



# 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 RESIDENCES IN RS DISTRICTS

*Adopted by City Council on January 16, 2018*

## 1 Application and Intent

These guidelines are intended to explain the regulations and process related to Passive House developments for residences. 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 dwelling uses in the RS District Schedules, *except laneway houses*. For all other zones and uses, see the “Passive House Relaxations - Guidelines for Larger Projects” document. For more information on passive design, applicants may refer to the City of Vancouver’s two Passive House Design Toolkits.

Applicants must demonstrate how the building envelope and mechanical system have been designed to achieve 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 Building By-law from a Registered Professional.

## 2 Policy Context

Removing barriers to the Passive House standard 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 Passive House buildings.

## 3 The Passive House Standard

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 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.

**January 2018**

For a full description of the criteria for certification and for the most up to date information, please see Passive House Canada's web site at: <http://www.passivehousecanada.com> and consult with a Certified Passive House Designer or Consultant.

#### 4 Relaxation of Regulations– Discretionary Allowances

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

Conditional relaxations may be allowed to accommodate the additional thermal insulation required to meet the Passive House standard, and the additional space required in installing a superior heat recovery ventilator. Applicants may apply for relaxations of floor area, height, yard, and building depth, depending on the applicable District Schedule and 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 Floor Area Exclusions

Section 10.33.2 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)".

If an applicant is seeking a floor area exclusion to accommodate increased insulation, it is currently required that a Building Envelope Professional must be retained to calculate and verify the exclusion. However in the case of a home meeting the Passive House standard and achieving Certification, this requirement may be waived, as the use of PHPP energy modelling and the retention of a Certified Passive House Designer or Consultant satisfies the same requirement.

As well, Section 10.41 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 that 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.

#### **4.2 Relaxation of Height**

Applicants building a Passive House home may apply for a relaxation of height via the relevant RS District Schedule. This relaxation is anticipated to remove a barrier to better insulated roofs.

This relaxation states that the Director of Planning may relax the height requirement to accommodate building features designed to reduce energy consumption in a building that meets the Passive House standard and achieves Certification, if the Director of Planning first considers: the intent of the relevant schedule and all applicable Council policies and guidelines; the relationship of the development with nearby residential areas; the submission of any advisory group, property owner, or tenant; and the relaxation does not exceed .5 m.

The Director of Planning may consider negligible intrusions into the height (primary and secondary) envelopes bearing in mind that the intent of the regulation is to pull the bulk and massing away from the side property lines in order to preserve light and privacy and mitigate shadowing of adjacent properties.

#### **4.3 Relaxation of Rear Yard Setback**

Applicants building a Passive House may also apply for a relaxation of rear yard setbacks in many RS District Schedules. This relaxation is anticipated to remove a barrier to building thicker walls; and enable the use of excluded floor area, applied for under Section 10.33 of the Zoning By-law, to be used onsite.

This relaxation states that the Director of Planning may decrease the rear yard requirement to accommodate building features designed to reduce energy consumption in a building that meets the Passive House standard and achieves Certification; if the Director of Planning 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 specific amount of relaxation allowed depends on the District Schedule. Please consult the relevant RS District Schedule.

For those RS District Schedules that do not contain a relaxation option for rear yard setbacks for Passive House, it was determined that existing regulations provided sufficient flexibility that a relaxation was not required.

#### **4.4 Relaxation of Building Depth**

Applicants building a Passive House may also apply for a relaxation to increase permitted building depth in many RS District Schedules. This relaxation is anticipated to remove a barrier to building thicker walls, that is: having some floor area excluded, and not being able to use all of the floor area on site.

This relaxation states that the Director of Planning may increase the permitted building depth to accommodate building features designed to reduce energy consumption in a building that meets the Passive House standard and achieves Certification, if the Director of Planning 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 specific amount of relaxation allowed depends on the District Schedule. Please consult the relevant RS District Schedule.

For those RS District Schedules that do not contain a relaxation option for building depth for Passive House, it was determined that existing regulations provided sufficient flexibility that a relaxation was not required.

It should be noted that the rear yard compatibility depth provision found in some RS Districts would not apply if an applicant sought the increased building depth allowance for Passive House.

#### 4.5 Other Relaxations

The following table provides a general reference for conditional allowances that are available for Passive House 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 [vancouver.ca](http://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 10.41
Allow increase in building height	All RS zones, and Section 10.10.4
Allow decrease in required rear yard depth	several RS zones
Allow increase in permitted building depth	several RS zones
Allow floor area exclusion for increased insulation	Section 10.33
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	RS, RT, RM, C-3A and I-C3: Section 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 10.11.1
Relax building height regulations for roof-mounted energy technologies and to provide access to green roofs	Section 10.11.1
Relax side yard and overhang requirements for fixed external shading devices	Section 10.7.1

## 5 Submission Requirements

This section outlines submission requirements for Passive House projects in RS District Schedules seeking relaxations. 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 single family dwelling application in a particular District Schedule - must be adhered to.

Please note the different roles and responsibilities of the:

- Certified Passive House Designer (CPHD) or Certified Passive House Consultant (CPHC);
- Energy Advisor (EA); and
- Passive House Building Certifier (Building Certifier).

See definitions of these terms in Section 6. Also note that it is possible to engage a *CPHD* or *CPHC* who is also an *EA*, and can thus serve in both roles.

- Before scheduling a pre-application appointment with the Supervisor of the Housing Review branch, applicants should consult this document and all typical application documents (such as the “Intake Checklist”). When scheduling the appointment, applicants should note that the application will be for a home that meets the Passive House standard and will achieve Certification, and that the project team will be requesting related relaxations.
- At the pre-application meeting, applicants must provide the City of Vancouver with a letter from a *CPHD* or *CPHC* (see definitions in Appendix B) confirming that he/she has

been engaged to model and advise for the project. A member of the project team - such as designer, builder or *EA* - may serve in this role provided that they are a credentialed *CPHD* or *CPHC*.

Applicants must also identify which relaxations they will be seeking, and provide the City with supporting documents and conceptual drawings. City staff may then direct applicants and provide feedback at the pre-application meeting that will inform their application. It should be noted that applicants must consider impacts on neighbouring houses on such issues as privacy, massing, and shadowing in their application.

- (c) Following the pre-app meeting, applicants are advised to model the project using a 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 as maintained by the Passive House Institute.

The applicant must engage an *EA* (see definition in Appendix B). Again, it is possible to engage an *EA* who is also a *CPHD* or *CPHC*, and can thus serve in both roles. 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.

It should be noted that Passive House applicants are not required to prepare a Hot 2000 model or to submit a "P-file" number. Instead applicants must submit the compliant pre-construction PHPP model (an electronic copy of the Excel file) along with a printout of the "verification" page and relevant notes.

In addition to the PHPP file, applicants must provide the Housing Review Branch with a letter from a *Building Certifier* (see definition in Section 6) stating that the project design and specifications have been reviewed and, in the opinion of the *Building Certifier*, the project is capable of achieving Passive House certification if built to the design and specifications noted in the *Building 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. Applicants must provide typical application materials and drawings, in addition to the materials and drawings that specify and document which relaxations are being sought as a Passive House home.

In particular, 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 above-noted 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 preceding bullet point.

- (d) At mid-construction, before drywall has been installed, an *EA* will conduct a site visit in accordance with requirements for all one- and two-family permit 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 *Building 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 Hot 2000 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", so that it may 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 *CPHD* or *CPHC* that contains:

- a statement that the *CPHD/C* attended and inspected the construction of the house and that the installed assemblies and components match those specified in the *Building Certifier's* letter;
- the results of the *EA's* mid-construction blower door test; and
- a statement that there are no known barriers to the project achieving Passive House certification by the Passive House Institute.

Again, please note that it is possible to engage a *CPHD* or *CPHC* who is also an *EA*, and can thus serve in both roles.

- (e) Prior to final inspection, 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, so that it may be submitted to the City.

In addition to the *EA* review, applicants must provide the City with a letter from a *Building Certifier* stating that the final PHPP and relevant documentation have been received and are being reviewed for final certification. The *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. Once the project is certified by the Passive House Institute, a copy of the certificate must be provided to the City of Vancouver.

#### Building Certification

The project must meet the Passive House standard and achieve Certification to support the relaxations noted. The 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.

### **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 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.

**Relaxation**

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