



Department of

Finance

An Roinn

Airgeadais

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The Building (Amendment) Regulations (Northern Ireland) 2024

Final Regulatory Impact Assessment for fire safety changes to The Building Regulations

Part E (Fire safety)

October 2024

Title: Fire safety changes to Part E (Fire safety) of The Building Regulations.	Regulatory Impact Assessment (RIA)	
	Date:	October 2024
	Type of measure: Subordinate legislation	
Lead department or agency: Construction & Procurement Delivery, Department of Finance	Stage: Final	
	Source of intervention: Fire	
Other departments or agencies:	Contact details: Building Standards Branch, Properties Division, Ground Floor, Goodwood House, 44-58 May Street, Belfast, BT1 4NN.	

Summary Intervention and Options

<p>What is the problem under consideration? Why is government intervention necessary?</p> <p>Following the Grenfell Tower fire in 2017, there have been calls to increase fire safety in domestic buildings (principally blocks of flats) to reduce risk to life. There is evidence that the construction industry has become more risk averse since the Grenfell Tower fire. However, over time this risk aversion might reduce and the industry may revert to being less cautious at a potential increased risk to public safety. The Grenfell tragedy and Phase 1 report to the Public Inquiry highlighted the potential benefits of some of the amendments in this impact assessment (sprinkler usage, wayfinding signage, evacuation alert systems, smoke ventilation systems and premises information boxes) to improve resident safety. Sprinklers and smoke ventilation systems, in particular, have been proven to be very effective fire protective measures for saving lives in residential type buildings. Provision of fire safety information to assist building owners/occupiers understand the benefits of all fire safety protection measures and management arrangements in their building will also be a new requirement. Although some property developers achieve a high level of fire safety, this is by no means universal. For outbreak of fire in a dwelling, early detection and warning to occupants can play a vital role in increasing their chances of escape. A more extensive fire alarm system to cover all habitable rooms can provide this early warning which can be particularly important for those who are elderly, vulnerable or asleep and may react slower. Government intervention is necessary to implement these improvements.</p>	
<p>What are the policy objectives and the intended effects?</p> <p>The objectives of the policy changes are to improve life safety for residents/occupiers of a range of various building types (primarily dwellings and principally blocks of flats) and provide greater firefighter security in tackling fires and effecting rescue operations. The intended effect is to reduce the consequences of fire through saving lives and preventing injuries.</p> <p>The changes implement similar changes introduced in other jurisdictions, particularly England through their equivalent Part B and Approved Document B (ADB) of their building regulations. A small number of the changes in part implement recommendations from the Phase 1 report from the Grenfell Public Inquiry in assisting firefighters in their operational capacity.</p>	
<p>What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)</p> <p>Option 1 – Do nothing. Under this option, there would be no change to Building Regulations and associated technical guidance on fire safety matters. Option 1 would produce little additional benefits as only a small percentage of developers would likely voluntarily move to fulfilling the new requirements as set out in Option 2. It would leave this jurisdiction out of step with related regulations, standards and guidance operational in other jurisdictions which could cause confusion within the industry.</p> <p>Option 2 - In this option, changes will be made to Building Regulations and supporting technical guidance. The new requirements will improve fire safety standards for residents/occupants and firefighters alike for various buildings including higher risk buildings (e.g. medium/high rise blocks of flats, care homes, student accommodation). This option would mean aligning the requirements here with similar requirements in other jurisdictions, providing a consistent approach to industry. Option 2 is the recommended option as it will have the biggest benefit to fire safety standards in new residential buildings and the fewest risks associated with it.</p>	
<p>Will the policy be reviewed? Yes</p>	<p>If applicable, set review date: 2029 (subject to the influence of interim policy developments in this area.)</p>

Cost of Preferred (or more likely) Option

Total outlay cost for business £ £54.96m over 10 years	Total net cost to business per year £ 5.47m	Annual cost for implementation by Regulator £25,474 (1 st year only)
------------------------------------------------------------------	----------------------------------------------------	----------------------------------------------------------------------------------------

Does Implementation go beyond minimum EU requirements?	NO	YES		
Are any of these organisations in scope?	Micro Yes	Small Yes	Medium Yes	Large Yes

The final RIA supporting legislation must be attached to the Explanatory Memorandum and published with it.

Summary: Analysis and Evidence

Policy Option2

Description:

ECONOMIC ASSESSMENT (Option 2)

Costs (£m)	Total Transitional (Policy) (constant price)	Years	Average Annual (recurring) (excl. transitional) (constant price)	Total Cost (Present Value)
Low	Optional	1 st year only	Optional	
High	Optional		Optional	
Best Estimate	£5.73m			

Description and scale of key monetised costs by 'main affected groups'

The costs above are the economic costs to business without the social benefits for these policy changes.
Total cost to business - £5.47m per annum.

Cost to Industry for familiarisation - £234,029 (1st year only)

Cost to District Council Building Control for familiarisation - £25,474 (1st year only). Further details are contained within this document on how these costs are arrived at.

Total cost for 1st year - £5.73m. Yearly cost after that - £5.47m.

Other key non-monetised costs by 'main affected groups'

Measures will place additional burden on industry to comply and these burdens could be disproportionate for some rather than others. There could be a disproportionate impact on charities and the voluntary sector in respect of the measures to improve fire safety standards in residential care homes.

Benefits (£m)	Total Transitional (Policy) (constant price)	Years	Average Annual (recurring) (excl. transitional) (constant price)	Total Benefit (Present Value)
Low	Optional	1 st Year	Optional	Optional
High	Optional		Optional	Optional
Best Estimate	£420.71k			

Description and scale of key monetised benefits by 'main affected groups'

The total monetised benefits are associated with the lives saved and injuries prevented (social benefits) per annum. Also, below for information purposes only is potential value for averted property damage:

Reductions in deaths and injuries £420.71k.

Reductions in property damage £1.34m

Monetised values are based on the Department of Transport's valuations of fatalities and casualties and BRE's estimation of average property loss value per fire. (See risks and assumptions)

Other key non-monetised benefits by 'main affected groups'

Reassurance of safety for residents (social benefit), reduction in fire and rescue service call outs, savings in water used for manual firefighting by firefighters, reduction in air pollution (fewer fires), CO/CO2 emissions (environmental benefits).

Key Assumptions, Sensitivities, Risks

See risks and assumptions detail in main body.

Assumptions include only 1 new purpose-built student accommodation per year, 5 new care/nursing/children's premises per year.

In the absence of evidence/research, there is no quantifiable figure for the benefits in lives saved/injuries prevented in providing additional fire alarm coverage for all habitable rooms in new dwellings.

BUSINESS ASSESSMENT (Option 2)

Direct Impact on business (Equivalent Annual) £5.47m		
Costs: £5.47m	Benefits: £420.71k	Net: £5.01m

Cross Border Issues (Option 2)

How does this option compare to other regions and to EU Member States (particularly Republic of Ireland)

Most of the amendments bring this region into line with England and the other devolved administrations on fire safety issues affecting blocks of flats on issues such as sprinklers, smoke ventilation requirements, and access and facilities matters for the fire and rescue service.

Some changes vary from those in ROI, while some align with requirements there also (such as fire alarm coverage in all habitable rooms of new dwellings). Those parts of the industry that operate on an all-island basis will have to understand and adapt where there are different standards between the two jurisdictions.

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Introduction

- 1.0 The Department of Finance (the Department) has policy responsibility for maintaining the Building Regulations. The Building Regulations apply to new buildings and to buildings being altered, extended or subject to a material change of use and are made principally to secure the health, safety, welfare and convenience of people in or about buildings; further the conservation of fuel and power; further the protection and enhancement of the environment and promotion of sustainable development.
- 1.1 The regulations set mainly functional requirements and are supported by Technical Booklets giving guidance, including performance standards and design provisions, relating to compliance with specific aspects of the Building Regulations for the more common building situations.

Purpose and intended effect

Objective

- 2.0 The principle aims and objectives of any health and safety proposals for buildings are to ensure those buildings are safer for citizens to occupy and use. The objective of amendments to the building regulations that impact fire safety standards are to improve the overall level of fire safety in buildings where relevant building work is carried out by reducing the risk of fires and consequences of fires, thereby saving lives and preventing injuries. There is also a need to protect firefighters with measures to assist them in their operational duties. These aims and objectives can be achieved through better regulation and guidance.

Background

- 2.1 The Grenfell Tower fire occurred on 14 June 2017 and led to the greatest loss of life due to a residential fire in the UK since the Second World War. A full Public Inquiry was established to examine the events that led to the tragedy. The Inquiry was conducted in two phases. Phase 1, which has concluded, published a report with recommendations in October 2019 (some of which are to be implemented as part of the proposed changes in this impact assessment). Phase 2 has also concluded and published a report with recommendations in September 2024. Any recommendations in that report pertaining to fire safety standards in building regulations will be considered at a later date.
- 2.2 This Regulatory Impact Assessment (RIA) considers changes to Part E (Fire safety) of the Building Regulations 2012 (as amended) and to Technical Booklet E (Fire safety) (TBE), which provides supporting guidance to implementing the Part E fire safety requirements. The proposed changes have been drawn upon from findings of research and experience which has prompted the same/similar changes in other jurisdictions, in particular England's equivalent Part B (Fire safety) of their building regulations and accompanying guidance in Approved Document B (ADB). Some other changes implement in part a small number of recommendations from the Phase 1 report of the Grenfell Tower Inquiry.

- 2.3 The changes include a new regulation 37A in Part E to assist building owners/occupiers to understand the fire safety measures and procedures which form part of their building's fire safety strategy and thus assist in the implementation of the Fire and Rescue Services (NI) Order 2006, which came into operation on 31 May 2006. Another new regulation 37B in Part E will also introduce for the first time a requirement for suitable automatic fire suppression systems (e.g. sprinklers) in certain types of higher risk residential buildings.
- 2.4 The TBE changes include supporting guidance to the two new regulatory requirements. They also clarify the requirements in relation to smoke ventilation provisions from the common escape routes in blocks of flats, through reference to BS 9991: 2015. There is an uplift to the level of fire alarm coverage in new build dwellings or dwellings created as a result of a material change of use. In Section 6 of TBE, a series of measures are proposed to assist firefighters in operational functions in relation to facilities and access for the Fire and Rescue Service. A final version TBE (with track changes) incorporating all the amendments will be available on the Department's website.

Scope

- 2.5 The changes will affect all those dealing with relevant building work (typically the erection, extension or alteration of a building) and buildings formed as a result of a material change of use. This may include Architects, Surveyors, Engineers, Developers, Builders, Contractors, District Council Building Control Departments, Property owners/occupiers, Insurers etc.

Rationale for Government Intervention

- 3.0 Ever since the tragedy of the Grenfell fire, there has been a heightened focus on fire safety issues in buildings and the detrimental potential impact fire can have on the lives of citizens. This tragedy combined with the available evidence-based research and examples of same/similar provision of requirements in other jurisdictions provides the driver for Government intervention here. Although a police investigation is on-going and recommendations from Phase 2 of the Grenfell Tower Public Inquiry have recently been released, a small number of changes in this package address in part some of the recommendations from the Phase 1 report of that Inquiry. Other issues may require to be considered in the future in respect of findings from Phase 2 and police investigations.
- 3.1 The proposals considered the fitness of building regulations and associated technical booklet guidance to cater for the known risks in primarily domestic dwellings (in particular medium/high rise multi dwelling buildings). Where the areas considered had an obvious impact on other building types, the opportunity has been taken to address these at this time (e.g. sprinkler provision in all care homes, nursing homes).
- 3.2 There is a need to ensure that not only do people feel safe in their homes and places of work or entertainment but that they actually are as safe as possible from the risk of fire. The proposed amendments should reduce the risk of fire, and where a fire does occur, ensure there are measures in place to restrict the growth of fire and smoke to

enable the occupants to escape safely and fire fighters to deal with fire safely and effectively.

Screening in/Screening out

- 4.0 The intervention of introducing new regulations and guidance will have an impact on the local business community. Therefore, the proposals are subject to a Regulatory impact assessment and thus screened in.

Viable options

- 5.0 The options considered were:

Option 1 – Do nothing.

Option 2 – Implement changes to Part E and TBE as proposed.

Option 1 – Do nothing

- 5.1 Option 1 is self-explanatory. It would produce no additional benefits. It would not keep pace with changes in risk and developments in technology. It would leave Part E out of step with related regulations, standards and guidance operational in other jurisdictions, which could cause confusion within the industry. Additionally, the potential benefits of Option 2 would be foregone because the lives saved and injuries prevented under that option would not be realised.
- 5.2 Under this option, there would be no change to Building Regulations. There would be no new requirements in regulations for the provision of fire safety information or installation of automatic fire suppression systems in certain types of higher risk buildings. It would also mean no changes to the guidance in Technical Booklet E on the matters of means of escape provisions, particularly fire alarm provision in dwellings, clarified smoke ventilation provisions for flats (reference to BS 9991) and issues concerning effective access and facilities for the Fire and Rescue Service in firefighting and rescue operations. No improvements would occur for buildings that will undergo building work in the future in order to ensure the safety of the occupants in the event of fire. This option does not address any of the issues of concern identified. It would not improve safety in affected buildings and may lead to criticism of government policy on fire safety for residents in the “post-Grenfell tragedy era”. Doing nothing and expecting a voluntary take-up in providing information, installing sprinklers or improving facilities for Fire and Rescue Service personnel is not a reasonable approach and would, at best, lead to an inconsistency in building designs.
- 5.3 For this option, resident safety would remain at the current level and would leave this region exposed in lagging behind fire safety standards already implemented in other regions of the UK and ROI.

Option 2 – Amend Part E ‘Fire safety’ and Technical Booklet E (Fire safety) of the Building Regulations.

5.4 Option 2 consists of a package of changes to Part E (Fire safety) of the building regulations and TBE (Fire safety).

5.5 The Part E changes are:

- (i) Introducing a new functional Regulation for the provision of fire safety information at the handover stage when a building is complete and ready for occupation;
- (ii) Introducing a new prescriptive Regulation for the provision of Automatic fire suppression systems (e.g. sprinklers) in certain types of buildings.

5.6 The TBE changes include:

- a. Providing guidance to the two new proposed regulatory requirements in Part E;
- b. Proposing an uplift in Section 2 ‘Means of escape’ to the provisions for automatic fire detection and alarm systems in dwellinghouses and flats;
- c. Clarifying in Section 2 ‘Means of escape’ the smoke ventilation requirements to the common escape routes of blocks of flats by reference to BS 9991;
- d. Amending the guidance in Section 6 ‘Access and Facilities for the Fire and Rescue Service’ to –
 - (i) require firefighting shaft provision in Purpose Group 5 buildings with a storey 900m² or more in area at a height of 7.5m or more above fire and rescue service access level;
 - (ii) set a new maximum distance (in hose laying terms) to a fire main from any point on a storey of 45m (for storeys not provided with sprinklers);
 - (iii) establish a 50m maximum storey height above fire and rescue service access level for Dry fire main provision;
 - (iv) clarify the hose distance from a fire vehicle pumping appliance to all points in a dwelling (for buildings without a fire main);
 - (v) require Fire and Rescue Service activated Evacuation Alert Sounders in buildings, containing flats, with a storey more than 11m above ground level;
 - (vi) require wayfinding signage in buildings containing flats with a storey more than 11m above ground level; and
 - (vii) require provision of Secure Information boxes in buildings, containing flats, with a storey more than 11m above ground level.

5.7 Most of the changes relate primarily to buildings containing flats (Purpose Group 1(a)). However, the changes do affect other purpose group buildings including all new domestic dwellings, purpose-built student accommodation, residential care premises, large assembly and recreation buildings with a storey over 7.5m and all ‘relevant premises’ as defined under the Fire and Rescue Services (NI) Order 2006. This option will result in improved fire safety standards for residents/occupants of buildings and firefighters alike. The rationale for these measures and the risks they are designed to address are discussed in Annex A.

- 5.8 Although the proposals at consultation were considered as a package of measures for the purposes of the Impact Assessment, they were not mutually exclusive, i.e. one or more of them could have been disregarded or amended.
- 5.9 When considering the potential costs and benefits of these measures it should be noted that the changes will only apply to new applications for building work after these amendments come into operation. The changes will predominantly impact on new buildings, currently estimated to be less than 1% of current building stock per annum.
- 5.10 Option 2 will produce the greatest benefits which would be mostly social (lives saved and injuries prevented) and reduced property loss/damage. It will also have some associated economic and environmental benefits. It has the advantage over Option 1 in that it provides clear and consistent guidance to all parties. In buildings, containing flats, with a storey more than 11m above ground level, the provision of sprinklers will lead to reductions in deaths and injuries and the updated reference to BS 9991 for ventilation systems to control smoke in such buildings will also lead to risk reductions. Similarly, sprinklers in new residential care premises and purpose-built student accommodation will have a positive benefit. In non-domestic buildings the provisions will assist in occupants escaping from fires and help the Fire and Rescue Service to affect search and rescue, firefight and consequently limit fire spread.

Social benefits to option 2

- 5.11 The basic approach for assessing social benefits is to determine the annual risks of fatalities and injuries of residents/occupants and firefighters as well as property protection advantages. Recognising the value of prevented fatalities and injuries are benefits. A 25 year period is chosen in some instances to demonstrate a measurable number of lives saved to be realised. However, all monetary values are calculated as per annum.
- 5.12 In order to calculate a financial benefit, deaths and injuries have been converted into a cash sum using standard valuation figures agreed with Department of Finance economist advice. Specifically the value of a prevented fatality is £1,554,395 and the value of minor injury prevented is £13,465 and serious injury prevented is £174,671 (these figures are taken from the Ministry of Housing, Communities and Local Government (MHCLG) (now the Department of Levelling Up, Housing and Communities – DLUHC) and their Impact Assessment for '*Sprinklers and other fire safety measures in high-rise blocks of flats*' of May 2020)¹. These standard values are based on research conducted by the Department for Transport (in England) and are used widely across Government.
- 5.13 There can be other social benefits associated with reducing the severity and incidence of fires, such as reducing the distress and disruption caused by fire (e.g. the upset at the loss of a person's home and belongings etc.). These may be

¹

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/887225/Impact_Assessment_-_Sprinklers_and_other_fire_safety_measures_in_high-rise_blocks_of_flats_2020.pdf

considerable but are far harder to quantify and therefore a figure has not been included in this Assessment. They are also outside the current focus of Part E and so can only be of secondary consideration when deciding whether a measure should be introduced under the Building Regulations, as the case must be made on health and safety grounds.

- 5.14 There is not expected to be any other social implications although there is potential for the increased provision of sprinkler systems in new buildings, to increase potential home buyers demand for buildings with sprinklers and so reduce the demand on existing stock that are not fitted with sprinkler systems.

Economic benefits of option 2

- 5.15 The economic benefits of Option 2 could also potentially be quite extensive. For example, although property protection is generally addressed through insurance, by introducing certain life safety measures, the Building Regulations may indirectly help to reduce damage to property. A particular example of this is sprinklers which can prevent extensive fire spread and hence damage. In the case of very large fires the negative impact on the local community/business could be significant.
- 5.16 Benefits to property protection in this Assessment have been monetised based on the historic evidence that sprinklers are 88% effective (based on BRE 2012 and Home Office figures) in reducing property damage and the average property loss value per fire is £10,075 (again taken from the MHCLG impact assessment of May 2020 and is based on ODPM 2006 figures updated by BRE 2015).
- 5.17 These property related savings are also beyond the current focus of Part E and so are of secondary consideration.

Environmental benefits of option 2

- 5.18 The environmental benefits of Option 2 would arise from further limiting the size and hence the consequences of fires. Combustion products, including smoke and toxic substances from fires can not only lead to localised deterioration in air quality (which can cause respiratory symptoms, including asthma) but also larger, particularly industrial fires, may have a widespread effect both on people and on the natural environment (living species and ecosystems). Water usage as a result of action to extinguish fires depletes resources and the run-off can lead to pollution of water courses. There may be small positive impacts in terms of improved air quality and reduction in water pollution incidents (from water run-off) as a result of a reduction in the number of fires.
- 5.19 Again although these impacts cannot be considered directly within the current focus of Part E, they are a secondary consideration. Such benefits are difficult to quantify and so figures have not been included in this Impact Assessment, although they are likely to be small in comparison to the social benefits and property loss reductions.

Other Non-monetised benefit of option 2

- 5.20 It is recognised that a large non-monetised benefit will be achieved in providing reassurance to residents that they not only feel safer but are safer in their homes.

Due to the lack of suitable existing research on residents' wellbeing and perceptions of safety, it is not currently possible to monetise this benefit.

Consultation

- 6.0 There is a statutory duty here to consult the Northern Ireland Building Regulations Advisory Committee (NIBRAC) and such other bodies as appear to the Department to be representative of the interests concerned on building regulations matters. A Part E 'Fire safety' technical sub-committee was established which included members of NIBRAC and seconded experts and personnel from industry, housing and enforcement bodies of District Councils and Fire and Rescue Service. The changes discussed in this Impact Assessment were developed in consultation with the technical sub-committee and main NIBRAC committee prior to issue of this Final Impact Assessment.

The Department carried out a twelve-week targeted public consultation exercise from 3 July to 25th September 2023 on the proposed changes. The Department has an extensive database of names of individuals and organisations that have expressed a specific interest in building regulations and technical guidance. 396 consultation notifications were issued to various stakeholders from industry and wider interested parties and the consultation documents were published on the Department's website. The consultation was also advertised via Twitter/X and Facebook. An online webinar awareness session to clarify the proposals was held on 18 July 2023. This was attended by 81 representatives from various strands of the fire sector, construction industry, District Councils who enforce building regulations and the Fire and Rescue Service. A narrated video outlining the proposals was posted on YouTube from 21 July 2023 and to date has 167 views. A Question and Answer brief of the questions asked at the webinar was placed on the Government website from 21 July 2023.

The consultation received a total of 40 responses. Most respondents completed the structured consultation response form. A few responses were received in letter format. Most responses were received on the citizen space platform and a number were received by e-mail. One response was received one minute after the closing date on the 25 September 2023 and another was received a week after the closing date (this respondent sought permission prior to the closing date to make their response after the closing date and this was agreed). All 40 responses were considered as part of the consultation analysis.

In broad terms, the proposed amendments were welcomed by the majority of respondents, and unanimously so in relation to some amendments.

Consultees responses have been reviewed by the Department in conjunction with the Part E technical sub-committee and main NIBRAC committee. An extensive summary of the responses to the consultation is available on the Department's website at: <https://www.finance-ni.gov.uk/consultations/consultation-fire-safety-changes-local-building-regulations>

Sectors and groups affected

- 7.0 Option 2 will impose some costs across all sectors of the building industry (developers, builders, manufacturers etc.) and on clients who are requiring building work to be carried out. There will clearly be more requirements on builders and developers who would have to provide additional fire protection measures such as additional fire alarms, sprinklers, smoke control measures, wayfinding signage, evacuation alert systems, information boxes etc. in some buildings.
- 7.1 District Council Building Control, along with the rest of the industry, including the Fire and Rescue Service will have to bear the cost of training and familiarisation with the proposed new regulations and guidance. Although this is regarded as a general business expense rather than a burden, the costs have been included in this Impact Assessment as a one-off cost in Year 1 (see Annex C). The intention of some of the amendments is to clarify guidance and make compliance more straightforward which should result in a more effective and efficient building control process.
- 7.2 There could also be impacts on charities and the voluntary sector in respect of the measures to improve fire safety in residential care homes.
- 7.3 Typical impacts can be broken down to:
- a. Building users – people living in or using the building should benefit from a safer building environment arising from these changes and not be subject to loss of amenity and facilities as a consequence of the take up of the new regulations and guidance.
 - b. Building designers/constructors – All those involved with building design and construction will have to familiarise themselves with the new regulations and guidance.
 - c. Building procurement – Persons or companies procuring new buildings or building work will experience modest increased costs, particularly those involved in the procurement of high-rise domestic buildings for rent or sale.
 - d. Enforcement – District Councils will have to train staff in the relevant areas where the new regulations and guidance applies. The Fire and Rescue Service will also have to familiarise themselves with the changes.
- 7.4 The changes will only affect those buildings within scope when proposed building work takes place. The impact on industry here will be relatively low and the benefits in terms of enhanced safety levels for residents/occupants and firefighters combined with clarity for everyone involved in the construction process outweighs the low impact to industry.

Micro and Small Business Impact

- 8.0 The policy change on sprinklers should have a positive impact on both small and large sprinkler firms. Both small and large firms may benefit from increased demand for their products and installation skills. The majority of affected buildings are likely to be owned or managed by larger firms, who will bear the costs of installation and maintenance. Businesses small or large installing sprinkler systems are expected to be made no worse off by the policy. The change for increased smoke alarm

coverage in new dwellings should benefit firms who manufacture these devices and provide more work for small electrical firms who install and test fire alarm systems.

- 8.1 Firms spend a significant amount of time keeping up to date with revised and new regulations and guidance. The cost of this is generally likely to be proportionately higher for small firms than large ones. Overall, the proposed changes are unlikely to have a significant adverse effect on the industry, nor would they place an unfair burden on small businesses. We consider it reasonable to assume small or micro businesses here will not be disproportionately affected by these changes.

Risks and assumptions

- 9.0 The costs and benefits of policy option 2 were considered against the option of doing nothing. The costs are any additional costs incurred to adhere to the new requirements and the benefits are a measure of improvements in fire safety brought on by the amendments. There are a number of uncertainties in estimating the costs and benefits with a number of assumptions being made:

- (A) For the social benefits in this Impact Assessment, the following figures have been adopted:
- (i) The value of a prevented fatality is £1,554,395
 - (ii) The value of minor injury prevented is £13,465
 - (iii) The value of serious injury prevented is £174,671
 - (iv) The average property loss value per fire is £10,075.

The fatality and injuries monetised figures are taken from the Ministry of Housing, Communities and Local Government (MHCLG) (now DLUHC) and their impact assessment for 'Sprinklers and other fire safety measures in high-rise blocks of flats' of May 2020'. These standard values are based on research conducted by the Department for Transport (in England) and are used widely across Government.

The property loss value is taken from the same MHCLG (DLUHC) impact assessment of 2020 and is based on ODPM 2006 figures updated by BRE 2015.

- (B) The number of new buildings per annum for buildings containing flats over a certain storey height is indicative and based on analysis of Planning Statistics over the 3-year period 2016 – 2019. The statistics were supplied by a Planning Statistician in Analysis, Statistics and Research Branch (ASRB) of Corporate Policy and Planning Division of the Department for Infrastructure.
- (C) A lot of the monetary calculations are based on starting figures obtained from the equivalent Impact Assessments carried out in England (2006, 2019, 2020 and 2022) for the same fire safety protection measures implemented there. Impact assessments in Scotland and Wales were also used in some instances as sources of starting figures.
- (D) There is a risk that the suppliers of sprinklers may not initially have the capacity for the increased demand following the update to Part E and TBE. This may have an impact on the cost and effectiveness of the policy in the short term. The residential sprinkler industry has reportedly expanded in the UK following the Grenfell Tower fire and the industry are confident in capacity to cope with any increased demand following an appropriate transition period. There may be a need to train additional sprinkler installers which could lead to the limit of

- industry capacity particularly if the policy has the knock-on effect of encouraging building owners to retrofit sprinklers in existing buildings.
- (E) Following the Grenfell fire there is an increasingly risk-averse industry whereby sprinklers and other measures are already being fitted prior to the introduction of these regulation and guidance requirements. Some developers are doing this to future proof in anticipation of more stringent regulations being put in place in future.
 - (F) It is assumed the cost of installation for sprinkler systems would be the same per dwelling in different buildings around the region. In meeting the requirements of BS 9251, systems must be able to achieve a certain water flow rate which is reliant on the water supply, either from the mains or a stored supply. Some buildings may require a pump system to achieve the requirements. It is expected that many new high-rise buildings will already have multiple pumps as part of the design to maintain water pressure and supply. However, it may be the case that the cost of installing a sprinkler system is higher or lower in some buildings where water pressure is different or where a stored supply approach to comply with the requirements of BS 9251 is necessary. Some building designers/owners may voluntarily choose the more expensive option of a stored water supply. The calculations in this Impact Assessment for sprinklers (in buildings containing flats) have derived an average value per building between mains fed systems and pump and tank type systems.
 - (G) The value of the individual sprinkler system is an important variable. Two values of £1400 and £1450 (mains fed) and a value of £2750 (tank & pump) for sprinkler installation per flat have been used based on recent Impact assessments conducted for the same provision introduction in England and Scotland.
 - (H) The proposals are designed to be proportionate to the risks that come with medium to high rise residential buildings in particular. They should ensure they do not hamper a step change increase in the supply of new homes.
 - (I) The benefits and costs have been calculated per annum. Some of the social benefits in terms of lives saved and injuries prevented are offered over a 25-year period to give a tangible realisation of the benefits, but the equivalent monetary values are based per annum (see Annex B).
 - (J) There are numerous uncertainties over sprinkler installation costs, lifetime of sprinklers and wayfinding signage, evacuation alert systems, future new build rates, applicability of economies of scale and uncertainty around industry's response to changes. These uncertainties are considered in the average of values calculated for the scenarios presented.
 - (K) Maintenance costs of sprinklers and wayfinding signage and evacuation alert systems are likely to fall on freeholders of the building and building management firms. They may be able to recover these costs through increased service charges.
 - (L) The costs for extending fire alarm coverage to all habitable rooms is based on the average number of new dwellings constructed in the last 6 years and 4 extra habitable rooms requiring a smoke alarm interlinked. The minimal cost should not impact significantly the overall build cost per dwelling or dwelling affordability.
 - (M) Some equivalent calculations here in comparison to costs in England have been derived through applying the 3.4% rule i.e. population of NI approximately

- 3.4% that of England. Similarly, some calculations are based on proportionate population of here compared to Wales and GB as a whole.
- (N) The changes should not have a significant impact on housing (flats) supply. The extra costs involved will be small in proportion to the total build cost.

Competition/Sustainability

- 9.1 Buildings captured by the policy changes will have a reduced risk of rapid-fire growth which will help to improve the longevity of the respective buildings.
- 9.2 Residential sprinkler components and systems are mostly supplied by USA companies and manufactured there. The UK sprinkler market is a small proportion of that of the USA, for that reason it is likely that the volume of sprinkler components and systems imported here will increase.
- 9.3 As the UK industry expands production and potential productivity to deliver new requirements in relation to sprinklers, there is a possibility that UK firms will become more competitive in the international market.
- 9.4 We do not expect the amendments to impact trade and investment in any other way.

Enforcement and Sanctions

- 10.0 Intended work that is subject to the provisions of the Building Regulations (Northern Ireland) 2012 (as amended) must be notified to the District Council. The new regulations in Part E 'Fire safety' will be enforced by building control in each District Council through the existing mechanisms and sanctions provided through the Building Regulations (Northern Ireland) Order 1979 (as amended).
- 10.1 Failure to comply with the requirements of the Building Regulations is a criminal offence. District Councils have powers to require the removal or alteration of work that does not comply with the requirements of building regulations. No changes to this process are proposed as part of these amendments.

Post Implementation Monitoring, Evaluation and Review

- 11.0 The revised Part E and changes to TBE are to be published in 2024 so as to come into operation 6 months later. It is normal practice for the Department to investigate experiences a reasonable time (usually about 5 years) after implementation to monitor how the changes are working in practice. The Department has quarterly meetings (Building Control Liaison Meetings) with the 11 District Councils in Northern Ireland who are responsible for enforcing the requirements of the Building Regulations on a daily basis. Feedback from them, as well as from members of the advisory committee (NIBRAC) on how the new requirements are working in practice will be ongoing.

Summary and Recommendation

12.0 This Impact Assessment considers changes to Part E (Fire safety) of the Building Regulations and the supporting guidance in Technical Booklet E 'Fire safety'. Two new regulations in Part E will require the provision of fire safety information to building owners/occupiers at the handover stage in a building lifecycle and the provision of suitable automatic fire suppression systems (sprinklers) in certain higher risk residential buildings. Other guidance changes will provide an extended coverage of automatic fire detection and alarms in new dwellings; clarify means of escape provisions (in particular smoke ventilation requirements) by reference to BS 9991: 2015 for buildings containing flats and assist firefighters in operational functions of firefighting and search and rescue. The amendments will typically impact upon new buildings, buildings created as a result of a material change of use and those existing buildings that are extended and/or altered.

12.1 Two options have been considered. Do nothing or implement the changes to Part E/TBE as set out. A summary of costs and benefits for the two options is given in Table 1. A more complete derivation of costs and benefits per item is given in Annex B and summarised in Table 2 in Annex B.

Table 1 Summary of costs and benefits		
Option	Costs	Benefits
Option 1	<ul style="list-style-type: none"> No direct costs – but would forego benefits of Option 2 	Although some voluntary implementation may occur from some developers, the benefits of this option are negligible
Option 2	<ul style="list-style-type: none"> £5.294m per year for dwellings (includes student accommodation) £178.84k per year for buildings other than dwellings £25,474k familiarisation for District Council Building Control (first year only) £234,029k familiarisation for Industry (first year only) 	<ul style="list-style-type: none"> 3 lives saved and 136 injuries prevented in a 25 year period (equivalent to annual benefit of £420.71k). Also reduced property damage of £1.34m Additional benefits in terms of – <ul style="list-style-type: none"> (i) Homeowners having improved early detection and warning of fire (ii) Reduction in distress and disruption due to fire (iii) Future economic savings

		(Reduced property damage) (iv) Environmental benefits (e.g. less water pollution, less water usage, improved air quality) (v) Improved clarity of guidance and consistency in application <ul style="list-style-type: none"> • Proactive measures to reduce future risk and assist in fire-fighting and search and rescue operations
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12.2 Table 1 shows that Option 1 should be rejected as, although it imposes no direct costs, it produces none to little benefits and would leave Part E and TBE out of step with related regulations and guidance in other jurisdictions. The current costs to society from fires in residential buildings (particularly in buildings, containing flats, with a storey more than 11m above ground level, purpose-built student accommodation with a storey more than 11m above ground level and residential care premises), including deaths and serious injuries would remain unchanged. The benefits of Option 2 would be foregone.

12.3 Option 2 will mean modest costs for industry (approximately £5.47m per annum), mainly in the domestic sector (dwellinghouses and flats). In the absence of supporting evidence/research, it is not possible to estimate the benefits of extending the coverage of automatic fire detection and warning alarms to all habitable rooms in new dwellings. There would be a one-off cost of £259.5k to cover training and familiarisation of the District Councils and industry. Much of the non-domestic costs concern the provision of proactive measures and so address future risks in new build types as well as assisting firefighting and search and rescue operations in tall buildings. As a consequence, it is not possible to quantify all the benefits that might accrue from these particular amendments at this time.

12.4 It should be noted that the social benefits in terms of lives saved and injuries prevented are cumulative. The benefits for the properties built in year 1 are experienced again in year 2, together with those for the properties built in year 2. In year 3 the benefits are experienced for properties built in each of the 3 years etc. and continue to accrue in this way over the lifetime of the buildings. However, other than a small element of routine maintenance associated with some measures (e.g. sprinklers and evacuation alert systems), the costs and/or savings associated with building the properties in accordance with the revised guidance in Option 2 are only experienced when the properties are built.

- 12.5 Option 2 will bring other extensive benefits in terms of reducing distress and disruption due to fire as well as reducing environmental impacts in terms of water pollution (less water run-off), less water usage and improved air quality. There would be economic benefits in terms of reducing damage and loss of buildings and contents but this goes beyond the current focus of building regulations.
- 12.6 A number of changes to TBE will not have a significant cost impact but they will improve clarity of the document and ensure consistency of application and thereby constitute better guidance to the regulations.
- 12.7 In many ways the changes are significant for residential type buildings (flats, care premises, student accommodation). The opportunity has been taken to target resources more effectively so as to maximise the number of lives saved and injuries prevented. It therefore represents a justified evolution of the regulations and guidance and an opportunity to clarify some existing provisions (e.g. smoke ventilation requirements in flats to BS 9991).
- 12.8 In terms of cumulative impacts, other building regulation requirements apply in addition to Part E (Fire safety). Non-dwellings are also subject to legislation governing fire safety in buildings in use (e.g. Fire and Rescue Services (NI) Order 2006, environmental and health and safety legislation and the Disability Discrimination Act 1995). Dwellings may also be subject to requirements of Housing legislation. Although the changes proposed in the Option 2 package will place additional burdens on industry, they are not considered onerous given the potential risks to life safety that they address.
- 12.9 It is concluded and recommended Option 2 is adopted.

Contact Point

13.0 This Regulatory Impact Assessment may be downloaded from:

<https://www.finance-ni.gov.uk/consultations/consultation-fire-safety-changes-local-building-regulations>

or a hard copy may be obtained from:

Department of Finance
Properties Division
Building Standards Branch
Goodwood House
44 - 58 May Street
Belfast
BT1 4NN
Tel: 028 90 257048

E-mail: info.bru@finance-ni.gov.uk

Departmental Signoff

14.0 For the changes to building regulations and associated technical guidance, the Department estimates an extra cost to industry of £5.47m per annum. Familiarisation costs for industry and District Council Building Control are estimated at £234k and £25.5k for the first year only respectively.

Signed:



Date: 30 October 2024

ANNEX A

RATIONALE BEHIND AMENDMENTS TO PART E AND TBE

Part E Regulatory Changes

New Regulation for Fire safety information

- A1. Through a new functional regulation 37A in Part E, it will be required that adequate fire safety information is given by the person carrying out work to the person who has fire safety duties in any 'relevant premises' as defined under 'The Fire and Rescue Services (Northern Ireland) Order 2006' (FRS(NI)O). The requirement will also apply to other non-relevant premises, specifically buildings containing flats.
- A2. Once a building is complete and occupied it can be difficult to establish fully what fire safety measures have been incorporated in the building or what assumptions have been made by designers in respect of the fire strategy for the building. The information could be described as 'hidden information' that cannot easily be established by an examination of the completed premises.
- A3. This new requirement will be for the 'as built' fire safety information to be made available to the owner/occupier which will help identify and document what fire safety measures have been incorporated into the building and what fire safety design assumptions have been made. This information will not only benefit those responsible for operating and maintaining the building for fire safety purposes when the building is occupied but also assist fire risk assessors and relevant enforcing authorities in fire risk assessments required under the 'Fire and Rescue Services (NI) Order 2006'. Such an approach seeks to ensure that there will be no disconnect between fire safety standards in design, occupation and enforcement over the lifetime of a premises.
- A4. This requirement to provide information to owners/occupiers on fire safety design and procedures for operating and maintaining a building's fire protective measures is already widely, though not universally adopted and is currently seen as good practice.
- A5. The Royal Institute of British Architects (RIBA) Plan of work suggests a 'fire safety strategy' from stage 2 or 3 in the design phase of a building. The fire safety strategy then develops and modifies through the lifecycle stages to occupation of the building. It is expected the fire safety strategy under RIBA stages will form an integral part of the 'as built' fire safety information required under this new regulation.
- A6. The Grenfell Inquiry Phase 2 report has recommended a future statutory requirement for a fire safety strategy to be produced by a registered fire engineer and submitted as part of building control applications for the construction or refurbishment of any higher risk buildings (as defined) and reviewed and resubmitted on completion of work.

New Regulation for automatic fire suppression systems

- A7. This new prescriptive regulation will require the provision of a suitable automatic fire suppression system (sprinklers) in certain types of buildings. A comparison of the Building Regulations here with equivalent requirements in England, Scotland, Wales and the Republic of Ireland highlights differences, particularly in relation to recognising new developments in sprinkler technology for residential use.
- A8. There are more fatalities resulting from fires in domestic premises than the collective total for all other types of buildings. The low level of fatalities in non-domestic buildings is undoubtedly due to the various legal obligations placed on the owners and operators of those buildings to carry out and maintain fire risk assessments.
- A9. Sprinkler systems are expected to reduce casualties in fires by controlling the fire spread thereby limiting the production of heat and smoke (through control of fire size). This also allows additional time for residents to escape and for the Fire and Rescue Service to respond. It is expected then there will not be a significant reduction in the number of fires but it is expected to see a benefit in a reduction in large fires that are associated with injury or fatalities.
- A10. Research in the past by the Building Research Establishment (BRE) into the effectiveness of sprinklers estimated a reduction in deaths and injuries at 90% and 61% respectively when sprinklers are provided in purpose-built flats. More recent analysis from Wales considering sprinkler provision in flats estimated a reduction in deaths and injuries at 90% and 62% respectively.
- A11. Following the Grenfell Tower fire of June 2017, there have been many calls from various sources for a wider application of automatic fire suppression systems to various building types, predominantly residential. On 11 March 2019, the Royal Institute of Chartered Surveyors (RICS) signed a joint statement standing alongside the Royal Institute of British Architects (RIBA) and the Chartered Institute of Building (CIOB), calling on the government to require the installation of sprinklers in all new and converted residential buildings, hotels, hospitals, student accommodation, schools and care home buildings with a storey more than 11m in height.
- A12. Requirements on this issue varies across England, Scotland, Wales and the Republic of Ireland. Individual requirements for each jurisdiction are generally based on the research commissioned over the last 20 years by various bodies including the English, Welsh and Scottish governments, the Chief Fire Officer's Association (CFOA) and carried out by the British Research Establishment (BRE).
- A13. The amendment here will acknowledge the role sprinkler system installations play in reducing the risk to life, particularly for dwellings. Therefore, any sprinkler system installed to satisfy the new requirement will be regarded as a life safety system. The new regulation will:
- recognise the recent developments in construction standards and sprinkler technology for residential use, in particular BS 9251 'Sprinkler systems for residential and domestic occupancies: Code of practice'.
 - Acknowledge research that has been carried out in England, Scotland, Wales and by the CFOA on the effectiveness of sprinklers in various types of premises and associated cost benefit analyses.

- Bring Building Regulations here closer to the position in other jurisdictions for automatic fire suppression systems provisions.

A14. The new regulation will apply when a building within scope is newly erected or created as a result of a material change of use. It will also apply to a small number of buildings which are subject to extension and/or alteration where the regulation has been applied to the building previously. The list of building types within scope of the new requirement will be limited to buildings containing flats with a storey more than 11m above ground level, all residential care premises (care homes/nursing homes/children's homes and family resident centres). Also, purpose-built student accommodation with a storey more than 11m above ground level.

i. Buildings, containing Flats, with a storey more than 11m above ground level

A15. Sprinkler systems installed in dwellings can reduce the risk to life and significantly reduce the degree of property damage caused by fire. Evidence has shown that automatic fire sprinklers protect residents of flats from fire, they limit fire spread protecting means of escape for residents, and also protect Firefighters who attend such fires.

A16. The change requiring a suitable automatic fire suppression system in all newly built buildings, containing flats, and buildings, containing flats created as a result of a material change of use, both with a storey more than 11 metres above ground level will significantly increase the use of domestic and residential sprinklers in this sector. There has already been a large increase in the UK since the disastrous Grenfell Tower fire.

ii. Residential Care Premises

A17. The environment of a care home presents a specific suite of fire risk challenges that needs very careful consideration if the vulnerable occupants and their families are to benefit from the protection they deserve. Aside from the very obvious potential for immediate life loss associated with any fire, in this situation the stress caused by the sudden displacement from a familiar environment can itself be greatly harmful, if not life-ending in its own right.

A18. The diminished senses that result from the ageing process may ultimately result in the occupants of residential care premises having a slower reaction time to raise an alarm, and due to the residents' reduced physical capabilities, a slower response time to an alarm, which may result in an increased evacuation time. These factors combine to increase the risk of injury or fatality in a fire in a care premises, especially where assistance from carers may be restricted at night.

A19. An automatic fire suppression system such as sprinklers can provide an enhanced protection from fire and give those caring for people with mobility difficulties a chance to evacuate a building in the case of a fire. They can also limit the damage that a fire can inflict on a property through limiting fire spread. This is why the installation of automatic sprinklers is so vital in care facilities.

iii. Purpose Built Student accommodation with a storey more than 11m above ground level

- A20. Primarily due to Ulster University relocating to the city centre, Belfast now benefits from a student population that is estimated to be around 45,000. Some 5,040 student accommodation units have been built in Belfast across 12 schemes since 2016, with another 1,237 beds due to be completed in 2024, and a further 3,773 units in planning. In recent years, new high-rise developments for purpose-built student accommodation have been completed in Belfast including at York Street, Great Patrick Street, Little Patrick Street, Queen Street, College Square East, Library Street, Botanic Avenue and McClintock Street. Some of these developments house 400+ students.
- A21. Reports suggest the market is not yet saturated in Belfast due to the demand for purpose-built student accommodation (PBSA) anticipated by the two main universities. Another seven PBSA schemes are in the planning system, with more under consideration according to research.
- A22. Both Queen's University and Ulster University have been acquiring property, which have been linked to potential PBSA schemes. In a recent university led submission to Belfast City Council, the universities claimed 6,000 additional student rooms will be needed in Belfast by 2030 with the current supply at capacity. UCAS are forecasting that there will be a 20% rise in Northern Ireland school leavers seeking university places by 2030.
- A23. Starting a course of study at a university or college of further education is generally a young person's first time away from family and home. For many, leaving home is liberating and fun. Unfortunately, it is not without its hazards; and partying, smoking, alcohol consumption and careless cooking are all factors that contribute to unwanted fires in buildings providing student accommodation.
- A24. Increasingly more and more high-rise student accommodation is being experienced by many of today's students. They are more lucrative than 'apartments' as developers can pack layers of small bedrooms into cluster type flats, rather than space-devouring individual flats, onto relatively small footprints and sometimes awkward sites.
- A25. As these developments increase, the calls recommending a suitable automatic fire suppression system such as sprinklers as the most effective and efficient way of protecting both lives and property in the student sector have increased.

Technical Booklet E Guidance Changes - TBE

A26. Following the technical guidance in Technical Booklet E is the most common way of meeting the requirements of the regulations in Part E. Consequently, if we wish to see a shift in how regulations are complied with, changing the guidance has the most impact. The rationale for amending the guidance in respect of each item is identified below.

Increased Fire detection and alarm systems in dwellings

A27. If there is an outbreak of fire in a dwelling, early detection and warning to the occupants can play a vital role in increasing their chances of escape. This is particularly important if the occupants are elderly/vulnerable/asleep and are more likely to react slower.

A28. Statistics from Scotland indicate that 62% of fatalities in dwelling fires are attributed to fires starting in certain rooms – living rooms 30%, bedrooms 17% and kitchens 15%. Also, from BRE research into Scottish fire deaths², fatalities are proportionately higher when the location of the fire origin is the living room or the bedroom. It would seem logical that any fire occurring in these rooms is detected quickly and the alarm raised as early as possible during the early stages of fire growth. This will give occupants, particularly the elderly/vulnerable/those asleep the best possibility of escaping.

A29. NI fire statistics for 2019/20 indicate a total of 782 dwelling fires with 3 fatalities (the average figure per year is approximately 8) and 69 injuries requiring hospital treatment.

A30. Most fires in dwellings are accidental and statistics show the main sources of ignition are cooking appliances, electrical distribution, domestic appliances, smoking materials, matches and candles³.

A31. From Home Office statistics in England, around half (48%) of all accidental dwelling fires are due to cooking appliances. However, these fires only account for 14% of fire related fatalities. Smoker's materials are the source of ignition in 7% of accidental dwelling fires but are the largest ignition category accounting for 23% for fire related fatalities⁴.

A32. Increased coverage of smoke alarms in bedrooms and living rooms to provide earlier detection and warning for occupants of dwellings may lead to lower fatality and injury rates.

² https://files.bregroup.com/research/Scottish-Fire-Deaths_BRE-briefing-paper_110296.pdf

³ <https://www.morganclark.co.uk/about-us/blog/uk-house-fire-statistics/>

⁴ <https://www.gov.uk/government/statistics/detailed-analysis-of-fires-attended-by-fire-and-rescue-services-england-april-2019-to-march-2020/detailed-analysis-of-fires-attended-by-fire-and-rescue-services-england-april-2019-to-march-2020>

A33. Analysis of fires attended by fire and rescue services England indicates fires where a smoke alarm was not present accounted for 26% of all dwelling fire related fatalities in year ending March 2020⁵. This concurs with a similar conclusion on house fire statistics where a smoke alarm not being present accounted for a quarter (25%) of all house fires in 2020/21⁶.

- Alarm Present and raised the alarm: 43%
- Alarm Present but did not raise alarm: 11%
- Alarm Present but did not operate: 21%
- Alarm Absent: 25%

A34. The same analysis in England also concluded mains powered smoke alarms have a lower 'failure rate' than battery powered smoke alarms. 21% (this figure may be lower for NI) of mains powered alarms failed to operate in dwelling fires whereas 37% of battery powered smoke alarms failed.

A35. Costings and advantages/disadvantages for this amendment are outlined in Annex B.

A36. The amendment will mean more extensive coverage of smoke alarm provision in all habitable rooms of the dwelling. This will go further than the existing requirement for alarms in the circulation spaces, principal habitable room and kitchen. This extra coverage will undoubtedly provide earlier detection and warning to occupants of potential fires in those rooms but also improve audibility levels of the alarm for occupants throughout.

A37. The amendment will be particularly beneficial to someone who is vulnerable, disabled, elderly or has a temporary mobility problem where available time for evacuation is critical.

A38. The amendment may lead to more nuisance/unwanted false alarms that may impact human behaviour in the long term or lead to interference with the alarm by householders making the system less effective.

⁵ <https://www.gov.uk/government/statistics/detailed-analysis-of-fires-attended-by-fire-and-rescue-services-england-april-2019-to-march-2020/detailed-analysis-of-fires-attended-by-fire-and-rescue-services-england-april-2019-to-march-2020>

⁶ <https://www.morganclark.co.uk/about-us/blog/uk-house-fire-statistics/>

BS 9991 for Smoke ventilation provisions in common escape routes in buildings containing flats

- A39. For some time TBE has referred to BS 5588-1 '*Fire precautions in the design, construction and use of buildings: Code of practice for residential buildings*' for the means of escape provisions in flats. BS 5588-1 has been withdrawn by BSI and superseded by BS 9991 '*Fire safety in the design, management and use of residential buildings. Code of practice.*' 2015. This amendment will replace reference to BS 5588-1 to the updated standard of BS 9991 for means of escape provisions in flats.
- A40. At the same time, reference will also be made to BS 9991 for the provisions for adequate smoke ventilation from the common escape routes (corridors/hallways/stairways) in buildings containing flats.
- A41. From the BRE report '*Smoke ventilation of common access areas of flats and maisonettes and their relationship to the provision of compartmentation and means of escape procedures*'⁷, the research showed concern about the potential for occupants trying to escape from a fire to be overcome by smoke. Analysis showed that some people were dying each year outside the room of fire origin in blocks of flats, most of which were overcome by smoke, gas or toxic fumes. A smaller percentage were killed by a combination of burns and being overcome by smoke/gas.
- A42. Even though the fire statistics did not reveal whether the death or injury occurred outside the room of fire origin as opposed to outside the flat itself (many of the casualties were suggested as still in the flat but not the room of origin), it is felt that updating the reference to the updated standard of BS 9991: 2015 and the provisions therein will impact directly on the number of casualties in the common escape routes of blocks of flats. This will not only mean referring to the recognised industry standard for flats but will also bring here into line with other UK regions on this issue.

Access and facilities for the Fire and Rescue Service

Firefighting shaft provision in PG5 buildings (7.5m+)

- A43. Current TBE guidance requires buildings in Purpose Groups (PG) 4, 6 and 7(a) to have a firefighting shaft if they have a storey 900m² or more in area at a height of 7.5m or more above fire and rescue service access level (all buildings with a storey more than 18m above fire and rescue access level require firefighting shaft/s). This amendment will mean Purpose Group 5 buildings (Assembly and Recreation) are added to this list if they satisfy the 900m² criteria. The casualty risk due to fire in PG5 buildings is considered greater than most building types. This change will assist firefighters where the greater risk to life safety occurs.
- A44. England adopted this change into their building regulations guidance in April 2007. Analysis of Planning applications then indicated a rate of construction of affected

⁷ https://www.bre.co.uk/filelibrary/pdf/rpts/partb/Smoke_Ventilation.pdf

buildings in PG5 to be about 10 times greater than for example those in PG 7(a). The casualty risk is greater in PG 5 as opposed to some other Purpose Groups of buildings. This change should contribute to both saving lives and preventing injuries over time, along with providing additional firefighter safety.

Maximum hose distance to a fire main of 45m

- A45. England amended its guidance in Approved Document B coming into operation from April 2007 in response to the Building Disaster Advisory Group's (BDAG) research project of 2005 – '*Economic impact of the inclusion of BDAG proposals for the provision of firefighting equipment and facilities in the revised Part B*'. Post World Trade Centre fire of 2001, tests were carried out on firefighters during search and rescue operations. Core body temperature and other physiological parameters were recorded during these tests. The outcome of these tests resulted in changes to firefighters clothing, equipment and procedures which have been implemented via various other Government and Fire and Rescue Service procedures.
- A46. The results of the research also showed that firefighters may not be able to safely penetrate more than 34m into a 'compartment' to rescue a casualty. This conflicts with guidance in existing TBE which sets out a minimum number of firefighting shafts for a given storey floor area and establishes a maximum distance from any point on the floor to the fire main landing valve in those shafts. That distance is limited to 60m maximum that firefighters would need to lay hose (hose distance).
- A47. The amendment will maintain the guidance in TBE that 2 firefighting shafts should be fitted in a building with any storey floor area over 900m² and also retain the 60m hose distance to a fire main in a firefighting shaft. In addition, the amendment will mean for storeys not fitted with sprinklers, no point on a floor should be more than 45m from a fire main in a protected stairway. The second criteria of 45m will mean this fire main does not necessarily have to be located in a firefighting shaft. This will go some way to address the concern in the research on penetration distances for firefighting personnel in a compartment.

50m height limit for Dry Fire main

- A48. In response to BRE Project Research 2005 – '*Hydraulic calculation of wet and dry risers hoses and branches*', England amended their guidance in Approved Document B (Fire safety) (ADB), coming into operation in April 2007. Based on this research, the original fire main guidance height limit for a dry fire main was adjusted accordingly.
- A49. The research concluded the hydraulic pressure from a fire and rescue service pump appliance could not deliver the required flow of water through a dry fire main beyond a storey height of 50m above fire and rescue service access level. The existing guidance in TBE specifies a 60m storey height limit for a dry fire main which originates from BS 5588 Part 5 '*Fire precautions in the design, construction and use of buildings. Access and facilities for fire-fighting*'.
- A50. This amendment will mean a building with a storey more than 50m above fire service vehicle access level should be provided with a wet fire main. In all other buildings where fire mains are provided, either wet or dry fire mains are suitable.

Fire Vehicle Access to all points in a dwelling

- A51. Using the same BRE research of 2005, '*Hydraulic calculation of wet and dry risers hoses and branches*', it was also concluded that for a building without fire main provision, the effective hose penetration distance from the fire and rescue vehicle pump appliance needed to be a maximum of 45m, to reach all points within each individual dwelling in a block of flats and all points within each dwellinghouse.
- A52. This amendment will mean the existing TBE guidance of 45m to reach the individual dwelling entrance door (set again under BS 5588 Part 5 '*Fire precautions in the design, construction and use of buildings. Access and facilities for fire-fighting*'), is changed so that a pump appliance should be able to access to within 45m of all points within a dwelling house/flat as opposed to 45m to the dwelling entrance door.

Fire and Rescue Service Activated Evacuation Alert Sounders

- A53. From the 'Grenfell Tower Inquiry: Phase 1 Report Overview', one of the recommendations was:
- 'that all high-rise residential buildings (both those already in existence and those built in the future) be equipped with facilities for use by the fire and rescue services to enable them to send an evacuation signal to the whole or a selected part of the building by means of sounders or similar devices'*.
- A54. Although rare, it is recognised that there may be occasions when the Fire and Rescue Service requires to evacuate the fire floor and in extreme cases, other floors or the entire building. Currently under such circumstances, the Incident Commander instructs firefighters to knock on the doors of the flats and advise the occupants to vacate the building when it is safe to do so.
- A55. This amendment will introduce guidance provisions in TBE to require an emergency evacuation alert system for buildings containing flats (Purpose Group 1a buildings) with a storey more than 11m above ground level. The system will provide the fire and rescue service with an option to initiate a change in evacuation strategy via an alarm. A new Standard for such a system has been published by BSI – BS 8629: 2019 '*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*'.

Wayfinding signage

- A56. As a way to improve access and facilities for fire and rescue services, a requirement for better wayfinding signage for fire and rescue service personnel will be introduced. The provision of storey and dwelling indicator signage will assist the Fire and Rescue Service in their firefighting and rescue operations in high rise domestic buildings.
- A57. There have been instances where firefighters have faced problems identifying floors during an incident where the wayfinding signage perhaps could have been clearer. This highlights the need to improve the consistency of approach in providing wayfinding signage to ensure this does not happen in future by making small but

meaningful changes to technical guidance. This simple change could result in improved pace of operational response.

- A58. The amendment will introduce new guidance in TBE to require consistent wayfinding signage for use by the fire and rescue service in Purpose Group 1a (residential blocks of flats) buildings with a top storey more than 11 metres above ground level. Signage will include floor identification and flat indicator signs. The amendment will set out the locations for the signage and guidance on typeface and wording. The signage will be required to be on a contrasting background, easily legible and readable in low level lighting or when illuminated with a torch.
- A59. The use of reflective vinyl lettering should be visible even where smoke has entered the stairwells. BS 9991: 2015 already recommends that signage numerically indicating the floor level should be provided within the firefighting stair of blocks of flats. There is however no prescribed format (size and design) for the signage to be provided.

Secure Information Boxes

- A60. Secure Information Boxes (or Premises Information Boxes) are a recognised method through which building owners / managers and occupiers can provide information to the attending Fire and Rescue Service. Currently, there is no statutory requirement to have them installed in multi-occupied residential premises; their use is voluntary.
- A61. When they are installed, there are benefits for the Fire and Rescue Service in terms of their response to incidents as the boxes provide fire-fighters with readily accessible information about the building. The information may include floor plans with the location of key firefighting equipment; a single page building plan; a copy of the fire risk assessment for the building and contact details for the person in charge of the building.
- A62. Having this information in a Secure Information Box could be seen either as an alternative or supplementary to sending paper and electronic copies of plans to the Fire and Rescue Service.
- A63. There is some existing guidance for such provisions in certain building types, e.g. BS 9999 '*Code of practice for fire safety in the design, management and use of buildings*' provides guidance on Operational Information (emergency packs). The Fire and Rescue Service may have their own guidance notes on Secure/Premises Information Boxes.
- A64. The amendment will require in technical guidance a secure information box in each building, containing flats, with a storey more than 11m above ground level. This new requirement in statutory guidance should be helpful to increase their usefulness, with the intention of standardising aspects such as box specifications, markings, signage, location, access, and contents.

ANNEX B

COSTS AND BENEFITS BY AMENDMENT

- B1. The costs and benefits associated with each individual change as well as general costs of implementation are discussed and Table 2 summarises the costs/benefits per item.

Provision of Fire safety information

- B2. Providing the 'as built' fire safety information should help to reduce risks of casualties that might occur as a result of failure to adopt appropriate management procedures for the design of the building or through failure to maintain protective measures. The new requirement is seen as particularly important given the greater use of, and increasing complexity of, fire engineering in building design.
- B3. There should also be potential cost savings as drawing this information together at the construction stage will reduce future costs of sourcing and assessing this information at a later date (for example if a different contractor/client is involved between base-build and fit-out, when a building is renovated or when a new owner or tenant takes over). It will particularly assist owner/occupiers in the production of their risk assessment under the terms of the Fire and Rescue Services (NI) Order 2006 (FRS(NI)O).
- B4. An impact will be on District Council Building Control who will be required to enforce the requirement and receive notice that the transaction of information has occurred. This arguably constitutes a small new burden on Building Control. The same information will need to be sourced by those preparing fire risk assessments under the FRS(NI)O, so ensuring the information is made available at the design stage will reduce the costs of this work and the policy costs of complying with the FRS(NI)O at a later date.
- B5. Prior to the introduction of this equivalent requirement to the England and Wales Building Regulations as part of their 2006 amendment (coming into operation in April 2007), the Department for Levelling Up, Housing and Communities (DLUHC), then named the Department for Communities and Local Government (DCLG), estimated the introduction of this measure to be cost neutral. Similarly, it is assumed overall this measure is cost neutral for introduction here (and may even give rise to some cost savings).

Provision of suitable automatic fire suppression systems

- B6. While there is much evidence that automatic fire suppression systems prevent fire growth and can save lives, the installation and maintenance costs remain relatively high. Current Building Regulations requirements for fire safety are focused on life safety. Policy has been that property protection should be addressed through insurance. An added benefit of life safety measures such as sprinklers (predominant form of automatic fire suppression system) is if properties are protected from fire spread, they do not have to be repaired as much after a fire or, in some cases, rebuilt.
- B7. Increasing the demand for sprinkler systems will also have benefits for businesses that supply systems and for those who are involved in installation (including those that offer training and qualifications for installers) and maintenance.

i. Buildings, containing Flats, with a storey more than 11m above ground level

Costs

- B8. The assessment of the costs for introducing sprinkler requirement in buildings, containing flats, with a storey more than 11m above ground level is focussed principally on two areas:
- i) installing the sprinkler systems; and
 - ii) the annual maintenance cost.
- B9. In 2020, England revised the threshold height for provision of sprinklers in buildings, containing flats, from 30m to 11m in their building regulations Approved Document B guidance (ADB). From their Regulatory Impact Assessment (RIA) of 2020⁸, they estimated an average sprinkler system would cost between £75,400 - £162,400 to install in each new building in scope. This figure included the cost of a sprinkler system as well as overheads such as professional fees and trade contractor preliminaries. The value of the individual sprinkler system per flat was estimated at £1,300 - £1,600.
- B10. Also from England's RIA, they estimated the annual maintenance costs to be between £6 and £13 per flat (equivalent to £480 - £720 per building) in accordance with BS 9251.
- B11. From Planning statistics supplied by Analysis Statistics and Research Branch in the Department for Infrastructure, over a 3-year period from 2016 to 2019, approximately 9 buildings, containing flats, with a storey more than 11m above ground level per year were proposed for planning permission (these 9 buildings were mostly new builds but also included formations as a result of a material change of use).

8

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/887225/Impact_Assessment_-_Sprinklers_and_other_fire_safety_measures_in_high-rise_blocks_of_flats_2020.pdf

B12. Assuming 6 flats per storey and taking average installation costs (mains fed) of £1450 and maintenance costs of £9.50 per flat, then:

- i. If all 9 buildings were 5 storey block of flats (30 flats in total) then:
 $9 \times 30 \times £1450 = £391.5k$ (installation) $9 \times 30 \times £9.50 = £ 2.57k$
(maintenance) Total=£394k
- ii. If all 9 buildings were 8 storey block of flats (48 flats in total), installation costs would be £626.4k and maintenance costs £4.1k Total = £631k
- iii. If all 9 buildings were 10 storey block of flats (60 flats in total), installation costs would be £783k and maintenance costs £5.1k. Total = £788k

B13. Figures would range from £394k to £788k per annum (mains fed) depending on the number of storeys for 9 buildings created of blocks of flats with a storey more than 11m above ground level per annum.

B14. Research in Scotland from 2015⁹, indicated that there may be a cost benefit to installing automatic fire suppression systems in buildings containing flats. Analysis there indicated costs for new build flatted accommodation was between £800 and £2000 per flat for a mains fed installation and between £2000 and £3500 per flat for a tank and pump installation.

B15. Again assuming 6 flats per storey and taking average installation costs of £1400 per flat (mains fed only) and maintenance costs of £9.50 per flat, then for 9 buildings:

(9 five storey block of flats)	Total costs - 381k
(9 eight storey block of flats)	Total costs - 609k
(9 ten storey block of flats)	Total costs - 761k

B16. If costing for a tank and pump installation and assuming the central figure of £2750 cost per flat, then for 6 flats per storey and maintenance costs of £9.50 per flat, then for 9 buildings:

(9 five storey block of flats)	Total costs - £745k
(9 eight storey block of flats)	Total costs - £1.19m
(9 ten storey block of flats)	Total costs - £1.49m

B17. Figures would range from £381k to £761k (mains fed) and £745k to £1.49m (tank and pump arrangement) per annum depending on number of storeys for 9 buildings created of blocks of flats with a storey more than 11m above ground level per annum.

B18. Taking central figures derived using England and Scotland estimated figures would mean costs here of between £388k to £775k (for mains fed) and £745k to £1.49m (tank and pump) depending on number of storeys.

B19. Central figure of £581k (mains fed) and £1.12m (tank and pump) per annum.

⁹ <https://www.thenbs.com/PublicationIndex/documents/details?Pub=ScotGov&DocID=310556>

B20. For impact assessment purposes assume the central figure of these 2 figures to represent the mix of buildings which will use mains fed water sprinkler systems and tank & pump-based sprinkler systems which is £850k per annum.

Benefits

B21. From England's Impact assessment, the estimated monetary values of avoided fatalities were £30.8m and avoided casualties as £13.6m (over a 10 year period). This translates to 20 avoided fatalities over 10 years, approximately 2 fatalities per year. This could be estimated as equivalent 0.07 lives for here per year saved or 1.75 lives over 25 years (based on 3.4% population calculation).

B22. For minor injuries £13.6m over 10 years translates as 101 injuries per year, roughly 3.43 injuries per year here or 86 injuries over 25 years. For serious injuries £13.6m over 10 years in England translates as 8 serious injuries prevented per year. This equates to 0.27 serious injuries per year here or 6.8 prevented over 25 years. Average of saving in prevented minor injuries and serious injuries is £47k per annum.

B23. These lives saved and injuries avoided translate in monetary terms to benefits of £108.8k and £47k per annum respectively.

Property Loss savings

B24. In relation to property protection savings, the values and assumptions made in England's Impact Assessment for sprinkler provision in medium/high rise blocks of flats of 2020 have been used to derive an equivalent value to be used for here. As in England's Impact Assessment, benefits to property protection have been monetised based on the historic evidence that sprinklers are 88% effective in reducing property damage and the average property loss value per fire is £10,075.

B25. From Home Office statistics 'Fires in purpose-built flats, England Apr 2009 to March 2017'¹⁰, average fires attended in purpose-built flats 4 to 9 storeys was 1988 and average fires attended in purpose-built flats 10+ storeys were 902 (both calculated as average over 8-year period 2009 – 2017).

B26. Average total fires over 4 storeys (11m) is then 2890 per annum in England. That equates to approximately 98 fires in blocks of flats here.

B27. Estimated property loss saved based on 98 fires would be £987.35k per annum.

¹⁰ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/622114/fires-in-purpose-built-flats-england-april-2009-to-march-2017.pdf

ii. Residential Care Premises

Costs

- B28. From BRE 2006 research BD2546 '*Sprinkler effectiveness in Care Homes*', a typical 26-bedroom care home cost of sprinkler installation and maintenance varied from £5600 to £16700 (equivalent with inflation to £9,376 to £27,961 in figures today).¹¹
- B29. From '*The Regulation and Quality Improvement Authority registered Nursing and Residential Homes and Beds Trend Report*' 2008 – 2018¹², there were 34 new nursing homes and 16 new residential care homes created over this 10 year period.
- B30. From 50 new 'homes', assuming approximately 5 new nursing homes/residential care homes/children's homes/family resident centres built per year of a typical size of 26 bedrooms, the annual cost to industry for sprinkler installation and annual maintenance is estimated to be –
5 x £18,699 (central figure) = £93,495 per annum.

Benefits

- B31. From the English Impact Assessment which considered benefits of sprinklers in care homes, they estimated saving 7 lives and preventing 77 injuries over 25 years. Equivalent figures for here of 0.24 lives and 2.6 injuries over a 25-year period¹³ (equivalent to £14.9k and £9.8k per annum).

Property loss savings

- B32. From official government statistics, the number of primary fires in care homes in England were 641 (2018/2019), 610 (2019/2020) and 500 (2020/2021)¹⁴. Taking the average of these as 584 fires in Care Homes in England per annum, this translates as approximately 20 fires in Care Homes here per year.
- B33. Benefit from reduced property loss saving would be approximately £201.5k per annum.

¹¹

https://www.google.com/search?q=bank+of+england+inflation+calculator&rlz=1C1GCEA_enGB931GB931&oq=bank+of+England+inflation+&aqs=chrome.0.0i512i2j69i57j0i512i7.8801j0j4&sourceid=chrome&ie=UTF-8&safe=active&ssui=on

¹² <https://www.rqia.org.uk/RQIA/files/0f/0ff745be-514f-4013-8309-7d63de74bbc1.pdf>

¹³

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland>

¹⁴ <https://www.gov.uk/government/statistics/primary-fires-in-care-homes-2010-11-to-2020-21>

iii. Purpose-built student accommodation with a storey more than 11m above ground level

Costs

- B34. Wales introduced a requirement for sprinklers in student halls of residence from 2014. In their '*Cost benefit analysis of residential sprinklers for Wales*¹⁵ report of 2013, they estimated 1 new purpose-built student accommodation per year for the period 2013 to 2022. From the same report they estimated the cost of sprinkler installation to be £64k +/- 10k assuming the same cost per bed as a care home and an average building size of 100 occupants. Sprinkler system maintenance costs were estimated at £154 +/- £11 per annum.
- B35. Assuming a similar build rate for here of 1 purpose built student accommodation (halls of residence with a storey more than 11m above ground level) building per year of a size for 400 occupants (400 bedrooms), then the cost for sprinkler installation could be assumed to be at the upper end of the Welsh estimation of £100,521 (adjusted for inflation) x 4 = £402k. Maintenance costs could be estimated at £224 (adjusted for inflation) x 4 = £896 per annum.
- B36. A total cost then for sprinkler installation and maintenance in a purpose-built student accommodation over 11m (assuming 1 per year) could cost £402.9k per annum.

Benefits

- B37. From the same report, Wales also estimated 0.2 lives saved and 4 injuries prevented over the period 2013 to 2022 for sprinkler installation in student halls, equivalent to a monetised benefit of £2.3m.
- B38. Based on population of Wales at 3.1m, NI population is approximately 61.3% that of Wales which would translate as equivalent figures of 0.123 lives and 2.45 injuries prevented over a 10-year period. This equates to savings of £19k and £23k respectively per annum for here (£42k in total savings).

Property loss savings

- B39. From DCLG publication 'Fire statistics for GB 2011 to 2012'¹⁶, there were 514 fires in student accommodation in GB (58% of which were due to misuse of cooking appliances). This translates as approximately 15 fires in student accommodation here.
- B40. The benefit in reduced property damage based on 15 fires prevented per year would be £151k per annum.

¹⁵ <https://gov.wales/sites/default/files/consultations/2018-01/130325sprinkler-cost-benefit-analysis-en.pdf>

¹⁶

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/36467/FSGB_2011_to_12.pdf

Fire detection and alarm systems in all habitable rooms of new dwellings

B41. TBE is currently in line with the coverage recommendations of BS 5839-6 in terms of an automatic fire detection and fire alarm system to Grade D Category LD2 standard, with a smoke alarm in the principal habitable room and a heat detector in the kitchen. This is already a higher standard of provision than that required in England and Wales equivalent Approved Documents for Part B (Fire safety).

Costs

B42. Average cost of a mains powered interlinked optical smoke detector - £30.

Average cost to fit an additional mains powered interlinked optical smoke detector - £100.

Depending on size of dwelling and extra rooms involved, then costs involved for provision of mains powered optical smoke alarm (interlinked) for parts and labour:

1 extra room - £130

2 extra rooms - £260

3 extra rooms - £390

4 extra rooms - £520

B43. Housing statistics NI¹⁷

Year	2017	2018	2019	2020	2021	2022
Total Dwellings	783,272	790,328	798,971	807,812	814,210	822,083
Flats	10.6%	10.7%	10.7%	10.8%	10.8%	10.9%
Dwellinghouses (Detached/Semi-detached/terrace)	89.4%	89.3%	89.3%	89.2%	89.2%	89.1%
New dwellings each Year	6880	7640	7420	6420	6398	7873

Average number of new dwellings per year over period 2017 - 2022 is 7,105.

B44. Extra cost involved per new dwelling - £520 (based on 4 extra rooms with interlinked alarms on average)

Total cost to industry per annum - £520 x 7105 = £3.69m.

¹⁷ <https://www.finance-ni.gov.uk/publications/annual-housing-stock-statistics>

Benefits

- B45. Under this amendment all bedrooms will constitute habitable rooms. Additionally, any secondary living room or any other room which fits under the definition for habitable room, if fitted with an interlinked smoke alarm will benefit occupants from shortened detection times and increased audibility levels.
- B46. The improved shortened detection time coupled with improved audibility for persons who may be asleep in bedrooms may reduce the number of casualties affected by a fire in bedrooms.
- B47. In addition, the improved audibility may also reduce the number of casualties who may otherwise sleep through an alarm and are not roused by alarms elsewhere in the dwelling. It may be the case that this may also facilitate more efficient evacuation of children and other occupants by alerting parents in a bedroom more effectively.
- B48. There are concerns that smoke alarms in all habitable rooms may result in an unacceptable rate of unwanted false alarms. For instance, any bedroom with an ensuite bathroom/shower room is likely to have more false alarms where steam, condensation or fumes are present. Other occupant behaviour such as smoking/vaping in bed could also lead to unwanted alarms.
- B49. With this increase in nuisance alarms, the smoke alarms may be prone to interference by householders which could reduce the effectiveness of the alarms or worse make the alarm system completely redundant.

BS 9991: 2015 standard for smoke ventilation of common escape routes in buildings containing flats

- B50. NI Valuation list of April 2019 indicated NI has 85,680 flats of a total dwelling stock of 798,971 (approximately 11% as opposed to a 20% figure in England¹⁸ based on 4.6 million flats in their housing stock¹⁹).
- B51. From the Impact Assessment in England of 2006 which resulted in implementing higher smoke ventilation requirements in England and Wales from April 2007, they estimated it would save 19 lives and prevent 1200 injuries over 25 years.
- B52. It is envisaged that implementing the smoke ventilation systems to BS 9991 standard (as in England and Wales) in blocks of flats here could also reduce the risk of death or injury by about a half thereby saving lives and preventing injuries tangibly measurable over a long period of 25 years. There may also be a small economic

¹⁸

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/817286/EHS_2017-18_Households_Report.pdf

¹⁹<https://www.gov.uk/government/statistics/leasehold-dwellings-2019-to-2020/leasehold-dwellings-2019-to-2020#:~:text=.gov.uk,-,Results,in%20the%20private%20rented%20sector.>

benefit in cost savings (cost of installing measures offset by benefits of space savings and hence larger floor area flats).

B53. Based on England's 19 lives lost and 1200 injuries prevented, this equates to 0.026 lives and 1.63 injuries per year being avoided here. This translates in monetary terms to benefits of £40.4k and £153.3k per annum respectively.

Access and facilities for Fire and Rescue Service

Firefighting shaft provision in PG5 buildings (7.5m+)

Costs

B54. This amendment was introduced in England and Wales equivalent building regulations guidance in 2007. From the impact assessment of that time, cost to construct a firefighting shaft in a building with a storey more than 7.5m (but less than 18m tall) was estimated to be £100k. This figure from 2006 equates today with inflation to £167.4k. Such a shaft would consist of a firefighting lobby, fire resistant doors, firefighting stairs and possibly a smoke shaft, but not necessarily a firefighting lift for access/means of escape. However, as the majority of such buildings would already have a stair, to upgrade this to a firefighting shaft would be less. England estimated to upgrade a stair to be a firefighting shaft at £24k in 2006, translating to a figure of £40.18k today.

B55. Annual compliance cost in England for the change was estimated at £1.5m which equates to a figure today of £2.51m. For NI this would equate to an annual cost of £85.34k per annum for compliance.

Benefit

B56. From the Impact Assessment of 2006, England estimated the same change would save 1 life and prevent 18 injuries over a 25-year period. This would equate to saving 0.034 lives and preventing 0.612 injuries over 25 years here (a social benefit of £4.4k per year).

B57. As there is a limited number of these sizes of buildings (storey 900m²+ and storey more than 7.5m above FRS access level) in the UK never mind here, when this proposal was implemented in England in 2007, it was seen as a proactive measure to address the possible increase in buildings of this height/size in the future. The amendment should ensure more effective firefighting operations as well as increased firefighter and occupant safety in the future.

Maximum hose distance to a fire main

B58. Within TBE, qualifying buildings with a floor area (sprinklered) up to 900m² require at least 1 firefighting shaft. Buildings with a floor area between 900m² and 2000m² should be fitted with at least 2 firefighting shafts, therefore the cost impact of this change on buildings up to this size is likely to be insignificant. Routes for laying hose will depend on building layout and hence additional fire mains may be needed in additional protected stairways. For very large buildings with a floor area over

5000m², the likely consequences of this amendment will be more significant. The amendment will give designers the flexibility to potentially design for fewer firefighting shafts with additional fire mains provision in protected stairways.

- B59. Planning statistics supplied by Analysis, Statistics and Research Branch in the Department for Infrastructure over a 3-year period 2016 to 2019 indicated 10 applications with a storey more than 18m above ground level, none of which had a storey over 900m² in area. Buildings with a floor area up to 2000m² are likely to have no significant cost increases.
- B60. For tall buildings over 2000m², costs of providing firefighting shafts and fire mains in protected stairs/shafts are taken from the BRE report '*The economic impact of the inclusion of BDAG proposals for the provisions of firefighting equipment and facilities*'. From this research and assuming firefighting shafts are positioned at the corners of buildings, England estimated the proposed amendment could produce an annual saving of £84k or an annual cost of £102k depending on the number of firefighting mains required. Locating firefighting or protected stairways centrally in a building is more space efficient and therefore more cost effective. However, this does not give designers the flexibility they desire and hence the likely cost savings are unlikely to be achieved. Given the variation in costs stated, the uncertainty in the derivation of the figures, it is hard to estimate precise cost figures, but it could be suggested the overall costs will be neutral.
- B61. This amendment will bring TBE into line with the BRE research findings and BDAG research on firefighting equipment. It is assumed there will be no significant cost impacts due to no evidence of buildings of this size being procured here. The benefits include providing clarity and ensuring a consistent approach with other regions.

50m height limit for Dry Fire mains

- B62. This amendment to restrict the use of a dry fire main to a maximum storey height of 50m above fire and rescue service access level as opposed to existing 60m will bring TBE into line with the BRE research findings. It will provide clarity and ensure a consistent approach to industry with no significant cost impact.

Fire Vehicle Access to all points in a dwelling in a building (without a Fire Main)

- B63. Amending the guidance to clarify a fire pump appliance vehicle should be able to reach (with hose) a distance of 45m to all points within a dwelling (for buildings that do not have a fire main) will bring TBE into line with the BRE research findings and BDAG research on firefighting equipment. No significant cost impacts are anticipated due to the change. The benefits include providing clarity to industry and ensuring a consistent approach with other regions.

Fire and Rescue Service Activated Evacuation Alert Systems

- B64. The provision of a fire service activated evacuation alert sounder system will assist the Fire and Rescue Service in evacuating part or all of the building if required, without compromising their firefighting abilities. The system will have a sounder in

each of the flats but will not be linked to the smoke and heat detection/alarm system within the individual flat. The system is solely for the use of the Incident Commander in the event of a partial or full evacuation being necessary.

Costs

- B65. The same requirement was recently introduced into England's building regulations guidance. From their Impact Assessment of 2019, they estimated the cost of installing the required evacuation system of between £33k to £40k per building for buildings of storey height 18m to 30m and between £52k to £78k per building for 30m+ buildings. Annual maintenance costs were estimated at £330 to £400 per building for 18m to 30m and between £520 to £780 for 30m+.
- B66. From planning statistics supplied by Analysis, Statistics and Research Branch in the Department for Infrastructure, over a 3-year period from 2016 to 2019, indicated approximately 9 planning applications per year for buildings (blocks of flats) with a storey more than 11m above ground level.
- B67. Taking central figures of £37k and £365 per building for installation and maintenance respectively (from England's Impact Assessment) for buildings 18m to 30m only and applying those figures for buildings 11m+ for here would result in a cost of £336.3k per annum for this new provision to industry here.

Wayfinding signage for Fire and Rescue Service

Costs

- B68. Wayfinding signage could be provided at relatively low cost but would be an important contribution to building safety. The type of wayfinding signage required in guidance will be reflective vinyl lettering achieved by a self-adhesive sheet.
- B69. From England's Impact Assessment²⁰ which introduced this same requirement in their building regulations guidance in 2020, the costs for vinyl lettering installation and maintenance per building were £1219 and £12 respectively.
- B70. Analysis of planning statistics over a 3-year period 2016 – 2019 supplied by a Planning Statistician in Analysis, Statistics and Research Branch (ASRB) of Corporate Policy and Planning Division of the Department for Infrastructure, indicated approximately 27 buildings (blocks of flats) applied for planning permission with a storey more than 11m above ground level - 9 buildings per year on average.
- B71. Based on costs from English Impact Assessment, vinyl lettering costs for installation and servicing here would approximately be £11079 per annum.

20

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/887225/Impact_Assessment_-_Sprinklers_and_other_fire_safety_measures_in_high-rise_blocks_of_flats_2020.pdf

Benefits

B72. The main benefits of increased wayfinding signage in residential blocks of flats are that it may reduce the time for the emergency services to get to the source of a fire and help to evacuate residents. Clear and consistent wayfinding signage could increase the operational performance of firefighters during a fire by reducing the risk of them becoming disorientated in a building with heavy smoke build up. Therefore, the impact could reduce fire spread/size and reduce casualties.

Secure Information Boxes

B73. England introduced this same requirement in their building regulations guidance recently. From their impact assessment of 2022²¹, they estimated costs from market suppliers as the average cost of an information box is £49, at the low estimate. The higher, best estimate cost on the market is about £650. England did not know what proportion of range in prices would be chosen to purchase which type of box, and so the midpoint between these estimates of £350 was chosen and served as the central estimate.

B74. Also, from the English Impact Assessment, in terms of cost to fit a box, it was estimated £100 in the high-end scenario and in the low end was about £40. Again, the central estimate chosen was the midpoint at £70 per box.

B75. Analysis of planning statistics over a 3-year period 2016 – 2019 supplied by a Planning Statistician in Analysis, Statistics and Research Branch (ASRB) of Corporate Policy and Planning Division of the Department for Infrastructure indicated approximately 27 buildings (blocks of flats) applied for planning permission with a storey more than 11m above ground level- 9 buildings per year average.

B76. Assuming England's costs for each box and installation, then for 9 buildings per year (blocks of flats with a storey more than 11m), this results in an annual cost to industry of £3780 per annum.

²¹ <https://www.gov.uk/government/publications/fire-safety-england-regulations-2022/impact-assessment-accessible>

Table 2: Costs and Benefits by Amendment		
Amendment to Part E/TBE	Benefit	Cost
New regulation for 'Provision of fire safety information'.	Already considered good practice. Will offset costs for FRA at later date to comply with FRS(NI)O.	Costs will vary depending on size/complexity of building. Given advantages to building owners/occupiers and cost savings in FRA process, considered cost neutral.
<p>New regulation for 'Provision of automatic fire suppression systems'</p> <p>a) sprinkler protection in blocks of flats (11m+)</p>	<p><u>Flats</u> Social benefit. Save 1.75 lives and prevent 86 injuries over 25 years (equivalent to £108.8k and £47k per year respectively).</p> <p>There is also a benefit from reduced property damage which is estimated at £987k per year (98 fires per annum).</p>	<p><u>Flats</u> Sprinklers (mains fed) cost about £1400 (installation) and £9.50 (maintenance) per flat. Annual cost of £388k (5 storey) to £775k (10 storey). Sprinklers (tank and pump) cost about £2750 (installation) and £9.50 (maintenance) per flat. Annual cost of £745k (5 storey) to £1.49m (10 storey).</p> <p>Overall figure for mix of mains fed/tank & pump systems taken as central £850k per annum based on 9 new buildings, containing flats, over 11m per year.</p>
b) sprinkler protection in residential care premises	<p><u>Care/Nursing Homes/etc.</u> Social benefit. Save 0.24 lives and prevent 2.6 injuries over 25 years (equivalent to £14.9k and £9.8k respectively per year).</p> <p>There is also a benefit from reduced property damage which is estimated at £201.5k per year (20 fires per annum).</p>	<p><u>Care/Nursing Homes/etc.</u> Sprinklers cost about £18,669 per average care/nursing home. Annual cost of £93,495 per annum for installation and maintenance (based on 5 new homes per year).</p>
c) sprinkler protection in purpose-built student accommodation (11m+)	<p><u>Student accommodation</u> Social benefit Save 0.31 lives and prevent 6.1 injuries over 25 years (equivalent to £19.1k and £23k respectively per year).</p> <p>Reduced property damage estimated at £151k (based on 15 fires per year).</p>	<p><u>Student accommodation</u> Sprinklers cost about £402.9k per annum (based on 1 new building of 400 bedrooms per year).</p>

Extend coverage of fire detection and alarm system to all habitable rooms in new dwellings.	<p>Social benefit – Intended to enhance detection and provide earlier warning for occupants of dwellings.</p> <p>This is likely to save lives and prevent injuries. No research available to indicate how effective this will be in order to quantify monetary figures.</p> <p>Property loss – May result in savings in property losses.</p>	Costs to industry - £3.69m per annum.
Refer to BS 9991: 2015 for clarified provisions for smoke ventilation systems suitable for the protection of common escape routes in blocks of flats.	Social benefit. Save 0.65 lives and prevent 40.8 injuries over 25 years (equivalent to £40.4k and £153.3k respectively per year).	Costs involved estimated to be minimal and could lead to a cost saving with potential increased floor space per flat.
Provide firefighting shafts in buildings with storey more than 7.5m in Purpose Group 5 (Assembly and recreation buildings).	Social benefit. Intended to improve occupant and firefighter safety. Could save 0.034 lives and prevent 0.612 injuries over 25 years (equivalent to £2.11k and £2.3k respectively per year).	<p>Additional cost to upgrade facilities to provide a firefighting shaft vary from £40.2k to £167.4k.</p> <p>Compliance cost for NI is estimated at £85.34k per annum.</p>
New 45m hose distance to a fire main through improved firefighting shaft provisions in tall buildings.	<p>Social benefit. Proactive measure to address possible increase in buildings of this height/size in future. Will increase firefighter and occupant safety in the future.</p> <p>Will give designers flexibility for less firefighting shafts in very large buildings with additional fire mains in protected stairs/shafts.</p>	<p>Impact costs will depend on shape and layout of building for laying hose.</p> <p>Given uncertainty in derivation of cost figures, it is suggested the overall costs will be neutral.</p>
Firefighting vehicle access – new dry fire mains height restriction and hose penetration distance clarification.	Social benefit. Proactive measures to improve future firefighting and search and rescue operations. Improved occupant and firefighter safety. Provides clarity and ensures a consistent approach.	No significant cost impacts.
Requirement of Fire Service activated 'Evacuation alert systems' in blocks of flats with storey more than 11m.	Will assist the Fire and Rescue Service in evacuating part or all of a building if required, without compromising their firefighting abilities.	Average cost of installation is £37k and maintenance of £365 per annum. Annual cost to industry of £336.3k per annum (based on 9 buildings per annum over 11m).
Wayfinding signage in buildings, containing flats, with a storey more than 11m.	Improve resident and firefighter safety through reduced times to source of fire, resident evacuations. Could lead to reduced fire size/spread and hence reduced casualties. Too unsure to monetise.	Vinyl lettering costs for installation and servicing – £11079 per annum (based on 9 buildings per year).

Premises Information Boxes in buildings, containing flats, with a storey more than 11m.	Benefits the Fire and Rescue Service in terms of their response to incidents as the boxes provide fire-fighters with readily accessible information about the building.	For Premises information boxes cost about £350 and a cost of £70 to fit. Annual cost to industry is £3780 (based on 9 buildings per year (blocks of flats over 11m).
Total	£420.71k (social benefits) and £1.34m (property loss savings)	£5.47m

ANNEX C

FAMILIARISATION COSTS

C1. The amendments will impose some additional burdens on designers, consultants and District Council building control. Although familiarisation is regarded as a general business expense rather than a burden, the costs have been included in this RIA as a one-off cost in Year 1. Familiarisation costs are detailed as below:

Familiarisation cost of new requirements				
	Familiarisation time	Blended hourly rate	Estimated number of professionals	Industry total
Architects	2 hours	£53	950	£100,700
Building Control Surveyors	2 hours	£47	180	£16,920
Building and Quantity Surveyors	2 hours	£47	668	£62,792
Project managers	2 hours	£47	21	£1,974
Building Service Engineers	2 hours	£47	165	£15,510
1 person per Building Control office updating internal building regulation procedures and disseminating information	7 Hours	£47	26	£8,554
1 person per Architect practice updating internal building regulation procedures and disseminating information	7 Hours	£53	143	£53,053
Total				£259,503

C2. Therefore, the costs to Building Control for familiarisation amount to £25,474 and the costs to industry for familiarisation amount to £234,029.

C3. Source of hourly rates – DCLG Consultation and Impact Assessment on ‘Broadband Cost Reduction Directive’ from 2016 which referenced EC Harris Cost Report.