

RURAL URBAN SYNTHESIS SOCIETY

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RUSS Church Grove

**London Plan Policy D12
Fire Safety**

Compliance Statement

Draft B

Client: RUSS
Architect: SEH
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Author: Nigel Hiorns



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CV OF AUTHOR**NIGEL HIORNS**

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Nigel is Managing Partner of Fire Ingenuity. Nigel has a fundamental engineering and safety & reliability background complemented by over 25 years as a fire engineer in leading building design consultancies. Nigel has also developed British and European Fire Safety Engineering standards for buildings and advice for UK Government on how to apply and assess building fire safety. Nigel has class-leading experience in the practice and practising of fire engineering as a consultant.

Nigel is acknowledged for his ability to develop sophisticated solutions from a technically-excellent skill-base:

- Fundamental (mechanical) engineering skills, with specialist expertise in fluid dynamics, mathematics, & thermodynamics.
- Formal Safety, Risk & Reliability expertise, having operated in mature risk-based sectors including defence, nuclear, transport, oil & gas.
- Sophisticated modelling expertise, having developed commercial and in-house CFD software and commercial evacuation modelling software.

Nigel has had involvement, and continues to be involved, in development of national and European standards, guidance, and national strategy via committee representation. This includes:

- FSH24, continuing development of BS 7974, the fire engineering standard for the design of buildings. This has recently been re-written and issued (March 2019). As well as a general overview role, Nigel has specific roles in the following Published Documents (BS7974 comprises the Standard and supporting Published Documents):
 - Panel Chair PD-7: Probability Risk Assessment
 - Panel Member PD-2: Fire modelling
 - Panel Member PD-5: Fire & Rescue Service Intervention
 - Panel Member PD-6: Evacuation Modelling
- Designated UK Principal Expert on Fire Safety Engineering for development of CEN European Fire Safety Engineering Standards in Buildings (CEN TC127 WG8)
- General role in rationale for development of FIRECODE for DoH
- BS9999 Means of Escape for BSI.
- Developing Key Performance Indicators for Fire Engineering and also developing fire safety guidance - both for the Office of the Deputy Prime Minister (ODPM), to enable Building Control to assess engineered solutions more effectively.

Nigel is currently acting as an expert witness on a c500apartment multi-block mixed-use development, having been specifically requested by the fire engineering consultancy (part of a major national multi-disciplinary building engineering consultancy practice) to represent them due to his expert knowledge and experience of residential design and approvals processes.

In accordance with the London Plan Policy D12, Nigel is a suitably qualified assessor: a qualified engineer and Member of the Institution of Fire Engineers and a competent professional with the demonstrable experience to address the complexity of the design being proposed.

1 INTRODUCTION

RUSS is a volunteer-led Community Land Trust (CLT) based in Lewisham, with a current membership of over 700 and rising. Founded in 2009 with the mission of creating sustainable neighbourhoods and genuinely affordable homes, RUSS aims to tackle the housing crisis across London with a new model for sustainable, affordable, and community-led housing. As RUSS' first housing project, Church Grove will establish, refine and prove the RUSS model, enabling future developments in Lewisham and elsewhere in London.

The design is for 36 flats and houses in three and four storey terraces facing south onto shared open space. The mix of dwellings is:

Tenure	Units	Note
Social Rent	4 x 1Bed 2 x 2Bed	For people currently under-occupying larger council accommodation which will, in turn, indirectly release those larger homes back into the social rented housing supply.
London Living Rent	2 x 3Bed	For young people unable to afford market rents, to allow them to access good quality, independent housing by renting a room or studio apartment instead of sub-divided small homes in the private rented sector.
Shared Ownership	1 x 1Bed 4 x 2Bed 4 x 3Bed 3 x 4Bed	(At an effective discount on open market rates) for households who cannot buy on the open market, but who are not eligible for social rented homes (i.e. the 'intermediate' market).
Shared Equity	9 x 1Bed 7 x 2Bed	(At 80% of open market rates) for people wishing to downsize or to own their first home. Homes will be well-designed, allowing people to stay in their homes longer and place less of a burden on social and health care services by offering mutual support through neighbourliness.

Across the scheme there will be:

- 90% Building Regulation Part M4(2) Accessible and Adaptable Dwellings and 10% M4(3) Wheelchair User Dwellings.
- Two 1Bed and one 2Bed dwellings are designated as M4(3) Wheelchair User Dwellings.
- In accordance with the 2017 extant scheme's planning condition, the M4(3) dwellings will be delivered as M4(3)(2a) Wheelchair Adaptable Dwellings

The amended scheme maintains (and improves) the degree to which the site is accessible to the local community:

- The revised scheme (2020) proposes to relocate the community hub to the building erected at the eastern corner of the site which currently has a temporary planning consent. RUSS and the residents will apply for planning permission to retain this temporary hub as a permanent building which will provide shared facilities for the development, establish links with the local community, provide a wider community resource and create a base for RUSS to disseminate information on sustainable development. *The community hub is a temporary building separate to the MMA proposals.*
- The communal laundry room, RUSS office / shared workspace and guest room are located to the southern end of the East Block.

The basis of the fire strategy design is BS9991 (2015) "Fire safety in the design, management and use of residential buildings – Code of practice". The housing is all Mainstream as defined in BS9991 (there is no specialised or residential care housing).

RUSS is a “major development” in terms of planning, since it comprises more than 10 households.

This fire strategy statement demonstrates how compliance with “Policy D12 Fire Safety” of the London Plan is achieved:

- A In the interests of fire safety and to ensure the safety of all building users, all development proposals must achieve the highest standards of fire safety and ensure that they:
- 1) identify suitably positioned unobstructed outside space:
 - a) for fire appliances to be positioned on
 - b) appropriate for use as an evacuation assembly point
 - 2) are designed to incorporate appropriate features which reduce the risk to life and the risk of serious injury in the event of a fire; including appropriate fire alarm systems and passive and active fire safety measures
 - 3) are constructed in an appropriate way to minimise the risk of fire spread
 - 4) provide suitable and convenient means of escape, and associated evacuation strategy for all building users
 - 5) develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in
 - 6) provide suitable access and equipment for firefighting which is appropriate for the size and use of the development.
- B All major development proposals should be submitted with a Fire Statement, which is an independent fire strategy, produced by a third party, suitably qualified assessor.
- The statement should detail how the development proposal will function in terms of:
- 1) the building's construction: methods, products and materials used, including manufacturers' details
 - 2) the means of escape for all building users: suitably designed stair cores, escape for building users who are disabled or require level access, and associated evacuation strategy approach
 - 3) features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans
 - 4) access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and positioning of equipment, firefighting lifts, stairs and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these
 - 5) how provision will be made within the curtilage of the site to enable fire appliances to gain access to the building
 - 6) ensuring that any potential future modifications to the building will take into account and not compromise the base build fire safety/protection measures.

2 OVERVIEW

The development is for residential and associated use, and comprises low-rise buildings with a maximum of 4 storeys and no apartment storey greater than 11m above ground level.

The fire strategy has been coordinated into the design from the outset to achieve an enhanced standard for Building Regulations compliance. The initial strategy was for sprinklers to apartments, an evacuation lift, and use of BS9991 (2015).

There were initial discussions with Guy Shattock Associates (Approved Inspector) at Stage 2 in 2016 to agree principles for the design.

BS9991(2015) was selected as the design guidance for the project since:

- It was the most up-to-date guidance at that time.
- It explicitly dealt with the balcony deck access.
- It dealt with the open-plan apartment options that were proposed.
- In common with its sister publication BS9999, BS9991 is intended for “designing buildings to be managed”.

BS9999 (2015) can still be regarded as the highest standard guidance for our development, noting Approved Document B (November 2020):

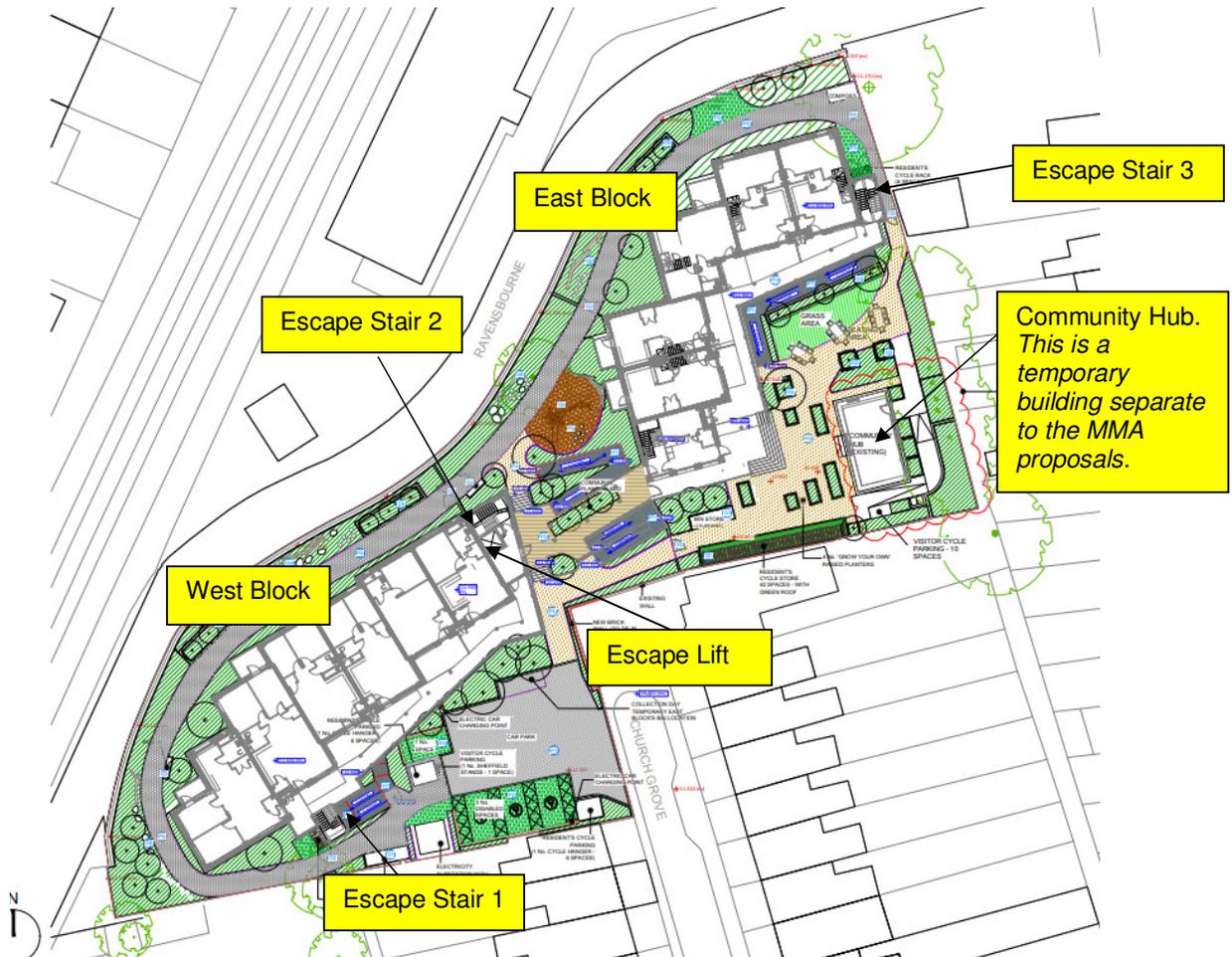
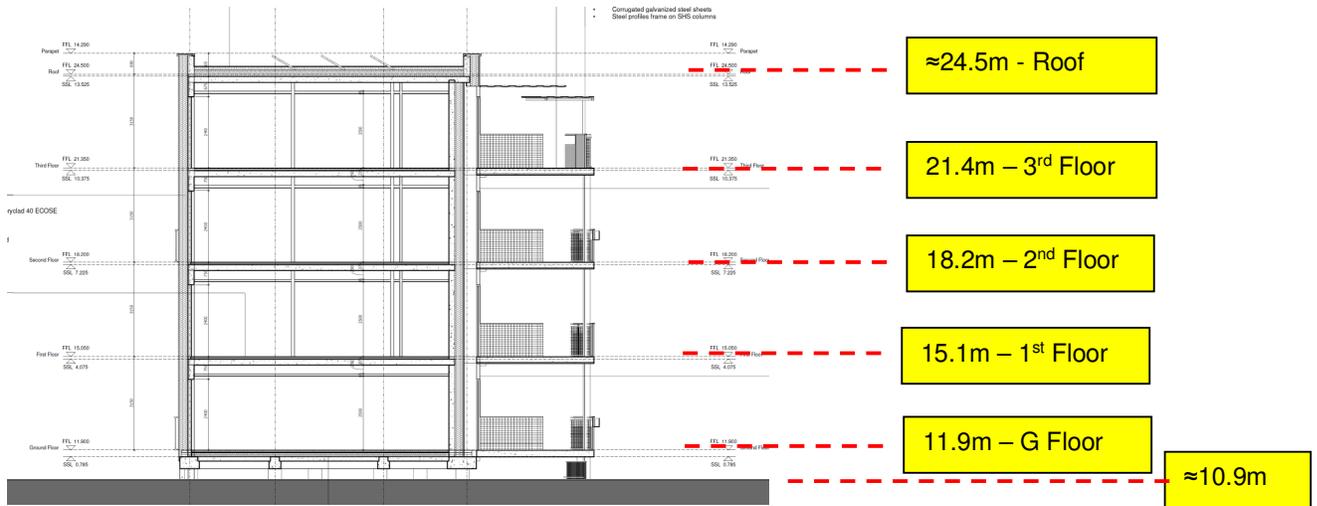
- Refers to BS991 (2015) for balcony deck access situations.
- Still has no explicit guidance on open-plan apartments.
- Still has little guidance on management.

As can be appreciated, the ambition from the outset has been to improve on the already high standard required for Building Regulations compliance. Also, learning has been taken from the Hackitt Review and the Moore-Bick Inquiry following the Grenfell tragedy (subsequent to the start of our project) in June 2017. The enhancements above the standard required for Building Regulations compliance include:

- All dwellings are provided with a BS9251 residential sprinkler system, even though the buildings could have been designed to achieve Building Regulations compliance without any need for sprinklers.
- All dwellings are provided with a mains-based Grade D LD1 fire alarm system, even though the buildings could have been designed to achieve Building Regulations compliance with a lower standard system.
- The insulation and facade in the external walls system will be either non-combustible (European Classification A1) or of limited combustibility (European Classification A2-s1, d0), even though the legislation (SI 1230) would only require this in residential buildings over 18m.
- An evacuation lift is provided; this would not be necessary for Building Regulations compliance.
- Fire information signs are to be provided in a means that all residents can understand.
- The building construction is concrete frame, which has inherent fire resistant, with jumbo-stud partitions forming apartment walls. The standard of fire resistance for elements of structure and for separation between the apartments is 60mins. 60mins is the guidance for Building Regulations compliance non-sprinklered apartments, and it can therefore be appreciated that the performance in the RUSS development (with residential sprinklers in every apartment) will significantly exceed the performance required for Building Regulations compliance.
- The balcony access decks are fire-rated to 60min, as opposed to the guidance 30min.
- RUSS has appointed its contractor (Rooff) in line with the “Golden Thread” construction control plan (Hackitt’s intent of this is to ensure that the fire strategy is not compromised by changes during construction).
- The Tenants’ handbook and the RUSS office on site will further assist ensuring that the fire strategy is not compromised during operation, as will maintenance of systems in accordance with the manufacturers’ recommendations.

3 BUILDING DESCRIPTION

There are a variety of dwellings provided over four storeys, as per the introduction. The ground floor is on a podium and the units are accessed by a deck, with the deck served by a central lift and three principal stairs. The approximate storey heights are as per the schematic below.



4 BUILDING CONSTRUCTION

The building construction is concrete frame, which has inherent fire resistant, with metal-stud partitions forming apartment walls.

The standard of fire resistance for elements of structure and for separation between the apartments is 60mins. 60mins is the guidance for Building Regulations compliance non-sprinklered apartments, and it can therefore be appreciated that the performance in the RUSS development (with residential sprinklers in every apartment) will significantly exceed the performance required for Building Regulations compliance.

The residential sprinkler system is to be extended to provide coverage to the communal areas in the East Block (Communal laundry room, RUSS office / shared workspace and guest room) (noting this as an additional benefit, over the performance required for Building Regs compliance). The supply will be the residential sprinkler supply and sprinkler heads will be provided in the communal areas. *Therefore this will not be a "standard" system; the intention is to provide a benefit taking advantage of the infrastructure for the residential sprinklers.*

5 MEANS OF ESCAPE

The residential escape comprises:

- Escape from the dwelling.
- Escape in common areas.
- Escape for disabled persons.

The means of escape strategy is "stay-put", in accordance with best practice; only the apartment of fire origin will evacuate initially. The alarm system is stand-alone; alarm is only given in the dwelling affected by fire.

- All dwellings are provided with a BS9251 residential sprinkler system, even though the buildings could have been designed to achieve Building Regulations compliance without any need for sprinklers.
- All dwellings are provided with a mains-based Grade D LD1 fire alarm system, even though the buildings could have been designed to achieve Building Regulations compliance with a lower standard system.

Once out of the apartment, the escape is via the external balcony access deck. Three escape stairs are provided to serve the access deck. The central core is also provided with an evacuation lift, which is above the standard necessary for Building Regulations compliance. Ramps give flexibility of use and escape from the ground storey.

Given the presence of sprinklers and the building construction, the risk of fire spread to other dwellings is significantly reduced (significantly lower than the risk accepted for Building Regulations compliance). The persons who evacuated from the fire apartment can readily be accommodated on site clear of firefighting vehicles and firefighting operations. There is also potential for use of the community hub. The situation is the same (persons evacuated can be accommodated on site clear of firefighting vehicles and operations) should other dwellings choose to evacuate or if the fire service (following a dynamic risk assessment on arrival) choose to evacuate additional dwellings.

6 PV FIRE SAFETY

Church Grove has roof-mounted PV systems.

The roof would only be accessed for maintenance of the roof or PV panels.

A single direction of escape is sufficient on the following guidance basis: *'Plant room or rooftop plant: escape route in open air (overall travel distance 60m if one direction only, 100m if more than one direction).'*

The fire safety implications of PV systems are only recently beginning to be considered in the UK. The principal life safety concern associated with PV panels is firefighting. There are two aspects:

- PV cells will continue to create voltage and current if there is received insolation.
- The DC voltage causes muscles to contract; therefore there is a tendency for muscles to “grip” rather than be thrown –off. This is therefore more inherently dangerous

An isolator switch is to be provided at fire service access **AND** at roof access level within any core(s) serving roofs with PV's. This isolator switch is to isolate the voltage as close as practicable to the PV cells.

7 ACCESS AND FACILITIES FOR THE FIRE SERVICE

The development does not have a storey above 18m, so firefighting shafts are not required.

A fire main is proposed with outlets in each of the three stairs and additional locations, to facilitate effective firefighting. The fire main is specified to BS9990 (2015).

It is noted that all dwellings are provided with a BS9251 Category 1 residential sprinkler system – which is a higher standard than required for Building Regulations compliance – and this should reduce the implications of a fire and may extinguish it. Therefore there would be an associated benefit to firefighting and rescue operations. As stated in LFB's consultation response (1/3/19) to the Technical Review of ADB (and consistent with Fire Service general recommendations):

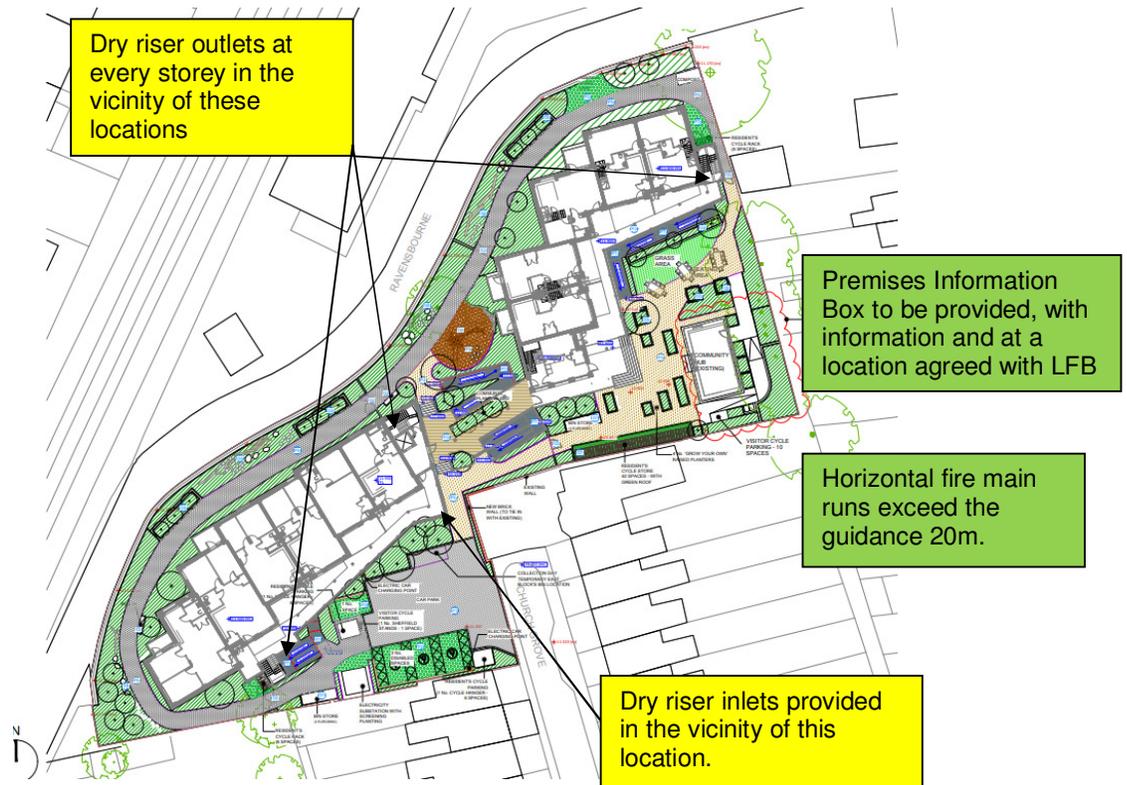
“There will be an additional cost to the design for the suppression system. However, occupants will have the protection of a suppression system to aid their escape. It is also expected that firefighters will be attending smaller fires causing less damage from smoke, fire and water. “

Tracking for a 7.9m pumping appliance was undertaken in May 2018 following LFB GN 29 (Guidance Note 29) Appendix 1. *It is noted that the LFB response to planning dated 3/5/18 also did not anticipate issues with fire vehicle access or water supply: It stated “Pump appliance access and water supplies for the fire service were not specifically addressed in the supplied documentation, however they do appear adequate. In all other respects the proposal should conform to the requirements of part B5 of ADB”.* There has been a reconfirmation (by a different consultant) of the ability of a 7.9m pumping appliance to access the site and turn (refer to tracking drawing below), as there was a need to redo the tracking due to a minor change to the site plan.



It is noted that the existing Church Grove has an extensive dead-end condition without an associated turning facility.

The proposal is for the dry riser inlets to be located as follows, so that they are within 18m of the fire vehicle (as per the standard guidance). Outlets are proposed as indicated, to reduce travel distance for firefighters and enable all points of all apartments to be reached within 45m of the outlet.



This does involve horizontal runs in excess of the guidance 20m, yet the hydraulic design of the system should be straightforward to ensure that the performance of the fire main is satisfactory. It is noted that a dry main can serve storeys up to 50m, and as our top storey is only approximately 10m above access level and it is more difficult to pump vertically (against gravity and the friction of the pipe) than horizontally (no gravity forces)

Similarly, there will be horizontal distances for the firefighters to travel. However, it is noted that the implications are significantly less than in other guidance-compliant accepted situations (e.g. unsprinklered hospitals with hospital streets, where the guidance is that final exits – and fire service entry points - are located with a maximum distance of 180m and stairs every 60m, and then the compartments served by a street have an outlet at the entrance and hoselaying within the compartment of up to 45m. A stair can serve storeys up to 18m without a firefighting lift). In comparison, in Church Grove

- The horizontal travel will be less.
- The vertical travel will be less.
- The access to the apartments are external, with benefits to smoke and heat ventilation.
- All apartments are sprinklered.

A premises information box is to be provided, with information and at a location agreed with the LFB. *It is noted that this is also a recommendation from the Moore-Bick Grenfell Inquiry.*

Church Grove is only approximately 250m drive from Lewisham Fire Station and there are two nearby fire stations (Lee Green and Forest Hill) within a 3-5km drive.

