ORIONFIRE
ENGINEERING

RIBA Stage 3 Design Fire Strategy

PROJECT NAME: George Hotel, Huddersfield

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Quality Assurance

Rev	Date	Prepared/Updated By	Reviewed By	Comments
-	22/04/2025	Stephen Grant/ Ryan Houghton	Hugh Foster/ Lisa Farnell/ Ben Cooper	Initial issue for design team comment.

1 Project Brief

1.2 Introduction

1.2.1 Orion Fire Engineering have been appointed by GMI construction Limited to produce a RIBA Stage 3 Design Fire Strategy report for George Hotel located on St Georges Square, Huddersfield. This report details the recommended fire safety features to be incorporated into the design of the building.

1.2.2 The recommendations within this report are based on meeting the functional requirements of Part B of the Building Regulations, in addition to the Employers Requirements as list in section 1.4.

1.2.3 The Building Regulations set a minimum acceptable standard for a building in England. As the recommendations within this report are based on complying with Building Regulations only, this report should be seen as a minimum fire safety standard for the building. Therefore, all recommendations given within this report must be incorporated into the design of the building in order to meet Building Regulations. Should any aspect of the report be unachievable, Orion Fire Engineering should be contacted at the earliest opportunity to review that aspect of the design.

1.2.4 Building Regulations approval can only be granted by a Building Control Body (BCB), and approval of this report is subject to the review of the BCB. As part of the Building Regulations approval process, the BCB must undertake a formal consultation with the Fire Safety Enforcing Authority (FSEA) for any building that would be subject to the Regulatory Reform Fire Safety Order 2005 (RR(FS)O), as amended by the Fire Safety Act 2021, upon completion of the works. Although the FSEA cannot enforce under the Building Regulations, they may provide observations under Building Regulations in addition to items that they would consider as enforceable under the Fire Safety Order on completion of the building and any best practice recommendations for the building that would not be enforceable under any regulations.

1.2.5 A summary of the report has been provided in Section 8, that lists the key fire safety features and systems that are to be provided within the building, alongside references to relevant sections within this report for those systems and also references to the applicable British Standards. This is to serve as a reference for the Responsible Person for the building to aid in discharging their duties under the RR(FS)O. The summary may also provide an aide-mémoire for designers; however, the detailed performance specification for fire safety systems is contained within the main body of the report.

1.3 Legislation and Design Guidance

1.3.1 This report has been developed to provide sufficient advice for the design of the development to meet the functional requirements of Part B of the Building Regulations 2010 (with Amendments). The Building Regulations 2010 contains functional requirements that are broad statements that describe how the development should perform to meet the requirements of the Building Regulations. Prescriptive codes, such as Approved Document B provide specific recommendations for the majority of typical buildings. The adoption of one of these prescriptive codes is one way to achieve compliance with the Building Regulations.

1.3.2 The fire strategy has been prepared using Approved Document B (ADB) Volume 2 (2019) Incorporating 2022 and 2024 Amendments (ADB Vol 2 as the primary fire safety guidance document. The recommendations for the development made within this report are based upon the recommendations given within Approved Document B and the various supporting British Standards.

1.3.3 Upon occupation of the development, the common areas will be subject to the RR(FS)O. The RR(FS)O places a legal responsibility on the Responsible Person of the building to ensure that the building is properly maintained with regard to fire safety. Upon completion of the project, this fire strategy will provide a summary of the fire safety provisions that should be in place within the building, to assist the Responsible Person in discharging their duties under the RR(FS)O.

1.3.4 The responsible person on occupation should provide adequate fire safety information to all eventual residents of the flats. This could be in the form of a home user guide to include basic prevention measures and the fire evacuation strategy and procedures.

1.3.5 As the proposed development involves providing an increased number of bedrooms, the building works constitute a Material Change of Use as defined under Regulation 2(5) of the Building Regulations. Consequently, the design and construction of the building shall be carried out as necessary to ensure the building complies with the existing Schedule 1 for compliance with Parts B1-B3, B4(2) and B5 of the Building Regulations. Any existing building elements being retained will need to be assessed by competent persons to ensure the performance requirements of the fire strategy are achieved to meet the functional requirements of Part B to Building Regulations e.g., existing compartmentation, structural fire protection, cavity barrier provisions, firestopping etc.

1.4 Project Information

1.4.1 The drawing information listed in Table 1 has been reviewed whilst producing this fire strategy. Any information not listed in Table 1 has not been reviewed by Orion Fire Engineering. All recommendations made within this report are based on the drawings listed below. Any revisions to those drawings may invalidate this report.

Table 1: Drawing Information Reviewed

Produced By	Drawing Number	Drawing Title	Rev
AHR Architects Ltd	L054-AHR-20-01-B1-D-A-20026	Level B1 - Proposed Basement Floor Plan	P1
	L054-AHR-20-01-00-D-A-20020	Level 00 - Proposed Ground Floor	P1
	L054-AHR-20-01-MZ-D-A-20021	Level MZ - Proposed Mezzanine Floor Plan	P1
	L054-AHR-20-01-01-D-A-20022	Level 01 – Proposed First Floor Plan	P1
	L054-AHR-20-01-02-D-A-20023	Level 02 – Proposed Second Floor Plan	P1
	L054-AHR-20-01-03-D-A-20024	Level 03 - Proposed Third Floor Plan	P1
	L054-AHR-20-01-04-D-A-20025	Level 04 - Proposed Fourth Floor Plan	P1
	L054-AHR-20-01-RF-D-A-20027	Level RF - Proposed Roof Plan	P1
	L054-AHR-20-01-ZZ-D-A-20120	Proposed Elevations	P1

1.4.2 In addition to the above, the following documents have been reviewed and incorporated into the fire strategy:

- The Radisson Hotel Group “Technical Standards for Design & Construction” Issue Date: September 21 – v1; and
- RHG “Technical Standards for Mechanical, Electrical & Plumbing” Issue date: September 21 – v1 have been reviewed in producing this fire strategy.

1.5 Site and Building Description

1.5.1 The George Hotel is a Grade II listed building, located in St Georges Square in Huddersfield. The building falls into Purpose Group 2(b) as residential (other). The building is undergoing a change of use due to the number of hotel rooms being increased. This is a part of the redevelopment and restoration to develop the

building into a Radisson Red Hotel. The redevelopment also includes the façade of Block C being rebuilt to allow for better access to the town centre.

1.5.2 It is a seven-storey building consisting of a basement, ground floor, mezzanine level and four upper floor levels with the height of the building being c.16.93m when measured from the lowest ground floor level to the topmost occupied floor, with the redevelopment not increasing or decreasing the number of storeys. Access to the building is provided via John William Street and St George Square.

1.5.3 The hotel has a footprint of 940m^2 which stays consistent at ground level up to fourth floor level and provides hotel rooms on all upper floors with ancillary spaces being provides on the ground floor (restaurant, bar, lounge, gym, reception, office spaces, laundry rooms). The basement will consist of a bar cellar, changing rooms, general store, team club room, meeting room, UPS equipment room, main live voltage room, BCWS Pump and plant rooms.

1.5.4 The hotel is made up of three blocks which are interconnected, Block A faces Railway Street Block B which faces the Huddersfield Train Station and Block C which faces John William street. Each block has been highlighted in Figure 1.



Figure 1: Hotel Blocks

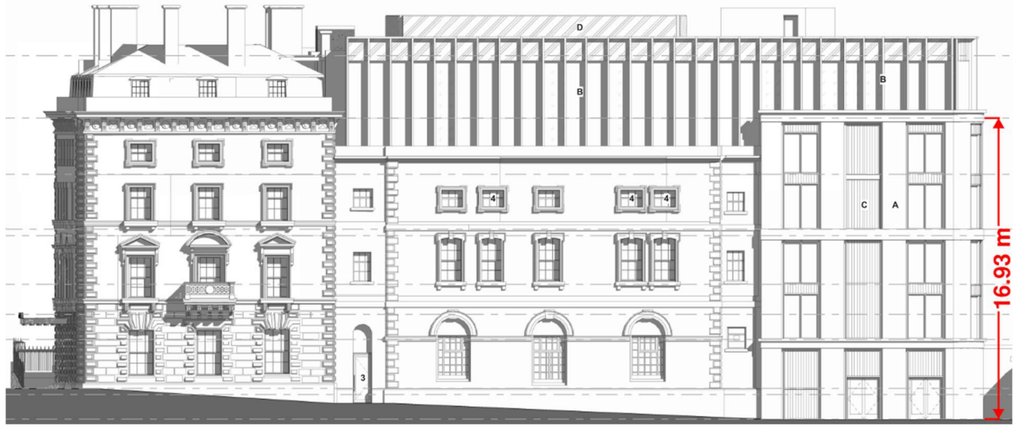


Figure 2: Height to the Topmost Occupied Storey

1.6 Purpose Groups

1.6.1 The proposed hotel redevelopment will consist of hotel accommodation and associated ancillary accommodation (bar, restaurant, office, stores and plant). Therefore, the various parts of the building will be designed in accordance with the recommendations of ADB to the following purpose groups:

Table 2: Purpose Groups

Use	Purpose Group
Hotel (Bedrooms and associated escape routes)	2(b) - Residential (Other)
Office/Meeting Rooms	3 – Office
Bar/Restaurant/Reception	5 – Shop and Commercial
Plant/Storerooms	7(a) – Storage and other non-residential

1.6.2 For the purposes of this report, all references to “ancillary accommodation” include any area within the hotel demise which is not an hotel room or circulation space. Ancillary spaces are listed below:

- Bar and bar cellar;
- Restaurant;
- Cleaners’ cupboards;
- Reception area;
- Offices;
- Plant rooms;
- Storerooms;
- Linen rooms;
- Refuse store.

1.7 Brand Standards

1.7.1 In addition to the Building Regulations fire safety guidance adopted in producing this fire strategy, the Radisson Hotel Group “Technical Standards for Design & Construction” Issue Date: September 21 – v1 and the RHG “Technical Standards for Mechanical, Electrical & Plumbing” Issue date: September 21 – v1 have been reviewed in producing this fire strategy.

1.7.2 As the building is an existing Grade II* Listed building, it is not feasible to comply with the brand standards where they relate to fire safety fully. A summary of the relevant brand standards which the fire strategy does not comply with has been included in Table 3 below.

Table 3: Brand Standards (Fire) Summary

RHG Spec Reference	Requirement	Commentary
Technical Standards for Design & Construction		
01.02.F	Only in the case of written request can alternatives be agreed to be adopted or for specific provisions to the Standards to be omitted for the specific project. This is a case per case assessment and under no circumstances will this be interpreted as being automatically applicable to any other project. All agreed deviations will be recorded within a signed off deviations schedule that shall be used to track all agreed changes during the delivery of the project.	GMI should confirm all deviations within a deviations schedule. This fire strategy only considered deviations that would directly affect the content of the fire strategy.
02.07.01.B	Solid doors with finish as appropriate to the facade, generally minimum 90cm wide with door closers and security locks. Panic hardware to be fitted on all doors leading to the exterior, especially if used as escape routes.	External door widths will be dictated by the existing structural openings.
03.02.01	Solid core doors with minimum 60-minute fire rating for staircase.	Fire doors will not be provided to open stair accessed from the reception as it is not enclosed. This stair is omitted from the means of escape assessments.
04.01.02.D	Emergency lighting, flashing alarm warning lamp, vibrating pillow, emergency buzzer and strobe light and a bathroom sounder are required within the accessible/needs adapted guest rooms.	To be provided.
04.01.03.C	Guest room doors should have a clear opening of at least 830mm, with accessible/needs adapted rooms having a clear opening of 900mm.	Widths will be dictated by existing structural openings. AHR to review requirements as these exceed the minimum Building Regulations requirements for fire safety.
06.03.01	Corridor widths should be 1.6m wide for double banked corridors. For corridors with guest rooms on one side only, this can be reduced to 1.4m.	This exceeds the required escape width. AHR to review against any general access and circulation requirements.
06.04	Escape stairs should have a hard wearing vinyl floor with anti-slip stair nosing in a contrasting colour. Handrails should be provided on both sides of a stair where wider than 1.5m, and be uninterrupted. Handrails should typically be painted galvanised steel circular section tubes.	The central feature stair is wider than 1.5m; however, all design aspects of that stair will remain as existing due to the heritage nature.
10.01.05	Whenever courting wall façade is applied fire consultant shall review and certified as fire-resistant compliant.	Orion assume that this is a typo for curtain wall. Orion will review façade materials against current fire safety requirements. Certification should come from the manufacturer.
Technical Standards for Mechanical, Electrical & Plumbing		
07.03	In locations with frequent power cuts a standby generator must be installed that generates 100% of the demand and must be provided with minimum fuel reserve of 48 hours of operations or more dependent on reliability and/or response of local supplier. For emerging markets an additional backup generator to be provided with min 50% capacity of above.	Orion are not aware of the location being frequent with power cuts. The evacuation lift is the only high-power life safety system, therefore, Orion deem it acceptable to provide diverse routes without the need for a generator. Low power life safety systems will be served with an integrated battery. If a standby generator is to be provided for the continuous running of day to day services, this may be utilised for emergency back-up of the life safety systems
08.02.02	All escape routes must be visible and easily accessible from any position within the hotel. In planning the compartmentation of the hotel every guestroom must be designed as a safe area with 60min fire rating and main guestroom door with 30min fire rating.	It is unlikely that the existing elements which will provide 60-minutes fire rating to the bedrooms. This is more akin to a residential apartment block rather than a hotel. GMI to confirm if this is to be followed.
08.02.02	Travel Distance Requirements	Approved Document B is more onerous in terms of travel distances therefore, the travel distances will be considered in relation to ADB.
08.03.A	The fire alarm must, wherever possible, be directly connected to the local fire department or 24-hour emergency monitoring service.	GMI are to confirm whether the fire alarm is to be linked to an offsite monitoring service.

RHG Spec Reference	Requirement	Commentary
08.03.A	The connection shall allow for an adjustable time delay of up to 5 minutes before automatically evacuating or alarming the guests (the delay is depending on the configuration of the property and must be agreed in cooperation with, and approved by, the local authorities and with RHG D&T).	GMI are to confirm whether they wish to adopt a staff alarm which aid in the reduction of false alarms.
08.03.E	Manual call points to be provided to local regulations, but at minimum to be fitted adjacent to each exit from a compartment. Additional points might be required as deemed necessary such as reception, dead end situations, etc. As a minimum emergency call buttons to be provided in sauna, steam room, fitness, pool area, accessible rooms.	As this exceeds the recommendations of ADB and BS 5839-1, GMI are to confirm whether they are to adopt this and provide additional manual call points.
08.03.H	Subject to local fire authority all staircases to be fitted with natural ventilation to top of the stairwells, opening automatically either when manually activated or when fire alarm is activated, or staircase smoke detection is activated.	Window sizes will be dictated by the existing structural openings. GMI to confirm if vents are to be provided.
Back of House Support Documentation		
3	FM200 Automatic fire extinguishing system is shown.	Suppression systems are not required to comply with the minimum requirements of the building regulations, GMI to confirm if this is to be adopted.

1.8 Variations from Prescriptive Guidance

1.8.1 The layout of the development is generally in accordance with the prescriptive recommendations given within ADB. All alternative approaches from the recommendations of ADB have been summarised in this section for ease of reference. Unless listed below, no other aspect of the design should deviate from the relevant recommendations.

Table: Variations from Prescriptive Guidance

Variation	Report Section
An Evacuation lift is to be provided due to the stepped escape routes within the corridors on the first and second floor. In addition, it is proposed to restrict wheelchair accessible bedrooms to other areas of the building. There is a function room on the first floor where wheelchair access cannot be restricted, therefore it is proposed to provide an evacuation lift to the building such that any occupants within the function room can take refuge in the lift lobby and be evacuated without needing to utilise any stepped routes.	2.6.5

1.9 Required Information

1.9.1 This fire strategy provides a performance specification for the required fire safety features to meet Part B of the Building Regulations based on the information provided to Orion Fire at the date of this report. The fire strategy contains multiple options

Table 4: Required Information Summary

Further works	Report section
A site plan showing the relevant boundary is to be provided for review.	1.4
GMI should review Table 3 and confirm that the relevant sections of the brand standards do not have to be complied with.	1.7
GMI should confirm if a double knock evacuation strategy is to be adopted.	2.3
The contractor and wider design team should confirm the preferred solution on fire stopping vertical risers.	4.5.3
The external wall materials need to be confirmed, or a schedule of the external wall build ups are to be provided for review.	5.2.2
West Yorkshire Fire and Rescue Service confirmed the local fire hydrant locations as and their operational status however, the flow rates will need to be confirmed.	6.2.3

2 Means of Warning and Escape

2.1 Evacuation Principle

2.1.1 The evacuation procedure within all areas of the building will follow a simultaneous evacuation procedure. If the fire alarm is raised within any area of the building, the alarm will sound throughout the entire building and all occupants would evacuate immediately.

2.1.2 GMI should confirm if the simultaneous evacuation strategy should be supported by a staff alarm period, in accordance with BS 5839-1.

2.2 Building Population

2.2.1 The expected number of guests has been based on the number of beds provided on the basis of 2 guests per hotel room.

2.2.2 The occupancy of the ancillary accommodation has been based on the floor space factor recommendations from Approve Document B Volume 2. The occupancy of each ancillary room has been calculated to allow for the means of escape provision from those rooms to be assessed individually. It is not envisaged that all ancillary rooms will be occupied simultaneously at full capacity.

Table 5: Building Population Summary

Floor	Use	Area (m^2)	Floor Space Factor	Occupancy
Basement	Office & Meeting room (combined)	35	6.0m^2 per person	5
	Team Club Room	22	2.0m^2 per person	11
Ground Floor	Reception	146	1.5m^2 per person (1)	97
	Bar	76	1m^2 per person	76
	Offices (combined)	22	6m^2 per person	4
	Restaurant	123	1m^2 per person	123
	Lounge	55	1m^2 per person	55
	Gym	30	3m^2 per person	10
	Kitchen	56	7m^2 per person	8
	Conference Room	37	2.0m^2 per person	18
Mezzanine Floor	Hotel bedroom	133m^2 (7 rooms)	Persons per room 2	14
	Office	6	6m^2 per person	1
First Floor	Guest room (combined)	257m^2 (10 rooms)	Persons per room 2	20
	Guest room A (combined)	120m^2 (7 rooms)	Persons per room 2	14
	Guest room B (combined)	52m^2 (2 rooms)	Persons per room 2	4
	Guest room C (combined)	83m^2 (5 rooms)	Persons per room 2	10
	Function Room	56m^2	2m^2 per person	28
Second Floor	Guest room A (combined)	162m^2 (7 rooms)	Persons per room 2	14
	Guest room B (combined)	52m^2 (5 rooms)	Persons per room 2	10
	Guest room C (combined)	68m^2 (5 rooms)	Persons per room 2	10
	Guest room D (combined)	54m^2 (2 rooms)	Persons per room 2	4
	Guest room U (combined)	200m^2 (8 rooms)	Persons per room 2	16
Third Floor	Guest room A (combined)	180m^2 (9 rooms)	Persons per room 2	18
	Guest room C (combined)	70m^2 (4 rooms)	Persons per room 2	8
	Guest room D (combined)	60m^2 (2 rooms)	Persons per room 2	4
	Guest room U (combined)	235m^2 (11 rooms)	Persons per room 2	22
Fourth Floor	Guest room A (combined)	182m^2 (9 rooms)	Persons per room 2	18
	Guest room C (combined)	54m^2 (4 rooms)	Persons per room 2	6
	Guest room D (combined)	33m^2 (2 rooms)	Persons per room 2	2
	Guest room U (combined)	251m^2 (12 rooms)	Persons per room 2	24
				654
			Total Upper Floors	**247**
			Total	**654**

(1) - Reception area to be taken 10m²/ person, referring to ADB V2, office with a low area density

2.3 Fire Detection and Alarm Systems

2.3.1 The building is to be provided with an addressable Category L1 fire detection and alarm system throughout designed and installed in accordance with BS 5839-1.

2.3.2 Smoke detectors should be spaced in accordance with BS 5839-1 such that all parts of the room should be within 7.5m of a smoke detector. Due to the size of the bedrooms, this will typically mean only one smoke detector will be provided in each bedroom. Should this smoke detector activate, this will sound the alarm in the bedroom.

2.3.3 Automatic detection throughout the building should be provided via multicriteria smoke and heat detectors throughout the premises, except in areas where they would not be appropriate (e.g. plant rooms).

2.3.4 GMI should confirm if they require a staff alarm to reduce the impact of false alarms. A staff alarm provides an investigation period for building management to determine whether the activation of a fire detection device was a false alarm, or otherwise confirm the presence of a fire. The length of this investigation period should not exceed 5 minutes. The investigation period would be triggered by the activation of an automatic smoke detector (area of activation to evacuate immediately) and will delay the full building fire alarm from sounding until one of the following events occurs:

- A second smoke detector is activated within the office areas; or
- Building management confirm the presence of a fire on the Fire Alarm Panel; or
- The pre-determined investigation period expires before the Fire Alarm Panel can be reset.

2.3.5 In addition to the above, the full building fire alarm will sound immediately on activation of either a manual call point or heat detector, circumventing the staff alarm.

General

2.3.6 As per the recommendations of BS 5839-1, the fire alarm control panel should be located at an appropriate location, suitable for staff and firefighters attending site. Note, the exact positioning of the main fire alarm panel and location should be discussed and agreed with the local Fire Authority and Building Control however, it is expected that the fire alarm panel will be located at reception, with a repeater panel provided at the base of each firefighting stair. The fire alarm panels should be accompanied by a diagrammatic zone plan adjacent to the control and indicating equipment.

2.3.7 Manual Call Points (MCPs) should be located on escape routes and storey exits leading directly to external. The positioning of MCPs should be designed so that no occupants need to travel more than 45m in any direction to reach the nearest call point. MCPs need to be provided on final exit doors, regardless of these doors not being designated as fire doors. MCPs should also be provided where communal terraces are present and at roof plant level. To prevent malicious or accidental use of MCPs by occupants of the building, it is recommended that covers are provided (linked to local alarm).

2.3.8 Any building sound system shall shunt and light dimming systems in public areas and assembly spaces shall turn on to full brightness on affected floors upon activation of the fire alarm system.

2.3.9 Consideration should be given for people who are deaf or hard of hearing in the design of the fire alarm and evacuation management plan for the premises. Additional features may be required (such as vibrating alarm devices, visual warning devices, etc.).

2.3.10 On detection of fire within a lift shaft or a corridor/lobby, the lifts should be sent to the ground floor, or to 1st floor if there is a fire on the ground floor.

2.4 Horizontal Means of Escape

2.4.1 The maximum permitted travel distances within the building should conform to recommendations in ADB Volume 2 and 11.

Table 6: Travel Distances

Use	Maximum Travel Distance in One Direction (m)	Maximum Travel Distance in More than One Direction (m)
Hotel bedroom	9	18
Hotel bedroom corridor	9	35
Restaurant & Bar	18	45
Gym	9	18
Kitchen	9	18
Conference room & Club room	15	32
Reception	18	45
Normal hazard storage	25	45
Place of special fire hazard	9	18
Plant rooms	9	35

2.4.2 A corridor providing access to alternative escape routes should be divided by fire doorsets fitted with a self-closing device where both of the following apply:

- It is more than 12m long.
- It connects two or more storey exits.

2.4.3 If the internal layout of partitions, fittings, etc. is not known, direct distances, rather than travel distances, should be assessed. The direct distance should be assumed to be two-thirds of the actual travel distance.

First Floor Conference Room

2.4.4 The means of escape from the first floor conference room lead to either the open central stair or have steps in the corridors prior to occupants being able to reach the escape stairs. For guest bedrooms, this approach is not considered an issue as the accessible bedrooms can be located outside of these areas. However, wheelchair access cannot be restricted to the conference room without limiting the ability of disabled occupants from experiencing the building to the same degree as able-bodied occupants.

2.4.5 To compensate for the stepped escape routes from the conference room, it is proposed to provide an evacuation lift to the building. To facilitate this evacuation lift, it is proposed that the leg of corridor containing the evacuation lift be constructed as a protected shaft, achieving the same level of fire-resistance as a stair. This arrangement has been shown indicatively below in Figure 3.

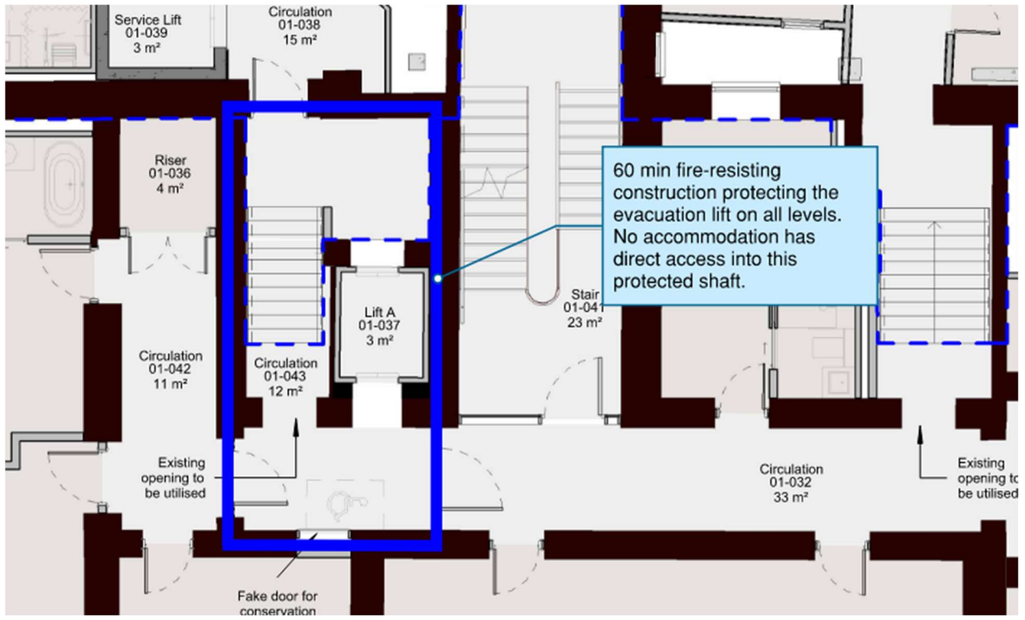


Figure 3: Extent of the Evacuation Lift Protected Shaft

Inner Rooms

2.4.6 If an inner room arrangement is to be provided (room within a room), additional fire safety provisions need to be considered in order to address the additional risk to occupants within the inner room. At least one of the recommendations below should be adhered to:

- The enclosures (wall or partitions) of the inner room are stopped at least 500mm below the ceiling;
- The door or walls of the inner room contain a vision panel (minimum 0.1m²), to allow occupants to inspect the conditions within the access room; or
- The access room is fitted with an automatic fire detection and alarm system.

2.4.7 The above recommendations are not applicable to sanitary accommodation, toilets, etc.

General Requirements

2.4.8 The number of escapes routes and exits from any room or storey should be not less than the minimum recommended in Table 7 for the intended number of occupants.

Table 7: Minimum number of escape routes and exits from a room or storey

Maximum number of persons	Minimum number of escape route/exits
60	1
600	2
More than 600	3

2.4.9 The minimum clear width for a door acting as an escape door is 800mm in accordance ADB. This requirement may be exceeded by the access and circulation requirements of Approved Document M, which are not covered within the scope of this document and are to be reviewed by the architect.

2.4.10 Doors should open to an angle not less than 90°, be provided with vision panels as required by Approved Document K and should be located such that opening the door does not reduce the effective width of any escape route. Ramps used on means of escape should not have a gradient steeper than 1:12.

2.4.11 Clear door widths within the scheme should be measured in accordance with Figure 4.

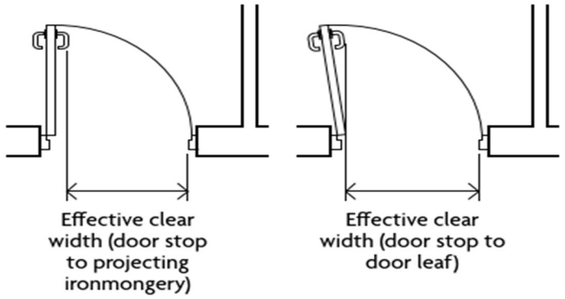


Figure 4: Measurement of Door Widths

2.4.12 Any access control or other door locking mechanisms incorporated within the design of the building should not adversely affect the ability of occupants to escape from the building. Where locking mechanisms are provided to doors on common escape routes, they should be simple fastenings that are easy to operate from the escape-side without the use of a key or more than one mechanism.

2.4.13 If electronic locking mechanisms are provided (e.g., all guestroom entrance doors), they should revert to the unlocked position in any of the following situations:

- The fire detection and alarm system operate; or
- There is a loss of power or system error; or
- The security mechanism override, such as a Type A call point in accordance with BS 7273-4 (Green Break Glass) is activated.

2.4.14 Security mechanism overrides for electrically powered locks should be a Type A call point, as described in BS 7273-4. The call point should be positioned on the side approached by the people escaping. If the door provides escape in either direction, a call point should be installed on both sides of the door.

2.4.15 Where automatic hold-open devices or other magnetic systems are provided (normally on escape routes or giving access to escape routes) these should release automatically on activation of the fire alarm and detection system or power failure and failsafe release to return to neutral position. Hold-open devices should comply with the recommendations of BS 5839-3.

2.4.16 Where a door serves more than 60 persons the door is to swing in the direction of escape and should be provided with the appropriate escape hardware.

2.5 Vertical Means of Escape

2.5.1 The building is served by four stairs, Stair 01 serves all levels of the hotel whilst Stair 02 and Stair 03 serves ground to fourth floor level, and Stair 04 serves basement to ground level only. The vertical escape routes from the building have been highlighted in Figure 5. Protected stairs should be enclosed in 60 minutes fire protection.

2.5.2 In accordance with ADB a stair serving a hotel should discharge either directly to the outside air or should lead to the outside via a protected corridor that is afforded with the same provisions as would be expected the stair itself. This is not achieved by Stair 03, as it discharges through the reception area; therefore, Orion are treating Stair 03 as a circulation stair only and are not taking it into consideration for the means of escape assessment.

2.5.3 All stairs must have a minimum clear width of 1,000mm in accordance ADB. As each stair exceeds 1,100mm, and therefore this is achieved. Where handrails protrude more than 100mm into the stair, the clear width of the stair will be taken between the handrails.

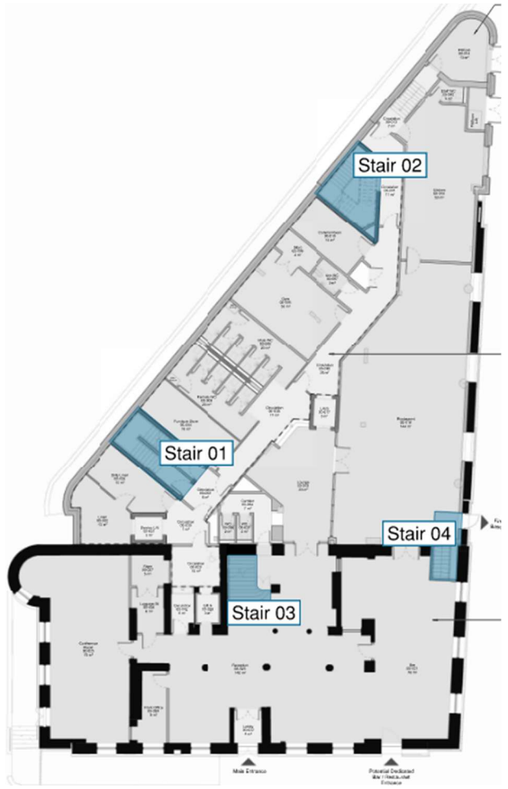


Figure 5: Stair Locations

2.5.4 The total vertical escape capacity of the building is 540 which exceeds the maximum expected above ground occupancy of 247 guests. A summary of the stairs within the development has been provided within Table 8.

Table 8: Stair Information

Stair	Floors Served	Width (mm)	Capacity	Stair Types	Lobby Protected?	Dry Rising Main?	Discharge?
1	Basement – Level 4	1,200	270	Protected	Yes	Yes	Direct to external
2	Ground – Level 4	1,100	270	Protected	Yes	Yes	Into protected corridor
3	Ground – Level 4	1,100	515	Protected (every floor apart from GL)	No	No	Into reception (stair discounted)
4	Basement - Ground	1,100	150	External	Yes	No	Direct to external

2.5.5 Any final exit should be immediately apparent to any person using a common stair that serves storeys both above and below the point of final exit.

2.5.6 As per the drawings, the exit of Stair 04 has a clear width narrower than the stair itself. As Stair 04 does serve any areas which are to be permanently occupied and is expected to only serve 16 occupants from basement to ground floor, the exit is considered to be sufficient for the safe evacuation.

Merging Flows

2.5.7 If the stair and a storey exit at the final exit level share a common final exit, the final exit should be wide enough to accommodate the merging flow of occupants.

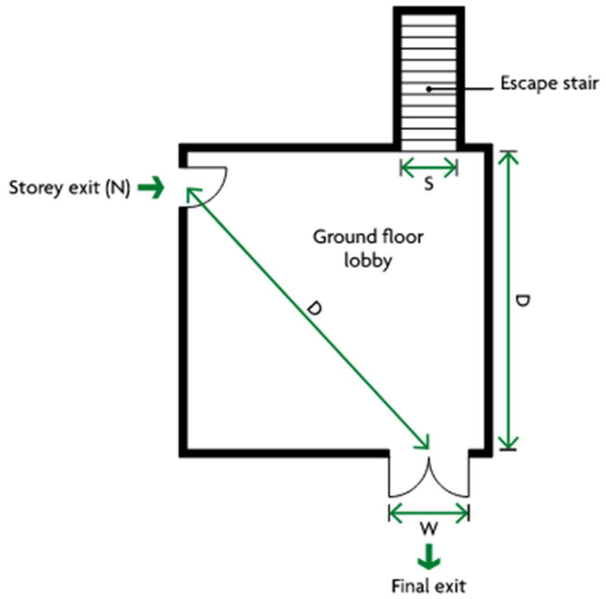


Figure 6: Merging Flow Diagram, as per ADB V2, Diagram 2.6

2.5.8 Merging flow equation can be seen below:

$$W = \frac{(\left(\frac{N}{2.5}\right) + (60S))}{80}$$

where:

W is the width of final exit in metres

N is the number of people served by ground floor storey exit (As the ground floor does not have an exit at Stair 1 this will be taken at Mezzanine level)

S is the stair width in metres

2.5.9 Following the calculation process, and considering 32 persons at first floor level, Stair 1 final exit should be 1,255mm wide. The stair final exit width is 1,350mm and is sufficient.

2.6 Evacuation of Non-Ambulant Occupants

2.6.1 The responsibility for safe evacuation of any persons needing assistance (reduced mobility, disabled, etc.) falls on the tenant or management of the building. As part of the RR(FS)O, specific fire evacuation procedures should be developed (such as Personal Emergency Evacuation Plans (PEEPS)), accounting for a wide spectrum of persons who may be present on the premises. No reliance should be made upon the Fire Service to assist during evacuation of the building.

2.6.2 A disabled refuge should be provided within the stair or stair lobby enclosure on every above-ground level within the protected escape stair. The refuges spaces should have dimensions of 900mm x 1,400mm and must not obstruct the width of the escape routes. Disabled refuges are located within the protected lobbies of Stair 1 and within the protected stairway of Stair 2. Additionally, there are disabled refuges in Stair 3 on Levels 1 to 3, and outside the protected stair on Level 4. On level 01 the 60-minute protected corridor which has the stairs requires disable refuge at the top and bottom of the stairs.

2.6.3 Each refuge point should be provided with an emergency voice communication (EVC) system so that the management is aware of anyone awaiting assistance in the refuge space. The EVC system is to comply with BS 5839-9 and consist of Type B outstations, which communicate with a master station located adjacent to the fire alarm control panel and at the ground floor of each stair.

2.6.4 Consideration will need to be given for people who are deaf and hard of hearing in the design of the fire alarm and evacuation management plan. If the adoption of warning aides is considered e.g. flashing beacons, vibrating pagers etc. an appropriate interface will need to be provided to the fire alarm system.

Evacuation Lifts

2.6.5 The ground and first floors contain the stepped escape routes within the corridors therefore, it is proposed to restrict wheelchair accessible bedrooms to other areas of the building. There is a function room on the first floor which is wheelchair accessible therefore, it is proposed to provide an evacuation lift in Block A such that any occupants within the function room can take refuge in the lift lobby and evacuate using the lift without need to utilise any stepped routes.

2.6.6 The Mezzanine Floor contains level access/ egress therefore, it is proposed to provide an protected escape route from the evacuation lift, to the external via Stair 01's final exit, as shown in Figure 7.

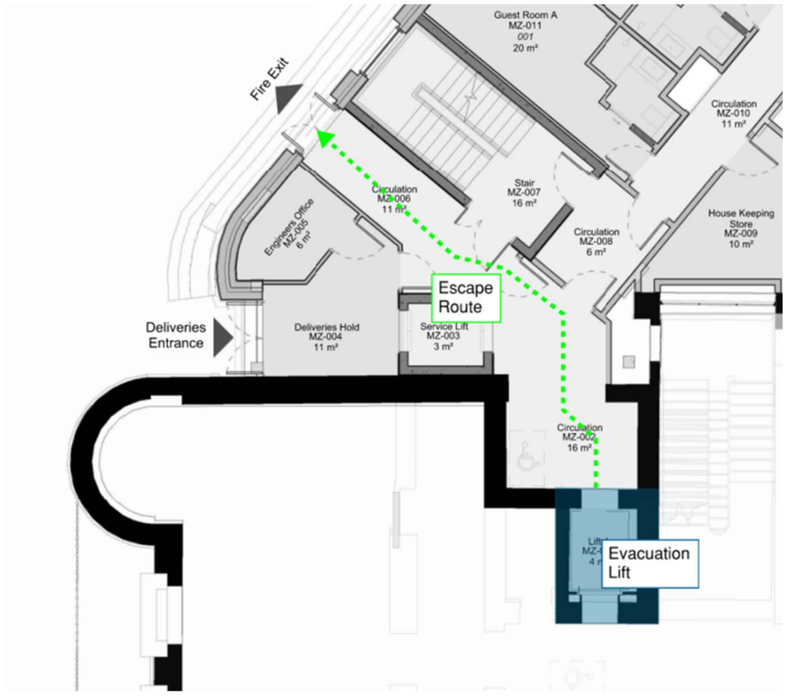


Figure 7: Evacuation Lift Location & Egress Route – Mezzanine Level

2.6.7 Evacuation lifts should comply with Annex G of BS 9999, BS EN 81-20 and BS EN 81-70. Due to the proposed use of the evacuation lifts (assistance in evacuation of Persons of Reduced Mobility (PRMs)), it is expected that the evacuation using the lift will be assisted and supported by an authorised person (management, competent staff, etc.). No reliance on the Fire Service should be made to evacuate PRMs out of the premises.

2.6.8 Evacuation lifts should be provided with alternative power supply. This allows for continuous operation of the lift in the event of a primary power supply failure in the building.

2.6.9 The evacuation lift operation should follow the following step-by-step process:

- Upon manual override of the lift via “Evacuation Lift” switch or upon detection activation in the building, the lift should isolate and all car and landing controls
- Lift to return to the lowest adjacent ground floor level (final exit level) and doors should remain open
- Once at the final exit level and once the “Evacuation Lift” switch has been operated, the car controls should be enabled; the evacuation lift should then operate only in response to the car controls.
- Evacuation of PRMs from the any floor under supervision and assistance from management. The following order of evacuation needs to be adopted (unless agreed otherwise with the Fire Authority):
  - The fire floor
  - The floor immediately above the fire floor
  - Other floors above the fire floor starting at the top storey
  - All remaining floors

2.6.10 The above operational procedure needs to be supported by a management response in order to facilitate the evacuation of PRMs.

2.6.11 The evacuation lift should be provided with the following features, not listed above (the list is not exhaustive and intended as guidelines only, listing out primary components):

- Ground floor manual override mechanism (BS EN 81-20);
- Manual controls within the lift;
- Interface with AFDA for the building;

2.7 Smoke Ventilation Systems

Basement Ventilation

2.7.1 Basement areas should be provided with suitable ventilation if:

- The floor area of the basement is more than 200m^2 excluding any means of escape and circulation spaces; or
- Depth of more than 3m below the adjacent ground floor level.

2.7.2 Each basement space should have one or more smoke outlets. Where this is not practicable (for example, the plan area is deep and the amount of external wall is restricted by adjoining buildings), the perimeter basement spaces may be vented, with other spaces vented indirectly by opening connecting doors. This does not apply for places of special fire hazard.

2.7.3 If a basement is compartmented, each compartment should have one or more smoke outlets, rather than indirect venting.

2.7.4 A basement storey or compartment containing rooms with doors or windows does not need smoke outlets.

2.7.5 Smoke outlets should be both of the following.

- Sited at high level in either the ceiling or wall of the space they serve.
- Evenly distributed around the perimeter, to discharge to the open air.

2.7.6 The combined clear cross-sectional area of all smoke outlets should be a minimum of 1/40 of the area of the floor of the storey they serve.

2.7.7 Separate outlets should be provided from places of special fire hazard.

2.7.8 If the smoke outlet terminates at a point that is not readily accessible, it should be kept unobstructed and covered only with a class A1 grille or louvre.

2.7.9 If the smoke outlet terminates in a readily accessible position, it may be covered by a panel, stallboard or pavement light that can be broken out or opened. The position of covered smoke outlets should be suitably indicated.

2.7.10 Mechanical smoke extract will be required if the required cross-sectional area for natural smoke outlets could not be met which would also require a sprinkler system in accordance with Appendix E of Approved Document B being required in the basement only.

2.7.11 The air extract system should comply with all of the following:

- It should give at least 10 air changes per hour.

- It should be capable of handling gas temperatures of 300 degrees Celsius for not less than 1 hour,
- It should do either of the following:
    - Be activated automatically if sprinklers activate,
    - Be activated by an automatic fire detection system that conforms to BS 5839-1, (minimum L3)

Other Ventilation

2.7.12 Where accessed internally, areas of special fire hazard should be accessed via a protected lobby provided with at least 0.4m^2 permanent ventilation. The following areas would be regarded as areas of special fire hazard;

- Oil-filled transformer room.
- Switch gear room.
- Boiler room.
- Storage space for fuel or other highly flammable substance(s).
- Room that houses a fixed internal combustion engine.

2.7.13 Where accessed internally, refuse stores should be accessed via a lobby provided with at least 0.2m^2 permanent ventilation.

2.7.14 Permanent ventilation required to the rooms listed below is to prevent the build-up of combustible gases in small enclosed spaces.

- Chemical CPD room
- Plant room

2.8 Emergency Signage

2.8.1 Emergency escape signage should be provided above every doorway or other exit that provides access to a means of escape, unless that exit is in ordinary use (e.g. the main entrances and primary circulation space). Where access to alternative means of escape is provided suitable signage should be provided to indicate access to alternative directions of escape.

2.8.2 Note, exit signage should be provided as per the recommendations of BS ISO 3864-1 and BS 5499-4. The following recommendations are intended to assist evacuating occupants in predicting the location of emergency signage along escape routes:

- Signs above doors or open spaces should be mounted between 2m and 2.5m from floor level, measured to the base of the sign and be sited as close to the centre line of the escape route as practicable.
- Signs sited on walls should be mounted between 1.7m and 2m from floor level to the base of the sign.
- Signs should be sited at the same height throughout the escape route, so far as reasonably practicable

2.8.3 It should be highlighted that the provision of emergency signage within an area is subjective and open to interpretation. Therefore, this should be discussed and agreed with Building Control prior to installation on site.

2.8.4 As stair 03 has not been included within the means of escape assessment it should not be signed as an escape route.

2.9 Emergency Lighting

2.9.1 As per the recommendations of ADB, emergency escape lighting will need to be provided within the main escape routes (stairs, lobbies, common corridors). Additionally, the following areas should also be provided with emergency lighting:

- Windowless accommodation

2.9.2 All emergency lighting should conform to the recommendations of BS 5266-1 and BS EN 1838 which provides further guidance on the provision of emergency lighting. The below list provides recommendations where emergency lighting should be provided:

- Within 2m of each door intended to be used in an emergency
- Within 2m of any change in level including stairs so each flight/level change are adequately illuminated
- Externally illuminated escape route signs, escape route directional signs and other safety signs
- At change of direction or intersection of common escape routes
- Within 2m of each final exit and outside the building to a place of safety
- Within 2m of each MCP
- Within 2m of manual release control units which release electronically operated doors as pert the recommendations within BS 7273-4

2.9.3 Note, the distance of 2m is an approximation measured horizontally, as stated in BS 5266-1

2.9.4 Escape stair lighting should be in a separate circuit from the electricity supply to any other part of the escape route

2.9.5 Emergency lighting needs to be provided with secondary power supply to maintain adequate illumination of an area no less than 3 hours as per BS 5266-1. This may be achieved through the provision of battery back up to the emergency lighting. Note that normal lighting should be maintained within the firefighting shafts (Stair 1 and 2 and the associated firefighting lobbies).

3 Internal Fire Spread (Linings)

3.1 Classification of Wall and Ceiling Linings

3.1.1 To meet the functional requirement of Part B2 of the Building Regulations, the internal linings of a building should adequately resist the spread of flame over their surfaces and if ignited, have a rate of heat release or fire growth which is reasonable for the location in which the lining is. To achieve this requirement, the internal linings of walls and ceilings within the building should meet the classifications given in Table 9.

Table 9: Classifications of Lining Materials

Location	Classification
Small rooms with a maximum internal floor area of 30m^2	Class D-s3, d2
Other rooms	Class C-s3, d2
Other circulation spaces	Class B-s3, d2

3.1.2 For the purposes of Table 9, the definition of a wall includes glazed screens and the internal surfaces of external glazing, and any part of a ceiling that slopes at an angle greater than 70° to the horizontal. Doors, door frames, frames for glazing (e.g. windows or screens), fitted furniture or narrow members such as architraves, skirtings, coving etc. do not need to achieve the requirements stated in Table 9.

3.1.3 Parts of walls in rooms may be of lower performance that stated in Table 9; however, they should be no worse than Class D-s3,d2. The total area of the lower performance wall lining should be equivalent to less than half the total floor area of the room, up to a maximum of 60m^2. Note that this relaxation is not permitted for ceiling linings.

3.2 Classifications of other Internal Surfaces

3.2.1 The flights and landings of all stairs should be constructed of A2-s3,d2 rated materials, as classified to BS EN 13501.

3.3 Fixing of Cables

3.3.1 As per BS 7671, all cabling within the building should be supported such that they wouldn’t present an entanglement risk to firefighters. All cables run above non-fire-rated ceilings should be secured with metal cable ties or run-in metal cable trays/conduits to reduce the risk of firefighter entanglement.

4 Internal Fire Spread (Structure)

4.1 Fire Resistance Nomenclature

4.1.1 The periods of fire resistance given within this section may refer to one or more specific performance criteria for fire-resistance. Any period of fire resistance given within this section will be clearly defined with regard to the specific fire resistance criteria it must achieve. A definition of each criterion has been provided below, with the European equivalent letter code given in brackets:

- Loadbearing Capacity (R): The ability to resist collapse due to loss of structural strength caused by exposure to fire.
- Integrity (E): The ability to prevent flames or hot gases from physically passing through the fire-resisting element.
- Insulation (I): The ability to prevent a large rise in temperature on the non-fire-exposed side of the fire-resisting element.
- Radiance (W): The ability to prevent a large degree of thermal radiation being emitted from the non-fire-side of the fire-resisting element.
- Smoke Leakage (Sa): The ability to prevent smoke flowing through the fire-resisting element.

4.2 Structure

4.2.1 Buildings should be designed and constructed such that, in the event of a fire, the building will remain stable for a reasonable period of time. This is achieved by providing an adequate level of fire protection to all loadbearing elements of structure within a building.

4.2.2 As the building is 16.93m all elements of structure for this hotel should achieve a fire resistance period of 60 minutes for Loadbearing Capacity (R 60). As the building is an existing Grade II* listed building, it may not be feasible to upgrade all existing elements of structure. This fire strategy provides the targeted performance specification, and at RIBA Stage 4 will be updated to confirm any areas which fall short of the prescriptive standards and where alternative mitigation measures will be required.

4.3 Compartmentation

Compartment Walls and Floors

4.3.1 A summary of the compartment wall and floor requirements has been provided in Table 10. As the building provides sleeping accommodation, all floors within the building are to be constructed as compartment floors.

4.3.2 As per Section 4.2.2, there will be areas of the building that cannot achieve the prescriptive requirements listed in Table 10. However, the following areas are seen as essential components of the compartmentation strategy:

- Stair enclosures
- Protected shaft for the evacuation lift
- Stair lobbies
- Floors

Table 10: Compartment Wall and Floor Requirements

Location	European Classification	Method of Protection
Compartment floors	REI 60	From underside
Bedroom corridor/protected routes	REI 30	Each side separately
Protected stair	REI 60	Each side separately
Protected lift	REI 60	Each side separately
Evacuation Lift	REI 60	Each side separately
Protected Shaft housing Evacuation Lift and lift lobbies	REI 60	Each side separately
Service riser (are not fire stopped at floor level)	REI 60	Each side separately
Service riser (are fire stopped at floor level)	REI 60	Each side separately
Refuse store	REI 60	Each side separately
Storage areas	REI 60	Each side separately
Plant room	REI 60	Each side separately
Ancillary rooms	REI 30	Each side separately
Kitchen	REI 30	Each side separately
Life safety equipment	REI 120	Each side separately
Corridor subdivision	REI 30	Each side separately

4.3.3 Compartment walls should be continued up to the underside of the floor above or through to the underside of the roof. This should achieve the same fire resistance as the wall they act as a continuation to. The continuation of compartmentation within the roof void will maintain the fire resisting enclosure between accommodations and minimise the risk of fire spread between compartments.

4.3.4 The roofing materials overlapping the compartment floor should achieve $B_{ROOF}(t4)$ rating, 1500mm either side of compartment wall (including the width of the wall below).

Fire Doors

4.3.5 A summary of the fire door requirements has been provided below in Table 11. Fire doors should typically achieve a rating equal to the wall that they are fitted, rounded up to the next largest 30-minute interval. Any access panels fitted in floors/ceilings should achieve the same rating as the floor/ceiling that they penetrate.

Table 11: Fire Door Requirements

Location	European Classification	Additional Notes
Protected stair	E60Sa	Self-closing
Protected corridor/lobby	E30Sa	Self-closing
Bedroom entrance doors	E30Sa	Self-closing
Cross-corridor door	E30Sa	Self-closing
Protected lift doors	E30	-
Service riser doors (fire stopped at floor level)	E30Sa	Locked shut and not easily openable
Other: Plant, stores, offices, kitchen etc.	E30Sa	Self-closing
Corridor subdivision	E30Sa	Self-closing

4.4 Sprinkler Suppression Systems

4.4.1 Based on the height, size and type of building, as well as the removal of the atrium, sprinkler suppression throughout the building is not a minimum requirement for Part B of the Building Regulations.

4.5 Protection of Openings and Fire Stopping

4.5.1 Fire stopping is required to prevent the performance of fire-separating elements from being impaired by joints, imperfect fits and openings for services. A variety of fire stopping methods are available for different types of penetrations. This section summarises the standard fire stopping approach for various penetrations.

Openings for Pipes

4.5.2 Pipes passing through fire-separating elements should be provided with a tested proprietary sealing system, such as an intumescent fire collar or sleeve wherever the internal pipe diameter exceeds the dimensions given in Table 12. Where the internal pipe diameter is less than the dimension given in Table 12, the penetration may be fire stopped with an appropriately tested intumescent mastic or cement mortar around the pipe only provided that the annular zone around the pipe is kept as small as possible.

4.5.3 There are two main approaches for fire stopping of vertical service risers within a building:

- Option 1: Risers to be designed with a continuous fire resisting protection when penetrating via a compartment floor, enclosing the riser with adequate fire resistance. The fire resistance of the riser enclosure should be the same or higher to the fire resistance provided to the compartment floors and/or structure it breaches. All penetrations through vertical fire protection of service risers will need to be fire stopped achieving the same fire resistance as the wall they penetrate. Note, no floors are required within encased vertical service risers however, access grilles or other means to prevent falling may be provided to satisfy other parts of Approved Documents; or
- Option 2: Risers to be provided with fire stopping at floor level, achieving the same fire resistance as the compartment floor they penetrate through. All penetrations through horizontal fire protection of service risers will need to be fire stopped achieving the same fire resistance as the wall they penetrate. Where walls enclosing the fire stopped riser at floor level are adjacent to/form part of separate compartments, these wall should achieve adequate fire resistance to maintain the compartmentation between the two areas.

4.5.4 Normally, common service distribution risers adopt Option 1 as the primary protection due to a large volume of services contained within. Small risers containing SVPs are recommended to be protected with Option 2. The contractor and wider design team should confirm the preferred solution on fire stopping.

4.5.5 Additional methods of fire-stopping pipes are given within prescriptive guidance, such as sleeving pipes with high melting point metals for 1m either side of the penetration, or enclosing drainage or water supply stack pipes in a separate fire-resisting riser. However, due to the onerous buildability impact that these methods have, Orion Fire Engineering recommend using a proprietary sealing system in any situation where the internal diameter of a pipe exceeds the dimensions given in Table 12.

4.5.6 Examples of typical fire stopping arrangements can be seen on Figure 8 and Figure 9.

Table 12: Maximum Internal Diameter of Pipes not Fitted with a Proprietary Seal

Situation	Pipe Material and Maximum Internal Diameter (mm)		
	High Melting Point Metal[1]	Lead, aluminium, aluminium alloy, uPVC[2], fibre cement	Any other material
Structure (but not a wall separating buildings) enclosing a protected shaft that is not a stair or a lift shaft	160	110	40
Any other situation	160	40	40

[1] Any metal (such as cast iron, copper or steel) which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe

[2] uPVC pipes that comply with either BS 4514 or BS 5255

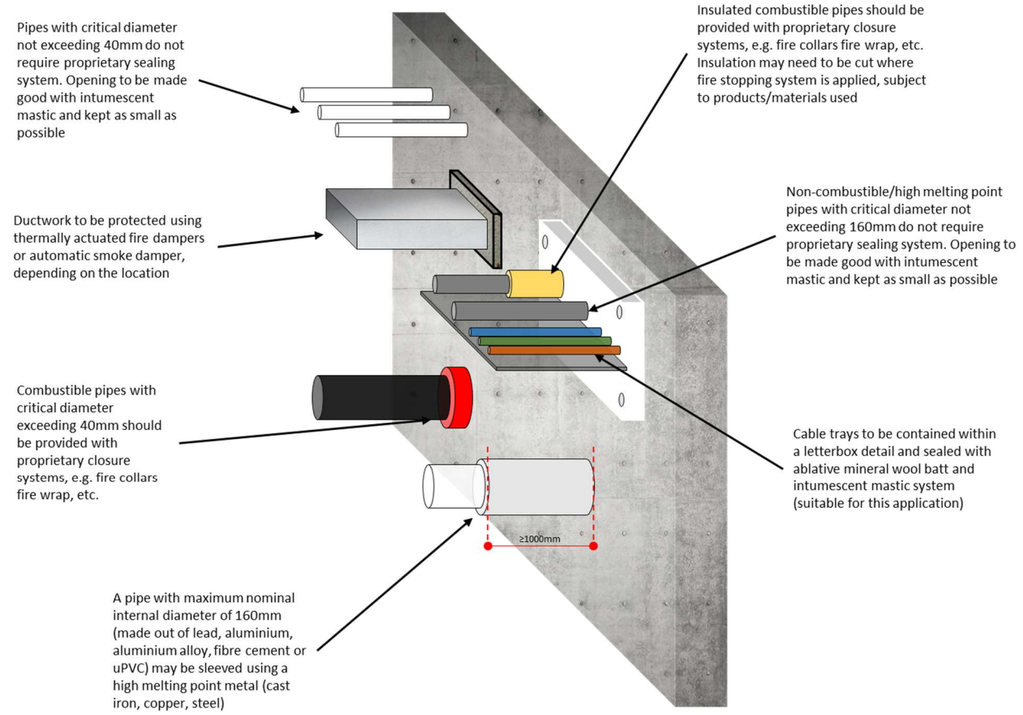


Figure 8: Example of Fire Stopping Methods – Compartment Wall

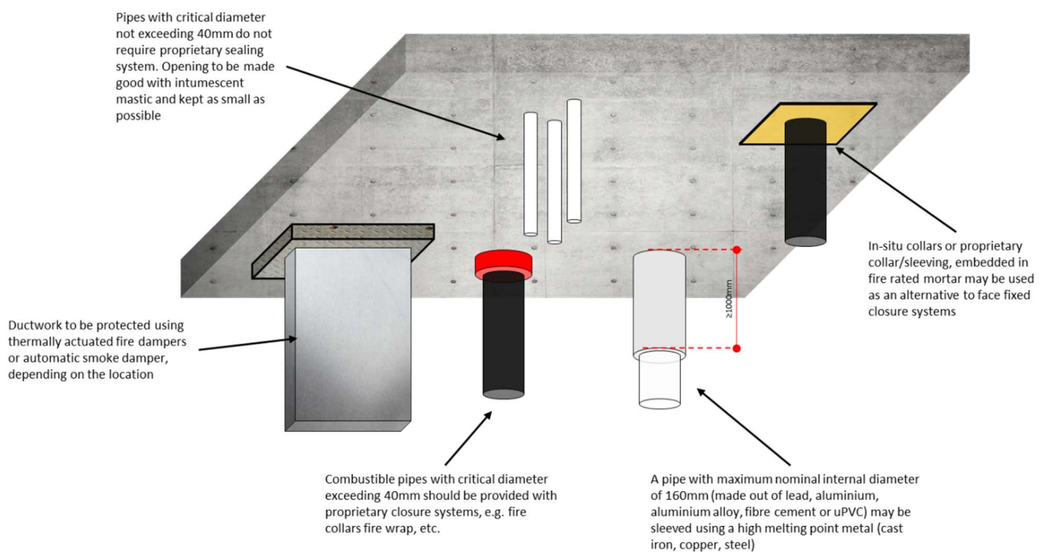


Figure 9: Example of Fire Stopping Methods – Compartment Floor

4.6 HVAC Systems

4.6.1 Ductwork should not provide a passage for fire and smoke to bypass compartment boundaries. Wherever ductwork passes through a fire-separating element it should be provided with a fire damper or fire and smoke damper. Table 13 below provides a summary of the required locations for both fire dampers and fire and smoke dampers. Note that the table below is based on compliance with ADB and is subject to confirmation with Whitbread whether all ducts passing through fire-resisting walls should be provided with automatic fire and smoke dampers.

Table 13: Fire Damper and Fire and Smoke Damper Locations

Ductwork Route		Thermally Actuated Fire Damper	Automatic Smoke Damper
From	To		
Floor	Floor		X[1]
Escape Routes	Any other room		X
Ancillary Room	Ancillary Room		X[1]

[1] See 4.6.2

4.6.2 Approved Document B states that where a building contains a sleeping risk, fire dampers or fire and smoke dampers should be actuated by smoke detector-controlled automatic release mechanisms. The exception to this is where “all occupants of the building can be expected to make an unaided escape” and “an L1 fire detection and alarm system is installed in accordance with BS 5839-1”. As the building is a hotel, it is expected that some guests will not be able to make an unaided escape, and therefore the following strategy is proposed:

- Ventilation systems serving accessible rooms for wheelchair users should be provided with automatic fire and smoke dampers.
- Ventilation systems serving standard bedrooms will be provided with metal ductwork connected to a common ventilation fan at roof level. Each bedroom will be provided with an independent duct such that there is no direct connection between rooms via the ductwork.
- On the basis that there will be independent steel ductwork for each room, it is proposed that the ducts are routed vertically through a fire-resisting service riser; however, no dampers will be provided on the ductwork. Instead, the ducts will be fire-stopped around the annular zone of the duct only. The service riser will be constructed of non-combustible materials to mitigate the risk of heat transfer via the metal ducts igniting anything within the riser.

General

4.6.3 Thermally actuated fire dampers as well as automatic smoke dampers should confirm to BS EN 15650, be tested in accordance with BS EN 1366-2 and classified in accordance with BS EN 13501-3. Thermally actuated fire dampers will need to achieve the same fire resistance as the fire resisting element they are fixed in, subject to a minimum classification of E (integrity) of 60 minutes. Automatic smoke dampers will need to achieve the same fire resistance as the fire resisting element they sit in, subject to a minimum integrity and smoke rating (ES) of 60 minutes.

4.6.4 Smoke detectors and automatic release mechanisms used for activation of fire damper and/or automatic smoke damper, should conform to BS EN 54-7 and BS 5839-3 respectively.

4.6.5 Where ductwork exhaust terminates at an external wall, it should be sited away from any escape routes and final exits. Where the ductwork exhaust point terminates at an external wall/roof or is in close proximity to a final escape route, it should be surrounded by a material Class A2 or better performance.

4.6.6 Both thermally actuated and automatic fire dampers should be securely fixed and sited within the thickness of fire-resisting wall/floor. Also, in a fire condition, the damper needs to be sited so that in the event of ductwork expansion due to heat, the damper stays in its designated position.

4.6.7 Where dampers are concealed within the internal fabric of the building, adequate maintenance access to the damper needs to be provided for inspection, testing and maintenance.

4.6.8 Extract ductwork serving kitchens should not be provided with fire dampers due to the adverse impact that the build-up of grease can have on the operation of the fire dampers. Ductwork serving kitchens should be fire-resisting from the point at which it leaves the kitchen to the point at which is discharges to fresh air.

4.7 Cavities

4.7.1 Concealed cavities within a building provide an unseen passage for the spread of fire and smoke. Additional protection, such as the provision of cavity barriers, is required in some situations to maintain the compartmentation provided to a building.

4.7.2 Cavity barriers as referred to within this section should achieve a fire-resistance rating of 30 minutes to Integrity and 15 minutes to Insulation (E30, EI 15). This is independent of the rating of any compartment wall or floor that they are adjacent to. Please refer to Section 4.4 for further information on fire-stopping.

4.7.3 Cavity barriers should be provided in all of the following locations:

- At the edges of cavities, including around openings (such as windows, doors and service penetrations);
- At the junction between an external cavity wall and every compartment floor and compartment wall.
- At the junction between an external cavity wall and every bedroom wall as a PIHS requirement.

- At the junction between an internal cavity wall and every compartment floor, compartment wall or other wall or door assembly forming a fire resisting barrier.

4.7.4 Cavity barriers should be provided to sub-divide extensive cavities (including floor and ceiling voids) as per the distances given in Table 14.

Table 14: Maximum Dimensions of Cavities

Location of Cavity	Surface Spread Classification for exposed surfaces within the cavity	Maximum dimension in any direction (m)
Between a roof and a ceiling	Any	20
Any other cavity	Class C-s3,d2 or better	20
	Worse than Class C-s3,d2	10

4.7.5 Cavity barriers within a stud wall or partition, or formed around openings (such as windows, doors and service penetrations) need not necessarily be a proprietary tested fire barrier system, and can instead be formed of any of the following materials:

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

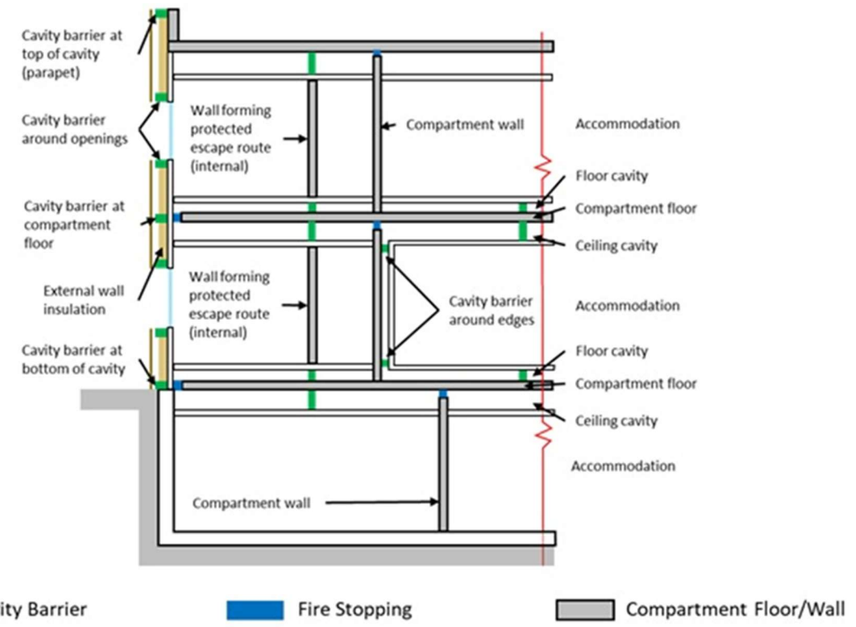


Figure 10: Provisions for Cavity Barriers – Building Section

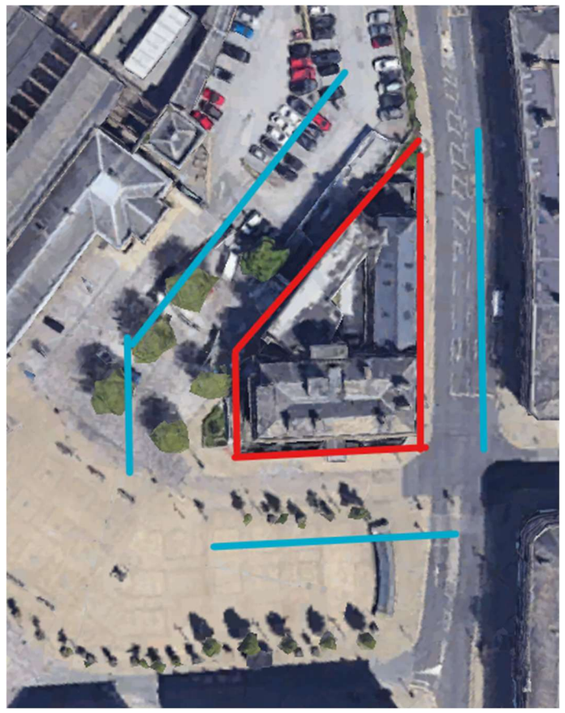
4.7.6 Cavity barriers should be tightly fitted to rigid construction and mechanically fixed in position in such a way that their performance is unlikely to be made ineffective by any of the following:

- Movement of the building due to subsidence, shrinkage or temperature change, and movement of the external envelope due to wind;
- During a fire, collapse of services penetrating the cavity barriers, either by the failure of the supporting system of through degradation of the service itself;
- During a fire, failure of the cavity barrier fixings;
- During a fire, failure of any material or construction to which cavity barrier abut.

5 External Fire Spread

5.1 Space Separation

5.1.1 The external fire spread relevant boundary locations has been shown be, the red line illustrates the site boundary, and the blue line illustrates the notional boundary of each elevation.



5.1.2 **Figure 11: External Fire Spread Boundaries**

5.1.3 The notional boundary is shown in blue in Figure 11, this may be extended past the site boundary, where the adjacent land is an area unlikely to be developed upon, such as a road or canal, as such the site boundary has been extended at to encompass the surrounding roadways.

5.1.1 As part of External Fire Spread assessment, space separation between the building and its relevant boundaries has been evaluated to minimise the risk significant radiation affecting buildings on neighbouring sites. The main aspect of the assessment is calculating the required protected areas, to limit non-fire rated elements on the external envelope of the building. The external fire spread assessment is benchmarked against minimum requirements stated in BR 187 – External Fire Spread, Building Separation and Boundary Distances, using calculation methods outlined in Annex A of the document. An example of the calculation performed for each compartment can be seen below.

$$u = \frac{(d/f)^2}{(wh)}$$

Where:

u = protected area requirement

d = distance to boundary

h= height of compartment

w = width of compartment

f = factor from Figure 25(BR 187)



Figure 12: John William Street Elevation



Figure 13: St George Square Elevation



Figure 14: West Elevation

Table 15: External Fire Spread Assessment

Area	Use	Width of Panel (m)	Height of Panel (m)	Distance to boundary (m)	Unprotected area (%)	Unprotected Area (m^2)
West Elevation (T1)	Residential (other)	37.6	3.1	14	100%	116.56
West Elevation (T2)	Residential (other)	17.4	5.8	14	100%	100.92
George Square Elevation	Residential (other)	29.5	4.3	24	100%	126.85
John William Street (T1)	Residential (other)	11.9	5.3	8	100%	63.07
John William Street (T2)	Residential (other)	19.7	6.2	8	61%	74.64
John William Street (T3)	Residential (other)	14.6	6.2	8	77%	69.44

5.1.2 From Table 15 above it states that T2 and T3 require fire resistance to 61% of T2 and 77% of T3 of the area of the facades. This should achieve 60 minutes from the inside only.

5.2 External Wall Construction

External Wall Materials

5.2.1 The external envelope of the building should not contribute to excessive smoke and fire spread from one part of the building to another or to another building.

5.2.2 The external wall materials need to be confirmed, or a schedule of the external wall build ups are to be provided for review. However, based on the age of the building and appearance of the external walls, it is not expected that there are substantial amounts of combustible materials within the external walls.

5.3 Roofs

Definitions

5.3.1 Part of a roof is defined as having a slope less than 70° to the horizontal plane. Any part of a roof greater than 70° to the horizontal plane, will be classified as forming part of the wall. For example, parapets on external walls are classified as part of the wall.

5.3.2 The term “roof covering” is used to describe constructions which may consist of one or more layers of material however, it does not describe the entirety of roof structure. The provisions of this section are mainly concerned with the performance specification of roofs when exposed to a fire from outside. This is measured in terms of penetration through the roof and the spread of flame over its surface. Roof classification should be in accordance with BS EN 13501-5.

Roof Coverings Relative to Distance to the Boundary

5.3.3 The existing roof build-up ought to be confirmed.

6 Access and Facilities for the Fire Service

6.1 Vehicle Access

6.1.1 Access to the building is provided via John William Street and St George Square.

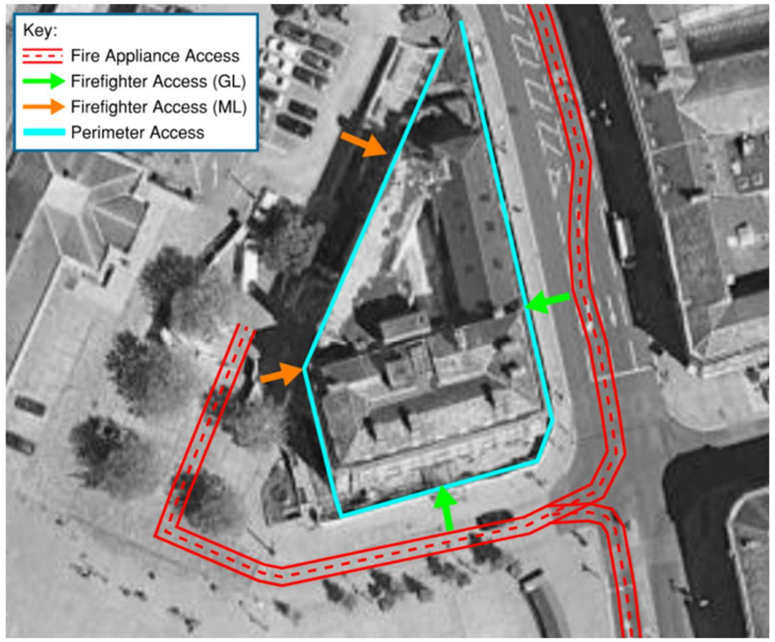


Figure 15: Fire Service access

6.1.2 As the building exceeds 11m in height and has a combined floor area between 2,000m^2 and 8,000m^2, a minimum of 50% perimeter access is required. The fire and rescue service has 90% perimeter access around this building which can be seen in Figure 15.

6.1.3 Based on information provided and drawings available, at the time of producing this report, it appears that no works are proposed to the existing road infrastructure around the premises. Where works to the existing infrastructure are proposed, these should be in accordance with Table 16.

Table 16: Typical Fire Appliance Access Route Specification

Appliance Type	Minimum Width of Road Between Kerbs (m)	Minimum Width of Gateways (m)	Minimum Turning Circle Between Kerbs (m)	Minimum Turning Circle Between Walls (m)	Minimum Clearance Height (m)	Minimum Carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High Reach	3.7	3.1	26.0	29.0	4.0	17.0

6.1.4 Note, fire appliances are not standardised and may vary from area to area. Consultation with the Local Fire Authority and Building Control are required to ensure these dimensions are true to the equipment available for fire crews.

6.1.5 Where a fire appliance needs to access the building via a dead-end access road, it should be ensured that the overall reversing distance does not exceed 20m.

6.2 Fire Hydrants

6.2.1 A fire hydrant should be located within 90m of each fire main inlet position. Note that this distance should be as measured on a route suitable for laying hose and rather than a direct line distance.

6.2.2 All hydrants should be equipped with signage designed in accordance with BS 3251.

6.2.3 Orion contacted West Yorkshire Fire and Rescue Service who confirmed the local fire hydrant locations as shown in Figure 16, these hydrants were confirmed to be operational; however, the flow rates were not confirmed.

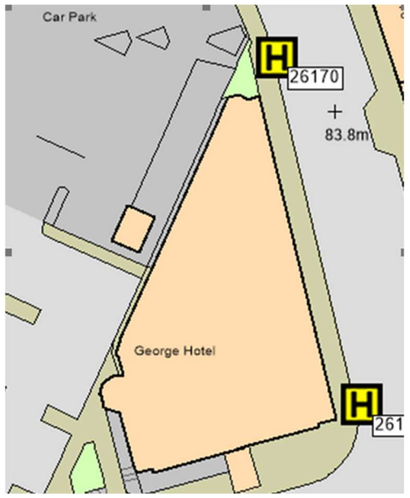


Figure 16: Fire Hydrant Locations

6.3 Premises Information Box

6.3.1 In order to assist the attending fire crews in obtaining the correct information efficiently upon arrival on site, the end-user/responsible person must provide a Fire Service Information Box within the building. This should be located adjacent or in close proximity to the entrance of the building most likely used by the attending fire crews. Location is to be discussed and agreed with local Fire Service. It should be ensured that the following crucial information is provided:

- Operational contingency plans
- Evacuation plans and procedures.
- Simple schematics and/or line drawings representing the building layout, key locations for firefighting equipment/installations and relevant information for firefighting facilities provided within the building (fire resistance of structure, key access areas, firefighting facilities, services, hazards, etc.)
- Information about the nature of any lifts for use by the Fire Service

- Basic operating instructions for fire protection and fixed firefighting systems

6.3.2 The fire safety/operational systems indicated on any of these plans should be labelled. Where plan symbols are to be used, they should follow the system outlined by the local Area Fire Safety Team and include a key with a suitable description alongside. When one or more of the same types of system is installed, they should be individually identified. For example, where two different alarm systems are installed to BS 5839-1, these should be designated with different symbols.

6.3.3 The contents of the box should be kept up to date and kept under regular review.

7 Secondary Power

7.1 General Requirements

7.1.1 It is crucial that all life safety systems provided within the building are capable of normal operation in any condition, including loss of primary power supply to the area/building. Since it is not possible to determine where a fire may occur, the power supplies provided to the life safety systems of the building will need to be adequately protected and additional resilience will need to be provided, in the form of secondary power supply, in order to maintain an acceptable level of safety and operation of all life safety systems in the building, regardless of the conditions present at a time of an emergency.

7.1.2 Recommendations of BS 9991 will be followed to provide detail and information on the performance specification of power supplies for life safety systems.

7.1.3 The electrical power supply to life safety and fire protection systems provided in the building should be separate from all other electrical circuits so that in the event of failure of non-life safety equipment, does not render the installation inoperative. The secondary power supply should be capable of providing emergency power to all life safety systems for at least 3 hours.

7.1.4 The following life safety systems have been installed in the building and therefore will require provision of primary and secondary power supplies:

- Automatic Fire Alarm and Detection Systems (AFDAS)
- Evacuation Lift
- Emergency Lighting
- Electrically operated doors (including magnetic hold open devices)
- Mechanical smoke extract

7.1.5 Primary power supply should be taken from the incoming public feed while secondary power supply should be provided by either:

- An uninterruptable power supply (UPS)
- A generator located within the building.
- A second intake from the substation into the building. Note that this option is only available for the evacuation lift.

7.1.6 Low electrical load life safety systems may be already installed with an integrated back up supply, such as AFDA, emergency lighting, electrically operated doors etc. These should be in accordance with their respective British and/or European Standards.

7.1.7 As the only high power life safety system is to be the evacuation lift, it is proposed that it is fed from diverse routes from a single electrical intake to the building without the need for a generator or UPS.

8 Conclusion

8.1 Report Summary

8.1.1 This summary acts as a main conclusion to the report and as a summary of Regulation 38 requirements for Building Management and will outline the approval status at the time of report issue.

8.1.2 The layout of the development, based on the drawings listed in Table 1, is considered sufficient to meet the functional requirements of Part B of the Building Regulations, provided that the recommendations made throughout this report are incorporated in full.

8.1.3 The design of the building is not in full accordance with prescriptive codes; however, it is considered that the alternative solutions presented in this report demonstrate that the proposed design provides an equal or greater level of safety than a code-compliant design.

8.2 Approvals Correspondence

8.2.1 This report has not yet been commented on by the Approvals Authorities

8.3 Key Fire Safety Information

8.3.1 Under Regulation 38 of the Building Regulations, the Responsible Person for the development should be provided with all essential fire safety information either when the project is complete, or when the premises are first occupied. This section summarises the fire strategy to provide the key information that will be required by the Responsible Person to allow them to:

- Understand and implement the fire safety strategy of the development.
- Maintain any fire safety provided in the development.
- Carry out an effective fire risk assessment of the development.

8.3.2 The information required to achieve this is provided within a collated Operation and Maintenance (O&M) Manual, which incorporates information produced by various consultants, and contractors. The fire safety strategy provides a performance specification for the development during the design phase and acts as a summary of the systems that should be in place within the development post-completion. The fire strategy alone is not sufficient to act as the package of fire safety information handed over the Responsible Person under Regulation 38.

8.3.3 A summary of the key fire safety features of the development has been provided in Table 17Table 17. The summary table is not intended to replace the fire strategy; however, it provides an aide-mémoire of the key information presented within this fire strategy, as well as a reference to the relevant section of this report that provides a detailed summary of the system/information. This summary table is intended to assist either the Responsible Person or their appointed Competent Person in producing and maintaining the fire risk assessment and other duties under the RR(FS)O.

Table 17: Key Fire Safety Features of the Fire Strategy

Key Feature	Summary	Section/ Reference
General Features		
Guidance Applied	Approved Document B Volume 2.	1.3
Building Height	16.93m when measured from the lowest adjacent ground floor to the topmost occupied storey floor.	1.4.2
Evacuation Procedure	Simultaneous Evacuation Strategy.	2.1.1
Travel Distances	Travel distances are generally compliant with prescriptive guidance recommendations although will need to be confirmed on fit out.	Table 6
Disabled Evacuation	Disabled Refuges to be provided in the stairs at the upper floor levels. EVC system to be provided in each refuge area. It is also proposed that persons requiring assistance may also be able to use the evacuation lift until the Fire Service arrive and will be assisted by management as required hotel operator will need to develop a disabled evacuation plan.	2.6
Structure	As the building is 15.5m all elements of structure for this hotel should achieve a fire resistance period of 60 minutes for Loadbearing Capacity (R 60)	4.2
External Wall Materials	External walls build up needs to be confirmed with the client.	**Error! Reference source not found.**
Passive Fire Protection Measures		
Compartmentation	General requirements as follows: All floors to be 60 minutes compartment floors. 30 minutes to bedrooms corridors and protected lobbies. 30 minutes to ancillary areas. 30 minutes to kitchen area. 60 minutes to plant rooms and stores. 60 minutes to storage and refuse areas. 60 minutes to evacuation and protected lifts. 120 minutes to areas which include life safety equipment.	4.3
Cavity Barriers	Cavity barriers will be provided at the junction of all floors and fire-resisting walls with the external walls. Cavity barriers should also be formed around openings.	4.7.2
Fire Doors	All doors on fire resisting wall lines should achieve a minimum half the fire rating of the wall subject to the next rounded interval of 30 minutes. All fire doors other than internal apartments doors, service riser doors should be fitted with self-closing devices. All doors other than internal bedroom doors should be fitted with smoke seals.	4.3.4
Escape Signage	Escape routes should be signed as per the recommendations of BS ISO 3864.	2.8
Internal Linings	Class B-s3,d2 within common circulation spaces. Class D-s3,d2 in small rooms less than 30m^2. Class C-s3,d2 within all other areas	3
Structural Fire Protection	All elements of structure to achieve 60 minutes fire resistance for loadbearing capacity.	4.2

Key Feature	Summary	Section/ Reference
Fire Stopping	Any penetrations through a fire-resisting wall should be fire-stopped using one of the methods described in Section 4.	4.5.1
Active Fire Safety Measures		
Fire Alarm	BS 5839-1 Category L1 system throughout building.	2.3
Evacuation lifts	Due to the stepped escape routes on the circulation routes on the first and second floor it is proposed to restrict wheelchair accessible bedrooms to other areas of the building therefore evacuation lifts should be incorporated to allow disable access to all areas of the building	2.6.5
Emergency Lighting	Emergency lighting should be provided in accordance with BS 5266-1:2016 and BS EN 1838:2013 to conform with the recommendations of ADB	2.9
Smoke Control	0.2m^2 permanent ventilation to the refuse store lobby Places of special fire risk - 0.4m^2 permanent natural ventilation. Basement ventilation – The combined clear cross-sectional area of all smoke outlets should be a minimum of 1/40 of the area of the floor of the storey they serve..	2.7
Secondary Power Supplies	The majority of life safety systems will be fed via integral battery back-ups. Secondary power location to be confirmed.	7
Firefighting Provisions		
Vehicle Access	Road access via John William Street and Railway Street and the service road to the rear of the site. All stairs are accessible via the service road.	6.1
Fire Hydrants	Two fire hydrants located on the west side of the building shown in Figure 16.	6.2