

# UNDERGROUND ELECTRIC RESIDENTIAL SERVICE

## 1.0 INDEX

- 1.0 INDEX
- 2.0 PURPOSE
- 3.0 LIMITS
- 4.0 CUSTOMER RESPONSIBILITY
- 5.0 NVE RESPONSIBILITY
- 6.0 LOCATION OF TERMINATION FACILITIES
- 7.0 UNDERGROUND SERVICES FROM UNDERGROUND DISTRIBUTION
- 8.0 UNDERGROUND SERVICES FROM OVERHEAD DISTRIBUTION
- 9.0 PERMANENT U/G SERVICE FROM A METER PEDESTAL
- 10.0 PERMANENT U/G SERVICE ON A WOOD POST
- 11.0 TERMINATION FACILITIES
- 12.0 TRENCHING

## 2.0 PURPOSE

The purpose of this standard is to assist the customer and his engineer and/or contractor in planning for an acceptable location and type of termination for underground service from NVE's overhead or underground electric distribution system.


## 3.0 LIMITS

The requirements in this standard are limited to single or multiple dwelling residences with a maximum of 1000 Amp, single phase service entrances. In areas where NVE establishes and maintains an underground distribution system or where required by local ordinances, service laterals will be underground only. If the length of service is such that it would prove electrically prohibitive, a transformer may be required on the customer's property; in which case, NVE's underground line extension rules will be applied.

## 4.0 CUSTOMER'S RESPONSIBILITY

See NEC, Article 700, NVE Standard, RM0001M, Metering Section and NVE Standard ENG04U, Vol. 5, for generator transfer switch requirements.

The customer is required to provide and maintain or to make arrangements and pay for the trench excavation, backfill, conduits with pull lines and any required substructures (pull boxes or vaults) and transformer pads on his property in accordance with NVE specifications. See notes in Section 7.0, 9.0 & 10.0.

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		US0001M
				UNDERGROUND ELECTRIC RESIDENTIAL SERVICE		
Drawn:	Eng:	Appr:	Date:			Revision: 13
RN	MB	DA	11/17			Page 1 of 11

Prior to backfilling trench, NVE must inspect service conduit in the trench to confirm installation and backfill material. Please contact local NVE office to schedule inspection. The customer will provide all easements and right of ways to install NVE facilities. It is the customer’s responsibility to install service equipment with proper grounding in accordance with provisions of the National Electric Code.

**5.0 NVE RESPONSIBILITY**

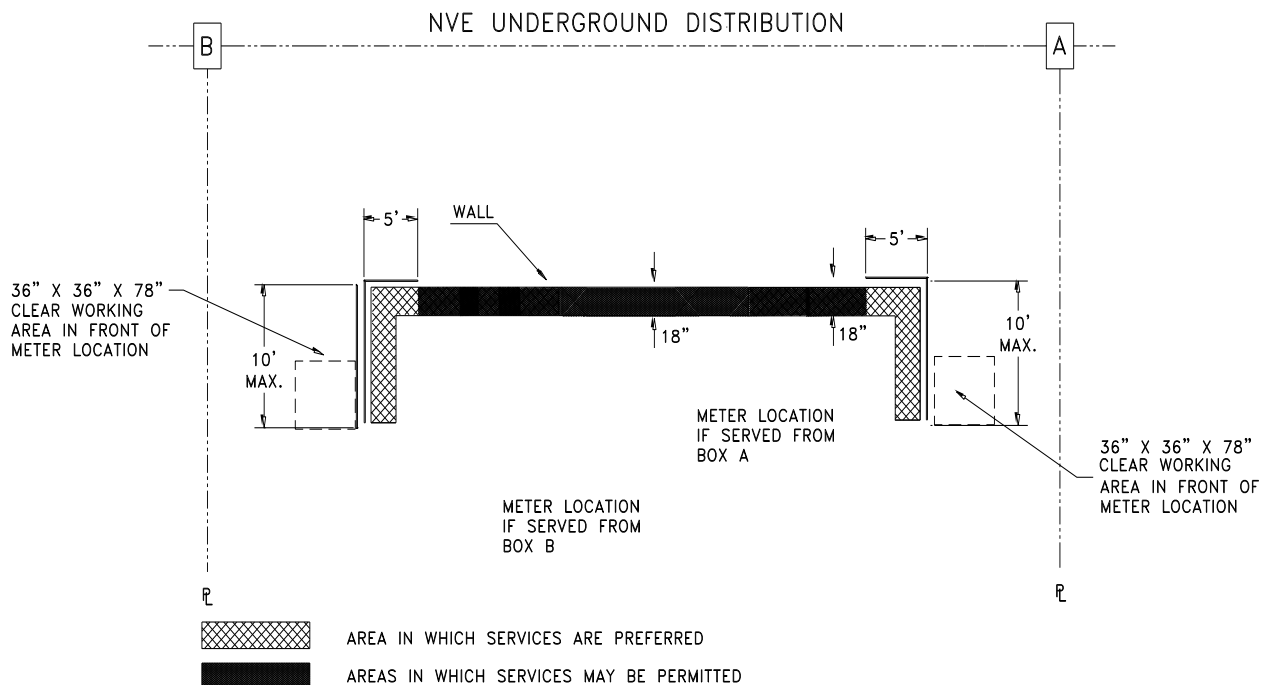
NVE will furnish (subject to the provisions of Rule 9), install, and maintain all cables from NVE's service connection point, (last box, pole or transformer), to the customer's service termination point.

**6.0 LOCATION OF TERMINATION FACILITIES**

NOTE: All service locations must be approved by NVE. Installation of additional facilities or future relocation at the customer's expense may be prevented by early consultation with NVE.

**The customer shall provide service termination or meter facilities within the first 10' of structure. The service location must not be fenced or otherwise obscured from view of meter readers or the access of operations personnel. Where NVE allows the meter facilities to be fenced, the customer shall provide a means for direct access by NVE personnel (i.e., easily opened, unobstructed gate).**

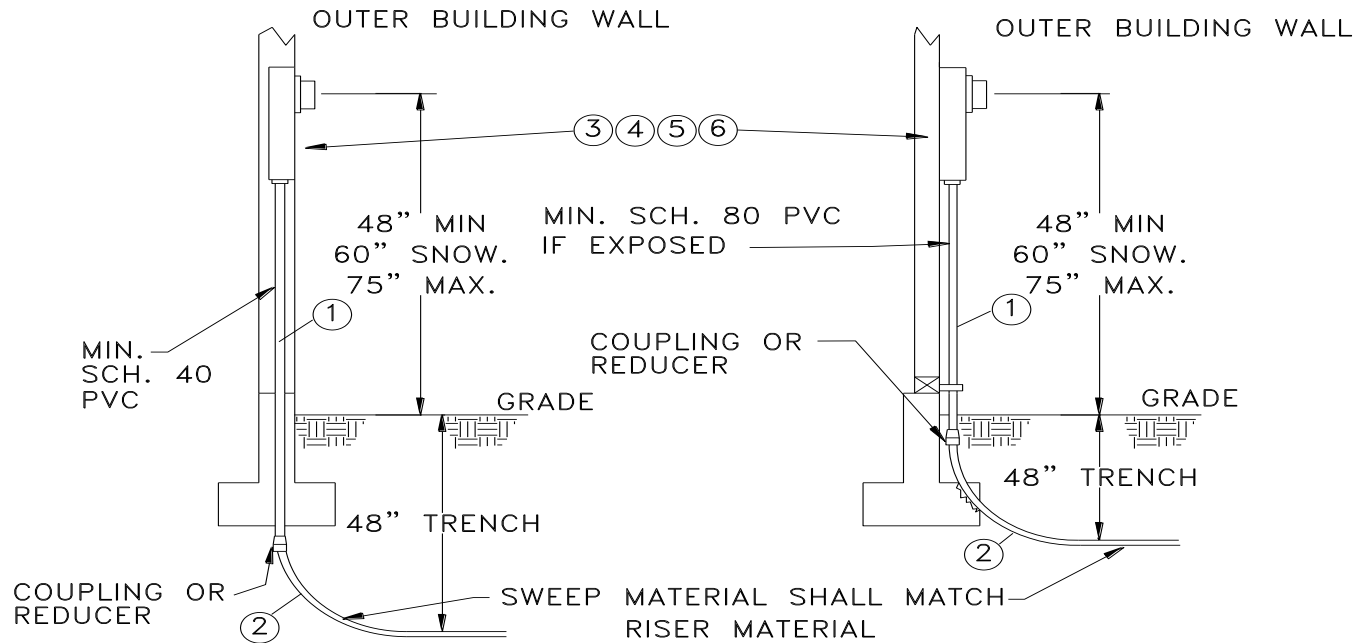
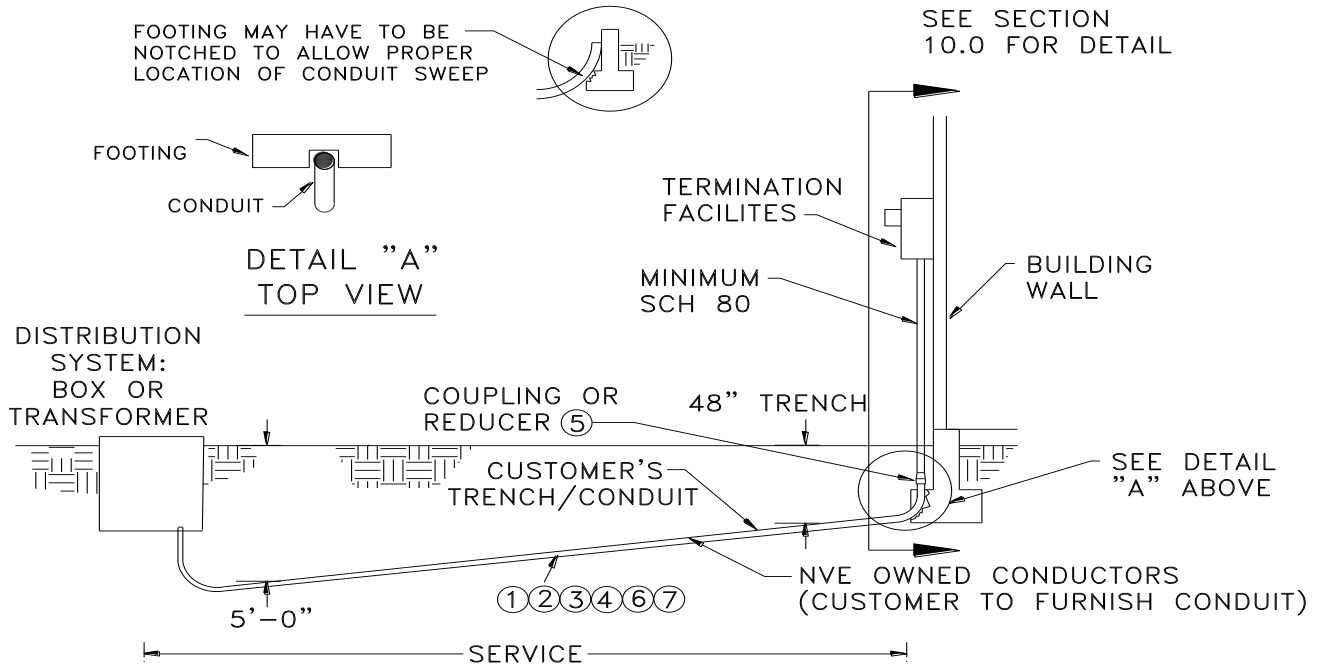
The customer for architectural reasons may conceal or recess the service entrance and meter panel where permitted by local codes. For detailed clearance requirements, see Section 5.2 of GM0001M, Electric Metering, General, Vol. 17, Section 8.




	VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD			US0001M								
	<p align="center"><b>UNDERGROUND ELECTRIC RESIDENTIAL SERVICE</b></p>											
<table border="1"> <tr> <td>Drawn:</td> <td>Eng:</td> <td>Appr:</td> <td>Date:</td> </tr> <tr> <td>RN</td> <td>MB</td> <td>DA</td> <td>11/17</td> </tr> </table>	Drawn:	Eng:	Appr:	Date:	RN	MB	DA	11/17				Revision: 13 Page 2 of 11
Drawn:	Eng:	Appr:	Date:									
RN	MB	DA	11/17									

**7.0 UNDERGROUND SERVICES FROM UNDERGROUND DISTRIBUTION SYSTEM**

The customer will be served with an underground service if his site or lot is located within an area that is supplied with existing underground distribution system or if required by local ordinances.



	VOLUME 17 - ENGINEERING & CONSTRUCTION STANDARD			US0001M
	UNDERGROUND ELECTRIC RESIDENTIAL SERVICE			
Drawn:	Eng:	Appr:	Date:	Revision: 13
RN	MB	DA	11/17	Page 3 of 11


**NOTES:**

1. Minimum conduit size shall be:

<u>Panel Size</u>	<u>Length of Service</u>	<u>Conduit Size</u>	<u>Wire Size</u>	<u>Maximum Distance*</u>
100 amp	All	3"	#2 Tx.	125'
200 amp	All	3"	2/0 Tx.	100'
400 amp	All	3"	350 Tx.	100'
600 amp	All	4"	750 Tx	Consult NVE
800 amp	All	2-3"	2-350 Tx	Consult NVE

\* Note: Maximum Distance (conduit) between panel and box or panel and transformer. If exceeding the distances additional boxes will be required. (See Section 8 for overhead service requirements.) The customer should consult with the local NVE representative to confirm the required service conduit size and distances prior to commencing construction. For additional conduit sizing details, refer to CB0003U, 600V Underground Cable and Conduit Selection Guide, Vol. 17, Section 4.

2. Maximum service distance and conduit bends are to be determined by the local customer service planner or inspector. Contact the local NVE office for an acceptable layout.
3. Underground conduit must be rigid steel, or electrical, gray, PVC (minimum ANSI/ASTM F512, DB-120). **DB-120 conduit can not be exposed.** For more detail, see CD0004U, Conduit Application Standard, Vol. 17, Section 4.
4. Minimum 36" radius sweep for 2" & 3" conduits. **Sweep material to match first section of riser material.** Example: PVC to PVC, steel to steel.
5. Reducers, when needed, shall be a tapered, smooth wall design to facilitate cable pulling. The preferred location for the reducer is at the conduit entrance at the bottom of the panel. An alternative location is below grade, at the **top** of the elbow below the service termination equipment.
6. A 1/4" polyester, pull line with sequential footage markings and minimum breaking strength of 400 pounds to be installed in each conduit by customer at time of conduit installation.
7. Pull line shall extend 3 feet from the conduit end at the service panel, and 5 feet from the conduit at the secondary service box.
8. A **36"x 36"x 78"** working space in front of all meters is required to permit installation and provide a safe working environment for NVE personnel. **Very limited exceptions from this requirement must be approved by NVE.**


	VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD			US0001M
	UNDERGROUND ELECTRIC RESIDENTIAL <b>SERVICE</b>			
Drawn:	Eng:	Appr:	Date:	Revision: 13
RN	MB	DA	11/17	Page 4 of 11

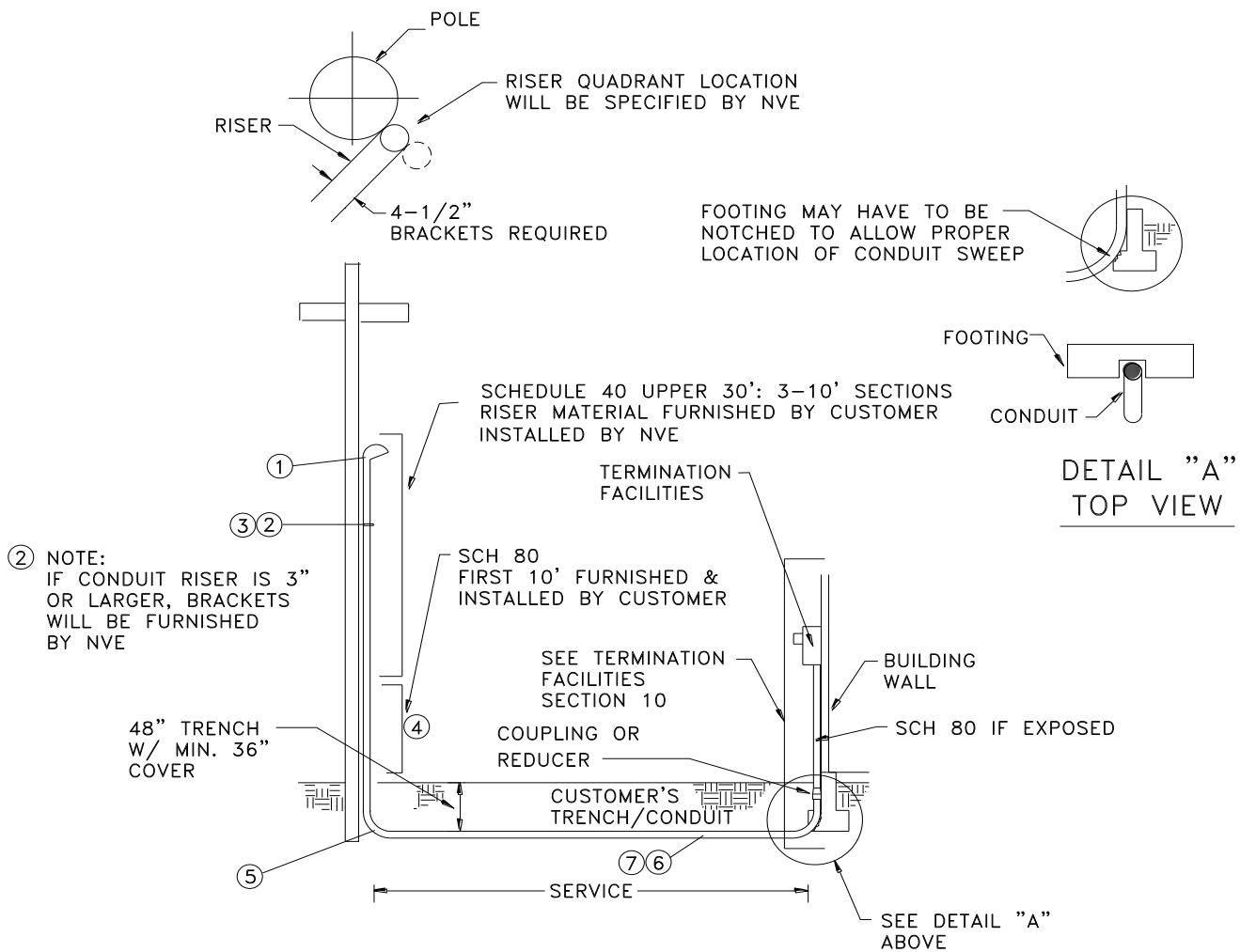
**8.0 UNDERGROUND SERVICE FROM OVERHEAD DISTRIBUTION SYSTEM**

If the customer is located in an area served by an overhead system and prefers to have the service installed underground, or if the local ordinance requires underground service, the service may be provided by means of a riser installed on an existing pole. Customer shall contact local NVE office for trench and riser requirements regarding location on pole.

**NOTES: (Customer to provide and install)**

1. Provide a clamp-on (bolted) weatherhead and upper sections of conduit 3-ten foot sections (see drawing below). Steel is not allowed in the upper sections.
2. Minimum Schedule 40 PVC electrical, gray, conduit. Straps, every 30". If conduit riser is 3" or larger, standoff brackets will be provided and installed by NVE.
3. Rigid steel or Schedule 80 PVC electrical, gray, conduit for the first 10' above ground.
5. Minimum 36" radius sweep for 2" and 3" conduits. **Sweep material to match first section of riser material.** Example: PVC to PVC, steel to steel.
6. Minimum ANSI/ASTM F512, DB-120 electrical, gray, w/ a 1/4" polyester, pull line with sequential footage markings and minimum breaking strength of 400 pounds to be installed by customer. **DB-120 conduit cannot be exposed.**
7. If service is over 75' in length from pole weatherhead, a 17"x30" box may be required at/near the base of pole (see VB0052U).


				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		US0001M
				<b>UNDERGROUND ELECTRIC RESIDENTIAL SERVICE</b>		
Drawn:	Eng:	Appr:	Date:			Revision: 13
RN	MB	DA	11/17			Page 5 of 11



## 9.0 PERMANENT U/G SERVICE FROM A METER PEDESTAL

### GENERAL INSTALLATION PROCEDURES


1. This section outlines the general procedures to follow for installing an electric service meter pedestal.
2. The developer/owner obtains NVE's approval on utility layout prior to construction. **NVE will designate the service locations.**
3. The developer/owner provides all trenching, excavation and backfill in accordance with NVE's standards.
4. Any service conduit/pipe is provided and installed by developer/owner as specified by NVE.

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		US0001M
				UNDERGROUND ELECTRIC RESIDENTIAL SERVICE		
Drawn:	Eng:	Appr:	Date:			Revision: 13
RN	MB	DA	11/17			Page 6 of 11


5. The developer/owner backfills trench to the level of joint utility before joint facilities are installed.
6. The developer/owner in the general sequence listed below, will install the electrical grounding system at the meter pad, the meter pedestal and the electric line from the meter pad to the home.
  - A. Install the electrical ground and bare copper grounding conductor. The grounding conductor shall not be connected to the gas pipe system.
  - B. Install the customer electric line (or conduit) from meter pad location to home connection point.
  - C. Install the gas service house line if required.
  - D. Remove the pull section panel of meter pedestal to allow service cable to extend through pedestal. Carefully place the pedestal over NVE’s electric conduit and customer’s electric conduit. Position meter pedestal as required and plumb and level pedestal. See Details #6A, #6B, #6C, and #6D.
  - E. Backfill the installation and compact meter pad subgrade to 90%. Form and pour the concrete pad. The concrete pad should extend approximately two inches above finish grade.
  - F. Connect the grounding conductor to the accessible grounding lug inside the pedestal. Ground the pedestal by connecting the accessible grounding lug to the neutral service terminal landing lug.
  - G. Connect the customer’s electric line.
  - H. Call for city/county inspection of electric and gas installation, as required.
7. Upon approval by inspecting authority, NVE will connect the electric service conductors to the landing lugs in the meter pedestal, install and seal the pull section panel, and blank off and seal the meter socket ring.
8. NVE will set the electric meter upon application for service.

**METER PEDESTAL SPECIFICATIONS**

1. The meter pedestal shall have a minimum rating of 100 amperes and ***shall face the street or point of access***. Construction, material, corrosive-resistant finish shall be approved by the Underwriters Laboratory (UL).
2. The meter socket base shall be UL recognized and provided with a sealing ring. The socket shall be factory-wired with the conductors in a separate or barriered raceway from the utility’s terminating lugs to the meter socket. These conductors shall be inaccessible from the main disconnect and power outlet section. The conductors which extend to the meter socket shall be connected at the utility’s terminating lugs independently of the connection for the customer’s conductors. The minimum meter height is 36” above grade line when the meter is enclosed, or 48” minimum if exposed.

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		US0001M
				<b>UNDERGROUND ELECTRIC RESIDENTIAL SERVICE</b>		
Drawn:	Eng:	Appr:	Date:			Revision: 13
RN	MB	DA	11/17			Page 7 of 11

3. The customer’s main disconnect and power outlet section shall have barriers installed to prevent access to the utility’s cable pull and terminating section and to unmetered conductors which connect to the socket.
4. The utility’s cable pull and terminating section shall be covered with a sealable and removable panel or panels, extending from 2" to 6" above grade, and when removed, give full access to the utility’s terminating lugs. Access to the terminating lugs may be from either the front or the rear of the post. Access shall not be restricted by load conduits or raceways.
5. A minimum 12” opening shall be maintained from the terminating lugs to any fixed panel below the lugs. The minimum lug height is 18” above grade line; the maximum is 48”. The terminating lugs shall be twin No. 2 to 350 KCM aluminum bodied pressure type for connection of the service lateral conductors. The space between terminating lugs, from lugs to sides of post, or from lugs to panel above shall be 1½" minimum. Rigid insulating barriers are required and shall project ¼" minimum beyond any energized parts if this space is less than 1½". Terminating lugs may be positioned either in-line or staggered. The neutral terminating lug shall be bondable to the post.
6. An accessible grounding lug shall be provided for a minimum #6 to 1/0 AWG grounding conductor.
7. The post shall have a minimum cross sectional dimension of 4” x 8” inside diameter. A fixed panel shall extend 2" minimum and 5" maximum above grade, and 18” minimum below grade.
8. The minimum depth of the post in the ground shall be 24” with openings at the base to permit the service lateral conduit or conductors to sweep into the post.
9. A moisture barrier, located below all terminals and other live parts, or adequate ventilation, shall be provided to inhibit the condensation of moisture.
10. For authorization to attach telephone and cable TV termination facilities, consult NVE.
11. Local codes must be followed for grounding requirements. Lugs for terminating the users ground wire (per A & B below), shall be located outside of the sealable termination section. This may be achieved by being located in a barriered raceway or installed on the outside of the meter pedestal. A minimum ground shall consist of a continuous bare copper grounding conductor extending from the neutral service terminal landing lug to a grounding electrode, which may be either:
  - A. UFER type ground as per National Electric Code, Article 250-66.
  - B. Metallic underground water piping system (not gas) with a minimum buried portion of 10'. If the buried portion of the metallic water piping system is less than 10' in length, it shall be supplemented with a 5/8” x 8’ copper clad ground rod.

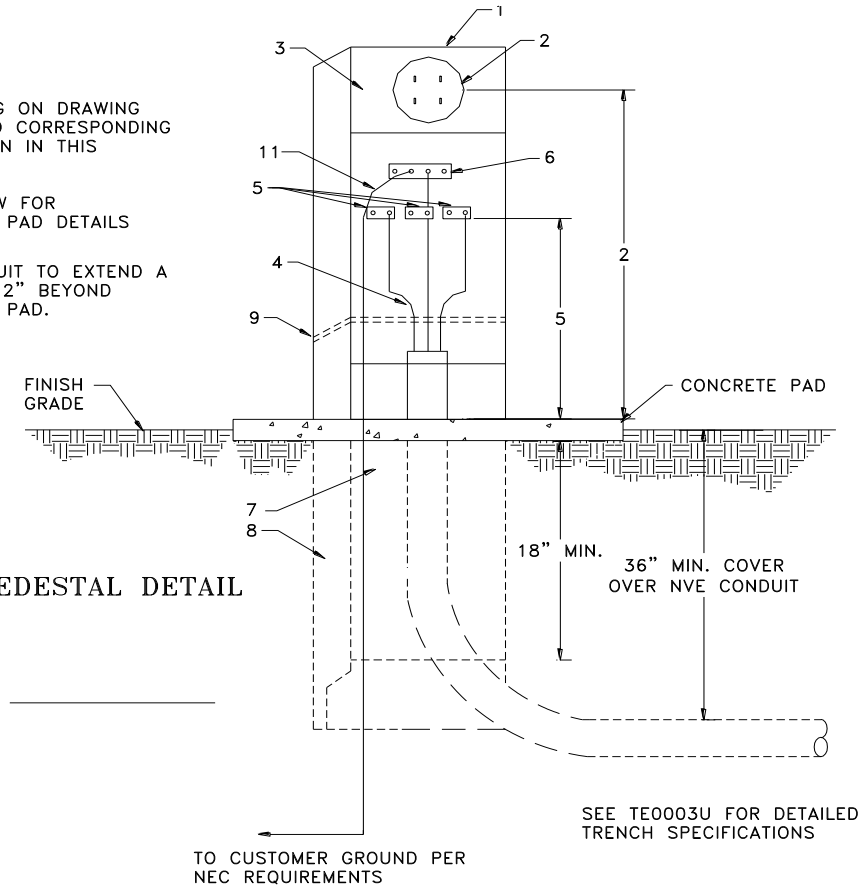
	VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD			US0001M
	UNDERGROUND ELECTRIC RESIDENTIAL SERVICE			
Drawn:	Eng:	Appr:	Date:	Revision: 13
RN	MB	DA	11/17	Page 8 of 11



NOTES:

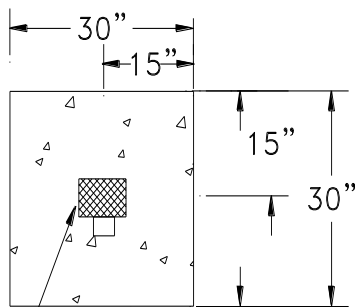
- A. NUMBERING ON DRAWING REFERS TO CORRESPONDING SUBSECTION IN THIS STANDARD.
- B. SEE BELOW FOR CONCRETE PAD DETAILS
- C. ALL CONDUIT TO EXTEND A MINIMUM 12" BEYOND CONCRETE PAD.

METER PEDESTAL DETAIL



SEE TE0003U FOR DETAILED TRENCH SPECIFICATIONS


PAD DETAIL



ELECTRIC METER PEDESTAL

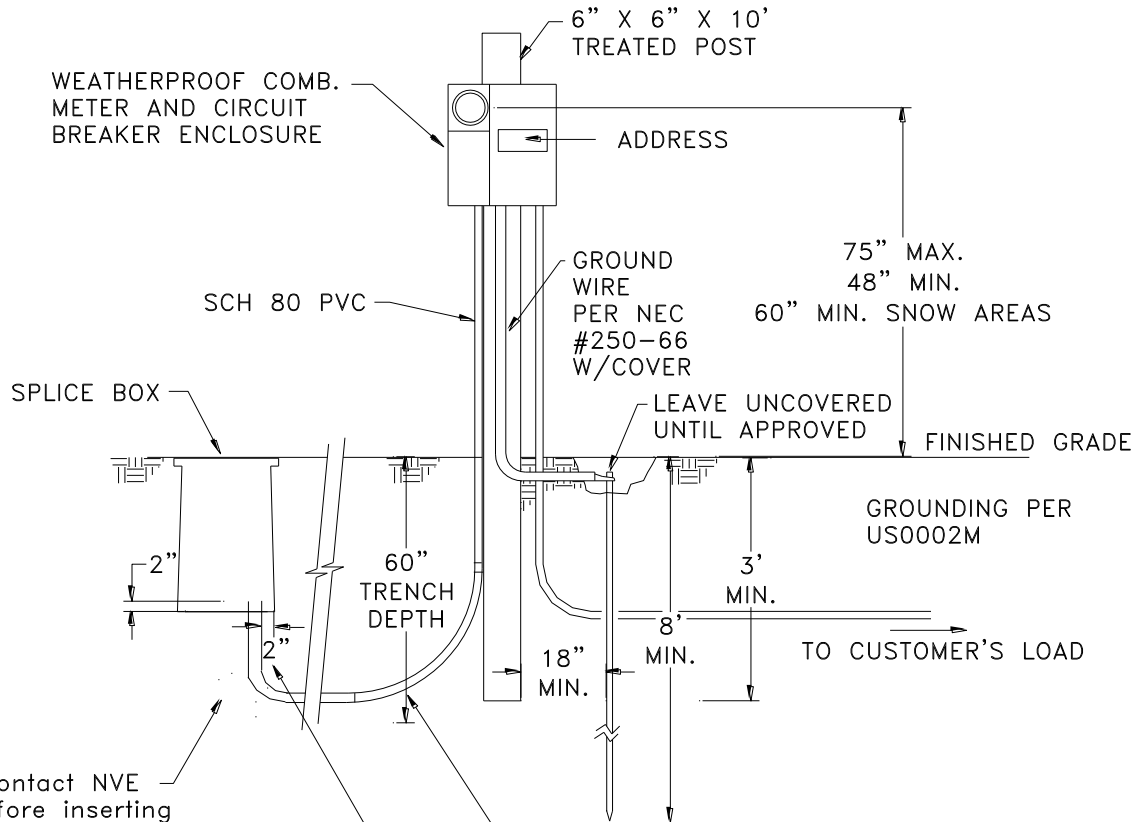
CONCRETE PAD

PAD is 4" THICK REINFORCED WITH 6"X6" 10/10 STEEL MESH

	VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD			US0001M
	UNDERGROUND ELECTRIC RESIDENTIAL SERVICE			
Drawn:	Eng:	Appr:	Date:	Revision: 13
RN	MB	DA	11/17	Page 9 of 11

**10.0 PERMANENT U/G SERVICE ON A WOOD POST**


*An approved manufactured steel pedestal is the preferred construction* but a terminating facility of 200 amps (maximum) single phase self-contained meter/service panel **attached to a 6" x 6" x 10' full length pressure treated wood or redwood post is acceptable. Posts/pedestals shall be located out of the way of vehicular traffic.**



CAUTION: Contact NVE inspector before inserting conduit into splice box.

Conduit will curve up into the bottom of the box. Box will not rest (touch) on conduit(s). 3' Minimum Sweep

Customer shall supply and install conduit with 1/4" pull tape. 3' Minimum Sweep  
 NVE secondary splice box normally located adjacent to sidewalk. Consult NVE for correct location and maximum distance.

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		US0001M
				UNDERGROUND ELECTRIC RESIDENTIAL SERVICE		
Drawn:	Eng:	Appr:	Date:			Revision: 13
RN	MB	DA	11/17			Page 10 of 11

**11.0 TERMINATION FACILITIES**


For detailed Meter Equipment Dimensions & Requirements, see RM0001M, Vol. 17, Section 8, Electric Metering Residential.

**NOTES: (Customer to provide and install)**

1. Conduit riser shall be minimum Schedule 40 PVC electrical, gray, conduit if recessed or minimum Schedule 80 PVC electrical, gray, conduit if exposed. For further details see CD0004U, Conduit Application Guide.
2. Minimum 36" radius sweep for 2" and 3" conduits. Sweep material to match first section of riser material. Example: PVC to PVC, steel to steel.
3. The socket and enclosure of termination point shall be specially designed to receive service cable from underground source. **Combination designed service panels are acceptable as long as they meet NVE requirements for underground feed.**
4. Termination enclosure (pull section) to include termination lugs located below meter socket.
5. A working space (36" x 36" x 78" high) in front of all meters is required to permit metering installation and provide a safe working environment for personnel.
6. The meter location will have an assigned address.

**12.0 TRENCHING**

See TE0003U, Vol. 17, Section 3, and your NVE representative for more detailed information.

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		US0001M
				<b>UNDERGROUND ELECTRIC RESIDENTIAL SERVICE</b>		
Drawn:	Eng:	Appr:	Date:			Revision: 13
RN	MB	DA	11/17			Page 11 of 11