Developed for:
MYCO Contracts Ltd

Detailed Fire Safety Statement

Acorn House

Kings Cross, London

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Detailed Fire Safety Statement

Acorn House
Kings Cross, London

Project Reference: AF3433
Client: MYCO Contracts Ltd

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01	19.04.2023	Issue for design team review	OR	CA	OR
02	16.05.2023	Updated information on sprinkler category	OR		OR
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The checker has provided an internal review of the technical content of the report.

The approver confirms the report has received quality assurance in accordance with the principles of ISO 9001 and authorises external release of the document on behalf of Ashton Fire.

EXECUTIVE SUMMARY

Ashton Fire has been commissioned by MYCO Contracts Ltd to provide fire safety consultancy services for the proposed Acorn House residential/mixed use development located in Kings Cross, London. This report is specific to Acorn House only.

This document details the fire safety strategy design as developed for the scheme, intended to assist the design team in progressing the detailed fire safety provisions for the project through to construction. This report may also be submitted to the building control body in support of the projects' Building Regulations submission.

This fire safety statement details the minimum fire safety provisions required for the proposed development to meet the functional requirements of the Building Regulations 2010 (as amended). This has been achieved by applying the prescriptive recommendations for life safety contained within BS 9991 and BS 9999 in the first instance. The strategy has not been developed to include specific measures for the protection of property. However, features included for life safety will to some extent contribute to property protection and continuity of use following a fire.

Apart from where noted in this report, the design will be in accordance with the recommendations of BS 9991 and BS 9999. The key fire safety challenges and / or variations from the prescriptive guidance documents are identified in Summary Table 1. These items constitute a project risk until they are discussed and agreed with the relevant authorities having jurisdiction (AHJs).

The project comprises the development of a new mixed-use residential led scheme, which consists of a single block.

The proposed building is a ten storey (G+9) residential block with a single basement floor, comprising single-storey flats on each of the upper levels and office, retail and ancillary accommodation on basement and ground levels. The building is arranged as a single block. Each flat is accessed via a protected common corridor. Escape from the upper storeys will be facilitated by a protected firefighting stair.

The top floor height of the building, measured from the adjacent ground level to the finished floor level of the topmost occupied storey is approximately 31.5m.

A defend-in-place evacuation regime is utilised for each residential unit, while a simultaneous evacuation would occur from the ancillary and non-residential areas. The flats, ancillary areas and non-residential areas will be provided with an automatic fire detection and alarm system, while the common areas will feature central fire detection in support of the smoke control system.

A natural smoke ventilation system will be provided to the residential corridors to protect the escape stairs. A 1.0m^2 AOV will be provided at the head of each stairway.

An automatic suppression system will be provided throughout all areas of the building, as it has a top storey more than 11m above ground level.

All elements of structure will be designed to achieve a 120-minute fire resistance and all floors will be designed as 120-minute compartment floors.

External elevations of the building should be designed to comply with Regulation 7(2), as it will incorporate residential storeys more than 11m above ground level. Due to the building's proximity to notional boundaries, protection will be required to be provided to the external wall on the east and south elevations.

Vehicular access for the fire and rescue service shall be provided via Gray's Inn Road and Swinton Street to within 18m and within sight of each dry riser inlet located on the face of the building.

Access will be provided internally via the general circulation routes, firefighting shaft provided with a firefighters lift, dry fire main and a firefighting stair to the upper floors. Sufficient hose coverage will be provided internally to within 60m of all areas on the floorplate, when measured on a hose laying route from a fire main outlet located within the firefighting shaft. Access to the ground floor residential ancillary spaces will be provided externally, via perimeter doors. Access to the ground floor retail unit and the office facility will be provided via their independent entrances. Access to the basement office will be provided via the office entrance reception serving the ground floor and basement office. A central protected stair continues the access to the basement office.

Suitable water supplies to support firefighting operations will be provided via fire hydrants sited so that they are within 90m of a building entry point and within 90m of a dry riser inlet.

To facilitate ease of review, the proposed fire safety systems are outlined in Summary Table 2.

Summary Table 1 – Fire safety systems

Item	Description	Ref.
Fire detection and alarm systems	Grade D Category LD1 to BS 5839-6 within flats. Common residential areas (e.g. lift lobby) provided with a Category L5 system to BS 5839-1. The ancillary and non-residential areas will be provided with a minimum L3(M) system conforming to BS 5839-1.	3.1
Evacuation alert systems	An evacuation alert system will be provided in accordance with BS 8629.	3.2
Sprinkler systems	A category 4 sprinkler system conforming to BS 9251 will be provided within all residential units. Non-residential areas in excess of a maximum floor area of 100m^2, will be provided with a sprinkler system in accordance with BS EN 12845.	3.3
Smoke control systems	Automatic smoke ventilation will be provided to the common residential corridors and escape/firefighting stair. The residential stair will be provided with a 1.0m^2 AOV at the head of the staircase.	3.4
Emergency lighting	Emergency lighting will be provided throughout occupied areas and escape routes.	3.7
Fire safety signage	Fire safety signage will be provided in accordance with Section 3.45 of ADB Vol.1, as referred to within BS 9991. Firefighting wayfinding signage to meet updated recommendations in ADB.	3.9
Firefighting lift	A lift which will be designed as a firefighting lift should be provided conforming to BS EN 81-72.	3.11
Emergency voice communication systems	Each protected refuge space shall be provided with an EVC system with a Type B outstation.	3.12
Stand-by power	Suitable back-up supplies to all fire safety systems in accordance with BS 8519.	3.13
Rising mains	A dry rising main is provided within the escape stair/firefighting shaft designed in accordance with BS 9990.	8.4
Water supplies	Hydrants to be provided within 90m of each dry riser inlet.	8.5

CONTENTS

1. INTRODUCTION

1.1 General

Ashton Fire has been commissioned by MYCO Contracts Ltd to provide fire safety consultancy services for the proposed Acorn House residential/mixed use development in Kings Cross, London. This fire safety strategy statement report is specific to Acorn House only and documents the proposed fire strategy to date.

1.1.1

This document is confidential and for the exclusive benefit of MYCO Contracts Ltd. It may not be assigned to or relied upon by a third party without the agreement of Ashton Fire in writing. Ashton Fire retains all copyright and other intellectual property in the document and its contents, unless transferred by written agreement between Ashton Fire and the Client.

1.1.2

Following full coordination and implementation, this strategy report may be used to support the end user of the building in the development of any fire safety management procedures and plans considered necessary to fulfil their responsibilities under the Regulatory Reform (Fire Safety) Order 2005 (FSO) and any other applicable fire safety legislation.

1.1.3

This document is not intended to portray detailed design information for fire safety systems or construction specifications. As a strategic document supporting and informing the wider design, it should be read in conjunction with the wider project design documentation.

1.1.4

It should be noted that any alternative design solutions proposed within this report are subject to agreement and subsequent approval by the relevant authorities having jurisdiction (AHJs).

1.1.5

1.2 Legislation and basis of design

Fire safety in buildings is governed by two primary pieces of legislation in the UK. The Building Regulations 2010, Part B (fire safety) applies to building design, whilst for fire safety management in buildings, compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO) is required.

1.2.1

This strategy has been developed to meet the level of fire safety expected under the Building Regulations 2010 (as amended), which are set out under Part B, namely:

1.2.2

- B1 – Means of warning and escape
- B2 – Internal fire spread (linings)
- B3 – Internal fire spread (structure)
- B4 – External fire spread
- B5 – Access and facilities for the fire and rescue service

The building will have a top storey more than 18m above ground and will contain one or more dwellings, and it will therefore be classified as a 'relevant building' under Regulation 7(4).

1.2.3

The fire safety strategy will be developed to satisfy the requirements for fire safety as set out by the Building Regulations. The strategy has not been specifically developed to address property protection or insurer's requirements. However, the features that are included for life safety, as required by the Building Regulations 2010, will contribute in some extent to business and property protection.

1.2.4

In general, the necessary level of life safety will be achieved utilising the guidance in BS 9991 [1] within the residential areas, BS 9999 [2] in non-residential spaces and documents referenced therein in the first instance.

1.2.5

Fire engineering principles may be employed to support alternative solutions where strict adherence to the guidance would conflict with the wider aspirations for the scheme. Unless otherwise stated, it is expected that all aspects of the design will be in accordance with BS 9991, BS 9999 and, applicable British Standards and codes of practice.

1.2.6

On the basis that recommendations made within the guidance documents are followed, it is considered that the life safety requirements of the Building Regulations 2010 (as amended) will be satisfied, and that an adequate level of fire safety will be provided throughout the premises.

1.2.7

Where departures from the guidance documents are identified, alternative proposals (including associated analysis) are documented for facilitating review with the project's approvers. In accordance with the fire safety engineering principles detailed in the PD 7974 codes of practice, it is considered appropriate that all fire precautions are determined based on there being one seat of fire (i.e. accidental fires).

1.2.8

Unless specifically covered in this report please refer to the adopted design guidance for further details.

1.3 Construction, Design and Management (CDM) Regulations 2015

The strategy has been developed in cognisance of the Construction (Design and Management) Regulations 2015 (CDM 2015) [3], which sets out what designers are required to consider to protect anyone involved in the construction or ongoing use of a project. A summary of management and maintenance issues are provided in Section 9.

1.3.1

This strategy does not provide a comprehensive assessment of site fire safety during the building works or the phasing of these works, though a designer's review of construction site fire safety issues is recommended to be conducted during technical design. The Fire Protection Association and the Health and Safety Executive (HSE) issue guidance on identifying and managing fire precautions during the works, which should be consulted by the contractor or their specialist advisor when developing their construction fire safety plan.

1.3.2

1.4 Referenced information

This strategy is based on information provided by the design team to Ashton Fire as listed in Table 1. Additional contradictory information or subsequent design variations to the information supplied may render the findings and recommendations of this report invalid.

1.4.1

The figures used within this report are indicative and whilst intended to convey the principles of the fire safety strategy, they may not be representative of the final arrangement. The fire safety principles contained within this report are required to be maintained through any design amendments during the lifetime of the building.

1.4.2

Table 1 – Referenced project documentation

Description	Drawing No.	Revision	Author
Existing Site Plan with Roof Plan	18102/A/(01)_001	P2	Allford Hall Monaghan Moris
GA Plans 1-100 Basement	5361-BAL-XX-B1-DR-A-68-0001	P2	Brookes Architects

Description	Drawing No.	Revision	Author
GA Plans 1-100 Ground Floor	5361-BAL-XX-00-DR-A-68-0002	P4	
GA Plans 1-100 First Floor	5361-BAL-XX-00-DR-A-68-0003	P4	
GA Plans 1-100 Second Floor	5361-BAL-XX-00-DR-A-03-0004	P4	
GA Plans 1-100 Third Floor	5361-BAL-XX-B1-DR-A-68-0005	P4	
GA Plans 1-100 Forth Floor	5361-BAL-XX-00-DR-A-68-0006	P4	
GA Plans 1-100 Fifth Floor	5361-BAL-XX-00-DR-A-68-0007	P4	
GA Plans 1-100 Sixth Floor	5361-BAL-XX-00-DR-A-68-0008	P4	
GA Plans 1-100 Seventh Floor	5361-BAL-XX-00-DR-A-68-0009	P4	
GA Plans 1-100 Eighth Floor	5361-BAL-XX-00-DR-A-68-0010	P4	
GA Plans 1-100 Ninth Floor	5361-BAL-XX-00-DR-A-68-0011	P4	

2. PROJECT OVERVIEW

2.1 Building description

The project comprises the development of a new mixed-use residential led scheme, which consists of a single block. This report discusses the fire strategy for Acorn House, Kings Cross, London only.

2.1.1 The proposed building is an ten storey (G+9) residential block with a single basement storey comprising single-storey flats all upper levels but the topmost (Level 9, which houses an ancillary space for the residents), and office, retail and ancillary accommodation on basement and ground levels. The building is arranged as a single block. Each flat is accessed via a protected common corridor. Escape from the upper storeys will be facilitated by a firefighting stair, with escape from the basement level being via a separate protected escape stair.

2.1.2

2.1.3 The building will have an approximate footprint of 585m^2. The top floor height of the building, measured from the adjacent ground level to the finished floor level of the topmost occupied storey is approximately 31.5m.

2.1.4 The building will comprise a concrete structure. External walls will consist of a steel frame system with masonry/brick cladding.

2.1.5 Indicative floorplans are represented in Figure 1 – Figure 6. The block in relation to the wider site is shown in Figure 7 below.

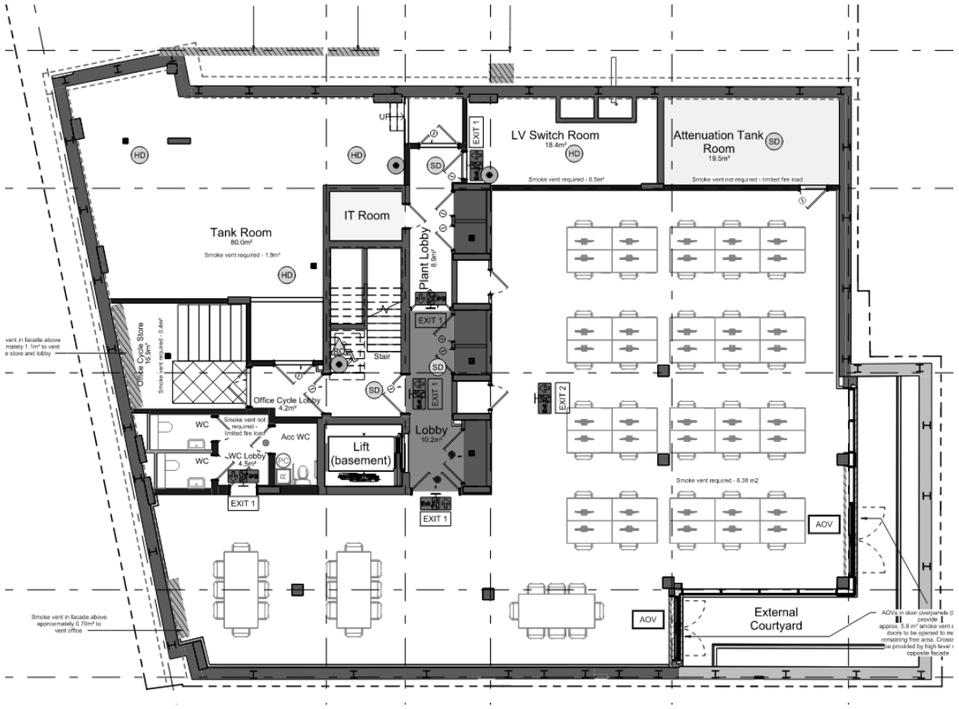


Figure 1 – Indicative basement floor layout

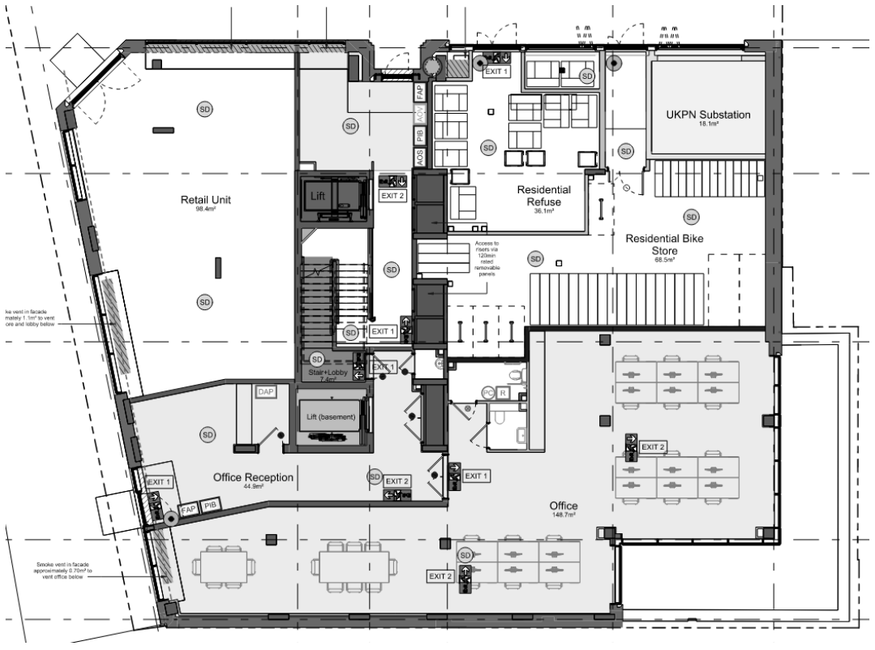


Figure 2 – Indicative ground floor layout

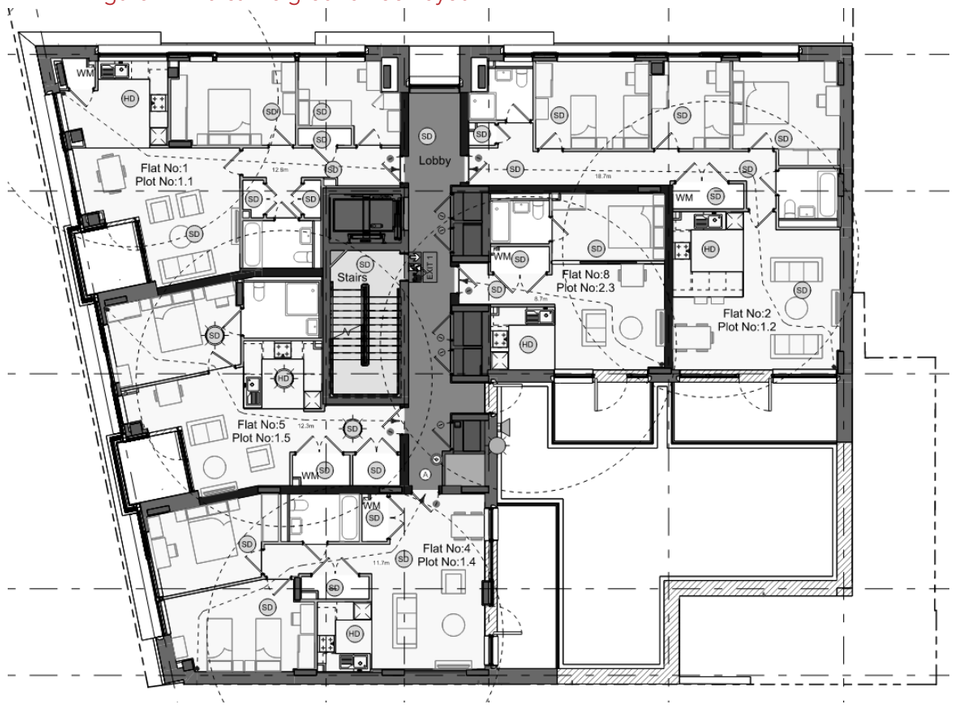


Figure 3 – Indicative floor layout (First – Fourth floor)

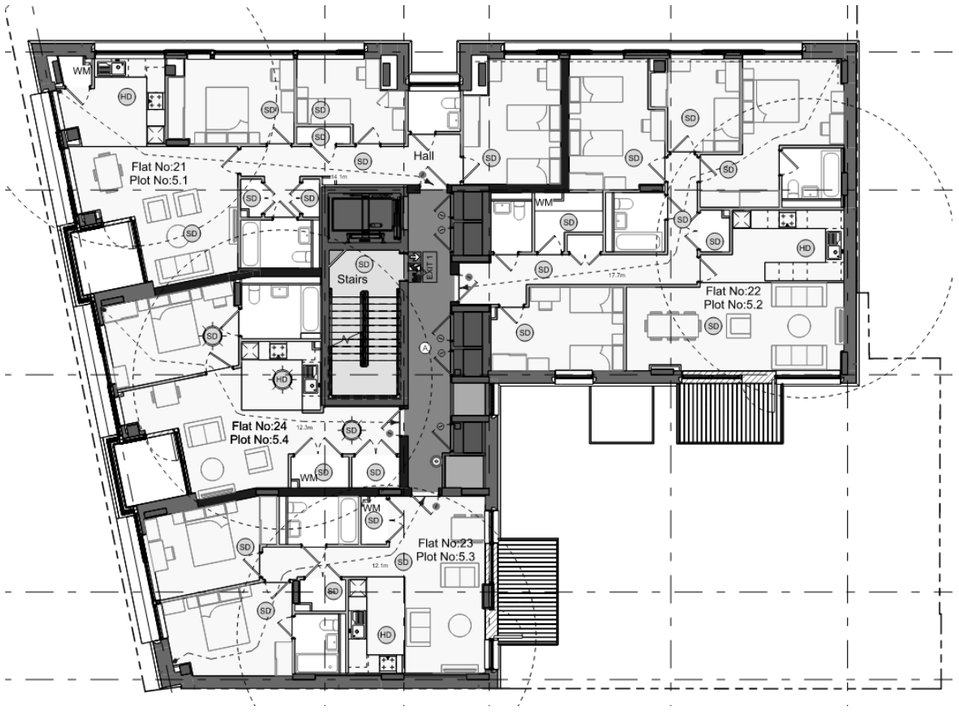


Figure 4 – Indicative floor layout (Fifth floor)

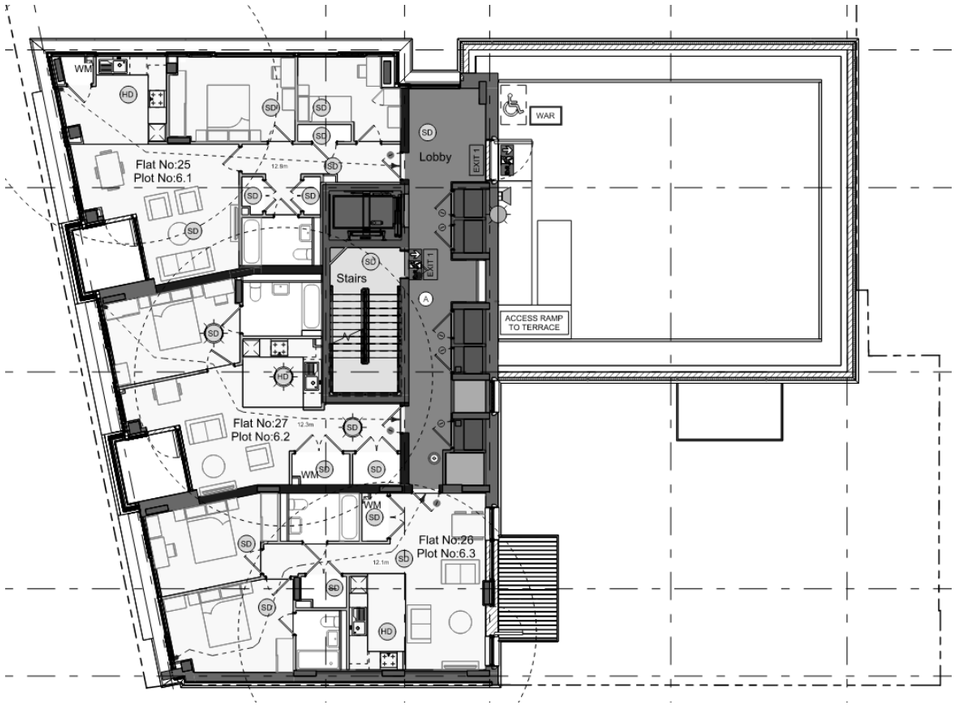


Figure 5 – Indicative floor layout (Sixth - Eighth floor)

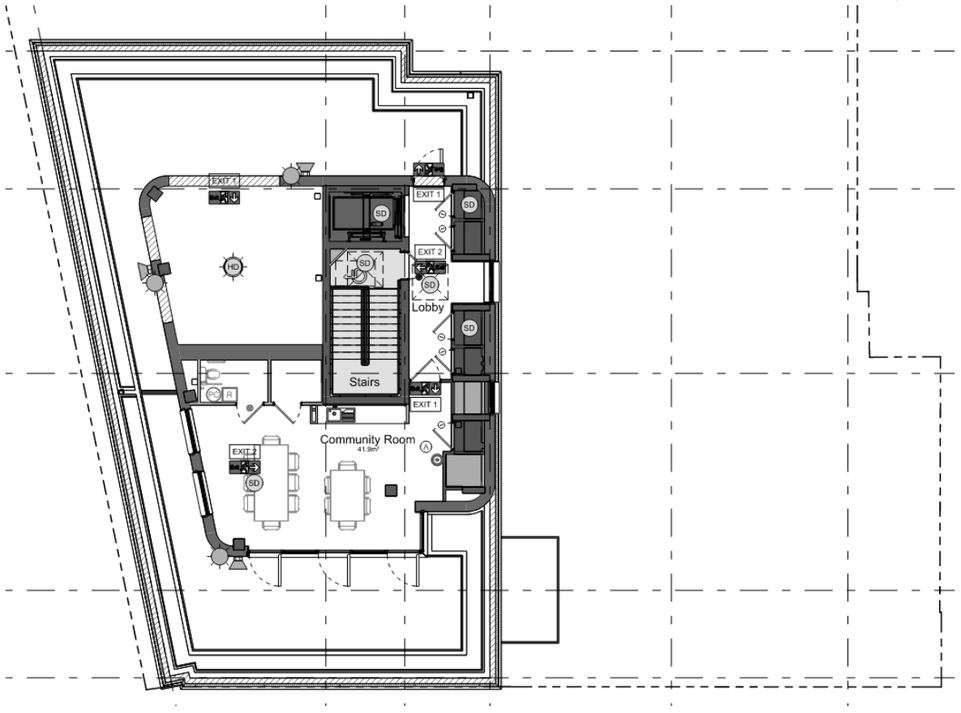


Figure 6 – Indicative floor layout (Ninth floor)

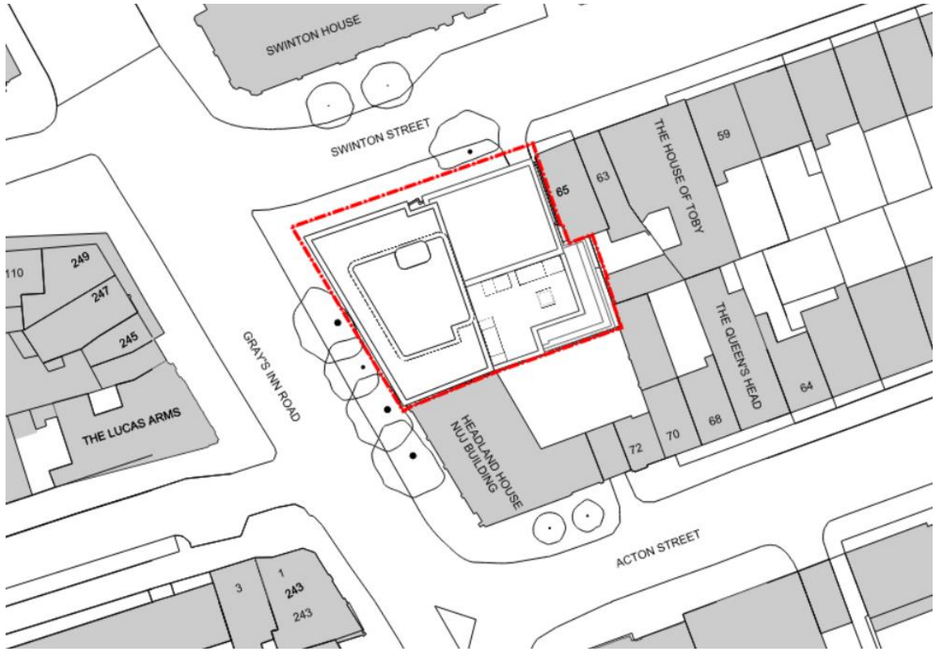


Figure 7 – Indicative site plan

2.2 Risk profile

The non-residential areas (e.g., the Office and Retail spaces and areas which are ancillary to the residential accommodation) within the building shall be designed in accordance with the guidance contained in BS 9999.

2.2.1 As per the guidance contained in BS 9999, a risk profile is established to determine appropriate means of escape and other relevant fire safety provisions for life safety. The risk profile is a function of the occupancy characteristic and the fire growth rate.

2.2.2 The risk profiles of the different non-residential areas are summarised in Table 2.

2.2.3 Table 2 - Risk profile summary

Areas	Occupancy characteristics	Fire growth rate [1]	Risk profile
Ancillary (i.e., plant and refuse store)	Awake and familiar	2	A2
Office	A – Awake and familiar	1	A1
Retail	B – Awake and unfamiliar	2	B2
Notes: 1) As this building is protected throughout by an automatic sprinkler system (Section 10), BS 9999 allows for the fire growth rate to be reduced by a factor of 1. This reduction has been considered within this table.			

2.3 Design occupancy

2.3.1 The means of escape provisions from the individual flats are not dependant on the number of occupants within the residential areas of the building, as only the occupants of the affected flat are expected to initially evacuate.

2.3.2 The number of occupants expected within the non-residential ancillary areas has been estimated to ensure that the number and width of exits have sufficient capacity for means of escape purposes.

2.3.3 Plantrooms and similar ancillary spaces will be occupied infrequently and therefore the escape arrangements have been premised on a transient occupancy. However, for design purposes the capacity of these spaces shall not exceed more than 60 people.

2.3.4 The estimated maximum design occupancy noted in Table 3 has been calculated based on the floor space factors provided in BS 9999 [4].

Table 3 - Estimated design occupancy

Floor	Area	Floor area (m^2)	Floor space factor (m^2/person)	Occupancy (persons)
Basement	Office	256.6	6	42
Ground	Office	153.5	6	26
Ground	Retail	99	2	50

3. FIRE SAFETY SYSTEMS

3.1 Means of detection and alarm

Residential areas

All owner-occupied flats shall be provided with a Grade D2, Category LD1 automatic fire detection and alarm system, designed and installed in accordance with BS 5839-6 [5]. 3.2.1

3.1.1 Rented units should be provided with Grade D1 Category LD1 systems.

3.1.2 The system in each flat will incorporate sufficient traditional sounders to be clearly audible throughout the flat. Heat detection should be provided in areas where there is a risk of false alarms due to steam or

3.1.3 fumes (e.g. kitchens and bathrooms) and smoke detection throughout other habitable areas. 3.3.1

Where private balconies are provided with a single escape route via the open plan kitchen, the alarm 3.3.2

3.1.4 system should be extended such that it is clearly audible from the balcony or alternatively, flashing beacons should be provided.

The communal areas shall be provided with an L5 automatic fire detection and alarm system designed 3.3.3

3.1.5 and installed in accordance with the recommendation in BS 5839-1 [6]. The system is intended to activate elements of the smoke control system (e.g., AOVs) within the communal areas only, and it should not provide an audible alarm within the building. It is recommended that the detector head spacing for 3.3.4 the L5 system within the corridors and stairs is in accordance with the recommendations for a category L4 system. The system in these areas could also notify the building's control and indicating equipment (CIE) of the occurrence of an incident as part of the fire safety management procedures, if provided. 3.3.5

Non-residential and ancillary areas 3.3.6

3.1.6 Accessible terraces should be provided with an alarm system linked to the communal fire detection system in the corridors to enact a simultaneous evacuation regime in case of a fire. Sounders or flashing 3.4.1 beacons should be provided to each terrace.

3.1.7 An automatic fire detection and alarm system equivalent to an L3(M) standard, designed and installed in accordance with BS 5839-1 should be provided in the ancillary spaces (e.g. Offices and Retail spaces).

3.1.8 3.4.2

Manual call points in accordance with BS EN 54-11 [7] should generally be provided adjacent to all storey exits and final exits within the non-residential spaces (offices and retail). The positioning of manual call

3.1.9 points will be the responsibility of the system designer.

Visual beacons should be provided in rooms covered by the BS 5839-1 system where the background sound level could be louder than an audible fire alarm (e.g. plantrooms) or where people with a hearing

3.1.10 impairment may be in isolation (e.g. accessible toilets).

It is recommended that the BS 5839-1 system is analogue and fully addressable, allowing early

3.1.11 identification and investigation of an activated detector head. The main fire alarm panel will be installed at an accessible location next to the main entrance point into the building.

In accordance with the recommendations of BS 5839-1 and BS 5839-6, the fire alarm and detection engineer must submit the design certificate for the scheme to the approving authority prior to commencement of the installation on site.

3.2 Evacuation alert systems (EAS)

As the building has a top storey more than 18m above ground, an evacuation alert system in accordance with BS 8629 [8] should be provided, to support the fire brigade during firefighting and rescue operations and facilitate early evacuation of the building should it be deemed necessary.

3.3 Automatic suppression systems

The building features a top storey height greater than 11m above ground level, and therefore an automatic fire suppression system will be provided throughout.

Automatic suppression will be provided by a sprinkler system designed in accordance with BS 9251 [9] to support increased travel distances within the corridors and by virtue of the building height. As such, a Category 4 system using the design density in Footnote C) of Table 2 in BS 9251 is to be provided within each of the flats (including common corridors).

In accordance with Table 2 in BS 9251 a minimum water supply duration of 60 minutes is to be provided for the sprinkler system, for both residential and non-residential areas.

The non-residential and ancillary areas of the building will be suppressed in accordance with additional expectations of Sections 5.5 & 5.6 and Tables 3 & 4 of BS 9251. This includes plantrooms and refuse subject to the size of the area (e.g., maximum 100m^2 etc.).

Other ancillary spaces exceeding 100m^2 in area such as the office, retail and plantrooms will be provided with an OH1 category automatic sprinkler system designed in accordance with BS EN 12845 [10].

The design of the sprinkler system shall be carried out by a third-party specialist designer.

3.4 Smoke ventilation systems – Residential areas

Automatic smoke ventilation will be provided to the common residential corridors and escape/firefighting stair.

Natural ventilation

Automatic smoke ventilation will be provided to the corridors and the escape stair. The corridors will be served by a natural smoke shaft which will meet the following recommendations:

- The cross-sectional area (free area) of the smoke shaft should be at least 1.5m^2, with a minimum dimension of 0.85m in any direction;
- The smoke shaft should be fully open to external air at the top and closed at the base;
- The opening at the top of the smoke shaft should be located at least 0.5m above any surrounding structures that fall within a 2m radius on a horizontal plane so that it is not subject to adverse wind effects (i.e. it should always have negative wind pressure coefficients);
- The shaft should extend a minimum length of 2.5m above the ceiling of the highest storey which is served by the shaft;
- The 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 1.0m^2;
- The top of the corridor vent should be located as close to the ceiling of the corridor as is practicable, and should be at least as high as the top of the door connecting the corridor to the stairwell;

- The corridor vents in the closed position, should have a minimum fire and smoke resistance performance equal to the resistance of the shaft and be specified as fire door sets or fitted with a smoke control damper achieving the same fire resistance described above;
- The smoke shaft should be constructed from class A1 materials;
- The smoke shaft should run vertically from top to bottom with no more than 4m of the shaft at an inclined angle (max 30°);
- The smoke shaft penetrating fire compartments should, as a minimum, maintain the same level of fire compartmentation as that which has been breached; and
- No services other than those associated with the smoke shaft should be contained within the smoke shaft.

In accordance with the above, the smoke shaft should extend 2.5m above the ceiling of the highest storey served. However, as an alternative, the smoke shaft will not serve the 9th Floor, with an AOV within the ceiling ventilating the corridor at this level.

A 1.0m² automatic opening vent (AOV) shall be provided at the head of the escape stair. The AOV should conform to BS EN 12101-2 [11].

3.5 Smoke ventilation systems – Basement

Natural ventilation will be provided to the basement level in accordance with Section 27.2.2 of BS 9999 from each basement compartment. Natural ventilation will be provided by smoke outlets with an aggregate equivalent area of 2.5% of the floor area they serve.

The vents should be located at high level in the ceiling or wall and be evenly distributed around the perimeter to discharge in open air.

If the outlets are not at a readily accessible position, they should be kept unobstructed and coveted with a class A1 grille or louvre.

If the outlets are accessible, they may be covered by a panel, stallboard or pavement light that can be broke out or opened.

3.6 Smoke ventilation systems – Ancillary areas

The ancillary areas in general are not required to be provided with a smoke ventilation system. However, the Ninth Floor has been designated as ancillary space for use by the building residents. This floor is served by the firefighting shaft, the firefighting lobby on this floor will be ventilated by means of a 1.0m² AOV within the ceiling to meet the requirements of BS 9999.

3.7 Electromagnetic locking / hold-open devices

Where doors are provided with electromagnetic locking or hold-open devices, these devices are to operate (either release the door to close normally, or release the door to be opened) upon:

- Activation of the detection and alarm system;
- Failure of the power supply;
- Operation of a hand operated switch located to the side of the door;
- Malfunction.

3.8 Emergency lighting

Emergency lighting (within the common areas only) will be installed to provide temporary illumination in the event of failure of the primary power supplies to the normal lighting system. As part of the emergency lighting system, escape lighting will be provided to ensure the escape routes (including external escape routes) are illuminated at all material times. Adequate artificial lighting will be provided in all common escape routes and will be of a sufficient standard to enable persons to see to escape.

Emergency lighting will be installed in accordance with the recommendations of BS 5266-1 [12], BS EN 1838 [13] and BS EN 60598-2-22 [14]. It will also illuminate a safe exit route including fire exits, fire alarm call points, changes in level or direction and fire-fighting equipment.

Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route.

Primary and emergency lighting will be required for any external escape routes that will not be lit by surrounding street lighting.

Discharge lighting installations may operate at voltages that are a hazard to firemen. An exterior discharge lighting installation, or an interior discharge lighting installation operating unattended or operating at a voltage exceeding low voltage (as defined in Statutory Instrument number 1018, part of the Building Regulations), should be controlled by a fire-fighter's emergency switch.

3.9 Fire safety signage

Fire safety signs will be installed where necessary (common areas and ancillary spaces) to provide clear identification of fire precautions, fire equipment and means of escape in the event of fire. All parts of the development will be fitted with appropriate fire safety signage to comply with The Health and Safety (Signs and Signals) Regulations 1996 [15], i.e. signage to be specified in according to BS ISO 3864-1 [16], BS 5499-4 [17] and BS 5499-10 [18].

The purpose of fire signs is to direct persons towards fire exits, or to provide specific information or warning about particular equipment, doors, rooms or procedures.

Fire notices should be permanently displayed in conspicuous positions throughout the building, including storey exits, and should be specific to it.

A block of flats with a single stair in regular use, such as Acorn House, would not usually require any fire exit signage.

All fire doors, other than bedroom doors and lift landing doors, will be marked with the appropriate fire safety sign, according to whether the door is:

- to be kept closed when not in use ('FIRE DOOR - KEEP SHUT').
- to be kept locked when not in use ('FIRE DOOR - KEEP LOCKED'), or
- held open by an automatic release mechanism ('AUTOMATIC FIRE DOOR - KEEP CLEAR').

Any emergency securing device fitted to doors on escape routes are to be provided with instruction notices, adjacent to the device, indicating the method of operation.

3.10 Wayfinding signage

The building will have a top storey more than 11m above ground and should therefore be provided with appropriate signage to assist the fire service to identify each floor and flat.

Wayfinding signage should be provided throughout the building in accordance with Clauses 15.13 to 15.16 in ADB, including:

- Floor identification signs at each landing of the protected stair and each common corridor accessed from the firefighting lift, formatted in accordance with Section 15.14 and 15.15 in ADB.

- Flat indicator signs, located beneath the floor indicator signs and indicating the flats present and each level. These should be formatted in accordance with Section 15.16 in ADB.

3.11 Firefighting lifts

3.11.1 The building will have a top storey more than 18m above ground and should therefore be provided with a firefighting lift, designed and installed in accordance with BS EN 81-20 and BS EN 81-72 [19]. The lift landing doors shall be within 7.5m of the firefighting stair door and the lift will be enclosed in 120 minutes fire resistance construction provided with FD60 fire doors. A firefighting lobby will be provided at ground level to separate the firefighting lift from the firefighting stair in buildings with a top storey more than 18m above ground. The firefighters lift serves the upper floors only.

3.12 Emergency voice communication systems (EVC)

3.12.1 Refuge spaces will be provided as detailed in Section 4.9.8. These refuge space shall be provided with an emergency voice communication system (EVC system). The system should comply with BS 5839-9 [20] and should consist of a Type B outstation which communicates with a receiving station (typically located next to the main fire alarm panel or a concierge desk).

3.13 Emergency (life-safety) power supply

3.13.1 All life-safety systems will be provided with robust power supplies in accordance with BS 8519 [21].

3.13.2 The following fire safety systems shall comply with their respective British Standards regarding secondary power supplies:

- Automatic fire detection and alarm systems.
- Sprinkler systems.
- Automatic smoke ventilation systems.
- Emergency lighting and signage.
- Firefighting lifts.
- Emergency voice communication systems (EVCs).

3.13.3 There must be minimal delay in change over if the main power fails and it must occur automatically.

3.13.4 Internal batteries may be used to provide back-up power supply to systems with a low power demand (i.e., emergency lighting and automatic detection and alarm systems). These batteries should be capable of a continuous stand-by supply in accordance with the relevant design standard and be fully rechargeable within a period of 24 hours.

4. MEANS OF WARNING AND ESCAPE

Building Regulations requirement B1:

"The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times."

4.1 Evacuation philosophy

A defend-in-place strategy, otherwise known as a 'stay-put' strategy shall be implemented in all residential units, whereby, in the event of a flat fire, only the unit of fire origin will receive a signal to evacuate. No other flats will receive an alert notification, though should residents become aware of a fire they may leave the building if they wish to do so.

4.1.1

In the unlikely event of a fire that spreads beyond the flat of fire origin, the wider evacuation of the building may be initiated and managed by the fire service should this be deemed necessary.

4.1.2

Areas of ancillary accommodation within the building (e.g., refuse and bike stores) will feature a simultaneous evacuation regime, whereby upon activation of the detection and alarm system, only the ancillary accommodation/area of fire origin shall receive a signal to evacuate. All other areas shall not receive a signal to evacuate.

4.1.3

The retail and office units will operate completely independently from the rest of the building. Evacuation from these areas shall be based upon local simultaneous evacuation, whereby, upon activation of the detection system, all areas within the relevant unit shall receive a signal to evacuate.

4.1.4

The fire detection and alarm system shall be configured to support this strategy statement (see section 3.1 for reference).

4.1.5

4.2 Horizontal means of escape – Internal flat design

The building will comprise single-storey flats more than 4.5m above ground level. Some of these flats will be open-plan arrangements whilst others will be provided with entrance halls. The travel distance for either internal arrangement will be limited to 20m on the basis that:

4.2.1

- All flats will be provided with an automatic fire detection and alarm system to a category LD1 standard in accordance with BS 5839-6;
- Cooking facilities will be sited remote from the escape route (minimum 1.8m away from a 0.9m wide route); and
- All flats will be provided with a sprinkler system designed in accordance with BS 9251.

4.3 Private balconies

4.3.1

Private balconies should be designed in accordance with Annex D of BS 9991 [22]. Balconies more than 4.5m above ground should meet the following recommendations:

- The escape route from the balcony should not pass through more than one access room;
- The interior of the access room should be visible from all parts on the balcony unless provided by an automatic fire detection and alarm system;
- Any cooking risks within the access room should be enclosed in fire resisting construction unless:
    - the open cooking risk is remote from the balcony escape route (i.e. 1.8m away); and
    - An automatic fire detection and alarm system in accordance with BS 5939-6 is provided to the access room with sounders or visual beacons provided on the balcony; and
- Where the maximum travel distance from the balcony access door to the furthest point on the balcony exceeds 7.5m either a separate exit into a different room should be provided or an automatic fire detection and alarm system within the access room.

4.3.2

Balconies less than 4.5m above ground should either be provided with escape doors or windows, or meet the recommendations in para. 4.3.1 above.

4.3.3

All balconies should be guarded by a protective guarding conforming to BS 6180 [23].

4.3.4

Further guidance on the combustibility of materials forming part of balconies and terraces is provided in Section 7.

4.4 Horizontal means of escape – Common residential areas

4.4.1

Escape from each flat will be via a protected communal corridor connecting to the escape stair. The protected corridor will be provided with ventilation via a natural smoke shaft, in accordance with Section 3.4.

The maximum travel distance within the corridor measured from the furthest flat door to the stair entrance door will not exceed 7.5m in accordance with Figure 6(b) of BS 9991. An indicative layout of an upper storey is shown in Figure 8.

4.4.2

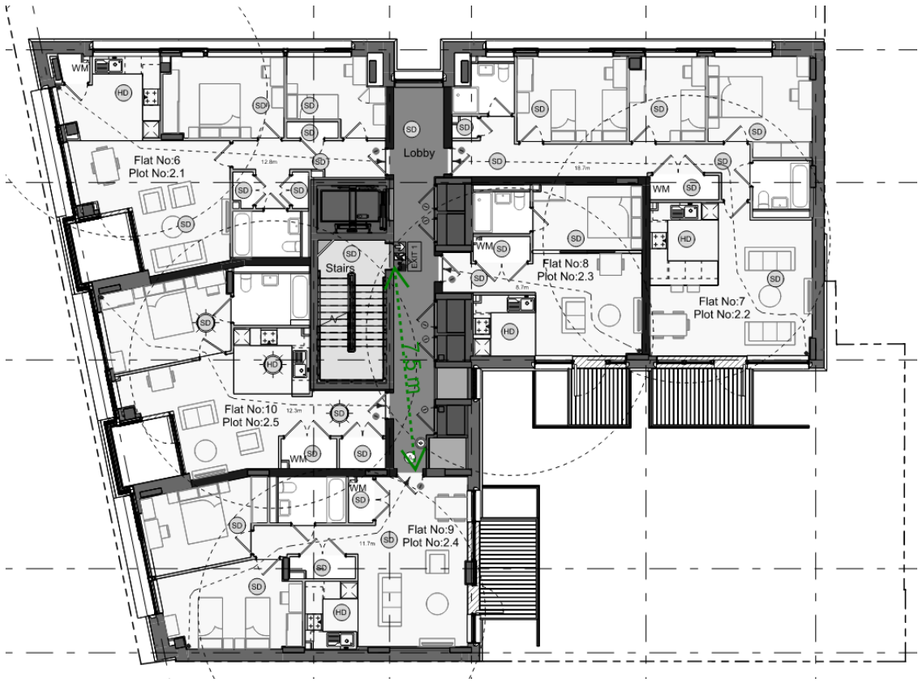


Figure 8 – Indicative floor layout (Second Floor shown)

4.5 Horizontal means of escape – Ancillary and non-residential areas

The non-residential areas of the building will comprise a residential bin store and residential bike store, plant, office spaces and retail spaces. Escape from these areas will be designed in accordance with the recommendations in BS 9999.

4.5.1 The maximum permitted travel distances are detailed in Table 4. The required width of each exit depends upon the number of occupants required to use them and are indicated in Table 5.

4.5.2 Areas served by a single exit will not accommodate more than 60 persons. Where multiple exits are available, the largest exit should be discounted in the event that it is blocked by a fire, when estimating the total available exit capacity.

4.5.3

Table 4 – Travel distance limitations

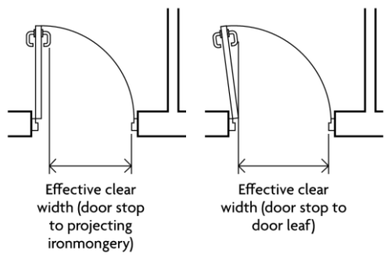
Area	Recommended maximum travel distance	
	Single direction (m)	Multi-direction (m)
Residential (open plan)	20	N/A
Office	26	N/A
Shop and commercial	20	N/A
Storage and other non-residential – normal hazard	22	55
Places of special fire hazard (i.e., substation)	12	45
Plant room of roof-top plant: a. escape route not in open air b. escape route in open air	 18 60	 45 100
Note: 1) Where the internal layout of partitions, fitting etc. is unknown, direct distances, rather than travel distances, should be assessed and should not exceed 2/3 of the limits above.		

Table 5 – Width of escape routes and exits

Number of people served	Minimum width (mm)
60	800 (850 for unassisted wheelchair users)
220	1,050
More than 220	5 per person

Note:

1) Doors hung to swing against the flow of escaping occupants are to serve a maximum of 60 people, irrespective of the available clear exit width.
2) Exit widths may ned to be increased to meet the guidance in ADM.
3) 5mm/person does not apply to a door serving less than 220 persons.
4) Exit widths are for clear widths measured in accordance with Figure 14 in ABS 9999 as indicated opposite:



Merging Flow

Merging flow occurs where occupants using the basement stairs share the final exit within the office reception area with occupants of the ground floor office. The final exit must therefore be suitably sized for all occupants simultaneously.

The merging flow calculation is based on the following formula:

$$W_{FE} = BX + 0.75S_{up}$$

Where:

W_{FE} = Width of the final exit;

B = Number of people served by the final exit level storey exit (60 people);

X = Minimum door width per person (2.81mm/person);

S_{UP} = Width of the stair (1200mm).

The merging flow calculation is summarized in table below.

Table 6 - Merging flow capacity summary

Exit	Width of stair	Capacity factor (doors)	No. of occupants	Minimum clear width of final exit to outside
Office reception	1200mm	2.81mm/person	60 people	1069mm

Based on the above, final exit from office reception shall achieve a clear width of 1069mm.

Based on the maximum occupancy estimated in Table 3, the required number of exits and their minimum clear widths are summarised in Table 7 for all non-residential areas.

Table 7 – Indicative minimum exit requirements

Area	Estimated occupancy (persons)	Min. required exits	Resulting exit capacity (persons) (1)
Office - Basement	42	1 x 800mm	60
Office – Ground floor	26	1 x 800mm	60
Retail	50	1 x 800mm	60
Note 1: Resulting escape capacity after discounting the largest exit.			

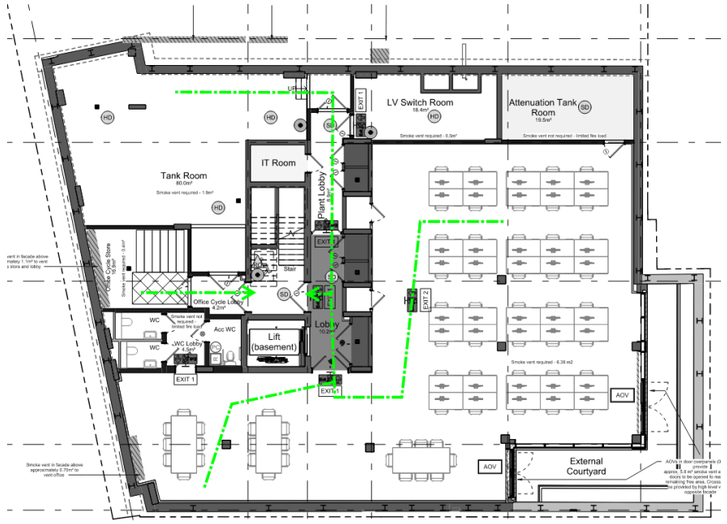


Figure 9 – Indicative escape arrangement from non-residential areas (Basement)

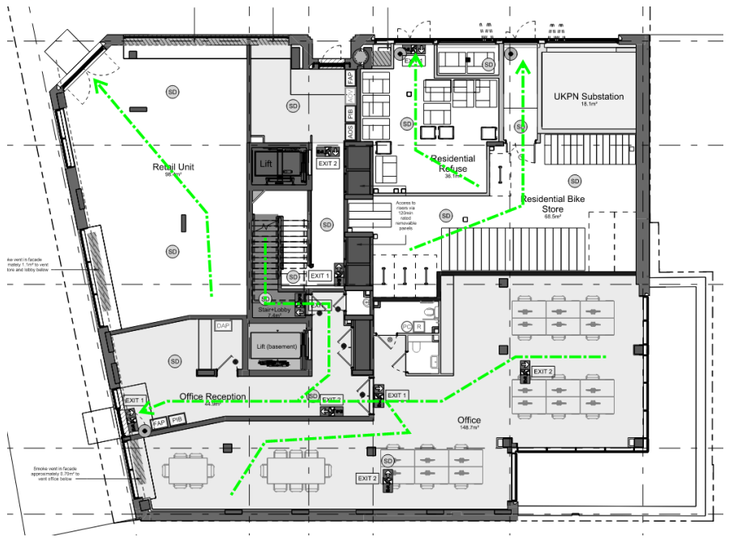


Figure 10 – Indicative escape arrangement from non-residential areas (Ground)

Accessibility requirements are outside of the scope of this report, and it should be noted that wider corridor or doorways may be required to satisfy the requirements of Part M of the Building Regulations. Further guidance is given in Approved Document M (ADM) [24].

4.6 Inner rooms

The attenuation tank room within the basement office is configured as an inner room. Inner rooms should be designed in accordance with Clause 16.3.4 of BS 9999.

4.7 Children's Playspace

It is proposed to provide a 'children's playspace' on an external roof terrace on Sixth Floor, accessible via the common residential corridor.

Section 14.1(b) of BS 9999 states the following:

"Where a creche is provided for children separately from their parents or guardians, it should be sited adjacent to escape routes used by parents or guardians on their way out to avoid clashing of streams of people as parents or guardians collect their children. A creche should be at or as near ground level (or the level at which the final exits discharge) as practicable. In no circumstances should the accommodation for children be:

1. *On a floor above the level at which parents or guardians are accommodated, unless the escape route is through the upper level; or*
2. *At basement level, unless the final exit is at basement level."*

Although this 'children's playspace' differs from a creche, Ashton Fire is of the opinion that the principles of this section of the guidance should also apply to such an area. As such, the location of this 'children's playspace' would not be in line with the recommendations of BS 9999.

However, the Client has stated that this space would not be expected to be occupied by unsupervised children and, as such, believe that it should not be considered in this manner. The approving authority has agreed with the Client's assessment and this 'children's playspace' is to remain in the design.

4.8 Vertical means of escape

Escape from the upper residential levels will be facilitated by a protected stair, which connects to the ventilated lift corridors on each level and discharge directly to outside via a protected passageway.

A stair of acceptable width for everyday use will generally be sufficient for escape purposes. As the stair will also be designed as a firefighting stair, it should be at least 1,100mm wide.

The stair from the basement office should be at least 1,200mm wide for upward travel as per Section 17.4.1. of BS 9999.

Where handrails intrude 100mm or less, these can be ignored when assessing the clear width of the communal stair. The stair should be kept free for a vertical distance of 2m.

A protected escape stair may only contain a lift well or electricity meters. In single stair buildings, electricity meters should be in securely locked cupboards. Cupboards should be separated from the escape route by fire resisting construction.

Post boxes are proposed to be provided within the main entrance lobby. The post boxes should be designed out of non-combustible materials specified to achieve a 30-minute fire resistance and should be limited in size (e.g. only letters and not parcels) with sloped tops to prevent the storage of items on top. An additional fire door will be provided to separate the post boxes from the escape. This space should be provided with signage to prevent the use of the lobby space for delivering/storing parcels or combustibles of any kind.

The flights and landing of the escape stairs should be constructed of materials achieving class A2-s3, d2 or better, as the stair serves a storey more than 18m above access level/is a firefighting stair.

4.9 Evacuation of disabled and mobility impaired persons (MIPs)

Residential areas

Disabled wheelchair refuges are not expected to be provided in residential buildings relying on a stay-put evacuation policy, as only the occupants within the affected flat would evacuate.

It should be noted that under the Regulatory Reform (Fire Safety) Order 2005, it is the duty of the responsible person along with their appointed safety assistants to assist everyone to a place of ultimate safety outside the building in the event of an emergency.

4.9.2 All areas at ground floor will be provided with step-free, or ramp access.

Non-residential areas

4.9.3 It should be noted that under the Regulatory Reform (Fire Safety) Order 2005, it is the duty of the responsible person along with their appointed safety assistants to assist everyone to a place of ultimate safety outside the building in the event of an emergency.

4.9.4 The building operator must develop procedures to assist with the evacuation of disabled persons in the event of fire.

4.9.5 It is envisaged that most persons will be able to escape to a place away from danger without requiring assistance. However, there may be a certain proportion of building occupants, such as those who are non-ambulant disabled (e.g. wheelchair users), who will not be able to negotiate stairs unaided. For these instances, refuge positions should be provided within the stairs/lobbies in the stair core, in which their safety can be assured for a period of time prior to being assisted to ultimate safety outside the building.

4.9.6 The refuge areas will have a clear area of at least 900 x 1,400mm and should be located so as not to impede the movement of occupants onto stairways or escape routes and will be clearly identified.

4.9.7 Refuge areas will be required at Basement and on Sixth Floor and Ninth Floor (due to the non-residential uses on these floors). The refuge area at Basement and Ninth Floor will be located within the landing of the protected stairs. The refuge area at Sixth Floor will be located on the external terrace.

4.9.8 Each refuge space shall be provided with an emergency voice communication system as recommended in Section 3.12.

4.9.9 Any disabled member of staff with specific needs should have a Personal Emergency Evacuation Plan (PEEP) and the procedures should be practiced. A Generic Emergency Evacuation Plan (GEEP) will need to be written for members of the public who would need assistance to escape.

4.9.10 Any ramps should be designed in accordance with Approved Document M.

4.10 Final exits and onward escape

4.10.1 Travel beyond the building final exits must be away from the building, towards a place of safety, and not be jeopardised by unprotected openings of the building.

4.10.2 In general, the building should be provided with escape routes, upon exiting the building that are either directly away from the building, have alternate path along the building façade or have alternative exits via a second stair or alternative exits at different levels.

4.10.3 Where the external escape route continues in a single direction along the façade, the external wall adjoining the escape routes should have a minimum of 30 minutes fire resistance (integrity and insulation).

4.10.4 Final exits should avoid outlets from basement smoke vents and openings to transformer chambers, refuse chambers, boiler rooms and similar risks.

4.10.5 Final exits should not present a barrier for disabled people. Where the route to a final exit does not include a stair, a level threshold and, where necessary a ramp should be provided.

5. INTERNAL FIRE SPREAD – LININGS

Building Regulations requirement B2:

"(1) To inhibit the spread of fire within the building, the internal lining shall:

a) Adequately resist the spread of flame over their surfaces; and

b) Have, if ignited, either a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.

(2) In this paragraph 'internal linings' means the materials or products used in lining any partition, wall, ceiling or other internal structure."

5.1 Internal wall and ceiling linings

5.1.1 During the development of a fire in a building, the choice of material for the lining of walls and ceilings can significantly affect the spread of fire and its rate of growth.

5.1.2 Restrictions are placed on the wall and ceiling lining materials within certain areas of buildings to limit the spread of fire and production of smoke in these areas.

5.1.3 It is particularly important that in circulation spaces, where the rapid spread of fire is most likely to prevent occupants from escaping, the surface linings are restricted, by making provision for them to have low rates of heat release and surface spread of flame.

5.1.4 All wall and ceiling linings within the building should meet the recommendations of Section 20 of BS 9991 and Section 34 of BS 9999 when tested under the European Classification (in accordance with BS EN 13501-1 [25]) as summarized in Table 8.

Table 8 – Classification of linings

Location	Classification
Small rooms of maximum internal floor area: ≤ 4m² (residential accommodation) ≤ 30m² (non-residential accommodation)	D-s3, d2
Other rooms	C-s3, d2
Circulation spaces (within dwellings)	
Other circulation spaces (communal)	B-s3, d2 (1)
Note 1: Wallcoverings which conform to BS EN 15102, achieving at least class C-s3, d2 and bonded to a class A2-s3, d2 substrate will also be acceptable.	

5.1.5 The surface linings of walls and ceilings should generally conform to the classification recommended above for the appropriate location. However, parts of walls in rooms may be of lower performance, but not worse than class D-s3, d2. provided that the floor area of those parts in any one room does not exceed half of the floor area of the room, subject to a maximum area of 20m² in residential areas and 60m² in non-residential areas.

5.2.1

5.2 Rooflights and thermoplastic materials

Any non-plastic rooflights are to meet the recommendations of Table 8 above.

Where thermoplastic materials (e.g., rooflights, glazing, suspended ceilings and lighting diffusers) are used in the building, these are to comply with the various recommendations provided in 18.6.2 of BS 9991.

6. INTERNAL FIRE SPREAD – STRUCTURE

Building Regulations requirement B3:

"(1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.

(2) A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings. For the purposes of this sub paragraph a house in a terrace and a semi-detached house are each to be treated as a separate building.

(3) Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following:

(a) sub-division of the building with fire resisting construction;

(b) installation of suitable automatic fire suppression systems.

(4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited."

6.1 Structural fire resistance

6.1.1 As the building has a top storey height of 31.5m above ground, all elements of structure should be designed and / or protected to achieve 120 minutes fire resistance in accordance with Table 4 of BS 9991.

6.1.2 Elements of structure that only support a roof do not generally require fire resistance. The structure is considered to support more than only a roof if it supports a load other than the roof itself (e.g., heavy rooftop plant equipment), the roof performs the function of a floor or it is essential for the stability of the building, or other fire resisting element (internal or external). In these cases, the structural elements are required to achieve the minimum required structural fire resistance indicated in para. 6.1.1 above.

6.1.3 Where a construction element with lower or no fire resistance supports or provides stability to another element of structure, then the protection to the supporting structure should be at least the same as the structure it is supporting.

6.2 Compartmentation and fire-resisting construction

6.2.1 All floors within the building should be designed as compartment floors providing at least 120 minutes fire resistance. All shafts (e.g. service risers, lift shafts, stair cores) should be designed and constructed as protected shafts enclosed in a minimum of 120 minutes fire resisting construction. Alternatively, service risers may be fire-stopped at each compartment floor level to maintain the same degree of compartmentation.

6.2.2 Flats will be separated from each other and from other parts of the building by compartment walls achieving a fire-resistance rating of at least 60 minutes. The non-residential and ancillary areas are also to be separated by compartmentation from adjacent areas by 120-minute compartment walls.

6.2.3 The building features re-entrant corners between different compartments at a 90° angle. It is recommended that compartmentation is extended by providing a fire resisting wall to achieve a separation distance of 1.8m between any unprotected areas of the adjoining compartments or protected stair cores.

6.2.4 Where the firefighting shafts adjoins an external elevation, it should be protected in accordance with Figure 23 of BS 9999.

6.2.5 The east and west elevations of the building are within 1m of the site boundary. As such, all areas within 1m of the site boundary are required to be protected using 120 minutes fire resisting construction, with protection provided from both the inside and outside.

6.2.6 To reduce the risk of fire spreading over the roof, from one compartment to another, a 1,500mm wide zone of the roof, either side of the compartment wall, should have a covering classified as $B_{ROOF}(t4)$, on a substrate or deck of a material rated class A2-s3, d2 or better. Further details and exceptions are given in Clause 31.4.5 of BS 9999.

6.2.7 Fire-resisting construction will be provided in accordance with the recommendations in Table 4 of BS 9991 and Table 22 of BS 9999 reproduced in Table 9 below.

Table 9 - Periods of fire resistance for fire-separating elements

Part of building	Minimum fire resistance rating when tested to the relevant part of BS 476 (mins)			Methods of exposure
	Loadbearing	Integrity	Insulation	
Structural elements	120	n/a	n/a	Exposed faces
Floors: Compartment floors	 120	 120	 120	 From underside
Roofs: Forming an escape route Performing the function of a floor	 30 120	 30 120	 30 120	 From underside From underside
External walls: Any part less than 1,000 mm from a point on the relevant boundary Any part more than 1,000 mm from the relevant boundary Any part beside an external escape route	 120 120 30	 120 120 30	 120 15 30	 Each side separately From the inside From the inside
Compartment walls separating flats from other parts of the building; occupancies	60	60	60	Each side separately
Any other compartment walls	120	120	120	Each side separately
Protected shafts (service risers, smoke shafts, lift shafts etc.)	120	120	120	Each side separately
Firefighting shafts Construction separating shaft from the rest of the building Construction separating firefighting stair, lift and lobby	 120 60 60	 120 60 60	 120 60 60	From side remote from shaft From shaft side Each side separately
Fire resisting ceiling	n/a	30	30	From underside

Part of building	Minimum fire resistance rating when tested to the relevant part of BS 476 (mins)			Methods of exposure
	Loadbearing	Integrity	Insulation	
Construction enclosing places of special fire hazard	30	30	30	Each side separately
Cavity barriers	n/a	30	15	Each side separately

6.3.5

6.3.6

Areas defined as places of special fire hazard (e.g. oil-filled transformer, switch gear room, boiler room, storage space for fuel or other highly flammable substance, rooms that house a fixed internal combustion engine) should be enclosed in fire resisting construction achieving a minimum of 30 minutes in accordance with Clause 7.2 of ADB Vol.1.

6.2.8

Notwithstanding the above, it is recommended that ancillary accommodation within the building is to be enclosed within fire-resisting construction. The degree of separation required depends on the contents of the room / enclosure and is summarised in Table 10 below.

6.2.9

6.3.7

6.3.8

Table 10 - Ancillary accommodation fire protection requirements

Ancillary accommodation	Minimum fire resistance (mins)
Storage areas not greater than 450m^2	30 minutes
Transformer, switchgear and battery rooms for LV equipment	
Service installation rooms	60 minutes
Places classified as high fire risk areas	
Transformer and switchgear rooms for equipment above low voltage	120 minutes
Refuse storage areas	
Boiler rooms	
Plantrooms associated with life safety systems and fire protection systems	
Substations[1]	
Note 1: Building Regulation requirement for substation is 120 minutes, this provision my need to be increased to up to 240 minutes on discussion with UKPN.	

6.3.9

6.3.13

6.3 Fire doors and doors on escape routes

Doors on escape routes should not be fitted with locks, latch or bolt fastenings or should only be fitted with simple fastenings that can be readily operated (without the use of a key) from the side approached by occupants making an escape without needing to manipulate more than one mechanism.

6.3.2

Doors should generally be hung to open in the direction of escape and should always do so where it is expected that the number of persons expected to use the door at the time of a fire is more than 60.

6.3.3

Vision panels should be provided where doors on escape routes sub-divide corridors, or where doors are hung to open in both directions. Further guidance on vision panels in doors across accessible corridors is provided in ADM and guidance on fire safety of glazing in contained in Approved Document K (ADK) [26].

6.3.4

Any fire doors fitted with automatic locking or hold-open devices should be designed as indicated in Section 3.7.

Where doors on escape routes need to be secured against unauthorised use by electrically powered access control measures (e.g. keypads, swipe or proximity card, biometric data etc.) when the building or part of the building is occupied, they should also be provided with a security mechanism override from the side approached by occupants making an escape.

Electrically powered locks should return to the unlocked position in the following situations:

- On operation of the detection and alarm system;
- On loss of power or system error; or
- On activation of a manual door release unit (Type A) that is designed to BS EN 54-11 [7] and is positioned at side of the door that is approached by people making their escape. Where the door provides escape in either direction, a unit should be installed on both sides of the door.

Fire doors are to be provided in accordance with the recommendations of Table 12 of BS 9991 and Table 30 of BS 9999, and as summarised in Table 11.

All fire doors should be self-closing except for doors within flats or dwellinghouses, fire doors to cupboards or doors which are normally locked shut, such as to places of special fire hazard or service risers, which may also need to be provided with appropriate signage.

Fire doors assemblies shall comply with:

- BS 476-22 [27] or BS EN 1634-1 [28] for fire resistance; and where applicable
- BS 476-31 [29] or BS EN 1634-3 [30] for smoke leakage.

Table 11 – Provision for fire doors

Position of Door	Minimum fire resistance in terms of integrity (minutes)	
	Tested to BS 476-22	Tested to the relevant European standard
In a party wall separating buildings	As per the wall it is fitted in	As per the wall it is fitted in
In a compartment wall or floor	As per the wall it is fitted in	As per the wall it is fitted in
Enclosing ancillary accommodation	As per the wall it is fitted in	As per the wall it is fitted in
Enclosing a smoke shaft	As per the wall it is fitted in and with the suffix 'S'	As per the wall it is fitted in and with the suffix 'S_a'
Enclosing a protected shaft (service riser, escape stair)	Half of the wall it is fitted in and with suffix 'S'	Half of the wall it is fitted in and with suffix 'S_a'
Enclosing a lift shaft	Half of the wall it is fitted in	Half of the wall it is fitted in
Enclosing a firefighting shaft	Half of the wall it is fitted in and with suffix 'S'	Half of the wall it is fitted in and with suffix 'S_a'
Forming part of a protected lobby, corridor	FD 30 S	E 30 S_a
Providing access to an external escape route	FD 30	E 30
Flat entrance doors	FD 30 S	E 30 S_a
Forming part of the enclosure to a place of special fire hazard	FD 30	E 30
Notes: Smoke seals are indicated by the suffix 'S' (to BS 476-31) or Sa (to BS EN 1634-3) and are required in all doors which form the enclosure to protected escape routes.		

6.4 Fire-stopping and penetrations through fire-resisting construction

6.4.1 Fire-stopping should be provided at the junction of fire-separating walls and external walls in order to maintain the fire resistance period of fire-separating walls, and thereby prevent a fire from travelling around the junction and into the neighbouring space. Penetrations through lines of fire-resisting separation should be fire-stopped using a system which will achieve the same fire resistance rating as the penetrated wall or floor.

6.4.2 In order to maintain the fire resistance of separating construction, any pipe or cable penetrations through lines of fire-resisting separation should be fire-stopped in accordance with one of the following methods set out by Section 34 of BS 9999, unless located within a protected shaft. Figure 11 is provided to assist in the interpretation of the recommendations below.

- for pipes of any diameter, a proprietary seal which has been shown by test to meet the fire-resistance rating of the wall, floor, or cavity barrier; or
- for pipes with a restricted diameter, keeping the opening as small as possible and providing fire-stopping around the pipe. The nominal interior diameter of the pipe should not be more than the relevant dimensions given in Table 31 of BS 9999, also reproduced in Table 12; or
- Sleeving – a pipe of lead, aluminium, aluminium alloy, fibre-cement or uPVC, with a maximum nominal internal diameter of 160mm, may be used with a sleeving of a high melting point metal. The opening in the structure should be as small as possible and the sleeve should be class A1 rated and extend no less than 1000mm on either side of the structure.

6.4.3 Any gas supply pipe in a protected shaft will be of a screwed-steel or all-welded steel construction, installed in accordance with the "Pipelines Safety Regulations 1996" [31] and the "Gas Safety (Installation and use) Regulations 1998" [32].

Table 12 - Maximum nominal internal diameter of pipes

Situation	Pipe material and maximum nominal internal diameter (mm)		
	High melting point metal (1)	Lead, aluminium, aluminium Alloy, uPVC (2), fibre cement	Any other material
Structure enclosing a protected shaft which is not a stairway or lift shaft	160	110	40
Any other situation	160	40	40

Notes:

1) Any metal (such as cast iron, copper or steel) which, if exposed to a temperature of 800° C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.
2) uPVC pipes conforming to either BS 4514 [33] or BS 5255.

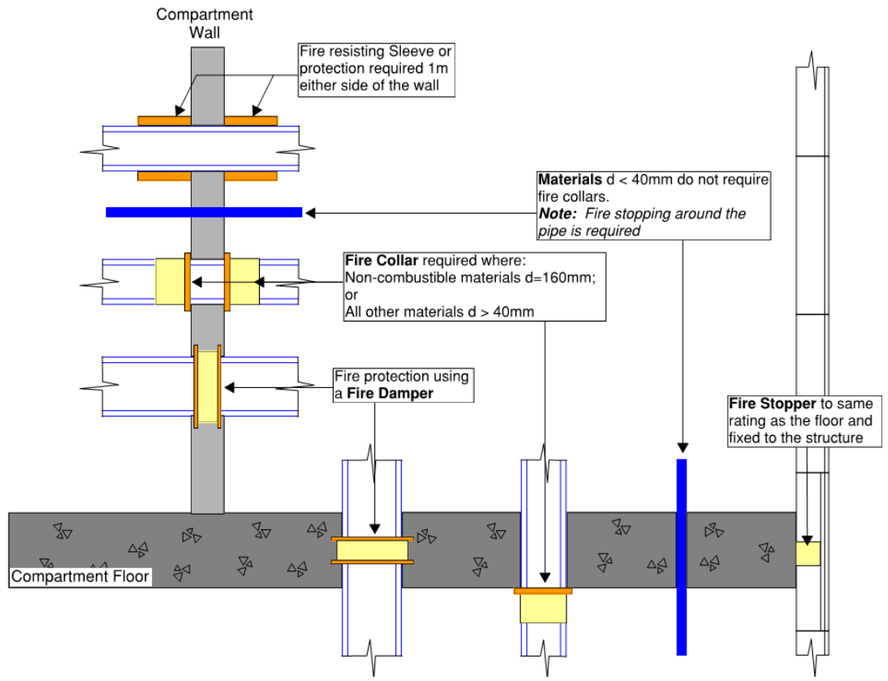


Figure 11 – Fire-stopping expectations

6.5 Protection of ductwork

6.5.1 One of the following methods is to be implemented where a ventilation duct passes through a fire resisting element to maintain the integrity of the element being breached:

- Thermally activated dampers (not suitable where passing through the enclosure of a protected escape route);
- Protection using fire and smoke dampers activated by smoke detectors (ES-type dampers);
- Protection using fire-resisting enclosure achieving the fire resistance rating equivalent to the highest rated compartmentation that is penetrated; or
- Protection using fire-resisting ductworks achieving the fire resistance rating equivalent to the highest rated compartmentation that is penetrated.

6.5.2 If dampers are the preferred form of ductwork protection, smoke detector operated fire and smoke dampers (ES-type) shall be provided where the ductwork enters fire-separated or smoke-separated sections of escape routes and where it enters in each dwelling.

6.5.3 Fire dampers should conform to BS EN 15650 [34] and achieve an 'E' classification equal to or greater than the resistance of the element that it penetrates, but not less than 60 minutes in accordance with BS 13501-3 [35].

6.5.4 Fire and smoke dampers should conform to BS EN 15650 and achieve an 'ES' classification equal to or greater than the resistance of the element that it penetrates, but not less than 60 minutes in accordance with BS 13501-3.

The fire resistance of duct and dampers should be equal to the fire-resistance required for the element that is penetrated. All ducts should be fire-stopped where they penetrate compartments and fire-resisting enclosure of escape routes.

6.5.5 Any air transfer grilles required as part of ventilation system should not be provided within any wall, door, floor or ceiling enclosing a protected entrance hall, protected corridors, firefighting stairways and lobbies, protected shafts and compartment walls or floors. Air transfer grilles located within fire hazard rooms should be provided with both fire and smoke containment. Any transfer grilles fitted in doors will need to be accompanied by a test certificate provided by the door manufacturer.

6.5.6 Any extraction ductwork serving a kitchen is recommended to avoid passing through fire-resisting construction where possible. If this cannot be avoided, then the ductwork should not be fitted with dampers, and should instead be fire-resisting or be enclosed within fire-resisting construction.

6.5.7

6.6 Cavity barriers and concealed spaces

6.6.1 Cavity barriers should be provided in order to prevent the rapid spread of unseen fire or smoke in voids, and to prevent the spread of fire around compartmentation via voids. Cavity barrier should be provided in accordance with Section 19 of BS 9991 and Section 33 of BS 9999 where appropriate to:

- To close the edges of cavities, including the top of the cavity wall and around openings (windows, doors and exit/entry points for services) in the external wall;
- At the junction between an external cavity wall (except where the cavity wall is twin-leaf masonry/concrete constructed in accordance with Figure 25 of BS 9991 and Figure 36 of BS 9999) and every compartment floor or compartment wall; and
- At the junction between an internal cavity wall (except where the cavity wall is twin-leaf masonry/concrete constructed in accordance with Figure 25 of BS 9991 and Figure 36 of BS 9999) and every compartment floor, compartment wall or other wall or door assembly which forms a fire resisting barrier.

6.6.2 Figure 12 is provided to assist with the interpretation of these requirements.

6.6.3 Extensive internal concealed cavities (e.g. roof voids or the void between suspended ceilings and the soffit of the floor above) generally require cavity barriers to sub-divide them. In general, cavity barriers should be at 20m centres in cavities with exclusively class C-s3, d2 linings or better. For other linings, the spacing between cavity barriers should be reduced to 10m. Various exceptions are provided in Section 33.2 BS 9999 with respect to extensive cavities in non-domestic premises.

6.6.4 All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I) and should be fitted to a rigid construction and mechanically fixed into position.

6.6.5 Cavity barriers in a stud wall or partition, or provided around openings may be formed of:

- steel at least 0.5mm thick;
- timber at least 38mm thick;
- polythene-sleeved mineral wool, or mineral wool slab, under compression when installed in the cavity; or
- calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

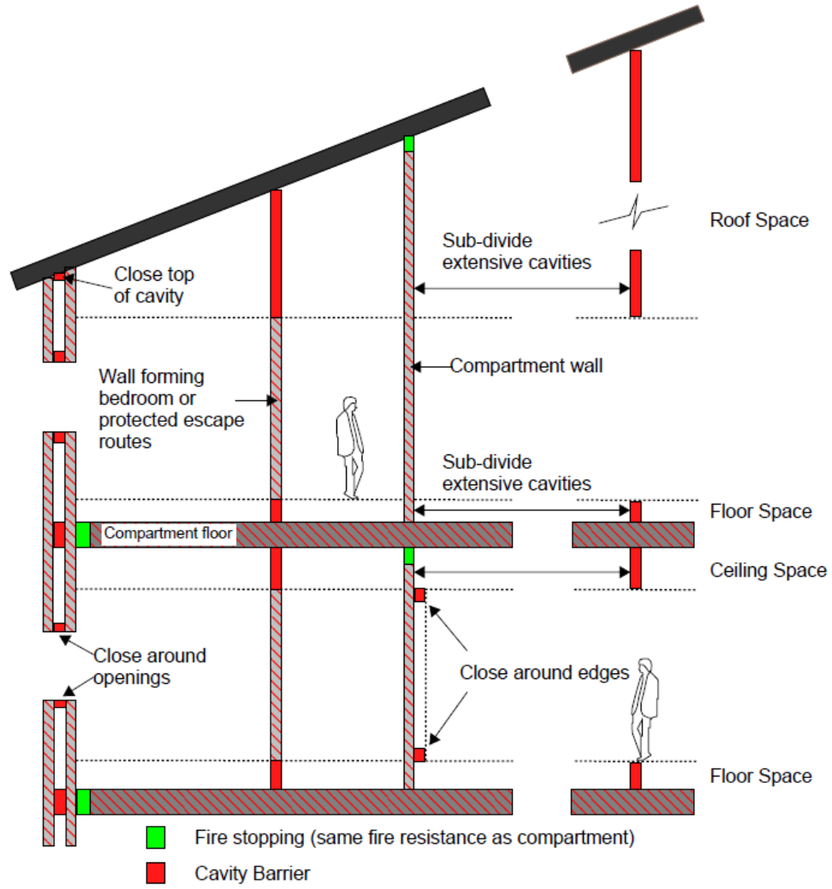


Figure 12 – Cavity barrier and fire-stopping locations

7. EXTERNAL FIRE SPREAD

Building Regulations requirement B4:

"(1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.

(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building."

7.1 General

To prevent the spread of flame across the external surfaces of the building, materials forming part of the external wall of the building should be in accordance with Section 18 of BS 9991. Further restrictions are placed on buildings classified as 'relevant buildings' as per Section 10 of ADB.

7.1.1

The definition of external walls contained within the Building Regulations also includes windows and doors within the wall and any decorations applied to the external surface of the walls.

7.1.2

7.2 External wall construction – 'Relevant buildings'

As the building will contain one or more dwellings, an institution or a room for residential purposes and will have a floor at a height greater than 18m above ground level, it will be classified as a 'relevant building' under Regulation 7(4) of the Building Regulations.

7.2.1

The building will comply with the requirements of Regulations 7(1) and 7(2), which state that:

7.2.2

[…] "(1A) building work shall be carried out so that relevant metal composite material does not become part of an external wall, or specified attachment, of any building."

"(2) building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or A1 (classified in accordance with the reaction to fire classification)."

In accordance with Regulation 7(3) the following items are exempt from Regulation 7(2):

7.2.3

- Cavity trays when used between two leaves of masonry;
- Any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;
- Door frames and doors;
- Electrical installations;
- Fibre optic cables;
- Insulation and water proofing materials used below ground level or up to 300mm above that level;
- Intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
- Membranes;
- Seals, gaskets, fixings, sealants and backer rods;
- Components associated with a solar shading device, excluding components whose primary function is to provide shade or deflect sunlight, such as the awning, curtain or slats;
- Thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1;
- Window frames and glass; or
- Materials which form the top horizontal floor layer of a balcony which are of European classification A1fl or A2fl-s1 (classified in accordance with the reaction to fire classification) provided that the entire layer has an imperforate substrate under it.

7.2.4

In addition to the recommendations set out by Regulations 7(1) and 7(2) above, the building should also comply with requirement B4 of the Building Regulations and the external walls of the building should meet the following recommendations:

- External surfaces should meet the recommendations in Table 10.1 of ADB Vol.1 reproduced in Table 13 below; and
- Cavity barriers should be provided in accordance with Section 6.6 of this report.

7.2.5

The provisions in Table 13 apply to each wall individually in relation to its proximity to the relevant boundary.

Table 13 – Reaction to fire performance of external surface of walls

Building type	Top storey height	Less than 1m from boundary	More than 1m from boundary
Relevant buildings as defined in Regulation 7(4)		Class A2-s1, d0[2] or better	Class A2-s1, d0[2] or better
All residential purpose groups (purpose groups 1 or 2)	More than 11m	Class A2-s1, d0[1] or better	Class A2-s1, d0[1] or better
Note 1: Profiled or flat steel sheet at least 0.5mm thick with an organic coating of no more than 0.2mm thickness is also acceptable. Note 2: The restrictions for these buildings apply to all the materials used in the external wall and specified attachments. Although external walls will meet the Regulations 7(2) requirements, certain exempt items may be subject to additional controls as set out in this table (see para. 7.1.2).			

7.2.6

Particular attention is drawn to the following points:

- Membranes used as part of the external wall construction above ground level should achieve a minimum of class B-s3, d0. Roofing membranes do not need to achieve a minimum of class A2-s1, d0 when used as part of a roof connecting to an external wall;
- Internal linings should comply with the guidance provided in Section 5.1;
- Any part of a roof should achieve the minimum performance as detailed in Section 7.3;
- As per Regulation 7(3), window frames and glass (including laminated glass) are exempted from Regulation 7(2). Window spandrel panels and infill panels must comply with Regulation 7(2);
- Thermal breaks are small elements used as part of the external wall construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two compartments and should be limited in size to the minimum required to restrict the thermal bridging (the principal insulation layer is not to be regarded as a thermal break);
- Regulation 7(2) only applies to specified attachments. Shop front signs and similar attachments are not covered by the requirements of Regulation 7(2), although attention is drawn to the point below;
- While Regulation 7(2) applies to materials which become part of an external wall or specified attachment, consideration should be given to other attachments to the wall which could impact on the risk of fire spread over the wall;

- Any material achieving class A1fl or A2fl-s1 in accordance with BS EN 13501-1 is exempted when it meets both of the following conditions:
    - It forms the top horizontal floor layer of a balcony; and
    - It is provided with an imperforate substrate under it which extends to the full size of the class A1fl or A2fl-s1 material.

Curtains and/or slats of solar shading devices should achieve a class A1 or A2-s1, d0 in accordance with Regulation 7(2), where installed more than 4.5m above ground. The curtain of a solar shading devices cannot be classified as a membrane in accordance with Regulation 7(3).

7.2.7

7.3 Roof coverings

Roof coverings are recommended to be resistant to fire spread where either close enough to a boundary to be at risk of ignition from a fire in other buildings or where needed to avoid fire spread between compartments via the roof covering.

7.3.1

The relevant test and classification standards for the external fire performance of roof systems are BS EN 13501-5 (European class) or BS 476-3 (national class). If required, Table B2 of ADB Vol. 1 provides further information on the transposition to the BS 476-3 classification.

7.3.2

Roof coverings refer to a construction that can consist of one or more layers of material but does not refer to the roof structure as a whole.

7.3.3

Table 14 below summarises the required separation distances from the boundary according to the type of roof coverings as described in Table 12.12 of ADB Vol.1.

7.3.4

Table 14 – Limitations on roof coverings

Distance from relevant boundary	Designation of roof covering		
	$B_{ROOF}(t4)$	$C_{ROOF}(t4)$	$D_{ROOF}(t4)$
Less than 6m	✓	×	×
At least 6m	✓	✓	×
At least 20m	✓	✓	✓

As the building will have a minimum relevant boundary distance of less than 6m, all roof covering should be specified as achieving a class $B_{ROOF}(t4)$.

7.3.5

7.3.6

The building features accessible terraces which are considered as occupied roofs under BS 8579 [36] guidance and are expected to meet the following:

- Terraces floor build-ups should resist fire spread onto the terrace or between compartments. These should feature a $B_{ROOF}(t4)$ or better deck building where located within 3 m of an extensive external façade.
- Balustrades located within 3 m of an extensive vertical façade are recommended to be constructed from Class A1 of Class A2-s1, d0 materials to BS EN 13501-1.

7.4.1

7.4 Green roofs

The building will comprise roofs and terraces classified as green roofs, which will consist of substrates including a growing media and waterproofing layers. Guidance for the design of green and biodiverse roofs is provided in the GRO Green Roof Guide [37], and the DCLG Fire Performance of Green Roofs and Walls [38] guide. In summary, the general recommendations for consideration in the design of green roofs are as follows:

7.4.2

7.4.3

7.5.1

7.5.2

7.5.3

7.5.4

7.5.5

7.5.6

7.5.7

- the waterproofing layer at the base of the substrate layers should achieve a classification no less than the roof covering designation (see Table 14);
- the substrate and growing media should be a minimum depth of 80mm and consist of no more than 20% organic content, where this should not consist of peat;
- fire breaks of at least 500 mm should be provided from the perimeter edge as well as from any openings (doors, windows, vents, etc.) and vertical elements of all types;
- fire breaks of at least 1.5m should be provided either side of compartment walls below, or otherwise, the roof covering and waterproofing classifications should be at least $B_{ROOF}(t4)$ for 1.5m either side of the compartment wall below; and
- fire breaks should be provided in 1m wide strips every 40m across extensive green roofs.

Fire breaks on green or biodiverse roofs may be provided using 20-40mm rounded pebbles with a minimum thickness of 50mm. Paving slabs may also be used as fire breaks. The formation of fire breaks should have a depth of not less than 75mm.

Provided that the structural deck and roof coverings comply with requirements B3, the presence of a green roof should not adversely affect the designation and the minimum relevant boundaries provided in BS 9999 are applicable.

7.5 Space separation and unprotected areas of the façade

Should a fire occur in a building, heat will radiate through non-fire resisting openings in the external walls. This heat can be enough to set fire to nearby buildings and in order to mitigate the risk of external fire spread, the Building Regulations place limits on the area of the external elevation with no fire resistance, known as the unprotected area.

The east and west elevations of the building are within 1m of the site boundary, as discussed in Section 6.2.5 and as such should shall be 100% protected (with the exception of those exclusions detailed in Figure 13).

The relevant boundaries are the reference point at which the potential for fire spread should be assessed, being:

- the site boundary;
- the centreline of a space where further development is unlikely, such as a road, railway, canal or river; or
- a notional boundary between two buildings on the same site where either of the following is met:
    - one of both of the buildings are in the 'residential' or 'assembly and recreation' purpose groups (purpose groups 1, 2 or 5); or
    - the buildings will be operated/managed by different organisations.

In this instance, the relevant boundaries for the north and west elevations have been taken as the centreline of Swinton Street and Gray's Inn Road, respectively.

In accordance with Clause 18.4 of BS 9991, only small, unprotected areas in an otherwise protected façade do not contribute to the extent of unprotected area. These are shown in Figure 13.

The allowable unprotected areas have been assessed using the enclosing rectangle method of the BRE report BR 187 [39], taking into account the compartment dimensions and specified emitter radiation intensities.

Two radiation intensities have been adopted as recommended in BR 187, corresponding to a standard and reduced fire load density, depending on the different occupancy types, as follows:

- 84 kW/m^2 for residential, office and assembly spaces; and
- 168 kW/m^2 for ancillary spaces (e.g. plant room, refuse store) and retail spaces.

7.5.8

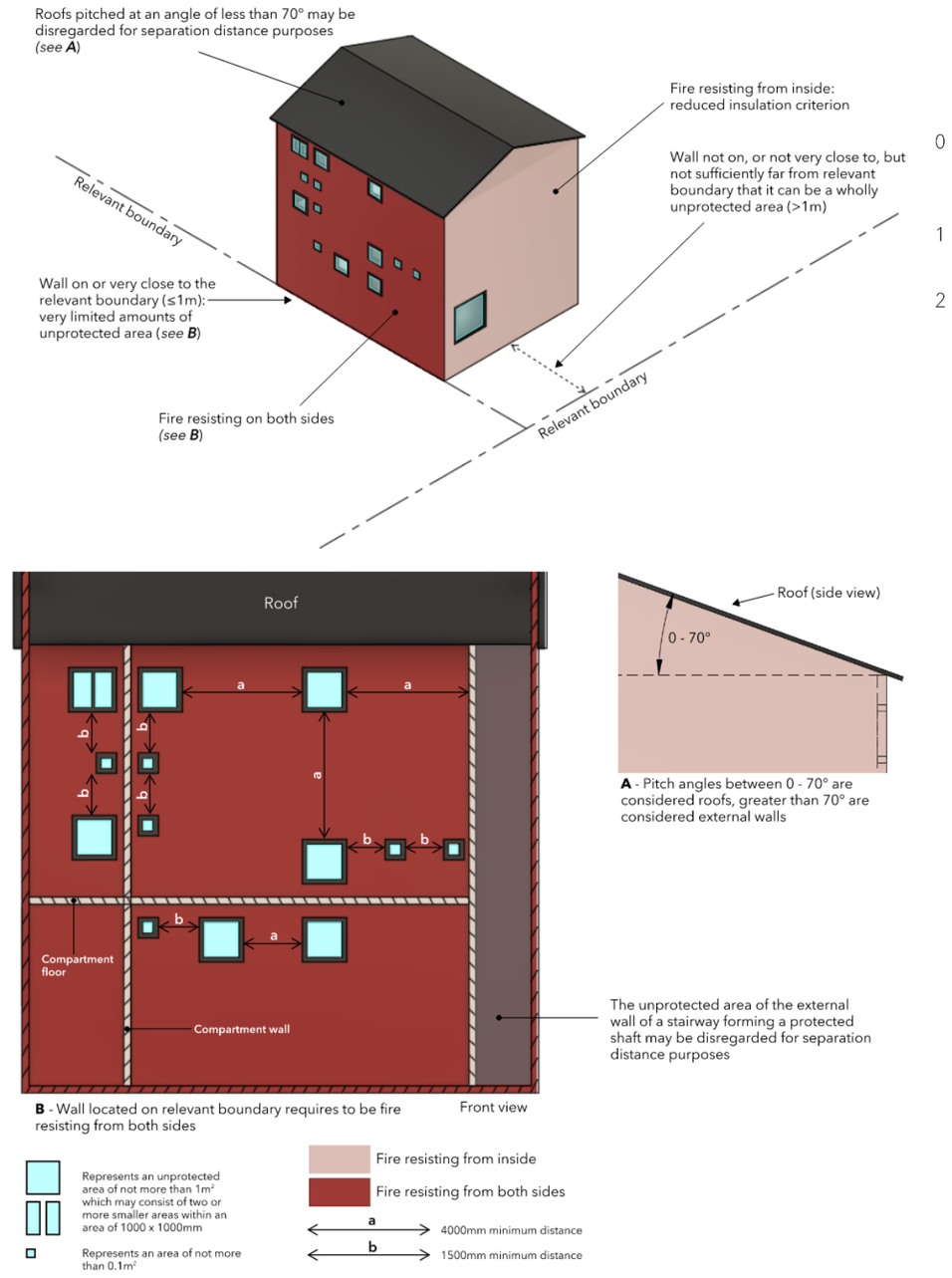


Figure 13 - Exclusion from unprotected area calculations

The benefit of the automatic sprinkler system has been considered in the external fire spread assessment, as recommended in Clause 18.5.3 of BS 9991, namely the distance to the boundary for a given amount of unprotected area has been halved (up to a minimum distance of 1m).

In accordance with BR 187, the height and width of the enclosing rectangle are measured to the nearest compartment wall/floor. Therefore, the worst-case scenario situation (corresponding to the largest compartment coinciding with each elevation) has been assessed.

Where an external wall is within 1.0m from the relevant boundary, that external wall shall have 0% unprotected area (with the exception of areas shown in Figure 13) and is required to achieve the fire resistance detailed in Table 9.

Indicative measurements between the building elevations and associated relevant boundaries are shown in Figure 14 and Figure 15.

The results of the analysis representing the worst-case scenarios are presented in Table 15 below. This table indicates the allowable unprotected area for the fire compartments on each elevation in relation to their distance from the relevant boundary.

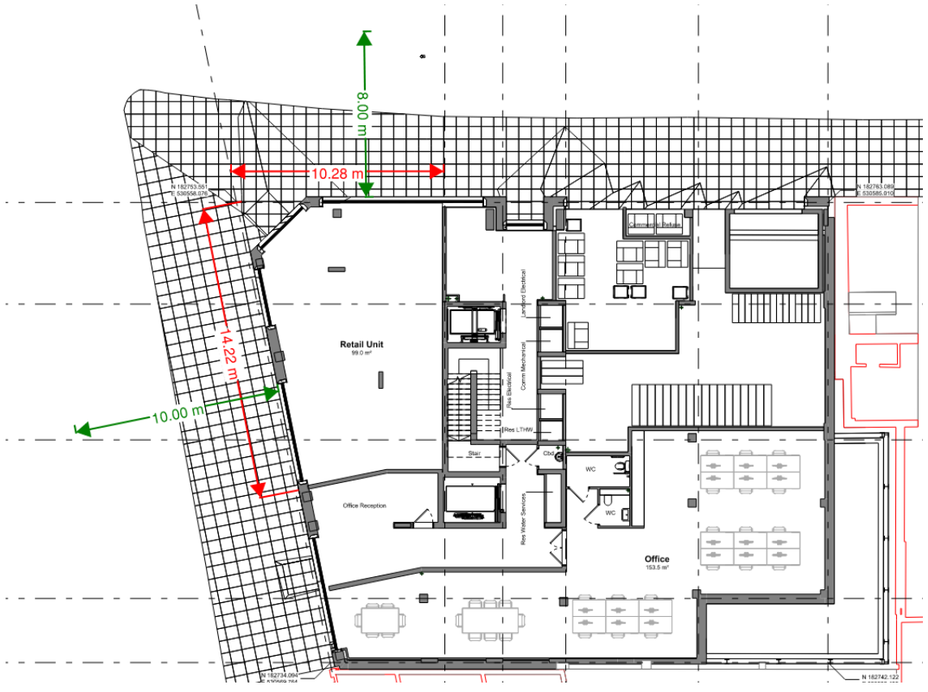


Figure 14 – Indicative measured distances to relevant boundaries (Ground floor)

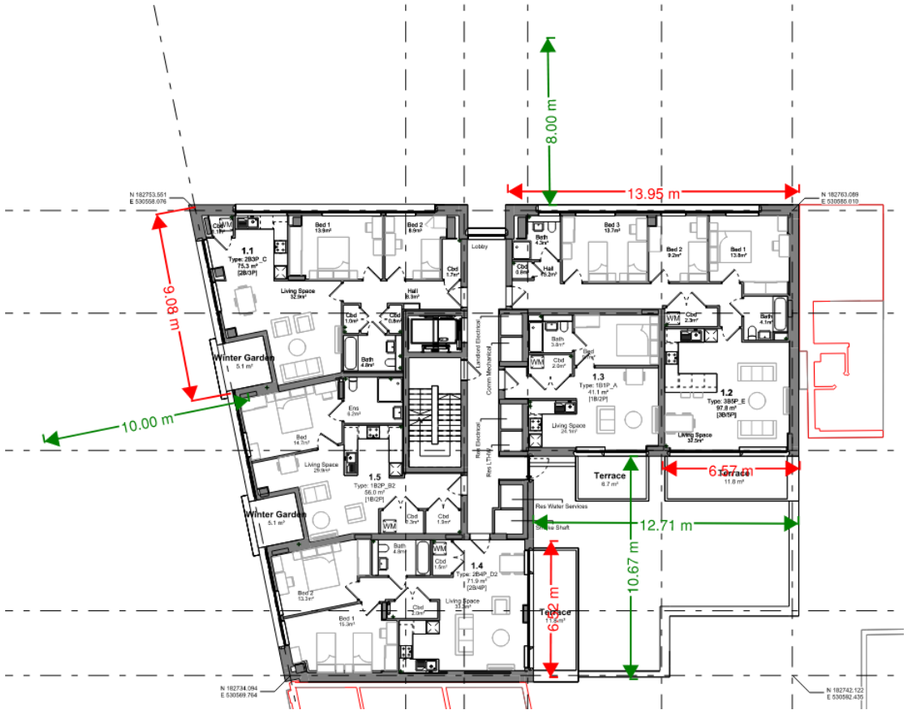


Figure 15 – Indicative measured distances to relevant boundaries (Upper floor)

Table 15 – Summary of external fire spread assessment

Elevation	Floor	Boundary distance (m)	Enclosing rectangle dimensions (m)		Sprinklers considered	Radiation intensity (kW/m^2)	Allowable unprotected area
			W	H			
North	Ground	8	10.3	3.15	Y	168	100
	Upper	8	14	3.15	Y	84	100
West	Ground	10	14.2	3.15	Y	168	100
	Upper	10	9.1	3.15	Y	84	100
South	Ground	<1	18	3.15	Y	84	0
	Upper	10.7	6.5	3.15	Y	84	100
East	Ground	<1	12	3.15	Y	84	0
	Upper	12.7	6.6	3.15	Y	84	100

8. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE

Building Regulations requirement B5:

"(1) The building shall be designed and constructed so as to provide reasonable facilities to assist fire fighters in the protection of life.

(2) Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building."

8.1 Means of notifying the fire and rescue service

8.1.1 In the event of fire, the fire and rescue service (FRS) will be notified by a resident of the building, a member of the general public or, where applicable, by a member of management staff. No automatic FRS notification is proposed to be used at the development.

8.2 Vehicle access to and around the site

8.2.1 Vehicle access to the site will be provide via Gray's Inn Road and Swinton Street to the west and north elevations, respectively, as indicated in Figure 16. The access routes for the fire appliances should meet typical values noted in Table 16, reproduced from Table 20 of BS 9999 / as recommended by London Fire Brigade in document GN29 [40]. The acceptability of the access route should be agreed with the local fire and rescue service.

8.2.2 Access and hardstanding areas will be provided for a pump appliance around the site within 18m and within sight of each dry riser inlet located on an external wall and within 60m of all points within the ground and basement floor areas.

8.2.3 The appliance should not be required to reverse more than 20m, otherwise, suitable turning facilities shall be provided such as a hammerhead or turning circle.

Table 16 – Typical firefighting appliance access requirements

Minimum access route specification	Appliance type
	Pump
Width between kerbs (m)	3.7
Width between gateways (m)	3.1
Turning circle between kerbs (m)	16.8
Turning circle between walls (m)	19.2
Clearance height (m)	3.7
Carrying capacity (tonnes) TBC by fire service	14

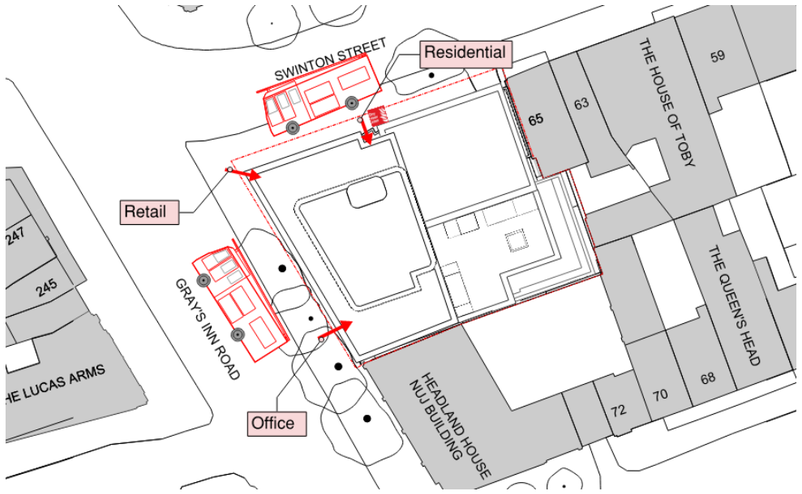


Figure 16 – Indicative fire service access to the site

8.3 Access into and through the building

8.3.1 The building has a top storey height greater than 18m above fire service access level and will be provided with a firefighting shaft.

8.3.2 Firefighting crews will enter the residential portion of the building at ground level via a perimeter door which leads via a protected passageway to the firefighting stair. The passageway / access corridor will be maintained fire sterile and be designed to achieve the same level of protection as the stair (e.g. 120-minute), as indicated in Figure 20b of BS 9999.

8.3.3 Access to the upper levels shall be facilitated by a firefighting stairway, achieving a clear width of 1,100mm. The stair will connect to a ventilated common corridor on all levels.

8.3.4 The firefighting shaft passageway should be kept fire sterile, however, post boxes are proposed to be provided within the reception, which forms part of the firefighting shaft entrance corridor. The post boxes should be designed out of non-combustible materials specified to achieve a 30-minute fire resistance and should be limited in size (e.g. only letters and not parcels) with sloped tops to prevent the storage of items on top. An additional 30-minute fire door will be provided to separate the post boxes from the firefighting stair and firefighting lift shafts. This space should be provided with signage to prevent the use of the staircase/lobby space for delivering/storing parcels or combustibles of any kind.

8.3.5 Ancillary spaces associated to the residential cores (e.g., refuse store and cycle store) located at ground floor will be accessed externally via perimeter doors. The retail and office spaces will be accessed externally and will not communicate to any residential areas.

8.3.6 The office spaces will be accessible via their reception area and the basement is accessed via the protected stair. All ground floor and basement areas are accessible within a 60m hose distance from the fire service appliance access position.

8.3.7 Rooftop terraces are accessible via protected, ventilated corridors and will be limited in size, such that they comply with the hose laying distance requirements set out in 8.4.4 below.

All access doors into the building will achieve a minimum width of 750mm.

8.4 Firefighting provisions

8.3.8 The protected stair will be provided with a dry fire main serving each storey (including ground level). Outlets will be located within the stairway on the full landing at each level. The dry-rising main shall be designed and installed in accordance with BS 9990 and the maximum horizontal pipe run between the fire main inlet and dry rising main should not exceed 18m.

8.4.1

The firefighting core will also be provided with a single-entry firefighters lift, designed and installed in accordance with Section 3.11. The lift landing doors shall be within 7.5m of the firefighting stair door and the lift will be enclosed in 120 minutes fire resistance construction provided with FD60 fire doors.

8.4.2

The firefighting shaft serving the residential cores will be protected by providing ventilation residential corridors as described in Section 3.4.

8.4.3

When measured on a suitable hose laying route, all areas on the building floorplate should be within:

8.4.4
- 60m of a fire main outlet located in a firefighting stair; or
- 45m of a fire main outlet located in an escape stair; or
- 45m from an appliance parking position.

As the building has a top storey more than 11m above ground, a secured information box should be provided on site to store information about the building to be used by the fire service during an incident. The box should be weather protected and be easily located and identified by the fire service, such as located in the main reception. Best practice guidance is provided in 'Code of practice for the provision of premises information boxes in residential buildings' published by the Fire Industry Association.

8.4.5

8.4.6 As the building has a basement storey with a floor area greater than 200m^2 more than 3m below the adjacent ground level, means for smoke clearance will be provided as indicated in Section 3.5 above.

8.5 Water supplies

8.5.1 Hydrants will be required in the vicinity of the building to support firefighting operations. The location of any existing fire hydrants near the building should be investigated on-site and confirmed with the fire and rescue service. Additional hydrants will be required if both of the following apply to the building:

- It has a compartment with an area of more than 280m^2; and
- It is being erected more than 100m from an existing hydrant.

8.5.2

8.5.3 Any new hydrants should be located not more than 90m of the dry riser inlet.

8.5.4 As the office facilities are not provided with fire mains, any new hydrants should be located within 90m of an entrance to the building and a maximum of 90m apart from each other.

8.5.5 Private hydrants should be designed and installed in accordance with BS 9990 [41]. All hydrants should have signage in accordance with BS 3251 [42].

If new fire hydrants are to be installed, they should be included as part of a fire ring main system. They should preferably be sited immediately adjacent to roadways or hard-standing facilities suitable for fire and rescue service appliances. To ensure that they remain usable during a fire, they should be sited with consideration of the effect that falling debris and other possible occurrences during a fire might have on the continuing viability of the location and as such should be sited not less than 6m from the building.

8.6 First-aid firefighting

First-aid firefighting provisions should be assessed and provided as part of the fire risk assessment for the building, including consideration for the day-to-day management of these provisions. Suitable first-aid firefighting provisions can help with the extinguishment of small fires, preventing these from growing into significant fires.

8.6.1 Fire extinguishers are not generally expected to be provided within common parts of blocks of flats, in accordance with available guidance on purpose-built blocks of flats [43]. Such equipment should only be used by those trained in its use, and it is not practicable for residents in a block of flats to receive such training. Furthermore, by placing an extinguisher within common areas would require an occupant to return to their flat to fight a fire which is not considered an appropriate procedure. This does not preclude residents from providing their own firefighting equipment such as extinguishers or fire blankets within their own flat.

8.6.2 In general, fire points should be provided within general areas of the building and within specific areas presenting a significant fire ignition risk, such as plantrooms, common community facilities, kitchen areas etc. The fire risk assessment that should be undertaken upon occupation of the building (see Section 9) may assist with the placement of suitable fire extinguishers.

8.6.3 The type and size of extinguisher(s) at each fire point will be chosen in accordance with the guidance given in BS 5306 [44], as summarised by Table 17 and the classification of fire fuel hazards are listed below:

- Class A – fires involving solid materials, usually of an organic nature (general hazards);
- Class B – fires involving liquid or liquefiable solids (such as liquid fuels, lubricants, paints, etc.);
- Class C – fires involving gases;
- Class D – fire involving metals; and
- Class F – fires involving cooking media (vegetable or animal oils or fats).

8.6.4 For general areas, each floor should have a fire extinguisher at a rate of approximately 1x fire point for every 200 m^2 of floor area. These would generally be recommended to be located adjacent to storey exits. Fire points are recommended to consist of either a 9L water and 2L CO_2 extinguisher, or a single 6L AFFF Foam extinguisher where covering electrical devices which would not exceed the 35 kV (dielectric test) limitation.

8.6.5 Plant rooms should be provided with extinguishers suitable for their risks. In general, it would be expected that CO_2 extinguishers would be provided for electrical risks, where this may be for higher voltage equipment. Powder extinguishers should not be used within these confined spaces, where breathing in of the powder is harmful to the health of lungs.

8.6.6 Wet chemical extinguishers are typically provided for kitchens having a risk of oil-based fires. Fire blankets should also be provided for extinguishing cooking fires within kitchen areas.

8.6.7

Table 17 – Fire extinguisher types and application guidance

Medium	Colour code	Application	Do NOT use for
Water	White	Class A fires	Liquid, electrical, metal or cooking fires
Powder	Blue	Class A, B or C fires	Metal or cooking fires
Foam	Cream	Class A or B fires	Electrical*, metal or cooking fires
CO_2	Black	Class B fires	Metal or cooking fires

Medium	Colour code	Application	Do NOT use for
Wet chemical	Yellow	Class A or F fires	Liquid, electrical or metal fires
* AFFF Foam extinguishers may be used for electrical fires up to 35 kV (dielectric test) and where operated from a distance of at least 1 m.			

9. FIRE SAFETY MANAGEMENT

9.1 Overview

Management procedures have a pivotal role to play in fire prevention, control and evacuation of occupants should a fire incident occur. This management is the responsibility of the responsible person, supported by the building fire safety design and handover of fire safety information. In all other areas, the Regulatory Reform (Fire Safety) Order 2005 (FSO) places legal obligations on management.

9.1.1

This section is intended to introduce the FSO, its obligations and provide initial guidance in fulfilling these duties. It is the responsibility of the landlords/ building management to ensure that all fire safety systems are tested and maintained to ensure their continuous effectiveness. Building management need to be aware of all fire safety features provided and their purpose.

9.1.2

It is important that management are aware of their responsibilities detailed in this document and agree that they are sufficiently capable of adequately performing them. Effective arrangements should be put in place to manage all aspects of fire safety in the premises and the details of those arrangements need to be recorded, e.g. within a fire safety management plan.

9.1.3

In accordance with BS 9999 [4], there are two management system levels. One of which should be implemented and are summarised in Table 18.

9.1.4

Table 18 – Management levels

Level	Management	Robustness	Minimum assurance	Conformity
1	Enhanced	Best Practice	High level of assurance	Conformity with a management level such as BS 9997 [45]
2	Adequate	Good Practice	Adequate level of assurance	Conformity with requirements of legislation

9.2 Regulatory Reform (Fire Safety) Order 2005

9.2.1

The Fire Safety Order came into effect in October 2006 and replaced over 70 pieces of fire safety law. The Order applies to all non-domestic premises in England and Wales, including the common parts of blocks of flats or houses in multiple occupation. The Order removed the legal status of fire certificates, which are no longer enforceable by the Fire Authorities. The 'responsible person' has a duty to make the premises safe and must undertake regular fire risk assessments. It is the responsible person who will be held accountable under the new legislation for any breaches in fire safety. It is expected that the building is managed and maintained to a standard in accordance with the expectations of the FSO.

9.2.2

In workplaces, the responsible person is the employer. In other cases, the owner or person in control of the premises is the responsible person, e.g. landlord, building management company.

9.2.3

Under the Order, the 'responsible person' must carry out a fire safety risk assessment and implement and maintain a fire management plan. The assessment should be kept under regular review and reassessed if the use of the building has been varied or a material alteration has been made. The significant findings must then be recorded, along with the measures taken to address the risks identified.

9.3.1

A competent person should carry out the fire risk assessment.

9.3 Management responsibilities in support of the fire strategy

Management of fire safety must be integrated with all other management systems. If this management is lacking, then there is a danger that all the other areas such as security measures and alarm systems will be ineffective. To ensure there is no doubt as to where the responsibility for fire safety rests, and to enable consistency of approach, it is important that each establishment appoints a designated Fire Safety Manager. It may be possible to appoint a professional to take on this role but that will depend on the size of the premises, costs, etc.

9.3.2

The appointed person should have the necessary authority and powers of sanction to ensure that the standards of fire safety are maintained. The main duties of the Fire Safety Manager include:

9.3.3

- management to minimise the incidence of fire; e.g. good housekeeping and security;
- producing an Emergency Fire Plan;
- being aware of all of the fire safety features provided and their purpose;
- being aware of any particular risks on the premises (e.g. issues relating to hot work);
- being aware of their responsibilities towards disabled people;
- attendance at the premises when members of the public are present, or the building is occupied. It is acceptable for a competent person other than the fire safety manager to be in attendance, provided that this person has been delegated in writing and that cover is not interrupted;
- liaising with, and where necessary seek the advice of, the fire authority, the licensing authority and other relevant enforcing authorities;
- having powers to deal with individuals who sabotage or tamper with safety systems, who ignore any smoking policy or who block exits;
- liaising with other fire safety managers in a multi-occupancy arrangement;
- ensuring that tenants, concessionaires and caretakers are appropriately briefed;
- ensuring that appropriate communication systems are in place to deal with any fire incident;
- checking the adequacy of fire-fighting equipment and ensuring its regular maintenance;
- ensuring fire escape routes and fire exits are unobstructed and doors operate correctly;
- ensuring that fire detection and protection systems are maintained, tested, with records kept; and
- ensuring any close down procedures are followed.

9.3.4

Good housekeeping is to ensure that the effectiveness of the fire safety provisions is not adversely affected, including the adequate provision for the disposal of waste and / or rubbish. Maintenance procedures are to be enacted so that equipment will operate effectively. Maintenance staff are to be trained in the importance of the fire safety systems and planned maintenance.

9.3.5

Suitable assembly points outside the building should be identified. These should be remote from the access routes used by the FRS.

Internal escape routes should generally have wall and ceiling linings achieving a European class B-s3, d2 surface spread of flame standard, apart from permitted exceptions noted in this report. These finishes must be maintained for the lifetime of the building. Display features or items such as posters, artwork pieces, etc. may be included with appropriate consideration, justification and on-going control.

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