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The Delta Building, Reading

Planning Stage Fire Strategy Report Issue 2

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DOCUMENT CONTROL & NOTES

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Notes:	This report is prepared for the exclusive use of the Delta Building 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. 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.

DOCUMENT HISTORY

Issue	Date	Amendment Details	Author	Checked
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Note: All amendments since the previous edition are highlighted with a vertical line in the right hand margin

AUTHOR DETAILS AND COMPETENCY

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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 conversion of the existing office building into residential apartments at the site known as the Delta Building in Reading.
- 1.1.2 This fire strategy issue is intended for discussion within the design team and to assist the design team in gaining approval in principle from the Approving Authorities for planning purposes. This strategy is intended to demonstrate that adequate fire safety facilities are included within the design such that the design will meet or exceed fire safety standards applicable to Building Regulations and then by extension satisfy planning requirements.
- 1.1.3 This fire strategy has been based on Approved Document B, Volume 1¹ (ADB) well as other relevant guidance, such as British Standard BS5839 Part 6².
- 1.1.4 The report follows the main sections in ADB, with each section outlining the recommendations applicable to the design. Where details are not mentioned in this report then specific guidance from ADB should be adopted.
- 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.
- 1.1.7 Until this report is agreed with the approving authorities, the content should only be used 'As Preliminary Information'.

1.2 Building Description

- 1.2.1 This project entails the conversion of an existing office building into residential apartments. The building is known as the Delta Building in Reading, RG1 3ES. This building is one of three on the overall site. This building is located at the remote east end of the site and has a basement car park which is shared between the three buildings.
- 1.2.2 At completion the building will consist of basement, ground plus four storeys of solely residential apartment accommodations. The building footprint is notionally "L-shaped". The existing building has three staircases however only the central and north staircases are to be used. The south staircase is to be sealed up and is not used within these works. There are passenger lifts associated with the central staircase only.
- 1.2.3 All apartments access the staircases via common corridors located centrally along the lines of the floor plates.
- 1.2.4 The common staircases have access from outside via a direct external doors from the highway (all on the eastern side of the building). There is also a separate main building entrance in the centre of the building on the west elevation. The main entrance was formerly a double height reception space which is infilled at first floor level in these works to create a single level ground floor only reception area.
- 1.2.5 The building will be approximately 17.9m high when measured in accordance with Approved Document B. To achieve this height the existing floor level on the fourth floor is being lowered within the works. It should be noted that locally the landings within the staircases will still be slightly above 18m high but all floor plate accommodation will be less than 18m high.
- 1.2.6 The building accommodation consists solely of single level apartments at each floor. As mentioned there is also a main reception on the ground floor. All ancillary plant and storage is located outside the building or in the basement.

1.2.7 The accommodation within the development is classified in the following Purpose Groups under ADB:

Accommodation	Purpose Group
Residential Apartments	1(a)
Car Parking	7(b)

Note – The plant and store rooms have been considered ancillary to the main building uses.

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 Approved Document B, Volume 1 including the May 2020, June 2022 and March 2024 Amendments. 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 the dwelling of fire origin only evacuating in the residential accommodation. The existing car park will evacuate independently of the residential accommodation on a local simultaneous basis for the basement. No interconnection of fire alarm system or evacuation protocol is proposed between any areas.
- The apartments in the building fall into one of three types as below:
 - Traditional Units – Each has an entrance hallway which will afford 30minutes fire resistance with internal hallway travel limited to 9m. The apartment will include a minimum LD2 standard fire alarm and detection system and residential sprinklers.
 - Studio Units – Each has a single open space with inner bathroom and storage. Travel distances within the unit back to the apartment entrance will be limited to 9m. The apartment will include a minimum LD2 standard fire alarm and detection system and residential sprinklers. The cooking hobs will be at least 1.8m away from the exit route within the apartment.
 - Open Plan Units – Each unit will include LD1 standard fire alarm systems and residential sprinklers, plus maximum internal travel distances of 20m. Internal fire resistance is not needed within these apartments. The internal floor to ceiling height in these units will be at least 2.25m and the unit footprint will not exceed 16m by 12m. Finally the cooking hobs will be at least 1.8m away from the exit route within the apartment.
- The building is served by two staircases that link to the apartments via common corridors. Travel distances in the corridors are generally limited to 7.5m in dead ends and 30m in multiple directions. The southern end of the building beyond the central staircase includes an extended dead end situation of up to 22m. This extended corridor has been mitigated based on the provision of a 0.6sqm mechanical smoke shaft. The common corridor zone that adjoins the north staircase has independent venting via a 1.5sqm natural smoke shaft. All common staircases are provided with a 1sqm natural AOV at its head.
- The basement car park will be separated from the residential areas by 60minutes fire separation. There are no direct links to the north staircase. The central stair and lifts extend down to the basement and these will be separated from the car park via a 60minute lobby that also includes a 0.4sqm permanent natural vent to outside. The car park includes a hybrid ventilation system (natural vent openings and some ducted mechanical venting). Commercial sprinklers will be installed in the car park as part of these works.
- Structural fire resistance to all elements of structure will have 60minutes fire resistance.
- All floors in the building will be constructed as a 60minute fire resistant compartment floor. Each apartment will form its own 60 minute fire resistant compartment. The staircases and vertical shafts generally will afford 60minutes fire resistance. Special fire hazard rooms will afford at least 60minutes fire resistance. Residential sprinklers will also be provided throughout the ground and above floors with commercial sprinklers in the basement.
- Fire alarm and detection systems within the building will be:
 - Within open plan apartments – LD1 (BS5839 Part 6)
 - Within studio and traditional apartments – LD2 (BS5839 Part 6)

- Residential Common Areas – L5 (BS5839 Part 1³) solely to operate the common areas smoke venting systems.
 - Ancillary Rooms – No fire alarm systems proposed.
 - Car park – L5 (BS5839 Part 1)
- Fire service access vehicle access to the site is available primarily to the rear of the building (east elevation) that is accessed from Gas Works Road. A reversing head is available between the site yard and junction onto Gas Works Road to avoid a fire appliance reversing more than 20m. All of the apartments are covered within a 45m hose distance from a dry riser outlet in the central staircase. As the building is over 11m high a premises information box will also be provided within the main entrance of the building. A fire hydrant will be available within 90m of the dry main inlet point. Fire service access to the basement car park is independent of the building based on access via personnel doors from outside around the car park perimeter. These measures are unchanged within the works.

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 or building damage.
- 2.0.4 Following occupation the management of the premises are required under current legislation to carry out a fire risk assessment (the residential common areas). This documentation will be developed following completion and will form part of the fire manuals developed for the premises (BS 9999⁴ 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 Approved Document B and various British Standards (most notably BS9999 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 2015

- 2.3.1 Projects undertaken in the UK are subject to the requirements of the Construction (Design and Management) Regulations 2015 (CDM Regulations 2015) 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 Regulation 9 (Duties of 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 Principal Designer. Where the Architect or other consultants use all or part of this report to specify works, they are understood to have the necessary skills, knowledge and experience to alert the Client, Principal 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 General Principles

- 3.1.1 The general philosophy for means of escape is that the occupants of the building should be able to turn their back on a fire and escape via the nearest exit without additional assistance from other occupants or fire fighters. This is achieved by providing alternative escape routes where necessary, limiting travel distances, providing sufficient exit width and escape routes that, depending upon the use of the building, will have specified periods of fire resistance.
- 3.1.2 Residential means of escape is somewhat different to many other types of buildings in that only the particular apartment that has a fire in it is immediately evacuated. The reasoning behind this is due to the level of compartmentation between each of the apartments and to reduce false alarms affecting all the people within the building. The Fire Service carries out evacuation of the other apartments if necessary, however the residents may choose to evacuate of their own accord if desired. This philosophy is reflected by the stand-alone detectors/sounders, which are required in each apartment but not necessarily in the common corridors or escape routes. A smoke detection system can be required within the common areas but this is only to operate the life safety systems within that area if required i.e. automatic opening vents (AOVs).
- 3.1.3 The car park, ancillary plant and store rooms are completely independent fire compartments and therefore each will be treated independently with each evacuating on an individual basis, effectively akin to the apartments. Following this fire alarm systems will not be provided within the individual ancillary rooms.

3.2 Escape within Apartments

- 3.2.1 Traditional Units - Entrance Hallway Configuration
- 3.2.2 These form the vast majority of the units on the site where the apartment has the individual rooms connected to the apartment entrance via an entrance hallway.
- 3.2.3 In each case the dwelling entrance doors will be FD30S and self closing and there will be 60minutes fire separation onto the common areas and also between apartments.

- 3.2.4 The apartments will include a 30minute fire rated entrance hallway with FD20 doors onto this hallway. Travel distances within the entrance hallway will also be limited to 9m.
- 3.2.5 The apartments will include residential sprinklers and also LD2 standard fire alarm and detection systems.
- 3.2.6 Very few apartments include external balconies, only those to the north of the ground floor and Flats 74 and 75 at fourth floor. In each case the balconies are accessed from the living-kitchen space (with secondary escape to the bedroom win the cases of Flats 74 and 75). In accordance with Annex D of BS9991 as the balconies have full visibility of the access space and the balcony travel distance is less than 7.5m the only mitigation needed is an external sounder on the balconies which are linked to the internal apartment fire alarm and detection systems. The cooking hobs will also be remote from the balcony escape route, i.e. at least 1.8m away from the internal route through the living-kitchen room.
- 3.2.7 As part of the ground floor reception configuration Flats 11-16 inclusive will also include an escape window that offers alternative escape in the event of a fire in the reception area.
- 3.2.8 Studio Configured Units (Flats 6, 13, 28 and 44)
- 3.2.9 These layouts are limited within the building but are based on the accommodation being a single open space with inner stores and bathrooms.
- 3.2.10 In each case the dwelling entrance doors will be FD30S and self closing and there will be 60minutes fire separation onto the common areas and also between apartments.
- 3.2.11 The apartments will each be provided with residential sprinklers and also LD2 standard fire alarm and detection systems. Following the guidance in ADB these units therefore do not require internal fire sub-division or compartmentation. However, internal travel distances from all parts of the unit back to the apartment entrance doors will be limited to 9m.
- 3.2.12 As an open space the cooking hobs should be located in a remote location with respect to the internal escape route. In each case the cooking hobs will either be at least 1.8m away from the internal escape route (with a 900mm escape route allowed for) or enclosed within a kitchen enclosure separate from the main residence escape route.
- 3.2.13 No external balconies are present with studio units.
- 3.2.14 As part of the ground floor reception configuration Flats 11-16 inclusive will also include an escape window that offers alternative escape in the event of a fire in the reception area.
- 3.2.15 Open Plan Apartments (Flats 7, 8, 12, 16, 23, 27, 31, 39, 43, 47, 55, 59, 60, 62, 70 and 76)
- 3.2.16 These apartments occur on each floor of the building.
- 3.2.17 Each of these apartments concerned has an open plan layout whereby the apartment entrance forms part of the living-kitchen space and the bedrooms are inner rooms accessed from this living space. In the majority of these layouts the bedroom areas are located on one side of a centrally located apartment entrance door with the living space forming the other side of the entrance space. In some cases there is a partial corridor area formed by the room partitions however these areas remain open to the living space.
- 3.2.18 These layouts are not addressed by Approved Document B and therefore the guidance in BS9991⁵ should be adopted as outlined below:
- An automatic fire suppression system will be provided throughout the open plan apartments
 - A LD1 automatic fire detection and alarm system designed to BS 5839 Part 6 will be provided to each open plan apartment.
 - The open plan apartments are situated over a single level.
 - The ceiling heights within the open plan apartments are in excess of 2.25m.
 - The open plan apartments are less than 16m by 12m.
 - Where the kitchen area is not enclosed then the cooking facilities should also be remote from the escape routes (i.e. at least 1.8m away from the escape route).

- 3.2.19 In general it is not ideal to use alternative guidance for an isolated part of the building design. However this approach is considered reasonable in this context as the overall building defend in place evacuation philosophy is completely based on the foundation that a fire event is localised to the apartment concerned and therefore internal apartment fire events do not impact on the rest of the building. Further to this the fire strategy for the remainder of the common parts has also been cross referenced against the wider requirements from BS9991 to ensure that no higher requirements would be presented within the building design that may conflict with this approach.
- 3.2.20 Each of these apartments will be fire separated from the rest of the building by 60minutes fire resistance. The dwelling entrance doors will be FD30S self closing doors.
- 3.2.21 As part of the ground floor reception configuration Flats 11-16 inclusive will also include an escape window that offers alternative escape in the event of a fire in the reception area.

3.3 Escape within Residential Common Areas

- 3.3.1 This building has two available staircases: one at the remote north end of the floor plates and a central staircase. The apartments access the staircases via a connecting common corridor.
- 3.3.2 Based on the above the travel distances in the common corridors between each flat and the staircases will be generally limited to 7.5m in dead ends and 30m in multiple direction routes.
- 3.3.3 The common corridor will be sub-divided with 30minute fire resistant construction and FD30S self closing doors. In this case it is proposed that the typical upper floors are sub-divided into four corridor sections: a north stair adjoined corridor, a small east-west dead end linking corridor, a north-south corridor above the central stair and a long north-south corridor adjoining the central stair.
- 3.3.4 The east-west dead end linking corridor is present to minimise the dead end corridor travel to 7.5m whilst providing two independent directions of escape from the dead end.
- 3.3.5 The common corridor that directly adjoins the north staircase will be provided with automatic smoke venting in the form of a 1.5sqm natural smoke shaft that serves every floor from ground to fourth inclusive.
- 3.3.6 The north-south common corridor that directly adjoins the central staircase has extended travel distances of up to 22m. In order to mitigate this travel distance and provide smoke venting for general escape route protection it is proposed that a 0.6sqm mechanical smoke shaft will be provided to this corridor at each floor. The mechanical smoke shaft will be located at the remote end of the floor plate (south end) with respect to the central staircase. In addition the central staircase doors will be rehung to open outwards onto the common corridor to assist smoke clearance. It is proposed that the higher standard of smoke venting mitigates the extended travel with this concept in line with Smoke Control Association guidance. This is discussed further in Appendix B at the end of this report.
- 3.3.7 Both common staircases will include a 1sqm natural automatically openable smoke vent at their head. The smoke venting will be controlled by both manual and automatic (smoke detection) means.
- 3.3.8 At ground floor level the staircases discharge to outside via direct external doors.
- 3.3.9 No ancillary plant rooms or stores are present within the building.
- 3.3.10 Notwithstanding the above the main entrance and reception is accessible from the common corridors at ground floor level. In this case the reception access is proposed as being separated from the common corridors by minimum 60minute fire rated separation and FD30S self closing doors. The reception will also be covered by residential sprinklers and the reception will be limited to fully non-combustible furnishings and materials (e.g. metals and ceramics etc). It is proposed that with these measures in place a fire is unlikely to occur in this area. However should this occur the mechanical smoke shaft venting in the southern common corridor will ensure that the central staircase remains protected. In addition all ground floor apartments accessed from the southern corridor (Flats 11-16 inclusive) will each include an escape window that offers alternative escape. This configuration is subject to discussion and agreement with the approving authorities.

- 3.3.11 The basement car park is solely accessible from the residential areas via the central staircase. As the only staircase link this is prescriptively acceptable subject to the link being via a 60minute fire resistant lobby that includes a 0.4sqm permanent natural vent to outside.
- 3.3.12 Exit widths within the residential areas of the building are not critical and the minimum size of exits can be based on the needs for everyday use but will be no less than 750mm. Staircase doors on the upper floors will maintain a minimum clear width of 750mm. The direction of opening is not essential for escape (due to the low occupancy).
- 3.3.13 Staircases within residential apartment buildings do not need to be sized for simultaneous evacuation and therefore the staircase widths are determined by fire fighting provisions and other non-fire design requirements. As the building is less than 18m high the staircases can be sized based on their daily requirements with a minimum width of 750mm being applicable for fire safety purposes.
- 3.3.14 The final exits and discharge routes at ground level from the staircases will maintain the clear escape width of the staircases (i.e. a minimum of 750mm).
- 3.3.15 It should be noted that the above exit widths solely consider minimum fire safety requirements additional clearance widths may be needed for other Building Regulation purposes.
- 3.3.16 Where access control devices are installed to staircase doors or cross corridor doors that are required for escape these need to be useable and available for escape. To this end the access control devices must be overridable in a manner acceptable to the approving authorities (this is typically via the provision of green break glass points adjacent to the exit doors needing override controls). It should also be noted that the break glass overrides are only needed on the sides of the doors where these doors are essential to meet the travel distances discussed in each floor specifically. All access control devices will also fail safe upon power failure.
- 3.3.17 All doors needed for escape will be openable with a single action and without the use of a key.
- 3.3.18 All escape routes will maintain a minimum height clearance of 2m.
- 3.3.19 The staircase discharge routes should be maintained unobstructed and free of fire load.

3.4 **Escape from Ancillary Accommodation**

- 3.4.1 There are no dedicated plant rooms located at roof level however there are a number of plant facilities present at roof level which will need periodic maintenance. In each case access is likely to be provided via hatches from the residential common stairs. From the stairs all parts of the roof will be reached within a maximum of 60m.
- 3.4.2 There are ancillary accommodations accessed from inside the building at each level. Travel distances within these areas should be limited to those recommended by the codes, as shown in the table below:

Accommodation	Area	Travel distance possible in one direction	Travel distance possible in more than one direction
Plant Room	Within Room	9m	35m
	Escape route not in open air (overall distance)	18m	45m
	Escape route in open air (overall distance)	60m	100m
Storage	Normal Hazard Storage	25m	45m

- 3.4.3 The rooms are very limited and therefore the above travel distances are met based on the limited dead end routes.
- 3.4.4 No inner rooms are present in the ancillary areas.
- 3.4.5 All ancillary accommodation will have individual occupancies of much less than 60 people and therefore the exit doors from these rooms will maintain a clear opening width of 750mm and are acceptable swinging in either direction.

- 3.4.6 Each ancillary room (bin store, bike store, plant room etc) will be fire separated from adjacent areas with 60minutes fire resistance and FD30S self closing doors.
- 3.4.7 No ancillary rooms are accessed from the residential common areas and therefore no additional measures are needed beyond the basic fire compartmentation discussed above.
- 3.4.8 The basement car park is existing and unchanged within these works beyond the provision of sprinklers being proposed. The car park has a combination of escape routes both directly to outside and also into the three respective buildings that it serves. Travel distances in the car park will be limited to 25m in dead ends and 45m in multiple direction routes. On activation of a detector or sprinkler in the car park any access controls to the exit doors will automatically disengage such that all existing exit routes are available for use. Manual override switches will also be available by doors that include access controls.
- 3.4.9 The basement car park is solely accessible from the residential areas via the central staircase. As the only staircase link this is prescriptively acceptable subject to the link being via a 60minute fire resistant lobby that includes a 0.4sqm permanent natural vent to outside.

3.5 Disabled Evacuation

- 3.5.1 The evacuation of disabled occupants plays an important role in the overall evacuation of the building.
- 3.5.2 The residential areas of the building are not proposed to be provided with disabled refuges as the high degree of compartmentation in building provides adequate protection and refuge for occupants to be able to safely remain in a separate compartment.
- 3.5.3 It is also understood that no planning or third party conditions in respect of evacuation lifts etc are applicable to the development at this stage.

3.6 Fire Alarm and Detection Systems

3.6.1 Residential Apartments

- 3.6.2 The automatic fire alarm and smoke detection systems within the apartments which are provided with entrance hallways and studio apartments will be designed in accordance with the BS 5839 Part 6 to a minimum LD2, Grade D1 standard. Each apartment of this type will be provided, as a minimum, with a single sounder / smoke detector in the internal hallway and interlinked appropriate fire detector / sounders to the kitchen-living spaces. The sounders will be capable of delivering 85dB (A) through the open doorway to each room. The system devices will be hard wired, interlinked and include a self contained battery backup.
- 3.6.3 The open plan apartments on the scheme will be provided with LD1, Grade D1 standard automatic fire alarm and detection systems to BS 5839 Part 6. In general these latter systems will provide detector coverage to all parts of the apartment. The sounders will be capable of delivering 85dB (A) through the open doorway to each room. The system devices will be hard wired, interlinked and include a self contained battery backup.
- 3.6.4 For the limited units which include balconies each will have an integrated external sounder on the balcony which forms part of that units fire alarm and detection system.

3.6.5 Residential Common Areas

- 3.6.6 A common zoned smoke detection system will be provided at every level in the common corridors that include automatic smoke venting. The purpose of the detection systems is to initiate the operation of the life safety automatic ventilation systems. No sounders or manual call points will be provided as part of the system.
- 3.6.7 Broadly the smoke detection systems serving the common corridors will be designed in accordance with the BS 5839 Part 1 to an L5 standard, with smoke detection being provided solely to the common corridors at each level which are directly provided with smoke venting. Smoke detection is not expected in the common staircases.

- 3.6.8 The smoke vents in the common corridors will also be manually controllable via manual switches located in the common staircases by the doors onto the respective common corridors. A similar manual switch will be located at ground floor level in the staircases to control the staircase smoke vents.
- 3.6.9 The sprinkler systems in this block will also include a status panel in the ground floor building entrance.
- 3.6.10 The general passenger lifts in the building will not automatically ground on the detection of smoke in the common areas. Instead the lifts will include a manual override switch at ground floor level which is present for fire service use.
- 3.6.11 Basement car park
- 3.6.12 The basement car park includes an existing fire alarm and detection system that serves the entire basement and is to a notional L5 standard. This system controls the mechanical smoke venting facilities present and also provides warning for the inner rooms off the car park. The system is also linked to the fire alarm systems in the buildings above (in the case of Kennet Place and the Delta Building this will be solely a notification link in the building entrance following these works).
- 3.6.13 The basement fire alarm will solely trigger a simultaneous evacuation of the car park and also send a notification alert to the building entrance in respect of Kennet Place and the Delta Building. Further actions are in place for the other existing building on the wider site.
- 3.6.14 It is not proposed to alter this existing fire alarm within these works with the exception of integrating the new sprinkler system with this fire alarm.

3.7 Emergency Lighting Systems

- 3.7.1 To facilitate normal use the lighting levels throughout the building are 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.
- 3.7.2 However, assuming a power failure, emergency lighting is provided as a secondary backup, complying with the requirements of BS 5266: Part 1⁶. This includes coverage as per following:

Residential Apartment Building	• All common escape routes • Areas directly outside the final exits • All accessible communal toilets • Switch gear/battery room for the emergency lighting system • Electricity/generator rooms
Ancillary Accommodation	• All escape routes • Areas directly outside the exits • Underground or windowless accommodation • Open plan areas of more than 60m² • Internal corridors more than 30m long • Accessible toilets • Switch gear/battery room for the emergency lighting system • Electricity/generator rooms

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

3.8 Emergency Signage

- 3.8.1 Escape signage will be provided above all common exit routes, storey and final exit doors within the building.
- 3.8.2 The signs will be in accordance with BS ISO 3864 Part 1⁸ and BS 5499 Part 4⁷.

- 3.8.3 To assist the fire service in identifying each floor, floor identification signs and flat indicator signs should be provided (Further informative discussion is present in NHBC technical extra 26 Nov 2020 (pages 18-21)). The floor identification signs should meet all of the following conditions:
- The signs should be located on every landing of a protected stairway and every protected corridor/lobby (or open access balcony) into which a firefighting lift opens.
 - The text should be in sans serif typeface with a letter height of at least 50mm. The height of the numeral that designates the floor number should be at least 75mm.
 - The signs should be visible from the top step of a fire service access stair and, where possible, from inside a firefighting lift when the lift car doors open (where applicable).
 - The signs should be mounted between 1.7m and 2m above floor level and, as far as practicable, all the signs should be mounted at the same height.
 - The text should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch.
- 3.8.4 The wording used on each floor identification sign should take the form Floor X, with X designating the number of the storey, as intended for reference by residents. The floor number designations should meet all of the following conditions:
- The floor closest to ground level should be designated as either Floor 0 or Ground Floor.
 - Each floor above the ground floor should be numbered sequentially beginning with Floor 1.
 - A lower ground floor should be designated as either Floor -1 or Lower Ground Floor.
 - Each floor below the ground floor should be numbered sequentially beginning with Floor -1 or Basement 1.
- 3.8.5 All floor identification signs should be supplemented by flat indicator signs, which provide information relating to the flats accessed on each storey. The flat indicator signs should meet all of the following conditions:
- The signs should be sited immediately below the floor identification signs, such that the top edge of the sign is no more than 50mm below the bottom edge of the floor identification sign.
 - The wording should take the form Flats X-Y, with the lowest flat number first.
 - The text should be in sans serif typeface with a letter height of at least half that of the floor indicator sign.
 - The wording should be supplemented by arrows when flats are in more than one direction.
 - The text and arrows should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch.
- 3.8.6 In the case of multi-storey flats with two or more entrances, the flat number should only be indicated on the normal access storey.
- 3.8.7 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.
- 3.8.8 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			

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

Signage	Sign Diameter	Letter Height
	240mm	20mm
		

3.9 Fire Extinguishers

- 3.9.1 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.
- 3.9.2 Manual fire fighting equipment will not be installed within the residential accommodation. At this stage it is not proposed that fire extinguishers be provided to the residential common areas however the landlords fire risk assessment may recommend fire extinguishers be provided to some parts of the common areas.

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 ADB section 4.1 as shown below.

Location	European Class*
Small Rooms of area (<4m ² in residential accommodation or <30m ² in non-residential accommodation)	D-s3,d2
Other Rooms (Residential or non-residential)	C-s3,d2
Other circulation spaces (including common areas, staircases, lobbies etc.)	B-s3,d2

Note: * = The European classifications are described in BS EN 13501-1:2007+A1:2009.

- 4.1.2 The class of linings recommended in the table above can be downgraded (but not less than 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 20m² in residential accommodation.

4.2 Unprotected Areas

- 4.2.1 The building is an existing office building and associated existing elevations. The works maintain the same fire spread parameters for space separation purposes (i.e. office and residential radiation parameters). In addition the works are heavily sub-dividing the building into smaller fire compartments and also introducing sprinklers throughout the building. Given these enhancements the space separation performance of the building will be far superior to the existing conditions due to these works.
- 4.2.2 Notwithstanding the above all parts of the external walls which are not windows and doors should afford at least 60minutes fire resistance as external walls.

4.3 External Wall Construction

- 4.3.1 As the building has a floor over 11m high the entire building is therefore governed by requirements for over 11m high buildings. Based on this rationale the following applies to all external walls based on Approved Document B, Volume 1.
- 4.3.2 All external wall external surface finishes should achieve Class 0 (national class) or class B-s3, d2 or better (European Class). However, these performances are superseded by the material requirements outlined below.
- 4.3.3 All materials used within the external wall build ups will achieve a European class A1 or A2-s1,d0 rating. This recommendation also applies to any balconies and similar specified attachments provided however it does not apply to the following:
- Cavity trays when used between two leaves of masonry;
 - Any part of a roof (other than any part of a roof which falls within paragraph (iv) of Regulation 2(6)) if that part is connected to an external wall;
 - Door frames and doors;
 - Electrical installations;
 - Insulation and water proofing materials used below ground level;
 - Intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
 - Membranes;
 - Seals, gaskets, fixings, sealants and backer rods;
 - Thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or,
 - Window frames and glass.
- 4.3.4 Additional guidance on the application of this Regulation is provided in Section 10 of Approved Document B, including guidance on membranes, window spandrel/infill panels, thermal breaks and shop signage.
- 4.3.5 All wall construction within 1.8m of the staircase final exit points should be fire rated to at least 30 minutes fire resistance. Of particular concern with this condition are the final exit doors from the central and north staircases which result in the two adjacent apartment windows needing to be 30minute fire rated and fixed shut (Flats 7 and 12 on the ground floor).

4.4 External Roof Construction

- 4.4.1 As the building concerned is located less than 6m from the relevant external boundaries the roof coverings present should achieve a minimum B_{ROOF}(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 As the building concerned presents a top floor less than 18m high but is more than 11m high and therefore all elements of structure will achieve a minimum of 60 minutes fire resistance.

5.1.2 Any elements of structure which only support themselves or a roof do not require any specific fire resistance. It should be noted that as there is plant located on the roof the roof structure which supports the escape / access routes to this plant should achieve at least 30minutes fire resistance.

5.1.3 Wherever there is any conflict with fire resistances to elements of structure the higher fire resistance will always apply.

5.2 Compartmentation

5.2.1 All floors will be constructed as compartment floors with the same fire resistance as the elements of structure (i.e. 60 minutes).

5.2.2 Each apartment will be fire separated from the common areas and each other by construction having a minimum fire resistance of 60 minutes. Each internally accessed apartment front door will be a minimum FD30S self closing door.

5.2.3 All studio and open plan apartments in the building will not include internal fire compartmentation beyond their party wall and floor separation. Instead each apartment will include residential sprinklers and LD1 standard automatic fire alarm and detection systems. All apartments with traditional entrance hallway layouts will include a 30minute fire rated entrance hallway with minimum FD20 doors.

5.2.4 The staircases will be constructed as a 60minutte fire resistant vertical shafts with FD30S self closing doors. The lifts associated with the main core will also afford 60minutes fire resistance with FD30 lift landing doors.

5.2.5 All discharge corridors from the staircase to the final exits at ground level will maintain the fire resistance of the staircase itself.

5.2.6 All service risers will be constructed as protected shafts having a minimum fire resistance not less than that of the elements of structure (i.e. 60 minutes). All service riser doors will have a fire resistance equal to half the period of fire resistance for the service riser shaft (no self closers are needed).

5.2.7 The basement car park will have 60minutes fire separation from the rest of the building. The basement car park solely links to the central staircase. This link will be via a 60minute fire resistant lobby that also includes a 0.4sqm permanent natural vent to outside. The car park will also include commercial sprinklers.

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
Apartment entrance doors	FD30S Self Closing	E30S Self Closing
Protected internal hallway doors	FD20	FD20
Stair doors	FD30S Self Closing	E30S Self Closing
Riser doors	FD30S	E30S
Lift landing doors	FD30	E30

Locations	When tested in accordance with BS476-22	When tested in accordance with BS EN 1634-1
Cross corridor doors	FD30S Self Closing	E30S Self Closing
Internally accessed ancillary room doors (bin stores, tank room and LV room doors)	FD30S Self Closing	E30S Self Closing
Externally accessed ancillary room doors (Plant rooms, bike stores, bin stores)	N/A – No fire ratings needed on the basis that these rooms are externally accessed. However this is subject to these doors being more than 1.8m away from the residential escape routes.	

5.3.2 All doors will be provided with self closers, except internal doors within dwellings, riser and small cupboard doors which should be kept locked shut and signed as such.

5.3.3 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 Risk**

5.4.1 Plant rooms, bike stores, cleaners stores and refuse rooms will achieve at least 60minutes fire resistance. Where these rooms are internally accessed then the access doors will also afford FD30S self closing doors.

5.4.2 Any electrical substation 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 4hours fire separation.

5.4.3 All plant rooms, bin stores and bike stores are accessed directly from outside and are remote from the residential escape routes therefore no fire resistance is needed to their room doors. For similar reasons no further mitigation is needed beyond the basic fire compartmentation discussed above.

5.4.4 The basement car park solely links to the central staircase. This link will be via a 60minute fire resistant lobby that also includes a 0.4sqm permanent natural vent to outside. The car park will also include commercial sprinklers.

5.5 **Fire Stopping**

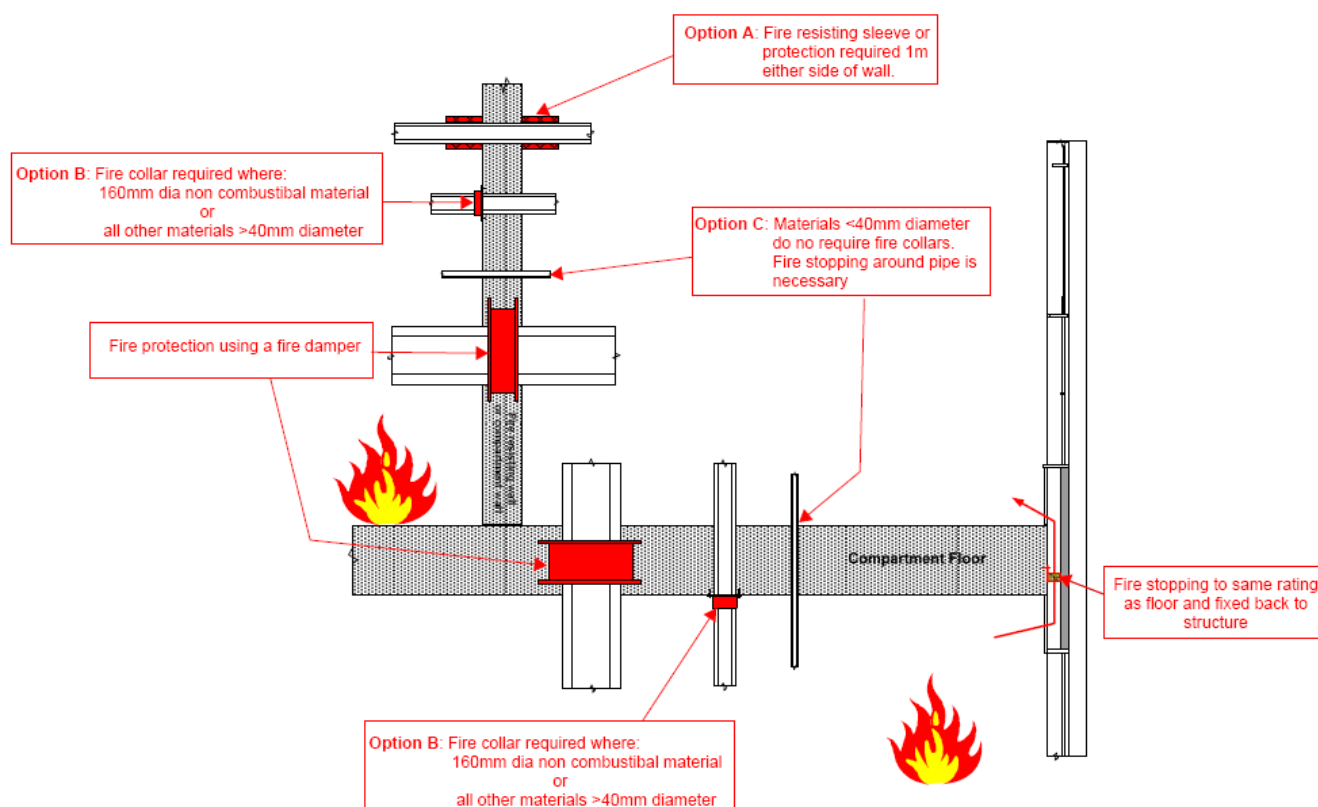
5.5.1 Ductwork passing through compartment/fire resistant walls will be either contained within fire resisting construction or provided with fire dampers.

5.5.2 The ductwork will be provided with fire and smoke dampers activated automatically on the activation of the building fire alarm and detection system. Fire and smoke dampers will be provided to ductwork which are installed in any of the following areas (unless they are contained within fire resisting construction throughout their route to fresh air):

- Ductwork serving both escape routes and accommodation or;
- Ductwork passing through both stairs, stair lobbies and accommodation or;
- Ductwork passing through walls separating fire compartments.

5.5.3 Any openings for services (exceeding the dimensions discussed in Table 9.1 of ADB as shown below) breaching fire rated walls or floors will be fire stopped (unless protected throughout their entire length with fire resisting material) in accordance with Section 9 of ADB. 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
Compartment wall or Compartment floor between flats	160	160 (stack pipe) 110 (branch pipe)	40
Any other situation	160	40	40



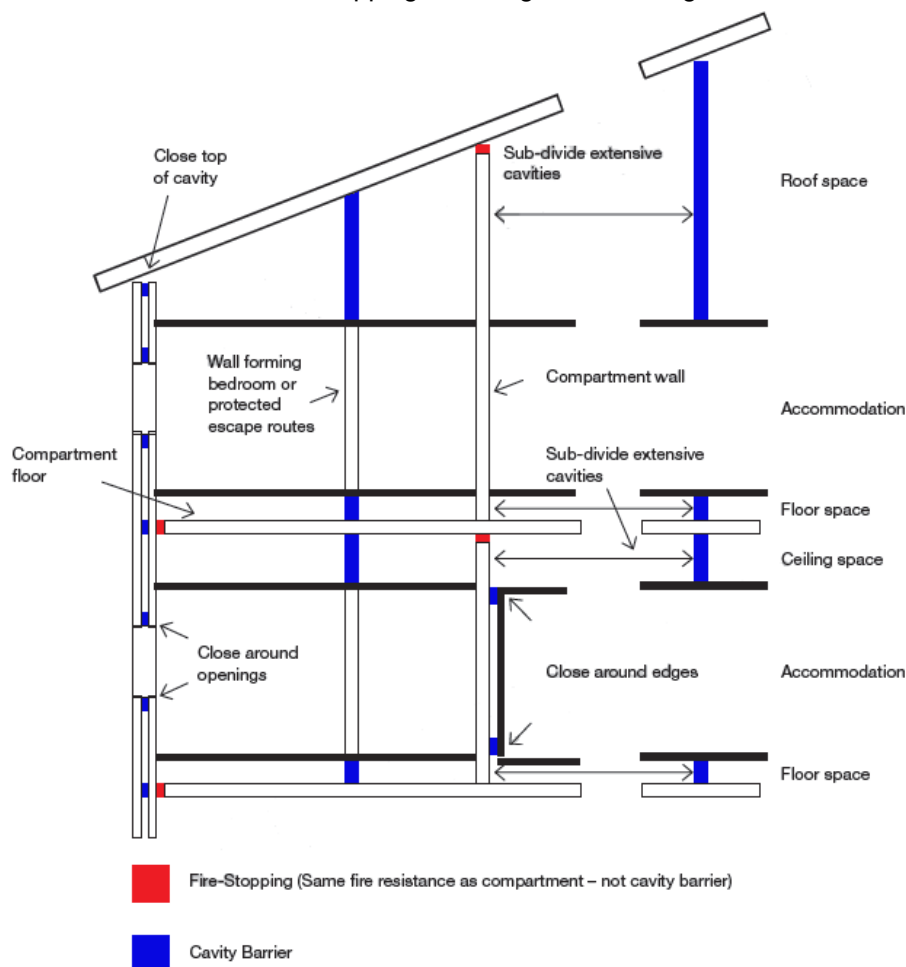
5.6 Cavity Barriers

5.6.1 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).

5.6.2 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.

- 5.6.3 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.
- 5.6.4 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 should afford the same level of fire resistance as the fire resisting elements themselves. These principles and the general cavity barrier locations are indicated in the diagram below. Following this where SFS systems form the internal skins of the external walls it is recommended that due to the potential lack of fully fire certified fire compartmentation that cavity barriers in these locations are treated as fire stopping reflecting the fire ratings of the walls of floors concerned.



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 is less than 18m high and therefore no fire fighting shafts are proposed. However, the central staircase will include a dry rising water main to assist fire service access. All parts of the internal accommodation will be covered within 45m of a dry main outlet within the central common staircase.
- 6.1.2 The ancillary ground floor rooms are the only parts of the building which rely on external hose distance access from the fire appliance (i.e. maximum 45m hose distances).
- 6.1.3 The dry main inlet point will be located within 18m of a fire appliance parking position outside the east side entrance to the central staircase off Gas Works Road. The inlet will also be visible from the fire appliance.
- 6.1.4 The car park is existing and unchanged within these works, with the exception that sprinklers are being introduced to the car park. Fire service access is based on the existing routes into the car park from outside via personnel doors around the car park perimeter. Access into the car park is also available from the three buildings on the site. These access arrangements are not being changed or made worse within these works.
- 6.1.5 Following the above the site access is served purely from Gas Works Road and more widely for the site also from Forbury Road. These highways are existing through routes and therefore no reversing or turning provisions are generally required. Notwithstanding this the east side of the site includes a vehicle yard and car park access ramp which permits a fire appliance to turnround with the junction onto Gas Works Road.
- 6.1.6 The external vehicle access provisions to the site access road will adopt the recommendations from ADB Table 13.1 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: * = This capacity will be subject to advice and confirmation from Berkshire Fire & Rescue Service in respect of their pumping appliances.

6.2 Internal Access

- 6.2.1 The externally accessed ancillary rooms at ground floor level will each be covered by a direct 45m hose distance from the fire appliance parking positions around the building.
- 6.2.2 As described in Section 6.1, internal fire fighting access will be achieved by the use of the central staircase which will also include a dry main.
- 6.2.3 The residential apartments within the building will all be served by the dry rising main in the central staircase. All parts of the accommodations will be covered within 45m of the dry main outlets in this staircase.
- 6.2.4 As stated earlier there will be access for a pumping appliance to within 18m of the fire main inlet connection points, typically on the face of the building. The inlet will be visible from the fire appliance.
- 6.2.5 In accordance with the June 2022 Amendments to Approved Document B the building will include a Premises Information Box externally by the main building entrance to the building.
- 6.2.6 No additional internal fire fighting provisions are proposed to the car park on the basis that this is existing unchanged accommodation. Notwithstanding this the car park will be sprinklered within these works.

6.3 Fire Suppression Systems

- 6.3.1 The building is over 11m high and therefore sprinklers will be provided throughout the building for Building Regulation purposes.
- 6.3.2 Based on the above the residential sprinklers proposed will be designed to BS9251⁹. These will be provided to all apartments, common circulation areas and ancillary rooms. Based on the building height and use the sprinklers will be designed to a minimum Category 3 standard.

- 6.3.3 It should be noted that for residential ancillary areas to be covered by the residential sprinklers each individual compartment must be a maximum of 100sqm to be supported by these systems.
- 6.3.4 The sprinklers are considered to be a life safety facility under Building Regulations and so secondary power supplies, and back up pumps are considered mandatory in accordance with Approved Document B.
- 6.3.5 The basement car park beneath the building will be provided with BS EN 12845¹⁴ life safety sprinklers as part of these works.

6.4 Smoke Venting Systems

6.4.1 Residential Apartments

- 6.4.2 No smoke venting systems are proposed internally within any of the apartments.

6.4.3 Residential Common Areas

- 6.4.4 The sections of common corridor that directly adjoin the north end staircase will be provided with automatic smoke venting in the form of a 1.5sqm natural smoke shaft. The smoke shaft will serve all floors within the building before discharging at roof level. The associated north staircase will also include 1sqm natural automatically opening smoke vents at its head.
- 6.4.5 It is proposed that the natural smoke shaft also serve the top floor common corridor. The smoke shaft will not extend 2.5m above the fourth floor ceiling on the basis of the adoption of the Building Control Alliance Guidance Note 8 arrangements. This latter document permits the omission of the overrun subject to the smoke shaft cross sectional area, the fourth floor corridor AOV into the smoke shaft and the discharge AOV at the head of the smoke shaft all maintaining a free area of at least 1.5sqm. The adoption of this rationale is subject to agreement with the Approving Authorities and if unacceptable will require the smoke shaft to be independent of the top floor common corridors and separate direct 1.5sqm natural AOV provided to the top floor common corridor.
- 6.4.6 The natural smoke shaft will be constructed of non-combustible A1 rated materials and be detailed as summarized below:
- The smoke shaft will have a minimum cross-sectional free area of 1.5m²
 - The smoke shaft will have a minimum internal dimension of 850mm
 - The minimum free area of the vent from the common corridor (AOV), the vent at the head of the smoke shaft (if applicable) and at all internal locations within the smoke shaft (e.g. allowing for safety grills etc) will have a minimum free area of 1m². Notwithstanding this the smoke shaft cross sectional area at third floor to the roof, the fourth floor corridor AOV's and the roof discharge AOV will all maintain a minimum 1.5m² free area in order to avoid the 2.5m overrun above the fourth floor inline with the recommendations of the Building Control Alliance Guidance Note 8 criteria.
 - The smoke shaft discharge at roof level will be at least 0.5m above any surrounding structures within a horizontal distance of 2.0m. The smoke shaft will not extend 2.5m above the ceiling of the highest storey served by the smoke shaft. This is above on the BCA guidance note 8 and principles summarised in the point immediately above.
 - The smoke shaft will be constructed from non-combustible materials and the smoke shaft should be vertical from base to head, with no more than 4m at an incline angle (maximum 30°)
 - The smoke shaft is not required to be open at the bottom and is akin to a chimney
 - An additional AOV is required at the head of the staircase in order to supply make up air. The free area of this AOV should be at least 1.0m².
- 6.4.7 The common corridor smoke vents will open automatically based on a smoke detector operating in that section of common corridor only. On activation the associated staircase smoke vent will also open. The remaining smoke vents will remain closed.
- 6.4.8 A manual override switch will be provided to enable the fire service to manually control the smoke venting arrangements as needed. In this case a manual override switch for the staircase AOV's will be provided in the respective staircases at ground floor level to control the staircase vents. The common corridor AOV's will include manual override switches within their associated staircases by the staircase door onto the common corridor concerned.

- 6.4.9 The smoke vent should comply with BS EN 12101 Part 2¹⁰.
- 6.4.10 The southern common corridors which adjoin the central common staircase will each be ventilated by a single 0.6sqm mechanical smoke shaft that serves each floor. This mechanical smoke shaft will be supported by a 1sqm natural automatically opening vent at the head of the central staircase. Additionally the staircase doors (and any intermediate corridor doors, in particular on the ground floor) will open against the direction of escape to assist the venting performance.
- 6.4.11 The mechanical smoke venting is provided to ensure that the staircase remains protected from smoke ingress at all times and also to mitigate the dead end extended travel distances. The mechanical smoke shaft is discussed further in Appendix B at the end of this report.
- 6.4.12 The central entrance reception area is considered to be a sterile and controlled fire risk however this zone will also be ventilated in an emergency via the mechanical smoke shaft provisions that vent the southern corridors as discussed earlier.
- 6.4.13 The central staircase is linked to the basement car park which will include a protected lobby for this link. The protected lobby will include a 0.4sqm permanent natural vent that discharges directly to outside within these works.
- 6.4.14 Basement Car Park
- 6.4.15 The basement car park is not changing within these works with respect to use, size etc therefore the ventilation to the basement itself is not currently being changed. The existing ventilation is based on a hybrid arrangement of permanent natural openings around the perimeter of the car park, plus central natural vents onto the courtyard above. The natural ventilation is also assisted by mechanical ducted extract ventilation. The mechanical ventilation is controlled by automatic fire detection throughout the car park.

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. At this stage the following life safety systems will include a backup power supply (where applicable):
- Illuminated emergency signage
 - Emergency lighting
 - Automatic fire alarm and detection system
 - Smoke venting systems (where electro-mechanical devices are used)
 - All fire alarm interlinked fire/smoke dampers
 - Sprinklers
- 6.5.2 It should be ensured that all power and control cabling required for life safety equipment within the building is specified and installed in accordance with BS 8519¹¹.

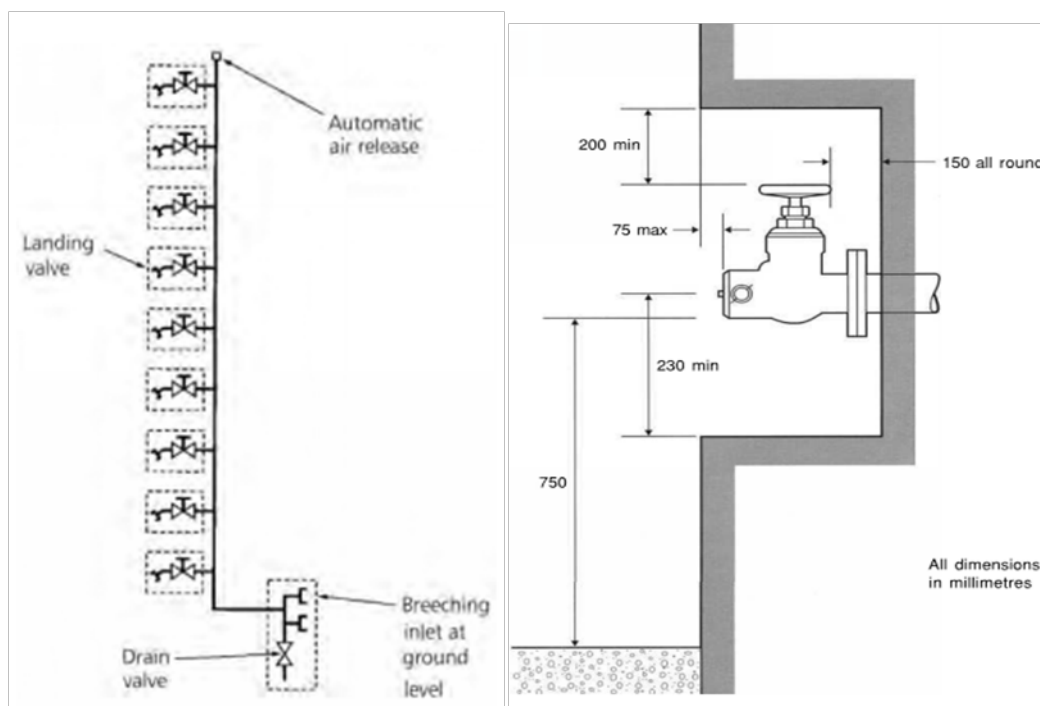
6.6 Fire Fighting Lifts

- 6.6.1 No fire fighting lifts or evacuation lifts are present or proposed on this development. There are three standard passenger lifts present in the central core only.
- 6.6.2 In accordance with BS EN 81-73¹² the lifts across the development will also be provided with a means of grounding the lift. As the building does not include a full building fire alarm system all lifts will include a manual grounding switch be provided at fire service access level. Automatic grounding of the lifts is not recommended in this case.

6.7 Dry Risers

- 6.7.1 As discussed in Section 6.2 the central staircase will include a dry rising water main within the common staircase. No wet rising mains will be provided in any building on the site.

- 6.7.2 The dry rising water main will have the outlets located in the central staircase at each level (including the ground floor). The outlets will be positioned so that all points in the apartments are covered within 45m hose distances.
- 6.7.3 The dry main inlet will be located within 18m of the fire appliance parking position with the inlet visible from the fire appliance. Ideally the inlet position will be adjacent to the residential core entrance whilst also meeting the guidance above. It should be noted that the horizontal distance between the inlet and the vertical rise of the dry main in the staircase should not be more than 18m.
- 6.7.4 The dry mains will be designed and installed in accordance with BS 9990¹³. Particularly attention will be paid to the fixing heights and recess requirements for landing valves as detailed below.



6.8 Hydrants

- 6.8.1 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 Approved Document B have included a recommendation to consider this as part of the development of the building design.
- 6.8.2 Following ADB all dry main inlets should be within 90m of a fire hydrant facility. In this case there are some an existing public fire hydrant present in Gas Works Road behind the site. This fire hydrant is less than 90m from each dry main inlet point. Located on the rear elevation of the building. On this basis no additional fire hydrants are needed in these works.

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 ADB requires that the fire strategy be brought to the attention of building management(s) and incorporated into the risk assessments 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 (RRO) 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 Section 17 of the current ADB (Regulation 38 of Building Regulations) requires information to be passed onto the responsible person on completion of the project. This project is considered a complex building and therefore the following information is required 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 hears, smoke detector heads, alarm call-points, detection/alarm control panels, alarm sounders, emergency communication systems, CCTV, fire safety signage, emergency lighting, fire extinguishers, dry and wet risers and other fire fighting equipment, other interior facilities for the fire service, emergency control rooms, location of hydrants outside the building, other exterior facilities for the fire service.
 - Details of all active fire safety measures including:
 - Smoke control system(s) (or HVAC system with a smoke control function) design, including mode of operation and control systems.
 - 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. Marked up as-built plans will be provided by the architect on completion. This information is considered to form an important part of the *Golden Thread* and should be maintained available to the people responsible for maintaining the building's safety throughout it's life cycle, following the relevant guidance and legislation associated with *Golden Thread* information once it is published.
- 7.0.6 Using this information and the original fire strategy the "responsible person" should ensure a fire risk assessment is carried out for the residential common areas of 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 if 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) will be developed for the building bringing together all aspects needed for the effective fire safety management of the building. The items discussed above are discussed in greater depth, along with key items that should be recorded in the buildings Fire Risk Assessment, in Appendix A.

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 Approved Document B, Volume 1 including the May 2020, June 2022 and March 2024 Amendments. 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 the dwelling of fire origin only evacuating in the residential accommodation. The existing car park will evacuate independently of the residential accommodation on a local simultaneous basis for the basement. No interconnection of fire alarm system or evacuation protocol is proposed between any areas.

- The apartments in the building fall into one of three types as below:
 - Traditional Units – Each has an entrance hallway which will afford 30minutes fire resistance with internal hallway travel limited to 9m. The apartment will include a minimum LD2 standard fire alarm and detection system and residential sprinklers.
 - Studio Units – Each has a single open space with inner bathroom and storage. Travel distances within the unit back to the apartment entrance will be limited to 9m. The apartment will include a minimum LD2 standard fire alarm and detection system and residential sprinklers. The cooking hobs will be at least 1.8m away from the exit route within the apartment.
 - Open Plan Units – Each unit will include LD1 standard fire alarm systems and residential sprinklers, plus maximum internal travel distances of 20m. Internal fire resistance is not needed within these apartments. The internal floor to ceiling height in these units will be at least 2.25m and the unit footprint will not exceed 16m by 12m. Finally the cooking hobs will be at least 1.8m away from the exit route within the apartment.
- The building is served by two staircases that link to the apartments via common corridors. Travel distances in the corridors are generally limited to 7.5m in dead ends and 30m in multiple directions. The southern end of the building beyond the central staircase includes an extended dead end situation of up to 22m. This extended corridor has been mitigated based on the provision of a 0.6sqm mechanical smoke shaft. The common corridor zone that adjoins the north staircase has independent venting via a 1.5sqm natural smoke shaft. All common staircases are provided with a 1sqm natural AOV at its head.
- The basement car park will be separated from the residential areas by 60minutes fire separation. There are no direct links to the north staircase. The central stair and lifts extend down to the basement and these will be separated from the car park via a 60minute lobby that also includes a 0.4sqm permanent natural vent to outside. The car park includes a hybrid ventilation system (natural vent openings and some ducted mechanical venting). Commercial sprinklers will be installed in the car park as part of these works.
- Structural fire resistance to all elements of structure will have 60minutes fire resistance.
- All floors in the building will be constructed as a 60minute fire resistant compartment floor. Each apartment will form its own 60 minute fire resistant compartment. The staircases and vertical shafts generally will afford 60minutes fire resistance. Special fire hazard rooms will afford at least 60minutes fire resistance. Residential sprinklers will also be provided throughout the ground and above floors with commercial sprinklers in the basement.
- Fire alarm and detection systems within the building will be:
 - Within open plan apartments – LD1 (BS5839 Part 6)
 - Within studio and traditional apartments – LD2 (BS5839 Part 6)
 - Residential Common Areas – L5 (BS5839 Part 1⁴) solely to operate the common areas smoke venting systems.
 - Ancillary Rooms – No fire alarm systems proposed.
 - Car park – L5 (BS5839 Part 1)
- Fire service access vehicle access to the site is available primarily to the rear of the building (east elevation) that is accessed from Gas Works Road. A reversing head is available between the site yard and junction onto Gas Works Road to avoid a fire appliance reversing more than 20m. All of the apartments are covered within a 45m hose distance from a dry riser outlet in the central staircase. As the building is over 11m high a premises information box will also be provided within the main entrance of the building. A fire hydrant will be available within 90m of the dry main inlet point. Fire service access to the basement car park is independent of the building based on access via personnel doors from outside around the car park perimeter. These measures are unchanged within the works.

9.0 LIMITATIONS, ASSUMPTIONS AND REFERENCES

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

9.1 Drawing Information

- 9.1.1 This document is based on the latest Brooks Murray Architects drawings, as available at the time of writing. All dimensions have been taken from these drawings.

9.2 Building Regulations

- 9.2.1 This report considers Planning and 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 Delta Building 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. Building Regulations, Approved Document B – Volume 1, 2019 incorporating May 2020, June 2022 and March 2024 amendments, Fire Safety: Dwellings
2. BS 5839 Part 6: 2019, Fire detection and fire alarm systems for buildings. Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in dwellings
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 9999: 2017, Code of practice for fire safety in the design, management and use of buildings
5. BS 9991: 2024, Fire safety in the design, management and use of residential buildings - code of practice
6. BS 5266 Part 1: 2016, Emergency lighting. Code of practice for the emergency lighting of premises
7. BS 5499 Part 4: 2013, Safety Signs. Code of practice for escape route signing
8. BS ISO 3864 Part 1: 2011, Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings.
9. BS9251: 2021, Sprinkler systems for residential and domestic occupancies. Code of practice
10. BS EN 12101 Part 2: 2017, Smoke and heat control systems. Natural smoke and heat exhaust ventilators
11. BS 8519: 2020, Selection and installation of fire-resistant power and control cable systems for life safety and fire fighting applications. Code of practice
12. BS EN 81-73: 2015, 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
13. BS 9990: 2016, Code of practice for non-automatic fire fighting systems in buildings
14. BS EN 12845: 2015, Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance.

APPENDIX A – MANAGEMENT RISKS / FIRE RISK ASSESSMENT LOG

The following log identifies the key fire strategy elements (although this is not an exhaustive list) that must be highlighted to the end user/occupier to assist them with managing and maintaining the fire safety strategy. These items should be incorporated into all applicable fire risk assessments and management procedures that consider fire safety within this building.

1. The staircases, final discharge routes and common corridors are maintained as sterile areas that are free of obstructions, combustible materials and furnishings. The staircases and corridors also need particular attention with respect to standards of housekeeping. Management procedures should also be developed and implemented for the management of deliveries, post, visitors and maintenance to avoid fire load and ignition sources being introduced in the escape routes.
2. The residential common escape routes also include smoke venting from the common staircases and corridors in order to protect the residential escape routes. These facilities need to be regularly tested and maintained to ensure they operate and perform effectively in the event of an emergency. Records must be kept to document the successful testing and maintenance regime.
3. Fire compartmentation is proposed, including compartment walls and floors. Any post occupation service penetrations created in any of these compartment walls and floors must be appropriately fire stopped to standard equivalent to those elements. It is essential that once the building is occupied that these separating walls and floors are regularly checked for breaches. It is recommended that a robust management policy including regular staff training is introduced to ensure that the compartmentation strategy remains a focal point to all staff during the life of the building.
4. The building generally includes several physical and active fire safety systems necessary to maintain the fire strategy proposals. Each system should undergo regular testing and maintenance to ensure that an acceptable level of safety is maintained throughout the life of the building.
5. It is a requirement under the RRO for the building owners / occupiers to carry out a Fire Risk Assessment (FRA) for the building / accommodation, including the residential common areas. Additionally management procedures should be developed and implemented to assist with the safe operation and evacuation of the building/areas (including the evacuation of any disabled occupants).
6. As the apartment entrance doors form a key part of the protection to the common escape routes any lease agreements will ensure that the apartment entrance doors remain under the landlord's responsibility and control with respect to testing, maintenance and repair.

APPENDIX B – RESIDENTIAL FAN ASSISTED SMOKE SHAFT CONCEPT DESCRIPTION & PERFORMANCE CRITERIA**B1.0 INTRODUCTION**

The development has been proposed to utilise a mechanical fan assisted smoke shaft to provide smoke ventilation to the southern common corridors at each floor in the building. The ventilation is present to protect the central common staircase and also to mitigate the extended corridor travel distances (up to 22m in this case).

In each of these southern common corridors concerned there will be an AOV at the remote end of the corridor from the staircase into the 0.6m² fan assisted smoke shaft. Makeup air will be provided via a 1sqm natural AOV located at the head of the central common staircase. To ensure that makeup air can be drawn into the common corridor the staircase doors will open against the direction of escape (acceptable due to the low occupancy numbers involved).

This appendix discusses the mechanical smoke ventilation concept that has been applied to this scheme along with the proposed performance criteria that the mechanical smoke ventilation system will be designed to achieve.

It is proposed that this note assists with obtaining agreement from the approving authorities for the smoke venting concept and subsequently these criteria form the basis of the technical submission, including detailed system design and CFD modelling justification, typically provided by the appointed specialist smoke venting contractor.

B2.0 FAN ASSISTED SMOKE SHAFT CONCEPT DESCRIPTION

B2.1 System Objective

The mechanical fan assisted smoke shaft proposed on this development is designed to provide smoke clearance from the residential common corridors during means of escape and fire fighting to a standard that is similar or better than that of a common corridor with traditional smoke clearance provisions. In addition the ventilation is intended to provide smoke clearance to the corridors such that the extended travel can be mitigated.

B2.2 Performance Concept Discussion

Legislative Position

Approved Document B (ADB) outlines the basic recommendations to achieve minimum fire safety standards to residential common corridors. Adopting ADB guidance any residential apartment building over 11m in height and served by a single staircase should have travel distances limited to 7.5m and automatic smoke ventilation by natural means should be provided.

Further developing the above ADB recommends that the common staircase can be accessed from a sterile staircase lobby, which is provided with smoke ventilation. A common corridor enables the individual apartments to access the staircase lobby and staircase beyond. The travel distances in this common corridor are then limited to 7.5m however no smoke clearance is provided to this common corridor.

Given the above guidance it is clear that the primary purpose of smoke ventilation in common corridors is to assist with protecting the staircase. This rationale is confirmed by the commentary in Paragraph 2.25 of ADB extracted below:

"Despite the provisions described in this Approved Document, it is probable that some smoke will get into a common corridor or lobby from a fire in a flat, if only because the entrance door will be opened when the occupants escape. There should therefore be some means of ventilating the common corridors/lobbies to control smoke and so protect the common stairs. This offers additional protection to that provided by the fire doors to the stair. (The ventilation also affords some protection to the corridors/lobbies)."

ADB goes on to discuss different forms of smoke venting that are considered to provide minimum acceptable standards of smoke venting to residential common corridors. These ventilation methods can be classified as follows:

- Traditional Automatically Openable Vents (AOV's) – 1.5m² vents or windows that discharge directly to outside from the common corridor concerned. In addition ADB recommends that a 1m² AOV should also be provided at the head of the common staircase that opens at the same time or before the AOV in the affected common corridor.
- Natural smoke shaft – A natural 1.5m² chimney type smoke shaft with 1m² AOV's into the smoke shaft from the common corridors at each level. Again a 1m² AOV should also be provided at the head of the common staircase that opens at the same time or before the AOV in the affected common corridor. Further details on this ventilation approach are given in Paragraph 2.26 of ADB.
- Mechanical pressure differential systems designed in accordance with BS EN 12101 Part 6.

Means of Escape Issues and Concept Proposals

From the discussions above it is clear that the primary concept objective for the smoke venting system must be to ensure that the staircase is maintained free of smoke at all times.

As the travel distances in the corridors are extended it is also necessary to demonstrate additional benefits and mitigation for the additional travel. To do this, consideration should be given to occupants escaping from the apartment of fire origin and those occupants of the other non-affected apartments.

It is proposed that once occupants in the apartment of origin have entered the common corridor (a separate fire compartment) they have entered a place of relative safety and can make their way to the staircase relatively unimpeded by heat and smoke. Logically this statement is valid as with the occupants moving away from the fire source conditions should be naturally improving and therefore for these specific occupants the relative conditions in a code compliant corridor as opposed to a corridor with extended travel distance are relatively negligible.

A much greater importance is the impact of the travel distance on occupants whom are in other non-affected apartments. These occupants may or may not be aware of the fire event but within the guidance should not be unduly confined to their apartments. The defend in place strategy certainly means that occupants may wish to leave their apartment at a point after which smoke has leaked into the common corridor. Within the code the 7.5m travel distance limit originated as a distance through which occupants would be reasonably prepared to attempt escape through a smoke filled environment, however the lack of performance criteria makes this an unrealistic design criteria. It should also be noted that on a practical level if the apartment door to the fire apartment is open then it is unlikely that any common corridor would be considered tenable for escape (in both a code compliant or extended corridor).

As a defend in place strategy is present then an important secondary design condition is to ensure that smoke cannot leak into any non-affected apartments. Beyond this the smoke venting should be designed to ensure that following the detection of smoke within the common corridor the ventilation should quickly and efficiently return the common corridor to tenable conditions. The design period needed to return the common corridor to tenable conditions is relatively arbitrary providing this period is completed shortly after the occupants evacuated the apartment of origin. One rationale could be that the common corridor should be returned to tenable conditions in a duration proportional to the performance of a code compliant common corridor and associated smoke clearance. Subject to external wind conditions, the fire scenario, the apartment entrance door etc the clearance times and conditions can vary significantly and therefore a reasonable short and practical clearance time is proposed of up to 160s from activation of the smoke ventilation system (as suggested within the Smoke Control Association document "Guidance on Smoke Control to Common Escape Routes in Apartment Buildings (Flats and Maisonettes) - Revision 3: January 2020").

Finally once the corridor has been returned to tenable conditions the smoke ventilation system should ensure that further smoke is not encouraged to leak into the common corridors from the fire apartment up until fire service intervention.

Fire Fighting Issues and Concept Proposals

During fire fighting the affected apartment entrance door and the staircase door are likely to be open, leading to significant smoke logging of the common corridor.

Previous research studies, notably by the Building Research Establishment, have explored conditions within common corridors and staircases during fire fighting. Such studies have highlighted that it is exceptional difficult to maintain the common corridors tenable under these circumstances and also with natural ventilation systems (particularly traditional wall mounted AOV's) there is the potential for some smoke logging of the staircases.

Given the above it is considered particularly onerous to attempt to design the smoke venting system to maintain tenable conditions within the common corridors during fire fighting. On this basis it is proposed that the fundamental objective during fire fighting operations remains to keep the staircase free of smoke at all times.

Further to the above, it is proposed that the smoke venting systems is also designed to ensure that conditions within the common corridors are in line with the performance criteria outlined in section 5.3.3 of the Smoke Control Association document "Guidance on Smoke Control to Common Escape Routes in Apartment Buildings (Flats and Maisonettes) - Revision 3: January 2020".

B2.3 Performance Criteria

Based on the discussions in earlier the design information for the fan assisted smoke shaft will need to achieve the following criteria:

During Means of Escape

- The staircase remains free of smoke at all times.
- The common corridor will be returned to tenable conditions within a maximum of 120s of the smoke ventilation system activating.
- Once activated the system will ensure that the pressure drop within the common corridor will not exceed 50Pa.

During Fire Fighting

- The staircase remains free of smoke at all times.

- Conditions within the common corridor are in line with those outlined in section 5.3.3 of the Smoke Control Association document referenced above.

B2.4 Justification & Design Validation

A CFD modelling study will be conducted that is specific to this development which demonstrates that the performance criteria outlined in Section B2.3 can be achieved via the smoke venting design.

The CFD modelling study will be documented in a Smoke Control Report which will be submitted to the approving authorities and include sufficient detail for the modelling study to be checked. The report will outline the system cause and effect, all modelling assumptions, relevant validation and all measurement data to be tested onsite at completion.

B3.0 FAN ASSISTED SMOKE SHAFT SYSTEM CONFIGURATION

B3.1 System Configuration Overview

The basic fan assisted smoke shaft system can be described as:

- A smoke extract shaft
- Automatic smoke shaft doors or dampers opening from the southern common corridors into the smoke shaft
- An Automatically Opening Vent (AOV) at the head of the central common staircase that serves the southern common corridors.

B3.2 Smoke Extract Shaft Design

The following provides an indicative outline for the construction of the mechanical smoke extract shaft. It should be noted that the guidance below will be superseded by the design proposals presented by the appointed smoke venting contractor as part of their system design.

- The smoke extract shaft will have a minimum internal cross-sectional free area of 0.6m².
- The smoke extract shaft and common corridor shaft doors/dampers will have a minimum critical dimension of 500mm.
- Each shaft door/damper structural opening into the smoke extract shaft from a common corridor will have a minimum opening of 1m high by 0.5m wide and be located at least 1.1m above the finished floor level in each common corridor served.
- The smoke extract shaft is not required to be open at the bottom and is akin to a chimney.
- The smoke extract shaft outlet at roof level will be located in the horizontal plane.
- An Automatically Opening Vent (AOV) is required at the head of the common staircase in order to supply make up air to the system. The structural opening for this AOV be a minimum of 1m x 1m with a clear 150mm four sided upstand.
- The door between the staircase and the common corridor at each level should open out of the staircase (i.e. against the direction of escape). This is specifically to allow the pressure differentials created by the extract fans to “pull” the staircase door open on the floor of activation.
- The smoke extract shaft should be of air tight construction with a maximum leakage rate of 3.8m³/hr/m² of wall area at 50Pa. The shaft construction should also achieve fire resistance from both sides to at least 120 minutes.
- For the residential accommodation the shaft doors/dampers are operated via smoke detection within the common corridor on each floor independently. The operation is as follows:
 - Smoke is detected in a common corridor by the smoke detection system.
 - All environmental vents will close and any environmental fans will shutdown (if applicable).
 - On activation the shaft door/damper on this corridor and the AOV at the head of the staircase will open. Once open the smoke extract fans will start up.
 - All remaining doors/dampers will remain closed.

Some dimensions, facilities and operations given above may vary depending on the specific requirements of the appointed smoke venting contractor however the basic principles discussed above will be maintained.