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A

Residents' and Environmental Services Policy Overview Committee

Councillors on the Committee

Michael White, (Chairman)
Michael Markham (Vice-Chairman)
Tony Burles
Jas Dhot
Patricia Jackson
Judy Kelly
Allan Kauffman
Kuldeep Lakhmana
Brian Stead

Date: **TUESDAY, 17 OCTOBER 2017**

Time: **5.30 PM**

Venue: **COMMITTEE ROOM 3 - CIVIC CENTRE, HIGH STREET, UXBRIDGE UB8 1UW**

Meeting Details: Members of the Public and Press are welcome to attend this meeting

Published: Monday, 9 October 2017

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This Agenda is available online at:
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Putting our residents first

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Terms of Reference

A central role of a Policy Overview Committees is to undertake in-depth policy reviews on specific issues. Reviews provide the opportunity to hear from members of the public and expert witnesses, including people from a wide range of external organisations. Reviews usually make recommendations to the Cabinet on how the Council could improve its work. They therefore perform an important role in opening up the policy-making process to a wider audience, including people who would not normally have the opportunity to participate.

This Committee undertakes the policy overview role in relation to the following matters:

- Highways, traffic, parking & street environment
- Local transport, including rail, cycling & London Underground
- Footpaths and Bridleways
- Road safety and education
- Planning & Building Control
- Libraries
- The Borough's heritage and history
- Sport & Leisure services
- Waste management & recycling
- Green spaces, allotments, woodlands, conservation and sustainable development
- Consumer Protection, Trading Standards & Licensing
- Registrars & Bereavement Services
- Local watercourses, drainage and flooding
- Environmental Health, Air & Noise Quality
- Local impacts of Heathrow expansion
- Local impacts of High Speed Rail

Agenda

Chairman's Announcements

1	Apologies for Absence	
2	Declaration of Interest in matters coming before this meeting	
3	To confirm that all items marked Part 1 will be considered in Public and that any items marked Part 2 will be considered in Private	
4	To agree the Minutes of the previous meeting - 20 September 2017	1 - 6
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Minutes

RESIDENTS' AND ENVIRONMENTAL SERVICES POLICY OVERVIEW COMMITTEE

20 September 2017
Meeting held at Committee Room 6- Civic Centre, High Street, Uxbridge UB8 1UW

	Committee Members Present: Councillors Michael White (Chairman), Michael Markham (Vice-Chairman), Lynne Allen, Tony Burles, Patricia Jackson, Allan Kauffman and Judy Kelly. **Apologies for Absence:** Councillors Jas Dhot, Kuldeep Lakhmana (Councillor Lynne Allen substituting) and Brian Stead. **Officers:** Val Beale ((Environmental Specialist, Planning Specialist Team), Chris Mansfield (Deputy Director, Planning & Transportation and Khalid Ahmed (Democratic Services Manager).	
18.	**TO CONFIRM THAT ALL ITEMS MARKED PART I WILL BE CONSIDERED IN PUBLIC AND THAT ANY ITEMS MARKED PART II WILL BE CONSIDERED IN PRIVATE** It was confirmed that all items on the agenda would be considered in public.	
19.	**MINUTES OF THE MEETING HELD ON 26 JULY 2017** Agreed as an accurate record, subject to an amendment to Minute No.13 - Budget Planning Report for Residents Services 2018/19 - in the resolution which should read "2018/19".	
20.	**RESIDENTS' & ENVIRONMENTAL SERVICES POLICY OVERVIEW COMMITTEE - MAJOR REVIEW 2017/18 - REVISION OF THE AIR QUALITY ACTION PLAN FOR THE LONDON BOROUGH OF HILLINGDON** Val Beale ((Environmental Specialist, Planning Specialist Team) and Chris Mansfield (Deputy Director, Planning & Transportation attended the meeting and provided the Committee with an overview of the review into the revision of the Air Quality Action Plan for Hillingdon. **Aim of the review** The Committee was informed that the aim of the review would be to make Members aware of the extent of air pollution in Hillingdon and the way that the Council had managed air quality since 2004. A review would assist in the development of	**Action By:**

	a revised Air Quality Action Plan (AQAP), as required by the Mayor of London. Members were informed that in Hillingdon, as in the majority of London Boroughs, the national air quality standard for the pollutant, nitrogen dioxide, was exceeded across areas of the Borough, most notably in the south around Heathrow Airport and also in association with the major road networks such as the M4, the A312, the A40 and the A4 and on busy parts of the Borough road network which pass through the Borough's towns. **Impact of poor air quality** To put the review into context, the Committee was informed that poor air quality has been described as the largest environmental risk to public health in the UK. It was known to have had more severe effects on vulnerable groups, for example the elderly, children and people already suffering from poor health such as respiratory disease. Members were informed that in Hillingdon, the public health team had undertaken an assessment which highlighted that respiratory diseases were the third highest cause of death in the Borough and that air pollution was a risk factor which had been linked to 1,100 life years lost due to aspects such as exacerbations of asthma and Chronic Obstructive Pulmonary Disease (COPD) leading to emergency admissions to hospital. The Committee was informed that the health effects of air pollution were distributed unequally across the population with the heaviest burden borne by those with the greatest vulnerability and/or exposure. The elderly, children and those with cardiovascular and/or respiratory disease were at greater risk from the health effects of air pollution. Officers reported that the development of the Air Quality Action Plan would ensure that improvements to health form an important objective in terms of the outcomes of the actions to be included. Members were provided with copies of maps which showed Air Quality Management Areas for the pollutant nitrogen dioxide. Members noted the correlation between densely populated areas in the Borough and less sparsely populated areas. Officers were asked to provide details on population increases within the Borough to assess the correlation between population and the quality of air, together with more detailed maps on pollution "hot spots" and focus areas. A Member raised an issue in relation an odour problem	**Action By:** **Val Beale/ Khalid Ahmed**

	associated with FM Conway Ltd in Hayes, and the impact this was having on local residents. A suggestion was that this could possibly be used a case study as part of the review. Reference was made to the impact of poor air quality near to the Borough's schools and possible mitigation measures which could be taken. The Council's Environmental Specialist reported that a good example of a school taking mitigation measures in relation to poor air quality was at the Botwell School, who were involved in a pilot project called Clean Air for Schools. A problem often associated with schools was around the times of the school "drop off" and "pick up" times. There could be initiatives such as areas nearly to schools where parents could stop and drop children off, who could then walk to school. Outside of schools there could be "No Idling Signs" erected, asking drivers to turn off their engines to prevent CO2 from polluting the air. By keeping engines running whilst parking or waiting, created high levels of pollution which increased health risks like asthma and heart disease, for school children. Details of the scheme at Botwell School, together with other possible measures to improve air quality near to schools, would be provided for the Committee to consider at the next meeting. The discussion took place on how the planning system could help improve air quality and Members were informed that the Mayor of London expected development to be, as a minimum, air quality neutral. Further information was requested from Planning on what the planning system could do to help in the improvement of air quality. It was noted that traffic was a contributory factor to poor air quality and as previously mentioned Hillingdon had major road networks such as the M4, the A312, the A40 and the A4. The Committee discussed HGV movements within the Borough, the impact of traffic calming measures such as road humps and the general congestion which existed on the Borough's roads and asked that further information be provided on the mitigation measures which could be used to alleviate this problem. Reference was also made to the canal network within the Borough which could be used more for transportation. Officers were thanked for their informative presentation and the information which was requested above be provided for the next meeting of the Committee.	**Action By:** **Val Beale/ Khalid Ahmed** **Val Beale / Khalid Ahmed** **James Rodger / Khalid Ahmed** **David Knowles / Khalid Ahmed**

	RESOLVED – **1. That approval be given to the draft scoping report for the review and officers be requested to invite witnesses to the next meeting of the Committee to help Members with the review.** **2. That officers be asked to provide the information outlined above, for the next meeting of the Committee.**	**Action By:** **Val Beale / Khalid Ahmed** **As above**
21.	**RESIDENTS' & ENVIRONMENTAL SERVICES POLICY OVERVIEW COMMITTEE - MAJOR REVIEW - SHISHA BARS, CAFES & LOUNGES** The Committee was asked to give consideration to suggestions made by the Council's Equality, Diversity and Inclusion Manager on the recent completed major review on Shisha Bars, Cafes & Lounges. Members discussed the comments received and asked that the comments provided be addressed in the Committee's final report, together with greater emphasis being given in the final report, on the health implications on the use of Shisha, to all residents in the Borough. In addition, the Committee noted that details would be provided in the final report, on the work which would be carried out in relation to consultation with owners of Shisha Bars, Cafes & Lounges on their responsibilities as owners of Shisha establishments, in making residents aware of the health risks associated in using Shisha. **RESOLVED –** **1.That the information provided be noted and be addressed in this Committee's final report before its submission to Cabinet for approval.**	
22.	**FORWARD PLAN** Noted.	
23.	**WORK PROGRAMME** Noted. Members requested that an information item be submitted to a future meeting on reducing the use of plastic water bottles at meetings of Committees / Sub-Committees / Working Groups of the Council.	**Khalid Ahmed**

	Meeting commenced at 5.30pm and closed at 6.45pm **Next meeting: 17 October 2017 at 5.30pm**	

These are the minutes of the above meeting. For more information on any of the resolutions please contact Khalid Ahmed on 01895 250833. These minutes are circulated to Councillors, Officers, the Press and Members of the Public.

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Residents' & Environmental Services Policy Overview Committee - Major Review 2017- 18- Revision of the Air Quality Action Plan for the London Borough of Hillingdon

Contact Officers: Khalid Ahmed
Telephone: 01895 250833

REASON FOR ITEM

The Committee is asked to receive witness evidence and written evidence as part of the Committee's major review into the revision of the Air Quality Action Plan for the London Borough of Hillingdon

OPTIONS OPEN TO THE COMMITTEE

The Committee is asked to consider the evidence given by the witnesses and to ask questions of the witnesses. In addition, Members are requested to receive the information which has been provided by officers to help with the review.

INFORMATION

1. At the last meeting of the Committee held on 20 September 2017, Members received the draft scoping report, together with a presentation from the Deputy Director, Planning, Transportation & Regeneration and the Council's Environmental Specialist from the Planning Specialist Team. For Members' reference, the draft scoping report is attached as **appendix 1** to this report, and the details of the discussion which took place at the meeting on 20 September are detailed in the minutes, earlier on the agenda.

WITNESSES

2. For this meeting, Members will receive evidence from the following invited witnesses:

   Val Beale - LBH Environmental Specialist
   James Rodger - LBH Head of Planning and Enforcement
   Dr Mike Holland - Member of the Committee on the Medical Effects of Air Pollution (COMEAP).

3. For Members information, Dr Holland has been working in the air quality field since the 1980s working on issues such as the economic assessment of pollution control and has developed methodologies for the quantification of health and other effects of pollution at the European level. He is a member of the Committee on the Medical Effects of Air Pollution (COMEAP).

4. In terms of Hillingdon, Dr Holland has worked with the Council from the inception of its first Air Quality Action Plan and has worked with officers to ensure the annual reporting

is accurate and reflects the work and progress made, as well as flagging the challenges the Council has faced. Dr Holland is commissioned to work with officers and Members to review the current action plan and progress this to the publishing of the new Air Quality Action Plan for consultation through to final adoption by the Cabinet and its submission to the Mayor of London.

5. The Committee can be taken through the original Air Quality Action Plan and be informed what has been achieved, what the challenges have been, and suggest the best way forward with the new Action Plan, incorporating any recommendations which may arise out of the review. Below is the link to the original Air Quality Action Plan

   http://www.hillingdon-air.info/pdf/Hillingdon_AQAP.pdf

ADDITIONAL INFORMATION

6. For Members information there are a number of documents which have been pulled together to provide background reading and also to provide details on some of the areas discussed at the last meeting of the Committee. There is information on best practice, information on schools and case studies which Members expressed an interest in:

   The NICE report - this gives recommendations that local authorities can consider to improve air quality and health;

   Improving Air Quality in the City of London - A practical Guide for City Businesses

   What is a Low Emission Neighbourhood? - A paper on a low emission neighbourhood approach.

   Schools - There are attached case studies of a pilot project - **Clean Air for Schools,** Hillingdon were one of the three partners in the pilot;

   Mayor of London's Healthy Streets initiative - this includes an area wide approach, improving air quality is on the key indicator of a healthy street;

   Selborne Road Air Quality Improvement Scheme - this outlines an approach from Waltham Forest, incorporating air quality improvements into a larger proposal

7. For the meeting, Members will be provided with detailed pollution maps of Hayes, Uxbridge and Ruislip town centres and a note on the challenges in each case and potential solutions.

8. In addition, there will be a briefing note circulated before the meeting which provides details, as requested at the Committee's last meeting, on the current Conway plant authorisation & conditions.

APPENDIX 1
DRAFT

Residents' & Environmental Services Policy Overview & Scrutiny Committee Review Scoping Report

Revision of the Air Quality Action Plan for the London Borough of Hillingdon

1. REVIEW OBJECTIVES

Aim and Background to review

The review seeks to make Members aware of the extent of air pollution in Hillingdon, the way that the Council has managed air quality since 2004 and to assist in the development of a revised Air Quality Action Plan (AQAP), as required by the Mayor of London.

In Hillingdon, as in the majority of London Boroughs, the national air quality standard for the pollutant, nitrogen dioxide, is exceeded across areas of the Borough, most notably in the south around Heathrow Airport and also in association with the major road networks such as the M4, the A312, the A40 and the A4 and on busy parts of the Borough road network which pass through the Borough's towns.

Poor air quality has been described as the largest environmental risk to public health in the UK, known to have more severe effects on vulnerable groups, for example the elderly, children and people already suffering from poor health such as respiratory disease. (para 3, page, DEFRA Air Quality Plan, 2017).

In Hillingdon, the public health team has undertaken an assessment which highlights that respiratory diseases are the third highest cause of death in Hillingdon and that air pollution is a risk factor which has been linked to 1,100 life years lost due to aspects such as exacerbations of asthma and Chronic Obstructive Pulmonary Disease (COPD) leading to emergency admissions to hospital. The health effects of air pollution are distributed unequally across the population with the heaviest burden borne by those with the greatest vulnerability and/or exposure. The elderly, children and those with cardiovascular and/or respiratory disease are at greater risk from the health effects of air pollution.

The development of the AQAP will ensure that improvements to health form an important objective in terms of the outcomes of the actions to be included. It is hoped that Members will develop suitable recommendations to Cabinet around the development of the revised Air Quality Action Plan for the Borough.

Terms of Reference

1. To understand the Council's responsibilities on air quality, examine how air quality in Hillingdon has been managed by the Council since 2004, why expected improvements are not as large as predicted and what is now required with the new Mayor of London air quality regime in terms of reviewing the AQAP;

2. To consider the options available for reducing pollution, including actions that can be taken directly by the Council, and identify the best means by which the Council can influence other organisations whose activities detrimentally impact on the air quality in Hillingdon.

3. In terms of the Council, examine the interactions that will be necessary between departments in order to bring about improvements in pollution levels and make a positive contribution to securing improvements to health.

4. To consider how the Council should prioritise air quality improvements, for example, Air Quality Focus Areas, on Borough-wide initiatives, directed towards at-risk/vulnerable groups.

5. To look at measures to best inform residents and local businesses in the Borough of the actions required to reduce air pollution.

6. To advise on the development of the Air Quality Action Plan before its submission to Cabinet for approval.

2. INFORMATION AND ANALYSIS

Key Information

Background

In 2003, following assessments of pollution as required in the legislation set by the Environment Act, the Council declared an Air Quality Management Area (AQMA) for the pollutant nitrogen dioxide. The AQMA boundary was chosen to ensure it covered all the areas that had been predicted to have levels of pollution above the recognised health limit for nitrogen dioxide when measured as a yearly average. The AQMA covers approx the bottom two thirds of the Borough (**see Appendix 1**)

Following on from this declaration, in 2004, an Air Quality Action Plan (AQAP) was developed which looked at measures that could be taken to improve air quality. The Plan recognised that this would require input and actions from a range of sources including the Council itself, the residents, businesses and employees in the Borough plus action from other organisations and businesses whose operations influence the levels of pollution, but over which the Council has no direct control.

The Plan was divided into seven packages which reflected the sources of pollution which needed to be tackled in order to bring about reductions in pollution

- Switching to cleaner transport modes;
- Tackling through traffic
- Promotion of cleaner vehicle technology
- Measures specific to Heathrow
- Measures concerning local businesses and industry
- Improvements through the planning system
- Working with regional and central government

In accordance with the legislative requirements, the Borough has continued to produce annual air quality progress reports for submission to DEFRA. These include an update of the air quality monitoring carried out in the Borough and an update on the actions taken to address air quality. All of this information is publicly available.

Progress to date

Many inroads have been made in terms of measures that have been put in place to improve air quality. The Mayor of London was one of the first regional powers to declare a Low Emission Zone across the whole of London which has restricted access to polluting lorries, buses and coaches; there is published best practice guidance for reducing emissions from large constructions sites; technical guidance for assessing potential pollution impacts from new developments and improvements

have been made in terms of promoting the use of cleaner technologies in buses, lorries, taxis and cars, including the installation of plug in electric charging points across London.

In Hillingdon, the implementation of measures, via the Air Quality Action Plan, has influenced actions across the Council. For example, all schools in the Borough now have travel plans; there are more dedicated cycle and walking paths; new developments are required to produce air quality assessments and include mitigation to reduce their impact on pollution; residents and people working in the borough are able to sign up to a free service, AirText, which alerts users to when a pollution episode is predicted to allow them to take appropriate action; pilot projects have been undertaken in regards to the use of green infrastructure to protect vulnerable receptors from pollution, and there is now Borough-wide enforcement against idling vehicles.

However, despite continued actions by regional and local government over the years, the air quality levels in certain areas still remain above the recommended limits.

The current situation

An assumption of a dramatic reduction in emissions from road vehicles is something the Government has relied upon for a number of years in terms of being the solution to the pollution problem. In reality this has not happened. Data from air quality monitoring stations, confirmed by those within Hillingdon, show that over the more recent years the pollution levels have remained more or less static and indicate little signs of a dramatic reduction. **See Appendix 2**.

Evidence from the increased use of diesel vehicles, along with the "Dieselgate Scandal" in regard to falsification of the actual emissions being emitted by diesel vehicles, has been given as one of the major causes for the lack of improvement of air pollution in urban areas.

New pollution information

The Mayor of London has provided updated pollution information for each London Borough. This information includes a breakdown of the sources of pollution. For Hillingdon this demonstrates that road transport, airport-related emissions, industrial emissions and domestic and commercial heating all contribute to the pollution levels found in the borough. **See Appendix 3 for breakdown**

In addition to this information the Borough has been provided with pollution maps. These updated maps indicate the same distribution of pollution as that for the original Action Plan in 2004 in that the higher levels are found to the south of the

borough, with Heathrow airport an easily identifiable pollution hotspot. The operation of the road network through the Borough such as the A40, the A312, M4, A4, Uxbridge Road, also contribute to the pollution levels and congested high streets and road junctions add to the local levels of pollution.

In addition the GLA has introduced a number of Air Quality Focus Areas where action should be prioritised. A Focus Area is defined as being where there are higher levels of pollution alongside a greater number of people exposed. (**see Appendix 4 for map of nitrogen dioxide and Focus Areas**)

Review of the Air Quality Action Plan

Using the updated pollution information, the GLA expects each borough to take the opportunity to review their AQAPs. The Boroughs are required to consider the following six areas for taking action:

- Emissions from developments and buildings
- Public health and awareness raising
- Delivery servicing and freight
- Borough fleet actions
- Localised solutions
- Cleaner transport

Whilst these areas are similar to the packages outlined in the Borough's original action plan, the Borough is impacted by a number of sources outside its direct control, which detrimentally impact on the air quality in the Borough. This will require the consideration of additional areas for inclusion, such as specific liaison with Heathrow Airport and with the Mayor of London, to ensure measures to improve air quality within Hillingdon are a priority for these organisations. In addition the Borough is impacted by a number of decisions taken by national Government such as hard shoulder running on the M4, expansion of Heathrow Airport, the construction of High Speed 2. The Action Plan will need to include a mechanism by which the Council's concerns can be brought to the attention of national Government.

Responsibilities

In line with the new London local air quality management guidance the action plan is required to be signed off by the Directors' responsible in each Borough for Public Health and for Transport before it is submitted for Cabinet approval. In recognition of

the importance the Council attaches to the issue, the review of the AQAP is also being scrutinised via the Health and Wellbeing Board to ensure air quality and health improvements are integrated in terms of their approach to bring about reductions in pollution.

Achieving air quality improvements will require commitment across the Council, across businesses and residents in the Borough and from the major stakeholders whose actions influence the pollution levels experienced in the Borough. Some of these actions can be achieved via the provision of information and guidance to allow an informed change in behaviour, others will require the enforcement of legislation to bring about reductions, others will need a co-ordinated approach with other stakeholders to bring about improvements.

3. EVIDENCE & ENQUIRY

Information on pollution levels, air quality monitoring and actions currently taken by the Council will be presented along with more detail on what the Mayor of London expects Boroughs to consider plus an overview of the challenges for the Borough such as Heathrow expansion, M4 widening and HS2 construction.

Witness testimony

Witnesses may be invited from:

Public health - to give an overview of the health issues within Hillingdon and what actions could be taken to bring about improvements to health, where/which groups should be prioritised;

AQ experts - to give detail on air pollution levels and what is predicted to happen, information on the sources of pollution, up to date information on measures that can reduce pollution;

Representative from Greater London Authority

Representatives from Council departments on actions, for example:

- **Planning** - overview of Council policy, what the planning system can achieve, what it can't achieve;
- **Transport** - overview of LIP priorities, Healthy Streets Initiative, working with schools, idling vehicles initiative, what issues the boroughs can't control;
- **Procurement** - reductions in energy use through council buildings and assets, improvements in emissions from council fleet, are there financial constraints;

Residents groups or individuals affected by poor air quality? - what are their concerns, what do they perceive as the problem, what do they perceive as the solution?

Lines of enquiry

What are the roles of different departments in the Council for improving air quality, and are there actions to be taken to ensure they work more closely together?

What actions could the Council itself undertake that would make a significant difference to air quality, recognising funding constraints.

How should the council work with other organisations (Heathrow, Transport for London, Highways England, Department for Transport etc.) to improve air quality? What should the council do if these bodies do not provide plans that sufficiently address the problem?

The GLA considers that actions should be initially prioritised in the Focus Areas, is there sufficient evidence to support this view? Is there sufficient evidence to support actions are taken borough-wide? Are there specific at risk groups that should be prioritised?

How should the Council engage with businesses and residents to raise the profile of air quality and provide sufficient information to allow them to bring about changes in behaviour which could aid reductions in pollution?

Emerging conclusions or themes for development

To be developed as the review progresses.

5. REVIEW PLANNING & ASSESSMENT

Proposed timeframe & milestones for the review up to Cabinet and beyond in terms of monitoring:

APPENDIX 1
DRAFT

Meeting Date	Action	Purpose / Outcome
20 September 2017	Draft Scoping Report and introduction from officers	Information and analysis plus witness evidence from internal sources.
17 October 2017	1st Witness session	Evidence & enquiry - witness evidence from internal sources and others
21 November 2017	Witness Session	Evidence & enquiry - witness evidence
24 January 2017	Witness Session	Evidence & enquiry - witness evidence
28 February	Draft Final Report and suggested recommendations	Proposals – agree recommendations and final draft report

* Specific meetings can be shortened or extended to suit the review topic and needs of the Committee

Resource requirements

None.

Equalities impact

The review could examine whether there are specific areas of deprivation within the Borough where there are problems with air quality.

Appendices

1 AQMA
2 Air quality monitoring graph
3 Breakdown of pollution sources
4 Pollution map and Focus Areas

NICE National Institute for Health and Care Excellence

Public Health England

NICE guideline

Air pollution: outdoor air quality and health

NICE guideline

Published: 30 June 2017
nice.org.uk/guidance/ng70

Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

Overview

This guideline covers road-traffic-related air pollution and its links to ill health. It aims to improve air quality and so prevent a range of health conditions and deaths.

Who is it for?

- Local authority staff working in: planning, local air quality management and public health, including environmental health
- Staff working in transport and highways authorities
- Local government elected members
- Employers
- Healthcare professionals, people working in the voluntary sector, non-governmental organisations and education
- Members of the public

NICE worked with Public Health England to develop this guidance.

Recommendations

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Planning

1.1.1 Include air pollution in 'plan making' by all tiers of local government, in line with the Department for Communities and Local Government's National Planning Policy Framework. This includes county, district and unitary authorities, as well as regional bodies and transport authorities. The Local Plan and other strategic planning processes (such as the core strategy, local transport plan, environment and health and wellbeing strategies) should include zero- and low-emission travel, for example cycling and walking (see section 1.6 and NICE's guideline on physical activity: walking and cycling). Other strategies for zero- and low-emission travel could include:

- Providing charge points for electric vehicles in workplaces, commercial developments and residential areas.
- Supporting car sharing schemes or car clubs.

1.1.2 When 'plan making' consider:

- siting and designing new buildings, facilities and estates to reduce the need for motorised travel
- minimising the exposure of vulnerable groups to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high
- siting living accommodation away from roadsides
- avoiding the creation of street and building configurations (such as deep street canyons) that encourage pollution to build up where people spend time
- including landscape features such as trees and vegetation in open spaces or as 'green' walls or roofs where this does not restrict ventilation

- including information in the plan about how structures such as buildings and other physical barriers will affect the distribution of air pollutants.

1.1.3 If the local plan does not address air pollution, consider developing local guidance (such as supplementary planning documents, see the Department for Communities and Local Government information on local plans) on how to design buildings and spaces to improve local air quality until the local plan is amended.

See how the committee made recommendations 1.1.1 to 1.1.3.

1.2 Development management

1.2.1 Consider ways to mitigate road-traffic-related air pollution. This could include:

- Taking action to reduce the number of motorised trips. For instance, by:
  - incorporating air quality outcomes in travel plans
  - developing local parking plans
  - supporting car clubs
  - supporting active travel (see NICE's guideline on physical activity: walking and cycling).
- Supporting the use of zero- and low-emission vehicles for instance, by providing charging facilities for electric vehicles.
- Managing street trees and vegetation to reduce the risk of restricting street ventilation, where this may contribute to poor air quality (for instance, by the choice of species, siting and pruning regimes).

1.2.2 In consultation with local communities, consider including air quality monitoring and measures to reduce road-traffic-related emissions in the Regulation 123 list of funding options for using the Community Infrastructure Levy (see the Planning Portal information on the Community Infrastructure Levy).

See how the committee made recommendations 1.2.1 and 1.2.2.

1.3 Clean air zones

1.3.1 Consider introducing a clean air zone that:

- includes restrictions or charges on certain classes of vehicle
- supports zero- and low-emission travel (including active travel)
- includes targets to progressively reduce pollutant levels below EU limits and aim to meet World Health Organization air quality guidelines
- aims to reduce exposure to air pollution across the whole zone rather than focusing on air pollution hotspots.

1.3.2 Identify which classes of vehicles to restrict or charge in a clean air zone (see recommendation 1.3.1) based on an understanding of local conditions (such as local sources of road-traffic-related pollution and factors influencing dispersion). Use nationally recognised vehicle types (such as the Euro classification for diesel and petrol vehicles).

1.3.3 Work across local authority boundaries to address regional air pollution and prevent migration of traffic and emissions to other communities, resulting in areas of poor air quality.

1.3.4 Consider support for zero- and low-emission travel. This could include:

- Encouraging walking and cycling (see NICE's guideline on physical activity: walking and cycling).
- Encouraging uptake of zero- and low-emission vehicles, for instance:
  - Providing electric charging points.
  - Encouraging public and private sector organisations to use zero- or low-emission vehicles for deliveries to retail, office, residential or other sites in the zone, particularly for the last mile of deliveries in city centres.
- Developing integrated public transport networks (including park and ride schemes) based on low-emission vehicles.

1.3.5 Consider taking action to reduce emissions within the clean air zone. For instance:

- Introducing fuel-efficient driving initiatives including:
  - Bylaws and other action to support 'no vehicle idling' areas, particularly where vulnerable groups congregate (such as outside schools, hospitals and care homes) and in areas where exposure to road-traffic-related air pollution is high.
  - Driver training to reduce emissions (see section 1.4).
  - Actions to smooth traffic flow (see section 1.5).
- Action to minimise congestion caused by delivery schedules.
- Using a fleet recognition scheme (such schemes help fleet operators improve efficiency by reducing fuel consumption and emissions: the system recognises operators who meet best operational standards).
- Addressing emissions from public sector transport activities (see section 1.4).
- Specifying emission standards for private hire and other licensed vehicles.

1.3.6 Where traffic congestion is contributing to poor air quality, consider incorporating a congestion charging zone within the clean air zone.

1.3.7 Consider monitoring outside the zone to identify whether its implementation is causing problems in terms of traffic composition and flow. If so, address any issues identified. For instance, by changing the boundaries to address increased pollution at the margins of the zone or problems caused by diversion of traffic.

1.3.8 Assess the impact of any proposed charges (including exemptions for zero- and low-emission vehicles) on vulnerable groups.

See how the committee made recommendations 1.3.1 to 1.3.8.

1.4 Reducing emissions from public sector transport services and vehicle fleets

Driver training

1.4.1 Consider introducing fuel-efficient driving as part of any test carried out when appointing or re-appraising staff who drive as part of their work.

1.4.2 Consider training staff drivers to reduce their vehicle emissions. This could include:

- reducing rapid accelerations and decelerations, and correct gear selection to improve fuel consumption
- switching off engines, if practical and safe, when parked by the roadside and when dropping off people or deliveries
- vehicle maintenance, including pumping up tyres to the recommended pressure
- emphasising that lower vehicle emissions will reduce both fuel costs and air pollution.

1.4.3 Consider using:

- 'in-vehicle' elements, for instance to ensure vehicles display real-time information about current fuel efficiency, appropriate gear selection and speed
- telematics technology to provide next-day information about driving style.

1.4.4 Consider monitoring fuel efficiency and providing feedback to drivers after training. This could include providing support from colleagues or 'buddies' to improve their driving style and rewards for those who drive efficiently (see NICE's guideline on behaviour change: individual approaches).

1.4.5 Consider monitoring the fleet's fuel consumption and evaluating the local effect on air pollutant emissions to demonstrate the benefits of training on fuel use and air quality.

Procuring public sector vehicles

1.4.6 Consider making low vehicle emissions (nitrogen oxides and particles) one of the criteria when making routine procurement decisions. This could include selecting low-emission vehicles, including electric vehicles.

See how the committee made recommendations 1.4.1 to 1.4.6.

1.5 Smooth driving and speed reduction

1.5.1 Consider promoting a smooth driving style by using:

- speed limits and average speed technology on the roadside
- real-time information to tell drivers what the current optimum driving speed is
- 20 mph limits without physical measures to reduce speeds in urban areas where average speeds are already low (below around 24 mph) to avoid unnecessary accelerations and decelerations
- signs that display a driver's current speed to reduce unnecessary accelerations.

See also recommendations 1.4.1 and 1.4.2.

1.5.2 Where physical speed reduction measures are used to reduce road danger and injuries (20 mph zones – see NICE's guideline on unintentional injuries on the road), consider using them to encourage drivers to maintain a reduced, steady pace along the whole stretch of road, rather than road humps that may increase acceleration- and braking-related emissions.

See how the committee made recommendations 1.5.1 to 1.5.2.

1.6 Walking and cycling

1.6.1 Provide support for active travel (see NICE's guidelines on physical activity: walking and cycling and physical activity and the environment).

1.6.2 Provide a choice of cycle routes, including routes that avoid highly polluted roads. Ideally use quiet streets or segregated routes.

1.6.3 Where busy roads are used consider:

- Providing as much space as possible between the cyclist and motorised vehicles.
- Using dense foliage to screen cyclists from motor vehicles, without stopping air pollution from dispersing or reducing the visibility or safety of cyclists near junctions. Also take into account concerns about personal safety.
- Reducing the time cyclists spend at highly polluted sites, including some junctions, where this can be done without increasing the time that other groups spend exposed to poor air quality.

See how the committee made recommendations 1.6.1 to 1.6.3.

1.7 Awareness raising

1.7.1 Base actions to raise awareness of road-traffic-related air pollution (and so change people's behaviour) on NICE's:

- guideline on behaviour change (general approaches)
- guideline on behaviour change (individual approaches)
- guideline on community engagement (in particular the section on a local approach to making community engagement an integral part of health and wellbeing initiatives).

1.7.2 Ensure healthcare professionals are aware that information on air quality is available, what it means for patients and what actions are recommended.

1.7.3 Consider providing information on air quality (using the Department for Environment, Food and Rural Affairs' Daily Air Quality Index) with weather forecasts and the pollen index. This could be provided through local, national and social media.

1.7.4 Consider providing information on:

- How health is affected by exposure to air pollutants in the long term as well as during specific periods of poor air quality.
- The impact of local pollution on air quality inside, as well as outside, a vehicle (levels of pollution are not always lower inside).

- How to reduce air pollutants and people's exposure, including the need to:
  - Reduce the number of motor vehicle journeys, if possible.
  - Drive in a style that minimises emissions by: avoiding rapid accelerations and decelerations, restricting the time spent with an engine 'idling' and ensuring the vehicle is correctly maintained (see the Energy Saving Trust's driving advice).
- Change routes to avoid highly polluted areas and adding to traffic congestion.

1.7.5 Consider public awareness initiatives such as car-free days or National Clean Air Day to raise awareness of air pollution.

1.7.6 Consider giving businesses information on how they can reduce road-traffic-related air pollution and improve fuel efficiency. For example, they could:

- help their drivers develop an energy-efficient driving style (see section 1.4)
- schedule deliveries to minimise congestion
- encourage employees to cycle to work (see NICE's guideline on physical activity: walking and cycling).

Vulnerable groups

1.7.7 Healthcare professionals should be aware of vulnerable groups who are particularly affected by poor outdoor air quality. When notified of poor outdoor air quality, during any contact with vulnerable groups healthcare professionals should give general advice on how to avoid contributing to levels of air pollution and raise awareness of how to minimise exposure. This could include advice to:

- Avoid or reduce strenuous activity outside, especially in highly polluted locations such as busy streets, and particularly if experiencing symptoms such as sore eyes, a cough or sore throat.
- Use an asthma reliever inhaler more often, as necessary.
- Close external doors and windows facing a busy street at times when traffic is heavy or congested to help stop highly polluted air getting in.

(See also the Department for Environment, Food and Rural Affairs' information about the Daily Air Quality Index.)

See how the committee made recommendations 1.7.1 to 1.7.7.

Terms used in this guideline

This section defines terms that have been used in a specific way for this guideline. For general definitions, please see the glossary.

Electric vehicles

Any vehicle that uses 1 or more electric motors for propulsion. It includes electric bikes and electrically assisted pedal cycles (see the Highway Code information on Electric bikes: licensing, tax and insurance).

Smooth driving

Driving in a way that assesses the road ahead to avoid unnecessary braking and acceleration, which increase the amount of fuel used and emissions.

Street canyons

Streets flanked by buildings on both sides. They can be categorised using the ratio of the height of the buildings to the width of the road, with a deep canyon having taller buildings relative to the width. The geometry of the canyon and its orientation to the prevailing wind influence the flow of air. This can lead to the formation of vortices and the recirculation of air that trap pollutants emitted within the canyon. It can also restrict dispersion, potentially leading to areas of high air pollution.

Vulnerable groups

Children, older people and people with chronic health problems are among the most vulnerable to air pollution. Short-term (for example day-to-day) peaks of elevated air pollution are linked with increased hospital admissions for people with respiratory and cardiovascular conditions. The Royal College of Physician's report on air pollution (Every breath we take: the lifelong impact of air pollution) noted that it can affect the growth of an unborn baby and may be linked to premature birth.

Putting this guideline into practice

NICE has produced tools and resources to help you put this guideline into practice.

Changes should be implemented as soon as possible, unless there is a good reason for not doing so (for example, if it would be better value for money if a package of recommendations were all implemented at once).

Different organisations may need different approaches to implementation, depending on their size and function. Sometimes individual practitioners may be able to respond to recommendations to improve their practice more quickly than large organisations.

Here are some pointers to help organisations put NICE guidelines into practice:

1. **Raise awareness** through routine communication channels, such as email or newsletters, regular meetings, internal staff briefings and other communications with all relevant partner organisations. Identify things staff can include in their own practice straight away.

2. **Identify a lead** with an interest in the topic to champion the guideline and motivate others to support its use and make service changes, and to find out any significant issues locally.

3. **Carry out a baseline assessment** against the recommendations to find out whether there are gaps in current service provision.

4. **Think about what data you need to measure improvement** and plan how you will collect it. You may want to work with other health and social care organisations and specialist groups to compare current practice with the recommendations. This may also help identify local issues that will slow or prevent implementation.

5. **Develop an action plan**, with the steps needed to put the guideline into practice, and make sure it is ready as soon as possible. Big, complex changes may take longer to implement, but some may be quick and easy to do. An action plan will help in both cases.

6. **For very big changes** include milestones and a business case, which will set out additional costs, savings and possible areas for disinvestment. A small project group could develop the action plan. The group might include the guideline champion, a senior organisational sponsor, staff involved in the associated services, finance and information professionals.

7. **Implement the action plan** with oversight from the lead and the project group. Big projects may also need project management support.

8. **Review and monitor** how well the guideline is being implemented through the project group. Share progress with those involved in making improvements, as well as relevant boards and local partners.

NICE provides a comprehensive programme of support and resources to maximise uptake and use of evidence and guidance. See our into practice pages for more information.

Also see Leng G, Moore V, Abraham S, editors (2014) Achieving high quality care – practical experience from NICE. Chichester: Wiley.

Context

The major human sources of air pollution are the combustion of fuels for heat, electricity and transport. Road transport accounts for 31% of nitrogen oxides (NO_x), 19.5% of $PM_{2.5}$ and 18% of PM_{10}[1] UK emissions. It frequently accounts for more than 64% of air pollution at urban monitoring sites (Road traffic's contribution to air quality in European cities European Topic Centre on Air Pollution and Climate Change Mitigation). This comes from exhausts and other sources such as the wear of tyres, brakes and the road.

Non-exhaust sources account for around 21% of $PM_{2.5}$ from vehicles. As exhaust emissions are reduced, the relative contribution from other sources becomes more significant.

In 2008, the effect of human-produced (anthropogenic) particulate air pollution on mortality in the UK was estimated as equivalent to nearly 29,000 deaths at typical ages, and an associated loss of total life of 340,000 life years (COMEAP: mortality effects of long-term exposure to particulate air pollution in the United Kingdom Public Health England).

In 2010 the total mortality burden of anthropogenic $PM_{2.5}$ in London was 52,630 life years lost and of long-term exposure to NO_2 was up to 88,113 life years lost (Understanding the health impacts of air pollution in London King's College London). This figure assumes the World Health Organization value of up to a 30% overlap between the effects of $PM_{2.5}$ and NO_2. The authors note that the figure for NO_2 is much less certain than that for $PM_{2.5}$.

The health impact of $PM_{2.5}$ pollution from human activities in the UK is estimated to cost between £8.5 billion and £18.6 billion a year (Ambient air quality UK Parliament).

Over recent decades air pollutant emissions have reduced. But in 2013, UK levels of nitrogen dioxide (NO_2) exceeded the EU directive limit in 38 of 43 geographical zones[2] (Directive 2008/50/EC European Commission).

The way air pollution is distributed is not straightforward. Pollutant concentrations vary:

- The most deprived areas tend to have higher concentrations of NO_2 and PM_{10}.
- Regardless of socioeconomic status, urban areas tend to have higher pollutant levels than rural areas, which often have larger populations in the mid-range of deprivation.

The national trend shows high average concentrations in both the most and least deprived areas, and lower concentrations in the (predominantly rural) mid-decile areas.

Children (14 and under) and older people (65 and older) are more susceptible to the effects of air pollution (Air quality and social deprivation in the UK: an environmental inequalities analysis Department of Environment, Food and Rural Affairs).

Addressing air pollution by encouraging people to walk and cycle rather than drive, can help people to become fitter and healthier. Changing the way we travel can also help reduce emissions of greenhouse gases that contribute to climate change. Climate change is linked to increased risk of extreme weather and other events that have an adverse effect on health, such as floods, heatwaves and the spread of some infectious diseases (Climate change 2013: the physical science basis Intergovernmental Panel on Climate Change Working Group I).

More information

You can also see this guideline in the NICE pathway on air pollution.

To find out what NICE has said on topics related to this guideline, see our web page on behaviour change, environment and transport, and on cardiovascular and respiratory conditions.

See also the evidence reviews and information about how the guideline was developed, including details of the committee.

[1] Particulate matter is produced by, among other things, combustion of fossil fuels or abrasion of tyres and brakes. Particles are classified by size, described using the abbreviation PM with a suffix (commonly 2.5 or 10) that gives the maximum particle size in micrometres. The mass concentration of particles is usually expressed in micrograms per m^3 of air.

[2] The UK is divided into 43 zones for assessing air quality and reporting compliance with EU targets. These zones generally include more than 1 local authority (Air quality plan for the achievement of EU air quality limit values for nitrogen dioxide (NO_2) in the UK, 2015 Department for Environment, Food and Rural Affairs.)

The committee's discussion

Evidence statement numbers are given in square brackets. See 'The evidence' at the end of each section for details.

Overview

The committee discussions below relate to all the recommendations.

Key pollutants

Various air pollutants are related to road transport including carbon monoxide, benzene and volatile organic compounds (VOC). This guideline focuses on particulate matter and NO_2 because these have the greatest impact on health at levels currently seen in the UK. The committee heard evidence that both long- and short-term exposure to air pollution adversely affects health and that fine particles and NO_2 are both important contributors [EP1].

Members noted that various metrics are used for particulate pollution including size (such as $PM_{2.5}$, PM_{10} and ultra-fine particles), particle numbers and particle composition (such as black carbon and elemental carbon). They also noted a possible causal relationship between road-traffic-related air pollution and negative health outcomes, and that black carbon is an indicator for such pollution.

Short-term exposure (over hours or days) to elevated levels of air pollution can lead to:

- effects on lung function
- exacerbation of conditions such as asthma
- increases in hospital admissions and mortality.

Epidemiological studies have shown that long-term exposure (over several years) reduces life-expectancy, mainly because of increased risk of mortality from cardiovascular and respiratory causes and from lung cancer [EP1].

The committee agreed that studies of interventions related to air pollutants are important but often carried out by disciplines other than public health and focus on environmental or road-traffic-related effects rather than health outcomes.

The committee agreed that measures of particles and nitrogen oxides (NO_x) were a key indicator of road-traffic-related air pollution so members focused on these as a proxy for health outcomes. The connection between fuel efficiency and emission of air pollutants is well known, so proxy measures such as fuel efficiency are also useful if other metrics are not available.

Limits, guidelines and indicator values

Maximum levels of outdoor air pollutants that affect health, such as particles (PM_{10} and $PM_{2.5}$) and NO_2, are set out in the 2008 Ambient Air Quality Directive (2008/50/EC) [EP2]. This was made law in England through the Air Quality Standards Regulations 2010, which sets targets and mandatory limits for levels of outdoor air pollutants. Equivalent regulations exist in Scotland, Wales and Northern Ireland.

There is also a public health outcomes framework indicator on air pollution. The June 2017 indicator is:

- 'fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution (measured as fine particulate matter, $PM_{2.5}$)'.

In addition, the committee was aware of guideline values, including for $PM_{2.5}$, PM_{10} and NO_2, in the World Health Organization's Ambient (outdoor) air quality and health.

Members noted that there is little evidence to suggest a threshold below which no adverse health effects would be anticipated. So reducing pollution below the EU limits will provide even more health benefits.

Additional impacts

The committee agreed that interventions to address air pollution are also likely to help reduce climate change from emissions of CO_2. Interventions that support a shift to active transport, like walking or cycling, will also lead to potentially substantial health benefits, mainly associated with increased physical activity levels.

The committee noted that a number of recommendations, principally those on planning, might have other impacts on health as a result of changes to, and use of, the built and natural environment. For instance, physical changes (such as changes that alter temperature or provide shade) might help prevent both overexposure to heat and skin cancer.

In addition, changes in the way the environment is viewed and used could mean more people socialise in that environment. Planning changes can also influence economic activity (and so, in turn, the health) of an area. But these issues were out of scope of the current guideline.

The committee noted that it was important to link information about air pollution to other health advice, such as the benefits of physical activity and the importance of social contact (see NICE's guideline on older people: independence and mental wellbeing).

Multiple interventions

Generally, the evidence gathered for this guideline examined single interventions. The committee felt that single, small scale actions were unlikely to lead to the significant reduction in air pollution needed to protect health. Although there was no evidence to demonstrate the effect, members agreed that multiple interventions, each producing a small benefit, would be likely to act cumulatively to produce significant change.

Monitoring

The committee agreed that although evidence suggests an intervention may produce a particular effect, local factors such as the type of vehicles involved, topography and weather conditions can all have an impact. It also agreed with evidence that air quality monitoring will be an important part of most large-scale changes – before and after implementation [EP2]. The committee noted that traffic data for most roads is currently ad-hoc and of low quality. Measurements of traffic will provide the high quality information needed for planning changes.

The committee noted that there was a risk that intended changes would erode over time as drivers became used to the change and readjust their behaviours. Continual monitoring of the effect of schemes and adjustments to them will probably be needed to ensure that positive, progressive effects are achieved.

Euro standards

A recognised approach to tackling air pollution has been to develop plans and initiatives to encourage cleaner vehicles and to work with transport authorities to discourage high polluting vehicles from entering certain geographical areas. This is based on the assumption that newer vehicles will produce lower emissions.

The committee heard that tail-pipe emissions from vehicles are regulated under a series of European Directives (commonly referred to as Euro standards) for all types of vehicles [EP3]. The

standards currently extend from Euro 1 to Euro 6 for cars and vans, and from Euro I to Euro VI for heavy goods vehicles (HGVs), buses and coaches.

The Euro standards have introduced progressively tighter emission limits for various air pollutants, but they have not led to a corresponding reduction in concentrations of NO_2. The committee heard that this is because of a difference in emissions during test procedures compared with 'real world' driving, combined with an increase in the number of diesel vehicles on the road.

The committee heard that the latest Euro standard (6/VI) requires manufacturers to adhere to tighter standards of emissions. Although NO_x emissions from Euro 6/VI diesel vehicles in normal use may be higher than the standard might suggest, they will be substantially lower than Euro 5/V vehicles. From September 2017, emissions tests for cars will include on-road tests as opposed to the laboratory tests that have been used to date. This is already a requirement for heavy duty vehicles.

Equality issues

The committee heard that children, older people and those with chronic health problems are among the most vulnerable to air pollution [EP1]. In addition, more deprived urban neighbourhoods often experience higher levels than more affluent areas. So any reduction in air pollution is likely to help tackle health inequalities. But at the same time, these vulnerable groups are less likely to be able to afford a new vehicle with low emissions and could be disadvantaged by any changes to restrict older, more polluting vehicles.

Overall, the committee agreed that removing older vehicles from the road would reduce health inequalities, provided these groups could get to the places and services they need.

Cost effectiveness

The economic modelling was based on assessments of specific interventions that had demonstrated effectiveness. It suggests those interventions could be highly cost effective in some settings. But both the effect and cost of any intervention will be highly dependent on factors specific to the local setting, so this may vary considerably from the case studies. A key limitation is that there were no data on pollution dispersal in relation to population for any of the case studies modelled.

Some identified benefits could not be quantified, suggesting that the overall benefits might be greater than the figure given. So the committee concluded that interventions could offer good value for money.

The evidence

The committee looked at evidence in:

- Expert testimony on key issues in the epidemiology of air pollution and health: Expert paper 1 (EP1).
- Expert testimony on national and local frameworks for action: Expert paper 2 (EP2).
- Expert testimony on the use of Euro Standards to control vehicle emissions: Expert paper 3 (EP3).

Planning

The discussion below explains how the committee made recommendations 1.1.1 to 1.1.3.

Rationale and impact

Why the committee made the recommendations

1.1.1

Some evidence suggests that strategic plans can have an important influence on air pollution. Based on the epidemiological evidence on the health impacts of air pollution, particularly for vulnerable groups, and committee consensus, the committee recommended several approaches. This includes action to encourage a move to zero- and low-emission travel (including active travel) by linking to the existing NICE guideline on walking and cycling.

1.1.2

Some expert testimony, supported by the committee's own expertise, suggests that the layout of new developments will affect motorised travel.

The committee agreed that it is important to take account of how air pollution disperses and where people spend time because these factors will influence their exposure.

Some evidence showed that street trees and green walls or roofs have a mixed effect on street air quality – in some cases they restrict street ventilation causing poorer air quality, in others, they improve it.

Because the evidence was uncertain, the committee recommended this as an action to consider.

1.1.3

The committee agreed by consensus that if air pollution is not included in the current local plan, other local policies should be developed until it is updated. Because the evidence was uncertain they recommended this as an action to consider.

Why we need recommendations on this topic

Our built environment can affect the emission of road-traffic-related air pollutants by influencing how, and how much, we travel. It can also affect the way air pollutants are dispersed (through street design and the resulting impact on air flow). Some areas experience poor air quality from motor vehicles passing through (rather than travel within) an area.

Air pollution issues are not always incorporated into local plans, making it difficult to reject a proposal that would have adverse effects.

Physical features (such as buildings, barriers, vegetation and landscape) influence the way air pollution moves and disperses and can sometimes create high pollution levels where people spend time. For instance, trees don't always reduce air pollution: it depends on the street design, species, number and siting of trees, canopy density, time of year and wind direction relative to the street.

Impact of the recommendations on practice

Only a limited amount of new building occurs at a time, but it will have an impact on road-traffic-related air pollution for decades. In addition, relatively small changes in the layout of buildings (such as the siting of air vents away from the roadside or small increases in distance from sources of pollution) might have an important impact on residents' exposure to air pollutants.

Addressing these and other issues at the planning stage may reduce the need for more expensive (and probably less effective) remedial action at a later date.

Evidence discussion

Interpreting the evidence

The outcomes that matter most

The committee agreed that the most important outcomes are health outcomes (for instance, mortality or exacerbations of respiratory conditions). But these are not usually measured directly in studies of air pollution, which rely instead on examining air pollutants. The most important of these are:

- ambient levels of particles, in particular $PM_{2.5}$
- ambient levels of NO_2.

Other outcomes relating to the need to travel and choice of vehicles are also likely to be relevant to planning interventions.

The quality of the evidence

The committee considered evidence on the impact of air pollution on health, particularly for vulnerable groups. This was from expert paper 1 but was based on the work of the Committee on the Medical Effects of Air Pollutants (COMEAP). Members also considered evidence on the impact of planning on air pollution. This was from expert paper 6 but was based on guidance produced by Environmental Protection UK and the Institute of Air Quality Management. Members agreed that both of these represented good quality evidence that could be used to support recommendations.

The committee considered the evidence of effectiveness of natural and artificial barriers in terms of impact on air pollutants.

- Five studies (4 from the USA, 1 from the UK) looked at barriers alongside major roads. All were rated as poor quality and so at high risk of bias [ES4.1a, ES4.1b].

Two of these studies examined solid noise barriers. They found that although barriers reduced air pollution in the immediate lee of the barrier, levels at some distance away were higher than without the barrier [ES4.1a].

The committee considered 3 modelling studies (2 from Belgium, 1 from the UK) that examined the impact of street trees and vegetation on air pollution [ES4.4]. One study was rated as moderate quality and 2 were rated as poor quality. They found that:

- Vegetation that does not interfere with air flow in a street canyon (such as green roofs or walls, or vegetation not situated within a street canyon) may reduce air pollution.
- Street trees were unlikely to reduce air pollution in most street designs and could worsen it in some cases.

The committee felt that the studies were plausible. No effectiveness studies were found.

Another 3 studies (1 from the UK, 1 from France, 1 from the US), rated as poor quality, agreed with what the committee knew about placing and maintaining trees but did not reduce the uncertainty in the evidence about their effects in any particular direction [ES4.4]. This further supports the need for additional research and the research recommendation developed by the committee.

Members agreed that specific factors in the individual settings were highly important in determining the outcome. However, they felt it was appropriate to recommend caution when using street trees and not to consider them as always being beneficial, because if they are poorly placed or maintained this may affect ventilation at street level and inadvertently create a canopy that traps air pollutants.

The committee agreed that the limited number of effectiveness studies (and the absence of corroboration of the findings of modelling studies around the effects of street trees) represented a gap in the available evidence base.

Benefits and harms of including air quality in plan making

Benefits include:

- New developments that do not exacerbate poor air quality or expose people to high levels of air pollution and that encourage zero- and low-emission travel (including active travel).
- Reduced risk of inadvertent exposure of people to poor air quality from the redistribution of pollution.
- Use of trees to encourage deposition of air pollutants, to reduce heat stress, provide shade and create a more attractive environment – all of which benefit health without inadvertently creating areas of poor air pollution.

Potential harms include:

- Using trees in areas where they do reduce ventilation.

- Using barriers in a way that creates poorer air quality (see also 'additional impacts' in the overview at the start of the committee discussion).

The evidence reviewed did not focus on the unintended consequence of interventions that may increase allergen levels.

Cost effectiveness and resource use

Taking air pollution issues into account at the plan making stage involves additional cost for training in relevant issues and could have an impact on public consultation. However, this is likely to be relatively small. There will be a cost impact for developers. This may extend beyond the initial site if changes to infrastructure are needed.

The committee did not recommend widespread use of green walls and roofs. The evidence from the reviews (based on modelling studies) suggests that these may improve air quality in some circumstances (where it does not reduce ventilation in the street). However, the committee felt that the very high resource impact for retrofitting green walls and roofs to existing buildings was not likely to be cost effective in terms of air pollution reduction alone. But they may be appropriate for new buildings.

Other factors the committee took into account

The committee agreed that urban trees and greenery play an important part in the urban landscape. They provide a number of positive benefits, including health benefits.

Leaves and branches slow air currents, causing pollutants to settle out. They may also act as 'sinks' for particles and chemicals that may have direct or indirect effects on air quality (in particular, VOCs). The extent to which this is the case depends on factors such as species, time of year and growing conditions.

The impact of trees on ventilation in a street canyon will influence their impact on air quality. Ventilation will vary according to the size, distribution and species of tree and their position within the canyon. For instance, air quality might deteriorate at street level near vehicle sources if ventilation were restricted, while improving near first floor windows above the canopy.

Although it is important to avoid the possible negative effects, it is also important to recognise the positive benefits of properly selected, sited and managed trees.

The committee discussed the dispersion of air pollutants by solid barriers. They agreed this is complex and depends on a range of local factors. There is some evidence to suggest that barriers may result in improved air quality near to the barrier but poorer air quality at a distance. As a result, air quality may be affected downwind from a roadside barrier. The impact on health will depend on the details of this dispersion and on where people live or spend time in relation to the barrier.

The committee noted that there was a concern that some local authorities might adopt the recommendations but others may not. This could mean that developers focus on areas with fewer controls, resulting in a loss of investment for those aiming for better air quality. It noted that recommendations to all local authorities might lead to a more consistent approach, to the benefit of all. It also noted members' experience of the benefits of a good quality environment in attracting developers.

The evidence

The committee looked at evidence in:

- Evidence review 1 on environmental change and development planning: ES4.1a, ES4.1b, ES4.4.
- Expert testimony on key issues in the epidemiology of air pollution and health: Expert paper 1 (EP1).
- Expert testimony on the role of the local authority planning regime in delivering improvements to ambient air quality and in reducing public exposure to pollution: Expert paper 6 (EP6).

Development management

The discussion below explains how the committee made recommendations 1.2.1 to 1.2.2.

Rationale and impact

Why the committee made the recommendations

1.2.1

Evidence on actions to address road-traffic-related air pollution suggested that travel plans could offer an opportunity to re-evaluate journeys to work and help a more general move away from car travel. Committee members also noted from their experience that these plans could support zero- and low-emission travel and could be implemented as part of the planning approval process.

Evidence indicated that the species, siting and management of trees and vegetation is important in reducing the risk of adversely affecting air quality.

Because the evidence was uncertain the committee recommended this as an action to consider.

1.2.2

Based on their expertise, the committee agreed that it is appropriate to use funds from developers, via the Community Infrastructure Levy, to pay for work to address air pollution issues. They also agreed that this is best carried out in consultation with local communities. Because the evidence was uncertain the committee recommended this as an action to consider.

Why we need recommendations on this topic

Local development plans do not always address traffic-related air pollution.

Impact of the recommendations on practice

If action to reduce traffic-related air pollution is incorporated in the development plans for new buildings and estates, this will help maintain people's health and wellbeing, both in terms of reducing pollution levels and encouraging physical activity. In turn, this may help reduce the need for NHS treatment and other support in the future.

Evidence discussion

Interpreting the evidence

The outcomes that matter most

The committee agreed that the most important outcomes are health outcomes (for instance, mortality or exacerbations of respiratory conditions). But these are not usually measured directly in studies of air pollution, which rely instead on measuring air pollutant levels. The most important of these are:

- ambient levels of particles, in particular $PM_{2.5}$
- ambient levels of NO_2.

Other outcomes relating to the need to travel and choice of vehicles are also likely to be relevant.

The quality of the evidence

The committee considered evidence on the impact of air pollution on health, including for vulnerable groups. This was from expert paper 1 but was based on the work of the Committee on the Medical Effects of Air Pollutants (COMEAP). Members also considered evidence on the impact of planning on air pollution. This was from expert paper 6 but was based on guidance produced by Environmental Protection UK and the Institute of Air Quality Management. Members agreed that both of these represented good quality evidence that could be used to support recommendations.

Evidence relating to travel plans consisted of 2 poor-quality studies [ES9.1a]. Both were carried out in the UK so the evidence is directly applicable. Both looked at changes in mode of travel, rather than air pollutant emission or air quality data. They focused on travel plans in workplaces. The studies suggest that information on, and the provision of facilities to support, other travel modes could reduce the number of people driving to work alone.

The committee also considered a qualitative study from the UK on factors influencing the uptake of travel plans [ES9.1b]. The committee felt that this evidence was applicable to wider settings.

The committee considered the evidence of effectiveness of natural and artificial barriers (see the discussion of recommendations 1.1.1 and 1.1.2 above) and the management of trees and vegetation.

- Five studies (4 from the USA, 1 from the UK) looked at barriers alongside major roads. All were rated as poor quality and so at high risk of bias [ES4.1a, ES4.1b].

Members agreed that factors such as siting, pruning and species were important in determining the outcome [ES4.4]. So it was appropriate to recommend considering these factors to avoid creating a canopy that traps air pollutants, ensuring air pollution is reduced and ensuring we gain the other benefits from sensitive use of trees and vegetation.

Benefits and harms of including air pollution in development management

Benefits include:

- New developments that do not exacerbate poor air quality or expose people to high levels of air pollution and that encourage zero- and low-emission travel (including active travel).
- Reduced risk of inadvertent exposure of people to poor air quality from the redistribution of air pollutants.

- Use of trees to encourage deposition of air pollutants, reduce heat stress, provide shade and create a more attractive environment – all of which benefit health without inadvertently creating areas of poor air pollution.

Potential harms include:

- Using trees in areas where they do reduce ventilation.
- Using barriers in a way that creates poorer air quality (see also 'additional impacts' in the overview at the start of the committee discussion).

Cost effectiveness and resource use

Taking air pollution issues into account at the development management stage involves additional cost for training in relevant issues, assessment of planning applications and any additional impact on public consultation. However, this is likely to be relatively small. There will be a cost impact for developers. This may extend beyond the initial site if changes to infrastructure are needed.

Other factors the committee took into account

The committee agreed that urban trees and greenery play an important part in the urban landscape. They provide a number of positive benefits, including health benefits.

The committee agreed that local planning and transport officers, in consultation with air quality or pollution control officers, are best placed to ensure that trees and barriers are used effectively in urban areas.

The committee agreed that parking plans (including park and ride plans) are an important way to help reduce motorised trips and avoid the traffic congestion that can be caused when people are having to spend time searching for a parking space.

The evidence

The committee looked at evidence in:

- Evidence review 1 on environmental change and development planning: ES4.1a, ES4.1b, ES4.4.
- Evidence review 3 on travel planning and other initiatives providing information, advice, education and skill development: ES9.1a, ES9.1b, ES10.1.

- Expert testimony on key issues in the epidemiology of air pollution and health: Expert paper 1 (EP1).
- Expert testimony on the role of the local authority planning regime in delivering improvements to ambient air quality and in reducing public exposure to pollution: Expert paper 6 (EP6).

Clean air zones

The discussion below explains how the committee made recommendations 1.3.1 to 1.3.8.

Rationale and impact

Why the committee made the recommendations

1.3.1

Some evidence suggested that area-wide action is needed to reduce the use of polluting vehicles and to encourage a shift to zero- and low-emission travel.

Some of this evidence showed that existing low-emission zones (the current nearest equivalent to a clean air zone) have only slightly improved air quality. This is partly because of the failure of new technology to reduce individual vehicle emissions under real driving conditions. But it is also probably linked to the limited scope of existing low-emission zones, in terms of class of vehicles restricted, and the failure to address the overall volume of traffic.

Some evidence suggested that reducing air pollution below current EU limits would provide more health benefits. The committee agreed that stricter targets should be considered because there is a lack of evidence on how effective a lower threshold would be. They also recognised that there are likely to be greater health benefits if pollution is lower than the legislative limits, so reduction to these limits is a minimum and should not be the maximum target for reducing air pollution. Members agreed that targets should be developed with health goals in mind but that, in practice, these will be expressed as air pollution targets.

Members agreed that the focus should not be limited to taking action to reduce air pollution hotspots alone.

Because the evidence was uncertain the committee recommended this as an action to consider.

1.3.2

Cost effectiveness evidence suggested that low-emission zones could be cost effective. Committee members agreed that it was important to aim for consistency across the country, particularly in relation to the vehicle types that are restricted.

1.3.3

Both air pollutants and their sources are mobile, so actions in one area may affect another. No evidence looked at this empirically, but the committee agreed it would be useful to take a wider geographical approach, involving cooperation across local authority boundaries. The evidence was uncertain (based on committee consensus) but the committee felt it was particularly important not to simply move the problem to another community so they made a strong recommendation.

1.3.4

The committee noted that active travel (such as walking and cycling) was linked to a range of other health benefits. This is covered by evidence used to develop other NICE guidelines.

Some evidence suggested potential benefits could be gained from using zero- and low-emission vehicles. This supported expert testimony on the actions of the Department for Environment Food and Rural Affairs to speed up the transition to a low-emission economy. The committee agreed that infrastructure (in particular, charging points) is needed to achieve significant uptake of zero- or low-emission motor vehicles.

Because the evidence for all these actions was uncertain, the committee recommended these as actions to consider.

1.3.5

There was some evidence on addressing driving style and traffic flow and this supported the committee's knowledge of how air pollution is produced. They agreed that training to reduce idling and to encourage people to change their driving style is unlikely to have any negative effects.

No direct evidence was found on local deliveries or private hire vehicles. However, based on the committee's experience, they suggested action to combat the large contribution that they can both make to air pollution.

They agreed that air pollution from congestion related to deliveries might be addressed by thinking about delivery schedules and by training and accreditation of fleets using a fleet recognition scheme. In addition, it may help reduce fuel use resulting in reduced emissions. Because the evidence was uncertain, they recommended this as an action to consider.

1.3.6

Some evidence, together with the committee's experience, suggested that congestion charging could contribute to a package of measures and incentives to address air pollution where congestion was identified as a significant cause. Because the evidence was uncertain, the committee recommended this as an action to consider.

1.3.7

Members agreed that it was important to monitor outside the zone to identify whether traffic is moving elsewhere and resulting in poor air quality in those areas. They also agreed that adjustments should be made in such cases. Because the evidence was uncertain (committee consensus), the committee recommended this as an action to consider.

1.3.8

The committee agreed that people living in deprived areas are more likely to be exposed to higher levels of air pollution and so might gain more from changes that reduce it. But at the same time, they may be less likely to be able to afford new vehicles and so might be disadvantaged by a charging scheme. The committee agreed that the potential impact that charging may have on inequalities should be taken into account. This was based on uncertain evidence (committee consensus) but the committee felt it was particularly important so they made a strong recommendation.

Why we need recommendations on this topic

Piecemeal, uncoordinated actions to tackle air pollution may make the situation worse. For example, the use of single interventions such as 'alternate car days', in which half the vehicle fleet is banned from an area on alternate days, may inadvertently encourage the use of older, poor performing vehicles.

Similarly, if different vehicle types are not classed in the same way in all clean air zones, then the overall impact will be diminished.

Impact of the recommendations on practice

Planning, transport and environment departments will need to work together across the country to ensure a consistent approach. More consistent, concerted action to change current practice will, in turn, improve people's health, by:

- reducing the ill effects of air pollution
- encouraging more people to become more active, by adopting active travel as a lifestyle choice.

Evidence discussion

Interpreting the evidence

The outcomes that matter most

The committee agreed that the most important outcomes in the absence of measured health outcomes are a reduction in the following air pollutants:

- Particles, especially $PM_{2.5}$ and the vehicle-related components of $PM_{2.5}$ (such as black carbon)
- NO_2.

Ideally these outcomes should be measured in the ambient air (the air that we breathe). But for many outcomes, changes in total emission levels or vehicle kilometres driven suffice and have been used to determine the effect of interventions.

The committee noted that ambient NO_2 concentrations are more sensitive to changes in local transport than total $PM_{2.5}$.

Other relevant outcomes include changes in number and type of vehicles in the zone.

The quality of the evidence

The committee considered the evidence of effectiveness for various elements of clean air zones:

- Six studies of low-emission zones (2 from the Netherlands, 3 from Germany and 1 from the UK) found some evidence of reductions in pollution, particularly with more stringent restrictions on vehicle classes [ES6.3]. Four studies were rated as moderate quality and 2 as poor quality. All were at some risk of bias but overall the committee considered the evidence sufficient to support the recommendations.

- Two cost effectiveness studies (1 from Italy and 1 from Sweden) that examined congestion charging zones in Milan and Stockholm, suggested that they were cost effective, although local factors mean that they are only partially applicable to the UK [ES6.2]. Both studies were rated as moderate quality.

- Four modelling studies of the use of alternative fuels (3 poor quality from Spain and 1 poor quality from the UK) showed the potential for considerable improvements in air quality from fuel changes if the penetration of the technologies is large enough [ES3.3]. As modelling studies, they involve greater uncertainty. However, the committee agreed that that they support the recommendations.

- Five studies of traffic restrictions (1 each from Italy, Korea and Israel, 2 from the US) suggested that vehicle restrictions or bans have little impact unless they restrict the volume of traffic substantially [ES5.1]. All were at some risk of bias, 3 were rated as poor quality and 2 as moderate quality.

- Three studies (2 from the UK, 1 from Italy) looked at congestion charging schemes [ES6.1]. All were at risk of bias (rated as poor quality) but committee members agreed with the evidence from their expert perspectives. The study from Italy found some reduction in elements of road-traffic-related air pollution.

- Three moderate-quality cost-effectiveness studies (from the US) looked at changes to vehicle fleets [ES3.4]. These suggested that changes to emission-controlled diesel or compressed natural gas were not cost effective when viewed against medical interventions. However, they were within the range normally considered cost effective for interventions to address mobile or stationary air pollution.

- One poor-quality study from the US found that a 10% to 20% reduction in fuel consumption could be obtained by using wireless technology to inform drivers of the appropriate speed on major roads [ES11.1].

- Two studies (1 from Canada and 1 from the Netherlands) looked at the impact of information and training on driver behaviour [ES11.2]. Both were rated as poor quality. They suggested that information and training might help reduce fuel consumption and time spent idling.

- The effect of anti-idling information campaigns for bus drivers was considered in 2 linked studies from the US [ES11.4]. Both were rated as poor quality and so at risk of bias. They suggested that such campaigns could reduce the time school buses spent idling.

The committee considered the evidence of effectiveness of charging zones on air quality.

- Three studies (2 from the UK, 1 from Italy) looked at charging schemes [ES6.1]. All were rated as poor quality. The studies from the UK failed to find clear evidence of reductions in air pollution. This may in part be because of the failure of Euro standards to produce the modelled benefits. The study from Italy suggested that there were some reductions in particulate air pollution most heavily linked to vehicle use. However, it is possible that there are differences in the vehicle fleet between Italy and the UK, meaning that this is only partially applicable. The committee agreed that this evidence supported the recommendations.
- Two cost effectiveness studies (1 from Sweden rated as moderate quality and 1 from Italy rated as moderate quality) looked at the costs and benefits of congestion charging schemes [ES6.2]. Both were at some risk of bias. Both suggested greater benefits than costs. However, the main benefits came from changes to traffic flow, travel time savings and reductions in road injuries, rather than from air pollution savings. Local factors (such as the limited number of access points to the islands of Stockholm and differences in the vehicle fleet) mean that the evidence is partially applicable. The committee agreed that this evidence supported the recommendations.

Benefits and harms of clean air zones

Benefits include:

- Discouraging use of the most polluting vehicles, by restricting their access to some areas or by encouraging zero- or low-emission travel, will improve local air quality.
- Increased levels of physical activity from encouraging 'active' travel.
- A reduction in health inequalities by reducing vulnerable groups' exposure to poor air quality.

Potential harms arise from:

- Approaches covering only limited classes of vehicles or geographical areas not reducing emissions sufficiently, or moving the pollution elsewhere.
- People who depend on highly polluting vehicles or older vehicles that do not meet current emission standards not being able to afford to replace them.

Cost effectiveness and resource use

Large-scale schemes such as city-wide clean air zones (that can include low-emission zones) can be expensive to set up – but they can deliver substantial benefits. They also target a large population, meaning that the cost per head of population is likely to be relatively low.

Much of the cost relates to setting up. Running costs are likely to be substantially lower (and potentially covered by charges or fines). Ongoing income can then be used for other activities to reduce air pollution. Demonstrating a link between income raised and funding activities to reduce air pollution is likely to encourage public support for the actions.

Evidence in the economic modelling suggested an annual cost of around £2 per head for the Amsterdam low-emission zone. Although a clean air zone involving a range of interventions might be more expensive, the committee felt this was likely to have an additive positive effect.

There are no data for clean air zones so the economic model considered 1 component – low-emission zones. It estimated a cost per quality-adjusted life year (QALY) of around £2,240. The committee noted this is likely to decrease as vehicle fleets progressively improve because of regulation, unless restrictions evolve to take into account improving vehicle standards. Nevertheless, because they have a benefit–cost ratio of around 29 (that is, £29 of benefit for every £1 spent) the committee considered the impact of these zones is unlikely to stop representing good value for money.

Interventions to encourage reductions in vehicle idling were included in the economic modelling. Using a study that assessed the impact of a campaign to tackle bus idling at 4 schools in Cincinnati the model estimated a cost per QALY of £157 and a benefit–cost ratio of 44. The committee noted the benefit was based on the best-performing school, some schools showed no improvement The committee felt that it was reasonable to extrapolate from this to interventions aimed at reducing idling more widely.

Other factors the committee took into account

The committee heard about the draft national clean air zone framework (Air quality plan for nitrogen dioxide in UK Department for Environment, Food and Rural Affairs) that aims to achieve compliance with the EU NO_2 limit values and the implementation of clean air zones [EP5]. Members noted that evidence about the effectiveness of clean air zones does not exist because they have yet to be implemented. However, they heard evidence about actions that might constitute a clean air zone (in particular low-emission zones) [EP2]. The committee heard expert testimony on influencing drivers' behaviour [EP4] which noted that better driving can reduce emissions and fuel consumptions.

The committee noted that the contribution of diesel cars to NO_2 pollution was substantial [EP3]. Which vehicle types need to be restricted in a particular area to protect health would need to be assessed in light of local conditions. This would include assessing the timetable to implement

changes and amending restrictions if modelled targets for health goals are not achieved, including the possibility of an introductory advisory-only restriction.

Members discussed providing parking concessions for lower-emission vehicles, such as electric vehicles, as an incentive for people to buy them. But they felt that such subsidies would be going to people who can afford expensive vehicles. In addition, in areas of high housing density, off-street space for charging electric vehicles is rare. So support for on-street charging would be necessary to alleviate any potential inequalities this may cause.

The committee agreed that the bulk of the actions would need to be taken by transport authorities. These are located in county council and unitary authorities. Environmental issues may be located in other authorities such as district councils. Directors of public health should sign off annual status reports and air quality management action plans. The committee felt that it was appropriate to target recommendations at these groups.

The committee agreed that although road traffic was a key contributor to poor air quality, other sources would need to be tackled as well. These would depend on local circumstances but would be likely to include gas-powered domestic boilers, domestic biomass use and combined heat and power stations.

The committee noted that perceptions about charging schemes risked reducing their effectiveness and antagonising the public. These include the perception that schemes are aimed at income generation rather than reducing air pollution, or that restrictions would inevitably damage economic growth and activity. It felt that emphasising the public health benefit of the schemes and adopting a consistent national approach would be important in limiting these misperceptions.

The evidence

The committee looked at evidence in:

- Evidence review 1 on environmental change and development planning: ES3.3, ES3.4.
- Evidence review 2 on traffic management and enforcement, and financial incentives and disincentives: ES5.1, ES6.1, ES6.2, ES6.3.
- Evidence review 3 on travel planning and advice: ES11.1, ES11.2, ES11.4.
- Expert testimony on epidemiology: Expert paper 1 (EP1).
- Expert testimony on national and local frameworks for action: Expert paper 2 (EP2).

- Expert testimony on the use of Euro Standards to control vehicle emissions: Expert paper 3 (EP3).
- Expert testimony on evidence relating to influencing driving behaviours for fleet drivers and others: Expert paper 4 (EP4).
- Expert testimony on the proposed clean air zones: Expert paper 5 (EP5).

Reducing emissions from public sector transport services and vehicle fleets

The discussion below explains how the committee made recommendations 1.4.1 to 1.4.6.

Rationale and impact

Why the committee made the recommendations

1.4.1 to 1.4.5

Some evidence showed that changes to driving style may be used to lower levels of local pollution, as well as reducing fuel use. It also showed that people can be encouraged to make these changes.

Some evidence suggests that if large numbers of people change their driving style this, combined with other measures to reduce traffic, could have a positive effect on the environment. An expert also told the committee that fuel consumption could be reduced by around 20% to 25% by adopting efficient driving techniques, with a realistic long-term reduction of between 5% and 10%.

Based on this evidence and their own experience, the committee felt that providing support to help people change their driving style was justified. They also noted that this would be cost neutral because of the savings generated by better fuel efficiency. Because the evidence was uncertain, the committee recommended these as actions to consider. The committee was aware of NICE's guideline on behaviour change: individual approaches and added a link to this in recommendation 1.4.4 but did not specify the type of rewards for those who drive efficiently.

1.4.6

The committee agreed by consensus that procurement of less polluting vehicles will help public sector organisations to reduce road-traffic-related air pollution. Members noted that this could be done as older vehicles are replaced. Because the evidence was uncertain, they recommended this as an action to consider.

Why we need recommendations on this topic

The public sector fleet is substantial. It includes various vehicle types (from local authority refuse vehicles and goods vehicles to lease cars and patient transport vehicles) many of which are highly polluting.

Public sector decisions about vehicle procurement don't always take air pollution into account. In addition, many drivers are unaware of the impact their driving has on air pollution, and about practical changes they could make to reduce this. Currently only around 20% of people employed as drivers have been trained in efficient driving by their employer.

Impact of the recommendations on practice

Making changes will help the public sector fleet to meet its duty to address its environmental impact, reduce emissions and promote the public's health and wellbeing.

Evidence discussion

Interpreting the evidence

The outcomes that matter most

The committee agreed that although outcomes relating to ambient air quality are important for health it would be unlikely to find studies that reported these in relation to changes to driving style.

Other more likely outcomes are:

- length of time a vehicle is left idling
- overall fuel consumption.

The quality of the evidence

The committee considered modelling evidence from 1 poor-quality US study [ES11.1]. This suggested that information on an appropriate speed could reduce emissions on major roads. The study was modelling only and rated as poor quality so the results were treated with caution. But the committee felt that it, together with other evidence, supported the recommendation.

The committee considered evidence of effectiveness from 2 studies (1 from Canada and 1 from the Netherlands) that looked at the impact of information and training on driver behaviour [ES11.2].

Both studies were rated as poor quality and so at risk of bias. They suggested that information and training might help reduce fuel consumption and time spent idling.

The committee considered the effect of anti-idling information campaigns for bus drivers in 2 linked studies from the US [ES11.4]. Both were rated as poor quality and so at risk of bias. It suggested that educating drivers about the importance of reducing the time they spend idling could be effective.

The committee considered qualitative evidence that looked at factors that influence the likelihood of people changing their driving style. One moderate-quality study from the UK suggested several factors likely to support the uptake of 'eco driving' [ES11.3]. The authors felt that a focus on cost savings, in-vehicle information and systems to feedback progress were key.

Key elements in reducing fuel consumption were vehicle maintenance (in particular ensuring correct tyre pressure), gear selection and avoiding aggressive acceleration.

Although in general the evidence was of poor quality, committee members felt that it was consistent with what they would expect from their own experience and so supported the recommendations.

Benefits and harms of driver training and public sector procurement

Benefits include:

- Increased knowledge about factors associated with fuel economy. Putting this knowledge into practice will result in lower fuel use and improved air quality.
- Energy-efficient driving with fewer rapid accelerations and decelerations. This will improve fuel consumption and reduce wear and tear on vehicles, leading to financial benefits.
- Energy-efficient driving with fewer rapid accelerations and decelerations may reduce road danger and encourage others to walk or cycle, resulting in lower total emissions.
- Training public sector staff may have the additional benefit of altering their driving habits outside work. It may also help to make these habits the norm more generally.

Cost effectiveness and resource use

Evidence from expert testimony suggested that efficient driving training is likely to be cost saving [EP4]. Training costs are estimated at a one-off cost of £25 to £30 per driver, with an annual fuel

saving of around £96. If training is provided as part of existing programmes for staff, the marginal cost is likely to be small.

Use of telematics would be likely to have an additional cost. However, the committee felt these costs were likely to be small.

It would be most logical to make changes to the vehicle fleet as part of the usual turnover of vehicles. Any resource impact would depend on the extent of changes and the relative cost of vehicles. This would need to be managed within available resources.

Other factors the committee took into account

The committee noted that the potential for financial savings and health benefits meant that these recommendations were highly relevant to the public sector. But the committee also felt that adoption of the recommendations by the public sector would act as an example of good practice that might be taken up in other sectors. In addition, it noted the potential for a positive knock-on effect if energy-efficient driving habits developed at work were carried over into people's personal lives.

Members noted that the views of those receiving training are important in determining the potential for success. They noted that there is a perception that air pollution levels inside a vehicle are lower than outside but this may not be the case.

The evidence

The committee looked at evidence in:

- Evidence review 3 on travel planning and advice: ES11.1, ES11.2, ES11.3, ES11.4.
- Expert testimony on influencing driving behaviours for fleet drivers and others: Expert paper 4 (EP4).

Smooth driving and speed reduction

The discussion below explains how the committee made recommendations 1.5.1 to 1.5.2.

Rationale and impact

Why the committee made the recommendations

1.5.1

Evidence on using lower speed limits, encouraging smoother driving and providing real-time information showed that reducing 'stop–go' driving could help reduce emissions of air pollutants. This was supported by the committee's understanding of air pollution and the effect of accelerations and decelerations.

The committee agreed that signs displaying drivers' current speed would encourage a smoother driving style.

Because the evidence was uncertain they recommended these as actions to consider.

1.5.2

Some evidence on physical speed reduction measures like humps and bumps suggested that individual measures may increase motor vehicle emissions by encouraging decelerations and accelerations. But evidence from area-wide schemes does not back this up.

So where physical measures are needed to reduce road injuries, the committee agreed that area-wide schemes should be designed to minimise the impact on air pollution. Because the evidence was uncertain, the committee recommended this as an action to consider.

Why we need recommendations on this topic

Speeding motor vehicles in residential areas discourages people from walking and cycling, increases the risk of injury and increases traffic-related air pollution.

Impact of the recommendations on practice

Ensuring motorists drive steadily at the optimum speed can help reduce stop–go driving and so improve fuel consumption as well as reducing congestion and air pollution. Reducing the speed limit in residential areas, while making sure that it does not result in an increase in vehicle emissions, will reduce road danger, injuries and air pollution.

Evidence discussion

Interpreting the evidence

The outcomes that matter most

The committee agreed that the most important outcomes are:

- Ambient levels of air pollutants, in particular NO_2 and $PM_{2.5}$.
- Individual vehicle emissions of these pollutants.

The quality of the evidence

The committee considered the evidence relating to the impact of motorway speed.

- Two studies examined the effect of schemes to reduce speed on urban motorways [ES6.4]. Both were from the Netherlands; 1 was rated poor quality and 1 moderate quality. They showed that speed limits and enforcement on urban motorways have a small positive effect on PM_{10} and NO_2. The emission reduction depends on the impact of speed management on traffic dynamics, so the larger the reduction in traffic congestion the larger the emission reduction. Although this evidence is poor quality, it supports the understanding of traffic flow dynamics and air pollution production. Although the studies are from the Netherlands they are applicable to the UK.
- One modelling study from the US noted savings in fuel consumption using wireless technology to inform drivers of the optimum speed on a major road [ES11.1].

The committee agreed that these studies were in line with expectations about the effect of smoothing traffic flow by reducing speed [ES6.4]. Members noted that where flow was not improved by changes to the speed limit (generally in less congested conditions) it would be unlikely that air quality would improve.

The committee discussed the modelling study [ES11.1]. This suggested substantial benefits were possible from changes to the behaviour of relatively small numbers of drivers. This had been achieved using wireless technology to identify the optimum speed. Although this was plausible, it would not be implementable at the moment because of lack of the necessary technology in vehicles to receive information about the current optimum speed. However, a similar effect might be obtained by the expansion of variable limit speed control using signs outside the vehicle.

The committee considered the evidence on the effect on air pollution of traffic-calming schemes.

- Two poor-quality studies from the UK suggested that there was no significant impact on ambient NO_2 concentrations from the construction of an area-wide traffic-calming scheme [ES5.2].
- Four modelling studies examined the emissions from individual vehicles [ES5.3]. Two moderate-quality studies were from Canada and 1 each, both poor quality, were from the US and UK.

Two poor-quality studies of area-wide traffic calming from the UK did not show significant changes in area-wide air quality. The changes seen were within the margin of error of the measurement techniques used.

The committee noted that the modelling evidence suggested that individual traffic-calming measures tended to increase emissions from vehicles because of the increase in accelerations and decelerations. The UK modelling study cited 9 measures including road humps, pinch points, raised junctions, chicanes and mini-roundabouts. Although there are uncertainties associated with the modelling, these studies supported an increase in emissions associated with individual traffic-calming measures.

One study was carried out in the UK on existing measures and so is applicable; others were carried out elsewhere and so differences in the design of measures and the make-up of the vehicle fleet mean that they are partially applicable.

Benefits and harms of traffic calming and speed reduction

Benefits include:

- Reducing stop–go driving will lower emissions of air pollutants from accelerations and decelerations, lowering exposure of the population to poor air quality.
- Reduced speeds in urban areas supports a modal shift to walking and cycling. This will reduce emissions of air pollutants.
- Reduced speeds reduces the number and severity of road injuries.

Cost effectiveness and resource use

The economic modelling included examination of speed restrictions around Amsterdam. This suggested that the reduction in the speed limit on a section of motorway from 100 kph to 80 kph was highly cost effective at reducing air pollution (cost per QALY approximately £1,290, benefit–cost ratio 51). However, the committee noted costs will vary depending on the existing enforcement infrastructure already in place and whether additional speed cameras are needed.

Other factors the committee took into account

The committee noted that altering driving behaviour to reduce emissions has 2 elements: education and restriction. The committee felt that these complementary elements should both be included in the guideline separately. Education is addressed in recommendations 1.4.1 to 1.4.5. Recommendations 1.5.1 to 1.5.2 address restriction.

The committee discussed the possibility of using average speed technology to reduce this risk in various areas. It noted that on major roads where there are very few (or no) route choices the cost is likely to be small because only a limited number of speed cameras would be needed. However, in other areas (such as residential streets) there were possible benefits, but implementation would be difficult or impossible because of the number of route options. Other measures (such as signs indicating current speed) were more likely to be useful in these areas.

The evidence

The committee looked at evidence in:

- Evidence review 2 on traffic management and enforcement, and financial incentives and disincentives: ES5.2, ES5.3, ES6.4.
- Evidence review 3 on travel planning and advice: ES11.1.

Walking and cycling

The discussion below explains how the committee made recommendations 1.6.1 to 1.6.3.

Rationale and impact

Why the committee made the recommendations

1.6.1 and 1.6.2

The committee agreed that it was important to support a general shift from motor vehicles to more active travel. They also agreed that this needed doing in a way that minimises cyclists' exposure to air pollution for example, by providing a choice of cycle routes.

In addition, evidence suggested that increasing the space between cyclists and motor traffic helps protect cyclists from air pollution. Although this evidence was uncertain, it agrees with the committee's understanding of the sources and dispersal of air pollutants.

1.6.3

Some evidence suggested that where it is not possible to create cycle routes using quiet streets, separating cycle routes from motor traffic and reducing the time spent by cyclists in areas of high pollution, including busy sites, helps protect them from air pollution.

Some evidence suggested that using dense foliage as a barrier may sometimes help protect cyclists from motor vehicle emissions, but the impact on the distribution of air pollutants needs to be taken into account. The committee agreed that the evidence supported its understanding of the dispersal of air pollutants. They also noted that it was important to take account of the need for cyclists to be visible to reduce the risk of collisions and to help normalise cycling.

Because the evidence was uncertain the committee recommended this as an action to consider.

Why we need recommendations on this topic

Cyclists and pedestrians are vulnerable to road-traffic-related air pollution as well as other injuries on the road. Both factors discourage people from taking up these zero-emission modes of transport.

Impact of the recommendations on practice

Encouraging active travel such as walking and cycling will help reduce traffic-related air pollution and help people to be more physically active. Incorporating the rest of the recommendations at the design stage of new cycle routes will help improve the currently patchy provision across the

country. It will also encourage planners to consider exposure to air pollution, which currently is not always taken into account.

Evidence discussion

Interpreting the evidence

The outcomes that matter most

Ambient levels of air pollutants, in particular NO_2 and $PM_{2.5}$.

The quality of the evidence

The committee considered the evidence of the impact of cycle route design on exposure to air pollution [ES3.1]. This included 6 studies that examined the siting and design of cycle routes: 3 from the US, 1 each from the Netherlands, Canada and the UK. All were rated as poor quality:

- All 6 found exposure to $PM_{2.5}$ was lower in low traffic routes and air pollution levels were reduced by increasing separation.
- Shelter provided by vegetation reduced levels of exposure to air pollutants; conversely, peak levels of exposure were seen in conjunction with junctions and waiting at signals.
- One study suggested exposure for drivers was as high as for cyclists.

There is considerable variation in measurement techniques used, which introduces uncertainty. However, the results are in line with what is known about dispersion of air pollutants in general.

The committee felt that although the evidence was of poor quality it was plausible. The reduction in air pollution with distance from the source is well understood and follows a simple mathematical relationship.

ES4.1b examined natural barriers. One UK study found a positive effect from a dense hedge adjoining a major road. Although this was a poor-quality study the committee felt it was plausible, based on its understanding of the deposition of air pollutants. Because the evidence was uncertain, the committee recommended this as an action to consider.

Benefits and harms of cycle routes

Benefits include:

- Positioning cycle routes away from areas of poor air quality will reduce the exposure of cyclists to air pollution.
- Perceptions of poor air quality put some people off cycling. Improving air quality will encourage more people to cycle and so further reduce air pollution.
- Those encouraged to cycle will also benefit from being more physically active.

Potential harms could arise from collisions as a result of poorly designed cycle routes.

Cost effectiveness and resource use

Construction and maintenance of dedicated and separated cycle routes may entail additional costs, but it is not as expensive as constructing and maintaining vehicular roads.

Modelling of the cost effectiveness of off-road cycle routes suggested that they were good value for money. The cost per QALY was estimated at around £5,080, with a benefit–cost ratio of 14. This analysis included additional monetised benefits of £64,000 resulting from increased take up of cycling. The committee noted the intervention costs and benefits calculated assume several routes are developed. Developing a single route would cost less, but may also be less effective because it is likely to reach less of the population.

Other factors the committee took into account

The committee noted that a variety of terms are used in the studies. The definitions are often not clear and may vary between studies (for example: cycle routes, paths and lanes). Members agreed that, other factors being equal, the significant factor in terms of exposure was the distance between the source (motor vehicles) and the cyclist. They also agreed to use the term 'cycle route'.

The committee was aware from members' own experience that air pollution concerns were among the factors putting some people off cycling. Taking action to address this would support the overall goal of achieving a shift in transport choices and so an overall reduction in air pollution.

The committee noted there was considerable uncertainty in this modelling. However, it agreed that off-road cycle paths could be cost effective in some circumstances.

The evidence

The committee looked at evidence in:

- Evidence review 1 on environmental change and development planning: ES 3.1, ES4.1b.

Awareness raising

The discussion below explains how the committee made recommendations 1.7.1 to 1.7.7.

Rationale and impact

Why the committee made the recommendations

1.7.1 and 1.7.2

Evidence on the impact of air pollution on health provided justification for action to raise awareness of the issues and ways to mitigate the problems. The committee agreed that community support is always important when aiming for sustainable changes in behaviour. This supported the evidence on interventions to change behaviours related to air pollution. Members noted that this is in line with other NICE guidelines.

1.7.3

The committee agreed that local, national and social media techniques are useful ways to disseminate information about the Daily Air Quality Index, particularly to vulnerable groups. Because the evidence was uncertain the committee recommended this as an action to consider.

1.7.4

The committee agreed that it is important to give the public information on how road-traffic-related air pollution affects their health and on how their transport choices (such as driving during episodes of high pollution) contribute to this. Because the evidence was uncertain the committee recommended this as an action to consider.

1.7.5

Some evidence relating to partial or occasional traffic restrictions suggested a limited effect. But the committee agreed that such restrictions offer the opportunity to demonstrate the positive benefits. So the consensus was that it is reasonable to use them as part of occasional awareness-raising activities. Because the evidence was uncertain the committee recommended this as an action to consider.

1.7.6

The committee agreed that it is reasonable to make businesses aware of the need to reduce air pollution, by encouraging active travel and more energy-efficient driving. Members noted that scheduling deliveries to avoid times when streets are congested might also reduce the contribution businesses make to congestion and the resulting pollution. Because the evidence was uncertain the committee recommended this as an action to consider.

1.7.7

The committee agreed that information provided by healthcare professionals is likely to be important in highlighting the effect of air pollution on health. So it is important to ensure health professionals are aware of the facts and can communicate them to vulnerable groups. Because the evidence was uncertain the committee recommended this as an action to consider.

Why we need recommendations on this topic

Many people do not understand the link between health and road-traffic-related air pollution. For example, they do not realise that long-term exposure to typical levels of air pollution causes far more health problems than short-term exposure to higher levels. In addition, they do not realise that they can help reduce this pollution, as well as their exposure to it, if they change their behaviour.

Without this understanding it will be difficult to get public support for the changes needed. Without such support changes are unlikely to be sustainable and implementing them would be unethical.

Impact of the recommendations on practice

If healthcare professionals routinely raise air pollution as an issue affecting health, this could help prevent health conditions escalating, particularly among the most vulnerable groups. If local authorities raise awareness about air pollution with businesses and the public, this could help reduce air pollution and resulting ill health, so meeting their duty to protect people's health and wellbeing.

In both cases this would also reduce the need for potentially more expensive and less effective remedial action later.

Evidence discussion

Interpreting the evidence

The outcomes that matter most

Reduced exposure to air pollution (NO_2 and particles) is the main outcome in determining health effects. Changes in knowledge and behaviours that may to lead to reduced exposure (either for the person or the wider community) are important.

The quality of the evidence

The committee heard expert testimony on the extent of the impact of air pollution on health [EP1]. It noted that some groups are more likely to be at risk from air pollution.

The committee heard expert testimony on influencing drivers' behaviour [EP4].

The committee felt that members' experience of working on air pollution, together with the wider public health evidence (including NICE guidance on behaviour change and community engagement), justified these recommendations.

The committee considered the evidence of effectiveness of traffic restrictions on air pollution from 5 studies of traffic restrictions (1 each from Italy, Korea and Israel, 2 from the US). The evidence suggested that vehicle restrictions or bans have little impact unless they restrict the volume of traffic substantially [ES5.1]. All were at some risk of bias, 3 were rated as poor quality and 2 as moderate quality.

Benefits and harms of engaging the public

Raising awareness of air pollution will:

- Help people, particularly those who are most vulnerable, to reduce their exposure – especially when levels of pollution are high.
- Help people understand how to change their behaviour to reduce emissions, thereby further reducing population-level exposure.
- Support the development of social networks (social capital), which can be built on for benefits in other areas.

Actions to reduce the amount of polluted air from entering a home (such as closing windows) might increase indoor levels of air pollutants, if there are other sources of pollution in the house. Potential harm may also be caused if unfounded concerns are raised about the possible health effects of air pollution.

Cost effectiveness and resource use

No cost effectiveness evidence or modelling was identified for this recommendation. The committee noted that local agencies were likely to have resources capable of addressing these issues by developing effective local communications strategies. Developing an effective strategy would involve a cost but this would be more likely to be successful.

The committee noted that training healthcare workers about air pollution would have a cost. However, this could form part of continuing professional development so would be cost neutral. There was also the potential for cost savings if exacerbations of ill health (such as asthma), and so hospital attendances, were reduced.

The evidence

The committee looked at evidence in:

- Evidence review 2 on traffic management and enforcement, and financial incentives and disincentives: ES5.1.
- Expert testimony on epidemiology: Expert paper1 (EP1).
- Expert testimony on influencing driving behaviours for fleet drivers and others: Expert paper 4 (EP4).

Evidence statements not used to make recommendations

- ES2.1 – bus operations. The committee felt that this evidence (2 poor-quality modelling studies, 1 from Canada and 1 from Greece) was too uncertain to support a general recommendation. Local factors would be particularly significant in this context, and would involve considerable potential disruption.
- ES3.2 – alterations to bus services and technology. The committee felt that the uncertainties in both studies (2 poor-quality studies, 1 from Chile and 1 from the US) meant that this evidence was unsuitable to support a general recommendation. In particular, differences in vehicle fleets in Chile and the UK and lack of appropriate control fleets in the US study made the evidence of

limited applicability. Emission standards are also addressed by recommendations relating to clean air zones.

- ES3.5 – bypass construction. The committee felt that this evidence (1 poor-quality UK study) did not justify a recommendation. Bypass construction is likely to be extremely expensive and only applicable in very specific circumstances. The committee felt that the reductions noted were possibly due to other factors. The age of the study (carried out in 1998) also meant that vehicle technology would be very different.

- ES4.2 – dust suppressants. The committee felt that this evidence (2 poor-quality studies, 1 from Spain and 1 from the USA) did not justify a recommendation. They felt that the results seen in the Spanish study would be unlikely to be replicated in the UK, partly from differences in climate. The study from the USA looked at unsealed roads so is not relevant to the UK generally.

- ES4.3 – street washing. The committee felt that this evidence (1 poor-quality study from Spain) did not justify a recommendation. They felt that the results would be unlikely to be replicated in the UK because of differences in climate. They felt that street washing was unlikely to have a significant effect on smaller particles most closely linked to health impacts.

- ES10.1 – personalised travel planning. This consisted of 1 poor-quality study of students in Japan, which suggested that vehicle mileage could be reduced substantially by using personalised approaches. Although the committee agreed that these interventions could be feasible in the UK, they felt the evidence was insufficient to base a recommendation on. The committee also noted that the linked walking and cycling guideline contains recommendations on these approaches based on evidence to promote physical activity (rather than to reduce air pollution).

Gaps in the evidence

The committee's assessment of the evidence and expert testimony identified a number of gaps. These gaps are set out below. Where a gap in the evidence was identified and prioritised as a research recommendation it is included in the 'Recommendations for research' section.

1. Effectiveness and cost effectiveness of environmental change and development planning at reducing road-transport-related air pollution:

a) Planning and land allocations, development control and planning decisions, urban space and building design: siting, layout and design of developments; and applying planning conditions or obligations.

b) Developing public transport routes and services, including bus lanes, and improving bus quality.

(Source: Evidence review on environmental change and development planning.)

2. Effectiveness and cost effectiveness of traffic management and enforcement, and financial incentives and disincentives to reduce road-transport-related air pollution:

a) Traffic management systems and signal coordination:

- road signs, traffic signals and road markings
- lane control
- elements of routes (such as positioning of traffic lights)
- roadside emission testing.

b) Parking restrictions and charges:

- restricted parking zones (including low-emission vehicles, car clubs and electric vehicle recharging points)
- higher parking charges.

c) Vehicle 'idling' restrictions and charges, including waiting and loading restrictions.

(Source: Evidence review on traffic management and enforcement, and financial incentives and disincentives.)

Recommendations for research

The guideline committee has prioritised the following gaps in the evidence as recommendations for research.

1 Vegetation and street trees

What factors influence how vegetation and street trees affect urban air quality?

Why this is important

There is limited evidence on how vegetation and trees influence urban air quality and health outcomes. Information is needed because they are often used to address air pollution or for other purposes.

Research is needed on a range of factors including:

- impact of different species of vegetation and tree types
- impact of trees depending on where they are sited and how they are maintained
- impacts across the course of a year
- impact on health inequalities
- other potential health benefits.

2 Promoting a shift to zero- and low-emission travel

What methods are effective and cost effective at promoting a shift to zero- and low-emission modes of travel, including active travel?

Why this is important

Achieving a shift to zero- and low-emission modes of travel (including active travel) is key to reducing air pollution. We also need to identify approaches that encourage more efficient, less polluting driving behaviour.

Studies based on behaviour change theories are needed to identify the most effective and cost effective approaches and messages for different groups and in different settings. Useful outcomes include: travel mode and driver behaviour.

3 Clean air zones

How do different elements of a clean air zone interact to improve air quality and what is the overall effect on people's health?

Why this is important

At publication of this guideline, clean air zones were being introduced. These zones are likely to vary across the country and it is important to use this opportunity to identify which elements are most effective and cost effective at reducing air pollution and supporting a shift to zero- and low-emission travel. Studies are needed to evaluate:

- exposure to air pollution
- acute and chronic health outcomes
- impact on health inequalities.

Research is also needed to look at travel behaviour in relation to different groups, to inform public awareness and social marketing approaches.

4 Telematics

How can information about driving style gathered from telematics devices and other technologies (such as apps or in-car global positioning systems) be used to reduce individual fuel consumption and vehicle emissions?

Why this is important

Evidence suggests that information and training can help drivers change their driving style.

Research is needed to evaluate how telematics devices can be most effectively used with different groups to influence driving style and so, in turn, reduce emissions and improve air quality. Specific gaps in current research include the impact on individual drivers and those driving as part of a fleet including costs, health and other benefits, and value for money.

5 Awareness raising

What is the effectiveness and cost effectiveness of different methods of awareness raising about air pollution (including air pollution alerts) on people's behaviour and on acute and chronic health outcomes?

Why this is important

Activities to raise awareness of air pollution, including air pollution alerts (using traditional, social media and other methods) are becoming increasingly popular as a way of warning of the potential risk from episodes of poor air quality. But little is known about whether these alerts help encourage people to change their behaviour. Research on the absolute and relative effect of different approaches could be used to develop effective and cost effective systems.

Research is needed on the impact of, for example, air pollution alerts on:

- different groups (such as those vulnerable to air pollution and the general population)
- behaviours related to the production of pollution (such as changes in mode of transport)
- acute and chronic health.

Studies are also needed on:

- the risk of adverse effects (such as making people worry unnecessarily, or increasing the level of motor vehicle travel after an alert)
- the ability of health services to respond to concerns raised by issuing alerts.

6 Exposure to air pollution using different modes of transport

How does altering a person's mode of transport and route affect their personal exposure to air pollution?

Why this is important

Mode of transport (such as walking, cycling, using public transport or driving) influences personal exposure to air pollution. Overall, 'active' travel (such as walking or cycling) reduces emissions of air pollutants. But it could potentially increase someone's personal exposure, depending on the route

they take. Research is needed to clarify the health impact of making such changes, including on health-related quality of life.

Glossary

Average speed technology

Cameras with automatic number plate reading (ANPR) digital technology, placed in multiple locations (at least 2, at a minimum of 200 m apart) along a stretch of road to monitor a vehicle's average speed.

Daily Air Quality Index

A number used by government agencies to tell the public how polluted the air is or will be. The number is provided with recommended actions and health advice. The index is numbered 1 to 10 and divided into 4 bands: low (1 to 3), moderate (4 to 6), high (7 to 9) and very high (10).

Euro standards

Standards produced by EU Directives specifying maximum permitted emissions of various air pollutants. Light duty vehicle standards are referred to using Arabic numerals (Euro 1 to 6); standards for heavy duty vehicles use Roman numerals (Euro I to VI).

$PM_{2.5}$, PM_{10}

Particulate matter is produced by, among other things, combustion of fossil fuels or abrasion of tyres and brakes. Particles are classified by size, described using the abbreviation PM with a suffix (commonly 2.5 or 10) that gives the maximum particle size in micrometres. The mass concentration of particles is usually expressed in micrograms per m^3 of air.

Airborne PM_{10} and $PM_{2.5}$ come from both primary emissions (including combustion of fossil fuels, tyre and brake wear) and secondary particles (for example, nitrates and sulphates) formed when pollutants react in the atmosphere. $PM_{2.5}$ particles are sometimes referred to as 'fine particles', and $PM_{2.5–10}$ as 'coarse particles'. Fine particles can penetrate deep into the lungs.

Street ventilation

Air in a street flows in a pattern determined by many factors, including the shape and design of buildings. It mixes with air from outside the street. If there are sources of pollution in the street (primarily motor vehicles) the air flow is restricted.

Telematics

Technologies that store and send information on the speed, position, acceleration and deceleration of road vehicles. This, together with global positioning system (GPS) data, can be used to compare driving styles and estimate the impact on fuel consumption, emissions or wear and tear.

Travel plans

Travel plans are a way of assessing and then mitigating the potential negative effects that new developments could have on air pollution by generating significant amounts of motor traffic.

For other public health and social care terms see the Think Local, Act Personal Care and Support Jargon Buster.

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Accreditation

Improving Air Quality in the City of London

A practical guide for City businesses

cityoflondon.gov.uk

A City of London initiative supported by:

NHS
East London and the City

SITUATION

Air Quality in parts of the City of London is the worst in the country and amongst the worst in Europe. It may not be as visible as the smog of Victorian London, but it is ever present.

Nitrogen dioxide (NO_2) is up to three times the recommended level for health and particulate matter (PM_{10}) regularly breaches EU limits.

IMPACT

Poor Air Quality has a significant impact on health, with up to 8,000 premature deaths in London each year attributed to it.

Fine particles have the greatest impact on health. Young children and the elderly are most susceptible.

The UK could face significant fines from the EC for failure to comply with Limit Values.

SOURCES

The major sources of air pollution are from combustion as a direct result of transportation and heating.

Carbon reduction, energy efficiency and modifying transport policies should therefore go hand-in-hand with improving air quality.

There is a great deal of work already being done by the City of London Corporation, the Government and the Mayor's Office, but targets are not being met.

With the help of City businesses, and the people that live and work in the Square Mile, we can make a difference to our health and the wellbeing of those around us.

THE FUTURE

There are many measures in place to deal with emissions from new developments including the construction and development phase, but no measures are in place to address existing building stock and how activities associated with them can reduce emissions.

The best practice and communications advice listed below, and in accompanying documents, seek to address this. Some will take time and an investment but all will lead to enhancing employee wellbeing and making our own working environment healthier. There are also some simple quick wins that can be implemented immediately.

We need your help to improve air quality in the City. It's time to act - it's time to think air quality

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COMMUNICATION

In the City, the density of people and scale of the problem compounds the impact of poor air quality and it is a problem that is too easily ignored.

A common theme identified by respondents to the initial consultation was that the issue of air quality needs greater visibility and a communication vehicle.

Support is needed with campaigns, to raise awareness of air quality internally, as well as promoting individual initiatives.

A campaign toolkit has been designed to make it as easy as possible for everyone to **'think air quality'**.

What is being done

- A CityAir 'button' has been developed by the City of London to be used by organisations that work towards improving air quality
- **To use this device please see the campaign toolkit**
- The City of London website has useful guidance, templates and links to make the most of the great work already done
- **The latest news is available on Twitter @_CityAir**
- Advice is also given on integrating air quality into sustainability communications, making it easy for people to understand the impact of poor air quality and how simple actions can improve the situation
- An annual Sustainable City Award for Air Quality has been established, to reward best practice and encourage innovative ideas that improve air quality
- A useful resource to monitor live air quality information has been developed by King's College London and is available, free of charge, for the iPhone as a downloadable 'app'
- Other applications and tools are referenced throughout the document and in the toolkit below

For more information see the Campaign Toolkit (App I)

CityAir

CityAir

Improving air quality in the City of London

There can sometimes be a 'disconnect' between asset owners, facilities managers, tenants, service companies and employees. Fixing the 'disconnect' will require working together and understanding the link between sustainability, operations, air quality, health and employee wellbeing.

Strong leadership starts with the Government, Mayor of London and the City of London, but we can all make a difference. If driven from the top any initiative will have the weight it needs to succeed.

It's about working together so 'whatever you're doing - think air quality'

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The Solutions listed in this section are applicable to all businesses and individuals.

They are not prescriptive and are designed as a guide to help you identify where you can help to improve your local air quality.

Basic changes to existing activities are the easiest and quickest to achieve. Help is given along the way with case study references and online resources for further information.

The first section focuses on **Corporate Responsibility** (CR).

The second section is broken down by the area in which change can be affected:

- **The Built Environment**
- **Transportation**
- **Supply Chain**

The solutions have been developed from an initial consultation exercise across a range of stakeholders. A request was made by businesses for further information and guidance, on implementing measures to help improve local air quality. These details have been added, with input from businesses, to ensure the solutions are achievable and match business, sustainability, health, wellbeing and air quality objectives.

Although great care has gone into presenting the solutions below, improving air quality through innovations and fresh ideas is a collective responsibility. Please get in touch and give your feedback via the web or directly to cityair@cityoflondon.gov.uk

SOLUTION EXAMPLE

Solution
• Outline and background • **What you need to do**
Support information and online resources

A checklist is provided at the back of the document. A summary document is also available, and can be downloaded from the City of London website.

The City of London Corporation is not liable for the contents of any external internet sites listed, nor does it endorse any commercial product or service mentioned or advised on any of the sites.

We can do something about poor air quality now – it's time to act

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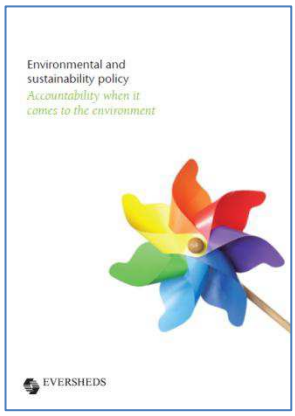
CORPORATE RESPONSIBILITY (CR)

'Doing the right thing' is now recognised by many organisations as a key competitive differentiator in the marketplace. Whether a long established 'way of doing business' or a new approach in a changing world, the benefits are beyond doubt. Adding air quality to the CR mix is straightforward and addresses both environmental as well as employee health and wellbeing objectives.

Build Air Quality Into CR Reporting

- Many of your existing carbon reduction and energy efficiency initiatives can have a positive impact on air quality
- **Embed air quality in your CR policies**
- **Highlight the health impact of poor air quality**
- **Don't forget - the CityAir button can be used alongside reporting or communication of these actions**

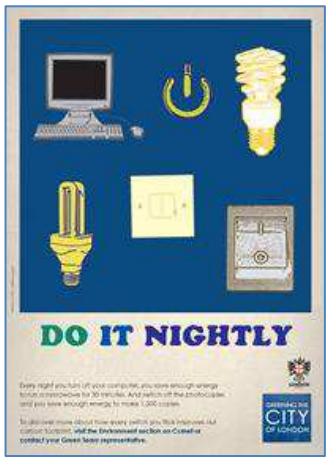
Use the template text to add to your CR Policy (App II)
See the Air Quality Health Impact sheet here (App III)



Employee Engagement

- There are many initiatives that could be used, from cycling and walking to waste reduction and consolidating deliveries
- **Build ownership by referencing the health impact of poor air quality**
- **Reward employees that go the extra mile**
- **Engage with other businesses and the wider community to share best practice**
- **In summer and winter turn the heating on and off a month earlier than you had planned and launch a 'Jumper to work month'**
- **Go beyond carbon reduction - a range of CityAir initiatives, relevant to air quality, are referenced throughout the document**

See the Employee Engagement guide (App IV)



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Working Together

- There can sometimes be a 'disconnect' between Asset Owner, Facilities Manager, Tenant and Employee
- Decisions made, for instance on infrastructure improvements, are usually a committee responsibility
- Fixing the 'disconnect' does not just come down to breaking down the barriers between stakeholder groups, it is about embracing common ground
- Cost is not always an issue, but the fear of disruption can often deter common sense interventions
- Neither should be a barrier and the reality of the intervention should bring benefits with no disruption to the business
- The key is in bringing together individuals across functions in all organisations to understand the impact of sustainability decisions on air quality
- **Set up a Green Building Team**
- **Dedicate an Air Quality Champion to the Group**
- **Formally integrate Facilities Management, HR, Supply Chain, Operations, CR, Marketing, IT and the Board in sustainability and, by extension, air quality decisions**
- **Work with fellow tenants, suppliers and industry partners to make change happen**
- **Join the City Environment Forum to share experiences and ideas to make sustainability and air quality improvements happen**

See the Green Teams summary (AppV)

Air Quality Monitoring Stations

- Air quality monitoring helps raise the visibility of the issue and, over time, shows how actions are having a positive effect
- **Work in partnership with the City of London to monitor air quality at your premises or at street level outside**
- The live data that results can be fed into any communications strategy

Contact the City of London - CityAir@cityoflondon.gov.uk

Current Air Quality Monitoring Network
NO_2
PM_{10}

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THE BUILT ENVIRONMENT

There are many measures in place to deal with emissions from new developments. However, there are very few measures in place to address emissions from existing building stock and how activities associated with them can reduce emissions and help improve local air quality.

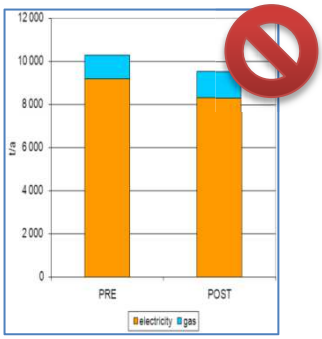
Memoranda of Understanding (MoU)

- Asset Owners, Property Managers and Tenants have a shared responsibility in improving air quality
- Get together through Green Teams and make change happen with all stakeholders
- **Sign up to a Memoranda of Understanding**
- **Make change straightforward and implement recommendations in bite size pieces**
- The MoU template below has been developed from documents provided by the Better Buildings Partnership – it includes air quality alongside other sustainability measures

See the MoU template (App VI)

Building Energy Review

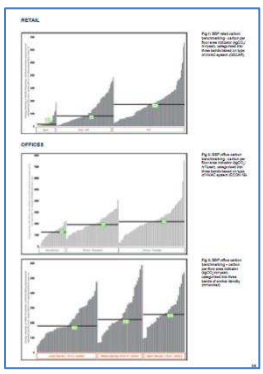
- There are instances where an energy review, although well meaning, can recommend an increase in gas usage, even though overall energy use goes down – **think air quality**
- **Commission an energy review and ask that NOx and PM_{10} reduction is included in the recommendations**
- **If you have already had an energy review on your building look at the implications to air quality over solely energy efficiency improvements**
- **If you do develop a MoU relating to air quality let the City of London know at CityAir**



See the Building Energy Review guide (App VII)

Energy Measurement & Monitoring

- The key to making an impact in this sphere is through measurement and monitoring energy usage, at as granular level as is feasible
- It needn't take long and will save you money
- **Take immediate action to evaluate your position following the Building Energy Review**
  - **Half hourly metering at floor level**
  - **Making Technology Work**
  - **Turn the heating on later and off earlier**



See the Measurement & Monitoring guide (AppVIII)

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Low Carbon Retrofit

- There are many good reasons for retrofitting buildings with the latest technologies
- It is not just about achieving reduced energy usage and carbon emissions – **think air quality**
- **When replacing boilers source one with NOx emissions less than 40mg per kWh**
- **If sourcing CHP look for low NOx and emission suppressing technologies**
- **If using renewable energy look for non-combustion technology**
- **Biomass and liquid biofuel is not a suitable unless emissions of NOx and PM_{10} can be adequately abated**
- **There are a variety of funding routes available**

Green Roofs & Walls

- As chilling and not heating is the main energy sink for most buildings in the City, green roofs and walls are an ideal solution as they insulate buildings from external temperatures
- They also absorb airborne pollutants
- The technology is now there to make them easy to install and maintain
- **Install a green roof and wall where practicable**

See the Green Roof case study (App IX)

TRANSPORTATION

The main source of emissions in the City, of both NOx and PM_{10}, is road transport. As a result, the decisions that businesses make on travel, as well as their supply chain can have a significant impact on improving air quality in the City.

Transportation decisions by businesses need to be put in context with what the Mayor of London and City of London are doing. Only then can businesses make the informed choices on how we travel, control deliveries and consolidate the supply chain.

Each can have a massive impact **- think air quality**

What is already being done

- City of London Corporation
  - Fleet review and driver training
  - Contractor stipulation on vehicle emissions
  - A reduction of 45% PM_{10}, 32% NOx, 16 % CO_2 were achieved over one year through improved fleet management
  - A range of cycling initiatives including theft reduction campaigns, traffic management and support for cycle safety training
  - Providing an extended network of charging points for electric vehicles in car parks

- The Mayor's office, GLA and TfL are committed to
  - Cleaning up London's bus fleet so that all buses meet Euro IV emissions standards for both NOx and PM_{10} by 2015
  - Cleaning up London's taxi and Private Hire Vehicle (PHV) fleet by introducing age limits to remove the older, more polluting vehicles from London's roads
  - Including larger vans and minibuses in the Low Emission Zone (LEZ) from January 2012
  - Aiming to introduce a new NOx standard for the LEZ from 2015
  - Reducing emissions from freight vehicles by promoting Delivery and Servicing Plans and freight consolidation facilities
  - Working with boroughs to implement action plans at air quality priority locations
    - Trials of dust suppression
    - Better traffic management
- Full details can be found in the Mayor of London's Air Quality Strategy

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Green Travel Planning

- A green travel plan is a package of measures produced by employers to encourage staff to use alternatives to single-occupancy car-use
- In the City that includes avoiding the use of taxis and Private Hire Vehicles (PHVs) for short journeys
- To facilitate ease of travel, improved street signage is being implemented across the City
- **Implement the solutions below and integrate them into a cohesive air quality plan**
- **Launch campaigns to support them**

Walking

- Walking should form a central part of your air quality plan
- The benefits to health are obvious and you can usually walk around the City more quickly than using public transport or a taxi/PHV
- Walking will form a key component of the communications plan
- **Engage with all staff explaining the benefits**
- **Use the WalkIt service to help you plan a delay-free, healthy and green journey, avoiding pollution**
- **Launch a 'walk to the client' campaign**

See the 'Walk to the Client' case study (App X)

Cycling

- Cycling is a great way to get around the City and practical issues such as accessibility and safety are being addressed
- **Implement the Government supported Cycle to Work Scheme, which allows employers to loan cycles and cyclists' safety equipment to employees as a tax-free benefit**
- **Employees can group together to set up their own Cycle to Work Scheme**
- **Provide safety training and branded high-vis wrist snaps**
- **Partner with local gyms to make up for the lack of showering and locker space**
- **Lobby TfL to set up company cycle hire accounts**

See the Cycling guide (App XI)

Taxis & Private Hire Vehicles (PHVs)

- It is estimated that, by 2015, 50% of PM_{10} emissions from vehicles in the City will be from taxis (black cabs)
- This is a significant increase from the current profile of around 38%
- Carbon offsetting by taxi and PHV companies does not help local air quality
- **Change contractor to one using electric vehicles or those meeting the Euro V standard for City use**
- **Request a 'no engine idling' policy across the taxi and PHV contract**

Business Fleet

- Much work is already being done and most businesses have seen their fleet drop to a fraction of the size it was five years ago
- More electric charging points are being installed by the City of London Corporation in their car parks
- In some situations a corporate fleet does still have a place, especially with support services
- **Bite the bullet, make a statement and lead by example with a hybrid limousine!**
- **Choose low emission vehicles on replacement or before if possible**
- **Employ vehicle pooling**
- **Invest in driver training**

A range of 'eco' driver training programs are available

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SUPPLY CHAIN

Every ream of paper for the office and pint of milk for the canteen is most likely delivered by a diesel powered vehicle.

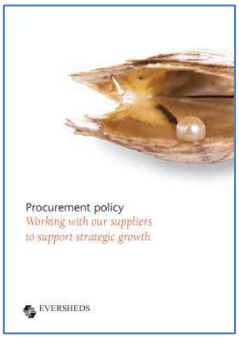
The impact on carbon emissions of the supply chain is well documented, but the resulting emissions of NOx and PM_{10} are often not considered in procurement policy decisions.

There is a bigger picture involved and it impacts on our health - **think air quality**

Procurement Policy

- **Incorporate air quality, alongside other environmental targets, into procurement policies**
- **Work with other tenants and coordinate central contracts for more efficient 'business basics' delivery**
- **Modify the cleaning contract to include 'equipment turn-off'**
- **Demand reduced emissions from contractor vehicles**
- **Reduce the number of deliveries per week**
- **Move to pedal bike couriers where possible**

See the Air Quality Procurement guide (App XII)



Waste & Recycling

- The more waste generated and the less waste segregated increases your cost, especially when considered alongside how it is collected
- **Remove under desk bins**
- **Centralise recycling facilitates**
- **Organise better collection regimes, coordinated with other building occupants**
- **Demand reduced emissions from the contractors' collection vehicles, setting targets over time**

See the Waste & Recycling case study (App XIII)

Deliveries

- A single delivery of personal post to an individual is a journey wasted, as well as an opportunity lost
- We can all make a difference – **think air quality**
- **Set up a building and, at the very least, a business account with the biggest internet retailers**
- Centralising deliveries builds trust in the overall objective of improving air quality
- …and it has yet another cost benefit too
- Work with partners to implement zero emission 'last mile' distribution

See the Zero Emission 'Last Mile' case study (App XIV)

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AIR QUALITY CHECKLIST

Corporate Responsibility	
Build Air Quality Into CR Reporting	☐
Employee Engagement	☐
Working Together	☐
Air Quality Monitoring Stations	☐

The Built Environment	
Memoranda of Understanding (MoU)	☐
Building Energy Review	☐
Measurement & Monitoring	☐
Low Carbon Retrofit	☐
Green Roofs & Walls	☐

Transportation	
Green Travel Planning	☐
Walking	☐
Cycling	☐
Taxis & Private Hire Vehicles (PHVs)	☐
Business Fleet	☐

Supply Chain	
Procurement Policy	☐
Waste & Recycling	☐
Personal Deliveries	☐

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Business in the Community

CARBON TRUST

defra

EVERSHEDS

LEGAL SECTOR ALLIANCE ACTING ON CLIMATE CHANGE

gnewtcargo

Simmons & Simmons

Transport for London

GREATER LONDON AUTHORITY

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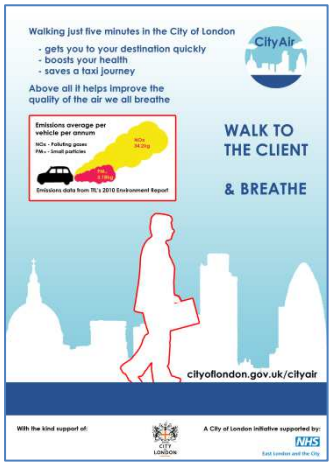
APPENDIX I – CAMPAIGN TOOLKIT

Throughout the document there are suggestions and examples of campaigns that can be run in any businesses. The information below describes what is available and how to access it.

The CityAir button

- An iconic button has been developed to be used by all organisations that work towards reducing their impact on local air quality
- The City would like businesses to use this button alongside air quality improvement projects as well as corporate communications
- Tell employees about steps you have taken that improve air quality
- To apply for high resolution and web ready artwork, please contact us using the links below, giving brief details of the proposed project

To apply contact CityAir@cityoflondon.gov.uk



Walking & Cycling

- Engage with all staff explaining the benefits of walking and cycling
- Use the low pollution WalkIt route planner to help you plan a delay-free, healthy and green journey, avoiding pollution hot spots
- Launch a 'walk to the client' campaign (see case study)
- Use TfL's Legible London maps for visibility
- See below to apply to receive all information, including intranet copy, imagery and campaign ideas across a number of initiatives

To apply contact CityAir@cityoflondon.gov.uk

Campaigning

- There are a range of other campaigns that you can run, alongside walking and cycling
- Visit the website for the latest information

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APPENDIX II – CR POLICY STATEMENT

The Corporate Responsibility (CR) statements that you make are important in communicating your intent, as well as a yardstick to measure on-going performance.

These statements normally cover responsibilities around four key areas:

- Environment - sustainability and legislative requirements
- Community - those affected in the areas in which you operate
- Workforce - wellbeing and equality
- Marketplace - the impact of supply chain and distribution decisions

Adding air quality to your CR policies is straightforward and addresses environmental, community, workforce and marketplace objectives. Examples are given below.

Air Quality Supplement - Short Version

"*Company Name*" is committed to reducing its impact on local air pollution through improved building energy management, encouraging employee walking and cycling, requiring suppliers to have clean vehicles and consolidating deliveries.

Air Quality Supplement - Long Version

Poor air quality can have a significant negative impact on health.

Alongside carbon reduction, every business needs to assess its impact on air quality and implement policies to improve it. "*Company Name*" is committed to reducing our impact, and aim to achieve this by:

- **Our Buildings**
  - Reviewing the performance of our buildings and implementing technologies to reduce emissions
  - Installing green roofs and walls where practicable
  - Encouraging positive behaviour change on energy usage
- **Transportation**
  - Encouraging walking
  - Encouraging cycling
  - Reviewing taxi and Private Hire Vehicle (PHV) contracts to encourage 'no idling' and the use of the cleanest vehicles
- **Supply Chain**
  - Incorporating air quality, alongside other environmental targets, into procurement policies
  - Consolidating deliveries to reduce the number of journeys made to our offices
  - Demanding reduced emissions from contractor vehicles and reducing the number of deliveries per week

APPENDIX III - HEALTH IMPACT

Air Quality in parts of the City of London is the worst in the country[1]. We may not be able to see the pollution, unlike in the 1950's when thick smogs blighted the City, but the problem is still ever present.

This information sheet gives an overview of the health impacts of poor air quality.

Impact

- The table below shows the main air pollutants, sources of these pollutants and potential health effects
- The main impact on health is long term exposure to fine particles

Pollutant	City Sources	Health effects
Nitrogen dioxide	**Road transport and boilers**	**Causes irritation to airways and can increase asthma symptoms at high concentrations and increase response to allergens**
Particulate Matter (PM_{10})	**Diesel vehicles and boilers**	**Can cause heart and lung diseases and long term exposure can lead to premature death**

Key Messages

- The Greater London Authority published a report in 2010, which detailed that an estimated 4,267 premature deaths in London in 2008 could be attributed to long term exposure to fine particles ($PM_{2.5}$)[2]
- The Committee on the Medical Effects of Air Pollutants (COMEAP), who advise the government on the health effects of air quality, published a report in 2010 detailing that air pollution makes a significant contribution to mortality in the UK[3]:
  - On analysis of 2008 data, 340,000 years of life were lost across the UK population, as a result of air pollution
  - Every individual has 6 months taken off their life due to poor air quality
  - Poor air quality has a greater impact on mortality than passive smoking or road traffic accidents
- Poor air quality is estimated to cost the country around £15 billion every year; this compares to the cost of obesity which is around £10 billion a year[4]

[1]City of London Annual Air Quality Report 2009
[2]Report on Estimation of Mortality Impacts of Particulate Air Pollution in London, Dr B G Miller, June 2010
[3]The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom, A report by the Committee on the Medical Effects of Air Pollutants (COMEAP) 2010
[4]DEFRA Air Pollution: Action in a Changing Climate March 2010

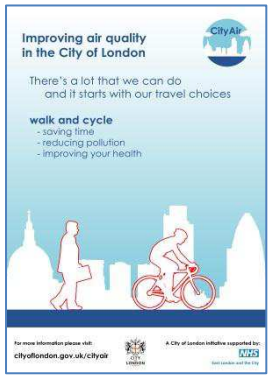
APPENDIX IV - EMPLOYEE ENGAGEMENT

Running a sustainable office can bring significant business benefits. Embracing air quality, and reducing emissions from operations, brings further benefits, specifically to the health and wellbeing of employees.

Businesses cannot succeed in either objective without an engaged workforce. Employees are the engine room of ideas, the source of innovation and the energy that helps to drive through change and achieve objectives. We're all a part of the problem and we should all be a part of the solution.

Starting Point

- There are many ways to engage employees and raise awareness, and it starts with communication:
  - Make every campaign and message relevant, clear and easy to implement
  - Use the company intranet to get the message across and update it with progress
  - Embrace and reward the early adopters
  - Reinforce the message with campaign posters at key points around the office



Maintaining Impetus

- Encourage feedback at all times and stimulate innovation and fresh ideas
- Develop a Green Team, supported from the top, and include representatives that would not normally take part
- Identify advocates and give them real support and the tools to spread the message

Training & Education

- Many air quality initiatives are best supported by formal training, for example:
  - Safe cycling
  - Optimising building performance
  - Air quality conscious procurement
- Use all media to reinforce your messages

Keep Communicating

- Constantly update employees on progress
- Develop tips and fact sheets from your experiences
- Recognise ideas and make them happen
- Above all celebrate success and don't give up

APENDIX V - GREEN TEAMS

Collaboration between owners, occupiers and building managers on air quality and environmental issues is best achieved through a Green Team.

Understanding how best to run a building, alongside considering air quality impacts, can realise significant savings as well as health benefits.

Full guidance on how to establish and develop a Green Team, also called a Green Building Management Group (GBMG), to effectively manage, monitor and record improvements is available from the Better Buildings Partnership.

The Reasons

- Minimises occupancy costs
- Reduces emissions and waste
- Reduces exposure to current and future environmental regulation
- Supports Corporate Responsibility commitments
- Improves working relationships
- A greater understanding of mutual responsibilities
- Celebrating successes and results can help build collective momentum of improvement

The Constitution

- Focus primarily on minimising the consumption of resources, such as gas or other heating fuels, water and reducing the generation of waste in a building
- Embrace sustainable procurement, travel and biodiversity
- This is useful in multi-tenanted offices where shared services can realise economies of scale with associated air quality impact
- Provide a forum to share ideas and best practise
- Require a shared commitment to meet regularly, to set and agree common objectives, to develop a plan and undertake improvement actions

Actions

- Review current level of building performance
- Review supply chain, waste and other air quality improvement provisions such as green roofs
- Identify common ground and early 'quick wins'
- Formulate, agree to and adopt a Memoranda of Understanding
- Meet regularly and don't give up

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APPENDIX VI

CityAir

Improving air quality in the City of London

Sustainable Tenancies & Air Quality

Memorandum of Understanding

INSERT ALL STAKEHOLDER LOGOS HERE

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Memorandum of Understanding

This Memorandum of Understanding (MoU) aims to facilitate collaboration between the Asset Owner and its occupants in order to improve the sustainability, air quality and reduce the environmental footprint of buildings and premises that we manage and occupy. It has been developed from best practice guidance set out by the Green Lease Working Group formed by the Better Building Partnership[1] to drive improvement in the environmental performance of existing commercial properties. The MoU can be entered into by the parties at any stage of a lease agreement.

DATE	
PARTIES	[ ] of [ ] (the Landlord) [ ] of [ ] (the Tenant)
PREMISES	
BUILDING	
LEASE	dated [ ] between [ ] and [ ]

1 Memorandum of Understanding

1.1 The Landlord currently owns the Building and the Tenant currently occupies the Premises under the Lease.

1.2 The Parties agree to work together collaboratively to improve the environmental performance of the Building and mitigate our impact to local air quality.

1.3 The Parties agree to consider and where appropriate implement the measures set out below and in the Schedule of Options.

1.4 The Landlord will encourage any other occupiers in the Building to enter an MoU on the same terms as this MoU in order to improve the overall environmental performance of the Building.

1.5 This MoU is not legally binding (save where expressly stated to be so). However, the Parties agree to work together in good faith (but without legal obligation) from the date of this MoU to implement the aims and objectives which are set out below.

[1] The Better Buildings Partnership is an initiative by the London Climate Change Agency to improve the sustainability of London's existing building stock. Its members comprises of commercial property owner organisations that own large property portfolios in London and who are committed to take on a leadership role in the sustainable retrofit of buildings.

2 Data Sharing

2.1 The Parties agree to share with each other all data and relevant information they have in relation to the Building and the Premises (in as much detail as is available to them) in respect of:

- Electricity consumption
- Gas consumption
- Other fuel consumption
- Water consumption
- Waste generation, management and recycling
- Maintenance of plant and equipment used in connection with the above
- Company transport, supply chain and other air quality impact areas

2.2 Such data and relevant information will be provided annually as a minimum in a form or methodology which the Parties agree upon as being appropriate for the purpose.

2.3 All such information will be provided in a form which produces meaningful and useful data.

2.4 An industry accepted methodology, agreed by the Parties, will be used to ensure consistency of data.

3 Building Management Committee

3.1 Where a Building Management Committee has already been established (customer liaison meeting), an agenda item will be introduced to review progress on environmental and energy efficiency measures. Where an appropriate forum does not already exist, the parties will set up a Building Management Committee which will meet regularly.

3.2 The Building Management Committee will comprise representatives of the Landlord, the Tenant, any managing agent employed by the Landlord or Tenant and other persons involved from time to time in the operation or management of the Building and the Premises as the Parties deem appropriate.

3.3 The Building Management Committee will:

(a) review;

- the data and other information shared by the Parties under paragraph 2;
- the environmental performance of the Building generally;
- any changes to the Building, the Premises or its operation which may affect the environmental performance of the Building or the Premises in the future;
- any forthcoming changes in law or practice which may be relevant to the environmental
- performance of the Building and the Premises.

(b) seek to agree an Environmental Management Plan (EMP) for the premises and agree upon annual targets for:

- the reduction of energy consumption, carbon emissions, NOx and PM_{10} emissions, water use and waste at the Building and the Premises;
- the increase, where possible, in the use of plant and equipment based on renewable technologies, renewable energy, recycling of waste, recycled water and captured rainwater for the Building and the Premises;
- other measures which it is practical to adopt in order to improve the environmental performance of the Building and the Premises.

(c) produce an annual statement[2] , where data is available, which:

(i) contains a summary of the building's energy and water use, NOx and PM_{10} emissions and the waste generated by the Building and the Premises

(ii) sets out the targets agreed pursuant to (b) above

(iii) sets out progress towards achieving the targets agreed for previous years and identifies any other achievements (e.g. reductions in fossil fuel consumption).

3.4 The Parties will provide each other with the names of the person(s) within their organisations and in any managing agents' organisations who should be contacted on issues relating to the environmental performance of the Building or the Premises.

4 Building Management System

4.1 Where the Landlord controls the hours of operation of any heating, lighting or air conditioning services to the Building and/or the Premises, the Tenant will provide to the Landlord details of its hours of occupancy of the Premises and its requirements for heating, lighting and air conditioning services for the Premises and will keep the Landlord informed of any changes in such requirements.

4.2 Where a Building Management System exists for the Building, the Landlord will:

(a) where appropriate, explain to the Tenant how the system works;

(b) ensure that, wherever practicable, the settings of the system are adjusted and regularly reviewed with a view to minimising unnecessary provision of heating, lighting or air conditioning services to the Building and the Premises and to reflect the information provided by the Tenant under paragraph 4.1 above.

[2] Note the Carbon Reduction Commitment Regulations (which are not yet in force) contain reporting requirements and this report should have regard to the timetable for CRC reporting.

5 Reinstatement of Tenant's Alterations

The Landlord will give reasonable consideration to:

(i) waiving any entitlement it may have to require reinstatement of alterations carried out by the Tenant; and

(ii) not including reinstatement requirements on the grant of any Licence for alterations where such alterations improve the environmental performance of the Building and/or the Premises and the Landlord considers that it will not need to remove or reinstate such alterations at the end of the Lease.

6 Co-operation on Schedule of Options Measures

6.1 The Parties will work together to consider and seek to implement, if appropriate, the measures against which a tick has been placed, set out in the Schedule of Options.

6.2 The Parties will co-operate with each other in complying with the requirements of any Carbon Reduction Commitment scheme to which either of them may be subject and which affects the Building and/or the Premises.

7 Managing Agents

The Parties will require their respective managing agents, if appointed, to implement the principles and objectives set out in this MoU.

8 New Owners and Occupiers

8.1 This MoU is personal to the Parties and will apply only for so long as the Landlord owns the Building and the Tenant occupies the Premises.

8.2 If the Landlord disposes of its interest in the Building, the Landlord will encourage the new owner to enter into a similar MoU with the Tenant and with other occupiers of the Building.

8.3 If the Tenant disposes of its interest in the Premises or sublets them, the Tenant will encourage any new occupier of the Premises to enter into a similar MoU with the Landlord.

9 Renewal of this Memorandum of Understanding

The Parties will review the progress which has been made in improving the environmental performance of the building on an annual basis based on the normal financial year. The MoU will continue to apply but can be terminated at any time by either party subject to a three month notice period on either side.

10 General

10.1 It is acknowledged that this Memorandum is not supplemental or collateral to the Lease and is not to be taken into account when construing the provisions of the Lease and that the provisions of the Lease shall prevail over anything in this Memorandum.

10.2 Each Party agrees that information provided to the other pursuant to paragraph 2 of this Memorandum shall be used only for the purposes of implementing this Memorandum and for no other purpose whatsoever and that they shall keep all such information confidential and will not disclose it to any other person (save their agents, consultants or contractors who need to have such information for the purposes of this Memorandum) other than if required to do so by law or with the written consent of the other Party. Notwithstanding this confidentiality requirement, we may disclose information relating to the energy use or environmental performance of the building as a whole so long as the energy use or environmental performance of the Premises is not separately identified.

10.3 The Guarantor has signed this Memorandum by way of approval of its terms.

10.4 The Parties agree that this paragraph 10 is legally binding [and is governed by English Law].

Signed on behalf of the Landlord

Name

Position

Company

Date

Signed on behalf of the Occupier

Name

Position

Company

Date

Schedule of Options

The following items are a list of possible areas of collaboration or improvement initiatives for both Parties to consider in the development of a Building and Premises specific EMP. Tick boxes are provided to indicate the items which Parties here agree to consider. It is recommended that the options are reconsidered at the end of each reporting year to see if additional measures can be added to the agreed list going forward.

1 Energy		
1.1	Commission an energy review and insist that air quality is included in the recommendations. If you have already had an energy review on your building look at the implications to air quality over solely energy efficiency improvements.	☐
1.2	When replacing boilers source one with NOx emissions less than 40mg per kWh.	☐
1.3	If sourcing CHP look for low NOx and emission suppressing technologies.	☐
1.4	If using renewable energy look for non-combustion technology.	☐
1.5	Implement separate metering facilities for individual utilities for the Premises and the common parts and for other occupiers and special uses.	☐
1.6	Purchase energy from renewable sources wherever possible.	☐
1.7	Ensure boiler servicing is to the highest possible standard and consider a burner upgrade.	☐
1.8	Look at improving generator maintenance and review the frequency of testing.	☐
1.9	Apply air filtration to boiler and generator vents.	☐
1.10	Install a green roof and wall.	☐
1.11	Landlords give reasonable consideration to requests by the Tenant for the installation of plant and equipment based on renewable technologies (including roof mounted equipment).	☐
1.12	Where appropriate participate in local and/or communal schemes for energy generation or provision.	☐

2 Waste		
2.1	Landlords develop and agree with the Tenant and other occupiers of the Building a waste strategy for the Building including, where practicable, the sharing of recycling and other waste facilities by the occupiers and joint waste strategies with neighbouring buildings.	☐
2.2	Organise better collection regimes, coordinated with other campus occupants.	☐
2.3	Demand reduced emissions from the contractor's collection vehicles.	☐
2.4	Evaluate and implement appropriate recycling arrangements for printer cartridges, fluorescent bulbs, batteries and similar items.	☐
2.5	The adoption of sustainable procurement codes with a regard to air quality (e.g. purchase of environmentally friendly office consumables and the adoption of "take back" and "re-use" schemes with suppliers for products and packaging).	☐
2.6	On refurbishment and fit-out, require contractors to make adequate waste segregation and recycling provisions and to re-use redundant materials wherever practicable.	☐
2.7	All electrical equipment in the Building or the Premises which is to be disposed of will be disposed of by the equipment owner in accordance with the WEEE Regulations 2006.	☐

3 Water		
3.1	The installation of high efficiency plumbing fixtures and control technologies in the Building and the Premises.	☐
3.2	Use filtered mains water rather than the bottled water delivered daily.	☐
3.3	A regular programme of leak inspections at the Building and the Premises.	☐
3.4	Where possible, the use of treated and recycled water, captured rain water and grey water, where potable water is not a necessity.	☐
3.5	The use of relevant water saving control systems.	☐

4 Transport		
4.1	The provision of space for bicycle storage, shower and changing facilities for cyclists. Alternatively partner with a local gym to mutual benefit.	☐
4.2	Implement the Government supported Cycle to Work Scheme, which allows employers to loan cycles and cyclists' safety equipment to employees as a tax-free benefit.	☐
4.3	Agree a 'Green Travel Plan' and engage with all staff explaining the benefits	☐
4.4	Launch a 'walk to the client' campaign	☐
4.5	Change contractor from a 'green' taxi company to one using hybrid vehicles or those meeting the Euro V standard for City use	☐
4.6	Enforce a 'no idling' policy across the taxi contract	☐
4.7	Choose low emission vehicles on replacement cycle or before if possible	☐
4.8	Employ vehicle pooling	☐
4.9	Invest in driver training	☐

5 Alterations and Replacement		
5.1	The reasonable consideration of sustainable sourcing, the use of energy efficient and sustainable products and materials, recycling and the environmental performance and impact of all replacement of plant and equipment and of all alterations.	☐
5.2	When replacing plant and equipment, the use of energy efficient plant and equipment and reasonable consideration of reductions in energy use and for improvements in energy rating (including any rating contained within an EPC or DEC).	☐
5.3	Avoiding alterations which have an adverse impact on the energy performance of the Building or the Premises.	☐
5.4	On the Tenant's part the provision to the Landlord of sufficient information in relation to the environmental impact of proposed alterations, on the making of any application for the Landlord's consent to such alterations.	☐
5.5	The Parties to give reasonable consideration to alterations that reduce the need for air conditioning and other energy consumption.	☐
5.6	Agreeing a target BREEAM rating prior to either party carrying out alterations for which a BREEAM rating would be available.	☐

6 Cleaning		
6.1	Requiring cleaning contractors to comply with any waste strategy or any energy or water reduction strategy agreed by the Parties and to maximise the use of natural solvent free and hydrocarbon free cleaning products.	☐
6.2	Specifying appropriate cleaning and maintenance procedures for specialist "green" plant, equipment, fixtures or fittings.	☐
6.3	Programming cleaning times to minimise the use of lighting, heating and air-conditioning resources.	☐
6.4	Providing awareness raising and training to cleaners.	☐

7 Supply Chain		
7.1	Incorporate air quality, alongside other environmental targets, into procurement policies	☐
7.2	Work with other tenants and save on central contracts for more efficient 'business basics' delivery	☐
7.3	Demand reduced emissions from contractor vehicles	☐
7.4	Reduce the number of deliveries per week	☐
7.5	Move to pedal bike and zero emission couriers where possible	☐

8 Sharing Initiatives		
8.1	Without breaching the confidentiality of information as required by paragraph 10.2, the Parties will be free to share with others their targets and achievements under this MoU.	☐
8.2	On the Landlord's part, to provide or arrange for workshops for the Tenant and other occupiers on their sustainability initiatives to demonstrate how reductions and savings to energy, water and waste consumption can be made.	☐
8.3	The provision of training and education and the communication of achievements to employees.	☐

9 Tenant Handbook		
9.1	On the Landlord's part, the provision to the Tenant of access to a portal or information pack which includes energy, air quality and environmental management information about the Building (including any EPC/DEC ratings and recommendation reports, reduction targets, energy metering and monitoring data, an environmental policy and water performance data and waste strategy data).	☐

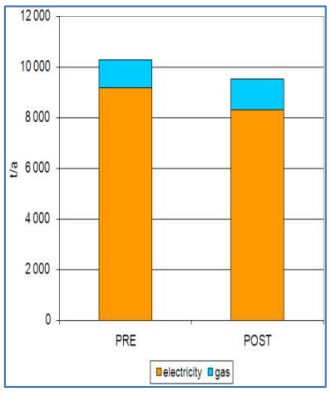
APPENDIX VII – BUILDING ENERGY REVIEW

Undertaking an energy review is the starting point for any businesses wanting to reduce emissions. All too often organisations embark on sustainability programmes without fully understanding how their buildings operate and where savings can most effectively be made.

There are numerous benefits that can be realised. Assessing performance trends gives a real understanding of the rhythm of the building. By identifying where action is most appropriate and setting realistic targets, great savings can be made.

Context

- Whatever your objectives in commissioning a building energy review – **think air quality**
- Basic components include:
  - Building energy usage
  - Building Management System review
  - Technology Review
  - Engineering Capacity
  - Financial and value implications
- It can be a daunting process, especially if the building has not been 'tuned' since commissioning
- Start simply and build up complexity as your understanding of the building grows



Air Quality

- In a recent energy review conducted for a building in the City, the recommendations would have resulted in a reduction in electricity usage but an increase in gas consumption – therefore increasing local air pollution
- Reducing energy usage is only one part of the picture – **think air quality**
- Addressing supply chain, transportation and behavioural change are also covered elsewhere in the document but all elements are linked

Outcomes

- A benchmark against which all future performance can be measured
- An action plan for the implementation of recommendations from the building energy review
- The possibility of integrating results and actions with an awareness campaign for staff

APPENDIX VIII - MEASUREMENT & MONITORING

While dependence on energy is unavoidable, effective energy management can result in significant cost and emission reductions. Good metering practice is a powerful tool forming the basis of effective energy management with timely and detailed information leading to better decisions.

Understanding Usage Levels

- With regards to local air quality, monitoring should focus on gas usage
- Large consumers of gas generally receive bills based on daily meter readings
- These bills include details of consumption and price according to time of use
- Accurate readings lead to accurate bills and, when analysed, can lead to a real impetus for change

Metering Techniques

- Meters vary greatly, but in essence they are all designed to measure volume flow or power
- The best system of monitoring and measurement are facilitated by half-hourly metering
- Some meters are not capable of recording pulses, which is an essential feature for collecting half-hourly gas data
- In this case the meter must be replaced
- Once the meter has been changed, the data can be collected and made available to the organisation or a company specialising in metering data analysis

Metering Options

- Consider devices that supplement the data from the site's existing meter
- Extra data could highlight areas where savings can be made
- In particular consider:
  - Advanced Metering
  - Sub-metering especially on boilers
  - Meter scheduling
  - Data acquisition & communications

APPENDIX IX - GREEN ROOFS

Case Study - A Green Roof in the Shadow of St. Paul's

Eversheds is an international law firm with a clear vision of the future. It is a firm that is adapting to new demands and business pressures as well as embracing their sustainability commitments.

Originally installed as a simple sedum blanket/mat system, Eversheds wanted to maximise the green roof for biodiversity.

The Benefits

- Green Roofs and Walls are widely recognised as a means of improving air quality
- They contribute to the reduction of airborne particles as well as enriching the air with oxygen
- Green roofs reduce the heat island effect
- They can also provide a valuable space for other biodiversity and employee wellbeing activities

The Practicalities

- The initial system consisted of an inverted roof with insulation on top of the waterproofing element
- A sponge element acts as a drainage and protection layer was added
- A green roof substrate was then laid onto the drainage layer and a blanket, consisting of a range of sedum species was laid out
- This not only covered the main roof but was one of the first to be installed beneath window cleaning runners around the perimeter of the roof

Best Practice

- A series of mounds with a maximum height of 150mm above the sedum blanket
- Creation of wood/log elements across the roof
- The use of dried wildflower hay bundles
- Seeding of new substrate areas sand mounds with a native seed mix
- Bird boxes, areas for food growing and bee hives alongside a flower rich habitat

Developed with the kind permission of Eversheds and the Green Roof Consultancy Ltd in association with the Grass Roof Company

APPENDIX X - WALKING

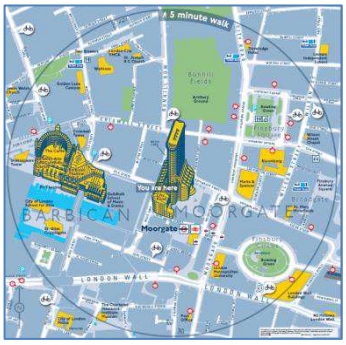
Case Study – 'Walk to the Client' initiative

Simmons & Simmons is a City law firm with international reach and an acute understanding of their responsibilities. Behavioural change in even the most forward thinking organisations, however, can still prove difficult.

The 'Walk to the Client' Initiative was a bold step, especially within an organisation where client journeys are often accompanied by large volumes of paperwork.

Setting the Scene

- It is not widely known that it takes less than ten minutes to walk from Moorgate to St Pauls
- Taking a taxi or public transport can take longer
- Using TfL Legible London mapping, pictured, the feasibility of walking is clear
- **Breaking down habitual behaviours takes time and needs supporting with compelling messages**

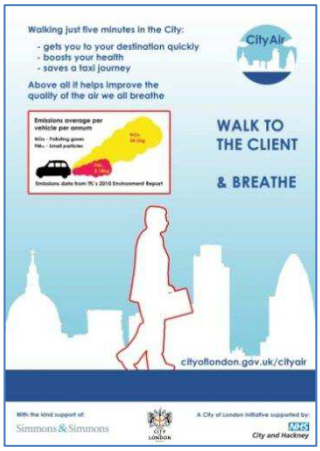


Communications

- Introduced through the company intranet, the campaign was backed by:
  - High impact communal area graphics, as shown here
  - Travel bags provided for transportation of large volumes of paperwork
  - Displaying walking journey times
- **Walking is good for you and your employees**
- When put in the context of the equivalent emissions of a taxi ride, it is a straightforward and logical choice for many journeys, especially in the City

The Benefits

- A staggering amount of time and money is spent on taxi and Private Vehicle Hire journeys
- Assist employees in making a choice and help improve local air quality
- **Simmons & Simmons hope to reduce short journeys by as much as 50% and remove approximately 60 unnecessary taxi miles from their carbon footprint throughout May 2011**



APPENDIX XI - CYCLING

There is no doubt that cycling in the City is by far the quickest way to get about. Cycling improves your health, is an efficient and cost effective mode of travel but, there are a number of barriers that are now being systematically broken down.

The Government and Mayor of London has committed a great deal to cycling, working alongside delivery partners such as the City of London and Transport for London (TfL) to make cycling an attractive proposition for any potential user.

- Cycle to Work Scheme
- Barclays Cycle Hire scheme
- Cycle training
- Barclays Cycle Superhighways

More details can be found in the Mayor of London's Air Quality Strategy.

Practicalities

- To promote healthier journeys to work and to reduce environmental pollution, the Government introduced an annual tax exemption, which allows employers to loan cycles and cyclists' safety equipment to employees as a tax-free benefit
- There really is no reason why companies should not sign up to this scheme however, should this be the case, employees can group together to set up their own scheme
- **Sign up to the Cycle to Work scheme**
- Further information on this and other great practical ideas are available on the TfL website

Safety

- A major concern of the potential City cyclist is safety
- **Work with TfL and the City of London to provide safety training**
- **Communicate the benefits and run a cycling campaign including branded high-vis wrist snaps**

Reality

- **Partner with local gyms to make up for the lack of showering and locker space for a fitter and more included workforce**
- **Keep up to date with latest developments at the City of London's Cycling Pages**

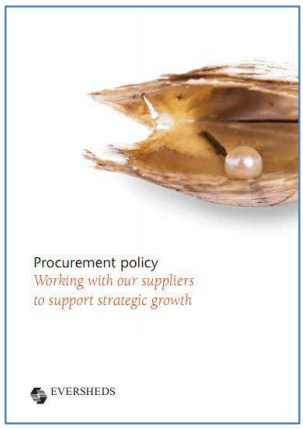
APPENDIX XII – PROCUREMENT

Procurement decisions have a direct impact on air quality. Consolidation of deliveries, collaboration with fellow businesses and working with suppliers to drive down emissions is a partnership commitment that should support strategic objectives.

By creating and managing best in class, diverse and innovative supply chains an organisation can realise significant cost, efficiency and reputation benefits.

Procurement Policy

- Support growth with innovative and flexible supply chain solutions
- Ensure that all suppliers add value through streamlined operational processes, innovative solutions and an appreciation of air quality impact
- Be proud of the development of procurement policies to embrace air quality
- Contract and relationship management should be maintained and best practice shared with clients and customers



Collaborate

- Develop cross-functional project teams internally and with other businesses to work together to minimise the number of daily deliveries made
- Centralising deliveries builds trust in the overall objective of improving air quality
- For all deliveries and contracts that include the use of vehicles, insist that those vehicles are, at a minimum, Euro V compliant
- Include taxis and Private Hire Vehicles (PHVs) in the application of modified policy to supply chain decisions

Innovate

- Work with fellow businesses to implement zero emission 'last mile' distribution (see the Zero Emission 'Last Mile' Delivery case study)
- Consolidate waste collection at a building level, even for confidential waste
- Only by working with suppliers can innovative solutions be found to mitigate the impact of activities on air quality
- Every supply chain decision is different but in every situation - **think air quality**

APPENDIX XIII – WASTE & RECYCLING

Case Study – ''Binning the Bin'

Simmons & Simmons is a City law firm with international reach and an acute understanding of their responsibilities. Behavioural change in even the most forward thinking organisations, however, can still prove difficult.

"Simmons & Simmons has always taken a proactive position on recycling, with varying levels of success. We arranged for plastic cup, aluminium can, glass, paper and compost recycling bins for our people to use, but we encountered some issues with the streams becoming contaminated with the wrong type of waste," said James Clark, office services manager.

Challenges

"Under-desk bins are a pain. We have 900 people in our London office, each with their own bin, usually only a quarter full of mixed waste. It's frustrating, as most of the waste is recyclable, but as it's mixed with non-recyclables, it goes into the stream for incineration as well as thousands of unnecessary bin-liners. Someone had to grasp the nettle and sacrifice the convenience of under-desk bins for the benefit of our environment."

The Solution

Help arrived from the CityPoint landlord's managing agent, who changed to a waste contract with a materials reclamation facility (MRF) in 2009. No longer did general office waste have to be separated into a variety of streams; it could be divided into two simple "recyclable" and "non-recyclable" groups; the MRF did the sorting for them. Backed by a positive campaign, more than 140 under-desk bins were collected over a weekend and replaced with three bins for recyclables and three bins for non-recyclables strategically and sympathetically placed in the pilot area.

Outcomes

"The results were great, with a 4,000% increase in recycling and a 60% reduction in waste for incineration. There has been some negative feedback, but if employees claim they don't have the time to take their waste to a bin, then they don't have time to use the toilet or the vending machine either!"

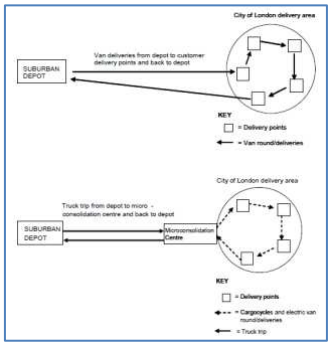
APPENDIX XIV – ZERO EMISSION 'LAST MILE'

Case Study – 'The Cargoycle & Electric Van'
Light Goods Vehicles (LGVs) are responsible for 18 % of PM_{10} emissions in the City. Research into the application of Euro standards has highlighted that the higher standards do not deliver the expected improvements in emissions of NOx, especially for diesel cars and LGVs.

The solution is simple – to improve air quality and our health, in the congested City, we need zero emission 'last mile' delivery of as many goods and services as possible. This case study shows what can be done, even on a small scale.

Challenges & Opportunities

- Gnewt Cargo evaluated the existing Office Depot deliveries to the City of London using diesel vans against a system of Cargocycles and electric vans for the final stage of delivery
- A trial was conducted focussing on total distance driven, road space occupancy and emissions
- This trial is now ongoing best practice



The Solution

- In the new system a diesel truck is used to transport goods from the suburban depot to the City of London microconsolidation centre for onward delivery by Cargocycles and electric vans
- The logistical implementation is not complex, based merely on an understanding of a new delivery methodology

Impact & Business Reality

- Zero local air pollutant emissions were generated
- The amount of space taken up by delivery vehicles dropped by 50%
- A tightening of the Low Emission Zone (LEZ) will push up the price of the 'standard' delivery model
- Gnewt Cargo won the 2010/2011 Sustainable City Award for Transport and were runners up in the Air Quality category
- Work with fellow tenants and across your sector to make a real difference – **think air quality**

With the kind permission of gnewtcargo

Supported by NHS East London and the City

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What is a Low Emission Neighbourhood?

The City of London Corporation is proposing to create a Low Emission Neighbourhood in the Barbican and Golden Lane area of the City of London between now and March 2019.

The aim of project is to improve air quality for people living and working in this area through targeted interventions that tackle the key sources of air pollution.

What will it do?

The ambition of the Low Emission Neighbourhood is to introduce an ambitious package of measures that will improve air quality by:

- Considering options for restricting access through Beech Street to ultra-low emission vehicles only;
- Working with businesses to reduce emissions from their buildings;
- Working with freight operators and businesses to reduce emissions from deliveries and servicing;
- Supporting the uptake of electric vehicles amongst taxi drivers;
- Installing electric vehicle charging infrastructure for residents and businesses;
- Supporting increased levels of cycling and walking;
- Greening the public realm and local environment; and
- Increasing enforcement of no idling vehicles and emissions from construction sites.

How to get involved

You can learn more about the project by visiting **www.cityoflondon.gov.uk/len** or register for our regular e-bulletins by contacting the Low Emission Neighbourhood Project Manager Ben Kennedy at **Ben.Kennedy@cityoflondon.gov.uk** or call **020 7332 3483**.

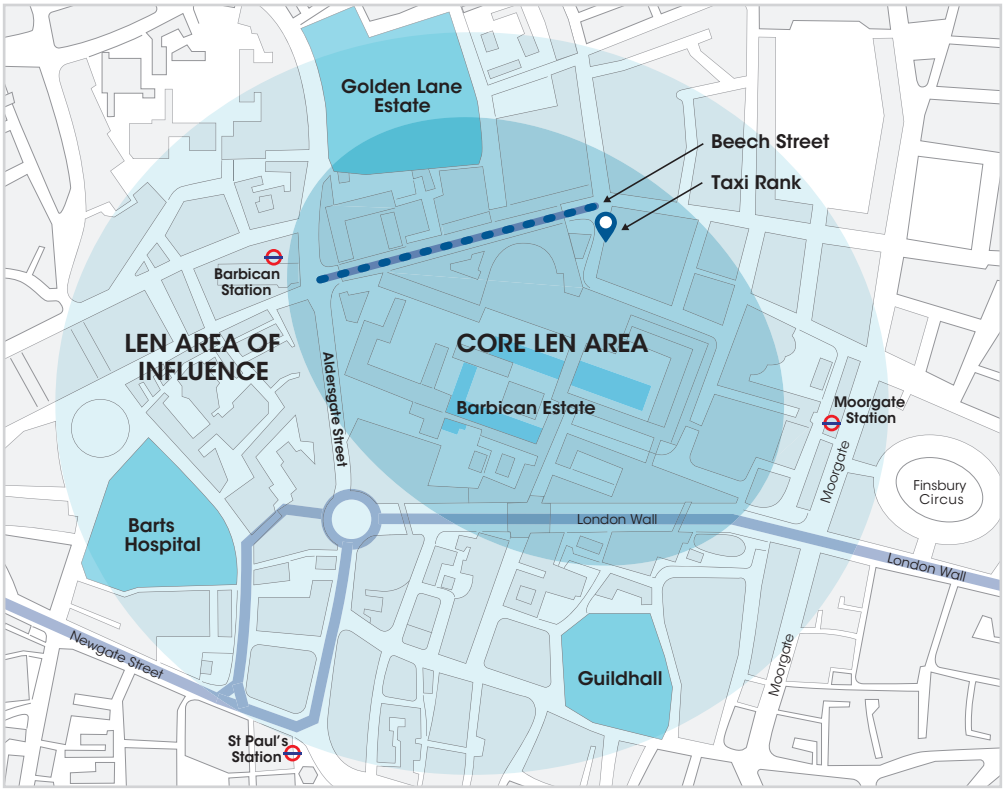
Follow the project on **Twitter: @_CityAir**

Air pollution information

Download the CityAir app to find out more about air pollution and get advice about how to reduce exposure to air pollution.

Download on the App Store

GET IT ON Google Play



www.cityoflondon.gov.uk/LEN

City of London Corporation, PO Box 270, Guildhall, London, EC2P 2EJ

CityAir Low Emission Neighbourhood

SUPPORTED BY MAYOR OF LONDON

CITY OF LONDON

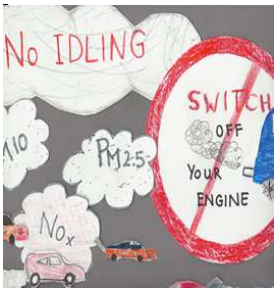
CLEAN AIR ZONES PILOT – THE LEARNING ENVIRONMENT

Engaging children with the air quality message and the greening installed is important to help them understand why the greening is there and to deliver behaviour change in the long term and reduce exposure in the interim.

WHAT COULD BE DONE?

- use the **Cleaner Air 4 Primary Schools Toolkit** to get lesson and activity ideas and develop them further e.g. traffic counts and surface wipes
- use the green infrastructure in the school to engage the children e.g. help with the planting and conduct an experiment to see which types of leaves are better at trapping particles

- project outputs to raise awareness for example: signage around the school ('no engine idling' and 'clean air garden' signs), animations and videos, newsletters, webpage development, plays, whole school assembly, air quality notice board, walking maps and air quality posters and leaflets
- whole class and whole of school workshops for the children to learn about the air quality message



- establish an 'eco-club' and 'air quality champions' in the school to keep the air quality messages and to help look after the greening once it has been installed

CASE STUDIES

BOTWELL HOUSE RC PRIMARY SCHOOL, HAYES

- **Cleaner Air 4 Primary Schools toolkit** - teachers used materials provided to ensure the children had an understanding of the importance of air quality. The children created posters, drew pictures and wrote poems about what they had learnt.
- **The Pollution Solution! workshop** - 6 interactive theatre workshops were run by the Big Wheel Theatre Company for Year 3, covering air pollution and climate change.
- **Planting Day** - about 50 children helped out on planting day, run by Groundwork. All the planting in the 'quiet area' was done on this day. They learnt about 'air quality' plants and herbs and worked on designs for 5 themed panels that were installed later in the planters.

- **The School Children's Council** have been involved in shaping the school and got involved in the project. We gave a presentation to the Council on air quality and what we were trying to achieve at the school. The children's Council were involved in the building audit and design of the 'quiet area'.

WHAT WAS THE OUTCOME: The children produced a wonderful junior assembly about air quality and the participation of the school in the Clean Air Zones project on the official open day for the 'quiet area'. This included a factual

presentation and a skit about the Mayor of London and the project. The school choir also sang a song about looking after environment. The fun filled theatre workshops showed what we could all do to improve air quality locally, suggested using good air quality routes and also how addressing air quality can have a positive impact on reducing carbon emissions and so help with climate change. The teachers and the children enjoyed themselves and gave very positive feedback about the workshops.

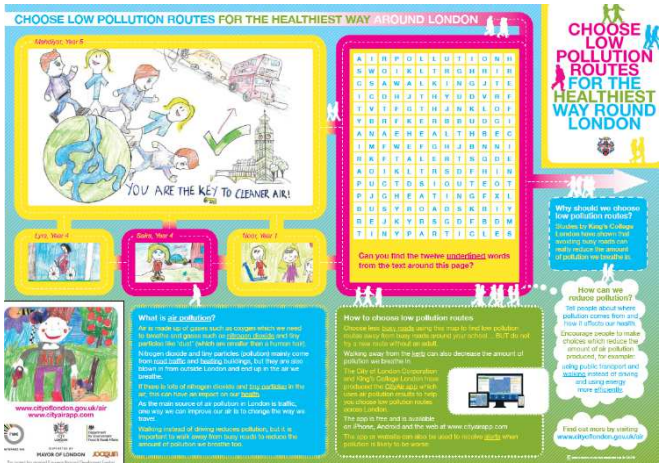
SIR JOHN CASS'S FOUNDATION PRIMARY SCHOOL, CITY OF LONDON

Over the course of the project various engagement programmes were implemented with the help of an external provider and a local volunteer group helped the pupils with 'air quality' planting.

- **Class engagement programme** - the year 6 class took part in a six week engagement programme where they found out about the causes and effects of air pollution, monitored air pollution around the school; investigated 'pollution loving/hating' lichen and produced no engine idling signs, air quality posters and webpages. Some work was presented at the leavers' assembly.
- **Workshop and project outputs** - all classes took part in air quality workshops where the pupils identified ways in which we can all reduce our 'air quality footprint'. Some classes followed with projects, including using the air quality monitoring results, writing articles and producing artwork for signs and a walking map. The project finished with a whole school assembly presented by nine air quality champions who prepared mini sketches, a short play and a song about air pollution.

- **eco club** – A year 4 eco-club was established and they learned about air pollution and monitoring in weekly sessions. They helped plant 170 air quality plants on the roof garden and in the playground with a local volunteer group.
- **Planting** – the pupils were actively encouraged to help with planting and looking after the 'air quality greening' by watering the plants during break-time. A 'green team' has been set up and the local volunteer group will continue to help the school with the care of the greening.

WHAT WAS THE OUTCOME: The children produced signs for around the school and a competition was run to design the artwork for a fold out walking map and a giant door sticker for the air quality monitoring station. The walking map explains how children can reduce their exposure by travelling via less busy roads. It also lets them know about the CityAir app which uses real time air quality data to show low pollution routes. The school are kept informed about the air quality in the area via termly reports and receive alerts when pollution levels are moderate or above.



OXFORD GARDENS SCHOOL AND ST CUTHBERTS WITH ST MATTHIAS, KENSINGTON AND CHELSEA

- **Education programme** - An education programme was designed for each schools' curriculum requirements using the Cleaner Air for Primary Schools toolkit and the Healthy Air education toolkit. Air pollutants NO_2, PM_{10} and $PM_{2.5}$ were highlighted in teaching sessions and practical exercises.

- **Practical Experiments** - *NO_2 diffusion tube s* deployment was undertaken as a practical exercise with each class followed by the collection of tubes and analysis of results. Sample location maps were created and graphs of results used to demonstrate changes in NO_2 in the local environment. *A surface wipe test* experiment was undertaken to demonstrate PM_{10} and $PM_{2.5}$ air pollution. The exercise was used to demonstrate the difference between roadside locations and locations away from the roadside. A traffic count was undertaken to demonstrate the volume of traffic along the busy road outside the school and the different types of vehicles contributing the poor air quality.
- **Monitoring station Installation** – To facilitate the schools teaching programme and further the understanding of the effectiveness of green screens to reduce local air pollution , at St Cuthberts with St Matthias school, a temporary (12 months) air quality monitoring station was installed. Continuous NOx and PM_{10} monitors positioned either side of a green screen located between the school playground and busy roadside location. Results from the monitoring station were used in teaching sessions to demonstrate how effective the green screens were at reducing NO_2 and PM levels in the school playground environment.

- **Animation/film creation** - Each class held a brainstorming session on air pollution and were given the task to create drawings about the sources and impact of air pollution on their health. The children then used their drawings to create a story board and create a script for their animation/ film. Sessions were held with the children and a team of animators to create the animation/film.
- **Gardening Sessions** - Existing gardening sessions run at St Cuthbert with St Matthias school used the green screen installation to carry on a legacy of air pollution teaching in the school after the education programme came to an end.

WHAT WAS THE OUTCOME: During the teaching sessions children made no idling engine posters to place outside of school along the busy road locations. Children also produced maps of low pollution walking routes to school using Walk-it.com. The final animation/film was premiered at the end of project school assembly. The classes led on presenting a summary of their work and showing their animation/film to the rest of the school, parents, governors and councillors. The animations were uploaded to You Tube and the Royal Borough of Kensington and Chelsea website. Gardening sessions at St Cuthbert with St Matthias school carried on the legacy of air pollution teaching by using the green screen installation as an example of how planting can improve local air quality. A research poster and paper were written using the results from the air quality monitoring station. Results were presented at the Monitoring Ambient Air 2014 conference. An article was also published in the Air Quality Bulletin Oct 2014. Links to You Tube animation/films can be found on the Schools Projects link:
http://www.rbkc.gov.uk/environmentandtransport/airquality/airqualityprojects.aspx

Green wall for London school

St Cuthbert with St Matthias School in the Royal Borough of Kensington and Chelsea has held a special assembly to celebrate the installation of a living green screen, made up of ivy, clematis, jasmine and lonicera.

The green wall aims to "significantly" reduce the pupils' exposure, whilst at school, to nitrogen dioxide and particulate matter vehicle pollution at the roadside location in Earl's Court. King's College London is monitoring air quality at the site (inset).

An air quality education programme has seen pupils from year six map their lowest pollution routes to school, create images for no-idling engine posters and script and produce an animated film. To see the film go to http://youtu.be/T4kpqIIYBNI

AIR QUALITY BULLETIN October 2014

Do's	*&*	*Don'ts*
meet the school needs by engaging with staff to see what the priorities are ensure the school understands the commitment required and establish a Letter of Agreement, which the teacher(s) and school sign do work with partner organisations who are already involved with schools and already know what works and is required have a single point of contact at the school to champion the project highlight how air quality fits across the curriculum: maths, sciences, geography, English, social studies, art and design use existing materials e.g. Cleaner Air 4 Primary Schools Toolkit, creating a comprehensive plan in advance be aware of holidays and activities at the school before agreeing timeframes establish early on with the school how the education programme will fit in with their curriculum requirements and schedule ensure the teachers are engaged with and informed of the education programme lesson plans, exercises and practical session provide teachers with information pack on air quality issues ensure that you have teachers assistance with the handing out and collection of homework and worksheets schedule the dates for the education programme to start and try to ensure that the sessions take place during similar school themes such as environment week, geography week etc. do book in use of school halls for assemblies early on and ensure time is made available to practice the assembly if using educational delivery agents, work with them to design the educational programme ensuring lessons plans, exercises and practical experiments are suitable for the air pollution educational programme and undertake regular updates and progress meetings		Do not leave it too late to contact the school. Ideally contact the school well before the new school year so the engagement can be programmed Do not overwhelm teachers with work or tasks. Keep the messages simple Do not forget to keep the school and teachers updated on the progress of the educational programme Do not forget to work with the school to publicise the programme through the school website and any school/governors newsletter to reach a wider audience/community Do not forget to send event and assembly invites early to parents, school and parent governors and where possible provide incentives such as 'freebies' to ensure they attend so as to spread the messages Do not forget to record each stage of the project, through written summaries, videos footage, photographs etc. but get school and parent/carer permissions for the use of photos etc. Do not forget that teachers are REALLY busy and so don't worry if some teachers do not want to be involved. It is better to work with teachers who have time and can commit Do not forget pre and post leaning evaluation sheets to understand what the children have learnt and what, if any behaviour change has occurred Don't forget copyright issues for materials produced on behalf of the school. Be sure the matters are finalised are agreed before proceeding

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As well as increasing biodiversity and absorbing nitrogen, plants can play a role in trapping fine particulate matter (PM_{10} and $PM_{2.5}$) found in the air we breathe. Research by Imperial College London indicates that plants with small leaves (which disrupt the flow of air) and fine hairs on their surface work best; however, leaves which cover a large surface or are grooved also provide surfaces upon which particles can be trapped. It is therefore thought that to help improve air quality, trees and plants which have these characteristics can be planted.

WHAT COULD BE DONE?

- Installation of green screens (pre-grown hedges/screens or plants trained to climb fences) and plants around the school to create 'air quality gardens' which can trap PM_{10} and NO_2
- Air quality monitoring before and after the installation to see the effect of planting and for the monitoring results to be used as a pupil engagement tool
- Outdoor air quality engagement projects such as monitoring, planting and designing signs to raise awareness regarding air quality matters (see The Learning Environment)

CASE STUDIES

BOTWELL HOUSE RC PRIMARY SCHOOL, HAYES

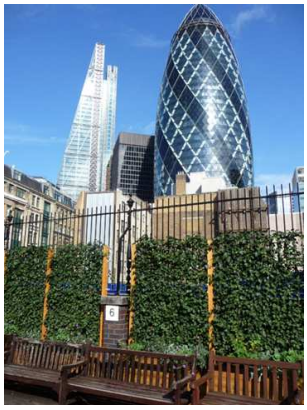
- **NO_2 Monitoring** - Air quality modelling data from CERC indicated nitrogen dioxide (NO_2) levels at the school are over the EU limit value. NOx tubes were used to monitor the air quality on Botwell Lane and at the boundary of the infants' playground; this monitoring is ongoing

- **Green screen** - a mature hedge was planted at the front of the school along the stretch of the infants' playground, adjacent to a busy main road and near a junction. Available monitoring data indicates green screens reduce PM_{10} levels compared to roadside levels and whilst Hillingdon does not have PM_{10} levels above the EU limit value, no level of PM is considered *safe*.
- **Green screen and planters** - A planted 'quiet area' was created in the rear playground, to replace the previous one that would be lost as part of the school redeveloped. Climbing plants, including *ivy* and *Virginia creeper,* were planted in the quiet area along the fence line adjacent to residential garages and creates an attractive green screen. Lost seating was replaced and the greening included raised planters with 'air quality' plants such as *lamb's ear* and *wild geranium.*

WHAT WAS THE OUTCOME: Monitoring data collected indicates the NO_2 annual mean may just exceed at the roadside, although it is likely to drop a little under the limit value by the boundary to the infants' playground. The EU limit value (NO_2 annual mean) is set for the facade of buildings with a sensitive use and the results indicate it is unlikely the EU limit value will be exceeded at the school building. It is hoped the hedge adjacent to the main road and the green screen in the rear playground will be effective in reducing the PM reaching the playground once they have fully matured. Once it fully grown, the hedge will have the additional benefit of providing some visual screening to the infants' playground. The 'quiet area' provides much needed greening for the school and an attractive environment for the children to learn about air quality and enjoy.

SIR JOHN CASS'S FOUNDATION PRIMARY SCHOOL, CITY OF LONDON

- **Monitoring and Alerting** - The school already had a continuous air quality monitoring system, but the Clean Air Zones project allowed a diffusion tube monitoring network to be set up in the school. The pupils are also able to use the results to look at how levels vary in and around the school. Additional particulate monitoring equipment was also installed in the front playground to look at the effects of changes to the road system outside the school. An air quality reporting and alerting system was established and using the Defra Daily Air Quality Index, the school are notified when pollution is predicted to be moderate or above.



- **Planting:** 45m^2 of pre-gown green ivy screens were installed in the rear playground and roof garden. Pupils also planted 170 'air quality' plants with the help of a local community group. Six mobile green ivy screens with chalkboards were made to create unique play areas within the playground. In addition, the shed roofs in the front and rear playground had sedum roofs containing *succulents* installed.

WHAT WAS THE OUTCOME: The screening in the back playground has turned a concrete, unwelcoming area into a green vibrant space which is engaging for the children. The mobile screens are used in the front playground to create a unique sheltered space for the children to play and plant vegetables. Monitoring as part of the wider project indicates that greening improves air quality and with monitoring at the school demonstrating that the NO_2 annual mean EU limit value is exceeded, it is hoped that simple greening measures will help with improvements and raise awareness. Monitoring will continue, providing data for the alerting system, for the children to use and for the effectiveness of the planting and road changes outside the school to be monitored.

OXFORD GARDENS SCHOOL AND ST CUTHBERTS WITH ST MATTHIAS, KENSINGTON AND CHELSEA

- **Green Screen Installation** - *Oxford Gardens School:* An elevated series of pre-grown green screens were installed to a wall in the rear playground, adjacent to the Westway dual carriageway (A40), an area where NO_2 is shown to exceed the EU limit values. PM_{10} is also in high concentrations around major road sources.

St Cuthberts with St Matthias: A 51 metre pre-grown green screen was installed to a wall in the front playground area adjacent to a busy road where NO_2 has been shown to exceed the EU limit values and roadside levels of PM_{10} have been shown to be high. The green screens comprised of built-in benching and a drip feed irrigation system to ensure appropriate plant maintenance. Plant species within the green screen were selected for their air quality improvement properties. A planter bed was also installed to the rear playground area to facilitate the teaching of planting and the benefits of certain plant species to the reduction of air pollutants.

- **Monitoring**- At *St Cuthberts with St Matthias* school a temporary (12 months) air quality monitoring station was installed into the school playground with continuous NO_x and PM_{10} monitors positioned either side of a green screen located between the school playground and

busy roadside location. Results from the monitoring station were used in teaching sessions to demonstrate how effective the green screens were at reducing NO_2 and PM levels in the school playground environment.

At *Oxford gardens school*, NO_2 diffusion tubes were deployed by the children during a practical exercise followed by the collection of tubes and analysis of results. Sample location maps were created and graphs of results used to demonstrate changes in NO_2 in the local environment.

- **Surface wipe test** - A surface wipe test experiment was undertaken in a practical exercise to demonstrate PM_{10} and $PM_{2.5}$ air pollution. The exercise was used to demonstrate the difference between particulate pollution at roadside locations in comparison to locations away from roadside locations. A traffic count was undertaken to demonstrate the volume of traffic along the busy road outside the school and the different types of vehicles contributing the poor air quality.
- **Gardening Sessions** - To continue the legacy of air pollution teaching, existing gardening sessions run at St Cuthbert with St Matthias school will use the green screen installation and planter beds and plants with air pollutant trapping properties to explain what air pollution is and demonstrate how plants can be used to improve local air quality.

WHAT WAS THE OUTCOME: The creation of an aesthetically pleasing environment with the addition of plant species with NO_2 absorption and particle trapping, air quality improving properties. Transformation of a bare stark tarmac and brick playground area into a green area with benching and planter bed space to facilitate a continued legacy of air pollution teaching.

ACTION PLANS

Green screen benefits claimed

Monitoring of pollutants near a playground suggests a green screen may be reducing pollution.

A green screen was installed on the boundary wall along the Warwick Road at St Cuthbert with St Matthias Primary School in Kensington and Chelsea.

This is one of the busiest and most congested roads in the borough and has been identified as an area that has high background levels of NO_2 and PM_{10} pollution.

A temporary air quality monitoring station was also installed into the school comprising two NO_2 analysers and two PM analysers. The analysers have provided concentration data for NO_2 and PM on the road side of the green screen and the playground side of the green screen installation.

The monitoring so far has shown early indications that the concentrations of NO_2 and PM on the playground side of the green screen are "markedly" lower than concentrations on the road side of the green screen.

An air quality education programme was also designed and delivered to year 5 and 6 pupils within the school in conjunction with the installation of the green infrastructure and monitoring station.

The project was funded by the GLA receiving funding through INTERREG IVB, the Royal Borough of Kensington and Chelsea Council and Defra and was run in collaboration with King's College London and the Transport Research Laboratory.

Before and after: the green screen is being monitored

AIR QUALITY BULLETIN January 2015

The 12 month monitoring programme enabled the scientific assessment of the effectiveness of the green installation to reduce local air pollution in a school environment. Results were presented in a poster presentation at the AAMG Monitoring Ambient Air 2014 conference and a research paper produced to promote the benefits of greening to the wider scientific community. Articles were also published in the Air Quality Bulletin in October 2014 and January 2015. Once the green screen foliage had matured the difference between the roadside and playground side of the screen was 35% for NO_2 and 30-40% for PM_{10}.

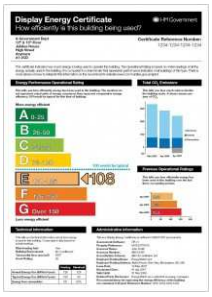
Do's	*&*	*Don'ts*
ensure the screening is located where it will be of most benefit, including for non-air quality reasons ensure the planting is attractive, and includes 'air quality' plants which can be used to educate children about air quality as tailored planting will be required, do undertake a site visit with green infrastructure contractors and site maintenance staff and school representatives at the design stage to assess suitability ensure that the plant species selected to make up the green infrastructure have known NO_2 absorption and particle trapping properties seek permissions from all levels of the school such as head teacher, diocese, school/parent governors identify water and electrical sources early on in programme of works and decide with the school the best solution to the provision of water for the planting include a minimum of 12 months green infrastructure maintenance into the contract for the installers, to include cut back, soil fertilising and irrigation system servicing and ensure the school agree (at the design stage) to take on the work after this time ensure adequate parking is available for the green infrastructure installer vehicles and ask for low emission, if possible work closely with school site maintenance staff and teachers to schedule the green infrastructure installation during school holidays or when children are least present ensure the green installation is a manageable size and design for the school to be able to maintain compile a green infrastructure care plan for the school to follow when they take over the maintenance programme		Don't implement a greening scheme without ensuring the school is able to maintain it in the long term Don't forget to check if it is feasible to plant straight into the ground, where a suitable depth of soil is available or can be created Do not forget to check with the planning department (and others, e.g. Building Control) whether permissions are required for the intended installation Do not forget to keep school site maintenance staff updated of changes to the installation schedule / design Do not forget to ensure the school site maintenance staff are available during installation works to assist with any queries Do not forget to keep the school children informed of the proposed installation through updates in the school newsletter and by teachers at whole of school assemblies Do not forget to maintain contact with the school after installation is complete to assist with any queries, problems or alterations Don’t forget to get the relevant health and safety documentation and insurance information from the installers Don’t forget to get a competent person to pre-approve installations where there are potential structural and weight restriction issues e.g. roof garden additions or sedum roof tile installation Don’t forget to engage the children with the installation design, where possible, and advertise the work conducted

CLEAN AIR ZONES PILOT - THE INDOOR ENVIRONMENT

In order to improve energy efficiency and lower the emission of air pollutants locally and on a wider scale, measures to reduce building emissions from the schools were considered. An energy audit was undertaken or used at each school to assess what measures could be implemented.

WHAT COULD BE DONE?

Possible ways of reducing building emissions include:



- Replacing old boilers with newer more efficient ultra low NO_x boilers - this has the added benefit of contributing to the improvement of air quality in the immediate area
- Thermostatic radiator control valves to control the temperature of the radiators, thus reducing boiler use and emissions
- Draught proofing/excluders around windows and doors (chimney's, floors and skirting boards in older schools)
- Energy saving light bulbs, power down switches and timer switches to reduce energy use e.g. classroom lighting and computers
- Solar (heat rejection) film/solar shading for windows to cut down on over-heating from solar heat gain and the need to use a cooling system
- Radiator reflector panels behind radiators to reduce heat loss
- Improved classroom ventilation practices to encourage openable windows above radiators to remain closed to reduce heat loss and alternative classroom windows or ventilation extracts to be used instead

CASE STUDIES

BOTWELL HOUSE RC PRIMARY SCHOOL, HAYES

- **Power down timer switches** - for the computer room - this was particularly effective at this school as they also had a server cabinet serving a number of schools which had to be maintained at the right temperature. Turning off computers promptly would also reduce the heat from these sources which also meant the air conditioning did not have to work as hard to keep the room cool when the computers were not in use
- **Solar (heat rejection) film** - there were a few classrooms in the new school building that were too hot due to solar heat gain. The solar film applied to the affected windows reduced the heat gain, and reduced the need to use energy to cool the classrooms

WHAT WAS THE OUTCOME: A more comfortable classroom environment was created whilst also saving energy and cutting down on pollutant emissions (NO_x as well as CO_2). The school's energy efficient operational rating was 101 in band E. Department of Energy & Climate Change (DECC) indicate 100 would be typical for a building. Just these simple measures have reduced the school's operational rating to 83 in band D.

SIR JOHN CASS'S FOUNDATION PRIMARY SCHOOL, CITY OF LONDON

- **Lighting management system** – Lights remained permanently on in various areas of the school and there was no way of isolating lighting systems when parts of the school were not in use. The schools lighting control system was repaired and upgraded to ensure better control and efficiency.

- **LED Lights** – Within the gymnasium area, new, robust LED lights were installed to save energy and create an additional indoor play area which could be fully utilised by children during wet play and pollution episodes.

WHAT WAS THE OUTCOME: A lighting audit identified the scope for improvement. The repaired lighting control system means that any member of staff closing the school is able to shut down the entire lighting system and lights no longer remain on overnight. The gymnasium had been out of action for ball games due to the outdated lighting system which could be damaged. The replacement system will improve energy efficiency and provides a fully versatile indoor play area.

OXFORD GARDENS SCHOOL AND ST CUTHBERTS WITH ST MATTHIAS, KENSINGTON AND CHELSEA

- **Reflective panels** – The addition of reflective panels behind radiators were encouraged.
- **Openable windows** – Openable windows above radiators and adjacent to roadside emissions were encouraged to remain closed and alternative ventilation methods to be used instead.
- **Radiator valves** – Broken thermostatic temperature valves were replaced.

WHAT WAS THE OUTCOME: In both schools there were limited opportunities to make changes to the indoor environment. Alternative ventilation advice was welcomed particularly in the schools adjacent to busy and very noisy roads. This also benefitted by reducing the roadside emissions entering the classrooms from adjacent roads. Energy loss from radiators under windows was reduced whilst reflective radiator panels ensured efficient retention of heat within the classrooms.

Do's	***&***	***Don'ts***
undertake a detailed audit if needed ensure any measures implemented have maximum/long term benefits form a good relationship with school's maintenance team gain approval and agree on scheduling of works with school maintenance team and head teacher e.g. during holidays establish if future changes to the premises are planned and how energy efficiency measures can be introduced discuss changes to be made with school representatives to determine benefits and establish permissions for changes e.g. listed building / planning issues ensure the school is kept updated inform all staff of energy efficiency measures undertaken and the reasons why changes have been made ensure adequate training and maintenance of any new installations use assemblies and newsletters to inform children and parents of changes		don't forget to check the building energy certificate to identify if improvement is actually needed don't forget low cost options such as staff training and awareness don't proceed without consulting with the school to identify areas where they feel emission reduction / energy savings can be made e.g. they know if classrooms are too hot or draughty don't forget to identify problem areas with school buildings e.g. areas to avoid due to structural issues don't introduce measures that the school consider unachievable or are unwanted e.g. lights which automatically shut down if there is no movement can be scary for children if introduced in areas which would become totally dark don't forget to provide updates of when energy efficiency measures will be installed/made

Healthy Streets for London

Prioritising walking, cycling and public transport to create a healthy city

MAYOR OF LONDON

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

About Transport for London (TfL)

Part of the Greater London Authority family of organisations led by Mayor of London Sadiq Khan, we are the integrated transport authority responsible for delivering the Mayor's strategy and commitments on transport.

As a core element in the Mayor's overall plan for London, our purpose is to keep London moving, working and growing, and to make life in our city better. We reinvest all of our income to run and improve London's transport services and to make it safer, more modern and affordable for everyone.

Our operational responsibilities include London Underground, London Buses, Docklands Light Railway (DLR), London Overground, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the Emirates Air Line.

On the roads, we regulate taxis and the private hire trade, run the Congestion Charging scheme, manage the city's 580km red route network, operate all of the Capital's 6,300 traffic signals and work to ensure a safe environment for all road users.

We are delivering one of the world's largest programmes of transport capital investment, which is building the Elizabeth line, modernising Tube services and stations, transforming the road network and making it safer, especially for more vulnerable road users, such as pedestrians and cyclists.

We work hard to make journeys easier through effective use of technology and data. We provide modern ways to pay through Oyster and contactless payment cards and provide information in a wide range of formats to help people move around London.

Real-time travel information is provided directly by us and through third party organisations, which use the data we make openly and freely available to power apps and other services.

We listen to, and act upon, feedback and complaints to constantly improve our services and work with communities, representative groups, businesses and many other stakeholders to shape transport provision in London.

Improving and expanding transport in London is central to driving economic growth, jobs and housing throughout the United Kingdom. Where possible, we are using our land to provide thousands of new, affordable homes. Our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

Foreword

London is facing an inactivity crisis. Over decades, machines, cars and technology have gradually taken over many of the tasks that used to require physical effort. More than 40 per cent of Londoners do not achieve the recommended 150 minutes of activity a week; and 28 per cent do less than 30 minutes a week. Almost without realising it, we have engineered physical activity out of our daily lives.

The consequences of this shift to more sedentary lifestyles are severe. Lack of physical activity is now one of the biggest threats to our health, increasing the risk of developing a range of chronic diseases including diabetes, dementia, depression and the two biggest killers in London – heart disease and cancer.

We urgently need to design physical activity back into our everyday lives. Active travel – walking more, cycling more, using public transport more – provides the easiest and most affordable way for us all to get more active and live healthier lives. In addition to these health benefits, all the evidence shows that more active travel will reduce air and noise pollution, help combat social isolation, ease congestion, make us safer and bring economic benefits to businesses – large and small – across the Capital.

The Mayor has shown that he is determined to help every Londoner live an active life. He has committed record levels of investment to cycling and active travel and has asked Transport for London (TfL) to put this agenda at the heart of its decision making. As the Capital's first Commissioner for Walking and Cycling, it is my job to work with City Hall, TfL and our wider partners to make this happen.

Our ambition is for all Londoners to enjoy the benefits of being active through walking or cycling for at least 20 minutes a day.

The Healthy Streets Approach provides the framework of policies and strategies we will put in place to achieve this. At a street level, direct investment in our walking, cycling and public transport infrastructure is vital to providing a safer, easier, cleaner and more appealing environment for everyone to enjoy. At a network level, we must design and manage our streets and rail systems so that more active travel becomes part of every journey. And we need to plan for the future. As London continues to grow, active travel needs to be designed into the fabric of new developments and regeneration projects.

Increasing the number of people walking, cycling and using public transport has the potential to transform London and improve the lives of everyone who lives in, works in and visits this great city. I am committed to working with our public leaders, with businesses and with all our communities to make this happen.

Will Norman
Walking and Cycling Commissioner

Message from the Commissioner

It will be clear to anyone reading 'A City for all Londoners' that the Mayor's plans for the future of London are more ambitious and wide-reaching than anything our city has seen before. The document also challenges us to be more ambitious, particularly around the role of transport in improving health and quality of life.

As the capital's strategic transport authority, we have a crucial role in the health of all Londoners. There is ample evidence that inactivity is the cause of many of London's major health problems and that walking, cycling and using public transport to get around are the easiest ways to stay active.

But at TfL there is a lot more we can do to deliver on this responsibility – putting people at the heart of our decisions and prioritising walking, cycling and public transport over private vehicles. The Healthy Streets Approach provides us with the clear direction we need to ensure that we do so.

The key to understanding the Healthy Streets Approach is to understand that most journeys made by Londoners start, end or happen entirely on our streets. To enable these streets to function in the way we want them to, we have to make them work for walking, cycling and public transport, so both individuals and the city as a whole can benefit. Adopting the Healthy Streets Approach means using this simple idea to inform our decision making – in our own schemes, our relationships with the boroughs, and our role in planning for London's growth.

The benefits of making this change could be profound. If everyone walked or cycled for 20 minutes a day, one in six early deaths among Londoners could be prevented and many more people would avoid cancer, heart disease and diabetes. We are committed to playing our part in delivering a better life for people living in our city.

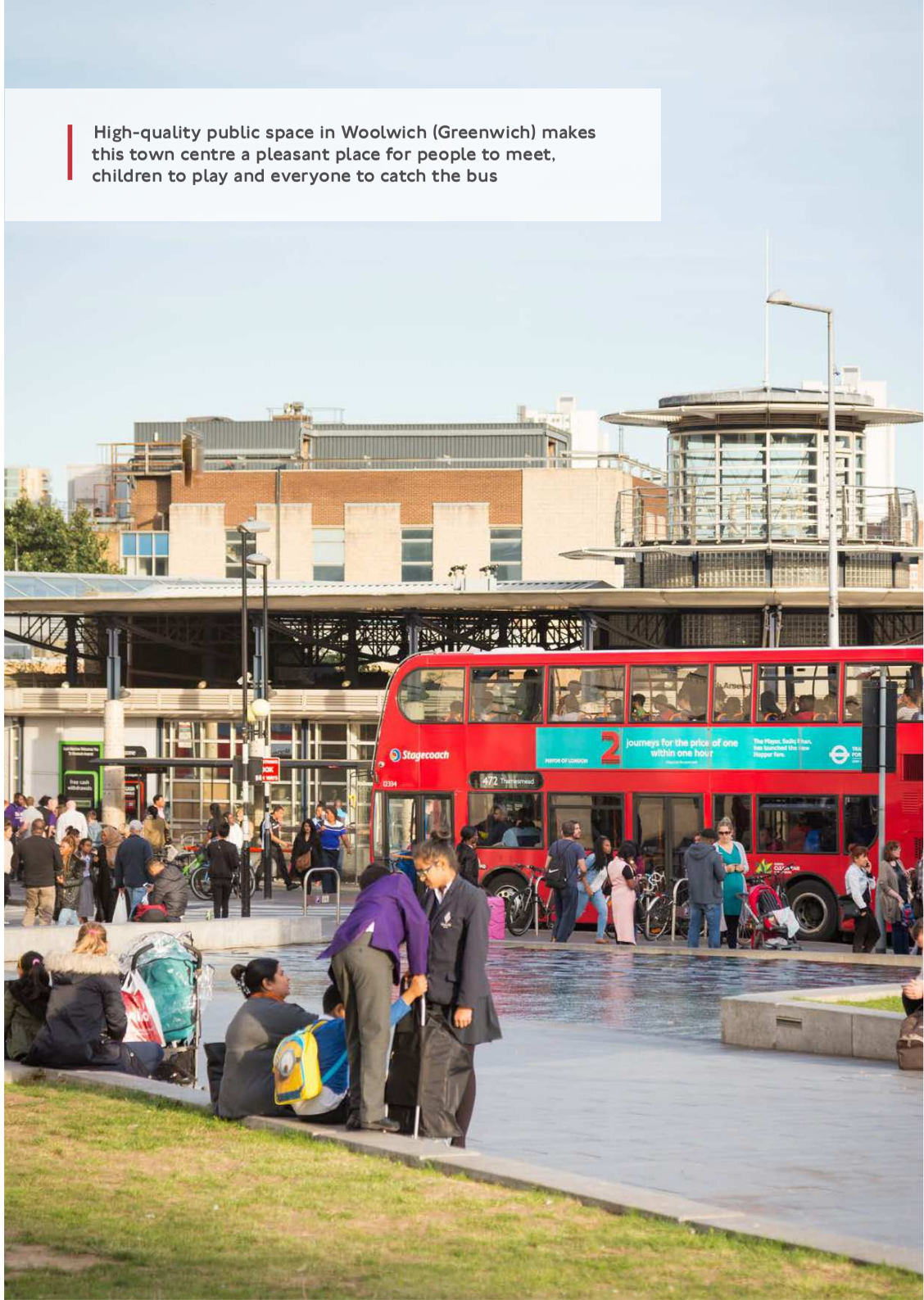
And the benefits are not limited to good health and wellbeing. The things that make a street work well for people are the same things that make a street work well for local and international businesses, and that create a resilient and sustainable environment.

These are challenges that cities around the world are grappling with, but they are challenges that we will overcome, because we want our city to be the best place in the world to live, work and visit.

Adopting the Healthy Streets Approach is essential if we are to create a city for all Londoners. I am determined that we will make the most of this opportunity to transform the health of our great city.

Mike Brown MVO
Transport Commissioner

High-quality public space in Woolwich (Greenwich) makes this town centre a pleasant place for people to meet, children to play and everyone to catch the bus



Chapter 1

A new approach

Re-examining our streets

The transport system has a huge influence on the character of our city, and the experience of living, working and spending time here. London's streets account for 80 per cent of the city's public space, yet too often they are dominated by traffic. The nature of these places – public places that belong to us all – defines what London is like as a city.

The Mayor has set out his vision of London as a city that is well-connected, has healthy residents, and is a good place to do business, visit and live. To achieve this we need to re-examine how London's streets operate.

The impacts of car use

London has seen real progress in encouraging people to switch from using the car to taking public transport, walking and cycling, and traffic levels have remained largely stable, despite significant growth in the city's population. However, the city's streets still suffer because of high levels of car use.

Private cars are a relatively inefficient means of moving people. Cars take up 19 per cent of street space in central London, but account for only 11 per cent of journey kilometres. By comparison, buses take up only 11 per cent of street space, but account for 57 per cent of journey kilometres.

We need to use the space cars take up more efficiently. As London grows towards 10 million residents by 2030, the imperative to do so will become greater – not least because of increasing congestion.

Car dependency brings with it road danger and air pollution. It limits opportunities to walk and cycle, and damages the reliability of our bus services. Above all, it has tied us into living inactive lives, a situation that has contributed to one of the most serious health challenges London has ever faced[1].

Prioritising walking, cycling and public transport

Our vision for the future of London is of a city where people choose to visit their local shops. A city where high streets are designed for people and the neighbouring streets are pleasant to be in; where people choose to take the bus instead of driving because buses are prioritised over other traffic. It is a city where essential delivery and service vehicles can get around efficiently, keeping everyone's lives running smoothly.

London can become a city where people choose to walk, cycle and use public transport more, bringing huge health and wellbeing benefits to everyone.

Providing more appealing walking, cycling and public transport options is the best way to reduce car use.

Thoughtfully designed public realm creates a good place to interchange with public transport and a better place to walk and enjoy. (Shepherd's Bush, Hammersmith and Fulham)

London has taken significant steps to do this in recent years, but there is still considerable potential for more car journeys to be made in other ways. A quarter of all car trips could potentially be walked, and two thirds could potentially be cycled[2], which would provide huge health benefits to Londoners and make our streets more efficient.

Roughly half of all walking journeys in London are part of longer public transport journeys[3] – walking to or from the bus stop or Tube station. This means an efficient and affordable public transport system is just as important as great walking and cycling routes to both the health of Londoners and the smooth functioning of the city's streets.

The Healthy Streets Approach

The Healthy Streets Approach is the system of policies and strategies to help Londoners use cars less and walk, cycle and use public transport more.

Because 80 per cent of Londoners' travel time is spent on our streets[4] – including bus and tram trips and journeys to and from Tube and rail stations – we can only do this by creating streets that feel pleasant, safe and attractive. Streets where noise, air pollution, accessibility and lack of seating and shelter are not barriers that prevent people – particularly our most vulnerable people – from getting out and about.

The purpose of the Healthy Streets Approach is not to provide an idealised vision for a model street. It is a long-term plan for improving Londoners' and visitors' experiences of our streets, helping everyone to be more active and enjoy the health benefits of being on our streets.

To deliver the Healthy Streets Approach, changes are required at three main levels of policy making and delivery:

i) Street level

Londoners' direct interaction with the Healthy Streets Approach will be through the streets they use every day. An important measure of success will be positive changes to the character and use of the city's streets.

We can provide high-quality environments with enough space for dwelling, walking, cycling and public transport use. We can enhance our streets with seating, shade and greenery, and reduce the dominance of vehicles by designing for slower vehicle speeds. We can hold events and activities that entice people out to shop, play and chat, including temporarily closing streets to cars. All of these measures will improve Londoners' experience of individual streets, encouraging them to live active lives.

ii) Network level: planning and managing London's transport networks

How the city's streets are planned and used at a larger scale has a big impact on individual streets around London. For example, the extent and reliability of the public transport network; whether, where and how fast people drive; and how clean London's air is could all affect the character of any street, anywhere in London. To deliver appealing local street environments, wider action is required to manage our transport networks and to plan the Capital better.

Developing more efficient and affordable services will make public transport the obvious choice for more journeys, and this will deliver the switch from car use that will make the streets more attractive places to walk and cycle. Designing and managing our stations and stops better will encourage more people to walk and cycle for onward journeys.

An efficient and reliable bus network goes hand-in-hand with walking and cycling infrastructure, helping all Londoners to choose the healthiest way to travel for every journey. (Prince Regent Lane, Newham)

We will work with the freight industry, its customers and the London boroughs to develop more creative solutions to managing freight and deliveries. This will include considering different uses of our streets across the day so that more street space is available for walking, cycling and leisure purposes, while ensuring our shops and services continue to thrive.

We will better manage roadworks, traffic lights and on-street enforcement operations across London to ensure people feel safe and road danger is reduced.

iii) Strategic level: policy and planning

London's rapid growth means we will need to move people more efficiently to keep the city functioning and to maintain and improve the quality of life of its residents. Planning a city where walking, cycling and public transport are the first choices for travel is the only way for us to achieve this.

Developing new housing around stations and improving connections to town centres will mean more people have the things they need within walking or cycling distance, while destinations further afield will be easily accessible by public transport.

By establishing clear policies in the London Plan – the Mayor's spatial planning document for the whole of London – and by working with developers and local authorities, we can ensure that new development and regeneration embeds the Healthy Streets Approach from the outset. Policies for regeneration, new developments and growth areas that reduce car dependency and promote active travel will ensure that the Capital grows in a sustainable way.

The Mayor's Transport Strategy will also set out a broader approach to reducing car dependency and enabling a shift to more walking, cycling and public transport use. The document will provide a strategic overview of how streets and public transport services can be planned to help Londoners make healthy travel choices across the Capital.

What this means for Londoners – the Healthy Streets Indicators

The aim of the Healthy Streets Approach is to help create a vibrant, successful city where people can live active, healthy lives. The Mayor's forthcoming Transport Strategy will provide details of how we will measure ourselves against this aspiration over the coming years.

Photo: Greater London Authority

Local businesses can support making their neighbourhood more liveable by providing things to see and do. (Greenwood Theatre, Snowsfield, Southwark)

Londoners' experiences of using our streets will help determine whether they decide to walk, cycle and use public transport, whether they choose to visit their local high street or drive to an out-of-town shopping centre, and even whether they feel they need to own a car at all.

Our work at the street, network and strategic levels must all therefore be aimed towards improving the experience of travelling through and spending time on London's streets. The Healthy Streets Approach uses 10 evidence-based indicators of what makes streets attractive places. Working towards these will help to create a healthier city, in which all people are included and can live well, and where inequalities are reduced.

10 Healthy Streets Indicators

Pedestrians from all walks of life

London's streets should be welcoming places for everyone to walk, spend time in and engage in community life.

People choose to walk, cycle and use public transport

Walking and cycling are the healthiest and most sustainable ways to travel, either for whole trips or as part of longer journeys on public transport. A successful transport system encourages and enables more people to walk and cycle more often. This will only happen if we reduce the volume and dominance of motor traffic and improve the experience of being on our streets.

Clean air

Improving air quality delivers benefits for everyone and reduces unfair health inequalities.

People feel safe

The whole community should feel comfortable and safe on our streets at all times. People should not feel worried about road danger or experience threats to their personal safety.

Not too noisy

Reducing the noise impacts of motor traffic will directly benefit health, improve the ambience of street environments and encourage active travel and human interaction.

Easy to cross

Making streets easier to cross is important to encourage more walking and to connect communities. People prefer direct routes and being able to cross streets at their convenience. Physical barriers and fast moving or heavy traffic can make streets difficult to cross.

Places to stop and rest

A lack of resting places can limit mobility for certain groups of people. Ensuring there are places to stop and rest benefits everyone, including local businesses, as people will be more willing to visit, spend time in, or meet other people on our streets.

Shade and shelter

Providing shade and shelter from high winds, heavy rain and direct sun enables everybody to use our streets, whatever the weather.

People feel relaxed

A wider range of people will choose to walk or cycle if our streets are not dominated by motorised traffic, and if pavements and cycle paths are not overcrowded, dirty, cluttered or in disrepair.

Things to see and do

People are more likely to use our streets when their journey is interesting and stimulating, with attractive views, buildings, planting and street art and where other people are using the street. They will be less dependent on cars if the shops and services they need are within short distances so they do not need to drive to get to them.

Source: Lucy Saunders

Partnership working

We cannot deliver Healthy Streets alone. It will require us to work with partners across the public, private and community sectors.

Many of our partner organisations across the Capital are already working hard to deliver against the Healthy Streets Indicators. We will continue to work with the London boroughs, developers and land owners, providing tools, training, support and guidance that will help them embed the Healthy Streets Approach in street schemes, borough and regional policies and plans, and developments and regeneration schemes. Vital to the success of Healthy Streets will be our continuing work with the Metropolitan Police Service, who provide on-street law enforcement and education.

Businesses will benefit greatly from the economic improvements the Healthy Streets Approach will deliver. We will continue to work with them to apply the Healthy Streets Approach and manage the impacts of freight on London's streets. We will also continue working with education and community partners on a range of supporting measures and initiatives to promote walking, cycling and public transport use.

Improving every street

London's streets function in two ways – as places where the city's social, economic and cultural life plays out, and as means for moving people and goods. Londoners' quality of life is dependent on both. We all want to have appealing places to visit and spend time in, just as we need to have goods delivered to our local shops and to get around ourselves.

The interaction between the need to create attractive places and the need to move goods and people varies from street to street. For example, bus routes can have a strategic significance for the movement of people, while high streets should be great places to dwell and spend time. Understanding these interactions will over time allow us to improve every street in the best way – keeping London functioning while making it a better place to live.

The movement of people on foot, by cycle and by public transport is central to the Healthy Streets Approach – these are the most efficient means for people to get around and they all provide health benefits. Public transport can be particularly important for people who are less able to travel on foot or by cycle.

Attractive, thriving streets also need to incorporate servicing and deliveries. Freight can be made more efficient so journeys are minimised. The impacts of remaining essential road freight can be reduced by encouraging more deliveries to be made using the cleanest vehicles, at times when the roads are less busy.

Some Londoners will continue to make essential journeys by car, particularly people with accessibility needs. Here, our priority is to ensure that these journeys are made by the cleanest vehicles available.

Traffic congestion

Congestion is a valid concern for many Londoners, and it's easy to see why – streets that are clogged with motor vehicles delay buses, make essential freight and car journey times unpredictable, and are unpleasant places to walk and cycle.

Flexible use of space on Lower Marsh (Lambeth) enables this local market to receive deliveries in the mornings, provide a lively food market at lunchtimes and a pleasant space for visiting shops and bars in the afternoons and evenings

The Mayor has a clear approach to addressing congestion. We are focusing on a short-term effort to ensure the streets are operating as efficiently as possible and we have a longer-term plan to achieve a shift away from car use towards more efficient means of travel. This recognises that it is not sustainable to go on trying to accommodate ever more vehicles within limited street space.

The Mayor's forthcoming Transport Strategy will describe the measures we will take to achieve this. In part, this will involve allocating more road space to the most efficient travel choices – installing new cycle lanes, giving buses more priority and providing more space for pedestrians. Over time, reallocating space will create streets that function better not only for people who are walking, cycling and using public transport, but also for taxis and essential delivery, servicing and car journeys. These changes have the potential to make short-term congestion worse in some locations. The Mayor has committed to planning and coordinating street improvement works more effectively to reduce this impact, and has announced a package of short-term measures that will keep the streets running as smoothly as possible. The Mayor's Transport Strategy will also look at how we can incentivise reductions in the most harmful car use more directly.

Photo: Alex Ingram

Most streets in London are local streets like Orford Road (Waltham Forest). These can be made less traffic-dominated and more welcoming

Chapter 2

Why Healthy Streets?

Reducing the use of the private car and increasing the number of people walking, cycling and using public transport has the potential to transform London and improve the lives of all those who live in, work in and visit the city.

The Healthy Streets Approach will make London a healthier, more sustainable, safer, more connected and, ultimately, more successful city for all Londoners.

A healthy city

Physical inactivity and sedentary lifestyles are creating one of the most serious public health challenges of our time. The easiest way for most Londoners to stay active is by walking or cycling as part of their daily travel. Two 10-minute periods of brisk walking or cycling a day is enough to get the level of physical activity recommended to avoid the greatest health risks associated with inactivity. At present, only about a third of adults in the capital are reporting this level of activity. It is our ambition for all Londoners to walk or cycle for 20 minutes every day.

This is not a small challenge, but more than 90 per cent of Londoners already walk each week, so we are building on a strong foundation. This shift in activity will see noticeable improvements in the health of Londoners, through improved mental wellbeing and a reduced risk of chronic illnesses such as Type 2 diabetes and cardiovascular disease.

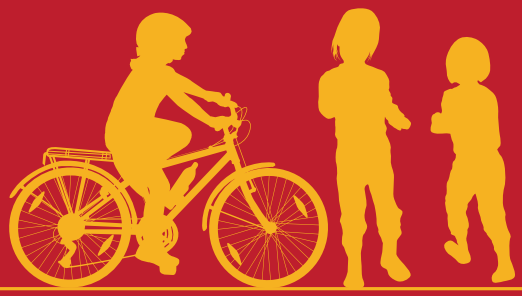
If all Londoners walked or cycled for 20 minutes a day, this would save

in NHS treatment costs over 25 years and would contribute to fewer of the following[5]:

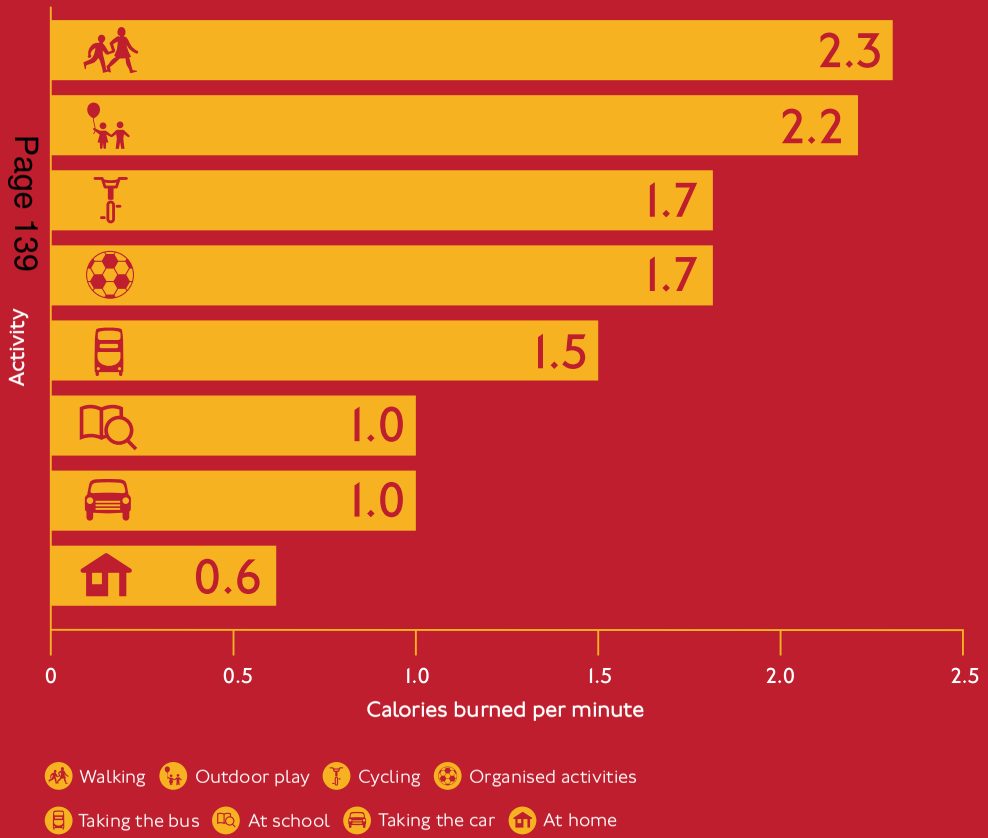
- hip fractures 85,000
- dementia 19,200
- depression 18,800
- cardiovascular disease 16,400
- stroke 6,700
- type 2 diabetes 4,800
- colorectal cancer 1,500
- breast cancer 1,300

A person who is active every day reduces their risk of[6]:

- Type 2 diabetes 35-50%
- Depression 20-30%
- Coronary heart disease 20-35%
- Alzheimer's disease 20-35%
- Hip fracture 36-68%
- Breast cancer 20%
- Death 20-35%
- Colon cancer 30-50%



Calories burned per minute by children doing different activities[7]



The health challenge is particularly acute for **children** as they need more **physical activity** to **stay healthy.** London has the highest levels of childhood obesity in England and streets and places provide important opportunities for children to get the activity they need through travel and play.

8 in 10

children in London do not get the **one hour** a day of physical activity that is the minimum they need to stay healthy[8]

4 in 10

children in London are already overweight or obese[8]

Children **burn most energy** playing outdoors, walking and cycling[7]

Older **children** build their **independence** by being able to travel unaccompanied, but unpleasant street environments often prevent this in London[9]

Children who **walk and cycle** are more likely to become adults who walk and cycle[10]

London children who live in households **without a car** are[10]:

2.3 times
more likely to walk to school

1.4 times
more likely to walk outside of school on school days

1.8 times
more likely to walk during the summer or weekends

Car ownership is the greatest factor that influences how often Londoners walk and cycle. It has a bigger impact than gender, income, employment, ethnicity and disability, in all parts of the Capital. Most car trips made by Londoners could be walked or cycled.

The short periods of walking and cycling associated with active travel have also been shown to be beneficial to mental health, improving self-esteem, physical self-worth, mood and mind-set, and reducing stress. Walking can reduce anxiety and depressive symptoms, and those who walk regularly – even for short periods – are significantly more likely to report better mental health than those who walk less.[11]

There is growing recognition of the impacts of traffic noise on health and wellbeing. Noise pollution influences sleep, stress, anxiety, blood pressure and mental health. In children it can impact on school performance, memory and concentration. Traffic noise disproportionately affects disadvantaged people in their homes and workplaces as well as making walking, cycling and using public transport less pleasant.

Car ownership[2]

Car owners in London are **2 – 3 times less** likely to do **half an hour of activity** in a day than those who don't own cars

Nearly **1/2 of car trips** made by **London residents** could be **cycled** in around **10 minutes**

More than **1/3 of car trips** made by Londoners as a driver or passenger could be **walked** in **under 25 minutes**

2/3 of car trips made by **London residents** could be **cycled in under 20 minutes**

Only **1/3 of car trips** are longer than **5km.** Some of these could be **cycled in around 20 minutes**

A sustainable city

Improving air quality is vital to making London's streets healthier. Air pollution affects the health of everyone in London and unfairly impacts on the most vulnerable people in our community. Road transport is responsible for 50 per cent of the main air pollutants, so we have an important role to play in improving air quality. The Mayor is consulting on an ambitious package of air quality proposals, including bringing forward and expanding the Ultra Low Emission Zone. The 50 per cent reduction in specific harmful emissions these proposed measures are expected to deliver will help to improve London's streets. The Mayor's Air Quality Fund will continue to target pollution hotspots, the Low Emission Neighbourhoods programme will help London boroughs improve local air quality and Low Emission Bus Zones will prioritise the greenest buses on the worst polluted routes.

Introducing more trees and greenery creates more attractive public spaces, increases biodiversity and helps to mitigate the impacts of air pollution. Greener streets can deliver against all of the Healthy Streets Indicators and can contribute to London's resilience to the consequences of climate change, such as extreme weather events like flooding and heatwaves.

A safe city

Minimising danger on our roads is fundamental to delivering streets where everyone feels safe walking, cycling and using public transport. Safety concerns are the main reasons people give for not cycling more[12] and for being unwilling to let their children walk unaccompanied. Road danger disproportionately affects people travelling on foot, by cycle or by motorcycle. Adopting a Vision Zero approach – working towards the elimination of road traffic deaths by reducing the dominance of motor vehicles on our streets – will serve to put the needs of vulnerable road users first.

Fear of crime has been linked to reduced walking and playing in adults and children[13], and personal safety concerns are a common reason given for older children preferring not to walk to school[14]. Healthy Streets, where more people are walking, cycling and using public transport, feel safer than streets with fewer people, and 'eyes on the street' can be a key factor in whether people consider streets suitable for walking[13]. Improving the feeling of safety can be particularly beneficial for more vulnerable groups, and could be an important factor in helping them to be physically active.

A connected city

London's streets need to be welcoming to ensure that our communities prosper. Currently 65 per cent of disabled Londoners consider the condition of pavements to be a barrier to walking, and 43 per cent report that obstacles on pavements, such as unnecessary signage, advertising boards and other clutter, are a barrier to walking more.

Social isolation and lack of community support puts pressure on health and care services. In London, a quarter of men and a third of women aged over 65 do not leave their house at all on a given day. The Healthy Streets Approach seeks to reduce the barriers to spending time on London's streets, whether these are physical or social.

> More and more global cities are now realising the value of investing in high-quality, appealing public spaces, and healthy residents and efficient transport networks.

A successful city

Streets make up most of London's public space and the nature of these streets goes a long way to determining the character of the city. An attractive and well-designed public realm is an important factor in attracting people to London[15]. Creating people-focused streets and public places will contribute to the social and cultural life of the Capital. Streets that work well for people generate more trade for local businesses, because people who tend to walk to their local shops spend more money there over the course of a month than people who get there by any other means[16]. More and more global cities are now realising the value of investing in high-quality, appealing public spaces. Healthy residents and efficient transport networks are vital to attracting investment and business interest from overseas.

Adopting the Healthy Streets Approach will not only help our high streets to thrive, but will also help London retain its status as a globally competitive and innovative city.

Smooth wide pavements make streets more accessible and pleasant for everyone on foot. (Tower Bridge Road, Southwark)

Photo: Greater London Authority

Chapter 3

Investing in Healthy Streets

Our Business Plan, published in December 2016 and covering our investment plans for the next five years, has the Healthy Streets Approach at its heart. We have brought together all of our street spending into a new £2.1bn Healthy Streets portfolio to ensure that, with our borough partners, we direct all of our streets investment towards delivering against the Healthy Streets Indicators.

This portfolio will in part be targeted at delivering current commitments, such as new cycle routes. The Business Plan includes around double the average annual spend on cycling seen under the last Mayor, taking London's spend per head to the same levels as Denmark and the Netherlands.

Investment in walking will be integral to projects across the portfolio, maximising opportunities to deliver improvements for pedestrians.

It will also see the enhancement of bus networks through increased investment in bus priority. It will deliver major new projects such as the Rotherhithe to Canary Wharf pedestrian and cycle bridge and the transformation of Oxford Street.

Much of the funding will be invested in a fundamentally new way, looking not at single transport modes as we have done in the past, but taking a wider view of how streets function to best deliver for people.

As this document explains, people using the streets to walk, cycle, dwell or travel by public transport all need environments that are not dominated by motor vehicles, and the Healthy Streets Indicators will be used to direct our spending towards this aim. We will use this approach to develop our new Liveable Neighbourhoods Programme and Healthy Routes initiatives, as well as to inform spending decisions on existing programmes.

Decision-making

This new approach to investment will be overseen by a Healthy Streets Portfolio Board, bringing together decision-makers from across our organisation, as well as from City Hall. The Board will assess investment decisions against the Healthy Streets Indicators, using the Health Economic Assessment Tool (HEAT) for walking and cycling and a new Healthy Streets Check on every scheme.

Our Board and Programmes and Investment Committee will direct investment towards the Mayor's priorities and assess progress against the Healthy Streets Indicators. We will also ensure that our day-to-day decision-making processes prioritise the delivery against these Indicators as a matter of course.

We are currently developing new targets and key performance indicators that will ensure we assess our progress against the aims of the Healthy Streets Approach. These will be published in draft in the new Mayor's Transport Strategy in spring 2017.

High quality infrastructure makes cycling feel comfortable on roads with heavy traffic. (Victoria Embankment, Westminster)

Chapter 4

Next steps

Healthy Streets for London sets out an important new approach for us, our partners and stakeholders that will make London's streets better for people. This approach will be embedded across the full range of Mayoral policy and strategy documents to ensure it is delivered effectively across the city.

Related strategies

The Mayor set out his new vision for Healthy Streets in 'A City for All Londoners' and each of his statutory strategies will reflect how his vision will be delivered. The London Plan, the Mayor's Transport Strategy and the Health Inequalities Strategy will lead the way, but the Environment, Culture, Housing, Police and Crime, and Economic Development strategies all have roles to play in delivering the Healthy Streets Approach.

We will also produce a new Health Action Plan in 2017, which will provide a more detailed plan for the delivery of the health aims set out in this document.

Mayor's Transport Strategy

The Mayor's Transport Strategy is the statutory plan for London's transport. It sets out the Mayor's policies for promoting and encouraging safe, integrated, efficient and economic transport facilities and services to, from and within Greater London.

We are currently developing the new strategy, which will set out the guiding principles to achieve a shift away from car use through the Healthy Streets Approach.

The London boroughs have a statutory duty to prepare Local Implementation Plans (LIPs), setting out how they will help to deliver the aims of the Mayor's Transport Strategy, and new borough LIPs will be required to have the Healthy Streets Approach at their heart. We will work with boroughs to help them to achieve this, ensuring that the approach is applied in the best way across every part of London.

The Mayor's Transport Strategy will be published in draft for consultation in spring 2017.

London Plan

The London Plan serves as the overarching framework for all planning policies and decisions across the city, and embedding the Healthy Streets Approach here will ensure that it becomes an integral part of future land use planning policy. Land owners and developers will be required to contribute to the health of their neighbourhoods when planning and building their developments. City planners will be required to prioritise walking, cycling and public transport use through high-density, mixed-use developments with good public transport access. The London Plan will ensure that the health and wellbeing of Londoners are essential considerations as the city develops in the future.

The London Plan will be published in draft in 2017.

Photo: Better Bankside

Across London, Business Improvement Districts work with local authorities, communities and TfL to create attractive, welcoming streets for people to walk, cycle and use public transport. (Southwark Street, Southwark)

Chapter 5

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Hildreth Street, Balham

Photo: Simon Kennedy, London Architectural Photographer

Windsor House
42-50 Victoria Street
London SWIH 0TL

February 2017

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Selborne Road Air Quality Improvement Scheme

The London Borough of Waltham Forest has secured funding from Transport for London and The Mayor's Air Quality Fund to improve conditions along the Selborne Road area. We are seeking your comments and suggestions on the proposals which are planned for this Autumn. These are listed below and shown on the plan included with this leaflet.

Selborne Road is a popular traffic route linking the High Street, Hoe Street and Markhouse wards and has been identified as one of the key Borough roads for air quality improvement.

The main proposals for the scheme are as follows:

- Installing a living 'Green Wall' to improve air quality
- Constructing a 'Green' buffer between Selborne Road and the footway
- Improved pedestrian and cycle crossing facilities
- A segregated cycle path on the southern side of Selborne Road
- The relocation of bus stops nearer to the main entrance of The Mall and where the footway is to be widened.
- Traffic calming at main pedestrian/cycle crossing points
- Removal of the centre hatching to reduce vehicle speeds
- Upgrading the traffic signals at the Willow Walk junction.

Additional information

Detailed plans of the proposals are available on-line at the councils website (www.walthamforest.gov.uk). Please use the search function and look for 'traffic schemes'.

If you require any more information please contact us:

Phone: 020 8496 3000

Email: traffic.scheme@walthamforest.gov.uk

Have your say

- **By email** to traffic.scheme@walthamforest.gov.uk
- **By post** by completing the questionnaire and using the pre-paid envelope supplied, attaching additional sheets if needed.

Please ensure your response arrives with us no later than **5th September 2014.**

If you did not receive a form, your comments are more than welcome in writing as long as you provide your name and address so we can relate your response to where you live.

If you did not receive an envelope, our FREEPOST address is:

Freepost Plus RSAS-BKTL-GGGA
Project Development
Waltham Forest Council
Low Hall Depot
Argall Avenue
LONDON E10 7AS

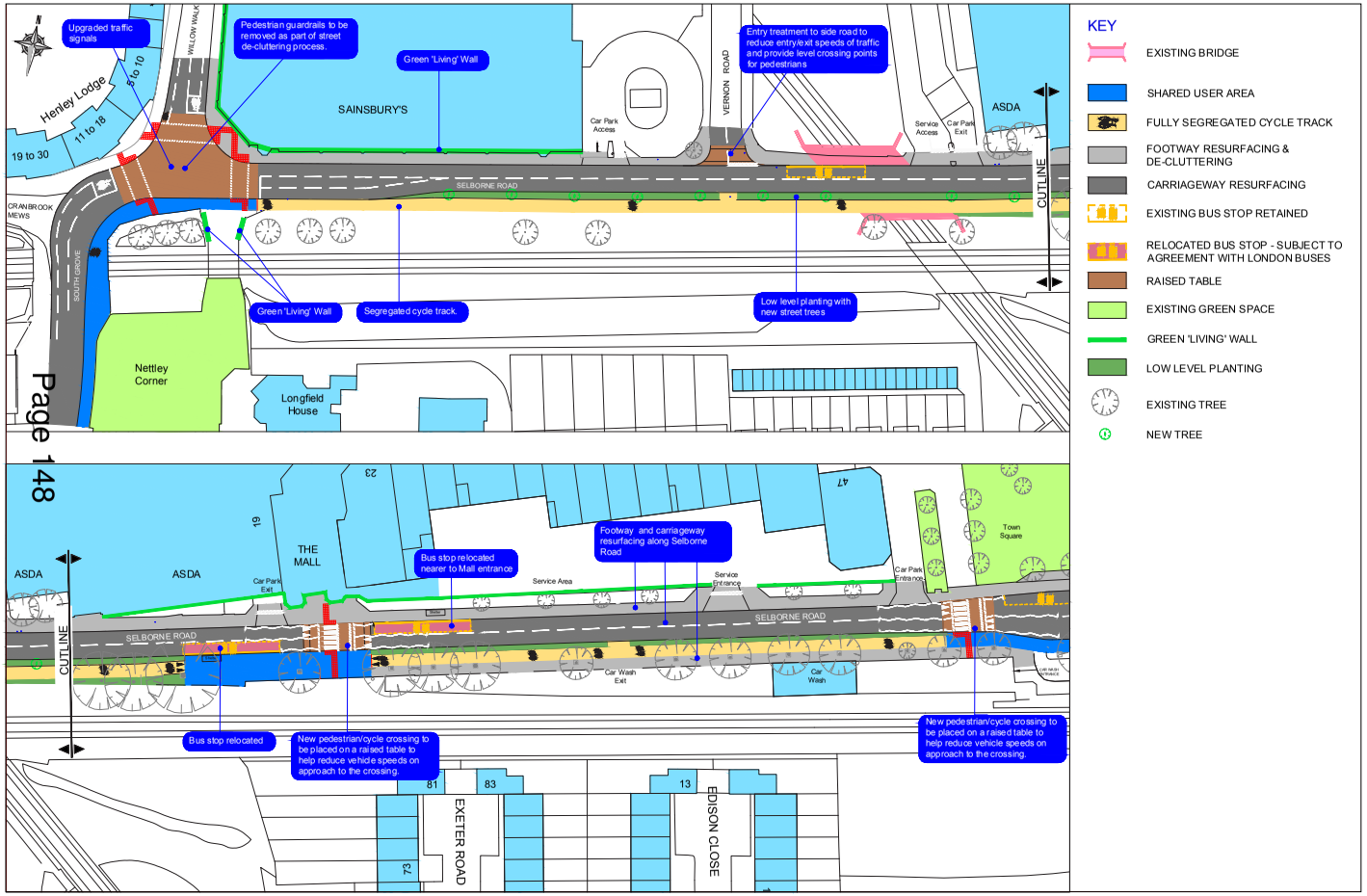
Important information enclosed regarding the future of your area.
Do not throw away!

We need your views on Selborne Road Air Quality Improvement Scheme

www.walthamforest.gov.uk/traffic-schemes

Transport for London

Waltham Forest



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Selborne Road Air Quality Improvement Scheme

Please let us know what you think by completing the section below.

Please complete the questionnaire by ticking the boxes as appropriate, then tear off this page, fold it and post to the freepost address by **5th September 2014.** Due of the large number of responses expected, regrettably we cannot reply individually to everyone who returns their form.

Please state your name

Please provide your address

The above information is only used so we can relate your response to where you live.

Tel:

(Optional, but helpful if we have any questions about your response)

Email:

(Optional, but helpful if we need to write to you)

Are you a local resident or do you work for a local business (please tick all that apply)

Local resident

Employee of owner of a local business

Please write any comment that you may have on the proposals in the box below attaching additional sheets if needed.

If you have any queries or would like to be kept up to date with the progress of this scheme please email: traffic.scheme@walthamforest.gov.uk

If you would like to receive updates on the mini Holland programme please email miniholland@walthamforest.gov.uk and we will add you to the mailing list

If you have any queries or would like to be kept up to date with the progress of our cycling schemes please email: cycling@walthamforest.gov.uk

Thank you for responding to the consultation

Forward Plan

Contact officer: Khalid Ahmed
Telephone: 01895 250833

REASON FOR ITEM

The Committee is required by its terms of reference to consider the Forward Plan and comment as appropriate to the decision maker on key decisions that relate to services within its remit (before they are taken by Cabinet or Cabinet Member).

OPTIONS OPEN TO THE COMMITTEE

- To comment on items going to the Cabinet or Cabinet Members for decision.
- Or to note the items and decide not to comment.

INFORMATION

1. The Forward Plan for the following months has been published. Unfortunately there are no items within this Committee's remit which are on the published Forward Plan. However, I have attach the full Forward Plan for the Committee's information.
2. Committee Members are requested to send in any questions they have regarding the attached Forward Plan or on any reports going to the next meeting of Cabinet, and to notify any officers that they would like to attend to give advice.

SUGGESTED COMMITTEE ACTIVITY

- To consider whether there are comments or suggestions that the Committee wishes to make that will aid Cabinet's decision making.

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Ref	Upcoming Decisions	Further details	Ward(s)	Final decision by Full Council	Cabinet Member(s) Responsible	Officer Contact for further information	Consultation on the decision	NEW ITEM	Public / Private Decision & reasons
SI = Standard Item each month				Council Departments: RS = Residents Services SC = Social Care CEO = Chief Executive's Office FD= Finance					
Cabinet - 19 October 2017									
203	**House Building Programme - General Needs Housing Development**	A report will be presented to Cabinet on the appointment of lead consultant and architect for Tranche 4 of the General Needs Housing Programme. This will support housing needs requirements in the Borough.	Brunel, Harefield, Townfield		Cllr Jonathan Bianco	RS - Edward Knott		NEW	Private (3)
211	**Council Owned Subsidiary Trading Housing Company**	Cabinet will consider a business plan to establish a Council-owned Subsidiary Trading Housing Company.	Various		Cllr Jonathan Bianco / Cllr Philip Corthorne	RS - Perry Scott	Internal and external finance and legal advisors	NEW	Public
212	**Consideration of setting a Licensed Deficit for two schools in the Borough**	Cabinet will consider setting a Licensed Deficit for Oak Wood School (formerly known as Abbotsfield) and for Bishop Winnington-Ingram CE Primary School during 2017/18.	Brunel / West Ruislip		Cllr Jonathan Bianco & Cllr David Simmonds CBE	FD - Peter Malewicz		NEW	Public
215	**Meals on Wheels, Community based Wellbeing & Welfare checks**	Cabinet will consider procurement decisions regarding Meals and Wheels, community wellbeing and welfare check services, as part of the Council's preventative agenda for older people.	All		Cllr Philip Corthorne	SC/FD - Sandra Taylor / Sarah Hollingsworth		NEW	Private (3)
202	**Safeguarding Adults Partnership Board Annual Report**	The Annual Report of the Safeguarding Adult Partnership Board will be presented to Cabinet. The report details the partnership's activity and performance in safeguarding adults at risk and its priorities for the year. The report is set in the context of national guidance and policy.	All		Cllr Philip Corthorne	SC - Steve Ashley (Independent Chairman) / Tony Zaman	Policy Overview Committee		Public
201	**Local Safeguarding Children Board: Annual Report**	Cabinet will receive the Annual Report of the Local Safeguarding Children Board (LSCB). It provides Elected Members with a view on effectiveness of children's safeguarding in Hillingdon and identifies priorities for future action and attention.	All		Cllr David Simmonds CBE	SC - Steve Ashley (Independent Chairman) / Tony Zaman	Policy Overview Committee		Public

Ref	Upcoming Decisions	Further details	Ward(s)	Final decision by Full Council	Cabinet Member(s) Responsible	Officer Contact for further information	Consultation on the decision	NEW ITEM	Public / Private Decision & reasons
SI = Standard Item each month				Council Departments: RS = Residents Services SC = Social Care CEO = Chief Executive's Office					FD= Finance
SI	**Quarterly Planning Obligations Monitoring report**	Regular monitoring report with information about spending on section 106 (developer contribution) monies.	All		Cllr Keith Burrows	RS - Nicola Wyatt			Public
SI	**Voluntary Sector Leases Report**	Regular report on discounted leases to voluntary sector organisations that benefit residents and the wider community	All		Cllr Jonathan Bianco	RS - Michael Patterson / Michele Wilcox			Private (3)
SI	**Monthly Council Budget - monitoring report**	The Cabinet receives a monthly report setting out in detail the Council's revenue and capital position.	All		Cllr Jonathan Bianco	FD - Paul Whaymand			Public
SI	**Reports from Policy Overview & Scrutiny Committees**	Major Policy Review recommendations for consideration by the Cabinet as and when completed.	All		TBC	CEO - Democratic Services	TBC		Public
Cabinet Member Decisions - October 2017									
SI	**Standard Items taken each month by the Cabinet Member**	Cabinet Members make a number of decisions each month on standard items - details of these standard items are listed at the end of the Forward Plan.	Various		All	CEO - Democratic Services	Various		Public
Cabinet - 16 November 2017									
213	**ICT Hosting & Application Support of Revenues Benefits & Housing Systems**	Cabinet approval will be sought to accept a 5 year contract for the provision of ICT system hosting & application support for the Council's Revenues, Benefits & Housing Service.	N/A		Cllr Jonathan Bianco	RS / FD - Louise Bateman / Jo Allen		NEW	Private (3)
214	**Hillingdon Homelessness Prevention Strategy 2017 to 2022**	Following Member approval to consult, Cabinet will consider the outcome of the consultation process and comments received before formally approving the Hillingdon Homelessness Prevention Strategy 2017 to 2022.	All		Cllr Philip Corthorne	RS - Dan Kennedy / Debbie Weller		NEW	Public

Ref	Upcoming Decisions	Further details	Ward(s)	Final decision by Full Council	Cabinet Member(s) Responsible	Officer Contact for further information	Consultation on the decision	NEW ITEM	Public / Private Decision & reasons
SI = Standard Item each month				Council Departments: RS = Residents Services SC = Social Care CEO = Chief Executive's Office					FD= Finance
200	**2017/19 Better Care Fund Plan Section 75 Agreement**	Cabinet will be asked to approve the agreement under section 75 of the NHS Act, 2006, with Hillingdon Clinical Commissioning Group, that will give legal effect to the financial arrangements in the 2017/19 Better Care Fund plan approved by the Health and Wellbeing Board.	All		Cllr Philip Corthorne	SC - Gary Collier	Health and Wellbeing Board, CCG		Public
210	**Older People's Plan update**	Cabinet will receive it's twice yearly update on progress on the Older People's Plan (May and November annually).	All		Cllr Ray Puddifoot MBE / Cllr Philip Corthorne	CEO - Kevin Byrne	Older People, Leader's Initiative		Public
SI	**Voluntary Sector Leases Report**	Regular report on discounted leases to voluntary sector organisations that benefit residents and the wider community	All		Cllr Jonathan Bianco	RS - Michael Patterson / Michele Wilcox			Private (3)
SI	**Monthly Council Budget - monitoring report**	The Cabinet receives a monthly report setting out in detail the Council's revenue and capital position.	All		Cllr Jonathan Bianco	FD - Paul Whaymand			Public
SI	**Reports from Policy Overview & Scrutiny Committees**	Major Policy Review recommendations for consideration by the Cabinet as and when completed.	All		TBC	CEO - Democratic Services	TBC		Public

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WORK PROGRAMME 2017/18

Contact Officer: Khalid Ahmed
Telephone: 01895 250833

REASON FOR ITEM

This report is to enable the Committee to review meeting dates and forward plans. This is a standard item at the end of the agenda.

OPTIONS AVAILABLE TO THE COMMITTEE

1. To confirm dates for meetings

2. To make suggestions for future working practices and/or reviews.

INFORMATION

All meetings to start at 5.30pm

Meetings	Room
27 June 2017	**CR3**
26 July 2017	**CR6**
20 September 2017	**CR6**
17 October 2017	**CR3**
21 November 2017	**CR3**
24 January 2018	**CR3**
28 February 2018	**CR3**
27 March 2018	**CR3**

Residents & Environmental Services Policy Overview Committee

2017/18 DRAFT Work Programme

Meeting Date	Item
27 June 2017	Residents & Environmental Services Policy Overview Committee Possible Review Topics 2017/18
	Shisha Bars, Cafes and Lounges - Draft final report and recommendations
	Work programme for 2017/18
	Cabinet Forward Plan

26 July 2017	Budget Planning Report for Residents Services
	Accessible Hillingdon Supplementary Planning Document
	Safety at Sports Grounds
	Review Topic and information reports for this municipal year
	Work Programme
	Cabinet Forward Plan

20 September 2017	Major Review - Scoping Report and Witness Session
	Equality Impact Needs Assessment - Shisha Bars, Cafes and Lounges - Committee's final report
	Cabinet Forward Plan
	Work Programme

17 October 2017	Major Review 2017-18 - Revision of Air Quality Action Plan for the London Borough of Hillingdon- witness session
	Cabinet Forward Plan
	Work Programme

21 November 2016	Major Review - Witness Session
	Information Report - Update

	Cabinet Forward Plan
	Work Programme

24 January 2018	Draft Budget Proposals Report for Residents Services 2018/19
	Major Review - Consideration of suggested recommendations
	Cabinet Forward Plan
	Work Programme

28 February 2018	Major Review - Consideration of draft final report
	Single meeting review
	Cabinet Forward Plan
	Work Programme

27 March 2018	Update on past review
	Single meeting review
	Cabinet Forward Plan
	Work Programme

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