

Guideline

Guidelines for the Administration of Variances
for Zero Emission Buildings in RS, RT and RA
Districts

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1 Application and Intent

These guidelines explain the administration of variances to Zoning and Development By-law regulations and related processes for residential projects designed to zero emission standards. The guidelines apply to dwelling uses in the RS, RT and RA district schedules, *except laneway houses*. For other zones and uses, see the “Guidelines for the Administration of Variances for Zero Emission Buildings in Larger Projects”.

Applicants must show how the building envelope and mechanical system have been designed to achieve the relevant standard before seeking related variances, and follow the process and requirements in this document.

These guidelines are to be used in conjunction with the relevant district schedule of the Zoning and Development By-law, as well as other applicable guidelines and bulletins. In particular, please consult section 10.23A: Passive House in the Zoning and Development By-law. Because this guideline document primarily addresses zoning considerations, applicants are encouraged to obtain early advice on meeting the requirements of Vancouver’s Building By-law from a Registered Professional.

2 Policy Context

Removing barriers to zero emissions building is part of the City’s emerging policy context. The Zero Emissions Building Plan, Vancouver’s Renewable City Strategy, and the Climate Emergency Response all prioritize removing regulatory barriers to the development of zero emission buildings.

3 Zero Emissions Standards

In this guide, acceptable zero emission standards include Passive House, the CHBA Net Zero Home Labelling Program with electric equipment, ILFI Zero Energy, and PHI EnerPHit. Projects must achieve the standard using on-site, installed equipment. Consideration may be given to equivalent rating systems. Applicants should confirm the suitability of other standards with staff before making an application.

4 Regulation Variances

Achieving a low-energy, high-efficiency home through high quality thermal envelope design and better insulation will result in thicker wall and roof insulation than a typical building, which may affect floor area and height.

Applicants in RS, RT or RA districts may apply for variances to floor area, height, yard, and building depth regulations provided that they demonstrate that they will achieve Passive House Certification or certification in another accepted zero emission standard. These variances may be granted at the discretion of the Director of Planning upon consideration of all applicable guidelines and policies. Please see section 10.23A of the Zoning and Development By-law for the requirements of these variances.

Because these conditional variances may allow extra height or floor space, the design of the project should consider impacts on neighbouring properties such as privacy, daylight, or shadowing in the application.

Other regulations that control building size, such site coverage or side yards, may still apply.

4.1 Floor Area – Fixed Exclusion

Section 10.23A.4 of the Zoning and Development By-law includes a floor area exclusion for zero emissions buildings in the RS, RT and RA districts that is 16% of the gross (or built) floor area in a one-family dwelling, or 18% in a two-family dwelling. This fixed exclusion replaces

previous multiple and more complex exclusions for insulation, mechanical equipment and skylights. Built area that is excluded from overall FSR may be located where it fits within the overall envelope. Where there is more than one FSR limit, such as above-grade FSR in RS-5, calculate and locate each exclusion separately. The amount of gross floor area that can be built under this clause may be estimated with the following formula:

$$\text{Net Area} / (1 - \text{Exclusion Percentage}) = \text{Gross Area}$$

For example, a single-family house that is permitted to have a net floor area of 3,600 sq. ft. by the FSR limit in zoning would use the figures:

$$3,600 \text{ sq. ft.} / (1 - 0.16) = 4,286 \text{ sq. ft.}$$

Applications under section 10.23A.4 cannot use any other floor area exclusions in sections 10.11 or 10.23A, or bay window exclusions.

4.2 Floor Area – Calculated Exclusions

Section 10.11 of the Zoning and Development By-law allows for the exclusion of floor area for insulation using two different calculations. For applications to exclude increased insulation under clause 10.11.2 in a conventional building, a Building Envelope Professional must be retained to calculate and verify the exclusion. In an application designed to the Passive House standard that provides a PHPP energy model, the Certified Passive House Designer or Certified Passive House Consultant may verify the exclusion instead. For more details on this exclusion, see the separate bulletin *Floor Area Exclusions for Improved Building Performance*.

Applications under section 10.11 cannot use the floor area exclusions in section 10.23A.4.

Section 10.23A.3 permits a floor area exclusion for the area occupied by heat recovery ventilators and connected shafts to a maximum exclusion of 2% of floor area being provided. The exclusion recognizes the larger space that may be required for high efficiency units or for additional units within a Passive House project. An HRV that is a Passive House “Certified Component” should be specified. The exclusion does not apply to mechanical equipment that uses the same floor area as a conventional system.

4.2 Height, Yards and Building Depth

Applicants building a zero emissions project may apply for a height variance via section 10.23A.1. This variance allows the Director of Planning to conditionally vary height regulations, including secondary envelopes, in RS, RT, and RA districts for Certified Passive House projects by a maximum of 1 m.

Applicants building a zero emissions project may also apply for front and rear yard setback variances via section 10.23A.1. Front yards that are expressed as a dimension can be varied by a maximum of 0.5m. Rear yards that are expressed as a dimension can be varied by a maximum of 1.25m.

Applicants building a zero emissions project may also apply for a variance to increase permitted building depth. Building depth, and front or rear yards that are expressed as a percentage, may be varied by a maximum of 5%.

4.5 Other Variances

Regulations that allow two-family dwellings in certain R districts include external design regulations that could constrain green building solutions. These regulations can be varied for zero emissions buildings. In RS-1 and other district schedules, the clause that allows a variance of design regulations may be found at the end of section 4.17.

Regulations in certain R districts that require interior spaces greater than 3.7 m in height to be counted into FSR twice may be varied using section 10.23A.1 (f).

The following table provides a reference for zoning variances that are available for green building features. For example, the dimensions of window wells and below grade entrances to basements can also be varied if they are designed to increase solar gain under clause 10.23A.1 (h).

Before making an application, please read the current and relevant regulation in the Zoning and Development By-law, and the related administration bulletins, along with other guidelines or policies. These documents can be found on the City of Vancouver Zoning and Land Use Document Library web page. For example, more information on shading devices located in yards can be found in the “Shading Devices and Yard Projections” bulletin.

Conditional Variance for Green Building Features	Zoning and Development By-law Section
Building depth	10.23A.1 (e)
Building height	10.23A.1 (a)
External design regulations	10.23A.1 (g)
Green roof access and infrastructure - height	10.18.5 (d)
HRVs and connected shafts	10.23A.3
Insulation	10.11.1 and 10.11.2
Rear yard depth	10.23A.1 (d) or (e)
Roof-mounted energy equipment - height	10.18.5 (d)
Shading devices, eaves, and overhangs – yards	10.32.1 (f)
Venting skylights and clerestory window – internal height	10.23A.1 (f)
Venting skylights and clerestory window – external height	10.18.5 (e)
Window wells and basement entry dimensions	10.23A.1 (h)

5 Submission Requirements

This section describes the submission requirements at each project phase. These requirements are **in addition** to those of the development and building permit process for a conventional building.

For zero emission projects pursuing building standards other than PHI's Passive House, such as the ILFI's Zero Energy Certification or the CHBA's Net Zero Home Labelling Program, applicants are expected to provide a comparable level of material. For example, where a PHPP model is required for PHI sites, applications using an alternate standard should submit an

energy or carbon balance, and an energy modelling report. For projects pursuing ILFI's Zero Energy Certification, twelve months of energy performance data is required. For questions about submittals for alternate standards, please contact green.buildings@vancouver.ca.

Please see definitions of terms in section 6 of these guidelines, and note the different roles and responsibilities of the Certified Passive House Consultant or Designer (CPHC or CPHD), the Energy Advisor (EA), and the Passive House Building Certifier (Certifier). Where a CPHC is referred to in this guide, either a CPHC or CPHD may serve. A CPHC who is also an EA can serve in both roles.

5.1 Scheduling an Pre-Application Appointment

When requesting an appointment, applicants should note that the application will be for a house that meets a zero emission standard, and that the project team will be requesting related relaxations.

Development Building (DB) Permit Application to Housing Review Branch: Before requesting an appointment, applicants should consult this document and all typical application documents (such as the "Intake Checklist"). After reviewing the material, applicants should contact the Supervisor of the Housing Review Branch to request an appointment.

5.2 Pre-Application Meeting

At an enquiry or pre-submittal meeting, applicants must provide:

- A design strategy that identifies the zoning variances sought, describes the primary design elements intended to achieve the standard, and shows the elements on conceptual drawings.
- A letter from a consultant who is qualified to administer the proposed zero emission standard, confirming they have been engaged to advise on the project.

Passive House applications: Provide a letter from the CPHC confirming that they have been engaged to do energy modelling and advise on the project. A member of the project team may serve in this role provided that they are a CPHC.

Net Zero applications: Provide a letter from a Qualified Net Zero Service Organization confirming that they have been engaged to advise on the project.

Zero Energy applications: Provide confirmation of registration with ILFI's Zero Energy Certification, and a letter from a Qualified Green Building Consultant confirming they have been engaged to advise on the project.

Proposals should show how potential impacts on neighbouring houses such as privacy, massing, and shadowing have been considered in the design. City staff may provide feedback at the pre-application meeting to inform the application.

5.3 Following the Pre-Application Meeting

- Prepare a preliminary energy model or other material as specified in the chosen zero emission standard, and revise the design as necessary to meet or exceed the standard.

Passive House applications: Applicants are advised to model the project using the current version of the Passive House Planning Package (PHPP) software,

and to revise the design as necessary to meet or exceed the Passive House requirements.

If specific challenges to meeting Passive House targets are identified, these must be resolved before applying for a Development Permit.

Development Building (DB) Permit Application to Housing Review Branch: The applicant must engage an EA. The EA must review the proposed assemblies, submit a detailed copy of the City of Vancouver's "Pre-Permit Checklist", and otherwise comply with pre-permit requirements for one- and two-family housing.

In addition to the PHPP file, applicants must provide the Housing Review Branch with a letter from a Certifier stating that the project design and specifications have been reviewed and, in the opinion of the Certifier, the project is capable of achieving Passive House certification if built to the design and specifications noted in the Certifier's letter.

Once the design, assemblies and components have been identified, and all of the above satisfied, applicants may submit their Development Building (DB) permit application to the Housing Review Branch.

Net Zero applications: Applicants should have the project modelled by a CHBA Qualified Net Zero Energy Advisor to achieve a 0 (zero) GJ rating using modelling methods and calculation in conformance with the EnerGuide Rating System v15, using HOT2000.

5.4 Development Permit Application

Applicants must submit:

- An updated design strategy that:
 - identifies the proposed zero emission standard,
 - specifies the related zoning relaxations being sought,
 - provides a rationale for the relaxation, and
 - identifies the design elements proposed to meet the zero emission standard on the application drawings

Zero Energy applications: Applicants should provide proof of an established energy target and a narrative as to how this target will be achieved, including strategies around energy efficiency, electrification of building systems, and on-site renewable energy generation, from a Qualified Green Building Consultant.

Net Zero applications: Applicants must provide a P-file prepared by a CHBA Qualified Net Zero Energy Advisor showing a 0 (zero) GJ rating using modelling methods and calculation in conformance with the EnerGuide Rating System v15, using HOT2000. The design must meet all requirements as outlined in the most current version of the CHBA Net Zero Home Labelling Program Technical Requirements, and show that the design is fully Net Zero and using all electric fuel sources.

Passive House applications: Applicants are not required to prepare a HOT2000 model or to submit a "P-file" number. Instead, the CPHC must submit:

- a compliant pre-construction PHPP model (electronic copy of the Excel file),

- a printout of the completed “verification” page with relevant notes, signed by a CPHC, and
- a memo providing modelling input values for the PHPP.

If applying for the exclusion of floor area occupied by heat recovery ventilators and connected shafts under section 10.23.A3, additional material is required:

- a signed letter from a CPHC that recommends the proposed mechanical system and notes the dimensions required,
 - dimensioned drawings in the application set showing the additional floor area required for the Passive House system as compared to a conventional system, and
 - a summary table of the proposed exclusion for each building level.
- Identification of the design elements proposed to meet the zero emission standard on the application drawings.
 - A signed letter of commitment from the owner to complete the steps set out in the selected zero emissions standard, including registration, certification, or labeling.

Passive House applications: Provide a letter of commitment to certify the building through the Passive House Institute.

5.5 Mid-Construction

Before drywall has been installed, the consultant must conduct a site visit in accordance with requirements for all one- and two-family permit applications. In addition to typical mid-construction checks such as a blower door test, the consultant must verify that all assemblies, materials, and components are installed as required to meet the zero emission standard.

Zero Energy applications: Provide a letter from a Qualified Green Building Consultant that contains:

- a statement that the construction of the house and that the installed assemblies and components match those specified in the consultant’s narrative; and
- a statement that there are no known barriers to the project achieving Zero Energy certification.

Passive House applications: The EA will verify that all assemblies, insulation materials, and components (including windows, doors and ventilation equipment) are installed as per the specifications provided in the Certifier’s letter. The EA will conduct a mid-construction blower door test to the EN 13829 protocol, with modifications as prescribed by the Passive House Institute, in lieu of the HOT2000 protocol. The EA will provide the applicant with documentation verifying the construction details and the EN 13829 blower door test results as attachments to the typical “Pre-Drywall Checklist”, and this must be submitted to the City.

In addition to the typical EA review, the applicant must also at this time provide the City with a letter from the retained CPHC that contains:

- a statement that the CPHC attended and inspected the construction of the house and that the installed assemblies and the doors and windows match those specified in the Certifier’s letter;

- confirming there is no kitchen or dryer vent, unless modelled in the PHPP provided;
- bathroom and kitchen exhaust roughed in to the mechanical room;
- the results of the EA's mid-construction blower door test at 0.6 ACH; and
- a statement that there are no known barriers to the project achieving Passive House certification.

Net Zero Applications: The Energy Advisor will provide a preliminary report with a predicted EnerGuide Rating based on the results of the mid-construction fan test to the City for review.

5.6 Prior to Final Inspection

In addition to typical requirements such as conducting a review and final door blower test, the EA should provide the applicant with a report on the mechanical and other construction details required to achieve the zero emission standard. The applicant must submit a copy of the report to the City.

Passive House applications:

- The EA must conduct a review and final door blower test. This test must be conducted to the EN 13829 protocol, with modifications as prescribed by the Passive House Institute (e.g. both pressurization and depressurization).
- The EA will provide the applicant with documentation of mechanical and other construction details, as well as a report on the results of the EN 13829/PHI blower door test, which must be submitted to the City.
- In addition to the EA review, applicants must provide the City with a letter from a Certifier stating that the final PHPP and relevant documentation have been received and are being reviewed for final certification. The Certifier's letter must include a suggested date by which the City may expect to be notified of final certification to the Passive House Institute standard.

Once the project is certified by the Passive House Institute, a copy of the certificate must be provided to the City of Vancouver.

5.7 Building Certification

The project must complete the requirements of the zero emission standard, and provide a copy of the confirmation to the City of Vancouver.

Passive House applications: The project must meet the Passive House standard and achieve Certification to support the relaxations noted. The Certifier will review the project documentation, including the PHPP model, building envelope drawings, mechanical systems and other information. Once the project is certified by the Passive House Institute, a copy of the certificate must be provided to the City of Vancouver.

Net Zero applications: Once the project is labelled under the CHBA Net Zero Labelling Program, a copy of the Net Zero Label must be provided to the City of Vancouver.

Zero Energy applications: The project must meet the Zero Energy requirements and achieve Certification to support the relaxations noted. The ILFI Auditor will review the project documentation, including energy demand and production over 12 consecutive months, lack of combustion within the project, project drawings,

site photographs, and other documentation. Once the project is certified by ILFI, a copy of the certification must be provided to the City of Vancouver.

6 Glossary

Building Envelope

A building's envelope is the structure separating the interior space from the environment.

Energy Advisor (EA)

An EA is a licensed professional who conducts home energy evaluations. An EA can evaluate a home, and provide the modeling and testing required for the final certification of a home under EnerGuide. They are trained to use NRCAN's energy simulation software, HOT2000, and to perform blower door air leakage testing.

Certified Passive House Consultant (CPHC) or Certified Passive House Designer (CPHD)

A CPHC is a person certified by the Passive House Institute as a Passive House Consultant. A CPHD is a person with professional and educational experience in architecture or building who is certified by the Passive House Institute as a Passive House Designer. The CPHD or CPHC is responsible for designing the building to meet the PH standard. The terms are used interchangeably in this guide.

CHBA Qualified Net Zero Builder

A builder who has met the requirements of the qualification as outlined in the CHBA Net Zero Administrative Requirements which include: being a CHBA builder member, being a registered EnerGuide builder with NRCAN, having successfully completed the CHBA NZ Builder Training, and having completed one Net Zero or Net Zero Ready labelled home.

CHBA Qualified Net Zero Energy Advisor (NZEA)

A professional who has met the requirements of the qualification as outlined in the CHBA Net Zero Administrative Requirements and registered with the CHBA. The NZEA is eligible to perform home energy evaluations for homes pursuing the CHBA's Net Zero Home Label using energy modeling methods in accordance with EnerGuide Rating System (ERS) Technical Procedures.

CHBA Qualified Net Zero Service Organization (NZSO)

An organization that has met the requirements of the qualification as outlined in the CHBA Net Zero Administrative Requirements and registered with the CHBA. The NZSO performs the administrative process for NZEA's and builders pursuing the qualification of homes under the program.

Heat Recovery Ventilator (HRV) or Energy Recovery Ventilator (ERV)

An HRV is a mechanical device that exchanges stale indoor air with fresh outdoor air while recovering heat at the same time using a heat exchanger. An ERV performs the same function and also provides humidification or dehumidification.

Passive House (PH)

In these guidelines, a Passive House building is one that meets the definition in the Vancouver Zoning and Development By-law. For a general description, see section 3 of this document.

Passive House Building Certifier (Certifier)

In these guidelines, a Passive House Building Certifier is one that meets the definition in the Vancouver Zoning and Development By-law. A general description is a person accredited by the Passive House Institute in Darmstadt, Germany for the purpose of certifying buildings as being designed in accordance with its Passive House standards.

Passive House Planning Package (PHPP)

PHPP is software used to determine whether a building meets Passive House standards. The package, available through the Passive House Institute, assists with house design and window planning to test how different designs will affect energy use.

Qualified Green Building Consultant

A professional with knowledge and practical experience in high-performance building design who ideally has worked on Zero Energy projects in the past. Training and experience in high-performing building design, energy modeling, efficient building systems, renewable energy assemblies, or comparable is likely necessary for ensuring Zero Energy targets are achieved.

Variance

For readability, this guideline refers to the different allowances for zero emissions buildings in the Zoning and Development By-law that require the approval of the Director of Planning as variances.