

EV Requirements for New Construction

March 2020

To support EV charging, Nelson City Council has adopted requirements for parking spaces in new buildings to feature electrical outlets capable of providing “Level 2” electric vehicle (EV) charging. Plans submitted for Development Permit applications and Building Permit applications must indicate an energized outlet at all applicable stalls under this requirement.

Nelson’s Off-Street Parking and Landscape Bylaw references the SAE International (the Society of Automotive Engineers) J1772 Standard, which defines an “Level 2” charging as:

Nominal Supply Voltage (V)	Max Current Range (Amps-continuous)
208 or 240V AC, single phase	From 16A to 80A

Nelson’s requirements specify that parking spaces feature an energized outlet capable of providing “Level 2” EV charging. An “energized outlet” means a connected point in an electrical wiring installation at which current is taken to supply utilization equipment. It does not refer to “electric vehicle supply equipment” (EVSE – i.e. an EV charging station). Developers and builders are welcome to implement EVSE at parking spaces; however, the City’s minimum requirement is an energized outlet be provided. An energized outlet can take the form of an outlet box with a cover, or an electrical receptacle of an appropriate configuration:



Examples: Outlet box with cover; electrical receptacle (6-50R)

If supplying a 6-50R receptacle, a wire and breaker also rated at 50A must be supplied (2018 Canadian Electric Code 26-700(2) and 14-104).

In cases where outlets must be installed outside to serve outdoor parking spaces, weatherproof enclosures should be used.

The bylaw sets the following requirements:

- Energized outlets provided pursuant to this section shall be clearly labelled for their intended use as electric vehicle charging.
- For new buildings that contain at least one dwelling unit, **at least one parking space per dwelling unit** shall feature Level 2 Charging or higher.
- For the first 10 required parking spaces, or a part thereof, for a **commercial, industrial, mixed-use, public, or institutional use**, a minimum of two parking spaces shall feature Level 2 Charging or higher, plus two Level 2 Charging or higher spaces for any portion of each additional 10 parking spaces.
- Where one or more accessible parking spaces are required by the bylaw, at least 50% shall feature Level 2 Charging or higher.
- Where a car-share stall is provided under subsections 7.3(2) or 7.3(5) of the bylaw, it shall feature Level 2 Charging or higher.

No electric vehicle parking will be required to construct a new dwelling unit within an existing building; for example, a secondary suite.

Residential Developments with Private Parking Spaces

To meet the City's requirements, **these parking areas must feature energized outlets of 208-240V AC 1-phase, and minimum 32 amp (40 amp branch breaker)**. One outlet can be shared between two, three or four adjacent parking spaces; users will have the option to install a multi-headed charging station to serve multiple vehicles.

In cases where no additional circuits are available for EVSE and dedicating a 40A circuit to the charging infrastructure would lead to an electrical panel upgrade, a "load miser", "watt miser" or "charge controller" may be used. Such equipment options allow a Level 2 charger to be implemented without exceeding the capacity of a panel or circuit. This does not preclude other EV energy management systems from being used.

Multi-Unit and Commercial Developments with Shared Parking Areas

Two strategies may be used to meet the requirements:

1. Dedicated Circuits

Projects can meet the requirement by providing a dedicated circuit capable of providing Level 2 charging to an outlet at each parking stall at each parking stall. Attachment 1 illustrates such a configuration. It indicates a 40A dedicated branch circuit per stall, which isn't a receptacle but a connection point for an EVSE (Charging Station).

2. EV Energy Management Systems

"EV energy management systems" refers to a variety of technologies that can control the electrical load associated with charging EVs. These systems are also variously referred to as "load sharing", "load management", "smart charging", etc. Many EV energy management systems for multifamily developments entail multiple EVSE connected to one electrical circuit, with EVSE with communications capabilities able to control their collective load so as not to exceed the capacity of a circuit. Designing for EV energy management systems can reduce the load for which the building electrical systems must be constructed, and thereby lower costs, relative to dedicated circuits. Section 8 of the 2018 edition of the Canadian Electrical Code recognizes the use of "EV energy management systems".

Attachment 2 indicates an EVSE at each of the 4 points on the shared branch circuit, with overall EV energy management system control of the 4 EVSE points.

The City of Richmond commissioned a report that profiles a variety of EV energy management system configurations, including commentary on their benefits, limitations, applications, and BC Electrical Code compliance considerations. The report is available here: www.richmond.ca/__shared/assets/EV_Charging_in_Shared_Parking_Areas_Report51731.pdf

Performance Standard

As per the bylaw, the Director of Development Services can establish a performance standard for projects with EV energy management systems. The performance standard is:

The system must be capable of supplying a minimum performance level of 12 kWh per parking space over an eight (8) hour overnight period, assuming that all parking spaces are in use by a charging EV.

Projects implementing EV energy management systems must provide for communications technology necessary for the function of an EV energy management system (e.g. cellular, wireless, or cabled infrastructure).

The intent of the performance standard is to ensure sufficient electricity is available to EV drivers to ensure a reasonable rate of overnight recharging. A variety of electrical infrastructure configurations are capable of meeting this performance standard. One configuration is to provide four (4) or fewer outlets on a 208V 40A circuit (see Attachment 2)¹.

Management of EV Charging in Stratas

New developments are encouraged to file strata bylaws and/or establish rules and service contracts which ensure successful management of EV charging infrastructure.

Guidance on strata bylaws and rules is available in the report linked below:

www.richmond.ca/__shared/assets/EV_Charging_in_Shared_Parking_Areas_Report51731.pdf

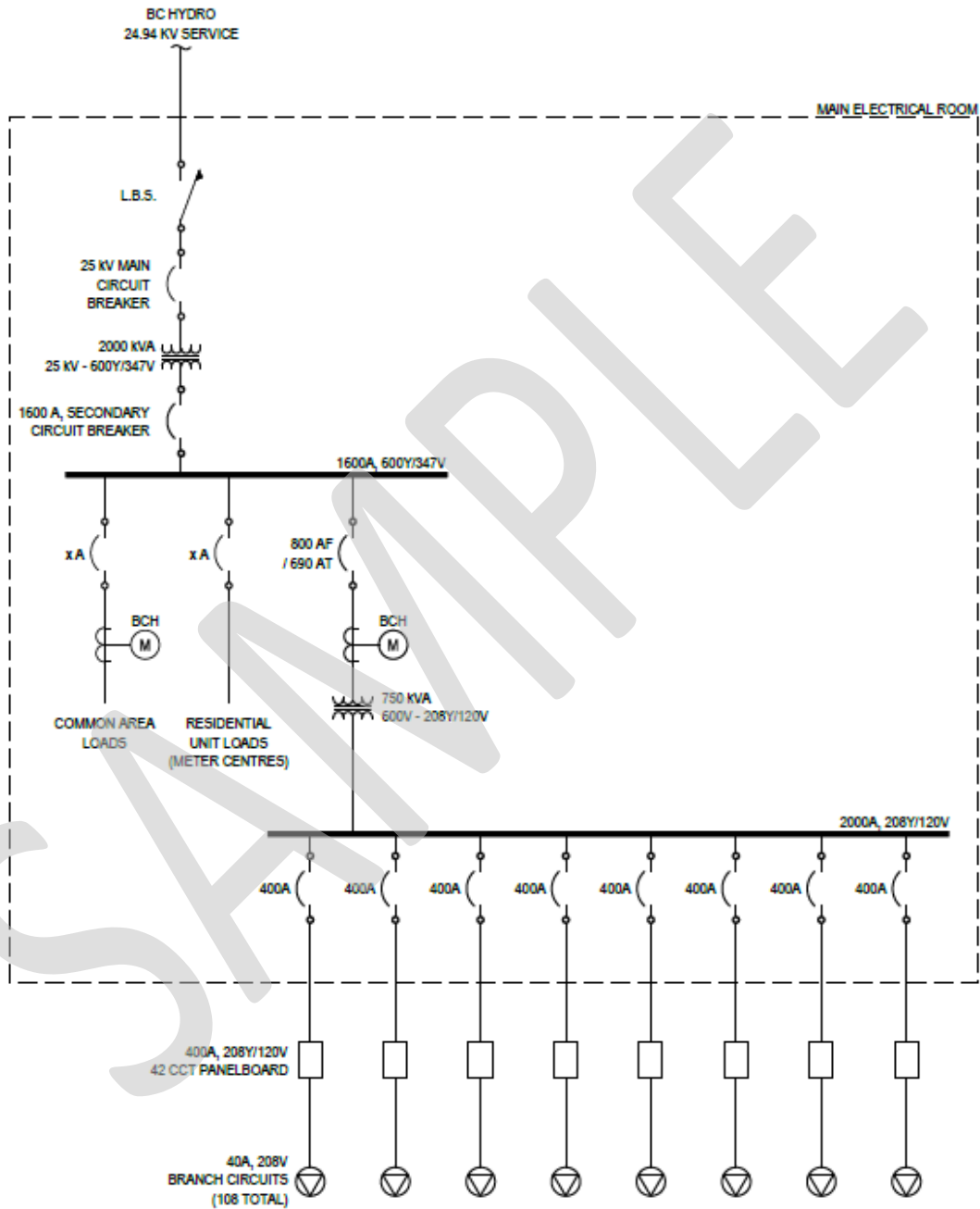
Likewise, model strata bylaws are available from: <http://pluginbc.ca/resource/strata-bylaw-templates-ev-charging/>

EV load should be metered separately from the “House” (i.e. common area or building) load. Energized outlets may be connected to a single BC Hydro meter that is separate from other meters. Alternately, energized outlets must be connected to a dedicated BCH meter sockets for each outlet.

¹ This does not preclude configurations with higher capacity branch circuits and larger numbers of chargers —other configurations may employ higher amperage circuits and share more EVSEs, or they might use dedicated circuits to the EVSEs and overload the panel with an energy management system to limit the use, provided the performance standard is met with an equivalent supply.

Attachment 1: Electrical Configuration for Dedicated Circuits – Multifamily Development

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HIGH RISE - CITY CENTRE 100% L2

project

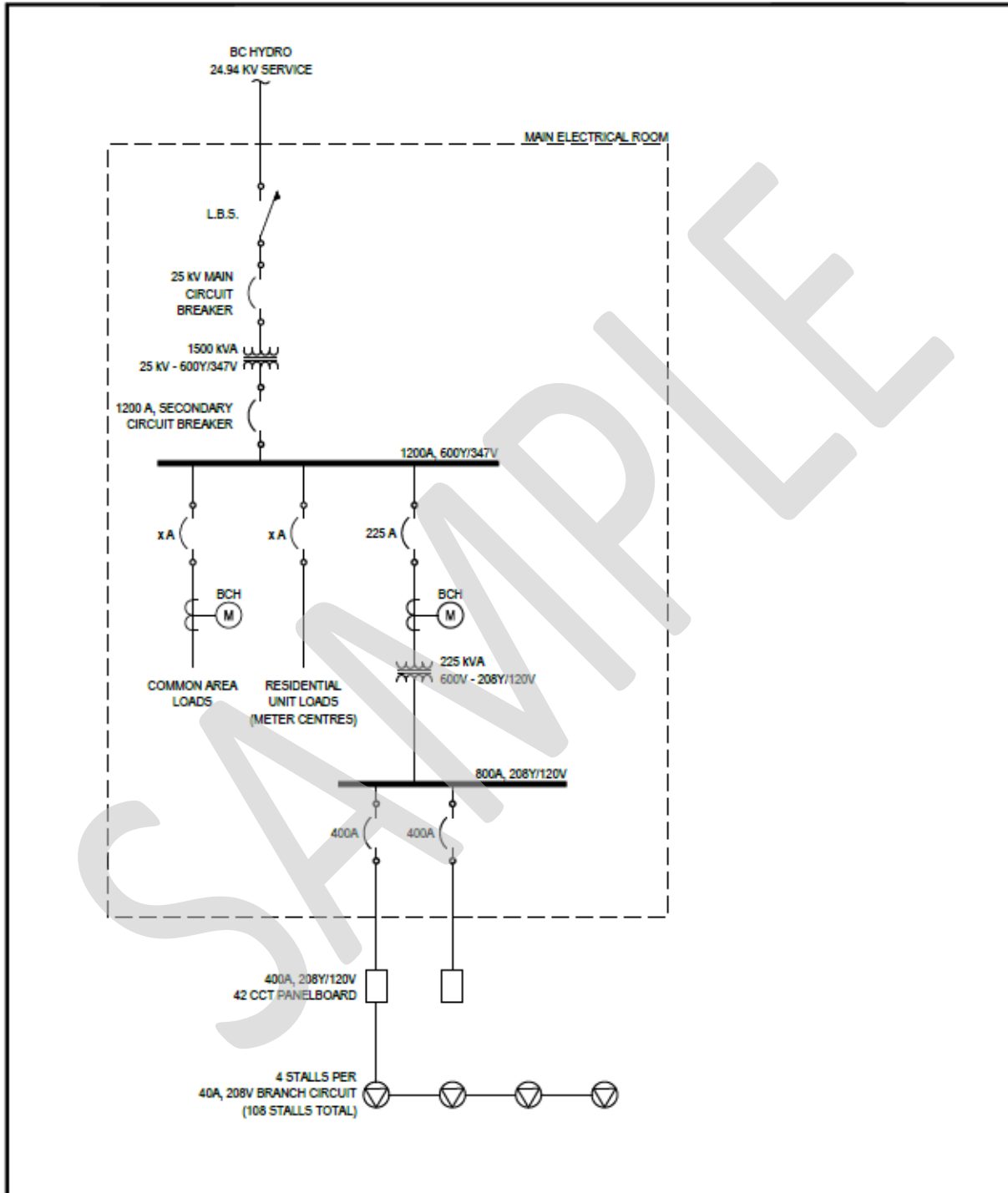
ELECTRIC VEHICLE CHARGING INFRASTRUCTURE REQUIREMENTS

designed	CF	scale	N/A	date	2017 JAN 18
drawn	CF	project no.	2-16-334		
checked	RB	drawing no.	E002		
approved	RB	rev.	1		

drawing title: Electric Vehicle Charging Infrastructure Requirements - 100% L2

Attachment 2: Electrical Configuration for 4-way Load Sharing Across a Circuit – Multifamily Development

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drawing title	HIGH RISE - CITY CENTRE 100% L2, 4-SHARED	
project	ELECTRIC VEHICLE CHARGING INFRASTRUCTURE REQUIREMENTS	

designed	CF	scale	N/A	date	2017 JAN 16
drawn	CF	project no.		2-16-334	
checked	RB	drawing no.		rev.	
approved	RB	E003		1	