LONDON FIRE BRIGADE

Consultation Response

28 November 2019

Subject

Sprinklers and other fire safety measures in new high-rise blocks of flats

Organisation

Ministry of Housing, Communities and Local Government

Introduction

London Fire Brigade (LFB) is London's fire and rescue service - one of the largest firefighting and rescue organisations in the world and we are here to make London a safer city. Decisions are made either by the London Fire Commissioner (the statutory fire and rescue authority for Greater London), the Mayor of London or the Deputy Mayor for Fire and Resilience. A Fire, Resilience and Emergency Planning Committee of the London Assembly holds the Commissioner, Mayor and Deputy Mayor to account.

Executive summary

London Fire Brigade welcomes the opportunity to respond to this consultation and to continue to support the review process to move towards a system that better provides the right level of fire safety provision for both members of the public and our firefighters.

We agree that the current height threshold of 30 metres for Automatic Fire Suppression Systems (AFSS) such as sprinklers, needs to be reviewed. We encourage the fitting of AFSS in all buildings where people sleep, regardless of overall building height. This includes all new purpose built blocks of flats, conversions, student accommodation, hostels and hotels, with particular attention being paid to buildings housing vulnerable residents such as hospitals, care homes and sheltered accommodation. Our evidence demonstrates that, at the very least, the current mandatory threshold for high-rise blocks should be reduced to 11 metres or 4 storeys/floors, whichever is the lower.

Sprinkler provision in new high-rise blocks of flats

There is clear evidence that AFSS play a highly significant role in reducing the impact of fire as part of an appropriate package of fire safety measures and reduce the impact of fire on people, property and the environment. They also assist firefighters in carrying out search and rescue operations by limiting fire development, which significantly reduces the risks to firefighters. For these reasons London Fire Brigade has long campaigned for their use more widely.

There is widespread support for AFSS – in addition to LFB, the National Fire Chiefs Council (NFCC) and fire and rescue services throughout the UK, the Fire Brigades Union, Association of British Insurers, Local Government Association, Building Research Establishment, Construction Industry Council and Royal Institute of British Architects have all championed the wider use of AFSS. There is also overwhelming public support for sprinklers – a YouGov poll of Londoners in February 2019 found that 94 per cent supported tougher regulation on sprinklers. Despite all the evidence and widespread support for AFSS our evidence shows that the voluntary approach for their inclusion in new buildings below 30 metres is not working, with developers consistently ignoring expert advice on when they should be included.

We do not suggest that sprinklers in isolation are the panacea for fire safety. They cannot be thought of as a substitute for robust fire safety measures to be included and maintained throughout the life cycle of a building. However, we appreciate that both the legislation to fix the 'broken system', as described by Dame Judith Hackitt in the *Independent Review of Building Regulations and Fire Safety*, and a full technical review of Approved Document B (ADB) will take a long time to implement. We therefore welcome the opportunity to review the current AFSS arrangements to help ensure that people are safer and feel safer in their homes and call for swift action from Government to make these changes.

The current mandatory requirement threshold height of 30 metres for AFSS in new blocks of flats is woefully insufficient. We support the proposal to lower the threshold height for the installation of AFSS in new blocks of flats and recommend that that they are fitted in all new purpose built blocks of flats over the height of **11 metres (or four storeys/floors),** whichever is the lower, at the very least. This recommendation is based on a number of key factors including modern firefighting equipment; recent serious fires where AFSS could have mitigated the impact of the fire and potentially provided additional time for rescue; to reduce the potential for developers 'gaming' the system; to bring England in line with other parts of the UK which would provide clarity to the industry and help protect the public and firefighters in England; and the expert opinion of other professionals.

We are concerned that the proposed transition period of six months could potentially be unrealistic to implement safely, given the need for competent installers and the number of considerations building owners will need make. Our view is that, subject to research, a period of **12 months** may be a more appropriate transition period to ensure the safety of future occupants rather than rushing through initial applications before the cut-off date.

The high-profile fire in a student accommodation block in Bolton on 15 November 2019, which was under 18 metres and therefore not classed as a high-rise building, focused attention on the current

failings of the building regulations system and shows that the risk of serious fire is not confined to certain height thresholds or types of premises. We note that the Government does not intend, at this stage, to provide for AFSS in other types of buildings, such as student accommodation. However, as we have emphasised throughout this process, it is essential that reform to the system following the Grenfell Tower fire deals with the built environment in the round and does not just focus on high-rise residential premises. Our concern is that by not considering mandatory requirements for AFSS in other types of buildings at this stage an opportunity to improve fire safety provision is being missed. We want to see AFSS being considered in all buildings where people sleep, regardless of overall building height.

We note that this consultation is on new high-rise blocks of flats but want to highlight that our evidence also supports a review of the existing arrangements for retrofitting existing buildings. This is specifically in existing purpose built blocks of flats over the height of 11 metres (or four floors) subject to a risk based approach and certain buildings of all heights, with examples including:

- Existing specialised housing schemes/care homes on a risk based approach;
- Buildings where the most vulnerable people live;
- Higher risk hospital buildings, in order to protect patients but also to protect the buildings which, if damaged, would have a detrimental effect on essential public services.

Wayfinding signage for fire and rescue services

We agree that a more consistent approach is needed regarding wayfinding and signage within high-rise blocks. We stress that any sign that indicates to firefighters the floor level or hazards needs to be readable and understandable at all times and in all situations i.e. low visibility and at low level with the potential for smoke or heat to obscure signage.

We have made suggestions for the way in which consistency in signage could work, for example by adopting a similar numbering system to hotels, but stress that whatever numbering system is adopted it will need to be consistent throughout the design stage consultation, all the way through to the completion and the life cycle of the building.

Our preferred option is for photoluminescent signage which will provide enough light for firefighting crews to read detail providing the signs store enough energy to luminesce when required.

Evacuation alert systems

We agree that Approved Document B should include a requirement for an emergency evacuation system, which could support fire and rescue services operational response by alerting residents if they need to evacuate. However, a building should never require the use of the evacuation alert system if it is designed, built, managed and maintained appropriately. Therefore the focus should be on ensuring buildings are safe and that such a system will never need to be used.

Further research is required before any evacuation systems can be rolled out. We have called for the Government to undertake urgent research into buildings which fail to such an extent that residents can no longer 'stay put'. The proposal is to install an alert system in buildings which are not designed to facilitate simultaneous evacuation and the research should consider how facilities in existing buildings (for example ventilation systems not designed for such a scenario) support the change of approach. The research should also include the effect of incident commanders using these systems in different configurations and any additional risk this places on occupants.

An emergency evacuation system may provide an additional tool for incident commanders to utilise during a fire. It should be recognised that the system must be supported by a package of measures to be effective and that without this it could have the potential to place more people at risk in a fire. That package of measures would include (but not be limited to) appropriate education for residents, signage and fire service consultation. Fire and rescue services must be consulted to ensure they agree with the package of measures proposed and to ensure they have appropriate understanding of the system installed.

Conclusion

We welcome the opportunity to respond to this call for evidence and are generally supportive of the overall proposals. We stress that the proposals should not be seen as a compensatory measure replacing active and passive fire safety measures that buildings are required to have, such as compartmentation.

As we stated in our response to *Building a Safer Future: Proposals for Reform of the Building Safety Regulatory System*[1], fire and rescue services cannot be regarded as a safety net for failures in the built environment. These proposals must take care not to lead to a false sense of security or a lessening of overall safety standards of any design which could be seen as a mitigating measure to deal with poor design, build or maintenance rather than dealing with the root causes of those failings.

[1] https://www.london-fire.gov.uk/media/3869/mhclg-consultation-building-a-safer-future-31-july-2019.pdf

Response to questions

Trigger height options

Question 1

Q1a: Do you agree or disagree that the height threshold for sprinkler provision in new blocks of flats should be reduced? [Agree/Disagree]

Agree.

London Fire Brigade supports the proposal to lower the threshold height for the installation of Automatic Fire Suppression Systems (AFSS) in new blocks of flats.

Q1b: If you agree that the height threshold should be reduced, what should the new threshold be and what is the evidence for this particular threshold.

We recommend that AFSS are fitted in all new purpose built blocks of flats over the height of **11 metres (or four storeys/floors), whichever is the lower, at the very least**.

The current threshold of 30 metres for sprinkler provision in flats is set too high. We note the Government's preferred option of reducing the threshold to 18 metres and welcome this as a positive step, however, this does not go far enough. Our evidence demonstrates that the threshold should be reduced to 11 metres (or four floors) at the very least for all new residential buildings.

We have conducted a recent review of our evidence and recommend a threshold of 11 metres based on these factors:

- Modern firefighting equipment;
- The expert opinion of other professionals;
- Bringing England in line with Scotland and Wales;
- Recent serious fires where AFSS could have mitigated the impact of the fire and potentially provided additional time for rescue; and
- To reduce the potential for 'gaming' of the system, for example building new premises that are just under a threshold height to avoid requiring mandatory safety measures.

Modern firefighting equipment

The longest ladder on LFB's frontline fire engines reaches a maximum working height of 11 metres.

Our understanding is that the 18 metre threshold which exists within building regulations elsewhere (e.g. the threshold for the inclusion of firefighting shafts) is a legacy from the time when external firefighting capabilities were based on the use of wheeled escape ladders (incorporating an additional ladder attachment to reach 18m). These have not been in use for decades but building regulations have not been changed to reflect this.

As set out in our response to the call for evidence on the *Technical review of Approved Document B of the Building Regulations*[2] we want to see regular reviews of building regulations with no more than five years between reviews, so they do not fall behind modern methods of construction and other changes in the built environment.

Further, there is an anomaly for protection of buildings between 11 metres and 18 metres. Most equipment carried on a frontline fire engine is appropriate for external firefighting and rescue up to 11 metres in height. This means that in between 11 metres and 18 metres, rescue and firefighting operations are usually undertaken inside the building. However, under the current guidance requirements such as firefighting shafts which are essential for firefighting within the building, are only mandatory in residential buildings over 18 metres.

In the MHCLG analysis of responses to the call for evidence on the *Technical review of Approved Document B* of the building regulations published in September 2019, there was wide recognition that 11 metres could be a potential trigger point for many other safeguards, including sprinkler protection (see for example paragraph 2, page 26).[3]

The expert opinion of other professionals

The Construction Industry Council (the representative forum for the professional bodies, research organisations and specialist business associations in the construction industry) have announced their support for the installation of sprinklers in all:

- New and converted residential buildings, hotels, hospitals, student accommodation, schools and care home buildings of 11 metres (or 4 floors) or above in height;
- Retrofit installation to existing buildings when refurbishment occurs, where a building is subject to 'material alterations';
- Support the installation of AFSS including sprinklers below this height on a case-by-case basis of risk assessment.[4]

The Building Research Establishment report: *Effectiveness of sprinklers in residential premises*[5] also makes reference that sprinklers are cost beneficial in the following premises:

- Bedsits of six units or more
- Most purpose-built blocks of flats
- All care homes

Bringing England in line with Scotland and Wales

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[2] https://www.london-fire.gov.uk/media/3491/technical-review-of-approved-document-b-of-the-building-regulations.pdf

[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/829483/MHCLG_analyses_of_the_call_for_evidence.pdf

[4] https://www.thefpa.co.uk//index.cfm?originalUrl=news-advice/news/news_detail.construction-industry-council-announces-support-for-installation-of-sprinklers-in-buildings-above-11m.html&_tkn=1091444C%2D84D5%2D4CEC%2DA77457340782195D

[5] https://www.bre.co.uk/page.jsp?id=422

There is a discrepancy between the threshold for AFSS in different parts of the UK, with Scotland and Wales afforded a better level of protection than England.

In Scotland, since 2005, sprinklers have been a legal requirement for all new care homes, sheltered housing, schools and for residential buildings taller than 18 metres. In December 2018, the Scottish Government announced a package of new measures that will come into effect in February 2021, which includes reducing that height limit to 11metres.[6]

In Wales, sprinklers have been a legal requirement since 2016 in all new domestic premises regardless of height. This applies to new build and change of use applications for new houses and flats; care homes; rooms for residential purposes (other than in a hotel, hospital, prison or short stay leisure hostel); and registered group homes and sheltered housing.

The decisions that we hope will arise from this call for evidence present a key opportunity to bring the threshold more in line with other parts of the UK and redress the imbalance between protection in England and that of Scotland and Wales.

Recent serious fires

In July 2018, firefighters were called to a rapidly developing fire on a third floor external balcony of a seven storey apartment block in West Hampstead in north London. The fire spread vertically affecting three additional balconies from fourth to sixth floor level and a further apartment located directly below the seat of the fire was also alight. In the space of 19 minutes from the time of the call, five apartments were exposed to fire and heat. However, the fire did not spread within the apartments due to the prompt activation of the AFSS. Fire damage was restricted to the glazing units/frames and heavy smoke logging was confined to the ceiling level of the apartments.

The building was below the 30 metre height threshold for the installation of AFSS but sprinklers had been installed to compensate for the open plan flat design. Without AFSS the outcome of this incident could have been much more serious with the potential for five different seats of fire on different floors of the building which would have seriously compromised the safety of residents and firefighters. With AFSS present there were no fire related injuries and personal contents in the apartments were virtually untouched by the fire.

In September 2019, a fire occurred in a low-rise residential block of flats in Worcester Park, London. The residential building was constructed of timber frame and was particularly vulnerable to fire due to the lack of cavity barriers installed. The entire building, which did not have AFSS, was destroyed.

In terms of retrofitting AFSS, consideration should be given to timber framed and modular buildings where the build quality cannot be assured. Due to the materials used in these buildings, when presented with fire and the potential lack of passive fire protection measures, such as cavity barriers, there is an increased risk of rapid fire spread and a failure of the building. Installing AFSS in these types of buildings will potentially extinguish or suppress fires, providing residents and firefighters with additional protection and could mitigate damage.

[6] https://www.gov.scot/news/building-and-fire-safety-5/

The fire in a student accommodation block in Bolton in November 2019, which was under 18 metres and therefore not classed as a high-rise building, further highlighted the current failings of the building regulations system, and shows that the risk of serious fire is not confined to certain height thresholds or types of premises.

Balconies and basements

Under the current guidance for the building regulations, balconies are considered as a 'bolt-on' feature rather than as part of the building. The fire in West Hampstead and the fire at De Pass Gardens in Barking in June 2019 highlighted the potential seriousness of balcony fires. The review of building regulations must give full consideration of how balconies can enable the potential for external fire spread and how this can spread into the building regardless of building height. The recent June 2019 amendment to the ADB guidance only requires buildings above 18 metres in height for the balconies to be non-combustible. This leaves a risk for new buildings lower than 18 metres and existing buildings of any height to be over looked by this recent review.

LFB recommends that any building with basement storeys should be fitted with AFSS throughout the building. The current guidance does not cover firefighting in deep basements. Firefighting in basements is particularly hazardous due to potentially complex layouts, limited access and egress, ventilation issues and the build up of heat and smoke within the enclosed space and AFSS are essential to mitigate the risk to firefighters working in those environments.

As one example, a recent fire in Westminster in August 2019, which was attended by around 100 firefighters and 15 fire engines, started in a basement and spread to five upper floors, as well as laterally to the neighbouring properties. Early suppression could have prevented the fire breaking out of the compartment of origin. In contrast, in November 2019 firefighters were called to a fire in the basement of an office block in the City of London. In this case AFSS had been installed and helped to suppress the fire.

Reduce the potential for 'gaming' of the system

Reducing the AFSS threshold to 11 metres would go some way to reducing the gaming we have seen in applying the building regulations. One example where we have seen this occur is the design of a block of flats to a height of 29.9 metres rather than 30 metres to explicitly avoid having to install sprinklers. We have also seen cases of developers building to just under 18 metres to avoid the requirement to include firefighter shafts.

Height and depth should not be the only criteria for considering limitations in adopting guidance, and consideration should be given to overall compartment sizes, number of floors and building use/risk. Changing the definition so that a building automatically falls within the guidance if either height or number of floor thresholds are met would prevent the current practice of designing a building up to a current threshold without having to put in additional design requirements, which is not in accordance with the spirit of the regulations.

With multiple sources of guidance available from industry bodies LFB has seen cases of 'cherry picking' whereby design teams choose between the guidance available to suit them. This can result in avoiding height thresholds and in fire safety provisions not being installed. LFB wants to see consideration of the impacts of 'cherry picking' and see the new guidance written is such a way that would reduce the ability for this to happen.

Other premises and retrofitting

AFSS should also be fitted in the following types of premises where people sleep:

- Existing purpose built blocks of flats (retrofitting), over the height of 11 metres (or 4 floors), subject to a risk based approach;
- New and existing specialised housing schemes/care homes (retrofitting), subject to a risk based approach;
- Buildings where the most vulnerable people live;
- Higher risk hospital buildings, in order to protect patients but also to protect the buildings which, if damaged, would have a huge negative impact on essential public services;
- All residential (other) buildings, e.g. hotels, student accommodation etc. over the height of 11 metres (or four floors), subject to a risk based approach.

All tall buildings where people sleep should have the protection of AFSS. When asleep, people will normally be less responsive and may take longer to become aware of and react to a fire.

LFB believes that consideration should be given to the need for retrofitting in premises where vulnerable people live. The vulnerability of the residents should be given careful consideration when fire safety measures are being put in place.

LFB's annual review of 2014/15 Accidental Dwelling Fire Data shows the need to consider personal fire risk profile along with vulnerability when ensuring an adequate level of fire protection. Home fire safety visits, including fire prevention advice and the fitting of smoke detection can reduce fire risk, but some people will continue to undertake behaviours that put them at high risk from fire. For a proportion of these people, specific tailored advice and the use of measures such as fire retardant bedding will reduce the fire risk, but where these behaviours are combined with a limited ability to respond and/or impaired mobility, AFSS offer the ability to effectively reduce risk.

We want to see AFSS fitted in high risk residential accommodation that can house the most vulnerable including all new residential care homes and sheltered (specialised) accommodation and hostels subject to a risk based approach that should include consideration of the vulnerability of the residents.

We have found a deeply concerning lack of AFSS in care homes, retirement homes and hostels, with sprinklers fitted in just one per cent of incidents our fire crews have attended. In London, there is an average of more than one fire every day in these buildings which house some of the capital's most vulnerable residents. These fires can involve people who have mobility and/or health issues that mean they are unable to escape even small fires and they may suffer fatal or life changing injuries before the fire brigade is even called. Of the 428 fires London's firefighters attended at these

premises in 2017, sprinklers were installed at just five of these incidents. There were three fatalities at these incidents and a further 53 people were injured.

There have been a number of high profile fires in care homes outside London in recent years, including:

- Rosepark fire in Lanarkshire in 2004, which resulted in 14 fatalities;
- Newgrange Care Home in Cheshunt, Hertfordshire in April 2017, which resulted in 2 fatalities and 33 rescues;
- Beechmere residential complex in Crewe in August 2019, which led to the evacuation of 150 residents.

In February 2019 LFB published an audit of fire safety in care homes[7] which showed that in 45 per cent of the 177 care homes the fire risk assessment was found to be not suitable or sufficiently comprehensive. It is important that work is done to improve this rate and ensure that responsible people are completing the actions they need to, but in addition LFB advocate that AFSS should be installed in all these premised provide greater protection to some of the most vulnerable people.

Hampshire Fire and Rescue Service fatal fire investigation report into the deaths of two firefighters in Shirley Towers, Southampton in 2010 and the Coroner's Rule 43 letter recommended that:

> *"Social housing providers should be encouraged to consider the retro-fitting of sprinklers in all existing high rise buildings in excess of 30 metres in height, particularly those identified by Fire and Rescue Services as having complex designs that make fire-fighting more hazardous and/or difficult".*

The Coroner's Rule 43 letter following the Lakanal House fire in Southwark in 2009 recommended to the Secretary of State for Communities and Local Government that:

> *"Evidence adduced at the inquests indicated that retro fitting of sprinkler systems in high rise residential buildings might now be possible at lower cost than had previously been thought to be the case, and with modest disruption to residents. It is recommended that your Department encourage providers of housing in high rise residential buildings containing multiple domestic premises to consider the retro fitting of sprinkler systems."*

Design for sprinkler provision

Q2a: Do you agree or disagree that these systems should be designed in accordance with the relevant guidance in BS 9251? [Agree/Disagree]

Agree.

[7] https://www.london-fire.gov.uk/media/3443/report-on-auditing-of-care-homes-by-london-fire-brigade.pdf

There is now an additional residential sprinkler standard, BS EN 16925:2018[8] co-existing with BS 9251:2014[9]. BS EN 16925:2018 is for residential and domestic occupancies up to four storeys or 18 metres in height, whichever is the lower. BS EN 16925:2018 contains a national foreword and two national annexes stipulating why the UK is opposed to the standard. It is anticipated a revised version of BS 9251:2014 will be published for domestic and residential occupancies exceeding this height in October 2020. BS EN 16925:2018 will then be the specific standard for residential and domestic occupancies up to four storeys or 18 metres in height, whichever is the lower.

Consideration should be given to updating ADB on the above points, specifically including a reference the national foreword and two national annexes contained in BS EN 16925: 2018.

This is a opportunity to focus on the areas of the guidance that need to be more robust for residential systems. BS 9251:2014 focuses on including resilience, installations in excess of 45 metres and where system standing pressures may challenge the sprinkler function. Resilience measures may include additional pump set, back up power supplies and extending the duration of water supplies. Any new guidance should note these considerations already exist in BS 9251:2014.

On many occasions LFB is not being consulted, including on projects where AFSS is being retrofitted, despite the fact that the installation of AFSS must breach building compartmentation, which should then be made good to the appropriate standard. We encourage informal consultations with fire and rescue services to ensure systems being proposed are fit for purpose.

An example of this is a case where LFB received notification of a partially completed watermist AFSS project. Following closer scrutiny, these systems were found not to be fit for purpose due to several deficiencies highlighted over parts of the system being installed that do not pass the appropriate test standard. This resulted in the project being put on hold following initial concerns raised by LFB and subsequent enquires made by the housing provider. These systems are now in the process of being replaced by a sprinkler system installed to BS 9251:2014, causing further disruption to residents and cost implications.

Q2b: If you disagree, what specifications and performance should be required?

N/A.

<u>Transitional provisions</u>

Q3: Do you agree or disagree that there should be a transitional period of six months? [Agree/Disagree]

Disagree.

[8] Fixed firefighting systems. Automatic residential sprinkler systems. Design, installation and maintenance.
9 Fire sprinkler systems for domestic and residential occupancies. Code of practice.

Although we want to see the new rules come into effect as soon as reasonably practicable there needs to be proper research into how long is needed to ensure AFSS are not being installed in a hurried and poor quality manner.

As we have highlighted previously, for example in our response to *Building a safer future: Proposals for reform of the building safety regulatory system*[10], competency is key to ensuring public safety in the built environment and we have long-standing concerns about competency and skills across the industry. We are concerned too tight a deadline could, paradoxically, lead to poor safety outcomes that could take many years to rectify.

Subject to research, a period of **12 months** may be a more appropriate transition period.

Some considerations are mentioned below (the list is not exhaustive):

- Availability of competent third party accredited installers;
- Availability of parts;
- Water supply demand (e.g. will the water supply need to be amended to deal with the demand?);
- Engagement with residents (both leasehold and freehold);
- Internal procurement processes;
- Sighting of AFSS infrastructure (e.g. where will it all be situated);
- Consideration to weight loading on the building due to the installation of tanks/pipework;
- A risk based approach will take time for building owners to appoint competent persons to assess all residents within the building.

Although this particular question is related to sprinklers, LFB sees this question as also applicable to the evacuation alert system. Building owners who are striving to reach good levels of safety need to factor many considerations and the government should consider this when implementing a transitional period.

Wayfinding signage for fire and rescue services

Q4: Do you agree or disagree that there should be a more consistent approach to wayfinding signage for fire and rescue services in Approved Document B? [Agree/Disagree]

Agree.

LFB recognises a more consistent approach is needed regarding wayfinding and signage within high-rise blocks. The following practicalities need to be considered:

- The numbering/labelling of the core(s) (stairwells) within high-rise buildings, ensuring that the cores are clearly marked with which floors they serve;
- Signage when the building is of a multi-level flat layout (duplex/triplex layout);
- The potential benefits of adopting a similar numbering system to hotels, e.g. Flat 101 is the first flat on the first floor;

[10] https://www.london-fire.gov.uk/media/3869/mhclg-consultation-building-a-safer-future-31-july-2019.pdf

- Consistency of a numbering system throughout the design stage consultation, all the way through to the completion and ongoing use/refurbishment of the building;
- The implications that maintenance could have on the adopted way finding option, especially around the potential risk of painting over the signage.

The Lakanal House Coroner's Inquest recommended that signage provide information to emergency services which would assist them in understanding a building's layout and quickly finding a particular flat or maisonette once inside the building.[11] Additionally, recommendation 9 from the Coroner's Rule 43 letter relating to the fire at Shirley Towers, Hampshire in 2010 also calls for wayfinding provision to assist emergency services and residents[12].

Although LFB recognises this consultation focuses on wayfinding for fire and rescue services, the Government should consider other valuable information that is relevant for the crews attending an incident, such as information relating to the isolation of key utilities, e.g. gas, water, electric, solar panels and sprinklers.

Q5: Are there any existing standards or guidance which should be introduced to the guidance provided in Approved Document B? Please specify.

Yes.

Details are set out below:

- The Health and Safety (Safety Signs and Signals) Regulations 1996
- HSE L64 - Safety signs and signals. The Health and Safety Regulations 1996. Guidance on Regulations
- BS EN 1838:2013 Lighting applications. Emergency lighting
- BS 5266-1: Code of practice for the emergency lighting of premises
- BS 5266-2:1998 Code of practice for electrical low mounted way guidance systems for emergency use
- BS 5266-6:1999 Code of practice for non-electrical low mounted way guidance systems for emergency use: Photoluminescent systems
- BS ISO 16069:2017 Graphical symbols. Safety signs. Safety way guidance systems (SWGS)
- BS ISO 3864-1:2011 Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings
- BS ISO 3864-3:2012 Graphical symbols. Safety colours and safety signs. Design principles for graphical symbols for use in safety signs
- BS ISO 3864-4:2011 Graphical symbols. Safety colours and safety signs. Colorimetric and photometric properties of safety sign materials
- BS EN ISO 7010:2012+A7:2017 Graphical symbols. Safety colours and safety signs. Registered safety signs
- BRE IP 17/89 Photoluminescent markings for escape routes
- BRE IP 1/93 Emergency wayfinding lighting systems

[11] https://www.lambeth.gov.uk/sites/default/files/ec-letter-to-london-borough-southwark-pursuant-to-rule43-28March2013.pdf
[12] Coroner's Rule 43 letter

- BRE IP 17/94 Emergency wayfinding lighting systems in smoke
- BS EN 50172:2004 Emergency escape lighting systems

Q5b: Does this guidance need to be supplemented or amended for inclusion in Approved Document B? If yes, please specify how.

Yes.

The majority of existing guidance is dated and for it to be included significant work is needed to ensure it is up to date.

Any sign that indicates to firefighters the floor level or hazards needs to be readable and understandable at all times and in all situations i.e. low visibility and low level with smoke or heat obscuration.

Floor indicator signs need to match those within the lifts and be consistent across buildings, particularly on estates. We recommended that a specific method of signing floors and lifts should be introduced either at floor or storey level that is consistent for residents and firefighters.

Q6: What views exist on the benefits of each signage option set out above?

Wayfinding signage is important for crews to identify which floor and area of a building they are in or accessing. This signage will be required to be read by crews wearing breathing apparatus and potentially in low light conditions and/or smoke filled areas. It is important that this signage can be read in these conditions and should either be lit or be readable in low light and/or torch light. It may also be necessary for firefighters to be able to read key information at a low level as well as low light and whatever system is chosen must be able to fulfil this requirement.

Vinyl lettering – in dark and smoky conditions this would not be effective. This may still not provide a suitable function as recommended in the Rule 43 letters for Lakanal House and Shirley Towers. Additionally, it may become damaged or displaced in day-to-day use and in a fire situation could both be damaged and provide a fuel source for the fire.

Photoluminescent signage – this functionality relies on regularly receiving energy from a light source and so is only practical where a light source is present. Where stair enclosures and corridors utilise energy efficient lighting systems that only operate when people are present this may affect the storage of energy and may not allow the signs to be visible.

Photoluminescent lettering may be suitable for this purpose (subject to testing) and be cost effective and with minimum maintenance.

Emergency powered lighting luminaires may not be the most efficient due requiring a power source which could be disconnected and batteries could run flat, Units also require maintenance, routine testing and could be broken.

Q6b: What is the preferred option set out above for wayfinding signage? Vinyl lettering, photo luminescent lettering, emergency powered lighting luminaries, other (please specify).

Photoluminescent signage which will provide enough light for firefighting crews to read detail providing the signs store enough energy to luminesce when required. We anticipate that this will be a more cost effective option than a full emergency escape lighting system.

As stated in response to Q5b above, any signs that indicate floor levels must be consistent across the floors and lifts.

Evacuation alert systems

Q7a: Should Approved Document B include a requirement for an emergency evacuation system, which could support fire and rescue services operational response by alerting residents if they need to evacuate? [Yes/No]

Yes.

An emergency evacuation system would provide an additional tool for incident commanders during a fire. It should be recognised that the system must be supported by a package of measures to be effective without which it could have the potential to place more persons at risk. That package of measures would include (but not be limited to) appropriate education for residents, signage and consultation with fire and rescue services.

Q7b: For each response, what views exist on the benefits and risks of such an approach?

Benefits:
The availability of an alert system would provide incident commanders with another tool which can be used instead of, or alongside, other methods such as door knocking or control staff encouraging residents to leave their homes. This could allow a more effective way of quickly directing residents to evacuate after an assessment of the incident by operational crews.

Risks and mitigation:
The proposed British Standard - BS 8629:2019[13] - is only providing a method to alert occupants, but the decision on whether to evacuate still ultimately remains with the occupant. Sounding an alert does not guarantee people will immediately react and evacuate. Some occupants may not chose to or may not be able to evacuate e.g. because of issues with mobility. Careful consideration needs to be given to the type of alert (e.g. an 'English' voice system in a diverse community) and educating the public and residents on these safety systems.

BS 8629:2019 requires a package of measures to support an incident commander being able to use such a system, such as a detailed management plan which includes information given to residents so that they know the purpose of the system and the actions required of them if it is used. Fire and rescue services must be consulted by the body submitting the proposal to ensure they agree with the package of measures proposed and to ensure they have appropriate understanding of the system installed.

There are training implications for fire and rescue services as the safe use of an evacuation alert system relies upon a good knowledge of potentially rapid changing conditions within a building. The

[13] Code of practice for the design, installation, commissioning and maintenance of evacuation alert systems for use by fire and rescue services in buildings containing flats

stairway is most vulnerable to being affected by heat and smoke during firefighting operations. Once firefighting has commenced any evacuation may impede operations and firefighting operations may increase the potential for injuries to escaping occupants. Even with the extensive training that fire and rescue services will be responsible for providing, it must be understood that scenarios where the emergency evacuation system might be used may pose additional risks to occupants. The incident commander will be expected to make an informed decision about when and where to use the system, and there may be situations whereby that decision making is based on weighing the risk of occupants being asked to escape through conditions which endanger their lives against the advice to stay put if not immediately at risk of fire, heat or smoke.

Evacuation alert systems provide an additional layer of protection but cannot be viewed as a substitute for the need for robust fire safety measures in a building. The use of a system should not be used in any way to justify variations from guidance or to be used as mitigation for building failings and should be consistent across all design guides.

Further research is required before any evacuation systems can be rolled out. LFB has called for the Government to undertake urgent research into buildings which fail to such an extent that residents can no longer 'stay put'. Evacuation alerts systems would be installed in buildings which are not designed to facilitate simultaneous evacuation and the research should consider how facilities in existing buildings (for example ventilation systems not designed for such a scenario) support the change of approach. The research should also look at the impact of incident commanders using these systems in different configurations (including stairs, corridors, ventilation systems etc.) and any additional risk this places on occupants.

Design and approval and installation of evacuation alerts systems will need to be suitably assessed. Including guidance on these systems in ADB means that they can be installed in both new and existing buildings, and the installation in all tall residential buildings was a recommendation from Phase 1 of the Inquiry into the Grenfell Tower fire. If these are to be used in existing buildings it is imperative that the approval is subject to the Building Regulations approval process and that fire and rescue services are appropriately consulted.

There are several measures which would reduce the risk to occupants when using an emergency evacuation system, such as those called up in the Scottish Technical Handbook (multiple escape routes, AFSS) and other measures such as evacuation lifts and disabled refuge areas. Some of these will be impracticable to incorporate into existing buildings in conjunction with the potential alert given by BS 8629:2019 system but they should be considered for tall new build residential designs.

Q8a: If this requirement was introduced to Approved Document B, above what height threshold should this system be required?

If a height threshold was the only option it should be 11 metres in line with our response to Q1b. However, a height threshold may not be the best approach, for example, there could be greater benefit in having an alarm in a building of 10 metres with a complex layout than in a 12 metre building with a simple layout and shorter escape routes where firefighters are better equipped to evacuate a building by door knocking. We therefore favour a case-by-case approach, with alarms being fitted in all residential buildings above 18 metres and on buildings between 11-18 metres

unless they can be demonstrated to be low risk e.g. simple layout and short travel distances. Finally, alarms should be fitted in high risk buildings of all heights e.g. a care home of two floors. The Beechmere care home fire in August 2019 provides an example of where such an alarm could be of benefit to the fire service, as a tool to help reduce risk to residents.

Q8b: For each response, please provide evidence to support your answer.

There may be individual cases whereby, due to a small number of flats in the building with shorter escape distances and where there is good firefighting access, there is limited benefit in the emergency escape system being installed at an 11 metre height threshold. This is due to firefighting resources allowing firefighters to evacuate by door knocking and the limited distance of travel for residents negating the need for an emergency evacuation alert system to be installed. There would need to be a requirement for evidence to be provided to demonstrate that such a building was low risk and not in need of an evacuation alert system.

Similarly, there may be individual cases where there may be benefit in installing a system in a building below 11 metres, for example where there are vulnerable residents with extended escape distances. While we appreciate the height threshold may be the simplest way to implement this requirement in this iteration of ADB, there would be benefit in allowing some assessment of risk to inform the installation of these systems.

We recommend liaison between any committees/authors of potential changes to Approved Document B and the committee responsible for the drafting of BS 8629:2019, to ensure that the intent and/or limitations of the standard are fully captured within the guidance.

Assessment of impacts

Q9: Please provide any additional evidence on costs, risks and benefits which should be considered in an assessment of impacts in the following areas.
a) Sprinkler provision in new high-rise blocks of flats
b) Wayfinding signage for fire and rescue services
c) Evacuation alert systems

a) Sprinkler provision in new high-rise blocks of flats

In 2017 the NFCC and the National Fire Sprinkler Network jointly published the report *Efficiency and Effectiveness of Sprinkler Systems in the United Kingdom: An Analysis from Fire Service Data.*[14] The report was based on an analysis of fires recorded in all United Kingdom fire and rescue services between 2011-2016, where sprinklers were recorded as being present. Five years of data on fires in premises with sprinklers was collected from 47 fire and rescue services across the UK. A further three services covering island areas confirmed that they did not attend any fires with sprinkler systems.

The report presented the following headline results:

[14] https://www.nationalfirechiefs.org.uk/Sprinkler-Position

- The cases analysed amounted to 2,294 incidents of which 1,725 (75%) were in non-residential buildings and 414 (18%) in dwellings.
- Sprinkler systems operate on 94% of occasions, demonstrating very high reliability when they operate, they extinguish or contain the fire on 99% of occasions in both converted and purpose-built flats.

In 2019 further research was conducted into the performance of sprinkler systems in protecting life and reducing the incidence of harm. Key findings across the reports include:

- There was not a single fatality in a building (other than a dwelling), where sprinklers were fitted and could be expected to work whether in a dwelling or other type of building, if sprinklers are fitted, you are half as likely to be harmed by a fire. If you were injured then the chances of going to hospital were reduced by 22%.

AFSS can permit freedom of design, resulting in savings in the initial capital cost, lifecycle costs and the construction programme for buildings.

Sprinklers are not expensive - if included at the design stage, they can cost as little as one per cent of the total build. The figures from 2019 presented below show the average cost of installation per dwelling, which includes new builds and retrofitting. The information has been sourced from the Residential Sprinkler Alliance (RSA), and by a third party accredited British Automatic Fire Sprinkler Association AFSS contractor.

Table 1: Example 1 from Residential Sprinkler Association – **new build** installed to BS9251:2014

Example	**Specification**	**Cost**
15 storey high rise residential block of 60 dwellings	2 bedroom flats Water Supply: cold water boosted supply	£50,000
Maintenance/service	Cost per annum for whole building	£1200.00
Average cost per dwelling (excluding maintenance charge)		**£833.00**

Table 2: Example 2 from Residential Sprinkler Association - **new build** installed to BS9251:2014

Example	**Specification**	**Costs**
4 storey low rise residential block of 60 dwellings	2 bedroom flats Water supply, cold water boosted supply	£46,000
Maintenance/service	Cost per annum	£600.00
Average price per dwelling (excluding maintenance charge)		**£766.00**

Table 3: Example from third party accredited British Automatic Fire Sprinkler Association AFSS contractor – **retrofitting** installed to BS9251:2014

Example	Specification	Costs
3 storey low rise residential block of 60 dwellings	Water Supply, cold water boosted supply Residential riser kit and wiring Concealed sprinklers to dwellings Distribution Main One test per flat Trace heating and lagging to distribution main in ground floor Builders work comprising of 1)Core Drilling in Riser cupboard for new pipework and electrical works 2)Fire stop all necessary holes and sleeve on all floors Cover and clean dwellings Design of works Project management/supervision of works Hire of cabins and plant	132,800.00
Average price per dwelling		**£2,213:00**

Sprinklers in the homes of vulnerable people – additional benefits

LFB fully supports the guidance given within BS 9251:2014, specifically Annex B sprinkler performance, reliability and resilience for systems installed in the homes of vulnerable people and the additional guidance contained in the NFCC publication *Fire Safety in Specialised Housing*.[15] Further commentary regarding power supplies, cabling and installation can be found in BS 9991:2015, where alternative solutions are referred to.

In multi-storey blocks of flats BS 9251:2014 allows the sprinkler alarm device to be configured to serve an alarm zone rather than each individual flat. This is provided that a number of recommendations are met including individual dwellings fitted with a LD1 automatic fire detection and alarm system with a minimum of a grade D power category LD1 system.

This is a clear benefit to improving the level of fire safety provision, as all new flats should be provided with a minimum automatic fire detection and alarm system to a minimum grade D category LD2 system BS5839-6: 2013.

In multi-storey blocks of flats, BS 9251:2014 allows the isolation valve set/flow switch to be configured to serve an alarm zone rather than each individual flat. This allows a considerable saving for the client which could be used to provide funding for further AFSS installations.

Sprinkler systems should be connected to a reliable and sustainable water supply. An example of this is using a cold water boosted supply. Typically in a purpose built apartment block, a tank of water will be pumped to guarantee pressure and flow of cold water services to the flats. This system can also be used for AFSS supplies. A key benefit of this system compared to an independent capacity tank is that where a multi-point fire starts on multiple floors, it has less potential for the supply to be over-run/exhausted and the water supply running out.

Where a sprinkler system has been installed for the protection of vulnerable people (specialised housing), the sprinkler alarm is required to be transmitted to an alarm receiving centre in accordance with the standard. This has the potential benefit to reduce the number fire deaths, by immediately summoning assistance from the fire and rescue service. However, to do so, it must be linked to the correct standard of fire detection equipment and have a resilient method of summoning assistance.

LFB fully supports the guidance given within BS 9251:2014, specifying the sprinkler alarm needs to be treated as a confirmed fire signal, instigating the appropriate emergency response, with a resilient method of summoning assistance. This will allow early arrival of the fire rescue service.

b) Wayfinding signage for fire and rescue services

15 https://www.nationalfirechiefs.org.uk/write/MediaUploads/NFCC%20Guidance%20publications/NFCC_Specialised_Housing_Guidance_-_Copy.pdf

For risks, please see our response to Q4 and Q5b which set out the factors that need to be taken into account to mitigate risks with signage.

For benefits, we reiterate that a more consistent approach should assist firefighters in operational duties and residents who may need to evacuate a building in the event of a fire.

c) Evacuation alert systems

Please see our response to Q7b which sets out the benefits and the ways in which risks could be mitigated.

For all of above measures LFB have experience of building control bodies making the judgement that this type of alteration does not constitute a material alteration, and therefore do not need to consult with fire and rescue services. This could result in potential systems being installed which are not fit for purpose and firefighters being unaware of these systems, putting public and firefighters at risk.

When building control bodies consult with fire and rescue services, they are not obliged to follow the recommendations made by that fire and rescue service. We urge that measures are put in place to address this going forward.

Q10: Are you aware of any particular equalities impacts for these proposals? How could any adverse impact be reduced and are there any ways we could better advance equality of opportunity or foster good relations between people who share a protected characteristic and those who do not? Please provide evidence to support your response.

The vulnerability of the residents should be given careful consideration when fire safety measures are being put in place. The new requirements of ADB needs to better protect vulnerable residents and meet the need of the aging population. Research has shown the increasing proportion of persons with reduced mobility living within buildings that require self evacuation. Care homes, retirement homes and hostels can house some of the most vulnerable residents and fires in these premises can involve people who have mobility and/or health issues that mean they are unable to escape even small fires and they may suffer fatal or life changing injuries before the fire brigade is even called.

High-rise buildings were never designed for simultaneous evacuations and the expectation that the majority of the building population are able to descend tall building staircases is outdated. This is unrealistic due to:

- Short term lets can change the demographic of the building
- Rising obesity levels
- More support/care packages being offered within homes

For further information, please contact helen.newton@london-fire.gov.uk