Park View Student Village, Newcastle

Fire Safety Strategy

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Executive Summary

Park View Student Village, located in Newcastle comprises of a new student residential accommodation located on the existing Richardson Road campus. The accommodation will comprise six, single-stair blocks ranging from 8.3 m in height to 25 m in height (measured to the topmost storey). The majority of the residential accommodation is arranged in clusters with a number of bedrooms sharing a kitchen living room. There are also a number of studio rooms and ancillary accommodation provided at the lower levels.

This fire strategy provides an outline of the fire safety measures that will be required for the purposes of satisfying the Building Regulations 2010. The recommendations of BS 9991: *Fire safety in the design, management and use of residential buildings* have been adopted as the basis for this fire strategy. Although this guidance has also be supplemented by BS 9999: *Code of practice for fire safety in the design, management and use of buildings*, where applicable.

The key aspects of the fire strategy include:

- Each block will have a Category L2 fire detection and alarm system design in accordance with BS 5839-1;
- Emergency lighting system designed to BS 5266-1, will be a maintained system with a duration not less than 180 minutes, i.e. an X1 A 180 system;
- Smoke ventilation will be provided to the common areas and will operate automatically on detection of smoke within the common areas;
- The load bearing elements of structure will be provided with not less than 90 minutes fire resistance for buildings greater than 18 m and not less than 60 minute fire resistance for buildings less than 18 m in height;
- All cluster apartments will be enclosed in compartment walls achieving not less than 60 minute fire resistance;
- Blocks 2, 3 and 4 will be provided with a fire-fighting shaft, which will include a fire-fighting lift and dry rising main

Contents

1.0

Introduction

1.0 Introduction

Park View Student Village, located in Newcastle comprises a new student residential accommodation located on the existing Richardson Road campus. The accommodation will comprise six, single-stair blocks ranging from 8.3 m in height to 25 m in height (measured to the topmost storey). The majority of the residential accommodation is arranged in clusters with a number of bedrooms sharing a kitchen living room. There are also a number of studio rooms and ancillary accommodation provided at the lower levels.

The aim of this fire safety strategy is to detail the fire safety measures required for the purposes of satisfying Building Regulations 2010. The recommendations of *BS 9991: Fire safety in design, management and use of residential buildings – Codes of practice* have been adopted as the basis for this fire strategy. Although this guidance have been supplemented by *BS 9999: Code of practice for fire safety in the design, management and use of buildings* and *Approved Document B: Fire Safety (AD-B)*, where applicable.

It is not always practicable to comply with all the recommendations in the above guidance documents and there may be parts of the design where an alternative solution is required, based on fire engineering principles. This is recognised in all these documents and thus, there is no obligation to adopt any particular solution contained within them if the designer prefers to meet the relevant requirements in some other way.

For the purpose of this Strategy, it has been assumed that fire is an accidental event and that there is a single seat of fire. No account is taken of the potential for arson, which may typically be characterised by multiple seats of fire and the use of accelerants. However, it should be recognised that a number of the fire safety measures provided will also help to reduce the risk and consequences of arson, e.g. compartmentation, etc.

There is also no reliance placed on the fire service for rescue from the building; the assumption being that people should be able to escape from the building using their own unaided efforts.

It has been assumed that all building work is carried out in accordance with Regulation 7 of the Building Regulations. Therefore, to ensure that the proposed fire safety systems detailed within this report achieve the appropriate fire performance, it is recommended that all products, components, material or structures relating to the fire strategy are installed using competent companies/persons and, where applicable, third party accreditation/certification.

Additional measures may be required for the purposes of property protection and business continuity, which are outside the scope of the Building Regulations. We do not expect there to be any additional measures required, however, it is recommended that the Client and their insurer are also consulted together with the other the relevant parties.

2.0

Applicable Legislation

2.0 Applicable Legislation

2.1 Building Regulations 2010

With a few exceptions, all buildings built in England and Wales, must comply with the England and Wales Building Regulations 2010.

The Building Regulations do not require anything to be done except for the purpose of securing reasonable standards of health and safety for persons in or about building, and for the conservation of energy in buildings. They cannot be applied retrospectively and make no recommendations relating to property protection, loss prevention or business continuity.

In England and Wales, the Regulations relating to fire safety are expressed in the form of six functional requirements, these being:

- Requirement B1 Means of warning and escape;
- Requirement B2 Internal fire spread (linings);
- Requirement B3 Internal fire spread (structures);
- Requirement B4 External fire spread;
- Requirement B5 Access and facilities for the fire services; and
- Regulation 36 Fire safety information.

The Department for Communities and Local Government has produced a number of guidance documents to assist designers in meeting for relevant requirements of the Building Regulations; these 'Approved Documents' provide guidance on different aspects of the Regulations. AD-B provides general design guidance on ways in which the functional fire safety requirements can be satisfied.

However, this document also recognises that there may be many ways in which compliance with a functional requirement can be demonstrated including by the use of fire engineering. Therefore, there is no obligation to adopt any particular solution contained in an Approved Document, if the designer prefers to meet the relevant requirement in some other way.

2.2 Regulatory Reform (Fire Safety) Order 2010

All existing fire safety legislation, except that relating to the Building Regulations, has been gathered together under a single Order. This Order encompasses the previous requirements made under the Fire Precautions Act 1971 and the Fire Precautions (Workplace) Regulations 1997, and extends them to include a requirement to take precautions to safeguard other persons who may be affected by a fire in a building. The legislation is based on risk-appropriate compliance and requires a fire risk assessment to be carried out once the building has been occupied.

The Order will apply to all areas of the building, other than within the apartments.

3.0

Means of escape

3.0 Means of escape

3.1 Automatic fire detection and alarm systems

An automatic fire detection and alarm system will be provided in all blocks and will be designed in accordance with the recommendations of BS 5839-, Category L2 system. This requires detectors to be provided in all the following spaces:

- All rooms within each cluster;
- All stairways;
- All lobbies;
- All corridors and areas forming part of the common escape route;
- All rooms which open onto escape routes;
- Any other rooms deemed high risk;
- Lift shafts;
- Sub-stations;
- Bin stores;
- Plant rooms/ancillary areas (multi criteria, dual optical/heat detection must be provided with these spaces).

Multi criteria heat and smoke detectors will be provided throughout the building, and detectors will always be provided in all escape routes and circulation spaces.

Sufficient sounders will be provided to achieve a sound pressure level of not less than 75 dB(A) in each bedroom and 65 dB(A) in all other areas of the building. For students with impaired hearing, the provision of tactile/vibrating devices that can be placed under a pillow should be considered. The provisions for hearing impaired occupants can be developed as part of the fire safety management plan, based on the needs to the occupants.

Manual call points provided with a plastic hinged cover, designed in accordance with BS EN 54-11 and installed in accordance with BS 5839-1, will be provided and located at all storey and final exits. The provision of the hinged cover is to prevent the potential malicious use of the call points.

In order to minimise the disruption cause by false alarms, it is proposed to adopt a stay-put strategy similar to that adopted in blocks of flats, but with some additional arrangements to reflect the actual use of the and occupancy of the blocks and the provision of on-site management. This can be developed in conjunction with the building management and the statutory authorities however, we would propose the following arrangements:

- Actuation of an alarm within a cluster flat, or studio, will result in the evacuation of those flats only, with an alert signal sent to the main panel in reception;
- Actuation of a fire detector or manual in a common corridor or lobby serving flats will alert all occupants of the flats associated with that lobby, with an alert signal sent to the main panel in reception;
- Actuation of a fire detector in the communal spaces at ground floor will result in a simultaneous evacuation of these area only.

If required there will be a means for sounding the evacuation signal throughout the relevant block if required by staff or the fire service on arrival.

3.2 Emergency lighting system and exit signage

Emergency lighting systems, designed and installed in accordance with the recommendations of BS 5266-1, will be provided in the common areas of the building. The system for the occupancy will be a maintained system with a duration not less than 180 minutes, i.e. an X1 A 180 system.

Emergency luminaires, provided to the following areas:

- All internal circulation areas, open plan areas greater than 60 m^2 in area and any windowless accommodation;
- At every storey exit and exit door from the building;
- External escape routes and external areas in the immediate vicinity of exits;

- In all escape stairs to ensure that each flight receives direct light. Lighting to escape stairs should be on a separate circuit from that supplying other parts of the system;
- At any changes in floor level and any changes in direction of escape routes;
- Close to (typically within two metres of) all fire safety, or other safety equipment;
- All toilets accommodation greater than 8 m^2 in area;
- All plants rooms;
- Cluster kitchens; and
- Accessible bedrooms.

Every escape route, other than those in ordinary use, will need to be distinctively and conspicuously marked by emergency exit signage of adequate size for the space and distance at which the sign is viewed. Signage will comply with the recommendations of BS EN ISO 3864-1 and positioned in accordance with BS 5499-4.

Additional fire safety signage, such as 'fire door keep shut' signs, fire action notices, etc. will also be required. The type and location of these signs will need to be discussed and agreed as the design progresses.

3.3 Access control systems and direction of door openings

Any door located on escape routes that are normally secured against entry should only be fitted with a lock or fastening, which is readily operated, without the use of a key and without having to manipulate more than one mechanism.

Any electrically powered locks will need to return to the unlocked position on operation of the fire alarm system, on loss of power, or on operation of a manual door release unit position on the side approached by people making their escape.

Where a door is used by more than 60 persons, the door will open in the direction of escape.

3.4 Power supplies for fire safety systems

Power supplies to fire protection systems will be designed such that failure of other electrical equipment does not render the installation inoperative. To reduce the risk of loss of power, a secondary power supply will be provided to these systems. It will be ensured that the secondary power supply will remain live when the remainder of the supplies are isolated. The cables for any associated electrical circuits will be suitably robust and their routes carefully chosen to limit the potential for damage to those cables. Further advice is provided in BS 8519. The equipment that will require a secondary power supply include the following:

- Fire-fighting lifts, (alternative low voltage supply);
- Smoke ventilation systems, (battery back-up);
- Emergency lighting, (battery back-up); and
- Automatic fire detection and alarm system, (battery back-up);

3.5 Means of escape

3.5.1 Internal arrangement of cluster accommodation

The internal arrangement of the cluster accommodation comprises of a number of bedrooms with a shared kitchen that are all accessed from a common corridor. The maximum travel distance in the corridor is approximately 11 m. Whilst this does not follow the guidance contained within BS 9991, when compared to a traditional flat with a protected entrance hall, the following additional features are:

- A higher level of coverage of fire detection, every space (other than the en-suites) provided with a fire detector, rather than just in the circulation spaces. In flats, detection is only normally provided within the entrance hall.
- Every door will be provided with a self-closer and smoke seals, which will reduce the risk of smoke spreading into the corridor. Doors within flats are not normally provided with self-closers or smoke seals.
- The majority of the rooms within the cluster accommodation are located with the recommended travel distance, with only two bedrooms and the living room/kitchen affected. For the living room/kitchen it is expected that the occupants will be awake and therefore it is considered to be more appropriate to apply the 18 m travel distance using associated in rooms/spaces with no sleeping risk. In the bedrooms, when the occupant is asleep, the escape time is largely dependent on the pre-movement time, with the travel distance only being a relatively small part of the

evacuation. Based on an average walking speed the travel time for the additional distance would be less than two seconds.

- The cluster accommodation will be subject to the Regulatory Reform (Fire Safety) Order 2005, which will require a suitable risk assessment, which should ensure that the above provisions are maintained.

3.5.2 Internal arrangement of the studios

The travel distance within studios will not exceed 9 m and the kitchens will be located remotely from the entrance door.

3.5.3 Protection of cooking facilities

The hobs within both the clusters and studios will be provided with a BS EN 50615 Category B device, which will isolate the power to the cooker prior to reaching conditions where a fire may occur. This will reduce the fire risk associated with the cooking facilities, particularly where the cooker may be left unattended when in use.

3.5.4 Ancillary accommodation

At the ground level of Blocks 1 to 5 there is ancillary accommodation accessed from the common area that also serves the residential units. Block 1 contains offices/staff accommodation and a workshop/store and Blocks 2 to 5 contains a common room. These spaces will be separated from the common areas by protected lobbies or corridors. There is also a standalone energy centre and substation located on the site.

The ground floor of each block comprises mechanical plant space that is of low risk, which is accessed via a lobby and enclosed within 60 minutes fire resistance. On sounding of the alarm, the plant and equipment will shut down as required. The plant rooms at these levels comprise heating and hot water plant, which is considered as an engineering service installation room, and according to BS 9999 requires a minimum fire resistance of 30 minutes.

Blocks 1 to 5 contain plant spaces and comms rooms at ground floor and block 6 contains plant at ground floor and a comms room located on the first floor, with small storerooms and cleaner's stores on the upper levels. All these spaces will be enclosed in fire resisting construction and will only be accessible to staff, with doors being kept locked shut. The storerooms and cleaner stores on the upper floors are all accessed via protected lobbies.

The comms room located on the ground floor will be enclosed in 60 minutes fire resistance. Furthermore, a cross corridor door has been provided to subdivide the stair final exit area. Hence, one of the two exits will be available in an emergency.

Automatic fire detection will also be provided in these spaces and provide a signal to the main fire alarm panel which will alert staff. With the provision of smoke ventilation provided to the common areas and the fire resisting enclosures, should a fire occur in these spaces, it is expected that the means of escape from the residential accommodation will remain tenable.

Other ancillary spaces, such as laundry rooms and bin stores are all accessed externally from the blocks.

Travel distances within ancillary accommodation will not exceed 18 m where only a single direction of escape is available or 45 m where alternatives are provided. Within plant rooms, these distances will be reduced to 9 m and 18 m respectively.

Where plant rooms are classed as inner room, the access plant room will be a low risk area containing boiler and similar low fire loads. Furthermore, the access room will be provided with adequate fire detection and travel distances from the inner room are within the above recommendations.

Travel distance within the plant rooms are generally compliant with the above paragraph. However, travel distance from the service corridor exceeds the recommendation, nevertheless it has been agreed with Newcastle Building Control Authority that the proposal is acceptable based on the following.

- A risk assessment should be carried to determine the necessary measures required to minimise risk to staff when these rooms is being accessed;
- The service corridor will only be access by trained staff on an annual basis;
- The room contains drainage facilities; therefore, it is considered to be a low risk area;
- The access room will be provided with suitable fire detection and alarm;
- A strategy should be put in place by building management on access to this area.

Where a room is expected to have more than 60 persons a minimum of two exits will be provided and each exit will not be less than 850 mm wide.

3.5.5 Common areas of residential accommodation

Each block is served by a single protected escape stair, which is accessed from a protected lobby at each storey. The stairs and lobbies will be provided with a means to ventilate any smoke that may enter, with the stairs being provided with a 1.0 m^2 vent at the head of the stair and the lobbies being ventilated by smoke shafts conforming to the following provisions:

- A shaft with a cross-sectional area not less than 1.5 m^2;
- A vent at the head of the shaft and into the lobby at each storey, with a minimum free area of 1.0 m^2.
- The shaft will extend at least 0.5 m above any surrounding structure on the roof (located within 2 m of the shaft) and the top of the shaft will be at least 2.5 m above the highest vent into the shaft.
- On activation of a detector within a lobby, the vent into the shaft in that lobby will open, the vent at the head of the shaft will open, and the vent at the head of the stair will open. All other vents will remain closed.

The entrance lobbies in all blocks will be ventilated via the smoke shaft. However, to compensate for the additional cross corridor fire door, the remainder of the entrance halls in Block 2, 3, 4 and 5 will be naturally ventilated by means of the door opening on activation of the fire detection alarm to provide the inlet air.

3.5.6 Disabled evacuation

Evacuation lifts will be provided in each block to assist in the evacuation of disabled persons, with emergency voice communication (EVC) systems provided in each lobby.

The evacuation lifts will be designed and installed in accordance with the relevant provisions in BS 8300, BS EN 81-20 and BS EN 81-70. In the event of a fire, the evacuation lifts, as will all the lifts will descend to the ground floor and the doors open. If required to assist in the evacuation of occupants, the evacuation lift will be controlled from within the lift car by a member of staff.

The EVC will conform to BS 5839-9 and comprise Type B outstations that communicate with a master station located in the block entrance lobby to allow staff to coordinate the evacuation.

3.5.7 Assembly points

In the event of an emergency all staff and students should be prepared to make their way to the blocks associated assembly points. Assembly points should be sufficiently far enough from each block to avoid interference with the fire and rescue service and/or danger from falling debris. The assembly points should be accessible and not so far away as to discourage the occupants from using them. Measures should be provided to ensure that the routes to the assembly points are kept clear and access to them is not blocked. The following details which assembly point each block is associated to:

- Block 1 – Assembly point T;
- Block 2 – Assembly point U;
- Block 3 – Assembly point V;
- Block 4 – Assembly point W;
- Block 5 – Assembly point W; and
- Block 6 – Assembly point W.

Figure 1: Assembly points plan

3.5.8 Rooftop plantroom

Building Control have raised concerns that a fire in a rooftop plantroom could result in fire spreading into the stair core and affect the means of escape of the occupants on the lower levels. In our opinion, the risk of this occurring is considered to be low, given that the plantroom is located above the residential accommodation, and the plantroom is separated from the stair by a protected lobby and a fire resisting wall. Should, in the unlikely event smoke does enter the stair, a vent is provided to the stair that will open on detection of smoke and vent the staircase, reducing the risk of smoke logging of the stair at the lower levels.

4.0

Internal fire spread

4.0 Internal fire spread

4.1 Linings of walls and ceilings

Although they are unlikely to be the first materials to ignite, the materials for construction of the wall and ceiling can have a significant effect on the speed of spread of a fire and its rate of growth and therefore should be selected carefully. This is particularly necessary where the internal linings selected for circulation spaces should have a non-flammable characteristic that can delay the spread of fire, so that the occupants' means of escape is not compromised. Consequently, linings of the walls and ceilings within the building should satisfy the surface spread of flame classification outlined in Table 1 below.

These provisions do not apply to the upper surface of floors and stairs and exclude door and window frames, architraves, skirting, picture rails and fixed furniture.

Table 1: Classification of surface linings

Location	National Classification (In accordance with BS 476-7)	European Classification (In accordance with BS EN 13501-1)
Rooms not more than 4 m^2 in area	3	D-s3, d2
All other rooms	1	C-s3, d2
Circulation spaces	0	B-s3, d2

4.2 Loadbearing elements of structure

The fire resistance required to the load bearing elements of structure is dependent on the height of the blocks. Blocks 2, 3 and 4 exceed 18 m in height, but are less than 30 m in height and therefore the elements of structure will be provided with not less than 90 minutes fire resistance. Blocks 1, 5, and 6 are all less than 18 m in height and therefore the elements of structure will be provided with not less than 60 minutes fire resistance.

4.3 Fire compartmentation and fire resisting enclosure

The following walls and floors that are required to be constructed as compartment walls and floors and will have the same level of fire resistance as for the elements of structure, except where stated:

- Every floor, other than the lowest floor.
- Plant rooms. The utility company may require a higher level of fire resistance to the sub-stations.
- Enclosure of fire-fighting stairs and lifts will achieve not less than 120 minute fire resistance, wall between the fire-fighting stair and lift can be reduced to 60 minutes fire resistance;
- Escape stairs (other than fire-fighting stairs), lifts (other than fire-fighting lifts), and service risers.
- Every wall separating cluster apartments from the common areas will achieve not less than 60 minutes fire resistance.
- Walls separating the ancillary accommodation at ground floors from the remainder of the building will achieve 60 minutes fire resistance.

In addition to the compartmentation above, the rooms within clusters will be separated from one another and the corridor by walls achieving not less than 30 minutes fire resistance.

4.4 Cavity barriers

Due to the modular construction used in the building, it is not possible to install cavity barriers in accordance with BS 9991 and BS 9999 in some circumstances. However, cavity barriers will be installed within the external wall cavities. Where cavity barriers are omitted, suitable measures have been provided to reduce the risk of a fire breaking into the

void, or from the void to the accommodation. The arrangements are described in Capita Fire Report (CS087977_Park View Village Cavity Barrier Assessment_Rev.00) produced by CIMC Modular Building Systems, who are responsible for the design of this element of the works.

4.5 Protection of openings and fire stopping

4.5.1 Fire doors

Fire doors will be provided with the same level of fire resistance as for the wall it is fitted. However, doors to stairs, lifts, and service risers can be half the fire resistance of the wall, but in no instance less than 30 minutes.

All fire doors will be provided with cold smoke seals and will be fitted with a self-closing device with the exception of service doors and cupboards, where these doors are normally kept locked shut. Where the self-closing devices may provide a hindrance or could result in the door being damaged suitable hold open devices will be provided. These should be designed to close the door on operation of the fire alarm system.

4.5.2 Ventilation ductwork

Ventilation ductwork will be designed and installed in accordance with BS 9999. Where non-fire resisting ductwork passing through fire resisting construction, dampers will be provided within the thickness of the fire separating elements through which the ductwork passes.

The recommendations for apartment blocks, is that ductwork will not be shared between apartments. Should common ductwork be provided, then it will need to be ensured that it is designed to prevent the spread of fire and smoke between apartments and to the common areas. Where the situation occurs, further information can be provided as the design progresses.

Any ductwork associated with the smoke ventilation systems will also be fire resisting ductwork.

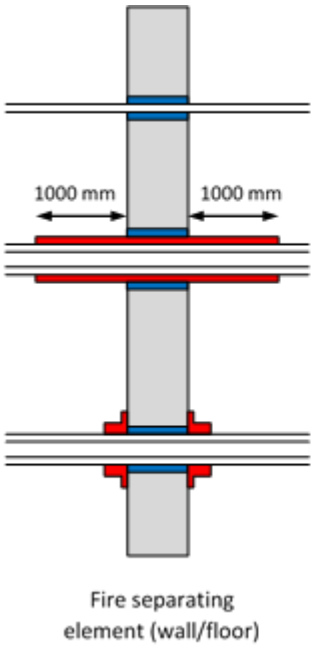
4.5.3 Fire-stopping

All joints between fire separating elements will be adequately fire stopped and all openings for service that pass-through fire separating elements will be:

- Kept as few in number as possible;
- Kept as small as practicable;
- Fire stopped (which in the case of pipes or ducts allow for thermal movement).

The selection of fire stopping products and materials will take account of the size and nature of the gap and any anticipated differential movement.

Pipes that pass-through fire resisting construction, unless they are contained within a protected shaft, will satisfy the provisions detailed in Figure 1 below.



- **Fire stopping only** – maximum allowable diameters:
  - **160 mm** – non-combustible pipes.
  - **110 mm –** pipes of lead, aluminium, aluminium alloy, fibre-cement or uPVC through protected shafts (excluding stairways and lifts shafts).
  - **40 mm** – pipes of any other material or situation.
- **Sleeving** – pipes of lead, aluminium, aluminium alloy, fibre-cement or uPVC with a maximum diameter of 160 mm can be provided with a sleeve of non-combustible pipe. The sleeving needs to extend 1000 mm either side of the fire-separating element.
- **Proprietary seals** – suitable for any pipe diameter. Install in accordance with manufacturer's instructions.

Figure 2: Protection of openings for pipes

5.0

External fire spread

5.0 External fire spread

5.1 External wall construction

Each of the blocks is provided with a rooftop plant area that is accessed from the stair core. The cladding at this level comprises Joris Ide panels which are coated steel composite panels with a pentane blown PUR/PIR insulated core. The external and internal faces of the panels achieve Class 0, which complies with the recommendations of Diagram 40 and paragraph 12.6 of Approved Document B.

For the three blocks which are greater than 18 m in height, the material forming the core of these panels (PUR/PIR) are not expected to satisfy the recommendation of paragraph 12.7 in Approved Document B, that all insulation and filler materials in the external wall construction satisfy the definition of 'limited combustibility' as defined in Appendix A to Approved Document B.

The risk of fire spread via the plantroom cladding to the rest of the building is considered to be low given that:

- The rooftop plant spaces are only located above the core and do not extend out to the wings of the building;
- The plant accommodation and the panels sit on a concrete slab and are not connected to the rest of the external façade;
- The external walls to the lower floors of the block satisfy the recommendations of Approved Document B, with all insulation and filler material satisfying the definition of 'limited combustibility'.

To reduce the risk of fire spread via the external walls, where Blocks 1, 5 and 6 are no greater than 18 m in height, the external surfaces of the walls will achieve, Class 0 (national class), or Class B-s3, d2 (European class) for parts of the walls no greater than 18 m above ground.

For Blocks 2, 3, and 4 where the buildings are greater than 18 m in height, the external surfaces of the walls will achieve, the classification Index (I) not more than 20 when tested in accordance with BS 476-6 or Class C-s3, d2 when tested to the relevant parts of BS EN 13501. Above 18 m the external walls will achieve not less than Class 0 (national class) or Class B-s3, d2 (European class).

All insulation, filler material, excluding gaskets, sealants, etc. used in the external wall construction will be of limited combustibility.

5.2 Space separation

Given the distance to the boundary and the relatively small sizes of the compartments, it is not expected that external walls will require any fire resistance. Suitable calculations can be provided if required by the authorities.

6.0

Access and facilities for the fire service

6.0 Access and facilities for the fire service

6.1 Water supplies

Fire hydrants are to be provided such that they are located not more than 90 m from a block. Where new hydrants are provided on site they will be designed in accordance with BS 9990.

6.2 Vehicle access

Access for a pump appliance will be provided to within 18 m of the dry main inlet connection point. The roadway should be at least 3.7 m wide, with a clearance height of 4 m.

6.3 Internal facilities

A fire-fighting shaft is provided to Block 2, 3 and 4. That will serve all upper storeys and be provided with a fire-fighting stair, fire-fighting lift and a dry rising main.

The fire-fighting stair will have a minimum width of 1,100 mm and the lift will be designed in accordance with BS EN 81-72, suitable provisions will be provided to prevent the ingress of water into the lift shaft, e.g. 25 mm slope to the lift. In addition, the lobbies are provided with a natural smoke extract ventilation system. These systems will limit the ingress of smoke into the fire-fighting stairs and lift.

The dry rising main will be designed in accordance with BS 9990, with an inlet provided adjacent to the entrance, and outlets provided on each upper floor, located within the stair. Dry riser outlets do not need to be located at the access level of the blocks.

The ventilation systems to the common areas of the buildings will be in accordance with that described in Section 3.5.4 of this Report.

Blocks 1, 5 and 6 are less than 18 m in height and therefore, do not require fire-fighting shafts. These blocks will either be fitted with a dry rising main, with access to be provided for a fire appliance as above, or, where a main is not provided, access will be provided to within 45 m of all points in the blocks.

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