

Assessment of Risk 2023

Report to:

Date:

Performance, Risk and Assurance Board	20 June 2023
Commissioner’s Board	12 July 2023
Deputy Mayor’s Fire and Resilience Board.....	25 July 2023
London Fire Commissioner	

Report by:

Assistant Director, Strategic Planning Susan Ellison-Bunce

Report classification:

For decision

For publication

I agree the recommended decision below.



Andy Roe

London Fire Commissioner

This decision was remotely
Date signed on 17 August 2023

PART ONE

Non-confidential facts and advice to the decision-maker

Executive Summary

The Assessment of Risk (AoR) for London is the Brigade's current understanding of the risks affecting the capital to which London Fire Brigade could be expected to respond. This assessment is used to inform the London Fire Commissioner's plans for reducing risk in London, as set out in the Community Risk Management Plan (CRMP). When the CRMP was approved, the LFC committed to an annual review of the AoR and this report presents the Assessment of Risk 2023. This will replace the version that originally informed the CRMP. No changes to the CRMP are required as a result of this updated assessment.

Proposed decision – the London Fire Commissioner

That the London Fire Commissioner approves and publishes the Assessment of Risk 2023.

1 Introduction and background

- 1.1 The Brigade's Assessment of Risk (AoR) underpins the Community Risk Management Plan (CRMP), which describes the changes that the Brigade needs to make to achieve its vision and how it will make those changes. The CRMP also identifies the improvements to existing services and the new services that are needed to respond to risk. It does this through reference to the AoR, which sets out the LFC's understanding of risk in London.
- 1.2 The AoR has been reviewed for 2023 and updated, in line with the LFC's commitment to review the AoR annually.

2 Outcome of the review

- 2.1 Overall, the review has identified no significant change to risk in London since the last assessment. Although the capital experienced a significant number of wildfires in July 2022, this has not resulted in an increased score within this assessment. The risk remains assessed as a 3 for likelihood and has the highest rating of 5 for impact. The number of wildfires experienced in London last year does not yet suggest that they are likely to occur more than five times per day on average.
- 2.2 However, some risks are more visible in this review, due to changes in presentation. These

changes are in response to feedback from internal and external stakeholders and from the independent academic review panel who provided feedback on the assessment of risk for 2022.

- 2.3 This new presentation allows specific incident types to be highlighted separately which is of use at local level when identifying risks prevalent in certain boroughs but not evenly spread across London. For example, incident type *Person in waterway / on foreshore accessible from land* has been split out from the larger category of *Non-fire incidents involving - outdoor water and boats*. This highlights the most casualty-generating incident type within the category which is a person entering the water and the subsequent need for appropriate plans to deal with that type of incident. A second example of this are two incident types related to hazardous materials incidents. When split from the wider data on non-fire incidents it becomes apparent that these incidents are clustered in certain boroughs where they have a disproportionate impact. This information can be used by borough teams when drawing up Borough Risk Management Plans (BRMPs).
- 2.4 This update to the assessment of risk also simplifies the presentation of risk information, which is hoped will make it more accessible and easier to use. The methodology underpinning the assessment has been moved to a separate document and on the advice of the expert panel who reviewed the AoR 2022, the concerns layer in the assessment has been simplified.
- 2.5 The changes that have been made to the AoR 2022 are set out in the tables overleaf. There is a table summarising changes to risk scores and another summarising changes to presentation.

Summary of Changes to Risk Scores

Section	Change	Implications of change	Rationale for change
Overall scoring of LFB risk data.	No Change	The Assessment of Risk that underpins the CRMP remains a good representation of risk in London based on most recent incident data.	Most recent 5 years incident data used to pick up on changes in patterns of incidents over most recent year, whilst maintaining a view of historical trends.
Extraordinary Risks from London Risk Register	Changes to Scoring and new risks in London Risk Register		Introduction of new fire related risks produces reasonable worst-case scenarios for contingency planning in these areas. Increased risk score for malicious attacks on infrastructure should inform planning in this area including USAR and CBRNE.
	Fires in purpose built high-rise flats	NEW	
	Fires in large public and commercial buildings	NEW	
	Fires involving landfill and waste processing sites	NEW	
	Major fire in care homes and hospitals	NEW	
	Radioactive incident caused by mishandling of radioactive material	NEW	
	Large aircraft incident in proximity to airport	NEW	
	Attack on infrastructure 1 (detail via RD)	UP	
	Attack on infrastructure 2 (detail via RD)	UP	
	Attack on transport (detail via RD)	UP	
	Small aircraft incident in proximity to airport	UP	
	Fire and Explosion at an onshore fuel pipeline	NEW	
	Large toxic chemical release	DOWN	
	Attack on Infrastructure 3 (detail via RD)	DOWN	

Summary of Changes to Presentation and Content

Section	Change	Implications of change	Rationale for change
Summary Risk Matrix	Lower scoring risks and risks to which LFB will not directly respond have been removed from this matrix for ease of presentation but are included on pages 10, 11 and 14.	Lower risks are presented further back in document. Risks to which LFB do not directly respond but which may have a business continuity implication are presented on page 14.	Feedback from stakeholders and academic panel regarding ease of use and understanding
Our layered approach to assessing risk	Change to text and headings for clarity. Removal/ disaggregation of “concerns” produced from consultation from incident or geographic data.	Concerns are now presented separately	Disaggregated following feedback from academic panel which stated that combining consultation data on risk perception with incident or geographic data was confusing.
Layer 1: Concerns of people and communities	Layer renamed to reflect change to focus on consultation feedback only. Geographic data removed. Disaggregated following feedback from academic panel review. Summarised topics from consultation feedback presented by frequency concern raised rather than location of similar geography.	Public perception of risk now unlinked from geographic data and incident data to allow separate presentation. In future development this will allow specific focus on risk perception and local concerns.	Disaggregated following feedback from academic panel which stated that combining consultation data on risk perception with incident or geographic data was confusing
Layer 2: Risks relating to property, places and incident type	Layer renamed to reflect data sources. Addition of ITC based risk matrix to allow disaggregation of data eg C1/C3 from geographic data. Removal of description of scoring system and moved to separate document for brevity.	Descriptors of method are now presented separately in a method and calculations document. This makes the AoR easier to read. Disaggregation of incident data by type code gives higher visibility to low frequency, high risk incident types.	Feedback from stakeholders and academic panel regarding ease of use and understanding Feedback from end users' departments that incident type data would be useful to track risks through mobilising, policy, and training Preparation for change to national incident codes

Section	Change	Implications of change	Rationale for change
Layer 3: Extraordinary risks and risks from the London risk Register.	Layer renamed to reflect and highlight source of risk information being the LRR Removal of descriptive methodology to separate document for brevity.	Descriptors of method are now presented separately in a method and calculations document. This makes the AoR easier to read	To highlight the London Risk Register in LFB planning in response to HMICFRS feedback Feedback from stakeholders and academic panel regarding ease of use and understanding
Layer 4: Emerging and future risks	Layer renamed, style changes only	None	Style changes only
Factors Affecting Fire Vulnerability	Moved to end of document	Style only	Allows layers to be consecutive
Risks of note in addition to data led matrices	Additional detail added to historic incidents. All maps of concerns removed due to feedback regarding linking consultation responses with geographic data.	Additional detail added to historic incidents not captured in LFB data or LRR. SME feedback to be sought on addition of any new risks to LRR Requirement for risk perception to be assessed and presented separately from incident data.	Historic and rare incidents provide scenario examples for possible addition to LRR Feedback regarding linking consultation responses with geographic data.

3 Conclusion

3.1 This update of the AoR will be used to inform the delivery of the strategic objectives and risk reduction as set out in the CRMP. The changes in the AoR 2023 do not require amendments to the CRMP itself and any actions needed to respond to the amended risk profile are within the scope of the CRMP.

4 Equality comments

4.1 The LFC and the Deputy Mayor for Fire and Resilience are required to have due regard to the

Public Sector Equality Duty (section 149 of the Equality Act 2010) when taking decisions. This in broad terms involves understanding the potential impact of policy and decisions on different people, taking this into account and then evidencing how decisions were reached.

- 4.2 It is important to note that consideration of the Public Sector Equality Duty is not a one-off task. The duty must be fulfilled before taking a decision, at the time of taking a decision, and after the decision has been taken.
- 4.3 The protected characteristics are: age, disability, gender reassignment, pregnancy and maternity, marriage and civil partnership (but only in respect of the requirements to have due regard to the need to eliminate discrimination), race (ethnic or national origins, colour or nationality), religion or belief (including lack of belief), sex, and sexual orientation.
- 4.4 The Public Sector Equality Duty requires decision-takers in the exercise of all their functions, to have due regard to the need to:
 - eliminate discrimination, harassment and victimisation and other prohibited conduct.
 - advance equality of opportunity between people who share a relevant protected characteristic and persons who do not share it.
 - foster good relations between people who share a relevant protected characteristic and persons who do not share it.
- 4.5 Having due regard to the need to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
 - remove or minimise disadvantages suffered by persons who share a relevant protected characteristic where those disadvantages are connected to that characteristic.
 - take steps to meet the needs of persons who share a relevant protected characteristic that are different from the needs of persons who do not share it.
 - encourage persons who share a relevant protected characteristic to participate in public life or in any other activity in which participation by such persons is disproportionately low.
- 4.6 The steps involved in meeting the needs of disabled persons that are different from the needs of persons who are not disabled include, in particular, steps to take account of disabled persons' disabilities.
- 4.7 Having due regard to the need to foster good relations between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
 - tackle prejudice
 - promote understanding.
- 4.8 The Equalities Impact Assessment for the previous AoR has been reviewed as current. Any specific issues arising from new census data will be addressed within BRMPs.
- 4.9 Borough Risk Management Plans will aid the targeting of groups vulnerable to specific risks either by location or by associated characteristic in prevention work and are therefore expected to have a positive equalities impact.

5 Other considerations

Workforce comments

- 5.1 The representative bodies have been engaged during the review of the AoR. The Fire Brigades

Union provided extensive feedback on the AoR 2022, which was taken into account for the final version. They have not provided any specific feedback during this review.

Communications comments

- 5.2 This is an internal facing document that is used to inform the service strategies and BRMPs. It also informs prioritisation of work in central departments, such as Operational Policy and Assurance. All relevant stakeholders have been made aware of the review of the Assessment of Risk and Strategic Planning will continue to work in collaboration with those stakeholders so that its relevance is understood.
- 5.3 This version of the Assessment of Risk will be published on the external website as one of the supporting documents for the CRMP. However, no active promotion of it is proposed. Its impact and relevance for communities is expressed through BRMPs.

6 Financial comments

- 6.1 The update to the AoR will not result in any financial consequences. However, in line with reviewing all of LFB's material risks, if it is identified that the organisation's risk matrix has changed then there will be cost implications (both potentially in savings and additional investment). The cost implications would be as a result of placing mitigating factors to ensure the risk is managed appropriately.
- 6.2 This can already be seen in a practical sense with the use of the Priority Crewing Guide (PCG) and the divergence away from this when the potential of high risks (such as heatwaves and wildfires) becomes more prominent which clearly results in financial implications.
- 6.3 Any changes to the assessment of risk would be assessed to its financial implications and form part of the budget cycle process.

7 Legal comments

- 7.1 Under section 9 of the Policing and Crime Act 2017, the London Fire Commissioner ("Commissioner") is established as a corporation sole with the Mayor appointing the occupant of that office.
- 7.2 Section 1 of the Fire and Rescue Services Act 2004 states that the Commissioner is the fire and rescue authority for Greater London.
- 7.3 Under section 327D of the GLA Act 1999, as amended by the Policing and Crime Act 2017, the Mayor may issue to the Commissioner specific or general directions as to the manner in which the holder of that office is to exercise his or her functions.
- 7.4 By direction dated 1 April 2018, the Mayor set out those matters, for which the Commissioner would require the prior approval of either the Mayor or the Deputy Mayor for Fire and Resilience (the "Deputy Mayor").
- 7.5 Paragraph 3.1 of Part 3 of the said direction requires the Commissioner to consult with the Deputy Mayor as far as practicable in the circumstances before a decision is taken on (inter alia) any "[c] decision that can be reasonably considered to be novel, contentious or repercussive in nature, irrespective of the monetary value of the decision involved (which may be nil)".

- 7.6 The decisions recommended in this report are considered to be ‘novel, contentious or repercussive’ and therefore the Deputy Mayor must be consulted before a final decision is taken.
- 7.7 When carrying out his functions, the Commissioner, as the fire and rescue authority for Greater London, is required to “have regard” to the Fire and Rescue National Framework prepared by the Secretary of State (“Framework”) (Fire and Rescue Service Act 2004, section 21).
- 7.8 The production of an Integrated Risk Management Plan (IRMP) is a requirement of the Framework. In line with guidance from the National Fire Chiefs’ Council, the Commissioner is now referring to the IRMP as a Community Risk Management Plan (CRMP).
- 7.9 The Framework states that the Commissioner’s CRMP “must” meet certain requirements, in considering the AoR 2023 the Commissioner must therefore have regards to the following requirement of the Framework; that the CRMP must:
- reflect up to date risk analyses including an assessment of all foreseeable fire and rescue related risks that could affect the area of the authority;
- 7.10 To assist the Commissioner in coming to a view on this matter it is recommended that the Commissioner should consider whether the CRMP properly reflects the AoR 2023. It would not be sufficient to state it is met by reference to additional documents, the CRMP itself must demonstrate this in of itself. When considering if the risk analysis is properly reflected in the CRMP it is not required that it reproduces the analysis completely but instead that it represents it accurately and in an appropriate way.
- 7.11 The recommendation in this report is that the CRMP does not need amending in response to the changes to the AoR 2023. If the Commissioner agrees with this recommendation then it falls to the Commissioner to decide following consultation with the Deputy Mayor.

List of appendices

Appendix	Title	Open or confidential*
1	Assessment of Risk 2023	Open
2	Assessment of Risk 2023 Methodology	Open
3	Equalities Impact Assessment 2022	Open

Part two confidentiality

Only the facts or advice considered to be exempt from disclosure under the FOI Act should be in the separate Part Two form, together with the legal rationale for non-publication.

Is there a Part Two form: NO

OFFICIAL

Assessment of Risk 2023

Assessment summary

The Fire and Rescue National Framework for England 2018 places a duty on all Fire and Rescue Services to "*identify and assess the full range of foreseeable fire and rescue related risks their areas face*". The London Fire Commissioner's (LFC) Assessment of Risk is the Brigade's response to that requirement. It sets out all foreseeable risks which the LFB might be expected to respond to and assesses their risk based on a combination of their likelihood and consequence.

London Fire Brigade's (LFB or "Brigade") Assessment of Risk (AoR) is designed to help increase understanding of how risk from fire and non-fire emergencies in London has changed over time and how the different elements combine to give a London-wide picture of risk. It fulfils the LFC's requirement to identify and assess the full range of foreseeable fire and rescue related risks. This process feeds LFB's ability to make decisions in relation to how the Brigade takes actions to prevent fire and other emergencies and mitigate risks.

The AoR is not the only process LFB uses to determine and provide its services, but it does give a high-level overview which can be used to understand the basic concepts and the steps that LFB is taking to make people safe. The AoR is reviewed annually, or as significant new data becomes available. This enables the Brigade to adapt its operations to London's changing environment. The Brigade's approach to assessing risk is founded on risk management principles and the definitions set out in the National Fire Chiefs Council's 'Definition of Risk Project'.

In this Assessment of Risk, risk is defined as a combination of the likelihood and consequences of hazardous events. This allows the risk of incidents that may have happened only rarely, or never, to be assessed alongside risks that are common. This next section outlines the Brigade's understanding of risk and its approach to assessing risk in London.

The Brigade attends a wide range of emergencies that result in casualties and fatalities. This AoR has identified several high-risk areas relevant for London based on incident data. The highest identified risks and highest demand are generally where most people live (Urban Centres). The highest risks and risk locations are:

- Fires in the home particularly purpose-built flats, high-rise buildings, and bungalows.
- Road Traffic Collisions leading to people trapped.
- Fires in care homes and specialised housing.
- Fires in landfill, wasteland and on rural land (urban/rural interface).
- People requiring rescue from water, collapsed structures and from trains and transport infrastructure.
- Hazardous materials incidents involving people.

The UK Government and the London Resilience Forum (a partnership of organisations with responsibility for emergency preparedness in London, including LFB) each produce a risk register of worst-case risks. These are updated annually and are used by them to prepare their response should these risks occur. The London Risk Register is a register of the risks that most impact London. Their risk assessment uses a broad definition of risk and includes impacts on human welfare, behaviour, economic, infrastructure, environment, and security.

The highest risks on the register to which the Brigade would respond directly are:

- Surface water, groundwater, tidal and fluvial flooding.
- Medium and Larger scale Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) attacks.
- Major Fires, including in purpose built high-rise flats and in large public and commercial buildings.
- Incidents involving high consequence dangerous goods and biological materials.
- Acts of terrorism including attacks on transport and infrastructure.

In addition to these risks, there are risks on both registers that may cause disruption to the LFB's ability to provide an emergency service. The Brigade must therefore also plan for how it will continue to operate, even in these circumstances. LFB may also support other partners during periods of emergency. The full London risk register is available here; [London Risk Register | LGOV](#) The National Risk register is available here, [National Risk Register 2020 - GOV.UK \(www.gov.uk\)](#)

Finally, the Brigade has identified broad categories of emerging risk likely to impact the Brigade over the term of the CRMP which may require the Brigade to adapt the services it provides to meet London's changing needs, wants and expectations. The highest risks are listed below:

- Changing built environment.
- Sustainability and climate change.
- Security and resilience.
- Population change.

The highest scoring response risks from both operational data and the London risk register are presented in a composite matrix below. Lower scoring risks have been removed from this matrix for ease of presentation but are included on page 10 and 11. Separation of incident data is aggregated by location in this matrix but presented as incident type data on page 11. The map which follows the matrix shows where incidents have occurred between 2018 and 2022, against population density.

Summary of changes from previous assessment

Broadly the risk assessment for London remains unchanged with the scoring of the highest risks remaining the same according to our LFB data. However, some risks are now more visible because we are presenting the data in new ways. Risk information for commonly occurring risks is presented separately, split by incident type code on page 12. This presentation allows specific incident types to be highlighted separately which is of use at local level when identifying risks prevalent in certain boroughs but not evenly spread across London. For example, incident type such as J3: Person in waterway / on foreshore accessible from land has been split out from the larger category of "Non-fire incidents involving - outdoor water and boats. This allows us to highlight the most casualty-generating incident type within the category which is *a person entering the water* and to ensure that we have appropriate plans in place to deal with that type of incident. Other incident types within this category, such as assistance to boats that have lost power or are sinking with no life risk are less impactful. A second example of this is incident types C3 and C1 incidents, related to hazardous materials incidents. When split from the wider data on non-fire incidents in various locations it's possible to see that these incidents are clustered in certain boroughs where they have a disproportionate impact. This information can be used by borough teams when drawing up Borough Risk Management Plans.

Composite Summary of highest risks from LFB data by location (black text) and London Risk Register (white text)

Consequence	5	Fire involving warehouses and bulk storage Fire involving manufacturing and processing plants	Fire involving landfill or wasteland Non-fire incidents involving outdoor water and boats	Fire involving rural land (urban rural interface) Non-fire incidents involving trains and transport buildings T7 larger Scale CBRN Attacks	Fire involving purpose-built flats Non-fire incidents involving road vehicles and urban infrastructure	
	4		R68 High Consequence Dangerous Goods, L54b Fires in large public and commercial buildings	Fire involving converted flats or HMOs Fire involving care homes and specialised living R83 Surface Water Flooding L21 Fluvial Flooding	Fire involving houses and bungalows_	
	3			Fire involving offices and call centres Fire involving short stay accommodation Fire involving retail outlets Fire involving food and drink outlets R91 Low temperatures and heavy Snow L19 Groundwater Flooding, HL19 Coastal/Tidal Flooding	Fire involving private garages and sheds R54 Major Fire R63 Accidental Release of a Biological Substance, L54a Fires in purpose built high-rise flats T2 Attacks on Infrastructure T3 Attacks on Transport T6 Medium Scale CBRN Attacks	
	2					
	1					
		1	2	3	4	5
Likelihood						
Extraordinary risk likelihood rating <i>probability of occurring within London within next 12 months</i> 1. Less than 0.2% chance of occurring 2. Between 0.2% and 1% 3. Between 1% and 5% 4. Between 5% and 25% 5. More than 25%				Fire/non-fire incident risk likelihood rating <i>likely frequency of incidents occurring within London</i> 1. Between one a year and once a week 2. Between one a week and one a day 3. Between one and five a day 4. Between five and twenty a day 5. Twenty or more a day		

Map 1. Combined map showing neighbourhood densities and incident occurred between 2018 and 2022.

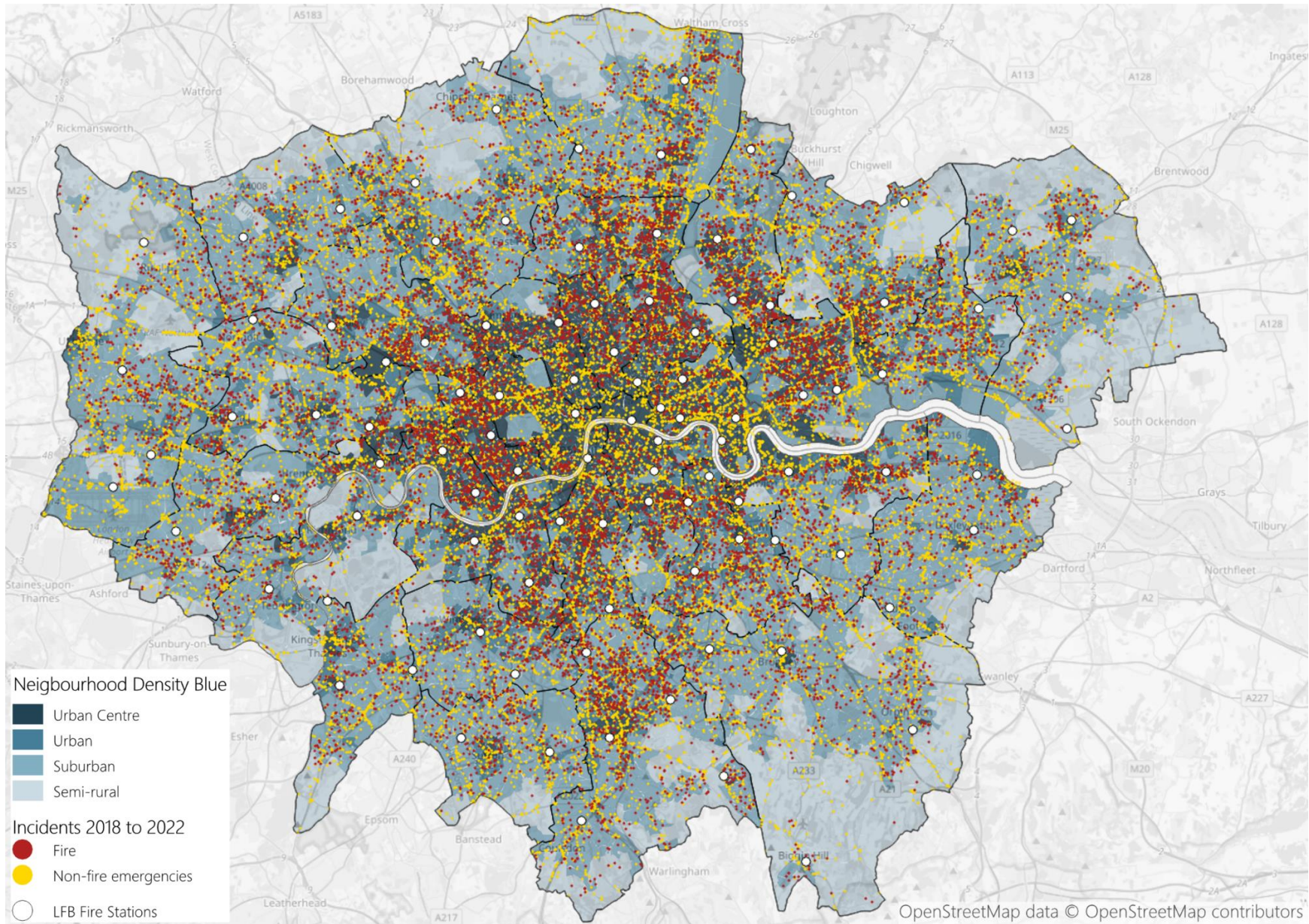


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Our layered approach to assessing risk

Our Assessment of Risk looks at all foreseeable risks, both fire and non-fire, for which the London Fire Brigade may be expected to put in place appropriate controls. In doing so, it is mindful of the statutory requirements that are put on fire and rescue services. In particular, the duties established by the following legislation:

- Fire and Rescue Services Act 2004.
- The Regulatory Reform (Fire Safety) Order 2005.
- The Fire and Rescue Services (Emergencies) (England) Order 2007.
- Fire and Rescue Service National Framework for England (2018).
- Equalities Act 2010.
- Civil Contingencies Act 2004.
- Human Rights Act 1998.

The Brigade takes a layered approach to understanding risks in London, putting our communities at the centre of the assessment. The Brigade considers public concerns, frequently occurring events from incident data, and low frequency but high impact events from the London Risk Register independently of each other, ensuring communities' concerns are highlighted addressed. LFB can identify if there are any emerging trends or gaps which may need additional or new capacity or capability in future by assessing future and emerging risks.

Separately, the Brigade is working with Partners and the National Fire Chiefs' Council to understand factors that impact vulnerability in relation to different classes of incident, considering vulnerability through several sources, including our internal reviews of each fire that results in a fatality.

The Brigade has developed Neighbourhood Density Zones, to illustrate where demand for services predominantly occurs and where different types of risk are concentrated.

Our Community Risk Management Plan sets out how we intend to help London reduce, manage, and respond to these risks.

Description of layers

Layer 1 Concerns of people and communities

This layer takes a people-centred view of concerns in London which aims to identify the risks that Londoners are most concerned about in relation to fire and rescue service incidents. These concerns reflect what Londoners, and those who commute into or visit London, have told us. The scale of some of these perceived risks may not match the reality that each risk poses, however it is important that the Brigade understands both the scale of actual risk and the perception of risk held by the public to allow it to engage in the most appropriate way to make people safer and feel safe in London. The Brigade aims to respond to these risks by understanding how people use and live in their spaces.

Layer 2 Risks relating to property, places and incident type

This is a data-led risk assessment using the most recent five years of data on casualties and of demand on LFB resources at incidents. This data helps us understand the type of incidents and locations associated with high numbers of casualties and larger draw on resources. Incident types and locations that appear prominently in this layer are incidents that occur commonly in London and often lead to casualties such as people trapped in road traffic accidents, and fires in domestic properties or lead to a high demand for resources such as fires in rural areas. This layer highlights risks which are relatively common.

Layer 3 Extraordinary risks from the London risk Register

This is a subjective risk assessment for the extraordinary or "worst-case" scenarios based on the London and National Risk Registers. These worst-case risks are assessed against a broad range of impacts: human welfare, behavioural impact, economic, infrastructure, environmental and security and are made up of three categories: accidents, threats, and natural

hazards. This gives the Brigade a wider, partner perspective on risks faced in London and England. This is a different way of assessing risk from the data-driven assessment of commonly occurring risks in layer two as it looks at the possible severity of infrequent but high impact events and an assessment of what the possible implications are across various aspects of impact for London. This layer deals with risks that may not appear in incident data as they are infrequent or novel but none the less have been assessed as reasonable expectations in a worst-case scenario.

This difference in assessment method and focus is the reason that similar risks can appear in both scoring systems but scored slightly differently. For example, the reasonable worst-case scenario for a large residential high-rise fire is for a single large event to cause many casualties, this is however not typical and the commonly occurring risk is for more frequent fires, each producing fewer casualties.

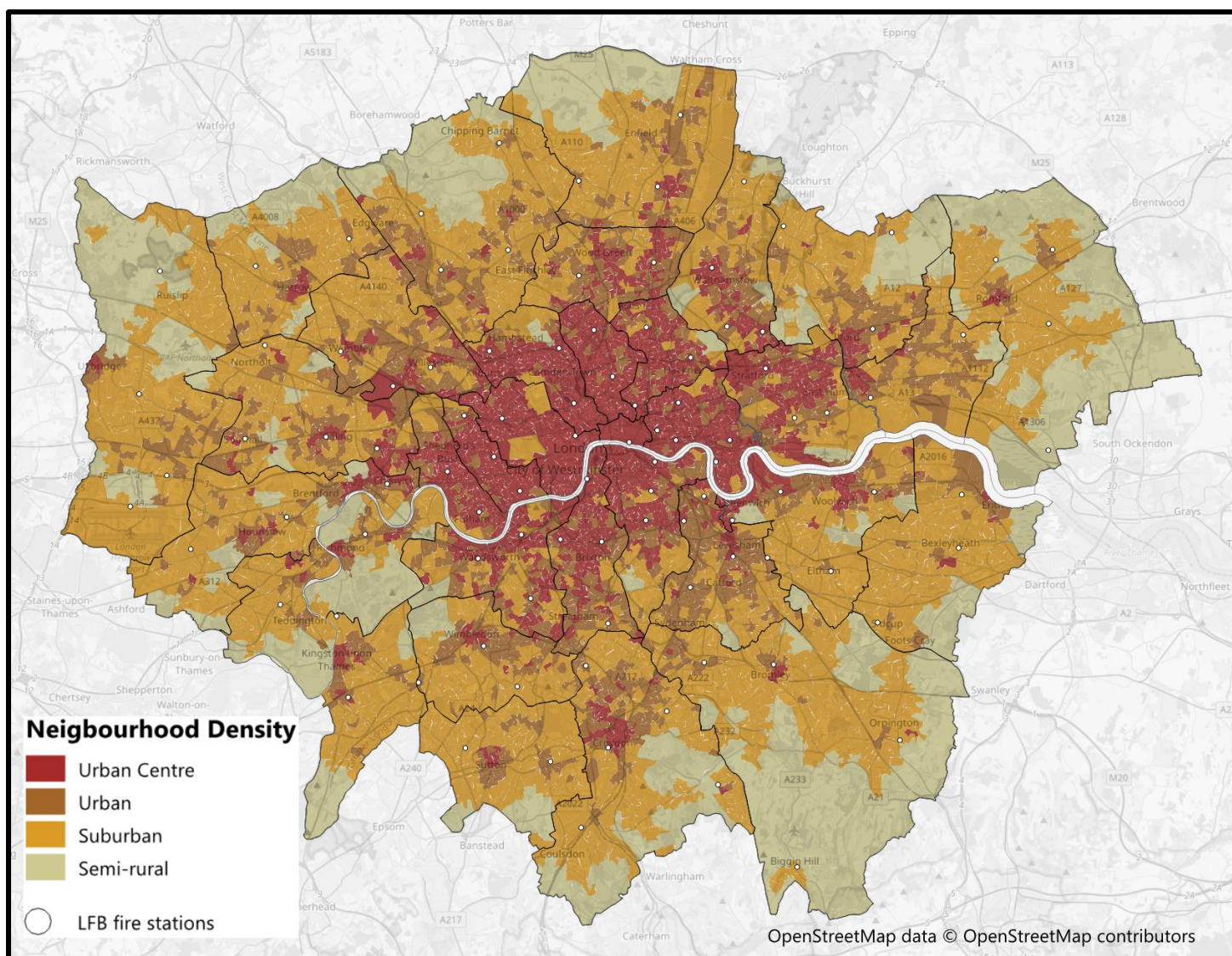
Layer 4 Emerging and future risk scenarios

This layer seeks to identify foreseeable risks to which the Brigade may need to adapt in the future but for which sufficient historical data does not yet exist. This allows for longer term planning to be undertaken. These risks have been informed by work undertaken by the Centre for London (as published in their 2020 report "*London at a crossroads*") and by their ongoing work on "*London Futures: Building a new vision for London to 2050 and beyond*".

Neighbourhood density zones, an all-risk approach

Our all-risk aggregated approach to understanding risk in London has been to create a 'neighbourhood' view of London. When looking at all risks together highest risks are correlated to the areas of London that have the most people and/or the most infrastructure (buildings) and as such, where more people work or visit. Our neighbourhood density zones highlight the areas of London where the combined densities of people and buildings are the greatest. Each neighbourhood zone has a different risk profile based on its level of density and population. There are some high risks that occur more commonly in less dense zones such as *Fire involving rural land* (urban rural interface).

Figure 1. Neighbourhood density zones



Layer one: Concerns of people and communities

This layer describes concerns that Londoners have related to fires, emergencies, and hazards. These concerns will not necessarily reflect the likelihood or severity of known incidents but reflect the concerns held by members of the public. The purpose of this layer is to:

- Establish the primary concerns of the public as they relate to the fire service;
- Inform risk communication work and public engagement;
- Allow public concerns to be weighed when setting organisational risk priorities; and
- Ensure the public not only are safe, but feel safe.

Concerns expressed by members of the public are grouped below into categories of concern. Proximity to, or ease of recollection of a risk is known to increase public risk perception and to make people feel less safe. The purpose of this table is to indicate which types of incidents may increase public risk perception around certain areas of concern and to guide LFB risk communication work. It is also illustrative of the types of incidents that most concern the public when weighing operational priorities.

Concerns around People

Concern	Description
Population <ul style="list-style-type: none"> • Density • Change • Transient • Commuters 	A concern that increases and changes in size of population can increase risk
Physical vulnerability <ul style="list-style-type: none"> • Older people • Health and disability • Younger people • Mental health 	A concern that certain physical characteristics increase an individual's risk
Social vulnerability <ul style="list-style-type: none"> • Employment • Deprivation • Deprivation change • Crime • Homelessness • Low trust levels in uniformed services • Communication/language difficulties • Overcrowding • Illegal activity • Poor fire education • Cultural differences • Homelessness • Illegal immigration 	A concern that certain socio-economic factors increase an individual's risk
Behavioural vulnerability <ul style="list-style-type: none"> • Terrorism • Hoarders • Smoking • Taking prescription drugs • Using illegal drugs • Drinking Alcohol • Hoax callers • Using candles 	A concern that certain behaviours increase an individual's risk

Concerns around places

Concern	Description
Building type/location <ul style="list-style-type: none"> • Density of buildings • Volume of high-rise buildings • Low Traffic Neighbourhoods • Difficult access 	A concern that buildings which are in close proximity to other or located near traffic reduction schemes, may present more risk
Building occupancy/use <ul style="list-style-type: none"> • Hospitals • Care homes • Schools and colleges • Entertainment and cultural venues • Restaurants and takeaways • Garages, sheds and garden annexes • Airports • Tunnels • Railway stations • Underground network • Industrial buildings • Heritage buildings 	A concern that a building's use and familiarity of the occupants can increase its risk
Building management / ownership <ul style="list-style-type: none"> • Poor escape routes • Poor fire safety management • Poor energy performance • Social • Rented (poor landlords) • Leasehold 	A concern that poor management practices or types of ownership are correlated to increased risk to the occupiers
Building age / construction / configuration <ul style="list-style-type: none"> • Wooden framed buildings • Modern methods of construction • Cladding • Buildings undergoing renovation • Construction sites • Basement living • Homes and business that use gas • Tent or caravan living 	A concern that certain types of construction and configuration can present higher risks
Open space <ul style="list-style-type: none"> • Derelict buildings • Accumulated rubbish • Landfill sites • Open land • Open water • Underground water sources • Road junctions • Places where large crowds gather 	A concern that areas which contain certain physical element can present higher risk to neighbourhoods especially if they are remote or cause delay to fire and rescue service resources

Public concerns around "worst case risks"

Respondents were asked about their concerns related to worst case risks. Events of concern to respondents are listed below in order of frequency suggested. Results indicate that two of the top three concerns of the public relate to Climate Change and Extreme Weather with climate related fires in forests, parks and grassland also a noted concern.

1. Extreme weather (wind, storms, heat or cold)
2. Rioting and/or social and civil unrest
3. Issues caused by climate change (not specifically described)
4. Major road traffic incidents
5. Plane and helicopter crashes
6. Train crashes and/or accidents on the underground
7. Industrial, chemical, or biological accidents
8. Protests and demonstrations
9. Building collapses
10. Power outages
11. Fuel shortages
12. Earthquakes (including those caused by fracking)
13. Fires in forests, parks and grasslands
14. Bridge or tunnel collapse
15. Cyberattacks on infrastructure
16. Loss of water and sanitation
17. Gas explosions
18. War
19. Object from space (e.g., asteroid or falling satellite)
20. Mass poison or gas attacks in the air and/or water

Public concern around future and emerging risks

The highest level of concern was around the impact of climate change with a combined 91% of respondents stating that it was, "very" or, "somewhat likely" to impact London Fire Brigade in the future. Respondents stated that they were concerned about increased incidents of serious flooding, heatwaves and grass/woodland fires driven by climate change.

Changes to the built environment concerned 94% of respondents with 68% of respondents feeling that changes in this area would very likely impact LFB in the future. Respondents were concerned that modern buildings are constructed to a lower standard with high-rise buildings a particular concern. Respondents also expressed a concern about the speed, density and regulation of new development, particularly of high-rise buildings.

Layer two: Risks relating to property, place and incident type

This is the second independent layer of our risk assessment. It sets out the risk of fire and non-fire events against where they happen and against incident type. In this layer we consider those incidents that are foreseeable as they occur sufficiently often to be considered "normal requirements". This is a term used in the Fire and Rescue Services Act 2004 to describe the level of "personnel, services and equipment" that should be provided for firefighting and road traffic accidents. Less frequently occurring events which would cause significant harm or damage are considered in the 'extraordinary risks' layer.

We have analysed the last five years' worth of our incident data and compared the rate of incidents, given their nature and location and the rate of casualties from these incidents.

We have displayed this information on two risk matrices below. The first shows where we attend the most incidents, and which locations and incident types give rise to the highest number of injuries and fatalities but using our mobilisation categories. This presentation allows specific incident types to be highlighted separately which is of use at local level when identifying risks prevalent in certain boroughs that are not evenly spread across London.

Incident risk - data by type and location

Consequence	5	<p>Fire involving warehouses and bulk storage</p> <p>Fire involving manufacturing and processing plants</p>	<p>Fire involving landfill or wasteland</p> <p>Non-fire incidents involving - outdoor water and boats</p>	<p>Fire involving rural land (urban rural interface)</p> <p>Non-fire incidents involving trains and transport buildings</p>	<p>Fire involving purpose-built flats</p> <p>Non-fire incidents involving road vehicles and urban infrastructure</p>	
	4	<p>Fire involving aircraft</p> <p>Fire involving static caravans, boats, houseboats or towing caravans</p> <p>Non-fire incidents involving camping tent, shelter, or marquee</p> <p>Non-fire incidents involving static caravans, houseboats or towing caravans and other residential property</p>	<p>Fire involving offices and call centres</p> <p>Fire involving short stay accommodation</p> <p>Fire involving retail outlets</p> <p>Fire involving food and drink outlets</p>	<p>Fire involving converted flats or HMOs</p> <p>Fire involving care homes and specialised living</p>	<p>Fire involving houses and bungalows</p>	
	3	<p>Fire involving trains</p> <p>Fire involving camping tents, shelters, or marquees</p> <p>Fire involving places of worship</p> <p>Fire involving communal living</p> <p>Fire involving entertainment and cultural venues</p>	<p>Fire involving hospitals and medical care facilities</p> <p>Fire involving other non-residential property</p> <p>Fire involving public administration, utilities, and amenities</p>	<p>Fire involving private garages and sheds</p>		
	2	<p>Fire involving barbecues</p> <p>Non-fire incidents involving barbecues</p>	<p>Fire involving sports and leisure facilities</p> <p>Fire involving education sites</p> <p>Fire involving urban furnishings</p> <p>Non-fire incidents involving carparks and transport</p> <p>Non-fire incidents involving places of worship</p> <p>Non-fire incidents involving other residential property</p> <p>Non-fire incidents involving urban furnishings</p> <p>Non-fire incidents involving vegetation by infrastructure network</p> <p>Non-fire incidents involving other non-residential property</p>	<p>Non-fire incidents involving converted flats and HMOs</p> <p>Non-fire incidents involving short stay accommodation</p> <p>Non-fire incidents involving non-residential property</p> <p>Non-fire incidents involving public administration, utilities, and amenities</p> <p>Non-fire incidents involving hospitals and medical care</p> <p>Non-fire incidents involving care and specialised living</p> <p>Non-fire incidents involving retail outlets</p> <p>Non-fire incidents involving food and drink outlets</p> <p>Non-fire incidents involving rural land</p>	<p>Fire involving road vehicles</p> <p>Non-fire incidents involving houses and bungalows</p>	<p>Non-fire incidents involving purpose-built flats</p>
	1	<p>Fire involving animals and agriculture</p> <p>Fire involving outdoor water</p> <p>Fire involving carpark and transport</p> <p>Non-fire incidents involving animals and agriculture</p> <p>Non-fire incidents involving refuse, rubbish, or recycling</p>	<p>Fire involving farms, agriculture</p> <p>Fire involving transport buildings</p> <p>Fire involving vegetation by infrastructure network</p> <p>Non-fire incidents involving education sites</p> <p>Non-fire incidents involving aircraft</p> <p>Non-fire incidents involving private garage or sheds</p> <p>Non-fire incidents involving farming and agriculture</p> <p>Non-fire incidents involving sports and leisure facilities</p> <p>Non-fire incidents involving communal living</p> <p>Non-fire incidents involving warehouses and bulk storage</p> <p>Non-fire incidents involving manufacturing and processing plants</p> <p>Non-fire incidents involving entertainment and cultural venues</p>	<p>Fire involving urban infrastructure</p> <p>Non-fire incidents involving offices and call centres</p> <p>Non-fire incidents involving landfill and wasteland</p>	<p>Fire involving refuse, rubbish, or recycling</p>	<p>False alarms any property types</p>
		1	2	3	4	5
Likelihood						

Incident risk data by Incident Type Code

Consequence	5	B7 Train/Tram Crash B93 Collapse of Building/Structure Persons involved D3 Sub Surface Workings, G0 Marauding Terrorism J1 Mid-Stream incident on Thames J7 Fire on Vessels on River Thames Persons on fire RTC on motorway B13 Serious collision involving Brigade Vehicles C11S Hazmat Incident Railway with BTP FSG fire survival guidance J10 Person in precarious position adjacent to waterway PI Initial Forward Mobilising B1B Vehicle into Building RTC Person Trapped	B0 Refer to supervisor B92 Significant Collapse of Structure J3 Person in waterway / on foreshore accessible from land B1T Train or Tram incident involving trapped person B20 Co-Responder Medical Incident C3 Acid attack on Person	PERSONS TRAPPED- RTC	A1HR Fire High Rise Buildings	A1 Fire A2 Fire Reduced fire attendance
	4	Multi Lane Make Safe RTC B14 Minor Road Traffic Collision involving LFB Vehicle C11 Hazmat on railway J8 Vehicles into Waterway accessible from land	A4 Hazardous Substance on River Thames accessible from land B10 Person in Precarious Position	C1 Hazmat Incident initial call Make safe RTC	B11 Person collapsed / injured including behind doors	B1 Person trapped excluding RTC
	3	Mutual Assistance ES5 Emergency Services Channel Inform Nilo	B19 Assist ambulance with Bariatric patient J0 Running Call from Fireboat B91 linked to b92	A8 Fire All out	B2 Person(s) Shut in Lift Emergency and Non- C2 Minor spillage of flammable liquids	
	2	A7 Fire on vessel accessible by land ACCIDENT involving LFB vehicle motorway AFR Alleged Fire Risk CMD1 Mass decontamination level 1 D1 Fire in Tunnels D2 Train Crash in Railway Tunnel E1 Aircraft Ground Incident and Full Emergency E3N Aircraft Accident Imminent FIRE ON MOTORWAY FMP2 Forward mobilising Control Point G01 Joint Police RVP Marauding terrorism G6 Operation Hasani Wide Area Search H2 Suspected Explosive or Incendiary Device J12 linked to C0 J2 Houseboat or Vessel sinking/flooded Special service Motorway A3 Reduced fire attendance involving Railway/Tram B17 Large Animal Rescue C4 Mercury spill	A12 Person Threatening to set Fire to themselves, others or property/siege situation Automatic fire alarm B12 Person threatening to jump or assist Police with person at height B6 Burst water Main	B2E Person(s) Shut in Lift Emergency	B2NE Person(s) Shut in Lift Non- Emergency B3 Person Locked In/Out B4 Flooding (not Commercial) C5 Gas Leak (Domestic or Commercial) Carbon Monoxide alarm actuating G11 NILO Assessment	A11 AFA in Residential premise
	1	C0 Hazmat incidents not covered by other ITC's C19 Firefighter Decontamination C1D Deliberate Hazardous Substance on Thames CMD3 Mass Decontamination level 3 CNAT0 Mass Decontamination National CTPOR G01 linked E2 linked to C0 Fuel on motorway	B8 Commercial Flooding	B15 Small Animal Rescue B5 Flooding Batch Mobilising		
		1	2	3	4	5
		Likelihood				

Layer 3: Extraordinary risks and risks from the London Risk Register

This is a subjective risk assessment for rare or "worst-case" scenarios. These worst-case risks are assessed against a broad range of impacts: human welfare, behavioural impact, economic, infrastructure, environmental and security and are made up of three categories: accidents, threats, and natural hazards.

These risks are taken directly from the London Risk Register and National Risk Registers. The National Risk Register is produced by Government and the London Risk Register is produced by the London Resilience Forum (LRF). The risks for which LFB is the lead are scored using input from LFB subject matter experts. Risks on which other partners lead are scored in a similar way. This gives the Brigade a wider, partner perspective on risks faced in London and England. This register includes risks that LFB will not specifically respond to, however the inclusion of risks on the London Risk Register indicates that LFB will need to continue plan to deliver its core function during an event that it may not specifically respond to but that has business continuity implications or business disruption implications.

The purpose of this layer is to allow the Brigade to plan and prepare for:

- Response to low frequency but high impact events
- Events that LFB will not respond to directly but during which LFB will need to continue to deliver its core function, i.e. events that have a business continuity implication for LFB.

The ratings for the fire-related risks on the London Risk Register are based on our recommendations. In producing this risk assessment, we have reviewed the ratings that we have provided to the LRF and are considering revisions to some of our recommended ratings. For the purposes of this risk assessment, we have used the original risk ratings agreed by the Forum and have used professional judgement to identify those which are considered high-risk for LFB.

Extraordinary scenario risk matrix - London Risk Register

Consequence	5		R84 Severe Drought	R76 National Electricity Transmission, R95 Influenza-type Pandemic, T7 larger Scale CBRN Attacks		
	4	R71 Aviation Crash, R55 Fire or Explosion at a fuel distribution site, R57 Explosion at a high-pressure gas pipeline, R74 Reservoir/Dam Collapse, R66 Radiation Release from overseas	R77 Gas Supply Infrastructure, R68 High Consequence Dangerous Goods, L54b Fires in large public and commercial buildings	R83 Surface Water Flooding, R92 Severe Space Weather, L21 Fluvial Flooding		
	3	HL23 Bridge Collapse, HL34 Evacuation of passenger ship, HL22 Building Collapse, R75 Water Supply Infrastructure, R64 Large Toxic Chemical Release, R61 Fire and Explosion at an onshore fuel pipeline, L66 Incident caused by mishandling of radioactive material	R69 Food Supply Contamination, R80 Systemic Financial Crisis, L64 Localised industrial accident involving small toxic release, HL105 Complex Built Environments	R91 Low temperatures and heavy Snow, R96 Growth of Anti-Microbial resistance, R97 Emerging Infectious Disease, R85 Poor Air Quality, L19 Groundwater Flooding, HL19 Coastal/Tidal Flooding	R90 Heatwave, R87 Volcanic Eruption, R54 Major Fire, R63 Accidental Release of a Biological Substance, L54a Fires in purpose built high-rise flats, T2 Attacks on Infrastructure, T3 Attacks on Transport, T6 Medium Scale CBRN Attacks	R104 Public Disorder
	2	R67 Maritime Pollution, R62 Accidental Release of Biological Pathogen, R103 Insolvency affecting fuel supply	R78 Disruption to telecoms systems, R98 Animal Disease, R102 Industrial Action (fuel), HL10 Local Accident on Motorways/ Major Trunk Roads, R99 Industrial Action (firefighters),	L54d Wildfires, L54e Major fire in care homes and hospitals, R93 Storms and Gales, HL11 Railway Accident, HL21 Land Movement, R101 Industrial action public transport, L71b Small Aircraft Incident	R105 Influx of British Nationals, R72 Collapse of major government contractor, R73 Major Social care Provider, R79 Technological failure at a retail bank, R100 Industrial action (prison officers), T4 Cyber Attacks T5 Smaller Scale CBRN Attacks	L54c Fires involving landfill and waste processing sites, T1 Attacks on Publicly Accessible Locations
	1	R70 Radiation exposure from stolen goods, R94 Earthquake	R29 Cyber-attack SWIFT system	R43 Undermining democratic activity		
		1	2	3	4	5
Likelihood						

Layer four: Emerging and future risks

This is the fourth layer of our risk assessment, which looks at emerging and future risks to London. These risks have been informed by work undertaken by the Centre for London (as published in their 2020 report "*London at a crossroads*") and by their ongoing work on "*London Futures: Building a new vision for London to 2050 and beyond*". The likelihood has been rated using responses from our public consultation.

Likelihood	Risk	Outcome description
Very-high	Changing built environment	Adapting the built environment whilst raising design and management standards resulting in continued issues with legacy building stock and modern methods of construction. Changes to the use of premises due to Covid-19 or other societal issues resulting in poorly adapted buildings resulting in potential for increased fire spread. The move to online retail could mean declining town centres and spaces especially in outer London resulting in the loss of retail space. Future of offices meaning that buildings which only presented a day-time life risk may be converted into residential property bringing an increased night-time life risk. Uncertainty about the future of central London meaning that property may change use. Increased use of low traffic zones meaning main transport routes may be more congested, though this will not affect LFB's pan-London response times it may impact attendance times for specific incidents in the vicinity to low traffic zones. Use of Lithium Ion Batteries in residential buildings and dwelling which could increase a building's vulnerability to accidental fire.
High	Health and well-being	Long term Covid-19 health impacts (direct and indirect) leading to greater mental health issues, poor mobility, and reliance on prescription drugs. Growing health issues, inequalities between those with private health care and those that rely on state provision. High level of obesity and inactivity increasing mobility issues. Unaffordable and overstretched care provision meaning fewer people are getting the help they require to enable them to live independently. Poorly trained and poorly regulated care providers, meaning lack of identification and reporting of risks.
High	Equalities and social inclusion	In-work poverty leading to higher levels of deprivation. Economic inequalities creating greater disparity between rich and poor within the same areas. Overcrowding of housing due to lack of social housing. Racism and associated movements leading to social unrest and public disorder. Greater proportions of fuel poverty are likely to occur in areas of higher poverty.
Very-high	Sustainability and climate change	A significant increase in the frequency of events or their impact, along with the possibility of new extreme weather events. Warming climate giving rise to more extreme weather events and hot dry summers like 2018, flooding of 2021 and the 2013 St Jude's day gales and storms. These incidents all put significant strain on the Brigade's resources, and it is therefore foreseeable that if the scale and intensity of these extreme weather events increase with climate change the Brigade's capacity to deal with these incidents whilst maintaining normal business may be exceeded in the future. Other emerging risks which are associated with climate change include changing fuels for road vehicles, alternate power supplies for domestic and commercial premises.
Very-high	Security and resilience	Continued risk of terrorism and the need to be able to respond with other emergency responders in a coordinated way mean that the Brigade will need to continue to deliver its high treat capability and enhance its response in light of the recommendations made by the Manchester Arena Inquiry.
Very-high	Population change	Most scenarios predict a continuation of the current trend for population growth, with some estimating population increases of up to 15 million people by 2050. This would be at a rate of 200,000 people a year, which is four times the current rate of population increase. However, at the other extreme there are predictions of population decrease. Additionally, the elderly population of London is predicted to increase in proportion as people live longer, with an increase of 1.3 million people over the age of 50 by 2050 or an increase of 45,000 a year. This could bring an increase in risk factors associated with an aging population and in particular an increase in people with dementia meaning more high-risk individuals.

Factors Affecting Fire Vulnerability

Evidence shows us that some people are more likely to have a fire, and some are more likely to become a casualty if they have a fire. Understanding what increases someone's vulnerability to fire enables the Brigade to target its services where they can best reduce risk.

Fatalities and risk factors

In the last five years, there were 1,191 fatalities from incidents we attended. From these incidents fire was responsible for the death of 259 people, of which 197 were from accidental fires in the home. A further 4,693 people were injured at fire incidents during this same period, of which 2,767 were considered serious and required hospital treatment. Over the same five-year period there were 932 fatalities and 13,652 casualties at the non-fire incidents we attended.

Our data shows that the two most important risk factors which contribute to someone becoming a fatality in a fire are if they smoke or have conditions more often associated with older people, such as visual, cognitive, or physical impairments. The last five years of data shows that 35 per cent of fatalities from fire were smokers and 65 per cent of fatalities from fire were over 65. Although the differential has reduced over time, men are still 16 per cent more likely than women to die from a fire. Additionally, proportionate to the size of population, there are more fire deaths in inner London than outer London (46 per cent of fire deaths compared to 40 per cent of population in inner London and 54 per cent of fire deaths compared to 59 per cent of population in outer London). This is likely to be related to increased risk factors such as the higher levels of deprivation in inner London compared to outer London outlined in the maps in appendix 1.

Individuals who are most at risk from fire, are those who:

- carry out high-risk fire behaviours
- are less able to react to a fire/alarm, and/or
- are less able to escape from a fire

Real life examples of risk factors include but are not limited to (Detailed analysis of fires attended by fire and rescue services, England, April 2019 to March 2020).

- Age,
- Mental health issues,
- Alcohol use,
- Drug use,
- Smoking,
- Poor housekeeping,
- Limited mobility,
- Living alone and low income.

These insights correlate with the National Fire Chief's Council's (NFCC's) work through the Definition of Risk project on the likelihood and consequence of dwelling fires. Based on their analysis of national definition of risk in dwelling fires, the following can be summarised (NFCC and Operational Research in Health (ORH), 2021, Definition of Risk – Likelihood and Consequence of Dwelling Fires).

- The rates of fire in socially rented properties are nearly triple owner-occupied properties and double the rates of privately rented properties.
- Socially rented flats are more than four times as likely to have a fire than a privately owned detached house. Conversely, a socially rented house is twice as likely to have a fire than a privately owned flat.
- On a national basis the rates of fires in sheltered housing or HMOs are significantly higher than other property types.
- Rates of fires in flats are more than double the rates in detached properties.

- Properties built after 1996 are much less likely to have a fire than those built before 1983 and generally rates of fire increase with age up to a point around 1900.
- Houses and bungalows with higher energy ratings are less likely to have fires than those with a lower energy rating. However, this is not true for flats.
- Dwelling fires in older properties are likely to have higher consequence than in newer properties.
- Dwelling fires in flats are much more likely to have a higher consequence on life but lower consequence on the property than for other property types.
- Dwelling fires caused by smoking have double the consequence score compared to other causes of fire.
- Fires caused by matches, candles and other naked flames are more likely to have a higher consequence.
- Cooking appliances are the most common cause of fire but have a low consequence score.
- Causes of fire that result in a high property consequence include naked flames, industrial equipment and spread from secondary fire.

LFB are currently working with ORH to integrate the Definition of Risk's approach into its understanding of risk for dwelling fires, alongside the neighbourhood density zones approach for all risks. This understanding of risk will continue to be refined on an annual basis as more products are released as part of the NFCC Definition of Risk project and help the Brigade target those who are most vulnerable to fires in the home.

Risks of note in addition to data-led matrices

These are foreseeable risks which are not identified in the last five years of LFB data as being very high or high but are highlighted as part wider consultation and through the NFCC preliminary Higher Risk Occupancy Guidance and as such are considered appropriate to highlight as part of the LFB's Assessment of Risk.

Risk	Outcome description	Examples of recent significant incidents that have occurred in London or in other countries
Fires in major entertainment, heritage, or public buildings	LFB responds to an average of 34 fires a year in entertainment and cultural venues, 20 fires in places of worship and 33 fires in grade I and II* buildings a year and 303 fires within 15m of a listed building a year in London. In particular cases this can give rise to significant loss of heritage to London and the UK and potential significant economic loss, and media and political attention associated with the buildings.	<ul style="list-style-type: none"> • Cutty Sark Fire – 2007 – Large fire occurred on the Cutty Sark, almost destroying the historic ship. • Glasgow School of Art, Glasgow – 2014 – Large fire at the Glasgow School of Art. • Morden Mosque fire – 2015 – Large fire damaging 50% of ground floor of Europe's largest mosque. • Notre-Dame de Paris fire – 2019 – Major fire in a historical cathedral in Paris requiring over 400 firefighters to extinguish costing over €1 billion to restore.
Fires involving public administration, utilities, or amenities	LFB responds to an average of 165 fires involving public utilities, utilities, and amenities a year over the last five years or three a week. This resulted in an average of 10 fire related injuries a year, or one casualty every 17 incidents attended.	<ul style="list-style-type: none"> • Holborn tunnels fire – 2015 - A fire in electrical tunnels in the Holborn area closed the centre of London for 36 hours and resulted in 5,000 people being evacuated and costing the local economy over £40 million. Required specialist teams to extinguish.
Fires in major transport building	LFB responds to an average of 71 fires involving transport buildings a year over the last five years or just over one a week. This resulted in an average of 5 fire related injuries a year, or one casualty every 118 incidents attended.	<ul style="list-style-type: none"> • Kings Cross Underground fire – 1987 – 31 people killed and 100 injuries from a fire in an underground station. • Elephant and Castle fire – 2021 – 15 pump, FRUs 4 fire and explosion in railway tunnel under Elephant and Castle railway station resulting in six casualties and over 600 people evacuated.
Fires in hospitals and medical care facilities	LFB responds to an average of 92 fires involving hospitals and medical care facilities a year over the last five years or nearly two a week. This resulted in an average of 7 fire related injuries a year, or one casualty every 14 fires attended.	<ul style="list-style-type: none"> • Royal Marsden Hospital, Kensington and Chelsea – 2008 – 20 pump fire, 800 staff and 29 patients evacuated. • University College Hospital, Westminster – 2008 – 20 pump basement fire, 20 staff and 83 patients evacuated.
Fires on education sites	LFB responds to an average of 100 fires involving education sites a year over the last five years or one very two weeks. This resulted in an average of 3 fire related injuries a year, or one casualty for every 29 incidents attended.	<ul style="list-style-type: none"> • Thomas Fairchild School, Hoxton – 2009 – 20 pump fire at an East London primary school which was subsequently demolished and required a £9.3 million rebuild, with 300 pupils to be relocated to alternative schools.

Planned development of the Assessment of Risk

Further development of the Assessment of Risk will focus on integration of NFCC definition of risk products as they are released, alignment of future and emerging risks with National Operational Guidance Contexts and supporting the development of Borough Risk Management Plans through provision of disaggregated data.

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Methodology

DRAFT
Assessment of Risk 2023

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Layer 1. Concerns of people and communities

The LFC ran a public consultation from 3rd September to 10th October 2021 to gather views from the public. Responses were collected via an online questionnaire through the Talk London platform, by email, and through a paper copy of the consultation. Results were analysed by a third party.

Respondents were presented with the LFC's list of factors known to be associated with increased fire risk based on historical data. Respondents were asked if they had concerns in addition to the items listed.

Issues raised by at least 5 percent of respondents are included in results tables, grouped according to concerns related to people and concerns related to place. The results are summarised in the AoR with detailed analysis included in the report by our third-party analysts.

Layer 2. Risks relating to property, places, and incident type

2.1 Risk Matrices

Risk information is presented both by incident type and location and by incident type code. The calculations for likelihood and severity are the same in each matrix. LFB incident data is collated and exported to excel. The most recent five years of incident data was analysed. Information is presented by both type and location and by Incident Type Code to allow disaggregation of specific incident types from the wider location data.

2.2 Calculation of likelihood

Likelihood score is based on frequency of incidents occurring. This is calculated by, Number of occurrences in data/ data period. The score is then taken from Table 1.

Table 1. Likelihood score table

Score	Descriptor
1	Between once a year and once a week
2	Between one a week and one a day
3	Between one and five a day
4	Between five and twenty a day
5	Twenty or more a day

2.3 Calculation of severity by casualty rate

Casualty rate is determined by calculating the number of incident type required on average to generate a casualty. This is calculated by, number of incidents in data period/number of casualties for incident type in data period. Severity score is taken from Table 2.

Table 2. Consequence by casualty rate score table

Score	Life consequence
1	One casualty occurs per 100 or more incidents
2	One casualty occurs per 25 - 100 incidents
3	One casualty occurs per 10 - 25 incidents or a fatality occurs in 300 or more incidents
4	One casualty occurs per 5 – 10 incidents or a fatality occurs per 100 – 300 incidents
5	One casualty occurs per 5 or fewer incidents or a fatality occurs per 100 or fewer incidents

2.4 Calculation of severity by wider consequence score

The wider consequence of an incident is indicated by the sum of fire appliances used over the full duration of the incident including the operational and post-operational phases, initial attendance and all required reliefs. This measure serves as a proxy for the wider impacts of an incident on the community as well as the overall scale and the impact on LFB. Where the wider impact score is higher than the life consequence score it has been used to moderate the score upwards. Below is an indicative worked example.

Table 3. Wider consequence score table

Score	Wider impact consequence
1	One or more incidents of this type have needed over 4 pumps in the last five years
2	One or more incidents of this type have needed over 40 pumps in last five years
3	One or more incidents of this type have needed over 60 pumps in last five years
4	One or more incidents of this type have needed over 80 pumps in last five years
5	One or more incidents of this type have needed over 100 pumps in last five years

2.5 Using the Risk Matrices

Once incidents have been scored for likelihood and consequence they are placed on the relevant matrix and displayed either by individual incident type code or by incident type and location. Incidents displayed by type code are placed in matrix 1 and Incidents displayed by type and location are placed in matrix 2. The base data is the same. The different presentation allow the same risk data to be viewed by location and by individual incident type.

Incidents with high severity but low likelihood are prioritised in this matrix over high frequency low severity incidents.

Severity	5					
	4					
	3					
	2					
	1					
		1	2	3	4	5
Likelihood						

2.6 Risk Score: Worked example

An incident of *fire* in the location *purpose built flat*, occurs in London on average 7.26 times per day giving a likelihood score of 4. On average, one casualty occurs every 7 incidents in this location type, giving a consequence score of 4. The combination of likelihood and consequence returns an overall risk score of 16 for the incident type *fire in a purpose built flat*. However, the wider consequence score of fires in purpose built flats is 5 due to the large number of resources required to resolve these incidents, indicating a higher overall impact. The score is therefore moderated up to a 5 for consequence as per the table. The overall risk score is now 20.

Layer 3. Extraordinary risks and risks from the London risk Register.

These risks are taken directly from the London Risk Register. The London Risk Register is produced by the London Resilience Forum (LRF). The London Risk Register reflects risks recorded on the National risk Register where appropriate.

These risk registers deal with low frequency, high impact events and take a subjective approach to assess the reasonable worst-case scenario for each risk identified. Due to the limited data available on rare events subject matter experts and partners use indicator tables, professional judgment and extrapolate from past events to produce risk ratings.

The ratings for the fire-related risks on the London Risk Register are based on LFB recommendations. Risk on which LFB does not lead are scored by partners in the London Resilience Forum. This layer uses the information directly from the LRR, we don't re-score any of the risks. If drawing these LRR risks into the AoR causes us to reconsider our recommended scores for any of the risks, we would seek to get the risk rescored by the LRF rather than show a different score on our own risk register for that year.

Layer 4. Emerging and future risk scenarios

Emerging Risks are risks for which LFB do not currently hold sufficient incident data to estimate likelihood or severity, but which are identified as a potential future risk.

Risks that are included in local or national risks registers or in Ordinary Risks Matrices based on historical incident data are not included here. As incident data and trends emerge risks may move from emerging risks onto the ordinary risk matrices or the extraordinary as the frequency and severity are better understood. Emerging risks are highlighted as broad categories of contextual changes that are likely to occur in London and will likely impact the fire service. This includes the wider environment within which LFB operates as well as specific events to which LFB will respond as a statutory duty or using its powers.

Emerging Risk is identified from the following sources:

- The Centre for London report "London at a crossroads" and "London Futures: Building a new vision for London to 2050 and beyond"
- Scenarios developed by Future London on behalf of the Greater London Authority.
- Public and staff consultation

Information is collated and summarised based on professional judgement of the LFB Strategic Planning team

Neighbourhood densities and local risk profiles

Neighbourhood Density Zones highlight the areas of London with different densities of people and buildings.

The map graphic is created by the LFB Information Management Team

Urban Centres are the areas with highest population and building density (more than 15,000 people per sq. km) and are shown in red. Urban areas have above average population and building density (between 9,000 and 15,000 people per sq. km) and are shown in amber. Suburban areas have below average population and building density (between 2,000

and 9,000 people per sq. km) and are shown in grey. Semi-Rural areas have the lowest population and building density (below 2,000 people per km) are shown in green.

Historical incident data is used to build a profile of the type of incidents occurring most frequently in each neighbourhood density zone. This information is used to generate the risk demand profile for each zone.

Appendix 3 Equalities impact assessment

Protected Characteristic	Impact: positive, neutral, or adverse	Reason for the impact	What information have you used to come to this conclusion?
<i>Example: Age</i>	<i>Adverse</i>	<i>Moving this service online will adversely affect older people, who are least likely to have access to a computer or smart phone and may not be able to use the new service.</i>	<i>GLA Datastore: X% of the London community are aged 70 or over. GLA data shows that only 10% of those over the age of 70 have regular access to a computer or smart phone.</i>
Age (younger, older, or age group)	NA	<p>The AoR identifies that older people are more likely to have specific risk factors such as mobility issues, mental health issues, taking prescription drugs and living alone.</p> <p>The AoR identifies that that young people do not have any particular risk factors associated with them though some may live in lower quality accommodation, flats and live alone.</p>	<p>LFB data shows that older people are more likely to be victims of fire and rescue service incidents and are particularly vulnerable to fires, with 85 per cent of fatal fires involving someone over the age of 50 and 65 per cent of fatal fires involving someone over the age of 65. Figure 7. in appendix 1. shows that those aged over 65 are evenly distributed across London. Table 1. confirms this with 49 per cent of over 65s living in urban areas which make up 30 per cent of London's area and 46 per cent of over 65s living in suburban areas.</p> <p>London's population, the number of Londoners aged 65 or over is projected to increase by 86 per cent between 2019 and 2050, faster than younger age groups. Therefore, there will be a growing need for infrastructure that supports an ageing population, including accessible.</p> <p>London Data Store 2019: 12% of Londoners are 65+. 68% are 16-64 and 20% are 0-15. 45% of fires deaths are in the over 40 years bracket. (LFB FIRE FACTS Fire deaths in Greater London 2019). The LFB have profiled the next fire death victim as;</p>

			<p>“This is an older person aged 65 or over who lives alone. Where they live, or the type of property, does not matter. However, their home will be unsafe from the risks of fire and without adequate fire detection” (LFB FIRE FACTS - Fire deaths in greater London 2019)</p>
<p>Disability (physical, sensory, mental health, learning disability, long term illness, hidden)</p>	NA	<p>The AoR identifies that people with disability are more likely to have specific risk factors which increase their vulnerability to fire.</p>	<p>LFB’s data shows that disability and poor mental health and mobility issues and taking prescription drugs increase your vulnerability to fire. Figure 4. in appendix 1. shows that disability is distributed across London with a great proportion in east London and the extreme west of London. Characteristics associated with disability are often found in older people who are found all over London and are proportional to the population density in each of the four neighbourhood impact zones. People with disability are also likely to be more economically deprived and as such have risk factors associated with deprivation. LFB’s data shows that if you are poor, you are more likely to have a fire. There are several related reasons for this. Figure 3. shows that there are patches of deprivation across London with a bias towards the eastern side of London as well as some areas in Northwest London.</p>
<p>Gender reassignment (someone proposing to/undergoing/ undergone a transition from one gender to another)</p>	NA	<p>People going through these processes can come up against some negative views when engaging with Establishment organisations, therefore they may be reluctant to invite them into their homes, for fear of being judged.</p>	<p>There is no detailed data held by the Brigade in relation to gender reassignment and their vulnerability to incidents which the fire and rescue service would be expected to attend and therefore no assessment has been made.</p> <p>Research carried out in 2012 on the acceptability of gender identity questions in surveys provided an indicative estimate that 1 per cent of the UK population identify as trans.</p> <p>LGBT in Britain – Home and Communities' Report shows that:</p> <p>Half of Ethnically Diverse LGBT people (51 per cent) face discrimination within the LGBT community.</p> <p>More than a third of trans people (36 per cent), one in eight LGBT disabled people whose activities are ‘limited a lot’ (13 per cent), and one in five LGBT people of non-Christian faith (21 per cent) say they’ve experienced discrimination from within the community because of different parts of their identities.</p>

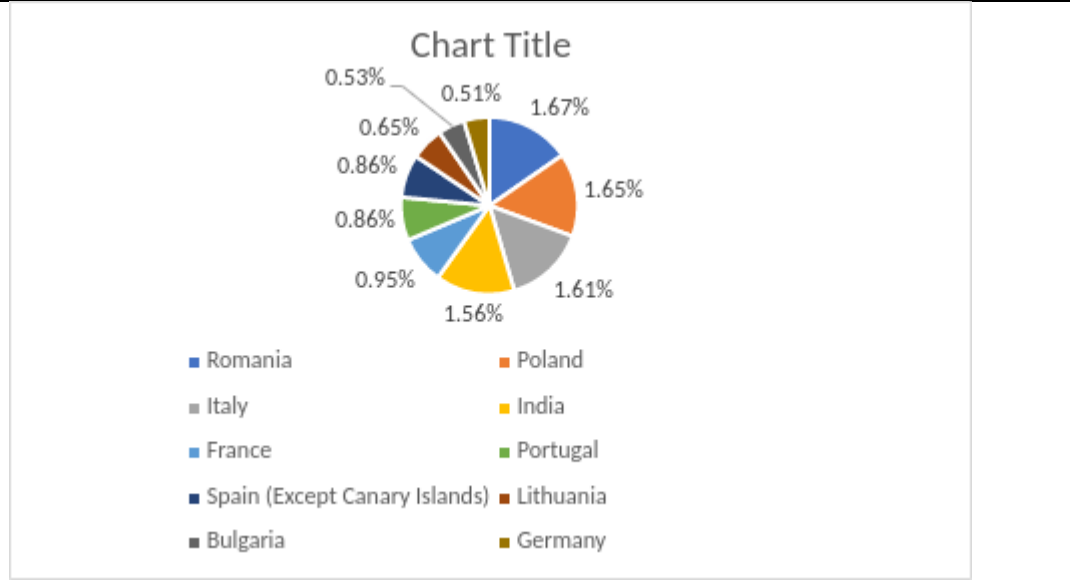
			<p>Only half of lesbian, gay and bi people (46 per cent) and trans people (47 per cent) feel able to be open about their sexual orientation and/or gender identity to their whole family.</p> <p>A third of bi people (32 per cent) say they cannot be open about their sexual orientation with anyone in their family.</p>
Marriage / Civil Partnership (married as well as same-sex couples)	NA	The AoR shows that single older men are more likely to be victims of fires.	LFB's data shows that being in a marriage or civil partnership generally decreases your risk from fire. As such those people who live alone and especially older people who live alone often have more risk factors making them more vulnerable to fire.
Pregnancy and Maternity	NA	Mobility and prescription drugs	<p>Though no LFB data specifically relates to pregnancy or maternity risk factors associated with pregnancy and maternity such as reduced mobility and prescription drugs are known to increase an individual's risk to fire.</p> <p>Some mobility risks are borne from the hormone, which relaxes ligaments. Movement of organs to accommodate a growing baby can result in pressure on nerves and hips which in turn result in issues with mobility.</p> <p>Additional risks presented in relation to the unborn child.</p> <p>Removing the assumption that only heterosexual people will be categorised within this characteristic</p>
Race (including nationality, colour, national and/or ethnic origins)	NA	The AoR cannot find any data that clearly shows that there any strong correlations between race and an increased vulnerability to fire or other emergencies.	<p>57 per cent of Londoners are white British, white Irish or other white ethnicity, with the remaining 43 per cent having a black, Asian or minority ethnicity (BAME).</p> <p>LFB's data shows that race does not have an impact on an individual's vulnerability to fire. The proportion of each category of race is relative to the size of that category's population in London. Though other risk factors such as economic deprivation and employment may be present in specific ethnic groups.</p>

The 2011 census show that 1 in 10 London residents had migrated to the UK within the previous 5 years.

78% of London's population is made up people from the United Kingdom. Therefore, up to 22% may not speak English as a second language if at all.

Top 10 represented nationalities (Other than UK non-English speaking) in order in London and main dispersion areas:

1. Romania – Northwest and Northeast
2. Poland – Northwest and Southeast
3. Italy – All, particularly Westminster, Kensington & Chelsea, Hammersmith & Fulham
4. India – West and Northwest, Hounslow. Northeast – Redbridge
5. France – All
6. Portugal – Outer London, Brent and Lambeth
7. Spain – All
8. Lithuania – Outer, Greenwich
9. Bulgaria – Haringey and Newham
10. Germany – All



Religion or Belief
(people of any religion, or no religion, or people who follow a particular belief (not political))

NA

The AoR does not show any specific additional risks for any religion or belief.

It is known that the lighting of candles, which can be related to religious activity can increase someone’s risk to fire.

Additionally, large gatherings can increase someone’s risk to certain incident types the likelihood of such incidents is relatively low.

The risk matrix shows that incidents in places of worship occur on average about once a month and result in one casualty every 10-25 incidents.

It is noted that some areas of London hold higher numbers of a particular religious group, for example Barnet has the highest Jewish community numbers and New Malden the highest Korean population. The views of each person are equally valued and that for proportion of views purposes it may be necessary to direct engagement in highest populated areas, this is not to suggest that the views are of lesser or more value. Nearly half of London’s residents, 48 per cent, give their religion as Christian.

Muslims account for 14 per cent and all other religions total 12 per cent. People stating no religion make up the remaining 26 per cent. The proportion of

			Londoners who are Muslims or who have no religion has increased in recent years, while the proportion who are Christian has declined.
Sex (men and women)	NA	<p>We will ensure language is inclusive throughout the project and run workshops to avoid excluding any groups, including the use of unnecessarily gendered language. Positive action opportunities to be explored in the future to facilitate a more balanced workforce and encourage participation from said groups.</p> <p>Gender specific groups to be contacted through engagement to seek views and opinions.</p>	<p>LFB's data shows that men are 16 per cent more likely to be victims of fire than women with men making up 58 per cent of fire victims over the last 20 years. Men and women are relatively evenly distributed across London.</p> <p>In 2019, the GLA projects that 4.55 million Londoners are female and 4.55 million are male. Women face issues around gender-based violence and low pay. As most lone parents (90 per cent) are women, recent reforms to welfare that have affected lone parents have had a disproportionate impact on women. Women sharing other characteristics women often face additional challenges, such as higher gender pay gaps among older and BAME women. Young women report issues around financial pressures and mental health issues.</p> <p>Men face issues around lower educational attainment and are at higher risk of suicide and therefore may be more at risk to fire and other emergencies. Additionally, if men become single in later life, they may find it harder to care for themselves and more likely to undertake riskier behaviours.</p>
Sexual Orientation (straight, bi, gay, and lesbian people)	NA	<p>People who are part of the LGBT community can come up against some negative views when engaging with Establishment organisations, therefore they may be reluctant to invite them into their home, for fear of being judged</p>	<p>Two per cent of adult Londoners identify as gay or lesbian, higher than the UK rate of 1.3 per cent. A further 0.6 per cent identify as bisexual and 0.6 per cent as other sexual identities.¹⁵ A recent survey of the UK's LGBT population found that 40 per cent had experienced an incident such as verbal harassment or physical violence because they were LGBT, and that they had lower levels of life satisfaction than the general UK population.</p> <p>Only half of lesbian, gay and bi people (46 per cent) and trans people (47 per cent) feel able to be open about their sexual orientation and/or gender identity to their whole family.</p> <p>A third of bi people (32 per cent) say they cannot be open about their sexual orientation with anyone in their family.</p> <p>Goals for Reducing Heterosexual Bias in Language:</p>

Reducing heterosexual bias and increasing visibility of lesbians, gay men, and bisexual persons. Lesbians, gay men, and bisexual men and women often feel ignored by the general media, which take the heterosexual orientation of their readers for granted. Unless an author is referring specifically to heterosexual people, writing should be free of heterosexual bias. Ways to increase the visibility of lesbians, gay men, and bisexual persons include the following:

a. Using examples of lesbians, gay men, and bisexual persons when referring to activities (e.g., parenting, athletic ability) that are erroneously associated only with heterosexual people by many readers.

b. Referring to lesbians, gay men, and bisexual persons in situations other than sexual relationships. Historically, the term homosexuality has connoted sexual activity rather than a general way of relating and living.

c. Omitting discussion of marital status unless legal marital relationships are the subject of the writing. Marital status per se is not a good indicator of cohabitation (married couples may be separated, unmarried couples may live together), sexual activity, or sexual orientation (a person who is married may be in a gay or lesbian relationship with a partner). Furthermore, describing people as either married or single renders lesbians, gay men, and bisexual persons as well as heterosexual people in cohabiting relationships invisible.

d. Referring to sexual and intimate emotional partners with both male and female terms (e.g., "the adolescent males were asked about the age at which they first had a male or female sexual partner").

e. Using sexual terminology that is relevant to lesbians and gay men as well as bisexual and heterosexual people (e.g., "when did you first engage in sexual activity" rather than "when did you first have sexual intercourse").

f. Avoiding the assumption that pregnancy may result from sexual activity (e.g., "it is recommended that women attending the clinic who currently are engaging

			in sexual activity with men be given oral contraceptives," instead of "it is recommended that women who attend the clinic be given oral contraceptives").
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