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Electric Vehicle Charging for Buildings - Load Management

This advises on the incoming enablement of load management technologies in electric vehicle charging, prior to VBBL amendments that explicitly enable such options. It should be noted that the present code does not allow for load management; however, the City recognizes that the CEC now allows load management, which can potentially offer significant cost savings. The suitability of load management may be assessed on a case-by-case basis through Development Services, Building and Licensing.

This bulletin supersedes Bulletin 2015-004-BU/EL.

The Vancouver Building Bylaw's requirements for electric vehicle charging will be amended shortly and will come into effect later this year as follows:

10.2.3.1. Electric Vehicle Charging for Buildings

- 1) The electrical installations, including the service capacity of the installation, the number and distribution of circuits and receptacles, shall meet the requirements of the "Electrical Safety Regulation."
- 2) Except as provided by Sentence (3), each storage garage or carport in *one-family dwellings, two-family dwellings, one-family dwellings or two family dwellings with secondary suites or lock-off units, and laneway houses* shall be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, supplied by a branch circuit rated not less than 40 A at the nominal voltage of 208 V or 240 V as applicable and labelled to identify its intended use with the electric vehicle supply equipment.
- 3) Where the requirements of Sentence (2) would cause the dwelling unit calculated load to exceed 200 A, the installation of a 40 A branch circuit shall be permitted to be omitted provided that a minimum nominal trade size of 21 raceway supplied with pull string leading from the dwelling unit panel board to an electrical outlet box is installed in the storage garage or carport and is labelled to identify its intended use with the electric vehicle supply equipment.
- 4) Each one of 20 per cent of all parking stalls used by owners or occupiers of dwelling units in a multi-family building or the multi-family component of a mixed use building that includes three or more dwelling units shall be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, for the use of electric vehicle charging.
- 5) Each one of 10 per cent of all parking stalls used by owners or occupiers of a building, including a mixed use building other than a multi-family building or the multi-family component of a mixed use building shall be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, for the use of electric vehicle charging.

- 6) The electrical outlet, receptacle or supply equipment described in Sentences (4) and (5) shall be supplied by a branch circuit rated not less than 40 A at the nominal voltage of 208 V or 240 V as applicable.

10.2.3.2. Electrical Rooms

- 1) In a multi-family building or the multi-family component of a mixed use *building*, with three or more *dwelling units*, an electrical room shall be designed with sufficient space for the future installation of electrical equipment necessary to support electric vehicle charging in all residential parking stalls.

EXPLANATORY INFORMATION AND SIMPLIFIED SUMMARY:

Article 10.2.3.1. of Division B of the Vancouver Building By-law regulates the requirements of Electric Vehicle Charging for Buildings. The Canadian Electrical Code, and subsequently the BC Electrical Safety Regulation have been updated to allow for load management for electric vehicle charging (also known as “smart charging”). This emerging technology, while not yet standardized, allows for multiple electric vehicle charging points to share loads, provided controls are in place to prevent the calculated demand of the circuit from being exceeded so that the circuit is not overloaded. In essence, this means that the calculated load for Electric Vehicles (EV) charging in a multi-family building can be reduced using a control system that ‘throttles’ EV charging as more vehicles are plugged in. The advancement of such technology has significant potential benefits for homeowners, stratas, developers and will help the City meet its Renewable City Strategy goals.

The intent of this section of the VBBL is to enable load management technologies in new construction to reduce costs and ‘overbuild’ of electrical systems that support EV charging. The wording of this section has been updated to highlight their role and suggest it as a viable solution. In the event that an electric vehicle charging system that uses load management technology and is compliant with the Canadian Electrical Code cannot be deployed due to the wording of this section of the Building Bylaw, applicants are encouraged to contact the City of Vancouver Building Review and Electrical Inspections groups to identify potential solutions that may allow for such a system’s installation.

This Article is divided into five Sentences which are delineated by numbers in brackets as follows:

- Sentence (1) clarifies that all installations must comply with the Electrical Safety Regulation. Requirements for electric vehicles are also referenced in the Canadian Electrical Code (“CE Code”) Section 86. Subrule (2) of the CE Code provides for control equipment related to load management.
- Sentence (2) requires a branch circuit rated not less than 40 A (@ 208 / 240 V) must be provided to power supply to an outlet, a receptacle or electric vehicle supply equipment installed in each storage garage or carport in one-family dwellings, two-family dwellings, one-family dwellings or two-family dwellings with secondary suites or lock-off units, and laneway houses. Each outlet box for the purpose of electric vehicle charging must be labelled in a conspicuous, legible, and permanent manner identifying it as an electric vehicle supply equipment outlet.
- Notwithstanding Sentence (2), the intent of Sentence (3) is, in lieu of the branch circuit, installation of a raceway not less than 21 mm running and connecting from the dwelling unit panelboard to an electrical outlet box located in the storage garage or carport is permitted, if computing the dwelling unit load that includes the 40 A branch circuit load will result the total calculated load of this dwelling unit greater than 200 A. Where possible, the use of load management systems may prevent this exemption from being triggered as frequently and should be considered. In either event, if a raceway is installed without conductor, the requirement now

stipulates that a pull-cord be placed in the empty conduit to facilitate future conductor installation.

- Sentence (4) requires that each one of 20 per cent of all parking stalls used by owners or occupiers of dwelling units in a multi-family building or the multi-family component of a mixed use building that includes three or more dwelling units must be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, for the use of electric vehicle charging.
- Sentence (5) requires that each one of 10 per cent of all parking stalls in a commercial building, or the commercial component of a mixed use building must be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, for the use of electric vehicle charging.
- Sentence (6) mandates that the branch circuit rated not less than 40 A at the nominal voltage of 208 / 240 V) must be provided to power supply to the receptacle required by Sentences (4) and (5). As allowed under the CE Code Rule 86-300 Subrule (2), such systems can use load management technologies to share circuits between loads. The intent of this rule is to ensure Level 2 charging, as defined by the Society of Automotive Engineers (SAE), is available to owners when EV charging is operating at full output, but can be managed such that total power output is 'throttled' in cases where multiple vehicles are charging at a given time, thereby lessening the total load calculated for EV electrical supply for a building.

Requirements for electrical rooms described in Article 10.2.3.2. remain unchanged.

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*DEFINED TERMS - Refer to Division A of the VBBL

Row housing means a building of residential occupancy where no dwelling unit is located above another dwelling unit and there is no common interior or exterior means of egress.

Laneway house means a detached dwelling unit constructed in the rear yard of a parcel on which is situate a one-family dwelling or one-family dwelling with secondary suite.

One-family dwelling with secondary suite means a building containing only two dwelling units of which the secondary suite is smaller than the principal residence.

Two-family dwelling with secondary suites means a building containing two self-contained dwelling units where each self-contained dwelling unit contains one secondary suite.

Secondary suite means that area of a building that is intended to be a dwelling unit that is smaller than the principal residence in the same building.

Lock-off unit means a smaller dwelling unit within a larger principal dwelling unit, which must have separate external access and shared internal access, and which can be locked off from the larger dwelling unit, but does not include a secondary suite.