

Job no 9300-24

Date. 21-02-24

Fire Strategy relating to the external facade changes at ground floor level to the Class E commercial unit at Q2 Watlington Street Reading RG1 4AY

1. This report outlines the Fire Safety Strategy for this development, the proposed alterations will have no effect on the fire safety of this building.

The fire design of the residential elements of the building will follow the guidance contained within BS 9999:2015 Code of Practice for fire Safety in the design, management and use of residential buildings- Code of practice for single stair buildings.

2. The non residential areas of the building will follow the guidance in British Standard BS 9999:2017 Code of practice for fire safety in the design, management and use of buildings.

- The commercial accommodation on the ground floor is completely independent from the residential areas of the building and is considered separately in this report.
- The commercial unit incorporates 3 no openings directly to the outside.
- The undercroft car park is provided with sufficient natural cross ventilation.

3. BUILDING DESCRIPTION

Consists a 10 storey building incorporating flats from the first floor to the tenth.

The ground floor accommodates the commercial unit/some residential units/bins & cycle stores.

There is an undercroft carpark.

The building is believed to be constructed with a concrete frame & concrete floors. The external & party walls will be constructed in masonry & non combustible cladding, the stairs & lift core will be a mixture of concrete & masonry. Internal walls will be metal studwork.

4. EVACUATION STRATEGY

All the dwellings will follow the evacuation strategy outlined in Approved Document B and BS9991.

Where a fire is in a flat, the occupants of that flat are expected to evacuate. Where a fire or smoke affects a neighbouring flat, the occupants of that flat are expected to evacuate. There will be no common fire alarm system therefore the remaining occupants of the block are unlikely to be aware of the fire and have no reason to evacuate.

In buildings with a simultaneous evacuation strategy it is standard practice for fire-fighters to prioritise evacuating the building over committing to fire-fighting. Blocks of flats are constructed so that there is fire separation to contain the fire and protect the neighbouring flats for sufficient time to allow the fire and rescue

service to prioritise fire-fighting. The fire-fighting strategy is to control the fire and prevent it spreading thus negating the need to evacuate the whole building.

In the event that the fire is not contained by the structure or by fire-fighting intervention, the building must be evacuated, as the fire separation provided by the building is limited in duration.

5. MEANS OF WARNING AND ESCAPE – FLATS

5.2 Alarm and Detection

Each flat will be provided with an LD2 Grade D2 Category smoke alarm system in accordance with the relevant recommendations of BS 5839-6: 2019+A1 2020 *Code of practice for the design, installation and maintenance of fire detection and fire alarms in dwellings*.

The open plan flats will be provided with a system in accordance with Grade D2 LD1 BS 5839-6.

5.3 Flats with entrance halls

The internal planning of some flats in this development follows the applicable guidance in BS9991 paragraph 9.4.2 a) for flats situated more than 4.5m above ground level and entered on the same level as the flat as follows;

a) The total travel distance from any point of the flat to the entrance door of the flat should be limited to 9m. Cooking facilities should be sited away from the flat entrance door and the internal escape route (at least 1.8m).

In this building there is no ancillary accommodation accessed from the common areas, with the bin stores accessed externally.

The car park and accommodation within the basement is accessed via a separate stair.

5.6 Common Areas - Stairs and Lift Lobbies

5.6.1 Alarm and Detection

It is not proposed to install any fire alarm sounders or manual call points in the common areas of the residential floors.

Smoke detection is installed in the lift lobbies and stair to operate the smoke control system. The automatic detection associated with the smoke clearance system should be installed to the same standard as a fire alarm system i.e. BS 5839-1: 2017 *Fire detection and alarm systems for buildings, Code of practice for system design, installation and commissioning and maintenance*.

5.6.2 Widths of Escape Routes (Corridors and Doors)

BS9991 has no specific recommendations on corridor storey exit width on the basis of the defend in place strategy. BS 9999 recommends that the minimum door widths should be 850 mm and the minimum corridor width should be 1200mm. This has been included in the design.

For the purposes of this report;

- The width of a doorway is the clear width of the opening between the door leaf and frame (or the width between two opening door leaves in the case of double doors) if the door leaf is free to open 90 degrees or more;
- The width of an escape route is the width at 1,500mm above floor level when defined by the walls or the minimum width of passage available between any fixed obstruction (handrails fixed to the wall are ignored);

5.6.3 Number of Stairs

The number of stairs in a building is determined by the acceptance of a single stair condition and by limiting travel distance.

The upper floors of this block are served by a single stair, which is served by ventilated common corridors or

lobbies at each level.

The stair is constructed from concrete which will satisfy the recommendation for materials of limited combustibility (BS9991 26c).

5.6.4 Stairs Serving Ancillary Accommodation

The basement car park and cycle store are accessed via a stair separated at ground level.

5.6.5 Width of Stairs

Paragraph 28 of BS 9991 makes the following recommendations with regards the width of common stairs;

The unobstructed width (measured between the walls and/or balustrades) of each common stair should be not less than 750mm; a common stair which is a fire-fighting stair should have an unobstructed width (measured between the walls and/or balustrades) of 1.1m. The width should be kept clear for a vertical distance of 2.0m. Note Handrails and strings that do not intrude more than 100mm into these widths may be discounted when calculating the common stair width.

Handrails projecting no more than 100mm into the stair can be ignored in terms of width.

The stair is not a fire-fighting stair but will provide a minimum width of 1000mm.

A ladder will provide access to the roof from the top stair landing if required.

5.6.6 Final Exits

The stair will discharge directly to the street following the recommendations of BS9991 figure 32.

Where serving a stair, the final exit widths should be the same width as the stair. Where not serving a stair the final exit width will be the same as the storey exit width described above. The entrance door to the building will

be 1100mm wide.

BS9991 29 b) recommends that there is a separation distance of 1.8m between any openings to the stair and other parts of the building at the final exit. There are no openings in the stair projection at ground floor.

5.6.7 Entrance Lobbies

The bottom of the stairs open up to form an entrance lobby. The building management will need to enforce safety policies to keep this area free from fire hazards.

5.6.8 External Escape Routes

The final exit at ground floor level discharges directly to the street. The doors are not configured to swing in the

direction of escape, however this is acceptable as the design fire occupancy is less than 60 people. The external

escape route will be illuminated by the street lighting.

5.6.9 Ventilation of Stairs

The stair is provided with an automatically opening vent at the top of the shaft with a clear area of at least 1m² configured to open if the smoke detectors in the common lift lobbies or at the top or bottom of the stair are activated.

5.6.10 Common Corridors

The building has been arranged to limit the travel distance from the furthest apartment entrance door to the stair door to less than 7.5m (BS9991 Figure 7 b).

All the common corridors serving apartments will be ventilated by means of automatic opening vents in the

external walls with a minimum opening area of 1.5m².

5.6.11 Disabled Egress

The defend-in-place philosophy described in ADB and BS9991 does not recommend specific disabled egress measures given, as disabled occupants not affected by the fire would stay in their apartments and those affected

will escape to the stair or lift. No refuges are required, although the stair can be used a refuge space.

It is presumed that people living within the flats will make suitable arrangements for evacuation taking into account any disabilities they may have. The provision of sprinklers will improve the safety of people living within

the flats especially if for some reason they are unable to evacuate.

5.6.12 Emergency Lighting

The common escape routes and staircase will be adequately lit and be provided with emergency escape lighting.

The emergency escape lighting should comply with BS5266: *Emergency lighting*: Parts 1-7.

5.6.13 Statutory Signage

Every door or other exit providing access to an escape route within the common areas other than exits in ordinary use (e.g. the main entrance) should be conspicuously marked with a sign installed to BS5499 - Part 4 2000 Code of practice for escape route signing. It is not envisaged that any escape signage will be required in the residential areas of the building.

The guidance in Approved Document B Vol 1 paragraphs 15.13 – 15.16 *Wayfinding signage for the fire service* will be adopted.

5.6.14 Access Control

Security requirements should not override the need to provide adequate means of escape. All security locks and/or devices fitted to a dwelling entrance or alternative exit door should be openable from the inside by a single manual operation not requiring the use of a key.

6.6 Widths of Escape Routes (Corridors and Doors)

The required door/corridor exit will be based on the figures in BS9999 Table 12 for risk profile B2 i.e. 4.1mm per person with a minimum width of 800mm. Each exit will therefore have a maximum capacity of 121 people.

6.9 Vehicle Access Barriers

Any vehicle access barrier or security shutter on the vehicle ramp should automatically open on activation of the car park fire detection and alarm system.

6.11 Width of Stairs

Table 13 of BS9999 provides recommendations for the width of stairs and is dependent on the risk category and

the number of floors served. The stair capacity has been analysed and the results documented in the following table. Handrails projecting no more than 100mm into the stair can be ignored in terms of width.

BS9999 recommend that the minimum width of a stair used for evacuation in a upwards direction is 1200mm.

The stair is currently shown at this dimension, however the width could be reduced based on the very low fire

design population of 38 people.

6.12 External Escape Routes

Any part of the external escape route that will not be illuminated by the street lighting should be provided with emergency lighting

6.13 Final Exit Widths

Where serving a stair, the final exit widths should be the same width as the stair. Both the stair and the final exit are considerably oversized for the emergency evacuation of the design population, therefore the proposed final exit width is sufficient.

6.14 Evacuation of people with impaired mobility

It has been assumed that everyone within the car park will have a degree of mobility with or without assistance.

People with impaired mobility can be expected to move horizontally but are likely to have problems with moving

vertically. A lift is provided to the car park which will allow access to all the upper floors. The ramp will have a gradient no steeper than 1:12 which will be suitable for escape.

People with impaired mobility are likely to be able to move to the stairs with the rest of the population but not be able to use them. To ensure the smooth flow of occupants using the stairs, it is recommended that a refuge space is provided within the lift lobby to allow mobility impaired people and their helpers to wait until the stair is sufficiently clear of people to allow them to be assisted /carried up safely. A refuge space should have an area

of 1.2m² and a minimum dimension of 900mm.

The building management will need to identify any member of staff who may be disabled and produce a personal emergency evacuation plan (PEEP) to ensure an appropriately resourced response, tailored to the individual needs of the disabled person and the specific features of the building.

6.15 Inner Rooms

Where the occupants have no other option but to pass through another room or rooms to get to an escape route or final exit, they need to be aware of a fire starting in the adjoining rooms.

The plant room is the only inner rooms currently shown. Given its infrequent use a management procedure could be adopted to mitigate the potential risk.

An automatic fire automatic fire detection and alarm system will be installed in the car park to trigger the smoke

ventilation system. This will also provide suitable mitigation.

6.16 Access Control Systems on Escape Routes

In general, doors on escape routes should not be fitted with locks, latch or bolt fastenings, or they should only be fitted with simple fastenings devices that can be readily operated from the side approached by the people making an escape. The operation of these fastenings should be clear without the use of a key and without having

to manipulate more than one mechanism.

Panic hardware on exit doors should be in accordance with BS EN 1125.

Electronic access control facilities should be installed so that they automatically fail to the unlocked condition

upon the sounding of the evacuation alarm or upon primary power failure to that device. Where linked, the signal from the fire alarm control panel to the security panel should be via a “latching” relay only. This is to prevent automatic reset upon the silencing of alarms. Under no circumstances is an electronic door release to be connected to a local fire alarm sounder circuit; it should be connected to the main fire alarm panel, as recommended in clause 19 of BS 5839 Part-1.

Suitable normal and escape lighting shall be provided adjacent to the emergency switch/break glass unit in accordance with BS 5266 Part-1.

7.4 Fire Alarm and Detection

BS9999 Table 7 recommends that a category L3 automatic fire detection and alarm system to BS5839 part 1 be installed in each unit. It is envisaged that these system will be installed by the tenants as part of the fitout. A manual system could be used if the unit is used for a lower risk profile. This can be reviewed as part of the fit out.

7.5 Number of Escape Routes

Table 10 of BS9999 recommends that three exits are provided to each storey/space with a design population greater than 600 people and two exits provided to each storey/room with a design occupancy greater than 60

but less than 600. Rooms with a design occupancy of less than 60 people only require a single exit subject to recommended limitations on travel distance.

All the units will have a single escape route, which will be the main entrance from Victoria Road. If any of the units is fitted out to accommodate more than 60 people, a second exit will be required.

7.6 Position of Escape Routes

The maximum recommended travel distance to the nearest exit is limited to the values in BS9999 Table 11. Paragraph 18 and figure 17 of BS 9999 states that where the proposed design provides a clear fire safety benefit

it is appropriate to apply a 15% increase in travel distances subject to the maximum figures in BS9999 Table 15. In the case of the units, they benefit from a tall ceiling and there will be a category L2 automatic fire detection and alarm system installed. It is considered appropriate to use the longer travel distances where necessary.

Location	Maximum travel distance (m)	
	Single direction	More than one direction
B3 Units – with additional fire protection measures	20	60
B3 Units – with no additional measures	16	40
B3 Bin Store	16	40

7.7 Widths of Escape Routes Corridors and Doors (notes for fit-out)

There are no corridors or rooms currently shown within the independent units as these will be fitted out by others. The designers of the fit outs will need to ensure that any internal doors or corridors are suitable for the number of people using them.

7.8 Final Exit Widths

The final exits from the independent units will be onto Victoria Road. Generally each exit will need to

accommodate less than 60 people therefore the minimum exit width of 850mm should be adopted. These doors can open inwards. The exit provisions should be reviewed as part of the fitout of the units.

7.9 External Escape Routes

The final exits will discharge to the street. Any part of the external escape route that will not be illuminated by the street lighting should be provided with emergency lighting.

7.10 Evacuation of people with impaired mobility

It has been assumed that everyone within the building will have a degree of mobility with or without assistance.

People with impaired mobility can be expected to move horizontally to the final exits and onto the street, therefore no additional features are required.

7.11 Doors on Escape Routes

Doors on escape routes should generally open outwards but can open inwards if the number of people using the door will be less than the figure for a single exit i.e. 60 people.

8. INTERNAL FIRE SPREAD – LININGS

The wall and ceiling linings of an enclosure such as a room can have a dramatic effect on the development of a fire and, in particular, the time it takes for the room to become completely involved. It is considered that the floor finishes do not significantly contribute to the development of a fire and are generally not controlled. BS 9991 and BS9999 suggests that wall and ceiling linings should have the classification as shown in Table 8.1 and 8.2, when evaluated by the methods described in BS EN 13501-1.

Location	European Class
Small room of area not exceeding 4m ² in a residential building and domestic garages not exceeding 40m ²	D-s3, d2
Other rooms (including garages)	C-s3, d2
Circulation spaces within dwellings	C-s3, d2
Other circulation spaces including the common areas of flats	B-s3, d2

Table 8.1 – Classification of Linings – Residential

Location	Classification
Circulation routes (Stairs and protected corridors)	B-s3, d2
Small room of area not exceeding 30m ² within a unit	D-s3, d2
Car park	A-s3, d2
Plant rooms	B-s3, d2
Bike store and bin rooms	B-s3, d2
Units	C-s3, d2
Rooms less than 30m ² in floor area	D-s3, d2

Table 8.2 – Classification of Linings – Non-residential

Parts of walls may be of a lower class than above provided that the total area in any one room does not exceed half of the floor area, up to a maximum of 20m² in residential accommodation and 60m² in non-residential accommodation.

It is recommended that Class C wall and ceiling lining products are avoided where p

9. INTERNAL FIRE SPREAD – STRUCTURES

Construction elements and components are specified in terms of their ability to provide resistance to fire and

their properties in relation to their reaction to fire.

Fire resistance is classified in terms of;

R	Resistance to Collapse (Loadbearing capacity – the ability to support a load at elevated temperatures)
E	Resistance to Fire Penetration (Integrity – the ability to contain a fire)
I	Resistance to the transfer of heat (Insulation – the ability to limit heat transfer from one side of the material to the other)

Reaction to fire considers the contribution a material makes to a fire as it decomposes and are classified A1, A2, B, C, D, E and F, with A1 having the highest performance (non-combustible materials) and F the lowest having failed to attain Class E. In addition, the tests classify the production of smoke (s1, s2, s3) and the production of flaming droplets (d0, d1, d2) with the lower value indicating the best performance.

It is important to recognise that materials that have a high performance in relation to reaction to fire do not necessarily have a high level of fire resistance. On its own, aluminium for example is a Class A1 product but has no fire resistance performance. Timber on the other hand is a Class C or D product but has very good fire resistance properties.

When specifying materials it is important to ensure that the correct fire criteria are referenced to avoid confusion.

Care should be taken in the selection of fire performing elements to ensure that they are; suitable for the construction in which they will be fitted; they are ordered with the correct components, and; installed in accordance with the manufacturer instructions.

9.1 Third Party Certification

While not a statutory requirement, it is recommended that all fire and smoke control assemblies be provided with appropriate certificate from a recognised third-party accreditation body. All assessment and test evidence should be available for inspection by the approving authorities and other interested parties.

9.2 Fire Resistance

For purposes of establishing the fire resistance periods, the height of the building will be taken from the fire brigade access level to the highest floor level in accordance with the guidance in BS 9991. Table 9.1 indicates the highest floor levels and fire resistance of the building.

Element	Height of upper storey (m)	Fire Resistance (min)	Fire Resistance (min) with Sprinklers
Flats	16	60	60
Ground floor	0	60	N/A
Basement	-3	60	N/A

Table 9.1 – Fire Resistance Periods

9.4 Compartmentation

Each flat is a separate compartment with REI-60 minutes fire resisting construction.

Each unit is a separate compartment with REI-60 minutes fire resisting construction.

All floors are compartment floors, thereby all shafts and risers passing through are protected shafts.

Shafts and service risers passing through the floor slab will need to be constructed to minimise fire spread and should therefore provide the same fire resistance as the structure – REI-60 minutes.

Compartment walls/floors are to maintain their integrity where meeting an external wall and this may require the provision of a cavity barrier inside the external wall cavity giving REI-30 minutes fire resistance, depending

on the wall construction.

9.6 Air Handling Systems

Any air handling systems installed within the apartments should be designed and installed so as not to compromise evacuation due to the spread of fire and smoke out of the apartment of fire origin.

9.7 Fire Doors

The fire performance of doorsets is given in table 9.2.

Door Location	Specification
Flat protected entrance halls	No performance where sprinklers are installed
Flat entrance doors	E30S self-closing
Door to stair	E30S self-closing
Riser shafts & cupboards	E30S keep locked shut
Lift landing doors	E30
Car park stair lobby doors	E30S self-closing
Door to car park from lobby	E30S self-closing
External doors	No performance

Table 9.2 – Fire Doorsets

9.8 Fire Stopping

Pipes and other opening less than 40mm in diameter will need to be fire stopped where passing through a fire resisting element, but not with a material that will close off the pipe – see Approved Document B table 9.1. Where greater than 40mm in diameter, pipes, ductwork and services passing through fire-resisting barriers should be penetration sealed with an appropriate sealing system and/or fire damper which has been shown by test or assessment to maintain the period of the fire-resistance of the barrier. The fire stopping and penetration sealing systems should be designed and installed in accordance with the manufacturer's recommendations.

9.9 Enclosure of Services

Service within the common stair or common lobby will be enclosed in risers formed of 60 minutes fire resisting construction with E30Sa doorsets. The enclosure can be a protected shaft with openings in the floor between levels, or cupboards where the floor is fire-stopped at each level. Either way the services should be fire stopped where they leave the enclosure. Where a shaft is adopted, the top of the shaft should either extend to the underside of the roof covering and fire stopped or capped with 60 minute fire resisting construction. Soil and vent pipes within flats (i.e. not within a protected shaft) will be fitted with intumescent collars at each compartment floor level and where they pass through a compartment wall. The ground floor is not a compartment wall in these blocks.

9.10 Cavity Barriers

Cavity barriers will typically be provided around external openings such as windows and doors, at all compartment floor and wall junctions with external walls, and otherwise installed to observe a 20-metre maximum linear dimension.

Cavity barriers do not need to be installed where the construction follows the recommendations for masonry cavity walls in ADB Paragraph 5.18 and diagram 5.3.

9.11 External Walls

The external walls are considered structural elements even though they are not loadbearing and will require 60 minutes fire protection subject to external fire spread calculations.

9.12 Balconies

The floors of the balconies are elements of structure and will be provided with 60 minutes fire resistance.

9.13 Roof

There is no recommendation for the roof structure to be provided with any fire resistance where it is not providing any support to a wall or floor. The roof will be accessed for maintenance and repair only. The compartment walls will need to be taken up to the underside of the roof covering and fire stopped. The roof covering will need to have a classification of BROOF(t4) on a substrate with a classification of A2-s3, d2 or better where it passes over the compartment walls for a distance of 1500mm to restrict fire spread from one side of the compartment to the other.

10. EXTERNAL FIRE SPREAD

10.1 Unprotected Area

When a building is on fire, heat will radiate through non-fire-resisting openings in the external walls. This heat can be intense enough to set fire to adjoining buildings. To reduce the chance of this occurring, the Building Regulations place limits on the area of external elevation with no fire resistance. This area is known as the 'unprotected area' (UPA) and is affected by such factors as distance from the boundary, use of the building and compartment size.

Table 10.1 – Recommended Boundary Distances

The unprotected area is acceptable in relation to the boundary distances.

10.2 External Walls (Regulation 7)

The building does have a storey taller than 18m therefore the external wall system does need to be constructed from materials that are non-combustible or of limited combustibility i.e. materials that are classified A1 or A2-s1-d0 to BS EN 13501 Part 1. The external wall construction will be non-combustible.

10.3 Fire Propagation – Roof covering

BS 9991 recommends that the surface of the roof should have the classification as shown in Table 8. The proposed roof coverings will provide a category BROOF(t4) fire performance and as such there are no recommended boundary limitations.

11. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE

To extinguish a fire within this building it is important that the fire service can gain access onto the premises, and from there, into the building. The fire safety strategy relies on the intervention of the fire service to extinguish the fire before it can spread significantly, as the fire separation is not designed to operate indefinitely.

Vehicle Access

There will be a single dry rising main in the building; the inlet will be within 18m of a suitable fire-fighting vehicle parking area and visible from the cab of the vehicle.

Fire and Rescue Service (FRS) access level will be at ground floor level. BS9991 recommends that the access roads should have a 3.7m clear width and 3.7m vertical clearance height and have a load bearing capacity of 14 tonnes for a pump tender.

Fire-fighting Shafts, Fire-fighting Lifts and Fire Mains

The top storey of the building is less than 18m therefore a fire-fighting shaft and lift will not be installed.

The stair and lift shaft will be constructed to provide 60 minutes fire separation, with FD30s doorsets to the stair and FD30 landing doors to the lift.

The landing valves will be located within the stair with a valve at each level or half landing. All parts of each floor

plate are within 45m of the landing valve.

Smoke Ventilation

Automatic opening vents will be installed in accordance with BS9991 to ventilate the residential common corridors primarily to restrict the movement of smoke into the stairs. These systems will include automatic vents at the top of the stairs.

The commercial units and bin stores are located on the ground floor and have external doors for fire-fighting access and smoke ventilation.

The car park will be provided with natural cross ventilation.

The cycle store and plant room (services intake room) will be ventilated via the car park.

The stair will be separated from the car park with a ventilated lobby.

Automatic Suppression Systems

A residential automatic suppressions system will be installed in all the apartments of this development to BS9251.

Fire-fighting Water

A water company fire hydrant will be located in the road within 90m of the building entry point but no closer than 6m to the building.

Secondary Power Supplies

There will be a secondary mains supply for the mechanical smoke ventilation system and the sprinkler booster pumps. The guidance relating to the use of a single electrical intake in BS9991 section 15 will be adopted i.e. the

provision of a suitably separated life safety distribution board.

The intake, smoke fans and sprinkler pumps will all be in the basement thus limiting cable runs through intermediate compartments.

The secondary supply for other fire safety systems will be provided by local or central batteries.

Signage

A signage scheme will be developed to ensure that each floor and apartment is clearly marked to assist navigation by fire-fighters in the event of an emergency as outlined in ADB paragraphs 15.13 to 15.16.

Site Access and Information

Access and information for attending fire-fighters is to be provided by the site management.

Chris Keen MRICS CABE



