INTERNATIONAL FIRE CONSULTANTS LIMITED

TECHNICAL NOTE
TN/21784/02E
Overview and Principles of the Fire Safety Strategy for the Temporary Building

Project: Minet School Extension
Client: Morgan Sindall Construction & Infrastructure
Issue Date: 04 May 2022

Introduction

International Fire Consultants Ltd (IFC) has been commissioned by Morgan Sindall Construction and Infrastructure Limited to advise on fire safety design of a new structure which is to be built on the Minet School site as temporary accommodation while works are undertaken to refurbish and extend the school's main building.

This technical note provides a brief overview of the approach and main provisions in the design to satisfy the requirements of Part B (fire safety) of the Building Regulations 2010 (as amended) and the Department for Education's property protection policy. It should be noted in this context that the Building Regulations apply to all structures which are erected and remain in situ for more than 28 days. The building will, therefore, not be temporary for the purposes of those Regulations.

In the following, the existing design and the alterations have been assessed against the design standards and guidance in the Department for Education's Building Bulletin 100 (BB 100).

Overview of the Building

The building will be a single-storey structure arranged with an L-shaped footprint. There will be two corridors – hereinafter referred to "corridor 1" and "corridor 2" – which run parallel to each other over the length of the longer leg and will be connected by five doors

Corridor 1 will run only the length of this leg, terminating to Food / Science / DT and Food Bay / Practical Resources rooms on the east side.

Corridor 2 will run the entire length of the L-shaped footprint, leading to the Main Hall on the southern corner.

The space between the two corridors will be approximately a metre wide. Except for the five points where the two corridors are connected, this space will be external to the building, i.e. will constitute a series of small courtyards. The parallel corridors will form a central spine, with rooms along either side. The kitchen will be at the joint between the two legs. Note that this kitchen will be a prep kitchen, and that the main kitchen in the existing building, where food is cooked, will remain in use.

Assuming that the building will be occupied in turn by either the Infants or the Junior School, based on current pupil and staff levels an occupancy of up to 530 is anticipated.

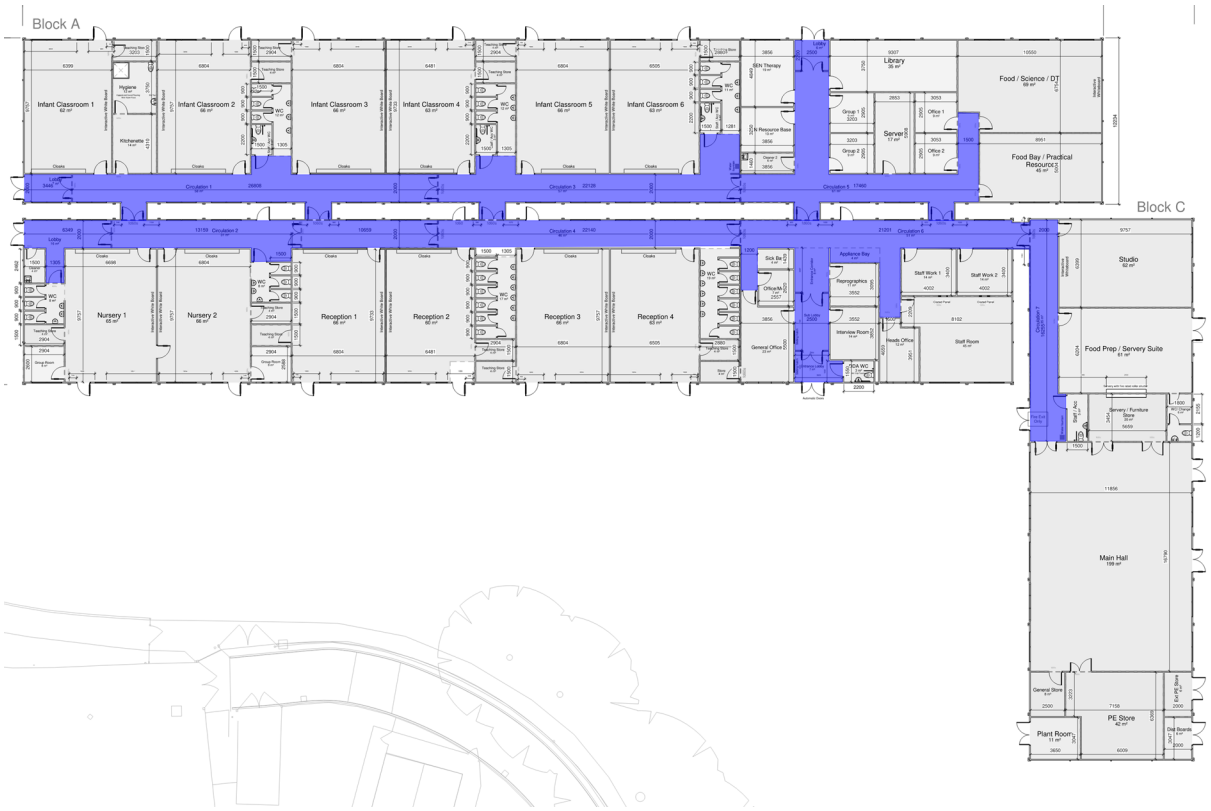

Figure 1 – Overview of the building

Means of Detection and Warning

The minimum requirement for fire detection and alarm for the schools is generally a Category M fire detection and alarm system complying with BS 5839-1:2017. However, because there are inner rooms in the building, as well as to provide enhanced protection for property and operational continuity, a Category L2 automatic fire detection and alarm system (AFD), which is designed, installed, and commissioned in accordance with BS 5839-1:2017, will be provided.

This system will be linked to the main control panels for the alarm system in both the infants' and junior schools to ensure that management across the campus can be alerted in the event of a fire.

NOTE: In order to provide enhanced protection for property and operational continuity, it is advisable to provide an automatic fire detection and alarm system connected to an external call receiving centre.

It should be highlighted that the proposed fire alarm system will be a dual-purpose system which will also serve the school's security lockdown procedures. The system will be programmed such that the Cause & Effect protocols for the event of a fire will override the lockdown protocols.

Means of Escape

Each class, nursery, and reception room will have its own exit leading to outside.

Protection of Means of Escape and Arrangements for Inner Rooms

There will be two small inner rooms (in addition to general store rooms and toilets) – i.e., Group Room, from Nursery 1 and 2. These, however, will not pose high risk as the occupancy is very low and the access room has its own exit leading to outside. In the staff and admin area where the offices and staffroom will be located it is proposed the individual rooms will also effectively be inner rooms due to the presence of an appliance bay which will be open to the corridor. The Hygiene room will be also an inner room to the kitchenette. However, the inner room arrangements are acceptable, as the building will have automatic fire detection.

Within the staff and admin area there will be a spur corridor. BB 100 advises against the incorporation of dead-end corridors in newbuild schools. However, the existence of a dead-end corridor can be considered acceptable in a staff area of a temporary building. Furthermore, due to the presence of the appliance bay, it is not proposed to construct the corridors in this part of the building as protected corridors, but instead, as discussed above, to treat all rooms in this part of the building as inner rooms.

There will also be a spur off the corridor in the part of the building which will be accessed by pupils, serving the Food/Science/DT classroom.

BB 100 advises that each dead-end corridor should be protected by at least 30-minute standard of fire resisting construction. These spurs will be less than 4.5 m long and can be considered reasonable in a temporary building, particularly as the former will only be used by a single class and the latter by small numbers of persons.

As stated above, the two corridors running between the main entrance and the exit at the southern end of the building will be connected by five fire doors. Each of the corridors will be subdivided approximately mid-way along their length by fire doors. Some cross-corridor partitions pass through the compartment lines – see below.

Capacities

There will be five exits from the corridors. Each will have a clear width of at least 1300 mm, providing capacity for 270 persons each. Thus, if any one exit is discounted, the total capacity will be greater than the total occupancy of the building.

There will be three exits from the Main Hall – two opening directly to outside, the third to the corridor, as shown in the figure overleaf. Each will be at least 1300 mm wide. One of them will open against the direction of egress. The capacity of an inward-opening door is limited to 60 people. On the principle that the widest exit from any room or area should be discounted when determining the total capacity for that room or area, the current arrangement provide capacity for 330 people.

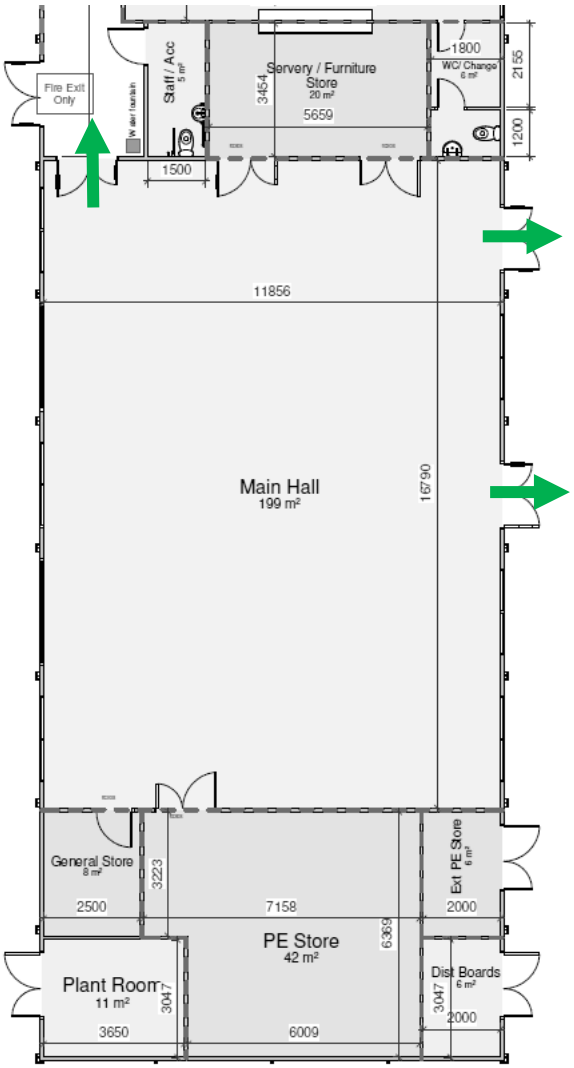

Figure 2 – Fire exits to Main Hall

Means of Escape for Persons with Impaired Mobility

In the case of the temporary building, given that it is a single-storey building, with step-free egress from all exits, the provision of disabled refuges is not deemed necessary.

IFC has been advised by the schools' management[1] that, there are currently no children with mobility issues within the school. However this is reviewed on a regular basis, and the school have confirmed that they will compile a personalised emergency evacuation plan (PEEP) if any pupil is identified as requiring assistance to evacuate the premises.

[1] E-mail from Caroline Adamczyk of Minet Infant & Nursery School to Jaspal Sian of Morgan Sindall, dated 10th February 2022

Assembly point

An assembly point will be designated for both the Junior and the Infant School in the Junior School playground as shown in Figure 3.

NOTE: The assembly point will be accessed via a gate in the perimeter fence of the playground. This gate opens against the direction of travel. The Schools' emergency procedures[2] foresee that all staff who are designated as fire wardens will be issued with a key. IFC would consider that this arrangement is reasonable, in view of the temporary nature of the building and the fact that this is a gate in open space where staff and pupils can move away from the building rather than in an enclosed area.

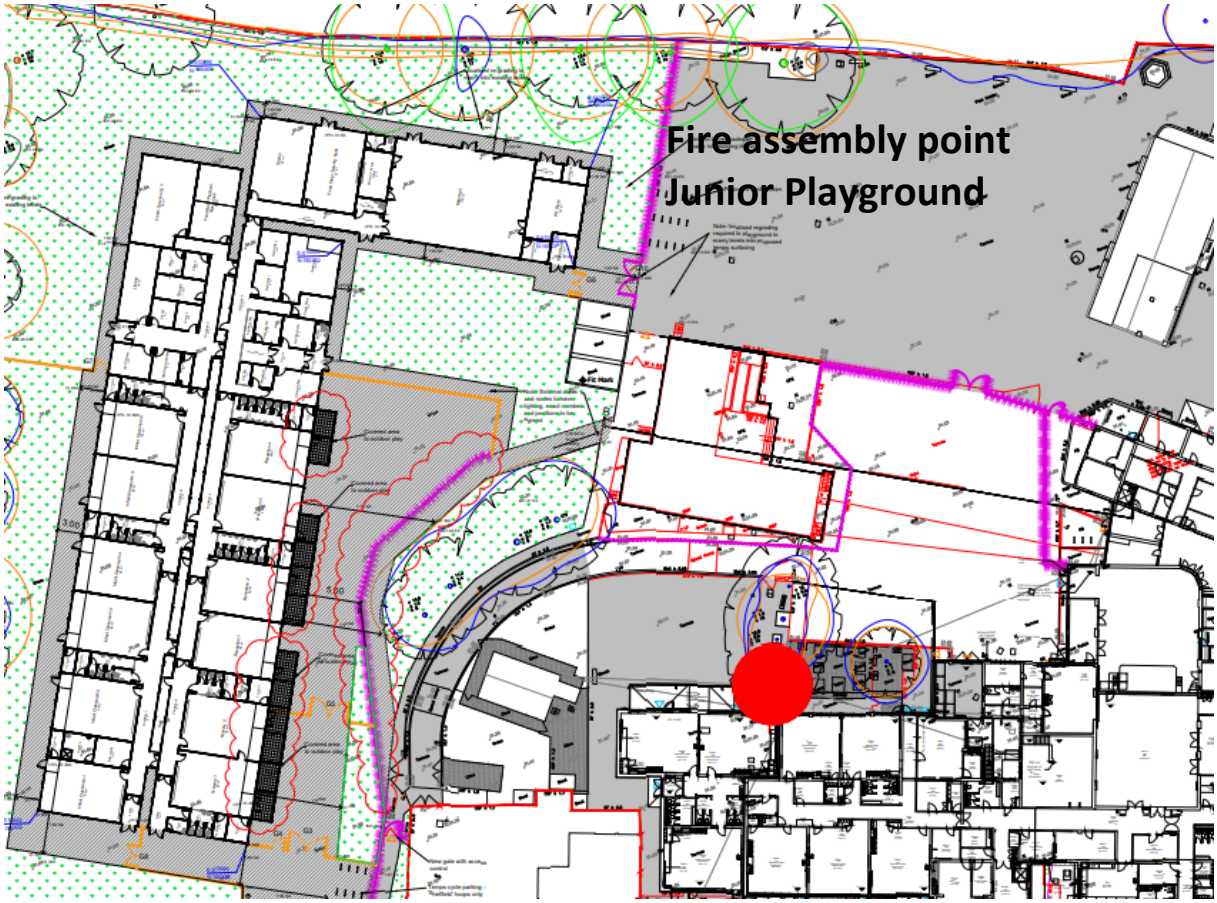

Figure 3 – Assembly point

Wall and Ceiling Linings

All materials lining the walls and ceilings should achieve the following classifications:

- in rooms of up to 30 m^2: Class D-s3,d2 as defined in BS EN 13501-1:2018;

[2] Minet Infant mobile building fire strategy exit routes – presentation slides issued to IFC via e-mail, 27 April 2022

- in other rooms: Class C-s3,d2 as defined in BS EN 13501-1:2018;
- in circulation spaces: Class B-s3,d2 as defined in BS EN 13501-1:2018.

Structural Fire Resistance and Compartmentation

The building will be subdivided into compartments in line with the guidance in BB 100 – see below under *Property Protection.*

The enclosures of all places of special fire hazard will be constructed to at least a 30-minute standard of fire resistance. These will be:

- all Store Rooms (including the PE Store);
- Plant Room and Distribution Boards;
- Food Prep/Servery Suite;
- Server Room;
- Reprographics Room;
- Food/Science/DT;
- Food Bay/Practical Resources;
- Kitchenette; and
- Staff room (due to the presence of tea point).

Any cavities or voids should be provided with cavity barriers in accordance with the guidance in BB 100.

External Fire Spread

The external faces of the extensions to the external walls and of any alterations to the existing external walls will achieve at least Class C as defined in BS EN 13501-1:2018.

An analysis will be provided to determine whether any of the external walls are required to be fire resisting. However, due to the subdivision of the building into small compartments, it is anticipated that the whole of the external walls can be unprotected.

The external surfaces of all new sections of roof and any alterations to the existing roofs will achieve a Class B_{ROOF}(t4) as defined in BS EN 13501-5:2016.

Access and Facilities for the Fire Service

The floor area of the building will be just over 2000 m^2. For buildings of this size, BB 100 would recommend that access be provided for fire appliances within at least 15 % of the perimeter. A vehicle tracking simulation has been carried out for a standard pumping fire appliance. The results are shown in Figure 4, from which it can be seen that vehicle access is available to significantly more than 15 % of the perimeter.

There is an existing hydrant immediately adjacent to the vehicle entrance to the site in Avondale Drive. This is within 100 m of where the building will be erected and thus compliant with BB 100 recommendations.

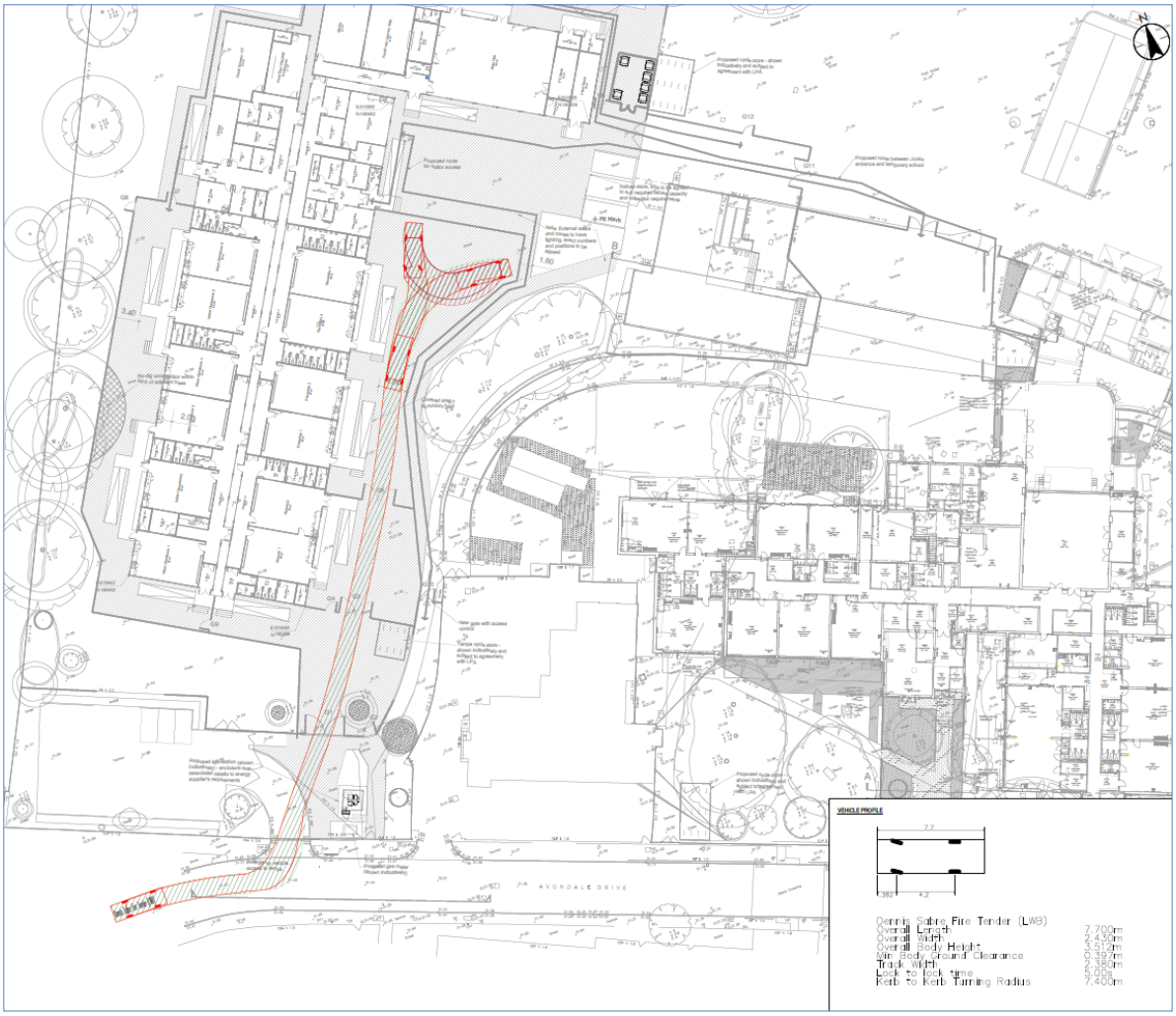

Figure 4 – Fire service access & access tracking

Property Protection Provisions

Automatic Fire Suppression

There is currently no infrastructure on the site for an automatic fire suppression system.

NOTE: The BB 100 "Fire Risk Analysis Tool" classes the building as "average" risk, and recommends that a sprinkler system be retrofitted to the building. IFC would recommend that a cost-benefit analysis be carried out to assess the business case for whether the provision of a sprinkler system would be proportionate to the risks in view of the temporary nature of the building.

Compartmentation

The building will be subdivided into compartments which do not exceed the recommended limit of 800 m^2 for unsprinklered buildings. The compartment walls will achieve at least a 60-minute standard of fire resistance. IFC would recommend subdividing the building into four compartments. Indicative compartmentation lines are shown in Figure 5.

NOTE: BB 100 would recommend that a 120-minute standard of fire resistance be provided for enhanced property protection. IFC recommend that a cost-benefit analysis be carried out to establish whether this would be warranted on a building which is intended for a short life span.

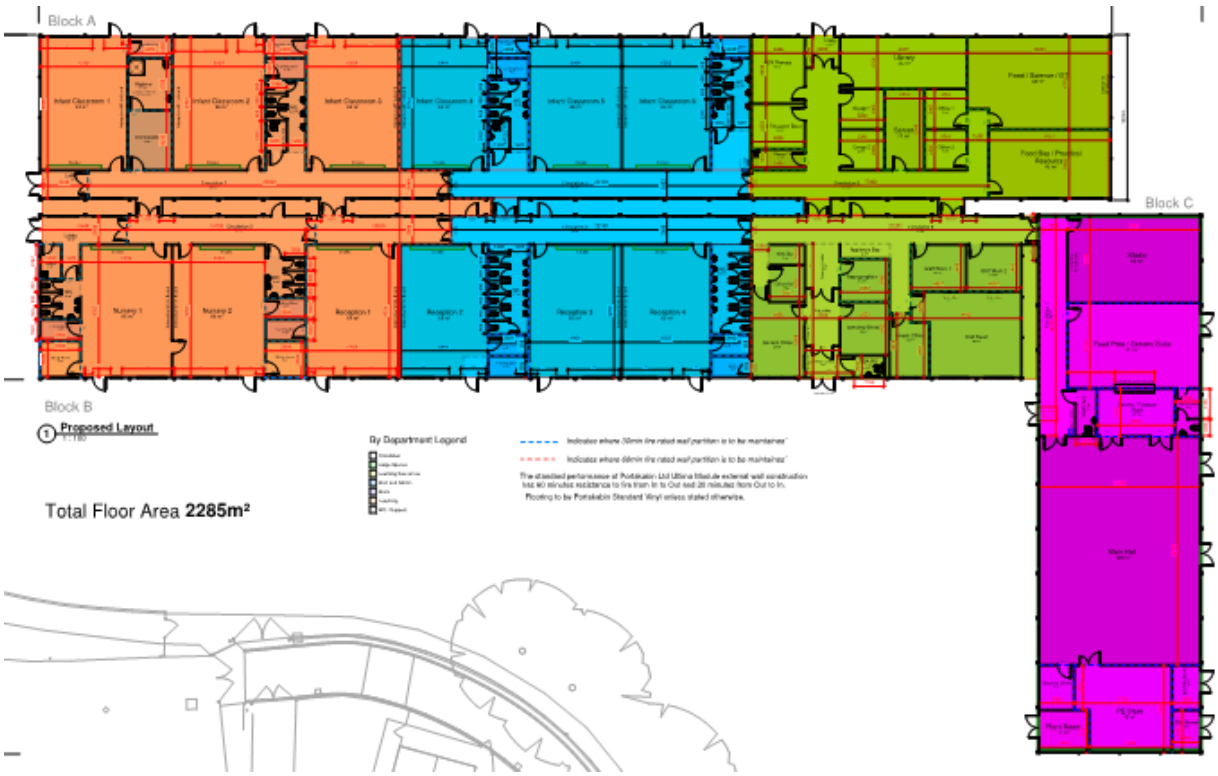

Figure 5 – Indicative compartmentation lines

Store Rooms

All store rooms will be enclosed in fire resisting construction achieving at least a 30-minute standard of fire resistance.

The classrooms will be provided with cloakrooms – there will be no coat hooks on the walls of the extensions to the corridors.

Limitations

Our advice is strictly limited to the scope of our current brief, i.e. the development of a fire safety strategy for the new temporary building on the Minet School site.

International Fire Consultants Ltd have not reviewed any other issues within the project other than those identified in our report. We offer no comment on the adequacy or otherwise of any other aspects of the development (whether related to fire safety or any other issue) and any absence of comment on such issues should not be regarded as any form of approval. The advice should not be used for buildings other than that named in the title.

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