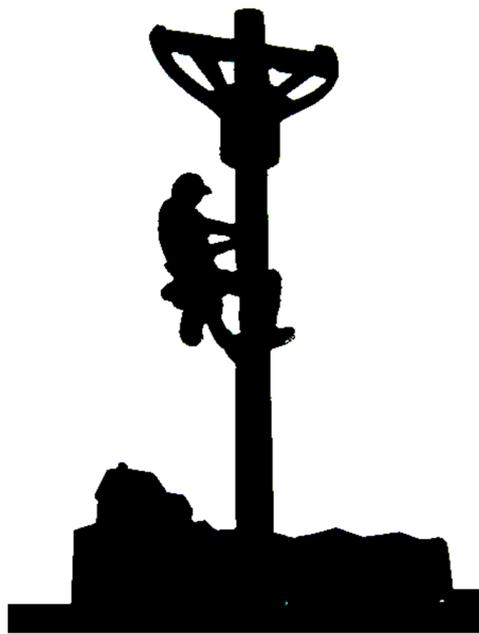


# **BTU**

## **SERVICE ENTRANCE REQUIREMENTS MANUAL**



8th Edition  
2014

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## **Preface**

The Customer's installation of the service entrance equipment and conductors shall conform to Bryan Texas Utilities' ("BTU") Service Entrance Requirements Manual. BTU will inspect the service entrance to the first means of disconnect for conformity.

BTU does not, however, assume any duty of inspecting the Customer's wiring, apparatus, devices, machinery or equipment. It is particularly understood that the Customer assumes full responsibility for electric energy furnished to him/her at and past the point of delivery, described as being the point where the electric energy first leaves the line provided, owned and maintained by BTU and enters the line provided, owned and maintained by the Customer. Furthermore, Customer shall protect and save harmless BTU from all claims for injuries and damages to persons and property occurring upon the premises of the Customer except where it is shown that the negligence of BTU or its agent or agents was the sole proximate cause of such injury or damage.

For the Customer's safety and equipment efficiency, the Customer's wiring shall conform to the following requirements:

- 1) The latest edition of the National Electrical Code and the National Electrical Safety Code.
- 2) All federal, state, county and municipal requirements in force at the time installation is made.
- 3) BTU's Service Entrance Requirements Manual.

**BTU recommends that the Customer obtain the assistance of a qualified, licensed electrician.**

**Notes:**

## BTU General Policies and Procedures

1. For service voltages offered by BTU see page 37.
2. Normal service install orders, requiring only the installation of an electric meter are typically worked within 2-3 business days from the time BTU receives the order. However, if any type of construction is needed the service request shall go through the normal scheduling process, which typically takes 5 business days after any necessary utility locates have been verified. The scheduling process time-line does not begin until the customer has mounted an approved meter loop, signed the Damage Waiver, executed necessary easements and has paid their Aid-In-Construction (“AIC”), which is their contribution towards the construction cost of their project. The customer shall have cleared all easements of trees, brush and any construction debris. The customer shall notify BTU Line Design when ready for service and BTU personnel will field verify that the work has been completed by the customer. All installations must be in compliance with the requirements in this manual.
3. For services required within a developed subdivision BTU ensures (through the development process) that a power source is made available to each lot within that subdivision. Particular care needs to be given to the location of that power source. **(It is expected the Builder and/or Electrician will locate their metering point on the side of their structure where the power source is readily accessible).** In the event the metering point is not located on the proper side of a structure, additional AIC may be required from the customer to cover costs necessary to relocate their power source to conform to BTU’s maximum service length (Refer to page 39). Alternately, at the Customer’s expense the meter and a sub-panel may be relocated to the power source side.
4. BTU will furnish all meter sockets for use within the BTU service area for all permanent installations. BTU meter cans shall not be used as a raceway for the customer’s load wire.
5. **Any customer provided sockets must be approved in writing by prior to installation.** If written authorization is not obtained the meter socket will not be allowed for use. BTU does not allow privately owned meter loops or any other non-approved equipment to be mounted on BTU owned poles, structures or facilities.
6. For all installations greater than 200 Amps, prior to service being extended or an AIC amount determined, an electric load analysis will be provided by the Customer or their contractor to BTU Line Design with enough detail to adequately size BTU’s electric facilities
7. For public safety and operating measures, BTU has a minimum distance a pad mounted transformer must be located from a building or structure. Refer to page 36 for allowable clearances. If an existing pad mounted transformer needs paint or repair BTU Line Design should be contacted to inspect the condition of the unit.

8. On all underground installations BTU will allow a shared ditch line with dry utilities only (Cable TV, Telephone). Refer to pages 43 & 44 for installation. BTU does not allow any type of public or private wet utilities (Sewer, Water, Gas) installed in the same ditch with any BTU owned electrical line.
9. For self-contained meter installations, BTU requires the first means of disconnect be within ten (10) feet of the meter can and load wires from the meter can shall be installed in conduit to the first means of disconnect.
10. BTU requires copper conductor be used from the load side of the metering point to the first means of connection at the Customer's load center.
11. For clarification of any or all parts of this manual or for information regarding a service requirement not covered by this manual, contact BTU Line Design at [BTULD@btutilities.com](mailto:BTULD@btutilities.com) or by phone at (979) 821-5770.

## **SECTION 1: Temporary Construction Meter Poles**

### **General**

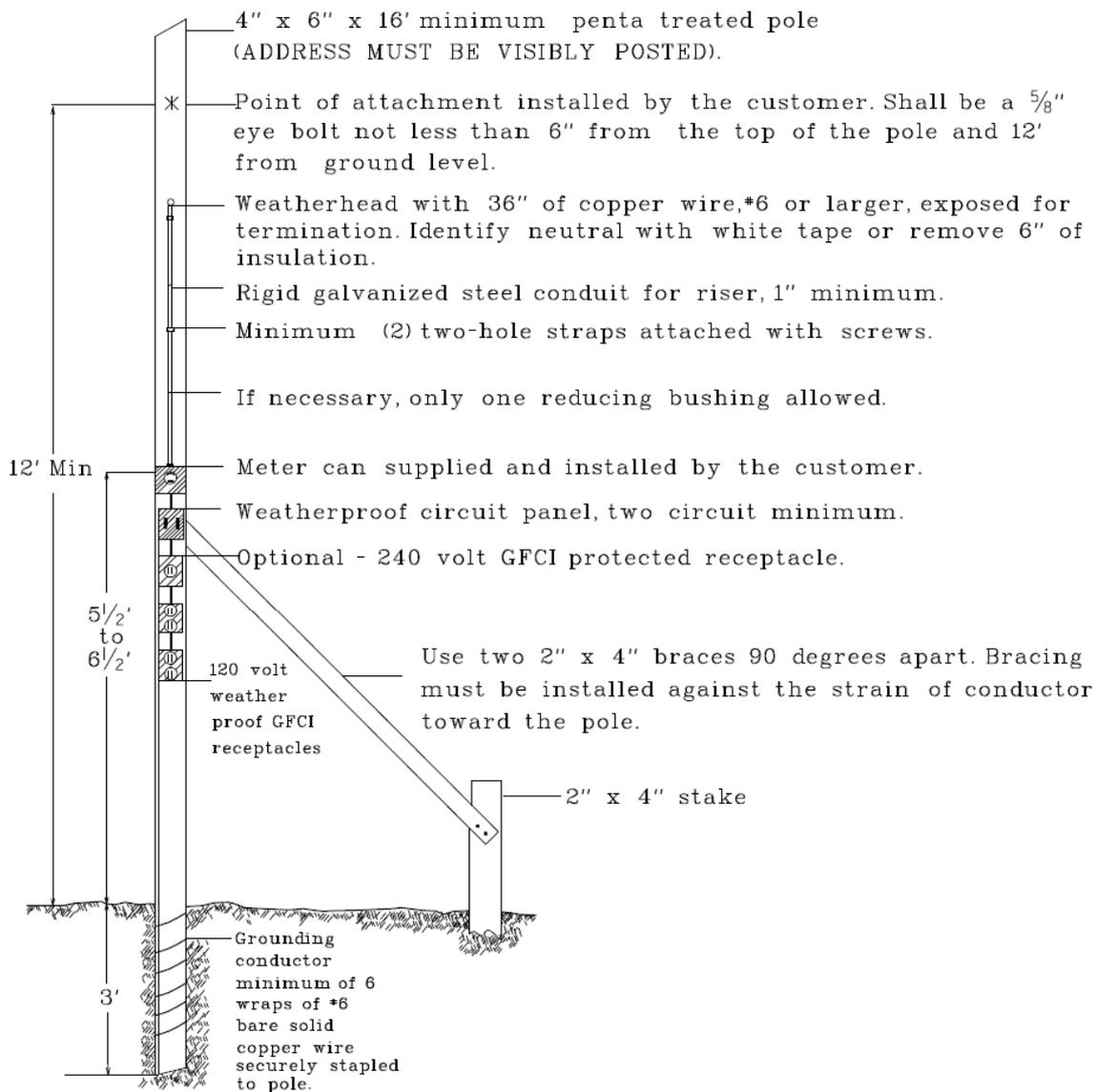
For all temporary meter poles over 200 amps and all three phase temporary meter poles the customer shall contact BTU Line Design at (979) 821-5770.

**\*\*\*BTU does not supply meter sockets for temporary applications.**

**Prior to setting an electric meter, BTU will inspect all meter loops for conformity to this manual.**

**BTU reserves the right to charge trip fees when multiple trips are made to the job site necessitated by installations not conforming to this manual.**

## Temporary Overhead Fed Meter Pole



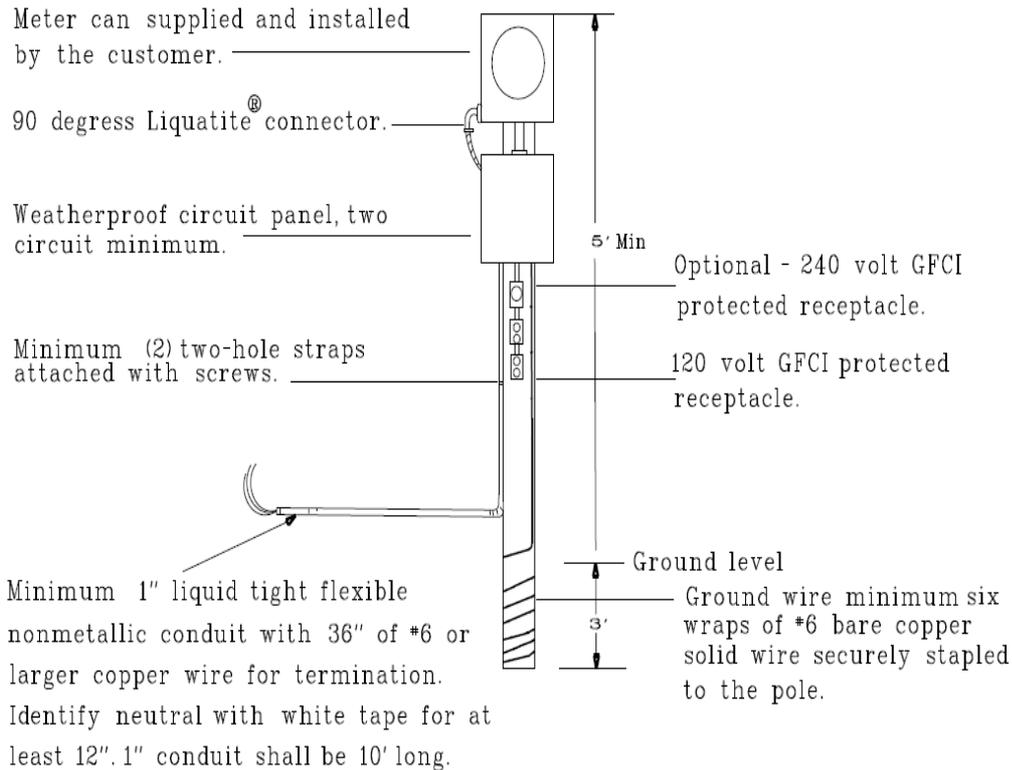
Temporary pole shall be installed within 50' of a BTU pole where 120/240V secondary voltage is available.

**Prior to setting an electric meter, BTU will inspect all installations for conformity to this manual.**

**BTU reserves the right to charge trip fees when multiple trips are made to the job site necessitated by installations not conforming to this manual.**

## Temporary Underground Fed Meter Pole

Penta treated pole (ADDRESS MUST BE VISIBLY POSTED)  
4" x 6" x 8' minimum and 5' minimum above ground level



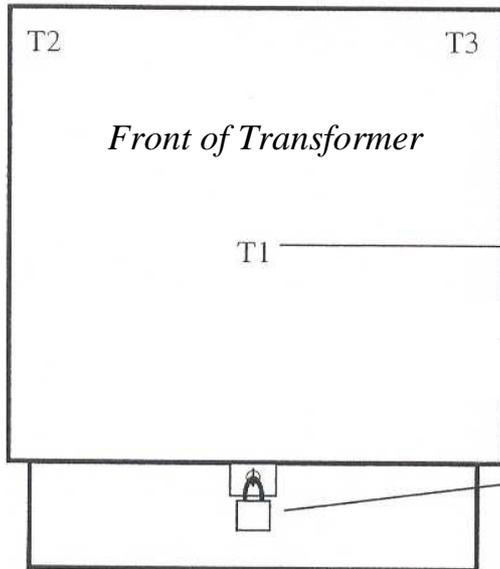
Install the temporary pole within 5' of the right front side of a padmounted transformer or within 5' of an underground secondary pedestal. See page 8.

\*\*\*In some cases, due to access, (fences, property lines, etc.) it may be necessary to install temporary poles farther than 5' from the source or enter a transformer other than on the right front side. All exceptions shall be decided on a case by case basis by BTU Line Design.

**Prior to setting an electric meter, BTU will inspect all installations for conformity to this manual.**

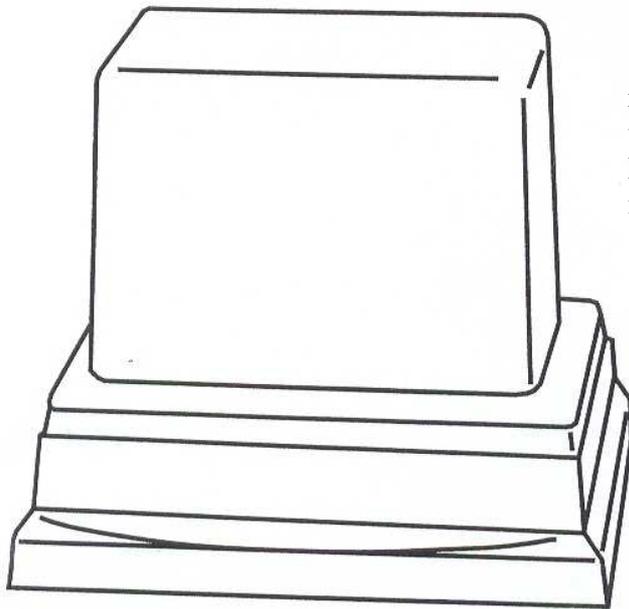
**BTU reserves the right to charge trip fees when multiple trips are made to the job site necessitated by installations not conforming to this manual.**

## BTU Equipment with Secondary Voltage Available



**NOTE: "T" for Transformer**

**Penta bolt and padlock**

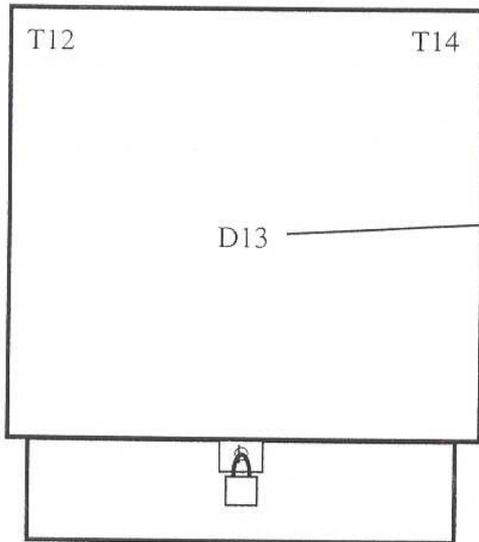


Secondary Power Pedestal.

**\*NOTE:** If you have any questions regarding whether BTU's equipment is able to provide secondary voltage, contact BTU Line Design at (979) 821-5770 prior to installing your temporary pole.

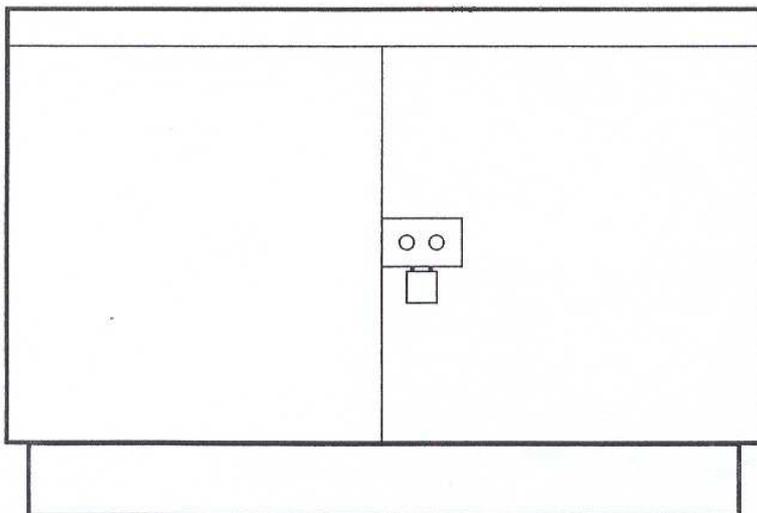
## BTU Equipment without Secondary Voltage Available

**DO NOT INSTALL A TEMPORARY POLE NEXT TO THESE TYPE CABINETS**



Junction Cabinet

**NOTE: "D" for "Dummy Can"**  
Used as a BTU junction cabinet – Not a source for temporary power.  
Contains Primary Voltage Only.



Switch Cabinet

— Contains Primary Voltage Only

**\*See Note on page 8.**

**Notes:**

## **SECTION 2: Overhead Service Entrances**

### **General**

Meter cans are furnished by BTU and installed by the customer. BTU allows one meter can per service. They may be picked up at the BTU Warehouse located at 2200 Fountain Ave. in Bryan, Texas. An investigation number is required to pick up a meter can.

Refer to page 40 for proper conduit and conductor size.

Refer to page 42 for proper meter can application.

All risers shall have a minimum of two (2) two hole straps secured to wall with screws (Nails are not acceptable).

All weather heads shall have 36" of copper wire protruding for termination. All neutrals shall be identified with white tape or by removing 6" of insulation.

BTU requires a continuous neutral from the weather head through the meter can to the first means of disconnect.

**Prior to setting an electric meter, BTU will inspect all meter loops and points of attachment for conformity to this manual.**

**BTU reserves the right to charge trip fees when multiple trips are made to the job site necessitated by installations not conforming to this manual.**

## Service Entrance Meter Pole

Meter pole shall be 18' minimum (Not to exceed 25') round class 7 creosote or penta treated pole with a minimum 4" diameter top.

If necessary, anchor and guy wire will be installed by customer.

Refer to page 35 for service drop attachment clearance to ground.

Point of attachment shall be installed by the customer 6" from top of the pole using a  $\frac{5}{8}$ " eyebolt.

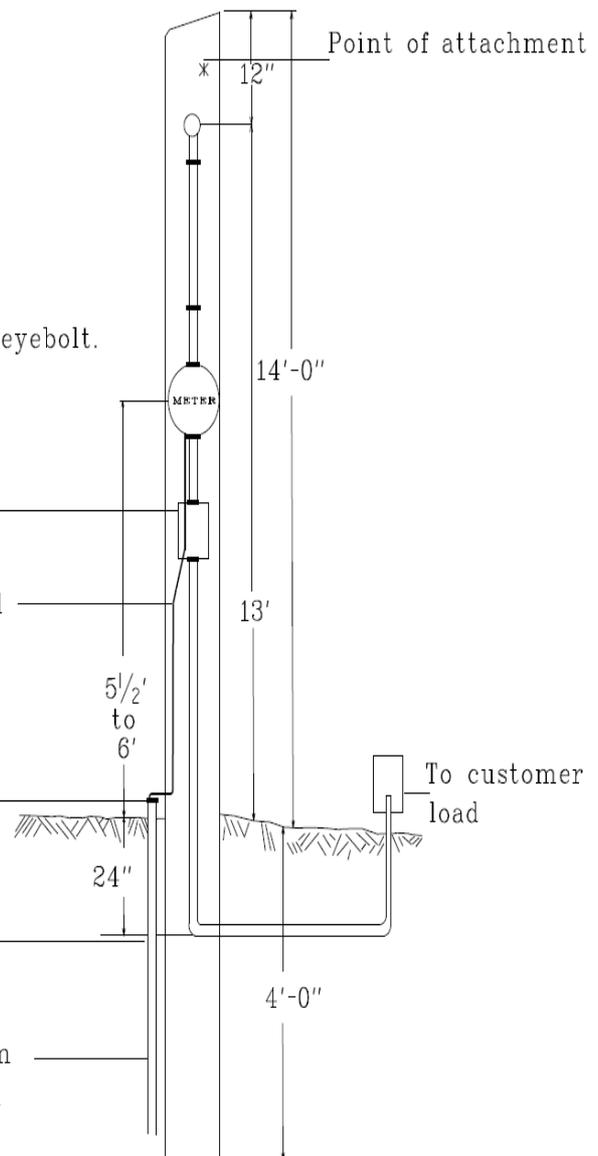
Weatherproof disconnecting means.

Minimum #6 copper ground wire securely stapled to pole. Must be one continuous piece, no splices, from the meter socket to the ground rod.

Approved ground rod clamp.

$\frac{5}{8}$ " x 8' copperclad or copperweld ground rod with 6" of rod exposed above ground.

\*All meter poles shall be set not less than 10' from a BTU pole and not less than 10' in any direction from a building or permanent structure. Only one meter loop will be allowed on each meter pole.



## Meter Loop Not Penetrating a Roof (Wall Mounted)

Customer shall furnish and install the point of attachment sufficient to withstand a minimum pull of 500 pounds. It shall be not more than 25' above ground, not more than 18" from weather head and not less than 12' above finished grade. **(Ceramic screw in wire holders, house knobs, will not be accepted on new construction).**

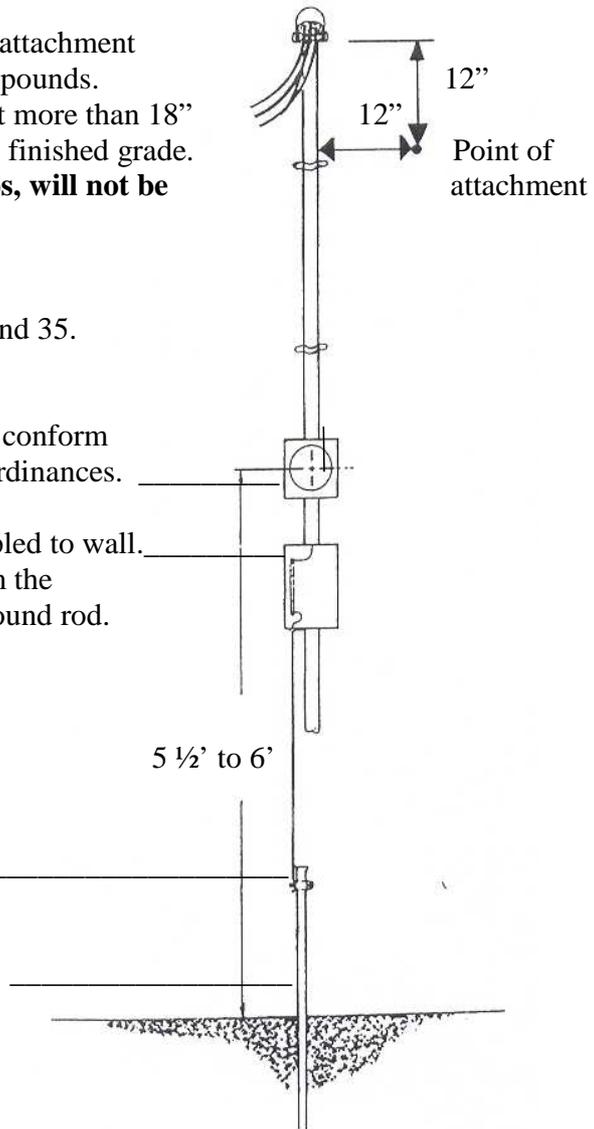
For service drop clearances refer to pages 33 and 35.

Service entrance disconnect and location shall conform to the latest version of the NEC and all local ordinances.

Minimum #6 copper ground wire securely stapled to wall. Must be one continuous piece, no splices, from the meter base, through the ground buss, to the ground rod.

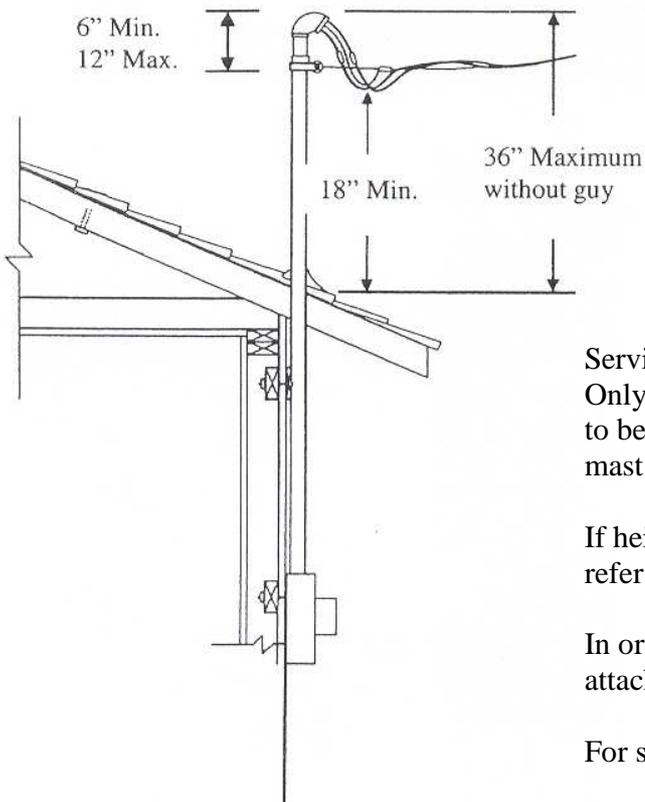
Approved ground rod clamp.

5/8" x 8' copperclad or copperweld ground rod with 6" of rod exposed above ground.



**NOTE: All mobile homes will be required to utilize a permanent meter pole for overhead installations (Refer to pg 12) and a Free Standing Meter Can Rack for all underground installations ( Refer to pg 20).**

## Meter Loop Penetrating Roof (Wall Mounted)



Service mast shall be minimum 2" rigid conduit. Only BTU service drop conductors are allowed to be attached to and supported by the service mast.

If height of service mast exceeds 36" above roof, refer to page 15 for service mast guying.

In order to maintain ground clearances, the point of attachment shall be no less than 12' above finished grade.

For service drop clearances refer to pages 33 and 35.

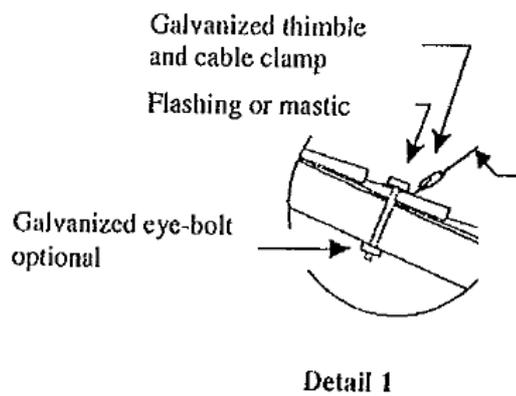
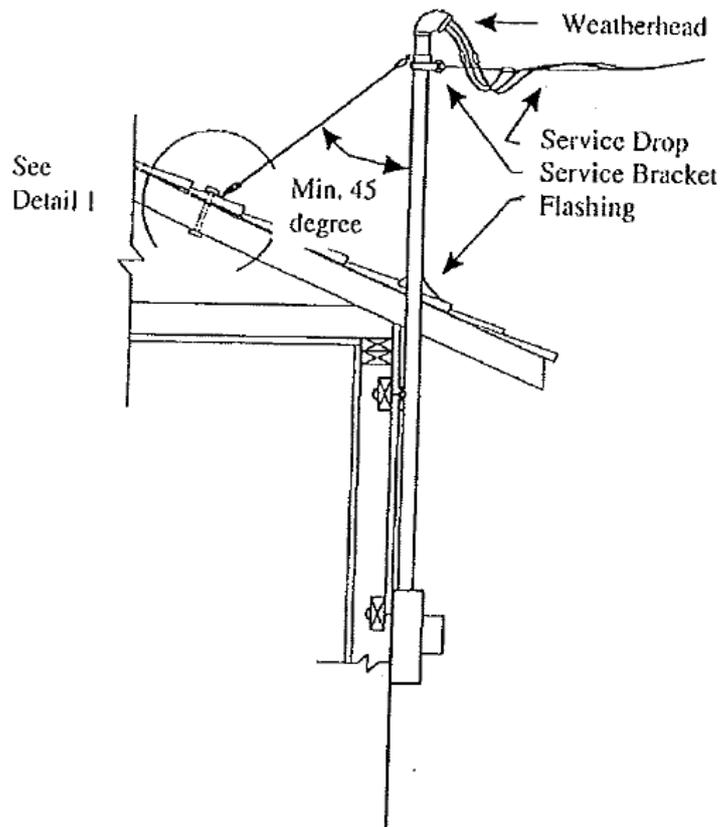
One continuous piece of at least a #6 copper ground wire shall be securely attached to the wall from the ground bar in the panel to the ground rod.

The ground rod shall be a 5/8" x 8' copperclad or copperweld with 6" of rod exposed above ground (Refer to pg 13).

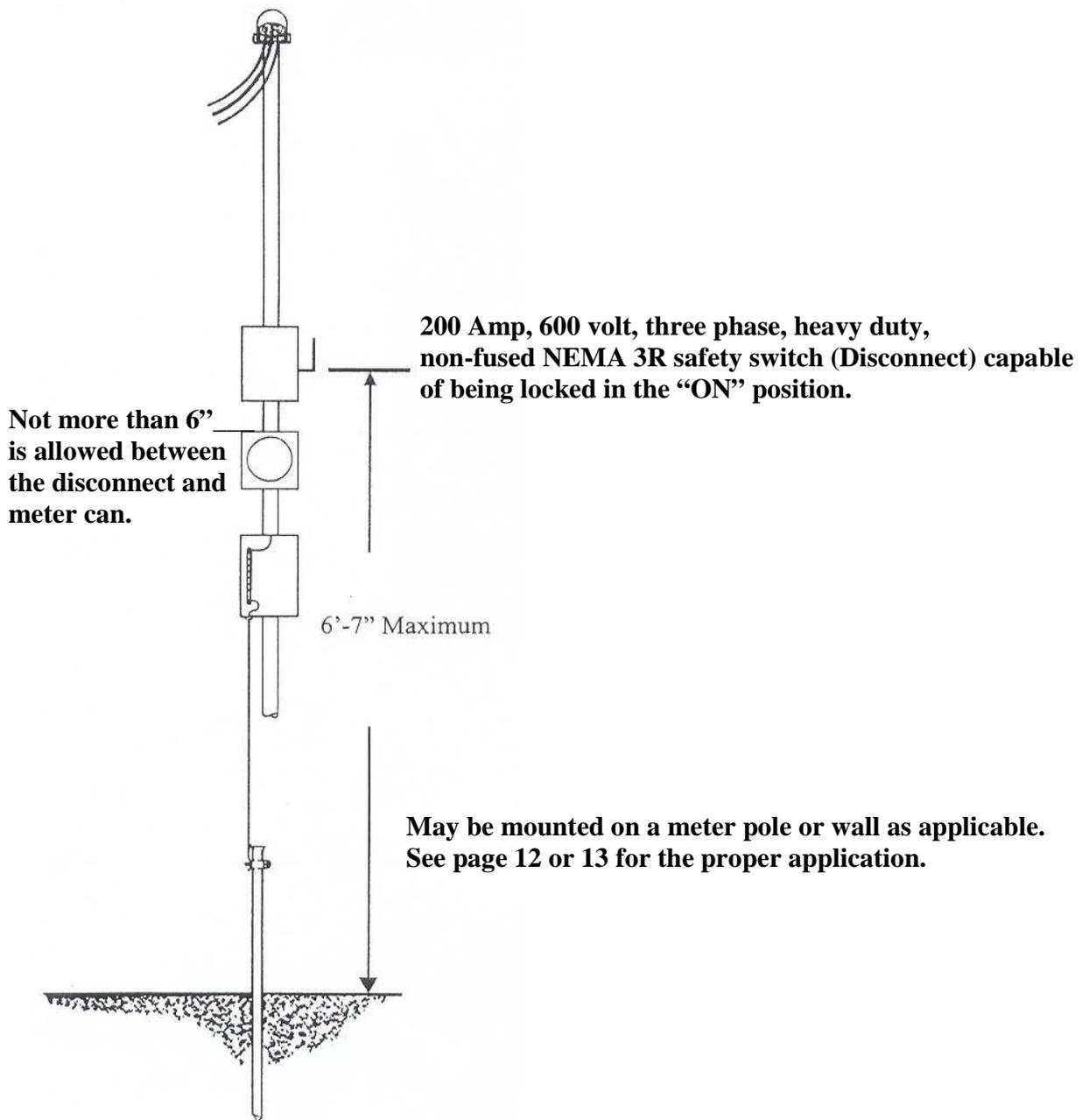
All services that exceed 75' from the transformer to the meter loop will require a lift pole.

# Service Mast Guying

(To be installed by the customer)



## Three Phase 480 Volt Self-Contained Meter Loop



## **SECTION 3: Underground Service Entrances**

### General

In underground fed meter cans the customer shall terminate their load wires in the bottom lugs, and BTU's line side wires will terminate in the top lugs.

Prior to setting an electric meter, BTU will inspect all meter loops for conformity to this manual.

**BTU reserves the right to charge trip fees when multiple trips are made to the job site necessitated by installations not conforming to this manual.**

### Early Pipe Program

BTU's Early Pipe program is designed to offer the Builder the opportunity to have underground service conduit installed prior to installation of the meter can. The BTU Damage Waiver must be completed and returned to BTU prior to scheduling of early pipe or cable installation.

All debris along or adjacent to the conduit route must be removed giving BTU crews adequate working room for conduit installation. Further, all private underground utilities must be located. BTU will not be liable for damage to sod or to private facilities not properly located. Until the final electric service is installed, the Builder will be responsible for repairing conduit installed as part of the Early Pipe Program.

In the event the slab is mismarked, the meter can location is changed, or the Electrician installs the conduit in the wrong location, it is the Electrician's responsibility to relocate the conduit to the correct location and ensure the riser and elbow are installed in an acceptable manner. The riser must be plumb from the horizontal run in the ground to the meter can.

### Option A

The location where the Electrician chooses BTU to turn up the secondary conduit must be prominently marked on the slab. BTU will leave sufficient conduit protruding from the ground to be used as a riser. If the Electrician mounts the meter can prior to BTU installing the conduit, it will no longer be considered Early Pipe and the Electrician shall then install the riser and elbow before BTU will connect to and/or extend service.

Option B

The customer may choose to install their own secondary conduit as described on page 21. BTU will provide enough PVC conduit necessary for the installation of the secondary conductors. The conduit may be picked up at BTU's warehouse located at 2200 Fountain Avenue, Bryan, Texas. The Electrician will need to provide either the job number or investigation number to receive the conduit. It is suggested that the customer contact BTU warehouse personnel by phone at (979) 821-5933 to arrange conduit pickup.

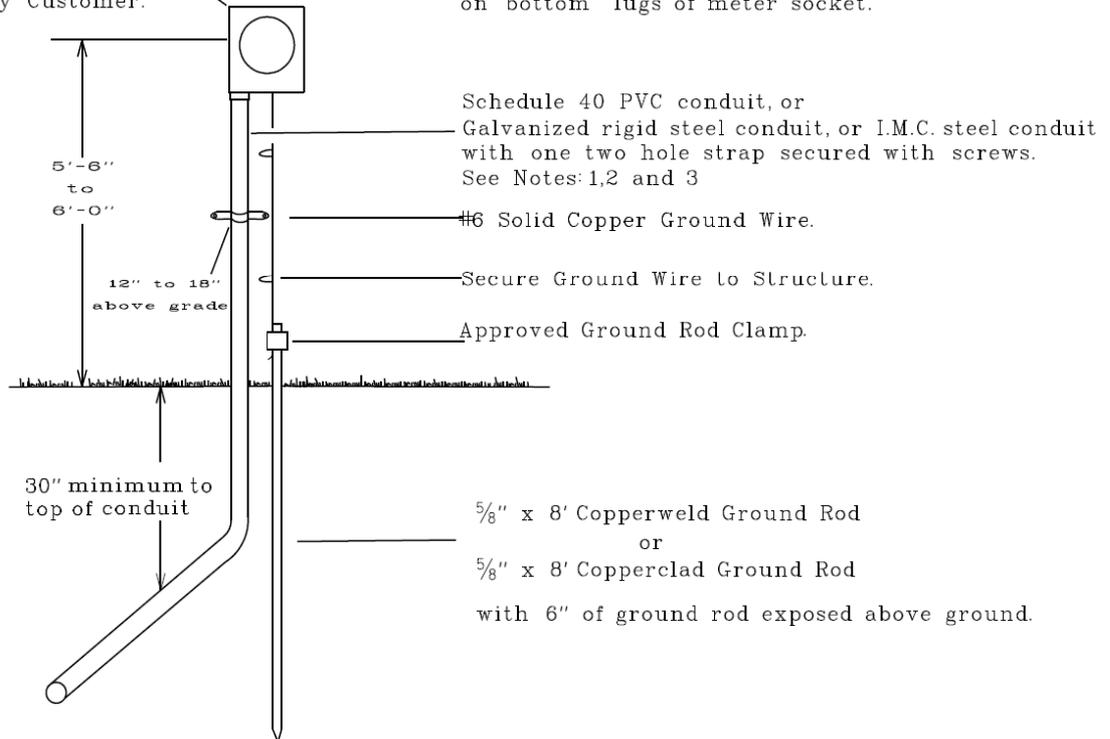
**NOTE: It will be the responsibility of the Builder/Electrician/Customer to protect the conduit by all means necessary from any debris or breakage. BTU does not take ownership of the conduit until the secondary conductor has been installed and terminations have been completed.**

Both the Early Pipe Program and service installation are subject to BTU's typical scheduling process.

**BTU reserves the right to charge trip fees when multiple trips are made to the job site necessitated by installations not conforming to this program.**

## Underground Service Entrance Wall Mounted

Underground service meter can.  
Furnished by BTU.  
Installed by Customer.



BTU Power Supply (line side) to terminate on top lugs of meter socket.

Customer (load side) wiring shall terminate on bottom lugs of meter socket.

**Note 1:** If metal riser is used, extend at least 6" below finish grade.

**Note 2:** The riser and meter can shall be mounted externally on an exterior finished wall.

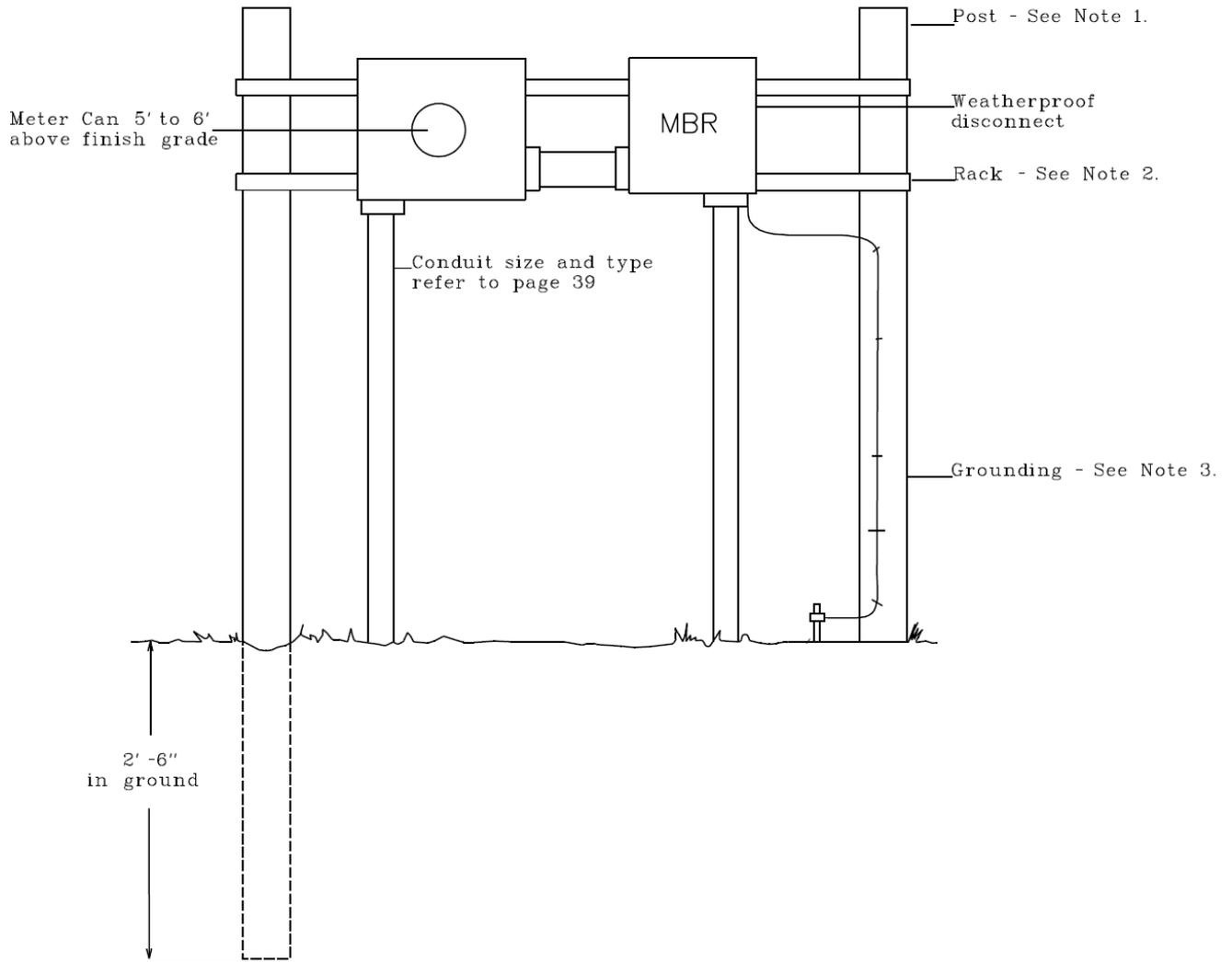
**Note 3:** There shall be no more than a 1½" gap between the riser and the exterior finished wall. All clamps shall be furnished and installed 12" to 18" above finished grade by the customer.

**Note 4:** No bends are allowed above grade. Service riser must be a continuous run from the ground line to meter socket.

**Note 5:** The wall mounted underground service entrance is not permitted for use on mobile homes, all underground services to mobile homes must be mounted on a free standing meter rack as shown on page 20.

Refer to page 39 for service entrance ratings and conduit size charts.

## Free Standing Underground Meter Can Rack



**Note 1:** Posts may be a minimum of either 4" square treated, 4" round treated or 2" galvanized pipe.

**Note 2:** Brackets may be 1" unistrut or 1" angle iron capable of bolting meter can and main breaker. Rack shall be plumb and level with no nails used in construction.

**Note 3:** Ground wire shall be minimum #6 copper securely attached to the post and connected with an approved ground rod clamp to a 5/8" x 8' copperweld or copperclad ground rod with 6" of rod exposed above ground level.

**Note 4:** Three Phase 480 volt self-contained meter racks must be constructed with a 200amp, 600volt, three phase, heavy duty, non-fused NEMA 3R safety switch capable of being locked in the "ON" position located on the line side of the meter.

## **Customer Installed Conduit**

The customer may choose to install their own conduit, however, BTU reserves the right to install and terminate all conductors from the power source to the customer's meter can.

In a platted underground subdivision, developer installs conduit stub outs from the padmount transformers and pedestals for future service installations. The customer shall connect their installed conduit to these stub outs. For verification and location of a stub out, contact BTU Line Design.

BTU does not allow a customer inside any of BTU's electrical equipment. If a customer is installing their conduit where a stub out does not exist, BTU Line Design will mark a location for the customer to stop their conduit adjacent to an existing, or future, power source. BTU will then install the stub out and tie in to the customer's conduit.

Before acceptance of customer installed conduit, the installation must conform to BTU's installation specifications (Refer to page 43 or 44). The installation shall be inspected by an authorized BTU representative before the ditch is backfilled. Failure to coordinate conduit inspection may result in the customer incurring delays and additional expenses related to the customer reopening the ditch line to allow for proper inspection.

NOTE: All conduit installed must be minimum schedule 40 electrical rated PVC. Contact BTU Line Design for proper size. Red 6" warning tape is required for all primary conduit installations. BTU will provide the warning tape upon inspection of conduit.

## Three-phase Underground Installations

BTU will install, own, operate, and maintain the primary underground cable, the distribution transformer, the electric meter, and the secondary connections in the padmount transformer.

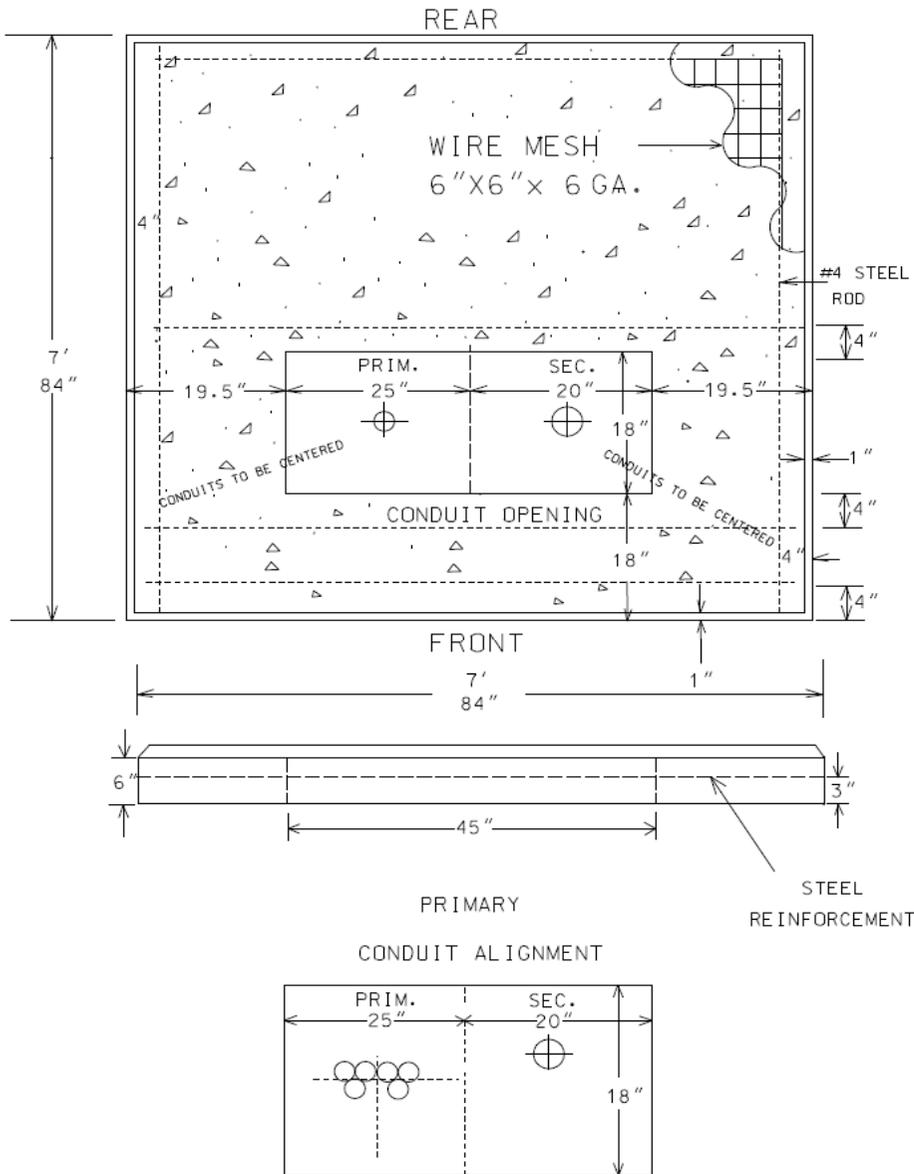
The Customer shall install, own, and maintain a concrete transformer pad constructed to BTU specifications shown below. If the transformer is located in an area where it may be subject to physical damage (e.g. from vehicular traffic), BTU may require the Customer to install, own, and maintain an approved means of protection.

Further, the Customer shall install, own, and maintain all secondary cables and conduits from the transformer to the service entrance. It is the Customer's responsibility to coordinate with BTU to provide the quantity and size of secondary conductors that will be installed (example: 500 MCM copper, four (4) conductors per phase) well in advance of construction. The maximum size secondary conductor which may be installed in a 3-phase transformer is 750MCM. All customer owned secondary cables installed in a three phase pad-mounted transformer shall be copper. The maximum number of secondary conductors per phase allowable in a three-phase padmount transformer shall be as follows:

Transformer Size	Maximum # of Conductors per Phase	Maximum # of Conduits
150 to 500kVA	6	6
750kVA or larger	10	10

The combined area of all secondary conduits (initial and future) shall not exceed 60% of the available secondary "window" area as shown on the applicable padmount transformer pad detail specification. For example, a transformer pad with a secondary window of 18"x24" has an area of 432 in<sup>2</sup>. A 6" schedule 40 PVC conduit with an OD of 6-5/8" has an area of approximately 34.5 in<sup>2</sup>. The maximum number of 6" PVC schedule 40 conduits allowed would be calculated as  $(432 \times 0.6) / 34.5$  or 7.5. This equates to no more than 7 conduits. **At no time will the secondary conduits or conductors exceed the limits shown in the table above nor will transformers be up-sized to merely allow for additional conduits or conductors.**

The phasing and proper conductor length will be the responsibility of the Customer regardless of who installs the terminals or terminates the secondary cables to the transformer connectors.



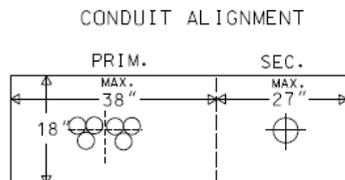
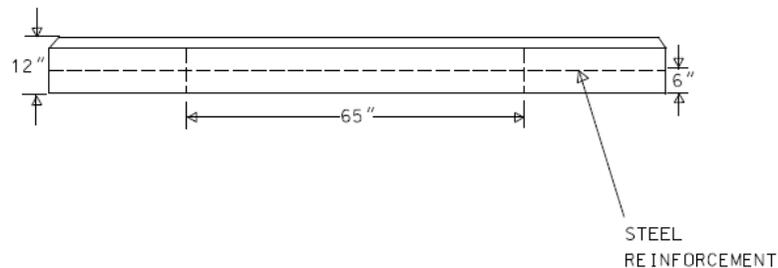
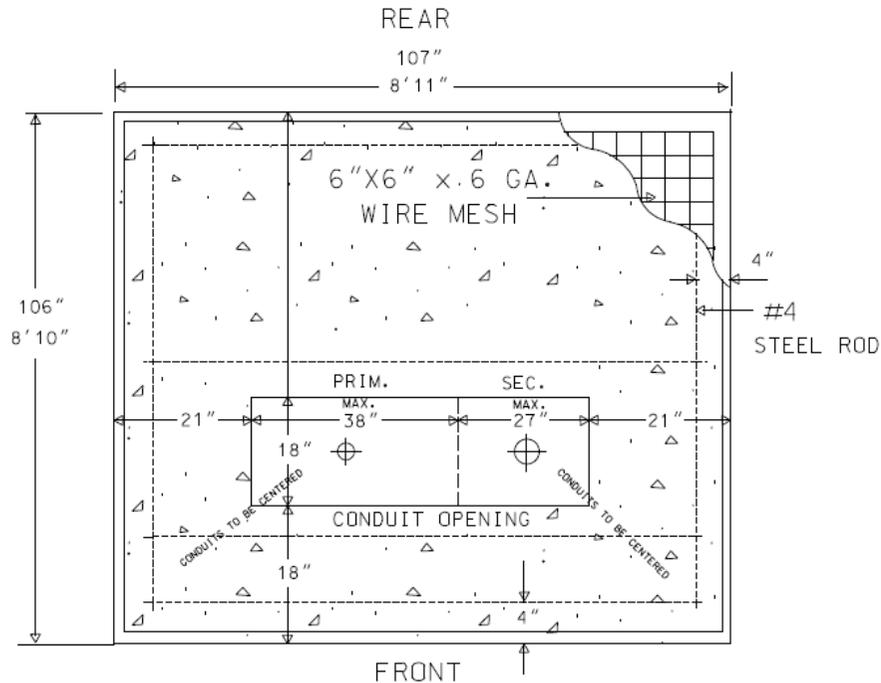
**NOTES:**

1. Concrete shall be min. 3000lb.test.
2. Reinforced slab with 6"x6"x6 gauge steel wire mesh and #4 steel rods as shown.
3. Pad shall be poured in place in one continuous pour.
4. Pad shall be level with a 1" chamfer around the edge.
5. Conduit opening will be formed to keep it free of concrete.
6. After conduit is installed, conduit opening shall be filled with sand to within 2" of slab top.
7. Before pour is made, the slab form and conduit arrangement must be inspected and approved by a representative of BTU Line Design. (979)821-5770.
8. Pad must cure 72 hours min. before transformer is set.
9. Contractor shall install elbows as required below (Type and size to be identified by BTU Line Design).
10. See Page 36 for transformer clearances.

Primary  
Elbows:     Qty.   Size   Type   Radius

Secondary  
Elbows:     Qty.   Size   Type   Radius

THREE PHASE XFMR PAD 150 TO 500 KVA	
BRYAN TEXAS UTILITIES	
NAME: _____	
INVESTIGATION NO.: _____	
ISSUED: _____	BRYAN, TEXAS



**NOTES:**

1. Concrete shall be min. 3000lb.test.
2. Reinforced slab with 6"X6"x6 gauge steel wire mesh and #4 steel rods as shown.
3. Pad shall be poured in place in one continuous pour.
4. Pad shall be level with a 1" chamfer around the edge.
5. Conduit opening will be formed to keep it free of concrete.
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8. Pad must cure 72 hours min. before transformer is set.
9. Contractor shall install elbows as required below (Type and size to be identified by BTU Line Design).
10. See Page 36 for transformer clearances.

Primary  
Elbows: 

Qty.	Size	Type	Radius
------	------	------	--------

Secondary  
Elbows: 

Qty.	Size	Type	Radius
------	------	------	--------

TRANSFORMER FOUNDATION 750kVA AND LARGER
BRYAN TEXAS UTILITIES
NAME :
INVESTIGATION NO. :
BRYAN, TEXAS

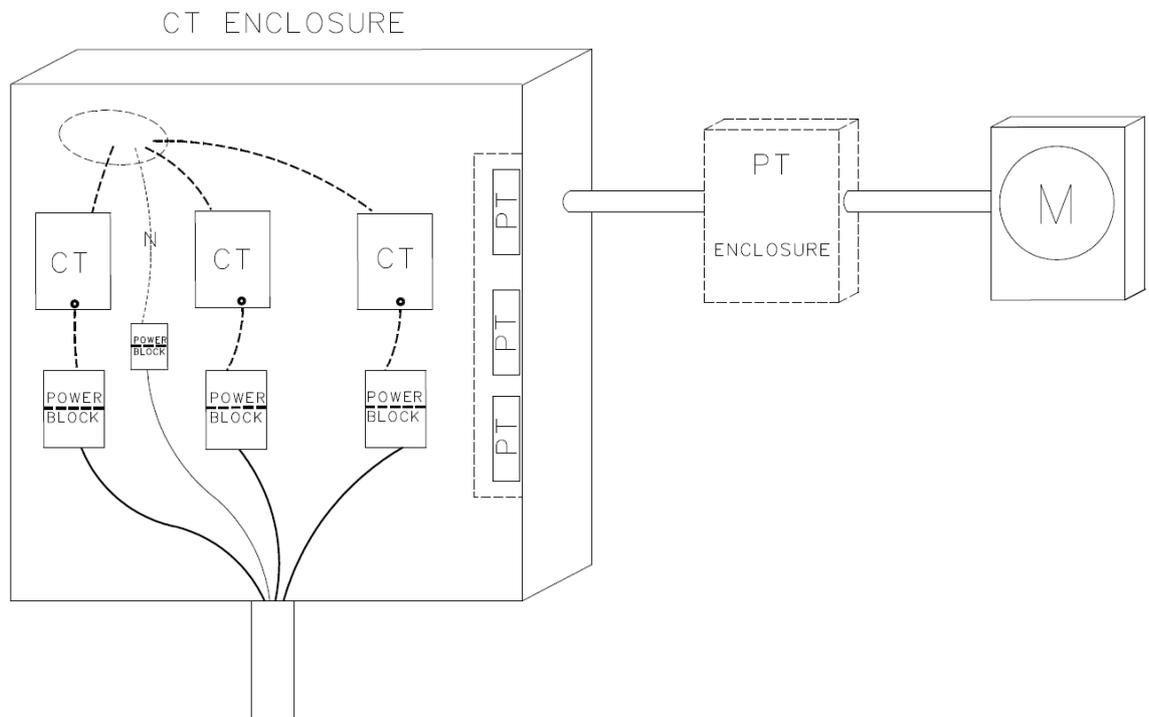
## SECTION 4: CT Metered Installations

### Typical CT Installations for Underground Services Metered On the Building

All 277/480 volt services will require potential transformers (“PT”).

Customer owned conductors shall run from the line side of the main disconnect, through the current transformers (“CT”), and terminate at the top of the power distribution blocks (“PDB”).

PDB’s shall be fixed (not floating) inside the CT enclosure.



The preferred location for PT’s is in the CT enclosure. In limited cases, typically due to space constraints, PT’s may be located in a separate enclosure as shown.

CT Polarity marks (dots) shall face the power source.

High side of the PT’s shall face the CT enclosure.

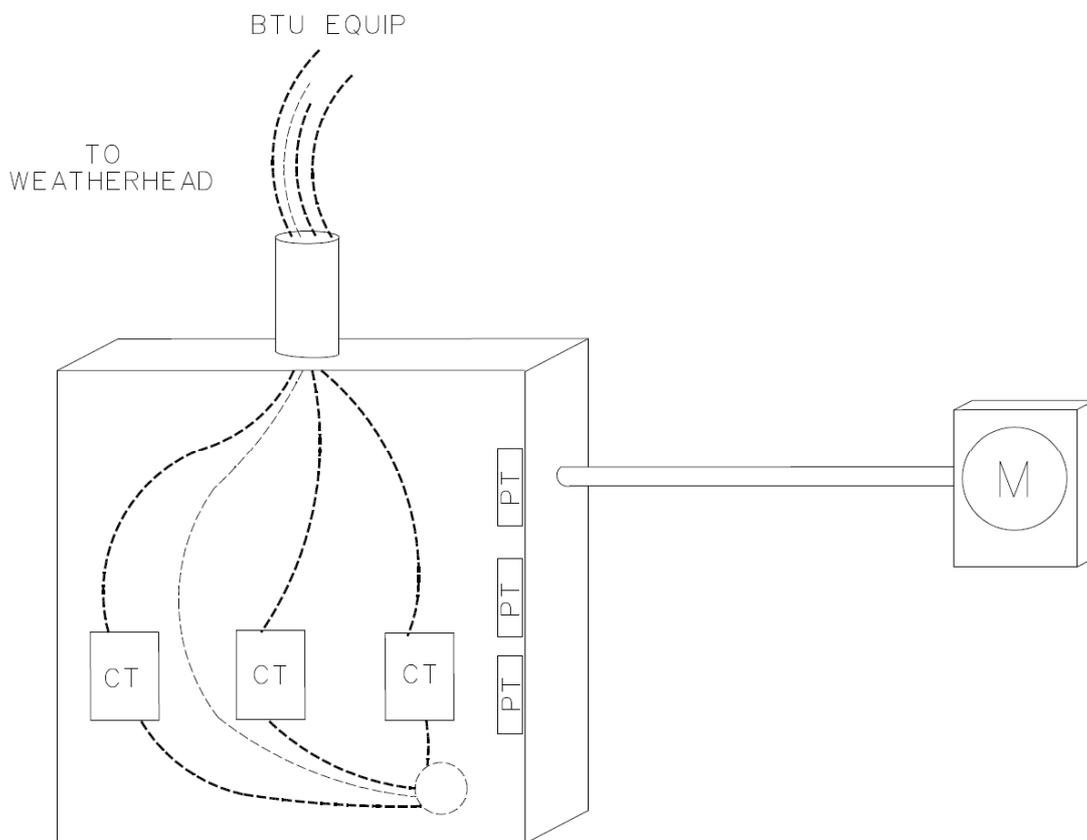
Customer is responsible for the installation of the BTU furnished electric meter can, CT’s, PT’s, CT enclosure, and (where applicable) PT enclosure. All other equipment, including conduits and power distribution blocks, shall be provided, owned, and maintained by the customer.

## Typical CT Installation for Overhead Services Metered on the Building

### All 277/480 volt Services Will Require Potential Transformers Installed (PT's).

Customer owned conductors shall be continuous from the line side of the main disconnect, through the CT's, through the riser and shall extend at least 36" out of the weatherhead.

Ownership is transferred at the connections at the weatherhead where BTU connects the service conductor.



CT Polarity marks (dots) shall face the power source.

High side of the PT's shall face the CT enclosure.

Customer is responsible for the installation of the BTU furnished electric meter can, CT's, PT's, and CT enclosure. All other equipment, including conduits and power distribution blocks, shall be provided, owned, and maintained by the customer.

## **Typical CT Installation for Underground Services Metered on the Transformer**

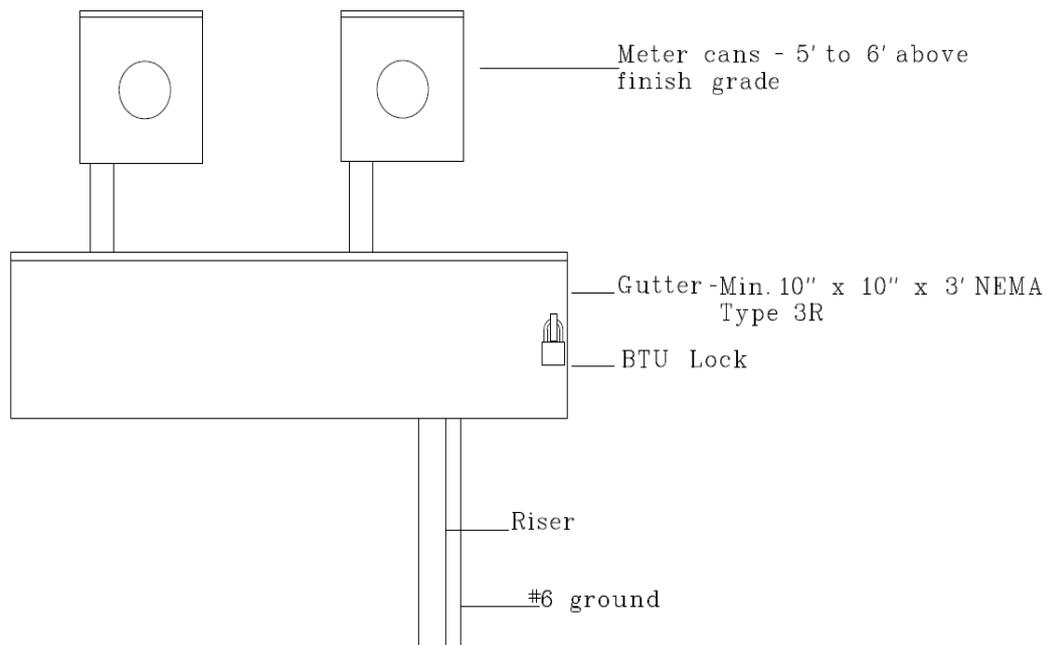
**For three phase pad mounted transformer installations where only one metering point will be served BTU will install and maintain all metering equipment on the transformer.**

1. The customer and BTU Line Design shall agree on the transformer location prior to installation. All transformers shall be located where BTU has 24 hour truck access from a paved surface for maintenance purposes.
2. It is the customer's responsibility to form and pour the transformer pad according to BTU provided specifications. According to the agreed upon design, the customer shall also furnish and install all conduit stub outs according to BTU's conduit installation specifications (Refer to page 43 or 44).
3. It is the customer's responsibility to furnish, install and maintain all conduit and conductor from the transformer to their load center. BTU will terminate the customer's conductor in the transformer.
4. When ready for service conductor installation the customer shall contact BTU Line Design, and an appointment will be made to allow access inside the transformer.
5. On all three phase underground installations the customer shall supply BTU Line Design with a detailed load analysis and shall agree on all conduit and conductor size for the appropriate load.
6. For public safety and operating measures, BTU has a minimum distance the transformer must be from a building or structure. Refer to page 36 for allowable clearances.

**Notes:**

## SECTION 5: Multiple Meter Installations

### Underground Duplex Installation



Electrician shall furnish the gutter and power distribution blocks (Floating, insulated type power distribution blocks required).

Address or apartment number must be permanently stamped or marked on the drip lip of each meter can. **Ink marking pens are not acceptable.**

Water proof hubs are required on the top entry of the gutter.

Gutter and meter cans shall be grounded with a minimum #6 copper ground wire attached to the ground rod with an approved ground clamp.

Gutter must have a 3/8" factory or field installed weatherproof locking hasp that will accept a BTU lock. **Drilling the gutter as a means to install a lock is not acceptable.**

Refer to page 39 for proper riser size and type.

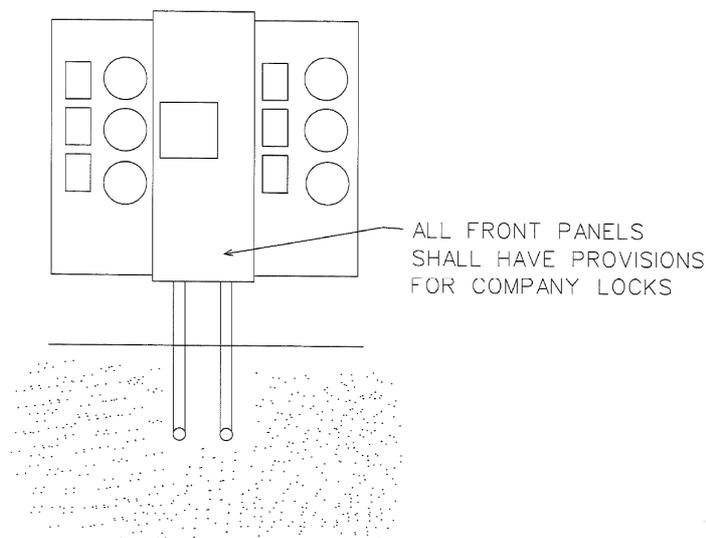
## Overhead Duplex Installation

1. If the customer chooses to install two separate meter loops to feed a duplex the risers should be installed within three (3) feet of each other with the point of attachment installed between the two. The customer shall install the point of attachment and it shall be an eye bolt anchored to the frame of the structure strong enough to hold the strain of the service conductor. BTU will install one service conductor to feed both meter loops. Each meter loop shall conform to the appropriate BTU's Service Entrance Requirements in SECTION 2: Overhead Service Entrances.
2. If the customer chooses to feed a duplex through a wireway, a minimum 10" x 10" x 3' gutter must be installed. The gutter and meter can shall be grounded with a minimum #6 copper ground wire attached to the ground rod with an approved ground rod clamp. The gutter must have a 3/8" factory or field installed weatherproof locking hasp that will accept a BTU lock. **Drilling as a locking device is not acceptable.**

## Manufactured Meter Packs

**Normally used as multiple meter installations for lease spaces, suites or apartments.**

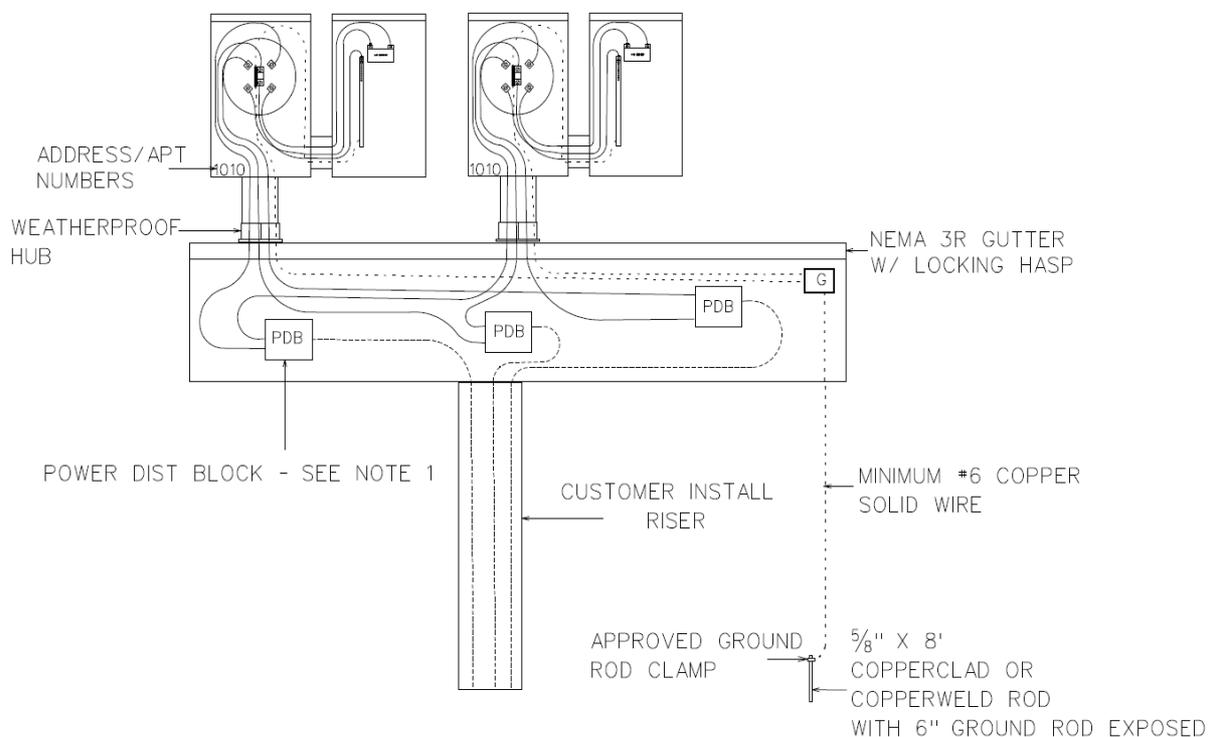
1. The meter pack shall have a factory means where BTU can install a BTU lock on the cover.
2. Each meter shall have a properly identified disconnect means mounted directly below or beside the corresponding meter.
3. Each meter and its disconnect means shall be identified to the corresponding lease space, suite or apartment by engraving or stamping the correct letter or numbers directly below or beside the appropriate meter. **Ink marking pens will not be accepted.**



## Meters Fed Through Wireways

1. Change of ownership for underground installations is defined to be at the Power Distribution Blocks ("PDB"). Customer to furnish, own, and maintain PDB (insulated type for this application) and all conductors on the load side of the PDB.
2. Address or apartment number must be identified on the face of the gutter with a permanent tag or stamp directly below the corresponding meter can. (**Ink markers of any type are not acceptable**).
3. Water proof hubs are required on the top entry of the gutter.
4. Gutter must have a 3/8" factory or field installed weatherproof locking hasp that will accept a BTU lock. (**Drilling as a locking device is not acceptable**).
5. Electrician to install riser and elbow per BTU requirements (Refer to pages 39 or 40 for applicable size and type).
6. Gutter and meter can shall be bonded with minimum #6 copper solid wire and bonded to the grounding electrode conductor.

**NOTE: On all 480 volt services, 200 amp or less, unfused line side disconnects shall be installed ahead of the meter (Refer to page 16).**



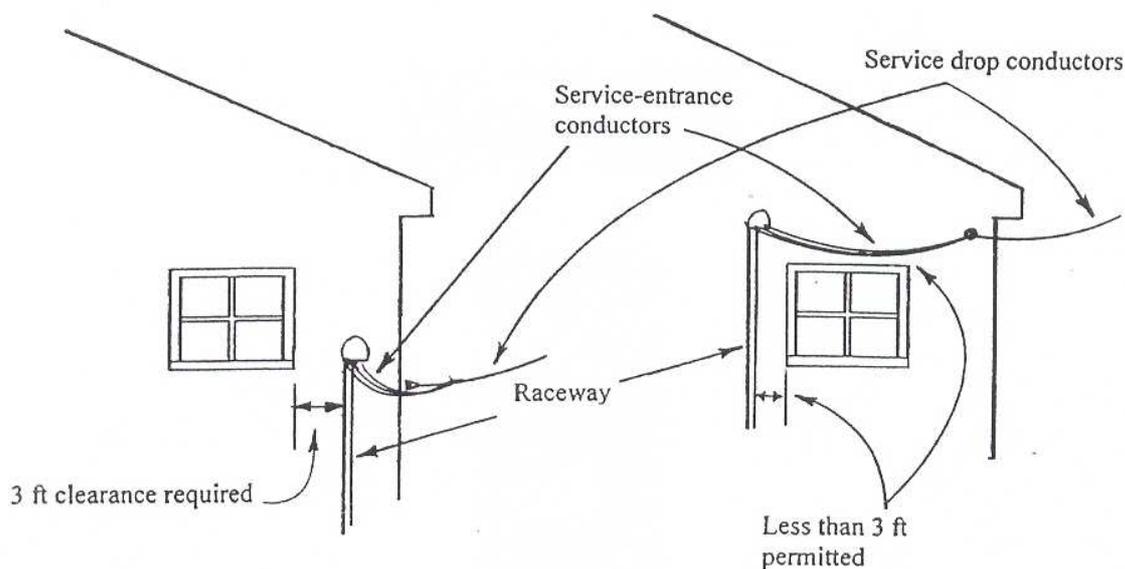
**Notes:**

## SECTION 6: Clearances

### General

In no case will BTU install a service or primary conductor which routes over a permanent structure.

### Clearances from Buildings Where Service Mast Does Not Penetrate the Roof

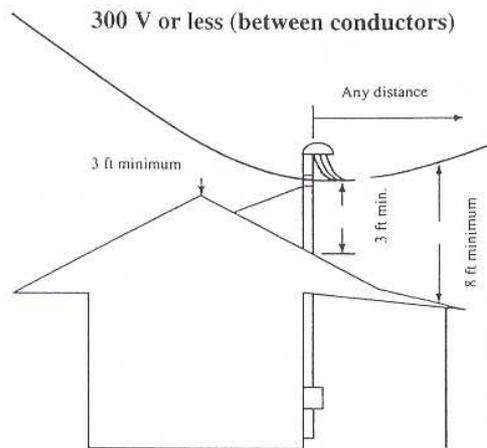


**Notes: Clearance from building openings:** Service conductors installed as open conductors or multi-conductor cable without a jacket shall have a clearance of not less than 3' from windows that are designed to be opened, doors, porches, balconies, ladders, stairs, fire escapes or similar locations.

**Exception:** Conductors run above the top level of a window shall be permitted to be less than the 3' requirement:

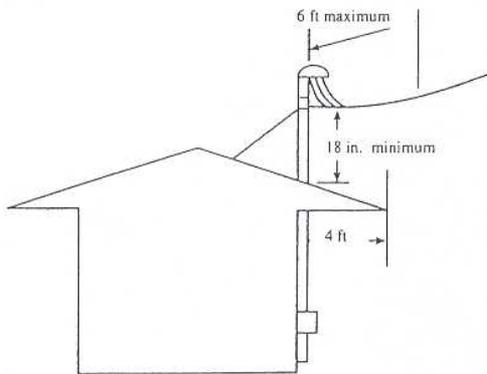
Overhead service conductors shall not be installed beneath openings through which material may be moved, such as openings in farm and commercial buildings, and shall not be installed where they will obstruct entrance to these buildings.

## Clearances Where Service Mast Penetrates the Roof



Exception No. 2 applies to steeply sloped roofs that are less likely to be walked on. These roofs have a slope of not less than 4 in. in 12 in. On such roofs, the vertical clearance of overhead conductors may be reduced from 8 ft to 3 ft. There are no restrictions on the length of the conductors over the roof or the horizontal distance over the roof.

300 V or less (between conductors)



Exception No. 3 permits service conductor clearances to be reduced to 18 in. for through-the-roof raceways passing through the overhanging portion, provided that not more than 6 ft of conductors pass over 4 ft of roof surface, measured horizontally. This applies to flat or sloped roofs that are easily walked on (less than 4 in. in 12 in.).

**Service conductors shall not be readily accessible.**

**Note: Above Roofs:** Conductors shall have a clearance of not less than 8' above the roof surface.

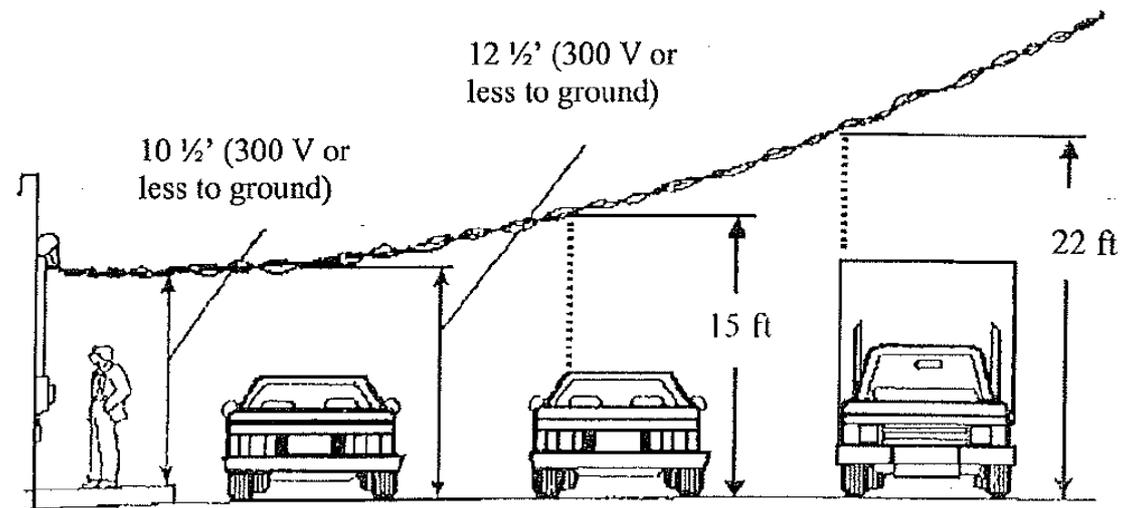
Exception 1: The area above a roof surface subject to pedestrian traffic shall have a vertical clearance from the roof surface in accordance with the clearance requirements.

Exception 2: Where the voltage between conductors does not exceed 300 volts and the roof has a slope of not less than 4" in 12", a reduction in clearance to 3' shall be permitted.

Exception 3: Where the voltage between conductors does not exceed 300 volts, a reduction in clearance above only the overhanging portion of the roof to not less than 18" shall be permitted if (1) not more than 6' of service drop conductors, 4' horizontally, pass above the roof overhang, and (2) they are terminated at a through-the-roof raceway of approved support.

Exception 4: The requirement for maintaining the vertical clearance 3' from the edge of the roof shall not apply to the final conductor span where the service drop is attached to the side of the building.

## Clearances to Ground for Overhead Service Conductors



### **Service drop conductors, 300 volts or less to ground, shall have the following minimum clearances from final grade:**

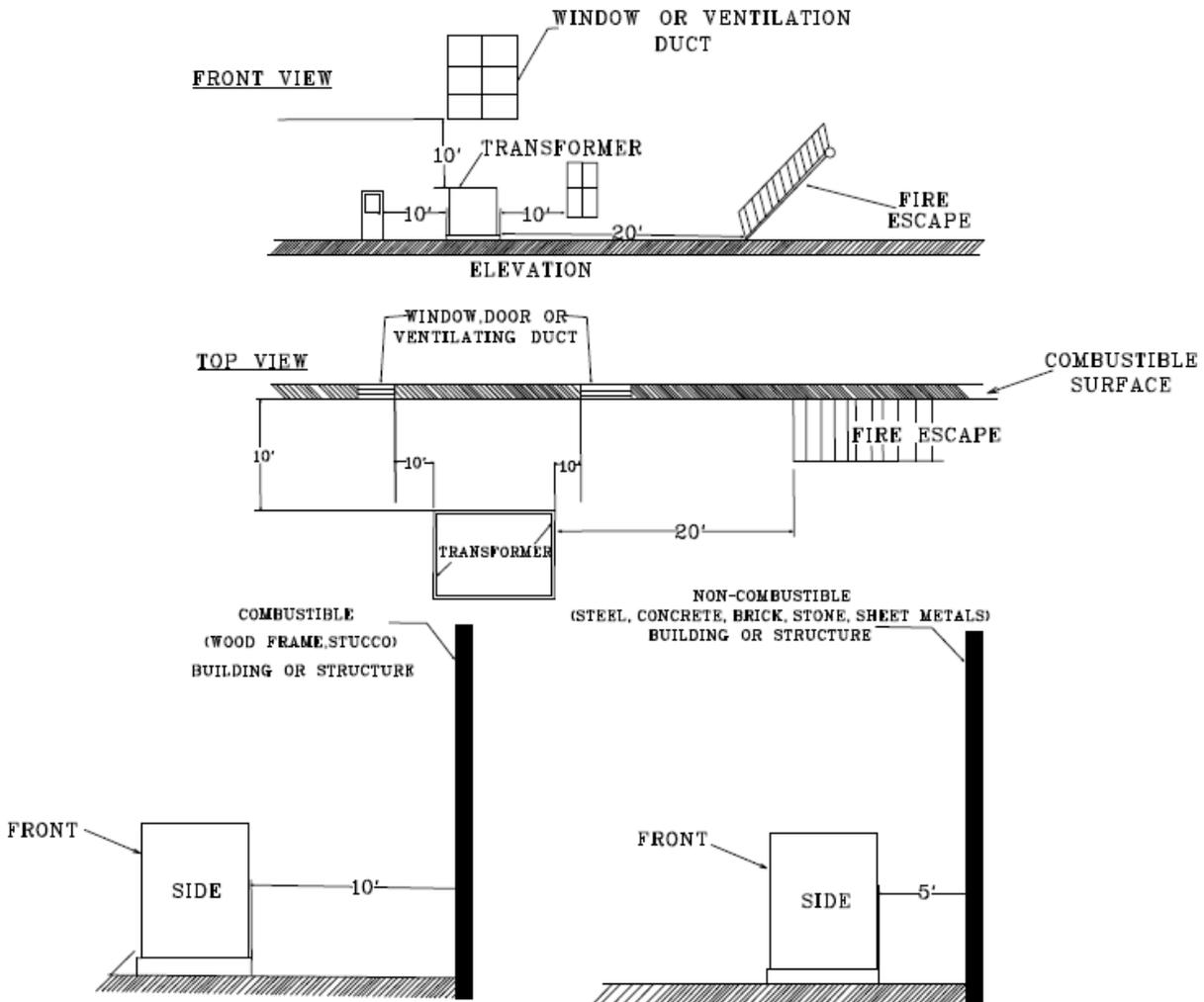
10½' – At the electric service entrance to buildings, at the lowest point of the drip loop of the building electric entrance and above areas or sidewalks accessible only to pedestrians. This is measured from final grade or other accessible surfaces.

12½' – Over residential property and driveways and those commercial areas not subject to truck traffic where the voltage does not exceed 300 volts to ground.

15' – Over residential property and driveways and those commercial areas not subject to truck traffic where the voltage exceeds 300 volts to ground.

22' – over public streets, alleys, roads and parking areas subject to truck traffic, driveways on other than residential property and on other property subject to traffic by other vehicles such as farm equipment.

## Pad Mounted Transformer Clearances



### NOTES:

1. ALL DIMENSIONS SHOWN ARE MINIMUM DIMENSIONS (NOT TO SCALE).
2. THERE SHOULD BE NO ABOVE GROUND OBSTRUCTIONS, SUCH AS SHRUBS, AIR CONDITIONERS, GAS METERS, CABLE AND PHONE UPRIGHT PEDESTALS WITHIN 5 FEET OF PAD OR WITHIN 12 FEET OF THE EQUIPMENT DOORS.
3. THERE SHOULD BE NO UTILITIES OR OTHER OBSTRUCTIONS PASSING UNDER TRANSFORMER PAD.
4. CLEARANCES FROM TRANSFORMER TO SURFACE CAN BE REDUCED TO 3 FEET IF SURFACE IS 2-HOUR FIRE RATED.
5. ALL CLEARANCES SHOULD BE DOUBLED FOR TRANSFORMERS > 750KVA.
6. PAD-MOUNTED EQUIPMENT, PEDESTALS, AND OTHER ABOVEGROUND ENCLOSURES SHOULD BE LOCATED NOT LESS THAN 4 FEET FROM FIRE HYDRANTS.

## SECTION 7: Charts, Tables and BTU Specifications

### Voltages Offered By BTU

OVERHEAD	UNDERGROUND
120/240V single-phase	240/120V single-phase
120/240V three-phase	
120/208V single-phase or three-phase	208/120V single-phase or three-phase
277/480V three-phase	480/277V three-phase

### Maximum Padmount Transformer Sizes

The following is the maximum transformer size (kVA) offered by BTU. If the service point requires a larger transformer than what is offered, the service location will need to be split into smaller service points.

Voltage	kVA
240/120V single-phase	167
208/120V three-phase	1,000
480/277V three-phase	2,500

## Color Identification Codes for Conductors at Service Entrance

### 120V Single-Phase

Neutral - White	Leg "A" - Black	Leg "B" - Red
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### 120/240V Three-Phase Delta

Neutral - White	Leg "A" - Black	Leg "B" - Orange	Leg "C" - Blue
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**The Hi-Leg (Orange) is to be located on the right hand lug of the meter can and the middle lug ("B"-phase) of the electrical panel or disconnect.**

### 120/208V Three-Phase Wye

Neutral - White	Leg "A" - Black	Leg "B" - Red	Leg "C" - Blue
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### 277/480V Three-Phase Wye

Neutral - White	Leg "A" - Brown	Leg "B" - Orange	Leg "C" - Yellow
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## Service Entrance Ratings and Conduit Charts for Underground Service Risers

### Single Phase Commercial – 3-Wire System

Service Rating	Riser Conduit Size And Type	Riser Elbow Size And Type	Maximum Wire Service Length
200 Amp	3" Rigid or IMC	18" Radius PVC	220'
320 Amp	3" Rigid or IMC	18" Radius PVC	120'
400 Amp	4" Rigid or IMC	36" Radius PVC	100'

- Contact BTU Line Design for all service ratings over 400 amps.
- All metal risers shall extend at least 6" below finished grade.
- Prior to service being extended or an AIC amount determined, an electric load analysis will be provided to Line Design with enough detail to adequately size BTU's electric facilities.

### Three Phase Commercial – 4-Wire System

Service Rating	Riser Conduit Size And Type	Riser Elbow Size And Type	Maximum Wire Service Length
200 Amp	3" Rigid or IMC	18" Radius PVC	75'
400 Amp	4" Rigid or IMC	36" Radius PVC	75'

- Contact BTU Line Design for all service ratings over 400 amps.
- All metal risers shall extend at least 6" below finished grade.
- Prior to service being extended or an AIC amount determined, an electric load analysis will be provided to Line Design with enough detail to adequately size BTU's electric facilities.

### Single Phase Residential – 3-Wire System

Service Rating	Riser Conduit Size And Type	Riser Elbow Size And Type	Maximum Wire Service Length
200 Amp	3" PVC, Rigid or IMC	18" Radius PVC	220'
320 Amp	3" PVC, Rigid or IMC	18" Radius PVC	120'

- Contact BTU Line Design for all service ratings over 320 amps.
- All metal risers shall extend at least 6" below finished grade.

#### **NOTES:**

1. No more than three (3) 90° elbows may be installed in any single service run from the power source to the metering point. Adding the 3<sup>rd</sup> elbow will reduce the maximum wire service lengths by 25%. **Back-to-back 90° degree elbows are prohibited.**
2. **Maximum Wire Service Length is the linear distance from the meter can to the transformer connection.**

**Service Entrance Ratings, Wire and Conduit Charts for Overhead Service Risers**

**Single Phase Commercial – Three Wire System**

100 amp	#2 copper	1 ½”
125 amp	#1 copper	1 ½”
150 amp	2/0 copper	2”
200 amp	3/0 copper	2”
320 amp	350 copper	2 ½”
400 amp	500 copper	3”

**Three Phase Commercial – Four Wire System**

100 amp	#2 copper	1 ½”
125 amp	#1 copper	1 ½”
150 amp	2/0 copper	2”
200 amp	3/0 copper	2”
400 amp	500 copper	3”

**Single Phase Residential – Three Wire System**

100 amp	#4 copper	1 ½”
125 amp	#2 copper	1 ½”
150 amp	1/0 copper	1 ½”
200 amp	2/0 copper	2”
320 amp	250 copper	2 ½”
400 amp	400 copper	3”

**\*\*\* For all services over 400 amps contact BTU Line Design**

**\*\*\* All risers must be either rigid metal or IMC. (PVC will not be accepted in overhead applications)**

### Maximum Overhead Span Lengths-Service Cable

(Spans greater than lengths shown will require a guy.)

CABLE SIZE	SERVICE SPAN (Feet)
6 DSC	150 (> 150' will require a lift pole)
6 TSC QSC	150 (> 150' will require a lift pole)
2 TSC QSC	50'
1/0 TSC QSC	50'
4/0 TSC QSC	25'
350 MCM QSC	25'
500 MCM QSC	25'
2 – 4/0 QSC	25'
2 - 350 MCM QSC	25'
2 - 500 MCM QSC	25 (> 50' will require a lift pole)

#### NOTES:

\*\*A lift pole will be required for all services greater than 75 ft. (except where noted).

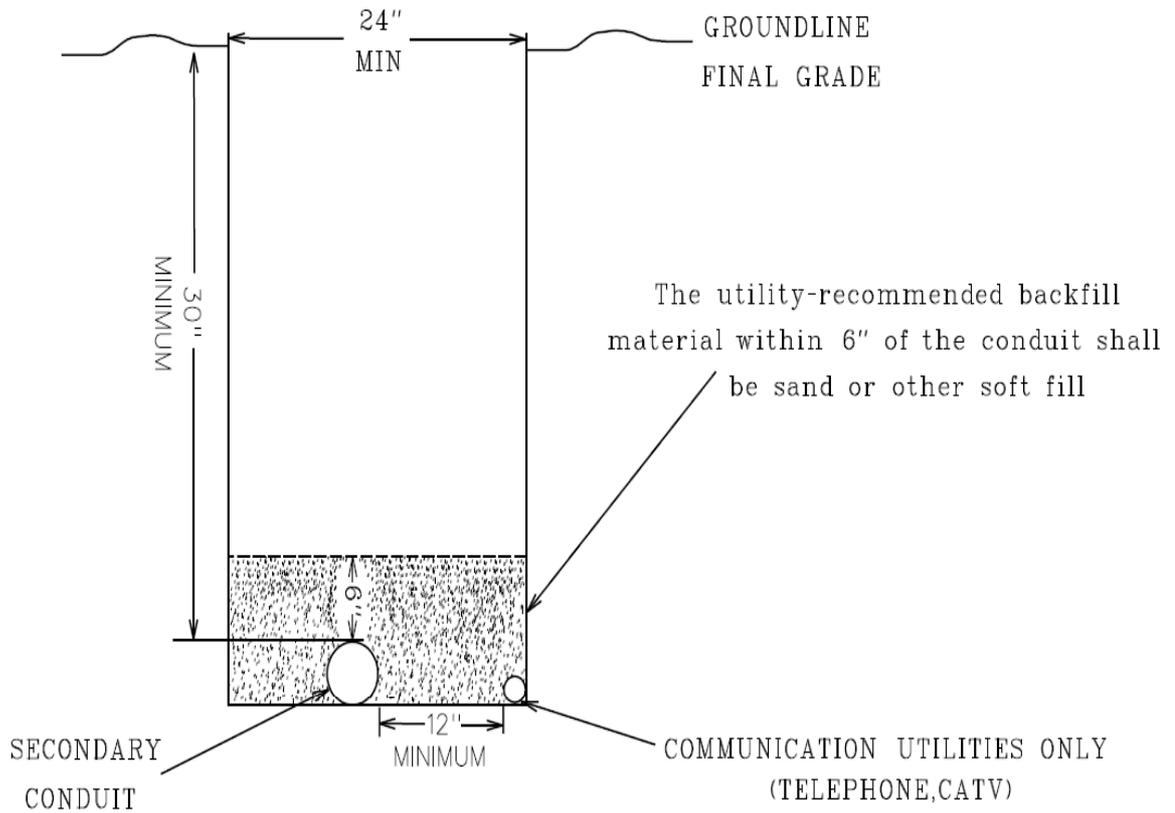
\*\*In all cases, NESC clearances must be met.

**Meter Can Description, Application and BTU Identification Codes**

Single phase overhead 120/240V up to 200 amp	Residential and Commercial	EM51
Single phase underground 120/240V up to 200 amp	Residential and Commercial	EM45
Single phase overhead 120/240V 200 to 320 amp	Residential and Commercial	EM52
Single phase underground 120/240V 200 to 320 amp	Residential and Commercial	EM46
Three phase overhead 120/240V, 120/208V, 277/480V up to 200 amp	Commercial	EM54
Three phase underground 120/240V, 120/208V, 277/480V up to 200 amp	Commercial	EM47
Single phase transocket OH &UG 120/240V 320 to 400 amp	Residential and Commercial	EM105
Three phase transocket OH & UG 120/240V, 120/208V, 277/480volt 200 to 400 amp	Commercial	EM106
Single phase OH & UG 200 to 400 amp (CT on building) 120/240V	Commercial	EM100
Single phase OH & UG 400 to 700 amp (CT on building) 120/240V	Commercial	EM167
Three phase OH & UG 200 to 400 amp (CT on building) 120/240V, 120/208V	Commercial	EM150D
Three phase OH & UG 400 to 600 amp (CT on building) 120/240V, 120/208V	Commercial	EM225D
Three phase OH & UG 600 to 800 amp (CT on building) 120/240V, 120/208V	Commercial	EM300D
Three phase OH & UG 800 to 1200 amp (CT on building) 120/240V, 120/208V	Commercial	EM500D
Three phase OH & UG 200 to 400 amp (CT on building) 277/480V	Commercial	EM300E
Three phase OH & UG 400 to 600 amp (CT on building) 277/480V	Commercial	EM500E

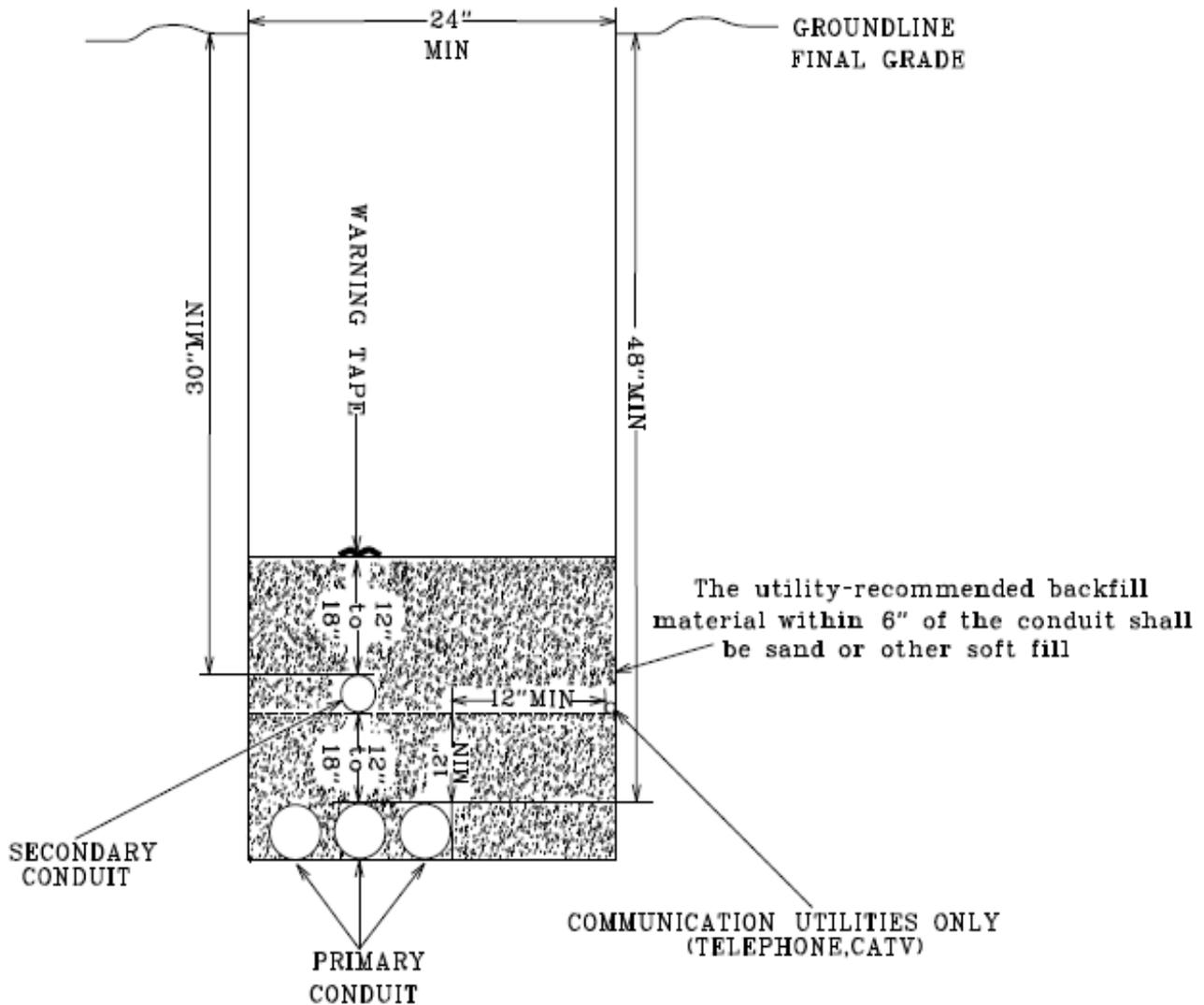
## Secondary Conduit Installation

### (Joint Trench with Other Communication Utilities)



DISTANCE FROM CENTER OF TRENCH TO PROPERTY LINE OR EASEMENT  
TO BE COORDINATED BETWEEN BTU LINE DESIGN AND DEVELOPER PRIOR  
TO CONDUIT INSTALLATION.

**Primary & Secondary Conduit Installation  
(Joint Trench with Other Communication Utilities)**



DISTANCE FROM CENTER OF TRENCH TO PROPERTY LINE OR EASEMENT TO BE COORDINATED BETWEEN BTU LINE DESIGN AND DEVELOPER PRIOR TO CONDUIT INSTALLATION.

## **SECTION 8: Motors and Controllers**

### **General**

Appliances and apparatus equipped with motors that provide the customer with satisfactory operation of the appliance shall at the same time avoid interference with service to other customers. Motors may cause voltage disturbances resulting in flickering lights, television interference, and other objectionable conditions. BTU uses IEEE Standard 141-1993 as a guideline for the level of allowable voltage fluctuation. Customers are not allowed to start any load on the BTU's system that causes voltage fluctuations that will be detrimental to the operation of BTU's distribution and/or transmission system, or to the service of any of BTU's customers. If the starting of a motor installation and the resulting voltage disturbance causes, or is expected to cause, detrimental service to other customers, reduced voltage starters or other suitable means must be employed by the Customer and at the Customer's expense, to limit the voltage fluctuations to a tolerable level. Customers are responsible for correcting unacceptable voltage fluctuation problems in a timely manner when notified by BTU.

All motors connected to BTU's lines shall bear a manufacturer's nameplate indicating horsepower, continuous or intermittent duty, speed, voltage and current ratings. When a motor is rewound to produce a change in the original design, a new nameplate shall be attached indicating the motor's new characteristics. All new motor installations shall be designed to operate on the type of service provided by BTU. The Line Design Department will advise the customer as to the type of service available at the location where the motor is to be used. Inquiry should be made before purchasing or installing the motor.

Before any large motors or special apparatus are installed, it is necessary to consult BTU regarding the character and adequacy of the available service and the manner in which the equipment may be connected.

### **Motor Starting Limitations**

The starting of a motor on an electric circuit causes a momentary fluctuation of the circuit voltage each time the motor starts. Where this effect is pronounced, a visual disturbance or lighting flicker may be observed by the customer or other customers served from the same system. In extreme cases, the motor itself may have difficulty in starting. To minimize this problem, it is necessary to set limits upon the starting current permitted in any motor installation. These limits are designed to cover typical cases, and BTU gives no warranty that particular conditions may not later require changes.

Typical motor starting limitations based on motor start cycles not exceeding four starts per hour, are listed in Tables I - IV below. Separate limitations are prescribed for conventional motorized equipment rated in BTU's per hour. Cases not covered therein should be referred to BTU Line Design.

All motors connected for operation at 120 or 240 volts which do not exceed the locked rotor starting current limitations as stated in Tables I and II **and** are normally started four times per hour or less may be connected directly to BTU's supply lines.

Motors that do not comply with the locked rotor starting current limitations or not covered therein shall be discussed with BTU prior to purchase and installation, as it may be necessary for the customer to provide means to reduce starting currents and/or voltage fluctuations. Specific inrush limitations will be supplied and will vary with the size, type, demand and location of service.

When starting devices are used, the total current taken by the motor is not restricted but may have to be built up in steps, each of which does not exceed the maximum allowable motor starting current as stated in Tables I-IV. When a step type starter is used, an appreciable time delay must be allowed on each step.

When motors are started as a group instead of individually, the starting current limitations apply to the group and not to the individual motors.

**Starting Current Limits for Single-Phase Motors**

BTU must be notified of any single-phase motor installation totaling 3 HP or more, as it may be necessary in such cases to effect changes in the supply system to serve the additional load.

All single-phase motor driven equipment rated larger than 1 HP must be connected for operation at 240 volts unless agreed upon with BTU ahead of time as part of an approved three-phase installation.

Tables I and II list the maximum starting currents permitted at 120 or 240 volts single-phase for conventional motorized equipment rated in horsepower and for air conditioning or heat pump equipment rated in BTU's per hour. These limits are permitted only for motors normally expected to start not more than four times per hour. For convenience, the tables include the NEMA Code designation of motors which will start without exceeding the prescribed starting current limits and without requiring auxiliary starting devices.

Table I Motor Starting Limitations Single-phase Equipment with Motors Rated In Horsepower

Operating Voltage	Maximum Starting Current (A)		NEMA Code Letter
	Motor Size (HP)		
120	1/2	50	A to M
120	3/4	50	A to J
120	1	50	A to G
240	1/2	60	A to S
240	3/4	60	A to P
240	1	60	A to H
240	2	60	A to G
240	3	80	A to B
240	5	120	A
	In excess of 5HP		(see note)

Table II Single-phase Air Conditioning or Heat Pump Equipment

Operating Voltage	Capacity (BTU/Hr.)	Maximum Starting Current (A)
120		50
240	20,000 or less	60
240	25,000	75
240	30,000	90
240	35,000	105
240	40,000	120
240	In excess of 40,000	120 (see note below)

**Note:**

**Motors in these sizes generally require an auxiliary starting device to meet the starting current limits. BTU should be consulted to obtain allowable inrush limitations which will vary with service size and location.**

**Starting Current Limits for Three-phase Motors**

Tables III and IV list the maximum starting current permitted at 240 volts, three -phase for conventional motorized equipment rated in horsepower and for air conditioning or heat pumping equipment rated in BTU's per hour, on the basis of not more than four starts per hour.

A customer, upon proper notification to BTU, may connect to BTU's supply lines, any motor which conforms to the starting current limits specified in these tables, with or without the use of reduced voltage starting equipment; provided that the estimated or recorded electrical demand at the point of service, exclusive of the motor being added, meet the Minimum Demand Required, shown in the left hand column.

In the case of motor-driven equipment rated greater than 20 HP or 225,000 BTU's per hour, BTU should be consulted. In cases of motor driven equipment rated less than 20 HP or 225,000 BTU's per hour, if the equipment in question cannot meet the starting current limits indicated in the Tables or if the customer's existing load does not satisfy the minimum demand requirements. BTU will then determine whether specific conditions at the point of service will permit a greater starting current to be drawn without adverse effect on the electric service to other customers.

The starting currents permitted in the Tables are based on motors carrying a nameplate voltage rating of 220 volts. Motors rated at 200 volts, or at 208 volts, will actually draw a higher starting current than indicated on their name plates when they are supplied at a higher voltage, for example, 230 volts. However, for the purpose of this manual, it may be assumed that the actual starting currents of motors rated at 200 or 208 volts will be the same as the starting current (*locked rotor current*) indicated on the nameplate.

Table III Motor Starting Limitations Three-Phase Equipment with Motors Rated in Horsepower

Minimum Demand Required (kW)	Motor Size (HP)	Maximum Starting Current (A)
No Minimum Demand Required	2 or less	50
10	3	64
10	5	92
10	7	127
20	10	162
20	15	232
30	20	300

Table IV Three-Phase Air Conditioning or Heat Pump Equipment

Minimum Demand Required (kW)	Capacity (BTU/Hr.)	Maximum Starting Current (A)
No minimum demand required	20,000 or less	50
10	30,000	75
10	40,000	100
10	50,000	125
10	60,000	135
10	75,000	150
20	100,000	175
20	150,000	225
30	200,000	275
30	225,000	300

### Motor Starting and Control Equipment

All motors and motor control equipment shall be installed in accordance with the NEC Article 430 and all other applicable local, state or federal codes.

Motor Starters/Controllers of the Silicon Controlled Rectifier (SCR) type as well as other similar devices can create harmonic disturbances that may have detrimental effects on BTU's electric system and/or service to BTU Customers. Disturbances of this nature attributable to the use of these type devices shall be corrected without undue delay at the Customer's expense and to the satisfaction of BTU.

### Critical Service Motor Operation

Where continuous operation of a motor is essential, the no-voltage release should have a time delay relay, which will prevent the opening of the circuit in the event of momentary voltage fluctuation. BTU will attempt to assist the Customer in selection of an automatic starting device and any other device to hold motors on line during voltage disturbances.

**Motor Protection**

It is recommended that all motors installed on BTU's electrical system incorporate adequate motor protection. Some protection types to be considered are discussed below. This is not an exhaustive list. BTU will not be responsible in any way for damage to customer's equipment due to the failure of the customer to provide adequate motor protection.

**Phase Reversal Protection**

Reverse phase relays are required on three-phase elevator services as discussed in the National Electric Code (NEC) Article 620. It is strongly recommended that the Customer install them where accidental reversal of motor rotation would cause serious inconvenience, damage, or delay. BTU shall not be responsible for any damages caused by phase reversal.

**Over Current Protection**

The NEC requires that adequate over current protection be provided in each phase on all motor installations. The Customer should ensure complete protection against "single-phasing" on all three-phase motors. Over current protection in two phases is not adequate protection for this condition. Single phasing on the distribution system is necessary at times for fault clearing and switching and occurs occasionally due to unforeseen circumstances. Motor protection is the responsibility of the Customer. BTU will not be responsible in any way for damage to customer's equipment due to the failure of the customer to provide adequate over current protection.

**Partial or Complete Loss of One or More Phases**

BTU protects certain sections of its three-phase distribution system with single-phase devices (e.g., fuses). For this reason, it is recommended that all Customers with three-phase motors follow the NEC Article 430 III pertaining to motor protection. The Code requires motors to be provided with three current overload units, one in each phase. In addition, it is also recommended that all polyphase motor installations be equipped with an automatic disconnecting device (sensing voltage loss) as added protection for 'single phasing conditions' (partial or complete loss of one or more phases). Partial or complete loss of one or more phases may be from failure of the Customer's equipment serving the motor or from inherent partial or complete loss of one or more phases of BTU's electric distribution equipment. BTU shall not be held responsible or liable for damage to the Customer's installation due to such causes in the inherent operation of BTU's distribution system.

**Under Voltage Protection**

All motors and special apparatus should be equipped with suitable undervoltage tripping devices to prevent sustained under voltage operation and equipment damage. BTU will not be responsible in any way for damage to customer's equipment due to the failure of the customer to provide adequate under voltage protection.

## **SECTION 9: Power Delivery**

### **Utility Grade Power vs. Premium Power**

"Utility grade power" is electricity delivered by a utility in a well-established, industry accepted manner allowing for satisfactory performance of conventional lighting and motor loads. Utility systems providing electric power are designed to minimize costs while maintaining reasonable levels of reliability.

Utility grade power also refers to the power supplied inside customer-owned facilities, which contains internally created power quality disturbances and problems. In fact, studies done by the Electric Power Research Institute (EPRI) indicate that four out of five power quality problems are due to faulty wiring and grounding inside customer-owned facilities.

In contrast, "premium power" is electricity delivered to sensitive electronic loads requiring higher reliability and power quality than conventional loads. Premium power can be customized to match the operating requirements of the equipment in question and is commonly referred to as "computer-grade" power. Ideally, premium power will consist of continuous, regulated voltage free from disturbances.

Standards defining the quality of utility grade power include the evenness of the average voltage, frequency, and the reliability. BTU follows national guidelines defined by the American National Standards Institute in designing and operating the electric utility system for voltage and frequency.

In general, BTU cannot provide premium power. To obtain this level of service, customers must enhance or upgrade their existing electrical facilities by installing power conditioners and applying other power quality solutions specifically selected to meet their requirements.

It is the Customer's responsibility to install the necessary protective equipment to limit adverse effects on equipment from voltage fluctuations, waveform distortion and single-phasing events.

### **Power Quality**

While BTU cannot deliver premium power to its customers, BTU does attempt to maintain service voltages within the ranges recommended by the American National Standard Institute (ANSI) in its standard C84.1, *American National Standard for Electric Power Systems and Equipment - Voltage Ratings (60 Hz)*.

ANSI C84.1 was prepared by the National Electrical Manufacturers Association (NEMA) with participation by the Edison Electric Institute (EEI) and others. These voltage ranges apply to steady-state voltages, and do not apply to momentary voltage fluctuations, caused by switching operations, motor starting, fluctuating loads, and other normally occurring electrical operations.

ANSI C84.1 categorizes each voltage range for two locations: service and utilization. Service voltage is measured at the point of delivery (typically at the customer's electric meter) while utilization voltage is measured at the terminals of the customer's utilizing equipment. The difference between service and utilization voltage allows for voltage drop in facility wiring

between the point of utility delivery and the utilization equipment. The National Electrical Code (NEC) covers this in greater detail in Articles 210, 215, and 310.

BTU strives to design and operate its electric system to operate within  $\pm 5\%$  of nominal voltage. The occurrence of service voltage excursions outside Range A (See table below) for long periods is infrequent, but may occur due to unusual operating conditions. When abnormal conditions occur (such as the loss of a major transmission line, generator, etc.), corrective measures are taken by BTU within a reasonable time to improve voltages to meet Range A guidelines. However, it is the responsibility of the Customer to design their electrical system to ensure the utilization voltage guidelines in ANSI C84.1 are met.

The following table shows the acceptable voltage range as defined by ANSI C84.1 for BTU's common service voltages:

<b>Nominal Voltage</b>	<b>Range A Minimum</b>	<b>Range A Maximum</b>
240/120	228/114V	252/126V
208Y/120	197/114V	218/126V
480Y/277	456/263V	504/291V

Besides variations in the steady state voltage, momentary voltage sags and over voltages occur on all electric utility systems. These short duration voltage variations can adversely affect electric equipment, particularly variable speed motor drives, computers, programmable logic controls, and motor contactors. It may be especially noticeable using incandescent lighting. Normally-occurring voltage sags and overvoltage transients were not a major concern before the wide-spread use of electronic equipment. The increased use of sophisticated electronic equipment has made it necessary for utility customers to take proactive steps to mitigate the affect of voltage transients on their equipment.

Over voltage transients can occur during the normal operation of an electric system, such as when capacitor banks are switched on, when circuit breakers operate, or when lightning hits a feeder. Transient voltage surge protection should be installed by the utility customer to help prevent electrical equipment from being damaged, or failing to operate properly. These over voltage transients are very short events (typically occurring for fractions of a second), and yet they can cause electrical equipment to malfunction. As mentioned before, our society's increased usage of sophisticated electronic equipment has made it necessary for utility customers to take proactive steps to mitigate the affect of over voltage transients on their equipment.

## Frequently Called Numbers

Line Design.....	(979) 821-5770
Line Design Fax.....	(979) 821-5796
Customer Service.....	(979) 821-5700
Conduit Inspection.....	(979) 821-5925
New Service Applications (Fax).....	(979) 821-5781
Electric Dispatch.....	(979) 822-3777
Scheduling Manager.....	(979) 821-5773
Report a Streetlight Outage.....	<a href="http://www.btutilities.com">www.btutilities.com</a> or (979) 822-3777
Temporary Construction Pole (T-pole) Connections.....	(979) 821-5770
Warehouse (meter cans).....	(979) 821-5933
24-hour Outage/Emergency Hotline Phone.....	(979) 822-3777
City of Bryan Planning and Development.....	(979) 209-5010
City of College Station Planning and Development.....	(979) 764-3570
Texas 811 (Line Locates).....	(800) 344-8377

## NOTES

## **BRYAN TEXAS UTILITIES**

### **Physical Address**

205 E. 28th Street  
Bryan, TX 77803

### **Mailing Address**

PO Box 1000  
Bryan, TX 77805

### **Contact:**

**BTULD@btutilities.com**

**Line Design Telephone..... (979) 821-5770**

**Line Design Fax ..... (979) 821-5796**

**<http://www.btutilities.com>**