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RESIDENTIAL DEVELOPMENT AT SCAIRT CROSS, CASTLETREASURE, DOUGLAS, CORK

FIRE SAFETY ASSESSMENT

DATE 04/07/2024

REVISION 4

JOB NO. 6415

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1 Introduction

Denis O'Sullivan & Associates have been engaged as Consulting Engineers for the proposed development at Scairt Cross, Castletreasure, Douglas, Cork. The proposed development consists of the construction of 46 no apartments in 2 blocks and 8 no residential dwellings and is accessed from Scairt Cross, Castletreasure, Douglas, Cork. The site is located on the outskirts of Cork City and is in close proximity to the town of Douglas. The overall development shall provide a mixture of apartments and dwelling units of varying sizes.

2 Fire Safety Assessment

This Fire Safety Assessment has been developed setting out the means by which compliance with Part B (Fire Safety) of the second schedule to the Building Regulations 1997 to 2006 is to be achieved for the proposed construction of the development and in particular Block B which has 23 apartments served by a single escape stairs.

2.1 Design Criteria

This specification and calculations are based on the following design guides:

- → Technical Guidance Document B- Fire (TGD 'B'), published by The Minister for the Environment under Article 7, of the Building Regulations reprinted edition 2020
- → Technical Guidance Document B Volume 2 Dwelling Houses- Fire (TGD 'B'), published by The Minister for the Environment under Article 7, of the Building Regulations
- → BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential buildings
- → BS 5588-8:1999 - Fire Precautions in the Design, Construction and use of Buildings Part 8: Code of practice for means of escape for disabled people
- → BRE 187:2014 - External Fire Spread: Building Separation and Boundary Distances
- → I.S. 3218: 2013 + A1:2019 Code of Practice for Fire Detection and Alarm Systems.
- → I.S. 3217: 2023 Code of Practice for Emergency Lighting.
- → BS 7346-8: 2013 Components for smoke control systems. Code of practice for planning, design, installation, commissioning and maintenance
- → BS 5306: Part 1: 2006 Code of practice for fire extinguishing installations and equipment on premises. Hose reels and foam inlets.
- → BS 9999:2017 - Fire safety in the design, management and use of buildings. Code of practice

2.2 Assessment Summary

Building Classification

The main use of the building is classified as Purpose Group 1(c), Flat or Maisonette, as per Table 0.1 TGD 'B', Classification of Buildings by purpose group. Therefore, the design for horizontal and vertical escape for the apartments shall be assessed under BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential buildings.

BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential buildings

The building will be assessed under the following sections of BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential buildings:

- Section 3: Flats and Maisonettes
    - Clause 7 Escape from fire,
    - Clause 9 Internal planning of flats
    - Clause 12 Escape routes from dwellings with corridor or lobby approach
    - Clause 14 Stairs and final exits
- Section 7; Fire Protection for facilities for buildings containing flats or maisonettes
    - Clause 36 Smoke control for means of escape.
    - Clause 37 Smoke control for firefighting

Section 3 Flats & Maisonettes

7 Escape from fire

All the units within the building are approached by way of a single protected stairwell and corridor.

The internal planning of the flats shall be in accordance with clauses 9 and 12 of BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential buildings.

9 Internal planning of flats

All flats shall comply with the following;

a) There are no inner rooms in the flats that will be habitable rooms.
b) All habitable rooms shall be entered directly from a protected entrance hall and the travel distance from the flat entrance door to the door of any habitable room shall not exceed 9m as per figure 4 of BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential buildings.

12 Escape routes from dwellings with corridor or lobby approach.

To ensure adequate safety to escaping occupants, the limitation of travel in one direction shall be adhered too along with the provision of cross corridor fire doors and ventilation. The building shall comply with section 12.2 and figure 12 of BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential building.

Block B is three stories high, and the top floor is a maximum of 8.5m over the proposed external ground level. The building is served by a single escape stairs and there is a level difference of 1.6m between the eastern and western half of the building. Therefore, the building shall comply with section 12.2 and figure 12 of BS 5588-1:1990.

To ensure adequate safety to escaping occupants, the limitation of travel in one direction of 7.5m shall be adhered too along with the provision of cross corridor fire doors and ventilation. The building shall comply with figure 12 of BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential building. An automatic opening vent (AOV) having a clear opening area of not less than $1m^2$ shall be situated at the top of the stairway enclosure and an AOV to a natural smoke shaft shall be located within the protected corridor. The smoke shaft shall comply with the following;

(i) The smoke shaft shall have a minimum cross-sectional area of $1.5m^2$.
(ii) The minimum ventilation area from the common protected corridor into the shaft, at the opening at the head of the shaft and at all internal locations within the shaft shall be at least $1m^2$
(iii) The top of the protected corridor vent shall be located as close to the ceiling of the protected corridor as is practicable and shall be at least as high as the top of the door connecting the protected corridor to the stairwell lobby.
(iv) The shaft shall extend a minimum length of 2.5m above the ceiling of the highest storey which is served by the shaft
(v) The opening at the roof shall be at least 0.5m above any surrounding structure within a horizontal distance of 2.0m
(vi) The smoke shaft shall be constructed as a protected shaft
(vii) The ventilation openings from the common protected corridor to the vent shaft shall be FD60s
(viii) No services other than those relating to the smoke shaft shall be contained within the smoke shaft
(ix) The shaft shall be vertical
(x) The design of the system shall be such that, on detection of the fire detection and alarm system, the ventilator on the fire floor, the ventilator at the top of the smoke shaft and the ventilator at the head of the stairway shall open simultaneously.

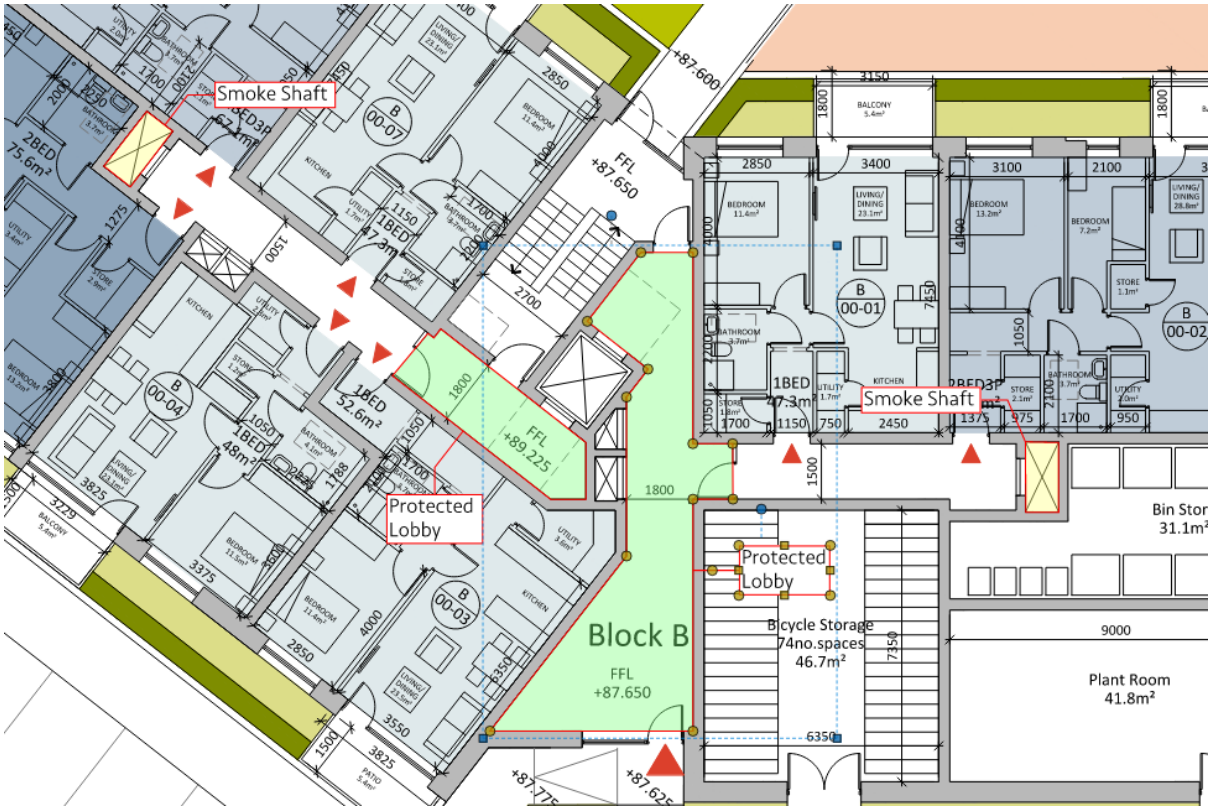

Figure 1 Ground floor layout showing smoke shafts and protected lobby to stairway.

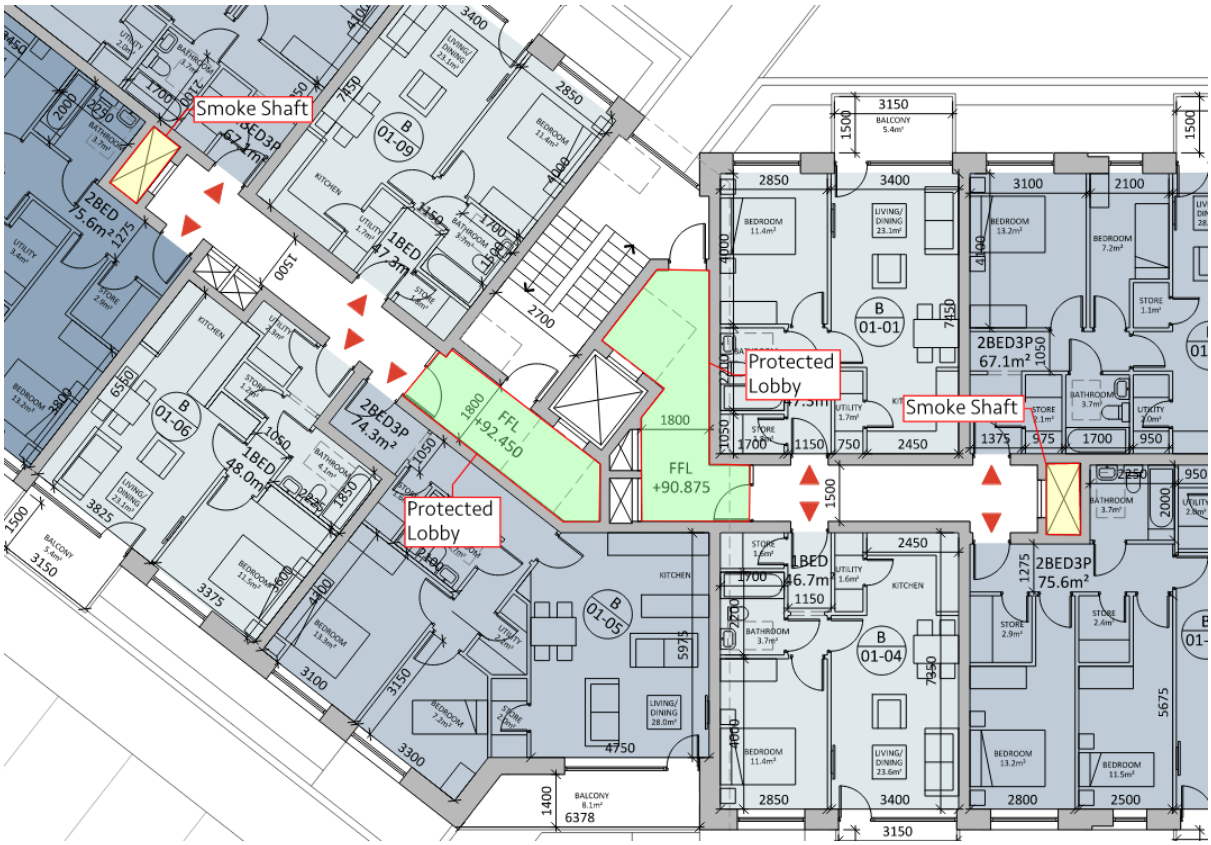

Figure 2 First floor layout showing smoke shafts and protected lobby to stairway.

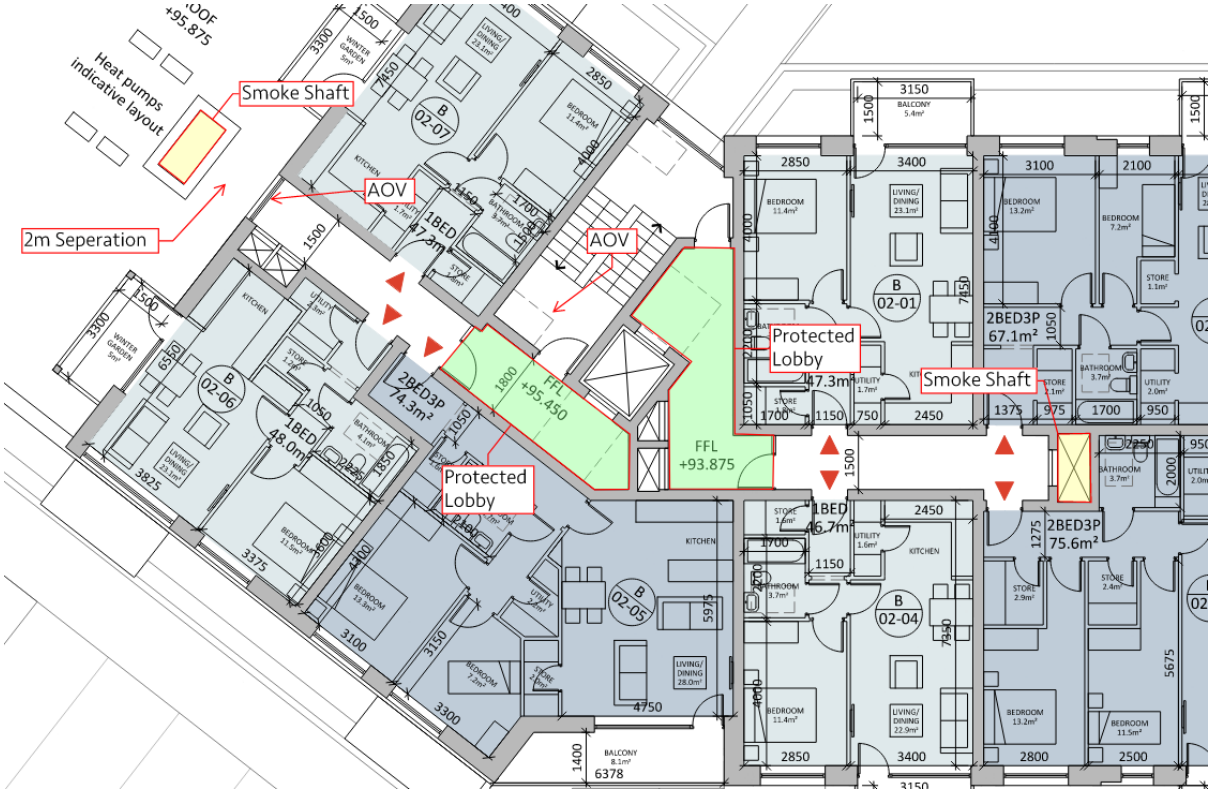

Figure 3 Second floor layout showing smoke shafts, AOV and protected lobby to stairway.

14 Stairs and final exits

There shall be one common protected escape stairs from the upper floors of the buildings. The protected escape stairs shall be within the limits of escape in one direction.

It is proposed to provide a ventilated protected corridor and a protected lobby to the stairway at all levels of the building. The building shall have a ground floor and two stories above this. All stories shall have flats only with no other uses or ancillary accommodation within the building

The common escape stairway shall have direct discharge to the exterior of the building through a final exit from the stairway. The final exit shall be immediately apparent to anyone using the stairway. The final exit shall be sited so as to be clear of any risk form fire or smoke.

Section 7 Fire protection facilities for buildings containing flats or maisonettes

36 Smoke control for means of escape.

It is proposed to provide smoke control in the protected corridor on all floors and at the head of the stairway.

The design of the common stairs shall be in accordance with the principles of figure 12 (a). Both wings of the buildings shall be isolated from each other by fire doors to the stairway lobby and smoke ventilations shall be provided to the corridors. The design of the system shall be such that, on detection of the fire detection and alarm system, the ventilator on the fire floor, the ventilator at the top of the smoke shaft and the ventilator at the head of the stairway shall open simultaneously.

37 Smoke control for firefighting

There shall be an AOV with a minimum of 1m^2 clear opening provided for at the top of the protected stairs. The design of the system shall be such that, on detection of the fire detection and alarm system, the ventilator on the fire floor, the ventilator at the top of the smoke shaft and the ventilator at the head of the stairway shall open simultaneously. There shall also be a fireman switch located on the wall inside the main entrance door which can be activated by the fire fighters on entering the building.

Technical Guidance Document 'B' 2006

SECTION B1 – MEANS OF ESCAPE IN CASE OF FIRE

Purpose Group

The main use of the building is classified as Purpose Group 1(c), Flat or Maisonette, as per Table 0.1 TGD 'B', Classification of Buildings by purpose group.

Design for horizontal escape

The horizontal escape from the apartments shall be in one direction and shall be in compliance with the requirements of BS 5588-1:1990 for means of escape.

Escape from all Flats shall be in one direction only, as each storey has an occupant capacity of not more than 60 people and falls within the limits on travel distance in one direction only as per BS 5588-1:1990.

The stairs shall not form part of any circulation route between different parts of the building at the same level.

Each Flat shall have a separate occupancy, ownership or tenancy and shall comply with the following points:

a) The means of escape for each Flat shall not pass through any other Flat.
b) The stairway serving the Flats shall be protected using 60-minute fire resisting construction.
c) The property will be fitted with an *LD2/L3X* fire detection alarm system.

The minimum width of escape routes shall comply with both BS 5588-1:1990 and Table 1.4 of TGD 'B'. The final escape door from the escape stairs shall be 800mm clear opening.

Protected Corridors

The hallways within the Flats shall be constructed to achieve a minimum of 30 minutes fire resistance and shall be fitted with FD20 fire doors internally. The protected corridor and lobby to the stairway shall be constructed to achieve a minimum of 60 minutes fire resistance and shall be fitted with FD30s fire doors The protected stairway shall be constructed to achieve a minimum of 60 minutes fire resistance and all doors fitted to the stairway shall be FD30s fire doors.

Evacuation Considerations

Normal "self-help" evacuation procedures shall be used in this building. For people with disabilities a refuge area shall be provided in the escape stairs from which further evacuation can be made under less pressure of time as per BS 5588-8:1999.

Compartmentation

The building shall be constructed so that each Flat is constructed as a compartment. Each compartment shall be separated from each other by 60-minute compartment walls and floors.

Design for Vertical Escape

The flats shall be served by a single escape stair and shall be in accordance with BS 5588-1:1990.

Width of Escape Stairways

The escape stairways shall be 1200mm wide or 1000mm between handrails and therefore meets the minimum requirement of 750mm wide required in Section 3 of BS 5588-1:1990 and table 1.5 of Technical Guidance Document B- Fire (TGD 'B'). The stairway does not exceed 1400mm wide and does not narrow in the direction of escape and so complies with section 1.3.4 points (a) to (d) of TGD 'B'.

Provision of protected lobbies and corridors

It is proposed to provide a ventilated protected corridor and a protected lobby to the stairway at all levels of the building. as per figure 12 (a) of BS 5588-1:1990 - Fire Precautions in the Design, Construction and use of Buildings Part 1: Code of practice for residential buildings. The building shall have a ground floor and two stories above this. All stories shall have flats only with no other uses or ancillary accommodation within the building.

Fire Detection & Alarm Systems

An automatic fire detection & alarm system type LD2 is proposed for the individual Flats. A type L3X is proposed in the communal areas which shall also be linked to a heat detector and sounder in the entrance corridor of the Flats. The fire alarm shall incorporate automatic detectors and manual call points. The fire alarm is to be designed and installed in accordance with I.S. 3218: 2013 + A1:2019 Code of Practice for Fire Detection and Alarm Systems.

Provisions for Disabled Persons

Access for disabled persons shall be provided in accordance with T.G.D. – M and means of escape is provided in accordance with B.S. 5588-8 1999 Code of practice for means of escape for disabled people.

A refuge areas shall be provided in the escape stairway.

Heat Producing Appliances

Heating to the flats shall be provided by way of heat pumps located on the roof or on the individual balconies to each flat. Refrigerant gas pipes shall be ducted to the internal heat pump unit which shall supply hot water to radiators, underfloor heating and hot water storage cylinders. Any pipework from the heat pumps on the roofs shall be fire stopped at roof and floor levels.

Section B5 – Access & Facilities for the Fire Services

Fire Main

The Development shall receive fire-fighting water from the public mains. It is proposed to install Fire hydrants as indicated on the drawings 6415-5030.

Fire hydrants shall be provided within the development as indicated on the site layout drawing. The fire hydrants are required so that the location of the hydrants shall be in accordance with Diagram 30 of TGD 'B'.

Vehicle access

Fire brigade vehicle access to the exterior of the building will be in accordance with TGD 'B'.

Fire appliances have access to the buildings from Scairt Cross via the development road. Fire appliances will have access to the front elevations of all building from the internal estate roads which will comply with either 'Recommendations for Site Development Works for Housing Areas' (Department of the Environment and Local Government, October 1998) or The 'Design Manual for Urban Roads and Street' (Department of Transport, Tourism and Sport and the Department of Environment, Community and Local Government) or Making Places : a design guide for residential estate development (by Melville Dunbar Associates and Cork County Council).

The required minimum clear widths as shown in Diagram 32 of TGD 'B' can all be achieved for pumping appliances as the street's widths are adequate. Turning facilities for appliances shall be provided at the end of the internal road in accordance with Table 5.2 TGD 'B'.

Personnel access to building for fire fighting

Access to the buildings for firefighting purposes are by way of the normal exit / entrance doors.