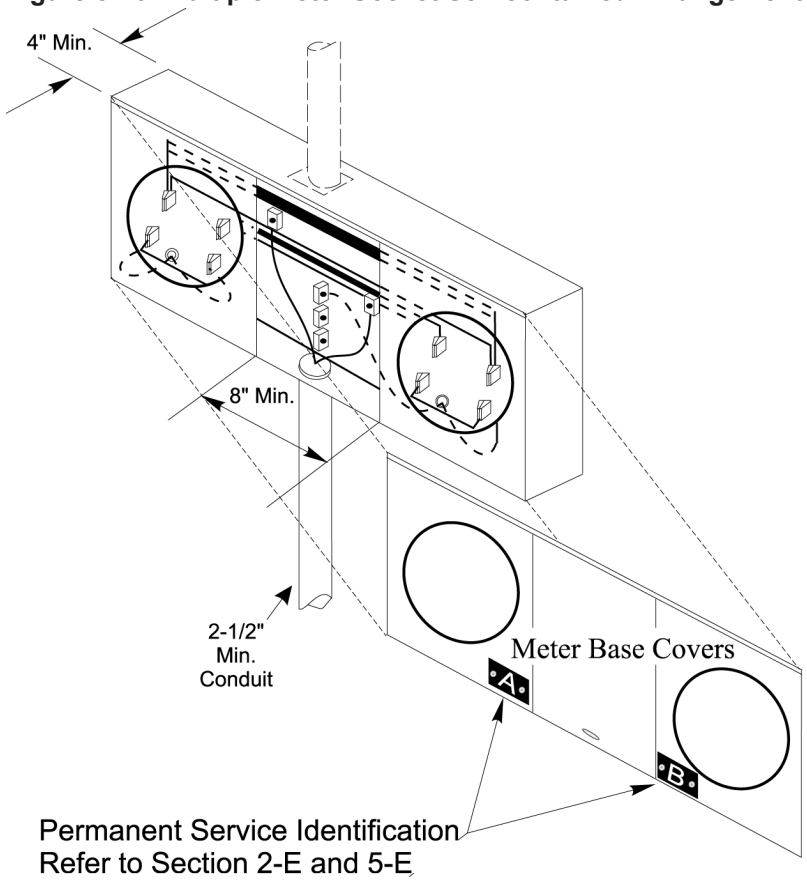
Note: All four lugs are hot when source line is energized.

Dimensions and layout are typical.

K. Multiple Meter Socket Self-Contained Arrangements

1. Single phase service
   a. Four terminal meter sockets rated 200 amps or less.
   b. Multiple meter sockets from two to six are allowed without requiring a main disconnect. Refer to Figure 5-18.
   c. Solid bus bar type is required.
   d. Meter sockets can be arranged horizontally, vertically or combinations there of.
   e. Permanent service identification is required. Refer to Section 2-F and Section 5-F.

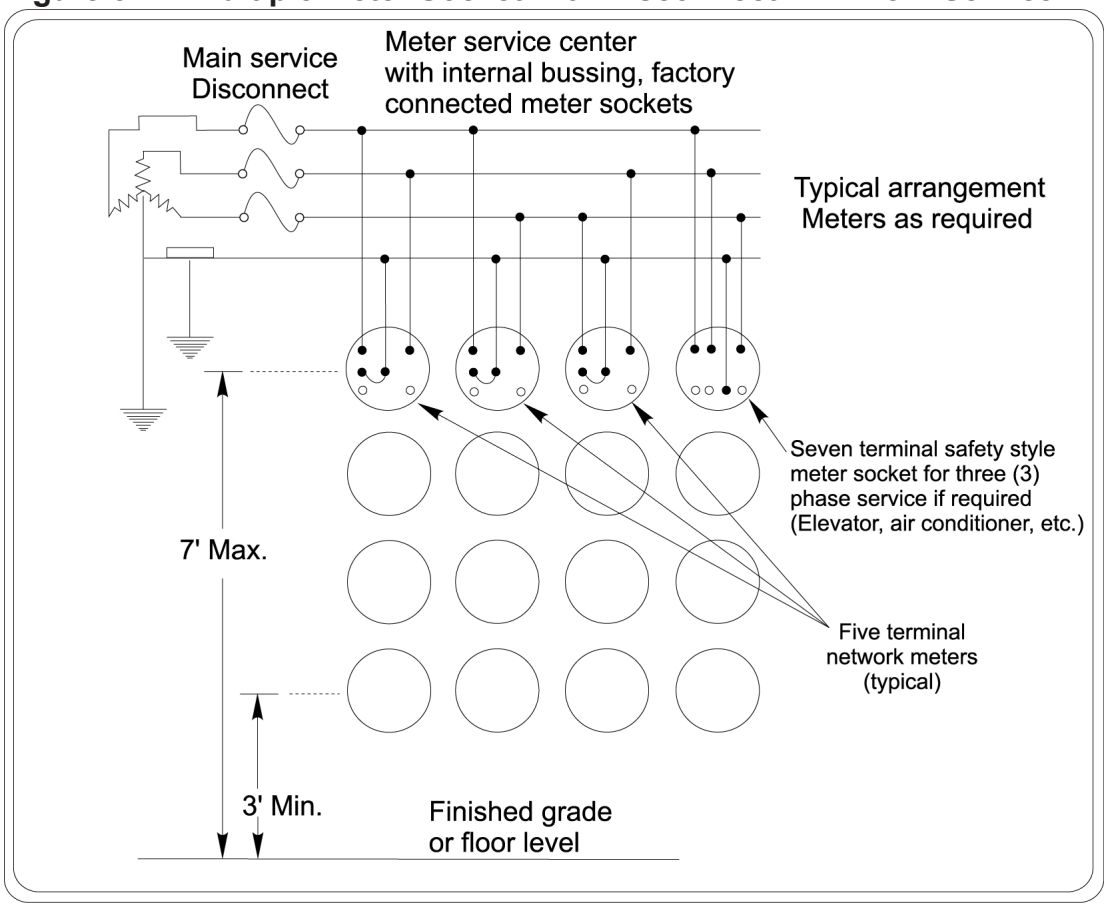
Figure 5-16: Multiple Meter Socket Self-contained Arrangements



2. Three phase service under 300 volts, phase to phase, 200 amps or less.
   a. All load to be balanced between phases, ± 10%.
   b. Load center may be top or bottom connected.
   c. Load center to be approved by the District before being installed.
   d. Automatic bypass type meter sockets are not allowed.
   e. Slide link and Lever By-Pass are not allowed.
   f. Safety sockets are required.
   g. Permanent service identification for all meters is required. Refer to Section 2-F and Section 5-F.

L. Multiple Meter Socket with Disconnect-4 Wire Y Service

Figure 5-17: Multiple Meter Socket with Disconnect - 4 Wire Y Service



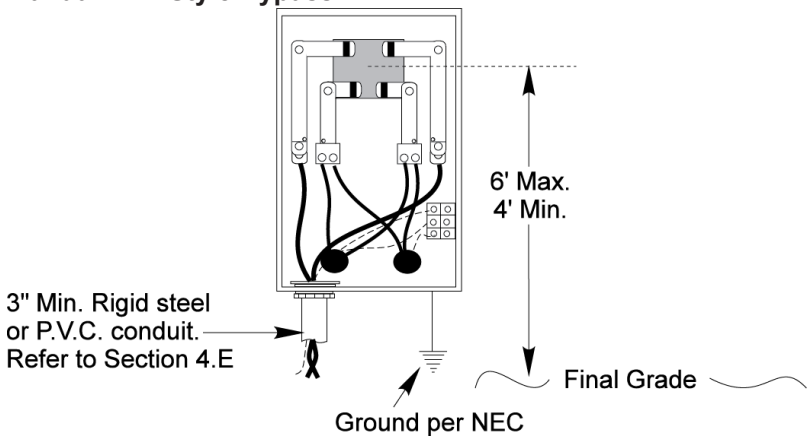
M. Meter Retaining Rings

1. The District will furnish and install a meter ring for all District meter installations in compliance with District requirements.
2. Ringless, sealable, front panel type meter sockets are acceptable for maximum 200 ampere single phase residential services.
   Exception:
   i. Recessed meter sockets shall be ring type only.
   ii. Multiple or gang metering, all sockets shall be ring type to accept lock rings.
   iii. Individual Safety Sockets shall be ring type only.

N. Metering - Services Over 200 Amperes

1. The preferred installation for single phase services rated 201 to 400 amps at 120/240 volts is a 400 amp meter socket for use with a class 320 meter. Refer to Figure 5-20.
   a. Ring type meter mounting only.
   b. Link type manual bypass is required.
   c. Slide link and lever type bypasses **are not acceptable**.

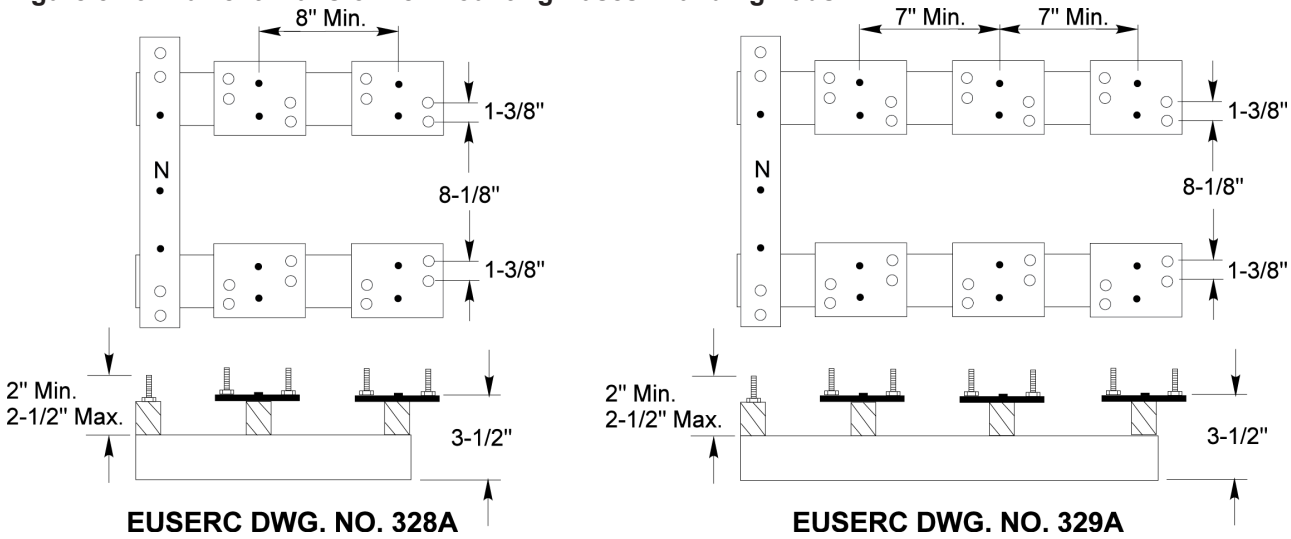
Figure 5-18: Typical Underground 400 Amp Meter Socket For Use With a Class 320 Meter With A Manual Link Style Bypass



2. Single phase services 201 to 400 amps may use current transformer installations.
   The customer shall furnish and install the current transformer enclosure. Refer to item 5 of this section for requirements.
3. Single phase services 401 to 800 amps and three phase 201 to 800 amps may use a current transformer enclosure or a switchboard.
   a. When current transformer enclosures are used, they shall be installed on the outside of the building and shall comply with the requirements listed in item 5 of this section.
   b. The District will furnish, install and wire the current transformers in the current transformer enclosure.
4. All services 801 amps and above shall be installed in switchboards. Refer to Section 5-O.

5. Current Transformer Enclosure Requirements
   Note: There will be no new installations of current transformers mounted directly on service entrance masts, building walls or meter poles.
   a. A "Current Transformer Enclosure" (commonly known as a "C T Can") is a separate enclosure which contains a commercially manufactured mounting base or landing pad to terminate the incoming and outgoing conductors and for mounting the current transformers.
   b. The customer shall furnish and install the current transformer enclosure and related equipment excluding the current transformers and meter wiring.
   c. The enclosure shall be UL approved. Enclosures shall be rain-tite type and sealable. Sealing provision shall be an integral part of the cover for installation of District seals.
   d. The typical cover of a current transformer enclosure shall be a single cover or the cover shall be hinged. Two-piece overlapping covers may be allowed on some larger CT enclosures (e.g. 36" wide by 42" high) check with the District's engineer before installing. The cover shall not be used for mounting meter(s) or other equipment.
   e. For single phase units the cabinet shall be 24" x 36" x 11" minimum, for three phase units the cabinet shall be 36" x 36" x 11" minimum. Refer to the NEC for additional requirements.
   f. Mounting bases or landing pads required for terminating conductors and mounting current transformers shall be as specified in drawing 328A single phase, or drawing 329A three phase of the EUSERC Manual. Refer to Figure 5-21.
   g. Enclosures shall be grounded.
   h. The mounting height of transformer enclosures shall be limited such that the top of the enclosure shall not be more than 8 feet above the floor or working platform of same unless exception is specifically permitted by the District. The minimum height shall be 6 inches above the floor or working platform level. Enclosures shall not be mounted in or under floor crawl spaces.
   i. Current transformer enclosures shall be mounted on the outside walls of buildings.
   j. All service entrance line side conductors shall be on the outside of the building.
   k. The meter socket shall not be separated from the enclosure by a distance greater than fifty feet.
   l. Current transformer enclosures shall contain only service conductors and transformers. The enclosure shall not be used as a junction box, or raceway for other wires or conduits.
   m. Current transformers are furnished, installed and wired by the District when approved current transformer enclosures are utilized for metering.
   n. Current transformer enclosures shall not be installed on ceilings. If the enclosure is installed on a balcony or platform, it must be available by a permanent stairway which conforms to OSHA standards.

Figure 5-19: Current Transformer Mounting Bases / Landing Pads



6. Current Transformer Conduit
    a. The customer shall provide proper size conduit for the metering conductors between the meter socket and the current transformers. Flexible conduit, condulets and LB's shall not be used.
    b. Current transformer enclosures must be connected to the meter socket or meter enclosure with conduit and shall be bonded by approved methods. A minimum of 1 inch rigid steel, EMT or Sch 80 PVC conduit is required.

O. Metering on Switchboard or Panels

1. Multiple Self-Contained Metering
    a. The clearance space around each meter socket shall not be less than 1 inch at the top and sides nor less than 2 inches at the bottom.
    b. Individual disconnects shall be on the load side of each meter socket.
    c. All unmetered compartments, on the line side of the meter, shall be sealable with padlock-type seals.
2. Current Transformer Switchboard Metering
    a. All services 801 amps and above shall be installed in switchboards.
    b. All services installed in switchboards shall be metered with large window current transformers. See EUSERC Drawings 330 and 322 for details. Bus link kits are required if the switchboard is built to EUSERC drawing 319 or 320
    c. Prior to the manufacture of the switchboard, the customer shall submit the switchgear drawing by means of a paper copy or electronic format to the District for approval and determination of the type meter or meters that will be used, type and size of current transformers and arrangements for mounting. Switchboards shall conform to EUSERC Standards approved by the District as listed on the EUSERC acceptability pages.
    d. Provision for current transformers shall be built into the bus of the switchboard (this shall be a sealable compartment, accessible only to the District).
    e. The District will furnish current transformers after approval of submitted drawings. The contractor shall pick up current transformers at the District's Meter Department (1802 75th St. SW, Everett).
    f. Working space requirements for meter socket and associated equipment shall be in compliance with Section 5-G.
    g. The electrical contractor shall install the metering socket and metering wires from the current transformer compartment to the meter socket. Current transformer instrument conductors shall be sized and color coded as indicated in Table 2 of this section.
    h. All unmetered compartments shall be sealable with padlock–type seals.
    i. The meter socket itself shall be on the outside of the building. Meters shall not be mounted on panels covering compartments which contain current transformers, fuses, switches, or any other devices that will require servicing, changing or adjusting, necessitating the breaking of seals on meter panels.
    Exception:
    The meter and test switch may be mounted on the front of the Current Transformer compartment when, and only when, the switchgear is in a qualifying meter room (7 or more active meters).
    j. The District's Meter Department personnel will connect the metering wires at the current transformers enclosure and the meter socket.

Table 5

Instrument Metering Wire Size and Color

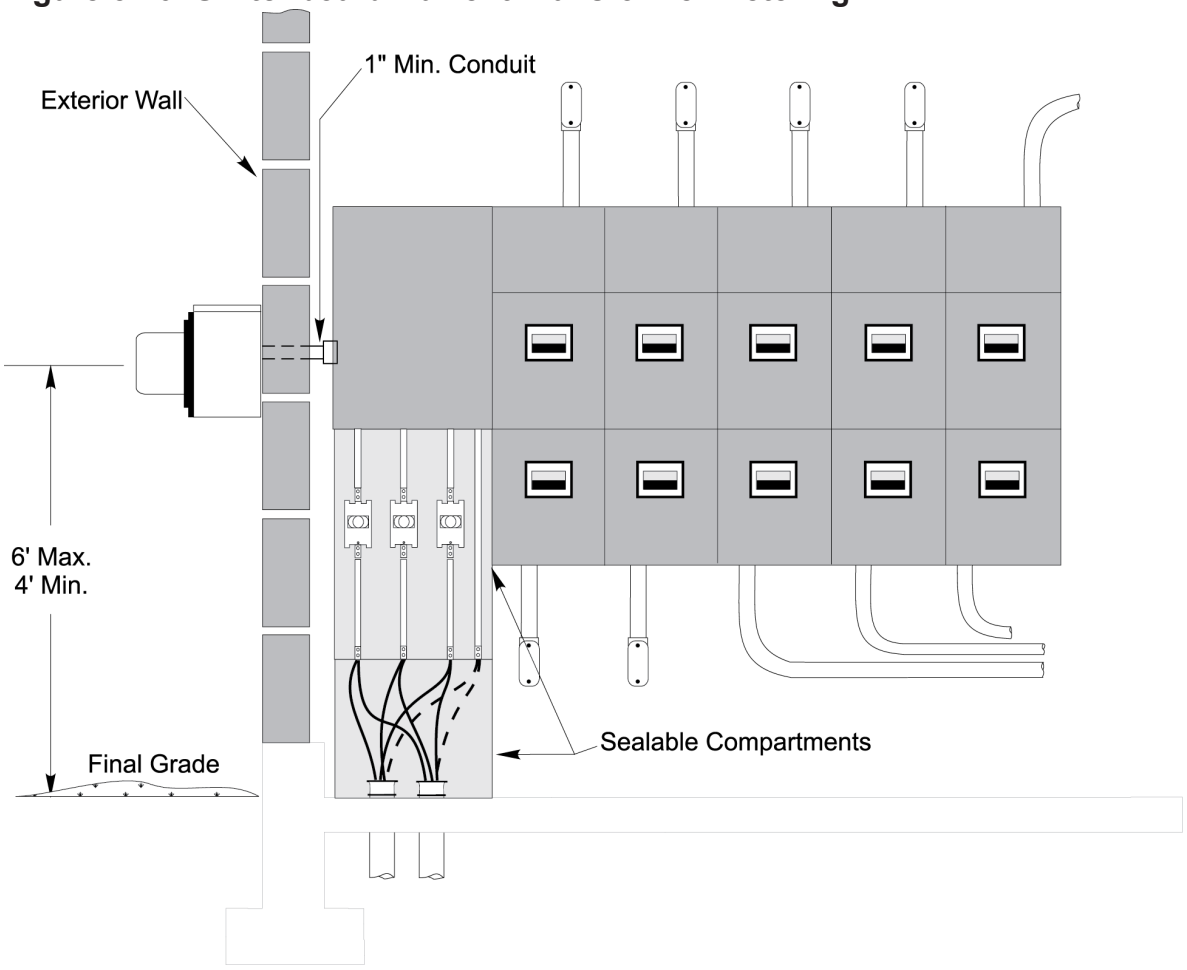
* Distance and Conduit Size	Voltage Wires	Current Wires	Voltage Wires	Current Wires
50 ft or Less 1" Conduit Minimum	Single Phase		Three Phase	
	1 #12 Red	1 #10 Black	1 #12 Red	1 #10 Black
	1 #12 Orange	1 #10 Brown	1 #12 Orange	1 #10 Brown
		1 #10 White	1 #12 Yellow	1 #10 Blue
		1 #10 Green		1 #10 White
				1 #10 Green

- Distance Between Current Transformer Switchboard and Meter Socket.
- Greater Than 50 feet By Approved Variance Only.

Notes:

1. THW or better insulation is required. TW wire is not acceptable.
2. Tape color coding of wire is not allowed.
3. The District must be contacted for special instructions if the distance between the current transformer compartment and the meter socket exceeds 50 feet.
4. The customer shall provide proper size conduit and copper secondary metering conductors between the meter socket and the current transformers. Flexible conduit, condulets and LB's shall not be used.
5. A minimum of 1 inch rigid steel, EMT or Sch 80 PVC conduit is required. All metal enclosures must be grounded per NEC.
6. At all current transformer metering sockets, the length of the metering conductors shall be one and a half times the length of the longest side of the meter socket enclosure.

Figure 5-20: Switchboard Current Transformer Metering



Note: Prior to the manufacture of the switchgear submit drawings to the District (Refer to 5.0.2.c.)

P. Secondary Metering Behind a Customer-Owned Transformer

1. Availability
   A customer-owned transformer is allowed on the source side of a District's revenue metering point if the following conditions are met:
   a. *The services fed from the customer-owned transformer are exclusively residential.*
   b. *The building is considered a high rise according to the 2003 edition of the International Building Code (IBC), section 403.1.*
   c. *All applicable requirements in the District's Electrical Service Requirements Manual are met.*
2. Metering of Losses
   The losses in the customer's transformer shall be metered at two metering points: one on the primary side and one on the secondary side of the customer's transformer. The difference between the two readings are the losses in the customer's transformer.
   All aspects pertaining to metering the losses shall conform to the requirements in Section 5, Meters and Service Entrance Equipment, of the District's Electrical Service Requirements Manual (ESR).

3. Installation Costs
   The customer shall pay all costs associated with the installation of additional metering equipment to determine the losses.
4. Billing
   The meter readings taken at the two metering points shall be entered into the District's billing system and the difference billed to the building owner's house meter account.
5. Metering Transformer Energy
   Subtractive metering is linked to the building owner's house meter account and if any of the transformer energy metering or house metering is disconnected all tenant metering will also be disconnected.
   Transformers and subtractive meter bases must be permanently labeled Transformer O1-Line, Transformer O1-Load; Transformer O2-Line, Transformer O2-Load; Transformer O3-Line, Transformer O3-Load, in accordance with ESR Section 5-F.
6. Building Electrical Facilities Agreement
   The customer shall complete and sign the Building Electrical Facilities Agreement (refer to Section 5-Q.) whereby the customer acknowledges responsibility for all aspects of all equipment installed past the District's Point of Delivery (except for the metering equipment installed by the District) and consents to accept billing for the transformer losses on a single house account. This fully executed agreement will be filed and retained by the District's Executive Account Team.
7. One-Line Diagram
   The customer shall supply the District a one-line diagram of the proposed electric system between the District's Point of Delivery and every metering point. The customer shall not proceed with installation of the proposed metering until they receive a signed letter of acceptance from the District's Meter Department.
8. Transformer Efficiency
   The customer-owned transformers shall conform to the minimum efficiency ratings given in NEMA TP1-2002, Table 4-2.
9. Customer Responsibility:
   The customer is responsible for complying with the one-line diagram and transformer efficiency requirements.
10. Sources
    International Building Code, Section 403.1
    NEMA TP1-2002, Table 4-2.

Q. Building Electrical Facilities Agreement

Building Electrical Facilities Agreement

R. Meter Rooms in High-Rise Buildings

Meter room locations in high-rise buildings shall be coordinated with the PUD Engineering and Meter Departments during the design stage of construction and must be approved prior to finalizing building design and start of construction.

Multiple meter rooms may be allowed in high-rise buildings if the following conditions are met:

a. *The building is considered a high rise according to the 2003 edition of the International Building Code (IBC), section 403.1.*
b. *Each meter room conforms with the requirements in Section 5, Meters and Service Entrance Equipment of the District's ESR.*
c. *All applicable requirements in the District's Electrical Service Requirements Manual are met.*

Additional Requirements:

1. The first meter room must be located on the ground level floor, after that one meter room will be allowed every third floor, maximum one meter room per floor.
2. If there are multiple meter rooms in a building each meter room must have signage inside the room indicating how many meter rooms are in the building and showing the locations of each room.
3. Each meter room shall have a BEST "SP" knobset, signage and meter base identification installed as per the requirements of this section.
4. If exterior access into the building and interior access to each meter room location will be open and unrestricted during normal District working hours, no exterior or interior BEST "SP" knobsets are required other than on the meter room door. If exterior or other interior doors accessing interior meter rooms will be locked or otherwise restricted during normal District working hours, then a BEST "SP" knobset must be installed as per the requirements of this section on each door leading to each meter room.
5. Should building access be by roll-up type door, electronic opener with exterior mounted keyway with "SP" insert shall be installed at each location.

Section 6 Generation Interconnection

Revised: Feb 21, 2025

A. Customer-Owned Generation

1. **Introduction:**
   Customers may request interconnection of generation projects for various purposes. The District will review each interconnection request using processes and criteria appropriate for the given project. In connecting generation of any type to the District's electric system, the resulting system shall:
   - *Ensure the safety of the general public and District personnel.*
   - *Minimize possibility of damage to property.*
   - *Minimize adverse service impacts to District customers.*
   - *Minimize adverse electric system and operational impacts to the District.*
   - *Adhere to District standards and operational requirements.*
   - *Not cause adverse rate impacts to District customers.*
   - *Permit safe and efficient operation of the generation project.*

   Customers wishing to interconnect generation with the District electric system should contact the District as early in the planning process as possible. This allows an orderly process in which project requirements can be identified in a timely, professional manner, and which allows for any necessary upgrades to the District's electrical system to be completed as required to meet project timelines.
   In addition, customers are urged not to purchase equipment or enter into any final purchase agreements until project requirements have been finalized and the District has reviewed and approved the project design.
   Note: For purposes of this policy document, "customer" includes both current District customers served under one of its retail electric rate schedules and entities that are not currently District electric customers, but who intend to build generation in the District's service territory.
2. **Net Metering:**
   Net metering allows customers with certain types of small generating facilities to return electricity generated in excess of their immediate needs to the District for credit on their energy bill. Projects up to a total combined generation of 100 kilowatts at a site which use energy from solar, wind, water, biogas from animal waste, or combined heat and power technologies (including fuel cells) to generate electricity may be eligible to participate in the District's Net Metering Program. Participating customers connect their generating equipment to, and operate in parallel with, the District's electrical distribution system and receive a credit on their bill for energy returned to the system.
   The District uses a streamlined application process and standardized requirements for interconnection and net metering of inverter-based systems that have been certified to meet the standards of UL-1741. Refer to Section 6-B for details. If generation also provides emergency backup generation, the requirements of Standby Generation also apply. Applications must include existing generation at site and noted on one-line drawing of system.
3. **Standby Generation & Batteries:**
   Standby, or emergency backup generation, which is intended to operate in parallel with the District's electric system, will be evaluated on a case by case basis, and requirements identified which will minimize the likelihood of negative operational or safety impacts to the utility system.
   Application for these interconnections is made using Form 6-1, Preliminary Application, or interconnection application. Refer to Section 6-C for details. Backup generation configured in a make before brake connection will not require District approval or application.

4. **All other Generation to be Interconnected to the District's Electrical System:**
   For all generation projects other than a single generator net metering or a standalone backup standby generation, the technical interconnection requirements will be based on the expected impact the project will have on the District electrical system. Requirements are project-specific, and are developed through District studies of the system. Following an initial, high-level, Feasibility Review, more detailed studies may be required. These may include a System Impact Study and/or Interconnection Facilities Study. The District or its consultant performs these studies at the customer's cost.

B. Net Metered Generation

1. **Introduction:**
   Projects up to 100 kW that use energy from solar, wind, water, biogas from animal waste, or combined heat and power (including fuel cells) may be eligible for net metering in accordance with state law (RCW 80.60).
2. **Application:**
   Application for a net metered interconnection is made through the Customer Renewables group. These applications can be found on the District's website.
3. **Technical Review:**
   The technical review is intended to ensure that the generation can connect safely to the District's electrical system without negatively impacting service to other customers.
   For single-phase projects connecting to single-phase transformers at secondary voltages through an inverter which is compliant with UL 1741, which require no modifications to the District's electrical system, and for which total connected generation on the circuit is less than 15% of the circuit's peak load, an expedited review and standardized technical requirements apply. Inverters must meet the UL 1741 without any additional devices, such as an auto transfer switch controller, for expedited review.
   For projects not connecting through a UL 1741 inverter, for projects connecting at primary voltages, or for projects requiring modifications to the District's electrical system, a more detailed technical review will be required. The technical review will consider the following:
   - *Project capacity as compared to the service wire capability or the transformer nameplate;*
   - *Imbalance created by connecting the generation to a center tap of a 240 Volt service;*
   - *Total aggregated generation connected on the line section;*
   - *Total aggregated generation connected on the circuit; and*
   - *Existing and proposed available short circuit current at the point on the District feeder where the generation is to connect.*
4. **Technical Requirements:**
   In order to comply with State worker safety laws, the ability to provide a disconnect located electrically between the generation equipment and the District's electrical system must be available. This can be achieved by a District socket type meter that is 320 A or less, or a disconnect switch. For CT connected meters, and all meters greater than 400 A, a customer owned disconnect switch will be required. Guidelines for placement of the switch are described in the NEC code.
   Note: Projects 78 kW and greater must be three-phase.
   For all projects, the District metering must be modified in order to credit the customer's account for energy delivered to the District, and if applicable, accurately track production of electricity for State incentive programs.
   The customer must provide a certificate of completion showing inspection of the system by the electrical inspector having jurisdiction over the installation.
5. **Standardized Technical Requirements for Small Net-Metered Systems:**
   For projects up to 77 kW, connecting to single-phase transformers at secondary voltages of 120/240 volts, through a self-contained meter, and for which total connected generation on the circuit is less than 25% of the circuit's peak load, an inverter, or whole home control device with integrated inverter, which is compliant with UL 1741 specifications satisfies the protective equipment requirement.
   Where standardized requirements do not apply, technical requirements specific to the project will be issued by the District's System Planning and Protection Department.

6. **Agreements:**
   In addition to any agreements regarding District financing or incentives, a Net Metering Agreement must be completed before the project is initially energized.
   An Interconnection Agreement must be executed. This outlines the interconnection requirements, billing and revenue agreements, and ongoing maintenance and operation requirements.
7. **Operation:**
   When required for District line work, the generation will be disconnected. If the work is planned, the District will make efforts to provide advance notice. For emergency conditions, no advance notice can be given.
8. **Sample Documents:**
   Sample documents can be found at:
   - Net Metering Agreement, Interconnection Application.

C. Standby Generation Connections to the District's System

1. **Introduction:**
   Emergency generation as covered in NEC Articles 700 through 705 may be connected to customer load by utilizing either an open transition transfer switch or a closed transition transfer switch. Typically, backup generation is provided using synchronous rotating machines.Alternatively, inverter based resources like batteries may provide backup power.
   Any generation which will operate in parallel with the District's electrical system has the potential to impact safe operation of the system and service to other customers. All projects will be evaluated to determine the extent of the possible impacts and identify project requirements to minimize the probability of adverse effects.
2. **Application:**
   Customers should submit Form 6-1, Preliminary Application for Operation of Customer-Owned Generation well in advance of project initiation. Generator and transfer switch information are provided on this form and are used by District personnel in identifying project parameters. However, backup power that is connected through a UL1741 certified devices should submit an interconnection application.
   It is especially important to note whether the transition switch is capable of operating with both positions closed, so that the generation operates in parallel with the District's electrical system, and for how long the parallel is designed to last. An electrical one-line diagram showing connection to the District electrical system should also be included with the application.
   Customers proposing to operate generation in parallel with the District electrical system should submit their final application using Form 6-2, Final Application for Operation of Customer-Owned Generation.
   The District will use information from the application to model the generation at the District circuit to which it connects so that the electrical performance can be evaluated. Characteristics of the transfer switch are also important. While operation as intended generally does not cause system disturbances, the consequences of other modes of operation must also be considered. Failure of a single device shall not result in loss of protection for a system.
3. **Technical Review:**
   District customers may use a closed transition transfer switch in a make before break mode to momentarily parallel an emergency generator to the District's electric system when the District's electric system is also energized. Closed transition switching shifts load between an emergency generator and the District system without dropping load. Closed transition switching is normally used for periodic emergency generator testing or after the District has restored electric service subsequent to an outage. The closed transition transfer switch must meet specific requirements.
   The technical review will consider the operational modes available and proposed for the transfer switch. If the generation will be connected through a make before break transfer switch, paralleling the generation with the District system, it may be necessary to provide relays to detect an inadvertent extended period of parallel operation.

4. **Technical Requirements:**
The District will provide interconnection technical requirements for each project, which must be incorporated into the system design.
Generation connecting through a closed-transition transfer switch must meet the following requirements unless connected through a UL 1741 certified devices:
    1. *The closed transition transfer switch must be UL/ANSI Standard 1008 listed, and must be labeled as such.*
    2. *The installation and operation of the closed transition transfer switch and the emergency generator shall comply with NEC Articles 700-705.*
    3. *The closed transition transfer switch shall function in the closed transition mode only when the District source and the backup generation source are energized and in synchronism. For all other transfers, the switch must operate in a break before make mode.*
    4. *If the closed transition, make before break, transfer mode is intended to parallel the District electric system with the backup generation system for more than 100 milliseconds, or if the aggregate generation is 1 MW or greater, protection must be provided to disconnect the generation system in the event of a fault on the District electric system.*
    5. *The closed transition, make before break, transfer mode must be supervised and controlled by a customer owned synchronism check relay and the transfer shall take place only when both the District source and the backup generation source are within 5% of each other in voltage, within 0.2 Hz in frequency, and within five electrical degrees in phase.*
    6. *The normal operation of the closed transition transfer switch shall not cause objectionable electrical disturbances external to the customer, as determined by the District.*
    7. *The customer will be responsible for the protection of its facilities from any voltage or frequency excursions that occur on the District system. This includes any voltage and frequency excursions that occur during the closed transition transfer.*
    8. *A District-owned visible disconnect switch will be installed at all points of interconnection to the District system at the customer's expense. The disconnect switch(es) shall be equipped with a lockable mechanism for clearance tagging to provide a visible air gap to ensure isolation of the customer generators from the District system.*

Alternately, non-inverter based generators, like synchronous machines, may be connected to the grid with a certified UL 1741 3rd edition or newer device. Also inverter based backup resources, like batteries, may be connected through a certified UL 1741 device.

Customers must provide documentation showing equipment installed to meet the requirements along with their final application (Form 6-2). This includes but is not limited to:

- *Final electrical one-line diagram*
- *Equipment parameters and ratings*
- *AC and DC schematic drawings*
- *Three-line diagrams showing protective devices and their control outputs*
- Spec sheets for all installed equipment (Modules, inverter, controller, combiner, battery, etc.)
- *Any pertinent information regarding normal operating modes*
- *Relay styles and part numbers*
- *Relay settings proposed*
- *Test plan*

Generally, because the intended operation of standby generation does not involve export of power to the District for sale or exchange, standard metering is applied, and protection can be provided by a device that measures power flowing out of the facility and acts to disconnect the generation after some time delay.

5. **Design:**
   Once the District provides interconnection technical requirements for the project, the customer may proceed with design of the project.
   Before equipment is purchased and construction begins, the District will review the customer's final interconnection design to verify that operation will be as intended. The review will encompass the following customer documents:

   ### Detailed One-line Diagram Of The Entire Generating Facility
   This drawing shows the functional arrangement of all interconnection and generation equipment, and must include a table showing equipment ratings.

   ### AC Current And Potential Schematic Of The Generating Facility
   The AC schematic is a primary three-line drawing showing the phasing and interconnection of the current and voltage transformers with the interconnection protective relays. The drawings should show all grounding of equipment and should indicate polarity.

   ### A Control Schematic Of The Generating Facility
   The schematic shall be functionally complete, showing all DC potential circuits with all relays and control connections to the tripping and closing coils of the interconnection breaker. Please include a contact development table for all interconnection relays and control switches used in control of the interconnection breaker.

   ### Equipment Specifications And Details
   This should include the specifications and details for transformers, circuit breakers, current transformers, voltage transformers, and any other major equipment. Transformer information should include configuration, ratings, nameplate diagram, and percent positive- and zero-sequence impedance based on the transformer's self-cooled rating. In addition, please provide model and style number for all interconnection protection relays.

6. **Agreements:** An Interconnection Agreement must be executed. This outlines the interconnection requirements and ongoing maintenance and operation requirements.
7. **Witness Testing Upon District Request:** Prior to system commissioning, operation of any required protective devices must be demonstrated to District representatives. The customer must submit a test plan outlining procedures and expected results for use during the witness testing.
8. **Operation:** When required for District line work, the generator will be disconnected. If the work is planned, the District will make efforts to provide advance notice. For emergency conditions, no advance notice can be given.
9. **Sample Documents:**

   Sample documents can be found at www.snopud.com

D. All other Generation to be Interconnected to the District's System

1. **Introduction:**
   The District will evaluate all generation projects designed to operate normally in parallel with the District's system, whether the customer intends to sell the output to the District or not, based on the generator's expected impacts to the electric system.
   For projects with a nameplate capacity greater than or equal to 200kW, Bonneville Power Administration (BPA), which acts as the Balancing Area Authority for the District, requires the project owner/operator to submit a separate interconnection request and to enter into a Balancing Authority Area Services Agreement or BAASA. The aggregated total generation on the site includes all sources of power, including batteries.
   BPA will evaluate whether additional deposits and technical studies must be performed, and will determine whether additional technical requirements, metering, integration services, agreements and/or fees apply. Detailed information on how to submit an interconnection request and the BAASA is available through BPA's Interconnection Home Page.
   The District can facilitate an introductory meeting to help the customer initiate the BPA process. Note that BPA requirements are separate from, and in addition to, the District interconnection process and requirements identified below.
   For projects meeting all of the following criteria, expedited processes and more standardized requirements apply:
   - The project does not qualify for net metering
   - Capacity of the proposed project is less than 500 kW
   - The proposed connection is to a radial distribution circuit
   - If the project connects through an inverter, the inverter is UL 1741 certified
   - The generator is not a synchronous generator
   - The generation does not exceed the lesser of the service wire capability or the nameplate of the transformer if proposed for connection to a shared secondary
   - If connected to the center tap of a 240 V service, the generation does not create an imbalance between the two sides of the 240 V service of more than 5 kVA
   - The aggregate nameplate capacity of all generation on the line section where the generation connects must be less than 15% of the line section's annual peak load
   - • Only minor upgrades to the District electrical system (<$10,000) are required to interconnect the project
   - The short-circuit current contribution of all the generation on the circuit does not exceed 10% of the distribution circuit's maximum available fault current at the primary distribution level nearest where the generation connects
   - Maximum available short circuit current on the circuit proposed for connection does not exceed 87.5% of the interrupting capability of any District protective device or equipment

   Projects which do not meet these criteria will require more in-depth studies to identify detailed design requirements for the customer's installation, as well as any modifications required to the District's system in order to accommodate the interconnection.
2. **Application:**
   Customers should complete and submit Form 6-1, Preliminary Application for Operation of Customer-Owned Generation to the District to indicate interest in installing generation connected to the District's system. In addition, the customer should include an electrical one-line diagram showing basic service voltages, anticipated metering location, desired point of interconnection, major facility equipment and ratings, and any pertinent information on normal operating modes and proposed in-service dates.
3. **Technical Review:**
   The District performs a technical review to identify equipment and/or operational practices needed to ensure safe, reliable operation of the project that meets the needs of both the customer and the District. Computer simulations of the existing District electrical system are used to analyze such project parameters as voltage regulation and reactive power capability of the generator, as well as short-circuit contribution, ability to detect and clear for faults and abnormalities, and the likelihood of operation in an inadvertent island mode with other District customers.
   The District performs different types of studies as described below, which become increasingly detailed as additional information becomes available and as the likelihood of connecting the project increases.

4. **Study:**
The District performs studies at various stages of project development. Each study provides specific types of information, with increasing levels of detail included as projects progress. While all studies will likely be required for larger projects, it is the customer's option whether to proceed through each study, with the opportunity to make decisions to proceed based on study results, or to combine studies in an effort to reduce the overall time required for completion of the studies.

   a. ***Feasibility Review***
   After receiving a preliminary application (Form 6-1), the District will perform a high-level review of the proposed project to identify basic parameters of the interconnection, to determine which processes and technical requirements apply, and to provide a description of potential technical requirements for the project, along with a non-binding outline of equipment and work which may be needed. Factors reviewed in this feasibility review will include such characteristics as availability of three-phase service at the project site if required, circuit load capacity, annual circuit and/or line section peak and minimum loads, available short-circuit current, any existing system constraints, and protective devices affected by the proposed installation. The District contact will schedule a meeting with the customer to present and discuss the findings of the feasibility review.
   An initial feasibility review is performed as a courtesy to District customers at no charge. If significant revisions are proposed to a project already proposed, a fee may be required to cover District costs to re-study the project.

   b. ***System Impact Study***
   If the customer elects to proceed with the project based on the results of the feasibility review, the District will perform a System Impact Study (SIS). Because the District personnel time and resources required to complete this study can be significant, the customer must sign a System Impact Study Agreement and pay a fee to cover District costs to perform the study.
   To provide the District with the data needed for the system models, the customer must submit a Final Application for Operation of Customer-Owned Generation (Form 6-2) along with additional information pertaining to equipment characteristics.
   The SIS identifies detailed effects to be expected due to operation of the generation, and includes such analysis as power flow and short-circuit studies, and stability modeling as needed. The SIS will also provide a high level summary of technical requirements that may apply for the interconnection.

   c. ***Interconnection Facilities Study***
   Following acceptance of the SIS, the customer may elect to request an Interconnection Facilities Study (IFS). The IFS will identify technical requirements that apply for interconnection, which may include the voltage operating range and reactive power requirements for the generator, along with the need for installation of a Power System Stabilizer to meet WECC operating criteria.
   In addition, any mitigating measures required to ensure ability to detect and clear for all faults, alleviate system overloads or increases in available short-circuit current caused by the generation, and prevent the project from islanding unintentionally with District loads will be identified.
   The report will also provide detailed estimates for the work identified in the SIS which is required on the District's electrical system for the interconnection, as well as an estimate of the timeline for completing the work. The customer must sign an Interconnection Facilities Study agreement and pay a fee to cover District costs to perform the study.
   Customers who have a high degree of certainty of implementing a project may choose to combine the SIS and the IFS into a single study. This can reduce the total time required for the District to complete its portion of the study phase of the project.

5. **Design:**
   Design of the interconnection must be performed by a professional engineer licensed in the state of Washington. Once the District and the customer execute an Interconnection Agreement, design efforts may commence in accordance with the milestones identified in the agreement. Milestones will include the District providing detailed interconnection technical requirements for the project, the customer's design efforts and purchase of long-lead time equipment, and the District's design of any required modifications to the District's electrical system. The customer and the District must agree on the milestones before the Interconnection Agreement is signed.
   Prior to purchase of equipment and start of construction, the District will review the design of the interconnection to verify that operation will be as intended. The review will encompass, at a minimum, the following customer documents:
   - *Detailed one-line diagram of the entire Generating Facility*
   - *AC current and potential schematic of the Generating Facility*
   - *A DC control schematic of the Generating Facility*
   - *All electrical drawings must be stamped by a professional engineer*
   - *Ground mat design and test data*
   - *Equipment specifications and details*

   While the design review is not an endorsement of the engineering soundness of the project, it is intended to demonstrate operation of the interconnection protection to the District engineers, and will aid in reviewing or recommending relay settings for the project.
   The System Protection Group performs relay setting review as the final step in the technical review. This review is intended to ensure proper clearing as required for all faults on the District electric system, as well as coordination with District protective devices.
6. **Construction:**
   The customer and the District will proceed with construction efforts in accordance with the milestones identified in the Interconnection Agreement. The District will complete required improvements to the District electrical system identified in the IFS.
7. **Protective Relay Testing:**
   Calibration testing of the required interconnection relays must be performed by a qualified test firm, and signed copies of the test reports provided to the District prior to witness testing.
   When all necessary improvements to the District electric system are complete and the generation facility is complete, District representatives will witness operation of the required interconnection relays. In advance of the witness testing, the customer must provide a test plan for demonstrating operation of the required interconnection protective scheme. This shall include a step by step checklist for all required protective functions with a list of expected outcomes.
   The District may ask to witness initial parallel operation of the generation facility.
8. **Agreements:**
   Before the generating facility is allowed to start commercial operation, all required agreements must be completed and signed by both the customer and the District, and witness testing completed, and a letter from the District authorizing parallel operation. These may include an Interconnection Agreement and a Power Purchase Agreement or Aggregation and Redelivery Agreement. The customer must also provide the District with proof of all agreements executed with BPA or other utility or purchaser of the plant output.
   From time to time, consistent with the terms of the Interconnection Agreement, the interconnection protection package may be reviewed to ensure that it meets the technical interconnection requirements currently in effect. Any plant revisions made necessary because of changes in technical requirements must be made at the customer's expense.
9. **Operation:**
   The Interconnection Agreement identifies operating requirements for the project. Notice must be provided to the District according to the provisions of the Interconnection Agreement for any changes made to (i) the project to comply with changes in operating requirements, or applicable laws and regulations, or (ii) the point of contact for the operation and maintenance of the project.

10. **Sample Documents:**

ESR Manual: Section 6 - Form 6-1 Preliminary Application for Generation
ESR Manual: Section 6 - Form 6-2 Final Application for Generation Interconnection
Facility Connection Requirements
Sample System Impact Study
Sample Interconnection Facilities Study agreement
Sample Interconnection Agreement
Sample Power Purchase Agreement
Exhibit 1: Interconnection Process Flow

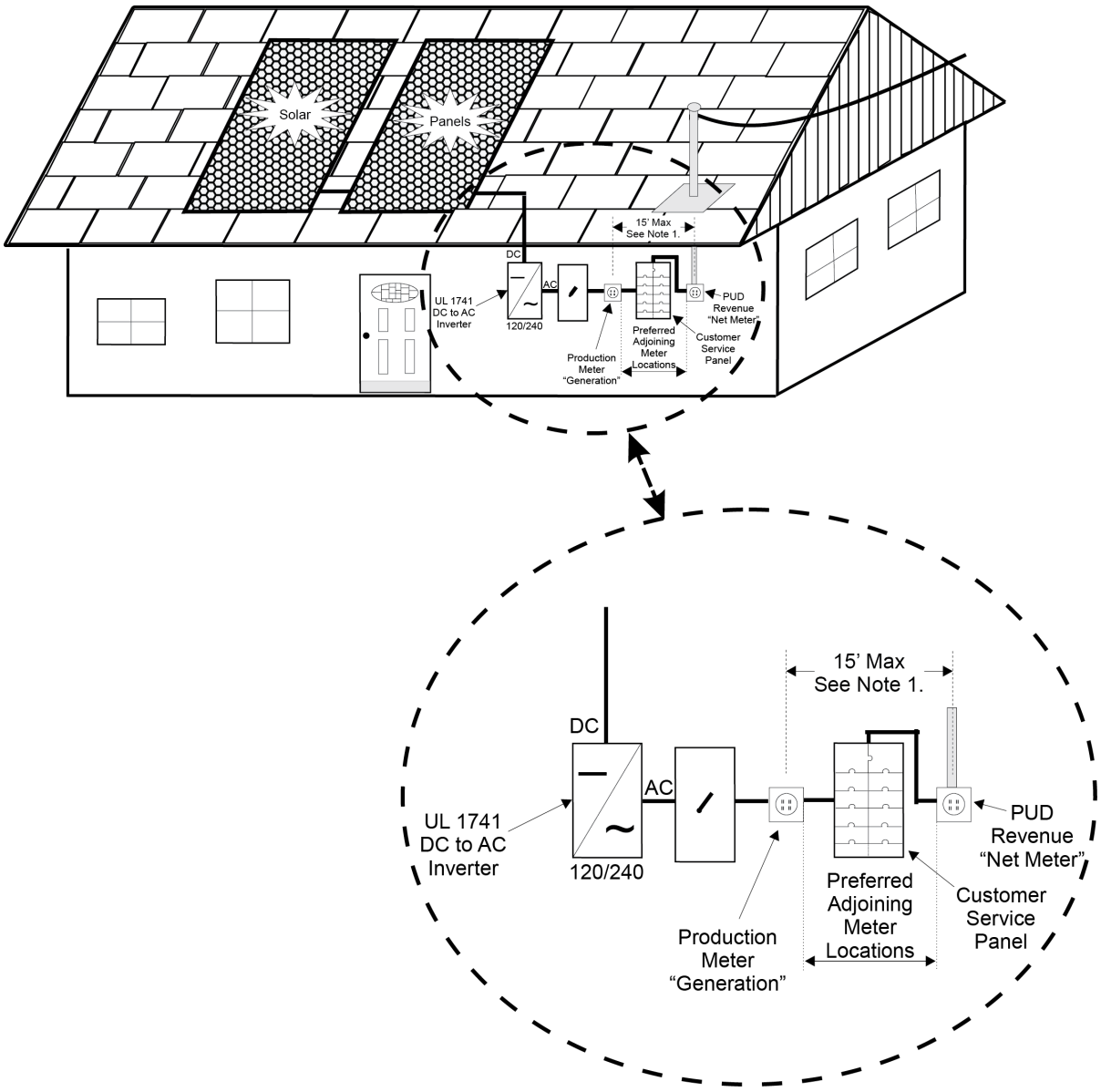
E. Solar Net Meter Generation

Installation of Solar Generation Production Metering must comply with the requirements in the District's Electrical Service Requirements Manual (ESR) as well as the requirements of the local electrical jurisdiction and the State of Washington.

Meters shall be permanently labeled "Production Meter" and "Net Meter" in compliance with ESR, Section 5-F. Service Identification/Meter Labeling.

Preferred location of meters shall be adjoining as shown on the figure below when possible. If adjoining meter locations are not possible meters shall be in clear view with unobstructed safe access of each other.

Contact the District's Energy Services Department for further information.



Notes:

1. Preferred location for District revenue meter is within 15' of production mater. Greater distances may be acceptable with prior District approval before installation.
2. Production meter is for the Washington State Renewable Energy Production Incentive. Production meters are no longer required by the District. If installing a production meter, it must be labeled on the one-line as customer owned.

F. Application Forms

Application Form 6-1

Application Form 6-2