



Fire Strategy Report

9442: Woodfield Avenue

Client: Castlemead Group Ltd

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INTELLIGENT FIRE SOLUTIONS

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Author: Andres Ortiz

Signature:



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Approver: Paul Yeomans

Signature:



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1 Introduction

1.1 Background

Fire-Q Ltd (Fire-Q) have been engaged by Castlemead to review the design of the proposed residential development at Woodfield Avenue, Flint, and to provide a fire strategy report to support the design. The location of the development is illustrated in Figure 1-1 below.

The proposal comprises a new residential building of three storeys (ground floor plus two upper floors), containing a total of 22 apartments together with ancillary accommodation at ground floor level, including a bicycle store and plant room.



Figure 1-1: Proposed Location of the development

1.2 Purpose and Scope

This report provides a fire strategy to demonstrate how the proposed development at Woodfield Avenue, Flint meets the functional requirements of Part B: Fire Safety of the Building Regulations 2010 (as amended). The principal guidance document used throughout is Approved Document B (AD B) Volume 2 (Buildings other than dwellings), 2006 edition including amendments.

The designs as proposed within this report are subject to formal approval by Building Control and consultation with other relevant authorities (i.e. local fire brigade). Unless specifically identified within this report, all other elements of the scheme design are assumed to be commensurate with standard guidance.

The building is not classed as a Higher Risk Building (HRB) due to its limited height. Nevertheless, it is recommended that all products, components, materials and systems relating to the fire strategy are installed by competent persons and, where applicable, supported by appropriate third-party accreditation or certification.

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The functional requirements of Part B of the Building Regulations relate to:

- B1 – Means of warning and escape;
- B2 – Internal fire spread (Linings);
- B3 – Internal fire spread (Structure);
- B4 – External fire spread; and
- B5 – Access and facilities for the fire service.

1.3 Applicable Legislation and Guidance

The primary legislation governing the design is the Building Act 1984 and its Statutory Instrument 'The Building Regulations'. As the development is located in Wales, the applicable Building Regulations are the Building Regulations 2010 (as amended) as they apply in Wales, administered by the Welsh Government. The principal guidance is Approved Document B (AD B) Volume 2 (Buildings other than dwellinghouses), 2006 edition including amendments.

A key statutory requirement specific to Wales is the mandatory provision of automatic water fire suppression systems (sprinklers) throughout all new residential developments, as required by Regulation 37 of the Building Regulations (as applicable in Wales) and the Domestic Fire Safety (Wales) Measure 2011. This requirement applies regardless of building height and is a fundamental consideration in this fire strategy.

The Building Safety Act 2022 is primarily aimed at higher-risk buildings with a floor above 18m or at least 7 storeys. This development does not meet that threshold; however, the Act's broader requirements — in particular the maintenance of a golden thread of fire safety information throughout design, construction and occupation — have been taken into account in the preparation of this strategy.

The Regulatory Reform (Fire Safety) Order 2005 (RRFSO) becomes the governing legislation for the common areas upon completion and handover. The responsible person will be required to carry out and maintain a suitable fire risk assessment and ensure all fire safety arrangements are properly implemented throughout the life of the building.

Regulation 38 of the Building Regulations requires that fire safety information is provided to the responsible person upon completion or first occupation. This report should form part of that information package.

1.4 The Construction (Design & Management) Regulations 2015

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

This report defines the strategy for meeting the functional and performance requirements for fire safety in the finished building. Where conclusions or recommendations have been arrived at for particular materials, products or forms of construction, these will have been assessed in accordance with CDM Regulation 9 (Duties for Designers). Any significant residual risks or health and safety critical assumptions will be made available to the Principal Designer. Where the architect or other consultants use the standards put forward in this report to specify works, they are understood to be competent in alerting the Client, Principal Designer, Contractor and Building Occupiers of CDM issues.

2 Means of Warning and Escape

2.1 Purpose Group

In accordance with AD B Volume 2, all residential units within the building are classified as Purpose Group 1(a) — Flats.

The ground floor incorporates a bicycle store and plant room for the exclusive use of residents and maintenance personnel, respectively. These are ancillary to the primary residential use of the building and do not constitute a separate or independent use. No separate purpose group assessment is required for these areas.

2.2 Building Description

The development consists of a single residential apartment building of three storeys (ground floor plus two upper floors), containing 22 apartments in total. The building is of linear plan form with a central corridor arrangement on each floor, served by two protected staircases.

The apartment distribution across the floors is as follows:

- Ground Floor — 8 apartments
- First Floor — 9 apartments
- Second Floor — 5 apartments

In addition to the residential apartments, the ground floor incorporates a bicycle store and a plant room. External car parking is provided within the site curtilage via a private drive.

The building is served by two protected stair cores: Stair 01, located centrally within the building, and Stair 02, located at the western end. Stair 01 serves all floors, whilst Stair 02 serves only the first floor and discharges at ground floor level. Both stairs are enclosed within protected shafts and discharge directly to the exterior at ground floor level.

The floor of the top occupied storey is below 11m above ground level. The building therefore does not meet the definition of a Higher Risk Building under the Building Safety Act 2022, and the wayfinding signage requirements associated with buildings above 11m do not apply.

No lift is provided within the development.

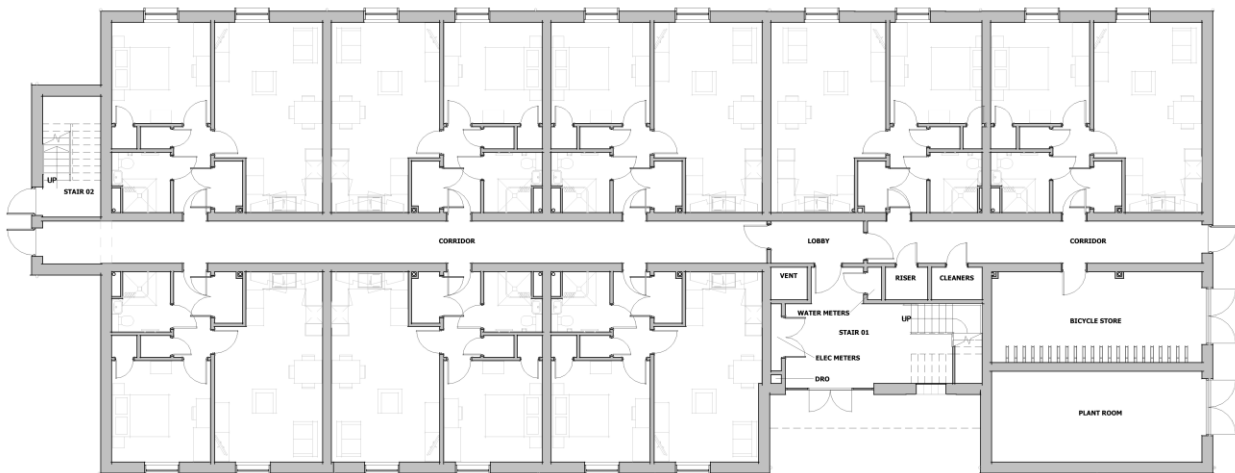


Figure 2-1: Ground floor layout.

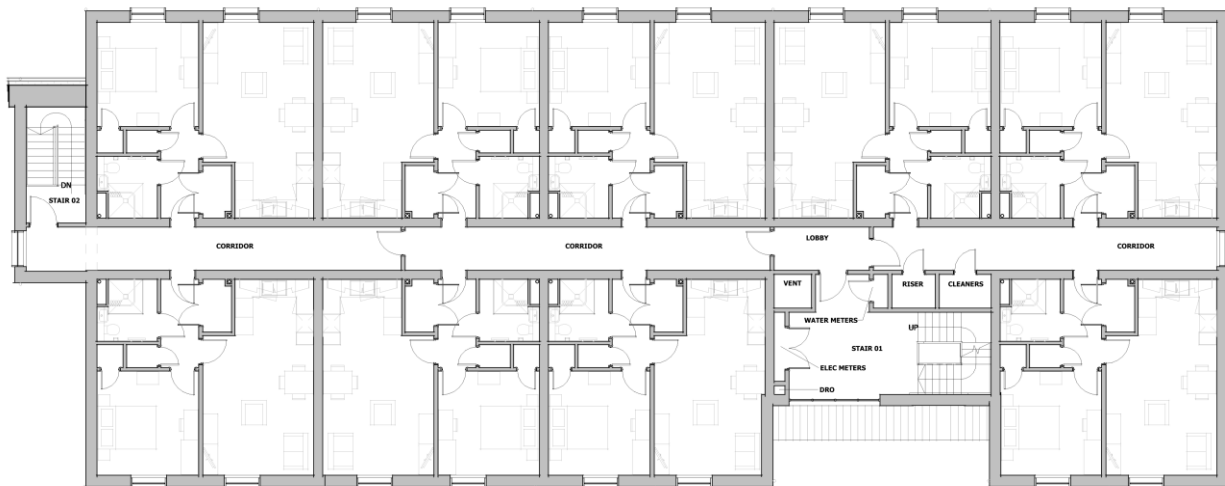


Figure 2-2: First floor layout.



Figure 2-3: Second floor layout.



Figure 2-4: Example Elevation.

2.3 Detection and Alarm

2.3.1 Residential Apartments

Each residential apartment should be provided with a Grade D, Category LD2 fire detection and alarm system, designed, installed and commissioned in accordance with BS 5839-6. An LD2 system provides detection in all rooms that present a high fire risk (including kitchens) and in all circulation spaces forming part of the escape route within the dwelling. This is considered appropriate given the stay-put evacuation strategy adopted and the provision of sprinkler protection throughout.

To ensure that the alarm is capable of waking sleeping occupants, the system should achieve not less than 75 dB(A) at every bedhead, or if measured at the doorway of each bedroom with the door open, not less than 85 dB(A).

Each apartment system will operate as a standalone system and will not be linked to a central panel, consistent with the stay-put evacuation strategy.

2.3.2 Common Circulation Areas

The common corridors, lobbies and stair enclosures should be provided with a Category L5 fire detection and alarm system, designed, installed and commissioned in accordance with BS 5839-1. The system covering the common areas should be entirely separate from the systems installed within individual apartments.

Consistent with the stay-put evacuation strategy, no sounders should be provided within the common corridors or stair enclosures. Detection in these areas serves solely to initiate the smoke control systems and to provide an alert at the main control panel. A link to a remote monitoring centre or permanently staffed management location should be provided.

The main control panel should be located at ground floor level, close to the principal entrance to the development, in a position readily accessible to the Fire and Rescue Service without the need to pass through any access-controlled area.

2.3.3 Ancillary Areas

The bicycle store and plant room at ground floor level should be provided with a Category L3 fire detection and alarm system designed, installed and commissioned in accordance with BS 5839-1. Activation of detection in either of these rooms should initiate a local alarm within the affected room.

2.3.4 Evacuation Strategy and Cause & Effect

The evacuation strategy for all residential apartments is 'stay put', where only the occupants of the affected flat are expected to evacuate. This does not prevent other occupants from evacuating if they become aware of a fire and can safely do so, but the system will only signal the unit where the fire originates, as each apartment has a standalone detection and alarm system.

A stay put evacuation strategy is appropriate given the compartmentation provided between apartments and between floors. Given the limited height and size of the building, this is considered appropriate.

The ancillary areas at ground floor should adopt a simultaneous evacuation strategy, with the alarm raised in the room affected on first detection. As the communal facilities are at ground floor level, egress is directly to the outside.

2.1 Horizontal Means of Escape

2.1.1 Internal layout of flats

All flats are designed with an internal hall that gives access to all rooms. As the travel distance from the furthest part of any flat to the entrance door is within 9m, it is not required to design the internal hall as a protected hall (i.e. no internal fire separation within each flat is required).

In all cases, the location of the cooking facilities is remote from the entrance door and does not prejudice the escape route.

The design of all flats meet the requirements of AD B.

2.1.2 Common Areas of Flats

The two stairs are positioned so that most flats have alternative routes of travel within the common spaces. However, three flats on the first floor and all flats on the second floor have a single direction of travel (as the second floor is only served by Stair 01).

The travel distance limit is 7.5m in a single direction when smoke ventilation is provided (or 4.5m when no ventilation is provided, for a small building) and 30m in more than one direction.

In the proposed design, flats in a dead-end condition or with egress only possible in a single direction have travel distance well within 7.5m, and since the space directly in front of the stair is provided with ventilation, the design meets the requirements of the guidance.

Flats that have alternative routes of travel have a travel distance less than 12m, and therefore are well within the limits prescribed.

In both cases, the stairs discharge at ground floor directly to the outside.

Doors in common egress routes should have a clear width of at least 850mm when measured in accordance with the guidance.

2.1.3 Residential Ancillary Areas of Flats

There are two ancillary spaces at ground floor level, the bicycle store and the plant room, both with a point of entrance and exit directly from the outside. In both cases, the travel distance is less than 9m in a single direction and therefore within the limits prescribed by the guidance.

2.1.4 Inner Rooms

There are no inner rooms in the proposed development.

2.2 Door Fastenings

In general, doors on escape routes should not be fitted with lock, latch, or bolt fastenings, or they should only be fitted with simple fastening devices that can be readily operated from the side of approach by the people escaping. The operation of these fastenings should be readily apparent, without the use of a key and without having to manipulate more than one mechanism.

Where security on final exit doors is an important consideration, panic hardware may be used in accordance with BS EN 1125.

To ensure means of escape are not compromised, any security door fitted on an escape route may be fitted with an electromagnetic locking device, linked to the fire alarm system, to enable a 'fail-safe' opening in the event of power failure or activation of the fire alarm and be provided with break-glass overrides.

It is recommended that doors on common egress routes have a clear width of at least 850mm when measured in accordance with Figure 2-2 below.

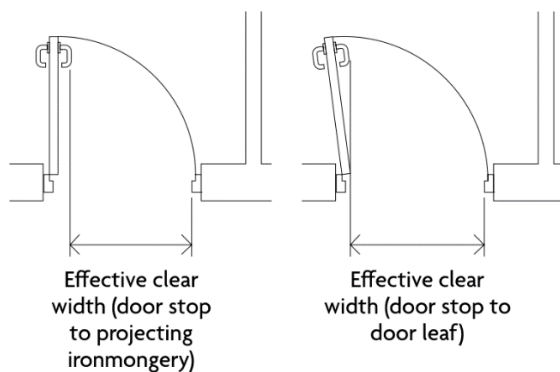


Figure 2-2: Measurement of door width.

2.3 Vertical Means of Escape

The building is provided with two internal stairs, Stair 01 serving both upper floors and Stair 02 serving only the first floor and discharging outside at ground floor level. The stairs in all cases are approached via a protected corridor or lobby, which will be provided with smoke ventilation.

Whilst AD B does not set out a minimum width for residential stairs of buildings below 11m, it is generally accepted that stairs with a sufficient width for day to day circulation are also suitable for emergency escape. In this case, all stairs are proposed with a minimum width of 1,100mm.

The stairs discharge at ground floor directly to the outside and do not serve any other areas.

2.4 Final Exits

The stairs discharge directly to the outside at ground floor level. The discharge from the stairs in all cases leads to an area of relative safety sufficiently away from other buildings and risks.

2.5 Means of Escape for Disabled Occupants

No passenger lift is provided within the development. Each apartment forms a separate fire compartment and provides a place of relative safety for any occupant unable to use the staircase. The provision of sprinkler protection throughout the building significantly limits fire growth and smoke production, further supporting the safety of occupants who remain in place.

The responsible person should ensure that suitable arrangements are in place for the evacuation of any resident who may require assistance. Residential Personal Emergency Evacuation Plans (RPEEPs) should be prepared where necessary and maintained as part of the fire risk assessment under the RRFSO.

3 Fire Safety Measures

3.1 Automatic Suppression

As the development is located in Wales, the provision of an automatic water fire suppression system (AWFSS) throughout the building is a mandatory statutory requirement under Regulation 37 of the Building Regulations (as applicable in Wales) and the Domestic Fire Safety (Wales) Measure 2011. This requirement applies regardless of building height or occupancy type.

The AWFSS should be designed and installed throughout the development in accordance with BS 9251:2021. The following system categories are proposed:

- A Category 2 system should be provided throughout all residential apartments;
- A Category 3 system should be provided within all ancillary rooms at ground floor level, including the bicycle store and plant room.

No sprinkler provision is required within the protected stair enclosures or common corridors, as these are sterile spaces with no significant fire load. This should be reviewed and agreed with the approving authority and other relevant stakeholders.

The AWFSS should be provided with a suitable water supply and pump arrangement designed in accordance with BS 9251:2021. The sprinkler system electrical supply should be installed using approved fire resisting cable, with a separately fused connection taken after the meter and from the supply side of the consumer unit, clearly labelled to prevent inadvertent isolation.

3.2 Smoke Control

To prevent smoke contamination of the common escape routes, the following smoke ventilation measures are proposed.

3.2.1 Stair Enclosures

An automatic opening vent (AOV) with a minimum free area of 1m² should be provided at the head of each stair enclosure. Each AOV should open automatically upon detection of smoke within the respective stair enclosure by the common parts detection system and should be tested and certified in accordance with BS EN 12101-2.

3.2.2 Smoke Shaft — Stair 01 Lobby

A smoke shaft is provided to ventilate the protected lobby giving access to Stair 01, serving all floor levels. The shaft should meet all of the following requirements:

- The shaft should be constructed using Class A1 materials throughout;
- The cross-sectional area (free area) of the shaft should be at least 1.5m², with a minimum dimension of 0.85m in any direction;
- The shaft should extend a minimum of 2.5m above the ceiling of the highest storey served;
- The opening of the shaft at roof level should be located at least 0.5m above any surrounding structures within a 2m radius on a horizontal plan;
- The shaft should be fully open to external air at the top;

- The shaft should not leak more than $3.8\text{m}^3/\text{h}/\text{m}^2$ of internal surface area at 50Pa of negative pressure;
- The inlet vent from the lobby into the shaft at each floor level should have a minimum free area of 1m^2 and should open automatically upon detection of smoke in the lobby on that floor, whilst remaining closed on all other floors;
- No services should be contained within the smoke shaft.

3.2.3 Ground Floor Corridor

At ground floor level, the lobby in front of Stair 01 is ventilated by the smoke shaft described in Section 3.2.2. Stair 02 discharges directly to the exterior of the building at ground floor level without passing through an enclosed common corridor, and therefore no additional smoke ventilation is required for this staircase at that level.

The common corridor at ground floor level is not provided with dedicated smoke ventilation beyond the above. Given that all ground floor apartments have direct access to the exterior and occupants at this level retain the ability to escape via alternative means including ground floor windows, the risk of smoke compromising escape from the ground floor corridor is considered low. The final exit doors serving the ground floor will further assist in venting the corridor when opened by escaping occupants or attending Fire and Rescue Service personnel. This arrangement is considered acceptable.

3.2.4 First Floor Corridor

The common corridor at first floor level is provided with a natural smoke ventilator (AOV) at each end of the corridor, located on the external façade. Each AOV should have a minimum free area of 1.5m^2 and should be positioned as high as possible within the corridor, with the top edge of the opening at least as high as the top of the fire door to the stair enclosure. Each AOV should open automatically upon detection of smoke in the corridor by the common parts detection system and should be tested and certified in accordance with BS EN 12101-2.

3.2.5 Second Floor Corridor

At second floor level the corridor arrangement differs between the north and south sides of the Stair 01 lobby.

The north corridor is provided with a natural smoke ventilator (AOV) at its external end, meeting the same specification as those described above.

The south corridor at second floor level terminates in a dead-end of less than 4.5m from the Stair 01 lobby. In accordance with AD B, dead-end corridors not exceeding 4.5m in length do not require dedicated smoke ventilation. No AOV is therefore provided to the south corridor at this level.

3.3 Emergency Lighting

Emergency escape lighting should be provided throughout the development to facilitate safe evacuation in the event of failure of the primary lighting system. Emergency lighting should be designed, installed and maintained in accordance with BS 5266-1:2016 and BS EN 1838:2013.

Emergency lighting should be provided to all of the following areas:

- All stair enclosures on all floor levels;
- All common corridors and lobbies on all floor levels;

- The bicycle store and plant room at ground floor level;
- All external escape routes leading from final exits to a place of safety, where not adequately illuminated by surrounding street lighting.

Emergency lighting is not required within individual residential apartments, as occupants are assumed to be familiar with the layout of their own dwelling.

Emergency lighting fittings should be provided with a minimum 3-hour integral battery backup. All fittings should adequately illuminate fire exits, changes in level or direction, firefighting equipment and any other fire safety features along the escape route.

3.4 Escape Signage

Fire safety and escape signage should be provided throughout the common areas of the development in accordance with BS 5499-4:2013, and should conform to BS ISO 7010 with respect to graphical symbols. All signs should include a pictogram and should be either internally illuminated or positioned within 2m of an emergency lighting fitting.

Escape signage should be provided in all common corridors, lobbies, stair enclosures and at all final exit points to clearly indicate the direction of travel to the nearest place of safety. Where the route to a final exit is not immediately obvious, additional directional signage should be provided.

As the floor of the top occupied storey is below 11m above ground level, the wayfinding and floor identification signage requirements associated with buildings above this threshold do not apply to this development.

3.5 Secondary Power Supplies

Alternative power supplies should be provided to all active fire safety systems to ensure continued operation in the event of mains failure.

The fire detection and alarm system should be provided with a suitable backup power supply, which is typically achieved via an integral battery backup within the main panel installation.

All AOVs and smoke shaft actuators forming part of the smoke ventilation system should be provided with a backup power supply. This is typically achieved via an integral battery backup within the AOV control panel.

The sprinkler system electrical supply should be installed in accordance with the requirements of BS 9251:2021 as noted in Section 3.1, using approved fire resisting cable with a separately fused and labelled connection to minimise the risk of inadvertent isolation

4 Internal Fire Spread

Materials used in the linings of walls and ceilings should comply with the classifications in accordance with the recommendations of AD B, which in this case is the most relevant and up-to-date standard, reproduced below for information. AD B has dropped the use of the national class since its last update as the European classification system offers better coherence and performance.

Table 4-1: Classification of linings for residential areas.

Location	European Class
Small rooms of area not more than 4 m ²	D-s3, d2
Other Rooms. Circulation spaces within a dwelling	C-s3, d2
Circulation spaces including the common areas of blocks of flats	B-s3, d2

Parts of walls in rooms may be of a lower class (but not lower than Class D-s3, d2) provided that the total area of those parts in any one room does not exceed one-half of the floor area of the room, subject to a maximum of 20 m².

Table 4-2: Classification of linings for non-residential areas.

Location	European Class
Small rooms of area not more than 30 m ²	D-s3, d2
Other rooms	C-s3, d2
Circulation spaces	B-s3, d2

Parts of walls in non-residential areas may be of a lower class (but not lower than Class D-s3, d2) provided that the total area of those parts does not exceed one-half of the floor area of the room, subject to a maximum of 60m². This does not apply to circulation spaces.

This document uses the European classification system for reaction to fire set out in BS EN 13501-1.

5 Internal Fire Spread – Structure

5.1 Fire Resistance of Building Elements

The height of the top floor (second floor) is above 5m and below 18m. Therefore, the required minimum fire resistance for all elements of structure is 60 minutes.

The resistance of the various elements of the buildings should be as described in Table 5-1 below.

Table 5-1: Minimum fire resistance performances.

Element	Minimum fire resistance (minutes)		
	Loadbearing	Integrity	Insulation
Structural frame, beam or column	60	Not applicable	Not applicable
Loadbearing wall	60	Not applicable	Not applicable
External wall (within 1m of the boundary)	60	60	60
External wall (not within 1m of the boundary, except allowed unprotected areas in section 6)	60	60	15
Compartment wall/floor	60	60	60
Protected shaft	60	60	60
Protected corridor/lobby	30	30	30
Service risers	60	60	60
Ancillary accommodation	60	60	60
Cavity barrier	Not applicable	30	15

Note: If a construction element falls into more than one category, the highest fire resistance applies. For example, if the partition of a protected corridor forms part of a compartment wall, a higher level of fire resistance applies.

5.2 Compartmentation

Compartmentation should be provided as shown in Table 5-2 below.

Each floor should be a compartment floor. Each flat should be enclosed with compartment walls and floors achieving the same level of fire resistance as the elements of structure.

The compartment walls and floors separating the ancillary areas or rooms of special fire risk from residential apartments should achieve 60 minutes fire resistance.

Risers/shafts should be enclosed with fire-resisting construction of a standard equivalent to the elements of the structure of the building and the doors thereto should be capable of being locked shut.

However, where each floor is continued into the riser shaft so that each floor is separated from the other, the riser need not be enclosed with fire-resisting construction.

Fire-resisting walls should continue to the soffit of the floor slab or through the roof space, or appropriate fire-stopping should be installed adequately.

Table 5-2: Fire resistance.

Location	Fire rating (mins)	Load bearing / Integrity / Insulation	Method of exposure
Loadbearing and/or elements of structure	60	R	
Floors	60	R E I	From underside
Roof that performs the function of a floor	60	R E I	From underside
Walls separating flats from any other part of the building	60	R E I	Each side separately
Protected shafts/risers	60	R E I	Each side separately
Places of special fire hazard	60	R E I	Each side separately
Division of protected lobbies and corridors (cross corridor doors/walls)	30	R E I	Each side separately
Cavity barrier	30	E	Each side separately
	15	I	

5.3 Fire Doors

All fire doors should be fitted with self-closers but the following exceptions are permitted:

- Fire doors to cupboards, which are normally kept locked shut.
- Fire doors within flats.

Table 5-3: Recommended fire ratings of doors.

Area	Minimum fire resistance
Apartment entrance doors	FD30s
Fire resisting construction	As per the wall they are fitted into
Place of special fire hazard (ancillary rooms)	FD 30s
Stair doors	FD30s

5.4 Concealed Spaces (Cavities)

Concealed spaces or cavities in the construction of a building provide a ready route for smoke and flame spread. This is particularly so in the case of voids in, above and below the construction of a building, e.g. walls, floors, ceilings and roofs. As any spread is concealed, it presents a greater danger than would a more obvious weakness in the fabric of the building. Cavity barriers or fire-stopping should be provided within the concealed spaces or cavities.

Cavity barriers should also be provided:

- At the junction between an external cavity wall and every compartment floor and compartment wall; and
- At the junction between an internal cavity wall and every compartment floor compartment wall or other wall or door assembly which forms a fire-resisting barrier
- At the edges of cavities, including around openings (such as windows, doors and exit/entry points for services),
- At the top and bottom of cavities.

5.5 Protection of Penetrations and Fire Stopping

5.5.1 Protection of Openings

All fire stopping and penetration sealing systems should be designed, installed, tested and maintained in accordance with the relevant current British and European Standards, and should be installed by competent persons with appropriate third-party accreditation where available.

Pipes that pass through a compartment wall or compartment floor (unless the pipe is in a protected shaft), or through a cavity barrier, should comply with one of the following alternatives:

- A proprietary sealing system that has been shown by test to maintain the fire resistance of the wall, floor or cavity barrier;
- Where a proprietary sealing system is not used, fire-stopping may be used around the pipe, keeping the opening as small as possible. The nominal internal diameter of the pipe should not be more than the relevant dimension given in Table 14 of AD B Volume 2. The diameters given in Table 14 for pipes of specification (b) used in situation (2) assume that the pipes are part of an above-ground drainage system and are enclosed as shown in Diagram 38 of AD B; if they are not, the smaller diameter given for situation (3) should be used;
- A pipe of lead, aluminium, aluminium alloy, fibre-cement or PVC, with a maximum nominal diameter of 160mm, may be used with a sleeving of non-combustible pipe as shown in Diagram 38 of AD B.

Table 14 Maximum nominal internal diameter of pipes passing through a compartment wall/floor (see paragraph 11.5 onwards)

Situation	Pipe material and maximum nominal internal diameter (mm)		
	(a) Non-combustible material ⁽¹⁾	(b) Lead, aluminium, aluminium alloy, uPVC ⁽²⁾ , fibre cement	(c) Any other material
1. Structure (but not a wall separating buildings) enclosing a protected shaft which is not a stairway or a lift shaft	160	110	40
2. Compartment wall or compartment floor between flats	160	160 (stack pipe) ⁽³⁾ 110 (branch pipe) ⁽³⁾	40
3. Any other situation	160	40	40

Figure 5-1: Table 14 from AD B

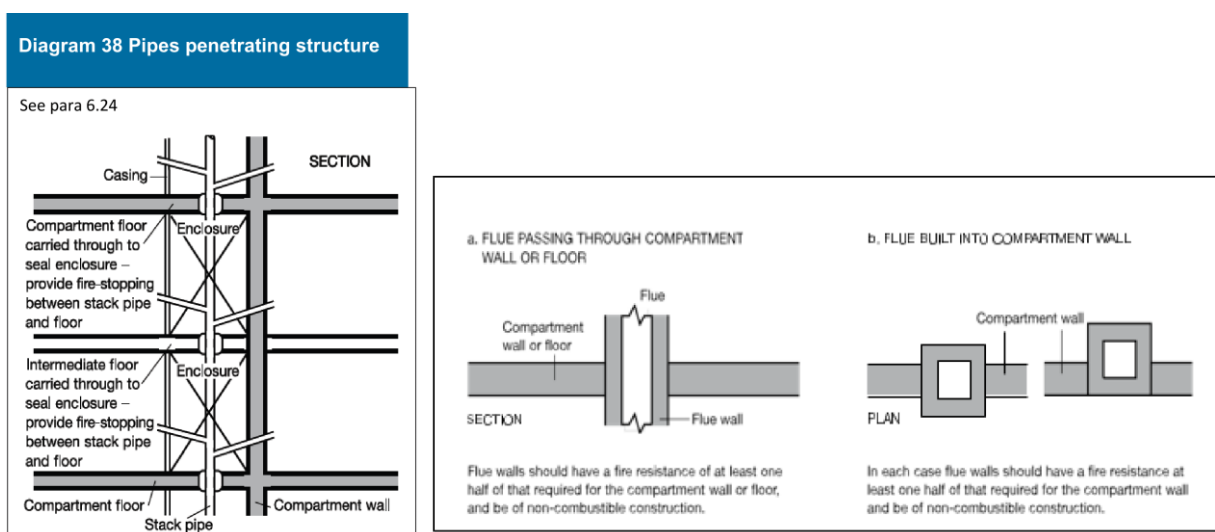


Figure 5-2: Figures 38 and 39 from AD B.

Where services penetrate compartment walls or floors, the routing of services should be coordinated at design stage to minimise the number of penetrations and to ensure that suitable tested solutions are available for each penetration type. Service penetrations through compartment elements should be kept to the minimum necessary and should not compromise the integrity or insulation performance of the compartment.

5.5.2 Ventilation Ducts and Dampers

One of the following methods is to be implemented where a ventilation duct passes through a fire resisting element:

- Method 1 – thermally activated fire dampers. This method should not be used for extract ductwork passing through the enclosures of protected escape routes.

- Method 2 - Fire resisting enclosure.
- Method 3 - protection using fire resisting ductwork.
- Method 4 - automatically activated fire and smoke dampers triggered by smoke detectors.

Ductwork and dampers are to be designed and installed in accordance with the relevant guidance.

Any exhaust points should be sited so as not to further jeopardize the building in the event of a fire, i.e. away from final exits, combustible building cladding or roofing materials, and openings into the building.

Ventilation ducts, and their associated plant supplying or extracting air directly to or from a protected escape route, should not also serve other areas. A separate ventilation system should be provided for each protected stairway.

Where ductwork serves more than one flat, smoke detector-operated fire and smoke dampers should be provided where the ductwork enters each dwelling.

Any ductwork passing through a protected stairway, lobby or corridor without an opening into that area should be fire-resisting.

The ductwork enclosure should be imperforate where it passes through the stairway or any protected lobby or protected corridor.

Note: Where possible the routing of ductwork through (not serving) escape routes should be avoided.

Where fire-resisting ductwork is not provided, fire or fire and smoke dampers, should be provided to any duct that passes through fire resisting construction.

Fire dampers should be situated within the thickness of the fire-separating elements and be securely fixed. It is also necessary to ensure that, in a fire, expansion of the ductwork would not push the fire damper through the structure.

Adequate means of access should be provided to allow inspection, testing and maintenance of both the fire damper and its actuating mechanism.

Fire and smoke dampers linked to the fire detection and alarm system should be provided to any ductwork penetrating a protected escape route.

Where a ductwork system serves more than one part of a compartment or fire separated protected escape route, smoke detector operated fire dampers should be provided where ductwork enters each fire separated or smoke-separated section of the escape route.

The provision of dampers is not suitable for extract ductwork serving kitchens. This is due to the likely build-up of grease within the duct which can adversely affect the effectiveness of any dampers.

Note: Fire dampers actuated only by fusible links are not suitable for protecting escape routes. However, an ES classified fire and smoke damper which is activated by a suitable fire detection system may be used.

Note: Fire dampers should be tested to BS EN 1366-2 and be classified to BS EN 13501-3. They should have an E classification equal to, or greater than, 60 minutes. Fire and smoke dampers should also be tested to BS EN 1366-2 and be classified to BS EN 13501-3. They should have an ES classification equal to, or greater than, 60 minutes.

5.6 Resistance to Slab Deflection

Compartment walls should be able to accommodate the predicted deflection of the floor. This should be achieved in one of the two following ways:

- 1) a head detail should be provided between the compartment wall and the floor, which is capable of deforming while maintaining its integrity when exposed to a fire; or
- 2) the design of the compartment wall should be such that it maintains its integrity by resisting the additional vertical load from the floor above when forced to sag under fire conditions.

6 External Fire Spread

6.1 External Walls

6.1.1 Regulation 7(2)

Regulation 7(2) applies to any building with a storey at least 18m above ground level and which contains one or more dwellings. It requires that all materials which become part of an external wall or specified attachment achieve class A2-s1, d0 or class A1, other than those exempted by Regulation 7(3).

The requirements of Regulation 7(2) do not apply to this development due to the limited height of the building.

6.1.2 External Wall Surfaces

For all elevations, as the height is limited and the distance to the relevant boundaries is more than 1m there are no specific provisions that need to be achieved for external wall coverings.

6.2 Space Separation

The distances of the proposed buildings to the relevant boundaries are illustrated in Figure 6-1.

The maximum allowable percentages of unprotected areas (UPA) are calculated using the Enclosing Rectangle Method recommended in BRE Report 187. The results are summarised in Table 6-1.

The results shown in Table 6-1 are only for the worst-case scenarios, those with the largest emitting areas and closest to the relevant boundaries. As noted, all elevations can be 100% unprotected, owing to the internal compartmentation, the distances to the relevant boundaries and the provision of suppression.

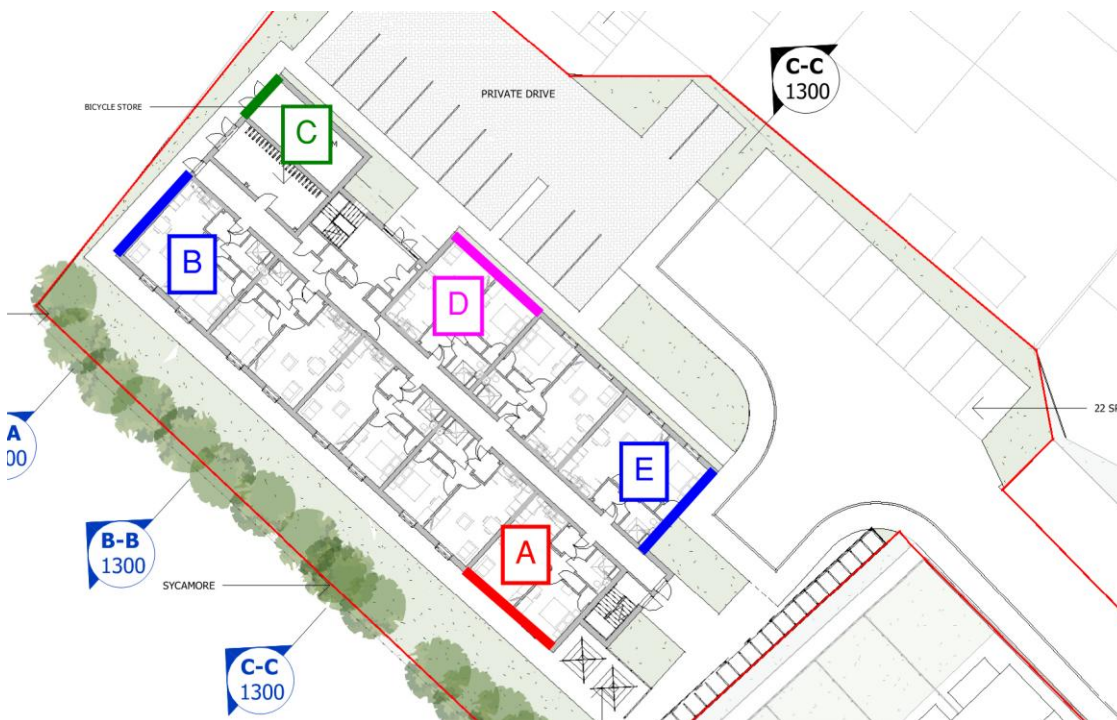


Figure 6-1: Space separation and elevations assessed.

Table 6-1: Maximum allowable percentage of unprotected area.

Elevation	Compartment width (m)	Compartment height (m)	Design distance to the relevant boundary (m)	Allowable Percentage of Unprotected Area	Comments
A	8.4	3	6.6	100%	Measured to the site boundary.
B	7.5	3	2.1	100%	Measured to the site boundary.
C	3.6	3	2.9	100%	Measured to the site boundary.
D	8.4	3	>10	100%	Measured to a notional point on the car parking area or access road.
E	7.5	3	>10	100%	Measured to the site boundary.

6.3 Roof Coverings

The shortest distance to a relevant boundary is less than 6m and therefore the roof coverings should achieve a European Class B_{Roof}(t4). If there are any plastic roof lights, the roof covering material surrounding the lights should be of limited combustibility for at least 3m distance.

Combustible insulation should not be carried over a compartment line (i.e. over different apartments or houses). Any roof voids should be fire separated to prevent a fire spreading via the roof between two adjacent apartments. The design of the roof should follow the recommendations of the guidance, reproduced below.

A compartment wall should be taken to the underside of the roof covering, and the compartment wall should be continued across any eaves.

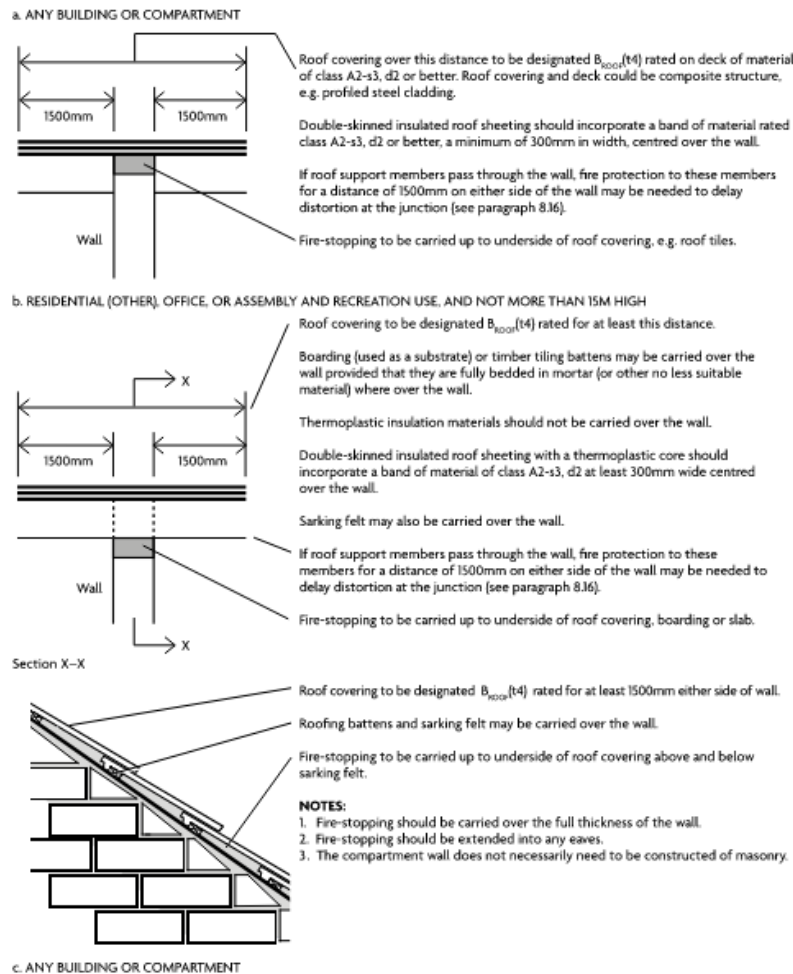


Figure 6-2: Diagram 30 from AD B Vol 2.

6.3.1 Roof-Mounted Photovoltaic Panels

The provision of solar panels on the roof (or other external surfaces) is not regulated by the Building Regulations (other than by requiring the roof classification noted in the previous section). Therefore, whilst there are various guidance documents from various third parties and associations, these are only guidelines and it is not a statutory requirement to adopt their recommendations. A developer can adopt some or all of the recommendations in the various guidance documents as part of an integral approach to fire safety, or, if this is required by external stakeholders (e.g. insurers or funders), but it is not considered a requirement to gain Building Control approval.

Any specific requirements for PV installations should be reviewed and discussed with the Building Control Officer and any relevant external stakeholders.

The Fire Protection Association document RC62: Recommendations for fire safety with PV panel installations advises a minimum distance of 2.5m between the PV modules on each side of the compartment/fire walls. It is recommended that provision is made to give warning to the fire service attending a fire of the existence of the PV system on the roof along with a means of manually isolating the DC cables and components from the PV panels which will otherwise remain live. A firefighter's label should be affixed in a prominent place close to the electrical shut-off point (e.g. adjacent to fire alarm panel or in a location as agreed with the local fire and rescue service).

If solar panels are integrated into the roof construction, then they should be tested and certified to meet the requirements for a roof covering.

7 Fire Service Access and Facilities

7.1 Vehicle Access

The development is located on Woodfield Avenue, Flint, with access for fire appliances via a private drive to the north of the building. The nearest fire station is Flint Fire Station, located within the town and therefore expected to provide a prompt attendance in the event of a fire.

A fire appliance can enter the site via the private drive and park in close proximity to the entrance points of both stair cores. From this parking position, all parts of the building are within 45m hose-laying distance and the dry riser inlet on the external face of the building is within 18m, in accordance with the requirements of AD B Volume 2. The fire appliance can access and egress the site without the need to reverse more than 20m.

The private drive and any access routes for fire appliances should be designed and maintained to meet the following minimum specifications in accordance with AD B Volume 2:

Table 7-1 Fire and rescue service vehicle access route specification.

Type	Min. width of road between kerbs	Min. width of gateways	Min. turning circle between kerbs	Min. turning circle between walls	Min. clearance height	Min. carrying capacity
Pump	3.7m	3.1m	16.8m	19.2m	3.7m	12.5 tonnes
High reach	3.7m	3.1m	26.0m	29.0m	4.0m	17.0 tonnes

Notes:

1. Fire appliances are not standardised. The building control body may, in consultation with the local fire and rescue service, use other dimensions.
2. The roadbase can be designed to 12.5 tonne capacity. Structures such as bridges should have the full 17-tonne capacity. The weight of high-reach appliances is distributed over a number of axles, so infrequent use of a route designed to accommodate 12.5 tonnes should not cause damage.

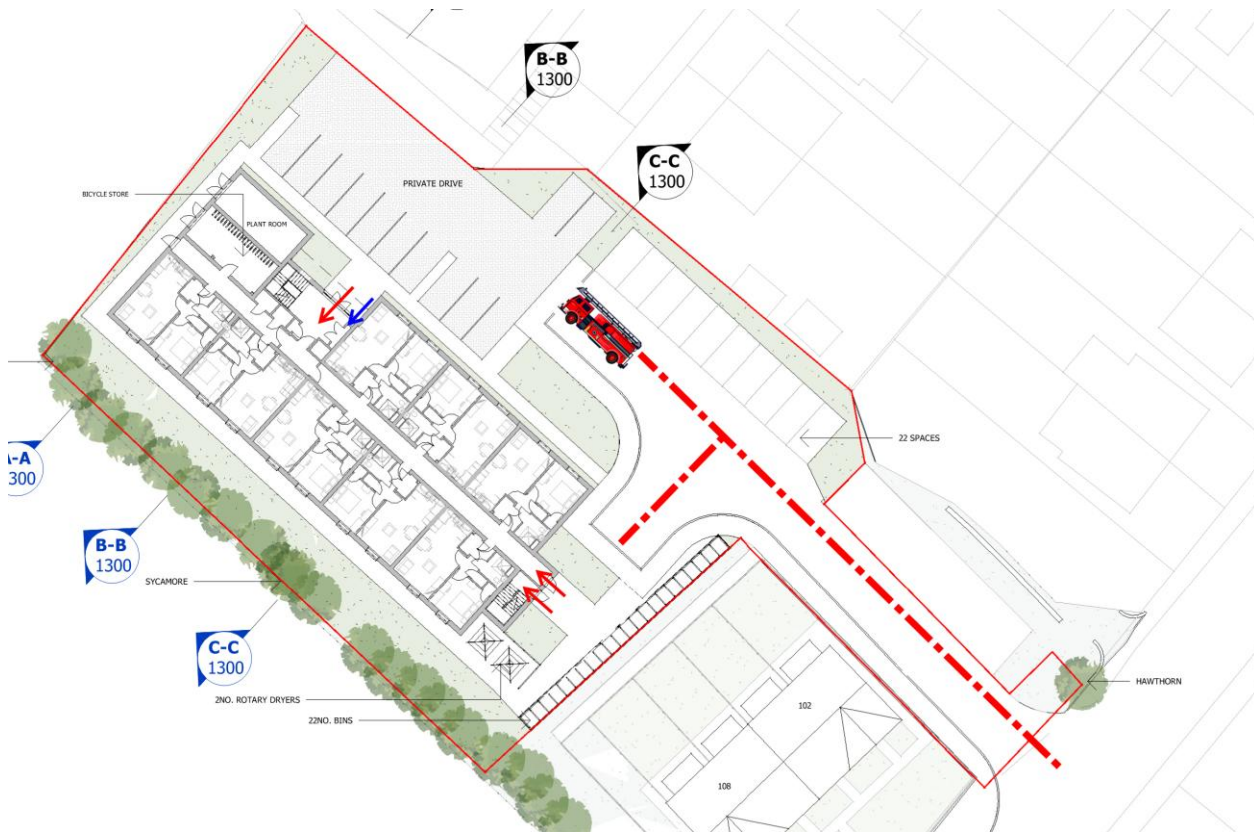


Figure 7-1: Firefighting access showing access points in red and dry riser inlet in blue.

7.2 Dry Main

Whilst the building does not exceed 18m in height a dry riser is nonetheless being provided within Stair 01 to ensure there are no excessive firefighting access distances. All parts within the building will be within 45m of a dry riser outlet or the fire appliance parking location.

The dry riser should be installed within the Stair 01 enclosure with outlet connections and valves at every storey level, positioned such that the hose-laying distance from the outlet to the furthest point on each floor does not exceed 45m. The inlet should be located on the external face of the building in a visible and accessible position for the Fire and Rescue Service, within 18m of the notional fire appliance parking location on the private drive. The inlet should be housed in a secure cabinet and clearly identified. The dry riser system should be designed, installed, commissioned and maintained in accordance with BS 9990:2015.

7.3 Hydrants

Fire hydrants should be located within 90m of any notional fire appliance parking location on site, in accordance with AD B Volume 2, a suitable supply of water for firefighting purposes should be available within 90m of the building. The development is located within an established area of Flint and it is understood that existing fire hydrant provision is incorporated into the local infrastructure in the vicinity of the site. The adequacy and location of existing hydrants should be confirmed with North Wales Fire and Rescue Service and Dŵr Cymru Welsh Water as part of the detailed design process. If existing provision is found to be insufficient, additional hydrants should be provided to ensure that at least one hydrant is available within 90m of the notional fire appliance parking location.

Any fire hydrants should be clearly indicated by indicator plates affixed in a conspicuous position in accordance with BS 3251:1976, and should not be obscured by vegetation, parked vehicles or other obstructions.

8 Fire Safety Management

8.1 General

This fire safety strategy has been developed based on the assumption that the building will be properly managed. The management regime should be maintained and any variation in that regime should be subject to a suitable fire risk assessment.

The responsible person (could be the owner, occupier or management of the building) should advise residents formally of the fire safety arrangements for the building, what to do to prevent fires from occurring, and what to do in the event of a fire. This information should be contained within a handbook which should also address the potential for particular problems arising where residents employ sub-contractors, e.g. for fit-out work.

BS 9991 Annex F contains information that can be given to owners and occupiers of dwellings in residential buildings (including flats) along with examples of fire instruction notices for residential buildings.

Procedures for the management of fire safety should be developed and documented in a fire safety manual. Guidance on fire safety management procedures is given in BS 9999 and a typical fire safety manual might include:

1. Fire safety policy statement
2. Fire safety management structure
3. Coordination with other parties (e.g. in a shared building)
4. Emergency response
5. Evacuation of people with special needs
6. Contingency and salvage plans
7. Emergency responsibilities of designated staff
8. Summary of fire safety strategy and plans for the building
9. Fire risk assessment.
10. Procedures for dissemination of information
11. Selection and control of materials
12. Maintenance and testing of fire safety equipment
13. Routine housekeeping (e.g. removal of combustible waste)
14. Fire safety training
15. Fire drills
16. Decoration, alteration and building work
17. Audit procedures and updating of the manual
18. Fire safety records

8.2 Regulatory Reform (Fire Safety) Order 2005

Under the Regulatory Reform (Fire Safety) Order 2005 every owner, occupier or operator of a premises is required to adequately manage the fire safety of the areas under their control. Under this legislation a 'Responsible Person or Persons' is required to be appointed in order that the necessary level of safety can be implemented, with an inherent necessity for competence in the area of fire safety. Within the Order there is a requirement to undertake and maintain a fire risk assessment. This should assess the fire risk to people within and around the building and the measures and procedures required to maintain

fire safety in the building and reduce fire risks to an acceptable level. It is important that the Responsible Person takes on board the information provided in this fire strategy when preparing the fire risk assessment reports accordingly to reflect any changes that may need to be made to current fire safety policies and procedures.

8.3 Fire Safety Information

8.3.1 Regulation 38

Regulation 38 requires that, for building work involving the erection or extension of a relevant building (i.e. a building to which the Regulatory Reform (Fire Safety) Order 2005 applies, or will apply), or the relevant change of use of a building, fire safety information should be given to the responsible person at one of the following times.

1. When the project is complete.
2. When the building or extension is first occupied.

8.3.2 Essential information

Basic information on the location of fire protection measures may be sufficient. An as-built plan of the building should be provided showing all of the following:

1. Escape routes.
2. Location of fire-separating elements (including cavity barriers in walk-in spaces).
3. Fire doorsets, fire doorsets fitted with a self-closing device and other doors equipped with relevant hardware.
4. Locations of fire and/or smoke detector heads, alarm call points, detection/alarm control boxes, alarm sounders, fire safety signage, emergency lighting, fire extinguishers, dry or wet fire mains and other firefighting equipment, and hydrants outside the building.
5. Any smoke control systems, or ventilation systems with a smoke control function, including mode of operation and control systems.
6. Any high risk areas (e.g. plant room).

Details should be provided of all of the following.

1. Specifications of fire safety equipment provided, including routine maintenance schedules.
2. Any assumptions regarding the management of the building in the design of the fire safety arrangements.
3. Any provision enabling the evacuation of disabled people, which can be used when designing personal emergency evacuation plans.

9 References

- 1) Approved Document B – Fire Safety, Volume 2: Buildings other than Dwellings, Welsh Government, 2006 edition including amendments.
- 2) The Domestic Fire Safety (Wales) Measure 2011.
- 3) The Regulatory Reform (Fire Safety) Order 2005.
- 4) The Building Safety Act 2022.
- 5) The Construction (Design and Management) Regulations 2015.
- 6) BS 5839-1:2025. Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises.
- 7) BS 5839-6:2019. Fire detection and alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises.
- 8) BS 5266-1:2016. Emergency lighting. Code of practice for the emergency lighting of premises.
- 9) BS EN 1838:2013. Lighting applications. Emergency lighting.
- 10) BS 5499-4:2013. Safety signs. Code of practice for escape route signing.
- 11) BS ISO 7010. Graphical symbols – Safety colours and safety signs – Registered safety signs.
- 12) BS EN 1125:2008. Building hardware. Panic exit devices operated by a horizontal bar. Requirements and test methods.
- 13) BS EN 1154:1997. Building hardware. Controlled door closing devices. Requirements and test methods.
- 14) BS EN 13501-1:2018. Fire classification of construction products and building elements. Classification using data from reaction to fire tests.
- 15) BS EN 13501-3:2005+A1:2009. Fire classification of construction products and building elements. Classification using data from fire resistance tests on products and elements used in building service installations.
- 16) BS EN 1366-2:2015. Fire resistance tests for service installations. Fire dampers.
- 17) BS EN 12101-2:2003+A1:2009. Smoke and heat control systems. Specification for natural smoke and heat exhaust ventilators.
- 18) BS 9251:2021. Fire sprinkler systems for domestic and residential occupancies. Code of practice.
- 19) BS 9990:2015. Non-automatic firefighting systems in buildings. Code of practice.
- 20) BS 3251:1976. Specification. Indicator plates for fire hydrants and emergency water supplies.
- 21) BS 9991:2015. Fire safety in the design, management and use of residential buildings. Code of practice.
- 22) BS 9999:2017. Fire safety in the design, management and use of buildings. Code of practice.
- 23) BRE Report 187. External fire spread: building separation and boundary distances. BRE Press.