Fire Safety Strategy Report

Kettering Science Academy
TX 130063 (Issue 1)

Deeble Road, Kettering
Fire Safety Strategy Report
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TX 130063 (Issue 1)

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<table>
<thead>
<tr>
<th>Date</th>
<th>Issue</th>
<th>Originator</th>
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<tr>
<td>11.02.2019</td>
<td>One</td>
<td>AMD</td>
<td>CMD</td>
<td>AMD</td>
<td>Issued for design team review and in support of the planning application</td>
</tr>
</tbody>
</table>

CMF – Codrinc Florescu MEng(Hons) AIFireE – Fire Engineer

AMD – Alexandru Dragan MEng (Hons) AIFireE – Business Manager & Fire Engineer
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Trenton Fire have been appointed by Pick Everard to provide fire safety design services in support of the Kettering Science Academy in Kettering.

This fire safety strategy has been developed to satisfy the requirements for fire safety under the Building Regulations 2010 (including amendments). This has been achieved through compliance with the recommendations for life safety of “BS 9999:2017 – Fire safety in the design, management and use of buildings – Code of practice” (BS 9999) in the first instance. In line with the objectives set by the client, the strategy has not been developed to include any additional specific measures for the protection of property. However, features that are included for life safety will contribute in some extent to property protection and business continuity.

Apart from where noted in this report, the designs will be in accordance with the recommendations of BS 9999. To facilitate ease of review by the building control body, the items departing from BS 9999 are identified in Table 1, along with the respective proposed alternative fire engineering solutions. All aspects of the fire safety design will be subject to review by the building control body and the local fire and rescue service, and ultimately formal approval by the building control body.

The school is a rectangular three-storey building (G+2) serving secondary school students. The building will have a footprint of approximately 960m² and a combined floor area of circa 2,880m². The building will have a typical storey height of approximately 3.6m, with the finished floor level of the topmost floor level (2nd floor) located approximately 7.2m above fire and rescue service access level (ground floor). The school is intended to accommodate a total of 722 pupils and members of staff.

The site to be developed will be part of the larger school site and in very close proximity to the main school building. Access to the above-ground storeys will be provided via three stairs. Community access will be provided out-of-hours only to the ground floor of the building.

Trenton Fire understand that the provision of a property protection sprinkler system is not a requirement of the project stakeholders. The fire safety provisions contained within the strategy will be sufficient in order to meet the life-safety requirements of the Building Regulations without the inclusion of a life-safety sprinkler system, and as such, a sprinkler system will not be provided.

A simultaneous building evacuation regime will be utilised for the new building which will be connected to the existing building, with a single-stage alarm protocol, i.e. evacuation of both buildings upon automatic detection or operation of a manual call point anywhere in either building. In support of the evacuation regime, the fire detection and alarm systems and the emergency voice communication systems will be interlinked in between the existing and new buildings in order for both to be operated as a single larger building.

Evacuation from the above-ground floors will be via the two lobby protected escape stairs. Disabled occupants will be assisted in their evacuation where required, and will be provided with suitable refuge areas. Ground floor occupants will be able to escape via final exits leading directly to the outside.

The school will be constructed as a single fire compartment. Fire-resisting construction is utilised in support of the means of escape arrangements, including cross-corridor separations and protection to dead-end areas. Ancillary areas having a heightened fire risk (e.g. changing rooms, store rooms, kitchen, plant rooms, server rooms, lifts) will be enclosed by 30-minute or 60-minute fire-resisting construction.

Firefighting access and facilities in the building will be provided in excess of minimum code compliance recommendations. It is proposed to provide firefighting access to 25% of the building perimeter, with primary access provided via external doors into the northern lobby-protected stair that will also include a dry rising fire main. Hose coverage will be achieved for all areas of the building within 45m from a dry riser outlet. The water supplies for firefighting operations will be provided via either existing or new hydrants.

**Table 1 - Summary of fire safety design challenges & departures from guidance**

<table>
<thead>
<tr>
<th>Design item</th>
<th>Challenge</th>
<th>Proposal</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Escape within 4.5m of a void edge</td>
<td>A secondary means of escape will be provided from those classrooms, which will enable occupants to avoid having to travel within 4.5m of a void edge.</td>
<td>4.8.2</td>
</tr>
<tr>
<td>B4</td>
<td>Non-compliant notional boundaries imposed by site condition</td>
<td>In order to reduce the risk to life safety posed by fire spread in between the existing and proposed school buildings on the same larger site, it is proposed to operate both as a single building, supported by an interlinked fire detection and alarm system and emergency voice communication system. Additionally, enhanced provisions for the fire and rescue service are proposed.</td>
<td>5.3.3 and 5.3.4</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

1.1 Background

1.1.1 Trenton Fire have been appointed by Pick Everard to provide fire safety design services in support of the Kettering Science Academy in Kettering.

1.1.2 It is intended that this report will primarily inform discussions with the building control body, assisting with the project’s Building Regulations submission, including their consultation with the local fire and rescue service. It will also serve to assist the client and the design team in progressing the detailed fire safety provisions for the project through to construction information. However, this report will also represent supporting documentation in the current planning application for the scheme.

1.1.3 The final fire safety strategy report should form part of the information pack handed over to the building operator, under Regulation 38 of the Building Regulations, to aid their Responsible Person in maintaining the fire risk assessment for the premises.

1.1.4 This fire safety strategy is not intended to portray detailed design information. As a strategic document supporting and informing the wider design, it should be read in conjunction with the wider project design documentation.

1.1.5 This strategy is developed based upon the project documentation referenced in Table 2. Additional information or variations to that supplied may render the conclusions and recommendations within this report invalid.

1.1.6 This report should be read in conjunction with the fire safety strategy mark-ups, as included in Appendix A.

1.2 Legislative requirements

1.2.1 Fire safety in buildings is governed by two pieces of legislation in the UK. The Building Regulations 2010, Part B, Fire Safety applies to building design, whilst for fire safety management in buildings, compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO) is needed.

1.2.2 The strategy has been developed to identify fire safety requirements for the project necessary to satisfy the substantive requirements for fire safety under the Building Regulations 2010 (as amended):

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

1.2.3 The strategy has not been developed to address property protection. However, the features that are included for life safety, as recommended by BS 9999:2017 [1], will contribute in some extent to business and property protection.

1.2.4 The advice has been developed in cognisance of the Construction (Design and Management) Regulations 2015 (CDM 2015), which sets out what designers are required to consider in order to protect anyone involved in the construction or ongoing use of a project.

1.2.5 The strategy does not address any phasing of the works nor the provision of appropriate access to fire safety systems, which should be considered during the detailed design of said systems following product selection, in line with CDM 2015 recommendations.

1.2.6 This strategy does not provide a comprehensive assessment of site fire safety during the building works or the phasing of these works. The Fire Protection Association [2] and the Health and Safety Executive (HSE) [3] issues guidance on identifying and managing fire precautions during the works, which should be consulted by the contractor or their specialist advisor when developing their construction fire safety plan.

1.3 Aims and objectives

1.3.1 The overall aim of this report is to present the fire safety strategy. This is supported by several objectives as follows:

- Identify fire safety design challenges and outline proposed solutions;
- To present any opportunities for the rationalisation of the fire safety design; and
- Raise queries that require response to assist fire strategy development.

1.4 Design basis and guidance

1.4.1 The fire safety strategy has been developed to satisfy the requirements for fire safety under the Building Regulations 2010 through compliance with the recommendations of BS 9999:2017, and the codes of practice referenced therein, in the first instance. Where not specifically stated, fire safety provisions should be specified and installed according to the current edition of relevant published guidance and the standards referenced therein.

1.4.2 Fire engineering principles are employed to support alternative solutions where strict adherence to the codes would conflict with the wider aspirations for the scheme. Departures from the codes are identified and alternative proposals (and associated analysis) are documented, see summary. In accordance with the fire safety engineering principles detailed in the PD 7974 [4] codes of practice, it is deemed appropriate that all fire precautions are determined based on there being one seat of fire (i.e. accidental fires).

1.4.3 External references utilised in the generation of this report are summarised in Section 9.

1.5 Regulatory approvals

1.5.1 This report has yet to be formally reviewed by the building control authority or the fire and rescue service. All aspects of the fire safety design remain subject to a formal review by the building control body (including their statutory consultation with the local fire and rescue service) and, ultimately, formal approval by the building control body.

Table 2 – Project documentation referenced

<table>
<thead>
<tr>
<th>Description</th>
<th>Reference</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Floor Plan</td>
<td>BRO046-PEV-01-00-DR-A-9010</td>
<td>P01</td>
</tr>
<tr>
<td>First Floor Plan</td>
<td>BRO046-PEV-01-01-DR-A-9011</td>
<td>P01</td>
</tr>
<tr>
<td>Second Floor Plan</td>
<td>BRO046-PEV-01-02-DR-A-9012</td>
<td>P01</td>
</tr>
<tr>
<td>Roof Plan</td>
<td>BRO046-PEV-01-RF-DR-A-9013</td>
<td>P01</td>
</tr>
<tr>
<td>Proposed Site Plan</td>
<td>BRO046-PEV-00-ZZ-DR-A-9002</td>
<td>P01</td>
</tr>
<tr>
<td>Building Section</td>
<td>BRO046-PEV-01-SX-DR-A-9015</td>
<td>P01</td>
</tr>
</tbody>
</table>
2. PROJECT OVERVIEW AND OCCUPANCY

2.1 Building description

2.1.1 The school is a rectangular three-storey building (G+2) serving secondary school students. The building will have a footprint of approximately 960m² and a combined floor area of circa 2,880m².

2.1.2 The building will have a typical storey height of approximately 3.6m, with the finished floor level of the topmost floor level (2nd floor) located approximately 7.2m above fire and rescue service access level (ground floor).

2.1.3 The school is intended to accommodate a total of 722 pupils and members of staff.

2.1.4 The site to be developed will be part of the larger school site and in very close proximity to the main school building as presented in Figure 1. Access to the above-ground storeys will be provided via three stairs as presented in Figure 1. Community access will be provided out-of-hours only to the ground floor of the building.

Figure 1 – Indicative ground floor general arrangement

Figure 2 - Indicative first floor general arrangement

Figure 3 - Indicative second floor general arrangement
2.2 Design occupancy

2.2.1 This strategy is based on occupancy levels determined using floor space factors for each area, as set out in Table 9 of BS 9999, input from the design team, as well as Trenton Fire’s design experience with schools. The calculated design occupancies noted in Table 3 will be utilised when determining the required capacity of the means of escape.

2.2.2 The strategy assumes that where out-of-hours or public events are to be held within the school on the ground floor, the maximum occupancies will not exceed those stated within Table 3, unless subject to a suitable fire risk assessment for the proposed use and mitigated accordingly.

2.3 Occupancy risk profile

2.3.1 BS 9999 recommends fire safety provisions such as warning systems, means of escape and compartment sizes, based on assumed risk. This is achieved by allocating a risk profile based on occupancy (e.g. A – awake and familiar, or B – awake but unfamiliar) and the likely fire growth rate (e.g. 2 – medium growth rate, or 3 – fast growth rate).

2.3.2 BS 9999 does not describe in detail what constitutes the characteristics of risk profiles “A” or “B”. However, the following occupant characteristics will be applied:

- Any group utilising the building with regularity (e.g. students and staff) are occupant characteristic “A”;
- Small groups (e.g. visitors and parents) that are accompanied at all times by trained staff are acceptable in a building of occupancy characteristic “A”. Staff should provide a fire safety / evacuation induction; and
- Groups utilising the building infrequently (i.e. community use), are considered as occupant characteristic “B”.

2.3.3 In support of out-of-hours or community use, ground floor areas (except staff areas) will conservatively be assumed to employ a B occupancy characteristic, assuming occupants are not familiar with the building. All areas on the first and second floor as well as staff only areas on the ground floor level will employ an A type occupancy characteristic, assuming occupants herein are familiar with the premises.

2.3.4 For standard risk areas, a base fire growth rate of “Medium” (2) will be applied, while areas deemed to have a greater fire growth rate, a base fire growth rate of “Fast” (3) will be applied.

2.3.5 Certain areas will be enclosed within construction having a fire-resistance rating of 30 minutes or better, thereby protecting the occupants of other rooms on that storey. Accordingly:

- The building will generally be assigned a medium fire growth rate, with an fast fire growth rate being applied to higher fire hazard rooms, which will be enclosed in fire resisting construction; and
- Areas used outside of school hours will be assigned a B occupancy characteristic. Rooms having a fire hazard rating (i.e. plant, kitchens, science labs) will not be occupied by unfamiliar occupants unless subject to a suitable fire risk assessment.

2.3.6 All plant, kitchen, cleaner and store areas will employ a fast fire growth rate. All other areas will employ a medium fire growth rate. No reduction in the fire growth rate is proposed at this stage as an automatic water fire suppression system will not be provided.

2.3.7 As the ground floor community use areas are connected through the void towards the above floors, the B2 risk profile has been conservatively adopted for sizing the vertical means of escape.

2.3.8 Risk profiles for each area of the building are summarised in Table 3 and are applied throughout the remaining sections of this report.

### Table 3 – Design occupancies

<table>
<thead>
<tr>
<th>Floor</th>
<th>Area</th>
<th>Occupancy</th>
<th>Risk Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>Lecture Theatre</td>
<td>56</td>
<td>A2</td>
</tr>
<tr>
<td></td>
<td>General Classroom (6 No.)</td>
<td>28</td>
<td>A2</td>
</tr>
<tr>
<td></td>
<td>Small Group Room</td>
<td>4</td>
<td>A2</td>
</tr>
<tr>
<td></td>
<td><strong>Total for second floor</strong></td>
<td><strong>228</strong></td>
<td><strong>A2</strong></td>
</tr>
<tr>
<td>First</td>
<td>General Classroom (6 No.)</td>
<td>28</td>
<td>A2</td>
</tr>
<tr>
<td></td>
<td>ICT Classroom (2 No.)</td>
<td>28</td>
<td>A2</td>
</tr>
<tr>
<td></td>
<td>Deputy Office</td>
<td>3</td>
<td>A2</td>
</tr>
<tr>
<td></td>
<td><strong>Total for first floor</strong></td>
<td><strong>227</strong></td>
<td><strong>A2</strong></td>
</tr>
<tr>
<td>Ground</td>
<td>Common / Dining Room (community use)</td>
<td>160</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>Library</td>
<td>20</td>
<td>B3</td>
</tr>
<tr>
<td></td>
<td>ICT Resource</td>
<td>15</td>
<td>B3</td>
</tr>
<tr>
<td></td>
<td>Study Area</td>
<td>40</td>
<td>B3</td>
</tr>
<tr>
<td></td>
<td>Small Group Room (2 No.)</td>
<td>4</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>Deputy Office</td>
<td>3</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>Conference Room</td>
<td>12</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>Interview Room</td>
<td>3</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>Staff Work Prep</td>
<td>10</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td><strong>Total for ground floor</strong></td>
<td><strong>267</strong></td>
<td><strong>B2</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total for building</strong></td>
<td><strong>722</strong></td>
<td><strong>B2</strong></td>
</tr>
</tbody>
</table>

**Notes:**

- Transient areas have not been considered with respect to total building occupancy in order to avoid double counting occupants.
- Transient areas include the following areas: Class Resource (Store), Plant Room, Cleaner Store, Central Resources (Stores), ICT Hub, Equipment Store, Premises Store, Furniture Store, Kitchen Servery, Kitchen Cleaner, Tank Room, Plant Room, etc.
- All the aforementioned transient areas include a A3 risk profile.
- Individual rooms with a high growth rate are separated from the remainder of the storey / compartment by fire rated construction, thus allowing for the more onerous risk profile to be assigned to the individual room in isolation while the wider storey was assigned a medium fire growth rate.
3. MEANS OF WARNING AND ESCAPE

The Building Regulations requirement B1 states:

“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.”

3.1 Evacuation Regime

3.1.1 A simultaneous building evacuation regime will be utilised for the new building which will be connected to the existing building, with a single-stage alarm protocol, i.e. evacuation of both buildings upon automatic detection or operation of a manual call point anywhere in either building.

3.2 Means of detection and alarm

3.2.1 To support the simultaneous evacuation regime, an automatic fire detection and alarm system will be provided throughout the building. In support of the fire safety strategy for the building, a Category L1(M) system will be provided within the building, designed, installed and maintained in accordance with BS 5839-1 [7].

3.2.2 The fire detection and alarm system will be interlinked with the system covering the existing building using a robust wired connection. This will enable an alarm to be activated immediately upon detection anywhere in either building.

3.2.3 The system will include automatic smoke detection throughout the building. Additional recommendations should be considered for boiler / plant rooms / kitchen. These include (but are not limited to):

- Heat detection linked to the fire alarm system;
- A means of automatically shutting off the fuel supply in the event of a fire;
- Carbon monoxide or carbon dioxide detection. The detection system should both raise an alarm and automatically isolate the fuel supply;
- An unburned gas detection system for gas fired boilers suitably located within the plant room depending on the fuel type (natural gas at high level and Liquefied Petroleum Gas at low level). This detection system should also both raise an alarm and automatically isolate the fuel supply; and
- An alarm that gives a visual indication if the ambient noise levels are so great as to make and alarm inaudible.

3.2.4 Manual call points will be provided at every storey exit and exit to outside, whether or not they are a designated fire exit, in accordance with BS 5839-1. The call points should be provided with a cover in order to prevent accidental or malicious operation.

3.2.5 A suitable method of warning (e.g. a visual and audible fire alarm signal) should be provided in areas where it is anticipated that one or more persons with impaired hearing may be in relative isolation and where there is no other suitable method of alerting them, e.g. roof, WCs and shower areas. This may also apply in mechanical / electrical plant rooms where there could be large amounts of background noise.

3.2.6 In accordance with the recommendations of BS 5839-1, the fire alarm and detection engineer must submit the design certificate for the scheme to the Approving Authority prior to commencement of the installation on site.

3.3 Means of escape provisions

3.3.1 The general philosophy for means of escape is that the occupants of a building should be able to turn their back on a fire and escape via the nearest exit without additional assistance from other occupants or firefighters. This is achieved by providing alternative escape routes where necessary, limiting travel distances, providing sufficient exit width and escape routes that, depending upon the use of the building, will have specified periods of fire resistance.

3.3.2 BS 9999 recommends escape widths, escape distances and stair widths based on the risk profile and the minimum fire protection measures. The BS 9999 recommendations for travel distance and horizontal escape width have been extracted as presented in Table 4.

<table>
<thead>
<tr>
<th>Risk profile</th>
<th>A2</th>
<th>A3</th>
<th>B2</th>
<th>B3</th>
<th>Roof level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escape width (mm/person)</td>
<td>3.6</td>
<td>4.6</td>
<td>4.1</td>
<td>6.0</td>
<td>N/A</td>
</tr>
<tr>
<td>Escape in a single direction (m)</td>
<td>22.0</td>
<td>18.0</td>
<td>20.0</td>
<td>16</td>
<td>60</td>
</tr>
<tr>
<td>Escape in multiple directions (m)</td>
<td>55.0</td>
<td>45.0</td>
<td>50.0</td>
<td>40</td>
<td>200</td>
</tr>
</tbody>
</table>

3.3.3 For the purpose of this report:

- During the horizontal phase of the means of escape, the individual storey escape routes and exit widths will be based on the conservative assumption that each floor is at 100% utilisation (see Table 3); and
- During the vertical phase of the means of escape, the stair widths will be based on the following conservative assumptions:
  - The total design occupancy for the above ground floors are conservatively applied as 100% utilisation; and
  - At ground floor level, there is no merging flow at the final exits from the protected stair enclosures, given the fact that ground floor areas are provided with multiple independent exits to outside.

3.4 Horizontal evacuation

3.4.1 In general, the building escape provisions are in keeping with the recommendations of BS 9999. That is, the travel distances, exit numbers and widths meet the recommendations of BS 9999 (as shown in Table 4) for the risk profiles and likely occupancy. General consideration will need to be given to the layout of equipment and furniture within rooms to ensure that actual travel distances remain within these stated limits.

3.4.2 A number of areas that are accessed via the circulation corridors are to be considered as inner rooms, as the circulation areas include the open plan dining area at ground floor, along with other combustibles in a number of locations. Most of the rooms accessible off the main dining / common area will also be classed as inner rooms. The provision of the Category L1(M) detection and alarm system (see Section 3.2.1) provides single knock detection coverage throughout the circulation (and classroom) areas, thereby meeting the recommendations of Clause
3.4.3 All doors should have a minimum clear effective width of 800 mm, or 850 mm where unassisted wheelchair access is required, unless specifically identified below or on the accompanying fire mark-ups. However, BS 77 [10] (replaced by BS 102 [11], BS 99 [12], Approved Document M (ADM), Approved Document K (ADK) [13], and the Standard Specifications Layouts and Dimensions (SSLD) for School Buildings booklets) may require additional width. It is recommended that the doors leading into a disabled refuge location are wide enough to accommodate unassisted wheelchair access.

3.4.4 Where corridors greater than 12 m in length connect storey or final exits, these are sub-divided by FD30S cross-corridor doors. These are provided throughout the building.

3.4.5 To assist with day-to-day circulation, any cross-corridor doors will be provided with magnetic door hold-opens, as detailed in Section 3.9. The cross-corridor doors should provide a clear width of at least 1,050 mm, and be dual-swing doors, in order to accommodate over 60 occupants in either direction of escape. These doors should be released at night time to reduce the chance of long term warping of the door as it is held back at a single point of contact.

3.4.6 All dead-end corridors greater than 2 m in length will be provided with 30-minutes fire-resisting construction and any doors opening into them should be protected by FD30S door sets. Low hazard ancillary accommodation areas (e.g. stores) which open into a dead-end corridor will be provided with FD30S doors. Dead-ends will serve small numbers of occupants, and not more than 60 people.

3.4.7 Rooms containing fume cupboards, such as the general science classrooms if applicable, science prep room and the specialist lab, should be provided with two separate means of escape. Fume cupboards should be located as far as reasonably practicable from the room exits.

3.4.8 The ground floor main dining / common room has a maximum design occupancy of 160 people. Two 1,800mm wide exits leading outside are provided, allowing sufficient egress capacity for 300 occupants per exit (B2 risk profile). Two additional exits (850mm wide each) providing a combined capacity of 166 people are also provided via the Library / ICT / Study areas which should be available even in the case of a major fire within the neighbouring existing building.

3.4.9 The ground floor Library / ICT / Study area has a maximum design occupancy of 75 people. Two 1,600mm wide exits leading outside are provided, allowing sufficient egress capacity for 266 occupants per exit (B3 risk profile).

3.4.10 The above ground floors are served by two storey exits, each with a clear width of 1,050mm, providing sufficient egress width for 291 occupants. By discounting one of the two exits on each floor separately, the remaining exits provide sufficient capacity for all occupants on that level.

3.5 Vertical evacuation

3.5.1 The two protected stairs will each have a minimum clear width of 1,300 mm, providing a total vertical egress capacity of 660, which is considered sufficient to accommodate the maximum design occupancy for the above ground level of the school (455).

3.5.2 Both protected stairs will be lobby-protected on all floors, therefore no discounting of stairs has been employed in design. The western accommodation stair however is not protected and has therefore been assumed to not be used during an evacuation.

3.5.3 The passenger lift will not be designed as an evacuation lifts, and it will not be available for vertical means of escape. Upon activation of the fire alarm, the lift should stop at first floor level, with the lift remaining inactive until the fire alarm has been reset. The lift apertures on the ground floor level however will be provided with a Fr30 minutes fire and smoke shutter (see Section 4.8.2), to start close immediately upon activation of the fire alarm. This shutter should also be provided with an emergency Fireman’s override switch.

3.5.4 Handrails which do no protrude more than 100 mm into the clear stair width may be disregarded as impacting upon the recommended stair width.

3.5.5 The ground floor final exits are considered to provide sufficient capacity for ground floor occupants to evacuate without significant numbers of occupants having to evacuate via the base of the stairs (approx. 60 occupants as a maximum). Therefore, it is considered that merging flow scenarios need not be applied when determining the final exit widths from the protected stairs.

3.5.6 The final exits from the stairs at ground level will each provide a clear width of 1,600mm which is in excess of the widths of the approaching stairs.

3.6 Roof escape provisions

3.6.1 Roof access and egress will be provided via a hatch. The current design includes a hatch leading into the plantroom on the second floor which is not permitted, therefore this should be relocated to discharge within the northern protected stair enclosure. The hatch and any roof level walkways will be arranged such that travel distances do not exceed 45m in a single direction.

3.6.2 All maintenance staff accessing the roof areas should be able to evacuate via escape hatches unaided of the routes described in this section unaided, and should be fully briefed with regards to the emergency evacuation procedures (see Section 7.5.5).

3.7 Escape beyond the final exits

3.7.1 Travel beyond the building final exits must be away from the building, towards a place of safety, and not be jeopardised by unprotected openings of the building. It is proposed that this is achieved through a combination of the following:

- Alternative paths along the building that cannot be impacted by a single fire location;

- Exit paths provided that lead away from the building.

3.7.2 Final exits should not present an obstacle to wheelchair users and other people with disabilities. Where a final exit is accessed without the need to traverse steps then a level threshold and, where necessary, a ramp should be provided. Where steps are required, and a ramp cannot be incorporated, a suitably protected refuge area should be provided in the vicinity of the final exit.

3.7.3 All final exits, including those which represent the final exit from a stair, should include accessible escape routes for disabled occupants up to a designated assembly point. These escape routes should be suitable for the use of a disabled occupant. This is likely to impact on landscaping design.

3.7.4 In order to avoid having protected façade as a consequence of maintaining disabled escape routes, the entire perimeter of the building should include a 2m wide accessible route. This would result in the disabled occupant having a choice of two direction of escape on this level, once outside the building.

3.7.5 The determination of suitable assembly areas is an operator-led exercise. Assembly areas should be located such that they are remote from access routes for the fire and rescue service and evacuation from the building can be achieved without exposure to a hazard from a building fire.

3.7.6 Escape beyond the final exits, including to and from assembly points should be usable by all occupants, e.g. a need to cross grass may not be appropriate for all mobility aids. Egress routes should meet the accessibility recommendations of Approved Document M or BS 8300 [15].

3.8 Means of escape for disabled occupants

3.8.1 Disabilities refer to any physical, sensory or cognitive impairments, being permanent or temporary, which may affect an occupant’s ability to evacuate a building unassisted in the event of a fire. The following guidance details...
3.8.7 It is envisaged that most people will be able to escape to a place away from danger without assistance from trained fire wardens. However, there will be a certain proportion of building occupants, such as those who are non-ambulant disabled (e.g. wheelchair users), who will not be able to negotiate stairs unaided. In these instances, an environment should be provided in which their safety can be assured for a given period of time (e.g. refuge areas) prior to being assisted to ultimate safety outside.

3.8.8 Emergency Evacuation Plan (GEEP) will need to be written for members of the public who would need assistance due to mobility, sensory and/or cognitive impairments, and the procedures should be practiced during fire drills. A Generic Emergency Evacuation Plan (GEEP) will need to be written for members of the public who would need assistance from both buildings at the same time in a fire scenario anywhere in either building.

3.8.9 Disabled persons should be provided with a suitable number of refuge areas at the upper floors, protected from the effects of a fire. These will be provided above ground within the protected stair enclosures (each at least 1,400 x 900mm) located in a position that does not encroach on the effective width of the stair. These refuges will enable them to await further assistance from suitably trained staff members in a place of safety, before they make their way out of the building at their own pace with assistance.

3.8.10 Each refuge space shall be provided with an emergency voice communication system (EVC system). The system shall comply with BS 5839-9:2011 [16] and consist of Type B outstations which communicate with a station located near the building control room or the fire alarm panel.

3.8.11 The EVC system for the new building should be interlinked with the one covering the existing building, including all supporting management procedures to assist disabled occupants from both buildings at the same time in a fire scenario anywhere in either building.

3.8.12 The school should develop a Personal Emergency Evacuation Plan (PEEP) for any student or member of staff with mobility, sensory and/or cognitive impairments, and the procedures should be practiced during fire drills. A Generic Emergency Evacuation Plan (GEEP) will need to be written for members of the public who would need assistance from both buildings at the same time in a fire scenario anywhere in either building.

3.9.1 All fire doors should be provided in accordance with Clause 32.1 of BS 9999.

3.9.2 All doors on common escape routes will either not be provided with a securing device, or be provided with a securing device that is easily openable from the inside without the use of a key and without having to manipulate more than one mechanism. Doors should open in the direction of escape where possible.

3.9.3 Doors on escape routes will generally be hung to open in the direction of exit (apart from certain instances where the doors will serve less than 60 people), will open not less than 90° and have a swing which is clear of any change in level, other than a threshold or single step on the line of a doorway.

3.9.4 The clear widths of exit doors should, as a minimum, meet the recommendations of Table 4 and Section 3.4.

3.9.5 Doors opening onto stairways or corridors will be sited so as not to encroach on the effective width of any stairway, landing or corridor.

3.9.6 Vision panels will be provided in any doors that swing in both directions and in doors sub-division on escape routes. Other vision panels may be required as part of accessibility requirements.

3.9.7 Doors on escape routes from rooms with an occupant capacity of more than 60 should either not be fitted with a lock, latch or bolt fastening, or should be fitted with panic fastenings in accordance with BS EN 1125 [17].

3.9.8 Fire doors may generally be maintained open during day-to-day use, e.g. to facilitate circulation in common areas, using magnetic hold open devices. Any fire doors fitted with hold-open devices should release on:

- Manual operation or operation of a hand-operated switch fitted in a suitable position, if necessary;
- Actuation of the fire alarm system;
- Failure of the electricity supplies.

3.9.9 Any power sliding doors should also default open in-line with the scenarios noted in Section 3.9.8.

3.9.10 Any doors fitted with an electronic latch, e.g. operated by a swipe card reader, code, biometric data or similar means, should return to the unlocked position:

- On operation of the fire alarm system;
- On loss of power or system error; and
- On activation of a manual door release unit (Type A) to BS EN 54-11 [8] positioned at the door on the side approached by people making their escape. Where the door provides escape in either direction, a unit should be installed on both sides of the door.

3.9.11 Fire-rated doors shall be fitted with smoke seals where specified. Complete door assemblies will be able to demonstrate compliance with:

- BS 476-22 [18] or BS EN 1634-2 [19] for fire resistance; and where appropriate

3.10 Emergency lighting

3.10.1 Emergency lighting will be installed to provide temporary illumination in the event of failure of the primary power supplies to the normal lighting system. As part of the emergency lighting system, escape lighting will be provided to ensure the escape routes are illuminated at all material times. Adequate artificial lighting will be provided in all escape routes and will be of a sufficient standard to enable persons to see during escape.

3.10.2 Emergency lighting will be installed in accordance with the recommendations of BS 5266: Parts 1-2 [22] and 4-6, BS EN 1838 [23], and BS EN 60598-2-22 [24].

3.10.3 Emergency lighting will illuminate all occupied areas, common evacuation routes (internal and external as necessary) and essential areas including plant areas (external plant also). It will also illuminate a safe exit route including fire exits, fire alarm call points, changes in level or direction and fire-fighting equipment. Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route.

3.10.4 Primary and emergency lighting will be required for any external escape routes that will not be lit by surrounding street lighting.

3.10.5 Where used, it must be ensured that the emergency lighting will provide at least the minimum level of illumination to photo-luminescent escape signage (Clause 5.3 of BS 5499-4 [25] - a minimum of 100 lux on the vertical and in the event of mains failure conditions a minimum of 5 lux in the vertical, with a uniformity of 0.7).

3.10.6 Emergency lighting will illuminate common areas and the exit routes including fire exits, changes in level or direction and fire-fighting equipment. Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route.
3.10.7 A facility should be provided for periodic testing of the emergency lighting luminaires without having to switch the relevant circuit off. A full discharge / recharge test must be performed for every luminaire during commissioning procedures.

3.10.8 Discharge lighting installations may operate at voltages that are a hazard to firefighters. An exterior discharge lighting installation, or an interior discharge lighting installation operating unattended, operating at a voltage exceeding low voltage (as defined in Statutory Instrument number 1018, part of the Building Regulations), should be controlled by a firefighter’s emergency switch, installed and situated in accordance with BS 7671 [26] and the requirements of the fire authority.

3.11 Fire safety signage

3.11.1 Fire safety signs will be installed in common areas where necessary to provide clear identification of fire precautions, fire equipment and means of escape in the event of fire. All parts of the building will be fitted with appropriate fire safety signage to comply with The Health and Safety (Signs and Signals) Regulations 1996, i.e. signage to be in accordance with BS ISO 3864-1 [27], BS 5499-4 [28], BS 5499-10 [29] and the Safety Signs and Signals: Guidance on Regulations publication [30].

3.11.2 The purpose of fire signage is to direct persons towards fire exits, or to provide specific information or warning about equipment, doors, rooms or procedures. They should be recognisable, readable and informative, as they convey essential information to regular and infrequent users of the premises, and the Fire and Rescue Service (FRS).

3.11.3 Fire notices should be permanently displayed in conspicuous positions throughout the building, including storey exits, and should have been updated to provide information specific to building.

3.11.4 All fire doors will be marked with the appropriate fire safety sign conforming to BS 5499-1 [31] (white on blue) according to whether the door is:

- To be kept closed when not in use ('FIRE DOOR - KEEP SHUT');
- To be kept locked when not in use ('FIRE DOOR - KEEP LOCKED'); or
- Held open by an automatic release mechanism ('AUTOMATIC FIRE DOOR - KEEP CLEAR').

3.11.5 Fire doors to cupboards and to service ducts should be marked on the outside at about eye level. All other fire doors should be marked on both sides at approximately eye level.

3.11.6 Any emergency securing device fitted to doors on escape routes are to be provided with instruction notices, adjacent to the device, indicating the method of operation.

3.12 Out-of-hours school use

3.12.1 It is expected that many areas within the building will be utilised outside of school hours, or for community use, including the dining / common room, along with adjacent areas at ground floor. The means of escape from the building provide suitable escape width to allow community use.

3.12.2 It should be ensured that where members of the public are allowed access to other areas of the school, they will be accompanied at all times by a member of school staff.

3.12.3 In the event of an out-of-hours fire, the magnetic locking systems installed on exits located within the secure line should deactivate upon detection, allowing occupants to use the same egress routes that would be available during school hours use. These arrangements should be incorporated into the fire-safety management plan for the building, when developed (see Section 7.5.6).

3.12.4 The means of escape for ground floor areas with both community use and school use have been designed based on the more onerous B2/B3 risk profile, such that these exits are able to accommodate both use types, provided that the maximum occupancies in Table 3 are followed.
4. INTERNAL FIRE SPREAD

The Building Regulations requirement B2 states:

“(1) To inhibit the spread of fire within the building, the internal lining shall:

(a) Adequately resist the spread of flame over their surfaces; and

(b) Have, if ignited, a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.

(2) In this paragraph 'internal linings' mean the materials or products used in lining any partition, wall, ceiling or other internal structure.”

The Building Regulations requirement B3 states:

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

(2) 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 a terrace and a semi-detached house are each to be treated as a separate building.

(3) 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.

(4) 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.”

4.1 Internal Linings

4.1.1 In the early stages of a fire in a building, the choice of material for the lining of walls and ceilings can significantly affect the spread of fire and its rate of growth. Wall and ceiling linings should achieve at the surface spread of flame and fire classifications outlined in Table 33 of BS 9999, as summarised in Table 5, as a minimum. Materials are permitted to meet either the UK National or the European classifications noted.

4.1.2 Parts of the wall area of an individual room are permitted to be of a poorer performance classification than those set out in Table 5, but no worse than UK National Class 3 or European Class D-s3, d2. This variation is limited to an area not exceeding half the floor area of the room or 60 m², whichever is less.

4.1.3 Should any thermoplastic materials, which do not achieve the performance given in Table 5, proposed in the construction (e.g. windows, roof-lights and lighting diffusers only) these should comply with the recommendations of Section 34 of BS 9999.

Table 5 – Surface spread of flame requirements

<table>
<thead>
<tr>
<th>Location</th>
<th>National (UK) Class</th>
<th>European Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small rooms ≤ 30 m²</td>
<td>Class 3</td>
<td>D-s3, d2</td>
</tr>
<tr>
<td>Other rooms</td>
<td>Class 1</td>
<td>C-s3, d2</td>
</tr>
<tr>
<td>Circulation spaces</td>
<td>Class 0</td>
<td>B-s3, d2</td>
</tr>
</tbody>
</table>

4.2 Displays on circulation routes

4.2.1 It is common in schools to use corridors and other circulations spaces to house display items, posters, artwork, etc. The provision of such features or items (such as displays, posters, artwork pieces, etc.) may be included with appropriate consideration, justification and on-going control as part of the Responsible Person’s duty under the FSO to maintain an up to date fire risk assessment for the building.

4.2.2 The school’s circulation areas, excluding the protected stairs, may be used for relaying information and displaying pupils’ work. It is recommended that notice boards in circulation spaces be no wider than 3 m and separated by a 1 m gap (from each other and room access doors).

4.2.3 Notice boards in protected or dead-end corridors should be fitted with a glass or polycarbonate cover, preferably top hung, which cannot be left projecting into the corridor.

4.2.4 Any lockers in corridors should be made of a material of limited combustibility and all rooms accessed from these corridors should be treated as inner rooms (see Section 3.4.2). Also, lockers are not permitted within stairs or lobbies providing protection to escape stairs.

4.3 Displays on teaching room walls

4.3.1 In classrooms, notice boards with a surface spread of flame no poorer than Class 3 or D-s3, d2 are permitted, but should not extend more than 2.5 m without having a break between them of not less than 0.4 m.

4.4 Fire suppression

4.4.1 A fire suppression system is not required to comply with the recommendations of BS 9999 and will not be provided in the building. The fire safety strategy is designed such that the building meets the functional requirements of Parts B1-B5 of the Building Regulations without the provision of a life-safety sprinkler system.

4.4.2 Within the kitchen, considerations should be given to providing a proprietary extinguishing system, should cooking facilities be employed within this area at any time. If applicable, proprietary extinguishing systems covering hob top and the cooker hoods should be considered. This will be of benefit to both life safety and the minimisation of fire damage.

4.5 Structural fire resistance

4.5.1 As the building will have top storey height above access level of approximately 7.2 m, elements of structure should achieve a fire resistance of at least 60 minutes, as specified in Table 23 of BS 9999.

4.5.2 Elements of structure that only support a roof do not generally require fire resistance. Structure is considered to support more than only a roof if it supports a load other than the roof itself (e.g. rooftop plant) or is essential to the stability of a compartment or other fire-resisting wall (internal or external). Photovoltaic (PV) cells on the roof are not considered to constitute plant in this context.

4.6 Compartmentation and fire-resisting construction

4.6.1 Performance requirements for fire resisting separations are documented in Table 6. The fire safety mark-ups presented in Appendix A denote the minimum fire-resistance requirements for various fire separating elements and enclosures. The identification of the structural, secondary structure, and load bearing elements should be sought from the structural consultant and the appropriate fire-resistance noted in Table 6 should be applied.

4.6.2 Table 28 of BS 9999 imposes a limit of 2,000 m² for the maximum area of any floor in a building with an uppermost storey of less than 18 m and a B3 risk profile, which is the most onerous in this case. This limit is not exceeded for this building, therefore the entire building will be enclosed in a single fire compartment.
4.6.3 As part of the design provisions in support of means of escape and fire-fighting operations, the north and south stairs will be designed as lobby protected stairs, to be enclosed in 30-minute fire resisting construction including lobby separation achieving 30-minute fire resistance rating on all levels.

| Table 6 – Minimum fire resistance periods for structural and-separating elements (in minutes) |
|---------------------------------|-------------|-------------|-------------|
| **Elements requiring fire-separation** | **Fire resistance** | **Exposure** | **Fire doors** |
| Structural frame, beam or column | 60 L | Exposed faces | N/A |
| Protected stair lobbies | 30 L/Int/Ins | From each side | FD30 |
| Subdivision of a corridor | 30 L/Int/Ins | From each side | FD30 |
| Protection of dead-end corridors | 30 L/Int/Ins | From each side | FD30 |
| Protected lift and service shafts | 30 L/Ins/Int | From each side | FD30 |
| Low hazard ancillary accommodation (as per Table 29 of BS 9999) | 30 L/Ins/Int | From each side | FD30 |
| Higher hazard ancillary accommodation (as per Table 29 of BS 9999) | 60 L/Ins/Int | From each side | FD60 |

Notes:
- Loadbearing integrity, insulation in accordance with BS 476 parts 21 (54) & 22 (55). The “L” rating only applies to loadbearing elements.
- “S” within the fire doors column denotes the inclusion of cold smoke seals on the fire doors.
- Fire doors for ancillary accommodation and riser shafts also require cold smoke seals if located if they open into a dead-end corridor (see Section 3.4.6), protected escape route and are located on a compartment line or line of cross-corridor separation as shown by the mark-ups in Appendix A.

4.6.4 As floors are not required to be compartment floors these may contain floor voids. One key architectural feature in this building is the central void spanning all floors which includes the western accommodation stair. However, solid areas of floor will otherwise be fire-resisting to meet the standard documented in Table 6 for supporting means of escape from the upper floors. Sealing of penetrations within these floors is not required unless the floor forms part of a protected escape route.

4.6.5 In order to provide a protected lobby for the northern and southern stairs, 30-minute fire resisting construction including integrity and insulation should be provided. At the moment, the design includes glazing in such partitions which should be also fire rated to achieve the same performance.

4.6.6 It is proposed to enclose and isolate areas of increased fire growth rate with a minimum of FR30 minutes rating construction thereby protecting the escape routes and other areas on that level from the higher risk. Plant rooms, the kitchen and the kitchen refuse store will be enclosed in FR60 minutes construction in order to mitigate the proportionally higher risks.

4.7 **Low- and high-hazard ancillary rooms**

4.7.1 If applicable, the use of mobile fume cupboards should comply with the recommendations of CLEAPSS G9 “Fume cupboards in schools. Revision of QEEB 88 88” [32] and BS EN 14175-2 “Fume cupboards. Safety and performance requirements” [33]. This applies to both re-circulatory filtration and ducted fume cupboards. Due to the mobility of the cupboards, the restrictive safe zones and positioning limitations in relation to room circulation paths and escape routes, the substances and processes used, and the risks associated with fume cupboard accidents or extraction system failures, rooms containing fume cupboards will be designated as low-hazard ancillary rooms.

4.7.2 As previously noted, all rooms and spaces (risers) that have the potential for a fast fire growth rate will be designated as places of higher fire hazard and will be enclosed within fire-resisting construction to isolate their risk.

4.7.3 Accordingly, the following areas have been designated as low hazard ancillary rooms and/or places of higher fire hazard: stores of any kind, kitchen, changing rooms, ICT hub, server, class resource, prep areas, any room with a fume cupboard, and all service risers.

4.7.4 All plant rooms have been designated as high-hazard ancillary accommodation.

4.7.5 If applicable, any areas fitted with gas supplies should follow the advice given in Gas Engineers publication “UP11 Gas installations for educational establishments”. Each such area should be fitted with a lockable isolating valve to enable gas supplies to gas taps on benches to be shut off at the end of the day. Where fume cupboards are provided these should have a powered extract system and fire resisting ductwork to extract hot smoke in case a fire occurs within them.

4.8 **Automatic fire barriers**

4.8.1 The kitchen area will not include food preparation and therefore is not considered as high risk. However, in order to enable flexibility in use in the future, it is recommended to include fire separation around the potentially high risk food preparation area. Therefore, any openings between the kitchen and the dining hall which are intended for servery use should be provided with fire shutters, rated to 60 minutes fire resistance rating (integrity only). There is not expected to be any fire load close-up to the opening as it is used as transient space in typical use so fire spread through the shutter via radiation is unlikely. Therefore, integrity-only is considered to be sufficient for the fire shutters. In the event of a fire within the kitchen, the shutters should descend and restrict the spread of fire, thus maintaining the fire resisting separation of the kitchen.

4.8.2 Additional local FR30 construction has been proposed to enable occupants to avoid escape within 4.5m of the void edge as presented on the mark-ups, in Appendix A. The lift shaft opens into the base of the void and also into the corridor which forms a secondary means of escape for occupants having to escape within 4.5m of the void edge. In order to mitigate this condition, an FR30 minutes (integrity only) fire and smoke shutter is proposed within the lift aperture on the ground floor level.

4.8.3 Automatic shutter barriers should be tested or classified in accordance with BS 476-22 or BS EN 13501-2 [34].

4.8.4 The 30-minute fire and smoke curtains will be specified in accordance with BS 8524-1 [29] and designed, installed, and maintained in accordance with BS 8524-2 [30]. Detailed performance criteria will be confirmed as the design progresses.

4.9 **Robust construction**

4.9.1 By the nature of the activities that go on within a school, the elements of construction making up the school should be able to withstand more abuse than those incorporated in the normal built environment. Accordingly:

- All glass should meet the requirements of BS 6262-4 [35], BS 6180 [36] (if used in a barrier), and BS 5234 (if used in a partition);
- All glass used in the construction of fire walls should be rated B or C in accordance with BS 6206 [37] & BE EN 12600 [38], dependent on location and pane size;
- All fire separating walls should, as well as providing the rating noted above, be rated at least heavy duty (HD) when evaluated by BS 5234-2 [39] and should be installed in accordance with BS 5234-1 [40];
- Fire-resisting timber door assemblies should achieve a performance rating of Severe Duty (SD) in accordance with DD 171 [41]; and
Door hardware will be essential or non-essential depending on door function and fittings, as per BS 8214 [42].

4.10 Fire-stopping and penetrations through fire-resisting construction

4.10.1 Fire-stopping should be provided at the junction of fire-separating walls and external walls to maintain the fire resistance period of fire-separating walls (see Figure 4), and thereby prevent a fire from travelling around the junction and into the neighbouring space.

4.10.2 To maintain the fire resistance of separating construction, any pipe penetrations through lines of fire-resisting separation should be fire-stopped in accordance with one of the following methods set out by Clause 32.5.14 of BS 9999, unless located within a protected shaft:

- For pipes of any diameter, a proprietary seal, which has been shown by test to meet the fire-resistance rating of the wall, floor, or cavity barrier for the penetration circumstance; and
- For pipes with a restricted diameter, fire-stopping should be provided around the pipe keeping the opening as small as possible. The nominal interior diameter of the pipe should not be more than the relevant dimensions given in Table 31 of BS 9999. Figure 4 is provided to assist in the interpretation of Table 31 of BS 9999.

4.10.3 All pipes, ductwork and services passing through fire-resisting separations should be either enclosed in fire-resisting construction (i.e. shafts) of matching fire resistance or provided with fire dampers of matching fire resistance. Certain small-diameter pipes require only fire-stopping around the pipe, dependent on pipe material and the type of fire-resisting barrier penetrated.

4.10.4 Where ducts cross fire-resisting construction enclosing a protected escape route (e.g. protected stair, protected corridor, protected lobby or a corridor sub-division), fire dampers on fusible links are not sufficient. Either combined fire and smoke dampers activated upon smoke detection (ES-type dampers) are provided, or the duct should be fire-resisting/enclosed within fire-resisting construction throughout its length while traversing the protected escape route. As such, all ductwork penetrating the protected stair enclosures, fire separation lines and protected lobbies / corridors should be provided with ES-type dampers.

4.10.5 Dampers should not be used if the duct used for extract is serving a kitchen area. Such ductwork should be fire-resisting or fully within a fire-resisting enclosure to the point of termination outside of the kitchen enclosure. Additional guidance is provided in BESA TR19 “Guide to good practice – Internal cleanliness of ventilation systems”.

4.11 Concealed Spaces

4.11.1 Cavity barriers are provided to prevent the rapid spread of unseen fire or smoke in voids, and to prevent the spread of fire around compartmentation via voids.

4.11.2 Concealed cavities (e.g. voids in partition walls, roof voids, void between suspended ceilings and the soffit of the floor above) require cavity barriers to sub-divide them, unless subject to the exceptions outlined in Clause 33.2 items (a) to (g) of BS 9999.

4.11.3 Cavity barriers should achieve 30 minutes integrity (E) fire resistance and 15 minutes insulation (I) fire resistance. They should be located as follows:

- In general, cavity barriers should be at 20 m centres in cavities with exclusively Class 0 or 1 linings. For other linings, the spacing between cavity barriers should be reduced to 10 m; and
- Above walls enclosing protected escape routes, where the wall does not continue to the level of the soffit or roof above.

4.11.4 Cavity barriers should be within the external wall cavity, positioned to align with the internal fire-resisting walls and floors, unless constructed in accordance with Figure 36 of BS 9999. Cavity barriers should also be installed to seal around any openings (windows or doors) in the external wall. Cavity barriers provided around an opening may be formed of:

- Steel at least 0.5mm thick or timber at least 38mm thick;
- Polythene-sleeved mineral wool, or mineral wool slab under compression when installed cavity; or
- Calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

Figure 4 – Fire stopping expectations
5. EXTERNAL FIRE SPREAD

The Building Regulations requirement B4 states:

“(1) 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.

(2) 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.”

5.1 External surfaces of walls

5.1.1 Façade linings should conform to Clause 35.5 and Figure 47 of BS 9999.

5.1.2 As the building includes areas of out-of-hours community use, with a risk profile of B2/B3, is less than 18 m in height and more than 1 m from all boundaries, façade linings for the fire compartment containing these areas should comply with the requirements in Figure 47c) of BS 9999.

5.1.3 BS 9999 recommends that façade linings up to 10 m above ground level and up to 10 m above a roof or parts of the building to which the public have access should achieve Class 0 (national class) or Class B-s1, d2 or better (European class). Profiled or flat steel sheet at least 0.5 mm thick with an organic coating of no more than 0.2 mm thickness is also acceptable.

5.2 Roof coverings

5.2.1 Roof coverings should conform to the prescriptive recommendations of Clause 35.4 of BS 9999 when tested in accordance with BS 476-3 [43], as summarised in Table 7. Where any plastic or thermoplastic materials are used for rooflights, these are to conform to the provisions of BS 9999.

5.3 Space separation and unprotected façade areas

5.3.1 In order to investigate the risk of fire spread to/from neighbouring properties/buildings via radiation, analysis has been undertaken in accordance with the calculation process outlined in BR 187 [44], to determine the boundary distance separation required for 0% unprotected façade. The results are presented in Table 8.

5.3.2 It can be observed that for this site, fire spread is possible towards the existing building across the notional boundaries. These notional boundaries have been introduced retrospectively on the larger school site, after the existing main school building had been already built. As a consequence, the new site boundaries represent notional boundaries in accordance with Section 35.1.2 of BS 9999. Trenton Fire have not received any information up to this point to indicate that the proposed building extension on the same site was taken into consideration by the design team for the existing building. Therefore, it is also possible that a fire scenario within the existing main building to result in fire spread towards the new proposed building.

5.3.3 In order to mitigate this condition with respect to life safety of occupants, the fire detection and alarm systems should be interlinked and include a robust, wired connection so that detection anywhere within the two buildings results in an immediate alarm in both buildings. Furthermore, the disabled refuge EVC systems and supporting management procedures should be interconnected to cover both buildings at the same time. Overall, the two buildings will end up being operated as a single larger building. Further detail is presented in Section 3.

5.3.4 In order to mitigate this condition with respect to life safety of firefighters, the local fire and rescue service should be consulted with respect to this departure to ensure that they are satisfied with the design overall, taking into account that the building incorporates 6m separation from the existing building and also incorporates enhancements with respect to provisions for firefighting as presented in Section 6.

5.3.5 However, Trenton Fire recommend that fire rated façade system be employed towards the south and the west in order to prevent fire spread. A detailed analysis on the actual required mitigation can be performed at a later stage in coordination with the design team.

5.3.6 It is critical that school management including any prospective insurers are made aware of the fact that fire spread in between the two buildings is possible from a property protection/business continuity/insurance point of view. Should any party not agree with the potential loss of both buildings in a fire scenario, then options could be investigated to mitigate fire spread, however this are likely to be highly onerous.

5.3.7 The design team are to confirm the actual boundary distances towards the east (site boundary) and north (middle of the adjoining road) in order finalise the analysis and estimate the required mitigation on those facades.

<table>
<thead>
<tr>
<th>Table 7 – Limitations on roof coverings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from relevant boundary</td>
</tr>
<tr>
<td>Less than 6m</td>
</tr>
<tr>
<td>At least 6m</td>
</tr>
<tr>
<td>At least 12m</td>
</tr>
<tr>
<td>At least 20m</td>
</tr>
</tbody>
</table>

Recommendations given in this table are not exhaustive as dispensations are provided in BS 9999, including for rooflights.

<table>
<thead>
<tr>
<th>Table 8 - Boundary distance requirements for 100% unprotected façade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>South</td>
</tr>
<tr>
<td>West</td>
</tr>
<tr>
<td>North</td>
</tr>
<tr>
<td>East</td>
</tr>
</tbody>
</table>

Notes:

The radiation intensity of 84 kW/m³ has been selected for the entire façade radiator which is the governing value for most of the areas. Even if some rooms could locally employ 168 kW/m³, these are limited in size and separated by FR construction from the rest of the building. This is considered conservative as the entire façade is not likely to be engulfed in a full compartment fire. Furthermore, the combustibles within the higher risk areas are more akin to school/office accommodation.

The actual boundary distance towards the south and west have been confirmed by the design team as measured up to the notional boundary halfway towards the existing building.

The actual boundary distance towards the east and north have to be confirmed by the design team in order to finalise the analysis and inform on the mitigation required on the associated elevations.
6. **ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE**

The Building Regulations requirement BS states:

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

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

### 6.1.1 Means of notifying the fire and rescue service

In the event of a fire, the fire and rescue service will be notified by a member of staff. During operational hours the fire and rescue service will be met by a member of staff upon arrival on site. The proposed detection and alarm system could also be provided with a ‘Redcare’ or equivalent connection thus addressing an out-of-hours fire, subject to discussion with the local fire and rescue service.

### 6.1.2 The location of the fire alarm panel will be within the protected enclosure of the northern stair on the ground floor level, which would easily serve both of the fire and rescue service and building management in their operations.

### 6.1.3 Vehicle access to and around the site

1. The completed building will have a total floor area of between approximately 2,880m² and as such, Table 19 of BS 9999 recommends that fire and rescue service access is provided to at least 15% of the perimeter in buildings of this size and which are not fitted with fire mains. The proposed building will have 25% perimeter access and also be provided with a fire main, which is in excess of the minimum requirements.

2. In order to substantiate perimeter access as an enhancement, it is proposed to add access points within the site fencing separating the street, in proximity to the north-western corner of the building.

3. The fire and rescue service vehicle access to and around the building will be via Deeble road as presented in Figure 5, which will enable a pump appliance to be located within 18m and line of sight of the entrance to the protected northern stair and the dry riser inlet.

4. Any secured gates providing access to the building elevations noted above should either be unlocked before the fire and rescue service arrive on site, or be quickly and easily openable by fire and rescue service personnel.

5. It should be ensured that either turning facilities or suitable vehicle circulation routes are provided on the main road (Deeble road) so that vehicles are not required to reverse for a distance greater than 20 m. Moreover, the road and all other vehicle access routes should comply with the requirements presented in Table 9, as a minimum. The local fire and rescue service may have different requirements than those noted in Table 9 – it should be confirmed that the access provided is suitable for their fleet of vehicles.

### 6.2 Firefighting facilities provided within the development

1. As the building does not include any floors in excess of 7.5m above ground floor level, no firefighting shafts are proposed. Fire and rescue service operations will be via the two protected stairs instead.

2. Primary access to the building will be via the northern protected stair which also includes the dry riser. Each full landing of the stair will include a dry riser outlet from where the firefighters can conduct operations and reach any area of each floorplate within 45m along a route suitable for laying hose.

3. In order to facilitate fire-fighting, it is also recommended that a premises information box is also located near the main fire alarm panel.

### 6.3 Water supplies

Hydrants should be provided to within 90 m of the accessible perimeter of the building, and within 90 m from the dry riser inlets for the north stair. The local fire and rescue service should be consulted with respect to the availability of hydrants on / near the site. The existing hydrants should be located within 90m from the dry riser inlet. If no existing compliant hydrants are available, additional hydrants should be provided within 90m of the dry riser inlet.

#### 6.4.1 Means of providing a water supply for fire-fighting operations

All water supplies should be designed and installed in accordance with BS 9999 [44].

Where there is insufficient flow and/or pressure available from an existing hydrant, the water supply for the fire service should comprise one or a combination of the following:

- A private fire main with hydrants no more than 90 m from the building, and no more than 90 m apart;
- A charged static water tank providing a minimum capacity of 45,000 litres;
- A spring, river, canal or pond capable of providing or storing at least 45,000 litres of water at all times of the year, to which access, space and hard standing are available for a pumping appliance; or
- Any other means of providing a water supply for fire-fighting operations considered appropriate by the local Fire Authority.

### Table 9 – Pump-type firefighting appliance access requirements (BS 9999)

<table>
<thead>
<tr>
<th>Minimum access route specification</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width between kerbs</td>
<td>3.7 m</td>
</tr>
<tr>
<td>Width between gateways</td>
<td>3.1 m</td>
</tr>
<tr>
<td>Turning circle between kerbs</td>
<td>16.8 m</td>
</tr>
<tr>
<td>Turning circle between walls</td>
<td>19.2 m</td>
</tr>
<tr>
<td>Clearance height</td>
<td>3.7 m</td>
</tr>
<tr>
<td>Carrying capacity</td>
<td>12.5 tonnes</td>
</tr>
</tbody>
</table>

#### Figure 5 – Indicative FRS access routes

[Diagram showing fire and rescue service access routes]

*Image Ref: 40351*
6.4.4 Life-safety power supplies are necessary for the emergency lighting, illuminated signage, fire detection and alarm, and the automatic fire barriers. These should be provided with a minimum standby power supply through either a battery, a UPS, or a diesel-generator.

6.4.5 It is expected that the life-safety systems mentioned above will be provided with back-up power through provision of suitable internal or external batteries.

6.4.6 Life-safety power supplies should be provided and protected in accordance with BS 8519 [46], or in accordance with the relevant standard for the life-safety system.

6.5 First-aid firefighting

6.5.1 First-aid firefighting provisions should be assessed and provided as part of the Fire Risk Assessment, including consideration for the day-to-day management of the provisions.

6.5.2 Portable extinguishers should comply with BS EN 3-7 [47] and BS EN 3-10 [48], to be inspected and maintained in accordance with BS 5306-3 [49].

6.5.3 Where practical, fire extinguishers are to be securely hung on wall brackets. Where this is impractical, extinguishers are to be placed on a suitable base plate (not on the floor). To assist in lifting, the carrying handle of larger, heavier extinguishers should be approximately 1m from the floor, but smaller, lighter extinguishers may be mounted at a higher level.

6.5.4 Fire blanket containers to be positioned to allow the blanket to be withdrawn quickly and easily. In this respect, the base of the container should be positioned not less than 1.5m from floor level. Fire blankets are to be located in the vicinity of the fire hazard they are to be used on, but in a position that can be safely accessed in the event of a fire e.g. on the escape route.

6.5.5 In general, fire points should be located at all storey exits, within specific areas presenting a significant fire risk and to ensure coverage of at least one fire point for every 200m² of floor area. The type and size of extinguisher(s) at each fire point should be chosen in accordance with the guidance in BS 5306-8 [50].

6.5.6 The type and size of extinguisher(s) at each fire point will be chosen in accordance with the guidance given in BS 5306 [27], as summarised by Table 10 and the classification of fire fuel hazards summarised as follows:

- **Class A** – fires involving solid materials, usually of an organic nature (general hazards);
- **Class B** – fires involving liquid or liquefiable solids (such as liquid fuels, lubricants, paints, etc.);
- **Class C** – fires involving gasses;
- **Class D** – fire involving metals; and
- **Class F** – fires involving cooking media (vegetable or animal oils or fats).

6.5.7 Fire blankets are typically provided for extinguishing cooking fires. Should suitable extinguishers for cooking or metal fires be required, it would be recommended that advice from a specialist be sought.

---

**Table 10 – Fire extinguisher types and application guidance**

<table>
<thead>
<tr>
<th>Medium</th>
<th>Colour code</th>
<th>Application</th>
<th>Do NOT use for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>White</td>
<td>Class A fires</td>
<td>Liquid, electrical, metal or cooking fires</td>
</tr>
<tr>
<td>Powder</td>
<td>Blue</td>
<td>Class A, B or C fires</td>
<td>Metal or cooking fires</td>
</tr>
<tr>
<td>Foam</td>
<td>Cream</td>
<td>Class A or B fires</td>
<td>Electrical*, metal or cooking fires</td>
</tr>
<tr>
<td>CO2</td>
<td>Black</td>
<td>Class B fires</td>
<td>Metal or cooking fires</td>
</tr>
</tbody>
</table>

* AFFF Foam extinguishers may be used for electrical fires up to 35 kV (dielectric test) and where operated from a distance of at least 1 m.
7. **FIRE SAFETY MANAGEMENT**

7.1 **Overview**

7.1.1 Management procedures have a pivotal role to play in fire prevention, control and evacuation of occupants should a fire incident occur. Within domestic dwellings, this management is the responsibility of tenants, supported by the building fire safety design and handover of fire safety information. In all other areas, the Regulatory Reform (Fire Safety) Order 2005 (FSO) places legal obligations on management.

7.1.2 This section is intended to introduce the FSO, its obligations and provide initial guidance in fulfilling these duties. It is the responsibility of the landlords/ building management to ensure that all fire safety systems within the common areas are tested and maintained to ensure their continuous effectiveness. The landlords/ building management need to be aware of all fire safety features provided and their purpose.

7.1.3 This fire strategy is based on the assumption that there will be appropriate fire safety management of the premises when in use, including during community use.

7.1.4 The responsible person(s) for the premises should ensure that all fire safety arrangements being maintained are accounted for as part of their fire risk assessment(s).

7.1.5 The remainder of this section provides guidance regarding management issues identified during the strategic development of the fire safety strategy for this building. This may be utilised to inform the ongoing fire risk assessment for the building, which should monitor the degree to which these items are being upheld in practice.

7.1.6 It is important that management are aware of their responsibilities detailed in this document and agree that they are sufficiently capable of adequately performing them. Effective arrangements should be put in place to manage all aspects of fire safety in the premises and the details of those arrangements need to be recorded, e.g. within a fire safety management plan.

7.1.7 In accordance with BS 9999, there are two management system levels. One of which should be implemented and are summarised in Table 13.

### Table 11 – Management Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Management system type</th>
<th>Robustness</th>
<th>Minimum assurance</th>
<th>Conformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enhanced</td>
<td>Best Practice</td>
<td>High level of assurance</td>
<td>Conformity with a management level such as PAS 7</td>
</tr>
<tr>
<td>2</td>
<td>Adequate</td>
<td>Good Practice</td>
<td>Adequate level of assurance</td>
<td>Conformity with requirements of legislation</td>
</tr>
</tbody>
</table>

7.2 **Fire safety management documentation**

7.2.1 Under Regulation 38 of the Building Regulations, this fire safety strategy report should form part of the information handed over to the management company to enable them to enact fire safety management in the building.

7.2.2 It is recommended that adequate premises information for the fire and rescue service is provided on site in a suitable manner, e.g. premises information box or similar. Further guidance relating to the format of this information can be obtained from the London Fire Brigade Fire Safety Team or in Annex O of BS 9999.

7.3 **Regulatory Reform (Fire Safety) Order 2005**

7.3.1 The Fire Safety Order came into effect in October 2006 and applies to all non-domestic premises in England and Wales, including the common parts of blocks of flats or houses in multiple occupation. The ‘responsible person’ has a duty to make the premises safe and must undertake regular fire risk assessments. It is the responsible person who will be held accountable under the new legislation for any breaches in fire safety.

7.3.2 In workplaces, the responsible person is the employer. In other cases, the owner or person in control of the premises is the responsible person.

7.3.3 Under the Order, the ‘responsible person’ must implement a fire management plan, including the undertaking of regular fire risk assessments. The assessment should be reviewed regularly and reassessed if the use of the building has been varied or a material alteration has been made. The significant findings must be recorded, along with the measures taken to address the risks identified. A competent person should carry out the fire risk assessment.

7.3.4 The act also extends the duties and obligations of the responsible person to anyone who has any extent of control over the premises. Some examples include a branch manager, building supervisor, the facilities management company and the head teacher of a school.

7.4 **General responsibilities of the Fire Safety Manager**

7.4.1 Management of fire safety must be integrated with all other management systems. If this management is lacking, then there is a danger that all the other areas such as security measures and alarm systems will be ineffective. To ensure there is no doubt as to where the responsibility for fire safety rests, and to enable consistency of approach, it is important that each establishment appoints a designated Fire Safety Manager. This should be a senior appointment preferably at Head or Deputy-Head level. It may be possible to appoint a professional to take on this role but that will depend on the size of the premises, costs, etc.

7.4.2 The appointed person should have the necessary authority and powers of sanction to ensure that standards of fire safety are maintained. The main duties of the Fire Safety Manager include:

- Managing the building to minimise the incidence of fire (fire prevention); e.g. good housekeeping and security;
- Producing and updating the Emergency Fire Plan;
- Being aware of all of the fire safety features provided and their purpose;
- Being aware of any particular risks on the premises;
- Being aware of their responsibilities towards disabled people;
- Being in attendance on the premises whenever members of the public are present or when the building is occupied. It is acceptable for a competent person other than the fire safety manager to be in attendance at such times, provided that this person has been delegated in writing and that cover is not interrupted;
- Liaising with the fire authority, the licensing authority and other relevant enforcing authorities;
- Ensuring that all necessary and appropriate communication systems are in place to deal with any fire incident;
- Monitoring the adequacy and ensuring the regular maintenance of fire-fighting equipment;
- Ensuring fire escape routes and fire exits are kept unobstructed and doors operate correctly;
- Ensuring that fire detection and protection systems are maintained, tested and proper records are kept; and
- Dealing with individuals who sabotage or tamper with safety systems, ignore smoking policy or block exits.

7.5 **Specific fire safety management requirements**

7.5.1 Good housekeeping is required to ensure that the effectiveness of the fire safety provisions is maintained. This includes the adequate provision for the disposal of waste and / or rubbish. Where appropriate, these facilities will be emptied daily, and the rubbish stored in a suitable area outside the building. Maintenance procedures will be developed to ensure that all equipment and services are able to operate effectively. Maintenance staff will be trained in the importance of the fire safety systems and planned maintenance programmes developed.
7.5.2 It is recommended that all held-open doors should be programmed to release overnight to reduce the risk of these distorting. They should also be checked regularly to ensure they close correctly on activation of the fire alarm.

7.5.3 Service risers and storage cupboards, being fire doors that are not provided with automatic closing devices, are to be kept locked shut whenever these are not in use.

7.5.4 Escape routes should generally have wall and ceiling linings achieving a Class 0 surface spread of flame standard, apart from permitted exceptions noted in this report. These finishes must be maintained for the life of the building and manufacturer’s guidelines should be followed with respect to maintenance and replacement of their products. Display features or items such as posters, artwork pieces, etc. may be included with appropriate consideration, justification and on-going control.

7.5.5 Management should ensure that any maintenance personnel working in the roof areas are fully briefed with regards to the evacuation procedures in case of fire, and are fully able to navigate all the roof escape routes, including the access hatches, unaided.

7.5.6 Management should ensure that the security strategy for the school allows for the deactivation of magnetic locks in the event of an out-of-hours fire. In the event of an out-of-hours fire, member of the public should be allowed to evacuate via the same routes that would be available during school use.

7.5.7 Disabled persons should be briefed into the evacuation / refuge procedures for the school. Accompanying staff should also be aware of the procedures such that they may assist if required. The school are to develop procedures for the evacuation of disabled persons. These should not rely on the fire and rescue service for assistance. Disabled persons include those with mobility, sensory or cognitive impairments.

7.5.8 Suitable assembly points should be identified that are remote from the access routes used by the fire and rescue service.

7.5.9 Security gates should not restrict egress away from the building to assembly points. If these are to be provided with lock and keys, staff should be in possession of the keys to the gates, such that they may open the gates to permit further escape away from the building. Staff should all be aware of their responsibilities with respect to evacuation of pupils within a fire scenario, including non-teaching staff.
8. DESIGNER'S ASSESSMENT FOR FIRE SAFETY DURING CONSTRUCTION

8.1 Introduction

8.1.1 The Construction (Design and Management) Regulations 2015 (CDM 2015) [1] sets out what designers are required to consider to protect those involved in the construction or ongoing use of a project. As part of this legislation, designers are required to provide consideration of specific challenges presented by their design, and to remove, reduce or consider how risk would be suitably managed, whilst this can influence the design of the building.

8.1.2 The Fire Protection Association (JCOP [2]) and the Health and Safety Executive (HSE) (HSG168 [3]) issue guidance on identifying and managing fire precautions during construction works, which should be consulted by the principle contractor or their specialist advisor when developing their construction fire safety plan. This guidance is also utilised within this designer’s risk assessment.

8.1.3 Ultimately, the provision of a suitable degree of fire safety within the construction site will be the responsibility of the principle contractor, supported by their fire safety specialist (where appointed). This section provides initial consideration of solutions which may provide a suitable degree of fire safety during construction within the constraints of the permanent design.

8.1.4 This section is not intended to be exhaustive or to provide comprehensive solutions. The intention of this section is to outline possible fire safety solutions to demonstrate that an adequate level of fire safety during construction is viable, and how this may be achieved. The principle contractor may utilise and develop the following proposals, or implement alternative solutions where considered preferable and providing a suitable degree of fire safety.

8.2 Key fire safety challenges

8.2.1 Developing educational buildings on a larger existing site presents certain challenges during the construction period for fire safety. These may include:

- Ensuring that means of escape from the existing areas are not adversely affected;
- Ensuring that fire and rescue service provisions for the existing areas are being maintained;
- Limiting possible fire spread in between the construction site and the existing neighbouring buildings.

8.3 Possible suitable construction solution

8.3.1 It is expected that a full construction phase fire safety strategy be developed to be implemented on site during construction. This strategy should include an assessment on the likely impact of the site on the existing areas and ensure that adequate mitigation is proposed. It is expected that procedures will be employed to evacuate both the construction site and the neighbouring school building in a fire scenario on either side of the hoarding line.

8.3.2 With respect to means of escape of operatives on site, to meet the recommendations of JCOP and HSG168, at least one protected stair should be provided from the building, assuming that temporary access will be provided throughout the building to enable access to all haki stairs and internal stairs. It would be recommended that the proposed stair cores be utilised for this purpose, including suitable security / safety provisions to separate occupied areas from the construction areas. Enclosure of these stairs during construction would require that any penetrations into the core are temporarily fire-stopped, until such time that the permanent fire-stopping is installed. Temporary self-closing fire doors should also be provided to each protected core, and these should achieve a rating of FD30S or better.

8.3.3 It would be recommended that haki stairs remain in place until such time that the proposed stairs can be safely utilised and are available for beneficial use. Any early removal of the haki stairs should be subject to conducting a fire risk assessment and implementing suitable alternative control measures.

8.3.4 Control measures such as no storage zones, designated storage areas and policies for the daily removal of waste are recommended to assist with the prevention of combustibles accumulating in escape routes.
9. REFERENCES


These areas should include accessible escape routes for disabled occupants and should be as per the fire safety strategy report, BS 9999 and the documents referenced therein. However, in order to enable flexibility in use in the future, this level was designed with the fire risk assessment in mind. Therefore, the fire safety strategy developed up to this stage is still at high level only and subject to coordination with the design team and the local fire authority. Any changes or modifications to the existing building should be non-combustible in order to ensure that it does not form a medium that facilitates fire spread.

The stair and the lobby serving the stair should be kept as fire sterile with no combustibles being proposed within. The kitchen area will not include food preparation and therefore is not considered as high risk. However, in order to ensure that the area can be converted to another use in the future, the kitchen has been designed in a way that it does not form a medium that facilitates fire spread. Any canopy or connection to the existing building should be non-combustible in order to ensure that it does not form a medium that facilitates fire spread.

The final exits from this level, including those which represent the final exit from a stair, should include accessible escape routes for disabled occupants. These escape routes should be as per the fire safety strategy report, BS 9999 and the documents referenced therein. This is likely to impact on an existing design. Additionally, in order to avoid having protected escape routes over unprotected space, the protected egress of the building should include a 2m wide accessible route. This would require the disabled occupants having a choice of two directions of escape on this level, once outside the building.

Localised lightly refurbished areas are beyond the scope of this review. It has been assumed that the existing condition created therein is no less satisfactory. These areas have not been reviewed with respect to compliance with parts B1 to B5.

All final exits from this level, including those which represent the final exit from a stair, should include accessible escape routes for disabled occupants. These escape routes should be as per the fire safety strategy report, BS 9999 and the documents referenced therein.
The fire safety strategy developed up to this stage is still at high level only and subject to coordination with the design team and agreement with building control including their statutory consultation with the local fire and rescue service. Unless otherwise shown, all fire safety provisions should be as per the fire safety strategy report, BS 9999 and the documents referenced therein.

In order to mitigate escape past the central void from north-western classroom, an additional escape door should be provided which should enable occupants to escape through adjoining classroom. The escape route should be maintained as available at all times using special management provisions.

In order to mitigate escape past the central void from south-western classroom, an additional escape door should be provided which should enable occupants to escape through adjoining classroom. The escape route should be maintained as available at all times using special management provisions.

A disabled refuge is required, including an emergency voice communication system.
A disabled refuge is required, including an emergency voice communication system.

Please define the plant proposed within this area.

In order to mitigate escape past the central void from classroom 02-019, an additional escape door should be provided which should enable occupants to escape through classroom 02-018. The escape route should be maintained as available at all times using special management provisions.

A dry riser outlet should be provided within this protected stair on each full landing.

To ensure fire emergency escape routes remain provided for all lands, please consider the proposal to relocate within the stair.

A disabled refuge including EVC is required, as shown.

The stair and the lobby serving the stair should be kept as fire sterile with no combustibles being proposed within.

This protected stair on each full landing should be kept as fire sterile with no combustibles being proposed within.

A review of the provided evacuation proposals is required.

A dry riser outlet should be provided within this protected stair on each full landing.

Please ensure all fire safety provisions are maintained to be fully compliant with the fire safety strategy.

The stair and the lobby serving the stair should be kept as fire sterile with no combustibles being proposed within.

A dry riser outlet should be provided within this protected stair on each full landing.

A review of the provided evacuation proposals is required.

A dry riser outlet should be provided within this protected stair on each full landing.

Please ensure all fire safety provisions are maintained to be fully compliant with the fire safety strategy.

The stair and the lobby serving the stair should be kept as fire sterile with no combustibles being proposed within.

A dry riser outlet should be provided within this protected stair on each full landing.

Please ensure all fire safety provisions are maintained to be fully compliant with the fire safety strategy.
Unless otherwise shown, all fire safety provisions should be as per the fire safety strategy report, BS 9999 and the documents referenced therein.

The fire safety strategy developed up to this stage is still at high level only and subject to coordination with the design team and agreement with building control including their statutory consultation with the local fire and rescue service.

**Special limitations apply for rooflights as per Section 34 of BS 9999.**

Access for the roof through the plant room is not permitted. Please consider the proposal to relocate within the north stair.
The following are considered to be significant risks in the design:

- Shelter: Existing hedgerow to be adjusted to suit access for fire and rescue service personnel. Subject to Approval. Note: additional planting may be required.
- Allow to create pathways as indicated, for refuse access. Refer to Civils information for proposed levels to rear of new block fence and gate pathway. Tarmac or similar approved.
- Maintainence Access: 2m wide perimeter maintainence only. Existing fenceline to be retained. Refer to Civils information for details.
- Existing Steps and handrailing to field to be retained and new block pathway to be extended / adjusted to meet up with steps with existing perimeter pathway. Refer to Civils information for details.

It has been assumed that the school site boundary is in excess of 50m on this side of the building and that no other buildings are existing or proposed within 20m of the school site.

In order to mitigate this condition with respect to the safety of the fire detection and alarm systems should be interlinked and include a robust wired connection so that detection anywhere within the two buildings results in an immediate alarm in both buildings. Furthermore, the disabled refuge EVC systems and supporting management procedures should be interlinked to cover both buildings at the same time. This enables the disabled occupant to escape through the building in the direction of the dry riser outlet valve. For the disabled refuge to be effective a minimum head room of 2.6m is required as a consequence of maintaining accessible escape routes, the entire perimeter of the building should include a 2m wide accessible route. This would result in the disabled occupant having a choice of two direction of escape on this level, once outside the building.

The boundary distance from the building to the end of the road is required for external fire spread calculations.

For two different reasons a 2m high perimeter would be required on the northern protected stair core and the dry riser inlet valve.

As shown in the diagram, the dashed line denotes proposed link canopy between new and existing buildings.

Note: Subject to Fire Consultant Review. Refer to Civil Engineer's Information for Finished Floor Level.

Ownership Boundary: Extent of Proposed Works (external)

Proposed fire and rescue service vehicle access route via the main road (Deeble Road) to be within 18m and line of sight of the entrance to the northern protected stair core and the dry riser inlet valve.

All final exits, including those which represent the final exit from a stair, should include accessible escape routes. Accessible means that would result in the disabled occupant having a choice of two direction of escape on this level, once outside the building.

Brooke Weston Trust

Kettering Science Academy

Job No.

Scale

As shown

Prepared by:
Alexandru Dragan
Codrin Florescu

Checked by:
Date:
11/02/19

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