

Transport for London

**Transport and Air Quality Strategy Revisions:
London Low Emission Zone**

Revised following consultation

July 2006

Preamble

With this revision new sections 4G.126 to 4G.198 and new Proposals 4G.27, 4G.28, 4G.29 and 4G.30 have been included in the Transport Strategy. This revision also replaces existing sections 4C.1 to 4C.35 and Proposal 10 of the Air Quality Strategy with new sections 4C.1 to 4C.73, and adds new Proposals 10, 11, 12 and 13.

The same text is proposed for both strategies to ensure they are consistent. No other sections of either strategy are being updated, and all remaining policies and proposals still apply.

Modifications have been made to the text of the draft Revisions as a result of representations and objections received during the stakeholder and public consultation. A full list of revisions is shown in a Schedule of Modifications, appended to this document.

These revisions also take into account the policies, proposals and objectives of the Mayor's other statutory and non-statutory strategies, published since the original Transport and Air Quality Strategies were published in July 2001 and September 2002 respectively. Copies of all the Mayor's strategies are available from the Greater London Authority (GLA) and on the GLA website at www.london.gov.uk. Copies of the strategies should also be available to view at all main public libraries in Greater London.

What happens next?

Publication of these Revisions to the Transport and Air Quality Strategies does not mean that TfL will automatically proceed with a Low Emission Zone (LEZ). Rather, publishing these Revisions allows TfL to continue its investigations into measures that would bring about reductions in the emissions from road transport most harmful to human health. TfL would only seek to implement a LEZ if it was satisfied that such a scheme would improve the health of Londoners.

If the decision to publish the Revisions to the Transport and Air Quality Strategies is made, TfL would then make an Order in accordance with amended proposals 4G.27 and 10. This would provide a further opportunity for stakeholder and public consultation. Should the Mayor confirm such an Order, the earliest possible date for implementation of a Low Emission Zone would be early 2008.

Background to the Revision

The Mayor has a statutory duty to take steps towards achieving Government air quality objectives and EU limit values for seven locally managed pollutants in London.

In accordance with Proposal 3.2 of the Mayor's Transport Strategy, a Feasibility Study to examine methods of reducing traffic emissions in London via differing LEZ options was commissioned in July 2001. This study was undertaken on behalf of the GLA, TfL, the Association of London Government, the Department for Transport and the Department for the Environment, Food and Rural Affairs. Phase I of that study concluded that a LEZ was the best approach to help achieve air quality objectives in London. Phase II, which reported in July 2003, looked at options for introducing a LEZ in more detail and concluded that a London wide LEZ as proposed in these strategies was the most effective option.

In his 2004 election manifesto, the Mayor proposed, subject to consultation, to designate the whole of Greater London as a LEZ.

In early 2005, TfL completed a review of the findings of the Feasibility Study, and concluded that there were no alternatives to the LEZ likely to achieve the same level of benefits in the same or shorter timeframe. During the spring of 2005, TfL engaged in informal discussions with key stakeholders potentially affected by a London LEZ, including business and industry representative groups, the London Boroughs and central government. On 22 June 2005, the Mayor formally delegated to TfL responsibility for preparing and consulting upon revisions to his Transport and Air Quality Strategies, to include a revised proposal for a London LEZ.

On 10 October 2005, the Mayor asked TfL to undertake a formal period of consultation on the draft revisions with the London Assembly and GLA Functional Bodies (the London Fire and Emergency Planning Authority, the London Development Agency, the Metropolitan Police Authority and Transport for London) as well as the London Sustainable Development Commission and the London Health Commission.

The results of that consultation were reported to the Mayor in January 2006. *The Draft Transport and Air Quality Strategy Revisions: Proposed London Low Emission Zone – Report of the consultation with the London Assembly and the Greater London Assembly Functional Bodies* can be downloaded from the web at <http://tfl.gov.uk/tfl/low-emission-zone/reportlibrary.asp>. Copies can also be obtained by telephoning 08457 22 45 77.

The Draft Revisions were amended to reflect the outcome of the consultation with the London Assembly and GLA Functional Bodies.

On 30 January 2006 *Transport and Air Quality Strategy Revisions: London Low Emission Zone – Draft for Public and Stakeholder Consultation* was issued. This public and stakeholder consultation version of the draft Strategy Revisions focused on the Mayor's preferred option for a London LEZ. This is a LEZ covering the whole of the GLA area introduced through a Scheme Order under

the Greater London Authority Act 1999, though the revisions allow for other implementation methods to be utilised.

Stakeholder and public consultation on the draft Transport and Air Quality Strategy Revisions was held for 12 weeks between 30 January and 24 April 2006¹. Over 1000 stakeholders received a copy of the draft Transport and Air Quality Strategy Revisions, together with *Transport and Air Quality Strategy Revisions: London Low Emission Zone – Supplementary Information*, which set out further technical information on the proposal, and an Executive Summary of the Environmental Report which provided additional information about the projected environmental impacts of a London LEZ.

Some 250,000 information leaflets were distributed to businesses, operators and the general public summarising the contents of the draft Transport and Air Quality Strategy Revisions, which included a questionnaire covering the key issues on which views were sought. Further information on the consultation and all the aforementioned documents were also posted on TfL's website.

In addition, MORI carried out an attitudinal survey of 1000 London residents, 545 businesses and 482 operators on the LEZ proposal.

TfL analysed all the representations and objections made during the stakeholder and public consultation. The results of TfL's analysis were presented to the Mayor in July 2006 in the document *Proposed Transport and Air Quality Strategy Revisions: London Low Emission Zone – Report to the Mayor following Consultation with Stakeholders and the Public*, together with all representations and objections received.

TfL's report to the Mayor on the consultation and the Mayor's decision statement are available at <http://tfl.gov.uk/tfl/low-emission-zone>. Individual representations or objections can be inspected at TfL's offices by appointment.

¹ London boroughs were allowed until 5 June 2006 to submit an addendum to their response following the local authority elections on 4 May 2006.

Transport and Air Quality Strategy Revisions: London Low Emission Zone

Inserting new sections 4G.126 – 4G.198 and new Proposals 4G.27, 4G.28, 4G.29 and 4G.30 into the Transport Strategy.

Replacing existing sections 4C.1 – 4C.35 and Proposal 10 of the Air Quality Strategy with new sections 4C.1 – 4C.73 and new Proposals 10, 11, 12 and 13.

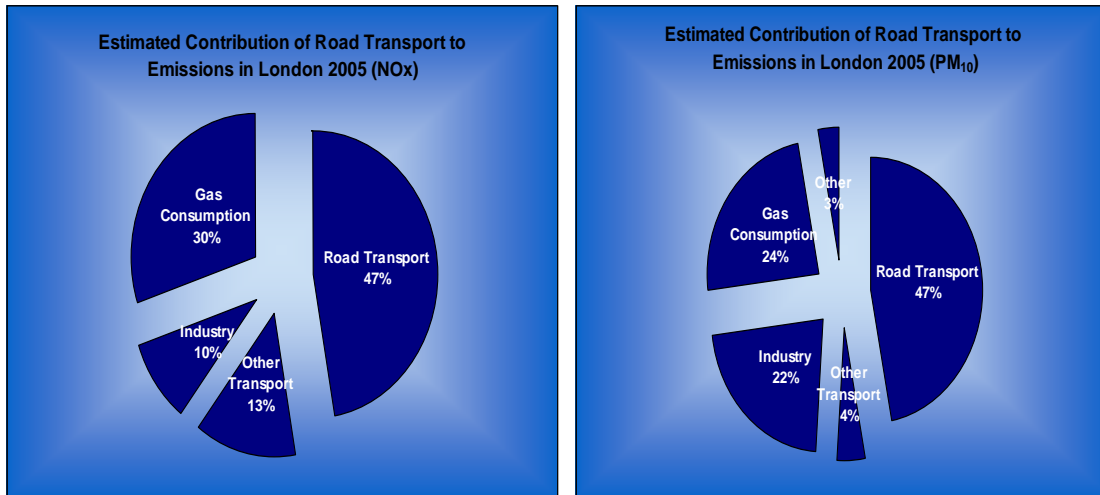
The need to tackle road transport emissions

4G.126 London is a very large city with a growing population, which is putting
4C.1 increased pressure on both the environment and the transport infrastructure. This pressure will get worse without determined action. Vehicle emissions contribute to poor air quality, and poor air quality is damaging to human health and people's quality of life; it particularly affects the most vulnerable in society – the sick, the very young and the very old.

4G.127 London's air quality is much better now than it was in the first half of
4C.2 the twentieth century. However, it still has the worst air pollution in the UK, and some of the worst air pollution in Europe. There are also still too many areas of London where nitrogen dioxide (NO₂) and particulate matter (PM₁₀) exceed recommended limits for protecting human health. It was predicted that around one thousand early deaths and the same number of hospital admissions would occur in the London area in 2005 due to air pollution.¹

4G.128 Road transport related emissions are a significant contributor to air
4C.3 pollution in London. Road transport was predicted to be responsible for 47 percent of emissions of PM₁₀ in London in 2005. These are the emissions most harmful to human health. PM₁₀ affects the respiratory and cardiovascular system, and is known to contribute to premature deaths. It can also carry carcinogenic compounds into the lungs that can cause cancer. It may worsen existing lung disease and increase the sensitivity to allergens of people with hay fever and asthma. Road transport was also predicted to be responsible for 47 percent of the emissions of oxides of nitrogen (NO_x)² in London in 2005; NO_x includes nitric oxide (NO) and nitrogen dioxide (NO₂). NO₂ has been associated with impaired lung function, as well as increases in allergies and a general deleterious effect on quality of life.³

Figure 1 - Estimated contribution of road transport to NO_x and PM₁₀ emissions in London in 2005



The emission source data presented in Figure 1 is based on information from the London Atmospheric Emissions Inventory (LAEI) 2002, which is an annually updated database of identifiable emissions sources, as well as estimates of the quantity of specific pollutants emitted into the air within and around the Greater London area. The LAEI is compiled and maintained by the GLA as part of the implementation of the Mayor's Air Quality Strategy. The base year for the LAEI 2002 is the 2002 calendar year. The LAEI 2002 contains average emission estimates for the base year. The emission estimates for the base were used, together with a set of assumptions and models, to project emission estimates for the years 2005 and 2010.

4G.129 UK policy on air quality is determined to a considerable extent by
4C.4 European legislation. The primary legislation governing air quality in the EU is the Directive 96/62/EC known as the "Air Quality Framework Directive". This EU Directive establishes a framework under which the EU will set "limit values" or "target values" for specified pollutants. The legally binding "limit values" are set out in the Daughter Directives for a range of pollutants that impact on human health, vegetation and ecosystems. They also require countries to achieve these "limit values" by a certain date, and once attained not to exceed them.

4G.130 The Air Quality Framework Directive and the Air Quality Daughter
4C.5 Directives are transposed into English law by the Air Quality (England) Regulations 2000, Air Quality Limit Values Regulations 2001 and amendments. They are implemented in large part through Part IV of the Environment Act 1995. Regulations made under Part IV, the Air Quality (England) Regulations 2000, contain domestic air quality objectives for England. Many of these are set at the limit values contained in the Air Quality Daughter Directives. The Secretary of State, local authorities and the Mayor are required to take steps to achieve these domestic air quality objectives. The Secretary of State is required to prepare a national air quality strategy, which is the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (2000). In April 2006, the Government commenced consultation

on a review of the Strategy – *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: A consultation document on options for further improvement in air quality.*

- 4G.131
4C.6 In its 2000 AQS, the Government has set objectives for nine main air pollutants.⁴ Two of these pollutants are being tackled at the national and European level, but responsibility for addressing the remaining seven is devolved to local authorities. Within London, the Mayor has a statutory duty to take steps towards achieving the objectives for the seven locally managed pollutants.
- 4G.132
4C.7 London is expected to meet the objectives for five out of the seven pollutants. However, data suggests that in many places London has not met the annual mean objective for NO₂ (date for achievement, end 2005)⁵ and the annual mean and daily mean objectives for PM₁₀ (which applied from the end of 2004). In particular, these objectives are expected to have been exceeded at locations in the vicinity of the main road network.
- 4G.133
4C.8 Beyond 2005, the next target date for achieving the prescribed air quality objectives is the end of 2010. On current trends and without further action, it is predicted that London will exceed its annual mean objectives for NO₂, as well as its annual and daily mean objectives for PM₁₀. Each year that the UK exceeds an EU limit value there is the risk of infraction proceedings and the UK potentially paying daily fines based on a percentage of GDP.
- 4G.134
4C.9 In September 2005, the European Commission published a Thematic Strategy on air pollution and proposed a new directive on ambient air quality and cleaner air for Europe. The new directive, should it be adopted, would provide scope for the achievement of the PM₁₀ and NO₂ limit values in 2010 to be deferred, but only where a Member State has demonstrated that it has taken significant action to try and meet those limit values. The proposed LEZ would be a means to demonstrate that London is making every effort to achieve the relevant limit values, or concentration caps, as the new directive may define them. The new directive also proposes a new concentration cap for fine particles, PM_{2.5} from 2010, which would be in addition to that for PM₁₀. PM_{2.5} are ultra-fine particles that are considered to be more damaging to human health than PM₁₀. A high proportion of PM_{2.5} emissions are from road transport, and the proposed LEZ would contribute to reducing emissions of these ultra-fine particles.⁶
- 4G.135
4C.10 The proposed LEZ represents the most effective option for helping London work towards meeting its daily mean objective for PM₁₀. It would also help London make progress towards achieving its 2010

annual mean objective for PM₁₀. While the introduction of the proposed LEZ would not enable London to meet the 2010 objectives in all locations, it should reduce the areas of London that exceed these objectives, and most importantly the exposure of people who live, work and visit London to this pollutant.

Existing initiatives

- 4G.136
4C.11 Within the Mayor's Transport Strategy, a number of initiatives are concerned with mitigating the environmental impacts of transport in London. The Central London Congestion Charging Zone, and the Western Extension of the Zone, primarily aim to reduce traffic congestion, although the existing zone has had secondary benefits in reducing vehicle emissions and one would anticipate comparable benefits with the Western extension. Initiatives to improve and encourage the use of public transport and other alternatives to private cars have also had a positive impact. The LEZ would be complemented by a range of other measures set out in the Mayor's Transport and Air Quality Strategies addressing air quality both directly and indirectly.
- 4G.137
4C.12 Within the Mayor's Air Quality Strategy there are a number of initiatives that are being pursued to deliver reductions in emissions. These have aimed to accelerate the introduction of cleaner vehicles, and take advantage of the technological advances that reduce emissions of vehicles already on the road. Where possible, the GLA group has led by example.⁷ All London buses under contract to TfL met a minimum of Euro II emission standards for all pollutants by the end of 2005.⁸ Through the fitting of particulate traps on all Euro II and Euro III buses, the fleet also met a minimum of Euro IV emission standards for particulates by the end of 2005. Similarly, the Taxi Emissions Strategy will require all London licensed taxis to meet Euro III emission standards for PM₁₀ and NO_x by mid 2008. The London Fire and Emergency Planning Authority (LFEPA) also replaced half of their original fire engines by the end of 2005, and all their vehicles should meet Euro III emission standards for PM₁₀ by mid 2008. TfL has also introduced a 100% discount on the Congestion Charge for the cleanest alternative fuel vehicles.
- 4G.138
4C.13 The Mayor requires boroughs to improve air quality at a local level, including pollution hotspots, through the Local Air Quality Management system. The Mayor is also working with the boroughs to address emissions arising from local traffic, new developments, and construction activities. The Mayor is encouraging local boroughs to assess and improve their own vehicles, including refuse collection and waste vehicles.

4G.139 While the emissions of vehicles operated by the GLA group and the
4C.14 boroughs are being targeted and reduced by these measures, further action is required to address emissions from diesel-engined Heavy Goods Vehicles, Light Goods Vehicles, coaches and non-TfL contracted buses.

4G.140 In the absence of national initiatives, a Low Emission Zone covering
4C.15 Greater London has been identified as the most effective means of reducing emissions from heavier, diesel-engined vehicles. Given the above, it is now considered that this proposal should be taken forward, building on the work of the Joint Feasibility Study from 2001 to 2003, and subsequent work by TfL.⁹

Taking forward a Low Emission Zone for London

4G.141 A Low Emission Zone is a geographically defined area which seeks to
4C.16 restrict or deter access by certain polluting vehicles. A LEZ would reduce road transport emissions by accelerating the introduction of cleaner vehicles and reducing the numbers of polluting vehicles within the LEZ. There are currently no cities in the UK that operate a LEZ, though a number of UK cities have expressed an interest in introducing LEZ's.

4G.142 "Environmental Zones" have been operating in the Swedish cities of
4C.17 Gothenburg, Lund, Malmo and Stockholm for a number of years. Initially these LEZ schemes only applied to Swedish-registered vehicles, but in 2001/02 were extended to non-Swedish registered vehicles. The cities banned diesel-engined heavy vehicles from entering their boundaries if they were over eight years old and had not been fitted with appropriate abatement equipment. Emissions of PM₁₀ and NO_x were shown to have been reduced as a result of these schemes. The entry criteria for the Swedish Environmental Zones are now being modified. New emission standards will be based on age of vehicle (a six-year limit) and Euro standards. These new standards represent a move towards the kind of emissions-based standards envisaged for London and favoured by the European Commission.

4G.143 Tokyo also implemented a LEZ in October 2003, which has been
4C.18 successful in reducing the emissions of heavy diesel-engined vehicles. More recently, Berlin has developed plans to implement a LEZ in the central city area.

4G.144 The success of the Swedish LEZs inspired work in the UK which led to
4C.19 the investigation of a LEZ being included in the Mayor's Air Quality Strategy, and referenced in the Transport Strategy. A Feasibility Study

to examine methods of reducing traffic emissions in London via one or more Low Emission Zones was commissioned in July 2001. This study was undertaken on behalf of the GLA, the Association of London Government, TfL, the Department for Transport (DfT) and the Department for the Environment, Food and Rural Affairs (Defra). Phase I of that study concluded that a LEZ was the best approach to help move London closer to achieving its air quality objectives. Phase II, which reported in July 2003, looked at options for introducing a LEZ in more detail and concluded that a London wide LEZ was the most effective option.

4G.145 In 2004, the Mayor asked TfL to review the Feasibility Study to
4C.20 determine whether its recommendations still formed a viable basis for the implementation of a LEZ.¹⁰ The TfL Strategic Review re-examined the legal framework for implementation of the LEZ under three main options: a Scheme Order; a Traffic Regulation Order (TRO) jointly undertaken on behalf of the London Boroughs and TfL; and a Parliamentary Bill introduced by TfL.

4G.146 A LEZ enacted under the TRO approach would ban specific classes of
4C.21 vehicle that did not meet the proposed emission standards from entering the zone. A LEZ introduced via a TRO would require either individual TROs made by TfL and the London local authorities as the local traffic authorities for their roads, or a single TRO made by one party, such as the Association of London Government Transport and Environment Committee (ALG TEC) or TfL. These organisations would be acting on behalf of all the London traffic authorities.

4G.147 In order to implement a LEZ by making a single TRO, the individual
4C.22 traffic authorities would have to enter into a 'joint arrangement' agreement under section 101 of the Local Government Act 1972, to delegate their TRO making functions to the joint committee or a chosen traffic authority. This would involve co-ordinating the actions of up to 34 traffic authorities, and would therefore be extremely complex and time consuming to implement. The Parliamentary Bill option would also be likely to result in a long implementation timetable, given the time needed to take a Bill through Parliament. There could be significant risk of delay to the implementation of the LEZ, which would lead to a delay in the health and air quality benefits from the LEZ.

4G.148 The Strategic Review, therefore, recommended a LEZ covering the
4C.23 whole of the GLA area and introduced through a Scheme Order under the GLA Act 1999. This was considered to achieve the best balance between the costs of the scheme and health and air quality benefits. In addition, it would be simpler to implement than the other options. Consequently this document focuses primarily on the preferred

implementation mechanism, and hereafter references to specific elements of the proposed LEZ relate to a LEZ implemented through a Scheme Order. However, this does not preclude the possibility that other implementation mechanisms could be utilised for a LEZ.

Possible alternatives to a LEZ

4G.149 The 2001 to 2003 Feasibility Study considered that a LEZ was the most
4C.24 effective policy available to the Mayor that could realistically move London significantly closer towards meeting its air quality objectives.

4G.150 TfL has reviewed alternative ways at both the national and local levels
4C.25 for addressing road transport related emissions. Alternative methods to a LEZ for achieving reductions in road transport related emissions that have been considered are summarised below. These include:

- **Relying on the natural vehicle replacement cycle and tighter Euro standards to produce the same air quality improvements as the proposed LEZ.** Work undertaken by TfL estimates that the introduction of a London LEZ, as proposed below, following consultation would bring forward by some 3 – 4 years reductions in PM₁₀ emissions in 2012 than would otherwise be achieved under the natural vehicle replacement cycle.
- **Higher levels of Vehicle Excise Duty (VED) for more polluting vehicles.** Government has indicated it has no plans to support the introduction of differential VED rates depending on PM₁₀ and NO_x emission levels.
- **The introduction of national road user charging with higher charges for more polluting vehicles.** Planning for a national road user charging scheme is in its infancy. There is no firm target date for its introduction and much debate on its form and development is still to be had.
- **Grants for retro-fitting emissions reducing equipment to vehicles.** European Union rules limit any environment-related grant to 30 percent of the capital cost of the equipment. Funding grants for operators to this level is unlikely to be cost-effective, and unlikely to provide adequate incentives to operators to clean up their vehicles. Furthermore, the Government has announced that it is stopping its Air Quality Retrofit programme which until relatively recently provided grants to operators to fit pollution abatement equipment to vehicles

- **Scrapping of older vehicles.** The issues relating to the provision of incentives for scrapping older vehicles are similar to those relating to grants. There would also be a number of problems in targeting financial assistance to the large number of UK vehicles that operate in London but are registered outside.
- **Roadside emission testing of vehicles.** Roadside emissions tests would only be able to identify the most polluting vehicles as the tests are insensitive. Roadside testing also requires the involvement of the Vehicle and Operator Services Agency (VOSA) or the police to stop vehicles, and it would not be practical to stop HGVs in many parts of London. As an approach for dealing with the emissions of Heavy Goods Vehicles, buses and coaches, roadside emissions testing would achieve very small reductions in emissions compared to those from the proposed LEZ.

4G.151 In the absence of national initiatives, therefore, the proposed LEZ
4C.26 represents the most effective option for achieving reductions of the most harmful road transport generated emissions in London between 2008 and 2015.

Benefits of a LEZ

4G.152 The most significant benefits of the proposed LEZ would be the health
4C.27 improvements achieved both inside and outside Greater London through reductions in PM₁₀ and NO_x emissions from road traffic. The benefits fall into three categories:

- Primary health benefits derived from reductions in PM₁₀ emissions. These benefits include reductions in premature deaths, reductions in years of life lost and reduced hospital admissions for people with respiratory illness;
- Secondary health benefits. These would benefit people with pre-existing respiratory conditions, through reductions in NO_x emissions; and,
- Non-health benefits achieved through a reduction in damage to materials, primarily building soiling associated with PM₁₀.

4G.153 The proposed LEZ would operate according to the 'polluter pays'
4C.28 principle. It would provide a powerful means to help secure key priorities of the Mayor's Air Quality and Transport Strategies by tackling road transport emissions in London. The following is a summary of the key benefits of the proposed LEZ:

- 4G.154
4C.29
- **It would reduce transport related emissions within London, and nationally** – this would contribute to better air quality within London and would also have impacts nationally, as vehicle operators based in and outside Greater London would be encouraged to replace or upgrade their vehicles to operate within the LEZ.
 - **It would be more effective than other measures in assisting to reduce the level of air pollution** – in the absence of national initiatives, the LEZ is the most viable initiative to achieve this goal. Other local initiatives such as incentives to help scrap older vehicles would be difficult to implement and are unlikely to be cost-effective.
 - **It would bring a number of health benefits to people who live in, work in and visit London** – this would include fewer premature deaths, less years of life lost to illness and reduced hospital admissions due to respiratory illness.
 - **It would make London a more pleasant location** – as a result of improved air quality, people’s enjoyment of London’s open spaces would be enhanced.
 - **It would benefit London as an international location** – improved air quality would enhance the image of London as an open, green and sustainable city.
 - **It would integrate well with other initiatives** – it would complement the Mayor’s Taxi emissions strategy and the requirement for all TfL contracted buses to meet stringent emission standards, as well as other initiatives to reduce transport emissions and improve air quality.

LEZ linkages with other Mayoral Strategies

4G.155
4C.30

The proposed LEZ would make a direct contribution to achieving two of the six objectives of the London Plan:

- **To make London a better city for people to live in** – the LEZ would contribute positively to improving health and easing the pressure on the health services.
- **To make London a more attractive, well-designed and green city** – the LEZ would contribute to London’s sustainable development through minimising air pollution, and so improving the quality of life of people who live and work in London.

4G.156 The LEZ would also help achieve some of the objectives in the Mayor's
4C.31 other strategies by, for example:

- **Creating a sustainable world city with strong long-term economic growth, social inclusion and environmental improvement (Economic Development Strategy)** – Improvements in air quality would support London's sustainable development, its reputation as a clean and green city, and could have beneficial impacts on tourism.
- **Encouraging the greening of the built environment and the use of open spaces in ecologically sensitive ways (the London Biodiversity Action Plan)** – Improvements in air quality would assist the Mayor in promoting the health benefits of open space.
- **Minimising the adverse impacts of road transport noise (Ambient Noise Strategy)** – In addition to having lower emissions, modern vehicles can be quieter, and the LEZ may lead to some small reductions in roadside noise through accelerating the vehicle renewal cycle.
- **Enhancing the cultural value and potential of London's public realm (The Culture Strategy)** – Supports the creation and enhancement of public spaces such as London's parks, through helping Londoners to appreciate fresh air and to enjoy these open spaces.

A proposal for a London LEZ

4G.157 The likely implementation route for the proposed LEZ is via a Scheme
4C.32 Order, although alternative implementation mechanisms are also available.

4G.158 The LEZ is designed to discourage the use of the most polluting
4C.33 vehicles in Greater London by encouraging the upgrade or replacement of diesel-engined HGVs, buses and coaches to meet or exceed Euro III for PM₁₀ by 2008 and Euro IV for PM₁₀ by 2012, and upgrade or replacement of heavier more polluting light goods vehicles (LGVs) and minibuses by 2010. Should the European Commission set a new standard covering ultra-fine particles or PM_{2.5} TfL will consider including such a standard within the LEZ. Any proposal to include a PM_{2.5} standard in the LEZ would be accompanied by a full consultation process. The standard of Euro IV for NO_x is still being considered

subject to commercial availability of suitable abatement equipment certification and a testing mechanism being established.

4G.159 Operators wishing to bring vehicles into the Zone that did not meet the
4C.34 specified emissions standards for the LEZ would be required to pay a substantial charge. Operators that do not pay the daily charge and whose vehicles are identified as not meeting the proposed emission standards would have to pay a penalty charge. Vehicles which meet the proposed emission standards would be able to operate in the LEZ without paying the charge. The charge would be set at such a level as to encourage operators to modify or replace their vehicles to comply with the proposed LEZ standards. To encourage compliance, the level of the charge and associated penalties would need to be set at a far higher level than that for the Central London Congestion Charging Scheme.

4G.160 Whilst the details of the proposed London LEZ would be confirmed by
4C.35 an Order, the key features are likely to be broadly as follows.

Where would the LEZ apply?

4G.161 In order to maximise the air quality and health benefits, it is proposed
4C.36 that the LEZ should cover all of Greater London. It should include those areas with the highest exceedences of air pollution within the Greater London boundary. These are central London, Heathrow and around the main road networks. Defining the LEZ according to the GLA administrative boundary achieves this objective.

4G.162 Other possible geographical configurations have been considered by
4C.37 TfL, including a boundary at the M25, a LEZ applying to the Transport for London Road Network (TLRN) only and a LEZ covering the existing central London congestion charging zone and western extension. Alternatives were considered as follows:

- **A LEZ with a boundary at the M25** – This option would increase the health and air quality benefits of the LEZ, but would be more difficult to implement and enforce, requiring the agreement of non-London local authorities to include parts of their areas in the LEZ.
- **A LEZ applying to the Transport for London Road Network (TLRN) only** – TfL could introduce the LEZ under a Traffic Regulation Order (TRO) on its own roads, and by so doing some Boroughs might be encouraged to join TfL in implementing the LEZ. However, there could be dis-benefits on non-TLRN roads in terms of increased emissions and congestion from vehicles diverting off the

TLRN to avoid the LEZ. The amount of signage required could also lead to a significant increase in visual clutter.

- **A LEZ covering the area of the central London congestion charging zone and the area of the western extension** – it is estimated that the air quality and health benefits gained from a scheme covering this relatively small area of London would be minor and would not address a substantial number of the areas in London which are projected to exceed the air quality objectives.

4G.163 The proposal is therefore that the boundary of the LEZ be as close as
4C.38 practicable to the GLA administrative boundary. This would maximise the health and air quality benefits of the LEZ, and is the most feasible option to implement. In practice, to allow for suitable diversion routes and identification of appropriate locations for signage, the actual boundary would not coincide exactly with the GLA boundary.

When would the LEZ operate?

4G.164 The hours of operation are proposed to be 24 hours a day, Monday to
4C.39 Sunday, 365 days a year. Suspending the LEZ on weekends or public holidays would erode the air quality and health benefits of the proposed scheme.

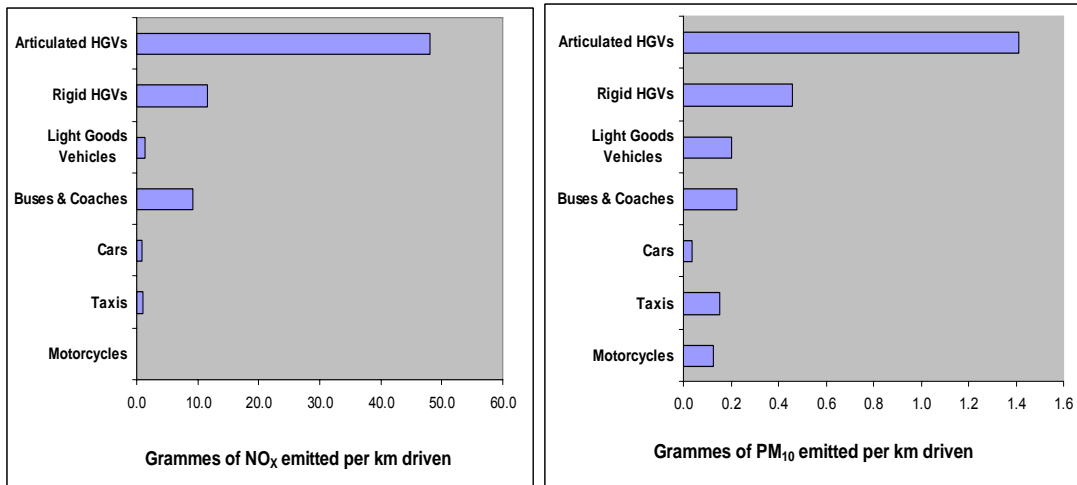
Which vehicles would be included?

New Section Where possible and practicable, it is proposed that European vehicle definitions be used to describe the vehicles to be included in the LEZ. This would ensure that vehicle definitions have a legal basis that applies equally to UK and European based vehicles. The vehicle definitions would be defined in the Order establishing the LEZ.

4G.165 The LEZ is designed to discourage the use of the most polluting
4C.40 vehicles. These are diesel-engined HGVs, buses, coaches and heavier LGVs and minibuses. The LEZ would apply to HGVs with a gross vehicle weight that is over 3.5 tonnes. It would also cover buses and coaches, which are those vehicles having more than 8 seats in addition to the driver's seat and a mass exceeding 5 tonnes, and subsequently heavier LGVs and minibuses. LGVs, or vans as they are often referred to, are designed for the carriage of goods and do not exceed 3.5 tonnes. Minibuses are those vehicles designed and constructed for the carriage of passengers comprising of more than eight seats in addition to the driver's seat, and having a maximum mass not exceeding five

tonnes. Minibuses are the passenger carrying equivalent of the heavier LGVs, they use very similar chassis and engines to larger LGVs, and have similar emissions levels, and there are no technical reasons to exclude them from a scheme that includes heavier LGVs. Car Derived Vans would not be included in the scope of the LEZ at this stage. Heavy diesel-engined vehicles, particularly articulated HGVs, emit the most PM₁₀ and NO_x per km driven as shown in Figure 2.

Figure 2 – Forecast Emissions from London vehicles at average London Speeds for 2005 (NO_x and PM₁₀)



The base year for Figure 2 is the 2002 calendar year. The forecasts are derived from the emissions data in the LAEI 2002 dataset, and the 2002 road traffic network.

- 4G.166 Emissions per kilometre driven are only part of the picture however.
- 4C.41 Total kilometres driven also contribute to levels of road transport emissions in London. It is estimated that HGVs will contribute 16 percent of road transport emissions of PM₁₀ by 2010, and 37 percent of NO_x.

- 4G.167 Whilst diesel-engined cars have lower emissions per km driven, the combined kilometres driven by diesel-engined cars are estimated to contribute around 39 percent of road transport-related PM₁₀ emissions in London in 2005, and nearly 32 percent of road transport-related NO_x emissions. For this reason the inclusion of diesel-engined cars has been carefully considered. Cars would not be included from the onset of the scheme, which would initially focus on the most individually polluting vehicles. The range of vehicles included in the LEZ would be kept under review by TfL.
- 4C.42

- 4G.168 It is necessary to balance the Mayor's social and economic development objectives for London with his AQS objectives. To this end, the most cost effective approach is for the LEZ to focus on the
- 4C.43

most individually polluting vehicles (i.e. HGVs, buses, coaches, heavier LGVs and minibuses). The Mayor is already delivering on initiatives to reduce the volume of traffic on London's roads through the Central London Congestion Charging Scheme, improvements to the accessibility and reliability of London's public transport, and the promotion of walking and cycling. The LEZ and Congestion Charging policies will be kept under review by the Mayor and TfL as London's congestion and air quality challenges evolve.

4G.169 There has also been careful consideration of whether the LEZ should
4C.44 be extended to include the heavier, most polluting LGVs and minibuses from 2010. LGVs generally are more polluting per kilometre driven than cars, though less so than HGVs, buses and coaches. By 2010 it is forecast that they will be responsible for 24 percent of road transport emissions of PM₁₀ within London.

4G.170 Whilst LGVs have a faster replacement cycle than other vehicles,
4C.45 approximately 20 percent of commercial vans are more than 10 years old. Any proposal to include these vehicles in the LEZ should target the most highly polluting part of the vehicle fleet to achieve the greatest air quality benefits for the least cost. TfL has considered the costs to operators and projected improvements in air quality of including LGVs in the LEZ. On the basis of this analysis, TfL concludes that the heavier, most polluting LGVs and minibuses should be included in the LEZ from 2010. It is anticipated that operators of heavier LGVs would tend to comply with the LEZ by replacing their vehicles, rather than cleaning them up. This is because the market for pollution abatement technology is less developed for these vehicles than for the heavier vehicles and because the cost of pollution abatement equipment would typically be a large fraction of the low residual value of older LGVs.

4G.171 [Deleted]
4C.46

What would the emissions standards be?

4G.172 The proposed emission standards determine the number of HGVs,
4C.47 buses, coaches, heavier LGVs and minibuses which would need to take some action to operate within the LEZ without paying a charge. Such action includes replacing vehicles or fitting pollution abatement equipment for HGVs, buses, coaches, heavier LGVs and minibuses. The emission standards need to be practical and easily recognisable, and balance affordability with achieving maximum air quality benefits. The standards need to discourage the most polluting vehicles from

driving within the LEZ. The standards should also encourage the clean up of existing vehicles, or the replacement of polluting vehicles with cleaner models more quickly than would occur through natural vehicle replacement.

4G.173 There are a number of options for specifying a vehicle emission
4C.48 standard, ranging from a simple standard based on age, a vehicle's Euro standard, and/or a standard based around the fitting of emission abatement equipment.

4G.174 TfL has examined the health and air quality benefits and compliance
4C.49 costs of six, eight and 10-year rolling age-based systems for HGVs, buses and coaches. This analysis has shown that a 10-year standard generates smaller health and air quality benefits than the proposed Euro standard approach. More specifically, the benefits of an age based scheme (either six or eight years rolling) are also less than those delivered by the proposed Euro standards based scheme and the costs for operators associated with an age-based standard are also slightly higher. An age-based scheme can also be unfair as vehicles of the same Euro class and emissions but of a different age could be treated differently. Such a scheme could also penalise early adopters of exhaust after-treatment systems, and those who had converted their vehicles to alternative fuels or re-engined their vehicles to a higher Euro standard.

4G.175 It is considered that the standard that best balances affordability with
4C.50 maximum air quality and health benefits is one based on Euro standards. This would allow operators to meet the emission standards not only through vehicle replacement but also through the fitting of abatement equipment to bring them up to the required standard.

4G.176 Since October 2001 it has been mandatory for manufacturers to
4C.51 produce HGVs, buses and coaches that meet Euro III emission standards. Since January 2002 it has been mandatory for manufacturers to produce heavier LGVs and minibuses that meet Euro III emission standards. Manufacturers are already producing and delivering new vehicles that comply with Euro IV standards, which become mandatory for manufacturers of HGVs, buses and coaches from October 2006 and for manufacturers of heavier LGVs and minibuses from January 2007. This makes it reasonable to introduce a Euro III standard for PM₁₀ for the heaviest vehicles in 2008, and to tighten this to Euro IV for PM₁₀ in 2012. TfL therefore proposes the following emission standards for the proposed LEZ on the following indicative timetable:

- from Quarter 1 2008, a standard of Euro III for PM₁₀ for HGVs over 12t;
- from Quarter 3 2008, a standard of Euro III for PM₁₀ for HGVs 3.5t – 12t, buses and coaches;
- from 2012, a standard of Euro IV for PM₁₀ for HGVs, buses and coaches. Should the European Commission set a new standard covering ultra-fine particles or PM_{2.5} TfL will consider including such a standard within the LEZ. Any proposal to include a PM_{2.5} standard in the LEZ would be accompanied by a full consultation process including any required amendment to the Scheme Order and Mayoral strategies; and,
- appropriate standards to address emissions from heavier LGVs and minibuses from 2010.

4G.177 Implementation of the proposed standards for PM₁₀, and potentially
4C.52 NO_x, requires a process for ensuring that abatement equipment is appropriately fitted, tested and maintained. The Department for Transport's Reduced Pollution Certification scheme is already in place and can be adapted to support the proposed LEZ's particulate standard. However, the issues around developing a certification process to support a NO_x emission standard are more complex.

4G.178 Targeting NO_x as well as PM₁₀ would help London to make more
4C.53 substantial progress towards meeting its air quality objectives for NO₂. However, a NO_x emission standard is dependent on developing certification and standards for the fitting and testing of retro-fit NO_x abatement equipment. NO_x abatement technology is still evolving. No appropriate registers exist of vehicles retrofitted with NO_x abatement equipment. Testing is also a complex process, requiring sophisticated on-board diagnostic equipment to be built into the vehicles. TfL is continuing to refine how a NO_x option might feasibly be implemented with the retrofit abatement industry and with the DfT and will consider moving to implement a NO_x standard when feasible. Any proposal to implement a NO_x standard would be subject to consultation, including any required amendment to the Scheme Order and Mayoral strategies, and would allow sufficient lead time for vehicle operators to comply with the standard.

New section There is evidence that the increased concentrations of NO₂ recently detected at roadside monitoring stations is due in part to the increasing number of newer diesel vehicles in the London fleet, and a side-effect of fitting catalysed diesel particulate filters (CDPF) to diesel engines. With the LEZ in place, the increased adoption of certain types of

pollution abatement equipment could reduce any projected NO₂ benefits of a LEZ. However, it should be noted that the LEZ would contribute to a reduction in total NO_x emissions.

New section In terms of the key health-based objectives of the LEZ, by a large margin PM₁₀ reductions generate more significant pollutant health improvements than an increase in the ratio of NO₂ in NO_x. Indeed, the Committee on the Medical Effects of Air Pollution (COMEAP) does not consider the estimates of the health effects of NO₂ sufficiently robust for quantification. TfL considers that the health benefits that would be brought about through reducing PM₁₀ emissions outweigh the impact of an increase in the ratio of NO₂ in NO_x. This approach supports the government's Air Quality Expert Group's recommendations that individual pollutants should not be treated in isolation and a wider, more holistic approach to air quality management would be more effective.

4G.179 The proposed LEZ is dependent upon the DfT retaining the Reduced
4C.54 Pollution Certificate (RPC) mechanism. The Government has indicated its intention to retain the RPC mechanism for operators who fit qualifying abatement technology to pre-October 2006 vehicles.¹¹

New section Pollution abatement equipment is generally the most cost effective way to reduce particulate emissions from heavy duty vehicles, particularly for larger vehicles and those with a relatively large residual value. If fitted and maintained correctly, pollution abatement equipment such as diesel particulate filters typically reduce PM₁₀ emissions by over 90%. It is the responsibility of both pollution abatement equipment manufacturers and vehicle operators to ensure a vehicle's specification, age and duty cycle are considered when fitting abatement equipment and establishing maintenance procedures. In response to these issues, the abatement industry has introduced measures to improve customer service and to ensure operators are aware of maintenance issues. TfL will work with pollution abatement manufacturers to ensure these measures become standard practice.

4G.180 With the proposed emission standards the LEZ would bring forward
4C.55 reductions in the level of PM₁₀ emissions by some three to four years. The level of the emission standard would remain subject to review, and could be broadened to include a standard for pollutants other than PM₁₀ and NO_x beyond 2012. This would be determined in light of the scheme's performance, and what national and EU air quality objectives were in place at the time.

How the scheme would work

- 4G.181 4C.56 The preferred means of implementing the proposed LEZ is to introduce a substantial daily charge so that operators can make an economic decision as to whether or not they drive their vehicles in the LEZ. The charge would be set at such a level so as to encourage operators to modify or replace their vehicles, thus maximising the air quality and health benefits of the LEZ. At the same time, it would allow infrequent visitors operating non-compliant vehicles to drive within the proposed LEZ, albeit at a cost. The level of penalty charge for non-compliance would be proportionate to the level of charge, and both would remain subject to review.
- 4G.182 4C.57 It is proposed that the LEZ would be enforced using Automatic Number Plate Recognition (ANPR) cameras similar to those used for Congestion Charging. Fixed cameras would be supplemented by mobile patrol units fitted with ANPR cameras. A database would be established to assist the identification and matching process, using data from licensing authorities such as the DVLA. TfL would only require registration from vehicles for which emission characteristics could not be determined from these records. Signs alerting drivers to the LEZ would be erected on roads at the boundary of the LEZ, and on key arterial routes outside Greater London. The zone boundary would be at locations where drivers of non-compliant vehicles could divert to other roads and advance warning signs would be erected to allow drivers to divert. It is also envisaged that there would be signs within the LEZ as a reminder to drivers.
- 4G.183 4C.58 There would be a very small number of exemptions from the LEZ. There are some vehicles which are exempt from VOSA vehicle testing, and their emission levels cannot be determined and so are outside the scope of the LEZ.¹² There are also some highly specialist vehicles for which abatement retrofit options are not practical.

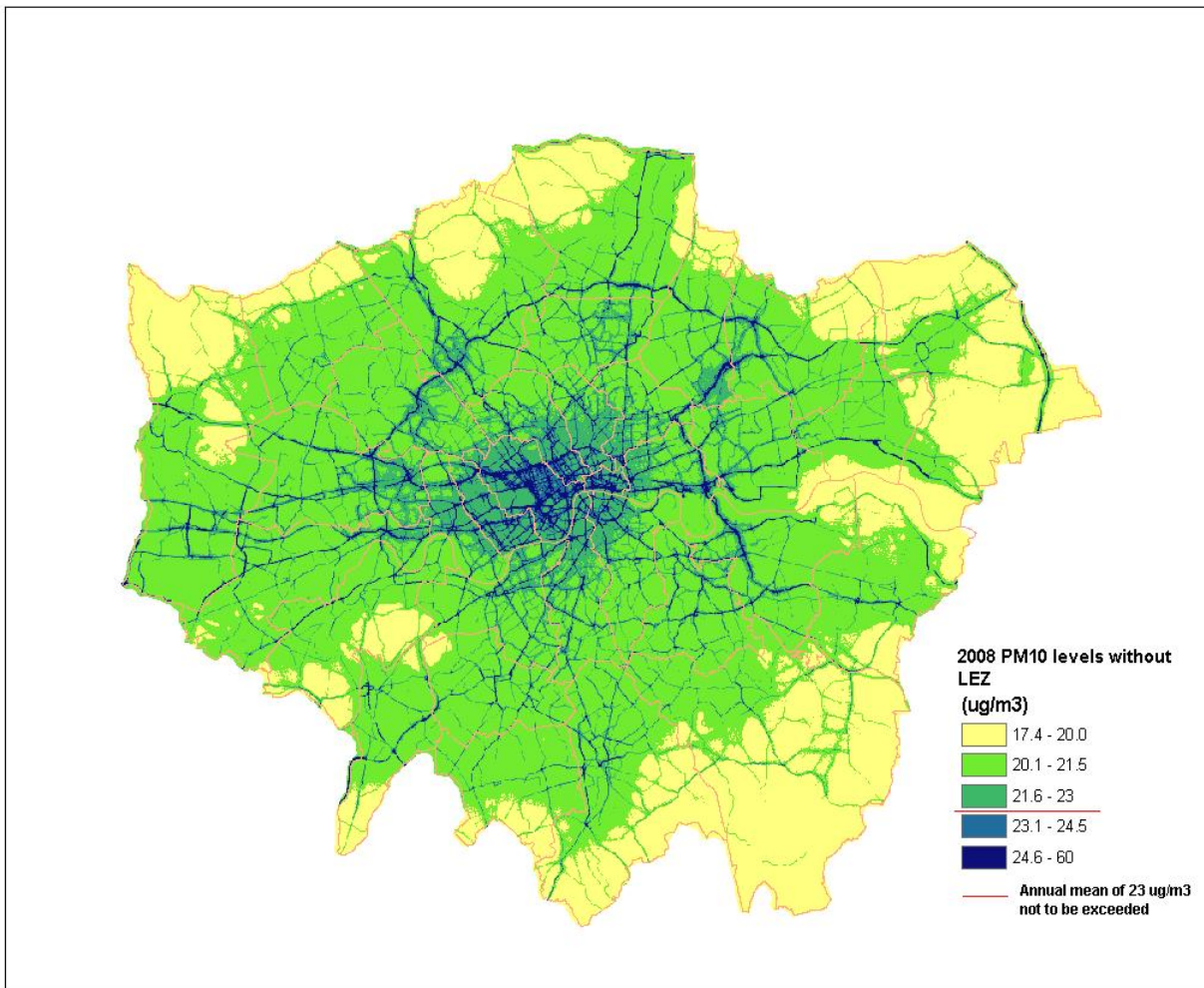
Air Quality and Health Impacts of the LEZ

- 4G.184 4C.59 The proposed LEZ is an environmental measure that seeks to achieve health and air quality benefits for people who live in, work in, visit and do business in London. By reducing overall PM₁₀ and NO_x emissions emitted in London by diesel-engined vehicles, the proposed LEZ would help to reduce the overall area of London that exceeds the AQS objectives and EU limit values for PM₁₀. This would have positive health benefits for communities in London. It would:
- reduce the tonnage of PM₁₀ and NO_x emitted; and

- reduce the areas of London that exceed the AQS objectives and EU limit values for PM₁₀.

4G.185 Figure 3 shows the forecast annual mean concentrations of PM₁₀
4C.60 across Greater London in 2008 without the proposed LEZ. 100 km² of Greater London is forecast to exceed the annual mean PM₁₀ objective of 23 ug/m³ in 2008.

Figure 3 Forecast of annual mean concentration of PM₁₀ across Greater London in 2008, without proposed LEZ



4G.186 [Deleted]
4C.61

- 4G.187
4C.62 The 2008 LEZ proposals (with a standard of Euro III for PM₁₀) would deliver reductions of around 6 percent in the area of London exceeding the annual PM₁₀ objective, and around 9 percent reductions in the area exceeding the daily PM₁₀ objective. In 2012, a standard of Euro IV for PM₁₀ for HGVs, coaches and buses would deliver reductions of around 11 percent in the area of London exceeding the annual and daily PM₁₀ objectives. Adding heavier LGVs and minibuses to the scheme would reduce the area exceeding the annual and daily PM₁₀ objectives by a further 3 percent.
- 4G.188
4C.63 TfL is working with Defra to investigate and understand any implications of recent work which suggests that some Euro III and some retrofitted vehicles may emit a higher proportion of NO_x as NO₂ than previously thought. The projected impact of the LEZ proposals on the area exceeding the annual mean NO₂ objective is sensitive to this ratio. The effect of this recent work is uncertain and subject to other factors such as how operators choose to comply with the LEZ, adding uncertainty to the impact of the LEZ on NO₂ concentrations. The predicted reductions in emissions of NO_x and PM₁₀ are unaffected by this work.
- 4G.189
4C.64 While the introduction of the proposed LEZ would not necessarily lead to the meeting of the 2010 objectives for PM₁₀ in all locations, it should reduce the areas of London that exceed these objectives, and most importantly the exposure of people who live, work and visit London to PM₁₀ and NO_x. The health benefits from the LEZ are likely to be widespread across the Greater London area, and outside London. The reduced emissions would improve the quality of life for many thousands of people who live in, work in and visit London, especially those already suffering from symptoms that restrict their daily activities. The LEZ would also reduce the number of premature deaths, the number of life years lost, respiratory hospital admissions and the need for medication for adults and children suffering from these diseases.
- 4G.190
4C.65 The monetary value of health benefits from the LEZ have been estimated. Using the Defra methodology, the net present value of benefits within London are estimated at around £100 million over the period 2008 to 2015. Benefits outside London are estimated at around £70 million over the same period. These benefits would accrue from the LEZ scheme, which would require HGVs, buses and coaches to meet a standard of Euro III for PM₁₀ in 2008 and Euro IV for PM₁₀ in 2012, and would target heavier LGVs and minibuses from 2010. The health benefits from the LEZ scheme within London, using the EU Clean Air for Europe (Café) Methodology are estimated at around £160 million, and around £100 million outside London.¹³

Financial impacts of the LEZ

Costs

- 4G.191 The estimated cost of the core LEZ scheme to TfL is between £125 million and £130 million, from development of the scheme until 2015/16.
4C.66 This range reflects different scenarios around how operators would respond to the proposed LEZ, and the scope and cost of services from DfT. The capital costs are approximately £60 million, which include all development, consultation and implementation costs. The total operating costs of the scheme from early 2008 to 2015/16 are estimated at between £65 million and £70 million.
- 4G.192 There would also be costs to operators from complying with the LEZ.
4C.67 The costs to operators of the LEZ scheme as proposed following consultation are estimated as being in the order of £300 million for the period to 2015/16. In the absence of any other LEZ schemes elsewhere in the UK, all these costs would be attributed to the London scheme.

Costs and benefits of alternative LEZ options

- 4G.193 TfL has also assessed the costs and benefits of three of the most
4C.68 feasible LEZ alternative options. Figure 4 below sets out the results of this assessment. None of the modelled alternatives achieved the same magnitude of reduced emissions in terms of the balance between costs and benefits as the proposed scheme (i.e. scheme consulted on).

Figure 4
Summary of costs and benefits of alternative LEZ options

| Option | Cost to TfL to FY 2015/16 £(m) | Compliance Cost to Operators £(m) | Monetised Health Benefits (2008 – 2015) £(m) | Earliest Likely Implementation Date |
|--|---|--|---|--|
| LEZ covering the GLA area introduced via a Scheme Order (the Proposed LEZ) | 132 – 127 | 195 – 270 | 130 – 180 | Early 2008 |
| LEZ covering the GLA area introduced via a TRO | 125 – 130 | 205 – 280 | 135 – 175 | Mid 2008 |
| Including an emission element in the congestion charge introduced by a variation to the existing Scheme Order (including Western extension) | 25 – 30 | 20 – 30 | 5 – 10 | Autumn 2007 |
| A LEZ covering the TLRN only using a TRO | 120 – 125 | 185 – 230 | 115 – 150 | Late 2007 |

NB this table reflects the scheme as consulted on and is not updated to reflect the scheme revised scheme following consultation. It is presented here for purposes of comparison.

Revenues

4G.194 The proposed LEZ is not designed to be a revenue generating scheme
 4C.69 and the revenues would not offset the costs of implementing and operating the scheme. Air quality improvements would be maximised by high levels of operator compliance. There would, however, be some revenues from the LEZ through charge and penalty charge payments. Revenues are expected of between £30 million and £50 million during the life of the scheme, from 2008 to 2015, and these would contribute towards the operating costs of the scheme.

Impacts monitoring

4G.195 The LEZ would have a range of broader impacts on London society and
4C.70 the economy, which would be assessed as the proposals are developed.

4G.196 Should the proposed LEZ be agreed, it would be supported by a
4C.71 programme of impacts monitoring to understand the impacts of the various stages of the scheme. This programme would commence in mid-2006 with the collection of data representing pre-LEZ conditions, against which data collected after implementation could be compared. There would be a programme of reporting throughout the life of the scheme.

4G.197 The key element of the monitoring strategy is measuring change in
4C.72 profiles of emission standards for vehicles within the scope of the LEZ scheme. This would then feed into complementary assessments designed to quantify air quality benefits. The monitoring would focus on identifying and quantifying change in vehicle numbers and type and fleet composition, for example, changes in the “Euro” profile of vehicles entering London. This would then provide data to assess the actual impact of the proposed LEZ on the environment, health and potentially other economic impacts. The impacts monitoring would also include the potentially significant impacts of the LEZ outside of Greater London, which would arise from the use of cleaner vehicles as they travel throughout the rest of the UK.

When would the scheme be introduced?

4G.198 If a decision is made to implement the proposed LEZ, this would be
4C.73 done by an Order. The earliest consultation with stakeholders and the public on an Order could take place is late 2006. Depending on the outcome of consultation, the earliest an Order could be confirmed would be spring 2007 and the earliest a LEZ could be operational would be early 2008. The actual implementation date would depend therefore on a number of issues, including the outcome of the consultation and the potential impacts of the proposed LEZ.

Proposal 4G.27 and 10: The Greater London area should be designated a Low Emission Zone (LEZ). The proposed LEZ would target the most individually polluting vehicles (HGVs, coaches, buses, heavier LGVs and minibuses). By so doing it would accelerate the introduction of cleaner vehicles and reduce the numbers of more polluting vehicles driving within the Greater London area. The LEZ would be implemented from early 2008; it would require certain heavy duty vehicles (HGVs, buses and coaches) to meet a proposed emission standard of Euro III for PM₁₀, which would change in 2012 to Euro IV for PM₁₀. Should the European Commission set a new standard covering ultra-fine particles or PM_{2.5} TfL will consider including such a standard within the LEZ. Appropriate standards to address emissions from heavier LGVs and minibuses would also be set to take effect from 2010.

Proposal 4G.28 and 11: Transport for London will consider further the environmental, health, economic and other impacts of the proposed LEZ when considering whether to make an order. The outcome of these investigations and other factors, including consultation results, will also be taken into account by the Mayor in deciding whether or not to confirm an order.

Proposal 4G.29 and 12: Transport for London will continue to investigate further the options for the proposed LEZ, including the additional option of Euro IV for NO_x and the range of vehicles covered by the scheme.

Proposal 4G.30 and 13: Transport for London will monitor and assess the performance of any London Low Emission Zone that is established, to understand the range of impacts and to inform decision-making.

¹ The Mayor of London, Greater London Authority The Mayor's Air Quality Strategy: Progress Report to March 2005. Available at www.london.gov.uk.

² NO_x is the symbol for a generic group of chemicals called oxides of nitrogen, including both NO (nitric oxide) and NO₂ (nitrogen dioxide), though the emissions of NO₂ emitted in this direct way is small. NO_x is also produced by high temperature combustion processes. Tailpipe emissions include NO (nitric oxide) and NO₂. NO₂ is also formed from the reaction of NO with ozone. This reaction is thought to be responsible for the majority of NO₂ originating in London.

³ These predictions are based on the London Atmospheric Emissions Inventory, an annually updated database of emissions sources. The emissions from these sources for 2005 were estimated using traffic flow and speed data, industrial emissions, and estimates of domestic and other common small sources of emissions.

⁴ There are nine pollutants for which AQS objectives are set with the aim of protecting human health, of which seven are managed at local level. They are benzene, "1,3-butadiene", carbon monoxide, lead, nitrogen dioxide, ozone, PM₁₀ and sulphur dioxide. In addition, there are objectives set for two pollutants for the protection of vegetation and eco-systems (nitrogen oxides and sulphur dioxide). PAH (polycyclic aromatic hydrocarbons) have also been recently included (2003) for regulation through the AQS. Ozone and PAH are not set as a statutory requirement at the local level as they are considered trans-boundary pollutants beyond the effective control of local authorities.

⁵ Data for 2005 indicates that levels of PM₁₀ and NO₂, when averaged over the entire year, exceeded the PM₁₀ and NO₂ annual objectives in many parts of London. The annual objective for PM₁₀ failed to be met at one national network site, London Marylebone Road; the annual objective for NO₂ failed to be met at 17 sites. These do not include the Borough network of sites. The daily mean objective for PM₁₀ allows for the limit of 50 µg/m³ to be exceeded up to 35 times per year before the objective is breached. Provisional monitoring data indicates that at several sites pollution levels rose above 50 µg/m³ on more than 35 days. The PM₁₀ objectives were required to be achieved from 31 December 2004. Exceedances of these standards in 2005, by ratified data, would cause a legal breach of the EU directives and UK regulations.

⁶ The proposed directive leaves unchanged the limit values for PM₁₀ which became binding on the UK in 2005, and which London is expected to have exceeded. It would, however, set a new standard for PM_{2.5} to be met by 2010. PM_{2.5} are ultra-fine particles that are thought to have particularly damaging impacts on respiratory and cardiovascular health. The proposed LEZ would assist London to meet the limit values for 2010, and would also assist in meeting any new limits introduced for PM_{2.5}. Road transport is estimated to be the largest source of PM_{2.5} in London. Should the European Commission set a new

standard covering ultra-fine particles or PM_{2.5} TfL will consider including such a standard within the LEZ.

⁷ The GLA group are the Greater London Authority, the London Development Agency, Transport for London, the Metropolitan Police Authority and the London Fire & Emergency Planning Authority.

⁸ The European Union sets “Euro standards” for vehicle emissions that all new vehicles must comply with from a set date – Euro IV will become mandatory for new HGVs, coaches and buses from October 2006 and for manufacturers of heavier LGVs and minibuses from January 2007. Euro III became mandatory from October 2001 for HGVs buses and coaches and from January 2002 for heavier LGVs and minibuses.

⁹ AEA Technology The London Low Emission Zone Feasibility Study, July 2003. The full final report and annexes are available at <http://www.tfl.gov.uk/tfl/low-emission-zone/>.

¹⁰ Deloitte London Low Emission Zone – Strategic Review of Feasibility Options, February 2005, available at: <http://www.tfl.gov.uk/tfl/low-emission-zone/>

¹¹ See the Chancellor of the Exchequer’s Pre-Budget report, December 2005, setting out his support for continuation of the Reduced Pollution Certification (RPC). See Box 61 to 62
http://www.hm-treasury.gov.uk/media/FA6/45/pbr05_chapter7_173.pdf

¹² There would be a small number of these vehicles, and most are unlikely to visit London, for example, Island Goods Vehicles. These are not DVLA tested and operate on some small outer UK islands.

¹³ The differences in the methodologies are explained more fully in the supplementary information. The Defra methodology for estimating health benefits is more “conservative” and is consistent with the guidance given by the UK Department of Health’s Committee on the Medical Effects of Air Pollutants (COMEAP). This method captures only the serious health impacts of air pollution, for example, premature deaths and respiratory hospital admissions. The EU methodology takes into account a wider range of health effects, for example, restricted activity days and respiratory symptoms and the costs of medicine.