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# Concrete foundation wall reinforcing

ALL CONCRETE FOUNDATION WALLS NEED TO BE REINFORCED, SO WE REVIEW THE REQUIREMENTS SET OUT IN NZS 3604:2011 *TIMBER-FRAMED BUILDINGS*.

**REINFORCING FOR CONCRETE FOUNDATION** walls and footings is generally 12 mm diameter deformed (D12) reinforcing bars. The use of deformed bars – bars with an irregular surface – creates a firm bond between the reinforcing and the concrete.

## ***In situ concrete and concrete masonry foundation walls***

Reinforcing requirements for in situ concrete and concrete masonry foundation walls supporting suspended framed floors and light cladding are described in NZS 3604:2011 Figures 6.13, 6.14 and 6.15. The layout of reinforcing bars, both horizontally and vertically, varies according to:

- the height of the wall
- whether the foundation wall is in situ concrete or concrete masonry
- whether the wall will support single-storey or 2-storey construction or is a cantilevered foundation wall.

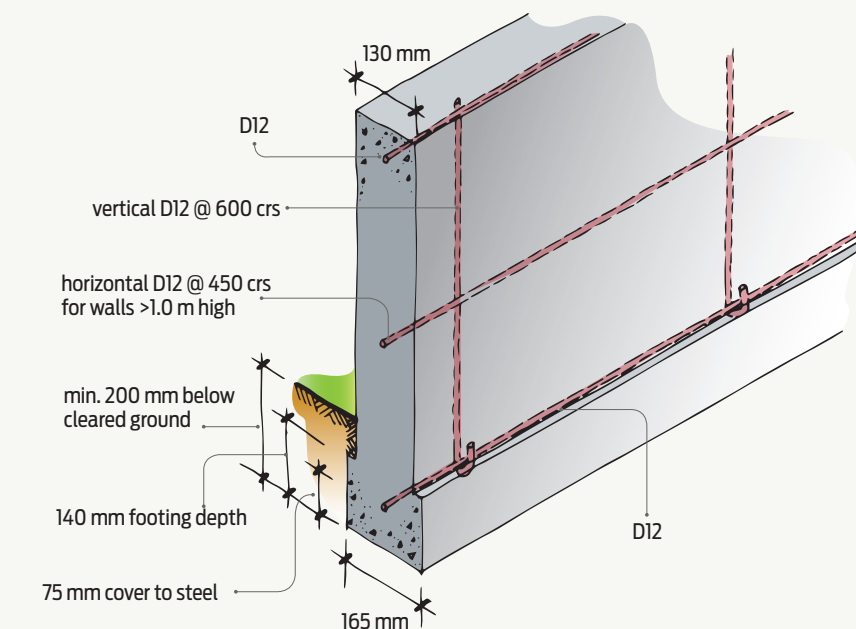
See Table 1 and Figures 1 and 2 for details.

## ***Foundation walls to concrete slab on ground floors***

Reinforcing for combined foundation wall/ concrete floor slabs supporting lightweight construction is described in NZS 3604:2011 Figures 7.13(B), 7.14(B) and 7.14(C).

If the combined foundation/floor slab supports masonry veneer cladding, the reinforcing is described in NZS 3604:2011 Figures 7.15(B), 7.16(B) and 7.16(C).

Reinforcing details for combined foundation wall/concrete floor slabs not supporting masonry veneer are summarised in Table 2 and Figures 3 and 4. Details for concrete masonry construction



**Figure 1** Reinforcing for in situ concrete foundation wall (not cantilevered) for single storey.

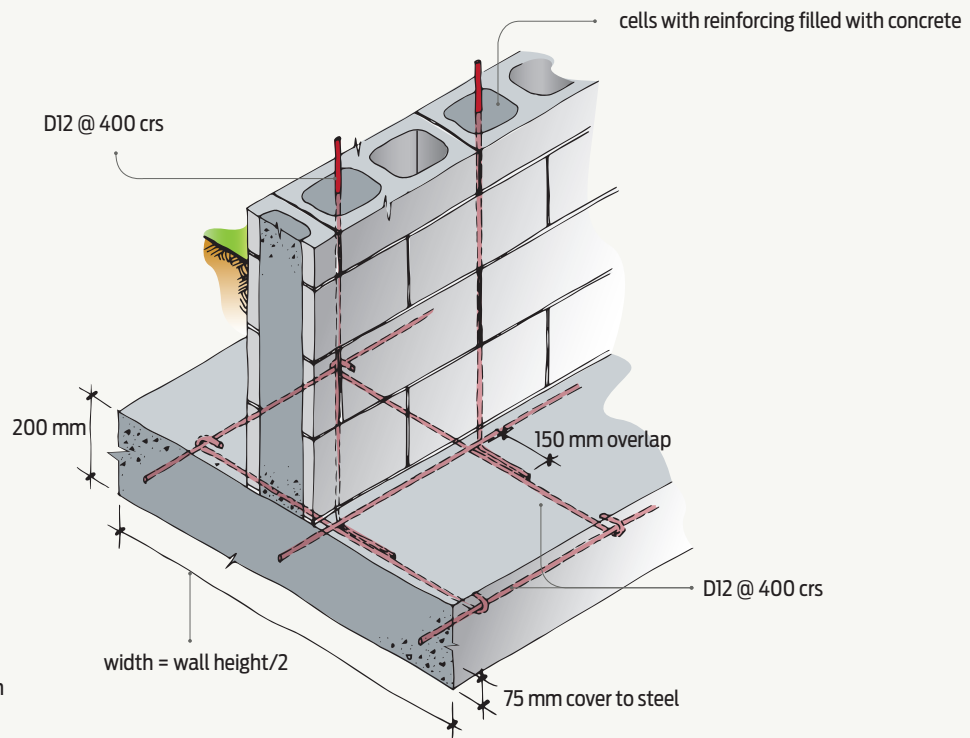
are given in NZS 4229:2013 *Concrete masonry buildings not requiring specific engineering design*.

B1/AS1 Amendment 11 deleted untied slab/ footing details shown in Figures 7.13(A), 7.14(A), 7.15(A) and 7.16(A). All concrete slab-on-ground floors must now be reinforced and the slab reinforcing tied into the foundation wall reinforcing (see Concrete slabs and control joints, *Build 138* pages 24–25).

## ***Overlaps and links***

Overlaps must be at least 500 mm where horizontal reinforcing bars require lapping and where reinforcing changes direction. At foundation wall corners, the laps must be 500 mm in each direction, as shown in NZS 3604:2011 Figure 6.15(A).

Lapped reinforcing should be tied with 1.6 mm black annealed steel wire at regular spacings ➤



**Figure 2**

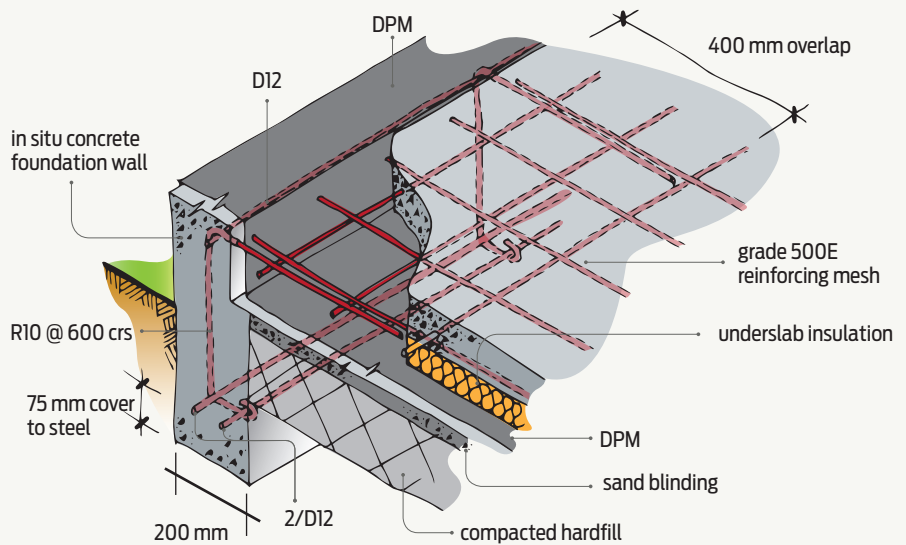
Reinforcing for cantilevered concrete masonry foundation wall for 1 or 2 storeys.

**Table 1**

## REINFORCING FOR FOUNDATION WALLS (FRAMED SUSPENDED FLOORS)

TYPE OF FOUNDATION WALL		REINFORCING		
		FOOTING AT BASE OF WALL	HORIZONTAL IN WALL	VERTICAL IN WALL
In situ concrete	Single-storey	1/D12* (see Figure 1)	D12 @ 450 mm crs for walls >1 m high	D12 @ 600 mm crs
	2-storey	2/D12	D12 @ 450 mm crs for walls >1 m high	D12 @ 500 mm crs
	Cantilevered	D12 @ 400 crs both ways	D12 @ 400 mm crs max.	D12 @ 400 mm crs
Concrete masonry	Single-storey	1/D12*	D12 @ at mid height for walls >1 m high	D12 @ 800 mm crs
	2-storey	2/D12	D12 @ at mid height for walls >1 m high	D12 @ 800 mm crs
	Cantilevered	D12 @ 400 crs both ways (see Figure 2)	D12 in bond beams @ 800 mm crs max.	D12 @ 400 mm crs

\* 2/D12 where wall supports masonry veneer.



**Figure 3**

**Reinforcing for in situ concrete foundation edge detail for 1 or 2 storeys.**

and at each end of the lap. Black annealed steel wire is soft and easily bent.

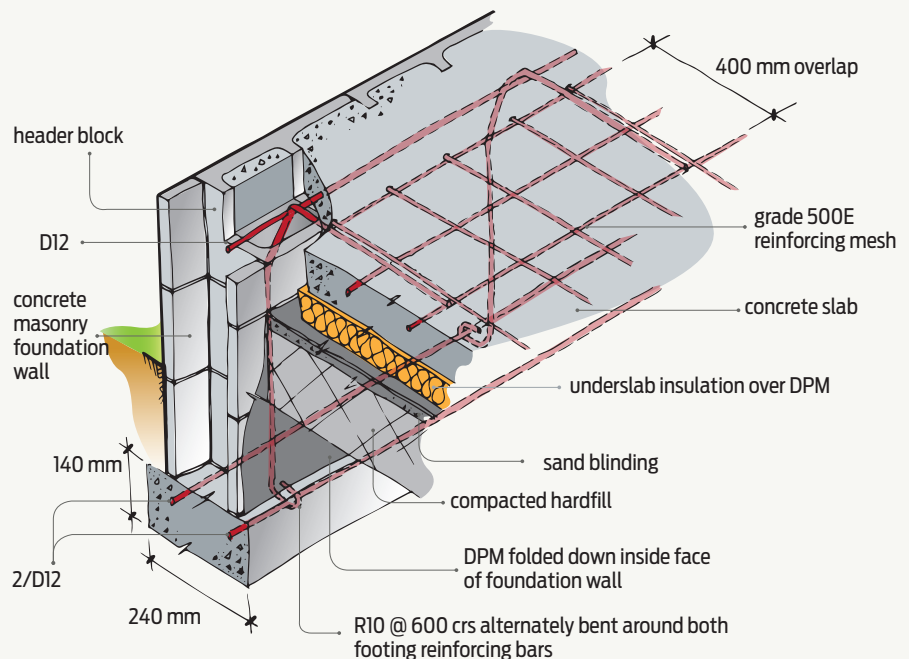
Concrete slabs require pairs of horizontal reinforcing bars in foundation wall footings. These must be linked by stirrups formed from R10 reinforcing bars, installed at 400 mm centres and tied with steel wire at the junctions of the reinforcing and stirrups.

Bends in the reinforcing, to form the hook or create a right angle, must have at least five times the diameter of the bar – the minimum bend diameter of a 12 mm diameter deformed reinforcing bar must be no less than 60 mm.

#### Other reinforcing requirements

There are a few other reinforcing requirements for foundation walls and footings:

- Stepped footings must have additional reinforcing in accordance with NZS 3604:2011 Figure 6.12 (see Figure 5).
- Where concrete or concrete masonry is against ground, reinforcing must have a minimum concrete cover of 75 mm.
- Openings larger than 300 mm in any direction must have one D12 trimming bar on each side of the opening, which must extend at least 600 mm past each corner of the opening. Where a lintel is less than 650 mm deep, the jamb trimming bars must be bent over 60 mm from the top of the concrete. ◀



**Figure 4**

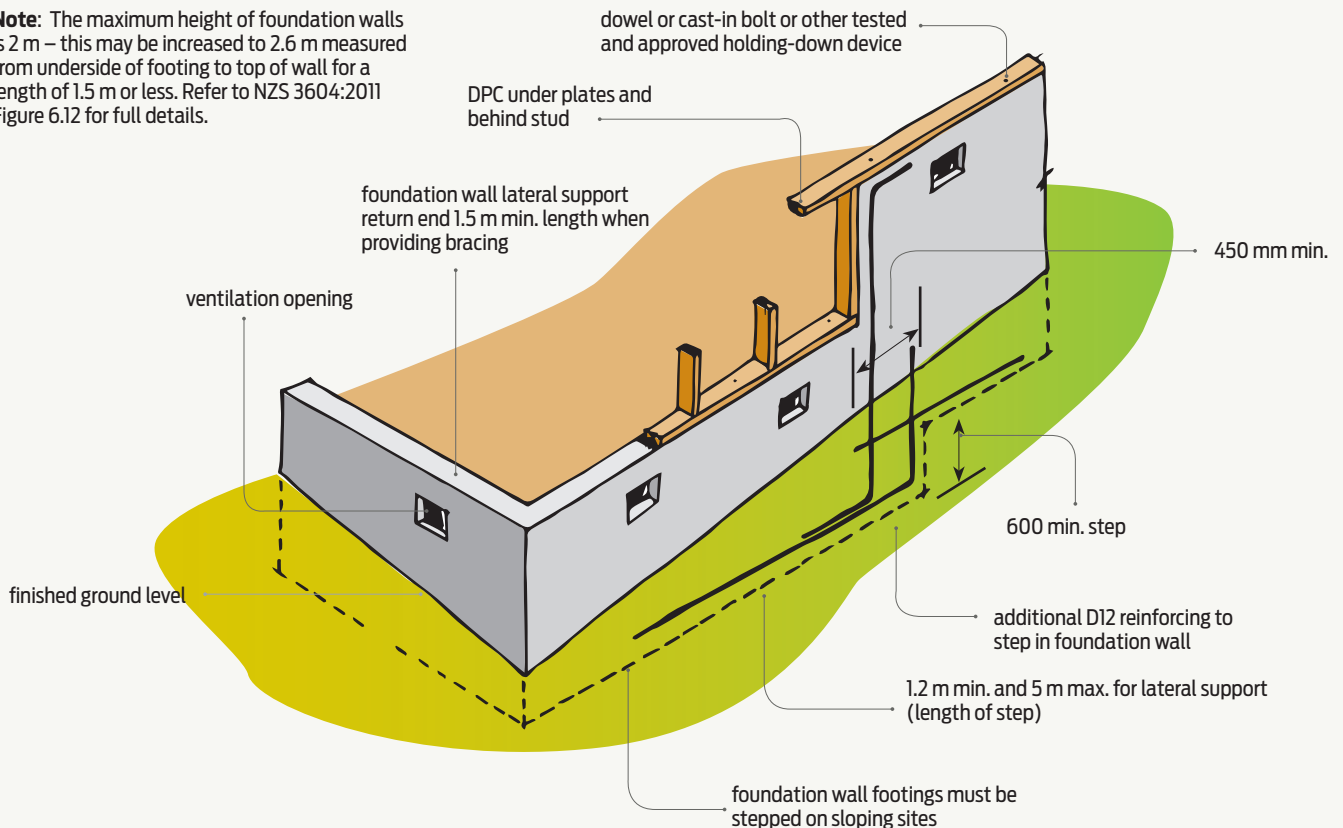
**Reinforcing for concrete masonry foundation edge detail for 1 or 2 storeys. This is an alternative insulated solution.**

**Table 2**

## REINFORCING FOR FOUNDATION WALL TO CONCRETE FLOOR SLAB

FOUNDATION EDGE DETAIL (SEE FIGURES 3 AND 4)	REINFORCING			
	FOOTING AT BASE OF WALL	HORIZONTAL IN TOP OF WALL	VERTICAL IN WALL	LAP (SLAB MESH AND FOOTING REINFORCING)
In situ concrete (1 or 2-storey)	2/D12	1/D12	R10 @ 600 mm crs (hooked around horizontal reinforcing)	400 mm
In situ concrete (1 or 2-storey supporting masonry veneer)	2/D12 (horizontal)	1/D12	R10 @ 600 mm crs (hooked around horizontal reinforcing)	400 mm
Concrete masonry (1-storey – 15 series masonry 2-storey – 20 series masonry)	2/D12 (placed horizontally side by side or stacked vertically)	1/D12	R10 @ 600 mm crs (hooked around horizontal reinforcing in footing in alternating directions)	400 mm
Concrete masonry (1 or 2-storey supporting masonry veneer)	2/D12 (horizontal)	1/D12	R10 @ 600 mm crs (hooked around horizontal reinforcing in footing in alternating directions)	400 mm

**Note:** The maximum height of foundation walls is 2 m – this may be increased to 2.6 m measured from underside of footing to top of wall for a length of 1.5 m or less. Refer to NZS 3604:2011 Figure 6.12 for full details.



**Figure 5** Reinforcing for stepped footings.