Determination No. 2002/7

Escape route from a new Court building

1 THE MATTER TO BE DETERMINED

1.1 The matter before the Authority is a dispute about whether an internal "forecourt" to a new building is a "safe place", or whether the street beyond is the relevant "safe place" so that steps from the forecourt to the street constitute a "final exit". Specifically, the Authority has been asked to determine:

> " . . . whether the steps leading from the forecourt to the street are the 'final exit' and hence must have handrails at spacings complying with NZBC 1992 C2.3.3 rather than D1/AS1.6"

1.2 The Authority takes the view that it is being asked to determine whether the steps are required to comply with clause C2 of the building code (the First Schedule to the Building Regulations 1992).

1.3 In making its determination the Authority has not considered any other aspects of the Building Act 1991 or of the building code.

2 THE PARTIES

2.1 The applicant was the owner of the building acting through a firm of architects. The other party was the territorial authority.

3 THE BUILDING

3.1 The building contains courtrooms and associated facilities. It has a small basement and three levels above ground, all protected by an automatic sprinkler system. The total occupant load for the building was stated to be 1017.

3.2 On the ground level there is an interior courtyard ("the forecourt") of approximately 33 m x 32 m. The upper floors extend over part of the forecourt, but there is an unroofed area near the centre of the forecourt of approximately 18 m x 18 m. Escape routes from part of the ground floor and all of the first floor, but not from the basement, lead to the forecourt. People going from the forecourt to the adjacent street pass through a covered area approximately 8.3 m high and down either an accessible ramp or a flight of seven steps. The flight is approximately 16 m wide and has a single handrail at one side.

3.3 When the building consent was issued, the territorial authority did not query the design of the steps. However, the territorial authority changed its mind and refused to issue a code compliance certificate on the grounds that the steps were part of an escape route and did not comply with the building code without handrails.

4 THE BUILDING CODE AND THE APPROVED DOCUMENTS

4.1 The relevant provisions of the building code (the First Schedule to the Building Regulations 1992) are:

Clause A2:

Access route A continuous route that permits people and goods to move between the apron or construction edge of the building to spaces within a building, and between spaces within a building.

Escape route A continuous unobstructed route from any *occupied space* in a *building* to a *final exit* to enable occupants to reach a *safe place*, and shall comprise one or more of the following: *open paths*, protected paths and *safe paths*.

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

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*.

Clause C2.3.3:

Escape routes shall be:

(g) Easy and safe to use as required by Clause D1.3.3 "Access Routes".

Clause D.1.3.3:

D1.3.3 Access routes shall:

(j) Have smooth, reachable and graspable handrails to provide support and to assist with movement along a stair or ladder,

4.2 The relevant provisions of the acceptable solutions are:

C/AS1 in Approved Document C:

3.3.3 For safe evacuation on stairs:

a) Stairways in escape routes wider than 1500 mm shall have handrails on both sides.

b) Stairways in escape routes wider than 2000 mm (see Figure 3.6) shall be provided with intermediate handrails, equally spaced, and providing a width not greater than 1500 mm for each section of the stairway.

COMMENT:

D1/AS1 Paragraph 6.0, requires all stairways to have at least one handrail, and for accessible stairs, handrails are required on both sides.

D1/AS1 in Approved Document D1:

> **6.0 Handrails**
>
> **6.0.1** All accessible stairways shall have handrails on both sides (see Paragraph 6.0.3). . .
>
> COMMENT:
>
> 1. Wherever possible, handrails should be continuous on all access routes. . .
>
> **6.0.2** Any stairway which exceeds 2.0 m in width shall:
>
> a) Have handrails on both sides and, where the width exceeds 4.0 m, shall also have an intermediate handrail provided at the centre of the stairway, or
>
> b) If the stairway is essentially an outdoor architectural feature and not required to be an accessible stairway, have at least one handrail. Examples of such stairways are those leading to civic areas, or to decks on Housing.
>
> COMMENT:
>
> A central rail gives all users a rail to use for safety purposes. On stairways in public buildings, such as sports stadia, intermediate rails are also effective for crowd control. The 2.0 m width is a comfortable width for three people, two of whom can grasp a rail if anyone trips.

5. THE SUBMISSIONS

5.1 Submissions from the applicant

5.1.1 The applicant provided photographs, drawings, and correspondence. It submitted that:

> ". . . the [forecourt] was regarded as a 'safe place' and egress routes were considered to terminate at final exits into it. The steps leading from this safe place to the street were regarded as 'external architectural landscaping features' . . .
>
> "The 10 additional handrails across the 16 m width that [compliance with paragraph 3.3.3(b) of C/AS1] would entail would not only be visually disruptive, breaking up the clean openness intended by the design, but we believe functionally disruptive as well, a target for abuse and vandalism . . ."
>
> "It is our contention that the *escape route* terminates at the [forecourt] which being a large . . . open space is a *Safe Place*. . . . [People escaping from a fire] having arrived in the [forecourt] are safe from the effects of the fire and may then spread out and make their own way at their own pace to [the street], in the same manner as they would across any other bit of external landscaping. They would no longer be part of an urgent, pushing, shoving crowd trying to get outside which the clause in question is intended to control."

5.1.2 The applicant also submitted the following opinion from a member of the Authority's staff:

"Please note that this is my personal opinion, based on the information you have provided, and if the Authority was to make a formal determination then it may take a different view.

"I think the best way to look at these steps would be as an alternative solution, in that I assume they are much wider than required for egress. If you calculate the required width base on the fire occupancy of the building and compare this figure with the actual width being provided it should indicate there is unlikely to be any crowding on the steps . . . The reason for the handrails at 1500 mm centres as given in the fire documents relates to a high density of people on the stairs and the need for many of these people to be able to reach a handrail."

5.2 Submissions by the territorial authority

5.2.1 The territorial authority made no specific submissions, but had told the applicant that:

"The Building Regulations 1992 make reference to an 'Escape Route', 'Final Exit' and 'Safe Place', all of which in our opinion add up to requiring that in the event of an emergency the occupants of the building should be able to reach the street in safety. In this case, the steps in question would require the handrails to comply with New Zealand Building Code 1992 C2 2.3.3 which states: *In an escape route, stairs more than 1800 mm wide shall be divided by handrails equally spaced and no more than 1600 mm apart.*"

5.2.2 The applicant responded that 900 people a day could well visit the building, but "they are never all there at the same time, and not all people in the building will exit via the front steps".

5.3 Consultant's report

5.3.1 The Authority obtained a report from a fire engineer ("the consultant's report"). That report, which was copied to the parties, said:

"The forecourt is an 'open air' space within the building complex, similar to a naturally vented 'atrium'. To leave the forecourt and reach the street, people are required to pass beneath a covered area before reaching the forecourt steps to the street. The building is sprinklered (fire precaution type 7 [in C/AS1 of Approved Document C]). The area of the forecourt is approximately 820 m^2. The natural vent area at the top of the forecourt appears to be approximately 520 m^2. The total occupant load for the building is stated to be 1017.

"From C/AS1, definitions, 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.'

"In determining whether the forecourt is a 'safe place' the key questions are:

"1 Will the building occupants have 'escaped the effects of a fire' if they remain in the forecourt following a fire in the building? and

"2 Can occupants safely disperse from the forecourt? and

"3 Is the size of the forecourt sufficient to accommodate the expected number of people?

"The major effects of a fire can be divided into heat and smoke.

"Smoke effects – will smoke be able to easily disperse from the forecourt without exposing the forecourt occupants to hazardous conditions? The forecourt is open to the exterior on one side and directly above. Conceivably adverse wind conditions at the time of a fire could cause smoke to swirl around in the forecourt area creating a nuisance or hazard for people located there – this would seem more likely in the event of an uncontrolled fire (ie sprinkler failure) where large quantities of smoke may be generated. However, for a sprinkler controlled fire, the quantity of smoke produced is unlikely to cause conditions in the forecourt area to be hazardous.

"Heat effects – can occupants in the forecourt locate themselves at a safe distance from the surrounding buildings to avoid discomfort and injury as a result of radiant heat from a fire in the building? For a sprinkler controlled fire in the building, only a small distance for clearance would be required. C/AS1 paragraph 3.14.3 suggests 1 m. For an uncontrolled fire a larger distance would be necessary, perhaps as much as 6 – 10 m depending on the size and intensity of the fire.

"Is the size of the forecourt sufficient to accommodate the expected occupant loads, at a sufficient distance from the building? There appears to be enough space to accommodate the occupants and allow for a clear distance from the external walls of the building, given that a sprinkler system will be installed in the building. If the building were not sprinklered, additional space requirements for fire-fighting operations requiring the use of some part of the foyer may be necessary. This would reduce the space available for occupants of the building. (From C/AS1 Table 2.2, the occupant density for standing space is 2.6 people per m^2, and for mall areas used for assembly – 1 person per m^2.

"Will the occupants be able to safely disperse from the forecourt? The travel routes and 'steps' should comply with clause D of the Building Code, for 'safe' dispersal; of occupants, and if other considerations (discussed above) are met allowing the forecourt to be a 'safe place' then there would be no need to apply the more stringent requirements of C2 of the Building Code to the design of the steps as it would not form part of an escape route

"**Conclusions**

"In our assessment, the forecourt area of the [building], being a sprinklered building, may be considered to be a 'safe place' in terms of Clause C2 of the New Zealand Building Code. This would not necessarily be the case had the building not been protected by a fire sprinkler system.

"We believe this conclusion is reasonable because in the unlikely event of a sprinkler system failure, egress from the building and from the forecourt to the street, if necessary, is still available and the adverse effect on egress with a lesser number of handrails traversing the

steps to the street would be small as the exit width available is much wider than the minimum required for the number of people to be accommodated."

6 DISCUSSION

6.1 The Authority must determine whether the forecourt is:

"A place of safety in the vicinity of a building, from which people may safely disperse after escaping the effects of a fire."

6.2 As the Authority said in Determination 2002/3:

"The building code does not have the purpose of preventing all risk, only of preventing unacceptable risk".

6.3 The essential question, therefore, is whether handrails at 1500 mm centres are needed on the steps to prevent an unacceptable risk that would mean that the forecourt is not such a place of safety.

6.4 In considering that question, the Authority accepts the consultant's report as a useful and appropriate discussion of the question leading to a sensible conclusion.

6.5 In its discussion of heat effects, the report quotes paragraph 3.14.3 of C/AS1 as suggesting that, in a fire, 1 m would be a safe distance from the sprinklered building and 6 – 10 m if the sprinkler system failed. The cited 1 m is in fact specified as the minimum clearance for people passing unprotected areas in sprinklered buildings, with 2 m specified for unsprinklered buildings. In this case, the question is whether people escaping to the forecourt can assemble at a safe distance from the building.

6.6 The total occupant load of the building was stated to be 1017. Unfortunately, the Authority has not been given sufficient information to identify the number of people who are to be assumed as escaping to the forecourt. However, the Authority considers that a realistic occupant density for people who have escaped to assemble in the forecourt is the 2.0 person/m^2 given by table 2.2 for "Bar standing area" rather than the 2.6 person/m^2 given for "Standing space". At that occupant density, the forecourt could hold the total occupant load of 1012 people with none of them less than 5 m away from the building. On that basis, the Authority concludes that the forecourt is a "safe place". That is a conservative conclusion because:

(a) The occupants of some parts of the building will escape to safe places other than the forecourt.

(b) It seems unlikely that all parts of the sprinklered building would be on fire during the evacuation period. In reality, it is likely that people could be 10 m or more away from those parts that were burning

That is not to say that the forecourt would necessarily be a "safe place" if the building were not sprinklered, but is a point worth noting should a similar question arise for an unsprinklered building.

6.7 As an additional point not mentioned in any of the submissions, the Authority notes that the presence of the accessible ramp means that some at least of the people who most need to use handrails will use the ramp rather than the steps.

6.8 After carefully considering all of the submissions, the Authority concludes that the forecourt provides a place from which people, after escaping the effects of a fire, may disperse with an acceptable level of safety.

6.9 Therefore the steps are required to comply with clause D1 but not with clause C2.

6.10 As to compliance with clause D1, the Authority considers that the steps are not "an outdoor architectural feature in terms of paragraph 6.0.2(a) of D1/AS1, because they form part of the main street entrance to the building. To comply with D1/AS1, therefore, the stairs would need to have handrails on both sides and in the middle. Of course, buildings are not required to comply with acceptable solutions so long as they comply with the building code, but in this case there seems to be nothing about these steps that would justify omitting such handrails without providing some compensating feature.

7 THE AUTHORITY'S DECISION

7.1 In accordance with section 20 of the Building Act, the Authority hereby determines that the steps:

(a) Are required to comply with clause D1 of the building code (subject to any waiver or modification granted by the territorial authority), but

(b) Are not part of an escape route and therefore need not comply with clause C2 of the building code.

Signed for and on behalf of the Building Industry Authority on this 5th day of July 2002

W A Porteous
Chief Executive