1.0 GENERAL

.1 Summary

.1 This Section covers items common to all Electrical sections and is intended only to supplement the requirements of Division 01.

.2 This Section shall be considered as an augmentation to Section 07 84 00 Firestopping and sub sections of Section 07 84 00.

.3 Provide seismic restraints for required equipment, lighting and conduit.

.4 Connect to equipment specified in other Sections and to equipment supplied and installed by other Contractors or by BCIT.

.5 Coordinate Work with other Sections, and determine extent and character of related work to ensure complete installation.

.6 CSA certified equipment and materials to be used.

.7 Where CSA certified equipment and materials are not available, submit them to inspection authorities for special approval prior to delivery to site.

.2 Related Sections

.1 Section 07 84 00 Firestopping.

.2 Section 26 05 53 Identification for Electrical Systems.

.3 References

.1 Current adopted edition British Columbia Building Code (BCBC).

.2 CSA C22.1-18 Canadian electrical code, part I (23rd edition), safety standard for electrical installations, Update No. 1 (2018) or the latest adopted edition.

.3 CAN3-C235-83(R2005) or latest edition. Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.4 IEEE SP1122-2000 The Authoritative Dictionary of IEEE Standards Terms, 7th Edition or latest edition.

.5 ULC 115 Standard Method of Fire Tests of Firestop Systems (CAN/ULC S115-11).

.6 Underwriters Laboratories, Inc. (cUL) – Fire Resistance Directory of Products Certified for use in Canada.

.4 Design Requirements

.1 Backboards to be fire-retardant backboards, pressure impregnated with fire-retardant chemicals, and stamp. Conform to CSA 080.

.2 Ensure equipment does not transmit noise and/or vibration to other parts of building.

.3 Operating instructions for each system and principal item of equipment to include following:

.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.

.2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.

.3 Safety precautions.

.4 Procedures in event of equipment failure.

.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.6 Noisy work to be done as per Section 01 14 00. Utilities interruption as per Section 01 51 00 Seismic Analysis and Provisions.

.4 Install electrical systems with adequate structural support to withstand seismic forces.

.5 Where ever sprinkler fire protection systems are installed, equipment and wiring systems in the vicinity shall be sprinkler proof.

.6 System Start-up:

.1 For all Major Equipment (Substation, Generator, ATS, UPS, New Product Types, etc): Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.5 Submittals

.1 Submit in accordance with Section 01 33 00 Submittal Procedures.

.2 Shop Drawings:

.1 Drawings to be stamped and signed by a professional engineer registered, or licensed in Province of British Columbia.

.2 Wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, wiring, conduit, and other items necessary to ensure coordinated installation.

.3 Identify circuit terminals on wiring diagrams and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.4 Indicate clearances for operation, maintenance, and replacement of operating equipment devices on Drawings.

.6 Quality Assurance

.1 Provide the following in accordance with Section 01 44 00 Quality Assurance:

.1 Submit test results of installed electrical systems and instrumentation. The results report shall be stamped and signed by a professional engineer registered, or licensed in Province of British Columbia.

.2 Seismic certificate including Letters of Assurance shall be stamped and signed by a professional seismic engineer registered, or licensed in Province of British Columbia.

.3 Submit Load Balance Report upon completion of Work.

.7 Delivery, Storage and Handling

.1 Divert all surplus used materials from the landfill to applicable recycling facilities.

.8 Warranty

.1 Use of installed equipment during construction shall not shorten or alter the warranty period, as specified in Division 01.

2.0 PRODUCTS

.1 Labels and Backboards

.1 Labels – Lamacoid Type:

.1 Normal Power: Black background, white lettering.

.2 Emergency Power: Red background, white lettering.

.2 Backboards:

.1 Provide plywood backboard (G1S) for all electrical rooms, communication rooms and security rooms as indicated:

.1 Where no size is indicated, provide a backboard a minimum of 100 mm wider and 100 mm higher than the equipment. Where more than one piece of equipment is installed on the backboard, construct the backboard of a size to suit the maximum vertical and horizontal dimensions of equipment.

.2 For communication and security rooms where not indicated, provide backboard for all surfaces in communication and security rooms.

.3 Backboard shall extend from finished floor to 2438 mm AFF, continuously around the communication and security rooms, or as indicated.

.4 Construct plywood backboards from 199 mm thick fir plywood (FSC to UF Free) good one side.

3.0 EXECUTION

.1 Installation

.1 Perform complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Ensure overhead and underground systems are in accordance with CSA C22.3 No.1 except where specified otherwise.

.3 Access Panels and Doors:

.1 Install access doors to match the building material grids where applicable.

.2 Install concealed electrical equipment requiring adjustment or maintenance in locations easily accessible through access panels or doors.

.3 Install systems and components to result in a minimum number of access panels.

.4 Indicate access panels on “Record” drawings.

.4 Nameplates and Labels: Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

.5 Location of Devices:

.1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

.2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.6 Mounting Heights:

.1 Mounting Heights for devices must meet code. Consult with BCIT for special circumstances that are not identified in code or table below:

Equipment	Requested Mounting Heights
Wall Receptacles above counter	200mm above top of counter surface
Wall receptacles above continuous baseboard heater	NOT ALLOWED
Panel boards	1800 mm to top or as required by Code

.2 Field Quality Control

.1 Load Balance:

.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance.

.2 Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.3 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.4 Provide load balance report as directed in PART 1 – SUBMITTALS upon completion of work:

.1 Phase and neutral currents on panelboards.

.2 Dry-core transformers and motor control centres.

.3 Operating under normal load.

.4 Hour and date on which each load was measured.

.5 Voltage at time of test.

.2 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project. Carry out tests in presence of Engineer. Test the following:

.1 Power generation and distribution system including phasing, voltage, grounding and load balancing.

.2 Touch and Step Voltage for High Voltage system.

.3 Generator and UPS commissioning test.

.4 Circuits originating from branch distribution panels.

.5 Lighting and its control.

.6 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.

.7 Fire alarm systems.

.8 Insulation resistance testing:

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350 – 600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

*** END OF **ELECTRICAL GENERAL REQUIREMENT** SECTION ***