



Page:	7-1
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRICITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

7.0 INSPECTIONS AND TESTING

7.1 General Requirements and Inspection Process

As noted in Section 4.1, Step 6, it is the Developer's responsibility to maintain a liaison with ATCO's Electricity Representative at all times throughout the construction period for the purpose of coordinating inspections.

Before construction begins, the Developer may engage an Independent Inspector to perform all required inspections and tests as described in the following sections. Selection of an Independent Inspector is not mandatory; however, it may expedite the inspection and testing process.

ATCO will inspect all cables laid on sand in the trench or in duct prior to backfill. ATCO may also participate in other inspections or tests. For this reason, the Developer and/or its agent(s) must provide ATCO's Electricity Representative with at least two (2) working days' notice before:

- a) backfilling road crossings;
- b) installing cable in road crossings;
- c) backfilling trenches, including backfilling over ducts;
- d) all aspects of constructing, installing and completing padmount transformer bases, with regard to PVC duct placement (where applicable), foundation compaction, ground grid installation and precast base placement;
- e) laying secondary and primary power cables in trenches;
- f) installing and terminating power cables in respective apparatus;
- g) installing and connecting grounding equipment to respective apparatus; and
- h) testing primary cable terminations at transformers, as well as testing the continuity and insulation of all primary cable prior to energization of the system.



Page:	7-2
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRICITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

ATCO’s Electricity Representative will advise the Developer and/or its agent(s), in writing, of any errors or deficiencies in the work at the time the error or deficiency is discovered.

7.2 Material Testing

7.2.1 Primary Cables

The Developer and/or its agent(s) shall contact the ATCO’s Electricity Construction Representative and/or Operation Representative to coordinate a DC Hi-Pot cable test. Continuity and phasing checks must be performed on all primary cables before proceeding to the DC Hi-Pot cable test. All primary cable terminations must be completed prior to any testing, including the installation of all required fault indicators (see Appendix E, Document E.6) and cable tags (supplied by ATCO, as per the ATCO /Developer Responsibility Matrix, Section 2.0, Table 2.1 and Section 4.1, Step 3).

Test results must be indicated in the URD Turnkey Commissioning Form (Appendix F, Form F.21)

7.2.2 Transformers

The Developer and/or its agent(s) must provide transformer test reports and drawings from the applicable transformer manufacturer(s), as specified in Appendix E, Document E.3.

The transformer test report data must be recorded on the provided ATCO Distribution Asset Documentation (DAD) Form.

7.2.3 Ground Grids

Ground grids for padmount transformers must be installed as shown in Appendix B, Drawing E22 to E25. The Developer and/or its agent(s) are



Page:	7-3
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRICITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

responsible to ensure tests for ground resistance are performed prior to energization, in accordance with the test method and values provided in D.4.20.

The ground resistance readings must meet ATCO standards as per Appendix B, Document E21 or remedial action must be taken until the readings are acceptable. The test results are to be added to the as-built drawings, beside the device number of each piece of equipment and on the Distribution Asset Documentation (DAD) Form.

The Distribution Asset Documentation (DAD) Form must be completed and signed by the Developer's qualified electrician and submitted to ATCO's Electricity Representative for approval.

7.3 Construction Inspections

See Appendix F, Form F.21 for the URD Turnkey Commissioning Form to complete the visual checks described below, in addition to any other forms noted.

7.3.1 Trench and Cable Lay

Visual checks must be completed to verify:

- a) the bottom of trenches and backfill materials are free of rocks;
- b) sand bedding is installed;
- c) trenches are in proper alignment, as per staking and the IFC drawing;
- d) ducts are properly located and placed (where required);
- e) all primary and secondary power cables are at the proper depth;
- f) marker tape is properly placed along the primary and secondary power cable trench alignments; and
- g) proper cable is installed.



Page:	7-4
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRICITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

7.3.2 Trench Sand Bedding and Backfill

Visual checks must be completed to verify:

- a) sand bedding is installed, where required;
- b) all road crossings are properly compacted as per Section 5.2.2.4 (if uncertain, ATCO's Electricity Representative will request certification that municipal standards have been meet); and
- c) all trenching is properly compacted.

For compaction testing, see Appendix F, Form F.16.

7.3.3 Transformer Bases

Visual checks must be completed to verify:

- a) unwashed gravel/sand bedding is installed, where required;
- b) ducts are properly located and placed, where required;
- c) pre-cast pads and bases are installed at proper grade, according to staking;
- d) pre-cast pads and bases are level;
- e) the ground grid surrounding the transformer base is properly installed;
- f) proper wire has been used; and
- g) all trenching and bedding of pre-cast transformer pads is properly compacted.

7.3.4 Equipment Installation

7.3.4.1 Primary Cables

All permanent cable tags (supplied by ATCO) are to be installed prior to testing and verification of the cables.



Page:	7-5
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRICITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

In addition to the continuity and phasing checks completed as per Section 7.2.1, visual checks must be completed to verify:

- a) primary cables are free of damage;
- b) connections are tight and treated with inhibitor, where required;
- c) bleed wires are properly connected on inserts and bushings;
- d) primary cables are clearly and properly labeled;
- e) cable tags correspond to the IFC Single Line Diagram (SLD).
- f) primary cable open points correspond to the normally open points shown on the IFC SLD;
- g) fault indicators are checked and reset; and
- h) proper cables are used.

7.3.4.2 Transformers and Terminations

In addition to the test reports provided by the Developer and/or its agent(s) as per Section 7.2.2, visual checks must be completed to verify:

- a) transformers are in proper alignment and location, as per staking and the IFC drawing;
- b) the slope of the grade on which the padmount transformer base sits is no more than 9.5 degrees, or less than a six-to-one slope (i.e., 1.0m rise in 6.0m run).
- c) access lid entry area of the padmount transformer is clear and accessible for switching;
- d) padmount transformer is securely attached to the pre-cast base;
- e) no traces of oil leaks, damage or paint scrapes are visible;
- f) door hinges and captive bolt leads are in good condition;



Page:	7-6
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRCITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

- g) padmount transformer primary grounding conductor goes directly to the H2 bushing and not via the X2 terminal;
- h) ground connections are properly installed and connected;
- i) warning and danger signs are installed and intact;
- j) Switch numbers and transformer Schematic SLD Plates correspond to the switch and transformer numbers on the IFC SLD; and
- k) phase indicators correspond to the phasing on the IFC SLD.

7.3.4.3 Ground Grids for Three Phase Transformers

The dimensions surrounding three phase transformer pads must be correct. Connections to the ground connectors must be tight and treated with inhibitor, where required. All ground resistance readings must be within AEUC limits (see Appendix B, Document E21 for required ground test values.)

7.3.4.4 Secondary Cables, Pedestals and Terminations

All lugs must be installed at the padmount transformer. All secondary junction boxes and pedestals must be securely installed. All doors must be installed and all terminal blocks must be securely tightened.

Visual checks must be completed to verify:

- a) all secondary power cables are free of damage;
- b) connections are tight and treated with inhibitor, where required;
- c) all secondary power cables are clearly and properly labeled; and
- d) proper cables are used.

7.3.4.5 Street Lights and Terminations

All street light poles or standards must have a uniform tilt of zero degrees (0°). The vertical tilt and light pattern of each street light



Page:	7-7
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRICITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

assembly must be inspected by the ATCO's Electricity Construction Representative prior to final acceptance.

Visual checks must be completed to verify:

- a) street lights are in proper alignment and location, as per staking and the IFC drawing;
- b) proper street light standard and luminaire are installed;
- c) headline and sideline are good;
- d) street light standard is securely attached to the pre-cast base and nut covers are installed;
- e) ground connections are properly installed and connected;
- f) access lid on the bottom of the street light standard is properly orientated, intact and secure;
- g) warning signs are installed and intact;
- h) proper connections are used and insulated appropriately; and
- i) proper cables are used.

7.3.5 As-Built Documentation

The Developer and/or its agent(s) must maintain accurate drawings throughout construction and inspection of the Developed Distribution Facilities. Any changes from designs previously approved by ATCO shall be submitted and pre-approved in writing by ATCO's Electricity Engineering representative prior to construction. A drawing of the proposed changes may be required at the discretion of the ATCO's Electricity Engineering representative.

Visual checks must be completed to verify:



Page:	7-8
Date:	2023-DEC-21
Revision:	8.1
Supersedes:	Revision 8.0, 2021-OCT-01

SPECIFICATIONS FOR NEW ELECTRICITY UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

- a) all construction is in accordance with the ATCO accepted IFC drawings, and changes, if any, are recorded on the As-Built drawings and the Distribution Asset Documentation (DAD) Form.
- b) phasing, equipment and switch numbers correspond to the approved SLD.