The following consolidated text of Part 10 of the VBBL is for information only, is intended to represent the Part 10 of the VBBL in effect as of June3, 2019. Important text in other sections related to Part 10 is also provided for information only.
Red text represents bylaw #12103and # changes approved by Council on May 2, 2018, enacted on May 15, 2018, and taking force and effect on June 3, 2019.

In Book I, Division B, Part 1, Council updates references from:

- ASHRAE 90.1-2010 to ASHRAE 90.1-2016;(Implementation date delayed to June 3, 2019 from January 1, 2019)
- NECB 2011 to NECB 2015. (Implementation date delayed to June 3, 2019 from January 1, 2019)

In Book I, Division B, Part 6, Sentence 6.2.2.1.(4), Council strikesthe words “of 6 storeys or less in building height and”, leaving:

> **4)**For *suites* in *buildings* required to conform to Part 10, the outdoor air required by Sentence (3) shall be supplied directly to each *suite* by mechanical ventilation ducting.

Part 10
Energy and Water Efficiency

Part 10
Energy and Water Efficiency

Section 10.1. General

10.1.1. Application

10.1.1.1. Scope

1) The scope of this Part shall be as described in Subsection 1.3.3. of Division A.

10.1.1.2. Application

1) The application of this Part shall be as described in Subsection 1.3.3. of Division A.

10.1.2. Definitions

10.1.2.1. Defined Terms

1) Words that appear in italics are defined in Article 1.4.1.2. of Division A.

Section 10.2. Energy Efficiency

10.2.1. Energy Design Building Classification

10.2.1.1. Application

1) Except as permitted by Sentence (2), a *building* shall be designed and constructed in conformance with this Subsection for the purpose of energy efficiency.

2) A structure that cannot be identified by the characteristics of a *building* in this Subsection shall comply with the requirements of 10.2.1.2., or as deemed *acceptable* to the Chief Building Official.

3) To meet the energy efficiency requirements of Articles 10.2.1.2. to 10.2.1.5., the design requirements of Subsection 10.2.2. shall form an integral part of this Subsection.

10.2.1.2. Buildings Without Residential or Commercial Components

1) All *buildings*, except those included in 10.2.1.3 through 10.2.1.6, shall

a) be designed in compliance with

i) 10.2.2.2. or 10.2.2.3.,or

ii) 10.2.2.2. in a building required to be designed to Part 9 by Division A, 1.3.3.3.,

b) Reserved,
c) Reserved,
d) Reserved,
e) beprovided with vestibules in compliance with Article 10.2.2.8.,
f) be provided with metering equipment in compliance with Article 10.2.2.9,
g) be provided with lighting in compliance with Article 10.2.2.10.,
h) Reserved.

i) comply with Article 10.2.2.15., where fire places are provided.

10.2.1.3. Residential Buildings of 7 Storeys or More, and Commercial Buildings (with or without residential components)

1) All *buildings* containing Group C, D, or E *Major Occupancies*, except those included in 10.2.1.4 through 10.2.1.6., shall

a) be designed in compliance with Article 10.2.2.5,
b) Reserved,
c) Reserved,
d) Reserved,
e) be provided with vestibules in compliance with Article 10.2.2.8.,
f) be provided with metering equipment in compliance with Article 10.2.2.9,
g) be provided with lighting in compliance with Article 10.2.2.10.,
h) Reserved,
i) comply with Article 10.2.2.15., where domestic gas fireplaces are provided, and
j) provide airtightness testing in compliance with Article 10.2.2.21.

10.2.1.4. Residential Buildings of 4 to 6 Storeys, and Mixed-Use Residential Buildings of 1 to 6 Storeys

1) Except for *buildings* included in 10.2.1.5 or 10.2.1.6, a *building* which is less than 7 *storeys* in *building height*, and which is classified as a Group C *major occupancy*, and containing no other *occupancies* (excluding Group D or E *major occupancy* on the first or second *storeys*, or Group F Division 3 (Storage Garage) *occupancy* subsidiary to the Group C major *occupancy*), shall

a) be designed in compliance with
   i. energy and emissions performance per Article 10.2.2.5, or
   ii. Articles 10.2.2.2. or 10.2.2.3., excluding building envelope trade-off and whole building energy modelling options, and provided with the thermal performance of Articles 10.2.2.6.and 10.2.2.7., and heat recovery ventilators in compliance with Article 10.2.2.17.

b) be provided with vestibules in compliance with Article 10.2.2.8.,
c) be provided with metering equipment in compliance with Article 10.2.2.9.,
d) be provided with lighting in compliance with Article 10.2.2.10.,
e) be provided with mechanical equipment in compliance with Articles 10.2.2.11. through 10.2.2.14.,
f) comply with Article 10.2.2.15., where domestic gas fireplaces are provided, and
g) provide airtightness testing in compliance with Article 10.2.2.21.

10.2.1.5.Residential Buildings of 1 to 3 Storeys (other than 1 or 2 Family Dwellings)

1) Except as otherwise required in this Subsection, a *building*, other than a *1 or 2 Family Dwelling*, which is less than 4 *storeys* in *building height*, and which is entirely classified as Group C *major occupancy*, excluding Group F Division 3 (Storage Garage) *occupancy* subsidiary to the Group C *major occupancy*, shall

a) be provided with thermal performance in compliance with Article 10.2.2.6.,
b) be designed with thermal performance in compliancewith Article 10.2.2.7.,
c) be provided with vestibules in compliance with Article 10.2.2.8.,

d) be provided with metering equipment in compliance with Article 10.2.2.9.,
e) be provided with lighting in compliance with Article 10.2.2.10.,
f) comply with Articles 10.2.2.11. through 10.2.2.13., where domestic hot water heating is provided,
g) comply with Article 10.2.2.14., where domestic gas heated furnaces or make-up air units are provided,
h) comply with Article 10.2.2.15., where domestic gas fireplaces are provided,
i) be provided with and heat recovery ventilators in compliance with Article 10.2.2.17.,
j) be designed with a solar photovoltaic ready pipe run in compliance with Article 10.2.2.19.,
k) provide documentation in compliance with Article 10.2.2.20., and
l) provide airtightness testing in compliance with Article 10.2.2.21.

10.2.1.6.One and Two Family Dwellings

1) Except as otherwise required in this Subsection, a *one-family dwelling* and *two-family dwelling*, with or without *secondary suites* or *lock-off units*, and including *laneway houses*and any other subsidiary structure with conditioned space(s), shall

a) be designed with thermal performance in compliance with Article 10.2.2.6.,
b) be designed with thermal performance in compliance with Article 10.2.2.7.,
c) be provided with metering equipment in compliance with Article 10.2.2.9.,
d) be provided with lighting in compliance with Article 10.2.2.10.,
e) comply with Articles 10.2.2.11. through 10.2.2.13., where domestic hot water heating is provided,
f) comply with Article 10.2.2.14., where domestic gas heated furnaces or make-up air units are provided,
g) comply with Articles 10.2.2.15.and 10.2.2.16., where domestic gas fireplaces are provided,
h) be provided with heat recovery ventilators in compliance with Article 10.2.2.17.,
i) be designed with a solar photovoltaic ready pipe run in compliance with Article 10.2.2.18 or 10.2.2.19,
j) provide documentation in compliance with Article 10.2.2.20., and
k) provide airtightness testing in compliance with Article 10.2.2.21.

10.2.2. Design Measures for Energy Efficiency

10.2.2.1. Application

1) This Subsection applies to all *buildings* and parts of the *buildings* that are required to be energy efficient under Subsection 10.2.1.

10.2.2.2. ANSI/ASHRAE/IESNA 90.1

1) A *building* designed in accordance with this Article shall, be designed and constructed in accordance with ANSI/ASHRAE/IESNA 90.1, “Energy Standard for Buildings, except Low-Rise Residential Buildings”, and with

a) a climate zone of 4,
b) ventilation in compliance with ASHRAE 62-2001 (except addendum n), or ifapplicable, 6.2.2.1.3.b) of the building bylaw,

c) the 5 per cent in Table 11.5.1.5. Building Envelope, Exception a., being replaced by 2 per cent, if designed in compliance with ASHRAE 90.1, Section 11,
d) the 5 per cent in Table G3.1.5.a. Building Envelope, Exception 1., being replaced by 2 per cent, if designed in compliance with ASHRAE 90.1, Appendix G,
e) no requirement to comply with the Fenestration Orientation provisions of ASHRAE 90.1, Article 5.5.4.5.,
f) no requirement to comply with Automatic Receptacle Control, per ASHRAE 90.1, Article 8.4.2.

10.2.2.3. National Energy Code of Canada for Buildings

1) A *building*, other than a Part 9 *building*, designed in accordance with this Article shall be designed and constructed in accordance with the National Energy Code of Canada for Buildings (NECB), except that the provisions of this By-law shall apply where the NECB refers to the National Building Code of Canada (NBCC), and shall be designed with

a) a climate zone of 4,
b) ventilation in conformance with ASHRAE 62 (except addendum n),
c) window-to-wall and skylight-to-roof area ratios of the reference building identical to area ratios of the proposed building,
d) a vertical glazing Solar Heat Gain Coefficient which does not exceed an assembly maximum of 0.36,
e) a skylight Solar Heat Gain Coefficient for all types, which does not exceed an assembly maximum of 0.40, where the ratio of the aggregate skylight area to roof area is less than or equal to 3.0 per cent.

10.2.2.4. Reserved.

10.2.2.5. Zero Emissions Building Plan (ZEBP) - Performance Limits

1) For a *building* required to comply with this Article, any energy modelling shall comply with:
   a. the applicable requirements of Part 8 of the NECB, and
   b. the City of Vancouver Energy Modelling Guidelines.

2) Except as permitted in Sentence (3), a *building* designed with this Article shall demonstrate the performance values of the proposed *building*in compliance with the limits in Table 10.2.2.5.A.

3) Compliance with the GHGI limits in Table 10.2.2.5.A is not required where a *building* can demonstrate the performance values of the proposed *building* comply with the TEUI and TEDI limits in Table 10.2.2.5.B.

Table 10.2.2.5.A Maximum Energy Use and Emissions Intensities Forming part of Sentence 10.2.2.5.(2)			
Occupancy Classification [1]	**Total Energy Use Intensity (kWh/m^2a)**	**Thermal Energy Demand Intensity (kWh/m^2a)**	**Greenhouse Gas Intensity ($kgCO_{2e}/m^2a$)**
Group C *occupancies* in *buildings* up to 6 *Storeys*	110	25	5.5
Group C *occupancies* in *buildings* over 6 *Storeys*, except Hotel and Motel	130	45	14
Hotel and Motel *occupancies*	170	30	14
Group D and E *occupancies*, except Office	170	30	5
Office *occupancies*	130	30	7
All other *occupancies*	Comply with ASHRAE 90.1 ECB in accordance with Article 10.2.2.2, or NECB Part 8 in accordance with Article 10.2.2.3		

Notes to Table 10.2.2.5.A.:

(1) For buildings containing multiple *occupancies*, refer to the procedures on mixed-use buildings in Section 5 of the City of Vancouver Energy Modelling Guidelines.

Table 10.2.2.5.B Maximum Energy Use and Emissions Intensities Forming part of Sentence 10.2.2.5.(3)			
Occupancy Classification	**Total Energy Use Intensity (kWh/m^2a)**	**Thermal Energy Demand Intensity (kWh/m^2a)**	**Greenhouse Gas Intensity ($kgCO_{2e}/m^2a$)**
Group C *occupancies* in *buildings* over 6 *Storeys*, except Hotel and Motel	120	30	6
Hotel and Motel *occupancies*	140	20	8
Group D and E *occupancies*, except Office	120	20	3
Office *occupancies*	100	20	3

10.2.2.6. Building Envelope Opaque Elements

1) Except as otherwise required in this Subsection, a *building* required to comply with this Article shall be comply with the performance values in Table 10.2.2.6., between

a) heated space and unheated space,
b) heated space and exterior air,

c) heated space and exterior *soil*,
d) heating floor assemblies and heated space,
e) heating floor assemblies and unheated space,
f) heating floor assemblies and exterior air, and
g) heating floor assemblies and exterior *soil*.

Table 10.2.2.6.
Minimum Effective Thermal Resistance of Assemblies in Buildings of Group C Major Occupancy
Forming part of Sentences 10.2.2.6.(1)

Building Assembly	**Assembly Minimum RSI Value (m^2°K/W)**
Attic Space[1]	8.5
Roof Joist Assemblies for one and two family dwellings (Cathedral Ceilings/Flat Roofs)	4.3
Roof Assemblies other than one and two family dwellings (Cathedral Ceilings / Flat Roofs)	5.28
Walls (including frame crawl space walls)[3]	3.85
Foundation Walls	3.85
Box and Rim Joists	3.85
Concrete or Masonry Walls (other than foundation walls)	3.85
Suspended Floors (framed)	4.2
Suspended Floors (concrete slab)	4.2
Concrete Slabs on Ground at, above, or below grade (insulation under all slab area and around edge of slab))	2.5
Radiant Heating Suspended Floor Assembly Over Heated Area (insulation between heated floor and heated area below)[2]	2.5
Concrete Balconies, Eyebrows, and Exposed Slab Edge (wrapped or using manufacturer thermal break in structure)	0.42

Notes to Table 10.2.2.6.:

[1]The thermal resistance rating of attic space insulation may be reduced to value required for frame walls for a distance of 1.0 m from the exterior wall.
[2]Not applicable when heating elements or piping are located within a concrete topping on a suspended floor assembly or within an internally heated suspended slab.
[3] Headers and lintels: cavities between structural members are to be fully insulated, except where a framing plan provided by the builder, architect, designer, or engineer indicates that full-depth solid headers are structurally required.

2) Insulation and the installation of insulation in a *building* designed to the requirements of Part 9 shall comply with Subsection 9.25.2. or Part 5.

3) The effective total “R” value of the opaque envelope area, the non-opaque envelope area, and the overall envelope area, calculated by a design professional, shall be submitted as part of an application for a *building permit.*

10.2.2.7. Building Envelope Windows, Skylights, Doors and Other Glazed Products

1) Except as otherwise required in this Subsection and as permitted by Sentence (2), a *building* required to comply with this Article shall comply with the performance values in Table 10.2.2.7.(1) and shall be labeled accordingly. (See Appendix A)

Table 10.2.2.7.(1) **Maximum Thermal Transmittance of Exterior Closures and Fenestration** Forming part of Sentence 10.2.2.7.(1)	
Type of Closure	Maximum Thermal Transmittance (W/(m^{2}K))
Windows and sliding doors or folding doors with glazing	1.4
Doors with or without glazing(1)	1.8
Doors with a required fire resistance rating	Exempt
Roof access hatches	2.9
Tubular daylight devices	2.6
Skylights larger than 1220mm in two directions	2.95
Skylights (not larger than 1220mm in two directions), roof windows and sloped glazing systems	2.4
Curtainwall and window wall assemblies	1.4
Storefront curtainwall, window, and door assemblies	2.27

Notes to Table 10.2.2.7.(1):

(1) Includes doors swinging on a vertical axis with or without glazing, door transoms, and sidelites.

2) A maximum of one entry door assembly consisting of one or two leafs installed in the principle entrance of a building, together with attached transoms and sidelites all within a single rough opening, need not comply with Table 10.2.2.2.(1), where constructed of thermally broken metal or wood with multiple panes of glass, which may be argon filled, or coated with a low-e coating.

3) The thermal transmittance of factory glazed products within the scope of existing certification programs shall be indicated by labels applied to the products at the manufacturing location. The thermal transmittance of site glazed products and products outside the scope of existing certification programs shall be suitably documented. (See Appendix A)

10.2.2.8. Building Envelope Vestibules

1) Except as permitted in Sentence (2), in a *building* required to comply with this Article there shall be an enclosed vestibule in all *building* entrances separating a conditioned space from the exterior, designed such that

a) all doors opening into and out of the vestibule shall be equipped with self-closing devices,
b) the interior and exterior doors of the vestibule shall be separated by no less than 2.1 m when closed,and the floor area of each vestibule shall not exceed 4.65 m^2 or 2% of the gross conditioned floor areas for that level of the *building*,
c) for spaces having a gross conditioned floor area for that level of the building of 3,716.1m^2 and greater, and when the doors opening into and out of the vestibule are equipped with automatic, electrically driven, self-closing devices, the interior and exterior doors shall be separated by 4.87m .
d)the exterior envelope of a conditioned vestibule shall comply with the design requirements for a conditioned space, and
e)the interior and exterior envelope of an unconditioned vestibule shall comply with the design requirements for a semi heated space.

2) An enclosed vestibule is not required for

a) a *building* entrance with revolving doors,

b) a door not intended to be used as the *building* entrance,
c) a door opening directly to the exterior from a *dwelling unit*,
d) a *building* entrance, in a *building* less than 278.7 m^2 in gross *floor area*,
e) a door which is separate from the *building* entrance and opens directly to the exterior from a space that is less than 278.7 m^2 in gross *floor area*, and
f) a building pursuing certification with the Passive House (PHI) standard.

10.2.2.9. Building Services Submetering

1) Every *building* shall be equipped with metering equipment capable of collecting *building* energy performance data for the *building* and for every portion of the *building* which supports a separate use or *occupancy*.

2) Submetering required by this Article shall include the following

a) hot water generated by a central hot water generation system
b) natural gas used for air handling systems in common areas, and
c) natural gas used for domestic hot water in amenity spaces, pools and spas.

10.2.2.10. Lighting in Residential Buildings

1) Where a portion of a residential *building* or a portion of a multi-use *building* located above a garage or on an adjacent grade contains more than 20 residential *suites*, the *building* shall be designed with

a) *occupancy* based lighting sensor controls, located in all *exit* stair shafts and parking garages, compatible with the requirements of Sentence 3.2.7.3.(1) of Division B, and
b) a switch near the principal entrance of each residential *suite* that
    i) controls all lighting fixtures within the *suite*, except lights serving corridors, stairs, washrooms, and rooms with no exterior window.
    ii) with an override on each floor, serving that floor, of a multilevel suite

2) Except as permitted by Sentence (3) and except for exterior lighting along paths of pedestrian and vehicular travel, fire department access, and signage and equipment lighting, the permanent ancillary exterior lighting of a *building* of *residential occupancy* that is required to conform to this Article shall
    a) be provided with fixtures that are fully shielded or full cut-off optics that:
        i) do not emit light upwards or horizontally beyond the property line, and
        ii) limit backlighting of building walls, roofs, or reflective surfaces to not more than4 lux at any given point;
b) minimize lighting of adjacent exterior properties;
c) not exceed an illumination level of 2 lux average on any reflective surface; and
d) conform with the exterior lighting power requirements of ASHRAE 90.1 of NECB.

3) Exterior directional lighting designed with integral automatic motion sensing devices need not comply with the requirements of Sentence (2) provided it shuts off within 5 minutes.

(see Appendix A)

10.2.2.11. Hot Water Tank Piping

1) In a *building* required to comply with this Article, the first 3 m of non-recirculating hot water piping leading from both electrically heated and gas heated hot water tanks, and the last 1 m of piping leading to the hot water tank connection, shall have insulation with a minimum RSI value of 0.35.

10.2.2.12. Domestic Gas-Heated Hot Water Heaters

1) In a *building* required to comply with this Article , gas-heated appliances providing domestic hot water onlyshall have a uniform energy factor of not less than 0.78 or alternatively a thermal efficiency of not less than 90%, except that existing homes may have a uniform energy factor of not less than 0.62, as determined by the following

a) CSA P.3-04, “Testing Method for Measuring Energy Consumption and Determining Efficiencies of Gas-Fired Storage Water Heaters”,
b) CSA P.7-10, “Testing Method for Measuring Energy Loss of Gas-Fired Instantaneous Water Heaters”,
c) CSA C191-04, “Performance of electric storage tank water heaters for domestic hot water service”, or
d) CSA 4.3/ANSI Z21.10.3, “Gas Water Heaters Volume III, Storage Water Heaters, with Input Ratings above 75,000 Btu per hour, Circulating and Instantaneous”.

10.2.2.13. Domestic Gas-Heated Boilers

1) In a *building* required to comply with this Article, domestic gas-heated boilers providing heat, or heat and domestic hot water, shall have an Annual Fuel Utilization Efficiency (AFUE) rating of not less than 92 per cent, as tested using CSA P.2-07, “Testing Method for Measuring the Annual Fuel Utilization Efficiency of Residential Gas-fired Furnaces and Boilers”.

10.2.2.14. Domestic Gas-Heated Furnaces or Make Up Air Units

1) In a *building* required to comply with this Article, domestic gas-heated furnaces or make up air units shall have an Annual Fuel Utilization Efficiency (AFUE) rating of not less than 92 per cent, as tested using CSA 2.6/ANSI Z83.8, “Gas unit heaters, gas packaged heaters, gas utility heaters and gas-fired duct furnaces”.

10.2.2.15. Domestic Gas-Fired Fireplaces

1) In a *building* required to comply with this Article, domestic gas-fired fireplaces in conditioned spaces shall be equipped with

a) intermittent pilot ignition (IPI) systems,
b) on-demand ignition systems that automatically shut off within

i) 7 days of appliance non-use in a one or two family dwelling building, or
ii) 6 hours of appliance non-use in a multifamily dwelling, or

c) match ignition.

2) In a *building* required to comply with this Article, domestic gas-fired fireplaces shall be direct vented(Naturally Aspirating Fuel-Fired Appliances (NAFFVA) are not permitted).

3) In a *building* required to comply with this Article, domestic gas-fired fireplaces must be on a timer.

4) Where exterior gas fireplaces are provided as an ancillary equipment to a *building* required to comply with this Article, then the exterior fireplaces shall be considered as part of the *building* for the purposes of this Part (see Appendix A).

10.2.2.16. Domestic Wood Burning Heating Appliances

1) In a *building* required to comply with this Article, and except for cooking stoves and ranges, a wood domestic burning heating appliance installed in a residential *dwelling unit* shall be tested in accordance with CAN/CSA B415.1-10 "Performance Testing of Solid-Fuel-Burning Heating Appliances" or EPA Title 40, Part 60, Subpart AAA - "Standards of Performance for New Residential Wood Heaters", and shall

a) produce not more than 2.5 grams per hour of particulate air contaminant emissions for catalytic appliances, or
b) produce not more than 4.5 grams per hour of particulate air contaminant emissions for non-catalytic appliances.

2) Open masonry fireplaces and factory-built fireplaces are not permitted.

10.2.2.17. Domestic Heat Recovery Ventilators

1) In a *building* required to comply with this Article, each dwelling unit shall be served by a heat recovery ventilator located in

a) each dwelling *unit*, or
b) a commonly accessible location if serving multiple *dwelling units*.

2) In a *building* required to comply with this Article, components of mechanical ventilation systems not specifically described in this Subsection shall be designed, constructed and installed in accordance with good engineering practice and as described in the ASHRAE Handbooks and Standards, HRAI Digest, TECA Ventilation Guideline, Hydronics Institute Manuals or the SMACNA manuals.

3) In a *building* required to comply with this Article, a heat recovery ventilator (HRV) shall

a) be sized to run at its rated speed for continuous operation while achieving a 65 per cent sensible heat recovery efficiency (65 per cent Minimum SRE at 0°C) and be designed and tested in conformance with CSA 22.2 No. 113M-1984,
b) be designed and tested to meet the CSA International Standard CAN/CSA-F326-M91, "Residential Mechanical Ventilation Systems",
c) beinstalled and commissioned by persons trained by the Thermal Environmental Comfort Association (TECA) or the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) or equivalent,
d) supply outdoor air directly to the principal living area, to each bedroom, and to any *floor area* without a bedroom, including similar rooms within *secondary suites* and *lock-off units*, directly or indirectly, through a central recirculation system with a continuously operating fan,

e) be designed to run continuously to comply with the minimum ventilation rates of Table 9.32.3.3.A of Division B,
f) not be connected to kitchen and bathroom exhaust fans,
g) except for mechanical ducts cast into concrete structure,have exterior connected supply-air ducts and exhaust ducts insulated to not less than RSI 0.75 (R 4.25) and shall have an effective vapour barrier,
h) have balanced HRV supply and exhaust air flows within plus or minus 20 per cent of the actual normal operating exhaust capacity,
i) be labelled with tested supply and exhaust air flows for high and low settings, measured in CFM, and
j) be located within *conditioned space* and fully serviceable space in the dwelling unit for access.

4) In a *building* required to comply with this Article, the HRV system contractor or installer shall provide a completed Mechanical Ventilation Checklist to the Chief Building Official.

5) In a *building* required to comply with this Article, a contractor trained in the installation of energy recovery ventilators (ERV) may install an ERV in lieu of a heat recovery ventilator (HRV).

10.2.2.18. Solar Ready Pipe Run

1) In a *building* required to comply with this Article, a solar ready pipe chase, consisting of at least two 50 mm PVC pipes, capped at both ends and having at least a 20° angle measured above the horizontal level, shall extend from a location near the *service water heater*, to the attic space.

10.2.2.19. Solar Photovoltaic Ready Pipe Run

1) In a *building* required to comply with this Article, a solar ready pipe chase, consisting of at least one 25 mm pipe or liquid tight flexible electrical conduit or electrical metallic tubing capped at both ends and having at least a 20° angle measured above the horizontal level, shall extend from a location near the electrical panel, to the attic space.

10.2.2.20. Passive House Planning Package (PHPP), EnerGuide, or Other Energy Documentation

1) In a *building* required to comply with this Article, at the time of building permit application, and at the time of final inspection, the owner shall provide to the Chief Building Official *acceptable* documentation, in the form of

a) a PHPP file from a Certified Passive House Consultant or Designer, or
b) anEnerGuide Rating System Audit, or
c) for*buildings* ineligible for an EnerGuide Rating System Audit, a Hot2000 file modelled in general mode and using the same baseload assumptions as Energuide for New Homes mode, or equivalent energy modelling documentation, *acceptable* to the Chief Building Official.

2) In a *building* required to comply with this Article, and where a *one family dwelling* or *two family dwelling*, with or without *secondary suites* or *lock-off units*, contains *conditioned space* of more than 325 m^2, including *suites* that are not strata titled, the owner shall

a) provide a calculation utilizing the EnerGuide rating system to demonstrate that the proposed home has a greenhouse gas (GHG) footprint that is no more than

the greenhouse gas (GHG) footprint of a 325 m^2 home built to the minimum standards in the Building Bylaw, and
b) meet the requirements of the modeling guidelines for large homes.

10.2.2.21.Building and Dwelling Unit Airtightness Testing

1) In a *building* required to comply with this Article, the *building* and *dwelling units* shall be tested for airtightness in accordance with

a) ASTM E 779, Standard Test Method for Determining Air Leakage Rate by Fan Pressurization,
b) USACE Version 3, Air Leakage Test Protocol for Building Envelopes, or
c) airtightness protocol recognized by Natural Resources Canada for use in homes and buildings labeled under the EnerGuide for New Homes program.

2) A *building* required to comply with this Article shall have maximum tested air leakage rates in conformance with Table 10.2.2.21., or sealed to the satisfaction of the Chief Building Official.

Table 10.2.2.21.
Maximum Tested Air Leakage Rates
Forming part of Sentence 10.2.2.21.(2)

Building Classification	**Maximum Tested Air Leakage Rate**
Buildings, excluding *1 or 2 Family Dwellings* and ground-oriented *dwelling units*	2.03 L/s/m²at 75 pascals
Ground-oriented *dwelling units*	3.5 air changes per hourat 50 pascals
Suites in *multi-family* buildings	1.23 L/s/m² at 50 pascals

~~Section 10.3. Water Efficiency~~

10.3 Water Efficiency content is being relocated to Book II (Plumbing Systems). Section 10.3 will become Electric Vehicle Charging.

Section 10.3. Electric Vehicle Charging

10.3.1. Electric Vehicle Charging for Buildings

10.3.1.1. Electrical Service and Capacity

(See Appendix A)

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) Where the requirements of section 4.14.1(a) of the Parking By-Law would cause the *dwelling unit* calculated load to exceed 200 A in building containing not more than 2 primary *dwelling units* only, with or without ancillary residential suites, the installation of an energized outlet for Level 2 charging may be omitted provided that a minimum nominal trade size of 21 raceway supplied with pull string leading from the *dwelling unit* panelboard 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.*

3) Where an *electric vehicle energy management system* is implemented, *Chief Building Official* may specify a minimum performance standard to ensure a sufficient rate of electric vehicle charging."

Section 10.5. Objectives and Functional Statements

10.5.1. Objectives and Functional Statements

10.5.1.1. Attribution to Acceptable Solutions

1) For the purposes of compliance with this By-law as required in Clause 1.2.1.1.(1)(b) of Division A of Division A, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 10.5.1.1. (See Appendix Note A-1.1.1.2.(1) of Division A in Appendix A)

Table 10.5.1.1.

Table 10.5.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 10
Forming part of Sentence 10.5.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
10.2.2.2. ANSI/ASHRAE/IESNA 90.1	
(1)	[F85, F86-OE1]
10.2.2.3. National Energy Code of Canada for Buildings	
(1)	[F85, F86-OE1]
10.2.2.5. Building Energy and Emissions Performance	
(1)	[F85, F86-OE1]
(2)	[F85, F86-OE1]
10.2.2.6. Building Envelope Opaque Elements	
(1)	[F85-OE1]
(2)	[F85-OE1]
10.2.2.7. Windows, Glass Doors and Skylights	
(1)	[F85-OE1]
10.2.2.8. Building Envelope Vestibules	
(1)	[F85-OE1]
10.2.2.9. Sub-metering in Buildings	
(1)	[F86, OE1]
(2)	[F86, OE1]
10.2.2.10. Lighting Controls in Residential Buildings	
(1)	[F86, OE1]
10.2.2.11. Hot Water Tank Piping	
(1)	[F85-OE1]
(2)	[F85, F86-OE1]
(3)	[F100-OE1]
10.2.2.12. Domestic Gas-Heated Hot Water Heaters	
(1)	[F86-OE1]
10.2.2.13. Domestic Gas-Heated Boilers	

(1)	[F86-OE1]
10.2.2.14. Domestic Gas-Heated Furnaces	
(1)	[F86-OE1]
10.2.2.15. Domestic Gas-Fired Fireplaces	
(1)	[F86-OE1]
	[F41, F44-OS3.4]
	[F44-OH1.1]
10.2.2.16. Domestic Wood Burning Heating Appliances	
(1)	[F86-OE1]
	[F44-OS3.4]
	[F44-OH1.1]
10.2.2.17. Domestic Heat Recovery Ventilators	
(1)	[F85-OE1]
(2)	[F85-OE1]
10.2.2.20. Passive House Planning Package (PHPP), EnerGuide, or Other Energy Documentation	
(1)	[F85-OE1]
10.2.2.21. Building and Dwelling Unit Airtightness Testing	
(1)	[F85-OE1]
(2)	[F85-OE1]

10.3.1.1. Electrical Service and Capacity	
(1)	[F02-OS1.2]
	[F02-OP1.2]
(2)	[F81-OP1.2]
(3)	[F41-OE1]

A-10.2.2.2.(1) Exterior Lighting Controls in Residential Buildings The objective of Sentence 10.2.2.2.(1) is to require a master switch that will permit non-essential lighting to be turned off when an occupant leaves the premises. As this was only intended to consider residential portions of a building, it is considered acceptable to consider each portion of the building structure located above the parkade slab constructed to Article 3.2.1.2. on an individual basis given that the cost-effectiveness of such energy saving features would not be as significant for smaller structures with proportionally larger exterior wall and roof surface areas relative to their volume.