

**REPORT TO AN BORD PLEANÁLA**

**ON**

**APPEAL AGAINST A CONDITION ATTACHED TO A GRANTED FIRE SAFETY CERTIFICATE**

**(Register Ref No: 16/6010F, FSC115/16)**

**ISSUED BY SOUTH DUBLIN COUNTY COUNCIL**

**FOR**

**CONSTRUCTION OF A NEW SCHOOL**

**AT**

**HOLYFAMILY COMMUNITY SCHOOL, KILTEEL ROAD, RATHCOOLE, CO. DUBLIN**

Client: An Bord Pleanála  
An Bord Pleanála Ref: FS 0529  
Our Ref: CTA1631  
Date: Aug 2016

## **1.0 BACKGROUND**

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This Report sets out my findings and recommendations on the appeal submitted by Ahearne Fire Engineering Consultants Ltd (AFEC) against Condition No. 4 on a Fire Safety Certificate (Register Ref. No: 16/6010F, FSC115/16) issued by South Dublin County Council (SDCC) in respect of an application for construction of a new community school at Rathcoole, Co. Dublin.

Condition No. 4 states:

*“The void over the General Purpose Area on the First and Second Floor Level shall be enclosed in toughened laminated glass”.*

**Reason:** *“To comply with Part B1 of the Second Schedule to the Building Regulations 1997-2013”.*

Having considered the drawings, details and submissions on the file I am satisfied that the determination by the Board of this application as if it had been made to it in the first instance would not be warranted, as no significant matters have been noted other than the subject matter of the appeal. Accordingly, I consider that it would be appropriate to use the provisions of article 40(2) of the Building Control Regulations, 1997 in this case.

### **1.1 SUBJECT MATTER OF THE APPEAL**

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- The application for a Fire Safety Certificate was lodged by AFEC on 21<sup>st</sup> January 2016.
- The Fire Safety Certificate dated 7<sup>th</sup> April 2016 was issued by SDCC with four conditions.
- An appeal against Condition No. 4 was submitted by AFEC on 3<sup>rd</sup> May 2016.

### **1.2 DOCUMENTS REVIEWED**

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- Application for Fire Safety Certificate lodged by AFEC on 21<sup>st</sup> January 2016, with compliance report and drawings.
- Appeal submission by AFEC to An Bord Pleanala, dated 3rd May 2016
- Submission by SDCC to Bord Pleanala dated 27<sup>th</sup> May 2016
- Appeal submission by AFEC to An Bord Pleanala, dated 29<sup>th</sup> June 2016
- The following files, included with the current file, were also reviewed in terms of similar issues that may have been adjudicated on previously by the Bord.
  - FS0484 (Extension to Dromore National School, Donegal)

- FS0489 (Single-3 storey Post Primary School, Stephenstown, Co. Dublin)
- FG0007 (Rathcormac National School, Co. Cork)

## 2.0 FINDINGS

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### **The case made by the building control authority is summarised as follows:**

- No detail is given regarding how the fire load in the atrium base will be controlled. There will be a huge reliance on school management to maintain the atrium as a sterile space with only furniture constructed of materials of limited combustibility.
- The school is designed so that the atrium will form the heart of the school as a social space, with a kitchen and microwave room adjoining, likely to be used as a dining space, with a capacity to hold concerts, and as a display space for posters, arts/crafts, Christmas tree etc. This aspect was not addressed in the design, and it is considered unreasonable and not credible to expect that the space will remain sterile as per the fire safety strategy, particularly over the lifetime of the school.
- SDCC questions the competence to implement an adequate fire load management plan, who will ensure it is adhered to? The heavy reliance on fire safety management and fuel load control is not considered acceptable in this type of building and occupancy.
- In the proposed design, escape via an unprotected balcony is proposed for certain rooms on the first floor (by reference to 1.2.3.2 of Technical Guidance Document B (TGDB) dealing with single direction travel within 5m of and towards an open connection between floors).
- The sole basis of the presented design is that it is equivalent to the code compliant design. The requirements of the code compliant design were not clearly defined, consequently the analysis is unclear.
- The decision process set out in BS5588:7 is also queried. At times such as the start of a new term, prize giving or award nights with parents or after school activities with other schools, occupants may not always be familiar with the building and therefore the design process refers to Fig 4a which requires that a controlled fire load at the base be provided, and maintaining a continuous controlled fire load at the base is not possible.
- It is proposed that the kitchen adjacent to the atrium will be compartmented from the atrium using fire shutters linked to the fire alarm system. This room may contain large fire loads, causing concern regarding the responsibility on management to maintain and service these

active protection systems. This would require an annual maintenance contract with a competent expert for the lifetime of the school; will this be guaranteed?

**The case made by the Appellant is summarised as follows:**

- The second floor is in any case already proposed (in the application) to be enclosed in toughened or laminated glass (smoke retarding construction) providing at least 30 minutes fire resistance for integrity.
- This enclosure will form a smoke reservoir of sufficient depth.
- The unenclosed part of the first floor (exposed to the atrium) is in compliance with the recommendations of BS5588: 7 (fire safety design of atria) with respect to the allowable non-enclosure of the atrium at that level, including the following:
  - Simultaneous evacuation
  - Accommodation is not fire/smoke separated from the atrium
  - The building height is less than 18m
  - All stairs sized for simultaneous evacuation
  - fire detection and alarm system to minimum Category L2
  - Top storey enclosed with smoke retarding construction or reservoir with equivalent volume at top of atrium
  - Smoke clearance system (minimum 10% of atrium floor area)
  - Inlet air by means of manually openable doors (automatically opening actually provided).
- Further levels of safety are provided by the fire engineered smoke control design for the atrium. The system as proposed shows that safe conditions for evacuation, providing for a smoke layer no less than 4m above the first floor for a period of time exceeding the required safe escape time. Calculations have been submitted for the above system.
- The design is based on enclosure of the atrium at second floor but open at the first floor.
- The required escape time (RSET) was estimated (as per BS7346-4/BRE 368) at 5 minutes, with automatic fire detection and alarm system, trained staff and occupants who are awake and familiar with the building.
- The calculations added an extra minute to RSET as a factor of safety (total 6 minutes).

- Fire locations were at the atrium base and in an area to the side of the atrium void. The area of smoke vents proposed is 16.5sqm, with 15sqm of replacement air inlets via auto-opening doors at ground floor level .
- No significant fire load is expected in the atrium base e.g. tables and chairs (un-upholstered), small electronic equipment, limited clothing, with occasional seasonal decorations and displays of pupils work, expected to result in slow or medium fire growth rate, not differing significantly from a “controlled fire load” as per section 27 of BS5588: 7, compared to what might be found in retail or office accommodation. It is not contended that the atrium floor would be a “sterile unoccupied space”, but that the potential loading as described is considered to be representative in terms of the smoke clearance calculations.
- Many modern (large, complex or architecturally innovative) buildings rely quite significantly on fire safety management procedures, as without them it is often impossible to ensure adequate levels of fire safety based solely on passive and/or active fire protection measures.
- Some reliance is placed on the management of the building (in terms of controlling fire load) but this applies to all areas of the building.
- To address the issue of those who may need to escape via a balcony at first floor in the atrium, a suitable alternative exit is provided from the Design Communication Graphics room into the Multimedia Room (which has a further exit and escape route that is separated from the void). No lock will be fitted on the communicating exit door between the two classrooms and the ironmongery on the exit door from the Multi-media classroom to the corridor will be such as to be usable at all times.
- The only spaces which have an escape route leading through the first floor balcony open onto the atrium are the toilets/WC.
- There may be short periods during the life-time of the building where some portion of the occupants will be new students who may not be familiar with the layout. However, statistically it is unreasonable to consider such short periods as the basis for designing the building.
- The management of the building has a clear legal responsibility to maintain all fire protection systems in working order, including by ensuring periodic inspection and servicing. If it were assumed that basic fire safety management principles would not be followed, it would not be possible to design such buildings in an architectural and financially viable way.

- In terms of single direction escape routes, the void (over the ground floor Social Area) will be separated from the accommodation and escape route near Stair 2 at first floor, in toughened or laminated glass deemed to achieve 30 minutes fire resistance equivalent to that of 30 minutes integrity.
- As regards the requirements for balcony escape, 22.2 of BS5588: 7 allows open balcony as single means of escape in un-sprinklered buildings in situations where the smoke control system design does not require sprinklers in order to operate correctly (as is demonstrated in the calculations).

### **3.0 CONSIDERATIONS:**

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Of relevance in this case is what appropriate guidance can be applied with respect to demonstrating compliance with the functional requirements of Part B (Fire) of the Second Schedule to the Building Regulations 1997-2014. The design generally is set out as compliant with the recommendations of TGDB, and where the atrium impinges on open floor areas the recommendations of BS5588: 7 are referenced, along with additional fire engineered smoke evacuation provisions.

From TGDB, reference is made to Building Bulletin 7/BB100 (Department for Children, Schools and Families (UK)), which contains fire safety design guidance specific to school buildings. Further guidance has been published by the Department of Education and Skills (Planning and Building Unit) entitled *"Supplementary Guide for Design Teams: Fire Strategy in Schools"*.

The guidance is published following consultation with the National Directorate for Fire and Emergency Management (DoECLG, which also publishes TGDB) and the Chief Fire Officers Association, and aims to allow for *"..agreed consistent principles for adequate fire safety in schools design and construction, that will in turn ensure that the necessary statutory certification is obtained...in the building control process as required in Part B of the Building Regulations"*.

Although the Guidance does not have the same statutory status as TGDB but is effectively published by the same source, on the basis of the above it is considered appropriate to have regard to the guidance when considering the fire safety design of a school.

The schools design guidance has specific reference to dealing with section 1.2.3.2 (open connections between floors), and notes that where a school building has an atrium void connecting 3 or more storeys the guidance in BS9999 (Annexes B and C) should be consulted.

In this case, there is a large General Purpose (GP) space at ground floor level and a smaller Social Space, with void areas rising above. The void over the Social Space is enclosed in fire resisting partitions and smoke retardant glazing at first floor, and does not rise to second floor, so the issue of smoke travel through the void to upper accommodation does not arise with regard to that space.

With regard to the GP space, the void at second floor is also enclosed in fire resisting construction and smoke retardant glazing, so smoke travel to the second floor via the atrium void does not arise (Note: Condition No. 4 requires the void at second floor to be enclosed in toughened laminated glass, even though this is already provided for in the application documents and drawings).

The remaining issue then arises with regard to the accommodation at first floor that is open to the void over the GP area, and which SDCC requires to be enclosed (as per Condition No. 4). By reference to BS9999 Annex B, the issues that arise under section B4.2 with regard to escape routes include:

- Siting of storey exits away from the atrium edge
- Maximum travel distances
- Escape away from the atrium, and not within 4.5m of void edge

These provisions would generally apply where there is a void within a larger open floor area (as shown in Figure B.1 of Annex B of BS9999), and escape routes were generally available away from the void. In this case, the only escape routes from the student toilets at first floor are not directly away from the void. The escape route from the female toilet into Compartment 10 is somewhat shielded from the void edge and the route passes within 6m of the void edge at its nearest point. The escape route from the male toilets is towards the void edge, and within 4.5m of the void at its closest point.

In this case, it is considered that the provisions of section B.4.3 of Annex B could also apply, as escape routes from the Design Communications Graphics classroom and the student toilets accommodation at first floor are effectively along a balcony that is exposed to the atrium void. The relevant criteria in this case (for an open balcony) include:

- The building should be equipped with sprinklers (unless not required for the smoke control design)

- Escape should be available within the atrium in at least two directions (with nearest storey exit at not more than 18m away)
- A smoke exhaust system to be provided to confine any smoke layer to not less than 3m above balcony floor level
- The atrium base should include only a controlled fire load.

In the case of the Design Communications Graphics classroom, an alternative escape route is available via the adjoining Multi Media classroom, with suitable non-lockable exit doors etc. so the only rooms reliant on balcony escape are the student toilets. These could be considered to have a likely maximum occupancy of 20 students or less.

With regard to the balcony escape criteria as noted above:

- The building is not equipped with sprinklers as the smoke control design does not require these.
- Escape is available within the atrium in two directions (from the toilets escape is available into Compartment 10 and to stair S2, and the Design Communications Graphics classroom has an alternative exit via the adjoining room to a protected corridor as well as a route to Compartment 10).
- The smoke exhaust system is calculated to provide a clear layer at 4m above the first floor level (2m is recommended under the Supplementary Guidance).
- The intention (of the applicant) is to provide a controlled fire load in the atrium base. Annex B.8 of BS9999 gives recommendations on controlling fire load in the atrium base, including confining materials to isolated islands of no more than 10sqm each (with max. 160kg of combustible materials in each) at least 4m apart and restricted specifications for walls linings, upholstered furniture and textile hangings.
- The open spaces at ground floor (General Purpose and Social areas of around 340sqm) could accommodate an estimated 10 such islands, with  $10 \times 160 = 1600\text{kg}$  of combustible materials allowable as a 'controlled fire load', and it is considered unlikely that this would include any upholstered furniture. It is considered unlikely that anything like that quantity of combustible (or easily ignitable) materials would be introduced to the space.
- SDCC have commented on the unreliability of fire safety management procedures (on an ongoing basis) to control fire load in the atrium base. The Guidelines set out restrictions that should be observed in respect of storage of combustible materials, lockers, display cabinets, notice boards, festive decorations etc. in multi-level spaces with atria/voids, and says they



must be carefully monitored by the School Authorities to ensure these measures are adhered to.

- SDCC have described their unwillingness to accept that a 'sterile space' will be maintained (on an ongoing basis) at the atrium base; however, the strategy of the applicant is based on a 'controlled fire load' as set out in the recommendations of the guidance.
- Section 0.1.6 of TGDB notes that the guidance in TGDB has been based on the assumption that there will be an adequate level of fire safety management when the building is in use. AFEC have contended that if it were assumed that basic fire safety management principles would not be followed, it would not be possible to design such buildings in an architectural and financially viable way; there must be some expectation that a reasonable level of fire safety management will be undertaken, particularly where a public building is concerned, including the periodic servicing and testing of active fire protection systems.

As well as the issue of escape via a balcony, the question of the atrium design itself arises, including the level of protection required to adjoining accommodation generally due to fire spread via the atrium.

As referenced in the guidance, Annex C of BS9999 (the guidance that supersedes that in BS5588: 7) provides examples of how different atrium configurations need to be protected, and presents a decision tree process to determine what the appropriate configuration might be.

SDCC have questioned the configuration used by AFEC (where persons would be familiar with the building and with a controlled fire load at the atrium base) on the basis that there may be occasions where occupants may be unfamiliar with the building (new students, prize giving events or attendance from other schools) and there is no confidence that the fire load would be controlled on an ongoing basis.

With regard to familiarity of occupants with the building, there is some precedent from the Bord from a previous decision (Cork County Reg. Ref. 20776, Bord file No. FG0007). That appeal dealt with the issue of stairway design in a school, but hinged on whether the type of stairway should be designed on the basis of whether the occupants were familiar or not with the building (whether it should be designed as a 'public' or as a 'semi-public' stairway).

The decision of the Bord stated that *“semi-‘public’ adequately describes the nature of the school building particularly taking into account the familiarity with the premises which most of the building users would have”*. That would appear to logically accept that, except for some limited time periods at their initial school attendance or other limited occasions, the pupils and teachers could be considered generally as familiar with the building.

In terms of others such as parents or other visitors to events, these are likely to occur at ground floor only (in the General Purpose Area and PE Hall), so issues to do with the atrium design (generally concerned with protection at the upper levels) would not be considered relevant in terms of familiarity of occupants with the building.

The atrium design in Annex C is based on Occupancy Characteristic A, where occupants (at the upper floors) are awake and familiar with the building. Figures C.1a and C2 provide for all or some of the associated floor areas to be open to the atrium, with an atrium height of less than 18m, all stairs sized for simultaneous evacuation, a minimum L2 fire detection and alarm system, enclosure of the atrium at the top storey with smoke retarding construction (or a reservoir above), smoke clearance in the atrium and a fire load in the atrium base comparable to the use and contents adjoining the atrium.

The proposed design meets the above criteria, with the added factor that the atrium base fire load will be controlled (as described above for the purposes of balcony escape) and there will be a double-height reservoir at the top of the atrium.

Exemplar 2 of BS9999 allows for the accommodation (except for the top level) to be open to the atrium at all other levels; in the proposed design, all accommodation is separated from the atrium, and all separation except for the staff room and the student toilets at first floor is separated in fire resisting or smoke retarding construction. This is a significant additional factor of safety compared to the allowance under BS9999 for accommodation at ground and first floors to be open to the atrium.

The proposed design provides for a Category L3 fire detection and alarm system to IS3218: 2013, providing detector coverage in common escape routes and all rooms opening onto escape routes. Given the layout and use of certain spaces opening of the atrium at ground floor level, and certain other rooms of higher fire risk not opening off common escape routes, the coverage should be extended to include full coverage of those spaces, and not just inside doorways where they adjoin

the escape routes (as provided for under Category L3 coverage). Similarly, the staff room at first floor is not fire separated from the atrium so should have full room detector coverage.

On the basis of the above, I consider that the appeal against condition No. 4 should be allowed, and revised conditions be included as set out below.

#### **4.0 REASONS and CONSIDERATIONS:**

Having regard to the submissions made in connection with the Fire Safety Certificate application and the appeal, the type of use and layout of the building (as a school with multi-levels open to an atrium) and the guidance given in Technical Guidance Document B and BS9999 Annexes B and C, it is considered that the appeal should be allowed and Condition No. 4 be deleted, to be substituted by alternative Conditions as follows:

##### **Condition:**

The fire detection and alarm system to be Category L2/L3 to IS3218: 2013, to include detector coverage to common escape routes and to all rooms adjoining common escape routes, as well as full room coverage of the following spaces:

- Library
- Book Store
- AV Store
- Art/Craft Room
- First floor staff room/Working Area

##### **Reason:**

To provide adequate fire detection coverage to allow for early warning in case of fire in higher fire risk areas in proximity to the atrium space.

##### **Condition:**

The fire safety management of the building to be in accordance with the recommendations in Appendix 3 of "Supplementary Guide for Design Teams: Fire safety Strategy in Schools (published by the Department of Education and Skills).

##### **Reason:**

To provide for adequate fire safety management of the building.

**Signed by:**

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COLM TRAYNOR BE FIEI Chartered Engineer

**Date: 3<sup>rd</sup> August 2016**