



# RESIDENTIAL AND SM COMMERCIAL QUICK REFERENCE

## PROVO CITY POWER STANDARDS

ELECTRICAL ENGINEERING

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# DEFINITIONS

**ANSI** — American National Standards Institute.

**Arc flash hazard** — A dangerous condition associated with the release of energy caused by an electric arc.

**Bushings** — Plastic or nylon rings that attach to the ends of conduit to protect the electrical cable from sharp edges.

**Bypass** — A method which allows for service continuity to the customer while the meter is removed for test or inspection.

**Common meter** — A non-residential meter for general energy use in apartment complexes, multi-use, or other multi-occupancy buildings. General energy use includes common area and exterior lighting, irrigation, laundry rooms, etc. Also called a house meter.

**CT** — Current transformer (see *Current transformer*).

**Current transformer** — A set of coils that reduce the primary current to the customer by a known ratio to an amount within the current capacity of the meter.

**Current transformer meter** — A meter that requires current transformers because its current capacity is not as large as the customer's current load.

**Customer** — The individual requesting electrical service from Provo City Power.

**Direct-connect meter** — A meter energized to line voltage that carries all the load current. Also called a self-contained meter. No current transformer or voltage interface is used.

**Direct-connect socket** — A meter socket connected to service wires, energized to line voltage and in series with the customer's load without external instrument transformers. A self-contained meter is used in a direct-connect socket.

**Drip loop** — The loop formed by the customer conductors that connects to the power company service drop. The conductors are formed in a downward "loop" so water will not enter the customer's service mast (weatherhead).

**Dwelling unit** — A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation.

**Dwelling, single-family** — A building that consists solely of one dwelling unit.

**Dwelling, two-family** — A building that consists solely of two dwelling units.

**Dwelling, multi-family** — A building that contains three or more dwelling units.

**Electric vehicles** — See EV *below*.

**ESRA** — Electric Service Requirements Agreement, a formal, written agreement between the Company and the customer that describes the details of each installation. A Power Company representative fills out the ESRA during the design process.

**EUSERC** (Electric Utility Service Equipment Requirements Committee) — An association of electric utilities and manufacturers that creates standard designs for the interface between the electric utility's service and the customer's facility.

**EV** — Electric vehicle. An automotive type vehicle for highway use such as passenger cars, buses, trucks, vans and neighborhood vehicles primarily propelled by an electric motor powered by electrical energy from rechargeable batteries or another source onboard the vehicle.

**EVSE** — Electric vehicle supply equipment.

**Fault current** — The available current under bolted short-circuit conditions.

**Fiberglass conduit** — Rigid conduit made of UV-resistant fiberglass, colored black with red stripes

**Free-standing metering assembly** — A metering assembly not attached to a building.

**GMC** — Galvanized metallic conduit.

**Grounding** — Grounding in accordance with latest issue of NEC (Article 250, *Grounding*). Code enforcement agencies may require the ground connection to be visible when inspection is made. For safety reasons, the top of the ground rod should be flush or below ground level in permanent applications.

**House meter** — A non-residential meter for general energy use in apartment complexes, multi-use, or other multi-occupancy buildings. General energy use includes common area and exterior lighting, irrigation, laundry rooms, etc. Also called a common meter.

**HDPE conduit** — A non-pressure-bearing conduit made from high density polyethylene plastic. The Power Company limits the use of HDPE conduit for cable plowing and conduit boring.

**Hub** — A conduit attachment in, or out of, a meter base can, into which electrical connections may be plugged.

**IMC** — Intermediate metallic conduit.

**Living space** — An area within a structure where the environment is controlled for cooking, cleaning, entertaining or sleeping. A garage is not considered living space.

**Mandrel** — A non-flexible wooden cylinder, with pulling eyes at each end, pulled through conduit to confirm the conduit's integrity by testing for obstructions and/or flattening.

**Manual link bypass** — A bypass facility requiring the physical act of placing links across the line and load bypass studs, for the purposes of removing the meter and preventing an outage while maintaining service continuity.

**Manufactured home** — A factory-assembled structure or structures, site specific and transportable in one or more sections, designed to be used as a dwelling with a permanent foundation.

**Meter** — A device that measures and records the summation of electrical quantity over a period of time.

**Meter socket continuous rating** — The rating, in amperes, that a meter socket will continuously carry for three hours or more under stated conditions without exceeding the allowable temperature rise. Typical continuous duty ratings of sockets include 80, 160 and 320 Amps (ANSI C12.7).

**Meter socket maximum rating** — The maximum rating of a meter socket in amperes; 125% of the continuous rating (EUSERC Section 300). Maximum ratings include 100, 200, and 400 Amps.

**Meter base** — The mounting device consisting of jaws, connectors, and enclosure for socket-type meters.

A mounting device may be either single or trough. The meter base is also referred to as a meter socket.

**Meter base ring** — A metallic ring secured to the meter base that can be sealed by the power company.

**Meter pedestal** — (Also see *free-standing metering assembly*.) A commercially built pedestal that contains a meter base and customer disconnect switches.

**Metered service conductor** — A conductor carrying customer load that is recorded by the Power Company's billing meter.

**Mobile home** — A factory-assembled structure or structures transportable in one or more sections, built on a permanent chassis and designed to be used as a dwelling without a permanent foundation.

**Modular home** — A factory-assembled structure or structures transportable in one or more sections, built on a permanent chassis and designed to be used as a dwelling with a permanent foundation.

**Mule tape** — Flat low friction polyester tape with a minimum pulling strength of 1250lbs.

**NEC** — The most recent publication of the National Electrical Code adopted by the state.

**NEMA** — National Electrical Manufacturers' Association.

**NEMA 3R** — A rating for water-tight enclosures, for any electrical equipment, indoors or outdoors.

**NESC** — The most recent publication of the National Electrical Safety Code adopted by the state.

**Net metering** — A debit and credit metering process in an account in which the customer owns and operates a qualified generating device that interconnects with the Power Company's electrical facilities. Net metering tariffs are available upon request.

**Network metering** — Single-phase service obtained from two of the phase wires and the neutral of a 4-wire system.

**NFGC** — The most recent publication of the National Fuel Gas Code.

**Non-residential service** — Service to any customer who does not qualify for residential service.

**OSHA** — Occupational Safety and Health Administration.

**Overhead service** — See *service drop*.

**Phase converter** — Any machine, circuit or device used to create additional phases for operating polyphaser motors or multi-phase devices from a single-phase source.

**Plumb** — (In this book, this term refers to the meter base.) Having the sides and front of the meter base perfectly vertical from both the front and side views.

**Point of delivery** — See *service point*.

**Post** — A pressure or thermally treated wooden structure that supports an underground service meter base.

**Primary service:** Services with delivery voltages greater than 600 volts.

**Primary voltage** — Over 600 volts.

**Power factor** — The cosine of the angle, expressed as a percent, between voltage and current. Also, the ratio of the active power to the apparent power.

**PVC conduit** — A gray-colored plastic pipe approved for use in electrical installations. Commonly referred to as polyvinylchloride pipe.

**Residential service** — Service furnished to customers for domestic purposes in single-family or duplex dwellings, or as defined by tariff.

**Relocation** — A change in location of any of the following electrical system components: 1) the meter base/socket, 2) the service drop, 3) the service lateral, or 4) the service entrance conductors.

**Rewire** — Work performed on electrical wiring that requires any of the following: 1) re-installation of the meter base/socket, 2) replacement of the service drop, 3) replacement of the service lateral, or 4) replacement of the service entrance conductors.

**RMC** — Rigid metallic conduit.

**SAE** — Society of Automotive Engineers.

**Safety socket** — A device consisting of a manual link bypass facility and a circuit closing nut and bolt assembly which de-energize the meter socket while the meter is removed for test or inspection.

**Secondary distribution underground** — A device 600 volts or less, going from transformer to secondary pedestal and between secondary pedestals.

**Secondary pedestal** — Fiberglass enclosure for secondary connections.

**Secondary service** — Customer delivery of secondary voltage, from either a transformer or a secondary pedestal to meter. See *service lateral*.

**Secondary voltage** — 600 volts and under.

**Self-contained meter** — A watt-hour meter connected directly to the supply voltage that is in series with the customer's load without external instrument transformers.

**Select backfill material** — Material used to bed and cover direct-burial cables or conduits, consisting of screened native soil or sand free of sharp or foreign objects.

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

**Service conductors, underground system** — See service lateral, underground.

**Service drop** — The overhead service conductors from the utility's pole, including the splices that connect to the customer's service entrance conductors.

**Service drop attachment point** — The location where the service drop conductors connect to the customer's residence, building or structure.

**Service entrance conductors (customer-owned)** — The conductors between the terminals of the service equipment connecting to the service point. In an overhead system, the customer installs and owns the wires (service entrance conductors) from the splices at the service head (weatherhead). In an underground system, the customer installs and owns the wires (service entrance conductors) from the meter.

**Service equipment** — Customer-owned equipment, usually consisting of circuit breakers (or switches) and fuses, and their accessories, connected to the load end of service conductors to the customer's structure, and intended to constitute the main control and cutoff of the supply.

**Service lateral, underground** — The entire length of service conductors between the street main, including any risers at a pole or other structure, or from transformers, and the first point of connection to the service entrance conductors in a terminal box or meter or other enclosure, inside or outside the building wall. Where there is no terminal box, meter, or other enclosure, the point of connection is considered to be the point of entrance of the service conductors into the building.

**Service point** — The point of connection between the facilities of the serving utility and the premises' wiring.

**Service trench** — A trench provided by the customer for a service lateral.

**Socket** — A mounting device consisting of jaws, connectors, and enclosure for socket-type meters.

**Spoil** — Native material removed from a hole or trench that is piled above grade, adjacent to the hole or trench.

**Sweep** — A PVC, fiberglass or steel bend that changes the direction of the conduit.

**Switchboard** — A large panel or assembly of panels which contains buses, current transformers, meters, switches, and protective devices.

**Tariff** — A set of policies (or rules) and rates written by the Power Company, approved by the Public

Service and Public Utility Commissions of each state served. All sections of the tariff are subject to updates at any time. Individual state rules may affect the Power Company's tariff. Tariff policy provides the working rules by which the Power Company serves its customers.

**Test block facility (TBF)** — An assembly used to bypass a self-contained meter socket.

**Test bypass facility (TBF)** — See *test block facility* (above).

**Test switch** — A device used by the Power Company to isolate the meter from current and voltage sources.

**Timber** — A pressure or thermally treated wooden structure that supports an overhead service. Length depends upon the type of installation.

**Underground cable** — Electrical cable approved by a Nationally Recognized Testing Laboratory (NRTL) suitable for direct burial in the ground or in conduit.

**Underground service** — Electric service supplied to the customer from the power company utilizing underground conductors.



**Unmetered service conductor** — A conductor carrying customer load that is not measured by the Power Company's billing meter.

**Unused facility** — A facility that exists with no recorded customer or contractual obligation for a length of time (specified by the State).

# **1. ELECTRICAL SERVICE UPGRADE INFORMATION**

## **1.1 Pre-inspections Required on all Service Upgrades:**

- 1.1.1 All temporary electrical service installations shall meet Provo City Power specifications, National Electrical Code, and National Electrical Safety Code latest revisions. Address to be posted at building site.
- 1.1.2 Provo City Power requires owner\builder to supply and install temporary power pole including meter base, disconnects and outlets. (See Figures 2.1, 3.1)
- 1.1.3 Temporary power connects are generally \$300.00. Additional charges may be necessary depending on size and type of temporary power request.
- 1.1.4 Owner\builder shall have a Provo City building permit number prior to temporary power connections.
- 1.1.5 Temporary power inspections will be scheduled on a first come basis, all temporary power installations shall be inspected by Provo City Power prior to connection. Call (801)852-6999. Anything over 200 amps shall be inspected by Building Inspection. Call (801)852-6450 or (801)852-6452.

## **1.2 Permanent Power:**

- 1.2.1 All permanent electrical service installations shall meet Provo City Power service specifications, National Electrical Code and National Electrical Safety Code latest revisions, no customer owned equipment between meter base and meter. Address to be posted at building site.
- 1.2.2 Contact Provo City Power at 251 West 800 North Provo, UT. for service specifications or call (801)852-6852.
- 1.2.3 Application for permanent electrical service must be completed by owner builder\contractor prior to connection of permanent electrical service.
- 1.2.4 Main service disconnect is required outside at the meter location for all electrical service installations. Provo City Power shall inspect trench and conduit installation prior to backfill. Call (801)852-6999 to schedule electrical service trench inspections.
- 1.2.5 Meter and service locations are to be determined by Provo City Power (see attachment to job copy drawings). General rules for the service location are as follows: the meter and main disconnect shall be setback from the front corner of the structure a maximum of 12'. The meter and main disconnect shall be on the side of the structure closest to the distribution power source intended for that site.
- 1.2.6 All underground and overhead electrical services shall be inspected by Provo City Building Inspection prior to connection by Provo City Power. Call (801)852-6450 or (801)852-6452 to schedule permanent power inspection.

- 1.2.7 All new developments will be serviced underground; owner/developer will be responsible to provide and install all underground conduit, transformer pads/vaults, and secondary boxes, ground sleeves will be provided by Provo City Power and installed by contractor. The underground electrical distribution layout shall be completed or approved by Provo City Power engineering division.
- 1.2.8 All services over 200 amps require sch. 40 PVC conduit and phase colored conductors to be supplied, installed, terminated and maintained by owner / contractor per NEC, from the meter base to the power source supplied by Provo City. Services 200 amps and below Provo City will provide the conductor up to 75 feet max. The cost of these conductors is included in the standard connection fees. For longer lengths consult with Provo City Power for additional cost.
- 1.2.9 Provo City Power will not allow any new structure to be constructed under/over any Provo City transmission/distribution, underground/overhead high voltage lines, or within any Right-of-Way or Public Utility Easement. All buildings and structures must meet Provo City Power overhead horizontal clearance requirements: 12' for single level structures, 20' for multiple level structures from the nearest phase conductor this includes balconies and edge of roof line. Other options: the power lines may be buried at owners' expense. Please contact Provo City Power Engineering division when conflicts are identified, (801) 852-6852.

## 2. U.G. TEMPORARY POWER POST TYPE METER INSTALLATION

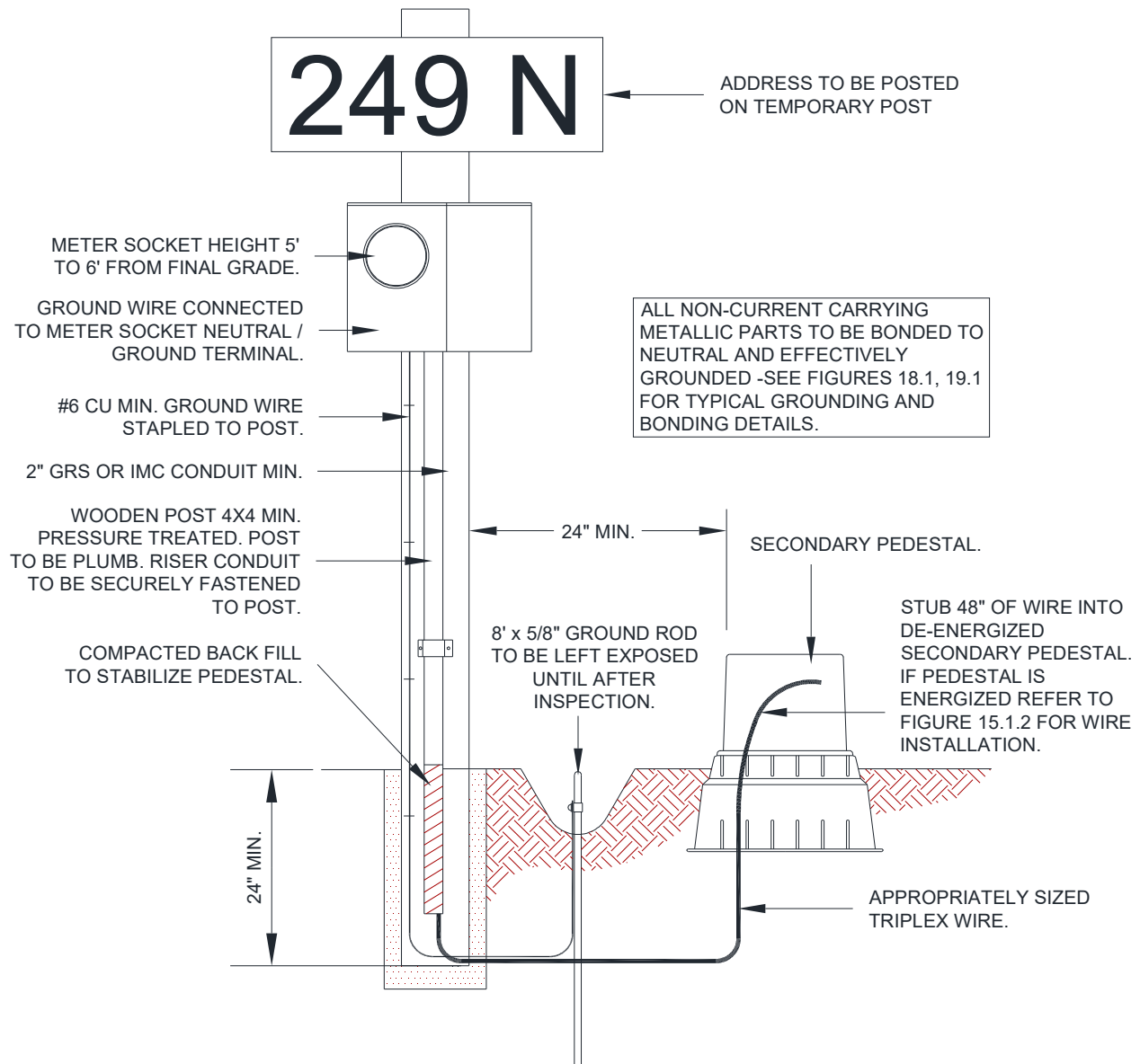


Figure 2.1 Underground Temporary Power

### 2.1 Additional Requirements:

- 2.1.1 Weatherproof, 3 wire, 240V, breaker and outlet cabinets are required. Ground fault circuit interrupters are required. (GFCI) on all outlets.
- 2.1.2 Pedestal and related equipment furnished by customer.
- 2.1.3 Installation by customer.
- 2.1.4 Pedestal must be placed within 10 feet and no closer than 2 feet to existing transformer or secondary pull box. Do not obstruct access to power boxes

- 2.1.5 Wire and trench to be furnished by customer.
- 2.1.6 Meter shall face street.
- 2.1.7 Meter pedestal to be inspected by Provo City Power. Call (801)852-6999
- 2.1.8 Call (801)852-6999 for access to transformer enclosures or secondary pedestals.
- 2.1.9 Temporary power requirements larger than 200A will be approved by Provo City Building Inspection department and installed by customer.

### 3. O.H. TEMPORARY POWER POST TYPE METER INSTALLATION

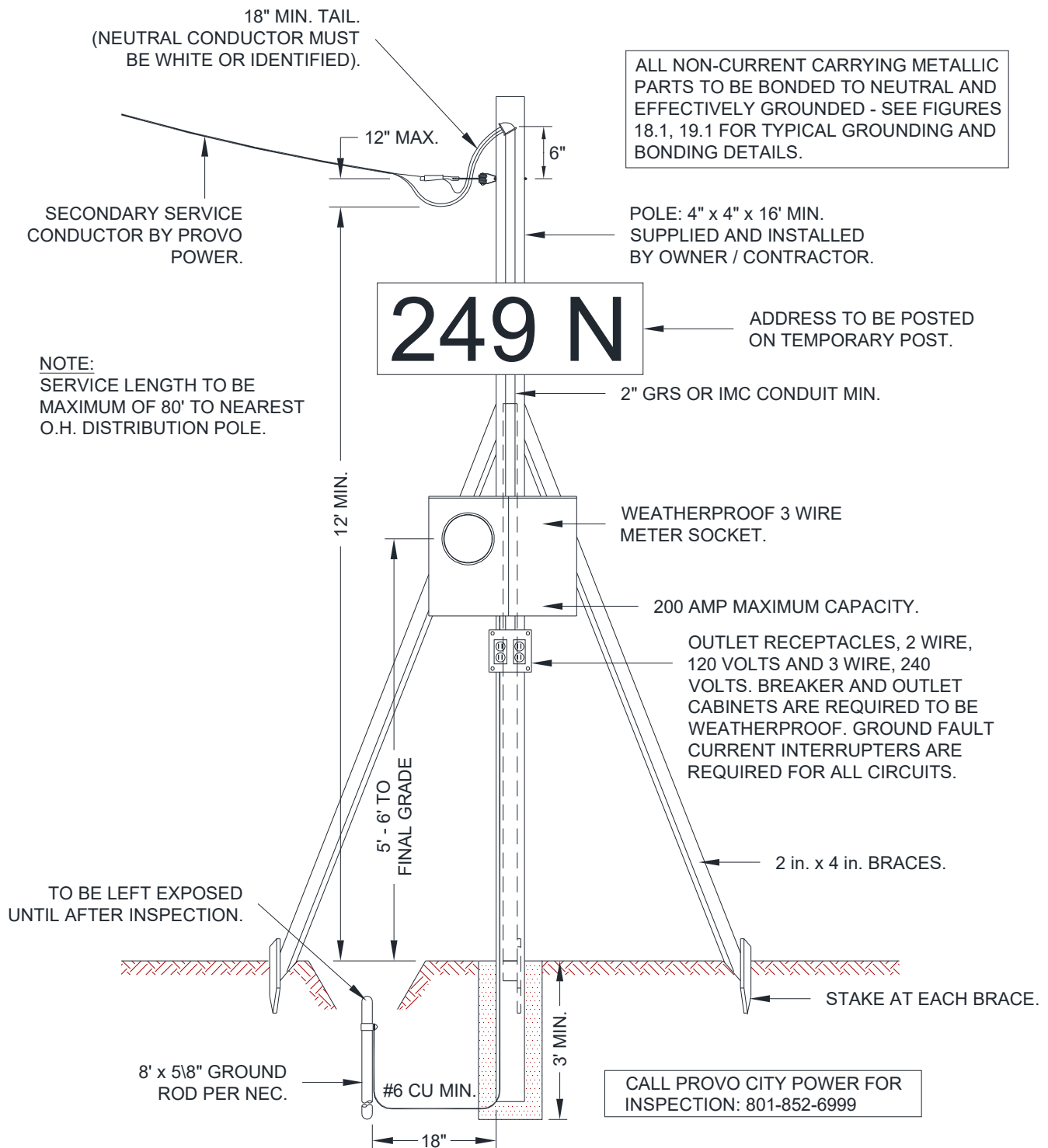


Figure 3.1 Overhead Temporary Power

## 4. TEMPORARY POWER METER PEDESTAL

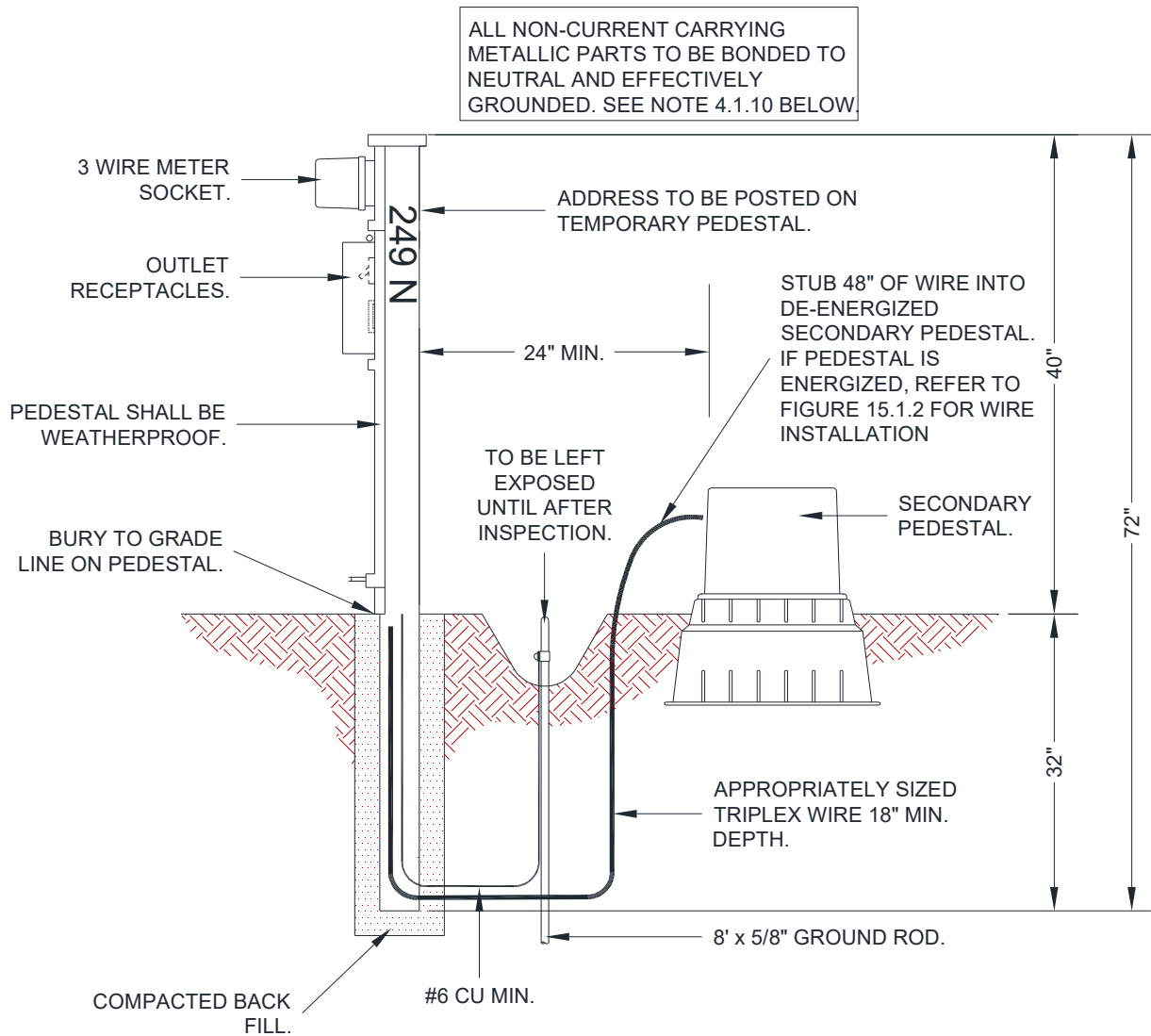


Figure 4.1 Meter Pedestal

### 4.1 Additional Requirements:

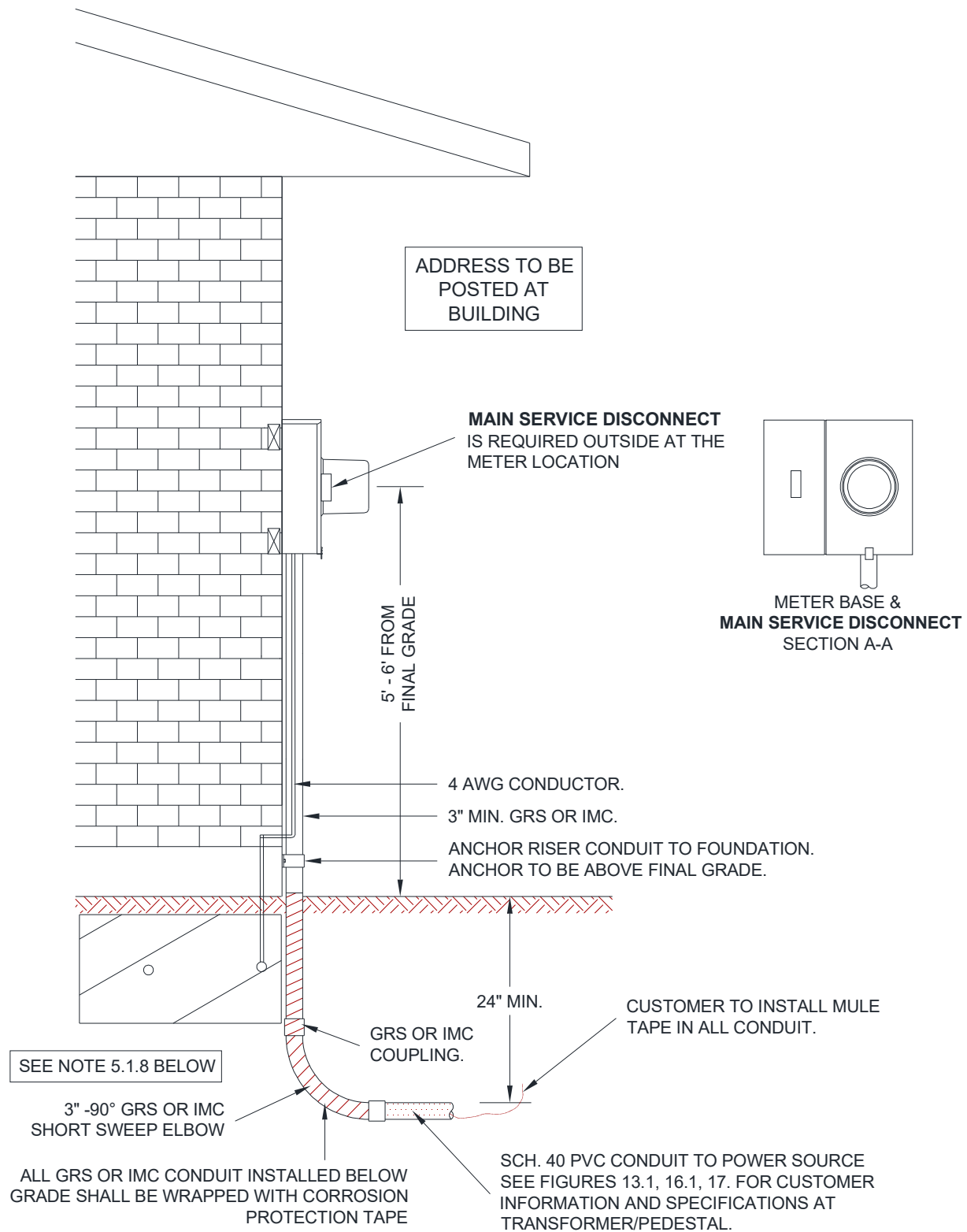
- 4.1.1 Weatherproof, 3 wire, 120/240V, breaker and outlet cabinets are required. GFCI protection required on all outlets.
- 4.1.2 Pedestal and related equipment furnished by customer.
- 4.1.3 Installation by customer.
- 4.1.4 Pedestal must be placed within 10 feet and no closer than 2 feet to existing transformer or secondary pedestals. Do not obstruct access to power boxes.
- 4.1.5 Wire and trench to be furnished by customer, with in 2' from power box.
- 4.1.6 Meter shall face street.

- 4.1.7 Meter pedestal to be inspected by Provo City Power. Call (801)852-6999
- 4.1.8 Call (801)852-6999 for access to transformer enclosures and secondary pedestals.
- 4.1.9 Temporary power requirements larger than 200 amps will be approved by Provo City Building Inspection dept. and installed by customer.
- 4.1.10 Neutral and grounding conductors shall be bonded as per NEC 250.146.



## 5. UNDERGROUND SERVICE INSTALLATION

**100-200 AMP (1 OR 3 PHASE)**



*Figure 5.1 Underground Service Installation*

## **5.1 Additional Requirements:**

- 5.1.1 Customer to furnish and install conduit from transformer\pedestal to meter location.
- 5.1.2 Contact Provo City Power for trench inspection (801)852-6999. Do not backfill prior to inspection.
- 5.1.3 See trench detail drawing for specifications.
- 5.1.4 Trench to be minimum depth of 24".
- 5.1.5 Provo City Power to supply conductors after inspection has been completed by Building Inspection.
- 5.1.6 Meter location to be approved by Provo City Power. Provo City Power (801)852-6852. Provo City Building Inspection. (801)852-6450.
- 5.1.7 All non-current carrying metallic parts to be bonded to neutral and effectively grounded as per NEC see Figures 18.1 and 19.1 for typical grounding and bonding details.
- 5.1.8 Conductive steel reinforcing rods (rebar) 1/2 in. or larger bonded together by steel tie wire that has a combined length of 20 ft. can serve as the grounding electrode. Contact Provo City Building Inspection with questions.

## 6. U.G. RESIDENTIAL RECESSED METER SERVICE

### REQUIRED RESIDENTIAL WORKING CLEARANCES

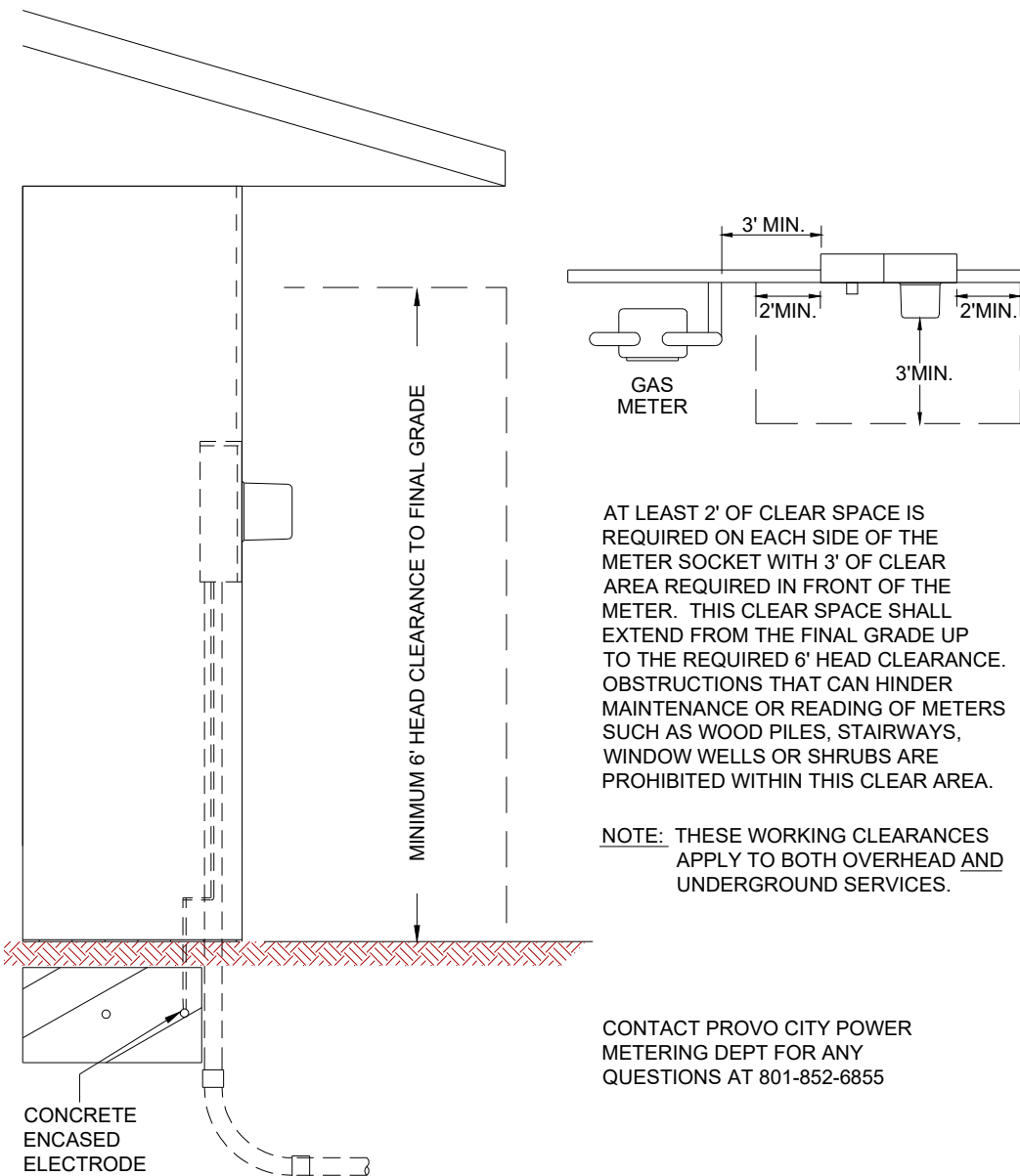


Figure 6.1 Residential Working Clearances

#### 6.1 Additional Requirements:

- 6.1.1 Install residential meters outdoors at a location acceptable to Provo City Power.
- 6.1.2 Locate the meter within 10 feet of the front (street side) of the dwelling, on the side of the dwelling closest to Provo City Power's source.

6.1.3 Metering equipment shall not be installed in locations such as:

1. Directly over any window well, stairway, ramp, or steps.
2. Within 3 feet of a window that has a view of living space or restrooms.
3. Provo City Power's poles, transformers, cabinets or other equipment.
4. An area likely to be fenced.
5. A location where the door to the meter cabinet or meter face is obstructed (for instance, areas near property line, walkways, and driveways).
6. Closer than 36 inches horizontally from gas meter, gas valves, fixed or threaded fittings, separable valves or unions, or regulators.
7. Areas within 5 feet of fuel storage units, including generator fuel tanks, unless prior approval is obtained from Provo City Power.

## 7. MULTI-METER INSTALLATION WITH UNDERGROUND SERVICE 2-6 METERS

### SERVICES LARGER THAN 200 AMPS, SELF-CONTAINED METERING

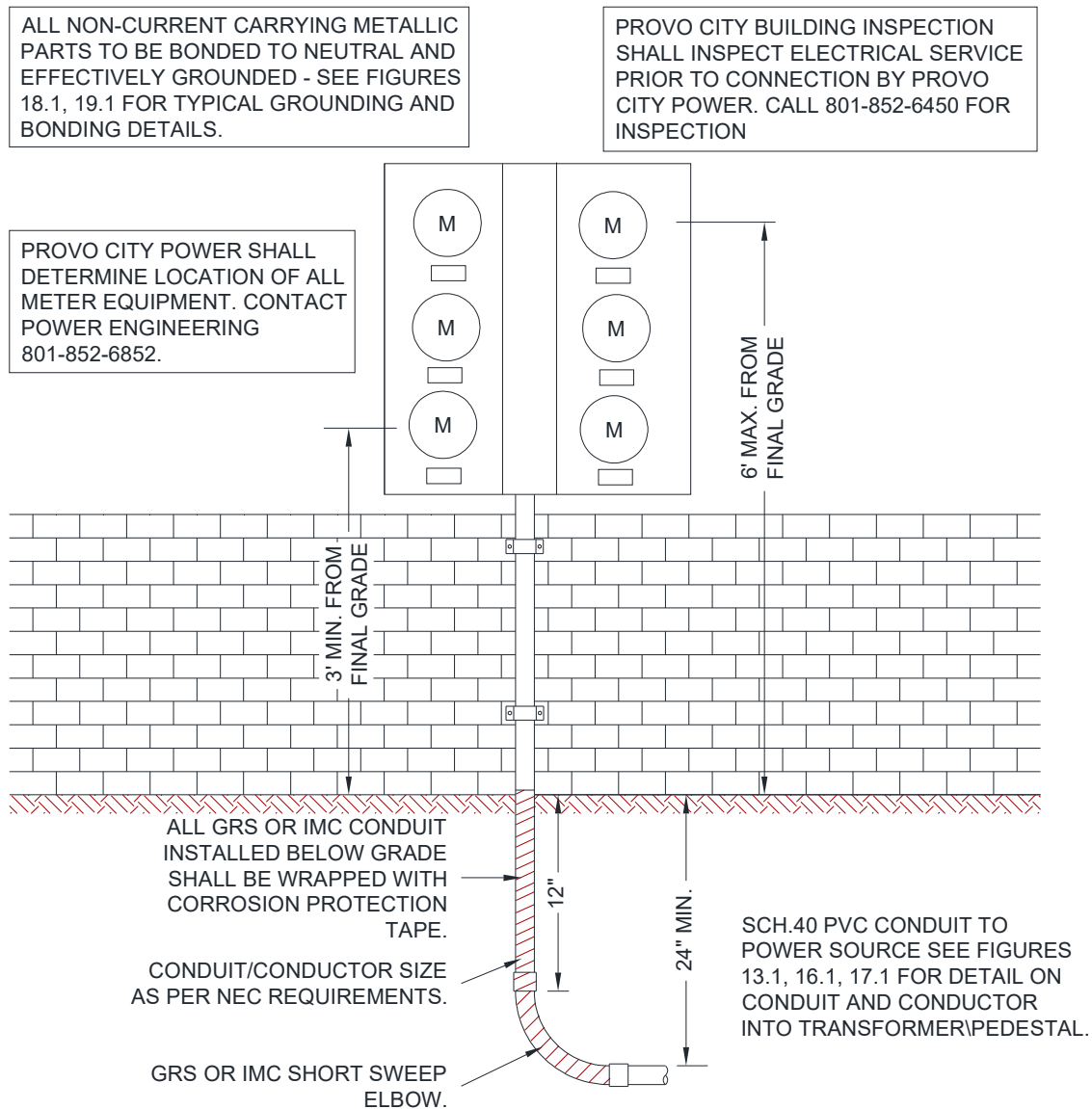


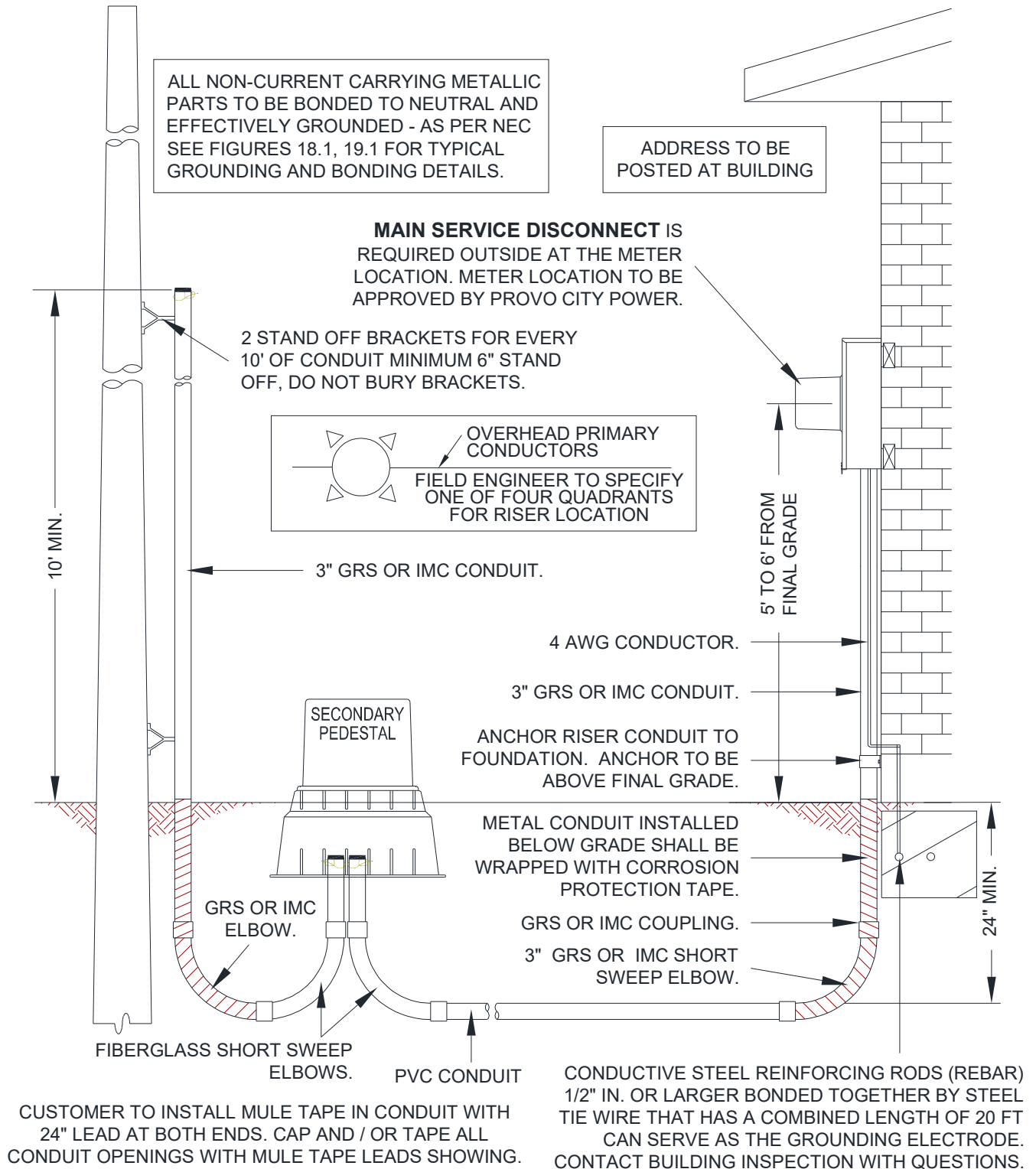
Figure 7.1 Multi-meter Installation

#### 7.1 Additional Requirements:

- 7.1.1 Contractor shall prewire the line side of the meter socket.
- 7.1.2 Conduit clamp must be above ground.
- 7.1.3 Customer to furnish, install and maintain conduit and phase colored conductors.
- 7.1.4 Call Provo Power Dispatch (801)852-6999 for inspection prior to backfill of trench.
- 7.1.5 Call Provo City Building Inspection (801)852-6450 for permanent power inspection.

## 8. OVERHEAD TO UNDERGROUND SERVICE INSTALLATION

### 100-200 A (1 OR 3 PHASE) RESIDENTIAL AND SMALL COMMERCIAL



## **8.1 Additional Requirements:**

- 8.1.1 Customer to furnish and install conduit from pole as shown. Customer to furnish additional 20' UV rated PVC conduit with standoffs and mounting hardware, to be installed by Provo City Power.
- 8.1.2 Contact Provo City Power for trench inspection (801)852-6999. Do not backfill prior to inspection.
- 8.1.3 See trench detail drawings for specifications (Figure 14.1)
- 8.1.4 Trench to be minimum depth of 24"
- 8.1.5 Provo City Power to supply conductor after all inspections have been completed.
- 8.1.6 Provo City Power (801)852-6852
- 8.1.7 Provo City Building Inspection (801)852-6450

## 9. TYPICAL RESIDENTIAL/SMALL COMMERCIAL SINGLE-PHASE OVERHEAD SERVICE

### 200 AMP MAX. FOR OVERHEAD SERVICE

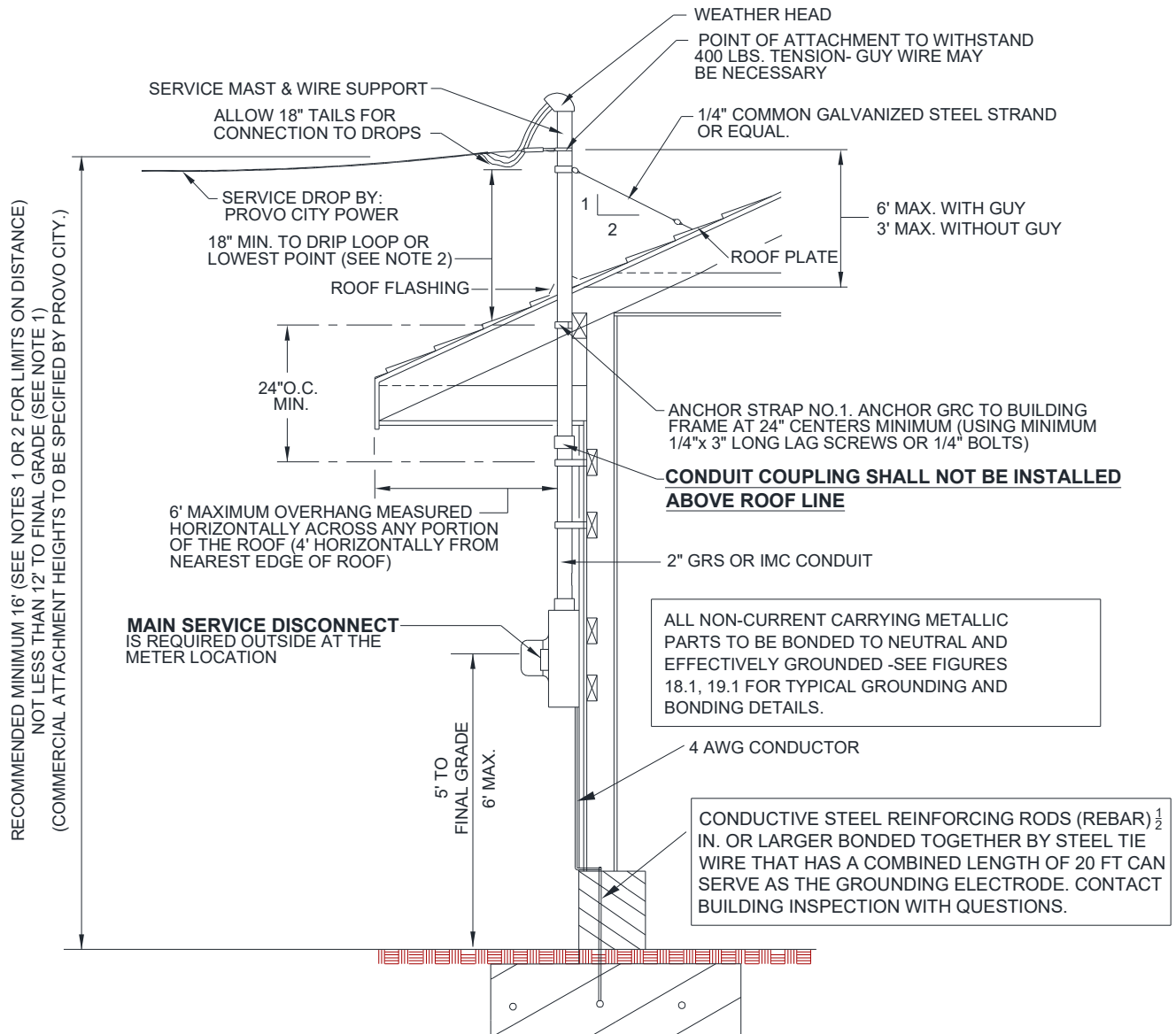


Figure 9.1 Pad Vault Specifications

### 9.1 Additional Requirements:

- 9.1.1 If accessible to truck traffic, to other vehicles over 8' in height, or to riders on horseback, minimum attachment height is 16'. Refer to NESC table 232-1.



- 9.1.2 If the service is crossing the roof for more than 6' horizontally in any direction, or more than 4' horizontally from the nearest edge of the roof, refer to NESC 234C3 and figure 11.1 for the appropriate clearance
- 9.1.3 For clearance of service drops, see section 230 of the NESC.
- 9.1.4 Service mast must be mounted on side nearest pole, Provo City Building Inspection to approve location.
- 9.1.5 Provo City Building Inspection to inspect prior to connection. Call (801)852-6450
- 9.1.6 Use oxide inhibitor when terminating aluminum conductors.

# 10. TYPICAL RESIDENTIAL UNDER EAVES SERVICE INSTALLATION

**(THIS IS A NON-STANDARD INSTALLATION AND REQUIRES APPROVAL BY PROVO CITY POWER) – (FOR MULTI LEVEL BUILDINGS ONLY) – (200 AMPS MAX. FOR OVERHEAD SERVICES)**

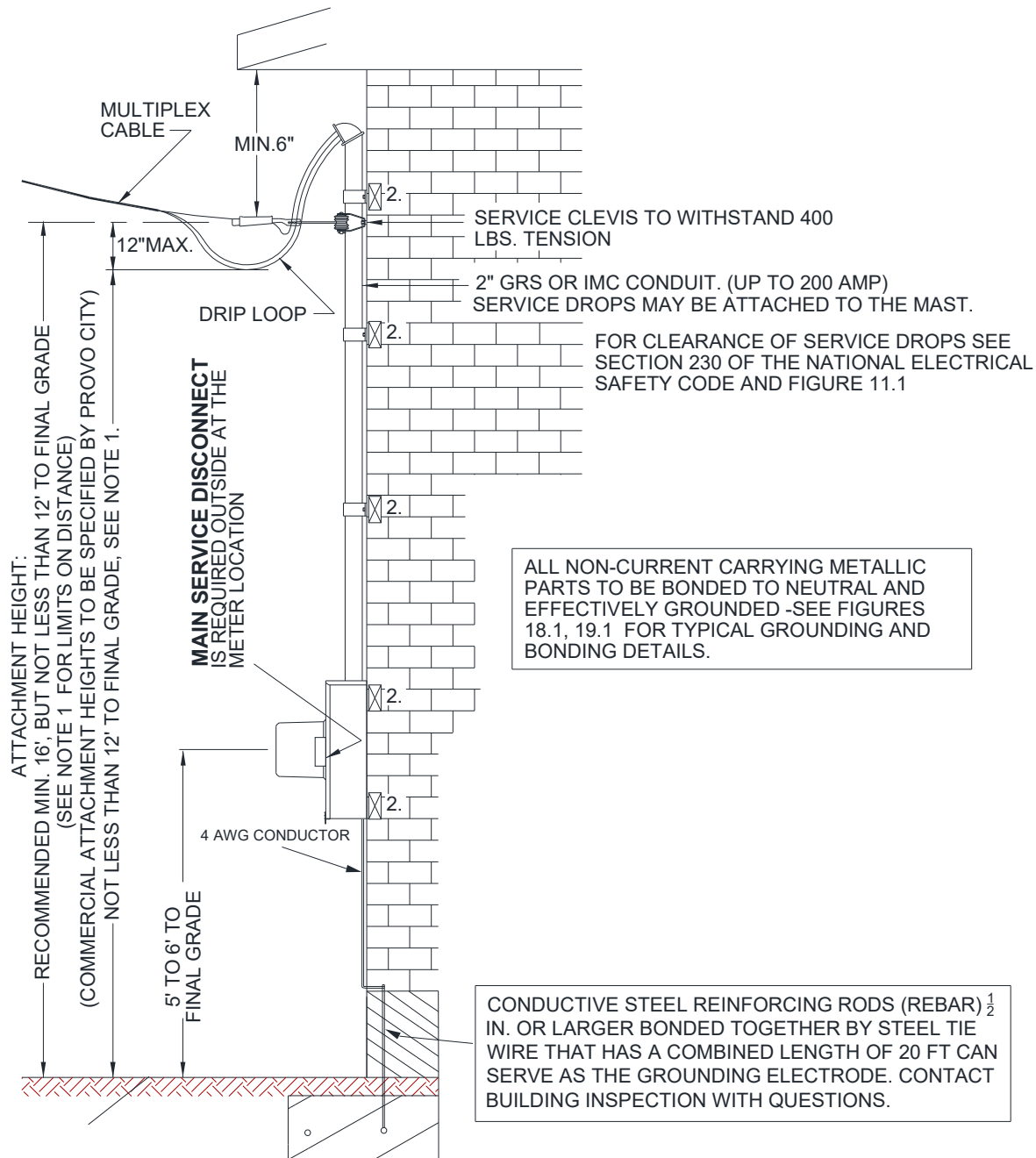


Figure 10.1 Under Eve Installation

## **10.1 Additional Requirements:**

- 10.1.1 If accessible to truck traffic or to other vehicles over 8' in height, or to riders on horseback, minimum clearance (and attachment height) is 16'; refer to NESC table 232-1. Clearances shown as 12' minimum are suitable for areas subject to pedestrians and restricted traffic only.
- 10.1.2 2"x4" blocks between studs are suggested. Anchor to building frame at 24" centers.
- 10.1.3 Service mast must be mounted on side nearest pole, Provo City Building Inspection to approve location.
- 10.1.4 Provo City Building Inspection to inspect prior to connection. Call (801)852-6450
- 10.1.5 Use oxide inhibitor when terminating aluminum conductors

# 11. CLEARANCES OF 600 VOLT SERVICE DROPS TO BUILDINGS, SIGNS, AND OTHER INSTALLATIONS TO WHICH ATTACHED (NESC RULE 234C3 AND 235C1)

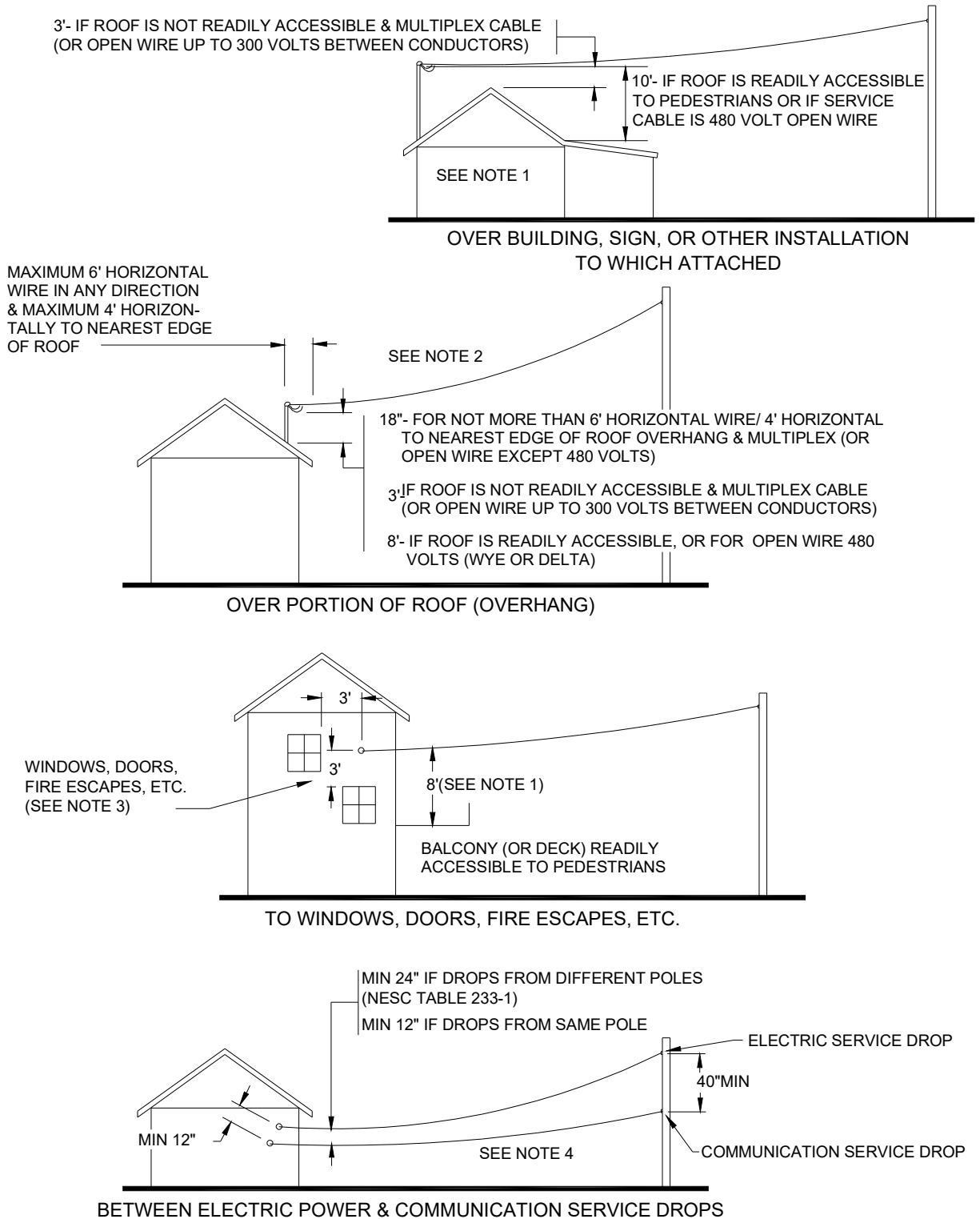
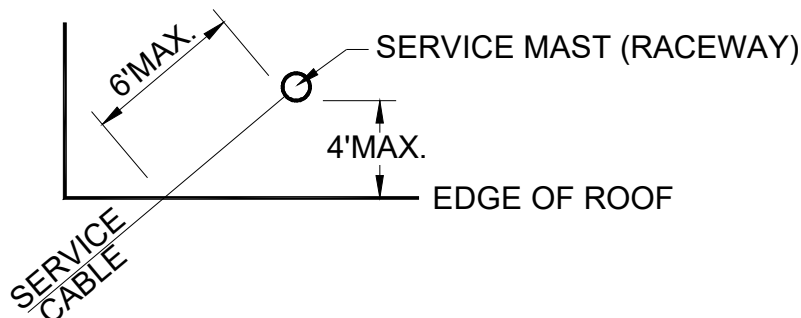


Figure 11.1 Clearances of 600 Volt Service Drops.

## 11.1 Additional Requirements:

- 11.1.1 If a roof or balcony is not readily accessible to pedestrians and the service cable is multiplex (up to 600 volts) or is insulated open wire (up to 300 volts between conductors, i.e. Not including 480V wye or delta), the clearance may be a minimum of 3 feet per NESC 234C3D (1) exception 1. (NEC 230-24 also requires 3' minimum for up to 300 volts between conductors and a roof slope of at least 4" in 12" to be considered not accessible to pedestrians.) NESC defines a roof or balcony readily accessible to pedestrians if it can be casually accessed through a doorway, window, ramp, stairway, or permanent ladder (with its bottom rung less than 8' from ground or from permanent accessible surface) by a person, on foot, who neither exerts extraordinary physical effort nor employs special tools or devices to gain entry. NESC shall govern from the utility's pole to the drip loop at the customer's service entrance; NEC shall govern from that drip loop into the building.
- 11.1.2 Where not more than 6 feet (measured horizontally) of a service drop passes over a roof to terminate at a (through-the-roof) service raceway or approved support located not more than 4' measured horizontally from the nearest edge of roof and the cable is either multiplex (up to 600 volts), or is insulated open wire (up to 300 volts between conductors, i.e. Not including 480V wye or delta), the clearance above the roof may be a minimum of 18". See the plan view sketch below. (NEC 230-24 allows the same 18" clearance for services up to 300 volts between conductors and similar overhang.)



- 11.1.3 A clearance of 3 feet in any direction from windows, doors, fire escapes, or similar locations is required, except it does not apply to:
- 11.1.4 Multiplex cable above the top of a window, or
- 11.1.5 Windows that do not open.
- (NEC 230-9 requires the same 3' of clearance except above the top level of a window; service conductors are not allowed below windows or openings through which materials may be moved, e.g. In farm or commercial buildings.)
- 11.1.6 Per NESC rule 235C1 (exception 3) a space of not less than 12" is required between electric service drops of 0-600 volts running above and parallel to communication service drops. This applies to any point in the span as well as at the building attachment. Other clearances apply at the pole. If these services are run from different support structures, NESC table 233-1 requires 24" vertical clearance between conductors. Communication cables should be installed below power supply conductors whenever possible.

11.1.7 CAUTION:

All NESC vertical clearances apply to the conductors at maximum final sag. Allow for 1.0 foot of additional sag for increase from initial sag to maximum final conditions.

## 12. METER SOCKET WIRING DIAGRAM SINGLE PHASE, 3 WIRE, 120/240V OR 120/208V, 3 WIRE NETWORK

(100 or 200-amp socket; residential or commercial)

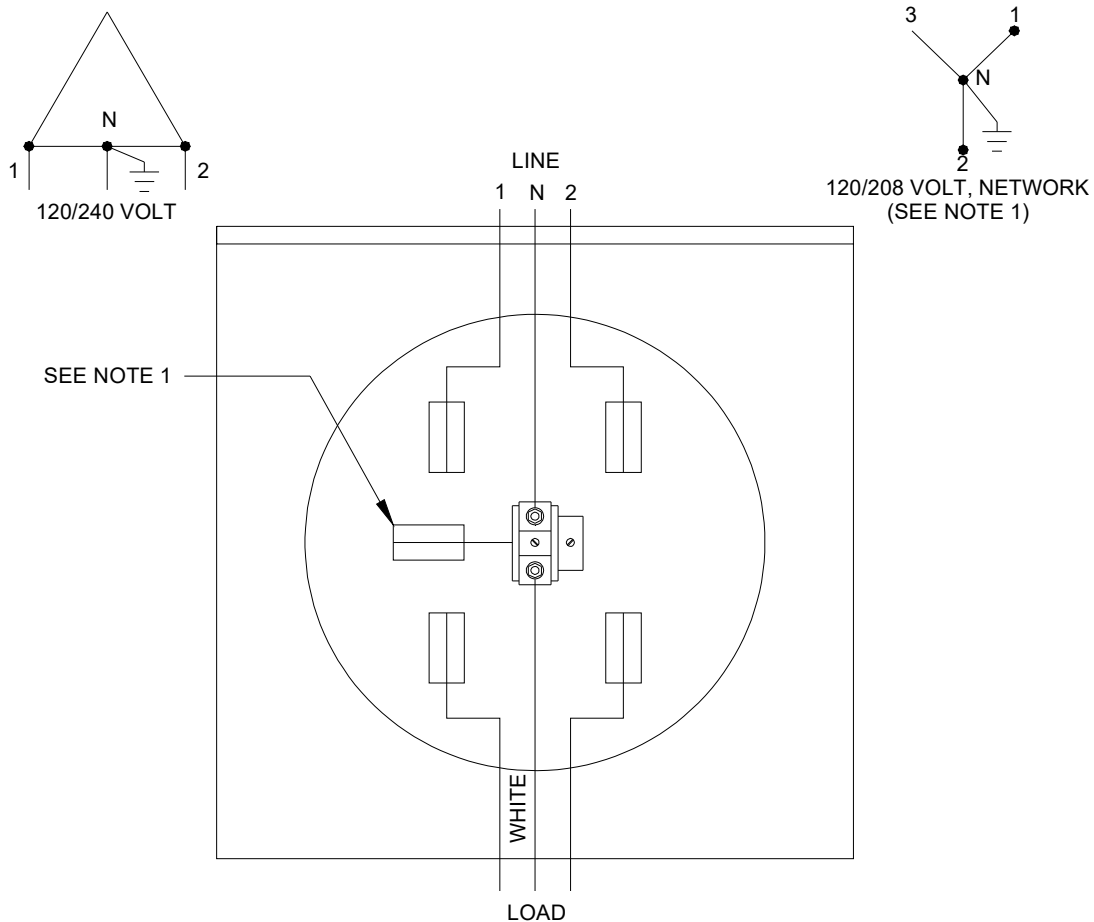


Figure 12.1 Meter Socket Wiring Diagram

### 12.1 Additional Requirements:

- 12.1.1 The fifth terminal (stinger) is required for 120/208V service.
- 12.1.2 Wire size range:
- 12.1.3 100 amp socket: lugs suitable for #6 - #2/0 stranded CU/AL conductors.
- 12.1.4 200 amp socket: lugs suitable for #2 - 350 kcmil CU/AL conductors.
- 12.1.5 Approximate dimensions:
- 12.1.6 100 amp socket: 3-5/16"(d) x 8"(w) x 11-1/2"(h).
- 12.1.7 200 amp socket: 4-3/8"(d) x 11"(w) x 15-1/2"(h).
- 12.1.8 Contact Provo City Power at (801)852-6952 for service voltage information.

# 13. UNDERGROUND DISTRIBUTION SPECIFICATIONS (SINGLE PHASE)

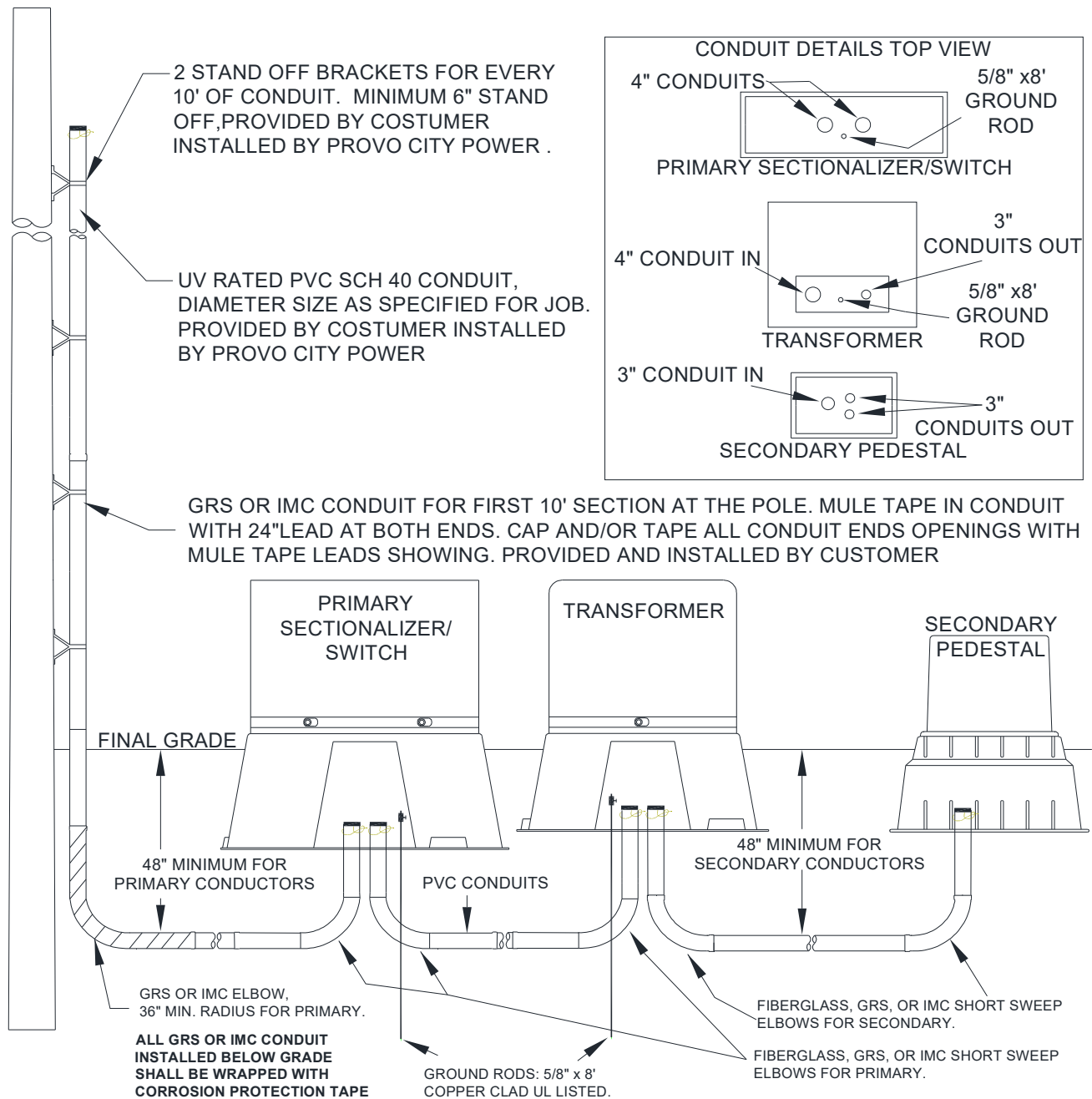


Figure 13.1 Underground specifications

## 13.1 Additional Requirements:

- 13.1.1 Trenches and pad mount transformer locations must be compacted to 95% compaction.



- 13.1.2 All depths shown must be from finished grade. Red warning tape to be placed in trench (2' above conduit). Minimum depth for primary and secondary conduit is 48"; or 24" for services and streetlights. See trench detail drawings for specifications.
- 13.1.3 PVC sch. 40 4" or larger required for primary, 3" for secondary, 3" for service conduits to a residence, or 2" for streetlights.
- 13.1.4 All trenches must be left open until final inspection by Provo City Power at (801)852-6999

## 14. JOINT TRENCH TYPICAL DETAIL

### COMMERCIAL/RESIDENTIAL SUBDIVISION

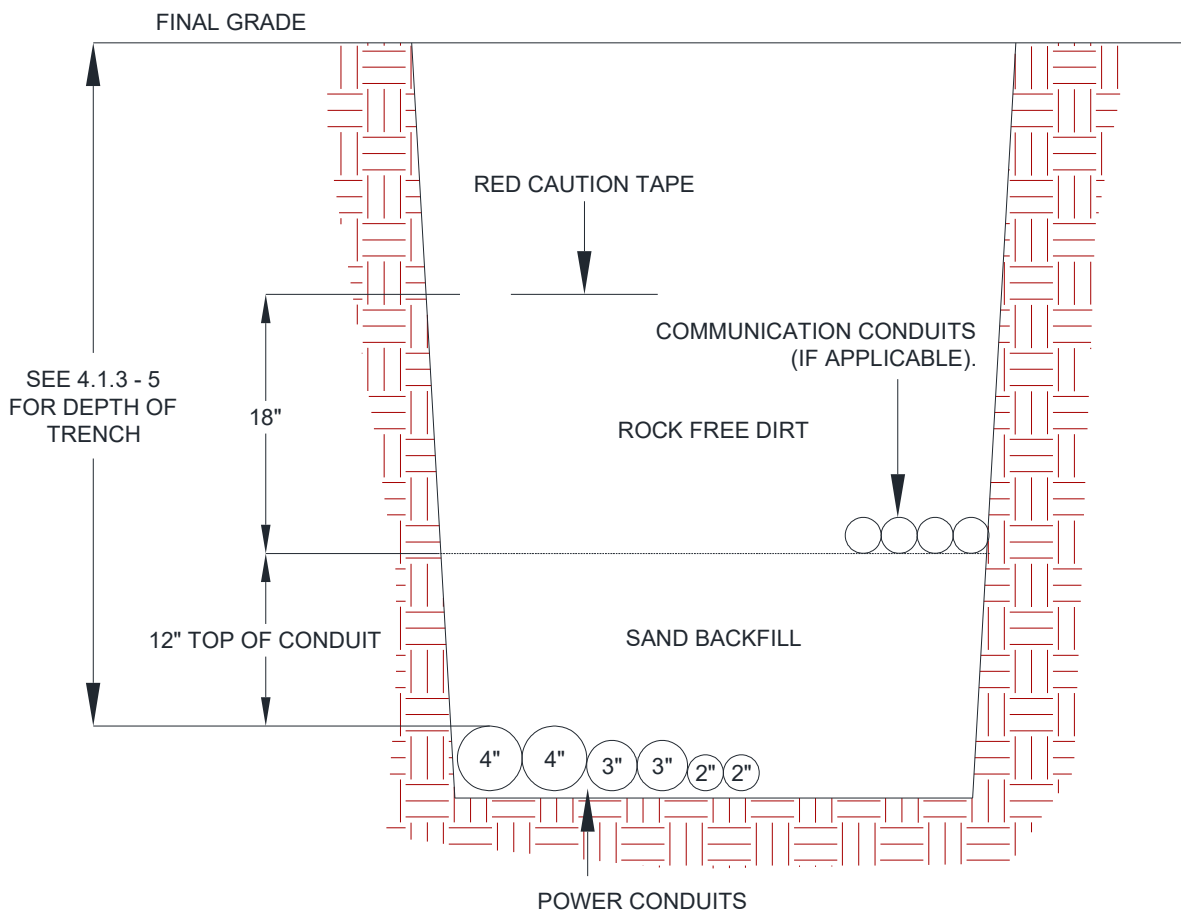


Figure 14.1 Joint Trench Typical Detail

#### 14.1 Additional Requirements:

- 14.1.1 Provo City Power to approve backfill material
- 14.1.2 Provo City Power shall inspect trench/conduit prior to backfill.
- 14.1.3 Primary depth 48" minimum.
- 14.1.4 Secondary depth 48" minimum.
- 14.1.5 Service depth 24" minimum.

#### 14.2 Required Trench Inspection for Projects:

- 14.2.1 For main line trench inspections: Call after conduit has been placed in trench and 12" of sand has been placed on conduit.

- 14.2.2 Trench must be left open for inspection or you will be asked to re-open trench for inspection and for inspector to GPS conduit location.
- 14.2.3 Call the project engineer you have been working with. Provo Power Engineering: (801)852-6852

### **14.3 Required Trench Inspection for Services:**

- 14.3.1 Call for service trench inspection before doing any backfill on trench. Provo City Power Dispatch: (801)852-6999

### **14.4 Placing Elbows into Existing Power Equipment:**

- 14.4.1 Call after trench has been extended to base of power equipment, and conduit has been installed and left 2' short of power equipment (see pages 33-34). Leave trench open 8'-10' from equipment, provide fiberglass elbows and contact Provo City Power for assistance on installation. Call Power Dispatch: (801)852-6999
- 14.4.2 NEVER place conduit into live equipment.

### **14.5 Final Project Inspection:**

- 14.5.1 Call when boxes are installed at proper height and are level, ground rods have been installed, mule tape has been placed in conduit, and conduit is at proper height.
- 14.5.2 Curb and gutter must be in before setting boxes. Elevation needs to be set by a surveyor. If elevation is too low, boxes and conduit will need to be re-installed to meet proper height. DO NOT cut fiberglass elbows.
- 14.5.3 Call the project engineer you have been working with. Provo Power Engineering: (801)852-6852

## 15. U.G. POWER INSTALLATION INTO EXISTING ENERGIZED EQUIPMENT

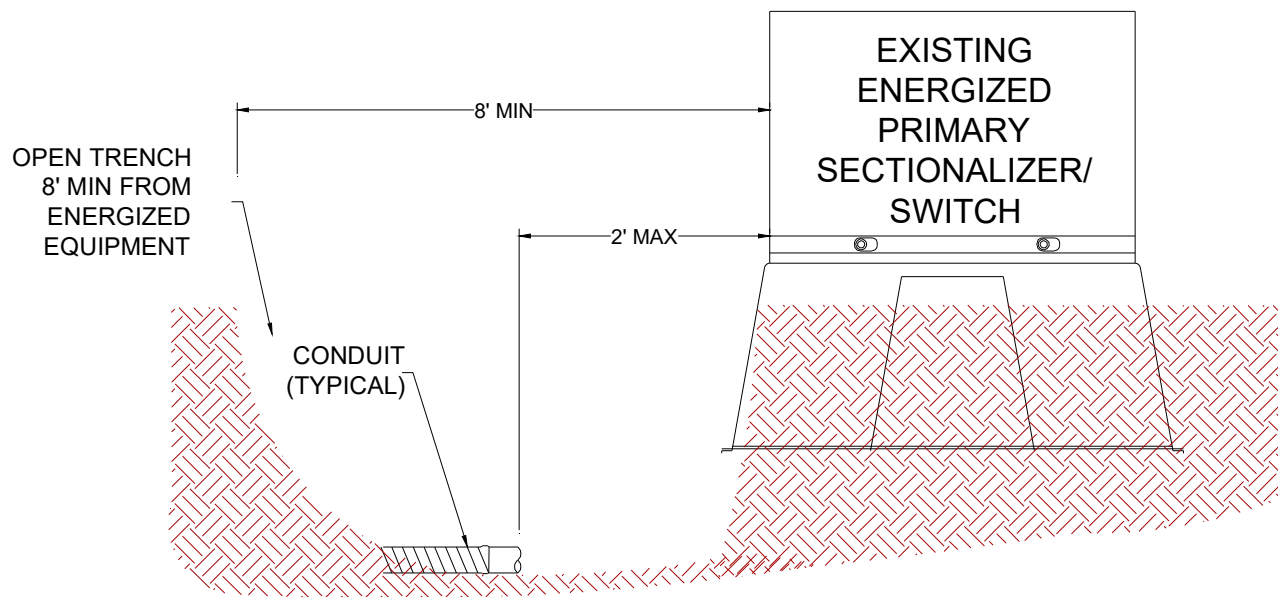


Figure 15.1.1 Connecting to a Sectionalizer

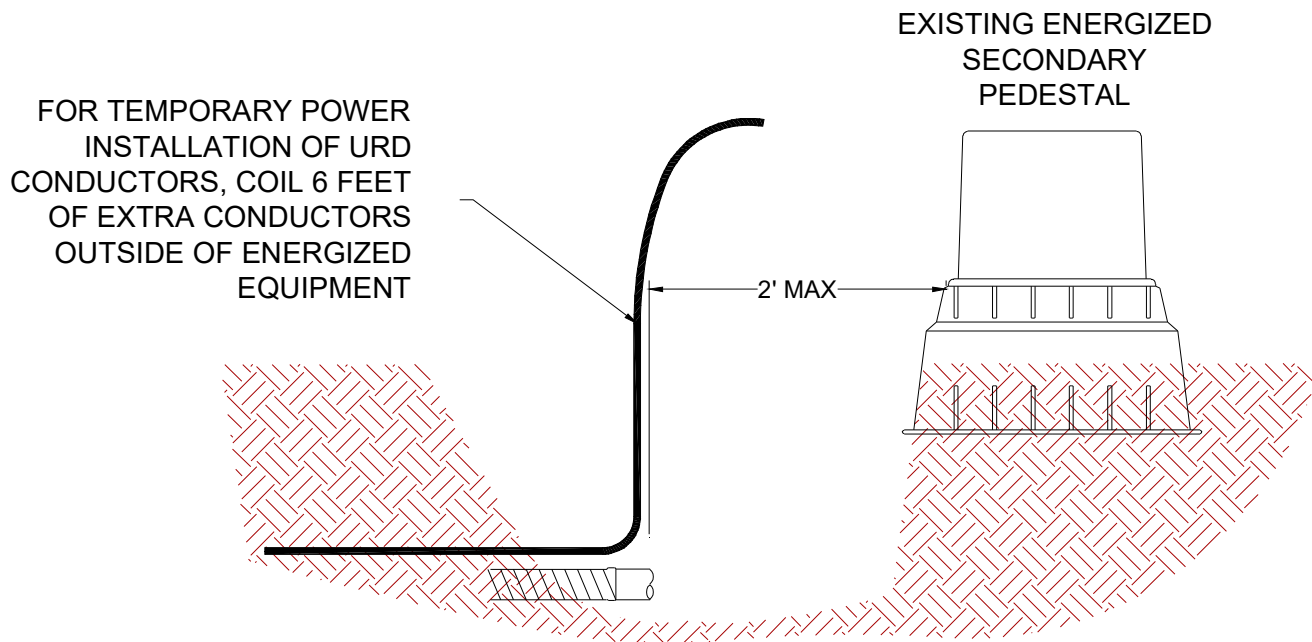
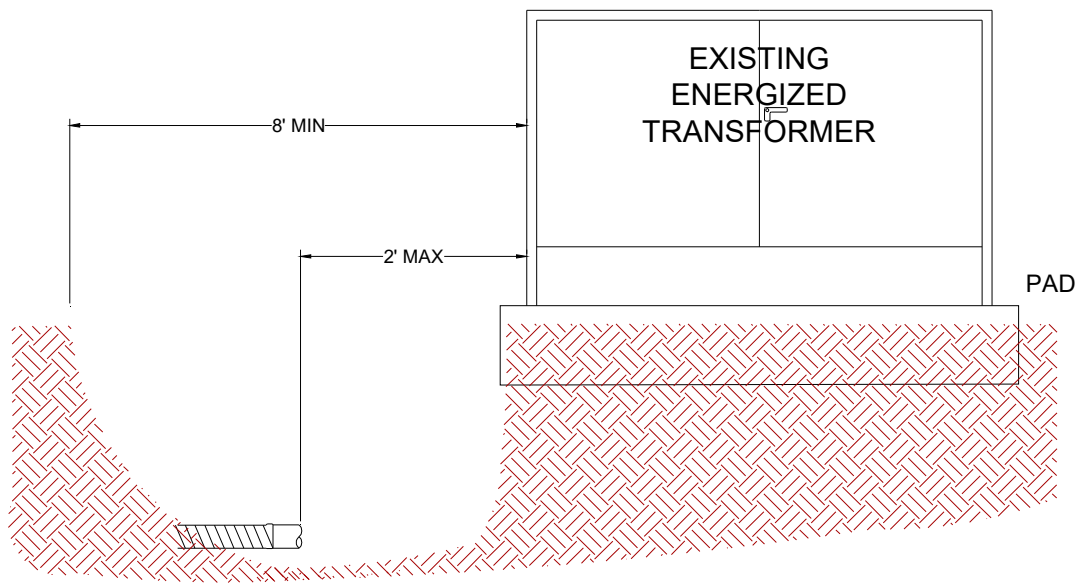


Figure 15.1.2 Connecting to a Pedestal

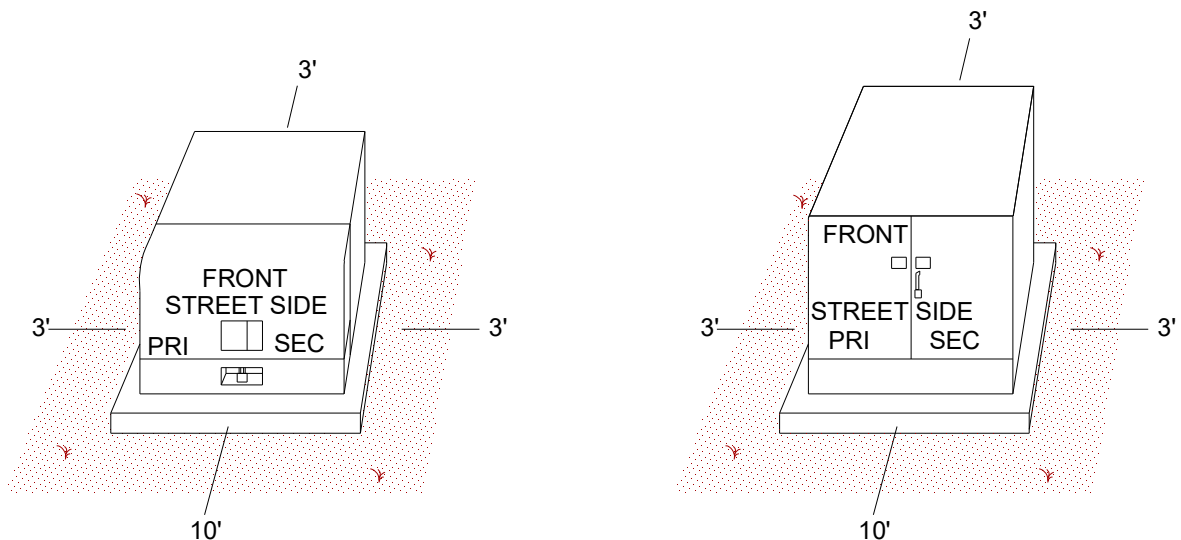


*Figure 15.1.3 Connecting to a Transformer*

## **15.1 Additional Requirements:**

- 15.1.1 For safety reasons DO NOT install conduits/conductors inside energized equipment.
- 15.1.2 Stop installation of conduits at maximum of 2' from energized equipment.
- 15.1.3 Extend trench to the edge of the equipment. Leave trench open 8'-10' from equipment.
- 15.1.4 Contractor to supply sweep and additional conduit needed. Call Provo City Power (801)852-6999 for assistance to complete installation.

## 16. TRANSFORMER AND PADMOUNTED EQUIPMENT ACCESS-CLEARANCES



**RESIDENTIAL SINGLE-PHASE TRANSFORMER**  
**PADMOUNTED EQUIPMENT**

**COMMERCIAL 3-PHASE TRANSFORMER**  
**PADMOUNTED EQUIPMENT**

*Figure 16.1 Access Clearances*

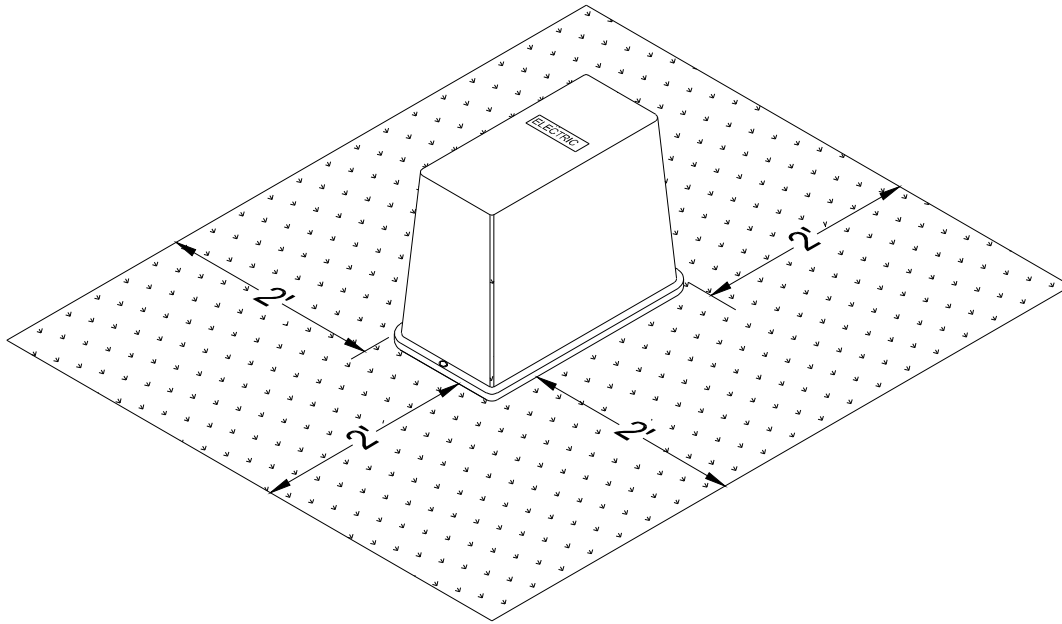
### 16.1 Additional Requirements:

- 16.1.1 In the event of an equipment failure or power outage, it is necessary for utility crews to have adequate access to pad mounted equipment and transformers. Access to the front shall be ten feet, access to the rear and sides shall be three feet.
- 16.1.2 No trees, shrubs, fences, large landscape rocks, or other obstructions shall be permitted in access area.

### 16.2 Note for New Services

- 16.2.1 Pad mounted equipment, transformers and secondary pedestals are locked for protection against electrical shock.
- 16.2.2 When installation of a new service requires access to a transformer or pedestal, owner\contractor should call Provo City Power at (801)852-6999.
- 16.2.3 All new conduit runs shall be installed by contractor into transformer\pedestal with Provo City Power supervision.
- 16.2.4 Blue stake laws prohibit any digging with equipment within the 2' safety zone. Please hand dig around any electrical equipment. For more details, please refer to [www.bluestakes.org](http://www.bluestakes.org) for complete details on excavation safety.

## 17. SECONDARY PEDESTAL ACCESS CLEARANCES



*Figure 17.1 Secondary Pedestal (Typ. 12"x20" lid approx.)*

### 17.1 Additional Requirements:

- 17.1.1 In the event of an equipment failure or power outage, it is necessary for Provo City Power crews to have adequate access to secondary pedestal lids. Access to the front and sides and rear shall be 2'.
- 17.1.2 No trees, shrubs, fences, large landscape rocks, or other obstructions shall be permitted in access area.

### 17.2 Note for New Services

- 17.2.1 Transformers and secondary pedestals are locked for protection against electrical shock.
- 17.2.2 When installation of a new service requires access to a transformer or pedestal, owner\contractor should call Provo City Power at (801)852-6999.
- 17.2.3 All new conduit runs shall be installed by contractor into transformer\pedestal with Provo City Power supervision.
- 17.2.4 Blue Stake laws prohibit any digging around equipment within the 2' safety zone. Please hand dig around any electrical equipment. For more details, please refer to [www.bluestakes.org](http://www.bluestakes.org) for complete details on excavation safety.

## 18. TYPICAL GROUNDING/BONDING FOR 100 AND 200 AMP SERVICES UP TO 480 VOLTS

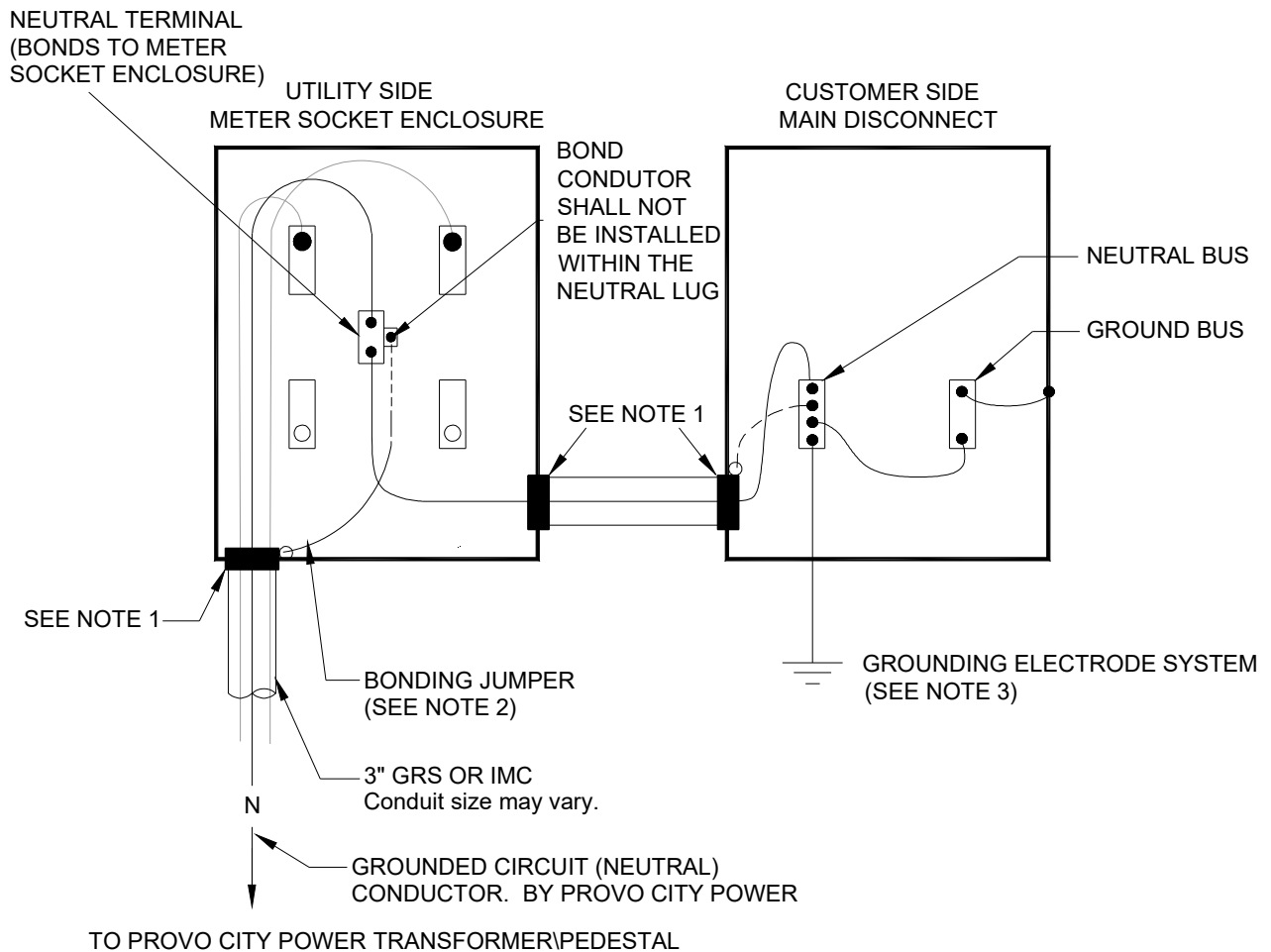


Figure 18.1 Typical Grounding and Bonding

### 18.1 Additional Requirements:

- 18.1.1 The metal conduit raceway shall be bonded to the neutral conductor using a grounding bushing (with bonding jumper), bonding locknuts, threaded conduit hub, or other as approved by Provo City Building Inspection.
- 18.1.2 When a grounding bushing is used, a bonding jumper shall be installed to connect with the neutral grounding terminal as required by Provo City Building Inspection.
- 18.1.3 The grounding electrode system (consisting of metal water pipes, metal building frame, concrete encased electrode, ground ring, driven ground rods, etc.) Shall be bonded to the neutral conductor and installed as required by Provo City Building Inspection. Call (801)852-6450. Concrete encased electrode shall be required for all new construction.



## 19. TYPICAL GROUNDING/BONDING FOR CT CABINET AND GUTTER

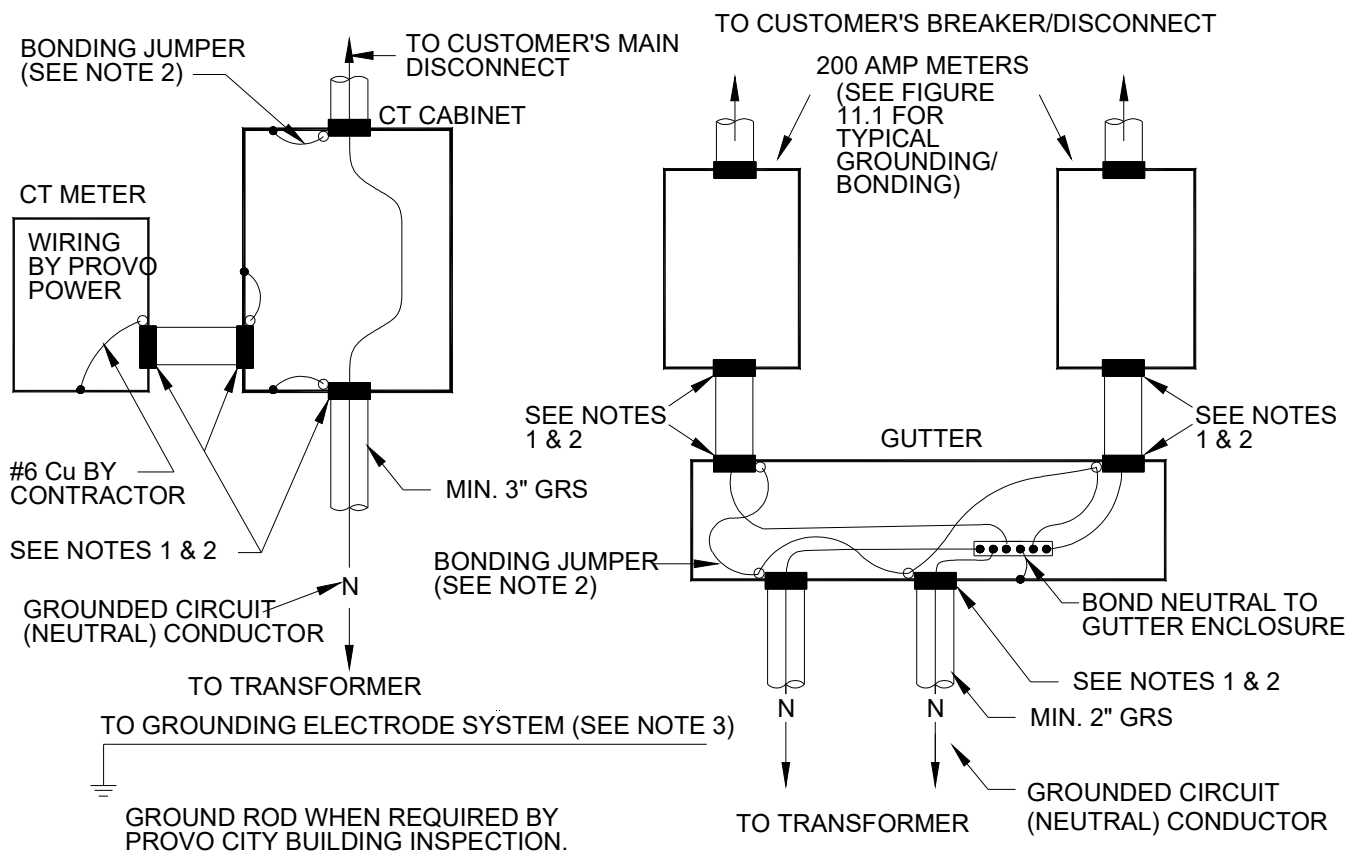


Figure 19.1 Typical CT Cabinet Grounding and Bonding

### 19.1 Additional Requirements:

- 19.1.1 The metal conduit raceway shall be bonded to the neutral conductor by the use of a grounding bushing (with bonding jumper), bonding locknuts, threaded conduit hub, or other as approved by Provo City Building Inspection.
- 19.1.2 When a grounding bushing is used, a bonding jumper shall be installed to connect with the neutral grounding terminal as required by Provo City Building Inspection. The bonding jumpers shall be sized to meet NEC table 250-66 as required by Provo City Building Inspection.
- 19.1.3 The grounding electrode system (consisting of metal water pipes, metal building frame, concrete encased electrode, ground ring, driven ground rods, etc.) Shall be bonded to the neutral conductor and installed as required by Provo City Building Inspection. Concrete encased electrode shall be required for all new construction.