

# The London Borough of Hillingdon



**Appendices**

**Approved by Cabinet, June 2004**



## Appendix 1: Action Plan Appraisal Checklist

The following checklist is published by DEFRA on the air quality management website. It has been completed here as a check that the plan has taken account of the many issues required by DEFRA and to guide reviewers.

	Reference Location	Comments
<b>1. Local Authority Information</b>	Inside front cover	
<b>2. Process Adherence to Guidelines and Consideration of Policies</b>		
Have Statutory Consultees been consulted:		
Secretary of State		In progress
Environment Agency	Appendix 3	
Highways Agency	Appendix 3	
Transport for London	Appendix 3	
Contiguous Authorities	Appendix 3	
Have other local authority departments been consulted		
Transport	Appendix 3	
Planning	Appendix 3	
Education	Appendix 3	
Have other relevant consultees been consulted		
Public Authorities	Appendix 3	
Business Interests	Appendix 3	
Members of the public	Appendix 3	
Others....	Appendix 3	
Has a statement of the problem causing the AQMA, as identified in the Stage 4, been clearly stated?	Section 1.4 to 1.7	
Have the principal sources of the pollutants causing the exceedence been identified?	Section 1.7	
Have other local authority plans/policies been considered?	Sections 2.4, 2.5, 2.7, Appendix 5	
Has an options timescale been included	Section 4	Timescales are defined as short, medium or long. Further work on this issue needs to be done during implementation
Have costs of options/plan been set out	Section 4	More information in database
Have impacts been assessed	Section 4	More information in database

For each general pollutant source, a number of measures have been identified by DEFRA. The list provided is not intended to be exhaustive and local authorities are instructed to include additional measures that they may have considered.

	Reference Location	Comments
<b>3. Process – Checklist of Measures</b>		
Evidence to support the local authorities' selection or rejection of each considered measure will be sought by identifying the following issues:		
Have options been considered?	Section 4	
How many options have been considered?	Section 4	The total number of measures considered exceeds 200
Have transport impacts been assessed?	Section 3.3.3 and database	
Have air quality impacts been assessed – Were these modelled or measured?	Section 4, Appendix 6, database	Modelled
Have socio-economic impacts been assessed?	See database	
Have other environmental impacts been assessed (noise, odour etc..)?	Section 3.3.3 and database	
Have costs been assessed?	Section 4, database	

Each set of measures listed in the DEFRA checklist is now mapped to the package of measures identified in Chapter 4. The Hillingdon Plan contains a number of measures beyond those listed here.

<b>Road Transport Measures</b>		
Physical traffic management: speed & flow	Package 2	
Re-routing and road hierarchy	Packages 1, 2	
Access control & clear zones	Package 2	
Low emission zones	Packages 3, 4	
Road user charging	Packages 3, 4	
Parking management & charging	Packages 3, 4	
UTMC Systems	Package 2	
Infrastructure development	Packages 1, 2, 4	
Reallocated road space	Package 1	
Public transport initiatives – Bus	Package 1	
Public transport initiatives – Rail	Package 1	
Public transport initiatives – other	Package 1	
Development of cycling and walking	Package 1	
Partnerships & travel plans (workplace & school)	Package 1	
Promotion, education & awareness raising	Packages 1, 3	
Fleet management & clean fuels	Package 3	
Land use planning	Packages 6, 7	
Freight measures	Packages 2, 3, 4	
Roadside emissions testing	Package 3	
Compulsory purchase		Rejected
<b>Other Transport Measures</b>		
Passenger rail	Packages 1 to 4	

Freight rail	Packages 1 to 3	
Maritime and ports		Not relevant
Inland waterways		Not relevant
Other..		
<b>Industrial Measures</b>		
Local abatement	Package 5	
Emission reduction	Package 5	
Closure		Rejected
Relocation		Rejected
Other..	Package 5	
<b>Domestic Measures</b>		
Energy conservation	Package 6	
Fuel improvement	Package 6	
Fuel switch	Package 6	
Appliance improvement	Package 6	
Smoke control		Statutory duty of the Council already, but not a priority for this plan
Nuisance policy (bonfires etc.)	Package 5	
<b>Airport Measures – Airside Activity</b>		BAA was required to produce an action plan for air pollution under the terms of the T5 enquiry.
Aircraft on stand	Package 4	
Aircraft ground movements	Package 4	
AC take-off / landing	Package 4	
Aircraft composition	Package 4	
Airside vehicles	Package 4	
Point source Emissions	Package 4	
Airport Measures – Surface Access	Package 4	
<b>4. Appropriateness and Proportionality</b>		
Do measures seem appropriate to the problem. Has the right balance been struck?		We have sought to balance the measures across all sources, not just Heathrow Airport and the major roads
How have measures been assessed?	Section 3, Appendix 6, Database	
Are the measures likely to achieve the stated goal? This may be the adoption of a new AQ measure or a tightening of an existing measure.		It will be extremely difficult to meet the target. A precise response is not possible because of uncertainty relative to developments of the major transport links in the AQMA, including Heathrow.
Have the wider impacts been appraised appropriately?	Section 3, database	
Was the method of assessing costs appropriate?	Section 3, database	
Is it likely for LAQM objectives to be met? How will success be measured? What impact will wider initiatives/policies have on the measures?		It will be extremely difficult to meet the target. A precise response is not

		possible because of uncertainty relative to developments of the major transport links in the AQMA, including Heathrow.
Is it likely for Directive values to be met? How will success be measured? What impact will wider initiatives/policies have on the measures?		It will be extremely difficult to meet the target. A precise response is not possible because of uncertainty relative to developments of the major transport links in the AQMA, including Heathrow.
Do the chosen measures comply with wider Government Policies?	Sections 2, 3, Appendices 4, 5	Measures are in accordance with other national, London-wide and local policies

	Reference Location	Comments
<b>5. Implementation</b>		
Are measures realistic in light of the objective deadline(s)?		It will be extremely difficult to meet the standards around Heathrow, particularly if further development of the airport is permitted. It is very unlikely that all of the measures identified will be in place before the EU compliance deadline of 2010.
Have responsibilities been assigned to the relevant party? Does the assigned party have the necessary powers?	Sections 4, 5	Preliminary allocation of responsibility
Has financing been secured and who will pay. Is this realistic?	Section 5	Financing is secure for some options but not others.

## Appendix 2: The UK's Air Quality Strategy and EU Directives

Ambient air quality standards for the protection of human health under UK and European Union (EU) legislation are shown in Table A2.1 and Table A2.2 respectively. These are the maximum permitted concentrations of various pollutants in locations outside the workplace where people are likely to be exposed for a significant amount of time.

In some cases the UK's air quality strategy seeks early implementation of the EU's limit values, reflecting the belief that standards can and should be achieved more quickly in the interests of protecting public health. The UK's standard of  $40\mu\text{g}/\text{m}^3$  for  $\text{NO}_2$  to be met as an annual mean concentration by 31st December 2005 is described as a provisional target. The same figure is adopted in the EU Directive, though the compliance date is set back to 2010, and the EU standard is final, not provisional.

The UK air quality strategy is periodically reviewed to ensure that the standards it sets are achievable, and maintain a reasonable level of protection of human health taking into account the latest research. EU legislation is currently under review through the CAFE (Clean Air For Europe) Programme of EC DG Environment.

Reference is made in the tables to a number of permitted exceedences of several of the standards in any year. This reflects the fact that periodic events (climate, bonfire night, etc.) make it unlikely that the standards given could be met at all times. By permitting a maximum number of exceedences, a higher level of overall protection is provided for public health than would be given if the standards were raised to a level that could reasonably be met at all times.

DEFRA announced in August 2002 that they will set new UK targets for  $\text{PM}_{10}$  for 2010. Table A2.1 shows the targets that apply to London. The targets outside London are set lower, permitting 7 exceedences each year of the 24 hour mean rather than 10, and setting the annual mean target to  $20\mu\text{g}/\text{m}^3$  rather than  $23\mu\text{g}/\text{m}^3$ . These limits recognise that it will be more difficult to reduce pollutant levels in London than elsewhere in England, partly because of the size of the conurbation and the amount of traffic that it attracts, and partly through the proximity of the south-east of England to emission sources in the rest of Europe.

Further information on the standards is available at the DEFRA and EC websites, addresses for which are given in Section 7 of the plan.

**Table A2.1 - UK air quality standards for the protection of human health**

Pollutant	Objective	Measured as	To be achieved by
Benzene	16.25 $\mu\text{g}/\text{m}^3$ (5 ppb)	Running Annual Mean	31-Dec-2003
	5 $\mu\text{g}/\text{m}^3$ (1.5 ppb)	Running Annual Mean	31-Dec-2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$ (1 ppb)	Running Annual Mean	31-Dec-2003
Carbon monoxide (CO)	10 $\text{mg}/\text{m}^3$ (8.5 ppm)	Running 8 Hour Mean	31-Dec-2003
Lead (Pb)	0.5 $\mu\text{g}/\text{m}^3$	Annual Mean	31-Dec-2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual Mean	31-Dec-2008
Nitrogen dioxide (NO <sub>2</sub> )	200 $\mu\text{g}/\text{m}^3$ (105 ppb) Up to 18 exceedences / year	1 Hour Mean	31-Dec-2005
	40 $\mu\text{g}/\text{m}^3$ (21 ppb)	Annual Mean	31-Dec-2005
Ozone (O <sub>3</sub> )	100 $\mu\text{g}/\text{m}^3$ Up to 10 exceedences of running 8 hour mean / year	Running 8 hour Mean	31-Dec-2005
PAHs	0.25 $\text{ng}/\text{m}^3$	Annual mean	31-Dec-2010
Particles (PM <sub>10</sub> )	50 $\mu\text{g}/\text{m}^3$ Up to 35 exceedences / year	24 Hour Mean	31-Dec-2004
	40 $\mu\text{g}/\text{m}^3$	Annual Mean	31-Dec-2004
Particles (PM <sub>10</sub> )	50 $\mu\text{g}/\text{m}^3$ Up to 10 exceedences / year	24 Hour Mean	31-Dec-2010
	23 $\mu\text{g}/\text{m}^3$	Annual Mean	31-Dec-2010
Sulphur dioxide (SO <sub>2</sub> )	266 $\mu\text{g}/\text{m}^3$ (100 ppb) Up to 35 exceedences / year	15 Minute Mean	31-Dec-2005
	350 $\mu\text{g}/\text{m}^3$ (132 ppb) Up to 24 exceedences / year	1 Hour Mean	31-Dec-2004
	125 $\mu\text{g}/\text{m}^3$ (47 ppb) Up to 3 exceedences / year	24 Hour Mean	31-Dec-2004

**Table A2.2 - EU air quality standards for the protection of human health**

Pollutant	Objective	Measured as	To be achieved by
Benzene	5 µg/m <sup>3</sup> (1.66 ppb)	Annual Mean	2010
1,3-Butadiene	No EU standard		
Carbon monoxide (CO)	10 mg/m <sup>3</sup> (8.5 ppm)	Running 8 Hour Mean	2005
Lead (Pb)	0.5 µg/m <sup>3</sup>	Annual Mean	2005
Nitrogen dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> (105 ppb) Up to 18 exceedences / year	1 Hour Mean	1-Jan-2010
	40 µg/m <sup>3</sup> (21 ppb)	Annual Mean	1-Jan-2010
Ozone (O <sub>3</sub> )	120 µg/m <sup>3</sup> (60 ppb) Up to 25 exceedences / year averaged over 3 years	Maximum daily 8 Hour Mean	2010
Particles (PM <sub>10</sub> )	50 µg/m <sup>3</sup> Up to 35 exceedences / year	24 Hour Mean	1-Jan-2005
	40 µg/m <sup>3</sup>	Annual Mean	1-Jan-2005
Indicative PM <sub>10</sub> levels for 2010	50 µg/m <sup>3</sup> Up to 10 exceedences / year	24 Hour Mean	1-Jan-2010
	20 µg/m <sup>3</sup>	Annual Mean	1-Jan-2010
Sulphur dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> (132 ppb) Up to 24 exceedences / year	1 Hour Mean	1-Jan-2005
	125 µg/m <sup>3</sup> (47 ppb) Up to 3 exceedences / year	24 Hour Mean	1-Jan-2005

## Appendix 3: Consultation

This appendix lists the stakeholders who have so far engaged in the development of the plan and meetings held specifically in relation to the development of the air quality action plan.

**Table A3.1. List of stakeholders consulted during the development of the action plan.**

Stakeholder	Attended meetings	Provided written comments
BAA Heathrow	✓	✓
British Airways	✓	
Cranford Cross Residents Association	✓	
DEFRA	✓	
Department for Transport	✓	
Energy Savings Trust	✓	
Environment Agency	✓	✓
First London Buses	✓	
First Centrewest	✓	
Friends of the Earth West London	✓	
GLA – Air Quality	✓	
Harlington Residents Association	✓	✓
Harlington Village Association	✓	✓
Harmondsworth and Sipson Residents Association	✓	✓
Highways Agency	✓	✓
Hillingdon Borough Council (transport, planning, etc.)	✓	✓
Hillingdon Chamber of Commerce	✓	
Hillingdon Primary Care Trust	✓	
Kings College London	✓	
London Borough of Hounslow	✓	
Nestle UK	✓	✓
Safeways Ltd	✓	✓
Slough Borough Council	✓	✓
South Bucks District Council	✓	
Spelthorne Borough Council	✓	✓
Strategic Rail Authority	✓	
Transport for London	✓	
West London Business (represented by Robert Huggins Associates)	✓	

**Table A3.2. Meetings and other publicity events arranged around development of the air quality action plan**

HACAN Clear Skies re: AQMA and need for action plan
BAA Heathrow Internal Environment Panel re: AQMA and need for action plan
Heathrow Area Consultative Committee, subgroup for environmental issues re: AQMA and need for action plan
Hillingdon Health Authority re: AQMA and need for action plan
Publicity around the designation of the AQMA and need for the action plan in the local press and in libraries
Representatives of Hillingdon and neighbouring councils, June 2002
Local businesses, July 2002
5 Villages Forum, July 2002
Highways Agency, July 2002
Residents meeting at Nestle Hayes Factory, July 2002
External stakeholders meeting, 5/3/2004
London Borough of Hillingdon Council Departments: Internal stakeholders meeting, 17/5/2004

As noted in the main text (Section 3.3.1), further opportunities have been taken to include relevant comments from:

- The LA21 consultation
- Community Plan conferences
- Residents' group meetings where air quality has been discussed
- The Borough Transport Conference.

## **Appendix 4: Pollution Sources Outside the Control of the London Borough of Hillingdon**

Hillingdon will need to work in partnership with a wide range of stakeholders in order to secure reductions in emissions from sources outside its direct control. Where there are not forums already in existence through which to achieve this aim, Hillingdon will strive to form them as part of the Action Plan.

### **A4.1 Heathrow**

#### **A4.1.1 General**

Heathrow is owned and operated by BAA Heathrow, a subsidiary company of BAA plc. The company provide facilities for over 450 organisations and companies. It is the largest airport in the UK and in 2000 served 64 million passengers and handled 1.3 million tonnes of air freight. The generation of a large number of flights brings with it corresponding volumes of surface traffic. Heathrow is situated in close proximity to residential areas and air pollution levels around Heathrow are predicted to exceed national air quality objectives in 2005 (see Section 1 of the main body of this plan). Problems are forecast in the SERAS report even as far ahead as 2015. Airport policy is determined at national and international levels leaving Hillingdon with little direct influence to control pollutant emissions.

#### **A4.1.2 BAA Heathrow Air Quality Action Plan**

As part of the conditions of the approval for the building of a 5<sup>th</sup> Terminal at Heathrow, BAA Heathrow was required to produce an action plan aimed at reducing emissions to air. This action plan was submitted to Hillingdon and neighbouring authorities in 2002. The plan focuses on reducing emissions over six key areas namely aircraft operations management, airside vehicle fleet management, better understanding of airport emissions and their impacts, surface access, land use planning, emissions from fixed point sources and construction.

As part of the T5 approval BAA are required to keep this action plan under review and to submit the results of the review to the London Boroughs of Hillingdon and Hounslow.

#### **A4.1.3 Terminal 5 (T5)**

Approval for construction of Terminal 5 at Heathrow was granted in 2001, and is scheduled for completion by 2008. This will bring about a major increase in the size of the airport, with passenger numbers forecast to rise from 64 million to 89 million and aircraft movements from 460,000 to 480,000 each year (levels are capped under planning conditions for the site). The inspector at the public inquiry into Terminal 5 accepted that it would have a significant impact on the environment and suggested a package of measures that should be adopted in mitigation. Planning conditions imposed following the T5 public inquiry include:

- Undertake an air quality action plan within one year of consent being given;
- Agree an air traffic movement limit of 480,000 movements per year;
- Extend the Heathrow Express and Piccadilly Line before T5 opens;
- Make provision for further rail services linking Heathrow directly to main line rail services;
- Agree a cap on total and work-related car parking of 42,000 and 17,500 spaces respectively;
- Agree conditions to reduce the impact of construction;
- Reduce the need for airside generators; and
- No widening of the M4, as had been requested.

To improve public transport links, the Secretary of State for Transport has approved extensions of the Heathrow Express (linking existing terminals to Paddington) and the Piccadilly line into Terminal 5. However, there is currently no approval to link Heathrow directly by rail to stations to the west. Following the decision to approve the construction of the new Terminal 5 (T5) at Heathrow, it is currently difficult to envisage how or when the air quality exceedences around Heathrow may be eliminated.

#### **A4.1.4 Aviation White Paper**

In this White Paper the Government recognised that air travel is likely to continue to grow rapidly in future and that, for a variety of important reasons, this growth and its impact needs to be managed.

Major airports, particularly in the London region, are already operating at or close to capacity, and it is feared that failure to allow for increased capacity could have serious economic consequences, both at national and at regional level. However, it is recognized that simply building more capacity to meet demand is not a sustainable way forward and growth must be balanced by the need to have regard to the environmental consequences of air travel. Therefore, the Government has sought to set out a balanced approach providing a strategic framework for the development of air travel in the UK for the next 30 years.

This approach is intended to:

- Recognise the importance of air travel to national and regional prosperity;
- Reflect people's desire to travel further and more often by air, and to take advantage of the affordability of air travel and the opportunities this brings;
- Reduce and minimise the impacts of airports on those who live nearby, and on the natural environment;
- Ensure that, over time, aviation pays the external costs its activities impose on society at large – in other words, that the price of air travel reflects its environmental and social impacts;
- Minimise the need for airport development in new locations by making best use of existing capacity where possible;
- Respect the rights and interests of those affected by airport development;
- Provide greater certainty for all concerned in the planning of future airport capacity.

The Government notes that aircraft engines and traffic on local roads and the airport surface contribute emissions and to pollution close to airports. The most significant pollutants in this case are nitrogen dioxide (NO<sub>2</sub>) and particulates (PM<sub>10</sub>). Nationally the contribution of air transport sector to these impacts is small, but locally their effect can be very significant. The Government believes more needs to be done to reduce and mitigate the impacts of air transport and airport development.

At the European and global levels, the Government will press for new solutions and stronger action by international bodies.

For local impacts, the White Paper prescribes a range of measures to be applied. These include new legislation and economic instruments as well as improved technology and stringent planning conditions attached to airport development. ***“The Government’s under-pinning objectives are to limit and, where possible, reduce noise impacts over time, to ensure air quality and other environmental standards are met, and to minimise other local environmental impacts.”***

#### **The White Paper’s significance in LB Hillingdon**

Not surprisingly, the Government has concluded that a strategy to future air transport provision is required in South-East England. The following list identifies those points of particular relevance to Heathrow Airport.

- The first priority is to make best use of the existing runways and capacity but there is an urgent need for additional runway capacity in the South East, which could be met by two new runways by 2030.
- *“The further development of Heathrow is supported, including a further new runway and additional terminal capacity to be delivered as soon as possible (within the 2015-2020 period) after a new runway at Stansted Airport, but only if stringent environmental limits can be met. An urgent programme of work and consultation will be started to examine this issue further and to consider how best use can be made of the existing airport.”*

**Regardless of this conclusion the London Borough of Hillingdon will continue to pursue a policy of strong opposition to additional terminal and runway capacity at Heathrow Airport.**

The Paper does not authorise or preclude particular developments but does indicate the Government’s view on how future planning applications may be decided.

Focusing closely on the local impacts of airport activities the Government requires that aviation and airport development at Heathrow are managed so that:

- *“Noise impacts are limited, and where possible reduced over time;*

- *Local air quality is maintained within legal limits across all relevant pollutants in order to protect human health and the wider environment;*
- *Loss of landscape and built heritage is avoided wherever possible, and otherwise minimised and mitigated to the greatest extent possible;*
- *All relevant water quality and other mandatory environmental standards are met;*
- *Surface access to airports is designed to help limit local environmental impacts*
- *Impacts on biodiversity, such as disturbance of habitats and species, are minimised.”*

As the documentation supporting Hillingdon’s Action Plan demonstrates, there are widespread exceedences of the annual mean air quality objective for NO<sub>2</sub> at residences all around the airport. In addition, Government evidence suggests that achieving this objective at all locations in the Borough even by the 2015-2020 period will be extremely challenging.

The Government suggests that all of the following actions will be required:

- *“Applying increasingly stringent technical standards to limit emissions and noise at source;*
- *Encouraging airport operators, airlines and air traffic managers to adopt the cleanest and quietest operational practices;*
- *Withdrawal of the noisiest and dirtiest aircraft, replacing them with aircraft capable of better environmental performance;*
- *Using economic incentives to encourage noise and emissions reductions, and the use of best available technology;*
- *Working with industry and universities to research, develop and introduce cleaner and quieter technology; and*
- *Using land-use planning and management measures at and around airports, including avoiding new housing development in areas exposed to high levels of noise.”*

The Government has reviewed existing appraisals of the environmental impact of Heathrow Airport and has studied in greater detail the scale of actions needed to reduce emissions from aviation as well as from other principal sources (i.e. road traffic). A companion document to the White Paper presented the results (**Air Quality Assessments Supporting the Government’s White Paper “The Future of Air Transport”, DfT, December 2003.**) This sets out in detail the Government’s assumptions regarding airport and traffic activity and technology in the 2015-2020 period. Clearly there are significant uncertainties in predictions made this far ahead. Nevertheless, results indicate how far emissions will need to be reduced from current levels.

The following table illustrates the predicted number of people still experiencing NO<sub>2</sub> levels above 40µg/m<sup>3</sup> in 2015 based on a range of actions taken.

Main actions taken	No. of people exposed to >40µg/m <sup>3</sup>
<ul style="list-style-type: none"> <li>• Baseline activity and emission factors updated</li> <li>• 20% reduction in airport-related landside vehicle emissions</li> <li>• 30% reduction in aircraft average holding time</li> <li>• Air transport movements at 655,000 per year</li> <li>• 3<sup>rd</sup> short runway to the north</li> <li>• Aircraft NOx emissions improved 31% from best current levels by introduction of a emissions-based landing charge.</li> </ul>	11,122
<ul style="list-style-type: none"> <li>• All of the above plus,</li> <li>• Displaced landing roll plan for certain classes of aircraft</li> <li>• Emissions-optimised speed limits on the M4 and M4 spur.</li> </ul>	9,425
<ul style="list-style-type: none"> <li>• All of the above plus,</li> <li>• Aircraft NOx emissions improved by a total of 34% from best current levels (i.e. an additional 3%) through the emissions-based landing charge</li> <li>• 50% reduction in airside emissions</li> <li>• 23% reduction in employee-related vehicle trips to LHR</li> <li>• 29% reduction in airport-related passenger trips from a £20 access charge</li> <li>• No growth in non-airport related traffic on the M4 and M4 spur over current levels</li> </ul>	6,584
<ul style="list-style-type: none"> <li>• All of the above plus,</li> <li>• Reallocate all westerly departures from northern runway to southern runway, all westerly arrivals on the northern runway (all easterlies unchanged, respecting the Cranford Agreement)</li> <li>• Air transport movements of 550,000 per year and road traffic scaled down</li> </ul>	2,272
<ul style="list-style-type: none"> <li>• All of the above plus,</li> <li>• Introduction of displaced start of take-off roll on southern runway.</li> </ul>	1,689
<ul style="list-style-type: none"> <li>• All of the above (except displaced start of take-off roll) plus,</li> <li>• Zero emissions for M4 between M25 (J4A) and Cranford (J3) (M4 and the spur placed in tunnel, with vent stacks which have scrubbers which are 100% effective at removing NOx)</li> <li>• All emissions for the M4 spur (right into CTA) turned off (see above)</li> <li>• Displaced start of take-off roll for all southern runway westerly departures (Assumes southern runway extended by 1km to west but retain easterly departures on the southerly runway at the existing start of roll point.)</li> </ul>	16

There is no current commitment to the actions identified in the table, but they do demonstrate that to get close to achieving the air quality objective around the airport (including a 3<sup>rd</sup> runway) by 2015 would be challenging, requiring:

- Upgrades to the aircraft and airside fleet and their take-off and landing practices with air transport movements held at 550,000 per year.
- Reductions in road transport movements in and around the airport with passenger movements subject to a £20 access charge.
- New road infrastructure to place key sections of the M4 and airport spur in tunnels and air treated with scrubbers.

The Government notes that “*even with full implementation of this package of tough measures, and making aggressive assumptions about future developments in aircraft and motor vehicle technology, the evidence of our further work suggests that substantial areas around Heathrow, containing the homes of many hundreds or thousands of people, would be subject to exceedences of the mandatory air quality limit value. Such exceedences would not be acceptable, and would be against the law. However, our overall assessment is that, within the 2015–2020 timescale, there would be a substantially better prospect of avoiding exceedences, in particular because it would allow more time to develop improved technologies, for both aircraft and road vehicles, to tighten standards, and to achieve widespread use of the improved technologies in road and aircraft fleets.*”

Consequently the Government has, together with the airport operator and relevant bodies and agencies, started a programme to consider how existing capacity at Heathrow combined with the addition of a third runway can be developed in an environmentally and socially sustainable manner.

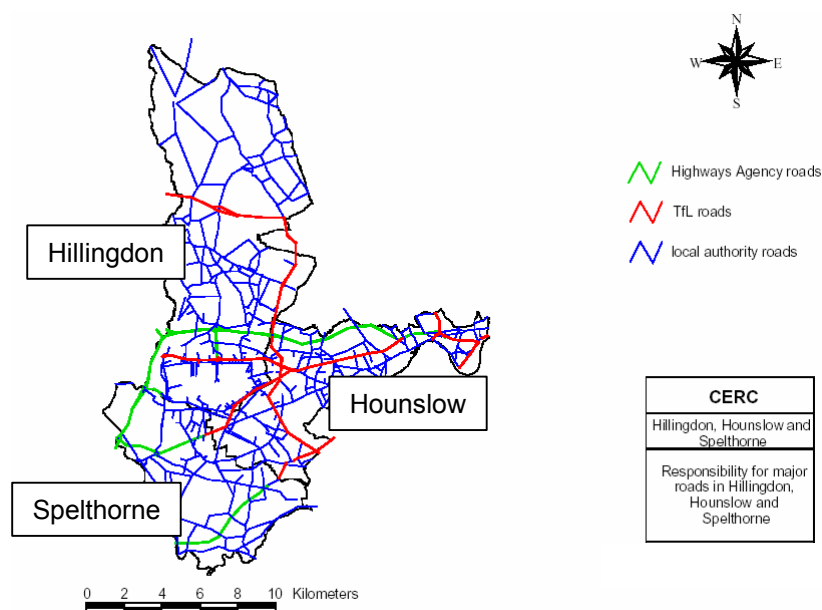
The results also demonstrate the options for improving air quality that are at the disposal of the UK Government and BAA as the operator of Heathrow airport. They will need to implement some of these options, or ones of similar scale, to achieve compliance with the current air quality objectives in Hillingdon regardless of whether a 3<sup>rd</sup> runway is developed or not.

#### **A4.1.5 BAA’s New Modelling Work**

BAA plc, in their consultation response, undertook new modelling work with regard to the proposal for a third runway at Heathrow. This new work suggests fewer residents would be exposed to levels above the European Union limit than the original DfT SERAS estimation. Hillingdon’s response to the SERAS consultation (the precursor to the White Paper), including the new BAA modelling work, can be viewed on the Hillingdon web-site. It is stated in Hillingdon’s response that the only conclusion that the Government can draw from the evidence provided by the BAA SERAS Response is that even under an optimistic emissions reduction scenario (which may be neither realistic or achievable), a new runway at Heathrow would lead to exposure of the population to levels of nitrogen dioxide above the European Union Directive limit. It follows that if a third runway at Heathrow would prevent compliance with the air quality legislation, as BAA’s own modelling shows would be the case, the Government should not contemplate proceeding with a third runway at the airport.

## **A4.2 Roads in the Borough**

Roads in the Borough are the responsibility of the Highways Agency, Transport for London and the Borough Council, as shown in Figure A4.2. Each of these bodies has specific objectives, some of which will conflict with those set nationally for air quality. Through this plan it has therefore been essential to establish an appropriate basis for factoring air quality into wider decision making.



**Figure A4.2. Control of major roads in and around Hillingdon's AQMA**

Recognising the importance of through-traffic in the Borough, Hillingdon will need to ensure it is fully involved in discussions around any implementation measures that may arise from:

- TVMMS (the Thames Valley Multi-Modal Study)
- M4 Route Management Study
- M25 Widening and other schemes
- Congestion Charging
- Possible extension of Central London Congestion Charging to Heathrow
- London Low Emission Zone Study (Hillingdon has played an active role on the steering group for this work).

### **A4.3 Emissions from Major Industrial Facilities**

Industry is regulated partly by the Environment Agency and partly by local authorities, with the Agency responsible for larger and more complex plant. Legislation of the past 20 years, such as the recent EU Directives on IPPC (Integrated Pollution Prevention and Control) and waste incineration, combined with trends such as the move away from traditional fuels (coal and oil) to natural gas, has led to a major decline in the importance of industry as a pollution source.

However, these industries can have significant effects on air quality by generating local pollution in the immediate vicinity of a plant and through raising background levels of pollution. Hillingdon can, via the planning

process, ask for conditions more stringent than those that would typically be defined as Best Available Techniques (BAT) under IPPC if a plant is operating in or close to “sensitive” areas.

Hillingdon, the Environment Agency and the businesses concerned should continue to work in partnership to ensure effective communication of information on development and performance on the major industrial sites. Councils in the area may wish to take the lead in facilitating stakeholder engagement where there is a significant level of concern about any operation or proposal.

#### **A4.4 Background Concentrations**

The atmosphere in Hillingdon includes pollutants generated from other places in London and the UK, and indeed, the rest of Europe, in addition to locally generated pollutants. Overall, the source apportionment study carried out for Hillingdon estimated that these background contributions comprise between 10% and 24% of the NO<sub>x</sub> concentrations across the Borough. As in the other cases listed in this Appendix, the Borough Council does not have control over these emissions.

## **Appendix 5: Local and Regional Plans Considered in Development of the Air Quality Action Plan**

### **A5.1 The London Plan: Spatial Development Strategy for Greater London**

The particularly severe air quality problems experienced in London compared to other UK cities are largely due to the unique concentration of population and activity in the city. The population of London is predicted to continue to rise rapidly over the next 10-20 years and hence strategic plans must be made to avoid this intensification causing further degradation in the environment.

The Mayor is responsible for strategic planning in London. His duties include producing a Spatial Development Strategy for London – called the London Plan – and keeping it under review. Among several other aims, the London Plan:

- Is the strategic plan setting out an integrated social, economic and environmental framework for the development of London to 2020 and beyond.
- Integrates the physical and geographic dimensions of the Mayor's other strategies, including broad locations for change and providing a framework for land use management and development, which is strongly linked to improvements in infrastructure, especially transport.

The London Plan is the main vehicle for strategic decision-making on London's development and will directly influence:

- Development decisions, for example, private sector proposals to develop new housing.
- Investment decisions with a spatial impact, for example, major land acquisitions.
- Other spatial policies formulated at sub-regional level, such as Sub-Regional Development Frameworks, or at local level, such as UDPs, which will be of primary importance in taking forward the London Plan policy at local level and which must be in general conformity with the London Plan.
- Decisions that regulate proposals for development control.

The Mayor will work with strategic partners to ensure that the spatial, transport and design policies of this plan support his Air Quality Strategy. The policies of that strategy are discussed elsewhere in this document.

The Mayor will work with sub-regional partnerships to develop a coherent Sub-Regional Development Framework for West London in which priorities will be further developed. As part of this process planning frameworks for Opportunity Areas (areas with good access such as Heathrow/ Feltham/ Bedfont Lakes and Hayes/ West Drayton/ Southall that are capable of accommodating substantial new jobs or homes through significant increases in density) will be prepared to build on frameworks already developed. These frameworks will set out a sustainable development programme for each

Opportunity Area, to be reflected in UDPs, so as to contribute to the overall strategy of the London Plan.

The London Plan lists a set of transport policies that should all contribute to the improvement of the London environment and to the sustainable development of London. The key policy areas are listed below. The plan includes objectives for each.

- Integrate transport and development.
- Match development to transport capacity.
- Develop sustainable transport in London.
- Provide sufficient land for transport functions through UDP policies.
- Improve and expand London's international, national and regional transport links.
- Develop a sustainable and balanced London area airport system.
- Increase the capacity, quality and integration of public transport to meet London's needs.
- Implement phased public transport improvements in line with development priorities.
- Develop new cross-London links within an enhanced London National Rail network.
- Improve underground and DLR services.
- Enhance bus priority, tram and bus transit schemes.
- Identify road scheme proposals that contribute to goals for a sustainable city and do not increase net traffic capacity of the corridor unless essential to regeneration.
- Tackle congestion and reduce traffic.
- UDPs to include policies that allocate street space in a way that reflects the Mayor's Transport Strategy and the London road hierarchy.
- Local area transport treatments.
- Improve the quality of bus services.
- Improve conditions for walking and cycling.
- Develop a parking strategy to ensure minimum necessary on-site car parking to encourage use of more sustainable non-car modes.
- Identify appropriate parking standards for town centres in UDP policies and transport Local Implementation Plans.
- Implement a sustainable freight transport strategy, encouraging modal shift. This to include the provision of strategic rail-based intermodal freight facilities.

Implementation would require action or support from the Mayor, Transport for London, the London Boroughs, Central Government, the Strategic Rail Authority and other partners.

These policies implemented via the Hillingdon UDP and other policy vehicles would aim at:

- Planned development capturing the benefits of economic generators within the sub-region for an expanded number of residents.
- Limiting or reducing trips made via non-sustainable transport modes.
- Improving choices, access and quality of public transport provision.

- Environmental improvement.

### **A5.2 UDP**

Hillingdon's UDP policies ensure that air quality is taken into account as a material consideration in new relevant developments. Air quality assessment of such cases is a requirement. Where increases in emissions are predicted, mitigation for air quality improvements is sought through Section 106 Agreements, or the development may be refused.

The Borough has issued Supplementary Planning Guidance on air quality.

### **A5.3 LA21**

Hillingdon's LA21 strategy provides the following vision statements:

It is a community where:

- Energy, waste and other natural resources are used more efficiently and with care;
- Waste is minimised then re-used through recycling, composting or energy recovery;
- The diversity of nature is valued and protected;
- Human health is protected through a safe, clean and pleasant environment;
- Access to skills and knowledge needed to play a full part in society is available to everyone;
- Access to facilities, services, goods and other people, in ways which make less use of the car and minimise impact on the environment, is available to everyone;
- Everyone is empowered to participate in decision making and consider the impact of decisions on the community;
- There is satisfying and rewarding work and a vibrant local economy that does not damage the environment;
- Access to good food, water, housing and fuel, at a reasonable cost, is available to everyone;
- Pollution is reduced to levels which don't damage natural systems or adversely affect the Earth's climate.

### **A5.4 Climate Change/Energy**

Hillingdon is currently developing an integrated Climate Change Strategy. This will contain an inventory of all current Green House Gas emissions within the borough, a challenging emissions reduction target and an action plan to achieve this. Emission reductions will be achieved principally from the council's own activities, domestic housing, business & industry and transport.

This strategy will need to work closely with, and reflect the targets of, other corporate strategies. Relevant strategies include the Air Quality Strategy, the Home Energy Conservation Act Strategy and the LA21 Strategy.

It is anticipated that a draft will be completed for Autumn 2004.

### **A5.5 Health Improvement and Modernisation Plan (HIMP)**

As part of the national strategy for improving health, reducing inequalities and modernising services, each health authority is responsible for developing a Health Improvement and Modernisation Plan in collaboration with local partners. The Hillingdon Plan identified ten priority areas of which transport is a key area. Measures identified for air quality improvement include preparation of a borough transport strategy, supporting safer routes to school, adopting revised parking standards and policies and participating in traffic reduction measures across London, working together with the GLA, to reduce congestion and pollution. This has been replaced by the Hillingdon Local Delivery Plan, though objectives are similar.

### **A5.6 Interim Local Implementation Plan (ILIP) 2002/03**

The ILIP set out Hillingdon's view of its transport systems, the need for improvements to these systems and the funding that will be required for these changes to occur. The plan seeks to flag up the need to achieve progress in creating sustainable, integrated transport systems ensuring equality of treatment and social inclusion for everyone. Key areas for improvement are identified include:

- Road Traffic - increasing bus lanes where needed and increasing enforcement, develop parking policies for parking control on streets and restriction of parking at new developments, engaging with education to implement Safer Routes to school;
- Public Transport – working with a wide range of stakeholders to seek improvements to public transport including better quality of service, improving interchanges, provision of travel guides, support for the Tram along the Uxbridge Road Corridor;
- Walking – provision of high quality surfacing, taking into account the needs of the disabled, improving safety and security for walkers, especially at night;
- Motorcycling – maintenance of road surfaces to ensure safety, adequate training and provision of sufficient motorcycle parking;
- Safety – promotion of Safer Routes to School, investigation into the introduction of traffic calming and Home Zones in residential areas where appropriate;
- Infrastructure – surface improvements, design improvements and good maintenance schemes;
- Freight - involvement in the development of a West London Freight Quality Partnership;
- Heathrow Airport – opposition of further substantial growth to the Airport, work in partnership with stakeholders to develop more sustainable transport patterns around Heathrow including the Mayors consideration of congestion charging in the area

Information received to date suggests that these priorities will be carried through to the Borough Transport Strategy which is currently being developed (see Section A5.9).

### **A5.7 Community Plan**

The Community Plan sets out a vision of ensuring that Hillingdon is a pleasant and vibrant place in which to live and work, where every member of its communities has access to excellent services and the opportunity to fulfil their potential. This is to be achieved by focussing on the following areas:

- Improving health, housing and social care
- Safety
- Economic prosperity
- A cleaner and more pleasant place
- A borough where opportunities are open to all
- A borough of learning and culture.

The Community Plan links to the Air Quality Action Plan in a number of ways. For example, improvements to the transport system are common to a number of goals in both plans. The Community Plan goes beyond some others by providing specific targets, dates for attainment of those targets, and named contacts for implementation and monitoring.

### **A5.8 Environmental Services Group Service Plan 2003/06**

This plan stresses the importance of environment to the Council and residents (the latter as assessed through various consultation exercises). The Core purpose of the Environmental Services Group is described as:

*“...to protect people, places and the environment, and enhance the quality of life for local people.”*

The service is delivered through four divisions of the Council, Consumer Protection (which includes the Environmental Protection Unit), Planning and Transportation, Highways, and Business Services. Key service objectives of particular relevance to the air quality action plan are as follows:

- Make a difference to the Borough’s environment that residents recognise
- Implement safer routes to schools
- Various activities to improve waste management in the borough
- Improvements to road condition
- Implementation of the Borough’s Transport Strategy which will improve the borough’s transport network and accessibility
- Development of controlled parking schemes acceptable to local residents
- Consult on the Air Quality Action Plan
- Participate in the London Low Emission Zone feasibility study
- Improve Uxbridge and Hayes Town Centres.
- Review transport links in the Borough and lobby for improvements in the London Transport underground system.

### **A5.9 London Borough of Hillingdon – Draft Transport Strategy April 2004.**

This Strategy, due to be adopted during 2004, has been developed along similar lines to the current air quality action plan document. The Strategy places great emphasis on promoting sustainability in the Borough through alternative modes of transport and through recognition of the key linkages between transport and the environment, land use planning, health, social and economic factors. It is organised into the following sections:

- Sustainable environment
- Road users
- Public transport
- Walking
- Cycling
- Mobility, access and social inclusion
- Travel Awareness and Safety
- Road Safety and Education

A key challenge in delivering the Strategy will be the successful balancing of priorities in each of these areas. Inspection of the measures included in the Draft Transport Strategy shows strong consistency with the measures identified for the Air Quality Action Plan.

### **A5.10 Summary**

It would clearly be wrong to develop air quality policy in Hillingdon independently of the policies listed above. To do so would ignore the fact that joined-up policy making offers substantial benefits in terms of cost-effectiveness. For this reason the recommendations made in these plans have been considered in development of the air quality action plan, and the impacts of options for air quality improvement on transport, noise and climate change (amongst other issues) are considered in the discussion of options that follows in later chapters of this action plan.

## Appendix 6: Evaluation of Air Quality Impacts of Abatement Measures

### A6.1 Estimating Impacts of Measures on Emissions

Table A6.1 provides a breakdown of emission sources in Hillingdon by sector. Values in the table are derived from source apportionment work reported in the main text and the latest version of the London Atmospheric Emissions Inventory, which was used in predicting the air quality in 2005.

**Table A6.1. Sector breakdown of annual NO<sub>x</sub> emissions in 2005 within the London Borough of Hillingdon. Values rounded to nearest 5 tonnes/year.**

Sector	Emission (tonnes/year)	% of total
Domestic combustion	320	5.0%
Commercial & small industrial combustion	165	2.6%
Council heating <sup>1</sup>	15	0.2%
Non-council public heating <sup>1</sup>	15	0.2%
Regulated Industry <sup>2</sup>	215	3.3%
Airport on-site activities <sup>3</sup>	3750	58.2%
Public transport <sup>4</sup>	515	8.0%
Road transport - HGVs	605	9.4%
Road transport - LDVs	145	2.3%
Road transport - Cars	645	10.0%
Road transport - Council fleet <sup>5</sup>	30	0.5%
Road transport sub-total	1690	26.2%
Other	20	0.3%
<b>Total<sup>6</sup></b>	<b>6440</b>	

#### Notes:

1. It is assumed that emissions from boilers up to 2MW can be attributed to council and other public service heating activities.
2. Part A and Part B regulated processes.
3. Including airborne aircraft, taxiing & holding, heating and on-site traffic, car parks and taxis.
4. Buses & coaches (227 tonnes/year), taxis (17 tonnes/year) and rail (250 tonnes/year)
5. Assumed to be 15 tonnes/year each from the total HGV and LDV totals

For each abatement measure, the percentage share of the relevant sector from the data in Table A6.1 was identified. For example, a shift to zero-emission cars would change the estimated 645 tonnes/year emissions from cars, approximately 10% of the total NO<sub>x</sub> emission or 40% of total road transport emissions. This puts a ceiling on the total benefit attributable to any measure.

The impact of each measure in terms of change in emission was estimated. This value is necessarily subjective since data on the real impact at a representative geographical location is not available in many cases. However,

based on expert judgement and the limited data in the literature it is possible to derive a rough estimate of the potential impact of a measure were it to be fully implemented. The reduction attributable to any measure is clearly a function of the degree to which it is implemented, which can be extremely variable. For the example given above, a 10% shift towards zero emission cars would be significant and would represent an overall emission reduction of 1% or a reduction in road transport emissions of 4%. A 1% shift to zero emission cars would obviously have a proportionally smaller impact.

## A6.2 Converting Reductions in Emissions to Air Quality Improvements

Depending on source characteristics, location of receptors and meteorology, different emission sources contribute to ambient NO<sub>x</sub> concentrations to a varying extent. To illustrate this, Table A6.2 presents the contribution of different sources to predicted ambient NO<sub>x</sub> concentrations at two relevant locations, one close to Heathrow airport and one at the northern boundary of the AQMA close to the A40.

**Table A6.2. Sector breakdown of annual mean NO<sub>x</sub> concentration in 2005 at two illustrative receptor locations within LB Hillingdon.**

Location	Close to Heathrow boundary ( $\mu\text{g.m}^{-3}$ )	Close to major road A40 ( $\mu\text{g.m}^{-3}$ )
Background	15.3	15.3
Major roads	21.8	28.7
Industry	3.6	2.7
Airport	29.7	3.9
Other	9.3	12
<b>Total</b>	<b>79.7</b>	<b>62.6</b>

These values indicate that the airport emissions contribute significantly to predicted ambient NO<sub>x</sub> concentrations in the southern part of the AQMA but much less so in the northern part. Emissions from traffic on major roads are significant at all locations close to this type of source. Contributions from background and 'other' (which includes traffic on minor roads) will also be significant though not dominant throughout the AQMA.

From the predicted ambient NO<sub>x</sub> concentrations listed in Table A6.2 it may be calculated that a reduction in road transport emissions of 4% (again taking the illustrative figures for zero emission vehicles discussed above) is equivalent to an ambient NO<sub>x</sub> reduction in the range 0.8-1.2  $\mu\text{g.m}^{-3}$  depending on location. An emissions reduction at Heathrow airport would result in a wider range than the example given since the impact of airport emissions is much smaller at the northern end of the AQMA (As shown in Table A6.2).

### A6.3 Converting Reductions in NO<sub>x</sub> Improvements in NO<sub>2</sub>

The relationship between NO<sub>x</sub> and NO<sub>2</sub> concentrations is complex, but one that has been simplified by approaches such as that developed by Derwent and Middleton who derived an equation describing the relationship by comparison of recorded hourly mean NO<sub>x</sub> and NO<sub>2</sub> concentrations at a given location. Such relationships are location specific but data from many UK sites representing a variety of situations (i.e. background, roadside, etc.) have been collated and a best-fit equation describing a generalised annual mean NO<sub>x</sub>:NO<sub>2</sub> relationship has been published (Pratt and Dalton 2000). This relationship is appropriate for use in the context of evaluating the effects on NO<sub>2</sub> from NO<sub>x</sub> emissions reductions in the Hillingdon AQMA.

Analysis has shown that the annual mean NO<sub>2</sub> concentration in 2005 is predicted to vary between 52-32  $\mu\text{g.m}^{-3}$  across the AQMA. Table A6.3 lists NO<sub>2</sub> concentrations across this range, the equivalent total NO<sub>x</sub> concentration (based on the generalised annual mean NO<sub>x</sub>:NO<sub>2</sub> relationship) and, hence, the change in NO<sub>2</sub> concentration per 10  $\mu\text{g.m}^{-3}$  reduction in NO<sub>x</sub>.

**Table A6.3. Converting NO<sub>x</sub> to NO<sub>2</sub>**

Total NO <sub>x</sub> concentration	Corresponding total NO <sub>2</sub> concentration	Derived change in NO <sub>2</sub> per 10 $\mu\text{g.m}^{-3}$ of NO <sub>x</sub>
130	52.3	-
120	50.3	-2.1
110	48.1	-2.2
100	45.7	-2.3
90	43.2	-2.5
80	40.5	-2.7
70	37.5	-3.0
60	34.3	-3.3
50	30.6	-3.6

Accordingly, for the emission reduction example given, the ambient NO<sub>x</sub> reduction in the range 0.8-1.2  $\mu\text{g.m}^{-3}$  is equivalent to an NO<sub>2</sub> reduction of the order of 0.2-0.3  $\mu\text{g.m}^{-3}$  across the AQMA.

It is recognised that there is significant uncertainty in results obtained by this approach. The key uncertainty lies in placing a value on the effect on emissions of any given reduction option for which good data are elusive. However, overall the approach is one that derives, to a reasonable approximation, a range of NO<sub>2</sub> improvement due to an emissions reduction.

## Appendix 7: Planning Application Form

Address of Planning Application:

Is it within the AQMA: Yes/No

Is it within an area of exceedance within the AQMA: Yes/No

Nature of Application:  
(e.g. warehouse/residential/hotel etc)

Potential for emissions to air:  
(e.g. increase in traffic by X%, space heating, increase in HGVs)

Quantification of emissions to air:  
(e.g. details from air quality assessment submitted i.e. X% or Xug/m3 increases in NOx emissions and X% or Xug/m3 increases NO2 and PM10 concentrations)

