

# Quality of the local environment

**London Borough of Hackney and the City of  
London 2019**

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## 7.1 Introduction

This section describes several distinct, though interlinked, environmental factors which influence health and wellbeing in Hackney and the City of London, namely:

- outdoor air quality
- indoor air quality
- climate change
- land contamination
- noise pollution

Though environmental damage has a negative impact on health, many actions taken to improve population health can reduce impact on the environment. This includes for example, policies designed to encourage active travel, and planning policies which promote warmer homes and walkable communities.

In this respect, the potential relationship between population health and the environment has been described as a virtuous circle. [1]

### 7.1.1 Outdoor air quality

Air pollution in the outdoor environment is a high profile public health concern – though levels have been decreasing in recent decades, parts of inner-city areas such as Hackney and the City of London remain above EU limit values and World Health Organisation (WHO) guidelines. The extent of health problems associated with air pollution is increasing as research in this area grows.

The main source of outdoor air pollution in the area is road transport – associated pollutants include oxides of nitrogen, fine particles (PM10 and PM2.5), ozone, sulphur dioxide, carbon monoxide, benzene and polycyclic aromatic hydrocarbons [6].

For more information on transport and health, see the ‘Transport and travel’ section of the JSNA.

Other key sources of air pollution locally include domestic gas, and commercial cooking, as well as river transport in the City – see Figure 26 and Figure 27 for example, and Table 3. Other sources of outdoor air pollutants include construction work, as well as industrial and agricultural sources beyond the borough boundaries. [2] Alongside manmade sources, there are also natural sources of air pollutants, though these are much less significant.

Particulates and nitrogen dioxide are widely considered to be the two most important pollutants – in terms of health impacts and concentration in the environment.

There are numerous other substances which are air pollutants – including ozone, benzene, lead and other heavy metals, all of which have been found to be harmful to health.

### 7.1.2 Indoor air quality

People may spend up to 90% of their day indoors, and as such, internal air pollution can add significantly to the overall lifetime exposure to a range of harmful pollutants. [3]

The indoor environment includes anywhere that people spend time – in particular, the home, the workplace, and schools, though also hospitals, nurseries, shops, inside vehicles, restaurants, bars, and hotels.

Indoor air pollution is particularly associated with cooking stove use in the home in developing countries. [4] In the UK however, this is considered to be a much less significant problem, though there are numerous other pollutants and sources. This includes outdoor air pollution which impacts on indoor air quality. The most harmful source of indoor pollution in the UK is tobacco smoke – this is discussed further in the JSNA section on ‘Smoking’.

As well as being a more complex and less widely understood issue, with a less developed evidence base, regulation of indoor air is more difficult outside of commercial and industrial settings.

Several indoor air pollutants are associated with a range of illnesses. Some groups of vulnerable people are likely to spend more time indoors, and so can be particularly affected by indoor air quality.

### 7.1.3 Climate change

Over the last 50 years, human activities – particularly the burning of fossil fuels – have released sufficient quantities of carbon dioxide and other greenhouse gases (gases capable of absorbing infrared radiation) to trap additional heat in the lower atmosphere, which has led to a rapid change in global climate. [5] This process was described by the UK Chief Scientific Officer as “the biggest challenge that our civilisation has ever had to face up to”. While some efforts to reduce climate change require national and international cooperation, local actions can also be effective, alongside building resilience to mitigate the effects of rising temperatures. Hackney is among a majority of English local authorities who have declared a climate emergency over the past year.

Climate change is likely to become a major environmental crisis, with effects already evident locally. While much of the political effort to prevent it requires concerted international action, individuals and organisations in Hackney and the City can lead this effort. It is also important that local health and other services are aware of the impacts and are prepared to adapt to the challenges – most particularly, in increased summer heat waves and other extreme weather patterns.

### 7.1.4 Land contamination

Land contamination is a potential health risk in parts of the local area associated with former industrial use. Industrial development from the late 18<sup>th</sup> century onwards saw

the growth of factories in Hackney. This, alongside the building over of farm land, leaves a legacy of potential for ground contamination.

Materials of human origin underlie parts of the borough, and may be associated with elevated levels of chemicals of concern - such as lead, polycyclic aromatic hydrocarbons and asbestos.

Contaminated land can have serious consequences for both human health and the environment.

### 7.1.5 Noise

Noise pollution can also be defined as “unwanted sound” and is a health concern in many localities in Hackney and the City. Transport is the major source of the problem though there are also issues caused by neighbours, construction sites and entertainment venues for example.

Noise can have long and short-term impacts on health, which are often underestimated. These include cognitive impairment, sleep disturbance, tinnitus, annoyance, negative impact of children’s learning, and a small increase in the risk of cardiovascular disease. [6] [7]

There are a number of groups who are particularly vulnerable to the impact of noise, including children, older people and those in poor health. Certain occupation types are also more vulnerable.

National research reports that noise problems are particularly associated with high density housing, rented accommodation (both social and private sectors), socio-economic deprivation, and urban environments. [8]

#### *Box 1: Definitions*

Attributable deaths – an estimate of the proportion of deaths caused by a risk factor in a population. For example, by consulting experts, and looking at rates of death in populations more and less exposed to man-made fine particulate air pollution, it is thought that 5% of all deaths of people aged over 30 in England can be attributed to this risk factor.

CO (carbon monoxide) – a gas produced when carbon-based fuel burns incompletely. Outdoor concentrations of CO are generally low in the UK, though it can be found in toxic concentrations indoors.

CO<sub>2</sub> (carbon dioxide) – the main “greenhouse gas” which contributes to man-made climate change.

COMEAP – the Committee on the Medical Effects of Air Pollution, a panel of experts who advise the UK Government.

**Contaminated land** - a specific legal definition whereby the land must cause significant harm, or present significant possibility of such harm. In London, this is normally associated with former industrial sites.

**Decibels (abbreviated to dB)** - a measure of the volume of sound. Safe and healthy levels are defined with reference to the World Health Organisation guidelines. dB(A) refers to a measure that is adjusted to reflect the ear's response to different frequencies of sound.

**Heatwave** – the UK Met Office uses the World Meteorological Organisation definition of a heatwave, which is "when the daily maximum temperature of more than five consecutive days exceeds the average maximum temperature by 5°C" (with the comparison being the period 1961-1990).

**LEN (Low Emission Neighbourhood)** – An area-based scheme that includes a package of measures focused on reducing emissions (and promoting sustainable living more generally).

**MSOA (Middle Super Output Area)** – geographical areas defined during the UK Census to support data release and analysis. Each has an average of 7,200 residents. There are 28 MSOAs in Hackney and one in the City of London.

**NOx (oxides of nitrogen)**. A group of polluting compounds, including Nitric Oxide (NO) and Nitrogen Dioxide (NO<sub>2</sub>) that have been associated with a number of short and long-term health conditions including respiratory and cardiovascular conditions.

**PM2.5 and PM10 (particulate matter 2.5 and 10)**. Air pollutants are made up of a complex mixture of non-gaseous particles of varied physical and chemical composition. Small particles are defined by their diameter - here, below 2.5 micrometres in diameter (PM2.5) or below 10 micrometres in diameter (PM10).

**ULEZ – Ultra Low Emission Zone** – An area within which motor vehicles need to meet exhaust emission standards or pay a daily charge to travel.

**Urban heat island** – higher temperatures experienced by urban areas (such as inner London) due to materials like tarmac and stone absorbing and storing more heat than vegetated areas, along with concentrated energy use due to the larger population.

**ZEN (Zero Emissions Network)** – business engagement network to encourage businesses to reduce emissions.

## 7.2 Key facts about the quality of the local environment

- There are several distinct, though interlinked, environmental factors which influence health and wellbeing in Hackney and the City as elsewhere. People living in the most socio-economically deprived circumstances, who are at increased risk of a range of health problems, are often the most vulnerable to these influences.

- Outdoor air pollution, mostly from transport sources in Hackney, and industrial sources in the City, is thought to be among the largest causes of ill-health and premature death, and its reduction is a significant priority in both local authority areas.
- The overall impact of poor indoor air quality is lower. In the home, it stems from a wide range of pollutants and sources, some of which are not well understood. There are also exposures associated with various occupations, some of which have a major effect on health - for example in workers in factories, and the beauty industry.
- Climate change is a major global threat, though in the short term less so in wealthy countries with a temperate climate such as the UK. Residents of Hackney and the City of London are thought to be particularly vulnerable to heatwaves (due to the urban heat island effect). These are becoming increasingly common as global temperatures continue to rise.
- In Hackney, most carbon emissions can be ascribed to domestic sources, with a similar volume coming from industrial and commercial sources, and less from transport. In the City of London, almost all carbon emissions come from the industrial and commercial sectors. Local residents also have an impact on carbon emissions produced elsewhere – for example, through products they use.
- Due to its inner-city location, and high level of socio-economic deprivation, Hackney has recently been ranked among the three areas in England most vulnerable to heatwaves. [9]
- Hackney and the City of London are exposed to the risk of flooding, with significant areas within the floodplain of the River Thames and its tributary, the River Lea. This risk is likely to grow as the impact of climate change grows.
- Data show that, due to a relatively energy efficient housing stock, and a less carbon intensive local economy, Hackney has a relatively low level of per person CO<sub>2</sub> emissions than the national average. [10]
- Contaminated land is an ongoing problem in Hackney, and may be impacting on population health in some local areas. Local estimates suggest that almost 25% of Hackney is associated with current or past potentially contaminating land use, but only a small proportion of these areas are likely to be resulting in harm to local people.
- Noise can have serious implications for health, and is particularly acute in inner-city boroughs such as Hackney and the City. Transport is the major source of the problem though there are also issues caused by neighbours, construction sites and entertainment venues for example

## 7.3 Health and wellbeing impacts

### 7.3.1 Air quality - outdoor

Outdoor air pollution is a major contributor to ill health and early death in Hackney and the City of London. Estimates suggest that the proportion of deaths attributable to pollution locally is among the highest in the country. Current air pollution levels locally exceed legal standards, and have a negative impact on the health of all residents and visitors. However, those with existing conditions and/or living in socio-economically deprived circumstances are particularly affected, making air pollution a contributor to health inequality.



As well as chronic long-term effects, poor outdoor air quality causes acute health problems for people with respiratory conditions.

Specific harmful health effects include suppressed lung growth in children, asthma and other chronic lung conditions, onset of type 2 diabetes, cardiovascular disease, cancer, and neurodegenerative disease (dementia). [11] Pregnant women exposed to air pollution are at increased risk of restricted foetal brain growth, as well as having low birth weight babies, stillbirth and infant mortality. [11] [12] Air pollution can affect lung function, exacerbate asthma and increase cardiovascular and respiratory disease. [13] Research continues to uncover previously unknown harmful effects of air pollution. [11]

Measures of overall population impact are largely based on expert elicitation and modelled estimates. For example:

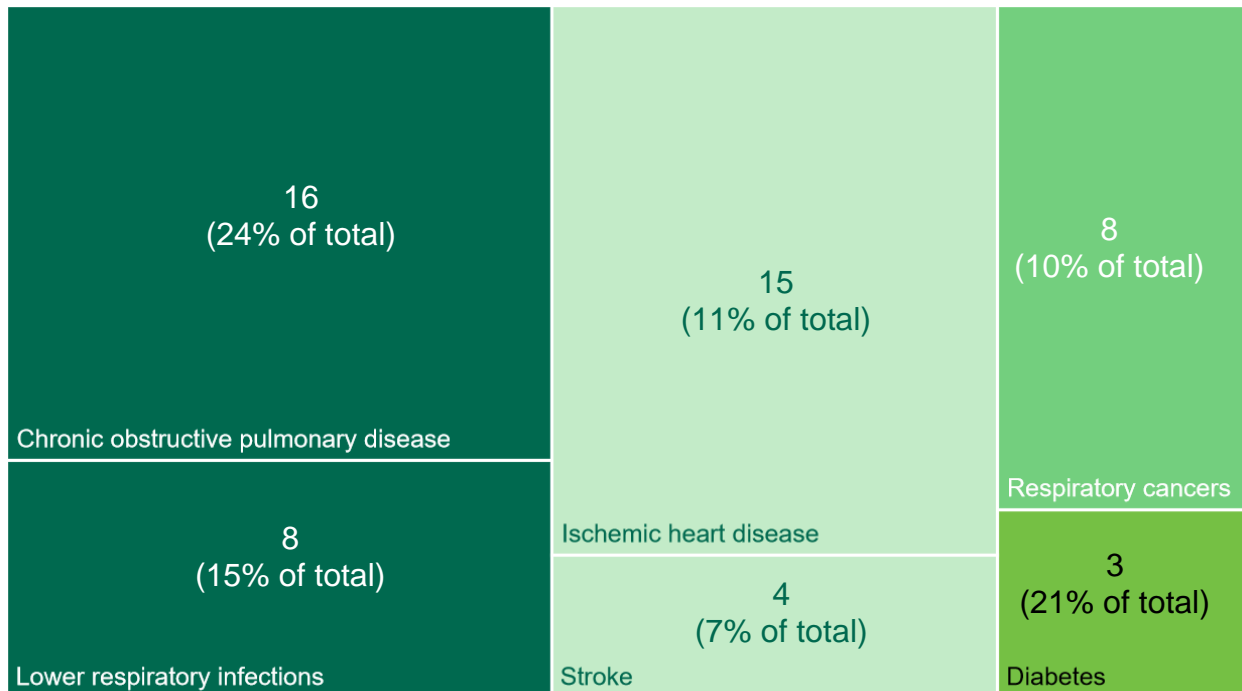
- in 2015 the Committee on the Medical Effects of Air Pollution (COMEAP) estimated that there were 29,000 attributable deaths in the UK annually due to PM2.5 pollution alone [14] [15]
- a study by the Department for the Environment, Food and Rural Affairs (Defra), estimated that a further 23,500 people die each year in the UK due to NO<sub>2</sub> (nitrogen dioxide) [16]
- in 2010, an estimated 9,416 deaths in Londoners were attributable to long-term exposure to NO<sub>2</sub> and PM2.5 overall [17]

There is considerable uncertainty around these estimates, however. Recent research suggests that the number of deaths attributable to air pollution may be twice as high as these estimates across Europe, causing a 2.2 year reduction in overall life expectancy. [18] In 2018, COMEAP revised their estimate to between 28,000 and 36,000 deaths nationally from all sources of human made air pollution. [19]

Illnesses and causes of death most commonly associated with air pollution include chronic obstructive pulmonary disease (COPD) and lower respiratory tract infections, cardiovascular disease (CVD) (including coronary heart disease and stroke), diabetes, and cancers of the respiratory system. For more information on these conditions, see the 'Adult health and illness' chapter of the JSNA.

Figure 1 shows the proportion of deaths from each of these conditions that can be attributed to particulate air pollution locally.

*Figure 1: Estimated annual attribution of outdoor particulate air pollution to deaths in Hackney and the City of London (all ages, 2017)*



Source: Institute for Health Metrics and Evaluation [4]

International pollution, which drifts into London during particular weather events, can also impact health – this is particularly the case with springtime pollution episodes, which can build up across the continent over several days. However, it is overall background levels of pollution which are the major contributor to ill-health, rather than these specific episodes.

There is growing evidence of the effects of air pollution, including NO<sub>x</sub>, on cognitive performance. For example, recent research has demonstrated a relationship with road traffic accidents, and it is likely that there will be a negative impact on other activities requiring high mental effort and concentration. [20] There is evidence of an increasing correlation between air pollution levels and reduced cognitive performance with age, particularly in less educated males. [21]

Beyond the direct impact on health and wellbeing, environmental factors (in particular air pollution) have a significant, but difficult to quantify, economic impact – this includes the cost of additional GP visits and working days lost to illness. Estimates of the health and care costs show these to be significant in Hackney and the City (Table 1).

*Table 1: Estimated costs to local health and care services of PM<sub>2.5</sub> and NO<sub>2</sub> pollution in £ millions (2019; age 18+ only)*

	Hackney		City of London	
	PM <sub>2.5</sub>	NO <sub>2</sub>	PM <sub>2.5</sub>	NO <sub>2</sub>
Primary care	£4.6m	£3.8m	£0.2m	£0.2m

Secondary care	£12.0m	£5.5m	£0.6m	£0.2m
Medication	£8.6m	£5.1m	£0.4m	£0.2m
Social care	£5.1m	£5.3m	£0.3m	£0.2m
<b>Combined costs</b>	<b>£30.3m</b>	<b>£19.9m</b>	<b>£1.6m</b>	<b>£0.8m</b>

Source: Public Health England [22] and GLA SHLAA 2016-based population estimates  
Note that figures may not add up due to rounding

Air pollution also has a wider economic impact than this. The United Nations estimates that developed countries lose 2% of GDP to urban air pollution. [23] This proportion is likely to be considerably higher in central London.

Concerns around the health impacts of air pollution can also negatively affect people's enjoyment and use of the wider local environment, which may limit opportunities for physical activity including active travel. It has been demonstrated that the health impact of air pollution is worse for commuters using motorised transport than those travelling by bicycle or on foot. This is due to high levels of pollutant exposure inside vehicles, as well as harms caused by a lack of physical activity. [24]

Air pollution contributes to land contamination across wide areas in the longer term. This effect has been observed in parks such as Hampstead Heath which have higher levels of lead than similar areas outside London. [25]

As well as impacting local air pollution, burning hydrocarbons is a major source of carbon dioxide gas – the major cause of climate change.

Actions taken to reduce outdoor air pollution are likely to drive a further range of public health co-benefits – reduced dependency on fossil fuel based transport sources in particular can reduce obesity, physical inactivity, and social isolation.

### 7.3.2 Air quality - indoor

Indoor air pollution is a major cause of ill health and mortality globally, associated with solid fuel cooking fires in developing countries. In wealthier countries, such as the UK, a range of other indoor pollutant chemicals are in regular use, although these are considered to be of a much lower health impact overall. [26]

People in specific occupations may be of increased risk of exposure to indoor air pollution – including drivers, industrial workers who may be exposed to mineral dusts, and people who work in beauty salons. [27] [28]

The government's Clean Air Strategy [3] has recognised the importance of indoor air pollution: "The principal forms of indoor air pollution are particulate matter (PM) and Non-Methane Volatile Organic Compounds (NMVOCs). PM is produced by many forms of cooking and home heating, most notably from combustion in open fires and

stoves. NMVOCs are emitted by a wide variety of chemicals that are found in carpets, upholstery, paint, cleaning, fragrance, and personal care products. Sulphur dioxide (SO<sub>2</sub>) is emitted by coal burned in open fires”.

There is a growing body of evidence showing that people inside vehicles are exposed to relatively high levels of pollution. [24] Evidence is also emerging about high concentrations of particulates in parts of the London Underground system. [29]

The health impacts of some specific sources of indoor air pollution are described below.

- **Carbon Monoxide.** Nationally, there are around 40 deaths recorded each year due to CO poisoning, 4,000 A&E attendances, and 200 hospital admissions. [30] It is believed that the longer term chronic effects of non-acute exposure are likely to be a more significant health risk.
- **Fine particulate matter.** Deaths and ill-health associated with particulate matter indoors are included in the overall estimates reported in section 7.3.1.
- **Dust mites and other allergens.** Pets, dust mites and damp and mould in homes can all cause allergic conditions, and can exacerbate respiratory problems. [31]
- **Oxides of nitrogen.** Deaths and ill-health associated with oxides of nitrogen indoors are included in the overall estimates reported in section 7.3.1..
- **Lead dust and mineral fibres.** Asbestos, a mineral fibre, can cause lung disease, and is mostly associated with historical industrial exposure. Lead dust exposure is particularly associated with old paint disturbed during renovations – it can accumulate in the body and cause significant health problems, particularly in children.
- **Polycyclic aromatic hydrocarbons.** The overall health impact of these substances is unclear, though they are likely to be associated with a small number of cancers.
- **Radon.** Thought to be responsible for around 1,100 lung cancer deaths each year in the UK in affected localities.
- **Tobacco.** Second hand smoke indoors is a serious public health risk. For further information see the JSNA section on ‘Smoking’.
- **Volatile Organic Compounds (VOCs).** These can cause short-term respiratory irritation or headaches, and exacerbate respiratory problems. Long-term effects may include increased risk of some cancers. [32] [33]

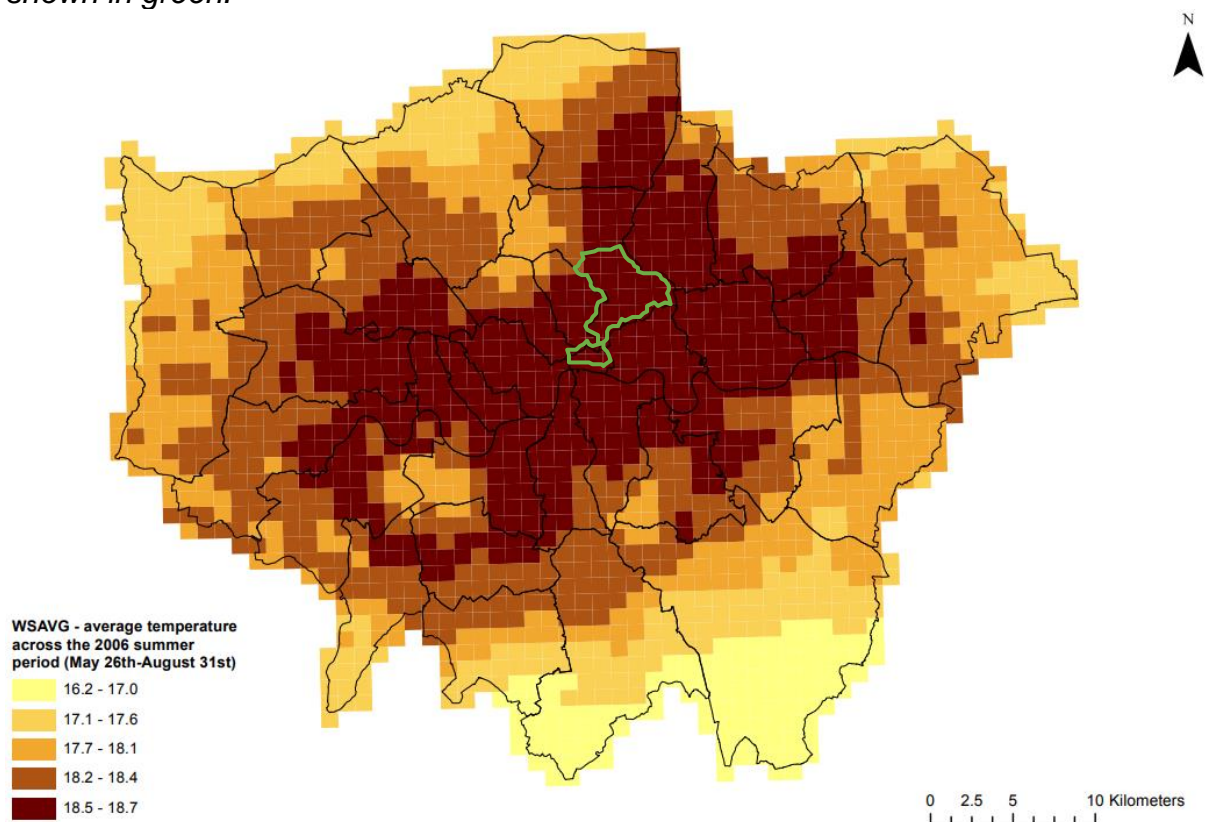
While considered separately here, it should also be noted that outdoor air pollution is also a major source of indoor air pollution. For example, research suggests that 75% of the daily variation in particulate matter in indoor air can be explained by changes in outdoor air, although this Indoor/Outdoor (I/O) ratio can vary greatly, even within the same building. [8] [10]

### 7.3.3 Climate change

Globally, a range of major health and societal impacts of climate change are predicted, as described in Table 2. In temperate, developed countries (such as the UK) the effects are likely to be more limited, though still significant.

The major health impact in Hackney and the City will be an increase in deaths and ill-health during hot weather in the summer. Certain population groups, including the very old and young, and people with long-term conditions are particularly vulnerable to the effects of high temperatures. Winters are expected to become increasingly warmer and wetter, with higher risk of flooding. [34] A worsening of respiratory conditions in the UK can be expected due to a combination of hot weather and poor air events. This impact of climate change is worsened by the 'Urban Heat Island' effect – this happens because materials like tarmac and stone absorb and store heat more than vegetated areas, along with concentrated energy use due to the larger population – see Figure 2.

*Figure 2: The average temperature across the 2006 summer in London demonstrating the Urban Heat Island effect – Hackney and the City boundaries are shown in green.*



Source: [35]

Extreme weather patterns are becoming more likely due to rising temperatures, with rainfall concentrated in storm events. Major floods which affected parts of the UK during 2007, 2013 and 2019 show the potential impact of this, as do the heatwaves in 2003, 2006, 2013, 2018 and 2019. The heatwave in 2003 led to 2,000 deaths nationally, while estimates suggest that the heatwaves in 2018 and 2019 may each have been responsible for around 1,000 deaths nationally [36] [37] Older people, people with existing medical conditions, and outdoor workers would be particularly affected.

Climate change is likely to make winters in England milder, as well as wetter. This is likely to reduce the numbers of excess winter deaths, though this would not offset the additional summer deaths. For more information on excess winter deaths locally, see the JSNA section on ‘Vulnerable Adults – Older People’.

As it historically developed around a port, like many cities in Europe, London is vulnerable to sea level rise and associated flooding. The increased likelihood of drought is another probable consequence of climate change. [9]

Some increase in the prevalence of food and vector borne infectious disease may also be expected in the UK. [38] For more information on the impact of infectious disease locally, see the JSNA section on ‘Infectious Disease’.

Wider effects of climate change will also impact on public health - this includes the loss of biodiversity. Diverse and well-functioning ecosystems provide clean air, fresh water and food security, as well as contributing in turn to a stable climate. [39]

Beyond this, it is likely that the global effects of climate change will increase the risk of political instability and war internationally – the impact of this locally is difficult to predict, though increased migration from worse affected countries, and reduced economic growth, could be expected, with consequent health impacts. In 2019, international experts polled by the World Economic Forum, suggested that issues related to climate change are the biggest risk to the world currently. [40] Less predictable effects are likely to have implications for the UK, although the specific health impacts are uncertain.

It is these larger risks that led Hackney council, along with the majority of other local authorities nationally, to recognise in 2019 that the world is facing a “climate emergency”. This declaration acknowledges the limited time available to make changes which could prevent these worst case scenarios.

Carbon based fuels are the major contributor to air pollution. High temperatures can also increase the production of air pollutants such as ozone, as well as extending the season of allergenic pollen.

Many local efforts to reduce climate change have the same health co-benefits as efforts made to reduce air pollution more widely.

*Table 2: Summary of the impacts of climate change on human health*

<b>Consequence of climate change</b>	<b>Impacts on human health</b>
<b>Increased temperatures and extended heat waves</b>	Increased risk of heat-related deaths during heatwaves, particularly among vulnerable groups. Higher levels of ultraviolet radiation which is a major cause of skin cancer. Decreased cold-related mortality in temperate countries.

<b>Flooding</b>	Immediate risk of drowning. Increased risk of water-borne infections. Food shortages and famine associated with loss of crops and livestock. Increased risk of land contamination. Physical damage to healthcare settings. Impact on mental health.
<b>Drought</b>	Risk of food shortages and famine associated with loss of crops and livestock. Significant displacement of populations.
<b>Wildfires</b>	Increased risk of fire-related death or harm. Impact of poorer air quality on health. Impact on mental health.
<b>Vector-borne disease</b>	Increased geographical spread and reproductive speed of infectious diseases spread by food and water, and those transmitted by insect vectors
<b>Air pollution and aeroallergen levels</b>	Climate change is expected to have a negative impact on outdoor air pollutants, in particular ozone. Warmer winters are likely to extend the season for people suffering from hayfever in temperate countries.
<b>Natural disasters and extreme weather events</b>	Increased risk of injury or loss of life due to hurricanes, tsunamis etc. Destruction of health infrastructure.

Source: Adapted from [34]

Climate change will have serious consequences for human health in the coming decades. Though the UK, as a wealthy country with a temperate climate, will be less seriously affected than most parts of the globe, it is important for local services to be aware of these changes.

### 7.3.4 Contaminated land

'Contaminated Land' has a specific legal definition under Part 2A of the Environmental Protection Act 1990. In order to determine areas as contaminated land, the land must cause significant harm or present significant possibility of such harm to any receptor. This includes the potential to cause significant pollution of surface waters (such as lakes or rivers) or groundwater. However, it should be noted that land that does not fit the legal definition under Part 2A may still be affected by contamination. Contamination can occur through the deliberate or accidental release of chemicals, or as a result of historical industrial practices. Land is still becoming contaminated through the release of chemicals and other human activities.

Soil lead concentrations for example are generally high across London with some local variation. [25] Levels are highest in central London, and there are differences associated with land use. Levels in public parks tend to be lower than in domestic gardens – levels are generally higher in older dwellings (probably associated with ash from burned domestic waste and the use of lead-based paints), and higher still in industrial areas. [41]

Contaminated land can have serious consequences for both human health and the environment. Increased risk of flooding is likely to be a consequence of climate change, and may also facilitate the mobilisation of soil contaminants such as arsenic. [42]

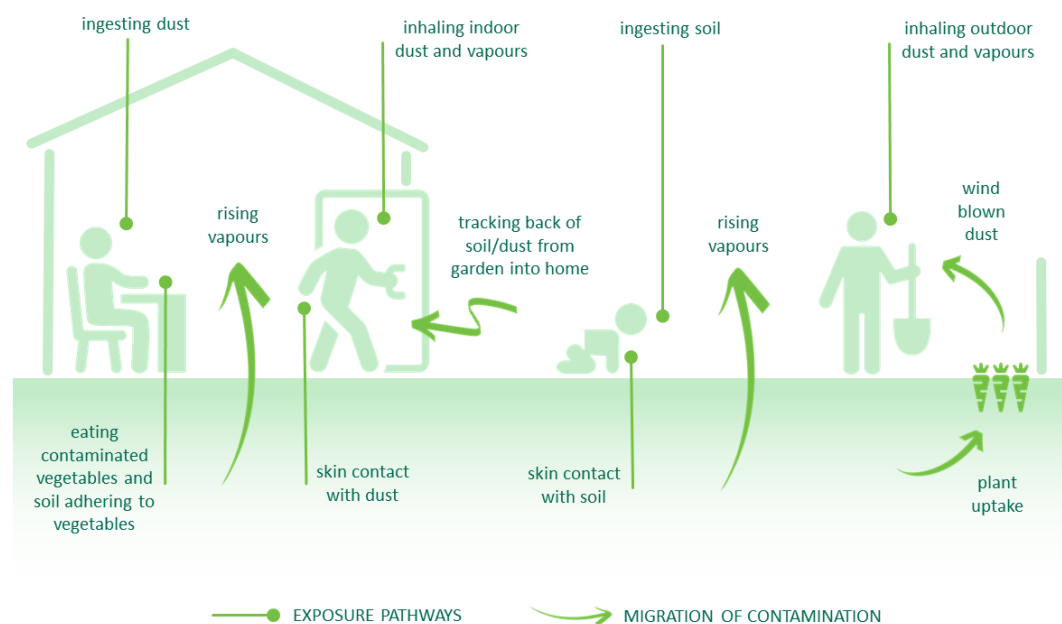
Health consequences from exposure to land contamination are thought to vary greatly depending the type and quantity of the contaminant(s), level, mode and duration of exposure, and individual vulnerability. [43]

Compounds associated with land contamination have been linked to a range of health impacts including skin and eye irritation, fatigue and nausea, cancers, congenital disorders, kidney damage and other long-term conditions. However, the evidence of these health impacts tends to be inconsistent and of variable quality, and associations linked to long-term exposure are very difficult to demonstrate. [44]

The health impacts of exposure to specific land contaminants, such as landfills, are particularly difficult to define as many chemicals with different known adverse effects usually coexist (Figure 3). Beyond direct exposure, there is further potential contamination of water bodies and supplies.. In addition, contamination of many sites is poorly documented and no information is available when contamination results from illegal practices.

Evidence does exist around the impact of stress and anxiety related to living near hazardous waste sites, which may be more broadly applicable to living near or on contaminated land generally. [44]

Figure 3: Routes of potential human exposure to land contaminants



Source: Adapted from Environment Agency [45]

### 7.3.5 Noise

The most common negative effect of noise is annoyance, but there are a number of other effects, including: sleep disturbance; hearing impairment; heightened cortisol in



the blood (a marker of stress); impairment of cognitive performance in children; and increased risk of developing CVD in those exposed long-term to noise pollution. [46]

A large study in 2015 found that across London there are significant excess deaths associated with traffic noise, however it's not clear that this is causal. [47]

WHO estimate that one million healthy years of life are lost every year in Western Europe because of traffic noise, particularly due to the contribution of raised cortisol levels to CVD. [48]

Impairment of early childhood development and education caused by noise may have lifelong effects on academic achievement and future health. [49]  
High levels of traffic noise are also associated with higher levels of air pollution, which can make it difficult to attribute specific underlying causes of related health impacts. Some recent research suggests that air pollution, rather than noise pollution, is associated with higher levels of low birth weight babies. [12]

## 7.4 Number of people affected

### 7.4.1 Air quality - outdoor

All residents and visitors to Hackney and the City of London are affected by the high levels of outdoor air pollution to some extent, although it affects vulnerable population groups, such as older people with long term health conditions, the most.

Concentration of particulate pollution in Hackney and the City is high compared to other parts of England and London. In 2017, the adjusted annual concentration of fine particulate matter in Hackney was 12.2  $\mu\text{g}/\text{m}^3$  and in the City of London it was 12.6  $\mu\text{g}/\text{m}^3$ . [50]

Estimates for Hackney suggest that as many as 7.0% of all deaths in those aged 30+ may be attributed to particulate air pollution, and 7.1% in the City of London. [50] In London as a whole, 6.6% of deaths in this age range can be attributed to particular pollution, compared to a national average of 5.2%. Additional local deaths associated with  $\text{NO}_2$  in particular are difficult to estimate.

According to the Global Burden of Disease (GBD) Study, an estimated 54 deaths in residents of Hackney and the City were attributable to air pollution in 2017. [4]

### 7.4.2 Air quality - indoor

All residents and visitors to Hackney and the City are affected to some extent by indoor pollutants.

According to the Global Burden of Disease Survey, five deaths in residents of Hackney and the City were attributable to occupational exposures to particulate matter, gases, fumes and diesel exhausts in 2017. [4] Three deaths in this same year were estimated to be attributable to residential radon gas.

### 7.4.3 Climate change

In Hackney, most carbon emissions can be ascribed to domestic sources, with a similar volume coming from industrial and commercial sources, and less from transport. The National Atmospheric Emissions Inventory does not identify any individual large industrial installations in the borough. [51]

In the City, almost all carbon emissions come from the industrial and commercial sector. Per person CO<sub>2</sub> emissions are particularly high in the City due to the small resident population. The National Atmospheric Emissions Inventory identifies four individual large industrial installations in the borough. [51]

Climate Just, a network of organisations including the Environment Agency and the Joseph Rowntree Foundation, have produced a model estimating the vulnerability of small areas (MSOAs, see Box 1) across England to flood and heat hazards associated with climate change. This is based on population vulnerability, ability to respond, ability to recover and likelihood of the hazard occurring. The model suggests that two out of 28 (7%) MSOAs in Hackney have a high vulnerability to flooding, and 13 out of 28 (46%) MSOAs have a high vulnerability to heat. The one MSOA in the City of London is categorised as having a high vulnerability to flooding and heat. [52]

Across London, a total of 468 deaths have been estimated to have resulted from the summer heatwaves of 2018, the highest rate of death in England. [53] Estimates are not available for Hackney and the City specifically.

### 7.4.4 Contaminated land

The location of contaminated and potentially contaminated land in Hackney has been identified under Part 2A of the Environmental Protection Act 1990 (see section 7.5.6). In total, 0.35 hectares of contaminated land have been identified locally, with a further 434.6 hectares identified as potentially contaminated (23% of the land in the borough).

No contaminated land sites in the City of London have been identified.

### 7.4.5 Noise

Noise from transport, construction sites and entertainment venues are particular issues in inner London.

Hackney Council received 5,413 complaints about noise in 2015/16. The Public Health Outcomes Framework estimates that 15% of the local population are exposed to transport noise of 65dB(A) or more in the daytime, and 18% at night. [54] The majority of complaints received by the council concern music.

The Hackney Matters Antisocial Behaviour (ASB) e-panel Survey in 2015 found that over 90% of those surveyed had experienced noise from people in the street at night, 85% from sirens, 80% from noise from neighbours at night and nearly 70% from noise from neighbours during the day. For more information, see the 'Community Safety' section of the JSNA.

The City of London received 1,093 complaints about noise in 2014/15 from residents and businesses. These concerned a range of sources, but were predominantly related to demolition/construction sites, street works and entertainment venues. The Public Health Outcomes Framework estimates that 28% of the resident population are exposed to transport noise of 65dB(A) or more in the daytime, and a similar proportion at night.

## 7.5 Inequalities

As well as affecting a significant number of individuals in total, environmental influences are a source of health inequalities.

### 7.5.1 Age

Air pollution disproportionately affects the elderly and children, as well as those with heart and respiratory disease. Estimates from the GBD study suggest that most related deaths in residents of Hackney and the City occur in people aged 80 or older (*Figure 4*).

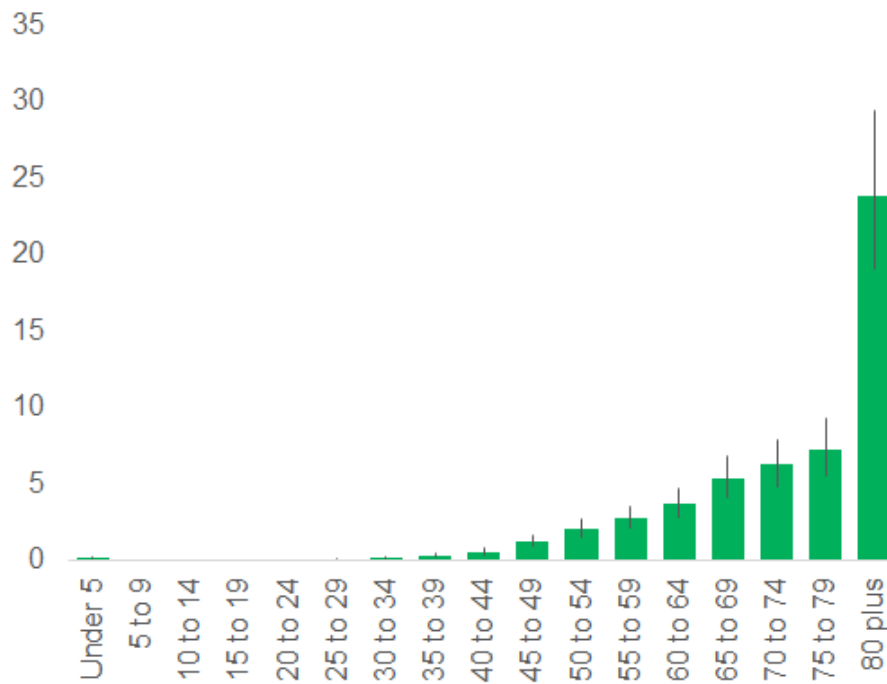
Other research has shown that concentrations of particulate matter in a sample of classrooms in London are above guideline values. [55]

Older people are particularly vulnerable to heatwaves associated with climate change. For example, of the 468 deaths in London estimated to have resulted from the summer heatwaves of 2018, 92% were thought to have occurred in people aged 65 or older. [53]

Chronically ill and elderly people are also more sensitive to noise disturbance. [56]

As children require more sleep than adults, they are more likely to be disturbed by night-time noise pollution. Impairment of early childhood development and education caused by noise may have lifelong effects on academic achievement and health. [49] Older adults, and people in poor health, are also considered to be more vulnerable to the effects of noise.

*Figure 4: Estimated annual attribution of air pollution to deaths in Hackney and the City of London by age (all ages, 2017) [4]*

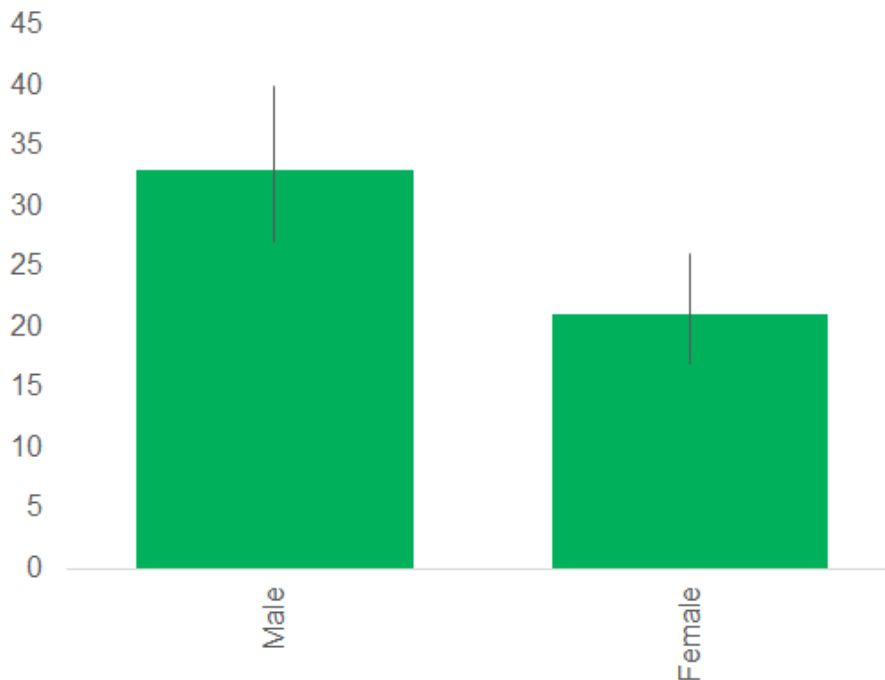


### 7.5.2 Gender

Estimates from the GBD study suggest that males are more likely to suffer premature mortality due to the effects of air pollution than females (Figure 5).

There is no clear local evidence for particular inequalities with respect to gender and other environmental health determinants.

Figure 5: Estimated annual attribution of air pollution to deaths in Hackney and the City of London by gender (all ages, 2017) [4]



### 7.5.3 Ethnicity

Nationally, the higher proportion of Black, Asian, and minority ethnic (BAME) people living in inner-city areas means that there are major inequalities in exposure to outdoor air pollution, urban noise pollution and heat waves – all of which are more common in built up areas. [57]

### 7.5.4 Disabilities and long-term conditions

Air pollution, heat waves, and noise pollution disproportionately affect people with existing medical conditions, including heart and respiratory disease.

### 7.5.5 Socio-economic deprivation

Though the relationship is complex, overall air and noise pollution are disproportionately experienced by people in lower socio-economic groups, who tend to be more concentrated in inner-city areas where roads are more congested. [57] [58] Other sections of the JSNA also show that more deprived residents also have higher rates of cardiovascular and respiratory disease, which increase the impact of pollution.

Research published in 2017 confirmed that many schools in deprived parts of East London were exposed to particularly high levels of air pollution. [59]

Poor indoor air quality (with high levels of VOCs, particulates and NO<sub>2</sub>) are associated with poor housing standards, linked to socio-economic deprivation. [11] Dampness is more common in homes that have insufficient heating, ventilation and insulation, and in homes that are overcrowded – again, more common among low

income households. People working in manual and lower skilled occupations (such as drivers, industrial workers, or those working in nail salons) are also at increased risk of exposure to indoor air pollution (see section 7.3.2).

While the causes of climate change are driven disproportionately by the actions of wealthier individuals, the health impacts are more commonly experienced by those living in deprived circumstances. It is estimated that the wealthiest 10% of the UK population produce more lifestyle CO<sub>2</sub> emissions than the poorest 40%. [60] [61]

Exposure to noise pollution is more common among socio-economically deprived groups, linked to higher housing costs in quieter areas plus the costs of insulation. [8] Occupational exposures to noise pollution are also linked to socio-economic status. Shift workers are also thought to be particularly vulnerable to noise-related harms due to sleeping at noisier times of the day. [8]

In general terms, people living in more deprived circumstances are less likely to be able to move houses or jobs to avoid any environmental nuisance or harm.

#### **7.5.6 Location within Hackney and the City**

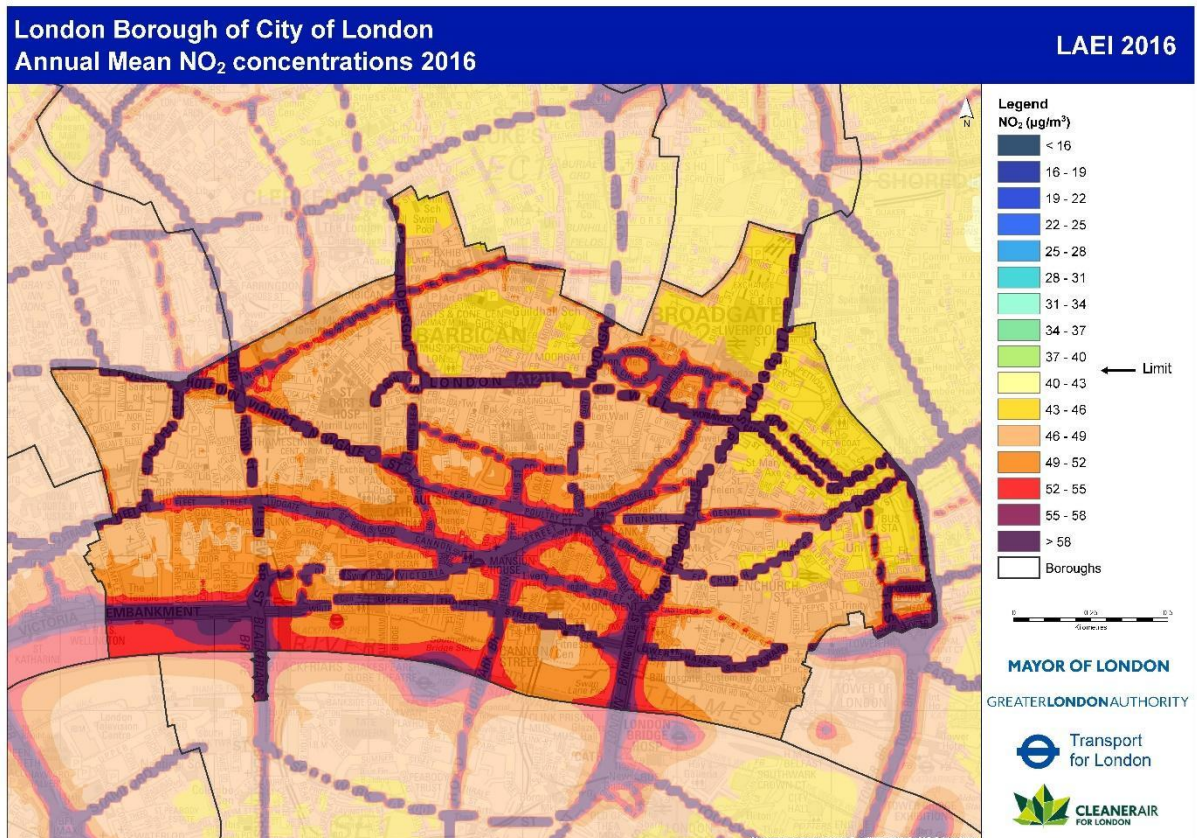
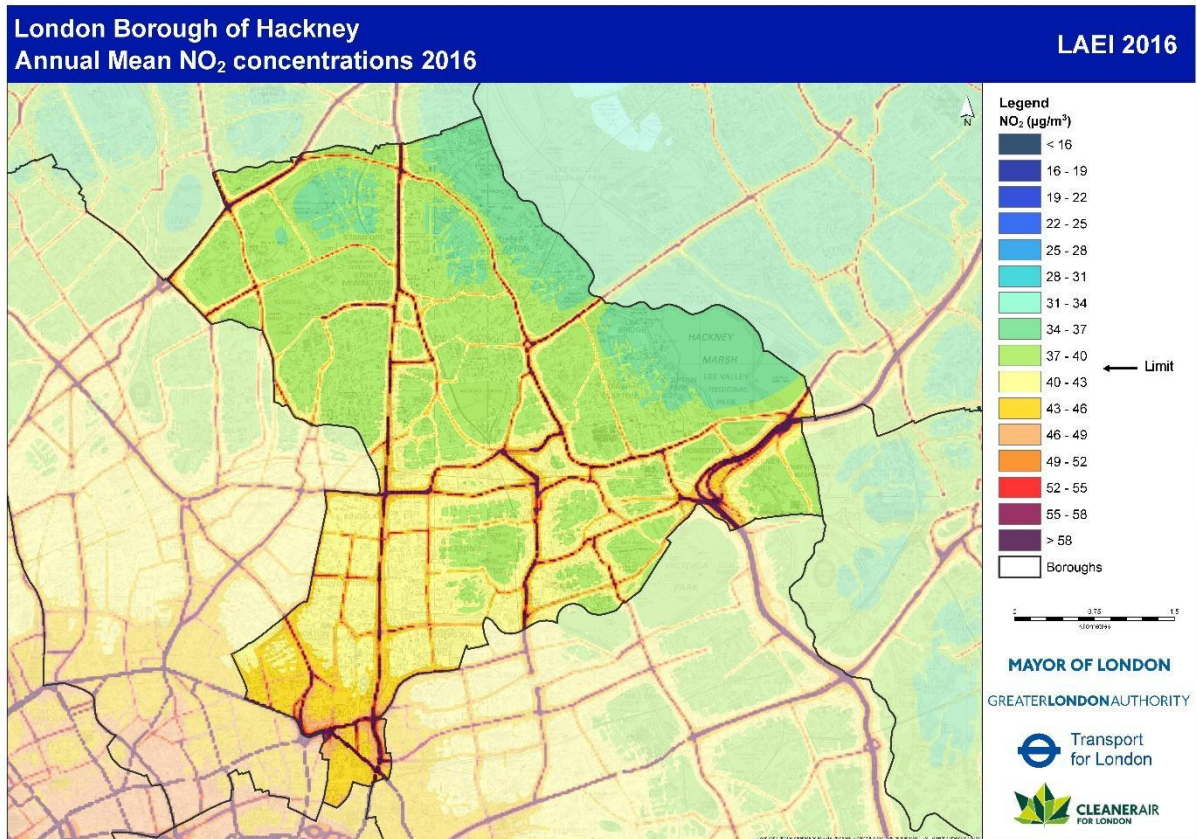
Inner-city areas with high traffic density are particularly affected by air pollution. These areas are also more vulnerable to the health impacts of climate change due to the urban heat island effect. [35]

Locally, the areas with the highest rates of pollution are Hackney Central, Shoreditch, the area close to the A12 in Hackney Wick, and the whole of the City of London (Figure 6). The highest concentrations of pollutants in both Hackney and the City are around major roads.

Estimates of the number of deaths attributable to PM<sub>2.5</sub>, however, suggest that these are evenly spread across Hackney. [62] This highlights the difficulty in clearly ascribing the impacts of air pollution geographically, as people will be exposed where they live, work and study; and longer-term impacts will be affected by areas they have spent time in over the course of their life.

There is also significant variation in air pollution exposure over very small areas. Shelter from air movements caused by tall buildings in parts of London, for example, can create a 'street canyon' microclimate, thus concentrating pollution over time. [63]

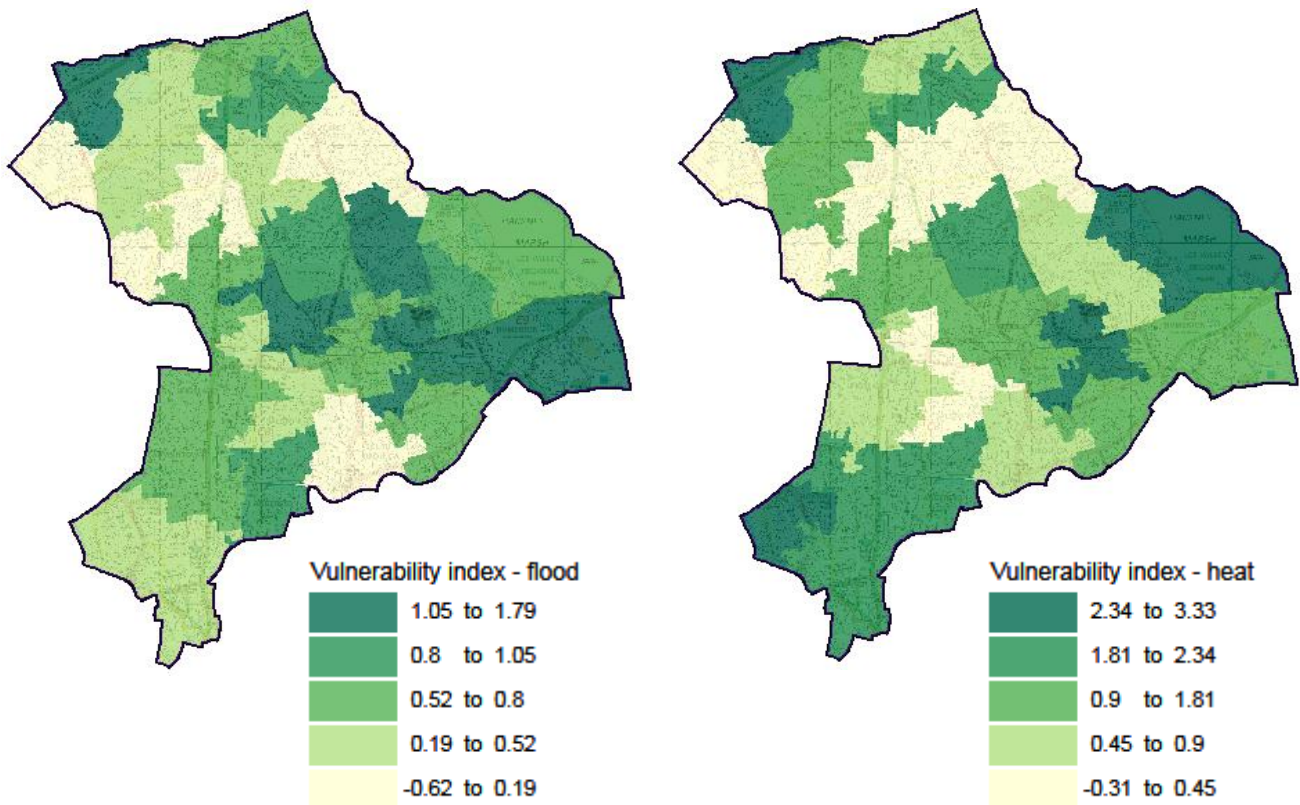
Figure 6: Average annual concentrations of nitrogen dioxide (NO<sub>2</sub>) across Hackney and the City of London (2016)



Source: [64]

Based on the estimates of risk produced by Climate Just, vulnerability to flood and heat in Hackney, (based on population vulnerability, ability to respond, ability to recover and likelihood of the hazard occurring) is concentrated in different parts of the borough – see *Figure 7*.

*Figure 7: The socio-spatial vulnerability index to heat and flood from climate change in Hackney (2014)*

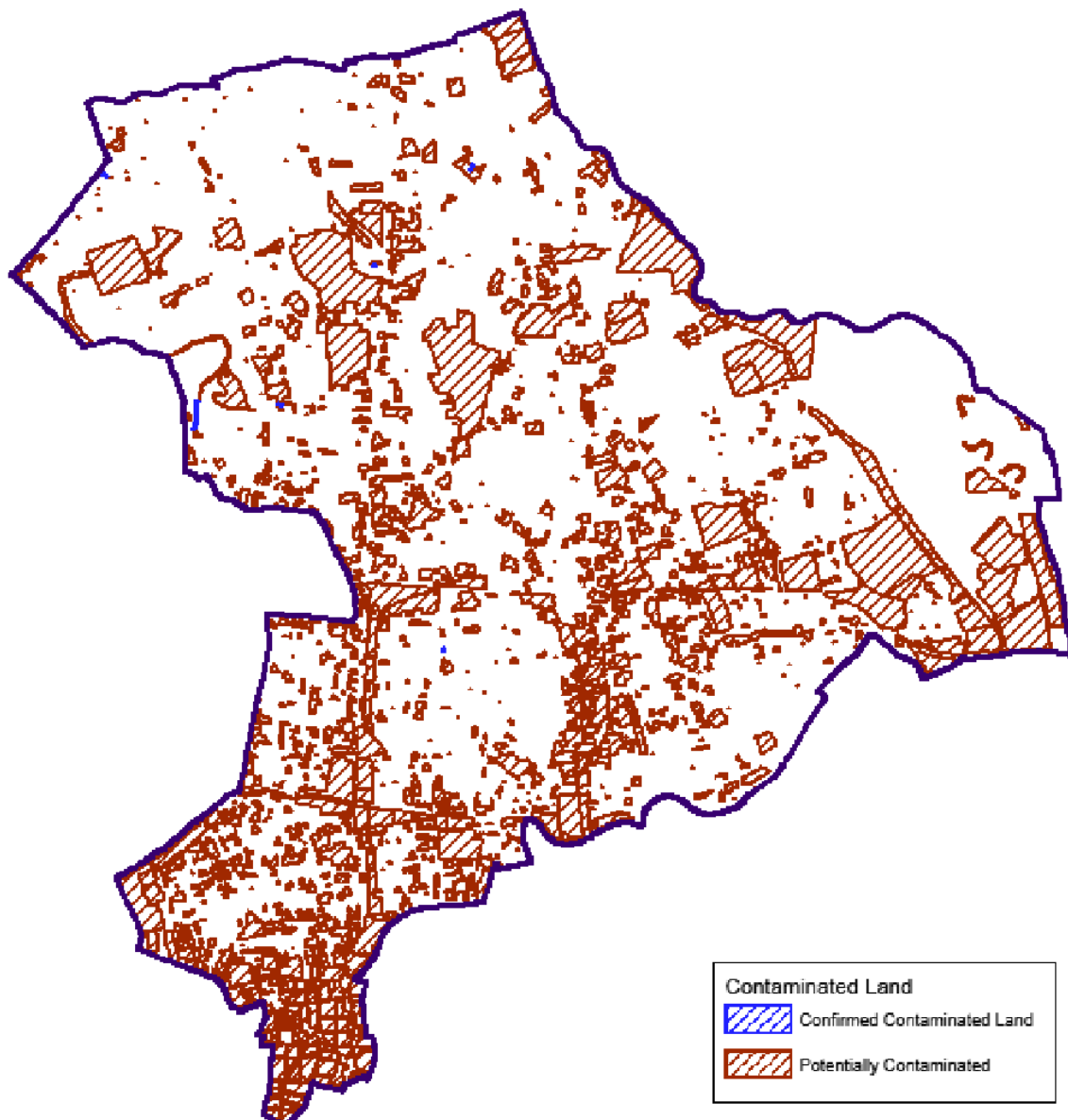


Source: Climate Just [2014]

The location of contaminated and potentially contaminated land in Hackney is shown in *Figure 8*.



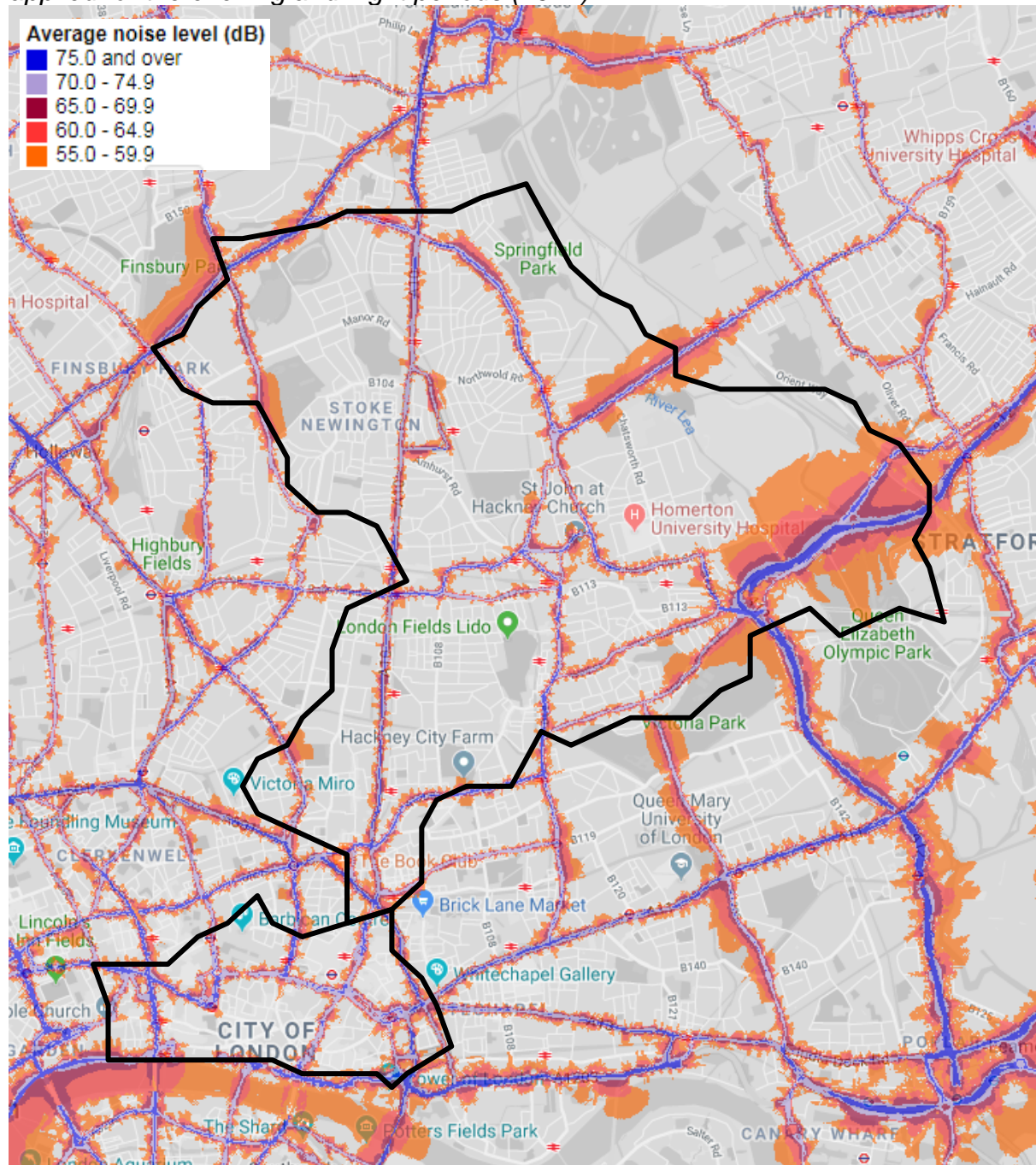
Figure 8: Contaminated and potentially contaminated land in Hackney (2016)



Source: London Borough of Hackney

Figure 9 shows the estimated average levels of traffic noise experienced locally in Hackney and the City of London. This follows a broadly similar geographical pattern in Hackney as that shown in Figure 6 for air pollution, though less so in the City where sources are not primarily road transport.

Figure 9: 24 hour annual average traffic noise level in decibels with weightings applied for the evening and night periods (2012)



Source: [www.extrium.co.uk](http://www.extrium.co.uk)

## 7.6 Comparisons with other areas and over time

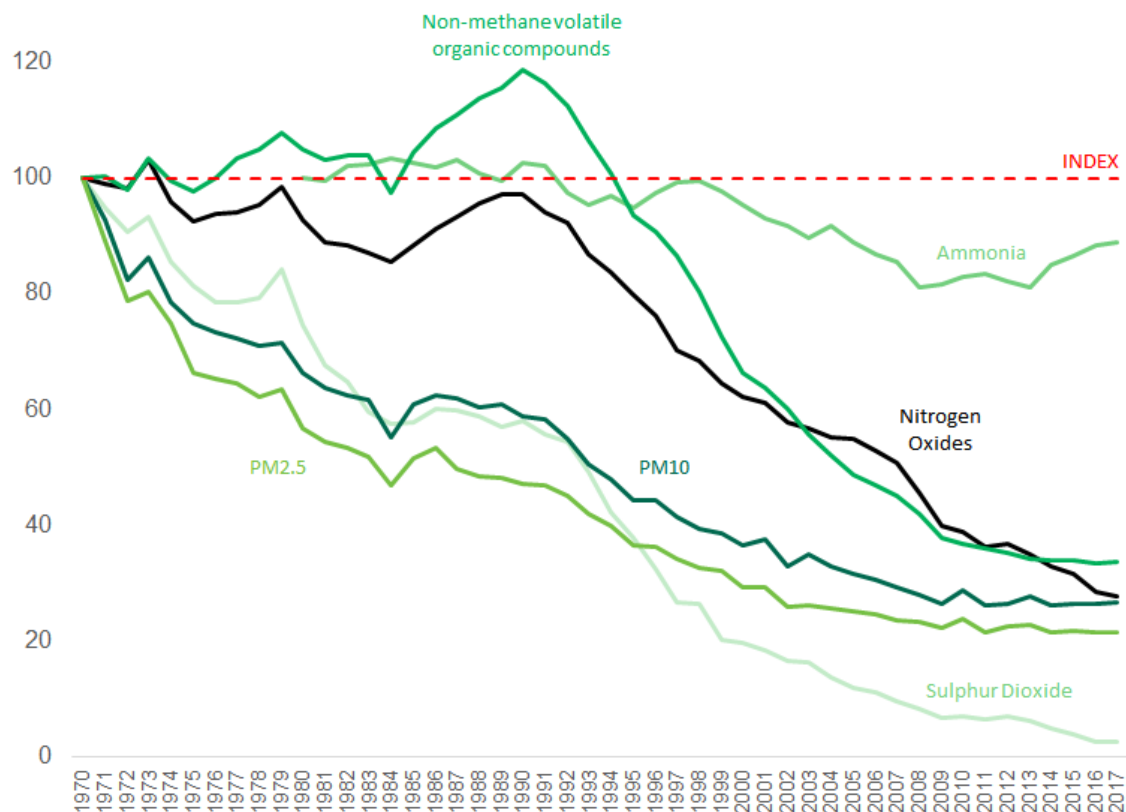
### 7.6.1 Air quality – outdoor

The Public Health Act was passed in 1891, creating the first financial pressure on businesses in London to reduce smoke emissions which were responsible for many thousands of deaths at the time. Pollution levels in London were comparable in the Victorian era to those experienced by cities such as Delhi and Beijing currently. The

Clean Air Act was passed in 1956 in response to continuing smogs in the UK, coinciding with the peak of negative consequences of industrialisation in the UK. Pollution is much less visible now, over 60 years after this law was passed, which has led some to suggest that there has been some complacency over the issue in recent years. [5]

While overall levels of emissions in the UK have fallen significantly in recent decades, the resulting decline in concentrations have been slower in London and levels overall remain well above legal limits (*Figure 10*).

*Figure 10: Trends in emissions of major air pollutants in the UK (1970 - 2017)*

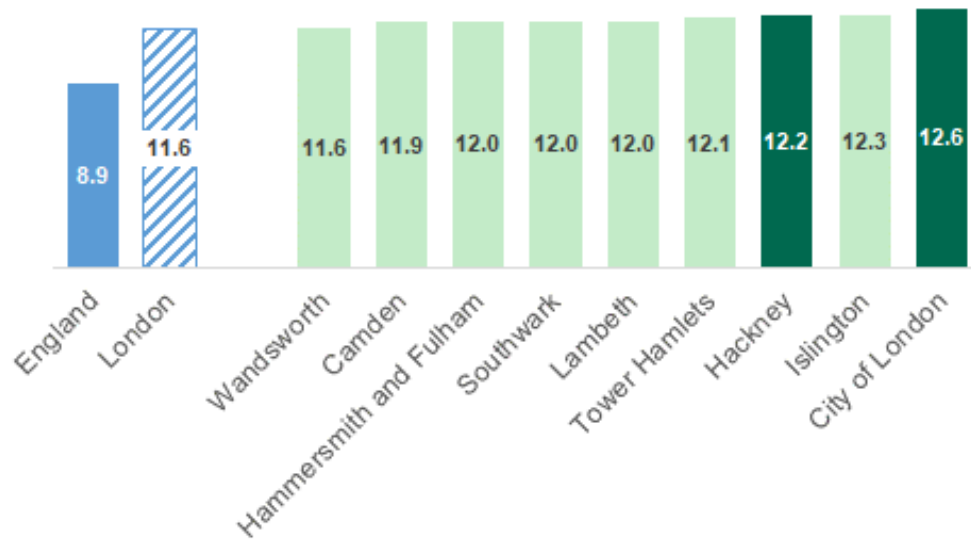


*Note: Comparator index line shows the level of emissions if they had remained constant from the beginning of the time trend*

*Source: Defra*

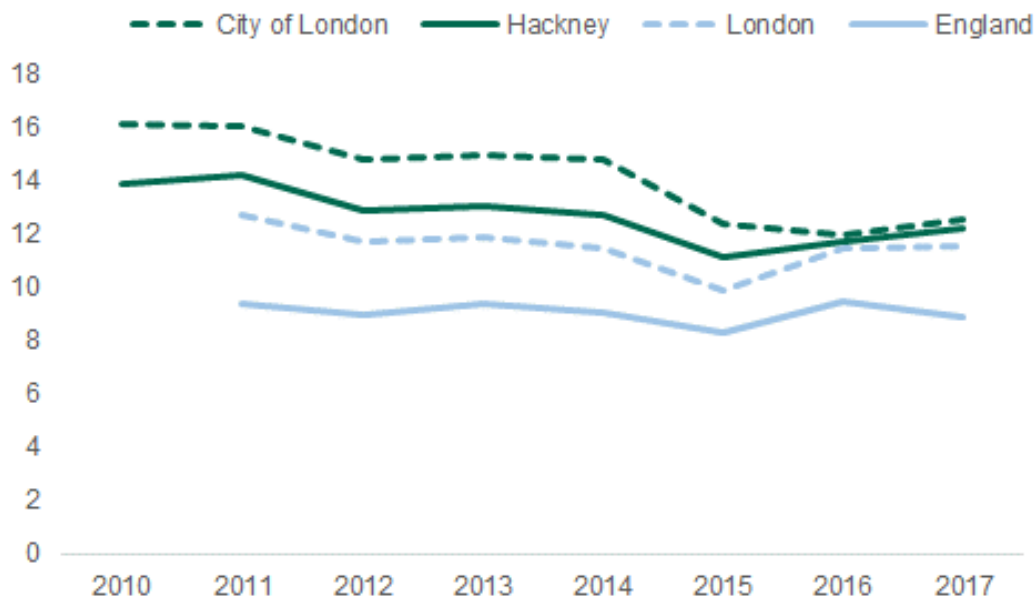
Locally, concentration of fine particulate pollution is higher than regional and national averages (*Figure 11*). However, there is evidence of a reduction in the annual levels of PM2.5 since 2010 in City and Hackney (*Figure 12*).

Figure 11: Annual concentration of man-made fine particulate matter (PM2.5) adjusted for population exposure ( $\mu\text{g}/\text{m}^3$ , 2017)



Source: Defra. Confidence intervals not provided. [50]

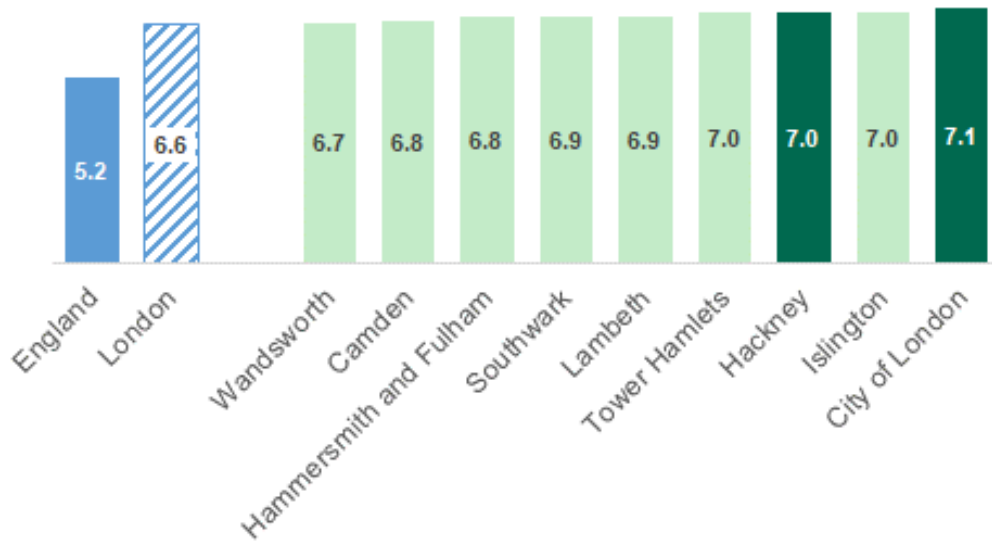
Figure 12: Annual concentration of man-made fine particulate matter (PM2.5) adjusted for population exposure ( $\mu\text{g}/\text{m}^3$ , 2010-17)



Source: Defra. Confidence intervals not provided. [50]

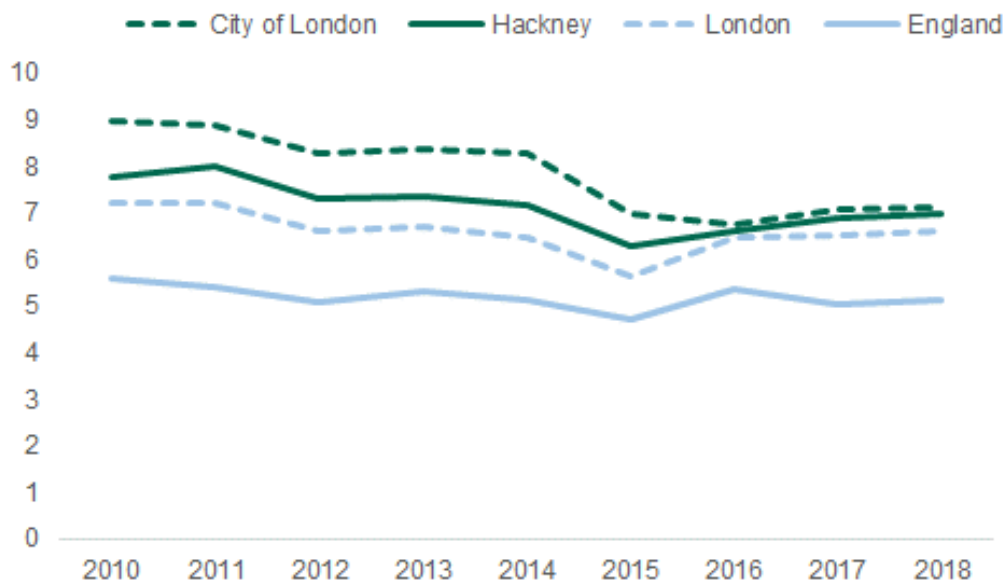
Figure 13 shows that the fraction of all-cause adult mortality attributable to particulate air pollution in Hackney and the City is among the highest of Hackney's statistical peers. However, there has been a downward trend in recent years, and at a faster rate than national and regional trends (Figure 14), which mirrors the decline in pollutant levels. Care should be taken when interpreting these trends and comparisons, as confidence intervals are not available in the published data to determine if they are statistically significant..

Figure 13: Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution, measured as fine particulate matter, PM2.5 (age 30+, 2018)



Source: Public Health Outcomes Framework. Confidence intervals not provided. [50]

Figure 14: Percentage of all-cause adult mortality attributable to anthropogenic particulate air pollution measured as fine particulate matter, PM2.5 (age 30+, 2010-2018)



Source: Public Health Outcomes Framework. Note: Confidence intervals not provided. [50]

The concentration of diesel vehicles in England, and more widely in Europe, is unique globally. The use of small diesel delivery vehicles nationally is likely to have increased over time, with an increase in internet shopping and home deliveries. However, recent national efforts to regulate diesel vehicles will have helped to mitigate against some of the negative impacts of diesel vehicles of this at least to some extent.

Predictions suggest that air pollution will continue to fall in Hackney and the City over time, particularly from transport sources. As a result, the proportionate contribution from domestic and commercial sources will correspondingly increase. [2]

### 7.6.2 Air quality - indoor

No data are available to compare the quality or impact of indoor air quality in Hackney and the City with other areas.

High concentrations of outdoor air pollutants will have a significant impact on indoor air and so the data reported in 7.6.1 have some relevance here.

Due to the downward trend in smoking prevalence locally (and nationally), indoor air pollution from tobacco smoke will have declined similarly in recent years – for more information, see the JSNA section on ‘Smoking’ in the ‘Lifestyle and behaviour’ chapter.

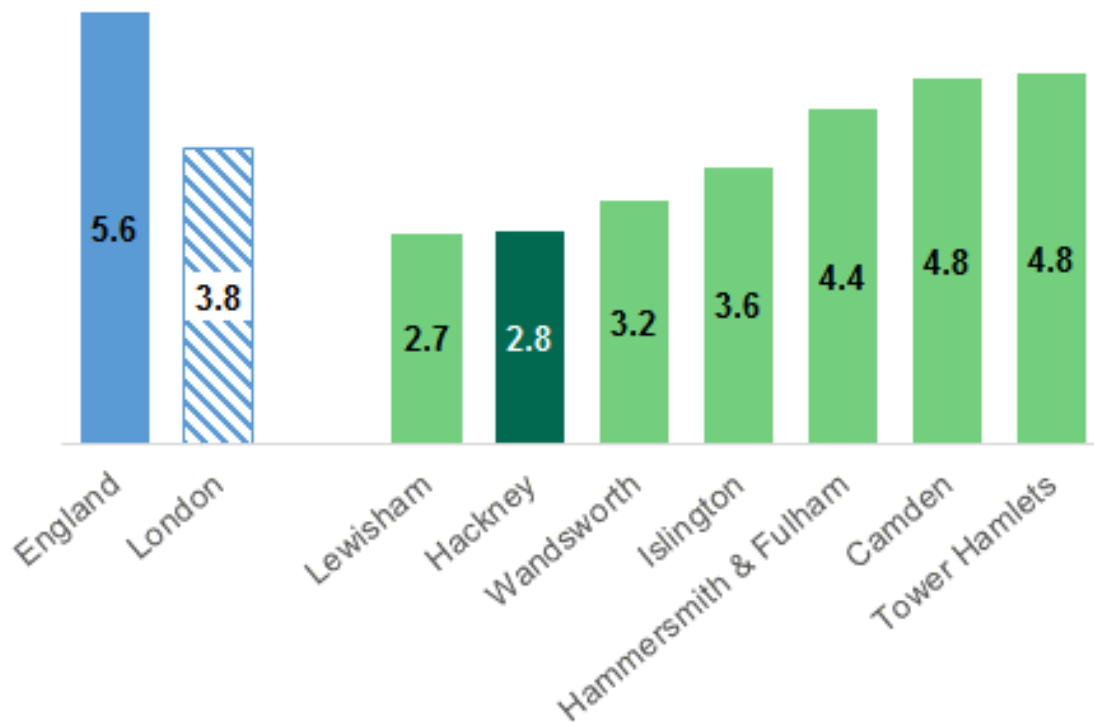
### 7.6.3 Climate change

Carbon dioxide is the main greenhouse gas.

Figure 15 shows that the level of CO<sub>2</sub> emissions per person in Hackney are lower than the national and regional average, and most similar areas in London. This may partially reflect the relative efficiency of using transport and other infrastructure in cities.

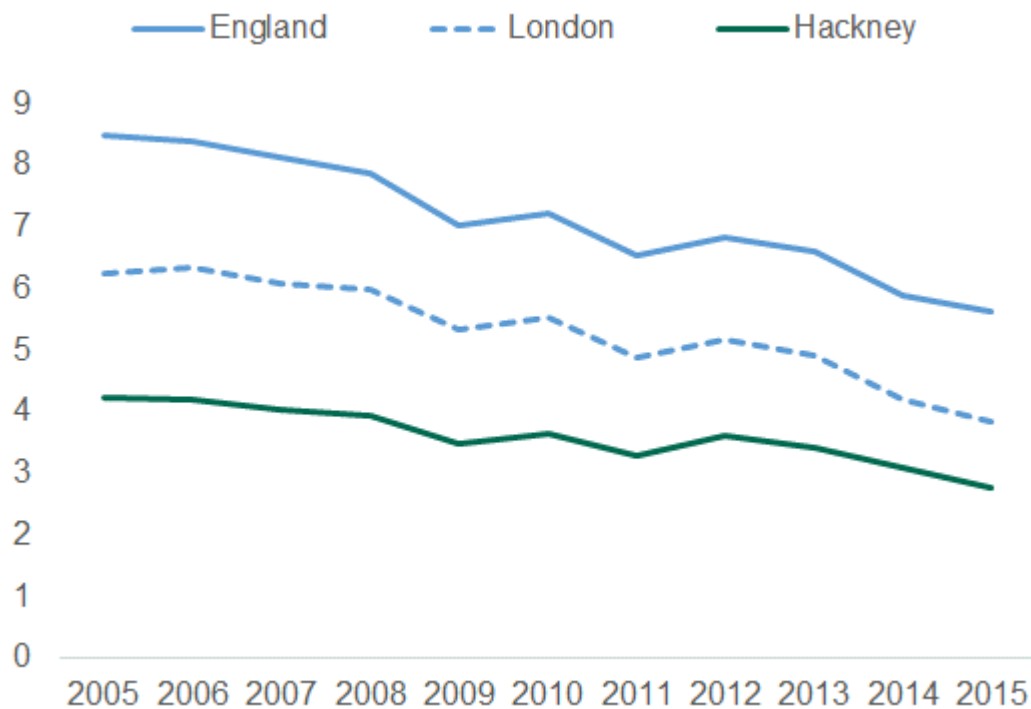
In Hackney, the overall level of carbon emissions fell by 19% between 2005 and 2015, from 915,000 to 742,000 tonnes of CO<sub>2</sub>. Per person CO<sub>2</sub> emissions also fell during this period, from 4.2 to 2.8 tonnes (Figure 16). In the City of London, the overall level of carbon emissions fell by 48% over this same period, from 1,641,000 to 860,000 tonnes of CO<sub>2</sub>. Per person estimates for the City of London are not presented, as the figures are artificially inflated due to exclusion of the large number of daytime City workers/commuters from the denominator.

Figure 15: Estimated CO<sub>2</sub> emissions (tonnes per person, 2015)



Source: DECC. Confidence intervals not provided. [50]. NB Figures for the City of London are not shown as they do not take into account the daytime worker population.

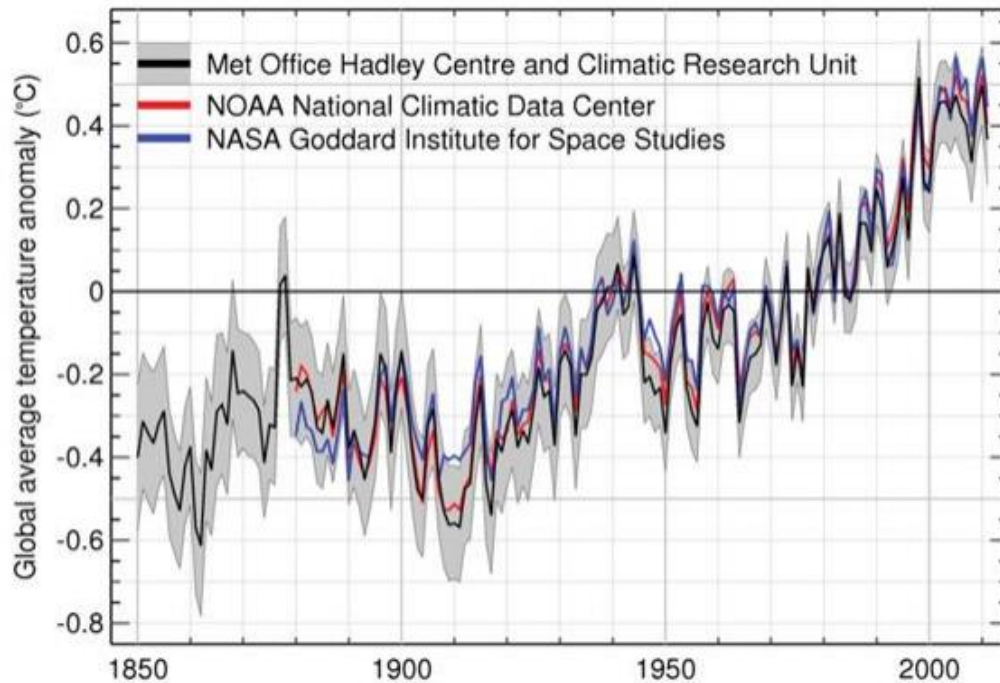
Figure 16: Estimated CO<sub>2</sub> emissions (tonnes per person, 2005-2015)



Source: DECC. Confidence intervals not provided. [50]. NB Figures for the City of London are not shown as they do not take into account the daytime worker population.

The longer term time trend of global average temperature rises associated with climate change is shown in Figure 17.

Figure 17: Long-term trends in global average temperature

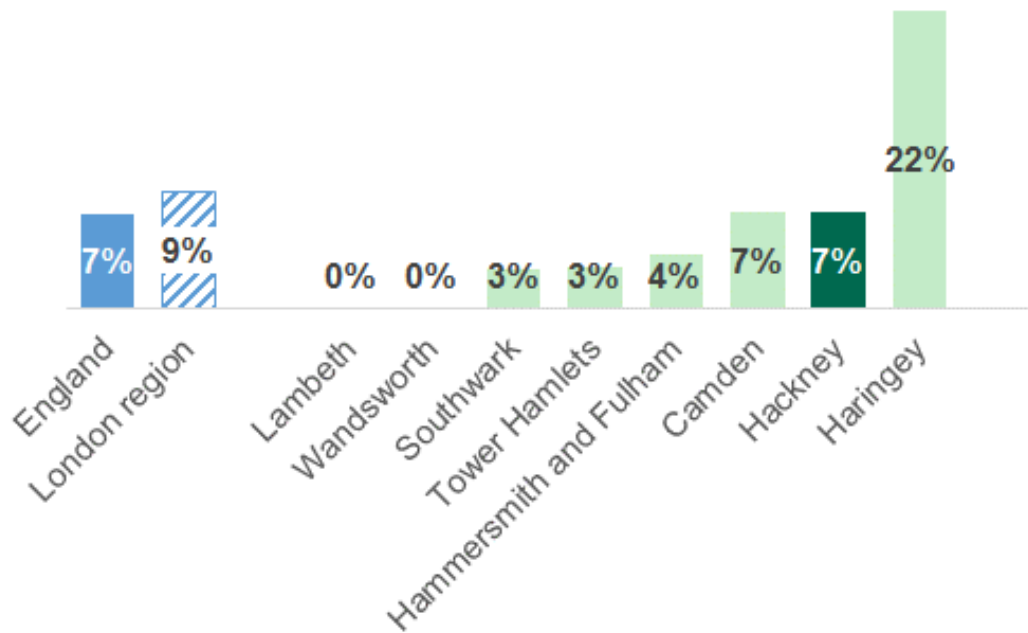


Source: [34] Note: Based on three observational datasets as shown in the key.

The proportion of MSOA areas (see Box 1) estimated to be highly vulnerable to climate change related flood risk in Hackney is similar to the national average (Figure 18). The proportion of areas estimated to be highly vulnerable to heat risk is higher than the London and national average (Figure 19). The one MSOA in the City of London is categorised as having a high vulnerability to both flooding and heat. [52]

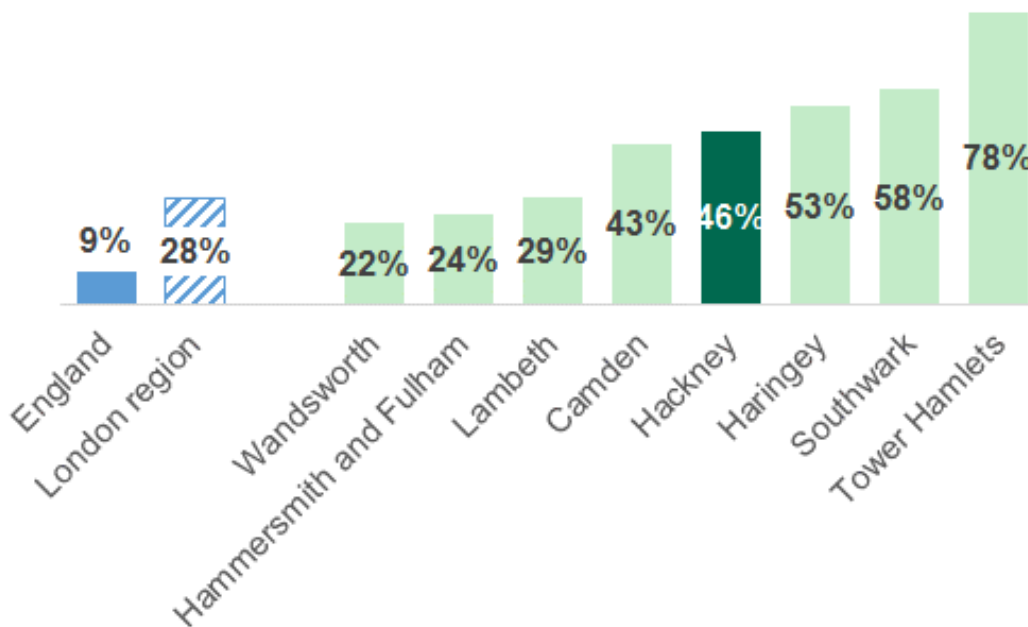


Figure 18: Estimated proportion of MSOA areas which are highly vulnerable to climate change related flooding (2014)



Source: [52]. Note: Based on 28 MSOA areas in Hackney. The one MSOA area in the City of London was also considered to be highly vulnerable, and is not shown for clarity.

Figure 19: Estimated proportion of MSOA areas which are highly vulnerable to climate change related heat (2014)



Source: [52]

Note: Based on 28 MSOA areas in Hackney. The one MSOA area in the City of London was also considered to be highly vulnerable, and is not shown for clarity.

### 7.6.4 Contaminated land

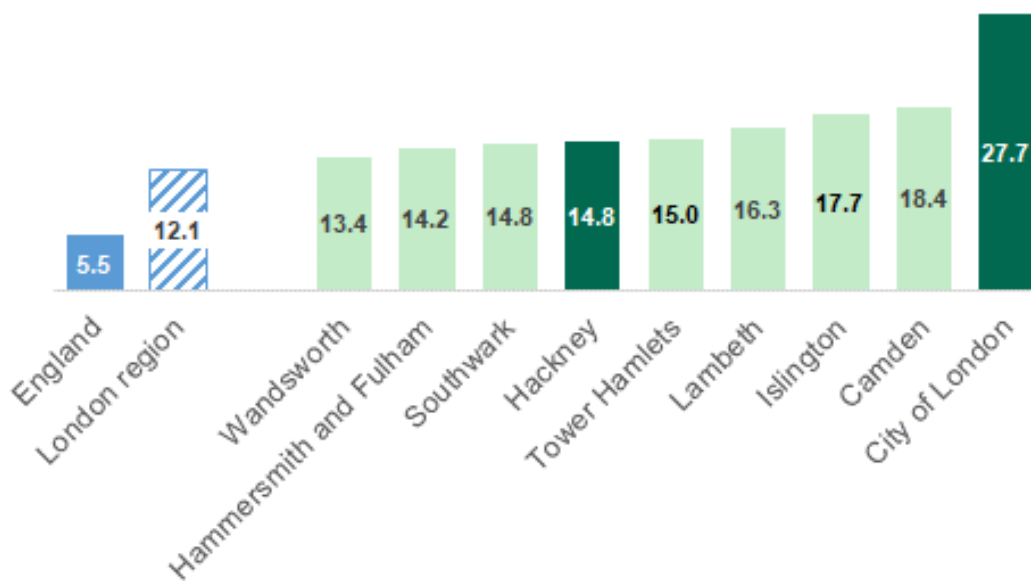
Comparative and time trend data relating to land contamination are not available. Most land contamination in the UK is associated with areas which have previously had some industrial use, such as Hackney.

### 7.6.5 Noise

Figure 20 shows that Hackney has higher levels of exposure to significant *daytime* noise than the London and England averages, but similar to many of its statistical peers.

The City has the highest rate of exposure in the country and much higher than the London or national average. This is due to its location, at the heart of London, and the density of development. However, please note that statistical significance cannot be ascertained in making these comparisons as confidence intervals are not available in published data.

Figure 20: Percentage of the population exposed to significant daytime road, rail and air transport noise (2016)

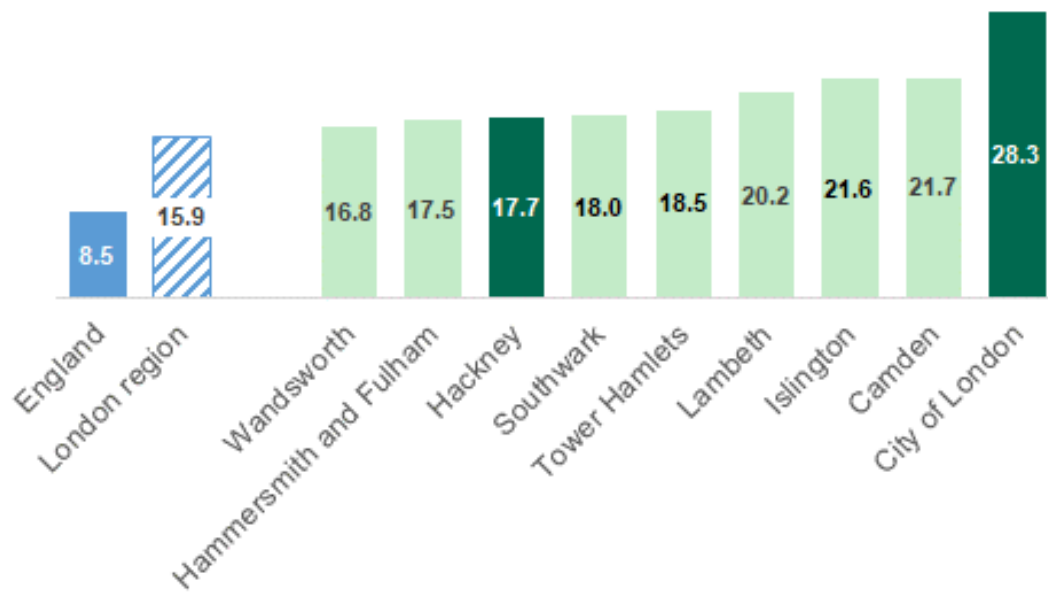


Source: Public Health Outcomes Framework [54].

Notes: 'Significant' daytime noise is defined by WHO as 65dB or above. Confidence intervals not provided.

Figure 21 shows that exposure to significant *night-time* noise is again higher in Hackney than the England average, but similar to most of its statistical peers. Levels of exposure in the City are much higher than in Hackney, London and England on average. Although again, statistical significance of these comparisons cannot be ascertained.

Figure 21: Proportion of the population exposed to significant night-time road, rail and air transport noise (2016)



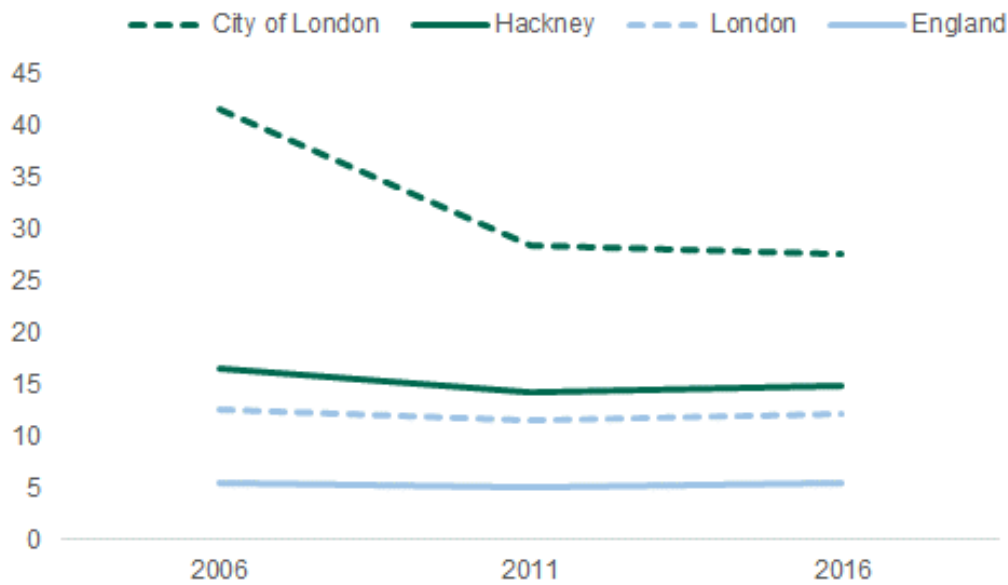
Source: Public Health Outcomes Framework.

Notes: 'Significant' night-time noise is defined by WHO as 55dB or above. Confidence intervals not provided. [65]

The proportion of the population exposed to significant daytime and night-time traffic noise is estimated to have reduced in Hackney between 2006 and 2016, from 17% to 15% in the daytime (Figure 22) and 22% to 19% at night (Figure 23). This is in line with London averages. The reductions are more significant in the City over this same period, with a sharp fall from 42% to 28% in those affected by daytime noise and from 48% to 28% in those affected by night-time noise.

Time trends in the health impact of occupational noise, estimated in the GBD study, show a largely stable trend in Hackney and the City from 1992 to 2017. [4]

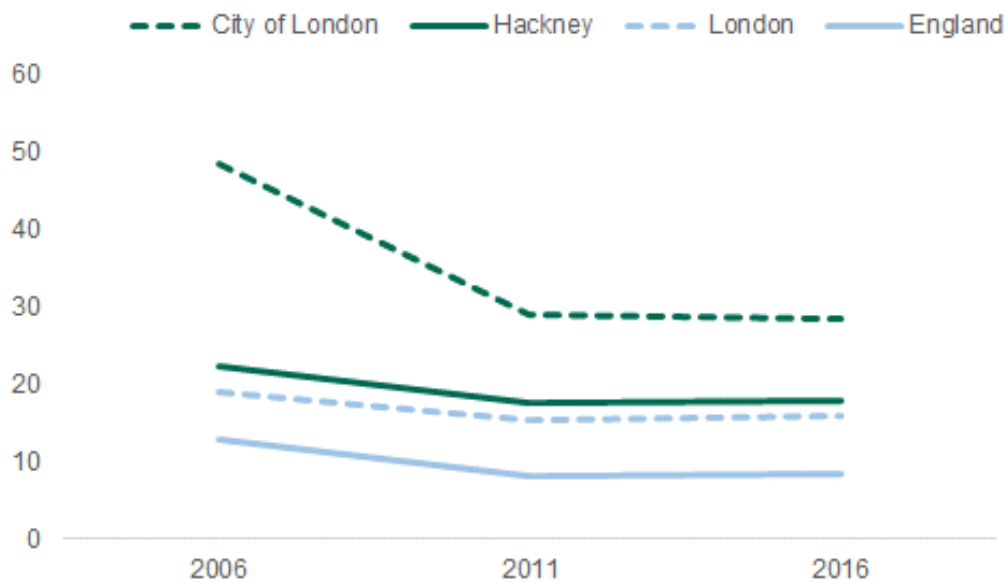
Figure 22: Percentage of the population exposed to significant daytime road, rail and air transport noise (2006-16)



Source: Public Health Outcomes Framework [54].

Notes: 'Significant' daytime noise is defined by WHO as 65dB or above. Confidence intervals not provided.

Figure 23: Proportion of the population exposed to significant night-time road, rail and air transport noise (2006-16)



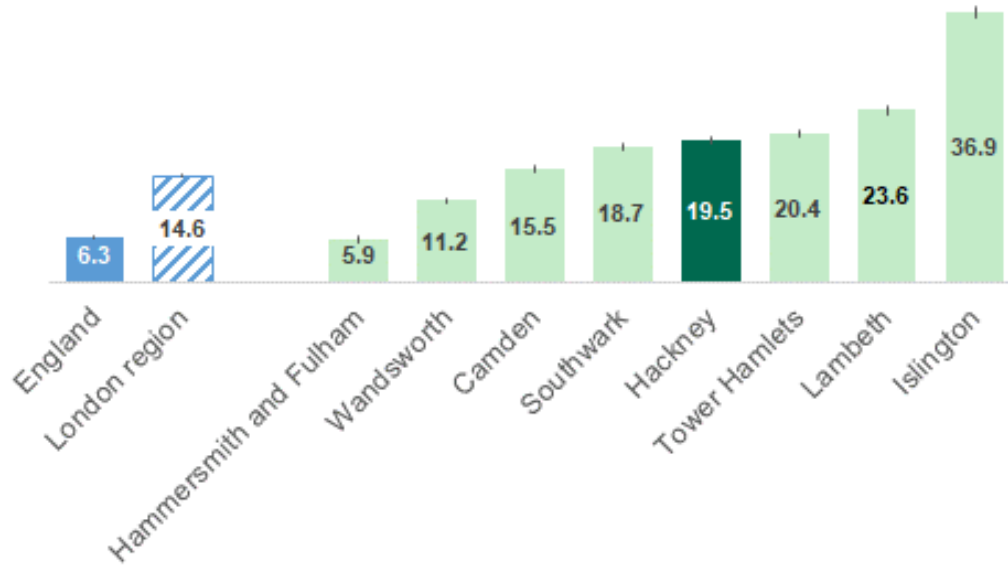
Source: Public Health Outcomes Framework. [65]

Notes: 'Significant' night-time noise is defined by WHO as 55dB or above. Confidence intervals not provided.

The rate of complaints about noise in Hackney is higher than both the England and London average, and in the middle of Hackney's statistical peers (Figure 25). Camden, Wandsworth and Hammersmith and Fulham have lower rates, while Lambeth and Islington's rates are higher than that of Hackney.

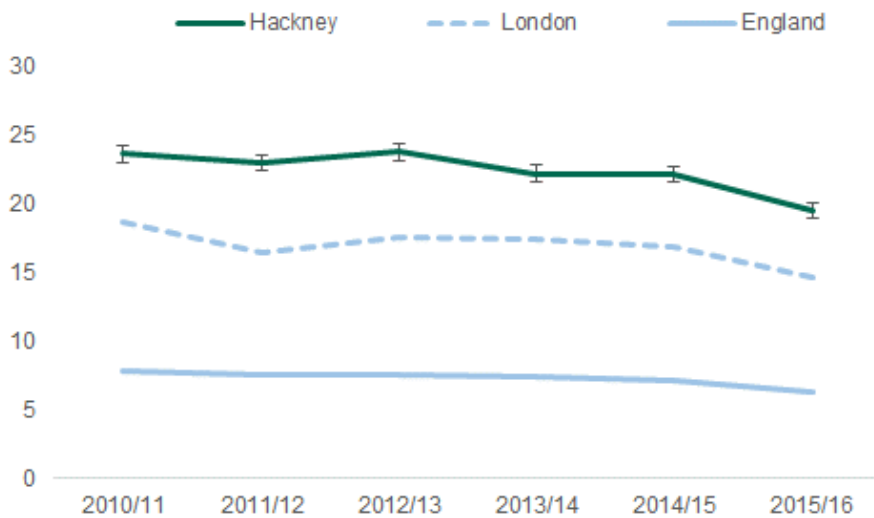
There has been a downward trend in the rate of complaints about noise in Hackney over recent years (Figure 25).

Figure 24: Rate of complaints per year per local authority about noise (per 100,000 population, 2015/16)



Source: Public Health Outcomes Framework. [54] Figures not available for the City of London

Figure 25: Rate of complaints per year per local authority about noise per 100,000 population (2010/11 - 2015/16)



Source: Public Health Outcomes Framework. [54] Figures not available for the City of London

## 7.7 Evidence and good practice

### 7.7.1 Air quality - outdoor

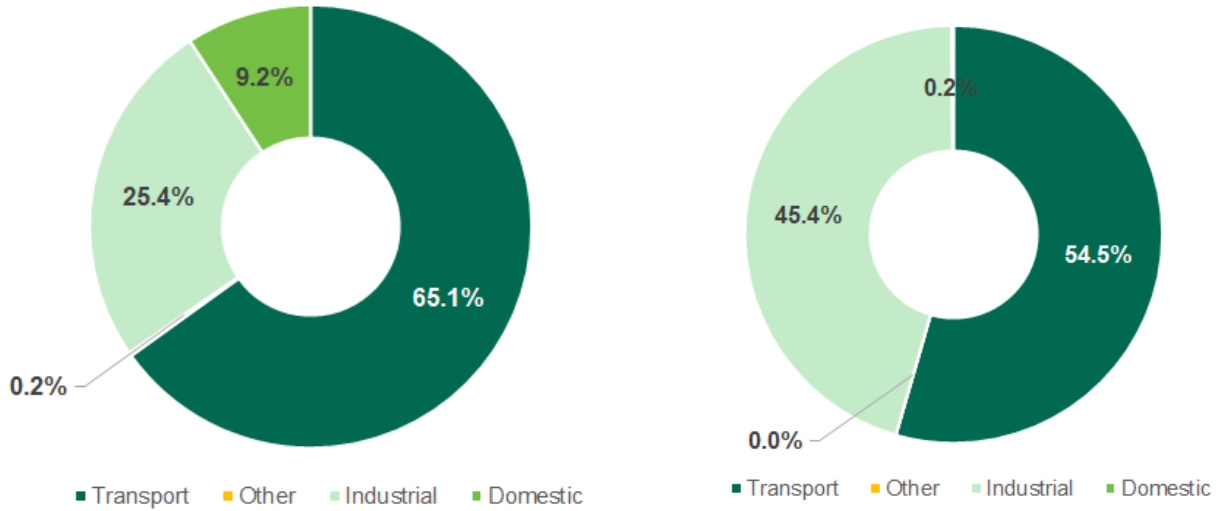
The National Institute for Health and Care Excellence (NICE) published guidance on air pollution in 2017. [63] Key recommendations from this guidance are summarised in Box 2.

*Box 2: Summary of NICE guidance NG70: Air pollution: outdoor air quality and health [63]*

- Include air pollution within local strategic plans and processes (including the Local Plan, core strategy, transport plan, and health and wellbeing strategies), with a focus on zero or low-emission travel.
- Consider air quality within plans for new developments or regeneration programmes, ensuring appropriate steps are taken to reduce the need for motorised travel and to minimise exposure to air pollution.
- Utilise Community Infrastructure Levy funding to implement air quality monitoring and measures to reduce road traffic-related emissions.
- Considering ways to reduce or mitigate road-traffic-related air pollution, including initiatives to reduce motorised vehicle trips, to encourage the use of no or low emission vehicles, and to review tree and vegetation management.
- Consider the implementation of local, potentially cross-borough clean air zones, which act to promote zero or low emission travel and discourage motorised vehicular travel.
- Ensure that air quality is considered within decisions around public sector fleet procurement, and that the staff driving these vehicles are adequately trained in how to drive in such a way as to minimise fuel consumption and air pollution.
- Provide both the public and health professionals with information about the impacts of poor air quality on health, and how to reduce local air pollution and minimise exposure to it.
- Develop infrastructure to support and encourage cycling and other forms of active travel.

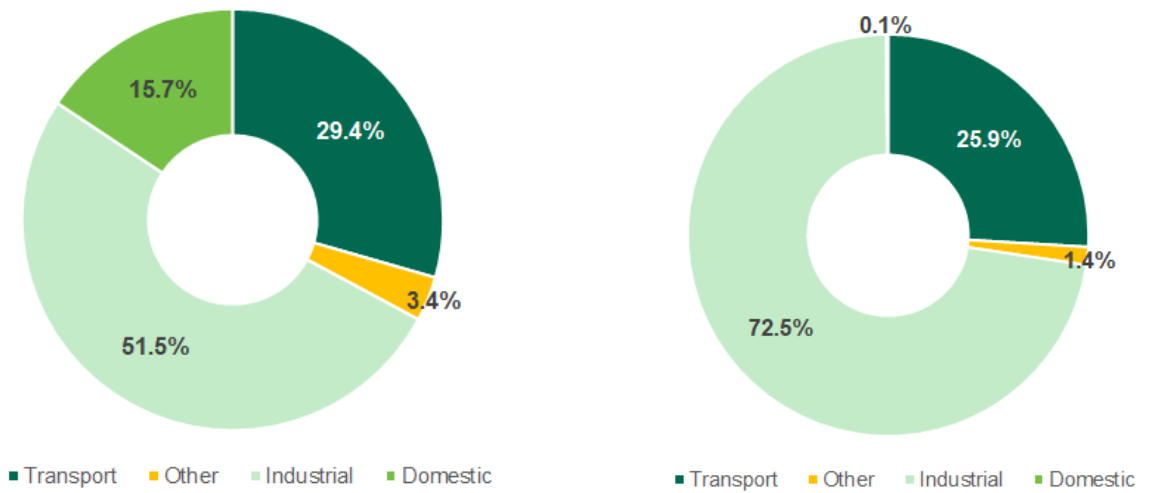
Figure 26 and Figure 27 below show the source of two major pollutants locally.

Figure 26: Expected sources of oxides of nitrogen in Hackney (left) and City of London (right) (2016, released 2019)



Source: GLA [64]

Figure 27: Expected sources of PM2.5 particulates in Hackney (left) and City of London (right) (2016, released 2019)



Source: GLA [64]

*Table 3: Expected sources of PM2.5 particulates and oxides of nitrogen in Hackney and City of London (2016, released 2019)*

Category	Subcategory	Sources	Nitrogen oxides (NOx)		Particulates (PM2.5)	
			Hackney	City of London	Hackney	City of London
Transport	Aviation	Aviation	0.0%	1.0%	0.0%	0.1%
Transport	Rail	Freight, Passengers	0.8%	-	0.3%	-
Transport	River	Commercial, Passengers, Small Vessels	0.1%	15.7%	0.0%	5.4%
Industrial and Commercial	Heat and Power Generation	Combustion from Gas, Coal, Oil Fuels	15.8%	41.8%	3.8%	11.9%
Industrial and Commercial	Industrial Processes	Part As/Bs, NRMM from Industrial Sites	0.7%	1.0%	2.1%	0.8%
Industrial and Commercial	Construction	Construction Dust, NRMM from Construction Sites	8.9%	2.5%	17.1%	6.5%
Industrial and Commercial	Waste	Landfill, WTS, Small Scale Waste Burning, STW	0.0%	0.0%	0.2%	0.0%
Industrial and Commercial	Cooking	Cooking from Commercial Outlets	-	-	28.2%	53.3%
Domestic	Heat & Power Generation	Combustion from Gas, Coal, Oil Fuels	9.2%	0.2%	6.3%	0.1%
Domestic	Biomass	Wood Burning	-	-	9.3%	0.0%
Resuspension			-	-	1.0%	0.7%
Miscellaneous			0.2%	0.0%	2.4%	0.8%
Transport	Road	Motorcycle	0.3%	0.3%	0.4%	0.5%
Transport	Road	Taxi	4.1%	7.4%	2.1%	6.5%
Transport	Road	Car - Petrol	4.3%	0.9%	6.4%	1.9%
Transport	Road	Car - Diesel	13.9%	4.0%	7.6%	2.7%
Transport	Road	Car - Electric	-	-	0.0%	0.0%
Transport	Road	Van / Minibus	9.6%	4.9%	5.3%	3.5%
Transport	Road	TfL Bus	17.2%	8.7%	3.5%	2.4%
Transport	Road	Non-TfL Bus and Coach	2.9%	4.6%	0.5%	0.8%
Transport	Road	HGV - Rigid	10.0%	6.2%	2.8%	1.9%
Transport	Road	HGV - Artic	2.0%	0.9%	0.5%	0.2%

Source: GLA [64]

Published quality standards underpinning this guidance identify four priority areas for action, as described below. [63]

- Quality statement 1: Local authorities identify in the Local Plan, local transport plan and other key strategies how they will address air pollution, including enabling zero- and low-emission travel and developing buildings and spaces to reduce exposure to air pollution.



- Quality statement 2: Local planning authorities assess proposals to minimise and mitigate road-traffic-related air pollution in planning applications for major developments.
- Quality statement 3: Public sector organisations reduce emissions from their vehicle fleets to address air pollution.
- Quality statement 4: Children, young people and adults with chronic respiratory or cardiovascular conditions are given advice at routine health appointments on what to do when outdoor air quality is poor.

Each of the four quality statements has a number of suggested indicators that can be used by local areas to monitor progress. These include measures such as mean particulate and NO<sub>2</sub> concentrations, levels of active or low/zero-emission journeys taken by local residents, rates of specific hospital attendances or admissions, as well as evidence drawn from key local documents.

NICE provides further guidance and information for a range of stakeholders around the implementation of NICE quality standards at a local level. [66]

Table 4 summarises key recommendations from the Royal College of Physicians (RCP) and Royal College of Paediatrics and Child Health (RCPCH) on reducing the health risks of poor air quality, at societal and individual level. This shares many of the recommendations covered by the NICE guidance described above.

Table 4: Air quality - recommendations from the RCP and RCPCH

Broad area	Summary of recommendations
Societal action	<ul style="list-style-type: none"> <li>● <b>Put the onus on polluters.</b> Political leaders at a local, national and European level must introduce tougher regulations, including reliable emissions testing for cars.</li> <li>● <b>Local authorities need to act to protect public health when air pollution levels are high.</b> When these limits are exceeded, local authorities must have the power to close or divert roads to reduce the volume of traffic, especially near schools.</li> <li>● <b>Monitor air pollution effectively.</b> Air pollution monitoring by central and local government must track exposure to harmful pollutants in major urban areas and near schools. These results should then be communicated proactively to the public in a clear way that everyone can understand.</li> <li>● <b>Quantify the relationship between indoor air pollution and health.</b> Understanding of the key risk factors and effects of poor air quality in our homes, schools and workplaces needs to be improved. A coordinated effort is required to develop and apply any necessary policy changes.</li> <li>● <b>Define the economic impact of air pollution.</b> Air pollution damages not only physical health, but also economic wellbeing. Further research needs to be conducted into the economic benefits of well-designed policies to tackle it.</li> <li>● <b>Lead by example within the NHS.</b> The health service must no longer be a major polluter; it must lead by example and set the benchmark for clean air and safe workplaces.</li> </ul>
Individual action	<ul style="list-style-type: none"> <li>● Use alternatives to car travel, preferably taking the 'active' option: bus, train, walking and cycling.</li> <li>● Aim for energy efficiency in homes.</li> <li>● Keep gas appliances and solid fuel burners in good repair.</li> <li>● Learn more about air quality and stay informed.</li> </ul>

Source: RCP, 2016 [10]

In March 2019, Public Health England (PHE) published an evidence review of a broad range of interventions aimed at improving outdoor air quality. Reviews of intervention evidence were conducted across five areas of potential action: vehicles and fuels; spatial planning; industry; agriculture; and behaviour change. This process highlighted the highly variable quality and quantity of the available research evidence relating to air quality interventions, with high quality evidence notably lacking across the areas of vehicle and fuel, spatial planning and behaviour change. Despite this, PHE was able to provide a number of recommended actions across the five areas, as well as a number of more general, cross-cutting approaches. They also identified seven general principles that can help to guide action on air quality at both the local and national level [67]:

1. Different air pollutants should be considered and tackled together
2. Local authorities need to work together

3. Effective strategies require a coherent approach
4. Everyone has a role to play
5. It is better to reduce air pollution at source than to mitigate the consequences
6. Improving air quality can go hand in hand with economic growth
7. As action is taken some groups may need particular support

While vegetation and tree planting is thought to have a positive impact on air quality, a review by NICE and a recent report prepared for Defra identified a lack of conclusive evidence, suggesting that the overall effect on urban air quality is likely to be low. [68] [63] Some planting approaches may in fact worsen air quality in the immediate vicinity. As such, approaches to planting should be considered at a local level, with a focus on species selection, placement and pruning schedules.

### *Approaches to reducing specific emissions*

Industrial standards for vehicle engines are based on international standards and, as such, there is little that can be done at local level to directly influence these. Older, more polluting vehicles can be retrofitted with either particulate or selective catalytic reduction filters, which can reduce levels of various emissions from anywhere between 20% and 90%. [69]

There is mixed evidence regarding the impact of low emission zones (LEZ) operating in a number of European cities in relation to levels of key pollutants. [70] [71] This may be related to the varying ways in which these schemes are implemented, monitored and enforced. The Greater London LEZ, implemented from 2008, has focused on heavy commercial vehicles. While there have been good levels of compliance, the impact on overall air pollution levels has been modest, with no discernible changes in NO<sub>x</sub> concentrations. [72]

Encouraging modal shift in transport also offers a key opportunity to reduce air pollution attributable to motorised vehicles, both in terms of exhaust emissions and particulate matter linked to tyre and brake wear. In a recent study, it was estimated that by taking necessary steps to meet the Government's Cycling and Walking Investment Strategy targets in England, more than 8,300 deaths attributed to air pollution could be prevented over ten years, and annual savings of £567m could be achieved for the national economy. This financial saving is five times that estimated over a 10 year period from implementation of the Government's Clean Air Zones in England. [73]

Open fires and wood-burning stoves have risen in popularity over recent years. While London has the lowest regional rate of domestic solid fuel burning in the UK, this is still the biggest contributor to particulate matter concentrations, accounting for up to 31% of the urban derived PM<sub>2.5</sub> in the capital. [74] [2] Education around fuel choice, stove efficiency and chimney maintenance are important in reducing emissions resulting from solid fuel burning. [3] Voluntary schemes, such as the Defra-backed 'Ready to Burn' scheme, aim to make it easier for consumers to purchase suitable fuel. [3] In 2022, new tougher emissions standards will come into effect for all new domestic stoves. [3]

### *Approaches to mitigate individual health risks from poor air quality*

Morbidity and mortality rise during air pollution incidents, and this justifies efforts to inform the public and groups at particular risk. Avoidance strategies should form an important part of any public education approach. [63]

Health and social care services have a key role to play in providing information directly to vulnerable people known to them, as well as a wider role in reducing their own emissions (see **Error! Reference source not found.** for a local example).

#### *Box 3: Case Study - Barts Health Action on Air Pollution*

The Barts Health *Action on Air Pollution: Collaboration and Public Health at Scale* project was a three year programme designed to take a comprehensive trust-wide approach to air quality. Alongside interventions to increase green space on trust sites, encourage modal shift and reduce fleet emissions, a number of the programme strands involved the delivery of patient interventions by clinicians and other healthcare staff.

Programme strand	Key deliverables
Warm and well	Community-based trust staff acted as trusted messengers to share key health messages with those most at risk of fuel poverty and in areas with high average domestic gas use.
Protecting patients	Clinicians and community staff were empowered to give their vulnerable patients practical advice on how to access key information around daily pollution levels, reduce their exposure and take action to protect themselves.
Waltham Forest pharmacies	10 pharmacists in Waltham Forest gave practical advice to patients in 'at risk' groups, and distributed 1,000 Cleaner Air packs to patients collecting certain medication.

The evaluation report of the programme identified that delivering messages relating to air quality via health care staff was up to 33% more effective than simply providing patients with relevant resources to consult themselves.

Source: Barts Health NHS Trust, 2016

Schemes such as airText provide free air quality forecasts by text, voicemail, twitter and an app. These resources allow members of the public to monitor local air quality, and to take appropriate steps to mitigate against the impacts of periods of high pollution levels. [75]

A 2014 evaluation of an air quality alert programme in Canada identified reductions in respiratory morbidity, but found impact on cardiovascular morbidity or mortality, or on respiratory mortality. [23] One relatively small study conducted in Wales did identify a near doubling of hospital admissions among patients with a range of long-term conditions who received air quality alerts over a two year period, with a four-fold



LOW	1-3	0	0	0	0	0	Enjoy usual outdoor activities	Enjoy usual outdoor activities
		-	-	-	-	-		
		2	1	5	3	2		
		0	0	0	5	6		
		0	0	0	5	6		
MODE -RATE	4-6	2	1			2	Adults and children with lung problems, and adults with heart problems, who experience symptoms, should consider reducing strenuous physical activity, particularly outdoors	Enjoy usual outdoor activities
		0	0	5	3	6		
		1	1	1	6	7		
		-	-	-	-	-		
		4	1	7	5	5		
0	6	5	3	3				
0	0			2				
HIGH	7-9	4	1			5	Adults and children with lung problems, and adults with heart problems, should reduce strenuous physical exertion, particularly outdoors, and particularly if they experience symptoms. People with asthma may need to use their reliever inhaler more often. Older people should also reduce physical exertion	Anyone experiencing discomfort such as sore eyes, cough or sore throat should consider reducing activity, particularly outdoors
		0	6	7	5	3		
		1	1	6	4	3		
		-	-	-	-	-		
		6	2	1	7	1		
0	4	0	0	0				
0	0	0		6				
VERY HIGH	10	6	2	1		1	Adults and children with lung problems, adults with heart problems, and older people, should avoid strenuous physical activity. People with asthma may find they need to use their reliever inhaler more often	Reduce physical exertion, particularly outdoors, especially if experiencing symptoms such as cough or sore throat
		0	4	0	7	0		
		1	1	1	1	6		
		+	+	+	+	5		
						+		

\* adults and children with heart or lung problems are at greater risk of symptoms - they should follow their doctor's advice

### 7.7.2 Air quality - indoor

NICE recently published guidelines on indoor air quality at home. [26] The scope of this guidance focuses on evidence of interventions to:

- change the structure of, ventilation of, and materials used in new and existing homes
- change people's knowledge, attitude and behaviour in relation to indoor air pollution.

Guidance produced by the City of London, as part of its CityAir programme, recommends the use of the European standard EN 13779 for indoor air quality. [81] The CityAir guide recommends that businesses and building operators should:

- ensure that air filters are regularly maintained and comply with EN 13779 (*It is a legal requirement to inspect all air conditioning systems with a rated output over 12kW at intervals not greater than five years*)
- install low energy two stage particle and gas filters for maximum effect and cost savings.

### *Reducing CO exposure*

Behaviour change programmes to reduce the risk of CO exposure in the home have been tested nationally, with a range of recommendations targeted at populations based on housing tenure. [16]

Locally, a 2013 study involving Hackney Homes found that the age and quality of gas cookers is a significant source of CO exposure in the home, alongside cooking practices. Recommendations developed as part of this work include replacement of gas with electric cookers, alongside education.

Fitting and maintenance of audible CO alarms remains a crucial and cost effective intervention to reduce the risk of deaths. [30]

Non-acute chronic exposure to CO can be detected as part of screening undertaken at antenatal and stop smoking clinics. [22]

### *Tackling poor housing conditions*

Schemes such as selective licensing aim to assure the quality of housing stock in the local private rental market, which may help to tackle some of the causes of poor quality accommodation linked to poor domestic indoor air quality (including damp). However, as the actions of occupants have a significant impact on indoor moisture levels, any intervention should also include awareness raising around the causes of dampness and the steps that can be taken to minimise its occurrence. [82]

Ventilation is an important factor in regulating exposure to indoor air pollution – modern energy efficient housing can have less ventilation, and otherwise vents can be poorly maintained or blocked. [83] [84]

Education can also play an important role – for example in encouraging opening windows and in using and maintaining carbon monoxide alarms. It is important to note that outdoor air pollution is a significant contributor to indoor air quality and, as such, the need for ventilation must be balanced with the potential for outdoor pollution to enter the home and worsen air quality, particularly during periods of very poor outdoor air quality.

### *Solid fuel burning*

Evidence for substantial exposure to indoor emissions from modern stoves is very limited. [85] The same methods of reducing outdoor air pollution attributed to domestic solid fuel burning (education around fuel and appliance choice, and appliance and chimney use and maintenance) will apply to reducing indoor air pollution from this source (see section 7.7.2).

### *Smokefree homes*

Environmental tobacco smoke (also known as second hand smoke) is an important source of indoor air pollution. Studies have shown that opening windows, smoking near extractor fans or restricting smoking to certain rooms within the home are ineffective at reducing exposure to secondhand smoke. [86]

A recently updated Cochrane review found that, while there are a small number of interventions which demonstrate a reduction in children's exposure to environmental

tobacco smoke and associated negative health outcomes, it was unclear as to what differentiated these interventions from those without evidence of effectiveness. [87] This can make it difficult to know how best to design and implement smokefree homes interventions to best effect.

Further information on environmental tobacco smoke can be found in the 'Smoking' section of the JSNA.

### *Regulation relating to indoor air quality*

Regulatory responsibility for indoor air quality is often unclear, leading to a general lack of standards in the UK compared to outdoor pollutants. Individuals, landlords, employers, manufacturers as well as local or national governments can take action to control exposure.

In the workplace, exposure to a range of airborne substances are regulated nationally under the Control of Substances Hazardous to Health Regulations (COSHH) 2002. This requires employers, including the self-employed, to control exposure to hazardous substances, including compliance with Workplace Exposure Limits (WELs) for relevant substances. [88] Sector specific COSHH guidance is provided by the Health and Safety Executive (see Table 6).

*Table 6: Industries with sector specific COSHH Guidance [89]*

<b>Industry</b>	<b>Examples of risks</b>
<b>Agriculture</b>	dusts, chemicals, diseases, toxic gases
<b>Baking</b>	dusts, enzymes, flavour concentrates, cleaning products
<b>Beauty</b>	products that cause skin irritation, allergies and asthma, acrylic fumes
<b>Catering</b>	products that cause dermatitis, skin allergies, asthma, fumes
<b>Cleaning</b>	products that cause dermatitis, allergies and asthma, corrosive products
<b>Engineering</b>	dusts, fumes, chemicals, germs in metalworking fluids
<b>Hairdressing</b>	products that cause dermatitis, allergies, asthma
<b>Printing</b>	products that can cause dermatitis, skin allergies and asthma, corrosive products, solvent vapours, ingredients that can cause damage to internal organs over a long period of time
<b>Motor vehicle repair</b>	paints, fuels, brake fluid, lubricants, degreasing fluids, cleaning products, welding and cutting fumes, dusts, battery acid
<b>Welding</b>	fumes, dust, chemicals, work in confined spaces, inert gases
<b>Woodworking</b>	dusts, adhesives, paints, stripping fluids, lubricants, disinfectants to treat water systems

### **7.7.3 Climate change**

The two major approaches to reducing the impact of climate change are 'mitigation' (preventing or reducing the effects of climate change) and 'adaptation' (building a

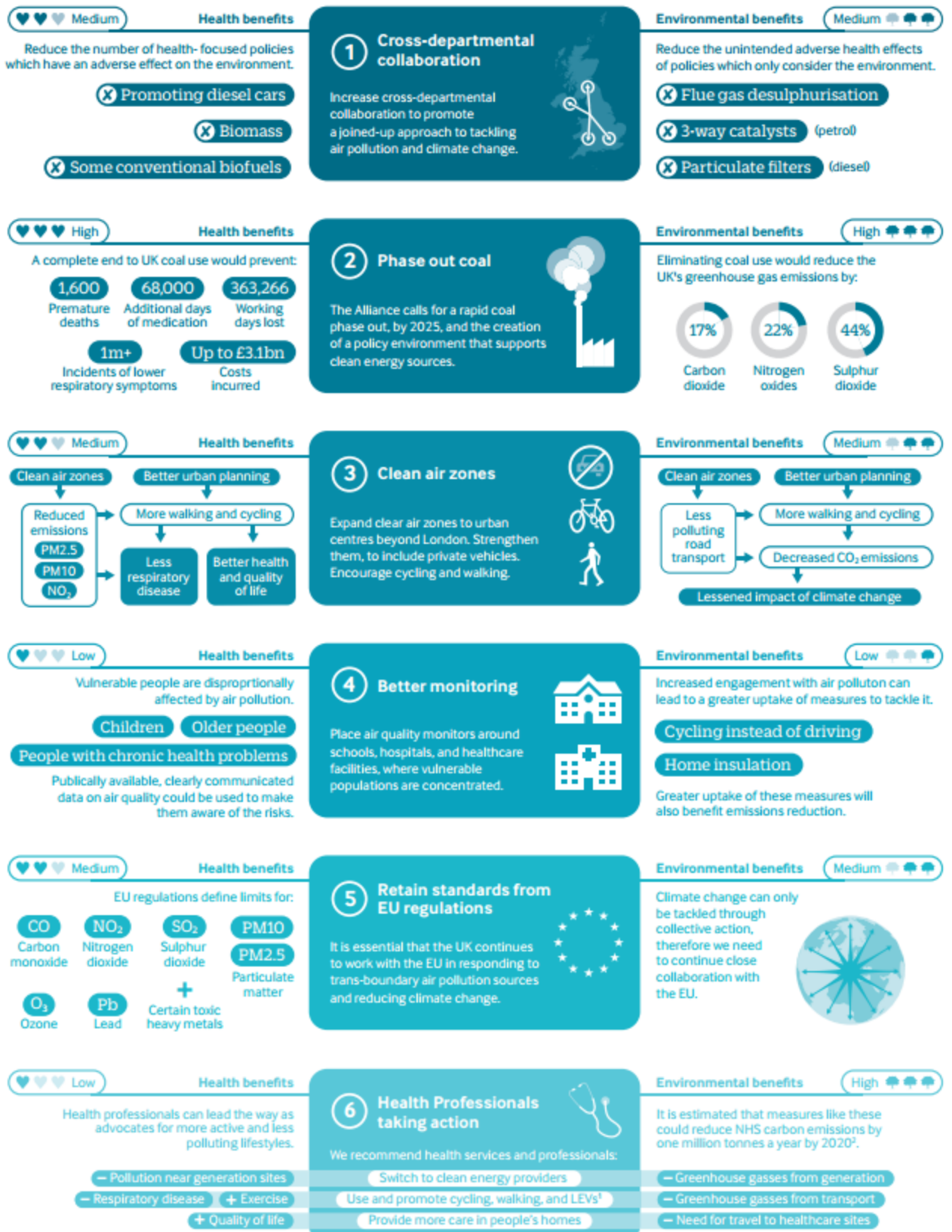


resilient societal response to the issue). A graphical summary of recommendations to improve air quality and tackle climate change, from the UK Health Alliance on Climate Change, is presented in Figure 28.

The rest of this subsection describes various recommendations from key publications on tackling the health effects of climate change, including a mixture of mitigation and adaptation measures. The overarching themes running through these various pieces of guidance include:

- a particular focus on vulnerable groups
- the importance of protecting health services and facilities
- taking action across government departments, agencies and sectors.

Figure 28: Summary of recommendations to tackle air pollution and climate change



<sup>1</sup> LEV = Low Emissions Vehicles (such as electric cars). <sup>2</sup> Securing Health Returns, NHS England, 15 June 2016.

In 2012, The Health Protection Agency (now incorporated into Public Health England) published guidance on tackling the health effects of climate change, as summarised in Table 7.

*Table 7: Tackling climate change [91]*

	Summary of recommendations
Temperature effects	<ul style="list-style-type: none"> <li>• Promotion of measures to avoid heat stress and dehydration during periods of hot weather.</li> <li>• Health care planning for hotter weather and heatwaves.</li> <li>• Focus climate change adaptation policies on vulnerable groups.</li> <li>• Additional advice for residents more likely to be affected by hot weather due to the urban heat island effect.</li> <li>• Promotion of affordable household interventions to maintain thermal comfort during periods of extreme heat and cold weather, particularly for the elderly.</li> <li>• Support for seasonal flu vaccination programmes.</li> </ul>
Air pollution	<ul style="list-style-type: none"> <li>• Strengthen warning systems based on air pollution forecasting, targeting high risk/vulnerable groups.</li> <li>• Raise public awareness of the adverse health effects of ground level ozone.</li> </ul>
Indoor environment	<ul style="list-style-type: none"> <li>• Improve understanding of current/emerging building infrastructure, and potential associations with climate-sensitive health impacts in the indoor environment.</li> <li>• Promote long-term, energy efficient building design to ensure adequate ventilation.</li> <li>• Vulnerability, health equity and cost-benefit analyses to be carried out for adaptation and mitigation interventions in the built and indoor environment.</li> <li>• Predict, monitor, prepare for emerging biological risks to health.</li> </ul>
Ultraviolet radiation	<ul style="list-style-type: none"> <li>• Appropriate and tailored messages relating to the risks/benefits of exposure to optical radiation from the sun.</li> <li>• Guidelines on how to optimise sun exposure protection.</li> <li>• Easy access to information to warn of increases in ultraviolet radiation exposure.</li> </ul>
Flooding	<ul style="list-style-type: none"> <li>• Effective surveillance and monitoring systems for floods.</li> <li>• Protect hospitals and health centres in flood risk zones and ensure continuity of health care services during floods.</li> <li>• Flood defences maintained to required standards. Sustainable planning should be undertaken to minimise the size of exposed populations.</li> <li>• Support/strengthen the inter-agency Natural Hazards Partnership, facilitating sharing of tools such as its Daily Hazard Assessments.</li> </ul>

As climate change is a global problem, many efforts to tackle it are taken at a global level and require international cooperation. However, local efforts to reduce climate change will yield additional health benefits. These efforts could include:

- steps to reduce local air pollution, particularly transport-related (see section 7.7.1)
- facilitating and promoting increased active travel (see the ‘Transport and Travel’ section of this JSNA chapter)
- schemes to improve home insulation and energy efficiency.

In 2016, the Town and Country Planning Association (TCPA) concluded that local authorities were failing to adopt appropriate climate change mitigation or adaptation strategies within their spatial planning approaches. [92] In response, they published ‘Planning for Climate Change: A Guide for Local Authorities’, which provides guidance to planners to ensure that climate change and its impacts are built into the Local Plan and other key strategies. [93]

In addition, the Joseph Rowntree Foundation has produced useful recommendations on how to incorporate social justice into climate change adaptations. [94] Although it is recognised that adaptation to climate change is not solely the responsibility of local authorities, the report contains local authority specific recommendations. The report urges a focus on vulnerabilities wider than just spatial vulnerabilities (e.g. those living in flood risk areas) and individual health effects (e.g. effects of temperature on older people), arguing for a broader conception around individuals’ ability to cope (e.g. socio-economic status and social capital). Recommendations for local authorities include:

- using mechanisms such as localism, neighbourhood planning and the Community Infrastructure Levy (charge on developers identified through the planning process) to enact ‘just adaptation’
- embedding just adaptation into service planning and corporate risk management (widening the focus from emergency planning)
- involving vulnerable communities in the design and delivery of services to ensure needs are met
- targeted adaptation where required.

A recent review of responses to the climate emergency by councils in the South West of England also makes useful recommendations. [95] In addition, the Lancet Countdown reports also provide a key source of information for health and other services. [96]

#### **7.7.4 Contaminated land**

As described previously, ‘contaminated land’ has a specific legal definition under Part 2A of the Environmental Protection Act 1990.

Under the Part 2A regime, once land has been designated as contaminated, steps must be taken by appropriate parties to:

- identify and remove unacceptable risks to human health and the environment
- seek to ensure that contaminated land is made suitable for its current use

- ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development. [97]

There is a large body of regional and national scientific and technical guidance on land contamination issues. This includes guidance on remediation techniques including risk assessment, options appraisal, implementation of remediation strategies, site characterisation and project management. [98]

There are three main ways to reduce or control unacceptable risks arising from land contamination, all of which aim to disrupt the pathway between the contamination source and receptors (i.e. people at risk as a result of exposure to contaminated land or water) [99]:

1. remove or treat the (source) of pollutant(s) - for example, excavation and removal of the source of contamination and/or contaminated soil or water, or treatment of the contaminant and/or contaminated soil or water
2. remove or modify the pathway(s) - for example, preventing further contamination of surrounding soils by constructing a physical barrier around the contamination source
3. remove or modify the behaviour of receptor(s) - for example, changing the land use or restricting access to land.

Within each of these categories, there are a range of different methods which may be employed, and it may be necessary to utilise a number of different approaches to sufficiently remediate risk on a single site.

Consideration of flooding is an important part of contaminated land management, as some contaminants can be transported by flood waters, creating diffuse soil contamination over a potentially large area.

Public health advice on contaminated sites focuses on promoting sensible measures to minimise contact with soil. PHE has produced a number of key messages which can be shared with the public in situations where land contamination is suspected, as summarised in Box 4.

*Box 4: Key public messages relating to contaminated land [100]*

- Reduce dust in your garden or allotment by covering bare soil with ground cover, compost, bark or mulch, or planting, to reduce the impact of air-borne contamination.
- Wear gloves when gardening. If you have cuts or sores, be especially attentive to avoiding any direct contact with the soil.
- Follow normal hygiene precautions and wash hands thoroughly after working or playing in the garden or allotment and before handling food, drinking or smoking.
- Remove and clean your outdoor gardening shoes before entering your home; indoor dust may become contaminated if you don't wipe your feet or take off your shoes.
- Talk to your local authority before undertaking building works. Don't dig holes for building works without talking to your local authority first.
- Thoroughly wash any vegetables or fruit grown in potentially contaminated soil, or peel if appropriate. If possible, grow fruit and vegetables in separate containers of clean (imported) soil, or incorporate clean soil and organic matter into the planting site to dilute any contamination.
- Closely supervise any children playing in the garden, to ensure that they don't play with the soil or put it in their mouths.
- Avoid taking used garden tools, gloves or shoes into your home or car before cleaning them.
- Stop children from biting their nails.
- Prevent pets from digging holes in your allotment or garden.
- 

**7.7.5 Noise**

WHO have produced guidelines for addressing community noise (and also specifically on night-time noise) which set parameters for various sources of noise at which health effects become apparent, alongside examples of policies which can mitigate the effects. These guidelines are summarised in Box 5.

*Box 5: Summary of WHO guidelines on reducing harms from noise[28, 29]*

- Human exposure to noise should be monitored.
- Noise mitigation procedures should take into consideration specific environments such as schools, playgrounds, homes and hospitals; environments with multiple noise sources, or which may amplify the effects of noise; sensitive time periods, such as evenings, nights and holidays; and groups at high risk, such as children and the hearing impaired.
- Noise consequences should be considered when making decisions on transport systems and land-use planning.
- Surveillance systems should be introduced for noise-related adverse health effects.
- Effectiveness of noise policies should be assessed in reducing noise exposure and related adverse health effects, and in improving supportive 'soundscapes'.
- Precautionary actions should be adopted for sustainable development of acoustical environments.

WHO recommend that average noise should be less than 30dB in bedrooms during sleep, and less than 35dB in classrooms. [49] Average night time noise levels are recommended not to exceed 40dB. [56] Employers are legally required to provide protection at average exposure levels of 85dB under the 2005 Control of Noise at Work Regulations

Environmental noise tends to be typically separated into three main categories: industrial noise; transport noise; and neighbourhood noise. Guidelines to minimise the impact of each of these sources are discussed in turn below.

- *Industrial noise*

Industrial noise minimisation tends to focus on the impact of associated noise on both site workers and members of the public in the vicinity. Actions to protect workers range from taking steps to eliminate unnecessary sources of noise or reducing the level of noise produced (for example, using less noisy construction techniques or using quieter machinery), to providing workers with appropriate personal protective equipment. [101] Many of these measures will also impact the noise exposure of the general public, complemented with additional measures such as sound reducing hoarding and limits on construction hours.

Local authorities can also require a Noise Impact Assessment to be completed before any large development projects take place, to ensure that the level of noise arising both during the construction period and once the development is completed are within acceptable limits.

- *Transport noise*

Activities to encourage a reduction in car use may be less effective than might be expected at tackling traffic noise, as heavy vehicle noise tends to mask the sound of smaller vehicles. Even in areas of low heavy vehicle use, it is estimated that a reduction in traffic volume of at least 40% would be required to make a perceivable reduction in noise. [102]

As such, action to tackle heavy vehicles (including lorries and buses) may be more effective in reducing motor vehicle noise.

Other ways to reduce transport related noise include: [102]

- technological improvements to vehicles and aircraft aimed at reducing associated noise
- improvements in infrastructure, such as low noise road surfaces and railway tracks
- traffic management techniques, including lower speed limits and traffic calming
- restrictions on use of very noisy vehicle use during certain hours, such as preventing aircraft from flying during the night
- utilising noise barriers and improved soundproofing to improve mitigation of sources of traffic noise
- urban planning and soundscaping to minimise the impact of transport noise on new developments.

Physical barriers are often employed to minimise noise from both transport and industry. While the most effective barriers can reduce noise by up to 10 dB, the level

of noise reduction is influenced by a range of factors, including the barrier's height, length, design, position, and composition. [103]

While more attractive than other forms of physical barrier, the sound absorbing properties of vegetation barriers are poor in comparison with other materials, and again are influenced by a range of factors including planting and foliage density and species selection. [103] [104]

Noise barriers may also interfere with local air circulation, which may negatively impact local air quality, and also obstruct views. [103]

- *Neighbourhood noise*

Neighbourhood (or community) noise is managed by local authorities, which have powers under the Environmental Protection Act 1990 to issue formal Abatement Notices in cases where noise is deemed to be a 'statutory nuisance'. Continued nuisance noise after an Abatement Notice may result in prosecution.

## 7.8 Services and support available locally

Hackney Council's Draft Local Plan 2033 emphasises that environmental sustainability forms a key part of future plans for the borough's development. The document includes chapters dedicated to improving accessibility and promoting sustainable transport, green and public space, and climate change. [105] The City of London Sustainability Policy builds on the principle of building a strong economy while equally respecting the limits of the planet's resources. [106]

The City of London Corporation is also in the process of revising its Local Plan - a draft document is entitled City Plan 2036. The current plan, adopted in 2015, includes sections on sustainable development and climate change; public transport, streets and walkways; waste; flood risk; and open spaces and recreation.

### 7.8.1 Air quality - outdoor

Published in January 2019, the national Clean Air Strategy lays out the Government's long-term plans to tackle poor air quality in England. [3]

The strategy considers actions that will need to be taken at both the national and local level. It sets out the national Government's commitments to reductions across five key pollutants by 2020 and 2030. A particular local action of note is the creation and enforcement of Clean Air Zones by local authorities (building on the 2017 Clean Air Zone Framework for England published in 2017). This includes committing a £275 million Implementation Fund to enable local authorities to take the necessary action to improve air quality, and a £220 million Clean Air Fund to help them to minimise the impact of their local plans on individuals and businesses.

Under the Environment Act 1995 and subsequent regulations, local authorities are required to review and assess the air quality in their area. Delivering against this requires local monitoring of air quality and levels of specific pollutants. The London Local Air Quality Management (LLAQM) system also requires local authorities with



air pollution concentrations exceeding national targets to designate an Air Quality Management Area (AQMA), and develop an Air Quality Action Plan (AQAP) with measures to address the issue. Currently all 32 local authorities in London have designated AQMA areas – this includes all of both Hackney and the City.

The findings of air quality monitoring in both Hackney and the City are made publicly available in annual status reports. [107] [108]

Hackney Council is tackling outdoor air pollution in the borough by:

- monitoring local air quality against national air quality objectives
- declaring AQMAs, and producing and implementing an air quality action plan to reduce air pollution levels (see below)
- controlling industrial pollution
- investigating and stopping air quality nuisance and idling vehicles.

In Hackney, the source of most poor air quality is vehicular traffic on the Transport for London (TfL)-controlled road network. However, there are also a number of roads in the borough with poor air quality that are used as ‘rat runs’,<sup>1</sup> which the council is addressing by extending the ‘filtered permeability network’ that restricts through traffic but facilitates safer cycling and walking. Reducing the amount of parking and reducing traffic flows also helps to improve air quality, reduce traffic casualties and make neighbourhoods more pleasant places to walk, play and cycle.

Table 8 describes Hackney’s current Air Quality Action Plan – a new plan will be published in 2020.

Key actions in the City of London’s latest Air Quality Strategy are described in Table 9.

The City of London Corporation uses a range of methods to inform businesses, workers and residents about air pollution (including social media, a bi-monthly e-newsletter, and the Corporation’s website). The Corporation’s free smartphone app, ‘CityAir’, provides advice to users when pollution levels are high or very high (see Box 6). The app includes a map showing current pollution levels and has a function to guide users along low pollution routes. There have been over 27,000 downloads of the app to date.

Additional initiatives are described below.

- The City Corporation worked with Barts Health NHS Trust on their *Action on Air Pollution* programme (see Box 3). The City Corporation has also worked with the Trust on idling engine awareness for their drivers.
- Following the success of the award-winning action taken at Sir John Cass’s Foundation Primary School (approaches include monitoring, planting, and filtration) specific action plans are being developed for other City schools.
- No engine idling action days, where staff and volunteers speak to drivers with a view to changing their behaviour. This model has been rolled out to 25 additional London Boroughs with the support of the Mayor of London.

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<sup>1</sup> Rat runs describe minor, typically residential streets used by drivers during peak periods to avoid congestion on main roads



Table 8: Hackney's Air Quality Action Plan 2015-2019 [32]

Area	Summary of action
<b>Policy 1:</b> Air quality and development management	<ul style="list-style-type: none"> <li>● Ensure that air quality issues are being appropriately dealt with through the planning system.</li> <li>● Develop appropriate development management policies, supplementary planning guidance (SPG) and technical planning guidance for air quality issues.</li> <li>● Ensure that Section 106 and Community Infrastructure Levy (CIL) money is being sought and made available for air quality related work.</li> </ul>
<b>Policy 2:</b> Actions to improve air quality	<ul style="list-style-type: none"> <li>● Deliver a Zero Emissions Network project in Shoreditch.</li> <li>● Enhance the borough's air quality monitoring network.</li> <li>● Undertake a detailed review and produce a plan to further develop cycling and walking in the borough.</li> <li>● Review of zero emission vehicle last mile deliveries in the borough.</li> <li>● Consideration of dust reduction techniques to ensure EU air quality objectives are met.</li> <li>● Deliver a taxi anti-idling initiative targeting idling hotspots.</li> <li>● Reduce air pollution levels at key junctions in the borough by exploring options and working with TfL to trial options/technologies.</li> <li>● Further incorporate air quality considerations into parking charges.</li> <li>● Lobby the Mayor of London, TfL and central government to reduce pollution over which the council has little or no control.</li> </ul>
<b>Policy 3:</b> Actions to reduce the health impacts of air quality	<ul style="list-style-type: none"> <li>● Incorporate air quality into the joint Health and Wellbeing Strategy.</li> <li>● Promote airTEXT (see Box 6 below) and campaign days to the most vulnerable residents, businesses and visitors.</li> <li>● Trial a project to improve air quality around schools and understanding about air quality.</li> <li>● Undertake air quality impact assessments of schools in areas of poor air quality and start to implement recommendations to reduce child exposure to air pollution.</li> <li>● Deliver a cycling and walking campaign to businesses and residents in the borough.</li> </ul>
<b>Policy 4:</b> Actions to reduce the council's own impacts on air quality	<ul style="list-style-type: none"> <li>● Develop and introduce a staff travel options 'hierarchy', providing clear guidelines on how staff should travel during work hours which will prioritise active forms of travel.</li> <li>● Set up a staff pool bike scheme for Hackney Service Centre and other offices.</li> <li>● Recruit staff cycling champions to promote benefits of cycling to staff.</li> <li>● Survey the council fleet with the aim of making Hackney's fleets one of the greenest in London.</li> <li>● Assess whether introducing telematics systems has reduced air pollution.</li> <li>● Introduce minimum standards for nitrogen dioxide emissions from council boilers, Combined Heat and Power (CHP) plants, gas engines etc.</li> <li>● Conduct a feasibility study to insulate and install alternative technologies on council buildings in areas of worst air quality.</li> <li>● Develop the council's green procurement strategy to include air quality and review of key council contracts.</li> </ul>

*Table 9: Actions from the City of London's Air Quality Action Plan 2019-2025 [33]*

Area	High level action
<b>Policy 1:</b> Air quality monitoring	The City Corporation will monitor air pollutants to assess compliance with Air Quality Limit Values and WHO guidelines. Data will also be used to support research, evaluate the effectiveness of policies to improve air quality and to provide alerts when pollution levels are high.
<b>Policy 2:</b> Leading by Example	The City Corporation will seek opportunities to influence air quality policy across London and lead by example to improve local air quality and reduce exposure to air pollution.
<b>Policy 3:</b> Collaborating with Others	The City Corporation will work with a wide range of external organisations on air quality policy and action in order to improve air quality in the Square Mile and across London.
<b>Policy 4:</b> Reducing Emissions from Road Transport	The City Corporation will implement a range of measures to reduce emissions of air pollutants associated with road traffic in the Square Mile.
<b>Policy 5:</b> Reducing Emissions from Non-Transport Sources	The City Corporation will take a range of action to significantly reduce emissions associated with non-transport sources in the Square Mile.
<b>Policy 6:</b> Public Health and Raising Awareness	The City Corporation will continue to raise awareness about air pollution and provide information on how to reduce exposure to pollution.

The City of London also adopted an Air Quality Supplementary Planning Document (SPD) in July 2017, the aims of which are to provide guidance on:

- measures that can be implemented to mitigate the potentially harmful impacts of new and upgraded developments on air quality
- the requirements of air quality impact assessments and the circumstances under which these will be required
- the use of the CIL, planning conditions and Section 106 obligations to improve air quality.

*Box 6: Case study – airTEXT and CityAir*

airTEXT is a service commissioned by London local authorities (including Hackney and the City) that sends a warning by text, voicemail or email if air pollution levels are expected to reach moderate, high or very high levels.

airTEXT alerts are particularly useful for anyone who is at particular risk of harm from air pollution, including:

- people suffering from asthma, bronchitis, heart problems or similar diseases
- elderly people
- children.

Air pollution affects everyone, even healthy and fit individuals may notice the effects. airTEXT is therefore an invaluable tool for everyone, especially if the user:

- cycles, runs or walks to work
- exercises outside
- spends a lot of time outdoors.

The airTEXT website provides detailed health advice, which identifies the types of health effects users may notice during moderate, high and very high air pollution events, and also lets users know what they can do to minimise their exposure.

airTEXT provides differentiated advice for those people at particular risk of the effects of poor air quality, as well as guidance for the general public. It also has a searchable and interactive map of London, which allows users to view predicted air pollution levels anywhere across the capital.

The CityAir app has the added functionality of being able to find a low pollution route between two points anywhere in London. Users can sign up as a different user (e.g. a pedestrian, jogger or vulnerable person) and receive tailored messages. The app also recommends action to reduce personal exposure and contains a map of current pollution levels.

*Box 7: Case Study – Working with the business community – ZEN*

The Zero Emissions Network (ZEN) is an innovative business liaison and behaviour change project tackling air pollution in London's City fringe area (Shoreditch, Spitalfields and Clerkenwell). This area has been chosen because the busy day and night-time economies have resulted in high levels of pollution here.

The project is managed jointly by the London Boroughs of Hackney, Islington and Tower Hamlets, demonstrating the fact that air quality is a cross borough issue that can be most effectively addressed through collaborative working.

The project concentrates on recruiting businesses to the network and encouraging them to reduce their emissions from transport, energy and waste. The project has exceeded its targets, with hundreds of local businesses signed up to the network and many pollution-reducing measures in place - from switching vans to cargo bikes, to carrying out energy and waste audits of business premises.

From September 2018, restrictions came into force to ensure that only ultra low emission compliant vehicles will be able to use nine streets in Shoreditch during peak hours, continuing to encourage a shift toward low emission transport methods in the most polluted parts of Hackney.

### 7.8.2 Air quality - indoor

There are few local interventions specifically targeted to protect and improve indoor air quality. However, a range of measures across Hackney and the City, particularly those focused on improving housing energy efficiency and warmth, are likely to yield indirect improvements in indoor air quality.

Specific examples are provided below.

- Seasonal Health Intervention Network (SHINE) – a service for vulnerable residents which provides advice on affordable energy, housing services and health and wellbeing, plus assessment for eligibility to entitlements.
- Hackney free energy advice line, through which any resident can get advice on topics such as home insulation or draft proofing, and other tips to save money on energy bills.
- Engaging with the Energy Company Obligation (ECO) funding scheme, working with energy providers to support energy saving improvements for vulnerable residents living in private accommodation.
- Offering heating and condensation surveys for council tenants, and ensuring that action is taken by private sector landlords to address damp and cold conditions in rented accommodation.

Free gas safety checks are carried out in all Hackney council properties, and there is a programme in place to install carbon monoxide detectors for all tenants. [109] All newly built or refurbished Hackney Council properties are also fitted with gas fired boilers which meet minimum emissions standards, and the City of London requires these standards to be met in all new commercial developments.

Health surveillance is a particular requirement of local employers under COSHH Regulations, with guidance on this responsibility available from the Health and Safety Executive (HSE). [88]

### 7.8.3 Climate change

Local authorities with housing responsibilities have a duty under the Home Energy Conservation Act 1995 (HECA) to produce a plan detailing energy efficiencies they will undertake. [34] Hackney's HECA details priorities and measures being taken to improve energy efficiency locally. [35] These include:

- SHINE service (see section 7.8.2)
- ECO funded initiatives
- Feed-in Tariff (FiT) payments to encourage and assist residents, landlords and housing providers to install renewable technologies that reduce their reliance on grid based electricity
- Renewable Heat Incentive (RHI) - encouraging and assisting residents, landlords and housing providers to install renewable technologies that reduce their reliance on mains gas
- decentralised energy and combined heat and power boiler systems, that produce both heating and electricity
- Zero Carbon Homes standards for all new build homes
- use of Energy Performance Certificate (EPC) data to ascertain the energy efficiency rating of residential accommodation to aid targeting of resources
- stock modelling of private sector housing to enable better targeting of resources to make energy efficiency improvements
- use of Housing Health and Safety Rating System (HHSRS) to protect tenants from Category 1 hazards including excess cold, excess heat and excess damp and condensation (see also 'Housing and homelessness' section of this JSNA chapter)
- support understanding of rights and obligations under the new private rented sector Energy Efficiency Regulation among tenants and landlords
- solid wall improvements in social housing blocks where funding is available
- cavity wall improvements where funding is available
- loft improvements to communal 'open' lofts in identified social housing blocks
- working with other key social housing partners through the Better Homes Partnership to influence improvements in energy efficiency
- energy advice line - providing domestic energy advice
- improving energy efficiency standards in the private rented sector, owner occupied housing and registered provider housing
- smart metres implementation by 2020
- estate-based delivery of energy efficiency improvements in residential accommodation.

Hackney Council also implements a raft of other measures in a number of areas which contribute to work towards protecting against and reducing the health effects of climate change, including:

- sustainable transport (for more information, see the 'Transport' section of this JSNA chapter)

- SPD on sustainable design and construction - including measures to increase energy efficiency, decrease water consumption, increase the use of urban greening techniques and minimise waste
- increasing levels of recycling and reuse in the borough, as well as minimising and treating food waste
- reducing energy use in the council's own buildings and within its own fleet.

Hackney Council is also moving toward obtaining 50% of its electricity from renewable sources. This includes plans to set up a publicly owned energy company which will develop rooftop solar energy sources, among other approaches.

The City of London's HECA also outlines a range of planned initiatives, including:

- ECO funded initiatives
- SHINE service (see section 7.8.2) for residents of City of London housing stock
- central heating callbacks programme - putting gas central heating into flats with no or inadequate heating
- proactive maintenance and upkeep of council properties - including checking boiler energy and operational efficiency, replacing broken light fittings with energy efficient bulbs, draught-proofing of windows and doors and installing secondary glazing
- encouraging contractors to adopt energy efficient approaches - such as requiring submission of monthly reports on steps taken to reduce energy usage, and setting targets to improve their energy efficiency.

The City Corporation has identified positive environmental outcomes as a key part of its corporate strategy over 2018-2023, and it has set out a process toward getting to zero carbon emissions. [110]

In the NHS, City and Hackney Clinical Commissioning Group's annual report for 2017-18 outlines the policies being pursued by local NHS commissioners to reduce carbon emissions across NHS services. [111] Homerton University Hospital trust has agreed a Carbon Management Strategy and Plan – it was the first hospital in the country to win the Eden Project's 'Planet Mark' award which recognised a range of policies, including publishing a detailed carbon footprint. The environmental policies of the other main local secondary care provider, Barts Health, have also been recognised by the HSJ Award 'Improving environmental and social sustainability'.

#### **7.8.4 Contaminated land**

Hackney Council is committed to enforcing relevant legislation relating to contaminated land, by:

- publishing a contaminated land strategy, which outlines how to identify contaminated sites in the vicinity of contaminated land
- carrying out inspections of land that may be contaminated
- identifying those responsible for the clean-up of affected sites
- keeping a public register of contaminated land sites.



Steps have been taken to improve the accessibility of information regarding the location of contaminated land sites within Hackney. The MapHackney tool allows interested parties to identify areas of confirmed or suspected land contamination.<sup>2</sup>

Although the City of London has no classified contaminated land sites (under Part 2A of the Environmental Protection Act 1990), the Corporation has made available via its online mapping platform information on local sites of historic land use and war damaged sites, which may be relevant to potential land contamination.<sup>3</sup> This mapping tool also provides access to contaminated land reports submitted as part of the planning process.

### 7.8.5 Noise

The City's Local Plan includes policies on protection from excessive noise and pays regard to acoustic design to create tranquil space and minimise noise. [113] Hackney's draft Local Plan (2033) includes a commitment to ensuring that construction-related noise is sufficiently considered and mitigated against prior to planning agreement being granted for new developments. [105]

As enforcing authorities under the Environmental Protection Act 1990, both the City of London Corporation and Hackney Council have a duty to investigate and manage noise complaints from residents.

Local authority Pollution Control Teams can help residents who are experiencing problems with a range of noise complaints, including noise arising from construction sites, street works, bars and clubs, air conditioning, servicing of commercial premises, and audible intruder and vehicle alarms.

The Hackney Pollution Control Team can be contacted out of hours during the evenings Thursday to Sunday, while the City of London provides a 24/7 out of hours support service.

If the noise is deemed to be a nuisance (as defined under the Environmental Protection Act 1990), local authorities can issue a noise abatement notice to prevent a recurrence. If noise abatement notices are not adhered to, local authorities have the power to issue a fixed penalty notice, to proceed with prosecution, or to seize any equipment responsible for the nuisance noise.

Many complaints do not meet the definition of 'nuisance noise', and in these cases Pollution Control Teams can provide the public with advice about trying to resolve the issue independently.

The City's Noise Strategy was published in 2016. [113] This brings together a number of different measures to maintain or improve the City's noise environment. It addresses new developments, transport and street works, dealing with complaints and incidents, and protecting and enhancing the acoustic environment and soundscape. It is hoped that the plan will contribute to the health and wellbeing of

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<sup>2</sup> <http://www.map.hackney.gov.uk/LBHackneymap/>

<sup>3</sup> <http://www.mapping.cityoflondon.gov.uk/geocortex/mapping/?viewer=compass>

the City's communities and support businesses, by carefully balancing the mitigation and minimisation of noise and noise impacts with the need to improve and update City infrastructure.

## 7.9 Challenges and opportunities

Hackney and the City of London are both AQMAs. The City published its latest local Air Quality Action plan in 2019, and Hackney will be publishing a new plan in 2020.

In March 2015, the Mayor of London and TfL confirmed they would proceed with the introduction of the world's first Ultra Low Emission Zone (ULEZ) in central London, which came into effect on 8 April 2019. The area covered includes the City of London and part of Hackney. The ULEZ replaced the previous T-Charge emissions surcharge, placing more stringent emissions standards on vehicles travelling within the central London congestion zone. Following public consultation, the Mayor of London has confirmed that the ULEZ will be expanded to cover the areas within the North and South circular roads from October 2021 – the whole of Hackney will then be covered. Modelling suggests that this intervention will improve health and reduce health inequalities across London. [114]

London Borough of Hackney has also sought to take the ULEZ concept further, by implementing Low Emissions Neighbourhoods (LENs), to complement the existing ZEN project that works with businesses in the Shoreditch Area (see

*Box 7).* The City of London is also establishing a LEN, in the area around the Barbican, to support and encourage zero emission vehicles. This includes a proposal for a ZEN to support City businesses.

There are still considerable gaps in our understanding of the specific effects of individual pollutants, particularly indoors. New health impacts associated with pollutants continue to be discovered, and this may increase the importance of future action taken to reduce the impact.

Much of the UK's environmental law derives from EU directives and requires clarification as the Brexit process is completed; concerns have been raised that the pressure on the national government to reduce air pollution may decline. [115] This, along with ongoing budgetary constraints following the 2010 global banking crisis, creates uncertainty about the continuation of key protections and policy at the national level.

Hackney Council is currently developing a new Environmental Sustainability strategy, which will have overarching implications across the breadth of topics considered in this chapter. This new strategy will draw on local, regional, national and international policy drivers to deliver a more comprehensive approach to tackling a range of environmental concerns. This will include development of a new Green Spaces strategy and Local Biodiversity Action Plan during 2020.

The priorities of the strategy will be to:

1. reduce the borough's carbon emissions
2. improve local resilience in response to the climate emergency
3. promote active travel and mass public transit in the borough
4. reduce waste and promote the circular economy
5. reduce and remove pollution.

In 2019, Hackney was among a large number of councils who declared a climate emergency. While it is understood that it's a global problem, and local actions taken in Hackney and the City are only part of the solution, it is likely to be an increasing focus of local action in coming years. A number of opportunities and challenges for local action to increase energy efficiency are listed in Table 10.

Table 10: Opportunities and challenges in increasing energy efficiency locally

	Opportunity	Challenge
General	Although there are relatively low levels of local CO2 emissions this could be reduced further.	Uncertainty about future government policy and funding initiatives (e.g. Green Deal has been withdrawn). Pace of change needed to make impact on national/London target promises.
Domestic	<p>Large number of buildings that can be improved</p> <p>Opportunity to increase the proportion of decentralised energy infrastructure based on development interest and cross borough working.</p> <p>Ongoing improvements to the council's existing social housing stock.</p> <p>Opportunity to improve insulation in high numbers of domestic lofts</p> <p>Using momentum created by new private rented sector energy efficiency regulations to improve energy efficiency standards.</p> <p>Increase uptake of energy efficiency measures in fuel poor households through more focused action to target households living in fuel poverty, based on improved targeting data.</p> <p>Increase use of renewable technology on council and housing association properties for the benefit of residents</p>	<p>Developing effective business cases to enable more strategic area wide improvements.</p> <p>Number of flats locally is very high and hence harder to retrofit on an individual basis for things like solid wall insulation.</p> <p>High proportion of 'hard to treat' walls (older historic property which would need solid wall insulation to make a significant impact).</p> <p>Number of properties in conservation areas as well as tight local planning standards and large proportion of historic property.</p> <p>High costs of installing energy efficiency measures</p> <p>A high and increasing proportion of residents live in the private rented sector and the sector is also highly fragmented (i.e. very few major landlords with multiple properties to engage).</p> <p>Low levels of owner occupation to create initial momentum.</p> <p>Lack of central government funding programmes for retrofit.</p> <p>Energy efficiency contractor delivery market is dependent on availability of grant funding for domestic level market due to long payback periods</p> <p>To enable better targeting of renewable technologies, there is a need to improve data available.</p>
Workspace	<p>Supporting the large number of small and medium sized enterprises to improve energy efficiency.</p> <p>Reduce the number of council buildings to improve energy efficiency for rental in the private market.</p>	<p>Landlords and tenants lack incentives and support to improve energy efficiency.</p> <p>Likely loss of EU funded business support programmes following Brexit.</p>

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