FREYA COMPREHENSIVE FIRE SOLUTIONS

PRIVATE & CONFIDENTIAL

Fire Safety Strategy

sempra HOMES

Chapel Gate Development
Laindon Link
Basildon
Essex

FCFS Report FSS/311296-01

Prepared on behalf of: **Calfordseaden LLP**

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March 2021

Issue Record

Issue	Date	Recipient	Comments
01	05 March 2021	Kyle Helleur, Asri Asra	For Comment
02			

Amendment Record

Paragraph	Date	Amendments

Quality Control Record

Issue	01	02	03	04	05
Author	Paul Brown				
Reviewer	Hayden Julian				

Contents

List of Tables

List of Figures

1. INTRODUCTION

Freya Comprehensive Fire Solutions Ltd (Freya) have been commissioned by Calfordseaden LLP on behalf of Sempra Homes to create a fire strategy for the Chapel Gate Development, Laindon Link, Basildon, Essex.

The relevant recommendations for the preparation of a fire safety strategy are contained within Approved Document B 2019 as amended.

For the purposes of this fire safety strategy, BS 9991:2015[1] has been used as a performance benchmark. BS 9991 offers guidance and recommendations from a fire safety perspective with particular attention to The Building (Amendment) Regulations 2018 and The Regulatory Reform (Fire Safety) Order 2005.

Where areas of the design of the building depart from the general guidance and recommendations set out under BS 9991, it is proposed to adopt alternative solutions using performance-based fire safety engineering in lieu of comprehensively meeting the guidance and recommendations discussed. In all cases, Freya consider that a satisfactory standard of fire safety is still to be achieved.

This report provides strategic information on means of warning and escape, internal and external fire spread, as well as access and facilities for the Fire and Rescue Service.

This report is based on drawings supplied by the client and prepared by BPTW Architects.

The drawings of the proposed works considered in the writing of this report are outlined below.

Drawing Number	Revision	Date	Description	Architect
CPK-BPTW-10-00-DR-A-1000	C01	23.03.2021	Block A Ground Floor Plan	BPTW
CPK-BTPW-10-01-DR-A-1001	C01	23.03.2021	Block A First Floor Plan (Typical Floor)	BPTW
CPK-BTPW-10-05-DR-A-1005	C01	23.03.2021	Block A - Roof Plan	BPTW
CPK-BTPW-10-ZZ-DR-A-2010	C01	23.03.2021	Block A Elevation - North	BPTW
CPK-BTPW-10-ZZ-DR-A-2011	C01	23.03.2021	Block A Elevation - East	BPTW
CPK-BTPW-10-ZZ-DR-A-2012	C01	23.03.2021	Block A Elevation - South	BPTW
CPK-BTPW-10-ZZ-DR-A-2013	C01	23.03.2021	Block A Elevation - West	BPTW
CPK-BTPW-11-00-DR-A-1010	C01	23.03.2021	Block B Ground Floor Plan	BPTW
CPK-BTPW-11-07-DR-A-1017	C01	23.03.2021	Block B Seventh Floor Plan	BPTW
CPK-BTW-11-08-DR-A-1018	C01	23.03.2021	Block B Roof Plan	BPTW
CPK-BTPW-11-ZZ-DR-A-2020	C01	23.03.2021	Block B Elevation - North	BPTW
CPK-BTPW-11-ZZ-DR-A-2021	C01	23.03.2021	Block B Elevation - East	BPTW
CPK-BTPW-11-ZZ-DR-A-2022	C01	23.03.2021	Block B Elevation - South	BPTW

[1] BS 9991:2015 – Code of practice for fire safety in the design, management and use of residential buildings.

CPK-BTPW-11-ZZ-DR-A-2023	C01	23.03.2021	Block B Elevation - West	BPTW
CPK-BPTW-12-00-DR-A-1020	C01	23.03.2021	Block C Ground Floor Plan	BPTW
CPK-BPTW-12-01-DR-A-1021	C01	23.03.2021	Block C First Floor Plan	BPTW
CPK-BPTW-12-06-DR-A-1026	C01	23.03.2021	Block C Roof Plan	BPTW
CPK-BTPW-12-ZZ-DR-A-2030	C01	23.03.2021	Block C Elevation - North	BPTW
CPK-BTPW-12-ZZ-DR-A-2031	C01	23.03.2021	Block C Elevation - East	BPTW
CPK-BTPW-12-ZZ-DR-A-2032	C01	23.03.2021	Block C Elevation - South	BPTW
CPK-BTPW-12-ZZ-DR-A-2033	C01	23.03.2021	Block C Elevation - West	BPTW
CPK-BPTW-13-00-DR-A-1030	C01	23.03.2021	Block D Ground Floor Plan	BPTW
CPK-BPTW-13-01-DR-A-1031	C01	23.03.2021	Block D First Floor Plan	BPTW
CPK-BPTW-13-07-DR-A-1037	C01	23.03.2021	Block D Roof Plan	BPTW
CPK-BTPW-13-ZZ-DR-A-2040	C01	23.03.2021	Block D Elevation - North	BPTW
CPK-BTPW-13-ZZ-DR-A-2041	C01	23.03.2021	Block D Elevation - East	BPTW
CPK-BTPW-13-ZZ-DR-A-2042	C01	23.03.2021	Block D Elevation - South	BPTW
CPK-BTPW-13-ZZ-DR-A-2043	C01	23.03.2021	Block D Elevation - West	BPTW
CPK-BPTW-14-00-DR-A-1040	C01	23.03.2021	Block E Ground Floor Plan	BPTW
CPK-BPTW-14-01-DR-A-1041	C01	23.03.2021	Block E First Floor Plan	BPTW
CPK-BPTW-14-07-DR-A-1047	C01	23.03.2021	Block E Seventh Floor Plan	BPTW
CPK-BPTW-14-10-DR-A-1050	C01	23.03.2021	Block E Roof Plan	BPTW
CPK-BPTW-14-ZZ-DR-A-2050	C01	23.03.2021	Block E Elevation - East	BPTW
CPK-BPTW-14-ZZ-DR-A-2051	C01	23.03.2021	Block E Elevation - North-East	BPTW
CPK-BPTW-14-ZZ-DR-A-2052	C01	23.03.2021	Block E Elevation - North-West	BPTW
CPK-BPTW-14-ZZ-DR-A-2053	C01	23.03.2021	Block E Elevation - South	BPTW
CPK-BPTW-14-ZZ-DR-A-2054	C01	23.03.2021	Block E Elevation - South-West	BPTW
CPK-BPTW-14-ZZ-DR-A-2055	C01	23.03.2021	Block E Elevation - West	BPTW

CPK-BPTW-08-00-DR-A-0102	C01	23.03.2021	Site Ground Floor Plan	BPTW
CPK-BPTW-08-00-DR-A-0106	C01	23.03.2021	Site Proposed Ground Finished Floor Level Plan	BPTW
CPK-BPTW-15-ZZ-DR-A-1060	C01	23.03.2021	House Terrace 01- Floor Plans	BPTW
CPK-BPTW-15-ZZ-DR-A-2060	C01	23.03.2021	House Terrace 01- Elevations	BPTW
CPK- BPTW-16-ZZ-DR-A-1070	C01	23.03.2021	House Terrace 02 - Floor Plans	BPTW
CPK- BPTW-16-ZZ-DR-A-2070	C01	23.03.2021	House Terrace 02 - Elevations	BPTW

Table 1: Drawings Reviewed

It is also important that the buildings' management team have a clear understanding of the fire safety strategy adopted, as well as of the operation and maintenance of the equipment designed to protect lives and property.

It is envisaged that this strategy will be used to inform and assist the person(s) responsible for the buildings in the assessment of risk with regards to fire. As such, this strategy should be considered along with the recommendations and findings of the fire risk assessments.

This strategy does not address contractor on-site fire safety issues during construction.

2. FIRE ENGINEERING BRIEF

The purpose of the Fire Engineering Brief is to consult with the relevant stakeholders to define the scope of the project, to agree upon the objectives and fire safety measures, as well as avoid the need for extra building work to be undertaken at the end of a project before a building can be occupied for its intended purpose.

Procedural guidelines[2] for fire safety (prepared by the Department for Communities and Local Government) provides direction with regard to the extent of consultation needed during the building approvals process.

In terms of approval, the two key bodies concerning fire safety are the building control body and the fire safety enforcing authority.

2.1 Building Control

Building control bodies are responsible for monitoring compliance with the requirements of the Building Regulations and should take a co-ordinating role with fire safety enforcement authorities (and where appropriate, with other regulatory bodies).

[2] Department for Communities and Local Government, Building Regulations and Fire Safety Procedural Guidance, Fourth Edition, July 2007.

2.2 Fire Safety Authority

The fire safety authority is responsible for the enforcement of the Regulatory Reform (Fire Safety) Order 2005 (FSO) which concerns the safety of people in relation to the operation and the use of certain buildings once occupied.

This strategy will need to be issued to the relevant building control authority for consideration and negotiation with the fire safety enforcing authority.

3. EVACUATION APPROACH

The proposed evacuation strategy for the five apartment blocks is a stay-put policy (also known as defend-in-place).

A defend-in-place evacuation strategy is typically assigned to residential apartments due to the high degree of compartmentation. A fire is assumed to be confined in the apartment of fire origin and only occupants in the apartment of fire origin evacuate in the first instant. Other building occupants may remain unaware of the fire unless evacuated by the Fire and Rescue Service (F&RS) or Management (where applicable), or they may choose to evacuate at any time.

4. DEVELOPMENT DESCRIPTION

The proposed development is for the creation of five (5) blocks of residential apartments and sixteen (16) residential houses.

The design for each of the residential apartment blocks is as follows.

Block A - 5 storeys (ground and 1st to 4th floors). The block will provide 32 single-storey apartments comprising of four apartments on the ground floor level and seven apartments on each of the upper storeys. The floor layout is mirrored over the 1st to 4th floor levels. There is also a refuse store and a cycle store provided at ground floor level.

Block B - 8 storeys (ground and 1st to 7th floors). The block is staggered in height with one section comprising ground to 6th floor levels and the second section extending to the 7th floor level. The block will provide a total of 49 single-storey apartments comprising of four apartments on the ground floor level and seven apartments on each of the 1st to 6th floors. The floor layout is mirrored over the 1st to 6th floor levels. At 7th floor level there is an additional three apartments. At ground floor level there is also a refuse store and a cycle store provided.

Block C - 6 storeys (ground and 1st to 5th floors). The block will provide a total of 36 single-storey apartments comprising of one apartment on the ground floor level and seven apartments on each of the 1st to 5th floors. The floor layout is mirrored over the 1st to 5th floor levels. At ground floor level there is also a refuse store provided.

Block D - 7 storeys (ground and 1st to 6th floors). The block will provide a total of 43 single-storey apartments comprising of one apartment on the ground floor level and seven apartments on each of the 1st to 6th floors. The floor layout is mirrored over the 1st to 6th floor levels. At ground floor level there is also a refuse store and a small caretaker's room provided.

Block E - 10 storeys (ground and 1st to 9th floors). The block is staggered in height with one section comprising ground to 6th floor levels and the second section comprising the 7th to 9th floor levels. The block will provide a total of 57 single-storey apartments comprising of seven apartments on each of the 1st to 6th floors. The floor layout is mirrored over the 1st to 6th floor levels. At 7th - 9th floor levels, there are three apartments. At ground floor level, there is the energy centre, water tank room, a refuse store and four-cycle stores provided.

5. MEANS OF WARNING

5.1 Individual Apartments

As a minimum, each apartment should be fitted with a mains-powered automatic fire detection and alarm (AFD) system to a minimum Grade D Category LD2 standard (in accordance with BS 5839-6:2019[3]). The AFD system for each apartment should be provided with an integral standby supply.

A category LD2 system should incorporate detectors in all circulation spaces that form part of the escape routes from the apartment and would also include coverage to specified risk areas; typically lounge and kitchen.

A heat detector should be installed in every kitchen. Consideration needs to be given to spacing requirements and the potential for false alarms from a smoke detector in the lounge as the kitchens open directly into the lounge.

The smoke and heat alarms should comply with BS EN 14604:2005[4] and BS 5446-2:2003[5] respectively.

It is not necessary to provide AFD interconnection between apartments.

5.1.1 Balconies

Where balconies are provided and there is no visibility to all areas of the access room from the balcony, smoke detection should be included to the access room and a sounder provided to the balcony.

5.2 Houses

A Grade D Category LD1 system should be provided to all houses. The system should incorporate detectors in all circulation areas that form part of the escape routes from the premises, and in all specified rooms or areas that present a high fire risk to occupants (including any kitchen and the principal habitable room).

5.3 Communal Areas within Blocks A to E

It is not a recommendation of any code of practice to provide fire alarms (sounders) in the common areas of residential blocks when a "defend-in-place" strategy has been adopted. However, automatic fire detection is to be provided in common areas to operate the smoke control system serving those areas.

As a result, a Category L5 AFD system (without sounders) should be provided within the Protected Lobbies leading onto the Protected Stairs within each block. Although the proposed Category L5 AFD system will not technically comply in full to BS 5839-1:2017[6] (as it is installed as part of the ventilation system, not as a fire alarm system), it is expected that the design, equipment and standard of installation will follow the relevant recommendations within BS 5839-1.

Actuation of a smoke detector within a Protected Lobby must immediately activate the automatic opening mechanisms for the Automatic Opening Vents (AOVs) relevant to that area. The AOV at the head of the stairs for Blocks A-D should also open simultaneously upon actuation of any of the AOVs.

Within Block E, actuation of a smoke detector within a Protected Lobby must immediately activate the automatic opening mechanisms for the Automatic Opening Vents (AOVs) relevant to that area. The AOV at the full landing level (relevant to the Protected Lobby that has seen an actuation) into the smoke shaft within the fire-fighting stair should also open simultaneously.

[3] BS 5839-6:2019 – Fire detection and fire alarm systems for buildings. Part 6: Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises.
[4] BS EN 14604:2005 – Smoke alarm devices.
[5] BS 5446-2:2003 – Fire detection and fire alarm devices for dwellings. Part 2: Specification for heat alarms.
[6] BS 5839-1:2017 – Fire detection and fire alarm systems for buildings. Part 1: Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises.

Within Block E, actuation of the smoke detector at each full landing of the fire-fighting shaft must immediately activate the AOV into the smoke shaft at that level, as well as the AOV at the head of the shaft.

It is not proposed to install Manual Call Points (MCPs) in the residential common areas. However, Fire Service vent-override controls should be provided in appropriate locations.

A Fire Alarm Control Panel (FACP) is to be provided in the entrance doorway of each block to provide information to the Fire & Rescue Service (F&RS) in regard to AOV activations.

6. MEANS OF ESCAPE

6.1 General

Owing to the high degree of compartmentation provided in dwellings in modern blocks, the spread of fire and smoke from one dwelling to another and the need to evacuate the occupants of adjoining dwellings are unusual. The occupants should be safe if they remain where they are. Nevertheless, the possibility that individuals may seek to leave the building cannot be overlooked, and therefore, provision should be made for the occupant of any dwelling to do so by their own unaided efforts, using adequately protected escape routes within the building without outside assistance.

The internal planning of any dwelling depends on its size, height and whether it has an independent final exit. Due to the presence of sleeping occupants within a dwelling (who may require a significant period of pre-movement time), it is essential to ensure that adequate and suitable means of escape are provided.

The defined term for apartment or apartments under BS 9991 is as follows:

> *Flat: dwelling, forming part of a larger building, that has all of its rooms on one level or, in the case of split-level flats, not more than half a storey height apart.*

All apartment entrance doors will be self-closing FD30S doors where no non-insulating glass or other non-fire-resisting apertures are permitted.

Security requirements should not override the need to provide adequate means of escape. All security locks and/or devices fitted to a dwelling entrance door should be openable from the inside by a single manual operation not requiring the use of a key.

Any secure doors on the escape route outside a dwelling should be provided with a simple opening device on the side of where occupants are seeking egress.

6.2 Evacuation within the Apartments

All of the residential apartments are single-storey apartments, and as such, the entrance level is on the same level as the apartment.

Within all the blocks, the apartments are designed with a Protected Entrance Hall that leads off to all habitable rooms. The travel distance from any point within the Protected Entrance Hall to the apartment entrance hall is within the 9m allowed.

6.3 Evacuation within the Houses

All housesare to be provided with Protected Escape Routes comprising the first-floor landing, staircase and the ground floor entrance hall. The design of the escape route is such that they can be maintained as sterile areas.

6.4 Horizontal Evacuation in Blocks A to E

Within each block, the design of the horizontal escape within the common areas is designed on the allowance for single-stair buildings with a floor level over 11m as per Paragraph 7.4 and Figure 6 of BS 9991 (as reproduced in Figure 1 below).

Figure 6 **Common escape routes in single stair buildings with a floor level more than 11 m above ground**

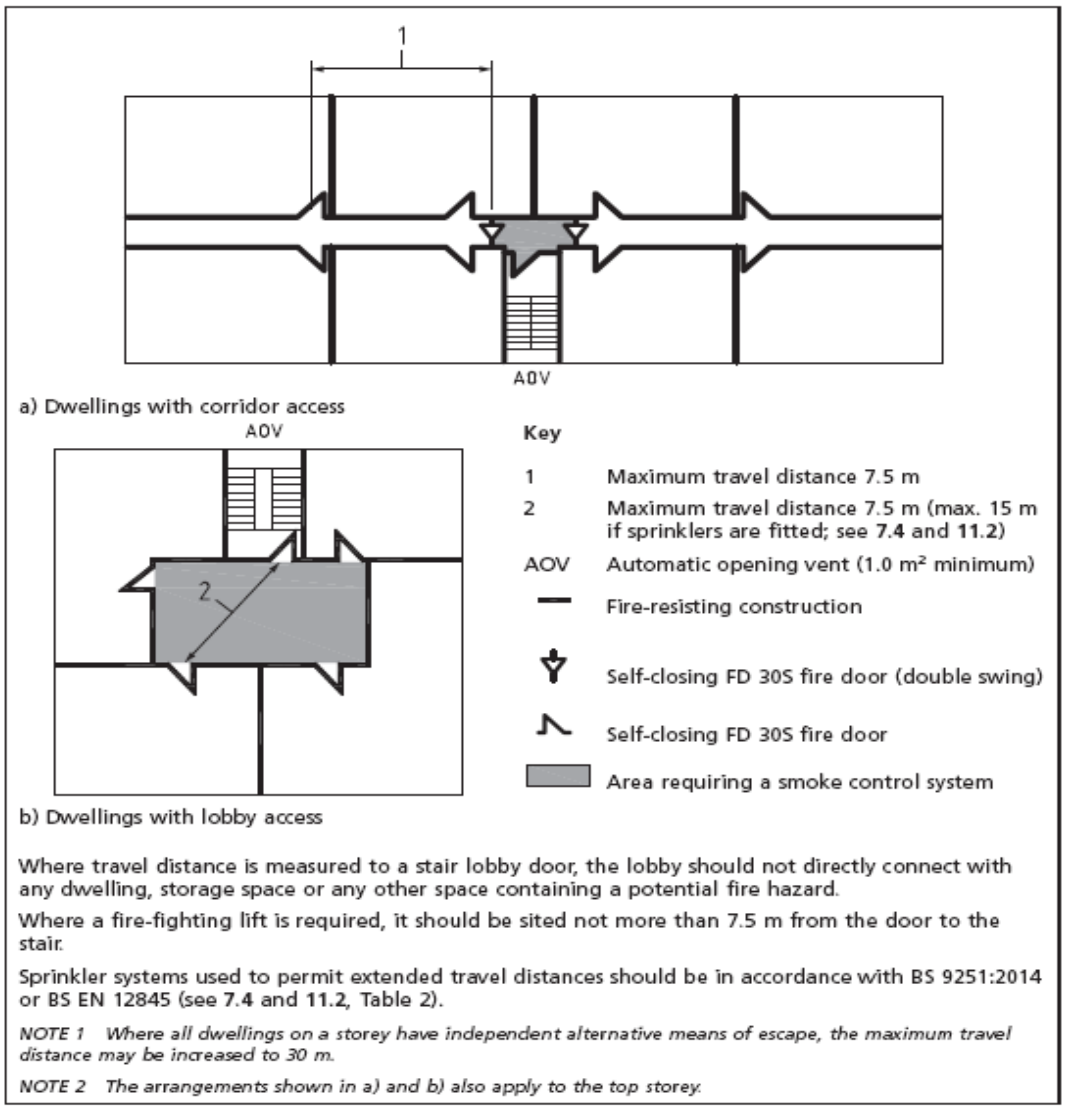

Figure 1: Reproduction of Figure 6 of BS 9991:2015

6.4.1 Block A

At ground floor level, the design approach is for persons making their escape to travel no more than 7.5m through an unventilated Protected Corridor that leads to a final exit from the building. Each apartment is also provided with an alternative means of escape through the rear door and onto the veranda (as shown in Figure 2).

The building adopts a defend-in-place approach. Therefore, if there was a fire at ground-floor level then persons from the upper floors would not in principle be evacuating. However, consideration must be given to the potential for persons to be descending the stairs. There is a final exit that leads directly from the Protected Stairs direct to fresh air; therefore, persons escaping from the upper floors are not required to enter into any areas that may contain smoke or the effects of a fire at ground floor level.

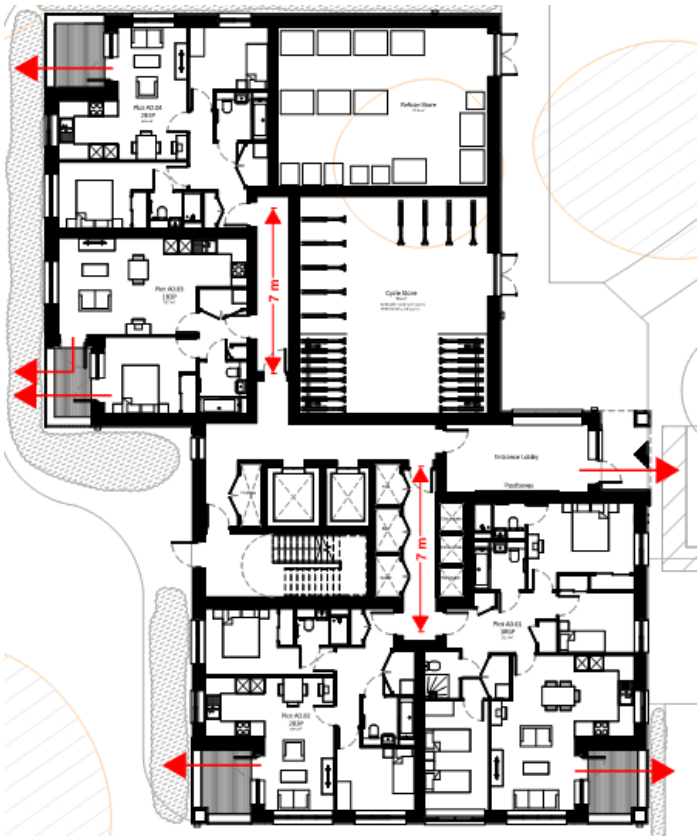

Figure 2: Block A ground floor escape routes

For the upper floor levels, the design intention is for persons to travel up to 7.5m through an unventilated Protected Corridor that will lead to a ventilated Protected Lobby prior to entering the Protected Stairs (as shown in Figure 3).

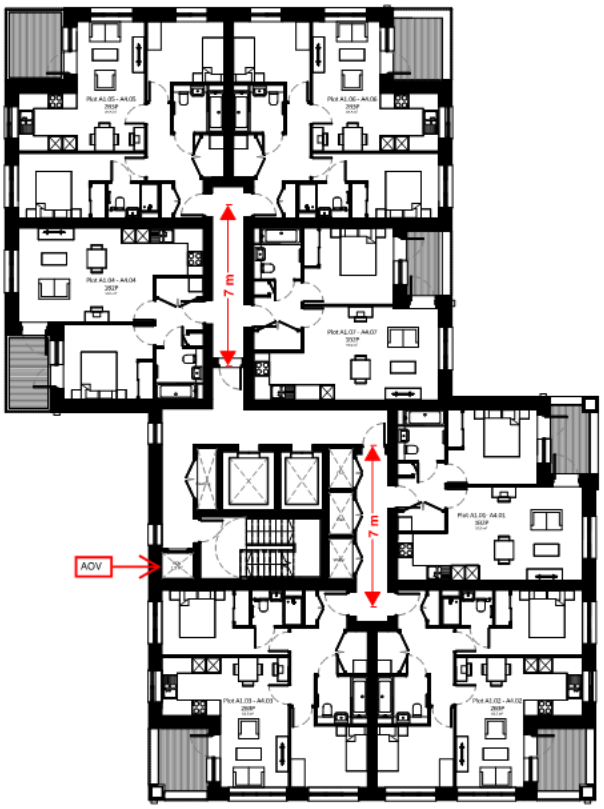

Figure 3: Block A upper floor escape routes

6.4.2 Block B

At ground floor level, the design approach is for persons making their escape to travel no more than 7.5m through an unventilated Protected Corridor that leads to a final exit from the building. Each apartment is also provided with an alternative means of escape through the rear door and onto the veranda (as shown in Figure 4).

As with all the blocks, the building adopts a defend-in-place approach. Therefore, if there was a fire at ground-floor level, persons from the upper floors would not in principle be evacuating. However, consideration must be given to the potential for persons to be descending the stairs. There is a final exit that leads directly from the Protected Stairs direct to fresh air; therefore, persons escaping from the upper floors are not required to enter into any areas that may contain smoke or the effects of a fire at ground floor level.

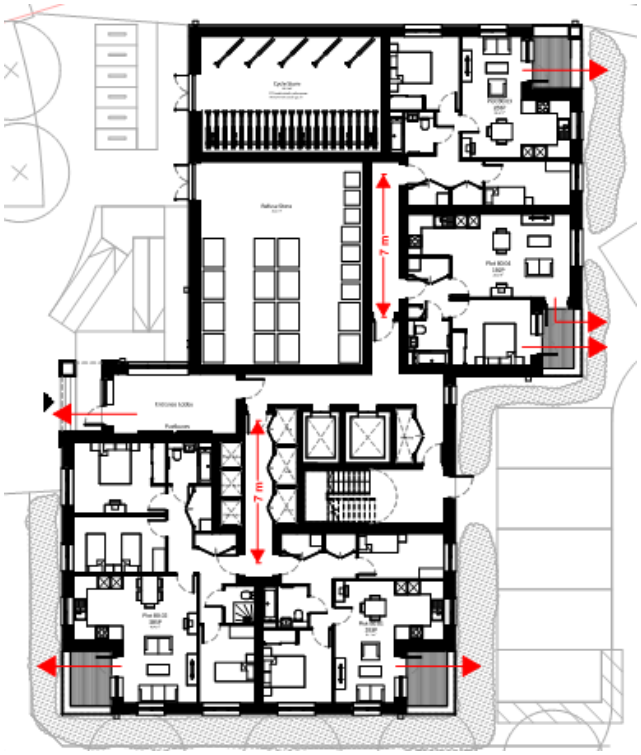

Figure 4: Block B ground floor escape routes

For the 1st to 6th floors, the design intention is for persons to travel up to 7.5m through an unventilated corridor that will lead to a ventilated Protected Lobby prior to entering the Protected Stairs (as shown in Figure 5).

For the 7th and 8th floors, the accommodation footprint is reduced due to the staggered height design of the building. The design intention however remains the same approach; with persons travelling up to 7.5m through an unventilated Protected Corridor that leads into a Protected Lobby prior to entering the Protected Stairs (as shown in Figure 6).

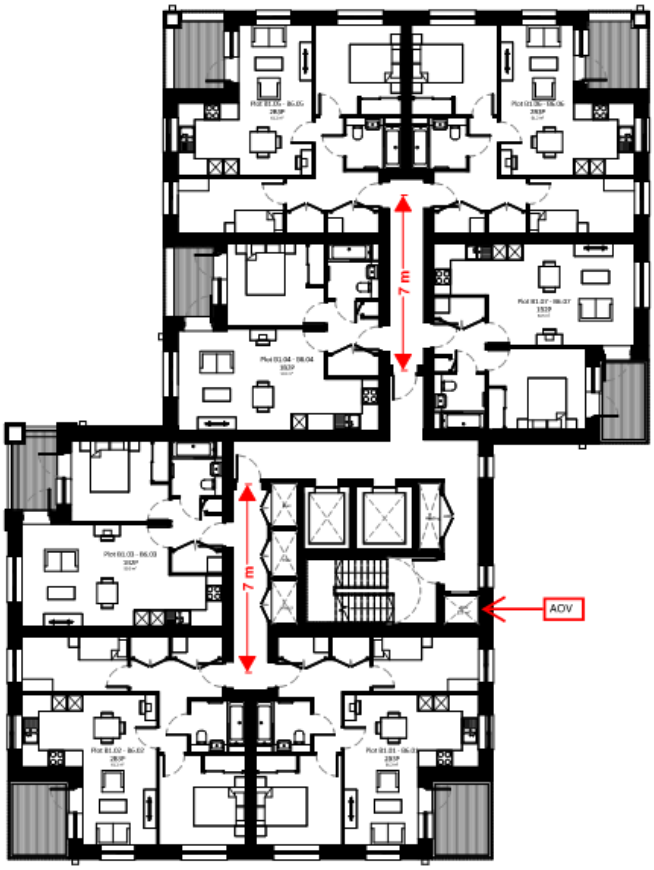

Figure 5: Block B 1st to 6th floor escape routes

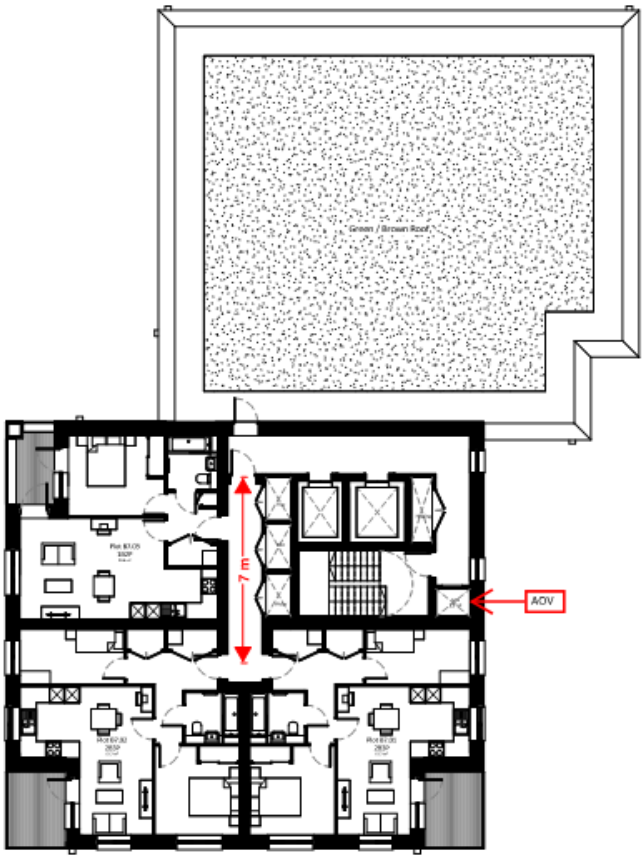

Figure 6: Block B 7th and 8th floor escape routes

6.4.3 Block C

At ground floor level, the design approach is for persons making their escape to travel no more than 7.5m through an unventilated Protected Corridor that leads to a final exit from the building. The apartment is also provided with an alternative means of escape through the rear door and onto the veranda (as shown in Figure 7).

As with all the blocks, the building adopts a defend-in-place approach. Therefore, if there was a fire at ground-floor level, persons from the upper floors would not in principle be evacuating. However, consideration must be given to the potential for persons to be descending the stairs. There is a final exit that leads directly from the Protected Stairs direct to fresh air. Therefore, persons escaping from the upper floors are not required to enter into any areas that may contain smoke or the effects of a fire at ground floor level.

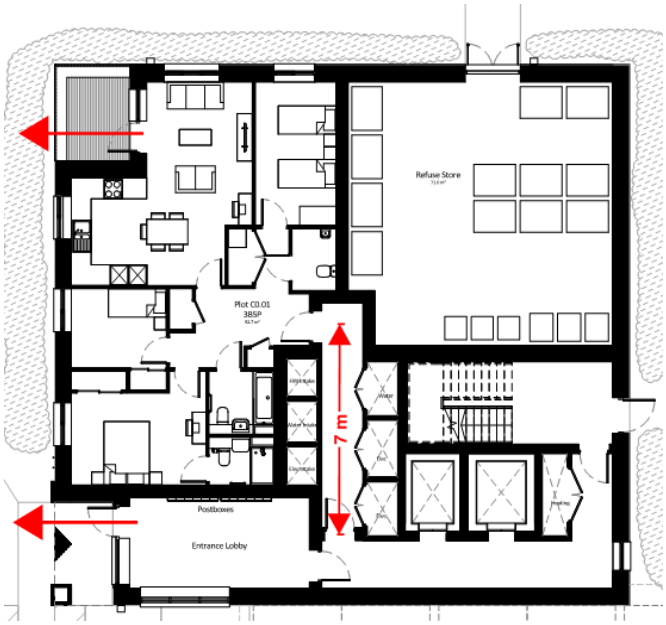

Figure 7: Block C ground floor escape routes

As with Blocks A and B, the design intention for the upper floor levels is for persons to travel up to 7.5m through an unventilated Protected Corridor that will lead to a ventilated Protected Lobby prior to entering the Protected Stairs (as shown in Figure 8).

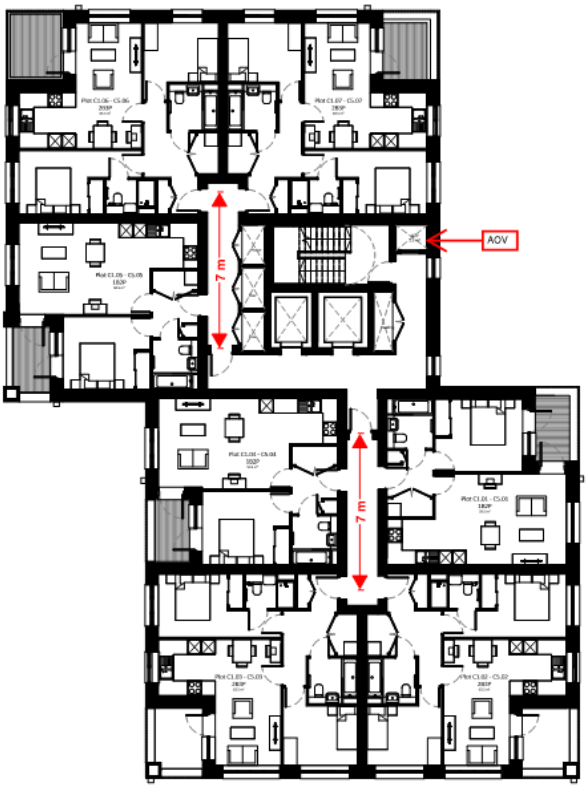

Figure 8: Block C upper floor escape routes

6.4.4 Block D

As with other blocks, at ground floor level the design approach is for persons making their escape to travel no more than 7.5m through an unventilated Protected Corridor that leads to a final exit from the building. The apartment is also provided with an alternative means of escape through the rear door and onto the veranda (as shown in Figure 9).

As with all the blocks, the building adopts a defend-in-place approach. Therefore, if there was a fire at ground-floor level, persons from the upper floors would not in principle be evacuating. However, consideration must be given to the potential for persons to be descending the stairs. There is a final exit that leads directly from the Protected Stairs direct to fresh air. Therefore, persons escaping from the upper floors are not required to enter into any areas that may contain smoke or the effects of a fire at ground floor level.

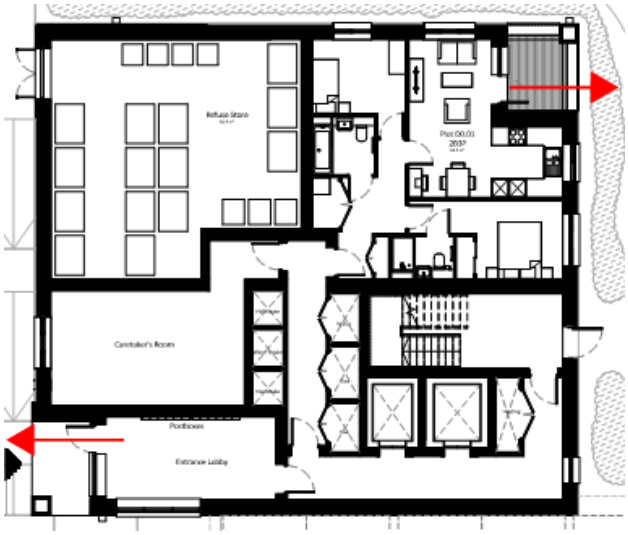

Figure 9: Block D ground floor escape routes

As with Blocks A to C, the design intention for the upper floor levels is for persons to travel up to 7.5m through an unventilated Protected Corridor that will lead to a ventilated Protected Lobby prior to entering the Protected Stairs (as shown in Figure 10).

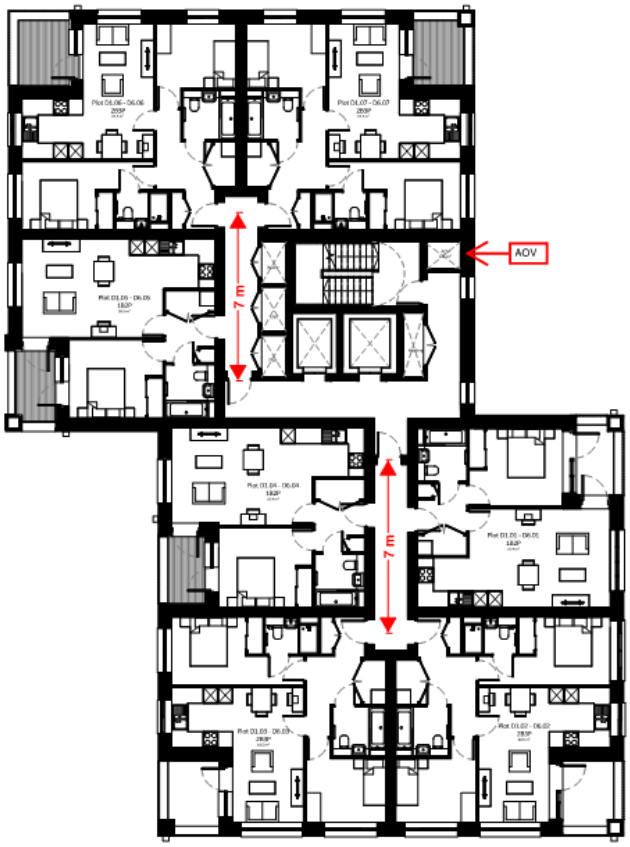

Figure 10: Block D upper floor escape routes

6.4.5 Block E

Within Block E there are no apartments at ground floor level.

On the 1st to 6th floors within the corridor serving the apartments to the north, the design intention is for persons to travel up to 7.5m through an unventilated Protected Corridor that will lead to a ventilated Protected Lobby prior to entering the Protected Stairs (as shown in Figure 11).

For the apartments on the south side, the design intention is for persons to travel up to 11m through a ventilated Protected Corridor that is served by an Automatic Opening Vent (AOV) into a naturally vented smoke shaft (as shown in Figure 11). As the apartments are provided with Automatic Water Fire Suppression Systems (AWFSS), Paragraph 7.4 of BS 9991 allows for an increase in the travel distance through a ventilated corridor from 7.5m to 15m as shown in Figure 6 of the standard (and reproduced in Figure 12 of this strategy).

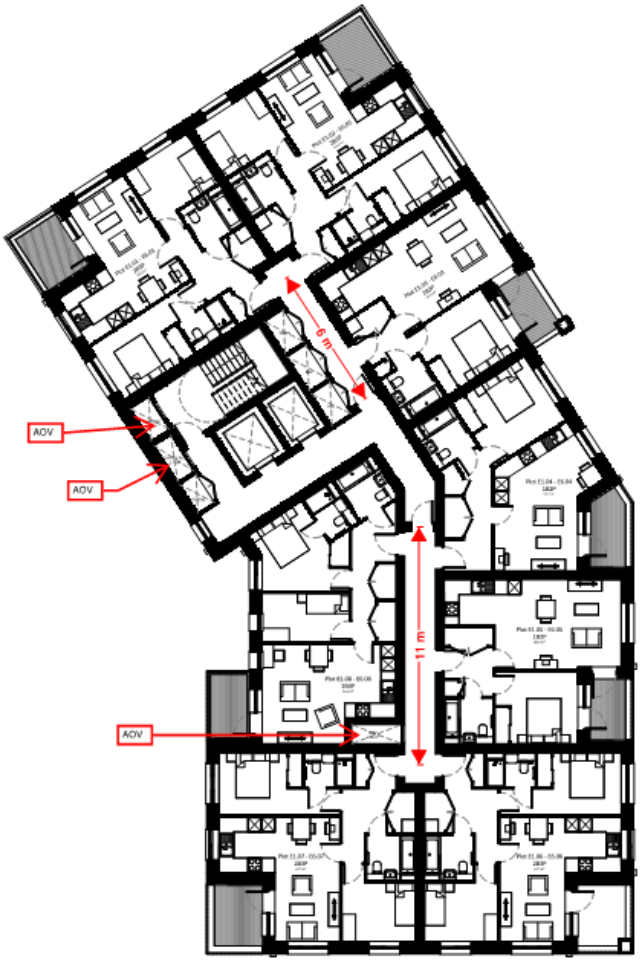

Figure 11: Block E 1st to 6th floor escape routes

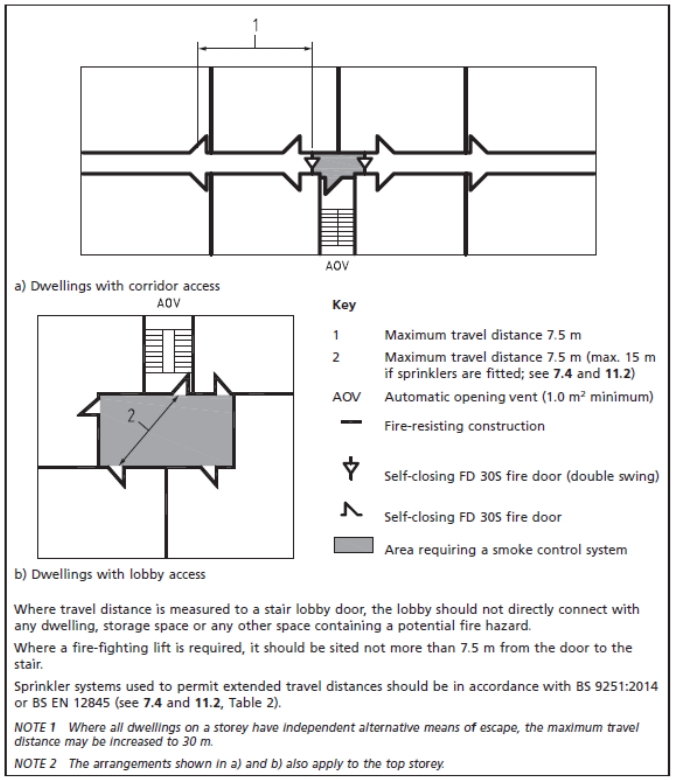

Figure 12: Reproduction of Figure 6 of BS 9991:2015

For the 7th to 9th floors, the accommodation footprint is reduced due to the staggered height design of the building. The design intention for the apartments on the north side of the block remains the same approach with persons travelling up to 7.5m through an unventilated Protected Corridor that leads into a Protected Lobby prior to entering the Protected Stairs (as shown in Figure 13).

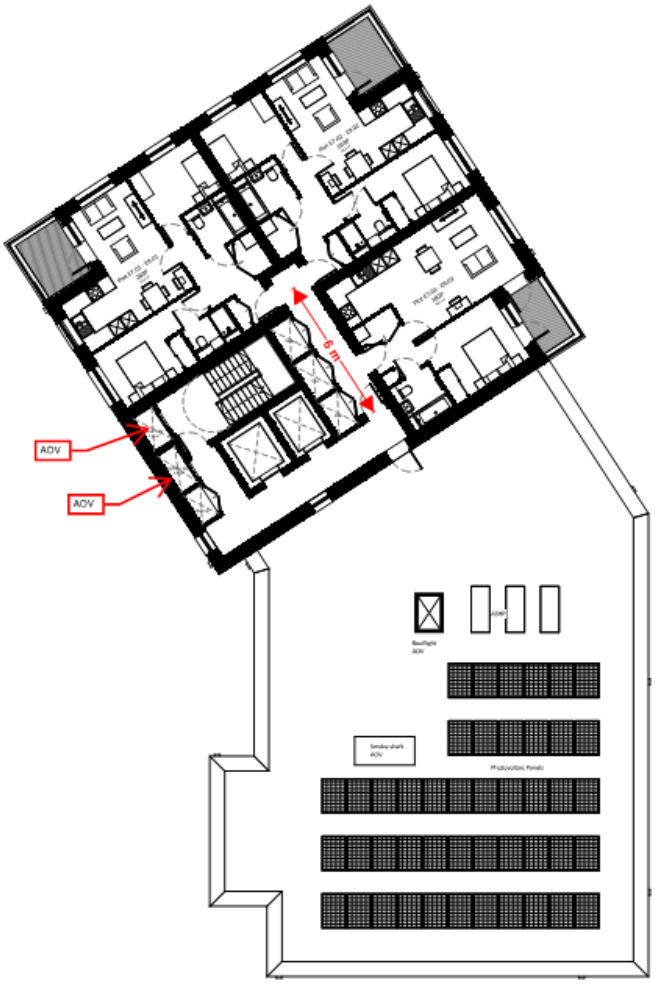

Figure 13: Block E 7th to 9th floor escape routes

6.4.6 Ancillary Accommodation

The ancillary rooms comprise mostly cycle stores and refuse stores. However, with Block D there is a caretakers room, and within Block E there is the Energy Centre and the Water Tank room.

All ancillary accommodation is located at ground floor level. Table 14 of BS 9991 allows 9m travel distance within one direction and 18m where there are more than one escape routes (which is generally achieved on the premises). It is noticed that within some of the cycle stores, the single direction travel distance slightly exceeds that allowed by 1m. However, given that these rooms are unlikely to have significant fuel loads, the extra distance can be considered as not being overly onerous.

6.5 Vertical Means of Escape

6.5.1 Blocks A and C

Blocks A and C have the highest storey level as less than 18m. Therefore, each block is provided with a single internal Protected Stair. The Protected Stairs should have an unobstructed width of 750mm between the shaft walls or the handrails which is achieved. (Note: handrails and strings that do not exceed more than 100mm into these widths may be discounted).

Within each block, access to the Protected Stairs above ground floor level is via a ventilated Protected Lobby. At ground floor level, the stairs are separated from all accommodation areas by fire-resisting construction and lead directly to a final exit.

6.5.2 Blocks B, D and E

Blocks B, D and E have the highest storey above 18m. Therefore, each block is provided with a single internal Protected Stair within a fire-fighting shaft. The Protected Stairs should have an unobstructed width of 1100mm between the shaft walls or the handrails. (Note: handrails and strings that do not exceed more than 100mm into these widths may be discounted).

Within each block, access to the fire-fighting shaft above ground floor level is via a ventilated Protected Lobby. At ground floor level, the stairs are separated from all accommodation areas by fire-resisting construction and lead directly to a final exit.

7. EMERGENCY LIGHTING AND EXIT SIGNAGE

Emergency lighting and escape signage should be provided throughout the building to the extent nominated under BS 5266-1:2016[7]. As such, emergency lighting should be provided to all escape routes and within the ancillary rooms.

Escape signage should be provided to identify escape routes within the ancillary rooms and to identify the location of the doors leading into any Protected Lobby or Protected Stair at any level. Final exit signage should be provided to identify the exit points from each block.

Escape signage should meet the requirements of BS 5499-4:2013[8] or BS ISO 3864-4:2011[9].

[7] BS 5266-1:2016 – Emergency lighting. Part 1: Code of practice for the emergency lighting of premises.
[8] BS 5499-4:2013 – Safety signs. Part 4: Code of practice for escape route signing.
[9] BS ISO 3864-4:2011 – Graphical symbols - Safety colours and safety signs. Part 4: Colorimetric and photometric properties of safety sign materials.

8. SMOKE HAZARD MANAGEMENT

8.1 Protected Lobbies

Within all blocks, all lobbies above ground floor level that lead onto the Protected Stairs are to be considered as Protected Lobbies. These are to be provided with an Automatic Opening Vent (AOV) with a minimum free venting area of 1.5m^2 that opens into a smoke shaft serving all floors except the top floor of each block.

At the top floor level of each block the Protected Lobbies are to be provided with an AOV located in the roof with a free venting area of 1.5m^2

Upon activation of the Automatic Fire Detection, only the AOV in the affected area should open and AOVs on all other floors should be closed.

8.1 Protected Stairs

Within Blocks A to D, the Protected Stairs are to be provided with an AOV with a minimum free venting area of 1m^2 sited at the top storey level as high as is practicable.

Activation of any Automatic Fire Detection within a Protected Lobby leading onto the Protected Stairs should simultaneously open the AOV at the head of the stairs, as well as the AOV in the affected lobby.

8.2 Extended Corridors

Within Block E, the corridors serving the residential accommodation to the south-east side over the 1st to 6th floors are to be ventilated by an AOV with a minimum free venting area of 1.5m^2 that opens into a naturally ventilated smoke shaft.

8.3 Block E Fire-Fighting Shaft

Within Block E, the highest storey level is just under 30m. Therefore, the Fire-Fighting Stair is to be provided with AOVs at each full landing level, except for the top floor level, with a minimum free venting area of 1.5m^2 that opens into a naturally ventilated smoke shaft.

At the top floor level the fire-fighting stair is to be provided with an AOV with a minimum free venting area of 1m^2 in the roof.

8.4 Smoke Shafts

Smoke shafts in all of the blocks are to be naturally ventilated smoke shafts. These shafts should meet the following recommendations.

1) The smoke shaft should be fully open to the external air at the top and closed at the base.
2) The opening at the top of the shaft should be located at least 0.5m above any surrounding structures that fall within a 2m radius on a horizontal plain.
3) The shaft should extend a minimum length of 2.5m above the ceiling of the highest storey which is served by the shaft.
4) The cross-sectional area (free area) of any smoke shaft should be at least 1.5m^2 with a minimum dimension of 0.85m in any direction.
5) The stair or corridor vent, the opening at the head of the shaft and all internal locations (such as safety grilles) within the shaft should have a free area of at least 1.0 m^2.

6) The top of the lobby or corridor vent should be located as close to the ceiling of the lobby or corridor as is practicable and should be at least as high as the top of the door connecting the lobby or corridor to the stairwell.

7) The vents, in the closed position, should have a minimum fire and smoke resistance performance of 30 minutes and integrity (leakage) no greater than 360 $m^3/h/m^2$ when tested in accordance with BS EN 1366-2:2015[10].

   The smoke shaft should be constructed either of non-combustible materials conforming to BS 476-4:1970[11] or of any material which, when tested in accordance with BS 476-11:1982[12], does not flame or cause any rise in the temperature on either the centre of the specimen or the furnace thermocouples.

   The smoke shaft should run vertically from top to bottom with no more than 4m of the shaft at an inclined angle (max 30°).

8) No services other than those relating to the smoke shaft should be contained within the smoke shaft.

9) The smoke shaft serving the corridors on the 1st to 6th floor levels of Block E are to be located at the remote end of the corridor away from the staircase.

9. MANUAL OPERATION OF SMOKE VENTS AND AOVS

Automatic Opening Vents are to have an "AUTO", "OPEN" and "CLOSE" override capability (for use by the Fire and Rescue Service) located at ground floor level and the highest level of each stair.

Within Block E, override switches should be provided at every full landing for the AOVs into the smoke shaft.

It is recommended that override switches for AOVs in the Protected Lobbies and the Protected Corridor in Block E be provided at every level and situated close to the point where fire-fighters would enter from. These override switches should only operate the AOV relevant to that area (and by design, the AOV at the head of the relevant Protected or Fire-Fighting Stairs).

Ground floor override controls should be located near the Fire Alarm Control Panel (FACP) in a prominent location and within reasonable reach for ease of operation. Fire equipment signage should be provided adjacent to manual control switches to identify control function. However, the control switches operate on a break-glass system which is self-explanatory.

Protective casing for controls should be considered to mitigate the risk of misuse by building occupants or others.

10. AUTOMATIC WATER FIRE SUPPRESSION SYSTEMS

Under current Building Regulations, residential buildings with a storey level over 11m are to be provided with Automatic Water Fire Suppression Systems (AWFSS) within the apartments.

There is no requirement to provide suppression systems within the common areas or the ancillary rooms.

AWFSS are to be provided in each apartment in accordance with BS 9251:2014[13] for a Category 1 system design.

[10] BS EN 1366-2:2015 – Fire resistance tests for service installations. Part 2: Fire dampers.
[11] BS 476-4:1970 – Fire tests on building materials and structures. Part 4: Non-combustibility test for materials.
[12] BS 476-11:1982 – Fire tests on building materials and structures. Part 11: Method for assessing the heat emission from building materials.
[13] BS 9251:2014 – Fire sprinkler systems for domestic and residential occupancies. Code of practice.

11. INTERNAL FIRE SPREAD (LININGS)

11.1 Material Classifications

Although unlikely to be the first materials to ignite, the wall and ceiling linings of an enclosure (such as a room) can have a dramatic effect on the development of a fire and, in particular, the time it takes for the room to become completely involved.

It is considered that the floor finishes do not significantly contribute to the development of a fire and are generally not controlled.

BS 9991 suggests that wall and ceiling linings should have the classification as shown in Table 2 below (when evaluated by the methods described in BS 476 Parts 6[14] and 7[15] as appropriate).

Location	National Class [b), b)]	European Class [c), d)]
The internal linings within circulation spaces within dwellings	Class 1	C-s3, d2
The internal linings within other circulation spaces and Protected Routes, including the common areas of blocks of flats	Class 0	B-s3, d2
Small rooms of area not more than $4m^2$ in residential portions	Class 3	D-s3, d2
Non-residential rooms less than $40m^2$	Class 3	D-s3, d2
Other rooms	Class 1	C-s3, d2

Note:

a) Linings which can be effectively tested for "surface spread of flame" are rated for performance by reference to the method specified in BS 476-7:1997, under which materials or products are classified 1, 2, 3 or 4, with Class 1 being the highest.

b) The National classifications do not automatically equate with the equivalent classifications in the European column; therefore, products cannot typically assume a European class unless they have been tested accordingly.

c) When a classification includes "s3, d2", this means that there is no limit set for smoke production and/or flaming droplets/particles.

d) Large rooms such as enclosed car parks need not be regarded as circulation spaces even though there are circulation routes in them.

Table 2: Classification of Linings

Freya recommends that Class 3 products should be avoided where possible.

[14] BS 476-6:1989+A1:2009 – Fire tests on building materials and structures. Part 6: Method of test for fire propagation for products.
[15] BS 476-7:1997 – Fire tests on building materials and structures. Part 7: Method of test to determine the classification of the surface spread of flame of products.

12. INTERNAL FIRE SPREAD (STRUCTURES)

12.1 Structural Fire-Resistance

During a fire, it is important that the structure and key construction elements of a building remain fully functional for a reasonable period of time. It is obviously beneficial if these elements remain in a serviceable condition after the fire for ease of reinstatement.

BS 9991 suggests that all elements of a structure should be given the period of fire-resistance in respect of the criteria of loadbearing capacity, integrity and insulation when evaluated in accordance with the relevant parts of the following series of guidance documents: BS 476[16], BS EN 1363[17], BS EN 1364[18], BS EN 1365[19] or BS EN 1366[20].

With respect to fire-resistance periods for structural elements, the design of the buildings should be such that failure of one part will not lead to progressive collapse of another in the event of fire.

The structure of a roof, and the structure that supports only a roof, does not generally require fire resistance unless the roof forms part of an escape route or functions as a floor, e.g. as a car park, or is part of a portal frame structure where the roof and the supporting stanchions form a single structural element.

12.1.1 Blocks A and C

For Blocks A and C, where the highest storey level is less than 18m, the fire-resistance period for structural (load bearing) elements should be not less than 60 minutes.

12.1.2 Blocks B, D and E

For Blocks B, D and E, where the highest storey level is more than 18m but less than 30m, the fire-resistance period for structural (load bearing) elements should be not less than 90 minutes.

12.2 Fire-Fighting Shafts

In Blocks B, D and E, the fire-resistance of the fire-fighting shaft, fire-fighting stairs and fire-fighting lift should be not less than 120 minutes.

12.3 Fire Separation and Compartmentation

In addition to structural fire protection, a fire should be contained by fire-resisting elements of the building to prevent it spreading to other parts of the building. This containment should include voids and cavities that could provide a path for fire.

12.3.1 Blocks A to E

Within each apartment block, the minimum fire-separation in regard to integrity and insulation for compartment lines should achieve those outlined in Table 3 below.

Service Risers and smoke shafts passing through the fire-rated floor separation should be constructed to prevent fire spread between different levels. Such shafts should maintain the same period of fire-resistance as the compartmentation which it passes through (as shown in Table 3).

[16] BS 476 – Fire tests on building materials and structures.
[17] BS EN 1363 – Fire resistance tests.
[18] BS EN 1364 – Fire resistance tests for non-load bearing elements.
[19] BS EN 1365 – Fire resistance tests for loadbearing elements.
[20] BS EN 1366 – Fire resistance tests for service installations.

Element of fire-resistance (mins) / Block	A	B	C	D	E
Party wall between apartments	60	60	60	60	60
Wall between an apartment and a corridor or a Protected Lobby	60	60	60	60	60
Wall between a corridor and a Protected Lobby	60	60	60	60	60
Horizontal compartmentation (floors)	60	90	60	90	90
Walls between an ancillary room and an escape route	60	60	60	60	60
Walls between ancillary rooms (each side separately)	30	30	30	30	30
Walls between ancillary rooms and apartments	60	60	60	60	60
Vertical Shafts	60	90	60	90	90

Table 3: Minimum Fire-Resistance to Elements of Compartmentation

12.3.2 Houses

Within the houses, the party wall between houses should achieve a minimum of 60 minutes fire-resistance for integrity and insulation.

The walls between the habitable rooms and the Protected Escape Routes should achieve a minimum of 30 minutes fire-resistance for integrity and insulation.

12.4 Glazing

If the smoke separation involves glazing, the glazing should be capable of demonstrating a minimum level of fire-resistance as that of the compartment walls or fire doors into which it is fitted.

12.5 Fire Doors

12.5.1 General

Doorways to fire-resisting walls should be fitted with self-closing fire doors, except for cupboards and service ducts which are to be kept locked shut.

Fire doors to the common areas should be capable of demonstrating compliance with BS 476-22:1987[21] and BS 8214:2016[22] when tested as a complete installed assembly – i.e., frame, glazing apertures, intumescent strips and ironmongery, etc.

If necessary, doors within the common areas (such as doors between a corridor and a Protected Lobby) may be fitted with magnetic hold-open devices if such doors are expected to be rendered ineffective by occupants – i.e., chocked open or continued overuse. These should be linked to the Automatic Fire Detection (AFD) system so that the doors are released to the closed position in the event of a fire.

Cabling for fire safety systems are to comply with Table 1 of BS 8519:2020[23].

12.5.2 Blocks A and C

Fire doors to the Protected Escape Routes within the building (such as apartment front doors, doors between corridors and Protected Lobbies, ancillary room doors and doors onto the Protected Stairs) should be a minimum FD30S, fitted with intumescent strips and cold smoke seals.

Riser doors should be a minimum FD30, fitted with intumescent strips.

12.5.3 Blocks B, D and E

Fire doors to the Protected Escape Routes within the building (such as apartment front doors, doors between corridors and Protected Lobbies and ancillary room doors) should be a minimum FD30S, fitted with intumescent strips and cold smoke seals.

Riser doors should be a minimum FD30, fitted with intumescent strips.

Doors leading into the fire-fighting Protected Stair from the Protected Lobbies should be a minimum FD60S, fitted with intumescent strips and cold smoke seals.

12.5.4 Houses

Doors onto the escape routes within the housesshould be a minimum FD30 with intumescent strips. The doors need not be fitted with self-closing devices.

12.6 Lift Doors

Lift doors tested to the appropriate fire-resistance in accordance with BS EN 81-58:2018[24] should be used.

[21] BS 476-22:1987 – Fire tests on building materials and structures. Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction.
[22] BS 8214:2016 – Timber based fire doors. Code of practice.
[23] BS 8519:2020 – Selection and installation of fire-resistance power and control cable systems for life safety, fire-fighting and other critical applications – Code of practice.
[24] BS EN 81-58:2018 – Safety rules for the construction and installation of lifts. Examination and tests. Part 58: Landing doors fire-resistance test.

12.7 Cavity Barriers

Cavity barriers are to be provided in accordance with Paragraph 19.1.1 and Figure 24 of BS 9991 (reproduced in Figure 14 below).

Cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should also be provided at:

- The junction between an external cavity wall *(except where the cavity wall is as shown in Figure 15)* and every compartment floor and compartment wall; and
- The junction between an internal cavity wall *(except where the cavity wall is as shown in Figure 15)* and every compartment floor, compartment wall, or other wall or door assembly which forms a fire-resisting barrier.

It is important to continue any compartment wall up through a ceiling or roof cavity to maintain the standard of fire-resistance. Therefore, compartment walls should be carried up full storey height to a compartment floor or to the roof as appropriate. It is, therefore, not appropriate to complete a line of compartmentation by fitting cavity barriers above the compartment wall.

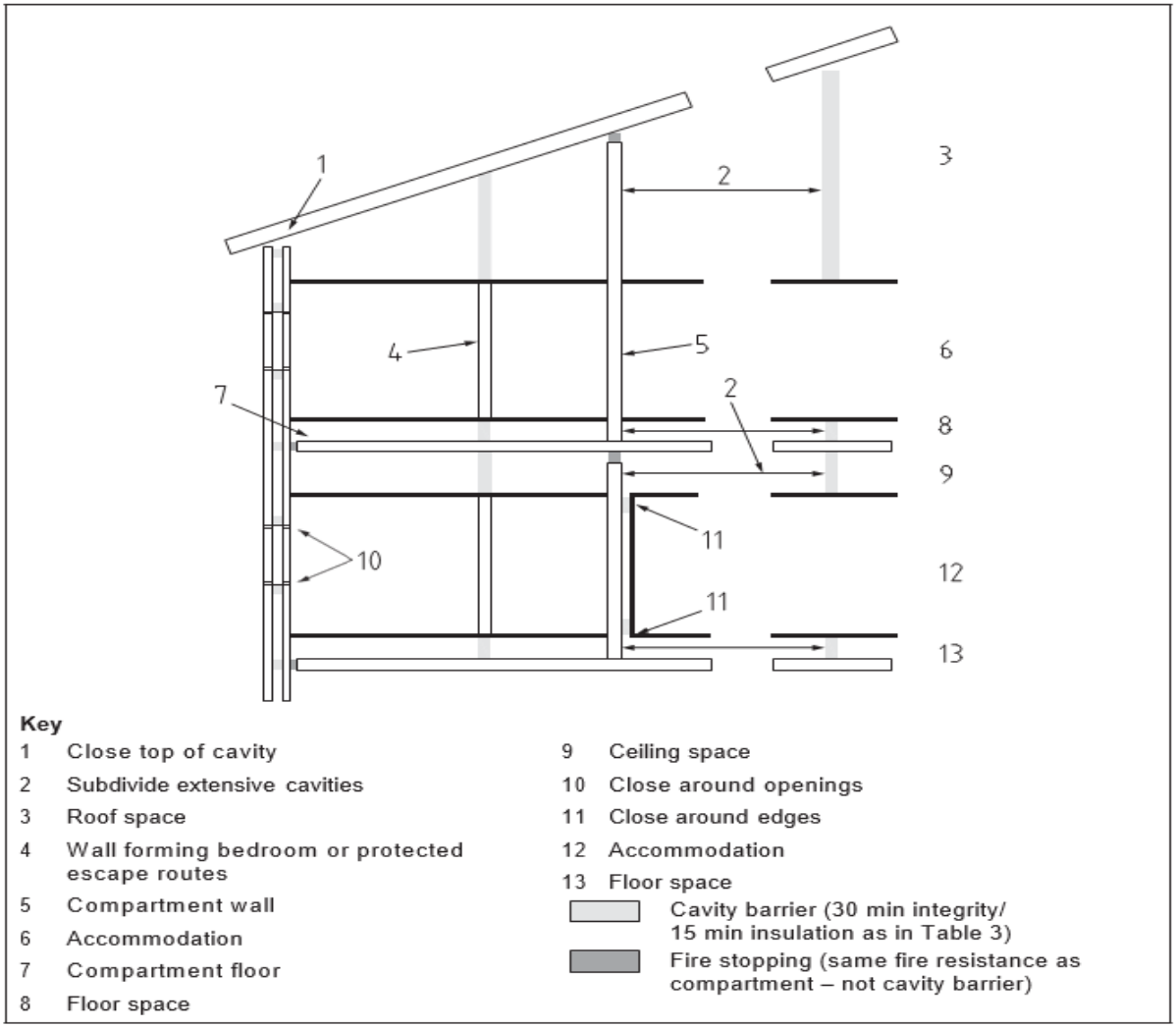

Figure 14: Provisions for cavity barriers

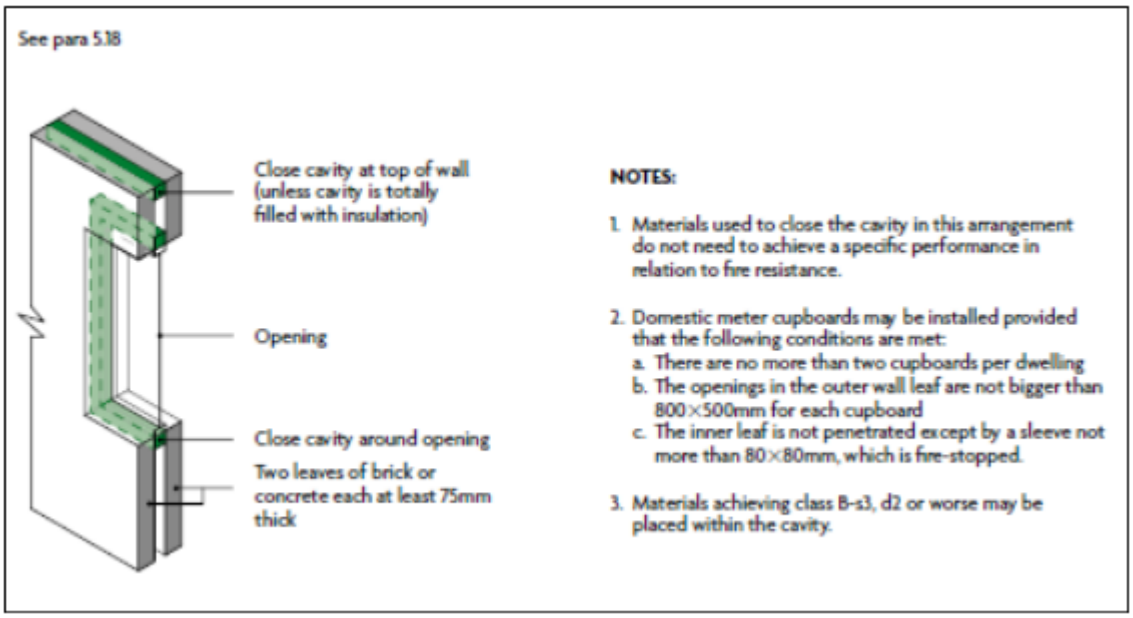

Figure 15: Cavity walls excluded from the provisions for cavity barriers

To prevent extensive cavities, concealed cavities (i.e. the void between a suspended ceiling and the soffit of the floor above) and raised floors that are used for services, etc. will require cavity barriers typically installed so as to observe a 20m maximum linear dimension. This includes cavities in external walls where compartment walls or floors are above the external wall.

Where cavities exist above or below partition walls of bedroom enclosures, those cavities should either be:

a) Fitted with cavity barriers in line of the partitions; or

b) For cavities above the partitions, enclosed on the lower side by a fire-resisting ceiling which extends throughout the building, fire compartment or fire-separated part.

All pipes, ductwork and services passing through fire-resisting barriers should be penetration-sealed with an appropriate sealing system *and/or* fire/smoke damper which has demonstrated (by an appropriate test or assessment) to maintain the required fire-resistance period of the barrier. The penetration sealing system should be designed and installed in accordance with the recommendations contained within the IFSA Code: Sealing Apertures and Service Penetrations to Maintain Fire Resistance.

Any fire and smoke control assemblies should be provided with an appropriate certificate from a recognised third-party accreditation body in order to demonstrate compliance with Regulation 38 of the Building Regulations 2010 (as amended). Assessment and test evidence should also be available for inspection by the approving authorities and other interested parties.

In the case of floors, any passing shafts and/or service Risers should achieve a minimum fire-resistance period of 60 minutes.

13. EXTERNAL FIRE SPREAD

The external wall finishes influence fire propagation to the external face of a building, which can prove hazardous to the occupants and Fire Service.

The surface spread of flame performance for the external walls should be as stated in Table 4 below. This includes wall and ceiling linings to balconies that are enclosed or partially enclosed.

Building Height	Less than 1000m from the Relevant Boundary	1000mm or More from the Relevant Boundary
More than 18m	Class A2-S1, d0(1) or better	Class A2-S1, d0(1) or better
Less than 18m	Class B-s3, d2(2) or better	No provisions
Notes (1) The restrictions apply to all the materials used in the external wall and specified attachments. (2) Profiled or flat steel at least 0.5mm thick with an organic coating of no more than 0.2mm thickness is also acceptable.		

Table 4: Classification of External Wall Surfaces

Blocks B, D and E have a top storey over 18m in height. Therefore, insulation, products and other materials used in the construction of the external wall (but not including gaskets, sealants and similar) should achieve Class A2-s1, d0 or better.

As Blocks A and C have a top storey height of less than 18m and the distances to the relevant boundaries are greater than 1m, there are no provisions stated in regard to the materials used. However, for the future proofing of the blocks, we strongly recommend that the materials used should achieve Class A2-s1, d0 or better.

13.1 Fire Spread via the External Walls

When a building is burning, heat will radiate through non-fire-resisting openings in the external walls. This heat can be intense enough to cause ignition to adjoining buildings or combustible material therein.

In order to reduce the chance of this occurring, the Building Regulations place limits on the area of external elevation with no fire-resistance. This area is known as the 'unprotected area' and is affected by such factors as distance from the boundary, use of the building and compartment size.

The conventional approach for analysing the risk of external fire spread from one building to another is detailed in BR 187:2014[25] which takes the approach assuming that:

- A fire has spread throughout the full extent of any fire compartment (i.e., full flashover fire throughout the compartment);
- Any non-fire-rated parts of the external wall have failed; and
- The heat and flames are radiating from the entire façade.

Therefore, the pre-determined calculations for unprotected areas provided in Tables A to C of BR-187 have been used to determine the unprotected areas.

Boundary locations are taken as the centre of a public highway, the boundary of the site or a notional boundary mid-way between blocks/buildings on the same site.

[25] BR 187:2014 – External fire spread: building separation and boundary distances.

13.1.1 Apartments

13.1.2 Block A - North Elevation

The north façade of Block A faces onto parking spaces and open parkland. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.3 Block A - East Elevation

The east façade of Block A faces onto parking spaces and Block C. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.4 Block A - South Elevation

The south façade of Block A faces onto open ground. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.5 Block A - West Elevation

The west façade of Block A faces onto parking spaces and open parkland. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.6 Block B - North Elevation

The north façade of Block B faces onto the boundary and public highway. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.7 Block B - East Elevation

The east façade of Block B faces onto parking spaces and Block E. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.8 Block B - South Elevation

The south façade of Block B faces onto Block C. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.9 Block B - West Elevation

The west façade of Block B faces onto parking spaces and open parkland. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.10 Block C - North Elevation

The north façade of Block C faces onto Block B. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.11 Block C - East Elevation

The east façade of Block C faces onto parking spaces and Block D. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.12 Block C - South Elevation

The south façade of Block C faces onto open land. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.13 Block C - West Elevation

The west façade of Block C faces onto parking spaces and Block A. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.14 Block D - North Elevation

The north façade of Block D faces onto Block E. The distance to the notional boundary is approximately 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.15 Block D - East Elevation

The east façade of Block D faces onto open land. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.16 Block D - South Elevation

The south façade of Block D faces onto open land. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.17 Block D - West Elevation

The west façade of Block D faces onto parking spaces and Block C. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.18 Block E - North Elevation

The north façade of Block E faces onto the boundary and public highway. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.19 Block E - East Elevation

The east façade of Block E faces onto open land. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.20 Block E - South Elevation

The south façade of Block E faces onto Block D. The distance to the boundary is approximately 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.21 Block E - West Elevation

The west façade of Block E faces onto parking spaces and Block B. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for apartments with a 3m high by 9m wide enclosure.

13.1.22 Houses

The houses have been grouped together into five blocks of developments as shown in Figure 16 below.

Figure 16: House block references

13.1.23 Block 1 - North Elevation

The north façade of Block 1 faces onto open land. The distance to the boundary is in excess of 5m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.24 Block 1 - East Elevation

The east façade of Block 1 faces onto open land and Block A. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.25 Block 1 - South Elevation

The south façade of Block 1 faces onto Block 2 houses. The distance to the boundary is approximately 1m. This would allow 20% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.26 Block 1 - West Elevation

The west façade of Block 1 faces onto open land and Block 3 houses. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.27 Block 2 - North Elevation

The north façade of Block 2 faces onto Block 1 houses. The distance to the notional boundary is approximately 1m. This would allow 20% of the façade to be unprotected for houses with a 4m high by 9m wide enclosure.

13.1.28 Block 2 - East Elevation

The east façade of Block 2 faces onto open land and Block A. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.29 Block 2 - South Elevation

The south façade of Block 2 faces onto open land. The distance to the boundary is in excess of 5m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.30 Block 2 - West Elevation

The west façade of Block 2 faces onto open land and Block 4. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.31 Block 3 - North Elevation

The north façade of Block 3 faces onto open land. The distance to the boundary is in excess of 5m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.32 Block 3 - East Elevation

The east façade of Block 3 faces onto open Block 1 houses. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.33 Block 3 - South Elevation

The south façade of Block 3 faces onto Block 4 Houses. The distance to the notional boundary is in excess of 5m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.34 Block 3 - West Elevation

The west façade of Block 3 faces onto open land and Block 5 houses. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.35 Block 4 - North Elevation

The north façade of Block 4 faces onto Block 3 houses. The distance to the notional boundary is in excess of 5m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.36 Block 4 - East Elevation

The east façade of Block 4 faces onto Block 2 houses. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.37 Block 4 - South Elevation

The south façade of Block 4 faces onto open land. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.38 Block 4 - West Elevation

The west façade of Block 4 faces onto parking spaces and Block 5 Houses. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.39 Block 5 - North Elevation

The north façade of Block 5 faces onto open land. The distance to the boundary is in excess of 5m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.40 Block 5 - East Elevation

The east façade of Block 5 faces onto Blocks 3 and 4 Houses. The distance to the notional boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

13.1.41 Block 5 - South Elevation

The south façade of Block 5 faces onto open land. The distance to the boundary is in excess of 5m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 9m wide enclosure.

13.1.42 Block 5 - West Elevation

The west façade of Block 5 faces onto open land. The distance to the boundary is in excess of 4m. This would allow 100% of the façade to be unprotected for houses with a 6m high by 6m wide enclosure.

14. ACCESS AND FACILITIES FOR THE FIRE SERVICE

The Fire and Rescue Service (F&RS) is provided access to all areas of the perimeter of the development by the surrounding public roads and new roads to be introduced as part of the development.

These access routes allow fire appliances to reach all areas of the terraced houses within 45m from an appliance.

For the apartment blocks, it is not possible to reach all areas of the residential accommodation within 45m. Therefore, as no block has a storey level over 50m, a Dry Rising Main is to be provided to each block. Fire-fighting appliances will be able to get to within 18m of the Dry Rising Main inlet for each core. The location of the inlet should be readily visible from where it is perceived a fire-fighting appliance will stop.

As the blocks are provided with Automatic Fire Suppression Systems, the distance from the fire main outlet to the furthest part of every storey should be no more than 60m hose-laying length (which is achieved).

The Dry Main systems provided for the site should be designed to BS 9990:2015[26]. Approved Document B:2019 (for Section B5) requires outlets to be located within the protected enclosure of a stairway or a Protected Lobby. As such, whenever possible the outlet for the Dry Rising Mains will be located on each full landing within the staircase or within three metres of the staircase associated with the relevant inlet at ground-floor level.

Signage is to be provided at the horizontal mains inlet identifying the Dry Rising Mains.

As Blocks B, D and E have the highest floor level in excess of 18m, fire-fighting stairs and fire-fighting lifts are to be provided to these blocks. The design of the layout for the fire-fighting shafts meets the requirements of Section 50 of BS 9991. The fire-fighting lift landing doors are within 7.5m of the fire-fighting stairs.

Suitable measures are to be provided to prevent water ingress into the fire-fighting lift shaft (such as an inclined floor level approaching the lift doors, drainage pipes etc).

External doors providing access to the block should be openable by the F&RS upon arrival. This should include fire-fighters override switches for any secured doors.

The minimum width of road between kerbs should be 3.7m to allow access for both fire-fighting appliances and a high reach.

As the vehicle weight of a high reach appliance (which is the most onerous weight) is capable of being distributed over a number of axles, the access roads should be designed to a minimum load capacity of 12.5 tonnes to support this. However, structures (such as bridges) must achieve the minimum carrying capacity of 17 tonnes.

Signage is to be provided at the entrance to each block stating the block number (or name) and the flats located within. Signage is to be provided at every landing level within a staircase stating the floor level and the apartments accessed at that level. There should also be signage provided within corridors and lobbies to identify the approach direction to each apartment.

Fire hydrants are to be provided within 90m of each Dry Rising Main inlet and within 90m of the entrance to every house.

The detailed information for the smoke ventilation is covered under Section 8 of this strategy. All vents and AOVs should be provided with override switches for F&RS use and capable of opening or closing the vents.

[26] BS 9990:2015 - Code of practice for non-automatic fire-fighting systems in buildings.

15. CONCLUSION

BS 9991 has been used as a performance benchmark during the development of this fire safety strategy report.

Where design consistency with this report can be verified, it is the opinion of Freya that the proposal is capable of demonstrating compliance with the requirement of Part B of the Building (Amendment) Regulations 2018 and that a satisfactory standard of fire safety can be achieved. This is subject to all works being designed, constructed and operated in accordance with this fire safety strategy report.

It is envisaged that this document will be used by the Responsible Person in the management of the building and to support the fire risk assessment produced by the Landlord/Management Company and commercial tenants of the building under the Regulatory Reform (Fire Safety) Order 2005 (FSO).

16. LIMITATIONS

Our advice is strictly limited to the scope of our current brief, i.e., to create a fire safety strategy for the Chapel Gate Development, Laindon Link, Basildon, Essex.

It is assumed that all the fire safety measures recommended in all other completed reports have been implemented.

Freya Comprehensive Fire Solutions Ltd have not reviewed any other issues within the project other than those identified in our report. We offer no comment on the adequacy or otherwise of any other aspects of the development (whether related to fire safety or any other issue) and any absence of comment on such issues should not be regarded as any form of approval. Our advice should not be used for buildings other than that named in the title.

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