

Jensen Hughes

Technical Note

TURNERS CROSS REFUGE CORK

FIRE ENGINEERING REVIEW

JG/1358/af/01cna

14th April 2025

1.0 INTRODUCTION

It is proposed to construct a women and childrens refuge at Evergreen Street, Turners Cross, Cork. The development will contain 20 no. self contained units of emergency accommodation with a mix of studio, one-bed and two-bed units for women and children who have experienced domestic violence. In addition to the accommodation, there will be ancillary accommodation that will serve staff and provide practical, educational, therapeutic and other health supports for residents. Furthermore, there will be residential accommodation located in a separate block to the West. On that basis, two FSC applications will be required for the site.

The following is a review of the fire strategy, outlining relevant Building Regulation guidance and any potential fire engineering solutions for aspects of the design which do not comply with standard code guidance. This technical note is not intended for submission to the approving authorities. It is only for the purpose of establishing fire strategy options for the purpose of design development.

We have reviewed the most recent information provided for the above and have the following comments regarding the fire strategy proposals for the development.

2.0 BUILDING GUIDANCE REGULATION

The basis of compliance for this development will be the relevant recommendations Technical Guidance Document B (TGD-B 2020) and BS 5588 Part 1. It should be noted that Building Regulations are functional, and there is no requirement to follow any code guidance. Alternative fire engineering solutions are possible, provided they are designed and demonstrated to achieve an equivalent standard of safety as that in the code. It should be noted that fire engineering solutions carry approvals risks and would therefore need to be agreed with the Fire Brigade.

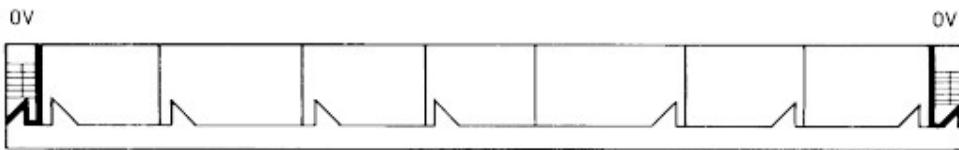
Please note that new TGD B regulation has been published and comes into effect for projects where planning/FSC was granted after 01 May 2025. There are parts of the following review that will be incorporate elements of the new TGD B regulations.

3.0 MEANS OF ESCAPE

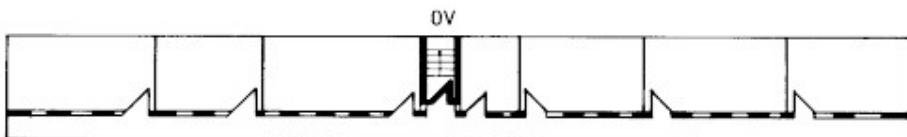
Deck Access(Western Block)

All apartments on the upper floors are approached via an external deck. The external deck is served by a single enclosed escape stairs.

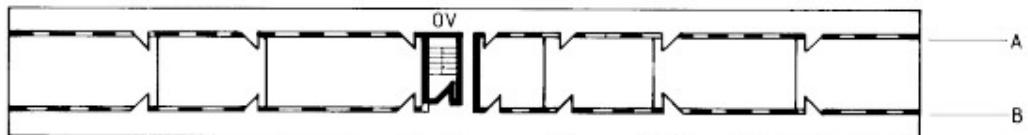
As there is only a single means of escape, fire-resisting construction must be provided along the deck serving the apartments, up to a height of 1.1m above deck level. Self-closing FD 30S fire doors must be provided on entry to these apartments and any glazing within this 1.1m zone will need to be fire rated and fixed shut. Design should be in accordance with the below Figure 15(b) from BS 5588 Part 1:



(a) Multi-stair building



(b) Single stair building



NOTE 1. Either external enclosure A or external enclosure B should be fire resisting.

(c) Single stair building with an alternative exit from every dwelling

Key: OV Openable vent for fire service use (1.0 m² minimum)

— Fire-resisting construction

— Fire-resisting construction up to a height of 1.1 m above deck level

↗ Self-closing FD 30S fire door

NOTE 2. All doors breaching the 1.1 m high fire-resisting separation should be self-closing FD 20 fire doors.

NOTE 3. Although there are no limitations on travel distance, all parts of the building need to be within 60 m of a fire main, measured along a line on which hose can be laid.

NOTE 4. The OV's to a stairway may be replaced by an openable vent over the stair.

Figure 15 — Common escape routes in balcony/deck approach buildings

There are no limitations on travel distance for escape routes in deck approach buildings however, all parts of the building need to be within 60m of a fire main outlet, measured along a line on which hose can be laid. This is achievable based on our review of the latest drawings received.

No store or other fire risk should be erected externally on the balcony or deck. Additionally, the soffit above a deck or a balcony with a width more than 2m should be designed with down-stands placed at 90° to the face of the building (on the line of separation between individual dwellings). The down-stand should project 0.3m to 0.6m below any other beam or down-stand parallel to the face of the building.

The deck should achieve 30minutes fire resistance along with any elements of structure supporting it. The walking surface should be imperforate so that occupants are protected from the effects of heat or smoke from below.

Apartment Common Areas(Eastern Block)

The means of escape from the apartment units located on the right-hand side of the Eastern block are to be designed in accordance with the following recommendations:

- The travel distance within the common corridor is permitted to a maximum distance of 7.5m (the single escape route).
- The common corridor should be enclosed in fire-resisting construction, and self-closing 30-minute fire doors, provided with smoke seals.
- Ventilation by means of a smoke control system should be provided(as outlined in smoke venting section below).
- The smoke control system for common corridors should be activated by means of an appropriate fire detection and alarm system.

Common Corridor Smoke Venting(Eastern Block)

Smoke ventilation can be achieved via automatic opening vents (AOVs) fitted to the building elevation achieving a minimum free area of 1.5 m². They should be fitted as high as is practicable but should be at least as high as the top of the door of the stair lobby.

Where it is not possible to provide an AOV to the external, smoke shafts should be provided for smoke ventilation. These may be natural or mechanical types as discussed below.

4.0 Option 1 – Natural Smoke Shafts / AOVs

The natural smoke shaft will be designed in accordance with Section 1.7.3 of TGD B 2020 and should consist of: -

- a) The cross-sectional area (free area) of the smoke shaft should be at least 1.5m² with a minimum dimension of 0.85m in any direction.
- b) The minimum ventilation area from the common protected lobby or corridor into the shaft, at the opening at the head of the shaft, and all internal locations within the shaft (e.g. safety grilles) should be at least 1m².
- c) The top of the protected corridor/lobby vent should be located as close to the ceiling of the protected corridor/lobby as is practicable and should be at least as high as the top of the door connecting the protected corridor/lobby to the stairwell or lobby.
- d) The shaft should extend a minimum length of 2.5m above the ceiling of the highest storey which is served by the shaft.
- e) The opening at roof level should be at least 0.5m above any surrounding structures within a horizontal distance of 2m.
- f) The smoke shaft should be constructed in accordance with Section 3.2.7.1 of TGD-B 2020.
- g) The ventilation openings from the common protected lobby or corridor to the vent shaft should achieve the same fire performance as the shaft, and not exceeding 60 minutes.
- h) No services other than those relating to the smoke shaft should be contained within the smoke shaft.
- i) The shaft should be vertical from base to head but may have not more than 4 m at an inclined angle not more than 30 degrees from the vertical plane.
- j) The design of the system should be such that, on activation of the fire detection and alarm system, the ventilator on the fire floor, the ventilator at the top of the smoke shaft, and the 1m² ventilator at the head of the stairway will all open simultaneously.

As noted above in point (d), the shaft must extend a minimum length of 2.5m above the ceiling of the highest storey served, therefore, to avoid a tall shaft on the roof of the building, the alternative is to provide an additional AOV on the roof of the corridor on the top floor, such that the top storey served by the smoke shafts becomes the storey below.

5.0 Option 2 - Mechanical Smoke Extraction

Mechanical smoke shafts serving stories above ground level will meet the following recommendations: -

- The smoke shaft should be fully open to the external air at the top and closed at the base.
- The top of the lobby vent should be located as close to the ceiling of the lobby or corridor as is practicable and will be at least as high as the top of the door connecting the lobby or corridor to the stairwell.

- The lobby vents, in the closed position, should have a fire and smoke resistance performance of 60 min and integrity (leakage) no greater than $360\text{m}^3/\text{h/m}^2$ when tested in accordance with BS EN 1366-2.
- No services other than those relating to the smoke shaft should be contained within the smoke shaft.
- The smoke shaft should be located at the remote end of the corridor away from the staircase.

It should be noted that if a mechanical smoke ventilation system is provided, an accompanying CFD report will need to be submitted with the Fire Safety Certificate application demonstrating that conditions in the corridor and stairs are equivalent to or better than the natural ventilation system that it replaces. This CFD report/modelling analysis is to be conducted by the mechanical smoke shaft system designer. Early engagement with a specialist system designer would be recommended if a mechanical extract system is proposed to be adopted.

A secondary power supply should be provided to the fans and all actuators and controls. Fan sets should usually be provided with a standby fan that operates automatically upon failure of the duty fan.

Stair sizing(Eastern and Western Block)

Each stair should achieve a minimum clear width of 1000mm for means of escape.

Stair Venting(Eastern and Western Block)

A 1m^2 automatically opening vent (AOV) is required at the top of each stair enclosure.

Final Exits(Eastern and Western Block)

The final exit from the enclosed stair is required to discharge direct to the external as per the recommendations of Section 1.3.6.3 of TGD B 2020.

Final exits from stair cores are required to achieve the minimum clear width of the stair i.e. 1000mm.

INTERNAL PLANNING OF APARTMENTS(EASTERN & WESTERN BLOCK)

Apartment Entrance Halls

All apartments within the upper floors should have an entrance hall which leads off all habitable rooms. Based on this layout, the entrance hall should be protected i.e. it should consist of 30 minutes fire rated construction with FD30 doorsets. The door entrance into each apartment should be a FD30s doorset. The travel distance should not be more than 9m from the flat entrance door to the door of any habitable room.

Private Balconies more than 4.5m above ground

There are balconies in apartments which are more than 4.5m above ground level (i.e. all apartments above the first floor). This is acceptable as:-

- ❑ The escape route from the balconies does not pass through more than 1 access room. The interior of the access room should be provided by a fire detection and alarm system in accordance with IS 3218:2013 + A1 2019; and
- ❑ Travel distance on the balcony are within 7.5m.
- ❑ Any open cooking risk in the access room is remote from the balcony and positioned in such a way that it does not prejudice the escape route through the access room. Note cooking appliance locations will need to be confirmed as design develops. In addition, a fire detection alarm system in accordance with IS 3218:2013 + A1 2019 should be provided to the access room. If the decibel level of 55db can't be reached on the balcony upon testing, then additional sounders may be required.
- ❑ Where balconies are enclosed, this is deemed acceptable where they are contiguous with enclosed balconies to other flats and fire resistance of the balcony structure and the compartmentation between the balconies is the same as the fire resistance.

ANCILLARY ACCOMODATION(EASTERN & WESTERN BLOCK)

All ancillary accommodation will be required to comply with the recommendations of TGD B.

1. Travel distances within ancillary accommodation appear to be within recommended limits, 18m in single direction and 45m where there is a choice of escape route (once a fit out is provided). For places

of special fire risk, travel distances are limited to 9m in a single direction and 18m where there is a choice of escape routes.

2. Based on TGD B 2020 regulations, ancillary accommodation should be separated from other parts of the building and should be lobbied before access to common corridors serving accommodation. It is not proposed to separate the ancillary areas via lobby protection on the left-hand side of the Eastern block on the basis that, the new TGD B 2024 regulations note that they do not need separation as long as there is an alternative escape route. Furthermore, the common corridors serving accommodation will be ventilated via a smoke shaft.
3. Emergency escape lighting should be provided.
4. Inner rooms should be limited to 20 occupants.
5. Ancillary accommodation should not share a single escape stair with accommodation.

CONSTRUCTION (EASTERN & WESTERN BLOCK)

The required period of fire resistance for the elements of structure varies dependent on the height of the top storey. The height of the top storey of both blocks is assumed to be below 20m and therefore, in accordance with Table A2 of TGD B, the structural elements should achieve a period of fire resistance of 60 minutes for load bearing capacity.

Compartment walls and floors should be constructed to achieve 60 minutes fire compartmentation for integrity, insulation and load bearing capacity.

Each escape stair should be enclosed in compartment construction (i.e. 60 minutes). Each apartment unit should form an independent compartment and each floor should form a compartment floor.

As the lift well will connect different compartments, it should form a protected shaft constructed to achieve 60 fire compartmentation for integrity, insulation and load bearing capacity. It is noted within TGD B that a lift should be approached only by way of a protected lobby if the lift delivers directly into corridors serving sleeping accommodation.

Service risers should also be vertically enclosed in compartment construction achieving a minimum of 60 minutes fire resistance.

The integrity of the linings of compartments walls should not be breached to allow for the installation of services, e.g. pipes, wires, flues (including manufactured flues), except where necessary to allow services pass through these compartment walls or floors. Services may be surface mounted or accommodated in service ducts or within service cavities created external to the unbreeched linings of the fire resistant compartment wall or floor. Where services pass through compartment walls or floors, they should be appropriately fire-stopped. No services should pass through separating walls.

The deck should achieve 30minutes fire resistance along with any elements of structure supporting it.

6.0 FIRE FIGHTING FACILITIES(EASTERN & WESTERN BLOCK)

Provision of Hydrants

At least 1 hydrant to be provided per 1,000m² of ground floor area for the development. Therefore, there should be 2 hydrants total located on the site.

The hydrants should be located such that: -

- The distance from the building is not less than 6m or more than 46m.
- The distance from a hydrant to a vehicle access roadway or hard standing for fire appliances is not more than 30m.
- they are distributed around the perimeter of the building, having regard to the provision of access for fire appliances and
- the hydrants are located on the same site as the building or are provided by a sanitary authority on a public roadway adjacent to the site.

Fire Tender Access

The building be provided with fire tender access in accordance with Table 5.1 of TGD-B (see extract below):

Table 5.1 Vehicle access to buildings			
Volume of building (m ³)	Height of top storey above ground (m)	Provide vehicle access	Type of appliance
up to 7,000	under 10	at rate of 2.4 m in length for every 90 m ² of ground floor area	pump
	over 10	to 15% of perimeter	high reach
7,000-28,000	up to 10	to 15% of perimeter	pump
	over 10	to 50% of perimeter	high reach
28,500-56,000	up to 10	to 50% of perimeter	pump
	over 10	to 50% of perimeter	high reach

Figure 2: Vehicle Access to Buildings

Vehicle access routes should be designed in accordance with Table 5.2 of TGD-B for Pump appliance. Moreover, turning facilities should be provided in any dead-end access route that is more than 20m long. This can be by a hammerhead or turning circle. Turning facilities should be demonstrated via auto track analysis.

Table 5.2 Vehicle access route specifications						
Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways between kerbs (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High Reach	3.7	3.1	26	29	4	16.25

Figure 3: Vehicle Access Route Specifications

It proposed to provide dry riser provisions to both the Western and Eastern block. Fire tender access should be provided to 18m of the dry riser inlets. Dry riser outlets should be provided on each floor in compliance with IS 391:2020.

7.0 ACTIVE FIRE SAFETY SYSTEMS(EASTERN & WESTERN BLOCK)

7.1 Fire Detection and Alarm System

The fire detection and alarm system should achieve an L1 standard in compliance with IS 3218: 2013+A1 2019 Code of practice for fire detection and alarm systems for buildings – system design, installation and servicing.

7.2 Provisions for Disabled Persons

Disabled refuges should be provided in each protected stair/ independent lobby at upper floor levels. These refuges should comply with BS 5588 Part 8 and should have a minimum dimension of 900mm x 1,400mm. It should be confirmed that the disabled refuges will not obstruct the clear width required for circulation or escape purposes (as noted in section 3.2 above).

An Emergency Voice Communication (EVC) system should also be provided and should comply with BS 5839-9:2011.

8.0 ADDITIONAL PROVISIONS(EASTERN & WESTERN BLOCK)

8.1 Provision for Photovoltaic Panels

If applicable, the provision of a Photovoltaic System (PVS) shall be designed and installed to current best practice and include measures to minimize the risk of electrocution to firefighters in the event of an incident. The installation shall be designed incorporating the technical guidance contained in: -

- RC62: Recommendations for fire safety with photovoltaic panel installations, as published by the Fire Protection Association/RISC Authority.
- NFPA 1 (Fire Code) Section 11.12 for PV Systems; and
- MCS/ECA's Guide to installation of PV Systems.

Furthermore: -

- The roof covering or decking under the arrays shall be of non-combustible materials
- The building shall have adequate and appropriate warning signages for firefighters to inform them of the presence of a PV System in the building

Only solar cables suitable for outdoor applications and severe weather conditions and UV radiation are to be used.

Additionally, it should be noted that PV panels cannot be located on a stair or within 1.8m of an AOV, and this should be kept in mind when locating PVs at roof level.

Confirmation is required if PV panels will be provided.

8.2 Provisions for Green Roofs

If applicable, Green Roof areas should be designed and installed to current best practice and include measures to prevent the spread of fire. The installations should be designed incorporating the technical guidance contained in: -

- Fire Performance of Green Roofs and Walls - DCLG UK: 2013.
- Green Roof Code of Best Practice UK: 2014.

In accordance to Section 4.5.1 of Fire Performance of Green Roofs and Walls - DCLG UK: 2013, fire breaks should be provided around all openings and vertical elements on all types of green roofs. The fire breaks should consist of paving slabs or non-vegetated strips of pebbles with a depth of 75mm and diameter between 20 and 50mm for a width of 500mm.

Whilst fire spread to a green roof via penetrations such as roof lights, pipes or vents in the roof is not in itself a breach of requirements B1 to B5, these fire breaks should be provided around such penetrations so that basic maintenance procedures can be carried out.

In addition, fire breaks should be provided in 1m strips every 40m across extensive green roofs. It should be noted that an extensive green roof is classified as a lightweight, low maintenance roof system typically with low growing ground cover, e.g. mosses, herbaceous plants, succulents and other hardy plant species planted in a shallow substrate. The depth of the growing medium is typically between 80 and 150mm on a well-designed system. The organic content of the growing layer is usually less than 20%. Generally, this type of roof does not normally require irrigation and is low in nutrients.

In accordance to Section 4.5.2 of Fire Performance of Green Roofs and Walls - DCLG UK: 2013, in order for green roofs to comply with requirement B4, the depth of the growing layer should be a minimum of 80mm, and the organic content should not exceed 50%. In accordance with Table 8 of BS 9991:2015, roof coverings with the designation AA, AB or AC are permitted on buildings where the minimum distance from any point on the relevant boundary is less than 6m.

Provided that the structural roof deck complies with requirement B3, i.e. the roof covering has the designation AA, AB or AC (National class) or BROOF(t4) (European class) then the testing has shown that the presence of a green roof above the roof covering should not affect the designation and the minimum distances from the relevant boundary given in Section B4 of this Compliance Report.

In addition to the above, to help maintain the vegetation barrier a retention angle should be included between the growing layer and the pebble margin/paving in accordance with Section 3.5 of Green Roof Code of Best Practice UK: 2014. This area should also be subjected to routine maintenance to remove any invasive plant species.