HOARE LEA

Barlby Schools.
London.
Mace Limited.

FIRE ENGINEERING
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STAGE 4 REPORT – FIRE SAFETY STRATEGY
SUITABILITY S4
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STAGE 4

Audit sheet.

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00	13/07/2018	RIBA Stage 4 Fire Safety Strategy – Draft for comment	JA	JL
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Contents.

Executive summary

This RIBA Stage 4 Fire Safety Strategy outlines the fire safety measures required for the proposed Barlby Schools development in London. The purpose of this report is to set out the fire safety principles for agreement with the Statutory Authorities. Within this document, the proposed solutions for means of escape, internal and external fire spread issues as well as firefighting access and facilities are outlined. The aspects of design that do not follow recognised statutory guidance have been highlighted within this fire strategy document and may require further consideration by the design team and further discussions with the Approving Authorities. The fire safety strategy has been based on BS 9999:2017.

The development will be provided with a commercial sprinkler system, designed and installed in accordance with BS EN 12845:2015. However, Hoare Lea has been asked to develop the fire strategy to meet the performance requirements of Building Regulations without reliance on the mitigating measures that are recognised through the provision of sprinkler protection in order to introduce an additional level of safety and robustness to the design.

The proposed building will comprise of two different parts, one a primary school and the other a SEN school. The primary school is proposed as a three-storey building from Ground Floor to Second Floor which will be provided with two escape stairs. The SEN school is also proposed as a three-storey building from Lower Ground Floor to First Floor. It should be noted that the Lower Ground Floor in the SEN school is the access level for this part of the building and subsequently no part of the building is below ground level measured from fire brigade access level. This arrangement is due to the sloping nature of the site. The SEN part of the building is provided with two escape stairs serving all levels.

It is proposed that both schools will be fitted with a Category L1 fire detection and alarm system, which means that all escape routes, high risk rooms and rooms opening onto stairs will be provided with automatic detection, thus providing the earliest possible warning.

The two different schools are fire separated from each other with fire resisting construction, however, at Ground Floor there are three halls used for dining and PE activities (two halls within the primary school demise and one hall within the SEN school demise) as well as a shared kitchen facility. The three halls will be separated by folding partitions as there is an intention of having the possibility of utilising the combined space of all three halls out of normal school hours. It is proposed that a managed evacuation strategy will be adopted including a ‘double knock’ feature with an investigation period.

Due to a height of the top habitable floor above 5m but below 18m, the elements of structure should be protected to achieve at least 60 minutes fire resistance for the entirety of the development.

1. Introduction

The purpose of this report is to set out the fire safety principles for agreement with the Statutory Authorities for the proposed development of two new schools at Barlby Road located in the north of the Royal Borough of Kensington and Chelsea.

Barlby Primary School is a high performing, oversubscribed school located in the north of the Royal Borough of Kensington and Chelsea. It is rated by Ofsted as "Outstanding". The school's admission arrangements are currently based on 1.5 forms of entry per year, and the reception classes are heavily oversubscribed with requests from predominantly local parents. In the 2013-14 academic years there were 190 first and second preference requests for the 45 available places.

There is both a local and a national desire to expand popular, high-performing schools to meet the increasing demand for primary places and to drive up local pupil outcomes, and this proposal seeks to develop that principle further in North Kensington. To meet this additional demand, it is proposed to construct a new school.

The new proposed building will comprise of two different parts, one a primary school and the other a SEN (Special Educational Needs) school. This fire safety strategy has been developed on the basis that the SEN school will be focused on children with extra educational and learning needs and does not specifically focus on children with physical mobility impairments.

The primary school is proposed as a three-storey building from Ground Floor to Second Floor which will be provided with two escape stairs. The SEN school is proposed as a three-storey building from Lower Ground Floor to First Floor. The SEN part of the building is also provided with two escape stairs.

The development will be provided with a commercial sprinkler system, designed and installed in accordance with BS EN 12845:2015. However, Hoare Lea has been asked to develop the fire strategy to meet the performance requirements of Building Regulations without reliance on the mitigating measures that are recognised through the provision of sprinkler protection in order to introduce an additional level of safety and robustness to the design.

In preparation of this document, it has been assumed that detailed aspects of the design and construction will, unless stated otherwise in this report, be in accordance with recommendations of Approved Document B Volume 2 **[1]**, BS 9999 and appropriate British Standards.

1.1 Drawings

The fire strategy report is based on information provided by Penoyre & Prasad Architects. The drawings used for this report are outlined in Table 1.

Table 1 – Architectural drawings

Name	Drawing number	Date	Revision
GA Plan – Lower Ground Floor	35137-0100-A1-LG-DR-A-3201	17.09.20	C04
GA Plan – Ground Floor	35137-0100-A1-00-DR-A-3202	17.09.20	C04
GA Plan – First Floor	35137-0100-A1-01-DR-A-3203	17.09.20	C03
GA Plan – Second Floor	35137-0100-A1-02-DR-A-3204	17.09.20	C03
GA Plan – Roof	35137-0100-A1-R2-DR-A-3205	25.03.20	C02

1.2 Building Description

The proposed Barlby Schools development in the Royal Borough of Kensington and Chelsea is comprised of one building divided into two different schools. The figures below visualise the two schools over the different levels of the building with the SEN school being showed in red and the primary school being showed in blue.

Figure 1. Lower Ground Floor.

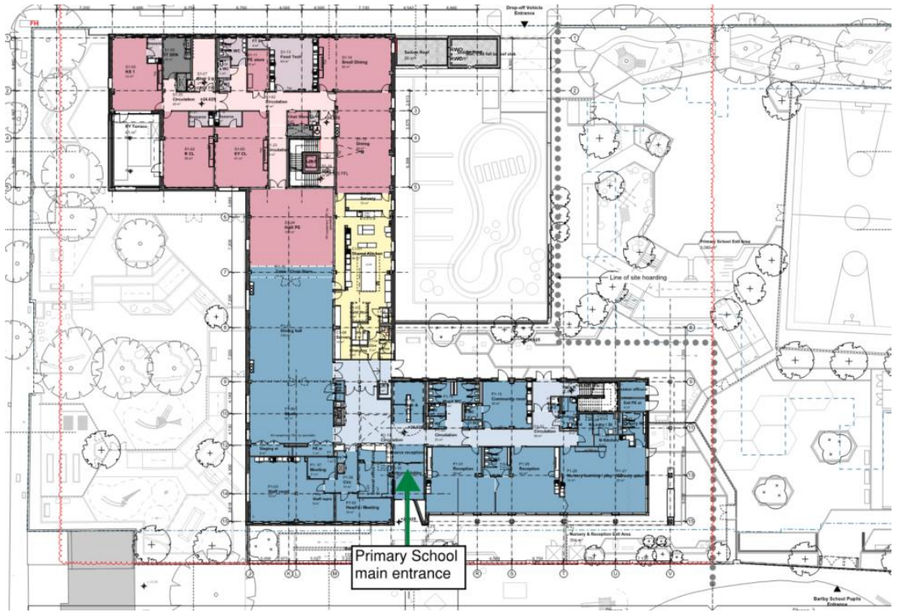


Figure 2. Ground Floor.

Figure 3. First Floor.

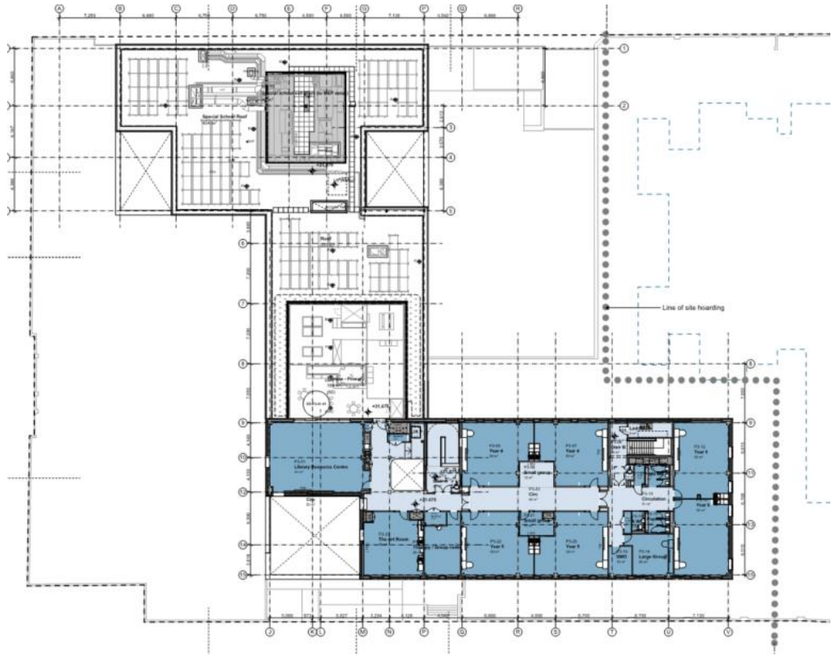


Figure 4. Second Floor.

The SEN school will consist of three storeys (i.e. Lower Ground Floor to First Floor). The height to the top habitable floor in the SEN school is 7.1m. It should be noted that the Lower Ground Floor is effectively the Ground Floor for the SEN school due to the sloping nature of the site. Subsequently, no part of the building is below ground level measured from fire brigade access level and the main entrance to the SEN school will be at Lower Ground Floor.

The primary school will consist of three storeys (i.e. Ground Floor to Second Floor). The height to the top habitable floor in the primary school is 7.1m. The main entrance to the primary school will be situated on Ground Floor.

1.3 Statutory Controls and Legislation

The design of the development requires compliance with the Building Regulations 2010 [2] and the objective of this fire safety strategy report is to meet the fire safety requirements of Schedule 1 of Part B of the Building Regulations. For fire safety, the functional requirements of the Building Regulations are set out under the following headings:

- Requirement B1 – Means of warning and escape
- Requirement B2 – Internal fire spread (linings)
- Requirement B3 – Internal fire spread (structure)
- Requirement B4 – External fire spread
- Requirement B5 – Access and facilities for the fire services

If followed, Approved Document B (ADB) Volume 2 will provide a legal presumption of conformity with the fire safety requirements of the Building Regulations. As the Approved Documents are intended to provide guidance for some of the more common building situations, it is recognised that there are alternative ways of achieving compliance with the requirements.

Alternative solutions are acceptable, provided that the functional requirements of the Building Regulations can be demonstrated to have been met.

For this development it is proposed to meet the functional requirements of the Building Regulations using the guidance contained in BS 9999:2017 [3].

Any departures or deviations from fire safety guidance will be detailed within this report, for discussion throughout the design process with the Statutory Authorities.

Unless specifically mentioned that an alternative fire engineered approach has been adopted it is assumed that the development will be designed in accordance with BS 9999.

1.4 The Regulatory Reform (Fire Safety) Order 2005

Responsibility for compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO) **[4]** will rest with the "responsible person". In a workplace, this will usually be the employer together with persons who may have control of other parts of the premises. In other cases, the person(s) who has control of the premises will be the "responsible person".

Where building work and fire protection measures comply with Part B of the current Building Regulations, additional physical measures should not normally be required under the FSO unless high-hazard materials or processes are introduced into the building.

The FSO places on the "responsible person" specific duties such as carrying out a risk assessment and providing first-aid fire-fighting equipment. More detailed guidance is available in a series of Fire Safety Risk Assessment Guides published by the Department for Communities and Local Government.

1.5 Property Protection

Property protection is not a requirement of the Building Regulations and therefore was not explicitly considered in this report, although some of the fire safety provisions will offer a degree of property protection to the buildings, i.e. automatic sprinkler system (for property protection purposes), automatic fire detection, compartmentation etc. For instance, insurance companies may require additional fire protection measures for property protection purposes and they should be informed of any changes to the buildings prior to detailed design to ensure that any requirements they may have are incorporated in a timely and cost-effective manner.

1.6 Construction, Design and Management Regulations

Design projects undertaken in the UK are subject to the requirements of the Construction (Design and Management) Regulations 2015 (CDM 2015), the objective of which is to ensure that health and safety issues are properly considered during a project's design and development so that the risk of harm to those who have to construct, use and maintain the building is reduced.

As a designer, in accordance with Regulation 9 of the CDM regulations, Hoare Lea have taken into account the general principals of prevention in the preparation of this report and where reasonably practicable, have eliminated, minimised and/or controlled foreseeable hazards associated with the design.

Where elimination has not been reasonably practicable, Hoare Lea is required to provide 'pre-construction' information in respect of any significant and/or unusual project-specific hazards that remain. Following our design process, Hoare Lea confirm that there are no significant and/or unusual residual hazards associated with this particular fire strategy design.

1.7 Materials and Workmanship

Regulation 7 of the Building Regulations requires that all building work should be carried out in a workmanlike manner, with adequate and proper materials that are appropriate for the circumstances in which they are used, are adequately mixed and prepared, and are applied, used or fixed so as to perform the functions for which they are designed.

Further guidance is provided in the Approved Document supporting Regulation 7.

Independent certification schemes exist to provide additional confidence that products are manufactured and installed to an appropriate and consistent standard. Such schemes can assist in ensuring that the Material and Workmanship requirements of Regulation 7 are satisfied. It is therefore suggested that, where appropriate, manufacturers and installers that are subject to independent certification schemes are specified on this scheme.

2. B1: Means of Warning and Escape

"The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times."

Building Regulation 2010, Schedule 1, Part B.

2.1 Risk Profile

While ADB is based on purpose groups (residential, office, assembly and recreation, etc.), BS 9999 uses risk profiles. The risk profile established will determine the appropriate means of escape and the appropriate design features of the building for life safety. This risk profile reflects the occupancy characteristic and the fire growth rate for a building and is expressed as a value combining these two elements.

The schools, while assumed to be familiar to pupils, has potential for visitors not familiar with the building. On this basis it is assumed that the general public will be admitted to the building. These occupants will not be familiar with the building (occupancy characteristic B).

The fire growth rate is not a reflection of the fire load but more of the type of fire load present in the building. A typical classroom would be classed as a "medium" fire growth rate (category 2).

On this basis, a risk profile of B2 is assigned to both schools.

2.2 Evacuation Strategy

The two different schools are fire separated from each other with fire resisting construction, however, at Ground Floor there are three halls used for dining and PE activities (two halls within the primary school demise and one hall within the SEN school demise) as well as a shared kitchen facility. The three halls will be separated by folding partitions as there is an intention of having the possibility of utilising the combined space of all three halls out of normal school hours. It is therefore proposed that a managed evacuation strategy will be adopted including a 'double knock' feature with an investigation period. It is proposed to effectively divide the building into three alarm zones as per below:

- Primary School Ground Floor
- SEN School Ground Floor
- Halls and Kitchen
- Primary School Remaining Floors
- SEN School Remaining Floors

The proposed interaction between the different zones at the Ground Floor of the Barlby Schools development is summarised in Table 2 below.

Table 2. Proposed managed evacuation strategy for the Barlby Schools development.

ALARM ACTIVATION (CAUSE):	EFFECT: (Alert and Investigate incorporates a 5-minute investigation period)				
	Primary School – Ground Floor	SEN School – Ground Floor	Halls and Kitchen	Primary School – Remaining Floors	SEN School – Remaining Floors
Primary School – Ground Floor	Evacuate	Alert and Investigate	Alert and Investigate	Evacuate	Alert and Investigate
SEN School – Ground Floor	Alert and Investigate	Evacuate	Alert and Investigate	Alert and Investigate	Evacuate
Halls and Kitchen	Evacuate	Evacuate	Evacuate	Evacuate	Evacuate
Primary School – Remaining Floors	Evacuate	Alert and Investigate	Alert and Investigate	Evacuate	Alert and Investigate
SEN School – Remaining Floors	Alert and Investigate	Evacuate	Alert and Investigate	Alert and Investigate	Evacuate

The above is a high-level cause and effect matrix which should be developed further and in more detail by the appointed fire alarm specialist.

The proposed strategy has been discussed and agreed with RBKC Building Control.

Whilst it is acknowledged that one school is a SEN school, this fire safety strategy has been developed on the basis that it is not a school focused on educational provisions for children with mobility impairments. Children with mobility impairments may attend the school as well (to the same extent as any other school), however, it is considered that sufficient consideration has been given to this in the development of the fire strategy (e.g. with inclusion of an evacuation lift).

If it is determined that the SEN school will cater to children with physical impairments to a greater occupancy split than would be expected in any other school, the fire strategy may require further consideration, such as adopting the guidance of Building Bulletin 100 and supporting documents such as Building Bulletin 104, in order to develop a strategy more focused on assisted evacuation.

Notwithstanding the above, it is recommended that special management considerations should be made for the SEN school premises (e.g. in terms of having sufficient numbers of trained staff present at all times who are aware of the features of the specific fire alarm system (see below) and evacuation procedures, including developing PEEPs as required). These management systems should be developed in detail as part of the Fire Risk Assessment prior to occupation.

2.3 Fire Detection and Alarm

In accordance with BS 9999 the schools should be fitted with a Category L3 fire detection and alarm system.

However, it is proposed that all parts of the building will be fitted with a Category L1 fire detection and alarm system, which means that all escape routes, high risk rooms and rooms opening onto stairs will be provided with automatic detection, thus providing the earliest possible warning. The system should be designed in accordance with the relevant recommendations of BS 5839-1:2013 [5].

It is proposed that the primary school is to be fitted with traditional alarm sounders (including on the outdoor terraces) in case of fire while a pager system is proposed for the SEN school. The pager system will be designed

so that the staff in the SEN school are notified of an alarm within the school but without traditional alarm sounders as it is understood that this may cause distress to the students with special needs.

2.4 Occupancy

When considering occupancy levels within the building it is generally assumed that all classrooms are at full capacity as per the proposed design occupancy (i.e. 33 occupants per classroom for the primary school and 16 occupants per classroom for the SEN school which includes both students and staff) with the addition of 30 occupants in the other areas (e.g. group rooms, library, external terraces) per floor level, which is considered a conservative assumption.

2.4.1 Primary School

Second Floor consist primarily of six classrooms, one art room, one library resource centre, an outdoor terrace and four group rooms. The maximum number of occupants on the outdoor terrace is currently limited to 60 people due to a single exit. It is assumed that when the classrooms are at full capacity the other areas (e.g. group rooms, library and external terrace) will have a low occupancy load (i.e. 30 occupants in total). Subsequently, the maximum occupancy on the Second Floor is estimated to 242 people.

First Floor consist primarily of six classrooms, four group rooms and two special teaching rooms (each designed for 6 students and 4 teachers/assistants). Following the same rationale as above, the maximum occupancy on the First Floor is estimated to 248 people.

At Ground Floor the primary school has no traditional classrooms and contain primarily nursery room, staff rooms, reception areas, PE hall and dining hall. It is considered reasonable to assume an occupancy load of 50 people for the staff areas. It is understood that the PE hall and dining hall will be separated with a foldable partition and the entire area of these two rooms will be used during school assemblies. It is our understanding that up to 520 people will need to be accommodated in this hall during school assemblies. However, it should be noted that when the assembly hall is at full capacity, the rest of the school will not be occupied.

Means of escape provisions for the PE hall and dining hall separately as well as the combined assembly hall are assessed further in section 2.5 below.

2.4.2 SEN School

First Floor consist primarily of staff areas and therapy rooms as well as an art/music room. Based on the maximum design occupancies (i.e. including full capacity of both staff rooms simultaneously), the maximum occupancy is estimated to 102 people.

Ground Floor consist primarily of three classrooms, two dining halls and one PE hall. The dining halls and PE hall are currently limited to 60 people per room due to single exits. It is assumed that when the classrooms (and PE hall) are at full capacity the other areas will have a low occupancy load (i.e. 30 occupants in total). It is understood that the maximum capacity of the SEN school classrooms will be 16 occupants per classroom. Based on this and 60 people in the PE hall and an additional 30 occupants distributed on the floor, the maximum occupancy on the Ground Floor is estimated to 152 people.

Lower Ground Floor consist primarily of eight normal classrooms, one extra classroom and offices. Assuming full capacity in all classrooms (including the extra) and office areas, the maximum occupancy on the Lower Ground Floor is estimated to 158 people.

2.5 Horizontal Evacuation

2.5.1 Primary School

The storey exits available at each level are detailed below:

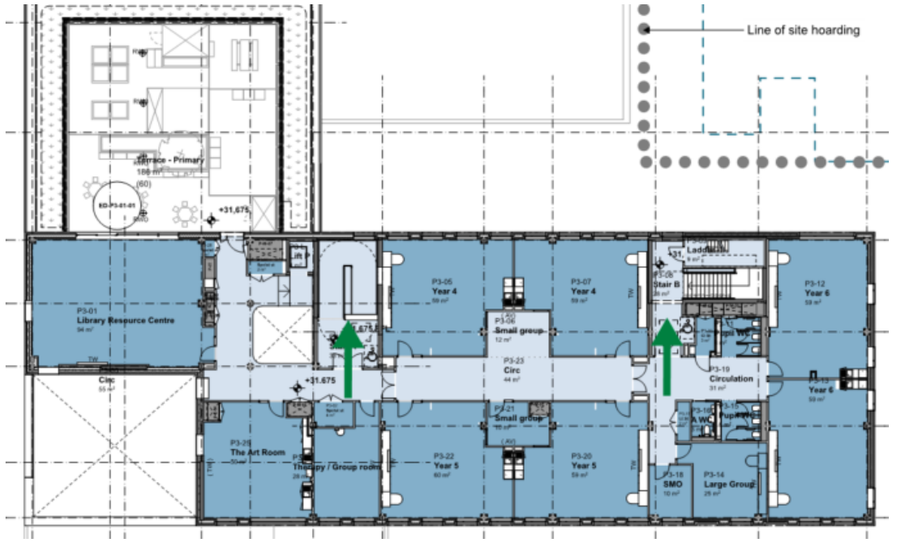


Figure 5. Storey exits at Second Floor of primary school.

Figure 6. Storey exits at First Floor of primary school.

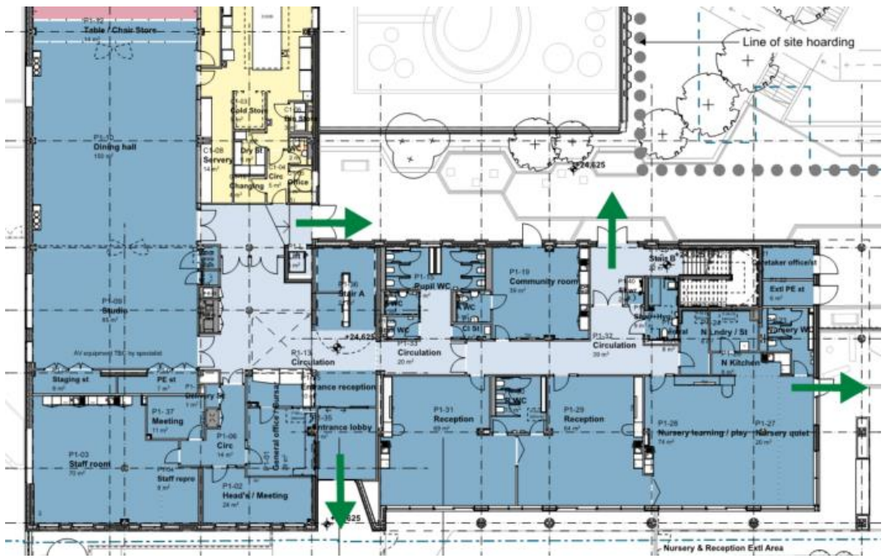


Figure 7. Storey exits at Ground Floor of primary school.

The minimum exit width per person for a B2 risk profile is 4.1mm as per BS 9999. Table 2 below details the storey exits of each level within the primary school and the resulting storey exit capacity after the largest exit has been discounted.

Table 3. Storey exits and their capacity for the primary school

Floor Level	Storey Exits (mm)	Storey Exit Capacity (people) [largest exit discounted]
Ground Floor	2 x 2000, 1 x 1800	926
First Floor	2 x 1800	439
Second Floor	2 x 1800	439

Note: Only the three main exits from Ground Floor have been taken into consideration for the purpose of determining the storey exit capacity.

A merging flow calculation has been performed on the final exit from the eastern stair as it also serves as an exit from the Ground Floor. The available exit width of 1800mm is sufficient to cater both for occupants from First and Second Floor as well as occupants from Ground Floor.

A merging flow calculation has also been performed for the main entrance exit as will potentially serve occupant from the upper floor levels via the western stair as well as occupants from the halls and other areas on the Ground Floor. This assessment is detailed in Section 2.5.1.2 below.

Although the above exit widths will more than accommodate the projected occupancies previously mentioned the permitted occupancy on the upper levels (First and Second Floors) will be determined by the stair width available. This is detailed under section 2.6 below.

2.5.1.1 Travel Distances

For a B2 risk profile, BS 9999 recommends that travel distances within the building are limited to 20m in a single direction of escape and 50m where more than one route of escape is available, measured as an 'actual distance' (i.e. when the internal layout is known). However, in order to allow for flexibility during fit-out, a 'direct distance' is conservatively applied (i.e. assuming a 2/3^{rds} route approach). Direct travel distance for a B2 risk profile are 13m in one direction and 33m where travel in more than one direction is possible.

The travel distance limitations applicable to Barlby Schools are summarised in Table 3 below.

Table 4. Travel distance limitations within Barlby Schools.

Risk Profile	Actual Travel Distance – Known Internal Layout	Direct Travel Distance – Unknown Internal Layout
B2	20m single direction 50m alternative directions	13m single direction 33m alternative directions

The areas within the Barlby School premises are generally assessed with direct travel distances in order to allow for flexibility during future fit-out works with the exception of the halls and the Ground Floor staff room in the primary school as these areas required further consideration. The travel distance arrangements for these areas are presented in the figures below.

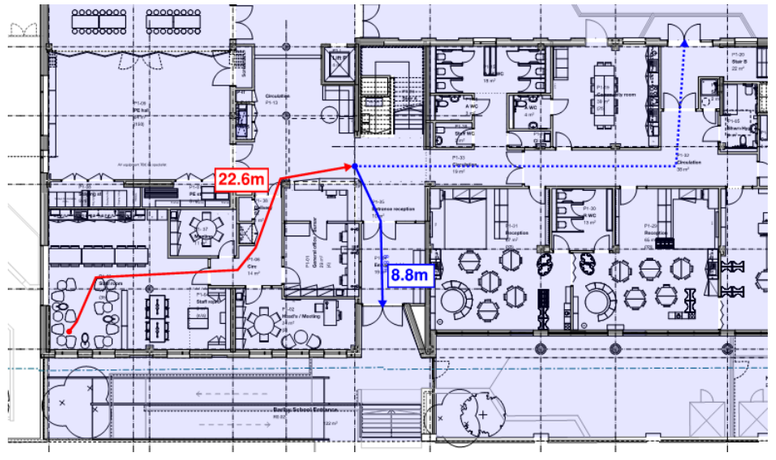


Figure 8. Travel distance arrangements for the Ground Floor staff room.

The current travel distance to a point of choice from the staff room located at ground floor is currently 22.6m in a single direction, as can be seen from the figure above.

The recommended maximum is therefore currently exceeded by 2.6m. However, the current arrangements are considered acceptable on the basis that the building will be provided with a life safety sprinkler system (although not generally taken into consideration) and the area in question is limited to staff members only who will be familiar with the building and therefore comparable to an office type of occupancy characteristic where the corresponding maximum travel distance in a single direction would be 26m.

The travel distances for the different arrangements of the halls are generally within the recommended travel distance limits as highlighted in Figure 9 below, with the exception of the single direction travel from the SEN school PE hall which is further addressed in Section 2.5.2.1.

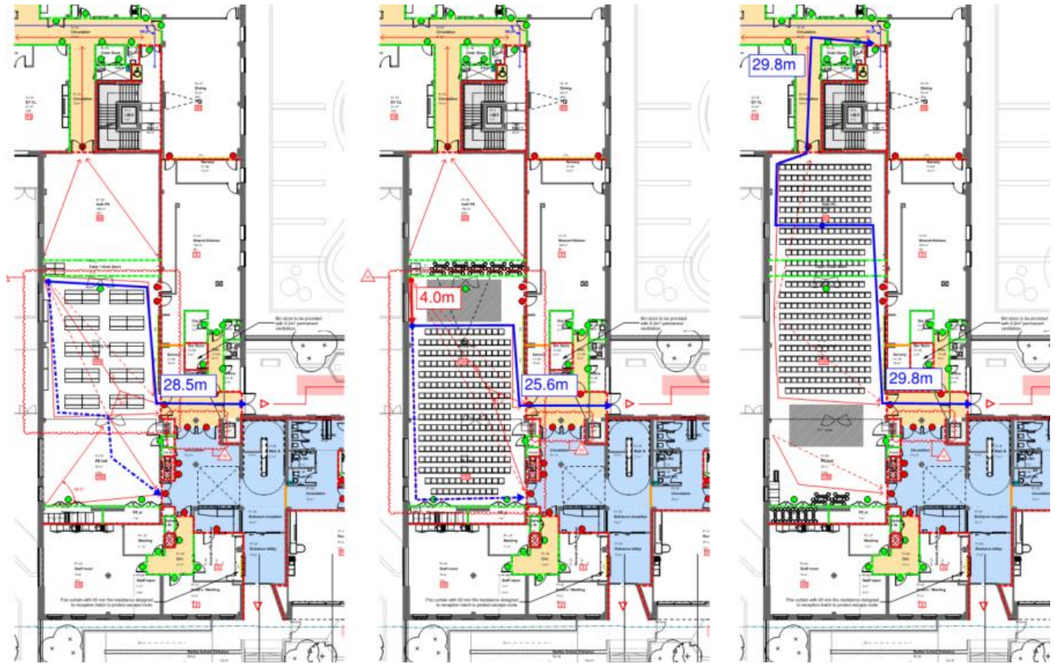


Figure 9. Travel distance assessment for the halls.

Considering that the clear ceiling height in the SEN school PE hall is 5.4m, BS 9999 allows for 15% longer travel distances from this area as the higher ceiling acts as a smoke reservoir, thereby allowing more time for occupants to escape. This would mean that the maximum recommended travel distance in single direction is extended to 23m (actual distance since the PE hall is expected to only house limited loose furniture and sports equipment) is retained and the current travel distance from the PE hall considered acceptable as it is within this limit.

BS 9999 does not mention external travel distances, however, ADB states that a single direction travel distance of up to 60m is acceptable in external areas.

2.5.1.2 Dining Hall/PE Hall

It is proposed to provide access between the PE Hall and Dining Hall within the primary school in order to enable escape in more than one direction. The door(s) between the halls will either be a double door achieving 2000mm clear width or two single doors, each achieving 1050mm clear width. The partition between the halls will also be removable to enable utilising the entire area of the two rooms during school assemblies.

With a minimum exit width of 3.5mm per person as per BS 9999 (including reduction for increased ceiling height of 5.4m), the design would theoretically allow for the dining hall to house up to 571 occupants (based on available exit width) with one exit discounted. The PE hall within the primary school will still be restricted to 60 occupants however since the doors connecting the two halls open into this space. If the partition is removed and the entire area of both rooms is utilised the maximum number of occupants allowed will remain at 571 as two doors now serve the one bigger room.

It is understood that the design occupancy for the small PE hall within the primary school is 30 occupants and the design occupancy for the dining hall is upwards of 250 occupants. The design occupancy during school assemblies when the halls are combined is 520 occupants. All these design occupancies are within the maximum allowed occupancy based on available exits.

Refer to Figure 10 below for a visualisation of the proposed configuration for the PE hall and Dining hall.

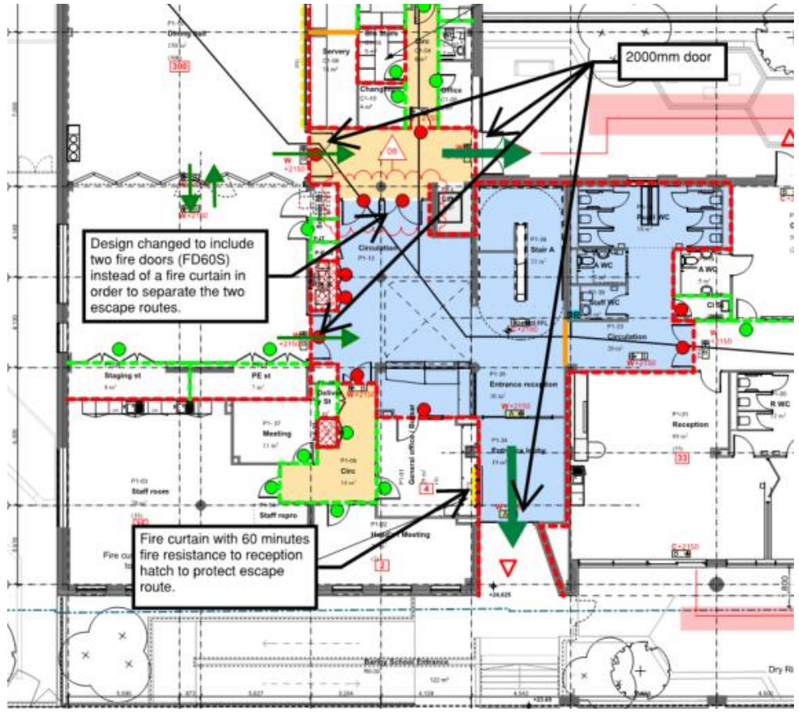


Figure 10. Proposed escape provisions from the PE hall and Dining hall in the primary school.

Furthermore, it is also proposed that all three halls (i.e. primary school PE hall and dining hall as well as SEN school PE hall) could be utilised for larger assemblies and events outside of normal school hours. In this case, the maximum allowed occupancy would be 1085 persons. This is based on three exits, two measuring 2000mm in clear width and one measuring 1800mm in clear width with one of the bigger exits discounted.

It is recommended that the proposed seating layouts of the halls are designed based on the recommendations within Appendix D of BS 9999 (specifically clause D.3).

Merging Flow

Merging flow should be considered for the large primary school hall since other occupants in the school may use the same final exit (i.e. main entrance/exit). The assessment has been based on a maximum design occupancy of 250 people in the primary school halls and a remaining 270 occupants equally distributed throughout the primary school facilities, as per information from Penoyre & Prasad Architects.

Furthermore, it is only the western stair which discharges in the merging flow route from the halls so it has been assumed that half of the primary school occupants on First and Second Floors use this stair (i.e. 135 occupants) and half of the Ground Floor occupants have also been considered (i.e. 125 occupants). This is deemed a conservative approach as some of the Ground Floor rooms will have exits directly to the outside.

The merging flow assessment is undertaken using the following equation (from BS 9999 Figure 6):

$W_{FE} = NX + 0.75S_{up}$ where

W_{FE} is the final exit with (in mm)

N is the number of people served by the storey exit at exit level

X is the minimum door width per person (i.e. 4.1mm/person)

S_{up} is the stair width for the upward position of the stair (in mm)

The result of the merging flow assessment shows that the final exit (i.e. the main entrance/exit as highlighted in Figure 11 below) is required to achieve at least 1865mm clear width.

Based on the above, it is considered that the current final exit widths of 2000mm are sufficient to accommodate for a 'worst case' merging flow scenario.

Figure 11. Merging flow at Primary School main entrance.

A merging flow assessment is not necessary for when both primary school halls are combined for school assemblies since there will be no significant occupancy load elsewhere in the primary school building. Likewise, a merging flow assessment is not required for a scenario where all three halls are used for larger assemblies and events outside of normal school hours.

2.5.1.3 Escape Past Void

The primary school will be fitted with a roof light to provide additional natural light to the school circulation area. The floor slab of the First and Second Floor in the primary school will have a 13m^2 void in order to let the natural light penetrate all the way down the building.

Figure 12 below shows the location of the void on the Second Floor.

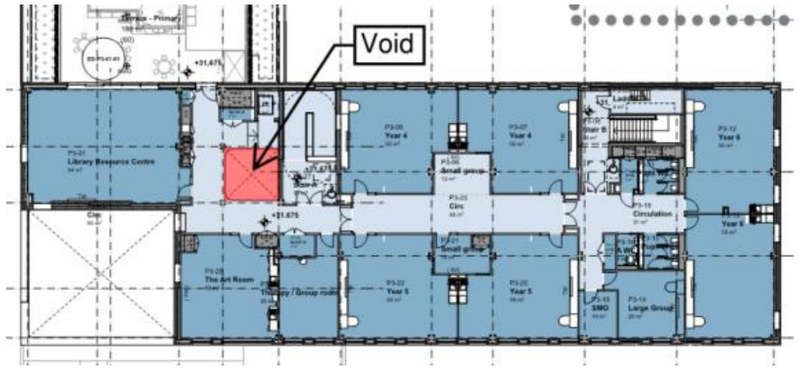


Figure 12. Location of void at Second Floor.

The location of the void results in escape past the void within 4.5m of it which is a departure from guidance recommendations. It is proposed to extend the 60 minute fire resistant construction to include the void within a protected area and thereby effectively reducing the risk in the area of the void, refer to Figure 13 below for a visualisation. The protected area with the void will be treated as a separate three-storey compartment meaning that both walls and doors on the line of separation will achieve 60 minutes fire resistance.

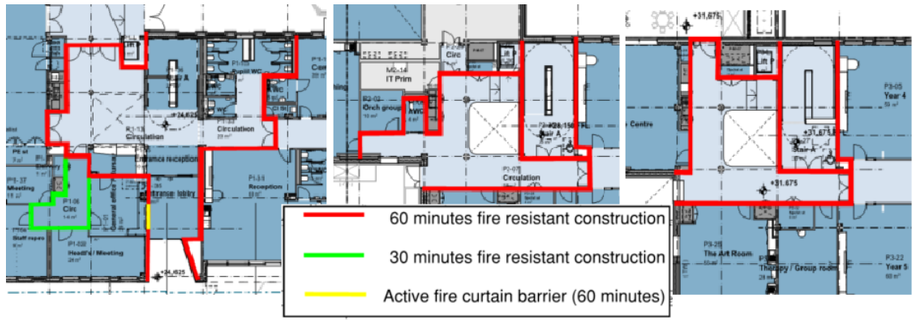


Figure 13. It is proposed to include the void in a protected area from Ground Floor (far left) up to Second Floor (far right).

As the figure above shows, the risks of fire and smoke spread normally associated with a void is minimised since it is situated within a protected area. The circulation areas included in the protected enclosure must be kept free from combustible material. The different means of escape routes from the halls are now separated by FD60S fire doors and as an additional protection measure, it is proposed to provide an active fire curtain barrier (60 minutes fire resistance) for the hatch in reception which will deploy on local detection. The 60 minute period of fire resistance relates only to integrity as uninsulated active fire curtain barriers are allowed for assemblies not exceeding 5m in length, as per Section 32.3 in BS 9999. Fire curtain assemblies are acknowledged as an acceptable means of protecting escape routes within the guidance of BS 9999: 2017 (Clause 32.3). Refer to Section 4.2.3 for further information on the active fire curtain barriers.

The line of fire resistance on Ground Floor is proposed to go through the reception, allowing a 10m^2 reception area within the protected enclosure, as per recommendations in BS 9999. Furthermore, it is proposed to provide an automatically openable vent (AOV) at the top of the void with a free area of not less than 10% of the maximum void plan area. The main entrance doors at Ground Floor will be designed to power open upon

activation of the fire detection and alarm system in order to provide inlet air for the purpose of ensuring efficient smoke ventilation via the void.

The updated configuration proposed is considered to achieve the functional requirements for safe means of escape and is thereby deemed reasonable. This has been discussed and agreed with RBKC Building Control.

2.5.1.4 Final Exit Routes

It is noted that during a period of time for when the primary school is first occupied, the old school will be demolished. It has been discussed and agreed with the architect that a clear path from the exit at the rear of the building will be provided with a clear unobstructed path which will be equal in width to the final exit. This path will run between the new school and the site of the old school.

External escape routes leading the assembly points should be sufficiently distanced from the building (i.e. not less than 1.8m) where escape is only possible in one direction. Where this is not achievable, the façade should be provided with 30 min fire resistance.

2.5.1.5 Dead-end Corridors

First Floor and Second Floor of the SEN school include dead-end corridor situations (i.e. dead ends greater than 2m) by the eastern stair. These sections of corridor will be provided with 30 minutes fire resisting construction, as per BS 9999. Furthermore, the corridor leading from the SEN School PE hall is technically a dead-end corridor and it is therefore proposed to make the entire circulation space in this area a protected corridor (i.e. 30 minutes fire resisting construction and FD30S fire doors), refer to the figure below from the fire strategy drawings for a visualisation.

Figure 14. Proposed corridor protection within the SEN school demise at Ground Floor.

The lower ground floor of the SEN school includes a recessed part of the corridor which exceeds 2m (recessed part is approximately 3m). The 1m addition is considered reasonable based on the fact that there are only two small offices opening into this part of the recessed corridor. The limited number of occupants within these rooms (i.e. members of staff) are expected to be familiar with the general arrangements of the school, including the evacuation procedures. Furthermore, the school is provided with a L1 fire detection and alarm system in order to give the earliest possible warning of fire. Refer to the figure below for the recessed corridor in question.

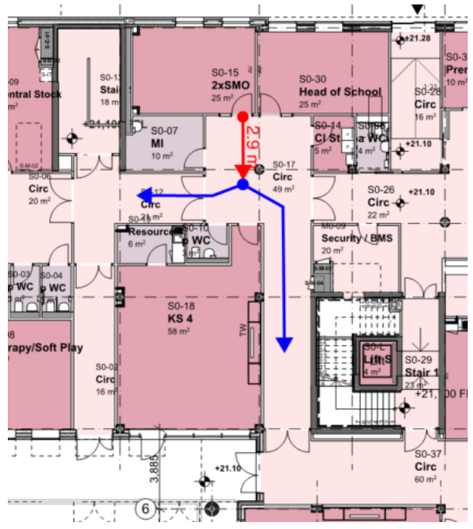


Figure 15. Recessed corridor within the SEN school demise at Lower Ground Floor.

The eastern part of the primary school ground floor includes a dead-end corridor of approximately 3.5m leading to the protected stair discharge route. The 1.5m addition is considered reasonable based on the fact that the nursery is provided with an alternative independent exit directly to outside. This means that the only room opening into the limited dead-end part of the corridor is a storeroom which is assumed to be accessed infrequently and solely on a transient basis.

The above has been discussed and agreed with RBKC building control.

2.5.2 SEN School

The storey exits available at each level are detailed below:

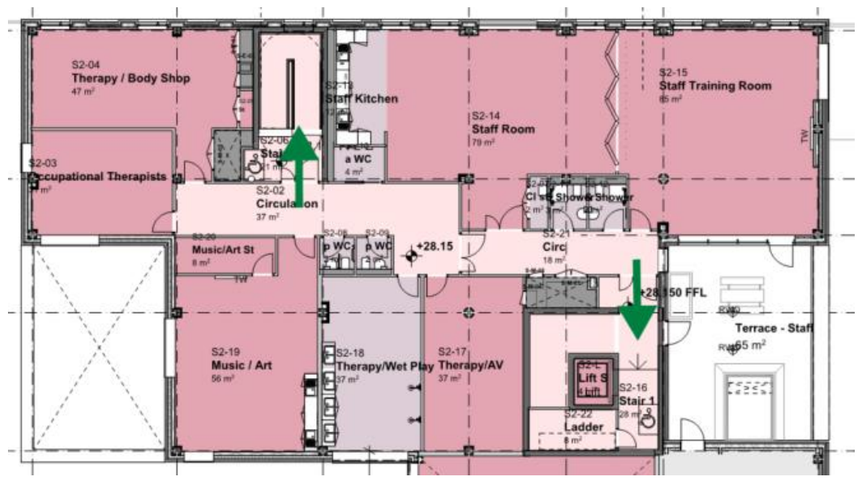


Figure 16. Storey exits at First Floor of SEN school.

Figure 17. Storey exits at Ground Floor of SEN school.

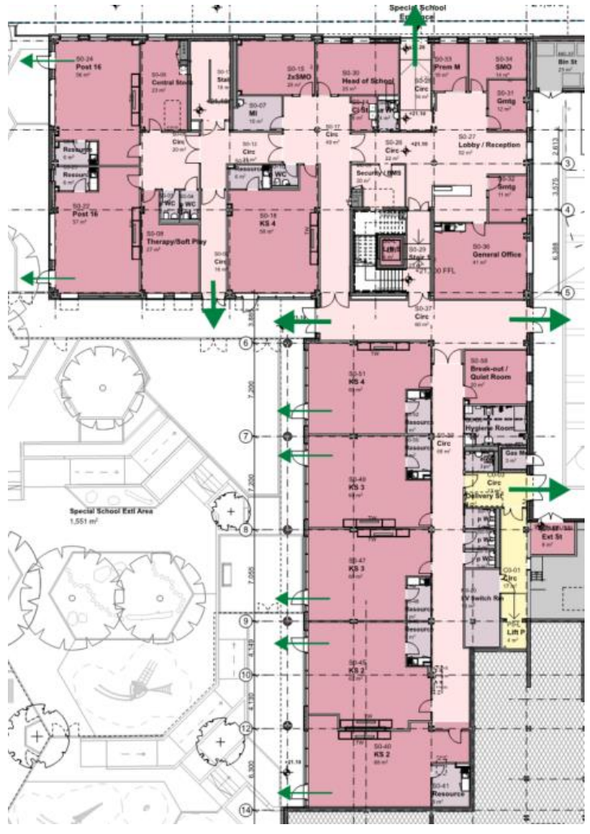


Figure 18. Storey exits at Lower Ground Floor of SEN school.

The minimum exit width per person for a B2 risk profile is 4.1mm as per BS 9999. Table 4 below details the storey exits of each level within the primary school and the resulting storey exit capacity after the largest exit has been discounted.

Table 5. Storey exits and their capacity for the SEN school

Floor Level	Storey Exits (mm)	Storey Exit Capacity (people) [largest exit discounted]
Lower Ground Floor (access level)	3 x 1800, 1 x 1600, 1 x 1200	1560
Ground Floor	1 x 1600, 1 x 1400	341
First Floor	1 x 1600, 1 x 1400	341

Note: Only the five main exits from Lower Ground Floor have been taken into consideration for the purpose of determining the storey exit capacity.

Although the above exit widths will more than accommodate the projected occupancies previously mentioned, the permitted occupancy on the upper levels (Ground and First Floors) will be determined by the stair width available. This is detailed under section 2.6 below.

2.5.2.1 Travel Distances

For a B2 risk profile, BS 9999 recommends that travel distances within the building are limited to 20m in a single direction of escape and 50m where more than one route of escape is available, using actual distances. However, in order to allow for flexibility during fit-out, a direct travel distance is conservatively applied (i.e. assuming a 2/3^{rds} route approach). Direct travel distance for a B2 risk profile are 13m in one direction and 33m where travel in more than one direction is possible.

An exception can be made for the SEN school PE hall as the primary function of this hall is PE activities since dining is provided elsewhere. Subsequently, it is considered that an actual travel distance can be applied as only limited loose furniture and sports equipment are expected in this space.

Considering that the clear ceiling height in the SEN school PE hall is 5.4m, BS 9999 allows for 15% longer travel distances from this area as the higher ceiling acts as a smoke reservoir, thereby allowing more time for occupants to escape. This would mean that the maximum recommended travel distance in single direction is extended to 23m and the current travel distance from the PE hall is therefore considered acceptable as it is within this limit.

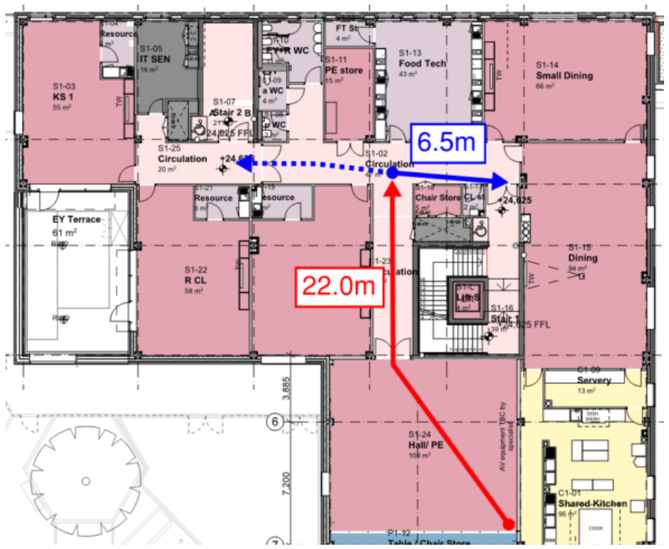


Figure 19. Travel distance from the SEN school PE hall.

The travel distance limitations set out above are not exceeded within the development.

2.5.2.2 Dead-end Corridors

Ground Floor and First Floor of the SEN school include dead-end corridor situations by the western stair (i.e. dead ends greater than 4.5m). These sections of corridor will be provided with 30 minutes fire resisting construction, as per BS 9999. Refer to Appendix A for fire strategy drawings highlighting these sections of corridor.

2.5.2.3 Final Exit Routes

External escape routes leading the assembly points should be sufficiently distanced from the building (i.e. not less than 1.8m) where escape is only possible in one direction. Where this is not achievable, the façade should be provided with 30 min fire resistance.

2.6 Vertical Means of Escape

2.6.1 Primary School

The primary school is served by two protected stairs serving all levels from Ground Floor to Second Floor. As mentioned previously the permitted occupancy will be determined by the width and number of stair cores available for means of escape. This is detailed below.

Figure 20. Second Floor stair cores.

Figure 21. First Floor stair cores.

Table 6. Vertical means of escape capacity in primary school.

	Type of stair	No. of floors served	Clear width for the purpose of the fire strategy	Permitted occupancy	Comments
Stair 1	Protected internal stair	2	1800mm	450 people	Used for means of escape assessment
Stair 2	Protected internal stair	2	1800mm	450 people	Discounted

In line with a B2 risk profile in BS 9999, the occupancies in Table 5 were calculated using a load factor of 4.0mm/person. This is based on simultaneous evacuation of the two upper floors.

As described in section 2.4 of this document, the estimated maximum design occupancy at First and Second Floor is 490 people. As shown in Table 5, the maximum number of occupants permitted due to vertical means of escape is 450. After discussions with the design team it is our understanding that a maximum design

occupancy of 490 people is considered highly unlikely and the client and school operator will adhere to the maximum occupancy based on vertical means of escape (i.e. 450 occupants at First and Second Floor).

The vertical means of escape capacity is based on an even distribution of occupants (i.e. 225 on First Floor and 225 on Second Floor). However, we understand that there is a preference to allow for a potentially uneven distribution of occupants with 350 people on the Second Floor and 100 people on the First Floor. This scenario has been assessed and deemed acceptable based on the following rationale.

In order to determine the additional evacuation time needed in a scenario where 350 of these occupants are at Second floor level (and therefore 100 occupants at First Floor), the flow time needs to be assessed.

The total time required for all occupants to leave the floor and enter the stair (i.e. a place of relative safety), is dictated by premovement time, travel time and flow time. For the purpose of this assessment, the premovement time and travel time are disregarded as an increased occupancy does not affect the premovement time or the longest travel distances. Furthermore, in high occupancy environments, travel time often becomes irrelevant as the flow time is the limiting factor (i.e. the time it takes to travel to the storey exit does not matter if the occupant effectively joins a queue afterwards).

When assessing the flow time, we are looking at the flow through the storey exit (i.e. the stair door) as the flow down the stair will remain constant and the full stacking capacity is being utilised as the majority of escaping occupants are located at the topmost floor level.

BS 7974 references a design flow of 1.3 persons/m/s taken from the SFPE Handbook and equates to 78 persons/m/minute.

The effective width of the storey exit for the purpose of these calculations is 1.8m – (0.15m x 2) = 1.5m.

For the base case scenario, the flow time required for all occupants to enter a place of relative safety (i.e. the stair) can therefore be calculated as:

225 / (78 x 1.5) = 1.92 minutes = 1 minute 55 seconds

For a scenario with 350 occupants on the Second Floor, the corresponding time required is calculated as:

350 / (78 x 1.5) = 2.99 minutes = 2 minutes 59 seconds

The additional evacuation time required for the proposed 'worst case' occupancy distribution is therefore 1 minute 4 seconds.

However, it should be noted that the current storey exit capacity based on BS 9999 guidance is 439 occupants on Second Floor which in flow time equates to 3 minutes 45 seconds. This flow time is subsequently deemed acceptable under BS 9999 guidance for the specific risk profile applicable for the building. The flow time for the proposed 'worst case' occupancy distribution is therefore less than the maximum recommended for the particular building and occupancy type. Please see a table summarising the different scenarios below.

Table 7. Flow time for all occupants to enter the protected stair based on different Second Floor occupancies.

Scenario	Maximum recommended Second Floor occupancy	Flow time required for all occupants to enter protected stair
Even distribution	225	1 min 55 sec
Proposed 'worst-case' distribution	350	2 min 59 sec
BS 9999 recommended storey exit capacity	439	3 min 45 sec

Based on the above rationale (without relying on the provision of sprinklers), it is our considered opinion that the proposed 'worst-case' distribution with 350 occupants on the Second Floor is acceptable and achieves the functional requirements of the Building Regulations for safe means of escape.

The above rationale has been discussed and deemed reasonable by RBKC building control. Refer to Appendix B for correspondence with RBKC Building Control.

2.6.2 SEN School

The SEN school is served by two protected stairs serving all levels. As mentioned previously the permitted occupancy will be determined by the width and number of stair cores available for means of escape. This is detailed below.

Figure 22. First Floor stair cores.

Figure 23. Ground Floor stair cores.

Table 8. Vertical means of escape capacity in SEN school

	Type of stair	No. of floors served	Clear width for the purpose of the fire strategy	Permitted occupancy	Comments
Stair 1	Protected internal stair	3	1800mm	450 people	Discounted
Stair 2	Protected internal stair	2	1400mm	350 people	Used for means of escape assessment

The occupancy for Stair 1 and 2 was calculated using a load factor of 4.0mm/person. This is based on simultaneous evacuation of two upper floors.

As described in section 2.4 of this document, the estimated total number of occupants at Ground and First Floor is 254 people. As shown in Table 6, the maximum number of occupants permitted due to vertical means of escape is 350 people with the largest stair discounted.

Therefore, the current stair widths accommodate the projected occupancies.

2.6.3 Means of Escape from the Roofs

The roof levels of both school buildings are provided with plant equipment in open air (i.e. not enclosed). It is proposed to provide a single access and escape hatch from each roof level leading into one of the protected stair enclosures.

It is not considered necessary to provide lobby protection to the associated stair solely due to the single escape from the roof. This is based on the rationale presented below.

Although BS 9999 does not mention external travel distances, ADB states that a single direction travel distance of up to 60m is acceptable in external areas. In current design, the maximum single direction travel distances are 39.8m on the SEN school roof and 58.5m on the primary school roof. This is within the maximum recommended single direction travel distance as per ADB. Refer to the fire strategy drawings in Appendix A for visualisations of the travel distances on the roofs.

The roof is only used for plant space meaning that it will be infrequently occupied only during maintenance work and the like. Furthermore, the occupants on the roof will be trained professionals aware of their surroundings and familiar with the escape arrangements and procedures.

The roof and plant spaces thereon is completely open to the air. Subsequently a fire event compromising the escape hatch is considered unlikely as the majority of the plant equipment is situated at least 4.5m away from the hatch.

Furthermore, the roof structure will be provided with 30 min fire resistance at least 3m either side of an escape route and there should be no ventilation openings within 3m of a single direction escape route.

The roof access hatches should be provided with suitable fastenings from the outside to ensure that they are readily openable for maintenance personnel in case of emergency.

It is proposed that all parts of the building will be fitted with a Category L1 fire detection and alarm system, which means that all escape routes, high risk rooms and rooms opening onto stairs will be provided with automatic detection, thus providing the earliest possible warning. The system should be designed in accordance with the relevant recommendations of BS 5839-1:2013. The system will also include means of warning on the roofs to provide the earliest possible warning to potential maintenance personnel on the roof.

Based on the above rationale, it is considered that lobby protection to stairs can be omitted despite of single means of escape from the roof plant space.

This has been discussed and agreed in principle with RBKC Building Control. Refer to Appendix B for correspondence with RBKC Building Control.

2.7 Impaired Mobility Means of Escape

All stairs within the development are to be provided with a disabled refuge at all upper levels. The refuge should be not less than 900mm x 1400mm in accordance with BS 9999 and oriented in the same direction as the escape flow.

Furthermore, it is proposed that the schools are provided with one evacuation lift each. The evacuation lifts should be designed in accordance with BS 9999 and supporting documents including suitable provision for emergency power supplies should the primary supply fail.

The management of the building should ensure that there are sufficient provisions in order to safely evacuate all mobility impaired occupants from the building in case of a fire. This may require the purchase of additional equipment or training.

2.8 Emergency Lighting and Escape Signage

2.8.1 Lighting of Escape Routes

Suitable emergency lighting should be provided to all premises to enable safe movement of persons along escape routes to a place of relative or ultimate safety. Emergency escape lighting should be provided in accordance with BS 5266-1:2011 [6] and BS 5266-7:1999 [7].

Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route. Standards for the installation of a system of escape lighting are given in BS 5266-1:2011.

2.8.2 Exit Signs

Every escape route should be distinctively and conspicuously marked by emergency exit signs of adequate size complying with BS ISO 3864-1:2011 [8]. All exit signs to be designed in accordance to BS 5499-1:2002 [9].

3. B2: Internal Fire Spread (Linings)

"To inhibit the spread of fire within the building, the internal lining shall:

a) Adequately resist the spread of fire over their surfaces; and
b) Have, if ignited, either a rate of heat release or a rate of growth, which is reasonable in the circumstances.

In this paragraph 'internal linings' means the materials or products used in lining any partition, wall, ceiling or other internal structure."

Building Regulation 2010, Schedule 1, Part B.

In order to prevent rapid flame spread throughout the development, the materials used in the construction of a building should have specified periods of fire resistance. All wall and ceiling linings should meet the relevant classifications outlined in Table 9 below.

Table 9: Material classification

Location	National Class Note 1	European Class Note 1, 3, 4
Small rooms Note 2 of area not more than: – 4 m^2 in residential accommodation – 30 m^2 in non-residential accommodation	 3 3	 D-s3, d2 D-s3, d2
Other rooms Note 2 (including garages)	1	C-s3, d2
Circulation spaces within dwellings		
Other circulation spaces, including the common areas of blocks of flats	0	B-s3, d2

Note 1: See paragraph B2. of ADB

Note 2: ADB defines a "room" as "an enclosed space within a building that is not used solely as a circulation space. The term includes not only conventional rooms, but also cupboards that are not fittings and large spaces such as warehouses and auditoria. The term does not include voids such as ducts, ceiling voids and roof spaces.

Note 3: The National classifications do not automatically equate with the equivalent classifications in the European column, therefore, products cannot typically assume a European class, unless they have been tested accordingly.

Note 4: When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

4. B3: Internal Fire Spread (structure)

"The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.

A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings. For the purposes of this sub-paragraph a house in terrace and semi-detached house are each to be treated as a separate building.

Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following:

a. *Sub-division of the building with fire-resisting construction;*
b. *Installation of suitable automatic fire suppression systems.*

The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited."

Building Regulation 2010, Schedule 1, Part B.

4.1 Structural Resistance

In order to limit premature collapse, the elements of main structure should have specified periods of fire resistance to be provided to all elements of structure such as:

- Structural frames
- Beams
- Columns
- Load bearing walls (internal and external)

Due to a height of the top habitable floor above 5m but below 18m, the elements of structure above ground should be protected to achieve at least 60 minutes fire resistance for the entirety of the development.

4.2 Compartmentation

4.2.1 Fire Resistance of Materials, Products and Walls

The following elements should be provided with the stated period of fire resistance for loadbearing, integrity and insulation:

Table 10: Fire resistance of walls and floors

Elements	Required fire resistance (minutes)
Walls enclosing protected stairs	60
Walls separating the two schools from the halls and shared kitchen	60
Walls separating the protected void area from other accommodation	60
Walls enclosing the shared kitchen	60
Walls enclosing the three halls	60
Walls enclosing dead-end corridors	30
Walls enclosing places of special fire hazard (e.g. oil-filled transformer and switch gear rooms, storage spaces for fuel or other highly flammable substances and rooms housing a fixed internal combustion engine)	30
Enclosures of storage areas (including folding partitions)	30

Refer to Appendix A for fire strategy drawings.

4.2.2 Fire Doors

The following doors should be provided with the following fire resistance in terms of integrity:

- Doors opening into protected void area: FD60S.
- Doors between the schools and halls / kitchens: FD60S.
- Doors opening into protected stairs: FD30S.
- Doors opening into a protected means of escape corridor: FD30S.
- Doors subdividing corridors connecting alternative exits: FD20S

Fire doors can only operate if they are fully closed at the time of fire. Therefore, fire doors should be fitted with a self-closing device. Held-open devices can be used to hold the fire door in an open position, against the action of a door closer, automatically releasing the closing mechanism in a fire situation. The automatic release mechanism should allow the door closing device to resume its self-closing function in the event of one or more of the following:

- The detection of smoke by suitable automatic apparatus;
- The detection of heat or smoke by any in-built sensing device;
- Failure of the power supply;
- Operation of the fire alarm system;
- Local manual operation; and/or
- If the facility is provided, a manual operation at central control point.

Such doors should be marked on both sides, at approximately eye level, with the appropriate sign conforming to BS ISO 3864-1:2011.

4.2.3 Active Fire Curtain barriers and Shutter Assemblies

All fire and smoke curtain products proposed in this fire strategy report should be tested in accordance with BS 8524 Parts 1 and 2 and the standards referred to by BS 8542. They should meet the performance requirements set down in BS8524 Part 2 Table 1 under the column heading “Performance criteria for barrier assemblies forming part of protected route for means of escape purposes”. This includes performance criteria for smoke control.

With respect to the BS8524 Part 2 Table 1 parameter “Fire resistance radiation (W) BS 8524-1:2013, 5.6.4)”, this fire strategy does not propose fire insulation performance for the fire curtains considering that the assembly does not exceed 5m in length. This is in accordance with Section 32.3 in BS 9999.

With respect to the BS8524 Part 2 Table 1 parameter “Self-test facility (BS 8524-1:2013, 5.8.7)”, this fire strategy does not propose Self-test facility for the fire curtain.

The fire curtains associated with escape routes should have a maximum leakage rate not exceeding $3m^3/m/hour$ when tested at 25 Pa under BS 476.

The serveries opening into the dining halls of each school will be provided with metal fire shutter assemblies achieving 60 minutes fire resistance. There is no leakage rate requirements for the fire shutters as these are not associated with escape routes.

4.2.4 Risers

Following the recommendations of Section 37.2.2 of BS 9999, electrical risers within protected stairways should be provided with 30 minutes fire resisting construction. Electrical risers elsewhere should be enclosed with fire resisting construction equal to that of the structural elements (i.e. 60 minutes) and doors which are capable of being locked shut. Alternatively, where the floor is continued into the riser, such that each floor is separated, the riser need not be enclosed with fire resisting construction.

Mechanical risers are not required to be constructed as protected shafts. However, based on comments from RBKC, mechanical risers which open into circulation areas on upper floor levels (regardless of whether these are protected corridors or not) have been provided with 30 minutes fire resistance to provide additional protection against smoke spread for means of escape.

4.3 Protection of Openings and Fire-stoppers

Automatic fire and smoke dampers should be provided on lines of fire resistance. These dampers should be classified to BS EN 13501:2007 **[10]** and be tested to BS EN 1366:2015 **[11]**.

4.4 Sprinkler Protection

It is proposed to provide the schools with a commercial sprinkler system designed and installed in accordance with BS EN 12845:2015 [12]. However, Hoare Lea has been asked to update the fire strategy to meet the performance requirements of Building Regulations without reliance on the mitigating measures that are recognised through the provision of sprinkler protection in order to introduce an additional level of safety and robustness to the design.

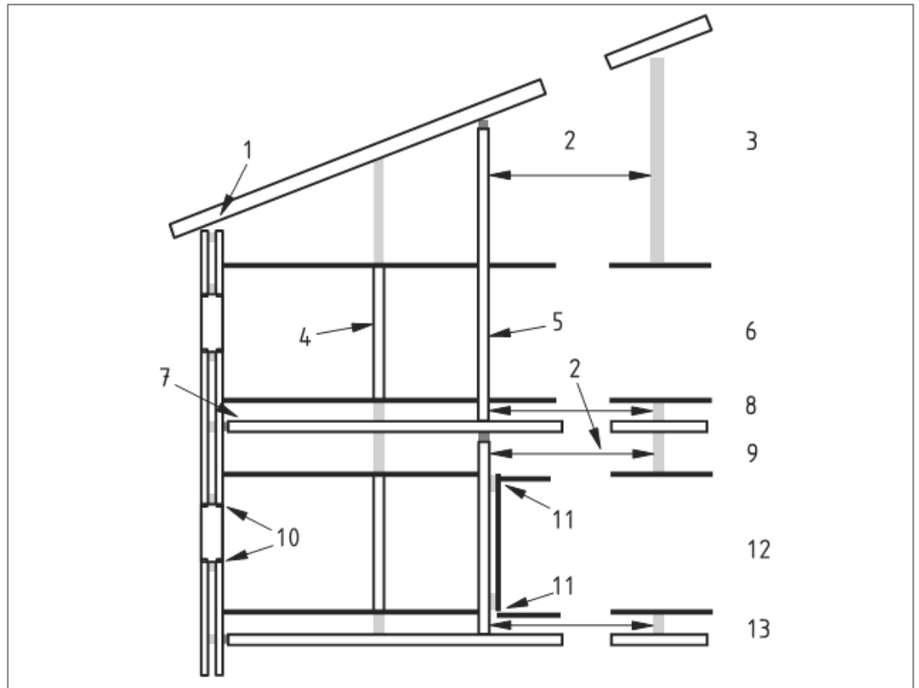
4.5 Concealed Spaces and Cavity Barriers

Where appropriate, suitable provisions should be made to prevent the unseen spread of fire and smoke through cavities or concealed spaces by the use of cavity barriers.

The provision of any such barriers should meet the general recommendations of Section 7 Clause 34.2 of BS 9999. In particular, cavity barriers should be provided in the locations described in Figure 32 of BS 9999 (see Figure 22), which details the cavity barrier requirements in particular parts of the building, such as behind the external face of rain screen cladding, above corridor subdividing doors, and at the junction of compartment walls and floors with each other and with the external wall.

Cavity barriers should also be used to subdivide any cavity, including any roof space so that the distance between cavity barriers does not exceed 20m in any direction.

Openings in any fire separating element (e.g. compartment walls, cavity barriers, protected corridor etc.) should be protected with appropriate fire stopping or sealing to ensure that the fire resistance of the element is not compromised.



Key

1	Close top of cavity	9	Ceiling space
2	Subdivide extensive cavities	10	Close around openings
3	Roof space	11	Close around edges
4	Wall forming bedroom or protected escape routes	12	Accommodation
5	Compartment wall	13	Floor space
6	Accommodation		Cavity barrier (30 min integrity/15 min insulation as in Table 24)
7	Compartment floor		
8	Floor space		Fire-stopping (same fire resistance as compartment – not cavity barrier)

Figure 24. Provision for cavity barriers (Figure 32 of BS 9999).

5. B4: External Fire Spread

"The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.

The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building."

Building Regulation 2010, Schedule 1, Part B.

5.1 Unprotected Area Acceptable

External fire spread between adjoining buildings and site boundaries will be assessed using the method detailed in BR187 **[13]** (1991) "External fire spread: building separation and boundary distances" published by the Building Research Establishment.

The external fire spread calculations are based on the following assumptions:

- Where the façade is separated by a compartment line, the largest compartment will be assessed as a 'worst case' scenario.
- The enclosing rectangle will be considered as the height and width of the compartment rather than only around the unprotected area (i.e. windows) or UPA. This is considered to be an onerous assumption as it assumes that the walls will not provide any fire resistance.
- When the building is adjacent to a road, a notional site boundary located in the middle on the street will be used rather than the site boundary. This is in accordance with recommendations within ADB and BR187.
- The height of the enclosing rectangle has been assumed to be the full height of the building unless separated by a compartment floor.

Figure 23 shows a site drawing with indicative distances to the boundary showed.

The results of the external fire spread calculations are detailed in Table 9 and 10.

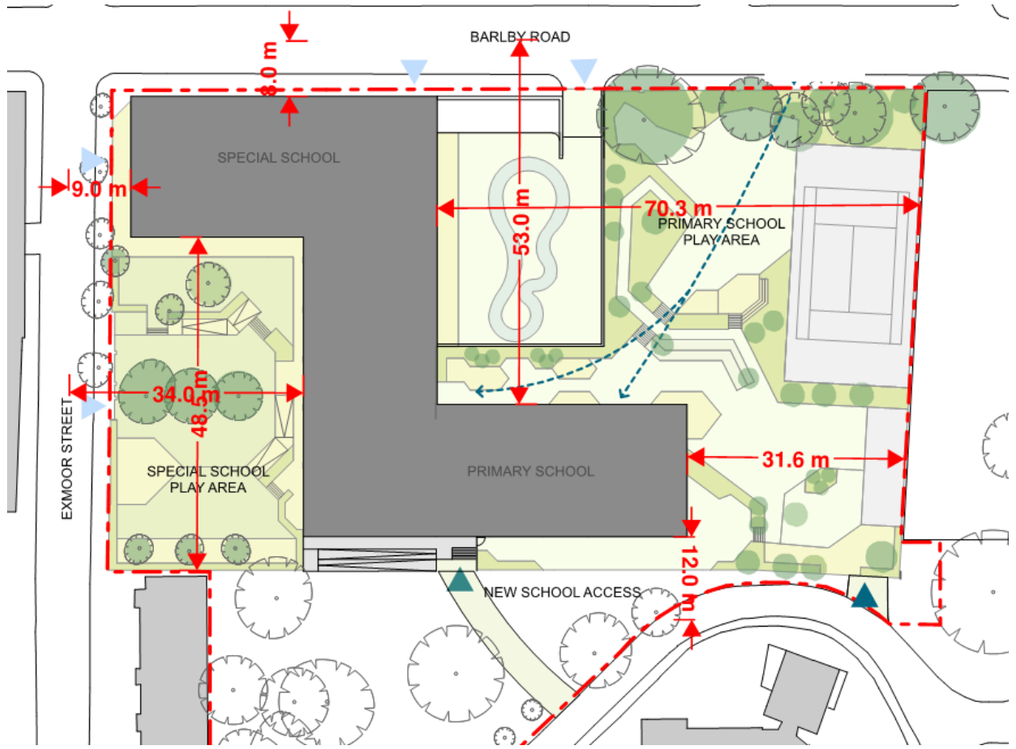


Figure 25. Distances between facades and boundary lines.

5.1.1 Primary School

Table 11. External fire spread requirements.

Façade reference	Enclosing rectangle dimensions (w x h)	Available distance to boundary (m)	Percentage of unprotected façade allowed	Further action required?
North	17.5 x 10.8	53.0 m	100%	No
East	17.0 x 10.8	31.6 m	100%	No
South	27.0 x 10.8	12.0 m	100%	No
West	34.0 x 10.8	34.0 m	100%	No

5.1.2 SEN School

Table 12. External fire spread requirements.

Façade reference	Enclosing rectangle dimensions (w x h)	Available distance to boundary (m)	Percentage of unprotected façade allowed	Further action required?
North	23.0 x 10.8	8.0 m	64%	No (see below)
East	20.0 x 10.8	70.3 m	100%	No
South	27.0 x 10.8	48.5 m	100%	No
West	10.0 x 10.8	9.0 m	100%	No

The north façade of the SEN school is allowed 64% unprotected façade. Current design of this façade consists of only 23.5% unprotected façade which is within the allowance and therefore acceptable. This is based on the actual façade arrangements and does therefore not follow the initial assumption that the entire façade is unprotected on the basis that a brick wall build-up achieves a Class 0 wall surface classification.

See Figure 24 below for a visualisation of the north façade.

Figure 26. North façade of the SEN school.

5.2 Construction of External Walls

The building does not have a storey that exceeds 18m in height. Either the external walls should satisfy the performance criteria described in BRE report BR135 or the external wall surface should be in accordance with Figure 47 of BS9999: 2017 for surface spread of flame classification, and cavity barriers in any external wall cavity are required in accordance with Clause 33.1 of BS9999: 2017.

Note: In practice, it may be necessary for external surfaces to achieve a Class 0 (National Classification) or Class B-s3, d2 or better (European Classification) surface spread of flame classification to avoid the walls contributing to the space separation (unprotected areas) calculations.

The provisions for external surfaces are showed in Figure 27.

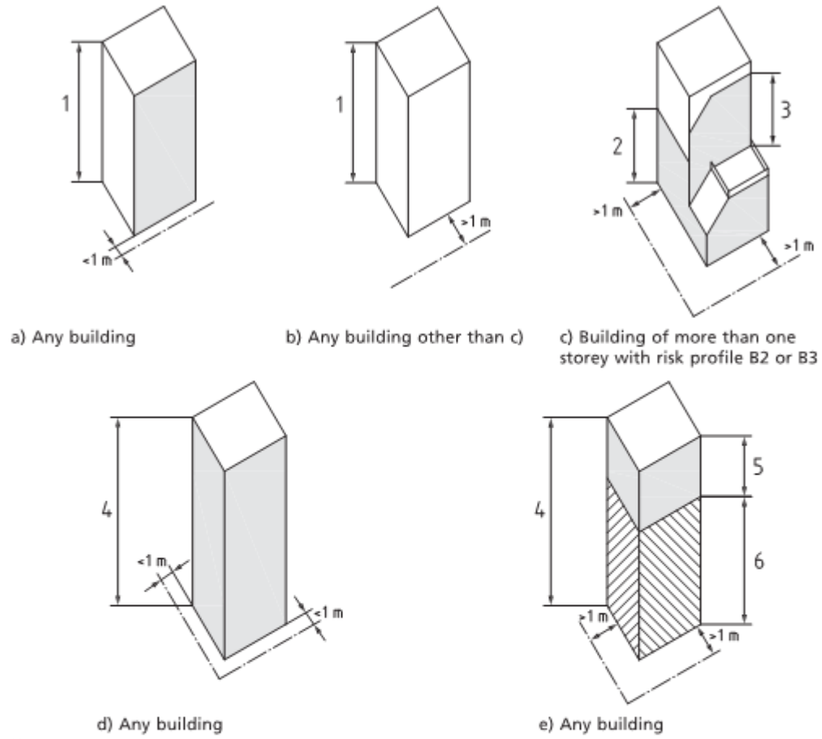


Figure 27. Provisions for external surfaces or walls

6. B5: Access and Facilities for the Fire Service

"The building shall be designed and constructed so as to provide reasonable facilities to assist fire fighters in the protection of life.

Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building".

Building Regulation 2010, Schedule 1, Part B.

6.1 Provision for Firefighting Access

The proposed building does not exceed 7.5m in height to the topmost occupied floor level and each school has a floor area below 900m^2 on every floor above Ground Floor. Therefore, no firefighting shaft is provided. However, in order to meet the perimeter access and hose laying distance requirements, a dry riser will be provided in each school. It is proposed to provide Stair 1 in each of the schools with the dry riser.

The riser inlet should be positioned in such a way that it is easily identified and accessed and within 18m of Fire and Rescue Services pump appliance, see Figure 26 below for a visualisation and Figure 27 for fire appliance access to the site.

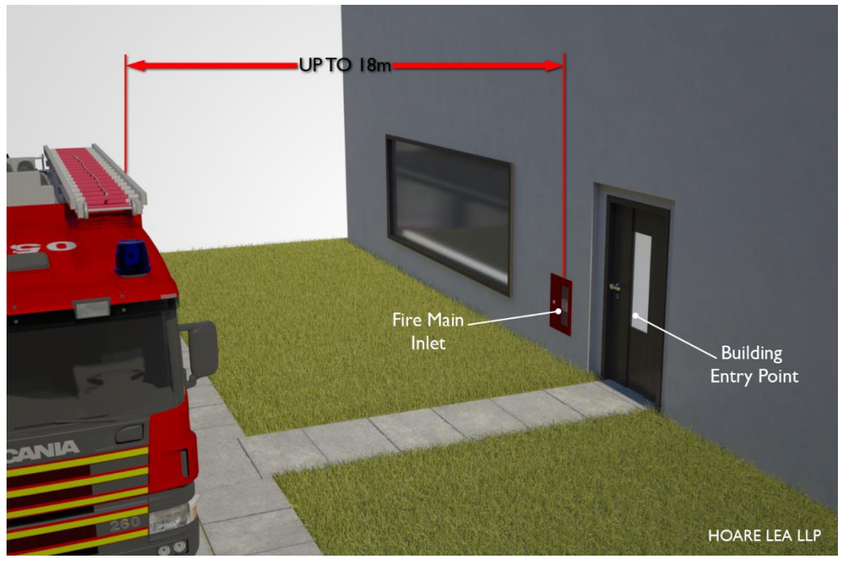


Figure 28. Provisions for access to fire main inlets.

6.2 Provision for Fire Hydrants

In accordance with BS 9999, for buildings fitted with dry fire mains, fire hydrants should be provided within 90m of the dry fire main inlets. Each hydrant should be clearly indicated by a plate, affixed nearby in a visible position, in accordance with BS 3251:1976 [14]. In accordance with site survey information, existing fire hydrants are located within 90m of the dry fire main inlets of both schools.

6.3 Fire and Rescue Service Vehicle Access

Figure 27 below indicates the fire brigade access. Routes highlighted in green are public open roads and the route highlighted in blue is an accessed controlled road. Fire brigade access to this route should be ensured by providing necessary keys. The vehicle access route specifications should be suitable for pump appliance and comply with Table 11.

Table 13. Typical fire and rescue service vehicle access route specification

Appliance type	Minimum width of road between kerbs	Minimum width of gateways	Minimum turning circle between kerbs	Minimum turning circle between walls	Minimum clearance height	Minimum carrying capacity
Pump	3.7m	3.1m	16.8m	19.2m	3.7m	14 tonnes Note1

Note 1: 12.5 tonnes in accordance to ADB; however, 14t in accordance with the LFEPA Fire safety guidance Note, Access for Fire Appliances, GN29, [15]

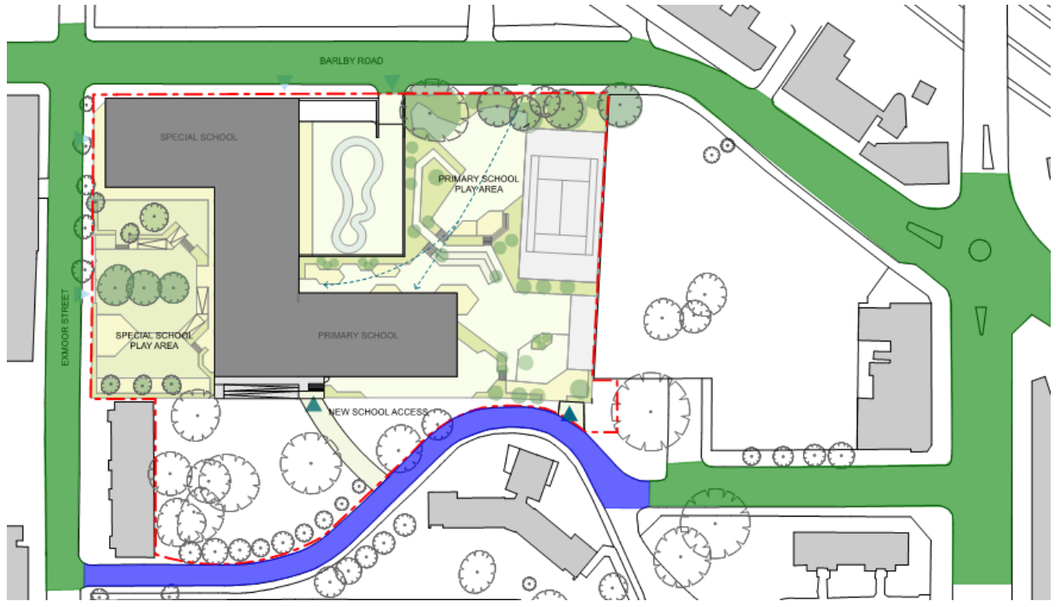


Figure 29. Fire Brigade access routes.

As mentioned above, both schools will be provided with dry fire mains to meet the hose laying distance recommendations. In accordance with guidance recommendations, the fire main inlet points should be within 18m from the Fire Service pump appliance. Although there is now explicit guidance on the maximum distance between the dry riser inlet and the building entrance, it is generally expected that it is located in close proximity.

The current proposal for the primary school building and the location of the dry rising main inlet means that the dry riser inlet connection point is located 70m from the existing fire hydrant and 18m from the proposed fire

appliance location, which is within the recommendations of guidance. The travel distance from the dry riser inlet point to the main entrance of the building is 24m due to the landscaping and school play areas proposed, refer to Figure 28 below for a visualisation of the proposed arrangements.

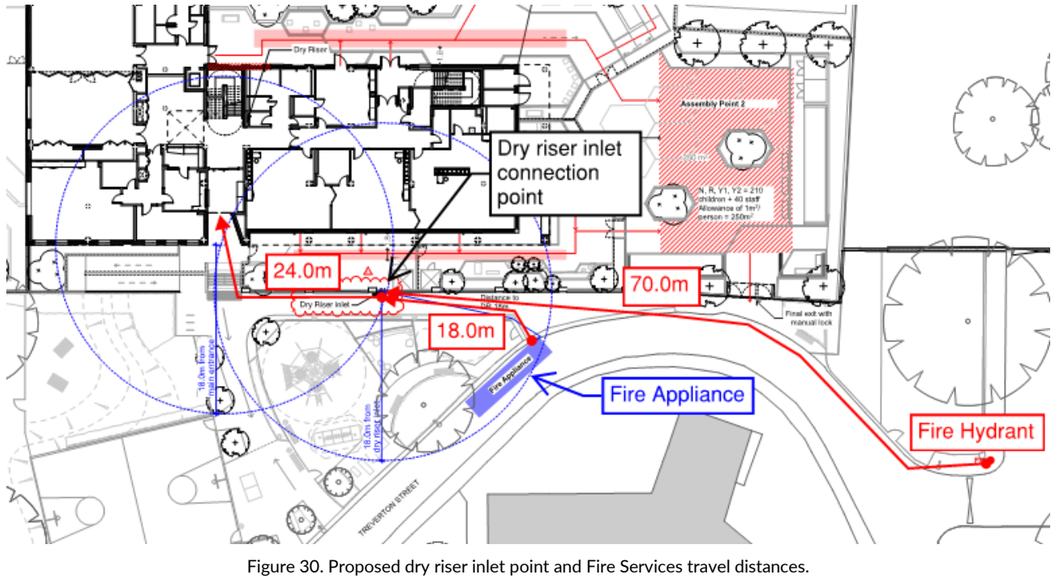


Figure 30. Proposed dry riser inlet point and Fire Services travel distances.

The 24m travel distance from the dry riser inlet point to the entrance of the building giving access to the dry riser outlet is considered acceptable based on the following rationale:

- The building is provided with a dry riser system, although a fire main is not required under the guidance of BS 9999 due to the height of the building (7.1m). This will allow the building to achieve the recommended hose laying distance of 45m and will result in a more effective approach for the Fire Service.
- A Category L1 fire alarm and detection system is provided within the building and this system will raise awareness of a fire event at an early stage, thereby providing the Fire Service with early access to the fire.
- There will be a high level of management within the development with staff members available to assist the Fire Service upon arrival.
- The proposed location of the dry riser inlet connection point means that, although resulting in 24m travel distance to the main entrance, the distance to the fire hydrant is reduced to 70m (the maximum recommended distance is 90m) and the proposed fire appliance location is strategically located between the existing fire hydrant and the main entrance of the building.

This has been discussed and agreed with RBKC Building Control but should also be discussed with the Fire Authority.

7. Summary Table

Section	Comments
2.2	– A managed evacuation strategy with a ‘double knock’ feature and investigation period is proposed for the schools.
2.3	– Both schools will be fitted with a Category L1 fire detection and alarm system, which means that all escape routes, high risk rooms and rooms opening onto stairs will be provided with automatic detection, thus providing the earliest possible warning.
2.5	– Horizontal evacuation provisions are sufficient.
2.5	– Escaping past a void is considered acceptable since it is situated within a protected enclosure.
2.5	– The current final exit widths are considered sufficient to accommodate for potential merging flows.
2.6	– Vertical means of escape provisions are sufficient for the SEN school and limits the occupancy of the upper levels of the primary school to 450 occupants. – An assessment has been undertaken to demonstrate that it is acceptable for a potential occasional occupancy split of 350 occupants on the primary school second floor and 100 occupants on the first floor.
4.1	– Due to a height of the top habitable floor above 5m but below 18m, the elements of structure above ground should be protected to achieve at least 60 minutes fire resistance for the entirety of the development.
5.1	– The site boundary generally provides adequate separation from an external fire spread point of view.
6	– Provisions for firefighting access and Fire and Rescue Services vehicle access are considered sufficient.

8. Reference

[1] Department for Communities and Local Government (DCLG), *Approved Document B: Fire Safety - Volume 2: Buildings Other Than Dwellinghouses*, 2006 Edition. vol. 2. NBS, 2006.

[2] Her Majesty's Stationery Office (HMSO), *The Building Regulations 2010, England and Wales*. The Stationary Office, 2010

[3] British Standard Institute (BSI), BS 9999:2017 - Code of practice for fire safety in the design, management and use of buildings, BSI Global

[4] UK Government, *Regulatory Reform (Fire Safety) Order 2005*. 2005.

[5] British Standards Institution (BSI), *BS 5839-1: Fire detection and fire alarm systems for buildings - Part 1: Code of practice for system design, installation, commissioning and maintenance of systems in non-domestic premises*. BSI Global, 2013.

[6] British Standards Institution (BSI), *BS 5266-1: Emergency lighting - Part1: Code of practice for emergency escape lighting of premises*. BSI Global, 2011.

[7] British Standard Institute (BSI), BS 5266-7:1999 - Lighting applications. Emergency lighting, BSI Global.

[8] British Standards Institution (BSI), *BS ISO 3864-1: Graphical symbols - Part1: Safety colours and safety signs Design principles for safety signs and safety markings*. BSI Global, 2011.

[9] British Standards Institution (BSI), *BS 5499-1: Graphical symbols and signs - Safety signs, including fire safety signs - Part 1: Specification for geometric shapes, colours and layout*. BSI Global, 2002.

[10] British Standards Institution (BSI), *BS EN 13501: Fire classification of construction products and building elements. Classification using test data from reaction to fire tests*. BSI Global, 2007.

[11] British Standards Institution (BSI), *BS EN 1366-2: Fire resistance tests for service installations – Part 2: Fire dampers*. BSI Global, 2015.

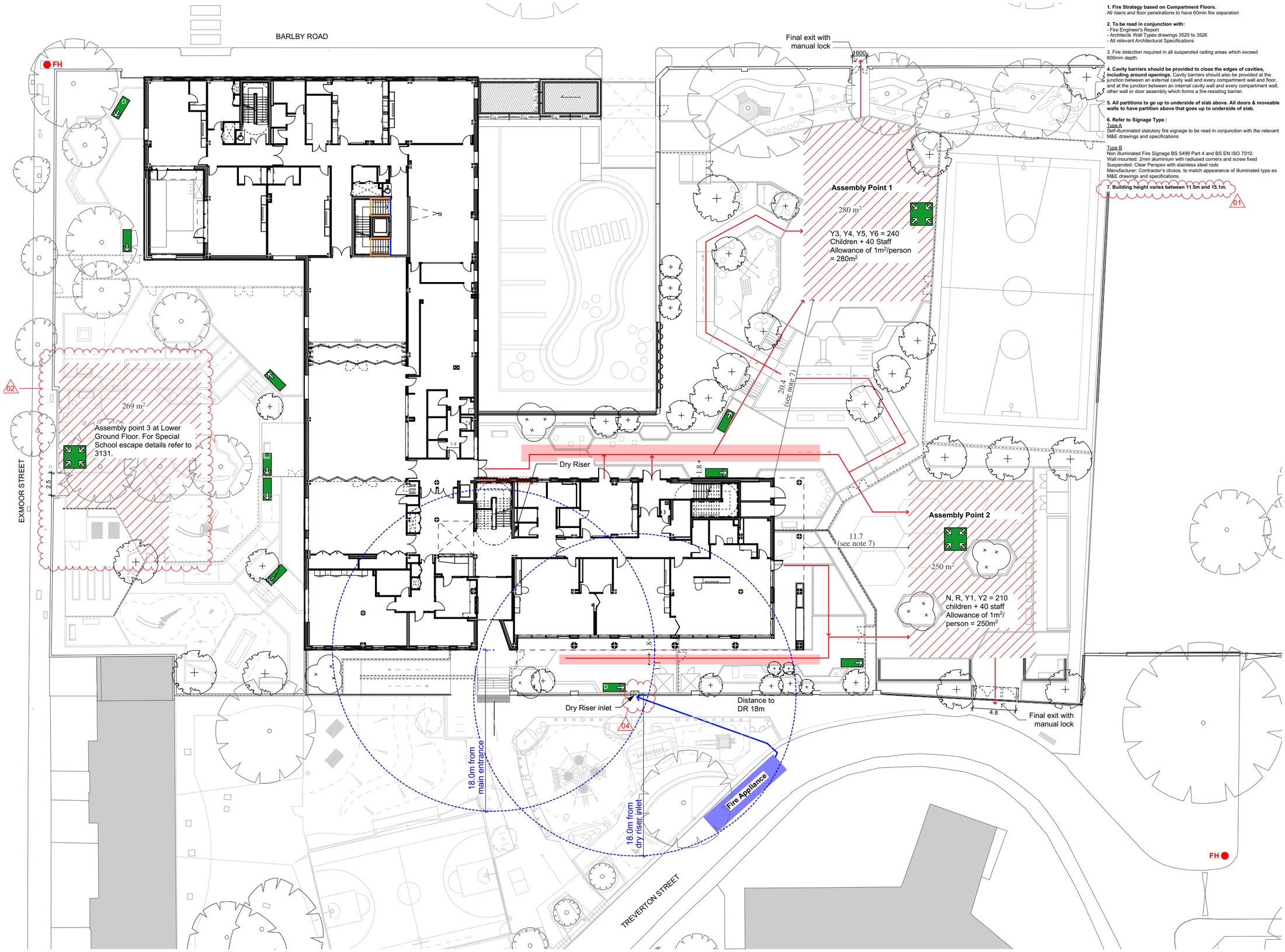
[12] British Standards Institution (BSI), *BS EN 12845: Fixed fire-fighting systems.* BSI Global, 2015.

[13] Building Research Establishment (BRE), *BR 187: External fire spread, building separation and boundary distances*. BRE, 1991.

[14] British Standards Institution (BSI), *BS 3251: Specification. Indicator plates for fire hydrants and emergency water supplies*. BSI, 1976.

[15] London Fire Emergency Planning Authority (LFEPA), "Guidance Note 29 - Access for Fire Appliances," 2007.

Appendix A – Fire Strategy Drawings



01 Fire Site Plan - Ground Floor
1:400

NOTES:

1. Fire Strategy based on Compartment Floors.
All risers and floor penetrations to have 60min fire separation

2. To be read in conjunction with:
- Fire Engineer's Report
- Architects Wall Types drawings 3520 to 3526
- All relevant Architectural Specifications

3. Fire detection required in all suspended ceiling areas which exceed 800mm depth.

4. Cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should also be provided at the junction between an external cavity wall and every compartment wall and floor, and at the junction between an internal cavity wall and every compartment wall, other wall or door assembly which forms a fire-resisting barrier.

5. All partitions to go up to underside of slab above. All doors & moveable walls to have partition above that goes up to underside of slab.

6. Refer to Signage Type :
Type A
Self-illuminated statutory fire signage to be read in conjunction with the relevant M&E drawings and specifications

Type B
Non illuminated Fire Signage BS 5499 Part 4 and BS EN ISO 7010.
Wall mounted: 2mm aluminium with radiused corners and screw fixed
Suspended: Clear Perspex with stainless steel rods
Manufacturer: Contractor's choice, to match appearance of illuminated type as M&E drawings and specifications.

7. Building height varies between 11.5m and 15.1m.

KEY

Muster Areas
Muster point with area (m2)

Route away from building
Fire escape route
Safe Route at least 1.8m away from building

Fire Escapes
Final Escape Doors
Protected area next to final escape

Fire Hydrant
FH Position of Fire Hydrant taken from the Asset Allocation Search report by Thames Water, Page 9. Positions to be checked on site

Fire Signage
Type C Type D

Note:
1/ To be read in conjunction with:
- Fire Engineer's report
- P&P fire plans 3130 series

Rev	Date	Prep/Check	Description
C02	15.05.2020	KM /SD	01 Additional note added 02Assembly point updated 03Fire escape routes updated 04 Dry riser inlet position updated
C01	30.01.2019	AT /SD	01 Dimensions added to exits

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Client
Royal Borough of Kensington and Chelsea

Project
Barlby New Schools

Drawing Title
Ground Floor Site Fire Plan

Suitability / Purpose of Issue
A - For Construction

Scale
1:400 @ A3

Drawing Number
project originator zone level type role number
35137 - **0100** - A1 - 00 - **DR** - **A** - 3130

Revision
C02

KEY

- Refuge Space
- XX Occupancy
- DR Dry Riser Outlet
- Xm Hose-laying distance

Fire Walls
- 30 min Fire Wall
- 60 min Fire Wall
- 240 min Fire Wall

Fire Curtain:
- 60 mins (integrity only)

Fire Shutter:
- 60 mins (integrity only)

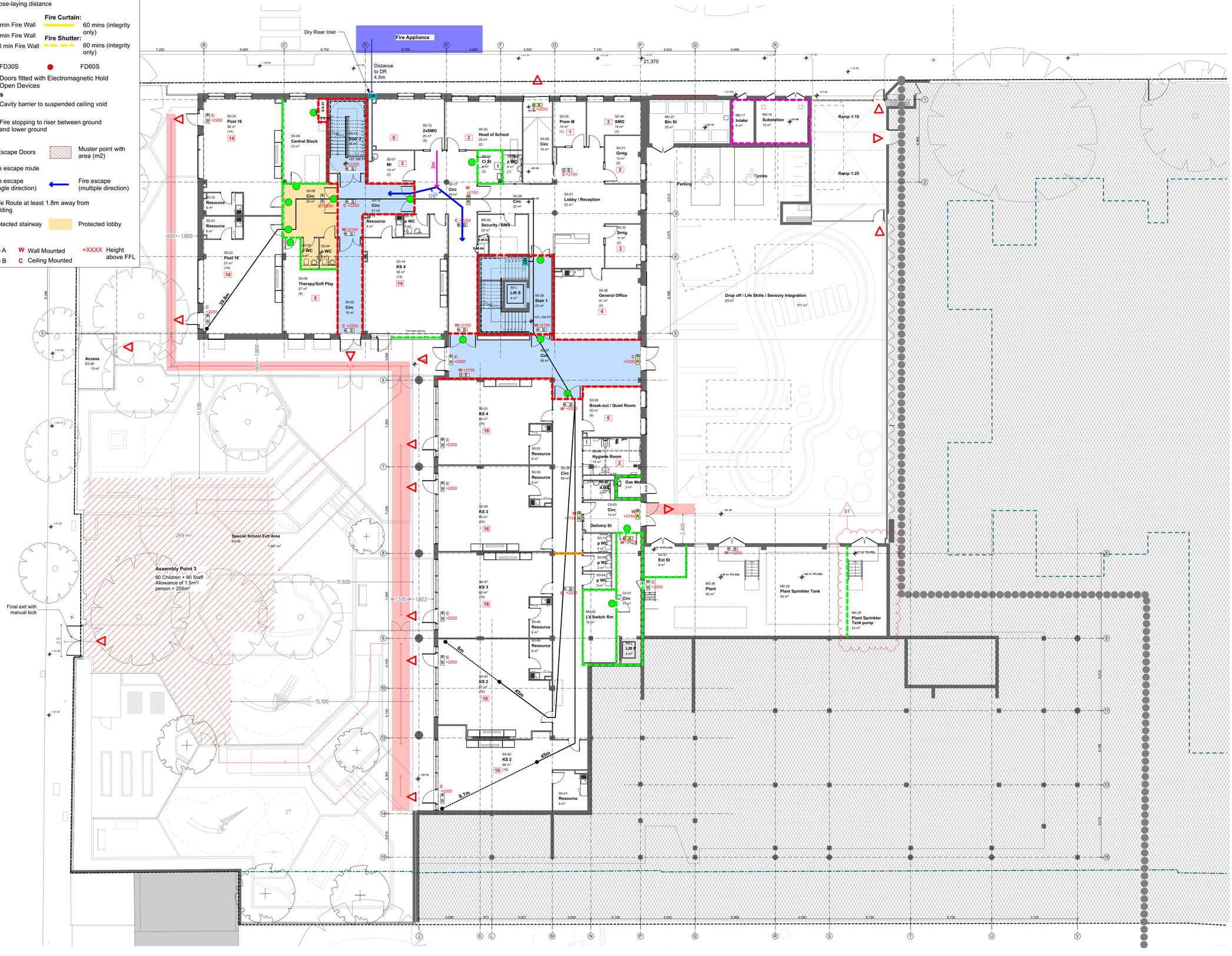
Fire Doors
- FD30S
- FD60S
- HO Doors fitted with Electromagnetic Hold Open Devices

Cavity Barriers
- Cavity barrier to suspended ceiling void

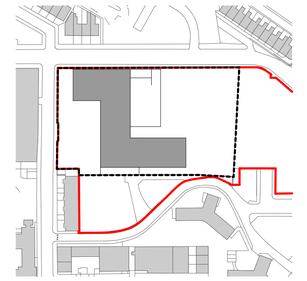
Fire Stop
- Fire stopping to riser between ground and lower ground

Fire Escape
- Final Escape Doors
- Muster point with area (m2)
- Fire escape route
- Xm Fire escape (single direction)
- Fire escape (multiple direction)
- Safe Route at least 1.8m away from building
- Protected stairway
- Protected lobby

Fire Signage
- A Type A
- B Type B
- W Wall Mounted
- C Ceiling Mounted
- +XXXX Height above FFL



01 Fire Plan - Lower Ground Floor Plan
1:150



NOTES:

1. Fire Strategy based on Compartment Floors.
All risers and floor penetrations to have 60min fire separation

2. To be read in conjunction with:
- Fire Engineer's Report
- Architects Wall Types drawings 3520 to 3526
- All relevant Architectural Specifications

3. Fire detection required in all suspended ceiling areas which exceed 800mm depth.

4. Cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should also be provided at the junction between an external cavity wall and every compartment wall and floor, and at the junction between an internal cavity wall and every compartment wall, other wall or door assembly which forms a fire-resisting barrier.

5. All partitions to go up to underside of slab above. All doors & moveable walls to have partition above that goes up to underside of slab.

6. Refer to Signage Type :
Type A
Self-illuminated statutory fire signage to be read in conjunction with the relevant M&E drawings and specifications

Type B
Non illuminated Fire Signage BS 5499 Part 4 and BS EN ISO 7010.
Wall mounted: 2mm aluminium with radiused corners and screw fixed
Suspended: Clear Perspex with stainless steel rods
Manufacturer: Contractor's choice, to match appearance of illuminated type as M&E drawings and specifications.

7. Building height varies between 11.5m and 15.1m.

OCCUPANCY:

Refer to plans for occupancy of individual rooms.

Max occupancy on first and second floor combined = 450

Max occupancy on second floor = 350

Rev	Date	Prep/Check	Description
C04	08.10.2020	KM /SD	01 Plant Room Fire Strategy Updated
C03	03.06.2020	MW /SD	01 Plant Room Fire Strategy Updated
C02	15.05.2020	KM /SD	01 Hose-laying distances shown 02Internal dry risers indicated 03 Occupancy numbers inidcated 04 Protected stairs and lobbies shaded for clarity 05 Fire escapes indicated
C01	30.01.2019	AT /SD	01 Escape route updated

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Client
Royal Borough of Kensington and Chelsea

Project
Barlby New Schools

Drawing Title
Fire Plan - Lower Ground Floor Plan

Suitability / Purpose of Issue
A - For Construction

Scale
1:150 @ A1

Drawing Number

project	originator	zone	level	type	role	number
35137	**-0100**	- A1	- LG	- **DR**	- **A**	- 3131

Revision
C04

KEY

- Refuge Space
- XX Occupancy
- DR Dry Riser Outlet
- Xm Hose-laying distance

Fire Walls
- 30 min Fire Wall
- 60 min Fire Wall
- 240 min Fire Wall

Fire Curtain: 60 mins (integrity only)

Fire Shutter: 60 mins (integrity only)

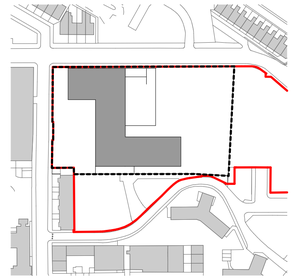
Fire Doors
- FD30S
- FD60S
- HO Doors fitted with Electromagnetic Hold Open Devices

Cavity Barriers
- Cavity barrier to suspended ceiling void

Fire Stop
- Fire stopping to riser between ground and lower ground

Fire Escape
- Final Escape Doors
- Muster point with area (m2)
- Fire escape route
- Xm Fire escape (single direction)
- Fire escape (multiple direction)
- Safe Route at least 1.8m away from building
- Protected stairway
- Protected lobby

Fire Signage
- A Type A
- B Type B
- W Wall Mounted
- C Ceiling Mounted
- +XXXX Height above FFL



NOTES:

1. Fire Strategy based on Compartment Floors.
All risers and floor penetrations to have 60min fire separation

2. To be read in conjunction with:
- Fire Engineer's Report
- Architects Wall Types drawings 3520 to 3526
- All relevant Architectural Specifications

3. Fire detection required in all suspended ceiling areas which exceed 800mm depth.

4. Cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should also be provided at the junction between an external cavity wall and every compartment wall and floor, and at the junction between an internal cavity wall and every compartment wall, other wall or door assembly which forms a fire-resisting barrier.

5. All partitions to go up to underside of slab above. All doors & moveable walls to have partition above that goes up to underside of slab.

6. Refer to Signage Type :
Type A
Self-illuminated statutory fire signage to be read in conjunction with the relevant M&E drawings and specifications

Type B
Non illuminated Fire Signage BS 5499 Part 4 and BS EN ISO 7010.
Wall mounted: 2mm aluminium with radiused corners and screw fixed
Suspended: Clear Perspex with stainless steel rods
Manufacturer: Contractor's choice, to match appearance of illuminated type as M&E drawings and specifications.

7. Building height varies between 11.5m and 15.1m.

OCCUPANCY:

Refer to plans for occupancy of individual rooms.

Max occupancy on first and second floor combined = 450

Max occupancy on second floor = 350

Rev	Date	Prep/Check	Description
C03	08.10.2020	KM/SD	01 Fire rating to door updated 02 Kitchen layout and fire strategy updated
C02	15.05.2020	KM/SD	01 Hose distances shown 02 Internal dry risers shown 03 Occ no.s shown 04 Protected stairs/lobbies shaded 05Escape route updated 06Door amended to hinged 07Corridor updated to protected & door omitted 08 Fire curtain replaced with FR doors
C01	30.01.2019	AT/SD	Reissued for Construction

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Client
Royal Borough of Kensington and Chelsea

Project
Barlby New Schools

Drawing Title
Fire Plan - Ground Floor Plan

Suitability / Purpose of Issue
A - For Construction

Scale
1:150 @ A1

Drawing Number

project	originator	zone	level	type	role	number
35137	-0100	- A1	- 00	- DR	- A	- 3132

Revision
C03

01 Fire Plan - Ground Floor Plan
1:150

KEY

- Refuge Space
- XX Occupancy
- DR Dry Riser Outlet
- Xm Hose-laying distance

Fire Walls
- 30 min Fire Wall
- 60 min Fire Wall
- 240 min Fire Wall

Fire Curtain:
- 60 mins (integrity only)

Fire Shutter:
- 60 mins (integrity only)

Fire Doors
- FD30S
- FD60S
- HO Doors fitted with Electromagnetic Hold Open Devices

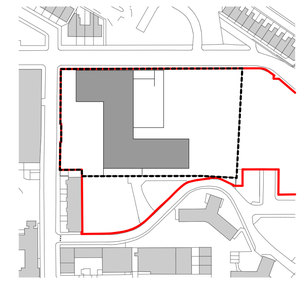
Cavity Barriers
- Cavity barrier to suspended ceiling void

Fire Stop
- Fire stopping to riser between ground and lower ground

Fire Escape
- Final Escape Doors
- Muster point with area (m2)
- Fire escape route
- Xm Fire escape (single direction)
- Fire escape (multiple direction)
- Safe Route at least 1.8m away from building
- Protected stairway
- Protected lobby

Fire Signage
- A Type A
- B Type B
- W Wall Mounted
- C Ceiling Mounted
- +XXXX Height above FFL

01 Fire Plan - First Floor Plan
1:150



NOTES:

1. Fire Strategy based on Compartment Floors.
All risers and floor penetrations to have 60min fire separation

2. To be read in conjunction with:
- Fire Engineer's Report
- Architects Wall Types drawings 3520 to 3526
- All relevant Architectural Specifications

3. Fire detection required in all suspended ceiling areas which exceed 800mm depth.

4. Cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should also be provided at the junction between an external cavity wall and every compartment wall and floor, and at the junction between an internal cavity wall and every compartment wall, other wall or door assembly which forms a fire-resisting barrier.

5. All partitions to go up to underside of slab above. All doors & moveable walls to have partition above that goes up to underside of slab.

6. Refer to Signage Type :
Type A
Self-illuminated statutory fire signage to be read in conjunction with the relevant M&E drawings and specifications

Type B
Non illuminated Fire Signage BS 5499 Part 4 and BS EN ISO 7010.
Wall mounted: 2mm aluminium with radiused corners and screw fixed
Suspended: Clear Perspex with stainless steel rods
Manufacturer: Contractor's choice, to match appearance of illuminated type as M&E drawings and specifications.

7. Building height varies between 11.5m and 15.1m.

OCCUPANCY:

Refer to plans for occupancy of individual rooms.

Max occupancy on first and second floor combined = 450

Max occupancy on second floor = 350

Rev	Date	Prep/Check	Description
			01 Fire rating to door updated
C03	08.10.2020	KM /SD	02 Riser fire rating updated in accordance with comments from BC
C02	15.05.2020	KM /SD	01 Hose-laying distances shown02 Internal dry risers indicated03 Occupancy numbers inidcated04 Protected stairs and lobbies shaded for clarity05 Note on occupancy added
C01	30.01.2019	AT /SD	Reissued for Construction

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Project
Barlby New Schools

Drawing Title
Fire Plan - First Floor Plan

Suitability / Purpose of Issue
A - For Construction

Scale
1:150 @ A1

Drawing Number

project	originator	zone	level	type	role	number
35137	0100	A1	01	DR	A	3133

Revision
C03

KEY

Refuge Space | XX Occupancy | DR Dry Riser Outlet

Xm Hose-laying distance

Fire Walls
- 30 min Fire Wall
- 60 min Fire Wall
- 240 min Fire Wall

Fire Curtain: 60 mins (integrity only)

Fire Shutter: 60 mins (integrity only)

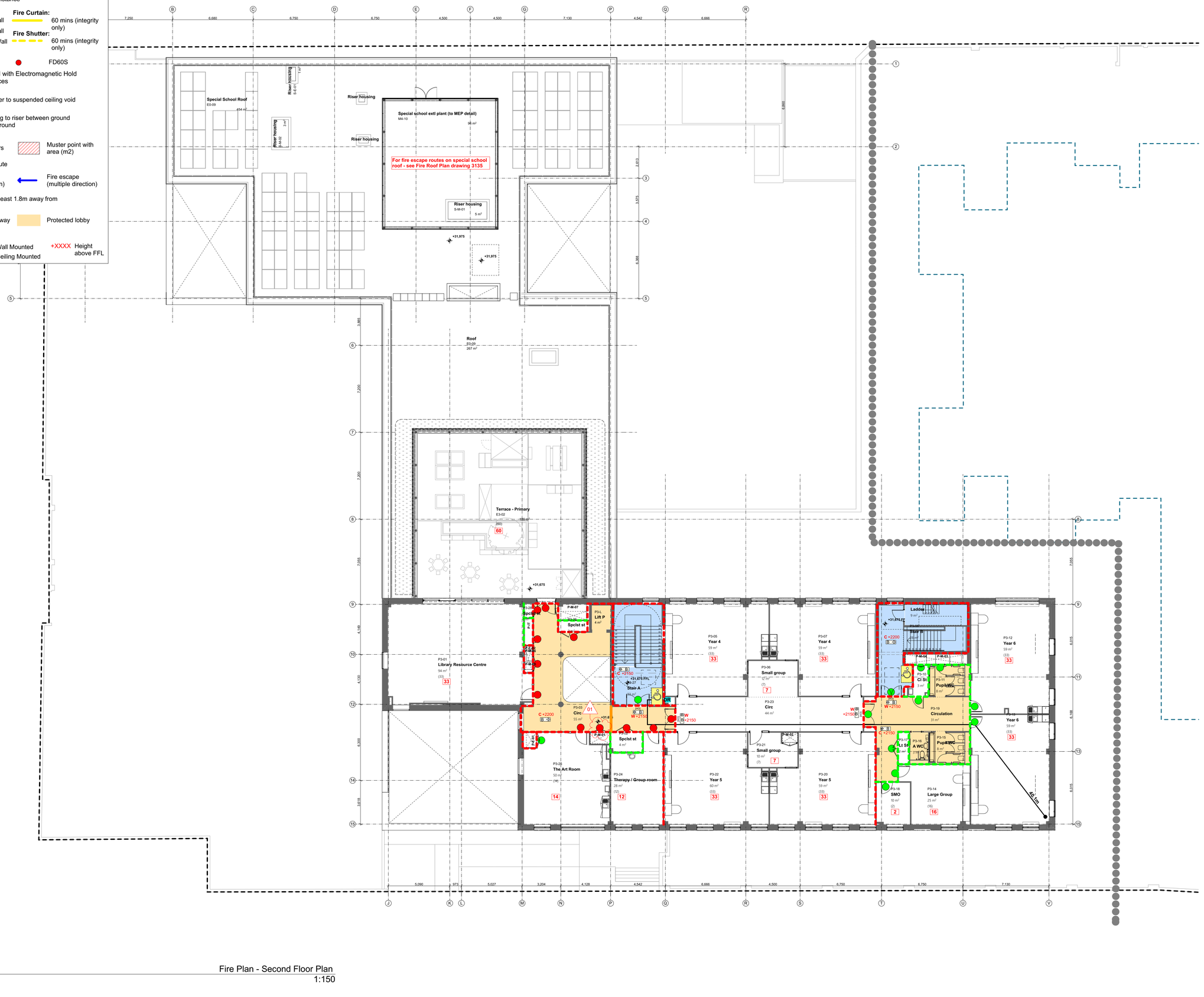
Fire Doors
- FD30S
- FD60S
- HO Doors fitted with Electromagnetic Hold Open Devices

Cavity Barriers
- Cavity barrier to suspended ceiling void

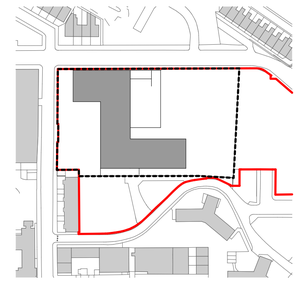
Fire Stop
- Fire stopping to riser between ground and lower ground

Fire Escape
- Final Escape Doors
- Muster point with area (m2)
- Fire escape route
- Xm Fire escape (single direction)
- Fire escape (multiple direction)
- Safe Route at least 1.8m away from building
- Protected stairway
- Protected lobby

Fire Signage
- A Type A
- B Type B
- W Wall Mounted
- C Ceiling Mounted
- +XXXX Height above FFL



01 Fire Plan - Second Floor Plan
1:150



NOTES:

1. Fire Strategy based on Compartment Floors.
All risers and floor penetrations to have 60min fire separation

2. To be read in conjunction with:
- Fire Engineer's Report
- Architects Wall Types drawings 3520 to 3526
- All relevant Architectural Specifications

3. Fire detection required in all suspended ceiling areas which exceed 800mm depth.

4. Cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should also be provided at the junction between an external cavity wall and every compartment wall and floor, and at the junction between an internal cavity wall and every compartment wall, other wall or door assembly which forms a fire-resisting barrier.

5. All partitions to go up to underside of slab above. All doors & moveable walls to have partition above that goes up to underside of slab.

6. Refer to Signage Type :
Type A
Self-illuminated statutory fire signage to be read in conjunction with the relevant M&E drawings and specifications

Type B
Non illuminated Fire Signage BS 5499 Part 4 and BS EN ISO 7010.
Wall mounted: 2mm aluminium with radiused corners and screw fixed
Suspended: Clear Perspex with stainless steel rods
Manufacturer: Contractor's choice, to match appearance of illuminated type as M&E drawings and specifications.

7. Building height varies between 11.5m and 15.1m.

OCCUPANCY:

Refer to plans for occupancy of individual rooms.

Max occupancy on first and second floor combined = 450

Max occupancy on second floor = 350

Rev	Date	Prep/Check	Description
C03	08.10.2020	KM /SD	01 Fire rating to door updated
C02	15.05.2020	KM /SD	01 Hose-laying distances shown02 Internal dry risers indicated03 Occupancy numbers inidcated04 Protected stairs and lobbies shaded for clarity05 Note on occupancy added
C01	30.01.2019	AT /SD	Reissued for Construction

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Client
Royal Borough of Kensington and Chelsea

Project
Barlby New Schools

Drawing Title
Fire Plan - Second Floor Plan

Suitability / Purpose of Issue
A - For Construction

Scale
1:150 @ A1

Drawing Number
project originator zone level type role number
35137-0100- A1- 02 - **DR-** **A** - 3134

Revision
C03

KEY

Refuge Space | XX Occupancy | DR Dry Riser Outlet

Xm Hose-laying distance

Fire Walls
- 30 min Fire Wall
- 60 min Fire Wall
- 240 min Fire Wall

Fire Curtain: 60 mins (integrity only)

Fire Shutter: 60 mins (integrity only)

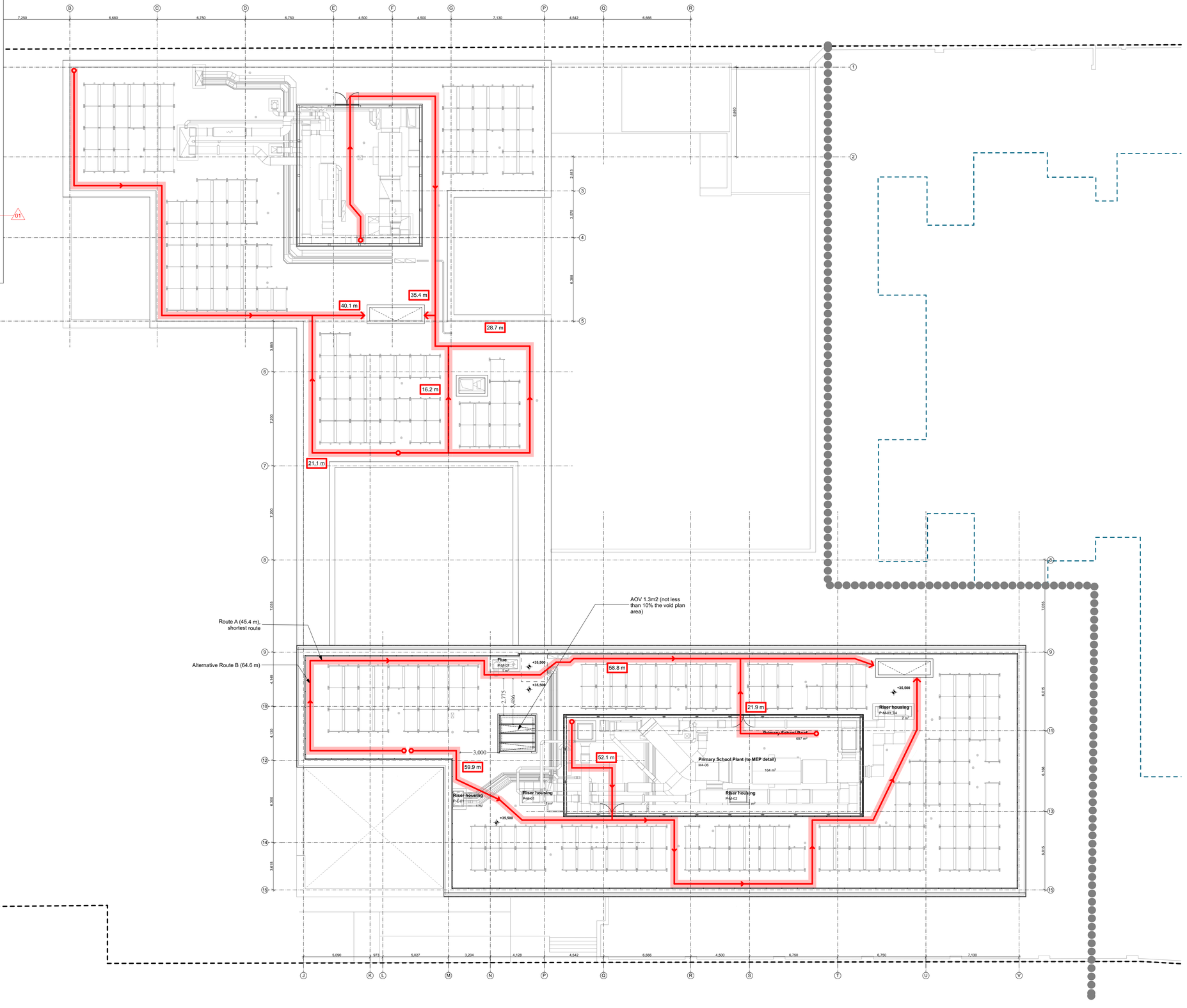
Fire Doors
- FD30S
- FD60S
- HO Doors fitted with Electromagnetic Hold Open Devices

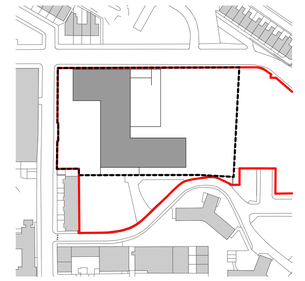
Cavity Barriers
- Cavity barrier to suspended ceiling void

Fire Stop
- Fire stopping to riser between ground and lower ground

Fire Escape
- Final Escape Doors
- Muster point with area (m2)
- Fire escape route
- Xm Fire escape (single direction)
- Fire escape (multiple direction)
- 600mm wide escape route at roof level
- Protected stairway
- Protected lobby

Fire Signage
- A Type A
- B Type B
- W Wall Mounted
- C Ceiling Mounted
- +XXXX Height above FFL





NOTES:

1. **Fire Strategy based on Compartment Floors.**
All risers and floor penetrations to have 60min fire separation

2. **To be read in conjunction with:**
- Fire Engineer's Report
- Architects Wall Types drawings 3520 to 3526
- All relevant Architectural Specifications

3. **Fire detection required in all suspended ceiling areas which exceed 800mm depth.**

4. **Cavity barriers should be provided to close the edges of cavities, including around openings.** Cavity barriers should also be provided at the junction between an external cavity wall and every compartment wall and floor, and at the junction between an internal cavity wall and every compartment wall, other wall or door assembly which forms a fire-resisting barrier.

5. **All partitions to go up to underside of slab above. All doors & moveable walls to have partition above that goes up to underside of slab.**

6. **Escape route to be illuminated - for emergency lighting and illuminated exit signs refer to M&E drawings.**

7. **External access to fastenings for doors and hatches.**

8. **1100mm high parapet guarding to 100% roof area perimeter.**

Rev	Date	Prep/Check	Description
C02	15.05.2020	KM /SD	01 - Fire escape routes updated to show 600mm wide escape zone
C01	30.01.2019	AT /SD	Reissued for Construction

Penoyre & Prasad

The White Chapel Building
10 Whitechapel High Street
London

020 7250 3477
penoyreprasad.com

Client
Royal Borough of Kensington and Chelsea

Project
Barlby New Schools

Drawing Title
Fire Plan - Roof Plan

Suitability / Purpose of Issue
A - For Construction

Scale
1:150 @ A1

Drawing Number

project	originator	zone	level	type	role	number
35137	0100	A1	R2	DR	A	3135

Revision
C02

01 Fire Plan - Roof Plan
1:150

NOTES:

1. Fire Strategy based on Compartment Floors.
All risers and floor penetrations to have 60min fire separation

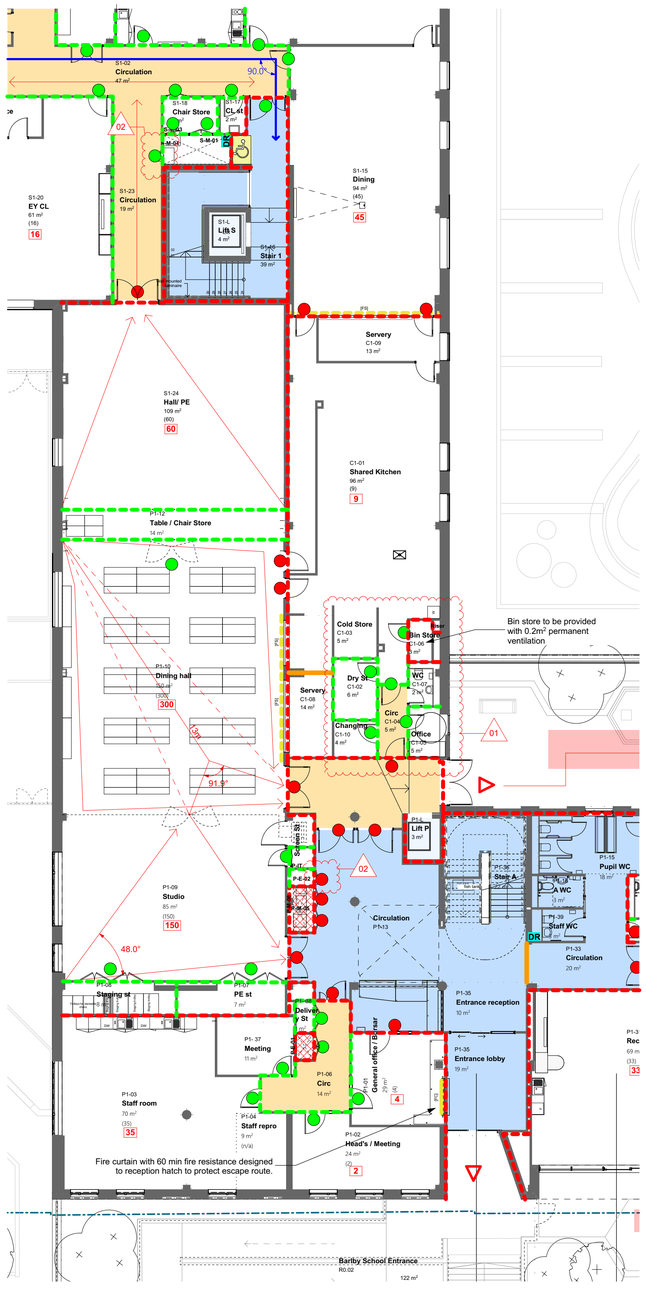
2. To be read in conjunction with:
- Fire Engineer's Report
- Architects Wall Types drawings 3520 to 3526
- All relevant Architectural Specifications

3. Fire detection required in all suspended ceiling areas which exceed 800mm depth.

4. Cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should also be provided at the junction between an external cavity wall and every compartment wall and floor, and at the junction between an internal cavity wall and every compartment wall, other wall or door assembly which forms a fire-resisting barrier.

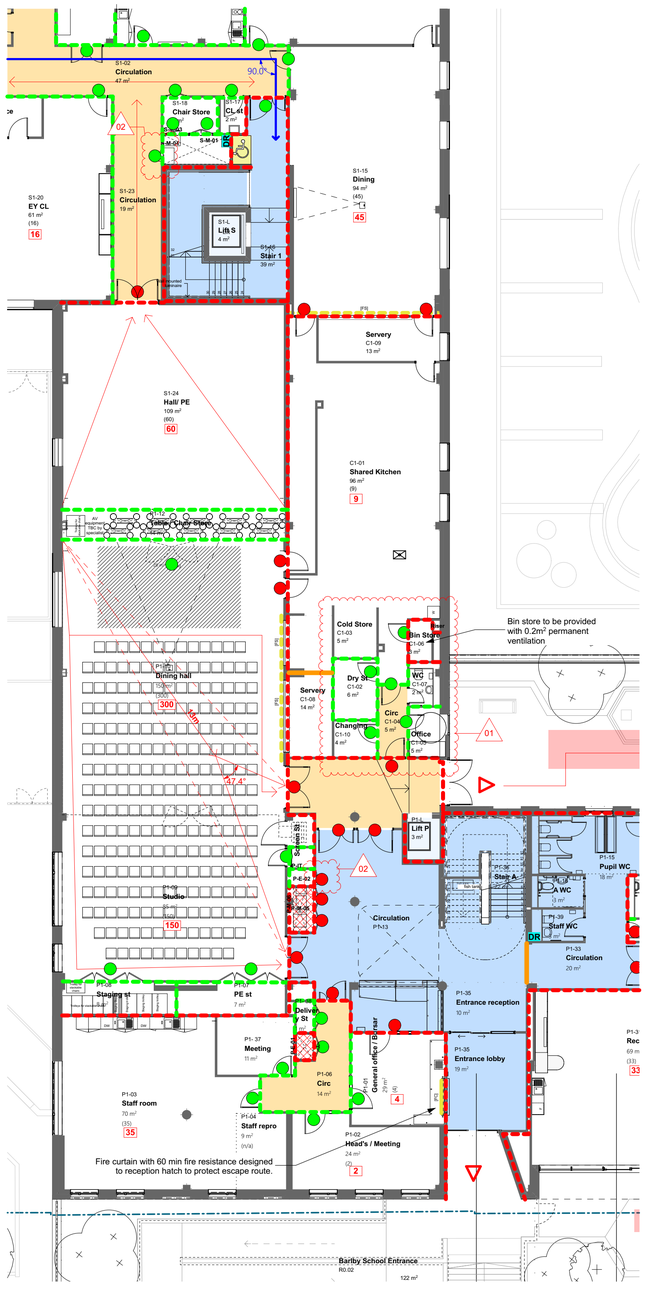
5. All partitions to go up to underside of slab above. All doors & moveable walls to have partition above that goes up to underside of slab.

6. Fire signage and hose-laying distances not shown on this drawing for clarity.



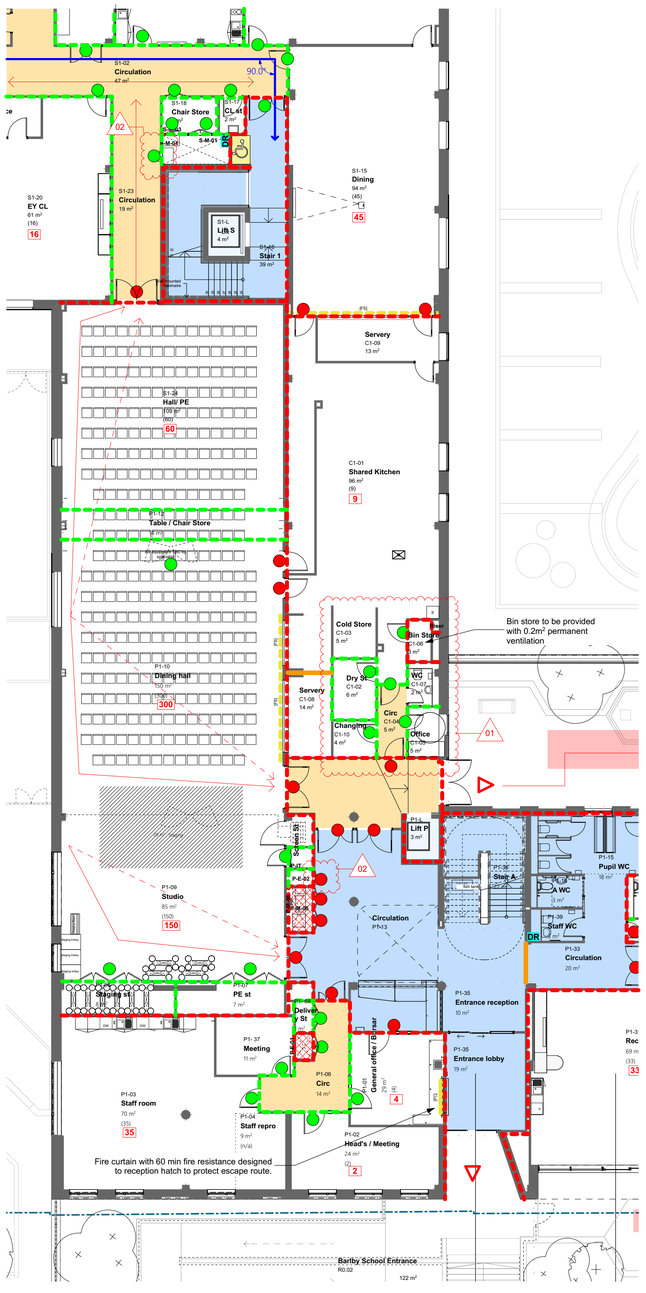
01 Hall - PE/Dining
1:150

PE Hall - 40 (Max. 60)
Dining - approx. 160 seats max. for dining or assembly. Seats secured in 4-seat lengths.
Special School Hall - 60 (Max. 60)



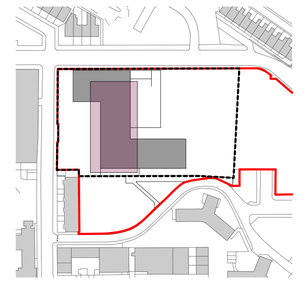
02 Hall - Primary Assembly
1:150

PE Hall / Dining - approx. 250 seats max. for assembly. Seats secured in 4-seat lengths.
Special School Hall - 60 (Max. 60)



03 Hall - Extended Hall Event
1:150

PE Hall / Dining / Special School Hall - approx. 320 seats (>250). Seats secured together, seats at end of row fixed to floor.



KEY

Refuge Space
XX Occupancy
DR Dry Riser Outlet
Xm Hose-laying distance

Fire Walls
30 min Fire Wall
60 min Fire Wall
240 min Fire Wall

Fire Curtain:
60 mins (integrity only)

Fire Shutter:
60 mins (integrity only)

Fire Doors
FD30S
FD60S
HO Doors fitted with Electromagnetic Hold Open Devices

Cavity Barriers
Cavity barrier to suspended ceiling void

Fire Stop
Fire stopping to riser between ground and lower ground

Fire Escape
Final Escape Doors
Muster point with area (m2)
Fire escape route
Xm Fire escape (single direction)
Fire escape (multiple direction)
Safe Route at least 1.8m away from building
Protected stairway
Protected lobby

Rev	Date	Prep	Check	Description
C03	13/10/2020	KM/	SD	01 Kitchen layout and fire strategy updated
C02	15/05/2020	KM/	SD	01 Hall escape routes updated 02 Internal dry riser positions shown 03 Occupancy numbers shown bigger for clarity 04 Fire signage omitted for clarity 05 Notes updated for clarity 06 Fire curtain replaced with FR doors
C01	29/01/2019	AT/	SD	01 Door FR amemded02 Folding Partition Wall FR amended03 Wall FR amended

Client
Royal Borough of Kensington and Chelsea

Project
Barlby New Schools

Drawing Title
Hall Fire Strategy

Suitability/Purpose of Issue
A - For Construction

Scale
1:150 @ A1

Drawing Number
project originator zone level type role number
35137 - 0100 - A1 - 00 - DR - A - 3136

Revision
C03

Appendix B – Correspondence with RBKC Building Control

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Paul Hanson
Royal Borough of Kensington and Chelsea
Town Hall
Hornton Street
London
W8 7NX

06 July 2018

Dear Paul,

Re: BARLBY SCHOOLS, LONDON – RESPONSE TO RBKC COMMENTS

Thank you for providing comments in regard to the Barlby Schools project in London. This is part of the consultation process with regards to the fire safety strategy Building Regulations approval for the development and this letter aims at addressing the comments raised by RBKC Building Control.

1. The School is described as a 'SEN' School in the fire strategy – The term is not one used in current mean of escape codes of practice. The meaning of the term should be clarified for the purpose of the fire strategy to ensure there is a clear understanding of the type of occupants and how this may affect means of escape.

   Note there is also the term 'SEND' (Children with special educational needs and disabilities), which includes specific 'Disabled users. Please confirm how this differs from 'SEN' in relation to this project.

HL: Based on discussions with Penoyre & Prasad, it is our understanding that the term 'SEN' School refers to special educational needs schools which is not specifically aimed at children with mobility impairments. It is acknowledged that children with mobility impairments may attend the school as well (to the same extent as any other school), however, it is considered that sufficient consideration has been given to this in the development of the fire strategy (e.g. with inclusion of an evacuation lift).

2. Based upon the definition requested in 1 above the fire strategy should discuss any challenges for evacuation and special requirements for this category of occupant. Staff managed evacuation should be discussed.

   It is recommended that consideration be given to the benefit of making all corridors feeding stairways fire resisting with FD 20S/30S doors to provide more evacuation time that may be needed for the staff managed evacuation of the occupants. See also item 8 Dead end corridors below.

   It has been noted that special needs have been identified in some cases in the fire strategy; the above should be regarded as an introductory section describing the general considerations for special needs which may differ from other schools.

HL: Special management considerations related to means of escape in the 'SEN' school will be expanded on in the Stage 4 fire strategy. However, it is not considered necessary to design all corridors as protected corridors since the overall fire strategy provides a holistic approach resulting in a high level of fire safety

within the building. The walls of the corridors are highly likely to have a degree of inherent fire resistance, however, designing all corridors as protected corridors will have major impacts on e.g. ventilation routes which is not considered feasible given the aforementioned high level of fire safety already proposed for the building.

Site layout and escape routes from final exits

3. The site plans at Ground or other final exit levels should be marked to show the path of escape from the final exits from the building to the assembly point (perhaps with a shaded colour).

HL: Noted. Fire strategy drawings will be produced and show the path of escape to the assembly points (the location of the assembly points are to be discussed and agreed with the operator of the school).

4. External routes adjacent to the building should be either marked as fire resisting or where the route is more than 1.8m away from the external enclosure (or more than 9 m below), the safe zone should be indicated.

HL: Noted. The 1.8m distance from the façade will be adhered to where escape is only possible in a single direction.

5. Consideration be given to the width of any external gates though which occupants need to reach the assembly point.

It is recommended that the client be consulted regarding the width needed for use other than fire safety.

HL: Agreed, this will be clarified in the Stage 4 report and will furthermore depend on distances from the gate to the building etc.

6. If security arrangements are included at any perimeter exit point, arrangements for opening the gates be considered.

HL: Noted and agreed, this should be part of the school operator's management plan to ensure that e.g. safeguarding procedures are included.

Occupancy

7. It is recommended the occupancy of each room or area should be noted on the plans. It should also be clearly shown which terraces are intended to be occupied with number of persons.

A generic reference could be made to classroom occupation on the plans.

HL: Noted, it is our understanding that the design occupancy of each room will be shown on the next issue of drawings.

Dead end corridors

8. There are sections of dead end corridor which should be fire resisting with at least FD20S doors as shown on the marked up plans with red shading and outlined in blue.

See also item 2 regarding fire resisting corridors.

HL: An additional two sections of corridor will be designed as protected corridors due to being dead-end corridors (i.e. east end of First and Second Floor within the primary school), refer to the figures below for visualisation.

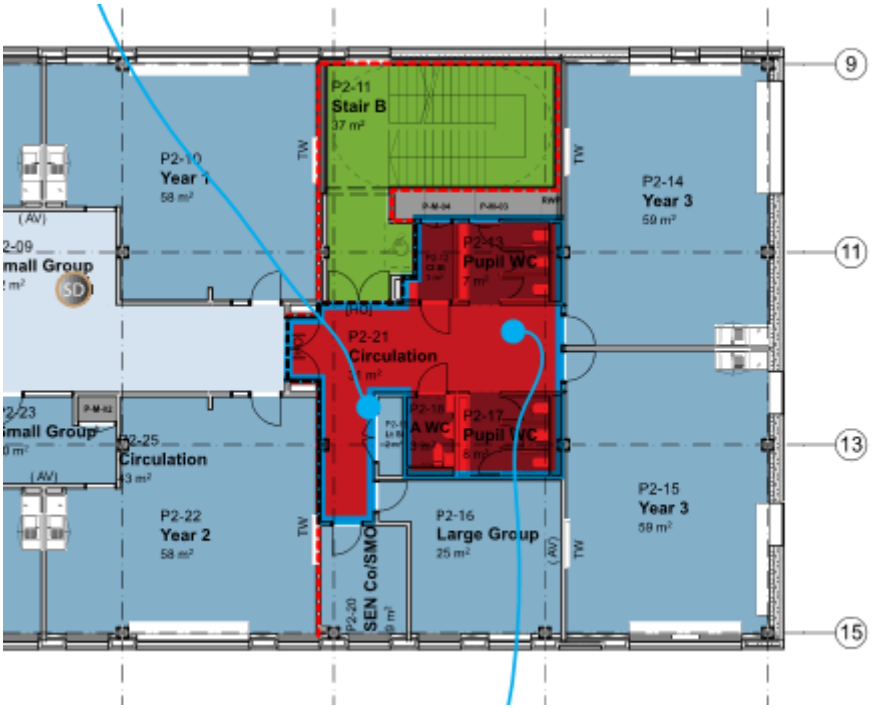

Figure 1. Dead-end corridor at First Floor in the primary school which will be provided with a minimum of 30 min fire resistance to walls and FD20S fire doors.

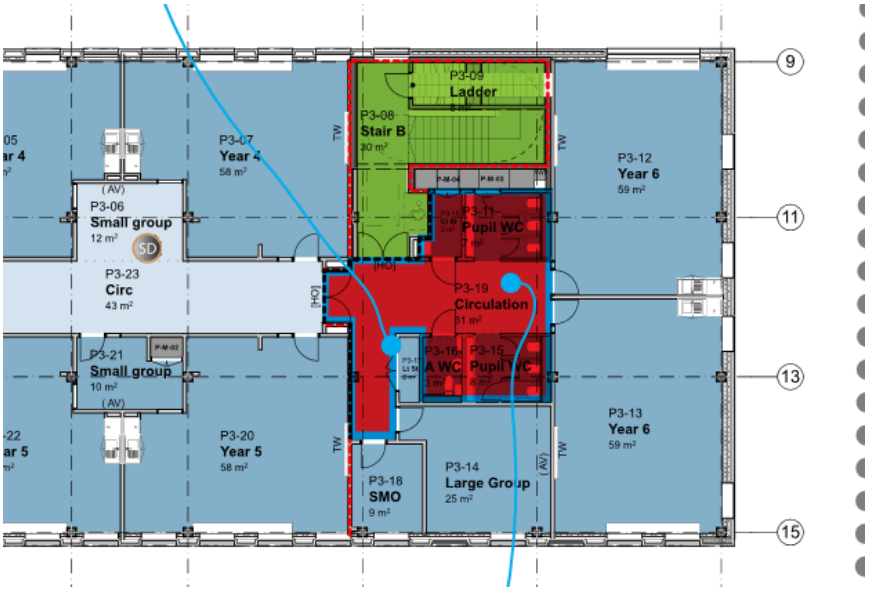

Figure 2. Dead-end corridor at Second Floor in the primary school which will be provided with a minimum of 30 min fire resistance to walls and FD20S fire doors.

However, there are a number of corridor sections highlighted on mark-ups from RBKC that does not constitute as dead-end corridors and therefore are not required to be protected corridors under the guidance of BS 9999: 2017. This is due to the fact that the dead-end distance is within 4.5m. This will be further clarified in the Stage 4 fire strategy report.

Riser shafts

9. Risers shafts are not shown to be enclosed with fire resisting construction on the plans (outlined in red and blue cloud).

HL: Requirements for risers are outlined in the fire strategy report (Section 4.2.4) and will be marked on the next set of compartmentation drawings.

Open special planning – reception area in protected route

10. The AOV ventilator above the reception area should be provided with low level inlet air provision to ensure the ceiling ventilator is effective.

HL: Noted and agreed, it is currently proposed to power open the main reception doors upon activation of the fire detection and alarm system in order to provide inlet air for the purpose of ensuring efficient smoke ventilation via the void. This will be further detailed in the Stage 4 fire strategy report.

Fastenings

11. The doors on escape routes should be fitted only with simple fastenings openable from the "escape side" without the use of "key" (including card or other similar item).

    The operation of the fastenings should be without having to manipulate more than one mechanism.

HL: Noted and agreed. Alternatively, doors could be accessed controlled during day to day operations as long as the doors automatically open upon activation of the fire alarm system.

12. The roof exits should be provided with suitable access fastenings from the outside for maintenance personnel.

HL: Noted and agreed.

Marked up plans

13. Comments have been made on the marked up plans, which should be addressed.

HL: Comments on the marked-up plans are addressed in this document.

Further details

14. Details in respect to the following should be submitted: -

a. The AOV ceiling ventilator serving the open special planning area, including its aerodynamic area (above Ground floor reception area). Also inlet air provision.

b. Escape lighting showing compliance with BS 5266 Part 1.

c. The proposed L1 fire warning system showing compliance with BS 5839 Part 1.

HL: The free aerodynamic area required for the void AOV is outlined in the fire strategy report. Further details of its operation to be provided by suitable party. Further details for escape lighting and fire detection and alarm system will be provided during next design stage by the suitable party.

15. Details should be submitted of any mechanical ventilation systems used.

BS 9999: 2017 gives detailed guidance including diagrams for fire protection measures to prevent such systems affecting the means of escape.

HL: Day to day mechanical ventilation system will be provided with suitable fire protection measures in accordance with the guidance of BS 9999: 2017. Further details to be provided by suitable party during next design stage.

16. Sliding doors – should be in accordance with 9999: 2017 paragraph 14.2 j.

HL: Noted and agreed.

Fire strategy report

17. Item 1.4 – See informatives at the end of this document regarding responsibilities regarding external areas, Regulation 38 plans etc.

HL: Noted.

18. Item 2.4.1 and 2.4.2 and 2.51 Exit widths – it is recommended a separate item be designated for exit widths and the distribution of exits be summarised in the form of table to aid clarity.

HL: Noted. This will be clarified in the Stage 4 fire strategy report.

19. Item 2.5.1 and 2.5.1.1 For completeness please indicate paragraph 18.2 of BS 9999 allows exit flow and travel distance reduction by 15% where automatic detection is used.

HL: Noted. This will be clarified in the Stage 4 fire strategy report.

20. Staff room at ground floor level travel distance. Item 2.5.1.1

The strategy relies upon the fire curtain not being deployed to provide an alternative escape route. This arrangement should be reviewed on the basis that the curtain has deployed.

HL: Noted. The design team is currently reviewing the staff room arrangements with the view of providing a secondary means of escape from this area. This will be detailed in the Stage 4 fire strategy report.

21. Assembly Hall/Dining hall/PE hall – item 2.5.1.2

The fire strategy suggests individually each hall could accommodate potentially 571 persons. However, each hall has one direct exit and one shared exit with a pass door between the halls. In this configuration the pass door set would be inward opening from the PE hall and therefore restricted to 60 persons.

If the Dining hall/PE hall are combined - two exits are available with a dead end in the Dining hall portion of the room. The reception area presents a potential risk to escape from the PE/Dining hall.
However, the active fire curtain is critical to separating the two routes. There is a concern that a heavy reliance is being placed on the device.

If the three halls are combined – there is an independent alternative exit available for the potential larger number of persons, which gives an acceptable distribution of exits.

It is recommended the hall configurations are reviewed: -

- Each of the layout configurations should be illustrated, with potential seating layouts.
- Dead ends identified (with and without seating) and travel distances.
- When halls are used individually - the number of persons considered including the use of the pass door between the PE and Dining hall.
- When Dining and PE halls combined - consideration given to whether the arrangement could be improved and less reliance placed upon the active fire curtain barrier. Consider separation of the reception area from the protected route, as previously discussed in meetings.

HL: The primary school PE hall is limited to 60 people when used separately due to the inwards opening doors. This will be clarified in the Stage 4 fire strategy report.

Fire curtain assemblies are acknowledged as an acceptable means of protecting escape routes within the guidance of BS 9999: 2017 (Clause 32.3) and as such it is considered that the proposal achieves the functional requirements of Building Regulations. Furthermore, the school will be highly managed and procedures should be put in place to ensure the correct function of the fire curtain (e.g. making sure that nothing is stored underneath the fire curtain).

Internal layout plans of the different hall configurations have been produced and these will be assessed and included in the Stage 4 fire strategy report.

22. Item 2.5.1.2 The merging flow concept needs clarifying – suggest explaining with diagrams and or table format may assist in explaining the strategy.

HL: Noted. This will be clarified in the Stage 4 fire strategy report.

23. Item 2.5.2.1 Travel distances – it is recommended the information be presented in a table to aid clearer understanding, and easier reference.

HL: Noted. This will be clarified in the Stage 4 fire strategy report.

24. Item 2.8.2 Exit signs – it is recommended an exit sign plan be provided with the provision for including additional signage to accommodate site configuration that may not be apparent on the plans.

HL: Noted.

25. Item 2.6.3 Escape from roofs – it is noted this is a single direction escape. Consideration should be given to:

a. Does the roof exit point lead directly to a protected stairway?
b. Fire resistance within 3m of the horizontal escape route?
c. Access fastenings?

HL: Roof exit points lead directly to a protected stairway and the arrangements of the horizontal escape route as well as fastenings will be confirmed and clarified in the Stage 4 fire strategy report.

Regulation 38

26. A new building requires the provision of fire safety information. It is recommended that such information be as simple as possible, enabling

a client to understand the escape routes and be aware of items such as fire doors, vent systems and other matters, which need to be maintained. Such information should be submitted in good time and prior to occupation of the building. This will also avoid delay in the issuing of any completion certificate by building control.

HL: Noted.

Further details

27. Details in respect to the following should be submitted: -

d. The ability of the fire appliance to park within 18m of the dry riser inlet should be indicated on the plans, including any necessary turning circles.

e. Confirmation regarding the need for any additional fire hydrants as discussed in item 6.2 of the fire strategy.

f. Dry risers.

g. Alternative power supplies to life safety systems including evacuation lifts.

HL: The items listed above will be further clarified in the Stage 4 fire strategy report. General requirements for dry risers and alternative power supplies to be included in the Stage 4 fire strategy report and details of the systems to be provided by MEP consultants.

Regulation 38 plans and end user

a. The final fire strategy plans submitted to Building Control as required by Regulation 38 are a record of the provisions and facilities related to means of escape and firefighting. These plans are intended as end user record drawings and also for use by the fire risk assessor under the Regulatory Reform (fire safety) Order, and will be used to compare how the building is occupied with the intended design.

The plans are also submitted by Building Control to the Fire Authority who are the controlling authority under the above Act.

It is recommended that the end user is consulted regarding the information contained on the fire strategy plans and that they agree the plans reflect their intended use.

Any changes in for example; configuration, number of people, designation of occupied areas, etc. that are different from the fire strategy plans will be matters the fire risk assessor is likely to raise as issues on their fire risk assessment report, and could be used as evidence of non-compliance by the Fire Authority.

HL: Noted.

Perimeter enclosures, school gates and external areas

b. Exit speed for evacuation is only considered for the purpose of the Building Regulations for fire safety from buildings. Consideration should be given to the width of openings or gates in the perimeter enclosure of the site for purposes other than the dispersal of occupants from a building in the event of a fire. Whether or not playground areas are designated assembly points, there may be a need to rapidly evacuate the external spaces for reason other than fire safety.

It is recommended the designer in consultation with the end user decide upon an appropriate flow rate and design perimeter exits accordingly.

Whilst control does not exist under the building regulations for external areas, (which are not buildings), the Regulatory Reform (fire safety) Order, may place a responsibility for such areas to be considered.

It is therefore recommended a fire risk assessor be appointed at an early stage to ensure such matters are considered at building design stage.

Measures intended to prevent unauthorised access can also hinder entry of the Fire and Rescue Service to rescue people trapped

by fire.

Potential conflicts should be identified and resolved at the design stage and not left to adhoc expedients after completion. The architectural liaison officers attached to most police forces are a valuable source of advice.

Some more detailed guidance on door security in buildings is given in section 4.5.3 of Building Bulletin 100.

HL: Noted.

Occupation

c. Note this is not now a matter for the Building Control Body.

Whilst there are no longer powers under the 'Building Regulations' to prevent occupation of new or existing buildings[1], it is recommended a fire risk assessor appointed by the 'Responsible person[2] is employed at an early stage during the building design. This will assist in allowing a smooth transition between the Building Regulations clearance and occupied building arrangements so that a satisfactory fire risk assessment can be achieved under as required for any occupied building covered by the Regulatory Reform (Fire Safety) Order 2005.

This also coincides with the need for the end user to be satisfied the Regulations 38 plans represent the intended use as discussed above.

HL: Noted.

Yours sincerely,

Johan Askman
Senior Fire Engineer
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johanaskman@hoarelea.com

Ref: LET-1903656A-02-JA-20180706-RBKC Response

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Paul Hanson
Royal Borough of Kensington and Chelsea
Town Hall
Hornton Street
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W8 7NX

08 July 2019

Dear Paul,

Re: BARLBY SCHOOLS, LONDON – RESPONSE TO RBKC COMMENTS

Thank you for providing the additional comments in relation to the proposed Barlby Schools in the Royal Borough of Kensington and Chelsea in London, for the following issued documents:

- Hoare Lea Fire Strategy Report Stage 4A (14/12/2018, Rev 02)
- Penoyre and Prasad Architects floor plans (Lower Ground Floor to Roof)

We understand that the proposed scheme has received a conditional approval, subject to the comments referenced herein. Please find below our responses addressing each of the comments raised in order to close these final items out. Once the responses presented herein are agreed, we will proceed to update the fire strategy report accordingly to a final version.

Main concerns

The following design flexibilities are proposed:-

Exit with reduction

A 15% reduction of exit and stair widths based upon and L1 fire warning system (locating smoke detection in rooms) enhanced from an L3 smoke detection in protected escape routes. BS 9999 recommends L3 in Primary and Special needs schools.

Travel distance increase

Similarly, a 15% increase in escapes travel distances is proposed based upon the use of an L1 smoke detection system.

*In both cases RBKC's view is that the value of the enhanced smoke detection system has NOT been **clearly demonstrated** (as required by BS 9999), that in respect of this case (Primary and Special Education Needs School) exit widths could be reduced or travel distances increased.*

HL: It is considered that the provision of detectors in all areas is a benefit compared to only providing detection in the escape routes and that this would enable earlier notification of a potential fire. However, the concerns regarding whether the benefit is sufficient to justify the proposed design flexibilities are acknowledged and especially since the proposed fire detection and alarm system incorporates an

investigation time. Subsequently, a review has been undertaken to determine whether the proposed design achieves the recommendations of guidance without the applied design flexibilities, and if not, where further consideration and justifications are required.

This review has revealed that the proposed strategy achieves the recommendations of guidance without the 15% design flexibility in all areas except the ones listed below, where additional justifications have been provided.

Vertical means of escape for the primary school

The vertical means of escape capacity in the primary school was determined to be 529 occupants with the 15% allowance in stair width. Without this allowance taken into account, the maximum vertical capacity is limited to 450 occupants. The strategy is based on the conservative assumption of a maximum occupancy on First and Second Floor of 490 occupants, however, in discussions with the architects, this occupancy is highly unlikely as it is based on the following scenario:

The maximum occupancy would be if all classes plus supporting staff are on first and second floors (with e.g. nursery in the second floor library and 2 Reception classes on the main roof terrace). Allowing for 3 members of staff for each of the 15 classes, this would mean 420 students + 24 nursery children + 45 staff = 489 occupants in total.

However, this scenario with 60 using the roof terrace but no users of the external ground floor play areas seems unlikely. If it is assumed that 1 Reception class is in the Library, 1 Reception and 1 Nursery class at external play at ground level or the MUGA, this would mean a maximum occupancy of 429 on First and Second Floor.

We will develop this rationale further in an updated version of the fire strategy report where the potential scenarios are assessed in more detail. If necessary, this may result in restrictions on the overall total maximum occupancy on the First and Second Floor.

Maximum occupancy of the combined halls

The maximum occupancy of the combined primary school halls was determined to be 571 occupants with the 15% allowance in exit width. Without this allowance taken into account, the maximum occupancy is limited to 487 occupants (compared to the maximum design occupancy of 520 occupants).

However, as the primary school dining hall has a clear ceiling height of 5.4m, BS 9999 allows for a 15% reduction of exit widths as the higher ceiling acts as a smoke reservoir, thereby allowing more time for occupants to escape. It is acknowledged that the smaller primary school PE hall is only provided with a 2.7m clear ceiling height, however, it is considered reasonable to account for the additional volume of the larger dining hall when these halls are combined as even if a fire originated in the PE hall, the smoke produced will spill into the larger volume of the dining hall.

Based on the above, it is considered reasonable to allow for 15% reduction of exit widths due to the ceiling height which results in the maximum occupancy of the combined halls being retained at 571 occupants.

Travel distances

The current maximum travel distances are outlined in the table below which are inclusive of a 15% allowance:

Risk Profile	Actual Travel Distance (Known Internal Layout)	Direct Travel Distance (Unknown Internal Layout)
B2	23m single direction 57.5m alternative directions	14.95m single direction 37.95m alternative directions

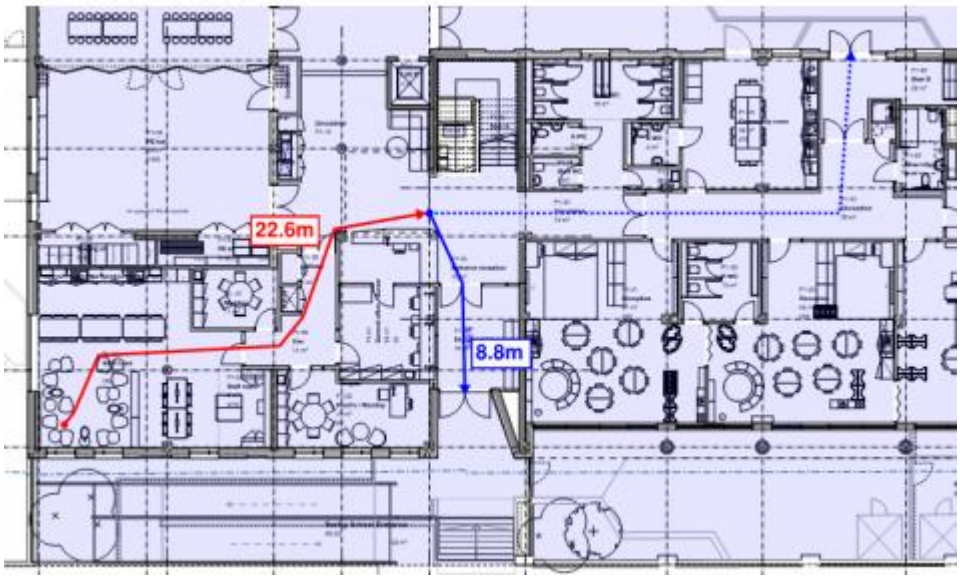
The maximum travel distances without the 15% allowance taken into account are outlined below:

Risk Profile	Actual Travel Distance (Known Internal Layout)	Direct Travel Distance (Unknown Internal Layout)
B2	20m single direction 50m alternative directions	13m single direction 33m alternative directions

The travel distances outlined in the second table (i.e. without the 15% allowance) are achieved in all areas except on two occasions as per below.

Ground Floor staff room

The current travel distance to a point of choice from the staff room located at ground floor is currently 22.6m in a single direction, please refer to the figure below.



As the layout is known in this area, the maximum single direction travel distance is limited to 20m (without the 15% allowance). This recommended maximum is therefore currently exceeded by 2.6m. However, the current arrangements are considered acceptable on the basis that the building will be provided with a life safety sprinkler system and the area in question is limited to staff members only who will be familiar with the building and therefore comparable to an office type of occupancy characteristic where the maximum travel distance in a single direction would be 26m (for a typical office accommodation provided with sprinkler protection).

SEN school PE hall

The current travel distance to a point of choice from the SEN school PE Hall located at ground floor is currently 22.0m in a single direction, please refer to the figure below.

The travel distance in the PE hall is assessed on the basis of actual travel distance as only limited loose furniture and sports equipment is expected in this space. This means that without the 15% allowance for enhanced detection and alarm system, the current travel distance is 2.0m longer than the maximum recommended in guidance.

However, as the clear ceiling height in the SEN school PE hall is 5.4m, BS 9999 allows for 15% longer travel distances from this area as the higher ceiling acts as a smoke reservoir, thereby allowing more time for occupants to escape. This would mean that the maximum recommended travel distance of 23m is retained and the current travel distance from the PE hall considered acceptable as it is within this limit.

The rationale presented above in regards to the travel distances will be reflected and expanded upon in an updated version of the fire strategy report.

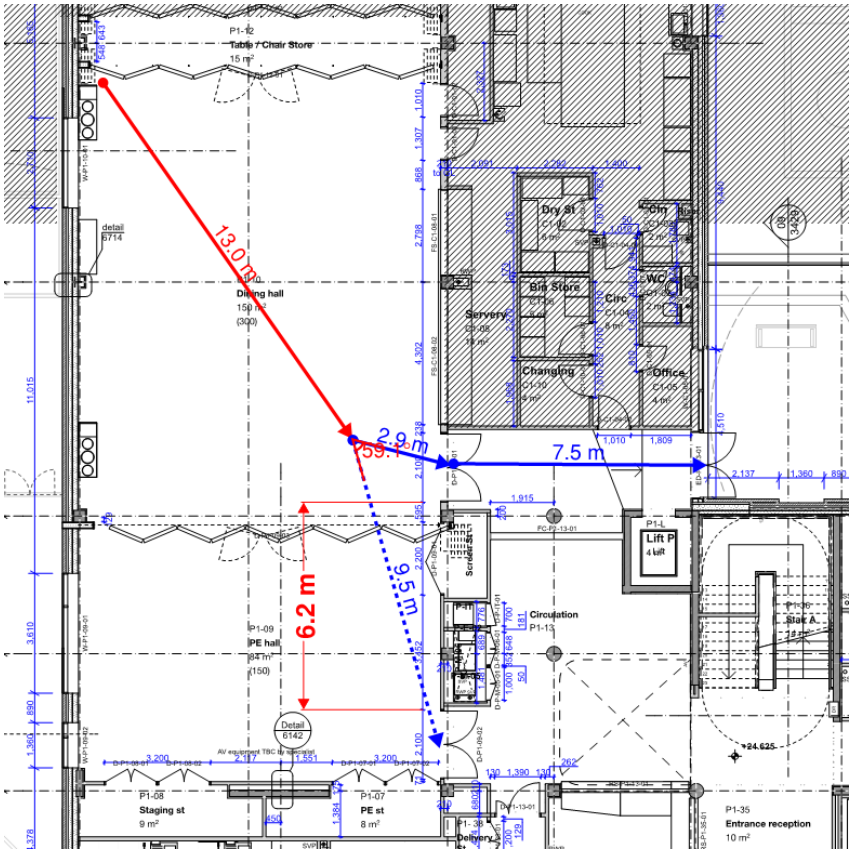
Exit configuration from Muti-use hall

A narrow angle between the two exits is proposed to a multi-use assembly and Dining hall.

RBKC's view is that the angle of exits is not in the spirit of BS 9999's guidance in this area and RBKC have suggested providing an alternative exit which appears to be achievable.

HL: The comment is noted, however, it is our considered opinion that the current arrangements of the halls achieve the recommendations of guidance. As shown in the figure below, once occupants travel the

maximum single direction travel distance of 13m, they will reach a point of choice where the alternative routes of travel are separated from each other by an angle of 59.1 degrees (compared to the minimum recommended 45 degrees). The two different exits from the halls are located 6.2m apart which is deemed sufficient to consider them two distinctly different exits.



The above is based on the use of the combined halls (i.e. without the sliding partition). If the halls are separated, the single direction travel distance would be reduced due to the location of the sliding partition doors.

It is acknowledged that the overall travel distance would be increased in the scenario of rows of seating being used in the halls, however, this would also create a more distinct choice of direction to the different exits.

As noted previously, the clear ceiling height in the primary school dining hall is 5.4m and the additional volume in this space would act as a smoke reservoir. Furthermore, the area is provided with a L1 automatic smoke detection and alarm system as well as sprinkler protection.

Based on the above, it is considered that the current arrangements achieve the functional requirements of the Building Regulations 2010.

Furthermore, it is recommended that the proposed seating layouts of the halls are designed based on the recommendations within Appendix D of BS 9999 (specifically clause D.3).

The proposal of including an alternative means of escape route via the SEN PE hall should be avoided as to do so would result in the dependency on primary school occupants escaping through SEN school premises. It is our understanding that the preference is for the different schools to be able to operate as independently as possible and the inclusion of the proposed alternative escape route would require a significant change in the overall evacuation strategy and would therefore potentially affect the proposed operation of the schools.

Observations to client

B1 Means of escape

General

Use – SEN definition

1. The evacuation strategy for the Schools management should be more defined in this area particularly with respect to the 'SEN' School to enable the potential school's management to understand at an early stage the need which to be addressed including the management of staff to meet the needs of a potential evacuation.

   The fire strategy suggests this is a matter for the school's management in item 2 (last paragraph).

   '... it is recommended that special management considerations should be made for the SEN school premises (e.g. in terms of having sufficient numbers of trained staff present at all times who are aware of the features of the specific fire alarm system (see below) and evacuation procedures, including developing PEEPs as required).'

   It is noted that the School is not defined as a 'SEND' School. It is important the end user fully understand the difference between a SEN and SEND School in this respect in relation to the implications of potential evacuations.

   Quote from Fire Strategy item 2.2.

   'This fire safety strategy has been developed on the basis that the SEN school will be focused on children with extra educational and learning needs and does not specifically focus on children with physical mobility impairments.'

HL: Noted. The fire strategy report reflects the information that we have received in terms of the intended use of the SEN school. The client should consider this part of the strategy and advise whether any more detailed information is available.

Fire strategy plans

Stair and horizontal exit 1 width reduction

2. In respect of the proposed method of determining the exit widths for Stairways and horizontal routes:-

A reduction in stair width is proposed (from 4.1mm to 3.5mm per person) based upon a 15% reduction of minimum exit width.

18.2 of BS 9999: 2017 staes **a clear benefit** resulting from the addition of an **automatic fire detection** and fire alarm system **should be demonstrated** and that such a strategy **is appropriate to the circumstances**.

The following comments are made regarding the proposal for reduced exit widths:-

a. The fire strategy has not ***clearly demonstrated*** how having detectors located in the rooms opening into protected routes as opposed to detection in the protected routes themselves would result in a lesser stair width being necessary.

b. It is not clear that such a strategy is ***appropriate to the circumstances***.

c. Particular attention is drawn to the occupancy being a Primary school and also special needs school where the evacuation may not be entirely predictable. This is likely to have an effect upon evacuation speed and thus the width of exits. Therefore, there may not be a clear benefit from the use of such a system that can be demonstrated in resulting in a reduced exit width.

d. Consideration needs also to be given to investigation periods which impact upon any perceived benefit if early warning triggering an earlier evacuation.

HL: Please refer to the response to the first comment in this document where this item is discussed in detail.

e. The fire strategy currently places a reliability on the end user (2.2) to develop an appropriate evacuation strategy and in this case the reduction of exit width is significant, therefore any reduction of exit widths would impact upon their responsibility and should have been developed in consultation with the end user.

e.g. 2.2 from Fire Strategy

'... it is recommended that special management considerations should be made for the SEN school premises (e.g. in terms of having sufficient numbers of trained staff present at all times who are aware of the features of the specific fire alarm system (see below) and evacuation procedures, including developing PEEPs as required).'

f. Any such analysis should be accompanied by a supporting statement from both the Architect and the Client (end user RBKC Schools department) which explains the reasons for adopting such a strategy for reduction of exit widths and their confidence in being able to evacuate the school with such reduced exit widths.

Excerpt from BS 9999: 2017:-

15.2 States
*'As a minimum, an **L3 fire detection and fire alarm system** should be installed where a phased, staged or zoned evacuation is proposed, and for **primary or special needs schools**.*

And in 18.2

***'Where a clear benefit** resulting from the addition of an automatic fire detection and fire alarm system **is demonstrated and** is **appropriate to the circumstances**,*

*a 15% increase in allowable travel distance and a 15% reduction in door width, corridor width and stair width may be applied, provided that the maximum acceptable variations given in **18.4** are not exceeded.'*

In relation to the proposed reduced exit with it is recommended that due to uncertainties upon the value of smoke detection in the circumstance of a Primary and Special needs schools the L1 smoke detection system be regarded as an added factor of safety rather than a means to reduce exit widths.

HL: HL: Please refer to the response to the first comment in this document where this item is discussed in detail.

Stair and horizontal exit width 2 Generally

3. Irrespective of the above the occupant capacity and resultant horizontal and vertical escape stair width should be shown more clearly, indicating:-
   a. Occupant capacity per room – consolidated to a floor level occupancy.
   b. The calculation of the stair widths shown in full.
   c. Merging flow calculations at final exits shown in full.

   It should be possible to track the room occupancies – consolidated into storey exit widths, and then presented as necessary stairway widths, with justified stairway widths calculated based upon the maximum estimated occupancy.

HL: This will be expanded on and clarified in an updated version of the fire strategy report.

Travel distance increase

4. Similarly, a 15% increase in escapes travel distances is proposed based upon the use of an L1 smoke detection system.

   In both cases RBKC's view is that the value of the enhanced smoke detection system has not been clearly demonstrated as required by BS 9999, in the case of a Primary and Special Education needs schools to show that exit widths could be reduced or travel distances increased.

   Similar concerns described in item 2 a-f apply. Due to uncertainties it is recommended the L1 smoke detection system be regarded as an added factor of safety rather than a means to generically increase travel distances.

HL: HL: Please refer to the response to the first comment in this document where this item is discussed in detail.

Assembly Hall/Dining hall/PE hall

5. The proposal includes three configurations for the Mufti-use hall located at Ground floor level.

   a. Dining hall accommodation 250 persons (with Upper PE hall).

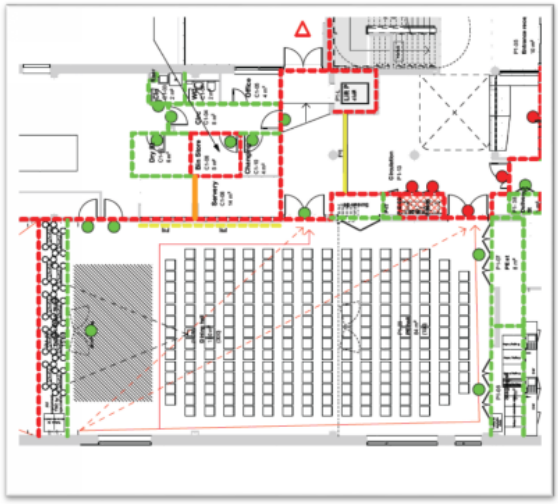
   b. Small assembly hall accommodation 520 persons (with Upper and lower PE halls).

   c. Full assembly hall accommodating 1085 persons.

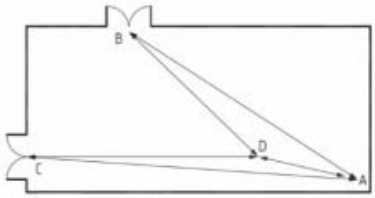
   Configurations 'a', and 'b', rely upon a narrow angle between exits and outside of the room, a 'fire curtain' to separate the two escape routes therefrom.

   The proposed exits from layouts 'a' and 'b' are not regarded as suitable for the following reasons:-

   i. The routes rely upon two exits which are located with a narrow angle of exit from the furthest point, less than 45° apart, as shown on the fire strategy drawings (shown below).



s) Alternative escape available from origin



Alternative routes are not available from A because angle BAC is less than 45°. However, after reaching point D the angle BDC is 45° or more and alternative escape is available. AD should be no more than the maximum distance for travel given for escape in a single direction and AB or AC whichever is the less) should be no more than the maximum distance for travel given for alternative routes.

Above proposal for Multi use hall layout (top) and Excerpt from Figure 7 in BS 9999:2017 (below)

ii. The layout is not shown to comply with Figure 7 in BS 9999 and it is RBKC's view - the configuration shown in figure 7 is intended to apply to mainly open plan layouts.

iii. The proposed increase of travel distance discussed earlier (item 4) within the room based on smoke detection adds another level of uncertainty.

iv. The seated layout and Dining hall configurations would not allow a rapid dispersal towards the two converging exits.

v. The high number of occupants (250 and 520) could result in a relatively slow evacuation in a seated layout and in the case of the Dining hall layout where tables and chairs need to be negotiated for occupant exit.

vi. The proposed reduction of exit width discussed earlier (item 2) also has an impact on the rapid dispersal of occupants from the room adding another level of uncertainly.

vii. The fire strategy suggests the evacuation strategy be devised by the end user school – which places a burden of responsibility for managing the converging exit situation upon the end user.

'... it is recommended that special management considerations should be made for the SEN school premises (e.g. in terms of having sufficient numbers of trained staff present at all times who are aware of the features of the specific fire alarm system (see below) and evacuation procedures, including developing PEEPs as required).'

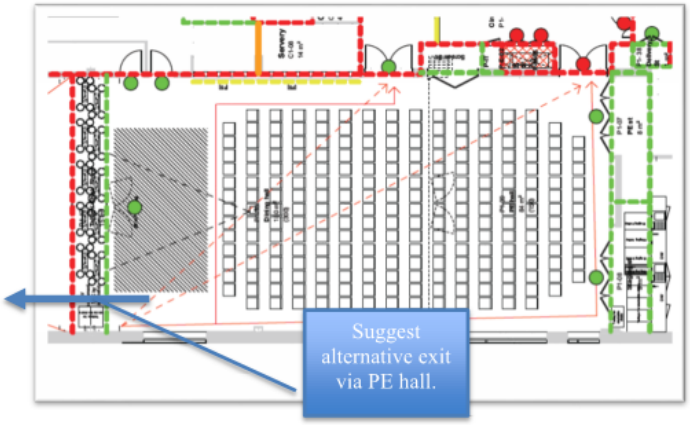
viii. The converging exits outside the Multi use Assembly hall are separated by a 'fire curtain'. Whilst 'Active fire curtain barriers' have reached a level of development where their use is accepted in British standards (BS 9999, BS 9991 and BS 8524) such products are still regarded as innovative and as indicated in the Joint Borough Active fire curtain Guide their use needs to be carefully considered in the particular circumstances of the case (item 2.2 of the Joint Borough Active Fire Curtains Barrier Guide).

In this instance the use of an Active fire curtain barriers adds a secondary level of uncertainty in addition to the narrowness of exit angle from the room.

ix. Evacuation strategy for wheelchair users is likely to affect total evacuation time, and similarly may create difficulties with the narrowly converging routes.

x. Given that the building is a new school it would be more beneficial for the design to embrace a more robust level of fire safety easily managed by the occupants.

xi. *It is recommended for all configurations of the room an alternative exit be provided at the back of the room, to allow more rapid dispersal of persons, particularly as this will allow less burden of reasonability being placed upon the school.*



xii. *Whilst the room does not contain fixed seating it is It also recommend consideration be given to the layout of sealing in rows, as similar considerations apply as to fixed seating regarding seat positioning and row widths etc.*

HL: Please refer to the commentary on pages 5-6 for the overall rationale related to the hall configurations.

Site layout and escape routes from final exits

6. The basis for the choice of distance for the assembly points from the buildings should be discussed in the fire strategy.

   It is noted that current guidance is vague in this respect.

HL: This will be expanded upon in an updated version of the fire strategy report.

7. The safe zone for fire resistance of external routes adjacent to the building should be shown on all plans (presently this is only shown on the site plan).

   e.g. where marked as fire resisting or where the route is more than 1.8m away from the external enclosure (or more than 9 m below), the safe zone should be indicated on all plans).

   It is recommended that the client be consulted regarding the use of assembly points for emergencies other than fire safety, and the width of gates for this purpose.

   External sports fields/playground areas are not covered by the building regulations for the purpose of means of escape and it is recommended consideration regarding evacuation plans for these area be given and responsibilities which exist under the Regulatory Reform (Fire Safety) Order 2005.

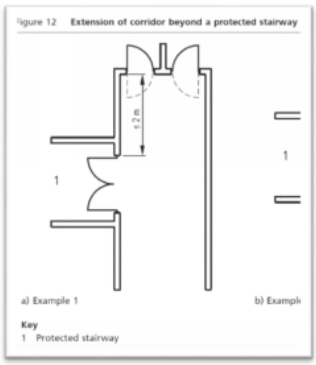
HL: Noted and for others to action.

Dead end corridors

8. There are sections of dead end corridor exceeding 2m at Ground floor and Lower Ground floor levels in both buildings which should be fire resisting.

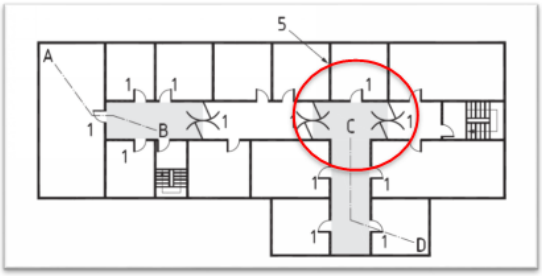
   The fire strategy and fire strategy plans appear to suggest that only corridors exceeding 4.5m need be fire resisting and/or that the length of the corridor can be measured using a diverging exit principle.

   However, it is RBKC Building control's view that the length of an unprotected dead end corridor should be a maximum of 2m measured upto the storey exit door.



   a. Therefore, for the proposed project in the case of the dead end corridors at Ground level of both buildings such corridors should be fire resisting. See marked up plans for suggestions.

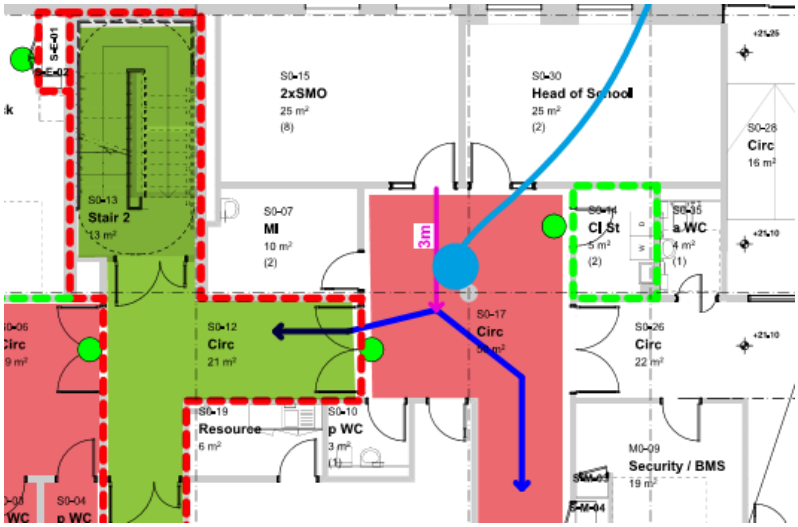
   b. Where dead end corridor exceeds 4.5m in addition to being fire resisting smoke stop screen are needed as shown in Figure 10 in BS 9999: 2017.



HL: The guidance recommendations of dead-end corridors exceeding 2m are acknowledged and the fire strategy report will be amended to reflect this. However, it is not considered necessary or reasonable to design the following corridors as protected corridors based on the rationale presented below.

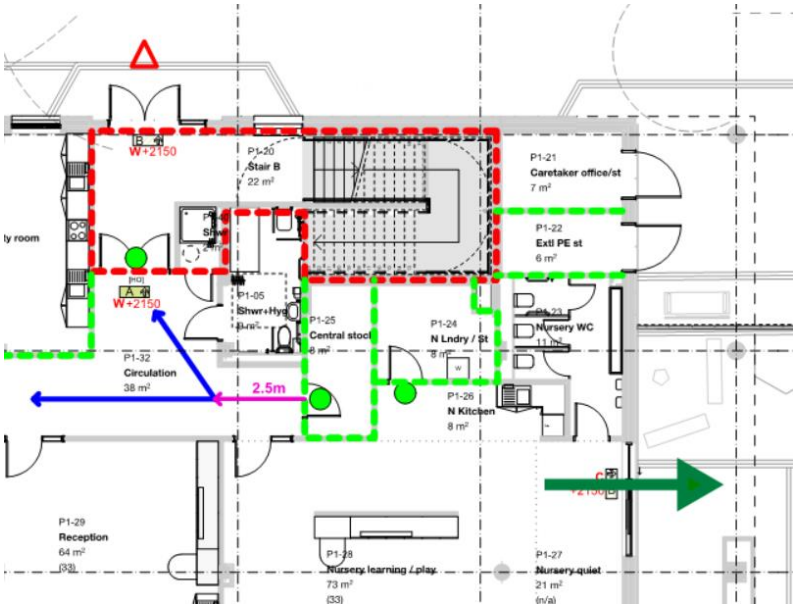
SEN school lower ground floor

The maximum distance in the recessed part of the corridor is approximately 3m to the door leading to the protected stair discharge route. The 1m addition is considered reasonable based on the fact that there are only two small offices opening into this part of the recessed corridor. The limited number of occupants within these rooms (i.e. members of staff) are expected to be familiar with the general arrangements of the school, including the evacuation procedures. Furthermore, the school is provided with a L1 fire detection and alarm system in order to give the earliest possible warning of fire and also a commercial sprinkler system.



Primary school ground floor

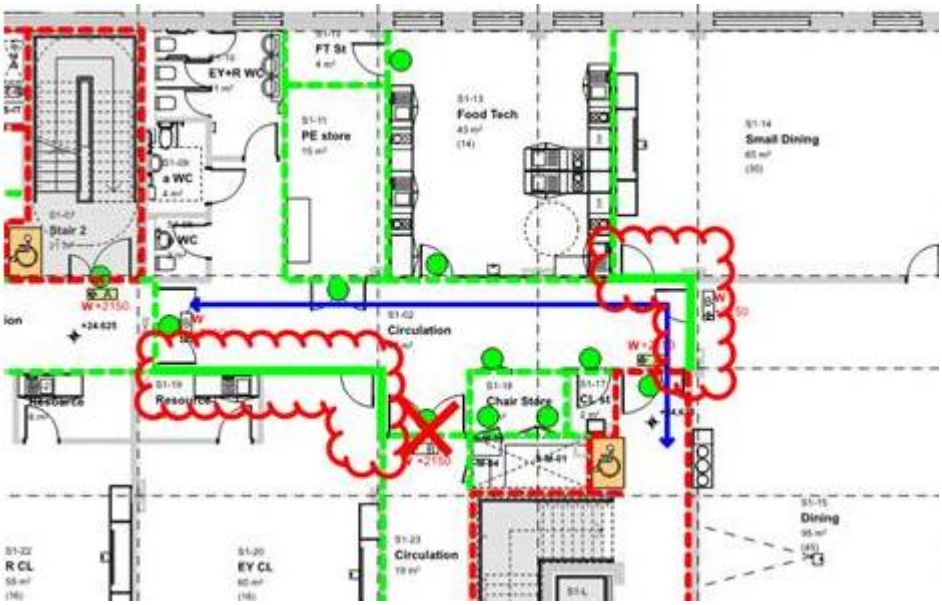
The maximum distance in the dead-end part of the corridor is approximately 3.5m to the door leading to the protected stair discharge route. The 1.5m addition is considered reasonable based on the fact that the nursery is provided with an alternative independent exit directly to outside. This means that the only room opening into the limited dead-end part of the corridor is a store room which is assumed to be accessed infrequently and solely on a transient basis. Refer to the figure below for a visualisation of the current arrangement.



SEN school ground floor – amendments needed

It is acknowledged that although the corridor leading from the SEN school PE hall leads to a point of choice where occupants can travel in alternative directions, there is a risk that the corridor can become smoke logged at the point of choice thereby potentially jeopardising safe means of escape from the PE hall.

Due to this, it is proposed to make the entire circulation space in this area a protected corridor (i.e. 30 minutes fire resisting construction and FD30S fire doors). This would also mean that the door between the two sections of corridor (i.e. the section leading from the PE hall and the section that serves the other rooms) is superfluous and can be omitted, refer to the figure below for the proposed solution where the additional fire resisting construction are highlighted with red clouds and the superfluous door marked with a red cross.

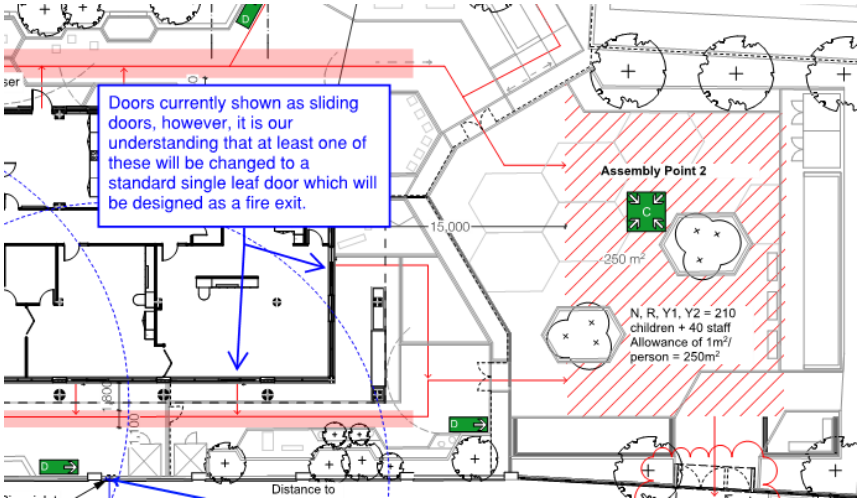


The proposed arrangements outlined above will be reflected in an updated version of the fire strategy report.

Nursery

9. Further information should be submitted regarding the independent exits from the Nursery. The plans appear to indicate doors. Are such doors designated as exits? What is the designated route from the external area outside the Nursery?

HL: The nursery will be provided with an independent designated exit directly to outside which will lead to an assembly area as shown in the figure below.



Open special planning – reception area in protected route

10. The AOV ventilator above the reception area should be provided with low level inlet air provision to ensure the ceiling ventilator is effective.

HL: Noted and agreed, the current strategy is for inlet air to be provided via the main entrance doors which are designed to automatically open upon activation of the fire detection and alarm system.

Fastenings

11. The doors on escape routes should be fitted only with simple fastenings openable from the "escape side" without the use of "key" (including card or other similar item).

The operation of the fastenings should be without having to manipulate more than one mechanism.

HL: Noted and agreed. Any door provided with access control will be designed to 'fail open' on activation of the fire detection and alarm system or power failure.

12. The roof exits should be provided with suitable access fastenings from the outside for maintenance personnel.

HL: Noted and agreed.

Marked up plans

13. Comments have been made on the marked up plans, which should be addressed.

HL: Noted, additional comments made on the floor plans are taken into account within this document.

Further details

14. Details in respect to the following should be submitted: -

a. The AOV ceiling ventilator serving the open spacial planning area, including its aerodynamic area (above Ground floor reception area). Also inlet air provision.

b. Escape lighting showing compliance with BS 5266 Part 1.

c. The proposed L1 fire warning system showing compliance with BS 5839 Part 1.

d. The water suppression system.

HL: Noted and information to be provided by the appropriate party.

15. Details should be submitted of any mechanical ventilation systems used.

BS 9999: 2017 gives detailed guidance including diagrams for fire protection measures to prevent such systems affecting the means of escape.

HL: No mechanical smoke ventilation system used in this development. Details of any other mechanical ventilation system (if applicable) to be provided by the appropriate party.

16. Sliding doors – should be in accordance with 9999: 2017 paragraph 14.2 j.

HL: Noted and agreed.

Regulation 38 Fire Safety information

17. A new building requires the provision of fire safety information. It is recommended that such information be as simple as possible, enabling a client to understand the escape routes and be aware of items such as fire doors, vent systems and other matters, which need to be maintained. Such information should be submitted in good time and prior to occupation of the building. This will also avoid delay in the issuing of any completion certificate by building control.

HL: Noted.

Comments upon Fire strategy report

1. Executive Summary – The term 'SEN' should be defined before the first use.

HL: Noted.

2. Item 2.2 – The staff responsibilities regarding the evacuation of 'SEN' occupants should, be described in more detail.

HL: Noted, the responsibilities will be expanded on from a strategic point of view. However, these will need to be developed in greater detail as part of the Fire Risk Assessment prior to occupation.

3. Item 2.5.1, 2.5.2 – Exit with reductions

   See comments in item 2 of this document.

HL: Please refer to the response to the first comments in this document.

4. Item 2.5.1.1 Travel distances.

   Terminology. Traditionally in other codes of practice the terms ***Direct distance*** and ***travel distance*** are used. BS 9999 appears to have introduced the following terminology: -

   Direct distance = **Direct travel (BS 9999 term)**

   Travel distance = **Actual travel (BS 9999 term)**

   To avoid confusion when using BS 9999 the terms **Actual travel and Direct travel** should be used. Presently it is difficult to understand which distances are referred to as the strategy use a mixture of the traditional terms and BS 9999 terms. e.g. Table 4 in the strategy headed 'travel distance' appears to be referring to 'Actual travel?' and not Direct travel distance?

   A table for 'Direct travel' could also be included, as this is used in some areas.

HL: This aspect of the fire strategy report will be clarified in an updated version.

5. Item 2.5.1.2 Escape from Multi-use Hall.

   See comments in item 5 of this document.

HL: Please refer to the response to item 5 in the previous section of this document.

6. Item 2.5.1.2 The Stairway merging flow calculation.

   The 'merging flow' calculation discussed in this section should be included as part of the submission.

HL: Noted, the calculation procedure for the merging flow will be included in an updated version of the fire strategy report.

7. Item 2.5.1.3 Void and fire curtain

   A fire curtain would not be a suitable product for the application on a protected escape route, however an 'active fire curtain barrier' to BS 8524 is more suitable to this application. However, their use remains particular to the circumstances of the case.

In respect of the two proposed applications:-

a. **To stairway at Ground floor level.**
This would be suitable provided the product is an 'active fire curtain barrier' with third party certification of compliance to BS 8524 (An 'accredited curtain).

BS 9999 and BS 8524 do not provide a prescriptive solution for the use of Active fire curtain barriers to Protected stairways, however the provision of a water suppression system could be put forward to provide protection against heat, in lieu of a heat radiation calculation as described in Annex B of BS 8524.

For further information, see attached Joint Borough Active Fire Curtains Guide.

b. **Muti-use hall exit division**
The use of the barrier with respect to the multi-use hall is discussed in item 4 in the main section of these observations.

HL: The intended product is an active fire curtain barrier tested in accordance with BS 8524 Parts 1 and 2 as clarified in Section 4.2.3 in the fire strategy report. However, the wording will be amended in an updated version of the report to avoid any confusion. As per Section 32.3 of BS 9999, the active fire curtain barriers are not required to achieve the fire insulation performance criteria on the basis that they do not exceed 5m in length.

8. Item 2.5.1.4 Temporary escape routes during building works.

This is a matter for the Regulatory Reform (Fire Safety) Order and it is recommended the arrangement be discussed with the Schools fire risk assessor under this Legislation.

HL: Noted.

9. Item 2.5.2 and 2.5.2.2 Dead end corridors less than 4.5m

As discussed in the main part of these observations, a dead end corridor up to 4.5m only allows the omission of the cross corridor doors separating alternative exits at the end of the corridors. Such corridor still need to protected corridors. We feel you intended to mean 2m permits a dead end corridor to be unprotected when measured as shown in figures 11 and 12 of BS 9999 not 4.5m.

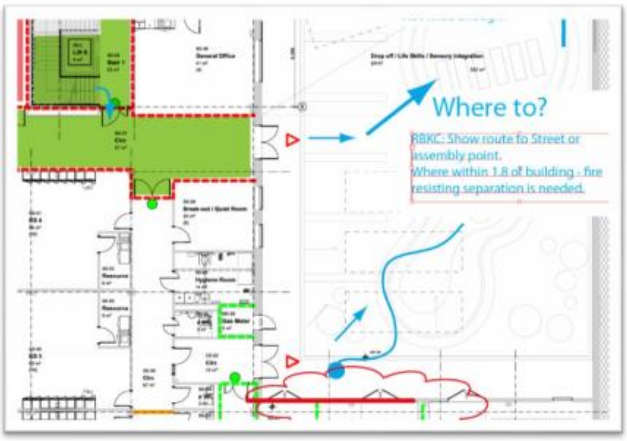
See Appendix A.

HL: Please refer to the response to comment 8 of the previous section in this document.

10. Item 2.5.2.3 External escape routes.

The principle of fire resisting separation from the building to external rotes should be shown on all plans, showing the fire strategy of the Ground and Lower ground final exits.

One of the exit route from the stairways serving the SEN school is not shown to have an assembly point.



HL: It is proposed that building occupants are not guided to using this exit and are guided/assisted to Assembly Point 1/SEN external area to gather and then escape to Exmoor St if necessary. However, in case any users are already in the drop off area, and should as such not re-enter the building, there is a pedestrian 1050mm door in the first automatic gate to access the 'airlock' and from there through a 1050mm gate directly into to the primary school playground assembly area; or through the 1050mm pedestrian access door in the second automatic gate to Barlby Road.

11. Item 2.6.1 2.6.2 Vertical means of escape width of stairs.
See comments in item 2 and 3 of this document.

HL: Noted and addressed previously in this document.

12. Item 2.8.2 Exit signs – it is recommended an exit sign plan be provided with the provision for including additional signage to accommodate site configuration that may not be apparent on the plans.

HL: Noted and for others to action as it is not within the fire engineering scope of works.

13. Item 2.6.3 Escape from roofs – it is noted this is a single direction escape. Consideration should be given to:

- **a.** Fire resistance within 3m of the horizontal escape route.
- **b.** Access fastenings.
- **c.** Lighting.
- **d.** Guarding.
- **e.** The roof of the SEN building appears to contain accessible plant, although escape routes are not shown on the drawings (see marked up plans).

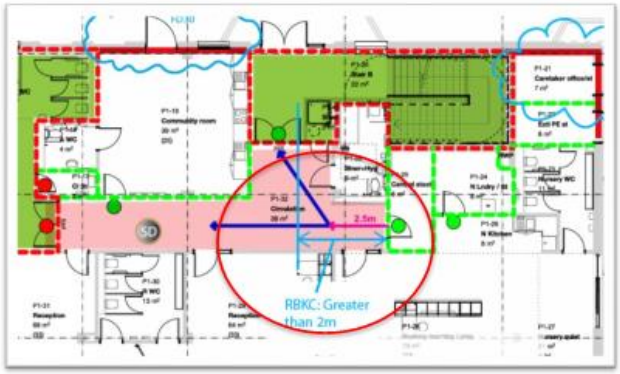
HL: Noted, escape routes on the SEN building roof visualised on the primary school roof plan (i.e. overall roof plan).

Appendix A
Interpretation of maximum distance for non-protected dead end corridors and cross corridor doors

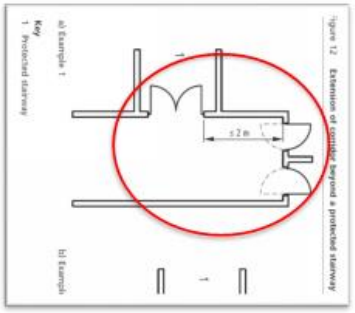
1. **Dead end corridors exceeding 2m**

Proposal shown below.

Dead end exceeds 2m but not proposed to be fire resisting.



However, BS 9999 Figure 12 (below) suggests corridor should, be fire resisting.



Above dead end corridor is longer than 2m more therefore should be fire resisting unless alternative escape provided from all rooms corridor serves as dead end.

The length of the corridor is measured to the edge of the storey exit door, but not to a point of diverging exits.

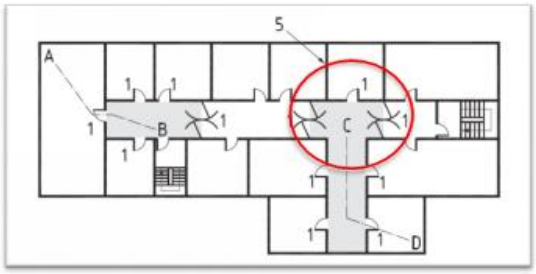
HL: Please refer to the responses in the main document (comment 8).

2. **Dead end corridors – cross corridor doors at end of dead end corridor where corridor exceeds 4.5m**

Proposal shown below.

Dead end exceeds 4.5m but no cross corridor doors provided to divide exits.

However, BS 9999 Figure 11 (below) suggests cross corridor doors provided to divide exits.



Above dead end corridor exceeds 4.5m therefore cross corridor screens should be provided OR entire corridor be fire resisting (to avoid too many doors). See also RBKC marked up plans S2 (coloured plans above are excerpts therefrom).

HL: Please refer to the responses in the main document (comment 8).

Reference used for above - *excerpts from BS 9999: 2017*

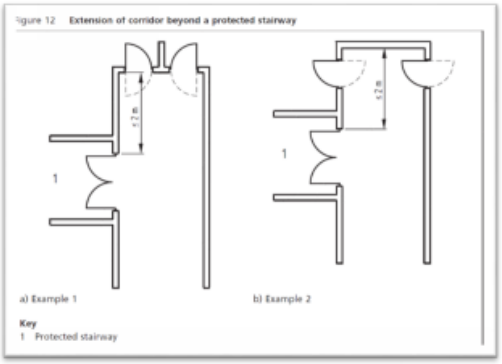
16.3.11.1 Protected corridors

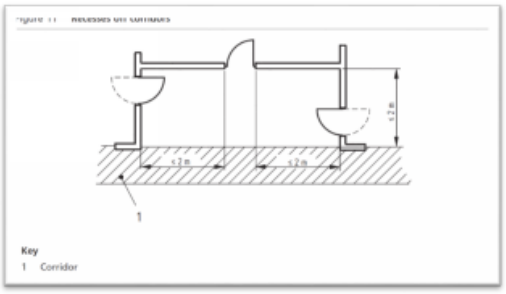
Where used as part of the means of escape, the following types of corridor should be constructed as protected corridors:

a) every corridor serving a bedroom;

b) every dead-end corridor exceeding 2 m in length (but see **16.3.11.4** for recesses off corridors);

c) any corridor common to two or more different occupancies (but see also **16.3.9**).





Excerpts from Figures 11 and 12 (BS 9999:2017)

Similarly, the 4.5m distance referred to in BS 9999 relates to the use of cross corridor doors and the end of a dead end corridor not the maximum length of a non-protected corridor.

RBKC interpret the following para as meaning the cross corridor doors shown in Figure 10 below can be omitted if the dead end corridor is less than 4.5m (the length measured as the actual length of the corridor not to a point of diverging exits).

16.3.11.3 **Subdivision of corridors**

If a corridor provides access to alternative escape routes, there is a risk that smoke will spread along it and make both routes impassable before all occupants have escaped. To avoid this, every corridor more than 12 m long which connects two or more storey exits should be subdivided by self-closing fire doors (and any necessary associated screens), so that the fire door(s) and any associated screen(s) are positioned approximately mid-way between the two storey exits.

NOTE 1 This is not to be interpreted as requiring sub-division of the corridor every 12 m.

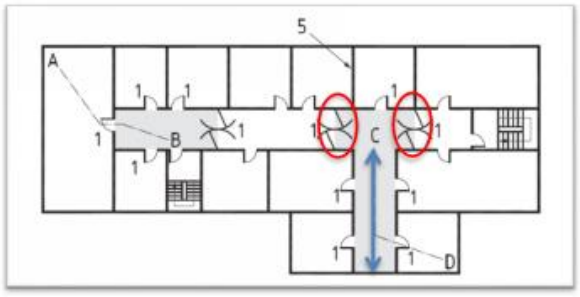
Any doors to the accommodation that would allow smoke to bypass the separating door should be self-closing.

NOTE 2 Corridors connecting alternative exits are illustrated in Figure 10a) and Figure 10b).

If alternative escape routes are immediately available from a dead-end corridor, there is a risk that smoke from a fire could make both routes impassable before the occupants in the dead end have escaped. To avoid this, every dead-end corridor exceeding 4.5 m in length should be separated by self-closing fire doors (together with any necessary associated screens) from any part of the corridor (but see **16.3.11.4**) which:

a) provides two directions of escape; or

b) continues past one storey exit to another [see Figure 10c)].



Excerpt from Figure 20 (BS 9999:2017)

HL: Please refer to the responses in the main document (comment 8).

Informatives

Regulation 38 plans and end user

a. The final fire strategy plans submitted to Building Control as required by Regulation 38 are a record of the provisions and facilities related to means of escape and firefighting. These plans are intended as end user record drawings and also for use by the fire risk assessor under the Regulatory Reform (fire safety) Order, and will be used to compare how the building is occupied with the intended design.

The plans are also submitted by Building Control to the Fire Authority who are the controlling authority under the above Act.

It is recommended that the end user is consulted regarding the information contained on the fire strategy plans and that they agree the plans reflect their intended use.

Any changes in for example; configuration, number of people, designation of occupied areas, etc. that are different from the fire strategy plans will be matters the fire risk assessor is likely to raise as issues on their fire risk assessment report, and could be used as evidence of non-compliance by the Fire Authority.

HL: Noted.

Perimeter enclosures, school gates and external areas

b. Exit speed for evacuation is only considered for the purpose of the Building Regulations for fire safety from buildings. Consideration should be given to the width of openings or gates in the perimeter enclosure of the site for purposes other than the dispersal of occupants from a building in the event of a fire. Whether or not playground areas are designated assembly points, there may be a need to rapidly evacuate the external spaces for reason other than fire safety.

It is recommended the designer in consultation with the end user decide upon an appropriate flow rate and design perimeter exits accordingly.

Whilst control does not exist under the building regulations for external areas, (which are not buildings), the Regulatory Reform (fire safety) Order, may place a responsibility for such areas to be considered.

It is therefore recommended a fire risk assessor be appointed at an early stage to ensure such matters are considered at building design stage.

Measures intended to prevent unauthorised access can also hinder entry of the Fire and Rescue Service to rescue people trapped by fire.

Potential conflicts should be identified and resolved at the design stage and not left to adhoc expedients after completion. The architectural liaison officers attached to most police forces are a valuable source of advice.

Some more detailed guidance on door security in buildings is given in section 4.5.3 of Building Bulletin 100.

HL: Noted.

Occupation

c. Note this is not now a matter for the Building Control Body.

Whilst there are no longer powers under the 'Building Regulations' to prevent occupation of new or existing buildings[1], it is recommended a fire risk assessor appointed by the 'Responsible person[2] is employed at an early stage during the building design. This will assist in allowing a smooth transition between the Building Regulations clearance and occupied building arrangements so that a satisfactory fire risk assessment can be achieved as required for any occupied building covered by the Regulatory Reform (Fire Safety) Order 2005.

This also coincides with the need for the end user to be satisfied the Regulations 38 plans represent the intended use as discussed above.

HL: Noted.

d. PU Foam (fire foam)

Care should be taken when using 'fire foam' as this is suitable for very limited applications with small gaps (typically 15mm). Not all foams are suitable for fire stopping services and other fire stopping applications. See ASFP Advisory Notice Using Polyurethane Foams available from:- http://asfp.associationhouse.org.uk/default.php?cmd=210&doc_category=241

For guidance on fire stoping see the ASFP's book FIRE STOPPING & PENETRATION SEALS FOR THE CONSTRUCTION INDUSTRY (RED BOOK) (cited in Approved Document B) Available from: http://asfp.associationhouse.org.uk/default.php?cmd=210&doc_category=309

HL: Noted.

e. Applications guide

A copy of 'Fire Information Note Submissions for means of escape' and 'Joint Borough Active Fire Curtains Guide', are included for your information.

HL: Noted.

Hoare Lea Fire has produced this letter to address the comments received from RBKC Building Control. As outlined before it is our considered opinion that our proposals meet the functional requirements of the Building Regulations 2010.

I hope you find these comments useful. However, please do not hesitate to contact us if you require any further information.

Yours sincerely,

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