



Ministry of Housing,  
Communities &  
Local Government

# **Impact Assessment**

## **Sprinklers and other fire safety measures in high-rise blocks of flats 2020**

# Summary

Cost of Preferred (or more likely) Option (in 2020 prices)			
Total Net Present Social Value	Business Net Present Value	Net cost to business per year	Business Impact Target Status Non-qualifying provision
-£693m	-£693m	£81m	

## What is the problem under consideration? Why is government intervention necessary?

Following the Grenfell Tower fire in 2017 there have been calls to increase fire safety in 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, in some cases resulting in enhanced fire safety measures in new buildings, for example including sprinklers in residential buildings under 30 metres in height. However, there is a risk that over time this risk aversion will fade and the industry may revert to being less cautious at an increased risk to public safety. The Grenfell tragedy and Phase 1 of the Public Inquiry highlighted the potential benefits of better information on emergency evacuation routes within blocks of flats and residential sprinklers to slow fire growth. The Call for Evidence in 2018/19 conducted by MHCLG to support the technical review of Approved Document B further highlighted the potential benefits and support for these further fire safety measures. Prospective occupiers are unlikely to have sufficient information to assess the benefit of all fire safety measures when deciding whether to move into buildings. Although some property developers achieve a high level of fire safety, this is by no means the whole market - market incentives are weak and government intervention is necessary to implement these improvements.

## What are the policy objectives and the intended effects?

The policy aims to improve life safety in new blocks of flats by increasing provision of sprinklers and wayfinding signage.

## What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

### Height threshold for provisions:

- (0) **Do nothing** – only provisions for sprinklers in blocks of flats with a top floor at 30m or higher are included in Approved Document B.
- (1) Include provision of sprinklers and wayfinding signage in new blocks of flats with a top floor of **18m** or higher in Approved Document B.
- (2) Include provision of sprinklers and wayfinding signage (reflective vinyl) in new blocks of flats with a top floor at **11m** or higher in Approved Document B.

The Government believes that care is required when considering any policy that has the potential to protect life. Installing sprinkler systems in new residential buildings over 11m in height will impact around 63,000 new flats each year, while an 18m sprinkler threshold would impact approximately 12,600 new flats. Alongside the introduction of wayfinding signage, this would significantly improve fire safety in new dwellings. Additional provision of reflective wayfinding signage to assist the Fire and Rescue service during a response to a severe fire is expected to only be beneficial in buildings with more than two storeys. Option 2 is the preferred option as we consider this will have the biggest benefit to fire safety in new residential buildings and the fewest risks associated with it.

**Will the policy be reviewed?** There are no current plans to review this policy.

## Summary: Analysis & Evidence

## Policy Option 2 (preferred option)

Price Base	PV Base	Time Period	Net Benefit (Present Value (PV)) (£m)		
2020	2020	Costs and benefits: 40-years	Low: -£778.6m	High: -£609.5m	Best Estimate: -£693.1m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	£1.0m	£77.0m	£664.1m
High	£1.5m	£99.8m	£860.5m
Best Estimate	£1.2m	£88.3	£761.3m

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

The costs above are the installation, operating and maintenance costs associated with:

- lowering the height threshold of sprinklers from 30m to 11m (**£736.1m**)
- introducing wayfinding signage in all residential new builds over 11m (**£24.0m**)

A general familiarisation time with the policy has also been taken into account (**£1.2m**)

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

There are no hypothesized non-monetised costs. Some of the risks are identified below which, if they are not mitigated, could become non-monetised costs.

BENEFITS (£m)	Total Benefit (Present Value)
Low	£54.6m
High	£81.9m
Best Estimate	£68.2m

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

The total monetised benefits are associated with the lowering of the sprinkler threshold to 11m and are based on:

- reductions in deaths and injuries (**£44.4m**).
- reductions in property damage (**23.8m**).

As discussed below, monetised values are based on the Department of Transport's valuations of casualties and BRE's estimation of average property loss value per fire.

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

Reassurance of safety for residents, reduction in fire and rescue service call outs, savings in water used for manual firefighting by firefighters, reduction in air pollution (fewer fires).

Key assumptions/sensitivities/risks	Discount rate
<p>The key risks are:</p> <ul style="list-style-type: none"> <li>- Market suppliers and installers not having the capacity to meet increased demand for residential sprinklers, potentially resulting in higher costs and risks of unacceptable standards of installation.</li> </ul> <p>The key assumptions are:</p> <ul style="list-style-type: none"> <li>- Number of new buildings which fall in scope, constructed over 10 years, is based on MHCLG estimates.</li> <li>- We have applied the 3.5% discount rate for costs and non-health related benefits and 1.5% for health-related benefits, as per the Green Book.</li> </ul>	3.5/1.5

**BUSINESS ASSESSMENT (Option 2)**

**Direct impact on business (Equivalent Annual) £m:**

**Costs:** £88.4m

**Benefits:** £7.5m

**Net:** -£80.9m

# Evidence Base

## Problem under consideration

1. This impact assessment considers several proposed technical changes to the guidance in Approved Document B including reducing the height threshold for requiring sprinklers in new residential buildings and introducing a requirement for wayfinding signage in new residential blocks of flats.
2. Part B of Schedule 1 of the Building Regulations 2010 sets out fire safety requirements for new buildings. There are five functional requirements made to secure reasonable standards of health and safety for persons in and around the building.
3. Approved Documents are statutory guidance that set out what, in ordinary circumstances, would normally be accepted as reasonable provision for compliance with the relevant requirements but there is no obligation to adopt any solution contained in an Approved Document.
4. Dame Judith Hackitt's review, following the Grenfell Tower fire on 14 June 2017, has identified serious failings with the construction industry and regulatory system. However, the reforms proposed by Dame Judith Hackitt's review will take time to implement and Government recognised a need to take more immediate action regarding fire safety in high-rise blocks of flats.
5. Currently, the guidance in Approved Document B (ADB) only requires blocks of flats with a top floor at or above 30m or higher to include a sprinkler system designed and installed in accordance with the relevant sections of BS 9251. Research by the Building Research Establishment (BRE) estimates a reduction in deaths and injuries at 90% and 61% respectively when sprinklers are provided in residential settings.<sup>1</sup>
6. There have been instances where firefighters have faced problems identifying floors during an incident where the wayfinding signage could perhaps have been clearer. This highlights the need for a consistent and effective approach.
7. The Grenfell Public Inquiry have recommended in their Phase 1 report that "floor numbers be clearly marked on each landing within the stairways and in a prominent place in all lobbies in such a way as to be visible both in normal conditions and in low lighting or smoky conditions". The Inquiry felt unable to make a recommendation on sprinklers at this stage. However, the Phase 1 report states that "sprinkler systems no doubt have a very valuable part to play in the overall scheme of fire safety measures".
8. MHCLG launched a consultation on 5 September 2019 which proposed reducing the sprinkler height threshold to 18m from 30m in new residential buildings, and also sought views on other height thresholds while providing consultation stage cost analysis for changing the height threshold to 18m, 11m, and for removing the height threshold. The consultation also sought views on several wayfinding signage options including vinyl lettering, photoluminescent lettering, and emergency powered lighting luminaries. The consultation closed on 28 November 2019 and received 184 responses.

## Rationale for intervention

9. MHCLG is responsible for maintaining the Building Regulations 2010 and the associated statutory guidance in Approved Documents that set minimum standards for the design and construction of buildings.
10. Recent high-rise fires including the Grenfell Tower fire has resulted in calls for enhancement of fire safety provisions in high-rise buildings and Government has committed to a full-scale technical review of ADB. The Grenfell tragedy highlighted the potential benefits of better information on emergency evacuation routes within blocks of flats and residential sprinklers to

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<sup>1</sup> Cost Benefit Analysis of Residential Sprinklers – Final Report March 2012 (BRE prepared for The Chief Fire Officers Association), page 26.

slow fire growth. The Grenfell Public Inquiry has recommended that all high-rise buildings include clear wayfinding signage.

11. Prospective occupiers are unlikely to have access to sufficient information and expertise to assess the overall benefit of fire safety measures when deciding whether to move into a new building.
12. There is evidence that the construction industry has become more risk averse since the Grenfell Tower fire in 2017, in some cases resulting in enhanced fire safety measures in new buildings, for example including sprinklers in residential buildings under 30 metres in height. However, there is a risk that over time this risk aversion will fade and the industry may revert to being less cautious. Hence a need for government intervention.
13. Although some property developers achieve a high level of fire safety, this is by no means the whole market - market incentives are weak and government intervention is necessary to implement these improvements.

### **Policy objective**

14. The aim of the policy is to increase fire safety in buildings.

### **Description of options considered (including status-quo)**

15. Responses to a recent MHCLG consultation responses were in favour of reducing the height threshold for sprinkler provision in new residential buildings (96% in favour) and for including a requirement for more consistent wayfinding signage (97% in favour).
16. Three options are considered in detail in this Impact Assessment:
  - a. (0) Do nothing – only provisions for sprinklers in new blocks of flats with a top floor at 30m or higher are included in ADB.
  - b. (1) Include provision of sprinklers and wayfinding signage (reflective vinyl) in new blocks of flats with a top floor of **18m** or higher in ADB.
  - c. (2) Include provision of sprinklers and wayfinding signage (reflective vinyl) in new blocks of flats with a top floor of **11m** or higher in ADB.
17. Option **2** is preferred as it is expected to provide the biggest benefits in terms of improving fire safety in a broader range of residential buildings. We have considered additional options such as each measure having a height threshold of 18m, however for detailed analysis we have considered the options expected to result in the lowest and highest impacts.
18. Option **1** would pose less of a financial burden on industry than option 2. The 18m height threshold is also in line with other fire safety measures for high-rise blocks of flats such as firefighting shafts and requirements for external wall component combustibility defined in Regulation 7. However, the Government is committed to a full technical review of Approved Document B and review of the in-effect ban of the use of combustible materials in and on the external walls of certain buildings in Regulation 7 so there may be further changes in guidance and the Regulations. Primarily, the life safety benefits that this option delivers are significantly less than option 2 and hence not our preferred option.
19. The “do nothing” option **0** is not preferred as this would not achieve government objectives to improve fire safety in buildings.
20. Consideration has been given to the type of wayfinding that should be referred to by ADB. The Department has consulted with the Building Regulations Advisory Committee (BRAC) and BRAC working groups, as well as seeking views in a public consultation, on options from standard paint, reflective vinyl, and photoluminescent lettering through to emergency powered lighting luminaries. Feedback from stakeholders has demonstrated support for increased wayfinding provisions in residential buildings. We consider reflective vinyl lettering

is the most cost-effective option of those included in the consultation<sup>2</sup>. There have been concerns raised about the suitability of photoluminescent signage, which requires a light source to function. Emergency powered lighting luminaries are increasingly costly. Each option has the drawback of being susceptible to vandalism, however reflective vinyl lettering would be cheaper to reapply/maintain.

## **Monetised and non-monetised costs and benefits of each option (including administrative burden)**

### **Costs**

#### **Do nothing (option zero)**

21. The 'do nothing' option has the potential to come at a large cost to society. The estimated direct cost to society of a multi-fatality incident, such as the Grenfell Tragedy, is between £0.8 and £1.1 billion<sup>3</sup> – doing nothing to improve fire safety in buildings maintains the current level of risk of a similar event in a new residential build incurring a large cost to society, both monetary and non-monetary.
22. Although the Government has taken steps to increase fire safety in new high-rise blocks of flats and other buildings by introducing an in-effect ban of combustible materials in and on the external walls and restricting the use of assessments in lieu of testing. If there were to be another large multi-fatality fire in the future it could be that additional fire safety provisions would be considered, including the more costly option of retrofitting existing building with sprinkler systems.

#### **Preferred option (option two)**

23. As with any change to Building Regulations guidance there will be some transitional costs associated with the users of the guidance familiarising themselves with the changes. Given that we are only changing the height threshold we do not consider that any additional training would be required for the lowering of the sprinkler threshold. We also do not consider that the introduction of guidance on consistent wayfinding signage would require additional training. It is most likely that professionals will familiarise themselves with the changes to the guidance in ADB when they come to use it for the first time following the update. We estimate the total policy familiarisation costs to be between £1.0m and £1.5m (mid estimate £1.2m).

### **Sprinklers**

24. Our assessment of the costs of a reduction in the trigger height has focussed principally on two areas i) installing the sprinkler systems ii) the annual maintenance cost.
25. An average sprinkler system will cost between £75,400 - £162,400 to install in each new building in scope. This figure includes 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 is estimated at £1,300 - £1,600<sup>4</sup>.
26. In accordance with BS 9251, sprinkler systems will be maintained annually to ensure their effectiveness. Following an engagement with industry since consultation, we have revised the estimated annual maintenance costs to be between £6 - £13 per flat<sup>5</sup>.

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<sup>2</sup> Consultation level analysis estimated an annual cost for vinyl lettering of £1.2-£1.9m if included in new residential blocks of flats ≥11m, with photoluminescent lettering at £2.4-3.6m and emergency-powered lighting luminaries at £74-£111m. For more detail please see the consultation document at: <https://www.gov.uk/government/consultations/sprinklers-and-other-fire-safety-measures-in-new-high-rise-blocks-of-flats>

<sup>3</sup> This figure includes the value of preventing a statistical fatality, mental health impacts, rehousing of residents, site management and demolition as published in *Building a Safer Future – Annex A* (<https://www.gov.uk/government/consultations/building-a-safer-future-proposals-for-reform-of-the-building-safety-regulatory-system>).

<sup>4</sup> This estimate excludes any costs which may occur at installation, such as overheads.

<sup>5</sup> This is the equivalent of £480-£720 per building. (Previous consultation maintenance costs were estimated at £160-£240 per flat per year).

27. Overall, reducing the height threshold to 11 metres would mean 15,940 new buildings fitting systems over 10 years, with an annual cost of between £74.8 million and £96.5 million (mid estimate £85.5 million).

### Wayfinding signage

28. We have estimated the cost impact of wayfinding for all blocks of flats over 11m. The type of signage costed is for a reflective vinyl lettering achieved by a self-adhesive sheet.

29. Reflective vinyl lettering is estimated to have an annual cost of £2.2 million - £3.3 million (mid estimate £2.8 million) if required in all new build blocks of flats over 11m<sup>6</sup>.

### Option one

30. As with any change to Building Regulations guidance there will be some transitional costs associated with the users of the guidance familiarising themselves with the changes. Given that we are only changing the height threshold we do not consider that any additional training would be required for the lowering of the sprinkler threshold. We also do not consider that the introduction of guidance on consistent wayfinding signage would require additional training. It is most likely that professionals will familiarise themselves with the changes to the guidance in ADB when they come to use it for the first time following the update. We estimate the total policy familiarisation costs to be between £1.0m and £1.5m (mid estimate £1.2m), equivalent to the familiarisation costs of our preferred option (two).

### Sprinklers

31. Reducing the height threshold to 18 metres would mean approximately 1,970 new buildings fitting systems over 10 years, with an annual cost of between £14.6 million and £18.9 million (mid estimate £16.7 million). This figure takes into account both the sprinkler installation cost<sup>7</sup> as well as maintenance costs<sup>8</sup>.

### Wayfinding signage

32. Reflective vinyl lettering, achieved by a self-adhesive sheet, is estimated to have an annual cost of £0.6 million - £1.0 million (mid estimate £0.8 million) if required in all new build blocks of flat over 18m.

33. Table 1 compares the costs between option one and two.

Table 1: Cost Summary of mid equivalent annual estimates (£m)

	Number of new buildings in scope per year	Sprinklers	Wayfinding Signage	Total Equivalent Annual Cost	Present Value Cost
<b>Option One</b>	<b>280</b>	<b>£16.7</b>	<b>£0.8</b>	<b>£17.7</b>	<b>£152.4</b>
<b>Option Two (preferred)</b>	<b>1,680</b>	<b>£85.5</b>	<b>£2.8</b>	<b>£88.4</b>	<b>£761.3</b>

<sup>6</sup> Based on an installation cost per building of £1,836 (11-17m), £2,937 (18-30m), £5,507 (30m+), including overheads and preliminaries, and an annual maintenance cost of £18, £29, £55 for each respective building height range.

<sup>7</sup> An average sprinkler system costs between £75,400 - £162,400 to install in each new building in scope. This figure includes 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 is estimated at £1,300 - £1,600.

<sup>8</sup> Estimated £6-£13 per flat per year.

## Benefits

### Preferred option (option two)

34. The main monetised focus is on reducing the risk of fatalities and injuries of residents and firefighters as well as property protection advantages.
35. Using standard values based on research conducted by the Department of Transport<sup>9</sup>, and used widely across Government, we have acknowledged the value of fatalities and injuries in our consideration of benefits. Values used to place a monetary value on avoiding death and injury are reported in table 2.

Table 2: assumed values of preventing death or injury

Value of a prevented fatality	£1,554,395
Minor injury prevented	£13,465
Serious injury prevented	£174,671

36. Benefits to property protection have been monetised based on the historic evidence that sprinklers are 88%<sup>10</sup> effective in reducing property damage and the average property loss value per fire is £10,075<sup>11</sup>.
37. We would expect that a recent, post-Grenfell, increase in compliance has decreased the expected value of property loss per incident (the £10,075 figure above) and hence it is possible that the benefit of sprinklers in reducing property damages is overestimated here. However, to construct a counterfactual scenario and model robust case study incidents would likely be disproportional. For this reason, the analysis relies on historic evidence. Some of this risk is reflected by use of a broad range in the low scenario in table 3.
38. Table 3 is a summary of the monetised benefits. The estimated casualty and fatality values take into account the value of preventing death and injury<sup>12</sup> and are based on an estimation of the reduction of casualties (injuries) and fatalities in dwelling fires as a result of sprinkler installation. The estimated property protection values take into account property values<sup>13</sup> and are based on an estimation of a fire incident occurring in a building given the installation of sprinklers<sup>14</sup>.

Table 3: Monetised benefits of preferred policy option (£m)

	Low	Mid	High
Avoided casualties	£10.9	£13.6	£16.3
Avoided fatalities	£24.6	£30.8	£37.0
Property protection	£19.1	£23.8	£28.6
<b>Total monetised benefits</b>	<b>£54.6</b>	<b>£68.2</b>	<b>£81.9</b>

39. Significant benefits below have not been monetised. This is because there is a lack of evidence base and robust data to accurately monetise these. In some cases there has also been insufficient time to carry out a proportionate analysis.

<sup>9</sup> See DfT webtag safety objective guidance for detailed information; <https://www.gov.uk/government/publications/tag-data-book>.

<sup>10</sup> Estimate based on BRE (2012) and Home Office figures

<sup>11</sup> ODPM (2006) figures updated by BRE (2015).

<sup>12</sup> As in Table 2.

<sup>13</sup> As in paragraph 35.

<sup>14</sup> There were 1,987 fires in medium rise block of flats (buildings of 4 to 9 dwellings) in 2017-18 (Home Office statistics – FIRE0205), and 96,000 residential buildings between 11m and 30m in height (Home Office estimates), suggesting the probability of a fire incident in a given building affected by the changes per annum is 2.07%.

40. For each fire safety measure assessed in this report it should be noted that severe fires should always be the exception and the majority of fires in blocks of flats do not require evacuation of more than the flat in which the fire originates. As such, analysis may suggest a small benefit in relation to the cost due to the rare and exceptional nature of a severe fire. However, these policy options are being pursued to reduce both the chance of a severe fire occurring, by providing sprinkler systems to slow fire growth, and to reduce the risk to residents and firefighters if such a fire were to occur. As noted previously, the Grenfell Tragedy resulted in the deaths of 72 individuals and cost society an estimated £0.8 - £1.1 billion. These policy changes will reassure residents as well as providing safety and property benefits.

### **Sprinklers**

41. 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. We do not expect then for a significant reduction in the number of fires but would expect to see a benefit in a reduction in large fires that are associated with injury or fatalities.

42. Research by Building Research Establishment (BRE) into the effectiveness of sprinklers estimates a reduction in deaths and injuries at 90% and 61% respectively when sprinklers are provided in purpose built flats<sup>15</sup> with confidence of  $\pm 3\%$  and  $\pm 12\%$ . More recent analysis from Wales considering flats estimates a reduction in deaths and injuries at 90% and 62% respectively with confidence of  $\pm 4$  and  $\pm 12\%$ .

43. Current Building Regulations' requirements for fire safety are focussed on life safety. Policy hitherto has been that property protection should be addressed through insurance. If properties are protected from fire spread, they do not have to be repaired as much after a fire or, in some cases, rebuilt. Members of the insurance industry have expressed the view that the Building Regulation guidance should do more to consider property protection and responded to our Call for Evidence favouring sprinklers in more new residential and non-residential buildings<sup>16</sup>.

44. 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. This is discussed in more detail later.

### **Wayfinding signage**

45. The main benefits of increased wayfinding signage in residential blocks of flats is in reducing the time for the emergency services to a) get to the source of the fire, and b) to help evacuate residents.

46. As such, we expect 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. Increasing consistency of signage between buildings by requiring a certain size and numbering system would also benefit the orientation of FRS personnel. Therefore, the impact will be on reducing fire spread/size and reducing casualties.

## **Option one**

47. Benefits, both monetised and non-monetised, are significantly less than the benefits associated with the preferred option (option two).

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<sup>15</sup> Cost Benefit Analysis of Residential Sprinklers – Final Report March 2012 (BRE prepared for The Chief Fire Officers Association), page 26.

<sup>16</sup> Analysis of responses to the call for evidence: <https://www.gov.uk/government/consultations/technical-review-of-approved-document-b-of-the-building-regulations-a-call-for-evidence>

48. Table 4 highlights the estimated monetised benefits associated with property protection and avoided casualties and fatalities of the two considered policy options. The difference in benefits value is largely due the differences in scope between the two policies. Policy option one will impact approximately 280 new buildings per year, this is 1,400 fewer buildings every year than our preferred option (two)<sup>17</sup>.

Table 4: Present value monetised benefit summary of policy options (£m)

Option One	8.4
Option Two (preferred)	68.2

49. The non-monetised benefits associated with sprinklers and wayfinding signage are also likely to be less than those associated with option two. This is expected to be proportionate to the decrease in number of households that the policy area will reach<sup>18</sup>.

### **Rationale and evidence that justify the level of analysis used in the IA (proportionality approach)**

50. It is noted that a large non-monetised benefit will be providing reassurance to residents that they are safe in their homes. Due to the lack of suitable existing research on residents' wellbeing and perceptions of safety, it is not currently possible to robustly monetise this benefit. The value of reassurance to households, over and above the material reduction in risk to residents, would need to total £694m for the benefits of the proposed option to exceed the monetised costs. This equates to approximately £10,900 per household affected over our appraisal period.

51. Furthermore, we don't expect some of the potential benefits, such as reduced water usage and carbon emissions, to have a substantial impact on the net policy costs. For this reason, on proportionality grounds, some additional benefits are non-monetised for this IA.

### **Risks and assumptions**

52. There are a number of important uncertainties. The number of new buildings per annum is indicative and has thus been reflected by the use of a broad range reflecting a plausible high and low scenario. The estimated number of new projects has also been compared to various other sources including ONS statistics strengthening the case for the build rates that have been assumed.<sup>19</sup>

53. This impact assessment has considered the costs and benefits of changes to the Approved Document B relative to the counterfactual of the current regime. This takes into account the current Approved Document B requirements, the ban on combustible materials in external wall systems, the social Aluminium Composite Material (ACM) remediation fund and current voluntary practice in the industry. The costs in such a scenario are any additional costs incurred in the new regime, and the benefits are a measure of improvements in fire safety brought on by the proposal.

54. There is a risk that the suppliers of sprinklers may not initially have the capacity for the increased demand following the update to ADB. 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

<sup>17</sup> 1,680 new buildings per year will be in scope of the preferred option (option two) – above 11m in height.

<sup>18</sup> Installing sprinkler systems in new residential buildings over 11m in height will impact around 63,000 new flats each year, whereas an 18m sprinkler threshold would impact approximately 12,600 new flats.

<sup>19</sup> We have assumed an annual build rate of 1.5%, 2.0% and 3.0% for residential new builds of 11m – 17m, 18m – 30m and 30m+ in height respectively.

period. However, there will likely be a requirement to train additional sprinkler installers which could reach the limit of industry capacity in this regard, especially if these policy changes have additional knock on effects such as local authorities or other building owners pursuing retrofitting of their existing stock.

55. This analysis has assumed that 50% of new buildings with a top storey height of between 11m and 30m are already including some form of a sprinkler system, although not necessarily a system in accordance with BS 9251. Views of stakeholders in the sprinkler supply industry is that this is partly a result of an increasingly risk averse industry following the Grenfell Tower fire and partly pre-empting increased Government activity in this space and the expectation that more stringent regulations would be put into place.
56. This analysis also assumes the cost of installation for sprinkler systems would be the same cost per dwelling in different buildings around the country. However, 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. We expect that many new high-rise buildings would already have multiple pumps as part of the design to maintain water pressure and supply. However, it may be that the cost of installing a sprinkler system is higher or lower in some buildings where water pressure is different or that are required to adopt a stored supply approach to comply with the requirements of BS 9251. Some building designers/owners may voluntarily choose the more expensive option of a stored water supply.
57. Our proposal is designed to be proportionate to the risks that come with high rise residential buildings, but we are taking care to ensure that our legislative framework facilitates and does not hamper a step-change increase in the supply of new homes. Building better and safer homes is in all our long-term interests.
58. The benefits and costs have been calculated over a 40-year appraisal period. The appraisal period includes 10 years of policy and 30 years of subsequent maintenance/benefits valuations<sup>20</sup>. We have assumed that the benefits and maintenance costs align with the expected sprinkler lifetime and run 30 years from installation date.

### **Sensitivity testing**

59. The low and high scenarios considered in the impact assessment reflect the primary uncertainty over sprinkler installation costs, the additional uncertainties from the lifetime of the sprinklers and signage, future new build rates, the applicability of the economies of scale and uncertainty around the industry's response to changes. Thus, most of the main uncertainties have been taken into account in the three, low, mid and high, scenarios presented.
60. The value of the individual sprinkler system is an important variable. We have used £1,300 - £1,600<sup>21</sup> per flat throughout the analysis as this is the cost sourced by PRP fire consultants as a representative unit for use in new buildings.

### **Direct costs and benefits to business calculations (following BIT methodology)**

61. Although some new buildings will likely be developed by local authorities, during construction most costs will fall on housing developers and housing associations in the first instance.
62. Maintenance costs of the sprinkler and wayfinding signage is likely to fall on the freeholders of the building and building management firms in the first instance. Despite the fact that

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<sup>20</sup> Maintenance and benefits valuations are assumed to decline over the last 10 years of the appraisal period as sprinklers installed early in the period reach the end of their lifespan.

<sup>21</sup> This estimate excludes any costs which may occur at installation, such as overheads.

they may be able to recover these costs through increased services charges, the potential cost to businesses is the total policy cost of £664m - £861m.

## **Wider impacts (consider the impacts of your proposals).**

### **Equalities impact test**

63. An initial equalities screening of the proposed policy was carried out and determined that a full equalities impact test was not required as the proposal is unlikely to disproportionately affect any groups sharing a protected characteristic.

### **Competition assessment**

64. The proposal updates the standards that residential blocks of flats should generally be constructed to. As such it does not make any long-term significant impact on competitiveness of English companies within the UK or elsewhere in Europe. Specifically, the sprinkler and wayfinding signage proposals will not limit the number of installers or product suppliers either directly or indirectly, it will not limit the ability of suppliers to compete and it will not reduce suppliers' incentives to compete.

65. On that basis, it is considered that the proposals to change the guidance apply in a proportional and equitable way.

### **Small firms impact tests**

66. 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 like to be owned or managed by larger firms, who will bear the costs of installation and maintenance in the first instance.

67. Lowering the sprinkler threshold will result in more sprinklers per building. This may lead to efficiency savings in maintenance and operating costs, especially for small firms such as a plumbing company. Small firms may therefore benefit through internal economies of scale.

68. However it is not clear whether small firms will grow, or new entrants will come to the market to meet excess demand. Without a detailed assessment of how competitive this market is, it is difficult to predict whether an increase in demand will lead to efficiency savings or whether these will be offset by new firms entering the market.

69. Excluding small and micro businesses would undermine the intention of the policy – to increase fire safety in buildings – but businesses (small and large) installing the systems are expected to be made no worse off by the policy.

### **Environmental impact tests**

70. The proposal has been assessed with respect to wider impacts on the environment in relation to waste; air quality; material change to landscape or townscape; water pollution, and flood risk; noise; living species and ecosystems. In all cases it is felt there would be no environmental impacts, and there may even 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.

### **Social impact tests**

71. We do not expect the proposal to have any 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.

### **Sustainable development**

72. 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.

**A brief qualitative summary of the potential trade implications of measure.**

73. 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 we would not expect a per unit increase in cost although it is likely that the volume of sprinkler components and systems imported by the UK will increase.

74. As the UK industry expands production and potential productivity to deliver the new requirements there is a possibility that UK firms will become more competitive in the international market.

75. We do not expect the proposals to impact trade and investment in any other way.

**Summary and preferred option with description of implementation plan.**

Table 5: Summary of present value mid estimates (£m)

	Transitional Costs	Sprinklers Costs	Wayfinding Signage Costs	Total Present Cost	Net Present Value
Preferred Option (2)	£1.2	£736.1	£24.0	£761.3	£-693.1

76. This impact assessment has examined the costs and benefits of lowering the threshold of sprinkler trigger heights and introducing reflective vinyl signage as a requirement in some new builds. The preferred option is to update Approved Document B to reduce the height threshold for the inclusion of sprinklers in new residential blocks of flats to 11m, along with guidance for more consistent wayfinding signage (made of reflective vinyl) in new residential blocks of flats with a top floor of ≥11m from ground level.

77. The estimated net policy cost of our preferred option is **£609 million - £779 million**. These summary costs are broken down in table 5. The net policy cost appears large due to the rare and exceptional nature of a severe fire and figures excluding non-monetised benefits such as reassurance for residents.

78. Amendments will be made to Approved Document B, which will be updated in May 2020. The change in guidance will take effect 6 months later in November 2020.