



## CDEC's Underground Specifications

The intent of this document is to be used as a guide for contractors, electricians, and CDEC's employees for underground power line installations.

The first step of the process is having the owner to officially request for new electric service by letter or in person at CDEC's connect office.

Contractors are also required to officially request for service in the same manner in order to start the process for getting temporary power.

For new underground installations:

- A licensed electrician or licensed electrical contractor should be the one doing the electrical work.

- A set of plans will need to be sent to CDEC (site plan, one-line diagram, load schedule, etc.). CDEC's engineering department will review the proposed set of plans and approve or recommend changes that need to be made. CDEC will use the provided information to calculate the size of the transformer required for the new service. CDEC only sizes and provides secondary wire for residential and small commercial services.

### **Residential and Small Commercial Services**

For new residential and small commercial services, the licensed electrician is responsible for trenching and installing the conduit for both primary and secondary lines. Also, the electrician will be required to install a fibercrete box pad when padmount transformers are required. CDEC provides these box pads and are included in the total estimate cost for the project. CDEC is responsible for providing and installing both primary and secondary underground power cables.

### **Large Power Services**

Regardless of the service type (single phase or three phase), if the transformer size required for a service is 50 KVA or greater, the service will have to meet CDEC's Large Power Service specifications. For Large Power installations, the electrical contractor is also responsible for trenching and installing the conduit for both primary and secondary lines. However, CDEC only provides and installs the underground primary wire, and the licensed electrician is responsible to furnish and install the secondary underground wire. Size, type of wire, and number of runs need to be provided to CDEC in writing or highlighted in the plans. The electrician will be required to install a fibercrete box pad, provided by CDEC, for single phase padmount transformers only. For three phase padmount transformers a concrete pad must be poured by the electrical contractor. The owner of the service will have to sign a Large Power Contract and a personal guarantee form before the service is energized. For specific information about Large Power Services, please visit our website or contact CDEC's connect office.

# Underground Primary Lines

## Trenching & Conduit

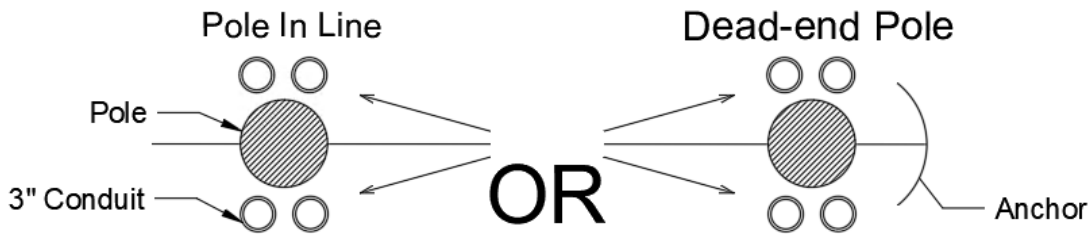
The electrician is responsible for providing and installing conduit for primary underground lines from the power pole to the padmount transformer.

Contractor shall install one conduit per phase (i.e., 1 conduit for single phase services, 3 conduits for 3 phase services). In addition, regardless of phasing, it is required to add one spare conduit as illustrated on the drawings below.

The proposed take off pole has to be inspected and approved by CDEC's engineering field crew before any work is done by the electrician. Conduit should be stubbed up out of the ground 12". The distance of the stub up conduit from the pole should be of 8". This distance is basically the size of the stand-off brackets that CDEC normally uses. Please refer to the following drawings for the location of the stub-up conduits for both single phase and three phase lines.

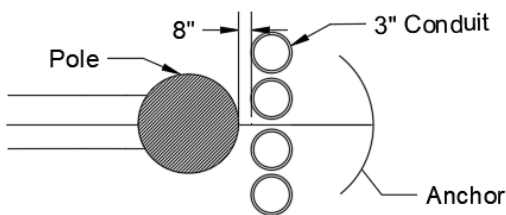
## Primary Single Phase Overhead Lines

On both tangent and dead-end single-phase poles, it is required to install both conduits next to each other parallel to the line and on either side of the pole.



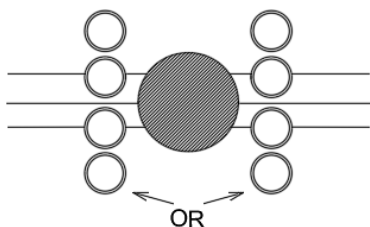
## Primary Three Phase Overhead Lines

### 3 Phase Dead-end



On dead end three phase poles, it is required to install all four conduits next to each other and in line with the overhead three phase line on the same side of the anchor.

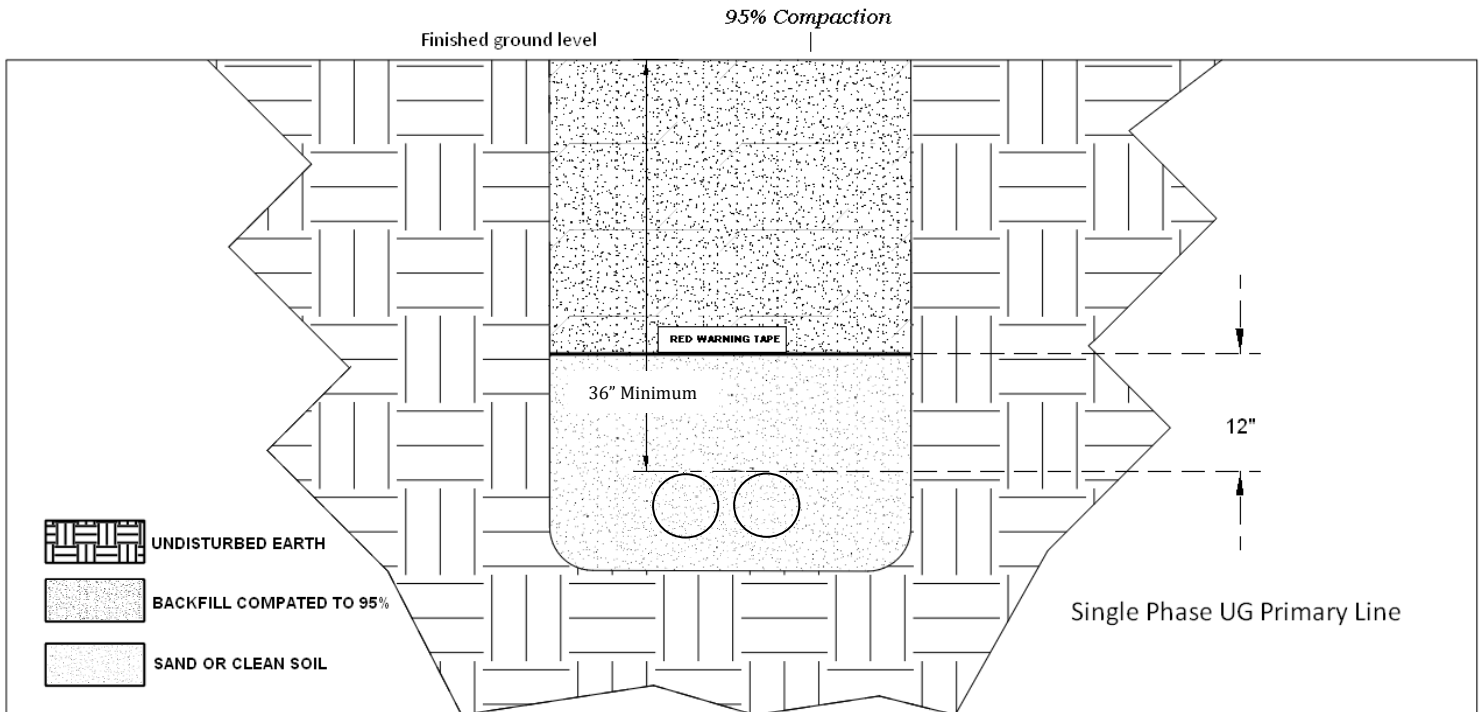
### 3 Phase In Line Pole



On tangent three phase poles, it is required to install all four conduits next to each other and in line with the overhead three phase line. On almost all cases, conduits can be on either side of the pole.

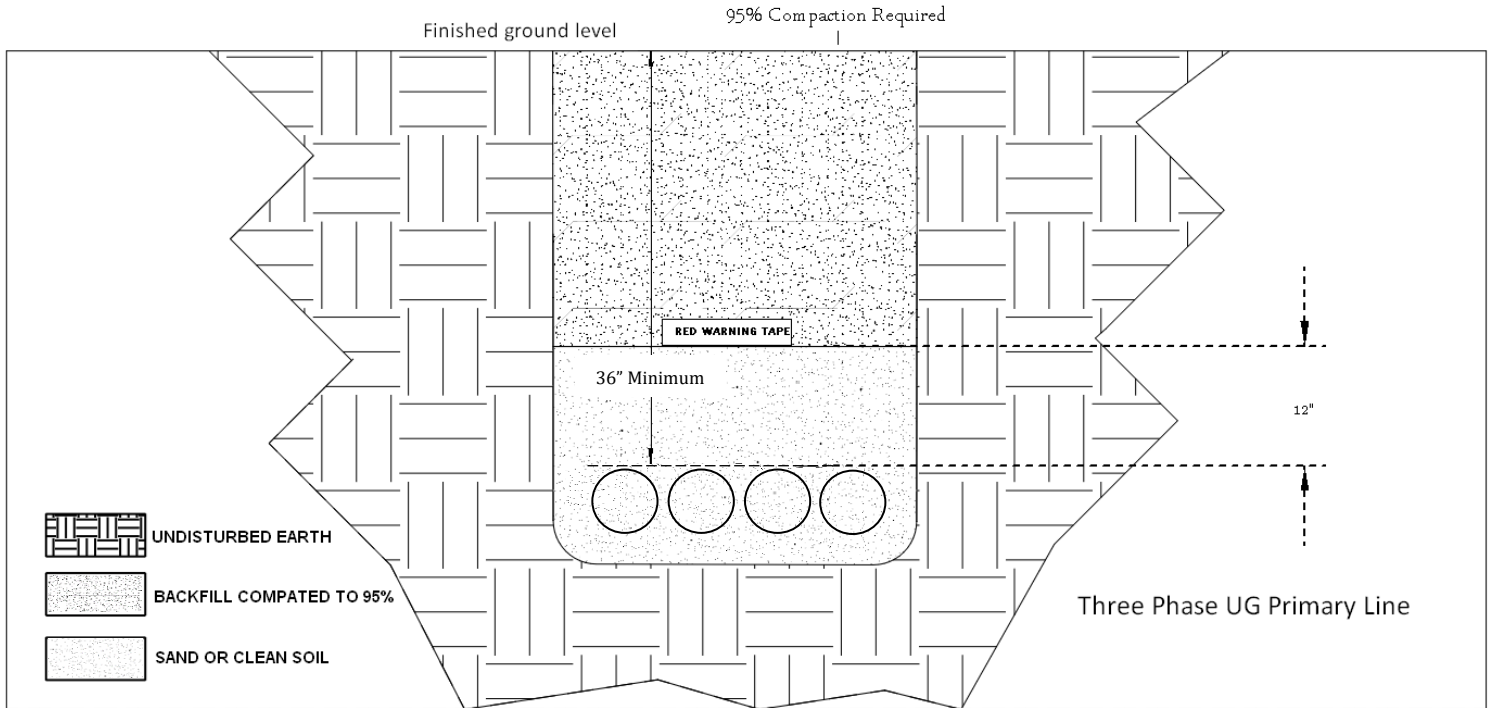
**If any questions, please contact CDEC's engineering department to verify the location of the stub-up conduits.**

- Conduits should be placed 36" deep as a minimum (from the top of the conduit).
- Conduit shall be 3" PVC SCD 40. If there is a traffic crossing over the underground line, a 4" concrete covering/encasement will be required.
- All sweeps shall be long rigid sweeps (24" or greater).
- The electrician is responsible for installing pull strings in all conduits.
- Warning tape should be installed 12" above the top of the conduit; one tape for every conduit installed in the trench.
- Backfill should be free of large rocks (none in excess of 1/2"). Trench shall be compacted to 95% of original.
- Reducers from 3" to 2" will be provided by contractor, when applicable. CDEC will provide standoffs brackets that go on the pole.



**Single Phase Underground Primary Line**

## CDEC Underground Specifications



### Three Phase Underground Primary Line

#### *Underground Primary Conductor*

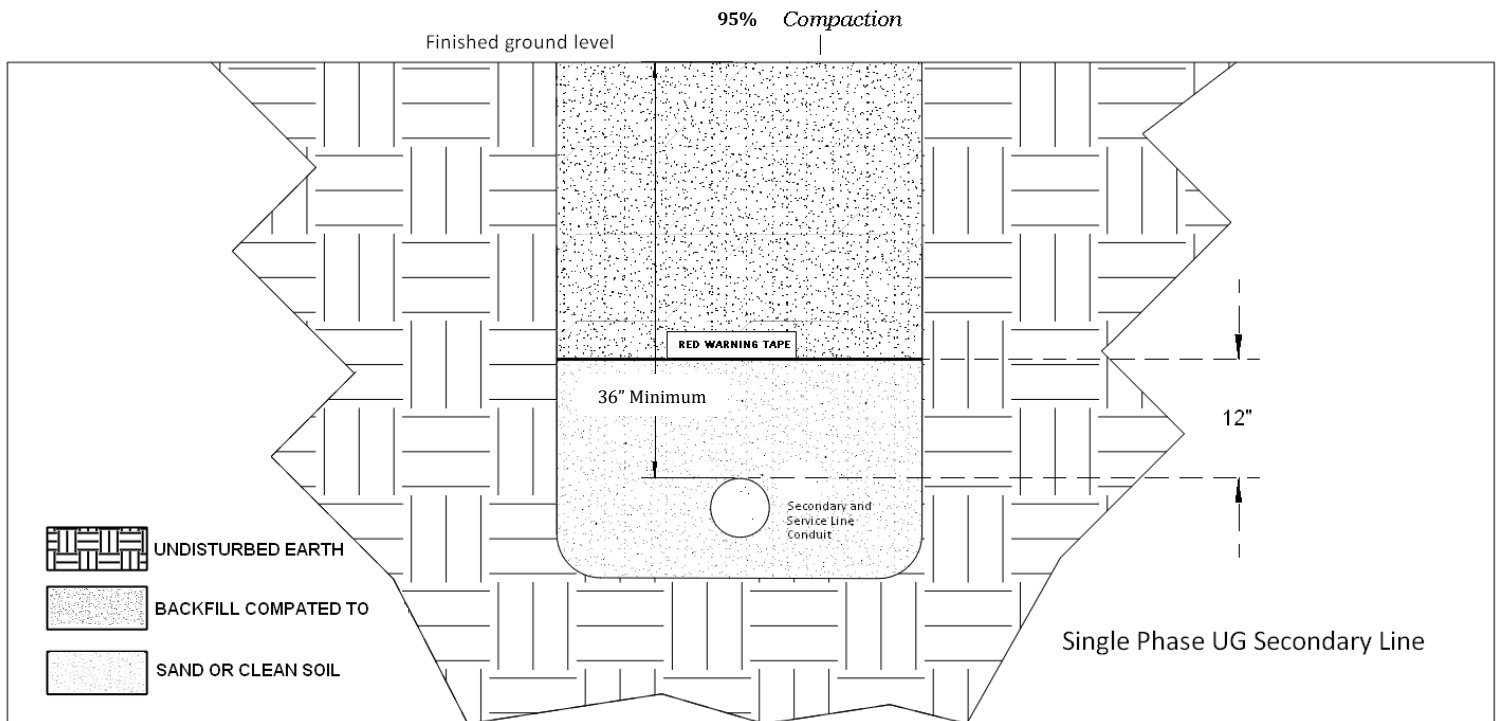
-CDEC will provide and install the underground primary conductor(s). For distances greater than 400' of primary line, pull boxes or a switch will be required (Please see pull boxes section for more details).

**⚠ CDEC requires a 2-work day advance notice to inspect the trench prior to back filling. Please email pictures of the trench to the Engineering Department. Pictures must show depth of trench using a measuring tape.**

# Underground Secondary Lines

## Trenching and Conduit

- Conduit should be placed 36" deep as a minimum (from the top of the conduit).
- Warning tape should be installed 12" above the top of the conduit. One tape for every conduit installed in the trench.
- Backfill should be free of large rocks (none in excess of 1/2"). Trench shall be compacted to 95% of original.
- Conduit shall be 2" PVC SCD 40 for single phase and 3" PVC SCD 40 for three phase. If there is traffic crossing over the underground line, a 4" concrete covering/encasement will be required.
- All sweeps shall be long rigid sweeps (18" or greater).
- For those cases where CDEC will provide and install the underground cable, pull strings shall be provided and installed by the electrician.



Single Phase & Three Phase Underground Secondary Lines

### ***Pole Mounted Transformer Underground Secondary Conductor***

For all underground services that will be fed by a pole mounted transformer (1 Ph/ 3ph bank), a Junction Box will be required at the bottom of the pole. CDEC will furnish the Junction Box, but the electrician is responsible for installing it.

For Large Power Services, the Junction Box will be the point of interconnection. CDEC will bring Triplex/Quadruplex underground wire down the pole to the Junction Box. The electrician will be responsible for providing and installing secondary wire from the Junction Box to the service entrance.

### ***Padmount Transformer Underground Secondary Conductor***

-The electrician is responsible for providing and installing secondary conductor for Large Power Services.



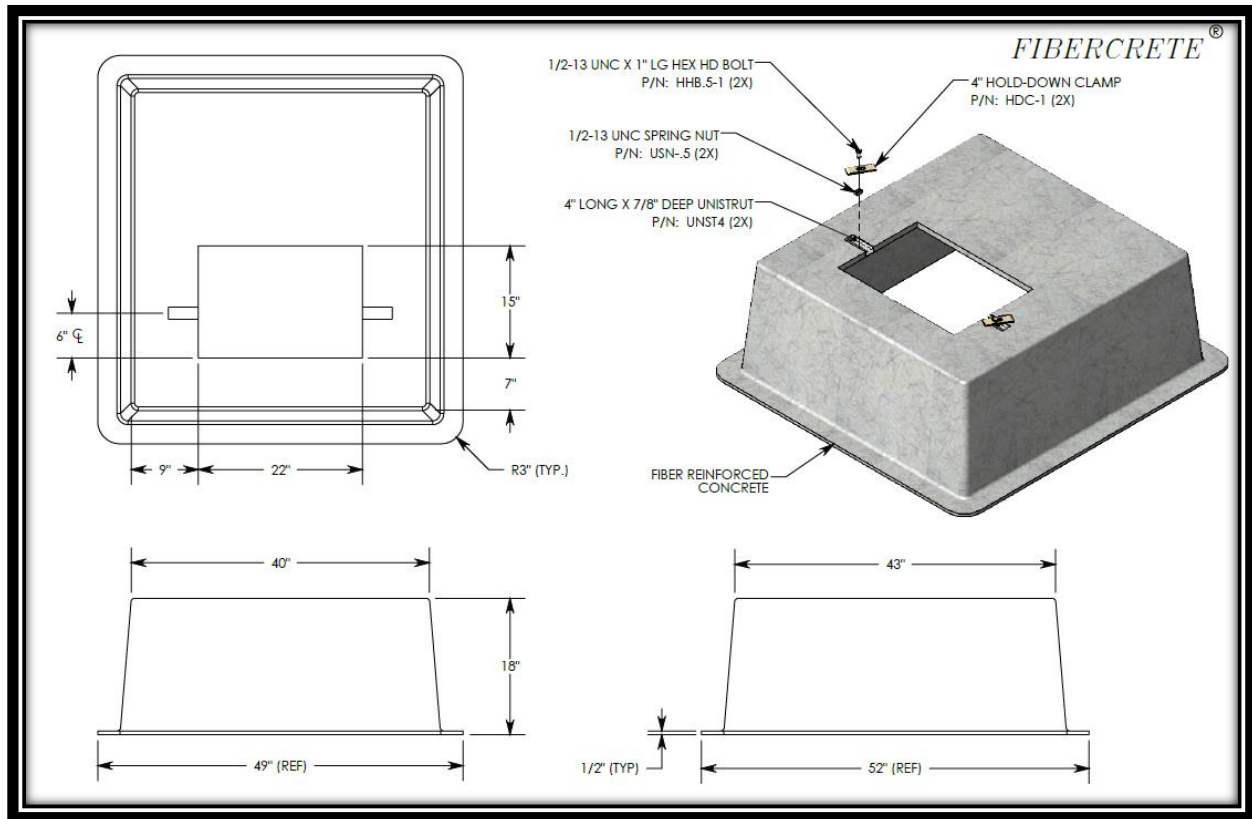
**CDEC requires a 2-work day advance notice to inspect the trench prior to back filling. Please email pictures to the Engineering Department. Pictures must show depth of trench using a measuring tape.**

# Transformer Pads

## Single Phase Fibercrete Pads

For single phase transformers, CDEC provides a fiber reinforced concrete pad for the electrical contractor to install.

Contractor shall leave 4-6" from finish grade to the top of the pad. Conduit needs to be cut flush with the top of the pad.



## Three Phase Concrete Pads

The following page shows CDEC's concrete pad drawing for three phase transformers of sizes 75 KVA and above. Please contact CDEC for specs or instructions for single phase or 45 KVA three phase transformers.

- Concrete Testing, 3000 pounds minimum, 4% to 6% entrained air, 3/4" maximum size aggregate.
- Pad to have 3" buffer from re-bar steel to edge of pad
- Minimum concrete cover over steel re-bar 3" unless noted otherwise.
- Wood float finish, leaving no depressions.
- Tool or Chamfer edges.

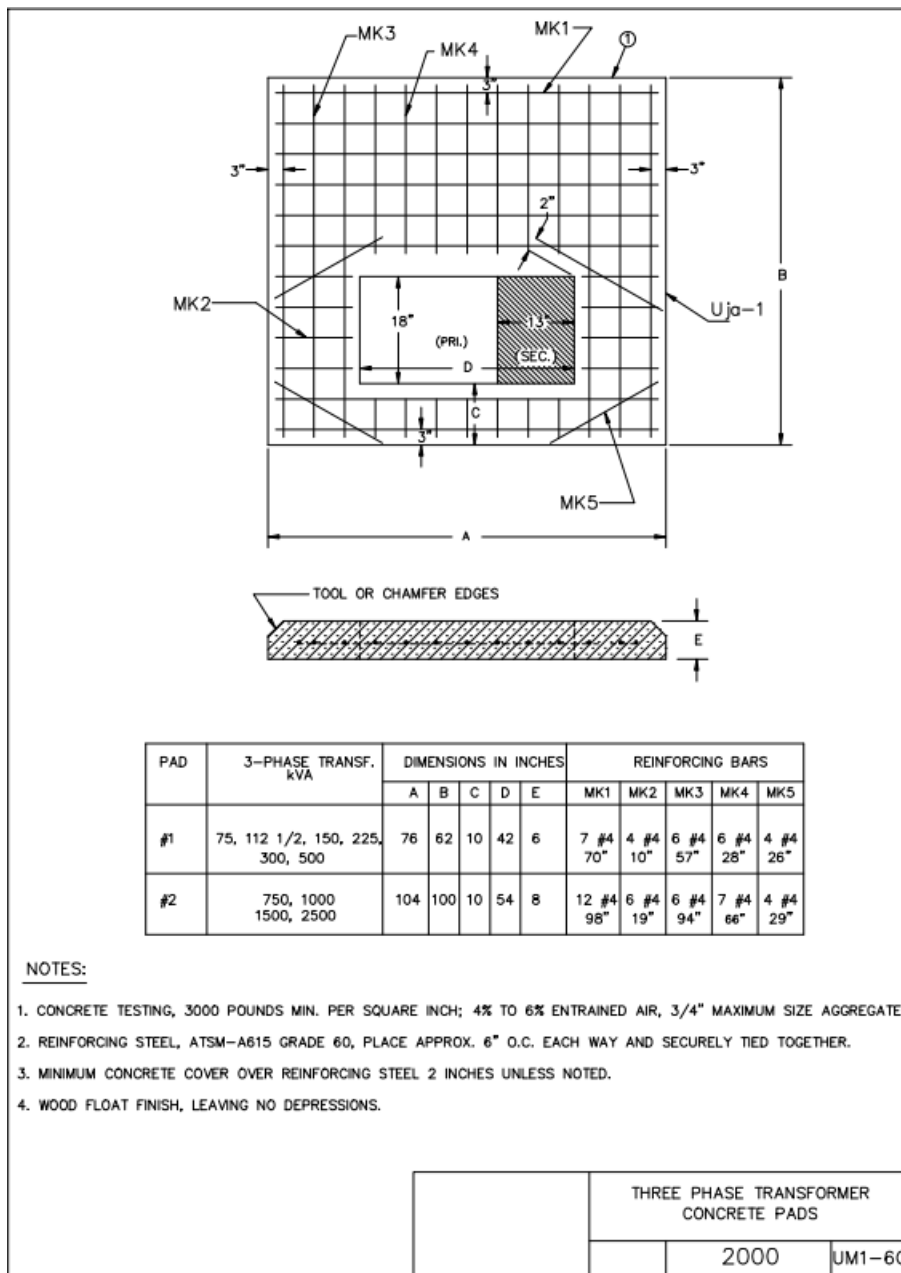
## CDEC Underground Specifications

-Conduit sweeps in and out of pad to be even with top of pad, free of sharp points and ends to be smooth.

-The space between the primary and secondary conduits in the pad trough to be no less than 12"

-Trough to be free from excess concrete

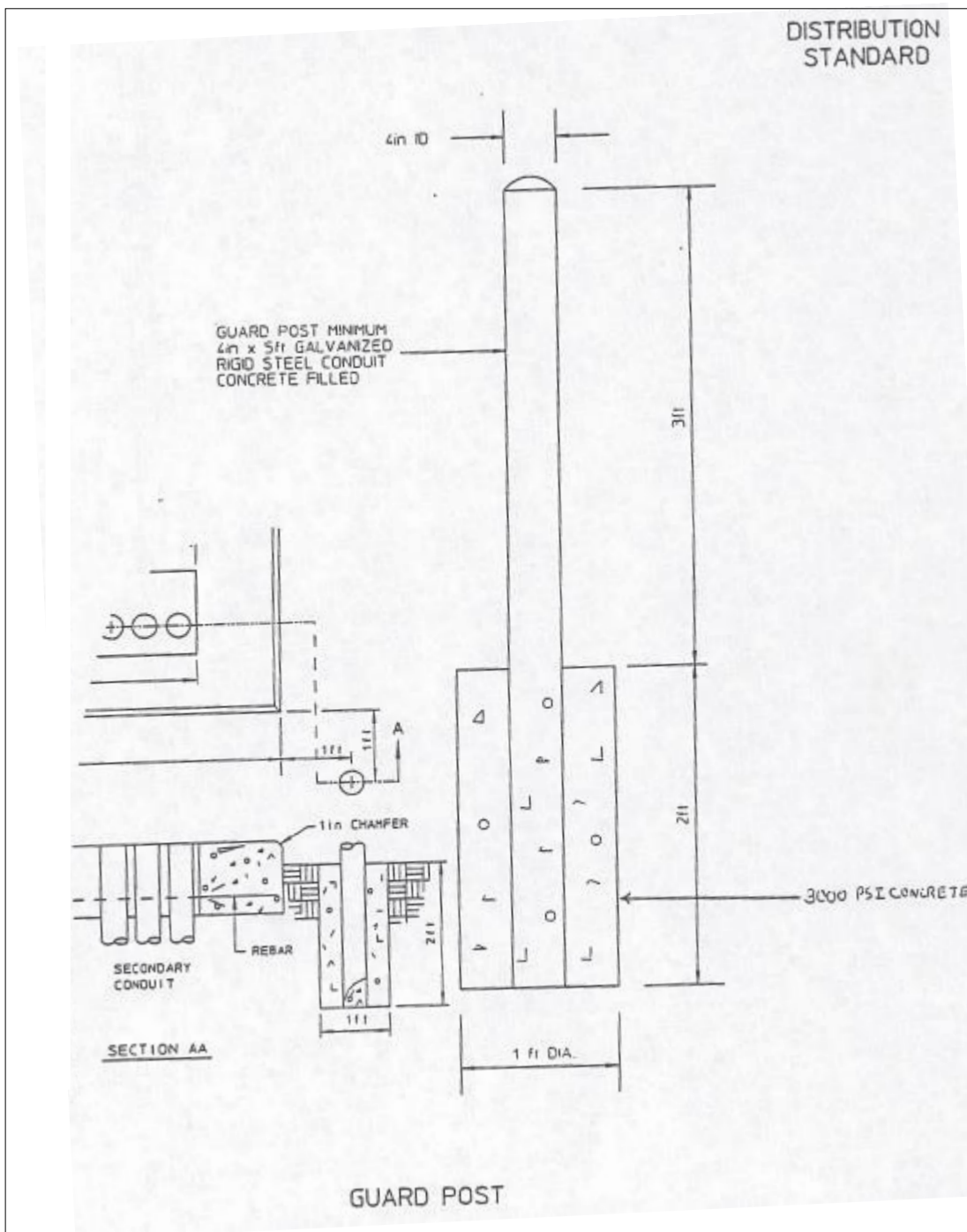
**⚠ CDEC requires a 2-work day advance notice to inspect the pad prior to pouring concrete. You can also email pictures to the Engineering Department. Pictures must show pad measurements using a measuring tape.**



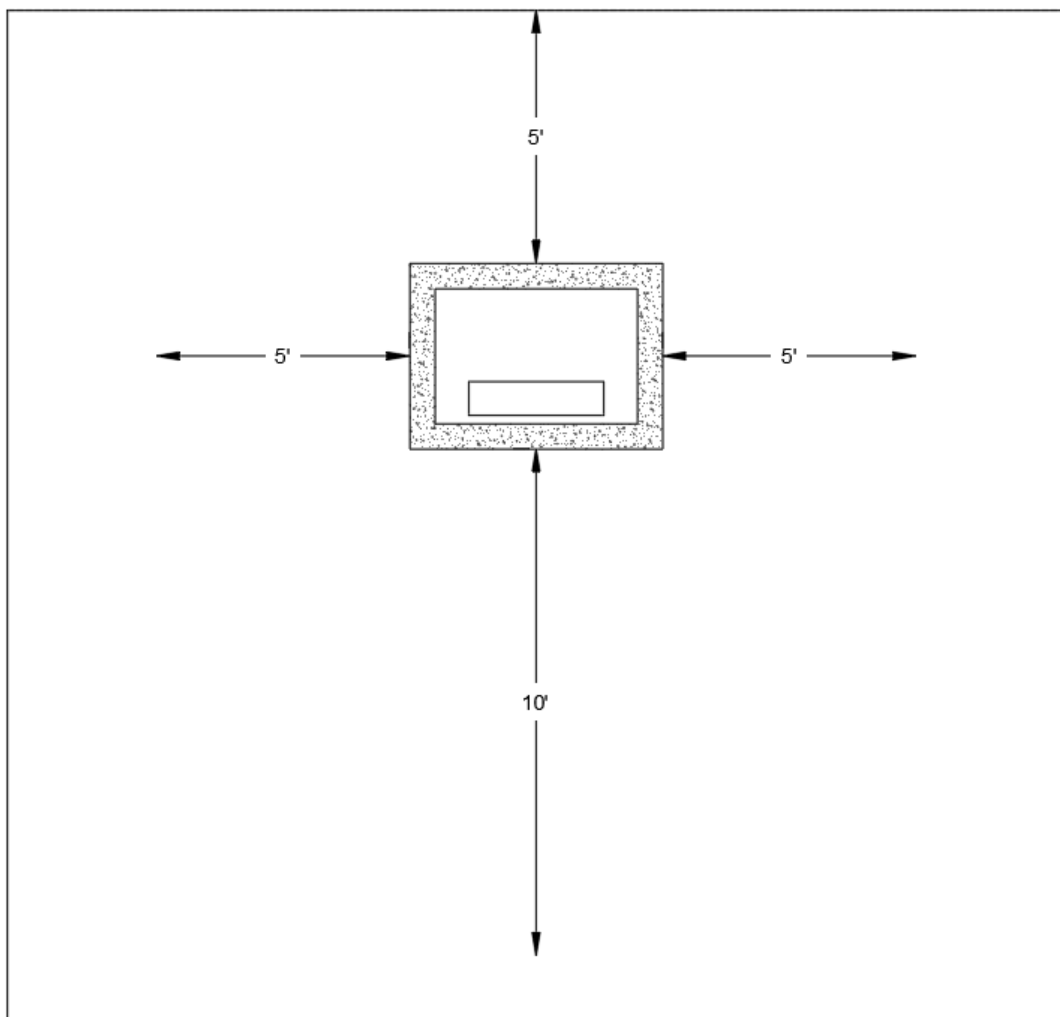


### Guard Post

The following figure shows an example of a Guard Post which could be used to protect padmount transformers, switches, poles, etc. against traffic.



### Padmount Transformer Clearances



### Pull Boxes

- CDEC will furnish Pull Boxes; however, the electrician is responsible for the installation.
- Contractor will install pull boxes per manufacture's specs. A minimum of 6" but no more than 8" of the box will be exposed the above finished grade.
- Compaction around the box will be complete and at 95%.

**⚠ CDEC requires a 2-work day advance notice to inspect around the pull boxes prior to back filling. Please email pictures to the Engineering Department.**

## Metering

CDEC will provide and install meters for all types of services. The electrician is responsible for providing and installing the meter base or any Meter/CT Enclosures needed in accordance to NEC and CDEC's specifications. The electrician is responsible for getting the electrical permit(s) approved by the New Mexico State Inspector. For mobile homes, it is required to have an approved mobile home permit in addition to the electric permit. No electric service will be energized until CDEC receives all necessary paperwork including these permits.

For services on Tribal land, please check our website or ask CDEC's office for a copy of a Letter of Compliance.

### ***Services of 320 Amps and below***

For services of 320 Amps and below, normally a regular self-contained meter base will suffice. This only applies for non-Large Power Services. The member/electrical contractor is responsible for verifying with CDEC that the service will not be considered Large Power before installing a meter base.

### ***Services above 320 Amps and all Large Power Services***

-Services that are greater than 320 Amps will require CTs for metering.

-All Large Power services are required to have CTs.

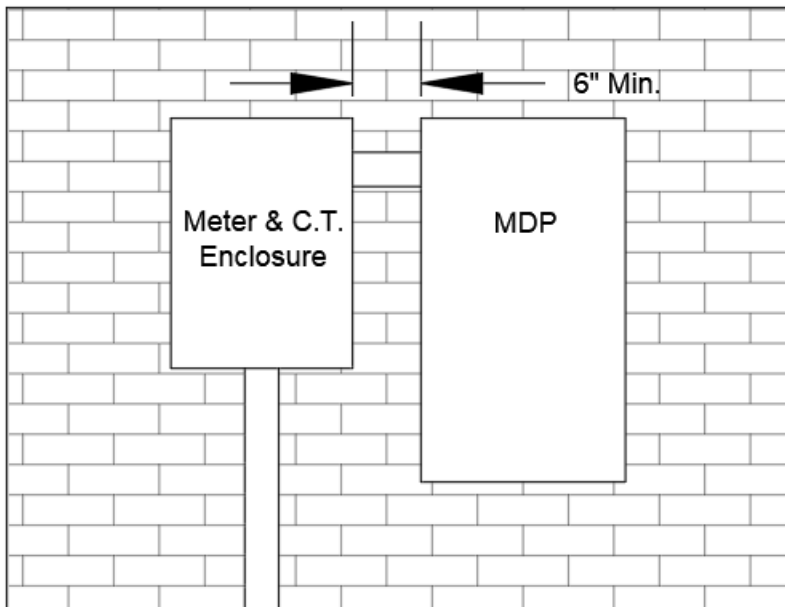
-CDEC will provide CTs and metering equipment.

-The electrician is responsible for contacting CDEC's metering department for correct metering installation and make arrangements for picking up CTs. If CTs are going to be installed in a CT enclosure, contractor is responsible for CT installation. If CTs are going to be installed inside a three phase padmount transformer, CTs will be installed by CDEC's metering department.

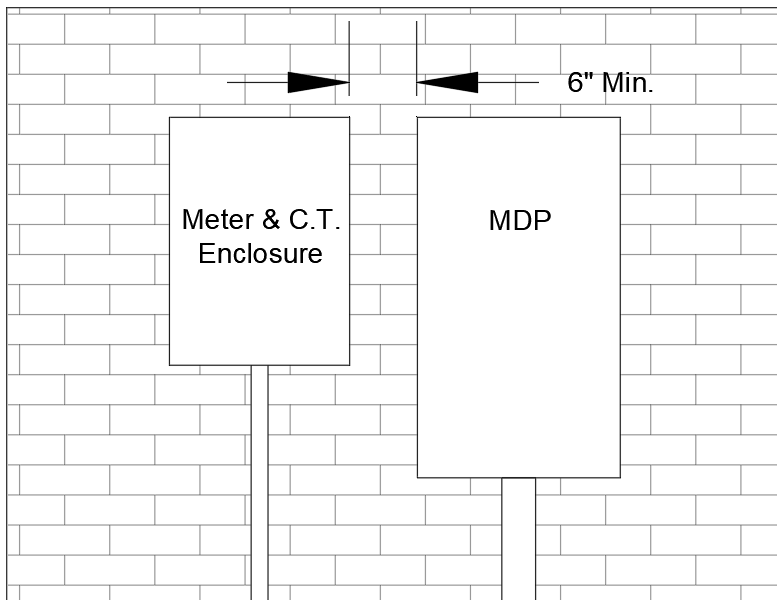
-Contractor will provide and install correct CT and Meter enclosures per CDEC specs. Note that both enclosures are required to have 3/4" plywood installed to mount meters and/or CTs on.

The following are generic configurations for single phase and three phase service underground installations:

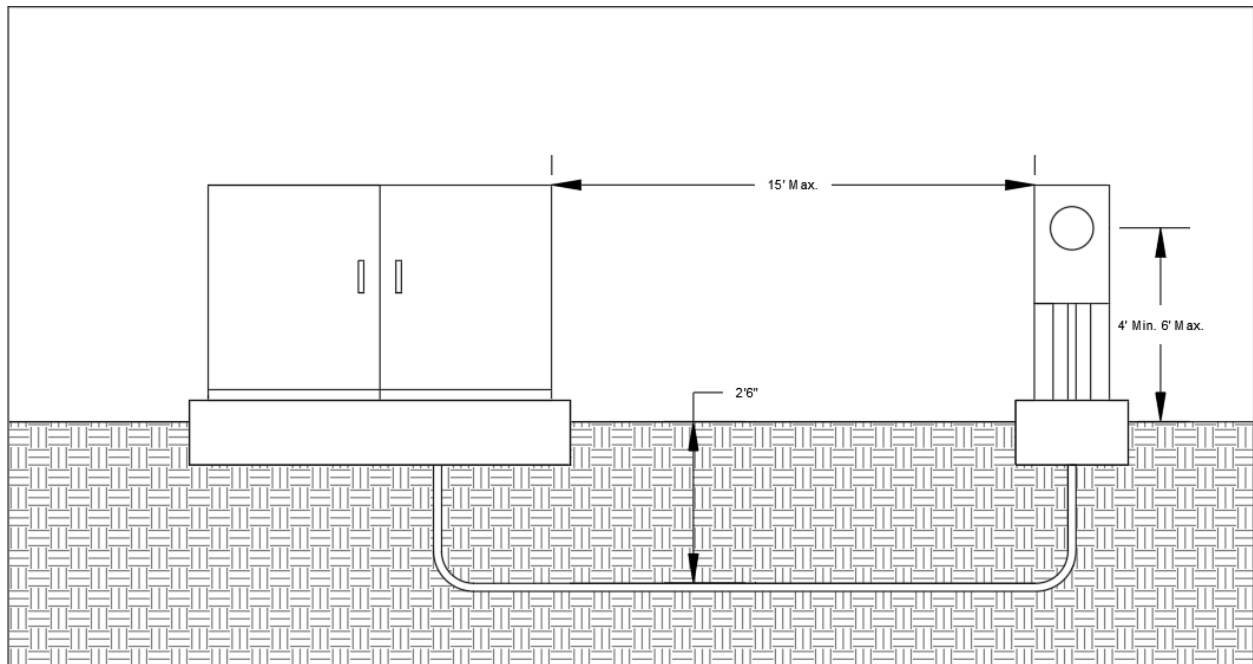
Single Phase



Three Phase Generic Configuration 1 (CTs inside Transformer)



1" pipe from Meter Enclosure to secondary side of concrete pad (see notes on page 13)



When using three phase padmount transformers, the distance between the meter enclosure and the padmount transformer cannot be more than 15 feet apart. If for some reason the 15-ft. distance cannot be met, please check Three Phase Configuration 2 on page 14.

### Notes:

-Meter Enclosure should be a Cooper B-line #352, #351, or equivalent size.

-CT Enclosure should be a Cooper B-line #421, #422 or equivalent size.

-Acceptable Support Members are as follows:

- 3 in x 3 in 1/2 in Angle
- 3 in x 4.1 lbs/ft. Channel
- 2 in x 2 in 3/16 in Box Steel
- 2-1/2 in Standard Pipe

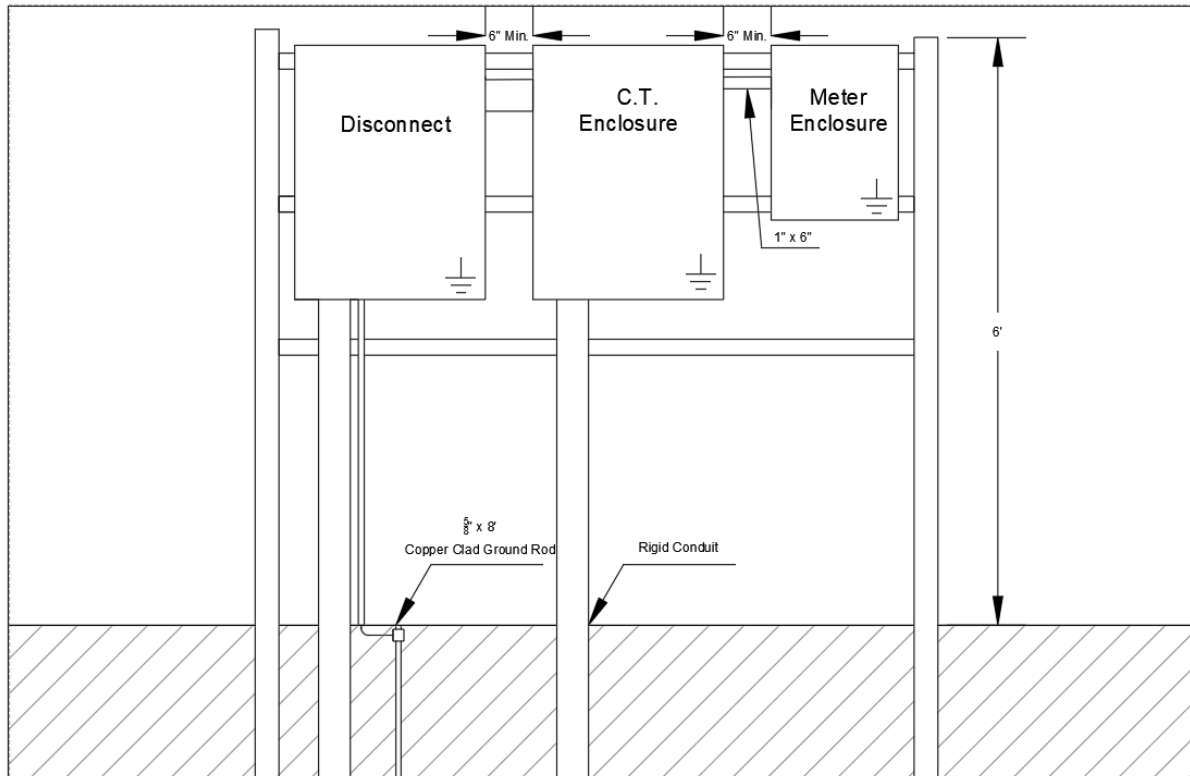
-Equipment shall be securely attached to support members either bolted directly or mounted to metal channel or Unistrut cross members.

-Contact CDEC metering department to verify the location.

-The conduit must be 1" Rigid Galvanized or 1" PVC SCD 40.

-Minimum #6 CU Ground wire. Connector and Rod per NEC article 250. A separate copper grounding electrode conductor sized in accordance with NEC article 250 must be provided for connection to CDEC Transformer and need 8' ground rod.

## Three Phase Generic Configuration 2



This configuration applies when:

- The secondary underground wire is coming from a pole mounted transformer(s).
- The maximum 15 feet distance between the padmount and the meter enclosure cannot be met (please notify CDEC's Engineering department).

Notes:

1. Stand pipe 4" Rigid with cap welded on top
2. Connecting steel between stand pipe to be 1 1/2" x 3/16" angle butt welded to stand pipe
3. Set stand pipe in concrete 3' deep
4. C.T. enclosure to be equal to B-Line #421 or equivalent size
5. Meter enclosure to be equal to B-Line #351 or equivalent size
6. C.T. and Meter enclosure are required to have 3/4" plywood backing mounted inside the enclosures
7. Conduit between C.T. enclosure and disconnect, entering C.T. enclosure and exiting disconnect to be sized for conductor size and number of runs.
8. C.T. and Meter enclosure locations can be reversed if required for ease of pulling in conductor

Please note that depending on the situation, the installation may vary. We highly recommend to contact CDEC's engineering/metering department to make sure that everything is clear before

starting to work at the electric service entrance and getting electric permits approved. Also, before submitting an electrical permit to the state, please contact CDEC's engineering/metering department to make sure the service installation is adequate and ready for CDEC. You can also provide CDEC with pictures showing the installation for approval.

**Important Note: The electrician is responsible for providing and installing Meter and CT Enclosures. These components may have a long lead time depending on availability. CDEC highly recommends taking this into account when planning for new large services.**

Utility/Current Transformer Metering

Utility Enclosures



352

352 & 353D

APPLICATION

- Used primarily in special metering applications involving self-contained or CT metering

CONSTRUCTION

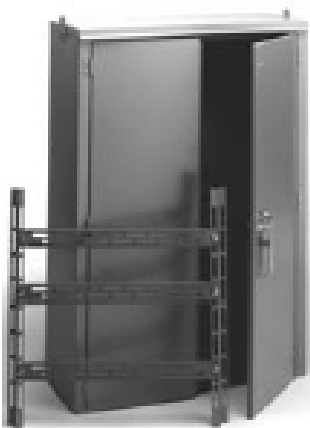
- Type 3R construction
- 28H x 28W x 11D
- Door hinged on right with padlock provision at left – 352 only
- Hinged, utility scalable meter window(s): 1 in 352 – 3 in 353D

FINISH

- ANSI 61 gray acrylic electrocoat finish

STANDARDS

- Not UL listed



420 & 415H

420 & 415H

APPLICATION

- Used primarily in special metering applications involving CT metering

CONSTRUCTION

- Type 3R construction
- 48H x 34W x 13D
- Double-doors with scalable 3-pt latch handle
- 3/4 inch plywood backboard

FINISH

- ANSI 61 gray acrylic electrocoat finish

ACCESSORIES

- Equipment mounting racks, catalog #415 (33 x 36), 415H (26 x 28)

STANDARDS

- Not UL listed



421



422

421 & 422

APPLICATION

- Used primarily in special metering applications involving CT metering

CONSTRUCTION

- Type 3R construction
- 48H x 34W x 13D
- Double-doors with scalable 3-pt latch handle
- Hinged, utility scalable meter window(s): 1 in 421 – 2 in 422
- 3/4 inch plywood backboard

FINISH

- ANSI 61 gray acrylic electrocoat finish

STANDARDS

- Not UL listed

Utility/Current Transformer Metering

7



## Energizing the Service

*In order to energize the service, the following conditions will have to be completed and received by CDEC:*

- Official new service request by owner and/or contractor. Any documents required by the connect office.
- Full payment of estimate costs and/or fees.
- Approved Right of Way (Easement Agreements, Service Line Agreements, Right of Way).
- Large Power Contract signed and payment of deposit (Large Power Services Only).
- All electrical work must be inspected and approved by the N.M. State inspector or a letter of compliance form the licensed electrician certifying that the installation complies with the NEC; this must have the contractor's signature and license number. A letter of compliance is accepted only if the service is not under state jurisdiction, (i.e. on Tribal Lands). The letter of compliance is only signed and turned in to CDEC when all the electrician's work is done and it is safe to energize the new electric service.

If any questions or concerns, please contact CDEC's office at (505) 285-6656.