



# City of Vancouver *Land Use and Development Policies and Guidelines*

## Planning, Urban Design and Sustainability Department

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# PASSIVE HOUSE RELAXATIONS - GUIDELINES FOR LARGER PROJECTS

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## 1 Application and Intent

These guidelines are intended to explain the regulations and process related to Passive House developments. In particular, they should be used by applicants seeking relaxations within the Zoning and Development By-law for projects that meet the Passive House standard and achieve Certification. These guidelines apply to all uses and zones, except dwelling uses in the RS District Schedules (including laneway houses). For single-family homes, see the “Passive House Relaxations - Guidelines for Residences in RS Districts” document. For more information on passive design, applicants may refer to the City of Vancouver’s two Passive Design Toolkits.

Applicants must demonstrate how the building envelope and mechanical system have been designed to meet the Passive House standard before seeking related relaxations, and adhere to the process and requirements in this document. **Buildings must meet the definition of a Passive House in the Zoning and Development By-law.**

These Guidelines are to be used in conjunction with the relevant District Schedule of the Zoning and Development By-law or Official Development Plan, as well as other applicable guidelines and bulletins. As this document addresses zoning considerations only, applicants are encouraged to obtain early advice on meeting the requirements of Vancouver’s By-law (BBL) from a Registered Professional.

## 2 Policy Context

Removing barriers to Passive House is important in Vancouver, and part of the City’s emerging policy context. The Zero Emissions Building Plan, a key component of Vancouver’s Renewable City Strategy, prioritizes removing regulatory barriers to the development of zero emission buildings such as those that meet the Passive House standard.

## 3 Passive House: Standard and Requirements

Passive House is a well-established ultra-low energy building performance standard and certification process. There are over 40,000 Passive House buildings built in a wide range of climates and typologies. Passive design is based on the principle that a high quality envelope can reduce most costs associated with heating and cooling. With thoughtful design, better energy efficiency can be achieved and costly heating and air conditioning systems are eliminated without sacrificing thermal comfort. Certifying a building built to the Passive House standard is a rigorous quality assurance process that determines whether a building meets all of the requirements of the Passive House standard, and 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 the most current information, please see Passive House Canada's website at: <http://www.passivehousecanada.com> and consult with a Certified Passive House Designer or Consultant.

## 4 Relaxation of Regulations– Discretionary Allowances

### 4.1 Floor Area and Height Relaxations

Achieving a low-energy, high-efficiency building through high quality thermal envelope design and better insulation will result in thicker walls and ceilings than a typical building.

Conditional height relaxations may be allowed to accommodate the additional thermal insulation required to achieve the Passive House standard. Floor area exclusions may be allowed to conditionally exclude the area occupied by heat recovery ventilators and connected shafts in a Passive House project. Applicants may apply for these relaxations provided that they demonstrate that they will achieve Passive House Certification. These relaxations may be granted at the discretion of the Director of Planning upon consideration of all applicable guidelines and policies.

The design of the development related to the relaxation should also address the development's urban design performance in its wider context. In particular, applicants must consider livability and impacts on neighbouring properties on such issues as privacy, massing, and shadowing in their application.

#### 4.1.1 Floor Area Exclusions

Section 10.11.2 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 reduce the disincentive of “losing” floor area. For detailed information on this exclusion and its submission requirements, please see the Planning Administrative Bulletin titled: “Floor Space Exclusion to Accommodate Improved Building Performance (Envelope and Thermal Insulation)”.

As well, section 10.12 permits a floor area exclusion for the area occupied by heat recovery ventilators and connected shafts, in a project that meets the Passive House standard and achieves Certification, to a maximum exclusion of 2% of permitted floor area. A heat recovery ventilator (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. The exclusion recognizes the larger space that may be required for high efficiency units or for additional units within a Passive House project. The exclusion does not apply to buildings that are not designed to the Passive House standard as defined in the Zoning and Development By-law, or to mechanical equipment that uses the same floor area as a conventional system.

In order to achieve the exclusion, an HRV that is a Passive House “Certified Component” would be utilized, as these HRV's have a high degree of filtration; are more energy efficient in operation; have automatic balancing; are relatively air tight; have an effective heat recovery of 75% or greater; and provide thermal comfort to -10 degrees.

Regulations which control building size, such as height and setbacks, remain in effect. Where the Director of Planning has discretion on regulations or guidelines, relaxations to accommodate this Passive House feature may be considered. For example, floor plate maximums may be increased.

#### 4.1.2 Relaxation of Height

The extra insulation required in Passive House 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 building a Passive House project may apply for a relaxation of height via section 10.18.4 in the Zoning and Development By-Law. The Director of Planning may permit a height increase to accommodate building features designed to reduce energy consumption in a building that meets the Passive House standard and achieves Certification, to a maximum of 1.25 meters (4 feet), if he or she first considers: the intent of the relevant schedule and all applicable Council policies and guidelines; the relationship of the development with nearby residential areas; and the submission of any advisory group, property owner, or tenant. The Director of Planning may also consider negligible intrusions into angled height envelopes, bearing in mind the intent of the regulations to preserve light and privacy, and to mitigate shadowing.

#### **4.2 Simplified Process for Solar Shading Devices**

(The process identified below applies to all applications, not just Passive House projects).

The use of solar shading devices can be a key way for buildings to avoid unwanted solar heat gain. 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, per the revised section 10.32.1 of the Zoning and Development By-law. Applicants and staff can refer to the “Shading Devices and Yard Projections” bulletin for more information on shades located in yards.

There is no requirement for solar shading devices projecting into side yards to be demountable, but applicants should consider if being demountable is necessary for building maintenance or window cleaning access. 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

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.

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 City Street.

##### **4.2.1 Simplified Process for Solar Shading Device Encroachments over City Property**

- (a) 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.
- (b) Staff will review designs to ensure solar shading devices have appropriate clearances and are demountable. Applicants must supply (make 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.

- (c) Generally, solar shading device encroachments into City street 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.

#### 4.3 Flexibility re 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.

#### 4.4 Other Relaxations

The following table provides a general reference for conditional allowances that are available for Passive House larger projects and related green building features.

For more information, applicants may consult the relevant regulation (e.g. the District Schedule), related Administration Bulletins (e.g. "Passive Design: Natural Ventilation and Light"), and other applicable guidelines or policies. These documents can be found at [www.vancouver.ca](http://www.vancouver.ca)

Conditional Allowance for Passive House and Green Building Features	Zoning By-law Section
Allow increase in floor area for HRV's and connected shafts	section 10.12
Allow increase in building height	section 10.18.4
Allow floor area exclusion for increased insulation	section 10.11
Allow green walls to project into required yard	section 10.7.1
Allow floor area exclusion for venting skylights, opening clerestory windows or other similar features	RT, RM, C-3A and IC-3: 4.7.2 or 4.7.3 or 4.7.4
Allow increase in building height for venting skylights, opening clerestory windows or other similar features	section 10.18.5
Relax building height regulations for roof-mounted energy technologies and to provide access to green roofs	section 10.18.5
Relax side yard and overhang requirements for fixed external shading devices	section 10.32.1

## 5 Submission Requirements

This section outlines submission requirements for Passive House projects seeking relaxations to the Zoning and Development By-law. These submission requirements are **in addition** to those of the typical development and building permit application process. These requirements – as well as typical requirements for a multi-family dwelling application in a particular District Schedule - must be adhered to.

Please note the different roles and responsibilities of the:

- (a) Certified Passive House Designer (CPHD) or Certified Passive House Consultant (CPHC);
- (b) Passive House Institute Accredited Building Certifier (Passive House Building Certifier).

See definitions of these terms in Section 6 of this document.

The documentation required at each of the stages listed below will include, but may not be limited to:

#### Prior to Pre-Application Meeting

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 the Passive House standard and will achieve Certification, and that the project team will be requesting related relaxations.
- request assignment of a Development Planner or Project Facilitator with Passive House experience.

#### Pre-Application Meeting

The applicant must provide:

- a letter from a CPHD/ CPHC confirming their engagement to model (PHPP) and advise on the project.
- supporting documents and conceptual drawings identifying which PH related relaxations they will be seeking with respect to the Zoning and Development By-law.
- identification of anticipated requested Alternative Solutions to Building By-law requirements.
- documents and/or drawings that indicate how the design addresses impacts on neighbouring properties on such issues as privacy, massing, and shadowing.

#### Development Permit Application

The applicant must submit:

- documents and materials that specify and document the Passive House relaxations being sought with respect to the Zoning and Development By-law. Permit drawings must identify the project as Passive House and state any relaxations along with rationale.
- to apply for an exclusion of the floor area occupied by heat recovery ventilators and connected shafts, the following will be required in addition to standard materials:
  - a signed letter from a *CPHD* or *CPHC* that recommends the proposed mechanical system and notes the dimensions required.
  - dimensioned drawings in the application set, prepared by the designer or architect to show the additional floor area required for the Passive House system as compared to a conventional system.
  - a summary table of the FSR exclusions proposed for each building level that includes the area calculated in the previous bullet point.
- documents and materials that specify Alternative Solutions being sought with respect to Building By-law requirements (note: the Alternative Solution process is a separate application with a separate process).
- preliminary project models using the PHPP software, demonstrating how Passive House certification requirements as maintained by the Passive House Institute will be met, including:
  - the pre-construction PHPP model (an electronic copy of the Excel file).
  - a printout of the “verification” page and relevant notes.

**Please note: if specific known challenges to meeting Passive House targets are identified, these must be resolved before applying for a Development Permit.**

- 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).

### Building Permit Application

Applicants must submit:

- information and documentation regarding any requested Alternative Solutions to Building By-law regulations (note: the Alternative Solution process is a separate application with a separate process).
- 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. **Please note: if specific known challenges to meeting Passive House targets are identified, these must be resolved before applying for a Building Permit.**
- 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, 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 Passive House Building Certifier, who holds the responsibility for the Verification Plan.**

#### Prior To Final Inspection

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.

#### Building Certification

Certification to the Passive House standard must be achieved to support the relaxations noted. 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.

## 6 Glossary of Terms

### **Building Envelope**

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

### **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)**

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.

### **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.

### **Relaxation**

For readability, this guideline refers to discretionary allowances to accommodate the Passive House standard as relaxations, including clauses in Section 4 of district schedules and Section 10 of the Zoning and Development By-law.

## Checklist - Passive House Verification Plan for Building Permit Application

(December 2017)

<b>Project Address:</b>	<b>Date:</b>
<b>Company:</b>	<b>Phone Number:</b>
<b>Name of Passive House Institute Accredited Building Certifier:</b>	<b>Email:</b>
<p><b>The following items are enclosed as part of the Verification Plan:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> A letter from a Passive House Building Certifier approving this Verification Plan</li> <li><input type="checkbox"/> A document stating the number of planned site visits and at what intervals</li> <li><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 provided in Passive House Building Certifier letter</li> <li><input type="checkbox"/> A written plan for monitoring and verifying continuous air barrier in all assemblies and components</li> <li><input type="checkbox"/> A written plan for verifying all key components and assemblies specified in the Passive House Building Certifier's letter</li> <li><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</li> <li><input type="checkbox"/> A written plan for ventilation commissioning, including who will conduct</li> <li><input type="checkbox"/> A written plan for occupant training, including who will conduct</li> </ul>	
<p><b>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 Passive House Building Certifier, who is responsible for the Verification Plan.</b></p>	
<b>Passive House Building Certifier Signature:</b>	<b>Date:</b>