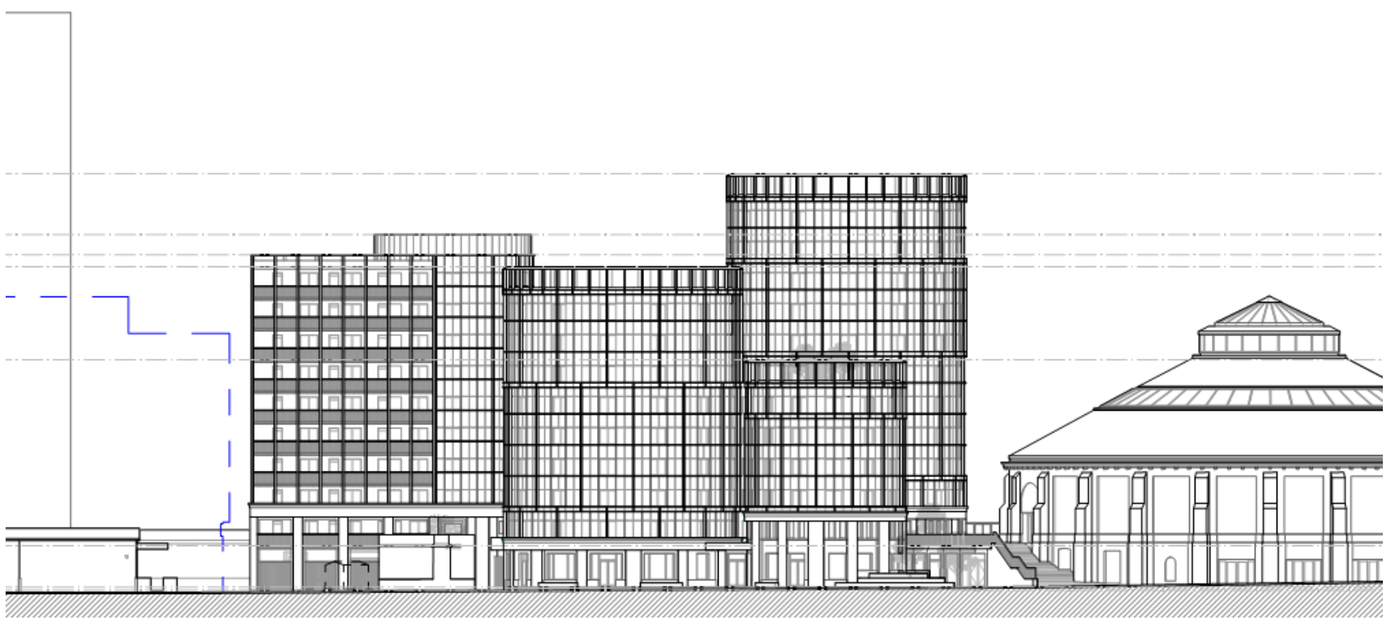
Developed for:
Regal Chalk Farm Limited

Fire Statement Report

100 Chalk Farm Road



London, NW1 8EH

Issue 02
2nd February 2024

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Fire Statement Report

100 Chalk Farm Road

Project Reference: AF3230
Developed for: Regal Chalk Farm Limited

Issue	Date	Description	Author	Checked	Approval
01	02.02.24	Initial issue for planning	AB	HMD	AB
02	11.06.24	Update following new plans	VDM	HMD	VDM

AB	Andy Ballantyne BArch MEng CEng MIFireE PMSFPE	Chartered Engineer
HMD	Harry McDaid BSc BSc(Hons) AIFireE MIEI	Director
VDM	Mois Daniel BEng MSc AIFireE	Associate Fire Engineer

The checker has provided an internal review of the technical content of the report.

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

THE LONDON PLAN 2021

Ashton Fire has been commissioned to provide fire safety consultancy services for a proposed student residential and affordable housing development at 100 Chalk Farm Road in the London Borough of Camden.

This Fire Statement report is provided both to fulfil the expectations of the London Plan 2021 [1] for a 'major development', as well as to support the client and design teams with developing their project information into detailed and technical design. The report includes completed Form 1 and Form 3 pro-forma as provided within the Greater London Authority document "London Plan Guidance – Fire Safety" (February 2022 version, draft for consultation) [2]. The remainder of the document provides more detailed information to substantiate the completed pro-forma and to assist the client with the further development of the scheme.

Further supporting fire strategy information as developed to date is also included within the main body and subsequent appendices of the report, offering technical content which may be of relevance to consultees during the planning process (such as the London Fire Brigade or Health and Safety Executive).

General information

Item	Description
Site address	100 and 100a Chalk Farm Road, London NW1 8EH
Description of development	Demolition of existing buildings and redevelopment of the site to provide two buildings containing purpose-built student accommodation with associated amenity and ancillary space (Sui Generis), affordable residential homes (Class C3), ground floor commercial space (Class E) together with public realm, access, servicing, and other associated works.
Name, qualifications and / or experience of lead author	Mr Andrew O.M. Ballantyne BArch MEng CEng MIFireE PMSFPE, on behalf of Ashton Fire Limited Andy is a Chartered Engineer registered with the Engineering Council by the Institute of Fire Engineers, being a Full Member of the Institute of Fire Engineers with Membership number 00056660. Andy graduated from the University of Edinburgh with the First Class Master's degree in Structural and Fire Safety Engineering. Prior to this, Andy also received a Batchelor's degree in Architectural Design from the University of Dundee. Following graduation, Andy has worked in fire safety engineering for circa 9 years, based primarily in the London area and undertaken numerous commercial, residential, and governmental projects of varying scale and complexity.
Gateway One	This development is also within the scope of Planning Gateway One, and a Gateway One Statement has been submitted alongside this report.
Declaration of Compliance	
The technical content produced for this planning application is considered to suitably comply with the relevant legislation and requirements of London Plan Policies D5(B5), D12A and D12B, subject to suitable development and implementation during the Building Regulations process, construction, and occupation.	

Form 1: Fire Statement – Policy D12A & D12B

Item	Description	Section:
The building's construction: methods, products, and materials used		
Structure	Non-combustible concrete structural frame	-
Internal walls	Generally, a combination of masonry or gypsum dry-lining walls. Internal wall lining classifications to be accordance with BS 9991 / BS 9999	4.1
External walls and attachments	External walls and specified attachments to be Class A1 or Class A2-s1, d0 materials to BS EN 13501-1 to meet Regulation 7(2) of the Building Regulations, excluding allowable exemptions set out in Regulation 7(3). External balconies and terraces are to also meet BS 8579.	6.1
Roof coverings	Roofing systems meeting either $B_{ROOF}(t4)$ to BS EN 13501-5, or green (inc. brown or sedum) roofs design in accordance with the GRO code.	6.2
Means of escape for all building users and the evacuation strategy		
Design basis	Means of escape from residential and ancillary areas based on BS 9991.	1.2
Evacuation regime	Two-stage zoned evacuation regime in the student residential building, with automatic evacuation of the zone upon double-knock or confirmation of fire. Commercial units each utilise a simultaneous evacuation strategy. Defend-in-place regime for the affordable housing block. Full evacuation of each block may also be initiated by the fire and rescue service if deemed necessary.	3.1
Escape from within apartments	Cluster flats are arranged based on the guidance within BS 9991, having protected internal corridors limited to 15 m in length in a single direction. Studios have limited travel distance to exits in accordance with BS 9991, alongside suitable measures for the incorporation of cooking facilities. Private apartments feature open-plan arrangements supported by BS 9991 and as extended based on further published research.	3.4 & 3.5
Escape through common areas	Internal protected common corridors serve all student residential apartments, supported by mechanical smoke control designed based on BS 9991. Two circulation cores serve the overall block, designed such at all residential floors have access to at least two common stairs. The affordable housing block features access by either a mechanically vented common corridor or external deck, leading to one of two common stairs.	3.6 & 3.7
Escape within non-residential areas	Means of escape based on limited travel distances and sufficiently sized exits in accordance with the recommendations of BS 9991.	3.8
Final exits	The firefighting stairs will each discharge directly to outside at Ground floor. Escape from the secondary stair would be available via either merging with the firefighting stair or by use of the main building entrance.	3.9
Evacuation lift	An evacuation lift is provided alongside a firefighting lift within each of the vertical circulation cores, to support dignified escape by disabled occupants. Final exit route available to outside via the protected stairs.	Form 3

Passive and active fire safety measures		
Structural fire resistance	Structural elements required to be fire-resisting will achieve a fire resistance rating of at least 120 minutes throughout the student residential building and 60 minutes within the affordable housing building.	5.2
Compartmentation and fire-resisting walls	Fire resistance ratings provided in accordance with BS 9991. Compartment walls and floors to have a fire resistance rating of each or better to the structural fire resistance rating of the block. Protected shafts to meet the same standard of fire resistances as compartment floors. Studios, clusters, apartments, and common corridors will be separated from one another by fire-resisting construction rated to at least 60 minutes.	5.3
Fire detection and alarm	Category L1 system to BS 5839-1 provided throughout the student residential building, offering early detection as well as a means of signalling the alarm to residents. The affordable housing block will feature Grade D1 Category LD1 detection and alarm in apartments to BS 5839-6, alongside Category L5 detection and alarm within the common parts to BS 5839-1.	3.2 & 3.3
Smoke control	Mechanical smoke venting from internal common corridors, alongside natural venting of external deck access routes based on BS 9991. An AOV at the head of each of the common stairs, with additional natural venting provided to lift lobbies. Mechanical smoke extract fans to meet BS EN 12101-3, AOVs to outside air to meet BS EN 12101-2, and vents to smoke shafts to meet BS EN 12101-8.	3.6 & 3.7
Automatic suppression	A Category 4 sprinkler system (including the design density in Footnote C) of Table 2 and water supplies for 60 minutes) to BS 9251 throughout the above-ground residential floors. Protection of amenity and ancillary areas at Basement and Ground floor to BS EN 12845.	5.1
Stand-by power	Stand-by power is currently expected to be via a diesel generator.	7.6
Access and facilities for the fire and rescue service		
Fire hydrants	An existing fire hydrant is available opposite the site adjacent to Chalk Farm Road, being located within 90 m of the proposed development.	7.2
Building access	External doors are provided to each building, offering street level access to the firefighting shafts and Ground floor ancillary areas.	7.4
Firefighting shafts	Two firefighting shafts are provided within the student residential building, with a single shaft provided within the affordable housing block. Each shaft will feature a firefighting stair, firefighting lobby, firefighting lift, dry rising main, evacuation lift, and emergency voice communication panels.	7.4
Firefighting lifts	One firefighting lift in each firefighting shaft in accordance with BS EN 81-72.	
Rising mains	A dry rising main in each firefighting shaft to BS 9990.	
Smoke control	As per means of escape provisions, which also support firefighting.	3.6 & 3.7
Car park venting	Not applicable	7.5
Basement venting	A mechanical basement smoke venting system is expected, supported by automatic suppression throughout the basement area.	

Site access for the fire and rescue service		
Access via public roads	Public highways provide the primary route of access to the development, with Chalk Farm Road being a generously sized road that would allow multiple appliances to access the development.	7.3
Internal road access	Internal routes across the landscaped area are provided between the hardstanding areas and Chalk Farm Road, to allow fire appliances to park closer to firefighting shaft entrances / dry riser inlets. These areas are less than 20 m from Chalk Farm Road, limiting the required fire appliance reversing to an acceptable distance.	
Hardstanding areas	Suitable appliance hardstanding areas are provided within the landscaped area of the site adjacent to the firefighting shaft entrances. These hardstanding positions are located within 18 m and clear sight of main building entrance, firefighting shaft entrances, the dry riser inlet, and the sprinkler tank inlet in accordance with BS 9991 / BS EN 12845 / BS 9990.	
Modifications to the development and the 'golden thread' of information		
During design and construction	Further development of the fire safety provisions within this Fire Statement are expected during the Building Regulations approvals process, including the selection of specific products, systems, or materials to fulfil the expectations of the Fire Statement. Modification to the fire safety provisions in this Fire Statement should not be incorporated unless agreed in writing by the appointed building control authority.	
Handover of information	The as-built fire safety strategy for the building, as agreed by the appointed building control authority, should be documented, and provided to the Accountable Person for the building as defined in the Building Safety Bill 2022, to meet the expectations of the Golden Thread of Information. This should include, but not limited to: • This Fire Statement report • The as-built fire safety strategy report and associated fire strategy drawings • Manufacturer's literature for fire safety products and equipment • Drawings indicating the installed locations of fire safety products and equipment	
Storage of information	It is recommended that the above information is provided to the Accountable Person in a digital format that may be retained using a cloud-based or other remote service, to reduce the potential for loss of information in the event of fire, flooding, theft, etc.	
Use of information	The Accountable Person and their appointed Building Safety Manager are expected to ensure that periodic maintenance of the fire safety equipment in the building is undertaken in accordance with the manufacturer's recommendations. The information provided within the Regulation 38 documentation may be used to assist maintenance professionals in identifying the systems, spare parts, operational procedures, maintenance procedures, etc. for the various systems present. The Regulation 38 documentation will also assist the Accountable Person and / or their appointed advisors in the preparation of a 'Safety Case Report', which is to demonstrate how risks are being identified, mitigated and managed on an ongoing basis.	
Future changes to the development	Any amendment to the fire safety provisions at the building will require consent from an appointed building control authority. The building owner should consult with a building control authority or fire safety professional prior to conducting any modification works, to ensure that these will meet any relevant fire safety legislation in force at that time.	

Form 3: Provision of evacuation lifts – Policy D5(B5)

Item	Description
Details of the evacuation lift and shaft	
Design standard	To meet BS EN 81-76 if / when published as a design standard, as well as being in accordance with Annex G.2 of BS 9999 (see also Section 3.10). To meet London Plan design guidance that evacuation lifts should be accessed via a lobby.
Location	Located within a protected shaft and accessed from a protected waiting space at each level. Occupants will be familiar with the location of the lifts where also being the day-to-day circulation route into and around the building.
Waiting areas	The lift waiting space is designed as a place of relative safety, included a level of smoke control equivalent to that typically expected for means of escape to a protected stair. Communication equipment meeting BS 5839-9 is to be provided at waiting spaces.
Capacity assessment	
Size of cars	Evacuation lifts are sized in accordance with the recommendations of Part M of the Building Regulations, as well as to facilitate day-to-day maximum lift traffic and furniture removals. This is considered sufficient for the transportation of typical wheelchair or other less mobile users, plus a lift operator. Should a resident present temporary or permanent additional escape requirements, such as being bed-bound or requiring medical equipment, a suitable evacuation plan via a PEEP should be developed in co-operation with building management for that specific individual.
Capacity of lifts	Specific guidance for undertaking capacity assessments for the evacuation of disabled occupants has not yet been developed / published. All lifts serving the residential levels of each building will be either an evacuation lift or a firefighting lift. This will meet the peak day-to-day capacity requirement and is considered as reasonably sufficient to support disabled users only in the event of a fire. An evacuation lifts are located within the main circulation core(s) of each tower, being the familiar access point to each level within travel distance limits for all occupants. As such, sufficient lift locations are provided to support the arrangements.
Evacuation strategy	
General philosophy	The student residential building will utilise a two-stage evacuation strategy, with only the floor of fire origin evacuating initially in the event of a fire. Other residents, including disabled residents, would remain within the building, where suitable fire-resisting construction and active fire safety measures support their safety during normal fire incidents. Similarly, for the affordable housing block, only the apartment of fire origin would be signalled to escape automatically. In the event of a large fire developing that causes concern, the full evacuation of the block may then be initiated by building management or the fire and rescue service.
Use of lifts	In the student residential building, management would use the evacuation lift to support disabled occupants escaping from the fire floor following the initial alarm activation. Upon confirmation of a fire, building management would seek to identify any disabled occupants at that floor, then assist them to vacate the floor utilising the evacuation lift.
Use of lifts (cont.)	Following clearance of the fire floor, management would be available to drive the evacuation lift to collect a disabled occupant of other floors where requested to do so via the Emergency Voice Communication system. The affordable housing block is not expected to feature 24/7/365 management. The method of evacuation lift operation in this block is to be confirmed by the time of lift purchase, with preference for system that would allow residential to use the lifts unassisted.
Operation	BS 9999 guidance recommends that evacuation lifts are driven by trained members of staff, requiring the presence of 24hr management within a residential building. This is expected to be available in the student residential block, but not in the affordable housing block. Development of standards for automatic and remote evacuation lift operation are occurring as part of the development in BS EN 81-76. Use of such protocols would be beneficial, allowing a resident to escape as soon as they wish without reliance on management, and without requiring management staff to place themselves at a heightened level of risk by attending an upper floor in the event of a fire. The method of evacuation lift operation is to be confirmed by the time of lift purchase, depending on the available technology and in accordance with best practice guidance. It is envisioned that this could be a driver-assistance system, though having additional capacity or futureproofing for an automatic or remote system if available. The proposed management regime shall also need to be aware and agree with the proposals.
Evacuation lift management plan	
Responsibility	The evacuation lift management plan must be developed by the building operator(s) as part of the wider fire safety management plan. This should include consideration of the organisation's fire safety policies and support tools, guidance provided by the manufacturer for operation of the evacuation lift, development of a general evacuation plan for unspecified occupants, a process for identifying and developing an evacuation plan for occupants with additional needs, and a plan for liaising with the fire service in an incident.
Roles	Where using a driver assisted system, the building management company should allocate suitable and sufficient staff such that in an emergency there would be an operator to take control of the lift, and a designated person to assist people at the floor being evacuated. For automatic / remote operation protocols, roles should be allocated in accordance with best practice guidance available at the time of lift purchase or subsequently issued.
Maintenance	Contingency is available through the presence of a firefighting lift adjacent to each evacuation lift that could also be used to support disabled evacuation prior to firefighting operations commencing. It is expected that sufficient time prior to firefighting would be available to evacuate disabled occupants from the fire floor using the firefighting lift should the evacuation lift be unavailable. This aligns with the two-stage evacuation philosophy that initially provides alarm at the fire floor / apartment of fire origin only. It is recommended that planned maintenance of the evacuation lift occurs during times when the building is less likely to be highly occupied, such as during normal working hours or university holidays (for the student building). Management are recommended to provide notification of planned or unplanned maintenance of evacuation lifts to disabled residents. In the event of residents having additional concerns, further contingency (such as evacuation chairs) could be considered.

CONTENTS

1. INTRODUCTION

1.1 General

1.1.1 Ashton Fire has been commissioned to provide fire safety consultancy services for the design of a new mixed student residential and affordable housing scheme at 100 Chalk Farm Road.

1.1.2 This report may be used to support detailed design development following planning, including development of any fire safety management procedures / plans necessary to meet responsibilities under the Regulatory Reform (Fire Safety) Order 2005 or other applicable fire safety legislation.

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

1.1.4 It should be noted that any alternative design solutions proposed within this report are subject to agreement and eventual approval by the relevant authorities having jurisdiction (AHJs), which for this project will be the building control body (BCB) and London Fire Brigade (local fire and rescue service).

1.2 Legislation and basis of design

1.2.1 Fire safety in buildings is governed by several pieces of legislation in the UK. The Building Regulations 2010, Schedule 1 Part B, Fire Safety applies to building design, whilst for fire safety management in buildings, compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO) is required. These are further supplemented by the Fire Safety Act 2021 and the Building Safety Act 2022.

1.2.2 This strategy has been developed to meet the level of fire safety expected under the Building Regulations 2010 (as amended), namely:

- B1 – Means of warning and escape
- B2 – Internal fire spread (linings)
- B3 – Internal fire spread (structure)
- B4 – External fire spread
- B5 – Access and facilities for the fire and rescue service
- Regulation 7 – Materials and workmanship

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

1.2.4 In general, the necessary level of life safety will be achieved utilising the guidance within BS 9991 [3] and documents referenced therein in the first instance, though also incorporating consideration of recent updates to Approved Document B including 2020 / 2022 amendments (ADB1) [4]. Fire engineering principles are employed to support alternative solutions where strict adherence to the codes would conflict with the wider aspirations for the scheme. Unless otherwise stated, it is expected that fire safety measures will be provided according to recommendations of BS 9991 as appropriate.

1.2.5 Departures from the guidance documents are identified and alternative proposals are documented for facilitating review by the project's approvers. In accordance with the fire safety engineering principles detailed in the PD 7974 [5] codes of practice, it is considered appropriate that all fire precautions are determined based on there being one seat of fire (i.e., accidental fires).

1.2.6 The strategy has been developed in cognisance of the Construction (Design and Management) Regulations 2015 (CDM 2015) [6], which sets out what designers are required to consider protecting anyone involved in the construction or ongoing use of a project. A summary of management and maintenance issues are provided in Section 8.

1.2.7 This strategy does not provide a comprehensive assessment of site fire safety during the building works or the phasing of these works, though a designer's review of construction site fire safety issues is recommended to be conducted during technical design. The Fire Protection Association [7] and the Health and Safety Executive (HSE) [8] issue guidance on identifying and managing fire precautions during the works, which should be consulted by the contractor or their specialist advisor when developing their construction fire safety plan.

1.3 Reference information

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

1.3.2 External references utilised in the generation of this report are summarised in Section 9.

Table 1 – Project documentation referenced

Description	Author	Reference	Rev
Basement Floor Plan	DSDHA Limited	356_P20.099	B
Ground Floor Plan		356_P20.100	C
Level 1 Floor Plan		356_P20.101	B
Level 2 – 3 Floor Plan		356_P20.102	B
Level 4 – 5 Floor Plan		356_P20.104	B
Level 6 Floor Plan		356_P20.106	B
Level 7 – 8 Floor Plan		356_P20.107	B
Level 9 Floor Plan		356_P20.109	B
Level 10 – 11 Floor Plan		356_P20.110	B
Level 12 Floor Plan		356_P20.112	B
Roof Plan		356_P20.113	B
Site Elevations		356_P30.104	A

2. PROJECT OVERVIEW

2.1 Building description

2.1.1 The development will consist of a Student Residential building featuring three 'drums' set over up to 13 storeys (B, G + 11), and a further Affordable Housing block set over 10 storeys (G + 9), as indicated in Figure 1 to Figure 6.

2.1.2 The uppermost occupied floor of the Student Residential building is circa 34.0 m above ground level, and the Affordable Housing building at circa 30.7 m above ground. As such, each block features multiple occupied storeys at greater than 18 m in height and the development is considered a 'Relevant Building' under Regulation 7(4) of the Building Regulations. The buildings also feature occupied storeys at greater than 11 m in height and should incorporate automatic suppression throughout the building following the principles of the May 2020 amendments to ADB.

2.1.3 The basement within the Student Residential building is located at circa 4.3 m below ground level.

2.1.4 Accommodation will be provided as per Table 2, primarily being residential accommodation at the upper floors and associated ancillary areas at Basement and Ground floors.

2.1.5 All areas of each building will be accessed by at least two common stairs, meeting the expected upcoming changes to guidance for residential buildings greater than 18 m in height. Each of the three firefighting stairs will terminate at Ground floor, with the basement area of the Student Accommodation block be served by the two secondary escape stairs.

2.1.6 The Student Accommodation building features up to 530 residents (conservatively assuming 2 persons per each of 265 rooms), with the Affordable Housing block estimated to accommodate up to 96 residents (assuming 4 persons per apartment each of 28 apartments). For means of escape when considering total evacuation of each building, the risk profile is taken as $C_{ii}1$ for the normal risk residential areas of the building in accordance with BS 9999 [9], supported by automatic suppression.

Table 2 – Development summary

Level	Student Residential			Affordable Housing
12	Roof plant			
10 – 11	13x studios			Roof plant, 1x flat
9	13x studios		Roof plant	3x apartments
7 – 8	13x studios		7x studios, 1x cluster	3x apartments
6	12x studios	External terrace	13x studios	3x apartments
4 – 5	12x studios	5x studios	7x studios, 1x cluster	3x apartments
2 – 3	12x studios	5x studios	7x studios, 1x cluster	2x apartments
1	11x studios	5x studios	7x studios, 1x cluster	2x apartments
Ground	Commercial, residential entrance, workspace, gym, bikes, plant			Plant, refuses, bikes
Basement	Commercial, refuse, plant			

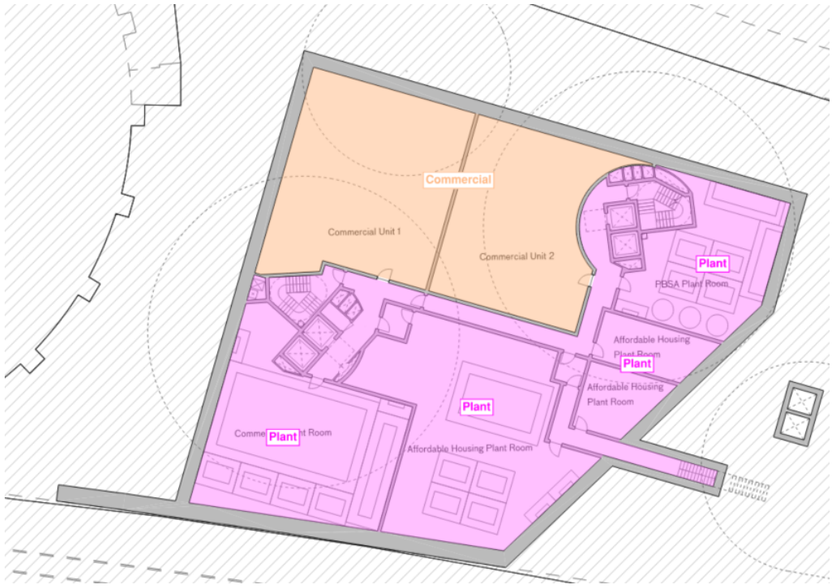

Figure 1 – Basement floor

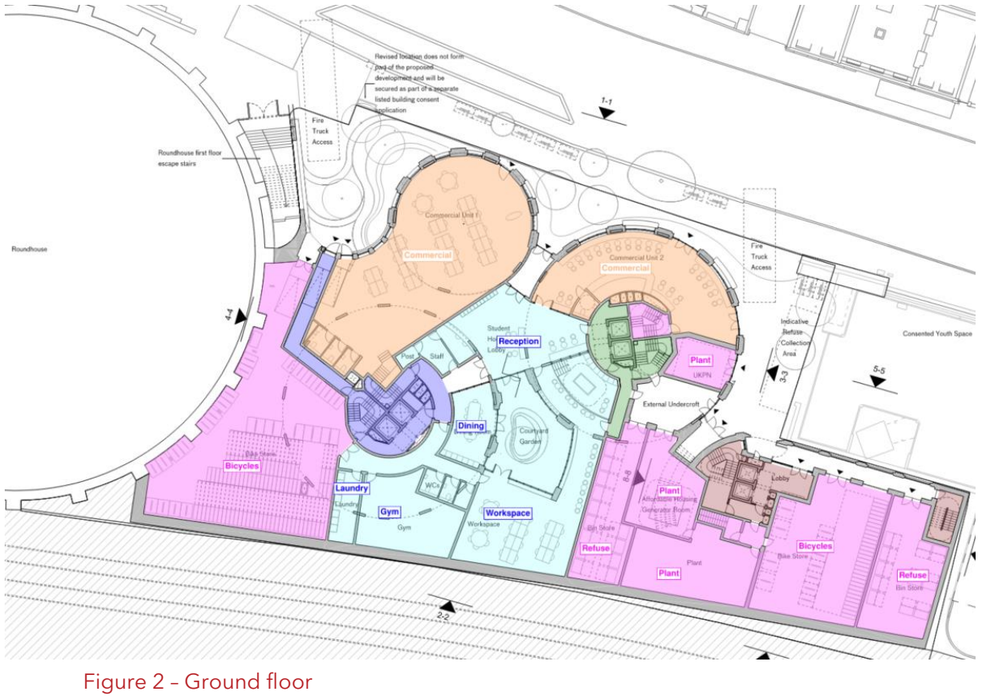

Figure 2 – Ground floor

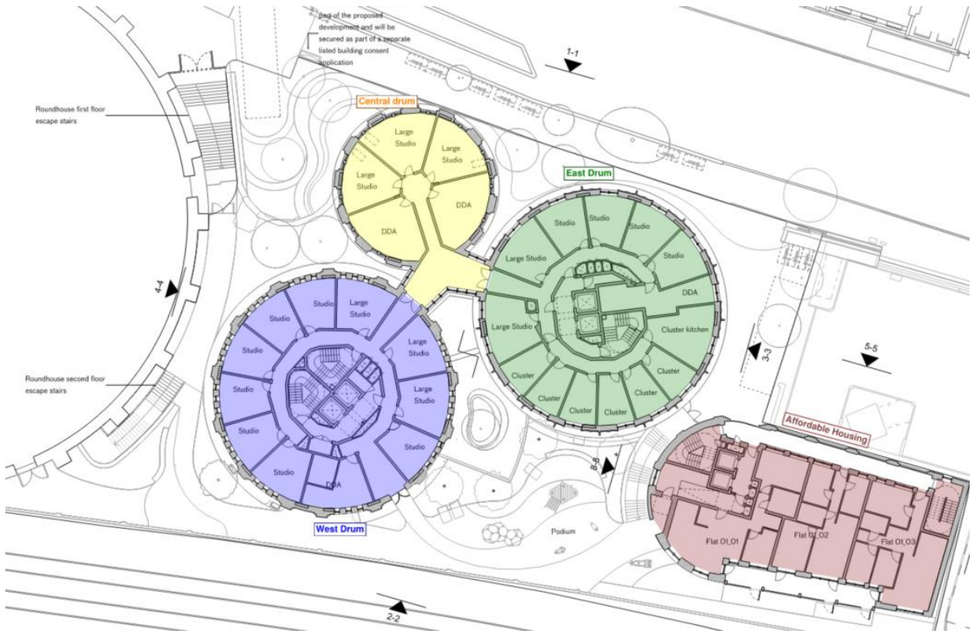

Figure 3 – First floor

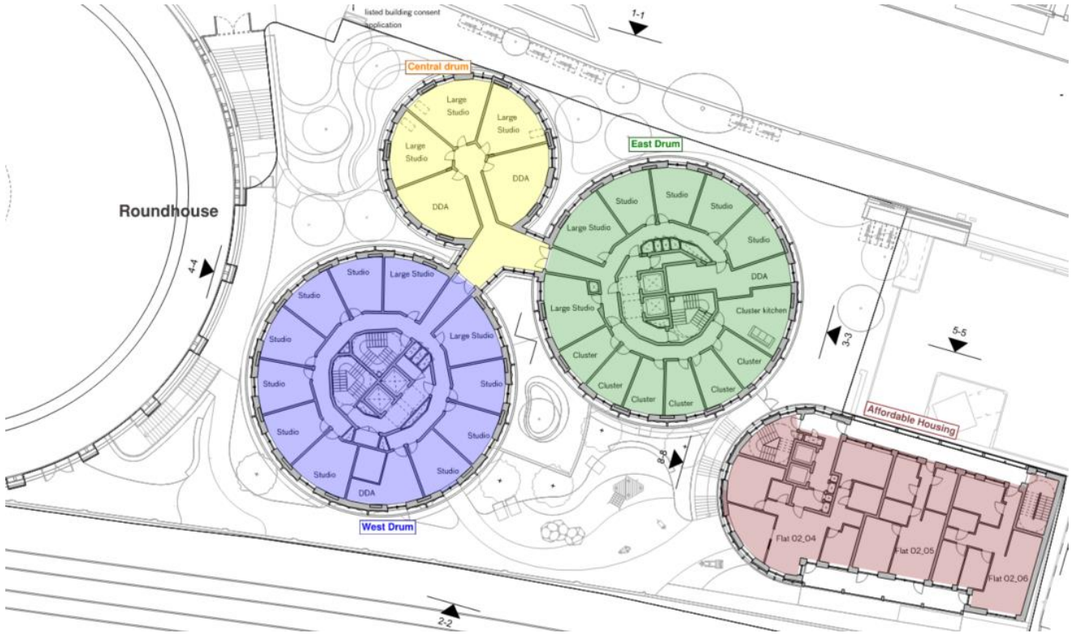

Figure 4 – Typical Second to Fifth floors

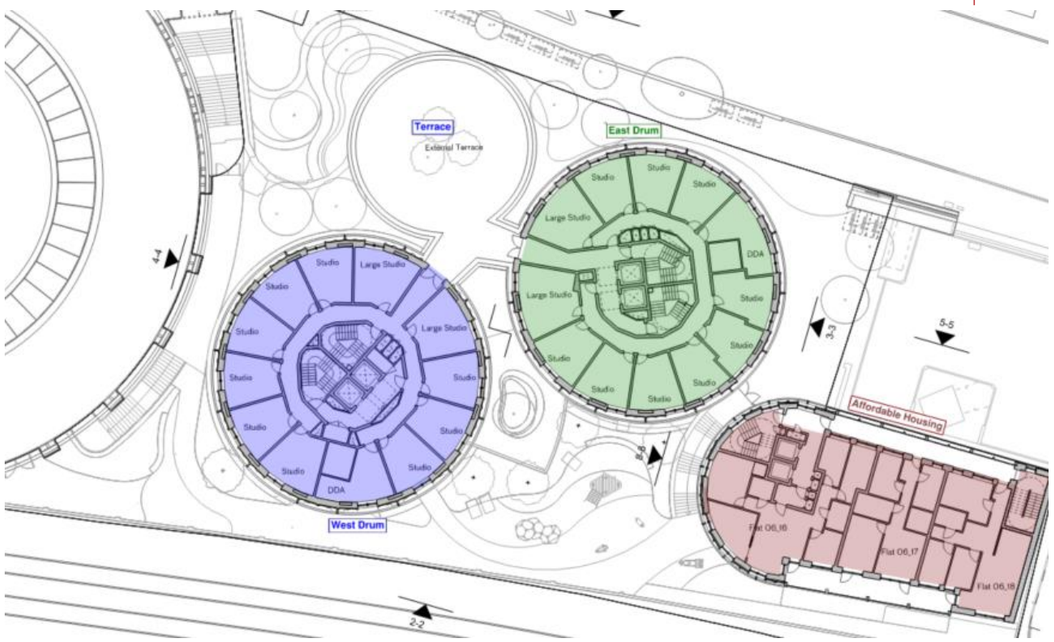

Figure 5 – Sixth floor

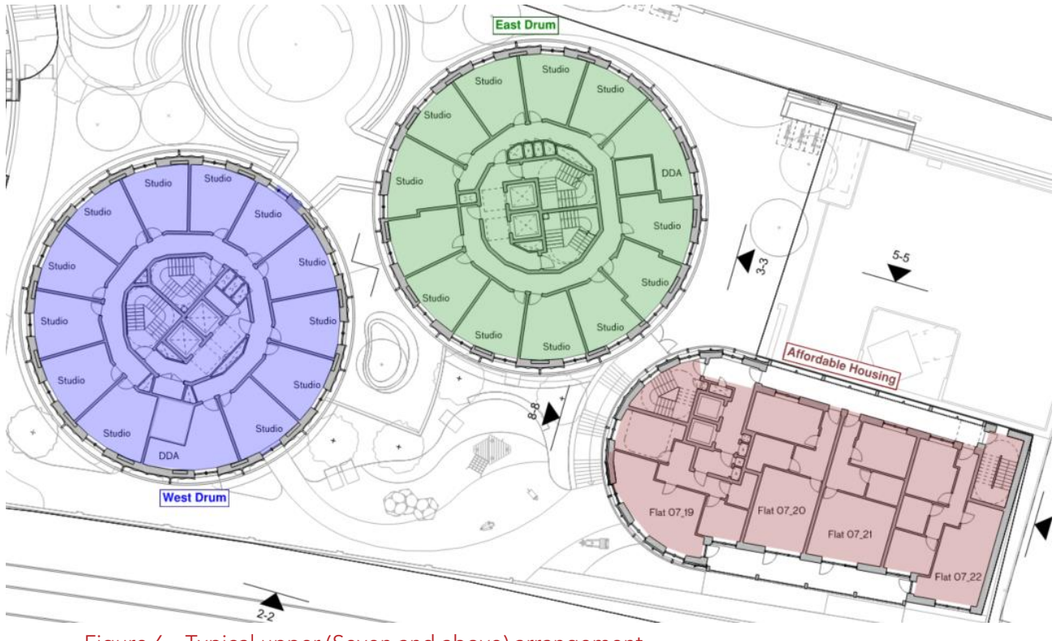

Figure 6 – Typical upper (Seven and above) arrangement

3. MEANS OF WARNING AND ESCAPE

Building Regulations requirement B1:

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

3.1 Evacuation philosophy

3.1.1 The Student Residential building will utilise a two-stage evacuation strategy. In the event of a confirmed fire at an above-ground floor, the alarm would be sounded throughout floor of the affected zone, as indicated on Figure 7. Zone C is to also be signalled to evacuate in the event of a fire in Zone A or B. This is considered appropriate for design to BS 9991 (which is based on a defend-in-place strategy), while offering a greater level of conservatism for occupants at the fire floor.

3.1.2 In the event of a fire that spreads beyond the area of fire origin, partial or total evacuation of the development may be initiated by the fire service using controls at the fire alarm (or repeater) panel.

3.1.3 The amenity / ancillary areas of the Student Residential building at Basement and Ground floors will be a single zone for evacuation. Immediate evacuation would be enacted throughout these Basement and Ground floor areas upon confirmation of a fire anywhere within in this area.

3.1.4 The commercial units may be operated as a stand-alone demise under separate management. Simultaneous evacuation would occur from a unit in the event of a fire occurring within that unit.

3.1.5 The Affordable Housing building will utilise a defend-in-place evacuation regime. In the event of an apartment fire, only the unit of fire origin will receive a signal to evacuate. No other flats will receive an automatic alert notification, though should residents become aware of a fire in another flat they may leave the building if they wish to do so.

3.1.6 If fire were to spread beyond the apartment of fire origin, evacuation of the Affordable Housing building may be initiated by the London Fire Brigade supported by an evacuation alert system.

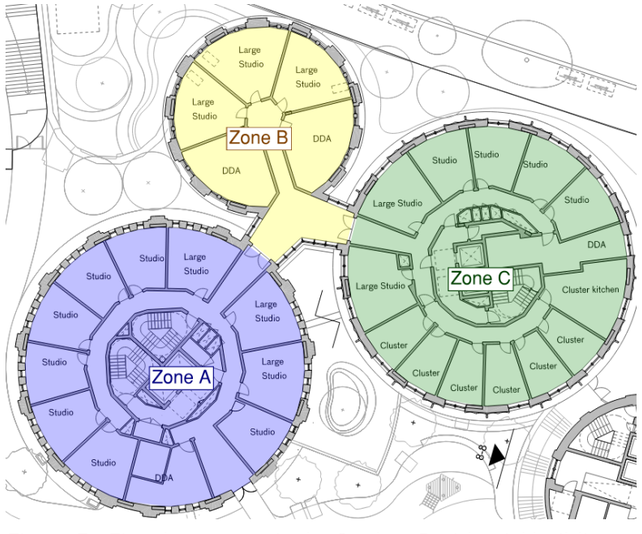

Figure 7 – Fire alarm zones in the Student Residential building

3.2 Means of detection and alarm (Student Residential)

3.2.1 The student residential building should be fitted with a fully addressable automatic fire detection system to meet Category L1 in BS 5839-1 [10]. This will include detection and alarm through all student cluster apartments, studios, circulation areas, amenity, and ancillary areas.

3.2.2 Manual call points will be provided at all storey and final exits, and such that all areas of the building are within 45 m of the nearest manual call point. Manual call points are to be provided with transparent hinged cover, to reduce the instances of casual or malicious operation.

3.2.3 The detection and alarm system should be a double-knock system, supported by 24/7 management, to reduce disruption associated with false alarms. It is recommended that:

- Upon activation of a single smoke detector head, only sounders within the studio, cluster, or ancillary room of fire origin will activate initially. An alert would be provided to building management, commencing a 5-minute investigation period.
- In the event of the investigating member of management confirming a fire, they may activate the fire alarm through use of a manual call-point within the fire zone. Should a false alarm be confirmed during the investigation, the alarm system may be reset at the fire alarm panel prior to timeout of the investigation period.
- Automatic activation of the alarm throughout the alarm zone would occur upon either activation of a second smoke detector head, activation of heat detector or a sprinkler head at any time, activation of a manual call point, or time-out of the first-knock investigation period.

3.2.4 In the event of detection of a fire at within an additional alarm zone following initial alarm activation, the alarm should also sound immediately throughout that alarm zone. The smoke control systems in each of Zone A & B should continue to operate at the floor of first fire detection (of that zone) only.

3.2.5 The BS 5839-1 system will feature heat detection at kitchen areas, mechanical plant rooms, and refuse stores, with smoke detection to be provided elsewhere in the building. Sufficient in-built sounders are to be provided for detector heads to meet the required sound pressure levels.

3.2.6 External sounders / visual beacons should be provided to the external terrace at Level 06, which should also activate alongside either of Zone A or B at that level.

3.2.7 Visual beacons should be provided in rooms covered by the BS 5839-1 system where the background sound level could be louder than an audible fire alarm (e.g., in plant rooms).

3.2.8 The fire alarm panel should be provided at the main building reception and is to have functionality to allow manual activation of alarm throughout the entirety of the building by management or the fire and rescue service. Repeater panels should be provided at the entrance to each the two firefighting shafts at Ground floor.

3.3 Means of detection and alarm (Affordable Housing)

3.3.1 Apartments are to be fitted with an automatic fire detection system to meet Grade D1 Category LD1 in BS 5839-6 [11], in support of the open-plan arrangements detailed in Section 3.5. This will include heat detection in the kitchen area, and smoke detection throughout living areas, corridors, and bedrooms.

3.3.2 Suitable means of warning are to be provided to private balconies where these are accessed directly via the kitchen / living areas only. Where balconies have a clear view of the internal space from all areas of the balcony, it would be considered that external alarms or beacons would not be necessary to avoid creating public nuisance during false alarms.

3.3.3 The common, amenity, and ancillary areas will be provided with a Category L5 detection and alarm system in accordance with BS 5839-1. The BS 5839-1 system is to be fully addressable, allowing early identification and investigation of an activated detector head.

3.3.4 The Category L5 detection and alarm system is to be provided as follows:

- Smoke detection will be provided in the residential lift lobbies and internal common corridors to activate the associated smoke ventilation equipment (see Section 3.7). Alarm sounders and manual call points need not be provided in common residential lobbies and corridors.
- The ancillary areas at Ground floor will feature detection and alarm, with sounders to activate throughout the Ground floor ancillary area immediately upon activation of any one detector head.
- Visual beacons should be provided in rooms where the background sound level could be louder than an audible fire alarm (e.g., in plant rooms).
- Smoke detection will be provided generally in the non-residential and ancillary areas, though heat detection should be provided in any mechanical plant rooms.

3.3.5 The fire alarm panel for the BS 5839-1 system is recommended to be located within the main entrance lobby to the Affordable Housing block.

3.3.6 It is recommended that the residential sprinkler system is either interfaced with the common area fire alarm panel or have a separate sprinkler alarm panel in the residential lobby area, to provide warning to management staff in the event of a sprinkler activation. A single sprinkler flow switch may be provided to each residential floor, where the Category LD1 detection and alarm in apartments would allow the location of the sprinkler activation to be identified via alarm in the apartment of fire origin.

3.3.7 An evacuation alert system to BS 8629 is to be provided throughout the development in accordance with revised expectations of ADB1 where being greater than 18 m to the uppermost floor.

3.4 Escape from within studio and cluster apartments (Student Residential)

3.4.1 Automatic suppression is required due to the height of the building (see Section 5.1). As such, automatic suppression will also be used in support of the studio and cluster flat arrangements. These will also have Category L1 detection and alarm to BS 5839-1 as detailed in Section 3.2.

3.4.2 Studio apartments are to meet the recommendations of Section 9.4.2 of BS 9991, as illustrated in Figure 8. This is to include:

- The total travel distance within the studio does not exceed 20 m to the nearest exit.
- Cooking facilities are to be situated away from the flat entrance door(s) and internal escape routes. It is recommended that a distance of at least 1.8 m be provided between the cooking appliance at escape route, with the escape route then having a clear width of 900 mm in accessible studios and 500 mm in non-accessible studios. Narrower escape routes will be subject to discussions with the authorities having jurisdiction regarding suitable measures to mitigate fire risk during cooking.

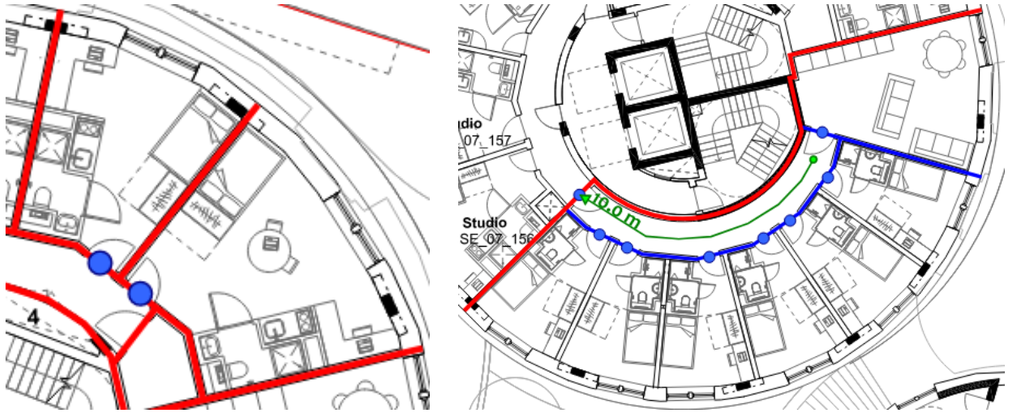

Figure 8 – Example studio (left) and cluster (right) arrangements

3.4.3 Cluster flats are typically arranged as indicated in Figure 8, to meet the guidance in Section 9.8 in BS 9991. This is to include:

- Cluster flats are to be separated from each other and the common areas of the building by construction having a fire-resistance rating of at least 60 minutes.
- Cluster flats are to be provided with protected entrance halls enclosed by construction having a fire-resistance rating of at least 30 minutes, with self-closing FD30S fire doors to each room accessed from the hallway.
- Single direction of travel distances in protected entrance halls are to be a maximum of 15 m, based on sprinkler system.
- Living / kitchen rooms are to be located remotely from the exit of the protected entrance hall in clusters having a single exit. These should also be separated from bedroom accommodation by construction having a fire-resisting rating of at least 30 minutes.

3.5 Means of escape from residential apartments (Affordable Housing)

3.5.1 The apartments are each designed and specified in accordance with the recommendations of Section 9.7 in BS 9991 for open-plan apartments. To meet these expectations, based on the findings of the NF19 [12] study for NHBC, open-plan apartments are to meet the following guidance:

- Apartments are to be set over a single level only.
- The area of the flat is not to exceed 192 m^2 (i.e., 16 m x 12 m). Kitchens in apartments exceeding 32 m^2 (i.e., 8 m x 4 m) should be enclosed. The ceilings will have a minimum height of 2.25 m.
- Automatic suppression is to be provided throughout the apartments in accordance with BS 9251.
- A Grade D1 Category LD1 system is to be provided to meet BS 5839-6.
- Adequate separation is to be provided between escape routes and cooking equipment.

3.5.2 To support the used of open-kitchen arrangements in larger apartments, further research by BRE (who undertook the initial NF19 study) was commissioned by Trenton Fire and publicly disseminated [13]. This research concluded that open-plan kitchens may be utilised within the maximum sized apartments considered in the study (three bedrooms, 192 m^2), while also further justifying the use of concealed sprinkler heads in open-plan apartments.

3.5.3 The revised specification is utilised for the design of all open-plan residential apartments, as follows:

- Apartments are to be set over a single level.

- The area of each apartment will not exceed 192 m^2 (i.e., 16 m x 12 m), which may include open kitchens. Ceilings within the apartments will have a minimum height of 2.25 m.
- Automatic suppression will be provided throughout the apartments in accordance with BS 9251 (see Section 5.1), and this may utilise concealed sprinkler heads.
- A Grade D1 Category LD1 system will be provided in apartments to meet BS 5839-6.
- Adequate separation is to be provided between escape routes and cooking equipment, generally recommended to be a minimum of 1.8 m clear to a 0.75 m wide channel for occupants.

3.5.4 Escape from the private balconies will typically be via the open-plan living area, prior to reaching the apartment entrance. In accordance with Section D.3 of BS 9991, cooking appliances are to be positioned such that these do not prejudice the escape routes from external balconies (with separation distances as recommended in Section 3.5.3).

3.5.5 A flat within the Affordable Housing is located on Level 10 and is accessible from Level 09 via an internal staircase. The internal staircase does not serve any accommodation at Level 09. The flat will be designed in line with recommendations noted in Section 9.4.3 of BS 9991. The total travel distance from any point of the flat to the head of the stair is limited to 20 m and the flat will incorporate a sprinkler system and an LD1 fire detection and fire alarm system in accordance with BS 5839-6:2013 are installed. Cooking facilities should be sited away from the flat entrance door and the internal escape route,

3.6 Means of escape through common residential areas (Student Accommodation)

3.6.1 In support of the height of the building and use of a two-stage evacuation strategy, each above ground residential floor is provided with at least two stairs, including at least one primary firefighting stair and a secondary escape stair.

3.6.2 It is considered that due to the long pre-movement times in sleeping accommodation, the two-stage evacuation regime, and the likelihood of firefighting operations within the firefighting stair making this unavailable for escape, sizing of the stairs is to ensure that a simultaneous evacuation may be facilitated using each stair individually.

3.6.3 When considering the full evacuation of the building, a minimum stair width of either 1,000 mm or in accordance with factors set out in supplementary guidance from Table 13 of BS 9999, whichever is greater, is required. For each 10+ storey building with a $C_{ii}1$ risk profile, a stair width of 1.5 mm/person is recommended. As such, a single 1,000 mm stair would be sufficient for up to 666 people and considered sufficient for the entirety of the maximum assumed occupancy of 530 people.

3.6.4 Each firefighting stair is to have a minimum clear width of 1,100 mm, being sufficient for evacuation of the entirety of the building where exceeding the minimum width of 1,000 mm required for escape.

3.6.5 The width of the stair should be kept clear for a vertical distance of 2.0 m. Where handrails and strings intrude 100 mm or less, these can be discounted when assessing the clear width of the escape stair.

3.6.6 At Level 7 and above, the building into two separate drums of accommodation as indicated in Figure 9. Each drum will feature a common corridor area with mechanical smoke venting in a two-shaft / push-pull arrangement and travel distances limited to no greater than 15 m in accordance with Figure 6(b) in BS 9991 where supported by automatic suppression. The corridor will lead to either the primary exit to the lift lobby and firefighting stair, or to an alternative exit to the secondary escape stair (for use should the primary stair be unavailable, such as during firefighting operations).

3.6.7 Two stairs should not be accessible from the same lobby. As such, primary stair should be separated from secondary stair by solid construction within the lobby.

3.6.8 Level 6 features an external terrace area which connects the two drums. The secondary stair within the eastern drum will be terminated at Level 6 and will transfer over to the west drum, as indicated in Figure 10. To support this escape route in remaining diverse from the primary exit route during a fire but open in support of day-to-day use of the building, a fire-and-smoke curtain rated to 120 minutes will be provided (see Section 5.4). The proposed arrangement does not align with prescriptive guidance recommendations and will be subject to approval from relevant stakeholders. It is recommended that that escape from terrace is directly into the staircase of West Drum and the corridor serving accommodation is separated from the escape from the terrace. This can be mitigated through signage and wayfinding.

3.6.9 Escape from central drum (Zone C in Figure 7) is by a dead-end corridor limited to less than 9 m in length before reaching a point of choice, based on Figure 7(c) in BS 9991. Further support for this arrangement will be provided through inclusion of at least 1.5 m^2 of automatic venting via the building façade in these corridors as indicated in Figure 11.

3.6.10 Smoke control is to be provided to support the common corridor arrangements and protect the common stairs from smoke ingress. Furthermore, the smoke control arrangement is to offer protection to each of the lift lobbies in a manner equivalent to as would be expected for a protected stair for means of escape, where these will feature waiting spaces for the evacuation lifts (see Section 3.10). The smoke ingress protection should be provided across all levels, including basement level for residential staircases and firefighting/ evacuation lifts.

3.6.11 The lobby providing access to evacuation lifts should not provide direct access to any flats, ancillary areas, or other area posing a fire risk.

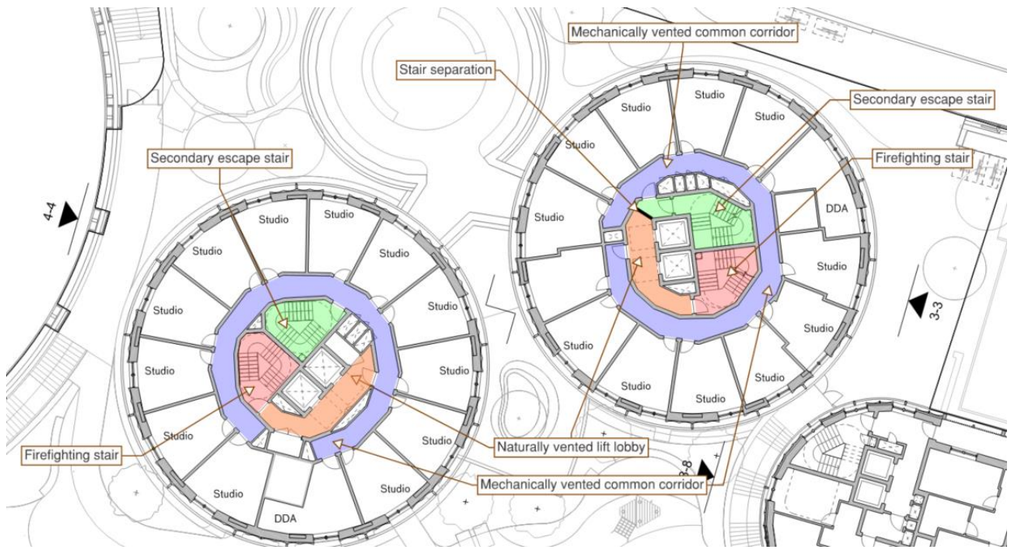

Figure 9 – Means of escape arrangement at upper floors

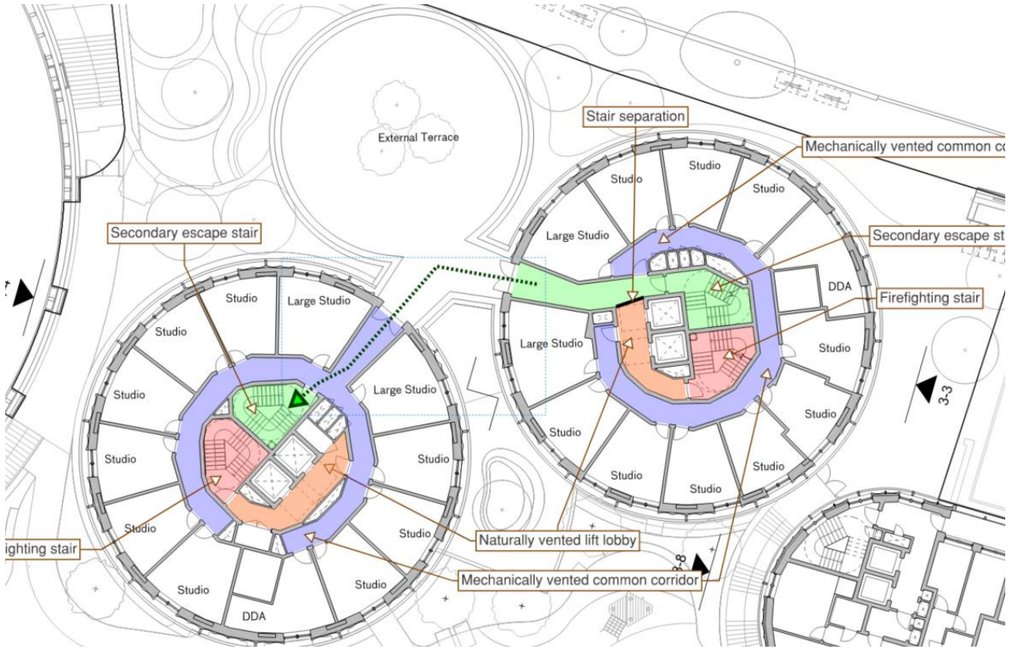

Figure 10 – Means of escape arrangement at Level 6

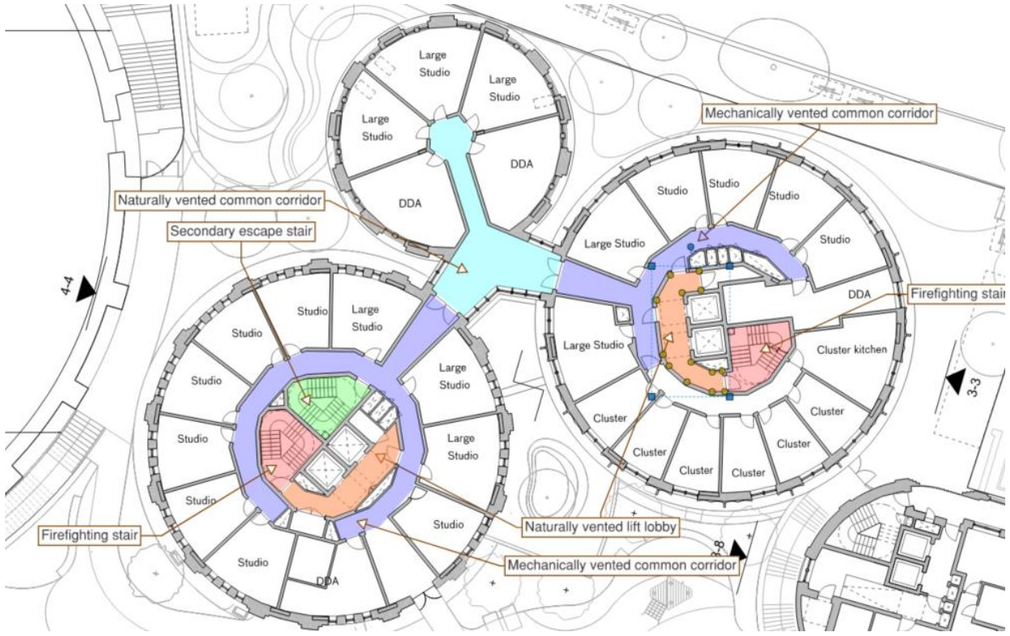

Figure 11 – Means of escape arrangement at lower floors

3.6.12 To support smoke venting, two mechanical extract shafts having a cross sectional area of at least 0.6 m^2 are provided in common corridors, with natural inlet shafts of at least 1.0 m^2 provided in lift lobbies.

3.6.13 Detailed design of the smoke control system is to occur following planning, which is expected to require computational fluid dynamics (CFD) modelling of mechanical smoke extract systems.

3.7 Means of escape through common residential areas (Affordable Housing)

3.7.1 As illustrated in Figure 12, residential floors are arranged to feature:

- Two common stairs, being one firefighting stair and one secondary means of escape stair.
- Common lift lobby featuring an evacuation and a firefighting lift.
- Protected lift lobbies, with doors separating the lift lobby and common corridors having an equivalent level of smoke protection as typically expected for a common stair in BS 9991.
- Access to apartments either via a mechanically ventilated internal common corridor or via an external common deck. The external common deck also provides access to the secondary stair.

3.7.2 Suppression will be provided in all apartments (see Section 5.1), also supporting the common corridor and smoke control arrangements in each of the buildings.

3.7.3 The internal common corridor arrangement has been developed based on the recommendations of Section 7.4, Figure 6(b), and / or Annex A in BS 9991. Further measures are included to support the inclusion of an evacuation lift lobby at each level.

3.7.4 The internal common corridors will feature mechanical smoke venting based on recommendations of BS 9991 and the Smoke Control Association (SCA) document "Guidance on Smoke Control to Common Escape Routes in Apartment Buildings (flats and maisonettes)" [14] as relevant, alongside PD 7974-5 [15] and PD 7974-6 [16]. Travel distances within these common corridors will not exceed the maximum distance of 15 m recommended within BS 9991.

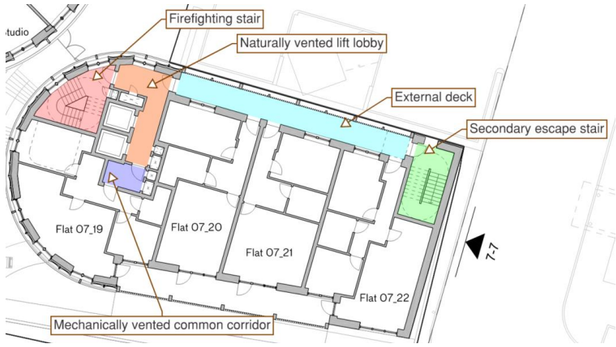

Figure 12 – Typical means of escape arrangement within the Affordable Housing block

3.7.5 With mechanical smoke extract employed in the internal common corridors, these should be provided in accordance with the outcome of a Computation Fluid Dynamics (CFD) assessment to be undertake during detailed design. The mechanical smoke control system should feature:

- Smoke extract fans in accordance with BS EN 12101-3 [17].
- Vents between corridors / lobbies and shafts in accordance with BS EN 12101-8 [18].
- An AOV at the head of the firefighting stair meeting BS EN 12101-2 [19].

3.7.6 Lift lobbies will each be provided with a natural vent of at least 1.0 m^2 via an AOV on the building façade in accordance with BS EN 12101-2. This will assist with the provision of inlet air or venting to the lift lobby area, supporting the mechanical smoke extract system in protected of the lift area from smoke ingress.

3.7.7 The design of the external deck access area is based on the expectations of Section 7.3 and Figure 5(b) in BS 9991 for balconies with escape in a single direction, where also considering escape to the evacuation lift lobby for disabled users. The following measures are incorporated in the design:

- The structure and floor of balconies should achieve a fire resistance rating of at least 30 minutes.
- The walking surface and balustrade should be imperforate.
- Walls and soffits adjacent to balconies should meet Class A2-s1,d0 or better to BS 13501-1 [20].
- Balconies should typically be no greater than 2 m wide, such that down stands would not be deemed necessary to prevent the lateral flow of smoke.
- The balcony is to be adjoined to the external wall at all locations, avoiding the potential for fire or smoke spread between the balcony and the building.
- The face of the building is to have a fire resistance rating of at least 30 minutes to a height of at least 1,100 mm. Doors opening onto the external decks are to be FD30 self-closing fire doors.
- The length of the balconies are limited such that the internal area of all apartments meet the maximum permitted distances for hose laying as set out in Section 7.4.

3.7.8 Fire-resisting construction will be provided between the secondary escape stair and the common access deck at each level, to meet the expectations of Figure 5(b) in BS 9991. The escape stair is to feature a remotely operable vent of at least 1.0 m^2 to BS EN 12101-2 at the head of the stair, with control for firefighting use to be provided at Ground floor and the uppermost landing of the stair.

3.8 Means of escape from ancillary and non-residential areas

3.8.1 A common external terrace will be provided at Level 6, having diverse exits via back into each of the main circulation cores and protected escape routes. It is considered that with the terrace area being external and the escape routes being via different towers, panic is sufficiently unlikely to ensure that full capacity of doors that open opposed to the direction of escape may be included. As such, for exit routes having a clear width of 850 mm would be considered as sufficient to support a maximum occupancy of 110 people on the terrace area.

3.8.2 The external terrace at Level 1 features two diverse external stairs leading toward Chalk Farm Road. These stairs are also required to support onward escape from the Roundhouse in the event of evacuation of this building, where having egress rights for two exits at the rear of the site that will discharge onto the Level 1 terrace as indicated in Figure 13.

3.8.3 Consideration of escape from the Roundhouse across the podium area is included in Appendix A.

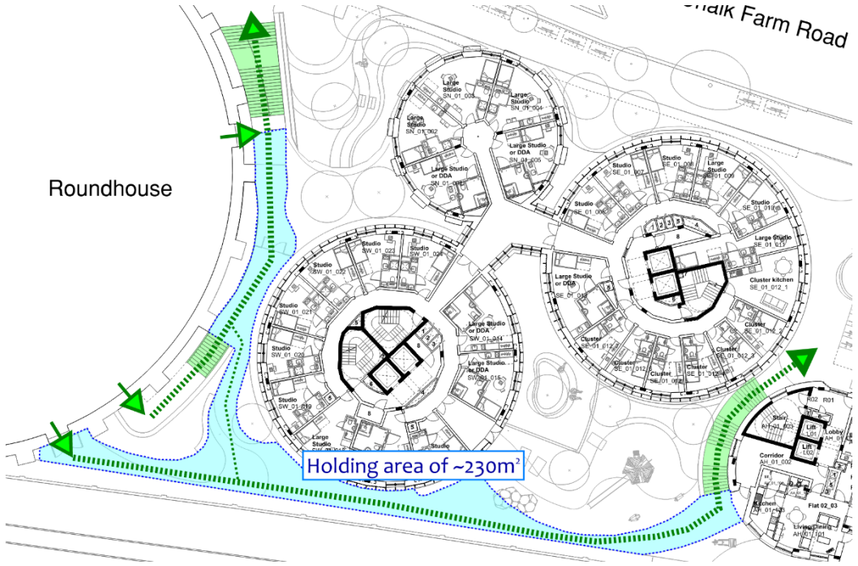

Figure 13 – Escape from the Roundhouse across the external terrace at First floor

3.8.4 Escape from the internal ancillary areas of each block at Ground and Basement floors should be in accordance with the recommendations for travel distance limits provided in Table 14 of BS 9991, summarised as follows:

- Higher-risk plant rooms and bin stores: Up to 9 m in a single direction to the room exit, 18 m where available in multiple directions.
- Other areas: Up to 18 m where in a single direction, and up to 45 m where escape is available in multiple directions.

3.8.5 The student amenity areas at Ground floor have diverse exits via either the main entrance, rear exit from the workspace, exit through the bicycle store, or exits via each of the firefighting stairs. These exits are arranged around the floor such that all travel distances are suitably limited and would offer ample escape capacity for occupants located within the gym and workspaces at Ground floor.

3.8.6 The commercial units each feature multiple exits to outside at Ground floor, supporting the escape travel distances and expected capacities of the units.

3.8.7 At basement level escape from commercial units is afforded via ancillary areas. Dedicated stairs are provided which discharge at Ground Floor.

3.8.8 The basement area will feature diverse escape route via stairs at each of the circulation cores beneath the east and west drums. At Ground floor, the basement stairs would into the commercial units.

3.8.9 A third staircase provides access from the Affordable Housing. To protect the residential staircase serving the upper floors, the stair serving the basement is to be separated from the rest of the block by a mechanical ventilated lobby which should afford the residential staircase/ lift same level of protection as per the upper floors.

3.8.10 Interaction between the commercial areas and residential means of escape is subject to approval from relevant stakeholders as prescriptive guidance does not support such arrangements.

3.8.11 The ancillary areas within the Affordable Housing block feature multiple directions of escape from the larger plant / bicycle store areas and limited single direction of travel distances from the refuse store and smaller plant rooms, meeting the expectations of BS 9991.

3.8.12 As each of the buildings feature multiple common stairs, ancillary areas are permitted to be accessed via lobbies that also connect to protected stairs. A 0.4 m^2 permanent vent will be provided to the lobby in the Affordable Housing building, where this connects the stair escape route to potentially higher-risk areas such as plant rooms and bicycle stores (if featuring e-bike storage and / or charging).

3.8.13 The lobby providing access to refuse stores at Basement level is to have 0.2 m^2 of permanent ventilation in accordance with the expectations of Section 47(c) in BS 9991.

3.9 Final exits and onward escape

3.9.1 The firefighting stairs are each provided with escape to outside at Ground floor, being the base of the stair where this does not continue onward to serve basement level. Escape will be either directly to outside or will be via a protected passageway with no internal connections.

3.9.2 The evacuation lifts discharge into protected lobbies at Ground floor, having either direct egress to outside or onward protected egress via the firefighting stair final exit.

3.9.3 The discharge of the protected stair within the West Drum does not discharge directly to outside. The proposal include alternative routes once occupants are outside the staircase either via the reception or via the firefighting shaft. This proposal is subject to agreement with relevant stakeholders.

3.9.4 The final exit to outside should be afforded the same level of protection as the staircase/ evacuation lifts on the upper floors in accordance with Section 34 of BS 9991.

3.9.5 Travel beyond the final exits of the building and toward a place of ultimate safety should not be jeopardised by unprotected openings. This is achieved by the provision of fire-resisting construction up to the point at which exit paths leading away from the building are available in multiple directions.

3.9.6 An assembly area is to be designated by the operator of the student residential building and indicated on the 'Action in the Event of Fire' notices. Assembly areas are to be located at a safe distance from the building and clear of firefighting access routes. It would be suggested that an adjacent external area such as the consented youth space could be used as an assembly area, is indicated in Figure 18.

3.10 Means of escape for disabled persons

3.10.1 In accordance with the expectations of the London Plan, and to support the self-evacuation of disabled residents or guests from the upper levels of the building, at least one evacuation lift is to be provided at each circulation core within the building.

3.10.2 The evacuation lifts are to be provided in accordance with BS EN 81-20 [21], and BS EN 81-70 [22] as relevant. Guidance within BS EN 81-76 [23] should also be incorporated should this be released during the design period. The cars should be at least Type 2 under BS EN 81-70 to support the evacuation of persons with disabilities. It is recommended that the lifts are operable using either an automatic procedure meeting Section 5.4.3.2 of BS EN 81-76, or where driven by a trained member of management staff.

3.10.3 Firefighting lifts will also be provided at the development, as discussed in Section 7.4. These may be required to support firefighting operations within the building and as such, cannot be relied upon to disabled evacuation. However, suitable controls to allow use as an evacuation lift are recommended to be provided within the firefighting lifts such that these could be utilised to support disabled egress until such time that a lift is required for use by firefighters.

3.10.4 Refuge points for disabled occupants are to be provided at all above-ground levels. These will be located within the lift lobby area and provided with an emergency voice communication panel in accordance with BS 5839-9 [24] which will comprise a type B outstation which communicates with a master station (typically located next to the fire alarm panel).

3.10.5 Smoke control is to be provided at each floor, arranged to offer a similar level of protection to the evacuation lift refuge areas as would also be expected within a protected stair.

3.10.6 Management and maintenance staff should consider whether they could adequately escape from the building in the event of a fire. For any member of staff having restricted mobility, it is recommended that a Personal Emergency Evacuation Plan (PEEP) is developed and practised in support of their employment at the site. Further information can be found in BS 8300-2 [25] and the DCLG Publication "Fire Safety Risk Assessment Supplementary Guide – Means of Escape for Disabled People" [26].

3.11 Fire and escape doors

3.11.1 All doors on escape routes in common areas will either not be provided with a securing device or be provided with a securing device that is easily openable without the use of a key and without having to manipulate more than one mechanism.

3.11.2 Doors on escape routes will generally be hung to open in the direction of exit (apart from certain instances where the doors will serve less than 60 people), will open not less than 90° and have a swing which is clear of any change in level, other than a threshold or single step on the line of a doorway.

3.11.3 Any fire doors fitted with hold-open devices should release on:

- actuation of the fire alarm system or local smoke detector head,
- manual operation or operation of a switch fitted in a suitable position, if necessary, or
- failure of the electricity supplies.

3.11.4 Doors fitted with an electronic latch (e.g., operated by a swipe card reader) on the un-secure side (e.g., leading to plant areas, etc.) should have door latches operated by a handle on the secure side (so people inside the room will always be able to get out).

3.11.5 Doors opening onto stairways or corridors will be sited not to encroach on the effective width of any stairway, landing, or corridor.

3.11.6 Vision panels will be provided in doors that swing in both directions and in doors subdividing corridors on escape routes.

3.11.7 Fire doors will be specified in accordance with Section 5.3 and Table 5.

3.12 Emergency lighting

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

3.12.2 Emergency lighting will be installed in accordance with the recommendations of BS 5266 [27], BS EN 1838 [28] and BS EN 60598-2-22 [29], illuminating all occupied areas, common evacuation routes (internal and external as necessary) and essential areas including plant areas. It will also illuminate a safe exit route including fire exits, fire alarm call points, changes in level or direction and firefighting

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

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

3.12.4 Discharge lighting installations may operate at voltages that are a hazard to firefighters. An exterior discharge lighting installation, or an interior discharge lighting installation operating unattended, operating at a voltage exceeding low voltage (as defined in Statutory Instrument number 1018, part of the Building Regulations), should be controlled by a firefighter's emergency switch, installed and situated in accordance with BS 7671 [30] and the requirements of the fire authority.

3.13 Fire safety signage

3.13.1 Fire safety signs will be installed where necessary to provide clear identification of fire precautions, fire equipment and means of escape in the event of fire. All common parts of the development will be fitted with appropriate fire safety signage to comply with The Health and Safety (Signs and Signals) Regulations 1996, i.e. signage to be specified in according to BS ISO 3864-1 [31], BS 5499-4 [32] and BS 5499-10 [33].

3.13.2 The purpose of fire signs is to direct persons towards fire exits, or to provide specific information or warning about particular equipment, doors, rooms, or procedures. They should be recognisable, readable, and informative, as they convey essential information to regular and infrequent users of the premises, and the fire and rescue service.

3.13.3 In accordance with recent updates to guidance in Section 15.13 to 15.16 in ADB1, wayfinding signage for the fire and rescue service is to be provided within each building, including:

- Floor identification signs at each landing of the protected stair and each common lobby accessed from the firefighting lift, formatted in accordance with Section 15.14 and 15.15 in ADB1.
- Studio / cluster flat indicator signs, located beneath the floor indicator signs and indicating the flats present at each level. These should be formatted in accordance with Section 15.16 in ADB1.

4. INTERNAL FIRE SPREAD – LININGS

Building Regulations requirement B2:

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

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

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

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

4.1 Internal wall and ceiling linings

4.1.1 During the development of a fire in a building, the choice of material for the lining of walls and ceilings can significantly affect the spread of fire and its rate of growth. Restrictions are placed on the wall and ceiling lining materials within certain areas of buildings to limit the spread of fire and production of smoke in these areas.

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

4.1.3 All wall and ceiling linings within the building should meet the recommendations of BS 9991 when tested under the European Classifications (in accordance with BS EN 13501-1 [20]), as summarised in Table 3 below.

4.1.4 The surface linings of walls and ceilings should generally conform to the classification recommended above for the appropriate location. However, parts of walls in rooms may be of a lower class but not lower than European Class D-s3, d2, provided that the area of linings having the lower classification does not exceed half of the floor area of the room, subject to a maximum of 20 m^2 in residential areas and 60 m^2 in non-residential areas.

4.1.5 No thermoplastic rooflights shall be used at the development.

Table 3 – Surface spread of flame requirements

Location	Euro Class
Within apartments	
Small rooms ≤4m^2	D-s3, d2
Other rooms	C-s3, d2
Within communal / non-residential areas	
Small rooms ≤30m^2	D-s3, d2
Circulation spaces (including walls, balustrades, and soffits adjacent to deck access balconies)	B-s3, d2
Other rooms	C-s3, d2

5. INTERNAL FIRE SPREAD – STRUCTURE

Building Regulations requirement B3:

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

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

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

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

(b) installation of suitable automatic fire suppression systems.

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

5.1 Automatic fire suppression

5.1.1 The uppermost floor at the Student Residential and Affordable Housing blocks are at circa 34.0 m and 30.7 m above access level respectively. As such, each block features floors which are greater than 11 m above ground level and automatic suppression is considered as appropriate based on the May 2020 amendment to ADB for residential apartment buildings.

5.1.2 Automatic suppression will be provided at the above-ground levels by a BS 9251 [34] sprinkler system in accordance with the recommendations of Table 2 in BS 9991 and Table 1 in BS 9251 to support the cluster flat and studio arrangements, common corridor travel distances, and height of the building. As such a Category 4 system using the design density in Footnote C) of Table 2 in BS 9251 is to be provided throughout the above-ground floors of each block in the development.

5.1.3 This fire safety strategy does not consider it necessary for sprinklers to be installed within residential common corridors, which are to be maintained as fire sterile. This view is supported by guidance in Note 2 of Table B4 of ADB1 and in a circular letter from MHCLG in May 2020 [35]. However, this should be discussed and agreed with all relevant stakeholders such a sprinkler supplier.

5.1.4 In accordance with Table 2 in BS 9251 a minimum water supply duration of 60 minutes is to be provided for the sprinkler system to cover the residential areas.

5.1.5 The water tank and pumps for the residential sprinkler system may be shared with the boosted cold-water system in accordance with Section 5.11.4.4 of BS 9251. Where sharing a water tank, the required volume for the sprinkler system must be retained in reserve during periods of peak domestic demand.

5.1.6 The amenity and ancillary areas of the building at Ground floor and Basement feature ordinary hazard areas with uses set out in Table 4 of BS 9251 that exceed 100 m^2 in area. As such, these areas are to be protected by a commercial grade suppression system meeting the expectations of BS EN 12845 [36].

5.1.7 The BS EN 12845 system is recommended to be in accordance with expectations for an Ordinary Hazard 2 (OH2), considered sufficient for amenity and bicycle storage areas, as well as for higher-risk plant and refuses stores limited to no greater than 144 m^2 in area (i.e., the AMAO of an OH2 system).

5.1.8 The commercial areas are to be provided with a sprinkler system in accordance with BS EN 12845. The category of sprinkler system for the commercial units should be commensurate with the use of the space.

5.1.9 The commercial sprinkler system should include the additional measures to improve system reliability set out in Annex F of BS EN 12845. Additional compliance with the Loss Protection Council (LPC) rules is not expected to meet the requirements of the Building Regulations.

5.2 Structural fire resistance

5.2.1 Elements of structure should be designed and / or protected to achieve at least 120 minutes fire resistance within the Student Residential building and at least 120 minutes fire resistance within the Affordable Housing building, where each block is supported by automatic suppression throughout. This meets the expectations of Table 4 in BS 9991 for a building greater than 30 m and up to 30 m in height to the uppermost floor respectively.

5.2.2 Elements of structure within the Affordable Housing building which form part of the firefighting shaft would be expected to achieve a fire resistance rating of 120 minutes.

5.2.3 Elements of structure that only support a roof do not generally require fire resistance. Structure is considered to support more than only a roof if it supports a load other than the roof itself (e.g., rooftop plant), is essential to the stability of a compartment or other fire resisting wall (internal or external) or contains an occupiable roof terrace.

5.3 Compartmentation and fire-resisting construction

5.3.1 All floors should be constructed as compartment floors, where each building contains residential accommodation. All shafts (e.g., risers, lift shafts and stair cores) are to be constructed as protected shafts where these will pass through compartment floors.

5.3.2 Apartments, clusters, and studios will be separated from each other and from common areas by construction having a fire-resistance rating of at least 60 minutes, with FD30S doors. The non-residential and ancillary areas are also to be separated by compartmentation from adjacent areas.

5.3.3 Fire-resisting construction will be provided in accordance with the recommendations of Table 3 in BS 9991, as summarised in Table 4. Fire doors should be provided as summarised in Table 5, based on the recommendations of Table 12 in BS 9991.

5.3.4 Commercial units should be separated from the rest of the building by 120-minute fire resistance compartment walls and floors.

5.3.5 Smoke shaft corridor vents are to achieve a fire-resistance rating equal to the rating as per the construction in which the dampers are situated, where tested in accordance with BS EN 12101-8 [37] and as recommended within the SCA guidance [14] document.

5.3.6 The electrical substation is to be protected in accordance with relevant UKPN guidance [38].

Table 4 – Periods of fire resistance for fire-separating elements (in minutes): Student Residential

Part of Building	Minimum Fire Resistance rating when tested to the relevant part of BS 476 (mins)			Methods of Exposure
	Loadbearing	Integrity	Insulation	
Structural elements	Note 1	n/a	n/a	Exposed faces
Compartment floors	Note 1	Note 1	Note 1	From underside
Compartment walls	Note 1	Note 1	Note 1	Each side separately
Firefighting stairs and lifts	120 60	120 60	120 60	From outside From inside
Other protected shafts	Note 1	Note 1	Note 1	Each side separately
Walls separating apartments or common corridors	60	60	60	Each side separately
Protected halls in cluster flats	30	30	30	Each side separately
External walls (Note 2): Within 1,000 mm of a point on the relevant boundary More than 1,000 mm from a point in the relevant boundary	 Note 1 Note 1	 Note 1 Note 1	 Note 1 15	 Each side separately From the inside
Lower risk ancillary areas	60	60	60	Each side separately
Higher risk ancillary areas (plant, refuse and cycle stores)	Note 1	Note 1	Note 1	Each side separately
Enclosure of life safety plant	120	120	120	Each side separately
Substation enclosure	240	240	240	Each side separately
Cavity barriers	n/a	30	15	Each side separately
Note 1: 120 minutes for all development				
Note 2: as required by Section 6.3 to resist the external spread of fire to or from neighbouring buildings				

Table 5 – Fire doors

Position of door	Tested to BS 476-22 [39]	Tested to BS EN1634-2 [40]
Firefighting stair / evacuation lift lobby: Between lobby and common corridors Between lobby and stairs Between lobby and lift shaft	 FD 30 S FD 60 S FD 60	 E 30 Sa E 60 Sa E 60
Other protected shafts (self-closer not required if normally locked shut)	FD 60 S	E 60 Sa
Common corridor apartment or ancillary area entrance doors	FD 30 S	E 30 Sa
Cluster flat hallways	FD 30 S	E 30 Sa
Lower risk ancillary*	FD 60	E 60
Higher risk ancillary*	FD 120	E 120
Life safety plant*	FD 120	E 120
Notes: The ratings shown above are for integrity only. * Smoke seals are indicated by the suffix 'S' (to BS 476-31 [41]) or Sa (to BS EN 1634-3 [42]) and are required in all doors which form the enclosure to protected escape routes.		

5.4 Active fire barriers

5.4.1 A fire-and-smoke curtain should be utilised at Level 06 of the Student Residential building in support of the means of escape strategy (see Section 3.6).

5.4.1 The fire curtain is to be provided in accordance with the expectations of BS 8524-1 [43] and BS 8524-2 [44], and as per the specifications in Table 6.

Table 6 – Fire-and-smoke curtain specification

Parameter	Performance criteria
Fire resistance integrity (E)	120 minutes
Fire resistance radiation (W)	120 minutes
Smoke containment	Leakage rate should not exceed $3m^3/m/h$
Obstruction warning	Not required where with a sterile circulation area
Deployment	Activation of the fire alarm in Zone B (Figure 7) at any floor or on loss of power (fail safe closed)
Retraction	Full retraction upon the fire alarm being reset.
Power supplies (mains and back-up)	Battery back-up, to conform to BS EN 12101-10.
Frequency of intended use (cycle class)	Class C1 in accordance with BS EN 14600:2005

5.5 Fire-stopping and penetrations through fire-resisting construction

5.5.1 Fire-stopping should be provided at the junction of fire-separating walls and external walls in order to maintain the fire resistance period of fire-separating walls (see Table 4), to prevent a fire from travelling around the junction and into the neighbouring space. Penetrations through lines of fire-resisting separation should be fire-stopped to achieve the same fire resistance as the separation.

5.5.2 All pipes, ductwork and services passing through fire-resisting separations should be either enclosed in fire-resisting construction (i.e., shafts) of matching fire resistance or provided with fire dampers of matching fire resistance. Certain small-diameter pipes require only fire-stopping around the pipe, dependent on pipe material and the type of fire-resisting barrier penetrated. Figure 14 is provided to assist in the interpretation of Section 19 of BS 9991.

5.5.3 Where ducts pass through fire-resisting construction of protected escape routes, either combined fire-and-smoke dampers activated upon smoke detection (ES-type dampers) are provided, or the duct should be fire-resisting / enclosed within fire-resisting construction.

5.5.4 Further co-ordination of the fire protection strategy for service risers, bathroom pods, and compartment floors is expected, being indicative only at this stage where assuming fire-stopping at floor level and / or between each unit.

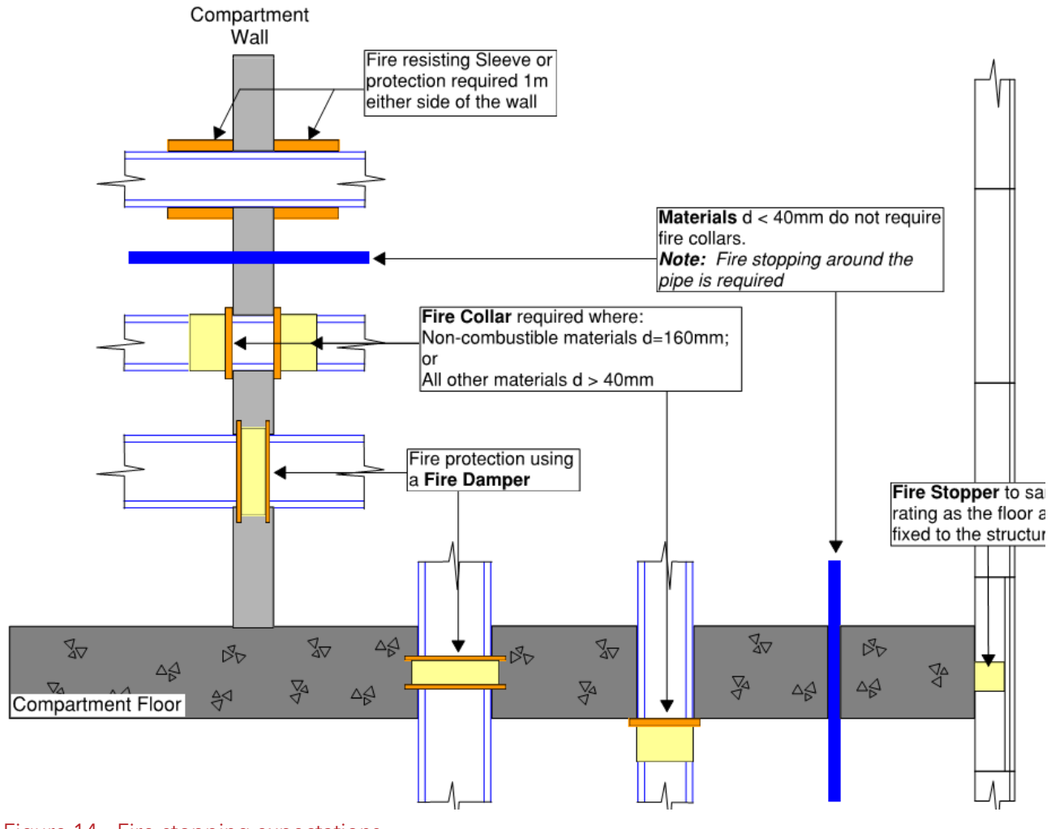

Figure 14 – Fire-stopping expectations

5.6 Cavity barriers and concealed spaces

5.6.1 Cavity barriers are provided to prevent the rapid spread of unseen fire or smoke in voids, and to prevent the spread of fire around compartmentation via voids. Extensive internal concealed cavities generally require cavity barriers to sub-divide them, as illustrated in Figure 15.

5.6.2 All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). Cavity barriers should be at 20 m centres in cavities with Class C-s3, d2 linings or better. For other linings, the spacing between cavity barriers should be reduced to 10 m.

5.6.3 For external wall systems featuring a wall cavity, cavity barriers are expected to be provided aligned to compartmentation, including horizontally at floor slabs, and vertically aligned to party walls. If twin-leaf masonry construction is utilised, further reference may be made to Figure 25 in BS 9991.

5.6.4 Cavity barriers provided within stud walls or around openings in the external wall may be formed of:

- steel at least 0.5mm thick or timber at least 38mm thick (not permitted in external walls); or
- polythene-sleeved mineral wool, or mineral wool slab under compression when installed cavity; or
- calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

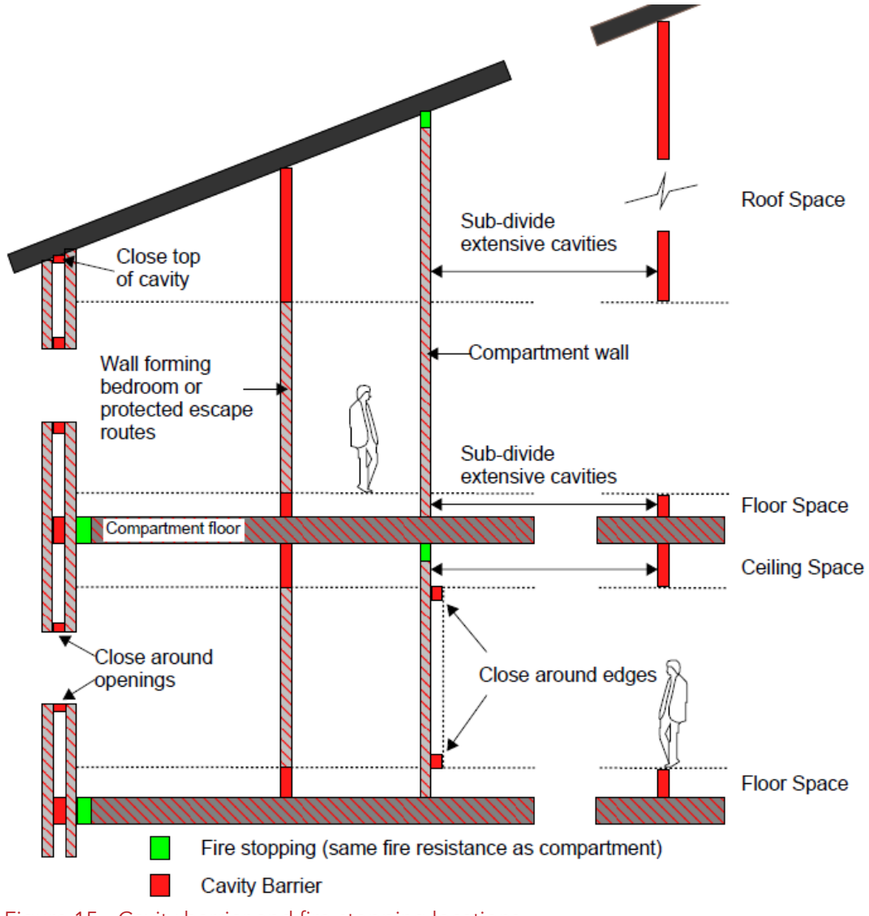

Figure 15 – Cavity barrier and fire-stopping locations

6. EXTERNAL FIRE SPREAD

Building Regulations requirement B4:

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

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

6.1 External wall construction

6.1.1 Each of the buildings will contain residential accommodation at a floor height greater than 18 m above ground level and are deemed 'Relevant Buildings' under Regulation 7(4) of the Building Regulations.

6.1.2 The building will comply with the requirements of Regulation 7(2), which states that: "building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or A1 (classified in accordance with the reaction to fire classification)."

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

- Cavity trays when used between two leaves of masonry (and for cavity trays in all other wall systems for a period of 18 months from 1st June 2022 following a circular letter from DLUHC);
- Any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;
- Door frames and doors, window frames and glass.
- Electrical installations;
- Insulation and water proofing materials used below ground level;
- Intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
- Membranes, seals, gaskets, fixings, sealants and backer rods; or
- Thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1.

6.1.4 In addition to the requirements set out by Regulation 7(2) above, the building should also meet Requirement B4 of the Building Regulations based on the following recommendations:

- External surfaces should meet the recommendations in Figure 17 of BS 9991. However, as these recommendations are less onerous that those in Regulation 7(2), the above requirements for Regulation 7(2) should be applied.
- Cavity barriers should be provided in accordance with Section 5.6 of this report.

6.1.5 Particular attention is drawn to the following points:

- Though excluded from by Regulation 7(3), membranes used as part of the external wall construction above ground level should achieve a minimum of Class B-s3, d0;
- Internal linings should of external walls comply with the guidance provided in Section 4.1;
- Any part of a roof should achieve the minimum performance as detailed in Section 6.2;
- As per Regulation 7(3), window frames and glass (including laminated glass) are exempted from Regulation 7(2). Window spandrel panels and infill panels must comply with Regulation 7(2);
- Thermal breaks are small elements used as part of the external wall construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two compartments and should be limited in size to the minimum required to restrict the thermal bridging (note: the principal insulation layer is not to be regarded as a thermal break);
- Regulation 7(2) only applies to specified attachments, being attached balconies, solar panels, and solar shading devices. Shop signs and other attachments are not subject to the requirements of Regulation 7(2), though due consideration should be given to other attachments posing a risk of fire spread over the wall.

6.1.6 Balconies and terraces are to be provided in accordance with the expectations of Sections 5.4 and 12 in BS 8579 [45]. In addition to meeting the expectations of Regulation 7(2) for specified attachments:

- Private balconies should be separated from each other by a non-combustible, impervious soffit.
- Deck access balconies are to meet the expectations in support of means of escape as set out in Section 3.7. Where used for the distribution of services, it is important to note that services contained within the deck-access balconies would also be subject to the expectations of Regulation 7(2) of the Building Regulations, including for materials used as sprinkler pipes, conduits, and pipe insulation.

6.1.7 Common terraces are deemed as occupiable roof areas under BS 8579 guidance, and expected to meet the following:

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

6.1.8 Any attachments to the external walls intended to support climbing plants are to also be Class A1 or Class A2-s1, d0 materials to align with the expectations of Regulation 7(2). Any use of climbing plants should be suitably managed and maintained, including suitable means of automatic or manual irrigation, and with the design of these being cognisant of the risk associated with fire spread across external walls.

6.1.9 It should be noted that Regulation 7(2) is also applicable to balconies/ external decks.

6.2 Roof coverings

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

6.2.2 Roof coverings are to meet the recommendations of Table 7. Roof coverings may constitute several materials (but does not include the roof structure as a whole). Therefore, the top covering material should be considered in tandem with the substrate(s) to assess the performance of the coverings.

6.2.3 Any areas of green (inc. brown or sedum) roofing are to meet the GRO Green Roof Code [46] rather than having B_{ROOF}(t4) classification. This includes that these be tested in accordance with BS 8616 [47], have a substrate layer of at least 80 mm depth, the organic content of the substrate should not exceed 20% (with no peat), and plants which retain water within their structure should be used to reduce to risk of drying out. A minimum 500 mm wide strip of pebbles or paving stones should be provided to separate the green roof from rooflight openings and façades having windows or doors.

6.2.4 Where photovoltaic panels are provided on the roofs, these should either also be in accordance with these recommendations or should meet suitable alternative guidance.

Table 7 – Limitations on roof coverings

Distance from relevant boundary	$B_{ROOF}(t4)$	$C_{ROOF}(t4)$	$D_{ROOF}(t4)$
Less than 6 m	✓	×	×
At least 6 m	✓	✓	×
At least 20 m	✓	✓	✓
The relevant test and classification standard is BS EN 13501-5 [48]			

6.3 Space separation and unprotected areas of the façade

6.3.1 Should a fire occur in a building, heat will radiate through non-fire resisting openings in the external walls. This heat can be enough to set fire to nearby buildings. To reduce the chance of this occurring, the Building Regulations place limits on the area of the external elevation with no fire resistance, known as the unprotected area.

6.3.2 The relevant boundaries are the reference point at which the potential for fire spread, being the site boundary, a notional boundary created on the centreline of an adjacent carriage way, a notional boundary created midway between a block and the nearest adjacent block.

6.3.3 As indicated in Figure 16 and Figure 17, relevant boundaries are taken at the centrelines of railway on the south side and Chalk Farm Road to the north. The relevant boundary to the east and west is taken as the site boundary where adjacent to neighbouring properties.

6.3.4 Confirmation is required that the land in front of the Affordable Housing unit shall not be developed upon in the future and as such distance to the relevant boundary is illustrated in Figure 16 is suitable. Otherwise, if this land is outside of the client ownership, the site boundary will need to be considered in the external fire spread assessment and this elevation will require 100% protected area.

6.3.5 Using BR 187 [49] and taking benefit from sprinklers, an analysis of the available distance between the building and the relevant boundaries has been conducted in Table 8.

6.3.6 This analysis considers the worst-case compartment on each façade, utilising the lower emitted radiation of 84 kW/m² for residential occupancies and 168 kW/m² for ancillary / commercial areas. These are then halved to 42 kW/m² and 84 kW/m² respectively on account of suppression.

Table 8 – External fire spread calculations

Area	Floor	Façade	Dimensions (m)		Radiation intensity (kW/m²)	Distance to boundary (m)	Permitted % of unprotected area
			W	H			
Commercial	G	N	≤26.0	3.6	84	≥10	100
Residential	1+		≤8.0	≤2.6	42		100
Ancillary	G	E	≤12.3	3.6	84	≥2.2	42 (party wall)
Residential	1+		12.3	≤2.6	42		100
Ancillary	G	S / W	N/A	3.6	84	0	N/A – party wall
Residential	1+	S	≤16.0	≤2.6	42	≥10	100
Commercial	G	W	≤17.2	3.6	84	≥7.9	100
Residential	1+		≤6.4	≤2.6	42	≥5.5	100

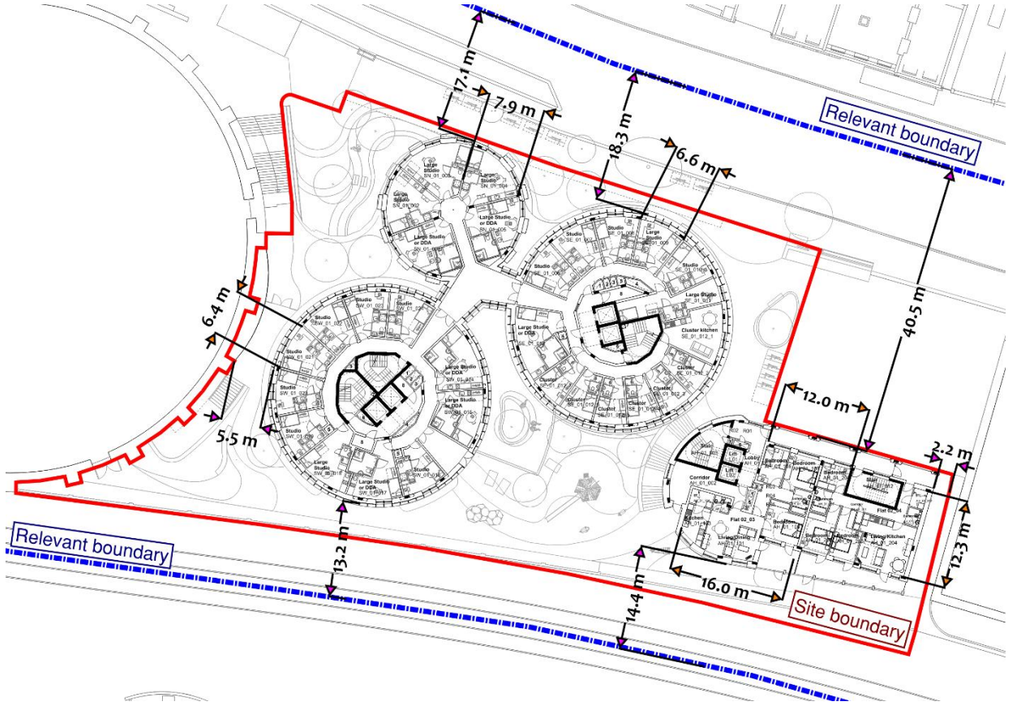

Figure 16 – Distances to relevant boundaries above ground (north at page north)

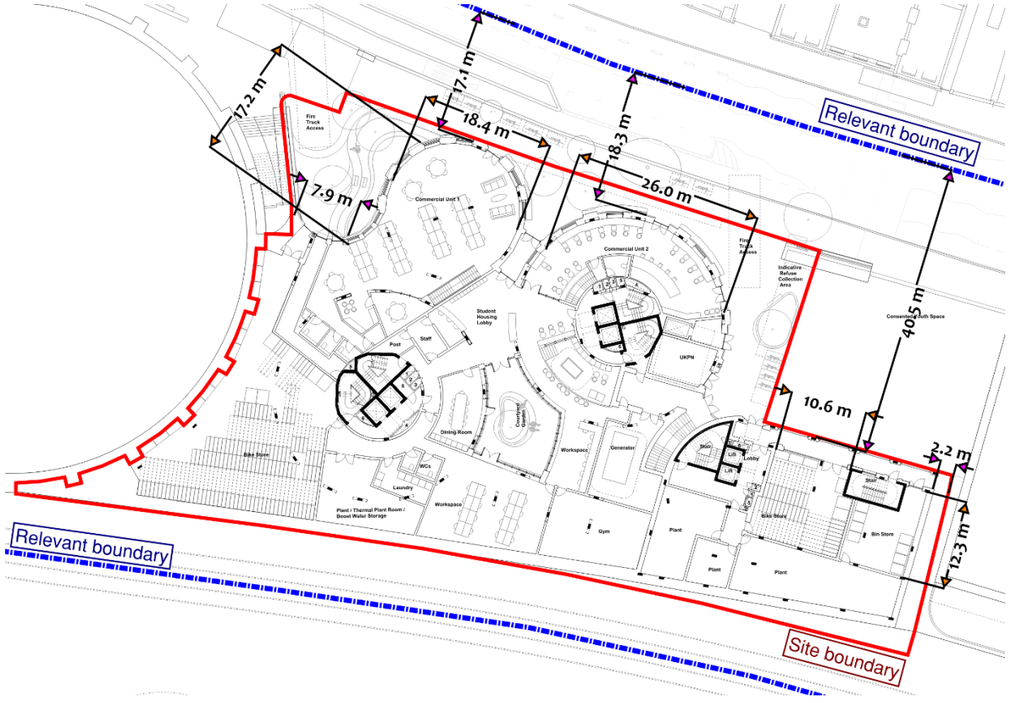

Figure 17 – Distances to relevant boundaries at Ground floor (north at page north)

7. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE

Building Regulations requirement B5:

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

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

7.1 Means of notifying the fire and rescue service

7.1.1 In the event of fire, the fire and rescue service (FRS) will be notified by a resident or member of management staff. The FRS is to be notified by dialling '999' and conveying the situation to the operator. No automatic FRS notification is proposed to be used at the development.

7.1.2 A secure information box for storing premises information for use by the fire and rescue service during an incident is recommended to be provided near to the main fire panel at the main entrance to the building. Guidance for the provision of the information box is available from the FIA [50].

7.2 Water supplies

7.2.1 Section 51.2 of BS 9991 recommends that where a building is located within 90 m of an existing fire hydrant, this is sufficient without further provision of firefighting water supplies.

7.2.2 An existing fire hydrant is located on the opposite side of Chalk Farm Road at a maximum of ~70 m from the proposed development / hardstanding areas as illustrated in Figure 18. As such, this meets the expectations of BS 9991, and no new hydrants are required to be provided.

7.3 Vehicle access to and around the site

7.3.1 The access routes for the fire appliances should meet typical values noted in Table 9, being those dimensions recommended by London Fire Brigade in document GN29 [51].

7.3.2 Access and hardstanding areas will be provided for a pump appliance such that these give access to within 18 m of the firefighting shaft entrances, dry riser inlets, and sprinkler tank inlets, located approximately as indicated in Figure 18.

7.3.3 The reversing distance from each hardstanding area back to Chalk Farm Road will not exceed 20 m, as indicated on Figure 18.

7.4 Access into and through the building

7.4.1 Each building will feature an occupied floor greater than 18 m above ground level, with the Student Residential building to feature two firefighting shafts and a single firefighting shaft being provided within the Affordable Housing block. The firefighting shafts will each feature:

- Firefighting stairs having a clear width of at least 1,100 mm.
- A dry rising main with outlets in the firefighting stair at each floor in accordance with BS 9990 [52]. The maximum hose laying distance at each floor will not exceed 60 m, in accordance with Section 50.2.2 of BS 9991.
- Access to each of the firefighting shafts will be available from outside at Ground floor, with the stair being located at no greater than 18 m from the final exit based on Figure 20(b) in BS 9999.
- Corridor that may feature counter flow between firefighters and escaping residents are to feature an additional 500 mm clear width in accordance with Figure 20(b) in BS 9999.
- Smoke control to the protected escape routes as discussed in Section 3.6 or 3.7.
- A firefighting lift in accordance with BS EN 81-72 [53], with lift doors within 7.5 m of the firefighting stair door. Additional controls to allow used in support of evacuation (see Section 3.10).
- Water protection to the lifts provided by threshold ramps, with a sump to also be provided beneath into which a pump could be lowered to support removal of water.
- An evacuation lift as per Section 3.10, available to assist the fire and rescue service if required.
- Firefighting floor indicator signage as detailed within Section 3.13.

Table 9 – Typical pump-type firefighting appliance access requirements

Minimum access route specification	Dimension
Width between kerbs	3.7 m
Width between gateways	3.1 m
Turning circle between kerbs	16.8 m
Turning circle between walls	19.2 m
Clearance height	3.7 m
Carrying capacity	14 tonnes
Maximum reversing distance	20 m

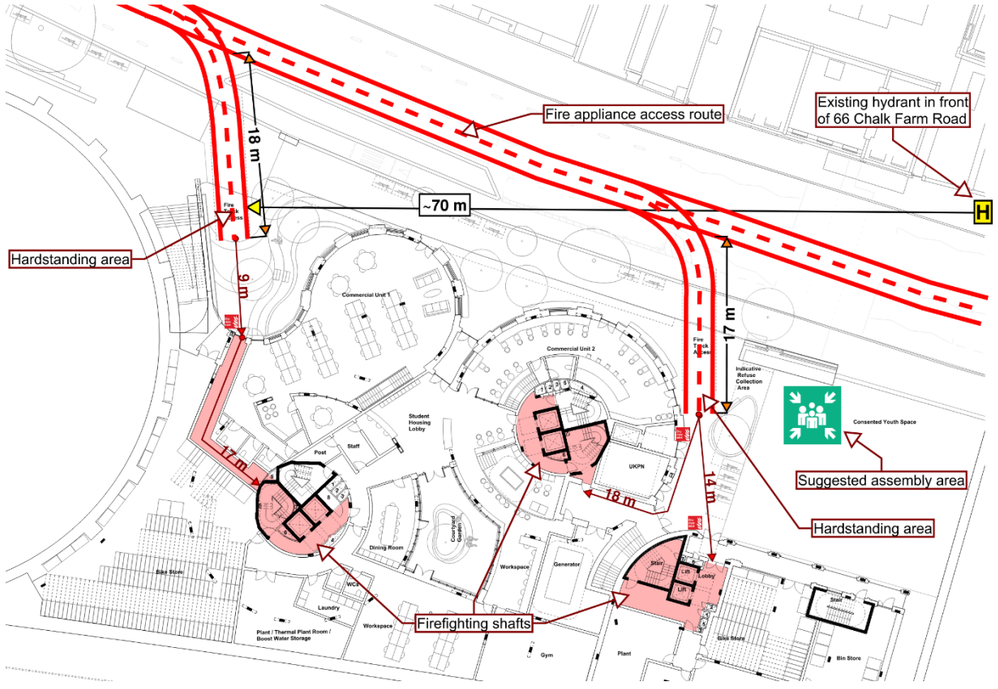

Figure 18 – Fire service vehicle access around the site

7.5 Smoke clearance

7.5.1 No car park will be provided within the development. As such, no means of car park smoke venting or clearance is expected.

7.5.2 The basement area is located at greater than 3.0 m below ground level and has a floor area of greater than 200 m^2, and ss such, will include smoke venting. At this stage, a mechanical basement smoke extract system in accordance with Section 14.2.1.3 of BS 9991 is expected to be provided, including:

- Being supported by the BS EN 12845 automatic suppression system.
- Feature fans in accordance with BS EN 12101-3.
- Operating automatically upon fire alarm / sprinkler head activation.
- Providing at least 10 air changes per hour, including provision of replacement air.
- Have fans capable of handling gas temperatures of 300 °C for not less than 60 minutes, with ductwork and fixing capable of resisting temperatures of 600 °C for not less than 60 minutes (or so as to maintain the fire resistance rating of penetrated walls / floors, whichever is greater).

7.6 Stand-by power supplies

7.6.1 All powered life safety systems, including emergency lighting, internally illuminated signage, fire detection and alarm systems, suppression systems, automatically opening vents, firefighting lifts, and evacuation lifts will be provided with emergency back-up power.

7.6.2 Life safety equipment with a low power demand is expected to utilised batteries capable of a continuous stand-by supply in accordance with the relevant design standard and be fully rechargeable within a period of 24 hours.

7.6.3 Larger items of life safety equipment will be provided with stand-by power in accordance with BS 9991 and BS 8519 [54]. This may feature one of:

- A stand-by diesel generator.
- A UPS system (noting the recommendations within Appendix A of BS 8519).
- A secondary incoming power supply from an alternative substation.

7.6.4 Detailed specification of the stand-by power supplies is to be provided during RIBA Stage 3 / 4 in support of the Building Regulations application for the development. As this stage it is envisaged that a diesel back-up generator will be provided at the scheme.

7.7 First-aid firefighting

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

7.7.2 In general, fire points should be provided within common areas and areas presenting a significant fire ignition risk, such as kitchens, refuse stores, and plant rooms. The fire risk assessment that should be undertaken upon occupation of the building (see Section 8) may assist with the placement of suitable fire extinguishers.

7.7.3 The type and size of extinguisher(s) at each fire point will be chosen in accordance with the guidance given in BS 5306 [55], as summarised by Table 10 and the classification of fire fuel hazards summarised as follows:

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

7.7.4 For general areas, fire extinguishers should be provided at a rate of approximately 1x fire point for every 200 m^2 of floor area. These would generally be recommended to be located adjacent to room or storey exits and be suitable for the hazards present.

Table 10 – Fire extinguisher types and application guidance

Medium	Colour code	Application	Do NOT use for
Water	White	Class A fires	Liquid, electrical, metal or cooking fires
Powder	Blue	Class A, B or C fires	Metal or cooking fires
Foam	Cream	Class A or B fires	Electrical*, metal or cooking fires
CO_2	Black	Class B fires	Metal or cooking fires
Wet chemical	Yellow	Class A or F fires	Liquid, electrical or metal fires
* AFFF Foam extinguishers may be used for electrical fires up to 35 kV (dielectric test) and where operated from a distance of at least 1 m.			

8. FIRE SAFETY MANAGEMENT

8.1 Management responsibilities

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

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

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

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

8.1.5 In accordance with BS 9999, there are two management system levels. One of management levels should be implemented, as summarised in Table 11.

Table 11 – Management levels

Level	Management	Robustness	Minimum assurance	Conformity
1	Enhanced	Best Practice	High level of assurance	Conformity with a management level such as BS 9997 [56]
2	Adequate	Good Practice	Adequate level of assurance	Conformity with requirements of legislation

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

8.2 Management to support of the fire safety within the building

8.2.1 Management of fire safety must be integrated with all other management systems. If this management is lacking, then there is a danger that all the other areas such as security measures and alarm systems will be ineffective.

8.2.2 To ensure there is no doubt as to where the responsibility for fire safety rests, and to enable consistency of approach, it is important that each establishment appoints a designated Fire Safety Manager. It may be possible to appoint a professional to take on this role but that will depend on the size of the premises, costs, etc.

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

- management to minimise the incidence of fire (e.g., good housekeeping and security)
- producing an Emergency Fire Plan
- being aware of all of the fire safety features provided and their purpose
- being aware of any particular risks on the premises (e.g., issues relating to hot work)
- being aware of their responsibilities towards disabled people
- liaising with, and where necessary seek the advice of, the fire authority, local council, or other relevant enforcing authorities
- having powers to deal with individuals who sabotage or tamper with fire safety systems, who ignore any smoking policy or who block exits
- liaising with other fire safety managers in a multi-occupancy arrangement
- ensuring that tenants, concessionaires, and caretakers are appropriately briefed
- ensuring that appropriate communication systems are in place to deal with any fire incident
- checking the adequacy of firefighting equipment and ensuring its regular maintenance
- ensuring fire escape routes and fire exits are unobstructed and doors operate correctly
- ensuring that fire detection and protection systems are maintained, tested, with records kept
- ensuring any close down procedures are followed

8.2.4 It is expected that further development of the fire safety management plan may occur during detailed design / construction, in liaison with those management organisations that will eventually take responsibility for management of each of the Student Residential and Affordable Housing buildings.

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

8.2.6 Common escape routes should have wall and ceiling linings achieving a Class B-s1, d0 reaction to fire standard, apart from permitted exceptions noted in this report. These finishes must be maintained for the life of the building. Display features or items such as posters, artwork pieces, etc. may be included with appropriate consideration, justification, and on-going control.

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APPENDIX A – ESCAPE FROM THE ROUNDHOUSE

A.1 Introduction

A.1.1 The 100 & 100A Chalk Farm Road development is located adjacent to the neighbouring plot of the Roundhouse, a live music and other events venue understood as having capacity for circa 4,600 people. The existing site at 100 & 100A Chalk Farm Road features escape routes from the Roundhouse across the site.

A.1.2 The purpose of this appendix is to provide a summary of the proposed approach for provision of means of escape from the Roundhouse exits in the event of full evacuation of a capacity crowd from the venue. This may be used to inform discussions with the Roundhouse and / or their representative(s) during co-ordination of the egress provisions.

A.1.3 For further information regarding the wider fire safety design of the building, recourse should be made to the main body of this Fire Statement Report.

A.2 Sources of information

A.2.1 This design note has been developed following provision of the following documents by the Roundhouse to Regal Chalk Farm Limited:

- 'Fire Safety Management Strategy', Lewis Watson, 14th May 2019
- 'Fire Risk Assessment', RB Health & Safety Solutions, 6th April 2023
- 'Fire Emergency Plan', RB Health & Safety Solutions, 6th April 2023
- 'A report reviewing the plans for 100 Chalk Farm Road, Camden', Mind Over Matter Consultancy Limited, January 2024.

A.3 Summary of development

A.3.1 The development features two blocks as summarised below and illustrated in Figure B1:

- Student Residential block: Residential accommodation for up to circa 530 residents set across 13 storeys (B, G + 11). The building is arranged across three interconnect 'drum' volumes with the main entrance at the front of the building from Chalk Farm Road.
- Affordable Housing block: Private residential accommodation for up to circa 100 residents set across 10 storeys (G + 9) with the main entrance facing Chalk Farm Road at the corner of the block adjacent to the student residential building.

A.3.2 Three exits from the Roundhouse will discharge across the proposed external podium at First floor of the development, as illustrated in Figure B2. The exit from Roundhouse Level 1 that is closest to Chalk Farm Road will discharge to the existing external stair leading to the front, remaining broadly as per the existing condition.

A.3.3 The Level 1 exit at the rear of the site will discharge directly onto the new podium area, having onward escape via paved routes to either the Roundhouse external stair or to the new external stair that will be provided between the Student Residential and Affordable Housing blocks.

A.3.4 The Level 2 exit from the Roundhouse will be provided with a new external stair that discharges onto the new podium area at First floor, with onward escape via either the external Roundhouse stair or new external stair between the Student Accommodation and Affordable Housing blocks.

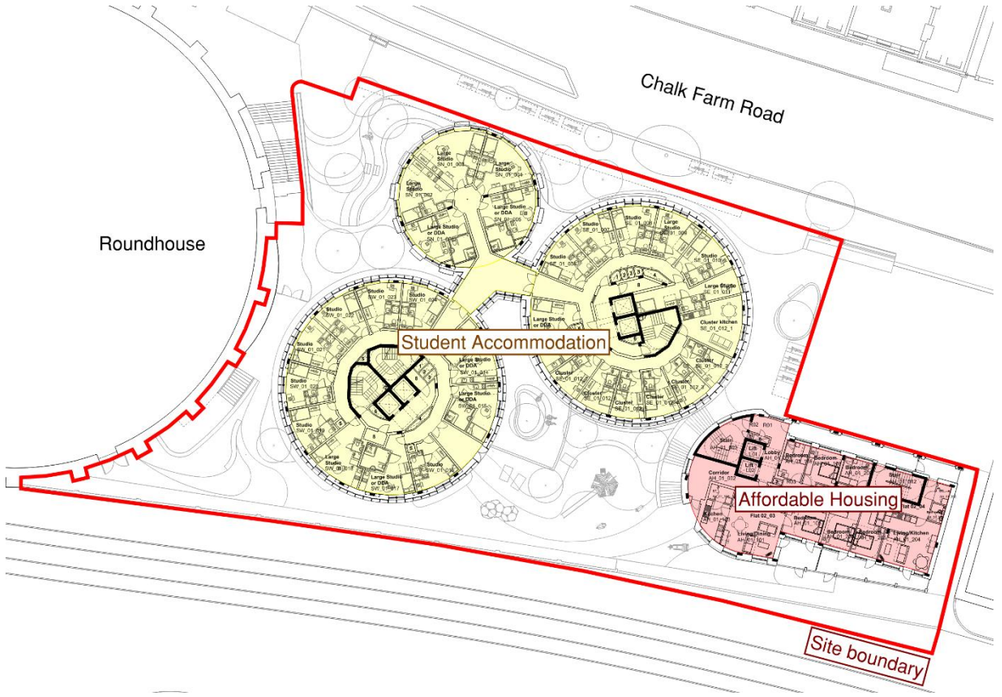

Figure B1 – Summary of development

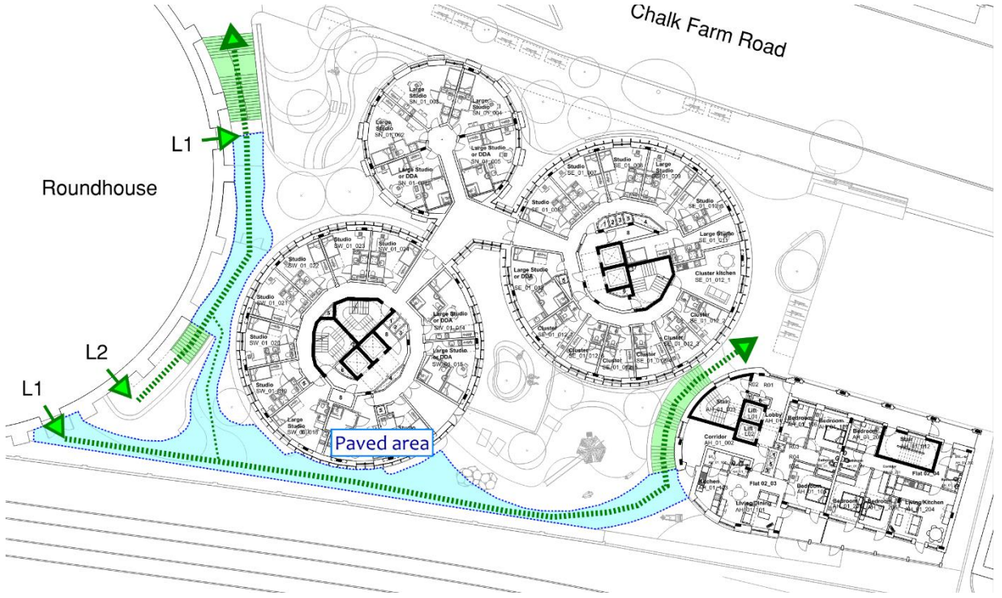

Figure B2 – Summary of Roundhouse exits and escape routes across First floor podium

A.4 Key assumptions

A.4.1 The Student Residential, Affordable House, and Roundhouse buildings are separate buildings with separate fire alarm systems. In the event of full evacuation of the Roundhouse in an emergency, such as fire, neither the Student Residential nor Affordable Housing blocks are expected to be signalled to evacuate simultaneously.

A.4.2 In the event of full evacuation of the Roundhouse, the main entrance to the Student Residential building may continue to be in use where remote from the Roundhouse escape routes. Access to the basement service lift entrance would be impacted, though it would be expected use of this entrance would cease during congestion resulting from escape from the Roundhouse.

A.4.3 The main entrance to the Affordable Housing block may be affected by occupants escaping via the external stair to podium level, though it would be noted that the square area in front of the Affordable Housing block is a consented external youth space being provided by the adjacent development (landscape expected to be developed to better connect the two schemes).

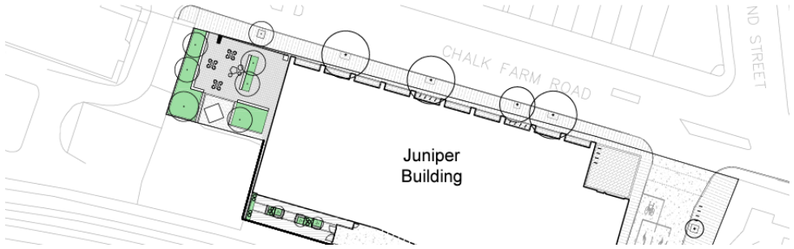

Figure B3 – Illustration of consented youth area for adjacent plot

A.5 Number of occupants escaping from the Roundhouse

A.5.1 The fire strategy information provided by the Roundhouse includes values for the overall assumed occupancy of the building, though does not provide indication of the maximum number of occupants expected to escape via the individual exits.

A.5.2 To consider the number of occupants that may expect to escape across the proposed external terrace / podium area of the development, an estimate of the number of occupants is made based on:

- The maximum number of occupants expected at each floor level.
- The number of exits available from each floor level.
- Discounting of the largest exit, in accordance with standard fire safety practice.
- Determination of the number of occupants expected to escape via the remaining exits at the floor.

A.5.3 The number of occupants at each level is provided in Section 10 of the 'Fire Safety Management Strategy' report. This states 450 people at Level 0, 2850 people at Level 1, and 1310 people at Level 2.

A.5.4 The number of exits assumed at each of Level 2 and Level 1 is indicated on Figure B4 and Figure B5 respectively. Level 0 of the Roundhouse is not considered further where occupants from this level would not escape across the proposed podium area.

A.5.5 For simplicity, each of the exits is assumed to serve an equal number of occupants. This would be considered as conservative, where the exits toward the podium appear to be smaller than those exits to the main entrance / west side of the Roundhouse.

A.5.6 Based on the stated occupancies and exits present, the number of occupants assumed as requiring onward escape from the podium area is calculated in Table B1.

Table B1 – Roundhouse occupancy level

Level	Occupancy	Total exits	Podium exits	Occupants to podium
2	1,310	4	1	437
1	2,850	7	2	950
			Total:	1,387

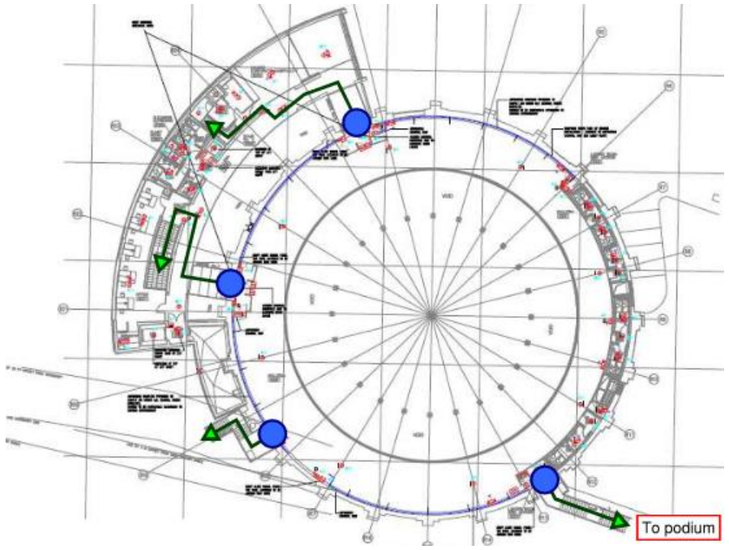

Figure B4 – Level 2 exits

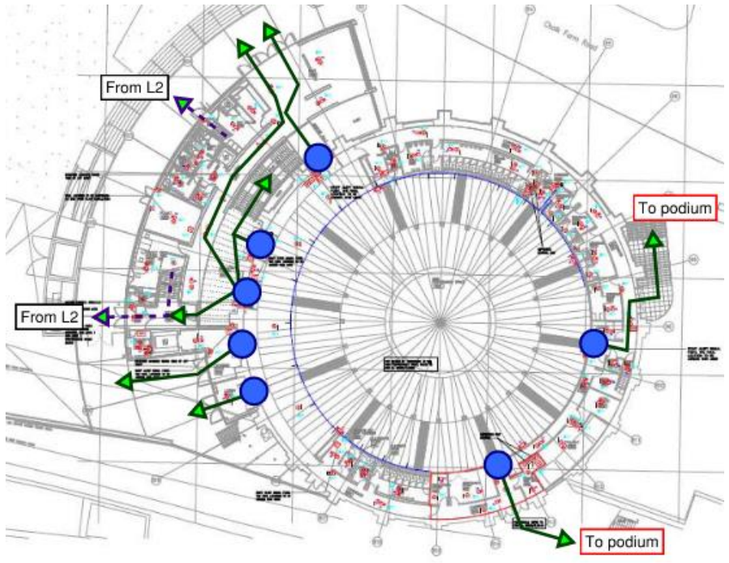

Figure B5 – Level 1 exits

A.6 Provision of onward escape across podium

A.6.1 With the podium area being in outside air and a separate site to the Roundhouse, this area can be considered as a place of relative safety, similar to a protected stair located within a building from which occupants are escaping.

A.6.2 As per the guidance on Section 3.18 of Approved Document B Volume 2 (ADB2) [57], escape provisions for places of relative safety may consider two contributing factors:

- The number of occupants that may escape through the place of relatively safety to a place of ultimate safety during the assumed evacuation period (typically 2.5 minutes for all occupants to reach a place of relative safety within ADB2 guidance).
- The available holding capacity of the place of relative safety.

A.6.3 Section 3.18 of ADB2 provides an equation for considering the escape capacity of protected stairs broken down into occupants flowing out of the stair plus the holding capacity of the stair.

> **3.18** As an alternative to Table 3.2, the capacity of stairs 1100mm wide or wider can be found using either of the following formulas:
>
> a. $P = 200W + 50 (W - 0.3)(N - 1)$
>
> b. $W = P + 15N - 15 / 150 + 50N$
>
> where:
>
> P is the number of people that can be served
>
> W is the width of the stair, in metres
>
> N is the number of storeys served.
>
> Separate calculations should be made for stairs serving basement storeys and stairs serving upper storeys.
>
> The population, P, should be divided by the number of available stairs.
>
> The formula is useful to determine the width of stairs where people are not distributed evenly – either within a storey or between storeys.
>
> In the formula, 200W represents the number of people estimated to have left the stair after 2.5 minutes of evacuation, and 50 (W – 0.3)(N – 1) represents the number of people estimated to be on the stair after 2.5 minutes of evacuation.

A.6.4 Based on the above equations, the capacity of escape from the external podium area via each of the two onward escape stairs can be considered as follows:

- West stair adjacent to Roundhouse = 2.9 m x 200 = 580 people
- East stair between proposed blocks = 2.2 m x 200 = 440 people.

A.6.5 The external podium area features paved areas that may be considered to offer a holding area comparable to that available within a protected stair following the 2.5-minute evacuation period. However, the equation given Section 3.18 of ADB2 is related to stair width and number of flights, this cannot be used to considering the holding capacity of the podium.

A.6.6 Alternatively, Table D1 in ADB2 provides floor space factors for the space to be assumed per person for differing types of use. In considering a congested, but not overly crowded holding space, a floor space factor of 0.5 m^2/person is used as suggested in ADB2 for assembly halls, concert venues, and bars (for >2m from the serving area).

A.6.7 As indicated in Figure B6, the standing area considered in blue has an area of circa 230 m^2. This would offer holding capacity for 460 people based on a floor space factor of 0.5 m^2/person.

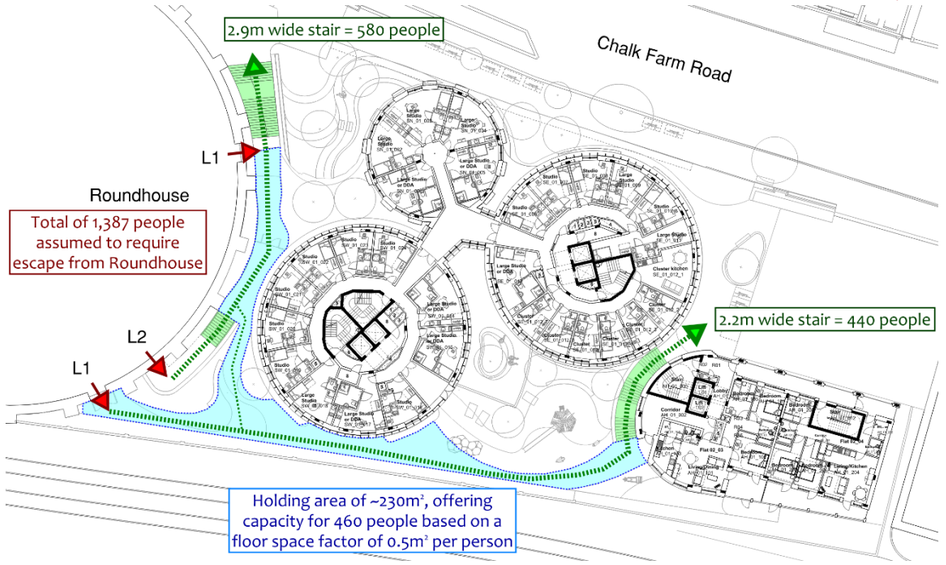

Figure B6 – Summary of escape provisions at podium

A.6.8 Based on a combination of escape width and holding capacity, a total of 1,480 people would be suggested as being able to escape via the terrace. This exceeds the number of occupants expected to escape from the Roundhouse by 93, offering an allowance for a number of occupants of the Student or Affordable Housing blocks to be present on the podium terrace at commencement of the evacuation.

A.6.9 A number of sources of conservatism are included in the above determination, including:

- The holding capacity of the external stairs is not considered in the calculations.
- The additional available areas of the podium, such as the playground area or paths to the student building are not included.
- Residents of the Student or Affordable Housing blocks would also be able to exit the podium into their respective buildings, rather than using the external stairs.
- The number of occupants escaping from the Roundhouse to the podium includes consideration of discounting of exits at both Level 1 and Level 2. However, typically only a single exit from a single floor would be expected to be discounted during the initial stages of a fire.

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