

Building for Earthquakes

A simplified guide to braced wall panels required under NBC 2015

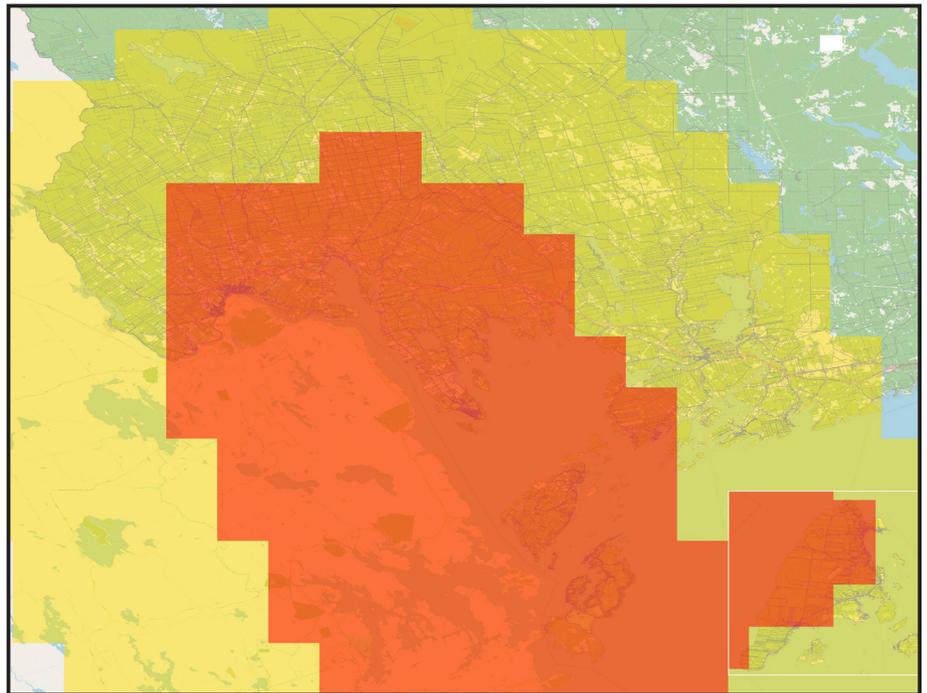
The 2015 issue of the National Building Code of Canada requires a shift in the way some buildings are constructed in the area: buildings in the area shown in red on the map must be built to earthquake standards.

Any construction shown in this red area must now conform to earthquake requirements under NBC 2015.

This is not a change in building code, but in the reclassification of some parts of our region: the federal geological department has deemed the Oak Bay Fault to be sufficiently active that now building Code demands more stringent construction protocols.

In general, what it means for most stick-built homes in this region (part 9 residential structures) is that at least 25 per cent of every perimeter wall has to be built more robustly. For the most part, this means adding foundation bolts, extra nailing, and perhaps the installation of cross-blocking.

The following is a simplified overview what is expected of contractors, and how to submit plans that our inspectors can evaluate for compliance with the Code.



Any construction shown in this red area must now conform to earthquake requirements under NBC 2015.



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The braced wall band

Homes subject to the new earthquake resistance rules must have what are called “braced wall bands.” These are zones requiring extra treatment, and include the perimeter of the structure. These imaginary zones extend from the foundation to the underside of the roof (and may also include basement walls).

If these bands are more than 10.6 metres apart (34’ 9”), then additional bands must be included within the structure. In homes that exceed this - usually the same dimension as the ridge-line of a typical gable roof - an interior braced wall band must be identified. The braced wall panels in these interior braced wall bands must be sheathed with either plywood, OSB, or diagonal board lumber.

In the image, the imaginary “braced wall bands” are in blue. These areas of a home must have a certain portion (usually 25 %) of more ruggedly built braced wall bands (shown in red). Each storey of construction will require these braced wall panels, and they have to be tied into braced wall panels below, or tied into a concrete foundation.

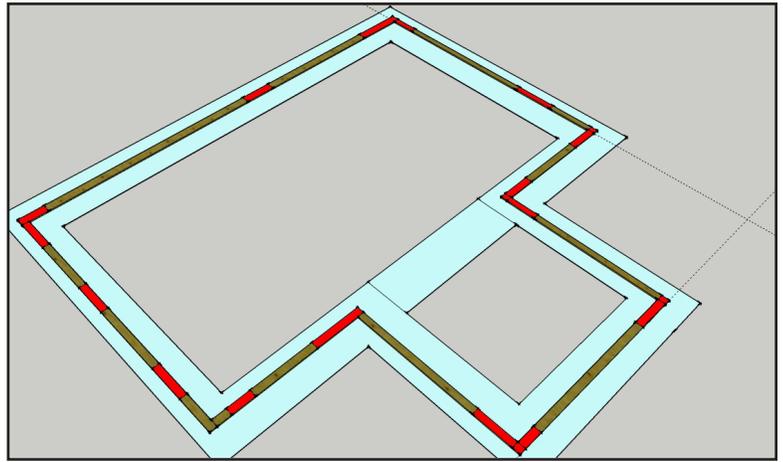
The braced wall panel

Within the braced wall bands there must be what are called braced wall panels (shown in red) . This is how the home will gain its extra rigidity and resistance to potential earthquake forces. These braced wall bands must be continuous from foundation to the underside of the roof, in other words, the bands must superimpose each other on all floor levels. (There may be requirements for larger bands on lower floors.) Panels must be at least 75 cm (30”) long - but can be 60 cm (24”) if they intersect another band.

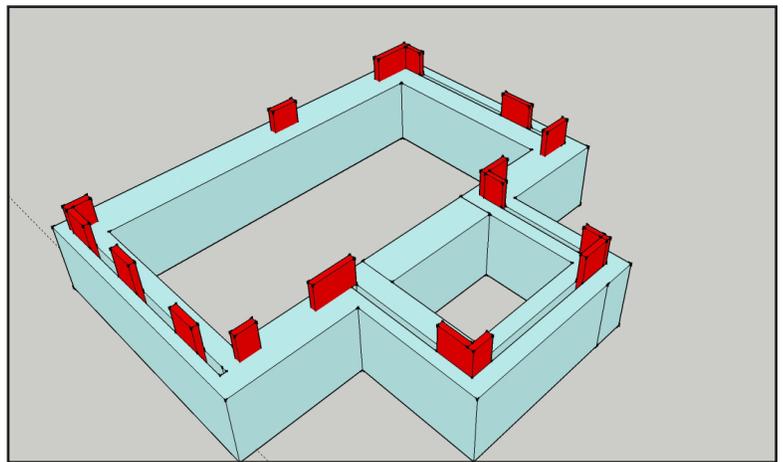
For the most part, one and two-storey buildings require 25 per cent of the perimeter (and 25 per cent of any internal braced wall bands) to be constructed with slightly beefier braced wall panels. These panels can be spaced up to 6.4 metres (21 feet) apart.

General requirements of a braced wall panel

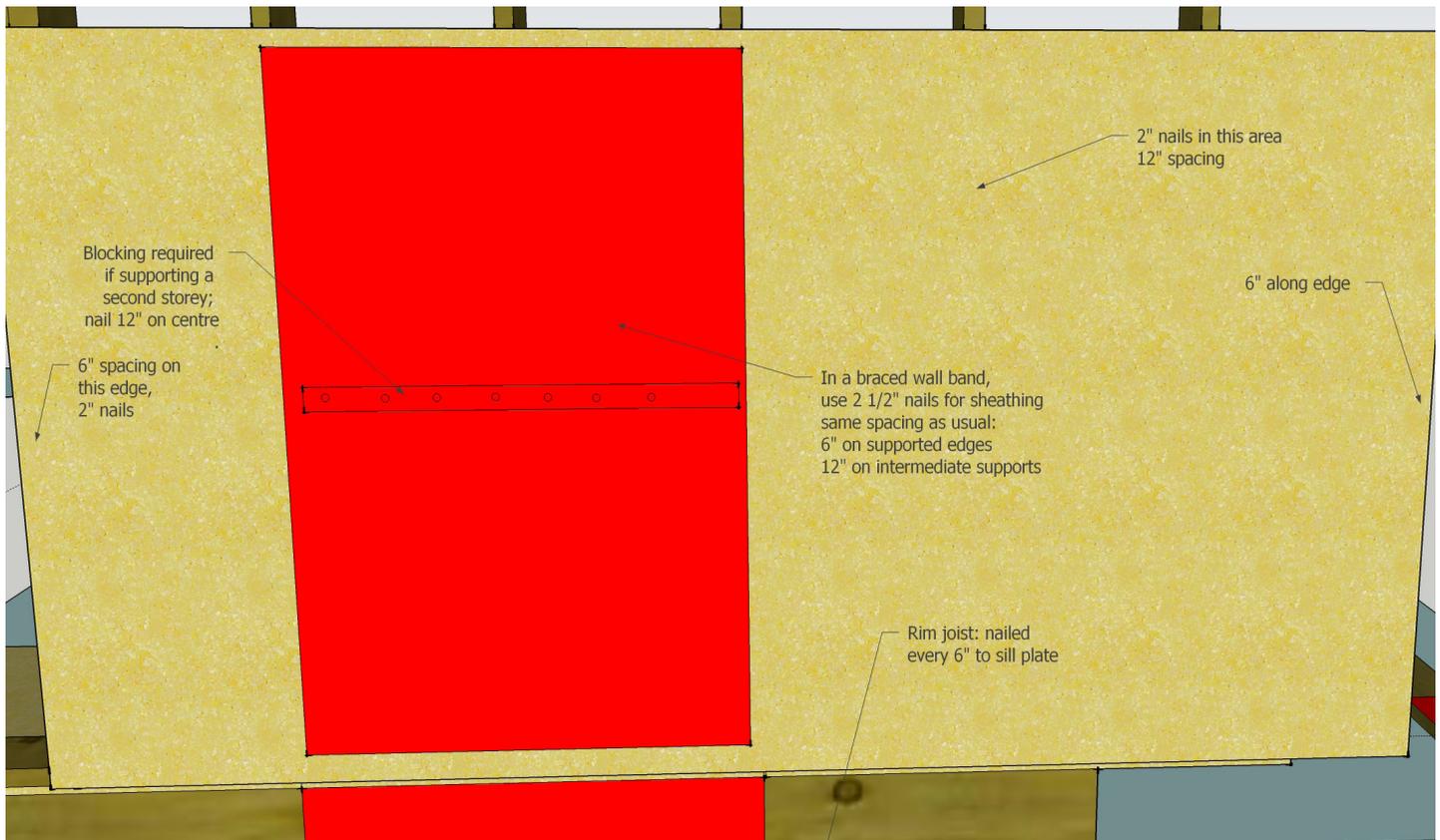
- If near a corner, these panels must rest on construction that is tied to the foundation by two anchor bolts.
- Must be nailed to the sill joist with 3.25” (82 mm) nails every 6” (15cm)
- Sheathing must be nailed every 6” (15cm) at the perimeter, using 2.5” nails (not the normal 2” nails required elsewhere).
- Can be no less than 60 cm (2’) long if intersecting another braced wall panel (usually at corners)
- Can be no less than 75 cm (2’6”) long if not intersecting another braced wall panel
- All joins in exterior sheathing must be attached every 6” (15cm) to supporting blocking if that braced wall panel supports another floor
- Any splices in top plates occurring in a braced wall panel will require additional nailing.
- No windows or other significant openings of any kind.
- Decreased anchor bolt spacing (esp. at corners)



In the diagram above, the braced wall bands - areas that need to be reinforced - are shown in blue.



Braced wall panels will be sections of the exterior stud wall that have no openings, and are nailed with more nails - and sheathed with longer nails.



It's important to ensure the continuity of the required nailing from the foundation to the underside of the roof. This image shows some of the requirements of nailing in a braced wall band. Contractors may wish to mark these with tape, paint or some other means to ensure site workers are aware of where the braced wall panels are.

Other construction

- 1) The width of braced wall panels will increase for walls supporting more than one storey and a roof (ie: three-storey buildings): in these cases, panels must comprise 40 per cent of a braced wall band.
- 2) Small garages may have relaxed requirements for the door-side, as long as more reinforcement is included on the opposite (rear) face.
- 3) Porches that do not support a storey are also subject to relaxed requirements.
- 4) There are limits on height (storeys) and extra construction requirements if a house will have

- a wall is comprised of cultured stone or brick façade,
- concrete topping on any floors on supported wood-frame construction
- A roof of heavy tile or similar construction

These homes cannot be more than two storeys in height unless designed by an engineer. Further, there are more restrictive requirements on anchor bolt spacing. In such cases, it's best to call our office with any questions you may have.

Submitting a permit

In order to issue a building permit, we will require a scale drawing of your building plan - this is a requirement in any regard.

Those that are in earthquake areas should also indicate the location of the braced wall bands. (This can be done by using a highlighter, for example.)

Requirements for braced wall band construction in earthquake-sensitive areas of Charlotte County

Anchor Bolt Spacing (metres) ¹

Minimum two anchor bolts per braced wall panel if located within 50 cm (20") of foundation corners, and

Bolt diameter mm (inches)	Light construction ²			Heavy construction ²	
	Number of floors supported				
	1	2	3	1	2
12.7 (1/2")	2.4	2.3	1.8	2.4	2.0
15.9 (5/8")	2.4	2.4	2.2	2.4	2.4

- 1) Along braced wall bands - the perimeter walls and any other supports identified as required
2) Heavy construction includes clay roofing systems, stone cladding, etc.

Nailing requirements for framing

Rim joist, trimmer joist or blocking (supporting walls with required braced wall panels) to sill plate or top wall plate:	82 mm (3.25") nails, 150 cm (6") OC
Bottom wall plate or sole plate – in required braced wall panels – to floor joists, rim joists or blocking (exterior walls):	82 mm (3.25") nails, 150 cm (6") OC
Required braced wall panels – in interior walls – to framing above and below:	82 mm (3.25") nails, 150 cm (6") OC

Nailing requirements for sheathing (St. Stephen-Saint Andrews area)

Sheathing type	Common, spiral, ring nail	Screws	14-gau staple	Minimum number/Spacing
Board lumber 184mm (7 1/4") or less	63 mm (2.5")	51 (2")	63 (2.5")	2 per support
Board lumber > 184mm (7 1/4")	63	51	63	3 per support
Plywood, OSB, waferboard up to 20 mm (3/4") thick	63	51	63	150 mm (6") oc on edge, 300 mm (12") on intermediate supports
Plywood, OSB, waferboard >20 mm (3/4") thick	63	57 (2.25")	n/a	150 mm (6") oc on edge, 300 mm (12") on intermediate supports

This is only for nailing in braced wall panels. Sheathing nailing elsewhere is per standard practice/Code (ie: 2" nails 150 mm oc, 300 mm on intermediate supports.)

Top plate nailing

- 76 mm common or spiral nails (3")
0 floors supported: 2 each side of splice
1 floor supported: 5 each side of splice
2 floors supported: 8 each side of splice