# ENERGY STEPCODE BUILDING BEYOND THE STANDARD



### Spring 2019 Builder & Designer Breakfast

**Norm Connolly** 

Community Energy Manager City of New Westminster

### Ryan Coleman

Program Coordinator Energy Save New West



### Local Adoption of the Energy Step Code for Part 9 Buildings

Norm / Ryan (City of New Westminster); Nick Schock (Building Energy Analyst, Enforma)

- Part 9 Step Code Building Bylaw amendments and timing of requirements
- Step Code compliance and verification processes in detail
- Policy and program incentives, technical training opportunities

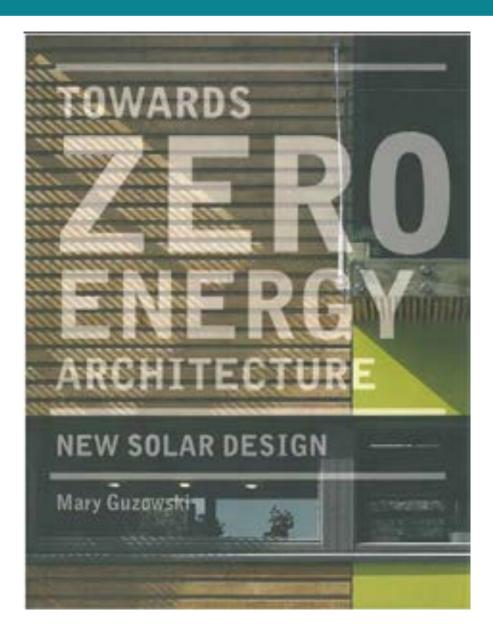
### **Design Guide for Forced Air Systems**

 Rob Pope (Senior Consultant, Ecolighten) will provide an overview of a new Natural Resources Canada design guide for forced air systems that support builders with HVAC equipment selection and design.

### **FortisBC New Home Program**

 Wayne Cankovic (Energy Solutions Manager, FortisBC) will update us on current Step Code incentives, eligibility requirements and application procedure.

## National and Provincial Code Direction



### Pan Canadian Framework on Clean Growth and Climate Change

Federal direction for the National Building Code is to adopt increasingly stringent, model building codes starting in 2020, with the goal that all provinces and territories adopt 'net zero energy ready' building requirements by 2030.

### **BC Climate Leadership Plan**

Intent is for phased updates to the BC Building Code so that all new buildings are 'net zero ready' by 2032, using the Step Code as the framework for setting beyond Code requirements.

Only three Building Code cycles away!

### Timeline for Energy Efficiency Regulatory Requirements in the BC Building Code

Here's what the province's CleanBC plan will mean for new-construction requirements.

2032	STEP 5	STEP 4	NET-ZERO ENERGY-READY UP TO: 80%
2027*	STEP 4	STEP 3	40%
2022*	STEP 3	STEP 2	
*NEW TARGET DEADLINES	PART 9 BUILDINGS	PART 3 BUILDINGS	Energy-efficiency improvement above 2018 BC Building Code requirements

4

# Step Code Implementation in BC

### **MUNICIPAL CONTEXT**

 To date, 41 municipalities have submitted notification to the Province indicating that they are consulting with industry on the Step Code, and 17 of these local governments have already adopted the Step Code into bylaw regulation.



These communities represent **over 75%** of the province's residential building permits issued.

(City of Vancouver included)

# Step Code Implementation in BC

### 41 Local Governments consulting on Step Code or have adopted into bylaw

City of Richmond	Comox Valley Regional District	District of Lake Country
City of North Vancouver	City of Duncan	City of Nanaimo
District of North Vancouver	City of Campbell River	City of Kamloops
District of West Vancouver	City of Kelowna	District of Central Saanich
City of New Westminster	City of Penticton	City of Port Moody
City of Surrey	City of Kimberley	City of Nelson
Township of Langley	City of Vernon	Village of Anmore
District of Squamish	Village of Belcarra	District of Elkford
City of Burnaby	District of Peachland	City of Abbotsford
Resort Municipality of Whistler	District of Oak Bay	City of Rossland
City of Victoria	City of West Kelowna	Town of Creston
District of Saanich	District of Sparwood	Village of New Denver
District of North Saanich	District of Summerland	Bowen Island Municipality
	Regional District of East Kootenay	

### Step Code Implementation in New Westminster

PART 9 **Endorsed by City** Council **April 2018** 

### SISTABLE BUILDINGS

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# **December 2018**

PART 3

**Endorsed by City** 

Council



# **Building Bylaw – Step Code Adoption**

### **FIVE YEAR IMPLEMENTATION 2018-2022**

• All Part 9 residential Building Permits filed on or after March 31, 2019 will have to meet BC Energy Step Code requirements, as per Section 9.36.6.2 of Division B, BCBC.

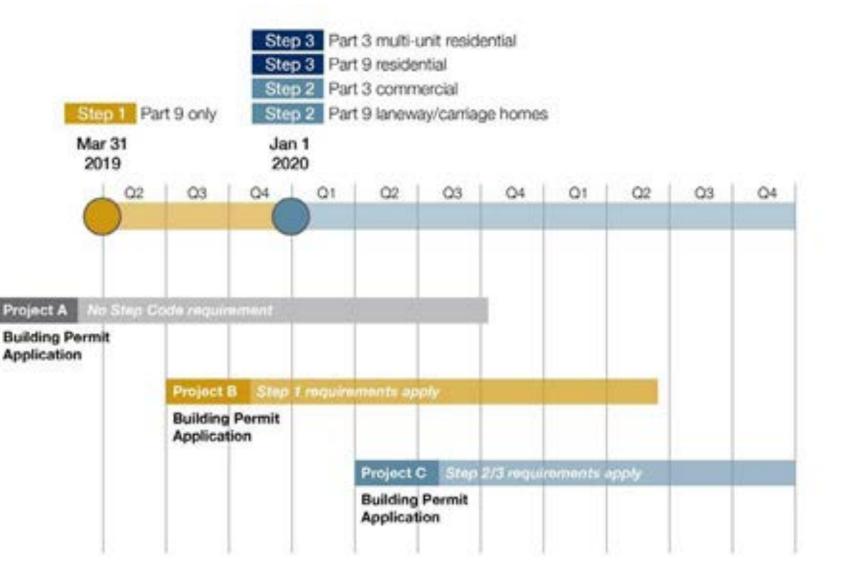
Part 9 Residential	March 31, 2019	January 1, 2020	January 1, 2022
Regulation	Building Bylaw	Building Bylaw	Future
Single Detached Home or Duplex	Step 1	Step 3	Step 4
Laneway or Carriage Home	Step 1	Step 2	Step 3
Triplex, Quadplex or Townhome	Step 1	Step 3	Step 4
Industry Training	$\checkmark$	$\checkmark$	$\checkmark$
Incentives for Energy Modeling	$\checkmark$	$\checkmark$	TBD

### Local Step Code Requirements



# **Step Code Implementation Timing**

Applicants that have previously initiated an application for a new building (rezoning, development permit, heritage revitalization agreement), are considered *in stream* and can build to the energy standards in place at the time of application, as long as a building permit application is submitted within one year.



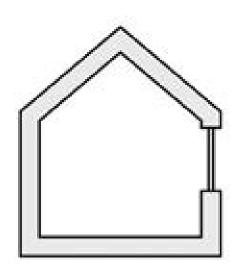
## Performance Path Compliance

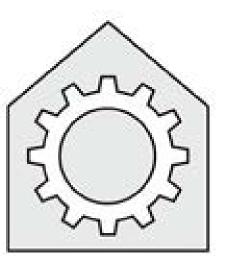


Energy Advisor + Building Energy Modeling Air-Tightness Testing and Reporting **No Prescriptive Requirements** 

### Part 9 Performance Metrics







Airtightness

ACH @ 50 pa

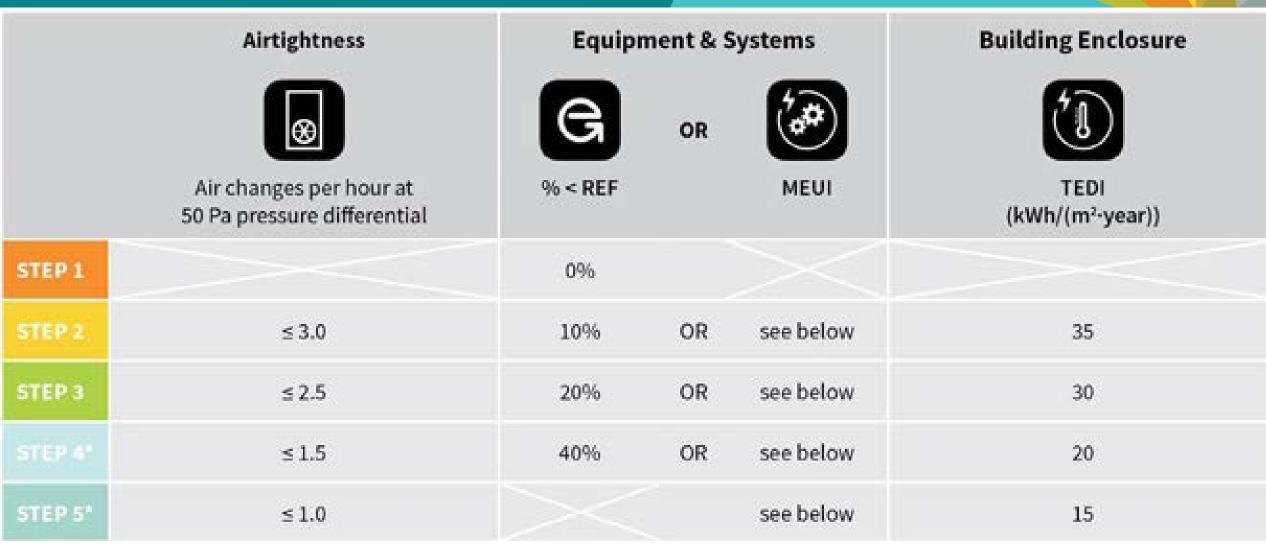
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### **Equipment & Systems**

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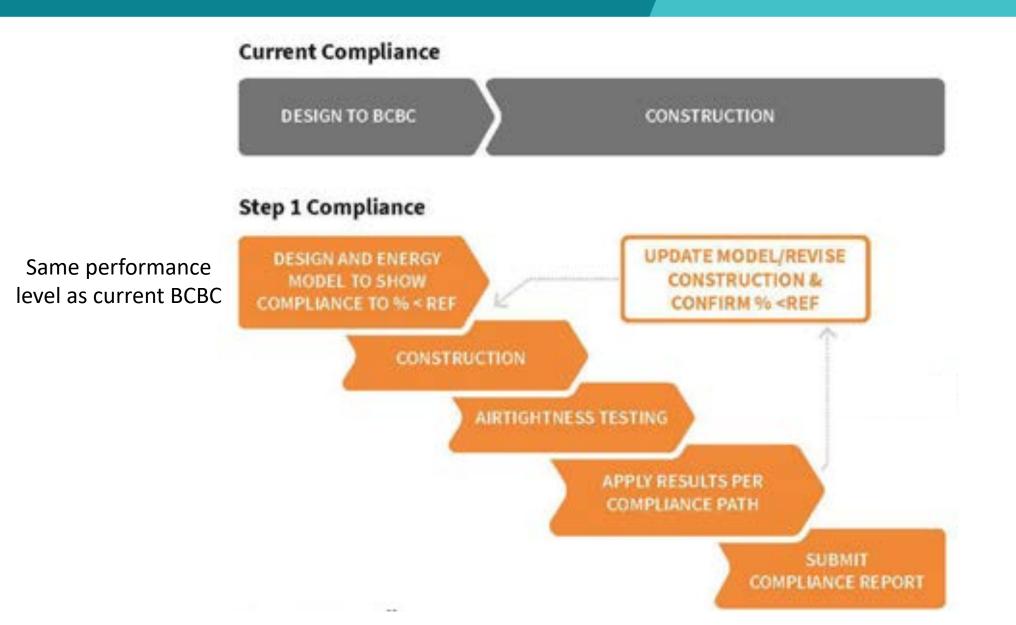
% > Reference (or) MEUI

### Part 9 – Step Code Metrics for Climate Zone 4



December 2018 BCBC update includes modified MEUI and TEDI targets based on home size and climate zone

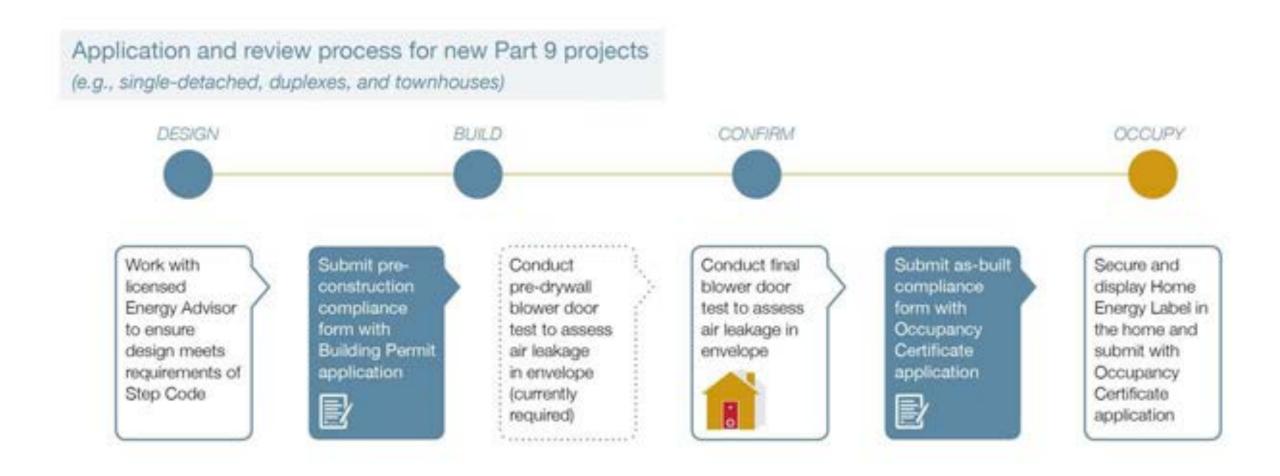
## Design / Build Process for Step Code 1



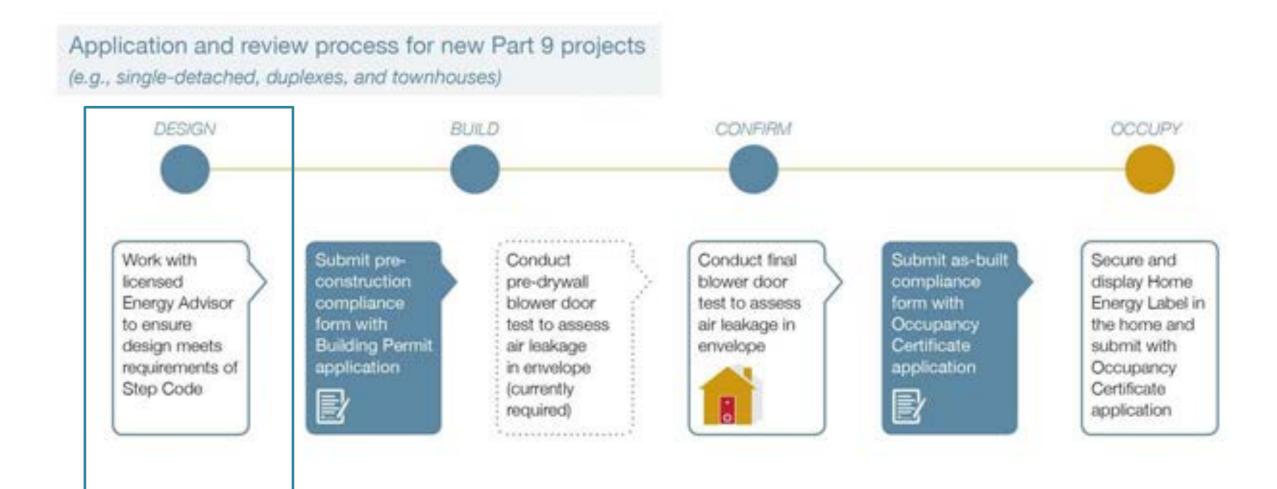
### Design / Build Process for Step Code 2 to 5



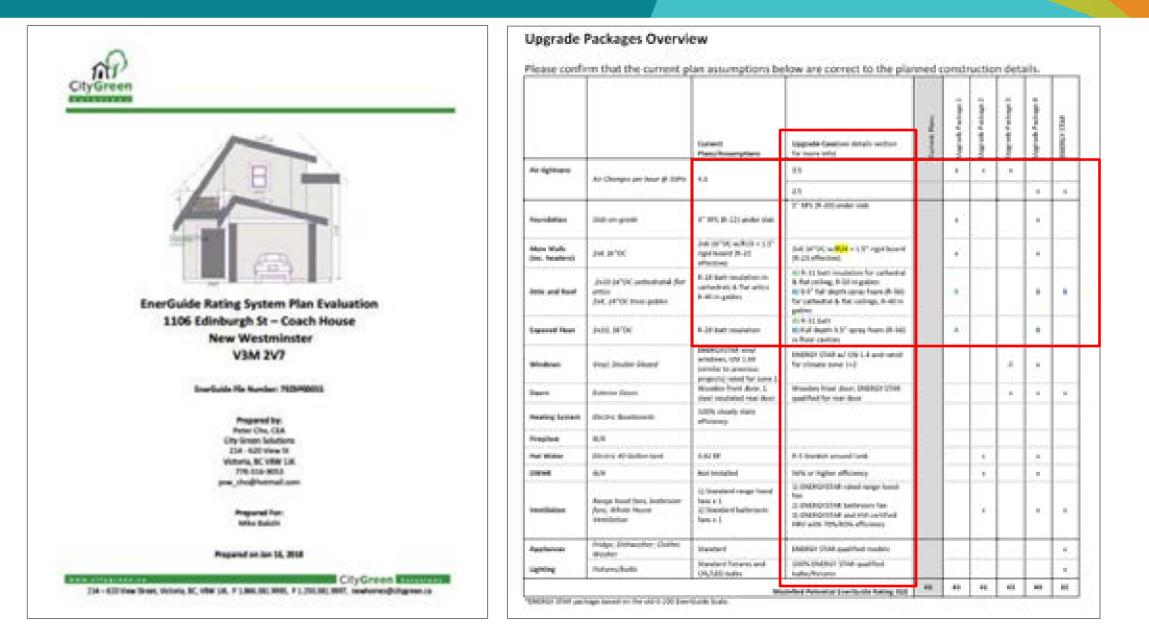
### City of New Westminster Step Code Process



### Part 9 Step Code → Design Review Stage

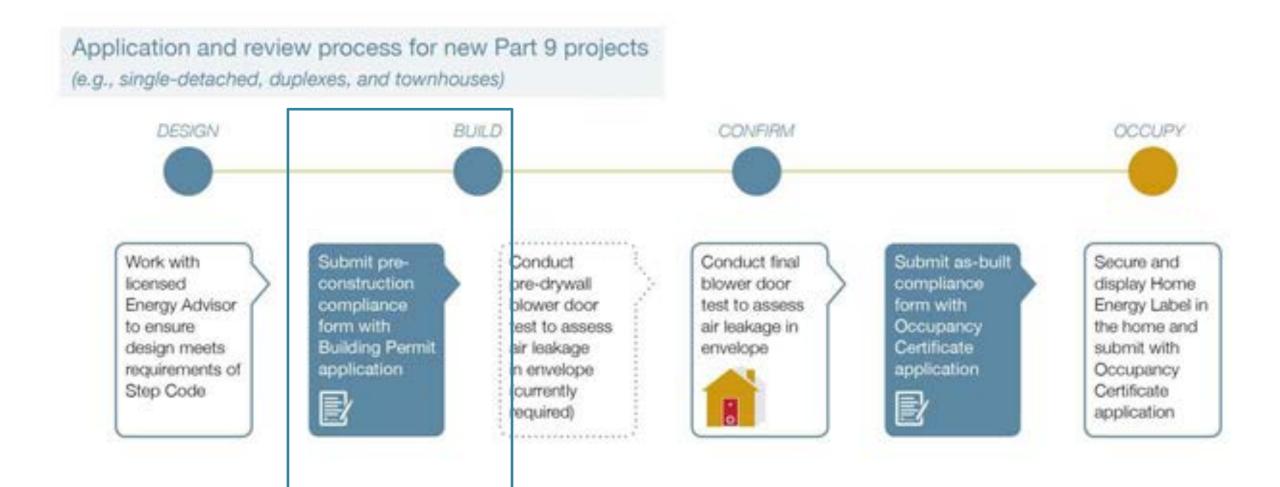


# Working with an Energy Advisor – Design Stage Options



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### Part 9 Step Code → Permit Review Stage



## Pre-Construction Compliance Form – Permit Stage

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**Energy Advisor** will complete this form based upon permit-ready plan drawings.

**Pre-Construction** forms available at:

energystepcode.ca or from your Energy Advisor

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### **PRE-CONSTRUCTION**

Energy Advisor notes compliance path the project will be taking.

**Note:** Step 1 projects have option to take 9.36.5 path, but projects at Steps 2-5 can only take 9.36.6 performance path.

### BC ENERGY COMPLIANCE REPORT - PERFORMANCE PATHS FOR PART 9 BUILDINGS

For Buildings Complying with Subsection 9.36.5. or 9.36.6. of the 2018 BC Building Code (see BCBC Article 2.2.8.3. of Division C)

### A: PROJECT INFORMATION

Building Permit #:		Building Type: Please Select Building Type
Builder:		If Other, Please Specify:
Project Address:		Number of Owelling Units:
Municipality / District		Climate Zone: Please Select Climate Zone
Postal Code:		Floor Area of Conditioned Space (m <sup>2</sup> ):
PID or Legal Description:		
BC Building Code Performance Com	pliance Path (select one):	
🔲 9.36.5. 🔶 Complete Se	ctions A, B, C, & E	9.36.6. 🔶 Complete Sections A. B. D. & E
Software Name:	Version:	Climatic Data (Location):

#### B: BUILDING CHARACTERISTICS SUMMARY (see BCBC Clause 2.2.8.1.(7)(b) of Division C)

Energy Advisor to complete this section.

	DETAILS (ASSEMBLY / SYSTEM TYPE / FUEL TYPE / ETC.)	EFFECTIVE RSI-VALUE / EFFICIENCY
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FENESTRATION & DOORS	FDWR:%	
AIR BARRIER SYSTEM & LOCATION		
SPACE CONDITIONING (HEATING & COOLING)		
MENICE WATER HEATING		
VENTILATION		
OTHER EMERGY IMPACTING PEATURES		
axed on information p	rovided by the builder and drawings prepared by	dated

Energy Advisor will fill out this section if a **Step 1** project is taking the **9.36.5** path.

### C: 9.36.5. ENERGY PERFORMANCE COMPLIANCE (see BCBC Clause 2.2.8.3.(2)(c) of Division C)

Complete this section only if using the Energy Performance Compliance Path in Subsection 9.36.5.

HVAC.	HVAC
Hot Water Heating	Hot Water Heating
SUM	SUM

146

The above calculation was performed in compliance with Subsection 9.36.5. of Division B:

Energy Advisor will fill out this section for projects seeking to meet **Step 2 to 5** performance, as per Section **9.36.6**.

### D: 9.36.6. ENERGY STEP CODE COMPLIANCE (see BCBC Sentence 2.2.8.3(3) of Division C)

Complete this section only if using the Energy Step Code Compliance Path in Subsection 9.36.6.

Proposed House Rated Energy Consumption (GJ/year) Reference House Rated Energy Target (GJ/year)

UNITS	REQUIRED	PROPOSED
Sonp 1 2 3, 4, or 5		
KWh/(m <sup>h</sup> year)	inad	
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kWh/(m <sup>tr</sup> year)	inad	
ACH@SOP.	inad	
	Step 1, 2, 3, 4, or 5 KWh/(m <sup>1</sup> /year) KWh/(m <sup>1</sup> /year)	Step 1.2.3.4 or 5       SWhi(m <sup>1</sup> year)       SWhi(m <sup>1</sup> year)       SWhi(m <sup>1</sup> year)

The above calculation was performed in compliance with (see BCBC Clause 2.2.8.3.(2)(e) of Division C)

Select One:

Subsection 9.36.5.

The Passive House Planning Package (PHPP), version 9 or never, and the energy model was prepared by a Certified Passive House Designer or Certified Passive House Consultant.

The EnerGuide Rating System (ERS), version 15 or never, or

The applicable requirements of NECB Part II and the City of Vancouver Energy Modelling Guidelines

Energy Advisor to complete this section, along with EnerGuide submittals where applicable.

For Certified Passive House projects, a CPHC or CPHD will complete the Step Code compliance form.

E: COMPLETED BY	
Full Name (Print):	If applicable, enter ERS information:
Company Name:	Advisor ID Number:
Phone:	Service Organization:
Address:	EnerGuide P #:
Email:	
Date (dd/mm/yyyy):	

BCBC 2018 REVISION 1 - EFFECTIVE 2018-12-10 2

City will require Energy Advisor to also complete optional **Supplementary Information** section on Page 3, for purposes of future data analysis (based on energy modeling data).

#### SUPPLEMENTARY INFORMATION

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### **EnerGuide Homeowner Information Sheet**





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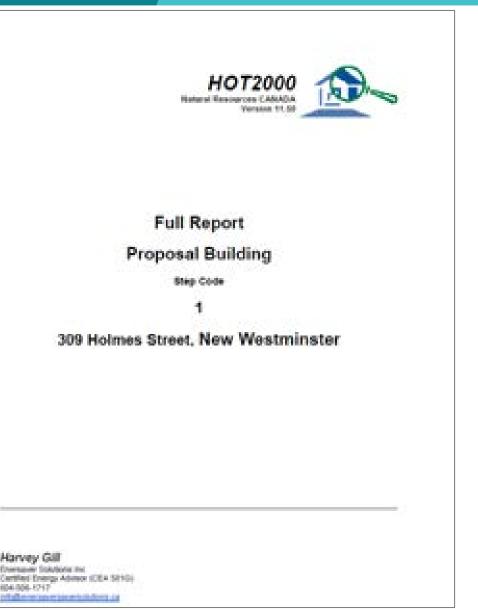
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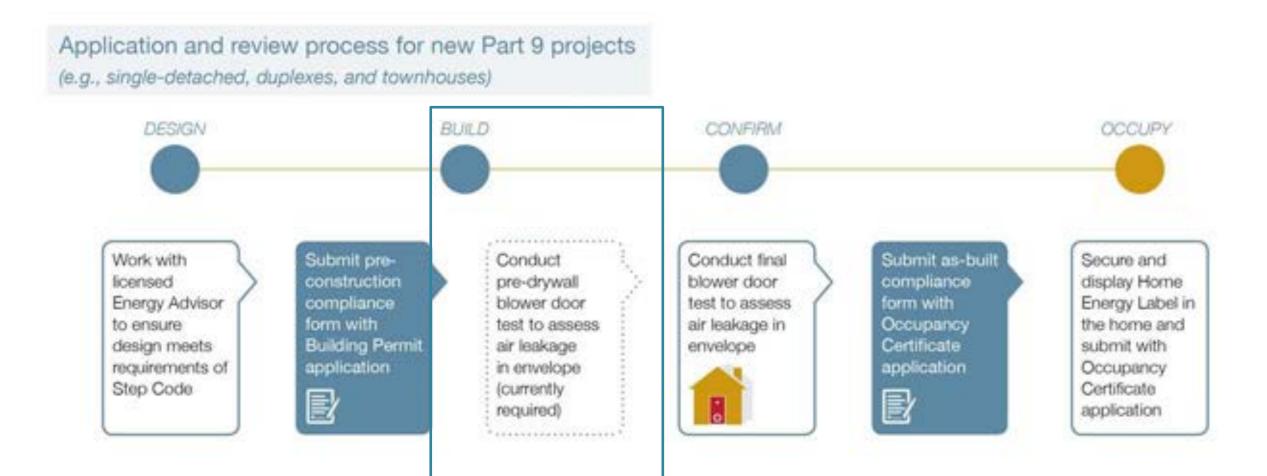
Your Energy Advisor will create the EnerGuide report / rating, and submit the energy modeling data file to NRCan.

### EnerGuide HOT2000 Model Summary

**Energy Advisor** to include printed or electronic copy of HOT2000 modeling summary with Building Permit.



### Part 9 Step Code → Mid Construction Stage



### Mid-Construction Airtightness Form

**Mid-stage** air tightness compliance form ready for pilot testing in April 2019.

Energy Advisor will conduct on-site blower door test once air barrier is in place.

Energy Advisor to confirm visible envelope and mechanical characteristics.

City will require this form to be submitted prior to insulation inspection.

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### MID-CONSTRUCTION

Energy Advisor to complete this section.

### BC STANDARD VERIFICATION REPORT - PERFORMANCE PATHS FOR PART 9 BUILDINGS

For Buildings Complying with Subsection 9.36.5. or 9.36.6. of the 2012 BC Building Code (see BCBC Article 2.2.8.3. of Division C)

### A: PROJECT INFORMATION

Building Permit #:	Building Type:	Step Required:
Project Address		Building #
Builder	Company:	
Builder <mark>E-Mailt</mark>		Phone #:
Energy Advisor:	Company:	
EA ID Number:	Service Organization:	
E-Mail:		Phone #:

Energy Advisor will complete this section.



The main advantage of the midconstruction (pre-drywall) test is that air leakage / thermal issues can be easily addressed prior to completion (As-Built).

#### B: AR TIGHTNESS INTERIOR VOLUME OF BUILDING (m<sup>3</sup>) RECORDED ACH. PROPOSED ACHin AR BARRER SYSTEM & LOCATION: Above-grade Walls: Avright downall C Spray Isans Interior: EN/A Sector polyettylene Other (describe below) Taped sheating **DN/A** Sealed membrane Extension: Stanley insulation Other (describe below). Other: Arriet **DINIA** C Spray Kum Cetter (describe below) Industries: Sealed polyethylene Sealed intodor sheathing ON/A. Sheathing eventstone Other (describe bokse) Exterior: Other: Measured Air Laskage Extrapolated ACH Score Date of Test 5: CFM (B) ACH @ 50 Pa Pressurited Depressurited Method used: = (CFME:50 Pa) x 50 / building interior volume Pa Distantia di sulla di Mereapole activity\* MOT2000 software\* Retrotech soffware\* Cither (see attached) \*Consider via CONS Service No. 161 10-008 Extrapolated ACH Score Date of Test 21 Measured Air Leokage CFM do ACH @ 50 Pa C Pressurized Depressurized Method used: - + (C/MB:50 Pa) x 60 / building interior volume Pa 12.0.00 - 54.00.000 Cher (see attached) HOT2000 software\* Religiest software". Minneapole software\* \* Consideral with CODER Doesdard No. 1981 IN MINE

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Energy Advisor to complete this section.

C: BUILDING ENVELOPE CHARACTERISTICS SUMMARY

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FLOORS OVER UNHEATED SPACES			(error/www.iat)	Not yet installed Unable to verify
FENESTRATION & DOORS			(rysystemated)	Not yet installed Unable to verify

Energy Advisor to complete this section.

#### D: BUILDING EQUIPMENT CHARACTERISTICS SUMMARY

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OTHER ENERGY MPACTING FEATURES			in such that is a local division of the	Not yet installed Unable to verify

I hereby certify that:

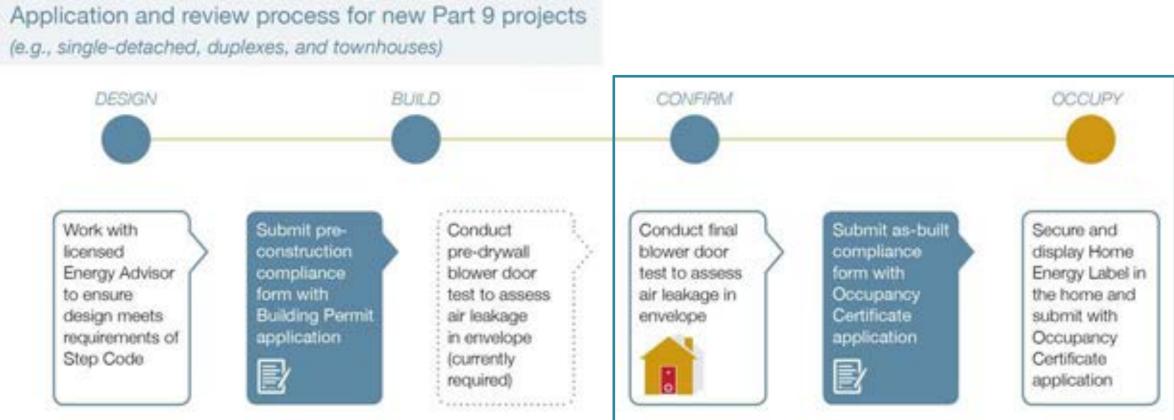
- The air leakage results reported here represent what was measured during the test.
- The extrapolated ACH scores were calculated using a standard industry protocol;
- I personally conducted the checks on the upgrades for the specifications noted above.

, dated (dsimm/yyyy)

Signed by Energy Advisor

Full Name (print):

### Part 9 Step Code $\rightarrow$ As Built Stage



### As Built Compliance Form – Prior to Occupancy

Energy Advisor will complete this form, with final air tightness test results, updated energy model and home energy label.

As Built compliance forms available at:

energystepcode.ca or from your Energy Advisor

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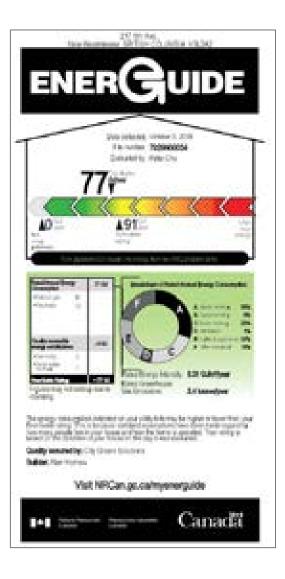
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RECOMMENDATION INCOME.

## Home Energy Label – Prior to Occupancy

As an administrative requirement for occupancy, the City of **New Westminster** requires an energy label to be affixed on or next to the electrical panel in each housing unit, where an electrical panel is present.





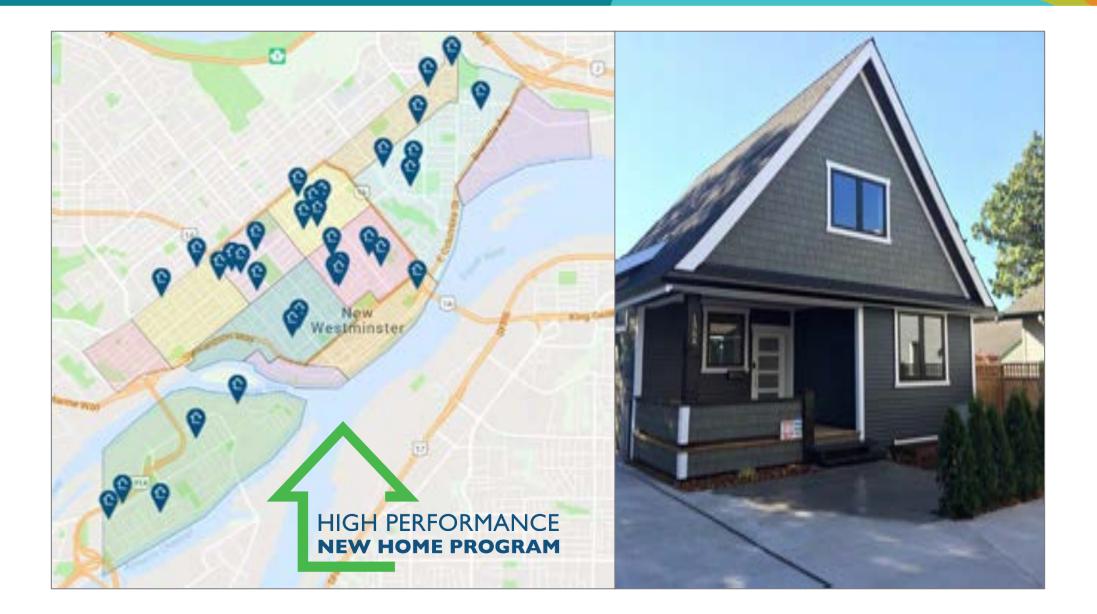
# **Energy Save New West**

#### PREPARING OUR MARKET FOR THE STEP CODE

 High Performance New Home program supports homebuilders, architects and designers with training, technical resources and incentives during the transition to the BC Energy Step Code.

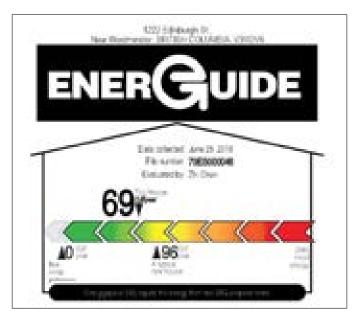


# Local Projects on the Step Code pathway



## 1222 Edinburgh Street

- R22+ Effective Walls
- ENERGY STAR® Windows
- 1.24 ACH @ 50Pa
- HRV @ 72% efficiency
- Tankless water heater (0.79 Energy Factor)
- 28% less energy than National Building Code model house

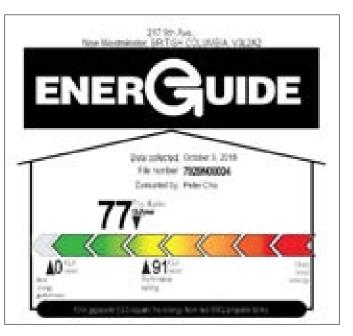






#### 217 Ninth Street

- R22+ Effective Walls
- Space heating with gas boiler (95% AFUE) Domestic hot water with tankless gas (0.79 EF)
- 2.09 ACH @ 50Pa (mid-stage blower door test)
- 22% energy than National Building Code model house

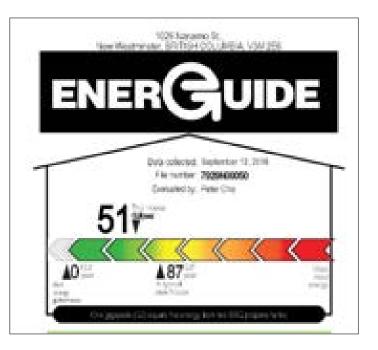






#### 1026 Nanaimo Street

- Space heating with gas furnace (96% AFUE) and heat pump (7.43 HSPF)
- Domestic hot water with tankless gas (0.96 EF)
- 1.94 ACH @ 50Pa (mid-stage blower door test)
- 41% energy than National Building Code model house

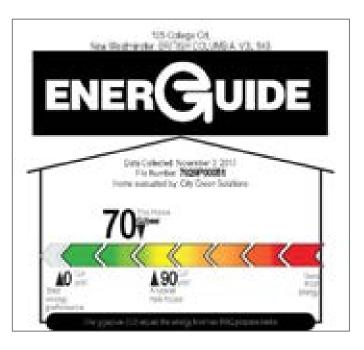






### 105 College Court

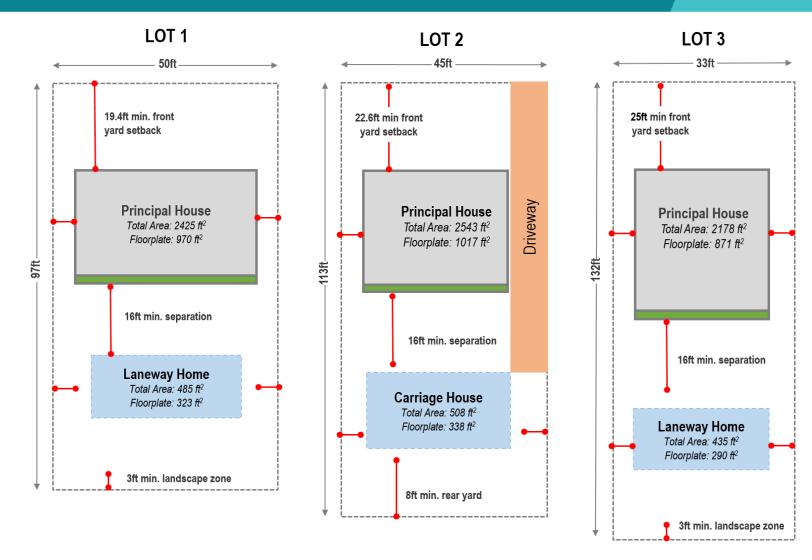
- R26 Effective Walls
- ENERGY STAR® Windows
- 0.49 ACH @ 50Pa (mid-stage blower door test)
- HRV @ 76% efficiency
- Tankless water heater (0.95 Energy Factor)







#### Passive Design Exclusions – Single Detached Zones



Performance Requirement	Increase in FSR (Density)
Step Code Level 3	Increase by 0.10
Step Code Level 4	Increase by 0.30
Step Code Level 5	Increase by 0.55

Allow for nominal increases floor space to compensate for internal area lost to thicker insulated walls (R22 effective or higher) when constructing energy efficient buildings.

Zoning Bylaw No. 7953, 2018

#### Allowance for Deeper Insulated Roofs and Foundations



For **Step Code Level 5** and **Passive House** projects, City has discretion to relax building height by up to 4 feet.

# Step Code Technical Guides

#### ILLUSTRATED GUIDE R22+ EFFECTIVE WALLS IN RESIDENTIAL CONSTRUCTION

BC Housing Website:

Energy Step Code Website:

City of New Westminster co-funded 🗸

# **ILLUSTRATED** GUIDE R22+ Effective Walls in Residential **Construction in British Columbia** Out, public mail developer the ansist builders and devigores in rotation 2 mids that achieve R23 to Higher thermal professories. The information included in this guide is interpet for loss and mid-line intellector haddings arrive Bullish Colordia NEW WESTMINSTER

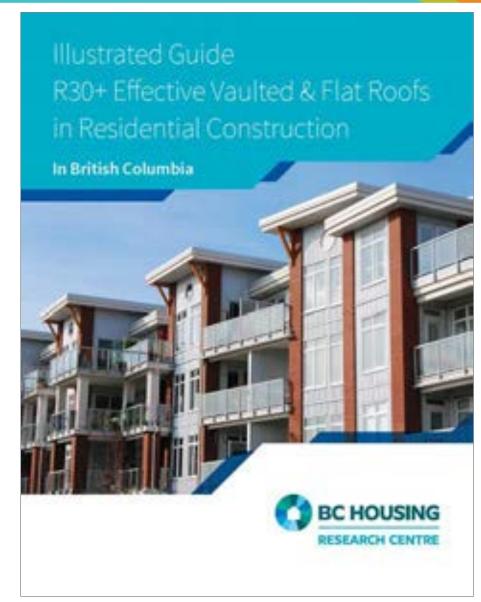
# **Step Code Technical Guides**

#### ILLUSTRATED GUIDE R30+ EFFECTIVE VAULTED AND FLAT ROOFS

BC Housing Website:

Energy Step Code Website:

City of New Westminster co-funded 🗸

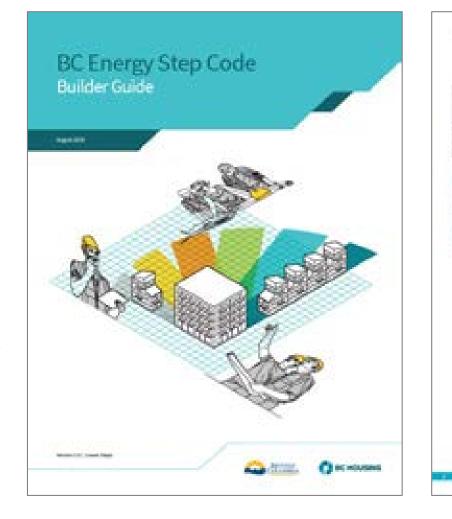


# Part 9 Design Guide from BC Housing

Key resource for builders, architects and designers

For single-family, duplexes triplexes, townhomes and apartments up to 4 floors

New Westminster co-funded 🖌



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# **Training Opportunities & Next Steps**

#### Building Air Tightness Workshops

- BCIT High Performance Construction Lab – Thursday, April 18, 2019
- Expert instruction and hands-on practice by RDH Building Science
- Two, ½ day sessions (morning and afternoon)
  - ✓ 7:30AM to 10:30AM
  - ✓ 11:30AM to 2:30PM
- Spots still available for both sessions



# Thank You!

# **QUESTIONS?**

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