Report

Project	17-37 William Road
Report Title	Outline Fire Strategy
Our Ref	EL7081/R1 Issue 6

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	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Issue 6
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By	CA	KS	KS	KS	KS	KS
Checked	KS	CA	CA	NH	NH	NH
Approved	NH	-	-	NH	NH	NH

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1.0 INTRODUCTION

1.1 Description of building

The Site is located at 17-37 William Road, London Brough of Camden.

The Site comprises two adjoining buildings situated to the south of William Road:

- No. 35-37 (Plot A) comprises a dated part two-storey, part six-storey office building with basement level, situated on the corner of William Road and Stanhope Street.
- No. 17-33 (Plot B) comprises a seven-storey building with ancillary office accommodation at ground floor level and residential units above.

The proposed redevelopment of the Site includes the following:

- Demolition of no. 35-37 and redevelopment of the site to provide a student accommodation-led scheme comprising a 15-storey building with basement level;
- Retention of no. 17-33 and provision of a 1,255m^2 (GIA) of affordable workspace at ground floor level, delivered alongside improvements to the existing ground floor façade, providing active frontages along William Road;
- Provision of 154 high-quality student units (206 bedspaces) alongside shared internal and external amenity spaces;
- Delivery of public realm improvements along William Road and Stanhope Street through the addition of planters and trees providing an enhanced pedestrian experience;
- Provision of 36m^2 (GIA) of replacement ancillary residential storage space serving existing residents within no. 17-33;
- Provision of secure cycle parking in line with emerging London Plan standards; and
- Improved servicing strategy to maximise servicing options.

The topmost occupied storey is greater than 30m above ground at approximately 41m from the ground level.

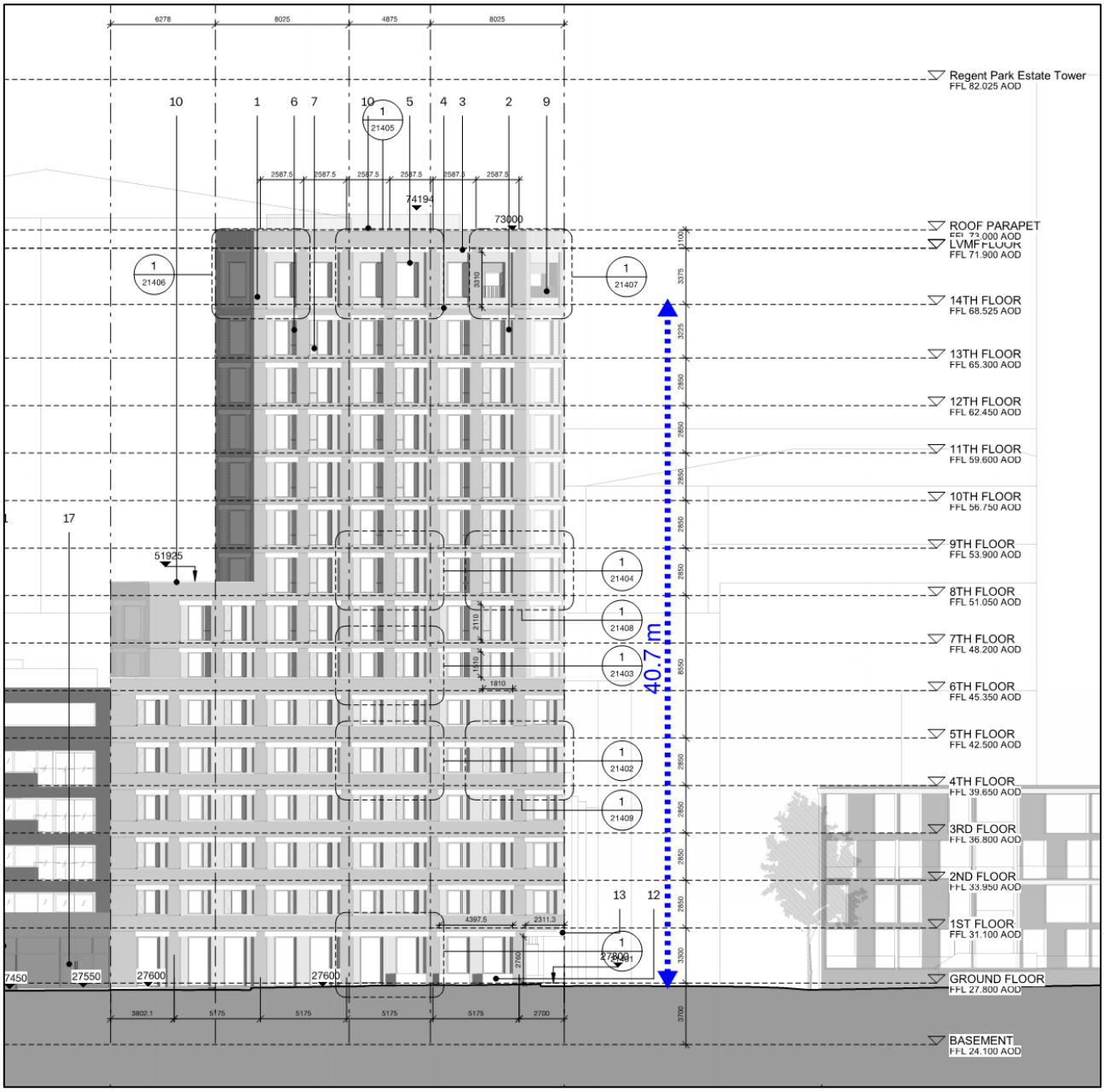

Figure 1 - Building Height

1.2 Aim of Report

This report summarises the outline fire strategy for the William Road development in the London Borough of Camden to demonstrate compliance with the Building Regulations for life safety only. Student residential buildings are permitted to be designed as apartment buildings. Therefore, this report draws from guidance in *BS 9991: 2015 Fire Safety in the design, management and use of residential buildings – code of practice* which is the principal document for fire safety in new student residential buildings constructed as blocks of flats. The strategy for the office and social spaces at basement, ground and 14th floor will be developed using *Approved Document B Volume 2: 2019 edition incorporating 2020 amendments.*

At the time of preparing this report it is recognised that the Approved Document B will be amended with updated guidance coming into effect as of December 2022. The updated guidance has been considered when developing the fire safety strategy.

The design of the scheme is intended for a compliant strategy; However, fire engineering solutions are proposed where the design does not comply with the prescriptive guidance. These will be developed in detail after planning and will require discussion with Building Control in the following stages.

This report is intended for issue to the design team and client for design team information to support the planning application. A detailed fire strategy report will be prepared at a later stage to support the Building Regulations application. This report will be submitted for initial discussions with Building Control.

2.0 ACTIVE FIRE SAFETY SYSTEMS

2.1 Sprinklers

The top floor height of the building is greater than 11m above ground floor therefore sprinklers will be required throughout the building to ensure compliance with the Building Regulations guidance.

The provision of sprinklers to the building will also permit the following:

- Increased travel distances within common corridors;
- Open plan layouts of flats;
- Increased travel distances within student apartments.

All student units will be provided with a residential sprinkler system designed in accordance with BS 9251 – 2021: *Fire sprinkler systems for the domestic and residential occupancies – Code of practice.*

The office accommodation and other ancillary accommodation at basement, ground floor and 14th floor amenity space should be provided with a commercial sprinkler system conforming to *BS EN 12845:2015_A1:2019 – Fixed Fire Fighting Systems. Automatic Sprinkler Systems. Design, Installation and Maintenance.*

See Section 3.2 for the proposed individual fire suppression systems above the hobs in the student units.

2.2 Fire Detection and Alarm

Fire detection and alarm system will be provided to an LD1 standard within the student apartments in accordance with BS 5839-6.

An L5 standard of detection will be provided in the common areas in accordance with BS 5839-1 to activate the smoke control systems which include:

- Automatic openable vents in the common corridors and at the heads of the stair.
- mechanical smoke extract in the stair lobby.

The following areas will be provided with fire detection and alarm to at least an L3 standard in accordance with BS 5839-1:

- Office;
- Other ancillary accommodation at basement, ground floor and 14th floor amenity space;

The Purpose-Built Student Accommodation (PBSA) and the ground floor office will be treated as a separate evacuation zone. In order to reduce business disruption, only the effected zone will be evacuated in the event of a fire.

The systems will be designed and installed in line with the relevant part of BS 5839. The design of the systems will be developed in more detail after planning in consultation with an accredited fire alarm contractor.

2.3 Evacuation Alert System

An evacuation alert system will be provided in accordance with BS 8629.

Evacuation alert systems are a facility that will enable the fire brigade to initiate a full building evacuation at their discretion. This system will be for the sole use of fire fighters.

2.4 Other Fire Safety Systems

2.4.1 Secondary Power Supply to Life Safety Systems

A secondary source of power will be provided for all life safety systems to ensure they operate continuously in the event of loss of power.

2.4.2 Signage

Signs will be provided on common escape routes and in accordance with the recommendations of BS 9991:2015 and BS ISO 3864-1:2011.

Floor identification signs and flat indicator signs will be provided to assist fire fighter wayfinding. These signs will be in accordance with Clause 15.13 and 15.14 of Approved Document B Volume 1 (2019 edition incorporating 2020 amendments).

2.4.3 Emergency Lighting

Emergency lighting will be provided in accordance with BS 5266-1:2016.

3.0 MEANS OF ESCAPE

3.1 Evacuation Strategy

The evacuation strategy for the Purpose-Built Student Accommodation (PBSA) will be designed similar to a residential building with a high level of compartmentation and two stairs serving all student apartments in line with the recommendations of BS 9991: 2015.

The building can therefore operate as a standard residential building with a “defend-in-place” evacuation strategy where only the affected student apartment would evacuate in the first instance.

In general, there are two types of student apartment provided in the building:

- Open plan two-bed apartment
- Single bed studio apartment;

Each of the units will be treated as an individual student apartment.

The building will be managed on a continuous 24/7 basis (see Section 7.0 Fire Safety Management for further details).

Student residential building operators often require more flexibility in managing the building evacuation in the event of a fire. The fire strategy will therefore be developed so that a simultaneous evacuation strategy could also be implemented by the end operator if required. Also, with the provision of two staircases one stair is sufficient for the occupancy of the entire building, which can leave the second stair clear for firefighting operations during a simultaneous evacuation.

3.2 Escape within Student Apartments

In accordance with BS 9991, open plan apartments should achieve the following:

- Be provided with sprinkler protection and LD1 automatic fire detection;
- Have maximum principal dimensions of 16 m x 12 m;
- Have ceiling height of at least 2.25 m;
- Be located on a single floor;
- Open-plan flats with principal dimensions exceeding 8m x 4m will have enclosed kitchens; the kitchens should be located remotely from the entrance where the flats are less than 8m x 4m.

All open plan apartments or studios will be provided to meet the BS 9991 guidance with the exception of the kitchens which will be located relatively near to the entrance of the apartments (see Figure 2 for a worst case arrangement). Due to the apartment’s configuration, the cooking hob is located along the escape path. The escape route is past the hob, with 1.64m between the centre of the hob and the opposite wall of the escape route.

The location of the cooking hob is considered acceptable based on the following: -

- Occupant will only be escaping past the cooking hob for a short period of time, with limited exposure to the radiant heat. Once past the hob, occupants will be moving away from the fire. See Appendix A for detailed analysis;
- All apartments will be sprinklered and individual fire suppression systems will be provided above the hobs to protect the occupants from the effects of cooking fires;
- All apartments will be installed with induction type hobs which will be maintained by the management on a regular basis;
- All induction hobs will be linked to the fire alarm to disconnect power to hob if alarm within the apartment activates.

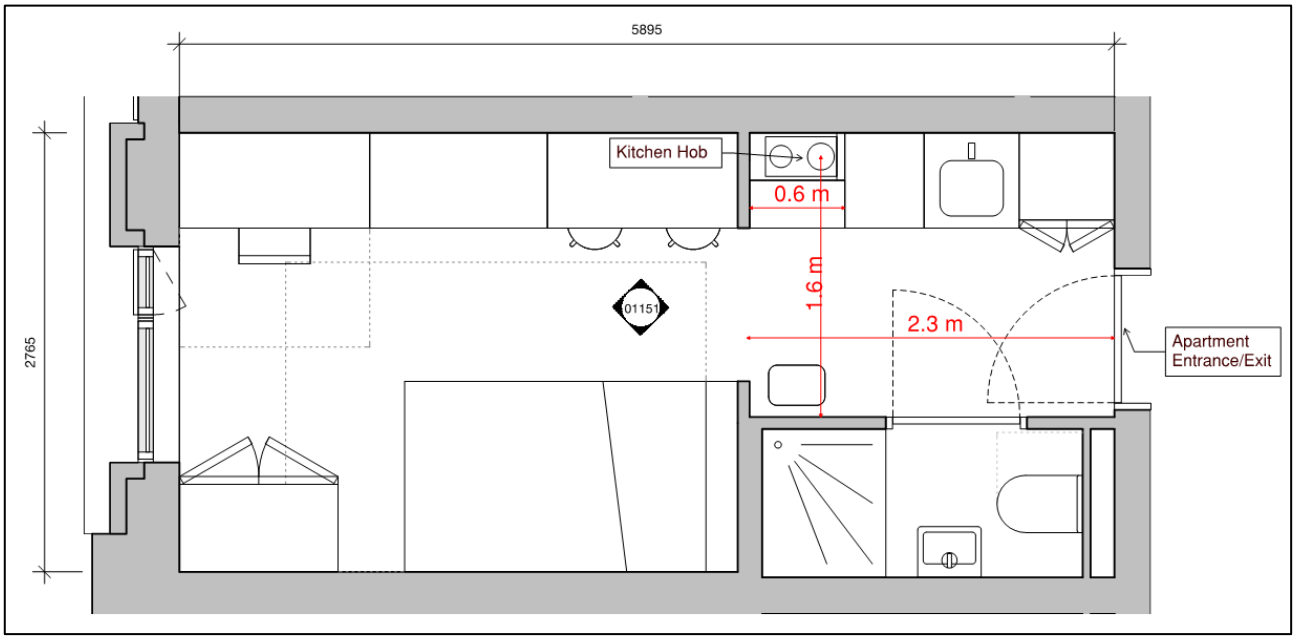

Figure 2 – Cooking Hob Location

Based on the provision of sprinklers and LD1 automatic fire detection, it is permitted to increase the travel distance from the furthest point of the student apartment to the unit exit to 20m. Travel distances within the student apartments are compliant.

3.3 Common Areas

Guidance recommends travel distances are limited to 7.5m in a single direction from the furthest flat entrance door to the stair/lift lobby door or 30m in corridors without dead ends. However, with the provisions of smoke venting and an automatic fire suppression system a dead end travel distance of up to 15m is permitted.

Floors 1-7 indicate some extended travel distance in which is above 7.5m, however below 15m. These corridors will be smoke ventilated via a 1.5m^2 automatically opening vent (AOV) which will be situated on the external elevation. This smoke venting method will only be implemented on the floors in which are below 30m above ground. Mechanical smoke control systems will be provided to serve other dead end common corridors to meet Figure 7 of BS 9991.The remaining common corridors without dead ends do not require smoke ventilation. The ventilation techniques are indicated in Figures 3 to 6.

Guidance also recommends that the area directly adjacent to the stairs should be smoke vented. The lobby in which is adjacent to the stairs will be served with a mechanical smoke extract system on all floors.

Mechanical smoke extract shaft is usually between 0.6-0.8m^2 in cross sectional area achieving an extraction rate of approximately 3-5m^3/s. This will need to be developed and confirmed by a specialist supplier at the next stage of the design.

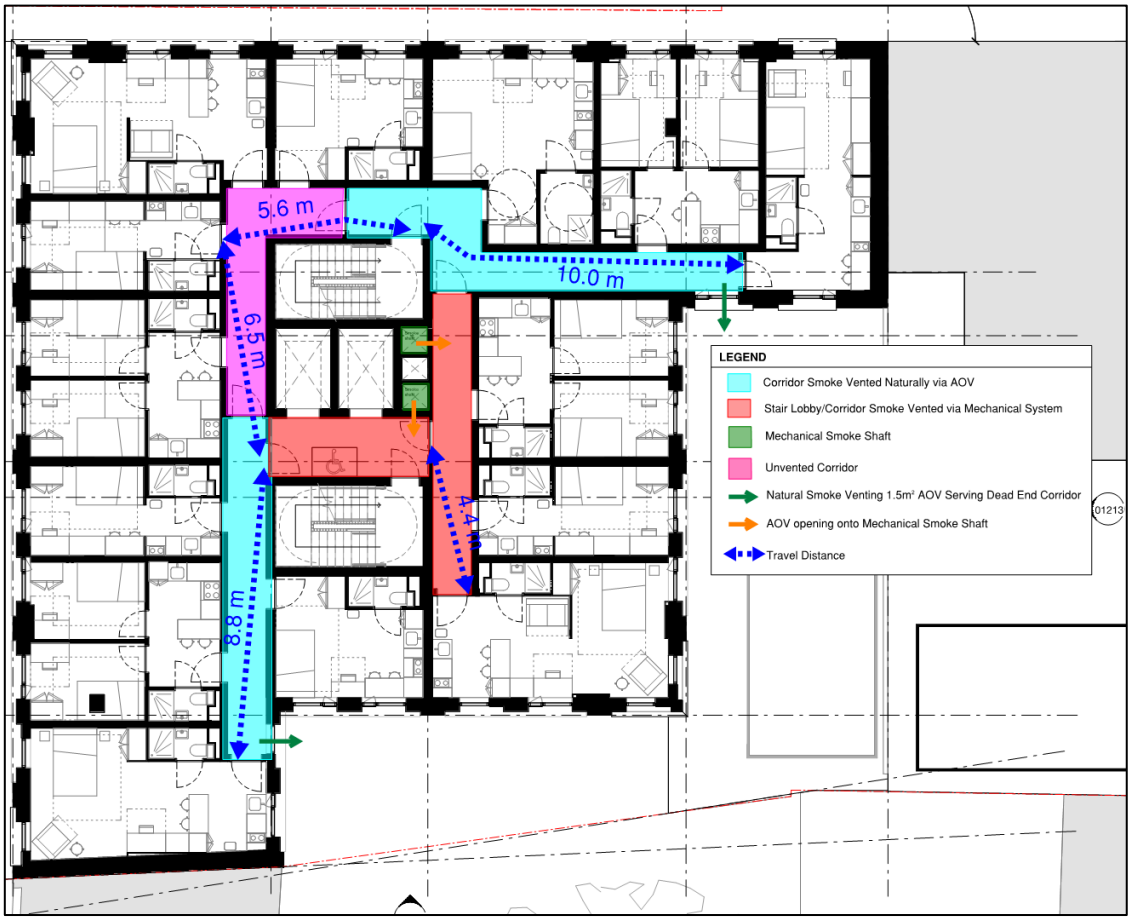

Figure 3 - Travel Distance and Smoke Venting of Common Areas at 1st-3rd floor

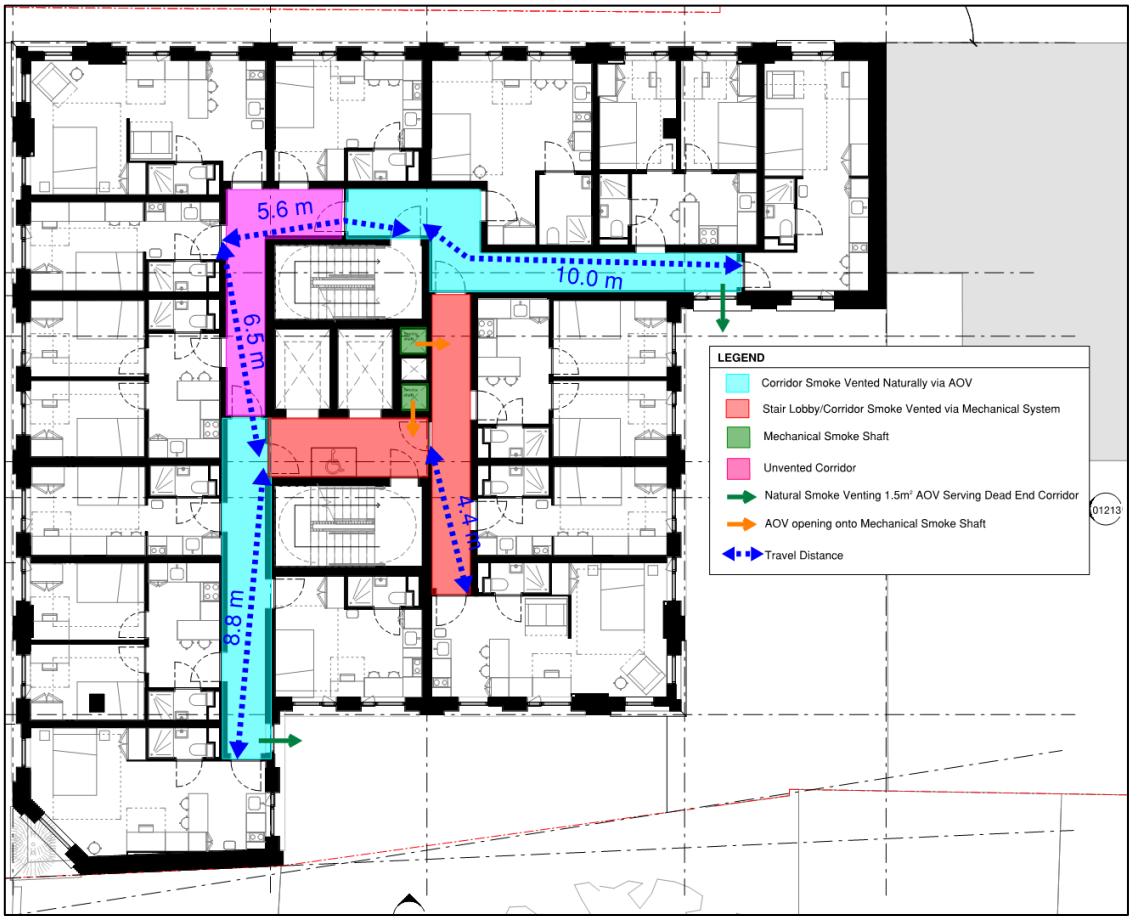

Figure 4 - Travel Distance and Smoke Venting of Common Areas at 4th-5th Floor

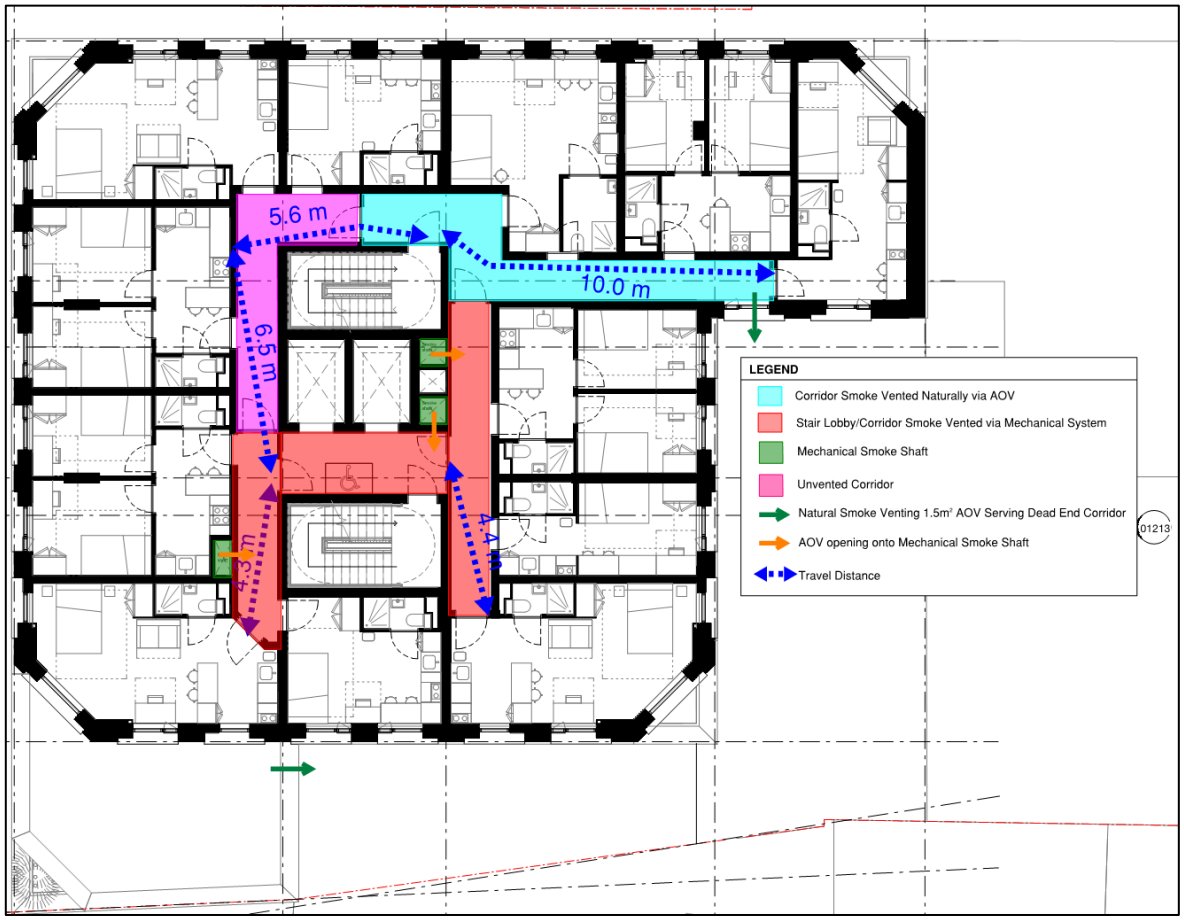

Figure 5 - Travel Distance and Smoke Venting of Common Areas at 6th-7th Floor

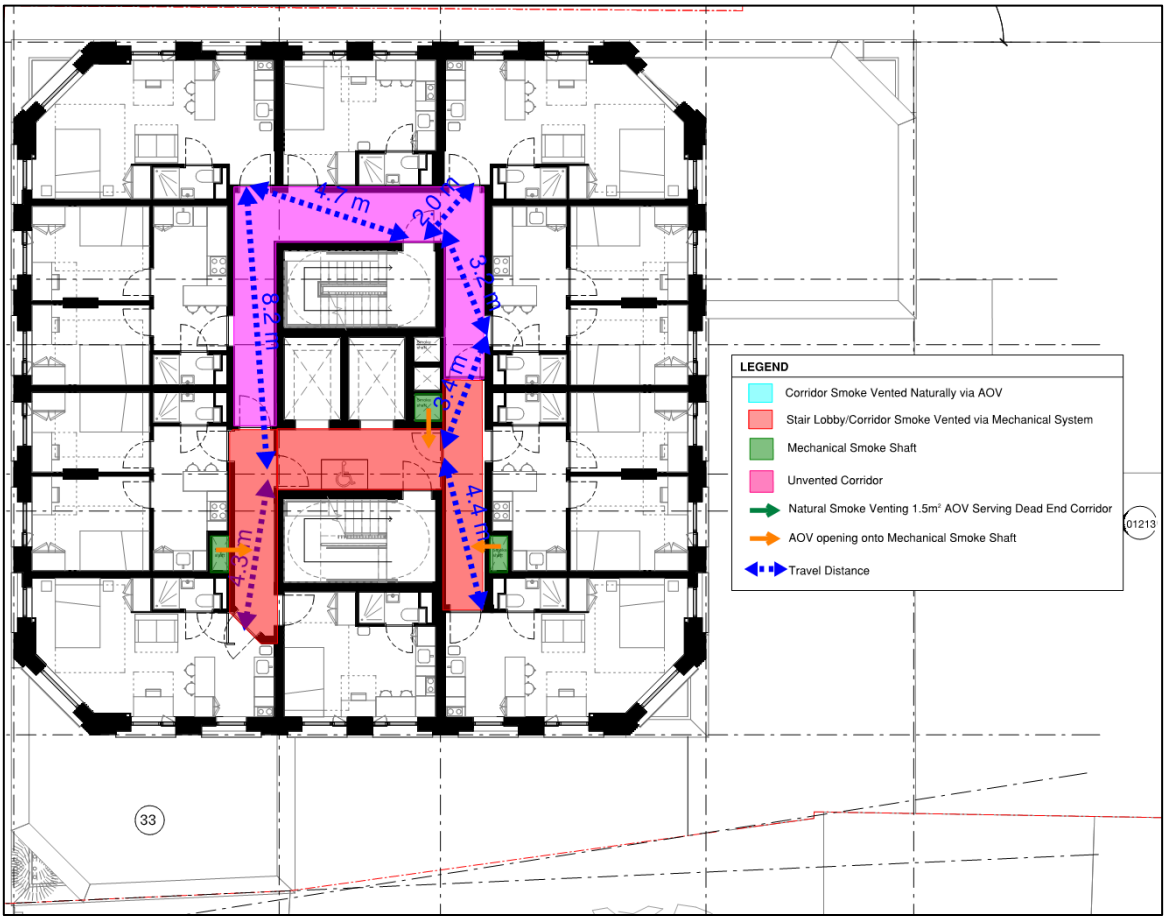

Figure 6 - Travel Distance and Smoke Venting of Common Areas at 8th-13th Floor

3.4 Escape Stairs

The escape stairs will be 1.0m and 1.1m (firefighting stair) clear width respectively.

A 1m² automatically opening vent (AOV) will be provided at the head of each stair.

Both stairs discharge directly to outside. The firefighting stair and final exit corridor are separated from the ground floor accommodation by protected smoke vented lobbies. The width of the final exit corridor will be 500mm wider than needed for means of escape.

3.5 Refuse Store

Guidance recommends that refuse store should be approached solely from the outer air and should be separated from other parts of the building by 60 minutes fire resisting construction. Access to refuse storage chambers should not be sited adjacent to escape routes or final exits or near to windows of dwellings.

The protected route directly to outside from the main stair has a connection to the refuse store. This is not in line with the current guidance. However, this arrangement is considered acceptable based on the following fire engineering justifications:

- The route from the stair to outside will be a fire sterile area;
- The refuse store will be separated from the protected final exit via a smoke vented lobby which will contain 1m² permanent ventilation.
- Occupants can escape through an alternative escape route either through the protected route directly to outside or through the reception area. This route is also supported through the mechanical smoke extraction system in which serves the lift lobby.

- The building will be served by two escape stairs providing alternative escape routes to the occupants if one is not available due to a fire in the refuge store.

The layout of the ground floor refuse store is illustrated below in Figure 7.

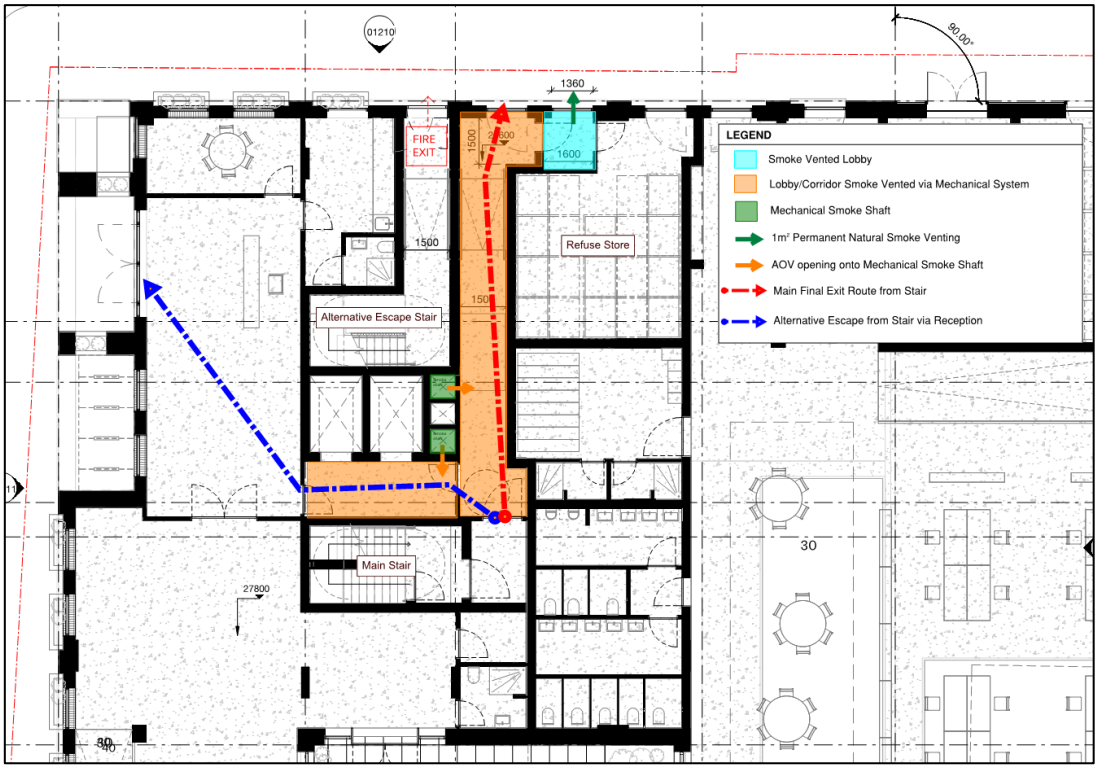

Figure 7 – Ground Floor Refuse Store

3.6 Evacuation of Mobility Impaired Occupants

The London Plan 2021 Policy D5(B5) requires measures in buildings that allow all building users to be able to make a dignified escape. It specifically recommends that at least one lift in each core should be able to be used for mobility impaired escape.

For the development, it is proposed to incorporate an evacuation lift into the lift core adjacent to the firefighting lift. These provisions satisfy the requirements of the London Plan in providing measures to facilitate a dignified and step free escape for occupants of restricted mobility.

Management procedures on how these lifts will be used will be developed in due course. The main stair core will be provided with a disabled refuge and associated communications at each above/below ground level within the protected lift lobby. This will provide occupants a place of temporary safety where they can wait for assistance before using the evacuation lift.

3.7 Basement

Guidance recommends that where there is more than one common stair from an upper storey or part thereof, at least one such stair serving the upper storeys (or parts thereof) should terminate at ground level; any other stair may connect with the basement storey provided that it is separated from the basement level by a protected lobby.

The proposal basement layout complies with the guidance above. This is indicated in Figure 8.

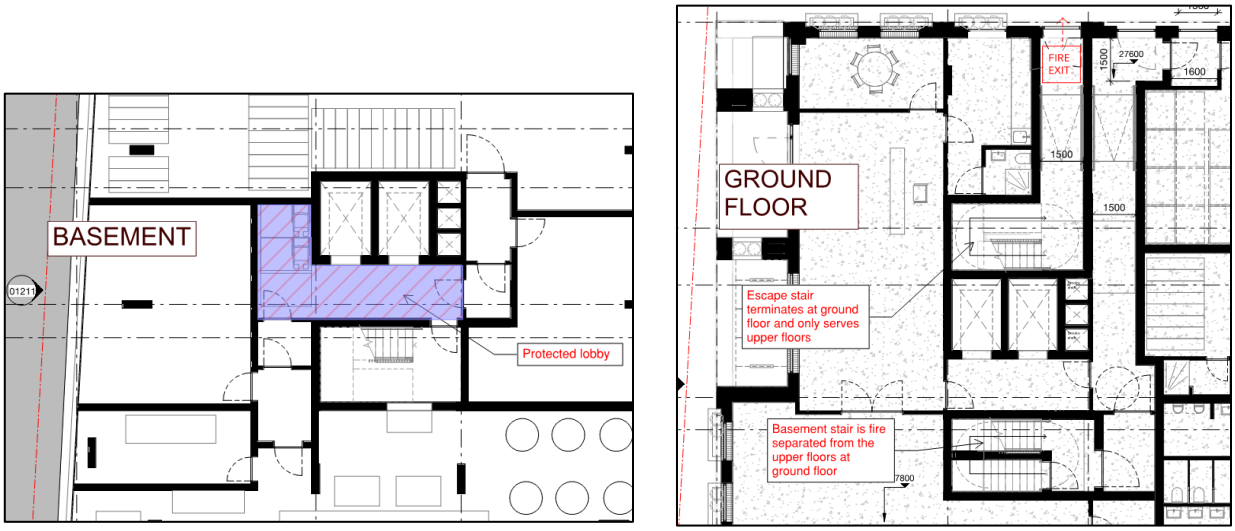

Figure 8 - Basement Stair Protection

3.8 Ground Floor Amenity Space

The ground floor amenity area contains two exits, one direct to outside and the other through a reception area.

Based on the exit widths, it is proposed that the occupancy of the amenity should be limited to 110 occupants after discounting the largest exit.

The amenity space contains an inner room in the form of a courtyard. The dead-end escape distance within the courtyard is approximately 8m. This is within the recommended 18m limit. To meet the guidance for inner room escape it is proposed that the access room (amenity space) be provided with automatic fire detection such that any occupants in the courtyard will receive early means of warning should a fire occurs in the access room.

3.9 14th Floor Amenity Space

Building Regulations guidance recommends that at least two exits should be provided for non-residential uses that have a floor over 11m above ground. The 14th floor is 41m above ground and is served by two stairs. The travel distance will be limited to 18m or 45m where alternative escape routes are provided.

Both stairs will be separated from the accommodation with a smoke vented lobby protection including a 1.5m^2 AOV at roof level.

The proposed layout complies with the guidance.

The occupancy will be limited to 110 people after discounting one storey exit. Note, the estimated occupancy is 92 people based on the furniture/seating layout.

The 14th floor amenity space is illustrated below in Figure 9.

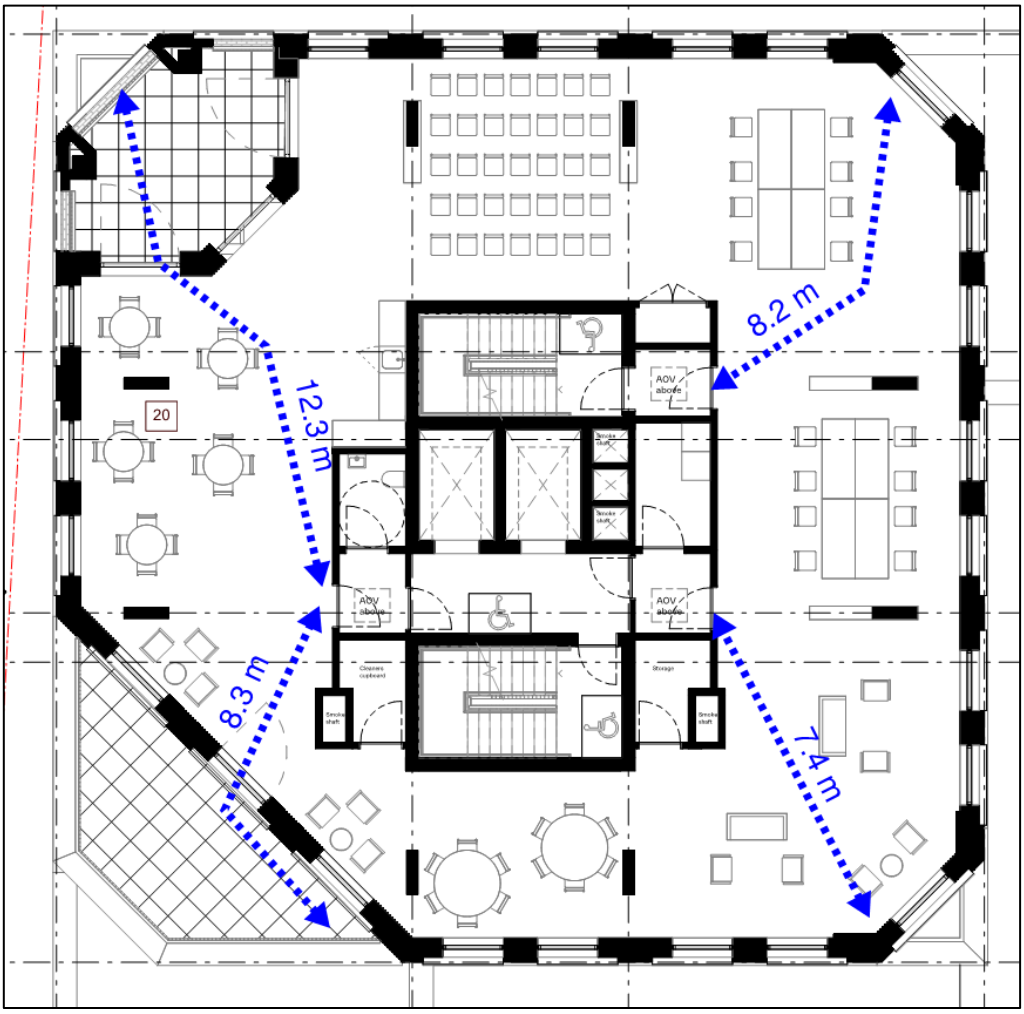

Figure 9 - 14th Floor Amenities space

3.10 Office Accommodation

3.10.1 Occupancy

The office floor has an area of 1220m^2 this gives an occupancy of 204 based on a standard floor space factor of 6m^2.

3.10.2 Storey Exit

The office space is provided with 2 exits located at either end of the office discharging directly onto William Road. Both exits open in the direction of escape and will be at least 1200mm clear width. After discounting the largest exit, the remaining exit provide capacity for 240 occupants which is sufficient for the occupancy.

3.10.3 Travel Distance

Guidance recommends a maximum travel distance of 18m in a single direction of travel and 45m in multiple directions. When analysed the office block shows a maximum single direction of travel of 10m before diverging into two separate directions indicating travel in two directions to be 43m. This is within the recommended limit.

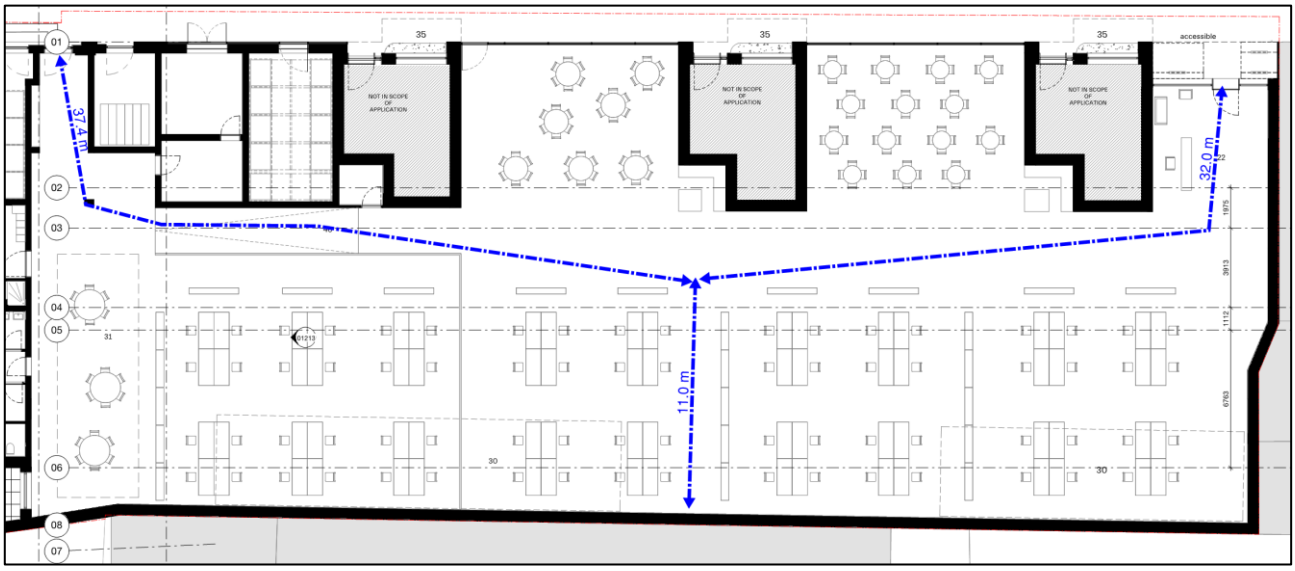

Figure 10 - Block B Office Travel Distance

3.11 Ancillary Accommodation

3.11.1 Bin and Cycle Stores

Guidance recommends travel distances for cycle and bin stores should be limited to no more than 18m in a single direction and no more than 45m where escape is possible in more than one direction.

Travel distances are within the recommended limits in the bin and cycle stores.

3.11.2 Plant Rooms

Guidance recommends travel distances in the plant rooms to the nearest storey exits should be limited to 9m in a single direction and 35m where multiple escape routes are available.

The single travel distances in the basement plant room will be up to 17.5m. This exceeds the limit given in the code guidance but is considered reasonable based on the provision of sprinklers to the building. The fire detection an alarm system will also give early warning of a fire to any occupants in the plant room.

Life safety equipment will be equipped with an alternative power supply as recommended in Section 15 of BS9991.

4.0 FIREFIGHTING

4.1 Firefighting Facilities

The building will have a floor greater than 18m above ground; therefore, a firefighting shaft will be provided to meet the Building Regulations guidance. The floor area is less than 900m² so a single fire fighting shaft is compliant with Building Regulations guidance.

The firefighting shaft will include the following:

- Firefighting lift including backup power supply located within 7.5m of the door to the stair on all floors;
- 1.1m wide firefighting stair;
- 2 hours fire resisting enclosure around the stair and the firefighting lift;
- Dry fire main with an outlet located within the stair enclosure on all floors;
- 1m² automatically opening vent at the head of the stairs;

An outlet will be provided on the full stair landing on all floors. Hose coverage is sufficiently achieved within 60m of a dry fire main outlet and on all floors as shown below in Figure 11.

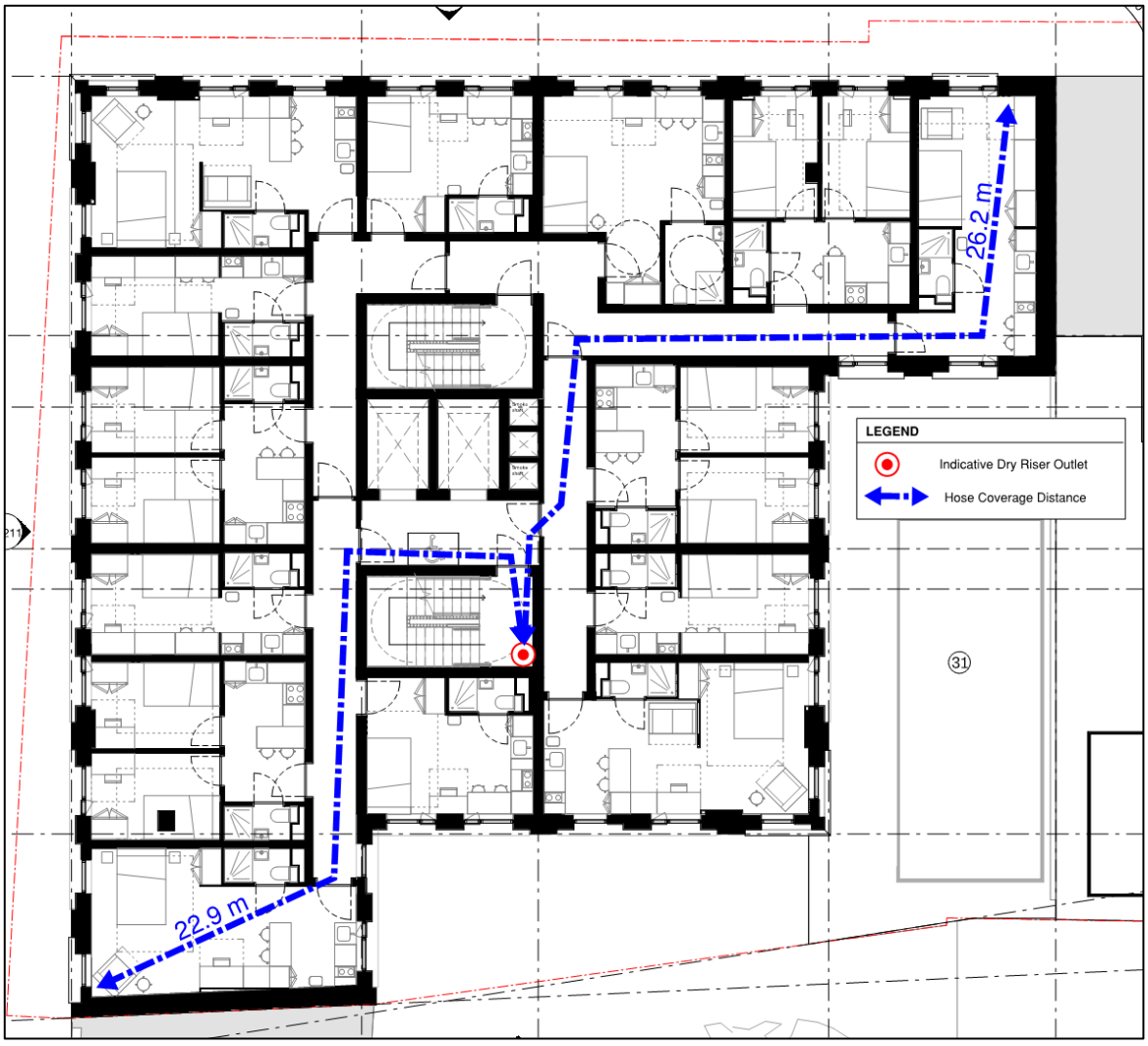

Figure 11 - Hose Coverage

4.2 Site Wide Fire Vehicle Access

Guidance recommends fire vehicle access should be provided to within 18m and in sight of all dry fire main inlets to buildings provided with fire mains.

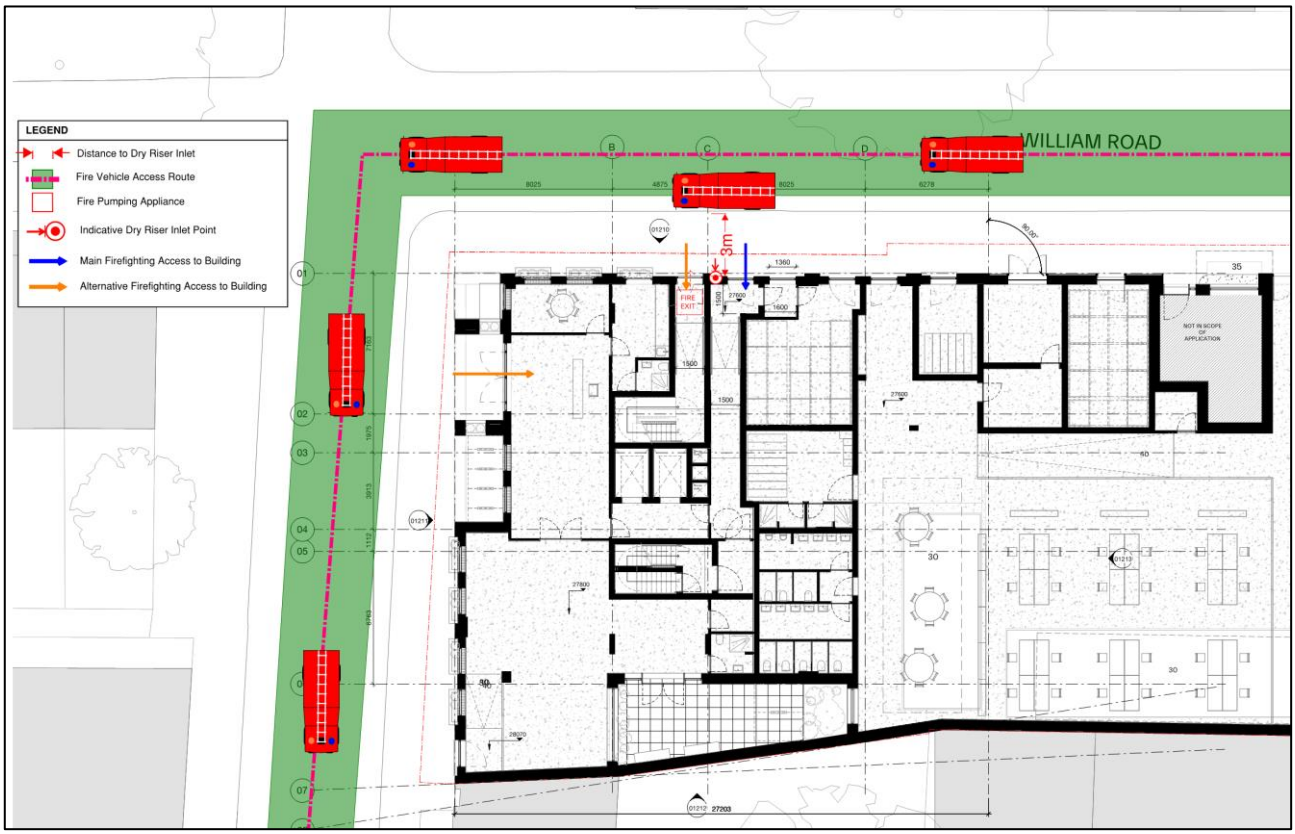

Figure 12 -Fire Vehicle Access

The office is less than 11m in top floor height and less than 2000m^2 in area therefore guidance recommends perimeter access is possible within 15% of the accessible perimeter. This is sufficiently achieved via William Road.

4.3 Basement Smoke Venting

The basement will be smoke vented via a mechanical ventilation system achieving an extraction rate of 10 air changes per hour.

4.4 Hydrants

The site is well covered by the existing street hydrants. At this stage, it is not expected that private hydrants will be required for the development.

5.0 STRUCTURE AND COMPARTMENTATION

5.1 Structure

The structure of the building will achieve 2 hours fire resistance.

5.2 Compartmentation

All floors will be constructed as compartment floors achieving a 2-hour fire resistance period.

Area	Fire Resistance Period
Enclosure to service risers	2-hour fire resistance
Firefighting stair	2-hour fire resistance
Firefighting lift shaft	2-hour fire resistance.
Walls between office and residential areas	2-hour fire resistance
Plant room containing life safety equipment	2-hour fire resistance
Separation between: - • **Student apartments and the common corridor** • **Student apartments**	1-hour fire resistance.
Stair Lobby/ Common Corridors	1-hour fire resistance.
Walls enclosing communal areas	1-hour fire resistance.
Refuse Store	1-hour fire resistance.
Plant Room – Primary main electrical distribution board	1-hour fire resistance. Note, 120-minutes fire resistance if the equipment serves for life safety purposes.
Cycle Store	30-minutes fire resistance.
Walls enclosing cluster corridors	30-minutes fire resistance.
Plant Room - LV	30-minutes fire resistance. Note, 120-minutes fire resistance if the equipment serves for life safety purposes.

Table 1 - Compartmentation

5.3 Cavity Barriers

Cavity barriers will be provided in concealed ceiling voids and floor voids, in accordance with the recommendations of with Section 19 of BS 9991: 2015.

5.4 Fire Stopping

Fire stopping will be provided to maintain the integrity of the fire separating elements in accordance with the recommendations of Section 24.4 of BS 9991: 2015.

5.5 Internal Wall and Ceiling Linings

5.5.1 Residential areas

The internal wall and ceiling linings to the residential areas will achieve the classifications described in Section 20 of BS 9991. These are shown in Table 2 below.

Location	European Class
Rooms no larger than 4m^2	D-s3,d2
Circulation spaces within dwellings	C-s3,d2
Common escape routes and circulation areas	B-s3, d2

Table 2 - Wall and Ceiling Linings in Residential Areas

5.5.2 Office Areas

The surface linings of walls and ceilings in the office and other non-residential areas will meet the classifications given in Table 3 below.

Location	European Class
Rooms no larger than 30m^2	D-s3,d2
Other rooms	C-s3,d2
Other circulation spaces	B-s3, d2

Table 3 - Wall and Ceiling Linings in Non-Residential Areas

6.0 EXTERNAL FIRE SPREAD

6.1 Fire Spread to Adjacent Buildings

Calculations into the permitted glazing on the building's elevations have been carried out using the enclosing rectangle method in line with the recommendations of BRE 187: External Fire Spread- Building Separation and Boundary Distances: 2014.

Guidance allows for the boundary distance to be taken to either the site boundary or to a notional boundary such as to the midpoint of a road on the basis that future development is unlikely. Fire separation between buildings has also been considered.

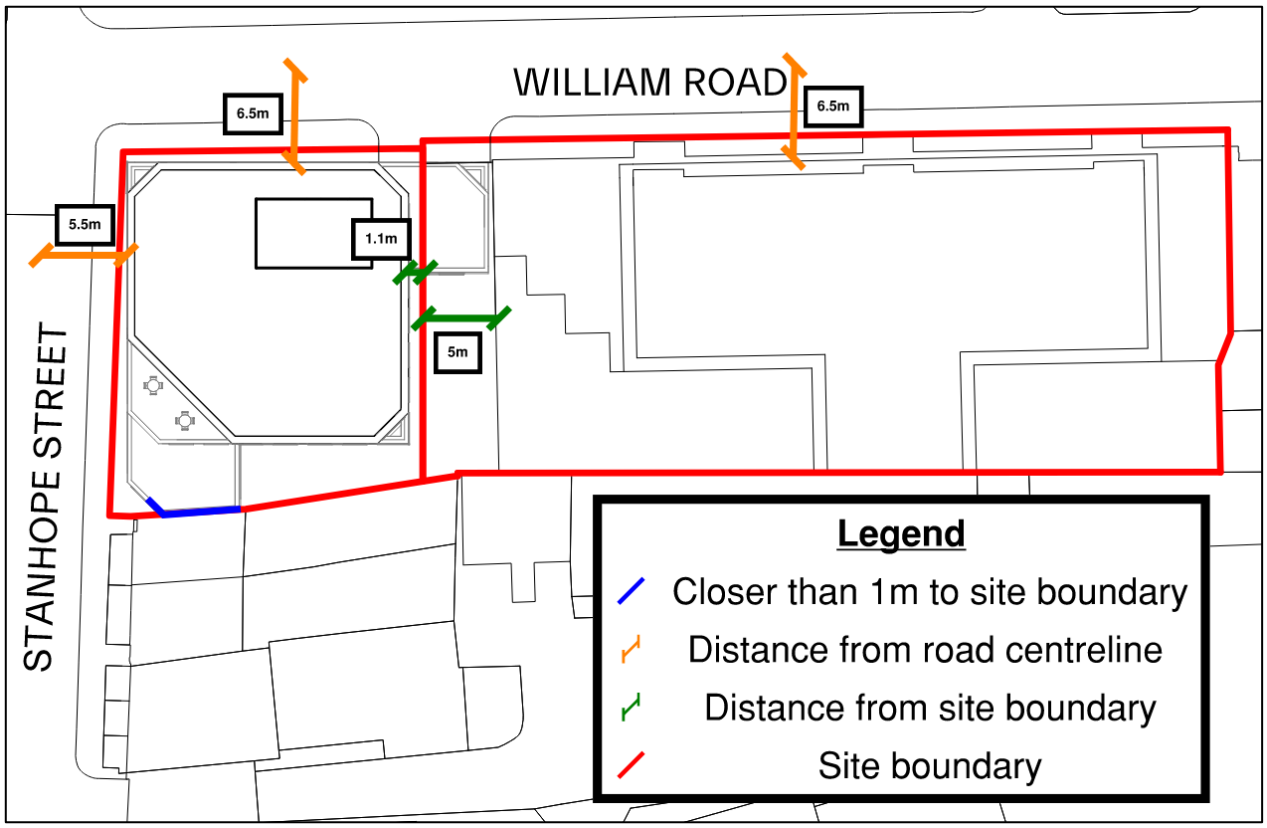

Figure 13 - Site Boundaries and Notional Boundaries

Elevation		Distance to Relevant Boundary (m)	Appropriate Enclosing Rectangle h x w (m x m)	Permitted Unprotected Area (%)
North Elevation	Office	6.5	3.3 x 50	100
	Residential	6.5	3.4 x 8	100
South Elevation	Office	N/A		
	Residential	2.3	3.4 x 8	100
East Elevation	Office	N/A		
	Residential	1.1	3.4 x 5	93.2
West Elevation	Office	5	3.3 x 23	100
	Residential	5.5	3.4 x 5	100

Table 4 – External Fire Spread Assessment

The South and East office external elevations and parts of the residential south elevation (Highlighted in Blue) run in coincidence with the site boundary. Where the building is within 1m of the boundary then the elevation would need to be fire resisting from both sides, with only small unprotected areas i.e. no more than 1m^2 with at least 4m separation or 0.1m^2 with 1.5m separation.

The elevations on the residential accommodation have been established to be able to contain 100% unprotected area on the majority of elevations. However, on the east elevation the amount of unprotected area i.e. glazing is limited to 93.2%. By the amount of glazing that is currently proposed on the scheme this is not considered an issue.

6.2 Protected Routes forming An Internal Angle

It is identified at Levels 1-7 that student unit windows in close proximity and at right angles to the common corridor windows. The distance between the two windows is less than 1.8m in accordance with Figure 31 of BS 9991.

To protect the common escape corridor from a fire in the student unit, it is proposed that fire resisting glazing (fixed shut with 30min integrity and insulation) be provided to the student unit windows.

6.3 External Wall Construction

All materials used in the construction of the external wall will achieve European Class A2-s1, d0 or Class A1, with the exception of sealants, gaskets, doors and windows (including frames); (see regulation 7(3) for the full list of exemptions).

Membranes within the external wall will achieve a minimum Class B-s3, d0.

7.0 FIRE SAFETY MANAGEMENT

7.1 General

Once the building is occupied, it is the responsibility of the management to ensure that all fire safety systems are tested and maintained to ensure their continuous effectiveness. The management should: -

- Be aware of all the fire safety features provided and their purpose
- Ensure a competent person is present in the building during all occupied times
- Liaise with and seek the advice of the fire authority

7.2 Staff

Staff should be trained by competent persons. The training should be at regular intervals and should ensure that all staff know what to do if a fire is discovered; the correct response on hearing a fire alarm, and the correct escape procedures from every part of the building.

A management structure should be provided to ensure that in the case of fire staff are aware of their responsibilities, which should be clearly defined. A chain of command should be provided with clear lines of responsibility, authority and accountability.

7.3 Fire Safety Manual

Before a building is occupied, a fire safety manual should be completed. The purpose of the manual is to clearly define the nature of the fire safety systems provided for the building. It should include: -

- An explanation of the overall fire safety strategy
- Evacuation procedures
- Design documentation to describe the use of each fire safety system
- Staff roles in the event of a fire: their responsibility, authority and accountability
- A detailed maintenance routine

The Fire Safety Manual should be reviewed periodically and when any alterations are made to the building. Details of the suggested contents of the fire safety manual are provided in Section 19 of the Approved Document B and Annex H of BS 9999 Code of practice for fire safety in the design management and use of buildings.

7.4 Maintenance and Housekeeping

It is the role of management to ensure that maintenance is carried out in accordance with the relevant British Standards, so that all fire safety systems are operational in the event of a fire. It is also important that good housekeeping practices are followed. The building management should be aware of any hazardous substances or practices within the building, which increase the risk of fire.

7.5 The Regulatory Reform (Fire Safety) Order 2005

This Order places a duty on the 'responsible person' to ensure, 'as far as is reasonably practical' the safety of thier employees and to take such general fire precautions as may be reasonably required to ensure that the premises are safe [i.e. for non-employees].

Under the Order, there is a requirement to carry out and continually update an assessment of the risk of fire to people in and around the premises/building, and to assess and maintain the measures to reduce those risks to an acceptable level. Where there are five or more employees, the risk assessment must be recorded.

A Fire Risk Assessment should be carried out:-

1. On completion of the building fit out, and strictly before first occupation of the building.
2. Regularly, particularly where any changes occur such as changes in the use of the building, the number or nature of occupants, or building works.
3. We would recommend that a fire risk assessment is carried out at least annually.

Other legal duties include: -

1. Keeping a record of the Fire Safety Arrangements. These are the preventative and protective measures for the building.
2. A person must be nominated for any special role identified in an emergency plan.
3. Employees must be consulted about nominations to perform special roles, and about any proposals for improving the fire precautions.
4. Other employers in the building must be informed about any significant risks, which might affect the safety of their employees, and there must be co-operation with them in measures to reduce the risk.
5. Those having control over the workplace have a responsibility to ensure compliance with the regulations in those parts of the building over which they have control.
6. A suitable and readily available method of calling the emergency services must be established.
7. Employees are required to co-operate in ensuring that the workplace is safe from fire.

The order also adopts 'Principles of Prevention'. These include:-

- Avoiding risks;
- Evaluating the risks which cannot be avoided;
- Combating the risks at source;
- Adapting to technical progress;
- Replacing the dangerous by the non-dangerous or less dangerous [particularly with respect to hazardous substances];
- Developing a coherent overall prevention policy which covers technology, organisation of work and the influence of factors relating to the working environment, and;
- Giving appropriate instructions to employees.

8.0 INFORMATION, LIMITATIONS AND ASSUMPTIONS

The information limitations and assumptions used in the preparation of this report are noted below: -

Drawings

This report is based on the Morris & Company drawings issued to us. Dimensions have been taken from these drawings. The following drawings were used: -

Information

The following information was used for the preparation of this report: -

Drawing	Drawing Number
GROUND FLOOR PLAN - PLOT B	A295 MCO BB G0 DR A 01099
GROUND FLOOR PLAN - PLOT A	A295 MCO BA G0 DR A 01100
LEVEL 01-03 FLOOR PLAN	A295 MCO BA 01 DR A 01101
LEVEL 04-05 FLOOR PLAN	A295 MCO BA 04 DR A 01104
LEVEL 06-07 FLOOR PLAN	A295 MCO BA 06 DR A 01106
LEVEL 08-13 FLOOR PLAN	A295 MCO BA 08 DR A 01108
LEVEL 14 FLOOR PLAN	A295 MCO BA 14 DR A 01114
BASEMENT PLAN	A295 MCO BA B0 DR A 01098
PROPOSED NORTH ELEVATION	A295-MCO XX ZZ DR A 01210

Survey (Existing Building)

This building has not been surveyed by Jensen Hughes.

Building Regulations

This report considers building regulations, which deal with life safety. Property protection and insurance issues are not addressed in this report. Guidance on property protection and insurance requirements can be found in the document *Approved Document B: Fire Safety (Volume 2) – Buildings other than dwellinghouses Incorporating Insurers' Requirements for Property Protection,* RIBA Publishing 2015.

Other Limitations

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

Unless otherwise described in this report, the fire strategy assumes that the building design, the mechanical and electrical systems, construction methods and materials specifications will comply with current Building

Regulations guidance, and relevant British Standards and Codes of Practice. The design of mechanical and electrical systems such as fire alarm and sprinklers is a specialist area. Fire Strategy recommendations are given in this report, however, the design and specifications need to be developed at the appropriate stage in consultation with the specialist designers of these systems.

This report has been prepared for the sole benefit, use and information of MBU Capital and the liability of Jeremy Gardner Associates Limited, its directors and employees in respect of the information contained in the report will not extend to any third party.

APPENDIX A – ASSESSMENT OF COOKING HOBS RADIANT HEAT FLUX

BS 7974 “Applications of Fire Safety Engineering Principles to the Design of Buildings” states that at a point where the radiant heat flux is 10 kW/m² tenable conditions are maintained for 4 seconds and where the radiant heat flux is 2.5 kW/m² they are maintained for 30s. This is a reasonable time to escape from the living room / kitchen area. The radiant heat flux is a function of the heat release rate of a fire and the distance from the fire (see Figure A1).

A research study carried out by IIT Gandhinagar and Underwriters Laboratory Inc. (“Report of research on detection of kitchen fire”, 8 July 2010) shows that the peak heat release rate of a cooktop fire is 86.9 KW. Another research study carried out by Hyeong-Jin Kim and David G. Lilley and published by the American Institute of Aeronautics and Astronautics (“Heat release rates of burning items in fires”, January 2000) gives a heat release rate for a 12-inch pan fire of 116KW. Both of these fire sizes were not controlled by sprinklers or above hob fire suppression system and represent the worst-case scenario as the fire was fed by constantly burning oil.

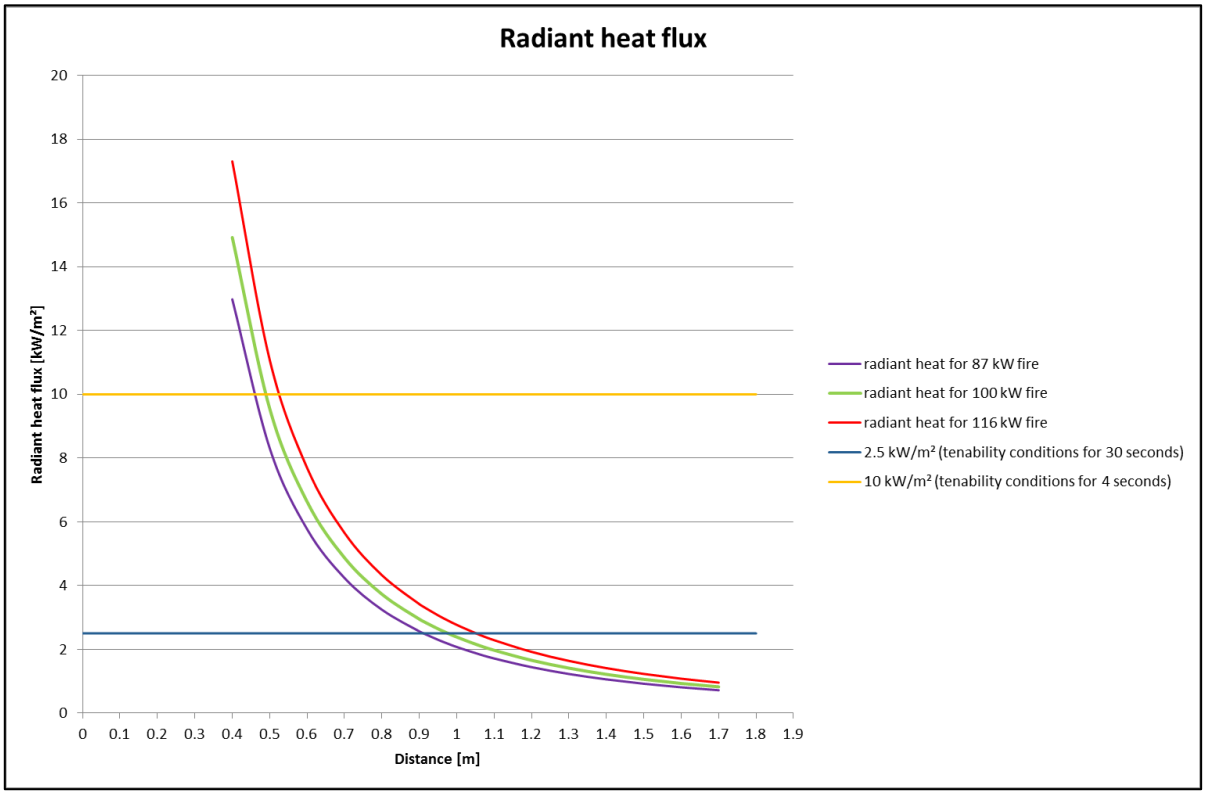

Figure A1 *– Radiant Heat Flux*

The hob fire sizes within a range between 87kW and 116kW are modelled, as shown in the figure above. The calculations below show that to keep tenable conditions for 30 seconds the distance from the hob fire should not be less than 1.1m. To keep tenable conditions for 4 seconds the distance from the hob fire should not be less than 0.53m.

A method of calculating the separation between a fire and a combustible material is described in NFPA92b and the SFPE Handbook, which assumes a point source, and measures the separation distance from this point.

The method relates the radiant heat flux (RHF), q, at a distance r from the centre of a fire to the total of heat release rate (HRR) of the fire, Q_t.

The equation is:

$$q = \frac{0.3Q_t}{4\pi r^2}$$

Where 0.3 is the fraction of heat emitted as radiation.

The distance, r, from the centre of fire can be calculated from the following equation:

$$r = \sqrt{\frac{0.3Q_t}{4\pi q}}$$

Therefore, the distance for 2.5kw/m^2 RHF at 116kW HRR would be:

$$r = \sqrt{\frac{0.3 * 116}{4\pi * 2.5}}$$

$$r = 1.1m$$

The distance for 10kw/m^2 RHF at 116kW HRR would be:

$$r = \sqrt{\frac{0.3 * 116}{4\pi * 10}}$$

$$r = 0.53m$$

Based on the worst case apartment layouts, the distance between the centre of the cooking hob and the opposite wall of the escape path is 1.64m. This means that there will be sufficient clearance for the occupants to avoid the zone containing RHF of 10kW/m^2 and 2kw/m^2 whilst making their way out of the apartment. This is based on adult males with a typical shoulder width of 510mm (SFPE Handbook 2017). Once they reach the apartment entrance/exit door, they will be separated by more than the 1.1m needed to keep exposure to within 2.5kw/m^2. This is tenable for more than 30 seconds, which is sufficient to allow occupants to enter the protected common escape route, at which point they will be protected from the fire by fire resistant construction.

Based on the fire engineering analysis, it is considered that the location of the cooking hobs will not prejudice escape from the studios and open plan apartments and the proposed layouts meet the functional requirements of Building Regulations.

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