



Determination 2015/016

Regarding the compliance of repairs to a foundation slab of a house at 137 Centaurus Road, St Martins, Christchurch

1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 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 the determination are:
- the applicant, Fletcher Construction – Earthquake Recovery (Fletcher EQR), the Project Management Office established by the Earthquake Commission (EQC), (“the PMO”). The PMO is represented by a Chartered Professional Engineer who is deemed to be an LPB under the Act²
 - the owners of the house, G Trotter and D French (“the owners”), who are acting through an agent
 - Christchurch City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 This determination arises from repairs to the foundation slab of a house that were carried out as exempt building work by the PMO. The owner is in dispute with the PMO and holds the view that the work does not comply with the Building Code.
- 1.4 The matter to be determined³ is whether the foundation repairs comply with the Building Code to the extent required by the Act.
- 1.5 In this determination, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.
- 1.6 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Ministry to advise on this dispute (“the expert”), and the other evidence in this matter.

2. The building work

- 2.1 The building is located on a flat suburban site and is a two-storey timber framed house with brick cladding and a concrete tiled roof. The existing foundation system is a reinforced concrete floor supported on a grid of 100mm x 100mm square driven

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 Chartered Professional Engineers under the Chartered Professional Engineers of New Zealand Act 2002 are treated as if they were licensed in the building work licensing class Design 3 under the Building (Designation of Building Work Licensing Classes) Order 2010.

³ Under section 177(1)(a) of the Act.

concrete piles. The piles were installed on an approximate 3m x 3m grid and were designed to provide support to the load bearing walls and the reinforced concrete ground floor slab without having support from the underlying ground.

- 2.2 At the foundation perimeter the piles support the underside of a reinforced concrete strip foundation, while to the remainder of the floor the piles terminate at pile caps with the floor sitting on the cap. The ground floor slab within the perimeter was poured on no fines tailings ranging from 14mm to 20mm in size, with an estimated thickness of 250mm.
- 2.3 During the Canterbury earthquake sequence⁴ the site was subject to ground settlement induced by liquefaction. With the support offered by this system of piles, voids had formed at various locations under the ground bearing slab.
- 2.4 During reinstatement, substantial parts of the concrete floor slab were removed and the original polythene DPM⁵ was cut out and replaced. Voids under the damaged floor were filled by installing pourable grout directly over DPM up to the formation level of the new sections of the concrete floor slab.
- 2.5 Reinforcing starter bars were grouted into the remaining sections of the ground floor slab, reinforcing mesh installed, and the new slab placed.

3. Background

- 3.1 The building was constructed between 2004 and 2006 and the authority issued a code compliance certificate for the house on 20 December 2006.
- 3.2 In 2010/2011 the building was subject to a series of earthquakes and the ground around and below the house was subject to the effects of liquefaction. The ground surface settled in the order of 100mm to 200mm, and significant quantities of ejecta erupted onto the ground surface. The site is categorised as Foundation Technical Category TC2⁶.
- 3.3 In March 2013 the PMO began repairs and in April 2013 a consulting firm was engaged by the PMO to carry out a ground penetrating radar floor survey, which resulted in the identification of voids below the floor. I have not been provided with any formal surveyed floor levels taken of the house itself or garage.
- 3.4 The PMO developed a repair strategy which it decided was to be carried out as work exempt from the need for a building consent under Schedule 1(1)(a)⁷. The work was described in document 'Technical Correspondence TC 001', dated 15 May 2013, and signed by a senior engineer for the PMO ("the senior engineer"), as consisting of either:
 - a) the 'void fully under slab' option – filling the voids below the existing floor slab, or
 - b) the 'slab reconstruction' option – removing sections of the slab, filling the voids, and reconstructing the slab.

⁴ The Canterbury Earthquake Sequence includes the 'Darfield Earthquake' of 4 September 2010 with a moment magnitude of 7.1, followed by a series of aftershocks that included a 6.3 magnitude shake on 22 February 2011.

⁵ Damp proof membrane

⁶ In terms of the Ministry's foundation repair guidance (Minor to moderate land damage from liquefaction is possible in future large earthquakes)

⁷ Schedule 1 was replaced on 28 November 2013. All references to Schedule 1 in this determination refer to the Schedule current at the time the building work was carried out (refer Appendix A).

- 3.5 The reconstruction option, subject to an engineer confirming voids did not exist between pile caps and the underside of the slab, was described as including:
- Fill voids with 10mpa flowable grout concrete to under slab.
 - Reinstate DPC (*sic*), lap all joints 150mm min and tape.
 - Epoxy D10 starter rods at 600mm centres into the edge of the existing slab.
 - Tie SE82DE mesh chaired centrally in slab.
 - Reinstate new 20Mpa concrete slab
 - After 7 days grind junctions / surface where required.
- 3.6 A second document, titled 'Exempt Building work, file record', dated 15 May 2013 and also signed by the senior engineer, describes the building work only as 'filling of voids beneath a concrete floor slab'. No reference is made to structural floor removal and replacement, and the file record notes the work was to be carried out by an LBP under the supervision of a PMO engineer.
- 3.7 A site inspection record provided by the PMO, with two dates (14 May and 21 May 2013) and signed by the senior engineer, states 'work completed as per engineer's report'.
- 3.8 The repair work was completed in July 2013.
- 3.9 'Technical Correspondence TC 001' headed as "Revised methodology for sub-slab remediation" dated 21 October 2013 (which given the date of the document appears should be recorded as TC 002) and signed by the senior engineer, it was noted that the tailings below the slab had settled, but the DPM was intact but lying directly on the tailings. It was stated that the work scope was altered from removal of the DPM to leaving it in place and pouring the void-filling grout directly on top of the DPM. The reason cited for the change was that 'this avoids the possibility of imperfect taped joints in the DPM leading to damp ingress'. (I note here that although the date of this document is after the work was carried out, it incorrectly refers to the original DPM being left in place.)
- 3.10 In 'Technical Correspondence TC 003' dated 10 April 2014, the PMO acknowledges that the owner's photographs indicate that the original DPM was cut out, and states that either method would be acceptable with 'the important consideration being the existence of a continuous DPM between the new concrete slab and the subgrade.' 'Technical Correspondence TC 003' goes on to state that 'the slab pre-pour inspection was undertaken and [the PMO is] satisfied that the work contained in the engineering scope was carried out to an acceptable standard and complies with the Building Code.' Photos provided with this correspondence show the new DPM in position but no reinforcing (this appears in a later photograph).
- 3.11 In response to an enquiry by the owner, a Producer Statement – PS3 Construction, dated 9 July 2014 and signed by an LBP, was provided. No Producer Statement – PS4 Construction Review has been provided by the PMO.
- 3.12 The Ministry received an application for a determination on 10 June 2014.

4. The submissions

4.1 The PMO made no submission to support the application, but provided copies of the following documents:

- Technical Correspondence and photographs from the PMO.
- A report titled ‘ground penetrating radar foundation investigation’ from a consultant (refer paragraph 3.3).
- PMO file records, including an ‘exempt building work file record’ and a floor plan (undated and unsigned) marked up with levels to the house ranging from +2 to -12.
- A construction monitoring site inspection record, dated 14 May and 21 May 2013.
- Photographs of the cut slab and showing the new DPM in place.

4.2 In an email to the Ministry on 23 June 2014, the authority noted that while it was interested in applications such as this, as it did not involve a decision made by the authority it would not offer a substantial submission.

4.3 On 5 August 2014 I met with the owner and visited the site. Later that day the agent for the owner provided copies of the following documents:

- Correspondence from EQC to the owner, dated 26 May 2014, regarding the company names and LBP numbers of those involved in the repair work.
- Christchurch City Council form B-390 “Information for homeowners & building practitioners: Building work that does not require a building consent”, which notes that dwelling substructure repair or replacement may be considered for discretionary exemption by the authority under Schedule 1(k).
- Photographs taken by the owner of the repair work in progress and of doors that are not properly aligned.
- Sections 17 and 112, and Schedule 1 of the Act (as at 5 August 2013)
- Technical correspondence from the PMO

4.4 The owners also provided a submission setting out their view of the matter as follows (in summary):

- A substantial portion of the ground floor slab was removed and replaced; this work is not exempt under Schedule 1. The work required building consent from the authority, which would have included the necessary inspections.
- There has been a lack of appropriate engineering design, supervision and sign-off: the work was not carried out by an LBP; there is no evidence it was supervised by an engineer; there is no record of a pre-pour inspection to confirm the new DPM was taped correctly; inaccuracies in the technical correspondence indicate inspections were not carried out.
- Documentation from the PMO was inconsistent and inaccurate. The relevant producer statements were not provided.

- The PMO has failed to provide evidence of compliance with the Building Code and with NZS 3604⁸, in particular with respect to:
 - grout infill to voids under all load bearing walls
 - correct compaction of the granular hard fill
 - correct installation of the DPM and its lapping to the original membrane.
 - If the original DPM was intact as stated in the PMO’s technical correspondence, why was it removed?
 - There has been continuous movement of a number of load bearing wall frames.
- 4.5 The owners noted failures of workmanship, quality, materials, project management contractual issues, and evidence of property damage. I note that these are matters that are outside those that can be determined by me under the Act.
- 4.6 Subsequent to the site visit, I requested further information from the PMO. In a response by email on 13 August 2014, the PMO advised:
- The original geotechnical report (dated 8 November 2002) indicates soft ground to approximately 3.6m deep.
 - A floor level survey was produced prior to the repair works being carried out with the maximum level difference in level being 14mm. If the piles had settled, a greater difference in levels and more damage would have been expected: these factors indicated that a geotechnical investigation was not required.
 - An investigation hole was formed to inspect the connection between the piles caps and the load bearing walls. The piles had not settled below the load bearing wall; the piles had not sustained damage and could still be relied on for support.
 - The under-slab voids resulted from settlement of the hardfill beneath the slab. The most effective way to fill the voids was to remove the internal slab, fill the voids and recast a new concrete slab on top of the existing pile caps, with the DPM replaced if this was considered necessary.
 - The original slab was designed to span between the pile caps. The tailings acted as permanent formwork during the original slab construction. Movement of the tailings away from the slab caused “drumminess” but was not a critical structural weakness in the slab itself.
 - The internal portions of the slab itself do not contribute to the structural stability of the main load bearing elements of the dwelling.
 - The replaced section of the internal slab is not a substantial replacement of a structural component or system and therefore considers the repair was exempt from requiring a building consent under Schedule 1(1).
- 4.7 On 6 August 2014 the PMO provided a Producer statement PS 3 – Construction from the main contractor for the repairs, dated 9 July 2014 and signed by an LBP. (I note that the date of the PS3 is approximately 12 months after the work was completed and after the date the determination was applied for.)
- 4.8 The agent for the owner provided further photographs by email on 12 August 2014.

⁸ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

4.9 Submissions in response to the draft determination

4.10 A draft determination was issued to the parties for comment on 4 February 2015.

The authority

4.11 The authority responded on 16 February 2015, requesting that the determination outline what should happen next. The authority noted that a building consent or a decision by the authority to exempt the building work from consent under its discretionary powers set out in Schedule 1 are not able to be granted retrospectively. The authority is of the view that an application for a certificate of acceptance should be submitted for its consideration, with reference in that application to this determination.

4.12 In response to the authority's submission I acknowledge that building consent for this work cannot be sought retrospectively, and that a certificate of acceptance is appropriate in such circumstances.

The PMO

4.13 The PMO provided a submission dated 18 February 2015 in response to the draft. In regards to comments in the expert's report (refer paragraph 5.5), the PMO submitted that references to the timeframes and the PMO's quality assurance process 'do not have any bearing in the matter to be determined', and said that:

- the expert was not engaged to comment on the quality assurance process. The expert did not consult the PMO about timeframes or issues with the PMO's quality systems
- 'additional record keeping and documentation on EQR systems are available on request should they be needed'.

4.14 The PMO further submitted that:

- The initial post-earthquake inspections showed no signs of differential settlement that would indicate damage to the piled foundations. No signs or indications of damage to the piles were found during the repair works.
- The repair strategy, 'regardless of land classification outside of the red zone, is based upon actual earthquake related damage to the structure itself.'
- The owners' queries about subfloor voids were addressed when a ground penetration survey was commissioned; the results indicated the tailings below the internal slab had settled.
- The repair strategy was to fill the voids by removing the floor slab. Although the construction methodology may have changed, the repair solution did not. The actual void depth was found to be greater than that indicated by the ground penetrating radar survey.
- The minimal earthquake related damage to the structure observed at the initial scoping stage did not call for an initial engineering report. Engineering advice was sought 'once the extent of the underslab voids was discovered'.

4.15 In regards to the contribution of the floor slab to the structure as a whole, the PMO submitted that it disagreed with the determination in that:

1. The floor slab is simply supported on the internal piles. Its function is to support internal superimposed dead and live loads. The original design does not rely on the internal slab to support the dwelling's primary load bearing structure. The

perimeter walls are supported on a reinforced concrete foundation beam which is in turn supported on separate piles.

2. The as-built record drawings show the internal floor slab is connected to the perimeter foundation beam using D10 floor ties at 800mm centers (sic). There is a layer of DPM between the slab and perimeter foundation beam. We do not believe the design of this internal slab acted adequately as a diaphragm as indicated in the draft determination. We do accept that the slab will contribute to the structural integrity of the building to some degree however we do not believe it's a critical structural component of this structure[']s primary load resisting paths.

It is noted that the plans prepared by the PMO for the repair work do not show the configuration of the foundation beam and slab as described above.

4.16 In response to the PMO's submission I note the following:

- The expert's findings are based on the information the expert had before him at the time. The expert's report was sent to the parties for comment on 3 November 2015. The PMO made no specific submission in response to the report, nor did it provide any evidence to counter the expert's view. The PMO has elected to offer this information advice 'on request' rather than provide it.
- I note the owners have been seeking advice about the quality assurance processes used by the PMO to carry out the building work in the period since the work was carried.
- The provision of relevant documentation is important in establishing how and whether compliance has been achieved. Such records are fundamental to determining the likely compliance of building elements that are now hidden: greater confidence can be taken from a well-documented process than from a process that is lacking in information. Poor documentation can indicate areas that require further assessment in order to establish compliance.
- I do not accept that the floor slab takes only gravity loads. The two-storey structure has heavy wall and roof claddings. The floor slab will have an in-plane component to resist lateral earthquake loads that impact on the slab from the upper levels. The floor slab has no moment-resisting frame or similar to resist in-plane loads.

The owners

4.17 The owners provided a submission in response the draft on 20 February 2015, noting some typographical errors that have since been amended. The owners commented on the lack of assurance from the PMO on the adequacy of the repair works, and submitted that:

- The determination should not find that the work complies with the Building Code as the assessment was a visual inspection only and the expert's view was on the balance of probabilities and concluded only that the work 'most likely' complied.
- The owners believe the determination conclusion should be that compliance cannot be reasonably assured, and a recommendation for further engineer lead investigation and consented remedial works to be carried out.

4.18 In response to the owners' submission, I consider sufficient information has been provided to enable a reasonable grounds decision to be made. The owners have not provided any technical evidence that contradicts that view.

4.19 I have amended the determination as I consider appropriate.

5. The expert's report

5.1 As stated in paragraph 1.6, I commissioned an independent expert who is a Chartered Professional Engineer with expertise in geotechnical engineering to assess the method of repair given the nature of the land on which the house is located. The expert carried out a site visit on 17 September 2014 and provided a report on 3 November 2014. The expert's report was forwarded to the parties on 3 November.

5.2 The expert described the existing building and the repair work that had been carried out. I have included that information in paragraph 2.

5.3 In regards to the original construction the expert noted:

- No records were provided showing that deep soils investigations were carried out for the pile design, nor were there any records provided indicating the actual pile depths achieved during construction.
- The foundation was likely piled because of soft or loose soils present near the ground surface.
- The hardfill materials below the concrete floor were commonly used prior to the earthquake sequence.

5.4 The expert noted that the calculated settlements from liquefaction performance exceeds that of its TC2 classification and that deep soil testing of adjacent properties also indicates that a TC3 classification would be more appropriate. However, the expert observed that the piles appeared to have been effective in protecting the house superstructure from settlement following liquefaction, with no obvious differential settlement of the house exterior.

5.5 The expert made the following comments regarding documentation of the repairs:

Documentation of the physical works some months after apparent completion raises concerns about record accuracy and the basis of the written documents.

The available documentation suggests that the work was likely carried out without consideration of:

- Whether the observed land performance suggested that a TC3 classification was more appropriate; and therefore warranted more detailed consideration of the repair design and inputs as required under [the Ministry's foundation repair guidance].
- Whether the owners' claims that land settlement had led to subfloor voids should be investigated prior to starting physical works.
- Whether the piles experienced additional vertical load from negative skin friction⁹ as a result of land settlement that could have compromised the piles capacity to carry future drag loads in the event of liquefaction; and therefore, specialist geotechnical advice should be obtained.

... the quality management documentation of the repair process from conception to final sign-off [those available to the expert at the time of writing his report] would not meet even the basic requirements of a quality management system and as such does not form a sound basis for confirming code compliance.

5.6 Given the change in repair methodology from simple subfloor void filling to replacement of sections of the reinforced concrete floor, and that the piles could have

⁹ The friction on the pile shaft generated by the foundation soils settling down around the pile as a result of liquefaction, placing further load onto the pile in addition to the house loads.

been overloaded and damaged, the expert was of the view that an application for building consent would have been preferable in this case.

5.7 In regards to the compliance of the repair work the expert noted:

- Evidence that the repairs did not comply with the Building Code would present itself as on-going settlement of the house or moisture ingress up through the floor.
- There were no indications of moisture entering the under-floor area through a compromised DPM or structural distress that could be readily attributed to the repaired area not performing satisfactorily.
- A photo shows a large area of reinforcing over what appears to be a concrete surface underneath the reinforcing rather than the DPM. What is visible below the reinforcing may be the void-filling grout placed on top of the DPM as referenced in the PMO's correspondence dated 21 October 2013.
- While the piles are likely to be more highly loaded in compression than before the earthquake sequence, there does not appear to have been any consequential settlement.

5.8 Referring to the owners' concerns, the expert commented as follows:

- The gap between sliding doors between the dining and living rooms seemed more likely to be due to misalignment of one or other doors hanging from runner rails above the doors. The architrave above the door visually appeared level, and there was no cracking in the walls to suggest sagging of the door frame.
- An accurate level survey may discern whether the issues with the ground floor toilet door and level one bathroom door are as a result of the respective floors no longer being level.
- If the repaired concrete floor was left only two weeks to cure before the floor coverings were replaced, as stated by the owner, this would seem too short a time for moisture in the concrete itself to dissipate before being covered.

6. Discussion

6.1 Is the repair work code compliant?

- 6.1.1 The repair methodology adopted by the PMO included filling the void under the ground floor slab, plus the reconstruction of a substantial portion of the slab. From the expert's report it appears that apart from development of the sub-floor voids, there was no structural damage to the original ground floor slab that necessitated the reconstruction of the slab.
- 6.1.2 I note that the original floor design relies on the slab's ability to support loads whilst spanning continuously between piles.
- 6.1.3 I accept the expert's opinion that there is no evidence of on-going settlement of the house or related structural distress, and I consider the repair to the ground floor slab satisfies Clause B1 of the Building Code.
- 6.1.4 I also accept the expert's comments regarding the inadequate documentation for the repair work (refer paragraph 5.5). The compliance of the repair does not turn on the standard of the documentation, however, documentation that fully records what was

done and verifies the proper completion of the completed work will assist in providing confidence about the compliance of repairs.

6.2 The DPM

- 6.2.1 The owner has concerns regarding the construction of the repairs and in particular how the new DPM has been installed. The expert observed no moisture issues relating to the repaired slab, and no specific matters of non-compliance where moisture is entering the building through the repaired slab have been brought to my attention by the owner.
- 6.2.2 The repair has experienced two winters and several periods of flooding. A significant area of the ground floor is covered by vinyl, and there does not appear to be any evidence that the adhesion of the vinyl to the concrete slab has been affected by the moisture coming through the slab.
- 6.2.3 There is no evidence to show that the DPM is not performing satisfactorily and I conclude that the repair of the floor slab satisfies Clause E2 of the Building Code.

6.3 Was a consent required for the repair work?

- 6.3.1 Work that can be undertaken without an owner first obtaining a building consent is described in Schedule 1 of the Act. Schedule 1 that was in force at the time the repair work was undertaken is shown in Appendix A.
- 6.3.2 Determinations 2013/058¹⁰ and 2013/071¹¹ have considered repair work to foundations in Christchurch and the application of Schedule 1, and both determinations are also referred to in the Ministry's published guidance on work that does not require consent¹².
- 6.3.3 It is accepted that the repair of the floor slab itself by reconstructing parts of it on a 'like-for-like' basis is 'comparable' in terms of being in the same location, performing a similar function, and using similar materials as that which existed previously. However, in terms of complexity, the slab was part of a specifically engineered design for the site, and the slab was designed to span between the pile caps: in my view verification was required to determine that the reconstructed slab will continue to perform as intended under the original design.
- 6.3.4 The foundation is an assembly that contributes to the building's structural behaviour. An exemption under Schedule 1(a) only applies if the building work is 'not substantial or complete' replacement, and so the question is whether or not the repair work to the concrete slab in this case constitutes a 'substantial' replacement. It is noted that irrespective of whether the replacement foundation is substantial or not, the Building Act requires all work to comply with the Building Code whether or not consent is required for that work.
- 6.3.5 'Substantial' has a broad interpretation and can be measured quantitatively and/or qualitatively, and account must be taken of the specific circumstances when applying the guidance to an individual building. When the test is based on a quantitative

¹⁰ Determination 2013/058: Regarding the authority's exercise of its powers of decision in respect a notice to fix issued for work done under Schedule 1(a) and

¹¹ Determination 2013/071: The compliance of proposed repairs to an earthquake-damaged foundation including partial replacement of a concrete perimeter foundation wall

¹² Building work that does not require a building consent, Third edition, March 2014

analysis, there will be a threshold at which point the amount of the component or assembly being replaced is considered substantial.

- 6.3.6 In this instance most of the ground floor slab that was not located under loadbearing walls and built-in cabinetry has been removed and replaced. This represents a substantial replacement of the slab in quantitative terms.
- 6.3.7 In respect of qualitative terms, while the building is located on land designated as TC2, the expert considered the degree of ground settlement on the property indicated that a TC3 classification was more appropriate. The expert noted a lack of information gathered, or recorded in relation to the ground for the original foundation design, and installation for the piles themselves. It would appear a detailed analysis of the land and building was required before the repair solution could be arrived at. Once this analysis and the design of the repair solution had been completed a decision should then have been made about the regulatory basis on which the work was to be performed.
- 6.3.8 While the PMO says that engineering advice was sought once the extent of the underslab voids was known, I consider an assessment of the land damage would have better informed the PMO of this likely scenario. I have not seen the engineering advice the PMO refers to (refer paragraph 4.14).
- 6.3.9 It is noted that Determination 2013/071 considered a foundation that was not supporting the building as a whole, however, in my view that is not the case here. The ground floor slab contributes to the structure of the building by transferring gravity loads to the piles but it also acts as diaphragm providing stability to the structure and as a whole.
- 6.3.10 Given the nature of the land and the building, and the specific engineering design that the original foundations required, I consider the repair work was also a substantial replacement of the slab in qualitative terms.
- 6.3.11 In my view the repair was work that required a building consent, or for which approval could have been sought for an exemption under Schedule 1(k).

7. The decision

- 7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the foundation repairs comply with the Building Code to the extent required by the Act.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 29 April 2015.

John Gardiner
Manager Determinations and Assurance

Appendix A

A.1 Schedule 1 Exempt building work (current at the time the building work was carried out)

1 A building consent is not required for the following building work:

(a) any lawful repair and maintenance using comparable materials, or replacement with a comparable component or assembly in the same position, of any component or assembly incorporated or associated with a building, including all lawful repair and maintenance of that nature that is carried out in accordance with the Plumbers, Gasfitters, and Drainlayers Act 2006, except—

...

(ii) complete or substantial replacement of any component or assembly contributing to the building's structural behaviour or fire-safety properties; or

...

(k) any other building work in respect of which the territorial authority (or, as the case requires, the regional authority) considers that a building consent is not necessary for the purposes of this Act because that building work—

(i) is unlikely to be carried out otherwise than in accordance with the building code; or

(ii) if carried out otherwise than in accordance with the building code, is unlikely to endanger people or any building, whether on the same land or on other property: