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# **Parcel D1 Great Wilsey Park, Haverhill**

## **Fire Strategy Report Issue 2**

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<b>Notes:</b>	<p>This report is prepared for the exclusive use of the Parcel D1, Great Wilsey Park project team and a third party shall not rely upon the information that it contains. BWC will not accept any responsibility for matters arising because of use by a third party. The recommendations and conclusions of the report should not be applied to any other building and may not be relevant if the report contents are not implemented into the design.</p> <p>This report is formulated on the basis of the information and experience available at the time of preparation. It is applicable to the above-mentioned project only in accordance with the client's instructions. It is only valid provided no other modifications are made other than those for which a formal opinion has been sought and given by BWC Fire Limited.</p>

## DOCUMENT HISTORY

Issue	Date	Amendment Details	Author	Checked
1	15/05/24	Initial Stage 3 report for discussion	BW	BH
2	10/06/24	Including design team comments	BW	BH

Note: All amendments to the fire strategy since the previous issue are indicated with a vertical line in the right hand margin of the document. |

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## **1.0 INTRODUCTION**

### **1.1 Report Scope and Objectives**

- 1.1.1 BWC Fire Limited (BWC) has been appointed to produce the fire strategy for the proposed new community use building on Parcel D1 of the wider Great Wilsey Park development in Haverhill.
- 1.1.2 The fire strategy is intended for discussion between the design team and to assist the design team in gaining approval from the Approving Authorities. This strategy is intended to address Building Regulations.
- 1.1.3 This report is based on the guidance in British Standard BS 9999<sup>1</sup> and uses this guidance to form the basis of demonstrating adequate levels of fire safety are achieved to ensure compliance with Building Regulations. Where relevant consideration has also been given to the May 2020, June 2022 and March 2024 Amendments to Approved Document B, Volume 2<sup>2</sup> if measures supersede those discussed in BS9999.
- 1.1.4 The report follows the main sections in BS 9999, however in some specific areas fire engineering has been used to demonstrate deviations from the guidance. Such deviations are explained in each section as appropriate.
- 1.1.5 The findings and opinions expressed are based on the conditions encountered and the information reasonably available at the date of issue of this document, and shall be applicable only to the circumstances envisaged herein.
- 1.1.6 As this document forms a concept approach for fire matters, the design team must ensure the contents of the report are incorporated in the building.

### **1.2 Building Description**

- 1.2.1 This project entails the development of a new community centre building on the parcel of land known as Parcel D1 of the development at Great Wilsey Park in Haverhill.
- 1.2.2 At completion of the works the building will consist of a ground and first floor of community accommodation building with associated car parking facilities. The accommodation includes two multi-use halls, cellular workspaces a café and class / nursery rooms on the first floor. The upper floor is accessed via two enclosed protected staircases located at remote ends of the floor space plus a central accommodation staircase.

### **1.3 Fire Strategy Overview**

- 1.3.1 The proposals outlined in this document demonstrate a level of fire safety equal to or greater than the general standard implied by compliance with the recommendations in BS9999. This level of safety therefore satisfies the functional requirements of the Building Regulations relating to fire safety.
- 1.3.2 The fire strategy described in this report can be summarised as follows:
- Means of escape will be based on simultaneous evacuation of the entire building on the operation of the fire alarm and detection system. It is proposed that this occurs on the operation of a single smoke detector, heat detector or manual call point.
  - The travel distances within the building will be limited to those recommended in BS 9999.
  - The occupancy loads and exit/staircase widths will be sized based on the recommendations in BS 9999.
  - The building will include an automatic fire alarm and detection system which will be designed and installed to a category L2 Standard as described in BS 5839 Part 1<sup>3</sup>. BS 5266 Part 1<sup>4</sup> emergency lighting will also be provided to all areas discussed in BS 9999.

- Structural fire protection to the building will achieve a 60 minute fire resistant standard. No sprinkler protection is proposed to the building. No compartment floors or compartment walls are needed beyond those needed to support the means of escape. The staircases will each afford 30 minutes fire resistance with FD30S self closing doors. Places of special fire hazard will be enclosed in 30 minute fire resisting construction. Although not defined formally, the acoustic requirements for the accommodation are likely to also provide an inherent degree of fire resistance that will assist with preventing fire spread.
- Fire service access is based on a minimum of 15% of the building perimeter being accessible for a standard pumping appliance. Public or private fire hydrants should be available to within 90m of the building entrances to which fire vehicle access is proposed; this is likely to require the addition of a new fire hydrant within the access roads to the site.

#### 1.4 **Building Risk Profile**

1.4.1 Following the guidance given in BS 9999 a risk profile can be established for the building based on a combination of the occupancy characteristic and the fire growth rate.

##### 1.4.2 Occupancy Characteristic

1.4.3 The occupancy characteristic is principally determined according to whether occupants are familiar or unfamiliar with the building and to whether they are awake or asleep. The following is the characteristic occupancy applicable to this building as referenced from Table 2 of BS 9999.

Occupancy Characteristic	Description
B	Occupants who are awake and unfamiliar with the building

##### 1.4.4 Fire Growth Rates

1.4.5 The fire growth rate is an estimation of the rate at which a fire will grow given the typical use to which the room will be put to. The fire growth rate is not necessarily related to the fire load density within the room. The following is the fire growth rate applicable to this building as referenced from Table 3 of BS 9999.

Category	Fire Growth Rate	Fire Growth Parameter (kJ/s <sup>3</sup> )
2	Medium	0.012

1.4.6 From considering the above tables the following Risk Profile has been established.

Occupancy Characteristic	Fire Growth Rate	Risk Profile
B	2 – 0.012kJ/s <sup>3</sup>	B2

## 2.0 **LEGISLATION**

2.0.1 The main fire legislation applicable to this building includes, The Building Regulations and The Regulatory Reform (Fire Safety) Order 2005.

2.0.2 This document forms a concept approach for fire matters, the design team must ensure the contents of this report are incorporated in the building. This concept will not prevent a fire occurring and good housekeeping will be encouraged to reduce the risk. This strategy is mainly concerned with getting occupants out of the building safely and providing measures, where necessary, to assist the fire fighters in their operations.

2.0.3 The concept is only valid where the systems are designed correctly and maintained in an operating condition. If there is a failure in the management approach and a fire occurs, this concept may not reduce the impact on contents and building damage. Until this report is agreed with the approving authorities, the content should only be used 'As Preliminary Information'.

2.0.4 Following occupation the management of the premises are required under current legislation to carry out a fire risk assessment. This document will be developed following completion of the fit out works and will form part of the fire manuals developed for the premises (BS 9999 provides appropriate guidance in this area).

## **2.1 Building Regulations**

- 2.1.1 The construction or modification of any building in England & Wales needs to comply with the statutory requirements of the Building Regulations. These regulations deal with the minimum standards of design and building work for the construction of domestic, commercial and industrial buildings. The Building Regulations contain a list of requirements, referred to as Schedules, which are designed to ensure the health and safety of people in and around buildings. There are 14 Parts, which cover subjects such as structure, fire safety, ventilation, drainage, etc.
- 2.1.2 In the case of fire, the regulations are dealt with under the functional requirements B1 to B5 of Schedule 1 of the Building Regulations. There are a number of prescriptive documents, which can be adopted to show compliance with the Schedules. These include various British Standards (most notably BS 9999 for fire safety design purposes). These guides are considered as adequate to provide general guidance for the more common buildings. An alternative approach is to adopt Fire Safety Engineering, which integrates fire engineering calculations, life safety systems, building inherent features and professional judgement, to produce a fire strategy that achieves appropriate levels of safety to a specific building and use.

## **2.2 Regulatory Reform (Fire Safety) Order 2005**

- 2.2.1 A full risk assessment covering general health and safety as well as fire safety will be required on occupation of the building to meet the Regulatory Reform Order and will allow the ongoing control to be monitored to ensure safe escape can be achieved.

## **2.3 Construction, Design and Management Regulations**

- 2.3.1 Projects undertaken in the UK are subject to the requirements of the Construction (Design and Management) Regulations 2015 (CDM), or within the European Union, that particular country's interpretation of the European Union Directive.
- 2.3.2 This report defines the strategy for meeting the functional and performance requirements for fire safety in the finished building. It is intended to form part of the submission for approval under the Building Regulations, Part B (Fire safety). Where any conclusions or recommendations contained within this report specify particular materials, products or forms of construction these will have been assessed, in accordance with CDM Regulations 9 and 11 (duties for designers).
- 2.3.3 In the event that these involve significant residual risks or health and safety critical assumptions, this information will be made available to the Principle Designer. Where the architect or other consultants use all or part of this report to specify works, they are understood to be competent in alerting the Client, Principle Designer, Designers, Contractors and Building Occupier of issues arising under the CDM Regulations.

## **3.0 MEANS OF ESCAPE**

- 3.0.1 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B1, Means of warning and escape:

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

- 3.0.2 The following discusses the implications of this proposed building design and seeks to demonstrate that a satisfactory standard of fire safety is achieved.

### **3.1 Evacuation Strategy**

- 3.1.1 The evacuation philosophy for the entire building will be based on simultaneous evacuation of the building in the event of an incident.
- 3.1.2 The fire alarm and detection system will signal the evacuation of the building on the activation of a single smoke detector, heat detector or manual call point. No acknowledgement or investigation period is currently proposed.

### 3.2 Travel Distances and Escape Protection

3.2.1 Travel distances should be limited to those discussed in the table below. In each case the travel distances should be measured from the furthest point in the accommodation to the nearest storey or final exit door as a direct linear route.

	Travel possible in one direction	Travel possible in more than one direction
<b>General Accommodation (B2 Profile)</b>	14.95m (23m)	37.95m (57.5m)

Notes: A – Distances in brackets are full travel distances that can be used when the internal layouts are known. The unbracketed figures are two third values for the direct travel distances.

3.2.2 The above travel distances have been increased 15% from the basic allowances for a B2 risk profile, on the basis that the building will be fitted with an L2 fire alarm system instead of the prescriptive minimum Manual system for this type of building which will result in a clear benefit in terms of pre-movement times (in line with section 18.2 of BS 9999).

3.2.3 The travel distances recommended above are met from the rooms and floor plates generally in the building, primarily due to the majority of rooms having escape available in two directions once escape is made into the main circulation spaces or their own direct escape route to outside.

3.2.4 Currently there are no dead end corridors present within the layouts. Should any be introduced that are in excess of 2m long then these would need to be enclosed in 30 minute fire resisting construction with FD30S self-closing doors.

3.2.5 Where the accommodation at each floor provides escape in at least two directions the corridors do not require fire separation to support the escape routes, however the corridors will still afford smoke retarding construction with doors being self closing. Cross corridor doors will be provided where the corridors link escape staircases and are in excess of 12m long. This sub-division applies at both ground and first floor levels with sub-division affording 30 minutes fire resistance and FD30S self closing doors.

3.2.6 All doors needed for escape will be openable with a single action and without the use of a key. Any access control devices fitted to doors will be interlinked to the fire alarm system such that they disengage on the activation of the fire alarm system. Additionally a manual override device will be positioned locally by each door needed for escape that includes access controls.

3.2.7 All escape routes will maintain a minimum height clearance of 2m.

3.2.8 The staircase discharge routes at ground floor will be maintained unobstructed and free of fire load.

3.2.9 Where accommodation room windows are located within 1.8m of the final exit routes these will be fire rated to at least a 30 minute integrity and insulation standard and be fixed shut such that the exit route is not impeded in the early stages of an incident.

3.2.10 If desired to assist general circulation during normal operations, the cross corridor doors be held open on electromagnetic door hold open devices that disengage on the operation of the fire alarm system. This arrangement is considered acceptable based on the extensive fire alarm and detection system coverage present and also on the basis that these door hold open devices disengage automatically on the activation of the fire alarm system.

3.2.11 Some of the circulation space at first floor will include limited seating facilities. Whilst this circulation space forms part of the escape route from the first floor rooms it is considered that the presence of an L2 fire alarm system throughout the building, the multiple escape routes available via this circulation area and the limited size of the proposed facilities combine to effectively mitigate the risk presented by them.

### 3.3 Occupancy Loads and Escape Widths

3.3.1 Full building occupancy levels have not been provided by the client however there is aspiration for potentially 100 people (children and staff) at first floor level and at least a 200 person capacity for the main hall.

- 3.3.2 Based on the above the building occupancy numbers have been based on 100 people on the first floor and furniture layouts within the ground floor café and workspace areas plus occupancy load factors for the two hall spaces. This assumption is highly conservative given the floor the expected uses, especially with all areas occupied fully at the same time.
- 3.3.3 It should be noted that the following discussions are based solely on satisfying fire safety requirements for the design, the project team should ensure that any other Building Regulation requirements that may need additional clear width are also addressed (e.g. General safe usage widths, operational minimum widths or disabled access needs).
- 3.3.4 *Informative BS 9999 Escape Width Parameters*
- 3.3.5 From Table 12 of BS 9999 the minimum door width per person recommended with the minimum fire protection measures is 4.1mm (B2 profile). Under BS 9999 the minimum door clear width of any escape door is 850mm, however doors may require to be wider than this minimum to suit the occupancy load expected to be using them.
- 3.3.6 For vertical escape routes Table 13 recommends a minimum stair width of 4.8mm per person for a staircase serving one upper floor with the minimum fire protection measures. A minimum stair width of 1000mm applies to downward travel on the staircases.
- 3.3.7 The building is proposed to be provided with an enhanced automatic fire alarm and detection system to an L2 standard which is a massive benefit beyond the basic manual fire alarm system recommended under the guidance. On this basis, in line with section 18.2 of BS 9999, a 15% reduction to the required door and stair widths has been applied (reducing the width requirements per person to 3.485mm and 4.08mm respectively). These figures have been used to establish the maximum allowable occupancy for the building, based on the exit widths proposed.
- 3.3.8 In line with section 16.6.1 of BS 9999, all doors with a clear width of less than 1050mm have been taken to have an effective width of 500mm when calculating occupant capacity.
- 3.3.9 *Horizontal Escape*
- 3.3.10 The minimum door width applicable to any escape route is 850mm, due to the building being proposed to support independent wheelchair users. Where rooms are provided with a single exit, or the door opens against the direction of escape then the occupancy of these routes will be limited to 60 people.
- 3.3.11 For rooms served by two exits then these rooms can theoretically have a maximum occupancy of up to 600 people, subject to the available exit widths. Rooms served by three or more exits will have the occupancy limited purely by the exit widths of the doors available. In these latter scenarios all exit doors should open in the direction of escape.
- 3.3.12 It is proposed that doors to individual WC cubicles need only achieve 800mm clear width as they are not wheelchair accessible (with the obvious exception of any dedicated wheelchair accessible cubicles).
- 3.3.13 For reference purposes any exit door which opens in the direction of escape and has a width of less than 1050mm will cater for up to 143 people.
- 3.3.14 On the first floor no individual room (including the outdoor play space) will have an occupancy in excess of 60 people. On this basis each first floor room is acceptable for exit width purposes with a single exit door that opens in either desired direction with a clear opening width of 850mm.
- 3.3.15 The storey exits and general circulation corridor doors on the first floor must open in the direction of escape and afford clear widths of at least 850mm. The cross corridor door swings to the north of the building on the basis that the occupancy on the northern side of this door will be less than 60 people. Based on these exit widths the maximum occupancy of the first floor on aggregate should not exceed 143 people at any time.
- 3.3.16 At ground floor with the exception of the two hall spaces no individual part of the ground floor will have an occupancy in excess of 60 people. On this basis for exit width purposes each individual area / room (excluding the two halls) will be acceptable for exit width purposes with a single exit door that opens in either desired direction with a clear opening width of 850mm.



- 3.3.17 Notwithstanding the above the café area is provided with four direct final exit doors and therefore the occupancy of this area could support well in excess of 300 people based on at least two of these final exit doors being at least 1050mm clear opening widths.
- 3.3.18 The small hall has a floor area of 166sqm which potentially suggests an occupancy of 332 people based on a floor space factor of 0.5sqm per person. The small hall is considered to have four potential exit routes and therefore based on these exits each would require a clear opening width of at least 1050mm. Each of these exits should open in the direction of escape.
- 3.3.19 The main hall has a floor area of 360sqm which potentially suggests an occupancy of 720 people based on a floor space factor of 0.5sqm per person. This hall has four potential exit routes available. After discounting the largest exit (considered to be the aggregate large sets of doors direct to outside at the south of the hall) each of the exits would need a clear opening width of at least 1050mm. Each of these exits should open in the direction of escape. It should be noted that the external courtyard space beyond the main hall should have both courtyard exit routes sized to maintain at least 1050mm clear opening widths with any gates opening in the direction of escape.
- 3.3.20 The main entrance to the west of the building should also afford a clear opening width of at least 1050mm with the doors opening in the direction of escape.
- 3.3.21 The plant/ancillary accommodation areas throughout the building are each anticipated to have an occupancy of far less than 60 people, and are each therefore acceptable with a single exit door of minimum 850mm clear width opening in either direction.
- 3.3.22 The minimum width of a circulation corridor for BS9999 is 1200mm which in this building can support up to 344 people. The first floor corridors will not exceed this capacity and therefore will be acceptable based on 1200mm wide corridors. This also applies to most sections of corridor at ground floor level.
- 3.3.23 The only exception to the above is for the corridor zone which serves the two halls. In a worst case fire event this central corridor could potentially serve up to 419 people (if the main hall was fully occupied with 720 people). Based on this occupancy this corridor should be at least 1500mm wide in general. The proposed cross corridor door separating this corridor from the reception area should maintain a clear opening of 1105mm, with the door swinging towards the reception area. This door clear width is based on part of the main hall occupancy escaping via the north staircase route (based on the surplus capacity of this staircase route).
- 3.3.24 Vertical Escape
- 3.3.25 The first floor is served by two protected staircases, neither of which is lobby protected and therefore one staircase should be discounted due to the potential of a fire event affecting its availability for escape. The central accommodation staircase has been ignored for the purposes of escape calculations.
- 3.3.26 For fire safety purposes each staircase must be at least a clear width of 1000mm (note: other Building Regulation requirements may require large widths than this). On this basis each of the staircases can support up to 245 occupants; with one stair discounted as discussed. The maximum occupancy of the first floor is therefore limited by the storey exit doors on the first floor to 143 people. This essentially creates a surplus capacity of 102 people which have been considered in respect of ground floor occupants escaping via the staircases to outside.
- 3.3.27 The final exit routes from the staircases to outside (including any doors along these routes) should maintain the clear widths of the staircases, i.e. 1050mm clear openings with the doors opening in the direction of escape. Merging flow has not been directly considered however it has been assumed that the ground floor occupants that escape through the staircase form the surplus capacity of the staircases (i.e. 102 people are allocated to ground floor escape via each staircase route in the worst case).
- 3.4 Persons of Reduced Mobility (PRM) Evacuation**
- 3.4.1 Provisions for the evacuation of persons of reduced mobility (PRM) in the building will be considered.

- 3.4.2 It is proposed that a refuge will be provided at first floor in the sections of common corridor that adjoin each protected staircase. A safe haven concept is adopted in this case. The refuge areas will be located close to the protected staircase lobby, and will not be less than 900mm x 1400mm allowing for manoeuvring. To enable wheelchair users to manoeuvre themselves into the refuge, the door width will have a clear opening of not less than 850mm, and the lobby width will not be less than 900mm.
- 3.4.3 To facilitate the effective evacuation of people from the refuge, an emergency voice communication (EVC) system will be provided. It is essential that the occupants of each refuge are able to alert other people that they are in need of assistance and for them to be reassured that this assistance will be forthcoming. The EVC system will conform to BS 5839 Part 9<sup>5</sup> and consist of Type B outstations.
- 3.4.4 The key to the disabled evacuation will be the management and it is not considered acceptable to rely on the fire service to evacuate persons from the building. A management plan will ensure that the PRM's in the building are aware of the facilities provided (by reference to a personal emergency evacuation plan) and that staff and facilities are available and adequately trained to evacuate occupants as required down staircases with the use of measures such as evacuation chairs and the evacuation lifts proposed.

### 3.5 Fire Alarm and Detection Systems

- 3.5.1 The minimum fire alarm and detection system standard for the building is a simple manual system, however a higher than minimum standard of detection is proposed to assist with justifying the escape arrangements present. In this case the building will include an automatic fire alarm and detection system that provides a minimum L2 level of coverage as described in BS 5839 Part 1.
- 3.5.2 The systems will comprise of a fire alarm panel, manual call points at storey and final exits, and appropriate automatic fire detection in all escape routes, rooms opening onto escape routes and all special fire hazard rooms. Sounders will also be provided in all areas of the building. The system will also be addressable.
- 3.5.3 Fire sounders will be provided to ensure a sound level of 65dbA or 5dbA above ambient background noise, whichever is the greater. It is recommended that external sounders are provided to any accessible roof areas (e.g. terraces and plant areas etc).
- 3.5.4 As mentioned earlier the building will be evacuated simultaneously on the operation of the fire alarm and detection system. This will occur in the event of a single smoke detector, heat detector or manual call point being operated. No acknowledgement or investigation period is proposed.
- 3.5.5 On activation of the fire alarm and detection systems the following facilities will be activated:
  - All HVAC plant will shut down.
  - An automatic solenoid valve will shut down any gas supplies to the building (if applicable).
  - Any doors held open on electromagnetic door hold open devices will be released.
  - Any access control devices to doors on escape routes will disengage to enable the escape route to be used.
  - All automatic fire dampers will close automatically (if applicable).
  - All lifts will return to the ground level (or the first floor if the fire event is within the reception area).

### 3.6 Emergency Lighting Systems

- 3.6.1 To facilitate normal working the lighting levels throughout the building will be excellent. In the event of a fire within the building, it is very unlikely that the power to the normal lighting circuit would be lost in the early stages while the occupants are escaping. This is based upon the fact that the electric supply to the light fittings would initially be away from a fire and would continue to operate. However, assuming a power failure, emergency lighting is provided as a secondary backup, complying with the requirements of BS 5266: Part 1. This includes coverage as per following:

<b>Entire building accommodation areas</b>	<ul style="list-style-type: none"> <li>• All internal escape routes</li> <li>• All external escape routes</li> <li>• Areas directly outside the final exits</li> <li>• Toilets with a floor area over 8m<sup>2</sup></li> <li>• Switch gear/battery room for the emergency lighting system</li> <li>• Electricity/generator rooms</li> <li>• Windowless accommodation</li> </ul>
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Note – Lighting to escape staircases should be on a separate circuit from that supplying any other part of the escape route.

3.6.2 The lighting comprises luminaries in all identified areas, with the type of fitting appropriate to the space they serve.



### 3.7 Emergency Signage

3.7.1 Illuminated escape signage will be provided above all exit routes, storey and final exit doors within the building.



3.7.2 The signs will be in accordance with BS ISO 3864 Part 1: 2011<sup>6</sup> and Health and Safety (Safety Signals and Signs) Regulation 1996.

3.7.3 Any doors in the lines of fire resistance will be provided with appropriate fire signage. In general doors to staircases and sub-division corridor doors will be provided with 'Fire door keep shut' signage. Doors to cleaner's cupboards, stores, plant rooms and service risers will be provided with 'Fire door keep locked' signage.

3.7.4 Examples of signage mentioned above that is dependent on their method of closure are given below.

Method of Closure	Signage	Sign Diameter	Letter Height
Self-closing device		60mm	5mm
Kept locked shut			

3.7.5 Examples of signage mentioned above that are applicable to exit doors and escape routes are given below.

Signage	Sign Diameter	Letter Height
	240mm	20mm
		

### 3.8 Fire Extinguishers

3.8.1 Manual fire fighting equipment is not necessary under Building Regulations however the Regulatory Reform (Fire Safety) Order 2005 does request that first aid fire fighting facilities should be provided in places of work.

3.8.2 Based on the above the building will be provided with hand held fire fighting equipment to the following minimum scale:

- 1 x 13A rated water type extinguisher per 200m<sup>2</sup> of floor space with at least 2 per floor.
- 1 x 34B rated extinguisher adjacent to any electrical apparatus presenting a risk.
- 1 x Fire blanket adjacent to any kitchen facilities.

3.8.3 In principle, fire points will be established adjacent to fire exits and call points such that persons will have to move towards the fire exit in order to obtain a fire extinguisher before tackling a fire. In reality this may not be achievable considering the likelihood of malicious discharge, and a review of the portable fire-fighting equipment may be required when the Fire Risk Assessment is undertaken once the building is occupied. The introduction of fire extinguisher covers can assist with reducing the frequency of malicious discharge of fire extinguishers if this does become an issue.

## 4.0 FIRE SPREAD AND CONTROL

4.0.1 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B2, Internal fire spread (linings):

(1) To inhibit the spread of fire within the building the internal linings shall-

- (a) adequately resist the spread of flame over their surfaces; and
- (b) have, if ignited, a rate of heat release which is reasonable in the circumstances.

(2) In this paragraph 'internal linings' means the materials lining any partition, wall, ceiling or other internal structure.

4.0.2 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B4, External fire spread:

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

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

4.0.3 The following sections discuss the implications of the proposed building design and seek to demonstrate that a satisfactory standard of fire safety is achieved with respect to both requirements stated above.

### 4.1 Linings

4.1.1 The wall and ceiling linings will meet the recommendations of BS9999 Section 35 and Table 35, as shown below.

Location	National Class*	European Class <sup>#</sup>
Small Rooms of area <30m <sup>2</sup>	3	D-s3,d2
Other Rooms	1	C-s3,d2
Other circulation spaces (including corridors, staircases, lobbies etc.)	0	B-s3,d2

Note: \* = National Classifications are based on tests in BS 476 Part 4, 6 and 7.  
# = The European classifications are described in BS EN 13501-1:2000.

4.1.2 The class of linings recommended in the table above can be downgraded (but not less than Class 3 or D-S3, d2) in walls of rooms providing the total area of those parts in any one room does not exceed one half of the floor area of the room and subject to a maximum of 60m<sup>2</sup>.

### 4.2 Unprotected Areas

4.2.1 The building is generally situated remote from the land or notional boundaries however the minimum space separation distances that would be required for the external facades has been assessed below. These calculations have been based on the enclosing rectangle method guidance given in BRE Guide 187<sup>7</sup>.

4.2.2 The worst case elevation on the building is the west elevation which has a worst case standardised enclosing rectangle of 50m by 9m high. Based on Table 1 of BRE Guide 187 this enclosing rectangle would require a minimum separation distance of 12.5m for the facades to be fully unprotected. The east elevation is considerably more than 12.5m away from its relevant boundaries (either legal boundaries, half the distance to neighbouring properties, or the centreline of any public walkway, road, waterway or railway) and therefore the east elevation can be fully unprotected for space separation purposes.

4.2.3 The west elevation is 10.25m away from the centreline of the adjacent highway and therefore this elevation can possess up to 81.6% unprotected areas (i.e. a maximum of 367sqm over the west elevation). The west elevation windows and doors are less than 367sqm on aggregate therefore no fire rated glazing is required subject to the non-glazed areas of this elevation being fire rated to a 60minute standard.

- 4.2.4 The south elevation is 8m from the centreline of the highway at its closest point. The standardised enclosing rectangle of this elevation is 30m by 9m. Based on Table 1 of BRE Guide 187 this enclosing rectangle and boundary distance would allow up to 70% unprotected areas (i.e. a maximum of 189sqm over the south elevation). The south elevation windows and doors are less than 189sqm on aggregate therefore no fire rated glazing is required subject to the non-glazed areas of this elevation being fire rated to a 60minute standard.
- 4.2.5 The north elevation has the potential of further future development being constructed therefore to enable this to happen a 2m land boundary distance has been applied in this case. The standardised enclosing rectangle of this elevation is 40m by 9m. Based on Table 1 of BRE Guide 187 this enclosing rectangle and boundary distance would allow up to 20% unprotected areas (i.e. a maximum of 72sqm over the north elevation). The north elevation windows and doors are less than 72sqm on aggregate therefore no fire rated glazing is required subject to the non-glazed areas of this elevation being fire rated to a 60minute standard.

#### **4.3 External Wall Construction**

- 4.3.1 Whilst the building is less than 18m in height and more than 1000mm from the site boundaries, BS 9999 recommends that buildings with a B2 risk profile should achieve a Class 0 or Class B-s3, d2 or better rating for all areas of the façade up to 10m above ground or any part of the building to which the public have access. In practice this is likely to mean that the entire façade of this building will require a rating of Class 0 or B-s3, d2 or better.
- 4.3.2 As the building is less than 11m high and not of a residential use technically there are very few limitations on the combustibility of the external wall materials. Notwithstanding this it is strongly recommended that non-combustible materials are adopted wherever possible to minimise potential fire risks and to assist with protecting the building.
- 4.3.3 Metal composite materials must not be used on the exterior walls of the building in line with June 2022 amendments to Building Regulations.

#### **4.4 External Roof Construction**

- 4.4.1 The building is potentially to be located less than 6m from other buildings, boundaries or compartments as further elements of the development are implemented. On this basis all external roof coverings present should achieve a minimum rating of AA, AB or AC (National Class) or a B<sub>ROOF</sub>(t4) (European Class).

### **5.0 CONSTRUCTION**

- 5.0.1 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B3, Internal fire spread (structure):

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

*(2) A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those two buildings.*

*(3) To inhibit the spread of fire within the building, it shall be sub-divided with fire resisting construction to an extent appropriate to the size and intended use of the building.*

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

- 5.0.2 The following sections discuss the implications of these requirements on the proposed design of the building.

## 5.1 Elements of Structure

5.1.1 All elements of structure will achieve the fire resistance as shown in the below table.

Height (m)	Period of fire resistance (min)
Less than 18m	60 minutes

5.1.2 Any elements of structure which only support themselves or a roof do not require any specific fire resistance except where they support plant equipment or form an escape route from plant areas. Structure supporting enclosed plant rooms (i.e. floors) will be protected as formal elements of structure i.e. 60 minutes. Structure forming escape routes (i.e. from open air plant areas) will be at least 30 minutes fire resistance.

## 5.2 Compartmentation

5.2.1 BS 9999 recommends that for the risk profile present, multi-storey buildings with a top floor less than 18m in height should contain a maximum compartment size or storey of 8000sqm and no compartment floors are required above ground. Based on this guidance, for compartmentation purposes the building has been considered as a single fire compartment.

5.2.2 All staircases within the building will afford 30 minutes fire resistance with FD30S self closing doors. Staircase discharge routes from the staircases to outside will afford at least 30 minutes fire resistance with FD30S self closing doors. The only exception to this is the central accommodation staircase which is open and considered to form part of the general accommodation areas. There is physical separation of this staircase at first floor level which ensures that escape past the staircase is available at all times however this separation does not require formal fire resistance.

5.2.3 The lift shafts will be constructed as protected shafts that afford 30 minutes fire resistance with FD30 landing doors.

5.2.4 Individually on each floor lines of fire resistance will be provided to assist with protecting the escape routes, e.g. fire protection to separate the corridor spaces between the two protected staircases. The fire separation on these compartment lines will afford 30 minutes fire resistance with FD30S self closing doors.

5.2.5 Service risers will be enclosed within 30 minutes fire resisting construction with FD30S doors (no self closers are needed) where these are formed as a continuous vertical protected shaft. If the service risers are fire stopped at each floor level to a 30 minute fire resistant standard then the service cupboards at each floor level will be enclosed with 30 minutes fire resistance and FD30S doors (no self closers are needed). Service riser cupboards will also need to be locked shut.

5.2.6 Plant rooms within the building will be fully separated from the adjacent accommodation by solid robust construction providing at least 30 minutes fire resisting construction and FD30S self closing doors. Any ventilation ducts serving these areas will be protected to a similar period of fire resistance to the outside or fire dampers provided where the ducts exit the plant room enclosure. Please refer to Section 5.4 for ultimate fire ratings associated with plant rooms.

## 5.3 Fire Doors

5.3.1 Fire doors will be provided with protection in accordance with the below table:

Locations	When tested in accordance with BS476-22	When tested in accordance with BS EN 1634 – 1
Stair door	FD30S Self Closing	E30S Self Closing
Riser doors	FD30S	E30S
Lift doors	FD30	E30
Cross corridor doors	FD20S Self Closing	E20S Self Closing
Plant room & kitchen doors	FD30S Self Closing	E30S Self Closing
Store doors	FD30S Self Closing (see 5.3.2 below)	E30S Self Closing (see 5.3.2 below)
Special fire hazard rooms (bin stores, fuel stores, high risk plant)	FD60S Self Closing	E60S Self Closing

- 5.3.2 All fire doors should be provided with self closers, except riser and small cupboard doors which should be kept locked shut and signed as such. In the case of store cupboards where these are kept locked shut then self closers are not needed.
- 5.3.3 It is acceptable to provide doors on electromagnetic door hold open devices which release on the operation of the fire alarm and detection system. Any smoke detectors included to assist with providing early closure of these doors will be located suitably close to the doors.
- 5.3.4 Doors will generally open in the direction of escape unless the occupancy using the door is less than 60 people. This may require some doors to open in two directions (i.e. cross corridor doors).
- 5.3.5 All doors necessary for escape which are provided with access controls will be provided with a suitable override facility that is acceptable to the approving authorities.

#### **5.4 Places of Special Fire Hazard**

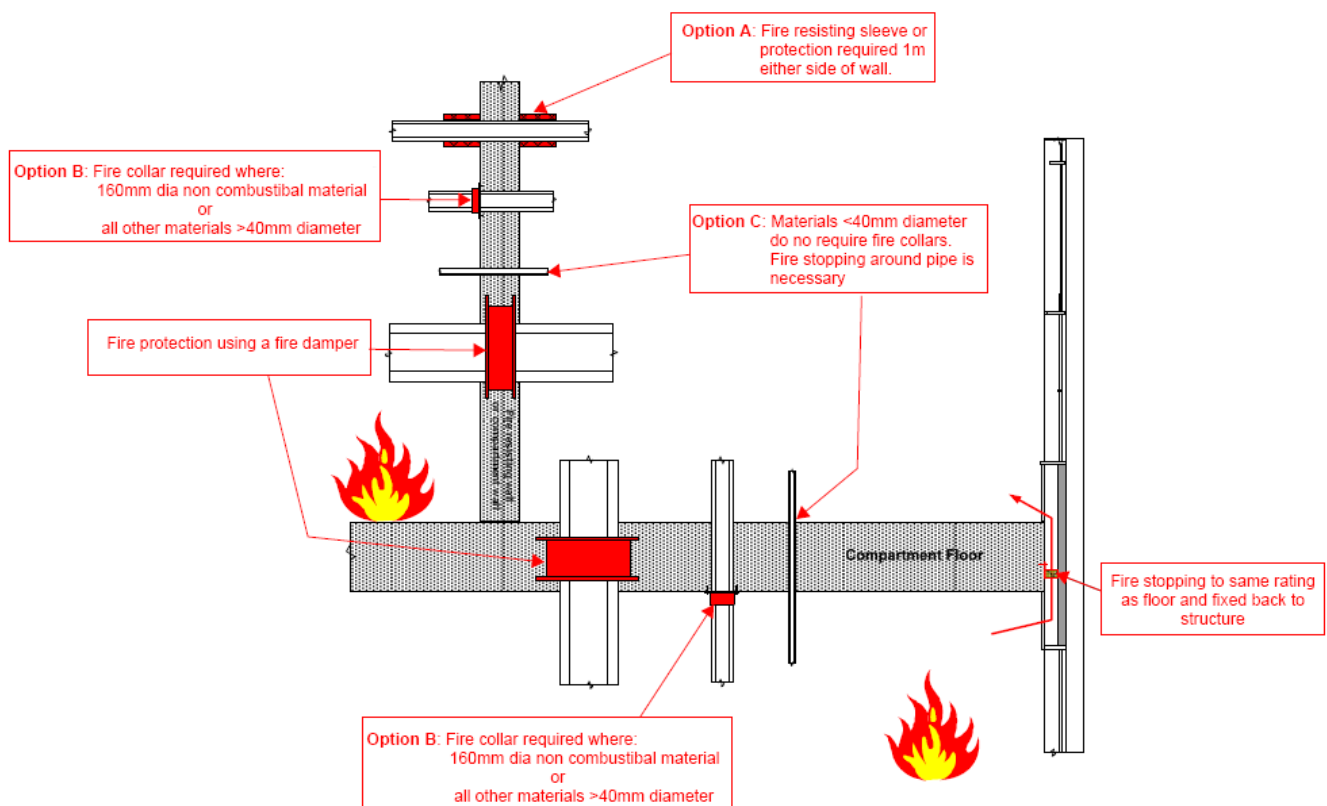
- 5.4.1 Following BS 9999 recommendations areas of special fire hazard will be enclosed in 60 minute fire resisting construction with FD60S self-closing doors. Places of fire special fire hazards as recommended in BS9999 are as follows:
- Boiler rooms
  - Storage spaces for fuel or other highly flammable substances
  - Oil filled transformer and switchgear rooms
- 5.4.2 Any electrical sub-stations will be fully separated from the adjacent accommodation spaces by at least 30 minutes fire resisting construction, although these requirements are likely to be superseded by the electricity supplier's requirements, which are typically based on 4 hours fire separation.
- 5.4.3 The kitchens and generic stores are also considered a place of special fire hazard and therefore should be enclosed with at least 30 minutes fire resistance and FD30S self closing doors.
- 5.4.4 The refuse store present at ground floor level should be enclosed with at least 60minutes fire resistance and FD60S self closing doors. The access to the refuse store from inside the building will be via a 60minute fire rated lobby with the lobby affording a minimum 0.2sqm permanent natural vent that discharges directly to outside.
- 5.4.5 There is a plant room located on the first floor which is currently located in the north protected staircase lobby. This plant room access is via a small plant room lobby that is independent of the main escape route through to the staircase. The plant room lobby should also be provided with a 0.4sqm permanent natural vent that discharges directly to outside. It should be noted that this recommendation is based on the plant room being a higher risk room however depending on the ultimate use of the plant room these requirements may be varied.

#### **5.5 Fire Stopping**

- 5.5.1 Ductwork passing through compartment/fire resistant walls will be either contained within fire resisting construction or provided with fire dampers.
- 5.5.2 As non-sleeping accommodation, fusible link type fire dampers are proposed generally to all ductwork which breaches a line of fire compartmentation within the building. The only exceptions to this will be ductwork that serves the staircases, staircase lobbies, passing through cross corridor door sub-division or dead end protected corridors, which will be protected with fire and smoke dampers that are operated automatically on the activation of the fire alarm and detection system.
- 5.5.3 All fire dampers will be tested to BS EN 1366 Part 2<sup>8</sup> and be classified to BS EN 13501 Part 3<sup>9</sup>. They will have an E classification equal to, or greater than, 60 minutes. All fire and smoke dampers will be tested to BS EN 1366 Part 2: 1999 and be classified to BS EN 13501 Part 3: 2005. They will have an ES classification equal to, or greater than, 60 minutes.

5.4.3 Any openings for services (exceeding the dimensions discussed in Table 33 of BS 9999, as shown below) breaching compartment walls or floors will be fire stopped (unless protected throughout their entire length with fire resisting material) in accordance with Section 33.4 of BS 9999. This is to prevent the passage of fire and to assist in retarding the movement of smoke. Joints between elements of structure that serve as barriers to fire will be fire stopped to prevent the passage of fire and smoke.

Situation	Pipe material and maximum nominal internal diameter (mm)		
	(a) Non-combustible material	(b) Lead, Aluminium, aluminium alloy, UPVC, fibre cement	(c) Any other material
Structure (but not a wall separating buildings) enclosing a protected shaft which is not a staircase or a lift shaft	160	110	40
Any other situation	160	40	40



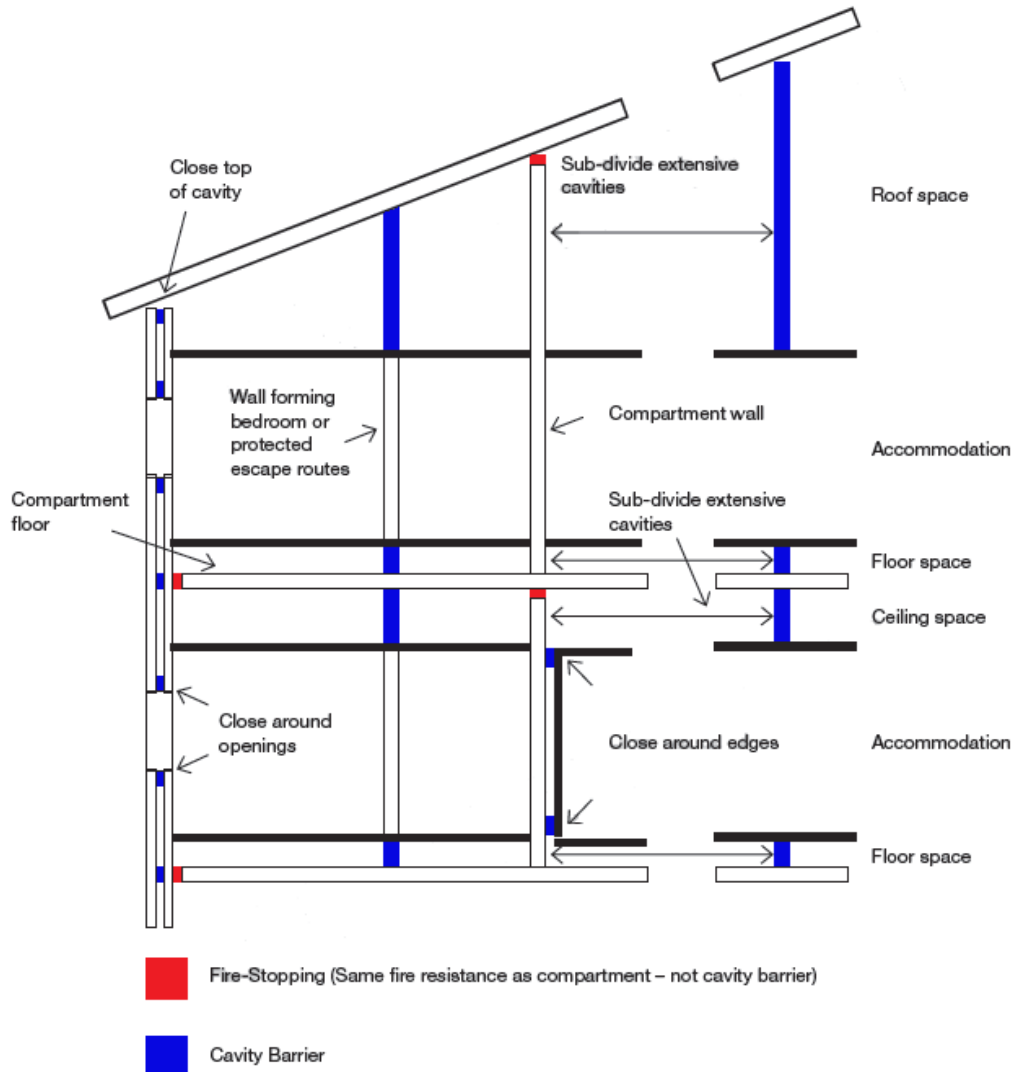
## 5.5 Cavity Barriers

5.5.1 Cavity barriers will be included in any large cavity with the potential for extensive unseen fire spread. The key areas that require cavity barriers are as follows:

- At the junction between an external cavity wall and a compartment wall that separates buildings; and at the top of such an external cavity wall.
- At the junction between an external cavity wall and every compartment floor and compartment wall.
- At the junction between a cavity wall and every compartment floor, compartment wall, or other wall or door assembly that forms a fire-resisting barrier.
- In a protected escape route, above and below any fire-resisting construction that is not carried full storey height.
- Where the corridor will be sub-divided to prevent fire or smoke affecting two alternative escape routes simultaneously.
- Within the void behind the external face of rainscreen cladding at every floor level, and on the line of compartment walls abutting the external wall of buildings
- At the edges of cavities (including around openings).



- 5.5.2 In addition to the above locations cavity barrier are also normally required in cavities (including ceiling voids and under floor service voids) where the cavity exceeds 20m.
- 5.5.3 The cavity barriers will provide a 30-minute fire rating (i.e. 30 minutes integrity and 15 minutes insulation). Any penetrations through the cavity barriers will be either;
- Fitted with a proprietary sealing system.
  - Pipes of limited diameters that are sealed with fire-stopping, or sealed with sleeving of non-combustible pipe material.
- 5.5.4 The specification of cavity barriers should not be confused with the specification of fire stopping between fire resisting elements, e.g. walls and floors, which will afford the same level of fire resistance as the fire resisting elements themselves. These principles are illustrated in the diagram below.



## 6.0 FIRE SERVICE ACCESS

6.0.1 Schedule 1 of the Building Regulations requires the following functional requirement to be met in respect of B5, Access and facilities for the fire service:

- (1) *The building shall be designed and constructed so as to provide reasonable facilities to assist fire fighters in the protection of life.*
- (2) *Reasonable provisions shall be made within the site of the building to enable fire appliances to gain access to the building.*

6.0.2 The following discusses the implications of these requirements on the proposed design with regard to access and facilities for the Fire Service within and around the building.

### 6.1 External Vehicle Access

6.1.1 The building considered within this strategy has a top floor that is less than 7.5m in height therefore fire fighter access to the building will be achieved by means of perimeter access rather than internal access via fire fighting shafts.

6.1.2 The total aggregate floor area of the proposed building is much less than 8000m<sup>2</sup>. On this basis Table 21 of BS 9999 recommends that buildings of this size have at least 15% of the perimeter accessible for a fire service pumping appliance. The fire vehicle access present via Haverhill Road, the site internal access road and car parking areas will exceed this requirement.

6.1.3 The building elevations to which perimeter access is proposed are provided with at least two access doors that are a clear width of 750mm and the distance between these doors being less than 60m.

6.1.4 Any access/security measures in and around the site (especially any bollards preventing vehicle access) will be bypass-able by the fire service. The details of the bypass arrangements will need to be developed and agreed with the fire service as applicable.

6.1.5 The external vehicle access provisions to the site are via the internal site access routes. These roads will adopt the recommendations from BS 9999 Table 22 as outlined below:

Min Width of road between kerbs	Minimum width of gateways	Minimum turning circle between kerbs	Minimum turning circle between walls	Minimum clearance height	Minimum carrying capacity
3.7m	3.1m	16.8m	19.2m	3.7m	12.5 tonnes*

Notes: \* = These weights should be confirmed as acceptable with the local fire and rescue service.

### 6.2 Internal Access

6.2.1 Plans for the building will be kept by the fire panel in the entrance to the building.

6.2.2 No internal fire fighting provisions are proposed to the building with fire service access based on external fire appliance access to the building perimeter.

### 6.3 Fire Suppression Systems

6.3.1 For Building Regulations purposes the building does not require any automatic fire suppression systems. On this basis none are currently proposed.

### 6.4 Smoke Venting Systems

6.4.1 As the building has a simultaneous evacuation and fire fighting is based on external fire perimeter access no smoke venting facilities are proposed to the building. Notwithstanding this, the building will include several openable windows and doors which could be used for smoke clearance during fire fighting operations.

### 6.5 Emergency Power Supplies

6.5.1 In the event of a failure of the mains power supply a secondary backup power supply will be provided to feed all life safety systems that require electricity to function as intended. The secondary supply will be appropriate for the life safety system concerned. The following life safety systems will include a backup power supply:

- Illuminated emergency signage
- Emergency lighting
- Automatic fire alarm and detection system
- All fire alarm interlinked fire/smoke dampers (if applicable)

6.5.2 Fire resistant power and control cable systems for life safety and fire fighting applications will be in accordance with BS 8519: 2020<sup>10</sup>.

## **6.6 Fire Fighting Lifts**

- 6.6.1 No fire fighting or evacuation lifts are proposed to this site.
- 6.6.2 Notwithstanding the above following BS EN 81-73<sup>11</sup> any passenger lifts will be provided with a means of grounding the lifts. As the building contains a fire alarm system the British Standard recommends that the grounding facility should be by automatic means. In this case it is recommended that all of the passenger lifts are grounded automatically on the activation of the fire alarm system. As part of these controls the lift should be intelligent to recognise if the incident is at ground level and if so the lifts will ground at first floor level.

## **6.7 Hydrants**

- 6.7.1 Until April 2007 the Building Regulations did not include requirements to provide additional fire hydrants beyond what was already provided in the public highways, however recent amendments to the Building Regulations have included a recommendation to consider this as part of the development of the building design.
- 6.7.2 BS 9999 recommends that for buildings without fire mains, hydrants should be provided within 90m of an entrance point to the building, and no more than 90m apart.
- 6.7.3 The development is a new site and therefore will require new access roads and associated infrastructure creating to facilitate the building. The existing completed residential phase to the north of Parcel D1 includes a public fire hydrant at its junction with Haverhill Road however this existing fire hydrant is 120m away from the nearest building entrance. On this basis at least one new fire hydrant will be needed in the works to ensure that the distances outlined above are achieved.

## **7.0 FIRE SAFETY MANAGEMENT**

- 7.0.1 The primary focus of this strategy is on two groups, the persons present in the building and the provisions associated with ensuring safe egress, and on fire-fighter protection. It is considered that in addressing these any impact on the environment and other persons will be minimised to a reasonable level. It is believed that the strategy outlined in the previous sections together with an effective fire manual and risk assessment developed from this strategy will provide a template for effective fire management of these premises.
- 7.0.2 Regulation 38 of the Building Regulations require that the fire strategy be brought to the attention of building management and incorporated into the risk assessment that will have to be carried out post occupation under the Regulatory Reform (Fire Safety) Order together with staff training, systems maintenance etc. and documented.
- 7.0.3 The Regulatory Reform (Fire Safety) Order 2005 requires that systems provided for fire safety are maintained in good working order at all times. This includes fire fighting equipment together with other facilities to be provided for the safety of people in the building and to help fire fighters.
- 7.0.4 At completion of the project the following information is recommended to be passed onto the responsible person where applicable:
- This fire strategy
  - All design assumptions relating to the management of the building (where not included in the fire strategy)
  - Escape routes, escape strategy and muster points
  - Details of all passive fire safety measures including compartmentation, cavity barriers, fire doors, self closing fire doors and other doors equipped with relevant hardware (e.g. access controls), duct dampers and fire shutters.
  - Fire detector heads, smoke detector heads, alarm call-points, detection/alarm control panels, alarm sounders, emergency communication systems, CCTV, fire safety signage, emergency lighting, fire extinguishers and other fire fighting equipment, other interior facilities for the fire service, location of hydrants outside the building, other exterior facilities for the fire service.
  - Any high risk areas (e.g. heating machinery) and particular hazards
  - As built plans of the building showing the locations of the above items.

- Specifications of any fire safety equipment provided, including operational details, operators manuals, software, system zoning and routine inspection, testing and maintenance schedules. Records of any acceptance or commissioning test.
- Any provision incorporated into the building to facilitate the evacuation of disabled people.
- Any other details appropriate for the specific building.

7.0.5 This information is mainly provided in the form of as built plans, but supplemented in this case by the fire strategy, i.e. this document.

7.0.6 Using this information the “responsible person” should ensure a fire risk assessment is carried out for the building. It is recommended that this is recorded, kept with the other information indicated in this document and updated on an annual basis or when any significant change is made to the fire risk or facilities in these areas.

7.0.7 It is suggested that a fire manual (see BS 9999) should be developed for the building bringing together all aspects needed for the effective fire safety management of the building.

7.0.8 In addition to the above BS 9999 discusses the levels of management processes within the building after occupation as part of the holistic approach to fire safety. In this case the building fire strategy requires a minimum Level 2 standard of management, these principles are summarised below:

- Identifies and reacts to any changes as they occur, including changes to occupancy, periods of abnormal occupancy, and fire growth characteristics. The system identifies any alternative protection and management measures that will be required as a result, and ensures that they are implemented.
- The responsibility for fire safety, and the necessary supporting staff and resources, is likely to be divided over a number of different individuals, departments or even companies. It is likely that the implementation of any necessary changes will require approval of those not directly responsible for the routine management of fire safety within the premises.
- There will not be any arrangements for contingencies such as training, sickness and other unexpected absences, etc, nor will there be provision for security such as regular patrols, perimeter controls, entry control systems, or staff able to respond to an intrusion.
- The training ensures that there are sufficient numbers of staff trained in all aspects of fire prevention, fire protection and evacuation procedures, and able to use the appropriate extinguishing equipment (and media), so as to provide full coverage of the building, but has no contingency provision.
- A work control system is developed reactively to work required on site to include clear lines of responsibility; a permit system; and logging and audit process.
- A communications system will provide information to all those involved, with alternative formats as necessary, but will not have contingency arrangements.
- A maintenance system is one where there is monitoring of the fire safety systems, and the equipment is kept fully functional at all times when the building is in use. When systems, equipment and other arrangements are not available or not functioning correctly, alternative procedures etc. are determined reactively.
- Liaison includes arrangements for notifying the fire and rescue service of changes to the occupancy, periods of abnormal occupancy, fire growth characteristics, and other relevant factors. However, the arrangements are unlikely to provide for routine meetings with the fire and rescue service or where a change in the building or its occupancy is proposed.
- A planning system takes into account a narrow range of possible emergencies and incidents. These are likely to include planning for logistical issues such as provision of shelter, communications, transport, the weather, time of day, time of week, time of year (holidays etc), and traffic-related issues, as well as scenarios such as power failures.

## **8.0 CONCLUSIONS & RECOMMENDATIONS**

8.0.1 The proposals outlined in this document demonstrate a level of fire safety equal to or greater than the general standard implied by compliance with the recommendations in BS9999. This level of safety therefore satisfies the functional requirements of the Building Regulations relating to fire safety.

8.0.2 The fire strategy described in this report can be summarised as follows:

- Means of escape will be based on simultaneous evacuation of the entire building on the operation of the fire alarm and detection system. It is proposed that this occurs on the operation of a single smoke detector, heat detector or manual call point.

- The travel distances within the building will be limited to those recommended in BS 9999.
- The occupancy loads and exit/staircase widths will be sized based on the recommendations in BS 9999.
- The building will include an automatic fire alarm and detection system which will be designed and installed to a category L2 Standard as described in BS 5839 Part 1. BS 5266 Part 1 emergency lighting will also be provided to all areas discussed in BS 9999.
- Structural fire protection to the building will achieve a 60 minute fire resistant standard. No sprinkler protection is proposed to the building. No compartment floors or compartment walls are needed beyond those needed to support the means of escape. The staircases will each afford 30 minutes fire resistance with FD30S self closing doors. Places of special fire hazard will be enclosed in 30 minute fire resisting construction. Although not defined formally, the acoustic requirements for the accommodation are likely to also provide an inherent degree of fire resistance that will assist with preventing fire spread.
- Fire service access is based on a minimum of 15% of the building perimeter being accessible for a standard pumping appliance. Public or private fire hydrants should be available to within 90m of the building entrances to which fire vehicle access is proposed; this is likely to require the addition of a new fire hydrant within the access roads to the site.

## **9.0 LIMITATIONS AND ASSUMPTIONS**

9.0.1 The information limitations and assumptions used in the preparation of this report are described below.

### **9.1 Information Provided**

9.1.1 This document is based on the drawings and supporting information issued to BWC by Pollard Thomas Edwards architects.

### **9.2 Building Regulations**

9.2.1 This report considers Building Regulations which deal with life safety only. Property protection, business continuity and insurance issues are not addressed in this report.

### **9.3 Other Limitations**

9.3.1 Complying with the recommendations of this report will not guarantee that a fire will not occur.

9.3.2 This report has been prepared for the sole benefit, use and information of the Parcel D1, Great Wilsey Park project team and the liability of BWC Fire Limited, its directors and employees in respect of the information contained in the report will not extend to any third party.

### **9.4 References**

1. BS 9999: 2017, Code of practice for fire safety in the design, management and use of buildings
2. Approved Document B, Volume 2, Buildings other than dwellings, September 2019 Edition (including May 2020, June 2022 and March 2024 Amendments)
3. BS 5839 Part 1: 2017, Fire detection and fire alarm systems for buildings. Code of practice for system design, installation, commissioning and maintenance
4. BS 5266 Part 1: 2016, Emergency lighting. Code of practice for the emergency lighting of premises
5. BS 5839 Part 9: 2011, Code of practice for design, installation, commissioning and maintenance of emergency voice communication systems in fire detection and fire alarm systems for buildings
6. BS ISO 3864-1: 2011, Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings.

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7. BRE Guide 187: 2014, External fire spread: building separation and boundary distances
  8. BS EN 1366 Part 2: 2015, Fire resistance tests for service installations. Fire dampers
  9. BS EN 13501 Part 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: fire resisting ducts and fire dampers
  10. BS 8519: 2020, Selection and installation of fire-resistant power and control cable systems for life safety and fire fighting applications. Code of practice.
  11. BS EN 81-73: 2016, Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Behaviour of lifts in the event of fire.