



HWA Building, University of Huddersfield

Fire Strategy Report

RIBA Stage 3

Revision 01

28 March 2022

Summary

Project

The proposed Health and Wellbeing Academy (HWA) University of Huddersfield Building development is a 7-storey university building in Huddersfield, which will be used primarily for health education. The height to the topmost occupied storey is 25m.

Fire Engineering Brief

Design Fire Consultants (DFC) is developing the fire safety design for compliance with Part B of the Building Regulations 2010. BS 9999 has been used as the basis of assessment for compliance with Part B of the Building Regulations.

Where the design does not readily comply with prescriptive recommendations, alternative fire engineering solutions have been proposed and are highlighted in the relevant sections of the report.

Means of Escape

A simultaneous regime will be adopted for the building. Escape from floors above ground is via three escape stairs.

Fire Containment

The compartmentation strategy has been developed to divide the building into two zones with 60 minutes fire resisting construction. This provides the benefit of containing fire in the compartment zone

All elements of structure should achieve a minimum fire resistance standard of 60 minutes. The elements of structure which form part of the fire-fighting shaft must achieve 120 minutes fire resistance.

Fire Service Access and Facilities

An internal fire-fighting strategy will be adopted for with access available via the fire-fighting shaft. The shaft will contain a fire-fighting stair, fire-fighting lift and a dry riser outlet. The fire-fighting shaft can be accessed directly from outside the building at Ground Floor. Perimeter access is also available for the lower levels.

Alternative Solutions

Several areas require an alternative solution to BS 9999 due to the constraints of the buildings. The alternative solutions and key issues are summarised below:

- Due to the open connecting design in the main reception/cafe area, there are escape routes located within 4.5m of the balcony edge on Level 01-04. The associated risks are mitigated based on the following (see Section 3.2.2):
 - An OH1 automatic sprinkler system in accordance with BS EN 12845 will be provided throughout the building. As sprinkler system is not required for this building as per prescriptive requirement, this is a significant enhancement which will limit the fire growth and smoke spread.
 - A Category L1 fire detection and alarm system with voice alarm system is provided which is above the minimum prescriptive requirement. This will reduce response times and facilitate early evacuation.
 - The stair widths and storey exit widths are oversized for the design occupancy. Alternative routes of escape are available for the occupants on the balconies, with travel distances within the maximum allowable limits.

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- As an additional fire safety measure, the void space is provided with a smoke clearance system that will vent heat and smoke out of the building.
- The floor area exceeds 900m² below Level 04 and is less than 900m² (excluding the protected core, stairs and lobbies) on Level 05 to 07, however the building is proposed to be provided with a single fire-fighting shaft based on the following (refer to Section 4.2):
 - The building is provided with OH1 automatic sprinklers throughout the building and as an enhanced fire protection measure the sprinkler coverage would effectively control the size and intensity of a potential fire, thus mitigating the risks associated with larger floor area for firefighting operations.
 - Every floor level is divided into two compartmentation zones with 60 minutes fire resisting construction. This provides the benefit of containing fire in the compartment zone where it originated.
 - The worst case hose laying distance measured from the fire main in the firefighting shaft is 56m, which is less than the 60m limit for a sprinkler protected building.
 - The height of the topmost storey (Level 03) which exceeds 900 m² in floor area (excluding protected cores) is 13m, firefighting can be undertaken based upon a combination of perimeter access and internal access for these low levels.
- The firefighting stair is accessed via a second protected lobby on Level 01-04, typically prescriptive guidance would require ventilation to be provided in the lobby. It is considered that ventilation requirement can be safely omitted in the protected lobby based on the following (refer to Section 5.4.4):
 - The protected lobby is not a firefighting lobby and does not provide fire service access, therefore the risk of set of lobby doors being held open during firefighting and resulting in smoke ingress into the firefighting stair is low.
 - The proposed L1 fire detection and alarm system and OH1 sprinkler system coverage are above the minimum prescriptive requirements, which will provide early detection and largely limit the potential spread of fire and smoke in the event of a fire.
 - The protected lobby achieves 120 minutes fire resistance (EI) with FD 60S doors, which reduces the risks of a potential fire affecting the protected lobby and the firefighting stair.

These alternative solutions are variations to BS 9999 and fire engineering principles will be applied to determine their acceptability, with further analysis undertaken during RIBA Stage 4.

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1 Introduction

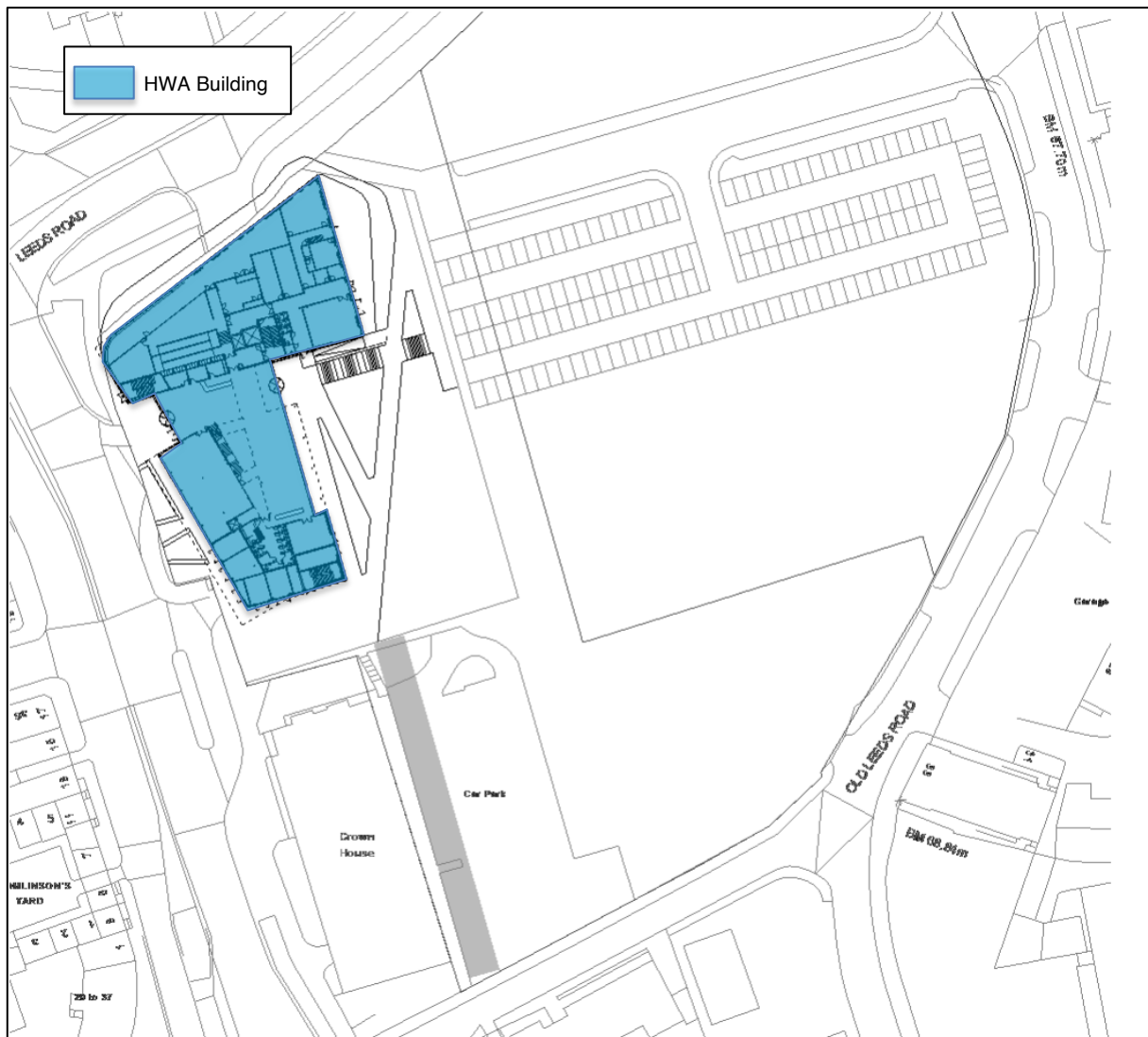
Design Fire Consultants (DFC) has been appointed by University of Huddersfield to provide fire safety engineering services for the proposed Health and Wellbeing Academy (HWA) Building development in the University of Huddersfield. This report documents the proposed RIBA Stage 3 fire strategy for the scheme and should be read in conjunction with fire strategy drawings provided in Appendix B of this report.

This report is intended to inform design coordination and initial consultation with the Approving Authorities to obtain an agreement in principle for the fire strategy.

1.1 Building Description

The proposed development is a 7-storey university building which will be used primarily for health education. The site plan and building location are shown in Figure 1.

Figure 1: Site plan and building location



The building will comprise primarily teaching facilities at Level 00-04 and office space at Level 05-06. Level 00 also includes a cafe, which opens into a void that connects some of the upper floors (refer to Section 3.2.2).

The key building features that influence the fire safety design are outlined in Table 1.

Table 1: Key building features

Item		HWA Building Development
Height		25m to topmost storey
Number of Storeys		7
Building Use	Level 00	Entrance, cafe, student hub, gait analysis, community house and back of house areas
	Mezzanine	Community house
	Level 01-04	Classrooms, physio labs, PC labs, internal and external plant room, and roof terrace
	Level 05-06	Office space and roof terrace
	Roof level	External plant enclosure
Site Location		Site bordered by Leeds Road and Old Leeds Road. Refer to Figure 1.

1.2 Legislative Requirements

Fire safety design must achieve the minimum standard required by Part B of Schedule 1 to the Building Regulations 2010¹ (hereafter referred to as Part B). The strategy has been developed to assist in obtaining approval in principle from the Approving Authorities and demonstrates compliance with Part B.

1.3 Basis of Design

To allow greater flexibility in the design it is proposed that the HWA Building development will adopt the guidance of BS 9999² for demonstrating compliance with the Building Regulations. BS 9999 uses a qualitative risk assessment process to determine the package of fire safety measures appropriate for a given building. This is based on the occupant characteristics within the space and the potential growth rate of a fire if it were to occur. Reference to Approved Document B³ (ADB) will also be used for the community house areas.

1.4 Purpose of Report

Preliminary consultation has been held with both Kirklees Building Control and West Yorkshire Fire and Rescue Service (WYFRS)^{4,5}. This Stage 3 fire strategy report update is intended to capture specific elements that formed part of those discussion with Building Control and WYFRS, as well as to incorporate minor changes to the architectural plans since last issue of Stage 3 fire strategy report.

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¹ Statutory Instruments, '2011 No. 1515 BUILDING AND BUILDINGS, ENGLAND AND WALES The Building (Amendment) Regulations 2011', 2.1515 (2011), 1–4.

² BS 9999, 'Fire Safety in the design, management and use of buildings – Code of practice', 2017

³ HM Government, The Building Regulations 2010, Approved Document B (Fire Safety), Volume 2 – Buildings other than dwellings, 2019 edition incorporating 2020 amendments (for use in England).

⁴ Meeting minutes email, Adam Monaghan "Re: HWA-Fire Strategy Workshop 15.03.22", 15th March 2022.

⁵ Meeting minutes email, Paolo Colagiovanni "Re: HWA-Fire Strategy Workshop 15.03.22", 16th March 2022.

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Revision markers are provided throughout the report to highlight changes since the last version of the Stage 3 fire strategy report. To summarise, the main changes are related to the following sections:

- Summary
- Section 4.1
- Section 5.1.9.3
- Section 5.3.1
- Section 5.4.5

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2 Building Use and Occupant Load

The facility will comprise predominantly teaching facilities and office space.

2.1 Risk Profile

Each separate use within the building (refer to Table 2) is assigned a risk profile, which determines the fire safety measures associated with those risk profiles. Refer to Appendix A for determination of risk profiles. Although BS 9999 recommends that a building with multiple risk profiles should adopt the most onerous predominant risk profile, it is proposed that the building is divided into distinct uses (or risk profiles) as the predominant risk profile (B1) at Level 00-04 is not appropriate for the back of house areas (A2), or office space (A1) at Level 05-06.

Each use and the associated escape routes and exits are identified as outlined in Table 2. (Refer to Appendix A for determination of risk profiles, note that risk profiles have been reduced to account for the additional fire protection measures such as the automatic sprinkler system).

Because there are interdependencies throughout the building in terms of operation and circulation (including the connected void), the most onerous risk profile should be adopted for the shared circulation routes and space where multiple risk profiles use that space.

Table 2: Building use risk profile and escape routes

Risk Profile	Use	Exit Provisions
1. Teaching Facilities (Risk Profile B1)	Level 00: Community house, gait analysis, physio lab	Exits directly to outside or via circulation corridors to outside.
	Mezzanine: Community House	Exit via internal stair to outside.
	Level 01-04: Classroom, physio lab, fidelity lab, acute care, clinic care, operating theatre training, PC lab, IT hub room, external partner, roof terrace	Exits via two alternative protected stairs with protected lobbies. Level 01-03 also has access to a third protected stair.
2. Office Space (Risk Profile A1)	Level 05-06: Office space	Exits via two alternative protected stairs.
3. Back of House (Risk Profile A2)	Level 00: Plant, kitchen	Exits directly to outside.
	Level 01: UPS room, comms room	Exits via two protected stairs with protected lobbies and an alternative third protected stair.
	Level 04: Plant	Exits via two alternative protected stairs with protected lobbies.
	Rooftop: Plant	Exits via protected stair.
4. Cafe (Risk Profile B1)	Level 00: Cafe	Exits directly to outside.

2.2 Design Occupant Load

The estimated maximum occupant load for each distinct use based on the accommodation schedule is outlined in Table 3. This has taken into account the plant rooms and storage rooms in the back of house area, which will be infrequently occupied by minimal workforce (assuming 1 person per room).

The occupant load in the building will ultimately be limited by the stair layout, clear stair width, minimum clear width of the storey exits and any direct exits to outside. The proposed occupant load for each space within the building is expected to be within this maximum limit.

Table 3: Building Occupant Load

Risk Profile	Floor	Occupant Load
1. Teaching Facilities (Risk Profile B1)	Level 00	191 persons
	Level 01	307 persons
	Level 02	357 persons
	Level 03	331 persons
	Level 04	181 persons
2. Office Space (Risk Profile A1)	Level 05	80 persons
	Level 06	85 persons
3. Back of House (Risk Profile A2)	Level 00	12 persons
	Level 01	2 persons
	Level 04	2 persons
	Rooftop (Level 07)	2 persons
4. Cafe (Risk Profile B1)	Level 00	100 persons

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3 Means of Escape

3.1 Evacuation Strategy

A simultaneous evacuation regime will be adopted within the building. On confirmed detection of fire, the alarm will be raised throughout the building and all occupants within the building are required to evacuate.

3.2 Horizontal Escape Routes

3.2.1 Internal Routes

This sub-section highlights the recommendations for the layout of escape routes throughout the building, and should be read in conjunction with Appendix A, which highlights the review and assessment of each use with respect to the allocation of Risk Profile and the application of BS 9999 to escape route components.

Teaching Facilities

Table 4 summarises the recommendations for the layout of escape routes throughout the teaching facilities (Risk Profile B1) based upon the review and assessment in Appendix A.

Based on the reviewed plans, the proposed design should be able to meet the requirements regarding number of exits, door swing, travel distances and exits widths, outlined in Table 4 throughout the teaching facilities.

Table 4: Minimum escape route recommendations for teaching facilities

		Number of Occupants		
		≤ 60 persons	> 60 & <163 persons	≥ 163 persons
Number of Exits		≥ 1 *	≥ 2	
Door Swing		Against or in the direction of escape	In the direction of escape	
Travel Distance	Single Direction**	≤ 27.6m		
	> Two Directions**	≤ 69m		
Storey Exit Width***		> 800mm		≥ 1050mm & ≥ 3.06mm/person
Stair Width		1500mm (Refer to Section 3.3)		

Notes:

* A single exit is acceptable providing that the single direction distance is within the stated recommendations.

** Travel distance is taken from Table 11 of BS 9999 with allowable variations as outlined in Appendix A.

*** Door widths are taken from Table 12 of BS 9999 with allowable variations as outlined in Appendix A. Doors should achieve a minimum of 850mm where they provide unassisted wheelchair access.

Office Space

Table 5 summarises the recommendations for the layout of escape routes throughout the office space (Risk Profile A1) based upon the review and assessment in Appendix A.

Based on the reviewed plans, the proposed design should be able to meet the requirements regarding number of exits, door swing, travel distances and exits widths, outlined in Table 5 throughout the office space.

Table 5: Minimum escape route recommendations for office space

		Number of Occupants		
		≤ 60 persons	> 60 & <177 persons	≥ 177 persons
Number of Exits		≥ 1 *	≥ 2	
Door Swing		Against or in the direction of escape	In the direction of escape	
Travel Distance	Single Direction**	≤ 29.9m		
	> Two Directions**	≤ 74.75m		
Storey Exit Width***		> 800mm		≥ 1050mm & ≥ 2.81mm/person
Stair Width		1500mm (Refer to Section 3.3)		

Notes:

* A single exit is acceptable providing that the single direction distance is within the stated recommendations.

** Travel distance is taken from Table 11 of BS 9999 with allowable variations as outlined in Appendix A.

*** Door widths are taken from Table 12 of BS 9999 with allowable variations as outlined in Appendix A. Doors should achieve a minimum of 850mm where they provide unassisted wheelchair access.

Back of House

Table 6 summarises the recommendations for the layout of escape routes throughout the back of house areas (Risk Profile A2) based upon the review and assessment in Appendix A.

Based on the reviewed plans, the proposed design should be able to meet the requirements regarding number of exits, door swing, travel distances and exits widths, outlined in Table 6 throughout the back of house areas.

Table 6: Minimum escape route recommendations for back of house areas

		Number of Occupants		
		≤ 60 persons	> 60 & <163 persons	≥ 163 persons
Number of Exits		≥ 1 *	≥ 2	
Door Swing		Against or in the direction of escape	In the direction of escape	
Travel Distance	Single Direction**	≤ 25.3m		
	> Two Directions**	≤ 63.25m		
Storey Exit Width***		> 800mm		≥ 1050mm & ≥ 3.06mm/person
Stair Width		1500mm (Refer to Section 3.3)		

Notes:

* A single exit is acceptable providing that the single direction distance is within the stated recommendations.

** Travel distance is taken from Table 11 of BS 9999 with allowable variations as outlined in Appendix A.

*** Door widths are taken from Table 12 of BS 9999 with allowable variations as outlined in Appendix A. Doors should achieve a minimum of 850mm where they provide unassisted wheelchair access.

Cafe

Table 7 summarises the recommendations for the layout of escape routes throughout the cafe (Risk Profile B1) based upon the review and assessment in Appendix A.

Based on the reviewed plans, the proposed design should be able to meet the requirements regarding number of exits, door swing, travel distances and exits widths, outlined in Table 7 throughout the cafe.

Table 7: Minimum escape route recommendations for cafe

		Number of Occupants		
		≤ 60 persons	> 60 & <163 persons	≥ 163 persons
Number of Exits		≥ 1 *	≥ 2	
Door Swing		Against or in the direction of escape	In the direction of escape	
Travel Distance	Single Direction**	≤ 27.6m		
	> Two Directions**	≤ 69m		
Storey Exit Width***		> 800mm		≥ 1050mm & ≥ 3.06mm/person

	Number of Occupants		
	≤ 60 persons	> 60 & <163 persons	≥ 163 persons
Stair Width	N/A (Refer to Section 3.3)		

Notes:

- * A single exit is acceptable providing that the single direction distance is within the stated recommendations.
- ** Travel distance is taken from Table 11 of BS 9999 with allowable variations as outlined in Appendix A.
- *** Door widths are taken from Table 12 of BS 9999 with allowable variations as outlined in Appendix A. Doors should achieve a minimum of 850mm where they provide unassisted wheelchair access.

3.2.2 Open Spatial Planning

The building incorporates a void space extending from Level 00 to Level 04. As the building does not rely upon compartment floors to support means of escape or mitigate against internal or external fire spread, the void space does not penetrate the compartment floor. Therefore, the void space does not need to be designed in accordance with Annex B or Annex C of BS 9999.

Due to the open connecting design in the main reception/cafe area, there are escape routes located within 4.5m of the balcony edge on Level 01-04 (as shown in Figure 2 and Figure 3).

The escape conditions along the balcony edge are supported by the following fire safety measures:

- Fire load in the base of the void space shall be limited, by virtue of the void base primarily being circulation, with limited seating and furnishings and cafe areas. This is comparable to breakout/communal spaces provided on all upper floors.
- The compartmentation strategy on every floor has been developed to divide the floor plate into two zones with 60 minutes fire resisting construction (refer to Figure 3 and Appendix B). This provides the benefit of containing fire in the compartment zone where it originated and minimising the risks imposed by balcony escape in the event of a fire in 'Green' zone (see Figure 3).
- Rooms opening onto the void have smoke retarding construction and self-closers, which reduces the fire risks present. The void space and escape routes will not contain any significant fire load or ignition sources (see Figure 2).
- As shown in Figure 3, alternative routes of escape are available for the occupants on the balconies, with travel distances to storey exits within the limits outlined in Section 3.2.1.
- An OH1 automatic sprinkler system in accordance with BS EN 12845⁶ will be provided throughout the building. This is a significant enhancement as a sprinkler system is not required for this building as per prescriptive guidance. The sprinkler provision will limit the potential spread of fire and significantly lower the temperature within the smoke layer in the event of a fire.
- The proposed L1 fire detection and alarm system (with aspirating smoke detection system) will provide early detection and warning. It is proposed that the building be provided with a voice alarm system giving evacuation instructions (refer to Section 5.4.6), which would provide a clear benefit in reducing response times in evacuation.
- As an additional measure to assist fire service intervention, the void space is provided with a smoke clearance system that will vent heat and smoke from the area (refer to Section 4.3 and 5.4.5). Although not specifically designed to facilitate means of escape, this system will assist with the upward flow of smoke and reduce the amount of smoke logging.

⁶ BS EN 12845 + A2, 'Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance', 2004 + 2009

Detailed analysis, including modelling, will be undertaken in RIBA Stage 4 with the purpose to determine the acceptability of egress along the void balconies..

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Figure 2: Indicative visual of void space design

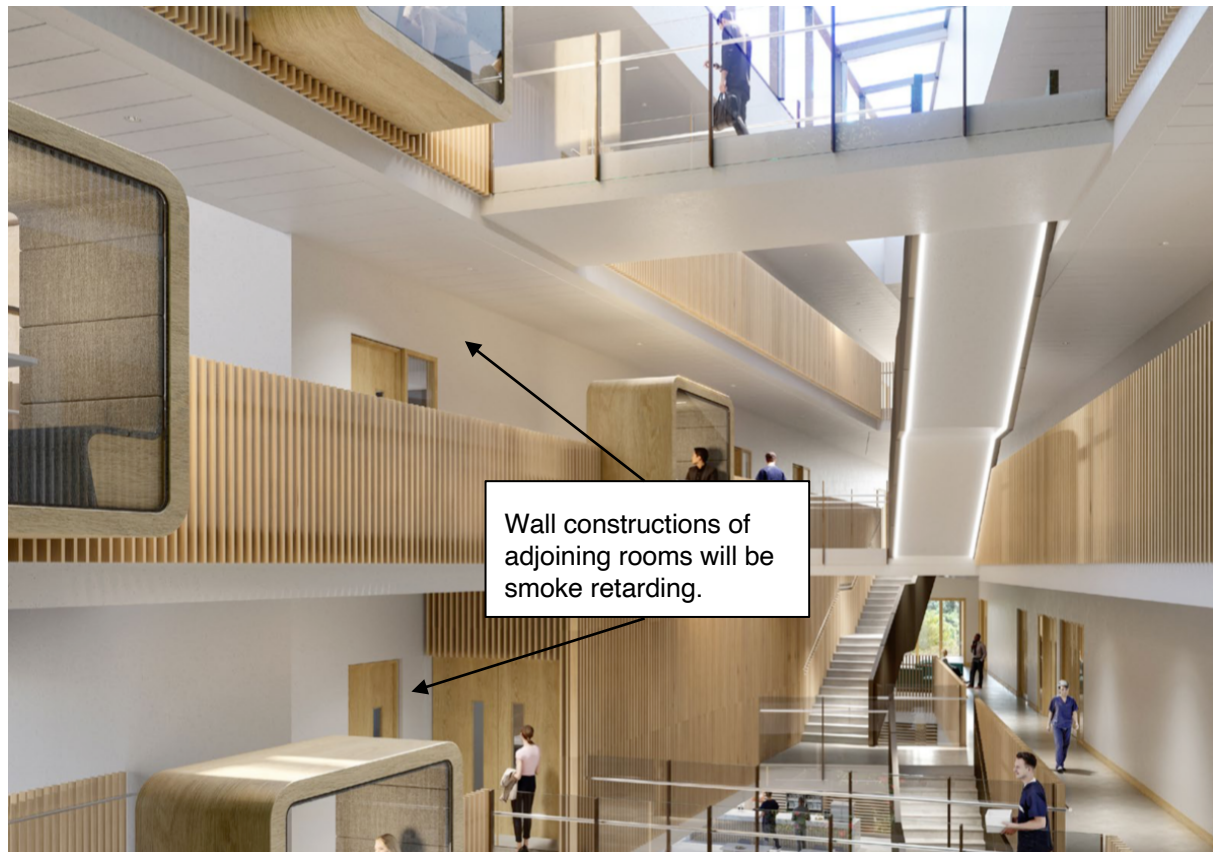
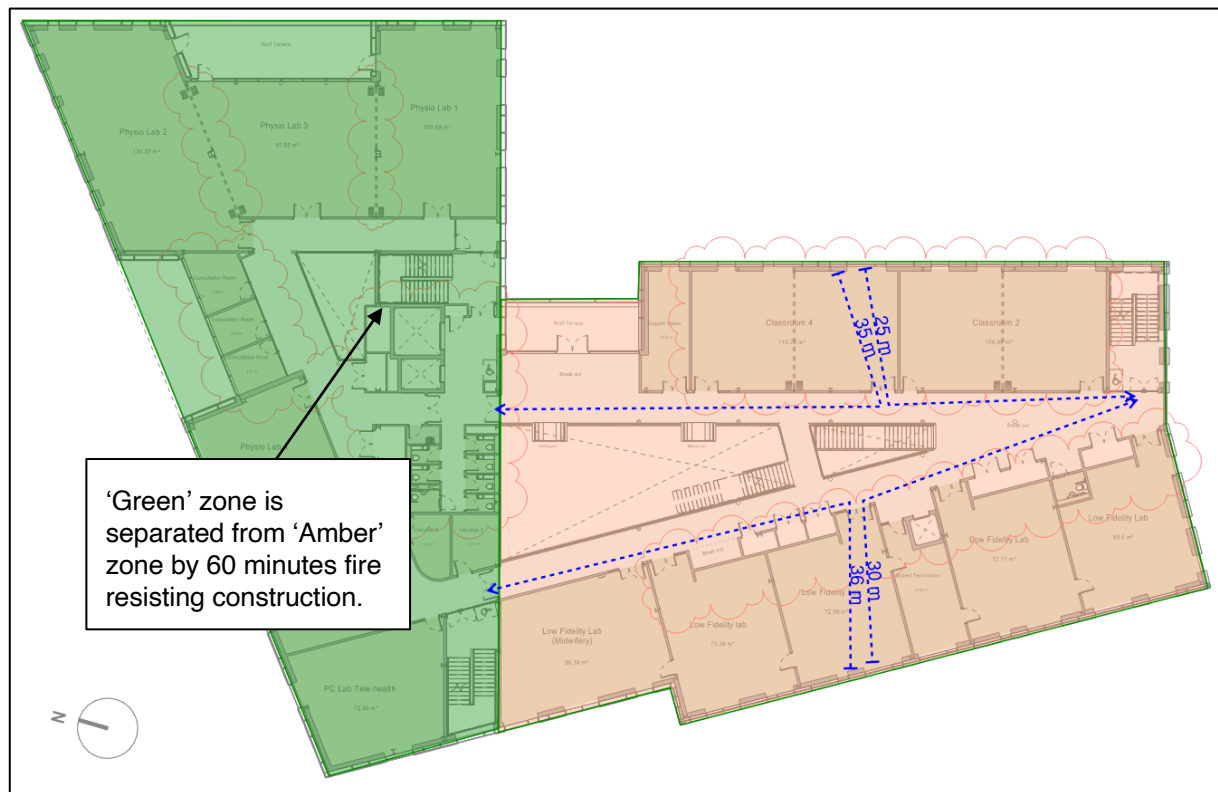


Figure 3: Balcony escape on a typical floor



3.2.3 Inner Rooms

There are instances of inner room or inner-inner room (e.g. stores) conditions within the open-plan office area and plant rooms. These inner room conditions will be protected in accordance with the following measures:

- Occupants in the inner rooms, and inner-inner rooms, will be provided with earliest possible warning in the event of a fire in the access room; this will be achieved by the comprehensive automatic fire detection and alarm system with smoke detection coverage throughout, as specified in Section 5.4.6.
- Travel distance from the inner rooms, and inner-inner rooms, to a storey exit shall meet the requirements outlined in Section 3.2.1.
- Occupant load in the inner rooms, and inner-inner rooms, will be limited.
- None of the access rooms will be a place of special fire hazard.
- Sprinkler coverage is provided throughout the building including the inner rooms and access rooms.

3.3 Vertical Escape Routes

The fire strategy has been developed to adopt a simultaneous evacuation strategy. Storeys above ground are served by up to three stairs, each with a clear width of at least 1500mm. Stair 1 (firefighting stair) serves Level 01-06 and Roof Level. Stair 2 serves Level 01-06. Stair 3 only serves Level 01-03 (Refer to Appendix B).

For conservatism, the stair sizing calculations have been based on discounting Stair 3. As Stair 1 and Stair 2 are provided with lobby protection, it is not necessary to discount them.

3.3.1 Teaching Facilities and Office Space

The stair sizing calculation assumptions are shown in Table 8 having discounted Stair 03 and assuming a subsequent even distribution of the building population.

Table 8: Above ground occupancy split for stair sizing calculation

Floor	Occupant Load	Occupants Served		
		Stair 01	Stair 02	Stair 03
Level 07 (roof)	N/A	N/A	N/A	N/A
Level 06	85	42	43	N/A
Level 05	80	40	40	N/A
Level 04	181	91	90	N/A
Level 03	331	166	165	DISCOUNTED EXIT
Level 02	357	178	179	DISCOUNTED EXIT
Level 01	307	154	153	DISCOUNTED EXIT
Level 00 (ground)	N/A	N/A	N/A	N/A
Total	1280 people	671 people	670 people	0 persons

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As outlined in Section 3.2, the applicable risk profile is 'B1' for teaching facilities and 'A1' for office space. The most onerous risk profile 'B1' has been adopted in determining the minimum vertical exit width.

The width per person required for vertical escape is outlined in Table 9 (refer to Appendix A).

Table 9: Minimum vertical exit width for Risk profile B1

Floors Served	Maximum Recommended Vertical Widths BS 9999 Risk Profile B1 - 15% (BS 9999; Table 13)
6 Floors	2.1mm – 15% = 1.79mm/person

Therefore, the minimum stair width required to serve 671 people over 6 floors is 1200mm. The minimum stair width of 1200mm should be measured as the clear width between walls or balustrades. Handrails that project a maximum of 100mm on each side of the stair can be ignored for the purposes of the measurement of stair width.

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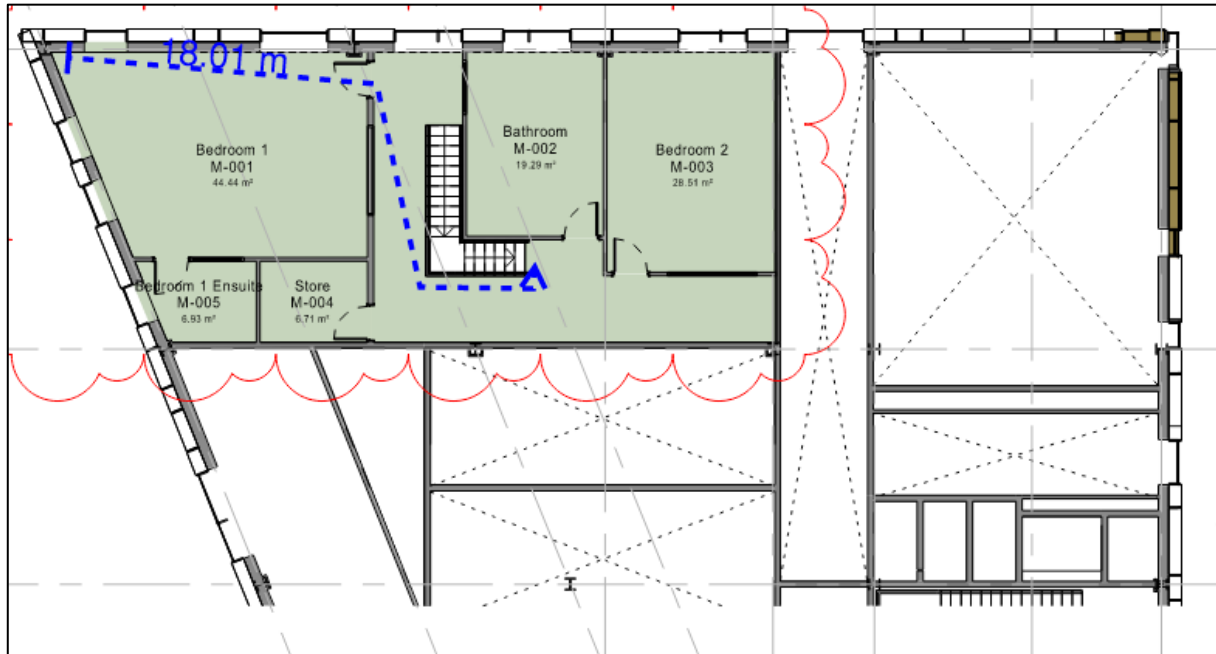
The stair width will be maintained throughout the escape routes on Level 00 to outside and away from the building (including clear width of doors and corridors).

As client requirements are for all escape stairs to have a minimum clear width of 1500mm, the stair width will be sufficient for the design occupant load.

Mezzanine Level

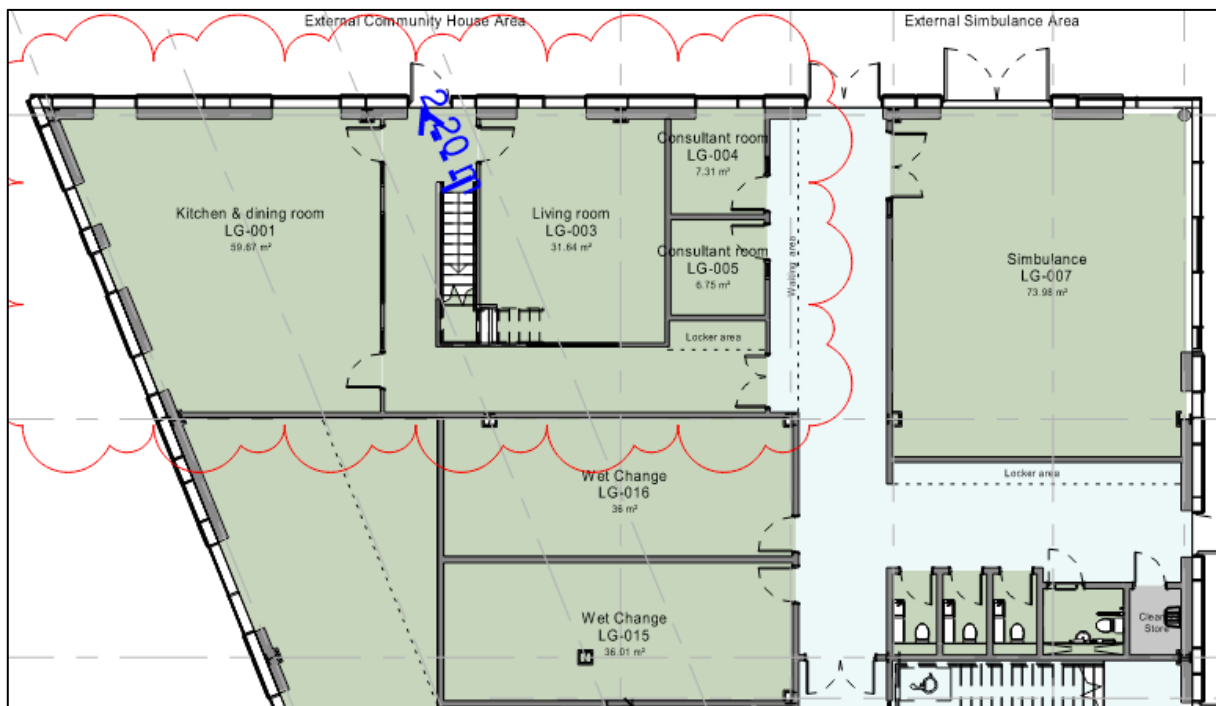
Within the community house, there is a small mezzanine level which is provided with internal stair access as shown in Figure 4.

Figure 4: Internal layout of community house on Mezzanine Level



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Figure 5: Internal layout of community house on Level 00



It is considered that the internal stair does not require fire protection based on the following:

- The community house is for training purpose only, therefore there is no sleeping risk which would be characteristic of typical dwellings.

- Should a fire occur on the mezzanine level, the proposed L1 fire detection and alarm system (see Section 5.4.6) and sprinkler system coverage (see Section 5.3.1) will provide early warning and limit potential spread of fire on the mezzanine level.
- The stair can be unprotected following ADB recommendation for small premises based on the following:
 - The internal stair connects Level 00 and mezzanine only, and the premise is not used as a restaurant or bar.
 - The travel distance from mezzanine level to the top of the stair is 18m (see Figure 4).
 - Escape route down the internal stair leads directly to the final exit of the building, with travel distance from the base of the stair to the final exit being less than 3m (see Figure 5).
 - Though the maximum floor area of any storey (150m²) in the community house is above the ADB recommended limit of 90m² for small premises, the stair is enclosed as opposed to being open stair in the ADB recommendation. In addition, typically a sprinkler system is not required in small premises. Its provision and L1 fire detection and alarm system will adequately mitigate the risks associated with slightly increased floor areas.

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3.3.2 Back of House

The back of house areas located on Level 00 are served by escape routes that are level routes direct to outside. Vertical escape is not required.

The plant rooms on Level 01 and roofs are accessed from the protected stair. The occupancy of the plant rooms is expected to be 1 person per room. Therefore, this has been considered as part of the overall building occupant load in consideration of vertical escape.

3.3.3 Cafe

The cafe located on Level 00 is served by perimeter exits direct to outside. Vertical escape is not required.

3.4 Occupants Requiring Assistance

A minimum of one wheelchair refuge space (1400mm x 900mm) per protected stair per storey will be provided in the firefighting lobby and the stair landings of protected escape stairs (Stair 2 and Stair 3) on every above ground floor level.

The refuges will be located so that they do not obstruct or reduce the escape width for other occupants.

Given the nature of the work required involving rooftop access (i.e. maintenance or replacement of mechanical equipment), it is not anticipated that access is required for mobility impaired occupants. As such it is proposed that a wheelchair refuge space is not required at Level 07 (Roof level).

A two-way communication system will be provided within the building to allow disabled occupants within disabled refuge areas to communicate with those managing the evacuation. The system will be designed as a Type B outstation in accordance with BS 5839-9⁷ and will provide communication to a staff-controlled station located at the base of the stair or at a suitable control panel.

⁷ BS 5839-9, 'Fire detection and alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems', 2011

The Fire Service should not be relied upon to evacuate occupants requiring assistance, and this should be managed by the tenants of each office space. Development of a personal emergency evacuation plan (PEEP) should be considered by the operator for any occupants requiring assistance.

Further guidance on the evacuation of disabled persons can be found in the guidance document produced by the UK government⁸.

⁸ HM Government, 'Fire Safety Risk Assessment Supplementary Guide – Means of Escape for Disabled People'. 2007.

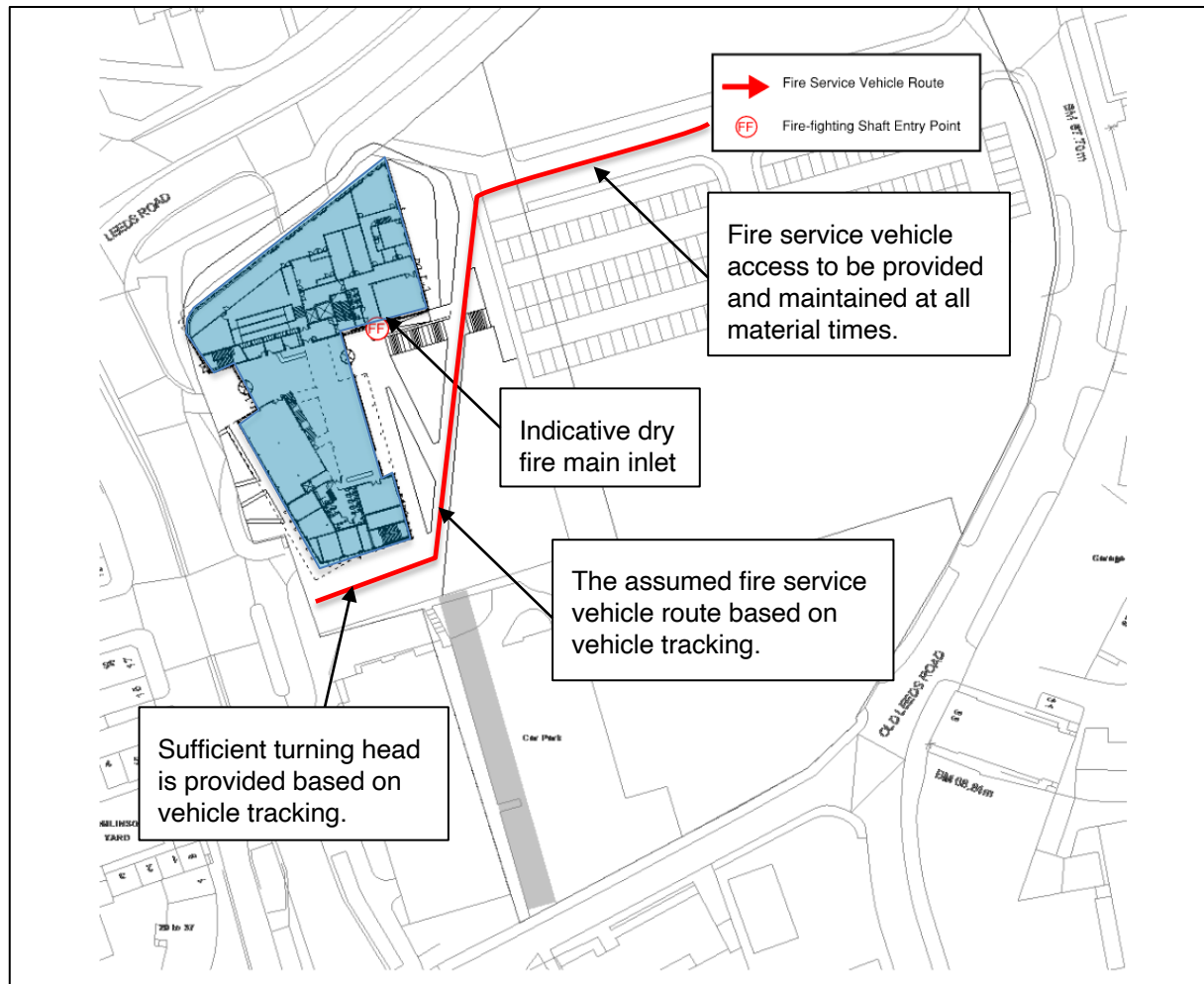
4 Fire Service Access Strategy

As the top floor of the building is greater than 18m above ground level, the fire strategy adopts internal firefighting access for firefighting personnel via a firefighting shaft.

4.1 Vehicle Access

The building is accessed via Leeds Road and Old Leeds Road (see Figure 6). Fire Service Vehicle access is provided to within 18m of the dry rising main inlet and adjacent to the fire-fighting shaft entry points as shown in Figure 6.

Figure 6: Fire-fighting access on the perimeter of building



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The vehicle access roads are to be designed in accordance with Table 10 for pump appliances as per BS 9999 guidance.

Table 10: Access route requirements for pump appliances

Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
3.7	3.1	16.8	19.2	4	24.0*

Note:

* While BS 9999 recommends 12.5t, this is a requirement by West Yorkshire Fire & Rescue Service⁹.

4.2 Internal Access

The building is more than 18m high and therefore a fire-fighting shaft is required.

The fire-fighting shaft arrangement in this building is provided in a single fire-fighting shaft which consists of the following:

- A ventilated fire-fighting stair (see Section 5.4.2).
- A ventilated fire-fighting lobby (see Section 5.4.3).
- Fire-fighting lift installation (see Section 5.4.1).
- Dry rising fire main (see Section 5.3.2).

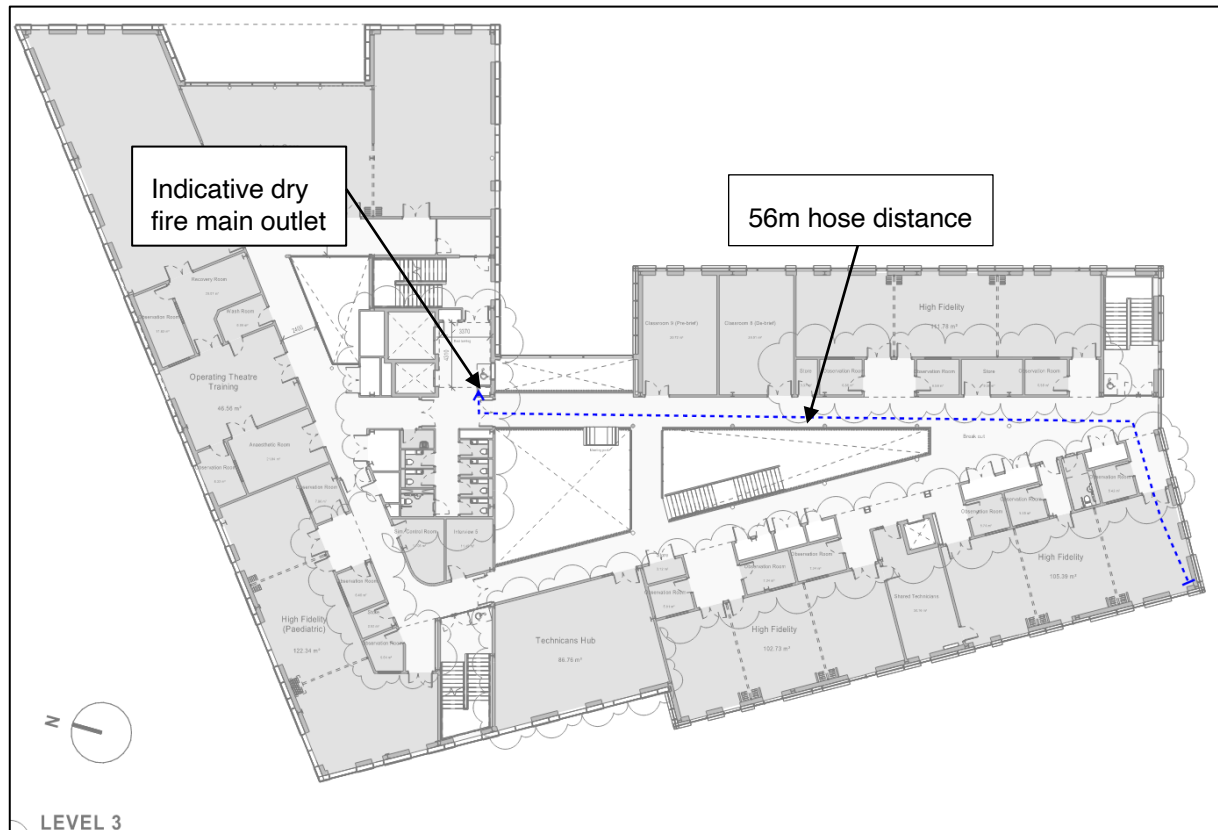
At Level 01-03, the maximum internal floor area is approximately 1915m² (excluding stair cores). Based on a floor area in excess of 900m², BS 9999 would recommend that two firefighting shafts should be provided.

The proposed single firefighting shaft arrangement is considered acceptable based on the following:

- The building is provided with automatic sprinklers throughout the building in accordance with BS EN 12845, which is above the minimum prescriptive requirement. The sprinkler coverage as an enhanced fire protection measure would effectively control the size and intensity of a potential fire, thus mitigating the risks associated with larger floor area for firefighting operations.
- Every part of every storey can be accessible within a 60m hose laying distance from the dry rising main in the firefighting shaft (see Figure 7), which meets BS 9999 recommendation for a sprinkler protected building.
- At Level 04-06, the maximum internal floor area is approximately 895m² (excluding stair cores) and therefore a single fire-fighting shaft is considered adequate to serve these levels based on the limited floor area.
- The height of the topmost storey (Level 03) which exceeds 900 m² in floor area is 13m. Firefighting can be undertaken based upon a combination of perimeter access and internal access for these low levels. The site access allows for both strategies, i.e. perimeter access is also provided.
- ADB would require two firefighting shafts to be provided if the building has a story that is both more than 18m in height and exceeds 900m² in floor area. It is therefore not an ADB requirement to provide two firefighting shafts for this building as the height of the topmost storey (Level 03) which exceeds 900 m² in floor area is less than 18m (if the area of protected cores are not included).

⁹ West Yorkshire Fire & Rescue Service, 'Fire Safety – Public Advice: Access for Fire Appliances', 2019.

Figure 7: Hose laying distance between fire main outlet and the furthest point on a typical floor with a floor area of more than 900m²



4.3 Smoke Clearance for Fire-fighting

As discussed in Section 3.2.2, it is not a prescriptive requirement to provide smoke clearance system in the void space as it is not an atrium as per BS 9999 guidance. However, it is recognised that it will be beneficial for fire-fighting and clearance of smoke to provide a smoke clearance system dedicated for the void space.

Therefore, it is proposed to provide a smoke clearance system comprising the following components (refer to Section 5.4.5):

- Natural air inlet via powering open the three sets of exit doors to external at Level 00 (refer to Figure 9 and Appendix B); and,
- Automatic opening vents at the head of the void, with a total aerodynamic free area of 20m²

Upon confirmed fire detection, the smoke clearance system will activate. This will enable early ventilation of the void space, compared to more typical smoke clearance systems that are activated following fire service attendance, and will therefore provide a benefit to occupants.

It should also be noted that the proposed total geometric free area of vents is more than 10% of the void area on the top floor level (void area is approx. 160m²). This satisfies clause B.9.2 in Annex B of BS 9999 although it is not a prescriptive requirement for this building. The proposed smoke clearance system will be capable of effectively venting smoke and heat out of the building and assisting fire-fighting operations with improved visibility and controlled temperature in the event of a fire.

4.4 Hydrant Locations

Hydrants shall be provided within 90m of the dry fire main inlets on a route suitable for laying a hose.

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All hydrants shall have signage in accordance with BS 3251¹⁰. Private hydrants will be designed and installed in accordance with the requirements of BS 9990¹¹.

Location of the hydrants is to be confirmed by the Mechanical Engineer.

¹⁰ BS 3251, 'Specification. Indicator plates for fire hydrants and emergency water supplies', 1976

¹¹ BS 9990, 'Non automatic fire-fighting systems in buildings, 2015.

5 Fire Protection Features and Systems

5.1 Structure and Fabric

5.1.1 Internal Wall & Ceiling Linings

All internal wall and ceiling linings will meet the classifications outlined in Table 11.

Table 11: Minimum performance requirements for internal wall & ceiling linings

Location	European Class *
Escape corridors, circulation routes & escape stairs	B-s3, d2
Rooms with an area $\geq 30\text{m}^2$	C-s3, d2
Rooms with an area $\leq 30\text{m}^2$	D-s3, d2

Notes:

* Tested in accordance with BS EN 13501-1¹².

5.1.2 Fire Resistance Performance Requirements

Where fire resistance standards are quoted in this document, they are in accordance with BS EN 1363-1¹³ or BS476-20¹⁴, and the following nomenclature has been used:

- R – loadbearing capacity
- E – integrity
- I – insulation

Unless otherwise stated:

- Loadbearing elements are required to achieve loadbearing capacity.
- Separating elements (e.g. compartmentation) are required to achieve integrity and insulation.
- Elements that are both loadbearing and separating are required to achieve loadbearing capacity, integrity and insulation.

5.1.3 Elements of Structure

The elements of structure which form part of the fire-fighting shaft must achieve 120 minutes fire resistance. All other elements of structure (such as structural frames, beams, columns, loadbearing walls, floors etc.), other than those supporting the roof structure only, must achieve 60-minutes fire resistance. Where a roof also performs the function of a floor i.e. it contains plant equipment or is expected to be walked upon, the associated elements of structure supporting the roof/floor must also achieve at least 60 minutes fire resistance standard.

5.1.4 Compartmentation

Table 12 defines the fire resistance periods for the construction of the separating elements around enclosures (i.e. compartmentation) and should be read in conjunction with fire strategy drawings

¹² BS EN 13501-1, 'Classification using data from reaction to fire tests', 2007.

¹³ BS EN 1363-1, 'Fire resistance tests. General Requirements', 2012.

¹⁴ BS 476-20, 'Fire tests on building materials and structures. Method for determination of fire resistance of elements of construction (general principles)', 1987.

located in Appendix B. Any instances where the drawings differ from the Table 12, the requirements of Table 12 govern.

Table 12: Compartmentation required within the building

Areas	Enclosure Requirements (EI)*
Fire-fighting shaft enclosure	120 minutes
Construction within the fire fighting shaft (e.g. separating the fire-fighting lobby, lift and stairs)	60 minutes
Smoke shafts	60 minutes
Life safety riser shaft	60 minutes
Protected escape stairs	60 minutes
Protected lobbies to escape stairs	30 minutes
Protected lobbies to firefighting stair (i.e. not fire-fighting lobbies)	120 minutes
Compartment walls to divide floor plates into two zones**	60 minutes
Enclosure of lightwell***	30 minutes
Rooms opening into the void	Imperforate solid construction with self-closing doors
Plant rooms containing life safety equipment	120 minutes
UPS room****	120 minutes
Comms room****	90 minutes
IT hub room, Patch panel room****	90 minutes
Substation	120 minutes^
Kitchen	30 minutes
Low voltage plant rooms	60 minutes
Other plant rooms not specifically listed	30 minutes

Notes:

- * Fire resistance standard are for all sides exposed and from each side separately unless otherwise stated.
- ** Refer to Section 3.2.2.
- *** Refer to Appendix B.
- **** Subject to review in RIBA Stage 4. Refer to further comments on Appendix B.
- ^ DNO might have a higher requirement of the fire resistance rating for substation.

Any doors, holes or other penetrations within separating elements must comply with Sections 5.1.5 to 5.1.7.

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5.1.5 Fire Doors

Unless otherwise stated below in Table 13, all door assemblies (leafs, frames and hardware) within separating elements must be self-closing, fitted with smoke seals and achieve the same fire resistance standard as the separating element.

Fire door assemblies must be tested in accordance with BS476-22 or BS EN 1634-1¹⁵. Fire doors denoted with the suffix 'S' require 'cold smoke seals'. Where cold smoke seals are required, they must comply with BS 476-31.1¹⁶ or BS EN 1634-3¹⁷.

Table 13: Fire resistance requirements for doors in separating elements

Door Location	Fire Resistance Requirements
Approach into fire-fighting lobby	FD 60S
Approach into fire-fighting stair from the fire-fighting lobby	FD 30S
Approach into fire-fighting stair from protected lobby (i.e. not a firefighting lobby)	FD 60S
Approach into the protected lobby of fire-fighting stair (i.e. not a firefighting lobby)	FD 60S
Firefighting lift doors	FD 60
Door to smoke shafts	FD 60S
Door to life safety riser shafts	FD 60S
Other protected escape routes, including escape stairs	FD 30S
Door to plant rooms containing life safety equipment	FD 60S
Doors opening into the void	Imperforate with self-closers
All other doors	As per the compartment wall in which it is located

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5.1.6 Junctions

Floors and Walls

Junctions where a fire resisting wall or floor meets any other wall or floor (including the external wall), must be fire stopped to maintain the fire resistance of the fire resisting wall or floor at a minimum of 60 minutes (EI). This fire stopping must continue as necessary through any cavity (void or filled) to complete the compartmentation.

¹⁵ BS EN 1634-1, 'Fire resistance tests for doors, shutters and openable windows', 2008.

¹⁶ BS 476-31.1, 'Methods for measuring smoke penetration through doorsets and shutter assemblies – Method of measurement under ambient temperature conditions', 1983.

¹⁷ BS EN 1634-3, 'Fire resistance tests for doors, shutters and openable windows – Smoke control tests for door and shutter assemblies', 2004.

Walls and Roofs

Compartment walls must be built to meet the underside of the external roof covering and fire stopping must be provided at the junction between the head of the wall and the underside of the roof covering.

A zone of roof 1.5m wide on either side of the compartment wall should have a covering designation of B_{ROOF}(t4) in accordance with BS EN 13501-5¹⁸ on a substrate or deck of material of limited combustibility (A2-s3,d2) or better.

The above wall and roof requirements only apply to walls that separate compartments.

5.1.7 Protection of Openings and Fire Stopping

Where services penetrate fire resisting construction, they should be protected as outlined in the following paragraphs.

Pipes

The following pipes of a restricted diameter must be provided with fire stopping around the pipe only:

- Non-combustible material with a melting point of 800°C (cast iron, copper or steel) having a nominal internal diameter of ≤160mm.
- Lead, aluminium, aluminium alloy, uPVC (complying with BS 4514 or BS 5255) and fibre cement having a nominal internal diameter of ≤40mm, and
- Any other material not stated above having a nominal internal diameter of ≤40mm.

All other penetrations through fire resisting construction must be adequately fire stopped using either a suitable proprietary product, or a sleeve where appropriate, to maintain the period of fire resistance.

Ductwork and Ductwork Systems

Any ductwork passing through compartment lines will need to be fire resisting to the same specification as the element through which it passes (including integrity and insulation criteria); or provided with suitably rated fire and smoke dampers. Note that fire dampers must be installed as tested, and such that they are adequately supported by the fire resisting construction through which the penetration has been made.

Fire dampers must have an E classification equal to the period of the fire resisting construction in which they are installed, although not less than 60 minutes, when tested to BS EN 1366-2¹⁹ and classified to BS EN 13501-3²⁰.

Any fire dampers protecting non-fire resisting ductwork that passes through escape routes will need to be motorised fire and smoke dampers that are activated by smoke detection.

Fire and smoke dampers must have an ES classification equal to the period of the fire resisting construction in which they are installed, although not less than 60 minutes, when tested to BS EN 1366-2 and classified to BS EN 13501-3.

Any kitchen extract ductwork shall be fully fire resisting where it passes through more than one compartment, as fire dampers are not appropriate for kitchen extract ductwork as the build-up of grease may prevent the mechanism from operating correctly. The ductwork should be installed independently from other ventilation systems.

¹⁸ BS EN 13501-5, 'Classification using data from external fire exposure to roofs tests', 2016.

¹⁹ BS EN 1366-2, 'Fire resistance test for service installations. Fire dampers', 2015

²⁰ BS EN 13501-3, 'Classification using data from fire resistance tests on products and elements used in building service installations. Fire resisting ducts and fire dampers', 2005+A1:2009

Flues

If a flue, or duct containing flues or appliance ventilation duct(s), passes through a compartment wall or compartment floor or is built into a compartment wall, each wall of the flue or duct must have a fire resistance of at least half that of the wall or floor and be of non-combustible construction.

5.1.8 Concealed Spaces & Cavity Barriers

All concealed spaces and cavities must be subdivided with imperforate cavity barriers, as follows:

- At the edges of cavities (including around openings in cavities such as windows, ducts, etc.).
- To subdivide any cavity such that the maximum cavity dimension does not exceed 20m where the cavity linings achieve either Class 1 (National) or Class C-s3, d2 or better (European), otherwise the dimension should not exceed 10m.
- Above sub-dividing cross-corridor doors, where the door does not form a part of a fire resisting wall sub-dividing the floor (in this instance, corridor walls are taken full height to the soffit).

Every cavity barrier must be constructed from materials achieving at least a 30-minutes (integrity) and 15-minutes (insulation) period of fire resistance.

Acceptable alternatives to a tested barrier system for use within partition walls and around openings in cavities only, include the following:

- Imperforate steel with a thickness of not less than 0.5mm, or
- Imperforate timber with a thickness of not less than 38mm, or
- Polythene-sleeved mineral wool or mineral wool slab (installed under compression in the cavity), or
- Calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

5.1.9 Construction of External Walls

5.1.9.1 External Surface

As the external walls are greater than 18m in height and greater than 1m away from the relevant boundary, BS 9999 recommends that the external wall surface up to 18m is to achieve C-s3, d2 (European Class) or better and the portion over 18m is to achieve Class B-s3, d2 (European Class) or better.

5.1.9.2 Compartmentation

Fire stopping must be provided in accordance with Sections 5.1.7 & 5.1.8.

5.1.9.3 Space Separation (Fire Resistance Requirements)

The risk of external fire spread from unprotected openings, across the site boundary or notional boundary has been assessed using BR 187²¹ as a basis to determine the requirement for fire protection to the external wall.

The assessment is based upon each of the buildings having the following:

- Compartment walls divide the floor plate into two zones with 60 minutes fire resisting construction at every floor level (see Figure 8).

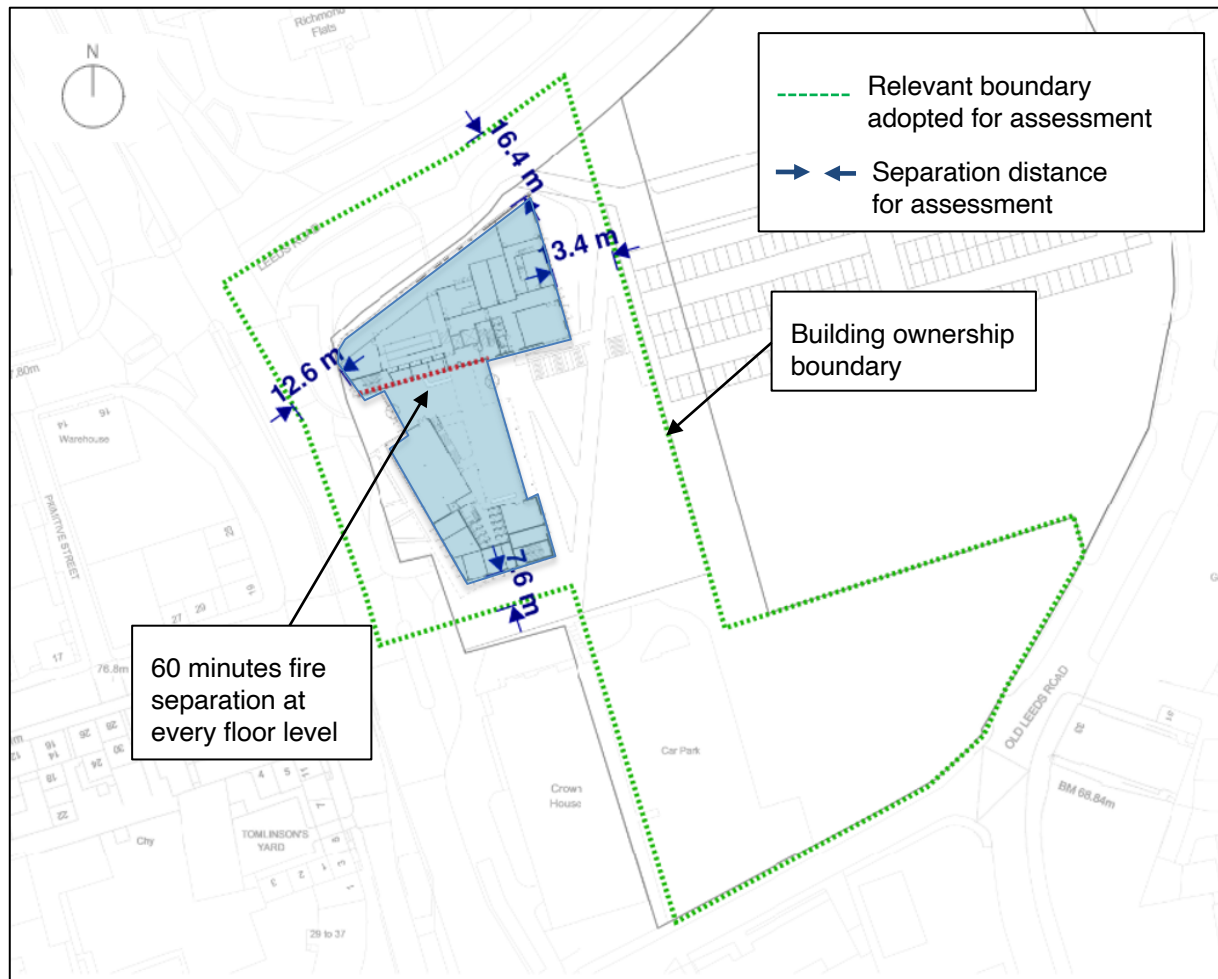
²¹ BR 187, 'External Fire Spread; Building Separation and Boundary Distances', BRE, 1991.

- Automatic sprinkler system coverage throughout the building (see Section 5.3.1).

The assessment is undertaken with respect to the relevant boundary, which is the furthest of either the site boundary or the centre line of a public roadway, as annotated indicatively in Figure 8. For the purposes of the assessment, it is typical to regard the entire compartment as a radiating panel and the most onerous compartments have been considered.

As the building is sprinklered throughout, the boundary distances used in BR187 assessment are doubled in accordance with the guidance in BS 9999.

Figure 8: Relevant boundaries adopted for assessing external fire spread



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Assessment of compartment sizes and boundary distances shows the most onerous cases for each elevation with regards to external fire spread, as outlined in Table 14. Assessment results demonstrate that neither the windows/doors on the external elevations nor the external wall construction itself would require fire protection for the purpose of limiting the risk of fire spread across adjacent relevant boundaries. Where the size of any compartment results in a larger façade than identified below or the building boundary changes, a further assessment will be required to ensure that risk of external fire spread is not increased.

Table 14: External fire spread assessment and indication of facade fire protection requirement

Building Facade	Enclosing Rectangle (W x H)	Minimum distance to the notional boundary*	Max. Allowable percentage of unprotected area	Facade Fire Protection
North Elevation	60.0 x 30.0m	16.4m	100%	Not required
East Elevation	40.0 x 30.0m	13.4m	100%	Not required
South Elevation	20.0 x 21.0m	7.6m	100%	Not required
West Elevation	45.0 x 30.0m	12.6m	100%	Not required

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Notes:

* Building footprint setback on upper levels has been discounted for conservatism in assessing the boundary distance.

5.1.9.4 Roof Coverings

Where areas of the roof are more than 6m from the relevant boundary, roof coverings should be constructed of materials achieving minimum $C_{\text{Roof}}(t_4)$ in accordance with BS EN 13501-5²², tested as part of the proposed substrate.

Alternatively, the roof build-up can comply with the European Commission Decision 2000/553/EC without providing a fully tested system. To adopt this approach, all combustible materials on the roof build-up must be fully covered over by one of the following as per Council Directives 89/106/EEC:

- Loose laid gravel with a thickness >50mm or a mass >80kg/sqm. Each aggregate must be between 4mm to 32mm in size.
- Sand or cement screed >30mm thick.
- Cast stone or mineral slabs >40mm thick; gaps between slabs should be suitably filled with sand, cement or similar to prevent exposure of combustible materials below.

Where compartment walls form junctions with the roof, guidance outlined in Section 5.1.6 should be followed.

²² BS EN 13501: Part 5, 'Classification using data from external fire exposure to roofs tests', 2016.

5.2 Escape Routes

5.2.1 Doors on Escape Routes

The fastening of any door used as an exit during a fire, which is to be locked during normal operation, will comprise panic hardware in accordance with BS EN 1125²³. The hardware must be located on the side approached by escaping persons.

Any secure doors must 'fail-safe' open in circumstances when they are required to be open for escape.

5.2.2 Escape Signage

Escape signage must be provided within all areas in accordance with BS ISO 3864-1²⁴ and BS 5499-4²⁵.

5.3 Wet Systems

5.3.1 Automatic Sprinklers

The building will be protected by an OH1 automatic sprinkler system in accordance with BS EN 12845²⁶. This will be a life safety system and incorporate the requirements as per Annex F of BS EN 12845.

It should be noted that automatic sprinkler system is not required in order to meet prescriptive guidance. Sprinkler coverage should be throughout the building and where sprinkler activation may present a hazard (e.g. electrical rooms), the proposal of omission in individual plant room need to be discussed and agreed with Building Control.

5.3.2 Internal Fire Mains

The fire-fighting shaft is to be provided with a dry rising main in accordance with BS 9990²⁷ and BS 5041-2²⁸.

Dry riser outlets are to be located within the fire-fighting lobby at every level.

Dry riser inlets will be provided on the exterior of the building at Level 00, adjacent to the fire-fighting entry points and within 18m of a fire service vehicle access point. The inlet connection point should be visible from the parking position of the Fire Service appliance.

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²³ BSEN 1125, 'Building hardware. Panic exit devices operated by a horizontal bar, for use on escape routes. Requirements and test methods', 2008.

²⁴ BS ISO 3864: Part 1 'Graphical symbols — Safety colours and safety signs Design principles for safety signs and safety markings', 2011.

²⁵ BS 5499: Part 4 'Code of practice for escape route signing', 2000.

²⁶ BS EN 12845 + A2, 'Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance', 2004 + 2009

²⁷ BS 9990, 'Non automatic fire-fighting systems in buildings', 2015.

²⁸ BS 5041, 'Fire hydrant systems equipment, Part 2 - Specification for landing valves for dry risers', 1987.

5.4 Mechanical Systems

5.4.1 Fire-fighting Lifts

The lift will be designed in accordance with BS EN 81-72²⁹ and BS EN 81-1³⁰ (as appropriate).

The fire-fighting lift shaft will be protected against water ingress via the provision of a raised threshold ($\geq 25\text{mm}$) or a floor sloped away from the lift shaft with minimum 1:100 fall. Alternative in-shaft measures may also be provided, in accordance with BS EN 81-72.

5.4.2 Fire-fighting Stair

An (automatic opening vent) AOV located at the roof of the stair is required and will provide at least 1.5m^2 free area and must comply with BSEN 12101-2.

A remote control located adjacent to the fire service access doorway and clearly marked as to its function and means of operation capable of opening and closing the vent should be provided.

Connections between the remote control and actuator mechanism should be within the fire-fighting shaft.

5.4.3 Fire-fighting Lobby

The fire-fighting shaft is to be provided with a smoke ventilation system in accordance with BS 9999. The design team preference is to provide the ventilation solution using a mechanical smoke ventilation system. The system will need to achieve a performance that is equivalent to or better than the BRE Report 79204 smoke shaft system. Detailed design of the mechanical ventilation system will be undertaken by a specialist sub-contractor, however based on experience the following should be allowed for:

- A mechanical exhaust riser is required to serve each firefighting lobby at each floor of the building.
- A space allowance of 1.0m^2 should be allowed for within the riser, with aspect ratio no worse than 1:2. The specialist smoke control sub-contractor should determine the appropriate exhaust rate to achieve equivalent to or better than the BRE Report 79204.
- A 1.0m^2 free area AOV should be provided at the face of each smoke shaft within the lobby at each level. The AOV should be sited to avoid clashes with doors that are likely to be open for fire-fighting activities.
- To avoid excessive depressurisation within the corridor, the system should incorporate a variable speed fan motor, linked to pressure sensors at each floor level.
- The mechanical extract fans shall be fire rated to achieve operation at 300°C for 60 minutes with components that have a melting point exceeding 800°C .
- The mechanical extract system is to be provided in accordance with BS EN 12101-3 guidance. Duty and standby fans will be required. Secondary power will be required for the smoke control system.
- Fire service override should be provided within the stairs via suitable controls or panels.

All component sizes are to be confirmed by the mechanical engineer who will undertake the detailed system design.

²⁹ BS EN 81-72, 'Safety rules for the construction and installation of lifts. Particular applications for passenger and goods lifts. Firefighting lifts,' 2015.

³⁰ BS EN 81-1 + A3, 'Safety rules for the construction and installation of lifts, Electric lifts' 1998, 2009.

5.4.4 Protected Lobby to Firefighting Stair

Where the firefighting stair is accessed via a protected lobby (refer to Appendix B), typically prescriptive guidance would require ventilation to be provided in the lobby. It is considered that ventilation requirement can be safely omitted in the protected lobby based on the following:

- The protected lobby is not a firefighting lobby and does not provide fire service access, therefore the risk of set of lobby doors being held open during firefighting and resulting in smoke ingress into the firefighting stair is low.
- The proposed L1 fire detection and alarm system (see Section 5.4.6) and OH1 sprinkler system coverage (see Section 5.3.1) are above the minimum prescriptive requirements, which will provide early detection and largely limit the potential spread of fire and smoke in the event of a fire.
- The protected lobby achieves 120 minutes fire resistance (EI) with FD 60S doors, which reduces the risks of a potential fire affecting the protected lobby and the firefighting stair.

5.4.5 Void Space Smoke Clearance System

As discussed in Section 4.3, it is proposed that a smoke clearance system will be provided in the void space. This system will comprise the following components:

- A smoke reservoir will be provided at the head of the void (one-storey in height) via a glazed system (see Figure 9 and Figure 10).
- Automatic opening vents at the head of the void, with a total aerodynamic free area of 20m². The vents can be constructed as actuated rooflights in accordance with BS EN 12101-2.
- The inlet air will be provided at Level 00 by power open three sets of exit doors to external (assuming each with a minimum clear width of 2.15m), as indicated in Figure 9 and Appendix B.

Detailed analysis will be undertaken to support the design of the smoke clearance system in RIBA Stage 4.

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The smoke clearance system shall come into operation automatically upon confirmed detection of fire in the void space or areas adjacent the void space, or by activation of manual call points.

Figure 9: Cross section view of the building

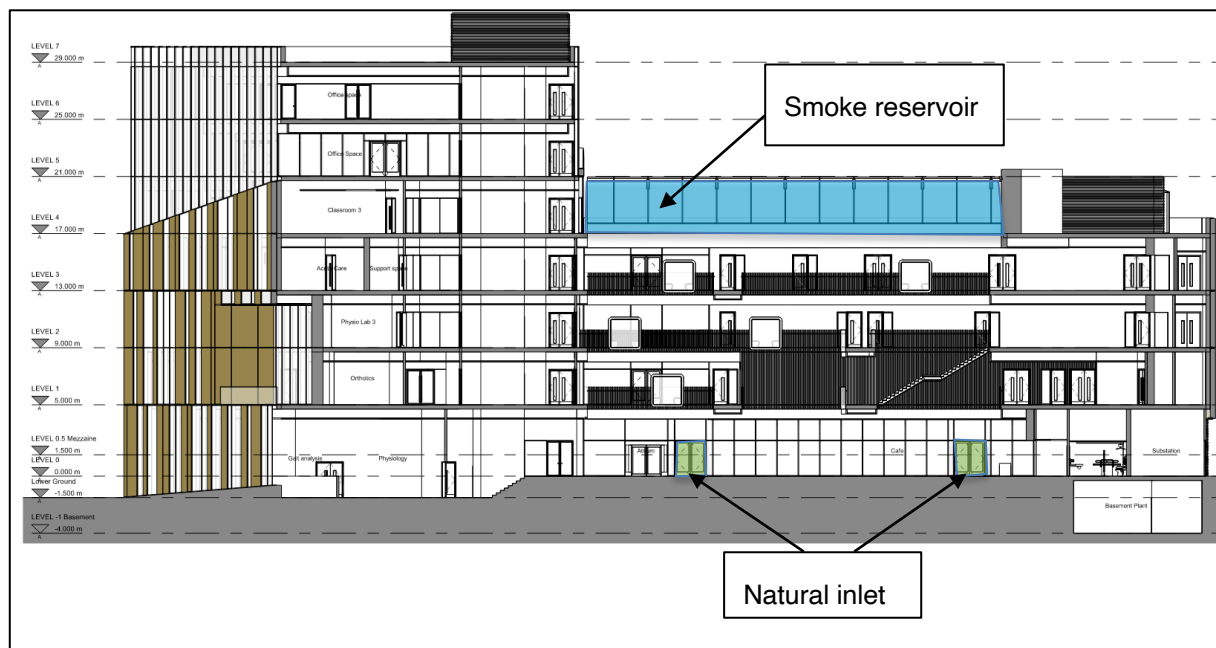
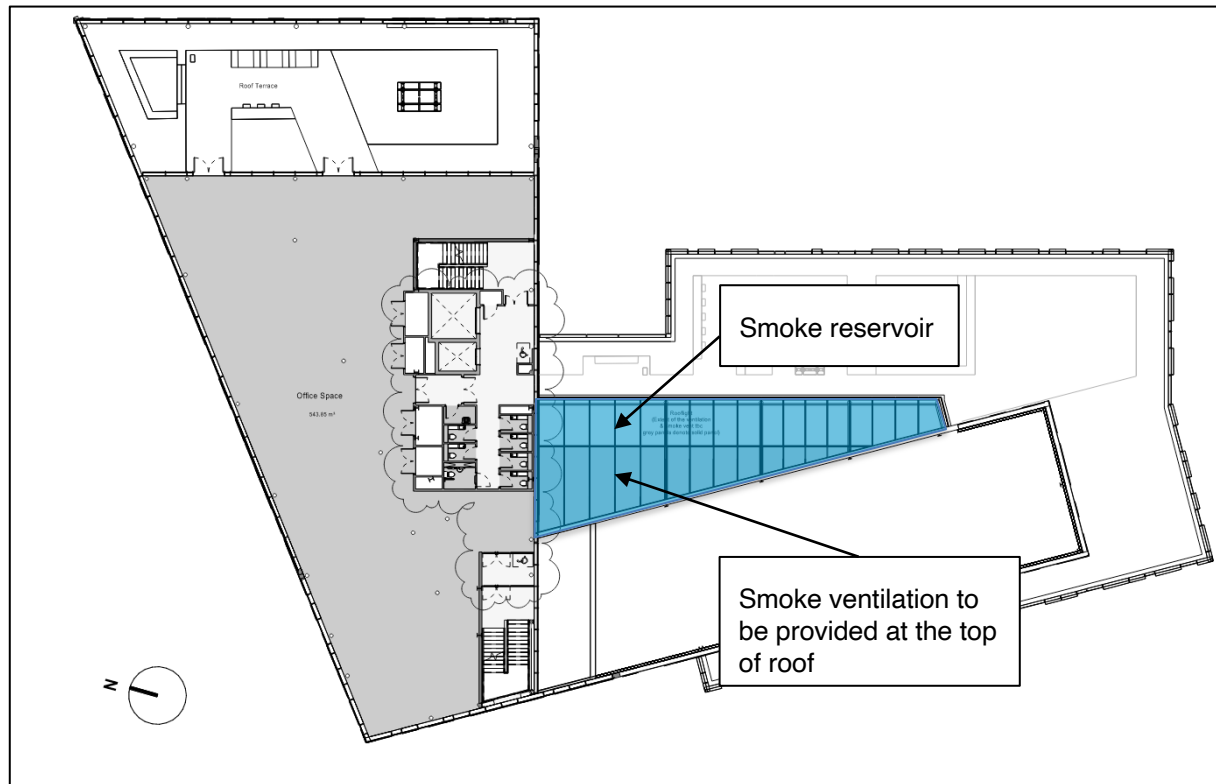


Figure 10: Extent of smoke reservoir (Level 05)



5.4.6 Automatic Fire Detection & Alarm

The building will be provided with a Category L1 automatic fire detection and alarm system in accordance with BS 5839-1³¹, incorporating a voice alarm in accordance with BS 5839-8³².

Due to the high ceiling, an aspirating smoke detection system (Class C with at least 5 holes) will be provided within the void space to provide early detection and warning.

Whilst the objective of providing a Category L1 system is to offer the earliest possible warning of fire, it is considered that in practice the design of locations of detectors could take into consideration the risk levels and the need for protection in certain areas (e.g. omission of detection within small risers or voids that are of low fire risks may be acceptable).

There is potential that automatic fire detection may be removed from ceiling voids >800mm in depth where the following can be achieved:

- The surface of the material/product used in the construction of the ceiling is Class 0 (National class) or Class B-s3, d2 or better (European class) and all supports and fixings in the ceiling must be of non-combustible construction.
- Pipe or ductwork insulation is limited combustibility or Class A2 or better (European class).
- Electrical wiring in the void is laid in metal trays, trunking or conduit.

³¹ BS 5839-1, 'Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises', 2017

³² BS 5839-8, 'Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of voice alarm systems', 2013

- Electrical connections are not to be located within the ceiling void apart from those needed to serve the corridor (lighting, signage etc.).
- Any other materials in the cavity are of limited combustibility or Class A2 or better (European class).

Omission of the automatic fire detection would require detailed assessment as part of the next stage of works.

Roof Terrace

Audible alarm sounders and flashing beacons should be provided to the terrace and be visible from accessible areas of the terrace. A manual call point should be provided adjacent to the terrace exit in accordance with BS 5829-1.

Fire Alarm Panel Location

It is recommended that the main fire alarm panel is located at the reception on Level 00, with repeater panels located at the base of Stair 1 (firefighting stair).

The panels should be visible to the fire service on approach. Where panels are proposed to be in cupboards or locations shielded from direct view from fire service access points, they should be suitably signposted to make obvious their location.

5.4.6.1 BS 9999 Benefit for Enhanced Detection

Table 7 of BS 9999 recommends the minimum fire alarm requirements of a Category M system for buildings of Risk Profiles B1, A1 and A2. The building is proposed to have an automatic fire and smoke detection and alarm system to Category L1 to offer early warning of fire and smoke in escape routes, rooms which open into escape routes, and areas of high fire hazard. This level of detection represents a significant enhancement from the minimum condition. As a result, BS 9999 permits a 15% benefit to be taken with respect to exit widths and travel distances (Refer to Appendix A).

5.4.7 Emergency Lighting of Escape Routes

Emergency lighting of escape routes will be provided to all escape routes in accordance with BS 5266-1³⁵, and any other relevant parts of BS 5266 necessary for the chosen system. This includes the open floor areas, as well as routes providing continued escape external to the building.

The majority of the system could be a 'Non-Maintained' system if preferred, as normal lighting is unlikely to be dimmed to less than emergency lighting levels during operation.

A minimum duration of 1 hour would be appropriate where it is considered unlikely to continue operation during mains failure, otherwise a duration of 3 hours would be appropriate.

5.4.8 Emergency Power Supply and Circuits

All cabling and power supplies for the fire alarm and detection systems, two-way communication systems and emergency lighting systems must be in accordance with the standards outlined in Sections 5.4.6, 3.4 & 5.4.7 respectively.

5.4.9 Electrically Powered Doors / Locks on Escape Routes

Electrically powered locks to doors on escape routes must return to the unlocked position on each of the following:

³⁵ BS 5266-1, 'Code of practice for the emergency lighting of premises', 2011.

- On operation of the fire alarm system.
- On activation of a manual door release unit (green break-glass box).
- On loss of power or system error.

5.4.9.1 Exit Doors Providing Smoke Ventilation

As discussed in Section 5.4.5, where doors are required to power open and act as a natural smoke vent as opposed to a dedicated AOV in the external wall, this door must fail safely into the open position in the following occurrences:

- On operation of fire detection system within the area to be protected to support the smoke ventilation regime described in Section 5.4.5.
- On system error.
- On loss of power, unless the system is provided with emergency power supply.

The fail-safe system of the door shall be provided in accordance with BS 7036-0, which references durability testing in accordance with BS EN 16005. Opening speed of the door should not obstruct means of escape.

To ensure the reliability of the system, the number of cycles the door set is tested for should reflect the actual frequency of use; i.e. as opposed to the cyclic loading for a dedicated AOV.

6 Further Work/ Fire Safety Design Implementation

The fire safety design (as documented in this report) has been developed to enable RIBA Stage 3 sign off from the client. This document will also be submitted to Building Control and the Fire and Rescue Service with the intention of gaining in principle Part B approval for its content. A detailed fire strategy will be produced during RIBA stage 4 which will contain all necessary calculations and information to submit for Part B approval.

Once all works are completed, Building Control will issue a completion certificate, and once the building is handed over, the Responsible Person(s) must comply with their duties under the Regulatory Reform (Fire Safety) Order 2005. In order to get to this position, the following needs to be conducted.

1. The Design Team must incorporate the fire safety design as specified in the approved RIBA Stage 4 Fire Safety strategy into their Developed Designs and Specifications.
2. The Contractor must ensure that the Developed Designs are implemented and that any changes are tracked and agreed as appropriate with the Building Control authorities.
3. The relevant fire safety information must be given to the Responsible Person(s) on completion of the works.
4. The Responsible Person(s) must take responsibility for ongoing health and safety within the completed building.

6.1 Fire Safety Information

Regulation 38 of the Building Regulations requires that fire safety information must be given to the responsible person at the completion of the works. As a minimum this must include:

- The fire safety strategy;
- Assumptions regarding the management of the building. In this instance this includes a requirement to provide assisted evacuation as appropriate from refuges spaces within the firefighting lobby and protected stairs;
- The evacuation strategy / regime and high-level cause and effect;
- Escape routes and muster points;
- Details of compartmentation, cavity barriers, fire doors, fire stopping and opening protectives;
- Details of smoke detector heads, alarm call points, alarm panels, emergency communication systems, fire safety signage, emergency lighting, fire extinguishers; and,
- As-built plans showing the above.

6.2 Fire Safety Management

The Regulatory Reform (Fire Safety) Order 2005 requires the Responsible Person to take responsibility for ongoing health and safety within the completed building.

Typically, this requires them to develop and implement a fire safety management plan, conduct a preliminary risk assessment upon or prior to building occupation and undertake regular fire risk assessments.

The Stage 4 fire strategy report and associated fire strategy drawings can be used as part of the preliminary fire risk assessment. DFC have not held preliminary meetings with the proposed

operators. This should be undertaken during RIBA Stage 4, if possible, to ensure the fire strategy aligns with the operational intent.

As part of the fire strategy for the building, a Level 2 Management regime (refer to BS 9999) should be adopted as a minimum. This includes the following principles:

- Ensures fire risk assessments, as required by the Regulatory Reform (Fire Safety) Order (RRO), are undertaken, kept up to date and the findings of the risk assessment are implemented or actioned appropriately.
- Reactive to the impact of proposed changes to the risk profile, identifies alternative protection and management measures required and ensures implementation.
- Responsibility for the management of fire safety may be divided over a number of different individuals, departments or even companies, and the implementation of changes may require approval of those not directly responsible for management of fire safety within the premises.
- Staffing level specific to the building considering the use of the building and nature of the occupants. Includes sufficient trained personnel to ensure all less able-bodied occupants are assisted out of the building effectively in an emergency.
- Ensures sufficient staff numbers are trained in fire safety and evacuation procedures. Contingency for sickness or holiday is not required as a minimum.
- Work control is developed reactively with clear lines of responsibility with a permit system and logging and audit processes.
- Communications ensure that those involved are informed of relevant fire safety information. Contingency for systems failure is not required as a minimum.
- Fire safety systems are monitored, and equipment is functional at all times when the building is in use. Alternative procedures for times when systems and equipment are unavailable are determined reactively.
- Liaison with the fire authority is proactive, including notification of the fire authority to changes in Risk Profile and other key factors. Routine meetings are not required as a minimum.
- Contingency planning takes account of a narrow range of possible emergency incidents.
- Void Space Fire Load. Management must ensure that fire load in the base of the void space is controlled to prevent a fire from occurring.
- The above reflects a well-managed building, and further guidance can be found in Section 4 of BS 9999.

Appendix A – Application of BS 9999 to the Building

The fire strategy for the building is based upon the guidance of BS 9999, which identifies risk profiles for specific uses based on the occupancy type and consideration of fire growth (e.g. materials in the building).

A.1 Risk Profile

A.1.1 Risk Profile for Different Uses

Risk Profile – Teaching Facilities

Occupants of the teaching facilities are primarily students and they might not be familiar with the building. Therefore, the predominant Occupant Characteristic (Table 2 of BS 9999) is considered to be 'B', i.e. occupants are awake, and unfamiliar with the building.

Table 3 of BS 9999 highlights the following example fire growth rates:

- Fire Growth Rate of 2; Classrooms.

As the building incorporates automatic sprinklers throughout, this growth rate can be reduced to a Fire Growth Rate of 1. Therefore, the predominant Fire Growth Rate is considered as '1'.

The combination of the Occupant Characteristics and Fire Growth Rate results in the Risk Profile for the space. Consequently, the Risk Profile considered appropriate to teaching facilities is 'B1'.

Risk Profile – Office Space

The office space will be places of work. Therefore, the predominant Occupant Characteristic (Table 2 of BS 9999) is considered to be 'A', i.e. occupants are awake, and familiar with the building.

Table 3 of BS 9999 highlights the following example fire growth rates:

- Fire Growth Rate of 2; Office/Administration.

As the building incorporates automatic sprinklers throughout, this growth rate can be reduced to a Fire Growth Rate of 1. Therefore, the predominant Fire Growth Rate is considered as '1'.

The combination of the Occupant Characteristics and Fire Growth Rate results in the Risk Profile for the space. Consequently, the Risk Profile considered appropriate to office areas is 'A1'.

Risk Profile – Back of House

Back of house areas will be places of work and therefore, the predominant Occupant Characteristic (Table 2 of BS 9999) is considered to be 'A', i.e. occupants are awake, and familiar with the building.

Whilst not all of the areas in the back of house will constitute a Fire Growth Rate of 3 (Fast Fire Growth), this is considered to be a conservative assumption and therefore is applicable to this area.

As the building incorporates automatic sprinklers throughout, this growth rate can be reduced to a Fire Growth Rate of 2. Therefore, the predominant Fire Growth Rate is considered as '2'.

The combination of the Occupant Characteristics and Fire Growth Rate, results in the Risk Profile for the space. Consequently, the Risk Profile considered appropriate to back of house areas is 'A2'.

Risk Profile – Cafe

Occupants of Cafe may be members of public and therefore, the predominant Occupant Characteristic (Table 2 of BS 9999) is considered to be 'B', i.e. occupants are awake, and unfamiliar with the building.

A fire Growth Rate of 2 (Medium Fire Growth) is considered to be appropriate and applicable to this area.

As the building incorporates automatic sprinklers throughout, this growth rate can be reduced to a Fire Growth Rate of 1. Therefore, the predominant Fire Growth Rate is considered as '1'.

The combination of the Occupant Characteristics and Fire Growth Rate, results in the Risk Profile for the space. Consequently, the Risk Profile considered appropriate to cafe is 'B1'.

A.2 Variations to Escape Route Components

Within BS 9999 it is possible to vary travel distances, exit widths and stair widths where fire protection measures are provided in addition to the minimum package of measures for means of escape.

Risk Profile B1 – Teaching Facilities, Cafe

A Category L1 Automatic smoke detection and alarm is installed while the minimum package of measures for risk profile B1 is a manual fire detection system linked to an electronic fire alarm.

Table A 1 highlights the allowable variations to escape route components respectively.

Table A 1: Allowable variations to escape route components for Risk profile B1

Parameter	Exit Width Variation	Travel Distance Variation
Automatic smoke detection (BS 9999; Clause 18.2)	- 15%	+ 15%
Total	- 15%	+ 15%

The distance travelled along horizontal escape routes should not exceed that identified in Table A 2.

Table A 2: Maximum travel distances for Risk profile B1

Number of Escape Directions	Maximum Recommended Travel Distances BS 9999 Risk Profile B1 + 15% (BS 9999; Table 11)
Single Direction	24m + 15% = 27.6m
Two or More Directions	60m + 15% = 69m

The potential reduction in the width of horizontal escape routes is listed in Table A 3.

Table A 3: Minimum horizontal exit widths for Risk profile B1

Location	Minimum Recommended Horizontal Widths Risk Profile B1 - 15% (BS 9999; Table 12)
Teaching facilities, Cafe	3.6mm/person – 15% = 3.06mm/person

The width of vertical escape routes should not be less than the minimum identified in Table A 4 (dependent upon the number of storeys served).

Table A 4: Minimum vertical exit widths for Risk Profile B1

Floors Served	Minimum Recommended Vertical Widths BS 9999 Risk Profile B1 - 15% (BS 9999; Table 13)
1 Floor	4.2mm – 15% = 3.57mm/person
2 Floors	3.6mm – 15% = 3.06mm/person
3 Floors	3.1mm – 15% = 2.64mm/person
4 Floors	2.6mm – 15% = 2.21mm/person
5 Floors	2.3mm – 15% = 1.96mm/person
6 Floors	2.1mm – 15% = 1.79mm/person

Risk Profile A1 – Office Space

A Category L1 Automatic smoke detection and alarm system is installed while the minimum package of measures for risk profile A1 is a manual fire detection system linked to an electronic fire alarm.

Table A 5 highlights the allowable variations to escape route components respectively.

Table A 5: Allowable variations to escape route components in the office areas

Parameter	Exit Width Variation	Travel Distance Variation
Automatic smoke detection (BS 9999; Clause 18.2)	- 15%	+ 15%
Total	- 15%	+ 15%

The distance travelled along horizontal escape routes should not exceed that identified in Table A 6.

Table A 6: Maximum travel distances within the office areas

Number of Escape Directions	Maximum Recommended Travel Distances BS 9999 Risk Profile A1 + 15% (BS 9999; Table 11)
Single Direction	26m + 15% = 29.9m
Two or More Directions	65m + 15% = 74.75m

The potential reduction in the width of horizontal escape routes is listed in Table A 7.

Table A 7: Minimum horizontal exit widths within the office areas

Location	Minimum Recommended Horizontal Widths Risk Profile A1 - 15% (BS 9999; Table 12)
Office Space	3.3mm/person – 15% = 2.81mm/person

The width of vertical escape routes should not be less than the minimum identified in Table A 8 (dependent upon the number of storeys served).

Table A 8: Minimum vertical exit widths for Risk Profile A1

Floors Served	Minimum Recommended Vertical Widths BS 9999 Risk Profile A1 - 15% (BS 9999; Table 13)
1 Floor	3.9mm – 15% = 3.32mm/person
2 Floors	3.4mm – 15% = 2.89mm/person
3 Floors	2.95mm – 15% = 2.51mm/person
4 Floors	2.45mm – 15% = 2.08mm/person
5 Floors	2.15mm – 15% = 1.83mm/person
6 Floors	2.0mm – 15% = 1.70mm/person

Risk Profile A2 – Back of House

A Category L1 Automatic smoke detection and alarm system is installed while the minimum package of measures for risk profile A2 is a manual fire detection system linked to an electronic fire alarm.

Table A 9 highlights the allowable variations to escape route components respectively.

Table A 9: Allowable variations to escape route components in back of house areas

Parameter	Exit Width Variation	Travel Distance Variation
Automatic smoke detection (BS 9999; Clause 18.2)	- 15%	+ 15%
Total	- 15%	+ 15%

The distance travelled along horizontal escape routes should not exceed that identified in Table A 10.

Table A 10: Maximum travel distances within back of house areas

Number of Escape Directions	Maximum Recommended Travel Distances BS 9999 Risk Profile A2 + 15% (BS 9999; Table 11)
Single Direction	22m + 15% = 25.3m
Two or More Directions	55m + 15% = 63.25m

The required widths of horizontal escape routes are listed in Table A 11.

Table A 11: Minimum horizontal exit widths within back of house areas

Location	Minimum Recommended Horizontal Widths Risk Profile A2 - 15% (BS 9999; Table 12)
Back of House	3.6mm/person – 15% = 3.06mm/person

The width of vertical escape routes should not be less than the minimum identified in Table A 12 (dependent upon the number of storeys served).

Table A 12: Minimum vertical exit widths for Risk Profile A2

Floors Served	Minimum Recommended Vertical Widths BS 9999 Risk Profile A2 - 15% (BS 9999; Table 13)
1 Floor	4.5mm – 15% = 3.825mm/person

A.3 Automatic Fire Detection & Alarm

The minimum standard of fire detection and alarm system recommended within BS 9999 for the building is outlined in Table A 13.

Table A 13: Minimum category of fire detection coverage for the building

Risk Profile	Minimum Acceptable Fire Detection & Alarm
B1	M*
A1	M*
A2	M*

A.4 Fire Resistance

The main use of the building will be that associated with the office space (Risk profile A1) and the teaching facilities (Risk profile B1) within the building.

The minimum period of fire resistance recommended within BS 9999 for the building is outlined in Table A 14.

Table A 14: Minimum period of fire resistance for the building

Height of Topmost Occupied Storey Above Access Level	Risk Profile	Minimum Period of Fire Resistance
<30m	A1	60 minutes*
<30m	B1	60 minutes*

Notes:

* This is reduced from 90 minutes because sprinklers conforming to BS EN 12845 are provided in the building.

The maximum fire compartment (per storey) area recommended within BS 9999 for the building is outlined in Table A 15.

Table A 15: Maximum fire compartment area for the building

Risk Profile	Height of Topmost Storey	Maximum Area
B1	No limit	No limit
A1	No limit	No limit
A2	<30m	No limit

A.5 Fire-Fighting Access

The minimum internal fire-fighting access recommended within BS 9999 for the building is outlined in Table A 16.

Table A 16: Minimum internal fire-fighting access for the building

Height of Topmost Storey Above Fire Service Access Level	Internal Fire Fighting Access
>18m	Required

Appendix B – Fire Strategy Drawings

General comments:
Comments in this sketch have been developed to meet Part B of the Building Regulations. BS 9999 has been used as the basis of design, whilst, reference to ADB is used for the community house areas.

Confirmation required on whether the assumed fire service route can carry fire appliances. The minimum width of road between kerb is 3.7m and the minimum carrying capacity is 12.5 tonnes for pump appliances.

The building will require one dry rising fire main to be provided in the firefighting lobby. Fire main inlet is required on the exterior of the building at Ground Floor, adjacent to the fire-fighting entry point. Inlet should be within 18m from a pump appliance parking space.

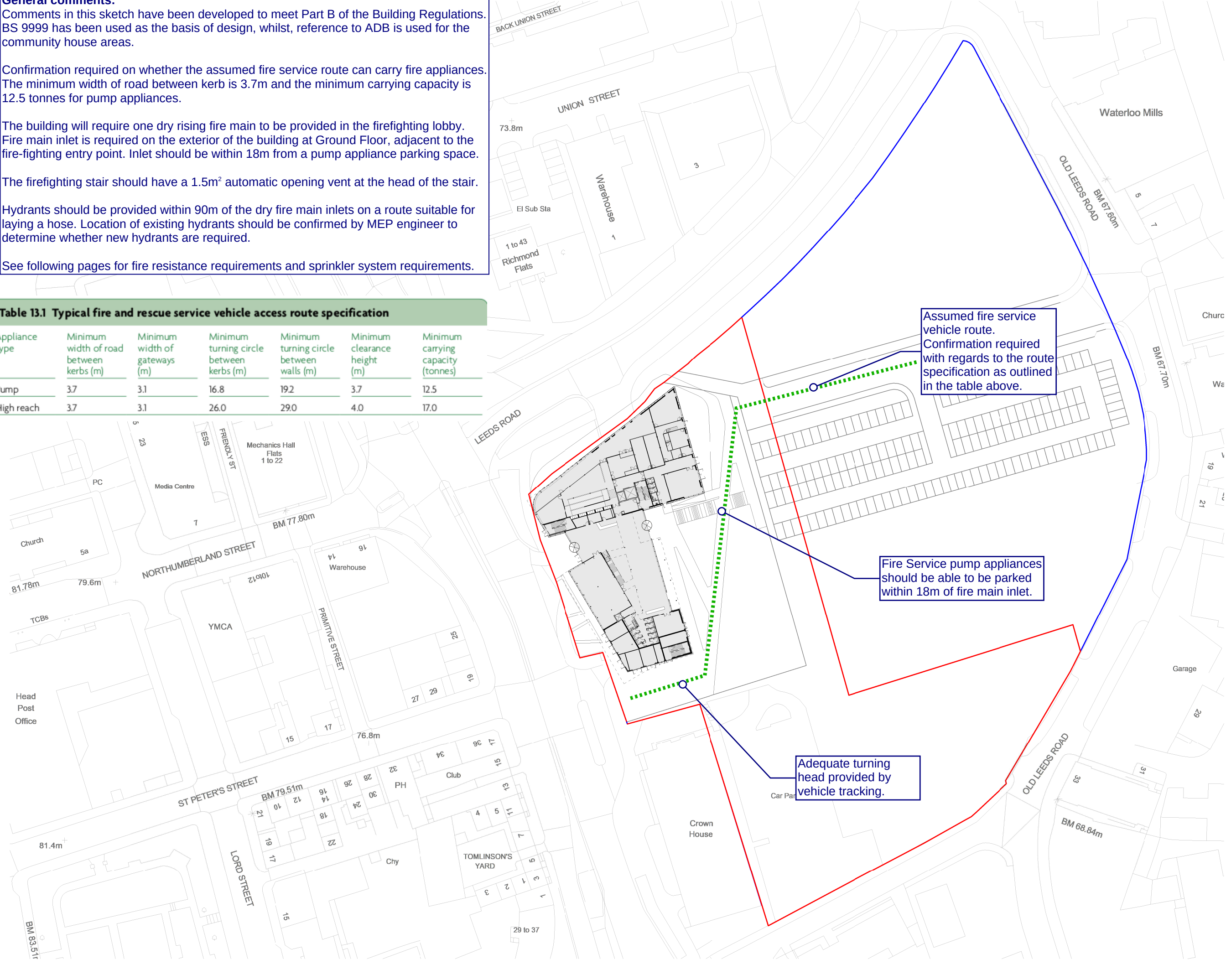
The firefighting stair should have a 1.5m² automatic opening vent at the head of the stair.

Hydrants should be provided within 90m of the dry fire main inlets on a route suitable for laying a hose. Location of existing hydrants should be confirmed by MEP engineer to determine whether new hydrants are required.

See following pages for fire resistance requirements and sprinkler system requirements.

Table 13.1 Typical fire and rescue service vehicle access route specification

Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High reach	3.7	3.1	26.0	29.0	4.0	17.0



Red Bounary Line denotes Heath & Wellbeing Academy site boundary

Blue Boundary Line denotes Southgate wider site plan



P1	Redline boundary amended to reflect recent discussions with client.	19.08.21	RH	RH
Rev	Description	Date	Dr	App
original by		date created	by	by
SL		08/11/21		RH

AHR
AHR Architects Ltd
5th Floor
55 Princess Street
Manchester
M2 4EW
United Kingdom

T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

client name	University of Huddersfield
project	Heath & Wellbeing Academy
drawing	Site Location Plan
computer file	C:\Rev\Projects\HWA-AHR-30-ZZ-M2-A-0000_siten\slp.rvt
project number	2020.00755.000
drawing number	HWA-AHR-P1-00-DR-A-09000
scale	1 : 500 @A1
rev	P1
issue status	S2
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Fire Strategy Key

Compartmentation

- 120 minutes
- 90 minutes
- 60 minutes
- 30 minutes

Fire Doors

- FD120S / FD120
- FD90S / FD90
- FD60S / FD60
- FD30S / FD30

Travel Distance

- Travel Distance

Maximum allowable travel distances:

- Single direction of travel:
 - 18.4m straight line
 - 27.6m actual layout
- More than one direction:
 - 46m straight line
 - 69m actual layout

The above has taken into account additional benefits from sprinkler coverage and enhanced fire detection and alarm system.

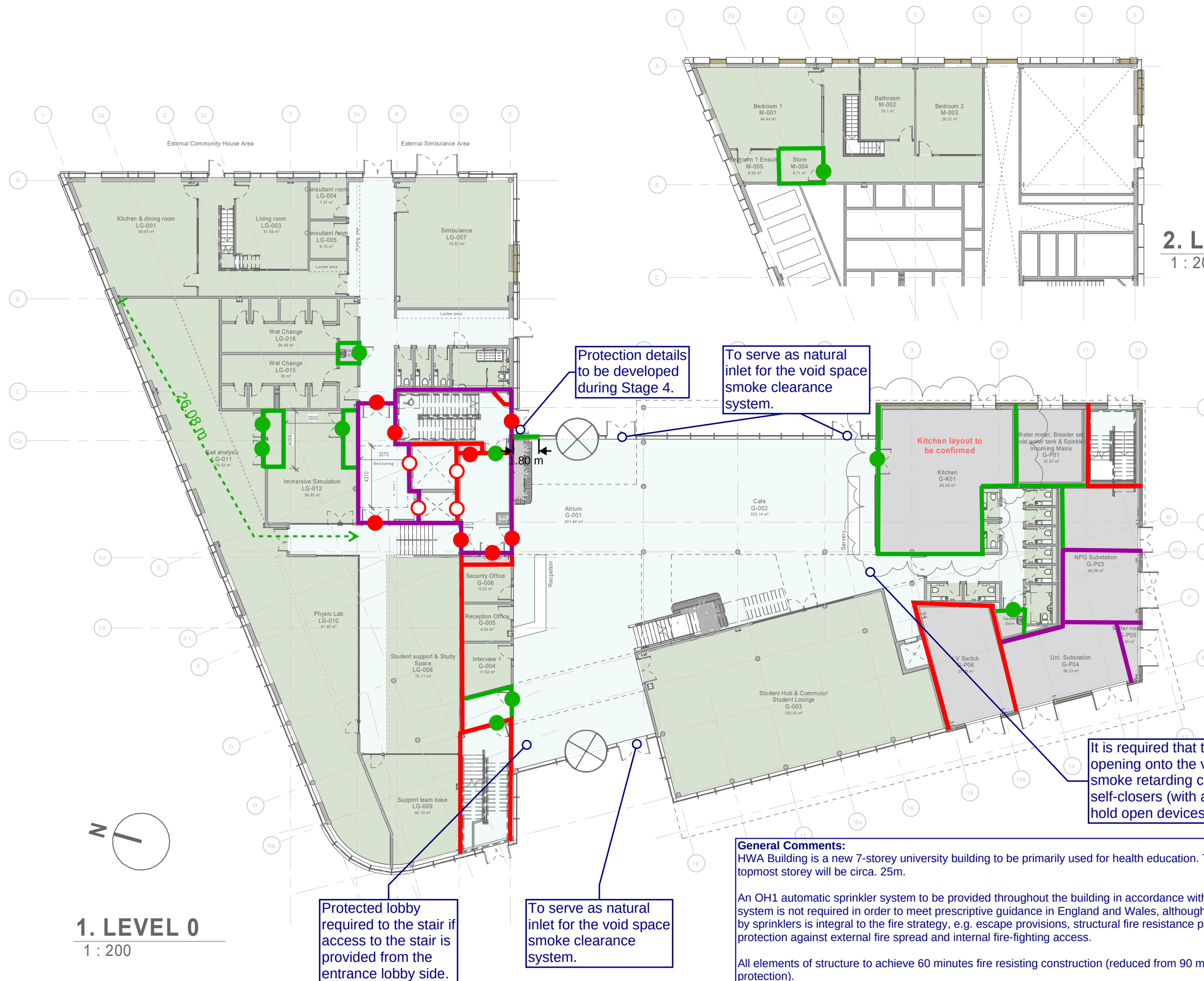
Rev	Description	Date	Dr by	App by
original by SL		02/09/21		RH
P6	GA amended to reflect comments from University and discussion with S/E and MEP consultants.	27.08.21	SL	RH
P5	Indicative Structural grid add, CA amended to incorporate revised riser sizes and to reflect recent end user discussions.	18.08.21	SL	RH
P4	CA amended to reflect discussions and feedback from client/ end users.	02.08.21	SL	RH
P3	Room areas added	21.07.21	FB	RH
P2	GA amended to address client comments - Supper lounge added for discussion - Drawing number updated.	19.07.21	SL	RH
P1	Basement omitted, GA amended to reflect VE proposals.	14.04.21	SL	RH

AHR AHR Architects Ltd
5th Floor
55 Princess Street
Manchester
M2 4EW
United Kingdom

T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

client name	University of Huddersfield
project	Health & Wellbeing Academy
drawing	Proposed Ground Floor
computer file	plot date
2020.00755.000	1 : 200 @A2
drawing number	rev
HWA-AHR-P1-00-DR-A-20000	P9 S4

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1. LEVEL 0
1 : 200

General Comments:

HWA Building is a new 7-storey university building to be primarily used for health education. The height to the topmost storey will be circa. 25m.

An OH1 automatic sprinkler system to be provided throughout the building in accordance with BS EN 12845. This system is not required in order to meet prescriptive guidance in England and Wales, although the benefit provided by sprinklers is integral to the fire strategy, e.g. escape provisions, structural fire resistance periods, void design, protection against external fire spread and internal fire-fighting access.

All elements of structure to achieve 60 minutes fire resisting construction (reduced from 90 minutes due to sprinkler protection).

A fire-fighting shaft inclusive of a fire-fighting lift should be provided, to be enclosed in 120 minutes fire resisting construction. A dry rising main in accordance to BS 9990 is required in the fire-fighting lobby. Refer to the first page for inlet locations. The outlet should be provided in the fire-fighting lobby at all storeys.

Category L1 fire detection and alarm system coverage in accordance with BS 5839-1 to be allowed for all areas. Whilst the objective of providing a Category L1 system is to offer the earliest possible warning of fire, it is considered that in practice the design of locations of detectors could take into consideration the risk levels and the need for protection in certain areas (e.g. omission of detection within small risers or voids that are of low fire risks may be acceptable). It is proposed to provide aspirating smoke detection system due to the high ceiling of the void and incorporate voice alarm system to reduce response time in evacuation.

Fire Strategy Key

Compartmentation

- 120 minutes
- 90 minutes
- 60 minutes
- 30 minutes

Fire Doors

- FD120S / FD120
- FD90S / FD90
- FD60S / FD60
- FD30S / FD30

Travel Distance

- Travel Distance

Maximum allowable travel distances:

- Single direction of travel:
18.4m straight line
27.6m actual layout
- More than one direction:
46m straight line
69m actual layout

The above has taken into account additional benefits from sprinkler coverage and enhanced fire detection and alarm system.

	consultants, additional riser added serving kitchen extract. Room numbers and structural grid added.			
P6	GA amended to reflect comments from University and discussion with S/E and MEP consultants.	27.08.21	SL	RH
P5	Indicative Structural grid add. GA amended to incorporate revised riser sizes and to reflect recent end user discussions.	18.08.21	SL	RH
P4	GA amended to reflect discussions and feedback from client/ end users.	02.08.21	SL	RH
P3	Room areas added	21.07.21	FB	RH
P2	GA amended to address client comments - Supper too arrange added for discussion - Drawing number updated.	19.07.21	SL	RH
P1	GA amended to reflect VE proposals	14.04.21	SL	RH
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AHR Architects Ltd
5th Floor
55 Princess Street
Manchester
M2 4EW
United Kingdom

T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

client name	University of Huddersfield
project	Health and Well Being Academy
drawing	Proposed First Floor
computer file	plot date
2020.00755.000	scale
1 : 200	@A2
drawing number	rev
HWA-AHR-P1-01-DR-A-20000	P10 S4

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This door is used as an exit during a fire and therefore should be readily openable in the event of a fire.

Dry riser to be enclosed in a 60-minutes fire resisting enclosure. Alternatively, it can be fire stopped at floor level. This comment applies to all floor levels.

There is proposal to omit sprinkler coverage in these two rooms, as sprinkler activation may present electrical hazard. Therefore, allow for 120 minutes fire resistance for the UPS room and 90 minutes for Comms room, subject to further assessment in RIBA stage 4.

Could this exit be moved to the far left? Currently it is too close to the alternative exit from Podiatry Clinic.

Protected lobby required to the stair.

1. LEVEL 01
1 : 200

Stage 2 Plan Overlay in magenta.

Fire Strategy Key

Compartmentation

- 120 minutes
- 90 minutes
- 60 minutes
- 30 minutes

Fire Doors

- FD120S / FD120
- FD90S / FD90
- FD60S / FD60
- FD30S / FD30

Travel Distance

- Travel Distance

Maximum allowable travel distances:

- Single direction of travel:
18.4m straight line
27.6m actual layout
- More than one direction:
46m straight line
69m actual layout

The above has taken into account additional benefits from sprinkler coverage and enhanced fire detection and alarm system.

	access to service risers. Classrooms re-named. Room numbers and structural grid added.			
P6	GA amended to reflect comments from University and discussion with S/E and MEP consultants.	27.08.21	SL	RH
P5	Indicative Structural grid add, GA amended to incorporate revised riser sizes and to reflect recent end user discussions.	18.08.21	SL	RH
P4	GA amended to reflect discussions and feedback from client/ end users.	02.08.21	SL	RH
P3	Room areas added	21.07.21	FB	RH
P2	GA amended to address client comments - Drawing number updated	19.07.21	SL	RH
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T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

client name	University of Huddersfield
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Stage 2 Plan Overlay in magenta.

The single direction travel distance slightly exceeds the limit based on straight line measurement. Fit-out should ensure that the travel distance is compliant with the limit for actual layouts (27.6m).

Fire compartment wall lines need to be carried through to meet with the external cladding. Suitable provision of fire stopping might be required to achieve this. This comment applies throughout the demise.

There is proposal to omit sprinkler coverage in this room, as sprinkler activation may present electrical hazard. Therefore, allow for 90 minutes fire resistance for the panel room, subject to further assessment in RIBA stage 4.

1. LEVEL 02
1 : 200

Fire Strategy Key

Compartmentation

- 120 minutes
- 90 minutes
- 60 minutes
- 30 minutes

Fire Doors

- FD120S / FD120
- FD90S / FD90
- FD60S / FD60
- FD30S / FD30

Travel Distance

- Travel Distance

Maximum allowable travel distances:

- Single direction of travel:
 - 18.4m straight line
 - 27.6m actual layout
- More than one direction:
 - 46m straight line
 - 69m actual layout

The above has taken into account additional benefits from sprinkler coverage and enhanced fire detection and alarm system.

The single direction travel distance slightly exceeds the limit based on straight line measurement. Fit-out should ensure that the travel distance is compliant with the limit for actual layouts (27.6m).

1. LEVEL 03
1 : 200

There is proposal to omit sprinkler coverage in this room, as sprinkler activation may present electrical hazard. Therefore, allow for 90 minutes fire resistance for the panel room, subject to further assessment in RIBA stage 4.

Rev	Description	date created	Dr by	App by
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P6	GA amended to reflect comments from University and discussion with S/E and MEP consultants.	27.08.21	SL	RH
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P4	GA amended to reflect discussions and feedback from client/ end users.	02.08.21	SL	RH
P3	Acute care amended and room areas added	21.07.21	FB	RH
P2	GA amended to address client comments - Drawing number updated	19.07.21	SL	RH
P1	GA amended to reflect VE proposals	14.04.21	SL	RH

AHR Architects Ltd
5th Floor
55 Princess Street
Manchester
M2 4EW
United Kingdom

T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

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project	Health and Well Being Academy
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Stage 2 Plan Overlay in magenta.

Fire Strategy Key

Compartmentation

- 120 minutes
- 90 minutes
- 60 minutes
- 30 minutes

Fire Doors

- FD120S / FD120
- FD90S / FD90
- FD60S / FD60
- FD30S / FD30

Travel Distance

- Travel Distance

Maximum allowable travel distances:

- Single direction of travel:
 - 18.4m straight line
 - 27.6m actual layout
- More than one direction:
 - 46m straight line
 - 69m actual layout

The above has taken into account additional benefits from sprinkler coverage and enhanced fire detection and alarm system.

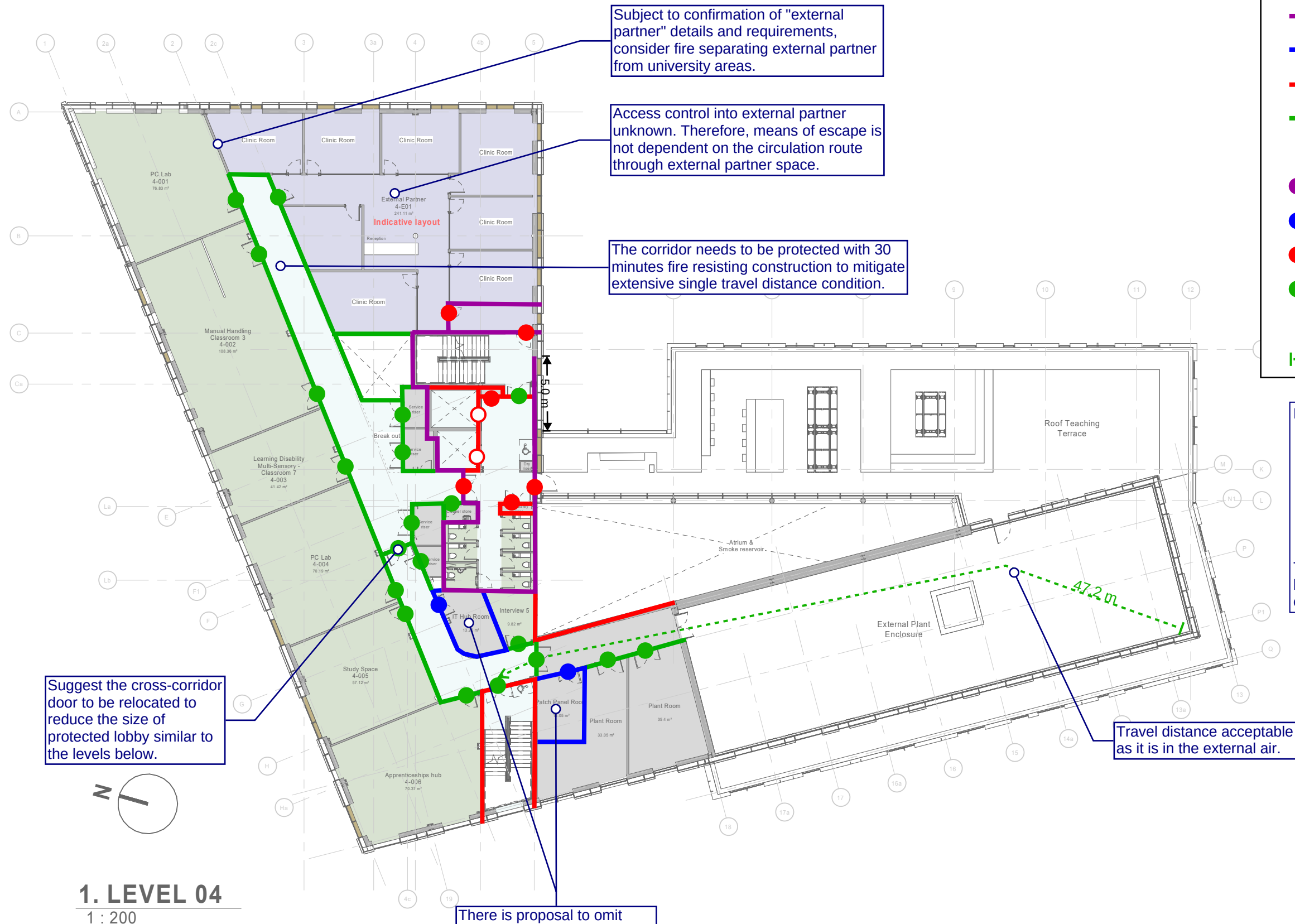
P6	GA amended to reflect comments from University and discussion with S/E and MEP consultants.	27.08.21	SL	RH
P5	Indicative Structural grid add, CA amended to incorporate revised riser sizes and to reflect recent end user discussions.	18.08.21	SL	RH
P4	CA amended to reflect discussions and feedback from client/ end users.	02.08.21	SL	RH
P3	Room areas added, 4th floor roof terrace reverted to original design intent	21.07.21	FB	RH
P2	GA amended to address client comments - Drawing number updated	19.07.21	SL	RH
P1	GA amended to reflect VE proposals	14.04.21	SL	RH
Rev	Description	Date	Dr by	App by
original by SL		date created 02/09/21	approved by RH	

AHR AHR Architects Ltd
5th Floor
55 Princess Street
Manchester
M2 4EW
United Kingdom

T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

client name	University of Huddersfield
project	Health and Well Being Academy
drawing	Proposed Fourth Floor
computer file	plot date
2020.00755.000	1: 200 @A2
drawing number	rev issue status
HWA-AHR-P1-04-DR-A-20000	P9 S4

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1. LEVEL 04
1 : 200

Stage 2 Plan Overlay in magenta.

Fire Strategy Key

Compartmentation

- 120 minutes
- 90 minutes
- 60 minutes
- 30 minutes

Fire Doors

- FD120S / FD120
- FD90S / FD90
- FD60S / FD60
- FD30S / FD30

Travel Distance

- Travel Distance

Maximum allowable travel distances (Office Space):

- Single direction of travel:
 - 19.5m straight line
 - 29.9m actual layout
- More than one direction:
 - 50.6m straight line
 - 74.8m actual layout

The above has taken into account additional benefits from sprinkler coverage and enhanced fire detection and alarm system.

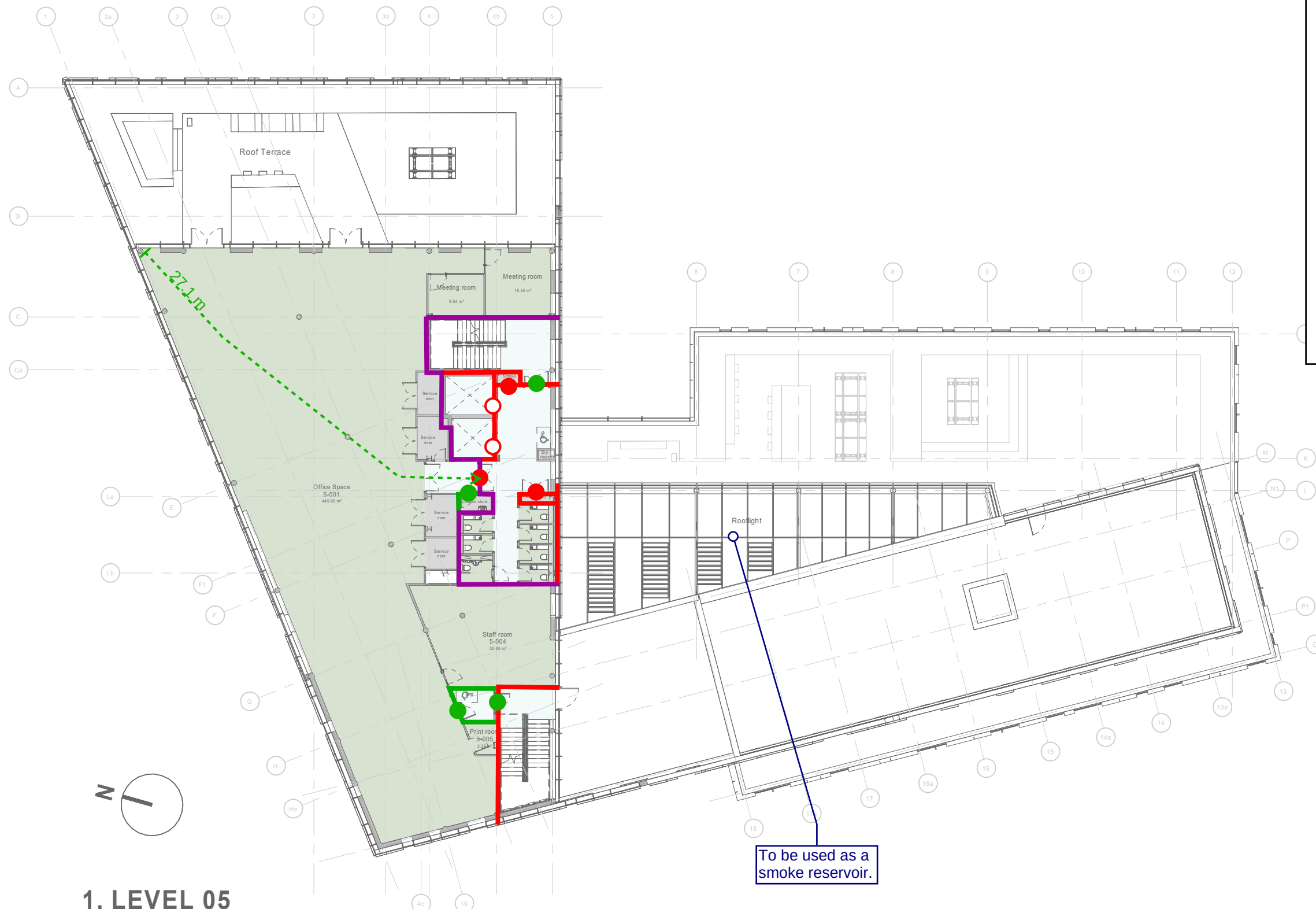
	plant room increased. Room numbers and structural grid added.			
P5	GA amended to reflect comments from University and discussion with S/E and MEP consultants.	27.08.21	SL	RH
P4	Indicative Structural grid add, CA amended to incorporate revised riser sizes and to reflect recent end user discussions.	18.08.21	SL	RH
P3	Room areas added, 4th floor roof terraced reverted to original design intent	21.07.21	FB	RH
P2	Drawing number amended	19.07.21	SL	RH
P1	GA amended to reflect VE proposals	14.04.21	SL	RH
Rev	Description	Date	Dr by	App by
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AHR AHR Architects Ltd
5th Floor
55 Princess Street
Manchester
M2 4EW
United Kingdom

T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

client name	University of Huddersfield
project	Health and Well Being Academy
drawing	Proposed Fifth Floor
computer file	plot date
2020.00755.000	1 : 200 @A2
drawing number	rev issue status
HWA-AHR-P1-05-DR-A-20000	P8 S4

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1. LEVEL 05
1 : 200

Stage 2 Plan Overlay in magenta.

Compartmentation

120 minutes

90 minutes

60 minutes

30 minutes

Fire Doors

FD120S / FD120

FD90S / FD90

FD60S / FD60

FD30S / FD30

Travel Distance

Travel Distance

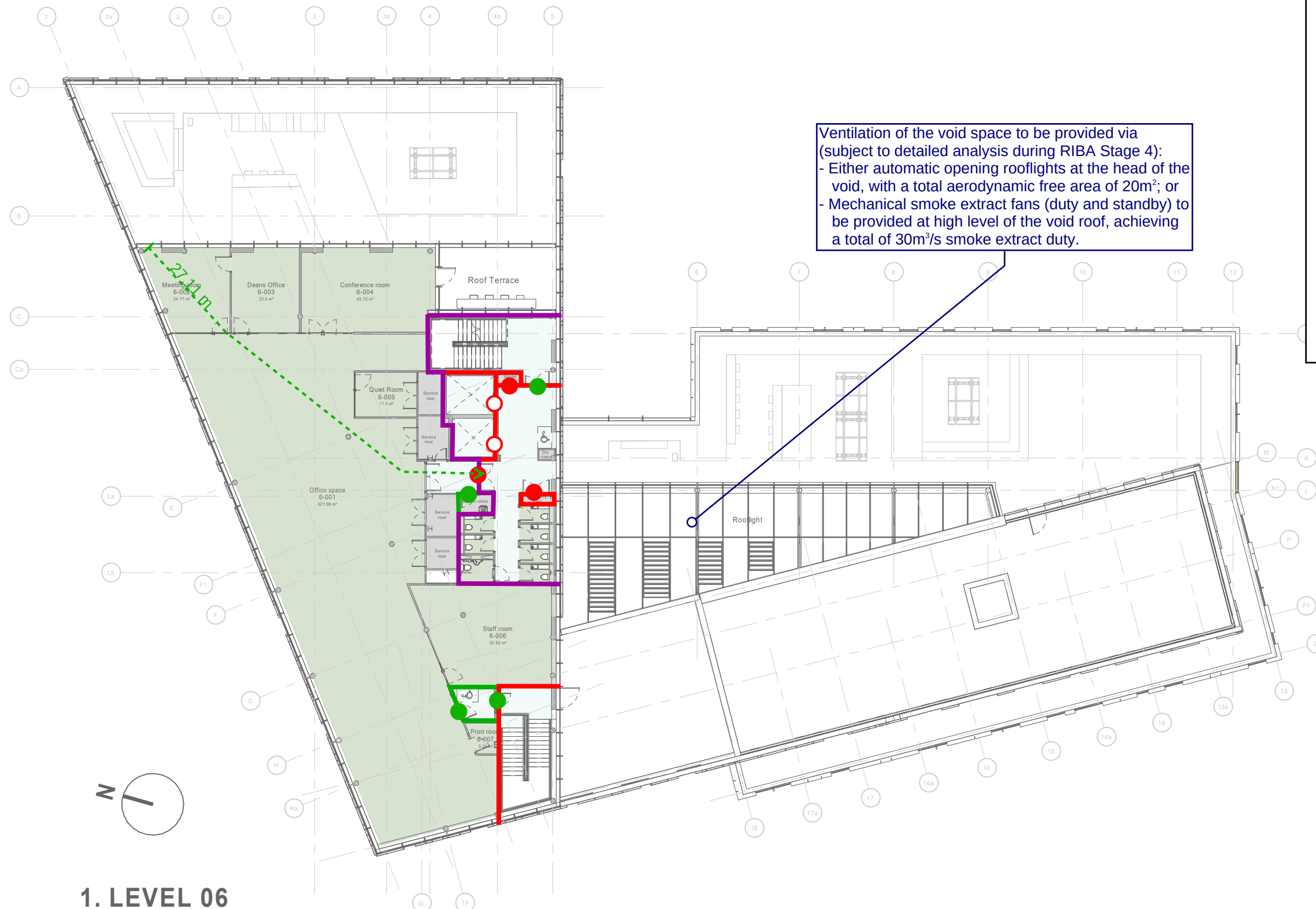
- Single direction of travel:
19.5m straight line
29.9m actual layout
- More than one direction:
50.6m straight line
74.8m actual layout

	plant room increased, room numbers and structural grid added.			
P5	GA amended to reflect comments from University and discussion with S/E and MEP consultants.	27.08.21	SL	RH
P4	Indicative Structural grid add, amended to incorporate revised river sizes and to reflect recent end user discussions.	18.08.21	SL	RH
P3	Room areas added, 4th floor roof terrace reverted to original design intent.	21.07.21	FB	RH
P2	Drawing number amended	19.07.21	SL	RH
P1	GA amended to reflect VE proposals	14.04.21	SL	RH
Rev	Description	Date	Dr by	App by
original by SL		date created 02/09/21	approved by RH	



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Stage 2 Plan Overlay in magenta.



1. LEVEL 06

1 : 200

Proposed Roof Finishes

1. Roof terrace to landscape architect's design.
2. Stone ballast over roofing membrane
3. Balcony paving
4. Plant enclosure concrete paving
5. Exposed roofing membrane with access routes define by concrete paving.

If the combustible insulation and membrane are not suitably covered, the roof covering need to be a tested system (tested as part of the substrate) achieving CRoof(t4) in accordance with BS EN 13501-5.

Fire Strategy Key

Compartmentation

- 120 minutes
- 90 minutes
- 60 minutes
- 30 minutes

Fire Doors

- FD120S / FD120
- FD90S / FD90
- FD60S / FD60
- FD30S / FD30

Travel Distance

- Travel Distance

P3	Stair core and lift over run indicated. Roof area over 4th floor roof plant room increased to reflect increased plant room size. 4th floor plant enclosure increased to reflect discussion with MEP consultant. Seventh floor roof plant enclosure enlarged to reflect comments from MEP consultant.	16.09.21	SL	RH
P2	4th floor roof terrace reverted to original design intent	21.07.21	FB	RH
P1	GA amended to reflect VE proposals	14.04.21	SL	RH
Rev	Description	Date	Dr by	App by
original by		date created		approved by
SL		03/01/21		RH

AHR Architects Ltd
5th Floor
55 Princess Street
Manchester
M2 4EW
United Kingdom

T +44(0)161 8287900
E manchester@ahr.co.uk
www.ahr.co.uk

client name	University of Huddersfield
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drawing	Proposed Seveth Floor & Roof Plan
computer file	plot date
2020.00755.000	1 : 200 @A2
drawing number	rev issue status
HWA-AHR-P1-07-DR-A-20000	P3 S2
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1. LEVEL 7 - Proposed Seventh floor - Roof Plan

1 : 200

Quality Assurance

This report has been prepared for the use by, and takes into account the particular instructions and requirements of, our Client. It is not intended for use by any third party, and Design Fire Consultants Ltd shall not be liable for the reliance on or use of the report by any third party.

Revision	Date	Issue Description	Author	Checked
01	28 March 2022	Update following comments received from preliminary consultation with Approving Authorities	W Lu <i>Wei-miao Lu</i>	M Eyre <i>M. Eyre</i>
00	15 Sept 2021	First Issue	W Lu <i>Wei-miao Lu</i>	M Eyre <i>M. Eyre</i>