



Southwest
New Brunswick
Service Commission

Footings and frost walls



Concrete forms rest atop footings in this new build. Our inspectors check footing width as part of every plans review we do. They're usually hidden when the work is done, and easily forgotten after the early and heady days of new construction, but the footings and frost wall upon which a home rests are among the most critical of building elements.

Here are some of the considerations – and requirements of the Building Code, as it applies to footings and frost walls

Footings

Footings need to be set on undisturbed soil, or – as needs be – on compacted, clean, well-draining fill.

If the basement is to be unheated, or the construction is a crawl space, the footings need to be below the depth of frost, which is 1.2 metres or 4', in general.

A basic one-storey wood-frame home demands a minimum footing width of 25 cm, or just about 10 inches. That's pretty scant, and most builders will go well beyond that, which we don't mind: remember, Code is the bare minimum acceptable, and nothing stops a builder from going above and beyond.

With the growing popularity of engineered trusses, homes with open joist spans of 25, 30, even 35 feet are growing more common. It's important to realize that the wider the truss span, the larger the footing supporting those loads must be.

For example, a one-storey stick home with a 25-foot joist span will require a 15 1/2" footing. A 30-foot span would need 18 1/2" footings.

Add another storey on to a build, and the demands on footings increase: a 25-foot joist span on a two-storey home will demand a footing of just more than 21 inches.

There are formulas our inspectors use to determine these minimum footing widths – and its one of the things that will be checked during a review of submitted plans.

Drainage beneath footings

The material immediately under a footing shall be crushed stone or a similar granular material (such as clean pit-run gravel free of organic material). This material must be at least 12.5 cm (five inches) thick, and shall extend to not less than 30 cm (one foot) beyond the outside edge of the footings.

Drainage and damp-proofing

Unless it can be shown to be unnecessary, the footings must also be drained with a system of deformation-resistant perforated pipe that drains to an area lower than footings. This pipe should be set at the outside edge of the footing (or, alternately) at the base of the footing and frost wall. It should be covered with course, well-draining gravel. (This is part of what inspectors will check for in a pre-backfill inspection.)

If the interior of the frost wall will serve a basement, the walls will also have to be damp-proofed – this is usually solved with the application of a tar-like material on the exterior walls.

Reduced footing depth

There are a number of situations where it's possible to have footings that are set shallower than the traditional four-foot depth.

The most obvious one is when there is solid rock at a depth less than four feet. If the stone is solid, there's no reason not to put the footing on the stone. Further, it may be possible to simply ignore the footing entirely, and set the frost wall directly onto the stone. This will require a pre-permit inspection to verify the rock is suitable for this purpose. [9.15.3.1]

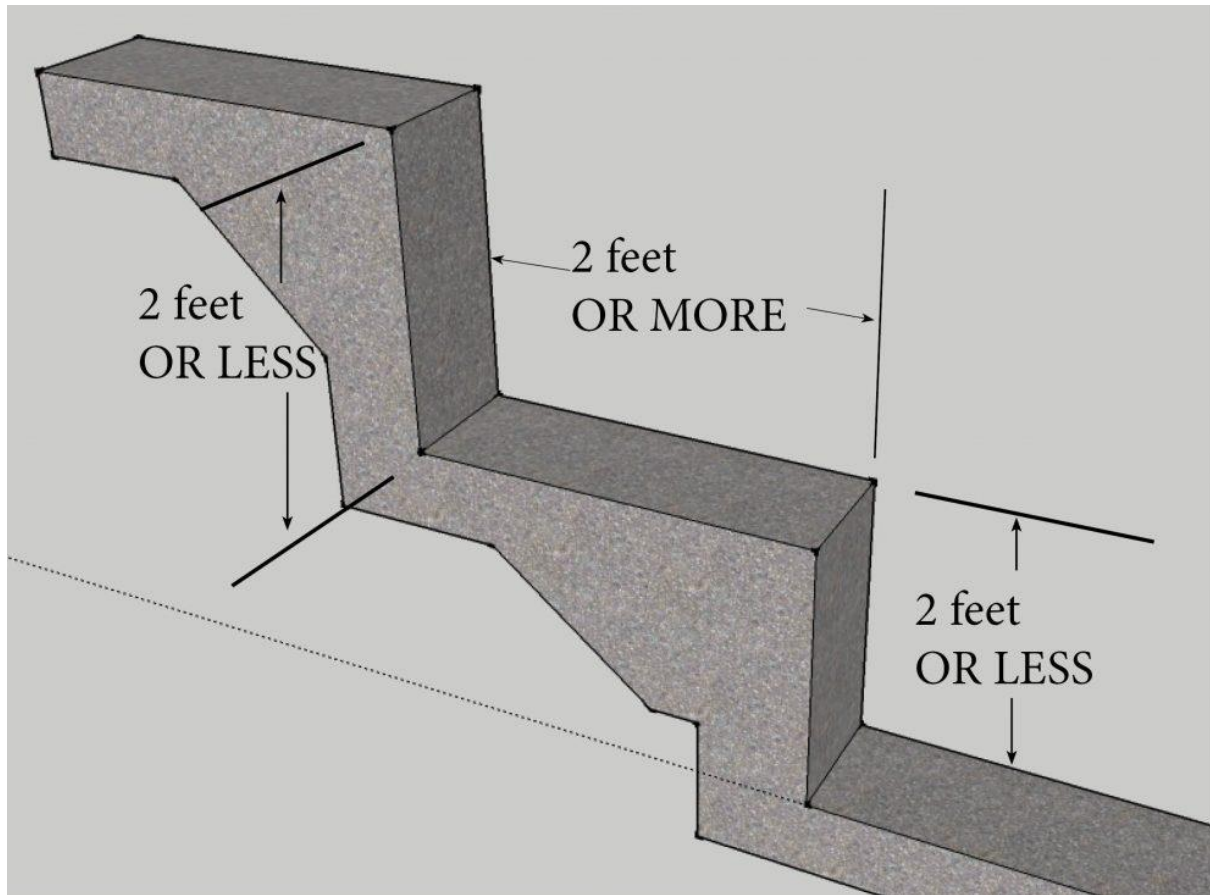
However, the National Building Code allows for foundations set shallower than 1.2 metres (four feet) if the soil conditions allow. [Table 9.12.2.2] There are such a wide range of soil conditions in our region that some situations do exist (such as well-drained, coarse-stoned gravel) where foundation depths can be reduced. This is a case-by-case basis, and again, a pre-inspection is required (unless the inspector is familiar with the soils in the immediate area from previous experience.)

Reduced-depth footings must also be drained with drainage tile, and the frost-walls damp-proofed, unless it is determined by the inspector to be unnecessary.

Stepped footings

When faced with trying to construct footings on sloping ground conditions, the only real solution is to "step" the footings to match the contour of the land. It's not a complex process, but there are some key Code requirements.

The (vertical) rise of any step in the footing can be no more than 60 cm, or two feet. It's possible to make multiple steps, but each vertical rise must be separated by at least 60 cm (or two feet) horizontal distance.



An illustration on the required maximum heights and minimum horizontal spacing of stepped footings.

Normally, when building a simple footing, contractors will either create a v-groove depression in the footing (a key) to help bond the frost wall to the footing, or install either vertical sections of rebar to do the same.

Some contractors, when faced with a stepped footing, will drill a hole through the form of the vertical rise and insert a rod of rebar to assist in bonding the concrete of the frost wall to the vertical edge of the stepped footing.

Note that this restriction does not apply to the frost walls that these footings may support.

Varied footing depths

If installing a stepped footing over rock or ledge, the footing can be built to contour the ground or the rock beneath. If on soil, then the requirement for a bed or granular material (as noted above) still applies. The depth of the footing can vary, as long as it does not decrease below the required minimum depth. Obviously, it can exceed this depth as required.

