ELECTRIC SERVICE REQUIREMENTS FOR IRRIGATION SERVICES

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2.0 PURPOSE

This standard provides specific information for the establishment of overhead or underground electric service for agricultural irrigation, stock watering and non-agricultural irrigation and drainage pumping installations.

3.0 LIMITS

NVE will install a single span of overhead service drop or a single run of underground cable from its pole or service box to the customer's permanent approved support, provided the customer has made an application for service and NVE's distribution pole line is located on the customer's premises or in an easement (public or private) adjoining said premises. If the length of the service is such that it would prove electrically prohibitive, a transformer and primary extension may be required, in which case, NVE's line extension rules will be applied.

Service from a pole-mounted transformer bank is limited to (3 x 75 KVA) 225 KVA three phase, four wire with a maximum of a 400 amp panel, with an overhead service drop capacity of parallel 4/0 Quad conductors. Underground service from a padmounted transformer is limited to 2500 KVA, three-phase, four wire. Overhead or underground service is limited to four wire 480Y/277 volt or 208Y/120 volt; no three wire three phase services are offered. This standard covers 100 amp to 800 amp installations. If a larger panel is needed, contact the local NVE-N office.

4.0 CUSTOMER'S RESPONSIBILITY

The customer shall furnish, install and maintain, at his expense, the service termination facilities necessary to accept overhead or underground service in accordance with state, local and national codes and the manufacturer's recommended single phase or three phase, overload protection which shall be provided by customer.

5.0 NVE RESPONSIBILITY

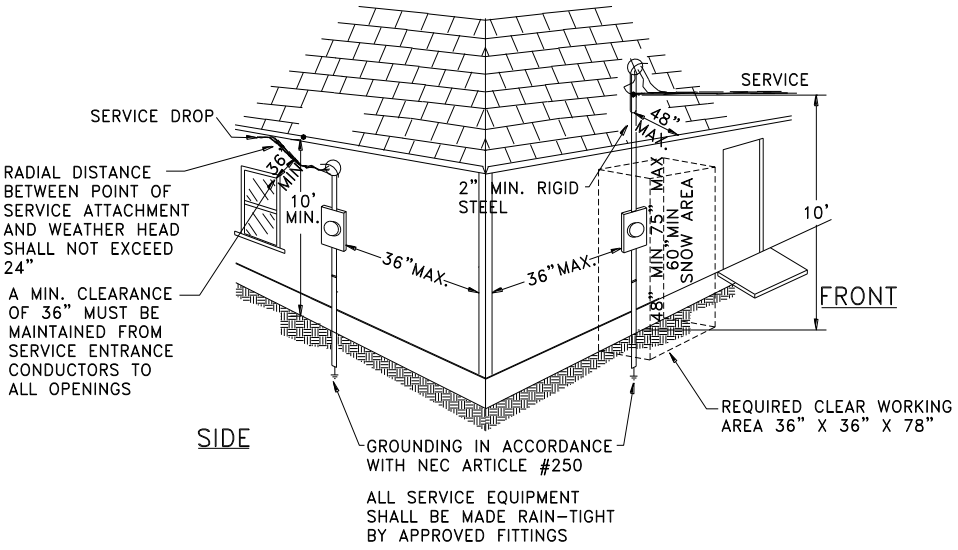
NVE may furnish, install and maintain the overhead service drop conductors, or the underground service cables, and any meters and instrument transformers required in accordance with the latest revision of our Rules and Regulations.

6.0 LOCATION OF TERMINATION FACILITIES

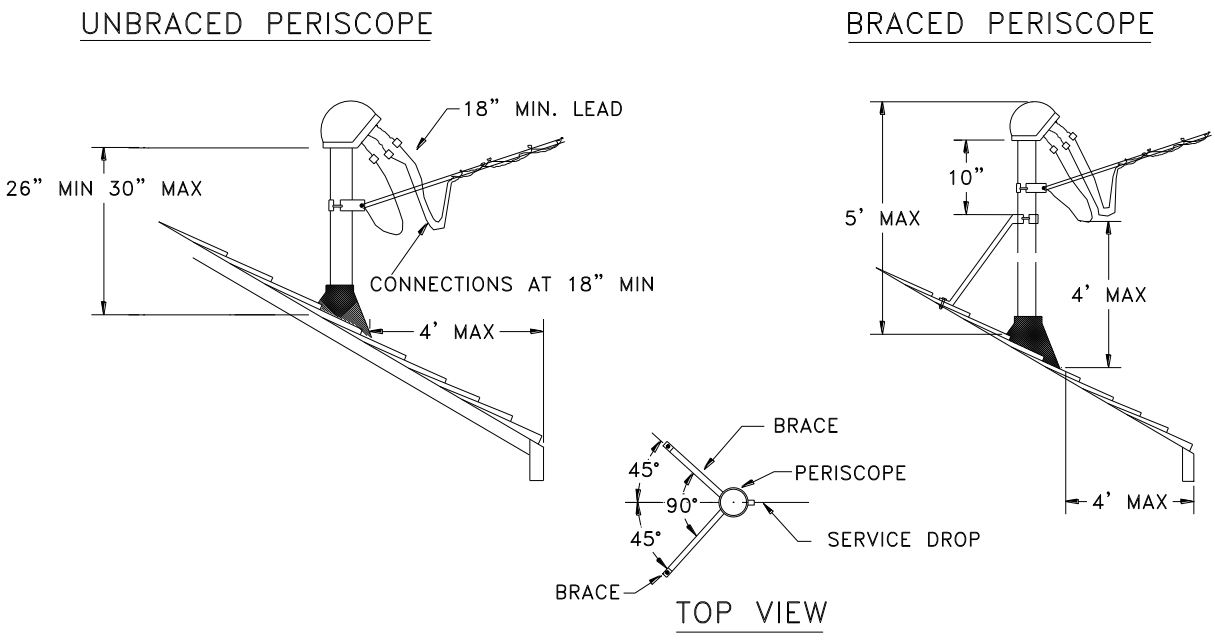
All service locations and lengths shall be approved by NVE prior to construction. Overhead service locations (the point of attachment of the service drop) shall be as short as possible and will be determined by the customer service representative prior to construction. Underground feed maximum service distance and conduit bends are to be determined by the local customer service planner or inspector. Generally pull boxes will be required for more than 75' of service or more than 270 degrees of accumulated bends. Service location must be a minimum distance of 10' from NVE facilities. Location of the service termination on a building is preferred over use of a service pole. A clear, level working space (36" wide x 36" deep x 78" high) in front of all meters is required to permit meter installation and provide a safe working environment for NVE personnel.

7.0 OVERHEAD SERVICE

O/H Service Panel on Building



PERISCOPE DETAIL



O/H SERVICE POLE DETAIL 100 AND 200 AMP

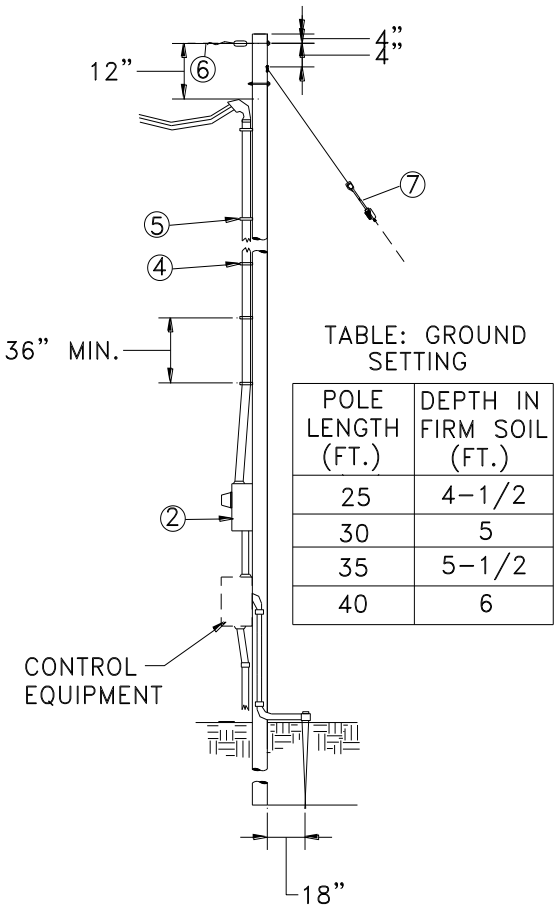
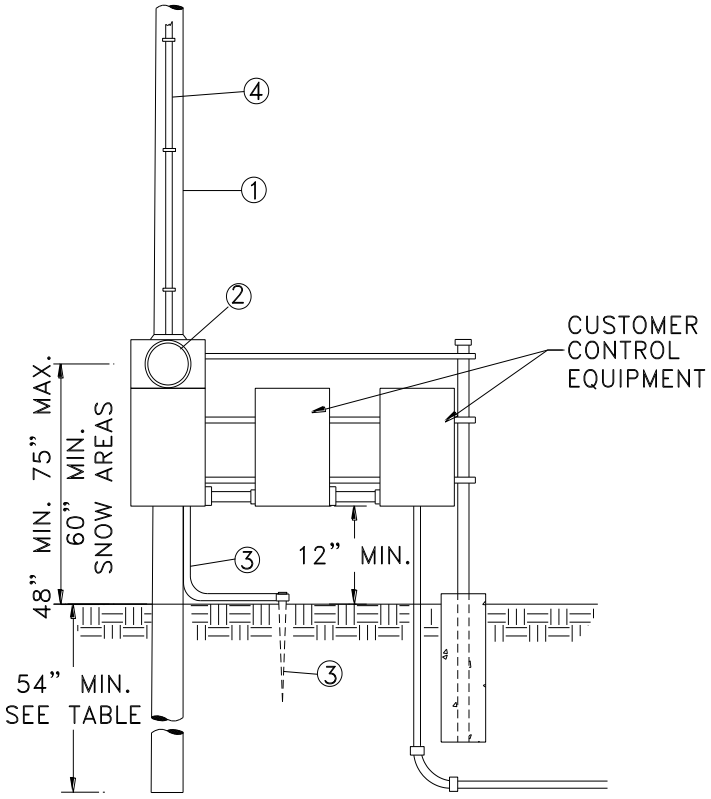


TABLE: GROUND SETTING

POLE LENGTH (FT.)	DEPTH IN FIRM SOIL (FT.)
25	4–1/2
30	5
35	5–1/2
40	6

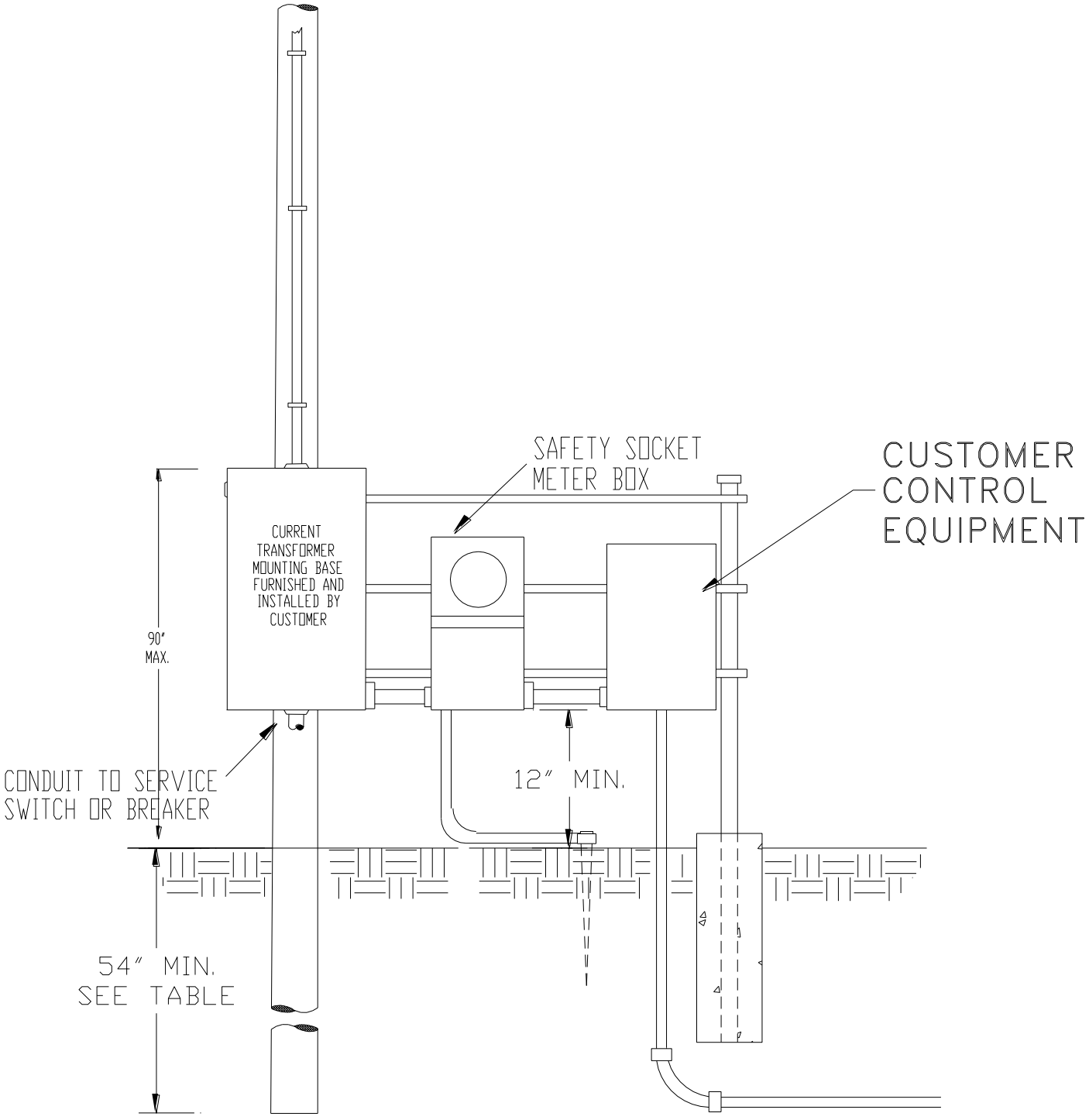


TYPICAL SERVICE USING PANEL BOARDS

Panel Board Details:

1. Pole, 25' minimum.
2. Meter socket and/or current transformer enclosure per EUSERC Standards.
3. Conduit, ground wire, ground rod per NEC and local codes.
4. Overhead feed service conduit, 2" minimum, Sch. 40 PVC, no steel allowed.
5. Conduit Attachment: Pipe strap, heavy duty galvanized.
6. Service drop by NVE. Service insulator and attachment by customer.
7. Down guy and anchor. See Page 10 for requirements.

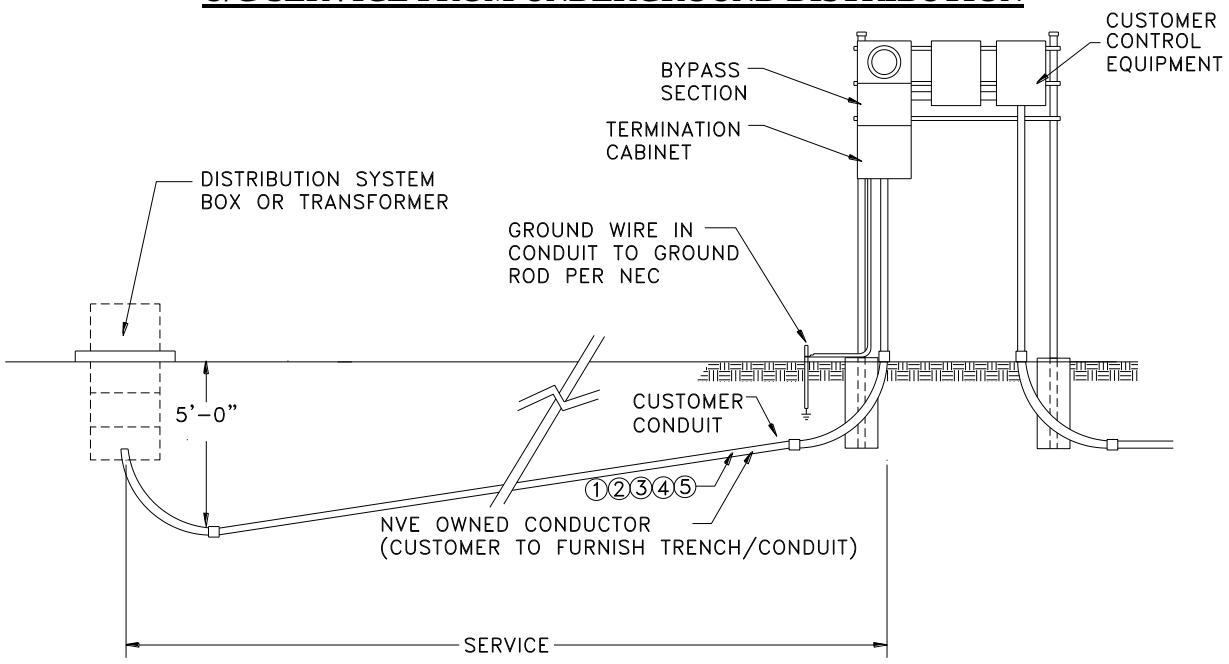
O/H SERVICE POLE DETAIL 400 AMP



8.0 UNDERGROUND SERVICE

If the customer prefers to have the service installed underground, the service may be provided by means of a riser installed on a pole or from an underground distribution system or padmount transformer. The local NVE office should be contacted for assistance in layout of the underground service.

U/G SERVICE FROM UNDERGROUND DISTRIBUTION



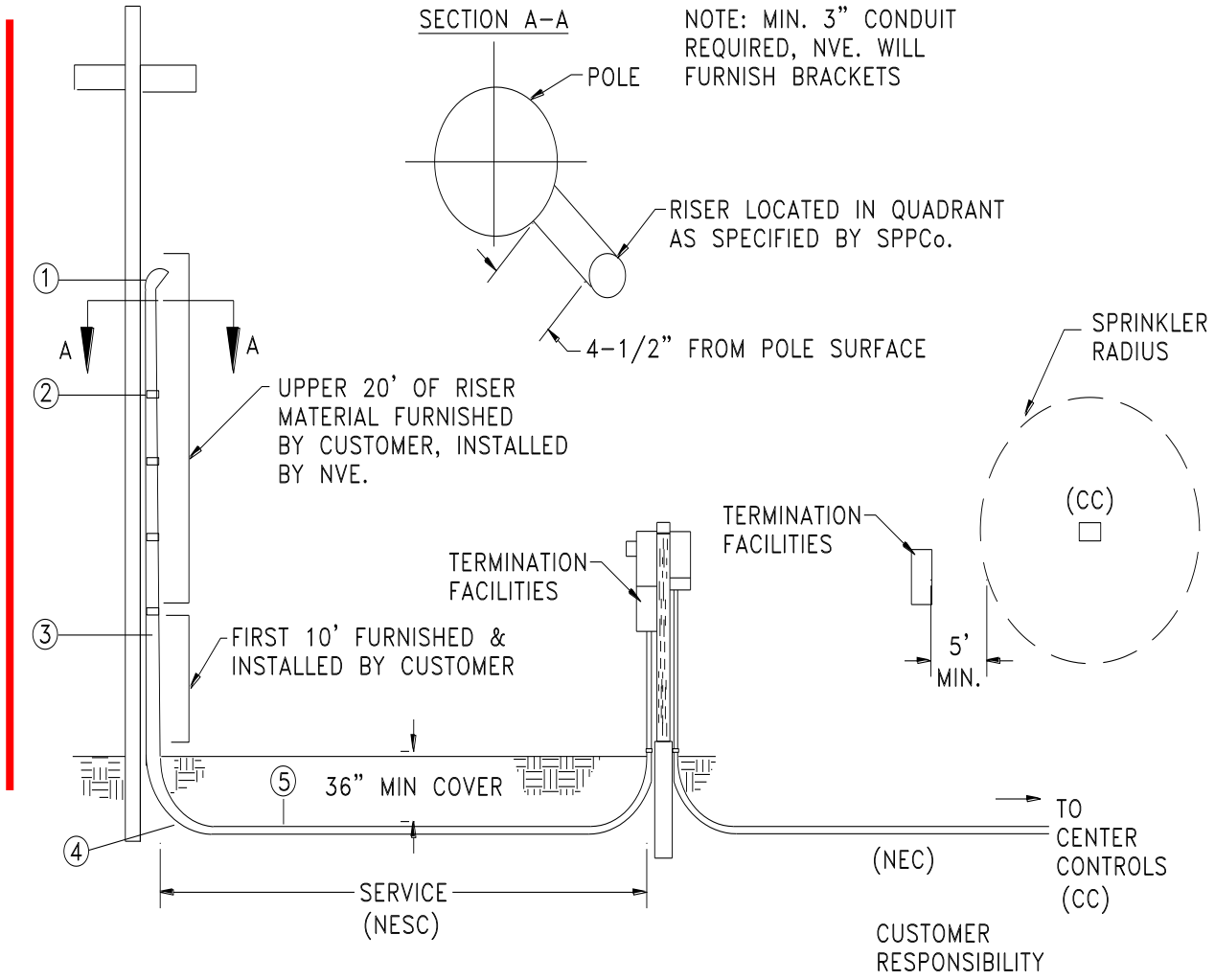
TYPICAL UNDERGROUND SERVICE USING A 100-200 AMP PANEL

NOTES: (Customer to provide and install)

1. For conduit sizing details, see CB0003U, 600V Underground Cable and Conduit Selection Guide.
2. Maximum service distance and conduit bends are to be determined by the local customer service planner or inspector. Generally pull boxes will be required for more than 75' of service or more than 270 degrees of accumulated bends (using five foot sweeps). Contact the local NVE office for an acceptable layout.
3. Below ground conduit must be electrical gray, PVC DB-120. Exposed riser conduit (into the panel), must be Sch 80 PVC or steel. The first sweep out of the panel must match the riser conduit material (steel to steel, PVC to PVC). ***DB-120 conduit cannot be exposed***. For more detail see the Conduit Application Guide CD0004U, Volume 17.
4. **For services over 75' in length, additional pull boxes may be required.** Contact local NVE office for acceptable layout.

5. A minimum 400# pull line with sequential footage markings to be installed in each conduit by customer at time of conduit installation.

U/G SERVICE FROM OVERHEAD POLE



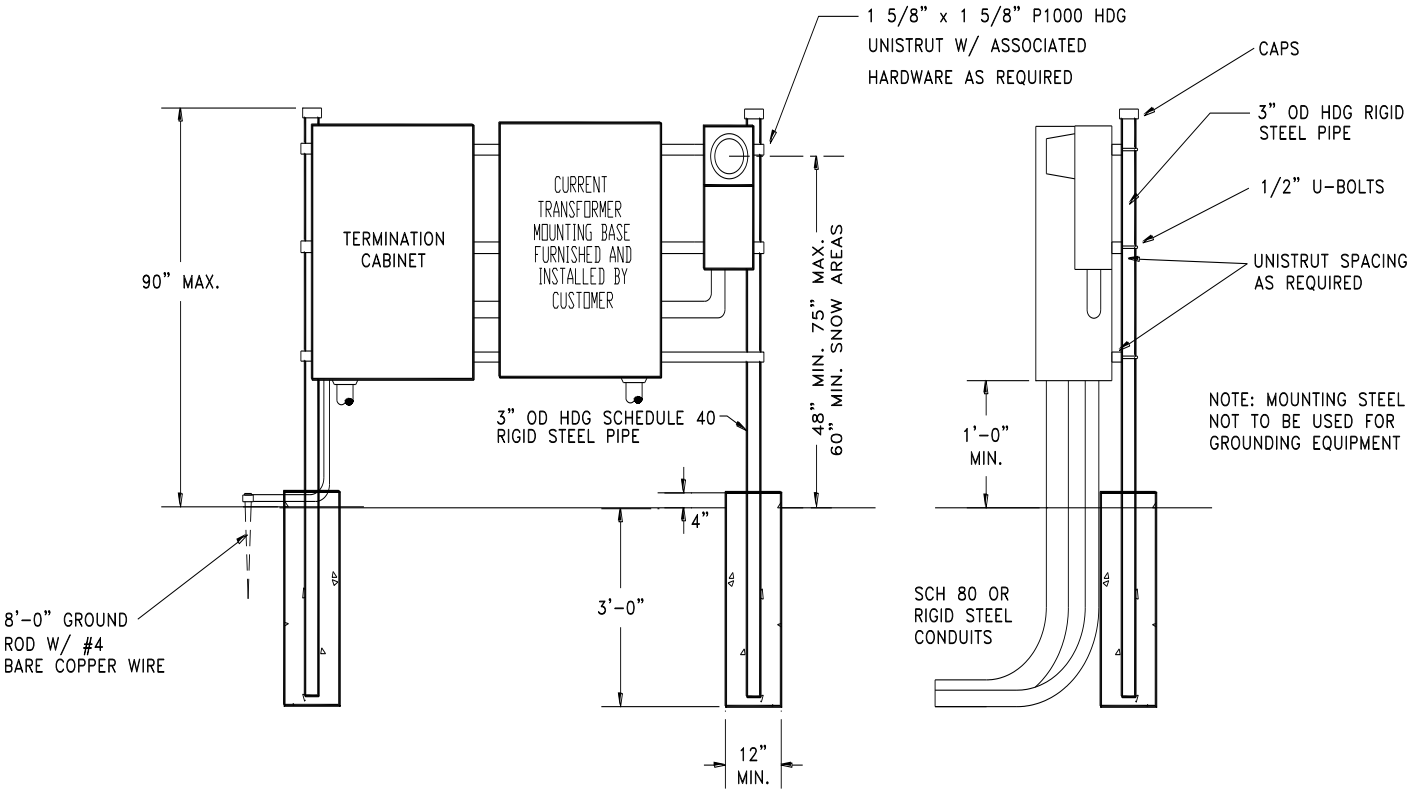
TYPICAL UNDERGROUND SERVICE USING A 100–200 AMP PANEL

NOTE: (Customer to provide and install items)

1. Weather head.
2. Minimum 3" (for 200 amp panels) Sch. 40 PVC gray electrical conduit. **Steel not allowed in upper section.** *Brackets furnished and installed by NVE*.
3. Rigid steel, or Sch. 80 PVC electrical, gray, conduit the first 10' above ground.
4. Minimum 36" radius sweep. Sweep material to match first section of the riser material.

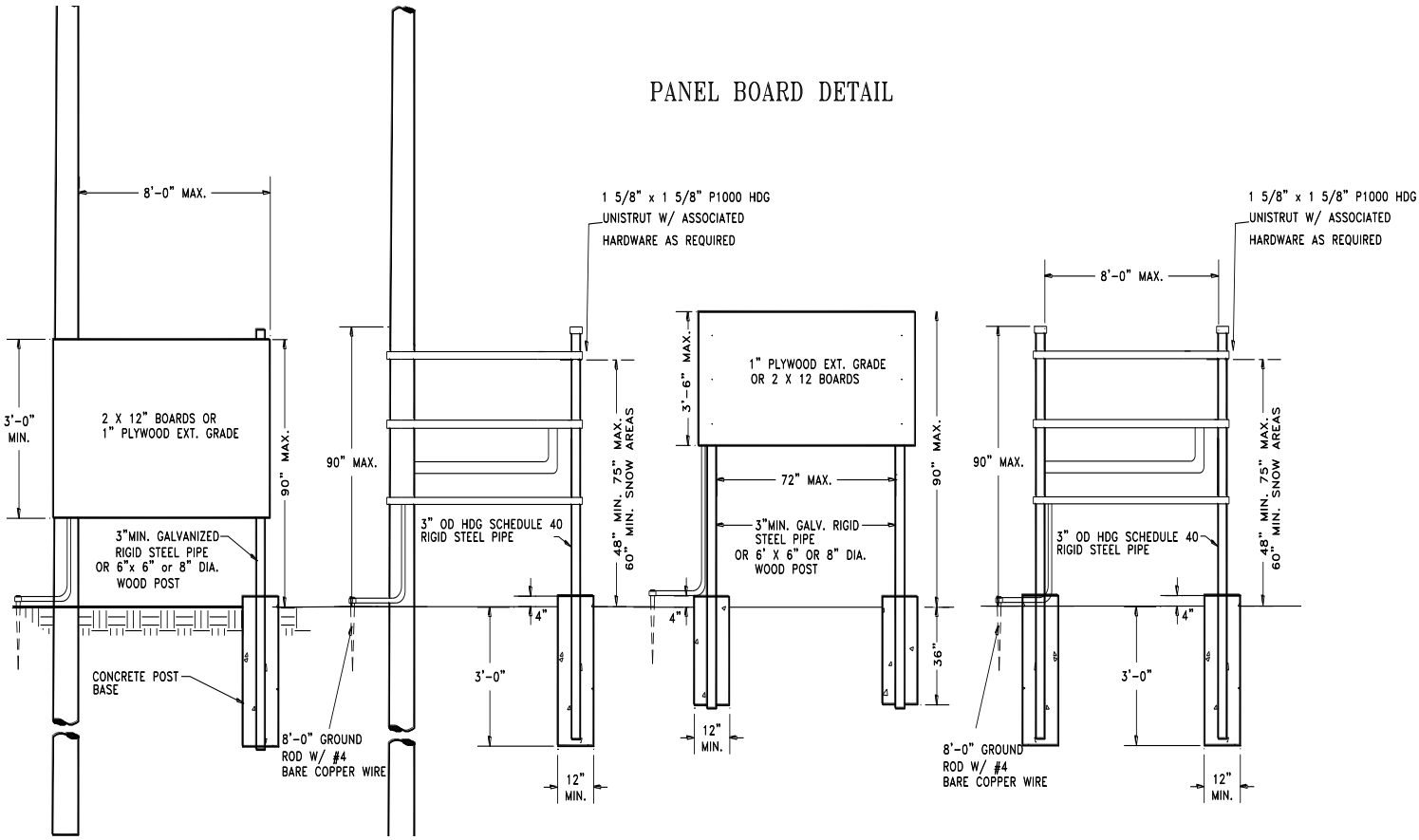
5. Minimum 3" DB-120 electrical gray, conduit with pull line.

400-800 AMP Underground Feed Detail



PREFERRED PANEL BOARDS USING UNISTRUT MOUNTING HARDWARE

PANEL BOARD DETAILS (O/H OR U/G FEED)



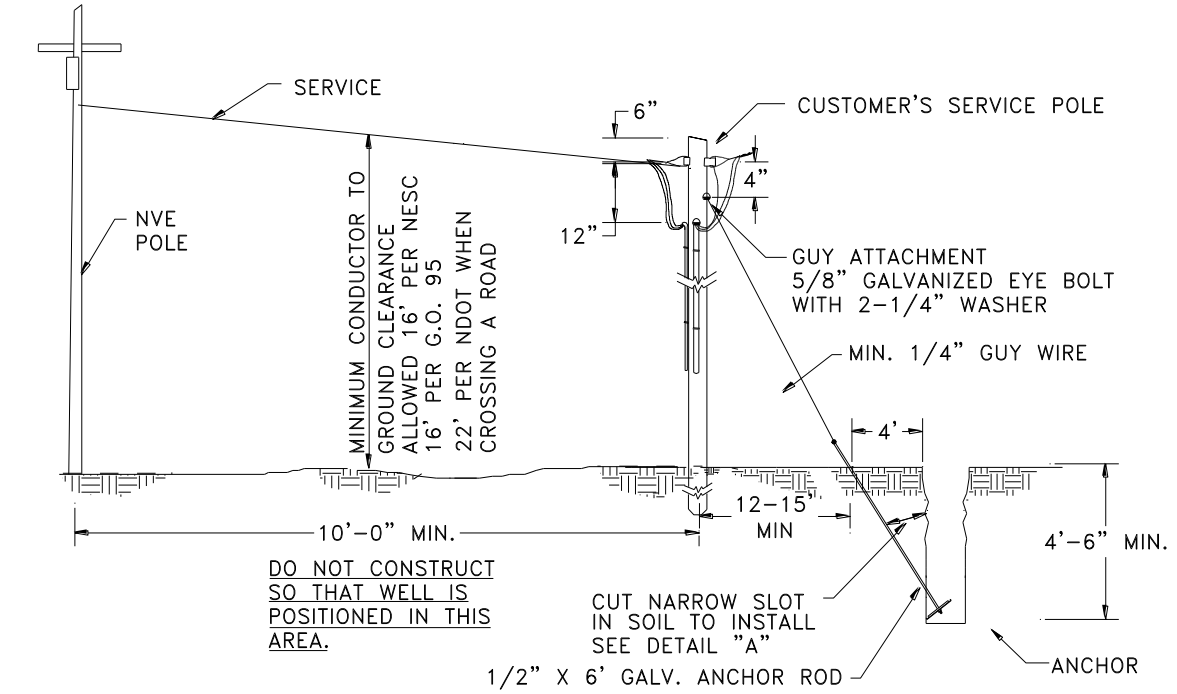
NOTES:

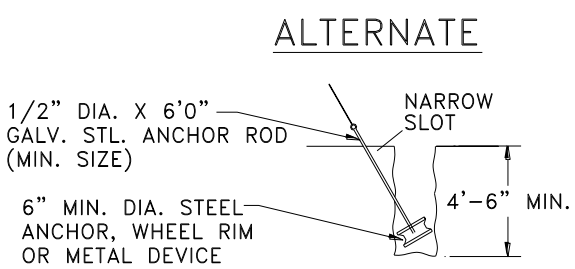
1. The service pole shall be round and shall be at least 25 feet in length (4-1/2 feet in ground) with a minimum top circumference of 16 ". The pole shall be machine shaved and full length treated by pressure or other process which will provide equivalent penetration and retention. See ANSI O5.1 for current pole specifications. ***Brush application of wood preservative is ineffective and, therefore, not acceptable***.

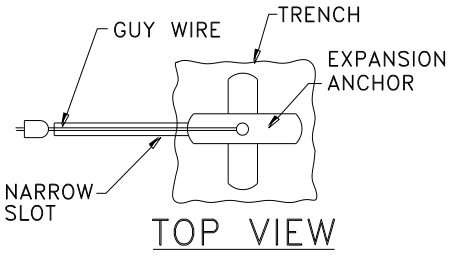
2. Wood posts shall be a minimum cross section of 6" x 6" or 8" in diameter and be treated per note 1 above.
3. Pipe posts shall be a minimum 3" in diameter and be galvanized rigid steel. See page 8 for unistrut detail.

4. The concrete footing shall be a minimum of 12" in diameter and a minimum of 36" in the ground and extend a minimum of 4" above the ground.

9.0 GUYING AND CLEARANCES







NOTES:

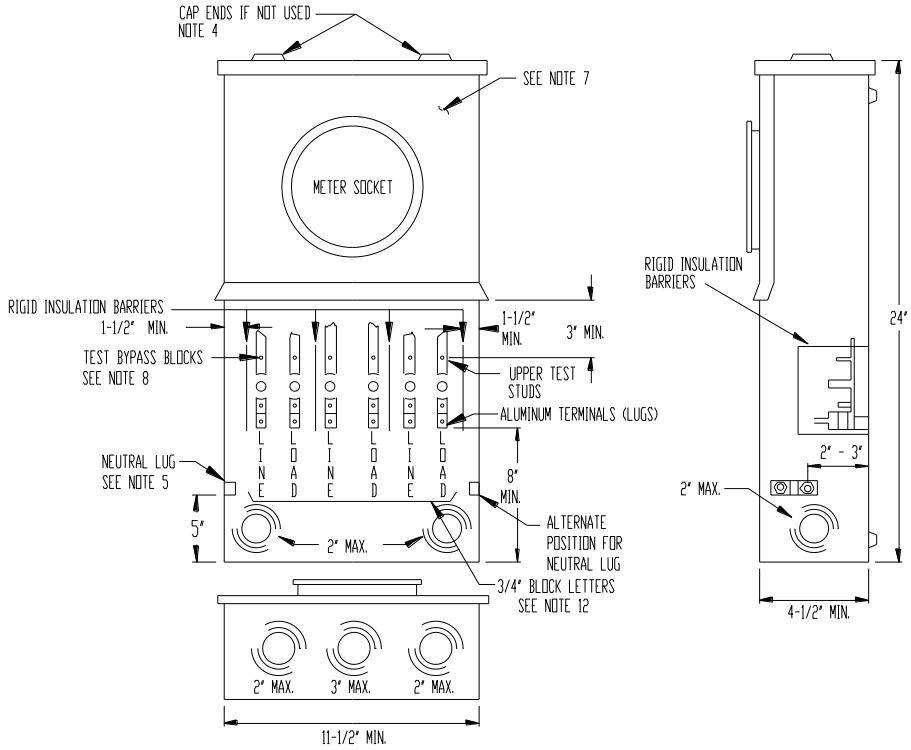
1. The service pole shall be located at least 10' from any well and in such a position the overhead conductors or guys will not cross through or over the area within a radius of 10' from the well. The service pole shall be located a minimum of 10' from the NVE pole. ***All service poles shall be anchored and guyed against the pull of the service drop.***

10.0 METERING

Refer to NVE-N Standard CM0001M, Metering Section 8.0, for details.

11.0 TERMINATION FACILITIES

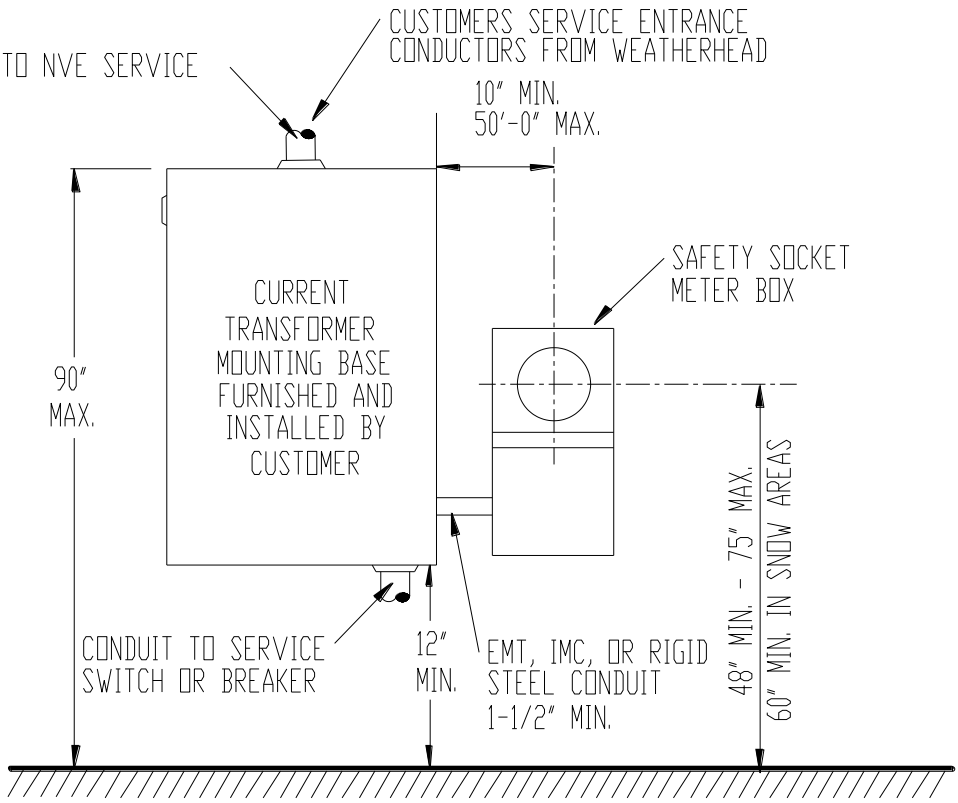
100 - 200 AMP OVERHEAD OR UNDERGROUND SERVICE
(Overhead Shown: U/G must have a 14″ Wide x 6″ Deep x 11″ Tall Termination Section)



NOTES:

1. This device shall conform to EUSER Committee Standards and may be used for installations served by an overhead drop or underground cable run. Three phase device shown; single phase device is the same size. Panels will be 100 or 200 Amp, no old obsolete panels will be used.
2. 100 Amp panels shall have aluminum terminals (lugs) for #6 thru #1/0 wire.
3. 200 Amp panels shall have aluminum set screw terminals (lugs) for #1/0 thru 250 KCM wire.
4. Hubs capped off if used for underground feed.
5. Rigid insulating barriers will be provided between phases.
6. Insulated bondable vertical lay-in, double neutral lug with 1/0 wire capacity for 100 amp panel, 250 KCM wire capacity for 200 Amp panels, mounted on either sidewall.
7. Test-bypass blocks shall be bussed or wired to socket jaws or terminals which permit NVE to bypass customer's load and de-energize the socket.
8. All section panels shall be independently removable. Upper panel shall be non-removable when meter is in place. Meter socket shall be mounted on support and attached to upper panel. Lower panel shall be sealable and permanently labeled: **"DO NOT BREAK SEALS - NO FUSES INSIDE"**
9. Decals on inside back of enclosure in 3/4" minimum block lettering.

400 AMP OVERHEAD FEED



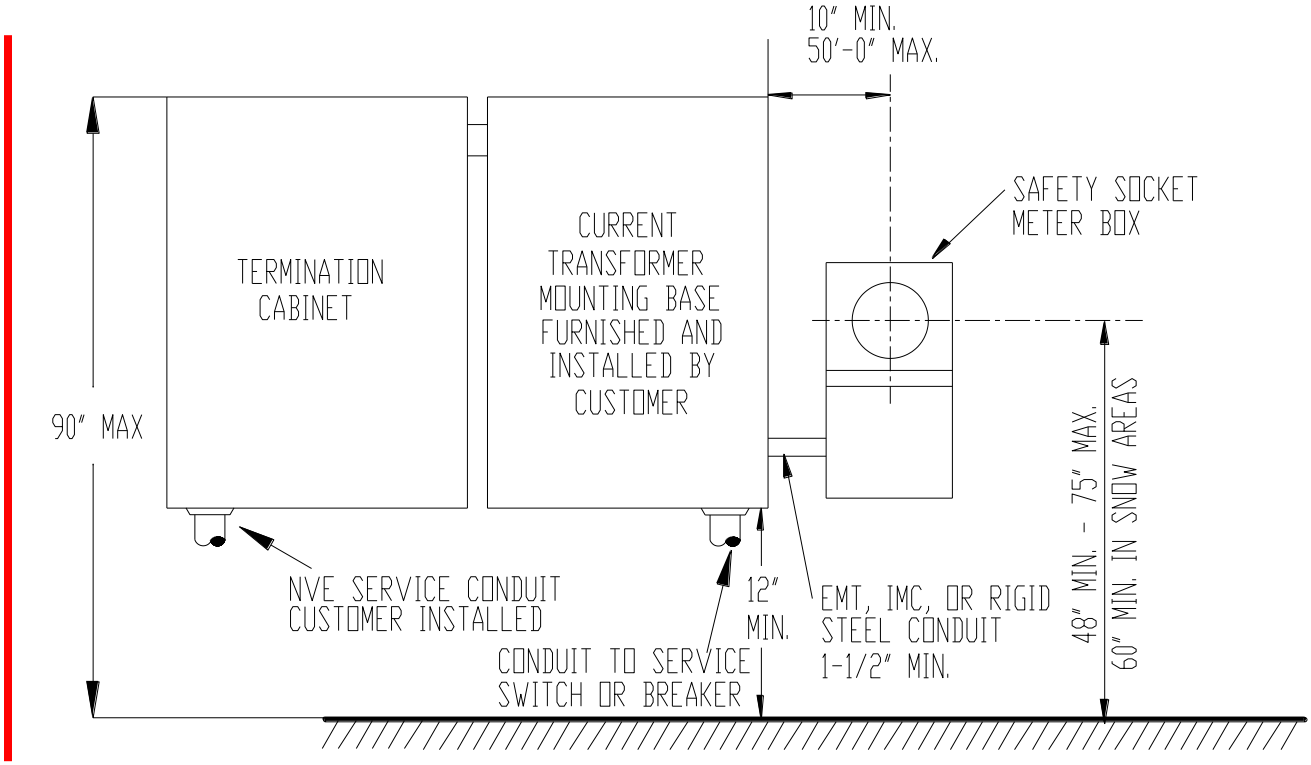
For single overhead irrigation service which is to be metered using current transformers, the customer shall furnish, install, own and maintain a separate current transformer cabinet and safety socket meter box and required service entrance conductors, conduit and weather head to the point of attachment of NVE's overhead service. The bussed current transformer cabinet is also acceptable for this application. Equipment shall conform to EUSER C Standards.

The customer shall furnish lugs and connect his service entrance conductors to the line and load sides of the current transformer mounting base.

The customer's neutral conductor shall be continuous without splice through the current transformer cabinet.

For dimensions of **current transformer cabinet, see page 17.**
For dimensions of **safety socket box, see page 18**.
Three phase four wire service a mounting bracket for three CT's is required.
Three phase three wire service is not offered.

400 - 800 AMPERE UNDERGROUND FEED



NOTES:

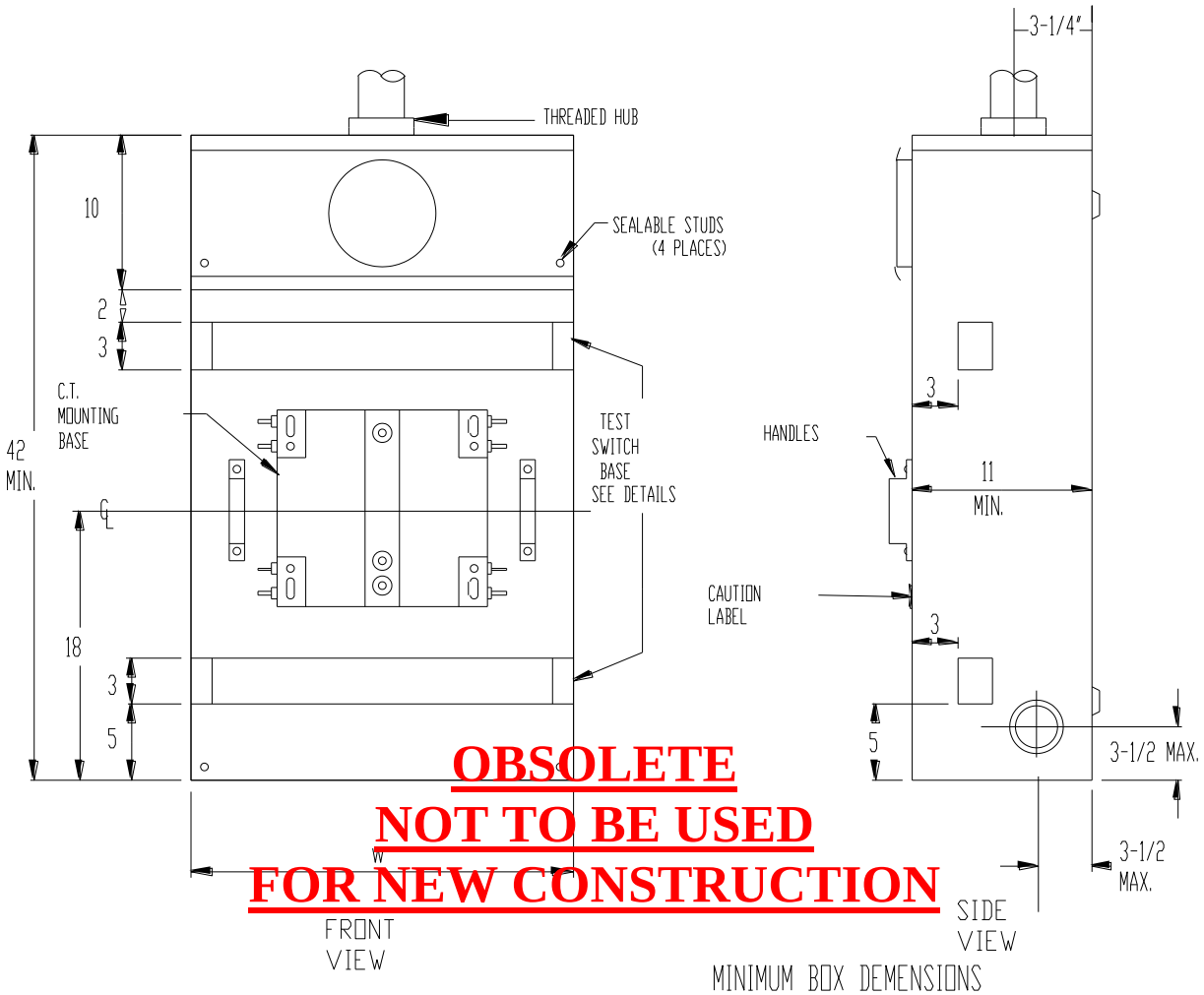
1. For service larger than 800 Amps, consult the local NVE office.
2. For a single underground irrigation service, which is to be metered using current transformers, the customer will furnish, install and maintain a service termination cabinet, current transformer cabinet and safety socket meter box as shown above. Equipment shall conform to EUSER C Standards.
3. For compactness of equipment, aesthetics and cost, it may be desirable to consider the installation of a switchboard service section.
4. NVE will pull and terminate its service conductors directly on the service termination facilities in the service termination cabinet. It shall be the customer's responsibility to provide the all wiring/terminations on the load side of the service termination cabinet.
5. For dimensions of **current transformer cabinet, see page 17.**
6. For dimensions of **safety socket box, see page 18**.
7. For dimensions of **service termination cabinet, see page 19.**
8. For three phase, four wire service, a mounting bracket for three CT's is required.
9. Three phase, three wire service is not offered.

10. Customer is responsible for providing and installing service entrance conductors, periscope and grounding conductors. Service entrance conductor ampacity and insulation material must conform to the requirements of NEC Article 310. Grounding conductors must conform to NEC Article 250.
12. The service entrance conductors shall be sized according to NEC requirements to meet the rating of the main service equipment, but, in no-case, shall be less than #8 AWG.
13. Maximum horsepower for single and grouped motors is based on the National Electrical Code for Motor Circuit Conductors, Article 430, Part M (Table 1).

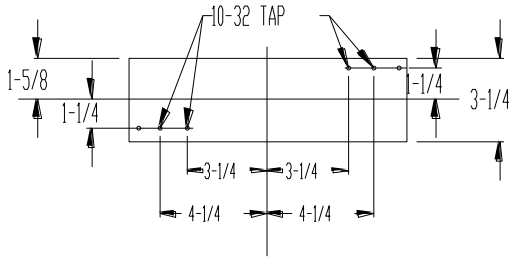
TABLE 1

SERVICE VOLTAGE	MAXIMUM HORSEPOWER (3) SINGLE OR GROUPED MOTORS	METERING EQUIPMENT MAXIMUM CONTINUOUS DUTY AMPACITY	TYPE METER EQUIPMENT (1) (2) REQUIRED
480 GrdY/277 Volts, 3 phase, 4 wire	60 HP SINGLE OR GROUPED	100 AMPERES	7-JAW BUSED SAFETY-SOCKET METER BOX
	125 HP SINGLE OR GROUPED	200 AMPERES	
	150 HP SINGLE OR GROUPED	400 AMPERES	COMBINATION METER, CURRENT TRANSFORMER AND SERVICE TERMINATION CABINET WITH 13-JAW SOCKET AND CT MOUNTING BASE

201 - 400 AMPERE COMBINATION METER AND CT CABINET FOR OVERHEAD SERVICE



OBSOLETE
NOT TO BE USED
FOR NEW CONSTRUCTION

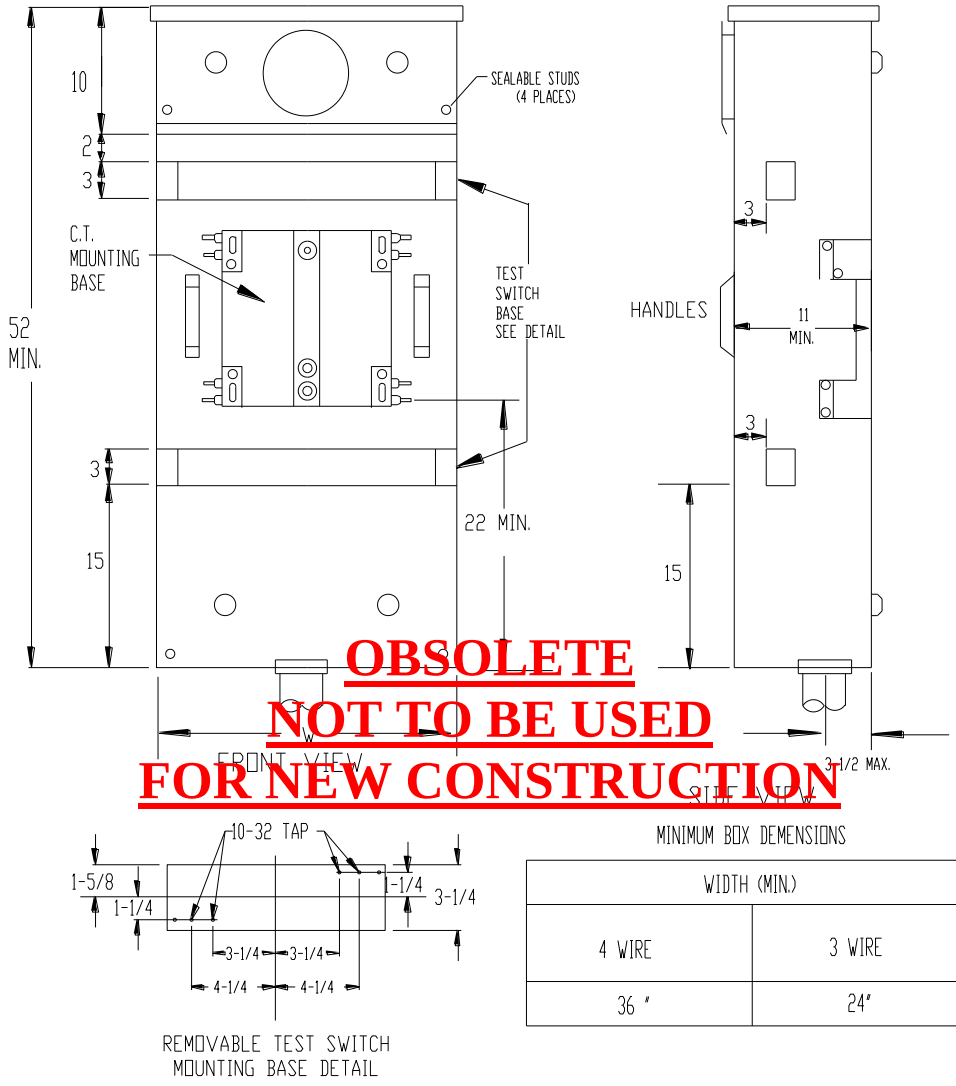


REMOVABLE TEST SWITCH MOUNTING BASE DETAIL

MINIMUM BOX DEMENSIONS

WIDTH (MIN.)	
4 WIRE	3 WIRE
36 INCHES	24 INCHES

201 - 400 AMPERE COMBINATION METER AND CT CABINET FOR UNDERGROUND SERVICE



OBSOLETE
NOT TO BE USED
FOR NEW CONSTRUCTION

REMOVABLE TEST SWITCH MOUNTING BASE DETAIL

MINIMUM BOX DEMENSIONS

WIDTH (MIN.)	
4 WIRE	3 WIRE
36 "	24"

NOTES:

1. Removable test switch perch shall be drilled and tapped the same as the removable plate.
2. All securing screws shall be captive. All panels and covers shall be sealable.
3. When exposed to weather, cabinet shall be rain-tight.
4. Provisions shall be made for bonding a neutral to the enclosure.
5. Provisions shall be made in the current transformer compartment for an insulated, bondable termination of NVE's neutral when required, and for the third phase of a three-wire, three-phase service.
6. **Cabinet shall not be used as a splicing chamber.**

CURRENT TRANSFORMER CABINETS (SEE TABLE BELOW)

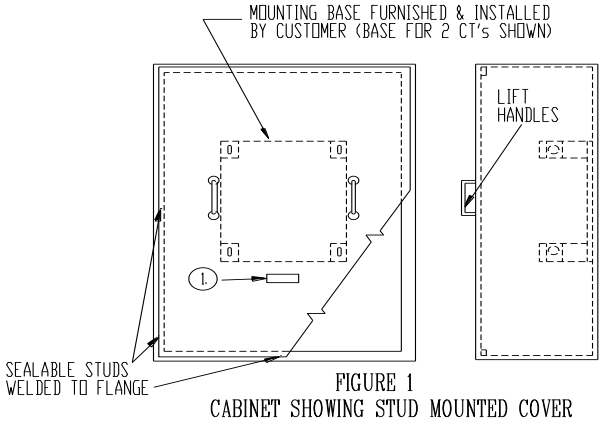


FIGURE 1
CABINET SHOWING STUD MOUNTED COVER

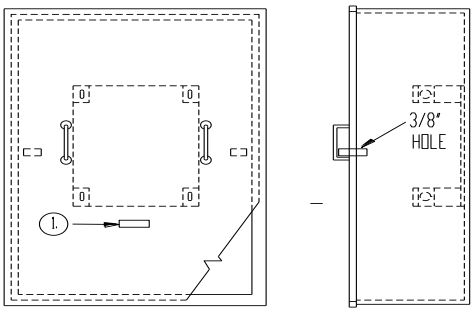


FIGURE 2
CABINET SHOWING FLANGED COVER FASTENED BY SEALABLE RIVIT LATCHES

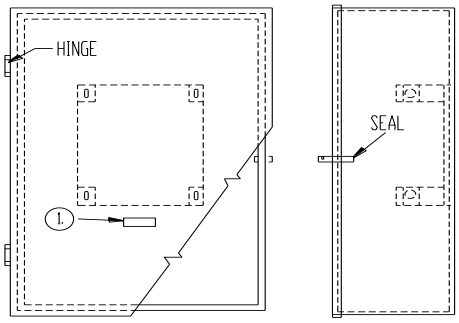


FIGURE 3 HINGED, FLANGED COVER

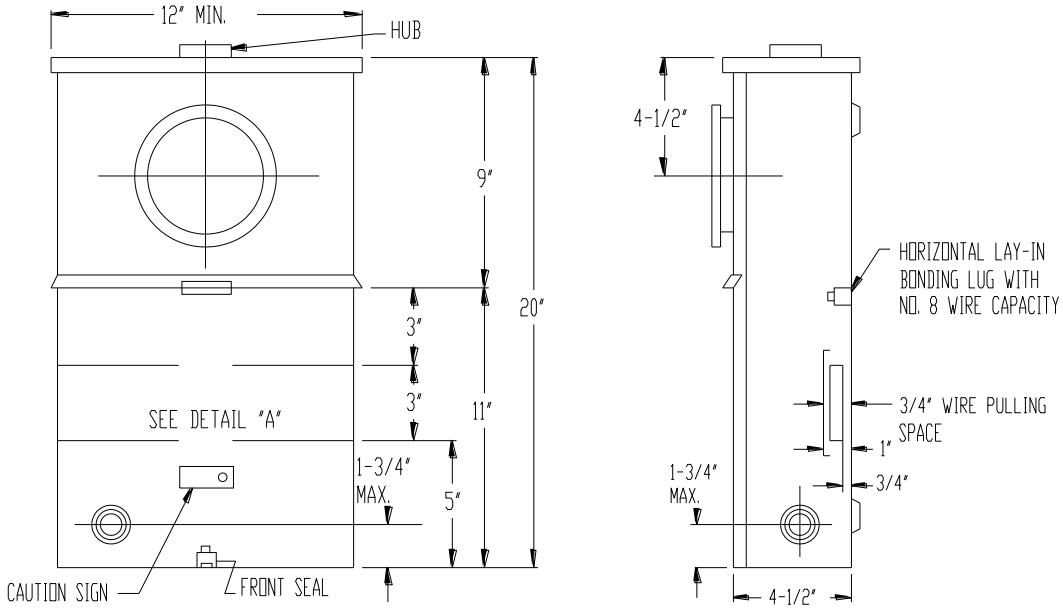
1. CAUTION SIGN

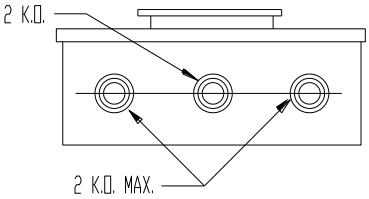
TABLE 2: (minimum cabinet size)			
TYPE OF SERVICE	**400 AMP CABINET SIZE**	**800 AMP CABINET SIZE**	**MOUNTING BASE**
4 WIRE	30” W x 36” H x 11” D	36” W x 48” H x 11” D	3 CT

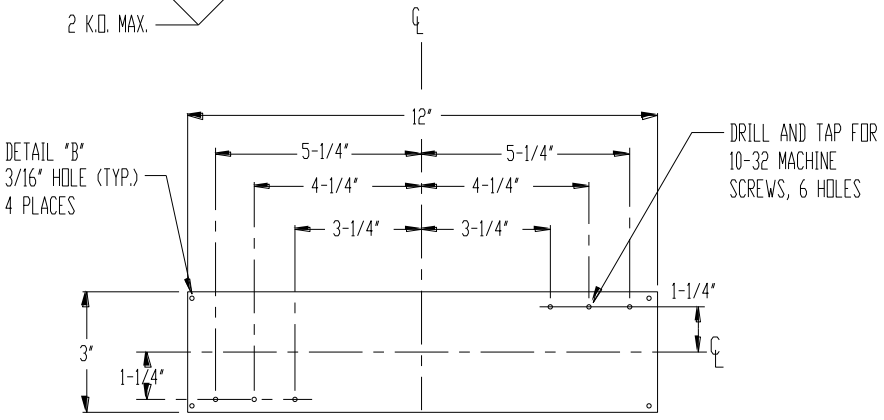
NOTES:

1. Cover shall be sealable and hinged
2. Customer shall furnish lugs and connect cable to current transformer mounting base for load side only.
3. **Current transformer cabinet shall not be used as a splicing chamber**.
4. When exposed to weather, cabinet shall be rain-tight.
5. Grounding lug(s) shall be provided and secured to CT cabinet.
6. See CM0001M, Volume 17, Section 8.0 for CT base details.

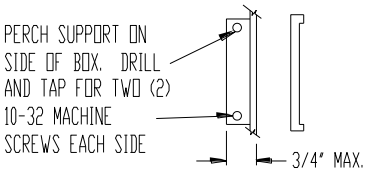
SAFETY SOCKET METER BOX







DETAIL "A"
REMOVABLE TEST BLOCK PERCH



DETAIL "B"

SERVICE TERMINATION CABINET

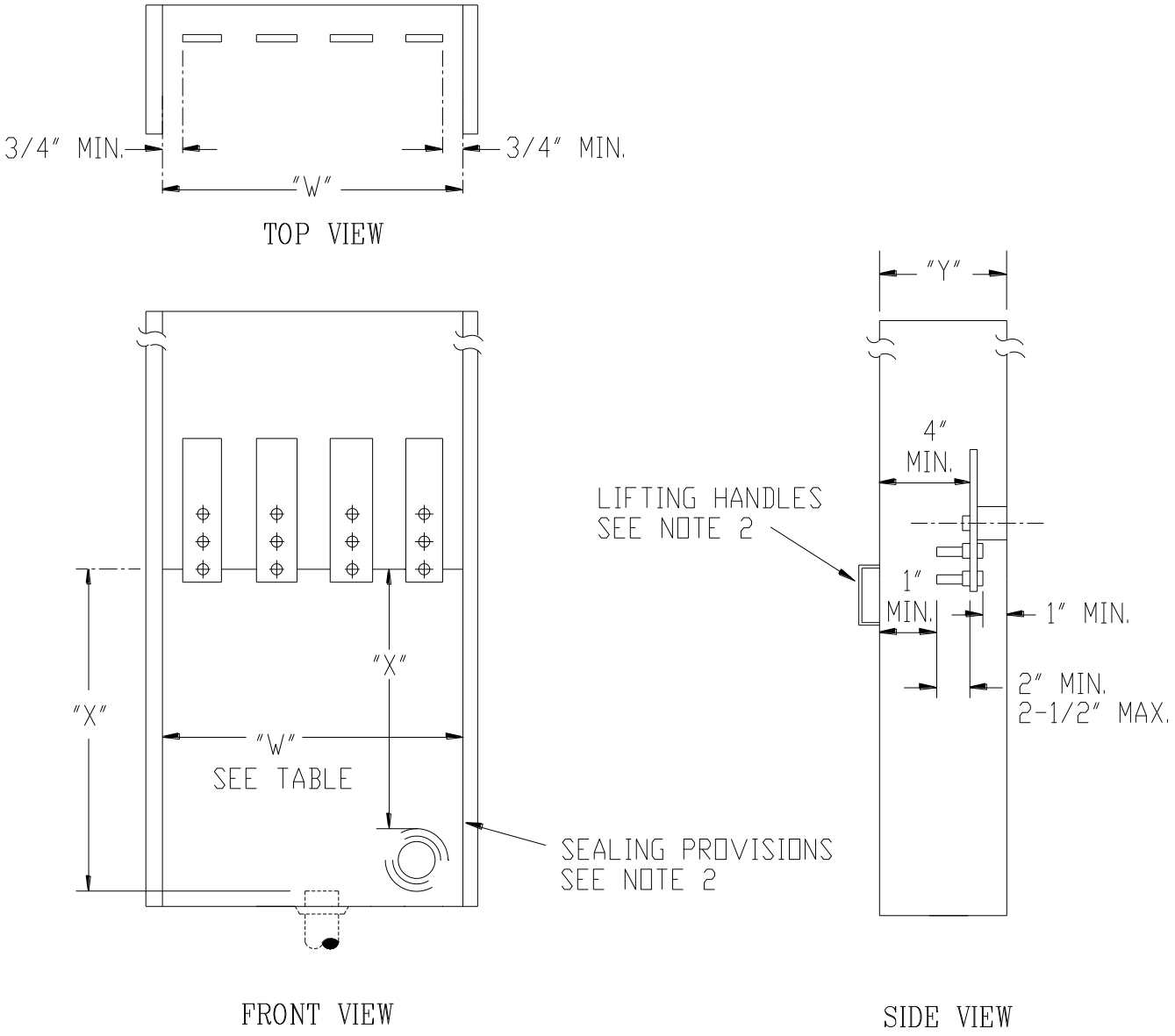


TABLE 3: (minimum pullbox dimensions)			
SERVICE AMPACITY	**W"**	**Y"**	**X"**
201 - 400	14"	6"	22"
401 - 800	22"	11"	26"

NOTES:

1. The above minimum dimensions are for the case where conduit enters the bottom of the pull box and all load conductors exit above the terminals. Where the service conduit enters from the side/back (bottom conduit entrance is preferred) of the pull box, the "X" dimension shall be taken from the closest portion of the conduit to the nearest termination bolt. The minimum pull box access opening (W), is measured between the left side and right side return flanges.

2. Pull box covers shall be removable, sealable, provided with two lifting handles, and limited to a maximum size of 9 square feet in area. Sealing provisions shall consist of two drilled stud and wing-nut assemblies on opposite sides on the panel. All securing screws shall be captive.

3. Terminating facilities for service supply conductors shall be two 1/2" steel bolts (NEMA standard) as shown. One set shall be provided for terminations rated up to 400 amperes, two sets of bolts for terminations rated 401-800 amperes.

4. Service larger than 800 Amps requires a switchboard. Contact the local NVE office for details.

5. **Terminating facilities shall be braced/secured to prevent turning or bus misalignment when the cables are installed.**

5. The fault duty rating must match or exceed the panel rating.