



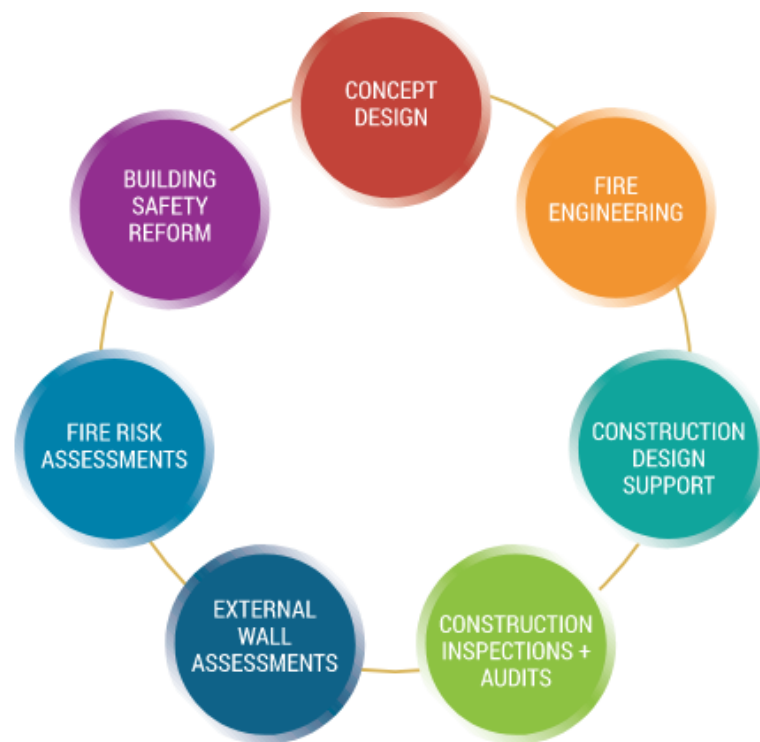
Developed for:
Kier Construction

Fire Safety Strategy

Pinn River SEND School

Hillingdon
London

Issue 04
14 February 2024



BAFE Fire Safety Register
Fire Risk Assessment Provider



Institution of Fire Engineers
Member



Fire Industry Association Member



Constructionline
Gold Member
Constructionline Gold Member

London

Birmingham

Bicester

Ireland

Manchester

T: 0203 9956 600 or 0121 8099 700 | E: enquiries@ashtonfire.com | W: www.ashtonfire.com

Fire Safety Strategy

Pinn River SEND School

Project Reference: AF3177

Client: Kier Construction

Issue	Date	Description	Author	Checked	Approval
01	21.09.2022	First issue of report	ASQ	OR	ASQ
02	30.04.2023	Report updated for CP issue	ASQ	SJS	ASQ
03	03.07.2023	Report updated in line with revised hydrotherapy room layout	ASQ	--	ASQ
04	14.02.2024	Report updated in accordance with comments from building control	VDM	--	ASQ

This report should not be divulged to any other parties without the approval of the client for whom it was produced. It should not be manipulated, abridged or otherwise presented without the written consent of Ashton Fire Ltd. In the event that such permission is sought and agreed, and the report is copied; then it must be copied in its entirety.

Ashton Fire shall have no duty of care beyond that owing to the Client. Under no circumstances shall Ashton Fire be liable for any reliance by any party, other than the Client, on the information contained within this report. Nothing in this report confers or purports to confer on any third party, any benefit or the acceptance of any third-party liability by virtue of the Contracts (Rights of Third Parties) Act 1999.

This report is subject to Ashton Fire’s standard terms and conditions and is issued Commercial in Confidence.

ASQ	Almin Qasim BEng AIFireE	Associate
OR	Oisín Roulstone MSc BSc	Senior Fire Engineer
SJS	Saskia Stimpson MEng (Hons) AIFireE	Senior 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.

EXECUTIVE SUMMARY

Ashton Fire have been commissioned by Kier Construction Ltd to provide fire safety consultancy services for the development of Pinn River SEND School in Hillingdon, London.

This document details the fire safety strategy design as developed for the scheme, intended to assist the design team in progressing the detailed fire safety provisions for the project.

This fire safety strategy has been developed to provide an equivalent level of safety as recommended within the life safety requirements with respect to fire under the Building Regulations 2010 (including amendments). This has been achieved through compliance with the prescriptive recommendations for life safety through the application of BS 9999: 2017 in the first instance. This has been further supplemented by the guidance within HTM 05-02 to account for non-ambulant pupils within the demise.

Apart from where noted in this report, the design will be in accordance with the recommendations of the aforementioned guidance documents. To facilitate ease of review, the fire safety systems proposed in the report are outlined in Summary Table 1.

The proposed development will consist of a new two storey (G+1) school to be built on the site of an existing school. Pinn River School will accommodate 180 pupils, with allowance for a further 120 members of a staff (resulting in a maximum design occupancy of 300). The school will cater to pupils aged between 4 and 19 years old with a wide range of learning disabilities and physical needs.

The first floor will predominantly feature workshops, classrooms, activity spaces, meeting rooms and open dining and activity areas. The ground floor will contain further classrooms and workshops, in conjunction with a hydrotherapy room, therapy and development rooms and staff ancillary areas.

The building will principally operate a simultaneous evacuation regime, supported by an automatic detection and alarm system. However, in recognition of there potentially being a small number of non-ambulant pupils, the evacuation strategy shall also allow for a progressive horizontal evacuation (PHE) protocol. Means of escape from the upper floor will be facilitated by the three protected stairs and two evacuation lifts, all of which discharge either directly to outside or via a protected corridor. In addition to this, independent exits directly to outside around the perimeter of the building are also available on the ground floor.

An automatic suppression system is not required to meet the minimum recommendations of BS 9999 but will be provided in accordance with DFE requirements. The school shall have a structural fire resistance rating of 30 minutes (loadbearing capacity only).

Firefighting operations will be carried out primarily through vehicle perimeter access to the building, achieved via suitable access routes to 15% of the building perimeter on site. Hydrants are to be provided so that they are within 90m of the building entry points, otherwise new hydrants are to be provided.

Summary Table 1 – Fire safety systems

Item	Description	Report Ref.
Detection and alarm	Category L2(M) system to BS 5839-1	3.2
Smoke Ventilation	Not required	N/A
Emergency lighting	Provided throughout occupied areas and escape routes.	3.12
Fire safety signage	Provided to indicate fire exits and escape routes.	3.13
Stand-by power	Back-up power supplies to all life safety systems	3.14
Automatic suppression system	Provided for property protection only	5.1
Fire mains	Not required	7.4

CONTENTS

1. INTRODUCTION	6		
1.1 General	6		
1.2 Legislation and basis of design	6		
1.3 Reference information	6		
2. PROJECT OVERVIEW	7		
2.1 Building description	7		
2.2 Risk profile	7		
2.3 Design occupancy	8		
3. MEANS OF WARNING AND ESCAPE	10		
3.1 Evacuation philosophy	10		
3.2 Means of detection and alarm	11		
3.3 Visual Alarms	11		
3.4 Smoke ventilation systems	11		
3.5 Fire shutters	11		
3.6 Travel distances	11		
3.7 Exit width factors	11		
3.8 Horizontal means of escape	12		
3.9 Vertical means of escape	13		
3.10 Means of escape for disabled persons	14		
3.11 Escape beyond the final exits	14		
3.12 Emergency lighting	14		
3.13 Fire safety signage	14		
3.14 Emergency (life-safety) power supply	15		
4. INTERNAL FIRE SPREAD - LININGS	16		
4.1 Internal wall and ceiling linings	16		
5. INTERNAL FIRE SPREAD - STRUCTURES	17		
5.1 Automatic fire suppression	17		
5.2 Structural fire resistance	17		
5.3 Compartmentation and fire-resisting construction	17		
5.4 Fire doors	17		
5.5 Fire-stopping and penetrations through fire-resisting construction	19		
5.6 Cavity barriers and concealed spaces	19		
5.7 Protection of ductwork	19		
5.8 Cavity barriers and concealed spaces	19		
6. EXTERNAL FIRE SPREAD	21		
6.1 External wall construction	21		
6.2 Roof coverings	21		
6.3 Space separation and unprotected areas of the façade	21		
7. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE	23		
7.1 Means of notifying the fire and rescue service	23		
7.2 Water supplies	23		
7.3 Vehicle access to and around the site	23		
7.4 Access into and through the building	23		
8. FIRE SAFETY MANAGEMENT	24		
8.1 Overview	24		
8.2 Regulatory Reform (Fire Safety) Order 2005	24		
8.3 Management responsibilities in support of the fire strategy	24		
APPENDIX A - FIRE STRATEGY MARK-UPS	25		
9. EXTERNAL REFERENCES	26		

1. INTRODUCTION

1.1 General

- 1.1.1 Ashton Fire has been commissioned by Kier Construction to provide fire safety consultancy services in support of Pinn River SEND School located in Middlesex, London
- 1.1.2 Pinn River School is a school that will consist of two storeys (G+1) and will cater for a total of 300 members of staff and pupils aged between 4 and 19. The pupils will include those with wide range of learning difficulties, behavioural problems and physical needs.
- 1.1.3 This report documents the fire safety strategy developed for the scheme. It is intended that this strategy report supports the design team in progressing the detailed fire safety provisions for the project.
- 1.1.4 This document is not intended to portray detailed design information for fire safety systems or construction specifications. This report should be submitted for review by the building control body as part of the Building Regulations approvals process at the next stage (i.e. Contractor's Proposal stage) of the project.
- 1.1.5 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). This includes the appointed building control body and the London Fire Brigade.

1.2 Legislation and basis of design

- 1.2.1 Fire safety in buildings is governed by two pieces of legislation in the UK. The Building Regulations 2010, Part B, Fire Safety applies to building design, whilst for fire safety management in buildings, compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO) is required.
- 1.2.2 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
- 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 BS 9999: Code of practice for fire safety in the design, management and use of buildings (2017) and documents referenced therein in the first instance. Fire engineering principles are employed to support alternative solutions where strict adherence to the codes would conflict with the wider aspirations for the scheme. In addition to this, aspects of the Healthcare Technical Memorandum 05-02: Firecode (referred to as HTM 05-02 henceforth) have been utilised as the basis of the fire strategy in recognition of a proportion of the pupils being non-ambulant.

- 1.2.5 Unless otherwise stated, it is expected that provisions will be provided according to recommendations of BS 9999 and supplemented by HTM 05-02 where applicable.
- 1.2.6 Departures from the guidance documents are identified and alternative proposals (including associated analysis) are documented for facilitating review with the project's approvers. In accordance with the fire safety engineering principles detailed in the PD 7974 [1] 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).
- 1.2.7 The strategy has been developed in cognisance of the Construction (Design and Management) Regulations 2015 (CDM 2015) [2], which sets out what designers are required to consider, to protect anyone involved in the construction or ongoing use of a project. A summary of management and maintenance issues are provided in Section 8.
- 1.2.8 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 [3] and the Health and Safety Executive (HSE) [4] 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.

Table 1 – Project documentation referenced

Description	Reference	Revision	Author
GA Plan - Ground Floor	FS0728-NOV-ZZ-00-DR-A-0300	P11	Noviun Architects
GA Plan - First Floor	FS0728-NOV-ZZ-00-DR-A-0310	P11	
GA - Roof	FS0728-NOV-ZZ-00-DR-A-0320	P04	
GA Sections	FS0728-NOV-V1-XX-SR-A-2.201	P04	
GA Elevations	FS0728-NOV-V1-XX-DR-A-2.301	P04	
Schedule of Accommodation	--	Nov 2020	DfE

2. PROJECT OVERVIEW

2.1 Building description

- 2.1.1 Pinn River SEN School is a proposed school located in Hillingdon, London that will cater to pupils with learning difficulties, pupils on the spectrum, pupils with behavioural problems and pupils with special physical needs
- 2.1.2 The new school building will comprise of two storeys (G+1) and will feature a top storey height of circa 3.75m . Three protected stairs and two evacuation lifts will be provided to serve the upper floors of the building.
- 2.1.3 The floors of the building will be arranged as follows:
- First floor - will predominantly feature workshops, classrooms, activity spaces, meeting rooms and open dining and activity areas.
 - Ground floor - will contain further classrooms and workshops, in conjunction with main hall, a hydrotherapy pool, therapy and development rooms and staff ancillary areas.
- 2.1.4 The new school building will cater for up to 180 pupils and a further 120 members of staff, resulting in a maximum design occupancy of 300. It is understood that the school may accommodate some pupils who are non-ambulant and will therefore require assistance to escape, with up to 65 mobility impaired pupils expected in the building according to the design team and SSB.
- 2.1.5 Rooms/areas commissioned for community-use, or out-of-hours events are to be confirmed.
- 2.1.6 Indicative floor layouts for the school are depicted Figures 1 and 2.

2.2 Risk profile

- 2.2.1 As per the guidance contained within BS 9999, a risk profile is required to be established for the building to ascertain the minimum fire safety parameters recommended in BS 9999. The risk profile is a function of the occupancy characteristic and fire growth rate for the building.
- 2.2.2 The occupants of the school shall primarily be pupils and staff who will attend the building on a regular basis for scheduled lessons and other activities.
- 2.2.3 As pupils will occupy the school grounds on a regular basis, it is expected that they will be familiar with their surroundings. However, given the potential cognitive disabilities of the pupil population, the young age of some of the pupils and the presence of non-ambulant students, a 'B - Awake and Unfamiliar' risk profile is deemed more appropriate.
- 2.2.4 Staff areas, and areas within the building that will be only accessible for maintenance (e.g. staff rooms, kitchen, plant) are also assigned an occupancy characteristic of 'A - Awake and Familiar'.
- 2.2.5 For community-use areas, a 'B - Awake and Unfamiliar' risk profile will also be assigned during out-of-hours events to account for the fact that visitors to the school may not be familiar with the building layout and the escape routes.
- 2.2.6 The fire loading / content of the school is considered as analogous to that of a general office space. The appropriate fire growth rate for the building is therefore taken to be '2 - Medium'. Plant rooms, kitchens, laboratories, and other similar areas are considered to have a fire growth rate of '3 - Fast' and shall be separated from the rest of the building by fire-resisting construction.
- 2.2.7 A sprinkler system will be installed in the premises but for primarily for property protection. Therefore, the benefits derived from it will not be factored into the risk profiles.

2.2.8 A summary of the risk profiles in the buildings, and various areas within are summarised in Table 2.

Table 2 - Risk profiles

Area	Occupancy characteristic	Fire growth rate	Risk profile
Areas occupied by pupils (i.e. wider school)	A - Awake & Unfamiliar	2 - Medium	B2
Areas commissioned for community use (dining area and main hall)	B - Awake & Unfamiliar	2 - Medium	B2
Areas of higher fire hazard occupied only by members of staff (e.g. plant, kitchen)	A - Awake & Familiar	3 - Fast	A3
Note: Sprinkler provision has not been factored into the risk profiles. .			

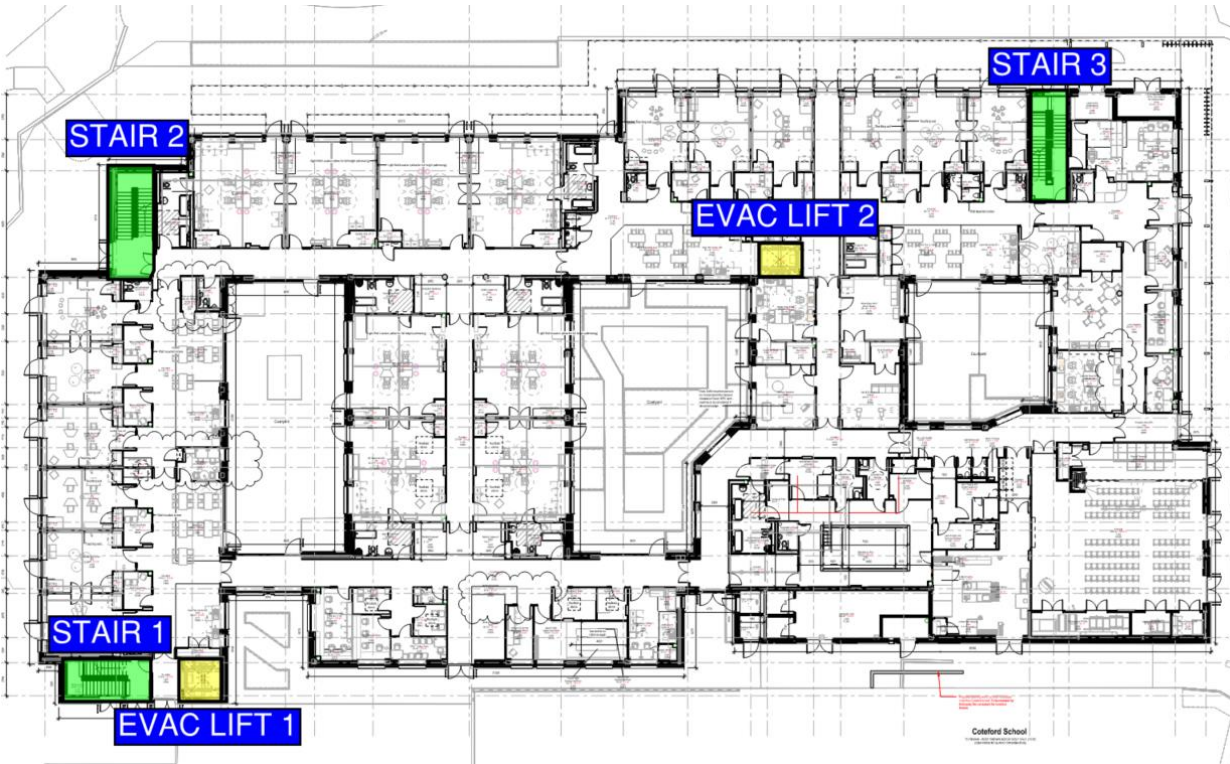


Figure 1 - Proposed ground floor layout

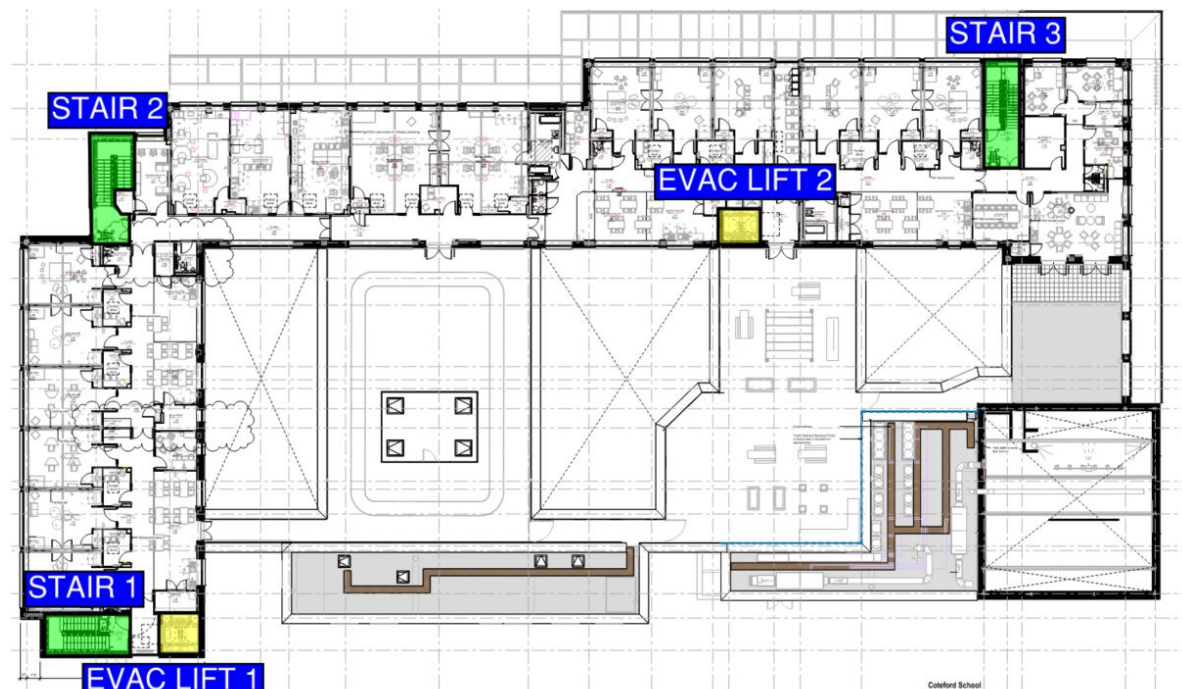


Figure 2 - Proposed first floor layout

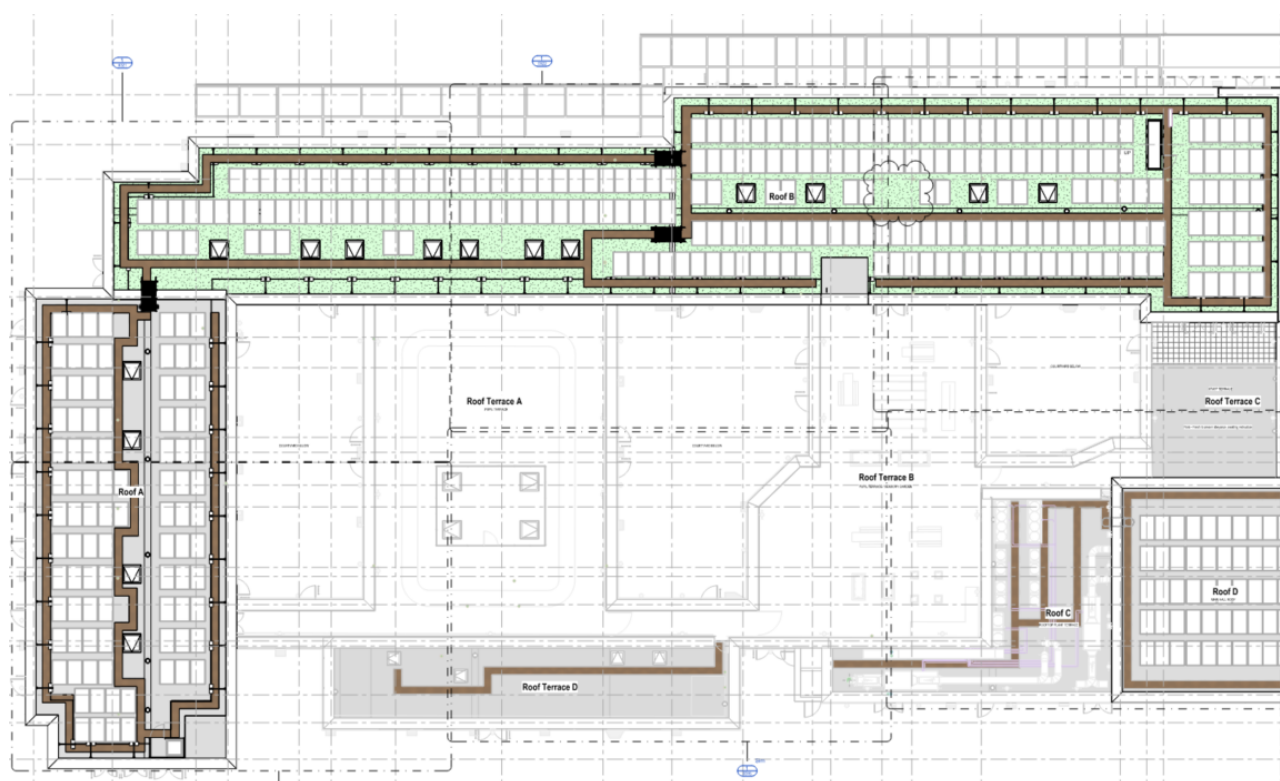


Figure 3 - Proposed roof layout

2.3 Design occupancy

- 2.3.1 The proposed school building is expected to accommodate up to 180 pupils, and 120 members of staff, totalling at a peak occupancy of 300 during school hours.

- 2.3.2 The expected occupancy numbers for various areas on each floor of the school building are based on the Schedule of Accommodation referenced in Table 1.

- 2.3.3 The estimated design occupancy for the building is summarised in Table 3.

Table 3 - Occupancy

Floor	Room	Occupants
First	Activity space (x12)	84
	Small group room (x8)	32
	MSI Classroom (x2)	16
	Science & Technology	3
	Secondary life skills	3
	Secondary food room	3
	Secondary library	6
	Staff wellness	24
	Conference room	10
	SLT office (x2)	16
	Head teacher's office	6
	AHT office	4
	Small meeting room	5
	Bursar / PA	2
	Staff work room	24
Total first floor occupancy		238 ^A
Ground	Main hall	64
	Physical development and Therapy	8
	Kitchen prep	6
	Pupils changing and showers (ambulant) (x4)	20
	Pupils changing (non-ambulant)	3
	Hydrotherapy Pool	16
	Special skills and development room (x5)	11
	Attention and listening room	3
	Salt room (x4)	16
	Therapy management office	7
	Activity space (x12)	84

Floor	Room	Occupants
	Staff workroom (x3)	25
	Small group room (x11)	44
	MSI classroom (x8)	64
	SLT office (x2)	16
	Primary food room	4
	i-lab	11
	Whole school art & music therapy	2
	Sensory integration room	4
	Theme space	4
	Cafe	24
	Life skills room	7
	Staff wellness	24
	Parents room	6
	General office	6
Total ground floor occupancy		479 ^A
Notes A) The combined pupil and staff population will not exceed 300 at any given time and therefore it is not expected that all rooms in the school will simultaneously be occupied at maximum occupancy. Egress provisions for each floor have been designed to accommodate no more than 300 occupants.		

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 A simultaneous evacuation regime will be implemented in the building, whereby, in the event of fire anywhere in a building, all occupants will receive the signal to evacuate.
- 3.1.2 Notwithstanding the above, allowance has also been made for a progressive horizontal evacuation protocol in the fire strategy in recognition of there being a small proportion of non-ambulant pupils in the building. This has been introduced due to the limited number of refuge spaces and evacuation lifts and involves pupils escaping into the adjacent fire compartment which will serve as a place of safety (with the aid of a suitably trained member of staff). So should they not be able to escape directly via a storey exit, they have the option to escape into the adjacent compartment where they may wait in a place of safety to continue their escape.
- 3.1.3 Therefore, upon detection of a fire anywhere in the building, non-ambulant pupils on the first floor shall:
- (i) Escape via the stair storey exit in their respective compartment (should a refuge space be available and can safely be used); or
 - (ii) Escape via the evacuation lift storey exit in their respective compartment (should this be available and safely be used - note that an evacuation lift is not available within Compartment 3); or
 - (iii) Should the above not be available, escape into an adjacent compartment, where they may temporarily reside in a place of relative safety whilst they await assistance and availability of a storey exit.
- 3.1.4 Occupants should not reside in the adjacent compartment indefinitely. They are to make their way to a suitable storey exit upon receiving assistance.
- 3.1.5 Members of staff should be suitably trained in the evacuation of non-ambulant pupils, taking into account the number of mobility impaired pupils requiring assistance on the first floor and any specific/individual evacuation needs.
- 3.1.6 A double-knock (two stage) alarm protocol may be administered throughout the school, provided that the school is permanently staffed whilst in operation. The double-knock system shall operate as follows:
- a) Upon activation of a single automatic smoke detector head (first knock), an alert will sound at the fire alarm panels. Members of staff will be given a fixed time (recommended maximum of 1 minute) to acknowledge the alert. During this acknowledgement period, an alarm would be raised throughout the school (full evacuation) if one of the following events were to occur:
 - a. Timeout of the acknowledgement period (1 minute);
 - b. Activation of a second automatic smoke detector;
 - c. Activation of a heat detector;
 - d. Activation of the suppression system; or
 - e. Activation of a manual call point.
 - b) On acknowledgement of the alert signal, an investigation period will be initiated (recommended maximum of 3 minutes). If during the investigation period, any of the following were to occur, then the investigation period will stop and the alarm will subsequently be raised throughout the school to signal a full evacuation of the entire building (second knock):
 - Confirmation of a fire by the investigating member of staff (manually activates the alarm system);
 - Timeout of the investigation period;
 - Activation of a second automatic smoke detector;
 - Activation of a heat detector;
 - Activation of the suppression system; or
 - Activation of a manual call point.
- 3.1.7 Activation of a heat detector, manual call point or suppression system at any time will result in the alarm being raised throughout the school instantly (second knock).
- 3.1.8 If the investigating member of staff determines that the detection and alarm system has activated falsely, the system may be reset with no alarm provided to the building.
- 3.1.9 Alternatively, an appropriate investigation time could be determined during the risk assessment and should be kept as low as reasonably possible. It is recommended that communication devices (such as walkie talkies) are made available so that the investigating member of staff is able to promptly relay the result of their investigation. A graphical alarm panel may also be provided to help members of staff easily locate the source of the first knock.
- 3.1.10 In summary, evacuation from the building should transpire as follows:
- (i) Investigation of first knock of the alarm by a member of staff;
 - (ii) Communication of investigation result to second member of staff at reception within the allotted 3-minute period (assuming no further activation of a detector/call point or the suppression system);
 - (iii) Instigation of alarm through the building upon confirmation of a fire;
 - (iv) Members of staff begin their evacuation of the 65 mobility impaired pupils in the building. If a storey exit can safely be used in the fire compartment then pupils may be evacuated in this manner. Otherwise, mobility impaired pupils should be re-located to the adjacent compartments. Able-bodied pupils who do not require assistance to evacuate should evacuate via one of the three stairs and should not utilise the evacuation lifts (as these are to be reserved for the mobility impaired pupils);
 - (v) Pupils are to be evacuated via the storey exits in these adjacent compartments as soon as they are available. All remaining pupils are to wait within the circulation corridors or within the refuge areas (if available).
 - (vi) The evacuation of the remainder of the mobility impaired pupils should be conducted as soon as possible and pupils should not reside in their compartment indefinitely.

- 3.1.11 Each mobility impaired pupil should be accompanied by at least one member of staff during the evacuation phase and each pupil should have a personal emergency evacuation plan that the respective member of staff should be familiar with.
- 3.1.12 In addition to the above, members of staff should be fully versed in the evacuation protocol for the building and the operation of the evacuation lifts. Furthermore, in the event of a fire, they should give careful consideration to whether or not the storey exits in the fire compartment are safe to use.
- 3.1.13 The automatic fire detection and alarm system will be provided in support this evacuation philosophy, as set out in Section 3.2.

3.2 Means of detection and alarm

- 3.2.1 Areas with a B2 risk profile are required to be provided with a minimum of a Category M (manual) detection and alarm system only. However, to provide early warning in the event of a fire, a Category L2 detection and alarm system shall be provided throughout the school building, designed and installed in accordance with BS 5839-1 [5]. The enhanced provision of the detection and alarm system will permit limited increases in travel distances and reduction in exit widths for areas with an A2 and B2 risk profile (a Category A2 detection and alarm system is also the minimum provision required for areas assigned an A3 risk profile).
- 3.2.2 Automatic detection and alarm shall be fitted within all rooms and escape routes within the building. It is recommended that heat detection is provided within the kitchen so as to limit the potential for false alarms to occur.
- 3.2.3 A voice alarm, design and installed in accordance with BS 5839-8, will supplement the alarm system in the building. The voice alarm may be programmed convey the location of the fire to assist staff with their evacuation plans. The voice alarm will activate in place of a conventional alarm upon confirmation of a fire.
- 3.2.4 Where provided, automatic fire safety systems (e.g. automatic fire curtain) may be activated by the wider Category L2 system or by a local detector provided in a strategic location.
- 3.2.5 Manual call points are to be provided as part of the automatic detection and alarm system installed within the building. In accordance with BS 5839-1, these should be of Type- A and provided to every storey exit within the building, or so that they are located within 45m of each other.
- 3.2.6 Within the hydrotherapy pool area, manual detection may be provided instead of automatic detection due to the adverse effects of corrosion on detector heads within wet environments. All parts of the pool area must be visible for all parts of the room.
- 3.2.7 In accordance with the recommendations of BS 5839-1, the fire alarm and detection engineer must submit the design certificate for the scheme to the approving authority prior to commencement of the installation on site.

3.3 Visual Alarms

- 3.3.1 Visual alarms will be provided where required in accordance with BS 5839-1.
- 3.3.2 In addition, areas that could facilitate occupants with hearing difficulties shall also be provided with a visual alarm as well as in areas with high ambient sound levels.

3.4 Smoke ventilation systems

- 3.4.1 In accordance with BS 9999 recommendations, there are no requirements for smoke ventilation systems within the building.

3.5 Fire shutters

- 3.5.1 The kitchen shall be separated from the main hall by a minimum of 30 minutes fire resistance. Any server openings shall therefore be provided with fire shutters which descend upon activation by a local heat sensor, such as a fusible link or heat detector, in the immediate vicinity of the shutter.
- 3.5.2 The fire shutters are required to have a minimum of 30 minutes fire resistance. Shutter assemblies should achieve the appropriate level of fire resistance in terms of integrity when tested or classified in accordance with BS 476-22 [6] or BS EN 13501-2 [7].

3.6 Travel distances

The maximum travel distances for this building are shown below for the appropriate risk profile. Escape from all areas within the building are within the actual single, and multi-directional travel distance limits given in Table 4, based upon the proposed FF&E layouts.

Table 4 - Travel distance limitations

Risk profile	Travel distance ^{A)}	
	Single direction (m)	More than one direction (m)
B2 (wider school and community-use areas)	23 ⁽¹⁾	57.5 ⁽¹⁾
A3 (kitchens, plant)	18	45
Open air / roof areas	60	200
Notes: A) The travel distance has been increased by 15% based on the provision of an L2 detection system.		

3.7 Exit width factors

- 3.7.1 The required width of exit doors, corridors and stairs are based upon the number of occupants in the building / area and the relevant factors given in Table 5.
- 3.7.2 Irrespective of the door widths calculated from the factors given in Table 5, BS 9999 recommends that all doors should have a minimum clear width of 800mm (to be increased to 850mm for doors that accommodate wheelchair users).
- 3.7.3 Corridors are to have a minimum clear width of 1,200mm in accordance with BS 9999. Cross corridor doors sub-dividing corridors should have a clear width no less than the corridor minus 150 mm. See Section 3.8.1 for additional discussion on sub-division of corridors.
- 3.7.4 Rooms serving more than 60 occupants should be provided with at least two exits, and they should be hung to swing towards the direction of escape. Doors hung to swing against the flow of escaping occupants are to serve a maximum of 60 people, irrespective of the available clear exit width.

Table 5 - Exit width factors

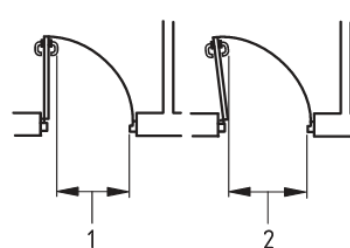
Risk Profile	Exit component	Minimum width factor (mm/person) ^{A)}
B2 (Pupil and Community-use areas)	Doors, corridors and escape routes	3.49 ^A
A3 (kitchen, plant)	Doors, corridors and escape routes	4.6

Notes:

A) The exit widths have been decreased by 15% based on the provision of an L2 detection and alarm system.

Capacity of doors with a width of less than 1,050mm shall be assessed on the basis of 'Door capacity = 500mm / exit factor'

Exit widths are for clear widths measured in accordance with Figure 14 of BS 9999



Key

- 1 Effective clear width (door stop to projecting building hardware)
- 2 Effective clear width (door stop to door leaf)

3.8 Horizontal means of escape

- 3.8.1 Corridors connecting storey and final exits that exceed 12m in length shall be sub-divided by cross-corridor doors. The cross-corridor doors are required to achieve 30 minutes fire resistance with smoke seals and should be configured such that they swing in both directions for escape. Where more than 60 occupants are located either side of the cross-corridor doors, these should swing in both directions.
- 3.8.2 Inner rooms are rooms that are accessed from a room or area containing a fire load which pose a higher risk to the escape of occupants.
- 3.8.3 BS 9999 provides recommendations to mitigate the risks presented to occupants in inner room arrangements, which include the following:
- Automatic detection will be provided in the classrooms and the corridor, with a fire alarm provided in the inner room, in the process alerting occupants to a fire within the access room;
 - The occupancy of each classroom will be less than the stipulated limit of 60 for inner rooms;
 - The travel distance from the remotest point of each classroom to the nearest exit from the access room is within the single-direction travel distance limit of 23m for rooms with an A2 risk profile; and
 - The access rooms (i.e. corridors / circulation spaces with a fire load) are not considered a place of special fire hazard.
- 3.8.4 Transient spaces such as store room, WCs are not deemed to be inner rooms due to occupants residing in them infrequently and for a relatively short duration.
- 3.8.5 Dead-end corridors greater than 2m are to be enclosed in 30 minutes fire resistance. Where this length exceeds 4.5m, the corridor that the dead-end subsequently discharges into should also be constructed as a protected corridor, using 30 minutes fire resisting construction and FD30S fire doors

(provided with cold smoke-seals) to ensure that the escape of the occupants is not prejudiced. Furthermore, the total occupancy of all rooms adjoining onto a dead-end should not exceed 60.

- 3.8.6 As stated in Section 3.1.2, each floor will be divided into three compartments, with each featuring at least one storey/final exit and an escape into an adjacent compartment in accordance with HTM 05-02. Compartments shall be separated by full height 60-minute compartment walls. The compartmentation for each floor shall be as per the figures below.

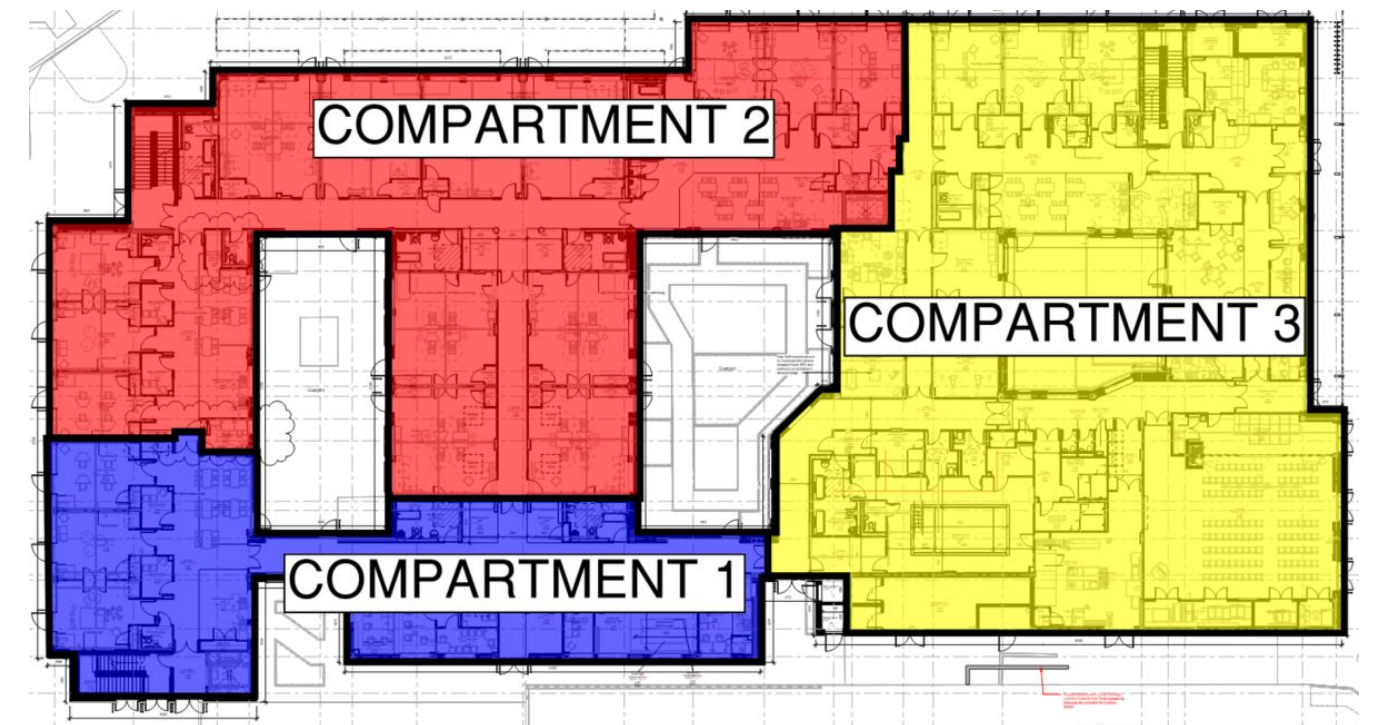


Figure 4 - Compartmentation on the ground floor

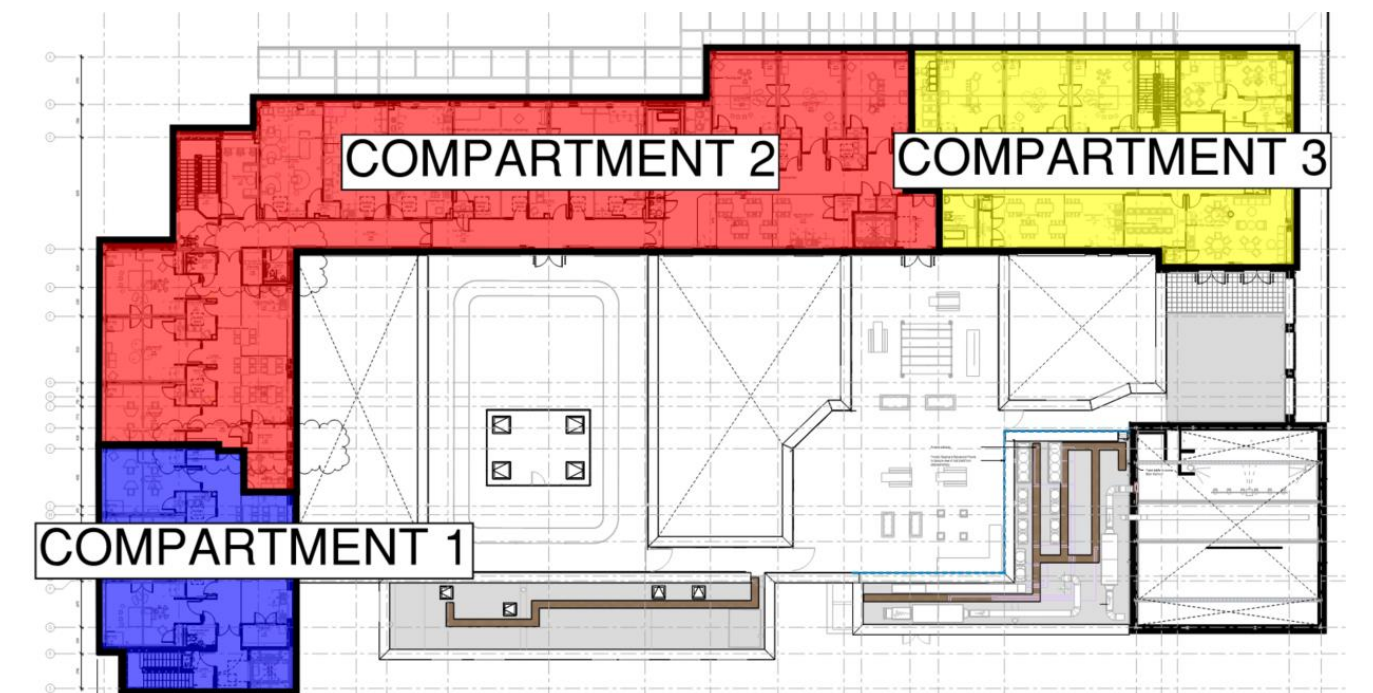


Figure 5 - Compartmentation on the first floor

- 3.8.7 Occupants on the ground floor should escape directly to outside in the first instance via the multiple exits provided around the building perimeter, alongside the independent exits assigned to individual rooms. Where there is a change in level for a final exit, a suitable ramp should be provided achieving a maximum gradient of 1:12.
- 3.8.8 Compartmentation is provided on the ground floor to facilitate escape from the first floor. On the first floor, occupants may escape into an adjacent compartment as opposed to a storey exit if there is a fire within their current compartment. This is due to the limited number of refuge spaces and evacuation lifts available for mobility impaired individuals. However, members of staff and pupils should not reside within the adjacent compartment indefinitely and should seek to escape (with the aid of a suitably trained member of staff) via a storey exit to outside at the earliest available opportunity.
- 3.8.9 The main hall is assigned an occupancy of more than 60 persons. Therefore, it will feature two exits, both swinging in the direction of escape, resulting in a total capacity of 143 persons. Each door should achieve a clear width of at least 850mm.
- 3.8.10 The escape routes from the hydrotherapy pool pass through the changing rooms. It should therefore be ensured that these rooms are unlocked upon detection of a fire anywhere in the building (including subsequent doors that lead to main circulation corridor of the school).
- 3.8.11 The ground floor contains six independent exits to outside. In conjunction to this, the majority of rooms on the ground floor have their own independent exit to outside. Consequently, as the school maximum occupancy equates to 300 persons, there is more than sufficient capacity available via the ground floor exits to accommodate the school occupancy without having to consider merging flows with the stairs. As a result of this, the stairs should not be signed as storey exits on the ground floor.
- 3.8.12 Any laboratories containing fume cupboards that are located next to the room exit should be provisioned with a secondary means of escape, either to outside the laboratory or via passage doors to the adjacent room. Alternatively, the fume cupboard should be re-located remotely from the exit of the room.
- 3.8.1 Inner rooms are rooms which are accessed from another room or area containing a fire load. Inner rooms are present on both floors e.g. the activity studios on the first floor that are accessed via a corridor that contains an open-plan activity area and family dining areas. See Section 3.8.3 and 3.8.4 for further details.
- 3.8.2 BS 9999 provides recommendations to mitigate the risks associated with inner room arrangements, which include the following:
- Automatic detection should be provided within both the inner room and access room, with a fire alarm provided within the inner room to alert occupants to a fire within the access room.
 - The occupancy of each inner room should not exceed 60 occupants at any given time.
 - The travel distance from the remotest point of inner room to the nearest exit from the access room is within the single-direction travel distance limits, as recommended in Table 4.
 - The access rooms should not be a place of special fire hazard
- 3.8.3 It is proposed that heated trolleys (plugged into power outlets) will occasionally be used in the family dining areas. As these will be used only during morning break and lunch time, it is proposed that their use in these areas is acceptable (subject to agreement from the approving authorities). It should be ensured that these trolleys are supervised by members of staff at all times, and that they are unplugged when not in use.

- 3.8.4 Occupants escaping via the southern elevation on the ground floor should be directed to the assembly point via suitably placed signage. Where the escape route is more than 1.8m away from the elevation of the building, fire protection is not required from inside to outside (see Section 3.11.2).
- 3.8.5 Any automatic doors should be configured to fail-open upon loss of power and should remain in the open position upon detection of a fire to facilitate ease of escape.
- 3.8.6 Doors along escape routes should not narrow, ensuring bottlenecks are avoided.
- 3.8.7 It is understood that the terraces on the first floor may be commissioned by the school for certain activities. Each terrace should have a secondary means of escape and where the internal areas of the first floor are not easily visible from the terrace, dynamic signage is recommended to direct staff and pupils to a safe compartment. Doors providing access to the school from the terrace should open upon detection and be configured to be 'fail-safe' upon loss of power.
- 3.8.8 Lockers should be of non-combustible construction and feature sloped tops to deter storage being placed on top of them. Furthermore, lockers and furniture/equipment should not be located within dead-end corridors.
- 3.9 Vertical means of escape**
- 3.9.1 The school building will be provided with three protected stairs serving the internal floor areas. The three stairs will not be lobby protected and as such BS 9999 requires that one of the stairs is discounted in the vertical egress calculation.
- 3.9.2 BS 9999 recommends stair width factors for calculating the minimum allowable stair width, based on the number of occupants on the upper floors of the building and number of floors served by each stair. As discussed in Section 3.2.1, the provision of an automatic detection and alarm system in the school building is taken into account in BS 9999, by permitting a 15% relaxation of the proposed stair width factor where this has been applied. This results in a stair width factor of 4.08mm/person (adopting a B2 risk profile for a stair serving a single storey).
- 3.9.3 The vertical egress calculation will conservatively be premised upon the entire school occupancy being present on the first floor.
- 3.9.4 Based on a clear width of 1400mm for each stair (actually provided), the capacity of the upper floor equates to 686. It should be noted that this capacity is specific to the able-bodied pupils as those who require assistance to evacuate will not directly use the stairs for escape in the event of a fire. However, the vertical egress calculation also has to also take into account mobility impaired occupants who cannot use the stairs for escape.
- 3.9.5 For disabled egress, the capacity is determined by the space available for mobility impaired occupants to queue. Assuming the worst case scenario, which is represented by a fire within the largest compartment (i.e. Compartment 2, resulting in all mobility impaired occupants having to queue in the two smaller compartments that are Compartment 1 & 3), the space available within the circulation corridors amounts to circa 140m².
- 3.9.6 As the mobility impaired occupants will likely be in wheelchairs, it is reasonable to adopt the stipulated size of a refuge space as the queuing space factor, which is 1.4m x 0.9m. This equates to an area of 1.26m². For members of staff accompanying these pupils, a space factor of 0.3m² per person has been adopted, as stated in Table 9 of BS 9999.
- 3.9.7 Based on the above, the circulation corridors can accommodate up to 89 mobility impaired occupants and 89 accompanying members of staff, which is greater than the 65 that have been assigned to this

school. It should be noted that this is a conservative assessment as it assumed that all mobility impaired occupants will be on the upper floor and does not take into account anyone using the storey exits or waiting in a refuge space within the stair.

- 3.9.8 It is understood that greater width may be required by other guidance such as Approved Document M or BB 102.
- 3.9.9 Handrails which do not intrude more than 100mm into the clear escape route width may be disregarded as impacting upon the recommended width.
- 3.9.10 Travel distances on the roof are limited to 60m where a single exit is available and 200m where there are at least two means of escape. On the roof terraces present on the first floor, the single direction travel distance is limited to 45m.
- 3.9.11 In addition to the three protected stairs, two evacuations lifts will be provided in Compartments 1 and 2. The evacuation lifts should be operated by a suitably trained member of staff as part of the emergency evacuation plan. Both evacuation lifts will discharge to outside via a protected lobby/corridor.

3.10 Means of escape for disabled persons

- 3.10.1 It should be noted that under the Regulatory Reform (Fire Safety) Order 2005, it is the duty of the responsible person along with their appointed safety assistants to assist everyone to a place of ultimate safety outside the buildings in the event of an emergency.
- 3.10.2 Disabled persons shall be provided with suitable refuge areas (each at least 900 x 1,400 mm) protected from the effects of fire, e.g. within each protected stairway separated from the location of the fire. This will enable them to wait in a place of safety while the majority of the building occupants descend before they make their way out of the building at their own pace with assistance.
- 3.10.3 Each refuge shall be provided with an emergency voice communications system (EVC). The system shall comply with BS 5839-9 and consist of a Type B outstation which communicate with a master station located near the building or the fire alarm panel.
- 3.10.4 Refuges should be located not to impede on the movement of occupants onto stairways or escape routes, be clearly identified and provided with emergency voice communication between the refuges and management / security positions.
- 3.10.5 Due to there being non-ambulant occupants present in the school, it is recommended that as many refuges as possible are provided in each protected stair (the minimum requirement is one).
- 3.10.6 Disabled refuges are to be provided on each floor, though they may be omitted from the ground floor level provided that level egress (or suitable ramp escape) to the outside ground level is provided.
- 3.10.7 Two evacuation lifts, designed and installed in accordance with relevant provisions of BS EN 81-20 [11] and BS EN 81-70 [11], will also be provided.
- 3.10.8 The evacuation lift shall be located within a protected enclosure consisting of the lift well itself and a protected lobby at each storey served by the lift. At Ground Floor the lift will discharge either directly to outside or via a protected escape route.
- 3.10.9 The evacuation lift should be provided with a switch/signage clearly marked "Evacuation Lift" and situated adjacent to the lift landing door at the final exit level.
- 3.10.10 The cause and effect of any evacuation lift is to be discussed and agreed with the relevant AHJ.

3.10.11 Suitable management procedures will be required to ensure effective operation of the evacuation lift in the event of an emergency and the evacuation lift should be manually operated by a suitably trained, competent person.

3.10.12 The evacuation lift is required to be provided with a suitable secondary power supply.

3.10.13 Any disabled pupils and members of staff should have a Personal Emergency Evacuation Plan (PEEP) and the procedures should be practised. A General Emergency Evacuation Plan (GEEP) will need to be written for members of the public who would need assistance to escape. Further information can be found in BS 8300-2 and the DCLG Publications "Fire Safety Risk Assessment Supplementary Guide - Means of Escape for Disabled People".

3.11 Escape beyond the final exits

- 3.11.1 Travel beyond the building final exits must be away from the building, towards a place of safety, and not be jeopardised by unprotected openings of the building. It is proposed that this is achieved through a combination of some of the following (relevant to each location):
 - external fire-rated construction provided to a minimum height of 1,800mm above ground level where people are required to pass within 1,800mm of an external wall;
 - where final exits discharge within 1,800mm of an external wall at 90° or less to the plane of the final exit, fire-rated construction will be provided to external walls within 1,800mm of the final exit;
 - exit paths provided that lead away from the building; and
 - alternative paths along the building that cannot be impacted by a single fire location.
- 3.11.2 Where escape around the building is within 1.8m of an external elevation, the corresponding elevation should be fire rated for 30 minutes (from inside to outside).

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 [8], BS EN 1838:2013 [9] and BS EN 60598-2-22:2014 [10].
- 3.12.3 Emergency lighting will illuminate 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 fire-fighting equipment. Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route.
- 3.12.4 Primary and emergency lighting will be required for any external escape routes that will not be lit by surrounding street lighting.

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 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 [11], BS 5499-4 [12] and BS 5499-10 [13].

- 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 Fire notices should be permanently displayed in conspicuous positions throughout the building, including storey exits, and should be specific to it.
- 3.13.4 Dynamic signage should be considered for the roof terraces, as described in Section 3.8.7
- 3.13.5 All fire doors will be marked with the appropriate fire safety sign conforming to BS ISO 3864-1:2011 (white on blue) according to whether the door is:
- to be kept closed when not in use ('FIRE DOOR - KEEP SHUT');
 - to be kept locked when not in use ('FIRE DOOR - KEEP LOCKED'); or
 - held open by an automatic release mechanism ('AUTOMATIC FIRE DOOR - KEEP CLEAR').
- 3.13.6 Any emergency securing device fitted to doors on escape routes are to be provided with instruction notices, adjacent to the device, indicating the method of operation.

3.14 Emergency (life-safety) power supply

- 3.14.1 All life-safety systems will be provided with robust power supplies in accordance with BS 8519:2020.
- 3.14.2 The following fire safety systems shall comply with their respective British Standards regarding secondary power supplies:
- Emergency lighting and signage;
 - Automatic fire detection and alarm system;
 - Emergency Voice Communication (EVC) system;
 - Fire shutter (unless gravity-fed)
 - Evacuation lifts
- 3.14.3 There must be minimal delay in change over if the main power fails and it must occur automatically.
- 3.14.4 A secondary power supply independent of the primary power supply to the building, such as an automatically started generator or a supply from another substation, shall be provided.
- 3.14.5 Alternatively, emergency lighting / internally illuminated signage and fire detection and alarm systems may utilise internal batteries to provide back-up power supply where appropriate. These batteries should be capable of a continuous stand-by supply in accordance with the relevant design standard and be fully rechargeable within a period of 24 hours.

4. 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.
- 4.1.2 Restrictions are placed on the wall and ceiling lining materials within certain areas of buildings to limit the spread of fire and production of smoke in these areas.
- 4.1.3 It is particularly important that in circulation spaces, where the rapid spread of fire is most likely to prevent occupants from escaping, the surface linings are restricted, by making provision for them to have low rates of heat release and surface spread of flame.
- 4.1.4 All wall and ceiling linings within the building should meet the recommendations of BS 9999 when tested under the European Classifications (in accordance with BS EN 13501-1 [15]) as summarised in Table 6.
- 4.1.5 The surface linings of walls and ceilings should generally conform to the classification recommended above for the appropriate location. However, parts of walls in rooms may be of a lower class but not lower than European Class D-s3, d2, provided that the floor area of those parts in any one room does not exceed half of the floor area of the room, subject to a maximum area of 60 m².

Table 6 – Surface spread of flame requirements

Location	Euro Class
Small rooms ≤30m ²	D-s3, d2
Circulation spaces	B-s3, d2
Other rooms	C-s3, d2

- 4.1.6 Any non-plastic rooflights are to meet the recommendations of Table 6.
- 4.1.7 Where thermoplastic materials are used in the building, these are to comply with the various recommendations provided in Sections 34.1.2 of BS 9999.

5. INTERNAL FIRE SPREAD – STRUCTURES

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 Based on the height of the building being less than 30m, an automatic suppression system is not required in accordance with BS 9999. However, in line with DfE requirements in the Technical Annex 2A for multi-storey SEN schools, a sprinkler system will be installed through the premises.
- 5.1.2 This sprinkler system is conservatively assumed to be for property protection only and therefore any benefits derived from it will not be taken into account.
- 5.1.3 Subject to agreement from all stakeholders on the project, including the DfE, the sprinkler contractor and the approving authorities, sprinkler protection may be omitted from the external canopies.

5.2 Structural fire resistance

- 5.2.1 The new school building will have a top floor level less than 5m above ground floor level. In accordance with BS 9999, buildings with a B2 risk profile and a top floor height of not more than 5m above ground floor level require a structural fire resistance of 30 minutes.
- 5.2.2 If a structure with lower fire resistance supports or provides stability to another element of structure, then the protection to the supporting structure should be at least the same as the structure it is supporting. Therefore, where the structure supports the 60-minute compartment walls, it should achieve the same rating as the compartment walls.
- 5.2.3 Where the roof supports an additional load (e.g. plant rooms, air handling units), the relevant structural elements should be fire rated so that evacuation and firefighting operations are not jeopardised.

5.3 Compartmentation and fire-resisting construction

- 5.3.1 Based on the overall risk profile for the building (i.e. B2), each compartment is limited to an area of 8,000m². This has been observed for the three 60-minute compartments provided in the building.
- 5.3.2 A compartment floor will not be provided in the building. This is a departure from the recommendations in HTM 05-02 however a compartment floor at the first-floor slab level is not deemed necessary due to occupants not remaining in the building indefinitely. Unlike hospital and healthcare buildings, occupants are not required to remain in the building (as would be the case with

patients in an operating theatre or patients that are unable to be moved) and therefore can continue their escape to final escape. Furthermore, should there be a fire on the ground floor, occupants are able to move into an adjacent compartment which will be fully separated from a fire below by virtue of the vertical compartmentation provided.

- 5.3.3 Notwithstanding the above, each compartment wall should run the entire length of the building. Where compartment walls do not align between storeys, the respective portions of the floor should be constructed as compartment floors (see Appendix A for further details). This is to ensure that the 60-minute compartment wall is continuous and cannot be breached between storeys.
- 5.3.4 Any penetrations through the compartment wall should be suitably fire-stopped for a period of 60 minutes.
- 5.3.5 Rooms and areas that are considered to present a higher fire risk should be separated from the rest of the building by a minimum of 30 minutes fire resistance. This includes rooms such as Science studios / workshops, kitchens, art rooms, store rooms, and the plant room.
- 5.3.6 Plant rooms housing life safety equipment (e.g. sprinkler pumps) should be enclosed in 120 minutes fire resistance.
- 5.3.7 Oxygen stores are to be enclosed in a minimum of 60 minutes fire resistance. Any stores of oxygen or gases external to the building should be sited a sufficient distance away such that the effects of a fire do not affect the main school building. Furthermore, any requirements supplementary to fire safety that relate to COSHH and DESEAR should also be carefully observed.
- 5.3.8 It is proposed that the changing rooms for the hydrotherapy pool are enclosed collectively. This is due to the wet environment that reduced the risk of a fire and to avoid issues with the operation and maintenance of fire dampers within a wet environment.
- 5.3.9 Storey exits are to be separated by a continuous 30-minute fire resisting line using cross-corridor doors in the circulation spaces to ensure that a single seat of fire doesn't jeopardise multiple storey or final exits.
- 5.3.10 Protected corridors and lobbies are to be enclosed using 30 minutes fire resisting construction. A protected lobby is to be provided to both evacuation lifts on the first floor. The updates to the wiring regulations with regards to services through protected corridors within BS 7671 are not considered in this report. This approach is subject to agreement from the approving authorities.
- 5.3.11 Server rooms are enclosed in 30 minutes fire resisting construction. However, supplementary requirements for property protection purposes with other stakeholders are to be confirmed.
- 5.3.12 The ground floor kitchen shall be enclosed using 30 minutes fire resisting construction. Where the opening is provided between the kitchen and the main hall, a 30-minute fire shutter should be fitted over the opening. This should be arranged to deploy immediately upon detection of a fire in the kitchen, or alternatively by a fusible link.
- 5.3.13 The server room is to be enclosed in 120 minutes fire resisting construction in line with DfE requirements (note that 30 minutes fire resistance is sufficient for life safety).
- 5.3.14 The fire resistance requirements for the new school buildings are summarised in overleaf.

5.4 Fire doors

- 5.4.1 Fire doors should be provided as summarised in , in accordance with the recommendations of BS 9999.

- 5.4.2 Doors on escape routes should not be fitted with locks, latch or bolt fastenings or should only be fitted with simple fastenings that can be readily operated (without the use of a key) from the side approached by occupants making an escape.
- 5.4.3 Where doors on escape routes need to be secured against unauthorised use by electrically powered access control measures when the building or part of the building is occupied, it should also be overridden from the side approached by occupants making an escape. Electrically powered doors should return to the unlocked position;
- on operation of the detection and alarm system; and
 - on loss of power or system error
- 5.4.4 Manual door release units (Type A) should be designed to BS EN 54-11 and should be positioned at side of the door that is approached by people making their escape. Where the door provides escape in either direction, a unit should be installed on both sides of the door.

Table 7 - Periods of fire resistance for fire-separating elements (in minutes)

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	30	n/a	n/a	Exposed Faces
Compartment wall	60	60	60	Each side separately
Compartment floor (where applicable)	60	60	60	From the underside
Lift shafts	30	30	30	Each side separately
Stairs	30	30	30	Each side separately
External walls				
Any part more than 1,000 mm from the relevant boundary ^{A)}	30	30	15	From the inside
Any part adjacent to an external escape route or stair	30	30	n/a	From the inside
Protected lobbies / corridors	30	30	30	Each side separately
Science studio / art and design / food room / kitchen	30	30	30	Each side separately
Distribution boards / plant rooms / chemical store	60	60	60	Each side separately
Plant rooms housing life-safety equipment	120	120	120	Each side separately
Cavity barriers	n/a	30	15	Each side separately
Notes:				
A) As required by Section 5.3 to resist external fire spread to neighbouring buildings				

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, and thereby prevent a fire from travelling around the junction and into the neighbouring space. Penetrations through lines of fire-resisting separation should be fire-stopped using a system which will achieve the same fire resistance rating as the penetrated wall or floor.
- 5.5.2 In order to maintain the fire resistance of separating construction, any pipe or cable penetrations through lines of fire-resisting separation should be fire-stopped in accordance with one of the following methods set out by BS 9999, unless located within a protected shaft.
- for pipes of any diameter, a proprietary seal which has been shown by test to meet the fire-resistance rating of the wall, floor, or cavity barrier for the penetration circumstance; or
 - for pipes with a restricted diameter, keeping the opening as small as possible and providing fire-stopping around the pipe. The nominal interior diameter of the pipe should not be more than the relevant dimensions given in Table 31 of BS 9999.
- 5.5.3 Any gas supply pipe through a protected stair will be of a screwed-steel or all-welded steel construction, installed in accordance with the "Pipelines Safety Regulations 1996, SI 1996 No 825" and the "Gas Safety (Installation and use) Regulations 1998. SI 1998 No 2451".
- 5.5.4 Where a duct crosses fire-resisting construction protecting escape routes, dampers on fusible links are not sufficient. 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.
- 5.5.5 Any gas supply pipe through a protected stair will be of a screwed-steel or all-welded steel construction, installed in accordance with the "Pipelines Safety Regulations 1996, SI 1996 No 825" and the "Gas Safety (Installation and use) Regulations 1998. SI 1998 No 2451".
- 5.5.6 Any extraction ductwork serving the kitchen is recommended to avoid passing through fire-resisting construction where possible. If this cannot be avoided, then the ductwork should not be fitted with dampers, and should instead be fire-resisting or be enclosed within fire-resisting construction. Access hatches will be required at least every 3 m within kitchen extraction ductwork to assist with cleaning to prevent the accumulation of flammable grease within the duct.

Table 8 - Fire doors

Position of Door	Tested to BS 476-22 [6]	Tested to BS EN1634-2 [16]
Enclosing ancillary accommodation	As per the wall it is fitted in	As per the wall it is fitted in
Enclosing a protected stair	FD 30S	E 30S _a
Enclosing a riser	FD 30	E 30
Enclosing a protected corridor	FD30S	E 30S _a
Cross-corridor doors	FD 30S	E 30S _a
Notes:		
The ratings shown above are for integrity only.		
Smoke seals are indicated by the suffix 'S' (to BS 476-31 [17]) or Sa (to BS EN 1634-3 [18]) and are required in all doors which form the enclosure to protected escape routes.		
All fire doors should be self-closing except for doors which are normally locked shut, such as to places of special fire hazard or service risers, which should also be provided with appropriate signage.		

Table 9 - Maximum diameter of pipes

Situation	Pipe material and maximum internal diameter		
	Non-combustible material ⁽¹⁾	Lead, Aluminium, Aluminium Alloy, uPVC ⁽²⁾ , Fibre Cement	Any other material
Structure enclosing a protected shaft which is not a stairway or lift shaft	160 mm	110 mm	40 mm
Any other situation	160 mm	40 mm	40 mm
Notes: 1) Any non-combustible material which, if exposed to a temperature of 800° C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe. 2) uPVC pipes conforming to BS 4514 and uPVC pipes conforming to BS 5255.			

5.6 Cavity barriers and concealed spaces

- 5.6.1 All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). In general, cavity barriers should be at 20 m centres in cavities with exclusively Class C-s3, d2 linings or better (European Classification) or Class 0 or 1 linings (National Classification). For other linings, the spacing between cavity barriers should be reduced to 10 m.
- 5.6.2 Cavity barriers provided around openings within the external wall may be formed of:
- steel at least 0.5mm thick or timber at least 38mm thick; 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.
- 5.6.3 Likely areas which may feature new extensive concealed cavities include within cavity walls forming facades, and above any suspended ceiling provided in the kitchen area.

5.7 Protection of ductwork

- 5.7.1 One of the following methods is to be implemented where a ventilation duct passes through a fire resisting element to maintain the integrity of the element being breached:
- Protection using fire and smoke dampers activated upon smoke detection (ES-type dampers). It should be noted that fire dampers only are not suitable to protected escape routes;
 - Protection using fire-resisting enclosure achieving the fire resistance rating equivalent to the highest rated compartmentation it penetrates;
 - Protection using fire-resisting ductworks achieving the fire resistance rating equivalent to the highest rated compartmentation it penetrates.
- 5.7.2 If dampers are the preferred form of ductwork protection, smoke detector operated fire and smoke dampers shall be provided where the ductwork crosses fire-separated or smoke-separated sections of escape routes. Such dampers should be tested in accordance with BS EN 1366-2 and an ES classification equal to or greater than 30/60 minutes in accordance with BS 13501-3.

- 5.7.3 The fire resistance of duct and dampers should be equal to the fire-resistance required for the element being penetrated. All ducts should be fire-stopped where they penetrate compartments and fire-resisting enclosure of escape routes.
- 5.7.4 Any extraction ductwork serving the kitchen is recommended to avoid passing through fire-resisting construction where possible. If this cannot be avoided, then the ductwork should not be fitted with dampers, and should instead be fire-resisting or be enclosed within fire-resisting construction. Access hatches will be required at least every 3 m within kitchen extraction ductwork to assist with cleaning to prevent the accumulation of flammable grease within the duct.
- ## 5.8 Cavity barriers and concealed spaces
- 5.8.1 Cavity barriers are provided in order to prevent the rapid spread of unseen fire or smoke in voids, and to prevent the spread of fire around compartmentation via voids. Extensive internal concealed cavities (e.g. roof voids or the void between suspended ceilings and the soffit of the floor above) generally require cavity barriers to sub-divide them, as illustrated in Figure 7.
- 5.8.2 All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). In general, cavity barriers should be at 20 m centres in cavities with exclusively Class C-s3, d2 linings or better. For other linings, the spacing between cavity barriers should be reduced to 10 m.
- 5.8.3 Cavity barriers provided around openings within the external wall may be formed of:
- steel at least 0.5mm thick or timber at least 38mm thick; 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.
- 5.8.4 Likely areas which may feature extensive concealed cavities include within the facade, and above any suspended ceiling provided in the main hall or other open areas.

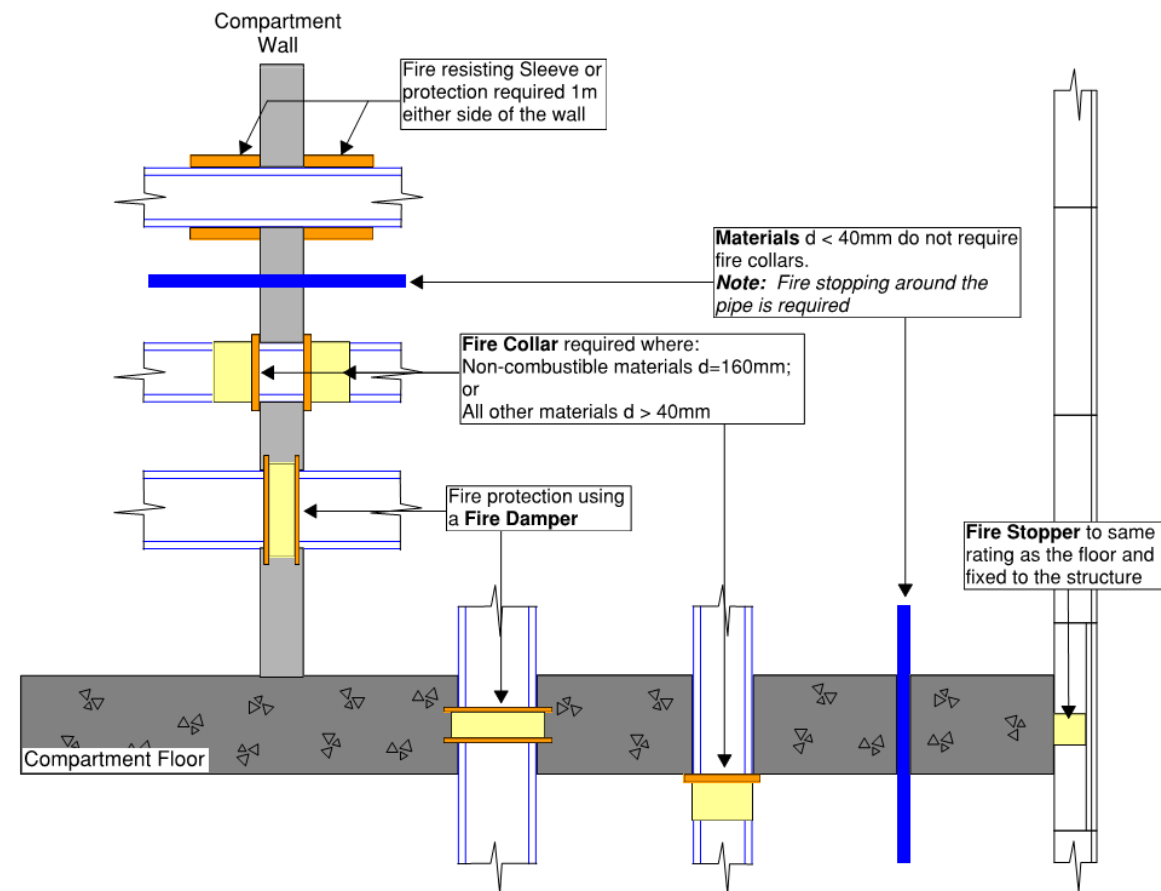


Figure 6 - Fire-stopping expectations

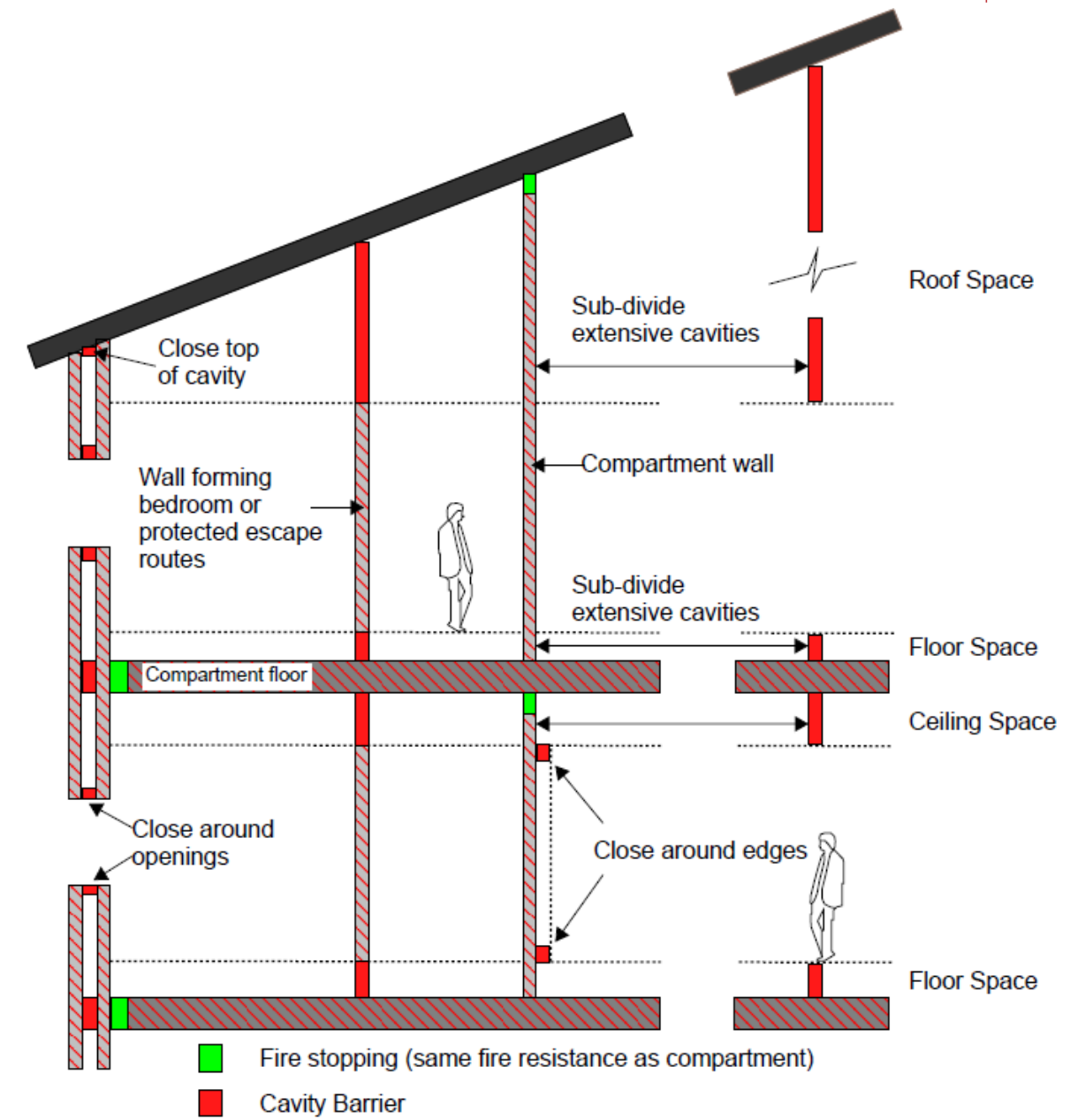


Figure 7 - Cavity barrier and fire-stopping locations

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 In order to prevent the spread of flame across the surface of a building at a speed which may pose a threat to life, materials forming the external cladding to buildings are meet the performance criteria given in BR 135 [19] for cladding systems using full scale test data from BS 8414-1 or BS 8414-2, or should meet the following recommendations:
- External surface of wall should be in accordance with 6.1.2;
 - Cavity barriers in accordance with section 5.6;
 - For walls which are not subject to the maximum cavity barrier spacing (by virtue of their masonry construction), the surfaces of materials which face into cavities should also meet the provisions set in 6.1.2.
- 6.1.2 Given the building has a top floor height of less than 18m above ground level, for facades less than 1 m from the adjacent boundary, the linings should conform to the following surface spread of flame classifications or better:
- Class B-s3, d2 or better (Europeans standards); or
 - profiled or flat steel sheet at least 0.5 mm thick with an organic coating of no more than 0.2mm thickness is also acceptable.
- 6.1.3 For facades greater than 1 m from the adjacent boundary, no performance criteria are specified.
- 6.1.4 For buildings less than 18 m in height, insulation or filler materials in the external wall are permitted to be combustible, provided that the external façade does not actively promote fire spread and meets the remainder of the recommendations for the external façade construction and materials.

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 The relevant test and classification standards for the external fire performance of roof systems is BS EN 13501-5 [20] (European Class).
- 6.2.3 Roof coverings refer to a construction that can consist of one or more layers of material but does not refer to the roof structure as a whole.
- 6.2.4 Should photovoltaic panels provided on the roofs, these should either also be in accordance with these recommendations or should meet suitable alternative guidance. Table 10 summarises the separation distances from the boundary according to the type of roof coverings as described in Section 35.4 of BS 9999.

Table 10 - Limitations of 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	✓	✓	✓

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. In order 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 the adjacent buildings across the site boundary; or
 - a notional boundary created midway between adjacent buildings.
- 6.3.3 A common radiation intensity of 84 kW/m² has been applied to the building as recommended in BR 187 [21]. The benefits derived from a fully operational sprinkler system in the building are not considered as a sprinkler system will not be installed in the building.
- 6.3.4 Considering the guidance of the BR 187, the size of the emitter will correspond to the width and height of each elevation and analysis of the results will be dependent on the relevant boundaries for the building as noted above. The height of the emitter will be taken to the top of the parapet which is measured to be circa 9.2m.
- 6.3.5 The dimensions of the emitter will correspond to the height and width of each emitter. Walls between compartment walls are to be constructed as full height compartment walls. However, this protection may be omitted from the courtyard where the compartments do not directly interface. Where the distance from the elevation to the site boundary is within 1m, the entire façade is to be fully protected.
- 6.3.6 The external fire spread analysis is carried out overleaf for each compartment.

Table 11 - External fire spread assessment for Compartment 1

Elevation	Enclosing rectangle [m]		Radiation intensity [kW/m ²]	Boundary distance (m)	Permitted unprotected area (% / m ²)
	W	H			
1	20.2	9.2	84	23.1	100% / 185m ²
2	25.5	9.2	84	<1	0% / 0m ²
3	9.9	9.2	84	<1	0% / 0m ²
4	22.7	9.2	84	15.4	100% / 208m ²
5	31.8	4	84	1.2	23% / 29 m ²

Table 12 - External fire spread assessment for Compartment 2

Elevation	Enclosing rectangle [m]		Radiation intensity [kW/m ²]	Boundary distance (m)	Permitted unprotected area (% / m ²)
	W	H			
1	27.9	9.2	84	21.6	100% / 256m ²
2	64.9	9.2	84	53.8	100% / 597m ²
3	17.1	9.2	84	<1	0% / 0m ²
4	44.3	9.2	84	<1	0% / 0m ²

Table 13 - External fire spread assessment for Compartment 3

Elevation	Enclosing rectangle [m]		Radiation intensity [kW/m ²]	Boundary distance (m)	Permitted unprotected area (% / m ²)
	W	H			
1	46.2	9.2	84	<1	0% / 0m ²
2	28.4	9.2	84	73.8	100% / 261m ²
3	46.2	9.2	84	50.1	100% / 425m ²
4	43.8	9.2	84	1.8	19% / 76m ²

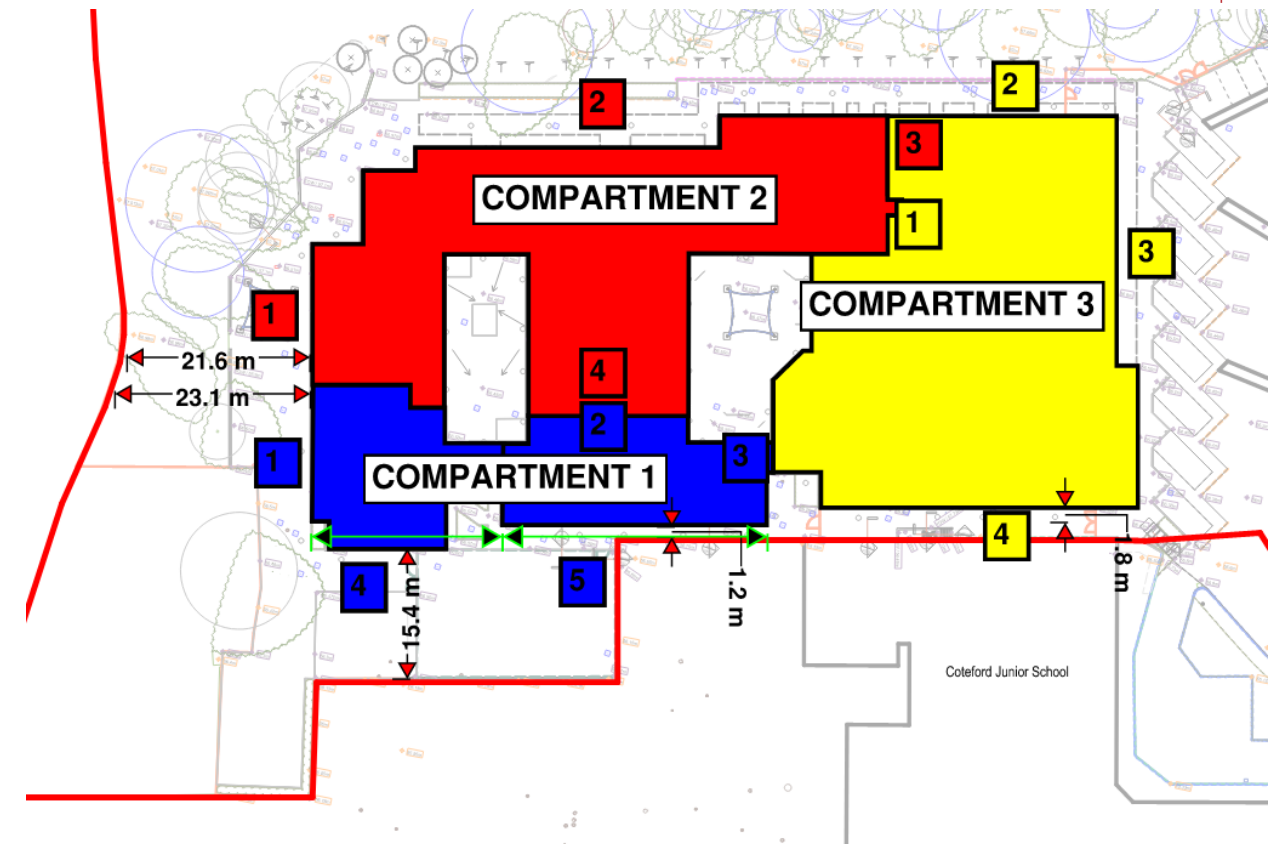


Figure 8 - Overview of external fire spread elevations

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 member of staff. The fire and rescue service will be met by a member of staff when they arrive on site.

7.2 Water supplies

- 7.2.1 Hydrants will be required in the building on site to support firefighting operations. The location of active fire hydrants local to the building should be investigated on-site and confirmed with the local fire service.
- 7.2.2 BS 9999 recommends that where a building is located so that entry points and dry riser inlets are within 90 m of an existing hydrant, this is sufficient without further hydrant provision.
- 7.2.3 Hydrants should be designed and installed in accordance with BS 9990 and should be capable of achieving a flow rate of 1500 litres/minute. In addition to this, all hydrants should have signage in accordance with BS 3251.

7.3 Vehicle access to and around the site

- 7.3.1 The building will have a top storey height of less than 11m above ground floor level, and a gross internal floor area of less than 8,000m². As such, BS 9999 recommends that access to up to 15% of the building perimeter should be provided for the fire service. Entry doors into the school should be provided along the portion of the elevation that is designated for perimeter access.
- 7.3.2 The maximum reversing distance for fire service vehicles is 20m. Should this be exceeded then suitable turning facilities are to be provided.
- 7.3.3 The access routes for the fire service vehicle should meet the values noted in Table 11. It should be noted that a typical carrying capacity is presented in the table and the final loadbearing capacity for new roads should be confirmed by the local fire and rescue service.

7.4 Access into and through the building

- 7.4.1 Both storeys of the building have been assigned an A2 risk profile and have a top floor height of less than 7.5m above ground. As such, a fire main or firefighting shaft is not required for the buildings where sufficient perimeter access is provided.
- 7.4.2 Within the building, access to the ground floor is provided via multiple doors in the building façade, and access to the upper floor provided by access directly into the stairs. In each case, access into the building will be by doors with a minimum width of 750mm.

Table 14 - 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	14.0 tonnes

8. FIRE SAFETY MANAGEMENT

8.1 Overview

- 8.1.1 Management procedures have a pivotal role to play in fire prevention, control and evacuation of occupants should a fire incident occur. This management is the responsibility of the responsible person, supported by the building fire safety design and handover of fire safety information. In all other areas, the Regulatory Reform (Fire Safety) Order 2005 (FSO) places legal obligations on management.
- 8.1.2 This section is intended to introduce the FSO, its obligations and provide initial guidance in fulfilling these duties. It is the responsibility of the landlords/ building management to ensure that all fire safety systems are tested and maintained to ensure their continuous effectiveness. Building management need to be aware of all fire safety features provided and their purpose.
- 8.1.3 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.
- 8.1.4 In accordance with BS 9999:2017, there are two management system levels. One of which should be implemented and are summarised in Table 15.

Table 15 - Management levels

Level	Management	Robustness	Minimum assurance	Conformity
1	Enhanced	Best Practice	High level of assurance	Conformity with a management level such as BS 9997:2019
2	Adequate	Good Practice	Adequate level of assurance	Conformity with requirements of legislation

8.2 Regulatory Reform (Fire Safety) Order 2005

- 8.2.1 The Fire Safety Order came into effect in October 2006 and replaced over 70 pieces of fire safety law. The Order applies to all non-domestic premises in England and Wales, including the common parts of blocks of flats or houses in multiple occupation. The Order removed the legal status of fire certificates, which are no longer enforceable by the Fire Authorities. The 'responsible person' has a duty to make the premises safe and must undertake regular fire risk assessments. It is the responsible person who will be held accountable under the new legislation for any breaches in fire safety. It is expected that the building is managed and maintained to a standard in accordance with the expectations of the FSO.
- 8.2.2 In workplaces, the responsible person is the employer. In other cases, the owner or person in control of the premises is the responsible person, e.g. building management company, headteacher.
- 8.2.3 Under the Order, the 'responsible person' must carry out a fire safety risk assessment and implement and maintain a fire management plan. The assessment should be kept under regular review and reassessed if the use of the building has been varied or a material alteration has been made. The significant findings must then be recorded, along with the measures taken to address the risks identified. A competent person should carry out the fire risk assessment.

8.3 Management responsibilities in support of the fire strategy

- 8.3.1 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. 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.
- 8.3.2 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;
 - attendance at the premises when members of the public are present, or the building is occupied. It is acceptable for a competent person other than the fire safety manager to be in attendance, provided that this person has been delegated in writing and that cover is not interrupted;
 - liaising with, and where necessary seek the advice of, the fire authority, the licensing authority and other relevant enforcing authorities;
 - having powers to deal with individuals who sabotage or tamper with safety systems, who ignore any smoking policy or who block exits;
 - liaising with other fire safety managers in a multi-occupancy arrangement;
 - ensuring that tenants, concessionaires and caretakers are appropriately briefed;
 - ensuring that appropriate communication systems are in place to deal with any fire incident;
 - checking the adequacy of fire-fighting equipment and ensuring its regular maintenance;
 - ensuring fire escape routes and fire exits are unobstructed and doors operate correctly;
 - ensuring that fire detection and protection systems are maintained, tested, with records kept; and
 - ensuring any close down procedures are followed.
- 8.3.3 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 will be trained in the importance of the fire safety systems and planned maintenance.
- 8.3.4 Suitable assembly points outside the building should be identified. These should be remote from the access routes used by the FRS.
- 8.3.5 Internal escape routes should generally have wall and ceiling linings achieving a Class 0 surface spread of flame 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.

APPENDIX A – FIRE STRATEGY MARK-UPS

Notes

COORDINATION NOTE:
The information on this drawing is still subject to the first co-ordination of structure, sub-structure, M&E, Building Control, Fire Office and Acoustics, Kitchen and F&E.

General Note:
Internal partitions, joinery, doors & frames/windows, rooming, internal finishes, sanitaryware, FF&E, service insulation and fire protection systems to be in line with architectural drawings, specification and Detail Specification (DS) specification and requirements.

Wall types to comply with min. performance as identified on acoustical report. For further wall types information refer to drawing '2000' 'Wall Types'. All dimensions taken to either centre line or finish face of partitions/walls, grid lines and to face of columns.

All dimensions, U-values & levels are to be checked on site by contractor & sub-contractors prior to commencement of work, any discrepancies are to be highlighted immediately to the architect.

All services are to be enclosed/concealed in all areas accessed by pupils.

M&E SOCKETS / SWITCHES:
Final position of all sockets and switches, to be confirmed with the client prior to any installation. For description of types of sockets, switches etc. please read in conjunction with M&E Electrical Services layouts.

PENETRATIONS NOTE:
"RIGID" denotes penetrator downpipe. For all other slab penetrations, refer to structural engineer's drawings. M&E penetrations through slabs may be shown on this drawing, but they need to be read in conjunction with M&E drawings to confirm actual sizes and functions of pipework / ducts etc.

"MF" denotes Movement Joint. MF positions to be confirmed with Structural Engineer.

Finishes are to be agreed with the School and colours are to be confirmed. They will need to comply with Building Regulations and BS8303 and provide sufficient contrast between the different elements.

PLEASE NOTE:
- STRUCTURAL, F&E AND MECHANICAL COORDINATION REQUIRED.
- SECONDARY STEELWORK REQUIREMENT TO FOLLOWING: LONG PARTITION MAIN HALL, ACTIVITY SPACE EXTERNAL CORRIDORING, ROLLER SHUTTERS TO MAIN HALL AND CAFE, HALF HEIGHT GLAZED SCREENS TO INTERNAL DOORS.
- M&E MODEL AT STAGE 3 AND MAY BE MISSING ADDITIONAL EQUIPMENT THAT WILL REQUIRE COORDINATION AT A LATER STAGE.

General comment: All risers should be enclosed in 30 mins (upgraded to 60 mins for electrical risers)

60-minute compartment line required here for space separation

Life safety plant rooms to be enclosed in 120 mins fire resistance

Doors through changing rooms should be signed as exits and should be unlocked upon detection

Store room should be fully separated from the stair by 30 mins fire resistance (including on the underside of the stair)

ASHTON FIRE Fire Resistance			
Rating (Minutes)	Walls	Doors	
		With Smoke Seals	Without Smoke Seals
30			
60			
Smoke retarding			

Fire Fighting	
	Hose Distance
	Fire Service Access Road
	Dry Riser Inlet
	Dry Riser Outlet
	Hydrant
	Fire Control Centre
	Fire Fighting Lift

Notes

1. Based on the height of the building, measured from the ground floor to the finished floor level of top storey, being more than 5m, the structure is required to have a minimum of 60 minutes fire resistance.
2. The school will operate on progressive horizontal evacuation regime to account for there being non-ambulant pupils present. Staff and members of staff will either evacuate via a storey exit or to an adjacent compartment and then to outside. Two evacuation lifts are provided to assist with escape from the first storey
3. An automatic Category L2 alarm and detection system is to be provided throughout the building.
4. Fire & rescue access to be provided to 15% of the building perimeter.
5. Hydrants to be located within 90m of an entry point into the building.

Coteford School TO REMAIN - ROOF SHOWN INDICATIVELY ONLY (TO BE)	
Project Name: Pinn River School, London	
Drawing Title: FIRE STRATEGY MARK-UPS & COMMENTS	
Author: AQ	Date: 14.07.23
Checked: Issue: 04	
Project Number: AF 2274	

Scale 1 to 100

Amendments	
PT1	Client design changes - initial update
PT2	Client design changes - initial update
PT3	Client design changes - initial update
PT4	Client design changes - initial update
PT5	Client design changes - initial update
PT6	Client design changes - initial update
PT7	Client design changes - initial update
PT8	Client design changes - initial update
PT9	Client design changes - initial update
PT10	Client design changes - initial update
PT11	Client design changes - initial update
PT12	Client design changes - initial update
PT13	Client design changes - initial update
PT14	Client design changes - initial update
PT15	Client design changes - initial update
PT16	Client design changes - initial update
PT17	Client design changes - initial update
PT18	Client design changes - initial update
PT19	Client design changes - initial update
PT20	Client design changes - initial update
PT21	Client design changes - initial update
PT22	Client design changes - initial update
PT23	Client design changes - initial update
PT24	Client design changes - initial update
PT25	Client design changes - initial update
PT26	Client design changes - initial update
PT27	Client design changes - initial update
PT28	Client design changes - initial update
PT29	Client design changes - initial update
PT30	Client design changes - initial update
PT31	Client design changes - initial update
PT32	Client design changes - initial update
PT33	Client design changes - initial update
PT34	Client design changes - initial update
PT35	Client design changes - initial update
PT36	Client design changes - initial update
PT37	Client design changes - initial update
PT38	Client design changes - initial update
PT39	Client design changes - initial update
PT40	Client design changes - initial update
PT41	Client design changes - initial update
PT42	Client design changes - initial update
PT43	Client design changes - initial update
PT44	Client design changes - initial update
PT45	Client design changes - initial update
PT46	Client design changes - initial update
PT47	Client design changes - initial update
PT48	Client design changes - initial update
PT49	Client design changes - initial update
PT50	Client design changes - initial update
PT51	Client design changes - initial update
PT52	Client design changes - initial update
PT53	Client design changes - initial update
PT54	Client design changes - initial update
PT55	Client design changes - initial update
PT56	Client design changes - initial update
PT57	Client design changes - initial update
PT58	Client design changes - initial update
PT59	Client design changes - initial update
PT60	Client design changes - initial update
PT61	Client design changes - initial update
PT62	Client design changes - initial update
PT63	Client design changes - initial update
PT64	Client design changes - initial update
PT65	Client design changes - initial update
PT66	Client design changes - initial update
PT67	Client design changes - initial update
PT68	Client design changes - initial update
PT69	Client design changes - initial update
PT70	Client design changes - initial update
PT71	Client design changes - initial update
PT72	Client design changes - initial update
PT73	Client design changes - initial update
PT74	Client design changes - initial update
PT75	Client design changes - initial update
PT76	Client design changes - initial update
PT77	Client design changes - initial update
PT78	Client design changes - initial update
PT79	Client design changes - initial update
PT80	Client design changes - initial update
PT81	Client design changes - initial update
PT82	Client design changes - initial update
PT83	Client design changes - initial update
PT84	Client design changes - initial update
PT85	Client design changes - initial update
PT86	Client design changes - initial update
PT87	Client design changes - initial update
PT88	Client design changes - initial update
PT89	Client design changes - initial update
PT90	Client design changes - initial update
PT91	Client design changes - initial update
PT92	Client design changes - initial update
PT93	Client design changes - initial update
PT94	Client design changes - initial update
PT95	Client design changes - initial update
PT96	Client design changes - initial update
PT97	Client design changes - initial update
PT98	Client design changes - initial update
PT99	Client design changes - initial update
PT100	Client design changes - initial update

Use figured dimensions only. All levels and dimensions to be checked on site. This drawing is to be used in conjunction with all other relevant drawings and specifications. ©Novium Limited. All rights reserved.

NOVIUM ARCHITECTS

Com Exchange
Bathurst Lane
Chichester
PO19 1BP
T 01243 558750
info@novium.com
www.novium.com

Project Name:
Pinn River SEND School LB Hillingdon

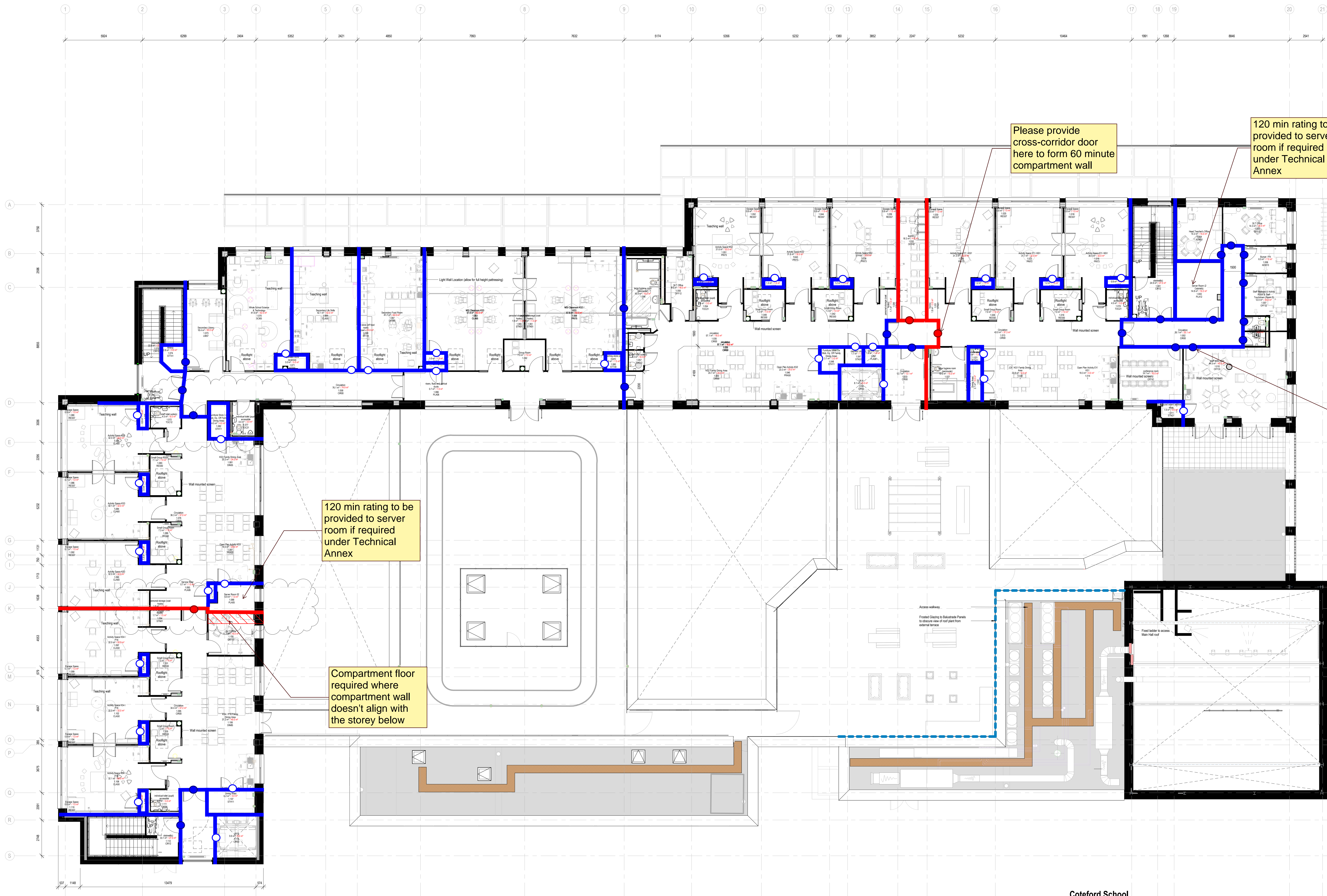
Dwg Reference:
GA Plan - Ground Floor

Drawn: FR Checked: CW
Scale: 1:100 @ A0 Project Issue Date: September 2022

Project	Originator	Volume	Level	Type	Rate	Number
F50728	NOV	ZZ	00	DR	A	0300

Status: S2 For Information
Revision: P11 Client design changes

Dwg Paper Size: A0
Novium Job No: Z0575



CO-ORDINATION NOTE:
The information on this drawing is still subject to the final co-ordination of structure, sub-structure, M&E, Building Control, Fire Officer and Acoustics, Kitchen and FFL E.

General Note:
Internal partitions, joinery, doors & frames/windows, non-masonry, internal finishes, sanitaryware, FF&E, service insulation and fire protection systems to be in line with architectural drawings, specification and Output Specification (OS) specification and requirements.

Wall types to comply with min. performance as identified on acoustician's report. For further wall types information refer to drawing '2000' Drawing 'Wall Types'. All dimensions taken to either centre line or finish face of partitions/walls, grid lines and to face of columns.

All dimensions, U-values & levels are to be checked on site by contractor & sub-contractors prior to commencement of work, any discrepancies are to be highlighted immediately to the architect.

All services are to be enclosed/concealed in all areas accessed by pupils.

M&E SOCKETS / SWITCHES:
Final position of all sockets and switches to be confirmed with the client prior to any installation. For description of types of sockets, switches etc. please read in conjunction with M&E Electrical Services layouts.

PENETRATIONS NOTE:
"RIGID" denotes penetrator downpipe. For all other slab penetrations, refer to structural engineer's drawings. M&E penetrations through slabs may be shown on this drawing, but they need to be read in conjunction with M&E design to confirm actual sizes and functions of pipework / ducts etc.

"MJ" denotes trackwork Movement Joint. MJ positions to be confirmed with Structural Engineer.

Finishes are to be agreed with the School and colours are to be confirmed. They will need to comply with Building Regulations and BS8300 and provide sufficient contrast between the different elements.














PLEASE NOTE:
STRUCTURAL, FF&E AND MEPV CO-ORDINATION ON GOING.
SECONDARY STEELWORK REQUIREMENT TO FOLDING/SLIDING PARTITION (MAIN HALL, ACTIVITY SPACE, EXTERNAL DOOR/SCREENS, ROLLER SHUTTERS TO MAIN HALL AND CAFE, HALF HEIGHT GLAZED SIDE SCREENS TO INTERNAL DOORS).
M&E RISERS AT STAGE 3 AND MAY BE MISSING ADDITIONAL EQUIPMENT THAT WILL REQUIRE CO-ORDINATION AT A LATER STAGE.

Scale 1 to 100

1	0	1	2	5
Metres				

Amendments

No.	Description	Date	Issued by
P11	Client design changes - initial update	2023 09 08	FR
P12	Client design changes - initial issue	2023 09 09	FR
P13	Client design changes - initial issue	2023 09 09	FR
P14	Client design changes - initial issue	2023 09 09	FR
P15	Client design changes - initial issue	2023 09 09	FR
P16	Client design changes - initial issue	2023 09 09	FR
P17	Client design changes - initial issue	2023 09 09	FR
P18	Client design changes - initial issue	2023 09 09	FR
P19	Client design changes - initial issue	2023 09 09	FR
P20	Client design changes - initial issue	2023 09 09	FR
P21	Client design changes - initial issue	2023 09 09	FR
P22	Client design changes - initial issue	2023 09 09	FR
P23	Client design changes - initial issue	2023 09 09	FR
P24	Client design changes - initial issue	2023 09 09	FR
P25	Client design changes - initial issue	2023 09 09	FR
P26	Client design changes - initial issue	2023 09 09	FR
P27	Client design changes - initial issue	2023 09 09	FR
P28	Client design changes - initial issue	2023 09 09	FR
P29	Client design changes - initial issue	2023 09 09	FR
P30	Client design changes - initial issue	2023 09 09	FR
P31	Client design changes - initial issue	2023 09 09	FR
P32	Client design changes - initial issue	2023 09 09	FR
P33	Client design changes - initial issue	2023 09 09	FR
P34	Client design changes - initial issue	2023 09 09	FR
P35	Client design changes - initial issue	2023 09 09	FR
P36	Client design changes - initial issue	2023 09 09	FR
P37	Client design changes - initial issue	2023 09 09	FR
P38	Client design changes - initial issue	2023 09 09	FR
P39	Client design changes - initial issue	2023 09 09	FR
P40	Client design changes - initial issue	2023 09 09	FR
P41	Client design changes - initial issue	2023 09 09	FR
P42	Client design changes - initial issue	2023 09 09	FR
P43	Client design changes - initial issue	2023 09 09	FR
P44	Client design changes - initial issue	2023 09 09	FR
P45	Client design changes - initial issue	2023 09 09	FR
P46	Client design changes - initial issue	2023 09 09	FR
P47	Client design changes - initial issue	2023 09 09	FR
P48	Client design changes - initial issue	2023 09 09	FR
P49	Client design changes - initial issue	2023 09 09	FR
P50	Client design changes - initial issue	2023 09 09	FR
P51	Client design changes - initial issue	2023 09 09	FR
P52	Client design changes - initial issue	2023 09 09	FR
P53	Client design changes - initial issue	2023 09 09	FR
P54	Client design changes - initial issue	2023 09 09	FR
P55	Client design changes - initial issue	2023 09 09	FR
P56	Client design changes - initial issue	2023 09 09	FR
P57	Client design changes - initial issue	2023 09 09	FR
P58	Client design changes - initial issue	2023 09 09	FR
P59	Client design changes - initial issue	2023 09 09	FR
P60	Client design changes - initial issue	2023 09 09	FR
P61	Client design changes - initial issue	2023 09 09	FR
P62	Client design changes - initial issue	2023 09 09	FR
P63	Client design changes - initial issue	2023 09 09	FR
P64	Client design changes - initial issue	2023 09 09	FR
P65	Client design changes - initial issue	2023 09 09	FR
P66	Client design changes - initial issue	2023 09 09	FR
P67	Client design changes - initial issue	2023 09 09	FR
P68	Client design changes - initial issue	2023 09 09	FR
P69	Client design changes - initial issue	2023 09 09	FR
P70	Client design changes - initial issue	2023 09 09	FR
P71	Client design changes - initial issue	2023 09 09	FR
P72	Client design changes - initial issue	2023 09 09	FR
P73	Client design changes - initial issue	2023 09 09	FR
P74	Client design changes - initial issue	2023 09 09	FR
P75	Client design changes - initial issue	2023 09 09	FR
P76	Client design changes - initial issue	2023 09 09	FR
P77	Client design changes - initial issue	2023 09 09	FR
P78	Client design changes - initial issue	2023 09 09	FR
P79	Client design changes - initial issue	2023 09 09	FR
P80	Client design changes - initial issue	2023 09 09	FR
P81	Client design changes - initial issue	2023 09 09	FR
P82	Client design changes - initial issue	2023 09 09	FR
P83	Client design changes - initial issue	2023 09 09	FR
P84	Client design changes - initial issue	2023 09 09	FR
P85	Client design changes - initial issue	2023 09 09	FR
P86	Client design changes - initial issue	2023 09 09	FR
P87	Client design changes - initial issue	2023 09 09	FR
P88	Client design changes - initial issue	2023 09 09	FR
P89	Client design changes - initial issue	2023 09 09	FR
P90	Client design changes - initial issue	2023 09 09	FR
P91	Client design changes - initial issue	2023 09 09	FR
P92	Client design changes - initial issue	2023 09 09	FR
P93	Client design changes - initial issue	2023 09 09	FR
P94	Client design changes - initial issue	2023 09 09	FR
P95	Client design changes - initial issue	2023 09 09	FR
P96	Client design changes - initial issue	2023 09 09	FR
P97	Client design changes - initial issue	2023 09 09	FR
P98	Client design changes - initial issue	2023 09 09	FR
P99	Client design changes - initial issue	2023 09 09	FR
P100	Client design changes - initial issue	2023 09 09	FR

Fire Resistance				Fire Fighting		Notes	ASHTON FIRE	
Rating (Minutes)	Walls	Doors			Hose Distance		Project Name: Pinn River School, London	
		With Smoke Seals	Without Smoke Seals					
30					Dry Riser Inlet			Drawing Title:
60					Dry Riser Outlet			FIRE STRATEGY MARK-UPS & COMMENTS
Smoke retarding					Hydrant	Author: AQ		Date: 14.07.23
					Fire Control Centre	Checked:	Issue: 04	
					Fire Fighting Lift	Project Number: AF 2274		

NOVIUM ARCHITECTS

Com Exchange
Bathurst Lane
Chichester
PO19 1BP

T 01243 588790
info@novium.com
www.novium.com

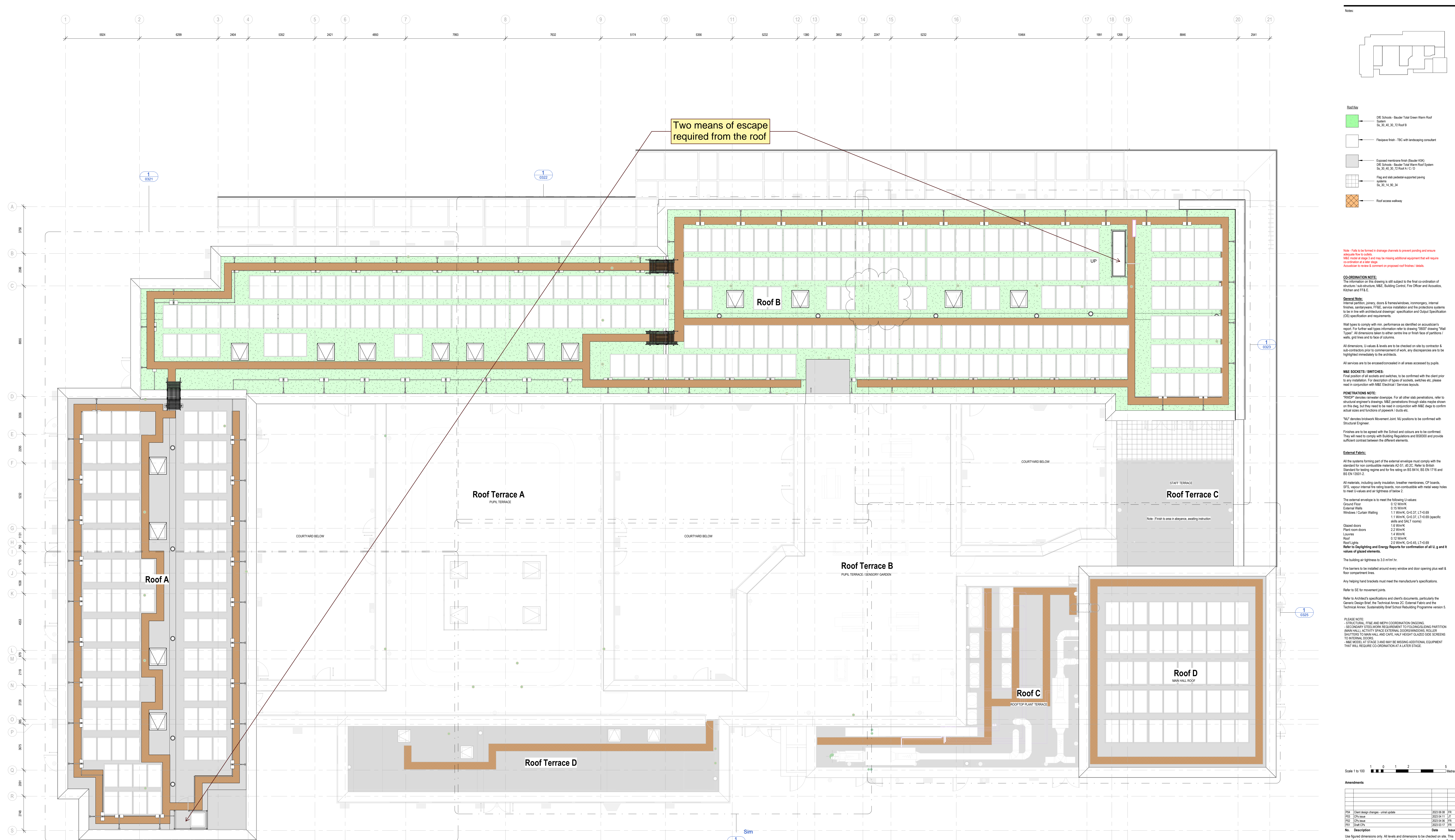
Project Name:
Pinn River SEND School LB Hillingdon

Dwg Reference:
GA Plan - First Floor

Drawn: JT Checked: FR
Scale: 1:100 @ A0 Project Issue Date: September 2022

Project	Originator	Volume	Level	Type	Rate	Number
F50728 - NOV - ZZ	01	DR	A	0310		

Status: S2 Suitability Description: For Information Orig Paper Size: A0
Revision: P11 Revision Description: Client design changes Novium Job No: Z0575



Notes:

Roof Key:

- DEF Schools - Boulder Total Green Warm Roof System Sls 30_40_30_72 Roof 6
- Finisage finish - TBC with landscaping consultant
- Exposed membrane finish (Boulder K90) DEF Schools - Boulder Total Green Warm Roof System Sls 30_40_30_72 Roof A / C / D
- Flag and slab pedestal-supported paving system Sls 30_14_30_34
- Roof access walkway

Note: Falls to be formed in drainage channels to prevent ponding and ensure adequate flow to outlets. M&E model at stage 3 and may be missing additional equipment that will require co-ordination at a later stage. Accession to review & comment on proposed roof finishes details.

CO-ORDINATION NOTE:
The information on this drawing is still subject to the final co-ordination of structure / sub-structure, M&E, Building Control, Fire Officer and Acoustics, Kitchen and PTA E.

General Note:
Internal partition, power, doors & frames/windows, terramony, internal finishes, sanitaryware, T&E, service installation and fire protection systems to be in line with architectural drawings/ specification and Output Specification (OS) specification and requirements.
Wall types to comply with min. performance as identified on account's report. For further wall types information refer to drawing "0307" drawing "Wall Types". All dimensions taken to either centre line or finish face of partitions / walls, grid lines and to face of columns.
All dimensions, U-values & levels are to be checked on site by contractor & sub-contractors prior to commencement of work, any discrepancies are to be highlighted immediately to the architect.
All services are to be encased/consented in all areas accessed by pupils.

M&E SOCKETS / SWITCHES:
Final position of all sockets and switches, to be confirmed with the client prior to any installation. For description of types of sockets, switches etc, please refer to consultation with M&E Electrical Services Agency.

PENETRATIONS NOTE:
"TWO" devices rainwater downpipes. For all other slab penetrations, refer to structural engineer's drawings. M&E penetrations through slabs must be shown on the drawings but they need to be read in conjunction with M&E design to confirm actual sizes and functions of proposed details etc.
"M&E" devices brickwork Movement Joint, 140 positions to be confirmed with Structural Engineer.
Finishes are to be agreed with the School and colours are to be confirmed. They will need to comply with Building Regulations and BS6300 and provide sufficient contrast between the different elements.

External Fabric:
All the systems forming part of the external envelope must comply with the standard for non-combustible materials BS 8414, BS EN 1716 and BS EN 12052-2.
All materials, including cavity insulation, breather membranes, CP boards, SFS, vapour internal fire rating boards, non-combustible with metal mesh holes to meet U-values and air tightness of below 2.
The external envelope is to meet the following U-values:
Ground Floor 0.12 W/m²K
External Walls 0.15 W/m²K
Windows / Curved Walling 1.1 W/m²K, G=0.37, L=0.69
1.1 W/m²K, G=0.37, L=0.69 (specific glass and SGL 7.0 mm)
Glazed doors 1.6 W/m²K
Plant room doors 2.2 W/m²K
Louvers 1.4 W/m²K
Roof 0.12 W/m²K
Roof Lights 2.0 W/m²K, G=0.45, L=0.69
Refer to Lighting and Energy Reports for confirmation of all U, g and i values of glazed elements.
The building air tightness to 3.0 m³/m²/yr.
Fire barriers to be installed around every window and door opening plus wall & floor compartment lines.
Any helping hand brackets must meet the manufacturer's specifications.
Refer to SE for movement joints.
Refer to Architect's specifications and client's documents, particularly the General Design Brief, the Technical Annex 2C: External Fabric and the Technical Annex: Sustainability Brief School Resilience Programme version 5.

PLEASE NOTE:
- STRUCTURAL, FIRE AND MEPH COORDINATION ONGOING.
- SECONDARY TIE-BEAMING REQUIREMENT TO FOLLOW BUILDING PARTITION (MAIN HALL) ACTIVITY SPACE EXTERNAL DOORS/WINDOWS, ROLLER SHUTTERS TO MAIN HALL AND CARE HALF FIRST GLAZED DOOR EXTERIOR TO INTERNAL DOORS.
- M&E MODEL AT STAGE 3 AND MAY BE MISSING ADDITIONAL EQUIPMENT THAT WILL REQUIRE CO-ORDINATION AT A LATER STAGE.

Scale 1 to 100

Amendments

No.	Description	Date	Issued by
1	Client design changes, initial update	2023-09-08	FR
2	Client design changes, initial update	2023-09-11	FR
3	Client design changes, initial update	2023-09-11	FR
4	Client design changes, initial update	2023-09-11	FR
5	Client design changes, initial update	2023-09-11	FR

Use figured dimensions only. All levels and dimensions to be checked on site. This drawing is to be read in conjunction with all other relevant drawings and specifications. ©Novium Limited. All rights reserved.

NOVIUM ARCHITECTS

Com Exchange
Bathia Lane
Chichester
PO19 1BP
T 01243 588750
info@novium.com
www.novium.com
















Project Name:
Pinn River SEND School LB Hillingdon

Dwg Reference:
GA Plan - Roof

Drawn: RC
Checked: FR
Scale: 1:100 @ A0
Project Issue Date: September 2022

Project	Originator	Volume	Level	Type	Rate	Number
FS0728 - NOV - ZZ - 02 - DR - A	ZZ	02	DR	A	0320	

Status: S2 For Information
Revision: P04 Client design changes
Submittal Description: For Information
Orig Paper Size: A1
Novium Job No: Z0575

Fire Resistance				Fire Fighting		Notes			
Rating (Minutes)	Walls	Doors				 Dry Riser Inlet	 Dry Riser Outlet	 Hydrant	 Fire Control Centre
		With Smoke Seals	Without Smoke Seals						
30									
60									
Smoke retarding									
									
						1. Based on the height of the building, measured from the ground floor to the finished floor level of top storey, being more than 5m, the structure is required to have a minimum of 60 minutes fire resistance.			
						2. The school will operate on progressive horizontal evacuation regime to account for there being non-ambulant pupils present. Staff and members of staff will either evacuate via a storey exit or to an adjacent compartment and then to outside. Two evacuation lifts are provided to assist with escape from the first storey			
						3. An automatic Category L2 alarm and detection system is to be provided throughout the building.			
						4. Fire & rescue access to be provided to 15% of the building perimeter.			
						5. Hydrants to be located within 90m of an entry point into the building.			
						Project Name:		Pinn River School, London	
						Drawing Title:		FIRE STRATEGY MARK-UPS & COMMENTS	
						Author: AQ		Date: 14.07.23	
						Checked:		Issue: 04	
						Project Number:		AF 2274	

9. EXTERNAL REFERENCES

- [1] BSI, "BS 7974:2019 Application of fire safety engineering principles to the design of buildings. Code of practice," British Standards Institution, London, 2019.
- [2] HSE, "Construction (design and management) regulations 2015 (CDM 2015) - Impact assessment," Health and Safety Assessment, London, 2015.
- [3] FPA, "Fire prevention on construction sites (9th edition)," Fire Protection Association, Moreton in Marsh, 2015.
- [4] HSE, "HSG168 Fire safety in construction (2nd edition)," Health and Safety Executive, London, 2010.
- [5] BSI, "BS 5839-1:2017 Fire detection and fire alarm systems for buildings - Part 1: Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises," British Standards Institute, London, 2017.
- [6] BSI, "BS 476-22:1987 Fire tests on building materials and structures. - Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction," British Standards Institution, London, 1987.
- [7] BSI, "BS EN 13501-2:2016 Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services," British Standards Institution, London, 2016.
- [8] BSI, "BS 5266-1:2016 Emergency lighting. Code of practice for the emergency lighting of premises," British Standards Institution, London, 2016.
- [9] BSI, "BS EN 1838:1999 Lighting applications. Emergency lighting," British Standards Institution, London, 1999.
- [10] BSI, "BS EN 60598-2-22:1999 Luminaires - Part 2-22: Particular requirements - Luminaires for emergency lighting," British Standards Institution, London, 1999.
- [11] BSI, "BS ISO 3864-1:2011 Graphical Symbols - Safety colours and safety signs - Part 1: Design principles for safety signs and safety markings," British Standards Institution, London, 2011.
- [12] BSI, "BS 5499-4:2013 Safety signs. Code of practice for escape route signing," British Standards Institution, London, 2013.
- [13] BSI, "BS 5499-10:2014 Guidance for the selection and use of safety signs and fire safety notices," British Standards Institution, London, 2014.
- [14] BSI, BS 8519:2020 Selection and installation of fire-resistant power and control cable systems for life safety, fire fighting, and other critical applications, London: British Standards Institute, 2020.
- [15] BSI, "BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests," British Standards Institute, London, 2018.
- [16] BSI, "BS EN 1634-2:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware. Fire resistance characterisation tests for elements of building hardware," British Standards Institution, London, 2008.
- [17] BSI, "BS 476-31-1:1983 Fire tests on building materials and structures. - Part 31: Methods for measuring smoke penetration through doorsets and shutter assemblies. Section 31.1 Method of measurement under ambient temperature conditions," British Standards Institution, London, 1983.
- [18] BSI, "BS EN 1634-3:2004 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. - Part 3: Smoke control test for door and shutter assemblies," British Standards Institution, London, 2004.
- [19] BRE, "BR 135: 2013, Fire performance of external thermal insulation for walls of multistorey buildings," BRE Press, Bracknell, 2013.
- [20] BSI, "BS EN 13501-5:2005 Fire Classification of construction products and building elements - Classification using test data from external fire exposure to roof tests," British Standards Institute, London, 2005.
- [21] BRE, "BR 187: 2014, External fire spread - Building separation and boundary distances," IHS BRE Press, Bracknell, 2014.
- [22] LFB, "GN29: Fire Safety Guidance Note - Access for Fire Appliances," London Fire Brigade, London, 2007.
- [23] BSI, BS 9990:2015 Non-automatic fire-fighting systems in buildings - Code of practice, London: British Standards Institution, 2015.
- [24] LFEPA, Fire Safety Guidance Note 29: Access for Fire Appliances, London: London Fire and Emergency Planning, 2007.
- [25] BSI, BS 7346-7:2013 Components for smoke and heat control systems - Part 7: Code of practice on functional recommendations and calculation methods for smoke and heat control systems for covered car park, London: British Standards Institute, 2013.



With over 140 years' combined experience in fire safety, Ashton Fire engineers have dealt with hundreds of successful fire engineering projects across the UK and worldwide.

Highly qualified as well as well as highly skilled, Ashton Fire is represented on many professional bodies, industrial committees and have a culture of continuous improvement.



Chartered Members with the Engineering Council



Society of Fire Protection Engineers Member



Institute of Healthcare Engineering and Estate Management Member



Institution of Fire Engineers Member

London

Birmingham

Oxford

Eastbourne

Taiwan

T: 0203 9956 600 or 0121 8099 700 | E: enquiries@ashtonfire.com | W: www.ashtonfire.com