Canadian Home Builders' Association

Canadian Wood Council / Conseil canadien du bois
CELEBRATING SIXTY YEARS 60 CÉLÈBRE SES SOIXANTE ANS

2020 Public review on proposed changes to codes: Find out what it means for you

Proposed Changes to Provisions for Lateral Loads

With Robert Jonkman, P.Eng., Canadian Wood Council

PCF 1475 in a nutshell

1. Prescriptive amounts of lateral resisting ‘braced’ walls are proposed for all locations in Canada…
2. Braced walls can be diagonal lumber, fiberboard, GWB, wood sheathed (with some restrictions).
3. The prescriptive provisions for amount and strength of braced walls are based on a ‘calibrated’ engineering approach

PCF 1475 in a nutshell

1. Prescriptive amounts of lateral resisting ‘braced’ walls are proposed for all locations in Canada in proportion to the design loads of the location, and not just for very high wind and seismic regions. **Just like rafters are designed for the location-specific snow load.**

Table 9.23.4.2.-D
Maximum Spans for Roof Joists – Specified Roof Snow Loads 1.0 to 2.0 kPa
Forming Part of Sentences 9.3.2.8.(1), 9.23.4.2.(1), 9.23.4.5.(1) and 9.23.14.10.(2)

Commercial Designation	Grade	Joist Size, mm	Maximum Span, m								
			Specified Snow Load, kPa								
			1.0			1.5			2.0		
			Joist Spacing, mm			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600	300	400	600

PCF 1475 in a nutshell

2. Braced walls can be diagonal lumber, fiberboard, GWB, wood sheathed, **but some wall types are restricted based on wind and seismic severity**.

Sheathing	Fastener type	Lateral resistance (approximations)
Gypsum unblocked	Drywall screws	1 kN/m
Gypsum blocked	Drywall screws	1-2 kN/m
Wood sheathed unblocked	Nailed	2-3 kN/m
Diagonal lumber	Nailed	4-6 kN/m
Wood sheathed blocked	Nailed	5-14 kN/m

PCF 1475 in a nutshell

3. The amount and required strength of braced walls are based on a ‘calibrated’ engineering approach, considering and balancing:

- ✓**Engineering analysis**
- ✓**Experience… what has worked, what are known issues**
- ✓**Understood redundancies in typical Part 9 construction**

Historical background of lateral resistance provisions

2005 NBC (and prior):	No explicit lateral load requirements
2010 NBC:	Prescriptive requirements were developed for NBC 2010 based on CWC Engineering Guide, based on engineering rationalization, but only for very high wind and seismic locations
2015 NBC:	Updated provisions to accommodate higher seismic data and new seismic methodology in Part 4, but still only for very high load regions
2020 NBC:	**PCF 1475, by Joint Task Group (Seismic, HSB)**

Why do we need prescriptive provisions?

To make it clear when a house should be designed.

This has no lateral bracing ability along the window elevation and should require a Part 4 engineered design…

…but nothing in Part 9 currently prohibits this home.

Why do we need prescriptive provisions?

To account for current house design…

Then …
Smaller homes, many interior partitions, small windows

Now…
more openings and open concept

Why do we need prescriptive provisions?

To accommodate narrow sites…

(Toronto, March 2017, CP24)

http://www.cbc.ca/news/canada/toronto/house-blown-over-1.4006173

Why do we need prescriptive provisions?

To account for current house construction…

Energy codes and cost saving measures sometimes have failures during construction wind storms.

These houses in the same subdivision withstood the windstorm without incident.

Why do we need prescriptive provisions?

Wind and seismic exemption triggers - where provisions for lateral resistance are not required - **are very high in NBC 2015**:

Of the 679 locations identified in Appendix C, 614 are exempt (!!)

- **2015** seismic, $S_a(0.2)$, **exemption trigger:** ≤ 0.70
- **2015** wind pressure, $q_{1/50}$, **exemption trigger:** ≤ 0.80 kPa.

Extremely high wind exemption trigger

no design provisions for locations with wind pressure less than…

Wind: $q_{1/50'} \leq 0.80$ kPa ~ 200 km/h wind speed (3-second gusts)

Hurricane Dorian gusts

175km/h

EF2 Tornado estimated wind speed

180 to 220 km/h

Enhanced Fujita Scale

The Enhanced Fujita Scale is used to measure the strength of tornadoes in Canada and the United States. In 2007, it replaced the Fujita Scale with updated wind speeds.

EF Rating	EF-Scale (wind speed rounded to 5 km/h)	Damage
0	90-130 km/h	Light
1	135-175 km/h	Moderate
2	180-220 km/h	Considerable
3	225-265 km/h	Severe

Why do we need prescriptive provisions?

SC ED has been questioning Part 9 provisions for several years.

Yukon Engineers concerned about a lack of seismic provisions in their low seismic area.

Why do we need prescriptive provisions?

Request from Engineers Yukon for seismic provisions

"We are concerned that structures are being built under Part 9 without adequate lateral load resisting systems. Although Whitehorse and most of the Yukon classifies as a low seismic zone, seismic loads can still be significant..."

Why do we need prescriptive provisions?

“Recent trends amplify this concern:

Large glazed facades

Open floor plans, with few interior walls

Taller storey heights

[…]

We would like to see a minimum level of lateral resistance specified for low seismic zones, such as an adaptation of Table 9.23.13.5 […].”

Why do we need prescriptive lateral provisions for Part 9 - summary

- To address changing archetypes
- To address changing construction materials
- In response to user demand for lower lateral load areas
- To ensure a similar degree of reliability across Canada by providing proportionate-to-load lateral bracing for both wind and seismic, as the code already enforces for other loads like snow.

Proposed Change 1475

Code Reference(s):

NBC15 Div.B 9.4.1.1.
NBC15 Div.B 9.4.2.
NBC15 Div.B 9.20.1.
NBC15 Div.B 9.23.1.1.
NBC15 Div.B 9.23.3.1.
NBC15 Div.B 9.23.3.4.
NBC15 Div.B 9.23.3.5.
NBC15 Div.B 9.23.6.1.
NBC15 Div.B 9.23.11.4.
NBC15 Div.B 9.23.13.
NBC15 Div.B 9.23.16.1.
NBC15 Div.B 9.23.16.5.
NBC15 Div.B 9.31.6.2.(3)
NBC15 Div.B 9.33.4.7.(2)

Lookup table for seismic value based on location, and description of Smax calculation

Permitted sheathing based on wind and seismic, fastening of sheathing to framing, and anchor bolt sizing and spacing

Double top plate splice connection

Braced wall provisions

Subject: Structural Design (Part 9) — Lateral Loads

Title: Resistance to Lateral Loads

Description: The proposed change updates the Part 9 provisions for resistance to lateral loads due to earthquakes and wind. It responds to an increase in seismic hazard values for many locations in Canada by replacing Sa(0.2) with the seismic design parameter, Smax, and by defining new wood-frame wall types.

PCF 1475 - 9.4.1.1 and Table 9.4.1.1. Seismic Design Parameter S_{max} for locations and site class

S_{max} lookup table based on location and Site Class

Table [9.4.1.1.] 9.4.1.1.

Seismic Design Parameter, S_{max}, According to Site Class for Selected Locations in Canada

Forming Part of Sentence [9.4.1.1.] -- ([4] --)and Article 9.4.2.5. -- (--)

Province and Location	S_{max} According to Site Class				
	A	B	C	D	E
British Columbia					
100 Mile House	0.067	0.085	0.145	0.240	0.264
Abbotsford	0.408	0.506	0.788	1.061	1.111

For comparison purposes, $S_a(0.2)$ lookup table based on location only in NBC 2015)

Table C-3
Seismic Design Data for Selected Locations in Canada

Province and Location	Seismic Data							
	$S_a(0.2)$	$S_a(0.5)$	$S_a(1.0)$	$S_a(2.0)$	$S_a(5.0)$	$S_a(10.0)$	PGA	PGV
British Columbia								
100 Mile House	0.140	0.113	0.083	0.058	0.027	0.0080	0.064	0.109
Abbotsford	0.701	0.597	0.350	0.215	0.071	0.025	0.306	0.445

PCF 1475 - 9.4.2.5 Seismic Design Parameter (S_{max}) described

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9.4.2.5 describes S_{max}… but easiest to use Table 9.4.1.1

Note A-9.4.2.5. Seismic Design Parameter.

The seismic design parameter, S_{max}, is used as a trigger for the application of seismic design provisions in Part 9.

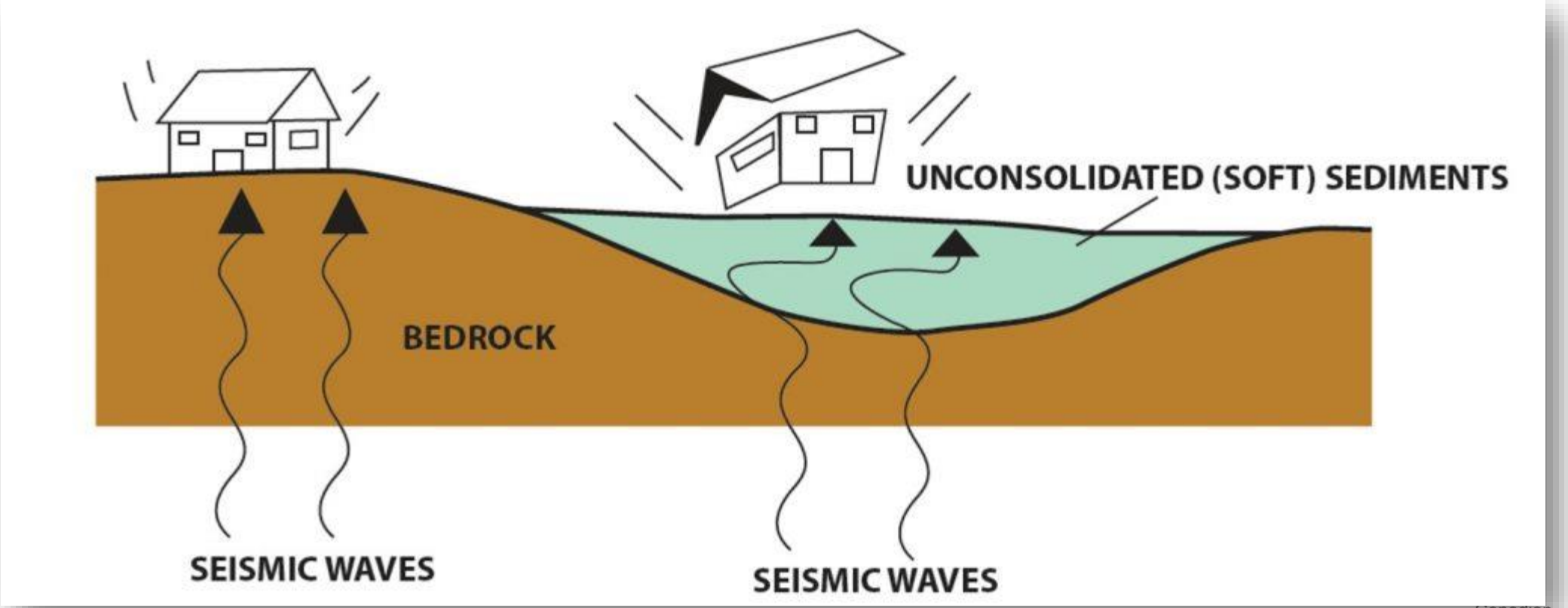
Note A-9.4.2.5. Seismic Design Parameter.

The seismic design parameter, S_{max}, is used as a trigger for the application of seismic design provisions in Part 9. It was derived by considering the upper limit on the minimum lateral earthquake force, V, as specified in Clause 4.1.8.11.(2)(c), and is taken as the larger of 2/3S(0.2) and S(0.5) where

S(0.2)	= $S_a(0.2,X_S)$ or $S_a(0.5,X_S)$, whichever is larger,
S(0.5)	= $S_a(0.5,X_S)$, and
X_S	= site designation in terms of Site Class, S, as determined in accordance with Article 4.1.8.4.

What is S_{max}?

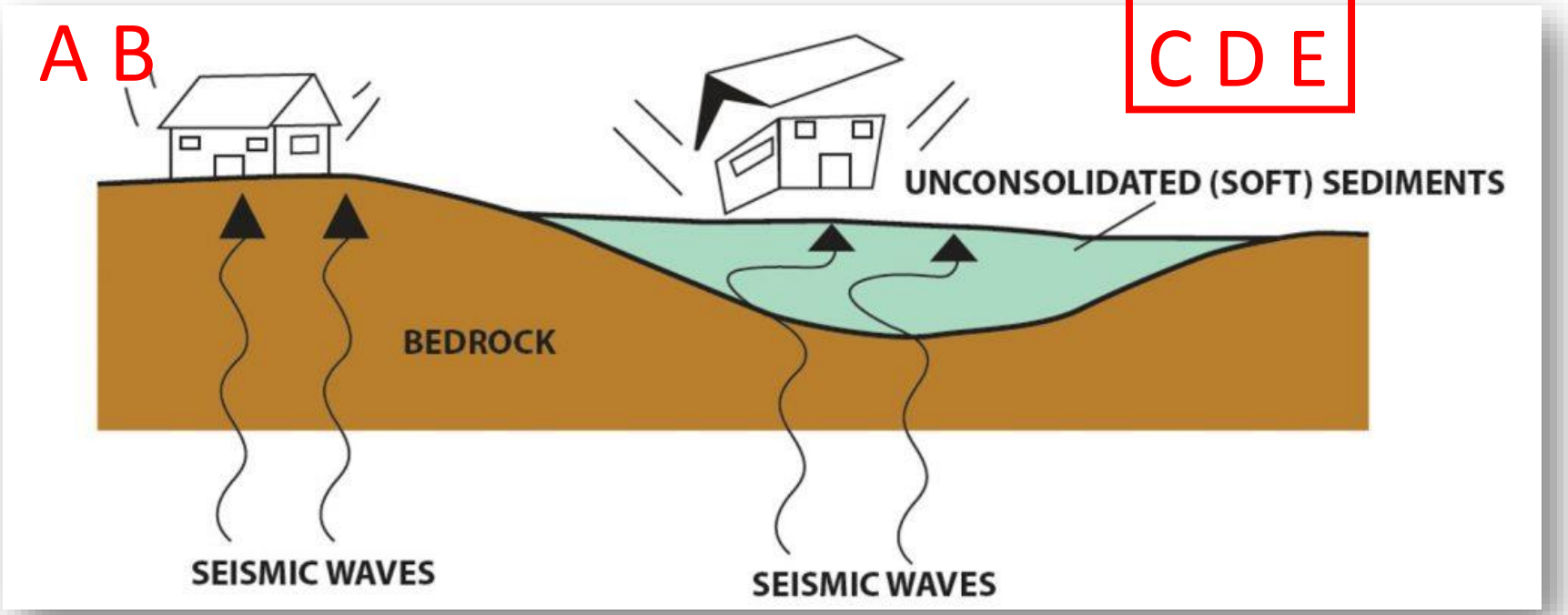
S_{max} represents the severity of seismic shaking based on location and soil type



What is S_{max}?

In NBC 2015, $S_a(0.2)$-based provisions assumed the worst case soil.

S_{max} enables the benefit of good soils
(lower seismic forces, less costly walls).



PCF 1475 - 9.23.3.5 Fasteners for Sheathing or Subflooring, Braced wall sheathing thickness, anchor bolts.

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9.23.3.5.A-D Fasteners for Sheathing and Subflooring

Table	Roof sheathing	Wall sheathing	Subfloor
Table 9.23.3.5.**A**	HWP < 0.80 kPa	Non-braced wall panels	all
Table 9.23.3.5.**B**	0.80 kPa ≤ HWP < 1.20 kPa S_{max} < 0.80		
Table 9.23.3.5.**C** **1-storey**		HWP ≤ 1.20 kPa S_{max} ≤ 2.6	
Table 9.23.3.5.**D** **2-storey and 3-storey**		HWP ≤ 1.20 kPa S_{max} ≤ 2.4	

9.23.3.5.A-D Fasteners for Sheathing and Subflooring

(includes braced wall sheathing type and thickness, and anchor bolts)

Table [9.23.3.5.-D]

Fastening of Wall Sheathing in Required Braced Wall Panels in Two-Storey Buildings of Normal or Heavy Weight Construction and Three-Storey Buildings of Normal Weight Construction Where $S_{max} \leq 2.4$ and HWP ≤ 1.2 kPa

Forming Part of Sentence -- (--)

No. of *Storeys* (1)	Type of Construction (2)	S_{max}	HWP, kPa	Sheathing (Bracing) Element (3)	Maximum Stud Spacing, mm	Minimum Specifications for Fasteners (4)		Maximum Spacing of Fasteners to Framing Along Edges of Sheathing Panels, mm (5)	Maximum Anchor Bolt Spacing, m (6)		Wall ID (Acceptable Alternative)
						Common, Spiral or Ring Thread Nails	Screws		12.7 mm diam	15.9 mm diam	

9.23.3.5.A-D Fasteners for Sheathing and Subflooring

No. of *Storeys* (1)	Type of Construction (2)	S_{max}	HWP, kPa	Sheathing (Bracing) Element (3)	Maximum Stud Spacing, mm	Minimum Specifications for Fasteners (4)		Spacing of Fasteners to Framing Along Edges of Sheathing Panels, mm (5)	Anchor Bolt Spacing, m (6)		Wall ID (Acceptable Alternative)
						Common, Spiral or Ring Thread Nails	Screws		12.7 mm diam	15.9 mm diam	
2	Normal weight	≤ 0.40	≤ 0.35	12.5 mm gypsum board (blocked) (7) or 15.9 mm (unblocked)	600 (blocked) (7) or 400 (unblocked)	2.48 mm diameter, 19 mm penetration (8)	3.45 mm diameter, 19 mm penetration (9)	100	2.4	2.4	GWB-F (WSP-A)
		≤ 0.50	≤ 0.40	15.9 mm gypsum board	600	2.48 mm diameter, 19 mm penetration (8)	3.45 mm diameter, 19 mm penetration (9)	100	2.4	2.4	GWB-H (WSP-B)

9.23.3.5.A-D Fasteners for Sheathing and Subflooring

We will come back to this table and go through an example…

PCF 1475 - 9.23.11.4 Double top plate splices

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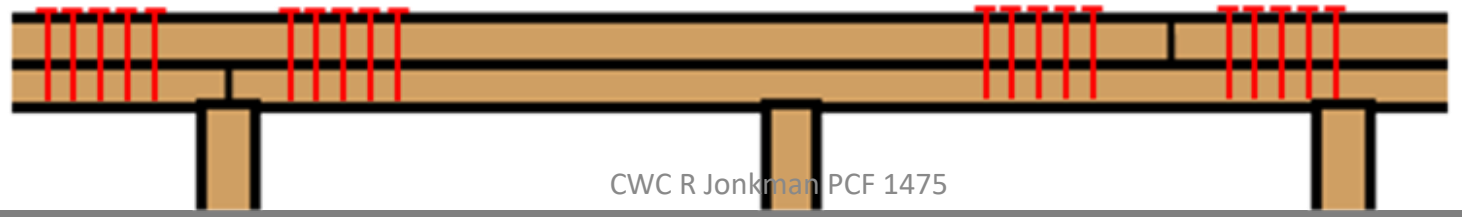
9.23.11.4 Double top plate splices

Table [9.23.11.4.] 9.23.11.4.

Fasteners in Doubled Top Plate Splice Connections in Braced Wall Bands Wwhere ~~0.70 < S_a(0.2) ≤ 1.8~~ HWP ≤ 1.2 kPa and S_{max} ≤ 2.6

Forming Part of Sentence [9.23.11.4.] 9.23.11.4.([5] 5)

S_{max}~~$_a$(0.2)~~	HWP, kPa	Minimum Number of Nails on Each Side of Doubled Top Plate Splice				
		~~Light~~ Normal Weight Construction (1)			Heavy Weight Construction (1)	
		Number of *Storeys*~~Supported Floors~~ (2) (3)				
		~~0~~1	~~1~~2	~~2~~3	~~0~~1	~~1~~2
~~0.70 < S_a(0.2)~~ ≤ 0.60~~80~~	≤ 0.35	~~2~~3	~~5~~3	~~8~~5	3	~~8~~5
~~0.80 < S_a(0.2)~~ ≤ 1.0~~0.90~~	≤ 0.40	~~2~~6	~~5~~6	~~8~~10	~~4~~6	~~8~~10



PCF 1475 - 9.23.13. Bracing to resist lateral loads due to wind and earthquake

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9.23.13.1 Application Limitations

[9.23.13.1.] 9.23.13.1. ~~Requirements for Low to Moderate Wind and Seismic Forces~~Application Limitations

[1] --) Except as provided in Sentence (2), bracing to resist lateral loads shall be designed and constructed in accordance with Part 4.

[2] --) Subject to the application limitations defined elsewhere in this Part, bracing to resist lateral loads is permitted to be designed and constructed in accordance with Articles 9.23.13.4. to 9.23.13.10.-2020, provided

[a] --) the lowest exterior frame wall supports not more than

[i] --) 2 floors in *buildings* of normal weight construction, or

[ii] --) 1 floor in *buildings* of heavy weight construction,

9.23.13.1 (2)(a)

1-storey

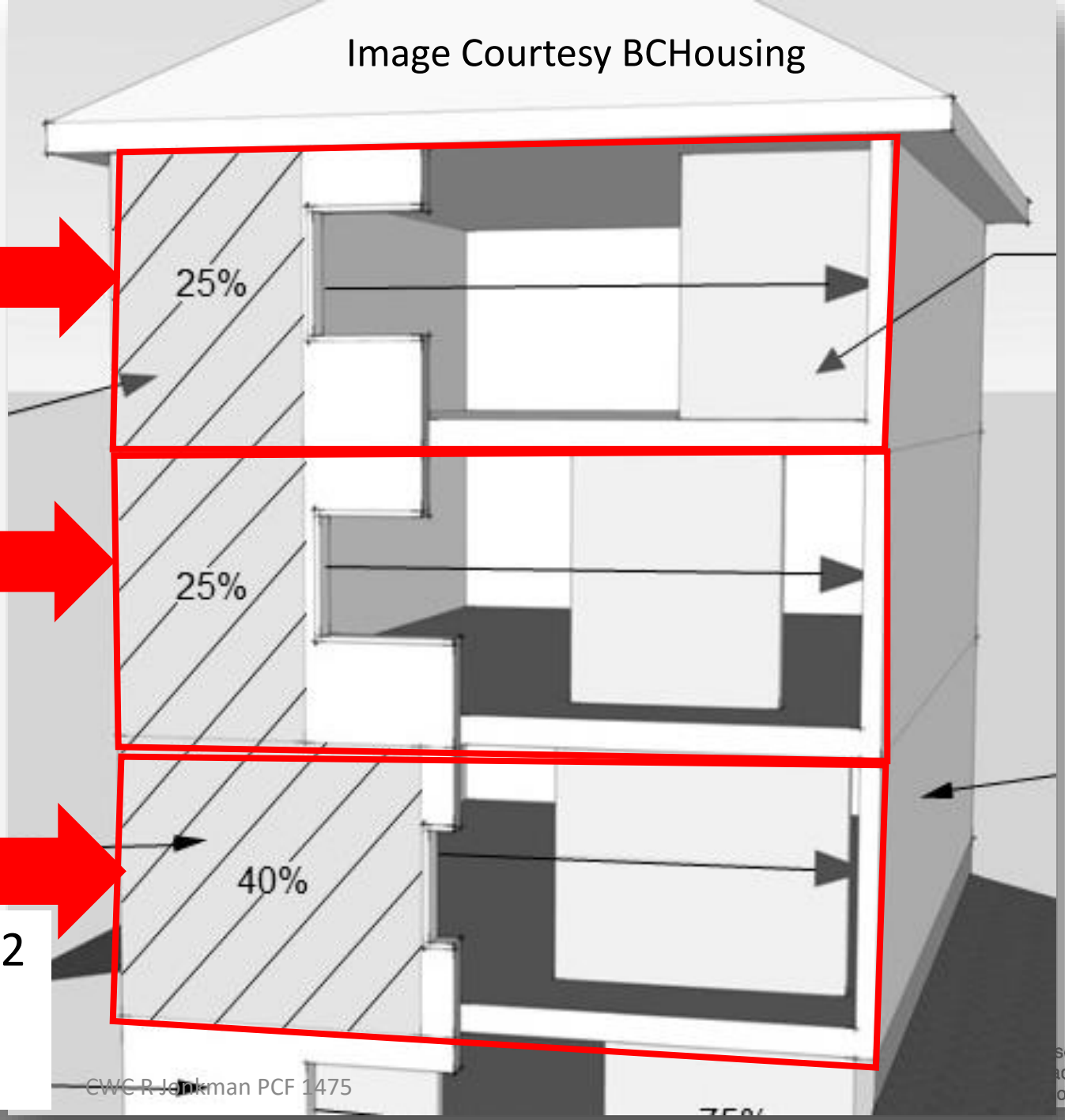
Supports roof only

2-storey

Supports not more than 1 floor

3-storey

Supports not more than 2 floors (not permitted for heavy construction)



9.23.13.1 (2) (b): Length-to-width (aspect) ratio limitations

[b] --) the *building*'s length-to-width ratio is less than

[i] --) 4:1 for *buildings* of up to 3 *storeys* in *building height* and of normal weight construction and for *buildings* of up to 2 *storeys* in *building height* and of heavy weight construction, where the 1-in-50-year hourly wind pressure (HWP) is not greater than 0.35 kPa,

[ii] --) 3:1 where the seismic design parameter, S_{max}, is greater than 2.0 and the 1-in-50-year hourly wind pressure (HWP) is not greater than 0.35 kPa, or

[iii] --) 2:1 where the 1-in-50-year hourly wind pressure (HWP) is greater than 0.35 kPa, provided the minimum lengths of the *braced wall panels* are adjusted according to Article 9.23.13.7.-2020,

9.23.13.1. (2) (b) Limitations to building aspect ratios

4:1	3:1	2:1
S_{max} ≤ 2.0	S_{max} > 2.0	$q_{1/50}$ > 0.35*
$q_{1/50}$ ≤ 0.35	$q_{1/50}$ ≤ 0.35	

*adjustment necessary 1.5x braced wall length required (see 9.23.13.7)

9.23.13.1 (2) (c): Braced wall panel height

[c] --) the unsupported height of the *braced wall panels* is not greater than 3 m.

The height limit doesn't apply to all walls or the storey, just to braced wall panels.

9.23.13.1 (2) (d): Normal vs Heavy construction

[3] --) For the purposes of Sentence (2) and this Section,

[a] --) in a *building* of normal weight construction, the average dead weight per *storey* shall not exceed

[i] --) 0.5 kPa for floors and 0.5 kPa for *partitions* and interior walls,

[ii] --) 0.5 kPa for the roof, and

[iii] --) 0.4 kPa for exterior walls, and

[b] --) in a *building* of heavy weight construction, the average dead weight per *storey* shall conform to Clause (a), except that the average dead weight per *storey* shall not exceed

[i] --) 1.5 kPa for floors and 0.5 kPa for *partitions* and interior walls,

[ii] --) 1.0 kPa for the roof, or

[iii] --) 1.2 kPa for exterior walls.

9.23.13.1 (2) (d): Normal vs Heavy construction

Heavy weight				Normal weight			
Walls:	1.5 kPa	=	31.3 psf	Walls:	0.4 kPa	=	8.4 psf
Floors:	1.2 kPa	=	25.1 psf	Floors:	0.5 kPa	=	10.4 psf
Roof:	1.0 kPa	=	20.8 psf	Roof:	0.5 kPa	=	10.4 psf

Only ONE heavy weight assembly permitted.

Construction weights are based on the average for the assembly

Storey height limit based on construction weight

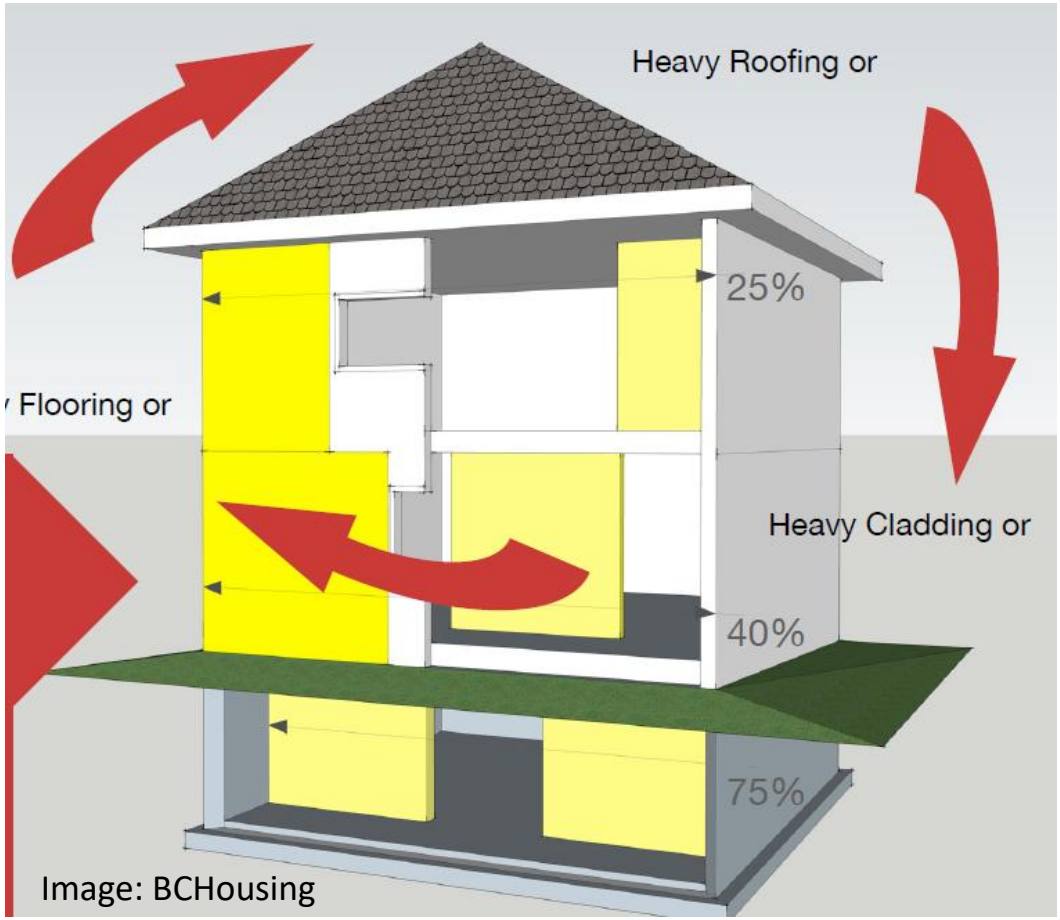


Image: BCHousing

Heavy walls or floors or roof limit restricts building to two storeys.

9.23.13.4: Braced wall bands

[9.23.13.4.] 9.23.13.4. Braced Wall Bands

(See Note A-9.23.13.4.)

[1] 1) *Braced wall bands* shall

[a] --) surround the perimeter of the *building*,

[b] a) be full *storey* height,

[c] b) be not more than 1.2 m wide,

[d] c) lap at both ends with another *braced wall band*,

[e] d) be aligned with *braced wall bands* on *storeys* above and below, and

[f] e) conform to the spacing and dimensions given in Table 9.23.13.5.

9.23.13.4: Braced wall bands

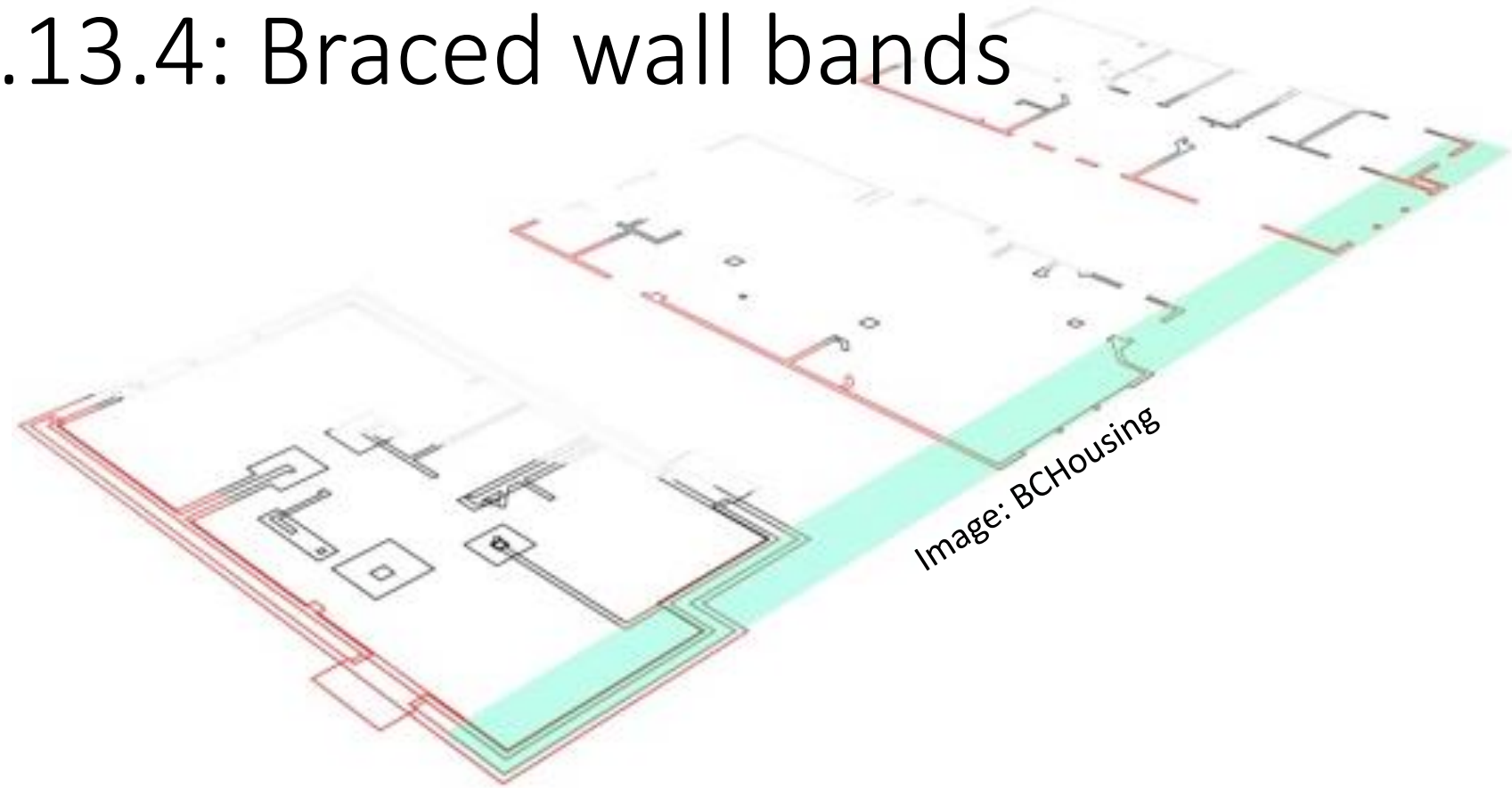
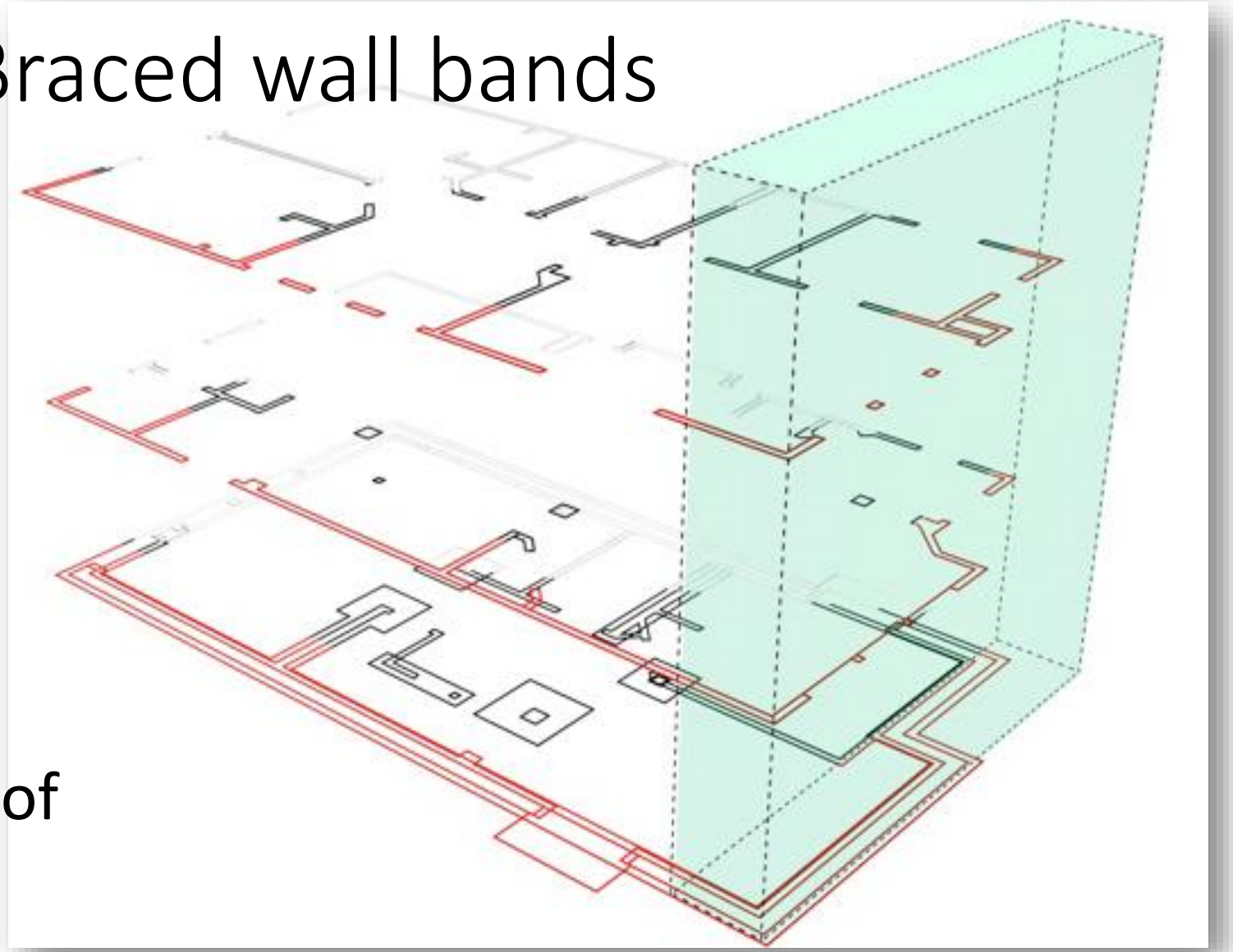


Image: BCHousing

Braced wall band is an imaginary continuous band up to 1.2 m wide …

9.23.13.4: Braced wall bands



… aligned from foundation to roof

Image: BCHousing

9.23.13.4: Braced wall bands

… surround the perimeter of the building and lap at both ends with another braced wall band

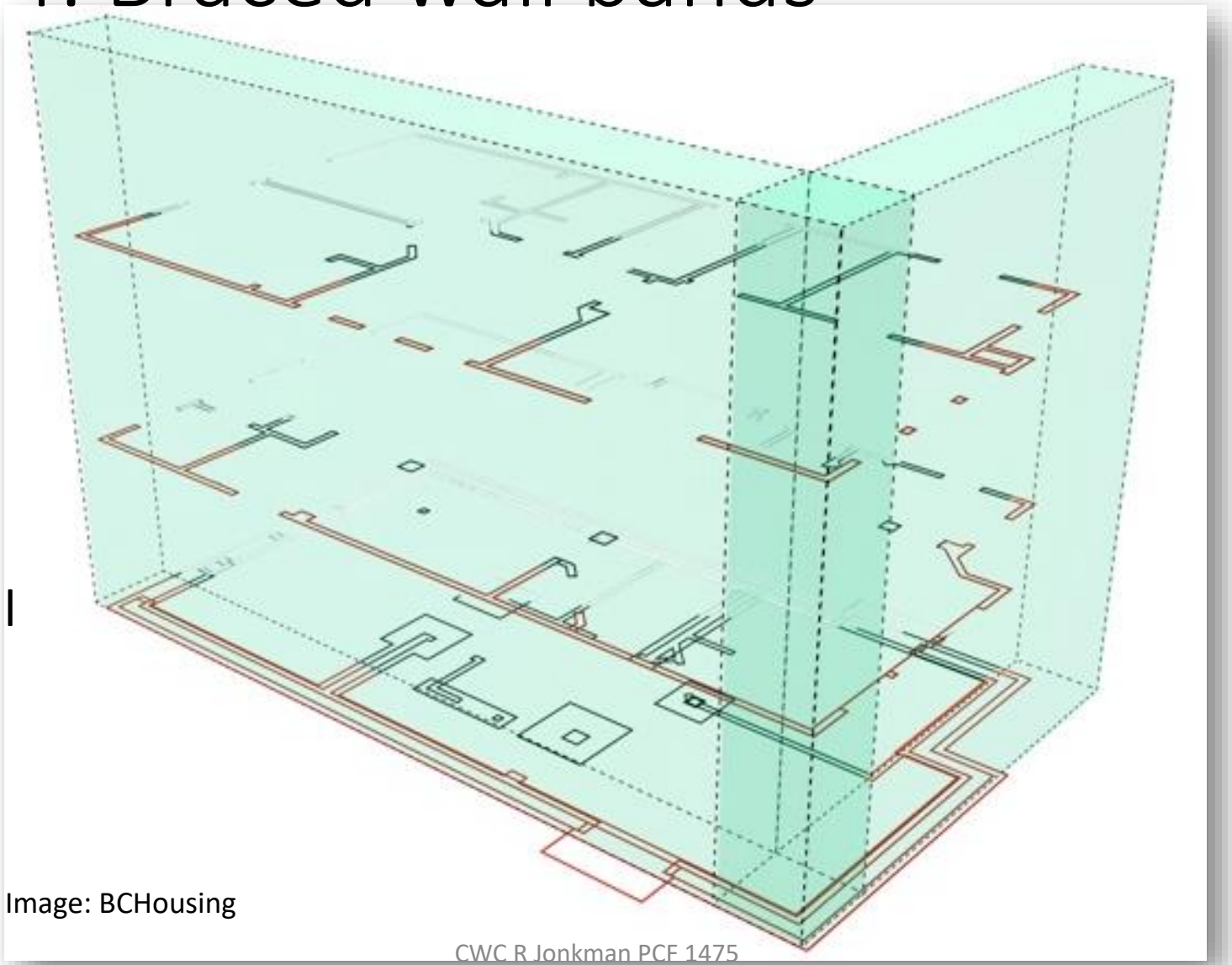


Image: BCHousing

9.23.13.4: Braced wall bands

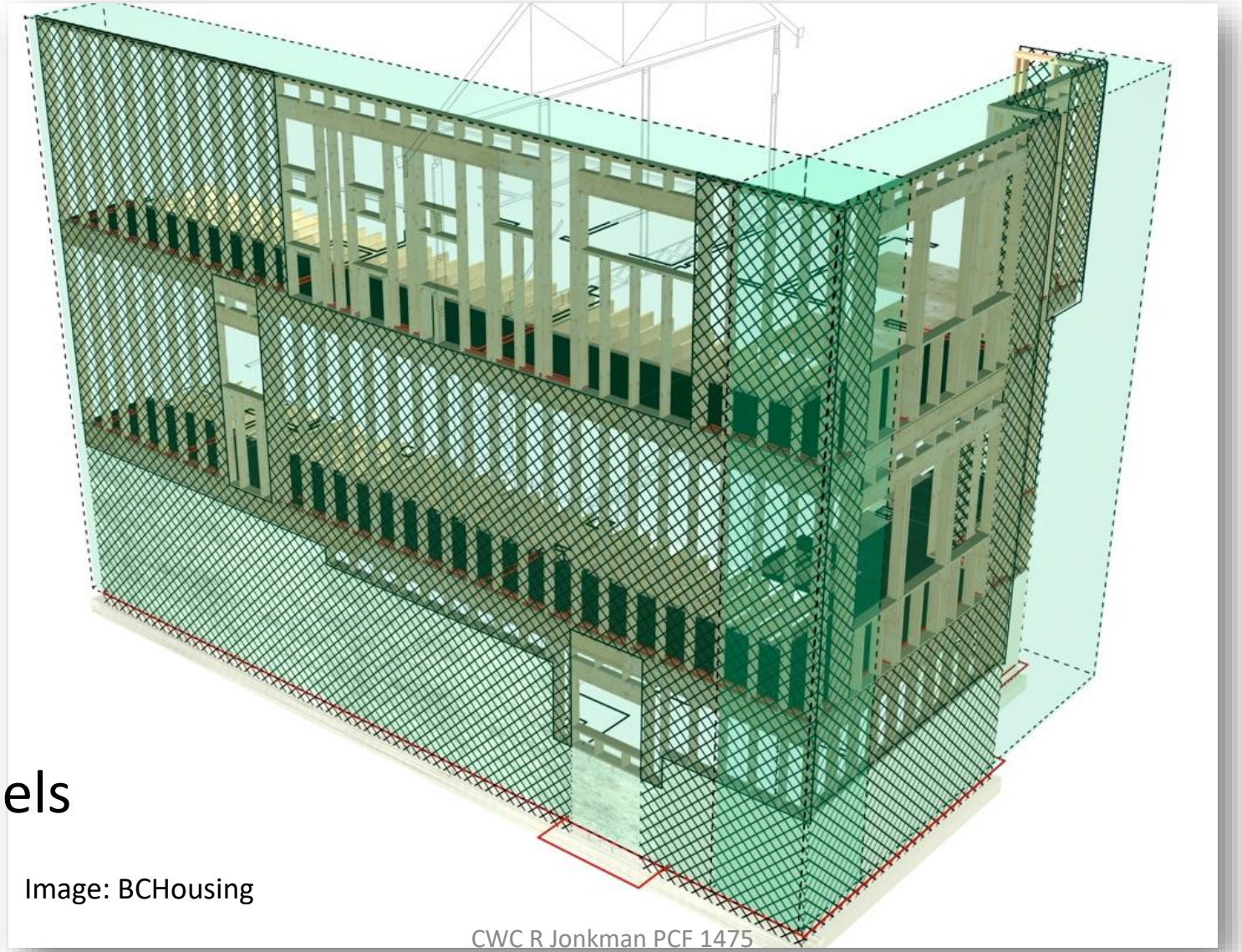


Image: BCHousing

… and contain braced wall panels

9.23.13.5 (1): Braced wall panels

] 9.23.13.5. Braced Wall Panels in Braced Wall Bands

1) Except as provided in Sentences (2) and 9.23.13.10.(2) to (4)-2020 ~~to (5)~~ and in Article 9.23.13.7.-2020~~Article 9.23.13.7.~~, *braced wall panels* shall

[a] a) be located within *braced wall bands*,

[b] --) be laterally supported at each floor level and the roof,

[c] b) extend, as applicable, from the top of the supporting footing, slab or subfloor to the underside of the floor, ceiling or roof framing above, and

[d] c) conform to the spacing and dimensions given in Table 9.23.13.5.

Table [9.23.13.5.] 9.23.13.5.

9.23.13.5 (1): Braced wall panels

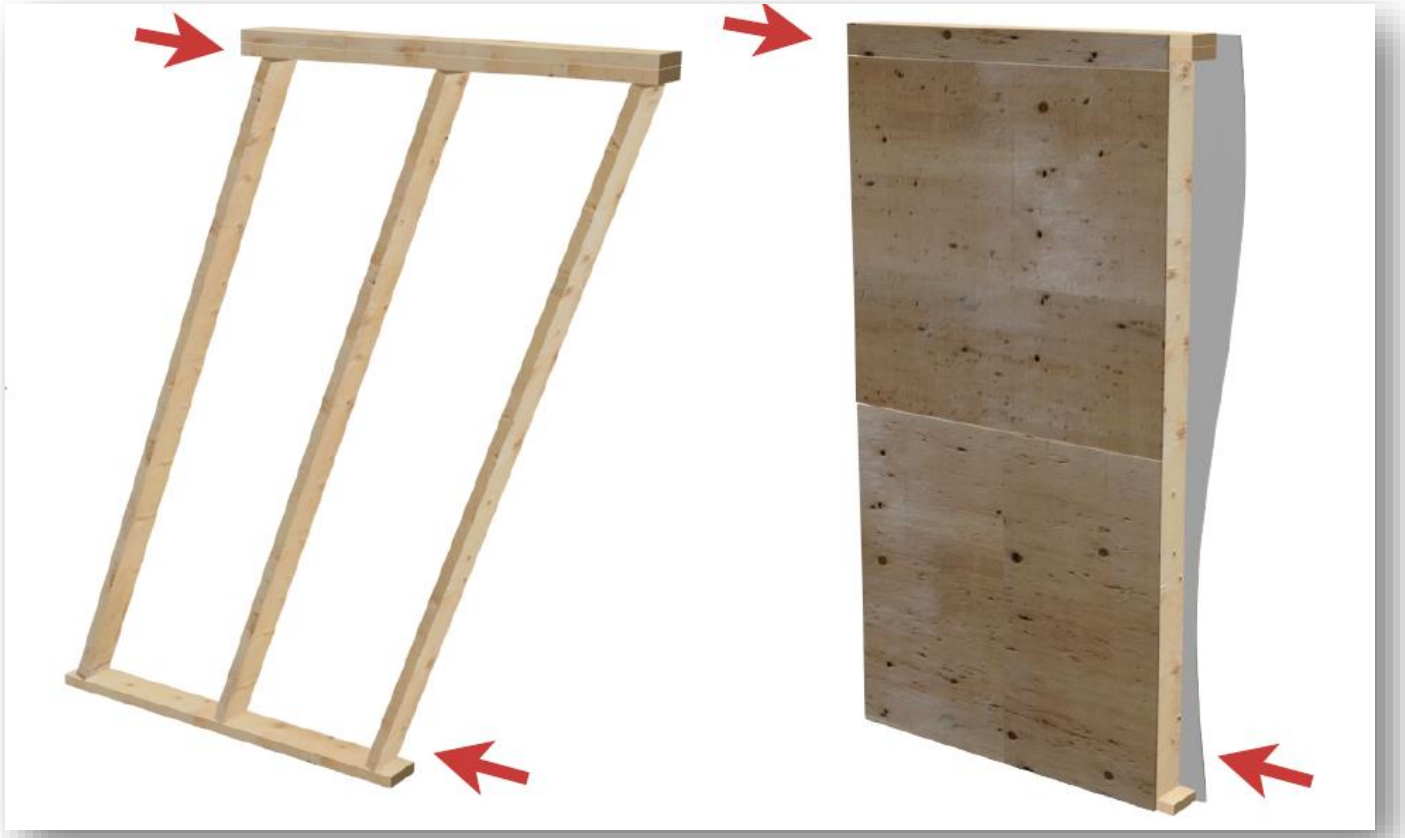


Image: BCHousing

"The basic, sheathed wall is very strong at resisting the typical lateral movement (back and forth) of the ground experienced during an earthquake".

(BC Housing Illustrated Guide)

Table 9.23.13.5: spacing and dimensions

Table [9.23.13.5.] 9.23.13.5.
Spacing and Dimensions of Braced Wall Bands and Braced Wall Panels
Forming Part of Sentences [9.23.13.4.] 9.23.13.4.([1] 1) and [9.23.13.5.] 9.23.13.5.([1] 1)

Description (1)	Spacing and Dimensions of *Braced Wall Bands* and *Braced Wall Panels* (2) (3) (4)	
	Seismic and Wind Loads	
	$S_{max} < 1.0$ HWP < 0.9 kPa	$1.0 \leq S_{max} \leq 2.6$ $0.9 \leq$ HWP ≤ 1.2 kPa
Maximum distance between centre lines of adjacent *braced wall bands* measured from the furthest points between centres of the bands	10.6 m (5)	7.6 m
Maximum distance between required *braced wall panels* measured from the edges of the panels	6.4 m	6.4 m
Maximum distance from the end of a *braced wall band* to the edge of the closest required *braced wall panel*	2.4 m	2.4 m
Minimum length of individual *braced wall panels*:		
• panel located at the end of a *braced wall band* where the *braced wall panel* connects to an intersecting *braced wall panel*	600 mm	600 mm
• panel not located at the end of a *braced wall band* or *braced wall panel* located at the end of a *braced wall band* where the *braced wall panel* does not connect to an intersecting *braced wall panel*	750 mm	750 mm

Table 9.23.13.5: spacing and dimensions

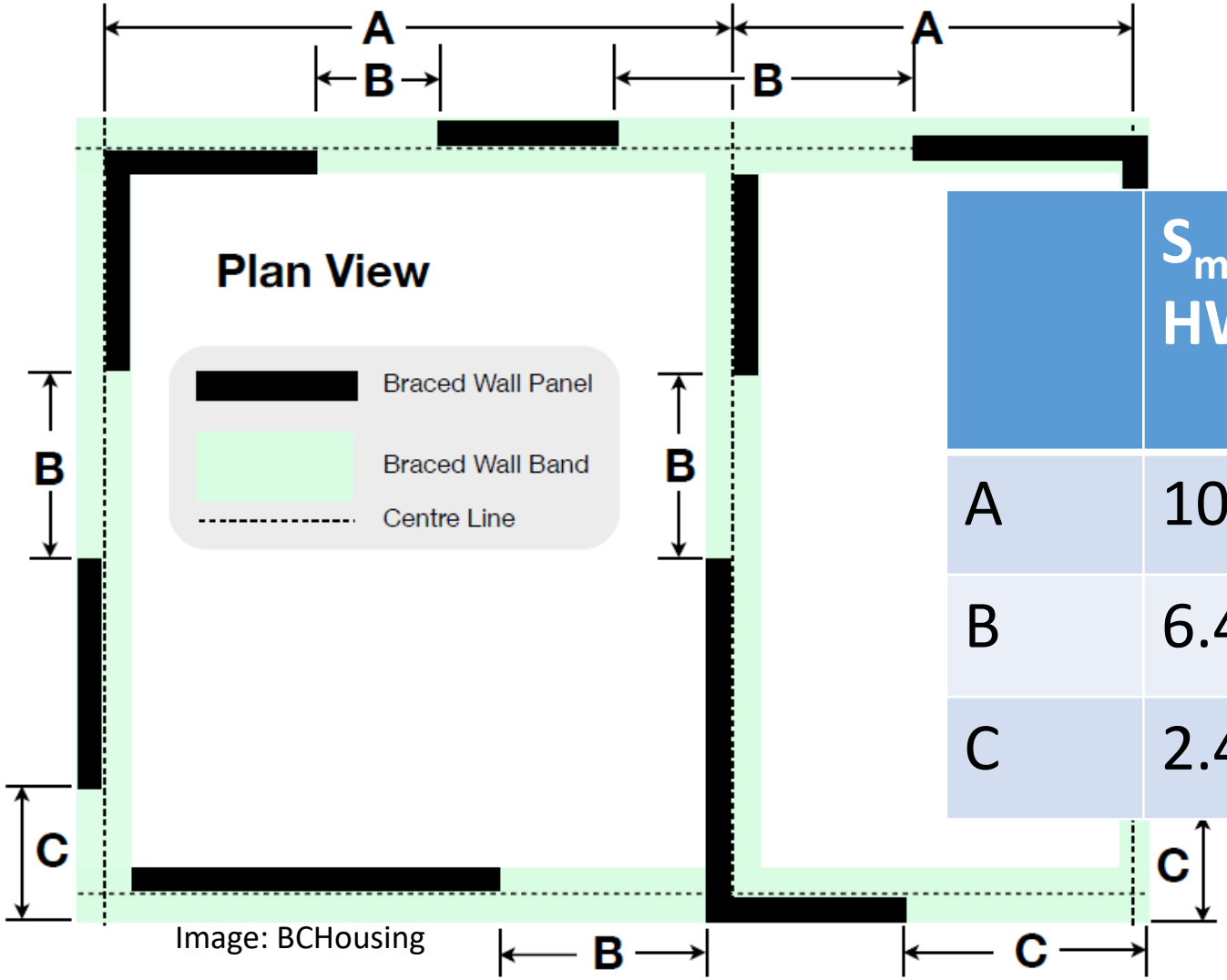


Image: BCHousing

	S_{max} < 1.0 HWP < 0.9 kPa	S_{max} ≤ 2.6 HWP ≤ 1.2 kPa
A	10.6 m (35 ft)	7.6 m (25 ft)
B	6.4 m (20 ft)	6.4 m (20 ft)
C	2.4 m (8 ft)	2.4 m (8 ft)

Table 9.23.13.5: spacing and dimensions

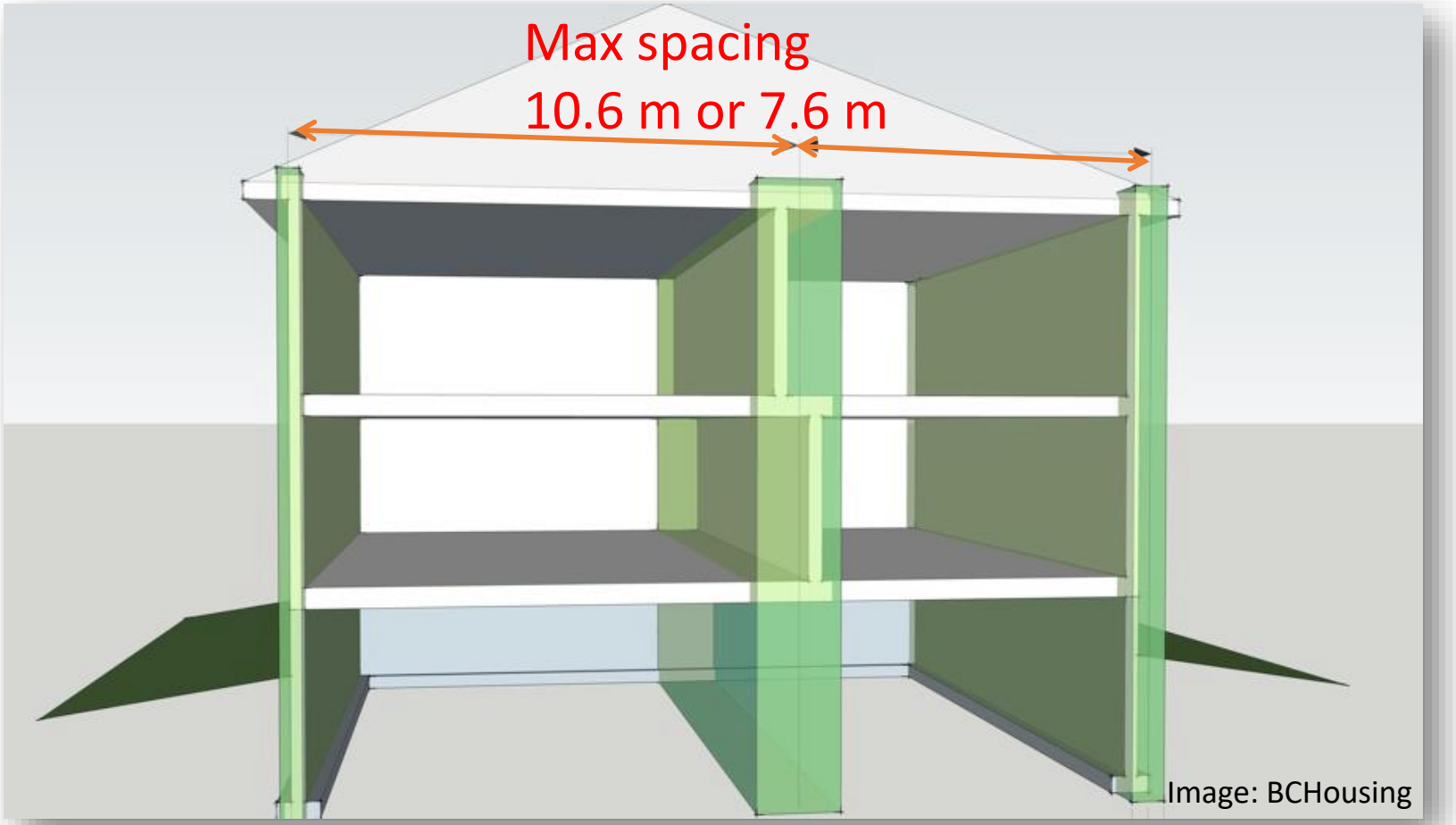


Table 9.23.13.5: spacing and dimensions

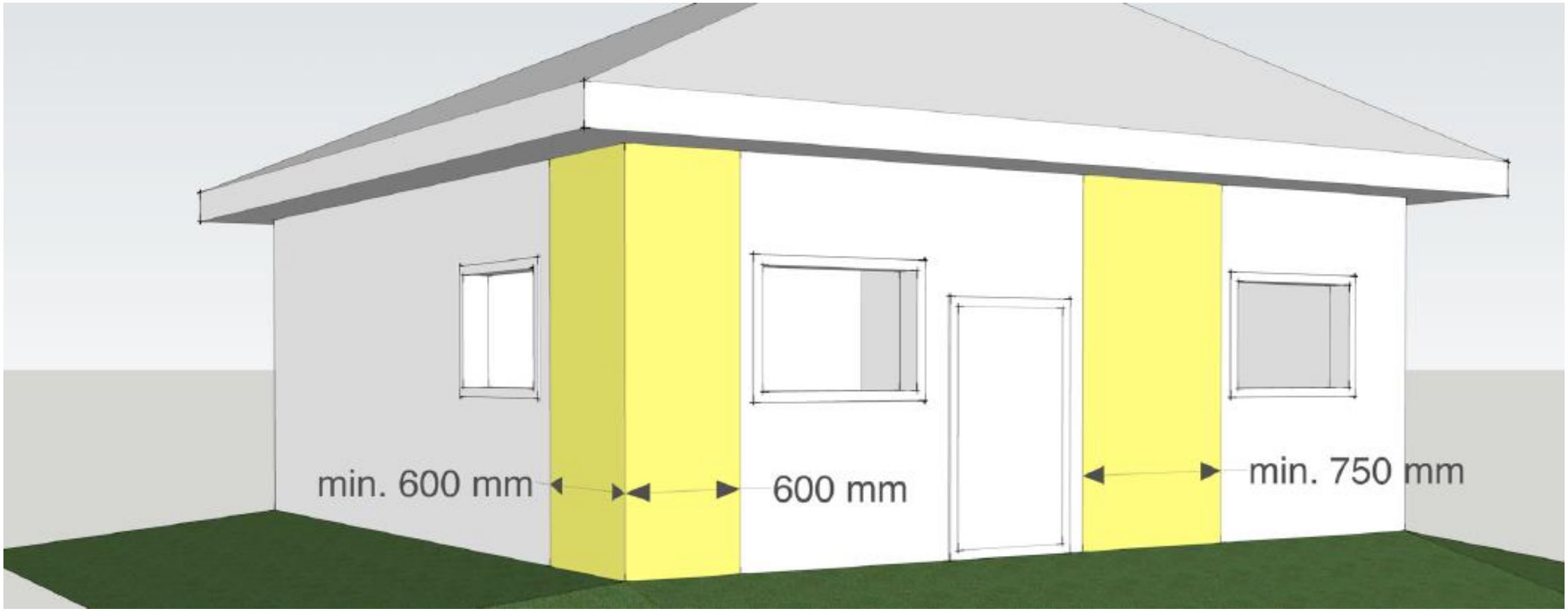


Image: BCHousing

Table 9.23.13.5

Wood sheathing

$S_{max} \leq 1.0$

HWP < **0.9** kPa

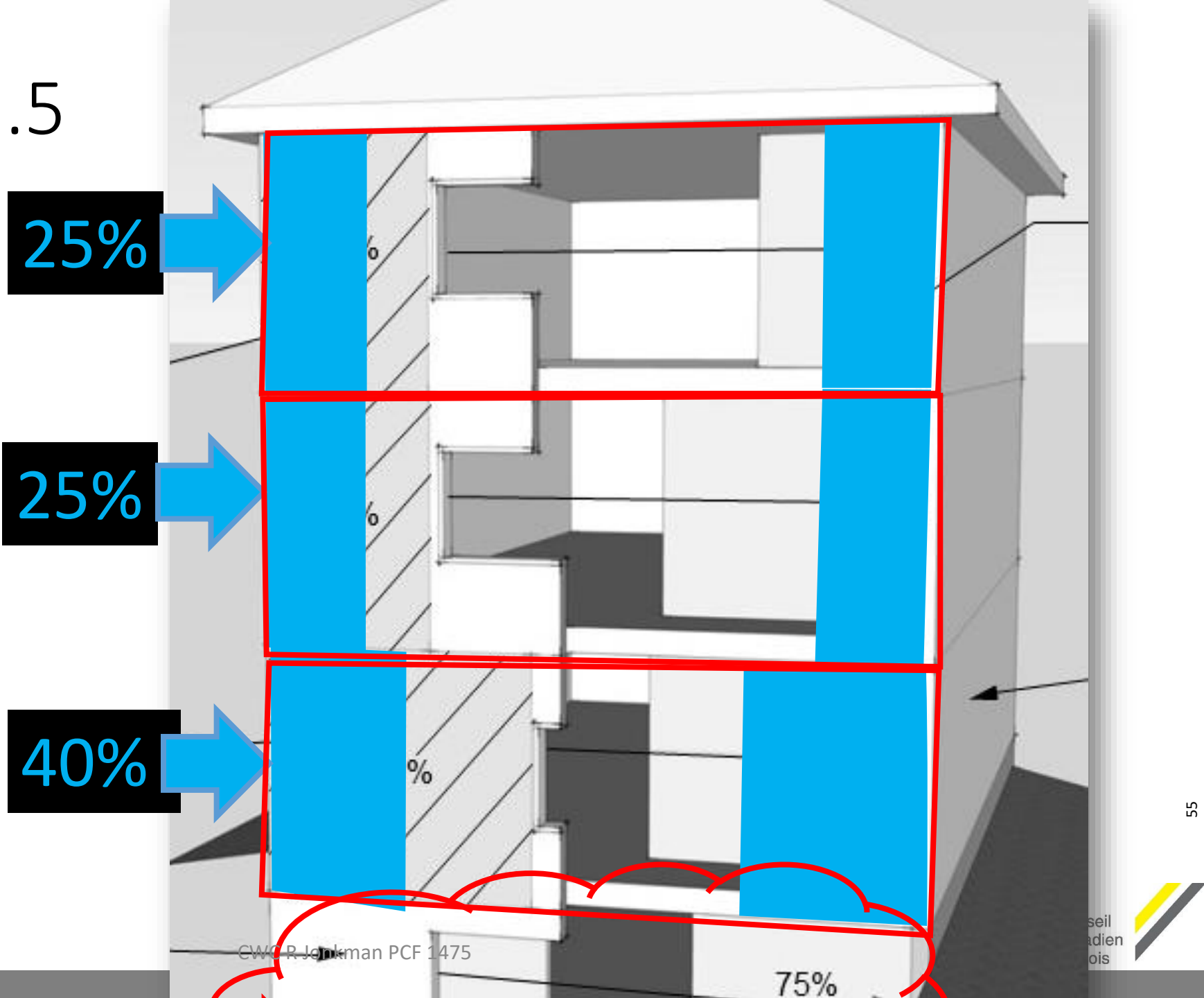
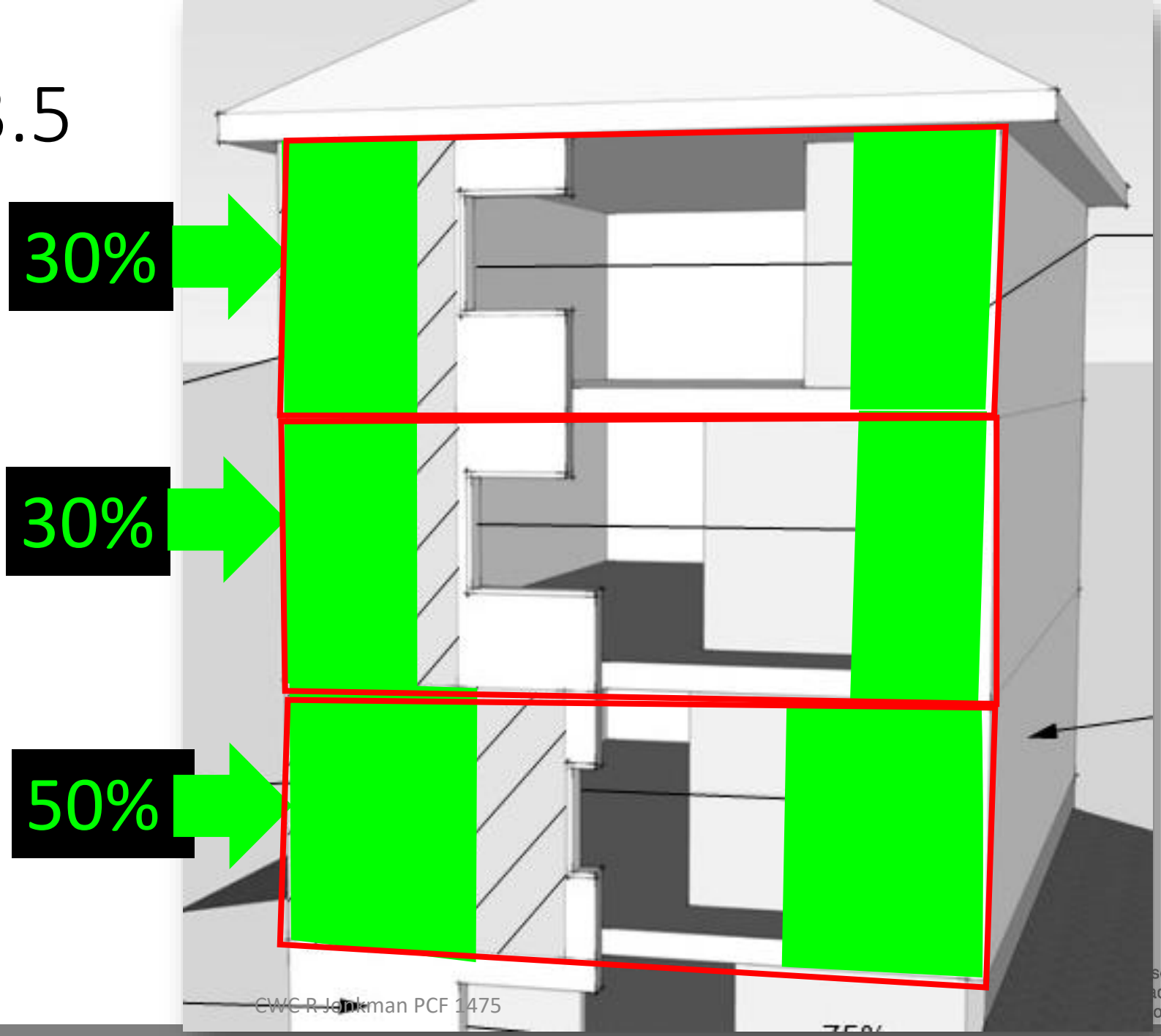


Table 9.23.13.5



Wood sheathing

$1.0 < S_{max} \leq \mathbf{2.4}^*$ or

$0.9 \leq HWP \leq \mathbf{1.2}$ kPa

$^*S_{max} \leq 2.6$ for one storey

1-storey

GWB

$S_{max} \leq 0.5$

HWP < 0.9 kPa

50%

2-storey

GWB

$S_{max} \leq 0.5$

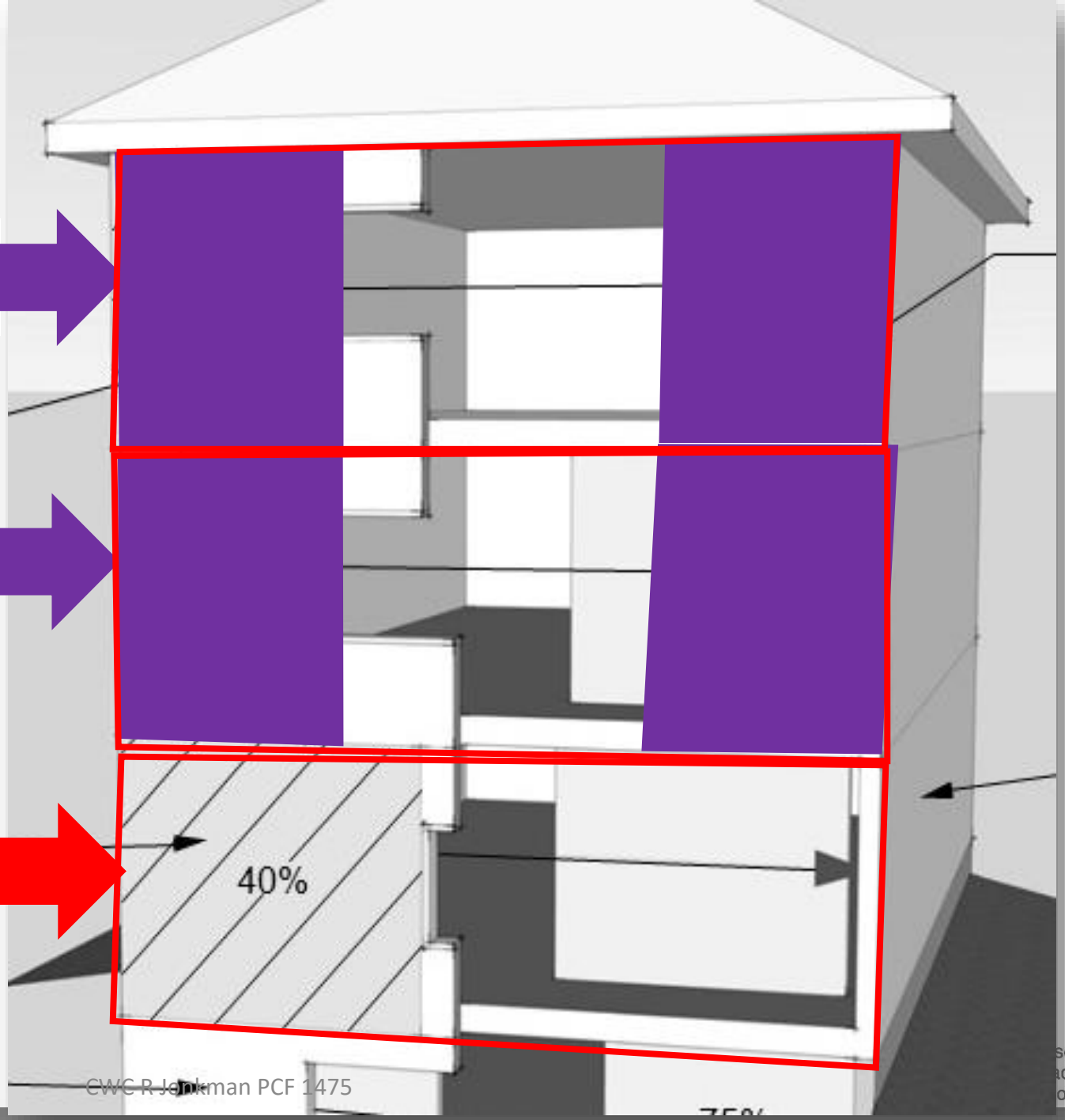
HWP < 0.4 kPa

50%

3-storey

GWB

not permitted



9.23.13.5 (2): Spacing and dimensions cont…

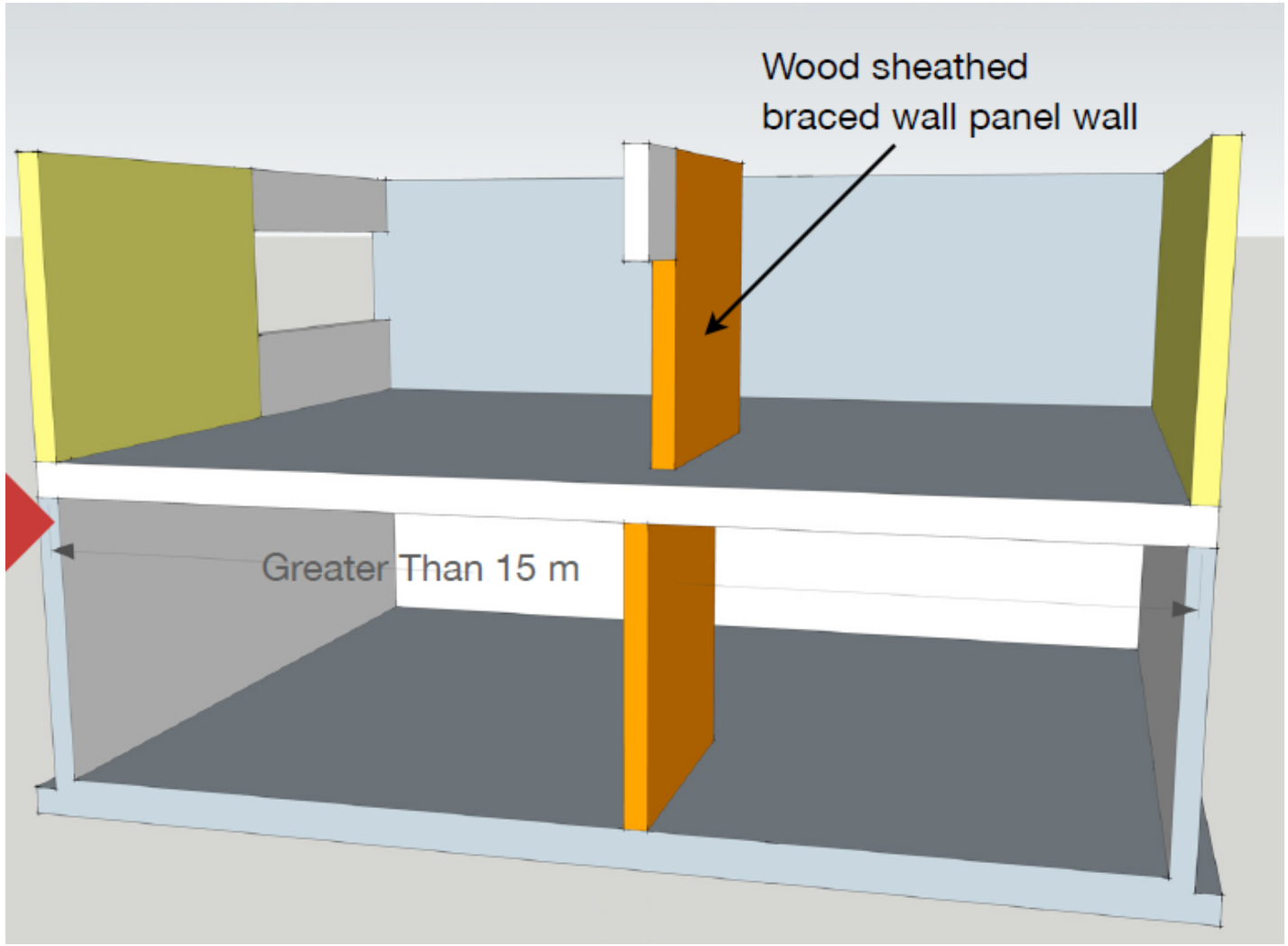
2) In *basements* or crawl spaces where the perimeter *foundation* walls extend from the footings to the underside of the supported floor, *braced wall bands* constructed with *braced wall panels* shall be spaced not more than

[a] a) 15 m from the perimeter *foundation* walls,

[b] b) 15 m from interior *foundation* walls, and

[c] c) 15 m from adjacent *braced wall bands* constructed with *braced wall panels*.

9.23.13.5 (2): Spacing and dimensions cont…



9.23.13.5 (3): Connection to roof framing

Where interior or exterior wood-sheathed *braced wall panels* extend to the roof framing, the top plates shall be connected to

[a] --) top chords of perpendicular trusses by using blocking panels or other methods of lateral load transfer designed by the roof truss manufacturer,

[b] --) perpendicular rafters by using blocking of the same construction as the *braced wall panel* below, or

[c] --) rafters or trusses by using methods of lateral load transfer designed in accordance with good engineering practice.

(See Note A-9.23.13.5.(3) and (4)-2020.)

9.23.13.5 (3): Connection to roof framing

Sheath all the way up to the roof framing in order to get the forces to the braced walls. <u>These images show what not to do.</u>

9.23.13.5 (3): Connection to roof framing

Sheath all the way up to the roof framing in order to get the forces to the braced walls. <u>These images shows adequate connection</u>.

9.23.13.6: Materials in braced wall panels

9.23.13.6. Materials in Braced Wall Panels

1) Required exterior *braced wall panels* shall be

~~[a] a) clad with panel-type cladding complying with Section 9.27. and Table 9.23.3.4.,~~

[b] b) sheathed with plywood, OSB, waferboard or diagonal lumber sheathing complying with Subsection 9.23.16. and Table 9.23.13.6., ~~and~~ fastened in accordance with Article 9.23.3.5., and finished on the interior with gypsum board complying with the requirements for gypsum board interior finish in Table 9.23.13.6., or

[c] c) ~~finished on the interior with a panel-type material in accordance with the requirements of Section 9.29. and Table 9.23.13.6.~~except as provided in Sentence (5), sheathed with gypsum board complying with the requirements for gypsum board sheathing in ASTM C1396/C1396M, "Standard Specification for Gypsum Board," and Table 9.23.13.6., and fastened in accordance with Article 9.23.3.5.

9.23.13.6: Materials in braced wall panels

Sheathing	Fastener type	Lateral resistance (approximations)
Limited to lower seismic and wind conditions		
Gypsum unblocked	Drywall screws	1 kN/m
Gypsum blocked	Drywall screws	1-2 kN/m
Wood sheathed unblocked	Nailed	2-3 kN/m
Diagonal lumber	Nailed	4-6 kN/m
Wood sheathed blocked	Nailed	5-14 kN/m

Blocking can be applied in either direction

2x3 blocking minimum, applied to match the depth of studs (left image) or rotated 90 degrees so the wide face of the blocking is attached to the sheathing edges (right image).

https://www.woodworks.org/shear-wall-blocking/

www.summerville-home-inspector.com

Avoid horizontal panel joints and blocking by using longer sheathing panels

9.23.13.7: Adjustments to braced wall lengths

[9.23.13.7.] --- Adjustment of Braced Wall Length

[1] --) Where interior finish, such as gypsum board, is omitted from the interior side *panels* listed in Table 9.23.13.5. shall be multiplied by an adjustment factor o

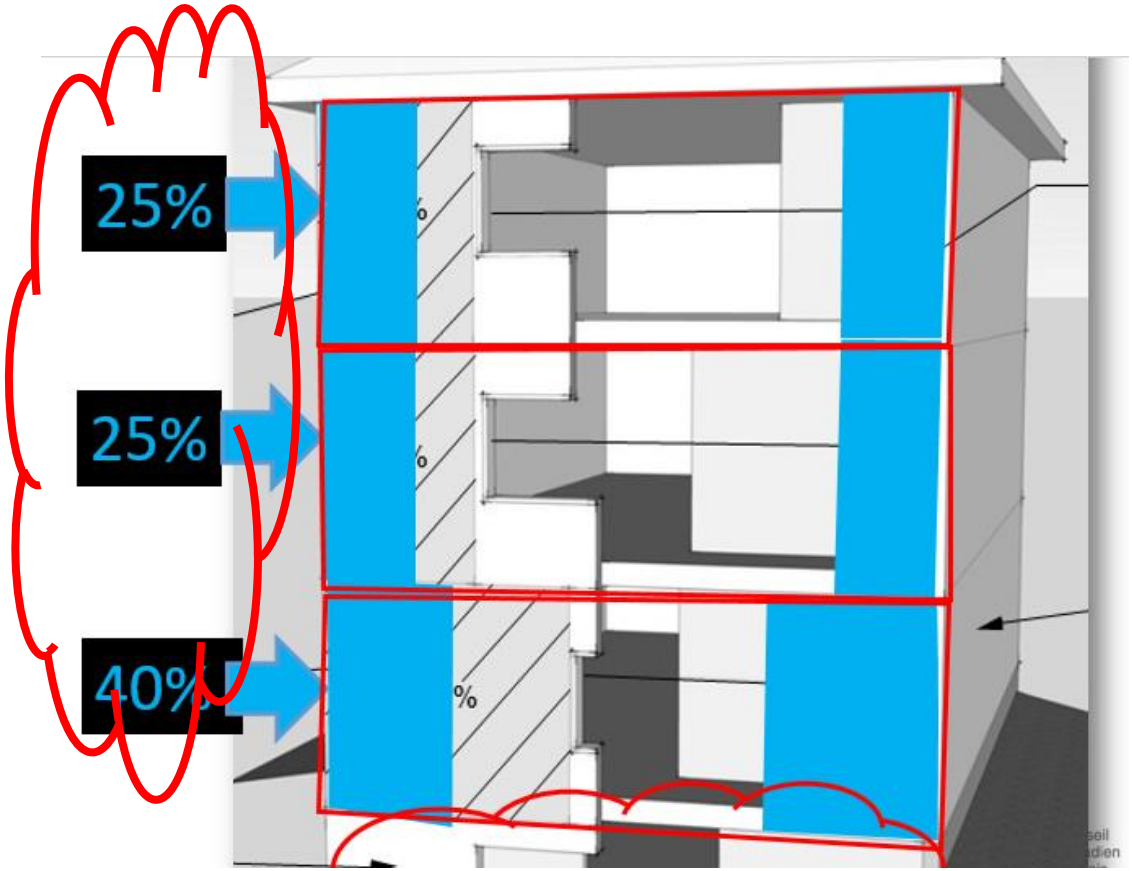
[a] --) 1.4 for unblocked walls, and

[b] --) 1.2 for blocked walls.

[2] --) Where *braced wall bands* are intermittently sheathed, the minimum lengths c multiplied by an adjustment factor of 1.15.

[3] --) For wind design only, where a *building*'s length-to-width ratio exceeds 2:1, 9.23.13.5. shall be multiplied by an adjustment factor of 1.5 for *braced wall p*

9.23.13.7: Adjustments to braced wall lengths



Adjust required wall length to accommodate:

- Omitted interior gypsum (ie unfinished sections of the building)
- Intermittent sheathed
- Long narrow aspect ratio

Adjustment to braced wall length where gypsum wall board is omitted

Where interior gypsum board not installed (garages, crawl spaces, attic spaces…

… increase
blocked wall length by 1.2, and
unblocked wall length by 1.4

Adjustment to braced wall lengths where intermittently sheathed

Intermittent sheathing: **15%** more braced wall length

Continuous sheathing: default

9.23.13.8.1 Cripple walls

[9.23.13.8.] --- Foundation Cripple Walls

(See Note A-9.23.13.8.)

[1] --) Except as provided in Sentences (2) and (3), *foundation* cripple walls supporting *braced wall panels* shall be

[a] --) considered as an additional *storey*, or

[b] --) designed in accordance with Part 4.

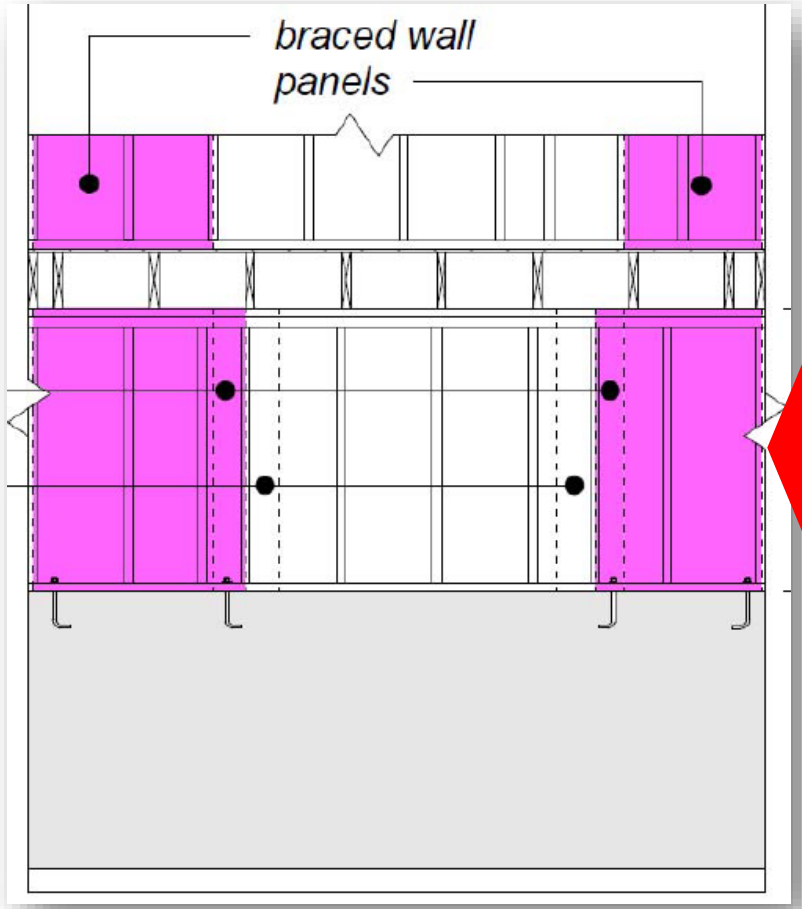
Consider the cripple wall an additional storey or designed as Part 4 unless conform with exceptions in (2) or (3) (next slide)

9.23.13.8.1 Cripple walls (and weak storeys)

1994 Northridge Earthquake

(photo credit: Boris Yaro/Los Angeles Times/TNS)

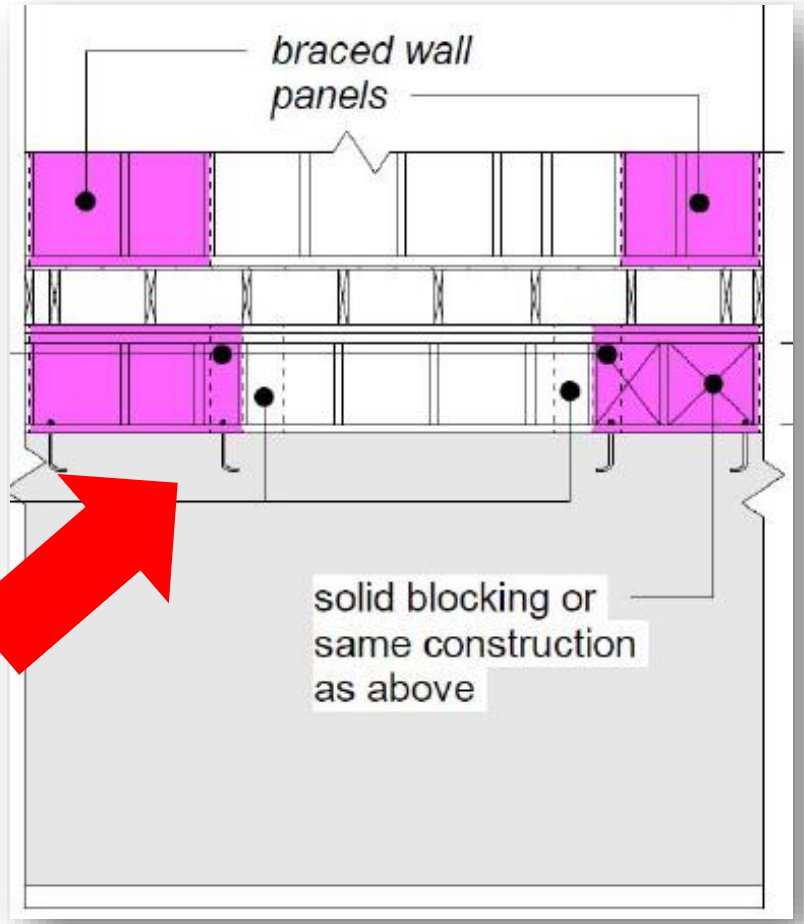
9.23.13.8.1 Cripple Walls



Cripple wall bracing same construction as above 20% more length.

Low seismic ($S_{max} \leq 0.60$)
6m length, 1.2m high

High seismic ($S_{max} > 0.60$)
5m length, 0.35m high



9.23.13.9.1 Cripple walls in stepped foundations

[9.23.13.9.] --- Cripple Walls in Stepped Foundations

[1] --) Cripple walls in stepped *foundations* need not be braced in accordance with Sentences 9.23.13.8.(2) to (4), provided

[a] --) the lowest floor framing rests directly on a sill plate anchored to a *foundation* not less than 2.4 m in length within a *braced wall band* not more than 7.6 m in length,

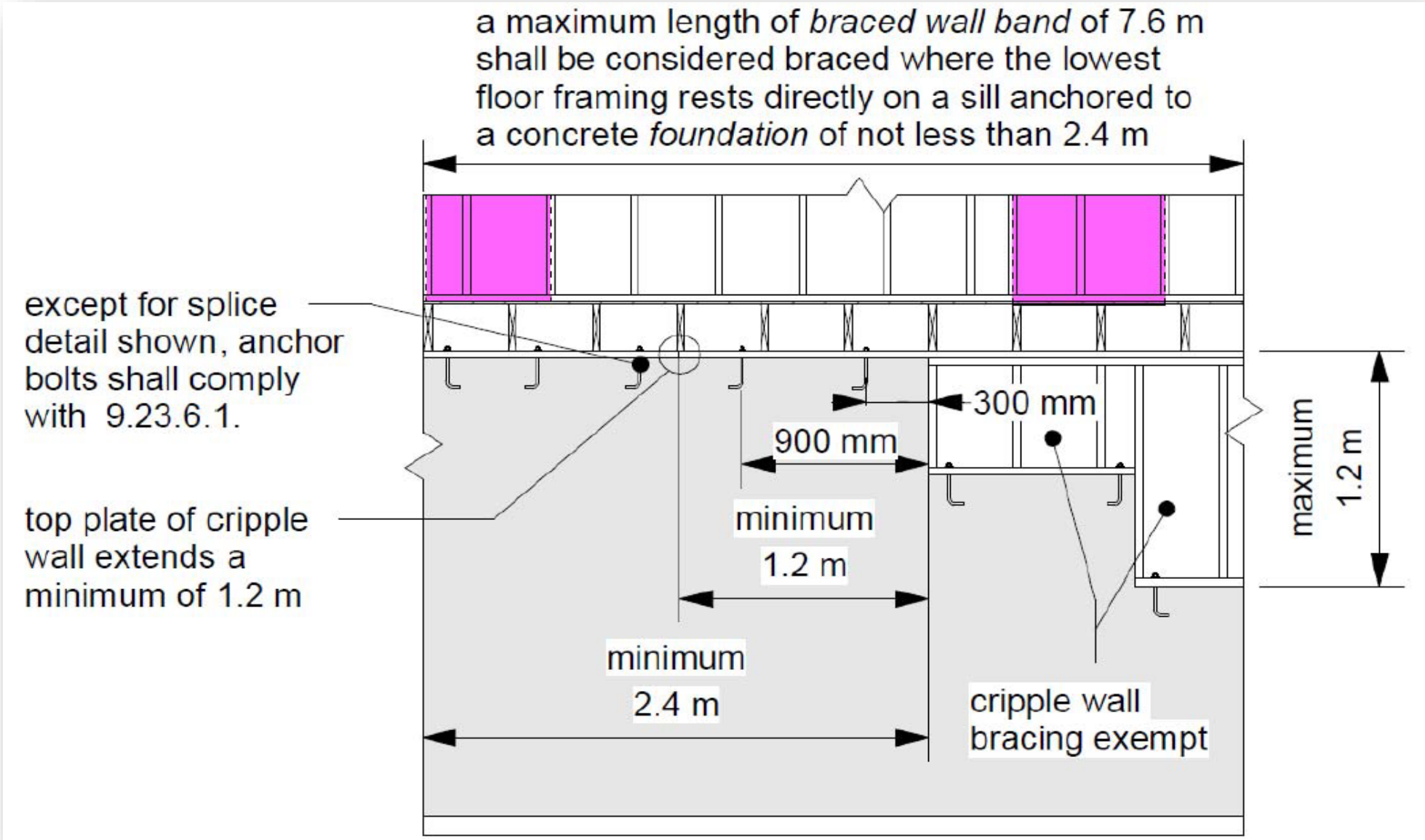
[b] --) the top plate of the cripple wall extends not less than 1.2 m along the *foundation*, and

[c] --) anchor bolts are located not more than 300 mm and 900 mm from the step in the *foundation*.

(See Note A-9.23.13.9.(1).)

If the cripple wall top plate (ie. sill of adjacent concrete wall) is fastened sufficiently anchored, the stepped wood wall is exempt from the cripple wall provisions in previous article

9.23.13.10. Stepped Foundations



Using the wind and seismic provisions in PCF 1475

Example: Vancouver, site class C (soil, for seismic)

S_{max} lookup table based on location and Site Class

Table 9.4.1.1.
Seismic Design Parameters for Selected Locations in Canada
Forming Part of Sentence 9.4.1.1.(4)-2020 and Article 9.4.2.3.-2020

Province and Location	S_{max} based on Site Class				
	A	B	C	D	E
British Columbia					
100 Mile House	0.066	0.068	0.120	0.192	0.260
Abbotsford	0.406	0.419	0.677	0.974	1.091
Agassiz	0.263	0.271	0.451	0.668	0.793
Alberni	0.569	0.595	1.097	1.486	1.600
Ashcroft	0.100	0.102	0.177	0.277	0.363
Bamfield	0.904	0.944	1.720	2.171	2.232
Beatton River	0.073	0.080	0.127	0.165	0.227
Bella Bella	0.127	0.131	0.263	0.412	0.542
Bella Coola	0.089	0.092	0.184	0.290	0.384

Example: Vancouver, Site Class **C**

Province and Location	S_{max} based on Site Class				
	A	B	C	D	E
Smithers	0.052	0.053	0.099	0.159	0.216
Sooke	0.904	0.933	1.630	2.174	2.274
Vancouver (city hall)	0.493	0.511	0.822	1.175	1.290

HWP ($q_{1/50}$)

Table C-2 (Continued)

Province and Location	Elev., m	Design Temperature				De-gree-Days Below 18°C	15 Min. Rain, mm	One Day Rain, 1/50, mm	Ann. Rain, mm	Moist. Index	Ann. Tot. Ppn., mm	Driv-ing Rain Wind Pres-sures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa	
		January		July 2.5%												
		2.5% °C	1% °C	Dry °C	Wet °C								S_s	S_r	1/10	1/50
Smithers	500	-29	-31	26	17	5040	13	60	325	0.60	500	120	3.5	0.2	0.31	0.40
Sooke	20	-1	-3	21	16	2900	9	130	1250	1.37	1280	220	1.3	0.3	0.37	0.48
Squamish	5	-9	-11	29	20	2950	10	140	2050	2.12	2200	160	2.8	0.7	0.39	0.50
Stewart	10	-17	-20	25	16	4350	13	135	1300	1.47	1900	180	7.9	0.8	0.28	0.36
Tahsis	25	-4	-6	26	18	3150	13	200	3845	3.91	3900	300	1.1	0.4	0.26	0.34
Taylor	515	-35	-37	26	18	5720	15	72	320	0.49	450	100	2.3	0.1	0.31	0.40
Terrace	60	-19	-21	27	17	4150	13	120	950	1.08	1150	200	5.4	0.6	0.28	0.36
Tofino	10	-2	-4	20	16	3150	13	193	3275	3.36	3300	300	1.1	0.4	0.53	0.68
Trail	440	-14	-17	33	20	3600	10	54	580	0.65	700	60	4.1	0.1	0.27	0.35
Ucluelet	5	-2	-4	18	16	3120	13	180	3175	3.26	3200	280	1.0	0.4	0.53	0.68
Vancouver Region																
Burnaby (Simon Fraser Univ.)	330	-7	-9	25	17	3100	10	150	1850	1.93	1950	160	2.9	0.7	0.36	0.47

Conseil canadien du bois

HWP ($q_{1/50}$)

Table C-2 (Continued)

Province and Location	Elev., m	Design Temperature				De-gree-Days Below 18°C	15 Min. Rain, mm	One Day Rain, 1/50, mm	Ann. Rain, mm	Moist. Index	Ann. Tot. Ppn., mm	Driv-ing Rain Wind Pres-sures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa	
		January		July 2.5%												
		2.5% °C	1% °C	Dry °C	Wet °C								S_s	S_r	1/10	1/50
Vancouver Region																
Burnaby (Simon Fraser Univ.)	330	-7	-9	25	17	3100	10	150	1850	1.93	1950	160	2.9	0.7	0.36	0.47
Cloverdale	10	-8	-10	29	20	2700	10	112	1350	1.44	1400	160	2.5	0.2	0.34	0.44
Haney	10	-9	-11	30	20	2840	10	134	1800	1.86	1950	160	2.4	0.2	0.34	0.44
Ladner	3	-6	-8	27	19	2600	10	80	1000	1.14	1050	160	1.3	0.2	0.36	0.46
Langley	15	-8	-10	29	20	2700	10	112	1450	1.53	1500	160	2.4	0.2	0.34	0.44
New Westminster	10	-8	-10	29	19	2800	10	134	1500	1.59	1575	160	2.3	0.2	0.34	0.44
North Vancouver	135	-7	-9	26	19	2910	12	150	2000	2.07	2100	160	3.0	0.3	0.35	0.45
Richmond	5	-7	-9	27	19	2800	10	86	1070	1.20	1100	160	1.5	0.2	0.35	0.45
Surrey (88 Ave & 156 St.)	90	-8	-10	29	20	2750	10	128	1500	1.58	1575	160	2.4	0.3	0.34	0.44
Vancouver (City Hall)	40	-7	-9	28	20	2825	10	112	1325	1.44	1400	160	1.8	0.2	0.35	0.45

Site parameters for Vancouver – Site Class C 2-storey

S_{max}					HWP ($q_{1/50}$)
A	B	**C**	D	E	
0.49	0.51	**0.82**	1.17	1.29	0.45 kPa

Table 9.23.3.5-x :

Sheathing, fastening, anchorage

Table 9.23.3.5.-D-2020
Fastening of Braced Wall Panel Sheathing in Two-*storey Buildings* and Three-*storey Buildings* with Normal Weight Construction where $S_{max} \leq 2.4$ and 1-in-50 HWP ≤ 1.0 kPa
Forming Part of Sentence 9.23.3.5.(4)-2020

No. of Storeys	Site Parameter Limits		Sheathing (Braced) Element (1)	Minimum Specification of Fasteners (mm)		Maximum Spacing of Fasteners(2) at Panel Edges to Framing	Anchor bolt(3) spacing (m)	Wall ID
	S_{max}	HWP (kPa)		Common, Spiral or Ring Thread Nails	Screws		12.7mm dia / 15.9mm dia	
2 storeys(7) (Normal and heavy construction(8))	≤ 0.4	≤ 0.40	12.5mm gypsum for 400mm stud spacing, blocked	(4)	(5)	100 mm o.c. (6)	2.4	GWB-H
	≤ 0.5	≤ 0.35	9.5 mm plywood, OSB or waferboard	2.84 mm x 51 mm	2.84 mm x 51 mm	150 mm o.c.	2.0 / 2.4	WSP-A
	≤ 1.0	≤ 0.55	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm	NP	150 mm o.c. (6)	1.0 / 1.4	WSP-B
	≤ 1.4	≤ 0.75	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm	NP	100 mm o.c. (6)	0.6 / 0.9	WSP-C

Table 9.23.3.5-x :

Sheathing, fastening, anchorage

Table 9.23.3.5.-D-2020
Fastening of Braced Wall Panel Sheathing in Two-*storey Buildings* and T
Weight Construction where $S_{max} \leq 2.4$ and 1-in-50 H
Forming Part of Sentence 9.23.3.5.(4)-2

No. of Storeys	Site Parameter Limits		Sheathing (Braced) Element (1)	Minimum Specificatio (mm)	
	S_{max}	HWP (kPa)		Common, Spiral or Ring Thread Nails	
	≤ 0.4	≤ 0.40	12.5mm gypsum for 400mm stud spacing, blocked	(4)	
			9.5 mm plywood	2.84 mm x 51	

Table 9.23.3.5-x :

Sheathing, fastening, anchorage

No. of Storeys	S_{max}	HWP (kPa)	Sheathing (Braced) Element (1)	Common, Spiral or Ring Thread Nails
2 storeys(7)	≤ 0.4	≤ 0.40	12.5mm gypsum for 400mm stud spacing, blocked	(4)
	≤ 0.5	≤ 0.35	9.5 mm plywood, OSB or waferboard	2.84 mm x 51 mm
	≤ 1.0	≤ 0.55	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm

S_{max}	HWP (kPa)	Sheathing (Braced) Element (1)	Common, Spiral or Ring Thread Nails	Screws	Spacing of Fasteners(2) at Panel Edges to Framing	(m) 12.7mm dia / 15.9mm dia	Wall ID
≤ 0.4	≤ 0.40	12.5mm gypsum for 400mm stud spacing, blocked	(4)	(5)	100 mm o.c. (6)	2.4	GWB-H
≤ 0.5	≤ 0.35	9.5 mm plywood, OSB or waferboard	2.84 mm x 51 mm	2.84 mm x 51 mm	150 mm o.c.	2.0 / 2.4	WSP-A
≤ 1.0	≤ 0.55	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm	NP	150 mm o.c. (6)	1.0 / 1.4	WSP-B

Site parameters for Vancouver – Site class C 2-storey

S_{max}					HWP ($q_{1/50}$)
A	B	**C**	D	E	
0.49	0.51	**0.82**	1.17	1.29	**0.45** kPa

- 11mm (7/16”) wood sheathing
- Blocked at panel edges
- 150mm (6”) o.c. nail spacing
- 15.9mm (5/8”) ø anchor bolts at 1.4m (4’-6”) o.c.

Site parameters for Vancouver – 2-storey Site class **UNKNOWN** (usually C or E)

S_{max}					HWP ($q_{1/50}$)
A	B	**C**	D	E	
0.49	0.51	**0.82**	1.17	**1.29**	**0.45** kPa

Site Parameter Limits		Sheathing (Braced) Element (1)	Minimum Fastener Length (mm)		Maximum Spacing of Fasteners(2) at Panel Edges to Framing	Maximum Spacing of Fasteners (2) at Intermediate Supports (m)	Wall ID
S_{max}	HWP (kPa)		Common, Spiral or Ring Thread Nails	Screws		12.7mm dia / 15.9mm dia	
≤ 1.0	≤ 0.55	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm	NP	150 mm o.c. (6)	1.0 / 1.4	WSP-B
≤ 1.4	≤ 0.75	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm	NP	100 mm o.c. (6)	0.6 / 0.9	WSP-C

Site Parameter Limits		Sheathing (Braced) Element (1)	Minimum Fastener Length (mm)		Maximum Spacing of Fasteners(2) at Panel Edges to Framing	Maximum Spacing of Fasteners (2) at Intermediate Supports (m)	Wall ID
S_{max}	HWP (kPa)		Common, Spiral or Ring Thread Nails	Screws		12.7mm dia / 15.9mm dia	
≤ 1.0	≤ 0.55	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm	NP	150 mm o.c. (6)	1.0 / 1.4	WSP-B
≤ 1.4	≤ 0.75	11 mm plywood, OSB or waferboard, blocked(3)	3.25 mm x 63 mm	NP	100 mm o.c. (6)	0.6 / 0.9	WSP-C

Site parameters for Vancouver – 2-storey
Site class **UNKNOWN**

S_{max}					HWP ($q_{1/50}$)
A	B	**C**	D	E	
0.49	0.51	**0.82**	1.17	**1.29**	**0.45** kPa

- 11mm (7/16”) wood sheathing
- Blocked at panel edges
- 100mm (4”) o.c. nail spacing
- 15.9mm (5/8”) ø anchor bolts at 0.9m (3’-0”) o.c.

What does this look like across Canada?

Gypsum-sheathed exterior braced walls in bungalows (supporting roof only) are permitted almost everywhere in Canada's high wind locations (up to HWP of 0.90 kPa) but not in high seismic areas where Smax is greater than 0.5).

Gypsum-sheathed exterior braced walls not permitted in three-storey (supporting two floors and a roof).

Table shows locations where permitted in two-storey buildings.

Number of code locations per **wind** category

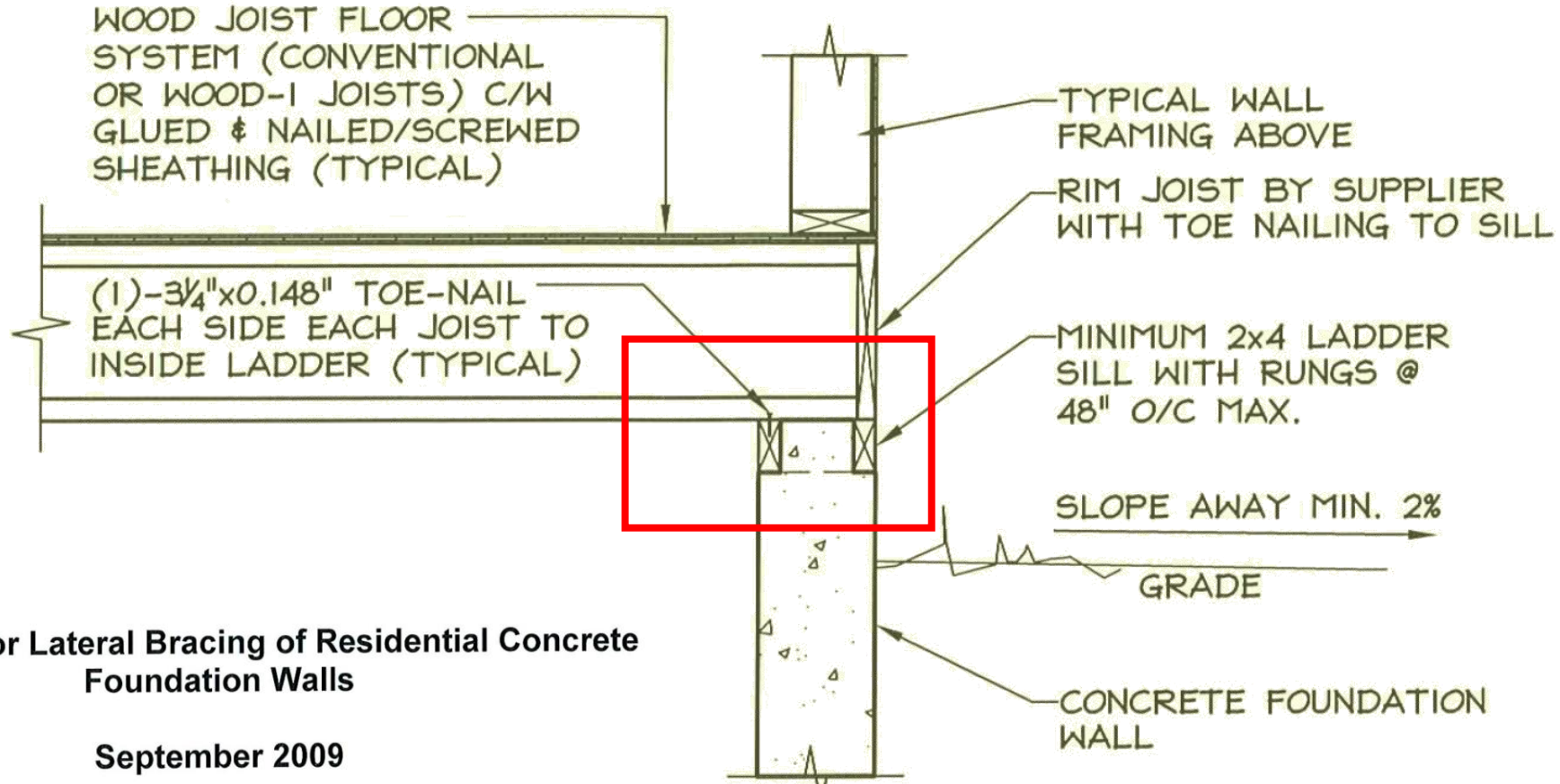
Wind Braced walls	HWP ≤ 0.35	HWP ≤ 0.40	HWP ≤ 0.55	HWP ≤ 0.65	HWP ≤ 0.70	HWP ≤ 0.75	HWP ≤ 0.90	HWP ≤ 1.20
Location	North Bay Sherbrooke	Kamloops Prince George Guelph	Vancouver Ottawa Calgary Montreal Toronto	Victoria Halifax	Tofino	Port Hawkesbury	St. John's St. Anthony	Resolution Island Cowley
Number of code-cites	136	151	322	43	7	9	7	3
2-storey GWB permitted?	Yes	Yes	No	No	No	No	No	No

Number of code locations per **seismic** category

Seismic Braced walls	Smax ≤ 0.2	Smax ≤ 0.4	Smax ≤ 0.5	Smax ≤ 1.0	Smax ≤ 1.4	Smax ≤ 1.8	Smax ≤ 2.4	Smax ≤ 2.6
Location + Site Class	Toronto A,B Calgary, Halifax A-C Edmonton A-E	Toronto C-E Ottawa A,B Montreal A,B Calgary, Halifax D,E	Ottawa C Vancouver A	Ottawa D,E Montreal C-E Vancouver B,C Victoria A,B	Vancouver D,E	Destruction Bay A Victoria C	Destruction Bay B,E Victoria D,E	Queen Charlotte E Destruction Bay C,D >2.6
Number of code-cites	126	304	43	151	25	11	17	1
2-storey GWB permitted?	Exempt	Yes	Yes	No	No	No	No	No

What is missing?

Alberta-specific ladder sills



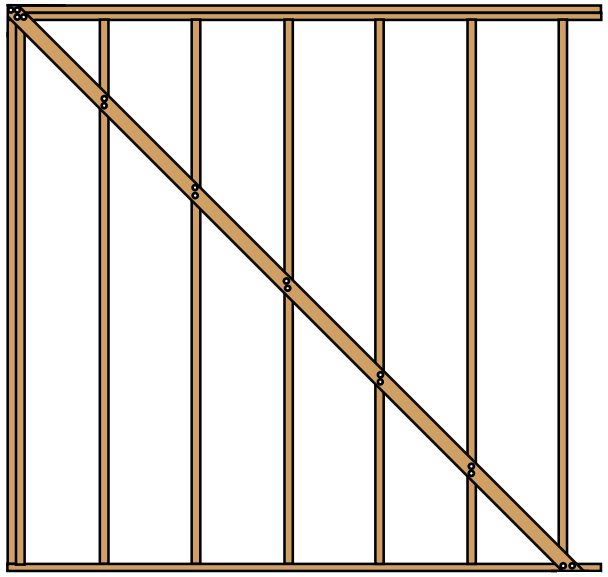
Guidelines for Lateral Bracing of Residential Concrete Foundation Walls

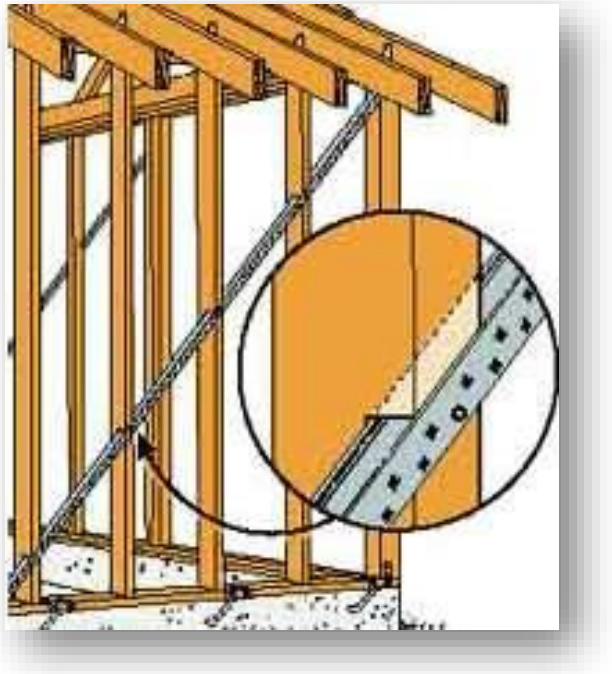
September 2009

Canadian Wood Council / Conseil canadien du bois

What is missing?

Diagonal bracing (commonly used in Maritime province(s).

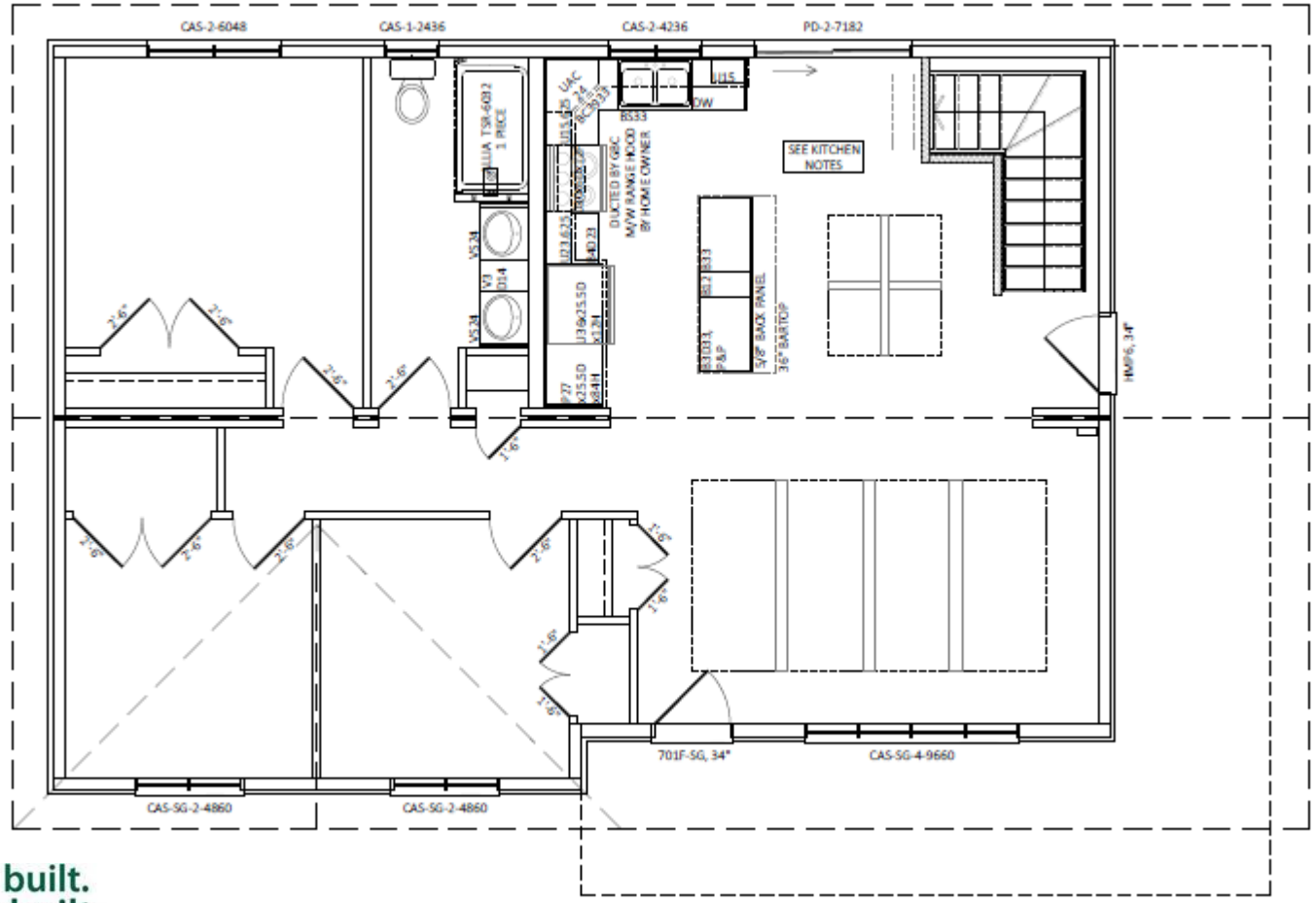




Ottawa single family

Ottawa duplex

Case study: Guildcrest Homes

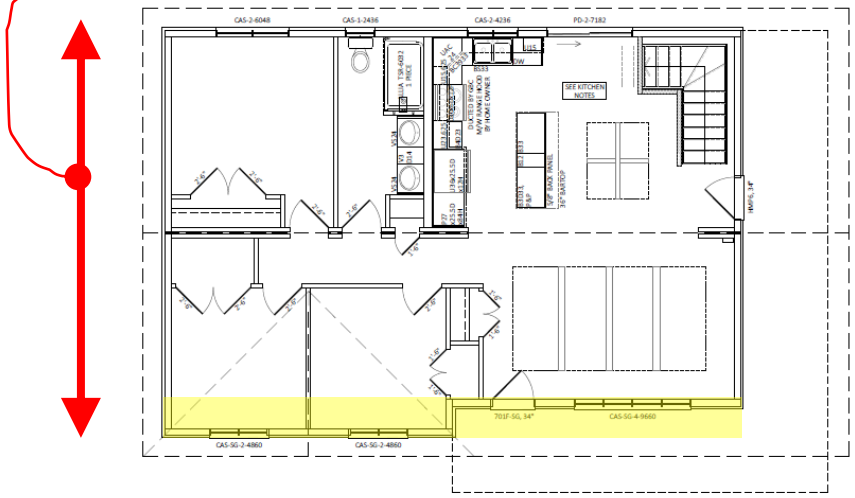


Better built.
Faster built.
Factory built.

Canadian Wood Council
Conseil canadien du bois

Case study: Guildcrest Homes

Less than 10.6m, ok for wind <0.9kPa and seismic <1.0,



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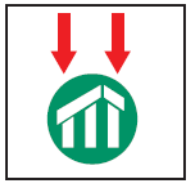
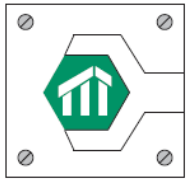
SOFTWARE FOR WOOD DESIGN



SIZER

SHEAR WALLS



CONNECTIONS

Coming soon:
BRACED WALL CALCULATOR for Part 9 design

CWC – Braced Wall Calculator (beta version)

Step by step instructions

Step 0: Set default values

Step 1: Import CAD drawing

Step 2: Create building footprint

Step 3: Building levels

Step 4: Create walls

Step 5: Edit walls

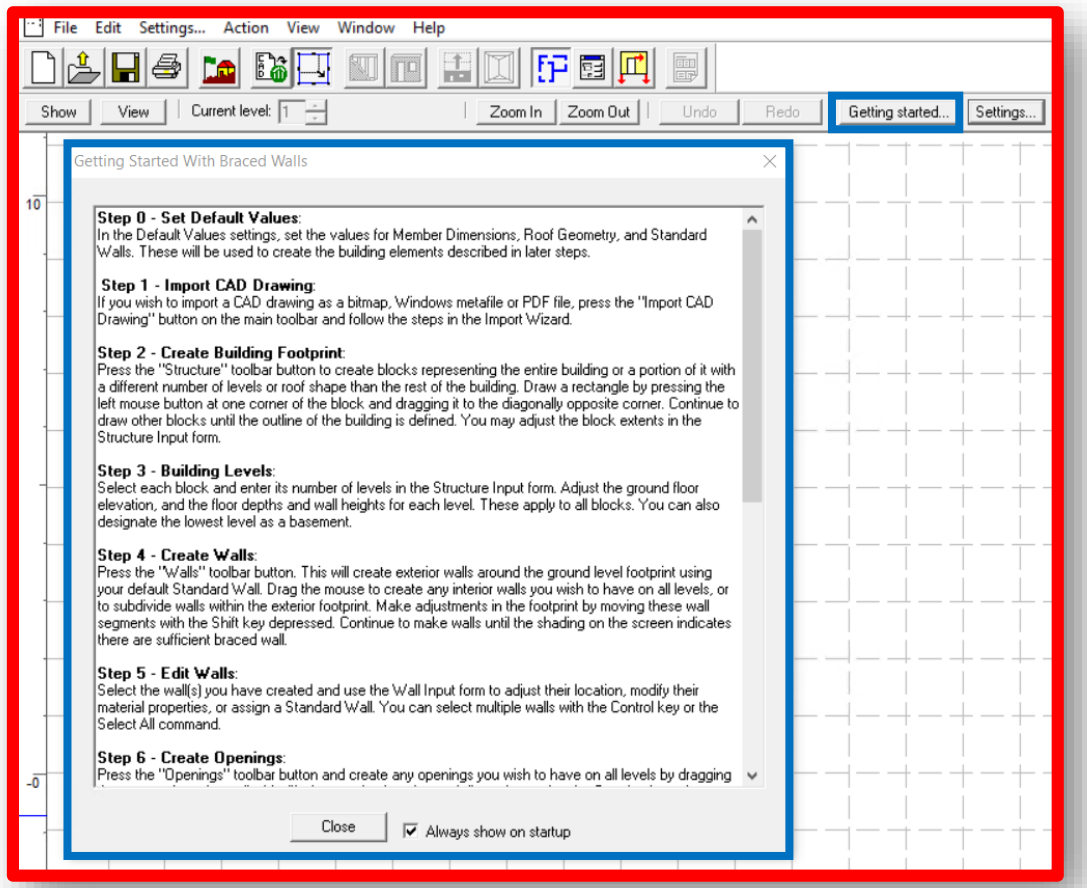
Step 6: Create openings

Step 7: Extend walls upwards

Step 8: Variations on individual levels

Step 9: Create roof

Step 10: View or print design results



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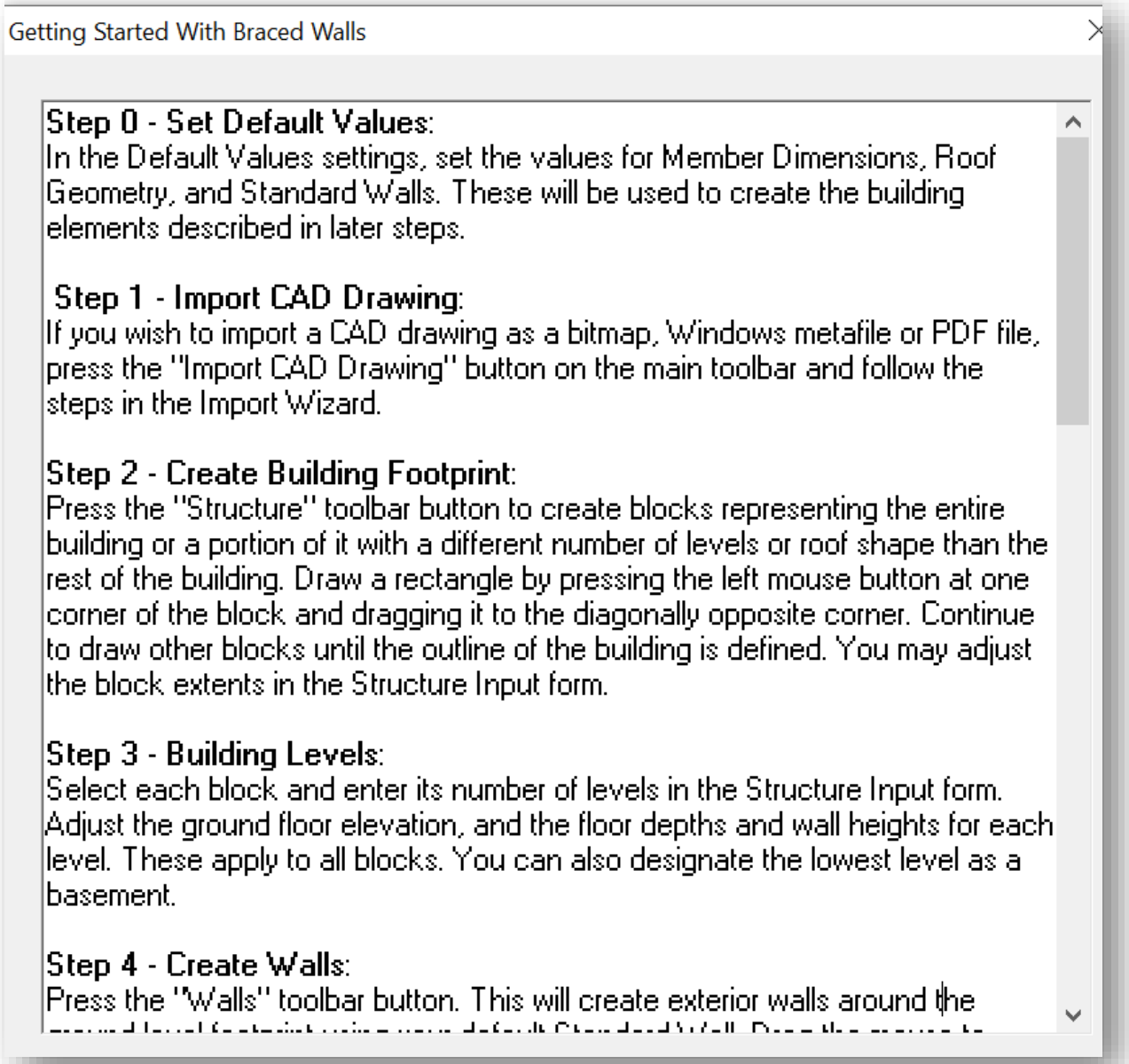
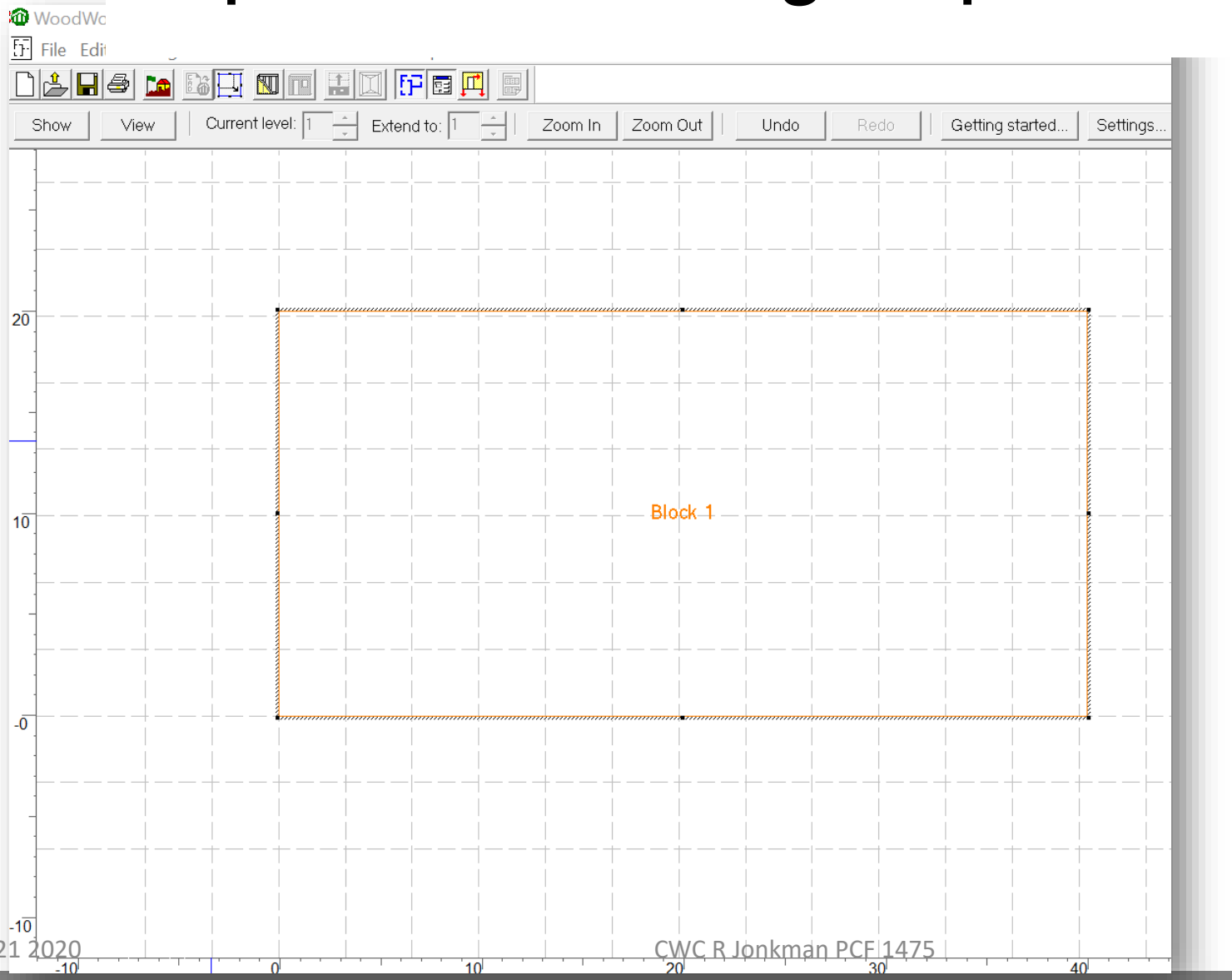
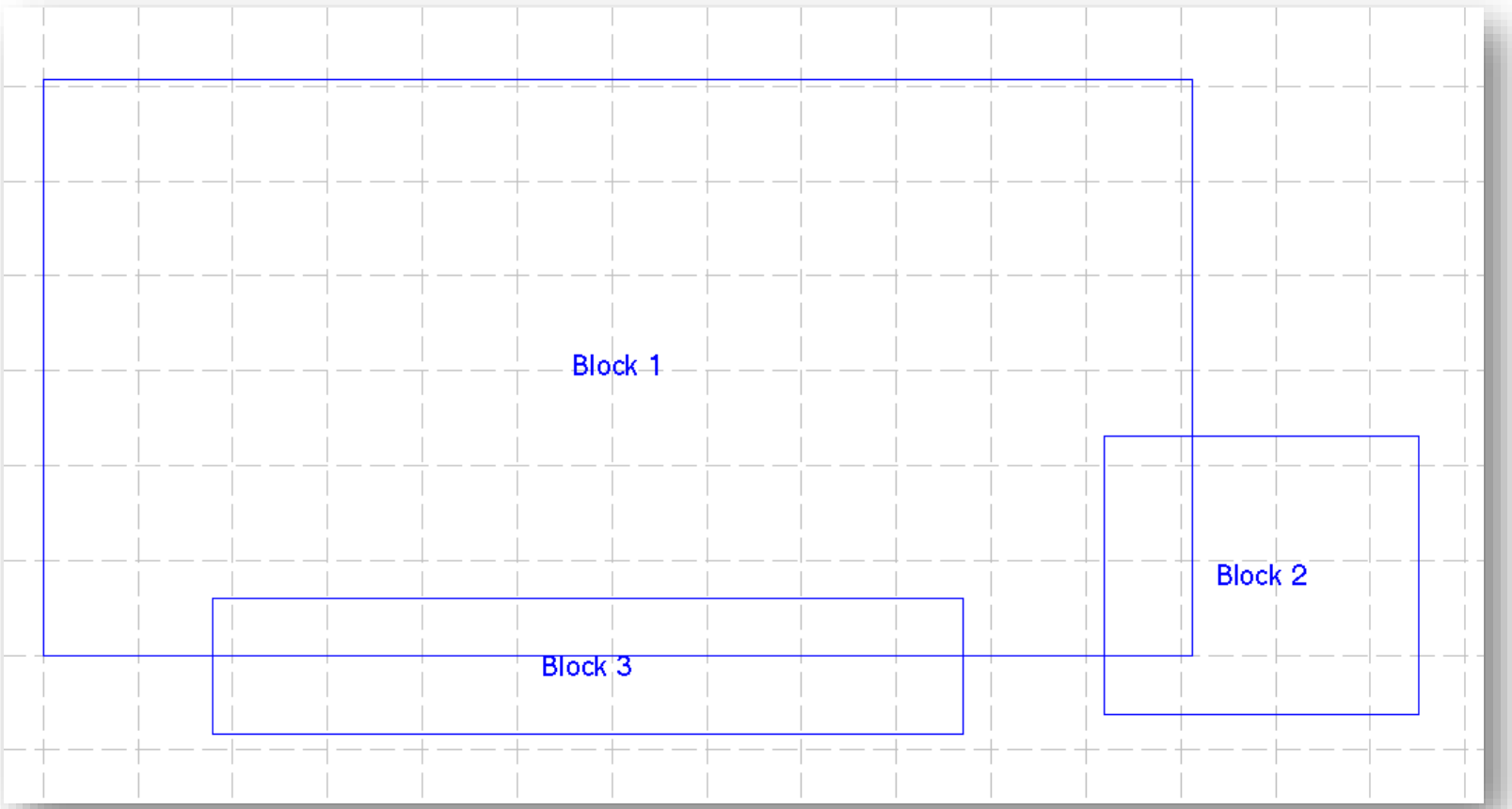
Braced wall calculator steps



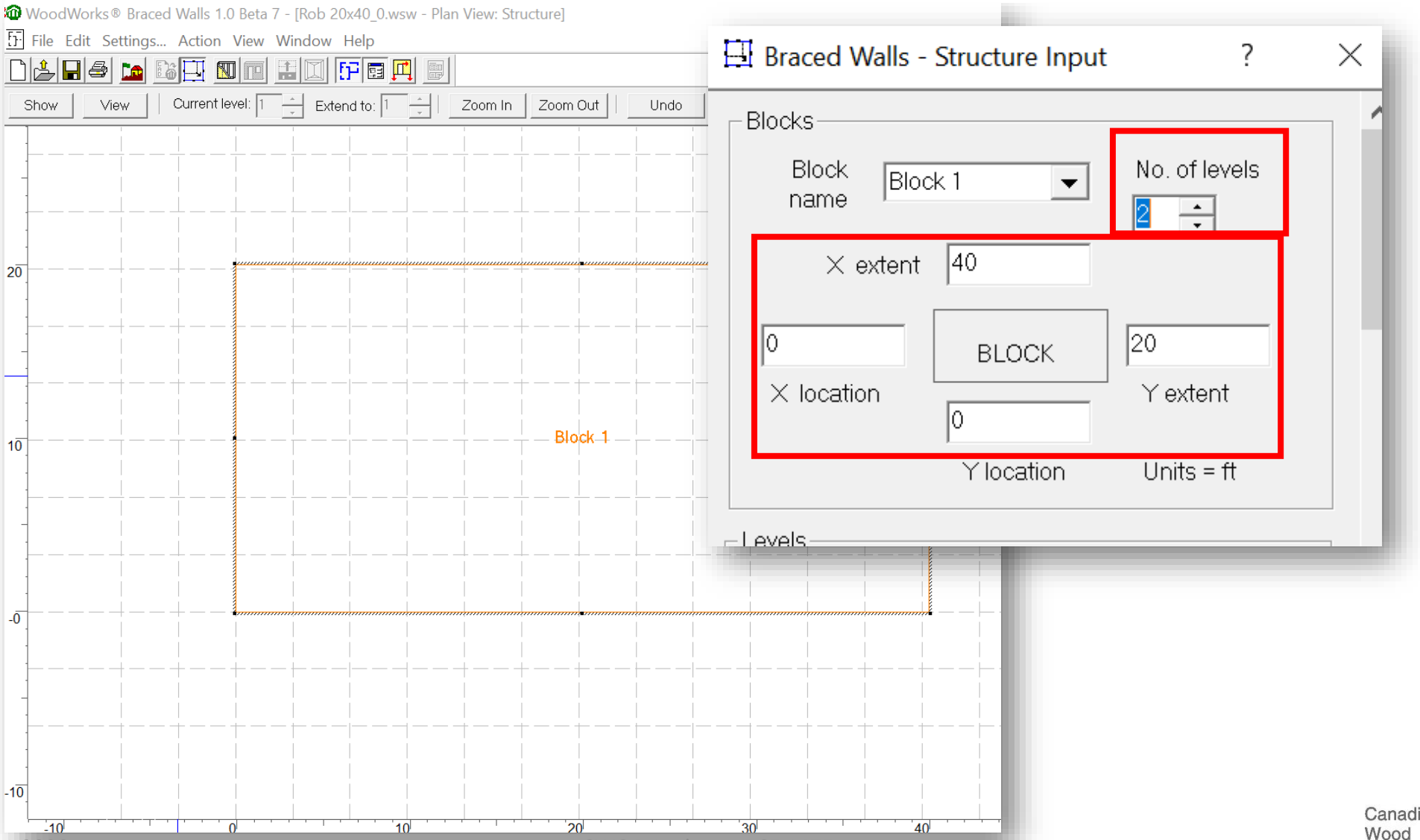
Step 2: Create building footprint



Step 2: Create building footprint



Step 3: Building levels



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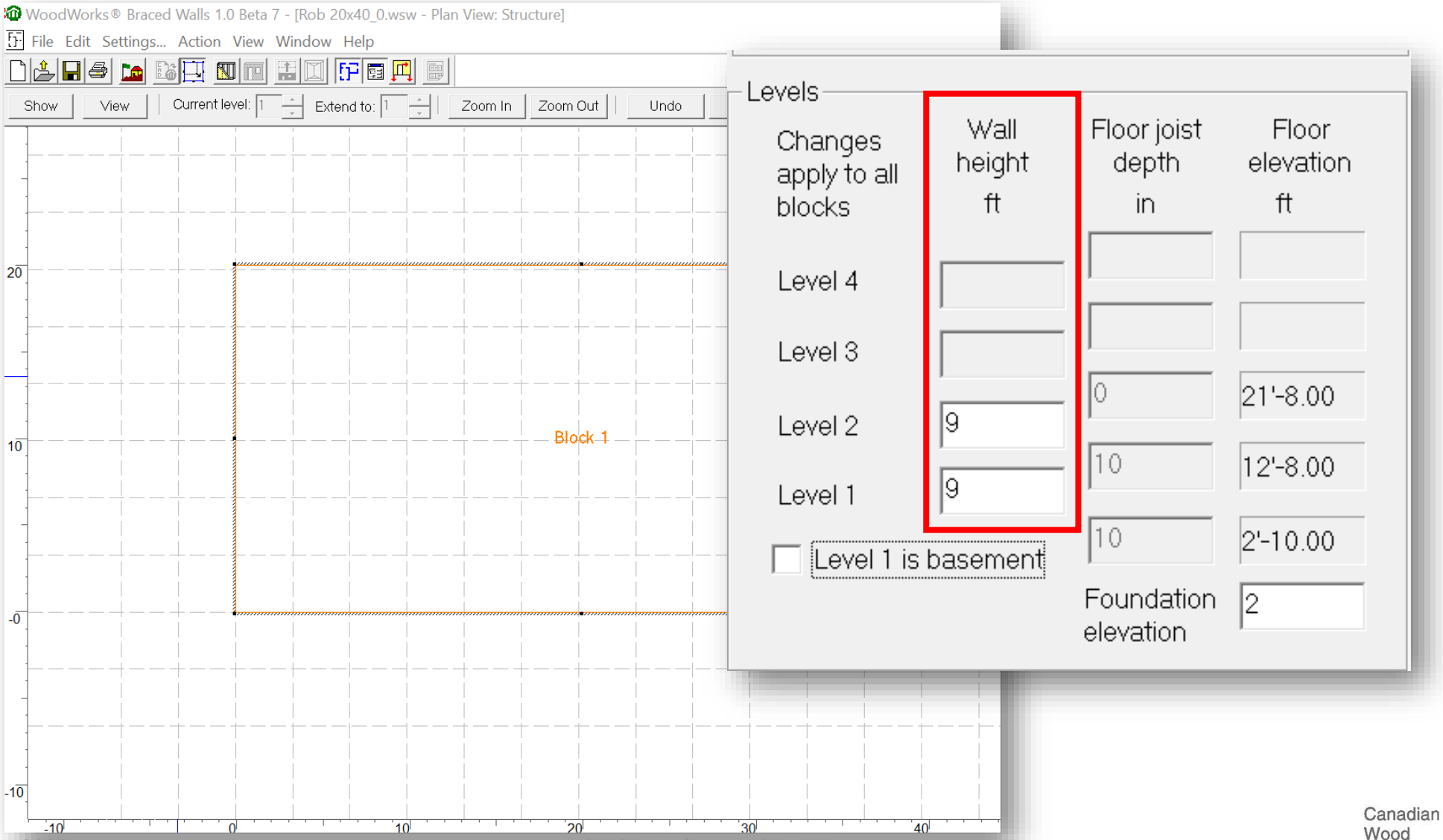
Step 3: Building levels



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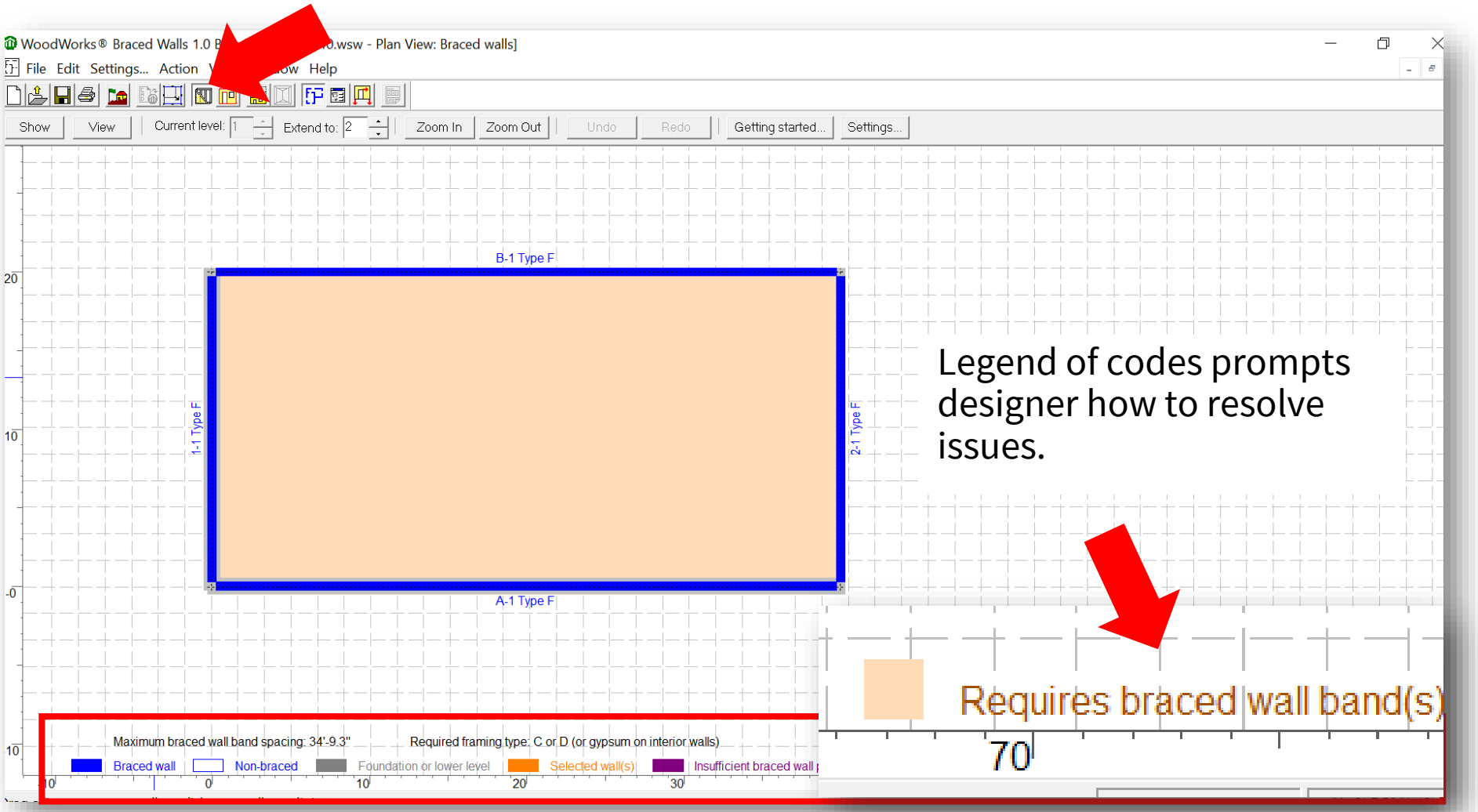
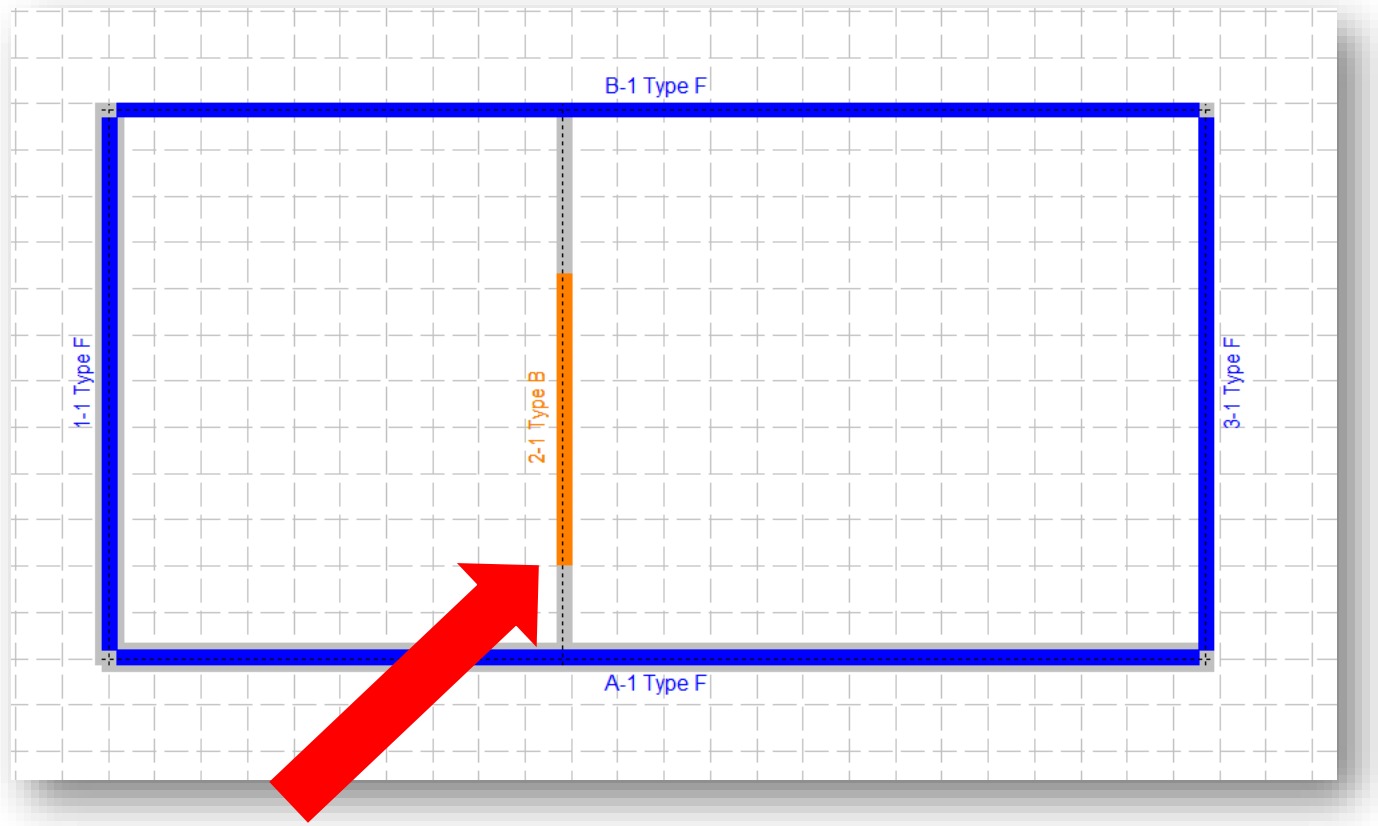
Step 4: Create walls

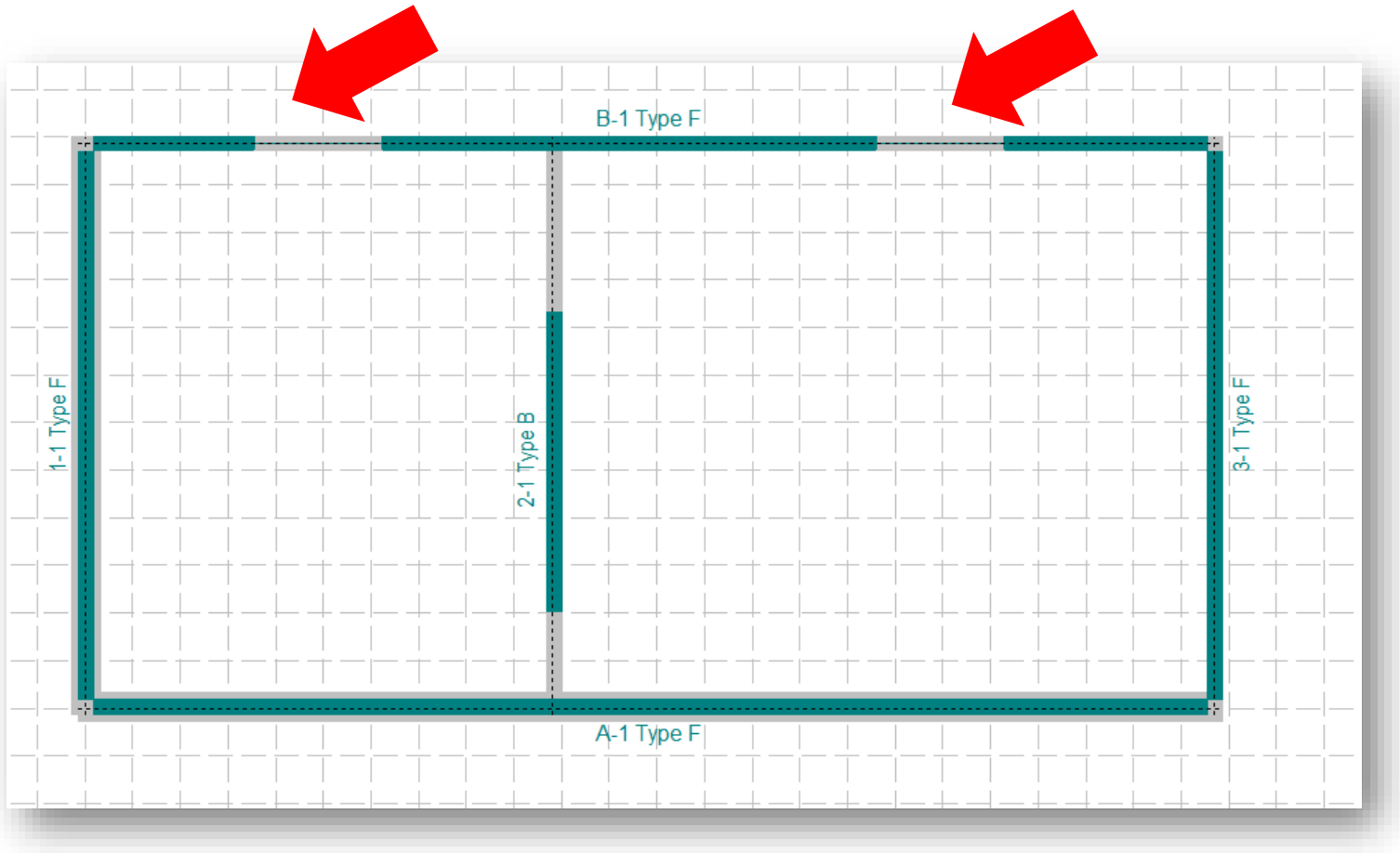


Step 4: Create walls

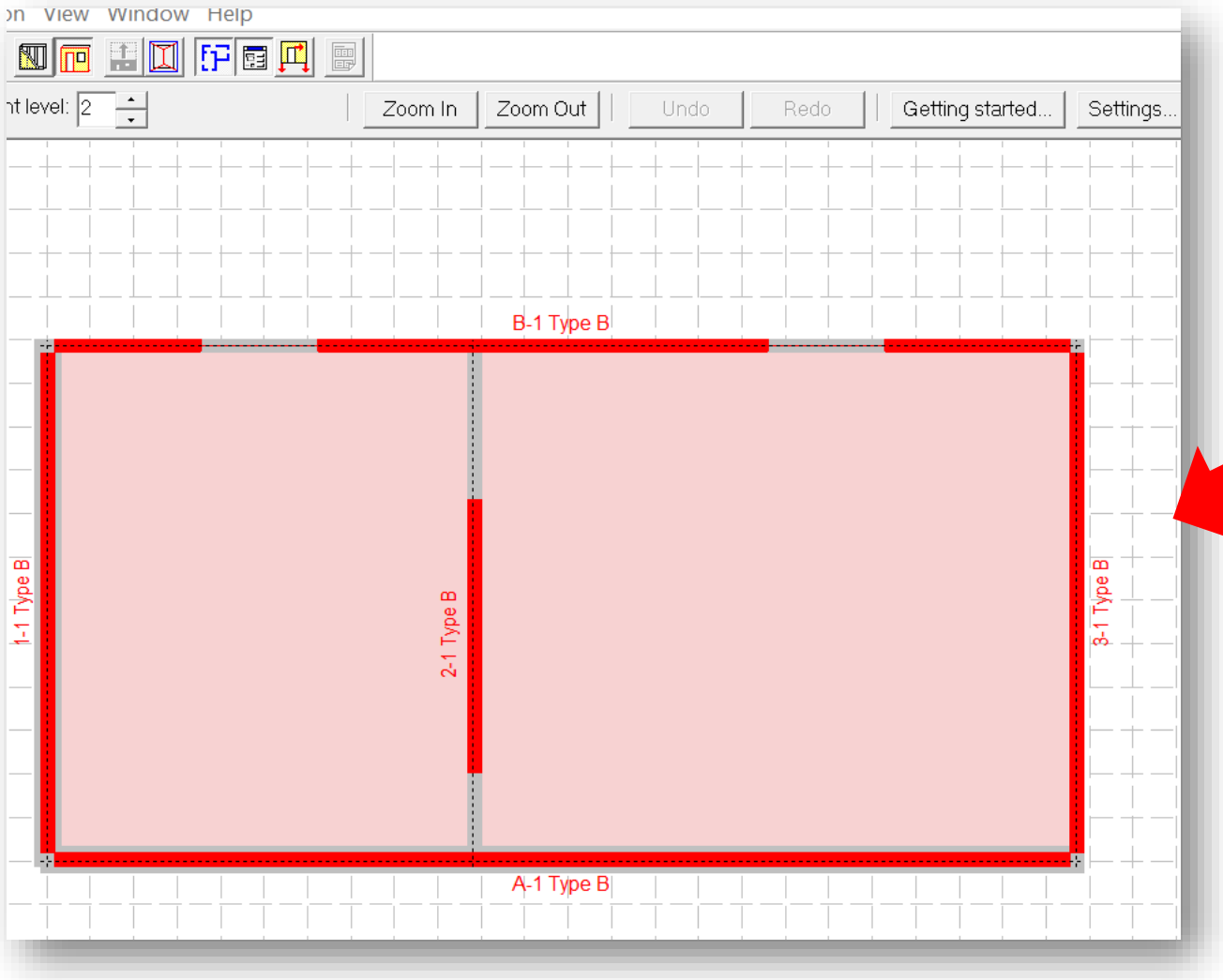


Adding interior braced wall band eliminates the orange shading warning. There are now sufficiently spaced bands.

Step 6: Create openings



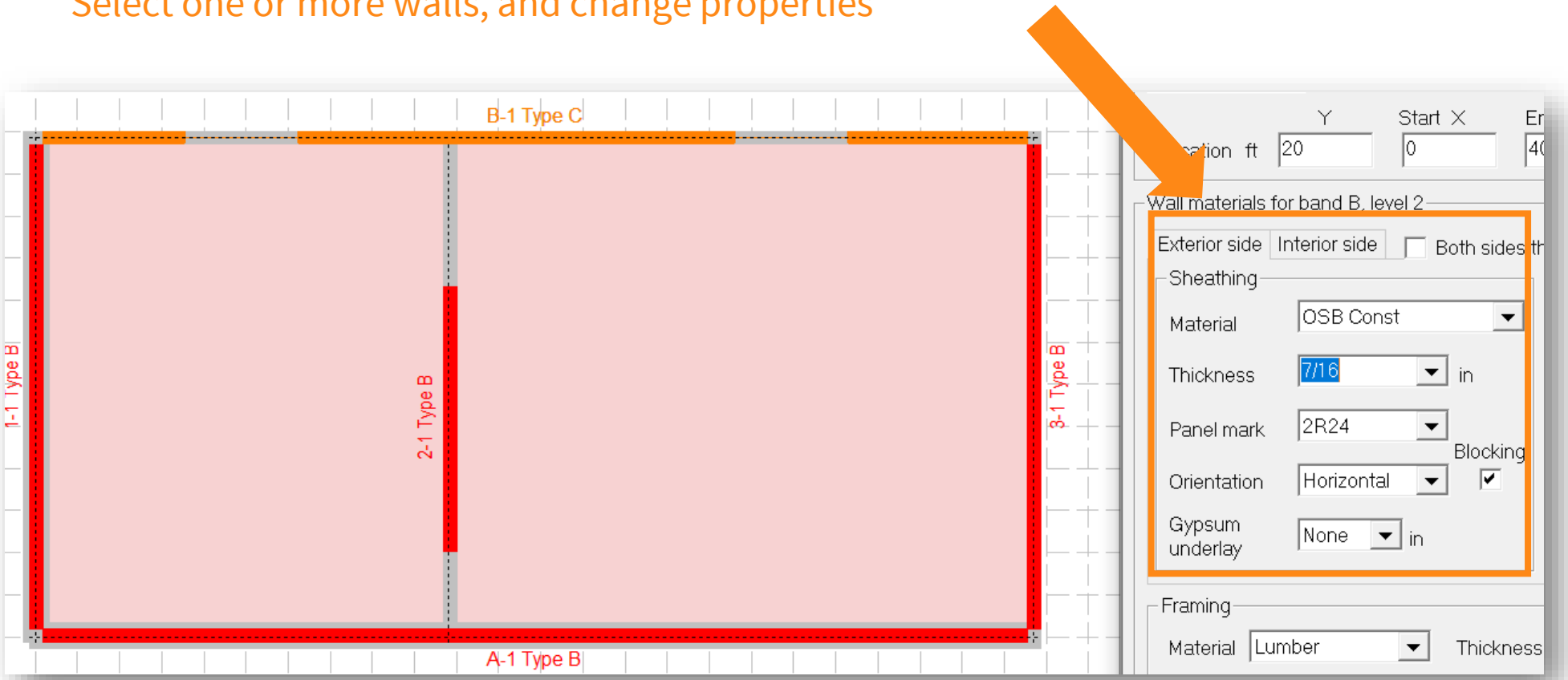
Step 5: Edit walls



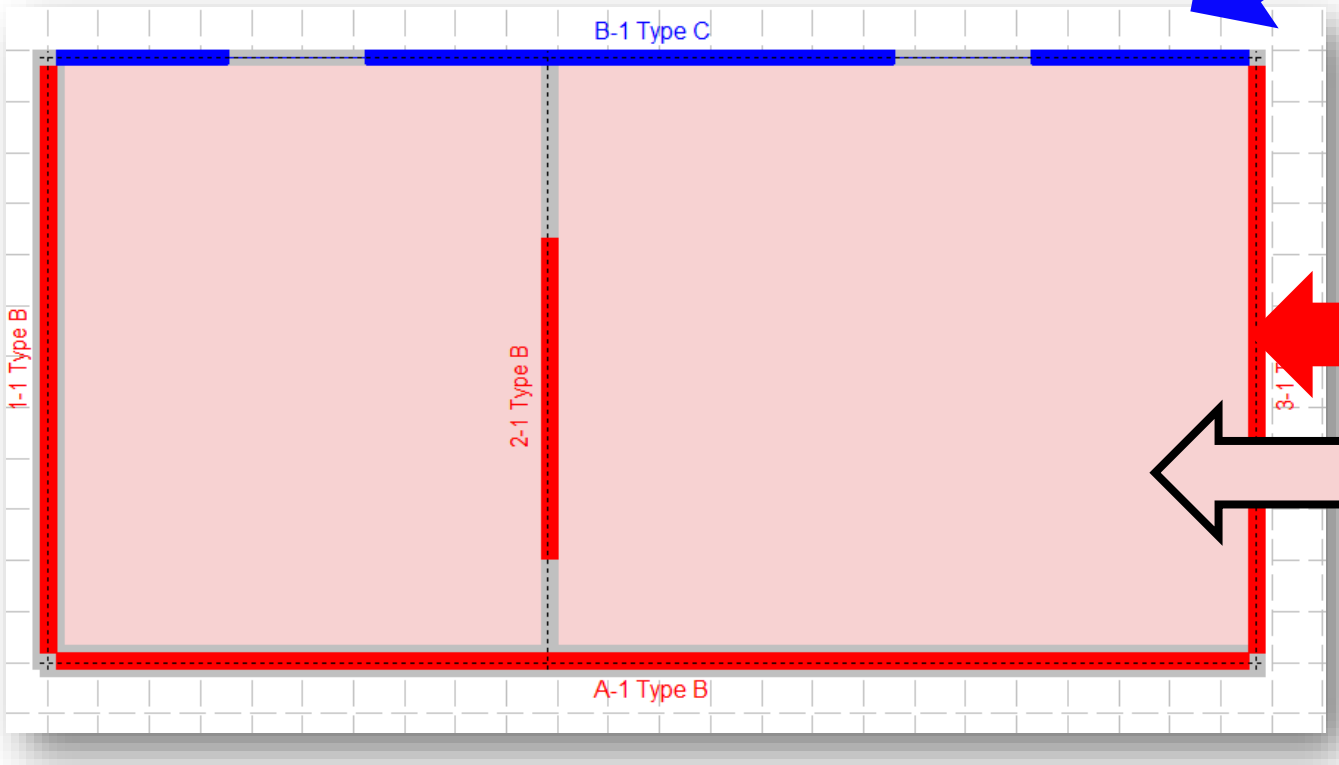
Walls with inadequate framing type are shown in red and regions requiring framing changes shaded in red.

Step 5: Edit walls

Select one or more walls, and change properties



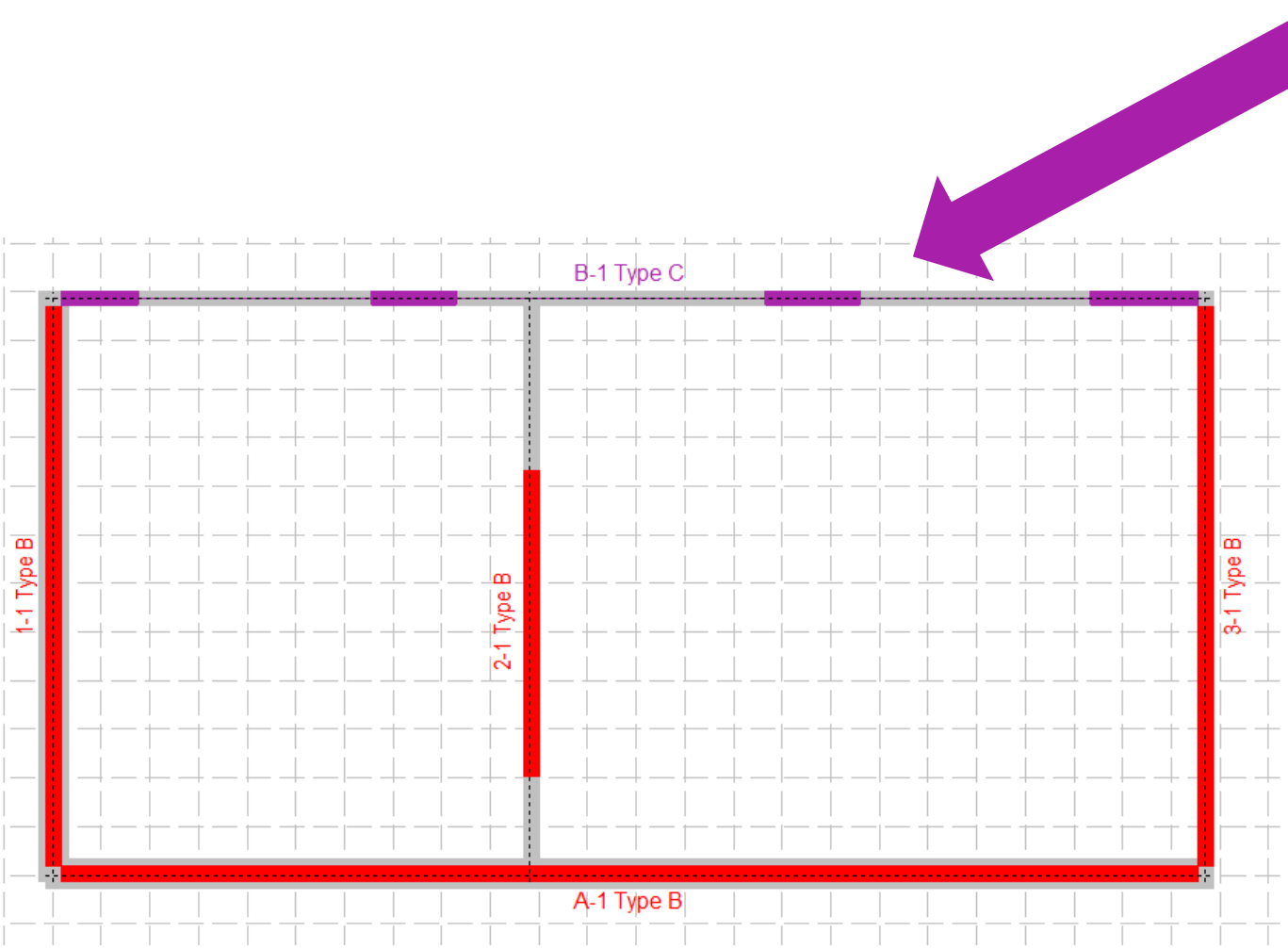
Step 5: Edit walls



Sufficient braced wall panel lengths and sufficient wall type (strength).

Walls with inadequate framing type and regions requiring framing changes shaded red.

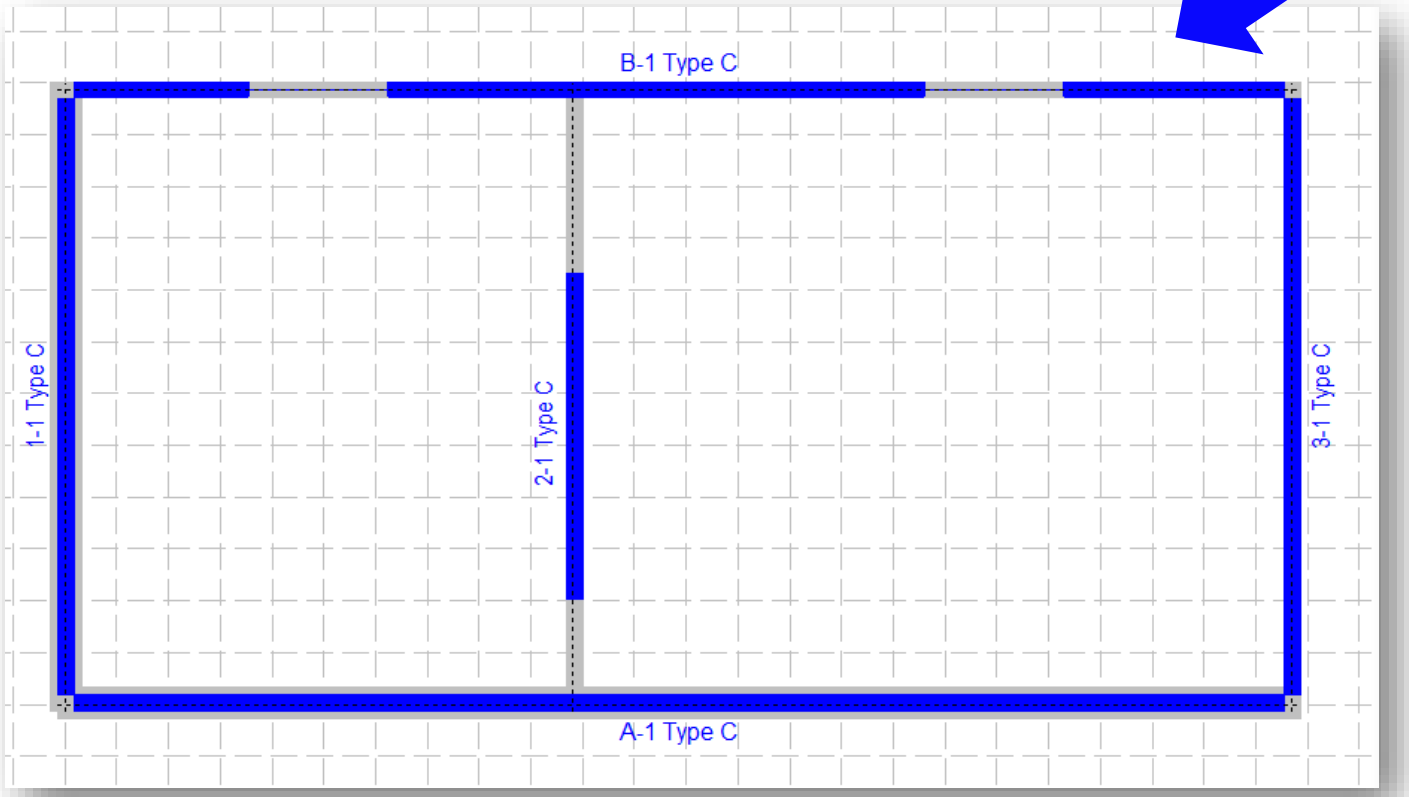
Step 5: Edit walls



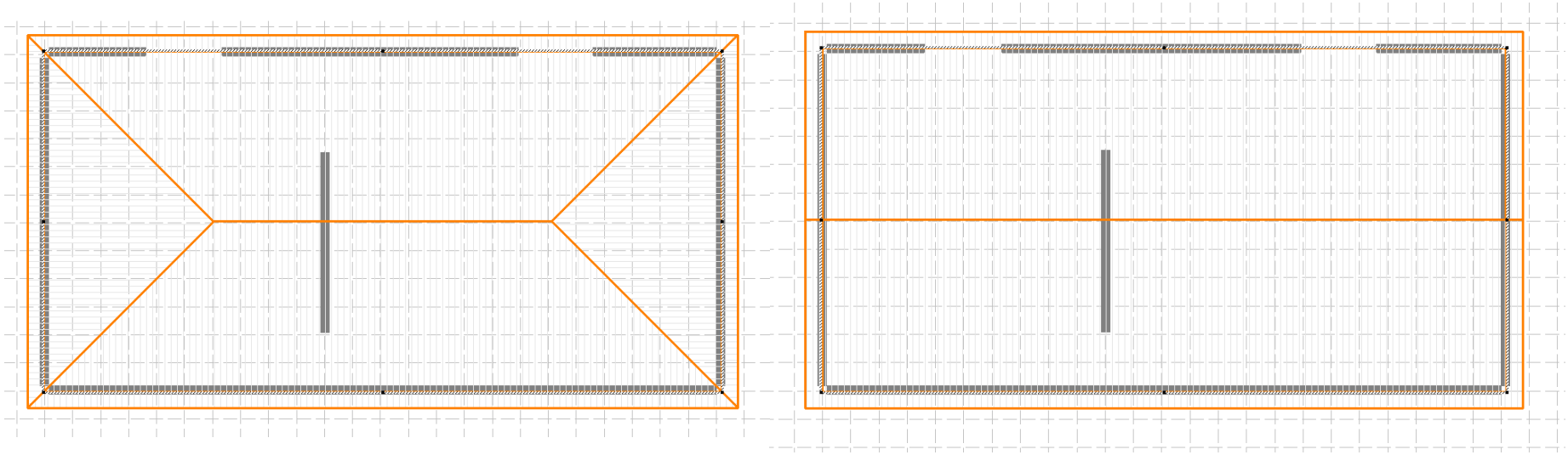
Insufficient braced wall panel lengths even though sufficient wall type (strength).

Step 5: Edit walls

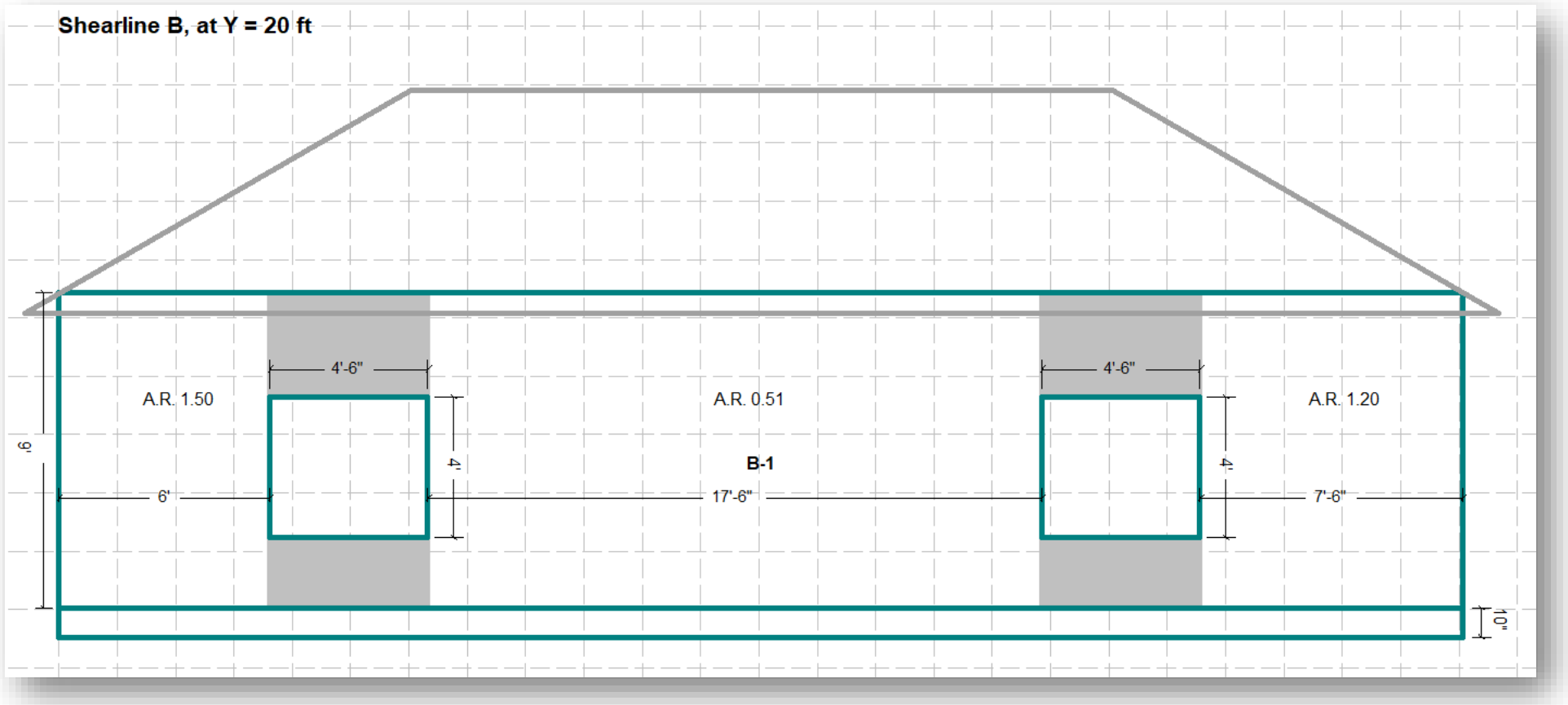
Sufficient braced wall panel lengths and sufficient wall type (strength).



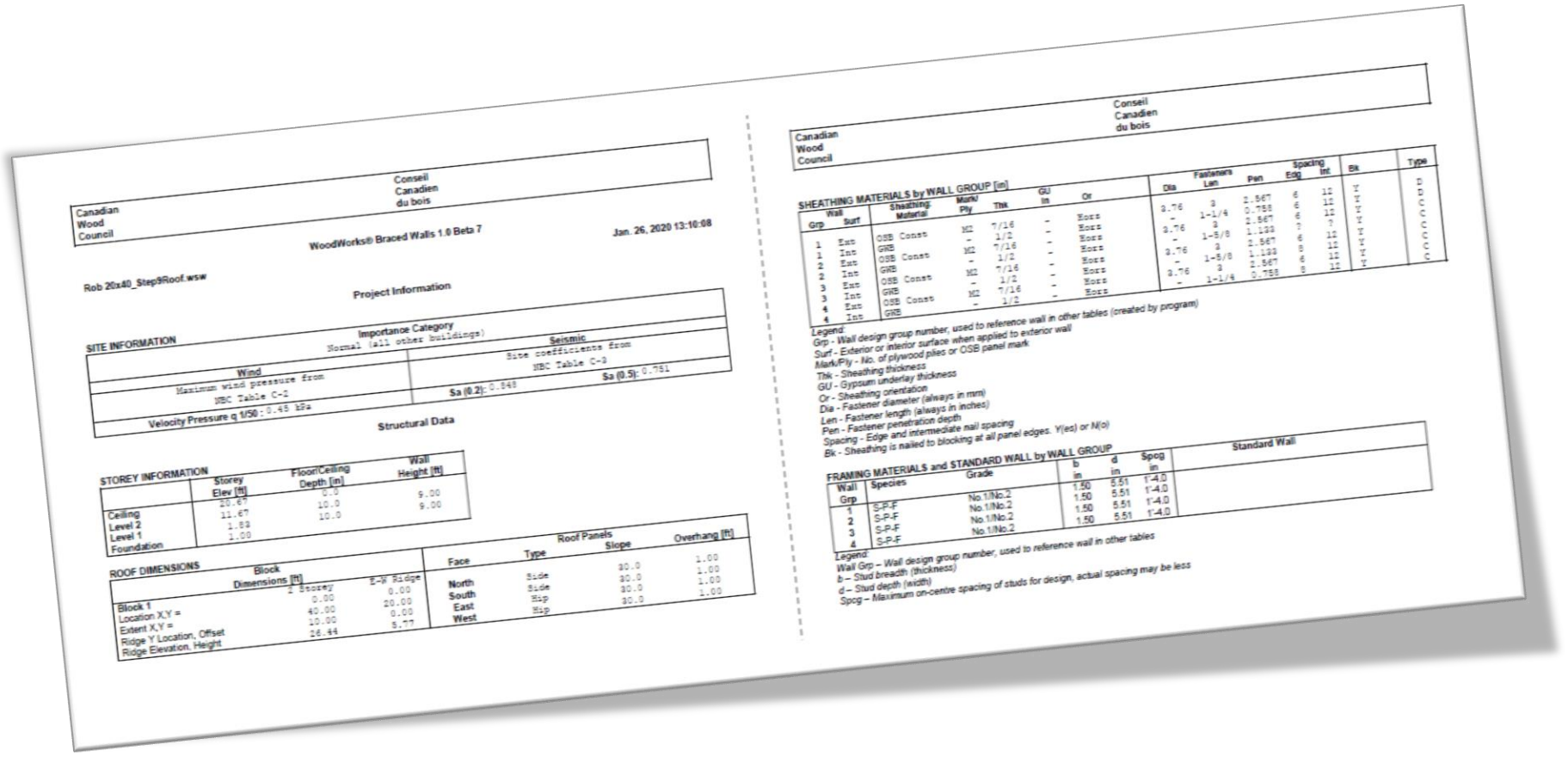
Step 9: Create roof (informational only)



Elevation view showing openings



Report:



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Rob 20x40_Step9Roof.wsw

Project Information

SITE INFORMATION

Importance Category	Seismic
Normal (all other buildings)	Site coefficients from NBC Table C-3
Wind	**Sa (0.2):** 0.848 — **Sa (0.5):** 0.761
Maximum wind pressure from NBC Table C-2	
Velocity Pressure q 1/50 : 0.45 kPa	

Structural Data

STOREY INFORMATION

	Storey Elev [ft]	Floor/Ceiling Depth [in]	Wall Height [ft]
Ceiling	20.67	0.0	9.00
Level 2	11.67	10.0	9.00
Level 1	1.83	10.0	
Foundation	1.00		

ROOF DIMENSIONS

	Block Dimensions [ft]		Roof Panels			Overhang [ft]
	2 Storey	E-W Ridge	Face	Type	Slope	
Block 1	0.00	0.00	North	Side	30.0	1.00
Location X,Y =	0.00	20.00	South	Side	30.0	1.00
Extent X,Y =	40.00	0.00	East	Hip	30.0	1.00
Ridge Y Location, Offset	10.00	5.77	West	Hip	30.0	1.00
Ridge Elevation, Height	26.84					

SHEATHING MATERIALS by WALL GROUP [in]

Wall Grp	Wall Surf	Sheathing Material		Mark/ Ply	Thk	GU In	Or	Fasteners Dia	Fasteners Len	Fasteners Pen	Spacing Edg	Spacing Int	Bk	Type
1	Ext	OSB	Const	M2	7/16	–	Horz	0.76	3	2.567	6	12	Y	D
1	Int	GWB		–	1/2	–	Horz	–	1-1/4	0.758	6	12	Y	D
2	Ext	OSB	Const	M2	7/16	–	Horz	–		2.567	6	12	Y	C
2	Int	GWB		–	1/2	–	Horz	0.76	3	1.133	7	7	Y	C
3	Ext	OSB	Const	M2	7/16	–	Horz	–	1-5/8	2.567	6	12	Y	C
3	Int	GWB		–	1/2	–	Horz	0.76		1.133	8	12	Y	C
4	Ext	OSB	Const	M2	7/16	–	Horz	–	3	2.567	6	12	Y	C
4	Int	GWB		–	1/2	–	Horz	0.76	1-1/4	0.758	8	12	Y	C

Legend:
Grp - Wall design group number, used to reference wall in other tables (created by program)
Surf - Exterior or interior surface when applied to exterior wall
Mark/Ply - No. of plywood plies or OSB panel mark
Thk - Sheathing thickness
GU - Gypsum underlay thickness
Or - Sheathing orientation
Dia - Fastener diameter (always in mm)
Len - Fastener length (always in inches)
Pen - Fastener penetration depth
Spacing - Edge and intermediate nail spacing
Bk - Sheathing is nailed to blocking at all panel edges. Y(es) or N(o)

FRAMING MATERIALS and STANDARD WALL by WALL GROUP

Wall Grp	Species	Grade	b in	d in	Spog in	Standard Wall
1	S-P-F	No.1/No.2	1.50	5.51	1'-4.0	
2	S-P-F	No.1/No.2	1.50	5.51	1'-4.0	
3	S-P-F	No.1/No.2	1.50	5.51	1'-4.0	
4	S-P-F	No.1/No.2	1.50	5.51	1'-4.0	

Legend:
Wall Grp – Wall design group number, used to reference wall in other tables
b – Stud breadth (thickness)
d – Stud depth (width)
Spog – Maximum on-centre spacing of studs for design, actual spacing may be less

Report: Sheathing and framing schedule

SHEATHING MATERIALS by WALL GROUP [mm]

Wall Grp	Wall Surf	Sheathing: Material	Mark/ Ply	Thk	GU mm	Or	Fasteners Dia	Fasteners Len	Fasteners Pen	Spacing Edg	Spacing Int	Bk	Type
1	Both	DF Plywood	4	12.5	-	Horz	3.76	3	64	150	300	Y	C
2	Both	DF Plywood	3	9.5	-	Horz	2.87	2	41	150	300	Y	B

Legend:
Grp - Wall design group number, used to reference wall in other tables (created by program)
Surf - Exterior or interior surface when applied to exterior wall
Mark/Ply - No. of plywood plies or OSB panel mark
Thk - Sheathing thickness
GU - Gypsum underlay thickness
Or - Sheathing orientation
Dia - Fastener diameter (always in mm)
Len - Fastener length (always in inches)
Pen - Fastener penetration depth
Spacing - Edge and intermediate nail spacing
Bk - Sheathing is nailed to blocking at all panel edges. Y(es) or N(o)

FRAMING MATERIALS and STANDARD WALL by WALL GROUP

Wall Grp	Species	Grade	b mm	d mm	Spcg mm	Standard Wall
1	S-P-F	No.1/No.2	38	140	400	
2	S-P-F	No.1/No.2	38	140	400	

Legend:
Wall Grp – Wall design group number, used to reference wall in other tables
b – Stud breadth (thickness)
d – Stud depth (width)
Spcg – Maximum on-centre spacing of studs for design, actual spacing may be less

Proposed Change 1475

Code Reference(s):	**NBC15 Div.B 9.4.1.1.** **NBC15 Div.B 9.4.2.** **NBC15 Div.B 9.20.1.** **NBC15 Div.B 9.23.1.1.** **NBC15 Div.B 9.23.3.1.** **NBC15 Div.B 9.23.3.4.** **NBC15 Div.B 9.23.3.5.** **NBC15 Div.B 9.23.6.1.** **NBC15 Div.B 9.23.11.4.** **NBC15 Div.B 9.23.13.** **NBC15 Div.B 9.23.16.1.** **NBC15 Div.B 9.23.16.5.** **NBC15 Div.B 9.31.6.2.(3)** **NBC15 Div.B 9.33.4.7.(2)**
Subject:	Structural Design (Part 9) — Lateral Loads
Title:	Resistance to Lateral Loads
Description:	The proposed change updates the Part 9 provisions for resistance to lateral loads due to earthquakes and wind. It responds to an increase in seismic hazard values for many locations in Canada by replacing Sa(0.2) with the seismic design parameter, Smax, and by defining new wood-frame wall types.

Next steps

The Joint Task Group reporting to SC HSB and SC ED will be reviewing every public review comment.

The code process allows technical revisions, if they can be justified (to EC and PTPACC) “not to cause further adverse reaction”. Modifications that address these public review comments and that will not cause further adverse reaction can still be made and recommended for inclusion in the 2020 NBC.

Canadian Home Builders' Association

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Questions?

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CHBA National
liz.wynder@chba.ca