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INSTALLATION OF U/G ELECTRICAL FACILITIES IN RESIDENTIAL SUBDIVISIONS - RU0005U

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ENGINEERING & CONSTRUCTION STANDARD

**ELECTRIC INSTALLATION
GUIDE SECTION 2
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2.0 PURPOSE

The procedures and requirements, as set forth in this standard, are to provide guidance for work done by the applicant for the installation of electric facilities for the exclusive use by Liberty Utilities in a residential subdivision.

3.0 DEFINITIONS

Applicant: The Owner(s), Developer(s), or their designated representative.

LU: Liberty Utilities

Utility Design Administrator (UDA): Liberty's engineering representative.

Inspector: LU's employee designated to inspect installation of any portion of electric facilities to be owned and/or maintained by LU.

Operations Coordinator: LU's operating representative who coordinates the start of construction dates.

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4.0 SCOPE OF WORK

- 4.1 **Work by Applicant:** Applicant shall perform all work necessary to construct or install facilities in accordance with LU's work order drawings, as follows:
- A) Applicant's engineer shall provide all staking as outlined in LU's Standard GI0001U, Substructures Volume Section 3, for electric facilities.
 - B) Furnish excavation and approved backfill of trenches and vaults for electric facilities, TE0001U & SUB01X, Substructures Volume Section 3.
 - C) Provide and install substructures including concrete encasement (if required), vaults, manholes, hand holes, pull boxes, transformer pads, equipment pads, ground rods, street light bases and/or sonotube, conduit and risers as shown on LU's work orders.
 - D) Applicant shall be solely responsible for protecting electric cables, ducts, and structures from superimposed loading created by construction equipment or otherwise. Applicant shall repair or pay for any damage done to above equipment to meet LU's Inspector's approval.
 - E) **Applicant is responsible for contacting Underground Service Alert (USA) at 811 two days before digging.**
 - F) Applicant is responsible for grouting/sealing of vaults, and the installation of a minimum 1/4" flat pull line with sequential footage markings and with a minimum breaking strength of 400 pounds in each conduit. Mandreling of the conduit is required. See LU Standard CD0001U, in Section 4, for specific details.

Applicant shall not cut holes in or enter existing LU energized vaults, manholes or transformers without an Inspector or other qualified LU employee being present. Applicant shall notify the Inspector 24 hours in advance when work is to be performed on existing energized vaults.
 - G) Applicant is responsible for providing enough space for proper layout of all utilities.
 - H) Applicant shall not install other utilities' boxes/equipment over LU conduit.

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4.2 **Work by LU:** LU shall perform the work necessary to complete the electric systems as contracted for by Applicant. For the electric system, this includes, transformers, switches, high voltage cable, service conductor, meter(s), and all connections.

5.0 INSPECTION AND PERFORMANCE

- 5.1 Preconstruction conferences will be scheduled to coordinate the start of construction. Those to attend should include LU's Utility Design Administrator, Operations Coordinator, and/or Inspectors(s); Applicants General or Excavating Contractor, and Engineer; and Representatives of other utilities, i.e. Communications, TV, City, Water, Gas, etc.
- 5.2 Applicant shall inform the inspector two work days in advance before commencing any item of construction or installation of material to enable proper inspection of materials and workmanship. Materials and/or workmanship failing to meet specifications or installed without prior notice to inspector will be subject to rejection. Any work rejected shall be immediately corrected at applicants expense. **No work shall be backfilled or otherwise covered or concealed until it has been inspected and approved by the LU Inspector.**
- 5.3 All materials and workmanship shall be first quality in every respect, plumb and true and according to the specific requirements of the work order drawings, LU's standards, and this specification.
- 5.4 Where interpretation or clarification of intent of any drawing is required, the Inspector, Utility Design Administrator, Regional Standards, and the Contractor will work together to resolve the problem.
- 5.5 **If any portion of the completed system fails to operate satisfactorily due to defects in the Applicant's work, the defect and any damaged portion of the system shall be corrected at the Applicant's expense and to the satisfaction of the LU Inspector.**

6.0 CHANGES

- 6.1 By mutual consent, in writing, additions/deletions may be made to/from these requirements without voiding this standard.
- 6.2 Any charges for additional work for LU brought about by Applicant's changes will be billed directly to the Applicant's with payment due prior to service(s) being made available.

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7.0 EXCAVATION

- 7.1 Streets shall be cut to subgrade and sewer and storm drains installed prior to staking of the electric trench.
- 7.2 Property lines shall be chiseled on the curb and finish stakes in place prior to obtaining approval from the Inspector to proceed with excavation for electric. All trenching shall be in accordance with OSHA requirements. Prior to the start of the electric trench, the Applicant may install electric conduit at street crossings for his convenience provided permission to do so is obtained from the Inspector and the installation itself is inspected and approved.

8.0 BACKFILL

- 8.1 Backfill material shall be approved by the Inspector and shall meet LU's Standard SUB01X. In addition, backfill material shall meet governmental codes and ordinances, as applicable.
- 8.2 A minimum of 6" of LU approved sand shall be placed below conduit(s) and compacted to 90% of the relative maximum density. After the conduit installation, an additional compacted sand cover of not less than 12" shall be installed and compacted to 90%.
- 8.3 Applicant shall place LU approved backfill in trenches in the presence of the Inspector. When joint construction is utilized, two or more backfill operations shall be required. Applicant shall be responsible for the cost of repair if any damage occurs to the cables or ducts where damage results from failure of Applicant to follow proper backfill procedures.
- 8.4 Native backfill shall be excavated native granular material free of ice, clay, debris, organic matter, and rocks larger than 4" across their greatest dimension. Backfill shall be in accordance with LU standard SUB01X.

9.0 CONCRETE

- 9.1 Concrete encasement of 90° sweeps may be required on primary/secondary conduit runs with multiple sweeps, refer to CD0001U, 16.2, Section 4, Substructures Volume for details.
- 9.2 Other concrete encasements may be required, see CD0001U, Section 13.

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10.0 COMPACTION

- 10.1 Backfill above the first 12" lift shall be secured with mechanical tamping units (not the tire or track of vehicles).
- 10.2 Backfill shall be placed in maximum lifts of 12".
- 10.3 Backfill shall be moistened, as required, to obtain compaction.
- 10.4 Compaction shall be a minimum of 90% of the relative maximum density, as determined by the Method ASTM D-1557. Local agencies whose ordinances require compaction in excess of 90% shall prevail.
- 10.5 Applicant is responsible for obtaining two compaction tests on all transformer and equipment pads:
- A) The first compaction test shall be a minimum of 90% of the relative maximum density on the first 10" - 12" lift of sand.
 - B) The second compaction test shall be a minimum of 95% of the relative maximum density on the 8" (minimum) base.

11.0 WORKMANSHIP

- 11.1 All vaults, hand holes, pull boxes, etc., shall be installed behind and parallel with sidewalk. If installed up against a sidewalk, box will be set 1/4" above sidewalk so water does not drain into the box/vault. See TE0001U, Section 6.4.
- 11.2 Padmounted transformers and switch pads shall be parallel and flush with the back of the sidewalk. The bottom of the pad shall be level to the top of the sidewalk.
- 11.3 If there are no sidewalks, another reference will be established by LU's UPC Inspector and the Contractor.
- 11.4 All material furnished by Developer will be on site prior to the start of any work by LU.
- 11.5 All work to be done in accordance with OSHA regulations.

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