PADDINGTON GREEN
POLICE STATION

NOVEMBER 2022

Fire & Life Safety Strategy

Fire & Life Safety Strategy – November 2022 – GLA0711

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AESG

BERKELEY GROUP

Paddington Green Police Station – Blocks I, J and K

RIBA Stage 2 Fire & Life Safety Strategy

Project Name	Paddington Green Police Station – Blocks I, J and K
Report Title	RIBA Stage 2 Fire & Life Safety Strategy
Description	RIBA Stage 2 Fire and Life Safety Strategy
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Reviewed by	Kieran Davies
Approved by	Holy Liang

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1 Introduction

1.1 Key Stakeholders

Table 1: Key Stakeholders

Role	Organisation
Developer/Contractor	Berkeley Group
Architects	Squire & Partners
Building Control	Westminster Building Control
MEP Consultant	Buro Happold
Structural Engineer	Walsh
Fire Consultant	AESG

1.2 Scope of Works

AESG has been assigned by Berkeley Group to provide a RIBA Stage 2 Fire & Life Safety Strategy for Blocks I, J and K of the Paddington Green Police Station development in Marylebone, London. The purpose of this report is to demonstrate that the design achieves the functional requirements of the Building Regulations 2010 as amended in 2018. Other aspects such as property protection, insurance requirements, property evaluation, business continuation protection, etc. are not within the scope of appointment.

1.3 Statutory Requirements

1.3.1 The Building Regulations 2010

Fire safety in buildings is governed by Part B of Building Regulations (2010, as amended in 2018). To achieve compliance with Part B of Schedule 1 of the Regulations, the following sections have been addressed:

- 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 Service

Approval of the building design will be sought during the Building Control Approval application. Responsibility for deciding if the requirements of the Regulations have been met rests with the Building Control body. The Fire Service will also be consulted as part of this process.

1.3.2 Amended Regulations and Guidance regarding External Wall Construction

As of the 21st of December 2018, amendments to the Building Regulations 2010 and the associated changes to the Approved Document B (Fire Safety) and Regulation 7 (Workmanship and Materials) have come into effect. Regulation 7 of the Building Regulations has been amended to require that materials which are part of the external wall construction and attachment shall achieve a reaction to fire performance of European Classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009, with exceptions of those within the exemption list as described in Regulation 7.

1.3.3 Regulatory Reform (Fire Safety) Order 2005 and Fire Safety Act 2021

The Regulatory Reform (Fire Safety) Order (RRO) is a primary piece of legislation relating to fire safety in newly operational and existing non-domestic premises and is enforced by the local fire authority.

It is necessary, among other things, under this order for the owner/occupier of the building to carry out a fire safety risk assessment for the common areas of the block of flats prior to occupation. The assessment shall be repeated periodically or whenever there are any new hazards or changes within the communal areas. The building's management team will also be responsible under this order to ensure that the building's fire safety provisions are appropriately managed, maintained and tested over the whole life of the building.

The Fire Safety Act 2021 which was made law in England and Wales since April 2021, is essentially an update and clarification of the Regulatory Reform Order – Fire Safety Order 2005. The key changes would be the extended coverage to which the Fire Safety Order 2005 applies. The Fire Safety Act 2021 makes it clear that a fire risk assessment of a residential building must now have consideration (amongst others) to the external wall system as well as fire doors for the flat entrances.

1.3.4 Construction, Design and Management Regulations 2015

Projects undertaken within the UK are subject to the requirements of the Construction, Design and Management Regulations (CDM).

This report defines the strategy for meeting the functional and performance requirements for fire safety in the finished building. Where any conclusions or recommendations have been arrived at which specify particular materials, products or forms of construction these will have been assessed by others, in accordance with CDM Regulation 9. In the event that these involve significant residual risks or health and safety critical assumptions, this information will be made available to the Principal Designer. Where the architect or other consultants use the standards

put forward in this report to specify works, they are understood to be competent in alerting the Client, Principal Designer, Contractor and Building Occupiers of CDM issues.

1.4 Basis of Design

The proposed buildings will be designed in accordance with the recommendations of Draft BS 9991:2021, Fire Safety in the design, management and use of residential buildings – Code of practice. Throughout the report this document will be referred to as **BS 9991**.

Where the design does not comply with the recommendations of the abovementioned guidance document, alternative fire engineering solutions will be proposed to demonstrate that the functional requirements of the Building Regulations have been met. Any departures or deviations from standard design guidance will be highlighted within this report for discussion with the statutory authorities.

Where not explicitly described within this report, it is assumed that the guidance contained within BS 9991, or the supporting British Standards referenced therein, is followed.

BS 9999:2017, Fire safety in the design and use of buildings – Code of practice will be used for all non-residential areas within the buildings. Throughout the report this document will be referred to as **BS 9999**.

1.5 Qualitative Design Review (QDR)

The recommendations within the British Standards can be applied to buildings of any height. However, the increased design demands on structural integrity, services, fire safety systems, means of firefighting and evacuation generated by buildings in excess of 50m in height mean that specific evaluation of all fire safety provisions is required.

To ensure that the active and passive measures proposed within the design are suitable and sufficient, AESG have conducted a concept Qualitative Design Review (QDR) in accordance with BS 7974:2019, Application of fire safety engineering principles to the design of buildings - Code of practice. Throughout the report this standard document will be referred to as **BS 7974**. A Concept QDR has been prepared along with RIBA Stage 2 fire strategy to support the planning application.

The RIBA Stage 2 fire strategy will outline the minimum requirements in accordance with both BS 9991 and BS 9999. A full QDR and associated report will be completed during RIBA Stage 3 and submitted as a standalone document to the approval authorities for review. Details and summaries of the QDR will also be included in the RIBA Stage 3 fire strategy.

The concept QDR study has shown that proposed active and passive fire protection systems which have been selected to comply with the minimum requirements of BS 9991 and BS 9999 are suitable and sufficient for use in buildings above 50m. Detailed test calculations for all active and passive fire protection systems will be carried out during RIBA Stage 3 to determine if any enhancements are required to be incorporated into the design to achieve the required performance and reliability.

1.6 Statutory Consultation

During the planning application process, HSE is a statutory consultee for projects involving relevant buildings or other buildings within the curtilage of a relevant building.

Planning applications submitted to the local planning authority must show that the fire safety needs relevant to land use and planning for the proposed building has been considered at the earliest opportunity and incorporated into the planning application.

Examples of fire safety needs relevant to land use planning include:

- Site layout
- Water supplies for fighting fires
- Access for the Fire Service

As part of the Building Regulations application process, fire strategy documentation must be submitted to the relevant Building Control body/Approved Inspector for review. The Building Control body/Approved Inspector will also consult with the Fire Authority having jurisdiction of the project. The purpose of this consultation is to provide the Fire Authority with the opportunity to make observations and comments with respect to the Building Regulations 2010 (as amended 2018) and make the applicant aware of action that may have to be taken to meet the requirements of the RRO.

If the Fire Authority require physical changes to be made to the building to meet the requirements of the RRO, the Building Control body has a legal responsibility to pass on all comments and recommendations to the applicant/responsible person. The applicant should take note of all comments and where necessary implement these into the building design.

1.7 Exclusions

The FLS does not:

- Set out to address insurance requirements, risks to business continuity, property protection. Recommendations or guidance provided for life safety purposes may or may not be beneficial with regard to these issues.
- Address fire precautions during the construction works for which the risk and hazard from fire are often greater.
- Represent a design or specification; it is a series of principle recommendations that others may consider and relate to the design of the building as appropriate.

- Constitute a fire safety management strategy. It is vital that the future building management team understand the principles of the fire strategy to enable them to implement effective management, inspection, training, and maintenance regimes.
- Satisfy the duties of the owner to carry out or instruct a fire risk assessment to inspect fire safety measures on an ongoing basis.
- Represent a handover document. It is vital that an approved fire strategy (including drawings) is provided to the client at handover to represent an 'as-built' status.

2 Executive Summary

2.1 Fire and Life Safety Strategy Summary

Table 2 provides a summary of the pertinent fire safety information relevant to the design.

Table 2: Fire Strategy Summary

Item	Summary – Block I	Summary – Block J	Summary – Block K
Occupancy	**Residential:** Occupants will be familiar with the building layout. Sleeping risk is present. Each block has been designed to accommodate the following occupancies; • 90% of M4(2) - Category 2 - Accessible and adaptable dwellings • 10% of M4(3) – Category 3 – Wheelchair user dwellings. **Note.** All occupants will be capable of independent escape. **Commercial Units:** Occupants will be unfamiliar with the building layout and awake during occupancy use. **Ancillary and amenity areas:** Occupants will be familiar with the building layout and awake. Anyone not familiar with the building will be escorted around the building by trained staff.		
Height of the building (Measured from fire service access level to the highest occupied floor).	78.3 m	55.65 m	128 m
Number of stairs provided	2	2	2
Evacuation Strategy	Defend in place within residential areas. **Note.** The building is provided with an emergency evacuation alert system which will provide the Fire Service with means to change the evacuation strategy within the residential demise (phased/simultaneous). Simultaneous evacuation within commercial/amenity areas/ancillary areas.		
Minimum category of fire detection and alarm system	Grade D(1) LD1 within open plan flats Grade D(1) LD2 within flats provided with protected entrance halls Heat detectors used within kitchens L5 within common escape routes L2 within ancillary areas and commercial units Evacuation Alert Systems (EAS), to be used by the Fire and Rescue Service (FRS) in the event of emergency (1)Grade D is subdivided into Grade D1 and Grade D2 as defined below: Grade D1 is a system of one or more mains-powered detectors, each with a tamper-proof standby supply consisting of a battery or batteries. Grade D1 systems are recommended for fire detection and fire alarm systems in rented dwellings, whether new or existing, due to the potential for a higher level of reliability that is appropriate because occupants of rented dwellings tend to be at higher risk. Grade D2 is a system of one or more mains-powered detectors, each with an integral standby supply consisting of a user-replaceable battery or batteries. Grade D2 systems are recommended for use in new owner-occupied dwellings. Owing to the possibility that the standby battery might be removed from the alarm.		
Fire Suppression Equipment	A system designed and installed in accordance with BS 9251 will be provided within the residential demise. A system designed and installed in accordance with BS 12845 will be provided within ancillary areas, amenity areas and commercial units.		

Active Systems	Wet riser system, automatic sprinkler system, mechanical smoke extract system, emergency lighting, emergency signage, emergency power supplies will be provided.		
Minimum Structural Fire Protection	120 minutes	120 minutes	120 minutes
Firefighting Provisions	One residential firefighting shaft containing an FF Lift, FF Stair and FF lobby with Wet Fire Main		Two residential firefighting shafts containing an FF Lift, FF Stair and FF lobby with Wet Fire Main
Additional Provisions for Occupants	Door widths within means of escape routes will be increased minimum to 850 mm as to be accessible by occupants such as wheelchair users. Refuge spaces will be provided with two-way communication system. Evacuation lifts with vented lift lobbies.		
Additional Considerations	In accordance with BS 9991, a building over 50 m will be required to have a Qualitive Design Review (QDR). Therefore, all blocks will have a QDR to determine if the minimum requirements of BS 9991 are suitable for buildings above 50 m in height. A concept QDR report has been prepared along with Stage 2 fire strategy and full QDR will be prepared along with Stage 3 fire strategy.		
Additional considerations for mechanical smoke ventilation systems (MSVS)	The following additional considerations should be considered for MSVS design: 1) Design of MSVS should limit the pressure differentials, so the door opening forces do not exceed 100 N at the door handle at any time. 2) Secondary power supply should be provided to the fans and all actuators and controls. 3) Standby fans should be provided along with duty fans. So, in case failure of duty fans, standby fan operates automatically. 4) MSVS ventilation rate should be determined through CFD (computational fluid dynamics) analysis. 5) The cross-sectional area (free area) should be sized as per the MSVS requirements (vary between 0.6 m^2 to 1 m^2) with a minimum dimension of 0.85 m in any one direction.		

2.2 Project Assumptions

To ensure that a suitable and sufficient package of protection is provided, AESG has discussed the design intent with Berkeley Group and the design team. The purpose of these discussions is to ensure that AESG fully understands how the building will be used and who is intended to use it. During discussions, AESG has asked for clarification on a number of points which influence the overall package of protection required for each block. A summary of the pertinent information is listed below:

- All units within each block will be designed as accessible and adaptable dwelling.
- The design will accommodate 90% Category M4(2) occupants and 10% Category M4(3) occupants.
- All occupants will be capable of independent escape.
- The building will be managed 24 hours a day, 365 days a year.
- The building management strategy will incorporate processes and procedures to ensure the building is maintained to facilitate the implementation of this fire strategy.
- The building management strategy will incorporate personal emergency evacuation plans (PEEPs) for occupants using the basement amenity areas.
- Alcohol may be served within the amenity area located on Level 01 of Block K.

This list is not exhaustive. Further details of all other assumptions are detailed in the appropriate sections of this report.

3 Design Information

3.1 Site Description

The Paddington Green Police Station development is located in Marylebone, London and comprises three residential blocks named as Blocks I, J and K. The site is located on Harrow Road, but it will be accessible from the Newcastle Place. Newcastle Place is a one-way road which is accessed from the East of the site from Edgware Road. Figure 1 shows the location of each block located within site plan and Figure 2 demonstrates the perspective image of each block.

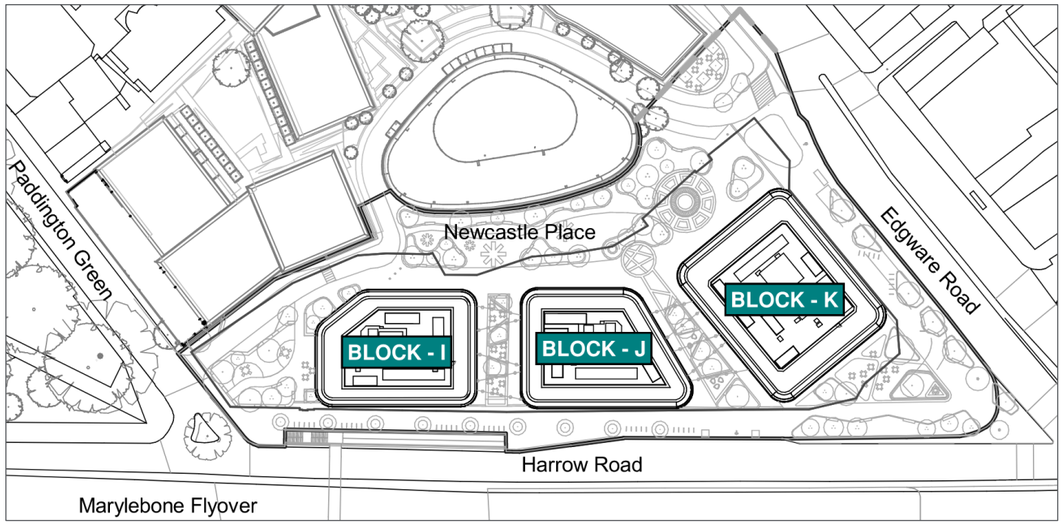

Figure 1: Site Plan

Figure 2: Perspective Image

3.2 Building Description – Blocks I, J and K

Blocks I, J and K are mixed-use occupancy buildings, which is containing two shared basement levels, flexible commercial units and ancillary rooms at ground level. All floors above ground level are consisting of residential apartments except Level 1 of Block K contain 298 m^2 of residential amenity area as well. The height of the proposed Blocks I, J and K are 78.3 m, 55.65 m and 128 m respectively measuring from the fire vehicle access road level to the highest occupied floor level. The height measuring from the fire vehicle access road level to the roof level for all proposed Blocks I, J and K are 83.019m, 60.389m and 133.969m respectively. Please note that throughout this report the height of buildings are considers up to the top occupied storey from the access level.

Blocks I and J are provided with one firefighting shaft and one additional stair core, while Block K is provided with two firefighting shafts as its single largest floor area is exceeding 900 m^2. Blocks I and J are provided with two passenger lifts and the same lifts will be designed and serve as a firefighting/evacuation lift and an evacuation lift. Block K is provided with two passenger lifts in each firefighting shaft, the same lifts will be designed and serve as a firefighting lift and an evacuation lift.

In addition, a dedicated lift is provided in each block serving between Ground level and Basement 1 level to transport cycle and goods between these two levels. This cycle and goods lift is accessible directly from outside of the building.

Table 3: Building Description

Block	Number of floors below ground	Depth of lowest occupied floor	Number of floors above ground	Height of highest occupied floor	Area of largest floor
I	2	<10 m	24 (G + 23)	78.3 m	<900 m^2
J	2	<10 m	17 (G + 16)	55.65 m	<900 m^2
K	2	<10 m	39 (G + 38)	128 m	>900 m^2

3.3 Building Description – Basement Levels

All three blocks are served by two shared basement levels as shown in Figure 3. Basement level 2 has a floor area of approximately 450m^2. This level provides a refuse holding and storage area. Basement level 2 is accessed by three stairs. Two stairs begin at this level and continue to Ground floor within Block I. The third stair only provides access between Basement level 1 and 2.

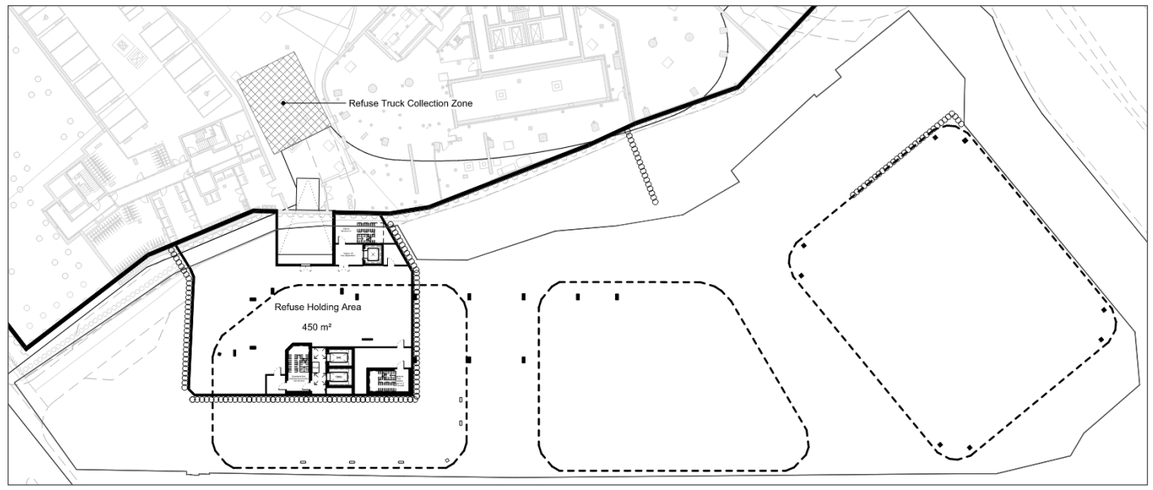

Figure 3: Basement 2 Level

Basement level 1 provides car parking spaces and cycle stores. This level also contains ancillary accommodation as displayed in Figure 4. Basement 1 is accessible by using lifts and stairs from all three blocks.

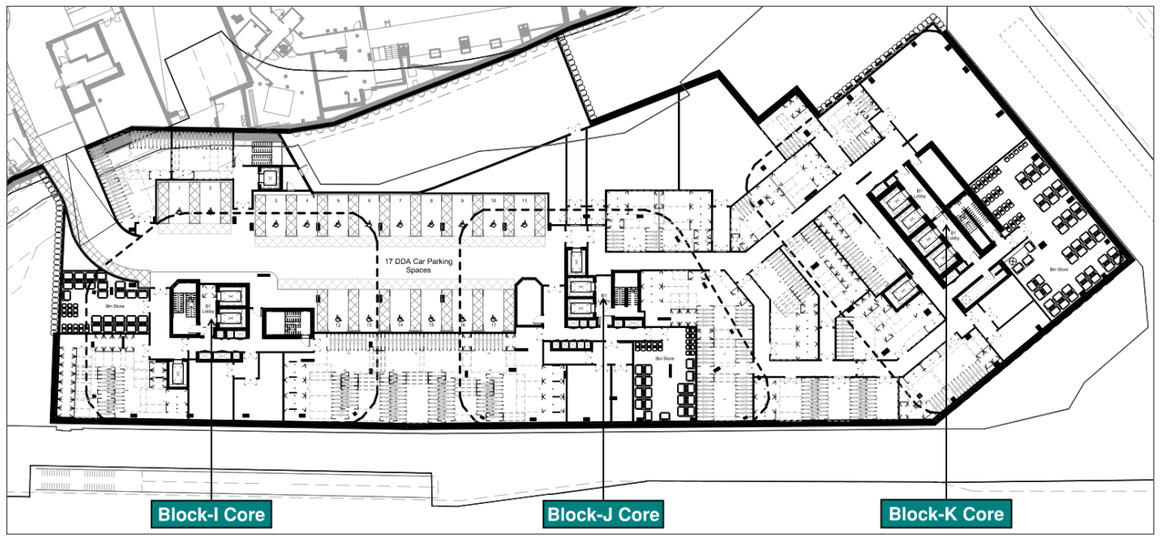

Figure 4: Basement 1 Level

3.4 Building Description – Ground Floor

Each building is provided with commercial units at ground floor. They are provided with independent means of escape opening directly outside of the building. Protected escape routes are provided on ground floor where the escape stairs are discharging, serving basements and above ground levels. Floor layouts of all Blocks are shown in Figure 5, Figure 6 and Figure 7 respectively.

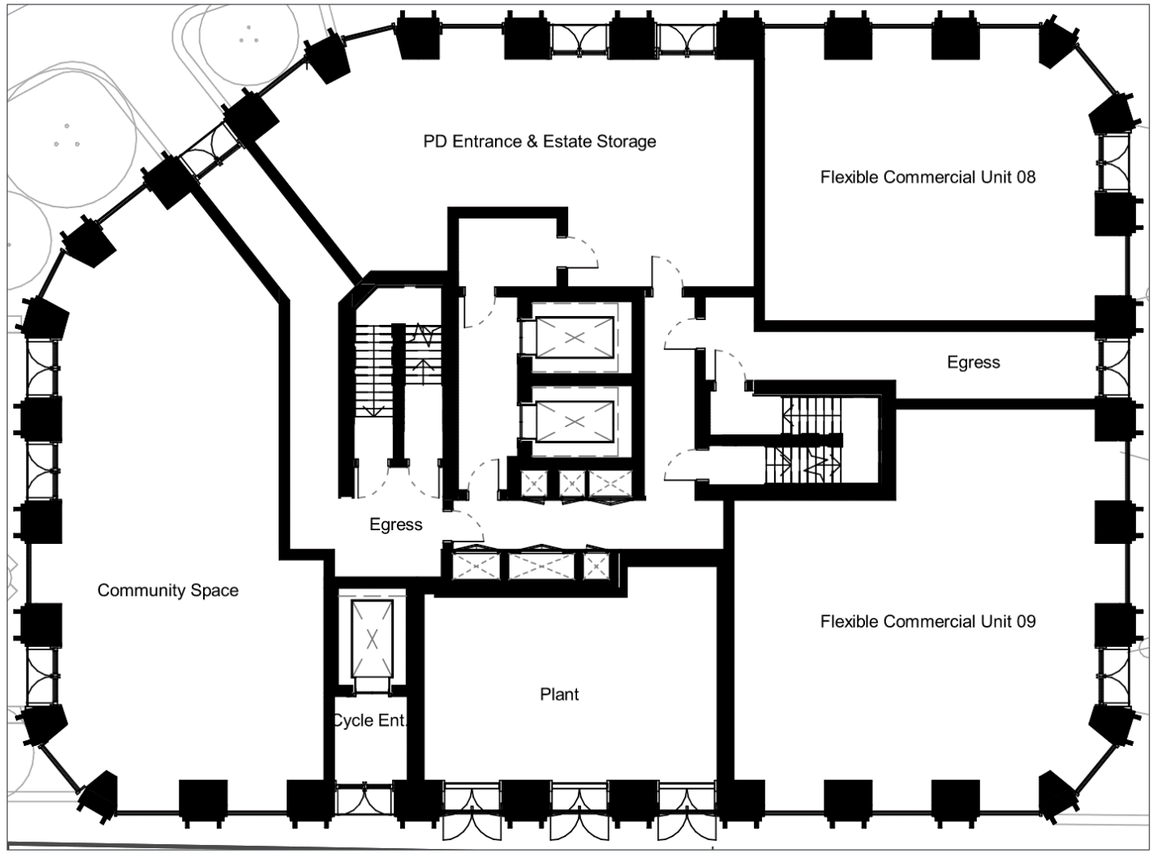

Figure 5: Block I Ground Floor Layout

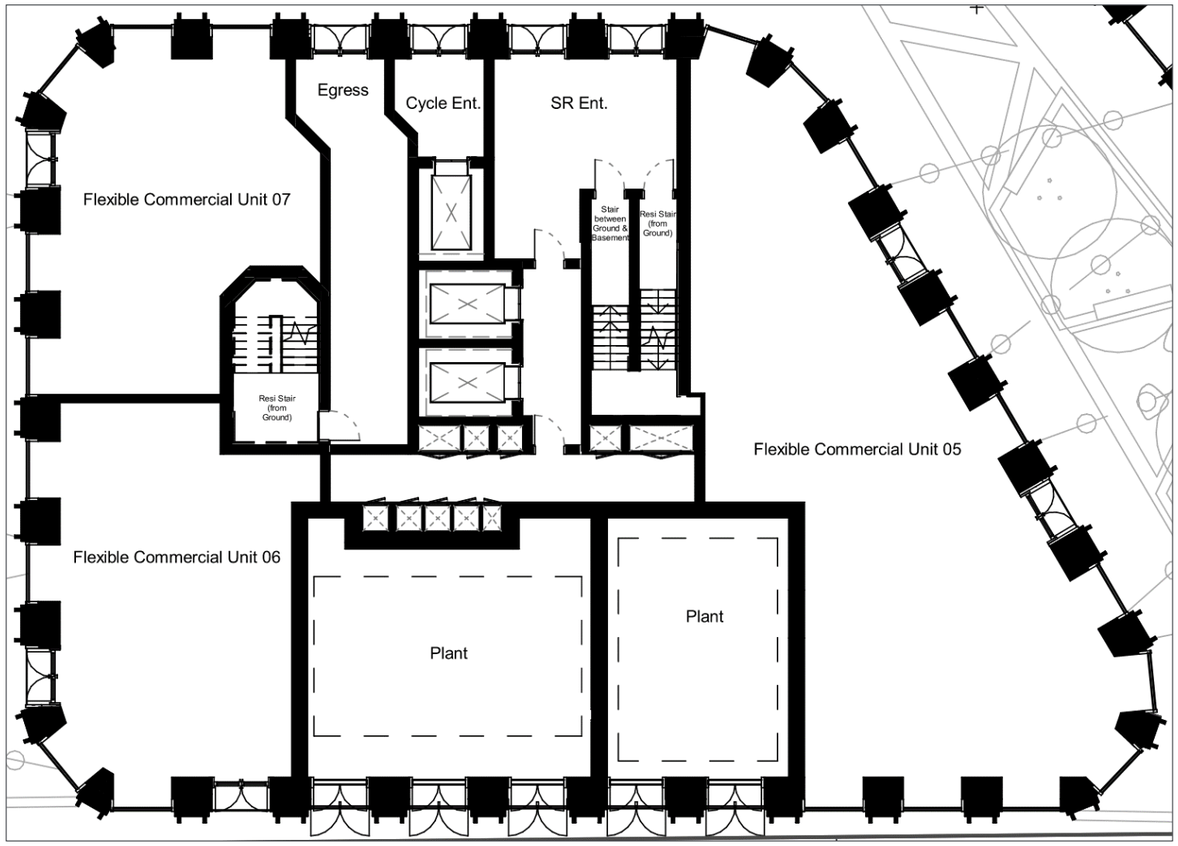

Figure 6: Block J Ground Floor Layout

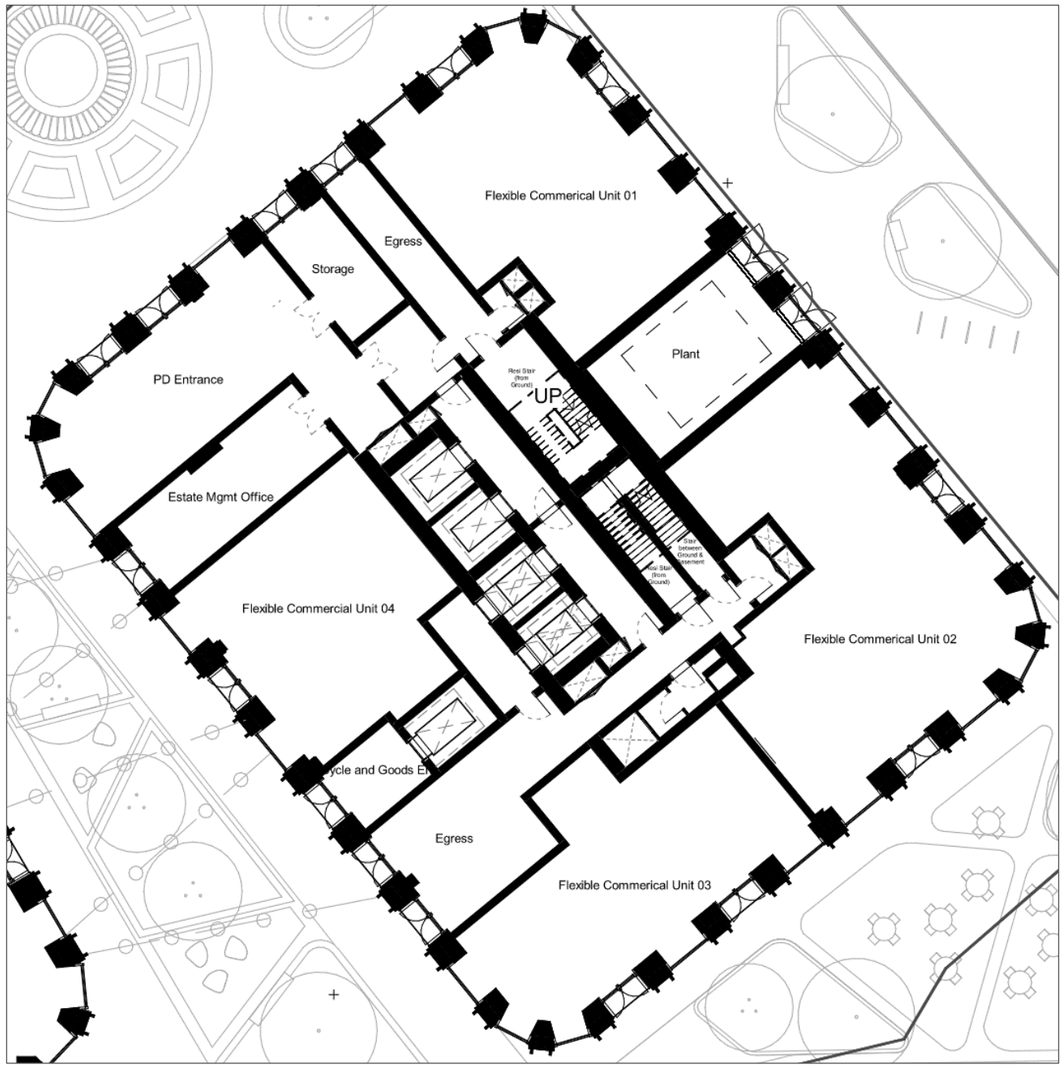

Figure 7: Block K Ground Floor Layout

3.5 Building Description – Floors Above Ground Level

All floors above ground level contains residential apartments such as open-plan flats and flats with protected entrance hall within all three blocks. Figure 8, Figure 9 and Figure 10 shows an example of a typical residential floor GA layout for Blocks I, J and K respectively.

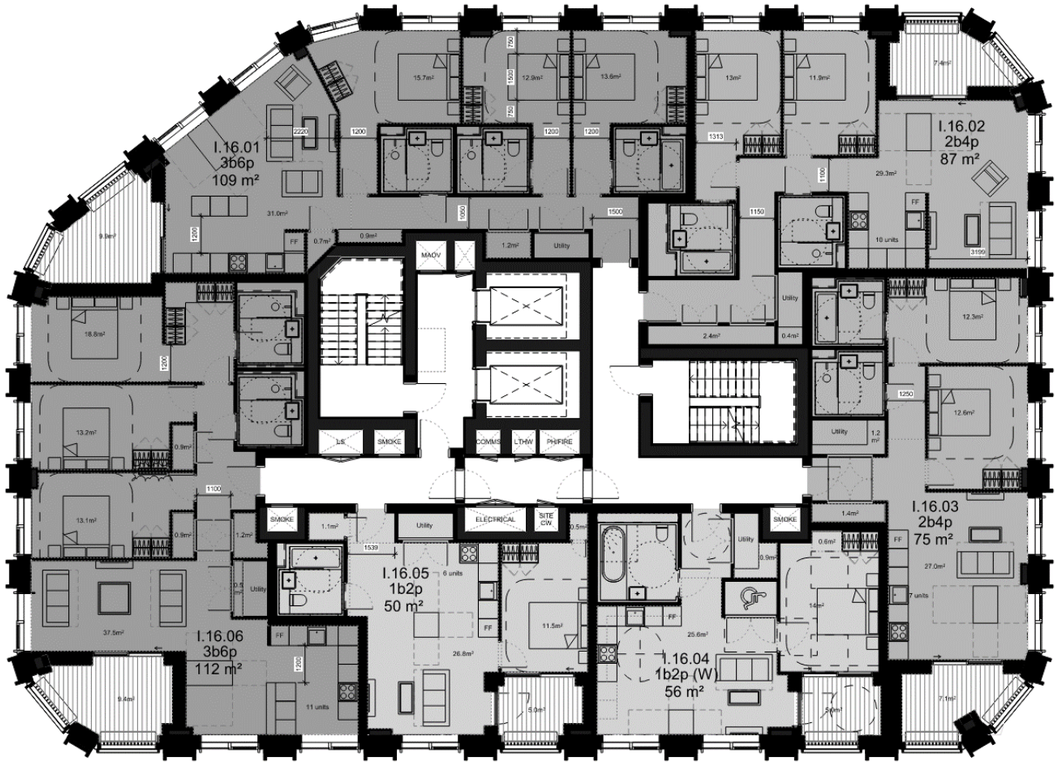

Figure 8: Example of Residential Apartments Floor Layout (Block I Levels 15-22 Layout)

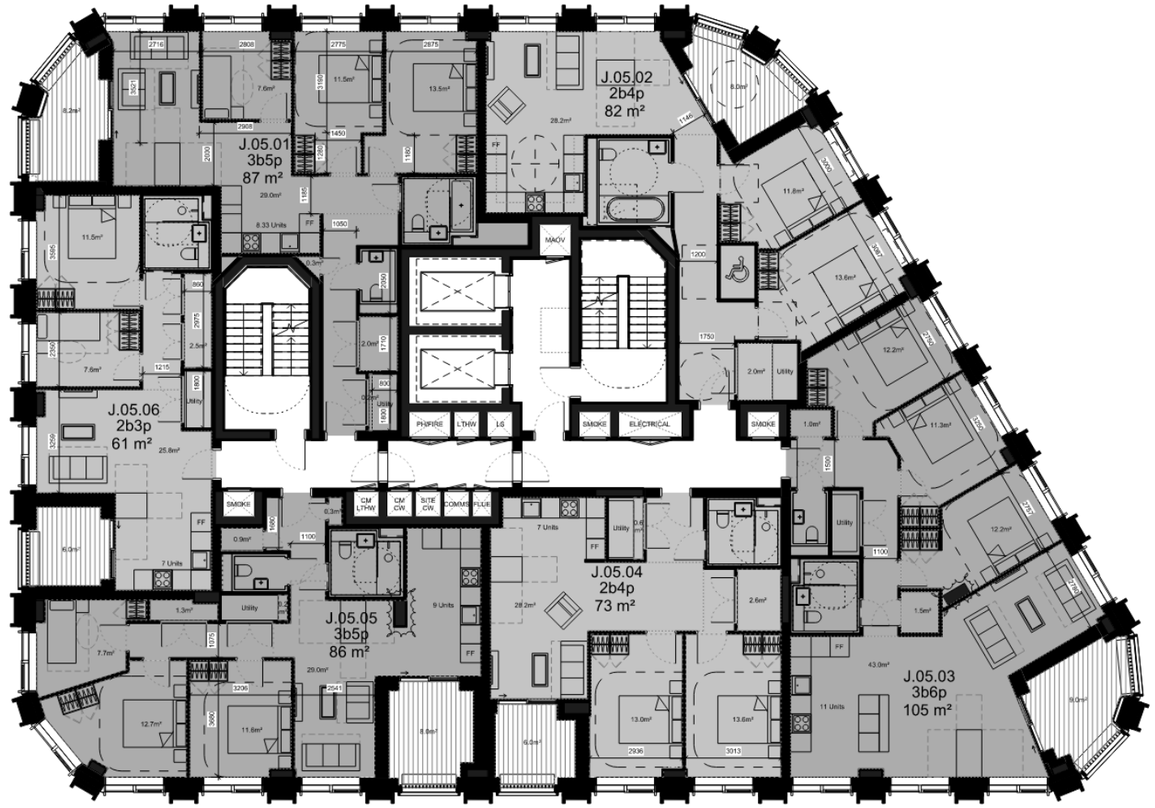

Figure 9: Example of Residential Apartments Floor Layout (Block J Levels 1-14 Layout)

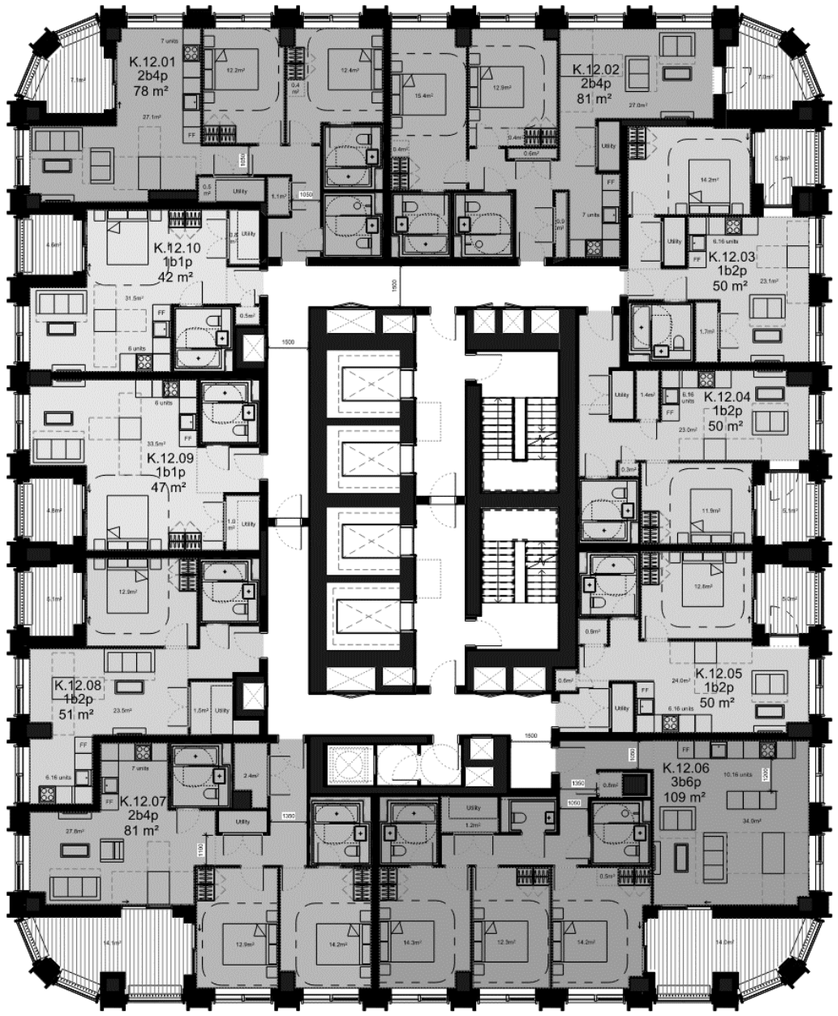

Figure 10: Example of Residential Apartments Floor Layout (Block K Levels 12 Layout)

3.6 Drawing Schedule

AESG has been provided with the drawings listed in Table 4. It is understood that these are the latest set of drawings, accurate at the time this report was written. The Fire and Life Safety strategy has been based on the drawings listed in Table 4.

Table 4: Reference Drawings

Block	Drawing number	Description	Drawing date	Architect
I, J and K	15044-SQP-ZZ-B2-DP-A-PL01102 (P2)	Proposed Basement Plan-2	18/11/2022	Squire & Partners
I, J and K	15044-SQP-ZZ-B1-DP-A-PL01103 (P2)	Proposed Basement Plan-1	18/11/2022	Squire & Partners
I, J and K	15044-SQP-ZZ-00-DP-A-PL01104 (P3)	Proposed Ground Floor Plan	18/11/2022	Squire & Partners
I	15044-SQP-01-05-DR-A-20801 (P09)	Block I Typical 1 – Levels 1-14 Tenure Plan	10/10/2022	Squire & Partners
I	15044-SQP-01-16-DR-A-20802 (P07)	Block I Typical 2 – Levels 15-22 Tenure Plan	10/10/2022	Squire & Partners
I	15044-SQP-01-24-DR-A-20803 (P04)	Block I Penthouse – Level 23 Tenure Plan	10/10/2022	Squire & Partners
J	15044-SQP-02-05-DR-A-20850 (P05)	Block J Typical 1 – Levels 1-14 Tenure Plan	10/10/2022	Squire & Partners
J	15044-SQP-02-16-DR-A-20851 (P04)	Block J Typical 2 – Levels 15-16 Tenure Plan	10/10/2022	Squire & Partners
K	15044-SQP-03-01-DR-A-20900 (P5)	Block K Residential Amenity – Level 01 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-02-DR-A-20901 (P4)	Block K Typical 1A – Level 2 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-09-DR-A-20902 (P8)	Block K Typical 1 – Levels 3-11 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-12-DR-A-20903 (P4)	Block K Typical 2A – Level 12 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-14-DR-A-20904 (P6)	Block K Typical 2 – Levels 13-16 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-ZZ-DR-A-20909 (P3)	Block K Typical 3A – Levels 17-23 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-ZZ-DR-A-20905 (P7)	Block K Typical 3 – Levels 24-29	14/11/2022	Squire & Partners
K	15044-SQP-03-32-DR-A-20906 (P6)	Block K Typical 4 Levels 30-33 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-34-DR-A-20907 (P5)	Block K Typical 4A – Levels 34-37 Tenure Plan	14/11/2022	Squire & Partners
K	15044-SQP-03-38-DR-A-20908 (P7)	Block K Penthouse – Level 38 Tenure Plan	14/11/2022	Squire & Partners

I	15044-SQP-01-ZZ-DE-A-PL01404 (P05)	Block I Proposed South Elevation	11/10/2022	Squire & Partners
I	15044-SQP-01-ZZ-DE-A-PL01405 (P05)	Block I Proposed West Elevation	11/10/2022	Squire & Partners
I	15044-SQP-01-ZZ-DE-A-PL01406 (P05)	Block I Proposed North Elevation	11/10/2022	Squire & Partners
I	15044-SQP-01-ZZ-DE-A-PL01407 (P05)	Block I Proposed East Elevation	11/10/2022	Squire & Partners
J	15044-SQP-02-ZZ-DE-A-PL01408 (P06)	Block J Proposed South Elevation	11/10/2022	Squire & Partners
J	15044-SQP-02-ZZ-DE-A-PL01409 (P04)	Block J Proposed West Elevation	11/10/2022	Squire & Partners
J	15044-SQP-02-ZZ-DE-A-PL01410 (P04)	Block J Proposed North Elevation	11/10/2022	Squire & Partners
J	15044-SQP-02-ZZ-DE-A-PL01411 (P04)	Block J Proposed East Elevation	11/10/2022	Squire & Partners
K	15044-SQP-03-ZZ-DE-A-PL01412 (P05)	Block K Proposed Southeast Elevation	11/10/2022	Squire & Partners
K	15044-SQP-03-ZZ-DE-A-PL01413 (P04)	Block K Proposed Southwest Elevation	11/10/2022	Squire & Partners
K	15044-SQP-03-ZZ-DE-A-PL01414 (P04)	Block K Proposed Northwest Elevation	11/10/2022	Squire & Partners
K	15044-SQP-03-ZZ-DE-A-PL01415 (P05)	Block K Proposed Northeast Elevation	11/10/2022	Squire & Partners

Note. Any changes to the design will require the Fire and Life Safety strategy to be reviewed.

4 B1 - Means of Warning and Escape

4.1 Occupancy Analysis – Residential Demise

An occupancy assessment has been conducted to ensure that a suitable package of protection is provided for people using the buildings.

4.1.1 Regulation M4, Category (2) and Category (3) Design

All apartments within each block have been designed in accordance with Approved Document M, Regulation M4. Within this document, Regulation M4 has been amended and is now titled 'Access to and use of buildings'.

90% of apartments have been designed to accommodate Category 2 occupants (providing accessible and adaptable dwellings) and 10% of apartments have been designed to accommodate Category 3 (providing wheelchair user dwellings)

Category 2 relates to dwellings that provide a higher level of accessibility that is particularly beneficial to older occupants, including some wheelchair users. The design will incorporate features to accommodate a variety of potential users.

Category 3 relates to dwellings that housing and provide full accessibility to wheelchair users including gain access to dwellings and use all the facilities within the dwellings. It will meet the needs of wheelchair user occupants.

4.2 Occupancy Analysis – Commercial Demise

Where parts of each building are not suitably addressed within BS 9991, BS 9999 has been used to supplement the strategy. As such, all ancillary and amenity spaces will be designed in accordance with BS 9999.

4.2.1 Risk profiles

In order to establish the minimum package or protection for occupants, BS 9999 uses risk profiles. The risk profiles contained within Blocks I, J and K are presented in Table 5.

Table 5: Risk Profile

Area	Occupancy Characteristic	Fire Growth Rate [1]	Risk Profile
Car Park	A – Awake and familiar	1 – Slow	A1
Residential Amenity			
General Stores	A – Awake and familiar	2 – Medium	A2
Refuse Stores			
Plant Rooms			
Flexible Commercial Units [2]	B – Awake and unfamiliar	2 – Medium	B2

Note.

[1] Sprinklers will be provided throughout all three blocks and the shared basement levels. Sprinkler suppression systems inhibit fire growth rates. BS 9999 states that where sprinklers are

provided, the fire growth rate can be reduced by 1 level. The values in Table 5 reflect this guidance.

(2) Risk profile of the flexible commercial units will be reviewed and revised based on the actual use and occupancy classification of those units.

4.3 Evacuation Strategy

A summary of the evacuation strategies used in each block is displayed in Table 6.

Table 6: Evacuation Strategies

Blocks	Area	Evacuation Strategy
I, J and K	Within apartments	Defend in place (1) (2)
	Within amenity and ancillary areas	Simultaneous (3)

Note.

(1) Only the occupants within the fire compartment will be alerted to an actuation of a detector head. Sounders elsewhere in the building will not activate.

(2) An evacuation alert system will be provided in accordance with BS 8629:2019. Accordingly, the Fire and Rescue Service can initiate the evacuation alert system for any single floor, multiple floors and the entire building, according to circumstances.

(3) Sounders within all amenity/ancillary areas will be interlinked. Actuation of a detector in any amenity/ancillary area will begin evacuation of all occupants within these areas simultaneously.

4.4 Fire Detection and Alarm Systems

A summary of the fire detection and alarm systems used within each block is displayed in Table 7.

Table 7: Detection and Alarm System Summary

Blocks	Area	System Provided
I, J and K	Apartments (with protected entrance hall)	Grade D (4) LD2
	Apartments (open-plan layout)	Grade D (4) LD1
	Throughout the residential demise	Evacuation alert system
	Residential common corridors	L5
	Protected escape stairs	L5
	Within amenity and ancillary areas	L2
	Commercial units	L2

Note.

(1) Heat detection will be used in kitchens.

(2) The L5 automatic detection system does not incorporate sounders. The detector head is linked to the ventilation system associated with that part of the building. Upon actuation of the detector, a signal will be sent to the associated ventilation system to commence its operation.

(3) In accordance with BS 9999, areas which have an A1, A2 or B2 must be provided with a Category M (manual) system. It is proposed that an enhancement to this minimum requirement is provided. As such, a Category L2 automatic detection and alarm system will be incorporated into the design.

(4) Grade D is subdivided into Grade D1 and Grade D2 as defined:

Grade D1 is a system of one or more mains-powered detectors, each with a tamper-proof standby supply consisting of a battery or batteries. Grade D1 systems are recommended for fire detection and fire alarm systems in rented dwellings, whether new or existing, due to the potential for a higher level of reliability that is appropriate because occupants of rented dwellings tend to be at higher risk.

Grade D2 is a system of one or more mains-powered detectors, each with an integral standby supply consisting of a user-replaceable battery or batteries. Grade D2 systems are recommended for use in new owner-occupied dwellings. Owing to the possibility that the standby battery might be removed from the alarm.

4.5 Means of Escape – Within Apartments

The internal layouts of all apartments are under development. As such the report considers both protected entrance hall and open-plan flat design.

4.5.1 Apartments with Protected Entrance Halls

Where a protected entrance hall is provided, travel distance is limited to 9 m. Travel distance is measured from the furthest habitable room access door to the flat entrance door.

4.5.2 Open-Plan Flat Arrangement

Where an open-plan flat arrangement is incorporated into the design, travel distance is limited to 20 m. Travel distance in this scenario is measured from the most remote part of the apartment to the entrance door.

This arrangement is acceptable if the following requirements are met:

- Occupants of the flat is capable of independent evacuation.
- A Grade D LD1 automatic detection and alarm system must be installed in all open plan flats. The system must be designed and installed in accordance with BS 5839-6.
- Open plan flats must be provided with a sprinkler suppression system designed and installed in accordance with BS 9251.
- The size of an open plan flat must not exceed 16 m x 12 m.
- Open plan flats should be situated on a single level only (this requirement includes flats with galleries).
- Open plan flats must have a minimum ceiling height of 2.25 m.
- The kitchen should be enclosed in open plan flats having an area exceeding 8 m x 4 m.
- Cooking appliances in an un-enclosed kitchen should be located remotely from the escape route and must not be located adjacent to the entrance of the flat.

4.5.3 Open Plan Assessment

AESG have conducted a hob assessment to determine the accumulation of radiated heat an occupant will encounter whilst effecting their escape. The assessment considers the most onerous internal layouts and found that the fractional effective dose was within acceptable limits.

The principles and findings of the assessment can be applied to the current design. However, should the internal layouts change due to design development then a further assessment must be undertaken to determine that the proposed locations of cooking appliances are suitable remote from the escape routes.

4.5.4 Private Balconies

Balconies that are accessed from apartments should meet the following provisions:

- The escape route from the balcony should not pass-through more than one access room.
- The interior of the access room should be clearly visible from all parts of the balcony unless provided by a fire detection and alarm system in accordance with BS 5839-6:2019+A1.
- Any cooking risk in the access room should be enclosed using fire-resistant construction unless:
    - The open cooking risk is remote from the balcony and positioned in such a way that it does not prejudice the escape route through the access room; and
    - a fire detection and fire alarm system in accordance with BS 5839-6:2019+A1 is provided to the access room with an alarm system on the balcony.
- Where the travel distance from the furthest point of the balcony to the balcony access door exceeds 7.5 m, it should be provided with an alternative escape route. Alternative escape route must not pass though the same access room.

4.6 Means of Escape – Residential Common Corridors

In accordance with BS 9991 Figure 9 b), travel distance is limited to 30 m in residential common corridors for multi-stair buildings having egress passing through an unventilated corridor. The design of Block I and Block J creates travel distances of up to 9.8 m which is within the maximum limitations. However due to buildings' height, (above 30 m) a mechanical smoke extract system must be provided as per Section 22.3.2.2 of BS 9991. A typical example for each block is shown in Figure 11 and Figure 12.

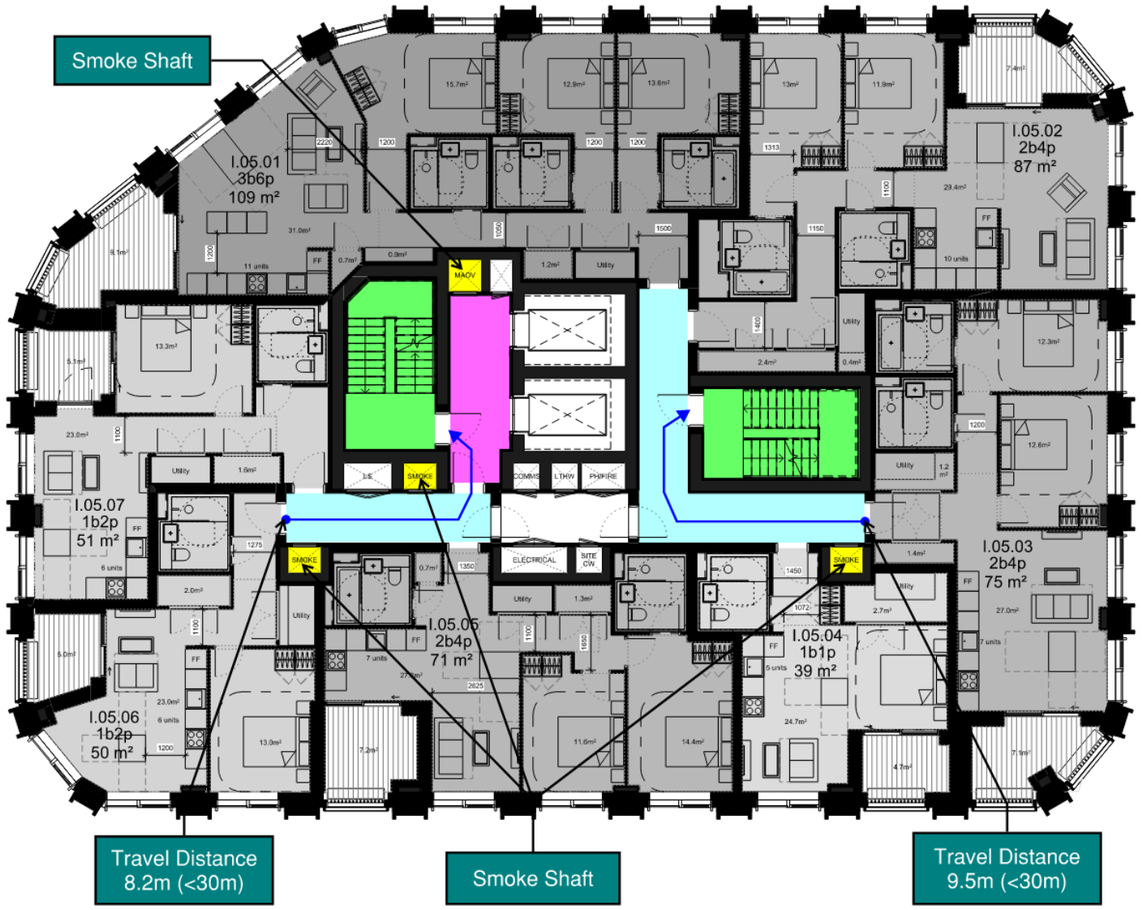

Figure 11: Block I - Mechanical Smoke Extract Arrangement and Travel Distance Measurement

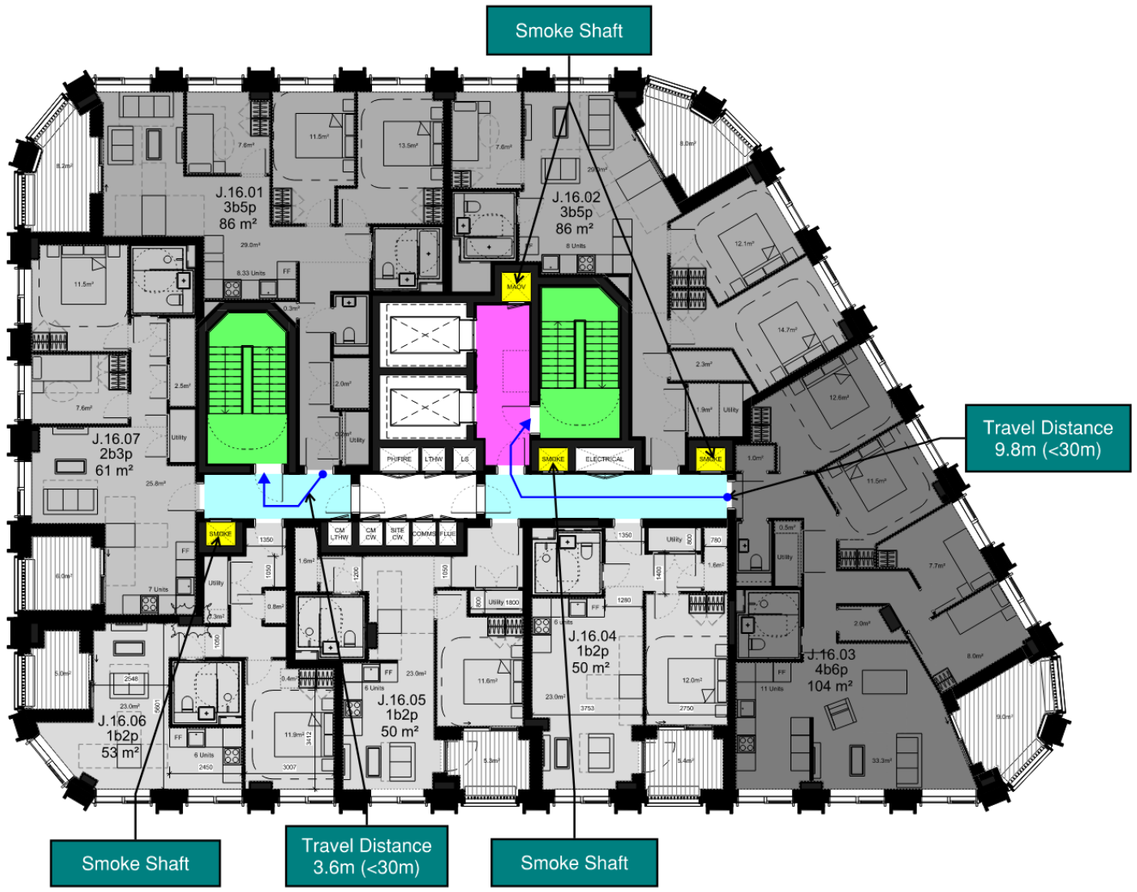

Figure 12: Block J - Mechanical Smoke Extract Arrangement and Travel Distance Measurement

Block K is provided with two escape stairs and both stairs are accessible from the ventilated escape corridor. Therefore, 60 m travel distance is permitted as shown and explained in Figure 9 a) of BS 9991. However, it creates maximum travel distance of 18.4 m. Block K escape corridor must be provided with mechanical smoke extract system as building height is exceeding 30 m in accordance with Section 22.3.2.2 of BS 9991. A typical example of travel distance and smoke extract arrangements is shown in Figure 13.

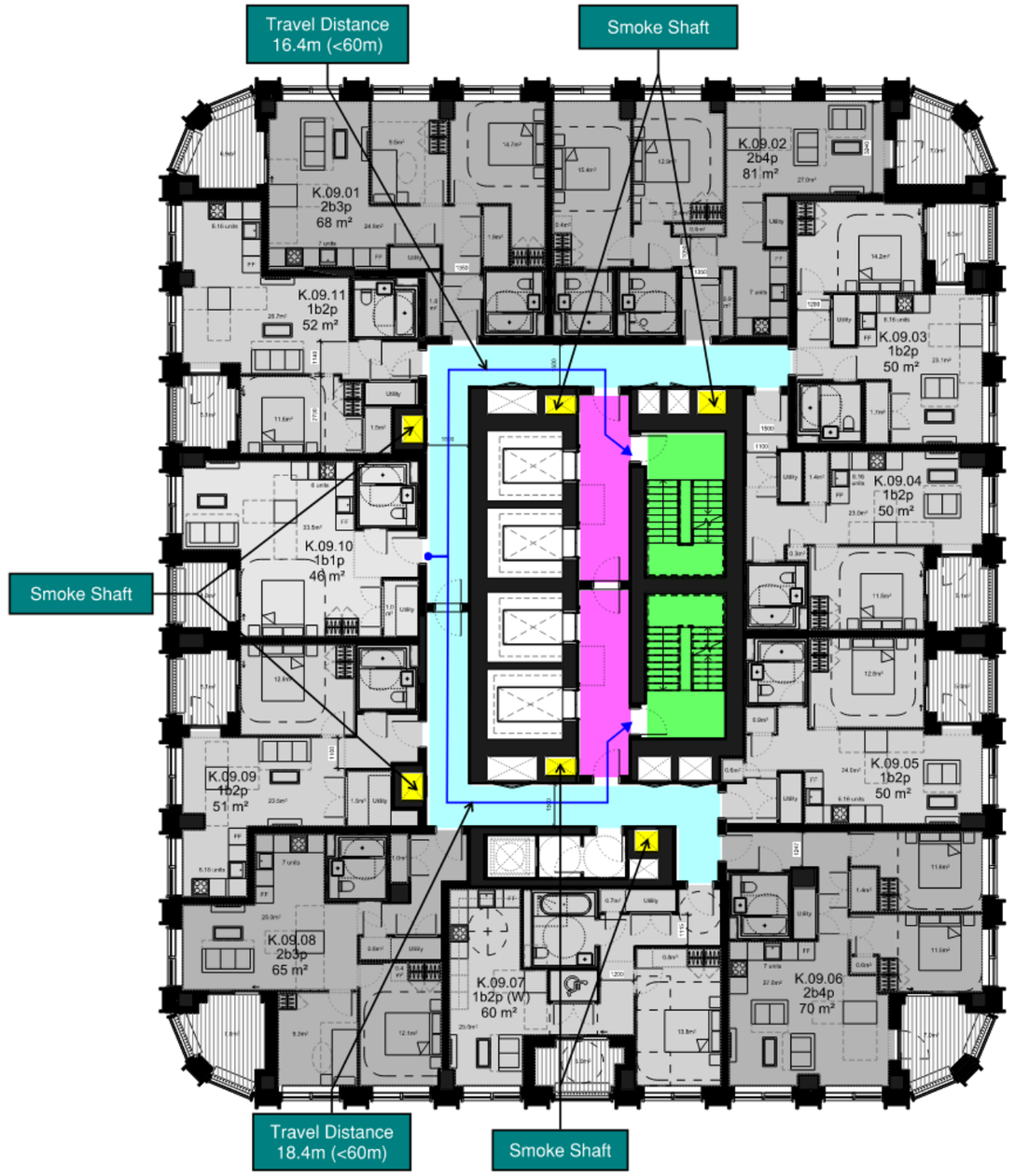

Figure 13: Block K - Mechanical Smoke Extract Arrangement and Travel Distance Measurement

Computational Fluid Dynamics (CFD) modelling and assessment will be conducted at later detailed design stage to demonstrate that the system can achieve the performance criteria detailed in BS 7974. In summary, the mechanical smoke ventilation system must prevent smoke ingress into the escape stairs and restore tenable conditions within the common corridor during both evacuation and firefighting phases. This solution is compliant with the guidance contained within BS 9991.

The methodology and performance criteria will be detailed in a separate report. The report will be issued to Building Control and the parameters will be agreed prior to commencement of the CFD study.

4.7 Means of Escape – Amenity and Ancillary Areas

Table 8 provides a summary of the maximum travel distances permitted within the amenity and ancillary areas of each building. Travel distances within Table 8 have been sourced from within BS 9999.

It is noted that BS 9991 does provide travel distances for amenity and ancillary areas. However, these areas are generalised and not covered in great detail. It is felt that due to the volume and nature of the amenity and ancillary areas, the use of BS 9999 would be more appropriate.

BS 9999 provides a more wholistic approach to considering the minimum package of protection incorporated into the buildings design. BS 9991 provides generic values for travel distance whereas BS 9999 considers all factors which may affect means of escape. Examples include;

- Ceiling height
- Detection and alarm provisions
- Familiarity with building layout
- The effect of fire suppression

As part of a conservative approach AESG have applied all necessary restrictions on travel distance and have not applied any enhancements during this design stage. This approach ensures that the means of escape is suitable and sufficient and that it does not rely on a fire engineered solution to achieve compliance.

Table 8: Travel Distance Limitations

Accommodation	Risk Profile	Maximum Permitted Travel Distance	
		Single Direction	Multiple Directions
Car park [2]	A1	26 m	65 m
Residential Amenity [1]	A1	17 m	44 m
General stores	A2	15 m	37 m
Plant rooms			
Refuse stores			
Flexible Commercial Units [1]	B2	13 m	33 m

Note.

[1] Travel distance limitations will be reduced by 25% where the provisions of alcoholic beverages consumption will be provided in the building/s as stated in Table 11 of BS 9999:2017.

[2] Travel distance for car park shown in Table 8 is actual travel distance limitation as the layout is known, if the layout is unknown direct travel distance will apply.

4.8 Minimum Number of Exits

To facilitate the safe egress of occupants, the building should be provided with a minimum number of exits and escape routes from each room, tier, or storey. These requirements are displayed in Table 9.

Table 9: Minimum Number of Exits

Number of Exits/Escape Routes	Maximum Occupancy
1	1 - 60
2	61 - 600
3	More than 600

4.9 Discounting Exits

In the event of a fire, it is assumed that a single exit (the largest) is blocked due to heat and smoke. The total permitted occupancy within a given area is the sum of all remaining exits capacities.

Where a room/area is provided with a single exit, occupancy is limited to 60 people. Occupants must also be able to travel from the most remote part of the room to the exit within single direction travel distance limitations.

4.10 Minimum Exit Widths

Table 10: Minimum Exit Widths

Area	Minimum clear width
All residential areas	850 mm (1)
Ancillary / amenity areas	850 mm (1)(2)
Plant rooms	800 mm (3)

Note.

(1) 850 mm is the minimum clear width to provide an unobstructed route for occupants such as wheelchair users.

(2) Exit widths may be required to be increased in these areas to accommodate the expected occupancy number. See Section 0 of this report.

(3) It is not anticipated that occupants such as wheelchair users will access these areas.

4.10.1 Expected Occupancy

When compared with residential areas, occupancy numbers in non-residential areas are significantly higher. The following equation will be used to establish the expected number of occupants within non-residential areas:

$$\text{Expected occupancy} = \frac{net\ internal\ area}{floor\ space\ factor}$$

The floor space factors used throughout the scheme are summarised in Table 11.

Table 11: Floor Space Factors

Use	Floor Space Factor (m^2 / person)
General stores	30
Refuse stores	30
Plant room	30
Car park	2 people per car parking space
Flexible Commercial Units	TBC during RIBA Stage 3
Residential Amenity	1

4.10.2 Exit Width Calculations

To ensure that exits are suitably sized for the number of occupants expected to use them, the following equation will be used:

$$\text{Required door width} = min.width\ per\ person \times expected\ occupancy$$

A summary of minimum widths per person has been displayed in Table 12.

Table 12: Minimum Exit Width Per Person

Risk Profile	Minimum Width Per Person
A1	3.3 mm
A2	3.6 mm
B2	4.1 mm

Note. Based on the minimum fire protection being provided.

4.10.3 Doors Less Than 1050 mm Wide

If an escape door has a clear width of less than 1050 mm then the following equation should be used to calculate its capacity:

$$\text{Exit capacity} = \frac{min.\ width\ per\ person}{500}$$

4.11 Direction of Opening

All storey and final exits should open in the direction of escape. Where a door is hung to swing against the direction of escape the door capacity is limited to 60 people.

4.12 Door Fastenings

All doors used as means of escape or final exit must be readily openable without the use of a key at all material times. Doors may be fitted with hardware to allow them to be locked when rooms are empty.

To expediate escape from secure areas, locks may be fitted so that are key operated from the outside and manually opened from the inside.

Door entry controls should be mounted between 900 mm and 1000 mm above finished floor level.

Doors fitted with electronic security locks should fail-safe and open upon actuation of the fire detection and alarm system within the buildings. Break glass panels will also be provided in case the electronic system fails to disengage the door locks.

4.13 Door Threshold

Doorways on escape routes must be provided with accessible thresholds to allow smooth transition of occupants such as wheelchair users.

4.14 Minimum Corridor Width

An accessible step-free approach route should be provided that is specifically suitable for the wheelchair users. The minimum clear width should not be less than 1200mm throughout the approach route to comply with the access (approach to the dwelling) requirements of Approved Document M for wheelchair users (Category M4(3)).

4.15 Minimum Stair Widths

As shown in Figure 11 and Figure 12, Block I and Block J are provided with two stairs. One stair is a firefighting stair and located within a firefighting shaft since Blocks I and J are above 18 m in height, and another stair is located within protected and ventilated escape corridor. The largest floor area of Block K exceeds 900 m^2. Therefore, as shown in Figure 13 Block K is provided with two firefighting shafts and each shaft is provided with a firefighting stair. The minimum width of firefighting stairs is displayed in Table 13.

Table 13: Minimum Stair Widths

Direction of Travel	Minimum Width
Upwards	1200 mm (1)
Downwards	1200 mm (1)

(1) As stated in Section 2.17 of Approved Document Part M, stair width should meet the requirements of Approved Document K (AD Part K). Therefore, minimum stair width should not be less than 1200 mm in accordance with Section 1.15 of AD Part K (2013 edition). However, stair width will require increasing to accommodate simultaneous evacuation following the actuation of the emergency evacuation system by the Fire Service. AESG will conduct an occupancy analysis calculation during RIBA Stage 3 which will determine the minimum width of each stair.

4.16 Stair Width Calculations

To ensure that stairs are suitably sized for the number of occupants expected to use them the following equation will be used:

$$\text{Required stair width} = min.width\ per\ person \times expected\ occupancy$$

Detailed analysis of the occupancy figures will be completed during RIBA Stage 3 to determine the exact width of stairs within each block. A summary of minimum widths per person has been displayed in Table 14.

Table 14: Minimum Exit Width Per Person

Risk Profile	Number of Floors Served	Minimum Width Per Person
A1	2	3.4 mm
A2		3.8 mm
B2		4.0 mm

4.17 Stair Separation at Ground Floor

All three blocks are provided with two escape stairs. Hence in accordance with BS 9991 Section 13.1, where there is more than one common stair from an upper storey or part thereof, at least one such stair serving the upper storeys (or parts thereof) should terminate at ground level.

Any other stair connecting with the basement storey(s) should be separated from each basement level by a protected lobby.

4.18 Exit From Stair Enclosure

All escape stairs should be provided with a final exit allowing occupants to discharge directly outside the building. Where this has not been provided a protected route must be incorporated into the design. The protected route must continue from the foot of the stair to a final exit elsewhere on the perimeter of the building. The protected route is considered an extension of the stair and must be afforded the same level of protection as the stair itself.

4.18.1 Protected Escape Route – Block I

In order to support the protected escape route provisions incorporated into the design the following measures will be implemented:

This arrangement is considered acceptable based on the following:

- The egress corridor will be fire sterile. Items such as combustible furniture will not be permitted in this area. As the building is managed by full time staff, a robust management strategy will be utilised to enforce this requirement.
- The egress corridor will be enclosed in 120-minute fire resistant construction separating it from the rest of the building.

This arrangement is shown in Figure 14.

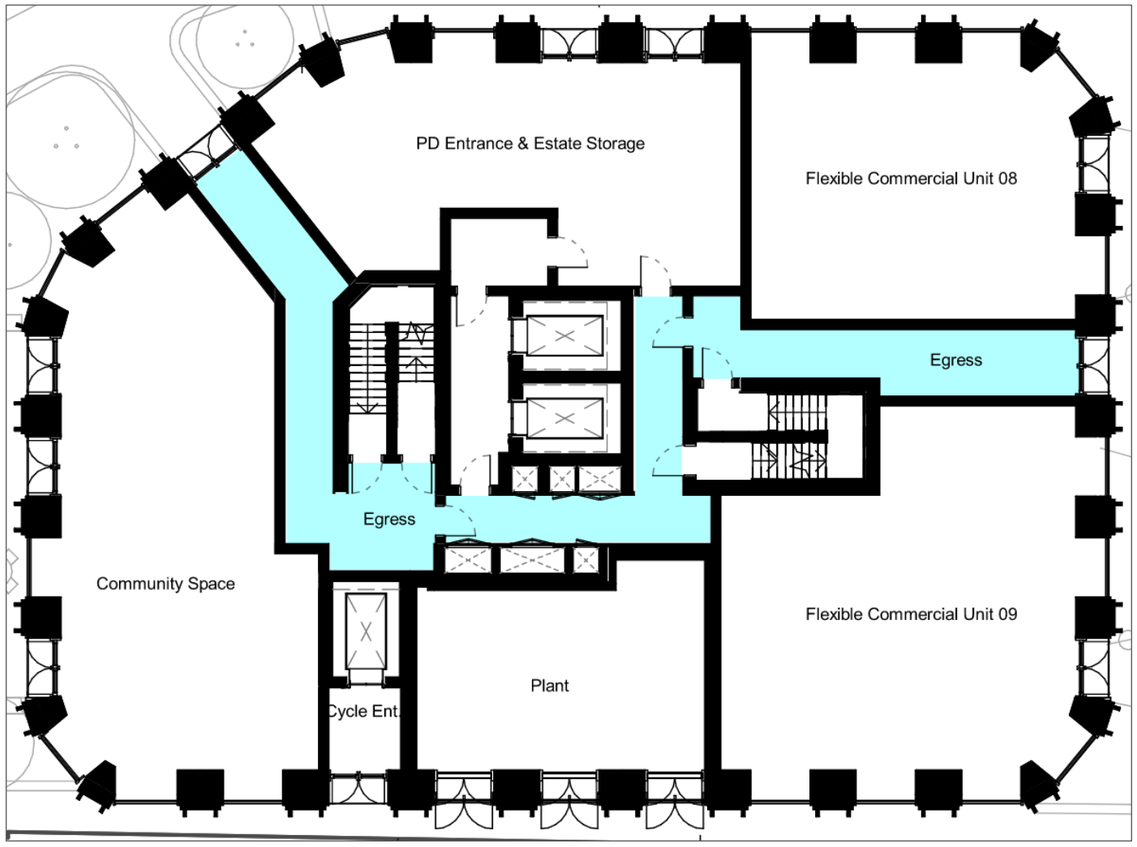

Figure 14: Protected Escape Route

4.18.2 Protected Escape Route – Block J

Within Block J a compliant protected route has been incorporated into the design. This is shown in Figure 15.

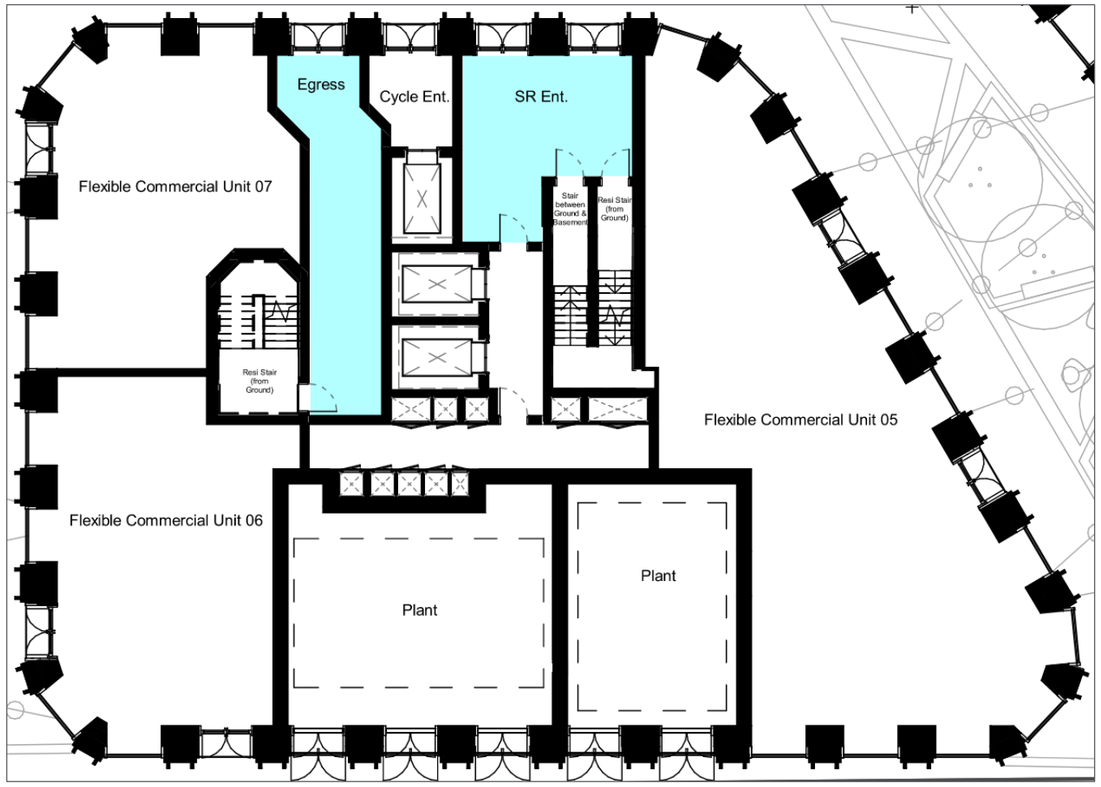

Figure 15: Protected Escape Route

4.18.3 Protected Escape Route – Block K

In accordance with BS 9991, protected escape stair should discharge either directly to a final exit or into a protected corridor leading to a final exit which is itself lobbied from any accommodation. The escape stairs within Block K discharge into two separate protected corridors at ground floor level, which is code compliant. Therefore, occupants will exit the stairs and travel through the protected corridors to reach the final exit. One egress corridor contains a fire/life safety service riser. This arrangement is shown in Figure 16.

This arrangement is considered acceptable based on the following:

- Service riser doors will be provided with smoke seals. If a fire should occur within the riser, smoke will travel vertically through the riser, unable to enter the escape route at ground level.
- Riser doors will be locked shut when not in use preventing the riser shaft being used as storage.
- The corridor containing service risers may also be ventilated using doors and windows provided in the facade.
- The egress corridors will be enclosed in 120-minute fire resistant construction separating it from the rest of the building.
- The stairs will be provided with a self-closing fire door fitted with smoke seals preventing smoke from entering the stair enclosure.

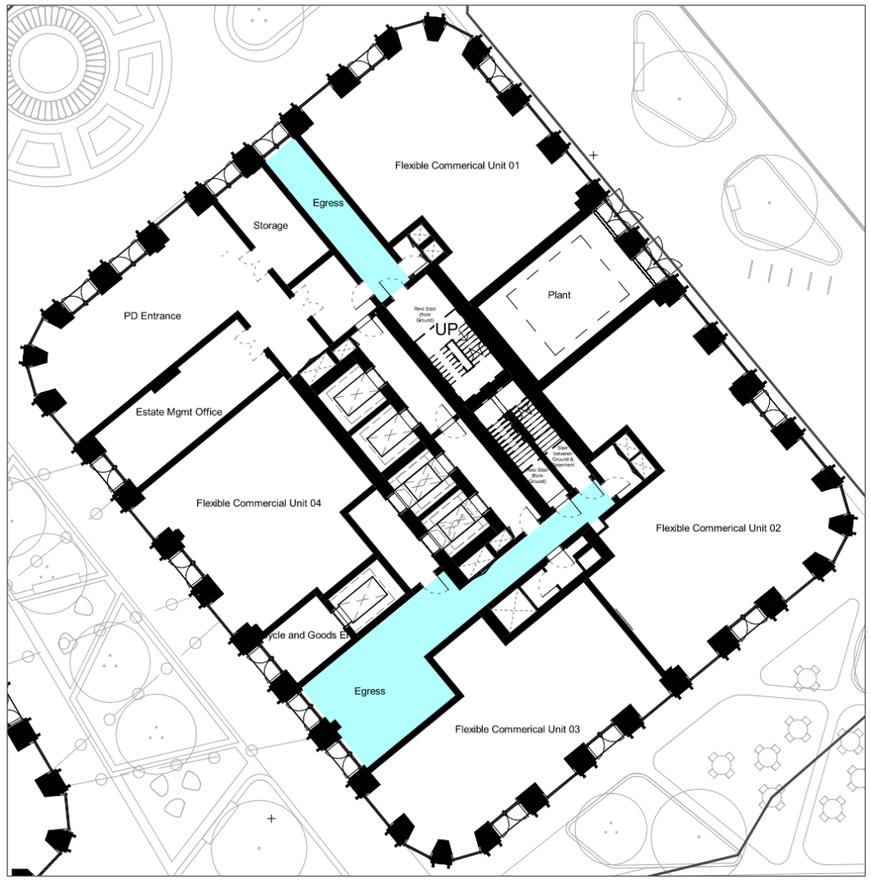

Figure 16: Protected Escape Route

4.19 Escape From Basement Level 01 and Level 02

Blocks I, J and K stairs are available to escape from the basement levels.

4.20 Evacuation of Persons with Restricted Mobility

4.20.1 Evacuation Lifts – London Plan 2021

As part of the London Plan 2021, one lift per core should be designed and installed for use as an evacuation lift. However, Section 7.6.1 of BS 9991 states that buildings greater than 18 m in height must be provided with more than one evacuation lift to ensure that at least one lift is available for use during maintenance or as a result of breakdown. Therefore, Blocks I, J and K incorporate two lifts per core. All lifts will be designed as a firefighting/evacuation lifts. This lifts arrangement is compliant with BS 9991.

Evacuation lifts should be situated within a protected enclosure consisting of the lift well itself and a protected lobby at each storey served by the lift. Evacuation lifts should be provided with a protected route from the lift to a final exit at ground floor level. It should be associated with a refuge and should be clearly identified. No part of an escape route should be served only via a lift.

Evacuation lift car size should not less than 1100 mm (width) x 1400 mm (depth) and rated at 630 kg weight capacity. Evacuation lift can be used as normal passenger lift when not in use as emergency evacuation lift. A refuge should be of sufficient size both to accommodate a wheelchair and to allow the user to manoeuvre into the wheelchair space without undue difficulty. To accommodate the wide variety of wheelchairs in use, including powered wheelchairs, the space provided for a wheelchair in a refuge should be not less than 900 mm × 1400 mm allowing for manoeuvring. To enable wheelchair users to manoeuvre themselves into the refuge, the door width should have a clear opening of not less than 850 mm and lift door to be not less than 900 mm.

Evacuation lift lobby in each block is provided with independent ventilation system in accordance with the BS 9991 Section 7.6.4. The smoke ventilation system provided within common corridors will not rely on evacuation/firefighting lift lobby ventilation.

Figure 17 shows the minimum dimensions for the evacuation lift and lobby.

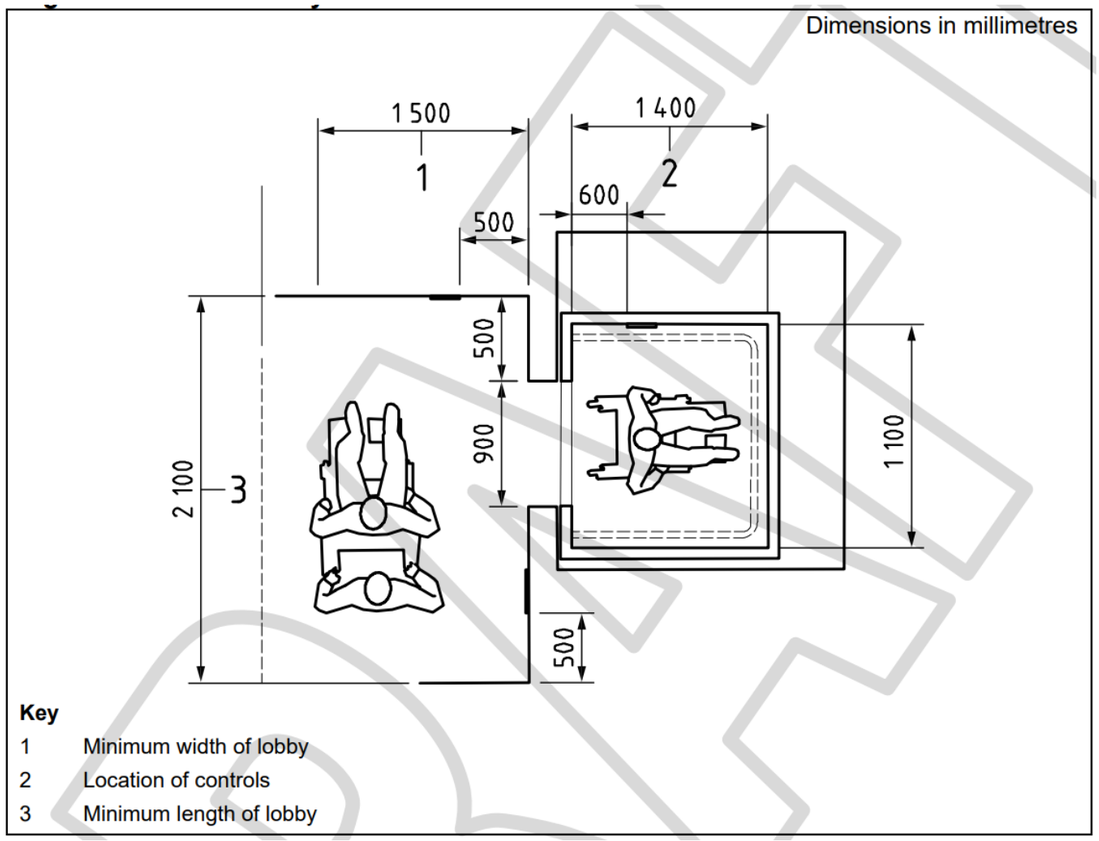

Figure 17: Evacuation Lift and Lobby Dimensions (Source: Figure 6 BS 9991)

4.20.2 Requirements for Refuges

Minimum one refuge should be provided within evacuation lift lobby. Refuges do not need to be located within the stair enclosure but should enable direct access to the stair.

The number of refuge spaces does not need to equal the number of wheelchair users who may be in the building. A single refuge may be occupied by more than one person during the evacuation procedure. A risk assessment should be conducted to ascertain if additional refuges are required due to the nature of the occupancy within the building.

Refuges should be a minimum of 900 mm x 1400 mm in size and accessible by someone in a wheelchair. Where sited in a protected stairway, protected lobby or protected corridor, refuges should not reduce the width of the escape route or obstruct the flow of people escaping.

Refuges should be provided with an emergency voice communication (EVC) system.

4.20.3 Emergency Voice Communication Systems (EVCS)

An emergency voice communication system will provide two-way voice communication between a central control point (location to be confirmed) and outstations (located at each refuge point). Where occupants are required to wait for assistance at refuge points, they must be able to communicate and receive reassurance or instruction. This is used in a fire emergency situation.

Emergency voice communication systems should comply with British Standard 5839-9. It should consist of Type B outstations communicating with a master station adjacent to the fire detection and alarm panel. If this location is impractical, then wireless technology may be more appropriate. Wireless technology falls outside the scope of this fire strategy and should be investigated through a specialist consultant.

4.20.4 Changes in Floor Level

In order to negotiate level changes within a building, suitable ramping may be used as an alternative to stepped access/egress routes. Where a ramp is used the following requirements should be met:

- The gradient of any ramp must not be greater than 1:12.
- An individual flight of ramp must not have a going longer than 10 m.
- An individual flight of ramp must not rise above 500 mm.
- The ramp should have a minimum width of 1500 mm.
- Landings should be provided at the foot and head of a ramp. The landing should be at least as wide as the ramp itself and clear of any obstructions.
- Ramps should be designed and installed in accordance with BS 8300.

4.20.5 Personal Emergency Evacuation Plans (PEEPs)

Wherever possible, Personal Emergency Evacuation Plans (PEEPs) should be produced for all people requiring assistance to leave the building. Through the recording of PEEPs, the management team should be made aware of the amount of staff support required for each evacuation.

Individual PEEPs should be created for people who frequently use the premise. This may include staff or regular contractors. Following discussions with an individual, a plan can be developed for their specific needs which should contain details of how they will evacuate the building.

By considering the individual needs of a person, managements are able to make reasonable adjustments to the premises or procedures. They are also able to make provision for actions to be taken in the event of a false alarm, or if the person cannot return to the building after a fire.

PEEPs should also be created for infrequent or first-time visitors to the building (this should include maintenance staff). This may include new members of staff, or members of the public. Visitors who are likely to require assistance in the event of an evacuation should be encouraged to make themselves known to staff. Management should be encouraged to have staff who are trained in disability awareness.

Staff should be trained so that they are aware of the facilities and their responsibility to evacuate disabled people and know how to use features such as evacuation lifts and refuges (if required). Enough staff should be available at all times to make sure that evacuation plans are viable.

5 Active Systems

5.1 Automatic Suppression Systems

All areas within Blocks I, J and K will be provided throughout with an automatic sprinkler suppression system.

Residential areas will be provided with a Category 4 system, designed, and installed in accordance with BS 9251.

Wheelchair charging areas located within apartments should be sprinkler protected. The sprinkler system should be designed and installed in accordance with Category 2 system of BS 9251:2021 or BS EN 12845:2015+A1 for an OH1 system. Sprinkler design category will be reviewed in RIBA Stage 3 fire strategy for any enhancement.

Non-residential areas will be provided with a commercial sprinkler system, designed, and installed in accordance with BS EN 12845.

5.2 Smoke Ventilation

5.2.1 Residential Common Corridors – Smoke Control System

In accordance with BS 9991 Section 22.3.2.2, buildings over 30m in height should be provided with mechanical smoke ventilation system (MSVS) or pressure differential system.

AESG will use Computational Fluid Dynamics (CFD) modelling and assessment to demonstrate that the MSVS meet the acceptance criteria given in the Guidance on Smoke Control to Common Escape Routes in Apartment Buildings (Flats and Maisonettes) Revision 3.1: 13 July 2020.

Details of the assessment will be provided for inclusion in the RIBA Stage 3 FLS Strategy.

5.2.2 Amenity and Ancillary Areas - Venting Heat and Smoke from Basement Levels

It is proposed that the basement levels will be provided with a mechanical smoke ventilation system. This arrangement is acceptable as a sprinkler suppression system, designed and installed in accordance with BS EN 12845 will also be provided.

The powered extract system must achieve the following requirements:

- Provide 10 air changes per hour
- Withstand temperatures of 300°C for not less than 60 minutes
- Operate automatically upon actuation of a detector head or sprinkler system

A mechanical smoke ventilation system should demonstrate conditions in the lobby or corridor and stairs that are equivalent to or better than the natural ventilation system that it replaces.

AESG will use Computational Fluid Dynamics (CFD) modelling and assessment to achieve this. It will assess the performance of the MSVS against the tenability criteria detailed in PD 7974. Details of the assessment will be provided for inclusion in the RIBA Stage 3 FLS Strategy.

5.2.3 Refuse Stores

Where refuse stores are not approached from outside the building, a protected lobby must be provided to separate these rooms from other parts of the building. The protected lobby must be provided with at least 0.2m^2 of permanent ventilation.

5.2.4 Firefighting Stair

The firefighting shaft must be provided with a smoke ventilation system. The primary objective of this system is to maintain smoke-free conditions in the staircase during means of escape and firefighting operations.

In order to remove heat and smoke from within the stair, an AOV that is sited as high as practical within the top storey of the stairway and having a free area of 1.0m^2 should be provided.

5.3 Emergency Lighting

Emergency escape lighting should be provided in the following locations:

- Ancillary accommodation normally accessible to occupants
- Common stairs
- All common escape routes
- Common escape routes across a flat roof

The emergency lighting system should be designed and installed in accordance with BS 5266-1.

5.4 Emergency Signage

Escape and other fire safety signage should also be provided in accordance with BS ISO 3864-1 and BS 5499-4. It should be highlighted that an effective and total signage strategy (that is developed by others) can only be finalised following site inspections to ensure reasonable coverage and visibility.

It should be noted that BS 9991 guidance on signage has been superseded by the amendments to ADB published in May 2020. These state that residential buildings over 11m should be provided with floor identification signs and flat indicator signs (see ADB sections 15.13 to 15.16).

In summary, signs should be provided on every landing of a protected stairway and every protected corridor. Floor identification signs should be supplemented by flat indicator signs providing information related to the flats accessed on each storey. It is recommended that this latest guidance is incorporated into the design.

5.5 Emergency Evacuation System

Following the tragedy of Grenfell, many things had to change in the construction and management of high-rise residential buildings. Therefore, emergency evacuation system should be provided in accordance with BS 8629:2019, which is the new standard that sets out requirements for Evacuation Alert Systems (EAS), to be used by the Fire and Rescue Service (FRS) in the event of emergencies in apartment blocks.

The new BS 8629:2019 standard covers 'the design, installation, commissioning and maintenance of evacuation alert systems for use by the Fire and Rescue Service (FRS) in buildings containing flats.'

An evacuation alert system is an alarm system operated by a control panel inside an apartment block for use by the FRS when they attend an emergency. BS 8629 requires an alarm sounder to be situated in each flat in a block – with the control panel capable of triggering evacuation alerts for specific areas or floors within a building. It does not need to incorporate a two-way communication mechanism or a Voice Alarm System, but each flat must be fitted with an alarm sounder and a visual alarm device (VAD).

It is a separate system from a fire alarm system. It is not initiated by heat or smoke sensors. Instead, it should only be operated by the FRS via a control panel also known as an EACIE (evacuation alert control and indicating equipment).

5.6 Emergency Power Supplies

In the event of a failure of the mains power supply, a secondary backup power supply must be provided to feed all life safety systems that require electricity to function as intended. The secondary supply will be appropriate for the life safety system concerned and is recommended to be provided via a separate external substation or via a standby generator. The following systems must be provided with a backup power supply:

- Automatic fire alarm and detection system
- Illuminated emergency signage
- Emergency lighting
- Smoke control/ventilation systems
- Mechanised dampers
- Firefighting lift
- Evacuation lift
- Refuge communication systems
- Sprinkler system
- Pumps feeding the fire main system (wet riser system for all Blocks)
- Any other life safety systems

5.7 QDR Process

The QDR process will determine if the minimum provisions require any enhancement to the fire safety systems. We have prepared separate QDR report for the Blocks I, J and K and it will be submitted to statutory consultee such as HSE, Building Control and Fire Service.

6 B2 - Internal Fire Spread (Linings)

An internal lining is any product or material used in lining any partition, wall, ceiling or other internal structure. For compliance with the Building Regulations, linings should adequately resist the spread of flame over their surfaces. In addition, if ignited, linings should inhibit the rate of heat release or the rate of fire growth.

6.1 Classification of Linings

The surface linings of walls and ceilings should meet the classifications displayed in Table 15.

Table 15: Classification of Linings

Location	National Classification	European Classification
Small room of area not exceeding 4 m^2 in a residential building and 30 m^2 in a non-residential building.	3	D-s3, d2
Other rooms (including garages)	1	C-s3, d2
Circulation spaces within dwellings	1	C-s3, d2
Other circulation spaces including common areas of flats	0 (1)	B-s3, d2

Note.

(1) Class 0 is not identified in any BS test standard. A Class 0 product is considered to be either of the following:

- Composed throughout of materials of limited combustibility.
- A material having a Class 1 surface spread of flame, and which has a fire propagation index (I) of not more than 12 and a sub-index (i1) of not more than 6. The fire propagation index is established by reference to the method specified in BS 476-6.

Parts of walls in rooms may be of lower performance than those displayed in Table 15, but no worse than class D-s3, d2. In any one room, the total area of lower performance wall lining should be less than an area equivalent to half of the room's floor area, up to a maximum of 20 m^2 in residential accommodation.

7 B3 – Internal Fire Spread (Structure)

7.1 Elements of Structure

Elements of structure include, but are not limited to, the primary structural frame and load-bearing walls and floors. Any elements of structure that support the roof only need not be fire protected, unless supporting life safety equipment, providing structural stability to the building, or its failure could lead to progressive collapse.

BS 9991 states the required fire resistance of structural elements of the building. This value is based on the height of the highest occupied floor and whether the building is sprinklered or not. The requirements for structural fire resistance are displayed in Table 16. However, QDR process will determine if additional fire resistance is required for the buildings above 50 m in height.

Table 16: Minimum Period of Fire Resistance for Elements of Structure

Block	Height to top occupied storey	Minimum period of fire resistance
I	78.3 m	120 minutes
J	55.65 m	120 minutes
K	128 m	120 minutes
Shared Basements	Approx. 9.8 m	120 minutes

7.2 Materials Classification for Construction of Common Stairs

In accordance with BS 9991 Section 34, flights and landings of common stairs should be constructed of Class A2-s3, d2 or better materials as all proposed buildings are above 18 m in height from ground level.

7.3 Compartmentation and Places of Special Fire Hazard

The spread of fire within a building can be restricted by subdividing the building into compartments. Each compartment can be separated from one another by walls and/or floors of fire-resisting construction.

7.3.1 Compartment Floors

All floors within Blocks I, J and K must be constructed as compartment floors. Compartment floors must achieve the same fire resistance as the elements of structure.

- Compartment floors in Blocks I, J and K must provide a minimum of 120 minutes fire resistance (see Section 8.1).

7.3.2 Compartmentation Walls

All of the following should be provided with compartment walls:

- Any wall separating a flat and another part of the building should have at least 60 minutes fire resistance.

- Any wall enclosing a refuse chute should have the same fire resistance of the floors it passes through i.e., REI 120.

7.3.3 Service Penetrations

All service risers/ducts must achieve the same level of fire resistance as the element through which they pass.

7.3.4 Firefighting Shaft

The firefighting shaft should be separated from the rest of the building by 120 minutes fire resistant construction.

Any construction separating the firefighting stair, firefighting lift shaft and firefighting lobby should achieve a minimum of 60 minutes fire resistance.

7.3.5 Electric Wheelchairs and Mobility Scooters Storage

In accordance with BS 9991 Section 7.3, the storage for electric wheelchairs and scooters located within the dwelling units should be separated from the means of escape by a minimum of30 minutes fire resisting construction. In addition, wheelchair storage and transfer space should be designed in accordance with the Section 3.25 of Approved Document M Vol 1 (2015 edition). Therefore, storage space should be of a minimum 1100mm deep and 1700mm wide and provided with a power socket. Storage space should be accessible from a 1200mm clear width space. Please refer to the Figure 18.

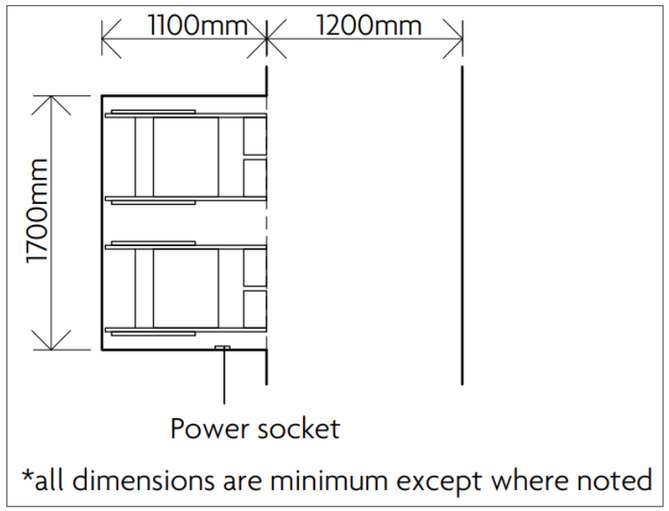

Figure 18: Wheelchair Storage and Transfer Space (Source: ADM Vol 1 Diagram 3.6)

7.3.6 Places of Special Fire Hazard

A place of special fire hazard is defined as all ancillary accommodation with the exception of communal lounges, common amenity areas and transformer, switchgear and battery rooms for low voltage or extra low voltage equipment.

Examples of places of special fire risk include:

- Boiler rooms
- Switchgear rooms
- Storage spaces for fuel or highly flammable substances

These rooms should be enclosed by fire resistant enclosures of at least 30 minutes fire resistance. Where a place of special fire hazard is located below ground, separate smoke outlets should be provided.

7.3.7 Refuse Stores

Refuse stores should be enclosed in 60 minutes fire resistant construction. Where a refuse store is not entered from outside it should be approached through a protected lobby. The lobby should be constructed to achieve a minimum of 30 minutes fire resistance. The lobby should be provided with $0.2m^2$ of permanent ventilation.

7.4 Fire Doors

All fire doors within the building will be provided in accordance with BS 9991/ BS 9999. Each door shall be tested and achieve the appropriate performance as stated in BS 476-22.

Where a fire door to a service riser opens into a common corridor, the fire doors will be provided with smoke-seals (BS 476-31) as an additional measure to protect the escape route. A schedule for fire doors within each block is shown in Table 17.

7.5 Fire Resistance Summary

Table 17 provides a summary of the requirements for fire resistant construction and fire doors within Blocks I, J and K.

Table 17: Fire Resistance and Fire Door Summary – Blocks I, J and K

Location	Blocks I, J and K	
	Fire Resistance	Fire Door Type
Construction enclosing a roadway	120 minutes	N/A
Compartment Floors	REI 120 minutes from under side	N/A
Lift Shaft	REI 120 Minutes	FD60
Firefighting shaft - separating the shaft from the rest of the building	REI 120 minutes	FD60S
Walls separating the car park and the rest of the building	REI 120 minutes	FD60S
Construction separating individual flats	REI 60 minutes	N/A
Construction separating flats with common corridor	REI 60 minutes	FD30S
Refuse storage	REI 60 minutes	FD60S
Service risers	Equal level of fire resistance as the element through which they pass	N/A
Alcohol stores	REI 60 minutes	FD60S
Transformer and switch gear rooms for equipment above low voltage	REI 60 minutes	FD30S
Corridor fan coil units	REI 60 minutes	FD60S
Protected Lobby (not forming part of a compartment wall or protected shaft)	REI 30 minutes	FD30S
Communal areas	REI 30 minutes	FD30S
Places of special fire hazard	REI 30 minutes	FD30S
Plant room	REI 60 minutes	FD30S
Kitchen	REI 30 minutes	FD30S
Transformer, switchgear and battery rooms for low/extra low voltage equipment	REI 30 minutes	FD30S
Substation (as per BS 9991)	REI 120 minutes (1)	FD60S[1]
Substation (as per UKPN)	REI 240 minutes (2)	FD120S[2]

[1]As per prescriptive requirements of BS 9991, substation is required to have minimum 120 minutes of fire resisting construction if located within the building. And it should be directly accessible from outside.

[2]As per UK Power Networks requirements, substation should provide with 240 minutes of fire resisting construction. However, installer guidance/recommendation should be referred for the construction.

7.5.1 Concealed spaces

Cavity barriers must be installed in all cavities/voids to prevent the potential for extensive unseen fire spread within these areas. Cavity barriers and fire stopping should be installed in accordance with Figure 19.

The key areas that will be provided with cavity barriers are as follows:

- At the junction between a cavity wall and every compartment floor, compartment wall, or other wall or door assembly that forms a fire-resisting barrier.
- In protected escape routes, above and below any fire-resisting construction that is not carried full storey height.
- At the edges of any external wall cavities (including around openings, i.e., windows).
- Within extensive cavities that exceed the distances set out within
- Table 18.

Table 18: Maximum Dimensions of Cavities

Location	Class of surface exposed in cavity	Maximum dimension in any direction
Between roof and ceiling	Any class	20 m
Any other cavity	C-s3, d2	20 m
	Any class	10 m

The cavity barriers will provide a 30-minute fire rating (i.e. 30 minutes integrity and 15 minutes insulation). Any penetrations through the cavity barriers will be either:

- Fitted with a proprietary sealing system.
- Pipes of limited diameters that are sealed with fire-stopping or sealed with sleeving of non-combustible pipe material.

The provisions in

Table 18 do not apply to any cavity described below:

- In a wall which should be fire resisting only because it is load bearing.
- In a masonry or concrete external cavity wall (two leaves of brick or concrete each at least 75 mm thick, cavity closed around gaps and to close of edges of cavities).
- Formed behind the external skin of an external cladding system with a masonry or concrete inner leaf at least 75 mm thick, or by over-cladding an existing masonry (or concrete) external wall, or an existing concrete roof, provided that the cavity does not contain combustible insulation and the building is not put to a residential or institutional use.
- Between double skinned corrugated or profiled insulated roof sheeting, if the sheeting is a material of limited combustibility and both surfaces of the insulating layer have as surface spread of flame at least Class C-s3, d2 or better and make contact with the inner and outer skins of cladding.
- In any floor or roof cavity above a fire resisting ceiling (at least 30 minutes FR) which extends throughout the building or compartment, subject to a 30 m limit on the extent of the cavity.
- Below a floor next to the ground or oversite concrete, if the cavity is less than 1000 mm in height or if the cavity is not normally accessible by persons unless there are openings in the floor such that it is possible for combustibles to accumulate in the cavity (in which case cavity barriers should be provided and access should be provided to the cavity for cleaning).
- Cavities that specifically protected by a sprinkler system in accordance with BS EN 12845.

Where a single room exceeds 20 m in any direction, cavity barriers within the ceiling void and/or floor void need only to be placed on the line of enclosing walls/partitions of any room and where services penetrate any fire-resisting floors to avoid vertical and horizontal voids meeting, provided that:

- The cavity barriers are no more than 40 m apart; and
- The surface of the material/product exposed in the cavity being Class C-s3, d2 or better.

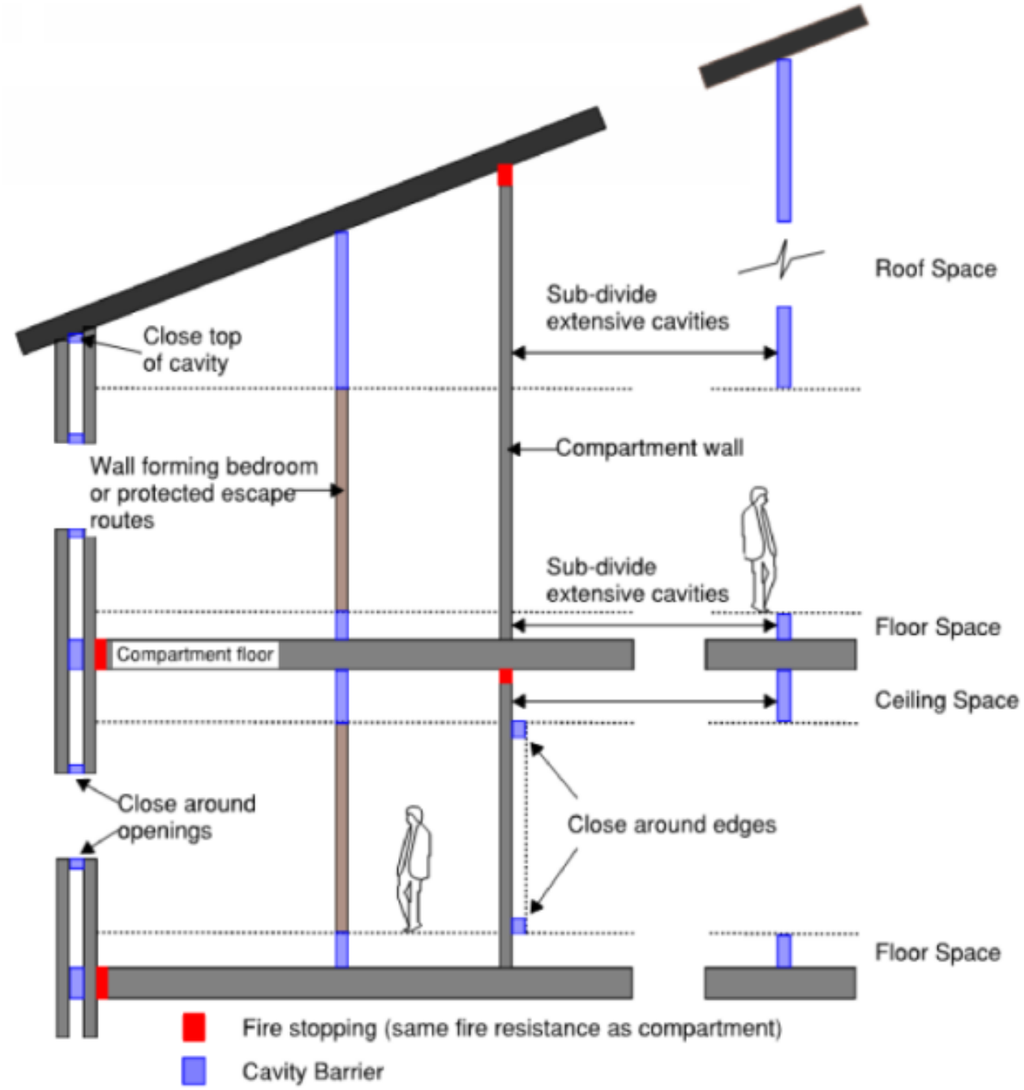

Figure 19: Provisions for cavity barriers

7.5.2 Protection of openings and fire stopping

Any openings for services that breach compartment/fire walls need to be fire stopped unless protected throughout their entire length with fire resisting material. This is to prevent the passage of fire and assist in retarding the movement of smoke.

Pipes that pass through a fire separating element, should meet one of the following provisions:

- **Proprietary Seals** – Provide a proprietary sealing system which has been shown by test to maintain the fire resistance of the wall, floor or cavity barrier.
- **Restricted Pipe Diameter** – Where a proprietary sealing system is not used, fire stopping may be used around the pipe, keeping the opening as small as possible. The nominal internal diameter of the pipe should not be more than the relevant dimension given in Table 19.
- **Sleeving** – A pipe of lead, aluminium, aluminium alloy, fibre-cement or uPVC, with a maximum nominal internal diameter of 160 mm, may be used with a sleeving of non-combustible pipe. The opening in the structure should be as small as possible and provide fire stopping between the pipe and structure. The sleeve should extend no less than 1000 mm either side of the structure as indicated in Figure 20.

Joints between elements of structures that serve as barriers to fire will be fire stopped to prevent the passage of fire and smoke.

It is also proposed that all existing penetrations will be assessed, and remedial works undertaken to ensure any penetrations through compartment floors or fire-resistant construction are appropriately stopped.

Table 19: Permitted pipe penetration details

Situation [A)]	Maximum nominal internal diameter (mm)		
	Class A1 materials [B)]	Lead, aluminium, aluminium alloy, PVC[C)], fibre-cement	Any other material
Structure (but not a wall separating buildings) enclosing a protected shaft which is not a staircase or a lift shaft	160	110	All diameters
Compartment wall or compartment floor between flats	160	160 (stack pipe) [D)] 110 (branch pipe) [D)]	All diameters
Any other situation	160	40	All diameters

Note.

[A)] The diameters given for pipes of material b) used in situation 2) assume that the pipes are part of an above-ground drainage system and are enclosed as shown in Figure 40 BS 9991. If they are not, the smaller diameter given in situation 3) should be used.

[B)] A class A1 material (such as cast iron 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.

[C)] uPVC pipes conforming to BS 4514 and uPVC pipes conforming to BS EN 1329-1. Products of any diameter that fall within the scope of BS EN 1366-3 should be fire-stopped.

[D)] These diameters are only in relation to pipes forming part of an above-ground drainage system and enclosed as shown in BS 9991 Figure 40. In other cases, the maximum diameters against situation 3) apply.

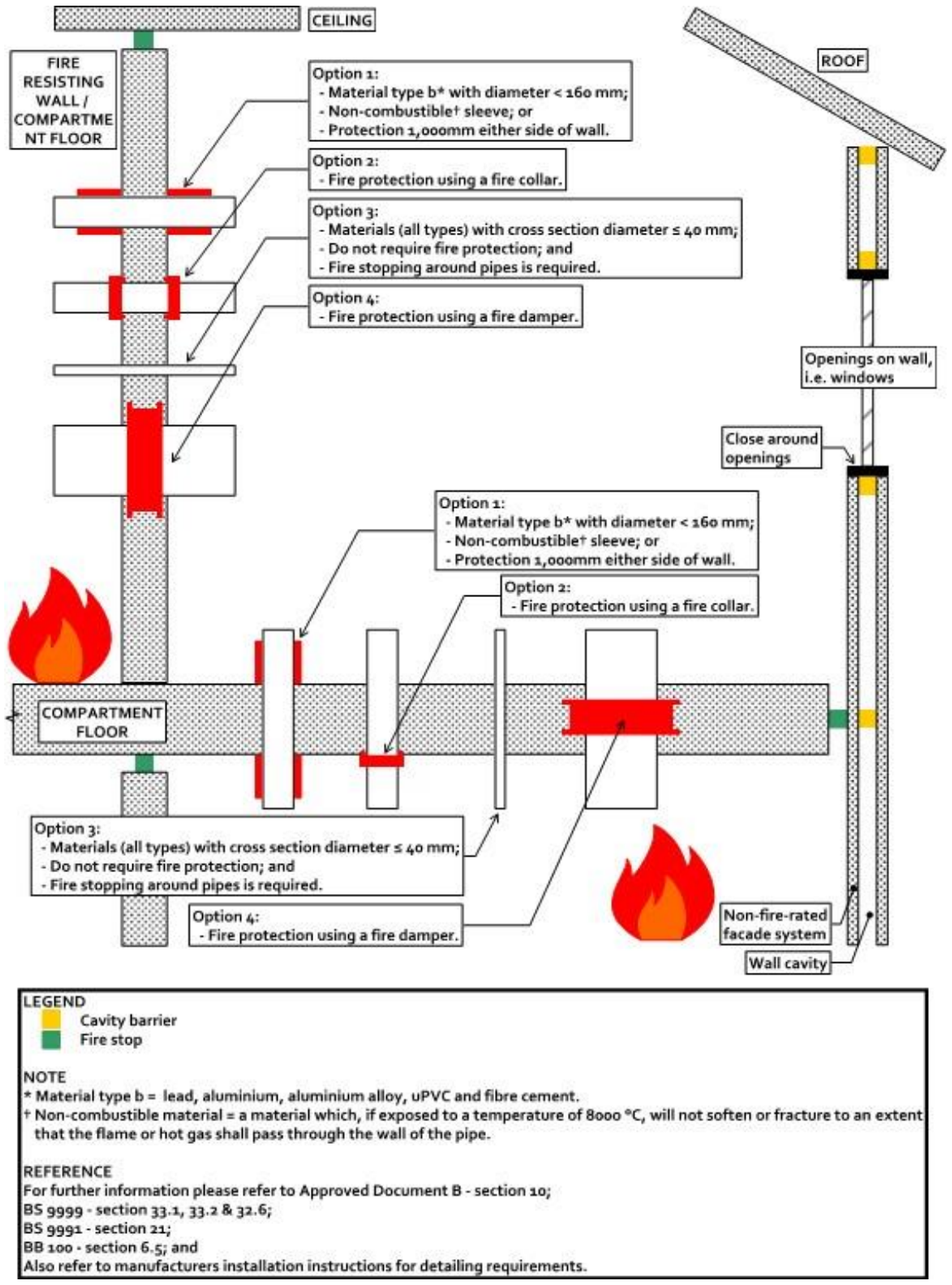

Figure 20: Fire stopping details

8 Building Services Coordination

8.1 Gas services

All gas services will need to be designed and installed in accordance with the current safety Regulations and the installer must confirm that no gas services are passing within the building and in particular through firefighting shaft, protected escape routes or protected staircase shafts.

At this stage of the design Berkeley Group have commented that no gas connection is envisaged. AESG have chosen to include this guidance for completeness until it is confirmed no gas connections will be provided.

8.2 Electrical services

Electrical services should be designed and installed in accordance with the latest version of electrical guidance and Regulations, mainly BS 7671:2018, Requirements for electrical installations.

8.3 Ductwork

Where any new air handling ducts pass through fire separating elements the structural stability and integrity of those elements should be maintained. There are three basic methods provided any one of which can be used to maintain the fire integrity:

Method 1 – Protection using Fire Dampers

The following damper types and locations will be applicable:

- Automatic Fire and Smoke Dampers will be provided where ductwork passes through a protected escape route (such as protected stairs, protected lobbies, dead end conditions etc).
- Thermally activated Fire Dampers will be provided in all other situations.

Note.

Fire dampers should be tested to BS EN 1366 Part 2:1999 and be classified to BS EN 13501 Part 3:2005. The dampers should have an E classification equal to or greater than 60 minutes.

Method 1 is not suitable for ductwork serving kitchen extracts.

Method 2 – Protection using Fire Resisting Enclosures

The fire resisting enclosures, where provided, would need to achieve the same fire resistance as the wall the ductwork penetrates which forms a protected shaft. This allows a multiplicity of

services to be transferred together with the duct to traverse a number of compartments within the building without the need for further subdivisions. Fire dampers (thermally or actuated by AFD, see above) will only be required where the ductwork enters or leaves the protected shaft.

Method 3 – Protection using Fire Resisting Ductwork

Where provided, the ductwork itself forms a protected shaft. The ductwork would need to achieve the same fire resistance as the wall the ductwork penetrates. The fire resistance can be achieved by the ductwork material itself, or through the application of a protective material.

Note.

The supporting hangers should be capable of supporting the ductwork for not less than the period of fire resistance of the ductwork.

8.4 Air Transfer Grilles

Any air transfer grilles required as part of the ventilation system will not be provided within enclosures to protected stairs, protected lobbies, protected corridors, protected shafts and compartment walls and floors. Air transfer grilles located in any place of special fire hazard will be provided with both fire and smoke containment unless opening to outside. Any transfer grilles fitted in fire doors will need to be accompanied by a test certificate from a UK registered testing laboratory provided by the door manufacturer.

9 B4 - External Fire Spread

9.1 External Wall Construction

The external envelope of a building should not provide a medium for fire spread if it is likely to be a risk to health or safety. The use of combustible materials in the cladding system and extensive cavities may present such a risk.

9.1.1 Definition of External Wall and Specified Attachments

The external wall of a building includes the following:

- Anything located within any space forming part of the wall.
- Any decoration or other finish applied to any external (but not internal) surface forming part of the wall.
- Any windows and doors in the wall.
- Any part of a roof pitched at an angle of more than 70 degrees to the horizontal if that part of the roof adjoins a space within the building to which persons have access, but not accessible only to carry out repairs or maintenance.

Specified attachment means;

- A balcony attached to an external wall.
- A device for reducing heat gain within a building by deflecting sunlight which is attached to an external wall.
- A solar panel is attached to an external wall.

9.2 Regulation 7

As of the 21st of December 2018, an amended version of Regulation 7 (Workmanship and Materials) has come into effect. Regulation 7(2) requires that any material which becomes part of an external wall, or specified attachment, of a relevant building as defined in Regulation 7(4), shall achieve European Classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009.

A relevant building is defined as a residential building which has an occupied floor 18 m or higher above fire service access level. Based on these criteria, Blocks I, J and K will comply with this requirement.

9.3 Fire Spread Between Buildings

BS 9991 states that there are two basic methods of fire spread between buildings, direct flame impingement and heat radiation. For buildings within 1000 mm of the relevant boundary direct flame impingement is the main mechanism of fire spread. Beyond this distance radiated heat is the main mechanism of fire spread.

To reduce the risk of external fire spread from one building to another, the amount of unprotected area that is allowed on an elevation may be limited, depending on the boundary distance.

An ‘enclosing rectangle’ methodology described in BR 187 - External Fire Spread: Building separation and boundary distances is adopted to calculate the maximum percentage of unprotected area permitted within each elevation.

External fire spread calculations are displayed in

Table 20, Table 21 and Table 22 of this report.

9.4 Boundary Distances

Boundary distance have been measured from the façade of each elevation to the notional boundary. Where a façade faces a roadway, a notional boundary distance has been measured from the elevation to the midway point of that roadway. Where a façade faces another building within the same site a notional boundary distance has been measured to the midway point between the two buildings. The location of each notional boundary used as part of the external fire spread calculations is shown in Figure .

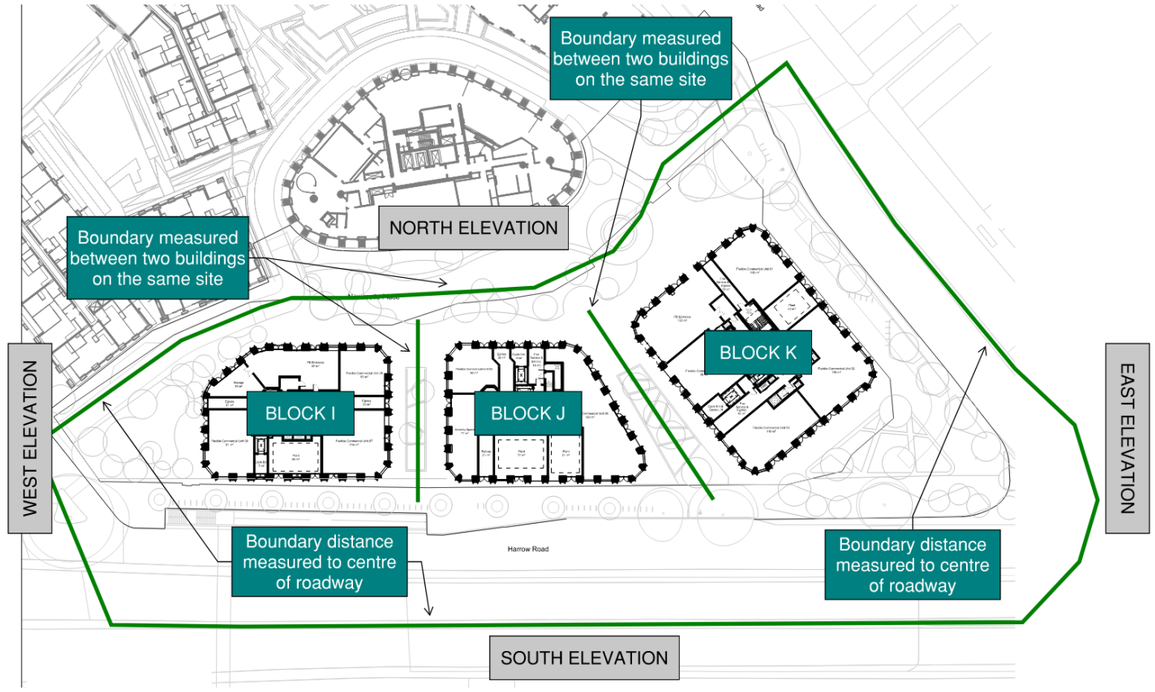

Table 20: Block-I External Walls Unprotected Area Allowance Calculations

Elevation	Compartment Dimensions	Enclosing Rectangle	Approximate Distance to Boundary	Permitted Percentage of Unprotected Area (1)
East Elevation	22.45 m x 3.3 m (Level 23 I.24.02)	24 m x 6 m	5 m	100%
West Elevation	13.17 m x 3.3 m (Level 23 I.24.01)	15 m x 6 m	5.8 m	100%
North Elevation	10.22 m X 3.3 m (Level 23 I.24.01)	12 m x 6 m	7.9 m	100%
South Elevation	24 m x 3.3 m (Level 23 I.24.03)	24 m x 6 m	26.1 m	100%
Commercial (Ground Level)				
East Elevation	11.44 m x 6 m (Unit 10)	12 m x 6 m	5 m	80%
West Elevation	11.44 m x 6 m (Unit 09)	12 m x 6 m	5.8 m	80%
North Elevation	7.72 m x 6 m (Unit 08)	9 m x 6 m	7.9 m	100%
South Elevation	11.54 m x 6 m (Unit 09)	12 m x 6 m	25.50 m	100%

Note.

(1) The permitted percentage of unprotected area has been doubled as sprinkler suppression is provided throughout the building. The permitted variation is in accordance with BS 9991 and detailed in Section 9.4 of this report.

These figures have not been extrapolated; this will be completed as part of the RIBA Design Stage 3. At RIBA Stage 3, we will use the interpolation method in accordance with BR 187 guidance, to determine the exact percentage of the façade which may remain unprotected.

Table 21: Block-J External Walls Unprotected Area Allowance Calculations

Elevation	Elevation Area	Enclosing Rectangle as per BRE 187	Approximate Distance to Boundary	Permitted Percentage as per BRE 187 (1)
East Elevation	14.24 m x 3.2 m (Level 1-14 J.05.03)	15 m x 6 m	4.7 m	100%
West Elevation	12.32 m x 3.2 m (Level 1-14 J.05.06)	12 m x 6 m	5 m	100%
North Elevation	11.46 m x 3.2 m (Level 1-14 J.05.01)	12 m x 6 m	8.7 m	100%
South Elevation	13.50 m x 3.2 m (Level 1-14 J.05.05)	15 m x 6 m	25.7 m	100%
Commercial (Ground Level)				

East Elevation	22.67 m x 6 m	24 m x 6 m	4.7 m	60%
West Elevation	11.93 m x 6 m	12 m x 6 m	5 m	80%
North Elevation	6.92 m x 6 m	9 m x 6 m	8.7 m	100%
South Elevation	10.50 m x 6 m	12 m x 6 m	25.7 m	100%

Note.

(1) The permitted percentage of unprotected area has been doubled as sprinkler suppression is provided throughout the building. The permitted variation is in accordance with BS 9991 and detailed in Section 9.4 of this report.

These figures have not been extrapolated; this will be completed as part of the RIBA Design Stage 3. At RIBA Stage 3, we will use the interpolation method in accordance with BR 187 guidance, to determine the exact percentage of the façade which may remain unprotected.

Table 22: Block-K External Walls Unprotected Area Allowance Calculations

Elevation	Elevation Area	Enclosing Rectangle as per BRE 187	Approximate Distance to Boundary	Permitted Percentage as per BRE 187 (1)
North-East Elevation	20.69 m x 3.50 m (Level 38 K.38.02)	21 m x 6 m	17.8 m	100%
South-West Elevation	24 m x 3.50 m (Level 38 K.38.01)	24 m x 6 m	4.7 m	100%
North-West Elevation	14.70 m x 3.20 m (Level 17-29 K.21.02)	15 m x 6 m	11.2 m	100%
South-East Elevation	25.45 m x 3.50 m (Level 38 K.38.03)	27 m x 6 m	25.3 m	100%
Commercial (Ground Level)				
North-East Elevation	14.83 m x 5.58 m (Unit 02)	15 m x 6 m	17.8 m	100%
South-West Elevation	9.65 m x 5.58 m (Unit 04)	12 m x 6 m	4.7 m	60%
North-West Elevation	8.29 m x 5.58 m (Unit 01)	9 m x 6 m	11.2 m	100%
South-East Elevation	15 m x 5.58 m (Unit 03)	15 m x 6 m	25.3 m	100%

Note.

(1) The permitted percentage of unprotected area has been doubled as sprinkler suppression is provided throughout the building. The permitted variation is in accordance with BS 9991 and detailed in Section 9.4 of this report.

These figures have not been extrapolated; this will be completed as part of the RIBA Design Stage 3. At RIBA Stage 3, we will use the interpolation method in accordance with BR 187 guidance, to determine the exact percentage of the façade which may remain unprotected.

9.5 Effect of Sprinkler Suppression on External Fire Spread

BS 9991 states that where sprinkler suppression is provided, the boundary distance may be halved, or the permitted percentage of unprotected area may be doubled. AESG have applied this permitted variation to the external fire spread calculation tables within this report.

9.6 Roof Coverings

Roof coverings should achieve the classification requirements set out in Section 18.6.1 of BS 9991. Table 23 of this report has summarised these requirements.

Table 23: Roof Covering Requirements

Designation of Covering of Roof or Part of Roof	Minimum Distance from any Point to Relevant Boundary			
European Class	Less than 6 m	At least 6 m	At least 12 m	At least 20 m
$B_{ROOF\ (t4)}$	Acceptable	Acceptable	Acceptable	Acceptable
$C_{ROOF\ (t4)}$	Not Acceptable	Acceptable	Acceptable	Acceptable
$D_{ROOF\ (t4)}$	Not Acceptable	Acceptable (1)(2)	Acceptable (1)	Acceptable
$E_{ROOF\ (t4)}$	Not Acceptable	Acceptable (2)	Acceptable	Acceptable
$F_{ROOF\ (t4)}$	Not Acceptable	Not Acceptable	Not Acceptable	Acceptable (2)

Note.

(1) Not acceptable on any of the following buildings:

- occupancy characteristic A;
- buildings with a volume of more than 1500 m^3.

(2) Acceptable on buildings not listed in footnote (1), if part of the roof is no more than 3 m^2 in area and is at least 1.5 m from any similar part, with the roof between the parts covered with a material of limited combustibility.

10 B5 - Access & Facilities for the Fire Service

10.1 Fire Appliance Access

The site is located on Harrow Road, but there is no direct access to site from the Harrow Road. Fire Service appliances can access to Blocks I, J and K from Newcastle Place. Newcastle Place is one-way and can be accessible from the Edgware Road. The access route for Fire Service appliances must conform to the size and load requirements set out in Table 24.

Table 24: Fire Appliance Roadway Requirements

Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High Reach	3.7	3.1	26.0	29.0	4.0	17.0

Access should prevent a fire service vehicle needing to reverse more than 20 m to manoeuvre. To comply with this requirement appropriate turning circles and/or hammerhead turns will be provided if necessary.

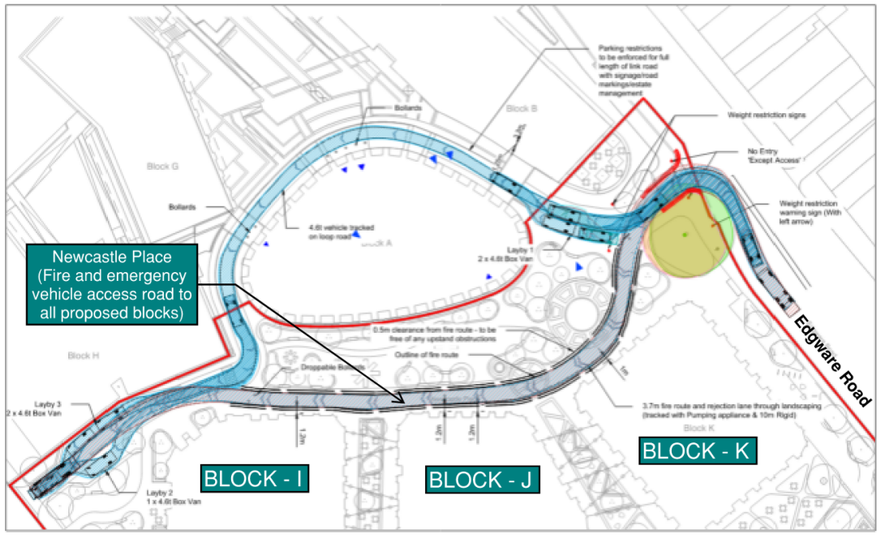

Figure 21: Fire and Emergency Vehicle Access Road

As indicated in Figure 21, all blocks are accessible from the Newcastle Place. Therefore, suitable entrance to each block is located within 18m distance (natural path of travel) from the fire appliance to access the wet fire main. The sketch used for vehicle access in Figure 21 will be updated once new drawing will be available with Newcastle Place.

10.2 Firefighting Shafts

Blocks I, J and K are above 18 m in height and must be provided with at least one firefighting shaft. Blocks I and J is provided with one firefighting shaft, while Block K is provided with two firefighting shafts as it has at least one floor greater than 900 m^2 in area.

All firefighting shafts must be provided with the following facilities:

- Firefighting stair
- Firefighting lift
- Firefighting main
- Firefighting lobby

In addition to the firefighting lift, an evacuation lift must be provided to comply with the requirements of the London Plan 2021. Blocks I and J are provided with two lifts in adjacent shafts. One lift will be designed as an evacuation lift, and the other will be designed as a firefighting/evacuation lift. Block K is provided with two firefighting shafts and each shaft contains two lifts, one is an evacuation lift and other one is a firefighting lift.

The enclosure of the firefighting shafts must achieve a minimum of 120 minutes fire resistance.

10.2.1 Access to Firefighting Shafts

Wherever practicable, firefighting shafts should be sited against an exterior wall. Where this is not possible the following requirements should be met:

- The route from the fire and rescue service entrance to the fire-fighting shaft should be as short as possible. BS 9999, which provides general guidance for the design of firefighting shafts and states the distance should not exceed 18 m.
- The fire-fighting shaft should be protected by fire-resisting construction to prevent fire from affecting the route or cutting off the means of escape for either the fire and rescue service or other persons within the building.

Firefighting shaft/s of all blocks are not located within exterior wall of the buildings. However, it is accessible through the protected corridor within 18m natural path of travel from the building entrance. Detailed drawing will be added showing fire vehicle access road, building entrance and access to firefighting shafts.

10.2.2 Firefighting Stair

All firefighting stairs within Blocks I, J and K will serve floors above and below ground level. Firefighting stairs designed in this way must be separated at ground floor level.

The stair must provide a minimum clear width of 1200 mm for downwards travel and 1200 mm for upwards travel.

Fire-fighting stairs should not contain any cupboards or provide access to service shafts serving the remainder of the building.

The stair should be designed and installed in accordance with BS 5935-1.

10.2.3 Firefighting Lift

Each firefighting shaft should be provided with a firefighting lift, designed and installed in accordance with BS EN 81-72. In Blocks I and J, firefighting lift should be designed to incorporate evacuation lift features as well. So, firefighting lift can be used as an evacuation lift in case of maintenance or a result of breakdown.

The fire-fighting lifts may open directly into the protected corridor or protected lobby.

On residential floors above ground, all firefighting lifts open into the protected lobby. This arrangement is compliant with BS 9991 for residential firefighting shafts. In this arrangement the firefighting lift door must be within 7.5 m of the firefighting stair. This requirement is achieved throughout the design.

There should also be means to minimize the effect of water penetration into the fire-fighting lift well.

10.2.4 Firefighting Main – Blocks I, J and K

Blocks I, J and K are above 50 m in height and must be provided with a 'wet' fire main located inside the firefighting stair. The fire main must be designed and installed in accordance with BS 9990.

All proposed Blocks I, J and K are 'tall buildings' as defined by BS 9991. It is therefore recommended that hydraulic calculations are performed to ascertain if the design requires additional pumps in order to deliver water to the upper levels at the correct flow rate and pressure. It is also recommended that calculations are made by MEP Consultant/Designer to ensure that the requirements to deliver water to the upper floors does not create unacceptable static pressures at ground level.

Outlets for the rising main should be located on each floor. An emergency inlet must be provided to allow the Fire Service to replenish the suction tank required. Suitable entrance to building should be provided within 18 m distance (and within sight of) from the fire appliance to access the wet fire mains. Fire main inlet should be provided within sight of fire appliance stopping position for the emergency replenishment of the suction tank.

10.2.5 Firefighting Lobby

In residential buildings the firefighting lobby is typically provided by the protected corridor. Where a firefighting lobby is provided, for example at ground floor, the lobby must be at least 5 m^2 but no larger than 20 m^2.

10.3 Hose Length Coverage

Each block will be designed so that Fire Service personnel can reach all parts of a qualifying storey within 60 m. This distance is measured from the rising main outlet to the most remote part of that floor on a route suitable for laying hose.

10.4 Fire Hydrants

10.4.1 Blocks I, J and K

Hydrants should be provided to within 90 m of an entry point and not more than 90 m apart.

All hydrants should have appropriate signage designed in accordance with BS 3251.

10.5 Information for the fire and rescue service

It is a considerable advantage for the fire and rescue service to be provided with information about the building on arrival at site. Section 52 of BS 9991 states that all residential buildings above 11 m from the ground or access level must be provided with the premises information box. Therefore, all proposed Blocks I, J and K should be provided with premises information box.

Typical types of premises information box should include:

- Floor plans showing layout, fire resistance provisions, internal access provisions, fire-fighting facilities, building services and any specific hazards associated with the building.
- Operating instructions relating to equipment/fixed insulations.
- Information regarding any fire engineering strategy that may affect the performance of the building (reduced fire resistance of elements of structure or any additional fire protection measures).
- If appropriate, information relating to potential environmental damage.
- Details of fire-fighting lift locations and operating procedures.
- Any other information pertinent to the building which will assist fire-fighting operations. E.g., evacuation alert system (EAS).

If a 'plans box' is used to store this information on site, a photo-luminescent identification sign should be provided to the outer face of the box door. The sign should remain prominent so that if the buildings lighting fails, the location of the box is still visible. If a 'plans box' is not used, then appropriate method should be applied to ensure the documents are clearly identifiable upon the arrival of the fire and rescue service.

11 Fire Safety Management

11.1 Management Requirements

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. The arrangements should include the following key areas:

- Development of a suitable emergency procedure;
- Maintenance contracts for essential fire safety systems and equipment;
- Schedule of in-house checks and tests;
- Display of appropriate fire safety notices and signs;
- Communications arrangements;
- Liaison with the fire service;
- Fire prevention, including control of works on site (e.g., hot work permits);
- Contingency plans;
- Management of bicycle rack space at Ground Floor to ensure it is only used for storage of bicycles.

Note: The above list is not intended to be exhaustive, only to highlight some key areas.

11.2 Management co-ordination and responsibility

The building is split into separate tenancies. As such, it is important that a holistic approach is taken towards the requirements of the fire management strategy for the building.

Overall control is afforded to the building manager who must ensure that the responsible person for each tenancy is adequately informed of their roles and responsibilities. This includes, but is not limited to:

- Adequate numbers of trained staff.
- Adequate internal procedures relating to fire safety.
- Adequate training.
- Awareness of actions taken within the building in the event of a fire.
- Responsibility to advise building management on changes to items which may affect fire and life safety (occupancy numbers, vulnerable people, increased hazards etc.).

11.3 Portable Fire Extinguishers

Portable fire extinguishers are not a requirement under the Building Regulations and need only be provided within the building based on the end user requirements and the Fire Risk Assessment undertaken as part of the RRO requirements. If required, portable fire extinguishers should be of specified types and in specific locations as per BS 5306-8.

11.4 Fire Safety Manual

A Fire Safety Manual should be created to contain design information and operational records. The design information forms the basis of an ongoing history document to which additional material is added when the building is occupied and at regular intervals thereafter. The fire safety manual should:

- Provide a full description of the assumptions and philosophies that led to the fire safety design, including explicit assumption regarding the management of the building, housekeeping and other management functions;

- Provide the nature of the fire safety planning, construction and systems designed into the building, and their relationship to overall safety and evacuation management;
- Provide documentation produced at the design stage to describe the use of the various protection systems in each type of incident, and the responsibilities of the staff;
- Provide a continuously updated record of all aspects of the building and the building users that affect its fire safety.

11.5 Regulation 38

To satisfy Regulation 38 of the Building Regulations a full package of building design information will be passed to the end user including the following relevant information:

- This fire strategy report;
- Any management information proposed in addition to that contained in this strategy;
- Details of all passive fire safety measures (including compartmentation, cavity barriers, fire doors, self-closers, and duct dampers);
- Details of the fire alarm and detection systems, emergency lighting, emergency signage, access controls, door hold open devices;
- Details of all active fire safety measures including the smoke control system design, mode of operation and control systems; (where applicable)
- Details of the dry risers and fire hydrants;
- Any high-risk rooms and equipment present;
- As built plans for the building;
- Fire strategy drawings of every floor level within the building;
- O&M Manuals for the building systems, including commissioning information and certification.

This information will be transferred as a package of information by the main contractor at handover of the building.