

fds consult

**Kensington Aldridge Academy,
London W10**

Fire Safety Review

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FIRE SAFETY REVIEW – CONTENTS

EXECUTIVE SUMMARY

- 1.0 INTRODUCTION
- 2.0 FIRE SAFETY REQUIREMENTS
- 3.0 EXTERNAL WALL SPECIFICATION
- 4.0 KAA FIRE SAFETY STRATEGY SUMMARY
- 5.0 KAA FIRE SAFETY REVIEW
- 6.0 CONCLUSIONS

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EXECUTIVE SUMMARY

FDS Consult has prepared this report on behalf of Royal Borough of Kensington Council (RBKC) following the Grenfell Tower fire to provide additional re-assurance regarding the specification of the cladding used on the Kensington Aldridge Academy (KAA) building.

In our opinion, the factors noted below demonstrate that a high standard of safety has been incorporated in the design of the building.

- The external walls of the KAA building are covered with aluminium composite material (ACM) panels which have a core of combustible Styrofoam insulation. The type of ACM panel used on KAA is different to that used on Grenfell Tower and, except for a few small isolated areas, is backed up with non-combustible mineral insulation.
- Following the Grenfell Tower fire, the government commissioned a series of fire tests to establish the performance of commonly used ACM panels with different filler specifications backed up by different insulation materials. This raised safety concerns regarding their use, particularly on tall residential buildings.
- KAA is not a tall, residential building. The top floor of the building is less than 18 m above ground level and the specification of the panels comply with the fire safety requirements of the current Building Regulations. Notwithstanding this, in view of the current concerns regarding the use of ACM panels in the external walls of buildings, FDS Consult undertook a holistic fire safety review of the building considering the external wall cladding and the other fire safety measures incorporated within the building.
- KAA is fitted with a comprehensive automatic fire detection and alarm system which will provide early warning to all parts of the building in the event of a fire alarm and will be evacuated simultaneously.
- The building is divided into relatively small fire compartments at each floor level which will restrict the effects of a fire.
- The building is served by three fire protected escape stairways, two of which are protected to a higher standard to assist with the fire-fighting strategy.
- The stairs are protected to a higher standard than the minimum recommendations which means that they should always be available for evacuation.
- Travel distances from every part of the building, measured to an escape stair at upper levels or final exits at the lower levels are well within the maximum recommended distances. This will reduce the time taken to reach a protected stair or final exit compared to the longer distances permitted by the guidance. Once in the main corridors, the location of the stair creates a choice of evacuation routes so that occupants can evacuate in an alternative direction if necessary.
- The external wall construction is provided with horizontal fire resisting barriers at every floor level and at the junction of compartment walls with the external wall which will help to restrict the spread of the effects of fire within the external wall construction during the evacuation.
- The shape and proportions of the KAA building will also help to restrict the effects of smoke and fire spread compared to a taller building with a smaller footprint.
- During the last year, the building has been subject to an audit process to re-confirm the standards of fire safety in preparation for its re-occupation in September 2018. As part of this process, physical inspections have been undertaken to confirm the fire safety measures meet statutory requirements.

1.0 INTRODUCTION

- 1.0.1 This report has been commissioned by Royal Borough of Kensington & Chelsea Council to provide additional reassurance regarding the specification of the cladding used on the external walls of Kensington Aldridge Academy (KAA).
- 1.0.2 Following the Grenfell Tower fire, the government commissioned a series of fire tests to establish the performance of commonly used aluminium composite material panels with different filler specifications backed up by different insulation materials. This raised concerns regarding their use, particularly on tall residential buildings.
- 1.0.3 The external walls of the KAA building are covered with aluminium composite material (ACM) panels which have a core of combustible insulation. The type of ACM panel used on KAA is different to that used on Grenfell Tower and is mostly backed up with a non-combustible mineral insulation batt. The top floor of the building is less than 18 m above ground level for which Building Regulations guidance does not restrict the use of combustible insulation therefore the cladding panel specification meets the fire safety requirements of the current Building Regulations and provides an adequate level of safety.
- 1.0.4 Notwithstanding this, in view of the current concerns regarding the use of ACM panels and combustible insulation in the external walls of buildings, this report provides a holistic fire safety review of the building considering the external wall cladding and the other fire safety measures incorporated within the building.

2.0 FIRE SAFETY REQUIREMENTS

- 2.0.1 As stated in the Exova Warringtonfire fire strategy report, the KAA building was designed to comply with the fire safety requirements of the Building Regulations using Building Bulletin 100 (BB100) as recommended by Approved Document B (ADB).
- 2.0.2 BB100 is a fire safety design guide published by Department for Children, Schools and Families in 2007. It makes recommendations regarding means of warning and escape, internal fire spread, external fire spread and access and facilities for the fire and rescue service. In addition to recommendations for compliance with the Building Regulations (which are for life safety), BB100 also provides additional recommendations for property protection.
- 2.0.3 A key property protection measure is the provision of sprinklers. However, these are not mandatory for either property protection or life safety and do not form a part of the Exova fire safety strategy for KAA which relies upon a high degree of internal compartmentation instead.
- 2.0.4 BB100 does not restrict the use of combustible insulation within external walls for either life safety or property protection. ADB does not restrict the use of combustible insulation in the external wall of a building with a storey less than 18 m above ground level.
- 2.0.5 The top floor of KAA is the 3rd floor which is 14.4 m above lowest ground level (southern courtyard). Based on the above, the use of ACM panels and the inclusion of combustible insulation within the external walls of KAA complies with both BB100 and ADB.

3.0 EXTERNAL WALL SPECIFICATION

3.0.1 The building structure comprises a reinforced concrete frame and floors. The external walls are lined internally with plasterboard sheets and externally with a proprietary ACM panel as shown in Figure 1 below. The rest of the external wall specification is confirmed below.

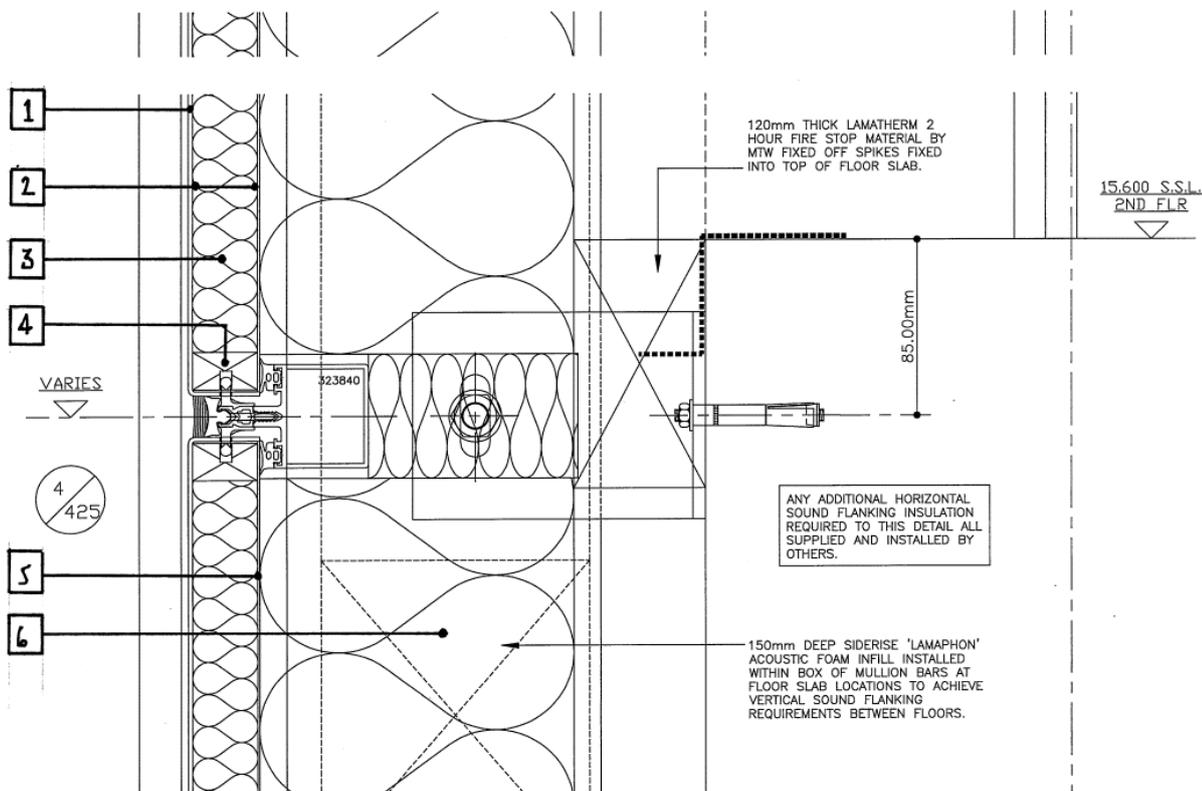


Figure 1 – Section through main external wall type

Legend to Figure 1

1. 2 mm polyester powder coated aluminium outer
2. Apollo A7535 single-component sprayable moisture-curing polyurethane adhesive
3. 31 mm thick Dow Styrofoam LBA insulated core (Class E reaction to fire in accordance with BS EN 13501)
4. Nylon perimeter packer with continuous slot
5. 1 mm mill finish aluminium balance
6. 150 mm thick Rockwool mineral wool 140 kg/m³ high density R6 insulation (Class A1 reaction to fire)

3.0.2 The perimeter of the ACM panels are machine with 80 mm long slots to allow the panels to be fixed using a Schuco retaining toggle. The joints between the panels are sealed with a resilient flexible sealant and cavity barriers are closed state (i.e. no ventilation openings) therefore it as an unventilated rainscreen cladding system.

3.0.3 As an alternative to the specification shown above, Kingspan K15 insulation (phenolic foam with a Class C-s1, d0 reaction to fire) is used instead of Rockwool for acoustic reasons. This alternative specification relates to three panels in one room at lower ground floor level (see Figure 2) and seven classrooms at ground floor level (see Figures 3 and 4) as highlighted in pink.

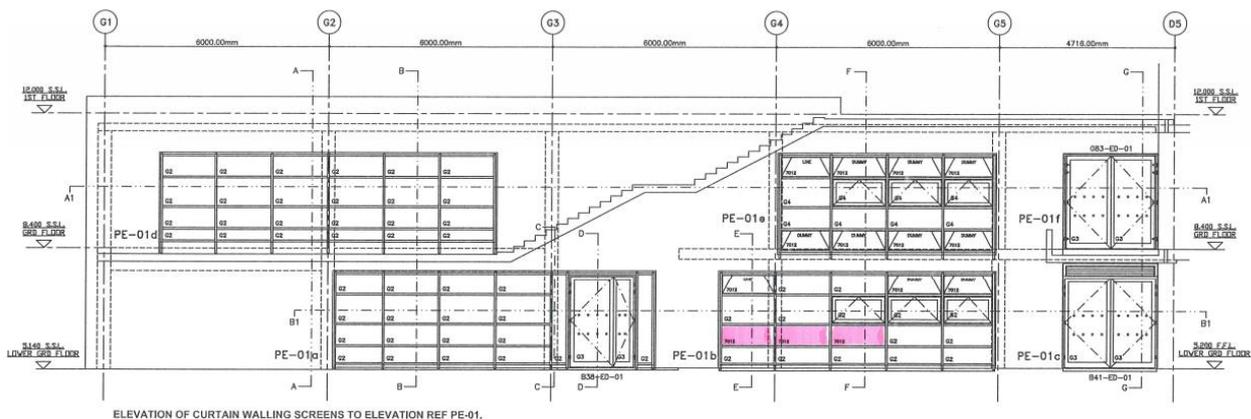


Figure 2 – Lower ground floor level

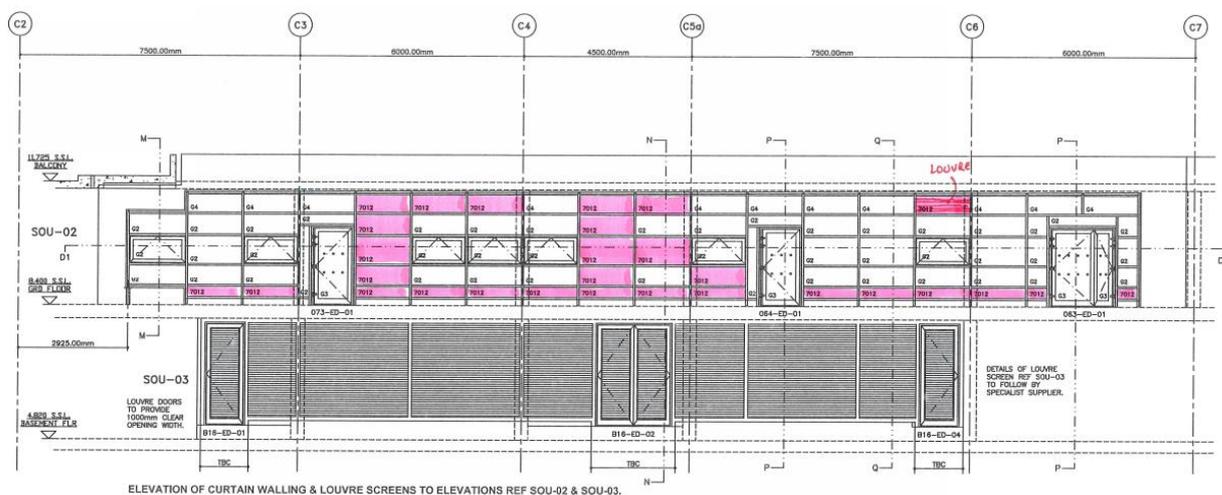


Figure 3 – Ground floor level

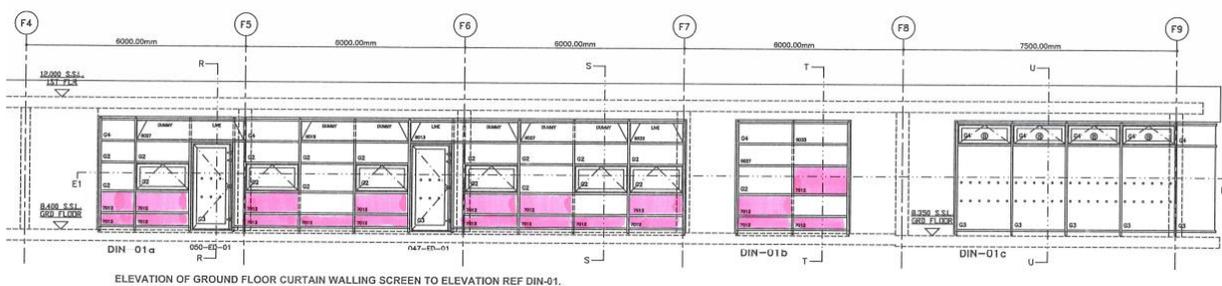


Figure 4 – Ground floor level

4.0 KAA FIRE SAFETY STRATEGY SUMMARY

- 4.0.1 The fire strategy for KAA was produced by Exova Warringtonfire and is documented in the report dated 5th August 2014 (Issue 13). The report specifies the following key fire safety measures will be provided based on the recommendations in BB100:
- a) A simultaneous evacuation strategy following a short investigation period;
 - b) A Category L1 automatic fire detection and alarm system in accordance with BS 5839-1:2013;
 - c) Escape capacity based on a total occupancy of 1290 people and assuming full utilisation of the accommodation at the upper floor levels;
 - d) Alternative escape routes away from the atrium balcony edges and natural smoke vents at the head of the atrium;
 - e) Travel distances compliant with BB100;
 - f) Three protected escape stairways;
 - g) Refuge space for wheelchair users with emergency voice communication systems within the protected escape stairs;
 - h) Emergency lighting to all escape routes in accordance with BS 5266;
 - i) Escape signage in accordance with BS 5499;
 - j) 60 minutes fire resistance to load-bearing elements of structure;
 - k) Maximum compartment size limits of approximately 800 m²;
 - l) A compartment floor between the lower ground floor and ground floor accommodation;
 - m) Service risers which pass through the ground floor slab to the lower ground floor level constructed as 60-minute fire resisting protected shafts;
 - n) Places of special fire hazard enclosed in 30-minute fire resisting construction;
 - o) Unprotected areas in the external walls limited in accordance with BR187;
 - p) Natural smoke ventilation to the sports hall and dance studio;
 - q) Two of the escape stairways designated as fire fighting shafts including dry rising fire mains, fire fighting lifts and natural smoke vents.

5.0 KAA FIRE SAFETY REVIEW

- 5.0.1 FDS Consult have reviewed the fire safety strategy for KAA and our comments are as follows.
- 5.0.2 It is expected that all users of KAA will be awake and the majority will be familiar with the building and therefore the fire safety arrangements in the event of an incident. This will result in a faster response time and shorter evacuation time compared to other occupancy purpose groups.
- 5.0.3 According to the commissioning certificates, KAA is provided with a Category L1 automatic fire detection and alarm system in accordance with BS 5839-1:2013. This will provide for automatic smoke detection throughout the building.
- 5.0.4 ADB, BB100 and BS 5839-1 all recommend that a Category M fire alarm system (no smoke detection) will normally be sufficient for a non-residential building where people are awake and familiar with the building (e.g. a school). The KAA fire detection and alarm system is used to provide early warning of a fire to people in rooms where the only escape route available is through another rooms (i.e. an inner room arrangement). The fire detection and alarm system can therefore be considered to provide very early warning of a fire during the incipient stages. This will be of benefit where individual rooms and spaces are unoccupied during the day and will create more time in which to safely evacuate the building.
- 5.0.5 In the event the fire alarm is actuated, there will be a short investigation period to check for a false alarm, followed by immediate simultaneous evacuation of the building. The evacuation process will be closely managed, with each teacher responsible for ensuring the safe evacuation of their class. Based on the principles in both ADB and BB100, once the evacuation is commenced it is assumed that complete evacuation of the school can be completed within 2½ minutes. Regular fire drills will be held to assist with ensuring safe and efficient evacuation of the building.
- 5.0.6 The building is served by three protected escape stairs (enclosed in at least 60-minute fire resisting construction), one at each end of the building and one located centrally. The stairs are protected to a higher standard than the minimum recommendations which means that they should always be available for escape.
- 5.0.7 Travel distances from every part of the building, measured to an escape stair at upper levels or final exits at the lower levels are well within the maximum distances recommended by BB100. This will reduce the time taken to reach a protected stair or final exit compared to the longer distances permitted by the guidance. Once in the main corridors, the location of the stair creates a choice of escape routes so that occupants can escape in an alternative direction if necessary.
- 5.0.8 The compartment sizes on each floor level are restricted to 800 m² in line with the recommendations in BB100. It is significantly smaller than the 2,000 m² limit for other buildings of this risk profile. and is understood to have its origins in early guidance for schools in relation to property protection. Smaller compartments, such as provided at KAA, will reduce the area affected by a fire and provide additional protection against the effects of a fire during the horizontal escape phase. The shape and proportions of the KAA building will also help to restrict the effects of smoke and fire spread compared to a taller building with a smaller footprint.
- 5.0.9 The external wall construction is provided with horizontal fire resisting barriers at every floor level and at the junction of compartment walls with the external wall which will help to restrict the spread of the effects of fire within the external wall construction during the escape phase. These have been audited as part of the re-occupation inspection process.
- 5.0.10 The building is provided with two firefighting shafts, one at each end of the building, and these will provide good facilities from which the Fire Service can launch a robust firefighting strategy inside the building. In addition to this, the height of the top floor on the north side of the building is 10.8 m above the adjoining ground level from which a fire can effectively be fought from outside the building without the need for specialist high reach fire appliances.



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- 5.0.11 The fire strategy has been developed on a conservative basis using the guidance in BB100 rather utilising more advanced guidance such as BS 9999, which allows a more transparent and flexible approach to fire safety design through use of a structured approach to risk-based design, where designers can take account of varying physical and human factors. A BS 9999 based fire strategy would still comply with the fire safety requirements of the Building Regulations but would permit longer travel distances, narrower escape routes and larger compartments than recommended in BB100. The margin for safety in KAA is therefore higher as a result on the approach taken.
- 5.0.12 During the last year, the building has been subject to an audit process to re-confirm the standards of fire safety in preparation for its re-occupation in September 2018. As part of this process, physical inspections have been undertaken to confirm the fire safety measures meet statutory requirements.

6.0 KAA FIRE SAFETY REVIEW

- 6.0.1 The top floor of KAA is less than 18 m above the lowest adjoining ground floor level for which guidance in BB100 and ADB for compliance with the Building Regulations do not restrict the use of combustible insulation within the external wall construction of the building.
- 6.0.2 Notwithstanding that the use of combustible insulation in the external wall construction of KAA complies with the Building Regulations, FDS Consult have conducted a fire safety review to provide additional reassurance.
- 6.0.3 In our opinion, the following factors provide for a high standard of safety within the building and provide acceptable mitigation for the combustible external wall insulation in line with the recommendations in BB100 and ADB.
- Non-residential purpose group therefore no sleeping risk involved;
 - Simultaneous evacuation strategy following the investigation period;
 - Early warning provided by the L1 automatic fire detection and alarm system;
 - Multiple escape stairs;
 - High degree of compartmentation;
 - Height of building;
 - Fire brigade access and facilities;
 - High standard of management that it is understood will exist when the building is re-occupied;
 - Managed evacuation process;
 - The audit process that the building has been through for re-occupation.