



Determination 2014/036

Regarding the compliance of building stability at 391E Karori Road, Wellington

1. The matter to be determined

- 1.1 This is a determination under Part 3 of the Building Act 2004¹ ('the Act') made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment ('the Ministry'), for and on behalf of the Chief Executive of the Ministry.
- 1.2 The parties to this determination are
 - P Dajnowski, the owner of 391E Karori Road, Wellington ('the applicant')
 - Wellington City Council, carrying out its duties and functions as a territorial authority or ('the authority').
- 1.3 The application for determination arises from concerns over potential land subsidence near the corner of the applicant's dwelling. This is very close to a steep bank on the boundary, which was present in its current form when the authority issued the building consent for the house in 1998 and the code compliance certificate in 2001.
- 1.4 The applicant is concerned about the ground stability and contends that more stabilising work to the site was required when the house was built.
- 1.5 I consider the matter to be determined² is whether or not the stability of the dwelling complies with the requirements of the Building Code that was current at the time the consent was issued. I note that issues of negligence or liability are outside the ambit of a determination.
- 1.6 In making my decision I have considered the submissions by the parties and the other evidence in this matter. The relevant Building Code clause is included in the Appendix.

2. The building, site and bank

- 2.1 The house was constructed for the applicant in 1998-1999. It is a light timber-framed weatherboard-clad dwelling with four bedrooms and an internal double garage. The roof is corrugated steel. The house is predominantly two-storey but reduces to a single storey at the double garage at the southern boundaries of the property.

¹ The Building Act, Building Code, Compliance Documents, past determinations and guidance documents issued by the Ministry are all available at www.dbh.govt.nz or by contacting the Ministry on 0800 242 243.

² Under section 177(1)(a) of the Act

- 2.2 According to the consented plans the foundations consist of a perimeter concrete beam a 'min 300mm below ground', a 100mm thick concrete slab-on-grade, with slab thickenings under load-bearing walls. The consent documents say 'All construction unless otherwise specified shall be in accordance with NZS 3604:1990'³. The consented plans make no reference to the ground falling away to the south of the property.

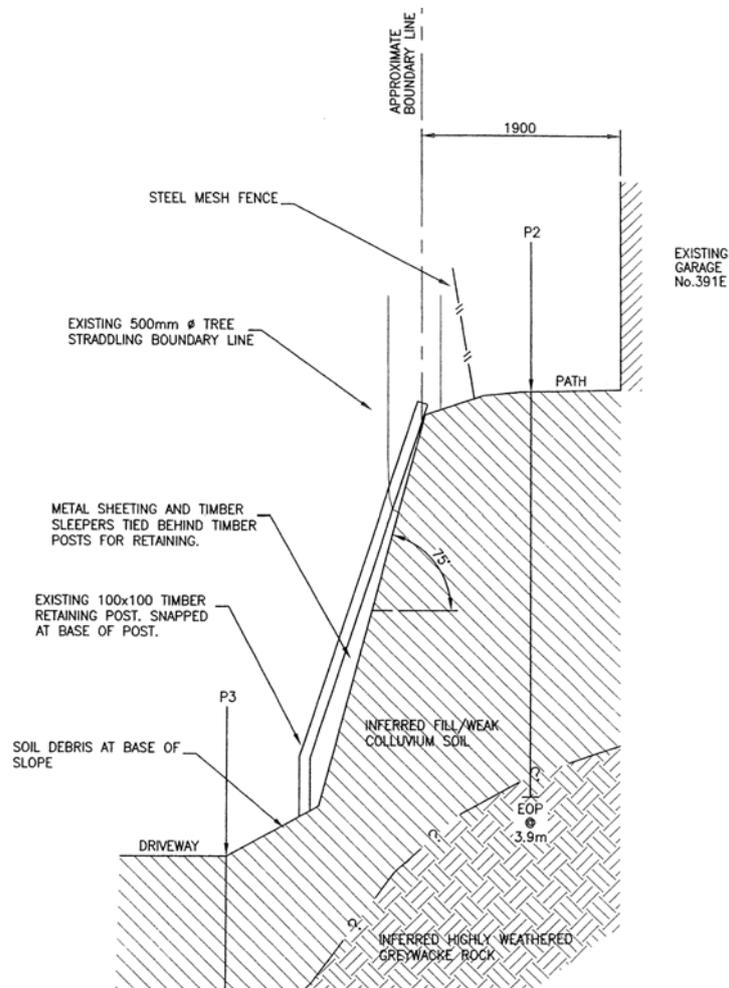


Figure 1: Section through bank to south west of garage

- 2.3 The consent documents include two Producer Statements - PS1 - Design: one is for seven steel beams supporting the upper level to the house, and the other is for alterations to the bracing schedule. Neither PS1 required specific site inspections by the engineer.
- 2.4 The site is a relatively flat subdivided section above Karori Road. The dwelling has been built at the rear (southern) of the section so that its back wall is approximately 3 metres from the site's southern boundary and its side wall (also the garage wall) is 1.9 metres from the western boundary.
- 2.5 A steep bank of up to approximately 3 to 4.5 metres in height and at approximately 70° to 80° to the horizontal⁴ runs along this western boundary, dropping down to the neighbouring property at 399 Karori Road (the neighbouring property), refer

³ New Zealand Standard NZS3604: Timber-framed buildings

⁴ As estimated by the second consultants in a letter to the applicant of 18 March 2013

Figure 1. The bank transitions to a steep slope towards the north and to a raised garden and leaning concrete wall at the corner of the boundary to the south (refer Figure 2).

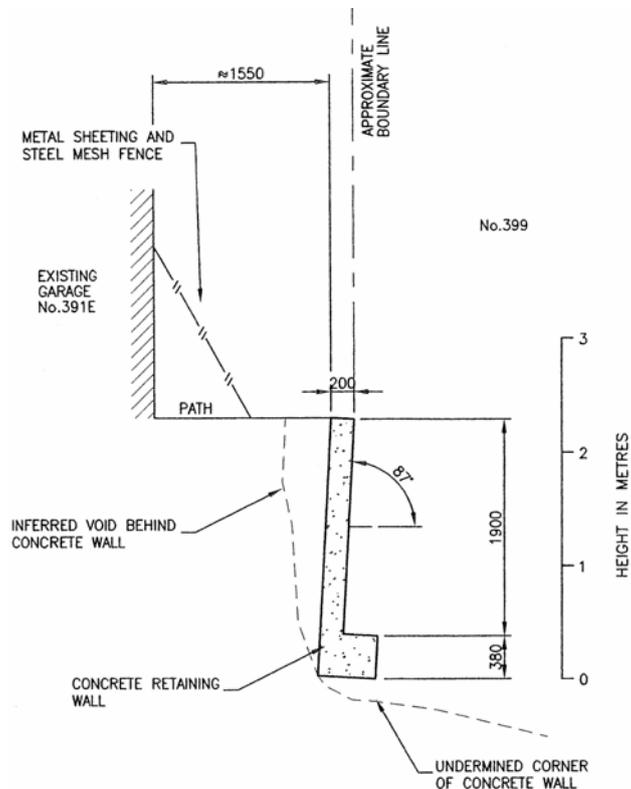


Figure 2: Section through bank to south east of garage

- 2.6 The top of the bank is primarily on the applicant's property and the rest of the bank is on the neighbouring property⁵. At its base is an informal parking area and driveway, which the applicant understands was created in the late 1960s/early 1970s when the neighbouring house was built.
- 2.7 The bank has exposed silty soil and some established vegetation, including mature trees. There are the remnants of retaining structures on part of the bank (wood and corrugated iron) but these are no longer functional; the structure would have provided some protection to the face of the bank even if it was not a retaining wall.

3. Background

- 3.1 On 13 January 1997 the authority issued building consent No 27202 to build the house.
- 3.2 On 8 September 1998, the authority carried out a foundation slab inspection and asked for additional piles⁶:

8.9.98: Footing is now dwelling ok to pour concrete. Told builder to install four pile holes to garage wall.

16.9.98: Slab to new dwelling all ok to pour concrete.

⁵ From a survey commissioned by the applicant in 2012

⁶ Authority's service request 27202: site inspection checklist and diary notes

- 3.3 The applicant understands the piles are ‘approximately 1.8 metres deep’ (refer paragraph 4.1.3).
- 3.4 On 8 March 2001 the authority issued a code compliance certificate for the house.
- 3.5 In early 2012 a potential buyer of the property brought a geotechnical engineer on site who identified potential problems with land subsidence and said the bank required stabilising.
- 3.6 On 31 August 2012 the applicant visited the authority for advice regarding the land subsidence and who was responsible. The authority said it was the responsibility of the land owners on whose land the subsidence had occurred (in this case, the owner of the neighbouring property).⁷
- 3.7 The authority also said this was a civil matter between the two parties and that its only function was to monitor the ongoing safety of the building and its occupants and adjoining property should the building fail. The authority advised that as the subsidence was less than 8 metres from the house the applicant should notify her insurer, lodge a claim with EQC and seek legal advice regarding her rights.
- 3.8 On 4 September 2012 the authority conducted a site visit⁸. From this it concluded:
- The applicant’s dwelling was close enough to the bank to have a surcharge on it.
 - There was no recent evidence of the bank having given way but there were indications of slow subsidence.
 - In the near future, new retaining work designed by a suitably qualified engineer should be installed and this would require a building consent.
- 3.9 The authority said:
- In the ordinary course of events’ (Building Act 2004 section 121), the building at No. 391 Karori Rd will become dangerous in the future as it will eventually be undermined as the bank on the boundary slowly subsides and becomes more unstable.
- 3.10 The authority wrote to the applicant on 13 September 2012 confirming its discussions with her (refer paragraph 3.6 and 3.7). It wrote again on 28 September 2012 summarising the conclusions from the site visit and said it had advised the neighbouring property owner to engage a geotechnical engineer to report on the best way to mitigate the ongoing subsidence.
- 3.11 The applicant commissioned engineering and surveying consultants (“the first consultants”) to survey the western boundary area and advise her on the land stability. The first consultants’ letter to the applicant dated 1 November 2012 said the top of the bank was “generally” on the boundary, the bank was generally in the neighbouring property, and the old “failed” retaining wall was wholly within that property.
- 3.12 The first consultants also said it would be a “very reasonable conclusion” to assume that: there was a surcharge on the bank from her house; the likelihood of the bank failing sometime in the future would therefore be quite high; and this would be highly likely to undermine the garage and affect the stability of the house itself.

⁷ Authority’s service request 263402 diary notes 31 August 2012

⁸ Authority’s service request 263402 diary notes 4 September 2012

- 3.13 The applicant then engaged a firm of consulting engineers (“the second consultants”) to determine what could be done to stabilise the land. The second consultants wrote to the applicant on 18 March 2013 to say that, based on a visual assessment only by its geotechnical engineer, it appeared the bank was excavated some time ago, was marginally stable, and that a slip would potentially undermine the garage foundations.
- 3.14 The second consultants also noted that constructing a retaining wall on the boundary would be difficult to achieve as space was limited and the existing slope would need to be excavated progressively.
- 3.15 On 9 August 2013 the second consultants provided the applicant with cost estimates, drawings and calculations for an engineered retaining wall and anchor support, which would largely be on the neighbouring property. These were drawn up after onsite testing to confirm the soil conditions.
- 3.16 On 9 December 2013 the applicant wrote to the authority noting her continued inability to sell the house because of the builder’s report (referred to in paragraph 3.5) and saying that the extra piles required by the authority’s inspector were “nowhere near” deep enough.
- There is also the question of why no engineer was required to be on site to do a report at the time of construction. I feel that the inspector at the time having had concerns about the stability of the ground should have required us to engage an engineer and have a full report done before continuing with the foundation wall.
- 3.17 On 20 December 2013 the authority wrote to the applicant saying the ‘boundary and landscaping issue’ was solely the responsibility of the property owners and it could not offer any further assistance.
- ... the officer who inspected your dwelling during construction acted according to the procedures of the time and showed an appropriate duty of care when undertaking the foundation inspections. None of the information I reviewed indicates that a different course of action should have been taken at the time.
- In addition it is clear from your engineer’s review that no subsidence has occurred to your home to date irrespective of the boundary retaining issues you have raised.
- 3.18 The application for determination was received on 20 February 2014.

4. Submissions

4.1 The initial submissions

- 4.1.1 In a covering letter to the application, the applicant said her concerns were:
- why the house was allowed to be built so close to the bank that it could put a surcharge on it;
 - why the authority’s inspectors at the time did not check the adjoining non-compliant retaining wall;
 - why the authority’s inspector did not order further investigations if he had concerns about the ground stability?
- 4.1.2 The applicant said that, due to what she considered to be negligence on behalf of the authority’s building inspector, she had been unable to sell her property until the problem was remedied.

4.1.3 The applicant contended that the cost of driving adequate piles at the time of building would have been substantially less and would have prevented the current problem arising, saying:

... obviously if inspector told builder to install four pile holes to garage wall he had concerns about the stability. If that was the case surely he should have ordered further investigations to determine how deep the foundations needed to be.

Builder installed four pile holes as requested and was given the okay to pour concrete on 16.9.98. We understand that these pile holes were approximately 1.8 metres deep which is nowhere near the 3.9 metres required to reach solid ground as determined by [the second consultants'] report.

... [The authority, and the first and second consultants] ... are all in agreement that it is only a matter of time before the stability of my house is undermined.

The [authority] also deemed it necessary to add this problem to my LIM Report, although [the manager Building Compliance and Consents] in a letter to me dated 20 December 2013 seems to be in disagreement with expert opinion.

4.1.4 The applicant provided copies of:

- plans for the building's floor joists and foundations of 30 December 1996
- the authority's site inspection checklist, inspection diary, and the Compliance Certificate (3 March 2001) for the building's construction
- photographs of the western bank taken on 18 September 2012
- the authority's service request of 31 August 2012 for the applicant's enquiry regarding potential land subsidence, diary notes of the same day, and diary notes from 4 September 2012 for its site inspection
- letters from the authority to the applicant dated 13 and 28 September 2013 regarding her enquiry, the advice given and concerns regarding land subsidence (including a copy of a letter sent to 399 Karori Road regarding land subsidence)
- letters from the first consultants to the applicant of 1 November 2012 and 28 March 2013 regarding its survey, ownership and responsibility for the bank
- letters from the second consultants of 18 March and 6 June 2013 regarding its assessment of the bank and a fee proposal, and detailed plans and a producer statement for a retaining wall design dated 9 August 2013
- letter from the applicant to the authority of 9 December 2013 regarding her continued concerns and the authority's response of 20 December 2013.

4.1.5 I subsequently requested and received a copy of the original building consent and associated documentation for the dwelling from the authority.

4.1.6 The authority did not make a submission in response to the application.

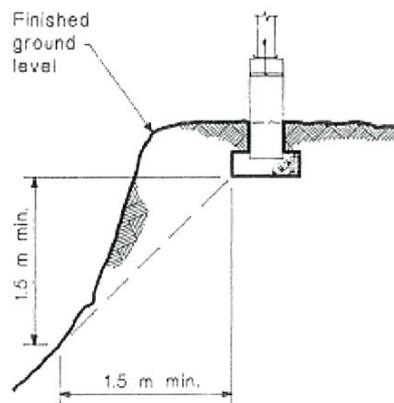
4.2 Submissions in response to the draft determination

4.2.1 A draft determination was issued to the parties for comment on 15 May 2014.

4.2.2 The authority did not accept the draft determination and set out its views in a letter dated 30 May 2014, saying in summary:

- The determination should be clear that the question of negligence is not something that can be addressed through the determination process.

- There is no information about how the retaining structures supporting different parts of the western and southern banks would have looked in 1997, and there are no records held by the authority that indicate the banks or their retaining structures were regarded as a cause of concern at that time. There is also no evidence that the minor frizzling or deterioration of the bank has been caused by the proximity of the house as opposed to changes caused by the maintenance or removal of vegetation.
- The determination does not consider NZS 3604:1990, which was a means of establishing compliance with Clause B1. The authority referred to Clause 3.1.1(c) and Figure 3.1 of NZS 3604:1990.

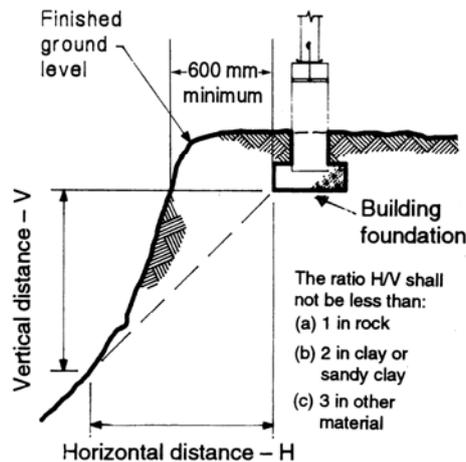


**Figure 3.1 'Relationship of foundation to sloping ground surface'
(from NZS 3604:1990)**

- The plans showed the building set back 2.2m from the western boundary and 3.3m from the southern boundary. The design complied with Clause 3.1.1(c) of NZS 3604:1990 which, amongst other things, required Figure 3.1 to be satisfied. In the absence of other evidence as to site instability, there would have been no reason for the authority to seek further information about site stability.
 - A concern about softness or bearing capacity of the ground would typically have been met by an on-site instruction to install additional piles and is distinct from concerns about the proximity to sloping ground. It cannot be inferred that the authority had concerns about the impact of the building on the stability of the bank.
 - There are no records that the authority or others had concerns about the stability of the site at the time the consent was sought. The authority would have been aware that the sloping ground adjacent to the site was 'at least partially retained, on both the western and southern boundaries.'
 - None of the current day assessments should affect the examination of the decision the authority made in 1997/1998. The determination should take into account the in-service performance of the building and the bank to date.
- 4.2.3 The applicant accepted the draft by email on 10 July 2014. The said it was 'difficult to accept the [authority's] suggestion that views as to the stability of the bank or whether the building of the house and garage placed a surcharge on it, may have been different in 1998/99'.

4.3 My response to the authority's submission

- 4.3.1 A foundation designed to NZS 3604:1990 assumed continuous support from the ground, and it cannot be expected that that consented foundation would span between 'four piles' requested by the building official. I do not accept that the piles were installed because soft ground had been encountered: soft ground is typically removed and replaced.



**Figure 3.1 'Relationship of foundation to sloping ground surface'
(from NZS 3604:1990, Amendment 1, 31 July 1992)**

- 4.3.2 The authority is of the view that the foundation satisfies Clause 3.1.1 and Figure 3.1 from NZS 3604:1990 (refer paragraph 4.2.2, 4th bullet). However, Figure 3.1 was amended in 31 July 1992 to that shown above. As piles were required by the authority, the ground under the foundations was unlikely to be considered rock at the time of inspection. Assuming the ground is at best 'clay or sand clay', the bottom of the foundation is to be supported on ground defined by a 1:2 line taken from the bottom of the foundation. At the time of construction I consider the bank did not provide this ground support.

5. Discussion

- 5.1 In considering whether or not the stability of the dwelling complies with the Building Code, I have also considered the information available to the authority at the time it made its decision to issue this consent.
- 5.2 The Objective of Building Code Clause B1 Structure that was in force at the time the consent was issued was to:
- safeguard people from injury caused by structural failure
 - safeguard people from loss of amenity caused by structural behaviour
 - protect other property from physical damage caused by structural failure.
- 5.3 The performance requirement of Clause B1.3.1 required that 'buildings, building elements and sitework shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives'. Clause B1.3.3 required account to be taken of all physical conditions likely to affect the stability of the building and sitework, including removal of support; and Clause B1.3.6 required sitework be carried out to provide stability for

construction on the site and avoid the likelihood of damage to other property. Clause B1.3.7 required sitework and associated supports to take account of the effects of ground loss and slumping.

- 5.4 I accept that the steep bank on the western boundary was close to its current state, aside from additional minor erosion and subsidence, when the applicant applied for building consent.
- 5.5 I am unable to determine from the original building consent documentation whether or not the authority was aware of the existence and nature of the bank before issuing the consent. The consent documentation showed the building platform as flat and made no reference to the bank, nor did it show anything other than what would be considered normal foundations for this building.
- 5.6 However, the presence of the bank would have been clear to the authority on inspection, and from the authority's inspection notes and instructions to the builder to install four piles, it appears the authority had some concerns about the stability of the ground once building work was underway (refer paragraph 3.2). I note that under the provisions set out in section 41(2)(a) of the Building Act 1991, the authority had the option in 1998 at the time of construction to cancel the building consent if it held the view that the proposed building work was not going to comply with the Building Code (I note that this provision does not exist under the current Act).
- 5.7 There is no confirmed information about the piles in terms of their exact location, material and/or reinforcement, diameter, and founding depth. The applicants are of the understanding that the piles were approximately 1.8 metres deep. Irrespective of the piles' depth, there is no information that shows how the perimeter foundation footing and the concrete slab was expected to perform to take account of the removal of ground beneath the foundation and/or the slab.
- 5.8 I have received no evidence of whether the building foundation has settled along its south and/or west side; however, in my view the four piles by themselves are not adequate to ensure the dwelling's stability over its lifetime given the proximity and nature of the bank on the southern and western boundaries. I accept the view of the first consultants that the likelihood of the bank failing in the future affecting the stability of the dwelling is 'quite high'; this is a view accepted by the authority given its advice to the applicant that the dwelling 'will become dangerous in the future' as the bank 'becomes more unstable'.
- 5.9 Based on the advice of the geotechnical professionals who have investigated this matter for the purpose of designing the rectification work, I conclude that the as-built foundations do not meet the objectives of Building Code Clause B1, as outlined above. Accordingly the building work does not comply with the provisions of the Building Code that were in force at the time the consent was issued.
- 5.10 The authority has advised the applicant that the dwelling is likely to become a dangerous building⁹ in time. However, I note there are mature trees on the bank currently providing some stability, there has been no significant subsidence to date by the authority's acknowledgement (refer paragraph 3.17), and the building's habitable areas are some distance from the bank (as the double garage is on the immediate corner).

⁹ In terms of section 124 of the Building Act

6. The decision

- 6.1 In accordance with section 188 of the Act, I hereby determine that the as-built foundations installed in 1998 under building consent No. 27202 along the western and southern sides of the dwelling do not comply with the Building Code that was in force at the time the consent was issued.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 18 August 2014.

John Gardiner
Manager Determinations and Assurance

Appendix A: The legislation

A.1 The relevant clause of the Building Code that was in force at the time the consent was issued is:

Clause B1—Structure

Provisions

Objective

B1.1 The objective of this provision is to:

- (a) safeguard people from injury caused by structural failure,
- (b) safeguard people from loss of amenity caused by structural behaviour, and
- (c) protect other property from physical damage caused by structural failure.

Functional requirement

B1.2 Buildings, building elements and sitework shall withstand the combination of loads that they are likely to experience during construction or alteration and throughout their lives.

Performance

B1.3.1 Buildings, building elements and sitework shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives.

B1.3.2 Buildings, building elements and sitework shall have a low probability of causing loss of amenity through undue deformation, vibratory response, degradation, or other physical characteristics throughout their lives, or during construction or alteration when the building is in use.

B1.3.3 Account shall be taken of all physical conditions likely to affect the stability of buildings, building elements and sitework, including:

- (a) Self-weight,
- (b) ...
- (r) Removal of support.

B1.3.6 Sitework, where necessary, shall be carried out to:

- (a) Provide stability for construction on the site, and
- (b) Avoid the likelihood of damage to other property.

B1.3.7 Any sitework and associated supports shall take account of the effects of:

...

- (c) Ground loss and slumping.