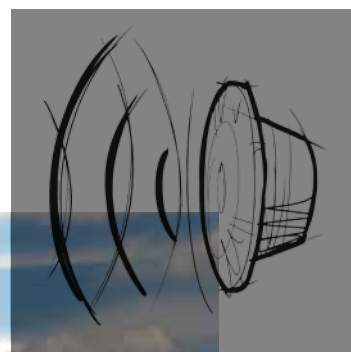


Good Growth, Quiet Buildings

Exploring the impact of noise in a growing city and solutions in the built environment



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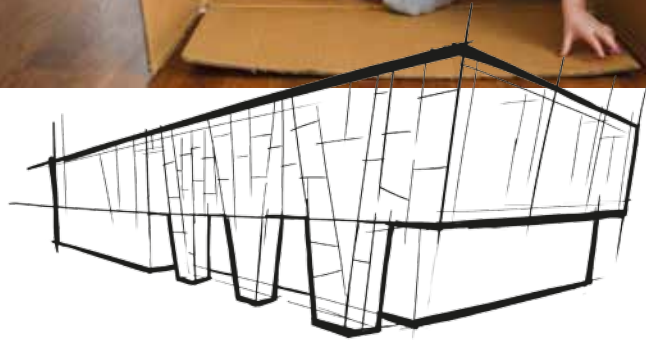
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Noise and its consequences

Introduction

Urbanisation is a global mega trend, with three million people a week moving to urban environments¹. In the UK alone, cities take up 8% of the land whilst accounting for 54% of the population, 60% of jobs and 62% of all exports².

Many factors contribute to the draw of urban living, including access to work as well as social and cultural amenities. However, city living also has its drawbacks, with noise being a common issue. Yet whilst this is often seen simply as a nuisance compared to well-documented health risks such as pollution, the implications for our health, productivity and educational attainment, as well as a city's attractiveness, are real.

This report draws together existing evidence on the impact of noise and highlights why current building regulations and planning requirements are not geared up to address the noise we experience in our cities - especially with the growth of high density, mixed-use sites coupled with a 24-hour economy.

However, with readily available solutions for the built environment and untapped consumer demand for quietness, we suggest the answer lies in incorporating noise into the core design process at the outset of any development.



What is noise and why is it a problem?

Physically, there is no distinction between sound and noise - in fact, noise is best defined as unwanted sound³. Noise is also highly contextual and our experience of it is affected by different factors such as volume, frequency and pitch, as well as how much control we have over it.

Noise becomes particularly problematic when it disturbs important activities such as sleep, learning and work. For example, World Health Organisation (WHO) guidelines recommend less than 30 A-weighted decibels (dB(A)) of noise in bedrooms and less than 40dB(A) outside of bedrooms for good quality sleep, and less than 35dB(A) in classrooms to support teaching and learning conditions, which is significantly lower than in many urban locations.

Those exposed to night noise levels above 40dB on average suffer sleep disturbance and awakenings, whilst exposure above 55dB may lead to elevated blood pressure and ischaemic heart disease⁴. Studies have also found that the risk of heart disease increases for people exposed to 55-60dBA of road traffic noise⁵.

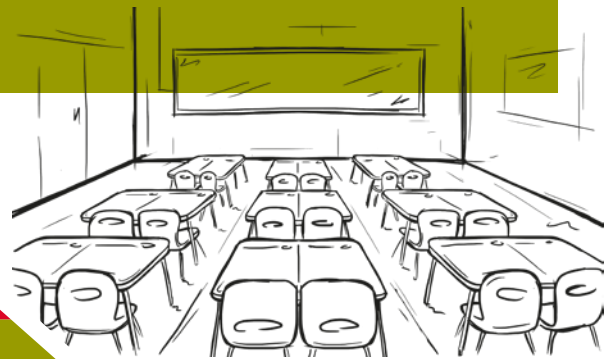
In fact, a WHO study found that at least one million healthy life years are lost every year in Western Europe as result of exposure to environmental noise⁶.

This means that noise is the second largest environmental cause of ill health, after air pollution⁷. Furthermore, a UK study showed that exposure to noise above recommended levels resulted in an additional 1169 cases of dementia, 788 cases of stroke and 542 cases of heart attack in a single year⁸.

Evidence also points to an impact in education settings. For example, a study of British primary school children showed that an increase in transport noise of 5dB led to a two month reading delay. Similar effects have been observed in the Netherlands⁹. Relatively little focus has been paid to the effects of noise on children at home as opposed to at school, but one German study recently found that higher levels of road traffic noise at home were associated with hyperactivity, inattention, and emotional problems. It also suggested a link with sleeping problems¹⁰.

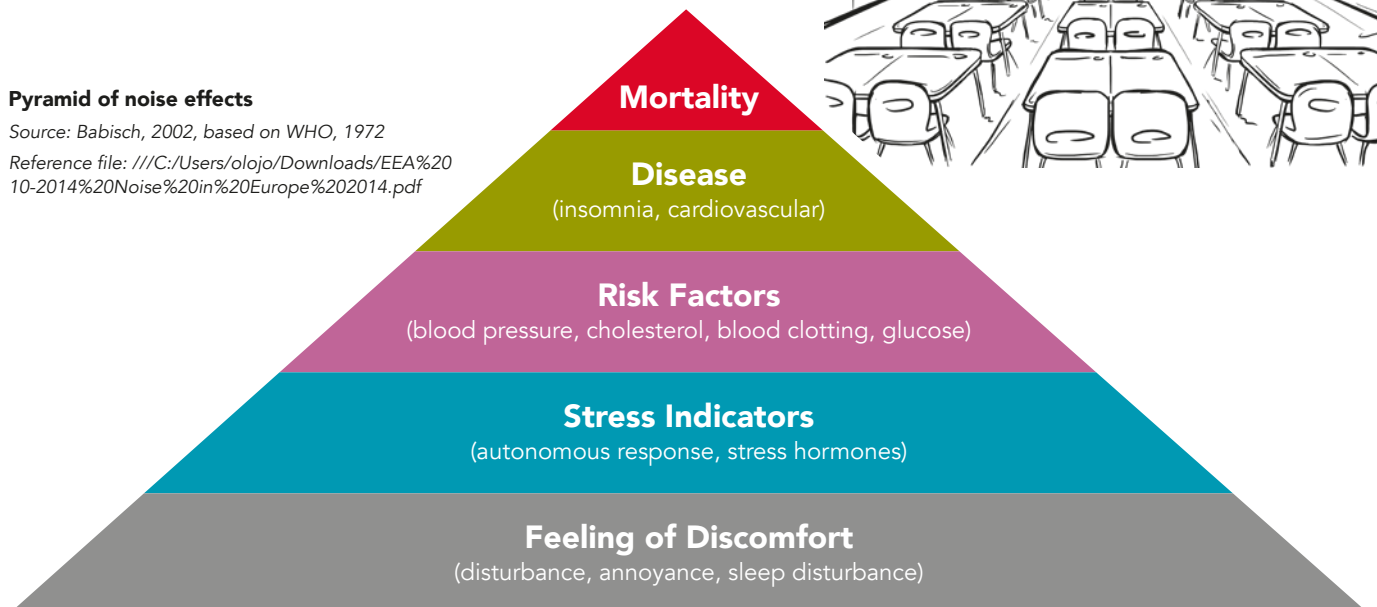
At least one million healthy life years are lost every year in Western Europe as result of exposure to environmental noise.

A study of British primary school children showed that an increase in transport noise of 5dB led to a two month reading delay.



Pyramid of noise effects

Source: Babisch, 2002, based on WHO, 1972
Reference file: ///C:/Users/olojo/Downloads/EEA%2010-2014%20Noise%20in%20Europe%202014.pdf



Public concerns about noise

UK government research shows that noise pollution is a real concern for the British public. The National Noise Attitude Survey showed that between 2000 and 2012, noise increased from being the ninth environmental priority to the fourth, with 48% of people feeling that their home life was spoilt by noise¹¹.

Studies show that noise pollution can impact on city's attractiveness too, affecting people's decisions on whether to locate there¹². Whilst London enjoys a reputation as the world's number one preferred relocation destination for professionals and the globe's most popular city for those considering working abroad¹³, research published in January 2017 also revealed that constant noise is one of the main reasons given by Londoners for moving out of the city, with 41% citing it as a reason for leaving¹⁴.

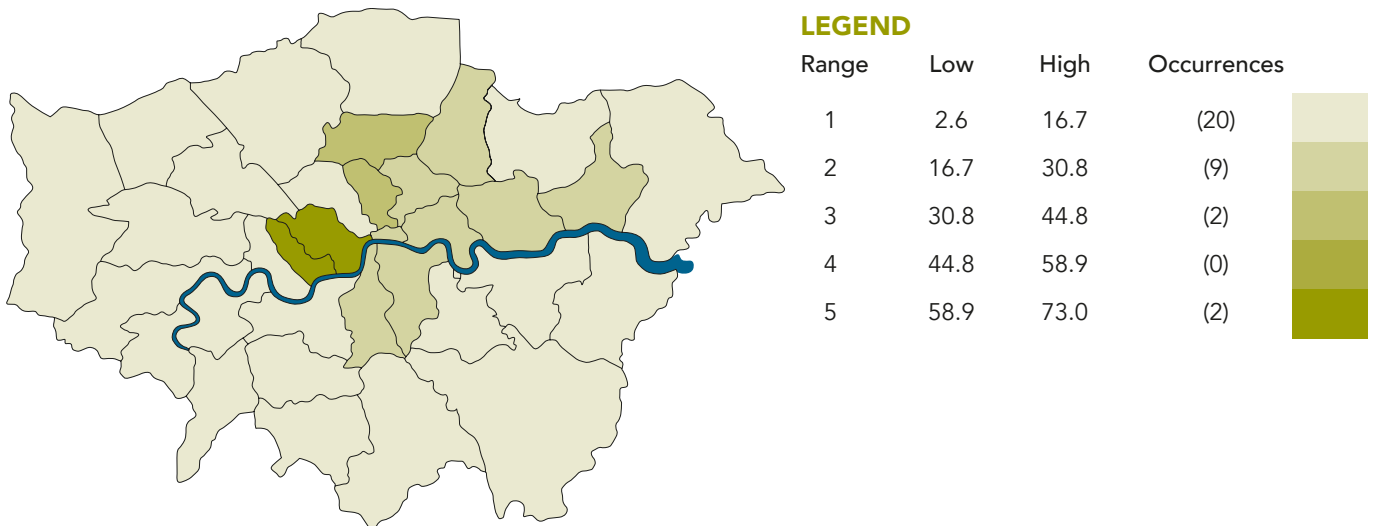
In fact, London is the region in England with the highest rate of noise complaints by a considerable margin, at 16.8 per thousand population (all other English regions have a rate between 4.2 and 6.7).

Within London, there is a clear pattern, with noise complaints being highest in central London (with Westminster and then Kensington and Chelsea having the highest level of complaints), followed by Islington and then Haringey. Levels of noise complaints appear to radiate out from central London, particularly to the east and north-east. Government figures also show that 2.4 million people (25% of the population) in the Greater London Urban Area (including parts of adjacent districts) are exposed to noise levels equal to or over 55dB from road traffic¹⁵.

Constant noise is one of the main reasons given by Londoners for moving out of the city, with 41% citing it as a reason for leaving.

Figure 1

Map of London Boroughs by noise complaints per 1000 population.



Case Study: Patterns of noise complaints in Westminster

In 2008, Westminster City Council conducted an analysis of noise complaints over the period April 2007 to March 2008, which showed clear patterns in types of noise complaints, as well as when they were most likely to occur.

Top five reasons for complaining¹⁶:

Reason	% of complaints
Residential noise (i.e. neighbours)	48.4
Noise from commercial premises	17.9
Building site	11.1
Noise in the street	10.5
Burglar alarm	7.5

Noise complaints of all types, other than building sites, were found to peak between 8pm and midnight. For example, 40% of complaints about buskers, 33.7% of complaints about burglar alarms, and 31% of complaints about commercial premises were made during this time. Noise complaints of all sorts, other than those about commercial premises, peaked on either Saturdays or Sundays. Complaints about noise from commercial premises peak on Fridays.

In both of the above cases, this is likely to be driven by people being more likely to be at home and trying to sleep in the evening and at weekends¹⁷.

There are also differences in complaint levels depending on the season. 52.6% of winter noise complaints were about residential noise, but only 44.6% of summer complaints. Conversely, 14.7% of winter noise complaints were about noise from commercial premises, compared to 21.1% in summer. This is probably caused by windows being more likely to be open, people being more likely to drink outside, and increased visitor levels¹⁸.

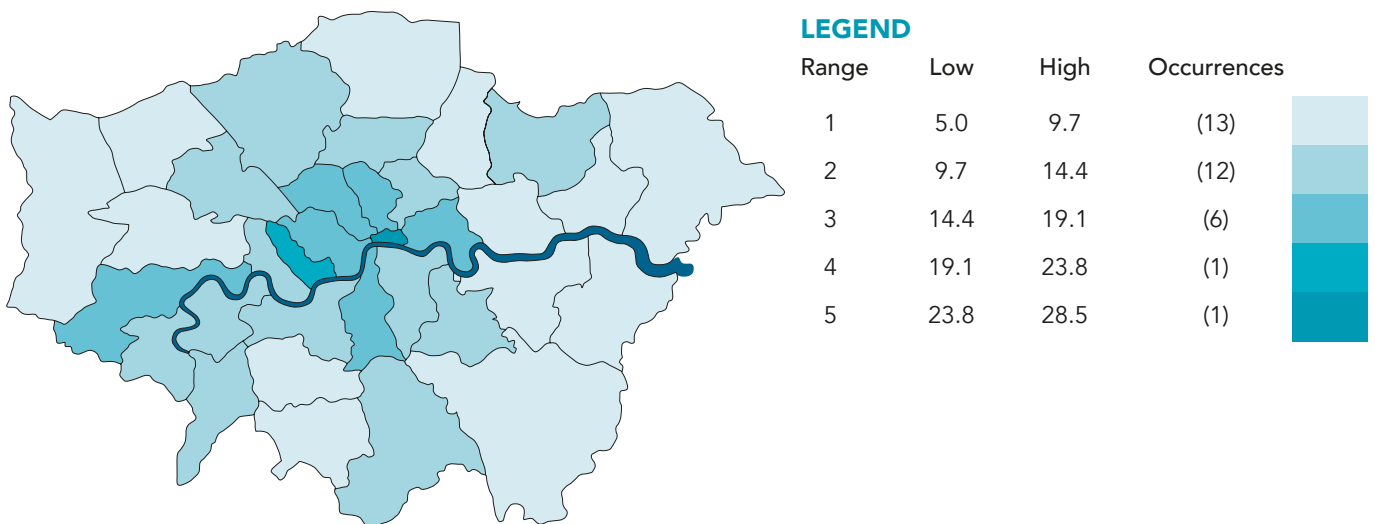
Daytime noise

The proportion of the population exposed to noise levels above 65dB(A) during the daytime is monitored on a five-yearly basis, with the most recent data from 2011 showing a clear distribution with noise radiating out from central London¹⁹.

The highest level of noise exposure, by a significant margin, is recorded in the City of London. Other central London authorities, including Kensington and Chelsea, Westminster, Camden and Islington also record high levels of noise exposure. Hounslow stands out as an outer London borough with a high level of noise exposure, explained by the presence of Heathrow Airport.

Figure 2

Map of London Boroughs by % of population affected by transport noise of over 65dB during the day (07:00-23:00).



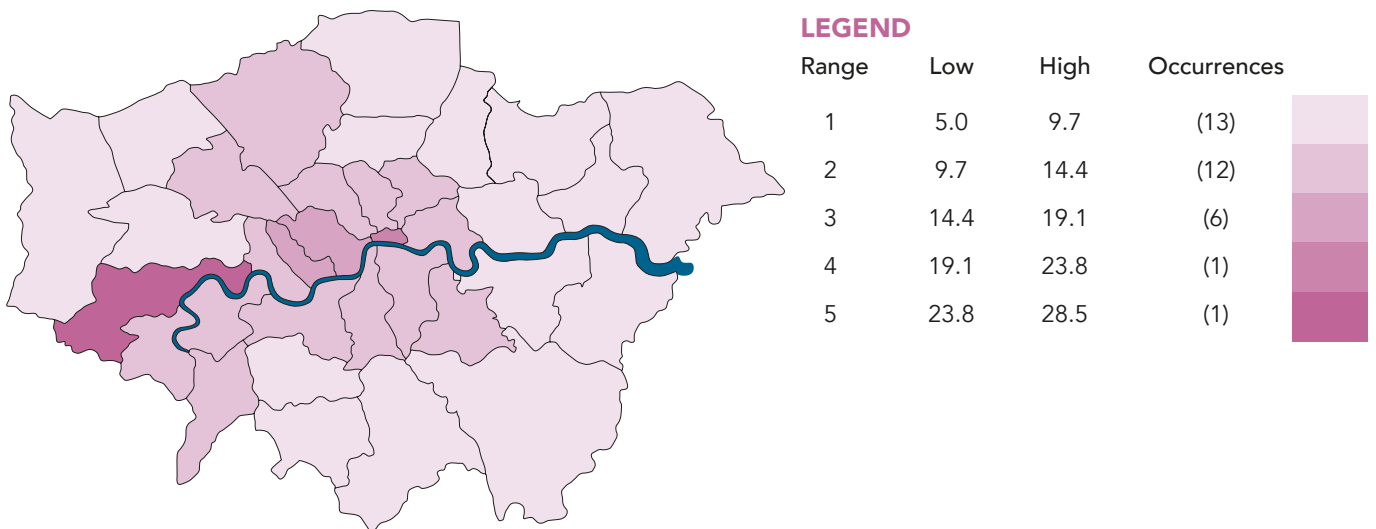
Night-time noise

The proportion of the population exposed to noise levels above 55dB(A) during the night-time (a lower level than that measured during the day to reflect increased sensitivity to noise at night) is also monitored on a five-yearly basis.

This shows a similar pattern to the daytime figures²⁰, except for the fact that Hounslow has the highest level of night-time noise exposure - 42% of the borough's population are exposed to noise levels above 55dB overnight, almost 14% more than the next nearest local authority, the City of London. In general, the percentage of the population exposed to high noise in London is higher at night than during the day.

Figure 3

Map of London Boroughs by % of population affected by transport noise of over 55dB during the day (23:00-07:00).



Noise has financial consequences for the public and private sectors as well as individual citizens.

The cost of noise

Noise has financial consequences for the public and private sectors as well as individual citizens. The Intergovernmental Group on Costs and Benefits produced estimates for the economic cost of noise in the UK. The social cost of environmental noise was placed at £7-£10bn a year (a similar range to road accidents), severe health costs at £2-3bn, loss of amenity at £2-£3bn, and loss of productivity at £2bn²¹.

WHO statistics shed further light on the health costs of noise in the UK²²:

- Daytime traffic causing heart disease: £1,183m per year
- 24-hour background noise causing severe annoyance: £1,571m per year
- Traffic/leisure noise causing tinnitus: £52m per year
- Daytime and night-time noise causing slower learning by children: £252m per year
- Loud music causing hearing loss: £38m per year
- **Total health costs estimated at £2-3 billion per year²³.**

Meanwhile there are further costs associated with loss of amenity. These reflect consumers' conscious annoyance from noise pollution, for example affecting house price value, or the cost of measures to reduce exposure to noise pollution. The current total disutility of current road noise alone is £3-5bn per year²⁴. A 1dB increase in road noise leads to a marginal disutility of £311-£479m a year, and an audible increase to a marginal disutility of £932m-£1.5bn.

In addition, these figures only cover road noise in large urban areas and therefore reflect a substantial underestimate of the total costs of noise with respect to loss of amenity across the country.

A further direct cost to the public purse arises from dealing with noise complaints. A 2012 UK government report examined the cost of making a complaint, both in terms of time and in terms of cost, and found the following:

- The average incident costs a complainant 4-8 hours and the local authority 4-7 hours
- In the least onerous scenario (complaint and no further action), the cost to both local authority and complainant would be 1-2hrs; in the most onerous scenario (10 complaints, diary sheets, visit, notice, 10 complaints, visit, prosecution, witness statement and court appearance) the time spent is between 67-135 hours for the local authority and 28-57 hours for the complainant
- The average incident costs the local authority £180-£360 to deal with, with the least onerous scenario costing £50-£100 and the most onerous £3,400-£6,810²⁵.

Government measures around noise

Planning policy and building regulations

The National Planning Policy Framework includes provisions on noise²⁶, stipulating that local planning policies should protect against noise giving rise to ‘significant adverse impacts on health and quality of life’, and recognising that planning policies should identify and protect existing tranquil areas.

Building regulations add to this with specific requirements in place for new buildings as well as conversions. For example, in England and Wales, the Building Regulations Approved Document E (Part E) requires all residential buildings (including hotels, hostels, student accommodation and nursing homes) to ensure a minimum level of sound reduction in specific aspects of a building.

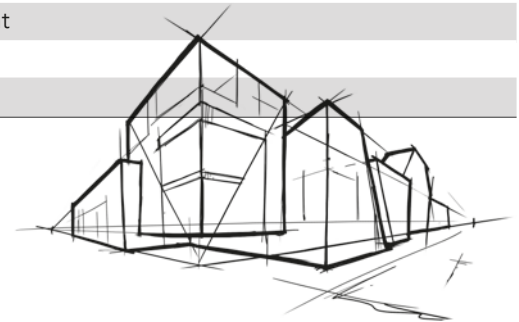
Between dwellings, Part E requires sound mitigation of 43-45dB for airborne noise in walls, floors and stairs (depending

on building type); and 62-64dB for impact noise in floors and stairs. Between floors and rooms within dwellings, the regulations require mitigation of 40dB²⁷.

However, building regulations are designed to ensure a standard baseline of requirements is met for health and safety purposes. That is why adhering to these requirements alone will not design out all unwanted noise - especially in settings such as cities, where high density living often results in higher than average experiences of noise.

To put the current requirements in context, typical noise levels from common disturbances are as follows:

Noise level	Sound equivalent
40dB	Quiet office
50dB	Large office
50-60dB	Loud conversation
55dB	Coffee percolator
60dB	Sewing machine
78dB	Washing machine
85dB	Noisy restaurant
110dB	Pneumatic drill
130dB	Jet take-off



In addition, there are few requirements to limit the noise entering buildings from the outside environment. This is particularly significant in urban environments where residential buildings are often subject to significant noise from the surrounding area – indeed, more than half of London noise complaints are based on external noise sources.

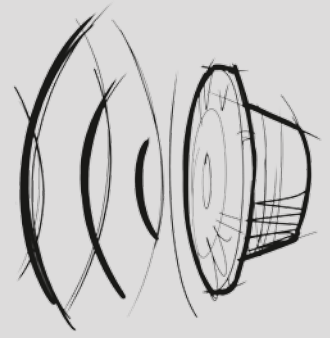
The only significant exceptions to the lack of requirements for minimising external noise intrusion are schools, where upper limits are set for indoor ambient noise levels and to limit the noise caused by rain on roofs, and in hospitals, where acoustic requirements are set for noise intrusion from external sources.

There are few requirements to limit the noise entering buildings from the outside environment.

Noise strategies

National and London-wide policy

National responsibility for environmental noise lies with the Department for the Environment and Rural Affairs (DEFRA), as outlined in the Noise Policy Statement for England (2010)²⁸.



The main action has been to implement the EU's Environmental Noise Directive through creating noise maps every five years (2007 & 2012)²⁹ and adopting action plans based on these maps³⁰; providing information to the public on environmental noise; and preserving good environmental noise quality by identifying Quiet Areas³¹.

The Department for Communities and Local Government (DCLG) also publishes guidance on noise, with suggestions for mitigation including engineering, layout (including purpose-built barriers), planning obligations on noise levels, and mitigating noise impact through insulating affected buildings. It further stipulates that local authorities can choose to include noise standards in their Local Plans³².

In line with this, the Mayor of London adopted a strategy for ambient noise in 2004 entitled 'Sounder City'³³, which remains in force and includes aims to reduce noise through better design of new housing. The London Plan (March 2016) also contains a number of measures related to noise, stating that new developments should mitigate existing noise sources nearby, improve the acoustic environment, and have regard for the impact of aviation noise³⁴.

This is reinforced by the Mayor's Sustainable Design and Construction Supplementary Planning Guidance, which provides guidance on design measures to minimise noise exposure such as noise insulation³⁵, and by the Mayor's Housing Supplementary Planning Guidance, which notes that "all dwellings should be built with acoustic insulation"³⁶.

Recognising that transport is a key contributor towards environmental noise, policies have also been set in the Mayor's Transport Strategy published in 2010³⁷. This notes that a fifth of Londoners are annoyed or disturbed by noise in their homes and that the most disturbing noise is created by buses and lorries. Similarly, **TfL has identified 128 'First Priority' sites³⁸ where noise pollution is a serious issue.** The Transport Strategy suggests that in some areas noise barriers and reviewing sound insulation regulations may be a solution and that all new projects will consider noise mitigation measures.

Aside from transport noise, entertainment venues and the 24-hour economy are another significant source of noise. The Mayor has established a Night Time Commission and appointed a Night Czar, as well as pledging to introduce an 'Agent of Change' rule so that new developments near entertainment venues will have to meet the cost of soundproofing.

Local authorities and London Boroughs

Local authorities including the London Boroughs have a responsibility to investigate complaints about noises that are a 'statutory nuisance', meaning that the cost of noise complaints falls on them. Front-line services delivered at the local level, such as health care and education, may also suffer from the adverse consequences of unwanted noise.

This makes it especially important for local authorities to be aspirational in relation to their duty to consider noise when making decisions about planning, entertainment licences, or building control³⁹. Getting this right can help deliver on multiple community benefits, whilst also helping to nurture London's ongoing attractiveness as a place to live and work.

Case Study: Westminster Noise Strategy

Typically across London, noise complaints are considered within separate frameworks from planning strategies. However, the Borough of Westminster has a strategy considering the overall effect of noise.

The Westminster City Plan (2006-2016) identified noise as a key priority and this led to the adoption of the Westminster Noise Strategy in 2009. The policies adopted in the strategy include ensuring that new developments have a high quality internal sound environment, with protection against both internal and external noise (including the encouragement of innovative design), and encouraging the creation of tranquil areas.

This focus is reflected in two key documents which make up Westminster's planning policy. Westminster's current City Plan (adopted in 2016) sets out broad aims to require development to minimise noise, ensure development provides an acceptable noise climate to occupants, and secure improvements to the sound environment⁴⁰. In addition, the council has saved more detailed noise policies from its older Unitary Development Plan⁴¹. In this, levels are set for noise inside residential developments, and for what the council's response will be for developments at different levels of background noise. A further policy sets specific limits for noise from plant, machinery and internal activity.

Consumer demand

Frustrations with noise are familiar to any city dweller. Councillors will similarly report that noise is one of the most frequent issues raised with them in the community, whilst review websites such as TripAdvisor tell of the frequency with which noise features in accommodations reviews.

Despite this and the commercial opportunities it presents for offering a more peaceful lifestyle to citizens and customers, to date few developments have sought to feature quietness as part of their offering. However, as highlighted in the government and WHO guidance above, good design can go a long way to addressing noise issues in buildings, and there are many ways in which to mitigate noise within the fabric of a building itself.

Good design can go a long way to addressing noise issues in buildings.

From domestic housing to student accommodation, hospitals to schools, and specialist buildings such as recording studios to places of worship, access to peace and quiet matters. This section profiles a number of building types where the case for better noise mitigation is particularly relevant to give a snapshot of the potential that exists.

Hotels

The J.D. Power North American Hotel Guest Satisfaction Survey has consistently shown noise to be the top complaint, but it is also significantly under-reported to the hotel and rarely resolved⁴². Research by ReviewPro found that noise is the most frequent complaint from hotel guests, topping the charts in most cities they studied, including London⁴³.

As a result, a number of hotel chains have taken actions to try and reduce the impact of noise on their guests and the Association of Noise Consultants runs awards to reward particularly innovative treatments of noise⁴⁴. One recent highly commended project was the Vermont ApartHotel in Newcastle, which used innovative noise abatement research to minimise impact sound, helping to drive the hotel's commercial proposition⁴⁵.

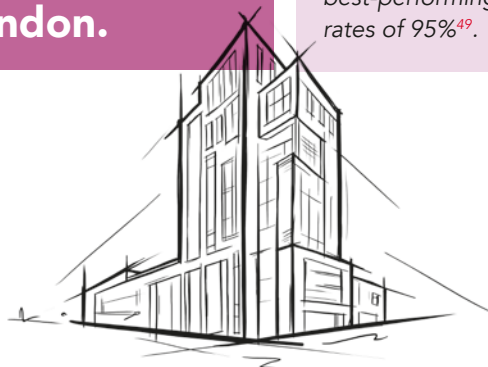
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Case Study: Premier Inn

In 2012, Premier Inn changed its marketing emphasis from cost to sleep quality, in order to differentiate itself from its rivals and appeal emotionally to consumers⁴⁶. The chain now offers its guests a 'Good Night Guarantee' under which guests will be refunded if they have not enjoyed a good night's sleep⁴⁷.

In 2011, Premier Inn also pioneered a new design of 'floating bedroom' at its new hotel in Leicester Square in partnership with engineering firm Aecom, in order to deal with environmental noise and noise generated by a nightclub on the ground floor. Each bedroom is an independent box with no contact with neighbouring rooms, with walls and ceilings given acoustic linings, services isolated, and windows quadruple-glazed to give better noise reduction than WHO standards.

As a result, each room is 10% more expensive to build than in a standard Premier Inn⁴⁸. According to Axiom, the building's architects, it is now one of the chain's best-performing hotels in London, with occupancy rates of 95%⁴⁹.



Retirement living

Noise has an increased impact on older people, which is particularly significant when we consider the two global trends of an aging population and an increasingly urban population.

A report for the GLA in 2016 entitled 'Older Londoners and the London Plan: Looking to 2050' noted that much can be done to make life easier for those with hearing loss, such as designing buildings to reduce background noise⁵⁰. Indeed, some local authorities have gone as far as introducing specific guidance for housing for older people, such as the Royal Borough of Kensington and Chelsea, whose guidance recommends identifying sensitive areas (e.g. bedrooms), siting them appropriately, and installing noise insulation⁵¹.

One group of predominantly older people particularly affected by noise are those with dementia. The Social Care Institute for Excellence stresses that the benefits of silence to those with dementia are underestimated, and recommends

Hospitals

Studies carried out on the health effects of noise in hospitals have found that it can be detrimental to the health of patients and impair recovery times. Indeed, a recent review of scientific research on the topic of noise and hospitals concluded that "hospital noise is a serious issue that can negatively affect patient physiology and more research is needed"⁵⁴.

One study in Sweden examined patients in a coronary health unit, comparing the use of sound-reflecting and sound-absorbing tiles. This found that "a bad acoustic environment during acute illness may have important detrimental physiological effects on rehabilitation". The poor acoustics led to patients having higher pulse amplitude, being more likely to be re-hospitalised, and considering staff attitudes to be much worse⁵⁵.

In addition, noise levels in hospitals have increased in recent years, with the Dementia Services Development Centre at the University of Stirling claiming that over the last forty years noise levels have gone up from 57dB to 72dB⁵⁶. This is an issue that has started to gain public attention, with the Daily Mail publishing an article last year entitled 'Why are hospital wards so infernally NOISY?'⁵⁷.

As a result, hospitals are paying more attention to their acoustic design and a number of new facilities such as the Forth Valley Royal Hospital have used Rockfon acoustic ceiling tiles to help address internal noise issues⁵⁸.

The benefits of silence to those with dementia are underestimated.

that noise reduction should be considered as part of the overall design of a care home or hospital, or a person's own home. The Institute suggests that designers consider three main factors: absorption, transmission, and insulation⁵².

The Department of Health's Health Building Note 08-02: Dementia-friendly Health and Social Care Environments also sets out the importance of acoustic design in designing for people with dementia, noting that sound absorbent materials "should be used for surfaces, fixtures and fittings whenever possible as they can contribute to quieter, peaceful and restful environments". For example, the document suggests the use of soundproof walls and acoustic tiles, along with measures such as quiet rooms, sound effects and careful layout design⁵³.

Case Study: Quiet Mark products

The Noise Abatement Society has long campaigned to raise awareness of, and find solutions to, noise pollution. The Society has also demonstrated the commercial value of quietness through the Quiet Mark scheme, which was launched in 2012 to accredit products designed with low noise levels.

Since its launch, the Quiet Mark has been awarded to a wide range of products and projects, including to the builders of the Shard for reducing noise disturbance during construction⁵⁹ and to Virgin Atlantic for their Boeing 787-9 Dreamliners, which Quiet Mark's specialists found to be quieter than other jet aircraft. A number of manufacturers have invested considerable resources in reducing the noise levels of their products - for example, Dyson spent £40m over three years to develop its Cool fan, which is 75% quieter than its predecessor⁶⁰.

All products are tested by the Society's own acoustics team in order to validate their manufacturer's claims and to compare them to other products on the market. The scheme is also progressively widening its coverage. For example, in 2016 the first window with a 5dB noise reduction ability⁶¹ was accredited with the Quiet Mark and a number of ROCKWOOL insulation products have been awarded the mark too.

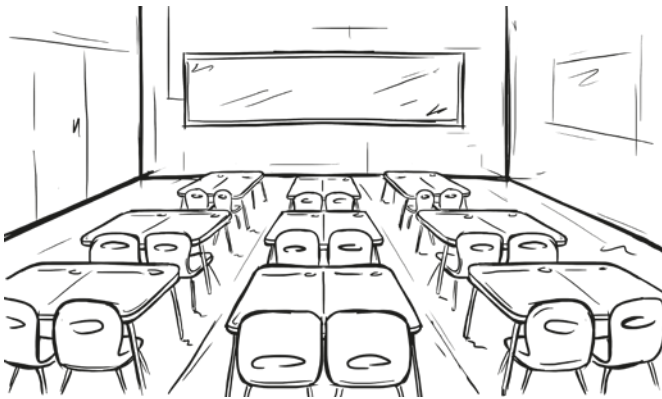
Significantly, the Quiet Mark has been shown to have commercial success. John Lewis is a partner of the Quiet Mark scheme and has recorded growing levels of sales of Quiet Mark accredited products - up by 33% in June 2016⁶². The firm's research also found that 49% of Britons considered noise an important factor in buying products, rising to 62% of those with open plan living spaces⁶³.

John Lewis research found that 49% of Britons considered noise an important factor in buying products, rising to 62% of those with open plan living spaces.

Schools and offices

As outlined earlier in the report, background noise has been shown to have a detrimental effect on educational attainment.

As a result, the government produces a set of minimum performance standards for school acoustics⁶⁴, whilst the Institute of Acoustics and the Association of Noise Consultants jointly publish a design guide⁶⁵. The performance standards state that the ambient noise level in new-build classrooms should not be above 35dB, with 40dB being the limit in refurbished classrooms. The need is even more acute in specialist settings. For example, at the Futures Community College in Southend all standard classrooms were fitted with Rockfon ceiling tiles that met the requirements for hearing impaired students⁶⁶.



Similarly, high noise levels in places of work can lead to lower productivity levels, and for this reason many firms have paid close attention to acoustic performance when building or refurbishing offices. Research has found that around 80% of office workers believe that better acoustics would increase their productivity. Other studies have found that background noise impairs the quality of work (in one study accuracy was found to reduce by 67%), whilst a study at a call centre found that improving acoustics delivered a 20% increase in sales productivity⁶⁷.

Examples of work places addressing these issues include BAM Nuttall, which specified Rockfon ceiling tiles for their recent head office refurbishment because they needed a high level of acoustic control in their mostly open-plan offices⁶⁸. Similarly, the construction firm Kier used ROCKWOOL products for their headquarters near Cambridge because of their acoustic properties, where the firm needed their flat roof to deliver high levels of acoustic performance, including insulating against airborne sound as well as noise from impact such as raindrops⁶⁹.



Kier headquarters near Cambridge

References

- 1 <https://unhabitat.org/books/state-of-the-worlds-cities-20082009-harmonious-cities-2/>
- 2 <http://www.centreforcities.org/reader/cities-outlook-2017/cities-outlook-2017-introduction/>
- 3 <http://apps.who.int/iris/handle/10665/66217> WHO Guidelines for Community Noise p.vii
- 4 http://ec.europa.eu/environment/noise/health_effects_en.htm
- 5 <http://ec.europa.eu/environment/integration/research/newsalert/pdf/47si.pdf>, p.6
- 6 http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf?ua=1, p.xvii
- 7 <https://www.newscientist.com/article/dn20326-noise-kills-and-blights-lives-in-europe/>
- 8 <http://ec.europa.eu/environment/integration/research/newsalert/pdf/47si.pdf>, p.11
- 9 <http://www.rivm.nl/dsresource?objectid=a4029a59-c241-46c8-b8d1-8f2f537e9ac1&type=org&disposition=inline>, p.43
- 10 <http://ec.europa.eu/environment/integration/research/newsalert/pdf/47si.pdf>, p.10
- 11 <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18288>
- 12 https://www.london.gov.uk/sites/default/files/economic_evidence_base_2016.compressed.pdf, p.330
- 13 http://files.londonandpartners.com/business/resources/London_a_leading_destination_for_headquarters_FINAL.pdf, p.10
- 14 <http://www.cityam.com/258120/air-pollution-would-cause-more-than-half-londoners-move>
- 15 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/276236/noise-action-plan-agglomerations-appb-201401.pdf, p.119
- 16 http://www3.westminster.gov.uk/docstores/publications_store/Noise%20complaints%20in%20Westminster.pdf, p.4
- 17 http://www3.westminster.gov.uk/docstores/publications_store/Noise%20complaints%20in%20Westminster.pdf, p.10
- 18 http://www3.westminster.gov.uk/docstores/publications_store/Noise%20complaints%20in%20Westminster.pdf, p.11
- 19 <https://data.london.gov.uk/dataset/public-health-outcomes-framework-indicators>
- 20 <https://data.london.gov.uk/dataset/public-health-outcomes-framework-indicators>
- 21 <http://www.eea.europa.eu/publications/noise-in-europe-2014>, pp.9-10
- 22 <http://webarchive.nationalarchives.gov.uk/20130402151656/http://archive.defra.gov.uk/environment/quality/noise/igcb/documents/igcb-first-report.pdf>, p.18
- 23 <http://webarchive.nationalarchives.gov.uk/20130402151656/http://archive.defra.gov.uk/environment/quality/noise/igcb/documents/igcb-first-report.pdf>, p.19
- 24 <http://webarchive.nationalarchives.gov.uk/20130402151656/http://archive.defra.gov.uk/environment/quality/noise/igcb/documents/igcb-first-report.pdf>, p.35
- 25 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/407845/RFI_7133_Defra_-_Estimating_Cost_of_Complaints_about_Noise_Nuisance_-_Final_Report____2_.pdf
- 26 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf, p.29
- 27 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/468870/ADE_LOCKED.pdf
- 28 <https://www.gov.uk/government/publications/noise-policy-statement-for-england>
- 29 <https://www.gov.uk/government/publications/noise-action-plans-large-urban-areas-roads-and-railways>
- 30 <https://www.gov.uk/government/publications/noise-action-plans-large-urban-areas-roads-and-railways>
- 31 <https://www.gov.uk/government/publications/2010-to-2015-government-policy-environmental-quality/2010-to-2015-government-policy-environmental-quality#appendix-8-managing-noise-and-other-nuisances-in-the-local-environment>
- 32 <https://www.gov.uk/guidance/noise--2>
- 33 https://www.london.gov.uk/sites/default/files/mayors_noise_strategy.pdf
- 34 https://www.london.gov.uk/sites/default/files/the_london_plan_malp_final_for_web_0606_0.pdf, pp.310-312
- 35 https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Sustainable%20Design%20%26%20Construction%20SPG.pdf
- 36 https://www.london.gov.uk/sites/default/files/housing_spg_revised_040516.pdf
- 37 <https://www.london.gov.uk/what-we-do/transport/transport-publications/mayors-transport-strategy>, pp.91-2 & pp.224-6
- 38 <https://www.london.gov.uk/what-we-do/health/transport-and-health>
- 39 <https://www.gov.uk/guidance/noise-nuisances-how-councils-deal-with-complaints>
- 40 http://transact.westminster.gov.uk/docstores/publications_store/cityplan/Westminster_City_Plan_consolidated_version_Nov_2016.pdf, pp.138-9

- 41 http://transact.westminster.gov.uk/docstores/publications_store/planning/Policy/udp_chapter_9_environment.pdf, pp.431-444
- 42 http://www.logison.com/site_Files/Content/Documents/PDFs/Industries/FS_LogiSon_Hotels.pdf
- 43 <http://www.travelandtourworld.com/news/article/noise-1-common-complaint-online-hotel-reviews-reviewpro/>
- 44 <http://www.association-of-noise-consultants.co.uk/2016-award-winners-revealed/>
- 45 <http://www.apexacoustics.co.uk/vermont-aparthotel/>
- 46 <https://www.marketingweek.com/2012/03/07/premier-inn-swaps-price-led-ads-for-comfort-stance/>
- 47 <http://www.premierinn.com/gb/en/why/sleep/good-night-guarantee.html>
- 48 <http://www.bighospitality.co.uk/Business/Premier-Inn-to-use-floating-room-design-for-Leicester-Square-hotel>
- 49 <http://www.axiomarchitects.co.uk/project/1017/leicester-square-premier-inn-architecture->
- 50 https://www.london.gov.uk/sites/default/files/older_londoners_and_the_london_plan_march_2016.pdf, pp.11 & 25
- 51 <https://www.rbkc.gov.uk/sites/default/files/atoms/files/Older%20People%27s%20Housing%20Design%20Guidance%20%28low%20res%29.pdf>
- 52 <http://www.scie.org.uk/dementia/supporting-people-with-dementia/dementia-friendly-environments/noise.asp>
- 53 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416780/HBN_08-02.pdf, pp.42-3
- 54 http://nfyilma.turner-white.com/pdf/jcom_jul12_noise.pdf
- 55 <http://info.soundofarchitecture.com/blog/3-studies-show-the-impact-of-hospital-noise-on-patients-health>
- 56 <http://dementia.stir.ac.uk/blogs/dementia-centred/2013-10-14/reduce-noise-your-ward>
- 57 <http://www.dailymail.co.uk/health/article-3639982/Why-hospital-wards-infernally-NOISY.html>
- 58 http://rwiembraco-rfn.inforce.dk/media/3240361/southmead_case_study_1.9.14.pdf
- 59 <http://www.bbc.com/future/story/20120921-give-peace-and-quiet-a-chance>
- 60 <http://aviationbenefits.org/newswire/2014/10/virgin-atlantic-787-receives-quiet-mark-award-recognition-1/>
- 61 http://www.the-glazine.com/WeeklyFolders/glazine03may2016/a_new_quality_accreditation.htm
- 62 <http://www.retailtimes.co.uk/john-lewis-reports-notable-growth-quiet-technology-sales/>
- 63 <http://www.johnlewis.com/inspiration-and-advice/electricals/quiet-mark-appliances>
- 64 <https://www.gov.uk/government/publications/bb93-acoustic-design-of-schools-performance-standards>
- 65 <http://www.ioa.org.uk/publications/schools-acoustics-guide>
- 66 http://www.rockfon.co.uk/u/website_project/23084/Futures%20Community%20College/
- 67 <http://www.ribaproductselector.com/Docs/6/26826/external/COL126826.pdf>
- 68 <http://rwiembraco-rfn.inforce.dk/media/3240738/bam%20nuttall%20camberley%20case%20study.pdf>
- 69 <http://buildingproducts.co.uk/soundproof-roof/>

About this report and its authors

The ROCKWOOL Group is a world leader in stone wool solutions, with expertise across many of today's biggest sustainability and development challenges, from energy consumption and noise pollution to fire resilience, water scarcity and flooding.

ROCKWOOL UK is an operating company of the ROCKWOOL Group, and has been manufacturing insulation solutions from our base near Bridgend, South Wales, since 1979. Our insulation is created from a natural, sustainable resource - volcanic rock - and is 97% recyclable.

On 23rd March 2017, ROCKWOOL UK hosted an event on the topic of 'Good Growth, Quiet Buildings' at the Danish Embassy in London, to discuss noise solutions in the context of London's development pipeline. This report captures much of the thinking behind this event, which was hosted in partnership with the Noise Abatement Society and London&Partners.



James Murray, Deputy Mayor for Housing and Residential Development.



Rory Moss, MD of ROCKWOOL UK.



ROCKWOOL building envelope solutions

The choice of materials in a building can make a significant difference to the perception of noise. For example, the choice of roofing materials can affect the experience of noise from overhead from sources such as heavy rainfall, or commercial aircraft - which from 1 nautical mile on approach can create noise at ground level of up to 97dB.

Meanwhile, the choice of external wall fabric is particularly significant in relation to the experience of street noise and traffic from within a building. In recent tests on ROCKWOOL Rainscreen, an external façade which is popular in hotels and high rise residential buildings, the product achieved a sound resistance of 58dB when installed in a typical rainscreen façade system. To put this in context, British Standards expect the noise level at 20 metres from the edge of a busy main road in a residential area to be 68dB – in this setting, the use of our Rainscreen product would reduce the experience of traffic noise to as little as 10dB, which is on par with leaves rustling in the distance.

Within a building, the composition of partition walls, ceilings and floors are key factors in the experience of noise from neighbouring rooms and flats – including the transfer of music, human voices and footsteps. The same is true in offices, where partition walls are used to divide and create separate spaces. Noise can also be transferred through buildings by pipework, such as plumbing and air-conditioning networks. Here, too, there are readily available options for insulating pipework in order to absorb noise and minimise the disturbance from internal systems.

Ensuring a high standard of acoustic performance does not have to add significant time or expense. Factoring in noise considerations from the outset of a project is the most cost effective route, and can be as simple as selecting an insulation material that delivers on both thermal needs and sound absorption.

For more information on ROCKWOOL solutions and to use our acoustic calculator, please visit www.rockwool.co.uk



100mm of RAINSCREEN DUO SLAB® has a thermal value of 0.035 W/mK, a sound resistance of Rw 58dB, and a Euroclass A non-combustible fire rating. ROCKWOOL insulation typically performs effectively for the lifetime of the building.

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