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SPECIFICATIONS FOR NEW UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

2.0 GENERAL CONSIDERATIONS

2.1. Scope of the Specifications

These specifications apply to new front lot underground electrical facilities supplying single lot dwellings, both urban and rural and multiple dwelling in a single parcel of private land (Bare Land Residential Development) within a new residential subdivision within the Municipality. In addition, these specifications may apply to new underground facilities supplying three phase secondary service loads within the boundaries of the Developer's residential subdivision.

2.2. Overall Process

The URD process includes the following steps:

- initial request by a Developer to design and construct an underground residential distribution system within a new subdivision This process is detailed in Section 4.0 and Appendix A.,
- the drawing approval process,
- construction and inspection of the facilities,
- acceptance and energization,
- transfer of the Developed Distribution Facilities to ATCO Electric.

2.2.1. Responsibilities

In accordance with the purpose stated in Section 1.0, the following describes the overall responsibilities of ATCO Electric and the Developer and/or its agent(s).

2.2.1.1. ATCO Electric

Has the responsibility to:

- a) provide detailed technical requirements to the Developer for the distribution facilities the Developer will install;

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- b) review the Developer's draft project schedule and negotiate with the objective of achieving a mutually agreed schedule for the entire project;
- c) plan the source primary and express feeders supplying the subdivision and provide detailed information to the Developer on the supply connection points and proposed switch cubicle locations, and indicate whether or not the Developer will be required to install the civil facilities (i.e., trench, ducts, ducts in concrete bank) for express and/or commercial feeders;
- d) install:
 - i. the main distribution express feeder supply cable;
 - ii. switch cubicle pre-cast concrete pads and grounding;
 - iii. switch cubicles;
 - iv. cable terminations for the express feeder supply cable;
- e) provide, size, coordinate and install fuses for switch cubicles associated with source primary and express feeders;
- f) provide SLD Schematic Plates, switch numbers, cable tags, ground test tags, danger signs, padlocks and asset tags;
- g) inspect all cables laid in open trench, on sand or in duct, prior to backfill, as per Section 7.1;
- h) assign all customer Site ID numbers post-construction, in accordance with AEUB Wire Service Provider Regulatory Requirements after receiving approved addresses from developer;
- i) accept the design for the Developed Distribution Facilities;
- j) provide Final inspection, acceptance and energization of the Developed Distribution Facilities, provided all specifications identified in this document have been met;
- k) assume ownership of the facilities once energized;

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- l) complete a Final Acceptance Inspection of the facilities near the end of the Developer's warranty period; and
- m) Supply meter and install the service cable from the drop box to the meter base on the dwelling for urban developments.
- n) Supply meter and complete service connection for rural developments.
- o) Obtain approval from the Municipal Authority using all drawings and specifications provided by the developer.

2.2.1.2. The Developer

Has the responsibility to:

- a) perform all work required to complete the design and installation of an underground electrical distribution system in a new residential development.
- b) develop a project schedule and lead negotiations to achieve a mutually agreed schedule;
- c) coordinate the design and installation of joint-use facilities as per Developer and joint-use agreements, maintaining the minimum specifications provided in Appendix B and D;
- d) provide all resources required to complete the work in accordance with these specifications, including items such as tools, equipment and personnel;
- e) engage a Consulting Engineer, as defined in Section 1.1, to design and administer construction of the URD, which includes the following:
 - i. prepare plans and specifications, coordinating with all shallow and deep utilities located within the subdivision and all other entities (i.e., pipelines, railways, roadways) affected or crossed by the proposed distribution facilities;

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- ii. obtain all necessary URW agreements, pipeline and railway crossing agreements, acceptances and permits to allow construction in the appropriate name (see Section 4.2.2);
 - iii. provide an Area Structure Plan to ATCO Electric's Engineering Representative (see Section 4.2.1, Step 1);
 - iv. authenticate design drawings as required, for acceptance by ATCO Electric's Engineering Representative;
 - v. provide voltage drop calculations to ATCO Electric's Engineering Representative;
 - vi. provide street lighting design and supporting documentation to ATCO Electric's Engineering Representative;
 - vii. issue drawings for tender/construction;
 - viii. obtain from the municipal authority approved civic addresses for all lots requiring electrical service;
 - ix. inspect and control the quality of the work;
 - x. coordinate the Final inspection and the Final Acceptance Inspection of the Developed Distribution Facilities;
- f) obtain an easement in ATCO Electric's name if a switch cubicle pre-cast concrete pad and grounding system cannot be accommodated within the municipality's URW, to allow ATCO Electric access in accordance with the terms of its Franchise Agreement with the municipal authority;
- g) obtain all necessary permits and approvals required for performance of the Installation, except for Municipal approval, which approval will be obtained by ATCO and for the duration of the project be in compliance with the requirements of the municipality and any other governing authority (i.e., local permits, building restrictions, construction requirements, environmental caveats, etc.) ;

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- h) install the following:
- i. express primary feeder civil requirements*;
 - ii. primary and secondary trench, backfill and warning tape;
 - iii. road crossing ducts and warning tape;
 - iv. single phase and three phase apartment and/or commercial service transformer pads, ground grids and transformers*;
 - v. subdivision primary feeder cable from the developer's project area to ATCO Electric's existing system interconnect point as specified in the System Planning Study (responsibility to be confirmed during the Pre-Design meeting).
 - vi. apartment, commercial service and/or feeder cable*;
 - vii. cable terminations;
 - viii. single phase and three phase (commercial)* transformer terminations (primary and secondary);
 - ix. secondary pedestals and pedestal terminations;
 - x. secondary grounding connections;
 - xi. secondary cable, service box (urban) and omni ball as specified in drawing D.5.1, metering post or pedestal (rural).
 - xii. street light trench, backfill, and warning tape;
 - xiii. Street light davits, bases, conduit, electrical connections and grounding connections.
 - xiv. SLD Schematic Plates, switch numbers, cable tags, ground test tags, danger signs, padlocks and asset tags (as provided by ATCO Electric);
- * Dependent on the decisions made as per Section 2.2.1.1. c.
- i) ensure the work is completed under the auspices of a qualified journeyman power lineman who is experienced in the installation of underground residential facilities (see Section 2.9);



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- j) supply and utilize the vehicles and equipment required for the proper handling and installation of the Developed Distribution Facilities, so as to not cause any damage to the facilities;
- k) at least four weeks prior to energization, provide ATCO Electric with the approved civic addresses, so that a Site ID may be issued for each pre-serviced lot and/or site requiring electrical service;
- l) within 30 days post-energization, provide to ATCO Electric final record drawings and documents, including authenticated as-built drawings, all easements and URW, railway and pipeline crossing agreements registered in ATCO Electric's name, a Construction Completion Certificate and complete asset documentation;
- m) ensure proper coordination of the entire project, including the provision of sufficient lead times for submission and acceptance of plans, field inspections, testing, commissioning and energization of the Developed Distribution Facilities; and
- n) In all aspects, adhere to the latest revision of these specifications.
- o) return electronic documents at project completion

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2.3 Responsibility Matrix

The Responsibility Matrix provided below (Table 2.1) includes the provision and installation of specific equipment.

Table 2.1 – ATCO Electric/Developer Responsibility Matrix

ITEM	ATCO ELECTRIC Provides/ Installs	DEVELOPER AND/OR ITS AGENT(S) – SINGLE FAMILY DWELLING	DEVELOPER AND/OR ITS AGENT(S) – MULTIPLE FAMILY DWELLING
DESIGN & DRAWINGS			
Registration of Easements \ URW		X	X
Easement Drawings \ Survey Plans		X	X
Crossing Agreements		X	X
Area Structure Plan		X	X
Drawing Authentication		X	X
Municipal Authority Approval	X		
Planning Information on Location of Source Primary Feeders, Express Feeders, Commercial Feeders and Switch Cubicles	X		
Easement on Private Property Provided to ATCO Electric if Switch Cubicle Cannot be Accommodated Within URW		X	X
Extend URW for transformer if placed in the 2.5m URW.			X
Acceptance of Design Plan	X		
Drawings Issued for Construction / Tender		X	X
As-Built Documentation		X	X
Coordination with Other Utilities		X	X
Civic Address Data		X	X
Customer Service Site IDs	X		
HIGH VOLTAGE PRIMARY SYSTEM			
Source Primary Feeder	X		
Source Connection Points	X (provides)		
Express Feeders – Note 1	X	X	
Subdivision Primary Feeder Trench / Backfill		X	X
Ducts (Road Crossings)		X	X



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Warning Tape		X	X
Single Phase Transformer Pads		X	X
Three Phase Transformer Pads Note 1		X	X
Switch Cubicle Pads	X		
Subdivision Primary Feeder Cable		X	X
Apartment/Commercial Service Feeder Primary Cable Note 1		X	X
Three Phase Padmount Transformers Note 1		X	X
Single Phase Padmount Transformers		X	X
Switch Cubicles Including: Terminations, Grounding	X		
Switch Cubicle Fuses	X		
Single Phase Terminations to Transformers		X	X
Three Phase Terminations to Transformers		X	X
Grounding System (Except Switch Cubicle)		X	X
SLD Schematics, Switch Numbers, Cable Tags, Ground Test Tags, Danger Signs, Padlocks and Asset Tags (Except Switch Cubicle)	X (provides)	X(installs)	X(installs)
LOW VOLTAGE SECONDARY SYSTEM			
Trench / Backfill		X	X
Warning Tape		X	X
Pedestals		X	X
Cable, Service Entry Box and Omni Balls		X	X
Connectors / Terminations		X	X
Grounding System		X	X
CUSTOMER SERVICE ENTRANCE			
Service Acceptance (Permit received, customer grounding meets requirements, trench adequate)	X		
Post Acceptance Service Inspections	X		
Conductors		X	X
Terminations at Pedestal	X		
Terminations at Meter Base	X		
Meter	X		
Rural metering post or pedestal		X	



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ITEM	ATCO ELECTRIC Provides/ Installs	DEVELOPER AND/OR ITS AGENT(S) – SINGLE FAMILY DWELLING	DEVELOPER AND/OR ITS AGENT(S) – MULTIPLE FAMILY DWELLING
STREET LIGHTING			
Design and Install		X	X
Trench / Backfill		X	X
Conduit		X	X
Bases, Davits and Luminaires		X	X
Warning Tape		X	X
INSPECTIONS (see Section 7.0)			
Cable in Trench on Sand or in Duct	X		
Material Compliance Prior to Installation	X	X	X
Transformer Primary Terminations (10%)	X		
Sand Overlay and Warning Tape		X	X
Backfill and Compaction		X	X
Final Inspection and Acceptance	X	X	X
Energization	X		
Inspection / Test Forms		X	X

Note 1 – With respect to all three phase services installation of express and Apartment/commercial feeders, responsibility for the civil works and installation of transformer (i.e., trench, ducts or duct bank) is at the discretion of ATCO Electric and will be discussed with the Consulting Engineer during the Preliminary Design stage (see Appendix A, Step 3).



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2.4 Bare Land Residential Development

This typically includes townhouses, duplexes, fourplexes, sixplexes, etc. Refer to ATCO Electric Customer Metering and Services Guide for metering details.

The installation of bare land residential development distribution facilities shall follow sections 2.4.1 and 2.4.2. ATCO Electric will own facilities in the following manner.

2.4.1 Primary and Secondary Facilities

ATCO Electric will own, operate and maintain primary and secondary facilities (i.e. primary/secondary cables, transformers and pedestals) within Bare Land Residential Developments and in doing so, the Developers and/or its agent(s) shall follow this Specification process and shall design and install the primary and secondary electrical distribution system in accordance with the standards and requirements stated in this document.

The Developers and/or Agent(s) shall provide a Utility Right of Way (URW) for all primary and secondary facilities excluding service cable. All URW shall be accepted and approved by ATCO Electric Engineering Representatives. The developers and/or agent(s) shall utilize the ATCO Electric URW form (Appendix F.1).

The primary and secondary facilities shall be accessible along roads and shall have enough space for maintenance and operation purposes.

Within the Bare Land Residential Development, primary cables shall be installed in ducts where it is under a pave surface. Consideration may be made for secondary ducts if the entire length of underground is under a paved surface (i.e. sidewalks, row houses). All requests for



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direct buried shall be accepted and approved by ATCO Electric CSR and Engineering Representatives.

Secondary cables are not required to be looped in Bare Land Residential Development.

ATCO Electric service entrance shall be opposite side of the building from Gas services. Developer shall group electrical service entrance for two townhouses where possible. Customer installation of metering enclosures shall meet the applicable code requirements (i.e. CEC Part 1). Refer to ATCO Electric Customer Metering and Services Guide.

2.4.2 Street Light Facilities

The ownership, maintenance and operation of street light facilities within the Bare Land Residential Development shall be mutually discussed and agreed upon between ATCO Electric and the developer following developer application.

2.5 Apartment and/or Commercial Services Loads (Single Phase or Three Phase) Within a New URD Development

If the Developer and/or its agent(s) are responsible for developing any apartment and/or commercial sites within the subdivision development boundary, the Developer must inform ATCO Electric's CSR and Engineering Representatives for these sites in the preliminary design stage. This will ensure the proper planning and coordination of all off-site construction requirements and the completion of proper phasing, looping and switching requirements within the subdivision, prior to any detailed engineering or construction of the URD.

The scope of these specifications includes single phase 120/240V self-contained commercial services and three phase 120/208V or 347/600V self-contained and instrument metered services. All apartment and/or commercial services must be



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designed and constructed in accordance with ATCO Electric's Service and Metering Guide. The latest revision of this guide may be found at the following web site: <http://www.atcoelectric.com/>.

The processes for testing and energization of these facilities are detailed in Sections 7.0 and 8.0. The Developer and/or its agent(s) must follow these processes and ATCO Electric's General Service Process. Also refer to ATCO Electric's Service and Metering Guide.

2.6 Construction Standards

All ATCO Electric standards and electrical installations must comply with the AEUC and any amendments thereto, under the Alberta Safety Codes Act. Where acts, bylaws and standards are referred to, they shall be the most current amended and updated issues (i.e., AEUC 4th Edition, 2013 and CSA Standards C22.3 No. 1-10 *Overhead Systems* and C22.3 No. 7-10 *Underground Systems*). The minimum construction standards to be applied by the Developer for Developed Distribution Facilities must meet or exceed the ATCO Electric standards as outlined in this document, and that of the governing authority.

2.7 Inspection of Developed Distribution Facilities

ATCO Electric will conduct on-site inspections of the Developed Distribution Facilities at any time and at the discretion of ATCO Electric during the progress of construction in accordance with the Contract.

The purpose of these inspections and acceptance procedures is to identify deficiencies at an early stage when it is easiest and most economical to correct them, and where possible to prevent design, material or construction defects from occurring prior to Final inspection and project completion.

2.8 Developer's Warranty

A complete description of the warranty requirements associated with the Developer's Warranty is included in the Underground Electrical Distribution Subdivision Service Agreement.

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2.9 Consulting Engineer and Contractors

Prior to design of the Developer's facilities, the Developer is required to submit a letter to ATCO Electric's CSR outlining the Consulting Engineer's and Contractor(s)' qualifications and experience to complete the work in accordance with these specifications. ATCO Electric reserves the right to accept or reject any agents, including sub trades. ATCO Electric also reserves the right to request information on the qualifications of the personnel who will be completing the work.

2.10 Left Blank

2.11 Timelines and Scheduling Guidelines

Timelines for URD projects will vary depending on the size, complexity and specific requirements of the project. A meeting is required during Step 2 of the process (see Section 4.1 or Appendix A) between the Developer and/or its agent(s) and ATCO Electric's Representatives (CSR, Planning and Design, Projects and Construction, and Operations), to determine and mutually agree upon timelines for the project. ATCO Electric's CSR will initiate this meeting. See Appendix A for a rough guide to timelines.

Note: While ATCO Electric encourages early contact with Developers and their Consulting Engineers on upcoming projects to begin the process of formal drawing review, priority in this regard is given to Developers with a signed Contract, Developer payment and proof of insurance.

2.12 Materials

All materials installed must either adhere to provided specifications, or match the manufacturers and catalogue numbers or ATCO Electric part numbers specified in Appendix E. See Section 6.0 and the Contract for details.