



Determination 2009/105

Compliance of the means of escape and fire-safety precautions for a proposed childcare learning centre at 25 Main Road, Tawa, Wellington

1. The matter to be determined

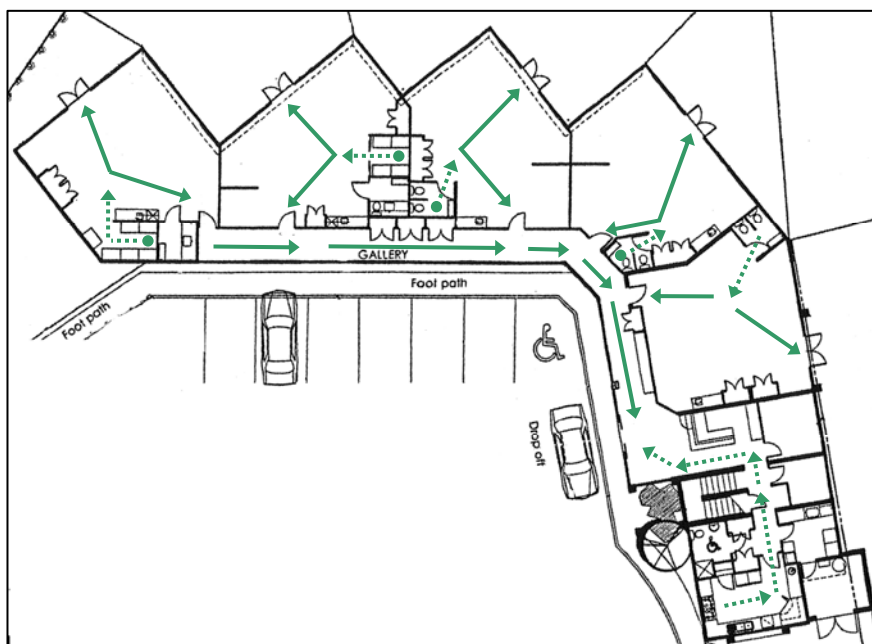
- 1.1. This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of the Department.
- 1.2. The parties are :
 - the owner of the proposed building, Kindercare Learning Centre (“the applicant”)
 - the Wellington City Council (“the authority”) carrying out its duties and functions as a territorial authority and a building consent authority.
- 1.3. I take the view that the matters for determination, in terms of section 177(a)², are whether the wall finishes on the timber lined internal walls and the safe path distances of a proposed childcare learning centre building (“the centre”) comply with Clause C of the of the Building Code (First Schedule, Building Regulations 1992).
- 1.4. In making my decision, I have considered the submissions of the parties and the other evidence in this matter.
- 1.5. I have not considered any other aspects of the Act or the Building Code with regard to the centre.
- 1.6. I have consulted with the New Zealand Fire Service (“the NZFS”) in accordance with section 170 of the Act.

¹ The Building Act 2004, the Building Code the Compliance Documents, past determinations, and guidance documents issued by the Department are available from the Department’s website at www.dbh.govt.nz or by contacting the Department on 0888 242 243.

² 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 proposed centre is a two-storey building with a ground floor area of 508m² and an upper floor area of 111m². The ground floor contains five classrooms, an office, kitchen, laundry, reception area, and a toilet area. The upper floor contains a staffroom, resource room, planning room, and a toilet.
- 2.2 The centre is generally of light-timber construction, with selected exterior wall cladding and a light steel roof. The interior partitions have natural timber or Gibraltar board linings and the ceilings are lined with Gibraltar board. In terms of means of escape and fire-safety precautions, the centre is designed for a maximum of 100 persons. A Type 4f automatic fire alarm system is also to be installed in the centre.
- 2.3 The specification calls for 22 mm thick solid timber horizontal cladding to be fixed to the internal walls supporting the upper-floor structure. This is to be finished with two coats of satin acrylic polyurethane.
- 2.4 The ground floor plan with escape routes is shown in Figure 1.



3. Background

- 3.1 As part of a building consent application, a firm of fire designers produced a report titled “Fire Safety, Accessibility, and Safety from Falling” (“the report”) that was dated 24 June 2009. The section of this report that is relevant to this determination related to the lengths of escape routes.
- 3.2 Paragraph 5.3 of the report stated:

As an alternative solution to compensate for the inability to achieve the SFI & SDI values for the use of clear polyurethane finishes on the internal natural timber walls, it is proposed to use a comparative approach to achieve compliance. As a comparison

we have referenced C/AS1: 3.4.2(e) which permits the surface finishes in Wharenui to be non compliant under specific requirement. A Wharenui (group sleeping) is a similar risk to a childcare, so it is a conservative comparison.

This will then half the allowable Dead end open path (DEOP) and Total open path (TOP) travel distances from the building. The Table below has been changed to reflect this and allows for a minimum 100% increase in travel distance where smoke detectors are installed. It is then considered the halving of the travel distance within the building has shown equivalence with C/AS1 3.4.2(e).

Activity	Purpose Group	Dead End Open Path		Total Open Path	
		Permitted ¹	Actual ²	Permitted ¹	Actual ²
Ground floor					
Room 1	CS	18	4	45	18
Room 2	CS	18	4	45	20
Room 3	CS	18	4	45	25
Room 4	CS	18	5	45	37.5
Room 5	CS	18	5	45	42
Office, Reception, Kitchen	WL	24	18	60	n/a
Laundry, toilets	IA	36	13	90	n/a
Intermediate floor					
Staffroom, Resource, Toilet	IA	36	36	90	n/a

¹ The length of the escape routes are shown in metres and have been halved to satisfy C/AS1 3.4.2(e) then doubled to take into account the 100% increase in travel distance where smoke detectors are installed

² The distances of travel are the worst case from each area to a safe place outside

³ On an intermediate floor the length for compliance with Table 3.3 shall be taken as 1.5 times the measured length. The 1.5 times the measured length only applies to the floor level and not the measured length of the stairs.

3.3 The NZFS published a “NZFS building Memorandum” dated 25 August 2009 in response to the Report. With regard to the requirement for compliant surface finishes, the NZFS considered that the centre, its occupancy, and its use are completely different in comparison with a wharenui. In so doing, the NZFS noted:

- A wharenui is required to be classified as an SA occupancy using a group sleeping area methodology. This would require each group sleeping firecell to be separated into smoke cells providing an increased level of protection.
- If it is compared to a sleeping occupancy such as a wharenui, the centre should be classified as an SC, rather than a CS/WL occupancy.
- The type of fires expected in a wharenui, in terms of the level of awareness and response from its occupants, differ from the design philosophy of an early childhood centre.
- Neither details nor specific information have been provided on the spread of flame and smoke development indexes of the non-compliant finish materials.

3.4 The NZFS also considered that the consent documentation was lacking in respect of:

- the surface finishes
- the fire-rated construction details
- the details of penetration protection.

3.5 The application for a determination was received by the Department on 2 October 2009.

4. The submissions

- 4.1 In a covering letter dated 22 September that was forwarded with the application, the applicant stated that the fire-design, using an alternative solution based on a likeness to a wharenuī, had been rejected by the NZFS.
- 4.2 The applicant provided copies of:
- the specifications and some of the plans for the proposed centre
 - the fire designers' report of 24 June 2009
 - the NZFS Building Memorandum of 25 August 2009.
- 4.3 The authority and the NZFS acknowledged receipt of the application for the determination and the authority noted that it would make a submission once a draft determination had been issued.
- 4.4 In a submission to the Department dated 9 November 2009, the applicant's architect listed the extra measures taken to ensure the fire-safety of its centres. It was noted that these measures were added benefits over and above a typical wharenuī situation. The submission also stated that, while the proposed wall surface finish did not quite meet the SFI or the SDI requirements, it nearly did so. Accordingly, the risk associated with the use of the finish was less in comparison with other non-complying clear finishes.
- 4.5 The submission included photographs of a fire that had taken place in another centre owned by the applicant. These showed that the centre's solid timber structure remained standing after a fire that required an entire re-build.
- 4.6 In an email to the Department dated 10 November 2009, the applicant noted that it was currently working with the builder and paint manufacturers on alternative acrylic clear finishes that will meet all the compliance requirements that at present are lacking in the proposed wall surface finish. The applicant was concerned that the batch of intumescent coatings currently available may be toxic to children playing in the classrooms.
- 4.7 A draft determination was issued to the parties and the NZFS for comment on 16 November 2009. The parties and the NZFS accepted the draft without comment.

5. The legislation

- 5.1 The following legislation applies in this determination. See Appendix A for the full text.
- The Building Code:
- Clause A2 – Interpretation (Fire Safety system)
 - Clause C3 – Spread of fire
- 5.2 The relevant clauses of Approved Document C/AS1 are:
- Definitions – Wharenuī
 - Height and width of escape routes 3.3.2 (h) Wharenuī

- Smoke detectors 3.5.4
- Table 3.3 – Lengths of open paths and protected paths
- 6.20.2 Interior surface finishes, floor coverings and suspended flexible fabrics
- Table 6.2

6. Fire safety features necessary to comply with the Acceptable Solution

6.1 The relevant provisions of the Acceptable Solution C/AS1 (“C/AS1”) amount to a means of compliance with the performance requirements of clauses C2 and C3 of the Building Code.

6.2 In comparing an alternative solution with an Acceptable Solution it is useful to bear in mind the objectives of the relevant Building Code clauses.

6.3 The applicant’s fire safety consultant contends that the design is an alternative solution complying with the Building Code.

6.4 With regard to this contention, I note that the antecedent of the Department, the Building Industry Authority (“the Authority”), said 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 benchmark³.

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.

5.2.4 As in several previous Determinations, the Authority makes the following general observations about Acceptable Solutions and alternative solutions:

- (a) Some Acceptable Solutions cover the worst case so that in less extreme cases they may be modified 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 to compensate for that in order to comply with the Building Code.

6.5 In the light of comments made separately, the Authority then stated:

I accept that the Authority’s reference to “the worst case” is too broadly worded in an application of this type. A better formulation would be:

- (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.

³ *Auckland CC v NZ Fire Service* [1996] 1 NZLR 330.”

7. Discussion

The wharenuī comparison

- 7.1 The applicant has based the requirements for the surface finish to the walls and the escape routes of the centre by assessing it as being equivalent to a wharenuī.
- 7.2 I note that the definition in C/AS1 states that a wharenuī is a ‘communal meeting house having a large open floor used for both assembly and sleeping in the traditional manner’. Comparing the centre in terms of this definition, the plans show the ground floor of the centre to be divided into 5 separate rooms, which is far removed from the “large open floor” definition of a wharenuī. I also cannot accept that the functions of the childcare centre equate to the “assembly and sleeping in the traditional manner” that is undertaken at a wharenuī. I accept the NZFS observation that the level of awareness and response in a childhood centre would be far less than in a wharenuī.
- 7.3 Accordingly, I am of the opinion that the childcare centre cannot be assessed on the basis of a wharenuī and must be considered in the terms of fire safety of a childhood centre in terms of C/AS1.

Code-compliance of the wall finishes

- 7.4 The fire designers have noted:
- As an alternative solution, in lieu of achieving the SFI and SDI for polyurethane finishes, that the means of escape travel distances from the building are halved as allowable in a Wharenuī (C/AS1.3.4(e)).
- 7.5 Regarding this statement, I note that I have not accepted that a wharenuī comparison is relevant in this case, and that it is not intended to install sprinklers in the centre. In terms of Table 2.1 of C/AS1, I am of the opinion that the purpose group definition for the centre, as it is an “early childhood centre” would be CS with a fire hazard category 2.
- 7.6 As set out in Table 6.2 of C/AS1, the walls and ceilings of the centre, taking into account the lack of sprinklers, are to have maximum permitted indices for the SFI (spread of flame index) and for the SDI (smoke developed index):

Locations	SFI	SDI
All occupied spaces	2	5
Exitways	0	3
Passageways, corridors and stairways not being part of an exitway	7	5

- 7.7 From the information provided by the fire designers and noting the type of finish to be applied to the timber-lined walls, I am of the opinion that the finishing system does not comply with the requirements of Table 6.2. I also note that as set out in paragraph 4.4, the applicant’s architect accepts that the finish does not quite meet SFI or the SDI requirements. Accordingly, I do not accept that this building element as proposed is code-compliant.

Code-compliance of the escape routes

- 7.8 As set out in paragraph 7.4, the fire designers have proposed that the length of escape routes be varied in view of the wharenui comparison proposal. Having rejected that comparison, I turn to the escape route lengths for a CS purpose group as set out in table 3.3 of C/AS1 and noting that smoke detectors are proposed to be installed.
- 7.9 In paragraph 4.2 of the report the fire designers have included the area designated for “cots” in the ground floor area in their calculations for occupant load. I am of the opinion that these should not be included as the occupancy of the cots is not additional to the rest of the ground floor. If the cot area is omitted, then the total area would be reduced by 11m² and the occupant load correspondingly reduced by three persons.
- 7.10 In addition, in the table set out in paragraph 5.3 of the report, the intermediate floor rooms have been designated as being IA. I consider that these areas are WL purpose group areas, which would give a permitted path length of 24 metres rather than the 36 shown on the table. However, taking into account the installation of smoke detectors, the permitted path length may be doubled to 48 metres. Therefore the actual path length of 36 metres complies.
- 7.11 I therefore accept that, if the reduction in open path lengths described in paragraph 3.4.2(e) of C/AS1 relating to wharenui is not considered, that the escape route lengths as designed for the centre are code-compliant.

8. What is to be done now?

- 8.1 It is for the applicant to provide the authority with a proposed wall finish for the internal timber lined walls of the centre that will comply with the requirements of Table 6.2 of C/AS1 or an alternative that complies with the Building Code. If this proposal is accepted by the authority then the applicant should appropriately amend its building consent application. In this respect, I note that the applicant is in discussion with paint manufacturers to endeavour to obtain a wall finish product that will be fully code-compliant.

9. The decision

- 9.1 In accordance with section 188 of the Act I determine that:
- the wall finishes on the timber lined internal walls of the proposed centre do not comply with Clause C of the Building Code.
 - the safe path distances of the proposed centre comply with Clause C of the Building Code.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 25 November 2009.

John Gardiner
Manager Determinations

Appendix A: The legislation

Relevant provisions of the Building Code include:

Clause A2—INTERPRETATION

Fire Safety system The combination of all methods used in a building to warn people of an emergency, provide for safe evacuation, and restrict the spread of fire, and includes both active and passive systems.

Clause C3—SPREAD OF FIRE

OBJECTIVE

C3.1 The objective of this provision is to:

- (a) Safeguard people from injury or illness when evacuating a building during fire.
- (b) Provide protection to fire service personnel during fire fighting operations.
- (d) Safeguard the environment from adverse effects of fire.

FUNCTIONAL REQUIREMENT

C3.2 Buildings shall be provided with safeguards against fire spread so that:

- (a) Occupants have time to escape to a safe place without being overcome by the effects of fire.
- (b) Fire fighters may undertake rescue operations and protect property, and
- (d) Significant quantities of hazardous substances are not released to the environment during fire.

PERFORMANCE

C3.3.1 interior surface finishes on walls, floors, ceilings and suspended building elements, shall resist the spread of fire and limit the spread of toxic smoke and heat, to a degree appropriate to:

- (a) The travel distance,
- (b) The number of occupants,
- (c) The fire hazard, and
- (d) The active fire safety systems installed in the building.

The relevant clauses of Approved Document C/AS1 are:

Definitions

Wharenui A communal meeting house having a large open floor area used for both assembly and sleeping in the traditional manner.

Height and Width of Escape Routes

3.3.2

(h) **Wharenui**. In wharenui where the surface finishes of the interior walls do not comply with Paragraphs 6.20.1 to 6.20.7, the escape route required by Table 3.3 shall be doubled.

Smoke detectors

3.5.4

Where the *firecell* is protected by smoke detectors (*fire safety precautions* Type 4, 5 or 7) complying with F7/AS1 and subject to *compliance schedule* requirements, *open path* lengths given in Table 3.3 may be increased by:

- a) 100% for *purpose groups* WL, WM, WH, IA and ID, CM, CS and CL (excluding *early childhood centres*), and
- b) 50% for *purpose groups* SA, SR and SH.

COMMENT:

No increase is permitted for SC, SD or WF *purpose groups* or in *early childhood centres*.

Table 3.3: Lengths of Open Paths and Protected Paths

Paragraphs 1.3.4, 3.4.1 a), 3.4.2 b), d) and e), 3.4.4, 3.4.6, 3.4.8, 3.5.1, 3.5.2, 3.5.3, 3.5.6, 3.8.1, 3.9.7, 3.11.7, 3.15.1 b) and c), 3.15.5 c), 6.8.2 and Figures 3.7, 3.15 and 3.21

Type of path	Purpose groups				
	SC, SD (Note 4)	WF	CS, CL, CM, SA	WL, WM, WH, SR, SH	CO, IA, ID
	Maximum length (m)				
Dead end open path	18	12	18	24	36
Total open path (Note 5)	45	30	45	60	90
Protected path	45	30	45	60	90
Column 1	2	3	4	5	6

Notes:

1. Where the *occupant load* exceeds 50, there shall be two or more *escape routes* from any space.
2. In accordance with Paragraphs 3.5 and 3.11.7 *open path* lengths and horizontal *safe path* lengths (but not protected paths), may be increased by:

	SA, SR, SH	CS, CL, CM, WL, WM, WH, IA, ID
where heat detectors are installed	10%	20%
where sprinklers are installed	50%	100%
where smoke detectors Types 4, 5 or 7 are installed	50%	100%

3. Paragraph 3.5.6 gives the circumstances where permitted increases, in the lengths of *dead end* and *total open path* may be combined.
4. Because *purpose groups* SC and SD are required by Table 4.1 always to have sprinklers and smoke detectors, no increases in accordance with Paragraph 3.5 are permitted for those *purpose groups*.
5. Allowed only if there is more than one *escape route*, but shall include any initial *dead end* length.

6.20.2 For other *purpose groups* [other than individual household units of *purpose groups* SR and SH] the surface finish requirements, which depend on the specific *purpose group* and location, are given in table 6.2. These may be modified in accordance with Paragraph 6.20.5 where sprinklers are used

Table 6.2: Requirements for Interior Surface Finishes and Suspended Flexible Fabrics to Inhibit Fire Spread Paragraphs 6.18.2 d), 6.20.2, 6.20.5, 6.20.7, 6.20.16, 6.20.20 and 6.20.21					
Building elements	Purpose group or location (Note 1)	Maximum permitted index			Row
		SFI	SDI	FI	
Walls, ceilings (Note 2)	<i>Exitways in all purpose groups.</i>	0	3	-	1
	<i>Sleeping areas in purpose groups SC and SD.</i>				
	<i>All occupied spaces in purpose groups CS and CL excluding exitways (see also Paragraph 6.20.7).</i>				
	<i>All occupied spaces in purpose group CM where the occupant load is greater than 50.</i>	2	5	-	2
	<i>Sleeping areas in purpose group SA (see also Paragraph 6.20.6 for trampers' huts).</i>				
	<i>Passageways, corridors and stairways not being part of an exitway in all purpose groups except SH and SR.</i>	7	5	-	3
	<i>Minimum requirement for all occupied spaces in all purpose groups except within household units in purpose groups SR and SH.</i>	5 or 9	10 8	-	4
<i>Within individual household units in purpose groups SR and SH.</i>		Nil requirement		5	
Column 1	2	3			
Key:	SFI = spread of flame index	(The smaller the index number the more stringent the requirement)			
	SDI = smoke developed index				
	FI = flammability index				
Notes:					
1. For the purposes of this table, the term " <i>occupied spaces</i> " means a space that can be expected to be occupied during normal use of the <i>building</i> by its intended occupants. It does not include <i>concealed spaces</i> or ceiling cavities which may be accessed only through a hatch, or plant rooms and the like occupied only for maintenance purposes.					
2. Sprinklered firecells: see Paragraph 6.20.5 for reduced requirements in sprinklered <i>firecells</i> .					