Determination 2008/6

Fire precautions in the conversion of household units to an early childhood centre at 30 Heather Street, Parnell, Auckland

1 The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004 ("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 the Department. The applicant is the New Zealand Fire Service ("the Fire Service"). The other parties are S.V.B.K. Holdings Ltd ("the owner"), which is the registered proprietor of the stratum estate in one of the units concerned, each of the proprietors of other units in the building ("the other unit-title holders"), and the Auckland City Council ("the territorial authority").

1.2 The application arises from the issuing of a certificate of acceptance by the territorial authority in respect of certain alterations to the building that were made without building consent for the purpose of changing the use of two floors of the building from household units to an early childhood centre.

1.3 I take the view that the matters to be determined are:

(a) the territorial authority's decision to issue a certificate of acceptance

(b) the territorial authority's decision to give notice under section 115 (in the form of the certificate of acceptance) to the effect that the building may be used as an early childhood centre)

(c) whether the building, if used as an early childhood centre, would comply as nearly as is reasonably practicable with the provisions of the Building Code for means of escape from fire.

1.4 In making my decision I have not considered any other aspects of the Act or the Building Code. 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 and the sequence of events

2.1 The building is on a sloping site and has two levels of basement car parks and four upper levels containing 21 household units. The car parks and the lower two levels of household units are of concrete construction, the two uppermost levels are of timber frame construction. The building has a type 4 fire alarm (automatic fire alarm system with smoke detectors and manual call points) and is served by two stairways and a lift. The escape height (see paragraph 3.3) from the top floor is 9.2 m.

2.2 The building was apparently erected as an office building in 1991, and converted to residential apartments in 1999. In 2004 the two uppermost floors (levels 5 and 6) were added and the building was subdivided under the Unit Titles Act 1972. The general layout of the building is shown in figures 1 and 2 below.

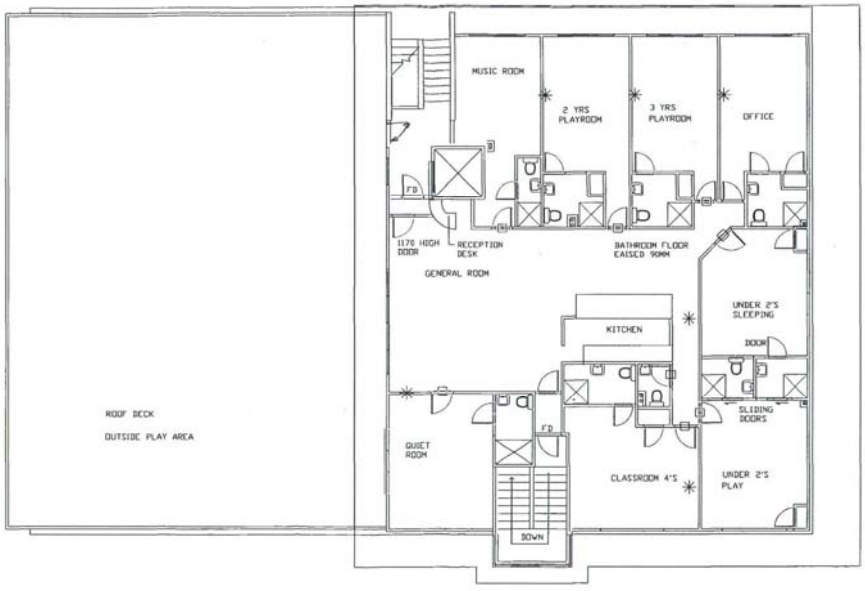

Figure 1: Floor plan of Level 6

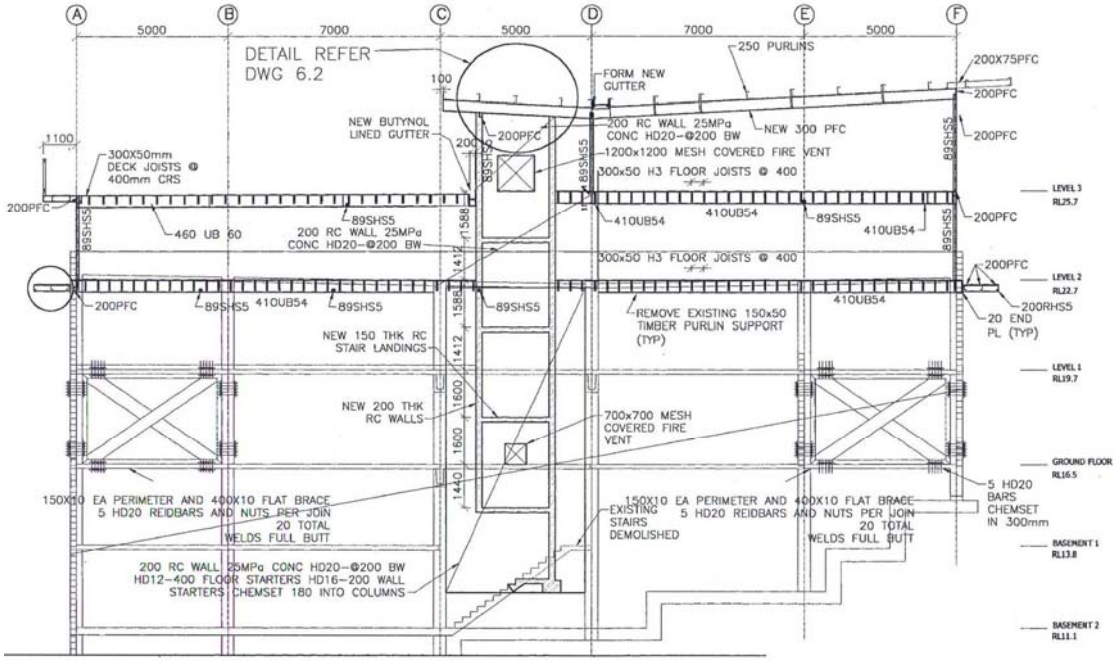

Figure 2: Section through the building taken from structural documentation (fire ratings not shown)

2.3 The top floor has a significant set-back which provides a large open deck external to the upper floor. The deck is approximately 260 m^2 in area and supported on a timber and steel frame. No information was provided to me about the fire rating of the deck.

2.4 The owner proposed to use the two uppermost floors as an early childhood centre, and in April 2006 obtained a resource consent under the Resource Management Act 1991 for a 24 hour childcare facility for the care of not more than 75 children aged between 3 months and 14 years.

2.5 In May 2006, the owner carried out certain building work associated with the proposed change of use. There was some disagreement about whether a building consent should have been obtained for that work, but on 3 July 2006 the owner applied to the territorial authority for a certificate of acceptance. That application was accompanied by a report by a firm of consulting engineers to the effect that the fire safety requirements in the proposed new use would be met provided that:

> exit doors must open in direction of escape easily without the use of a key and be sign posted in accordance with the Code.

2.6 On 29 July 2006 the territorial authority issued a certificate of acceptance ("the July 2006 certificate").

2.7 On 1 August 2006 the territorial authority advised the owner that the July 2006 certificate "has been withdrawn" after the territorial authority had reviewed the application at the request of the Fire Service.

2.8 Between August 2006 and May 2007 the territorial authority discussed the matter with a member of another firm of consulting engineers engaged by the owner ("the owner's fire engineer"). I shall not describe the detailed discussions, suffice to say that a letter from the owner's fire engineer, dated 2 October 2006, was to the effect that computer modelling analyses carried out by him had established to his satisfaction that the occupants could escape from a fire before the conditions in the building became untenable (see also 5.5 below). In particular, the letter said:

> . . . it is not disputed that a similar early childhood centre would require a sprinkler system. . . . It is our position that the absence of the sprinkler system does not prevent the design being shown as safe as detailed above. . . .
>
> The change of use . . . meets the requirements of s 115 with regard to life safety as outlined above.

(In the letter of 2 October 2006 and other correspondence there were references to the need for certain additional work over and above the work described in 2.4 above, but I have not been given any information about whether that additional work has been done. I take the view that the additional work does not need to be discussed in this determination.)

2.9 Between August 2006 and May 2007, the parties also interacted in respect of the Resource Management Act 1991, the Fire Safety and Evacuation of Buildings Regulations 2006, and the Education (Early Childhood Centres) Regulations 1998. The documents concerned are not discussed in this determination because they are outside my jurisdiction, and in the final event are not relevant to my decision.

2.10 On 17 May 2007 the territorial authority issued a new certificate of acceptance ("the May 2007 certificate"). The May 2007 certificate described the building work to which it applied as:

> Internal and external alterations to an existing residential building to establish an Early ChildHood Centre on the 4th/top floor.

and said:

> **APPROVAL**
>
> Items/features in the concerned areas that were considered to meet the NZ Building Code 1992.
>
> - Internal and external alterations that comply with Building Code clauses:
> - B1 Structure & B2 Durability
> - C2 Means of Escape & C3 Spread of fire . . .
>
> **EXCLUSION**
>
> - None . . .
>
> Attachments:

- Plans, Producer Statements Expert Reports and photographs held on file at [the territorial authority]

2.10 In the course of the determination I asked the territorial authority whether it had in fact made a decision under section 115(b) when it issued the July 2006 and May 2007 certificates. The territorial authority replied on 10 October 2007, saying:

1. I can confirm that this application was also decided under section 115(b) of the Building Act 2004 as the intended use of the illegal building work would be classed as CS whereas the original use of the building was classed as SR.

2. Council therefore proceeded under section 115(b) in order to determine the building code requirements for the building work with regard to its new use.

2.11 In other words, the owner and the territorial authority understood that the May 2007 certificate also served as written notice under section 115 to the effect that the owner could lawfully use the top two floors of the building as an early childhood centre.

2.12 In fact, it is my understanding that the early childhood centre was not opened, and remains unopened and therefore the use of the building was not changed after the May 2007 certificate had been issued, and the territorial authority and the owner's fire engineer continued to discuss the matter until, on 26 July 2007, the Fire Service applied for this determination.

2.13 The territorial authority responded to the Fire Service's application on 3 August 2007, and on 21 August 2007 I asked the territorial authority to provide certain additional information, which I subsequently received.

2.14 I then prepared a draft determination ("the draft"), which I copied to the parties under a covering letter dated 24 October 2007 to the effect that if it was not accepted (subject only to non-controversial amendments) there would need to be a formal hearing. The draft was to the effect that the top two floors of the building could not lawfully be used as an early childhood centre.

2.15 The owner did not accept the draft and requested a hearing. The Fire Service and the territorial authority accepted the draft. There was no response from the other unit title holders.

2.16 On 18 December 2007 I held a hearing at which the owner, the Fire Service, and the territorial authority were represented.

2.17 At the hearing, counsel for the owner made submissions and called evidence from the owner's fire engineer. Others present questioned the owner's fire engineer and spoke in support of the draft but did not present any evidence.

2.18 I amended the draft in the light of the hearing to produce this determination.

3 The legislation and the Acceptable Solution

3.1 Relevant provisions of the Act include:

7 Interpretation

In this Act, unless the context otherwise requires . . .

means of escape from fire, in relation to a building that has a floor area,—

(a) means continuous unobstructed routes of travel from any part of the floor area of that building to a place of safety; and

(b) includes all active and passive protection features required to warn people of fire and to assist in protecting people from the effects of fire in the course of their escape from the fire

19 How compliance with building code is established

(1) A building consent authority must accept any or all of the following as establishing compliance with the building code:

(b) compliance with the provisions of a compliance document . . .

23 Effect of compliance documents

A person may comply with a compliance document in order to comply with the provisions of the building code to which the document relates, but doing so is not the only means of complying with those provisions.

40 Buildings not to be constructed, altered, demolished, or removed without consent

(1) A person must not carry out any building work except in accordance with a building consent. . . .

41 Building consent not required in certain cases

(1) Despite section 40, a building consent is not required in relation to—

(b) any building work described in Schedule 1; or . . .

67 Territorial authority may grant building consent subject to waivers or modifications of building code

(1) A building consent authority that is a territorial authority may grant an application for a building consent subject to a waiver or modification of the building code. . . .

96 Territorial authority may issue certificate of acceptance in certain circumstances

(1) A territorial authority may, on application, issue a certificate of acceptance for building work already done—

(a) if—

(i) the work was done by the owner or any predecessor in title of the owner; and

(ii) a building consent was required for the work but not obtained; or . . .

(2) A territorial authority may issue a certificate of acceptance only if it is satisfied, to the best of its knowledge and belief and on reasonable grounds, that, insofar as it could ascertain, the building work complies with the building code.

(3) This section

(a) does not limit section 40 (which provides that a person must not carry out any building work except in accordance with a building consent); and

(b) accordingly, does not relieve a person from the requirement to obtain a building consent for building work.

114 Owner must give notice of change of use, extension of life, or subdivision of buildings

(1) In this section and section 115, change the use, in relation to a building, means to change the use of the building in a manner described in the regulations.

(2) An owner of a building must give written notice to the territorial authority if the owner proposes—

(a) to change the use of a building; or . . .

115 Code compliance requirements: change of use

An owner of a building must not change the use of the building,—

(a) in a case where the change involves the incorporation in the building of 1 or more household units where household units did not exist before, unless the territorial authority gives the owner written notice that the territorial authority is satisfied, on reasonable grounds, that the building, in its new use, will comply, as nearly as is reasonably practicable, with the building code in all respects; and

(b) in any other case, unless the territorial authority gives the owner written notice that the territorial authority is satisfied, on reasonable grounds, that the building, in its new use, will—

(i) comply, as nearly as is reasonably practicable, with every provision of the building code that relates to either or both of the following matters:

(A) means of escape from fire, protection of other property, sanitary facilities, structural performance, and fire-rating performance:

(B) access and facilities for people with disabilities (if this is a requirement under section 118); and

(ii) continue to comply with the other provisions of the building code to at least the same extent as before the change of use.

3.2 Relevant provisions of the Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005 include:

5 Change the use: what it means

For the purposes of sections 114 and 115 of the Act, change the use, in relation to a building, means to change the use (determined in accordance with regulation 6) of all or a part of the building from one use (the old use) to another (the new use) and with the result that the requirements for compliance with the building code in relation to the new use are additional to, or more onerous than, the requirements for compliance with the building code in relation to the old use.

6 Uses of buildings for purposes of regulation 5

(1) For the purposes of regulation 5, every building or part of a building has a use specified in the table in Schedule 2.

(2) A building or part of a building has a use in column 1 of the table if (taking into account the primary group for whom it was constructed, and no other users of the building or part) the building or part is only or mainly a space, or it is a dwelling, of the kind described opposite that use in column 2 of the table.

Schedule 2

Uses of all or parts of buildings

Uses related to sleeping activities		
Use	**Spaces or dwellings**	**Examples**
CS (Crowd Small)	enclosed spaces (without kitchens or cooking facilities) where 100 or fewer people gather for participating in activities	cinemas (with qualifying spaces), . . . daycare centres . . .
CL (Crowd Large)	enclosed spaces (with or without kitchens or cooking facilities) where more than 100 people gather for participating in activities, but also enclosed spaces with kitchens or cooking facilities and where 100 or fewer people gather for participating in activities	cinemas (with qualifying spaces), schools, . . .
SC (Sleeping Care)	spaces in which people are provided with special care or treatment required because of age, or mental or physical limitations	hospitals, or care institutions for the aged, children, or people with disabilities
SR (Sleeping Residential)	attached and multi-unit residential dwellings, including household units attached to spaces or dwellings with the same or other uses, such as caretakers' flats, and residential accommodation above a shop	multi-unit dwellings, flats, or apartments

3.3 Relevant provisions of the Acceptable Solution C/AS1 include:

Definitions

Early childhood centre A facility used for the education or care of children under the age of six, and required to be licensed under the Education (Early Childhood Centres) Regulations 1998.

[The Education (Early Childhood Centres) Regulations 1998 define "early childhood centre" by reference to section 308(1) of the Education Act 1988, which says:

Early childhood centre . . . means premises used (exclusively, mainly, or regularly) for the education or care of 3 or more children (not being children of the persons providing the education or care) under 6—

(a) By the day or part of a day; but

(b) Not for any continuous period of more than 7 days]**Escape height** The height between the floor level in the *firecell* being considered and the floor level of the required *final exit* which is the greatest vertical distance above or below that *firecell*.

COMMENT:

1. It is necessary only to use the greatest height to the exits required for the *firecell* being considered, even though the *building* may have other *final exits* at lower or higher levels.

2. Where the *firecell* contains *intermediate floors*, or upper floors within *household units* the *escape height* shall be measured from the floor having the greatest vertical separation from the *final exit*.

Final exit The point at which an *escape route* terminates by giving direct access to a *safe place*.

COMMENT:

Final exits are commonly the external doors from a ground floor, but this applies only if such doors open directly onto a *safe place*. If a *safe place* can be reached only by passing down an alley, or across a bridge, then the *final exit* is not reached until the end of such an alley or bridge. *Final exits*, therefore, should be seen strictly as a point of arrival, rather than as any particular element of a *building*. They are determined entirely by the definition of *safe place*.

Purpose group The classification of spaces within a *building* according to the activity for which the spaces are used.

Safe place A place of safety in the vicinity of a *building*, from which people may safely disperse after escaping the effects of a *fire*. It may be a place such as a street, open space, public space or an *adjacent building*.

Part 2: Occupancy Numbers and Purpose groups

Table 2.1: Purpose groups

Purpose group	Description of intended use of the building space	Some examples	Fire hazard category
CROWD ACTIVITIES			
CS or CL	For *occupied spaces.* CS applies to *occupant loads* up to 100 and CL to *occupant loads* exceeding 100	Cinemas . . . *early childhood centres, theatre* stages.	2
SLEEPING ACTIVITIES			
SC	Spaces in which *principal users* because of age, mental or physical limitations require special care or treatment.	Hospitals. Care institutions for the aged, children, *people with disabilities*.	1
SR	Attached and multi-unit residential dwellings.	*Multi-unit dwellings* or flats, apartments, .. . *household units* attached to the same or other *purpose groups* . . .	1

Clause 4.5.20 Where the *escape height* of a *firecell* containing an *early childhood centre* is greater than or equal to 4 m, all *firecells* in the building shall be sprinklered.

3.4 Table 4.1/5 of C/AS1 requires fire cells in purpose group SC to be provided with type 7 automatic fire sprinkler systems irrespective of escape height. As I understand it, that requirement reflects a long-standing principle in fire safety that people with disabilities, the aged, and children, especially when sleeping, require fire safety measures that are more stringent than those applying to the rest of the population.

4 The submissions

4.1 The Fire Service's submission

4.1.1 When applying for the determination, the Fire Service made detailed submissions to the effect that:

(a) The building was not sprinklered as required by C/AS1 for a building containing an early childhood centre whether considered as purpose group CL (Crowd Large), CS (Crowd Small), or SC (Sleeping Care)

(b) The territorial authority had issued the May 2007 certificate on the basis that the work complied "as nearly as is reasonably practicable" with the

> Building Code. That was the wrong test for a certificate of acceptance, because the "as nearly as is reasonably practicable" test was only relevant to the issue of a building consent and to the approval of a change of use.

4.1.2 The Fire Service recognised that complying with C/AS1 was not the only means of complying with the Building Code, but said:

> . . . the required level of safety from fire is virtually impossible to replicate without a sprinkler system.

4.2 The owner's submission

4.2.1 The owner's submission in reply to the application for a determination said:

> I did NOT do any building work thus I believed did not require a building consent

4.2.2 The submission also outlined the sequence of events from the owner's point of view and discussed non-Building Act matters (see 2.9 above), including complaints about delay and unhelpfulness on the part of both the territorial authority and the Fire Service.

4.3 The territorial authority's submissions

4.3.1 The territorial authority did not make any specific submissions but provided what it described as:

> . . . all the information held by Council regarding the issuing of a Certificate of Acceptance at the above address.

That information consisted of a CD-ROM containing e-copies of more than 230 documents plus hard copies of numerous other documents. However, few of the documents were directly relevant to the matters to be determined.

4.4 Other submissions

4.4.1 I did not receive any submissions from the other unit-title holders.

5 Discussion

5.1 General

5.1.1 Although the application for this determination was made in respect of the territorial authority's decision to issue the May 2007 certificate of acceptance, it is clear from the application that the underlying dispute is whether the top two floors of the building may be used as an early childhood centre instead of as household units. Section 114(1) provides in effect that whether or not there is a change of use for the purposes of section 115 must be decided in accordance with the Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005. It

was not disputed that the owner's proposals would involve a change of use. See also 5.6.3 to 5.6.5 below.

5.1.2 As I read the Act, the following procedures must be followed before the use of a building may be changed:

(a) Under Section 114, the owner must give the territorial authority written notice of the proposed change of use.

(b) Under Section 115, the territorial authority must give the owner written notice that it is satisfied that in its new use the building will comply with the Building Code to the extent specified by section 115.

5.1.3 In their submissions neither the owner nor the territorial authority clearly addressed the question of the notices required under sections 114 and 115. There is no prescribed form for such notices.

5.1.4 If a building needs to be upgraded to achieve the extent of compliance required by section 115 then, under section 40, the owner must obtain a building consent for the work concerned. After that work is properly completed then the owner must obtain a code compliance certificate from the territorial authority. If such work is unlawfully done without a building consent I take the view that, whether or not there has been an offence under section 40, that work must be taken into account when considering compliance with section 115.

5.1.5 The territorial authority can give the notice required by section 115 only once it is satisfied that the building work (if any) complies with the building consent and also that the building as a whole, in its new use, will comply with the Building Code to the extent required by section 115.

5.1.6 In the absence of decided cases, I take the view that if building work has been completed, a code compliance certificate in respect of that work (or a certificate of acceptance if it was done without a building consent):

(a) can constitute written notice under section 115, but only if

(b) The certificate specifically states that the building as a whole complies with the relevant provisions of the Building Code, specified in section 115, to the extent required in the new use.

5.2 Building consent

5.2.1 In this case, as indicated in 4.2 above, the owner believed that she did not need a building consent for the building work involved. The territorial authority disagreed, considering that a building consent had been required.

5.2.2 In the event, the owner applied for and the territorial authority issued a certificate of acceptance, see 2.4 to 2.10 above.

5.2.3 That being so, I do not need to consider whether the owner did in fact do building work without a building consent. The facts are that a certificate of acceptance was issued and that both the owner and the territorial authority understood it to be written notice under section 115 to the effect that the building could lawfully be used as an early childhood centre.

5.3 Certificate of acceptance

5.3.1 The owner applied for a certificate of acceptance on the basis that, following the work mentioned in 2.4, above the building complied with section 115. The territorial authority issued both the July 2006 and May 2007 certificates on that basis.

5.3.2 At that stage, the owner appeared to argue that the work brought the building to complete compliance in its new use. The territorial authority did not accept that argument, but did accept that the work brought the building to compliance as nearly as is reasonably practicable, and issued the certificate of acceptance on that basis.

5.3.3 For reasons set out in 5.6 to 5.7 below, I consider that the work did not bring the building to either complete compliance or to compliance as nearly as is reasonably practicable.

5.3.4 Even if the work had upgraded the building as a whole, so that it complied "as nearly as is reasonably practicable" with particular provisions of the Building Code as required by section 115, a certificate of acceptance cannot be issued on that basis. Under sections 96 to 99, a territorial authority may issue a certificate of acceptance only on the basis that, as far as the territorial authority can ascertain, the building work carried out without a building consent complies with the Building Code. A certificate of acceptance cannot be issued in respect of work that does not comply, even if that work complies "as nearly as is reasonably practicable".

5.3.5 Both the July 2006 and May 2007 certificates should have applied only to the building work mentioned in 2.4 above. I have been given no reason to doubt that that work does comply with the Building Code. However, that does not mean that the building as a whole will comply in its new use.

5.3.6 I do not need to consider the July 2006 certificate, which the territorial authority withdrew because of concerns raised by the Fire Service[1]. Accordingly, this determination applies to the May 2007 certificate (see 2.10 above) which the territorial authority subsequently issued[2]. I conclude that the territorial authority, having been asked to issue a certificate of acceptance, was entitled to do so on the grounds that the work concerned (but not the building as a whole) complied with the relevant provisions of the Building Code.

5.3.7 In this case, the issuing of both the July 2006 and May 2007 certificates was incorrectly taken to mean that the territorial authority had approved the change of use[3]. That misconception was no doubt assisted by the fact that the May 2007

[1] I offer no opinion as to whether the Act provides for the withdrawal of certificates of acceptance.
[2] I offer no opinion as to whether the 2007 certificate was in the form required by the Act.
[3] Most notably by the local Member of Parliament in a television interview broadcast on 4 September 2007.

certificate refers to the building work concerned as "Internal and external alterations to an existing residential building to establish an Early ChildHood Centre on the 4th/top floor".

5.4 Notice in writing

5.4.1 As to notice under section 114, as far as I can tell the owner never gave the territorial authority specific written notice of the proposed change of use that identified itself as being pursuant to section 114. However, it is clear from the fire engineer's letter of 2 October 2006 and other documents that the territorial authority was fully aware of the owner's proposed change of use. In the absence of decided cases, therefore, I take the view that for the purposes of this determination the owner did in fact give written notice under section 114.

5.4.2 Even if I am wrong about that, I can find nothing in the Act that makes notice under section 114 a precondition of notice under section 115. In other words, and in the absence of decided cases, I consider that if a territorial authority is aware from a written document of an actual or proposed change of use, whether or not that document identifies itself as being written notice under section 114, then the territorial authority is entitled to issue written notice under section 115 (or, if it is not satisfied as to compliance, advice to that effect or, if appropriate, a notice to fix).

5.4.3 As to notice under section 115, for reasons set out in 5.3 above, I take the view that, contrary to the territorial authority's intention, the May 2007 certificate could not and did not amount to written notice under section 115.

5.5 Computer modelling claimed to establish complete compliance

5.5.1 As mentioned in 2.8 above, in a letter dated 2 October 2006, the owner's fire engineer said that "The change of use . . . meets the requirements of s 115". However, the letter did not discuss the "as nearly as is reasonably practicable" provision of section 115 but argued that sprinklers were not necessary for life safety because computer modelling established that occupants could escape from a fire before the conditions in the building became untenable.

5.5.2 On that basis, the owner's fire engineer considered that the building in its proposed new use, without sprinklers, complied completely with the provisions of the Building Code for means of escape from fire. Specifically, fire modelling (essentially, probabilistic mathematical analysis of the building's behaviour in a range of fire situations) showed that the escape time by the longer of the two escape routes was 138 seconds whereas it would take 306 seconds for the building to become untenable, resulting in "a safety factor greater than 2".

5.5.3 In other words, the engineer argued that the building without sprinklers provided an adequate factor of safety, and therefore could be accepted as complying with the Building Code, even though it did not comply with the Acceptable Solution C/AS1.

5.5.4 I recognise the value of modelling, but I do not accept the approach of specifying some criteria that are not mentioned in either the Building Code or the relevant

Acceptable Solution, and claiming that compliance with those criteria establishes compliance with the Building Code. On the contrary, I take the same view as did the Building Industry Authority in Determination 2003/3:

> The Authority does not dismiss the significance of modelling, but emphasises that the results of modelling must be judged against the performance criteria required by the building code and exemplified by the acceptable solution. It is not acceptable to judge the results of modelling against some other criteria, however soundly based. Those other criteria cannot be used unless and until C/AS1 is amended (or a verification method is issued) under [section 49 of the previous Act, now section 29] so as to give those other criteria statutory recognition.

5.5.5 Further, in Determination 2005/109 (which relates to the sufficiency of a single means of escape from an apartment building) I said:

> 6.2.4 In this case, I consider that the type of comparative risk analysis [between the building concerned and a hypothetical building with the same escape height and number of apartments complying with C/AS1] is an appropriate method for deciding whether an alternative solution is effectively equivalent to the corresponding acceptable solution in terms of fire safety. . . .
>
> 6.2.5 . . . there is as yet inadequate data for fire engineering to achieve the accuracy that is expected from, for example, structural engineering. In particular, the probabilities used for a fire analysis must be based on fire statistics derived from a comparatively small data pool of mainly overseas buildings of unknown design. That applies not only to fire scenarios but also to the proper functioning of critical systems . . . . There appears to be no certainty as to the extent to which those statistics and probabilities are appropriate for use in the New Zealand context.
>
> 6.2.6 That does not mean that the method cannot be used in New Zealand, but it does mean, in my view, that the results of such analyses need to establish a high probability that an "alternative solution" building would be safer than the corresponding "acceptable solution" building in all relevant fire scenarios and across a realistic range of probabilities.

(In certain subsequent determinations I accepted that comparative probabilistic modelling had established that the buildings concerned achieved that level of safety and could be accepted as complying with the relevant provision of the Building Code.)

5.5.6 Even if I had not rejected the modelling by the owner's fire engineer on the basis that it did not use the correct criteria to establish compliance with the Building Code, I would have rejected it because (amongst other things):

(a) The modelling assumed that occupants had escaped the building when they had reached a fire-rated stairway or an outside deck area on the top floor which the fire engineer described as "a place of safety". I do not accept that assumption because:

(i) The occupants cannot be said to have escaped from a building until they have passed through a "final exit" into a "safe place" as defined in the Building Code and C/AS1.

(ii) The deck may well be a "safe space" in terms of the Education (Early Childhood Centres) Regulations in the sense that it is an outdoor space "close enough to the indoor space as to allow for quick, easy, and safe access by children". However, for fire safety purposes it is not a "safe place", such as a street, as defined in the Building Code.

At the hearing, the owner's engineer explained that the modelling had treated the deck as "the beginning of a safe path" and not as a "safe place". However, I do not consider that argument significantly changes the conclusion I have reached in terms of the compliance threshold required to be met.

(b) In respect of the behaviour of children during evacuation, the modelling was based on:

> Practical information provided by the owner . . . that there are often as many under 2's who are capable of walking down stairs as there are over 2's who, for whatever reason, can't or won't. Children of this age typically don't question any direction when part of a group and will all follow each other making evacuation sometimes simpler than with adults.

I do not accept that information as being a statistically reliable indication of what would happen if a number of children had to be evacuated during a real fire.

(c) One evacuation route required occupants on the upper floor to go out onto the deck and then re-enter the building, passing close to unprotected glazing in the external wall. The owner's fire engineer said:

> . . . the received radiation along the line of travel varies up to 5.6 kW/m^2 [and] exposure would be approximately 10 seconds at various levels for each child. . . [A paper in the *NFPA Journal*] notes that exposure to 5 kW/ m^2 for more than 30 sec will cause 2nd degree burns and . . . pain will occur after 10 sec exposure to 6 kW/m^2. It is therefore our belief that there is not a high risk of injury to the children due to radiation . . .

A similar situation was considered in Determination 2002/2, in which the Building Industry Authority said:

> . . . the Authority considers it unrealistic to expect everyone attempting to escape by way of the balcony to keep on walking into increasing exposure to heat radiation despite increasing pain. Some might, but some might not. Those who do not will be exposed to an unacceptable risk of injury or death.

I agree with the Authority's view in that case, and particularly when those attempting to escape are children. At the hearing I understood that radiation barriers had been or were to be erected on the deck to address that problem, but that does not affect the other problems with the fire modelling.

(d) The conclusion that the fire modelling established "a safety factor greater than 2" is misleading. At best, what the modelling established is that, if all its assumptions were correct and no unforeseen circumstances prevented the evacuation from being carried out perfectly in accordance with those

assumptions, then the children would escape from the fire with almost three minutes to spare. Even if all the assumptions were correct, which I do not accept, that is a narrow margin to rely on for life safety.

5.5.7 Previous determinations have taken a view regarding the appropriate attributes of analysis methodologies used to evaluate code compliance. I have not been presented with any evidence why a different approach should be taken in this instance.

5.6 Comparison with C/AS1 to establish complete compliance

5.6.1 As I have rejected the argument that the fire modelling established that the building, in its new use, would comply completely with the Building Code, I move now to discuss the approach of establishing such compliance by comparison with the Acceptable Solution. That approach was approved by the High Court in *Auckland City Council v New Zealand Fire Service* [1996] 1 NZLR 330, an appeal against Determination 1993/004 about a change of use.

5.6.2 I agree with the application of that approach that was taken by the Building Industry Authority in Determination 2004/5:

> 5.2.2 As for the proposed alternative solutions, the Authority's task is to determine whether they comply with the performance-based building code. In doing so, the Authority may use the acceptable solution as a guideline or benchmark[4].
>
> 5.2.3 The Authority sees the acceptable solution C/AS1 as an example of the level of fire safety required by the building code. Any departure from the acceptable solution must achieve the same level of safety if it is to be accepted as an alternative solution complying with the building code.

5.6.3 In this case, the only dispute is about the means of escape from fire in the new use. The term "means of escape from fire" is defined in section 7 as including active protective features such as sprinklers. For the purposes of Acceptable Solution C/AS1, the term "new use" must be considered in terms of the purpose groups defined in C/AS1 rather than in terms of the uses defined in the Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005.

5.6.4 In terms of the Regulations, the owner proposed to change the use of part of the building from use SR (Sleeping Residential) to use (SC) Sleeping Care or either use CS (Crowd Small) or use CL (Crowd Large).

5.6.5 The uses defined in the Regulations generally correspond to the purpose groups defined in C/AS1. However, under the Regulations, unlike C/AS1, use CS cannot apply to spaces with kitchens or cooking facilities, which I note is included in the design for the building, irrespective of whether it contains less than 100 people. As was pointed out at the hearing, although "daycare centres" are classed as use CS it is difficult to envisage such a centre that did not have a kitchen. Nevertheless, I take the view that the appropriate use for daycare centres is use CS because the Regulations specifically assign them to that use. The Regulations, unlike C/AS1, do

"[4] *Auckland CC v NZ Fire Service* [1996] 1 NZLR 330."

not specifically refer to early childhood centres. For the purposes of this determination, I take the view that under the Regulations:

(a) Part of a building that provides daytime but not overnight accommodation for children is to be classified as a "day care centre" coming within use CS, and

(b) Part of a building that provides overnight accommodation for children is to be classified as a "care institutions for . . . children" coming within use SC. I can find nothing in the Regulations that limits the meaning of "children" to "children under six". (I recognise that in practice children, especially very young children, will frequently be asleep during the daytime, but I do not need to consider that point for the purposes of this determination.)

5.6.6 I also take the view that the same applies to purpose groups under Acceptable Solution C/AS1 despite the fact that "early childhood centres" are specifically referred to under purpose groups CS and CL but not under purpose group SC. In other words, I take the view that under C/AS1:

(a) Part of a building that provides daytime but not overnight accommodation for children is to be classified as a care institution for children coming within purpose group CS (or CL if more than 100 people gather); and

(b) Part of a building that provides overnight accommodation for children is to be classified as a "care institutions for . . . children" coming within purpose group SC. Such a care institution is an "early childhood centre" only if it is used for the care of children under the age of six.

At the hearing, I understood the owner's fire engineer to query whether SC was applicable in this case because the term "special care" was not defined in either the Regulations or C/AS1. I take the view that the phrase:

> special care or treatment required because of age, or mental or physical limitations

is to be given its ordinary and natural meaning in context. Accordingly, I consider that in this case special care would be required because of the ages of the children concerned.

5.6.7 There was some discussion between the territorial authority and the owner's fire engineer as to whether overnight care would be provided for children under six. The point at issue seems to have been whether the appropriate purpose group for overnight care would be SC and whether the requirements for early childhood centres applied in respect of children aged six and over. However, in an email from the owner's fire engineer to the territorial authority on 30 November 2006 (after the July 2006 certificate had been issued) it appears to have been agreed that SC was the correct purpose group. However, at the hearing I understood the owner's fire engineer to say that there had been no such agreement. Be that as it may, I consider that purpose group SC applies whether or not the children concerned are aged six and over. Table 4.1 of C/AS1 requires an automatic sprinkler system for purpose group SC irrespective of escape height.

5.6.8 I also note that as at 12 October 2007 the owner's website referred to the provision of "evening baby sitting'' for children from three months to six years from 6.30 pm to 12.00 pm, and to "overnight" for children from 4 to 14 years from 6.30 pm to 7.00 am. I conclude that the owner intends the new use to be as an early childhood centre for children under six that will also be attended by children aged six and over.

5.6.9 I conclude that in terms of C/AS1 the building in its proposed new use will be either purpose group CS or purpose group SC depending on whether it provides overnight accommodation for children. Whichever of those purpose groups applies, C/AS1 requires the building to be protected by a sprinkler system:

(a) If the building is purpose group CS, a sprinkler system is required because the building contains an early childhood centre and has an escape height of 9.2 m.

(b) If the building is purpose group SC, a sprinkler system is required because of the building's escape height and hazard class.

5.6.10 I therefore conclude that in its proposed new use the building will not comply with C/AS1. However, section 23 provides that complying with an Acceptable Solution, in this case C/AS1, is not the only means of complying with the relevant provision of the Building Code. I therefore turn to other means, generally referred to as "alternative solutions".

5.7 Alternative solutions

5.7.1 In Determination 2006/52 I discussed the approach to accepting alternative solutions, saying:

> (a) Some Acceptable Solutions cover the worst case of a building closely similar to the building concerned. If the building concerned presents a less extreme case, then some provisions of the Acceptable Solution may be waived or modified (because they are excessive for the building concerned) and the resulting alternative solution will still comply with the Building Code.
>
> (b) Usually, however, when there is non-compliance with one provision of an Acceptable Solution it will be necessary to add some other provision or provisions in order to comply with the Building Code."

5.7.2 At the hearing, I understood the owner's fire engineer to contend that a child care institution on the uppermost two floors of a 4 storey building is a "less extreme" case than a similar institution on top of a 10 storey building, for example. I do not accept that suggestion, not only because C/AS1 requires different fire precautions for different escape heights but also because I do not accept that the provision of sprinklers would be "excessive".

5.7.3 The owner's fire engineer also contended that in a fire, people could go on to the deck and wait there in safety until rescued by the Fire Service (refer figures 1 and 2). In effect, he said, the building had an additional means of escape over and above the two required by C/AS1. The Fire Service accepted that it would have the operational capacity to perform such a rescue but said it would expect to do so only in an extreme emergency.

5.7.4 I recognise that clause C2.2(b) refers to giving Fire Service personnel "adequate time to undertake rescue operations", but that does not mean that the possibility of such an operation justifies reducing a building's level of safety. I take the view that when considering the fire safety precautions to be provided in a building, no account can be taken of the possibility of rescue by the Fire Service.

5.7.5 Accordingly, I consider that the building does not include any provision to compensate for the omission of sprinklers, and I recognise the validity of the Fire Service comment that "the required level of safety from fire is virtually impossible to replicate without a sprinkler system". That is the case whether or not the building provides overnight accommodation for children.

5.7.6 I therefore conclude that the building, in its new use, will not comply with the provisions of the Building Code for means of escape from fire. However, section 115 does not require complete compliance but only compliance "as nearly as is reasonably practicable".

5.8 Compliance "as nearly as is reasonably practicable"

5.8.1 The territorial authority issued the May 2007 certificate and purported to establish that the building, in its new use, would comply as nearly as is reasonably practicable with the relevant provision of the Building Code as required by section 115. In Determination 2006/78 I said:

> 5.1.4 The "as nearly as is reasonably practicable" test under the previous section 38 of the Building Act 1991 is discussed in numerous determinations[5] issued by the previous Building Industry Authority ("the Authority"). I take the view that substantively the same test applies under the current Act . . . I conclude that the approach taken by the Authority under the Building Act 1991 remains the correct approach under the current Act.
>
> 5.1.5 In considering any particular item of upgrading, the Authority applied the interpretation of the words "as nearly as is reasonably practicable to the same extent as if it were a new building" decided by the High Court in *Auckland City Council v New Zealand Fire Service* [1996] 1 NZLR 330, an appeal against Determination 93/004, in which it was held that:
>
> [Whether any particular item of upgrading is required] must be considered in relation to the purpose of the requirement and the problems involved in complying with it, sometimes referred to as "the sacrifice". A weighing exercise is involved. The weight of the considerations will vary according to the circumstances and it is generally accepted that where considerations of human safety are involved, factors which impinge upon those considerations must be given an appropriate weight.

5.8.2 Applying that approach to this case, the life safety benefits of a sprinkler system must be weighed against the sacrifices involved in installing such a system. At the hearing, I was told that the sacrifices would not only be the cost, said to be of the order of $180,000, but also the practical difficulties of obtaining agreement from the other unit title holders. When asked about the possibility of installing sprinklers in

[5] See Determinations 1993/2, 1993/3, 1993/4, 1994/2, 1994/5, 1995/2, 1995/6, 1996/1, 1996/5, 1997/1, 1997/2, 1997/9, 1999/1, 1999/15, 2001/4, 2002/2, 2002/5 and 2002/8.

only parts of the building, the owner's fire engineer said that would not greatly reduce the cost because an improved water supply to the building was a major component of the total cost.

5.8.3 I recognise that those sacrifices are significant, but I also recognise the validity of the Fire Service comment that "the required level of safety from fire is virtually impossible to replicate without a sprinkler system".

5.8.4 On balance, therefore, I consider that the benefits of installing a sprinkler system outweigh the sacrifices. Accordingly, I conclude that the building, in its new use, will not comply as nearly as is reasonably practicable with the provisions of the Building Code for means of escape from fire.

5.8.5 After the hearing, I received a request from the Solicitor representing the owner that should I conclude the building in its new use does not comply as nearly as is reasonably practicable with the relevant provisions of the Building Code, I outline what work will result in compliance. I cannot do that as it is not something that was put to me for determination and insufficient evidence has presented to me to draw any conclusion.

5.8.6 At the hearing a general discussion outlined the possibility that partial sprinklering may meet an application of the nearly as is reasonably practicable test. However, such a proposal will need to have a more robust analysis provided to the relevant decision maker that what has been provided to date.

5.9 Conclusion

5.9.1 The proposal to change the use of the top two floors of the building from household units to an early childhood centre may be done only if the building in its new use will comply with the Building Code either completely or as nearly as is reasonably practicable in accordance with section 115. Those approaches are discussed above, and I conclude that:

(a) For reasons set out in 5.5 to 5.7 above, the building in its new use would not comply completely with the Building Code.

(c) For reasons set out in 5.8 above, the building in its new use would not comply with the Building Code as nearly as is reasonably practicable.

6 Decision

6.1. In accordance with section 188(1) of the Act, I hereby:

(a) Modify the territorial authority's decision to issue the May 2007 certificate by replacing the description of the building work to which the certificate applies to read:

"Alterations to a safety barrier to the deck on the uppermost level, providing additional partitions and fire-rated 30/30/30 doors on that level and the level below, and installing a direct-dial connection to the Fire Service."

(b) Reverse the territorial authority's decision to give notice under section 115 to the effect that the building, without a sprinkler system, may be used as an early childhood centre.

(c) Determine that the building without a sprinkler system, in its proposed new use, will not comply as nearly as is reasonably practicable with the provisions of the Building Code for means of escape from fire as required by section 115.

6.2 It follows that the use of the top two floors of the building cannot lawfully be changed from household units to an early childhood centre.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 25 January 2008.

John Gardiner
Manager Determinations