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100 & 88 Gray's Inn Road - London Plan Fire Statement

1. Introduction

Maze Fire Consulting has been appointed by Lawnmist Limited, on behalf of Global Holdings to provide a Fire Safety Statement document for the remodelling work of the 88 Gray's Inn Road residential building and the 100 Gray's Inn Road new office building in London.

The aim of the Fire Statement is to clearly communicate to the Planning Authority that the design of the building project demonstrates an understanding of the matters listed in Planning Policy D12 (Pre-consultation draft March 2021), this will be achieved by documenting strategic fire safety provisions for the development. The statement declares that the fire safety strategy satisfies the requirements of London Plan Policy D12 and the building has been designed to incorporate features which will mitigate the risk to life and the risk of serious injury in the event of a fire.

This fire statement will outline the minimum fire safety provisions required for the proposed development to be compliant with the Functional Requirements of the Building Regulations 2010 (as amended) using the guidance contained in BS 9991:2015, BS 9999:2017 associated British Standards.

2. Project Description

2.1 100 Gray's Inn Road Building

100 Gray's Inn Road development consists of a new ten-storey office building (including Basement and Ground). It is proposed to construct the building using Cross Laminated Timber (CLT) for the main structure, with concrete cores. The CLT structure is not covered directly by BS 9999, therefore, a separate analysis will be conducted by a specialist consultant to assess the suitability for the use of CLT for the structure of the building.

The current proposal is to:

- Include in the design 8 storey of open office spaces, plus a partially enclosed roof terrace and plant room basement.
- A retail or restaurant space is proposed to be located in the South-West part of Level 00.
- The construction of two escape stairs serving all floors including the roof terrace and basement with one of the two stairs designed as fire-fighting stairs and 1 evacuation lift per each stair core.

An indicative layout showing the various levels of the building is copied in the Figure below.

The building users will predominantly be office staff who would be expected to be awake and familiar with the building (occupancy characteristics A). The appropriate fire growth rate for a typical office is 2 (i.e. medium fire growth rate). Therefore, the overall risk profile for the building is A2. As sprinklers are being provided this growth rate can be reduced by 1 giving a final building risk profile of A1. The retail units will be Risk Profile B1, as the people may be unfamiliar with the unit and the building will be sprinklered.

Figure 1 100 Gray's Inn Road Building layouts

2.2 88 Gray's Inn Road Building

The 88 Gray's Inn Road Building development consists of remodelling of an existing office building in residential units from Level 01 to Level 04 with an independent workplace on the ground floor and basement residential plant room.

The current proposal is to:

- Retain the existing external façade up to Level 03 and the concrete internal structure.

- Strip away the later added extension to the façade of the building widening the distance from the opposite building from 2m to 5m above the ground level.
- Include in the design two apartments per each floor above ground served by single stair and an open space office with independent entrance on the ground floor. The basement will be a plant room accessible from an independent stair.

An indicative layout showing the various levels of the building is copied in the Figure below.

The flats in 88GIR will be covered by the guidance of BS 9991, which does not impose risk profiles.

The workspace at ground of 88GIR will be Risk Profile A2 and the basement B2.

The building has an upper floor height lower than 11m, therefore no sprinkler system is required (as per current government requirements).

Figure 2: 88 Gray's Inn Road Building layouts

3. London Plan Fire Statement

This London Plan statement has been prepared by Alex Manning (BSc (Hons) AIFireE LETAPAEWE), Alex has 20 years of experience in fire engineering, and is a Member of the Institution of Fire Engineers.

The declaration of compliance has been included in Section 4.

The following sections are prepared to align with the London Policy Plan 12B in the following six sections.

3.1 Methods of Construction

3.1.1 100 Gray's Inn Road Building

The new office building structure is proposed to be constructed from cross-laminated timber.

The 100 Gray's Inn Road building is classified as Risk Profile A1, the height of the top office floor is over 18m, but less than 30m high from the firefighters' access level. However, the partially closed roof terrace has a height of 32.12m. For buildings with a height of more than 30m, in accordance with Table 23 of BS 9999 it will require 120 minutes of fire resistance applied to the element of structure. It is noted that with the increased risk associated with the CLT structure, this is outside of the standard scope of BS 9999 with regards to fire protection and, therefore, a separate analysis will be conducted by others to assess the suitability for the use of CLT for the structure of the building.

3.1.2 88 Gray's Inn Road Building

The existing building is of concrete construction with concrete floors and masonry façade.

The 88 Gray's Inn Road building is over 5m, but under 18m high to the topmost storey. In accordance with Table 4 of BS 9991 it will require 60 minutes of fire resistance applied to the loadbearing structural elements.

3.2 Means of Escape

3.2.1 Requirements

In order to ensure the safety of the building occupants, Policy D12 of the London Plan (Pre-consultation draft March 2021) requires all developments to achieve the highest standard of fire safety and ensure the following:

- Section A, Item 4: provide suitable and convenient means of escape, and associated evacuation strategy for all building users
- Section A, Item 6: develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in.
- Section B, Item 2: Means of escape for all building users and the evacuation strategy.

In response to the requirements stated above, the following comments have been made to demonstrate how the design affords adequate escape provisions for occupants in line with the guidance in Policy D12 of the London Plan.

3.2.2 100 Gray's Inn Road Building – Maze Comments

The building will have a simultaneous evacuation strategy on confirmation of a fire within the building. The occupants will be evacuated via two stairs to street level at the ground, where assembly points can be provided that are remote from the building either along Clerkenwell Road or Gray's Inn Road.

Exits providing access to a means of escape, other than exits in ordinary use (e.g. main entrances), shall be distinctively and conspicuously marked by an exit sign in accordance with BS ISO 3864-1 and BS 5499-4.

Measurements taken from the latest architectural drawings indicate that the travel distance limits stated in Table 11 of BS 9999 are met when considered as a shell and core.

The lift will be dual entry but provided with fire/smoke curtains over the non-lobby doors to prevent smoke from spreading from the fire level to the upper levels.

Minimum Height of Escape Routes

A minimum clear height of 2.0m shall be maintained throughout the escape routes.

Minimum Number of Exits

Any room or storey should be provided with a minimum of:

- One exit where the occupancy is less than 60 people;
- Two exits where the occupancy is greater than 60 people; and

- Three exits where the occupancy exceeds 600 people.

Doors Opening Direction

Any doors used by more than 60 people should open in the direction of escape. Doors should also not reduce the minimum width of the means of escape when open.

Changes in Level

Single steps will be avoided, where possible, but if provided, they will be appropriately marked.

Horizontal Exit capacity

The following figures show the exit routes from Basement Level B01, Level 00, Level 01, L02 to Level 07 (similar layout and number of exits), Level 08 and the Roof Terrace Level 09

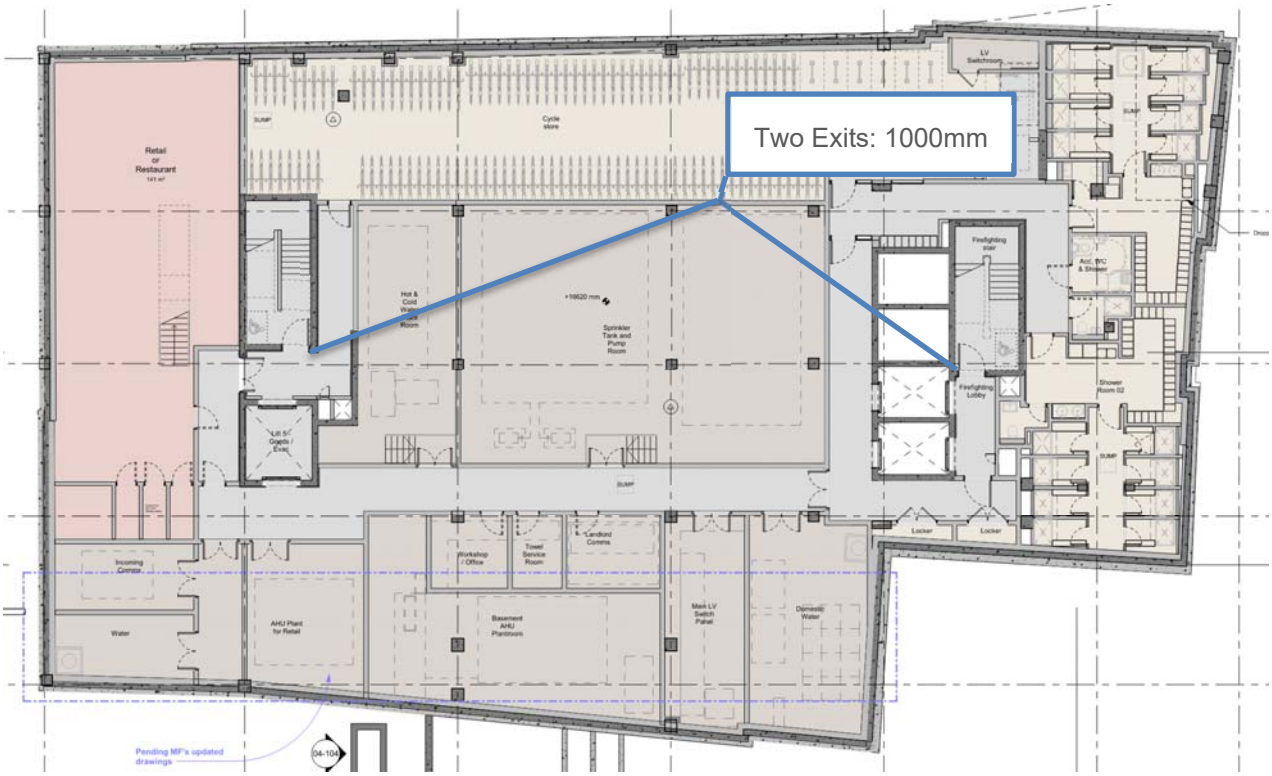

Figure 3: Basement Level B01 horizontal means of escape

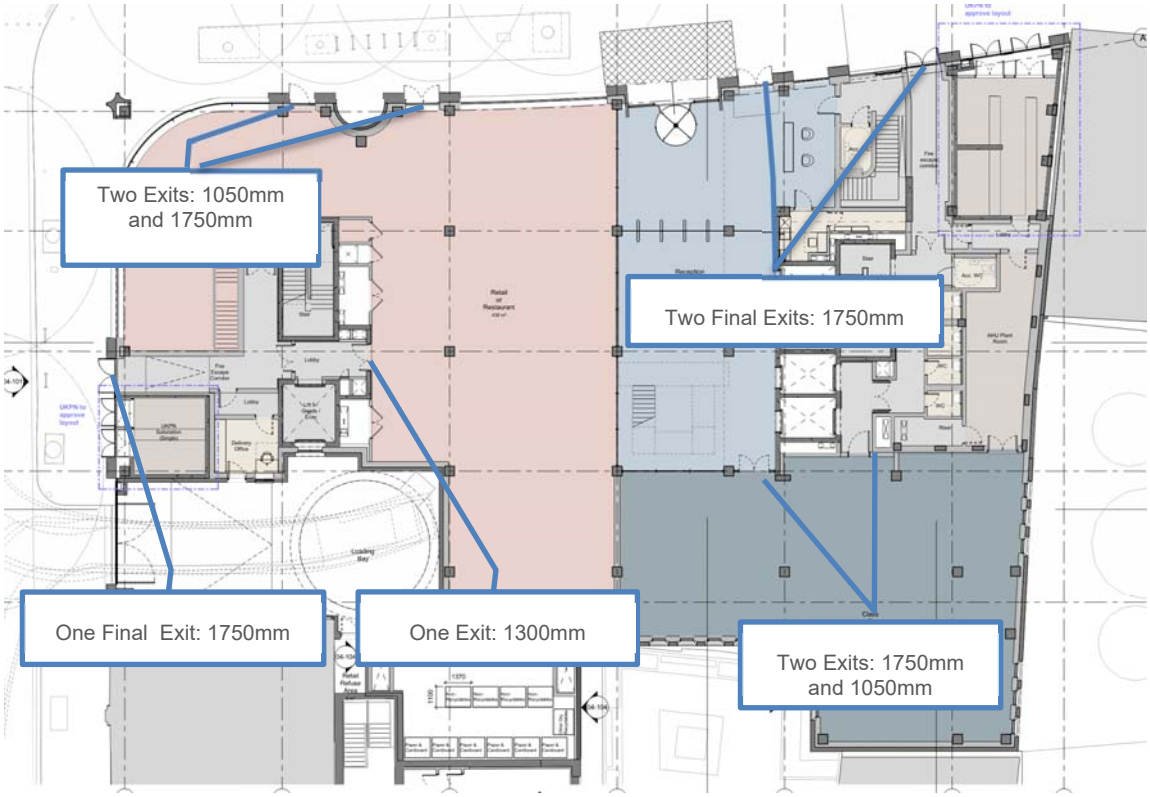

Figure 4: Level 00 horizontal means of escape

Figure 5: Lower 01 horizontal means of escape

Figure 6: Level 02 to 07 horizontal means of escape

Figure 7: Levels 08 horizontal means of escape

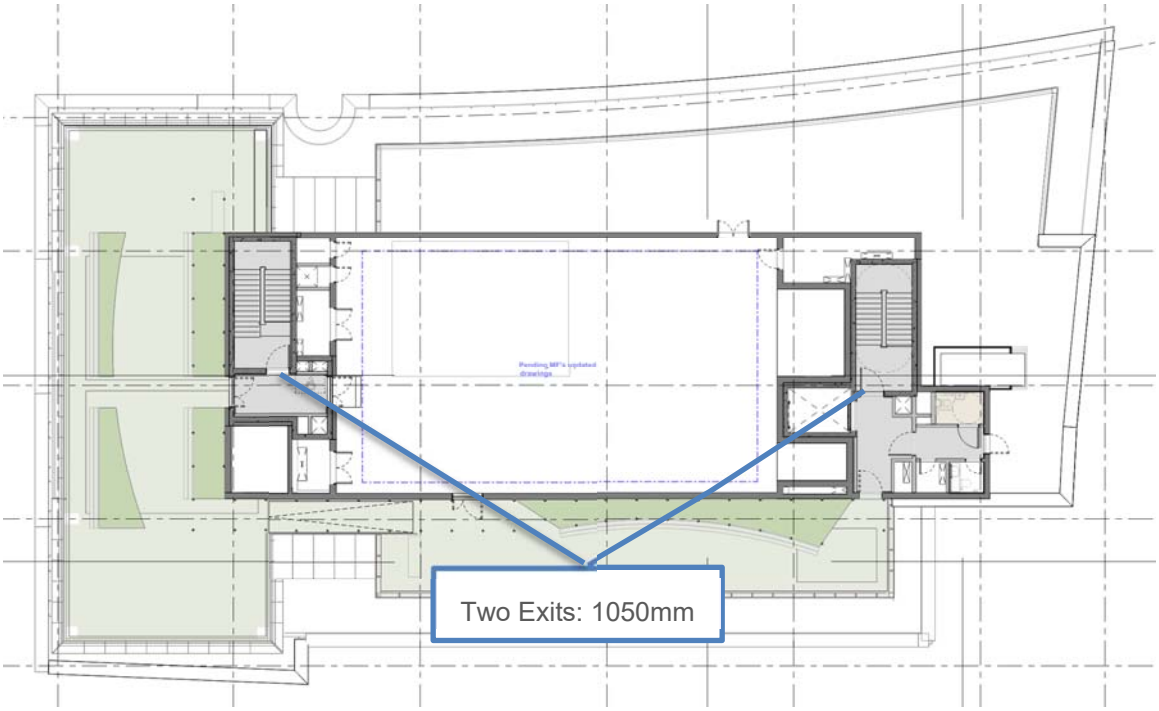

Figure 8: Roof Garden Level 09 horizontal means of escape

The following table shows a calculation of exit capacities from each of the levels in the building. Occupancy level is based on floor space factor in Table 9 of BS 9999 and floor area, the normal density for use type Offices (6m^2/person) and medium density for shops (4m^2/person) are taken.

A 15% decrease in the door width per person (as per guidance recommendation when an enhanced detection system is designed for the building) is applied in the following table.

Level	Occupancy	Available Means of Escape		Comments
		No & Width	Capacity	
Level B01	n/a	2 Exit doors, width 850mm	357	A1 risk profile, 2.8mm/person One exit discounted, one remaining 1050mm door, sufficient for 357 persons. BS 9999 does not give a floor space factor for basement level. However, the basement occupancy is expected to be lower than 303 persons. Sufficient exit capacity from the Basement Level B01.
Level 00	Office 43 (256 m^2)	2 Exit doors, width 1750mm and 1050mm	60	The escape from this office is via reception or the fire-fighting stair lobby. However, as the two exits leading to these spaces are relatively close to each other, this space is conservatively considered to have only one means of escape (in case of fire both of the exits could be unavailable) One exit, maximum allowed occupancy 60 occupants. Sufficient exit capacity from the ground floor office area.
	Reception 31(185 m^2)	1 Exit door, width 1750mm	60	One exit, maximum allowed occupancy 60 occupants. Sufficient exit capacity from the Reception at Level 00

Level	Occupancy	Available Means of Escape		Comments
		No & Width	Capacity	
	Retail or Restaurant 109(436 m^2)	3 Exit doors, width 1750mm, 1050mm and 1300mm	419	B1 risk profile, 3.1mm/person Two close exits discounted (largest route blocked by fire), one remaining 1300mm door, sufficient for 419 persons. Sufficient exit capacity from the Restaurant or Retail area
Level 01	173(1040 m^2)	2 Exit doors, width 1050mm	375	A1 risk profile, 2.8 mm/person One exit discounted, one remaining 1050mm door, sufficient for375 persons (based on 1050/2.8 calculation in BS 9999). Sufficient exit capacity from the Office from Level 01 to Level 09
Level 02	181(1084 m^2)	2 Exit doors, width 1050mm	375	
Level 03	175(1049 m^2)	2 Exit doors, width 1050mm	375	
Level 04	170(1018 m^2)	2 Exit doors, width 1050mm	375	
Level 05	165(988 m^2)	2 Exit doors, width 1050mm	375	
Level 06	165(987 m^2)	2 Exit doors, width 1050mm	375	
Level 07	165(987 m^2)	2 Exit doors, width 1050mm	375	
Level 08	141(846 m^2)	2 Exit doors, width 1050mm	375	
Roof Terrace Level 09	47(2810 m^2)	2 Exit doors, width 1050mm	375	

Table 1: Means of Escape Capacities from new areas

Vertical Means of Escape

The building has one escape stair and one fire fighting stair measuring 1200mm.

Both stairs serve all the floors in the building and are lobbied at each level therefore it is not necessary to discount one for the purposes of checking evacuation capacity. The total number of people that would use the stair in case of simultaneous evacuation would be 1382 (people evacuating from Level 01 and above). The minimum stair width per person for simultaneous evacuation serving 9 floors is 1.275mm/person (Table 13 in BS999, considering 15% of decrease due to the automatic detection system designed for the building). Therefore, the maximum number of evacuees that the stairs can safely evacuate is 1882 (941 persons per stair). Sufficient stair capacity is provided to the building.

Disabled Egress

Two Refuges (accompanied by a management plan) will be provided on all floors without a level route to outside along with an Emergency Voice Communication system complying with BS 5839-9 to aid disabled occupants that are not able to use the stairs.

The Figure below indicates the location of refuges on a typical floor.

The fire-fighting shaft will be provided with a mechanical smoke shaft (area circa 0.6m^2, to be confirmed by the specialist designer) serving the fire-fighting lobby, with a 1m^2 AOV provided at the head of the fire-fighting stair.

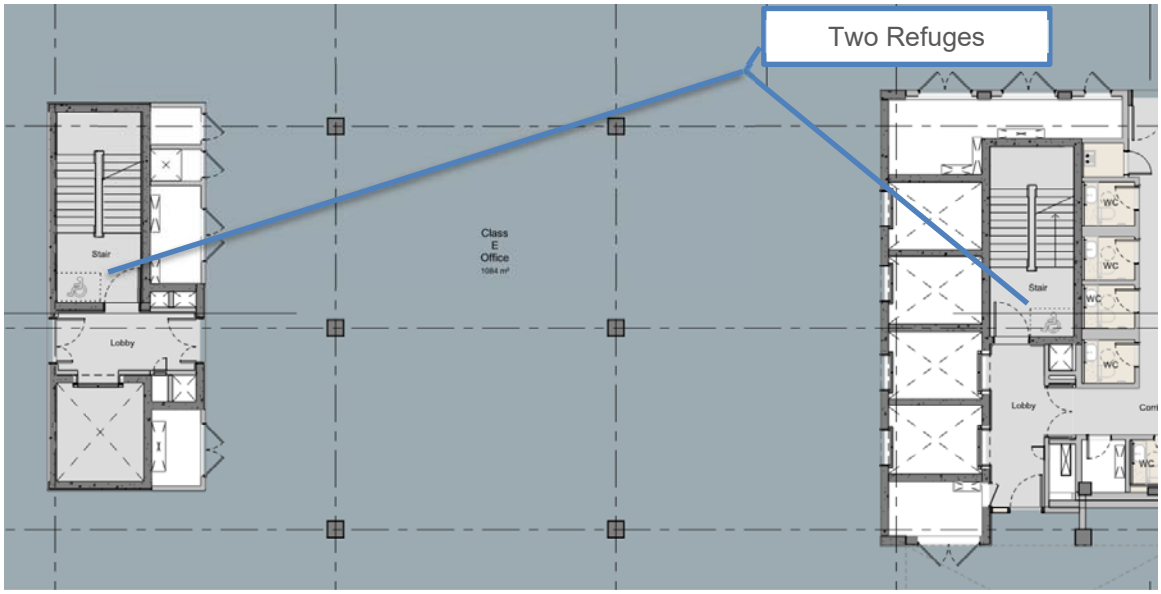

Figure 9: Location of refuges on a typical floor

A staff management plan is required to ensure that all disabled refugees are checked via the emergency voice communication panels in an evacuation scenario and to assist with disabled evacuation where required.

Evacuation Lift

The building is provided by one fire fighting lifts and two evacuation lift (one for each stair core).

The evacuation lift in the fire-fighting core serves all the floors. The evacuation lift in other core serves all the floors other than Level 09.

The evacuation lift will be designed and installed in accordance with the guidance in BS 9999 Annex G.

3.2.3 88 Gray's Inn Road Building - Maze Comments

A stay-put policy is adopted for the residential flats in 88 Gray's Inn Road Building, with only the fire affected flat being alerted and evacuated.

The Workspace will be independently evacuated from the flats above.

An assembly point can be provided that is remote from the building along Gray's Inn Road.

Every doorway or other exit providing access to a means of escape, other than exits in ordinary use (e.g. main entrances), should be distinctively and conspicuously marked by an exit sign in accordance with BS ISO 3864-1 and BS 5499-4. Exit signage should be located and operated in accordance with BS 5499-4.

Minimum Height of Escape Routes

A minimum clear height of 2.0m shall be maintained throughout the escape routes.

Horizontal Means of Escape

Every flat will be provided by a protected internal hall. The escape from the apartment will be in line with Figure 11 of the BS 9991 where travel distances within the protected hall will be no more than 9m. The escape from the common part of the residential building will be in line with Figure 6 a) of BS 9991 as shown in the figure below. Each apartment door is never farther than 7.5m from the stair door as recommended by the guidance.

Measurements taken from the latest architectural drawings indicate that the travel distance limits stated in Table 11 of BS 9999 are met when considering the workplace at Level 00 and Basement Level.

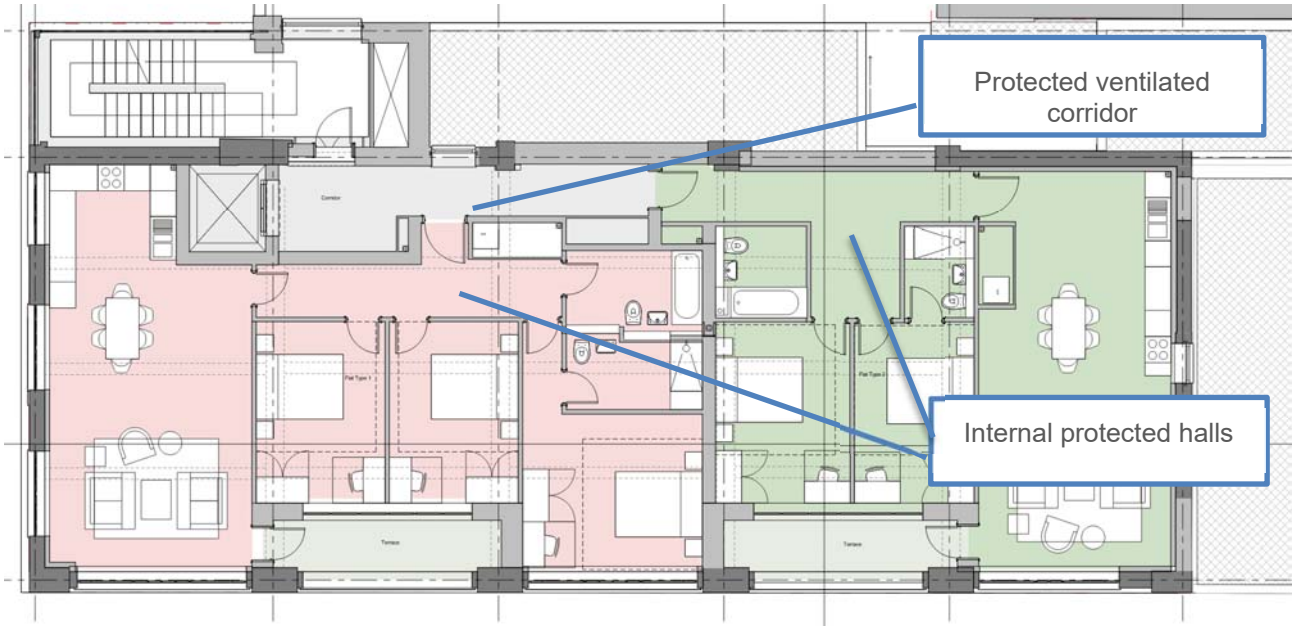

Figure 10: Typical layout – Horizontal means of escape

Vertical Means of Escape

Both the stairs serving the residential floors and the basement will have a width of 1000mm as recommended by the guidance.

Evacuation Lift

The building is provided with one evacuation lift.

The evacuation lift serves all the floors of the residential levels. The evacuation lift will be designed and installed in accordance with the guidance in BS 9999 Annex G.

Disabled refugees are not required within this building. However, it is noted that the protected common corridors are considered as suitable refugee areas for disabled people waiting to use the evacuation lift.

There will be no presence of a competent person allowing for a drive assisted evacuation, people are expected to use the lift with no assistance.

3.3 Passive and Active Fire Safety Measures

3.3.1 Requirement

- London Plan Policy D12 - Section A, Item 3: The designed to incorporate appropriate features which reduce the risk to life and the risk of serious injury in the event of a fire; including appropriate fire alarm systems and passive and active fire safety measures.
- London Plan Policy D12 - Section B, Item 3: Provide features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans.

3.3.2 100 Gray's Inn Road Building - Maze Comments

An L1 standard fire alarm system (in place of the manual detection system recommended by the guidance), in accordance with BS 5839-1, in line with insurance requirements, with smoke or heat detection will be provided in all applicable areas in order to assist and protect occupants in the process of moving safely away from danger after a fire has started and provide early notification of a fire to occupants.

Manual call points shall be Type A of BS EN 54-11:2001 and installed in accordance with BS 5839.

Emergency lighting will be provided as necessary to cover all escape routes, internal and external in accordance with BS 5266 Part 1 and BS EN 1838 to enable occupants to find their way out of the building should there be a power failure following a fire.

All life safety systems will be required to comply with their respective British Standards which require a back-up power supply.

Basement stairways are more likely to be filled with smoke and heat than stairs on the ground and upper storeys. In order to prevent a basement fire endangering upper storeys, a mechanical smoke ventilation system achieving 10 air changes an hour shall be provided within the basement levels.

Sprinkler protection will be provided in accordance with BS EN 12845 and is recommended to be designed to meet the sprinkler hazard classification requirements of a Category OH3 system.

A suitable level of compartmentation in line with BS 9999 requirements will be implemented in the design in the stair cores, ancillary areas, separation from other buildings and separation between the restaurant/shop area at the ground floor and office/reception area (if required by having different management).

Cavity barriers shall be provided as per the recommendations of Section 33 of BS 9999 in order to restrict the unseen spread of fire and smoke spread through concealed spaces.

Joints between elements that serve as a barrier to the passage of fire as well as any openings for pipes, ducts, conduits or cables passing through these barriers shall be fire-stopped using appropriate sealing products.

3.3.3 88 Gray's Inn Road Building - Maze Comments

A Grade D1, Category LD2 detection and alarm system is appropriate to the building in line with the recommendations of BS 5839-6 for a new build - Residential (dwellings) development.

Audible warning will be provided to the development using sounders in accordance with BS 5839-6. The audible warning is necessary only for the apartment of origin of the smoke/fire detection.

Emergency lighting will be provided as necessary to cover all escape routes, internal and external in accordance with BS 5266 Part 1 and BS EN 1838 to enable occupants find their way out of the building should there be a power failure following a fire.

All life safety systems will be required to comply with their respective British Standards which require back-up power supply.

The common corridor will be provided with 1.5m^2 AOVs direct to outside at every level, and a 1m^2 AOV provided at the head of the stair. The existing basement is less than 200m^2 in floor area and therefore does not require a smoke clearance system.

A BS 5839-1: L5 alarm system should be installed in the stair common lobbies to activate the AOV at the top of the stair. This system should not feature an audible alarm in keeping with the stay-put policy.

The basement level is less than 200m^2 in floor area and therefore does not require a smoke clearance system.

A suitable level of compartmentation in line with BS 9991 requirements will be implemented in the design in floors separating different levels, ancillary areas, risers, stair cores, protected halls, common corridor, walls separating different apartments and separation the office on the ground floor with the remaining of the building and ancillary areas.

Cavity barriers shall be provided as per the recommendations of Section 19 of BS 9991 in order to restrict the unseen spread of fire and smoke spread through concealed spaces.

Joints between elements that serve as a barrier to the passage of fire as well as any openings for pipes, ducts, conduits or cables passing through these barriers shall be fire-stopped using appropriate sealing products.

3.4 Access for Fire Service Personnel and Equipment

3.4.1 Requirements

- Section A, Item 1: identify suitably positioned unobstructed outside space for fire appliances to be positioned on

- Section A, Item 7: Provide suitable access and equipment for firefighting which is appropriate for the size and use of the development.
- Section B, Item 4: The Fire Statement must clearly identify the emergency access routes to the site, including contingency routes and access in the event the primary route is blocked. The Fire Statement must identify all active measures included for use by the fire and rescue service.
- Section B, Item 5: The Fire Statement must clearly identify the emergency access routes within the site and to individual buildings for the fire and rescue service.

3.4.2 100 Gray's Inn Road Building - Maze Comments

The building is provided with one fire fighting shaft serving all the floors.

Access into the building for the Fire Service is provided via a protected corridor leading into the firefighting shaft on the ground floor level, all rooms linking this corridor will be lobbied. Firefighting lobbies are provided on upper levels to assist with firefighting operations.

Fire-fighting lobby will be ventilated by way of a mechanical smoke ventilation system.

The fire-fighting lift will be dual entry but provided with fire/smoke curtains over the non-lobby doors to maintain the protection of the lift in the event of a fire.

Vehicular access into the site is via Clerkenwell Rd and the dry riser inlet point is within 18m from the vehicle parking area. Existing street hydrants should be located no more than 90m from the entrance.

The Figure below shows fire fighters access arrangements.

Figure 11: Fire Service Access and Existing Street

The restaurant/shop area will be provided with access for a fire appliance vehicle to at least 15% of the unit perimeter from Gray's Inn Road and Clerkenwell Rd

3.4.3 88 Gray's Inn Road Building - Maze Comments

The 88 Gray's Inn Road Building will provide with a dry rising main with outlets at every upper storey located within the residential stair enclosure, and an inlet located externally at Ground within 18m of (and in site of) where a fire appliance can park on Gray's Inn Road.

The workspace at ground level will be provided with access for a fire appliance vehicle to within 45m of every point of the space.

3.5 Fire Safety Management and Future Development

This part of the statement is concerned with the management of fire safety measures in the building, i.e. those elements necessary to ensure a satisfactory standard of fire protection.

Effective arrangements shall be put in place to manage all aspects of fire safety in the premises and the details of those arrangements shall be recorded in a Fire Management Plan. The arrangements will include some of the following key areas:

- Development of a suitable emergency procedure, including an evacuation plan.
- Staff training plan
- Maintenance contracts for essential fire safety systems and equipment.
- Schedule of in-house checks and test
- Evacuation drills
- Communication arrangements
- Control of works on site (e.g. permit to work)
- Contingency plans
- Preparation of personal emergency evacuation plans (PEEPs) for staff and visitors as necessary.

The fire strategy for this building will be revisited should any of the following happen:

- The use of the building changes.
- The occupancy of the building increases.
- Major refurbishment/alteration/extension that will involve omitting or moving doors, structural alterations, change to internal arrangements or commencement of keeping explosives or highly flammable materials.
- Areas in disuse.

4. Declaration of Compliance

The fire strategy for 100 & 88 Gray's Inn Road Building development written in line with the guidance in BS 9999 and BS 9991 as well as the fire safety information provided to satisfy the requirements of the London Plan Policy D12.

It is considered that provided the evacuation lift is designed and installed in accordance with the guidance outlined in this Fire Statement, the provision of the evacuation lift will meet the requirements of London Plan Policy D12 and D5(B5) for both buildings.

Alex Manning who has prepared this Fire Statement, is the Project Director and has over 20 years of experience in fire engineering. Alex is an Associate Member of the Institution of Fire Engineers, Projects Include Airport terminals, Commercial and residential buildings, Education and research facilities, Hospitals, and Warehouse and distribution centres.

Mark Jones (PhD MEng (Hons) CEng MIFireE APAEWE) is the reviewer of this document. Mark has over 14 years of experience in fire engineering, is a Chartered Fire Engineer and Member of the Institution of Fire Engineers.

Maze Fire will assist the design team in ensuring that all development agreements, development briefs and procurement processes shall incorporate the highest standard of fire safety.

Quality Management

Version	Date	Information about the proposal		
01	17/03/2023	Reason for issue:	First Issue for Comments	
		Prepared by:	Alex Manning Associate	
		Reviewed By	Mark Jones Principal Consultant	 Mark Jones (Mar 17, 2023 15:41 GMT)

Validity

This document is formulated on the basis of the information and experience available at the time of preparation. It is applicable to the above-mentioned project only in accordance with the client's instructions. It is only valid provided no other modifications are made other than those for which a formal opinion has been sought and given by Maze Fire Consulting Limited.

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