

**SPORTCITY LIVING,
PHASE 4,
BLOCKS 1 & 2,
MANCHESTER**

**FIRE STRATEGY
REPORT**

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FIRE STRATEGY REPORT

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VALIDITY

This document is a strategic review of proposed residential development known as Sportcity, Phase 4, Block 1& 2. All of the information is correct at the time of issue, and is intended for application to this project only. The conclusions of this report are subject to issue and review by Statutory Authority.

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Although Building 2 does have 8 storeys, Levels 6 and 7 form duplex apartments, with Level 6 being the point of access for occupants and the Fire Service and the last level served by the stair and lift. Therefore, with regards to the building height when assessing structural fire protection and Fire Service access, it has been assumed that the building has a height not exceeding 18m.

1.1 Statutory Guidance

Fire safety in the design of buildings is legislated in England and Wales by the Building Regulations. These Regulations are functional in nature rather than being prescriptive. Guidance as to how the functional requirements of the Regulations can be satisfied is set out in the Approved Document B to the Building Regulations (AD-B).

AD-B specifies that the guidance provided therein does not represent the only satisfactory design solution available and allow for a fire-engineered alternative. Generally, the guidance in AD-B will be applied to this development.

However, in some areas of the design, an alternative solution may be applied to this building. This is considered to be acceptable provided that an equivalent level of fire safety to that provided by the standard solutions can be demonstrated.

This report deals only with statutory requirements and property protection is not, therefore, explicitly addressed.

2.0 MEANS OF WARNING AND ESCAPE

2.1 Means of giving warning

Under guidance of AD-B, each residential apartment is to be supplied with an independent fire alarm and detection system. There is to be no interconnection between apartments due to the risk of the apartment detectors or sounders being disabled due to false alarm activations.

For the majority of apartments in Phase 4, the fire alarm and detection system will reach at least the standards for type L4 under the guidance of BS 5839 Part 1 or to a Grade E type LD3 standard under the recommendations of BS 5839 Part 6. These systems would typically comprise of a smoke detector and combined sounder being located in the protected entrance hall of each apartment.

The exceptions to these requirements are the duplex apartments of Building 2, where an upgraded fire alarm and detection system will be provided to compensate for departures from the codes of practice. The detection system will comprise of linked detectors located in every habitable room (e.g. bedrooms, living room and kitchen), with an additional combined beacon and sounder located on the external roof terrace of each duplex. Reference should be made to Section 2.2.3 below.

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1.0 INTRODUCTION

The purpose of this report is to provide a fire safety review of the proposed residential development Sportcity, Phase 4, Block 1 & 2.

The two blocks will be assessed separately within the report and will be referred to as Building 1 and Building 2.

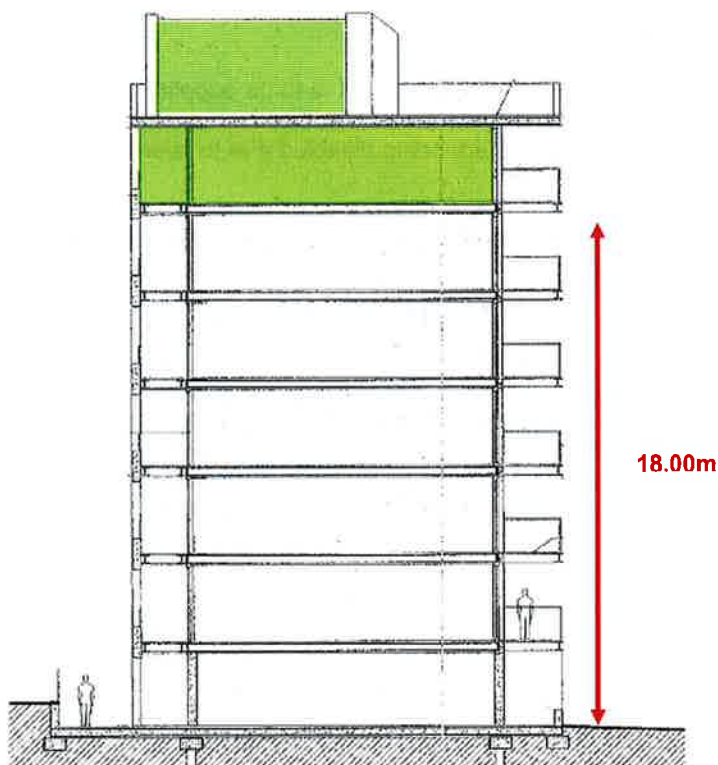
Building 1 comprises of 9 storeys of residential accommodation, served by a single fire-fighting shaft containing a fire fighting stair and fire fighting lift serves all levels.

The main entrance and Fire Service access to the building is provided at Level 0, with the finished top-floor level at Level 8 of the building being 25.20m above the Fire Service access level.

Building 2 comprises of 8 storeys of residential accommodation, Levels 0 – 7, with Levels 6 and 7 being duplex apartments. The building is divided into two separate halves, each served by a single staircase and lift.

The main entrance and Fire Service access to each half of the building is provided at Level 0, with the finished top-floor level at Level 6 (duplex access level) of the building being no greater than 18.00m above Fire Service access level.

Diagram 1 – Building 2, showing duplex apartments level with height of top-floor served



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2.2 Means of escape from the apartments

Throughout both blocks the means of escape from the residential apartments is proposed via the provision of a protected entrance hall serving all habitable rooms.

2.2.1 Building 1 – Protected entrance hall approach

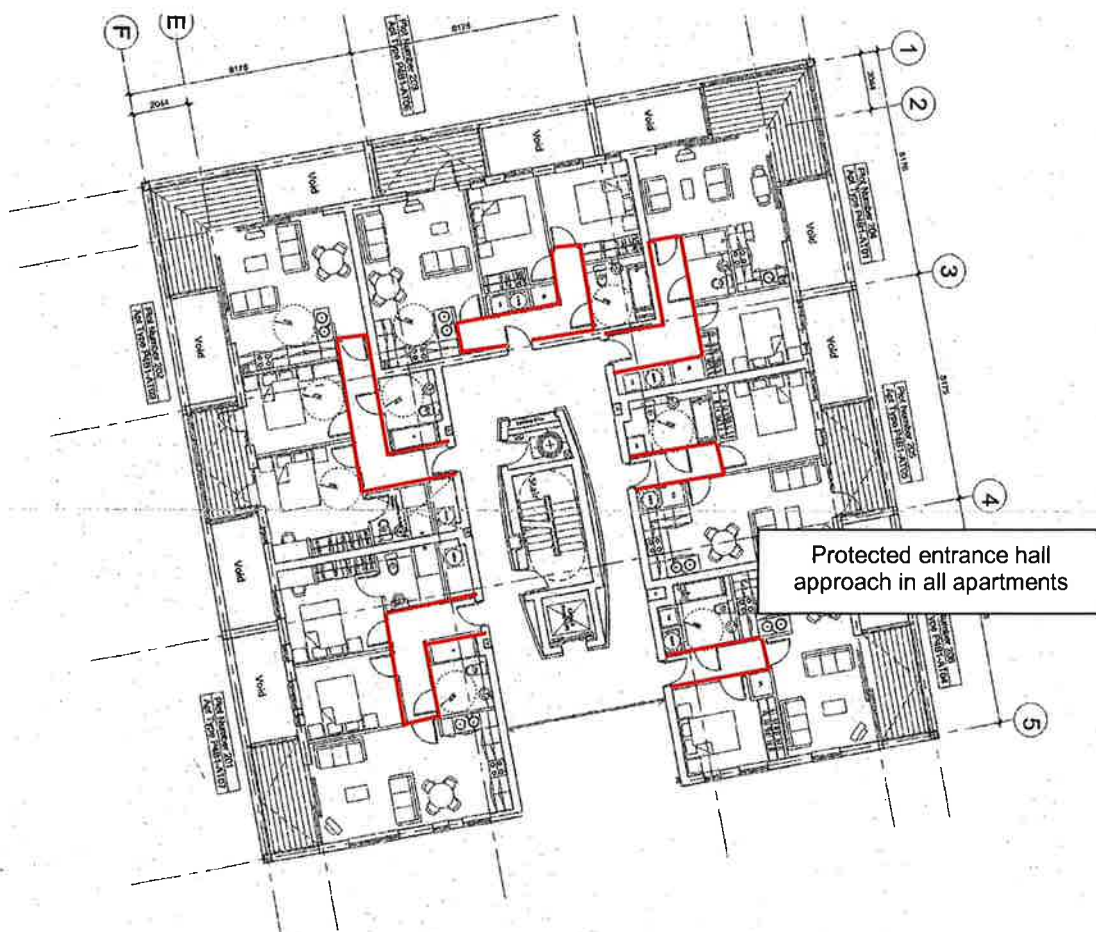
In all apartments in Building 1, a protected entrance hall is provided. The hall will be constructed of 30-minute fire rated material and accessed by FD20 self-closing fire doors, as per the recommendations of AD-B. The requirement for fire rated doors includes all cupboards, although these doors are not required to be self-closing.

The travel distance from the furthest door of a habitable room to the flat entrance door should not exceed the 9m travel distance limitation given in AD-B. The travel distances for all apartments in Building 1 are less than 9m and therefore compliant.

It should be noted that AD-B does not apply any limitations on travel distances within a habitable room provided with a protected entrance hall.

It is proposed for the kitchen to be provided as part of the living room space (e.g. open plan). It is our opinion that this is acceptable under the guidance of AD-B, as the kitchen (while a habitable room) is acceptable as an inner room under the guidance of Paragraph 2.4 of AD-B and as such, does not require direct access from a protected entrance hall.

Diagram 2 – Building 1 typical layout, showing protected entrance hall approach



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2.2.2 Building 2 – Protected entrance hall approach

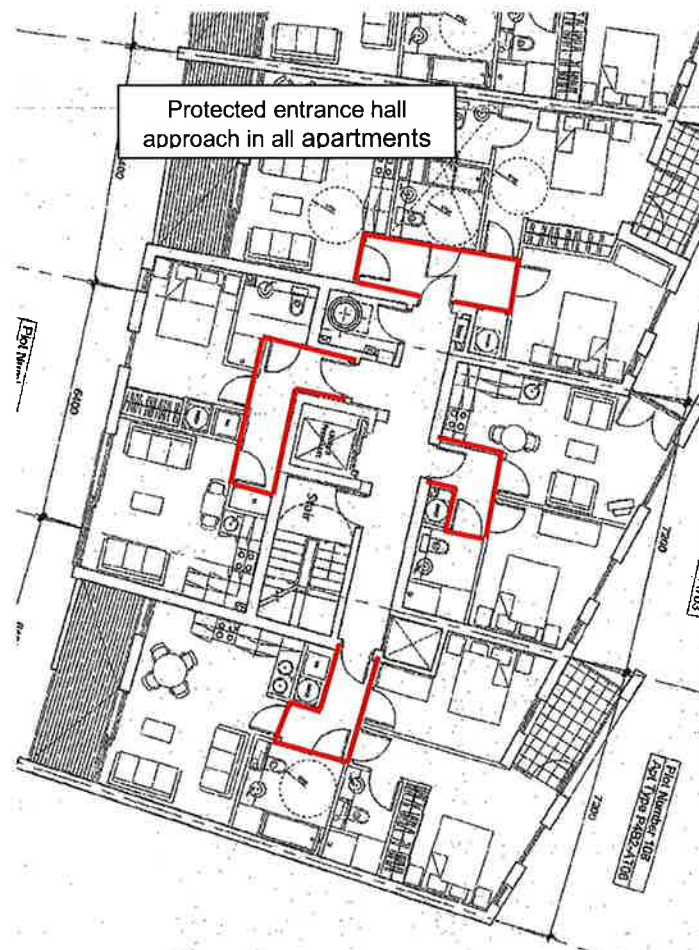
In all apartments in Building 2, a protected entrance hall is provided. The hall will be constructed of 30-minute fire rated material and accessed by FD20 self-closing fire doors, as per the recommendations of AD-B. The requirement for fire rated doors includes all cupboards, although these doors are not required to be self-closing.

The travel distance from the furthest door of a habitable room to the flat entrance door should not exceed the 9m travel distance limitation given in AD-B. The travel distances for all apartments in Building 2 are less than 9m therefore compliant.

It should be noted that AD-B does not apply any limitations on travel distances within a habitable room provided with a protected entrance hall.

It is proposed for the kitchen to be provided as part of the living room space (e.g. open plan). It is our opinion that this is acceptable under the guidance of AD-B, as the kitchen (while a habitable room) can be provided as an inner room under the guidance of Paragraph 2.4 of AD-B and as such, does not require direct access from a protected entrance hall.

Diagram 3 – Building 2 typical layout of one half, showing protected entrance hall approach



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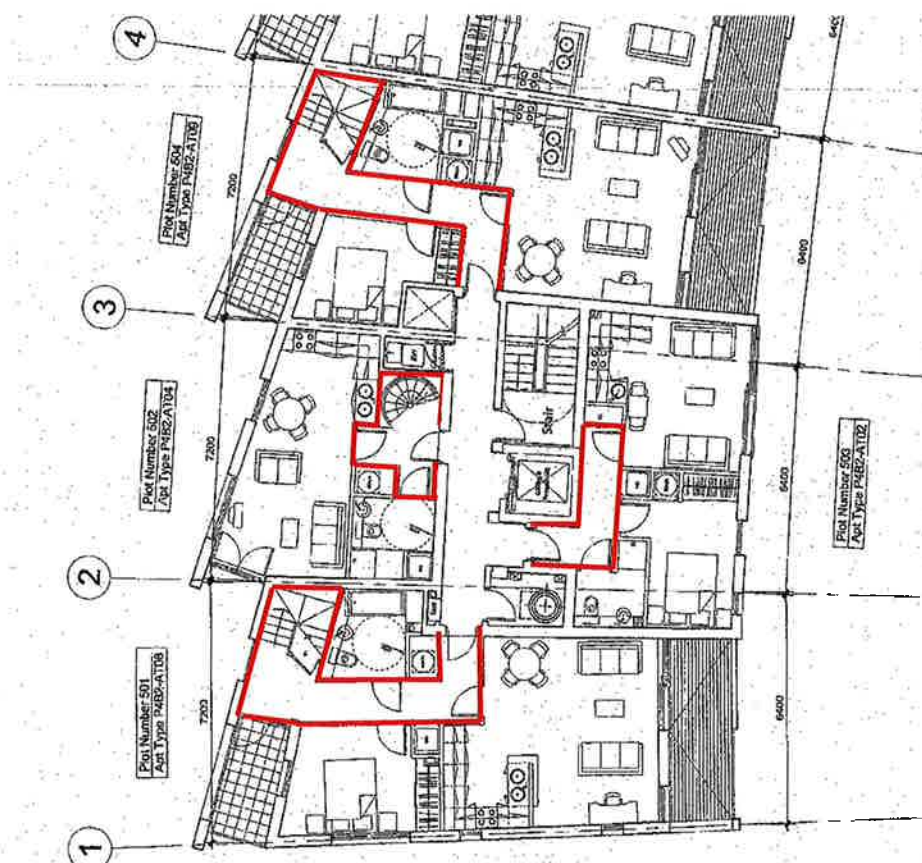
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2.2.3 Building 2 - Level 6 duplex apartments

AD-B recommends that all maisonettes (or duplexes) should have an alternate exit from the upper (non-entrance) level. Nevertheless, in this instance we are of the opinion that as an alternative solution, it is proposed that the staircase serving the upper level of the duplex will be accessed from a protected entrance hall. This entrance hall stair serves only a single bedroom and terrace, and is provided with an enhanced alarm and detection system (i.e. detection in every habitable room). On the basis of this, the duplex design is considered to be of at least an equivalent fire safety standard as the recommendations made in AD-B.

Of the six duplex apartments in Building 2, four have an enclosed internal stair, accessed directly from the end of the protected entrance hall, well within 9m. To the head of these stairs there is a self-closing FD20, providing additional separation and protection to the occupants of the upper-level bedroom and roof terrace. It is therefore our considered opinion that, given the upgraded fire alarm and detection system provides much earlier warning is given to occupants of all areas of the duplex (as compared to the standard system) and that the occupants have

Diagram 4 – Building 2 typical duplex layout of one half, showing protected entrance hall approach



the additional protection of being able to move from the upper level into a protected corridor via a fire door. This solution is considered to provide as much, if not more, protection to the occupants than a design that is fully compliant with AD-B.

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Given that access to the upper-level bedroom is from the protected entrance hall via enclosed stairs and a self-closing FD20, within 9m of the apartment entrance door, the bedroom could be considered as any other habitable room accessed off the protected entrance, or alternatively no worse than a 'gallery' type apartment as detailed in BS 5588: Part 1. AD-B does not apply any limitations on travel distances within a habitable room provided with a protected entrance hall and therefore the travel distance within the bedroom and terrace should be viewed in this light.

The remaining two duplex apartments are of a differing design to those described above, by the inclusion of a fully open spiral stair within the protected entrance hall. These duplexes do not have an enclosed stair, however, the travel distance from the foot of the spiral stair to the front door of the apartment is approximately 1m. Considering that the travel distance within the bedroom to the top of the stair is, at most, 4m, and the distance from the foot of the stair to the entrance door is approximately 1m, a total travel distance including the stair is unlikely to exceed 9m.

Therefore, with relatively short travel distances, it is considered alongside the upgraded fire alarm and detection system, which will give warning to occupants of all areas of the duplex within the early stages of a fire. On this basis, we are of the considered opinion that the occupants of this upper bedroom are actually provided with more protection than if the upper level was open to the lower level as would be the case for a gallery bedroom.

2.2.4 Building 2 – Roof terraces

On all roof terraces, the outlet for the smoke shafts have been incorporated into the walls dividing the areas of roof terrace and placed as remote from storey exits as possible to ensure they do not jeopardise evacuation of occupants off the terrace.

The terrace areas will also be linked to the upgraded fire alarm and detection system of the apartment via the provision of a combined beacon and sounder in a prominent position on the terrace. This beacon/sounder will give warning to any occupants of the terrace in the early stage of a fire within the flat, allowing the occupants to evacuate into the protected entrance hall before the fire can develop.

It is the opinion of Hoare Lea Fire that the provision of such a beacon/sounder, incorporated within the upgraded fire alarm and detection system, will provide more than sufficient warning to the occupants early on in the fire situation to allow them to evacuate safely.

2.3 Communal means of escape

The communal means of escape for each building will be assessed separately:

2.3.1 Building 1

Building 1 is greater than 18m in height and therefore requires a fire fighting shaft including a fire fighting lift, under guidance of AD-B and BS 5588: Part 5.

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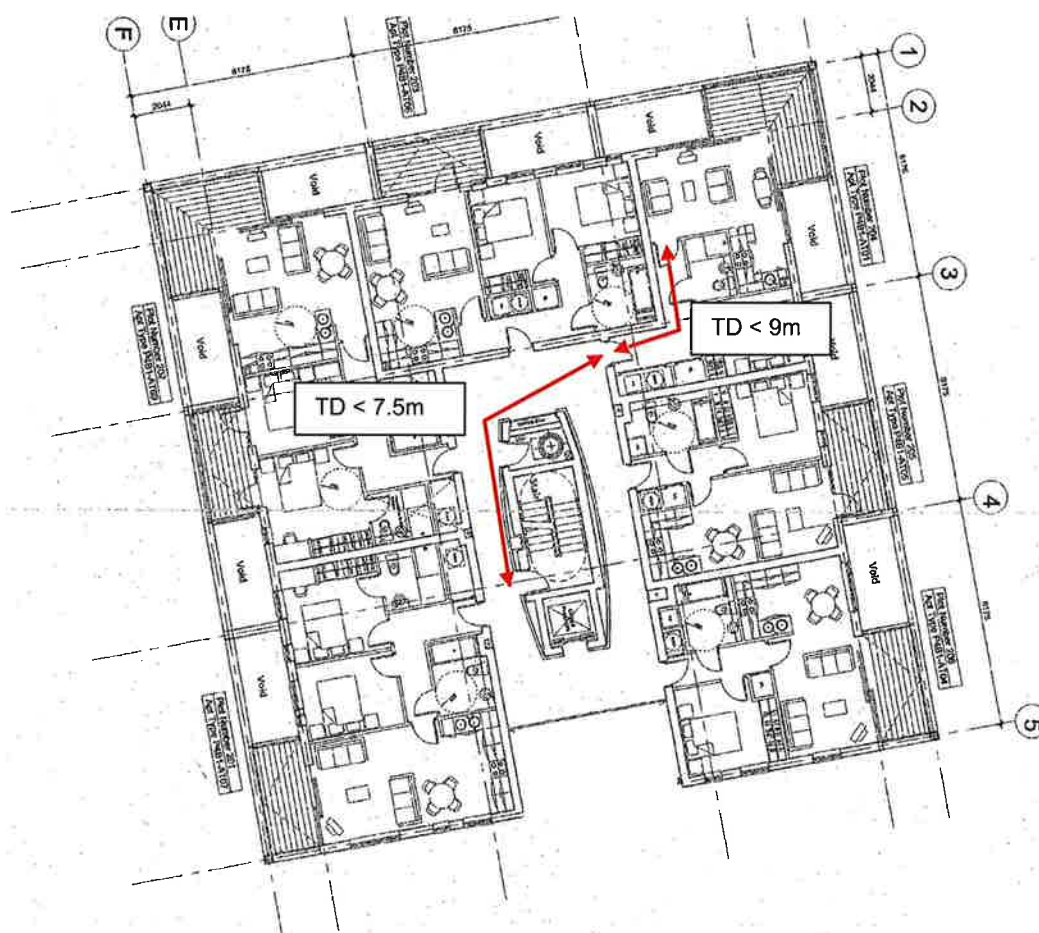
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2.3.1.1 Common corridor

On levels 1–8, common corridor travel distances up to 11.5m are present from a number of apartments. AD-B Table 2 recommends that escape in one direction is limited to 7.5m.

However, it is the opinion of Hoare Lea Fire that the short travel distances within the protected entrance hall of the apartments compensate for the slightly extended travel distances within the

Diagram 5 – Building 1 typical layout, showing travel distances



protected common corridor. The total travel distance from any habitable room door to the protected stair door is below the notional total acceptable distance of 16.5m (9m + 7.5m).

It is also noted that the common corridors will be open to the outside via louvers extending the full height of the building, totalling at least 70% floor area per floor. This common corridor space could effectively be classed as external balcony space, which under AD-B guidance allows much more excessive travel distances. We therefore consider this to satisfy the functional requirements of the Building Regulations.

2.3.1.2 Staircase requirements

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Due to the height of Building 1 being in excess of 18m, a fire-fighting shaft including a 1100mm fire-fighting stair and fire-fighting lift is required. Stair requirements will therefore be covered in section 6.1 – Fire Service Access.

2.3.2 Building 2

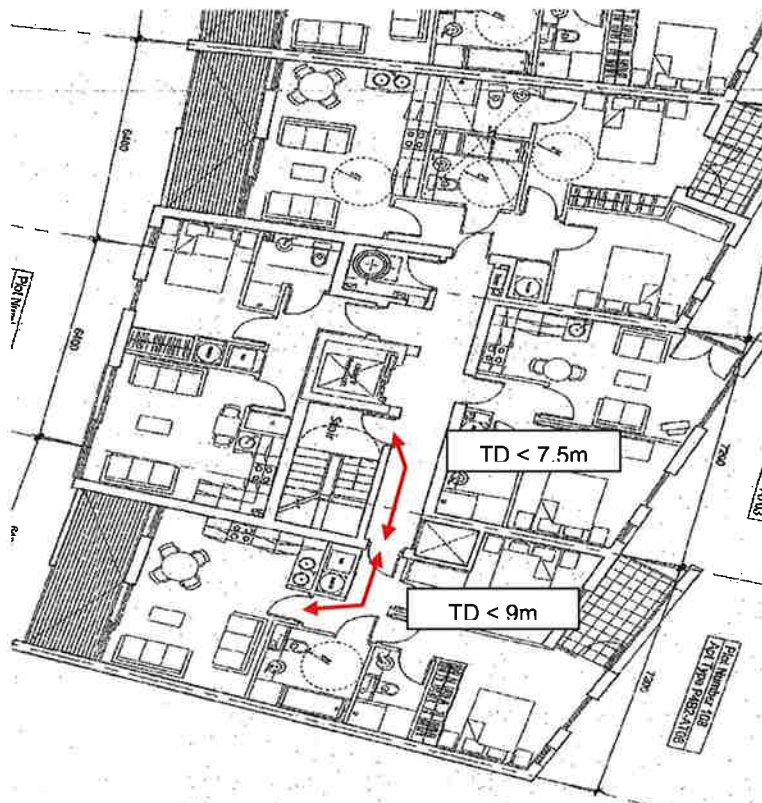
Building 2 does not exceed 18m in height and therefore under guidance of AD-B does not require a fire fighting shafts.

2.3.2.1 Common corridor

Throughout Building 2, all common corridor travel distances are below the 7.5m stipulated in AD-B for single direction travel and therefore compliant.

The ventilation of the common corridor is in accordance with the recommendations of AD-B, i.e. a 1.5 m² smoke shaft connected to each floor via an AOV.

Diagram 6 – Building 2 typical layout of one half, showing travel distances



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2.3.2.2 Staircase requirements

As Building 2 does not exceed 18m in height, it does not require a fire-fighting shaft, therefore the 850mm stair is fully compliant with AD-B.

Ventilation of the stair is in line with AD-B, via a 1m² OV at high level in the stair core.

2.3.3 Refuse chutes

It is proposed to provide a single refuse chute to the common corridor of Building 1 and a single refuse chute to the common corridor of each half of Building 2.

Section 6.5 of AD-B and BS 5588: Part 5 recommends that refuse chutes should not be located in protected stairways or protected lobbies. It is also recommended that they should be separated from any other accommodation by fire resisting construction, and approached either directly from open air or via protected a lobby with no less than 0.2m² permanent ventilation.

However, the refuse chutes to be included within both buildings will be constructed to a 1 hour fire-resisting integrity standard, with a smoke-sealed fire doors at each level and will be open at the head of the chute to provide ventilation.

In addition to the above, the refuse room will act as the lobby to the shaft and will be provided with no less than 0.2m² permanent ventilation, either naturally or mechanically, and enclosed in 60-minute fire resisting construction from the common lobby, with a self-closing FD60.

This design has been agreed by Building control on the basis of the 60-minute integrity of the refuse chute and refuse chute fire doors.

At Ground floor in both buildings, all refuse chute and refuse storage areas are separated from the common areas via 60-minute fire resisting construction, including self-closing FD60's and are provided with a minimum of 0.2 m² of permanent ventilation (either natural or permanent) as agreed by Building Control.

3.0 INTERNAL FIRE SPREAD (LININGS)

All wall and ceiling linings will comply with the relevant guidance in Table 10 of AD-B and Table 1 below.

Table 1; Limitations on wall and ceiling linings

Location	National Class		European Class
	Walls	Ceilings	
Communal circulation spaces	Class 0	Class 0	B-s3, d2
Circulation space within the dwelling	Class 1	Class 1	C-s3, d2
Other rooms	Class 1	Class 1	C-s3, d2
Small rooms (max 4m ²)	Class 3	Class 3	D-s3, d2

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"The National classifications used are based on tests in BS 476: Fire tests on building materials and structures, namely Part 6: Method of test for fire propagation for products and Part 7: Method of test to determine the classification of the surface spread of flame of products. However, Part 4: Non-combustibility test for materials and Part 11: Method for assessing the heat emission from building products are also used as one method of meeting Class 0.

The European classifications are described in BS EN 13501-1:2002, Fire classification of construction products and building elements, Part 1-Classification using data from reaction to fire tests. They are based on a combination of four European test methods, namely:

BS EN ISO 1182:2002, Reaction to fire tests for building products – Non-combustibility test;

BS EN ISO 1716:2002, Reaction to fire tests for building products – Determination of the gross calorific value;

BS EN 13823:2002, Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item; and

BS EN ISO 11925-2:2002, Reaction to fire tests for building products, Part 2-Ignitability when subjected to direct impingement of flame."

Extract taken from Approved Document B Amendments 2002.

4.0 INTERNAL FIRE SPREAD (STRUCTURE)

4.1 Structure

For Building 1, a residential building greater than 18m in height, all structural frames beams, columns, load bearing elements and floor structures will have 90 minutes fire resistance in accordance with Table A2 of AD-B, with the fire fighting shaft being separated by 120-minute construction.

For Building 2, a residential building less than 18m in height, all structural frames beams, columns, load bearing elements and floor structures will have 60 minutes fire resistance in accordance with Table A2 of AD-B.

4.2 Compartmentation

Under the guidance of AD-B, compartment construction is required for the following:

- a) Around any refuse or storage area.
- b) Every wall and floor between residential occupancies.
- c) Around the stair shaft and all common corridors.

Building 1 will provide 90-minute fire resisting construction to all walls and floors, except for the fire-fighting shaft. The level of fire-resisting construction for the fire-fighting shaft is to be 120 minutes.

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Building 2 will provide 60-minute fire resisting construction to all walls and floors stipulated above.

5.0 EXTERNAL FIRE SPREAD

In the majority of cases the buildings overlook the adjacent canal, road and car park, and therefore it is envisaged that external fire spread on these elevations will be compliant with AD-B, particularly due to the level of compartmentation provided in residential blocks.

However, two of the elevation either overlook the adjacent building or site boundary and therefore the external fire spread for these elevations has been assessed using the 'enclosing rectangle' method, detailed in BRE 187 .

Building 1 overlooks Building 2, the area of unprotected glazing at worst-case point is only 3.35m². The distance to notional boundary being approximately 3m. Under guidance of BRE the separation distance will permit up to 80% unprotected glazing. The amount of glazing currently shown is significantly less than this and therefore is considered to be acceptable.

Building 2 overlooks Building 1, the area of unprotected glazing at worst-case point is only 2.75m². The distance to notional boundary being approximately 3m. Under guidance of BRE the separation distance will permit up to 70% unprotected glazing. The amount of glazing currently shown is significantly less than this and therefore is considered to be acceptable.

Where Building 2 overlooks the neighbouring site, the area of unprotected glazing at worst-case point to notional boundary is 2.7m² and is approximately 2m away. Under guidance of BRE the separation distance will permit up to 40% unprotected glazing. The amount of glazing currently shown is significantly less than this and therefore is considered to be acceptable.

6.0 FIRE SERVICE ACCESS

6.1 Building 1

Due to the height of Building 1, a fire fighting shaft including a fire fighting lift is required.

At Ground floor, the entrance lobby opens directly on to the lift and not the fire fighting stair. It is noted that BS 5588: Part 5 Figure 2 provides recommendations on standard Fire Service access level lobby layouts. Part 5 recommends that access must be directly into the fire-fighting stair from outside. However, it is the opinion of Hoare Lea Fire that this design is fully compliant considering the high level of ventilation the entrance space, which may be considered as an external space. This approach was agreed by building control.

BS 5588: Part 5 also recommends that the common corridor be used as the fire-fighting lobby in residential buildings with protected entrance halls to all flats, provided that the common corridor is provided with at least ventilation required to satisfy means of escape, i.e. 1.5m².

Building 1 is therefore compliant due to the area of ventilation provided in the common corridor via louvers extending the full height of the entrance void. This area of openings totals at least 70% of the floor area of each lobby, well in excess of the requirements and therefore compliant.

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The staircase has a clear width of 1100mm in line with the recommendations of BS 5588: Part 5.

According to the recommendations of BS 5588: Part 5, fire fighting stairs also require natural ventilation at their head controlled by remote operation, and natural ventilation equivalent to at least 15% of cross-sectional area at each level.

The design of the fire fighting shaft in Building 1, however, is provided with of a AOV of at least 5% of the stair core area at it's head alone, on the basis of the high level (70%+) of ventilation to the common corridor.

This design, when compared with the recommendations of BRE guidance, which recommends a minimum of 3m² smoke shaft to the lobby, combined with an AOV of at least 5% to the top of the stair, works on the basis that high ventilation levels to the lobby will significantly reduce the risk of smoke entering the stair if leakage from the flat of fire origin occurs.

This design is in excess of the requirements of AD-B, BS5588: Part 5 and comparable with the BRE guidance and was therefore accepted by Building Control.

The provision of a dry riser has been included in each common corridor of Building 1, in line with the recommendations of BS 558: Part 5.

6.2 Building 2

Following recommendations of the Approved Document, as Fire Service travel distances exceed 45m from access level to the furthest flat, a dry rising main has been provided to each common corridor of Building 2, to ensure the Fire Service can reach all parts of all floors.

7.0 CONCLUSIONS

Subject to the incorporation of the above recommendations, we consider that the fire safety provisions are equivalent to the recommendations stated in AD-B and therefore the building fully complies with the functional requirements of the Buildings Regulations.

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Fire Safety Measures

Table 2 is a summary of the fire protection measures required for the building. This list is not exhaustive and the reader should make full reference to the report.

Table 2 - Summary of Fire Protection Measures

Means of Escape	
•	Enhanced fire alarm and detection system is provided to all duplex apartments in Building 2.
•	Travel distances in the common corridor of Building 1 exceed those recommended in the Approved Document. However, due to the large level of ventilation in the lobbies and the total distance travelled by occupants, these distances are considered acceptable.
Internal Fire Spread	
•	Building 1 shall have the provision of all elements of structure and compartmentation constructed of 90 minutes fire resisting construction.
•	Building 2 shall have the provision of all elements of structure and compartmentation constructed of 60 minutes fire resisting construction.
External Fire Spread	
•	External fire spread to adjacent buildings is unlikely and therefore external fire spread is considered to meet the functional requirements of the Building Regulations.
Fire Service Access	
•	Ventilation to the staircase serving Building 1 is not provided in line with the Approved Document on the basis of the significantly large amount of ventilation to the lobbies, when compared to BS 5588: Part 5 and BRE guidance.
•	Dry rising mains are provided in the all staircases serving Buildings 1 and 2 to facilitate Fire Service access.
•	Building 1 requires a fire fighting shaft, containing a fire fighting stair and fire fighting lift, in accordance with BS 5588: Part 5.

