UNDERGROUND SERVICE

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UNDERGROUND SERVICE

GENERAL

The consumer must install an approved underground type service entrance which provides a pull section or is bussed for bottom connections.

In cases where the consumer requests the Cooperative to install an underground service from existing overhead lines, such installations will be made provided the existing overhead facility has space available for underground termination equipment.

The consumer should check with the Cooperative's Engineering Department or nearest Area Service Representative prior to planning a service of this type. The Cooperative will furnish and install service drop conductors to the consumers service entrance equipment.

The Cooperative reserves the right to determine meter location(s) and which pad-mount transformer or secondary pedestal the meter will be served from.

The consumer must provide all trenching work as specified in the Trenching Portion of this manual.

The consumer will be required to furnish a concrete pad poured in place including necessary conduits for all installations requiring a three-phase pad-mounted transformer, per specifications supplied by the cooperative.

If service conductors in conduit are to be paralleled, they shall be paralleled in separate conduits. Paralleling underground conductors in one conduit is not allowed.
UNDERGROUND RISER REQUIREMENTS

RISER MATERIAL

Underground risers shall be of rigid metallic or intermediate metallic conduit (IMC) and listed or rated for their intended use. Only true round cross section risers will be acceptable.

Riser shall not be cut with a torch, welded or brazed.

OPTIONAL RISER MATERIAL

In situations where riser will be mounted externally to a structural wall and will also be completely enclosed by a permanent skirt of wood, stucco or block, it may be of Schedule 80 rigid plastic conduit.

Installation shall be so riser is completely protected from weather, sunlight, and mechanical damage above grade. Schedule 80 PVC conduit shall be secured to pull section with threaded PVC adapter.

NOTE: Underground Risers that are inside a structural wall must be IMC or rigid metallic conduit.
METALLIC RISER COATING

Rigid metallic risers, conduits and fittings installed underground or in concrete shall be factory coated or half wrapped to a minimum 40 mil thickness with an approved 20 mil plastic tape suitable for direct burial to a minimum of 6 inches above grade.

UNDERGROUND RISER REQUIREMENTS

RESIDENTIAL SINGLE PHASE U.G. RISER SIZE

<table>
<thead>
<tr>
<th>SES Rating</th>
<th>Riser Trade Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-200A</td>
<td>2”</td>
</tr>
<tr>
<td>*400A</td>
<td>3”</td>
</tr>
<tr>
<td>*600A</td>
<td>4”</td>
</tr>
</tbody>
</table>

*Includes multi-meter paks for multi-family residential installations

COMMERCIAL SINGLE PHASE U.G. RISER SIZE

<table>
<thead>
<tr>
<th>SES Rating</th>
<th>Riser Trade Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-200A</td>
<td>2”</td>
</tr>
<tr>
<td>400A</td>
<td>4”</td>
</tr>
<tr>
<td>600A</td>
<td>2-4”</td>
</tr>
</tbody>
</table>

COMMERCIAL AND RESIDENTIAL THREE PHASE U.G. RISER SIZE

<table>
<thead>
<tr>
<th>SES Rating</th>
<th>Riser Trade Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-200A</td>
<td>3”</td>
</tr>
<tr>
<td>400A</td>
<td>4”</td>
</tr>
<tr>
<td>600A</td>
<td>2-4”</td>
</tr>
<tr>
<td>800A</td>
<td>2-4”</td>
</tr>
<tr>
<td>1000A</td>
<td>3-4”</td>
</tr>
<tr>
<td>1200A</td>
<td>3-4”</td>
</tr>
<tr>
<td>1600A</td>
<td>4-4”</td>
</tr>
<tr>
<td>2000A</td>
<td>5-4”</td>
</tr>
<tr>
<td>2500A</td>
<td>6-4”</td>
</tr>
<tr>
<td>3000A</td>
<td>7-4”</td>
</tr>
</tbody>
</table>
RISERS FOR SERVICES INSTALLED IN CONDUIT

When service conduit is extended away from the service riser sweep, there are three methods of making the vertical to horizontal transition. They are listed in order of preference:

METALLIC RISER WITH SCH 80 RIGID PLASTIC 90 DEGREES SWEEP

1. No portion of plastic sweep including fittings, will be above finished grade.
2. A threaded steel to plastic fitting is installed at bottom of riser so that it will be below finished grade.
3. Where sweep runs horizontal it shall have 30” minimum cover.
4. Sweep will have 24” radius as a minimum and shall be of Sch 80 grade rigid plastic conduit.
5. Metallic riser sized per underground riser requirements.

METALLIC RISER COUPLED TO SCH 80 PVC 90° BEND FOR CONDUIT SYSTEM
(PREFERRED METHOD)
METALLIC RISER WITH 45° SWEEP AND SCHEDULE 40 RIGID PLASTIC WITH 45° SWEEP

1. A threaded steel to plastic fitting is installed to make transition from steel riser to approved rigid plastic 45° sweep.

Metallic 45° sweep and plastic 45° sweep to be minimum 24” radius. Where sweep runs horizontal, there shall be a minimum of 30” of cover.

2. Metallic riser sized per underground riser requirement.
METALLIC RISER WITH 90° SWEEP

1. A threaded steel to plastic fitting installed at bottom of metallic sweep to make transition from metallic to approved rigid plastic conduit, Where sweep runs horizontal, it shall have 30” minimum cover.

2. Metallic riser sized per underground riser requirements.

24" MIN RADIUS, METALLIC RISER WITH 90° BEND COUPLED TO A PVC CONDUIT SYSTEM

SERVICE CONDUIT REQUIREMENTS

MATEIRIAL FOR SERVICE CONDUIT

Material for Service Conduit shall be electrical conduit, labeled for wires rated 90 degrees C. Acceptable material shall be either schedule 40 or 80 PVC conduit and when
specified, IMC or rigid metallic conduit taped or coated for direct burial.

STEEL CONDUIT

All rigid or intermediate conduits and fittings shall be Hot-Dipped galvanized. Rigid or intermediate steel conduit shall be installed with threaded couplings and joints made up tight.

BENDS AND SWEEPS

Factory bent sweeps are preferred; however, field bent sweeps are acceptable if done properly.

A. Metallic--One Shot bending. Specified radius maintained. Internal diameter of conduit not effectively reduced.

B. Non-Metallic--Use of plugs at both ends. No direct flame heating. No evidence of scorching. Specified radius maintained.

TABLE OF APPROVED NON-METALLIC SERVICE CONDUIT

<table>
<thead>
<tr>
<th>Application</th>
<th>Acceptable Product Material</th>
<th>Conduit Marking Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight Conduit</td>
<td>PVC SCH 40 or SCH 80</td>
<td>Mfg. name, PVC, SCH 40, or SCH 80 size, NEMA TC-2 90°C wire code.</td>
</tr>
<tr>
<td>Bends, Sweeps and Elbows</td>
<td>PVC SCH 40 or SCH 80</td>
<td>Mfg. name, PVC, SCH 40 or SCH 80 size, NEMA TC-2, radius, degree of curvature, 90°C wire code.</td>
</tr>
<tr>
<td>Fittings</td>
<td>SCH 40 or SCH 80</td>
<td>Mfg. name, PVC, SCH 40 or SCH 80 size, NEMA TC-2 (marking may appear on packaging material)</td>
</tr>
</tbody>
</table>

USEABILITY OF CONDUIT

All conduit shall be free of obstructions, dirt, rock, etc. The conduit shall be clean and useable at the time the Cooperative installs conductors.
In all cases, the consumer is responsible for the usability of the conduit at the time the Cooperative installs conductors.

**CONDUIT PULL LINE**

The consumer will be required to install a pull line in all conduit runs containing one or more sweeps.

**TYPICAL SERVICE ENTRANCE INSTALLATION (U.G.)**

100 AMP—200 AMP SINGLE PHASE THREE WIRE (RESIDENTIAL)

**FRONT VIEW**

- **Notes:**
  - Underground service conductors and connections to service terminals provided by Cooperative.
  - This is the preferred installation for single family residential applications.
NOTES:

1. Neutral conductor from customer's distribution panel shall be code sized and shall extend into meter cabinet and be terminated on neutral landing lug.

2. Underground service conductors are provided by the cooperative.

3. All wire and equipment shall comply with the national electrical code.

4. For a 3Ø 4 wire delta service, the power phase (high leg) must be installed in the right hand (Cø) test block and meter socket positron and identified by an outer finish that is orange in color.
1. Pedestal shall be UL Listed and EUSERC approved. May be Used for temporary for construction.

2. Material of construction and corrosive-resistant finish shall be approved by a recognized testing laboratory.

3. Pedestal and meter socket shall have a minimum rating of 100 amperes. The socket shall be sealable and ring-type.

4. The socket shall be factory-wired with the conductors in a separate or barriered wireway from the service termination lugs to the meter socket. The conductors which extend to the meter socket shall be connected at the service termination lugs independent of the connections for the service lateral conductors.

5. Minimum meter height shall be 36" when enclosed or 42" when exposed. If the meter is enclosed, the enclosing cover shall be hinged for ready access. The metering cover shall have a demand reset cover which shall be hinged, lockable and constructed of steel with minimum dimensions of 6 inches wide by 6 inches high.

6. Pedestal and power outlet section shall be rated 10,000 A.l.C. minimum.

7. Service cable pull and termination section shall be covered with a sealable removable panel or panels, extending from 2" above grade, and when removed, give full access to the service termination lugs. Access to the service termination lugs may be either the front or the rear of the pedestal. (See note 18.)

8. Service termination lugs shall be twin #2 to 350 MCM aluminum bodied pressure hype for in and out connection of the service conductors.

9. Insulation barriers shall be required when spaces between the termination lugs are less than 1 ½" or less than 1 " to the sides of the pedestal.

10. The grounding electrode conductor shall be continuous to the neutral landing block in breaker compartment and
shall not pass through the service termination section or meter compartment. Bare copper conductor may be used if properly supported. Connect pedestal bond lug as shown.

11. Grounding shall be provided by the Customer in compliance with the N.E.C. Made electrodes shall have a resistance to ground of not more than 25 ohms.

12. The pedestal at grade line shall have a minimum cross-sectional dimension of 4” x 8”. A fixed panel for the final grade and concrete pour shall extend 2” above grade a minimum of 6” below grade.

13. The minimum depth of the pedestal in the ground shall be 24” with openings at the base to permit the service lateral conduit and/or conductors to sweep into the pedestal.

14. Poured concrete slab shall be 24” x 24” min. size end have a 3 ½” min. thickness.

15. Provide and install 2” rigid PVC conduit and sweep. A 24” radius is required. If service to pedestals will be cascaded, to 2” conduit bends are required; consult the cooperative to determine if service will be radial or cascaded. Conduit shall extend to 1” below top lip of pour panel.

16. The Customer shall be responsible for the location and final grade of the utility island and the included electric meter pedestal.

17. That portion or pedestal buried in concrete and earth shall be coated with an approved corrosion restraint material such as zinc, cadmium, or enamel to withstand all deterioration.

18. Receptacle plugs, cords or “hard-wire” connections shall not block access to panel(s) covering service cable and termination pull section. (See Note 7)
1. Riser to be a minimum 3" for 1 phase residential applications. Riser to be a minimum 4" for 1 phase and 3 phase commercial applications—Refer to Riser Specifications.

2. The Cooperative furnishes and installs the C.T.'s, meter socket and test switch.

3. Bondable vertical layin, double neutral lug must be provided in the C.T. enclosure which will accommodate up to 500 MCM conductor.

4. When used for 3 phase-4 wire delta service, high phase shall be on the right hand side and properly identified.
TEMPORARY UNDERGROUND SERVICE

When temporary service for construction purposes is required in an area served solely by underground primary facilities, upon proper application by the consumer, the Cooperative will provide temporary service under one of the following methods.

1. (PREFERRED METHOD)

Consumer shall install service equipment on partially completed wall or on a temporary “Batter Board” in a permanent location.

Cooperative will install underground service to entrance equipment on a permanent basis.

Consumers service entrance equipment and installation shall be approved by the Inspection Agency.

TYPICAL TEMPORARY/PERMANENT SERVICE ENTRANCE
2. Consumer shall install a self contained mobile home type meter pedestal no further than ten (10) feet from the Cooperative's Service Pedestal or Transformer. Approved direct burial service wire (type UF, USE or equivalent) shall be installed by consumer and extended to within 3 feet of the Cooperative's facilities.

A sufficient coil of wire to reach the secondary terminals of the transformer or service Pedestal must be left.

The Cooperative will extend wire into transformer or service pedestal and make the service connection. All wires and equipment shall be per N.E.C. and local codes.

CAUTION

Before digging or driving ground rod be sure to contact Blue Stake and arrange for a cable location.
3. Consumer shall set a temporary pole and metering equipment as shown herein no further than ten (10) feet from the cooperative’s Service pedestal or Transformer.

The cooperative reserves the right to determine which service pedestal or transformer shall feed the temporary service.

Approved direct buried service wire (type UF, USE or equivalent) shall be installed by the consumer and extended to within 3 feet of the Cooperative's Facilities.

**A sufficient coil of wire to reach the secondary terminals of the transformer or service pedestal must be left.**

The Cooperative will extend wire into transformer or service pedestal and make the service connection. All wires and equipment shall be per N.E.C. and local codes.

**CAUTION**

Before digging or driving ground rod, be sure to contact **Blue Stake and arrange for a cable location.**

**TEMPORARY SERVICE FEE**

The consumer will be required to pay the appropriate installation and user charges in effect at the time.

Check with the Cooperative's Service Representatives for these charges.
NOTES:

1. 3" RGS (RIGID GALVANIZED STEEL) CONDUIT SHALL BE A MAXIMUM LENGTH OF 10 FEET.

2. THE 3" RGS CONDUIT SHALL BE PLACED IN THE CENTER OF A 12" MINIMUM DIAMETER CONCRETE FOOTING. THE FOOTING SHALL BE A MINIMUM OF 36" IN THE GROUND AND EXTEND A MINIMUM OF 4" ABOVE GROUND LEVEL AND HAVE A 1/2" SLOPE AWAY FROM THE CONDUIT TO ALLOW FOR DRAINAGE.
WOOD PRESSURE TREATED POLE

APPLICABLE VOLTAGE 120/240, 3 WIRE SINGLE PHASE - ONLY

METER SOCKET SIZE AS REQUIRED, MUST BE APPROVED BY COMPANY

RAINTIGHT DISTRIBUTION PANEL

WEATHERPROOF RECEPTACLES AS REQUIRED WITH GFCI PER N.E.C.

1-1/2" MINIMUM RIGID OR INTERMEDIATE METAL CONDUIT FOR CUSTOMER SUPPLIED AND INSTALLED WIRE

GROUND WIRE MIN. #4 BARE COPPER STAPLED TO POLE

GROUND LINE

INSULATING THREADED BUSHING TO PROTECT CABLE

N.E.C. SIZED GUTTER

48" MIN. 75" MAX.