Department of Building and Housing
Te Tari Kaupapa Whare

Determination 2008/112

Refusal to amend a building consent for a house currently under construction at 131 Redoubt Road, Manukau City

1. The matters to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("the Act") made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing ("the Department"), for and on behalf of the Chief Executive of that Department. The applicants are the owners of the property, U and J Mahammed ("the applicants") and the other party is the Manukau City Council ("the authority") carrying out its duties and functions as a territorial authority or building consent authority.

1.2 This determination arises from the decision of the authority to refuse to issue an amendment to a consent for a house under construction because it was not satisfied that the alternative roof tile being proposed would result in the house meeting the requirements of Clause E2 External Moisture, and Clause B2 Durability of the Building Code[2] (Schedule 1, Building Regulations 1992).

[1] The Building Act 2004 is available from the Department's website at www.dbh.govt.nz.
[2] The Building Code is available from the Department's website at www.dbh.govt.nz.

1.3 I therefore consider that the matters for determination are:

- whether the authority was correct in refusing to amend the building consent.
- whether the roof as installed complies with the Building Code. By "the roof as installed" I mean the components of the systems (such as the various tiles types, the fastening, flashings, and mortar) as well as the way the components have been installed and work together.

1.4 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute ("the expert"), and the other evidence in this matter. I have evaluated the information on the roof claddings using a framework that I describe more fully in paragraph 6.1.

1.5 In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

2. The building work

2.1 The building work consists of a reasonably large two story detached house with monolithic and brick wall claddings. Construction is concrete foundations and floor slab with light timber frame construction with isolated structural steel beams and posts. The house is set on a slightly sloping site below the top of a rise and is in a medium/high wind zone for the purposes of NZS 3604[3].

2.2 The roof is in two levels. The upper level appears to be complete while the lower level is incomplete.

2.3 The roof cladding is ceramic tiling which is installed at a 25^{o} pitch. The tiles have 40mm overlaps and are installed over 1.5mm thick heavyweight bitumen impregnated paper laid across 50mm x 50mm timber battens on the roof trusses. The paper laps are 150mm which complies with E2/AS1.

3. Background

3.1 The authority issued a building consent (No. 070279A3) which I have not seen, for the house. The house as consented was to have been roofed with concrete tiles.

3.2 In May 2008 the builder applied for an amendment to the consent. The application was to use clay tiles instead of the concrete tiles specified in the consent. For reasons which are not entirely clear to me, but which arose because the authority has concerns about the tiles, communications between the parties were not effective and the roof was installed using clay tiles without an amendment to the consent being approved. Work on the house has now ceased until this matter is resolved.

3.3 The authority advised it would not carry out any further inspections until the tiles were removed and issued a notice to fix requiring the applicant to:

[3] New Zealand Standard NZS 3604:1999 Timber Framed Buildings

Remove the un-consented building work and continue construction work in accordance with the approved consent.

3.4 The Department received an application for a determination on 14 May 2008.

4. The submissions

4.1 The applicant forwarded a written submission outlining what had occurred and submitted copies of

- the notice to fix
- correspondence between the parties
- the Notice of Acceptance of the tiles in Dade County, Florida
- a copy of test results carried out by a consultant
- the manufacturers details.

4.2 Copies of the submissions and other evidence were provided to each of the parties.

4.3 The draft determination was issued to the parties and the builder for comment on 13 October 2008.

4.4 Both parties accepted the draft determination without comment (the authority's response was not received until 14 November).

5. The expert's report

5.1 As discussed in paragraph 1.4, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination. The expert is a member of the New Zealand Institute of Architects specialising in building surveying. The expert inspected the house on 25 September and furnished a report that was completed on 30 September 2008.

5.2 The expert inspected most of the rooms, the roofs, and much of the main roof space but did not see any water stains, mould or other clear evidence of external moisture penetration.

5.3 The expert noted that:

- there were isolated tears and cuts to the paper at various locations and what appeared to be unsatisfactory repairs
- the tiles were fixed with one nail each. The battens and fixing were in accordance with Clause 3.10.2 of NZS4206[4]. However there were some areas where the fixing was clearly unsatisfactory. The eaves tiles were cut and not nailed, and pointed with weak, roughly applied mortar
- hips and ridges had half round tile fittings which if well mortared would be adequate. However the mortar application was poor with cracks and voids

[4] New Zealand Standard NZS4206: Concrete Interlocking Roof Tiles

- the valleys either side of the north entrance roof were inspected. These appeared to be inadequate as the underlay was turned up over the valley flashing. Cut tiles either side of the valleys were fixed using silicone sealant in some places
- the standard of workmanship was poor, and incomplete at various eaves, valleys, hips and at junctions with decks. The lower roof had some broken tiles and inadequate flashing.

5.4 A copy of the expert's report was provided to the parties for comment on 1 October 2008.

6. Evaluation for code compliance

6.1 Evaluation framework

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions[5], which will assist in determining whether the features of this house are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add one or more other provisions to compensate for that in order to comply with the Building Code.

6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing.

7. Discussion

7.1 Part of the reason the authority declined the amendment to the consent was that the tiles were imported and the authority was not sure that the roof would meet Clause E2 of the Code if it was clad with these tiles. I have discussed the tiles in the following paragraphs.

7.2 The roof tiles which are the subject of the determination are categorised in E2/AS1 8.2. "Masonry Tiles" and conform to 8.2.1.1 (a) Type 1 profile. Masonry Tiles include concrete and clay (ceramic) tiles. The subject tiles are glazed ceramic and appear to have been fired at a high temperature.

[5] An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way (but not the only way) of complying with the Building Code. The Acceptable Solutions are available from The Department's Website at www.dbh.govt.nz.

7.3 E2/AS1 lists installation requirements including minimum pitches for masonry roof tiles which should comply with AS 2049[6]. This Standard lists eight tests that can be applied to tiles.

- Three tests relate to dimensional consistency and strength i.e. characteristics which may affect weathertightness.
- Four tests are more directed to concrete tiles and do not obviously apply to clay tiles. However the supplier of these tiles has submitted test results, from a New Zealand laboratory, of an absorption test and transverse breaking strength test. This showed the moisture absorption to be 3% as compared to a maximum limit of 10%, and mean breaking strength to be 4.7 kN compared to the minimum requirement of 1.0 kN.

7.4 The final test, AS 4046.9[7], is a dynamic watertightness test which is specifically to test resistance to rain. As the tiles have not been subject to this test I have considered the demonstrated performance of the tiles as installed on this roof and comparison of weathertightness of these tiles compared with the consented concrete tiles.

7.5 To date the roof appears to have met the requirements of Clause E2 of the Building Code as there are no signs of leaks over a period of about 6 months. I note this included a period of severe weather conditions.

7.6 A sample supplied to the Department, which I believe to be representative of these tiles, demonstrates adequate strength to withstand foot traffic.

7.7 E2/AS1 also cites AS 2050[8]. AS 2050 describes fastening requirements for the tiles based upon wind loading. This house, located in suburban Auckland, is in a wind classification zone 'N1' (refer AS 2050, Table 3). The minimum mechanical fastening requirements for this wind classification is taken from AS 2050, Table 4 which says:

> Mechanically fasten each full tile in second course and then every second tile in every course or every tile in each alternate course.

7.8 The expert observed that each tile is fastened with one nail per tile in each course. This is at least equivalent to the fastening requirements described in AS 2050.

7.9 Table 10 of E2/AS1 gives requirements for installation at various pitch angles. Tiles installed at 25^{o} do not require an underlay. In the case of this house the roof angle is 25^{o} and a heavy duty black paper roof underlay has also been installed. This is an additional protection (or a compensating feature) to the solution described in E2/AS1.

7.10 The manufacturer's requirement for the tile overlap for this roof pitch is 30 to 35mm, as installed the overlap is 40mm.

7.11 In addition the roof must also meet the durability requirements of Clause B2 and remain watertight for at least 15 years. As ceramic tiles, even without glazing, have

[6] Australian Standard AS 2049: 2002 Roof Tiles
[7] Australian Standard AS 4046.9 Method 9 Determination of dynamic weather resistance
[8] Australian Standard AS 2050: 2002 Installation of Roof Tiles

demonstrated much longer lives than this in many environments, I consider this roof could comply with Clause B2.

7.12 However, I consider that with the installation defects noted in the expert's report the roof is unlikely to meet the Code requirements for this period. I conclude that remedial work is necessary in respect of the items listed in paragraph 5.3.

7.13 I have consequently come to the view that if these tiles are installed on the house in accordance with good trade practice and the supplier's instructions, the roof will comply with the Building Code.

8. What is to be done now

8.1 The authority should issue an amended building consent showing the use of clay tiles as installed in accord with the application for the amendment.

8.2 A new notice to fix should then be issued that requires the owner to bring the house into compliance with the Building Code, identifying items listed in paragraph 5.3. This should also refer to any further defects that might be discovered in the course of investigation and rectification. It is not for the notice to fix to stipulate directly how the defects are to be remedied and the house brought into compliance with the Building Code. That is a matter for the owner to propose and for the authority to accept or reject.

8.3 I would suggest that the parties adopt the following process to meet the requirements of paragraph 5.3. Initially the authority should issue the new notice to fix. The owner should then produce a response to this in the form of a detailed proposal, produced in conjunction with a competent person as to the rectification or otherwise of the specified issues. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

9. The decision

9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that if the roof tiles on this house are installed in accordance with good trade practice and the supplier's instructions, the roof will comply with the Building Code. Accordingly, I reverse the authority's decision to refuse to amend the building consent.

9.2 However, I also determine that, with the roof in the condition as currently installed, the building does not comply with Clause B2 of the Building Code.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 4 December 2008.

John Gardiner
Manager Determinations