

Guidelines

Guidelines for the Administration of Variance in Larger Zero Emission Buildings

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Background and 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.

Intent

These guidelines explain the regulations and application process for developments that are seeking variances or conditional approvals within the Zoning and Development By-law for zero emission buildings. These guidelines apply to all uses and zones, except certain dwelling uses in the RS, RT and RA district schedules. For those projects, please see the “Guidelines for the Administration of Variances for Zero Emission Buildings in RS, RT, and RA Districts”. For rezoning applications, see the “Green Buildings Policy for Rezoning - Process and Requirements” bulletin.

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

These guidelines are to be used in conjunction with the relevant district schedule as well as other applicable guidelines and bulletins. In particular, please consult the Zoning and Development By-law, section 10.23A: Passive House. 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.

Definitions

The following definitions apply in these guidelines:

- **Canadian Home Builders' Association (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 preform 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.
- **Certified Passive House Designer (CPHD):** A CPHD is a person with significant professional and educational experience in architecture or building that has been certified by the Passive House Institute as an accredited Certified Passive House Designer. The CPHD or CPHC helps design a building to meet the PH standard.
- **Certified Passive House Consultant (CPHC):** A CPHC is a person certified by the Passive House Institute as an accredited Passive House Consultant.
- **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 (Building 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.
- **Registered Professional:** In these guidelines, a Registered Professional is one that meets the definition in Vancouver's Building By-Law. A general description is a person a person who is registered or licensed to practice as an architect under the Architects Act, or a person who is registered or licensed to practice as a professional engineer under the Engineers and Geoscientists Act.
- **Variance or Relaxation:** 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.

Guidelines

1 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 City staff before making an application.

Passive House is a well-established ultra-low energy building performance standard and certification process. There are more than 65,000 Passive House buildings built in a wide range of climates and typologies. Using a high performance enclosure allows heating and air conditioning costs to be reduced without sacrificing thermal comfort. Certifying a building to the Passive House standard is a rigorous quality assurance process that confirms that the building has been designed to achieve high levels of occupant comfort with very low energy consumption. For a full description of the criteria for certification and for the most up to date information, please consult a Certified Passive House Designer.

2 Regulation Variances

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

Applicants may apply for variances to floor area, height, yard, and building depth regulations, if they demonstrate that they will achieve Passive House certification or another accepted standard. These relaxations 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 detailed information on 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.

Some regulations that control building size, such setbacks or height, may not be varied by the Director of Planning and will still apply.

2.1 Floor Area – Calculated Exclusions

Section 10.11 of the Zoning By-law permits a floor area exclusion to accommodate the additional thickness of walls for thermal insulation by excluding some of the floor area used for insulation. The exclusion is intended to mitigate the reduction of usable floor area. For detailed information on this exclusion and its submission requirements, please see the bulletin titled: “Floor Area Exclusions for Improved Building Performance: Thermal Insulation and Rain Screen”.

As well, 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 the provided floor area. 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.

2.2 Relaxation of Height

The extra insulation required in zero emissions building means thicker assemblies, not only at the walls, but also at ceilings and floors. When the building design includes overhangs, step-backs, or other envelope protrusions, it becomes necessary to insulate not only the uppermost ceiling and lowermost floor, but also each panel of ceiling and floor created by these corrugations in the building envelope. These assemblies are usually thicker than conventional assemblies, leading to extra building height.

Applicants may apply for a relaxation of height to a maximum of 1.25m via section 10.23A.2. The Director of Planning may also consider minor intrusions into angled height envelopes, bearing in mind the intent of the regulations to preserve light and privacy

2.3 Simplified Process for Solar Shading Devices

The use of solar shading devices can be a key way for buildings to avoid unwanted solar heat gain. In particular, multi-unit residential buildings that are highly insulated should be tested for overheating to ensure thermal comfort. Carefully designed shading may allow buildings to pass this test without requiring the use of mechanical air conditioning.

Solar shading devices are expected to be located and designed to provide a significant decrease in solar heat gain, and they are included in the normal development permit review of applicable policies and guidelines.

Solar shading devices are currently permitted to project into a required yard within a private property site, and there is no requirement for solar shading devices projecting into side yards to be demountable. For more information regarding shades located in yards, please consult the “Shading Devices and Yard Projections” bulletin.

Applicants should use thermal breaks for best building practice. A thermal break is an element of low thermal conductivity placed in an assembly to reduce or prevent the flow of thermal energy between conductive materials.

Vancouver’s Building By-law has also been amended to provide clarity on how solar shading devices can meet building code requirements, in Division C, Part 1, Section 1.8.9

Simplified Process for Solar Shading Device Encroachments over City Property: In some cases, the optimal dimensions of a solar shade extend beyond the private property site. Solar shading devices proposed over City streets previously required a registered encroachment agreement. Revisions to the process to further support the use of effective shading devices in building designs now allow staff to issue a “Permit to Use City Property” instead of securing an encroachment agreement.

- If solar shading devices are to be considered, staff will require notation on drawings from the Registered Professional of record that the design complies with appropriate requirements of the Building By-law.
- Staff will review designs to ensure solar shading devices have appropriate clearances and are demountable. Applicants must supply (through a separate application to Engineering Services) and receive approval within the DP process by submitting the following:
 - Completed “Permit to Use City Property” application form.
 - Supporting documents, including drawings of the proposed solar shading devices that clearly show dimensions of the shades, property lines, clearances, adjacent curb alignment and street poles, as well as method of demountability.

Generally, solar shading device encroachments into City streets can be accepted under a Permit to Use City Property if they are in compliance with the Building By-law. In some instances, at the discretion of the General Manager of Engineering Services, a registered Easement and Indemnity Agreement prepared in accordance with the Encroachment By-law will be required.

Applicants are advised that building encroachments onto City street may inhibit subdivision by strata plan due to Section 244(1) (f) of the Strata Property Act. The City of Vancouver may not support the provision of easements for any parts of the building on a City street.

2.4 Horizontal Angle of Daylight Requirements

For most Passive House applications, there should be no significant change in applicants' ability to meet the horizontal angle of daylight regulations. In cases where the basic angle cannot be met due to a Passive House design, such as very narrow windows in a thick wall that is located close to an obstruction, applicants may seek Director of Planning approval to reduce the angle of daylight requirement using the available relaxation clause. Daylight regulations are typically found in section 4.10.4 of district schedules.

2.5 Other Variances

The following table provides a general reference for conditional zoning variances that are available for larger zero emissions projects and related green building features. For example, height limits may be varied for solar photovoltaic panels using section 10.18.5 (d).

Before making an application, read the current and relevant regulation in the Zoning and Development By-law, and 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, information on floor area increases and floor plate limits in multi-family buildings can be found in the "Zero Emissions Building Catalyst Policy" and the related guideline.

Table 1: Summary of Conditional Variance Related to Zoning and Development By-law

Conditional Variance for Green Building Features	Zoning and Development By-law Section
Building depth or yard	10.23A.2
Building height	10.23A.2
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
Mechanical rooms with zero emission equipment	10.15A
Roof-mounted energy equipment - height	10.18.5 (d)
Shading devices, eaves, and overhangs - yards	10.32.1 (f)
Venting skylights and clerestory window - height	10.18.5 (e)

3 Submission Requirements

This section describes the submission requirements at each project phase for larger zero emissions projects seeking relaxations. These requirements are **in addition** to those of the development and building permit process for a conventional building. Applications that follow a rezoning should also see the recommended conditions of approval for sustainability.

For 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 submission material. For example, where a PPHP model is requested, an alternate standard may submit an energy or carbon balance and an energy modelling report. For questions about submittals for alternate standards, please contact green.buildings@vancouver.ca.

Please see definitions of terms on page 4 of these guidelines, and note the different roles and responsibilities. For Passive House projects, a CPHC who is also an EA can serve both roles. The CPHD and CPHC roles are equivalent in this guide.

3.1 Scheduling an Enquiry Appointment

When requesting a meeting through the Planner Appointment Request system or with a Project Facilitator, the applicant should:

- first consult this document and other applicable policies and guidelines
- note that the application will be for a project that meets an identified zero emission standard, and that the project team will be requesting related relaxations
- request assignment of a Development Planner or Project Facilitator with zero emission building experience

3.2 Enquiry Meeting

Enquiries must include:

- A design strategy that identifies the zoning relaxations sought and any alternative solutions that are anticipated under the Building By-law, and 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 if they are a CPHC.

Net Zero applications: Provide a letter from the CHBA of British Columbia to confirm that the project has been enrolled to obtain a Net Zero label, and a letter from an NZEA 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.

City staff may provide feedback at the pre-application meeting to inform the application. Applicants should consider potential impacts on neighbouring houses such as privacy, massing, and shadowing in their designs.

3.3 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.

Net Zero applications: Applicants should have the project modelled by an NZEA to confirm it can achieve a 0 (zero) GJ rating using modelling methods and calculation in conformance with the EnerGuide Rating System v15, using HOT2000.

3.4 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 Homeowner Information Sheet prepared by the NZEA 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, show that the design is fully Net Zero and uses all electric equipment. The applicant must submit a signed letter from an NZEA that confirms the project is enrolled in the CHBA Net Zero program.

Passive House applications: 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, or a letter provided by an Mechanical Engineer and then approved by the 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.
- A letter of commitment by 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 Passive House International.

- Documents and materials that indicate any known Alternative Solutions that will be sought to meet Building By-law requirements. Note that the Alternative Solution process is a separate application and process.
- If solar shades that encroach over City property have been approved as part of the design, submit to Engineering Services a “Permit to Use City Property” application form with supporting documents (drawings of the proposed solar shading devices that clearly show dimensions of the shades, property lines, clearances, adjacent curb alignment and street poles, as well as method of demountability).

3.5 Building Permit Application

Applicants must submit:

- Updated material to verify that the proposed design is on track to meet the proposed zero emission standard at the building permit stage. If there are known issues to meeting the standard, these must be resolved before applying for a building permit.

Passive House applications: Provide the following items:

- The project’s compliant PHPP model together with a Passive House Design Summary report that details critical assemblies, components, and strategies.
- A letter from a Passive House Building Certifier noting specifications (assemblies, building components), and stating that the project design and specifications have been reviewed and, in the opinion of the Passive House Building Certifier, the project is capable of achieving Passive House certification.
- A written Passive House Verification Plan, with completed fronting checklist (found on the last page of this document). The Plan will be used to verify construction assemblies, components, insulation, air barrier, air tightness performance etc., and is designed to be a similar step to the energy checklists (ASHRAE, NECB) provided by Registered Professionals at this point in the permit process for projects not pursuing Passive House. The Verification Plan and checklist will be prepared by the project team and verified by the Passive House Building Certifier (as part of his/her design stage review) on behalf of the project team. This plan must include, *at a minimum:*

- The name and credentials of the Passive House Building Certifier who will document and verify construction to plan.
 - The number of planned site visits and at what intervals.
 - A written plan for monitoring and grading insulation installation in all assemblies - including inspections of insulation layers below-grade and insulation installation within assemblies - to verify that all assemblies, insulation materials, and components (including windows, doors and ventilation equipment) are installed as per the specifications provided in the Passive House Building Certifier's letter.
 - A written plan for monitoring and verifying continuous air barrier in all assemblies and components.
 - A written plan for verifying all key components and assemblies specified in the Passive House Building Certifier's letter.
 - A written plan for air tightness testing, including who will conduct mid construction and final blower door tests to the protocol prescribed by the Passive House Institute.
 - Written plan for ventilation commissioning, including who will conduct.
 - Written plan for occupant training, including who will conduct.
- If there are known challenges to meeting Passive House criteria, these must be resolved before applying for a Building Permit.
- If any element of the Verification Plan should become non-compliant, this must be immediately brought to the attention of the City of Vancouver by the Passive House Building Certifier who holds the responsibility for the Verification Plan.

Net Zero Applications: The NZEA 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.

- Information and documentation regarding any requested Alternative Solutions

3.6 Prior to Final Inspection

Applicants must submit:

- Updated material to verify that the building is on track to meet the proposed zero emission standard before applying for final inspection
 - 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: Buildings may be certified by any of the Passive House Institute Accredited Building Certifiers operating worldwide. In addition to the documents already required at final inspection, applicants must provide the City with:

- A signed letter from a Passive House Building Certifier confirming that work implemented was as prescribed in the Passive House Verification Plan and that they are not aware of any reason the project will fail to certify.
- A letter from the Passive House Building Certifier stating that the final PHPP and relevant documentation have been received and are being reviewed for final certification. The Passive House Building 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.

3.7 Building Certification

Completion of the zero emission standard is required to support variances or conditional approval. The owner must follow the process in the chosen standard, which may conclude with issuance of a labeling or certification, and provide this confirmation to the City of Vancouver.

Passive House applications: The Passive House Building 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.

Project Address:	Date:
Certified Passive House Designer or Consultant (CPHD or CPHC)	Phone Number:
Company:	Email:
<p>The following items are enclosed as part of the Verification Plan:</p> <ul style="list-style-type: none"> <input type="checkbox"/> A letter from a Passive House Building Certifier approving this Verification Plan <input type="checkbox"/> A document stating the number of planned site visits and at what intervals <input type="checkbox"/> A written plan for monitoring and grading insulation installation in all assemblies - including inspections of insulation layers below-grade and insulation installation within assemblies - to verify that all assemblies, insulation materials, and components (including windows, doors and ventilation equipment) are installed as per the specifications in the project documentation. <input type="checkbox"/> A written plan for monitoring and verifying continuous air barrier in all assemblies and components <input type="checkbox"/> A written plan for verifying all key components and assemblies specified in the project documentation. <input type="checkbox"/> A written plan for air tightness testing, including who will conduct mid-construction and final blower door tests to the protocol prescribed by the Passive House Institute <input type="checkbox"/> A written plan for ventilation commissioning, including who will conduct <input type="checkbox"/> A written plan for occupant training, including who will conduct 	
<p>If, at any point, any element of the Verification Plan should become non-compliant, this must be immediately brought to the attention of the City of Vancouver by the CPHD or CPHC, who is responsible for the Verification Plan.</p>	
CPHD or CPHC Signature:	Date: