DESIGN RIGHT

Topographic zones

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A READER ASKS, 'HOW DO THE NZS 3604:2011 TOPOGRAPHIC ZONES WORK?'. WITH MORE BUILDINGS BEING CONSTRUCTED ON EXPOSED SITES, THIS IS AN IMPORTANT QUESTION TO UNDERSTAND.

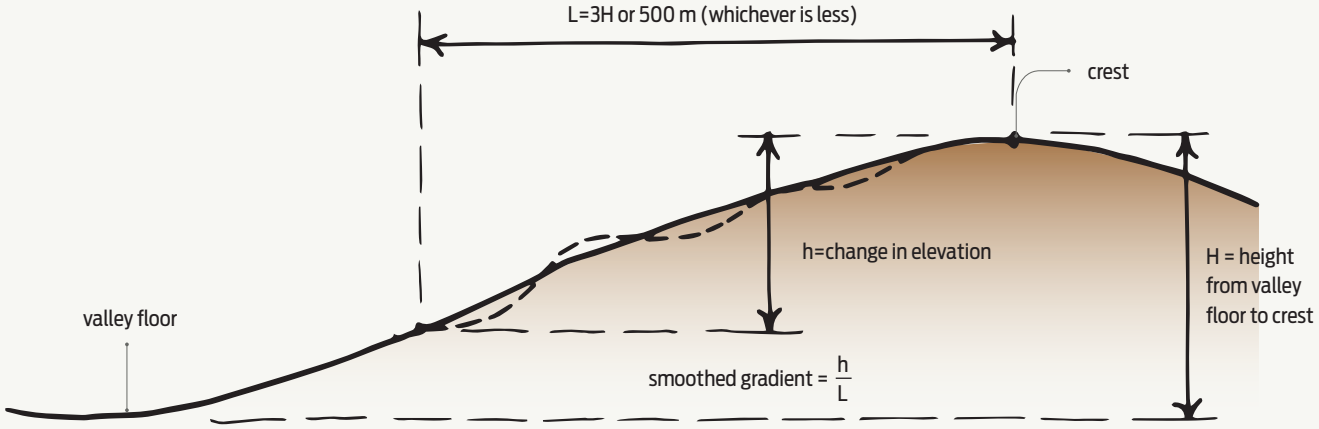


Figure 1 **Smoothed gradient.**

WE ALL KNOW from experience that hilltops (and other exposed locations) have higher wind speeds than the valley floor, and the topographic classes T1 to T4 are a measure of just how much higher.

Start with shape of ground

The first step is to stand back and get an overall picture of the shape of the ground surrounding the site. Don't get into too much detail. This is big picture stuff and is best done by a site visit.

Most of New Zealand's hill country is 'spur/gully' formation where the land drops away on both sides of a hilltop, ridge or spur. This is a 'hill shape' in NZS 3604-speak.

However, around the coasts or beside large river valleys, there are often 'escarpments' where the water has cut away one side of the hill and the other side is relatively flat. Note that if the ground comprises undulations of less than 10 m (height of a 3-storey house) or is flatter than 1:20, the topographic class is T1.

Then smoothed gradient

The next step is to determine the slope of the hill or 'smoothed gradient'. This is also big picture stuff, and contours from a typical site survey will rarely extend far enough. The best source of information is a large-scale contour map or an online tool such as Google Earth.

The hill slope is measured over either:

- a distance from the hill crest of 3 × height of the crest above the valley floor (H), or
- 500 m, whichever is less.

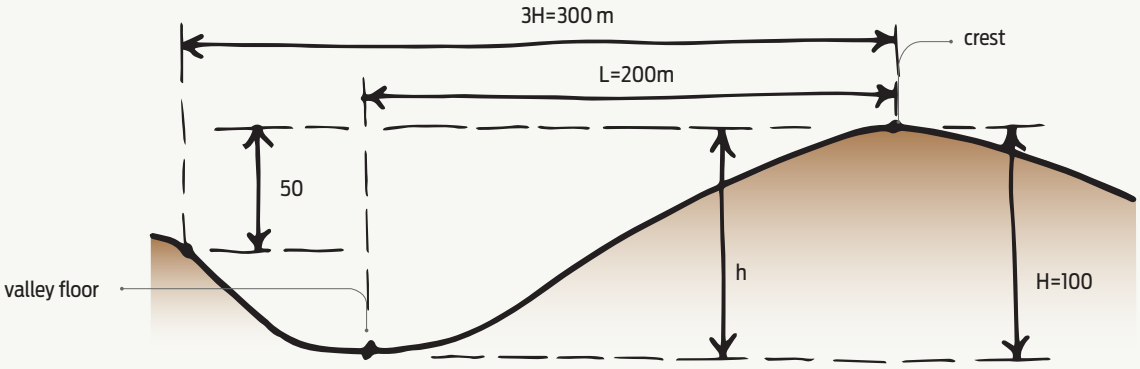
Figure 5.2 of NZS 3604:2011 *Timber-framed buildings* is misleading here, and an alternative is given in Figure 1.

The smoothed gradient is h/L. Where the distance L extends from the crest up the next hill, as can sometimes happen in steeper country (see Figure 2), take L as the distance to the valley floor.

Position of building

Next consider the position of the building site in relation to the crest of the hill (or escarpment):

- If it is within distance H (or 2H downwind for an escarpment), it is in the 'crest zone' where wind acceleration is a maximum.



In this example, smoothed gradient should be:
100/200 = 0.5 = steep **NOT** 50/300 = 0.17 = moderate

Figure 2 **Determining topographic zone in steep hillside.**

- If it is within 2H (or 4H downwind for an escarpment), it is in the 'outer zone' where wind acceleration is less.
- If it is more than 2H (or 4H), it is T1 because wind acceleration is not significant.

Note that row 4 in NZS 3604 Table 5.2 is irrelevant for topographic class and should be ignored – it fits into Table 5.4.

Note also that the entry for 'steep' in Table 5.2 should have no upper limit.

Now the topographic class

Finally, the topographic class T1 to T4 is determined from Table 5.3 using the information determined above.