

ALBERT BRIDGE HOUSE

PROJECT NUMBER 21-1203

FIRE ENGINEERING BRIEF

REVISION 01

OCTOBER 2022

**URBAN
CHANGE**

The logo for Urban Change features the words "URBAN" and "CHANGE" in a bold, white, sans-serif font. The "C" in "CHANGE" is stylized, incorporating a white silhouette of a person standing next to a bicycle wheel.

DOCUMENT CONTROL

URN	Author	Checker	Approver
221025 Fire Engineering Brief ABH 21-1203 R01	PMC	GWJ	GWJ
Gateway 1 Planning Application			
220524 Fire Engineering Brief ABH 21-1203 R00	PMC	GWJ	GWJ
RIBA stage 1 Design Team collaboration & strategic input			

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1 INTRODUCTION

Oval Real Estate Limited appointed Urban Change Group Ltd (UCG) in January 2022 to provide fire engineering advice at RIBA Stage 1 & 2 in support of a proposed mixed-use development at 1 Bridge Street, Manchester, M60 9AF. The development is known herein as Albert Bridge House (ABH).

The proposal comprises the redevelopment of an existing site on the south bank of the River Irwell.

1.1 Building Components

Residential Building (Tower A) - is a high-rise multi-residential block set over 45 storeys. The residential block features 1,2, & 3-bed homes with private winter gardens. The height of the block triggers a relevant building classification under the Building Regulations 2010 (as amended).

Commercial Building (Tower B) - is a tiered commercial office block set over 20 storeys featuring retail outlets and food & beverage amenities at Ground level. A single basement storey serves each plot below the public realm & facilitates ancillary plant & car parking facilities.

The concept images of ABH below have been produced by Studio Egret West (Project Architects).

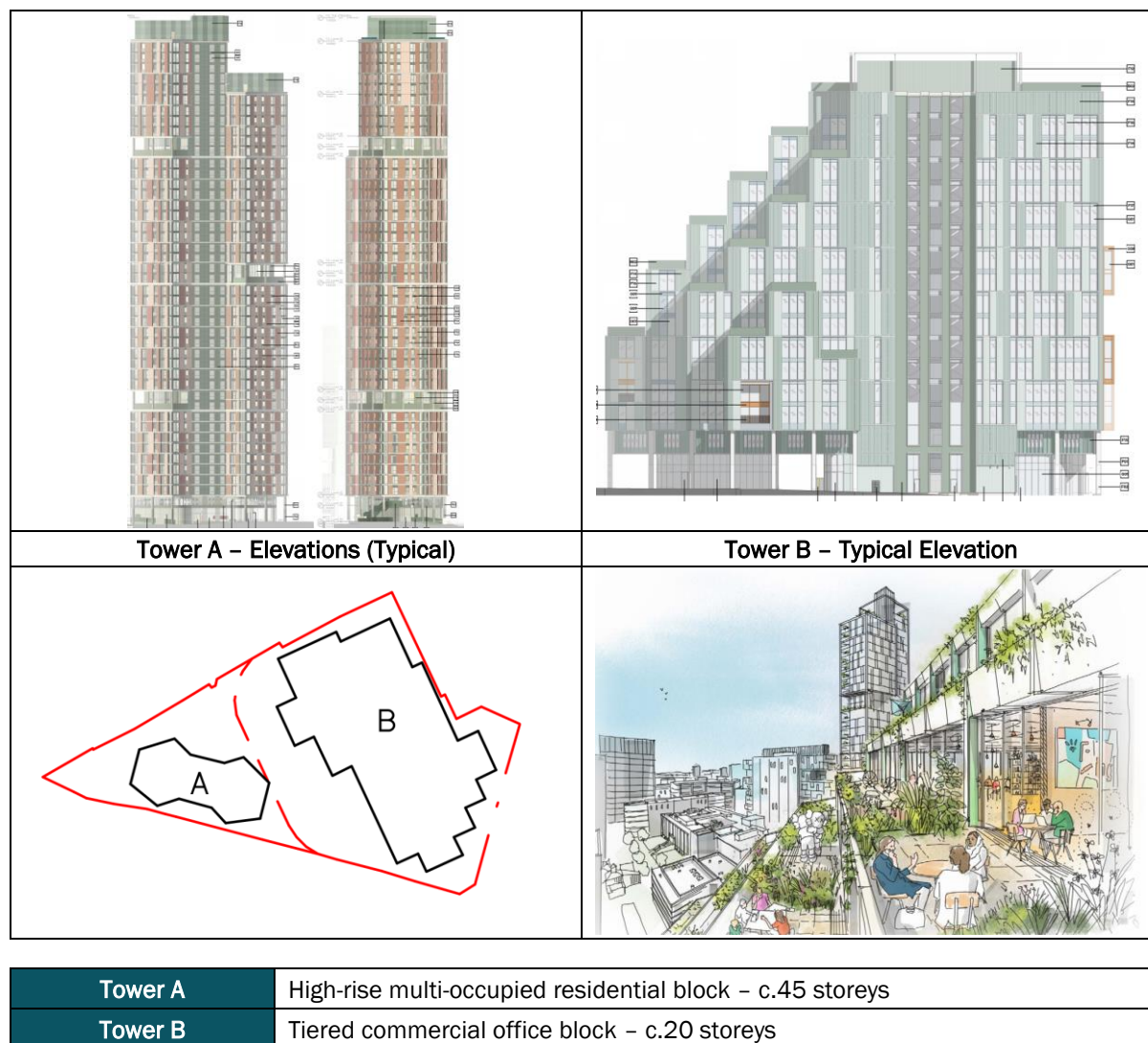


Figure 1 ABH Project Vision (Studio Egret West)

2 FIRE ENGINEERING BRIEF (FEB)

2.1 Purpose & Context

The role of the FEB is to balance design aspirations with appropriate & proportionate fire safety objectives for the project. The FEB is established to guide design evolutions, & inform the development of the fire safety strategy, including its implementation at subsequent stages. Remaining as a live document, the FEB is a record of stakeholder discussions & decisions from inception through to the operation of the premises.

Revision R00 of the FEB highlights our contribution to design development and collaboration with the broader project team at RIBA Stage 1. This revision (R01) supports the fire safety design at Gateway 1.

2.1 Project Stakeholders

Statutory Consultees & External Representatives	
Health & Safety Executive (HSE) – Building Safety Regulator Representative (TBC)	
Greater Manchester Fire & Rescue Service – Fire Service Representative (TBC)	
Manchester City Council – Planning Department – Lead Planner (TBC)	
Building Control Body – Manchester City Council (TBC)	
Manchester Police / CTSA / Ambulance Departments – Representatives (TBC)	
Property Insurance Underwriter – Representatives TBC as required	
Design Team Representatives	
Client / Client Representative:	Oval Real Estates (Steve Sanders)
Structural & Civil Engineers:	AKTII
Mechanical, Electrical & Plumbing Services:	Hoare Lea
Sprinkler System Designer:	Unknown at this stage (TBC by Oval)
Smoke Control Designer:	Unknown
Development & Landscape Architect:	Studio Egret West (SEW)
Transport Consultants:	Curtins
Security Consultant:	Unknown at this stage (TBC by Oval)
Acoustic Consultant;	Hoare Lea
Accessibility Consultant:	Unknown at this stage (TBC by Oval)
Waste Management Consultant:	Curtins
ICT Consultant;	Unknown at this stage (TBC by Oval)
Façade Engineer;	AKTII
Operating / Managing Agents:	Unknown at this stage (TBC by Oval)
Principal Construction Contractor;	Unknown at this stage (TBC by Oval)
Fire Safety Engineers:	Urban Change Group

2.2 Planning Fire Statement (Fire Safety Gateway 1)

In support planning application at Gateway 1, a Fire Statement is required for Building A. The fire safety strategy reports for Buildings A & B will typically include the following subsections, established at the next stage:

2.3 Fire Safety Strategy (FSS) Reporting - RIBA Stage 3 Onwards

FSS Reporting	Descriptions
Section 1	Executive Summary & Introductions
Section 2	Fire Safety Management & Leadership Duties
Section 3	Fire Risk Profiling & Safety Tactics
Section 4	Fire Prevention & Preparedness Planning
Section 5	Emergency Notification, Communications & Alerts
Section 6	Fire Emergency Escape Planning & Places of Safety
Section 7	Containment, Treatment & Separation of Fire
Section 8	Fire Intervention, Salvation & Recovery Responses
Appendices	Design Calculations, Fire Strategy Drawings, Supporting Information

3 FIRE STRATEGY REQUIREMENTS

Functional Objectives	Development Components		
	Site Level	A – Residential Block	B - Commercial Office
Life Safety			
Local Planning:	Planning Permission (Manchester City Council).	Planning Permission (Manchester City Council).	Planning Permission (Manchester City Council).
Min Statutory Standards:	Functional requirements - Building Regulations 2010 (as amended).	Functional requirements - Building Regulations 2010 (as amended).	Functional requirements - Building Regulations 2010 (as amended).
Other:	Note 1	Note 1	Note 1
Asset Protection & Organisational Resilience			
Loss Control			
Building Fabric:	N/A	BLD Regulation 2010 + Regulation 7	N/A
Infrastructure:	Note 1	Note 1	Note 1
Contents:	Note 1	Note 1	Note 1
Continuity of operations:	Note 1	Note 1	Note 1
Insurance conditions:	Note 1	Note 1	Note 1
Reputation / Brand / Image:	Note 1	Note 1	Note 1
Saleability & Letability:	(DTM#2 27/01/22) Components A & B are to operate independently, which means independent Life safety systems & management/operations post-occupation.	The plot must operate independently to permit separate asset disposal or scheme development (phasing).	The plot must operate independently to permit separate asset disposal or scheme development (phasing).
Financing / Lending Requirements			
RICS valuation (EWS1):	N/A	Output A1 - Non-combustible materials only, unless classified as exempt by Regulation 7.	N/A
Environmental Protection			
Avoid/reduce products & materials that negatively impact the environment:	Not Identified ¹	Not Identified ¹	Not Identified ¹
Avoidance/control of effluent from fire-fighting operations impacting the environment and the immediate habitat surrounding the site:	Not Identified ¹	Not Identified ¹	Not Identified ¹
Enable the safe use of products and materials that generate/provide green energy:	None	None	Yes (integrated Solar PVs) – More detail at RIBA 3.

Note 1: To be confirmed by Oval Real Estate.

3.1 General Fire Safety Principles

The following general principles (identified at RIBA Stage 1) have been established to support the development of a resilient fire strategy for each building component during subsequent RIBA stages.

The fire strategy will develop the fire safety principles into design criteria for the development. Each component's fire strategy will detail project-specific performance criteria for implementation by various design disciplines, i.e., planning, landscaping & urban design, architecture, structures, infrastructure, MEP services & security controls.

Ref	Principles	What it means
1	Fire prevention	Where practicable, the proposals shall focus on fire prevention (risk removal and reduction) ahead of fire protection (risk treatment).
2	Access & Circulation	Fire safety shall influence development layout, access, and circulation to improve emergency access for first responders and facilitate the timely evacuation of all building users.
3	Infrastructure	The development site will incorporate / adapt adequate space and physical infrastructure to reduce the risk of fire, e.g., Fire hydrants, assembly points, primary and secondary power supplies, and artificial lighting provisions.
4	Layout and massing	Fire safety shall influence the spacing and orientation of buildings to enhance visual and physical accessibility, reduce the risk of external fire spread and enhance emergency responses.
5	Means of warning & Escape	The buildings shall be provided with the following: a) satisfactory means of warning occupants of the presence of fire. b) satisfactory means of escape for all occupants, including anyone requiring assistance in the event of fire.
6	Internal linings	To inhibit the spread of fire within the buildings, the internal linings shall: a) adequately resist the spread of flame over their surfaces; and b) have, if ignited, either a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.
7	Internal fire spread	The buildings shall be built to achieve the following in the event of fire: a) avoidance of premature collapse during fire b) sufficient fire separation within & between buildings c) automatic fire suppression where appropriate to the risk d) restriction of unseen spread of fire & smoke.
8	External fire spread	The buildings shall be built to restrict both: a) the potential for fire to spread over external walls & roofs (including compliance with regulations 6(4) & 7(2)) b) the spread of fire from one building to another
9	Fire service intervention & their facilities	The buildings shall be constructed to ensure both: a) satisfactory access for the fire service vehicles & equipment b) facilities to help firefighters save lives in & around the buildings.
10	Designed with management and maintenance in mind	The public realm, buildings & ancillary areas shall be easy to manage & maintain in a manner that is aligned with available resources and the operational management strategy of the owner / occupier.

11	Defence in depth	The development fire strategy shall avoid single points of failure, i.e., it will feature layers of safety measures & controls.
12	Balanced solutions	The development fire strategy will seek an appropriate balance of active, passive & procedural controls to ensure there is no over-reliance on one type of general fire precaution.
13	Resilience (Adaptability & Scalability)	The premises fire strategy shall be adaptable and scalable to ensure that fire safety can be maintained in the following circumstances: a) Changing fire hazards over time. b) Different modes of operation and changes of use and users. c) Systems maintenance and associated downtime. d) System and component failures.
14	Documented Information (Golden Thread)	Fire safety-related documentation shall be suitably recorded & shared with the end-user to support effective management and maintenance of fire safety in operation.

4 FIRE STRATEGY DEVELOPMENT & IMPLEMENTATION

The documentation of a FEB is the start of the fire safety risk management process for the new development. As Building A is classified as a relevant building (>18m & multi-occupied residential), in accordance with the latest industry best practice, there will be three separate gateways during project delivery (Gateway 1 to 3) whereby the adequacy & implementation of fire safety proposals are subject to audit by external third parties. The following figure and table broadly describe the anticipated steps in the overall process.

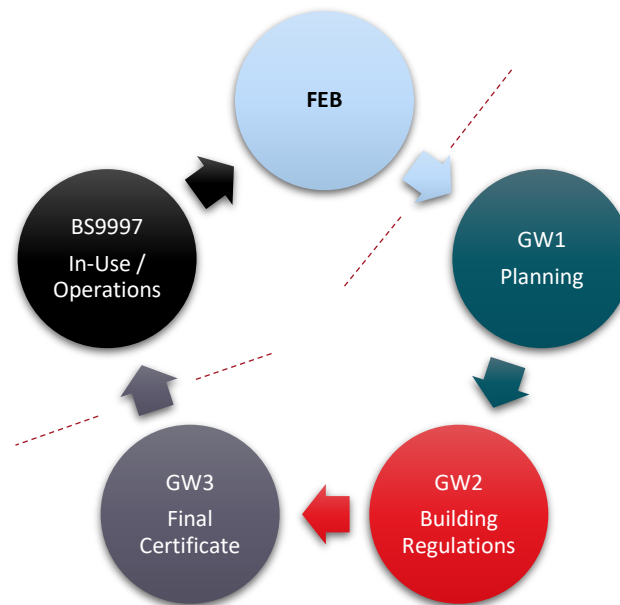


Figure 2 **Golden Loop of Fire Safety Information**

Gateway 1 (GW1)	
Planning Application	A fire statement is a statutory requirement of planning applications for relevant buildings. The statement is a record of fire safety matters (planning) that are integrated into the development plan at the earliest design stage.
Gateway 2 (GW2)	
Building Regulations	In order to comply with the Building Regulations, the deposition of full plans to an appointed Building Control Body is necessary. This gateway is termed the 'hard stop' gateway, as all construction phase activities are dependent on conditional approval from Building Control & the Building Safety Regulator (BSR) before proceeding to GW3.
Gateway 3 (GW3)	
The Final Certificate	In consultation with Building Control, the Building Safety Regulator will conduct a final inspection prior to releasing the final certificate. Practical completion & occupation relies on the release of the final certificate & the sharing of design information for fire safety with duty holders that are responsible for the fire safety management (BS9997) of the building in operation –this gateway is regulated & monitored by the BSR.

PLANNING & ARCHITECTURAL DESIGN APPRAISAL

4.1 Site Characterisation

Physical Attributes	Initial Observations / Opportunities / Constraints
Ownership, site perimeter / relevant boundaries?	Oval Real Estate (Property investor & developer).
Utilities, e.g., power, comms?	A new/enhanced grid connection and an independent secondary power supply are essential for each plot.
Transport amenities?	Plots are located directly off Bridge Street & within 5mins walking distance from Salford Central Rail Station.
Open space, e.g., assembly?	Public street pavements New public realm Upgrades to existing public gardens adjacent to the River Irwell.
Neighbouring Fire Hazards / Access Requirements?	No significant fire hazards noted / the existing pedestrian bridge (Trinity Bridge) flanks the RHS of the commercial office. Fire strategies are to confirm fire vehicle specifications – post the initial consultation with BSR & GMFS (Gateway 1).
Public realm activation / features?	The development proposes to enhance the existing riverside gardens & offer a new public realm at the Ground level.
Any abnormal / notable site-based fire hazards?	Basement ancillary plant areas & car parking facilities Proposed passages/rights of way and Ground floor under crofts feature new amenity spaces.
Environmental Factors	
Ambient noise?	Typical of a central city habitat.
Weather?	Typical UK weather at heights of c.80-140m above FGL.
Lightening?	High-rise buildings - building heights c.80-140m.
Visual accessibility?	The development frontages face Bridge Street & St Mary's Parsonage. The massing of the development is likely to create a known destination and focal / meeting point in the city.
Emergency Response (e.g., firefighting)	
Addressing / Landmarks?	- No. 1 Bridge Street is located on the NW edge of Manchester City Centre between Salford Central Station & the Central Retail District. - The height and architectural proposals (iconic nature) will likely make the property a landmark in the area, and this could assist the emergency response times.
Anticipated response times (reasonable worst case)?	Four number fire & rescue stations are located within 10-15 minutes of the proposed development. - Salford Fire Station C.10mins - Thompson St c.11.0 mins - Broughton c.13mins & - Gordon Street c.14mins.
Public realm / Site access constraints?	The site is marginally constrained by its proximity to River Irwell, and the development plot is adjacent to an existing wayleave over a pedestrian footbridge (Trinity Bridge).
Fire service access, incl. fire appliance route? Planning, RVP, car parking	Bridge Street & St Marys Parsonage offer stopping points for fire service appliances. Dedicated public realm stopping & breaching inlet point provisions are to be developed with GMFS during subsequent design stages/fire safety gateways.
Command and control?	The size and mixed-use nature of ABH warrant the consideration of a dedicated incident command and control facility. This would allow emergency services to plan & monitor their incident intervention response.

Geometry and interconnection of spaces?	Hexagonal shape - plan view (concept architectural vision).
Internal subdivision of building?	A high level of subdivision is anticipated, which is commonplace within high-rise residential blocks.
Normal circulation routes?	Users will naturally be familiar with emergency escape routes, as access double with emergency routes (used daily).
Escape routes?	Dual separated stair arrangement (offering N+1 redundancy). Limited common corridor escape distances <15m in a single path.
Wall and ceiling linings?	Internal linings to achieve a satisfactory classification.
Fire performance of external walls?	Materials & wall systems are to follow current good practices for 'relevant buildings' (Regulation 7) & the Building Regs 2020.
Method of dispersing people from the building?	New public realm, landscaping design & surrounding pavements provide an opportunity to accommodate large numbers of evacuees if required by the fire service (Evac Alert Mode).
Possible fire and smoke spread routes?	Passive & active provisions mitigate the potential for internal fire & smoke spread.
Proposed fire detection and alarm provision?	Automatic systems are required, given the extent of subdivision and the size and height of the building.
Location relative to other buildings or site boundary?	c.15.0m from the neighbouring building within the red line boundary of the proposed development site.
Planning constraints (listed/historical interest)?	Discussions with Manchester City Planning Department + Change of land use application in progress.
Any other factors that influence fire safety design?	An initial single-stair design was enhanced with the introduction of a dual stair arrangement, offering separation & redundancy for emergency escape & firefighting phases.

4.3 Principal Building Characteristics – Commercial Office Block

Building B – Commercial Office	Initial Observations / Opportunities / Constraints
Any abnormal / notable fire hazards?	Mainly the subterranean storey with several fast electric vehicle charging capacity. Passive & active mitigation measures to suitably counter the risks associated with fast vehicle charging within an enclosed basement.
Number of storeys (above and below ground)?	c.20 storeys above Ground 1 basement car park.
General dimensions / Area?	c.90m x 63m / c.5670m ²
Nature of construction?	Reinforced concrete & steel with glazed curtain wall facades.
Geometry and interconnection of spaces?	Rectangular shape featuring an enclosed central atrium.
Internal subdivision of building?	Concrete / masonry and or SFS partitions.
Normal circulation routes?	Yes – leading to redundant stair cores.
Escape routes?	Limited travel distance paths to alternative routes leading away from the atrium edge in all instances & aligning with potential tenancy split.
Wall and ceiling linings?	Typical finishes are to be applied to suitably meet the requirements of the Building Regulations.

Fire performance of external walls?	Materials & wall systems to follow current good practices & satisfy failure criteria set by the fire strategy.
Method of dispersing people from the building?	The use of the new public realm to remote points accommodating emergency flows from final exit locations. Onward movement away from the building is possible to the surrounding street pavements.
Possible fire and smoke spread routes?	A series of passive & active provisions as required by the fire safety strategy to satisfy B1 & B5 principles.
Proposed fire detection and alarm provision?	Manual & automatic capability that is appropriate to commercial offices & independent retail units.
Location relative to other buildings or site boundary?	The plot is at c.9m (pinch point) & c.15m from the neighbouring building beyond the red line boundary. This separation distance will be analysed at the next stage post-settlement of the façade design.
Planning constraints (listed/historical interest)?	Discussions with Manchester City Planning Department + Change of land use application is in progress.
Any other factors that influence fire safety design?	The office storeys offer a variety of external terraces on varying levels. Terraces are an extension of the main office provision, i.e., planned business gatherings but prohibiting public events.



Figure 4 Typical Views of Building B (External & Internal)

4.4 Principal Occupant Characteristics

The peak occupancy numbers associated with Buildings A & B are based on the number of homes and & net lettable areas. The tables record information known to the project team at RIBA Stage 2.

Building A – High-Rise Residential	Initial Observations / Opportunities / Constraints
Use classes?	Private residential living with in-house amenity spaces exclusive for use by residents and their guests.
Number & distribution?	A mix of 1B2P, 2B4P & 3B5P apartments – Total unit numbers & occupants are to be confirmed by the Architect at RIBA Stage 3.
Single or multiple occupancies?	Multiple (Residential + Independent Retail at Ground).
Mobility, vulnerability & assistance needs?	General needs occupants, some of whom may have disabilities.
State of wakefulness?	Asleep/awake.

Familiarity with premises?	Familiar: Management staff, residents & their guests Unfamiliar: Visitors & external contractors.
Social groupings?	Yes – a variety of amenity spaces for residents.
Commitment to an activity?	Yes – Private living & or resident social group gatherings.
Presence of a focal point?	Yes – Private living (TV, media devices) & cinema amenity.
Any other notable observations regarding persons at risk or that will influence human behaviour in fire?	Yes – social gatherings may include guests that are not familiar with the building layout. Guests would be accompanied by residents and guided out of the building in a fire emergency (rather than returning to individual flats).
Building B – Commercial Office	Initial Observations / Opportunities / Constraints
Use classes?	Commercial office, Independent retail, café, and restaurant units.
Number & distribution?	c.4000-5000 occupants over 20 storeys calculated on a density of 1 in 8/10. Exact occupancy figures are subject to confirmation by Architects at RIBA Stage 3.
Single or multiple occupancies?	Multi-tenanted offices, with up to two tenants per storey (subject to satisfying fire strategy escape requirements).
Mobility, vulnerability & assistance needs?	Yes – Office workers and visitors, a percentage of whom may have varying disabilities.
State of wakefulness?	Awake
Familiarity with premises?	Familiar / Unfamiliar
Social groupings?	Yes – a variety of terraced amenity spaces for tenants.
Commitment to an activity?	Yes – Meetings / social gatherings
Presence of a focal point?	Yes – Presentations / social gatherings
Any other notable observations regarding persons at risk or that will influence human behaviour in fire?	Yes – Office spaces could feature communication booths (with high-performance acoustic linings) / occupants could utilise noise-cancelling headphones.

5 DESIGN REQUIREMENTS

5.1 Acceptance Criteria & Method of Analysis

5.1.1 Building A - Residential Tower

Fire Strategy Approach	Anticipated Methodology / Type of Analysis	
Comparative Analysis:	AD B Vol 1 ^A Yes ☐ No ☒	BS9991 (2017) ^B / SCA ^C Yes ☒ No ☐
Deterministic Analysis		
Smoke Control:	CFD Modelling Unlikely ☒ Likely ☐	
Structural Fire Engineering:	Finite Element Modelling Unlikely ☒ Likely ☐	
Evacuation Modelling:	BS7974 part 6 Unlikely ☒ Likely ☐	
Probabilistic Analysis:	BS7974 - 7 Yes ☐ No ☒	
Safety Case Report:	HSE Guidance / Building Safety Regulator Yes ☒ No ☐	

Note A: Approved Document B Volume 1 Dwellings – 2019 incorporating 2020 amendments for use in England.

Note B: Fire safety in the design, management, and use of residential buildings. Code of practice

Note C: Smoke Control Association (2020) – Guidance on Smoke Control to Common Escape Routes in Apartment Buildings.

5.1.2 Building B – Commercial Office

Fire Strategy Approach	Anticipated Methodology / Type of Analysis	
Comparative Analysis:	AD B Vol 2 ^C Yes ☐ No ☒	BS9999 (2017) Yes ☒ No ☐
Deterministic Analysis		
Smoke Control:	CFD Modelling	Unlikely ☐ Likely ☒
Structural Fire Engineering:	Finite Element Modelling	Unlikely ☒ Likely ☐
Evacuation Modelling:	BS7974 part 6	Unlikely ☒ Likely ☐
Probabilistic Analysis:	BS7974 - 7	Yes ☐ No ☒
Safety Case Report:	N/A	

Note C: Approved Document B Volume 2 – Buildings other than dwellings - 2019 incorporating 2020 amendments for use in England.

6 TRIAL FIRE STRATEGY DESIGNS (RIBA STAGES 1 & 2)

6.1 Introduction

This section records some of the design advances made possible as a result of early coordination workshops at RIBA stages 1 & 2. It summarises the broader improvement particulars that make Buildings A & B more robust for fire safety. Finally, it lists the broader fire performance specifications at RIBA 2 / Gateway 1, which are required to be set out in a detailed strategy report following further design coordination at RIBA 3.

6.2 Building A - Residential Block

Our early input analysed the initial design that featured a single escape core (pressurized to BS EN 12101 - 6) against the benefits of dual stair cores offering N+1 redundancy (fire-separated walls & storey exits). The landlocked stairs serve an inverted T-shaped common corridor equipped with a fixed automatic sprinkler installation to BS9251:2021 (Category 4) & a mechanical smoke ventilation provision. A wet riser provision (BS9990) is proposed in response to the overall height of the building being >50m.

As a high-rise residential tower, design evolutions carefully considered the mode of evacuation for disabled persons & those of reduced mobility, i.e., emergency evac lifts, comms facilities & disabled refuge areas. The apartments (open plan) & common corridors feature sprinkler protection. The open-plan apartment layouts are subject to further coordination at RIBA Stage 3 (kitchens & inner bedroom relationships compound open-plan living arrangements).

During RIBA stage 3, the necessary building management assumptions and recommendations are to be discussed & documented. The high-rise tower is to feature an EVAC Alert system (for use only by the Fire Service). A back-up power facility is required for key life safety components (detailed at subsequent RIBA Stages & Fire Safety Gateways).

Fire Strategy Performance Specification – RIBA Stage 2 / Gateway 1		
B1 – Means of Escape		
B0	Fire Safety Management:	Fire Strategy Management Assumptions & Recommendations
B1.1	Fire Detection and Alarm – Residential Apartments:	Automatic LD1 category of fire detection & alarm following BS5839 part 6.
B1.2	Fire Detection & Alarm – Landlord Controlled Areas:	Automatic L5 category fire detection & alarm following BS5839 part 1.
B1.3	Emergency Voice Communications (EVC):	Master, Repeater & Field Devices (Disabled Refuges) to BS 5839 part 9. Code of practice for the design, installation, commissioning, and maintenance of emergency voice communication systems.
B1.4	Emergency Evacuation Lifts	BS9991 & Annex G of BS 9999 – Requires a secondary power supply (Life Safety,) including suitable car controls and override functions.
B1.5	Travel Distance Paths & Storey Exits	Varies with occupant characteristics & function – To satisfy BS9991 (recognising active enhancements that affect the risk profile).
B1.6	Emergency Lighting:	A) Installation throughout following BS 5266 part 1. B) Low-mounted emergency way finding BS 5266 part 2.
B1.7	Emergency Signage:	A) BS 5499-4:2013 Safety Signs. CoP for Escape Route Signing. B) BS 5499-10:2014 Safety Signs, Including Fire Safety Signs. Code of Practice for the Use of Safety Signs, Including Fire Safety Signs. C) Fire Door Assembly Signage to BS 5499 part 5.
B1.8	Doors on Escape Routes:	A) Building Hardware. Fire exit devices on escape routes BS EN 1125 & or BS EN 179. B) Building Hardware. Electrically; powered hold-open devices for swing doors BS 1155.
B2 – Internal Linings		

B2. 1	Internal Fire Spread – Linings:	A) Performances vary by location & are subject to a material specification review at RIBA stage 3 (A1, A2-s1, d0 to D-s3, d2 following BS EN 13501 part 1). Fire classification of construction products and building elements - Classification using data from reaction to fire tests. B) Circulation spaces within dwellings C-s3, d2 or better. C) Common areas B-s3, d2 or better.
B3 – Internal Fire Containment		
B3. 1	Elements of Structure (Load Bearing):	A) Primary elements to achieve a minimum fire resistance of 120 minutes. BS EN 1364 part 4 (Columns), BS EN 1365 part 1 (Walls), BS EN 1256 part 2 (Floors & Roofs), BS EN 1365 part 3 (Beams), BS EN 1356 part 5 (Balconies & Walkways). BS EN 1365 part 6 (Stairs).
B3. 2	Elements of Structure (Non-Load bearing):	B) BS EN 1364 part 1 (Wall), part 2 (ceilings), part 3 (Curtain walls – full configuration).
B3. 3	Fire Compartmentation (Primary & Secondary):	C) Varies depending on purpose & location (30 minutes to 240 minutes - in terms of load-bearing capacity, integrity & insulation).
B3. 4	Residential Corridor Smoke Ventilation:	D) BRE Shaft - Smoke Shafts Protecting Fire Fighting Shafts, Their Performance and Design. E) Powered Smoke & Heat Fans to BS EN 12101 part 3. F) Smoke & air relief shaft AOVs to BS EN 12101 part 8.
B3. 5	Fixed Auto Suppression	G) Automatic suppression to BS9251 Category 4 & BSEN 12845 OH1 (Office) & OH2 (Car park).
B3. 6	Fire Doors & Shutters:	H) Fire door resistance ratings vary from 30 minutes to 120 minutes – subject to door purpose & location (identified at RIBA stage 3). EN 1634-1: 2014 - Fire resistance tests for door and shutter assemblies, Part 1 - Fire doors and shutters. I) EN 1634-2: 2008- Fire resistance tests for door and shutter assemblies, Part 2 - Fire door hardware. J) EN 1634-3: 2004 - Fire resistance tests for door and shutter assemblies, Part 3 - Smoke control doors and shutters.
B3. 7	Fire Ducts & Dampers:	K) BS EN 1366 part 1 (Ducts) & BS EN 1366 part 2 (Fire dampers)
B3. 8	Penetration Seals & Linear Joint seals:	L) BS EN 1366 part 3 (Penetration Seals) & BS 1366 part 4 (Linear Joints).
B3. 9	Smoke Extraction Ducts (Basement Car Park):	M) BS7346 part 7. Code of practice on functional recommendations and calculation methods for smoke and heat control systems for the covered car park. N) BS7346 part 8. Components For Smoke Control Systems - Code of practice for planning, design, installation, commissioning & maintenance.
B4 – External Fire Spread		
B4. 1	External Walls & Cladding:	A) Minimum Fire Classification satisfying A2-s1, d0 or better to BS EN 13501:1 Fire Classification of Construction Products & Building Elements – using data from reaction to fire tests. B) Regulation 7 – Materials & Workmanship. C) Alternatively, satisfy the performance criteria given in BR 135 using full-scale test data from BS 8414 part 1 / 2 – fire performance of external cladding systems. D) Insulation – A2-s1, d0 or A1 fire classification.
B4.2	Separation Distances:	E) Minimum separation distances to limit the likelihood of external fire spread are subject to separate detailed analysis at RIBA stage 3.
B4. 3	Resisting Fire Spread over Roof Coverings:	F) For roofs forming part of a means of escape ($B_{Roof}(t_4)$). G) Internal surfaces of roof lights (internal linings). H) Roofs used as floors passing over fire compartmentation walls.
B5 – Access & Facilities for the Fire Service		
B5.1	Fire Fighting Shaft:	A) 120 minutes fire resistance in accordance with BS9991.
B5.2	Fire Fighting Lift:	B) Firefighting lifts to BS9991, BS EN 81 - 20 & BS EN 81 - 72.
B5.3	Wet Rising Main	C) Main designed & installed in accordance with BS9990.

B5. 4	Power & Control Cables:	D) BS 5819 – Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications.
B5. 5	Evac Alert System (EAS) – separate, resilient & secure	A) To BS8629 for use only by Fire & Rescue Service (FRS) in the event of emergencies in apartment blocks. Typically requires a visual alarm device (VAD) within apartments and related ancillary spaces – manually activated, i.e., is not triggered by smoke & or heat.

6.3 Building B – Commercial Office Block

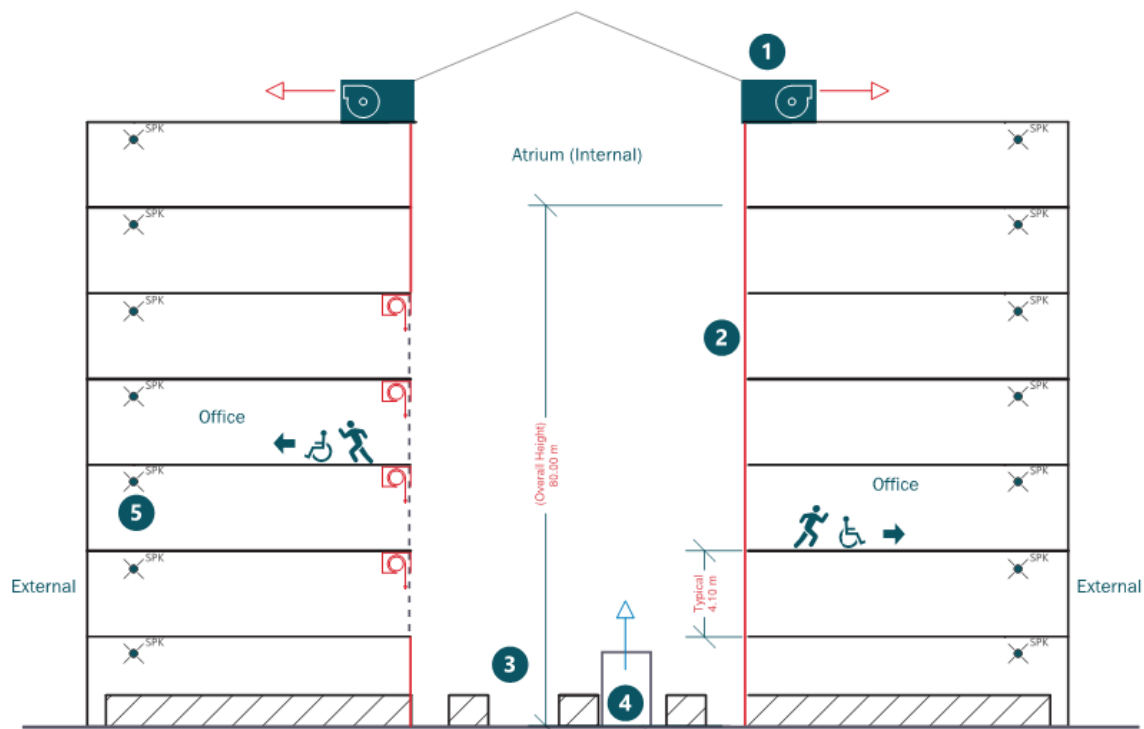
Early design discussions enabled the project team to secure a minimum of two firefighting stair cores serving all habitable storeys (satisfying a maximum hose reach distance of 60m) in a sprinkler protected setting. The tiered floor arrangement limits the height of the two satellite stairs (dropping away at levels 11 & 13). A wet riser provision (BS9990) is featured within each firefighting shaft as the block height is >50m.

The required level of fire safety management is to be discussed & documented at RIBA stage 3. The building is to be fully protected by an automatic sprinkler system to BS EN 12845 (OH1 & OH2). A back-up power facility is required for key life safety provisions (detailed at RIBA stage 3). Emergency evacuation lifts and communication facilities at disabled refuge areas are proposed within the fire-fighting shafts. Defined carry-down procedures are required from protected refuge areas that do not feature lifts suitable for emergency evacuation.

The office features a rectangular atrium. The atrium (c.80m in height) is to be fire sealed from office storeys (except where the fire safety strategy permits active barriers). As the height of the atrium is >30m, the atrium features a mechanical smoke clearance provision – for Fire Service use.

Fire Strategy Performance Specification – RIBA Stage 2 / Gateway 1		
B1 – Means of Escape		
B0	Fire Safety Management:	Fire Strategy Management Assumptions & Recommendations
B1.1	Fire Detection and Alarm	Automatic L1/M category of fire detection & alarm following BS5839:1.
B1.2	Fire Detection & Alarm – Commercial Units:	Automatic L5/M category fire detection & alarm following BS5839:1.
B1. 3	Emergency Voice Communications (EVC):	Master, Repeater & Field Devices (Disabled Refuges) to BS 5839 part 9. Code of practice for the design, installation, commissioning, and maintenance of emergency voice communication systems.
B1.4	Emergency Evacuation Lifts	Strategic use of firefighting lifts within firefighting shafts (prior to the arrival of the Fire & Rescue Service). Managed by the lead evacuation coordinator.
B1. 5	Travel Distance Paths & Storey Exits	Varies with occupant characteristics & function – To satisfy BS9999 (recognising active enhancements that affect the risk profile).
B1. 6	Emergency Lighting:	A) Installation throughout following BS 5266 part 1.
B1.7	Emergency Signage:	A) BS 5499-4:2013 Safety Signs. CoP for Escape Route Signing. B) BS 5499-10:2014 Safety Signs, Including Fire Safety Signs. Code of Practice for the Use of Safety Signs, Including Fire Safety Signs. C) Fire Door Assembly Signage to BS 5499 part 5.
B1.8	Doors on Escape Routes:	A) Building Hardware. Fire exit devices on escape routes BS EN 1125 & or BS EN 179. B) Building Hardware. Electrically; powered hold-open devices for swing doors BS 1155.
B2 – Internal Linings		
B2. 1	Internal Fire Spread – Linings:	A) Performances vary by location & are subject to a material specification review at RIBA stage 3 (A1, A2-s1, d0 to D-s3, d2 following BS EN 13501 part 1). Fire classification of construction products and building elements – Classification using data from reaction to fire tests.

B3 – Internal Fire Containment		
B3. 1	Elements of Structure (Load Bearing):	A) Primary elements to achieve a minimum fire resistance of 120 minutes. BS EN 1364 part 4 (Columns), BS EN 1365 part 1 (Walls), BS EN 1256 part 2 (Floors & Roofs), BS EN 1365 part 3 (Beams), BS EN 1356 part 5 (Balconies & Walkways). BS EN 1365 part 6 (Stairs).
B3. 2	Elements of Structure (Non-Load bearing):	B) BS EN 1364 part 1 (Wall), part 2 (ceilings), part 3 (Curtain walls – full configuration).
B3. 3	Fire Compartmentation (Primary & Secondary):	C) Varies depending on purpose & location (30 minutes to 240 minutes – in terms of load-bearing capacity, integrity & insulation).
B3. 4	Firefighting lobby Smoke ventilation:	D) BRE Shaft – Smoke Shafts Protecting Fire Fighting Shafts, Their Performance and Design. The performance of mechanically assisted shafts is subject to verification by the system supplier. E) Powered Smoke & Heat Fans to BS EN 12101 part 3. F) Air relief path via fire-fighting stairs – AOVs to BS EN 12101 part 8.
B3. 5	Atrium	G) See Exemplar 1 Height >30m – Simultaneous evacuation away from the enclosed atrium. Duty & standby fans with secondary power supply.
B3. 6	Fixed Auto Suppression	H) To BSEN 12845 OH1 (Office) & OH2 (Car park).
B3. 7	Fire Doors & Shutters:	I) Fire door resistance ratings vary from 30 minutes to 120 minutes – subject to door purpose & location (identified at RIBA stage 3). EN 1634-1: 2014 - Fire resistance tests for door and shutter assemblies, Part 1 - Fire doors and shutters. J) EN 1634-2: 2008- Fire resistance tests for door and shutter assemblies, Part 2 - Fire door hardware. K) EN 1634-3: 2004 - Fire resistance tests for door and shutter assemblies, Part 3 - Smoke control doors and shutters.
B3. 8	Fire Ducts & Dampers:	L) BS EN 1366 part 1 (Ducts) & BS EN 1366 part 2 (Fire dampers)
B3. 9	Penetration Seals & Linear Joint seals:	M) BS EN 1366 part 3 (Penetration Seals) & BS 1366 part 4 (Linear Joints).
B3. 10	Smoke Extraction Ducts (Basement Car Park):	N) BS7346 part 7. Code of practice on functional recommendations and calculation methods for smoke and heat control systems for the covered car park. O) BS7346 part 8. Components For Smoke Control Systems - Code of practice for planning, design, installation, commissioning & maintenance.
B4 – External Fire Spread		
B4. 1	External Walls & Cladding:	A) Minimum Fire Classification satisfying B-s3,d0 or better (Below 18m) & C-s3,d0 or better (above 18m) to BS EN 13501 part 1 Fire Classification of Construction Products & Building Elements – using data from reaction to fire tests. B) Regulation 7 – Materials & Workmanship. C) Alternatively, satisfy the performance criteria given in BR 135 using full-scale test data from BS 8414 part 1 / 2 – fire performance of external cladding systems. D) Insulation – A2-s3, d2 or better
B4.2	Separation Distances:	E) Minimum separation distances to limit the likelihood of external fire spread are subject to separate detailed analysis at RIBA stage 3.
B4. 3	Resisting Fire Spread over Roof Coverings:	F) For roofs forming part of a means of escape ($B_{\text{Roof}}(t_4)$). G) Internal surfaces of roof lights (internal linings). H) Roofs used as floors passing over fire compartmentation walls.
B5 – Access & Facilities for the Fire Service		
B5.1	Fire Fighting Shaft:	A) 120 minutes fire resistance in accordance with BS9999.
B5.2	Fire Fighting Lift:	B) Firefighting lifts to BS9999, BS EN 81 - 20 & BS EN 81 – 72.
B5.3	Wet Rising Main	C) Main designed & installed in accordance with BS9990.
B5. 4	Power & Control Cables:	D) BS 5819 - Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications.



Typical Atrium Cross Section

- 1 Mechanical smoke clearance system ☒
- 2 Atrium enclosed with passive & active fire-resisting / smoke-retarding construction ☒
- ☒ If atrium open provide atrium pressurization or smoke control from each floor level ☒
- 3 Controlled fire load within atrium ☒
- 4 Smoke clearance system replacement air ☒
- 5 Sprinkler protection within floors adjoining atrium ☒

Exemplar 1 - Height >30m with simultaneous evacuation response